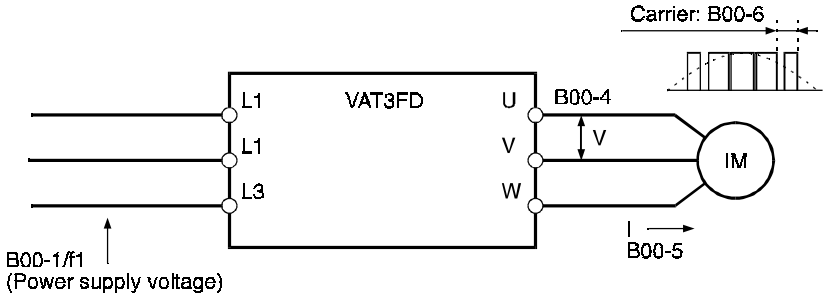
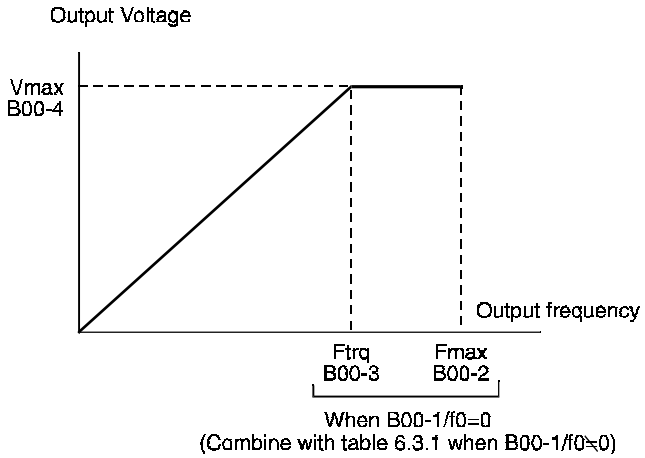
| | |
|---|---|
| B00-1 | **Pre-set V/F patterns** |
| B00-2 | **Maximum output frequency (Fmax)** |
| B00-3 | **Base frequency (Ftrq)** |
| B00-4 | **Output voltage** |
| B00-5 | **Motor rated current** |
| B00-6 | **Carrier frequency** |

**Note)** Before running the motor, these parameters must be set according to the power supply voltage and motor ratings.



The functions of B00-1 differ per digit as shown below.

B00-1 = 2 1

f0: Selection of base frequency, maximum output frequency.

f1: Rated input voltage,
Select the rated voltage of Power Supply

**Table 6.3.1**

| Setting value | Ftrq [Hz] | Fmax [Hz] |
|---|---|---|
| 0 | Random setting with B00-3 | Random setting with B00-2 |
| 1 | 50 | 50 |
| 2 | 60 | 60 |
| 3 | 50 | 60 |
| 4 | 50 | 75 |
| 5 | 50 | 100 |
| 6 | 60 | 70 |
| 7 | 60 | 80 |
| 8 | 60 | 90 |
| 9 | 60 | 120 |

**Table 6.3.2**

| Setting value | 200V system | 400V system |
|---|---|---|
| 1 | 190V | 380V |
| 2 | 200V | 400V |
| 3 | 210V | 415V |
| 4 | 220V | 440V |
| 5 | 230V | 460V |

**Note 1)** If B00-1/f0 is set to a value other than 0, the B00-2 and 3 data will change to the Fmax and Ftrq values selected with B00-1/f0.

**Note 2)** If B00-1/f1 is set, the B00-4 output voltage setting will change to the voltage selected with B00-1/f1 if the setting value is not 0.

**Note 3)** If B00-4 = 0, the DC-AVR function is disabled. This function compensates the fluctuation in the power voltage to keep the output voltage constant but may produce unstability. Disabling the AVR, the output voltage will be the same as the input voltage at Ftrq.

**Note 4)** When setting the B00-2 (max. frequency), make sure that the motor and machine rating is not exceeded.

**Note 5)** Set B00-3, 4 and 5 according to the motor rating. A value exceeding the rated input voltage cannot be set for B00-4. B00-5 cannot be set higher than the inverter rated current or 0.3 times or less of the inverter rated current.

B00-4: Output voltage ≤ rated input voltage (power supply)

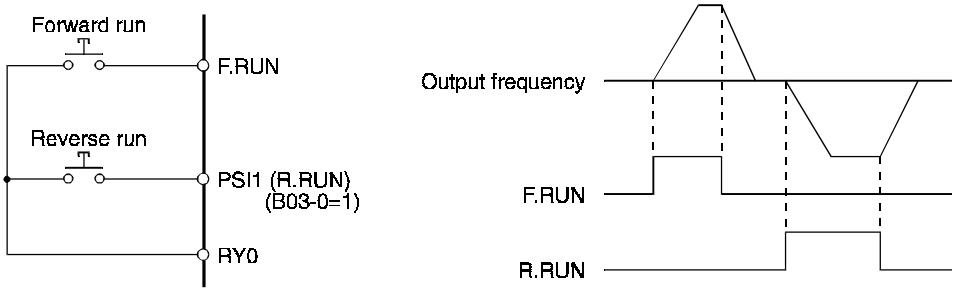
Inverter rated current x 0.3 B00-5: Motor rated current ≤ inverter rated current

**Note 6)** Noise to the inverter's peripheral equipment can be reduced by lowering the carrier frequency.

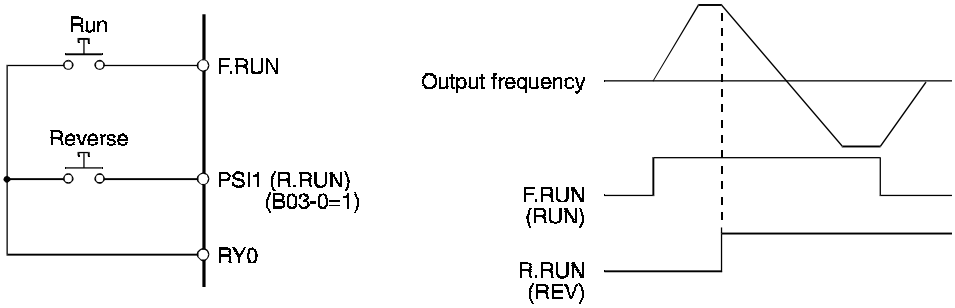
**Note 7)** If the Inverter heatsink's temperature exceeds 70ºC and the output current reaches the 90% of the inverter's VT rated current, the carrier frequency is automatically switched to 4KHz. Details in appendix A1.

B01-0 **Run/Stop Methods**

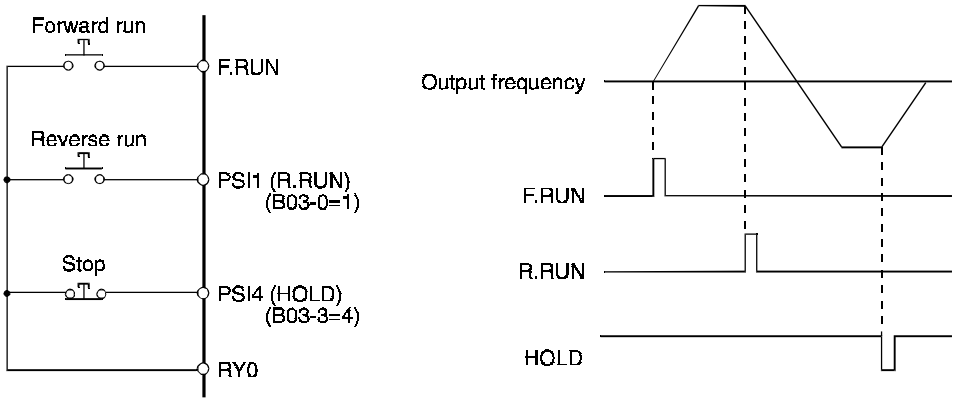
B01-0/f0, Run command method = 1; F.RUN, R.RUN




B01-0/f0 = 2; RUN, REV



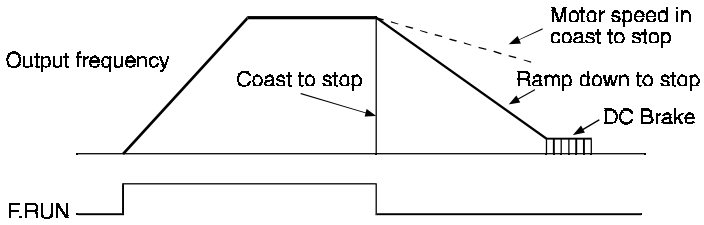

B01-0/f0 = 3; Self hold



B01-0/f1 F.RUN, R.RUN stop method
B01-0/f2 JOG stop method

= 1: Coast to stop
= 2: Deceleration stop

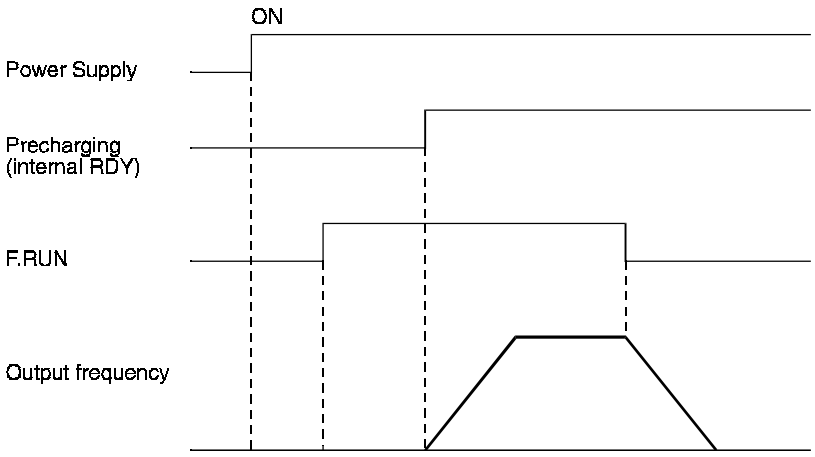
Coast to stop refers to stopping by turning the output OFF simultaneously with the stop command (F.RUN and R.RUN OFF).
Deceleration stop refers to stopping by decelerating to the stopping frequency with the ramp down after the stop command, and then applying the DC-brake to stop.




**Note)** To restart after coast to stop, confirm that the motor has stopped. The inverter may trip if attempted when the motor is running.

