



RHYMEBUS INVERTER AC MOTOR CONTROLLER



RM5G Series

Pre-quality Satisfied Service



Analog Keypad
(KP-202C)



Digital Keypad
(KP-201C)



RHYMEBUS CORPORATION

<http://www.rhymebus.com.tw>

V1.0 2004.1.9

V1.6 2007.1 Revised

FOREWORD

Thank you for choosing the RHYMEBUS " RM5G Series "high-function, inverter. This instruction manual gives information on installation, wiring, parameter unit operation, etc. as well as maintenance and inspection procedures. However, it is essential to read this manual carefully to use the equipment safely, correctly, and to its full capability. Please forward this manual to the end user.

SAFETY PRECAUTIONS


Please read this manual thoroughly prior to installation, wiring, operation, maintenance and trouble shooting. Also, any statement and symbol denoted by "**DANGER**" or "**CAUTION**" should be read carefully.



DANGER : Indicate dangerous cases that accompany the possibility of death or serious injury caused by erroneous handling not in accordance with manual.



CAUTION : Indicate dangerous cases that accompany the possibility of medium or light injury or material damage caused by erroneous handling not in accordance with manual.

* Note : that although  **CAUTION** indicate medium or light injury or material damage can be caused, there is possibility of serious injury.

Note :

that installation, wiring, operation and trouble shooting can be performed only by experienced peoples who know the principles, constructions, properties and operational procedures of inverter, can prevent damages, and read this manual completely.

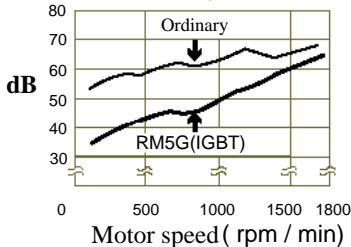
INTRODUCTIONS

Features

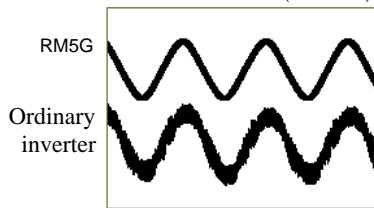
- **Low noise**
- **High torque**
- **Automatic voltage regulation**
- **User friendly**
- **Restart after instantaneous power interruption**
- **9 levels for speed settings and 5 independent acc/dec time settings**
- **6 digits display**
- **Programmable inputs and outputs**
- **Store and copy settings by using KP-201C digital keypad**
- **Connect to the external indicators for displaying the status of inverter**
- **Energy saving**
- **RM5G series apply to the constant torque loaded; RM5P series apply to the variable torque loaded.**

- **Low noise**

Using IGBT by which the maximum switching frequency of sinusoidal PWM is 10kHz to 15kHz, the motor is operated smoothly and efficiently with low noise.



Current waveform(at 10Hz)



- **High torque**

At low speed, the torque compensation by which the compensated torque can be above 150% of rated torque is provided for smooth start in the case of heavy load.

- **Automatic voltage regulation (AVR)**

In spite of the fluctuation of power source, output voltage of inverter can be kept at the desired level.

- **User friendly**

There are two types of operating keypad, one for advanced applications and the other for usual use. User can choose one of them to function inverter easily and properly. Besides, the connector between inverter and keypad is the same as that of telephone. The remote control is then easily realized with maximum distance of 25 m.

- **Restart after instantaneous power interruption**

If the power source is shutdown during running, the functions of recording the speed of motor before power interruption and resuming that after restart are provided.

- **9 levels for speed settings and 5 independent acc/dec time settings**

There are 5 independent acc/dec time settings in the 9 steps speed level. The setting range is 0.0~3200.0 seconds. Speed from 0Hz to 60Hz , the minimum acceleration time is 0.015 sec.(except free running), the maximum acceleration time is 19200000 sec. (about 222 days).

- **6 digits display**

There are 8 status of inverter can be displayed (frequency, speed, voltage, current , etc).

