

# KEYPAD OPERATION AND QUICKSTART

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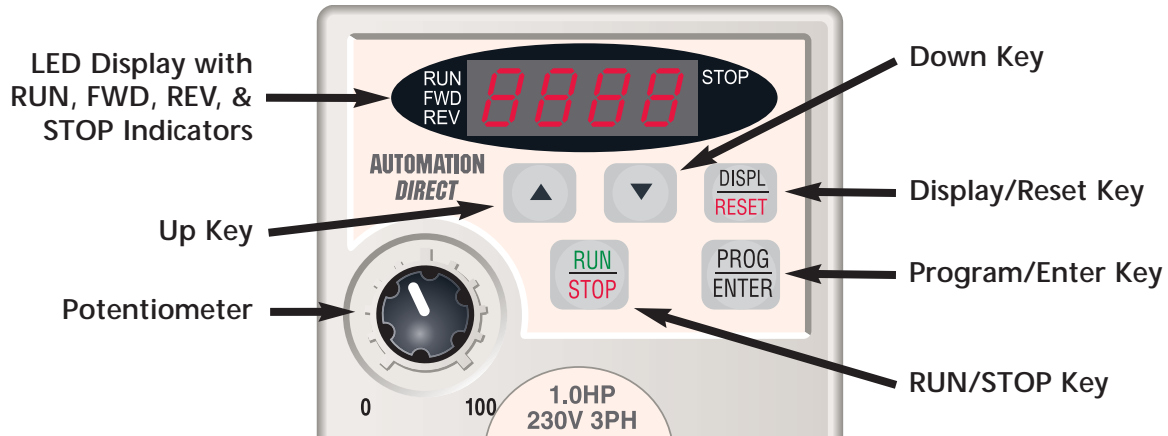


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## The GS1 Digital Keypad

The digital keypad includes a 4-digit LED display, 4 LED indicators, 5 function keys, and a potentiometer. The diagram below shows all of the features of the digital keypad and an overview of their functions.



### LED Display

The LED Display shows the operation values and parameter settings of the AC drive. The display also has four LED Indicators that show the RUN, STOP, FWD, and REV status of the AC drive.

### Function Keys



#### Program/Enter Key

Press the PROGRAM/ENTER key to view parameters and store parameter settings.



#### Display/Reset Key

Press the DISPL/RESET key to cycle through the operational values (Status Display) of the AC drive. This key will also reset the AC drive when a fault has occurred.



#### Run/Stop Key

Press the RUN/STOP key to start or stop the AC drive operation.

#### Up/Down Keys



Press the UP/DOWN keys to scroll through the parameter set or to change parameter settings. Press the "Up" or "Down" key momentarily to change the parameter settings in single-unit increments. To quickly run through the range of settings, press and hold the "Up" or "Down" key.

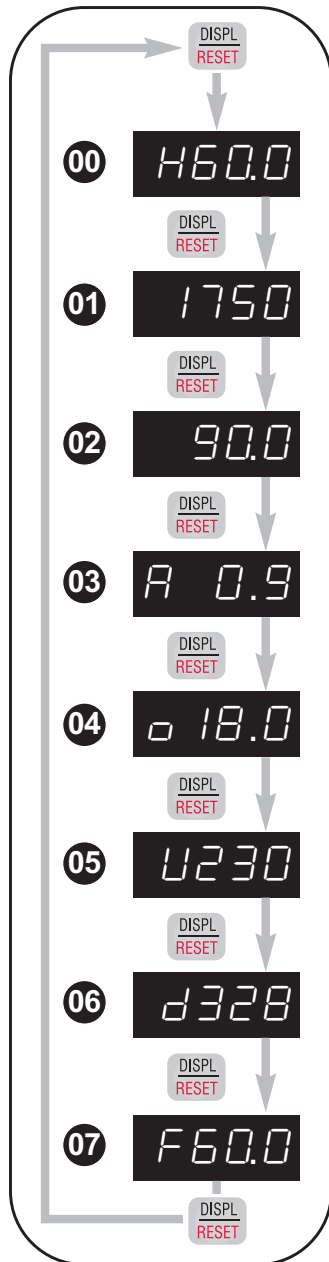


#### Potentiometer

The potentiometer is used to set the AC drive operation frequency.