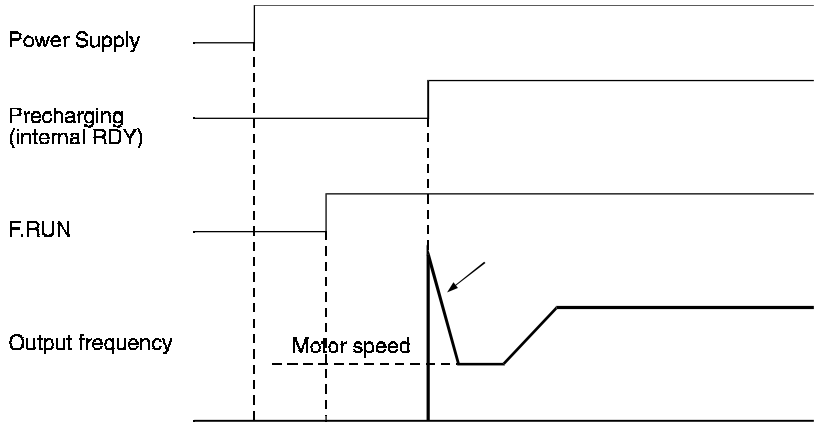
B01-0/f3 Auto start

= 1: OFF (runs with the run command ON after pre-charging)
= 2: ON without pick-up
If the run command is ON when the power is turned on, run will start after the inverter is charged.



= 3: ON with pick-up

If the run command turns ON when the power turns ON, pick-up will start when the inverter charging is completed, and then operation will start. Set this when using momentary restart.

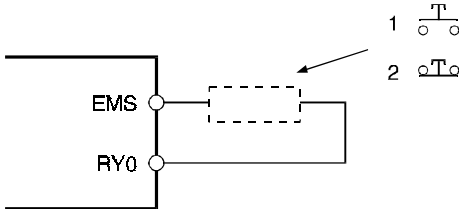



**Note)** If auto start is used, undervoltage fault will not be actived. However, EC0..3 will display the undervoltage fault code.

## B01-1 Emergency stop (EMS) method

B01-1/f0: Input signal logic

= 1: Close to stop (when “1” contact is connected)
= 2: Open to stop (when “2” contact is connected)




B01-1/f1: Stop method

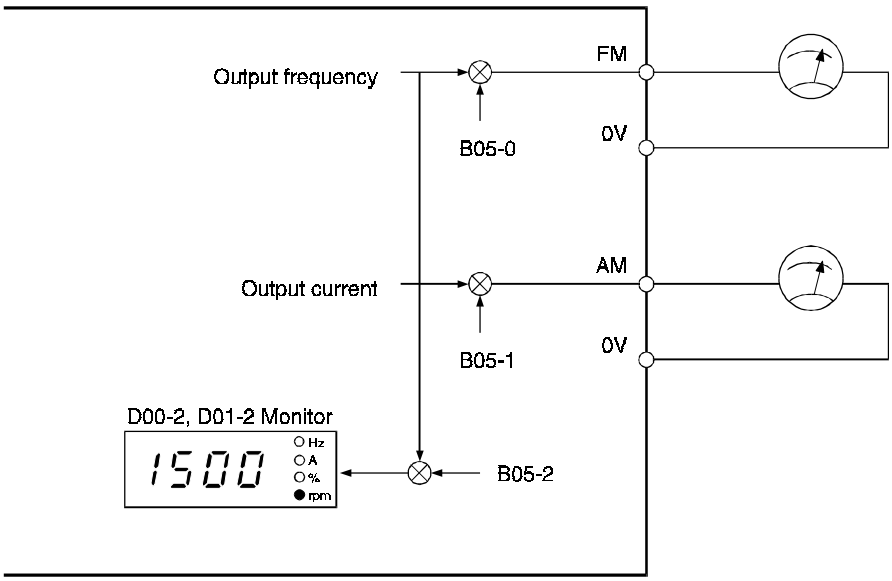
= 1: Coast to stop, without fault output
= 2: Coast to stop, with fault output
When the EMS signal turns ON, the output will be shut off, and FLT will be output.
= 3: Ramp down to stop (without fault output)

| B01-2 | **Control switchover method** |
|---|---|

B01-2/f0: J1 setting =1: ON =2: OFF
Select whether to use the terminal block input signals with the local operation mode. Refer to section 5-3 for details.

B01-2/f1: J2 setting =1: ON =2: OFF
Select the auxiliary command input when the COP command is ON.
Refer to section 5-3 for details.

| B05-0 | **FM output gain** |
|---|---|
| B05-1 | **AM output gain** |
| B05-2 | **Arbitrary scale display coefficient** |




**Note 1)** The maximum output voltage of the FM and AM outputs is approx. 11V
Thus, even if a large value is set in B05-0 and 1, a voltage exceeding 11V will not be output.

**Note 2)** A correct display will not appear if the multiplication results of B05-2 exceed 65535.

## B06-0 Operation panel operation, parameter protection function

Set this parameter to prevent unintentional operations from the OPU (operation panel, operation unit).

B06-0/f0: Parameter protection

Changing of the data can be protected per function group

O: Changeable

x: Unchangeable

| f0 setting value | Block A Parameter | Block B Parameter | | | |
|---|---|---|---|---|---|
| | | Basic | Extended | S/W | H/W |
| 1 | O | O | O | O | O |
| 2 | x | x | x | x | x |
| 3 | O | x | x | x | x |
| 4 | O | x | O | x | x |
| 5 | O | x | O | O | x |
| 6~8 | x | x | x | x | x |
| 9 | O | O | O | O | O |

S/W: Software option functions

H/W: Hardware option functions

**Note 1)** Set 6 to prohibit all changes.

**Note 2)** Set 1 to allow all changes. The 9 setting is for maker maintenance, so do not set it.

B06-0/f1: Operation panel operation protection

= 1: All operation possible

= 2: All operation prohibited

( FWD , REV , STOP key operations are ignored.)

Note, the motor will stop when the STOP key is pressed for two seconds or more.

= 3: Only STOP key can be operated.

B06-0/f2: LCL switchover protection

=1: LCL mode switchover ( STOP + SET ) during running disabled

**Note)** Even when stopped, if the terminal block's F.RUN, R.RUN, F.JOG or R JOG is ON, switchover to remote is not possible.

=2: LCL mode switchover ( STOP + SET ) during running enabled

## B06-1 Reverse lock

The R.RUN and R.JOG reverse run command inputs can be enabled or disabled.

B06-1/f0 = 1: R.RUN enabled

= 2: R.RUN disabled

B06-1/f1 = 1: R.JOG enabled

= 2: R.JOG disabled

## B06-2 Fault history buffer clear

The fault history details can be cleared by setting the value to 1 and then pressing STOP key. This setting will not be registered in the internal memory. Thus, this parameter must be set each time.
Nothing will occur if set to a value other than 1.
Use this before handing the unit over to the final user.

## B06-3 Default value load

All values or values per function group are changed to the default values.
=9 : All default values load
=10: Block A parameters default values load
=11: Block B parameters basic function default values load
=12: Block B parameters extended function default values load
=13: Block B parameters software option function default values load
=14: Block B parameters hardware option function default values load

Nothing will occur when values other than the above are set.
This parameter setting value will not be registered in the internal memory.

**Note)** The setting values exceeding 2000 are codes for maker maintenance, so do not set. If set, the following inverter operation may be abnormal.

## B07-0~7 Custom parameter register

Set the No. of Block B parameter to be displayed on A04-0~7.
To set block B parameter B24-1, set as 24.1.
Refer to section 4-6 for details.

### 6-3-2 Extended Function Settings

A list of extended function settings is shown in Table 6.4.

**Table 6.4 (1/3) Block-B parameters - Extended Functions**

(1) can be reflected to the operation immediately.

(2) can only be changed while the drive is at a stop.

| No. | Parameter | Default | Min. | Max. | Unit | Function |
|---|---|---|---|---|---|---|
| B20 - Program Frequency Setting | | | | | | |
| 0 | Program - 0 | 0.10 | 0.10 | 440.00 | Hz | Select as follows with S0, S1 and S2. |
| 1 | Frequency 1 | 0.10 | 0.10 | 440.00 | Hz | |
| 2 | 2 | 0.10 | 0.10 | 440.00 | Hz | |
| 3 | 3 | 0.10 | 0.10 | 440.00 | Hz | |
| 4 | 4 | 0.10 | 0.10 | 440.00 | Hz | |
| 5 | 5 | 0.10 | 0.10 | 440.00 | Hz | |
| 6 | 6 | 0.10 | 0.10 | 440.00 | Hz | |
| 7 | 7 | 0.10 | 0.10 | 440.00 | Hz | |
| B21 - Acceleration/Deceleration Times | | | | | | |
| 0 | Acceleration time -2 | 10.0 | 0.1 | 6000.0 | S | |
| 1 | Deceleration time -2 | 20.0 | 0.1 | 6000.0 | S | |
| 2 | Acceleration time for jog | 5.0 | 0.1 | 6000.0 | S | |
| 3 | Deceleration time for jog | 5.0 | 0.1 | 6000.0 | S | |
| 4 | S-shape characteristics (Ts) (2) | 0.0 | 0.0 | 5.0 | S | Set to less than one-half of the ramp up time. |
| 5 | Time Unit Multiplier (2) | 1 | 1. | 3. | | =1: Standard (sec.) = 2: x 0.1<br>= 3: x 10. |
| B22 - Frequency Skip | | | | | | |
| 0 | Skip Frequency - 1 | 0.10 | 0.10 | 440.00 | Hz | |
| 1 | Skip band - 1 | 0.0 | 0.0 | 10.0 | Hz | |
| 2 | Skip Frequency - 2 | 0.10 | 0.10 | 440.00 | Hz | |
| 3 | Skip band - 2 | 0.0 | 0.0 | 10.0 | Hz | |
| 4 | Skip Frequency - 3 | 0.10 | 0.10 | 440.00 | Hz | |
| 5 | Skip band - 3 | 0.0 | 0.0 | 10.0 | Hz | |
| B23 - Ratio Interlock Setting | | | | | | |
| 0 | Polarity Setting for Constant A and Bias B | 11. | 11. | 22. | | f0: Polarity of Coefficient A = 1: Plus [+] = 2: Minus [-]<br>f1: Polarity of Bias B = 1: Plus [+] = 2: Minus [-] |
| 1 | Coefficient A value | 1.000 | 0.000 | 10.000 | | Both plus and minus values can be set. |
| 2 | Bias B value | 0.00 | 0.00 | 440.00 | Hz | Both plus and minus values can be set. |
| 3 | Upper Limit | 440.00 | 0.10 | 440.00 | Hz | |
| 4 | Lower Limit | 0.10 | 0.10 | 440.00 | Hz | The Upper Limit be larger than the Lower Limit. |

| Sequence command | | | Selectecd frequency |
|---|---|---|---|
| S2 | S1 | S0 | |
| OFF | OFF | OFF | Program frequency- 0 |
| OFF | OFF | ON | Program frequency- 1 |
| OFF | ON | OFF | Program frequency- 2 |
| OFF | ON | ON | Program frequency- 3 |
| ON | OFF | OFF | Program frequency- 4 |
| ON | OFF | ON | Program frequency- 5 |
| ON | ON | OFF | Program frequency- 6 |
| ON | ON | ON | Program frequency- 7 |

**Table 6.4 (2/3)**

(1) can be reflected to the operation immediately.
(2) can only be changed while the drive is at a stop.

