

## Keypad Module Description

### Parameter Number Display

These two digits display the active parameter number for both Display and Program Group parameters.

### Program Mode Indicator

When the Program Mode Indicator flashes, you can edit the parameter value. When the Display Mode is active, the indicator will not be lit.

**ESC**

#### Escape

The ESCape key allows you to toggle between the Display and Program modes. When the Program mode is active, this key will disable the editing of a parameter value.

**SEL**

#### Select

The SELect key enables editing of a parameter value when the Program mode is active. When you press this key the Program Mode Indicator flashes.



#### Up/Down Arrow Keys

Use the Up/Down Arrow keys to scroll through a list of parameters, or increase and decrease parameter values. Press and hold either key to increase scrolling speed.

Real time frequency adjustment can be achieved when using P58-[Internal Frequency]. Refer to the User Manual for further information.



#### Enter

Pressing this key causes the current value displayed to be entered into memory (only while in the Program mode). When you press this key the Program Mode Indicator remains on, but stops flashing.

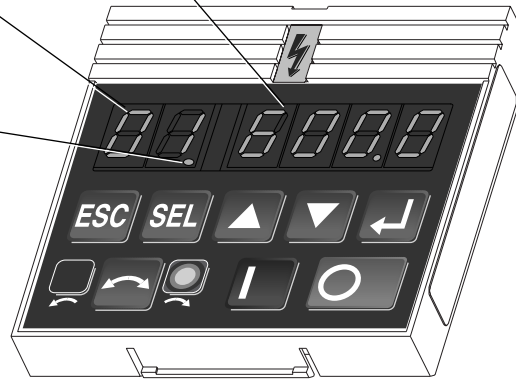


#### Start

The Start key initiates a start command when the controller is programmed for local start/stop control (P46 - [Input Mode] is set to "2").

### Parameter Value/Fault Number

These four digits display the parameter value or fault code number.



#### Direction LEDs (Indicators)

The appropriate LED will illuminate continuously to indicate the commanded direction of rotation. If the second LED is flashing, the drive has been commanded to change direction, but is still decelerating.

**Important:** Actual motor rotation could be different if motor leads are not connected properly. Refer to Chapter 4 of the User Manual for details on how to verify motor rotation.



#### Stop

Pressing the Stop key will cause the motor to stop, using the selected stop mode. Refer to the P34 - [Stop Mode] parameter.

If the drive has stopped due to a fault, pressing this key will clear the fault.



#### Reverse (Change Direction)

Pressing this key causes the motor to ramp down to 0 Hz and then ramp up to its set speed in the opposite direction.

When the motor is running, pressing this key causes the (currently illuminated) LED to flash, indicating motor rotation while decelerating to zero. The other LED will illuminate indicating the commanded direction.



## Bulletin 160 SSC™ Controller

Quick Reference  
Series B, FRN 5.xx-6.xx



**IMPORTANT:** This publication is designed as a reference tool. The 160 SSC User Manual (publication 0160-5.9) must be consulted for more detailed information about parameters, faults and hazards of personal injury.

## 160 Parameter List

### Display Group Parameters

No.	Parameter Name	Min/Max Range	Units/Settings
01	[Output Frequency]	0-240 Hz	0.1 Hz
02	[Output Voltage]	0-[Max Voltage]	1 Volt
03	[Output Current]	0-2 x Rtd. Out. Curr.	0.01Amps
04	[Output Power]	0-2 x Rtd. Out. Power	0.01 kW
05	[Bus Voltage]	0-400 (230V) 0-800 (460V)	1 Volt
06	[Frequency Command]	0-240	0.1 Hz
07	[Last Fault]	0-49	Numeric Value
08	[Heatsink Temperature]	0-150	1 Degree C.
09	[Controller Status]	0000 to 1011	Bit 3 Decel Bit 2 Accel Bit 1 Forward Bit 0 Running
10	[Controller Type]	Numeric Value	Numeric Value
11	[Control Version]	Fixed Value	Numeric Value
12	[Input Status]	0000 to 1111	See Below

