

Inverter Basics (Function) for the FR-800 series

This course is for those who will build an inverter system using the FR series inverters. This course will teach you about the inverter functions, parameter roles, and how to set the parameters, using the FR-A800 series inverter as an example.

Introduction Purpose of the Course

This course is intended for those who will build an inverter system using the FR series inverters. This course teaches you about the inverter functions, parameter roles, and how to set the parameters, using the FR-A800 series inverter as an example.

Introduction Course Structure



The contents of this course are as follows.
We recommend that you start from Chapter 1.

Chapter 1 Role of Parameters

Learn about the roles, display method, and basic settings of parameters.

Chapter 2 Misoperation Prevention

Learn about the parameters useful for preventing misoperation.

Chapter 3 Adjustment before Starting the Motor

Learn about the parameters to be set before starting the motor.

Chapter 4 Adjustment According to the Operation

Learn about the parameters to be adjusted according to the operation after startup.

Chapter 5 PLC Function

Learn about the outline and how to use the PLC function, which allows an advanced use of the inverter.

Final Test

Passing grade: 60% or higher.

Introduction How to Use This e-Learning Tool



Go to the next page		Go to the next page.
Back to the previous page		Back to the previous page.
Move to the desired page		"Table of Contents" will be displayed, enabling you to navigate to the desired page.
Exit the learning		Exit the learning. Window such as "Contents" screen and the learning will be closed.

Introduction **Cautions for Use**



Safety precautions

When you learn by using actual products, please carefully read the safety precautions in the manuals of the product before use.

Chapter 1 Role of Parameters



This course explains the function of the inverter functions, parameter roles, and how to set the parameters, using the FR-A800 series inverter as an example for those who will build an inverter system using the FR series inverters.

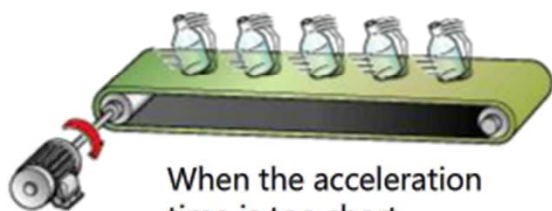
This chapter explains the roles, display method, and basic settings of parameters.

- 1.1 Role of the Parameters
- 1.2 Two Parameter Display Methods
- 1.3 Setting Parameters from the Operation Panel
- 1.4 Setting Parameters Using External Devices
- 1.5 Summary of This Chapter

1.1 Role of Parameters

Parameters are the user-programmable factors for the inverter operations.

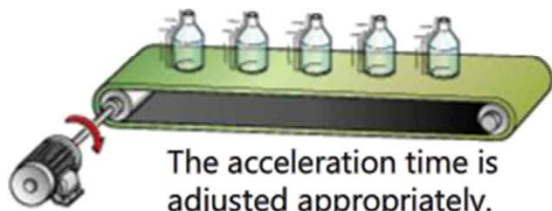
For simple variable-speed operation of the inverter, the initial values of the parameters may be used as they are.



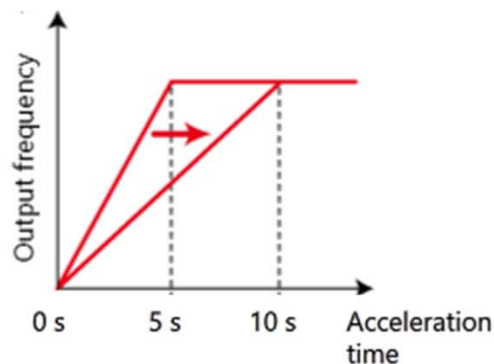
When the acceleration time is too short



Change a parameter.
(Set a larger value for a slower acceleration.)



The acceleration time is adjusted appropriately.



The parameters are classified into the following two types.
In the initial setting, all parameters are displayed.

Type	Description
Simple mode parameters	16 parameters for the basic functions.
Extended parameters	Parameters for the applied functions according to the application.

1.2 Types of the Parameter Indication

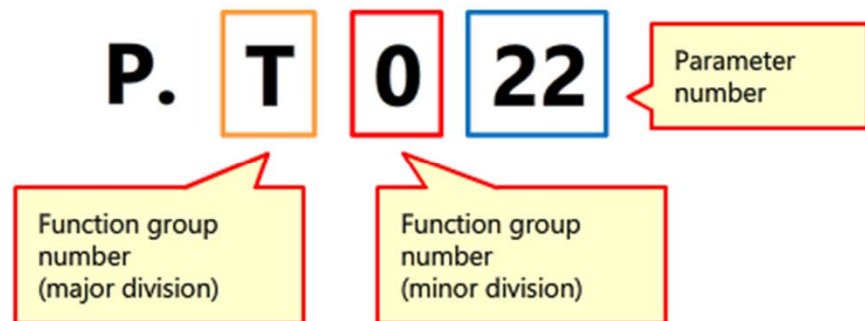
Two types of the parameter indication are available.

One is the **parameter indication by the function group** (parameters grouped by their functions), and the other is the **parameter indication by the parameter number** (parameters shown in numerical order).

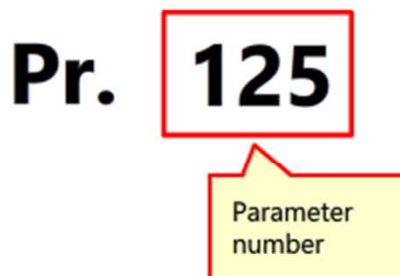
Using the parameter indication by the function group facilitates the setting of the similar functions and helps you remember the parameter numbers.

In the FR-A800 series, the two types of the parameter indication can be switched anytime. (The conventional model supports the parameter indication by the parameter number only.)

■ Parameter indication by the function group



■ Parameter indication by the parameter number



In this course, a parameter is shown in the combination format as "Parameter indication by the function group (parameter indication by the parameter number)".

Example: P.T022 (Pr.125)

1.2 Types of the Parameter Indication

The following shows the function groups of the parameter.

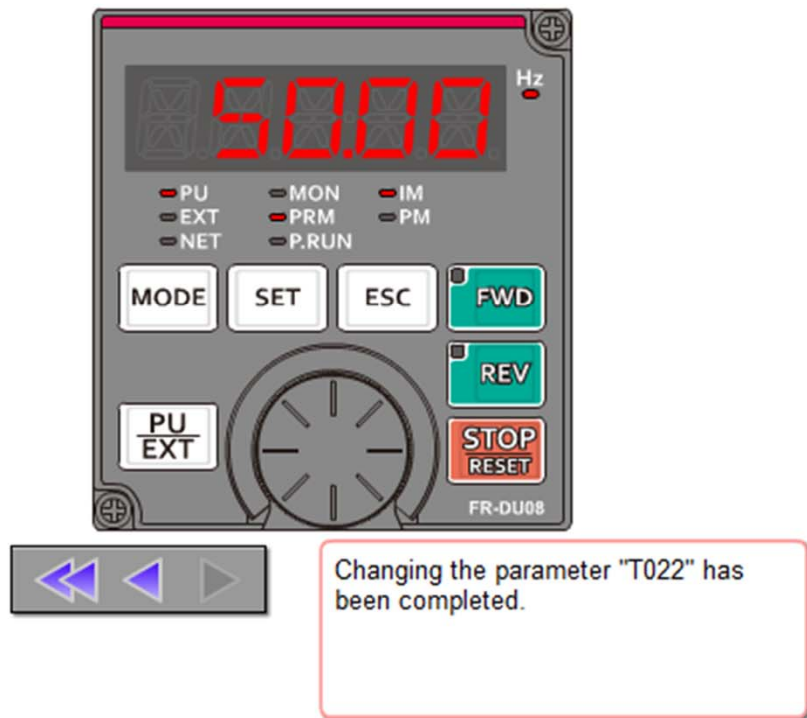
Function group number (major division)	Function name	Description
E	Environment setting parameter	Sets the inverter operation characteristics.
F	Setting of acceleration/deceleration time and acceleration/deceleration pattern	Sets the motor acceleration/deceleration characteristics.
D	Operation command and frequency command	Specifies the inverter's command source and sets the motor driving frequency and torque.
H	Protective function parameter	Protects the motor and the inverter.
M	Monitor display and monitor output signal	Sets the monitors and output signals for the inverter's operating status.
T	Multi-function input terminal parameter	Sets the input terminals through which the inverter receives the commands.
C	Motor constant parameter	For the applied motor setting
A	Application parameter	Sets a specific application.
B	Position control parameter	For the position control setting
N	Operation via communication and its settings	Sets the communication specifications and operation for the communication operation.
G	Control parameter	For the motor control setting

For the function group numbers (minor division) and parameter numbers in each function group, refer to the Instruction Manual (Detailed) of the FR-A800.

1.3 Setting Parameters with the Operation Panel

Parameters can be set with keys and the setting dial on the operation panel of the inverter. The details are given in Chapter 5 of the Inverter Basic (Operation) course for the FR-800 series course.

Change the P.T022 (Pr.125) setting from 60 Hz to 50 Hz, using the following simulator of the operation panel. This can be a chance to review the operation for those who finish the Inverter Basic (Operation) course for the FR-800 series course.



■ Note


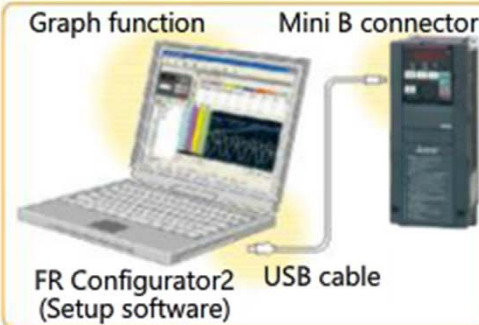
Please note that this page shows the operation procedure in actually but the simulators in Chapters 3 and 4, which shows how the parameter settings affect the inverter operation, have sliding switches for the parameter setting due to the structure of our e-Learning system.

1.4

Setting Parameters Using External Devices

You can also use an optional LCD operation panel or a personal computer in which FR Configurator2 (setup software) is installed to set parameters.

These are useful devices to operate the inverter from a distance.

Product name	Image	Description
LCD operation panel (FR-LU08)		<p>This LCD operation panel can be installed externally. This LCD operation panel has the LCD monitor that can display textual information such as menus. Parameters can be set and saved with this device.</p>
FR Configurator2 (setup software)		<p>The wizard (interactive) function of FR Configurator2 (setup software) helps you set parameters. The high-speed sampling in the graph function is available during USB connection.</p>

1.5 Summary of This Chapter

Here is what you have learned in this chapter.