<table>
<tr><th>No.</th><th>Parameter</th><th>Default</th><th>Min.</th><th>Max.</th><th>Unit</th><th>Function</th></tr>
<tr><td colspan="7">B24 - Setting Input Terminal function</td></tr>
<tr><td>0</td><td>Input Terminal Mode (2)</td><td>1111.</td><td>1111.</td><td>1232.</td><td></td><td>f0: FSI terminal input mode = 1: 4-20mA, = 2: 0-20mA<br>f1: AUX terminal input mode<br>= 1: Disable AUX terminal input<br>= 2: ±10V bias, added to FSI, FSV and CFS inputs<br>= 3: ±10V control. If its polarity is minus, the rotating direction command is reversed.<br>(When PID Control is used, the drive will ignore this parameter if set to 2 or 3.)<br>f2: Filter time constant for FSV, FSI and AUX<br>= 1: 8ms<br>= 2: 32ms<br>f3: (Not used)</td></tr>
<tr><td>1</td><td>AUX Input Gain</td><td>1.000</td><td>0.000</td><td>5.000</td><td></td><td></td></tr>
<tr><td colspan="7">B25 - Output Terminal function</td></tr>
<tr><td>0</td><td>FM/AM Output Parameters</td><td>20.</td><td>00</td><td>88</td><td></td><td>The terminal voltage can be changed freely with parameters B05-0 and 1.<br>(The maximum output voltage of the terminals is approx. 11V.)<br>FM Terminal Parameter Selector<br>AM Terminal Parameter Selector<br><table><tr><th>Value</th><th>Parameter</th><th>Output Voltage</th></tr><tr><td>0</td><td>Output frequency</td><td>10V at Fmax</td></tr><tr><td>1</td><td>Setting frequency</td><td>10V at Fmax</td></tr><tr><td>2</td><td>Output current (motor)</td><td>5V at motor rated current</td></tr><tr><td>3</td><td>Output current (drive)</td><td>5V at drive rated current</td></tr><tr><td>4</td><td>Torque current (Motor)</td><td>5V at motor rated torque</td></tr><tr><td>5</td><td>Output Voltage</td><td>5V at rated Voltage</td></tr><tr><td>6</td><td>DC Voltage</td><td>5V at 300V (200V Series)<br>5V at 600V (400V Series)</td></tr><tr><td>7</td><td>OLT Monitor</td><td>10V at 100%</td></tr><tr><td>8</td><td>Heatsink Temperature</td><td>10V at 100ºC</td></tr></table><br>Note: The torque indication can be affected in accuracy in a range of 10-30% by the motor characteristics and boost settings, and should be regarded as a guide only.</td></tr>
<tr><td>1</td><td>RUN Terminal Parameter</td><td>0.</td><td>0.</td><td>15.</td><td></td><td>The following parameters can be available as output signals at these terminals.<br><table><tr><th>Value</th><th>Output signal</th></tr><tr><td>0</td><td>RUN</td></tr><tr><td>1</td><td>FLT</td></tr><tr><td>2</td><td>MC</td></tr><tr><td>3</td><td>RDY</td></tr><tr><td>4</td><td>LCL</td></tr><tr><td>5</td><td>REV</td></tr><tr><td>6</td><td>IDET</td></tr><tr><td>7</td><td>ATN</td></tr></table><table><tr><th>Value</th><th>Output signal</th></tr><tr><td>8</td><td>SPD1</td></tr><tr><td>9</td><td>SPD2</td></tr><tr><td>10</td><td>ACC</td></tr><tr><td>11</td><td>DCC</td></tr><tr><td>12</td><td>EC0</td></tr><tr><td>13</td><td>EC1</td></tr><tr><td>14</td><td>EC2</td></tr><tr><td>15</td><td>EC3</td></tr></table></td></tr>
<tr><td>2</td><td>ATN Terminal Parameter</td><td>7.</td><td>0.</td><td>15.</td><td></td><td></td></tr>
<tr><td colspan="7">B26 - Detect levels for sequence output</td></tr>
<tr><td>0</td><td>ATN: detect band</td><td>1.0</td><td>0.0</td><td>20.0</td><td>%</td><td>Set the attained detection width.<br>%.Fmax</td></tr>
<tr><td>1</td><td>IDET: Current Detect level</td><td>100.</td><td>5.</td><td>300.0</td><td>%</td><td>Set the IDET operation level.</td></tr>
<tr><td>2</td><td>SPD1: Speed Detect 1 level</td><td>95.0</td><td>1.0</td><td>105.0</td><td>%</td><td>Set the SPD1 operation level.</td></tr>
<tr><td>3</td><td>SPD2: Speed Detect 2 level</td><td>50.0</td><td>1.0</td><td>105.0</td><td>%</td><td>Set the SPD2 operation level.</td></tr>
</table>

**Table 6.4 (3/3)**

**Block-B parameters - Extended Function Parameters**

(1) can be reflected to the operation immediately.

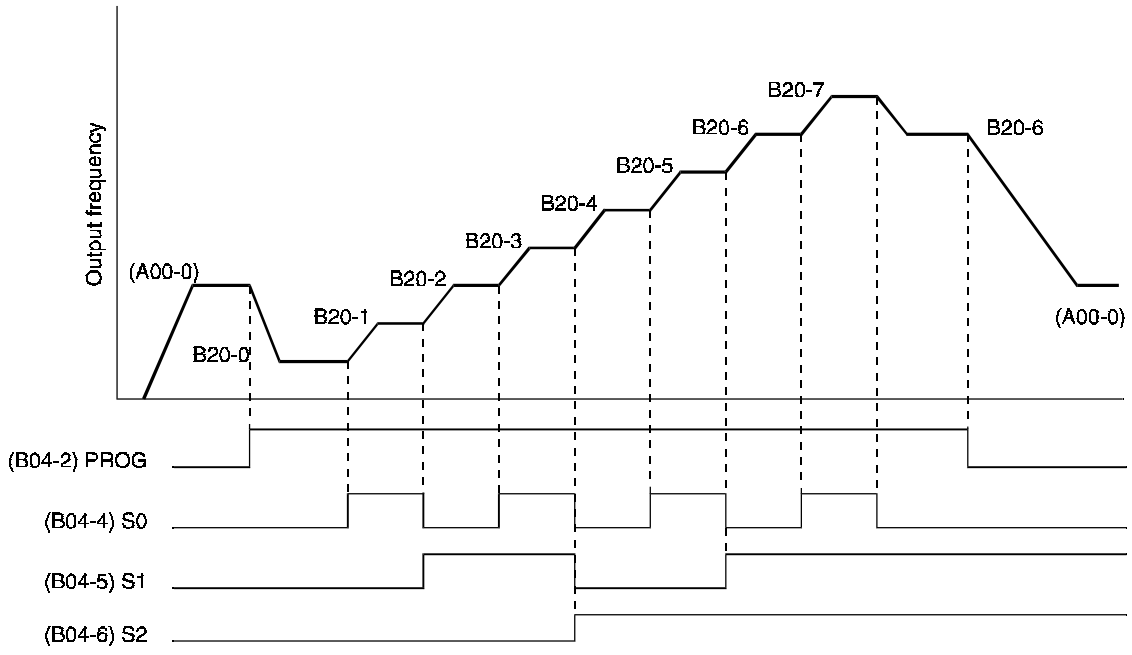
(2) can only be changed while the drive is at a stop.

| No. | Parameter | Default | Min. | Max. | Unit | Function |
|---|---|---|---|---|---|---|
| B28 - Retry/Pick-Up (2) | | | | | | |
| 0 | Number of Retries | 0 | 0. | 10. | | |
| 1 | Retry wait time | 5 | 1. | 30. | S | |
| 2 | Pick-Up wait time | 2 | 1. | 10. | S | |
| B29 - Overcurrent Limit | | | | | | |
| 0 | Drive current limit (CT) | 150. | 50. | 300. | % | for units UADX.. |
| | Drive current limit (VT) | 103. | 50. | 112. | % | for units UADVX.. (VT) |
| 1 | Regenerative torque | 10. | 5. | 300. | % | Set to 10% if there is not DBR |
| B30 - Overload (2) | | | | | | |
| 0 | Overload setting (CT) | 100. | 50. | 105. | % | Note that when this parameter is changed, Parameters B30-1 and B30-2 will automatically be adjusted to the value of this setting. |
| | for UADVX.. units (VT) | 100. | 50. | 100. | % | |
| 1 | 0Hz Overload | 100. | 20. | 105. | % | The maximum value is as set on B30-2. |
| 2 | 0.7Ftrq Overload | 100. | 50. | 105. | % | The maximum value is as set on B30-1. |
| 3 | DBR overload setting | 0.0 | 0.0 | 60.0 | S | Max operation time for 10 minutes. |
| | | | | | | The DBR overload is disabled when set =0 |
| B31 - V/F Middle Point | | | | | | |
| 0 | Frequency 2 (GF2) | 0.0 | 0.0 | 440.0 | Hz | These parameters should be set: |
| 1 | Voltage 2 (GV2) | 0.0 | 0.0 | 100.0 | % | Ftrq ≥ GF2 ≥ GF1 |
| 2 | Frequency 1 (GF1) | 0.0 | 0.0 | 440.0 | Hz | GV2 ≥ GV1 |
| 3 | Voltage 1 (GV1) | 0.0 | 0.0 | 100.0 | % | |
| B32 - Start Interlock (2) | | | | | | |
| 0 | Start/Stop Frequencies | 0.0 | 0.0 | 20.0 | Hz | The motor will stop when below this frequency setting. (The function is disabled when B32-0=0) |
| 1 | Start/Stop Histerises | 1.0 | 0.0 | 20.0 | Hz | |
| 2 | Interlock Frequency | 0.0 | 0.0 | 20.0 | Hz | The motor will not start when the setting is above this frequency. When using with the setting start, set a value larger than the setting start frequency. The function is disabled when B32-2=0 |
| 3 | Run delay timer | 0.00 | 0.00 | 10.00 | S | |
| B33 - High efficiency operation. Energy saving (only for VT units, UADVX..) | | | | | | |
| 0 | High efficiency operation time constant | 301 | 10 | 301 | s | Values from 10 to 300s adjust the time to reduce the output voltage to the limit adjusted in B33-1. This function takes effect when the output frequency is attained. To disable the function, set to 301 |
| 1 | Voltage lower limit for High efficiency operation | 55 | 55 | 100 | % | Set a higher value than 55% if the motor rotation is unstable or if the inverter trips |

