KEYPAD MENU ITEMS AND PARAMETERS

NOTE: SR44 soft starters have been discontinued. Please consider SR55 soft starters as a replacements.

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KEYPAD MENU ITEMS AND PARAMETERS

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NOTE: SR44 soft starters have been discontinued. Please consider SR55 soft starters as a replacements.

5.0 – How to Use This Chapter

SR44 Soft Starters have two basic types of settings that can be changed and/or viewed by users.

- Keypad Menu Items:
  These settings have no numerical address, and can be accessed only through a keypad.
- Parameters:
  These settings have numerical parameter numbers and numerical addresses, and they can be accessed through a keypad or by serial communications.
  (Optional accessories are required for serial communications; refer to the "Accessories" chapter.)

5.0.1 – How Keypad Menu Items and Parameters are Arranged in this Chapter

1) Keypad Menu Structure – Abbreviated Map of Keypad Structure

This section contains a one-page flow chart that shows an abbreviated 'map' of the keypad layout, and how to scroll through the keypad to access the Keypad Menu Items and Parameters.

2) Keypad Menu Structure – Complete Keypad Menu Structure

This section contains tables that list all of the Keypad Menu Items and Parameters arranged in the same groups and sequential order as they can be accessed through a keypad menu.

3) Parameter Basic Information

This section contains tables that list and briefly describe all of the Parameters. They are listed in their numerical sequence, which is the same sequence as they can be accessed through the 'Parameters' menu of the keypad. (Some of the parameters may be accessed alternately through some of the other menu groups of the keypad.)

4) Menu Settings and Parameter Descriptions

This section contains detailed descriptions of all of the available Menu Items and Parameters. These items are presented in the same groups and sequential order as they can be accessed through a keypad menu.

Some of the Parameters can be accessed through non-parameter menu groups, and they are listed in the same sequence as they can be accessed through those groups, regardless of their numerical order.

All of the Parameters can be accessed through the 'Parameters' menu group in numerical sequence. Therefore, they are listed in the 'Parameters' menu group in numerical order.

5.1 – Configuring the SR44 Soft Starter

5.1.1 – General Configuration Information

WARNING: The owner, installer, and user are responsible for the correct installation and use of the SR44, and must ensure that only qualified personnel install the SR44. The owner, installer, and user must ensure that the installation, operation and maintenance of the SR44 complies with the relevant Codes of Practice, Regulations, and Statutory Requirements. The Manufacturer or his agent do not assume any liability, expressed or implied, for any consequence resulting from inappropriate, negligent, or incorrect installation, application, use or adjustment of the product or circuit design, or from the mismatch of the SR44 to a motor. To prevent an electrical shock hazard, the SR44 must be properly connected to a safety ground. The SR44 is not designed for use in hazardous areas. Use in such an area may invalidate the hazardous area certification.

Firmware Versions

This manual applies to all versions of SR44 firmware.

Useful Information

Additional useful quick-start information can be found in the following document which is available on our website, www.automationdirect.com:

- Stellar SR44 Soft Starter Basic Quick-start Guide.

Conventions

The following typographical conventions are used in this programming chapter of this user manual:

1. Characters that are quoted directly from the SR44 display are quoted within single quote marks. This includes:
   Menu names: 'Basic';
   Parameter names: 'Start Time';
   Parameter values: '5 Seconds';
   Status information: 'Stopped and ready'.
2. Buttons on the keypad to be pressed by the user will be indicated by their name, ENTER, in all capital letters, or by the appropriate symbol. Thus, ▼ indicates the decrement, or move down button.

Quick Start

Once the unit is mounted and wired per the instructions in the "Stellar SR44 Soft Starter Basic Quick-start Guide", or in the "Mechanical Installation" and "Electrical Installation" chapters of this User Manual, then select a suitable application from the "Applications Menu" described later in this chapter (5.2.2 & 5.4.2). The unit can then be started with the keypad. This will give a good basic setup, but fine tuning will be required in some instances.

We highly recommend that you configure the SR44 by first selecting and setting an application from the "Applications" menu that is similar to your application. If necessary, you can then 'fine-tune' your configuration by changing the settings of other parameters and menu items.

5.1.2 – User Interface

The Keypads

There are three types of user interface for use with the SR44
(Only one interface may be used at any one time.):

- The unit's built-in keypad (Figure 5.1.2a),
- An optional remote keypad (Figure 5.1.2b and "Optional Hardware" chapter),
- Optional Modbus communications ("Modbus Protocol" & "Optional Hardware" chapters).

All parameters that control the operation of the SR44 Soft Starter can be accessed via the interfaces. Parameters and their values are shown on the interface display, and any changes to parameter values are affected by using the buttons on the interface. The interface has three basic modes of operation:

- System Status Mode
- Menu Navigation Mode
- Data Entry Mode

Explanation of the modes mentioned above can be found in sections 5.2.3, 5.2.4, and 5.2.5.

Figure 5.1.2a: Keypad

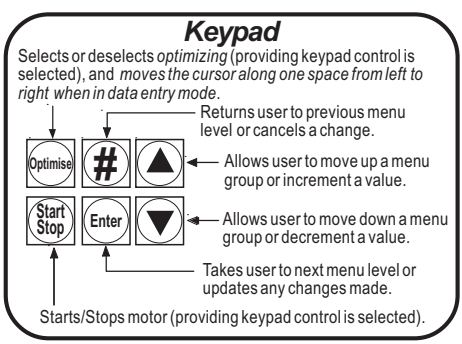
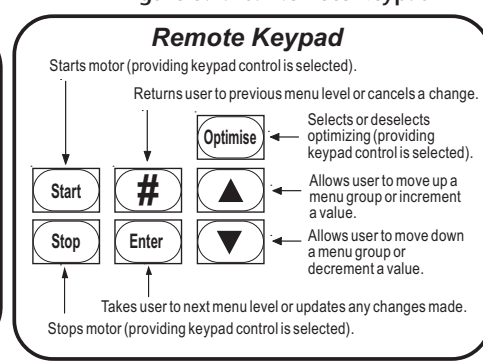


Figure 5.1.2b: Remote Keypad



Menu Structure

The menu structure of the user interface gives the operators two main routes by which they can change the operation of the SR44; the text based menus or the number based parameter list. The Menu Items and Parameters which are most commonly used by operators are shown and described in section 5.2 "Keypad Menu Structure". Section 5.3 "Parameter Basic Information" shows basic information for the Parameters, and section 5.4 "Menu Settings and Parameter Descriptions" provides more detailed information on both Menu Items and Parameters.

5.1.3 – System Status Mode

Following the initial boot-up report (see section 5.1.9), the unit enters the Status Mode. In this mode the operating status of the unit is constantly displayed, resulting in a number of status messages:

Non-Running Status

Two messages indicate that the unit is not running the load at present. 'Stopped and Ready' indicates the unit is enabled, and 'Starter Disabled' indicates that the unit is disabled. (See Appendix A.1.2).

Fault number Fault description

This message indicates that a fault has occurred, giving the fault number and a short fault description such as '#1 Phase Loss'. The second line of the message tells the user to reset the unit with the # key.

Temporary Comms Status Errors

These messages, ('CRC Error', 'Slave Busy', 'Illegal Address', and 'Illegal Function') tell the user when there has been a Modbus Comms Error. (See the Modbus chapter for more details.)

Running Status

This message indicates which running mode the unit is in either, 'Starting', 'Full Volts', or 'Optimizing'. The second line of the message gives a current indication in Amps. If an overload condition exists, then a bar graph indicating the state of overload integration will be shown across both lines on the right hand side of the display.

5.1.4 – Menu Navigation Mode

The Menu Navigation Mode is entered as soon as the ENTER button is pressed in the System Status Mode. In this mode, the user can navigate through all levels of the menu structure using the relevant buttons on the keypad. (See Figures 5.1.2a & 5.1.2b).

5.1.5 – Data Entry Mode

The Data Entry Mode is entered as soon as the bottom level of the menu structure for that particular menu branch is reached, i.e., a menu item or parameter name is displayed in the top line of the keypad display, and the associated value is displayed in the bottom line of the display. Not all parameter values can be changed by the user, as some are read-only.

A user can tell whether the menu item or parameter is writeable, as there will be a flashing cursor present on the bottom line of the display if writing is permitted. Writeable values may be changed by using the Up and Down keys (for a numerical value), or by pressing ENTER (for a change in a logic value). In the first case (a numerical value), the ENTER key must be pressed to confirm the changed value. The user interface display will flash once to confirm the change.

To keep Menu Item and Parameter setting changes, they must be permanently saved using the 'Permanent Store' menu. (See section A.1.5 for more information.)

5.1.6 – Changing Parameter Values

All parameters can be read by the user, and some parameters can also be written to by the user. The full list of parameters and their values can be found in the Parameter Menu and subsequent sub-menus. The most commonly read and written to parameters can also be found under the other Level 1 (see Figure 5.2.1) menus such as 'Basic' and 'Applications'. A simple example of how to view and change a parameter value is given in Appendix A.1.3.

To keep Menu Item and Parameter setting changes, they must be permanently saved using the 'Permanent Store' menu. (See section A.1.5 for more information.)

5.1.7 – Soft Starter Data Types

There are basically four types of data held in parameters: Analog, Multiple, Percentile, and Bit data. Their definitions are given below:

Analog Data

One of a range of values between two extremes (usually 0–255, 0–50 or 0–10) that represent units such as Volts, Amps, seconds, etc. For example: 'Start Time' ('Stopped & ready' --> 'Basic' --> 'Start Time') would be set at 5 seconds by default, but can be set to a maximum of 255 seconds.

Multiple Data

A multiple of an absolute quantity. For example: the running current displayed by the unit is a multiple of the value of the unit's 'Rated Current' (e.g. 1.0 x 'Rated Current' to 8.0 x 'Rated Current'). Note that the unit's 'Rated Current' normally approximates the motor or load Full Load Current.

Percentile Data

Percentage value of an absolute quantity, ranging from 0–100%. For example: the 'Kick Pedestal' ('Stopped & ready' --> 'Advanced' --> 'Kick Pedestal') is the percentage of supply voltage applied to the unit during an optional start-up kick.

Bit Data

This represents the selection or non-selection, turning 'On' or turning 'Off' of whichever bit parameter is in question.

5.1.8 – Bit Masks

Some parameters can also be addressed via the appropriate Bit Parameter, instead of or as well as being accessed via the more commonly used menus. These Bit Parameters can only be accessed by the 'Parameters' menu, i.e., the menu path for the Auto Config Bit Parameter would be: 'Stopped & ready' --> 'Parameters' --> 'P1 to P20' --> 'P18 Auto Config'. The user would then see a display similar to the one below:

Parameter Name:	**P18 Auto Config**
Bit Data:	**0000011<u>0</u> Flags**
Bit Number:	7_ _ _ _ _ _0

Note: Only the text shown in the shaded box would actually be displayed by the user interface.

A cursor would be flashing at the character on the display which represents the Least Significant Bit (LSB, also known as bit 0, i.e., the 0 or 1 on the right hand side of the eight 0's and/or 1's). This character is actually underlined for clarity in the example above.

The cursor represents the user's current input point, and the value of the bit highlighted by the cursor can now be changed. To move the cursor one place to the left, the user needs to press the OPTIMISE key, and the user will then be able to edit bit 1. Pressing the OPTIMISE key repeatedly will continue to move the cursor one place to the left until bit 7, or the Most Significant Bit (MSB; the 0 or 1 on the left of the eight 0's and/or 1's) is reached, after which pressing the OPTIMISE button again will wrap the cursor around to bit 0.

To continue with the example, let us suppose that the user wishes to enable the 'Auto Pedestal' (bit 7) and disable the 'Auto Bypass' (bit 2). The user should first press the OPTIMISE button twice to move the cursor two places to the left to bit 2. Then to change the value of bit 2 from "1" to "0", the user would simply press the ▼ key once. To move the cursor to the 'Auto Pedestal' bit (bit 7), the user would now press the OPTIMISE button five times. Then to turn on the 'Auto Pedestal' bit, just pressing the ▲ key once will change the bit to the required value. To confirm the changes made, the user would then press the ENTER button. Not pressing ENTER would effectively cancel the changes made by the user.

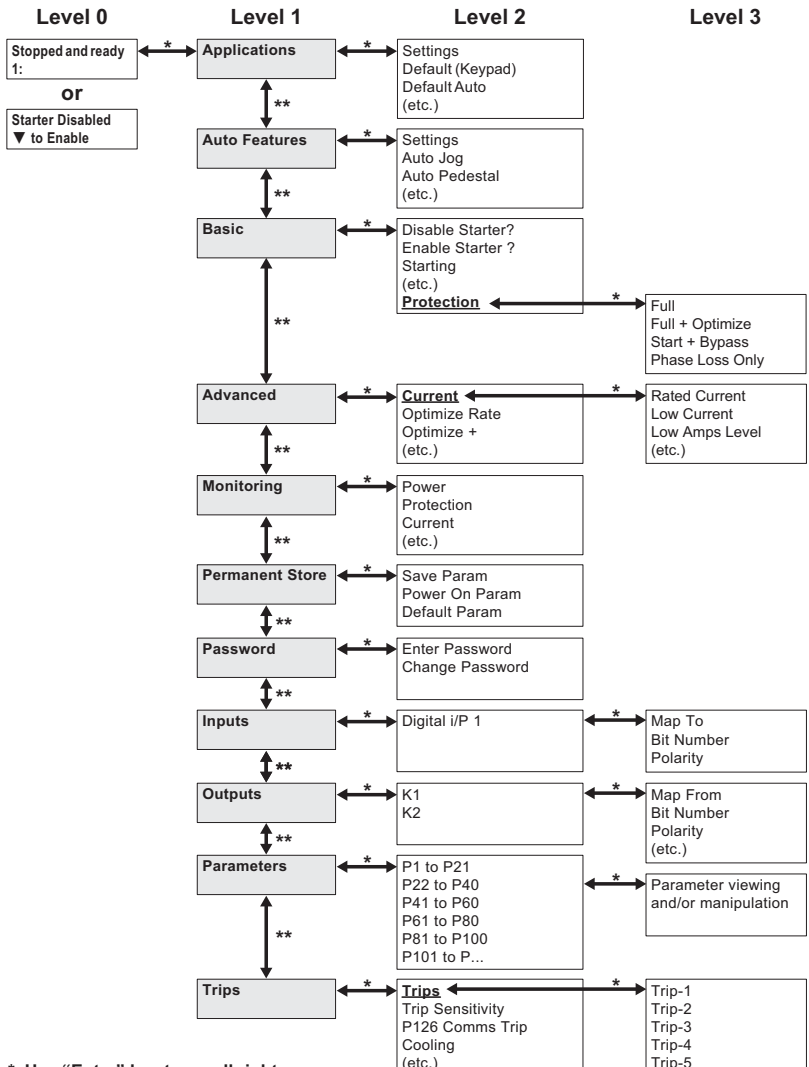
5.1.9 – Keypad Boot-up Messages

When the control supply to the SR44 is switched on, the user interface will go through a boot-up procedure during which it will display some information relevant to the SR44's current state. The messages are displayed during the boot-up procedure in the order that they are listed below. (A brief explanation of each message is included.)

'V1.069LM 10/12/16'	This message shows the keypad firmware version number and release date (date displayed in European format; YY/MM/DD).
'1 Find Starter'	This message indicates that the keypad is looking for a Soft Starter, starting with a station number of "1". If it is unable to find a starter with that station number, it will move on to station number 2, etc., until 32, (the highest valid station number) is reached. See section 5.3.4 for further details.
'Password is Set'	This message appears if the password has been set.
'Stopped & ready 1:'	'Stopped and ready' is displayed after the end of a successful boot-up procedure. The number on the second line is the station number of the unit that the keypad is currently talking to.

5.2 – Keypad Menu Structure

5.2.1 – Abbreviated Map of Keypad Structure



*** Use "Enter" key to scroll right**
Use "#" key to scroll left

**** Use "▲" & "▼" keys to scroll up & down**

5.2.2 – Complete Keypad Menu Structure

We highly recommend that you configure the SR44 by first selecting and setting an application from the "Applications" menu that is similar to your application. If necessary, you can then 'fine-tune' your configuration by changing the settings of other parameters and menu items.

To keep Menu Item and Parameter setting changes, they must be permanently saved using the 'Permanent Store' menu. (See section A.1.5 for more information.)

Keypad Menu Structure						
	Horizontal Keypad Scrolling: Enter key = right (forward); # key = left (back)					
Vertical Keypad Scrolling: Down Arrow key = down; Up Arrow key = up	Level 0	Level 1	Level 2	Parameter / Bit #	Level 3	Parameter / Bit #
	Stopped and Ready 1: –or– Starter Disabled 1: ▼ to Enable	Applications	Settings		n/a	
			Default (Keypad)			
			Default Auto			
			Small Pump			
			Large Pump			
			Conveyor			
			Low Inertia Fan			
			Hi Inertia Fan			
			Recip Compressor			
			Screw Compressor			
			Rotry Compressor			
			Crusher			
			Grinder			
			Hi Torque Start			
			Motor Gen Set			
			aerator			
			Flywheel / Press			
			Moulder			
		Auto Features	Settings	P18	n/a	
			Auto Jog (On/Off)	P18 / B3		
			Auto Pedestal (On/Off)	P18 / B7		
			Auto End Start (On/Off)	P18 / B6		
			Auto Stop (On/Off)	P18 / B5		
			Auto End Stop (On/Off)	P18 / B4		
			Auto Bypass (On/Off)	P18 / B2		
			Auto 3MC (On/Off)	P18 / B1		
			Auto Ramp (On/Off)	P18 / B0		
			Auto All (On/Off)			
			P122 Stop Smoothing (On/Off)	P121 / B2		

Table continued next page.

5.2.2 – Complete Keypad Menu Structure (continued)

Keypad Menu Structure (continued)						
	Horizontal Keypad Scrolling: Enter key = right (forward); # key = left (back)					
Vertical Keypad Scrolling: Down Arrow key = down; Up Arrow key = up	Level 0	Level 1	Level 2	Parameter / Bit #	Level 3	Parameter / Bit #
	Stopped and Ready 1: –or– Starter Disabled 1: ▼ to Enable	Basic	Disable Starter? / Enable Starter?	P52 / B1&B2	n/a	
			Starting (Keypad/Remote)	P51 / B7		
			Start Pedestal (20%)	P11		
			Start Time (5s)	P12		
			Stop Pedestal (10%)	P16		
			Stop Time (0s)	P17		
			Current Limit (3.5xI_e)	P30		
			Protection	P7	Full	P7 / B6
					Full + Optimise	P7 / B6 & B7
					Start + Bypass	P7 / B7
					Phase Loss Only	P7 / B0

Table continued next page.

5.2.2 – Complete Keypad Menu Structure (continued)

Keypad Menu Structure (continued)						
	Horizontal Keypad Scrolling: Enter key = right (forward); # key = left (back)					
Vertical Keypad Scrolling: Down Arrow key = down; Up Arrow key = up	Level 0	Level 1	Level 2	Parameter / Bit #	Level 3	Parameter / Bit #
	Stopped and Ready 1: –or– Starter Disabled 1: ▼ to Enable	Advanced	Current		Rated Current (I_e)	P24 & P25
					Low Current (On/Off)	P51 / B4
					Low Amps Level (0.1xFLC)	P28
					Low Amps Time (50 cycles)	P29
					C/L Time Out (On/Off)	P51 / B1
					Current Limit (3.5xI_e)	P30
					Limit Time Out (30s)	P31
					Shearpin (On/Off)	P51 / B3
					Shearpin Level (3.125xI_e)	P32
					Shearpin Time (100 cycles)	P33
					Overload Level (1.1xI_e)	P34
					Overload Delay (140)	P35
			Optimise Rate (5)	P19	n/a	
			Optimise + (On/Off)	P121 / B4		
			Kickstart (On/Off)	P51 / B0		
			Kick Pedestal (75%)	P13		
			Kick Time (25 cycles)	P14		
			Dwell Time (5s)	P15		
			Low Volts Stop (On/Off)	P52 / B0		
			Contactor Delay (160ms)	P71		
			Trip Sensitivity (1)	P72		
			Station Number (1)	P1		
			Firing Mode (0)	P6		
			P122 Stop Smoothing (5)	P122		
			Cooling (On/Off)	P53 / B5		
			Cooling Time (-)	P116		
			Temp/Alt Derate (0%)	P123		
			Line Contactor (On/Off)	P121 / B3		
			Thermistor Trip [not available]	P51 / B5		
			P126 Comms Trip (On/Off)	P126		
			P109 Upper Limit (12)	P109		
			P110 Lower Limit (10)	P110		

Table continued next page.

