Instruction booklet

IREM - IRET
INVERTER



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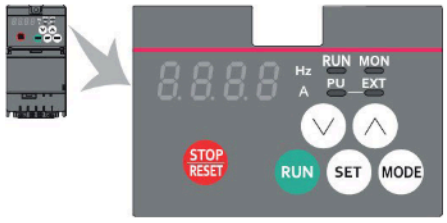
IREM/IRET

IREM/IRET CONFIGURATION

Here is the procedure to follow for typical **IREM/IRET** drive configurations

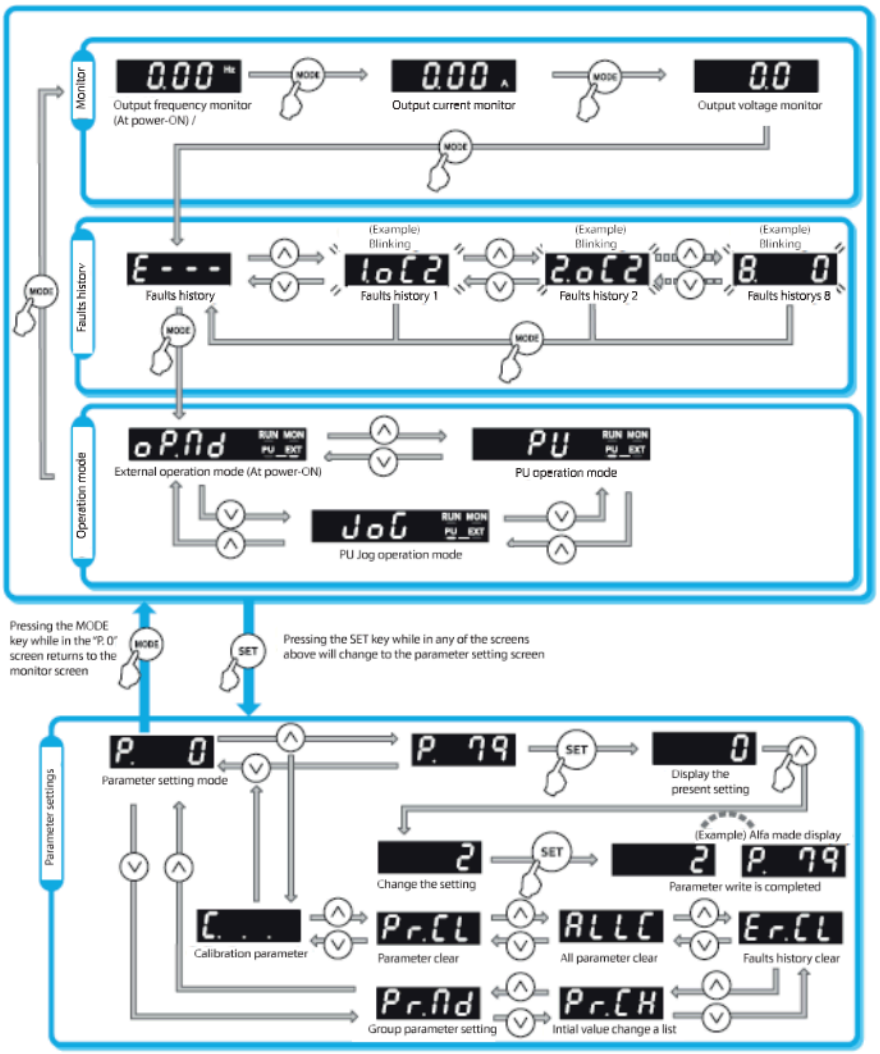
PROCESS TO CHANGE PARAMETERS:

First of all, it is convenient to know the process to move through the IREM/IRET drive menus and to be able to configure it correctly, because this series of drives presents some differences with respect to the existing ones.



SET: button that allows us to move to the parameter menu (**PRM**), enter to edit or view a parameter and set a new value.
MODE: button that allows us to return to monitoring (**MON**) when we are in the parameters menu. Once in monitoring, it allows us to see the output variables (by default the frequency, output voltage and motor consumption) and the list of errors.
RUN: run command button in **PU** mode
STOP/RESET: stop button in **PU** and reset mode.
↑ ↓**:** management buttons, we use them to move between the parameters and to modify the value they have.

BASIC OPERATION



*1 The monitor items can be changed
*2 For the details of each fault
*3 In each fault record display, "0" is displayed instead of the fault indication when no fault records exists
*4 For de details of operation modes
*5 "P. 0" will appear if the MODE key is pressed during parameter setting

PARAMETERS TO BE SET FOR PU CONTROL (PARAMETER UNIT):
In this control mode the inverter is controlled by the **RUN** and **STOP** buttons and the frequency is adjusted by the arrows on the inverter itself.

Pr.1 = Set maximum frequency (Hz)
Pr.2 = Set minimum frequency (Hz)
Pr.7 = Acceleration time (s)
Pr.8 = Deceleration time (s)
Pr.9 = Nominal current setting of the motor for its thermal protection (A)
Pr.79 = Set to 1 to indicate that the control will be done through the inverter buttons themselves.