B20-0~7 **Program frequency setting**

This is the frequency setting for when running program run (multi-step frequency setting) by turning the sequence command PROG ON. The following program frequency settings can be selected with the sequence commands S0, S1 and S2 as shown below.

| S2 | S1 | S0 | Selected parameter |
|---|---|---|---|
| OFF | OFF | OFF | B20-0: Program frequency -0 |
| OFF | OFF | ON | B20-1: Program frequency -1 |
| OFF | ON | OFF | B20-2: Program frequency -2 |
| OFF | ON | ON | B20-3: Program frequency -3 |
| ON | OFF | OFF | B20-4: Program frequency -4 |
| ON | OFF | ON | B20-5: Program frequency -5 |
| ON | ON | OFF | B20-6: Program frequency -6 |
| ON | ON | ON | B20-7: Program frequency -7 |

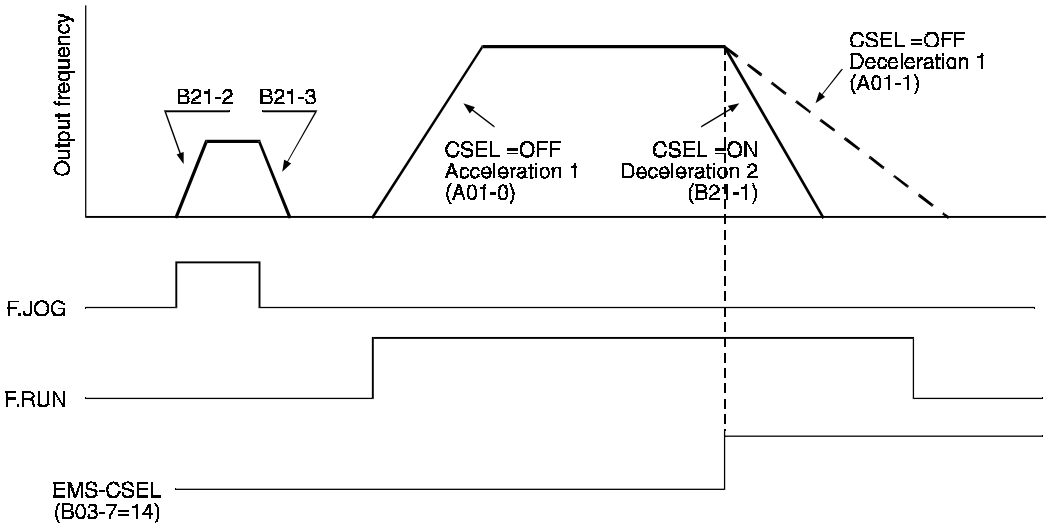



Program run example
When F.RUN is ON and VFS and IFS is OFF

Set the PROG command input terminal with B04-2. Set the S0, S1 and S2 input terminals with B04-4..6

| | |
|---|---|
| B21-0 | **Acceleration time -2** |
| B21-1 | **Deceleration time -2** |
| B21-2 | **Acceleration time for jogging** |
| B21-3 | **Deceleration time for jogging** |

The ramp up/down time can be switched by turning the sequence command CSEL ON. Set the CSEL command input terminal with B03-7.
The ramp time for jogging can be set independently with B21-2 and -3.

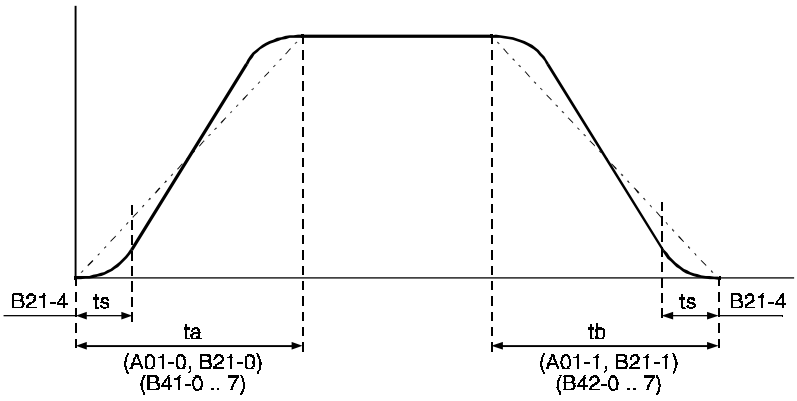



The above run example shows the case when the sequence command CSEL is connected to the EMS terminal (B03-7=14), and the run is decelerated with ramp down time -2 during emergency stop

**Note)** The ramp times are both set with the acceleration/deceleration time 0Hz-Fmax.

## B21-4 S-shape characteristics

Acceleration/deceleration with the S-shape pattern is possible by setting this parameter.




This parameter indicates the time of the section shown with ts above
The total acceleration/deceleration times ta and tb will not change.
When this parameter is set, all acceleration and deceleration will be as shown above.

**Note)** Set so that the relation of the B24-4 setting and acceleration/deceleration time is as shown below.

B21-4 Setting value (ts) x 2 ≤ acceleration/deceleration time (ta, tb)

## B21-5 Time unit multiplier

The acceleration/deceleration time setting unit can be changed when an acceleration/deceleration time in a wider range is to be set.

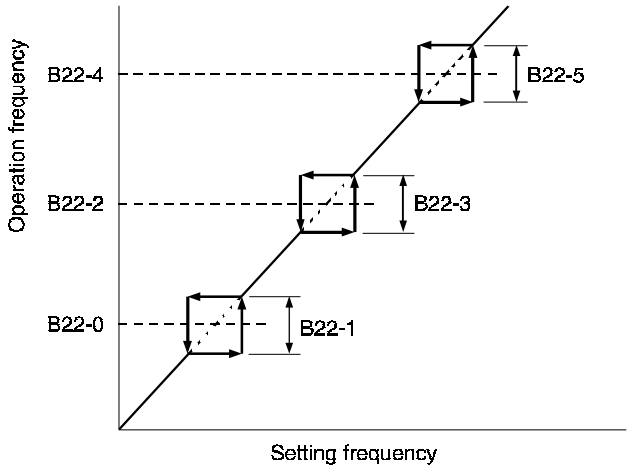
B21-5 = 1 (standard) : x 1
2 : x 0.1
3 : x 10

This parameter will affect all acceleration/deceleration time parameters.

B22-0~5

## Frequency skip

By setting this parameter, the motor's mechanical resonance point at a specific frequency can be skipped.




**Note)** This function controls the frequency setting, so the above skip frequency area will be passed with a ramp function.

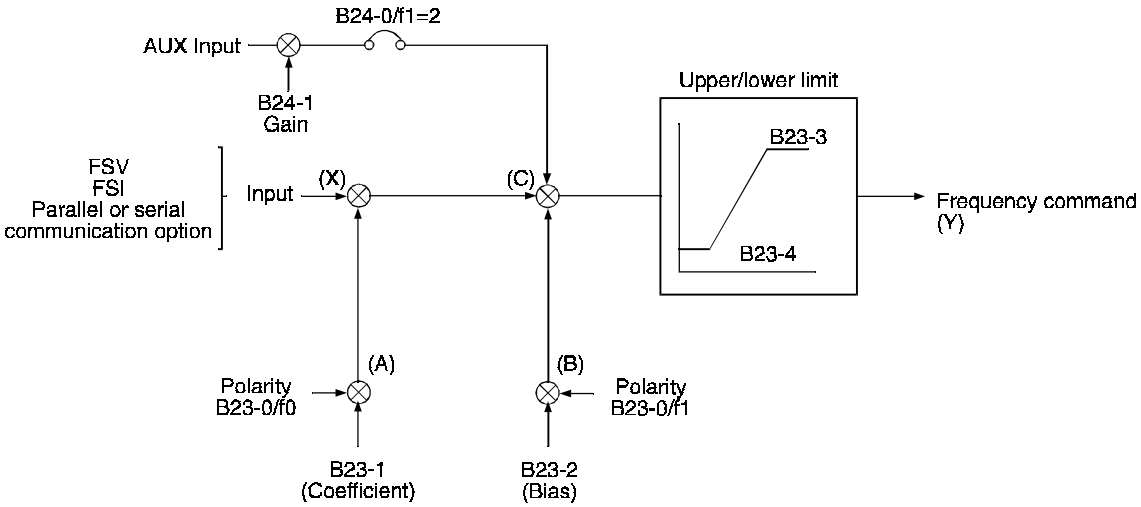
B23-0~4

## Ratio interlock setting/upper/lower limits

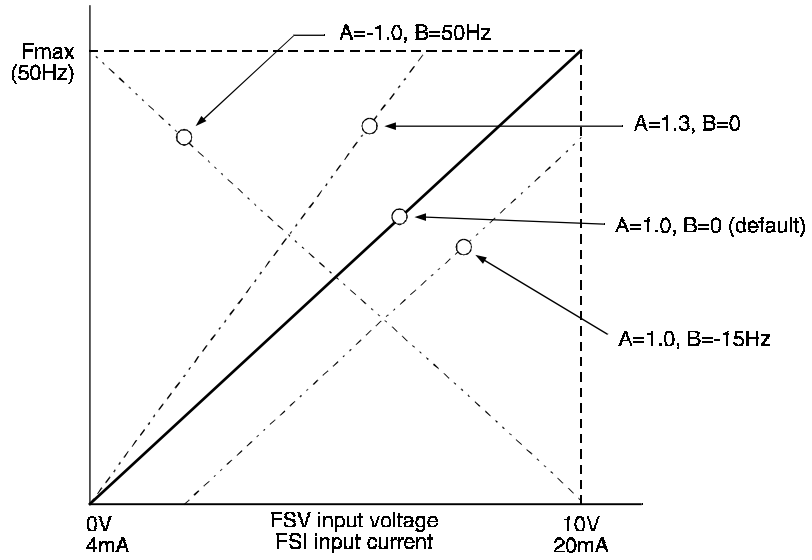
Use the following formula to calculate the ratio interlock, and set according to each setting signal characteristics.