## Displaying the Status of the GS1 AC Drive

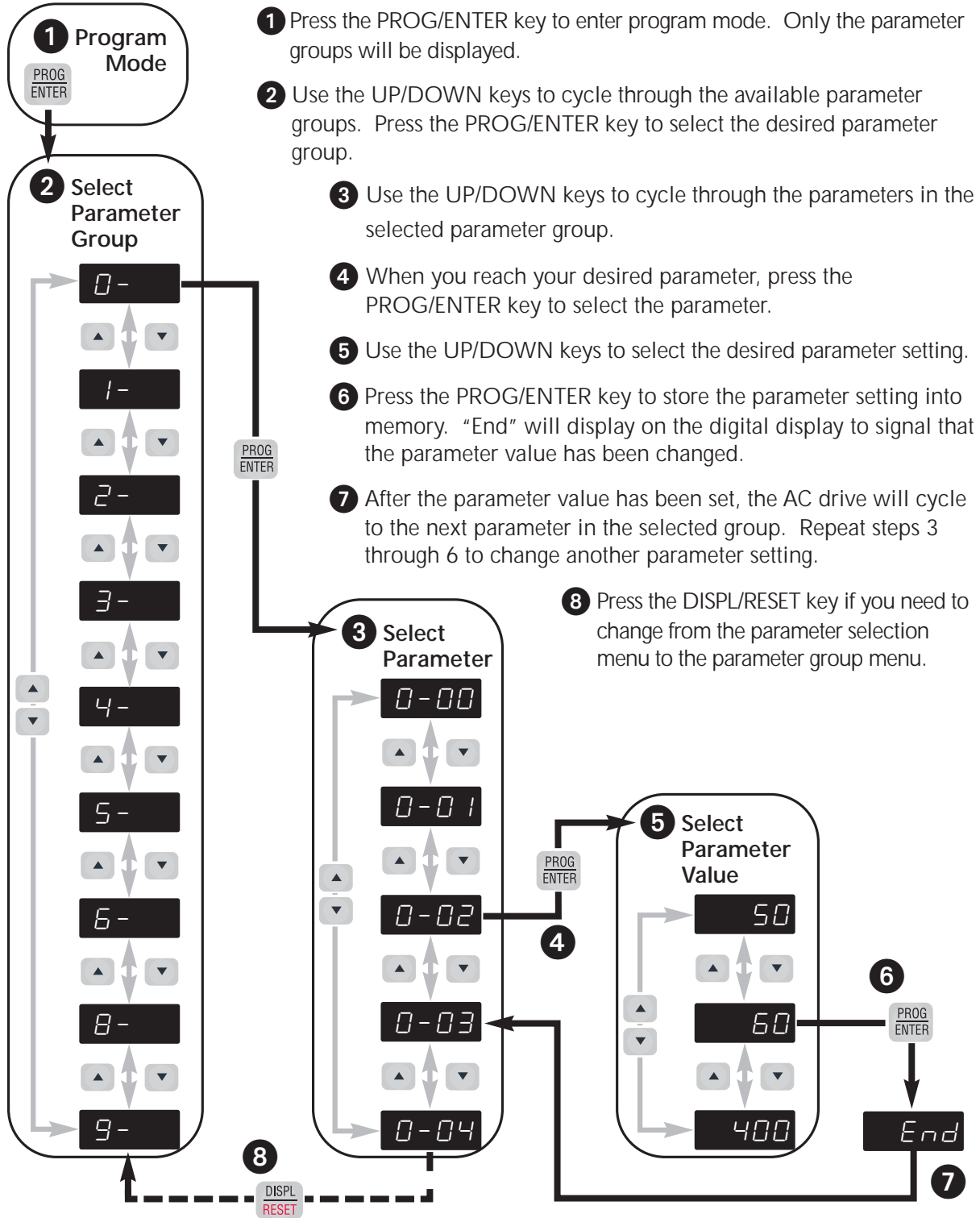
Press the DISPL/RESET button on the keypad repeatedly to cycle through the status messages on the AC drive. The diagram below shows the order of the status messages and their definitions. The status of the AC drive can be shown in RUN or STOP mode.



