

ADLEEPOWER®

# INSTRUCTION MANUAL

## GENERAL-PURPOSE INVERTER



THANK YOU VERY MUCH FOR YOUR PURCHASE  
OF ADLEE INVERTER AS SERIES.  
PLEASE READ THIS INSTRUCTION MANUAL  
BEFORE INSTALLATION OF THE INVERTER.

## PREFACE

This general-purpose inverter made by ADLEE Powertronic., Ltd. Read this instruction manual thoroughly before operation.

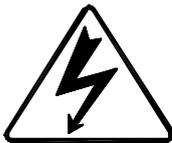
This manual will be helpful in the installation, parameter setting, troubleshooting, and daily maintenance of the AC motor drives. To guarantee safe operation of the equipment, read the following safety guidelines before connecting power to the AC drives. Keep this operating manual handy and distribute to all users for reference.

### A. General Precaution

1. There are some covers and shields on this inverter.  
Make sure all covers and shields are replaced before operating this product.
2. This manual may be modified when necessary because of improvement of the product or changes in specification.
3. Contact your ADLEE representative to order a copy of this manual, if your manual has been damaged or lost.
4. ADLEE is not responsible for any modification of the product made by the user, since that will void your guarantee.

### B. Safety symbols

Symbols which may appear on the manual



#### WARNING

Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury to personnel.



#### CAUTION

Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury to personnel and damage to equipment.

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## RECEIVING

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### CAUTION

- \* Do not install or operate the driver which is damaged or has missing parts.  
Failure to observe this caution may result in personal injury or equipment damage.
- 

## INSTALLATION

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### CAUTION

- \* Lift the cabinet by the base. When moving the unit, never lift by the front cover.  
Otherwise, the main unit may be dropped causing damage to the unit.
  - \* Mount the driver on nonflammable material. (i.e. metal)  
Failure to observe this caution can result a fire.
  - \* When mounting units in an enclosure, install a fan or other cooling device to keep the intake air temperature below 45 °C.  
Overheating may cause a fire or damage to the unit.
- 

## INSTALLATION

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### WARNING

- \* Only commence wiring after verifying that the power supply is turned OFF.  
Failure to observe this warning can result in an electrical shock or a fire.
- \* Wiring should be performed only by qualified personnel.  
Failure to observe this warning can result in an electrical shock or a fire.
- \* Make sure to ground the ground terminal.  
Ground resistance : 100 Ohm or less.  
Failure to observe this warning can result in an electrical shock or a fire.

## CAUTION

- \* Verify that the driver rated voltage coincides with the AC power supply voltage.  
Failure to observe this caution can result in personal injury or a fire.
- \* Do not perform a withstand voltage test of the driver.  
It may cause semi-conductor elements to be damaged.
- \* To connect a braking resistor, follow in APPENDIX A.  
Improper connection may cause the unit damaged or a fire.
- \* Tighten terminal screws.  
Failure to observe this caution can result a fire.
- \* Never connect the AC main circuit power supply to output terminals U, V and W.  
The inverter will be damaged and invalidate the guarantee.

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## OPERATION

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## WARNING

- \* Only turn ON the input power supply after replacing the front cover.  
Do not remove the cover while current is flowing.  
Failure to observe this warning can result in an electrical shock.



## CAUTION

- \* Since it is easy to change. operation speed from low to high speed, verify the safe working range of the motor and machine before operation.  
Failure to observe this caution can result in personal injury and machine damage.
- \* Do not change signals during operation.  
The machine or the inverter may be damaged.
- \* All the constants of the inverter have been preset at the factory.  
Do not change the settings unnecessary.

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## MAINTENANCE AND INSPECTION

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### WARNING

- \* Never touch high-voltage terminals in the driver.  
Failure to observe this warning can result in an electrical shock.
- \* Replace all protective covers before powering up the inverter.  
To remove the cover, make sure to shut OFF the molded-case circuit breaker.  
Failure to observe this warning can result in an electrical shock.
- \* Perform maintenance or inspection only after verifying that the CHARGE LED goes OFF, after the main circuit power supply is turned OFF.  
The capacitors are still charged and can be dangerous.
- \* Only authorized personnel should be permitted to perform maintenance, inspections or parts replacement.  
Failure to observe this warning can result in an electrical shock.

## **CAUTION**

- \* The control PC board employs CMOS ICs. Do not touch the CMOS elements by hand.  
They are easily damaged by static electricity.
- \* Do not connect or disconnect wires or connectors while power is applied to the circuit.  
Failure to observe this caution can result in personal injury.

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## **OTHERS**

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### **WARNING**

- \* Never modify the product.  
Failure to observe this warning can result in an electrical shock or personal injury and will invalidate the guarantee.

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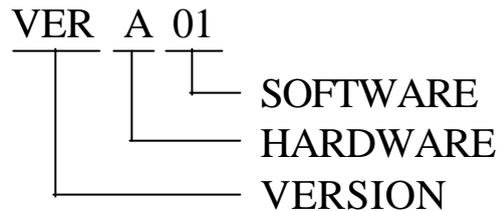
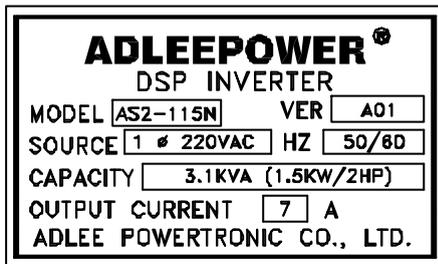
# 1. RECEIVING

This AS series AC drive has gone through rigorous quality control tests at the factory before shipment. After receiving the AC drive, please check for the following :

- (1) No damage is found on each product after shipping.
- (2) The product is as ordered (check the nameplate, voltage and frequency).
- (3) A set of inverter unit and instruction manual is contained in the package.

For any irregularity, contact the sales shop where you purchased immediately.

- (4) Description of name plate



MODEL : AS 2 - 115 N

AS series ——— N : With current setting

Voltage class : ——— Max Applicable motor(4 pole)

1 : 110V

2 : 220V

4 : 380/440V

Single Phase :

104 : 0.4KW    107 : 0.75KW    115 : 1.5KW

122 : 2.2KW    137 : 3.7KW

3 Phase :

304 : 0.4KW    307 : 0.75KW    315 : 1.5KW

322 : 2.2KW    337 : 3.7KW

## 2. SPECIFICATIONS

### (1) Single phase input port

Model	AS1-N		AS2-N				
Voltage	1 110VAC $\pm$ 10%		1 220VAC $\pm$ 10%				
Model No	AS1-104	AS1-107	AS2-104	AS2-107	AS2-115	AS2-122	AS2-137
Input Frequency	50HZ ~ 60HZ $\pm$ 10%						
Output Voltage	3 220VAC						
Output Frequency	0.5 ~ 400HZ						
Output Rated current (A)	2.5 A	4.1 A	2.5 A	4.1 A	7 A	10 A	16 A
Capacity (KVA)	1.0 KVA	1.6 KVA	1.0 KVA	1.6 KVA	2.7 KVA	3.8 KVA	6.1 KVA
Largest motor KW ( 4 poles )	0.4KW	0.75KW	0.4KW	0.75KW	1.5KW	2.2KW	3.7KW
Control	Sine wave pulse width modulation						
Braking	Regenerative discharge braking						
Over current Capacity	150% of rated current ( 1 minute)						
Acceleration time	0.1 ~ 6000 SEC						
Deceleration time	0.1 ~ 6000 SEC						
Frequency setting	Digital	Use keyboard    for setting and confirm by 					
	Analog	By frequency knob / 0~5VDC, 0~10VDC, 4~20mA / RS-485					
Display type	LED Digits						
Cooling Method	Self-cooled	Air-cooled	Self-cooled	Self-cooled	Air-cooled	Air-cooled	Air-cooled
Dimension drawing	Fig 1	Fig 2	Fig 1	Fig 1	Fig 2	Fig 2	Fig 3
Weight ( NW . KG )	1.2KG	1.3KG	1.2KG	1.3KG	1.3KG	1.4KG	4.2KG

## (2) 3 Phase input port

Model	AS2-N					AS4-N			
Voltage	3 220VAC $\pm$ 10%					3 380/440VAC $\pm$ 10%			
Model No	AS2-304	AS2-307	AS2-315	AS2-322	AS2-337	AS4-307	AS4-315	AS4-322	AS4-337
Input Frequency	50HZ ~ 60HZ $\pm$ 10%								
Output Voltage	3 220VAC					3 380/440VAC			
Output Frequency	0.5 ~ 400HZ								
Output Rated current (A)	3 A	5 A	8 A	11 A	17 A	2.5 A	4 A	6 A	9 A
Capacity (KVA)	1.1 KVA	1.9 KVA	3.1 KVA	4.2 KVA	6.5 KVA	1.9 KVA	3.1 KVA	4.2 KVA	6.9 KVA
Largest motor KW ( 4 poles )	0.4 KW	0.75 KW	1.5 KW	2.2 KW	3.7 KW	0.75 KW	1.5 KW	2.2 KW	3.7 KW
Control	Sine wave pulse width modulation								
Braking	Regenerative discharge braking								
Over current Capacity	150% of rated current ( 1 minute)								
Acceleration time	0.1 ~ 6000 SEC								
Deceleration time	0.1 ~ 6000 SEC								
Frequency setting	Digital	Use keyboard    for setting and confirm by 							
	Analog	By frequency knob / 0~5VDC, 0~10VDC, 4~20mA / RS-485							
Display type	LED Digits								
Cooling Method	Self-cooled	Self-cooled	Air-cooled	Air-cooled	Air-cooled	Air-cooled	Air-cooled	Air-cooled	Air-cooled
Dimension drawing	Fig 1	Fig 1	Fig 2	Fig 2	Fig 3	Fig 2	Fig 2	Fig 2	Fig 3
Weight ( NW . KG )	1.2 KG	1.3 KG	1.3 KG	1.4 KG	4.2 KG	1.3 KG	1.3 KG	1.4 KG	4.0 KG

### 3. DIMENSION DRAWINGS

Unit : mm

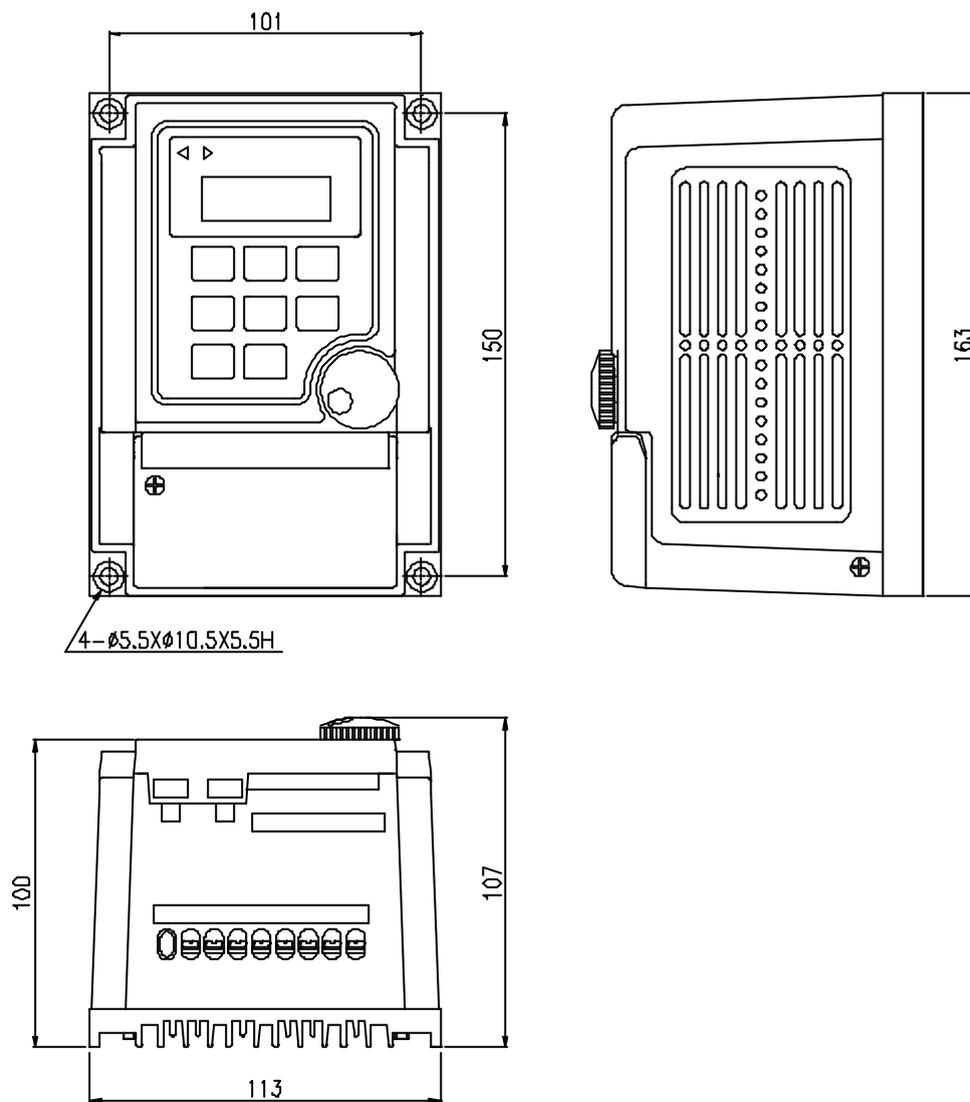


Fig 1

Unit : mm

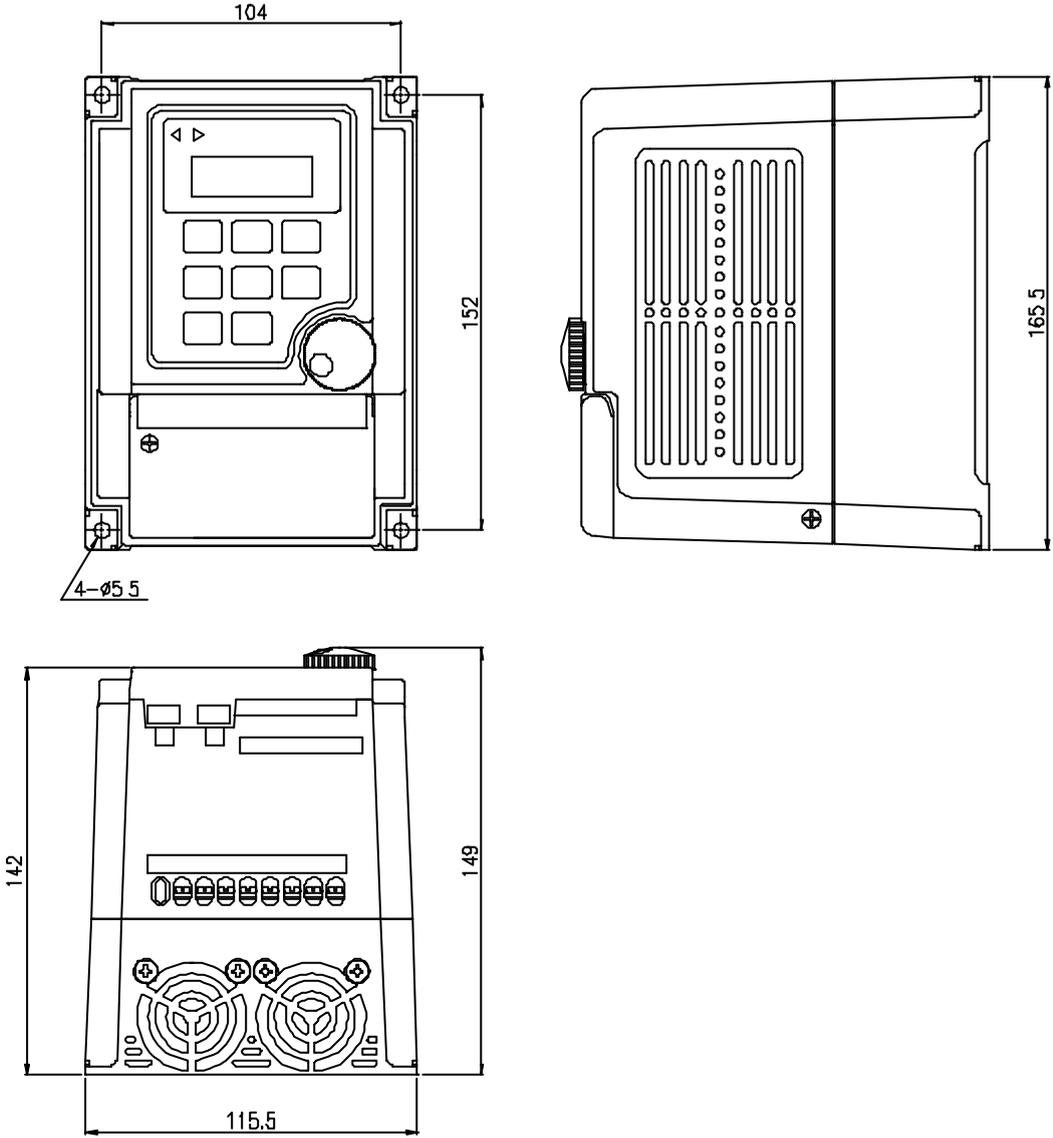
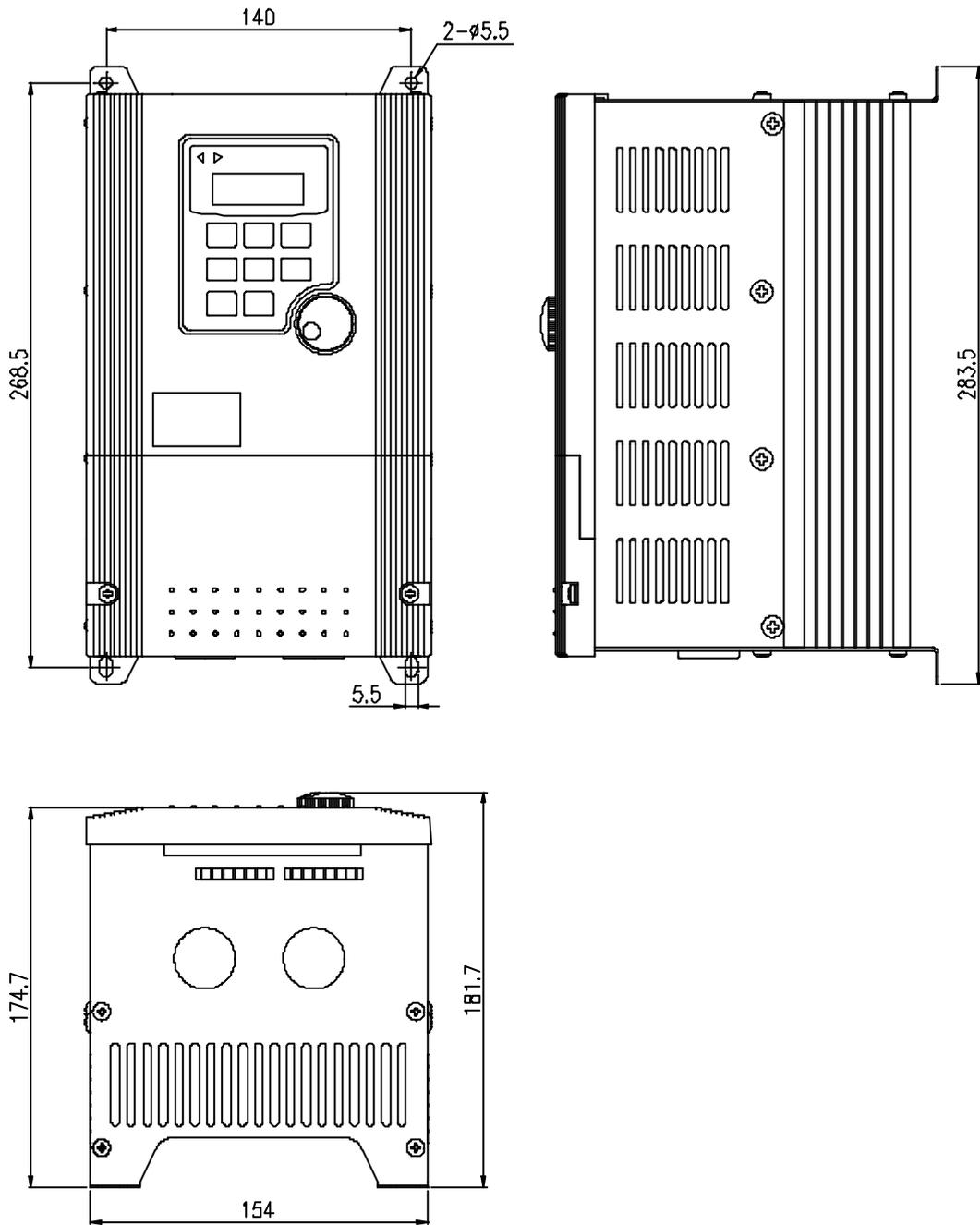