PU CONTROL OPERATION (PARAMETER UNIT):
Once the parameterization has been carried out, the control of the inverter will be carried out by means of the **RUN** and **STOP** button.
To adjust the frequency, with the MON led on, we will adjust the setpoint frequency using the arrows on the panel itself and press the **SET** button to confirm the setpoint. Once the setpoint has been correctly given, the setpoint that has been given and an **"F"** will flash alternately on the display.

PARAMETERS TO ADJUST FOR EXT CONTROL (EXTERNAL ELEMENTS):
In this control mode the inverter is controlled by the digital and / or analog inputs of the inverter itself.

Pr.1 = Set maximum frequency (Hz)
Pr.2 = Set minimum frequency (Hz)
Pr.4 = Frequency reference associated to RH terminal
Pr.5 = Frequency reference associated to terminal RM
Pr.6 = Frequency reference associated to RL terminal
Pr.7 = Acceleration time (s)
Pr.8 = Deceleration time (s)
Pr.9 = Nominal current setting of the motor for its thermal protection (A)
Pr.79 = Set to 2 to indicate that the control will be done through external elements

ANALOG INPUT PARAMETERS:
Pr.73 = Terminal 2 input setting

0	Terminal 2 input 0 to 10V
1	Terminal 2 input 0 to 5V
10	Terminal 2 input 0 to 10V
11	Terminal 2 input 0 to 5V

Pr.125 = Frequency setpoint at maximum voltage signal (Hz)
Pr.C2 = Frequency setpoint at minimum voltage signal (Hz)

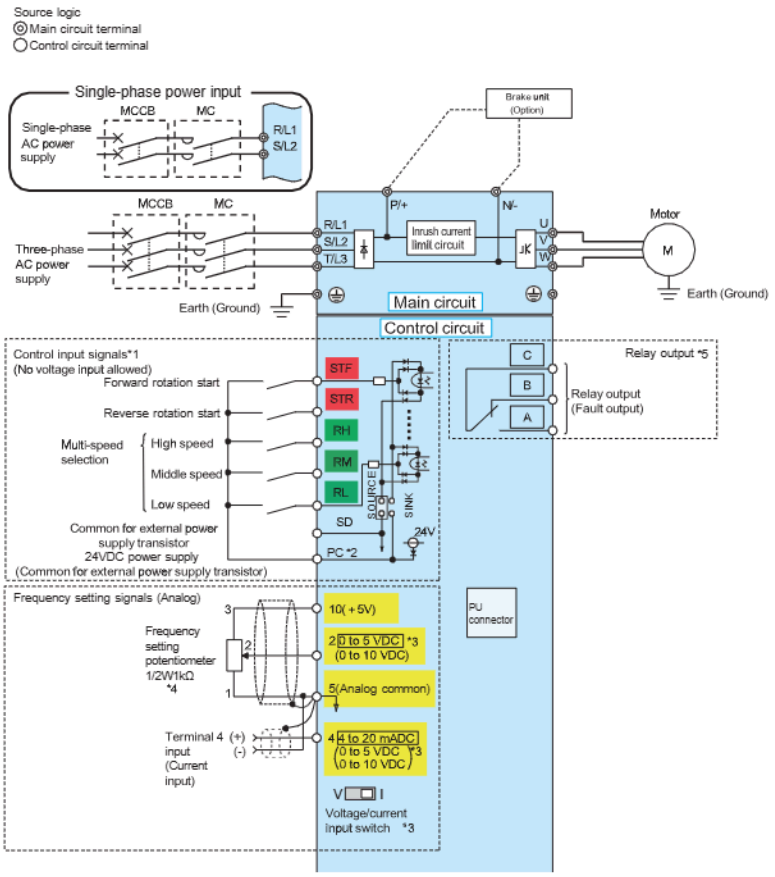
Pr.267 = Terminal 4 input setting

0		Terminal 4 input, 4 to 20 mA
1		Terminal 4 input, 0 to 5 V
2		Terminal 4 input, 0 to 10V

Pr.126 = Frequency setpoint at maximum signal (Hz)
Pr.C5 = Frequency setpoint at minimum signal (Hz)

To indicate to the inverter that the signal is given by terminal 4, we must activate the AU signal (by setting **Pr.180 =** 4, the RL terminal becomes AU).

SIGNALS AND WIRING:



- Running order (**STF** = clockwise / **STR** = anti-clockwise)
- Frequency setpoint, multi-speed (fixed speeds of RH, RM and RL)
- Frequency setpoint, analog signal.
  Terminal 10 = Internal power supply + 5V
  Terminal 5 = Common of analog inputs

By activating the running signal (**STF** or **STR**) and activating the fixed speed (**RH**, **RM** and **RL**) we make the motor work at a constant speed while these signals are activated.
In case of working with analogs, we must activate the start signal (**STF** or **STR**) and through the configuration of the commented parameters, depending on the signal it receives, it will scale for the relevant frequency setpoint.

Note: bear in mind that the drive gives priority to the fixed speeds over the analog, so if we work with analog we CANNOT activate any of the RH, RM and RL inputs, because then the drive will not pay attention to the analog command.