5.2.2 – Complete Keypad Menu Structure (continued)

Keypad Menu Structure (continued)								
	Horizontal Keypad Scrolling: Enter key = right (forward); # key = left (back)							
Vertical Keypad Scrolling: Down Arrow key = down; Up Arrow key = up	Level 0	Level 1	Level 2	Parameter / Bit #	Level 3	Parameter / Bit #		
	Stopped and Ready 1: –or– Starter Disabled 1: ▼ to Enable	Monitoring	Power		n/a			
			Protection (full + optimise)	P7				
			Current	P26				
			P27 Peak Start	P27				
			P40 Supply Volts	P40				
			Real PF	P39				
			P22 Delay Angle	P22				
			P23 Max Angle	P23				
			P20 Reference PF	P20				
			P21 Internal PF	P21				
		Permanent Store	Save Param		n/a			
			Power On Param					
			Default Param					
		Password	**Enter Password**	P5	n/a			
			Change Password					
		Inputs	Digital I/p 1		Map to	P65	52 Parameter	
					Bit Number	P66	0001 0000 Mask	
					Polarity	P54 / B4	Positive Logic	Inverse Logic

Table continued next page.

5.2.2 – Complete Keypad Menu Structure (continued)

Keypad Menu Structure (continued)						
Horizontal Keypad Scrolling: Enter key = right (forward); # key = left (back)						
Vertical Keypad Scrolling: Down Arrow key = down; Up Arrow key = up	Level 0	Level 1	Level 2	Parameter / Bit #	Level 3	Parameter / Bit #
	Stopped and Ready 1: –or– Starter Disabled 1: ▼ to Enable	Outputs	K1		Map From	P57
					Bit Number	P58
					Polarity	P54 / B0
					K = Run Relay	
					K = Bypass Relay	
					K = Alarm	
					K = Current Limiting	
					K = Ovld Integrating	
					K = Stall	
					K = Cooling	
					K = Enable Status	
					K = I/P1	
					K = 60Hz	
					K = Shearpin	
					K = Undercurrent	
					K = C/L Timeout	
					K = Thermistor [not available]	
					K = Overload	
					K = Thermal Switch	
			K2		Map From	P59
					Bit Number	P60
					Polarity	P54 / B1
					K = Run Relay	
					K = Bypass Relay	
					K = Alarm	
					K = Current Limiting	
					K = Ovld Integrating	
					K = Stall	
					K = Cooling	
					K = Enable Status	
					K = I/P1	
					K = 60Hz	
					K = RYB (phase sequence ABC)	
					K = Shearpin	
					K = Undercurrent	
					K = C/L Timeout	
					K = Thermistor [not available]	
					K = Overload	
					K = Thermal Switch	

	52 Parameter
	0010 0000 Mask
	Positive Logic | Inverse Logic
	Note: The "K" selection in Level 3 loads P57 & P58 with the appropriate values to configure the K1 output relay to perform the described function. A simpler way to configure the relay. (Choose only one function.)
	8 Parameter
	0000 1000 Mask
	Positive Logic | Inverse Logic
	Note: The "K" selection in Level 3 loads P59 & P60 with the appropriate values to configure the K2 output relay to perform the described function. A simpler way to configure the relay. (Choose only one function.)

Table continued next page.

5.2.2 – Complete Keypad Menu Structure (continued)

Keypad Menu Structure (continued)							
	Horizontal Keypad Scrolling: Enter key = right (forward); # key = left (back)						
Vertical Keypad Scrolling: Down Arrow key = down; Up Arrow key = up	Level 0	Level 1	Level 2	Parameter / Bit #	Level 3	Parameter / Bit #	
	Stopped and Ready 1: –or– Starter Disabled 1: ▼ to Enable	Parameters	P1 to P21		See the "Parameter Descriptions" section and table for parameter descriptions as they appear on the keypad.		
			P22 to P40				
			P41 to P60				
			P61 to P80				
			P81 to P100				
			P101 to P...				
		Trips	Trips		Trip-1	P73	(Last Trip)
					Trip-2	P74	(2nd Last Trip)
					Trip-3	P75	(3rd Last Trip)
					Trip-4	P76	(4th Last Trip)
					Trip-5	P77	(5th Last Trip)
			Trip Sensitivity (1)	P72	n/a		
			P126 Comms Trip (On/Off)	P126			
			Cooling (On/Off)	P53 / B5			
			Thermistor Trip [not available]	P51 / B5			
			C/L Time Out (On/Off)	P51 / B1			
			Low Current (On/Off)	P51 / B4			
			Shearpin (On/Off)	P51 / B3			
			Overload (On/Off)	P51 / B2			
			Sensing Signal (On/Off)	P127 / B7			
			User - OK	P53 / B3			

5.3 – Parameter Basic Information

- **The parameters are accessed through the "Parameters" menu in Level 1 of the Keypad Menu Structure.**
- **For SR44s with optional communcations accessories, the parameters can also be accessed through Modbus addressing, as described in the "Serial Communications" chapter.**
- **Scaling applies ONLY when using serial commuication, as described in the "Serial Communications" chapter.**

Parameter Basic Information

Parameter Number	Parameter Bit #s	Default	Maximum	Minimum	Units	Type *	Scaling **	Name / Function	User Setting
0	–	0	255	0	none	R	1	dummy parameter	
1	–	1	32	1	none	R/W	1	Station No	
2	–	44	255	1	none	R/W	1	Language	
3	–	5	56	5	none	R	1	Program Type	
4	–	11	255	0	none	R	1	Software Ver	
5	–	0	255	0	none	R/W	1	**Password**	
6	–	0	1	0	none	R/W	1	Firing Mode	
7	–	192	192	0	none	R/W	1	Protection	
8	–	0	255	0	flags	R	1	Status 1	
	0 (1)	0	1	0	–			Stopped	
	1 (2)	0						Starting	
	2 (4)	0						Current Limit	
	3 (8)	0						Top of Ramp	
	4 (16)	0						Dwell	
	5 (32)	0						Full Conduction	
	6 (64)	0						Energy Saving	
	7 (128)	0						Stopping	
9	–	0	99	0	flags	R	1	Status 2	
	0 (1)	0	1	0	–			Alarm	
	1 (2)	0						Overload Integrating	
	2 (4)	0						Stall	
	3 (8)	0						Forced Override	
	4 (16)	0						Noise	
	5 (32)	0						Inhibit Start	
	6 (64)	0						DC I/p Level Reached	
	7 (128)	0						Reserved	

** Type: R = Read Only; R/W = Read/Write*

*** Scaling applies ONLY when using serial commuication; details in "Serial Communications" chapter.*

Table continued next page.

5.3 – Parameter Basic Information (continued)

Parameter Basic Information (continued)									
Parameter Number	Parameter Bit #s	Default	Max Value	Min Value	Units	Type *	Scaling **	Name / Function	User Setting
10	–	0	255	0	flags	R	1	Status 3	
	0 (1)	0	1	0	–			Relay K1 Status	
	1 (2)	0						Relay K2 Status	
	2 (4)	0						(unused)	
	3 (8)	0						(unused)	
	4 (16)	0						Input 1 Status	
	5 (32)	0						(unused)	
	6 (64)	0						(unused)	
	7 (128)	0						(unused)	
11	–	20	60	10	%	R/W	1	Start Ped	
12	–	5	255	1	seconds	R/W	1	Start Time	
13	–	75	90	60	%	R/W	1	Kick Ped	
14	–	25	40	10	cycles	R/W	1	Kick Time	
15	–	5	255	1	seconds	R/W	1	Dwell Time	
16	–	10	60	10	%	R/W	1	Stop Ped	
17	–	0	255	0	seconds	R/W	1	Stop Time	
18	–	6	255	0	flags	R/W	1	Auto Config	
	0 (1)	0	1	0	–			Auto Ramp	
	1 (2)	1						Auto 3MC	
	2 (4)	1						Auto Bypass	
	3 (8)	0						Auto Jog	
	4 (16)	0						Auto end stop	
	5 (32)	0						Auto stop	
	6 (64)	0						Auto end start	
	7 (128)	0						Auto Pedestal	
19	–	5	30	4	none	R/W	1	Opt Rate	
20	–	146.76	146.76	0	degrees	R	0.57554	Reference PF	
21	–	146.76	146.76	0	degrees	R	0.57554	Internal PF	
22	–	146.76	146.76	0	degrees	R	0.57554	Delay Angle	
23	–	57.554	146.76	17.27	degrees	R	0.57554	Max Angle	

** Type: R = Read Only; R/W = Read/Write*

*** Scaling applies ONLY when using serial commuication; details in "Serial Communications" chapter.*

Table continued next page.

5.3 – Parameter Basic Information (continued)

Parameter Basic Information (continued)									
Parameter Number	Parameter Bit #s	Default	Max Value	Min Value	Units	Type *	Scaling **	Name / Function	User Setting
24	–	0	3000	0	amps	R/W	100	Reserved – Rated Amps (100s)	
25	–	5	99	1	amps	R/W	1	Reserved – Rated Amps	
26	–	0	7.9688	0	amps	R	0.03125	Current	
27	–	0	255	0	amps	R	1	Peak Start I	
28	–	0.0938	0.7813	0.031	x I_e	R/W	0.03125	Low I Level	
29	–	50	255	5	cycles	R/W	1	Low I Time	
30	–	3.5	7.9688	0.375	x I_e	R/W	0.03125	C/L Level	
31	–	30	255	5	seconds	R/W	1	C/L Time	
32	–	3.125	5	0.5	x I_e	R/W	0.03125	Shear Level	
33	–	100	255	5	cycles	R/W	1	Shear Time	
34	–	1.0938	1.25	0.5	x I_e	R/W	0.03125	Ovld Level	
35	–	140	140	10	none	R/W	1	Ovld Delay	
36	–	0	100	0	%	R	0.39216	% Overload	
37	–	–	–	–	–	–	–	Reserved	
38	–	0	255	0	flags	R/W	1	UserFlags 5 – Reserved	
	0 (1)	0	1	0	–			(Unused)	
	1 (2)	0						Reserved	
	2 (4)	0						Reserved	
	3 (8)	0						(Unused)	
	4 (16)	0						(Unused)	
	5 (32)	0						(Unused)	
	6 (64)	0						(Unused)	
	7 (128)	0						(Unused)	
39	–	0	127.5	0	degrees	R	0.5	PF Angle	
40	–	416	1000	108	volts	R	4	Supply Volts	
41	–	–	–	–	–	–	–	Reserved	
42	–	–	–	–	–	–	–	Reserved	
43	–	–	–	–	–	–	–	Reserved	
44	–	–	–	–	–	–	–	Reserved	
45	–	–	–	–	–	–	–	Reserved	
46	–	–	–	–	–	–	–	Reserved	
47	–	–	–	–	–	–	–	Reserved	
48	–	–	–	–	–	–	–	Reserved	
49	–	–	–	–	–	–	–	Reserved	
50	–	–	–	–	–	–	–	Reserved	

** Type: R = Read Only; R/W = Read/Write*

*** Scaling applies ONLY when using serial commuication; details in "Serial Communications" chapter.*

Table continued next page.

5.3 – Parameter Basic Information (continued)

Parameter Basic Information (continued)									
Parameter Number	Parameter Bit #s	Default	Max Value	Min Value	Units	Type *	Scaling **	Name / Function	User Setting
51	–	142	255	0	flags	R/W	1	User Flags 1	
	0 (1)	0	1	0	–			Kickstart	
	1 (2)	1						Current Limit Timeout Sel'd	
	2 (4)	1						Overload Selected	
	3 (8)	1						Shearpin Selected	
	4 (16)	0						Under Current Selected	
	5 (32)	0						Thermistor Selected [not available]	
	6 (64)	0						(Unused)	
	7 (128)	1						Terminal Starting	
52	–	0	255	0	flags	R/W	1	User Flags 2	
	0 (1)	0	1	0	–			Low Voltage Soft-Stop	
	1 (2)	0						Not Global Enable 1	
	2 (4)	0						Not Global Enable 2	
	3 (8)	0						Pod Start/Stop	
	4 (16)	0						Board Start/Stop	
	5 (32)	0						Main Contactor	
	6 (64)	0						Second Parm Set	
	7 (128)	0						Zero Start Time	
53	–	51	255	0	flags	R/W	1	User Flags 3	
	0 (1)	1	1	0	–			pf1 pol	
	1 (2)	1						pf2 pol	
	2 (4)	0						User Current Limit	
	3 (8)	0						User Trip	
	4 (16)	1						Invert Controller Input	
	5 (32)	1						Cooling (Inhibit Restart)	
	6 (64)	0						(Unused)	
	7 (128)	0						(Unused)	

** Type: R = Read Only; R/W = Read/Write*

*** Scaling applies ONLY when using serial commuication; details in "Serial Communications" chapter.*

Table continued next page.

5.3 – Parameter Basic Information (continued)

Parameter Basic Information (continued)									
Parameter Number	Parameter Bit #s	Default	Max Value	Min Value	Units	Type *	Scaling **	Name / Function	User Setting
54	–	255	255	0	flags	R/W	1	I/O Polarity	
	0 (1)	1	1	0	–			K1 Polarity	
	1 (2)	1						K2 Polarity	
	2 (4)	1						(Unused)	
	3 (8)	1						(Unused)	
	4 (16)	1						I/p 1 Polarity	
	5 (32)	1						(Unused)	
	6 (64)	1						(Unused)	
	7 (128)	1						(Unused)	
55	–	–	–	–	–	–	–	Reserved	
56	–	–	–	–	–	–	–	Reserved	
57	–	52	123	0	prmtr	R/W	1	K1 Map	
58	–	32	255	0	mask	R/W	1	K1 Bit Mask	
59	–	8	123	0	prmtr	R/W	1	K2 Map	
60	–	8	128	0	mask	R/W	1	K2 Bit Mask	
61	–	–	–	–	–	–	–	Reserved	
62	–	–	–	–	–	–	–	Reserved	
63	–	–	–	–	–	–	–	Reserved	
64	–	–	–	–	–	–	–	Reserved	
65	–	52	123	0	prmtr	R/W	1	i/p1 Map	
66	–	16	128	0	mask	R/W	1	i/p1 bit Msk	
67	–	–	–	–	–	–	–	Reserved	
68	–	–	–	–	–	–	–	Reserved	
69	–	–	–	–	–	–	–	Reserved	
70	–	–	–	–	–	–	–	Reserved	
71	–	160	800	100	ms	R/W	4	Cntactor Dly	
72	–	1	15	1	none	R/W	1	Trip Snstvty	
73	–	0	17	0	trips	R	1	Last Trip	
74	–	0	17	0	trips	R	1	2nd Last Trp	
75	–	0	17	0	trips	R	1	3rd Last Trp	
76	–	0	17	0	trips	R	1	4thLast Trp	
77	–	0	17	0	trips	R	1	5th Last Trp	

** Type: R = Read Only; R/W = Read/Write*

*** Scaling applies ONLY when using serial commuication; details in "Serial Communications" chapter.*

Table continued next page.

5.3 – Parameter Basic Information (continued)

Parameter Basic Information (continued)									
Parameter Number	Parameter Bit #s	Default	Max Value	Min Value	Units	Type *	Scaling **	Name / Function	User Setting
78	–	192	192	0	none	R/W	1	Protection 2	
79	–	50	60	10	%	R/W	1	Start Ped 2	
80	–	5	255	1	seconds	R/W	1	Start Time 2	
81	–	75	90	60	%	R/W	1	Kick Ped 2	
82	–	25	40	10	cycles	R/W	1	Kick Time 2	
83	–	5	255	1	seconds	R/W	1	Dwell Time 2	
84	–	10	60	10	%	R/W	1	Stop ped 2	
85	–	0	255	0	seconds	R/W	1	Stop Time 2	
86	–	6	255	0	flags	R/W	1	AutoConfig 2	
	0 (1)	0	1	0	–			Auto Ramp	
	1 (2)	1						Auto 3MC	
	2 (4)	1						Auto Bypass	
	3 (8)	0						Auto Jog	
	4 (16)	0						Auto Endstop	
	5 (32)	0						Auto Stop	
	6 (64)	0						Auto Endstart	
	7 (128)	0						Auto Pedestal	
87	–	0.125	0.7813	0	x I_e	R/W	0.03125	Low I 2	
88	–	50	255	5	cycles	R/W	1	Low I time 2	
89	–	4	7.9688	0.375	x I_e	R/W	0.03125	C/L 2	
90	–	15	255	5	seconds	R/W	1	C/L Time 2	
91	–	3	5	1.063	x I_e	R/W	0.03125	Shearpin 2	
92	–	50	255	5	cycles	R/W	1	Shear time 2	
93	–	1.0938	1.25	0.5	x I_e	R/W	0.03125	Ovld Level 2	
94	–	140	140	10	none	R/W	1	Ovld Delay 2	
95	–	134	255	0	flags	R/W	1	User Flags12	
	0 (1)	0	1	0	–			Kickstart 2	
	1 (2)	1						Current Limit Timeout Sel'd 2	
	2 (4)	1						Overload Selected 2	
	3 (8)	0						Shearpin Selected 2	
	4 (16)	0						Under Current Selected 2	
	5 (32)	0						Thermistor Selected 2 [not available]	
	6 (64)	0						(Unused)	
	7 (128)	1						Terminal Starting 2	

** Type: R = Read Only; R/W = Read/Write*

*** Scaling applies ONLY when using serial commuication; details in "Serial Communications" chapter.*

Table continued next page.

5.3 – Parameter Basic Information (continued)

Parameter Basic Information (continued)									
Parameter Number	Parameter Bit #s	Default	Max Value	Min Value	Units	Type *	Scaling **	Name / Function	User Setting
96	–	64	255	0	flags	R/W	1	User Flags22	
	0 (1)	0	1	0	–			Low Voltage Soft-Stop (2)	
	1 (2)	0						Not Global Enable 1 (2)	
	2 (4)	0						Not Global Enable 2 (2)	
	3 (8)	0						Pod Start/Stop (2)	
	4 (16)	0						Board Start/Stop (2)	
	5 (32)	0						Main Contactor (2)	
	6 (64)	1						Second Parm Set (2)	
	7 (128)	0						Zero Start Time (2)	
97	–	0	125	0	prmtr	R/W	1	U1 I/P srce	
98	–	0	128	0	mask	R/W	1	U1 I/P Mask	
99	–	0	125	0	prmtr	R/W	1	U1 O/P Dest	
100	–	0	255	0	mask	R/W	1	U1 O/P Mask	
101	–	0	125	0	prmtr	R/W	1	U2 I/P srce	
102	–	0	20	0	mask	R/W	1	U2 I/P Mask	
103	–	0	125	0	prmtr	R/W	1	U2 O/P Dest	
104	–	0	11	0	mask	R/W	1	U2 O/P Mask	
105	–	–	–	–	–	–	–	Reserved	
106	–	–	–	–	–	–	–	Reserved	
107	–	–	–	–	–	–	–	Reserved	
108	–	–	–	–	–	–	–	Reserved	
109	–	12	50	1	none	R/W	1	Bypass Upper Limit	
110	–	10	150	0	none	R/W	1	Bypass Lower Limit	
111	–	–	–	–	–	–	–	Reserved	
112	–	0	255	0	flags	R	1	Status 4	
	0 (1)	0	1	0	–			60 Hz	
	1 (2)	0						Phase Rotation Sequence	
	2 (4)	0						Shearpin	
	3 (8)	0						Under Current	
	4 (16)	0						Thermistor [not available]	
	5 (32)	0						Timeout	
	6 (64)	0						Overload	
	7 (128)	0						Thermal Switch	
113	–	–	–	–	–	–	–	Reserved	

** Type: R = Read Only; R/W = Read/Write*

*** Scaling applies ONLY when using serial commuication; details in "Serial Communications" chapter.*

Table continued next page.