- 00 Actual Operating Frequency**  
Displays the actual operating frequency present at the T1, T2, and T3 terminals. *Example: 60.0Hz*
- 01 RPM**  
Displays the present *estimated* speed of the motor.  
*Example: 1750 RPM*
- 02 Scaled Frequency**  
Displays the result of output frequency x P8.01.  
*Example: 60Hz x 1.5 = 90.0*
- 03 Amps**  
Displays the output current present at the T1, T2, and T3 terminals. *Example: 0.9A*
- 04 % Load**  
Displays the amount of load on the AC drive.  
*Example: (Output Current ÷ Drive Rated Current) x 100*
- 05 Output Voltage**  
Displays the output voltage present at the T1, T2, and T3 terminals. *Example: 230V*
- 06 DC Bus Voltage**  
Displays the DC Bus Voltage. *Example: 328 VDC*
- 07 Setpoint Frequency**  
Displays the frequency setting of the AC drive.  
*Example: 60.0 Hz*

## Programming the GS1 AC Drive

The GS1 AC Drive parameters are organized into 10 different groups according to their functions. The illustration below shows you how to navigate through the parameter groups and parameter settings. For a complete list of parameters, see CHAPTER 4.



- 1** Press the PROG/ENTER key to enter program mode. Only the parameter groups will be displayed.
- 2** Use the UP/DOWN keys to cycle through the available parameter groups. Press the PROG/ENTER key to select the desired parameter group.
- 3** Use the UP/DOWN keys to cycle through the parameters in the selected parameter group.
- 4** When you reach your desired parameter, press the PROG/ENTER key to select the parameter.
- 5** Use the UP/DOWN keys to select the desired parameter setting.
- 6** Press the PROG/ENTER key to store the parameter setting into memory. "End" will display on the digital display to signal that the parameter value has been changed.
- 7** After the parameter value has been set, the AC drive will cycle to the next parameter in the selected group. Repeat steps 3 through 6 to change another parameter setting.
- 8** Press the DISPL/RESET key if you need to change from the parameter selection menu to the parameter group menu.

## GS1 Quickstart

The following examples will help you quickly set up your GS1 AC Drive for two common applications. The first example applies to an application that requires constant torque, and the second example requires variable torque in its application.



*For a complete list and description of the parameters for the GS1 Series AC drives, refer to CHAPTER 4, AC DRIVE PARAMETERS.*

### Example 1: Constant torque (e.g. conveyors, compressors, etc.)

In this example, the AC drive needs to operate a motor that is connected to a conveyor. In order to decide which parameters need modifications, we will make a list of the needs for the application.

#### Application Needs

- The AC drive must control a 230V, 1hp motor. The AC drive model that we will use for this application is a GS1-21P0. An example of the motor nameplate is shown below.

INVERTER DUTY MOTOR							
HP	1	Volts	230	PHASE	3	TYPE	P
RPM	1725	AMPS	4.2	HZ	60	SF	1.15
DESIGN	B	AMB	40°C	INSUL CLASS	F		
DUTY	CONT	ENCL	TEFC	CODE	K		

- The maximum speed for the motor is 2000 rpm.
- The motor should accelerate to maximum speed in 5 seconds.
- The motor should decelerate from maximum speed in 5 seconds.
- The motor will require a high torque when starting.
- The operation of the motor (start, stop, etc.) will be controlled by external control terminals. All keys on the GS1 keypad should be disabled.
- The frequency of the AC drive will be determined by a remote potentiometer that provides a 0 to +10V signal.
- The display of the AC drive should show the motor speed (rpm) when running.

### Parameter Setup (for example 1)

In order to meet the needs of this application, the parameters should be set as follows:

**P0.00**    **Motor Nameplate Voltage**    **Setting: 230**

Range: 200V series: 200/208/220/230/240    Default Setting: 240

This parameter setting is determined by the motor nameplate.

**P0.01**    **Motor Nameplate Amps**    **Setting: 4.2**

Range: Drive Rated Amps x 0.3 to    Default Setting: Drive Rating (A)  
Drive Rated Amps x 1.0

This parameter setting is determined by the motor nameplate..

**P0.02**    **Motor Base Frequency**    **Setting: 60**

Range: 50/60/400    Default Setting 60

This parameter setting is determined by the motor nameplate.

**P0.03**    **Motor Base RPM**    **Setting: 1725**

Range: 375 to 9999 RPM    Default Setting: 1750

This parameter setting is determined by the motor nameplate.