PARAMETERS TO ADJUST FOR COMBINED CONTROL:

As we have commented on the **PU** and **EXT** control mode, our drives allow us to exercise a combined control of these controls.

Pr.79 = 3

Adjusting this parameter in this way, we enable a type of combined control, which consists of:
- Running order **(EXT)**: Via **STF** and **STR** terminals
- Frequency reference **(PU)**: Using the arrows on the console (Parameter Unit) and confirmation with the **SET** button

Pr.79 = 4

Adjusting this parameter in this way, we enable a type of combined control, which consists of:
- Running order **(PU):** By **RUN** and **STOP** buttons
- Frequency reference **(EXT):** Through external signals, digital inputs (**RH**, **RM**, **RL**) or analog (terminal 2 or 4)

Purpose: PID in SFC series

Product: SFC Series

PID function adjustment in the 700 series

This function allows for pressure, flow, temperature, air flow, etc. controls. Using the feedback signal from our system (e.g. pressure transducer), the drive constantly adjusts the output speed in such a way as to maintain the set point defined by the user.

Basic parameters

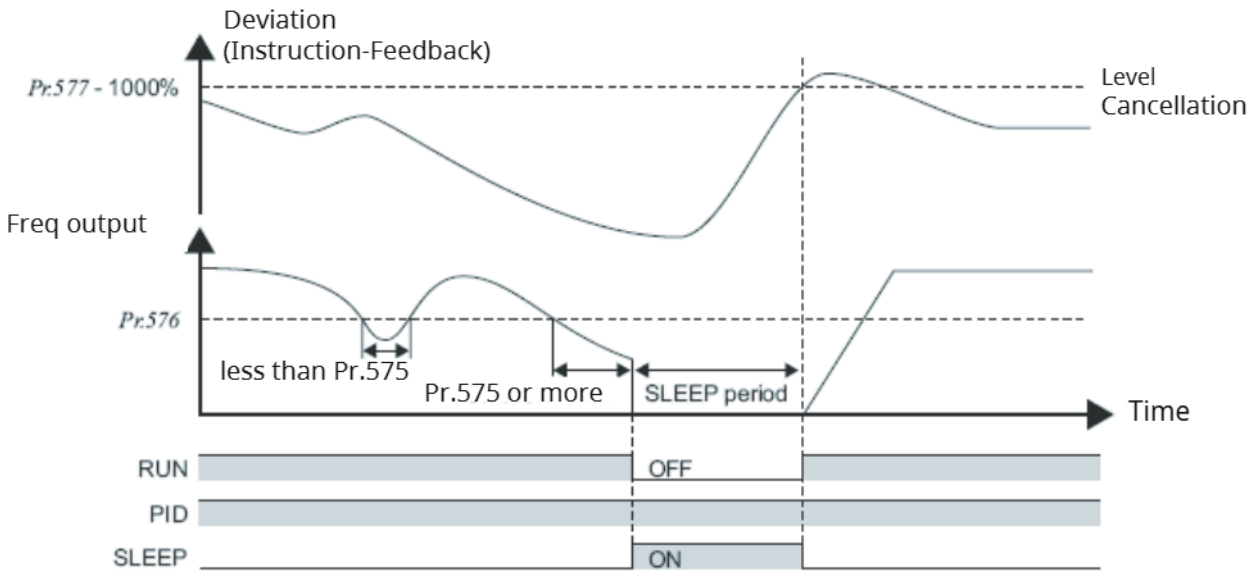
Parameter	Name	Worth	
1	Maximum frequency	.Hz	
2	Minimum frequency	.Hz	
3	Base frequency	Reference frequency for acceleration and deceleration times. Factory setting: 50 Hz	
7	Acceleration time	_sec	
8	Deceleration time	_sec	
9	Motor thermal protection	Inom engine x 1.1	
160	Display Extended functions	either	
1 27	(FR-F700) Frequency of change automatic PID control	Or at 400 Hz	Frequency of switching to PID
		9999	Without automatic transmission
1 28	PID action selection	20: The output frequency is increased if the set point is greater than the current process value.	
		21: The output frequency is increased if the set point is lower than the current process value.	
1 29	Proportional part PID	100%	
130	PID Integral Time	Is	

131	Upper limit setting	9999	No function
		Oa 100%	If the feedback value exceeds the setting value, the FUP* output signal[1] is activated.
132	Lower limit setting	9999	No function
		Oa 100%	If the feedback value decreases from the setting value, the FDN output signal*[1] is activated.
133	Set point	Or to 100% Desired set point adjustment	
		9999: Set point adjusted from input analog via terminals 2 and 5	
134	PID Differential Time	9999	
182	RH Terminal Function	14: PID Activation	
575*[2]	Detection time for the output interruption (Sleep time)	Or at 3600s: If the output frequency remains at a value lower than or equal to the value set in the Pr.576 more than the time set in Pr.575 the inverter stops.	
		9999: no sleep function	
576*[2]	Detection level for output interruption (Level sleep)	Or at 400 Hz: If the output frequency remains at a value lower than or equal to that set in the Pr.576 more than the time set in Pr.575 the inverter stops.	
577*[2]	Awakening level	900 to 1100%: Awakening level = Pr577-1000%	