Input Mode	Description	Bit 3	Bit 2	Bit 1	Bit 0
0	3 Wire	0 = Positive	Start	Stop	Reverse
1	2 Wire	Analog Input	Run Forward	Stop	Run Reverse
2	Keypad		N/A	Stop	N/A
3	Mom. Run Fwd/Rev	1 = Negative	Run Forward	Stop	Run Reverse
4	Accel/Decel	Analog Input	Run Forward	0=Accel 2/Decel 2 1=Accel1/Decel 1	Run Reverse
5	Enable		Run Forward	0=Drive Disable 1=Drive Enable	Run Reverse
6	Local/Remote		Run Forward	0=Local (TB3) Control 1=Remote Control	Run Reverse

13	[Power Factor Angle]	0.0-180.0	0.1 Degrees
14	[Memory Probe Display]	Numeric Value	Numeric Value
15	[Preset Status]	0000 to 0111	Bit 3 Not Used Bit 2 SW3 Bit 1 SW2 Bit 0 SW1
16	[Analog Input]	-150 to +150	0.1%

### Program Group Parameters

No.	Parameter Name	Min/Max Range	Units/Settings	Default
30	[Accel Time 1]	0.0-600	0.1 Sec.	10.0
31	[Decel Time 1]	0.1-600	0.1 Sec.	10.0
32	[Min. Freq.]	0-240	1 Hz	0
33	[Max. Freq.]	0-240	1 Hz	60
34	[Stop Mode Select]	0-3	0 = Ramp 1 = Coast 2 = DC Brake 3 = DC Brake Auto-Off	0
35	[Base Freq.]	10-240	1 Hz	60
36	[Base Voltage]	20-230/460	1 Volt	230/460
37	[Max. Voltage]	20-255/510	1 Volt	230/460
38	[Boost Select]	0-12	Start Volts (%) Midpoint (%)	2
			0 = 0 9 = 45.0 1 = 2.5 10 = 40.0 2 = 5.0 11 = 35.0 3 = 7.5 12 = 30.0 4 = 10.0 5 = 12.5 6 = 15.0 7 = 17.5 8 = 20.0	
39	[Skip Freq.]	0-240	1 Hz	240
40	[Skip Freq. Band]	0-30	1 Hz	0
41	[Motor Overload Select]	0-2	0 = No Derating 1 = Min. Derating 2 = Max. Derating	0
42	[Motor Overload Current]	0.1-200% of Controller Rating	0.01 Amps	115% of Rating
43	[Current Limit]	1-180% of Controller rating	1 %	150%

### Program Group Parameters (continued)

No.	Parameter Name	Min/Max Range	Units/Settings	Default
44	[DC Hold Time]	0-25	0.1 Sec.	0
45	[DC Hold Voltage]	0-115	1 Volt	0
46	[Input Mode]	0-6	0 = 3 wire control 1 = 2 wire control 2 = Keypad control 3 = Momentary FWD/REV control 4 = 2 wire "Accel/Decel" control 5 = 2 wire "Enable" control 6 = 2 wire "Local/Remote" control	0
47	[Output Configure]	0-9	0 = Controller Ready/Faulted 1 = At Frequency 2 = Controller Running 3 = Reverse 4 = Motor Overload 5 = Ramp Regulated 6 = Above Frequency 7 = Above Current 8 = Above DC Bus Voltage 9 = Retries Exhausted	0
48	[Output Threshold]	0-815	P47 = 6 = 0-240 Hz Range P47 = 7 = 0-180% Range P47 = 8 = 0-815 V Range	0
49	[PWM Freq.]	2.0-8.0	0.1 kHz	4.0
50	[Restart Tries]	0-9	Numeric Value	0
51	[Restart Time]	0.5-300	0.1 Sec.	10.0
52	[DB Enable]	0-100	0 = Disable, > 0 = % of dB	0
53	[S-Curve]	0-10	0, 1...10 @ 10% Increments	0
54	[Clear Fault]	0-1	1 = Reset fault	0
55	[Memory Probe Address]	Numeric Value	Numeric Value	Numeric
56	[Reset Functions]	0-2	0 = Idle Status 1 = Reset Defaults 2 = Update Input Mode	0
57	[Program Lock]	0-1	1 = Lock 0 = Unlock	0
58	[Internal Freq.]	0-240	0.1 Hz	60
59	[Freq. Select]	0-1	0 = TB3 1 = Internal Freq. Source	0
60	[Zero Offset]	-50.0 to +50.0	0.1%	0
61-68	[Preset Freq.0 - 7]	0-240	0.1 Hz	See Below