5.3 – Parameter Basic Information (continued)

Parameter Basic Information (continued)									
Param. Number	Param. Bit #s	Default	Max Value	Min Value	Units	Type*	Scaling**	Name / Function	User Setting
114	–	0	100	0	none	R/W	1	StopProfile	
115	–	0	255	0	none	R/W	1	Last App	
116	–	0***	63.75	0	minutes	R/W	0.25	CoolingTime	
117	–	–	–	–	–	–	–	Reserved	
118	–	–	–	–	–	–	–	Reserved	
119	–	–	–	–	–	–	–	Reserved	
120	–	0	255	0	flags	R	1	Status 5	
	0 (1)	0	1	0	–			Over Temperature	
	1 (2)	0						Offline Command Fail	
	2 (4)	0						(unused)	
	3 (8)	0						Fan Status	
	4 (16)	0						(unused)	
	5 (32)	0						(unused)	
	6 (64)	0						(unused)	
	7 (128)	0						(unused)	
121	–	0	255	0	flags	R/W	1	UserFlags 4	
	0 (1)	0	1	0	–			Impact Load	
	1 (2)	0						(unused)	
	2 (4)	0						Auto Soft Stop Smoothing	
	3 (8)	0						Breaker Present (0 = Contactor; 1 = Breaker)	
	4 (16)	0						Optimise +	
	5 (32)	0						Quick Ramp Times	
	6 (64)	0						Two Stop Bits	
	7 (128)	0						Auto Stop (2)	
122	–	5	25	1	none	R/W	1	Stop Smooth	
123	–	0	50	0	%	R/W	1	Temp/Alt Derate	
124	–	0	255	0	none	R/W	1	Off-Line Command	
125	–	–	–	–	–	–	–	Reserved	
126	–	0	255	0	none	R/W	1	Comms Trip	
127	–	0	255	0	flags	R/W	1	Trip Flags	
	0 (1)	0	1	0	–			Trip 1 Enabled (Phase Loss)	
	1 (2)	0						Trip 8 Enabled (Motor Side Thyristor Loss)	
	2 (4)	0						Trip 9 Enabled (Thyristor Sensing Trip Type A)	
	3 (8)	0						Trip 10 Enabled (Thyristor Sensing Trip Type B)	
	4 (16)	0						Trip 4 Enabled (Thyristor Sensing Trip Type C)	
	5 (32)	0						Trip 5 Enabled (Edge Sensing Trip)	
	6 (64)	0						Trip 6 Enabled (Sensing Trip Type A)	
	7 (128)	0						Trip 7 Enabled (Sensing Trip Type B)	

** Type: R = Read Only; R/W = Read/Write*

*** Scaling applies ONLY when using serial commuication; details in "Serial Communications" chapter.*

**** P116 default value varies depending upon soft starter model size.*

5.4 – Menu Settings and Parameter Descriptions

This section gives a description of the individual menus and the functions that their parameters perform.

- **Menu Settings and Parameters are presented in the same groups and sequence as they appear in the Keypad Menu Structure.**

We highly recommend that you configure the SR44 by first selecting and setting an application from the "Applications" menu that is similar to your application. If necessary, you can then 'fine-tune' your configuration by changing the settings of other parameters and menu items.

To keep Menu Item and Parameter setting changes, they must be permanently saved using the 'Permanent Store' menu. (See section A.1.5 for more information.)

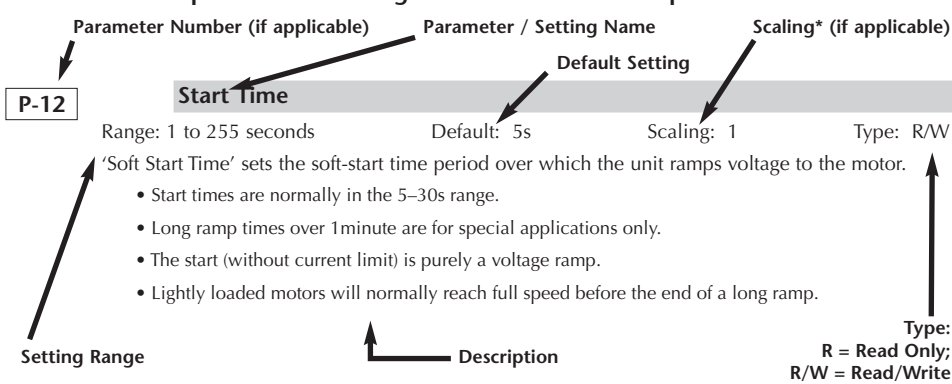
5.4.0 – Restoring Defaults

There are two methods of restoring the SR44 parameters and settings to their default values:

1) Through the 'Applications' menu; choose 'Default (keypad)' or 'Default Auto'.
2) Through the 'Permanent Store' menu; choose 'Default Param'.

Refer to the applicable menu descriptions for further details.

5.4.1 – Example of Menu Settings and Parameters Descriptions



*** Scaling:**

- Scaling applies ONLY when using SERIAL COMMUNICATION to read and write parameters.
- When READING from parameters, MULTIPLY the serial comm value by the scaling factor.
- When WRITING to parameters, DIVIDE your desired value by the scaling factor (multiply by the inverse of the scaling factor).
- Refer to "Chapter 6: Serial Communications" for scaling example.

5.4.2 – 'Applications' Menu

This menu contains a list of typical applications for which a set of parameters have been predefined by the manufacturer. This feature provides a quick and easy way of setting up the unit. There are three exceptions to this list:

1) The first menu item, 'Settings', provides a brief report on the basic settings of the unit (see below and Appendix A.1.6).
2) The second menu item, 'Default (keypad)', provides a way of loading the default parameter values with 'Keypad Starting' as the choice for the starting option (see Appendix A.1.4).
3) The third menu item, 'Default Auto', loads default parameter values and additionally turns on a number of features from the Auto Features menu. Further details can be found in the "SR44 Applications Data" and "SR44 Bit Parameters" sections of the "Electromagnetic Compatibility" chapter (4).

'Applications' Menu Read Only Settings

– **Settings**

Range: n/a Default: n/a

Displays information relevant to the SR44's current state:

- 'V1.069LM 10/12/16'
  This message shows the keypad firmware version number and release date (date displayed in European format; YY/MM/DD).
- '5MC V56.11'
  This message gives the version number of the firmware in the SR44 control board.
- 'Menu V1.023'
  This message gives the version number of the navigating menu.
- 'Remote/Keypad Starting'
  This message indicates whether the Starting Parameter has been set to keypad or remote starting.
- 'Full/Full&Opt/Start&Bypass/Phase Loss Only'
  This message shows what protection mode has been set in the Protection Parameter.
- 'Small Pump'
  This next message will show what (if any) application has been set from the Application menu (Small Pump is shown as an example). If no application has been set, then the display will appear blank for a couple of seconds.
- 'Temp/Alt Derated'
  This message will be displayed if the unit has been derated for temperature or altitude. If no deratinghas been set, then the display will appear blank for a couple of seconds.

5.4.2 – 'Applications' Menu (continued)

'Applications' Menu User configurable settings:

(These 'Applications' auto-features preset the SR44 for the selected application.)

* * *	**Default (keypad)**

Range: n/a Default: n/a

The 'Default (keypad)' setting provides a way to RESTORE all **DEFAULT** VALUES to the starter. It also sets the starter for starting and stopping from the local or remote KEYPAD.

Provides a way of loading the default parameter values with 'Keypad Starting' as the choice for the starting option (see Appendix A.1.4).

* * *	**Default Auto**

Range: n/a Default: n/a

The 'Default Auto' setting provides a way to RESTORE all **DEFAULT** VALUES to the starter. It also sets the starter for starting and stopping from the Auto Features menu

Loads default parameter values and additionally turns on a number of features from the Auto Features menu. Further details can be found in section 5.4.7 and Appendix B "Applications Data".

–	**Small Pump**

Setting for Small Pump (≤60 hp) application. (See "Appendix B: Applications Data" for details.)

–	**Large Pump**

Setting for Large Pump (≥75 hp) application. (See "Appendix B: Applications Data" for details.)

–	**Conveyor**

Setting for Conveyor application. (See "Appendix B: Applications Data" for details.)

–	**Low Inertia Fan**

Setting for Low Inertia Fan application. (See "Appendix B: Applications Data" for details.)

–	**Hi Inertia Fan**

Setting for High Inertia Fan application. (See "Appendix B: Applications Data" for details.)

–	**Recip Compressor**

Setting for Reciprocal Compressor application. (See "Appendix B: Applications Data" for details.)

–	**Screw Compressor**

Setting for Screw Compressor application. (See "Appendix B: Applications Data" for details.)

–	**Rotry Compressor**

Setting for Rotary Compressor application. (See "Appendix B: Applications Data" for details.)

5.4.2 – 'Applications' Menu (continued)

–	**Crusher**

Setting for Crusher application. (See "Appendix B: Applications Data" for details.)

–	**Grinder**

Setting for Grinder application. (See "Appendix B: Applications Data" for details.)

–	**Hi Start Torque**

Setting for application requiring High Starting Torque. (See "Appendix B: Applications Data" for details.)

–	**Motor Gen set**

Setting for Motor Generator Set application.
(See "Appendix B: Applications Data" for details.)

–	**aerator**

Setting for Aerator application. (See "Appendix B: Applications Data" for details.)

–	**Flywheel / Press**

Setting for Flywheel or Press application. (See "Appendix B: Applications Data" for details.)

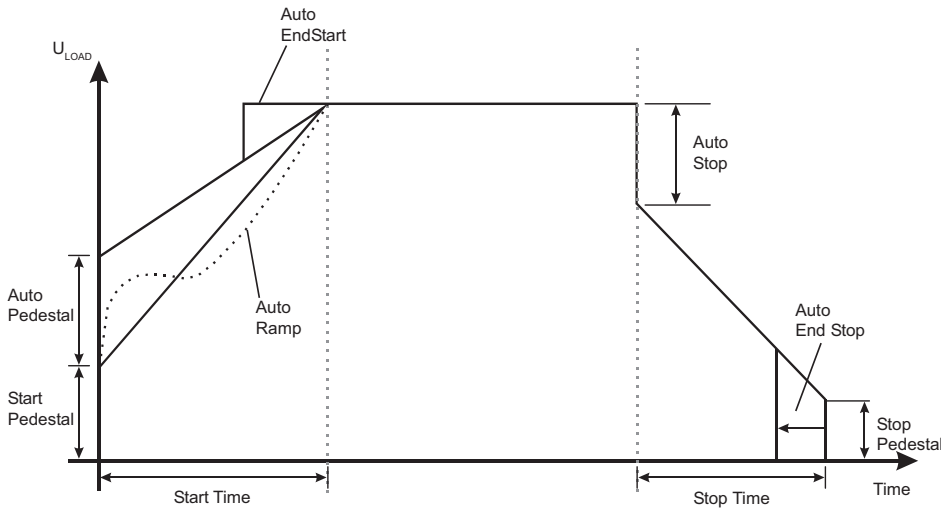
–	**Moulder**

Setting for Moulder application (injection molding). (See "Appendix B: Applications Data" for details.)

5.4.3 – 'Auto Features' Menu

The Auto Features Menu contains commonly used parameters that may be automatically adjusted by the unit.

'Auto Features' Menu Explanation Diagram



'Auto Features' Menu Settings

(P-18) **Settings**

Range: P18 'Auto' settings listed by name Default: Auto 3MC, Auto Bypass

When active, the 'Settings' menu item will provide a brief report on which, if any, 'Auto' options have been switched 'On'. A downwards facing arrow will appear on the right hand side of the top line of the user interface display. While this icon is present, all of the 'Auto' options that appear on the bottom line of the display have been switched 'On'.

- Auto Jog (P18 / B3)
- Auto Pedestal (P18 / B7)
- Auto End Start (P18 / B6)
- Auto Stop (P18 / B5)
- Auto End Stop (P18 / B4)
- Auto Bypass (P18 / B2)

Auto Bypass detects the presence of a bypass contactor, and should be ON when using one. Using a bypass contactor with Auto Bypass in the OFF state can cause thyristor faults.

- Auto 3MC (P18 / B1)
- Auto Ramp (P18 / B0)

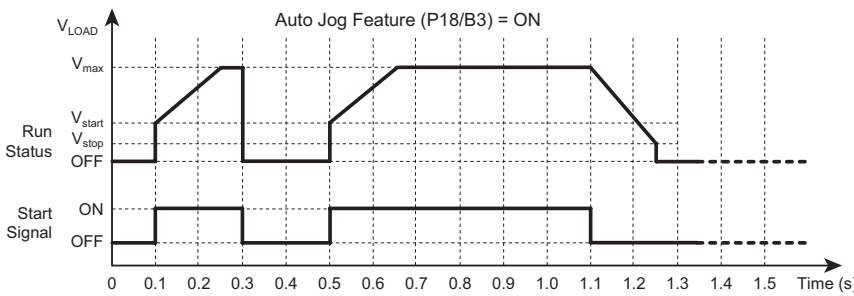
5.4.3 – 'Auto Features' Menu (continued)

(P18.B3) **Auto Jog**

Range: P18 / B3 Default: Off Scaling: n/a Type: R/W

'Auto Jog' turns 'On' and 'Off' automatic Jog detection. When 'Auto Jog' is 'On' and the soft-stop time is set greater than zero (0), the stop varies based upon the length of time the start signal is applied. If the start signal is applied for less than 0.5 seconds, the unit executes a zero (0) second stop when the start signal is removed. If the start signal is applied for more than 0.5 seconds, the unit executes a timed stop per the stop settings. This menu item is intended to be used for short term jogging of light loads.

Auto Jog Explanation Diagram



(P18.B7) **Auto Pedestal**

Range: P18 / B7 Default: Off Scaling: n/a Type: R/W

'Auto Pedestal' turns 'On' and 'Off' the automatic overriding of the start pedestal. When 'On', the unit approximately detects the start of motor rotation and tries to adjust the pedestal to suit.

(P18.B6) **Auto end start**

Range: P18 / B6 Default: Off Scaling: n/a Type: R/W

'Auto End Start' turns 'On' and 'Off' the automatic detection of motor full speed during the start-up. Having detected motor full speed achieved before the end of the programmed ramp, this menu item brings forward the end of the ramp, cutting short an overlong programmed start.

(P18.B5) **Auto stop**

Range: P18 / B5 Default: Off Scaling: n/a Type: R/W

'Auto Stop' turns 'On' and 'Off' the automatic adjustment of the Soft Stop. When 'On', the unit attempts to automatically adjust the soft-stop profile to suit the load.

(P18.B4) **Auto end stop**

Range: P18 / B4 Default: Off Scaling: n/a Type: R/W

'Auto End Stop' turns 'On' and 'Off' the automatic detection of a stalled motor during Soft Stop. When 'On', and the motor has stopped before the end of the unit's programmed Soft Stop, the unit will attempt to detect the stall and turn off the thyristors, thus truncating the soft-stop time.

5.4.3 – 'Auto Features' Menu (continued)

(P18.B2) Auto Bypass

Range: P18 / B2 Default: On Scaling: n/a Type: R/W

'Auto Bypass' turns 'On' and 'Off' the automatic detection of a bypass contactor. When 'On', a bypass contactor will be automatically detected. Soft-starter thyristor trips and thyristor short-circuit trips will be disabled during Run (after full voltage is reached). Thyristor protection and thyristor short-circuit protection are still available during the start ramp, and phase-loss protection is available during both Start and Run.

An external user-supplied current transformer is required if any of the current or power related trip or monitoring features are needed in bypass mode.
(Parameters: 8/B2, 9/B1/B2, 20, 21, 22, 23, 26, 28, 30, 32, 33, 34, 36, 39, 51/B1/B2/B3/B4, 87, 89, 91, 93, 112/B0/B1/B2/B3/B6, 121/B4)
Refer to Electrical Installation Chapter 2, subsections 2.4.1 & 2.5.2 for wiring information.

Auto Bypass detects the presence of a bypass contactor, and should be ON when using one. Using a bypass contactor with Auto Bypass in the OFF state can cause thyristor faults.

(P18.B1) Auto 3MC

Range: P18 / B1 Default: On Scaling: n/a Type: R/W

'Auto 3MC' turns 'On' and 'Off' the automatic removal of the low voltage ramp for high pedestal starts.

'Auto 3MC' applies only to 'Start Pedestal' voltages set above 50% (P-11 or P-79). The SR44 normally does a very brief low-voltage ramp up to the pedestal voltage level before the start ramp begins, but 'Auto 3MC' applies a higher starting torque and eliminates this initial pedestal ramp for pedestal voltages above 50%.

(P18.B0) Auto Ramp

Range: P18 / B0 Default: Off Scaling: n/a Type: R/W

'Auto Ramp' automatically detects motor acceleration and dynamically adjusts the ramp to give smoother acceleration. This menu item works in conjunction with the Start Time parameter (P12), which should be set to the estimated start time of the load. This would be suitable for starts with varying loads.

– Auto All –> OFF

Range: n/a Default: n/a

'Auto All –> OFF' turns 'Off' all the 'Auto' options (all options contained in this submenu except 'Stop Smoothing'). The only action of this menu item is to turn 'Off' these 'Auto' options when the menu item is activated.

(P122.B1) P122 Stop Smooth

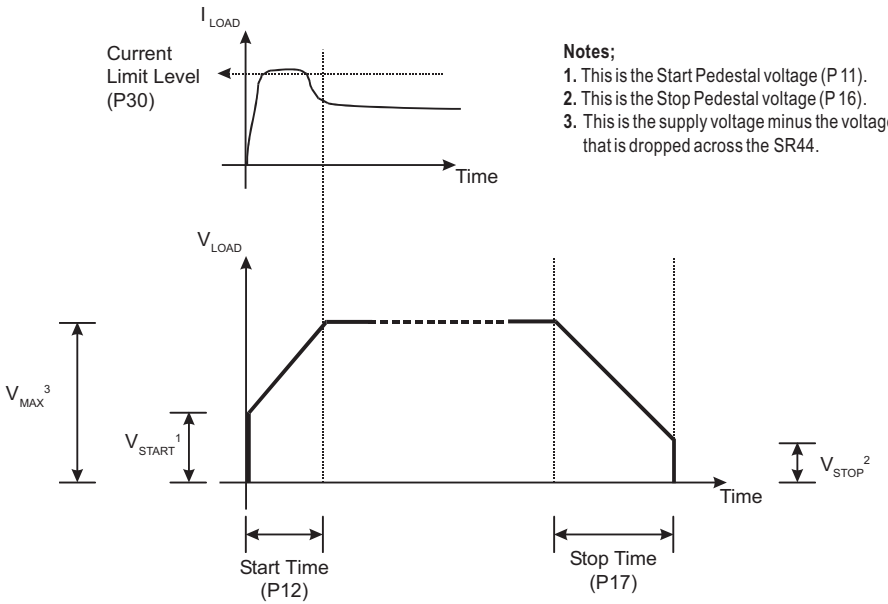
Range: P121 / B1 Default: Off Scaling: n/a Type: R/W

'Auto Soft Stop Smoothing' (P121 / B1) turns 'On' and 'Off' the 'Stop Smoothing' function (P122). When turned 'On', this menu item attempts to eliminate any oscillations that may occur when the unit Soft Stops with an unstable load.