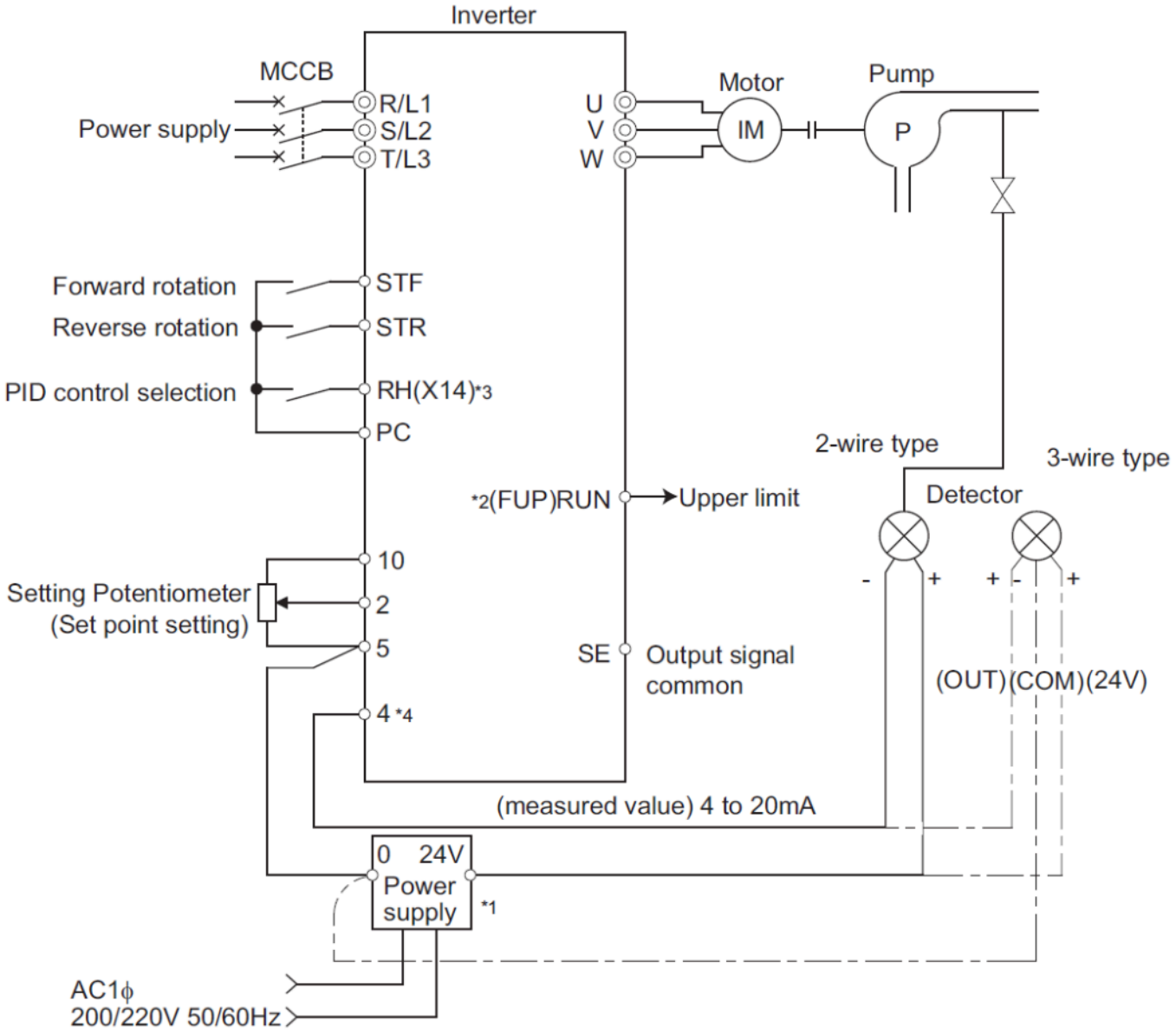
*[1] Pr.190 to 196 "output terminal function", set 14 in case of using FON function or set 15 in case of using FUP function.

*[2] Look at the graph.

Sleep function operation chart



Connection



The activation of the PID function must be done through a digital input that has the X14 function assigned.
The feedback will always be between terminals 4 and 5, and the set point always between terminals 2 and 5 (the set point could also be entered/adjusted using Pr.133).

Procedure to modify the setting value of the parameters.