SW3	SW2	SW1	No.	Name	Default	Accel	Decel
0	0	0	61	[Preset 0]	3 Hz	Parameter 30,	Parameter 31,
0	0	1	62	[Preset 1]	20 Hz	[Accel Time 1]	[Decel Time 1]
0	1	0	63	[Preset 2]	30 Hz		
0	1	1	64	[Preset 3]	40 Hz		
1	0	0	65	[Preset 4]	45 Hz	Parameter 69,	Parameter 70,
1	0	1	66	[Preset 5]	50 Hz	[Accel Time 2]	[Decel Time 2]
1	1	0	67	[Preset 6]	55 Hz		
1	1	1	68	[Preset 7]	60 Hz		

69	[Accel Time 2]	0.0-600	0.1 Sec.	20.0
70	[Decel Time 2]	0.1-600	0.1 Sec.	20.0
71	[IR Compensation]	0-150	1%	50%
72	[Slip Compensation]	0.0-5.0	0.1 Hz	2.0 Hz
73	[Reverse Disable]	0-1	0 = Enable 1 = Disable	0
74	[Analog Select]	0-1	0 = Unipolar 1 = Bipolar	0
75	[Analog Input Min.]	0.0-150.0	0.1%	0.0%
76	[Analog Input Max.]	0.0-150.0	0.1%	100%
77	Not Used			
78	[Compensation]	0-1	Numeric Value	0

1 This parameter applies to the Preset Speed model only.

2 When using P46, [Input Mode] setting "4," the Accel and Decel times are selected by providing an input to TB3-8.

## Programming Steps

### Action

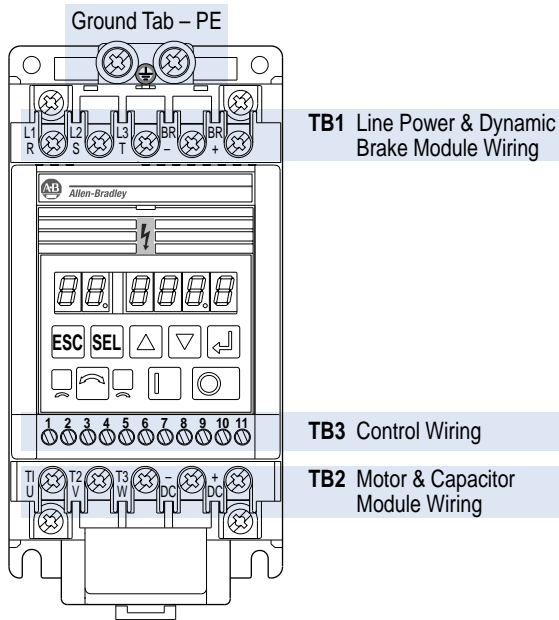


### Description

- To program the value of a Program Group parameter, enter the program group by pressing the ESCape key. The Program Mode Indicator will illuminate.
  - Press the Up/Down Arrow keys until the desired parameter number is displayed.
  - Press the SELect key. The Program Mode Indicator flashes, indicating that you can use the Up/Down Arrow keys to change the parameter value.
  - Press the arrow keys until the desired value is shown.
- Important:** Continuously holding the Up or Down key will cause the value to increase or decrease as long as the key is pressed.
- When the desired value is displayed, press the Enter key. This writes the new value to memory. The Program Mode Indicator will stop flashing and the display will flash once indicating that the new value has been accepted.

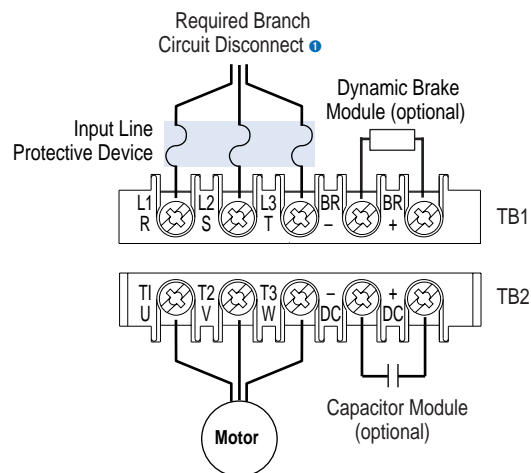
**Important:** If at any time (while in the Program mode) you wish to abort the editing process, press the ESCape key. The original value of the parameter will remain unchanged and you will be exited from the Program Mode.