5.4.4 – 'Basic' Menu

The Basic menu holds the parameters which control the primary functions of the unit. Changing the values of these parameters will vary the starting and stopping duties, the trip protection set for the unit, and the source of the start signal (Keypad or Remote).

'Basic' Menu Explanation Diagram



Notes;
1. This is the Start Pedestal voltage (P 11).
2. This is the Stop Pedestal voltage (P 16).
3. This is the supply voltage minus the voltage that is dropped across the SR44.

'Basic' Menu Settings

(P52.B1&2) **Disable Starter?**

Range: P52 / B1&B2 Default: Off Scaling: n/a Type: R/W

'Disable Starter?' disables the starter by setting P52/B1&B2 = 1. While the unit is disabled it will not comply with a start signal. Disabling the starter also allows the user to change certain parameters which cannot be changed while the unit is enabled (such as Password and Station #).

(P52.B1&2) **Enable Starter?**

Range: P52 / B1&B2 Default: On Scaling: n/a Type: R/W

'Enable Starter ?' enables the starter by setting P52/B1&B2 = 0. While the unit is enabled it will comply with a start signal. Some parameters cannot be changed while the unit is enabled.

5.4.4 – 'Basic' Menu (continued)

(P51.B7) Starting

Range: P51 / B7 Default: On Scaling: n/a Type: R/W

The 'Starting' setting sets the source for the start signal. If set to OFF (Keypad), the unit will Start/Stop when the Start/Stop button on the user interface is pressed. If set to ON (Remote), the unit will start when signalled to do so by an external circuit.

(P-11) Start Pedestal

Range: 10 to 60 percent Default: 20% Scaling: n/a Type: R/W

'Start Pedestal' sets the percentage of the unit's rated supply voltage that is applied to the load before the ramp starts.

(P-12) Start Time

Range: 1 to 255 seconds Default: 5s Scaling: n/a Type: R/W

'Soft Start Time' sets the soft-start time period over which the unit ramps voltage to the motor.

- Start times are normally in the 5–30s range.
- Long ramp times over 1minute are for special applications only.
- The start (without current limit) is purely a voltage ramp.
- Lightly loaded motors will normally reach full speed before the end of a long ramp.

(P-16) Stop Pedestal

Range: 10 to 60 percent Default: 10% Scaling: n/a Type: R/W

'Soft Stop Pedestal' sets the percentage of supply voltage at which the Soft Stop will cease. The actual value is affected by certain load variations.

(P-17) Stop Time

Range: 0 to 255 seconds Default: 0s Scaling: n/a Type: R/W

'Soft Stop Time' sets the time period over which the Soft Stop Ramp is performed.

(P-30) Current Limit

Range: 0.375 to 7.9688 xI_e Default: 3.5 xI_e Scaling: n/a Type: R/W

'Current Limit Level' sets the current level at which the the Soft Start ramp will be held. The Current Limit only holds the ramp if its level is reached. The current naturally falls as motor speed increases, allowing the ramp to continue.

«•» This parameter is not fully functional in Bypass Operation unless a user-supplied external current transformer is installed. (Refer to P18/B2, 'Auto Bypass'.)

1. The actual current drawn by the load may exceed the Current Limit Level slightly, as the unit manages the current limit through control of the delay angle.
2. Current Limit is active only during starting.

5.4.4 – 'Basic' Menu (continued)

(P-7) **Protection**

Range: 0 to 192 Default: 192 Scaling: n/a Type: R/W

'Protection Mode' controls which trips are available:

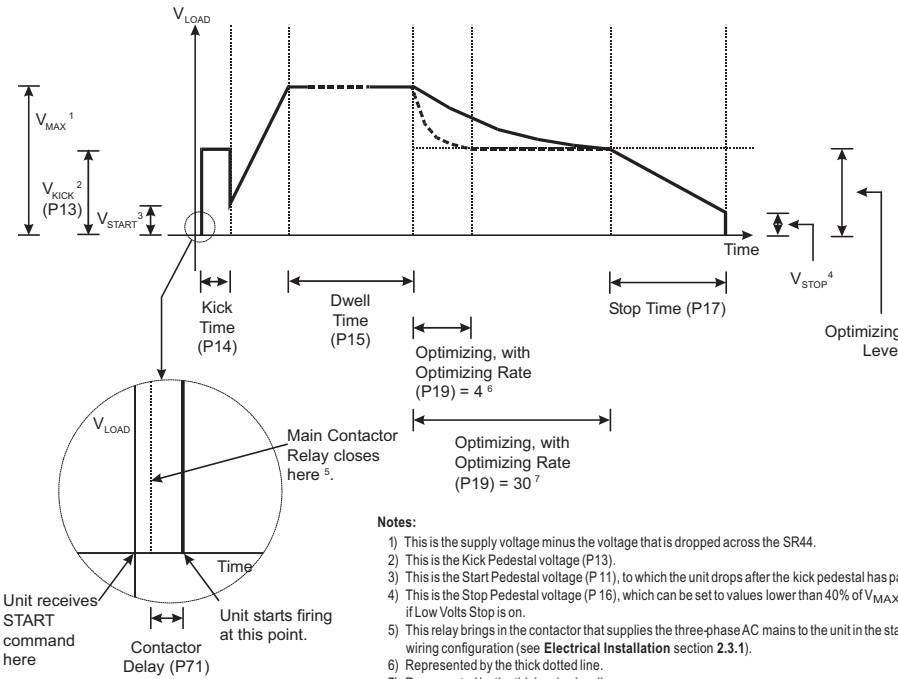
- 64 = FULL = full protection with full volts after top of ramp; optimizing function turned off
- 192 = FULL+OPTIMIZE = full protection + optimize
- 128 = START+BYPASS = protection during start; then bypass
- 0 = PHASE LOSS ONLY = I/p phase loss detection only

Start and Optimize mode is forced to 'FULL' Protection Mode when 'Delta' Firing Mode is selected (P-6 = 1). In 'PHASE LOSS ONLY' Protection Mode (P-7 = 0), the bottom 12.5% of starter current is ignored after TOR (Top Of Ramp).

5.4.5 – 'Advanced' Menu

The Advanced Menu holds parameters that need to be changed only to solve specific sets of circumstances.

'Advanced' Menu Explanation Diagram



Notes:

1) This is the supply voltage minus the voltage that is dropped across the SR44.
2) This is the Kick Pedestal voltage (P13).
3) This is the Start Pedestal voltage (P 11), to which the unit drops after the kick pedestal has passed.
4) This is the Stop Pedestal voltage (P 16), which can be set to values lower than 40% of V_{MAX} if Low Volts Stop is on.
5) This relay brings in the contactor that supplies the three-phase AC mains to the unit in the standard wiring configuration (see **Electrical Installation** section **2.3.1**).
6) Represented by the thick dotted line.
7) Represented by the thick unbroken line.

NB. Please note that the above diagram is intended for use as a **GUIDE ONLY.**

'Advanced' Menu (continued)

– **Current**

'Current' provides access to the 'Current' submenu, which contains all the parameters associated with the Unit Full Load Current and its associated trip levels.

(P24&25) Rated Current ('Current' sub-menu of 'Advanced' menu)

Range: P24 & P25 Default: n/a Scaling: n/a Type: R

The 'Rated Current' (I_e) menu item holds the value of the Soft Starter's rated current. It cannot be altered by the user.

'Current' Sub-menu of 'Advanced' Menu (continued)

(P51.B4) Low Current ('Current' sub-menu of 'Advanced' menu)

Range: P51/B4 Default: Off Scaling: n/a Type: R/W

The 'Low Current' menu item turns 'On' and 'Off' the 'Low Current' trip. A 'Low Current' trip occurs when the current output measured by the unit falls below the level specified by the 'Low Amps Level' parameter (P28) for a length of time specified by the 'Low Amps Time' parameter (P29).

- Refer to "Low Current Protection Explanation Diagram".

«•» This parameter bit is not available in Bypass Operation unless a user-supplied external current transformer is installed. (Refer to P18/B2, 'Auto Bypass'.)

(P-28) Low Amps Level ('Current' sub-menu of 'Advanced' menu)

Range: 0.031 to 0.7813 x I_e Default: 0.0938 x I_e Scaling: n/a Type: R/W

The 'Low Amps Level' menu item specifies the current level below which a 'Low Current' trip can occur.

- Refer to "Low Current Protection Explanation Diagram".

«•» This parameter is not available in Bypass Operation unless a user-supplied external current transformer is installed. (Refer to P18/B2, 'Auto Bypass'.)

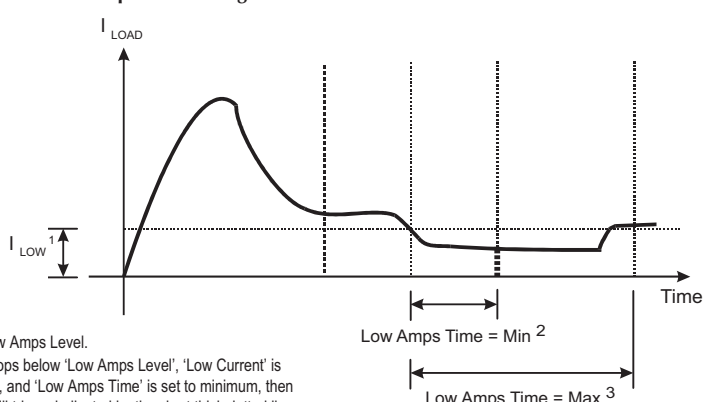
(P-29) Low Amps Time ('Current' sub-menu of 'Advanced' menu)

Range: 5 to 255 cycles Default: 50 cycles Scaling: n/a Type: R/W

The 'Low Amps Time' menu item specifies the time that the current must remain below the level specified by the 'Low Amps Level' (P28) before a 'Low Current' (P51/B4) trip occurs. The time is specified in supply frequency cycles. The default value is 50 cycles (at the supply frequency). [For 60 Hz: (50 cycles) ÷ (60 cycles/s) = 0.833s]

- Refer to "Low Current Protection Explanation Diagram".

Low Current Protection Explanation Diagram



Notes

1. I_{LOW} = Low Amps Level.
2. If I_{LOAD} drops below 'Low Amps Level', 'Low Current' is set to 'on', and 'Low Amps Time' is set to minimum, then the unit will trip as indicated by the short thick dotted line.
3. If 'Low Amps Time' is set to maximum and I_{LOAD} rises above 'Low Amps Level' before 'Low Amps Time' has elapsed, then the unit will not trip.

'Current' Sub-menu of 'Advanced' Menu (continued)

(P51.B1) C/L Time Out ('Current' sub-menu of 'Advanced' menu)

Range: P51/B1 Default: Off Scaling: n/a Type: R/W

The 'C/L Time Out' menu item turns 'On' and 'Off' the 'Current Limit Time Out' trip. A 'Current Limit Time Out' trip will occur if this menu item is set to 'On', and the load is demanding more current than the level specified in the 'Current Limit' parameter for longer than the time specified in the 'Limit Time Out' parameter. If the 'C/L Time Out' menu item is set to 'Off', then no trip would occur in a similar situation.

- Refer to "Current Limit Explanation Diagram".

«•» This parameter bit is not available in Bypass Operation unless a user-supplied external current transformer is installed. (Refer to P18/B2, 'Auto Bypass'.)

(P-30) C/L Level ('Current' sub-menu of 'Advanced' menu)

Range: 0.375 to 7.9688 xI_e Default: 3.5 xI_e Scaling: n/a Type: R/W

The 'Current Limit Level' parameter sets the level in Amps at which the unit will begin current limiting.

- Refer to "Current Limit Explanation Diagram".

«•» This parameter is not fully functional in Bypass Operation unless a user-supplied external current transformer is installed. (Refer to P18/B2, 'Auto Bypass'.)

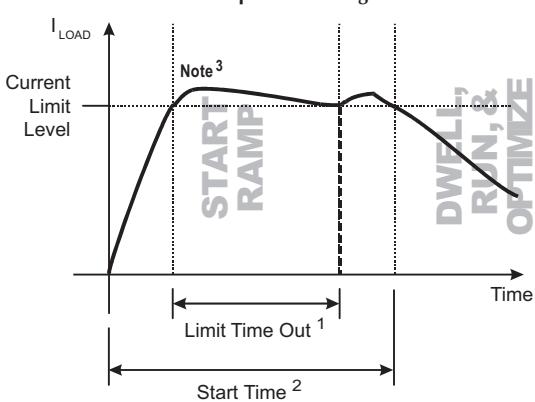
(P-31) C/L Time ('Current' sub-menu of 'Advanced' menu)

Range: 5 to 255 seconds Default: 30s Scaling: n/a Type: R/W

The 'Current Limit Time' parameter sets the time in seconds that the unit must be in a current limit situation for a current limit trip to occur.

- Refer to "Current Limit Explanation Diagram".

Current Limit Explanation Diagram



Notes

1. If I_{LOAD} exceeds 'Current Limit Level' for time 'Limit Time Out', and 'C/L Time Out' is on, the unit will trip at the thick dotted line. If 'C/L Time Out' is off, the unit will continue ramping until T.O.R. and then enter the Dwell period.
2. If the unit current limits during start-up, the start time will be elongated by the amount of time that the unit was current limiting.
3. The actual current rises slightly above the level set in 'Current Limit' because the unit manages the current through control of the thyristor firing delay angle.

'Current' Sub-menu of 'Advanced' Menu (continued)

(P51.B3) Shearpin ('Current' sub-menu of 'Advanced' menu)

Range: P51/B3 Default: On Scaling: n/a Type: R/W

The 'Shearpin' menu item turns 'On' and 'Off' the 'Shearpin' trip. The 'Shearpin' trip is intended to catch transient current peaks which exceed the value specified in the 'Shearpin Level' parameter for a time that is specified in the 'Shearpin Time' parameter (P33).

- Refer to "Shearpin Explanation Diagram".

«•» This parameter bit is not available in Bypass Operation unless a user-supplied external current transformer is installed. (Refer to P18/B2, 'Auto Bypass'.)

The Shearpin trip is automatically turned off during starting and stopping.
See also the Special Case in the Overload Level entry.

(P-32) Shearpin Level ('Current' sub-menu of 'Advanced' menu)

Range: 0.5 to 5 x I_e Default: 3.125 x I_e Scaling: n/a Type: R/W

The 'Shear Level' parameter holds the level in Amps at and above which a 'Shearpin' trip condition will exist.

- Refer to "Shearpin Explanation Diagram".

«•» This parameter is not available in Bypass Operation unless a user-supplied external current transformer is installed. (Refer to P18/B2, 'Auto Bypass'.)

(P-33) Shearpin Time' ('Current' sub-menu of 'Advanced' menu)

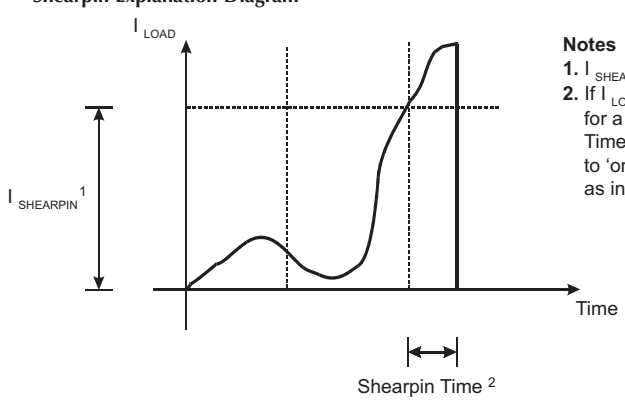
Range: 5 to 255 cycles Default: 100 cycles Scaling: n/a Type: R/W

This parameter holds the time in supply frequency cycles that a 'Shearpin' trip condition must exist before a trip occurs. The default value is 100 cycles (at the supply frequency).

[For 60 Hz: (100 cycles) ÷ (60 cycles/s) = 1.67s]

- Refer to "Shearpin Explanation Diagram".

Shearpin Explanation Diagram



Notes

1. $I_{SHEARPIN}$ = Shearpin Level.
2. If I_{LOAD} exceeds $I_{SHEARPIN}$ for a time equal to 'Shearpin Time', and 'Shearpin' is set to 'on', then the unit will trip as indicated.

'Current' Sub-menu of 'Advanced' Menu (continued)

(P-34) Overload Level ('Current' sub-menu of 'Advanced' menu)

Range: 0.5 to 1.25 x I_e Default: 1.0938 x I_e Scaling: n/a Type: R/W

The 'Start of Overload Level' parameter holds the level in Amps at which an 'Overload' trip will start integrating.

- Refer to "Overload Explanation Diagram".

«•» This parameter is not available in Bypass Operation unless a user-supplied external current transformer is installed. (Refer to P18/B2, 'Auto Bypass'.)

Special case: If a load current exceeding 7.2 x FLC occurs for longer than 60 ms, a 'Shearpin Trip' is forced whenever the 'Overload' is 'On' (see section 5.4.12).

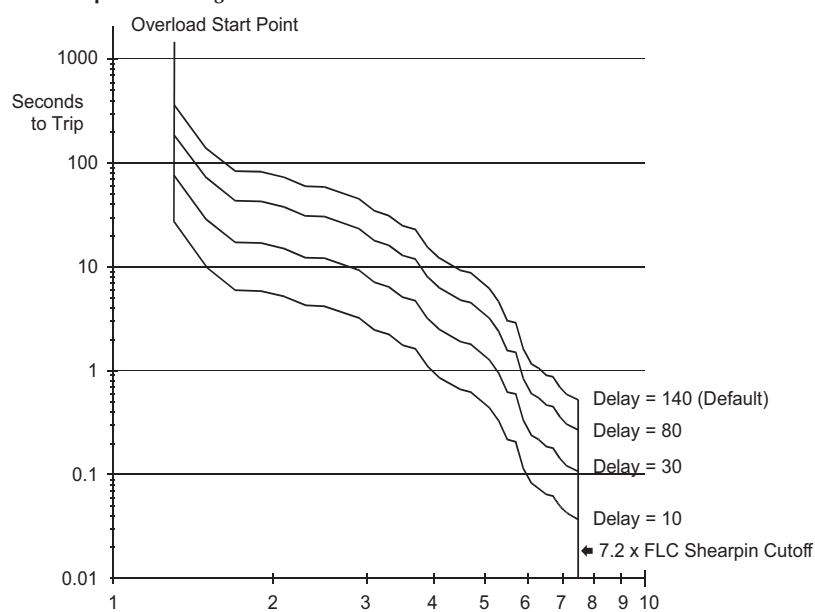
(P-35) Overload Delay ('Current' sub-menu of 'Advanced' menu)

Range: 10 to 140 Default: 140 Scaling: n/a Type: R/W

The 'Overload Delay' parameter holds an arbitrary dimensionless number which slows down the integration of an 'Overload' trip. The larger the value of the number stored here, the longer a given 'Overload' will take to result in a trip.

- Refer to "Overload Explanation Diagram".

Overload Explanation Diagram



Notes
1. Delay = 'Overload Delay'.