Fig 2

Unit : mm



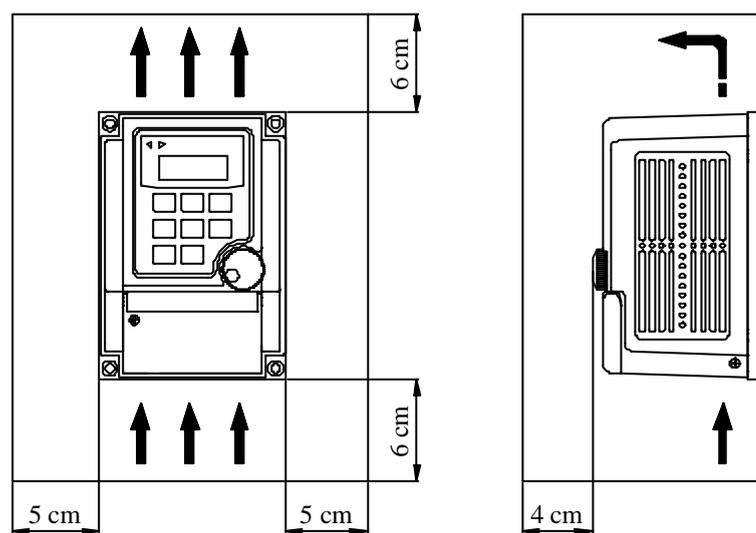
**Fig 3**

## 4. INSTALLATION

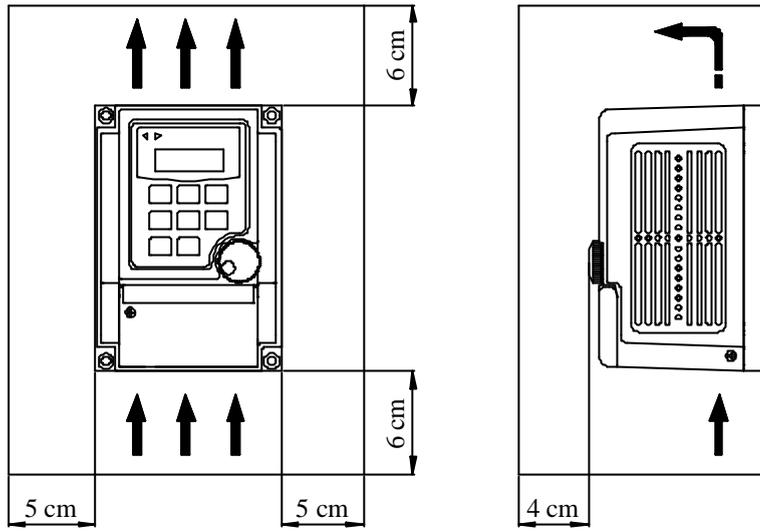
Inadequate environment around installation site and installation surface can result in damage to the inverter.

Before operating the AS series inverter, please check the following points :

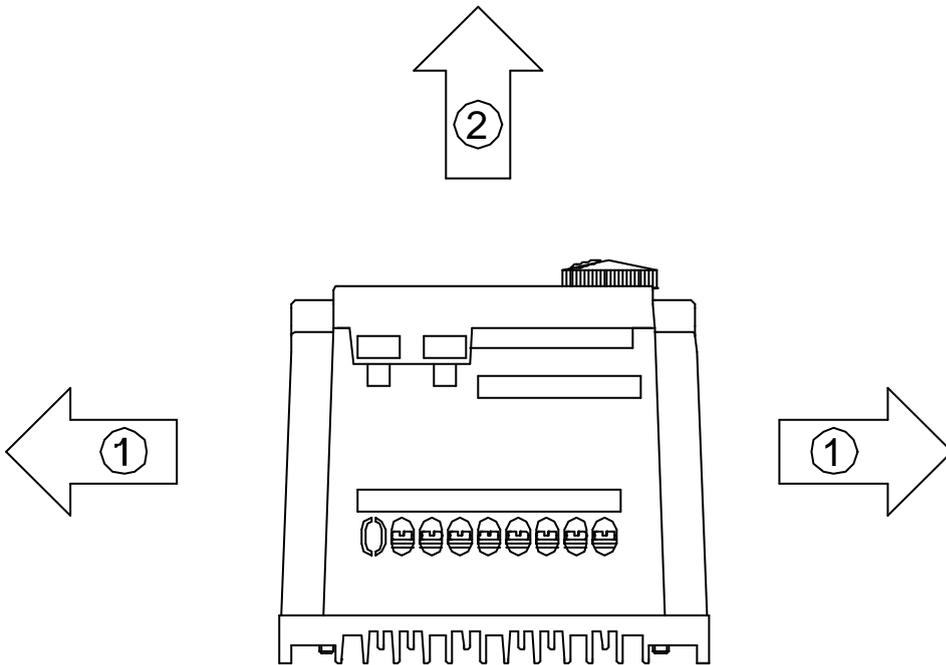
- (1) Avoid high temperature, high humidity, easy-to-dew ambient environment. Don't expose to dust or dirt, corrosive gas, and coolant mist, and direct sunlight. Place the unit in a well-ventilated room.
- (2) Avoid a place subjected to substantial vibration.
- (3) When installing the unit within the cabinet. Please pay attention to ventilation and limit the ambient temperature in between  $-10 \sim 45$  . ( $14 \sim 113$  ).
- (4) Use a nonflammable material, such a steel sheet on the wall for installation. (The rear side will generate heat)
- (5) Install the unit always vertically with a marginal spacing around.



← AIR FLOW

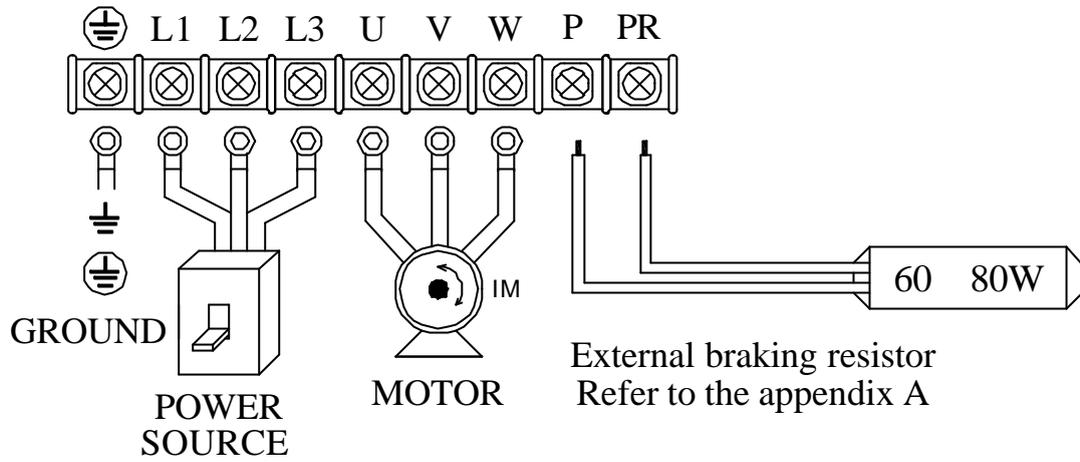


← AIR FLOW



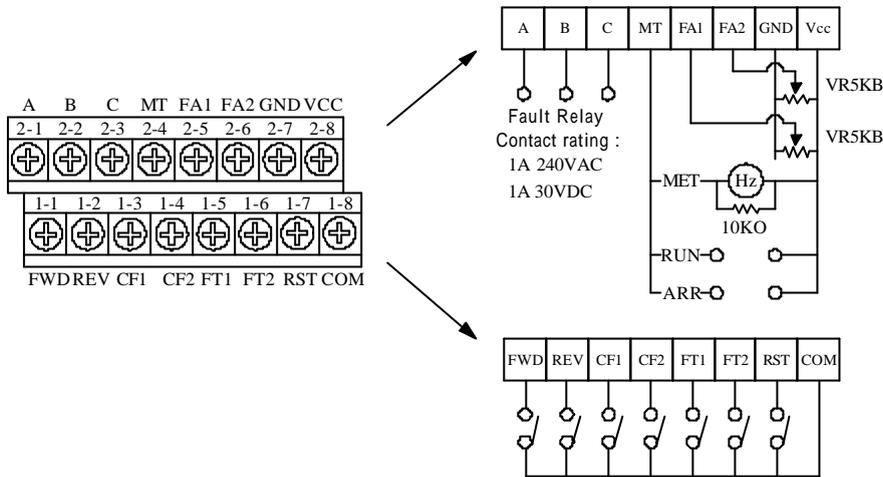
## 5. DESCRIPTION OF TERMINALS

### (1) Main circuit connection diagram

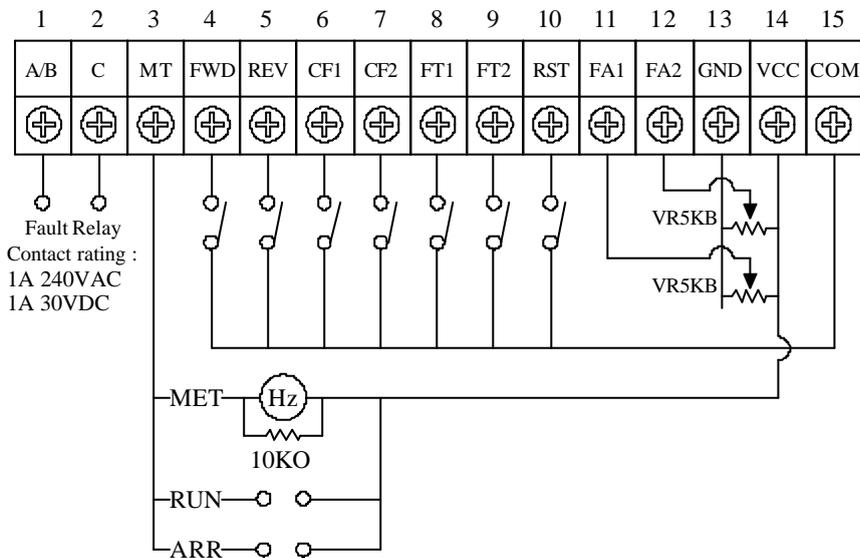


Main circuit terminal			
No.	Symbol	Description	Terminal name
1		Ground	Ground(Earth) Terminal
2	L1	Connect power supply	(L1,L2) Single Phase (L1,L2,L3) 3 Phase
3	L2		
4	L3		
5	U	Inverter output	Terminals connected to motor
6	V		
7	W		
8	P	Dynamic brake	Terminals connected to braking Resistor, resistance refer to Appendix A
9	PR		

## (2) Control circuit terminal



AS1-104~107, AS2-104~122, AS2-304~322, AS4-307~322



AS2-137, AS2-337, AS4-337

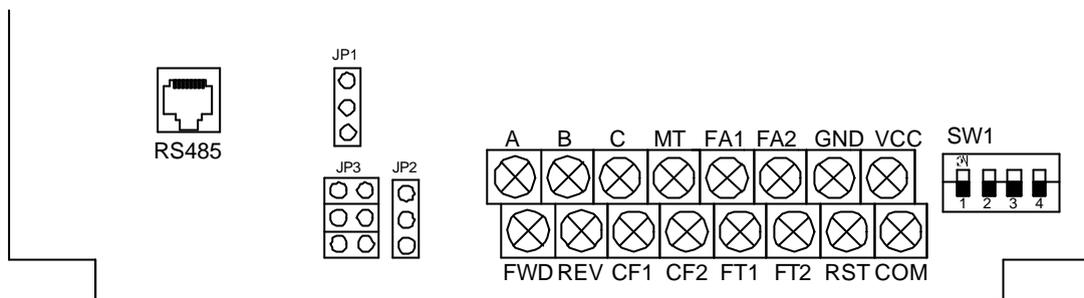
Note : To avoid meter power vibration parallel 10K Resistor between VCC and MET terminal.

Resistor between

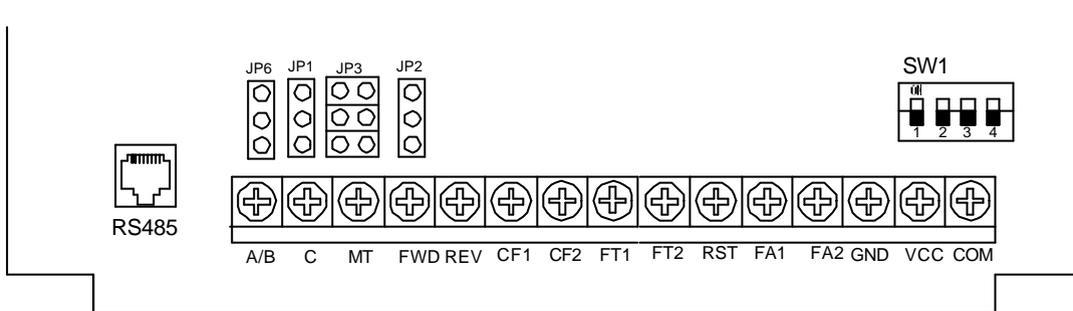
Symbol	Terminal name	Description															
<b>FWD</b>	<b>Forward operation</b>	<b>Forward operation / stop terminal</b>															
<b>REV</b>	<b>Reverse operation</b>	<b>Reverse operation / stop terminal</b>															
<b>CF1</b>	<b>Multistage speed terminal</b>	<table border="1"> <thead> <tr> <th>CF1</th> <th>CF2</th> <th>SPEED</th> </tr> </thead> <tbody> <tr> <td>OFF</td> <td>OFF</td> <td>SPEED - 1</td> </tr> <tr> <td>ON</td> <td>OFF</td> <td>SPEED - 2</td> </tr> <tr> <td>OFF</td> <td>ON</td> <td>SPEED - 3</td> </tr> <tr> <td>ON</td> <td>ON</td> <td>SPEED - 4</td> </tr> </tbody> </table>	CF1	CF2	SPEED	OFF	OFF	SPEED - 1	ON	OFF	SPEED - 2	OFF	ON	SPEED - 3	ON	ON	SPEED - 4
CF1		CF2	SPEED														
OFF		OFF	SPEED - 1														
ON		OFF	SPEED - 2														
OFF		ON	SPEED - 3														
ON	ON	SPEED - 4															
<b>CF2</b>																	
<b>FT1</b>	<b>Multi function terminal 1</b>	<b>See functions description (CD42)</b>															
<b>FT2</b>	<b>Multi function terminal 2</b>	<b>See functions description (CD43)</b>															
<b>RST</b>	<b>Reset</b>	<b>Reset</b>															
<b>COM</b>	<b>Common terminal</b>	<b>Common terminal of control terminals</b>															
<b>A</b>	<b>Alarm output A</b>	<b>Fault alarm contact A(normal open)</b>															
<b>B</b>	<b>Alarm output B</b>	<b>Fault alarm contact B(normal close)</b>															
<b>C</b>	<b>Alarm output C</b>	<b>Fault alarm contact (common)</b>															
<b>MT</b>	<b>Multi function output terminal</b>	<b>Open collector output 50mA MAX RUN : Operating indicator MET : Connect to frequency meter, refer to CD07 description ARR : Frequency arrived indicator, refer to CD55 description</b>															
<b>FA1</b>	<b>Free analog terminal 1</b>	<b>See CD44 &amp; 3-1 SW1</b>															
<b>FA2</b>	<b>Free analog terminal 2</b>	<b>See CD45 &amp; 3-1 SW1</b>															
<b>GND</b>	<b>Analog common terminal</b>	<b>Common terminal of free analog terminals</b>															
<b>VCC</b>	<b>Analog source</b>	<b>Power source +10V of analog terminals/ Power source ARR</b>															

(3) Description of Hardware setting

AS1-104~107, AS2-104~122, AS2-304~322, AS4-307~322



AS2-137, AS2-337, AS4-337

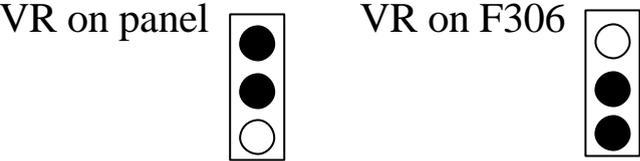


3-1 DIP Switch setting (SW1)

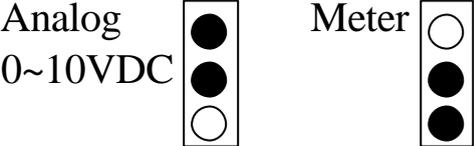
Setting FA1	Setting FA2
<p>FA1 : 0 - 10V</p>	<p>FA2 : 0 - 10V</p>
<p>FA1 : 0 - 5V</p>	<p>FA2 : 0 - 5V</p>
<p>FA1 : 4 - 20mA</p>	<p>FA2 : 4 - 20mA</p>
<p>Error setting</p>	<p>Error setting</p>

### 3-2 Jumper Setup

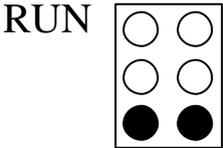
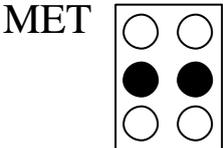
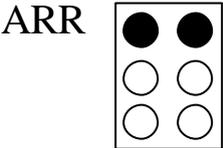
1. JP1 : VR on panel / VR on F306



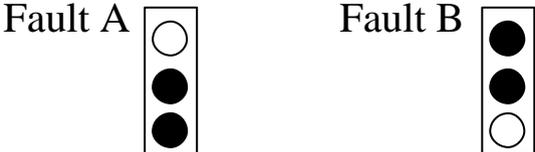
2. JP2 : MET output signal selection



3. JP3 : MT terminal

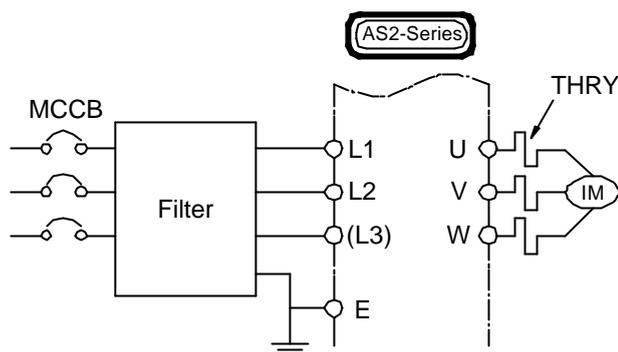


4. JP6 : Fault A / Fault B terminal



## (4) WIRING

### 4-1 Wiring of main circuit



### 4-2 Wiring equipments

Select the wiring equipment and wiring size, refer to the table below.

1. On the input power side, a molded case circuit breaker (MCCB) to protect inverter primary wiring should be installed.
2. A leakage current breaker threshold of 200mA and above, or of inverter use is recommended.
3. Use of input side magnetic contactor. An input MC can be used to prevent an automatic restart after recovery from an external power loss during remote control operation. However, do not use the MC reduced reliability.
4. In general, magnetic contactors on the output of the inverter, Should not be used for motor control. Starting a motor with the inverter running will cause large surge currents and the inverter overcurrent protector to trigger.

Model	AS1		AS2					AS4			
Model No	04	07	04	07	15	22	37	07	15	22	37
Capacity (KVA)	1.0	1.6	1.0	1.6	2.7	3.8	6.1	1.9	3.1	4.2	6.5
Current (A)	2.5	4.1	2.5	4.1	7	10	16	2.5	4	6	9
Circuit Breaker (MCCB) (A)	15	15	10	10	15	20	20	10	10	10	15
Electro-Magnetic Contactor (A)	12	12	12	12	12	12	18	12	12	12	12
Thermal relay RC value (A)	4.8	7.6	2.4	3.8	6.8	9	15	1.9	3.4	3.8	6.8

### 4-3 Surge absorber

In order to prevent malfunction, provide the surge absorber on the coils of the electromagnetic contactors, relays and other devices which are to be used adjacent of the inverter.