- Role of the parameters
- Types of the Parameter Indication
- Setting Parameters with the Operation Panel
- Setting Parameters Using External Devices

Point

Role of the parameters	Parameters are user-programmable factors for the inverter operations.
Types of the Parameter Indication	The parameter indication by the function group and the parameter indication by the parameter number, can be switched anytime.
Setting parameters with the operation panel	Parameters can be set with keys and the setting dial on the operation panel of the inverter.
Setting parameters using external devices	You can also use an optional LCD operation panel or a personal computer in which FR Configurator2 (setup software) is installed to set parameters.

Chapter 2 Misoperation Prevention

This chapter explains the parameters useful for preventing misoperation.

- 2.1 Narrowing Down the Displayed Parameters
- 2.2 Disabling Parameter Changes
- 2.3 Limiting the Rotation Direction of the Motor
- 2.4 Resetting Parameters to the Initial Values
- 2.5 Summary of This Chapter

2.1 Narrowing Down the Displayed Parameters

In the initial setting, all parameters are displayed.

The displayed parameters can be narrowed down so that unused parameters or parameters already set should not be changed accidentally.

Use **P.E440 (Pr.160) User group read selection**, to select the parameters to be displayed.

To narrow down the displayed parameters to only the simple mode parameters, set "9999".

To narrow down the displayed parameters to the parameters registered in the user group, set "1".

For the details on how to register or deregister parameters in the user group, refer to the Instruction Manual (Detailed) of the FR-A800.

Parameter	Name	Initial value	Setting range	Description
P.E440 (Pr.160)	User group read selection	0	9999	Displays only the simple mode parameters.
			0	Displays the simple mode parameters and extended parameters.
			1	Displays only the parameters registered in the user group.
P.E441 (Pr.172)	User group registered display/batch clear	0	(0 to 16)	Displays the number of parameters registered in the user group.
			9999	Batch-clears the user group registration.
P.E442 (Pr.173)	User group registration	9999	0 to 999, 9999	Set a parameter number to be registered in the user group.
P.E443 (Pr.174)	User group clear	9999	0 to 999, 9999	Set a parameter number to be deleted from the user group.

■ List of simple mode parameters

Parameter	Name
P.G000 (Pr.0)	Torque boost
P.H400 (Pr.1)	Maximum frequency
P.H401 (Pr.2)	Minimum frequency
P.G001 (Pr.3)	Base frequency
P.D301 (Pr.4)	Multi-speed setting (high speed)
P.D302 (Pr.5)	Multi-speed setting (middle speed)
P.D303 (Pr.6)	Multi-speed setting (low speed)

Parameter	Name
P.F010 (Pr.7)	Acceleration time
P.F011 (Pr.8)	Deceleration time
P.H000/P.C103 (Pr.9)	Electronic thermal O/L relay / Rated motor current
P.D000 (Pr.79)	Operation mode selection
P.T022 (Pr.125)	Terminal 2 frequency setting gain frequency
P.T042 (Pr.126)	Terminal 4 frequency setting gain frequency
P.E440 (Pr.160)	User group read selection

Parameter	Name
P.E430 (Pr.998)	PM parameter initialization
P.E431 (Pr.999)	Automatic parameter setting

2.2 Disabling Parameter Changes

You can disable parameter write and prevent parameters from being changed accidentally.

Set "1 (write-disable)" in **P.E400 (Pr.77) Parameter write selection**.

Parameter	Name	Initial value	Setting range	Description
P.E400 (Pr.77)	Parameter write selection	0	0	Parameter write is enabled only during stop.
			1	Parameter write is disabled.
			2	Parameter write is enabled regardless of the operation status and the operation mode.

If a parameter writing is tried by accident,



Write disabled



An error occurs and the parameter is not written.



■ Note

The following parameters can be written even when the parameter write is set to be disabled.

Parameter	Name
P.H500 (Pr.22)	Stall prevention operation level
P.E100/P.E101/P.E102 (Pr.75)	Reset selection / Disconnected PU detection / PU stop selection
P.E400 (Pr.77)	Parameter write selection
P.D000 (Pr.79)	Operation mode selection
P.E440 (Pr.160)	User group read selection
P.E410 (Pr.296)	Password lock level
P.E411 (Pr.297)	Password lock/unlock

Parameter	Name
Pr.345, 346	DeviceNet communication
P.M501, 502 (Pr.496, 497)	Remote output data
P.A804 (Pr.498)	PLC function flash memory clear
P.M531 to P.M534 (Pr.656 to 659)	Analog remote output
P.D401 (Pr.805)	Torque command value (RAM)
P.D402 (Pr.806)	Torque command value (RAM, EEPROM)
P.H103 (Pr.997)	Fault initiation

2.3 Limiting the Rotation Direction of the Motor

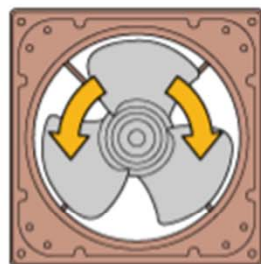
The motor can be prevented from reverse rotation fault resulting from the incorrect input of the start signal (forward rotation or reverse rotation).

This function is suited for the motor applied to the machine in a system that has a rotation function in one direction only.

Set the rotation direction in **P.D020 (Pr.78) Reverse rotation prevention selection**.

Parameter	Name	Initial value	Setting range	Description
P.D020 (Pr.78)	Reverse rotation prevention selection	0	0	Forward and reverse rotations are enabled.
			1	Reverse rotation is disabled.
			2	Forward rotation is disabled.

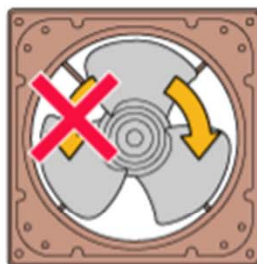
Parameter setting "0"
Forward/reverse rotation enabled



Parameter setting "1"
Reverse rotation disabled



Parameter setting "2"
Forward rotation disabled

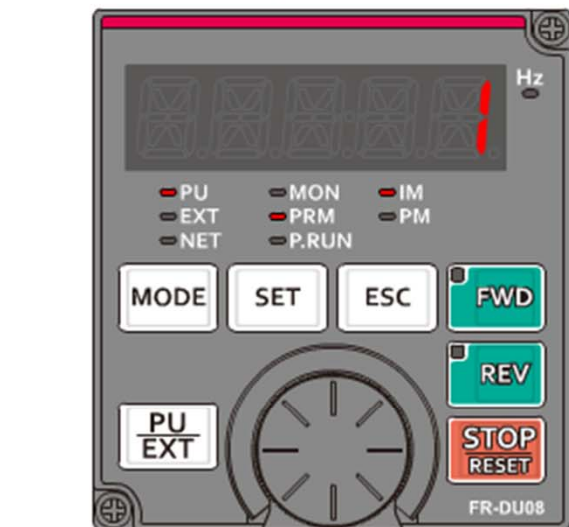


2.4 Resetting Parameters to the Initial Values

As a means of troubleshooting, etc., parameters can be reset to their initial values. The target parameters are different between the Parameter clear and the All parameter clear. For the details, refer to the parameter list in the Instruction Manual (Detailed) of the FR-A800.

Parameter	Name	Initial value	Setting range	Description
Pr.CLR	Parameter clear	0	0	Clears no parameters.
			1	Resets the parameters to their initial values.
ALL.CL	All parameter clear	0	0	Clears no parameters.
			1	Resets the parameters to their initial values.

Simulate the setting of **Pr.CL Parameter clear** using the operation panel below.



■ Precaution

Once parameters are cleared, their settings cannot be restored. To back up the parameter settings, use any of an operation panel (FR-DU08/FR-LU08), FR Configurator2 (setup software), or a commercial USB memory.

The parameter is cleared.

The operation of parameter clear is completed.

2.5 Summary of This Chapter

Here is what you have learned in this chapter.

- Narrowing down the displayed parameters
- Disabling parameter changes
- Limiting the rotation direction of the motor
- Resetting parameters to the initial values

Point

Narrowing down the displayed parameters	The displayed parameters can be narrowed down so that unused parameters or parameters already set should not be changed accidentally
Disabling parameter changes	To prevent parameters from being changed accidentally, you can disable parameter write.
Limiting the rotation direction of the motor	The motor can prevented reverse rotation fault resulting from the incorrect input of the start signal (forward rotation or reverse rotation).
Resetting parameters to initial values	When a problem cannot be solved, etc., parameters can be reset to their initial setting values.
Backing up the parameter settings	To back up the parameter settings, use any of an operation panel (FR-DU08/FR-LU08), FR Configurator2 (setup software), or a commercial USB memory.

Chapter 3 Adjustment before Starting the Motor

This chapter explains parameters to be set before starting the motor.

3.1 Selecting the Operation Mode

3.2 Changing the Speed with External Input

3.3 Operating the Motor in the Optimal Status

3.4 Protecting the Motor from Overheating

3.5 Summary of This Chapter

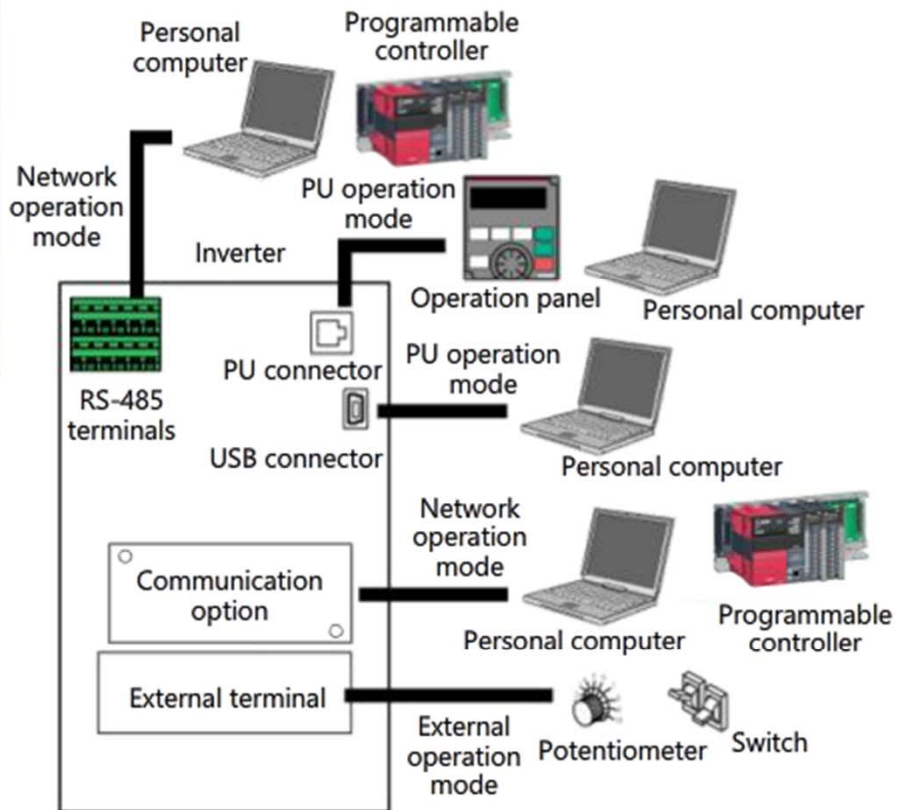
3.1 Selecting the Operation Mode

A **start command** and a **frequency command** are required for the inverter to control a motor.