**P0.04**    **Motor Maximum RPM**    **Setting: 2000**

Range: P0-03 to 9999 rpm    Default Setting: P0-03

This parameter setting is determined by the needs of the application.



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**WARNING:** The Motor Maximum RPM parameter (P0.04) should never exceed the maximum RPM rating for the motor you are using. If this information is not readily available, consult your motor manufacturer.

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**P1.00**    **Stop Methods**    **Setting: 0**

Range: 0 - Ramp to Stop    Default Setting: 0  
1 - Coast to stop

The application requires that this parameter be set to Ramp to Stop because the motor needs to stop under power. If the AC drive was set for Coast to Stop, the AC drive would ignore the Deceleration Time setting.



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**WARNING:** If the Stop Method for the GS1 AC drive is set for Coast to Stop, the AC drive will ignore any setting you have for Deceleration Time (P1.02).

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**P1.01 Acceleration Time Setting: 5.0**

Range: 0.1 to 600 sec Default Setting: 10 sec  
 The motor should accelerate from 0 rpm to Base RPM (P0.03) in 5 seconds.

**P1.02 Deceleration Time Setting: 5.0**

Range: 0.1 to 600 sec Default Setting: 30 sec  
 The motor should decelerate from Maximum RPM (P0.04) to 0 rpm in 5 seconds.

**P2.00 Volts/Hertz Settings Setting: 1**

Range: 0 – General Purpose Default Setting: 0  
           1 – High Starting Torque  
           2 – Fans and Pumps  
           3 – Custom

The GS1 Series AC drive has some predefined torque settings that meet the needs of most applications. A custom setting is available if needed. In this example, the application requires a high starting torque.

**P3.00 Source of Operation Command Setting: 2**

Default Setting: 0

Settings	0	Operation Determined by Digital Keypad.
	1	Operation determined by external control terminals. Keypad STOP is enabled.
	2	Operation determined by external control terminals. Keypad STOP is disabled.
	3	Operation determined by RS-485 interface. Keypad STOP is enabled.
	4	Operation determined by RS-485 interface. Keypad STOP is disabled.

The AC drive operation will be determined by external control terminals and the keypad stop will be disabled.

### P4.00

### Source of Frequency Command

Setting: 2

Default: 0

- Settings:
- 0 Frequency determined by keypad potentiometer.
  - 1 Frequency determined by digital keypad up/down.
  - 2 Frequency determined by 0 to +10V input on AI terminal. AI switch must be set to "V".
  - 3 Frequency determined by 4 to 20mA input on AI terminal. AI switch must be set to "I".
  - 4 Frequency determined by 0 to 20mA input on AI terminal. AI switch must be set to "I".
  - 5 Frequency determined by RS-485 communication interface.



AI switch must be set to "V" in order to use 0 to +10V input.

The frequency of the AC drive will be determined by an external potentiometer with a 0 to +10V signal.

### P8.00

### User Defined Display Function

Setting: 1

Default Setting: 0

- Settings:
- 0 Output Frequency (Hz)
  - 1 Motor Speed (rpm)
  - 2 Output Frequency x P8.01
  - 3 Output Current (A)
  - 4 Motor Output Current (%)
  - 5 Output Voltage (V)
  - 6 DC Bus Voltage (V)
  - 9 Frequency Setpoint

The AC drive display will show motor speed (rpm) when running.

**Example 2: Variable torque (e.g. fans, centrifugal pumps, etc.)**

In this example, the AC drive needs to operate a motor that is connected to a centrifugal pump. As in Example 1, we will make a list of the needs for the application in order to decide which parameters need modifications.

**Application Needs**

- The AC drive must control a 208V, 1/2hp motor. The AC drive model we will be use for this application is a GS1-20P5. An example of the motor nameplate is shown below.

INVERTER DUTY MOTOR							
HP	0.5	Volts	208	PHASE	3	TYPE	P
RPM	3525	AMPS	2.5	HZ	60	SF	1.15
DESIGN	B	AMB	40°C	INSUL CLASS	F		
DUTY	CONT	ENCL	TEFC	CODE	K		

- The maximum speed for the motor is 3600 rpm.
- The motor should accelerate to maximum speed in 20 seconds.
- The motor should coast to stop when operation is terminated.
- The motor will be turning a centrifugal pump.
- The operation of the motor (start, stop, etc.) will be controlled by the GS1 digital keypad.
- The frequency of the AC drive will be determined by the GS1 keypad potentiometer.
- The display of the AC drive should show output current (A) when running.