Example to modify the value set in Pr.1 Maximum Frequency

1. Screen that appears when power is applied. The monitoring display appears.

2. With the PU/EXT key we select the PU mode.

3. With the key MODE we select the adjustment mode parameters.

4. Turn the dial until it appears P. 1

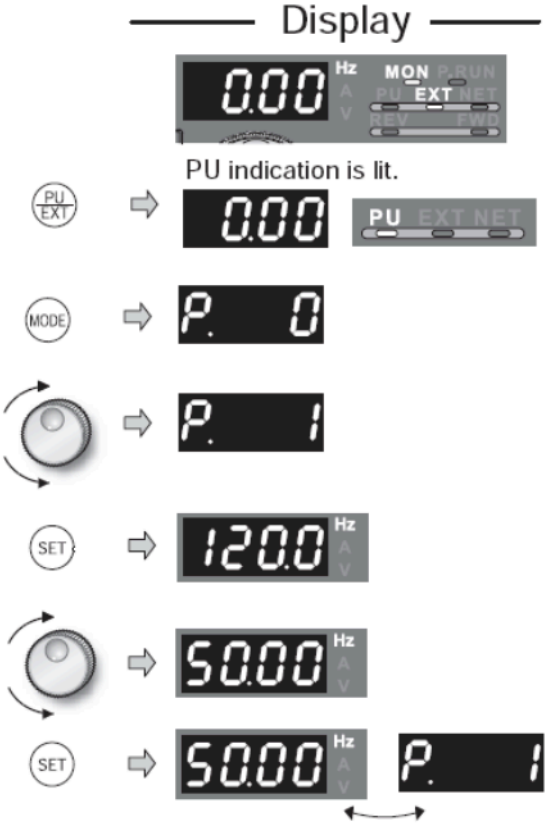
5. With the key SET we read the current value.

Appears "120.0" (Initial value)

6. Turn the dial to adjust the desired value.

By example we adjust "50.00".

7. With the key SET we adjust the value.



Flashing between set value and parameter Adjustment -filled

· Turning the dial , we can access another parameter

· Pressing SET we visualize the adjustment again

· Pressing SET twice we display the following parameter.

· Pressing MODE twice we return to the monitoring screen.

Purpose: Typical configurations in the SFC series

Product: SFC Series

Start/Stop and speed adjustment via console.

The drive receives the running orders and speed setpoint from the parameterization console (PU)

Parameter settings

Parameter	Name	Worth	
1	Maximum frequency	.Hz	
2	Minimum frequency	.Hz	
7	Acceleration time	_sec	
8	Deceleration time	_sec	
9	Motor thermal protection	Inom engine	
20	Reference for accelerator and deceleration times	50 Hz	
79	Mode selection operation	1 (from the parameterization console)	
160	Display Extended functions	either	
161	(FR-F) Function of the parameterization console dial	either	With the dial we adjust the set frequency and confirm with the SET key
		1	The dial on the parameterization console works as a potentiometer

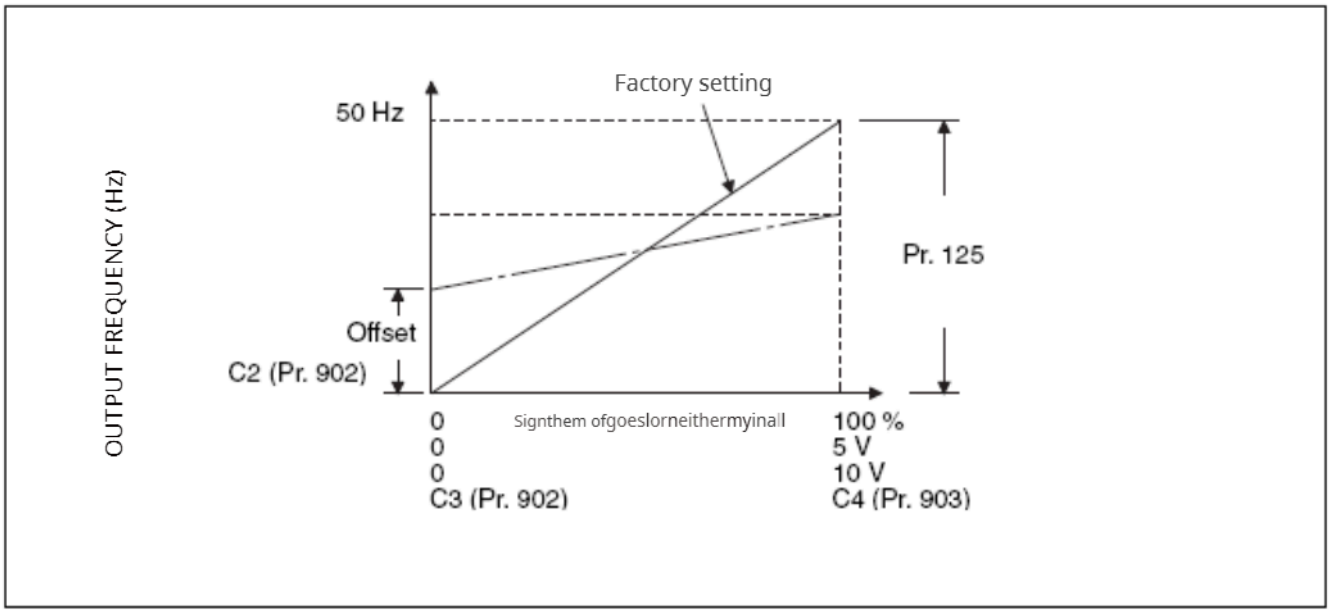
Start/Stop by terminals and speed assigned by analog input.