Y = AX + B + C

X: Frequency setting
Y: Frequency command (calculation results)
A: Coefficient (B23-1)
B: Bias (B23-2)
C: Bias (AUX input)

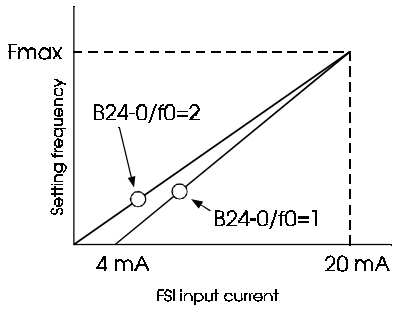


Various functions can be obtained as shown below by setting coefficient: A and bias: B.



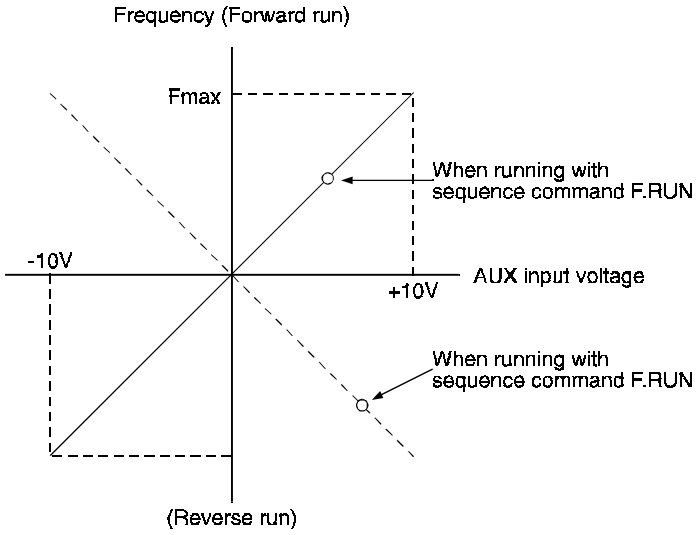

The AUX input can be added as the interlock ratio calculation bias (C).
This can be used to finely adjust the AUX terminal input.

| | |
|---|---|
| B24-0 | **Setting input terminal function** |
| B24-1 | **AUX input gain** |




B24-0/f0: FSI terminal input mode
= 1: 4-20mA input
= 2: 0-20mA input

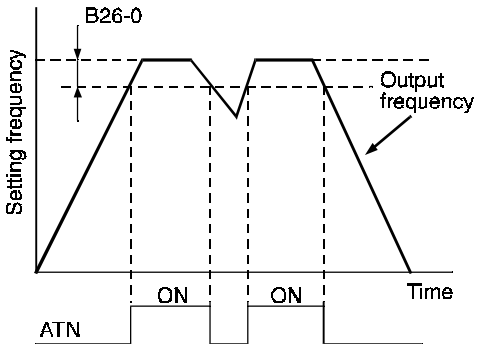
B24-0/f1: AUX input terminal mode
= 1: Disable (the ratio interlock C item will be 0)
= 2: ±10V bias (added as the ratio interlock C item)
= 3: ±10V main setting
(The motor will run in reverse if the input polarity is minus. The run direction can be changed according to the setting input polarity. The absolute value of this setting is input to the ratio interlock C item.)




B24-0/f2: Filter time constant for FSV, FSI and AUX.
= 1: 8mS
= 2: 32mS
Fluctuation of the setting value caused by noise, etc., can be suppressed by increasing the time constant.

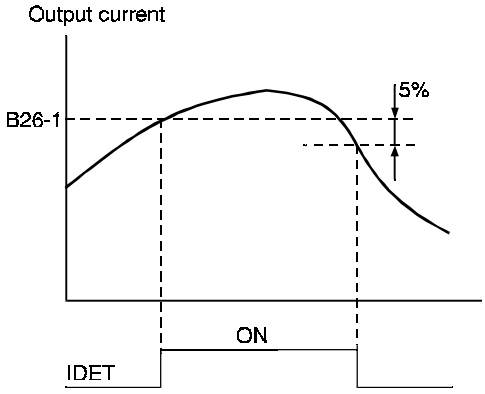
B26-0 **Attained (ATN) detect band**

The attained output ATN operation band set.



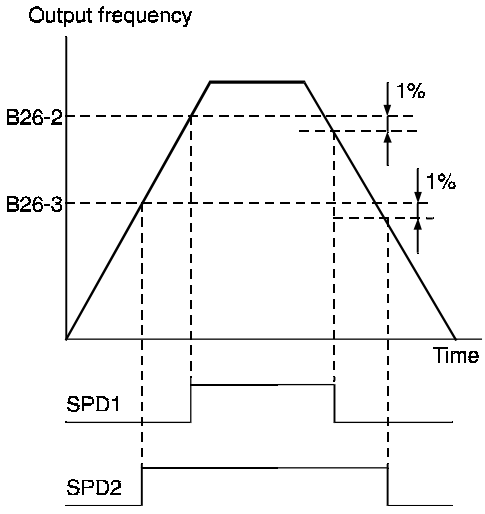

B26-1 **Current detection (IDET) value**

The current detection (IDET) level is set with a percentage of the rated current (B00-5)The histerises is 5%




B26-2 **Speed detect 1 (SPD 1) level**
B26-3 **Speed detect 2 (SPD 2) level**

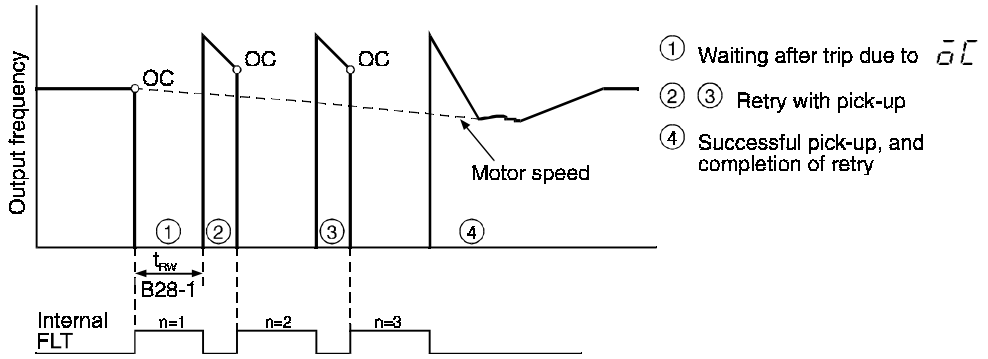
The speed detection SPD 1 and SPD2 level is set with a percentage to the max. frequency.
If the ASR option is used, the real speed will be the target for comparison
The histerises is the 1%



| | |
|---|---|
| B28-0 | **Number of retries** |
| B28-1 | **Retry wait time** |

Retry is a function that performs its own fault reset and performs pick-up. Set the number of retries, and the wait time ($T_{RW}$). If pick-up is not possible within the number of set times, an IO-4 fault will occur.

The errors that are targets of retry are power module (Pn-), overcurrent (oC-), overvoltage (ou-), overload (oL-), and ground fault (GFd).



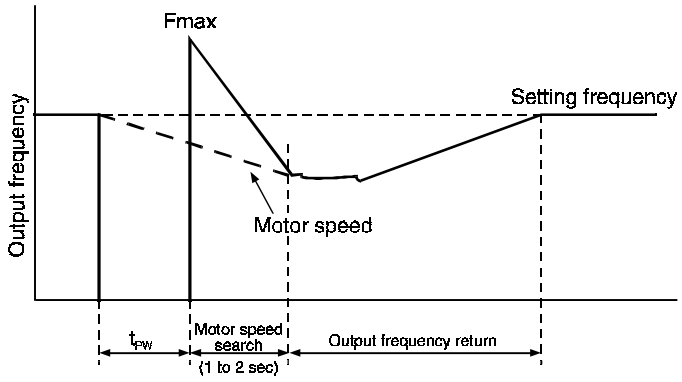

**Note 1)** If IB28-0=0, retry will not function.

**Note 2)** The FA-FC connection output will stay open during retry, but will not function.

**<Pick-up operation>**

Pick-up starts when F.RUN or R.RUN is ON in the PICK ON state or when the power is turned on when auto start with pick-up is selected (B01-0/f3=3).