Turning ON a start command enables the motor rotation, and a frequency command determines the rotation speed of the motor.

In the FR-A800 series, the command method for the start command and the frequency command is can be changed by switching the **operation mode**.

Operation mode	Start command source	Frequency (speed) command source
PU operation mode	Operation panel (FWD or REV key)	Operation panel (setting dial)
External operation mode	External input device	External input device
Combined operation mode (Combination 1)	External input device	Operation panel (setting dial)
Combined operation mode (Combination 2)	Operation panel (FWD or REV key)	External input device
Network operation mode	Network device	Network device



3.1 Selecting the Operation Mode

Set the operation mode using **P.D000 (Pr.79) Operation mode selection**.

In the initial setting, "0 (External/PU switchover mode)" is set in P.D000 (Pr.79), which allows you to switch between the PU and External operation modes by pressing the PU/EXT key on the operation panel.

The following table lists the available operation modes. This course covers the operation modes of the settings "0 to 4".

Parameter	Name	Initial value	Setting range	Description		
P.D000 (Pr.79)	Operation mode selection	0	0	PU/External switching mode. Press the PU/EXT key on the operation panel to switch between the PU and External operation modes. At power-ON, the inverter is set in the External operation mode.		
			1	PU operation mode (fixed)		
			2	External operation mode (fixed) The operation can be performed by switching between the External and NET operation modes.		
			3	External/PU combined operation mode 1		
				Frequency command source	Start command source	
					Setting dial on the operation panel	External signal input (terminals STF and STR)
			4	External/PU combined operation mode 2		
				Frequency command source	Start command source	
					External signal input (Terminals 2, 4, JOG, multi-speed selection, etc.)	FWD or REV key on the operation panel
			6	Switchover mode Switching among the PU, External, and NET operation modes is enabled while continuing operation.		
7	External operation mode (PU operation interlock) X12 signal ON: Switches to the PU operation mode (shuts off the outputs in the External operation mode). X12 signal OFF: Prohibits switching to the PU operation mode.					

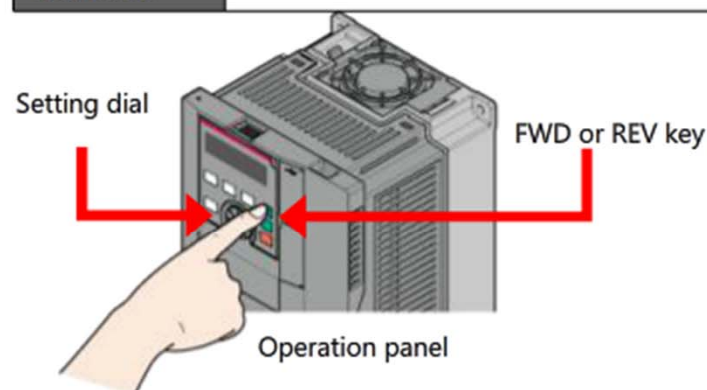
■ Remarks

You can learn how to wire the external input device in Chapter 4 of the Inverter Basic (Operation) course.

3.1.1 PU Operation Mode

In the PU operation mode, the inverter's start and frequency commands are input from the operation panel of the inverter. A system can be constructed most simply with the inverter only. The setting dial can be used to change the frequency (rotation speed) during the operation. The basic configuration of the PU operation mode is shown below.

Start command	Operation panel (FWD or REV key)
Frequency command	Operation panel (setting dial)



■ Parameter setting

To use the PU operation mode, set either of the following values in **P.D000 (Pr.79) Operation mode selection**.

Setting	Operation mode	Description
0	External/PU switching mode	Select this mode to use the PU/EXT key on the operation panel to switch between the PU and External operation modes. The inverter is set in External operation mode at power-ON. Use the PU/EXT key to switch to the PU operation mode.
1	PU operation mode (fixed)	Select this mode to fix the operation mode to PU operation mode.

3.1.2 External Operation Mode

In the External operation mode, the frequency is controlled using input devices externally connected to the inverter.

This mode eliminates the need for directly actuation on the operation panel, for example, enabling you to change the motor speed while monitoring the equipment status or workpiece status.

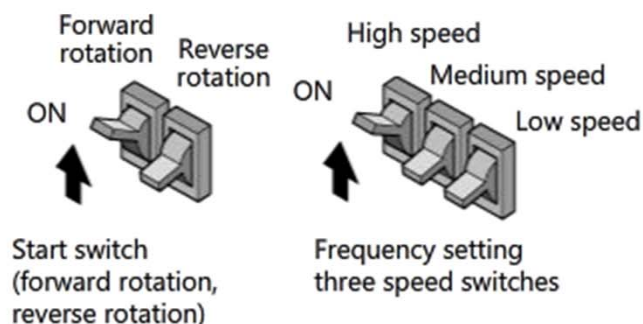
In addition, this mode is useful when the inverter is built in the equipment and hard of direct access for the operation. According to the control target and level, control with analog or digital signal can be selectable.

The basic configuration of the External operation mode is shown below.

■ Changing the frequency using multi-speed switches

Start command source	Start switch
Frequency command source	multi-speed switches

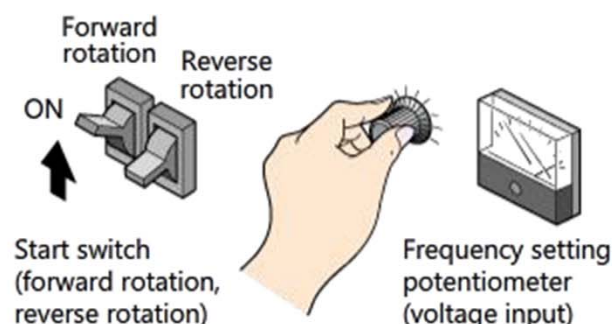
External input device



■ Changing the frequency using a potentiometer (voltage input)

Start command source	Start switch
Frequency command source	Potentiometer (voltage input)

External input device



■ Parameter setting

To use the External operation mode, set either of the following values in **P.D000 (Pr.79) Operation mode selection**.

Setting	Operation mode	Description
0	External/PU switching mode	Select this mode to use the PU/EXT key on the operation panel to switch between the PU operation and external operation modes. The inverter is set in the External operation mode at power-ON.
2	External operation mode (fixed)	Select this mode to always select the External operation mode.

3.1.3 Combined Operation Mode

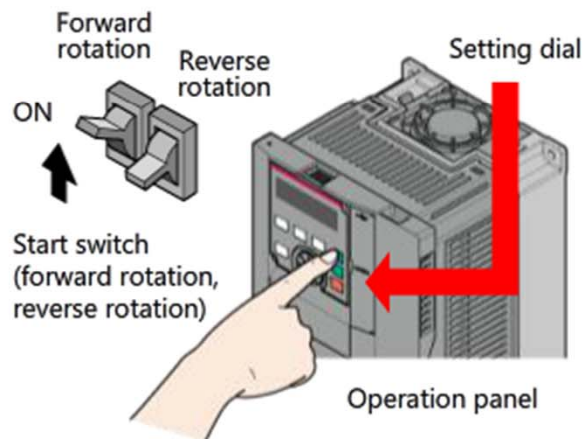
In the combined operation mode, the PU and External operation modes are combined.
In Combination 1, for example, a start command is input with the external switches and a frequency command is input with the setting dial on the operation panel.

The basic configurations of the combined operation modes are shown below.

■ Combination 1

Start command source	Start switch
Frequency command source	Setting dial on the operation panel

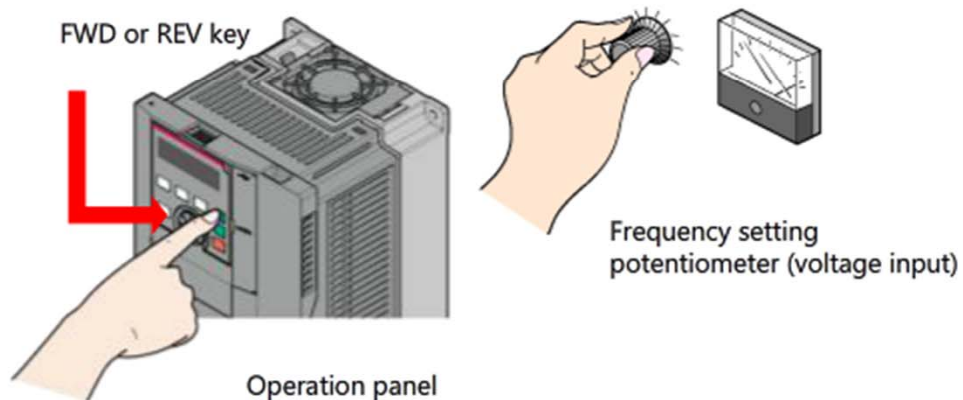
External input device



■ Combination 2

Start command source	FWD or REV key on the operation panel
Frequency command source	Potentiometer (voltage input)

External input device



■ Parameter setting

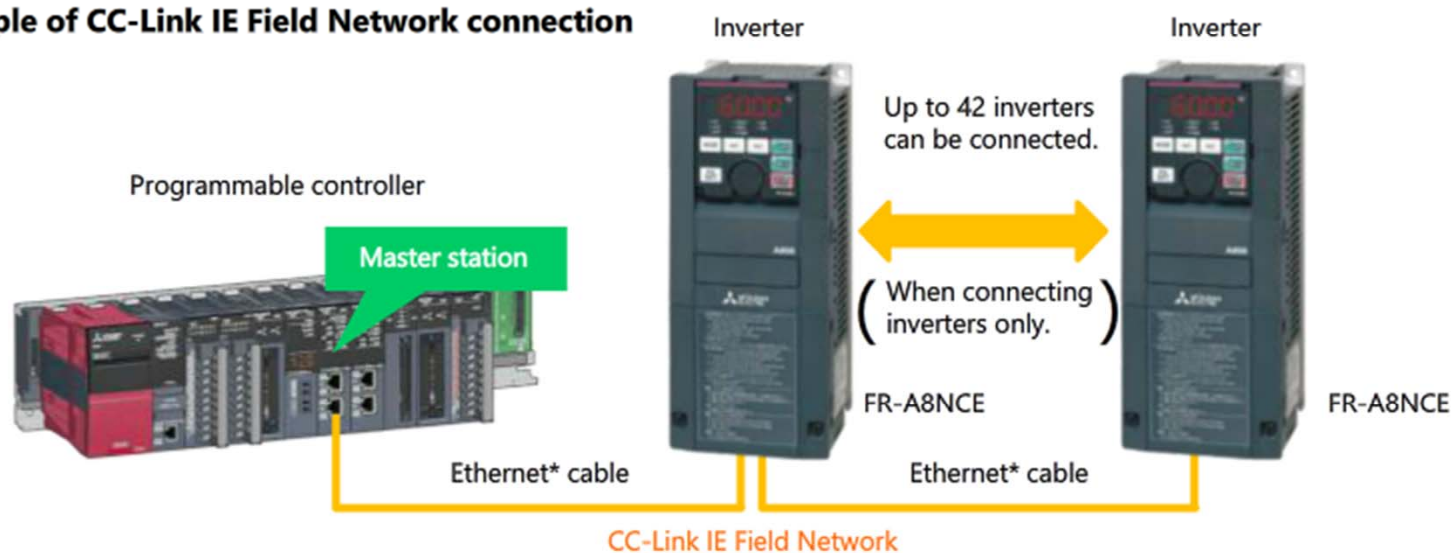
To use the combined operation mode, set either of the following values in **P.D000 (Pr.79) Operation mode selection**.