### 4-4 Cable size and length

If the inverter is connected to a distant motor (especially when low frequency is output), motor torque decreases because of voltage drop in the cable. Use sufficiently heavy wire.

Changing the carrier frequency reduce RF1 noise and leakage current. (Refere to the table below)

Distance INVERTER MOTOR	under 25M	under 50M	under 100M	above 100M
AS2 SERIES	under 16KHZ	under 10KHZ	under 5KHZ	under 2.5KHZ

#### 4-5 Wiring and cautionary points

##### A. Main circuit

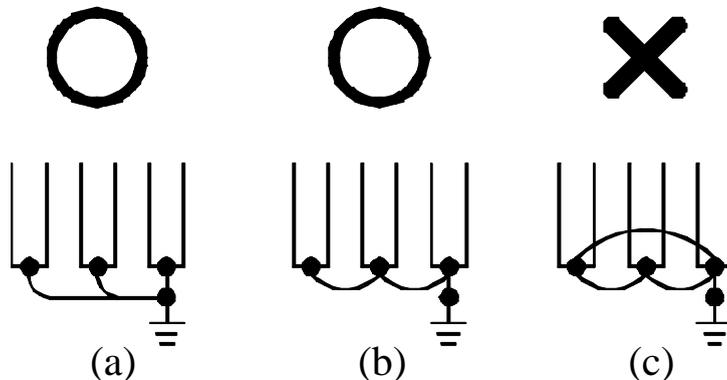
1. Connect the cables of the power supply side to the U, V and W output terminals for the motor.
2. Don't connect any electromagnetic contactor between the inverter and motor. If it is inevitable, turn on the contactor when both the inverter and motor are both at stand still.
3. Don't put the advance phase capacitor between the inverter and motor.
4. Put MCCB in the input power supply.

##### B. Control signal circuit

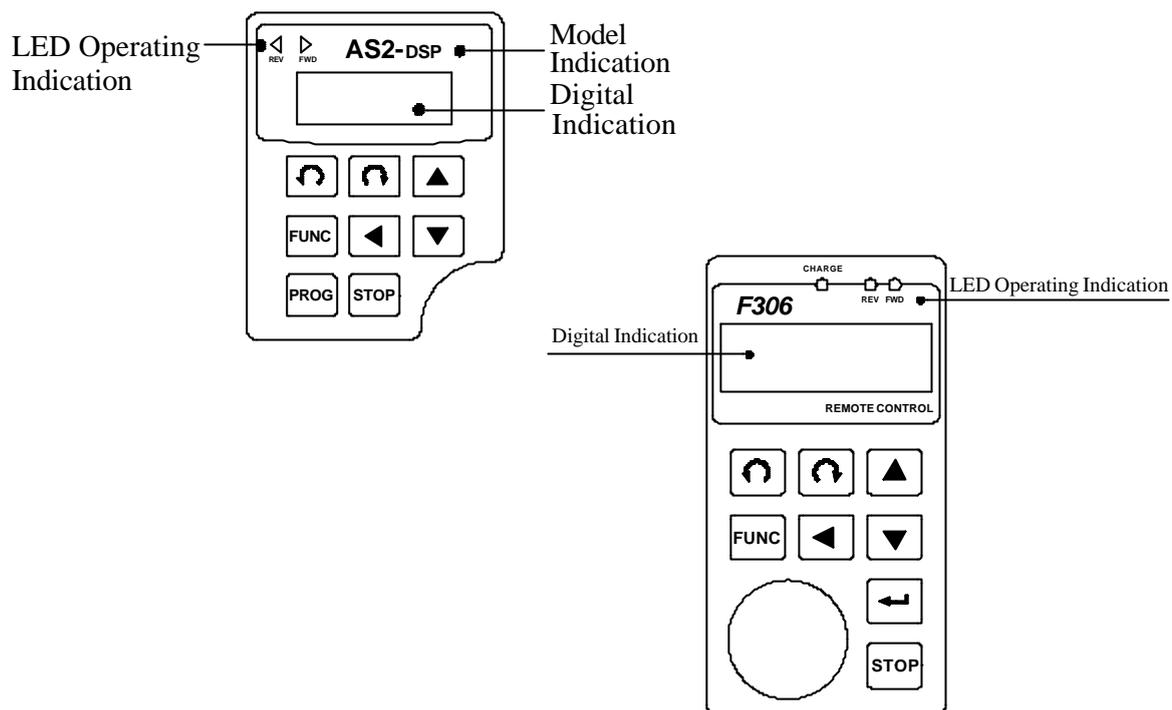
1. Separate the power cables of main circuit etc. from the control cables of the sequence and analog signals by passing the cables through the different ducts.
2. Use twisted pair shielded wire for control signal and connect the shield to earth terminal at one end, COMMON terminal of control board. Leave the other end of shielding open.
3. Avoid common Ground leads between high and low level voltage equipment.

##### C. Grounding

1. Be sure ground both the inverter and motor.
2. Keep grounded leads as short as possible.
3. Shield cables used to protect low-level signal leads should grounded at one end point.
4. Provide class 3 grounding (100  $\Omega$  or less) for a terminal.
5. When grounding several inverters, make connections as shown below, no loop is produced as shown in FIG "a", FIG "b".



## 6. DIGITAL OPERATION PANEL



Operation key		Key function	Description
	FWD RUN	Forward run	Commands forward run
	REV RUN	Reverse run	Commands reverse run
	SHIFT	Cursor movement	Select the digit
	DOWN	Down	Decrease the parameter value
	UP	Up	Increase the parameter value
	PROG	Memory storage	Saves the setting vaule
	FUNC	Function	Press once to select function CDxx and press again to change its content
	STOP	Stop	Stop operation / Escape to standby mode

## 7. FUNCTIONS DESCRIPTION

DISPLAY CODE	FUNCTION	DEFAULT VALUE
CD00	First speed setting	60.00HZ
		50.00HZ
CD01	Parameter lock	0
CD02	Acceleration time 1	10.0Sec
CD03	Deceleration time 1	10.0Sec
CD04	Jogging frequency	5.00HZ
CD05	Start frequency	0.50HZ
CD06	Jog mode	0
CD07	Analog output gain	120.00HZ
		100.00HZ
CD08	CW or CCW or CW / CCW	0
CD09	Reserved	
CD10	Analog / digital frequency input	1
CD11	Dynamic brake / Free running	0
CD12	Terminal / Keypad command	0
		1
CD13	Source operation command	0
CD14	Maximum frequency limit	120.00HZ
		50.00HZ
CD15	Minimum frequency limit	0.00
CD16	Frequency display Scale	1.00
		30.00
CD17	1st Maximum voltage frequency	60.00HZ
		50.00HZ

ADJUST RANGE	UNIT	USER SETTING	REMARK
0.00 ~ 400.00HZ	0.01HZ		60HZ region
			50HZ region
0 or 1			0 = lock 1 = Unlock
0.1 ~ 6000.0Sec	0.1Sec		
0.1 ~ 6000.0Sec	0.1Sec		
0.00 ~ 400.00HZ	0.01HZ		
0.50~ 30.00HZ	0.01HZ		
0 or 1			0 = Normal 1 = Jog
30.00 ~ 400.00HZ	0.01HZ		60HZ region
			50HZ region
0 or 1 or 2			0 = CW/CCW 1 = CW 2 = CCW
0 or 1			0 = Digital 1 = Analog
0 or 1			0 = Dynamic brake 1 = Free running
0 or 1			60HZ region : Keypad
			50HZ region : Terminal
0 ~ 2			0 = Normal 1 = F306 2 = RS485 communication
0.50 ~ 400.00HZ	0.01HZ		60HZ region
			50HZ region
0.00 ~ 400.00HZ	0.01HZ		
0.01 ~ 500.00	0.01		60HZ region
			50HZ region
25.00 ~ 400.00HZ	0.01HZ		60HZ region
			50HZ region

<b>DISPLAY CODE</b>	<b>FUNCTION</b>	<b>DEFAULT VALUE</b>
<b>CD18</b>	<b>V/F pattern setting</b>	<b>0</b>
<b>CD19</b>	<b>DC braking time</b>	<b>1.0Sec</b>
<b>CD20</b>	<b>DC braking power</b>	<b>10</b>
<b>CD21</b>	<b>Torque boost</b>	<b>0.0%</b>
<b>CD22</b>	<b>Second speed setting</b>	<b>20.00HZ</b>
<b>CD23</b>	<b>Third speed setting</b>	<b>30.00HZ</b>
<b>CD24</b>	<b>Fourth speed setting</b>	<b>40.00HZ</b>
<b>CD25</b>	<b>Acceleration time 2</b>	<b>10.0Sec</b>
<b>CD26</b>	<b>Deceleration time 2</b>	<b>10.0Sec</b>
<b>CD27</b>	<b>Carrier frequency</b>	<b>16.0K</b>
<b>CD28</b>	<b>Output voltage gain</b>	<b>100.0%</b>
<b>CD29</b>	<b>Frequency jump 1</b>	<b>0.00</b>
<b>CD30</b>	<b>Frequency jump 2</b>	<b>0.00</b>
<b>CD31</b>	<b>Frequency jump 3</b>	<b>0.00</b>
<b>CD32</b>	<b>Jump range</b>	<b>0.50HZ</b>
<b>CD33</b>	<b>Frequency reference bias</b>	<b>0.00</b>
<b>CD34</b>	<b>Frequency reference bias direction</b>	<b>0</b>
<b>CD35</b>	<b>Frequency gain</b>	<b>100.0%</b>
<b>CD36</b>	<b>The latest errors record</b>	<b>NONE</b>
<b>CD37</b>	<b>Errors record 1</b>	<b>NONE</b>
<b>CD38</b>	<b>Errors record 2</b>	<b>NONE</b>

ADJUST RANGE	UNIT	USER SETTING	REMARK
0 ~ 2			0 : Constant torque 1 : (Frequency) 2.0 2 : (Frequency) 3.0
0.0 ~ 25.0Sec	0.1Sec		
0 ~ 250	1		
0.0 ~ 25.0%	0.1%		
0.00 ~ 400.00HZ	0.01HZ		
0.00 ~ 400.00HZ	0.01HZ		
0.00 ~ 400.00HZ	0.01HZ		
0.1 ~ 6000.0Sec	0.1Sec		
0.1 ~ 6000.0Sec	0.1Sec		
1.0K ~ 16.0K	0.1K		
50.0 ~ 100.0 %	0.1%		
0.00 ~ 400.00HZ	0.01HZ		
0.00 ~ 400.00HZ	0.01HZ		
0.00 ~ 400.00HZ	0.01HZ		
0.50 ~ 3.00HZ	0.01HZ		
0.00 ~ 400.00HZ	0.01HZ		
0 or 1			0 = Positive 1 = Negative
40.0 ~ 200.0%	0.1%		

<b>DISPLAY CODE</b>	<b>FUNCTION</b>	<b>DEFAULT VALUE</b>
<b>CD39</b>	<b>Errors record 3</b>	<b>NONE</b>
<b>CD40</b>	<b>Clear errors record</b>	<b>0</b>
<b>CD41</b>	<b>HZ / RPM / AMP Display</b>	<b>0</b>
<b>CD42</b>	<b>FT1 Multi-Function Terminal 1</b>	<b>0</b>
<b>CD43</b>	<b>FT2 Multi-Function Terminal 2</b>	<b>0</b>
<b>CD44</b>	<b>FA1 Free Analog Terminal 1</b>	<b>0</b>
<b>CD45</b>	<b>FA2 Free Analog Terminal 2</b>	<b>0</b>
<b>CD46</b>	<b>Reserved</b>	
<b>CD47</b>	<b>5th speed setting</b>	<b>25.00HZ</b>
<b>CD48</b>	<b>6th speed setting</b>	<b>35.00HZ</b>
<b>CD49</b>	<b>7th speed setting</b>	<b>45.00HZ</b>
<b>CD50</b>	<b>8th speed setting</b>	<b>55.00HZ</b>
<b>CD51</b>	<b>Dynamic Braking Energy Limit</b>	<b>100</b>
<b>CD52</b>	<b>Version selector</b>	<b>F60.0</b>
<b>CD53</b>	<b>S curve</b>	<b>0</b>
<b>CD54</b>	<b>4 ~ 20mA speed command</b>	<b>0</b>
<b>CD55</b>	<b>Frequency arrive signal range</b>	<b>10.0%</b>
<b>CD56</b>	<b>2nd Maximum voltage frequency</b>	<b>60.00HZ</b>
<b>CD57</b>	<b>Reserved</b>	
<b>CD58</b>	<b>Auto running mode</b>	<b>0</b>
<b>CD59</b>	<b>1st step timer</b>	<b>0.01</b>
<b>CD60</b>	<b>2st step timer</b>	<b>0.00</b>

ADJUST RANGE	UNIT	USER SETTING	REMARK
0 or 1			1 = Clear
0 or 1 or 2			0 = HZ Display 1 = RPM Display 2 = Current Display
0 ~ 15			
0 ~ 15			
0 ~ 15			
0 ~ 15			
0.00 ~ 400.00HZ	0.01 HZ		
0.00 ~ 400.00HZ	0.01 HZ		
0.00 ~ 400.00HZ	0.01 HZ		
0.00 ~ 400.00HZ	0.01 HZ		
0 ~ 300%	1%		0 = Auto turning
F60.0/F50.0			60HZ region
			50HZ region
0 ~ 10			
0 ~ 3			
0.0 ~ 100.0%	0.1 %		
25.00 ~ 400.00HZ	0.01HZ		
0 ~ 6			
0 ~ 15Hr	hr.min		
0 ~ 15Hr	hr.min		

<b>DISPLAY CODE</b>	<b>FUNCTION</b>	<b>DEFAULT VALUE</b>
<b>CD61</b>	<b>3st step timer</b>	<b>0.00</b>
<b>CD62</b>	<b>4st step timer</b>	<b>0.00</b>
<b>CD63</b>	<b>5st step timer</b>	<b>0.00</b>
<b>CD64</b>	<b>Timer unit selector</b>	<b>0</b>
<b>CD65</b>	<b>Stall prevention</b>	<b>0</b>
<b>CD66</b>	<b>Overload current stall prevention</b>	<b>170.0%</b>
<b>CD67</b>	<b>Overload detect</b>	<b>0</b>
<b>CD68</b>	<b>Overload setting</b>	<b>150.0%</b>
<b>CD69</b>	<b>Overload time setting</b>	<b>60.0Sec</b>
<b>CD70</b>	<b>2nd stage overload time setting</b>	<b>20.0Sec</b>
<b>CD71</b>	<b>Reserved</b>	
<b>CD72</b>	<b>Communication loss time</b>	<b>0.5Sec</b>
<b>CD73</b>	<b>Communication error counter</b>	<b>3</b>
<b>CD74</b>	<b>Address setting</b>	<b>1</b>
<b>CD75</b>	<b>Transmission speed</b>	<b>0</b>
<b>CD76</b>	<b>Transmission fault treatment</b>	<b>3</b>
<b>CD77</b>	<b>Reserved</b>	
<b>CD78</b>	<b>Communicator protocol</b>	<b>0</b>
<b>CD79~ CD99</b>	<b>Reserved</b>	

To change version see description of CD52.

This function provides different standard setting values for 50/60HZ power region.

F50.0 : 50HZ power region.

F60.0 : 60HZ power region.

CD13 after finished parameter setting, please repower "ON".

<b>ADJUST RANGE</b>	<b>UNIT</b>	<b>USER SETTING</b>	<b>REMARK</b>
<b>0 ~ 15Hr</b>	<b>hr.min</b>		
<b>0 ~ 15Hr</b>	<b>hr.min</b>		
<b>0 ~ 15Hr</b>	<b>hr.min</b>		
<b>0 or 1</b>			
<b>0 ~ 1</b>			<b>0=Disable 1=Enable</b>
<b>20 ~ 250%</b>	<b>%</b>		
<b>0 ~ 2</b>			
<b>20.0 ~ 200.0%</b>	<b>0.1%</b>		
<b>0.0 ~ 60.0Sec</b>	<b>0.1Sec</b>		
<b>0.0 ~ 120.0Sec</b>	<b>0.1Sec</b>		
<b>0.1 ~ 100.0Sec</b>	<b>Sec</b>		
<b>0 ~ 10</b>			
<b>1 ~ 255</b>			
<b>0 ~ 3</b>			
<b>0 ~ 3</b>			
<b>0 ~ 7</b>			

## Communication address description

<b>CODE</b>	<b>FUNCTION</b>	<b>DEFAULT VALUE</b>
<b>100</b>	<b>Speed command for RS485</b>	<b>3</b>
<b>101</b>	<b>Frequency data output for RS485</b>	
<b>102</b>	<b>Current data output for RS485</b>	
<b>103</b>	<b>Fault code for RS485</b>	

ADJUST RANGE	UNIT	USER SETTING	REMARK
0 ~ 4			
	0.01HZ		
	0.1A		

## 7-1. Function setting

Before starting test run, check carefully the following points :

- (1) Be sure to connect the power supply to L1, L2, L3 (input terminals) and the motor to U.V.W. (output terminals). (Wrong connections will damage the inverter.)
- (2) Check that the input power supply coincide with input voltage and input phase of the inverter.
- (3) Check the signal lines for wrong wiring.
- (4) Be sure to ground an earth terminal for personnel safety.
- (5) Check that other terminals than earth terminal are not grounded.
- (6) Check that the inverter is mounted on the wall on non-flammable material.
- (7) For operation start and stop, use    and FWD / REV terminals. Never use input power supply to switch ON/OFF.

## Operating

### 1-1. Pannel

Action : (a) Press   for forward / reverse operation.

Speed : (a) Using   to change motor speed with 1HZ increment step. or  to select the digit for quick setting and confirm by 

Standby : (a) Press  back to standby mode after trip or function setting mode.

### 1-2. F306

Set CD13=1 and repower "ON", operation same as 1-1 panel.

### 1-3. RS485 communication control

Set CD13=2 and set CD74~CD78. (Refer to CD74~CD78).

Using 06H function write command to address 100(64H).

1 : CW, 2 : CCW, 3 : Stop, 4 : Clear fault.

### 1-4. Terminal control

Set CD12=1, writing refer to control circuit terminal wiring digaram.

<b>First speed setting</b>
<b>CD00</b>

<b>Setting Range</b>	<b>0.00 ~ 400.00HZ</b>
<b>60HZ region</b>	<b>60.00HZ</b>
<b>50HZ region</b>	<b>50.00HZ</b>

Press   key for increase or decrease the speed.

Press  key to select the digit for quick setting.

Press  to save the setting value.

<b>Parameter lock</b>
<b>CD01</b>

<b>Setting Range</b>	<b>0 or 1</b>
<b>Default Value</b>	<b>0</b>

0 : Lock 1 : Unlock

Function to prevent inadequate setting.

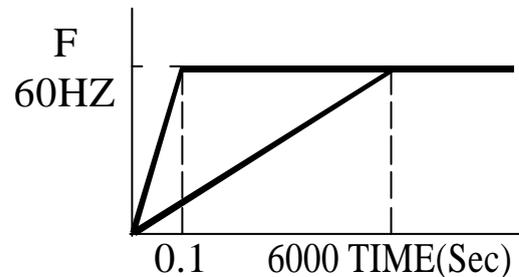
To change the contents of CD, set CD01=1 and press  first.

To lock the data set CD01=0 and press  .

<b>Acceleration time 1</b>
<b>CD02</b>

<b>Setting Range</b>	<b>0.1 ~ 6000.0Sec</b>
<b>Default Value</b>	<b>10.0Sec</b>

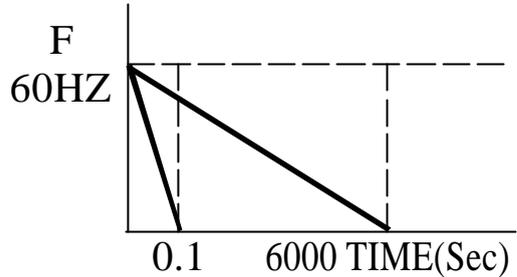
CD02 value corresponds to the time of acceleration from 0 to 50/60HZ. (For 120HZ. setting, the arrival time to 120HZ is double.)