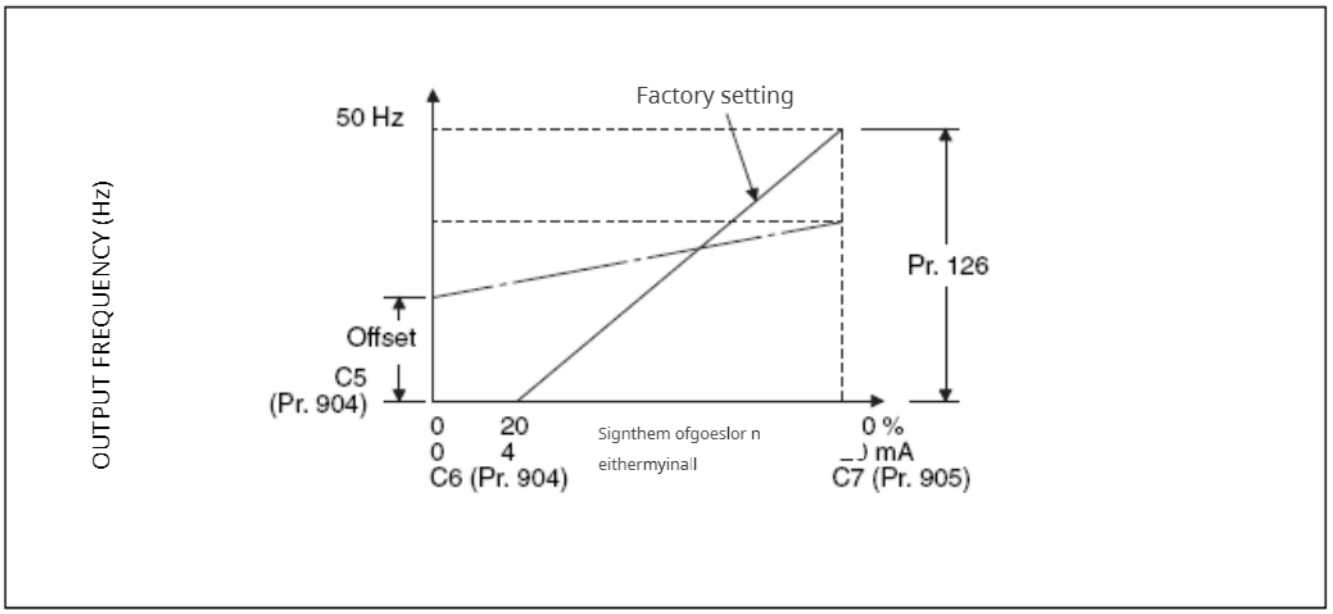
The drive receives the start and speed commands from the external control terminals, the start command via a digital input and the speed command from an analog voltage or current input, as configured.

Parameter settings

Parameter	Name	Worth
1	Maximum frequency	.Hz
2	Minimum frequency	.Hz
7	Acceleration time	_sec
8	Deceleration time	_sec
9	Motor thermal protection	Inom engine
20	Reference for accelerator and deceleration times	50 Hz
79	Mode selection operation	2 (from external terminals) This parameter should be set last
160	Extended Functions Display (FR-FyFR-0700)	either
73	Entry selection analog (O-SV or 0-1OV)	O: 0-10VDC input 1:0-SVDC input (factory setting)
1 25	Set speed maximum voltage	_Hz (Factory setting SOHz)
1 26	Set speed maximum current	_Hz (Factory setting SOHz)
(2(902)	Set speed minimum voltage	_Hz (Factory setting OHz)
(3(902)	% of minimum voltage signal	_%(Factory setting 0%)
(4(903)	% of maximum voltage signal	_%(Factory setting 100%)
(5(904)	Speed at minimum current setpoint	_Hz (Factory setting OHz)
(6(904)	% of minimum current signal	_%(Factory setting 20%)
C7(905)	% of maximum current signal	_%(Factory setting 100%)

Calibration of analog input terminals 2and 4.