## Power Wiring – TB1, TB2



## Wire Size and Torque Ranges

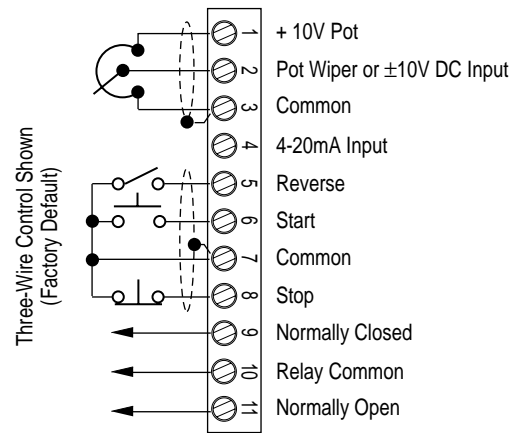
Terminal	Max./Min. Wire Size <i>mm<sup>2</sup> (AWG)</i>	Max./Min. Torque <i>Nm (lb.-in.)</i>
TB1	4-0.75 (12-18)	1.81-1.35 (16-12)
TB2	4-0.75 (12-18)	1.81-1.35 (16-12)
TB3	2.5-0.5 (14-22)	0.8-0.4 (8-4)



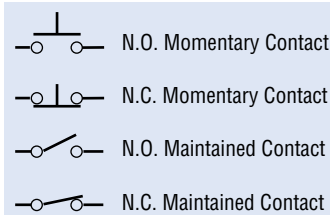
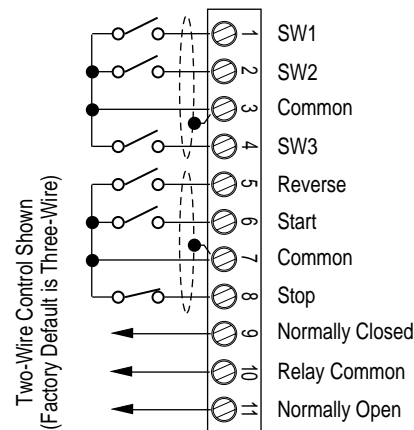
① For single phase input applications, connect the AC input line to input terminals (L1) R and (L2) S.

## Control Wiring – TB3

### Analog Signal Follower Model

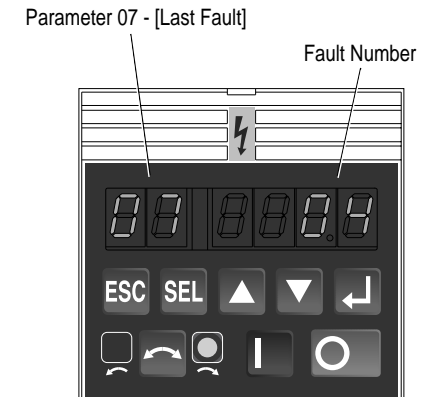


### Preset Speed Model



Wires must be shielded.

## Fault Codes



Fault No.	Fault Indication and Corrective Action
<b>03</b>	<b>Power Loss Fault</b> Monitor incoming AC line for low voltage or line power interruption.
<b>04</b>	<b>UnderVoltage Fault</b> Monitor incoming AC line for low voltage or line power interruption.
<b>05</b>	<b>OverVoltage Fault</b> Bus overvoltage caused by motor regeneration. Monitor incoming AC line for excessive voltage. Extend the decel time or install dynamic brake module or external capacitor module.
<b>06</b>	<b>Motor Stall Fault</b> Longer acceleration time or a reduced load required.
<b>07</b>	<b>Motor Overload Fault</b> Reduce motor load until controller output current does not exceed the current set by P42 - [Motor Overload Current]. Reduce P38 - [Boost Select].
<b>08</b>	<b>Over Temperature Fault</b> Clear blocked or dirty heat sink fins. Check ambient temperature. Check for blocked or non-operating fan.
<b>11</b>	<b>Operator Error</b> Clear fault. Do not remove keypad under power.
<b>12</b>	<b>Overcurrent Fault</b> Check short circuit at the controller output or excessive load conditions at the motor.
<b>32</b>	<b>EEPROM Fault</b> Reset EEPROM using P56 - [Reset Functions]. Set to 1. Cycle Power
<b>33</b>	<b>Max Retries Fault</b> Repair system fault.