<b>Deceleration time 1</b>
<b>CD03</b>

<b>Setting Range</b>	<b>0.1 ~ 6000.0Sec</b>
<b>Default Value</b>	<b>10.0Sec</b>

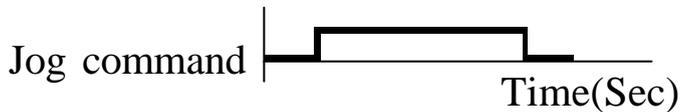
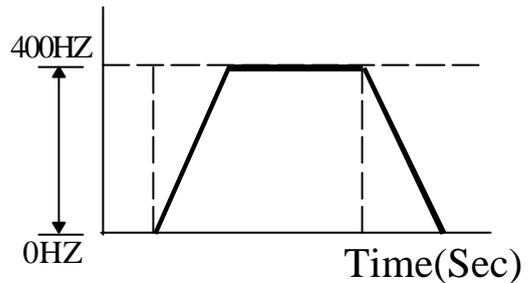
CD03 value corresponds to the time of deceleration from 50/60HZ to 0.



<b>Jogging frequency</b>
<b>CD04</b>

<b>Setting Range</b>	<b>0.00 ~ 400.00HZ</b>
<b>Default Value</b>	<b>5.00HZ</b>

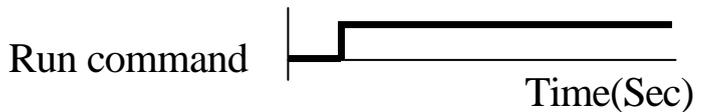
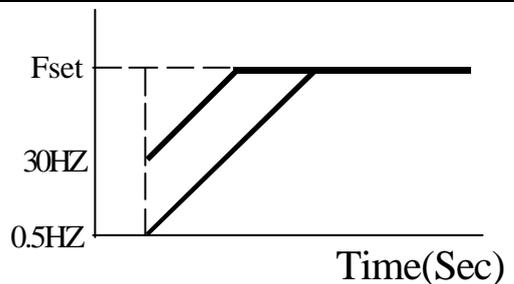
Use terminal control refer to CD12 and CD42 setting, keyboard control refer to CD06.



<b>Start frequency</b>
<b>CD05</b>

<b>Setting Range</b>	<b>0.50 ~ 30.00HZ</b>
<b>Default Value</b>	<b>0.50HZ</b>

When setting this value, pay attention to the starting current.



<b>Jog mode</b>
<b>CD06</b>

<b>Setting Range</b>	<b>0 or 1</b>
<b>Default Value</b>	<b>0</b>

0 : Normal      1 : Jog Mode

1. Set jogging operation from key panel  &  .
2.   LED blinking in JOG mode.

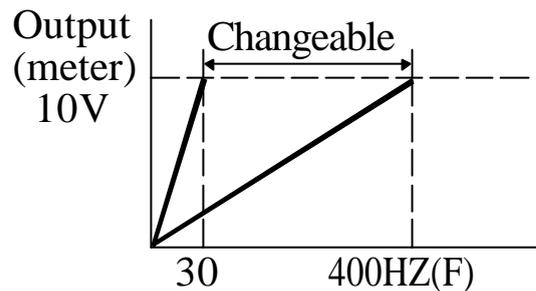
Note : Refer to CD12&CD42 for using jog mode by terminal control.

<b>Analog output gain</b>
<b>CD07</b>

<b>Setting Range</b>	<b>30.00 ~ 400.00HZ</b>
<b>60HZ region</b>	<b>120.00HZ</b>
<b>50HZ region</b>	<b>100.00HZ</b>

The specification of the output meter is 10V(i.e. 1mA) full scale rating .

Set by CD07 the value will be correspond to maximum correspond of MET terminal output meter.



<b>CW or CCW or CW/CCW</b>
<b>CD08</b>

<b>Setting Range</b>	<b>0 ~ 2</b>
<b>Default Value</b>	<b>0</b>

0 : CW/CCW operation

1 : CW only

2 : CCW only

If inadequate operation, the “OPE2“ warning message will be indicated.

<b>Analog / Digital frequency input</b>
<b>CD10</b>

<b>Setting Range</b>	<b>0 or 1</b>
<b>Default Value</b>	<b>1</b>

0 : Operation frequency change by using  or  key and confirm by  .

1 : Operation frequency depends on the angle of the knob.

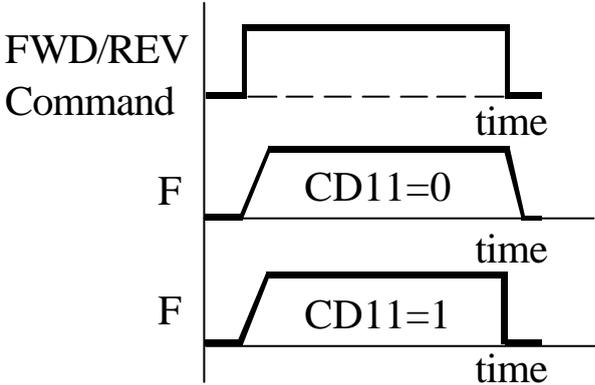
Note : Using   key to change motor speed when CD01=1, the “OPE3“ warning message will be indicated.

<b>Dynamic brake / Free running</b>
<b>CD11</b>

<b>Setting Range</b>	<b>0 or 1</b>
<b>Default Value</b>	<b>0</b>

0 : Activates dynamic brake function when deceleration.

1 : Output cut off when accept a stop command to be free running.



<b>Terminal / Keypad command</b>
<b>CD12</b>

<b>Setting Range</b>	<b>0 or 1</b>
<b>60HZ region</b>	<b>0</b>
<b>50HZ region</b>	<b>1</b>

0 : RUN/STOP Command from operation panel.

1 : RUN/STOP Command from control terminal.

Note : If inadequate operation, the “OPE4“ warning message will be indicated.

<b>Source operation command</b>
<b>CD13</b>

<b>Setting Range</b>	<b>0 ~ 2</b>
<b>Default Value</b>	<b>0</b>

0 : Normal

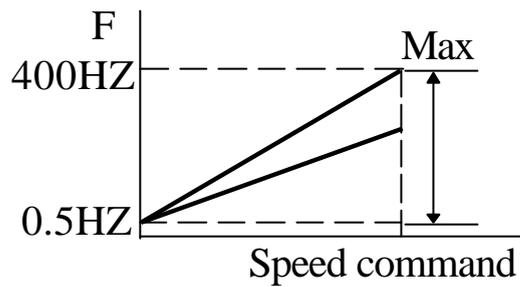
1 : F306

2 : RS485 communication

Note : After finished this parameter setting, please repower "ON".

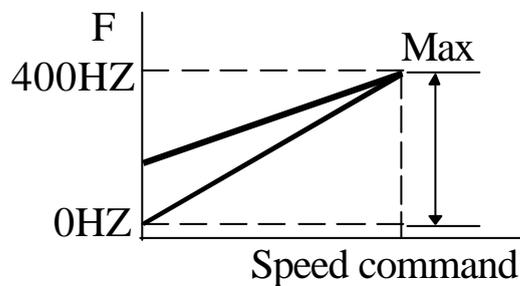
<b>Maximum frequency limit</b>
<b>CD14</b>

<b>Setting Range</b>	<b>0.50 ~ 400.00HZ</b>
<b>60HZ region</b>	<b>120.00HZ</b>
<b>50HZ region</b>	<b>50.00HZ</b>



<b>Minimum frequency limit</b>
<b>CD15</b>

<b>Setting Range</b>	<b>0.00 ~ 400.00HZ</b>
<b>Default Value</b>	<b>0.00HZ</b>



<b>Frequency display scale</b>
<b>CD16</b>

<b>Setting Range</b>	<b>0.01 ~ 500.00</b>
<b>60HZ region</b>	<b>1.00</b>
<b>50HZ region</b>	<b>30.00</b>

Use the following equation to calculate the mechanical shaft speed in rpm.

$$\text{RPM} = \text{HZ} \times \text{Scale setting}$$

When RPM > 9999 display **— — E —** for over range warning in this condition.

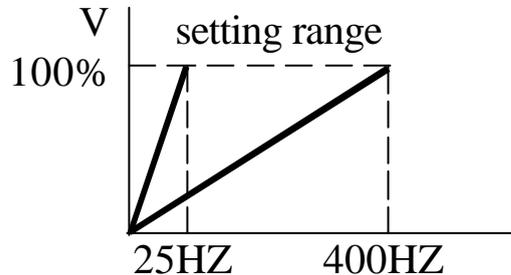
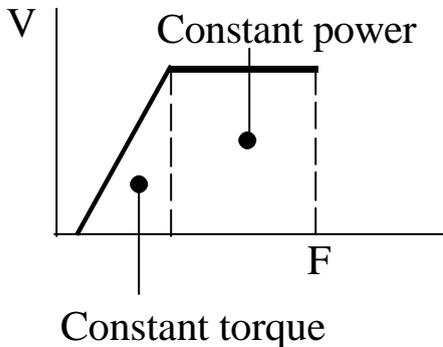
Setting CD41=1 for display shown RPM.

Pole	Synchronous speed		Scale setting
	50HZ	60HZ	
2	3000	3600	60
4	1500	1800	30
6	1000	1200	20
8	750	900	15
10	600	720	12
12	500	600	10

<b>1st Maximum voltage frequency</b>
<b>CD17</b>

<b>Setting Range</b>	<b>25.00 ~ 400.00HZ</b>
<b>60HZ region</b>	<b>60.00HZ</b>
<b>50HZ region</b>	<b>50.00HZ</b>

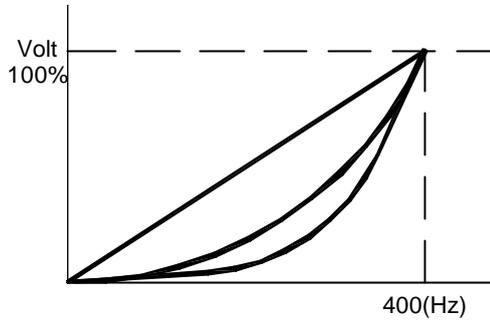
Use 2nd V/F to set CD42(43)=7 and terminal FT1(2) close. 2nd V/F setting is at CD56.



<b>V/F pattern setting</b>
<b>CD18</b>

<b>Setting Range</b>	<b>0 ~ 2</b>
<b>Default Value</b>	<b>0</b>

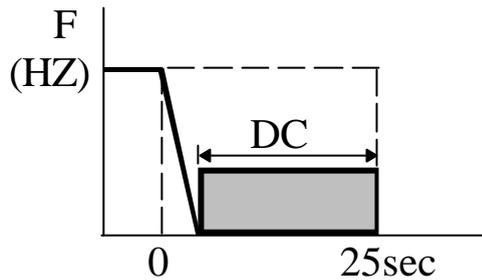
- 0 = Constant torque curve
- 1 = Reduce torque curve  $F^{2.0}$
- 2 = Reduce torque curve  $F^{3.0}$



<b>DC braking time</b>
<b>CD19</b>

<b>Setting Range</b>	<b>0.0 ~ 25.0Sec</b>
<b>Default Value</b>	<b>1.0Sec</b>

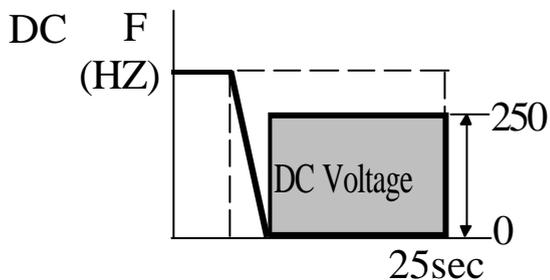
DC brake at frequency under 0.5HZ.



<b>DC braking power</b>
<b>CD20</b>

<b>Setting Range</b>	<b>0 ~ 250</b>
<b>Default Value</b>	<b>10</b>

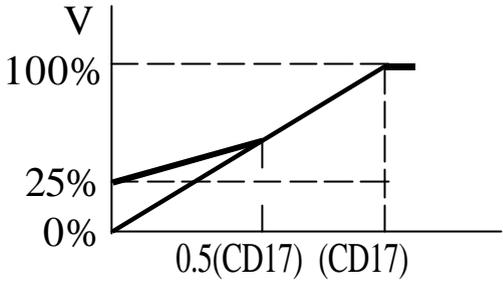
CD20 setting DC voltage gain various braking power.



<b>Torque boost</b>
<b>CD21</b>

<b>Setting Range</b>	<b>0.0 ~ 25.0%</b>
<b>Default Value</b>	<b>0.0%</b>

Torque boosting is used to compensate the torque lost due to stator resistance. Over boosting will cause over current and high acoustic noise.



<b>Second speed setting</b>
<b>CD22</b>

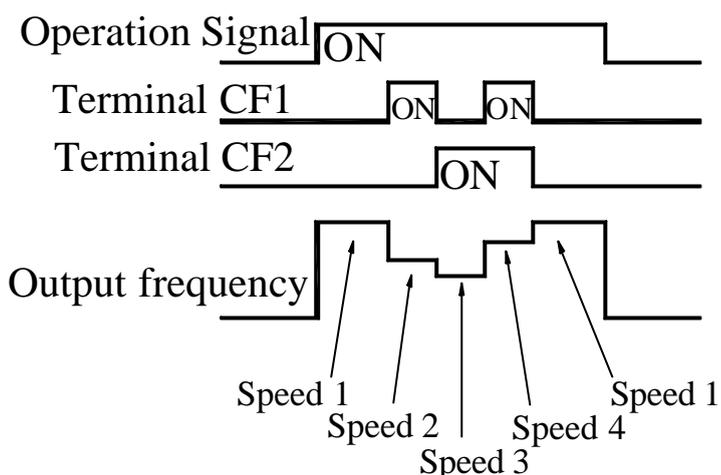
<b>Setting Range</b>	<b>0.00 ~ 400.00HZ</b>
<b>Default Value</b>	<b>20.00HZ</b>

<b>Third speed setting</b>
<b>CD23</b>

<b>Setting Range</b>	<b>0.00 ~ 400.00HZ</b>
<b>Default Value</b>	<b>30.00HZ</b>

<b>Fourth speed setting</b>
<b>CD24</b>

<b>Setting Range</b>	<b>0.00 ~ 400.00HZ</b>
<b>Default Value</b>	<b>40.00HZ</b>



Terminal order	CF1	CF2
SPEED		
SPEED - 1	OFF	OFF
SPEED - 2	ON	OFF
SPEED - 3	OFF	ON
SPEED - 4	ON	ON

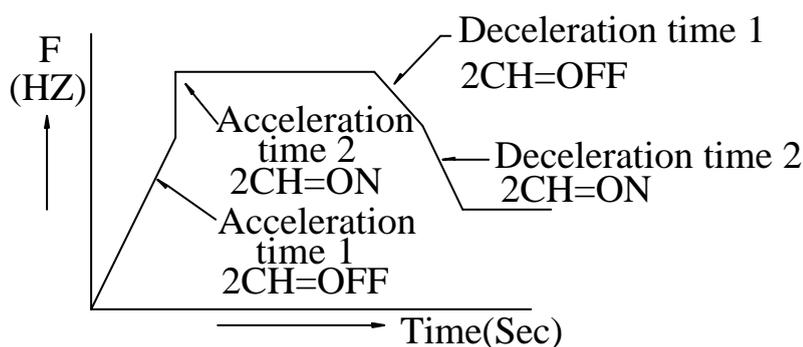
<b>Acceleration time 2</b>
<b>CD25</b>

<b>Setting Range</b>	<b>0.1 ~ 6000.0SEC</b>
<b>Default Value</b>	<b>10.0SEC</b>

CD42 or CD43 setting FT1 or FT2=3, then CD25 or CD26 can be set.

<b>Deceleration time 2</b>
<b>CD26</b>

<b>Setting Range</b>	<b>0.1 ~ 6000.0SEC</b>
<b>Default Value</b>	<b>10.0SEC</b>



Description	2CH
Acceleration time 1	OFF
Deceleration time 1	
Acceleration time 2	ON
Deceleration time 2	

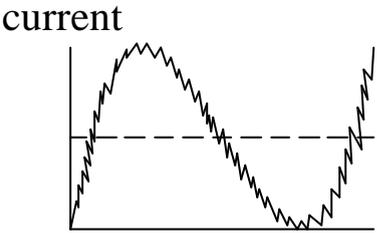
To operate inverter with 2CH function, check to see CD42 or CD43=3. 2CH command inputs from FT1 or FT2 terminal.

<b>Carrier frequency</b>
<b>CD27</b>

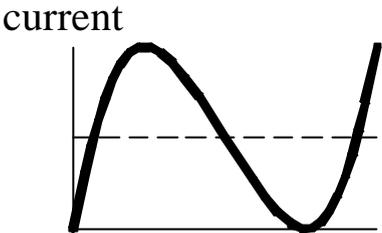
<b>Setting Range</b>	<b>1.0 ~ 16.0K</b>
<b>Default Value</b>	<b>16.0K</b>

Increase the carrier frequency would reduce motor noise but efficiency might be decreased.

Reduce the carrier frequency would increase noise and reduce motor current, and gain better efficiency.



Low carrier frequency



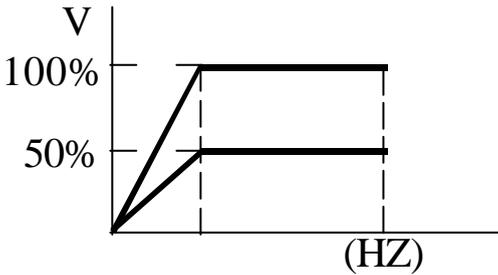
High carrier frequency

<b>Output voltage gain</b>
<b>CD28</b>

<b>Setting Range</b>	<b>50.0 ~ 100.0%</b>
<b>Default Value</b>	<b>100.0%</b>

Reduce output voltage for energy saving operation.

Setting CD44(45)=12 for FA1 (FA2) terminal control.



<b>Frequency jump 1</b>
<b>CD29</b>

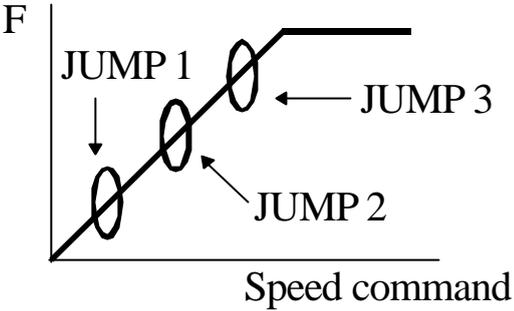
<b>Setting Range</b>	<b>0.00 ~ 400.00HZ</b>
<b>Default Value</b>	<b>0.00HZ</b>

<b>Frequency jump 2</b>
<b>CD30</b>

<b>Setting Range</b>	<b>0.00 ~ 400.00HZ</b>
<b>Default Value</b>	<b>0.00HZ</b>

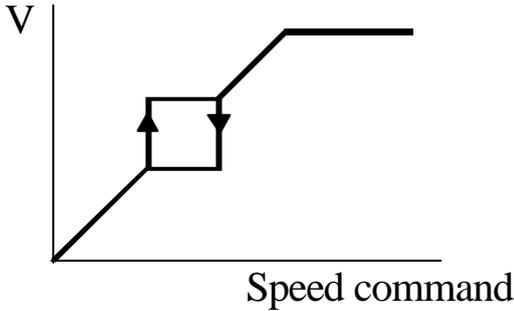
<b>Frequency jump 3</b>
<b>CD31</b>

<b>Setting Range</b>	<b>0.00 ~ 400.00HZ</b>
<b>Default Value</b>	<b>0.00HZ</b>



<b>Jump range</b>
<b>CD32</b>

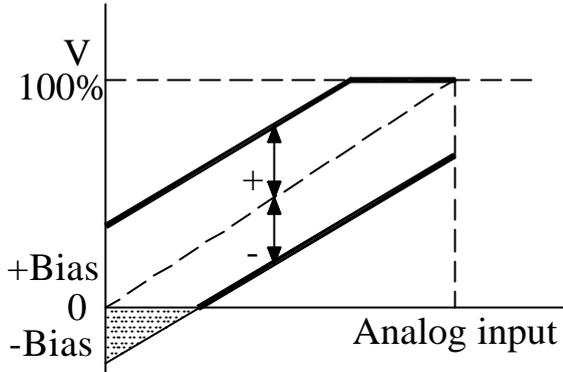
<b>Setting Range</b>	<b>0.50 ~ 3.00HZ</b>
<b>Default Value</b>	<b>0.50HZ</b>



<b>Frequency reference bias</b>
<b>CD33</b>

<b>Setting Range</b>	<b>0.00 ~ 400.00HZ</b>
<b>Default Value</b>	<b>0.00</b>

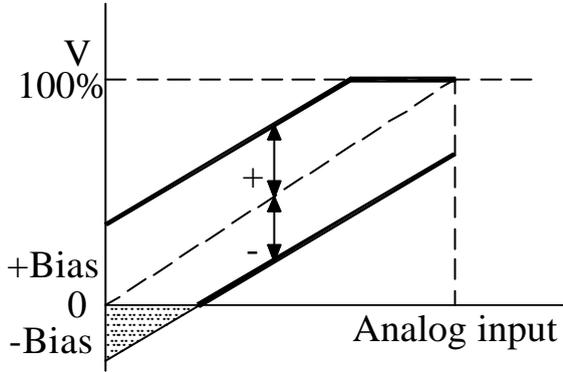
Move Frequency bias with same gradient.  
 Frequency in the range of “-” bias, motor is stop.