Setting	Operation mode	Description
3	External/PU combined operation mode 1	Select this mode to use "Combination 1".
4	External/PU combined operation mode 2	Select this mode to use "Combination 2".

3.1.4 Network (NET) Operation Mode

In the NET operation mode, a start command and frequency command are input from a personal computer, programmable controller, or GOT (HMI) through network via the PU connector or RS-485 terminal block of the inverter or a communication option.

■ Example of CC-Link IE Field Network connection



* ETHERNET is a registered trademark of Xerox Corporation of the United States.

■ Parameter setting

To use the NET operation mode, set the following value in **P.D000 (Pr.79) Operation mode selection**.

Setting	Operation mode	Description
2	External operation mode (fixed)	After setting this value, the External operation mode is selected. To switch to the NET operation mode, send a command from a network device connected to the inverter. The command sending procedure varies depending on the network used. For the details, refer to the Instruction Manual (Detailed) of the FR-A800.

3.2 Changing the Speed with External Input

This section explains how to set the parameters required to command an inverter frequency (speed) with external inputs. External inputs are categorized into two types: digital inputs and analog inputs.

	Type of external input	Input device example
Digital input	Multi-speed setting (speeds 1 to 3)	Switch, relay, programmable controller, etc.
	Multi-speed setting (speeds 4 to 15)	
Analog input	Voltage input	Frequency setting potentiometer, etc.
	Current input	instrumentation device, etc.

To change the frequency with external inputs, set the following value in **P.D000 (Pr.79) Operation mode selection**.

Setting	Operation mode
0	External/PU switching mode
2	External operation mode (fixed)
4	External/PU combined operation mode 2

Refer to Section 3.1 for the details of each operation mode.

■ Remarks

Digital and analog inputs can be used together.
In this case, the **digital input** is given priority over the **analog input**.

3.2.1 Changing the Speed with Digital Input

When the motor speed is set in parameters in advance, these pre-set speeds can be switched with external digital inputs. You can combine the RH, RM, and RL signals to set the frequency (speed) from 1 to 7. In the initial setting, 3 speeds (speed 1 (high speed) to speed 3 (low speed)) are available. The table below lists the signal combinations and parameter numbers for the speed from 1 to 7.

Parameter	Name	Signal			Initial value	Setting range	Description
		RH	RM	RL			
P.D301 (Pr.4)	Multi-speed setting (speed 1: high speed)	ON	OFF	OFF	60 Hz (FM)* 50 Hz (CA)*	0 to 590 Hz	Set the frequency when RH is ON.
P.D302 (Pr.5)	Multi-speed setting (speed 2: medium speed)	OFF	ON	OFF	30 Hz		Set the frequency RM is ON.
P.D303 (Pr.6)	Multi-speed setting (speed 3: low speed)	OFF	OFF	ON	10 Hz		Sets the frequency when RL is ON.
P.D304 (Pr.24)	Multi-speed setting (speed 4)	OFF	ON	ON	9999	0 to 590 Hz, 9999	Set the frequencies (0 to 590 Hz) for the speed from 4 to 7 according to the combination of the RH, RM, and RL signals. •9999: Not used
P.D305 (Pr.25)	Multi-speed setting (speed 5)	ON	OFF	ON			
P.D306 (Pr.26)	Multi-speed setting (speed 6)	ON	ON	OFF			
P.D307 (Pr.27)	Multi-speed setting (speed 7)	ON	ON	ON			

* The initial value varies depending on the control terminal type (FM or CA). For the details, refer to the Instruction Manual (Detailed) of the FR-A800.

■ Remarks

With the additional **REX signal** to the RH, RM, and RL signals, you can set up to 15 speeds. To use the REX signal, assign the REX signal to an unused terminal. For the details, refer to the Instruction Manual (Detailed) of the FR-A800.

■ Note

If two or more speeds are selected simultaneously in the multi-speed setting (speeds 1 to 3), the frequency corresponding to the lower-speed signal is given priority. For example, when the RH and RM signals are turned ON, the RM signal for P.D302 (Pr.5) is given priority.

3.2.2 Changing the Speed with Analog Voltage Input

You can use analog voltage inputs from external devices (frequency setting potentiometer, etc.) to adjust the running frequency. Two input voltage ranges are available: 0 to 5 VDC (initial value) and 0 to 10 VDC.

Use the following parameters to set the magnitude (slope) of the output frequency to the input voltage.

Parameter	Name	Initial value	Setting range	Description
P.T022 (Pr.125)	Terminal 2 frequency setting gain frequency	60 Hz (FM)* 50 Hz (CA)*	0 to 590 Hz	Set the frequency of the terminal 2 input gain (maximum).
P.T200 (Pr.C2)	Terminal 2 frequency setting bias frequency	0 Hz	0 to 590 Hz	Set the frequency on the bias side of terminal 2 input.
P.T201 (Pr.C3)	Terminal 2 frequency setting bias	0%	0 to 300%	Set the converted % on the bias side voltage of terminal 2 input.
P.T203 (Pr.C4)	Terminal 2 frequency setting gain	100%	0 to 300%	Set the converted % on the gain side voltage of terminal 2 input.

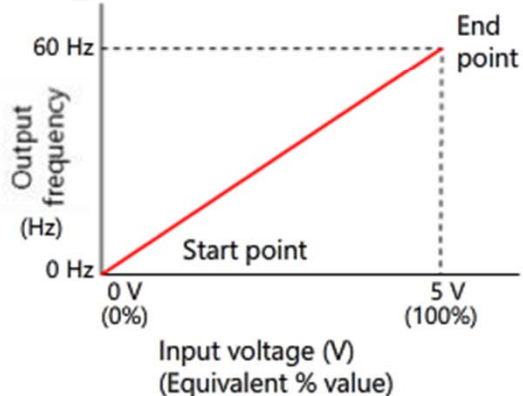
* The initial value varies depending on the control terminal type (FM or CA). For the details, refer to the Instruction Manual (Detailed) of the FR-A800.

The degree (incline) of the output frequency is determined by the straight line connecting the start point (the settings of P.T200 (Pr.C2) and P.T201 (Pr.C3)) and end point (the settings of P.T022 (Pr.125) and P.T203 (Pr.C4)) on a line graph.

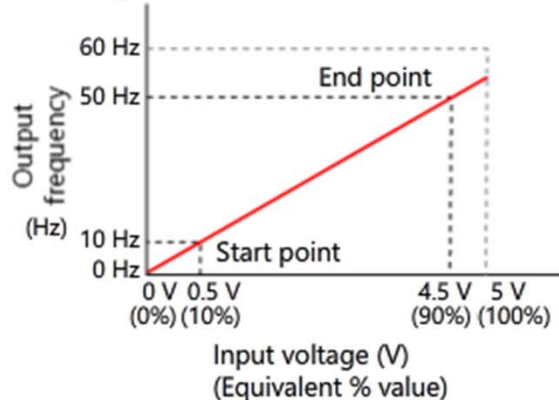
For example, the initial setting for the FM type inverter (start point is set at 0 Hz and 0% (0 V), and end point is set at 60 Hz and 100% (5 V)) produces the incline as shown in **Figure 1**.

When the start point is set at 10 Hz and 10% (0.5 V) and the end point is set at 50 Hz and 90% (4.5 V), the incline is as shown in **Figure 2**.

■ Fig. 1



■ Fig. 2



3.2.2 Changing the Speed with Analog Voltage Input

Use the simulator to check how the degree (incline) of the input voltage determines the inverter operation. (The input voltage range is set to 0 to 5 V in this simulator.)

The conveyor has stopped.
Click the "Start again" button.

▶ Start again

Parameter setting

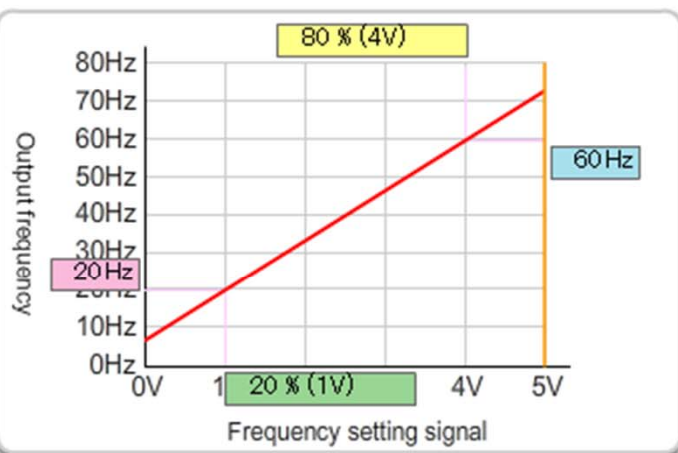
T022 (Pr.125) Terminal 2 input maximum gain frequency	60Hz
T200 (Pr.C2) Terminal 2 frequency setting bias frequency	20Hz
T201 (Pr.C3) Terminal 2 frequency setting bias	20 %
T203 (Pr.C4) Terminal 2 frequency setting gain	80 %

Frequency setting potentiometer

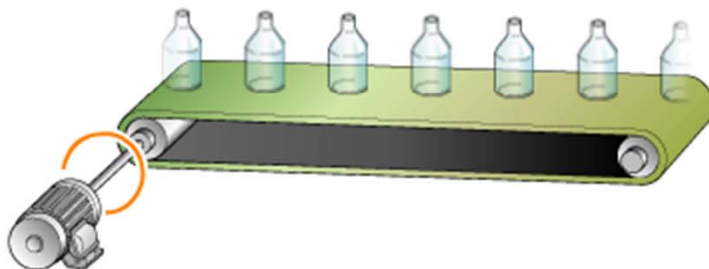
(Input voltage: V)



Start switch



73.0



3.2.3 Changing the Speed with Analog Current Input

You can use analog current inputs from external devices (instrumentation device, etc.) to adjust the running speed. For the analog current input, 4 to 20 mA DC is available range. Use the following parameters to set the degree (incline) of the output frequency to the input current.