5.4.5 – 'Advanced' Menu (continued)

(P-19) Opt Rate

Range: 4 to 30 Default: 5 Scaling: n/a Type: R/W

'Optimize Rate' sets the speed at which the SR44 will reduce the voltage during optimizing. Some unstable loads benefit from a slower optimizing rate

(P121.B4) Optimise +

Range: P121 / B4 Default: Off Scaling: n/a Type: R/W

'Optimize +' gains the maximum amount of energy savings on variable loads. For lightly loaded motors, the soft starter provides energy savings in Energy Optimizing mode. For fully loaded motors, a bypass contactor provides better energy savings.

- Requires an external user-supplied bypass contactor and current transformer
- Associated with P109 Upper Limit and P110 Lower Limit

When motor is lightly loaded as set in P110, the bypass contactor is de-energized to run the motor from the soft starter in Energy Optimizing mode. When motor is heavily loaded as set in P109, the bypass contactor is energized to eliminate the soft starter thyristor losses.

'Optimise +' requires an external user-supplied bypass contactor and current transformer. Refer to Electrical Installation Chapter 2, subsections 2.4.1 & 2.5.2 for details.

(P51.B0) Kick Start

Range: P51 / B0 Default: Off Scaling: n/a Type: R/W

This menu item turns the Kick Start function 'On' or' Off'. The Kick Start applies a short-lived voltage kick at the beginning of the start ramp to dislodge sticky loads.

(P-13) Kick Pedestal

Range: 60 to 90 percent Default: 75% Scaling: n/a Type: R/W

'Kick Pedestal' provides a short kick of voltage at start of ramp to dislodge sticky load.

(P-14) Kick Time

Range: 10 to 40 cycles Default: 25 cycles Scaling: n/a Type: R/W

'Kick Time' sets the number of cycles for which Kick Ped (P13) is applied, if selected (P51/B0).

(P-15) Dwell Time

Range: 1 to 255 seconds Default: 5s Scaling: n/a Type: R/W

'Dwell Time' provides a period of time following soft-start allowing the load to settle, and to ensure that it is up to speed, before optimizing commences (if selected).

5.4.5 – 'Advanced' Menu (continued)

(P52.B0) Low Volts Stop

Range: P52 / B0 Default: Off Scaling: n/a Type: R/W

This menu item turns 'On' or 'Off' the 'Low Voltage Stop' function. When 'On', this allows soft-stop pedestals of less than 40% to be set. Soft-stop pedestals of 40% and less can be set with the 'Low Volts Stop' set to 'Off', but they will be treated by the unit as a 40% soft-stop pedestal.

(P-71) Contactor Delay

Range: 100 to 800 milliseconds Default: 160 ms Scaling: n/a Type: R/W

'Contactor Delay'. Following a start command, this is the delay allowed for the main incoming contactor to close. After this time, a phase loss detection routine checks the incoming supply.

(P-72) Trip Sensitivity

Range: 1 to 15 Default: 1 Scaling: n/a Type: R/W

'Trip Sensitivity' holds an arbitrary number to adjust the sensitivity of the fault trips of P-127, 'Hidden Trip Flags'. The larger the setting of P-72, the slower the trips of P-127.

(P-1) Station No

Range: 1 – 32 Default: 1 Scaling: n/a Type: R/W

'Station Number' assigns the Local Network ID of this card.

(P-6) Firing mode

Range: 0 to 1 Default: 0 Scaling: n/a Type: R/W

'Firing Mode':

- 0 = Normal Motor (outside delta or star/wye)
- 1 = Delta (inside delta no optimizing)

An in-line isolation contactor controlled by the soft starter MUST be used with the In-Delta Firing Mode and motor connections.

(P-122) P122 Stop Smooth

Range: 1 to 25 Default: 5 Scaling: n/a Type: R/W

'Auto Soft Stop Smoothing' is an arbitrary filter to smooth soft stop jitters caused by unstable load.

This feature is turned ON or OFF by Bit 2 of Parameter 121.

5.4.5 – 'Advanced' Menu (continued)

(P53.B5) Cooling

Range: P53 / B5 Default: On Scaling: n/a Type: R/W

This menu item turns 'On' and 'Off' the 'Cooling' (Inhibit Restart) function. Once this menu item has been turned 'On', and the unit has been started and subsequently stopped, the 'Cooling' function inhibits the start command (not allowing the unit to start), until the time held in 'Cooling Time' has elapsed (measured from the last stop signal). During this period the unit displays 'Stopped. Cooling'. This menu item is mainly for use in commissioning soft-start units that have large thyristor stacks, and its purpose is to avoid damage to the thyristors during the commissioning process.

(P-116) Cooling Time

Range: 0 to 63.75 minutes Default: varies by unit model Scaling: n/a Type: R/W

This parameter holds the time in seconds that the soft-start unit will ignore a start signal if 'Cooling' is turned on (see above). By default, this is set to zero (0) for units of less than 242A. For units of 242A and above, the default value is 420 seconds (7 mins). (Changes should be entered in seconds.) The default value can be extended, but it should NOT be reduced as it will invalidate the manufacturer's warranty.

(P-123) Temp/Alt Derate

Range: 0 to 50% Default: 0 Scaling: n/a Type: R/W

This parameter enables the user to derate by percentage of Unit Full Load current, where local temperature or altitude is outside of the normal operating range. (Refer to the Mechanical Installation chapter for temperature and altitude specs.)

(P121.B3) Line Contactor (Breaker Present)

Range: P121 / B3 Default: On (0) Scaling: n/a Type: R/W

This menu item turns 'On' and 'Off' the 'Line Contactor' function, which selects the use by the customer of an in-line contactor in his wiring configuration.

However, if the decision is made to use a breaker instead, a new mode has been introduced so that the Soft Start can trip the breaker via the alarm relay when it is in the 'Stopped and ready' state (see section 5.1.3). This helps to eliminate the problems that arise when the breaker is closed and a faulty Soft Start has short circuit devices. The breaker option is selected by turning this menu item, 'Line Contactor', 'Off', or by enabling bit 3 of 'User Flags 4' (P121).

- P121/B3 = 0 = 'Line Contactor'
- P121/B3 = 1 = 'Breaker Present'

An in-line contactor MUST be used with 'In Delta' mode, and the use of an in-line contactor is always recommended.

5.4.5 – 'Advanced' Menu (continued)

(P51.B5) Thermistor Trip (reserved)

Range: P51 / B5 Default: Off Scaling: n/a Type: R/W

'Thermistor Selected' – Not Available.

(P-126) P126 Comms Trip

Range: Off / On Default: Off Scaling: n/a Type: R/W

'Bus Action on Fail' – Action following a bus failure: (Active only with certain Comms Options.)

0 = No Trip; 1 = Trip.

(P-109) Bypass Upper Limit

Range: 1 to 50 Default: 12 Scaling: n/a Type: R/W

Bypass Upper Limit

- Associated with P121/B4, Optimize +.

'Optimise +' requires an external user-supplied bypass contactor and current transformer. Refer to Electrical Installation Chapter 2, sections 2.4.1 & 2.5.2 for details.

- Typically set about 80% of motor FLC.
- Current required = (motor FLC / SR44 FLC)(32)

(P-110) Bypass Lower Limit

Range: 0 to 150 Default: 10 Scaling: n/a Type: R/W

Bypass Lower Limit

- Associated with P121/B4, Optimize +.

'Optimise +' requires an external user-supplied bypass contactor and current transformer. Refer to Electrical Installation Chapter 2, sections 2.4.1 & 2.5.2 for details.

- Typically set about 40% of motor FLC.
- Current required = (motor FLC / SR44 FLC)(32)

5.4.6 – 'Monitoring' Menu

User-supplied current transformer is required if any of the current- and power-related monitoring features are needed in bypass mode. Refer to Electrical Installation Chapter 2, sections 2.4.1 & 2.5.2 for details.

– **Power**

Range: 0 to 20,000,000W Default: 0W

Three phase power as calculated by the Soft Starter keypad.

(P-7) **Protection**

Range: 0 to 192 Default: 192 Scaling: n/a Type: R/W

'Protection Mode' controls which trips are available:

- 64 = FULL = full protection with full volts after top of ramp; optimizing function turned off
- 192 = FULL+OPTIMIZE = full protection + optimize
- 128 = START+BYPASS = protection during start; then bypass
- 0 = PHASE LOSS ONLY = I/p phase loss detection only

Start and Optimize mode is forced to 'FULL' Protection Mode when 'Delta' Firing Mode is selected (P-6 = 1). In 'PHASE LOSS ONLY' Protection Mode (P-7 = 0), the bottom 12.5% of starter current is ignored after TOR (Top Of Ramp).

(P-78 'Protection Mode 2' is the second parameter set counterpart of P-7 'Protection Mode'.)

(P-26) **Current**

Range: 0 to 3000 Amps Default: 0A Scaling: n/a Type: R

'Running Current' displays the current that the motor is taking, as monitored in one phase. This is the source parameter for the Overload, Current Limit, Shearpin, Under Current Trip, etc. The divisor is 32, and the multiplier is the rated current of the unit.

(P-27) **P27 Peak Start I**

Range: 0 to 255 Amps Default: 0 Scaling: n/a Type: R

'Peak Start Current' displays the peak current seen by the unit during the last start.
Scaling is per the running current.

(P-40) **P40 Supply Volts**

Range: 108 to 1000 Volts Default: 416V Scaling: n/a Type: R

'Supply Volts' is the manually entered main supply voltage.
(It also works in conjunction with Bit 1 of User Flags 5 for voltages above 500V.)

(P-39) **Real PF**

Range: 0 to 127.5 degrees Default: 0° Scaling: n/a Type: R

'Real Power Factor Angle' displays the angle by which the sine curve of the voltage in a circuit leads the sine curve on the current in that circuit; calculated by the Soft Starter keypad.

5.4.6 – 'Monitoring' Menu (continued)

User-supplied current transformer is required if any of the current- and power-related monitoring features are needed in bypass mode. Refer to Electrical Installation Chapter 2, sections 2.4.1 & 2.5.2 for details.

(P-22) P22 Delay Angle

Range: 0 to 146.76 degrees Default: 146.76° Scaling: n/a Type: R

'Firing Delay Angle' shows the firing delay angle (thyristor off time).

(P-23) P23 Max Angle

Range: 17.27 to 146.76 degrees Default: 57.554° Scaling: n/a Type: R

'Maximum Optimizing Delay Angle' shows the maximum allowed Firing Delay Angle during optimizing. (The Optimize function reduces energy consumption by reducing voltage, but the system also senses motor conditions and automatically adjusts the maximum delay angle by which the voltage can be reduced without allowing the motor to stall.)

(P-20) P20 Reference PF

Range: 0 to 146.76 degrees Default: 146.76° Scaling: n/a Type: R

'Reference PF' shows the Power Factor Angle that the SR44 has calculated as the target for the optimizing control loop. (Refer to Ch 3.6 for PF degrees-to-ratio conversion.)

(P-21) P21 Internal PF

Range: 0 to 146.76 degrees Default: 146.76° Scaling: n/a Type: R

'Internal PF' shows the Power Factor Angle of the load.
(Refer to Ch 3.6 for PF degrees-to-ratio conversion.)

5.4.7 – 'Permanent Store' Menu

–	**Save Param**

Range: n/a Default: n/a

'Save Parameters' saves all the parameter settings to a permanent store. This means that if the control supply is removed from the main control board, the parameters will still remain stored and will be recalled the next time the unit boots up.

–	**Power on Param**

Range: n/a Default: n/a

'Power on Parameters' recalls all the parameter settings from the last 'Save Param', and loads the current parameters with these recalled values.

* * *	**Default Param**

Range: n/a Default: n/a

'Default Parameters' loads all the parameters with their factory default values.

The 'Starting' parameter is set to 'Remote' by this menu item (P51, bit 7).

5.4.8 – 'Password' Menu

(P-5) Enter Password

Range: 0 to 255 Default: 0 Scaling: n/a Type: R/W

'Password' is used by the keypad; Keypad sees 0s as no password set.

This option enables the user to temporarily unlock a unit by entering a previously set password. When the unit is 'locked', the user can read all parameters as usual, but the user cannot write to any parameters. The unit can be started and stopped while it is locked. (See Appendix A.1.10a).

– Change Password

Range: Default: 0

'Change Password' enables the user to change a previously set password, to enter a password for the first time, or to clear the password. If the password is non-zero, then you must unlock the password using "Enter Password' previous to using 'Change Password.' This last action (clear password) is performed by changing the password to zero (0) and pressing Enter. This action clears any set password, but the control supply must be cycled or the unit reset by pressing the ▲ and ▼ buttons at the same time after the password has been cleared. (See Appendix A.1.9).

5.4.9 – 'Inputs' Menu

–	**Digital i/p 1**

Range: n/a Default: n/a

'Digital Input 1' gives access to the setup parameters for the first programmable input (see section 2.7.2 of Electrical Installation). An example showing how to set up a digital input is given in Appendix A.2.4.

I/p1 Map To – P-65

I/p1 Bit Mask – P-66

I/p1 Polarity – P-54 / B-4

5.4.10 – 'Outputs' Menu

– **K1**

Range: n/a Default: Run Relay

The 'K1' menu item allows the customer to program the K1 relay (section 2.7.2 of Electrical Installation). At the bottom of the sub-menu is a list of programming shortcuts which will set up the relay for the user. Below is a list of the shortcuts with a description of when they energize the relay:

Map From – P-57

Bit Mask – P-58

Polarity – P-54 / B-0

K = 'Run Relay' – Usually for controlling the main contactor; energizes while the unit is running.

K = 'Bypass Relay' – Usually for controlling the bypass contactor; energizes when the unit reaches 'Top of Ramp' (P8/B3=1).

K = 'Alarm' – Energizes when an Alarm condition is present.

K = 'Current Limitng' – Energizes when the unit is current limiting.

K = 'Ovld Integrating' – Energizes when the SR44's overload is integrating.

K = 'Stall' – Energizes when the motor is stalling.

K = 'Cooling' – Energizes when the SR44 is cooling (start inhibited).

K = 'Enable Status' – Energizes when the SR44 is enabled.

K = 'I/P1'

K = '60Hz'

K = 'Shearpin'

K = 'Undercurrent'

K = 'C/L Timeout'

K = 'Thermistor' – not available

K = 'Overload'

K = 'Thermal Switch'

K = 'RYB' – Phase sequence ABC, or L1, L2, L3

A worked example showing how to program a relay is given in Appendix A.1.11.

5.4.10 – 'Outputs' Menu (continued)

–

K2

Range: n/a Default: Bypass Relay

The 'K2' menu item allows the customer to program the K2 relay (section 2.7.2 of Electrical Installation). At the bottom of the sub-menu is a list of programming shortcuts which will set up the relay for the user. Below is a list of the shortcuts with a description of when they energize the relay:

K2 Map From – P-59

K2 Bit Mask – P-60

K2 Polarity – P-54 / B-1

K = 'Run Relay' – Usually for controlling the main contactor; energizes while the unit is running.

K = 'Bypass Relay' – Usually for controlling the bypass contactor; energizes when the unit reaches 'Top of Ramp' (P8/B3=1).

K = 'Alarm' – Energizes when an Alarm condition is present.

K = 'Current Limitng' – Energizes when the unit is current limiting.

K = 'Ovld Integrating' – Energizes when the SR44's overload is integrating.

K = 'Stall' – Energizes when the motor is stalling.

K = 'Cooling' – Energizes when the SR44 is cooling (start inhibited).

K = 'Enable Status' – Energizes when the SR44 is enabled.

K = 'I/P1'

K = '60Hz'

K = 'RYB' – Phase sequence ABC, or L1, L2, L3

K = 'Shearpin'

K = 'Undercurrent'

K = 'C/L Timeout'

K = 'Thermistor' – not available

K = 'Overload'

K = 'Thermal Switch'

A worked example showing how to program a relay is given in Appendix A.1.11.

5.4.11 – 'Parameters' Menu

P-0 **dummy parameter**

Range: 0 to 255 Default: 0 Scaling: 1 Type: R

Dummy used for mapping unused bit parameters, etc. No keypad access.

P-1 **Station No**

Range: 1 – 32 Default: 1 Scaling: 1 Type: R/W

'Station Number' assigns the Local Network ID of this card.

P-2 **Language**

Range: 1 to 255 Default: 44 Scaling: 1 Type: R/W

'Language' sets the international language code for country, e.g. English = 44;
Used by keypads to determine which language to use. (English is the only language available.)

P-3 **Program Type**

Range: 5 to 56 Default: 5 Scaling: 1 Type: R

'Program Type' shows the generic firmware type; always 5-something.

P-4 **Software Ver**

Range: 0 to 255 Default: 11 Scaling: 1 Type: R

'Software Version' shows the issue number for particular firmware type.

P-5 **Password**

Range: 0 to 255 Default: 0 Scaling: 1 Type: R/W

'Password' is used by the keypad; Has no effect on the firmware; Keypad sees 0s as no password set.

This option enables the user to unlock a unit by entering a previously set password. When the unit is 'locked', the user can read all parameters as usual, but the user cannot write to any parameters. The unit can be started and stopped while it is locked.

5.4.11 – 'Parameters' Menu (continued)

P-6 **Firing Mode**

Range: 0 to 1 Default: 0 Scaling: 1 Type: R/W

'Firing Mode':

- 0 = Normal Motor (outside delta or star/wye)
- 1 = Delta (inside delta no optimizing)

An in-line isolation contactor controlled by the soft starter MUST be used with the In-Delta Firing Mode and motor connections.

P-7 **Protection**

Range: 0 to 192 Default: 192 Scaling: 1 Type: R/W

'Protection Mode' controls which trips are available:

- 64 = FULL = full protection with full volts after top of ramp; optimizing function turned off
- 192 = FULL+OPTIMIZE = full protection + optimize
- 128 = START+BYPASS = protection during start; then bypass
- 0 = PHASE LOSS ONLY = I/p phase loss detection only

Start and Optimize mode is forced to 'FULL' Protection Mode when 'Delta' Firing Mode is selected (P-6 = 1). In 'PHASE LOSS ONLY' Protection Mode (P-7 = 0), the bottom 12.5% of starter current is ignored after TOR (Top Of Ramp).

(P-78 'Protection Mode 2' is the second parameter set counterpart of P-7 'Protection Mode'.)

P-8 **Status 1**

Range: 0 to 255 (flags) Default: 0 Scaling: 1 Type: R

'Status 1' flags – Read this parameter by individual bits.

- Bit #:

0: Stopped – start/stop signal inactive thyristors off main contactor open.

1: Starting – starter is in start ramp.

2: Current Limit – during a softstart – indicates motor has reached Current Limit level, and ramp is being held.
«•» This parameter bit is not fully functional in Bypass Operation unless a user-supplied external current transformer is installed. (Refer to P18/B2, 'Auto Bypass'.)

3: Top of Ramp – the unit has finished the Start Ramp and any Current Limit.

4: Dwell – period of time at end of Start Ramp where motor is held at full volts before entering optimizing – to allow the load to stabilize, and to ensure that it is up to speed.

5: Full Conduction – thyristors are fully on.

6: Energy Saving – starter is monitoring motor power factor and adjusting applied voltage to bring it close to optimum.

7: Stopping – starter is performing a Stop Ramp.

5.4.11 – 'Parameters' Menu (continued)

P-9 **Status 2**

Range: 0 to 99 (flags) Default: 0 Scaling: 1 Type: R

'Status 2' flags – Read this parameter by individual bits.