<b>Freq. ref. bias direction</b>
<b>CD34</b>

<b>Setting Range</b>	<b>0 or 1</b>
<b>Default Value</b>	<b>0</b>

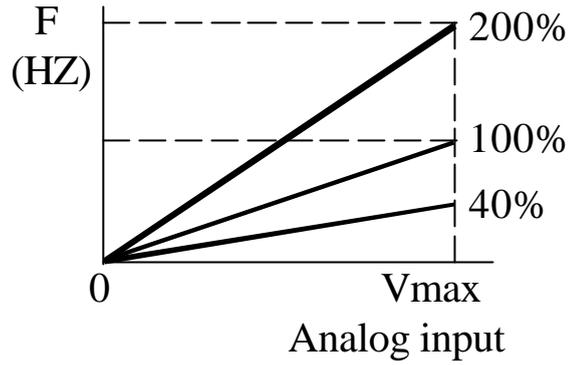
0 = Positive “+”  
 1 = Negative “-”  
 Polarity setting for (CD33) frequency reference bias.



<b>Frequency gain</b>
<b>CD35</b>

<b>Setting Range</b>	<b>40.0 ~ 200.0%</b>
<b>Default Value</b>	<b>100.0%</b>

FA1, FA2 analog input gain, refer to application example.



<b>The latest error record</b>
<b>CD36</b>

<b>Error record 1</b>
<b>CD37</b>

<b>Error record 2</b>
<b>CD38</b>

<b>Error record 3</b>
<b>CD39</b>

Errors record flow-chart when Error occur. The new content will shift the other contents to one higher CD code and the highest one will be dropped.



<b>Clear errors record</b>
<b>CD40</b>

<b>Setting Range</b>	<b>0 or 1</b>
<b>Default Value</b>	<b>0</b>

Set CD40=1 and  PROG clear CD36 ~ CD39 Error record, the contents in CD36 ~ CD39 are “ NONE “

<b>HZ / RPM / AMP Display</b>
<b>CD41</b>

<b>Setting Range</b>	<b>0 ~ 2</b>
<b>Default Value</b>	<b>0</b>

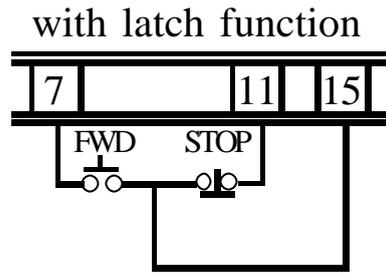
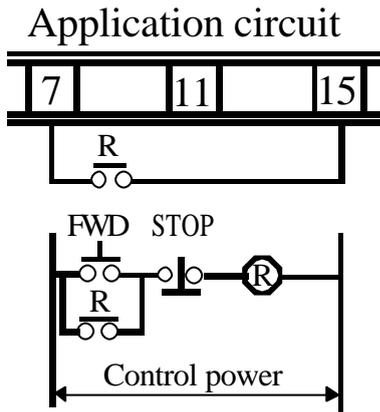
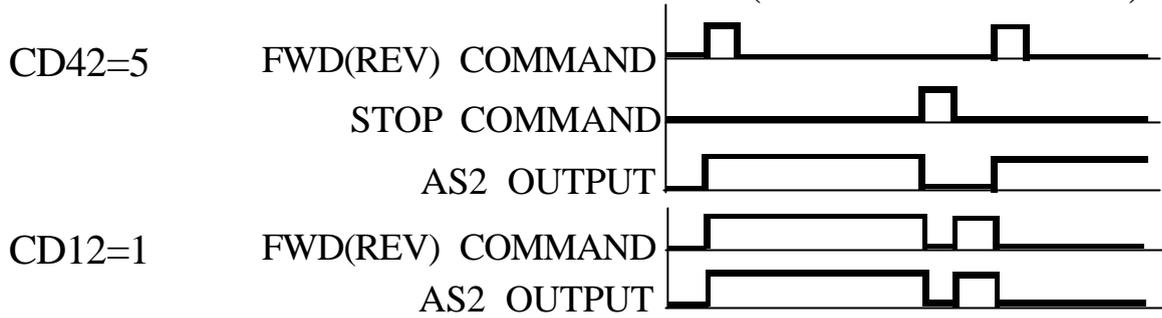
0 = HZ Display    1 = RPM Display    2 = Current Display  
Setting correct scale CD16 for R.P.M display shown.

<b>FT1 Multi-Function Terminal 1</b>
<b>CD42</b>

<b>Setting Range</b>	<b>0 ~ 15</b>
<b>Default Value</b>	<b>0</b>

FT1 FT2	Symbol	Function description
0	-----	-----
1	JOGF	Jog operation FWD command
2	JOGR	Jog operation REV command
3	2CH	ACC/DEC time 2 command
4	FRS	Free running command
5	3 - WIRE	3 - wire sequence mode
6	CF3	5 - 8 Speed Setting Terminal
7	VF2	2nd V/F curve setting (CD56)
8		Reserved
9	OH	External over temperature command
10~15		Reserved

### 3 - WIRE CIRCUIT CONNECTION DIAGRAM (terminal latch function)



Ⓜ and CONTROL POWER not necessary  
 Remark: STOP command entry from control terminal ⑪ FT1 or ⑫ FT2, and set CD42(FT1)=5 or CD43(FT2)=5 before operation.

<b>FT2 Multi-Function Terminal 2</b>
<b>CD43</b>

<b>Setting Range</b>	<b>0 ~ 15</b>
<b>Default Value</b>	<b>0</b>

Refer to CD42 description.

<b>Free analog terminal 1</b>
<b>CD44</b>

<b>Setting Range</b>	<b>0 ~ 15</b>
<b>Default Value</b>	<b>0</b>

Refer to CD45 table.

<b>Free analog terminal 2</b>
<b>CD45</b>

<b>Setting Range</b>	<b>0 ~ 15</b>
<b>Default Value</b>	<b>0</b>

<b>FA1 FA2</b>	<b>Function</b>	<b>Setting Range Min-----Max</b>
<b>0</b>	<b>-----</b>	<b>-----</b>
<b>1</b>	<b>Acceleration time 1</b>	<b>0 ~ CD02 Content</b>
<b>2</b>	<b>Deceleration time 1</b>	<b>0 ~ CD03 Content</b>
<b>3</b>	<b>Acceleration time 2</b>	<b>0 ~ CD25 Content</b>
<b>4</b>	<b>Deceleration time 2</b>	<b>0 ~ CD26 Content</b>
<b>5</b>	<b>Boost setting</b>	<b>0 ~ 25%</b>
<b>6</b>	<b>DC Brake time</b>	<b>0 ~ 25Sec</b>
<b>7</b>	<b>DC Brake Energy</b>	<b>0 ~ 250</b>
<b>8</b>	<b>Speed 2</b>	<b>F-min ~ CD22 Content</b>
<b>9</b>	<b>Speed 3</b>	<b>F-min ~ CD23 Content</b>
<b>10</b>	<b>Speed 4</b>	<b>F-min ~ CD24 Content</b>
<b>11</b>	<b>Fmax</b>	<b>F-min ~ CD14 Content</b>
<b>12</b>	<b>Output voltage gain</b>	<b>50% ~ 100%</b>
<b>13</b>	<b>Speed 1</b>	<b>F-min ~ CD00 Content</b>
<b>14</b>	<b>Reserved</b>	
<b>15</b>	<b>Reserved</b>	

<b>5th speed setting</b>
<b>CD47</b>

<b>6th speed setting</b>
<b>CD48</b>

<b>7th speed setting</b>
<b>CD49</b>

<b>8th speed setting</b>
<b>CD50</b>

<b>Dynamic braking energy limit</b>
<b>CD51</b>

SPEED	CF3	CF2	CF1
1th speed setting	OFF	OFF	OFF
2th speed setting	OFF	OFF	ON
3th speed setting	OFF	ON	OFF
4th speed setting	OFF	ON	ON
5th speed setting	ON	OFF	OFF
6th speed setting	ON	OFF	ON
7th speed setting	ON	ON	OFF
8th speed setting	ON	ON	ON

For example, set 8th speed as follows :

1. CD12=1 (Terminal function)
2. CD42 or CD43=6 (Function command)  
(FT1 or FT2 → CF3)

<b>Setting Range</b>	<b>0 ~ 300%</b>
<b>Default Value</b>	<b>100</b>

The higher the percentage, the more braking energy.

The lower the percentage, the lower braking energy.

Description of regenerative discharge braking active period.

0 : Auto-adjust

1 ~ 100% : Deceleration period

101 ~ 200% : Braking active period of  
(Decel/accel/constant frequency)

201 ~ 300% : Braking active period of  
(Decel/accel/constant frequency/stand-by)

Remark : No. 1,2,3 are different working situations, but their braking energy ranges are 1~100%.

<b>Version selector</b>
<b>CD52</b>

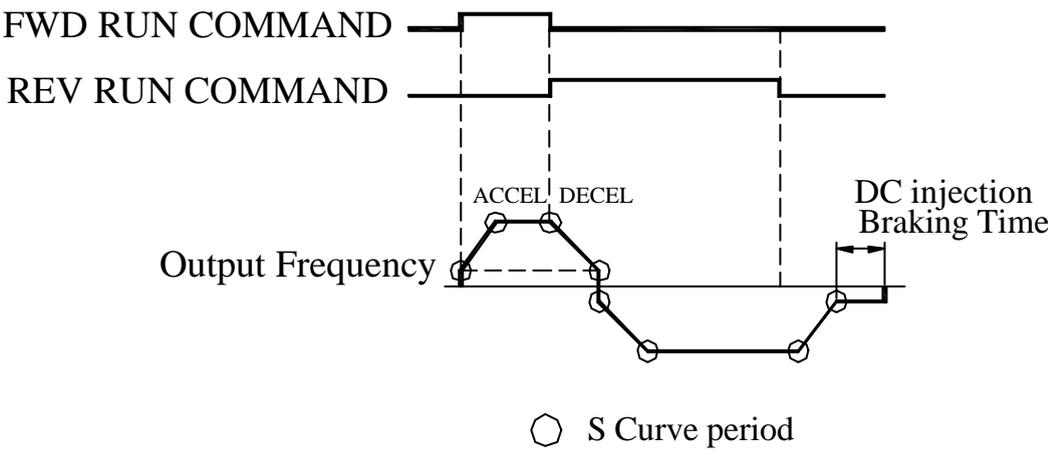
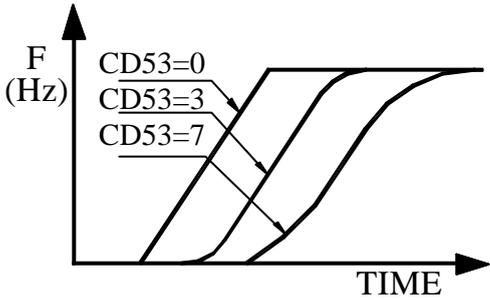
<b>Setting Range</b>	<b>F50.0 / F60.0</b>
<b>60HZ region</b>	<b>F60.0</b>
<b>50HZ region</b>	<b>F50.0</b>

Select function CD52, then use UP/Down key to select F50.0/F60.0 Version. Press **PROG** to save it. System will return to the factory setting and go into standby mode.

<b>S curve</b>
<b>CD53</b>

<b>Setting Range</b>	<b>0 ~ 10</b>
<b>Default Value</b>	<b>0</b>

Setting S curve non-Linear Accel/Decel Operation from 1 to 10. Setting 0 is normal operation without S curve.

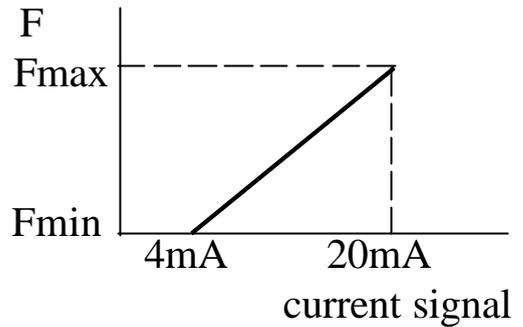


<b>4 ~ 20 mA speed command</b>
<b>CD54</b>

<b>Setting Range</b>	<b>0 ~ 3</b>
<b>Default Value</b>	<b>0</b>

Set FA1 (FA2) for current signal (4 ~ 20mA). This function only effects in CD44(CD45)=8,9,10,13

- 0 : NO current signal application
- 1 : Current signal in terminal FA1
- 2 : Current signal in terminal FA2
- 3 : FA1 & FA2 current signal terminal

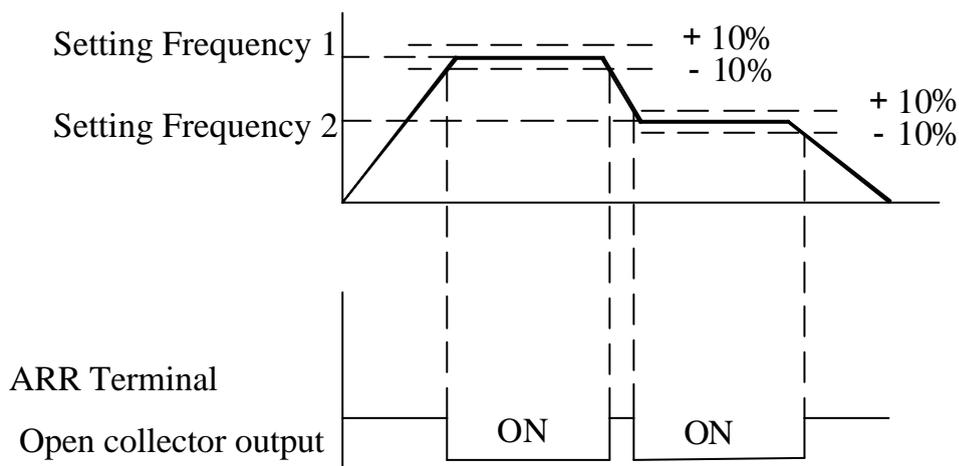


Note : Referent to FA1(FA2) terminal setting for 4-20mA signal.

<b>Frequency arrive signal range</b>
<b>CD55</b>

<b>Setting Range</b>	<b>0.0 ~ 100.0%</b>
<b>Default Value</b>	<b>10.0%</b>

- 1.Signal output at running F. setting  $F \cdot x(1 - CD55\%)$  for acceleration.
- 2.Signal output at running F. setting  $F \cdot x(1 + CD55\%)$  for deceleration.



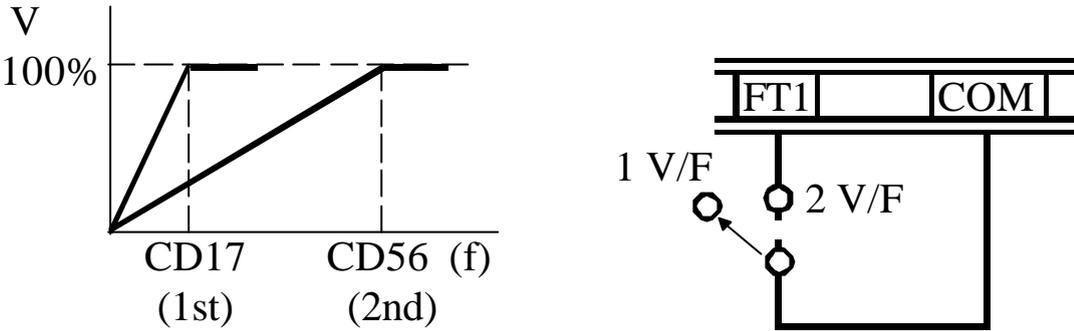
<b>2nd Maximum Voltage frequency</b>
<b>CD56</b>

<b>Setting Range</b>	<b>25.00 ~ 400.00HZ</b>
<b>Default Value</b>	<b>60.00HZ</b>

Set CD42(CD43)=7 define FT1(FT2) terminal for hardware V/F curve switcher.

Open : select the 1st V/F curve preset in CD17

Close : select the 2nd V/F curve preset in CD56



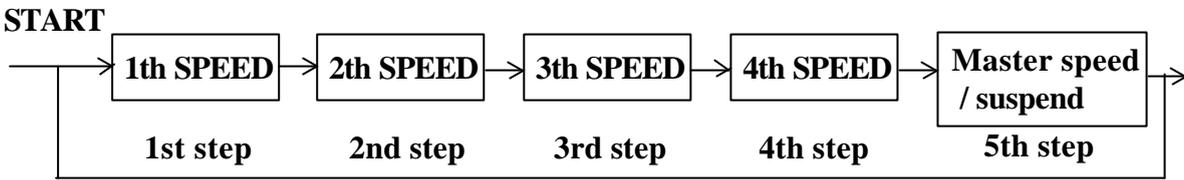
<b>Auto running mode</b>
<b>CD58</b>

<b>Setting Range</b>	<b>0 ~ 5</b>
<b>Default Value</b>	<b>0</b>

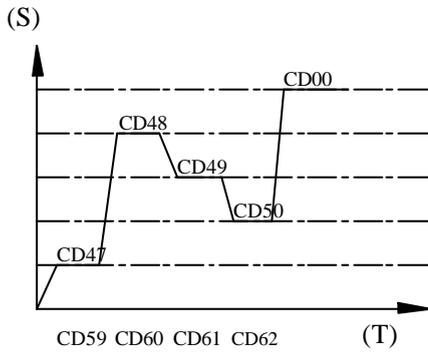
System can operate at digital panel control only when set at auto-running mode. CD10=1 and CD12=1 are inactive.