Parameter	Name	Initial value	Setting range	Description
P.T042 (Pr.126)	Terminal 4 frequency setting gain frequency	60 Hz (FM)* 50 Hz (CA)*	0 to 590 Hz	Sets the frequency of terminal 4 input gain (maximum).
P.T400 (Pr.C5)	Terminal 4 frequency setting bias frequency	0 Hz	0 to 590 Hz	Sets the frequency on the bias side of terminal 4 input.
P.T401 (Pr.C6)	Terminal 4 frequency setting bias	20%	0 to 300%	Sets the converted % on the bias side current of terminal 4 input.
P.T403 (Pr.C7)	Terminal 4 frequency setting gain	100%	0 to 300%	Sets the converted % on the gain side current of terminal 4 input.

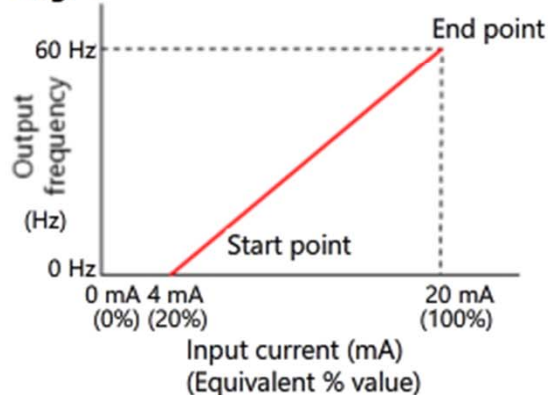
* The initial value varies depending on the control terminal type (FM or CA). For the details, refer to the Instruction Manual (Detailed) of the FR-A800.

The the degree (incline) of the output frequency is determined by the straight line connecting the start point (the settings of P.T400 (Pr.C5) and P.T401 (Pr.C6)) and end point (the settings of P.T042 (Pr.126) and P.T403 (Pr.C7)) on a line graph.

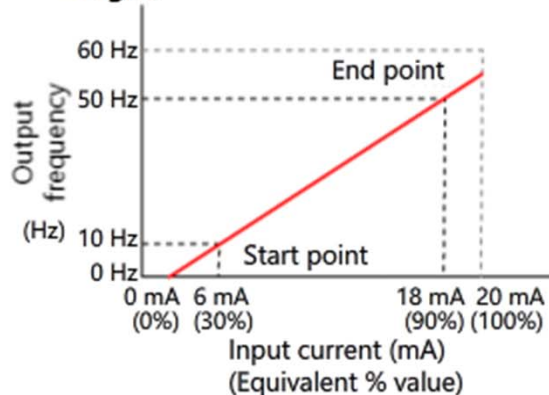
For example, the initial setting or the FM type inverter (start point is set at 0 Hz and 20% (4 mA) and end point is set at 60 Hz and 100% (20 mA)) produces the incline as shown in **Figure 1**.

When the start point is set at 10 Hz and 30% (6 mA) and the end point is set at 50 Hz and 90% (18 mA), the incline is as shown in **Figure 2**.

■ Fig. 1



■ Fig. 2



3.3 Operating the Motor in the Optimal Status

To run a motor in the optimal status, match the inverter output (frequency, voltage) with the motor rating. The following parameters must be set before starting the motor.

In **P.G001 (Pr.3) Base frequency**, set the rated frequency indicated on the motor's rating plate.

In **P.G002 (Pr.19) Base frequency voltage**, usually set "9999" (initial value), which selects the same voltage as the power supply voltage. If the rated motor voltage differs from the power supply voltage, set the rated motor voltage.

Parameter No.	Name	Initial value	Setting range	Description
P.G001 (Pr.3)	Base frequency	60 Hz (FM)* 50 Hz (CA)*	0 to 590 Hz	Set the rated motor frequency (50/60 Hz).
P.G002 (Pr.19)	Base frequency voltage	9999	0 to 1000 V	Set the base voltage.
			8888	Set 95% of the power supply voltage.
			9999	Set the same voltage as the power supply voltage.

* The initial value varies depending on the control terminal type (FM or CA). For the details, refer to the Instruction Manual (Detailed) of the FR-A800.

Rating plate example of Mitsubishi high-speed motor

See the area enclosed in the red frame below. Set the HERTZ value for the base frequency, and the VOLT value as the base frequency voltage.

1.5	k W	6	POLE
HERTZ		400	
VOLT		200	
AMP			
RPM			

3.4 Protecting the Motor from Overheating

For the electronic thermal relay setting, set appropriate thermal characteristic according to the motor. Doing so will protect the motor from overheating.

This setting is also effective when the motor's cooling ability decreases in a low-speed operation. The following parameters must be set before starting the motor.

Set the rated motor current in **P.H000 (Pr.9) Electronic thermal O/L relay**. For a standard motor, set the rated current of **200 V/50 Hz**, which is indicated on the motor's rating plate, regardless of the power supply frequency.

In **P.C100 (Pr.71) Applied motor**, set the appropriate motor type.

Parameter	Name	Initial value	Setting range	Description
P.H000 (Pr.9)	Electronic thermal O/L relay	Inverter rated current*	0 to 500 A (55K or lower) 0 to 3600 A (75K or higher)	For a standard motor, set the rated current of 200 V/50 Hz indicated on the motor's rating plate.
P.C100 (Pr.71)	Applied motor	0	0 to 6, 13 to 16, 20, 23, 24, 30, 33, 34, 40, 43, 44, 50, 53, 54, 70, 73, 74, 330, 333, 334, 8090, 8093, 8094, 9090, 9093, 9094	For the details of the setting value, refer to the Instruction Manual (Detailed) of the FR-A800.

* When the inverter capacity is 0.75K or lower, 85% of the rated current is set.

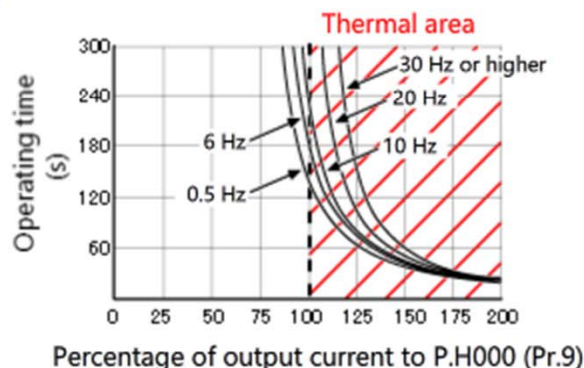
Rating plate example of Mitsubishi standard motor

Set 2.0 A (the rated current (AMP) at the rated frequency (HERTZ) of 50 Hz and the rated voltage (VOLT) of 200 V, emphasized in the red frame) in **P.H000 (Pr.9) Electronic thermal O/L relay**.

0.4 kW		4 POLE	
71-1395			
HERTZ	50	60	60
VOLT	200	200	220
AMP	2.0	2.0	2.0
RPM	1410	1690	1700

■ Note

If the output current of the inverter exceeds the rated motor current, the motor overload trip (E.THM) occurs.



3.5 Summary of This Chapter

Here is what you have learned in this chapter.

- Selecting the operation mode
- Changing the speed with external input
- Operating the motor in the optimal status
- Protecting the motor from overheating

Point

Command type	A start command and a frequency command are required for the inverter to control a motor. Turning ON a start command enables the motor rotation, and a frequency command determines the rotation speed of the motor.
Operation mode	The command method for the start command and the frequency command can be changed with the operation mode. Change the operation mode according to the application.
Changing the speed with external input	You can change the speed of the inverter with the external input. Both the digital input and analog input (voltage/current) are available.
Setting the base frequency and base frequency voltage	Match the inverter output (frequency, voltage) with the motor rating to run the motor in the optional status. Set the related parameters before starting the motor.
Setting the electronic thermal O/L relay	Set appropriate thermal characteristic to the electronic thermal O/L relay to protect the motor from overheating. Set the related parameters before starting the motor.

Chapter 4 Adjustment According to the Operation

This chapter explains the parameters to be adjusted according to the operation after startup.

- 4.1 Limiting the Motor Speed
- 4.2 Operating the Motor at 120 Hz or Higher Frequency
- 4.3 Adjusting Acceleration/Deceleration of the Motor According to the Load
- 4.4 Operating Fans and Pumps in the Energy-saving Mode
- 4.5 Improving the Reduction of Start-up Torque
- 4.6 Limiting the Output Current
- 4.7 Summary of This Chapter

4.1 Limiting the Motor Speed

In actual operation, a frequency (speed) that cannot be followed by the connected machine or motor may be commanded, or a fan motor has to be always run at a certain speed or higher to keep the specified temperature. In such cases, set **P.H400 (Pr.1) Maximum frequency** and **P.H401 (Pr.2) Minimum frequency**.

Example: When the maximum frequency is set to 60 Hz, the motor runs at 60 Hz even when the 80 Hz is commanded.

Parameter	Name	Initial value	Setting range	Description
P.H400 (Pr.1)	Maximum frequency	120 Hz (55K or lower) 60 Hz (75K or higher)	0 to 120 Hz	Set the maximum output frequency.
P.H401 (Pr.2)	Minimum frequency	0 Hz	0 to 120 Hz	Set the minimum output frequency.

4.1 Limiting the Motor Speed

Use the simulator to check how the maximum/minimum frequency settings affect the inverter operation.

The system is now in constant speed operation.
To stop the operation, click the "Start again" button.