The operation is as shown below.



| B28-2 | **Pick-up wait time** |
|---|---|

Set this time according with the motor residual voltage time. (The residual voltage is a voltage generated by the motor after the inverter output turns OFF, and will be abated in approx. 1 to 3 seconds. This time will take longer if the motor capacity is large.)

| B29-0 | **Drive current limit** |
|---|---|

The output current is limited by lowering the output frequency so that the output current does not exceed the value set with this parameter during starting or constant running. (OCL: Overcurrent limit)
The setting uses the motor rated current (B00-5) as 100%.
**Note)** Set a value larger than the motor no-load current.

| B29-1 | **Regenerative torque limit** |
|---|---|

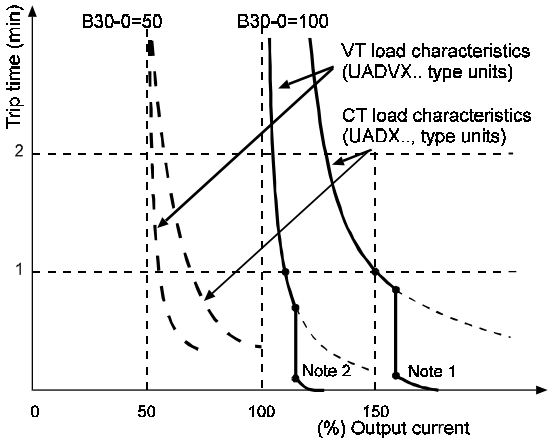
The regenerative torque to deceleration or the regenerative load during or constant running is limited. Set to 10% when not using the DBR option. When using the DBR option, calculate the value with the following formula and set.

$$B29-1=\left[\left(\frac{V2}{DBRresistancevalue}\right)/\ Motor\ldots Capacity[KW]\right]\times 100[\%]$$

where V2=148.2 for the 200V system and V2=593 for the 400V system.

| B30-0 | **Overload setting (L0)** |
|---|---|
| B30-1 | **0Hz overload (L2)** |
| B30-2 | **0.7 Ftrq overload (L1)** |

The reverse time interval characteristics will change with the B30-0 setting.
As shown in the drawing, the Overload trip curve depends if the drive used is an UADX.., or an UADVX..




The setting uses the motor rated current (B00-5) as 100%

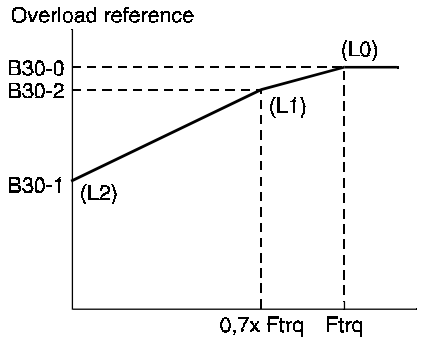
**Do not set a value that exceeds the inverter rated current.**

**Note 1)** Overload UADX.., type units: 150%/60s, 160%/10s, 170%/2,5S
**Note 2)** Overload UADVX.., type units: 112%/60s, 132%/0,5s

**Note 3)** At 0.5Hz or less, the inverter will trip at 75% of the rated current in 60s, (General purpose drives UADX..)

**Note 4)** At 0.5Hz or less, the inverter will trip at 56% of the rated current in 60s. (VT drives UADVX..)

When running a self-cooling type motor at a low speed, set B30-1 and B30-2 according to the motor characteristics. The characteristics will be as shown on the right.

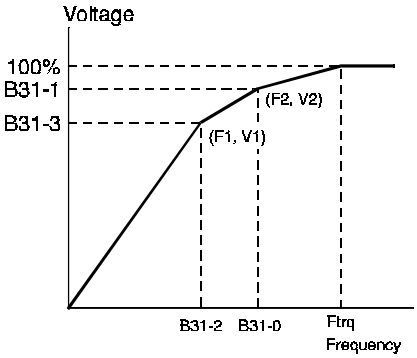



.

| B31-0~3 | **V/F middle point** |
|---|---|

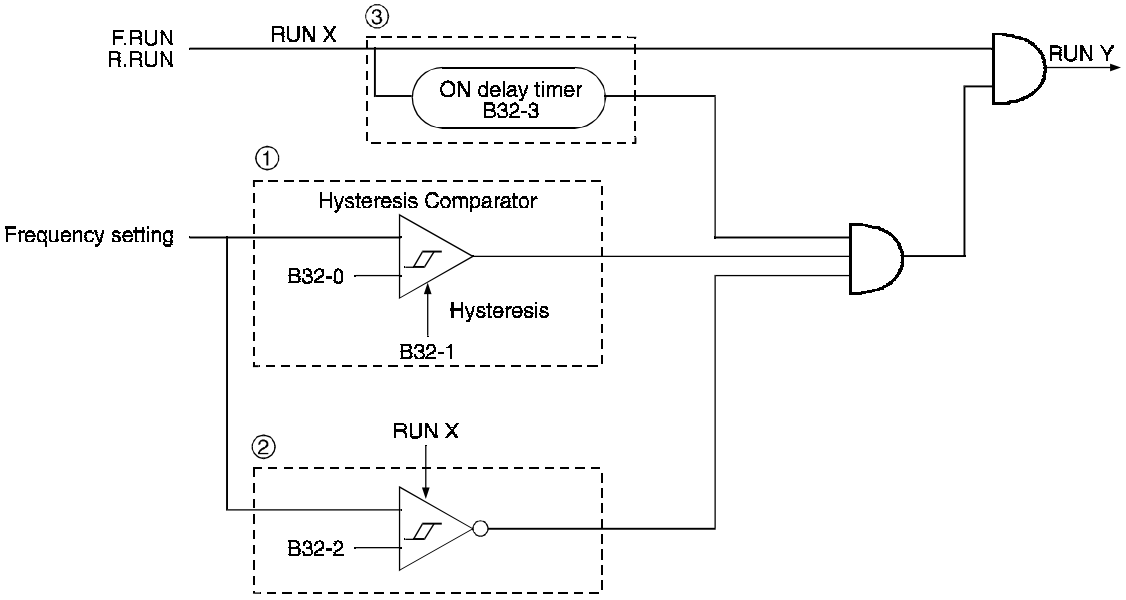
A V/F characteristic as shown on the right can be obtained for motors having special V/F characteristics.

**Note)** Set so that F1≤F2≤$F_{trq}$ and V1≤V2.




| B32-0 | **Setting start/stop function reference frequencies** |
|---|---|
| B32-1 | **Setting start/stop function histerises** |
| B32-2 | **Setting interlock frequency** |
| B32-3 | **Run delay timer** |

The following types of interlock can be obtained for the run F.RUN and R.RUN commands.

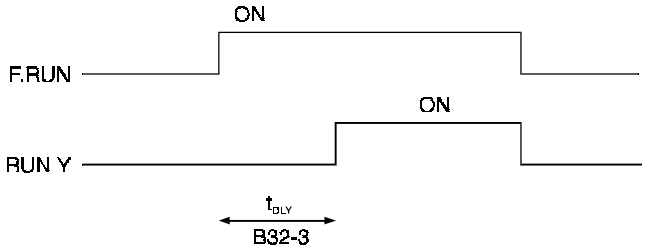


(1) Setting start/stop function
The motor will run when the frequency setting is higher than the B32-0 setting value, and will stop when lower. (Normally when the frequency setting is 0, the motor will not stop completely because the output frequency will be limited at 0.1Hz.)
Starting and stopping by the potentiometer or setter is possible with this function.

(2) Start interlock
If the frequency setting value is larger than B32-2 when the run command (RUN X) is ON, the motor will not start. Use this function when the frequency setting is to be lowered when starting for safety purposes.

**Note)** The start/stop and start interlock functions cannot be used simultaneously.

(3) Run delay timer
The motor will be delayed from the run command (RUN X) by the time set in B32-3.

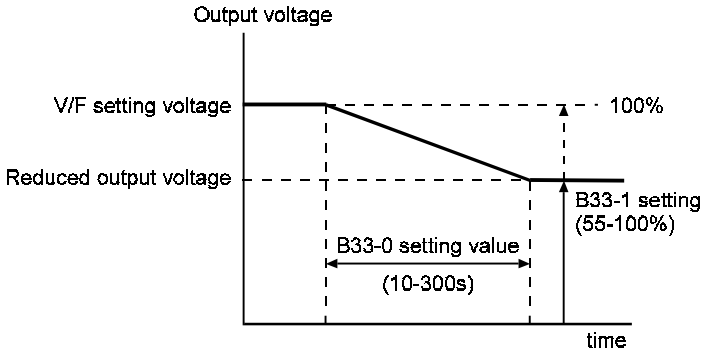



This is used for synchronization with peripheral machines such as mechanical brake
The run delay timer will not function in the jogging or local modes.

**Note 1)** Set the parameter setting values to 0 when not using (1), (2) or (3) .
**Note 2)** The (1), (2) or (3) functions will not be active during jogging run.
**Note 3)** The function will not be active during the local mode.
**Note 4)** When interlock is applied on(1), (2) or (3), the FWD or REV lamp will flicker.

B33-0 **High-efficiency operation time constant**

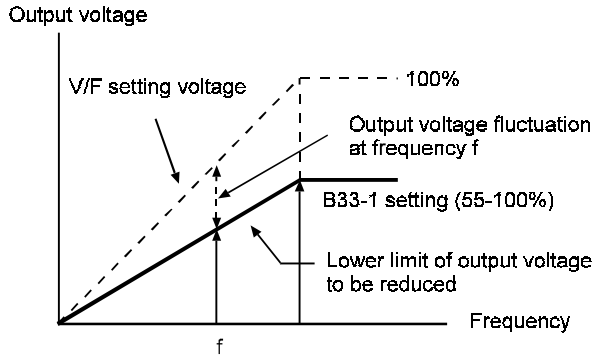
- To select the high-efficiency operation function, set between 10 and 300 while the inverter is stopped. This setting value is the time to reduce the output voltage to the lower limit set in B33-1 from the value (V/F setting) when the high efficiency operation function is not selected after the output frequency reaches the set frequency.




- Normally the minimum setting value is 10. However, if the rotation is unstable or if trips occur during reduction of the voltage, set a large value.
- To disable the high-efficiency function, set 301 while the inverter is stopped.

B33-0 **Voltage lower limit value setting for high-efficiency operation**

- Set the output voltage in range of 55-100%. The voltage will not be reduced when 100% is set,
- Normally the minimum setting value is 55. However, when applying this function to loads having a remarkable torque fluctuation, the rotation may become unstable or trips may occur. In this case set a larger value




**<High-efficiency operation>**

During normal V/F constant operation, the rate of no-load loss is large at light loads causing the motor efficiency to drop remarkably. Thus, the output voltage is reduced according to the load in respect to the voltage set at V/F using the B33-1 setting value as the lower limit, by that improving the motor efficiency.

### 6-3-3 Software Option Function

The program ramp, PID and traverse pattern run functions can be selected as software option functions.
The validity of these functions is selected with B40-0.

B40-0/f0 = 1: The following functions are not used.
2: Program ramp function use
3: Pattern run function use
4: Traverse function use

B40-0/f1 = 1: PID not used
2: PID use

A list of S/W option functions is shown in Table 6.5.
Each function is described in sections 6-4 to 6-6.