SPEED	1th	2th	3th	4th	Master /suspend	VALUE RANGE	UNIT
SPEED SETTING	CD47	CD48	CD49	CD50	CD00	0 ~ 400	Hz
TIMER SETTING	CD59	CD60	CD61	CD62	CD63	0 ~ 15.00	hr.min

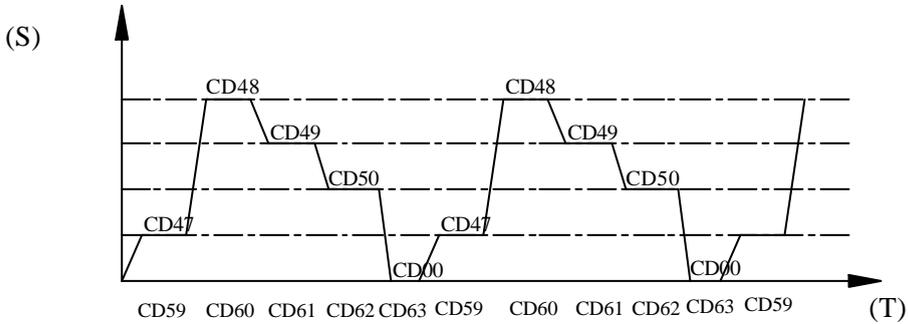
CD58	Auto running mode
0	Speed with timing control disable
1	Sequence running then constant speed running
2	Sequence running then stop and repeat from 1st step for cycling
3	Sequence running then stop and repeat from 1st step in reversed direction for cycling
4	Sequence running, and repeat for cycling
5	Sequence running then perform reverse direction and repeat for cycling
6	Sequence running then stop



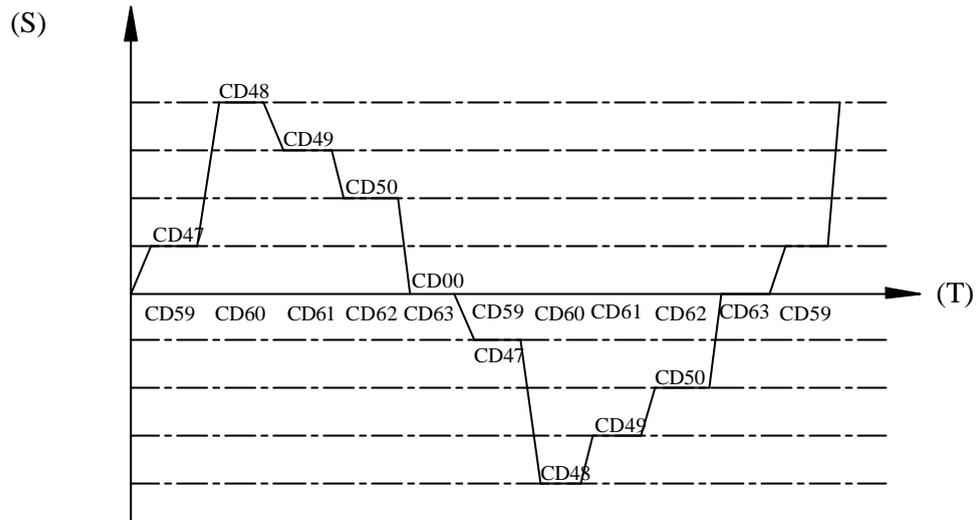
CD58=1



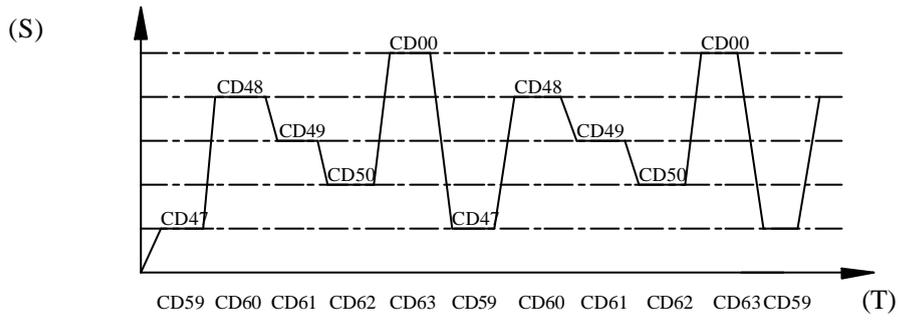
CD58=2



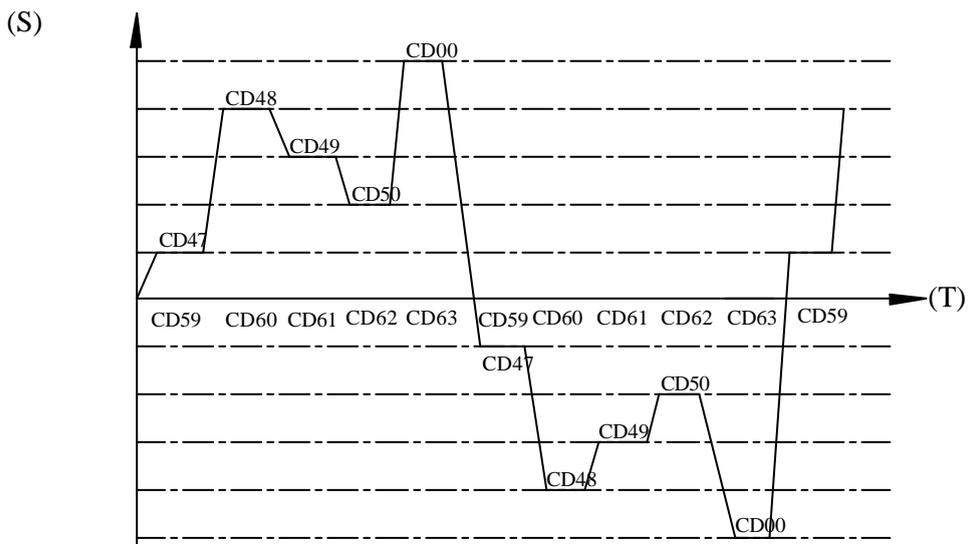
CD58=3



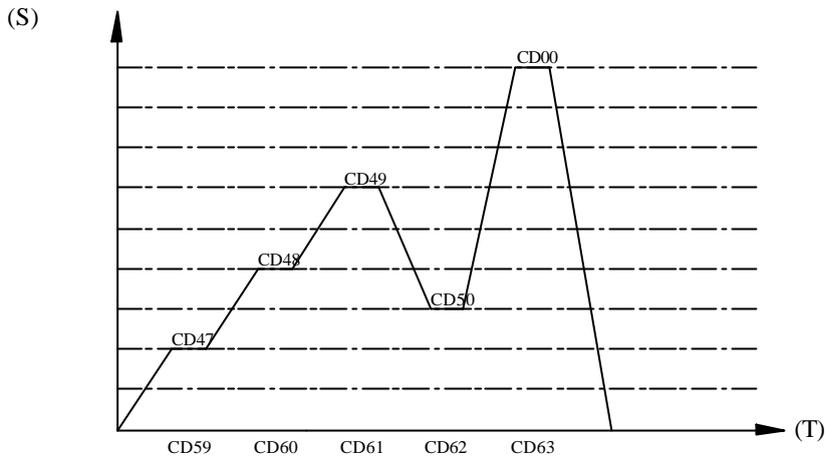
CD58=4



CD58=5



CD58=6



One time sequence running then stop.

<b>1st step timer</b>
<b>CD59</b>

<b>Setting Range</b>	<b>0 ~ 15Hr</b>
<b>Default Value</b>	<b>0.01Hr.min</b>

Setting running time for 1th speed.(CD47)

<b>2st step timer</b>
<b>CD60</b>

<b>Setting Range</b>	<b>0 ~ 15Hr</b>
<b>Default Value</b>	<b>0.00Hr.min</b>

Setting running time for 2th speed.(CD48)

<b>3st step timer</b>
<b>CD61</b>

<b>Setting Range</b>	<b>0 ~ 15Hr</b>
<b>Default Value</b>	<b>0.00Hr.min</b>

Setting running time for 3th speed.(CD49)

<b>4st step timer</b>
<b>CD62</b>

<b>Setting Range</b>	<b>0 ~ 15Hr</b>
<b>Default Value</b>	<b>0.00Hr.min</b>

Setting running time for 4th speed.(CD50)

<b>5st step timer</b>
<b>CD63</b>

<b>Setting Range</b>	<b>0 ~ 15Hr</b>
<b>Default Value</b>	<b>0.00Hr.min</b>

Setting running time for 1th speed.(CD00)

<b>Timer unit selector</b>
<b>CD64</b>

<b>Setting Range</b>	<b>0 ~ 1</b>
<b>Default Value</b>	<b>0</b>

0 : hr.min

1 : min.sec

Note 1 : CD64 cannot be reset to default value by CD52. Set CD64 as needs separately.

Note 2 : In RS485 communication input, CD59~CD63 need to transfer minimum unit. Ex CD64=0, CD59=2.3 CD59 constant for RS485 communication is  $2 \times 60 + 30 = 150(0096H)$

<b>Stall prevention</b>
<b>CD65</b>

<b>Setting Range</b>	<b>0 ~ 1</b>
<b>Default Value</b>	<b>0</b>

0 : Disable

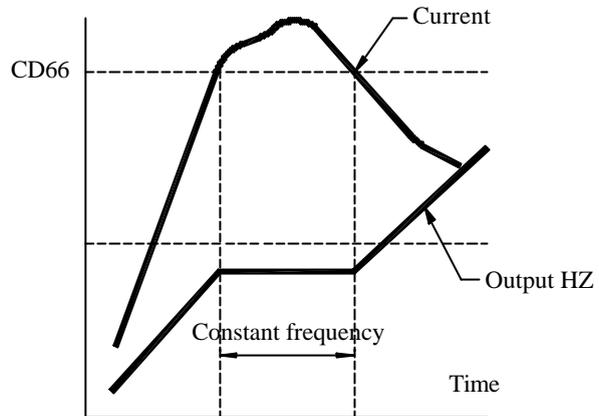
1 : Enable

When enable CD65, if any overload over CD66 setting value during ACC period, inverter will increase ACC time to prevent inverter to go into fail safe mode.

<b>Overload current stall prevention</b>
<b>CD66</b>

<b>Setting Range</b>	<b>20 ~ 250%</b>
<b>Default Value</b>	<b>170%</b>

During ACC, if ACC time is too short or load is too heavy, the current will reach CD66 value, inverter will stop to ACC until current is lower than CD66 value.



Actual stall current limit = rate current  $\times$  CD66 percentage.  
Rate current number refers to section 2 table.

<b>Overload detect</b>
<b>CD67</b>

<b>Setting Range</b>	<b>0 ~ 2</b>
<b>Default Value</b>	<b>0</b>

0 : Normal

1 : Overload detect and stop

Motor stops operation if load condition is reached CD68 and CD69 setting.

2 : Two stages overload detection and stop (CD68<100% only).

AC drive will limit output current at CD68 setting if load condition is reached CD68 and CD69 setting. And motor will stop operation if timing of limited output current is reached CD70 setting.

<b>Overload setting</b>
<b>CD68</b>

<b>Setting Range</b>	<b>20.0 ~ 200.0%</b>
<b>Default Value</b>	<b>150.0%</b>

Set overload level.

<b>Overload time setting</b>
<b>CD69</b>

<b>Setting Range</b>	<b>0.0 ~ 60.0Sec</b>
<b>Default Value</b>	<b>60.0Sec</b>

Set overload time.

<b>2nd stage overload time setting</b>
<b>CD70</b>

<b>Setting Range</b>	<b>0.0 ~ 120.0Sec</b>
<b>Default Value</b>	<b>20.0Sec</b>

Set 2nd stage overload time.

<b>Communication loss time</b>
<b>CD72</b>

<b>Setting Range</b>	<b>0.1 ~ 100.0Sec</b>
<b>Default Value</b>	<b>0.5Sec</b>

Set communication loss time. When communication loss time over CD72 setting, Inverter will active as CD76 selected.

Note : This function does not effect in standby condition.

<b>Communication error counter</b>
<b>CD73</b>

<b>Setting Range</b>	<b>0 ~ 10</b>
<b>Default Value</b>	<b>3</b>

When communication error continuous time more than CD73 setting. Inverter will active as CD76 selected.

<b>Address setting</b>
<b>CD74</b>

<b>Setting Range</b>	<b>1 ~ 255</b>
<b>Default Value</b>	<b>1</b>

Each drive must have unique identified address if they are controlled by RS485 communication. Each address cannot be duplicated.

0 : broadcast to all inverter.

<b>Transmission speed</b>
<b>CD75</b>

<b>Setting Range</b>	<b>0 ~ 3</b>
<b>Default Value</b>	<b>0</b>

Setting the transmission speed between computer and drive.

0 : 2400 bits/second.

1 : 4800 bits/second.

2 : 9600 bits/second.

3 : 19200 bits/second.

<b>Transmission fault treatment</b>
<b>CD76</b>

<b>Setting Range</b>	<b>0 ~ 3</b>
<b>Default Value</b>	<b>0</b>

0 : Alarm and keep operation.

1 : Alarm and decelerate to stop.

2 : Alarm and free to stop.

3 : No alarm and keep operation.

Use panel  or write address 100=4 to clear the transmission fault.

Note : Warning means Fault Relay active.

<b>Communicator protocol</b>
<b>CD78</b>

<b>Setting Range</b>	<b>0 ~ 7</b>
<b>Default Value</b>	<b>0</b>

#### A. Date format

0 : 8,N,1 RTU (1 start bit+8 data bits+1 stop bit)

8,N,1 RTU (10-bit)(character frame in hexadecimal)

Start bit	0	1	2	3	4	5	6	7	Stop bit
--------------	---	---	---	---	---	---	---	---	-------------

1 : 8,N,2 RTU (1 start bit+8 data bits+2 stop bit)

8,N,2 RTU (11-bit)(character frame in hexadecimal)

Start bit	0	1	2	3	4	5	6	7	Stop bit	Stop bit
--------------	---	---	---	---	---	---	---	---	-------------	-------------

2 : 8,E,1 RTU (1 start bit+8data bits+1 Even bit+1 stop bit)

8,E,1 RTU (11-bit)(character frame in hexadecimal)

Start bit	0	1	2	3	4	5	6	7	Even Parity	Stop bit
--------------	---	---	---	---	---	---	---	---	----------------	-------------

3 : 8,O,1 RTU (1 start bit+8data bits+1 Odd bit+1 stop bit)

8,O,1 RTU (11-bit)(character frame in hexadecimal)

Start bit	0	1	2	3	4	5	6	7	Odd Parity	Stop bit
--------------	---	---	---	---	---	---	---	---	---------------	-------------

4 : 8,N,1 ASCII (1 start bit+8data bits+1 stop bit)

8,N,1 ASCII (10-bit)(character frame in hexadecimal)

Start bit	0	1	2	3	4	5	6	7	Stop bit
--------------	---	---	---	---	---	---	---	---	-------------

5 : 8,N,2 ASCII (1 start bit+8data bits+2 stop bit)

8,N,2 ASCII (11-bit)(character frame in hexadecimal)

Start bit	0	1	2	3	4	5	6	7	Stop bit	Stop bit
-----------	---	---	---	---	---	---	---	---	----------	----------

6 : 8,E,1 ASCII (1 start bit+8data bits+1 Even bit+1 stop bit)

8,E,1 ASCII (11-bit)(character frame in hexadecimal)

Start bit	0	1	2	3	4	5	6	7	Even Parity	Stop bit
-----------	---	---	---	---	---	---	---	---	-------------	----------

7 : 8,O,1 ASCII (1 start bit+8data bits+1 Odd bit+1 stop bit)

8,O,1 ASCII (11-bit)(character frame in hexadecimal)

Start bit	0	1	2	3	4	5	6	7	Odd Parity	Stop bit
-----------	---	---	---	---	---	---	---	---	------------	----------

## B. Communication protocol

Data contents are in hexadecimal with positive and negative format.

### 1. RTU

Start	A silent interval of more than 10ms
Address	8-bit address
Function	8-bit command
Data (n-1)	Contents of data : n*8-bit data, n ≤ 30
...	
Data 0	
CRC CHK Low	Check sum (CRCL)
CRC CHK High	Check sum (CRCH)
End	A silent interval of more than 10ms

### 2. ASCII

STX	Start character=' : ' (3AH)
Address Hi	Communication address : 8-bit address consists of 2 ASCII codes.
Address Lo	
Function Hi	Command code : 8-bit command consists of 2 ASCII codes.
Function Lo	
Data (n-1)	Contents of data : n*8-bit data consist of 2n ASCII codes.
...	
Data 0	
LRC CHK High	LRC check sum : 8-bit check sum consists of 2 ASCII codes.
LRC CHK Low	
END Hi	End characters : END Hi=CR(0DH) END Lo=LF(0AH)
END Lo	

CRC(Cyclical Redundancy Check) is calculated by the following steps:

- Step 1. Load a 16-bit register (called CRC register) with FFFFH.
- Step 2. Exclusive OR the first 8-bit byte of the command message with the low order byte of the 16-bit CRC register, putting the result in the CRC register.
- Step 3. Shift the CRC registers one bit to the right with MSB zero filling. Extract and examine the LSB.
- Step 4. If the LSB of CRC register is 0, repeat step 3, else Exclusive OR the CRC register with the polynomial value A001H.
- Step 5. Repeat step 3 and 4 until eight shifts have been performed. When this is done, a complete 8-bit byte will have been processed.
- Step 6. Repeat steps 2 to 5 for the next 8-bit byte of the command message. Continue doing this until all bytes have been processed. The final contents of the CRC register are the CRC value.

LRC (Longitudinal Redundancy Check) is calculated by summing up, module 256, the values of the bytes from Address to last data character then calculating the hexadecimal representation of the 2's-complement negation of the sum.

For example, refer to 06H at CD00=60.00HZ

$$34+06+00+00+17+70=C1H$$

the 2's-complement negation of C1H is 3FH

### C. ASCII code description

Character	"0"	"1"	"2"	"3"	"4"	"5"	"6"	"7"
ASCII code	30H	31H	32H	33H	34H	35H	36H	37H
Character	"8"	"9"	"A"	"B"	"C"	"D"	"E"	"F"
ASCII code	38H	39H	41H	42H	43H	44H	45H	46H

### D. Function code

1. 03H : Read AC drive' s setting
2. 06H : Write parameter setting into AC drive
3. 08H : Communication loop detection

<b>(1) 03H : Read AC drive's setting</b>	
Computer command message D1 : Communication address D2 : Function code D3 : Parameter number (H) D4 : Parameter number (L) D5 : Quantity of parameter (H) (word count) D6 : Quantity of parameter (L) (word count) D7 : CRCL D8 : CRCH	(00~FFh) (03h) (00h) (0~67h) (00h) (00~10h) (0~FFh) (0~FFh)
AC drive response message D1 : Communication address D2 : Function code D3 : Quantity of parameter (byte count) D4 : Content of data (H) D5 : Content of data (L) ... Dn-1 : CRCL Dn : CRCH	(01~FFh) (03h) (00~20h) (0~FFh) (0~FFh) (0~FFh) (0~FFh)

Example : Read two parameters of AC drive address 52(34H) from CD22. CD22=20.00(07D0H) CD23=30.00(0BB8H).

1. RTU

Computer command message			AC drive response message		
D1	Address	34H	D1	Address	34H
D2	Function	03H	D2	Function	03H
D3	Start address (H)	00H	D3	Quantity of data (count by byte)	04H
D4	Start address (L)	16H	D4	CD22 content (H)	07H
D5	# of data (H)	00H	D5	CD22 content (L)	D0H
D6	# of data (L)	02H	D6	CD23 content (H)	0BH
D7	CRCL	CRCL	D7	CD23 content (L)	B8H
D8	CRCH	CRCH	D8	CRCL	CRCL
			D9	CRCH	CRCH

2. ASCII

Computer command message			AC drive response message		
	STX	3A		STX	3A
D1	Address '3'	33	D1	Address '3'	33
	Address '4'	34		Address '4'	34
D2	Function '0'	30	D2	Function '0'	30
	Function '3'	33		Function '3'	33
D3	Start address '0'	30	D3	# of data '0'	30
	Start address '0'	30		count by byte '4'	34
D4	Start address '1'	31	D4	CD22 content '0'	30
	Start address '6'	36		CD22 content '7'	37
D5	# of data '0'	30	D5	CD22 content 'D'	44
	# of data '0'	30		CD22 content '0'	30

Computer command message			AC drive response message		
D6	# of data '0'	30	D6	CD23 content '0'	30
	# of data '2'	32		CD23 content 'B'	42
	count by word '2'		D7	CD23 content 'B'	42
D7	LRC HI	LRC HI		CD23 content '8'	38
D8	LRC LO	LRC LO	D8	LRC HI	LRC HI
	END HI	0D	D9	LRC LO	LRC LO
	END LO	0A		END HI	0D
				END LO	0A

Note 1 : The parameter values can be in integer and decimal. Each value has different process to read and write.

Refer to 8-1 lists to find out the minimum unit and value range for each parameter.

The following value processing description (Note2~3), each hexadecimal value has 4 numbers. First two numbers are D4, last two numbers are D5.

Note 2 : Processing integer number

Transfer value into hexadecimal value. The first two numbers is D4 and the last two numbers is D5.

Ex. Speed=1710 rpm

1710(decimal)=06AE(hexadecimal)

D4=06H

D5=AEH

**Note 3 : Processing decimal number**

Using following methods to process if the minimum parameter value is decimal number.

Minimum unit by 1<sup>st</sup> decimal number : The original value times 10 to be a new number.

Minimum unit by 2<sup>nd</sup> decimal number : The original value times 100 to be a new number.

Then,

Use this new number to transfer value into hexadecimal value.

Returning numbers to original value, the numbers need to divide by 10 or 100 if they have been timed by 10 or 100.

The first two numbers is D4 and the last two numbers is D5.