▶ Start again

Parameter setting

H400(Pr.1) Maximum frequency 120 Hz

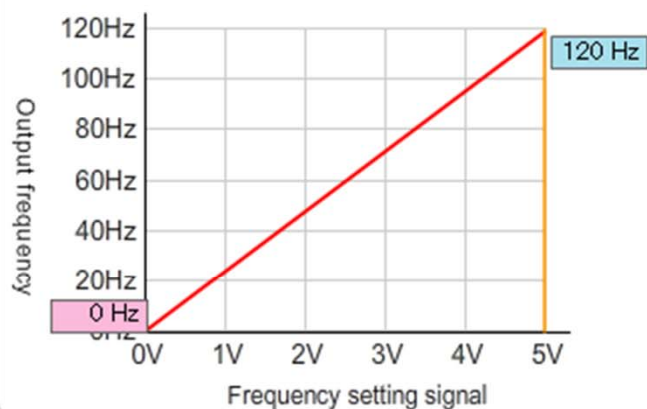
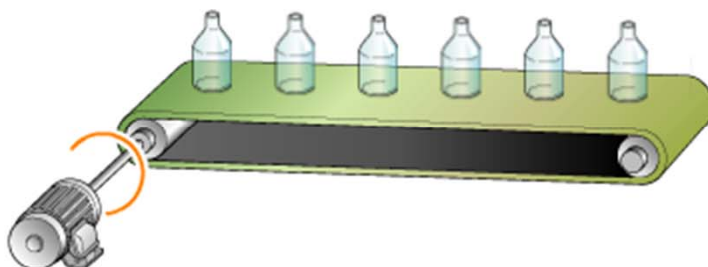
H401(Pr.2) Minimum frequency 0 Hz

Frequency setting potentiometer
(Input voltage: V)

Start switch



120.00



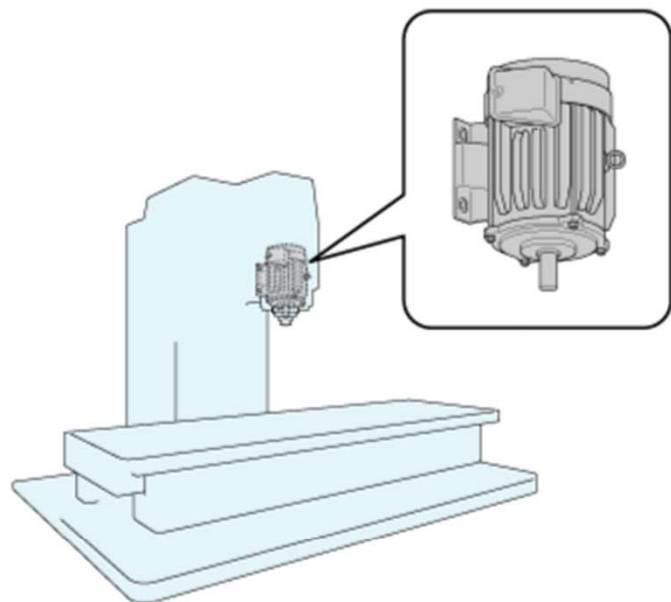
4.2 Operating the Motor at 120 Hz or Higher Frequency

In the initial setting, 120 Hz or a higher frequency cannot be commanded.

To run the motor at 120 Hz or a higher frequency, set 120 Hz or a higher frequency in **P.H402 (Pr.18) High speed maximum frequency**.

This setting may be useful for a spindle motor of a machine tool, etc.

Parameter	Name	Initial value	Setting range	Description
P.H402 (Pr.18)	High speed maximum frequency	120 Hz (55K or lower) 60 Hz (75K or higher)	0 to 590 Hz	Set 120 Hz or a higher output frequency.



■ Note

When the setting in **P.H400 (Pr.1) Maximum frequency** is changed, the setting in **P.H402 (Pr.18) High speed maximum frequency** is automatically changed to the frequency set in **P.H400 (Pr.1) Maximum frequency**.

4.3 Adjusting Acceleration/Deceleration of Motor According to Load

Set the optimal acceleration/deceleration time according to the load.

In **P.F010 (Pr.7) Acceleration time**, set the time to reach **P.F000 (Pr.20) Acceleration/deceleration reference frequency** from the stop status (0 Hz).

In **P.F011 (Pr.8) Deceleration time**, set the time to reach the stop status (0 Hz) from **P.F000 (Pr.20) Acceleration/deceleration reference frequency**.

Parameter	Name	Initial value		Setting range	Description
P.F010 (Pr.7)	Acceleration time	7.5K or lower	5 s	0 to 3600 s	Set the motor acceleration time. This is the time period to reach P.F000 (Pr.20) from the stop status.
		11K or higher	15 s		
P.F011 (Pr.8)	Deceleration time	7.5K or lower	5 s	0 to 3600 s	Set the motor deceleration time. This is the time period to reach the stop status from P.F000 (Pr.20).
		11K or higher	15 s		
P.F000 (Pr.20)	Acceleration/deceleration reference frequency	60 Hz (FM)*1 50 Hz (CA)*1		1 to 590 Hz	Set the reference frequency for the acceleration/deceleration time.

*1: The initial value varies depending on the control terminal type (FM or CA). For the details, refer to the Instruction Manual (Detailed) of the FR-A800.

Use the following formulas to determine the acceleration and deceleration time for P.F010 (Pr.7) and P.F011 (Pr.8).

Acceleration time setting =

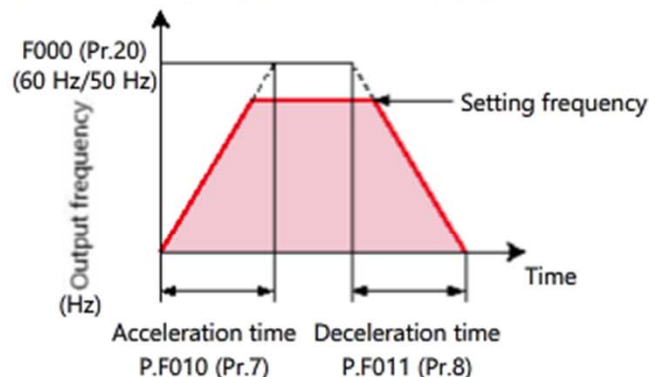
$$\frac{\text{P.F000 (Pr.20)}}{\text{(set frequency - P.F102 (Pr.13)}^{*2})} \times \text{acceleration time from the stop to the set frequency}$$

*2: P.F102 (Pr.13) Starting frequency (initial value: 0.5 Hz)
 For the details, refer to the Instruction Manual (Detailed) of the FR-A800.

Deceleration time setting =

$$\frac{\text{P.F000 (Pr.20)}}{\text{(set frequency - P.G100 (Pr.10)}^{*3})} \times \text{deceleration time from the set frequency to the stop}$$

*3: P.G100 (Pr.10) DC injection brake operation frequency (initial value: 3 Hz)
 For the details, refer to the Instruction Manual (Detailed) of the FR-A800.



■ Note

Setting the acceleration time or deceleration time too short the occurrence of sudden acceleration or deceleration may cause overcurrent and a trip.

4.3 Adjusting Acceleration/Deceleration of Motor According to Load

Use the simulator to check how the acceleration or deceleration time settings affect the inverter operation.

The conveyor has stopped.
Click the "Start again" button.

▶ Start again

Parameter setting

F000(Pr.20) Acceleration/
deceleration reference frequency



F010(Pr.7) Acceleration time



F011(Pr.8) Deceleration time

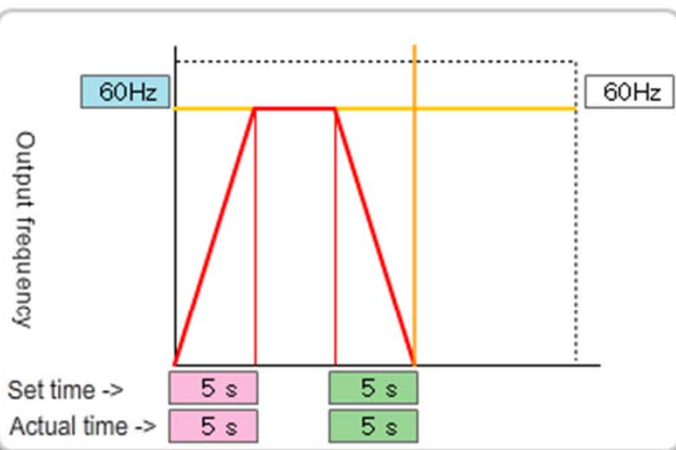


Frequency setting potentiometer

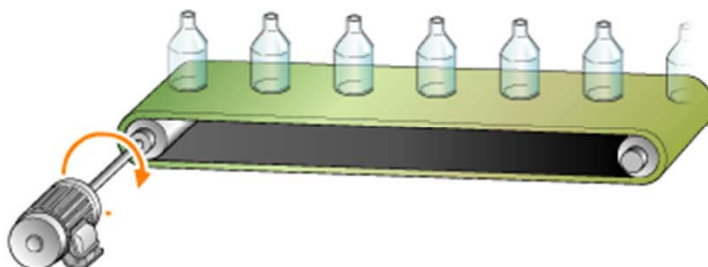
(Input voltage: V)



Start switch



60.0



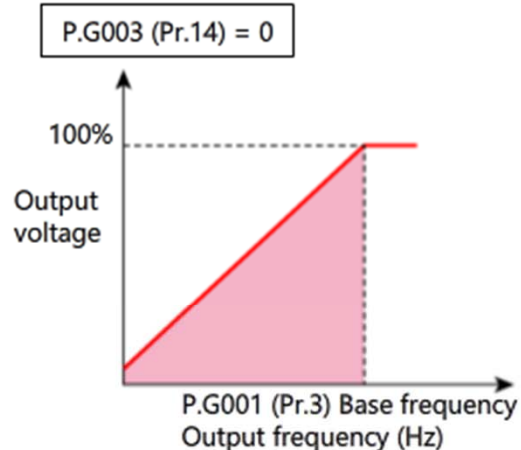
4.4

Operating Fans and Pumps in the Energy-saving Mode

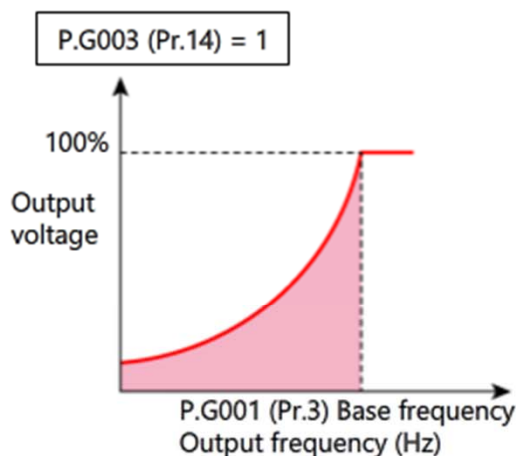
When a fan or pump is used, setting "1" (for variable-torque load) in **P.G003 (Pr.14) Load pattern selection** provides an energy saving effect of about 3 to 5%.