**Table 6.5 (1/2) Block-B parameter - S/W option functions**

(1) can be reflected to the operation immediately.
(2) can only be changed while the drive is at a stop.

| No. | Parameter | Default | Min. | Max. | Unit | Function |
|---|---|---|---|---|---|---|
| B40 - S/W option application (2) | | | | | | |
| 0 | S/W operation selection | 1111. | 1111. | 1124. | | f0: Function selection -1 = 1: Following functions are not used. = 2: Program ramp ON = 3: Pattern run ON = 4: Traverse ON<br>f1: Function selection -2 = 1: Following function is not used<br>(For future use)<br>(For future use) = 2: PID ON |
| B41 - Program ramp - acceleration | | | | | | |
| 0 | Acceleration time cushion -0 | 10.0 | 0.1 | 6000.0 | Sec. | The time unit will change according to the B25-5 setting. |
| 1 | -1 | 10.0 | 0.1 | 6000.0 | | |
| 2 | -2 | 10.0 | 0.1 | 6000.0 | | |
| 3 | -3 | 10.0 | 0.1 | 6000.0 | | |
| 4 | -4 | 10.0 | 0.1 | 6000.0 | | |
| 5 | -5 | 10.0 | 0.1 | 6000.0 | | |
| 6 | -6 | 10.0 | 0.1 | 6000.0 | | |
| 7 | -7 | 10.0 | 0.1 | 6000.0 | | |
| B42 - Program ramp - deceleration | | | | | | |
| 0 | Deceleration time -0 | 20.0 | 0.1 | 6000.0 | | |
| 1 | -1 | 20.0 | 0.1 | 6000.0 | | |
| 2 | -2 | 20.0 | 0.1 | 6000.0 | | |
| 3 | -3 | 20.0 | 0.1 | 6000.0 | | |
| 4 | -4 | 20.0 | 0.1 | 6000.0 | | |
| 5 | -5 | 20.0 | 0.1 | 6000.0 | | |
| 6 | -6 | 20.0 | 0.1 | 6000.0 | | |
| 7 | -7 | 20.0 | 0.1 | 6000.0 | | |
| B43 - PID control | | | | | | |
| 0 | Proportional gain | 1.00 | 0.01 | 10.00 | | |
| 1 | Integral time constant | 10.0 | 0.0 | 30.0 | Sec. | |
| 2 | Differential time constant | 0.000 | 0.000 | 1.000 | Sec. | |
| 3 | Upper limit | 100. | 50.0 | 100.0 | % | Fmax at 100% |
| 4 | Lower limit | 0. | 50.0 | 0.0 | % | |
| B44 - Traverse option | | | | | | |
| 0 | Center frequency (FH) | 10.0 | 0.5 | 440.00 | Hz | |
| 1 | Amplitude - A | 10.0 | 0.1 | 20.0 | % | Set with (A/FH) * 100 |
| 2 | Drop - D | 0.0 | 0.0 | 50.0 | % | Set with (D/A) * 100 |
| 3 | Acceleration time - B | 10.0 | 0.5 | 60.0 | Sec. | |
| 4 | Acceleration time - C | 10.0 | 0.5 | 60.0 | Sec. | |
| 5 | Deviated traverse - X | 10.0 | 0.0 | 20.0 | % | Set with (X/FH) * 100 |
| 6 | Deviated traverse - Y | 10.0 | 0.0 | 20.0 | % | Set with (Y/FH) * 100 |

Select as follows with S0, S1, S2

| Sequence command | | | Selection |
|---|---|---|---|
| S2 | S1 | S0 | |
| OFF | OFF | OFF | B41-0: Acceleration time -0<br>B42-0: Deceleration time -0 |
| OFF | OFF | ON | B41-1: Acceleration time -1<br>B42-1: Deceleration time -1 |
| OFF | ON | OFF | B41-2: Acceleration time -2<br>B42-2: Deceleration time -2 |
| OFF | ON | ON | B41-3: Acceleration time -3<br>B42-3: Deceleration time -3 |
| ON | OFF | OFF | B41-4: Acceleration time -4<br>B42-4: Deceleration time -4 |
| ON | OFF | ON | B41-5: Acceleration time -5<br>B42-5: Deceleration time -5 |
| ON | ON | OFF | B41-6: Acceleration time -6<br>B42-6: Deceleration time -6 |
| ON | ON | ON | B41-7: Acceleration time -7<br>B42-7: Deceleration time -7 |

**Table 6.5 (2/2) S/W option function setting**

(1) can be reflected to the operation immediately.
(2) can only be changed while the drive is at a stop.

| No. | Parameter | Default | Min. | Max. | Unit | Function |
|---|---|---|---|---|---|---|
| B50 - Pattern run step-0 | | | | | | |
| 0 | Mode | 0. | 0. | 2. | | f0=0: Stop,<br>=1: Forward run,<br>=2: Reverse run |
| 1 | Frequency | 0.10 | 0.10 | 440.00 | Hz | |
| 2 | Time | 1.0 | 0.1 | 6000.0 | Sec. | |
| B51 - Pattern run step-1 | | | | | | |
| 0 | Mode | 0. | 0. | 2. | | f0=0: Stop,<br>=1: Forward run,<br>=2: Reverse run |
| 1 | Frequency | 0.10 | 0.10 | 440.00 | Hz | |
| 2 | Time | 1.0 | 0.1 | 6000.0 | Sec. | |
| B52 - Pattern run step-2 | | | | | | |
| 0 | Mode | 0. | 0. | 13. | | f0=0: Stop,<br>=1: Forward run,<br>=2: Reverse run,<br>=3: Return<br>(return destination is f1)<br>f1: Return destination step No. |
| 1 | Frequency | 0.10 | 0.10 | 440.00 | Hz | |
| 2 | Time | 1.0 | 0.1 | 6000.0 | Sec. | |
| B53 - Pattern run step-3 | | | | | | |
| 0 | Mode | 0. | 0. | 23. | | f0=0: Stop,<br>=1: Forward run,<br>=2: Reverse run,<br>=3: Return<br>(return destination is f1)<br>f1: Return destination step No. |
| 1 | Frequency | 0.10 | 0.10 | 440.00 | Hz | |
| 2 | Time | 1.0 | 0.1 | 6000.0 | Sec. | |
| B54 - Pattern run step-4 | | | | | | |
| 0 | Mode | 0. | 0. | 33. | | f0=0: Stop,<br>=1: Forward run,<br>=2: Reverse run,<br>=3: Return<br>(return destination is f1)<br>f1: Return destination step No. |
| 1 | Frequency | 0.10 | 0.10 | 440.00 | Hz | |
| 2 | Time | 1.0 | 0.1 | 6000.0 | Sec. | |
| B55 - Pattern run step-5 | | | | | | |
| 0 | Mode | 0. | 0. | 43. | | f0=0: Stop,<br>=1: Forward run,<br>=2: Reverse run,<br>=3: Return<br>(return destination is f1)<br>f1: Return destination step No. |
| 1 | Frequency | 0.10 | 0.10 | 440.00 | Hz | |
| 2 | Time | 1.0 | 0.1 | 6000.0 | Sec. | |

| No. | Parameter | Default | Min. | Max. | Unit | Function |
|---|---|---|---|---|---|---|
| B56 - Pattern run step-6 | | | | | | |
| 0 | Mode | 0. | 0. | 53. | | f0=0: Stop,<br>=1: Forward run,<br>=2: Reverse run,<br>=3: Return<br>(return destination is 1)<br>f1: Return destination step No. |
| 1 | Frequency | 0.10 | 0.10 | 440.00 | Hz | |
| 2 | Time | 1.0 | 0.1 | 6000.0 | Sec. | |
| B57 - Pattern run step-7 | | | | | | |
| 0 | Mode | 0. | 0. | 63. | | f0=0: Stop,<br>=1: Forward run,<br>=2: Reverse run,<br>=3: Return<br>(return destination is f1)<br>f1: Return destination step No. |
| 1 | Frequency | 0.10 | 0.10 | 440.00 | Hz | |
| 2 | Time | 1.0 | 0.1 | 6000.0 | Sec. | |
| B58 - Pattern run step-8 | | | | | | |
| 0 | Mode | 0. | 0. | 73. | | f0=0: Stop,<br>=1: Forward run,<br>=2: Reverse run,<br>=3: Return<br>(return destination is f1)<br>f1: Return destination step No. |
| 1 | Frequency | 0.10 | 0.10 | 440.00 | Hz | |
| 2 | Time | 1.0 | 0.1 | 6000.0 | Sec. | |
| B59 - Pattern run step-9 | | | | | | |
| 0 | Mode | 0. | 0. | 83. | | f0=0: Stop,<br>=1: Forward run,<br>=2: Reverse run,<br>=3: Return<br>(return destination is f1)<br>f1: Return destination step No. |
| 1 | Frequency | 0.10 | 0.10 | 440.00 | Hz | |
| 2 | Time | 1.0 | 0.1 | 6000.0 | Sec. | |

**Table 6.6 Main and PCB's function setting**

| **B80 - Hardware Option Selection (2)** | | | | | | |
|---|---|---|---|---|---|---|
| 0 | PCB option selection | 1111. | 1111. | 2226. | | Selection of PCB options |
| | | f0 : PCB option = 1: Not mounted = 2: UADOPTR = 3: UADOPTP = 4: UADOPTM = 5: UADOPTA = 6: UADOPTT<br>**Caution:** An IO-5 fault error will occur for settings 2-6, if the VAT3FD is not fitted with appropriate PCB option<br>f1 : Relay input (PSI6 to 9) = 1 : Not used = 2 : Used<br>f2 : Relay output (PSO1 to 4) = 1 : Not used = 2 : Used<br>f3 : ASR function = 1 : Not used = 2 : Used | | | | |
| 1 | Main Option Selection | 11. | 11. | 22. | | Selection of Main options |
| | | f0 : DBR = 1 : Not used = 2 : Used<br>f1 : Ground fault detection = 1 : Not used = 2 : Used | | | | |
| **B80 - B85, are settings of PCB Options. (Ask your supplier for dedicated manual)** | | | | | | |