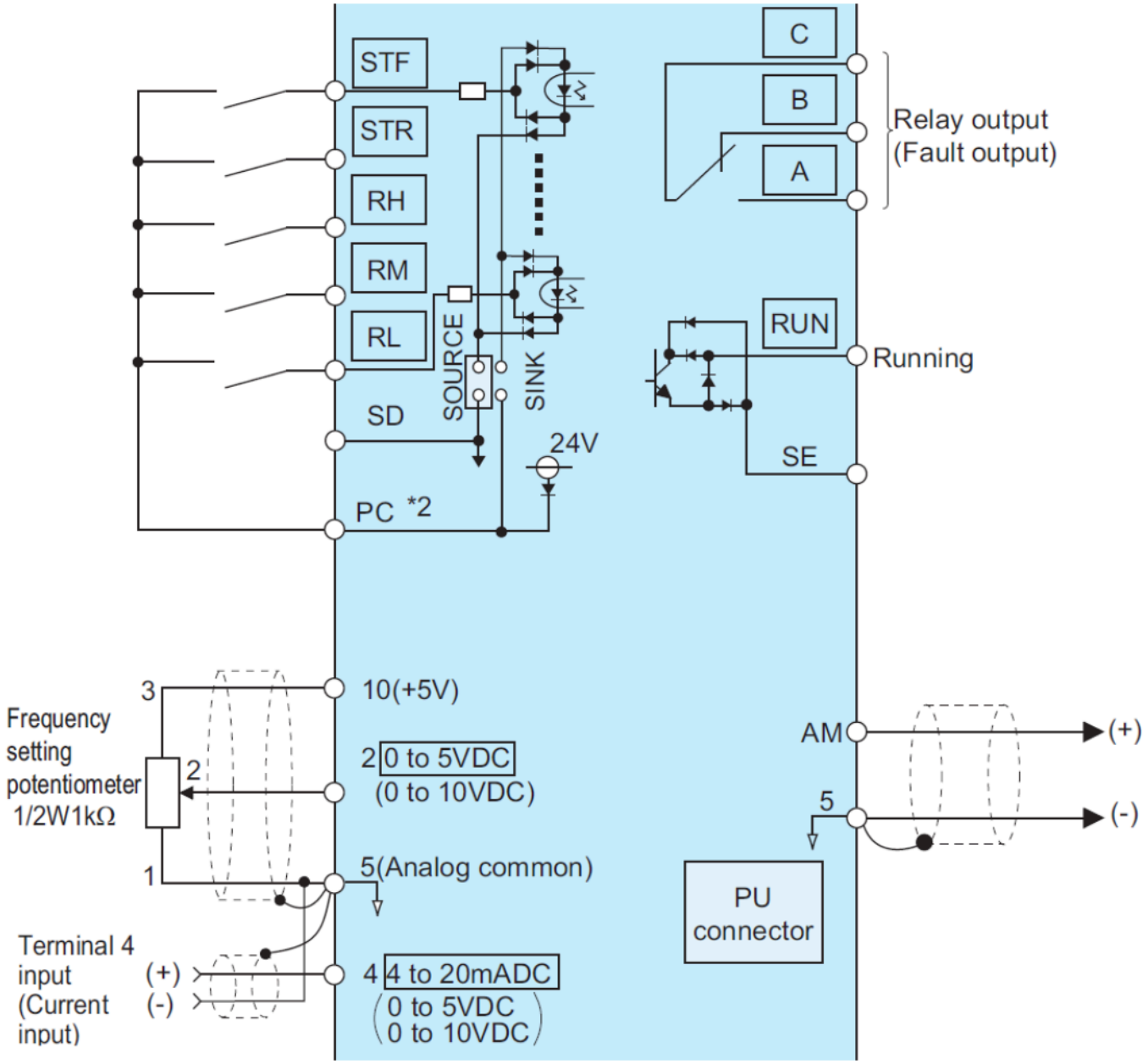




To work with a speed command using an analog current signal (e.g. 4-20 mA) we only need to activate the AU input, in this way we tell the drive to go look for the analog speed command at terminal 4 (terminal for working in current).

For SFC drives, we must assign the AU function to one of the input terminals. To do this, we must set the parameter corresponding to the selected input function to 4. (Pr. 180 to Pr. 84, e.g., if we use the RH terminal for the AU function, we will set Pr. 182 to 4.)

Connecting control signals



* The RH terminal has the AU function (Pr.182 set to 4) to select the analog setpoint source. Setting the function to this terminal is only necessary for the FR-D and E700 since the FR-A and FR-F700 already have an AU terminal.
input with this function.
If AU = ON -7Analog signal source via terminal 4 (4 to 20 mA)
If AU = OFF -7Analog signal source via terminal 2 (0-5 or 0-1)OVselectable by Pr.73)

The speed setpoints assigned by Multispeeds (digital inputs RL, RM in this example) prevail over the analog speed setpoints.

In the connection diagram we see that the RM and RL inputs also appear. They are factory-defined as fixed speed assignments and these prevail over the analog inputs. That is, if RL is activated, for example, the device will set the speed command at the value defined by this input (speed set in Pr.6), ignoring the analog inputs.

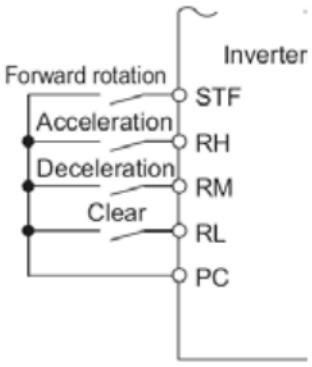
Start/Stop by terminals and speed assigned by motorized potentiometer.

By using digital inputs (push buttons) we can make continuous speed variations without the need to use analog signals.