- Bit #:
  - 0: Alarm – starter has detected a Fault and has tripped.
  - 1: Overload Integrating – onboard overload has detected Overcurrent and is integrating.
    «•» This parameter bit is not available in Bypass Operation unless a user-supplied external current transformer is installed. (Refer to P18/B2, 'Auto Bypass'.)
  - 2: Stall – starter has detected that motor speed is slipping.
    «•» This parameter bit is not available in Bypass Operation unless a user-supplied external current transformer is installed. (Refer to P18/B2, 'Auto Bypass'.)
  - 3: Forced Override – starter has turned off optimizing since the current has risen above 80% FLC.
  - 4: Noise – starter is experiencing poor mains reference signals.
  - 5: Inhibit Start – Start is Inhibited for a period to keep the unit within its allowable start duty.
  - 6: DC I/p Level Reached – DC I/p has risen above the level specified in parameter 48.
  - 7: Reserved

P-10 **Status 3**

Range: 0 to 255 (flags) Default: 0 Scaling: 1 Type: R

'Status 3' flags – Read this parameter by individual bits.

- Bit #:
  - 0: K1 – Relay K1 Status
  - 1: K2 – Relay K2 Status
  - 2: (unused)
  - 3: (unused)
  - 4: I/p 1 – Input 1 Status
  - 5: (unused)
  - 6: (unused)
  - 7: (unused)

5.4.11 – 'Parameters' Menu (continued)

P-11 **Start Ped**

Range: 10 to 60 percent Default: 20% Scaling: 1 Type: R/W

'Start Pedestal' sets the percentage of the unit's rated supply voltage that is applied to the load before the ramp starts.

(P-79 'Start Ped 2' is the 2nd parameter set counterpart of P-11 'Start Ped'.)

P-12 **Start Time**

Range: 1 to 255 seconds Default: 5s Scaling: 1 Type: R/W

'Soft Start Time' sets the soft-start time period over which the unit ramps voltage to the motor.

- Start times are normally in the 5–30s range.
- Long ramp times over 1minute are for special applications only.
- The start (without current limit) is purely a voltage ramp.
- Lightly loaded motors will normally reach full speed before the end of a long ramp.

(P-80 'Soft Start Time 2' is the 2nd parameter set counterpart of P-12 'Soft Start Time'.)

P-13 **Kick Ped**

Range: 60 to 90 percent Default: 75% Scaling: 1 Type: R/W

'Kick Pedestal' provides a short kick of voltage at start of ramp to dislodge sticky load.

(P-81 'Kick Pedestal 2' is the 2nd parameter set counterpart of P-13 'Kick Pedestal'.)

P-14 **Kick Time**

Range: 10 to 40 cycles Default: 25 cycles Scaling: 1 Type: R/W

'Kick Time' sets the number of cycles for which Kick Ped (P13) is applied, if selected (P51/B0).

P-15 **Dwell Time**

Range: 1 to 255 seconds Default: 5s Scaling: 1 Type: R/W

'Dwell Time' provides a period of time following soft-start allowing the load to settle, and to ensure that it is up to speed, before optimizing commences (if selected).

P-16 **Stop Ped**

Range: 10 to 60 percent Default: 10% Scaling: 1 Type: R/W

'Soft Stop Pedestal' sets the percentage of supply voltage at which the Soft Stop will cease. The actual value is affected by certain load variations.

P-17 **Stop Time**

Range: 0 to 255 seconds Default: 0s Scaling: 1 Type: R/W

'Soft Stop Time' sets the time period over which the Soft Stop Ramp is performed.

5.4.11 – 'Parameters' Menu (continued)

P-18 **Auto Config**

Range: 0 to 255 (flags) Default: 6 Scaling: 1 Type: R/W

'Auto Configuration' – Set this parameter by individual bits.

- Bit #:

0: Auto Ramp – gently ramps voltage to starter; acts somewhat like an automatic current limit.

1: Auto 3MC – enable automatic removal of low voltage ramp for high start pedestals.
'Auto 3MC' applies only to 'Start Pedestal' voltages set above 50% (P-11 or P-79). The SR44 normally does a very brief low-voltage ramp up to the pedestal voltage level before the start ramp begins, but 'Auto 3MC' applies a higher starting torque and eliminates this initial pedestal ramp for pedestal voltages above 50%.

2: Auto Bypass – enable automatic bypass contactor detection.
'Auto Bypass' turns 'On' and 'Off' the automatic detection of a bypass contactor. When 'On', a bypass contactor will be automatically detected. Soft-starter thyristor trips and thyristor short-circuit trips will be disabled during Run (after full voltage is reached). Thyristor protection and thyristor short-circuit protection are still available during the start ramp, and phase-loss protection is available during both Start and Run.

An external user-supplied current transformer is required if any of the current or power related trip or monitoring features are needed in bypass mode.
(Parameters: 8/B2, 9/B1/B2, 20, 21, 22, 23, 26, 28, 30, 32, 33, 34, 36, 39, 51/B1/B2/B3/B4, 87, 89, 91, 93, 112/B0/B1/B2/B3/B6, 121/B4)
Refer to Electrical Installation Chapter 2, subsections 2.4.1 & 2.5.2 for wiring information.

Auto Bypass detects the presence of a bypass contactor, and should be ON when using one. Using a bypass contactor with Auto Bypass in the OFF state can cause thyristor faults.

3: Auto Jog – enable automatic Jog detection; Stop requests within about 0.5 seconds of a Start request are forced to 0 stop time. Use this feature for short jogging of light loads
(For details & timing chart, refer to subsection "5.4.3 – 'Auto Features' Menu.")

4: Auto Endstop – enable Detect Stalled Motor during soft-stop, and turn off thyristors.

5: Auto Stop – detect variations in PF during stop smooth stall.

6: Auto Endstart – enable detection of full speed during Start, and complete Start ramp.

7: Auto Pedestal – enable approximate detection of motor rotation at Start, and adjust pedestal to suit.

(P-86 'Auto Configuration 2' is the 2nd parameter set counterpart of P-18 'Auto Configuration'.)

P-19 **Opt Rate**

Range: 4 to 30 Default: 5 Scaling: 1 Type: R/W

'Optimize Rate' sets the speed at which the SR44 will reduce the voltage during optimizing. Some unstable loads benefit from a slower optimizing rate

5.4.11 – 'Parameters' Menu (continued)

P-20 **Reference PF**

Range: 0 to 146.76 degrees Default: 146.76º Scaling: 0.57554 Type: R

'Reference PF' shows the Power Factor Angle that the SR44 has calculated as the target for the optimizing control loop. (Refer to Ch 3.6 for PF degrees-to-ratio conversion.)

«•» This parameter is not fully functional in Bypass Operation unless a user-supplied external current transformer is installed. (Refer to P18/B2, 'Auto Bypass'.)

P-21 **Internal PF**

Range: 0 to 146.76 degrees Default: 146.76º Scaling: 0.57554 Type: R

'Internal PF' shows the Power Factor Angle of the load.
(Refer to Ch 3.6 for PF degrees-to-ratio conversion.)

«•» This parameter is not available in Bypass Operation unless a user-supplied external current transformer is installed. (Refer to P18/B2, 'Auto Bypass'.)

P-22 **Delay Angle**

Range: 0 to 146.76 degrees Default: 146.76º Scaling: 0.57554 Type: R

'Firing Delay Angle' shows the firing delay angle (thyristor off time).

«•» This parameter is not available in Bypass Operation unless a user-supplied external current transformer is installed. (Refer to P18/B2, 'Auto Bypass'.)

P-23 **Max Angle**

Range: 17.27 to 146.76 deg Default: 57.554º Scaling: 0.57554 Type: R

'Maximum Optimizing Delay Angle' shows the maximum allowed Firing Delay Angle during optimizing. (The Optimize function reduces energy consumption by reducing voltage, but the system also senses motor conditions and automatically adjusts the maximum delay angle by which the voltage can be reduced without allowing the motor to stall.)

«•» This parameter is not fully functional in Bypass Operation unless a user-supplied external current transformer is installed. (Refer to P18/B2, 'Auto Bypass'.)

P-24 **Rated Amps (hundreds)**

Range: 0 to 3000 amps Default: 0A Scaling: 100 Type: R/W

Unit's Rated Current is stored in two bytes; parameters 24 & 25. Parameter 24 holds the number of hundreds. Parameter 25 holds the number of units. These parameters should not be changed, since they go hand-in-hand with the burden resistors installed to the board.

P-25 **Rated Amps**

Range: 1 to 99 amps Default: 5A Scaling: 1 Type: R/W

(Refer to P-24 for explanation.)

P-26 **Current**

Range: 0 to 7.9688 Amps Default: 0A Scaling: 0.03125 Type: R

'Running Current' displays the current that the motor is taking, as monitored in one phase. This is the source parameter for the Overload, Current Limit, Shearpin, Under Current Trip, etc. The divisor is 32, and the multiplier is the rated current of the unit.

«•» This parameter is not available in Bypass Operation unless a user-supplied external current transformer is installed. (Refer to P18/B2, 'Auto Bypass'.)

5.4.11 – 'Parameters' Menu (continued)

P-27 **Peak Start I**

Range: 0 to 255 Amps Default: 0A Scaling: 1 Type: R

'Peak Start Current' displays the peak current seen by the unit during the last start.
Scaling is per the running current.

P-28 **Low I Level**

Range: 0.031 to 0.7813 x I_e Default: 0.0938 x I_e Scaling: 0.03125 Type: R/W

The 'Low Current Level' parameter, if enabled, sets a level of current under which the unit will trip. This low current trip level is not active during the starting or stopping phases. The Low Current Level flag (P-112 / B3) is continually updated even if tripping is disabled.

«•» This parameter is not available in Bypass Operation unless a user-supplied external current transformer is installed. (Refer to P18/B2, 'Auto Bypass'.)

(P-87 'Low Current Level 2' is the 2nd parameter set counterpart of P-28 'Low Current Level'.)

P-29 **Low I Time**

Range: 5 to 255 cycles Default: 50 cycles Scaling: 1 Type: R/W

'Low Current Time' sets the number of cycles for which an Under Current situation must exist before tripping.

(P-88 'Low Current Time 2' is the 2nd parameter set counterpart of P-29 'Low Current Time'.)

P-30 **C/L Level**

Range: 0.375 to 7.9688 xI_e Default: 3.5 x I_e Scaling: 0.03125 Type: R/W

'Current Limit Level' sets the current level at which the the Soft Start ramp will be held.
The Current Limit only holds the ramp if its level is reached.
The current naturally falls as motor speed increases, allowing the ramp to continue.

«•» This parameter is not fully functional in Bypass Operation unless a user-supplied external current transformer is installed. (Refer to P18/B2, 'Auto Bypass'.)

(P-89 'Current Limit Level 2' is the 2nd parameter set counterpart of P-30 'Current Limit Level'.)

P-31 **C/L Time**

Range: 5 to 255 seconds Default: 30s Scaling: 1 Type: R/W

'Current Limit Time' sets the maximum time allowed for the current limit before it trips or continues the ramp regardless of motor current level.

(P-90 'Current Limit Time 2' is the 2nd parameter set counterpart of P-31 'Current Limit Time'.)

P-32 **Shear Level**

Range: 0.5 to 5 x I_e Default: 3.125 x I_e Scaling: 0.03125 Type: R/W

'Shearpin Level' sets the level of current which will cause a quick trip. Not active during Start or Stop.

«•» This parameter is not available in Bypass Operation unless a user-supplied external current transformer is installed. (Refer to P18/B2, 'Auto Bypass'.)

(P-91 'Shearpin Level 2' is the 2nd parameter set counterpart of P-32 'Shearpin Level'.)

5.4.11 – 'Parameters' Menu (continued)

P-33 **Shear Time**

Range: 5 to 255 cycles Default: 100 cycles Scaling: 1 Type: R/W

'Shearpin Time' sets the number of cycles a Shearpin Current must be present before tripping. The shearpin is active only during the running phase; not Start or Stop. The shearpin flag (P-112 / B2) is updated even if tripping is not enabled.

«•» This parameter is not available in Bypass Operation unless a user-supplied external current transformer is installed. (Refer to P18/B2, 'Auto Bypass'.)

(P-92 'Shearpin Time 2 ' is the 2nd parameter set counterpart of P-33 'Shearpin Time'.)

P-34 **Ovld Level**

Range: 0.5 to 1.25 x I_e Default: 1.0938 x I_e Scaling: 0.03125 Type: R/W

'Start of Overload Level' sets the level at which the on-board single phase Overload starts to integrate. This Overload does NOT replace an overload for the motor. The overload is designed to detect Soft Start overloads.

«•» This parameter is not available in Bypass Operation unless a user-supplied external current transformer is installed. (Refer to P18/B2, 'Auto Bypass'.)

(P-93 'Start of Overload Level 2' is the 2nd parameter set counterpart of P-34 'Start of Overload Level'.)

P-35 **Ovld Delay**

Range: 10 to 140 Default: 140 Scaling: 1 Type: R/W

'Overload Delay' sets an arbitrary delay to slow Overload integration down. The overload delay mapping is designed primarily for protection of the thyrisors.

(P-94 'Overload Delay 2' is the 2nd parameter set counterpart of P-35 'Overload Delay'.)

P-36 **% Overload**

Range: 0 to 100 percent Default: 0% Scaling: 0.39216 Type: R

'% Overload' is a status value showing how close the Overload is to tripping. (100 = tripped)

«•» This parameter is not available in Bypass Operation unless a user-supplied external current transformer is installed. (Refer to P18/B2, 'Auto Bypass'.)

P-37 **(reserved)**

P-38 **UserFlags 5 (reserved)**

Range: 0 to 255 (flags) Default: 0 Scaling: 1 Type: R/W

'User Flags 5' – (reserved)

- Bit #:

  0: (unused)
  1: Reserved
  2: Reserved
  3: (unused)
  4: (unused)
  5: (unused)
  6: (unused)
  7: (unused)

5.4.11 – 'Parameters' Menu (continued)

P-39 **PF Angle**

Range: 0 to 127.5 degrees Default: 0° Scaling: 0.5 Type: R

'Real Power Factor Angle' displays the angle by which the sine curve of the voltage in a curcuit leads the sine curve on the current in that circuit.

«•» This parameter is not available in Bypass Operation unless a user-supplied external current transformer is installed. (Refer to P18/B2, 'Auto Bypass'.)

P-40 **Supply Volts**

Range: 108 to 1000 Volts Default: 416V Scaling: 4 Type: R

'Supply Volts' is the manually entered main supply voltage.
(It also works in conjunction with Bit 1 of P-38, User Flags 5, for voltages above 500V.)

P-41 **(reserved)**

P-42 **(reserved)**

P-43 **(reserved)**

P-44 **(reserved)**

P-45 **(reserved)**

P-46 **(reserved)**

P-47 **(reserved)**

P-48 **(reserved)**

P-49 **(reserved)**

P-50 **(reserved)**

5.4.11 – 'Parameters' Menu (continued)

P-51 **User Flags 1**

Range: 0 to 255 (flags) Default: 142 Scaling: 1 Type: R/W

'User Flags 1' is a set of individual bits for user control or system status.
(Other 'User Flags' are parameters 52, 53, 95, 96, & 121. P95 is a direct 2nd set for P51.)

- Bit #:
  - 0: Kickstart – selects Kickstart (except in 3MC mode).
  - 1: Current Limit Timeout Selected – selects Trip or Continue on Current Limit Timeout.
    «•» This parameter bit is not available in Bypass Operation unless a user-supplied external current transformer is installed. (Refer to P18/B2, 'Auto Bypass'.)
  - 2: Overload Selected – selects Overload operation
    «•» This parameter bit is not available in Bypass Operation unless a user-supplied external current transformer is installed. (Refer to P18/B2, 'Auto Bypass'.)
  - 3: Shearpin Selected – selects Shearpin operation.
    «•» This parameter bit is not available in Bypass Operation unless a user-supplied external current transformer is installed. (Refer to P18/B2, 'Auto Bypass'.)
  - 4: Under Current Selected – selects Under Current operation.
    «•» This parameter bit is not available in Bypass Operation unless a user-supplied external current transformer is installed. (Refer to P18/B2, 'Auto Bypass'.)
  - 5: Thermistor Selected – not available.
  - 6: (unused)
  - 7: Terminal Starting – Start/Stop through onboard terminals

P-52 **User Flags 2**

Range: 0 to 255 (flags) Default: 0 Scaling: 1 Type: R/W

'User Flags 2' is a second set of individual bits for user control or system status.
(Other 'User Flags' are parameters 51, 53, 95, 96, & 121. P96 is a direct 2nd set for P52.)

- Bit #:
  - 0: Low Voltage Soft-Stop –
  - 1: Not Global Enable 1 – bits 1 & 2 must both be Off (0) to enable the starter
  - 2: Not Global Enable 2 – bits 1 & 2 must both be Off (0) to enable the starter
  - 3: Pod Start/Stop
  - 4: Board Start/Stop
  - 5: Main Contactor
  - 6: Second Parameter Set
  - 7: Zero Start Time

5.4.11 – 'Parameters' Menu (continued)

P-53 **User Flags 3**

Range: 0 to 255 (flags) Default: 51 Scaling: 1 Type: R/W

'User Flags 3' is a second set of individual bits for user control or system status. (Other 'User Flags' are parameters 51, 52, 95, 96, & 121.)

- Bit #:
  - 0: pf1 polarity
  - 1: pf2 polarity
  - 2: User Current Limit
  - 3: User Trip
  - 4: Invert Controller Input
  - 5: Cooling (Inhibit Restart)
  - 6: (Unused)
  - 7: (Unused)

P-54 **I/O Polarity**

Range: 0 to 255 (flags) Default: 255 Scaling: 1 Type: R/W

'I/O Polarity' sets the I/O polarity for output relays K1 & K2, and input I/p1; i.e. 1-to-1 or 1-to-0.

- Bit #:
  - 0: K1 Polarity
  - 1: K2 Polarity
  - 2: (Unused)
  - 3: (Unused)
  - 4: I/p 1 Polarity
  - 5: (Unused)
  - 6: (Unused)
  - 7: (Unused)

P-55 **(reserved)**

P-56 **(reserved)**

5.4.11 – 'Parameters' Menu (continued)

P-57 **K1 Map**

Range: 0 to 123 parameter # Default: 52 parameter Scaling: 1 Type: R/W

'Map K1 To' holds the parameter # for the internal starter function assigned to drive the K1 relay output. (Works in conjunction with P58.)

- Refer to Appendix A.1.12 or A.1.13 in the "Programming" chapter.

P-58 **K1 Bit Mask**

Range: 0 to 255 bit mask Default: 32 Scaling: 1 Type: R/W

'K1 Bit Mask' holds the parameter bit # for the internal starter function assigned to drive the K1 relay output. (Works in conjunction with P57.)

P-59 **K2 Map**

Range: 0 to 123 parameter # Default: 8 parameter Scaling: 1 Type: R/W

'Map K2 To' holds the parameter # for the internal starter function assigned to drive the K2 relay output. (Works in conjunction with P60.)

- Refer to Appendix A.1.12 or A.1.13 in the "Programming" chapter.

P-60 **K2 Bit Mask**

Range: 0 to 128 bit mask Default: 8 Scaling: 1 Type: R/W

'K2 Bit Mask' holds the parameter bit # for the internal starter function assigned to drive the K2 relay output. (Works in conjunction with P59.)

P-61 **(reserved)**

P-62 **(reserved)**

P-63 **(reserved)**

P-64 **(reserved)**

P-65 **i/p1 Map**

Range: 0 to 123 parameter # Default: 52 parameter Scaling: 1 Type: R/W

'I/p1 Map To' holds the Parameter # of the User Flag that contains the internal starter function assigned to be driven by the I/p1 input (S1, S0). (Works in conjunction with P66.)

User Flag mapping through parameters 65, 66.
65, 66 = the source User Flag address; 65 = parameter; 66 = bit mask.

P-66 **i/p1 bit Msk**

Range: 0 to 128 bit mask Default: 16 Scaling: 1 Type: R/W

'I/p1 Bit Mask' holds the parameter bit # of the User Flag that contains the internal starter function assigned to be driven by the I/p1 input (S1, S0). (Works in conjunction with P65.)