Ex. Acc. time 1 CD02=60.0 sec

$$60.0 \times 10 = 600(\text{decimal}) = 0258(\text{hexadecimal})$$

D4=02H

D5=58H

The value needs to divide by 10 when it returns to original shape.

<b>(2) 06H : Write parameter setting into AC drive</b>	
Computer command message	
D1 : Communication address	(00~FFh)
D2 : Function code	(06h)
D3 : Parameter number (H)	(00h)
D4 : Parameter number (L)	(0~4Eh)
D5 : Content of data (H)	(0~FFh)
D6 : Content of data (L)	(0~FFh)
D7 : CRCL	(0~FFh)
D8 : CRCH	(0~FFh)
AC drive response message	
D1 : Communication address	(01~FFh)
D2 : Function code	(06h)
D3 : Parameter number (H)	(00h)
D4 : Parameter number (L)	(0~4Eh)
D5 : Content of data (H)	(0~FFh)
D6 : Content of data (L)	(0~FFh)
D7 : CRCL	(0~FFh)
D8 : CRCH	(0~FFh)

Computer write CD00 content (60.00HZ) to inverter address=52

### 1. RTU

Computer command message

D1	D2	D3	D4	D5	D6	D7	D8
34H	06H	00H	00H	17H	70H	CRCL	CRCH

AC drive response message

D1	D2	D3	D4	D5	D6	D7	D8
34H	06H	00H	00H	17H	70H	CRCL	CRCH

### 2. ASCII

Computer command message			AC drive response message		
	STX	3A		STX	3A
D1	Address '3' Address '4'	33	D1	Address '3' Address '4'	33
		34			34
D2	Function '0' Function '6'	30	D2	Function '0' Function '6'	30
		36			36
D3	Number of parameter '0' Number of parameter '0'	30	D3	Number of parameter '0' Number of parameter '0'	30
		30			30
D4	Number of parameter '0' Number of parameter '0'	30	D4	Number of parameter '0' Number of parameter '0'	30
		30			30
D5	CD00 content '1' CD00 content '7'	31	D5	CD00 content '1' CD00 content '7'	31
		37			37
D6	CD00 content '7' CD00 content '0'	37	D6	CD00 content '7' CD00 content '0'	37
		30			30
D7	LRC HI	LRC HI	D7	LRC HI	LRC HI
D8	LRC LO	LRC LO	D8	LRC LO	LRC LO
	END HI	0D		END HI	0D
	END LO	0A		END LO	0A

Computer command message inverter address=52 forward run at 60.00HZ

1. RTU

Step 1. Write CD00=60.00HZ (6000=1770H) to AC drive address=52

Computer command message

D1	D2	D3	D4	D5	D6	D7	D8
34H	06H	00H	00H	17H	70H	CRCL	CRCH

AC drive response message

D1	D2	D3	D4	D5	D6	D7	D8
34H	06H	00H	00H	17H	70H	CRCL	CRCH

Step 2. Write address 100 (64H)=1

Computer command message

D1	D2	D3	D4	D5	D6	D7	D8
34H	06H	00H	64H	00H	01H	CRCL	CRCH

AC drive response message

D1	D2	D3	D4	D5	D6	D7	D8
34H	06H	00H	64H	00H	01H	CRCL	CRCH

Note : When address 100=1, speed is depended on terminal setting (CF1, CF2, CF3)

2. ASCII

Step 1. Write CD00(60.00HZ) to inverter address=52

Computer command message			AC drive response message		
	STX	3A		STX	3A
D1	Address '3'	33	D1	Address '3'	33
	Address '4'	34		Address '4'	34
D2	Function '0'	30	D2	Function '0'	30
	Function '6'	36		Function '6'	36

Computer command message			AC drive response message		
D3	Number of parameter '0'	30	D3	Number of parameter '0'	30
	Number of parameter '0'	30		Number of parameter '0'	30
D4	Number of parameter '0'	30	D4	Number of parameter '0'	30
	Number of parameter '0'	30		Number of parameter '0'	30
D5	CD79 content '1'	31	D5	CD79 content '1'	31
	CD79 content '7'	37		CD79 content '7'	37
D6	CD79 content '7'	37	D6	CD79 content '7'	37
	CD79 content '0'	30		CD79 content '0'	30
D7	LRC HI	LRC HI	D7	LRC HI	LRC HI
D8	LRC LO	LRC LO	D8	LRC LO	LRC LO
	END HI	0D		END HI	0D
	END LO	0A		END LO	0A

Step 2. Write address 100 (64H)=1

Computer command message			AC drive response message		
	STX	3A		STX	3A
D1	Address '3'	33	D1	Address '3'	33
	Address '4'	34		Address '4'	34
D2	Function '0'	30	D2	Function '0'	30
	Function '6'	36		Function '6'	36
D3	Content of data '0'	30	D3	Content of data '0'	30
	Content of data '0'	30		Content of data '0'	30
D4	Content of data '6'	36	D4	Content of data '6'	36
	Content of data '4'	34		Content of data '4'	34
D5	CD31 content '0'	30	D5	CD31 content '0'	30
	CD31 content '0'	30		CD31 content '0'	30

Computer command message			AC drive response message		
D6	CD31 content '0'	30	D6	CD31 content '0'	30
	CD31 content '1'	31		CD31 content '1'	31
D7	LRC HI	LRC HI	D7	LRC HI	LRC HI
D8	LRC LO	LRC LO	D8	LRC LO	LRC LO
	END HI	0D		END HI	0D
	END LO	0A		END LO	0A

<b>(3) 08H : Communication loop detection</b>	
Computer command message	
D1 : Communication address	(0~FFh)
D2 : Function code	(08h)
D3 : Data 1	(0~FFh)
D4 : Data 2	(0~FFh)
D5 : Data 3	(0~FFh)
D6 : Data 4	(0~FFh)
D7 : CRCL	(0~FFh)
D8 : CRCH	(0~FFh)
AC drive response message	
D1 : Communication address	(0~FFh)
D2 : Function code	(08h)
D3 : Data 1	(0~FFh)
D4 : Data 2	(0~FFh)
D5 : Data 3	(0~FFh)
D6 : Data 4	(0~FFh)
D7 : CRCL	(0~FFh)
D8 : CRCH	(0~FFh)

AC drive response messages need to be same as command message when do communication loop detection.

Ex. Write data data 1=11, data 2=22, data 3=33 and data 4=44 to AC drive address 52(34H)

1. RTU

Computer command message			AC drive response message		
D1	Address	34H	D1	Address	34H
D2	Function	08H	D2	Function	08H
D3	Data 1	11H	D3	Data 1	11H
D4	Data 2	22H	D4	Data 2	22H
D5	Data 3	33H	D5	Data 3	33H
D6	Data 4	44H	D6	Data 4	44H
D7	CRCL	CRCL	D7	CRCL	CRCL
D8	CRCH	CRCH	D8	CRCH	CRCH

2. ASCII

Computer command message			AC drive response message		
	STX	3A		STX	3A
D1	Address '3'	33	D1	Address '3'	33
	Address '4'	34		Address '4'	34
D2	Function '0'	30	D2	Function '0'	30
	Function '8'	38		Function '8'	38
D3	Content1 '1'	31	D3	Content1 '1'	31
	Content1 '1'	31		Content1 '1'	31
D4	Content2 '2'	32	D4	Content2 '2'	32
	Content2 '2'	32		Content2 '2'	32
D5	Content3 '3'	33	D5	Content3 '3'	33
	Content3 '3'	33		Content3 '3'	33
D6	Content4 '4'	34	D6	Content4 '4'	34
	Content4 '4'	34		Content4 '4'	34

Computer command message			AC drive response message		
D7	LRC HI	LRC HI	D7	LRC HI	LRC HI
D8	LRC LO	LRC LO	D8	LRC LO	LRC LO
	END HI	0D		END HI	0D
	END LO	0A		END LO	0A

### E. Communication error respond

Once communication error happened, inverter will respond “Function code and 80H” and communication error code to master system.

Communication error code definition

Error code	Description
01H	Function code error, only 03/06/08 available
03H	Illegal data address (data address is not available)
04H	Illegal operation command
05H	Check sum error
31-39H	Data error

### 1. RTU

Once communication error happend, AC drive respond as follow.

D1 Address	D2 Function code & 80H	D3 Error code	D4 CRCL	D5 CRCH
---------------	---------------------------	------------------	------------	------------

## 2. ASCII

Start code	3A
Address (01)	30 31
Function code & 80H (86)	38 36
Error code (02)	30 32
LRC (77)	37 37
End code H	0D
End code L	0A

Ex. Write CD00=500HZ(C350H), but maximum value of CD00 is 400HZ.

### 1. RTU

Computer command message

D1	D2	D3	D4	D5	D6	D7	D8
01H	06H	00H	00H	C3H	50H	CRCL	CRCH

AC drive response message

D1	D2	D3	D4	D5
01H	86H	02H	CRCL(C3H)	CRCH(A1H)

## 2. ASCII

Computer command message			AC drive response message		
	STX	3A		STX	3A
D1	Address '0'	30	D1	Address '0'	30
	Address '1'	31		Address '1'	31
D2	Function '0'	30	D2	Function '8'	38
	Function '6'	36		Function '6'	36
D3	Address content '0'	30	D3	Error code '0'	30
	Address content '0'	30		Error code '2'	32
D4	Address content '0'	30	D4	LRC HI '7'	37
	Address content '0'	30		LRC LO '7'	37
D5	CD00 content 'C'	43		END HI	0D
	CD00 content '3'	33		END LO	0A
D6	CD00 content '5'	35			
	CD00 content '0'	30			
D7	LRC HI	LRC HI			
D8	LRC LO	LRC LO			
	END HI	0D			
	END LO	0A			

## Communication address description

<b>Speed command of RS485</b>
<b>100</b>

<b>Setting Range</b>	<b>0 ~ 4</b>
<b>Default Value</b>	<b>3</b>

0 : Normal

1 : Forward run

2 : Reverse run

3 : Stop

4 : Fail mode reset

Note : 1.Fail mode reset by writting address 100 content=4. It will fall into EEP1 error mode if any operation command is set before reset the fail mode. It needs to re-power ON to remove this error.  
2. Speed command is CD00, or using CF1/CF2/CF3 terminal to select 2<sup>nd</sup>~8<sup>th</sup> speed (CD22~CD24, CD47~CD50).

<b>Frequency data output for RS485</b>
<b>101</b>

<b>Unit</b>	<b>0.01HZ</b>
-------------	---------------

To know output frequency, using function 03H to read address 101 content.

<b>Current data output for RS485</b>
<b>102</b>

<b>Unit</b>	<b>0.1A</b>
-------------	-------------

To know motor current, using function 03H to read address 102 content.

<b>Fault code for RS485</b>
<b>103</b>

Using 03H function to read address 103(67H) content to know the cause of fault if fault occurred.

01H : EP0

02H : PF01

03H : PF02

04H : PF03

05H : PF04

07H : OH

08H : OL

09H : EEP1

0AH : EEP2

31H : OPE1

32H : OPE2

34H : OPE4

35H : OPE5

36H : OPE6

37H : OPE7

38H : OPE8

39H : OPE9

## 7-2. Operation key-in sequence

### EXAMPLE : CHANGE acceleration time

Setting sequence	Display indicator	Description
		In waiting mode, the display is blinking
		Enter function mode
		Select function number 1 (parameter lock)
		Press "FUNC" again to change the parameter value
		Enable to change parameter
		Press "PROG" to save the parameter and back to standby mode
		Enter function mode
		Select function number 2 (acceleration time)
		Press "FUNC" again to change the parameter value
		Select the first digit
		Increase the value to 3
		Select the second digit
		Increase the value to 2
		Press "PROG" to save CD02=12.3 and back to standby mode.

## CHANGE maximum frequency limit

Setting sequence	Display indicator	Description
		Enter function mode
 		Increase the value to 4
 		Select the second digit
		Increase the value to 1
		Press "FUNC" again to change the Maximum frequency limit
  		Select the second digit
  		Decrease the value to 90HZ
		Press "PROG" to save CD14=90HZ and back to standby mode

## **8. PROTECTIVE FUNCTION**

### **A. Inverter self-checking errors**

<b>Internal protection</b>
<b>CPU</b>

Noise protection.

Self test failure protection

<b>Program check sum error</b>
<b>EP0</b>

<b>EEPROM access error</b>
<b>EEP1</b>

<b>EEPROM check-sum error</b>
<b>EEP2</b>

<b>Power device failure 1</b>
<b>PF01</b>

Power device failure during acceleration

<b>Power device failure 2</b>
<b>PF02</b>

Power device failure during constant frequency

<b>Power device failure 3</b>
<b>PF03</b>

Power device failure during deceleration (stopping)

<b>Power device failure 4</b>
<b>PF04</b>

Power device failure during stand-by

## B. Operation errors

<b>Parameter Locked</b>
<b>OPE1</b>

To change the contents of CD02~CD52 set CD01=press  first

<b>FWD or REV only</b>
<b>OPE2</b>

Motor direction limiter.  
See function description CD08

<b>Analog signal input only</b>
<b>OPE3</b>

Motor speed command from control terminal only.  
Input analog signal by Frequency knob  
see functions description CD10

<b>Terminal command only</b>
------------------------------

<b>OPE4</b>
-------------

Accept run command from control terminal only.  
Not operation panel.  
See functions description CD12

<b>Over range error</b>
-------------------------

<b>OPE5</b>
-------------

Operating error message ~ over range.

<b>Logic error warning</b>
----------------------------

<b>OPE6</b>
-------------

Logic error when setting.  
EXAMPLE : Setting F-min > F-max will result an error.

<b>Only changed in standby</b>
--------------------------------

<b>OPE7</b>
-------------

The parameter can only be changed in standby mode.

<b>Read only parameter</b>
----------------------------

<b>OPE8</b>
-------------

The parameter created by system. Unable to be changed by user.

<b>Communication error</b>
<b>OPE9</b>

<b>Over heat</b>
<b>OH</b>

Over temperature for external indicator.  
Refer to CD42(FT1) or CD43(FT2).

<b>Over load</b>
<b>OL</b>

Load is over rating.

## **9. PRECAUTIONS**

### **9-1 Prior to maintenance, check the following :**

- (1) Before maintenance, be sure to turn the power off and wait until the LED digits vanish in the display. However, approx. 50 VDC still remains immediately after the display disappears, so wait a little bit longer.**
- (2) When removing or re-installing a connector, do not pull the cable.**
- (3) Take special care not to misplace the connector. Carefully note any disconnecting or poor contact. Be sure to tighten the terminals and connectors securely.**
- (4) It should be noted that electronic equipment is not resistant to moisture and oil mist, and intrusion of dust or iron powder will damage the insulation, leading to an unexpended accident.**

### **9-2 Application precautions**

- (1) Before you start operation, thoroughly check for erroneous wiring or short circuits in the motor or in the wiring between your motor and the inverter. Do not ground the neutral point of the motor with a star connection.**
- (2) An inverter-driven run generates a certain amount of electromagnetic noise, as compared with that of driven directly by a commercial power supply. Thus you should be aware of such limitation when using an inverter-driven motor at a noise-sensitive site.**
- (3) Before setting the maximum frequency at 60HZ or higher, confirm that this operation range is acceptable with that of your motor.**
- (4) When you determine an appropriate inverter capacity, ensure that the rated current of the motor does not exceed the inverter' s rated current.**
- (5) Install a mold-case circuit breaker (MCCB) at the inverter' s power supply end to protect the wiring.**

## 10. TROUBLESHOOTING

Display symbol	Cause of fault message contents	Check point	Suggested remedy
No display	Discharge LED extinguished	Review the power system. Check that MCCB has been turned on or no poor contact.	Turned on or Replace MCCB
PF01	Power device failure during acceleration	The acceleration time is too short.	Increase the acceleration time
		Boost voltage too high	Reduce CD21 contents
		Check the motor is locked or the load is too heavy	Reduce the load factor
		Disconnecting the output wiring U.V.W. Restart (Run) the inverter check for the same message	Repair
PF02	Power device failure during constant frequency operation	Check for sudden change in load	Eliminate sudden change in load
		Check that the ambient temperature is too high	Reduce the ambient temperature
PF03	Power device failure during deceleration	The load $GD^2$ is excessive	Set the deceleration time suitable for load $GD^2$
		Power supply voltage is too high	Reduce th voltage within specified range
PF04	Power device failure during stand-by	Check around the noise source. Power supply voltage is too high.	Remove the cause  Reduce the voltage
EEP1	EEPROM access error	Communication reset error	Refer to address 100 description
		Rework with previous process, if same message happen again.	Repair
EEP2	EEPROM check-sum error	Rework with previous process, if same message happen again.	Repair

# 11. APPLICATION

**EXAMPLE 01 : Use 2 external variable resistor for multistage speed command input**

**DESCRIPTION :**

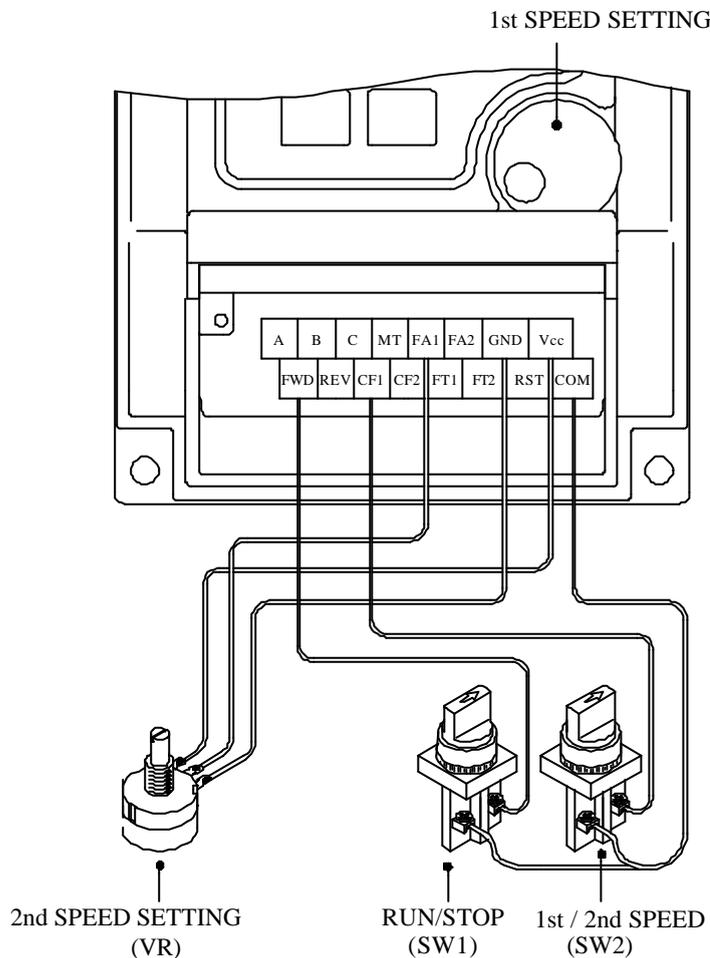
**CD10 = 1** ( Use frequency knob for 1st speed setting)

**CD12 = 1** ( External command)

**CD44 = 8** ( 2nd speed signal enter from FA1)

**SW1 = RUN / STOP**

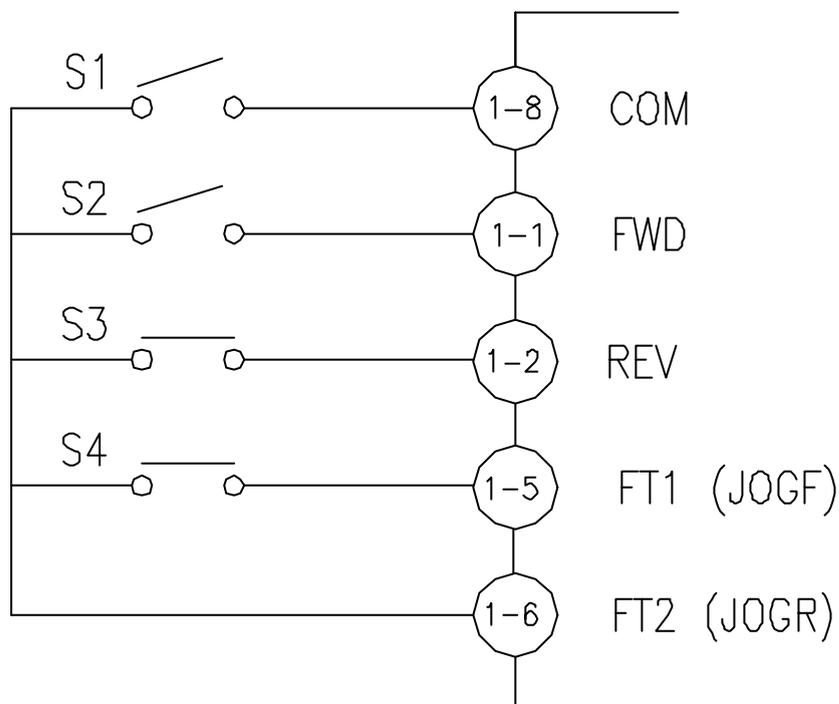
**SW2 = 1st / 2nd SPEED**



## EXAMPLE 02 : Normal / Jog operation

### DESCRIPTION :

- CD00 = Normal speed ; User setting**
- CD04 = Jog speed ; User setting**
- CD12 = 1 ; Terminal command (For External)**
- CD42 = 1 ; Define FT1 Terminal = JOGF function**
- CD43 = 2 ; Define FT2 Terminal = JOGR function**