## Troubleshooting

- 38 Phase U Fault**  
Check the wiring between the controller and motor.  
Check motor for grounded phase.
- 39 Phase V Fault**  
Check the wiring between the controller and motor.  
Check motor for grounded phase.
- 40 Phase W Fault**  
Check the wiring between the controller and motor.  
Check motor for grounded phase.
- 41 UV Short Fault**  
Check the motor and external wiring to the controller output terminals for a shorted condition.
- 42 UW Short Fault**  
Check the motor and external wiring to the controller output terminals for a shorted condition.
- 43 VW Short Fault**  
Check the motor and external wiring to the controller output terminals for a shorted condition.
- 48 Reprogram Fault**  
Clear fault.
- 49 Zero Overload Fault**  
Reduce motor load at zero hertz. Reduce motor dwell time at zero hertz. Reduce P38-[Boost Select].

- **Motor Does Not Start**  
(No output voltage to motor)
  1. Check power circuit.
    - Check supply voltage.
    - Check all fuses and disconnects.
  2. Check motor.
    - Verify that motor is connected properly.
  3. Check control input signals.
    - Verify that START signal is present.
    - Verify that STOP signal is present.
    - Verify that RUN FORWARD and RUN REVERSE signals are NOT both active.
  4. Check P46 - [Input Mode].
    - If P46 - [Input Mode] is set to "2", only the program keypad module start button will start the motor.
- **Controller Started but Motor NOT Rotating**  
(P01 - [Output Frequency] displays "0.0")
  1. Check motor.
    - Verify that motor is connected properly.
  2. Check frequency source P06 - [Frequency Command].
    - Verify that frequency signal is present at terminal block TB3.
      - 10 to +10V signal
      - 4-20 mA signal
    - Verify that Preset Frequencies are set properly.
  3. Check control input signals.
    - Verify that SW1, SW2 and SW3 are correct. (Refer to the chart in the User Manual at the end of Chapter 5).
  4. Check parameter settings.
    - Verify that P59 - [Frequency Select] is showing desired frequency source.
    - Verify that P58 - [Internal Frequency] is the desired value.
- **Motor Not Accelerating Properly**
  1. Check motor.
    - Verify that motor is connected properly.
    - Verify that no mechanical problems exist.
  2. Check parameter settings.
    - Verify that P30 - [Accel Time 1] or P69 - [Accel Time 2] is set properly.
    - Verify that P43 - [Current Limit] is set properly.
    - Verify that P38 - [Boost Select] is set properly.
- **Can Not Operate in "RUN FWD/RUN REV" Mode**
  1. Verify that P46 - [Input Mode] is set to "1".
  2. Verify that P73 - [Reverse Disable] or P74 - [Analog Select] are not set to "1".
  3. Verify that power has been cycled for above change to take effect.
  4. Verify that both RUN FORWARD and RUN REVERSE switches are NOT closed simultaneously.

## 160 Programmable Parameter Settings

### Program Group Parameters

No.	Parameter Name
30	[Accel Time 1]
31	[Decel Time 1]
32	[Min. Freq.]
33	[Max. Freq.]
34	[Stop Mode Select]
35	[Base Freq.]
36	[Base Voltage]
37	[Max. Voltage]
38	[Boost Select]
39	[Skip Freq.]
40	[Skip Freq. Band]
41	[Motor Overload Select]
42	[Motor Overload Current]
43	[Current Limit]
44	[DC Hold Time]
45	[DC Hold Voltage]
46	[Input Mode]
47	[Output Configure]
48	[Output Threshold]
49	[PWM Freq.]
50	[Restart Tries]
51	[Restart Time]
52	[DB Enable]
53	[S-Curve]
54	[Clear Fault]
55	[Memory Probe Address]
56	[Reset Functions]
57	[Program Lock]
58	[Internal Freq.]
59	[Freq. Select]
60	[Zero Offset]
61	[Preset Freq 0]
62	[Preset Freq 1]
63	[Preset Freq 2]
64	[Preset Freq 3]
65	[Preset Freq 4]
66	[Preset Freq 5]
67	[Preset Freq 6]
68	[Preset Freq 7]
69	[Accel Time 2]
70	[Decel Time 2]
71	[IR Compensation]
72	[Slip Compensation]
73	[Reverse Disable]
74	[Analog Select]
75	[Analog Input Min.]
76	[Analog Input Max.]
78	[Compensation]