User Flag mapping through parameters 65, 66.
65, 66 = the source User Flag address; 65 = parameter; 66 = bit mask.

5.4.11 – 'Parameters' Menu (continued)

P-67 **(reserved)**

P-68 **(reserved)**

P-69 **(reserved)**

P-70 **(reserved)**

P-71 **Cntactor Dly**

Range: 100 to 800 milli-seconds Default: 160 ms Scaling: 4 Type: R/W

'Contactor Delay'. Following a start command, this is the delay allowed for the main incoming contactor to close. After this time, a phase loss detection routine checks the incoming supply.

P-72 **Trip Snstvty**

Range: 1 to 15 Default: 1 Scaling: 1 Type: R/W

'Trip Sensitivity' holds an arbitrary number to adjust the sensitivity of the fault trips of P-127, 'Hidden Trip Flags'. The larger the setting of P-72, the slower the trips of P-127.

Affected trips (P-127 'Hidden Trip Flags'):

Trip 1 – 'Phase Loss'
Trip 4 – 'SCR Firing' (Thyristor Sensing Trip Type C)
Trip 5 – 'SCR Signal' (Edge Sensing Trip)
Trip 6 – 'SCR Signal' (Sensing Trip Type A)
Trip 7 – 'Sensing Signal' (Sensing Trip Type B)
Trip 8 – 'SCR Loss Motor' (Motor-Side Thyristor Loss)
Trip 9 – 'Sensing Signal' (Thyristor Sensing Trip Type A)
Trip 10 – 'SCR Shorted' (Thyristor Sensing Trip Type B)

P-73 **Last Trip**

Range: 0 to 17 trip number Default: 0 Scaling: 1 Type: R

'Last Trip' holds the number of the last trip.

- Trip #:

E0 – no trip
E1 – Phase Loss
E2 – Too Hot
E3,5,6 – SCR Signal
E4 – SCR Firing
E7,8,9 – Sensing Signal
E10 – SCR Shorted
E11 – Low Current
E12 – C/L Time Out
E13 – Overload
E14 – Shearpin
E15 – Thermistor – not available
E16 – External trip
E17 – Comms Timeout

5.4.11 – 'Parameters' Menu (continued)

P-74 **2nd Last Trp**

Range: 0 to 17 trip number Default: 0 Scaling: 1 Type: R

'2nd Last Trip' holds the number of the second to last trip.

• Trip #:

E0 – no trip
E1 – Phase Loss
E2 – Too Hot
E3,5,6 – SCR Signal
E4 – SCR Firing
E7,8,9 – Sensing Signal
E10 – SCR Shorted
E11 – Low Current
E12 – C/L Time Out
E13 – Overload
E14 – Shearpin
E15 – Thermistor – not available
E16 – External trip
E17 – Comms Timeout

P-75 **3rd Last Trp**

Range: 0 to 17 trip number Default: 0 Scaling: 1 Type: R

'3rd Last Trip' holds the number of the third to last trip.

• Trip #:

E0 – no trip
E1 – Phase Loss
E2 – Too Hot
E3,5,6 – SCR Signal
E4 – SCR Firing
E7,8,9 – Sensing Signal
E10 – SCR Shorted
E11 – Low Current
E12 – C/L Time Out
E13 – Overload
E14 – Shearpin
E15 – Thermistor – not available
E16 – External trip
E17 – Comms Timeout

5.4.11 – 'Parameters' Menu (continued)

P-76 **4th Last Trp**

Range: 0 to 17 trip number Default: 0 Scaling: 1 Type: R

'4th Last Trip' holds the number of the fourth to last trip.

• Trip #:

E0 – no trip
E1 – Phase Loss
E2 – Too Hot
E3,5,6 – SCR Signal
E4 – SCR Firing
E7,8,9 – Sensing Signal
E10 – SCR Shorted
E11 – Low Current
E12 – C/L Time Out
E13 – Overload
E14 – Shearpin
E15 – Thermistor – not available
E16 – External trip
E17 – Comms Timeout

P-77 **5th Last Trp**

Range: 0 to 17 trip number Default: 0 Scaling: 1 Type: R

'5th Last Trip' holds the number of the fifth to last trip.

• Trip #:

E0 – no trip
E1 – Phase Loss
E2 – Too Hot
E3,5,6 – SCR Signal
E4 – SCR Firing
E7,8,9 – Sensing Signal
E10 – SCR Shorted
E11 – Low Current
E12 – C/L Time Out
E13 – Overload
E14 – Shearpin
E15 – Thermistor – not available
E16 – External trip
E17 – Comms Timeout

5.4.11 – 'Parameters' Menu (continued)

P-78 through P-96 define the 2nd parameter set, which can be used to define a different Start/Stop profile. See appendix A.2.1 (Using An Alternative Parameter Group) for more information.

P-78 **Protection 2**

Range: 0 to 192 Default: 192 Scaling: 1 Type: R/W

'Protection Mode 2' – Use with 2nd parameter set.

'Protection Mode 2' controls which trips are available; for use with second parameter set:

- 64 = FULL = full protection with full volts after top of ramp; optimizing function turned off
- 192 = FULL+OPTIMIZE = full protection + optimize
- 128 = START+BYPASS = protection during start; then bypass
- 0 = PHASE LOSS ONLY = I/p phase loss detection only

Start and Optimize mode is forced to 'FULL' Protection Mode when 'Delta' Firing Mode is selected (P-6 = 1). In 'PHASE LOSS ONLY' Protection Mode (P-78 = 0), the bottom 12.5% of starter current is ignored after TOR (Top Of Ramp).

(P-7 'Protection Mode' is the 1st parameter set counterpart of P-78 'Protection Mode 2'.)

P-79 **Start Ped 2**

Range: 10 to 60 percent Default: 50% Scaling: 1 Type: R/W

'Start Pedestal 2' – Use with 2nd parameter set.

'Start Pedestal 2' sets the percentage of the unit's rated supply voltage that is applied to the load before the ramp starts.

(P-11 'Start Ped' is the 1st parameter set counterpart of P-79 'Start Ped 2'.)

P-80 **Start Time 2**

Range: 1 to 255 seconds Default: 5s Scaling: 1 Type: R/W

'Soft Start Time 2' – Use with 2nd parameter set.

'Soft Start Time 2' sets the soft-start time period over which the unit ramps voltage to the motor.

- Start times are normally in the 5–30s range.
- Long ramp times over 1minute are for special applications only.
- The start (without current limit) is purely a voltage ramp.
- Lightly loaded motors will normally reach full speed before the end of a long ramp.

(P-12 'Start Time' is the 1st parameter set counterpart of P-80 'Start Time 2'.)

P-81 **Kick Ped 2**

Range: 60 to 90 percent Default: 75% Scaling: 1 Type: R/W

'Kick Pedestal 2' – Use with 2nd parameter set.

'Kick Pedestal 2' provides a short kick of voltage at start of ramp to dislodge sticky load.

(P-13 'Kick Pedestal' is the 1st parameter set counterpart of P-81 'Kick Pedestal 2'.)

5.4.11 – 'Parameters' Menu (continued)

P-82 **Kick Time 2**

Range: 10 to 40 cycles Default: 25 cycles Scaling: 1 Type: R/W

'Kick Time 2' – Use with 2nd parameter set.

'Kick Time 2' sets the number of cycles for which Kick Ped 2 (P81) is applied, if selected (P95/B0).

(P-14 'Kick Time' is the 1st parameter set counterpart of P-82 'Kick Time 2'.)

P-83 **Dwell Time 2**

Range: 1 to 255 seconds Default: 5s Scaling: 1 Type: R/W

'Dwell Time 2' – Use with 2nd parameter set.

'Dwell Time 2' provides a period of time following soft-start allowing the load to settle, and to ensure that it is up to speed, before optimizing commences (if selected).

(P-15 'Dwell Time' is the 1st parameter set counterpart of P-83 'Dwell Time 2'.)

P-84 **Stop ped 2**

Range: 10 to 60 percent Default: 10% Scaling: 1 Type: R/W

'Soft Stop Pedestal 2' – Use with 2nd parameter set.

'Soft Stop Pedestal 2' sets the percentage of supply voltage at which the Soft Stop will cease. The actual value is affected by certain load variations.

(P-16 'Soft Stop Pedestal' is the 1st parameter set counterpart of P-84 'Soft Stop Pedestal 2'.)

P-85 **Stop Time 2**

Range: 0 to 255 seconds Default: 0s Scaling: 1 Type: R/W

'Soft Stop Time 2' – Use with 2nd parameter set.

'Soft Stop Time 2' sets the time period over which the Soft Stop Ramp is performed.

(P-17 'Soft Stop Time' is the 1st parameter set counterpart of P-85 'Soft Stop Time 2'.)

5.4.11 – 'Parameters' Menu (continued)

P-86 **AutoConfig 2**

Range: 0 to 255 (flags) Default: 6 Scaling: 1 Type: R/W

'Auto Configuration 2' – Use with 2nd parameter set.
– Set this parameter by individual bits.

• Bit #:

0: Auto Ramp – gently ramps voltage to starter; acts somewhat like an automatic current limit.

1: Auto 3MC – enable automatic removal of low voltage ramp for high start pedestals.
'Auto 3MC' applies only to 'Start Pedestal' voltages set above 50% (P-11 or P-79). The SR44 normally does a very brief low-voltage ramp up to the pedestal voltage level before the start ramp begins, but 'Auto 3MC' applies a higher starting torque and eliminates this initial pedestal ramp for pedestal voltages above 50%.

2: Auto Bypass – enable automatic bypass contactor detection.
'Auto Bypass' turns 'On' and 'Off' the automatic detection of a bypass contactor. When 'On', a bypass contactor will be automatically detected. Soft-starter thyristor trips and thyristor short-circuit trips will be disabled during Run (after full voltage is reached). Thyristor protection and thyristor short-circuit protection are still available during the start ramp, and phase-loss protection is available during both Start and Run.

An external user-supplied current transformer is required if any of the current or power related trip or monitoring features are needed in bypass mode.
(Parameters: 8/B2, 9/B1/B2, 20, 21, 22, 23, 26, 28, 30, 32, 33, 34, 36, 39, 51/B1/B2/B3/B4, 87, 89, 91, 93, 112/B0/B1/B2/B3/B6, 121/B4)
Refer to Electrical Installation Chapter 2, subsections 2.4.1 & 2.5.2 for wiring information.

Auto Bypass detects the presence of a bypass contactor, and should be ON when using one. Using a bypass contactor with Auto Bypass in the OFF state can cause thyristor faults.

3: Auto Jog – enable automatic Jog detection; Stop requests within about 0.5 seconds of a Start request are forced to 0 stop time. Use this feature for short jogging of light loads
(For details & timing chart, refer to subsection "5.4.3 – 'Auto Features' Menu.")

4: Auto Endstop – enable Detect Stalled Motor during soft-stop, and turn off thyristors.

5: Auto Stop – detect variations in PF during stop smooth stall.

6: Auto Endstart – enable detection of full speed during Start, and complete Start ramp.

7: Auto Pedestal – enable approximate detection of motor rotation at Start, and adjust pedestal to suit.

(P-18 'Auto Configuration' is the 1st parameter set counterpart of P-86 'Auto Configuration 2'.)

P-87 **Low I 2**

Range: 0 to 0.7813 x I_e Default: 0.125 x I_e Scaling: 0.03125 Type: R/W

'Low Current Level 2' – Use with 2nd parameter set.

The 'Low Current Level 2' parameter, if enabled, sets a level of current under which the unit will trip. This low current trip level is not active during the starting or stopping phases. The Low Current Level flag is continually updated even if tripping is disabled.

«•» This parameter is not available in Bypass Operation unless a user-supplied external current transformer is installed. (Refer to P18/B2, 'Auto Bypass'.)

(P-28 'Low Current Level' is the 1st parameter set counterpart of P-87 'Low Current Level 2'.)

5.4.11 – 'Parameters' Menu (continued)

P-88 **Low I time 2**

Range: 5 to 255 cycles Default: 50 cycles Scaling: 1 Type: R/W

'Low Current Time 2' – Use with 2nd parameter set.

'Low Current Time 2' sets the number of cycles for which an Under Current situation must exist before tripping.

(P-29 'Low Current Time' is the 1st parameter set counterpart of P-88 'Low Current Time 2'.)

P-89 **C/L 2**

Range: 0.375 to 7.9688 xI_e Default: 4 xI_e Scaling: 0.03125 Type: R/W

'Current Limit Level 2' – Use with 2nd parameter set.

'Current Limit Level 2' sets the current level at which the the Soft Start ramp will be held.
The Current Limit only holds the ramp if its level is reached.
The current naturally falls as motor speed increases, allowing the ramp to continue.

«•» This parameter is not available in Bypass Operation unless a user-supplied external current transformer is installed. (Refer to P18/B2, 'Auto Bypass'.)

(P-30 'Current Limit Level' is the 1st parameter set counterpart of P-89 'Current Limit Level 2'.)

P-90 **C/L Time 2**

Range: 5 to 255 seconds Default: 15s Scaling: 1 Type: R/W

'Current Limit Time 2' – Use with 2nd parameter set.

'Current Limit Time' sets the maximum time allowed for the current limit before it trips or continues the ramp regardless of motor current level.

(P-31 'Current Limit Time' is the 1st parameter set counterpart of P-90 'Current Limit Time 2'.)

P-91 **Shearpin 2** (external CT required for bypass mode; see P-86/Bit-2 for note)

Range: 1.063 to 5 x I_e Default: 3 x I_e Scaling: 0.03125 Type: R/W

'Shearpin Level 2' – Use with 2nd parameter set.

'Shearpin Level 2' sets the level of current which will cause a quick trip.
Not active during Start or Stop.

«•» This parameter is not available in Bypass Operation unless a user-supplied external current transformer is installed. (Refer to P18/B2, 'Auto Bypass'.)

(P-32 'Shearpin Level' is the 1st parameter set counterpart of P-91 'Shearpin Level 2'.)

P-92 **Shear time 2** (external CT required for bypass mode; see P-86/Bit-2 for note)

Range: 5 to 255 cycles Default: 50 cycles Scaling: 1 Type: R/W

'Shearpin Time 2' – Use with 2nd parameter set.

'Shearpin Time 2' sets the number of cycles a Shearpin Current must be present before tripping. The shearpin is only active during the running phase; not Start or Stop. The shearpin flag (P-95 / Bit 3) is updated even if tripping is not enabled.

«•» This parameter is not available in Bypass Operation unless a user-supplied external current transformer is installed. (Refer to P18/B2, 'Auto Bypass'.)

(P-33 'Shearpin Time' is the 1st parameter set counterpart of P-92 'Shearpin Time 2.')

5.4.11 – 'Parameters' Menu (continued)

P-93 **Ovld Level 2**

Range: 0.5 to 1.25 x I_e Default: 1.0938 x I_e Scaling: 0.03125 Type: R/W

'Start of Overload Level 2' – Use with 2nd parameter set.

'Start of Overload Level 2' sets the level at which the on-board single phase Overload starts to integrate. This Overload does NOT replace an overload for the motor. The overload is designed to detect Soft Start overloads.

«•» This parameter is not available in Bypass Operation unless a user-supplied external current transformer is installed. (Refer to P18/B2, 'Auto Bypass'.)

(P-34 'Start of Overload Level' is the 1st parameter set counterpart of P-93 'Start of Overload Level 2'.)

P-94 **Ovld Delay 2**

Range: 10 to 140 Default: 140 Scaling: 1 Type: R/W

'Overload Delay 2' – Use with 2nd parameter set.

'Overload Delay' sets an arbitrary delay to slow Overload integration down. The overload delay mapping is designed primarily for protection of the thyrisors.

(P-35 'Overload Delay' is the 1st parameter set counterpart of P-94 'Overload Delay 2'.)

5.4.11 – 'Parameters' Menu (continued)

P-95 **User Flags12**

Range: 0 to 255 (flags) Default: 134 Scaling: 1 Type: R/W

'User Flags 1, 2' – Use with 2nd parameter set.

'User Flags 1, 2' is a set of individual bits for user control or system status.
(Other 'User Flags' are parameters 51, 52, 53, 96, & 121. P95 is a direct 2nd set for P51.)

- Bit #:

  0: Kickstart – selects Kickstart (except in 3MC mode).

  1: Current Limit Timeout Selected – selects Trip or Continue on Current Limit Timeout.
  «•» This parameter bit is not available in Bypass Operation unless a user-supplied external current transformer is installed. (Refer to P18/B2, 'Auto Bypass'.)

  2: Overload Selected – selects Overload operation
  «•» This parameter bit is not available in Bypass Operation unless a user-supplied external current transformer is installed. (Refer to P18/B2, 'Auto Bypass'.)

  3: Shearpin Selected – selects Shearpin operation.
  «•» This parameter bit is not available in Bypass Operation unless a user-supplied external current transformer is installed. (Refer to P18/B2, 'Auto Bypass'.)

  4: Under Current Selected – selects Under Current operation.
  «•» This parameter bit is not available in Bypass Operation unless a user-supplied external current transformer is installed. (Refer to P18/B2, 'Auto Bypass'.)

  5: Thermistor Selected – not available.

  6: (unused)

  7: Terminal Starting – Start/Stop through onboard terminals.

P-96 **User Flags22**

Range: 0 to 255 (flags) Default: 64 Scaling: 1 Type: R/W

'User Flags 2, 2' – Use with 2nd parameter set.

'User Flags 2, 2' is a set of individual bits for user control or system status.
(Other 'User Flags' are parameters 51, 52, 53, 95, & 121. P96 is a direct 2nd set for P52.)

- Bit #:

  0: Low Voltage Soft-Stop –

  1: Not Global Enable 1 – bits 1 & 2 must both be Off (0) to enable the starter

  2: Not Global Enable 2 – bits 1 & 2 must both be Off (0) to enable the starter

  3: Pod Start/Stop

  4: Board Start/Stop

  5: Main Contactor

  6: Second Parameter Set

  7: Zero Start Time

5.4.11 – 'Parameters' Menu (continued)

P-97 **U1 I/P srce**

Range: 0 to 125 parameter # Default: 0 Scaling: 1 Type: R/W

The 'ipf1_addr' parameter holds the parameter # for the internal starter input function assigned to drive the P99 internal starter output function. (Works in conjunction with P98.)

User Flag mapping through parameters 97, 98, 99, 100.
97, 98 = the source flag address; 97 = parameter; 98 = bit mask.
99, 100 = the destination flag address; 99 = parameter; 100 = bit mask.

P-98 **U1 I/P Mask**

Range: 0 to 128 bit mask Default: 0 Scaling: 1 Type: R/W

The 'ipf1_mask' parameter holds the parameter bit # for the internal starter input function assigned to drive the P99 internal starter output function. (Works in conjunction with P97.)

User Flag mapping through parameters 97, 98, 99, 100.
97, 98 = the source flag address; 97 = parameter; 98 = bit mask.
99, 100 = the destination flag address; 99 = parameter; 100 = bit mask.

P-99 **U1 O/P Dest**

Range: 0 to 125 parameter # Default: 0 Scaling: 1 Type: R/W

The 'opf1_addr' parameter holds the parameter # for the internal starter output function assigned to be driven by the P97 internal starter input function. (Works in conjunction with P100.)

User Flag mapping through parameters 97, 98, 99, 100.
97, 98 = the source flag address; 97 = parameter; 98 = bit mask.
99, 100 = the destination flag address; 99 = parameter; 100 = bit mask.

P-100 **U1 O/P Mask**

Range: 0 to 255 bit mask Default: 0 Scaling: 1 Type: R/W

The 'opf1_mask' parameter holds the parameter bit # for the internal starter ouput function assigned to be driven by the P97 internal starter input function. (Works in conjunction with P99.)