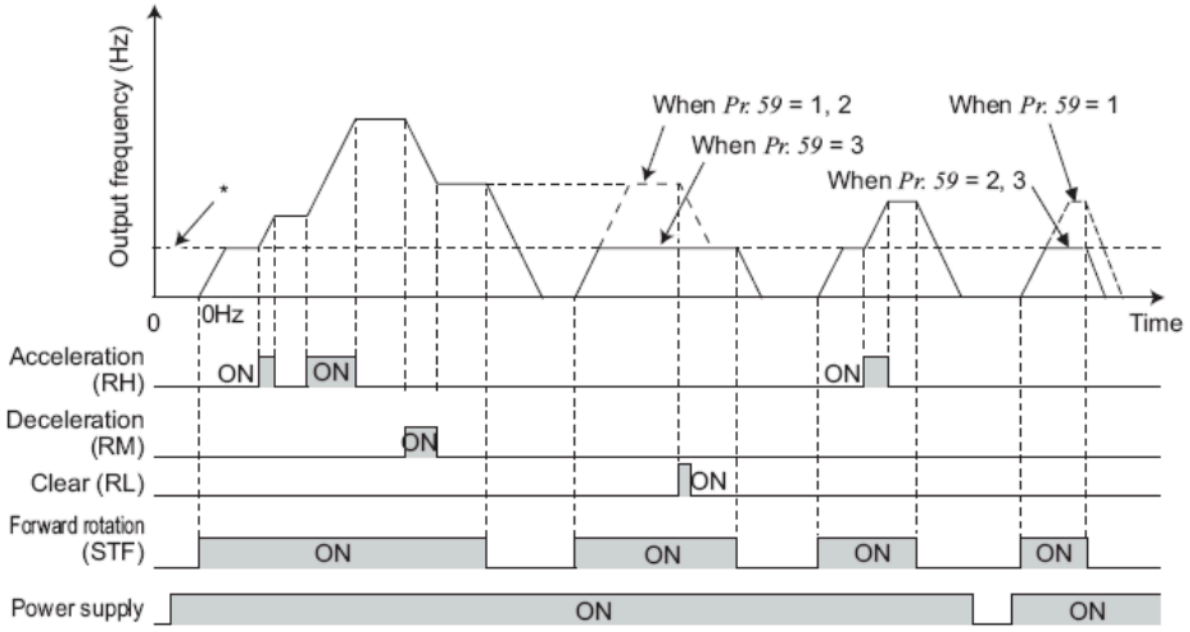
Parameter settings

Parameter	Name	Worth
1	Maximum frequency	.Hz
2	Minimum frequency	.Hz
7	Acceleration time	_sec
8	Deceleration time	_sec
9	Motor thermal protection	Inom engine
20	Reference for accelerator and deceleration times	50 Hz
79	Mode selection operation	2 (from external terminals) This parameter should be set last
160	Extended Functions Display (FR-Fy)	either
59	FR-0700) Selecting the motorized potentiometer function	O: no function
		1: Motorized potentiometer with retentive frequency adjustment
		2: Motorized potentiometer with non-retentive frequency adjustment when power fails
		3: Motorized potentiometer with non-retentive frequency adjustment when the run signal drops.

Connecting control signals



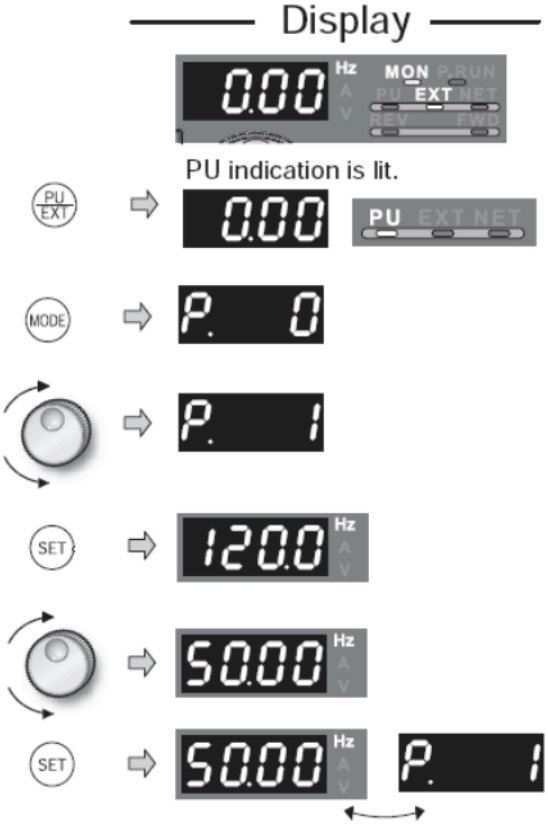
Operating diagram.



* External operating frequency or adjustment from PU (console).

Procedure to modify the setting value of the parameters.

Example to modify the value set in Pr.1 Maximum Frequency



l. Screen that appears when power is applied. The monitoring display appears.

2.With the PU/EXT key we select the PU mode.

3.With the key MODE we select the adjustment mode parameters.

4.Spin until it appears P. 1

S. With the key SET we read the current value.

Appears " 120.0" (Initial value)

6. Turn to adjust the desired value.

By example we adjust "50.00".

7. With the key SET we adjust the value.

Flashing between set value and parameter Adjustment - filled

· Turning the dial , we can access another parameter

· Pressing SET we visualize the adjustment again

· Pressing SET twice we display the following parameter.

· Pressing MODE twotimes we return to the monitoring screen.

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