**Parameter Setup (for example 2)**

In order to meet the needs of this application, the parameters should be set as follows:

**P0.00** Motor Nameplate Voltage **Setting: 208**

Range: 200V series: 200/208/220/230/240      Default Setting: 240  
 This parameter setting is determined by the motor nameplate.

**P0.01** Motor Nameplate Amps **Setting: 2.5**

Range: Drive Rated Amps x 0.3 to      Default Setting: Drive Rating (A)  
 Drive Rated Amps x 1.0  
 This parameter setting is determined by the motor nameplate.

**P0.02**      **Motor Base Frequency**      **Setting: 60**

Range: 50/60/400      Default Setting: 60

This parameter setting is determined by the motor nameplate.

**P0.03**      **Motor Base RPM**      **Setting: 3525**

Range: 375 to 9999 RPM      Default Setting: 1750

This parameter setting is determined by the motor nameplate.

**P0.04**      **Motor Maximum RPM**      **Setting: 3600**

Range: P0.03 to 9999 RPM      Default Setting: P0.03

This parameter setting is determined by the needs of the application.



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**WARNING:** The Motor Maximum RPM parameter (P0.04) should never exceed the maximum rpm rating for the motor you are using. If this information is not readily available, consult your motor manufacturer.

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**P1.00**      **Stop Methods**      **Setting: 1**

Range: 0 - Ramp to Stop      Default Setting: 0  
          1 - Coast to stop

The application requires that this parameter be set to Coast to Stop.



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**WARNING:** If the Stop Method for the GS1 AC drive is set for Coast to Stop, the AC drive will ignore any setting you have for Deceleration Time (P1.02).

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**P1.01**      **Acceleration Time**      **Setting: 20.0**

Range: 0.1 to 600 sec      Default Setting: 10 sec

The motor should accelerate from 0 rpm to Base RPM (P0.03) in 20 seconds.

**P2.00**      **Volts/Hertz Settings**      **Setting: 2**

Range: 0 – General Purpose      Default Setting: 0  
          1 – High Starting Torque  
          2 – Fans and Pumps  
          3 – Custom

The GS1 Series AC drive has some predefined torque settings that meet the needs of most applications. A custom setting is available if needed. In this example, the motor will be running a pump.

**P3.00** **Source of Operation Command** **Setting: 0**

Default Setting: 0

- Settings:
- 0 Operation Determined by Digital Keypad.
  - 1 Operation determined by external control terminals. Keypad STOP is enabled.
  - 2 Operation determined by external control terminals. Keypad STOP is disabled.
  - 3 Operation determined by RS-485 interface. Keypad STOP is enabled.
  - 4 Operation determined by RS-485 interface. Keypad STOP is disabled.

The AC drive operation will be determined by the digital keypad.

**P4.00** **Source of Frequency Command** **Setting: 0**

Default Setting: 0

- Settings:
- 0 Frequency determined by keypad potentiometer.
  - 1 Frequency determined by digital keypad up/down.
  - 2 Frequency determined by 0 to +10V input on AI terminal. AI switch must be set to "V".
  - 3 Frequency determined by 4 to 20mA input on AI terminal. AI switch must be set to "I".
  - 4 Frequency determined by 0 to 20mA input on AI terminal. AI switch must be set to "I".
  - 5 Frequency determined by RS-485 communication interface.

The frequency of the AC drive will be determined by keypad potentiometer.

**P6.00** **Electronic Thermal Overload Relay** **Setting: 1**

- Range: 0 – Constant Torque Default Setting: 0  
 1 – Variable Torque  
 2 – Inactive

- This function is used to limit the output power of the AC drive when powering a "self-cooled" motor at low speed.

### P8.00

### User Defined Display Function

Setting: 03

Default Setting: 00

Settings:	00	Output Frequency (Hz)
	01	Motor Speed (rpm)
	02	Output Frequency x P8.01
	03	Output Current (A)
	04	Motor Output Current (%)
	05	Output Voltage (V)
	06	DC Bus Voltage (V)
	09	Frequency Setpoint

The AC drive display will show output current (A) when running.



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*For a complete list and description of the parameters for the GS1 Series AC drives, refer to CHAPTER 4, AC DRIVE PARAMETERS.*

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