User Flag mapping through parameters 97, 98, 99, 100.
97, 98 = the source flag address; 97 = parameter; 98 = bit mask.
99, 100 = the destination flag address; 99 = parameter; 100 = bit mask.

5.4.11 – 'Parameters' Menu (continued)

P-101 **U2 I/P srce**

Range: 0 to 125 parameter # Default: 0 Scaling: 1 Type: R/W

The 'ipf2_addr' parameter holds the parameter # for the internal starter input function assigned to drive the P103 internal starter output function. (Works in conjunction with P102.)

User Flag mapping through parameters 101, 102, 103, 104.
101, 102 = the source flag address; 101 = parameter; 102 = bit mask.
103, 104 = the destination flag address; 103 = parameter; 104 = bit mask.

P-102 **U2 I/P Mask**

Range: 0 to 20 bit mask Default: 0 Scaling: 1 Type: R/W

The 'ipf2_mask' parameter holds the parameter bit # for the internal starter input function assigned to drive the P103 internal starter output function. (Works in conjunction with P101.)

User Flag mapping through parameters 101, 102, 103, 104.
101, 102 = the source flag address; 101 = parameter; 102 = bit mask.
103, 104 = the destination flag address; 103 = parameter; 104 = bit mask.

P-103 **U2 O/P Dest**

Range: 0 to 125 parameter # Default: 0 Scaling: 1 Type: R/W

The 'opf2_addr' parameter holds the parameter # for the internal starter output function assigned to be driven by the P101 internal starter input function. (Works in conjunction with P104.)

User Flag mapping through parameters 101, 102, 103, 104.
101, 102 = the source flag address; 101 = parameter; 102 = bit mask.
103, 104 = the destination flag address; 103 = parameter; 104 = bit mask.

P-104 **U2 O/P Mask**

Range: 0 to 11 bit mask Default: 0 Scaling: 1 Type: R/W

The 'opf2_mask' parameter holds the parameter bit # for the internal starter ouput function assigned to be driven by the P101 internal starter input function.
(Works in conjunction with P103.)

User Flag mapping through parameters 101, 102, 103, 104.
101, 102 = the source flag address; 101 = parameter; 102 = bit mask.
103, 104 = the destination flag address; 103 = parameter; 104 = bit mask.

5.4.11 – 'Parameters' Menu (continued)

P-105 **(reserved)**

P-106 **(reserved)**

P-107 **(reserved)**

P-108 **(reserved)**

P-109 **Bypass Upper Limit**

Range: 1 to 50 Default: 12 Scaling: 1 Type: R/W

Bypass Upper Limit

- Associated with P121/B4, Optimize +.
  «•» This parameter bit is not fully functional in Bypass Operation unless a user-supplied external current transformer is installed. (Refer to P18/B2, 'Auto Bypass'.)
- Typically set about 80% of motor FLC.
- Current required = (motor FLC / SR44 FLC)*(32)

P-110 **Bypass Lower Limit**

Range: 0 to 150 Default: 10 Scaling: 1 Type: R/W

Bypass Lower Limit

- Associated with P121/B4, Optimize +.
  «•» This parameter bit is not fully functional in Bypass Operation unless a user-supplied external current transformer is installed. (Refer to P18/B2, 'Auto Bypass'.)
- Typically set about 40% of motor FLC.
- Current required = (motor FLC / SR44 FLC)*(32)

P-111 **(reserved)**

5.4.11 – 'Parameters' Menu (continued)

P-112 **Status 4**

Range: 0 to 255 (flags) Default: 0 Scaling: 1 Type: R

'Status 4' flags – Read this parameter by individual bits.

- Bit #:

0: 60 Hz – the unit is using 60 Hz parameters.
«•» This parameter bit is not fully functional in Bypass Operation unless a user-supplied external current transformer is installed. (Refer to P18/B2, 'Auto Bypass'.)

1: Phase Rotation Sequence – the phase rotation detected at start was ….
«•» This parameter bit is not fully functional in Bypass Operation unless a user-supplied external current transformer is installed. (Refer to P18/B2, 'Auto Bypass'.)

2: Shearpin – current is above Shearpin level.
«•» This parameter bit is not available in Bypass Operation unless a user-supplied external current transformer is installed. (Refer to P18/B2, 'Auto Bypass'.)

3: Under Current – current is below Under Current level.
«•» This parameter bit is not available in Bypass Operation unless a user-supplied external current transformer is installed. (Refer to P18/B2, 'Auto Bypass'.)

4: Thermistor – not available.

5: Timeout – Current Limit has timed out.

6: Overload – overload has passed Trip Level.
«•» This parameter bit is not available in Bypass Operation unless a user-supplied external current transformer is installed. (Refer to P18/B2, 'Auto Bypass'.)

7: Thermal Switch – heatsink is above max allowed temperature.

P-113 **(reserved)**

P-114 **StopProfile**

Range: 0 to 100 Default: 0 Scaling: 1 Type: R/W

'Soft Switch Off' – system variable

P-115 **Last App**

Range: 0 to 255 Default: 0 Scaling: 1 Type: R/W

'Selected App' – Value selected from application table.

P-116 **CoolingTime**

Range: 0 to 63.75 minutes Default: varies per model Scaling: 0.25 Type: R/W

'Cooling Inhibit Time'

Time for which the unit is not allowed to restart; display shows "Stopped.Cooling". Mainly for larger stacks to avoid destroying thyristors during commisioning.

This parameter holds the time in seconds that the soft-start unit will ignore a start signal if 'Cooling' is turned on (P53/B5). By default, this is set to zero (0) for units of less than 242A. For units of 242A and above, the default value is 420 seconds (7 mins). (Changes should be entered in seconds.) The default value can be extended, but it should NOT be reduced as it will invalidate the manufacturer's warranty.

5.4.11 – 'Parameters' Menu (continued)

P-117 **(reserved)**

P-118 **(reserved)**

P-119 **(reserved)**

P-120 **Status 5**

Range: 0 to 255 (flags) Default: 0 Scaling: 1 Type: R

'Status 5' flags – Read this parameter by individual bits.

• Bit #:

0: Over Temperature –
inhibits re-start if set; effectively the heatsink is too hot to start, but is OK to run.

1: Offline Command Fail –
the last offline command failed; automatically resets when the next command is attempted.

2: (unused)

3: Fan Status – used in conjunction with an output relay to control fans

4: (unused)

5: (unused)

6: (unused)

7: (unused)

P-121 **UserFlags 4**

Range: 0 to 255 (flags) Default: 0 Scaling: 1 Type: R/W

'User Flags 4' is a fourth set of individual bits for user control or system status.
(Other 'User Flags' are parameters 51, 52, 53, 95, & 96.)

• Bit #:

0: Impact Load – limit max delay adjustment in optimizing for highly volatile loads.

1: (unused)

2: Auto Soft Stop Smoothing – Enable P-122 Soft Stop Smoothing for pumps.

3: Breaker Present (Line Contactor)
If the starter is to be used with a circuit breaker, then set bit 3 to a one (1).
Read the description of the "Line Contactor" Menu Item in section 5.4.5 ("Advanced Menu") for a more detailed explanation of this functionality.
• 0 = 'Line Contactor'
• 1 = 'Breaker Present'

4: Optimize + – gains the maximum amount of energy savings on variable loads.
• Requires an external user-supplied bypass contactor and current transformer
• Associated with P109 Upper Limit and P110 Lower Limit
When motor is lightly loaded as set in P110, the bypass contactor is de-energized to run the motor from the soft starter in Energy Optimizing mode. When motor is heavily loaded as set in P109, the bypass contactor is energized to eliminate the soft starter thyristor losses.

'Optimise +' requires an external user-supplied bypass contactor and current transformer. See Electrical Installation Chapter 2, subsections 2.4.1 & 2.5.2 for details.

5: Quick Ramp Times – selects ramp times to be 10 times faster than the value entered, although min = 0.3 seconds.

6: Two Stop Bits – when set, the comms will have two stop bits.

7: Auto Stop (2) – alternative stopping method.

5.4.11 – 'Parameters' Menu (continued)

P-122 **Stop Smooth**

Range: 1 to 25 Default: 5 Scaling: 1 Type: R/W

'Auto Soft Stop Smoothing' is an arbitrary filter to smooth soft stop jitters caused by unstable load. This feature is turned ON or OFF by Bit 2 of Parameter 121.

P-123 **Temp/Alt Derate**

Range: 0 to 50 percent Default: 0% Scaling: 1 Type: R/W

This parameter enables the user to derate by percentage of Unit Full Load current, where local temperature or altitude is outside of the normal operating range. (Refer to the Mechanical Installation chapter for temperature and altitude specs.)

5.4.11 – 'Parameters' Menu (continued)

P-124 **Off-Line Command**

Range: 0 to 255 Default: 0 Scaling: 1 Type: R/W

Used by serial communication.

1 = Disable
2 = Enable
3 = Bus Starting
4 = Remote Starting
5 = Reset Starter
6 = Reset Trip
7 = Bus Start
8 = Bus Stop
9 = Load EEROM from Defaults
10 = Load RAM from EEROM
11 = Save RAM to EEROM

P-125 **(reserved)**

P-126 **Comms Trip**

Range: 0 to 255 Default: 0 Scaling: 1 Type: R/W

'Bus Action on Fail' – Action following a bus failure: (Active only with certain Comms Options.)

0 = No Trip; 1 = Trip.

P-127 **Trip Flags**

Range: 0 to 255 (flags) Default: 0 Scaling: 1 Type: R/W

'Hidden Trip Flags' – Enable or Disable certain trips. Read/Write this parameter by individual bits. (This parameter is for Diagnostic Purposes; 0 = Trip Disabled; 1 = Trip Enabled.)

- Bit #:

0: Trip 1 Enabled – enable or disable Trip 1 – 'Phase Loss'
1: Trip 8 Enabled – enable or disable Trip 8 – 'SCR Loss Motor' (Motor-Side Thyristor Loss)
2: Trip 9 Enabled – enable or disable Trip 9 – 'Sensing Signal' (Thyristor Sensing Trip Type A)
3: Trip 10 Enabled – enable or disable Trip 10 – 'SCR Shorted' (Thyristor Sensing Trip Type B)
4: Trip 4 Enabled – enable or disable Trip 4 – 'SCR Firing' (Thyristor Sensing Trip Type C)
5: Trip 5 Enabled – enable or disable Trip 5 – 'SCR Signal' (Edge Sensing Trip)
6: Trip 6 Enabled – enable or disable Trip 6 – 'SCR Signal' (Sensing Trip Type A)
7: Trip 7 Enabled – enable or disable Trip 7 – 'Sensing Signal' (Sensing Trip Type B)

(P-72 'Trip Sensitivity' determines the sensitivity of these P-127 trips.)

5.4.12 – 'Trips' Menu

This menu holds all the parameters that are associated with control of the various trips

–	**Trips**

Range: 0 to 17 trip number Default: 0

The 'Trips' sub-menu accesses a trip history of the unit's last five trips. These trips are recorded automatically, and need no intervention from the user. They are useful in troubleshooting a unit.

Most trips can be turned off, either via this menu, or through the 'Trip Byte', P127, or via the 'Current' menu for the current related trips. Below is a list of each trip condition used by the SR44.

Trip Numbers and Explanations:

- 01 'Phase Loss' – One or more input phases are missing at start, during the ramp, and after full voltage; even when running on bypass. (See section 5.4.5, Line Contactor.)
- 02 'Too Hot' – Soft starter heat sink is too hot. (This trip applies only to units SR44-30 and larger.)
- 03 'Comms' – Errors in serial communications while communications are still active between the user interface and the Soft Starter.
- 04 'SCR Firing' (Thyristor Sensing Trip Type C) – Short-circuit thyristor after full voltage.
- 05 'SCR Signal' (Edge Sensing Trip) – Short-circuit thyristor during the ramp and after full voltage. Motor-side phase loss during the ramp and after full voltage.
- 06 'SCR Signal' (Sensing Trip Type A) – Short-circuit thyristor during the ramp and after full voltage. Motor-side phase loss during the ramp and after full voltage. Input-side phase loss during the ramp and after full voltage.
- 07 'Sensing Signal' (Sensing Trip Type B) – Short-circuit thyristor or external noise during the ramp and after full voltage. Motor-side phase loss during the ramp and after full voltage.
- 08 'SCR Loss Motor' (Motor-Side Thyristor Loss) – Short-circuit thyristor at the start. Motor-side phase loss at the start.
- 09 'Sensing Signal' (Thyristor Sensing Trip Type A) – Short-circuit thyristor or external noise during the ramp and after full voltage.
- 10 'SCR Shorted' (Thyristor Sensing Trip Type B) – Short-circuit thyristor during the ramp. Motor-side phase loss during the ramp.
- 11 'Low Current' – Output current falls below a previously set level (P28 'Low Amps Level') for a specified time (P29 'Low Amps Time'). Active only during the running stage.
- 12 'C/L Time Out' – During start-up ramp, output current exeeds the 'Current Limit' level (P30) for the time specified in 'Limit Time Out' (P31).
- 13 'Overload' – Output current exceeds the previously set 'Overload Level' (P34) and 'Overload Delay' time (P35). Active in all stages of operation. (See section 5.4.5, "Overload Explanation Diagram".)
- 14 'Shearpin' – Output current exceeds the previously set 'Shearpin Level' (P32) for a time set in 'Shearpin Time' (P33). Active only during the running stage. (See section 5.4.5, "Shearpin Explanation Diagram".)
- 15 Unused
- 16 'User' – A trip which can be triggered by the customer via a variety of means, e.g., through the serial comms or via a programmable input.
- 17 'Comms Timeout' – No communication on the serial connection for more than five seconds.

5.4.12 – 'Trips' Menu (continued)

'Trips' Sub-menu of 'Trips' Menu

(P-73) **Last Trip ('Trips' sub-menu of 'Trips' menu)**

'Last Trip' holds the number of the last trip.

(P-74) **2nd Last Trp ('Trips' sub-menu of 'Trips' menu)**

'2nd Last Trip' holds the number of the second to last trip.

(P-75) **3rd Last Trp ('Trips' sub-menu of 'Trips' menu)**

'3rd Last Trip' holds the number of the third to last trip.

(P-76) **4th Last Trp ('Trips' sub-menu of 'Trips' menu)**

'4th Last Trip' holds the number of the fourth to last trip.

(P-77) **5th Last Trp ('Trips' sub-menu of 'Trips' menu)**

'5th Last Trip' holds the number of the fifth to last trip.

(P-72) **Trip Sensitivity**

Range: 1 to 15 Default: 1 Scaling: n/a Type: R/W

'Trip Sensitivity' holds an arbitrary number to adjust the sensitivity of the fault trips of P-127, 'Hidden Trip Flags'. The larger the setting of P-72, the slower the trips of P-127.

(P-126) **P126 Comms Trip**

Range: 0 to 255 Default: 0 Scaling: n/a Type: R/W

'Bus Action on Fail' – Action following a bus failure: (Active only with certain Comms Options.)

0 = No Trip; 1 = Trip.

(P53.B5) **Cooling**

Range: P53 / B5 Default: On Scaling: n/a Type: R/W

This menu item turns 'On' and 'Off' the 'Cooling' function. Once this menu item has been turned 'On', and the unit has been started and subsequently stopped, the 'Cooling' function inhibits the start command (not allowing the unit to start), until the time held in 'Cooling Time' has elapsed (measured from the last stop signal). During this period the unit displays 'Stopped. Cooling'. This menu item is mainly for use in commissioning soft-start units that have large thyristor stacks, and its purpose is to avoid damage to the thyristors during the commissioning process.

0 = No Trip; 1 = Trip.

(P51.B5) **Thermistor Trip (reserved)**

Range: P51 / B5 Default: Off Scaling: n/a Type: R/W

Thermistor Selected – not available.

5.4.12 – 'Trips' Menu (continued)

(P51.B1) C/L Time Out

Range: P51 / B1 Default: On Scaling: n/a Type: R/W

The 'C/L Time Out' menu item turns 'On' and 'Off' the 'Current Limit Time Out' trip. A 'Current Limit Time Out' trip will occur if this menu item is set to 'On', and the load is demanding more current than the level specified in the 'Current Limit' parameter for longer than the time specified in the 'Limit Time Out' parameter. If the 'C/L Time Out' menu item is set to 'Off', then no trip would occur in a similar situation.

(P51.B4) Low Current

Range: P51 / B4 Default: Off Scaling: n/a Type: R/W

Under Current Selected – selects Under Current operation.

(P51.B3) Shearpin

Range: P51 / B3 Default: On Scaling: n/a Type: R/W

Shearpin Selected – selects Shearpin operation.

(P51.B2) Overload

Range: P51 / B2 Default: On Scaling: n/a Type: R/W

Overload Selected – selects Overload operation

The 'Overload' menu item switches 'On' and 'Off' the 'Overload Trip.

Special case: If a load current exceeding 7.2 x FLC occurs for longer than 60 ms, a 'Shearpin Trip' is forced whenever the 'Overload' is 'On'.

(P127.B7) Sensing Signal

Range: P127 / B7 Default: On Scaling: n/a Type: R/W

Hidden Trip Flag 7 – enable or disable Trip 7 – Sensing Trip Type B

The 'Sensing Signal' menu item switches 'On' and 'Off' Trip 7. This may be useful if there is excessive noise on the supply causing spurious 'Trip 7 Sensing Signal' trips.

(P53.B3) User

Range: P53 / B3 Default: Off Scaling: na Type: R/W

The 'User' menu item is a trip which can be triggered by the customer via a variety of means, e.g., through the serial comms or via a programmable input.

5.5 – Definitions for Chapter 5

Dwell

This is the period between 'Top of Ramp' and 'Run', which is designed to give unstable loads a chance to settle down, and to ensure that they are up to speed.

Index Rating

The Index Rating defines the duty of the starter.

Jog

Small movements of a three-phase induction motor, usually used when commissioning the motor or load.

Keypad

The keypad is the internally mounted user interface. The user can start/stop, program, and query the unit's status through this interface. Fitting of the keypad precludes fitting of a remote keypad.

Keypad, Remote

The remote keypad is the externally mounted user interface. The user can start/stop, program, and query the unit's status through this interface. Fitting of the remote keypad precludes fitting of the internal keypad.

Kick Start

This is an optional extra 'kick' of voltage to start 'sticky' loads.

Load Current

The current drawn by the application or load.

Optimize

This is an optional energy saving feature. The SR44 will reduce voltage to a lightly loaded motor. (Refer to the "Applications" chapter of this user manual for a detailed explanation.)

Overload

An Overload is a sustained over-current, with a duration of seconds or minutes rather than cycles, that might or might not end in a trip. Changes in the load characteristics might cause an overload. (An Overload generally draws less current than a Shearpin.)

Parameter

A parameter is a menu item that directly relates to an internal parameter of the Soft Starter.

Rated Current

This is the nominal current (in Amps) at which the unit has been designed to run.

Shearpin

Shearpin is also an over-current, but of a much shorter duration (cycles rather than seconds), and is generally a higher current than an Overload.

Stall

The point at which the load placed on a motor threatens to stop a motor's rotational movement.

5.5 – Definitions for Chapter 5 (continued)

Static

Static, as in static loads. This term refers to loads with no moving parts, so induction motors, linear motors, etc., are non-static loads. An example of a static load would be a resistor bank.

Top of Ramp

This is the point at which the Soft Starter reaches maximum output voltage.

Unit Full Load Current

This is another name for the Rated Current of the unit.

Writeable Parameters

A parameter that can be written to by the user as well as being read by the user, as opposed to a read-only parameter which can only be read by the user.