Parameter	Name	Initial value	Setting range	Description
P.G003 (Pr.14)	Load pattern selection	0	0	For constant-torque load
			1	For variable-torque load
			2	For constant-torque lift (boost at reverse rotation 0%)
			3	For constant-torque lift (boost at forward rotation 0%)
			4	RT signal ON : for constant-torque load RT signal OFF : for constant-torque lift, boost at reverse rotation 0%
			5	RT signal ON : for constant-torque load RT signal OFF : for constant-torque lift, boost at forward rotation 0%

■ Application for Constant-torque load



■ Application for Variable-torque load



■ Note

Selecting "1" (for variable-torque load) reduces the generable torque.
A heavy-loaded machine may not be accelerated due to the lack of starting torque.
In that case, select "0" (for constant-torque load).

4.5 Improving the Reduction of Start-up Torque

Changes in output frequency and output voltage are proportional to each other. Thus, a significant voltage drop in the low-frequency range reduces the motor output torque.

For a heavy start-up load, the motor may not accelerate due to torque shortage.

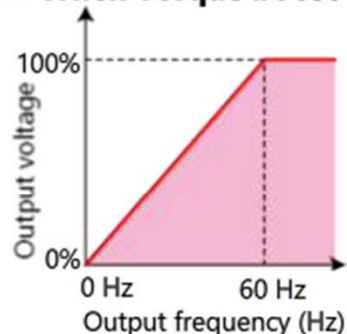
Use **P.G000 (Pr.0) Torque boost** to compensate for the output voltage at 0 Hz output frequency.

The initial torque boost setting varies depending on the inverter capacity. (Refer to the initial values in the following table.)

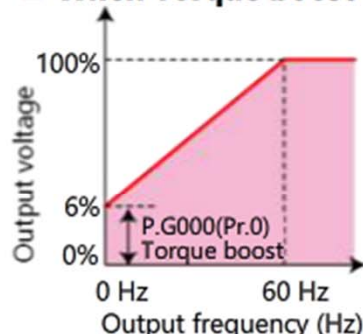
When the starting torque is insufficient, increase the torque boost value.

Parameter	Name	Initial value		Setting range	Description
P.G000 (Pr.0)	Torque boost	0.75K or lower	6%	0 to 30%	Set the output voltage at 0 Hz output frequency (stop status) in %. • 100% = the setting value in P.G002 (Pr.19) Base frequency voltage (For the details, refer to Section 3.3.)
		1.5K to 3.7K	4%		
		5.5K to 7.5K	3%		
		11K to 55K	2%		
		75K or higher	1%		
P.G010 (Pr.46)	Second torque boost	9999		0 to 30%	Set the torque boost value at when the RT signal is ON.
				9999	Without second torque boost
P.G020 (Pr.112)	Third torque boost	9999		0 to 30%	Set the torque boost value at when the X9 signal is ON.
				9999	Without third torque boost

■ When Torque boost = 0%



■ When Torque boost = 6%



■ Note

- Adjust the parameter setting gradually (in about 0.5% increments) up to 10% as a reference while checking the motor status.
- For a light load or when a high-efficiency motor is used, increasing the torque boost too much may cause overcurrent or overheating trip.
- For a light load, decreasing the torque boost improves the motor efficiency.

4.5 Improving the Reduction of Start-up Torque

Use the simulator to check how the torque boost setting affects the inverter operation.
Set an appropriate torque boost to solve the torque shortage problem at operation start.

Setting the optimal torque boost has been successful in smooth winding of the lift.
Click the "Start again" button.

Start again

Parameter setting

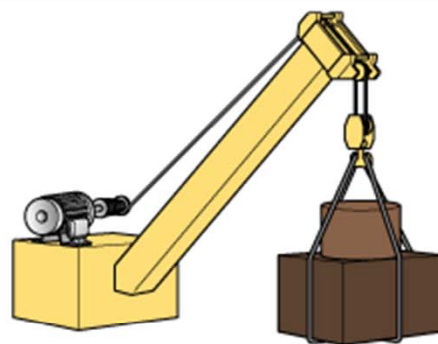
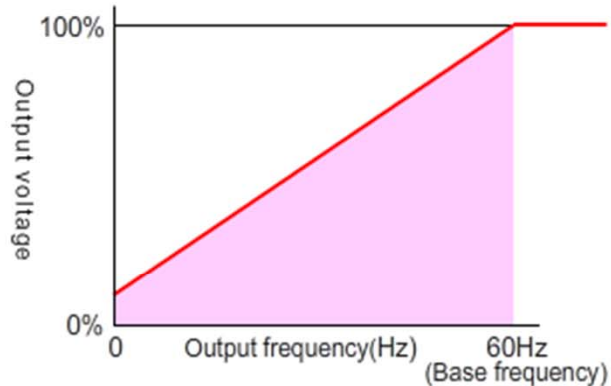
G000(Pr.0) Torque boost

0%

6%

20%

Start switch



4.6 Limiting the Output Current

Moving a heavy load may cause overcurrent and the inverter may trip.

Use the stall prevention operation function to prevent a trip.

When the output current exceeds the setting in **P.H500 (Pr.22) Stall prevention operation level**, this function automatically changes the inverter output frequency to reduce the output current.

The initial value of the stall prevention operation level is 150% of the inverter rated current.

When a trip occurs due to overcurrent, lower the stall prevention operation level.

Parameter	Name	Initial value	Setting range	Description
P.H500 (Pr.22)	Stall prevention operation level	150%*	0	The stall prevention operation is disabled.
			0.1 to 400%	Set the output current at which the stall prevention operation activates. • 100% = Rated inverter current

* For the 3.7K or lower, the initial value changes to 200% depending on conditions. For the details, refer to the Instruction Manual (Detailed) of the FR-A800.

■ What is a trip?

The operation status where the inverter outputs are shut off when the inverter's protection circuit detects faults.

■ What is a stall?

The condition where the motor rotation is stopped because the rotation torque is insufficient to rotate an excessive load, etc.

■ Remarks

When the stall prevention operation activates, "OL" is displayed on the monitor of the operation panel.

4.6 Limiting the Output Current

Use the simulator to check how the stall prevention operation level affects the inverter operation.

Acceleration/deceleration has been performed smoothly because the stall prevention operation level was set properly. Click the "Start again" button.

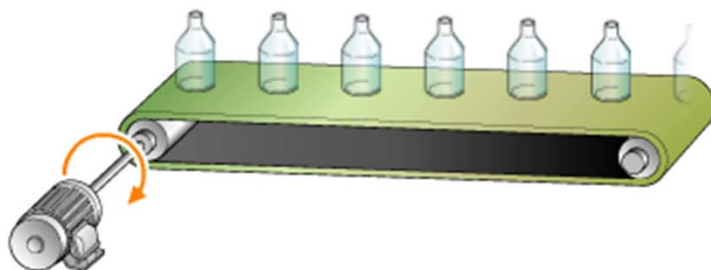
▶ Start again

Parameter setting

H500(Pr.22) Stall prevention operation level

- When the stall prevention operation level is too low
- When the stall prevention operation level is adequate
- When the stall prevention operation level is too high

Start switch



4.7 Summary of This Chapter

Here is what you have learned in this chapter.

- Limiting the motor speed
- Operating the motor at 120 Hz or higher frequency
- Adjusting acceleration/deceleration of the motor according to the load
- Operating fans and pumps in the energy-saving mode
- Improving the reduction of start-up torque
- Limiting the output current

Point

Setting the maximum and minimum frequencies	In actual operation, a frequency (speed) that cannot be followed by the connected machine or motor may be commanded, or a fan motor has to be always run at a certain speed or higher to keep the specified temperature. In such cases, set the maximum frequency or the minimum frequency.
Setting the maximum frequency	With the initial parameter setting, 120 Hz or a higher frequency cannot be commanded. To run the motor at 120 Hz or a higher frequency, set 120 Hz or a higher frequency in the high speed maximum frequency.
Setting the acceleration/deceleration time and acceleration/deceleration reference frequency	Set the optimal acceleration/deceleration time according to the load in the parameter for the acceleration time or the deceleration time.
Setting the load pattern	When a fan or pump is used, setting the parameter for the load pattern selection provides an energy saving effect.
Setting the torque boost	To improve the insufficient torque, use the parameter for the torque boost to compensate for the output voltage at 0 Hz output frequency.
Setting the stall prevention operation level	Moving a heavy load may cause overcurrent trip. Use the stall prevention operation function to prevent such trips.

Chapter 5 PLC Function

This chapter explains the outline and how to use the PLC function, which allows an advanced use of the inverter.

- 5.1 Outline of the PLC Function
- 5.2 How to Use the PLC Function
- 5.3 Summary of This Chapter

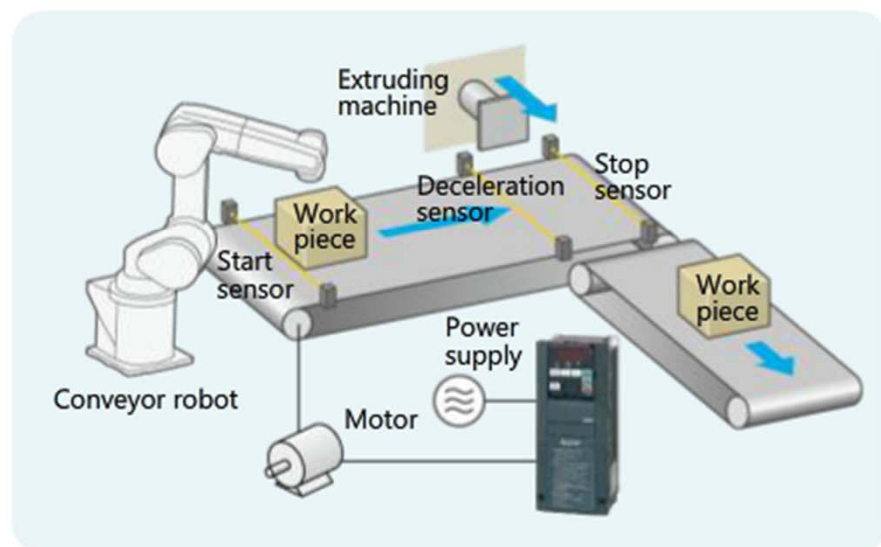
5.1 Outline of the PLC Function

PLC control enables various operation of the target workpiece according to the order or condition as programmed in advance.

With the PLC function, small-scale PLC control can be performed with the inverter alone.

The following shows an example of conveyor control with the PLC function.

Capturing signals from sensors that detect workpieces, the inverter controls a motor, conveyor robot, and extruding machine in response to their individual movement.



5.2 How to Use the PLC Function

This section briefly explains how to use the PLC function.