## 6-4 Program Ramp Function

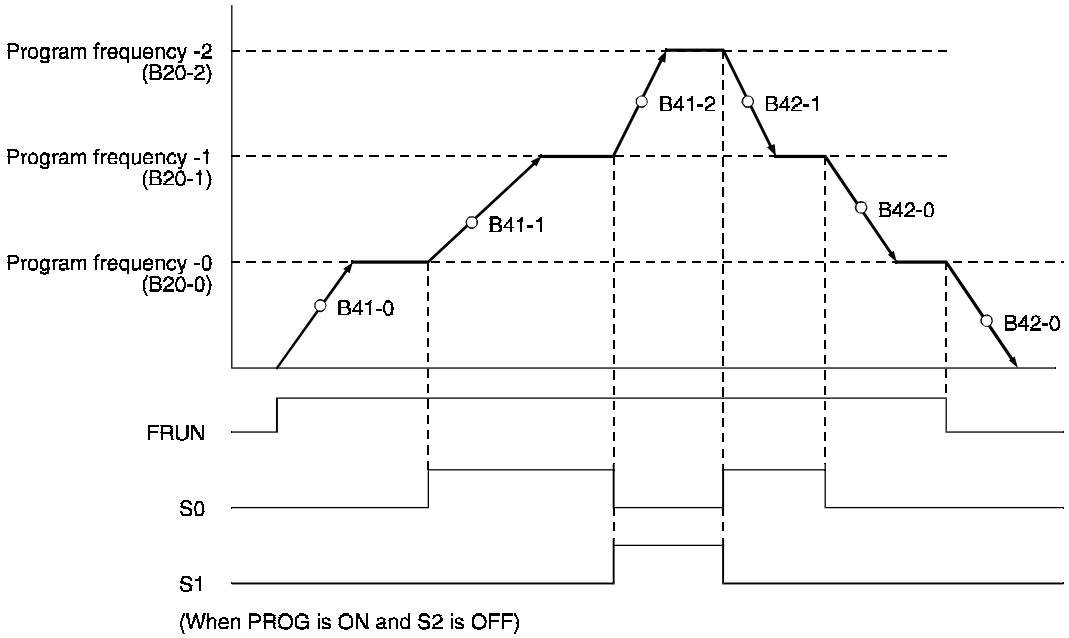
The motor can be run with program frequency setting 0 to 7 using the sequence commands PROG and S0, S1 and S2. The program ramp time can also be switched at this time and the motor run.
If PROG is OFF, only the program ramp time can be changed with S0, S1 and S2.
The ramp time selected with S0, S1 and S2 is as shown in Table 6.5.1.

**Table 6.5.1**

Select as follows with S0, S1, S2

| Sequence command | | | Selection |
|---|---|---|---|
| S2 | S1 | S0 | |
| OFF | OFF | OFF | B41-0: Acceleration time -0<br>B42-0: Deceleration time -0 |
| OFF | OFF | ON | B41-1: Acceleration time -1<br>B42-1: Deceleration time -1 |
| OFF | ON | OFF | B41-2: Acceleration time -2<br>B42-2: Deceleration time -2 |
| OFF | ON | ON | B41-3: Acceleration time -3<br>B42-3: Deceleration time -3 |
| ON | OFF | OFF | B41-4: Acceleration time -4<br>B42-4: Deceleration time -4 |
| ON | OFF | ON | B41-5: Acceleration time -5<br>B42-5: Deceleration time -5 |
| ON | ON | OFF | B41-6: Acceleration time -6<br>B42-6: Deceleration time -6 |
| ON | ON | ON | B41-7: Acceleration time -7<br>B42-7: Deceleration time -7 |

An example of combination with the program frequency setting is shown below.

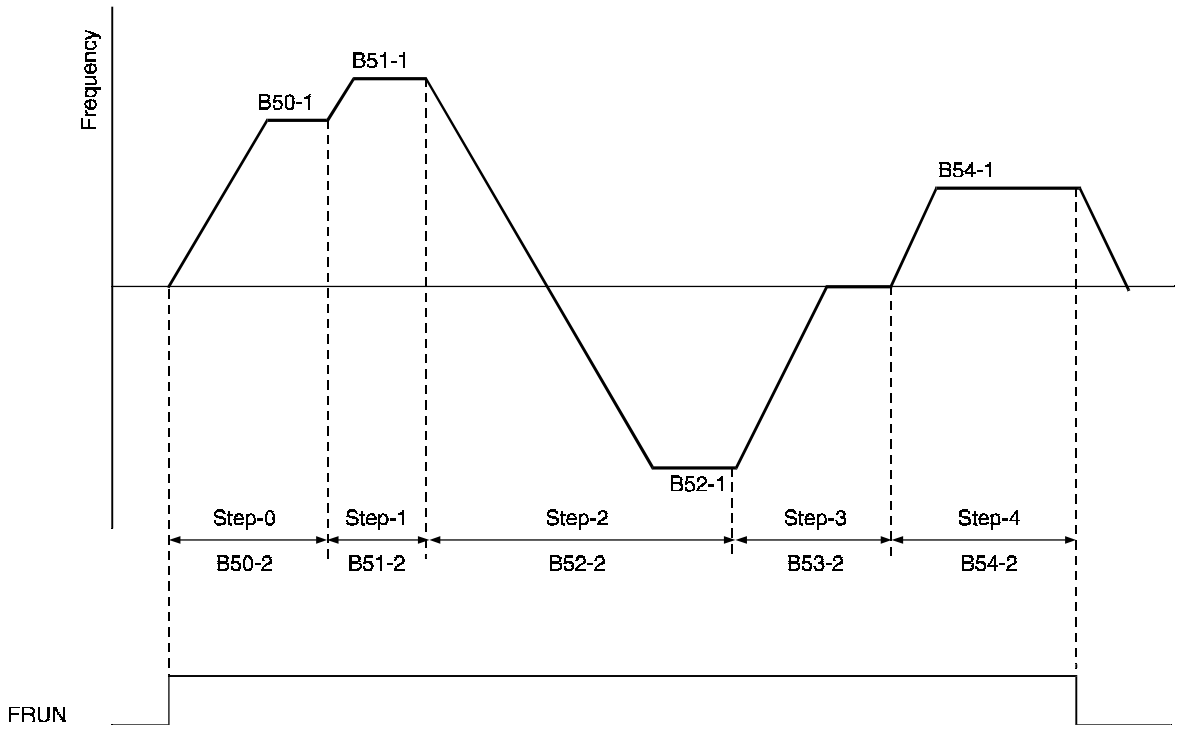


(When PROG is ON and S2 is OFF)

**Note)** The ramp time-2 (B21-0, 1) will be selected by turning the sequence command CSEL ON even when using the program ramp (B40-0/f0=2).

## 6-5 Pattern Run Function

The frequency, run direction and time can be changed automatically with the pattern run function.




(1) A max. of ten patterns can be set. Program in the B50-B59 blocks as shown below.
n is the step No. from 0 to 9.

B5n-0: Run mode

f0: Mode

= 0: Stop

= 1: Forward run

= 2: Reverse run

= 3: Final step (set when repeating before B59)

f1: Return destination step

= 0~8

(Set the No. of the step to be executed next when f0=3.)

B5n-1: Run]

B5n-2: Run time [sec.]

(2) The sequence command functions will be as shown below during pattern running.

F.RUN: When ON, the pattern run will reset and restart, and will operate from step 0. The inverter will stop when OFF.

**Note 1)** The pattern running operates with the remote mode (LCL OFF).
**Note 2)** The R.RUN, F.JOG, and R.JOG commands are invalid during pattern running.

S0: The internal timer operation will stop when ON. (Hold).
Use this to pause the pattern run.

S1: Proceeds to the next step at the edge from OFF to ON. (Skip) By turning this signal ON/OFF with S0 ON (hold), the step can be proceeded in synchronization with the peripheral machine regardless of the internal timer.

S2: If this signal is ON when step n is completed, the pattern run will be repeated from step 0. (Reset) Turn OFF when step 0 is entered. If left ON, step 0 will be repeated.

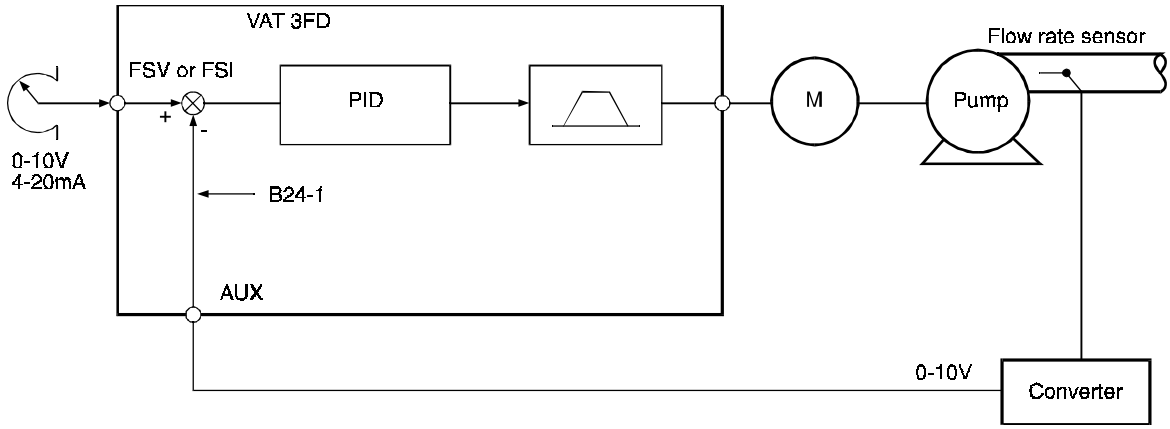
(3) When using pattern run, the sequence status output (D04-1) ACC and DCC functions will change as shown below.

ACC: Turns ON when the last step of the pattern run is being executed. (EOS)
When S2 turns ON, the step at that time is the final step, so this signal will also turn ON.

DCC: Operates with the reverse logic of the above ACC. ($\overline{\text{EOS}}$)

## 6-6 PID Control

The following type of feedback loop can be configured by using the AUX input terminal for feedback.




**Note 1)** The ASR option cannot be used when using PID.
**Note 2)** The ratio interlock calculation's AUX input (C) will be set as 0 and calculated when PID is used.
**Note 3)** PID will function only in the remote mode (LCL OFF). In the local mode (LCL ON) the operation will be the same as when PID is not used.

The PID calculation block is as shown below.