### NORMAL / JOG

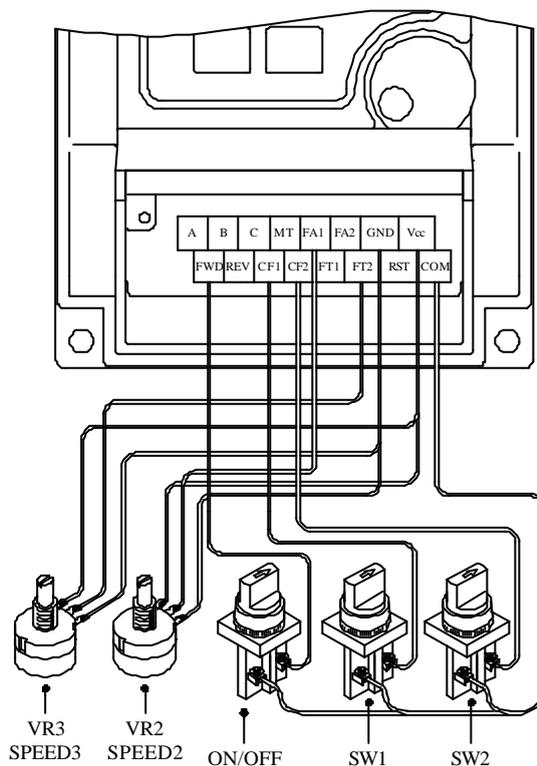
- S1 = FWD SW**
- S2 = REV SW**
- S3 = FWD JOG SW**
- S4 = REV JOG SW**

### EXAMPLE 03 : Using VR for 3stage speed setting

#### DESCRIPTION :

- CD12 = 1 ; Terminal command (For External)
- CD44 = 8 ; 2nd speed signal enter from FA1
- CD04 = 1 ; 3nd speed signal enter from FA2

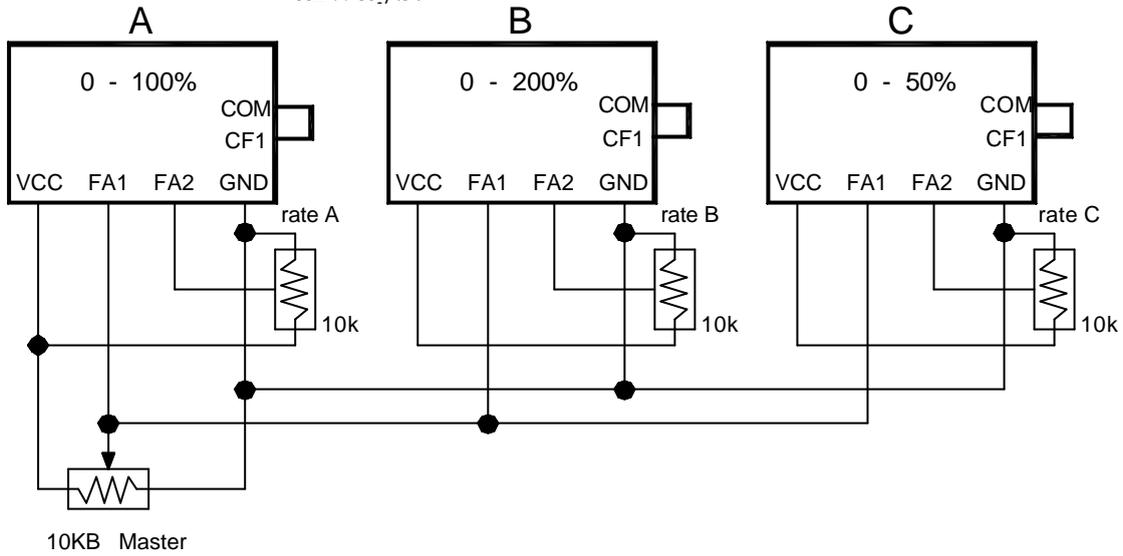
SPEED	TERMINAL		SPEED COMMAND ENTRY
	SW2	SW1	
1	OFF	OFF	FREQUENCY KNOB
2	OFF	ON	VR2
3	ON	OFF	VR3



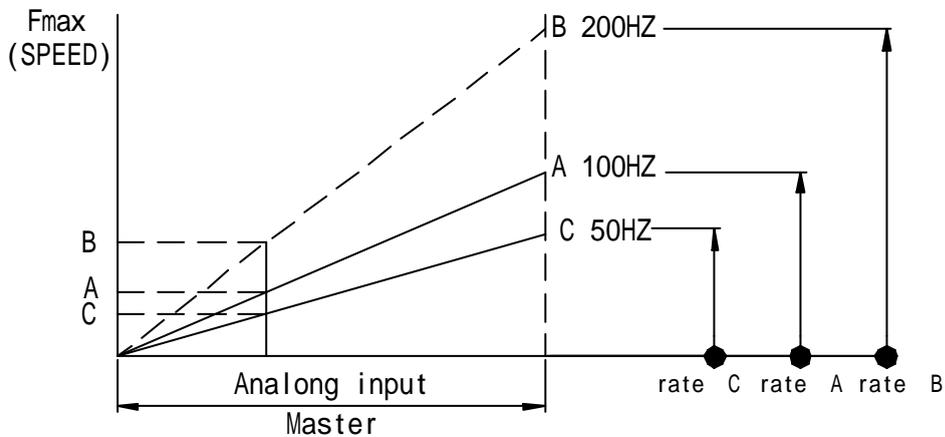
**EXAMPLE 04 : Master / slave driver system**

**DESCRIPTION : Set FA1 as 2nd speed signal input terminal.**

**Connect COM and CF1 for 2nd speed command always.**



Number	A	B	C
Speed rate	0 ~ 100%	0 ~ 200%	0 ~ 50%
Function setting	CD12 = 1 CD14 = 100 CD44 = 13 CD45 = 11	CD12 = 1 CD14 = 200 CD44 = 13 CD45 = 11	CD12 = 1 CD14 = 50 CD44 = 13 CD45 = 11



### 13. Inverter Selection

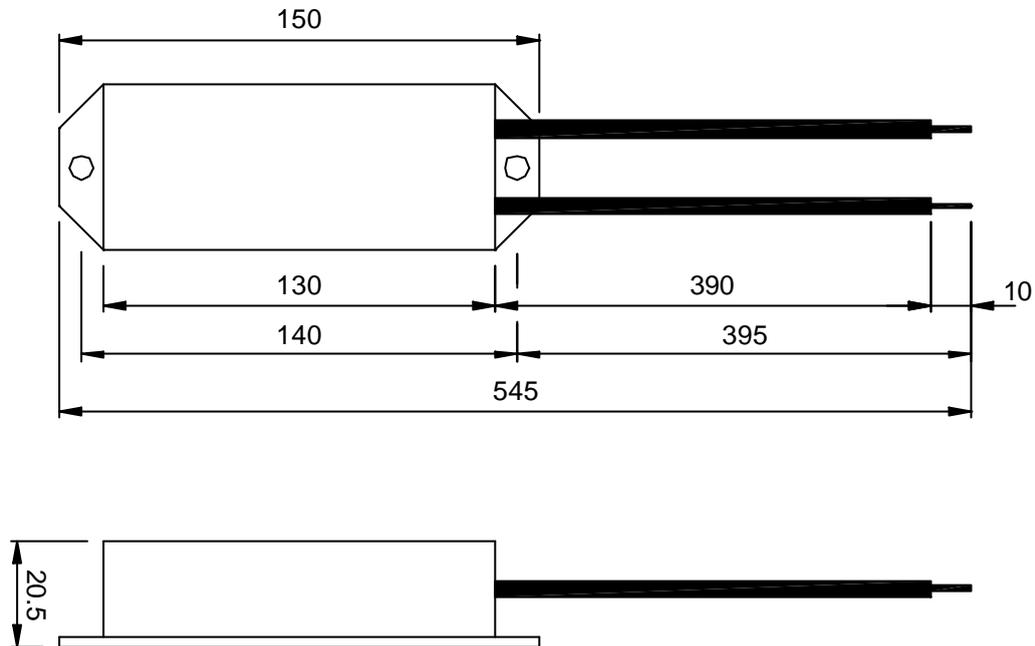
#### Inverter Capacity Check Method

Description		Related factor
Load characteristics	Load type	Friction load and weight load Liquid(viscous) load inertia load Load with power transmission and accumulation
	Load speed and torque characteristics	Constant torque Constant power Decreasing torque
	Load characteristics	Motoring Braking or overhanging load Constant load Shock load Repetitive load High-start torque Low-start torque
Operation	Continuous operation Long-time operation at medium or low speeds Short-time operation	
Rated output	Maximum required output(instantaneous) Constant output(continuous)	
Rated rpm	Maximum rpm Rated rpm	
Power supply	Power supply transformer capacity and percentage impedance Voltage fluctuations Number of phases, less phase protection Frequency	
Deterioration of load capacity due to age	Mechanical friction, losses in wiring	
	Duty cycle modification	



## 12. APPENDIX

### A. Optional braking resistor



Part no : E-MSAA-008000

Specification : 60 80W

Remove build-in dynamic brake resistor.

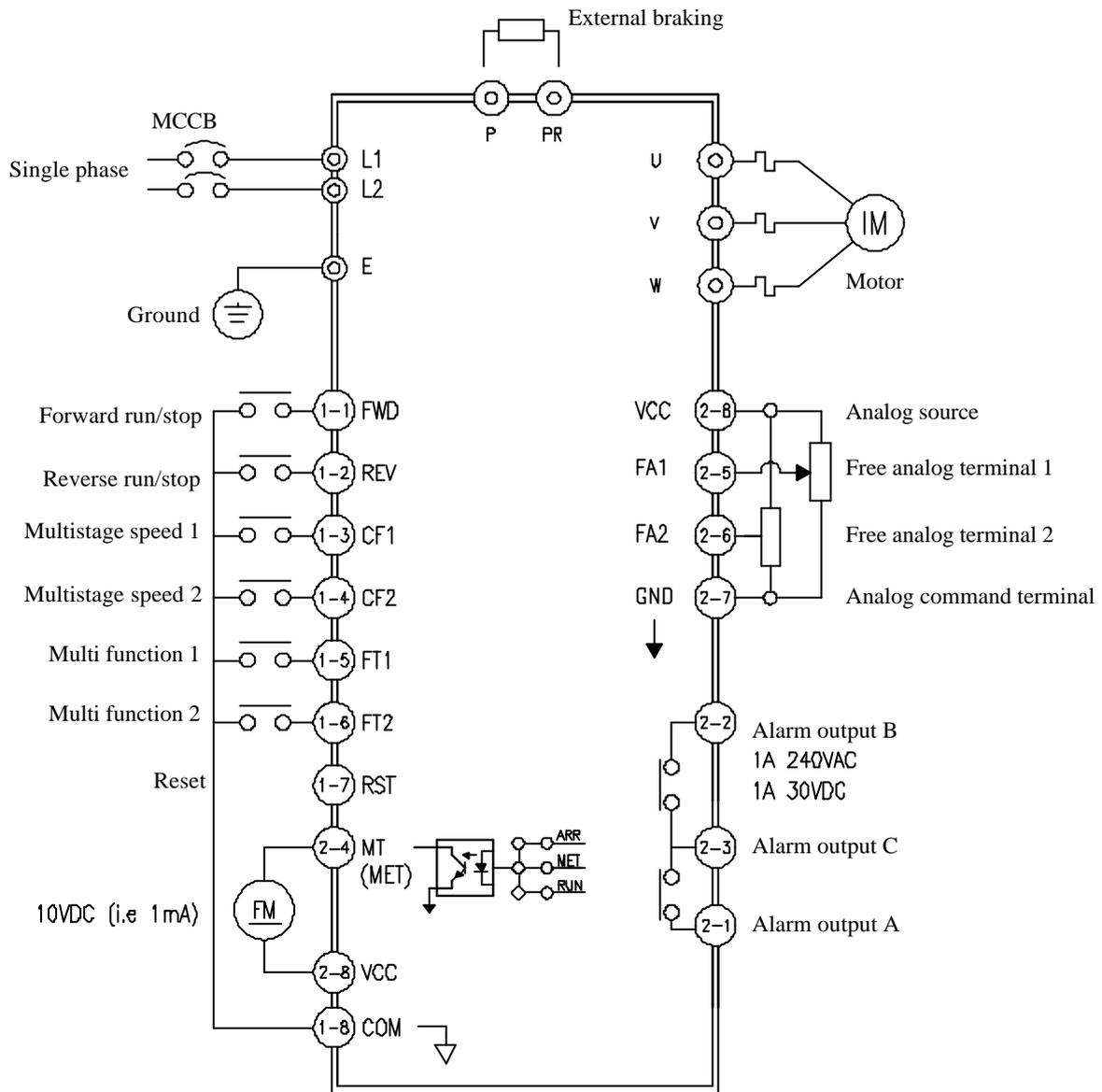
Connect a larger capacity resistor, the value should be greater than the table below:

Unit : Ohm

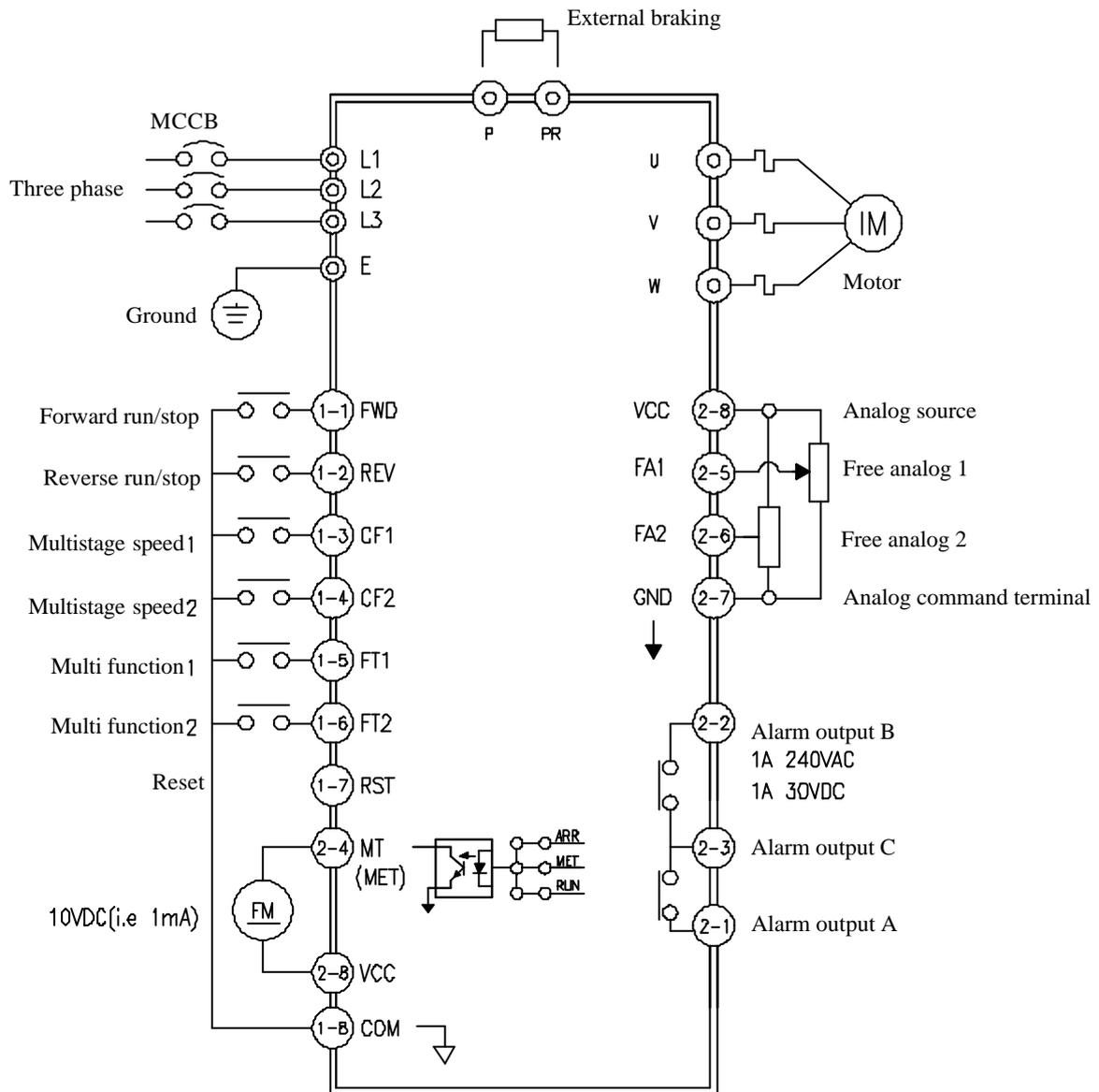
Model No	104/304	107/307	115/315	122/322	137/337
AS1	60	60	--	--	--
AS2	60	60	60	60	40
AS4	200	180	180	180	160

## B. Terminals wiring diagram

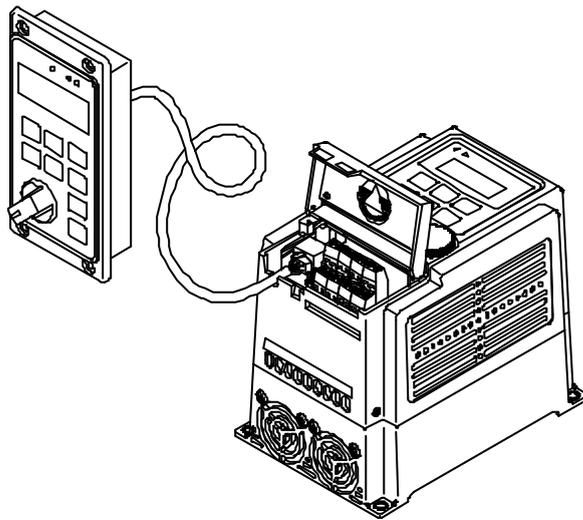
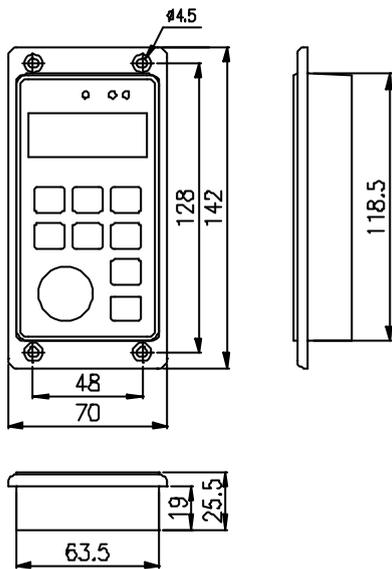
### 1. SINGLE PHASE



## 2. THREE PHASE



### C. Remote operator



UNIT : M/M

A-0000-F306G3	F306 Remote operator
E-092A-010200	1 meter extension cable
E-092A-030200	3 meter extension cable
E-092A-050200	5 meter extension cable

MEMO

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INSTRUCTION MANUAL

PART NO : E-PHAA-EASA03

Model : AS series

JUL. 2008 3<sup>st</sup> edition



**ADLEEPPOWER<sup>®</sup> SERVICE OFFICE**

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