■ Items to prepare

- Personal computer
- FR Configurator2 (setup software)
- USB cable for connecting the inverter and personal computer *1

*1: The cable needs to be connected to the USB mini B connector on the inverter.

■ Work flow

1. Set parameters.
2. Create and write a sequence program.
3. Wire the control circuit.
4. Execute the sequence program.

A sequence program is the program file having the details of the PLC function control written with a dedicated programming language.

Create the program using the Developer function of FR Configurator2.

This course covers steps 1, 3, and 4.

Take the following courses of Mitsubishi FA in e-Learning for step 2 which requires knowledge of the PLC control and the sequence program.

Course on the basics of the PLC control

- "FA Equipment (PLCs) for Beginners"

Course on how to create the sequence programs

- "PLC Basic for Programming" *2
- "PLC GX Works2 Basic" *2

*2: Although the software used for learning in these two courses is not FR Configurator2 but programmable controller engineering software (GX Works2) much of the programming screens and operations are the same as those for the Developer function of FR Configurator2.

5.2.1 Parameter Setting

The following shows the parameter settings required for the PLC function.

■ PLC function operation selection

Enable the PLC function.

Set "2" in **P.A800 (Pr.414)**.

Parameter	Initial value	Description
P.A800 (Pr.414)	0	2: PLC function enabled

■ Assignment of the sequence start signal

Assign the sequence start signal (SQ signal) to an unused terminal of the standard control circuit.

The SQ signal is used to execute a sequence program.

In the following example, the signal is assigned to the RES input terminal.

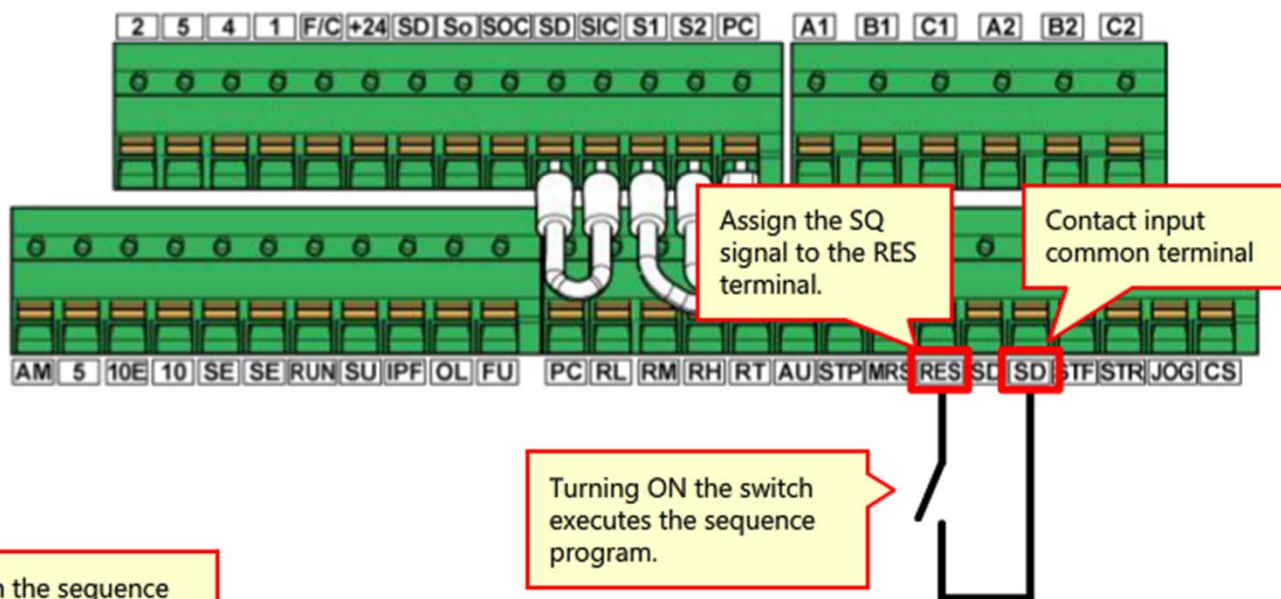
Set "50" in **P.T711 (Pr.189) RES terminal function selection**.

Parameter	Initial value	Description
P.T711 (Pr.189)	62	50: The SQ signal is assigned.

5.2.2

Wiring the Control Circuit and Executing the Sequence Program

The following shows a wiring example of the standard control circuit.
Connect a switch to the RES terminal to which the SQ signal is assigned.
Turning ON the switch executes the sequence program written in the inverter.



When the sequence program is executed, [P.RUN] indicator on the operation panel is lit.



The I/O terminals of the control circuit can be used as general-purpose terminals.
With the external devices connected to these terminals, the inverter control by the sequence programs is possible as you desire.

In the conveyor control example in Section 5.1 "Outline of the PLC function", for example, assign the start signal for the conveyor robot to the general-purpose terminal.

5.3

Summary of This Chapter



Here is what you have learned in this chapter.

- Outline of the PLC function
- How to use the PLC function

Point

PLC control	PLC control enables various operation of the target workpiece according to the order or condition as programmed in advance.
PLC function	With this function, small-scale PLC control can be performed with the inverter alone.

Now that you have completed all of the lessons of the **Inverter Basics (Function) for the FR-800 series**, you are ready to take the final test. If you are unclear on any of the topics covered, please take this opportunity to review those topics.

There are a total of 8 questions (23 items) in this Final Test.

You can take the final test as many times as you like.

How to score the test

After selecting the answer, make sure to click the **Answer** button. Your answer will be canceled if you proceed without clicking the Answer button. (Regarded as unanswered question.)

Score results

The number of correct answers, the number of questions, the percentage of correct answers, and the pass/fail result will appear on the score page.

Correct answers : 8
Total questions : 8
Percentage : 100%

To pass the test, you have to answer **60%** of the questions correct.

Proceed

Review

- Click the **Proceed** button to exit the test.
- Click the **Review** button to review the test. (Correct answer check)
- Click the **Retry** button to retake the test again.

The following explains the roles of parameters and how to prevent accidental operations.
Fill in the blanks of the explanation.

Parameters are the settings that determine the of the inverter.

The parameters are classified into the following two types.

: 16 parameters that set the basic functions

: Parameters that set complex functions according to the application

can be displayed on the FR-A800 series inverter in the initial setting.

To limit the displayable parameters, use .

To prevent parameters from being changed by accidental operation, set .

Suppose the start command and frequency command are input under the following specifications, choose the optimal "D000(Pr.79) Operation mode".

Specifications

- Start command: "FWD or REV" key on the operation panel
- Frequency command: External frequency setting potentiometer (voltage input)

- "0: PU external switching mode"
- "1: PU operation mode fixed"
- "2: External operation mode fixed"
- "3: External/PU combined operation mode 1"
- "4: External/PU combined operation mode 2"

[Answer](#)[Back](#)

Test**Final Test 3**

Frequency is set by external digital input.

Choose the parameter settings under the following specifications:

Specifications

- Output frequency when the terminal RH signal is ON: 80Hz
- Output frequency when the terminal RM signal is ON: 60Hz
- Output frequency when the terminal RL signal is ON: 40Hz

"D301(Pr.4) Multi-speed setting (speed 1)": --Select-- ▼

"D302(Pr.5) Multi-speed setting (speed 2)": --Select-- ▼

"D303(Pr.6) Multi-speed setting (speed 3)": --Select-- ▼

[Answer](#)[Back](#)

Frequency is set by analog voltage input to terminal 2 from the external frequency setting potentiometer.
Choose the parameter settings under the following specifications:

Specifications

- Input voltage: 0 to 5V
- Output frequency when input voltage is 0.5V: 10Hz
- Output frequency when input voltage is 4.5V: 50Hz

"T022(Pr.125) Terminal 2 frequency setting gain frequency": --Select-- ▼

"T200(C2) Terminal 2 frequency setting bias frequency": --Select-- ▼

"T201(C3) Terminal 2 frequency setting bias": --Select-- ▼

"T203(C4) Terminal 2 frequency setting gain": --Select-- ▼

Answer

Back

To allow the inverter to operate under the optimal conditions, choose "G001(Pr.3) Base frequency" and "G002(Pr.19) Base frequency voltage" in accordance with the following specifications:

Specifications

- Type of motor: High-speed motor
- Rated frequency of motor: 400Hz
- Rated voltage of motor: 200V
- Power supply voltage/frequency: 220V/60Hz

"G001(Pr.3) Base frequency":

"G002(Pr.19) Base frequency voltage":

To protect the motor from overheating, choose "H000(Pr.9) Electronic thermal O/L relay" and "C100(Pr.71) Applied motor" under the following specifications:

Specifications

- Motor type: Standard motor
- Rated motor current: See the table "Rated current of motor" below.
- Power supply voltage/frequency: 220V/60Hz

"H000(Pr.9) Electronic thermal O/L relay": --Select-- ▼

"C100(Pr.71) Applied motor": --Select-- ▼

Rated current of motor

Power	200V/50Hz	200V/60Hz	220Hz/60Hz
Rated current	15.4A	14.4A	13.8A

[Answer](#)[Back](#)

Set the acceleration/deceleration time when the setting frequency is 50Hz.

Choose "F010(Pr.7) Acceleration time" and "F011(Pr.8) Deceleration time" when the actual acceleration time and deceleration time meet the following specifications:

Specifications

- Setting frequency: 50Hz
- Acceleration time from the stop to the setting frequency: 5 s
- Deceleration time from the setting frequency to the stop: 10 s

"F010(Pr.7) Acceleration time":

"F011(Pr.8) Deceleration time":

"F000(Pr.20) Acceleration/deceleration reference frequency": 60Hz

"F102(Pr.13) Starting frequency": 0.5Hz

"G100(Pr.10) DC injection brake operation frequency": 3Hz

Answer

Back

The following explains how to overcome the shortage of start torque and how to prevent a trip.
Fill in the blanks of the explanation.

When a heavy load is to be moved, the start torque may be too small to implement acceleration.

--Select-- ▼ the torque boost value to overcome the shortage of start torque.

Note that --Select-- ▼ the torque boost value may cause overcurrent and then a trip.

Moving a heavy load may cause overcurrent and then a trip.

--Select-- ▼ the stall prevention operation level to limit output current and prevent a trip from occurring

Answer

Back

Test**Test Score**

You have completed the Final Test. Your results are as follows.
To end the Final Test, proceed to the next page.

Correct answers : **8**

Total questions : **8**

Percentage : **100%**

Proceed

Review

Congratulations. You passed the test.

You have completed the **Inverter Basics (Function) for the FR-800 series.**

Thank you for taking this course.

We hope you enjoyed the lessons and the information you acquired in this course will be useful in the future.

You can review the course as many times as you want.

Review

Close