- **Programmable inputs and outputs**

There are 17 functions programmed by using input terminals X1~X6 and 12 functions programmed by output terminals, Y1 and Y2 (open collector), and two relay output.

- **Connect to the external indicator for displaying the status of inverter**

There are 3 external indicators(96mm x 48mm, 5 digits)can be used simultaneously to indicate the inverter status such as frequency, speed, voltage, current, and line velocity etc. Therefore, it is not needed to use the other instruments or sensors such as CT etc., and the cost and wiring will be reduced.

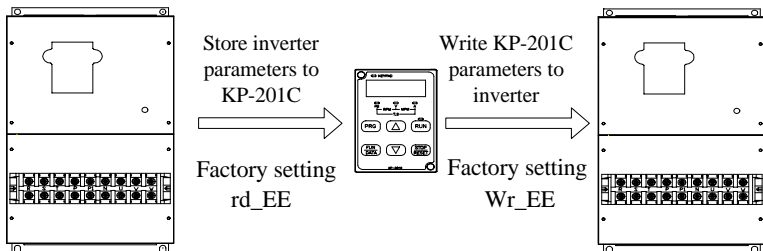
- **Energy saving**

Under the light load condition, the less energy is outputted for the purpose of saving energy.

- **Store and copy settings**

The settings can be stored in KP-201C and download to other inverter . This function is useful in the case of several inverters with the same data settings. If any alarm occurs during copy, the keypad will show “Wr_F” and copying will stop.

Note: Check the version of software(F_000) first, only the same version software inverter then it can be do the store and copy setting function.



CONTENTS

CHAPTER 1 INSPECTIONS AT PURCHASE

- (1) Confirmation of product1
- (2) Standard specifications2

CHAPTER 2 INSTALLATIONS AND CONFIRMATIONS

- (1) Basic setup4
- (2) Environment4
- (3) Descriptions of terminals and wiring diagram6

CHAPTER 3 TYPES OF KEYPADS

- (1) Digital keypad (KP-201C)17
- (2) Analog keypad (KP-202C)17

CHAPTER 4 OPERATIONS OF KEYPADS

- (1) Settings of digital keypad (KP-201C)18
- (2) Settings of analog keypad (KP-202C)23

CHAPTER 5 LIST OF FUNCTION CODE SETTINGS26

CHAPTER 6 DESCRIPTIONS OF FUNCTION CODE SETTINGS

- (1) Settings of keypad33
- (2) Multiple speed level settings37
- (3) Acc/dec time of multiple speed level.....39
- (4) V/F pattern settings41
- (5) Analog input commands43
- (6) Upper and lower bound of output frequency.....45
- (7) Analog outputs46
- (8) Settings for motor protection.....47
- (9) Multiple function input terminals48
- (10) Settings of multiple function outputs.....54
- (11) Frequency detection59
- (12) Gain of the torque boost59
- (13) Settings of overload detection60
- (14) Settings of stall prevention61
- (15) DC braking62
- (16) Resumption after instantaneous power interruption63
- (17) Jump of frequency64
- (18) Speed tracking65

(19) Settings of creep65
(20) External indicators66
(21) Miscellaneous67
(22) Settings of KP-202C analog keypad69

CHAPTER 7

OPERATIONAL PROCEDURES, MAINTENANCE, AND TROUBLE SHOOTING

(1) Operational procedure and operations72
(2) Fault, maintenance and trouble shooting73

APPENDIX A

(1) Outline drawings75
(2) Auxiliary control equipment (ACE series)79
(3) Dynamic brake and resistor80
(4) Selections of motor82
(5) Selections of AC reactor (ACL)83

APPENDIX B

(1) Remote controllers84
(2) Remote indicators DM-50187

APPENDIX C

(1) Connect braking resistor88
(2) Connect D.B.unit89

APPENDIX 1

DIMENSIONS OF OPENING OF KP-201C AND KP-202C90

APPENDIX 2 SETTINGS MEMO91

APPENDIX 3 FAULT DISPLAY95

CHAPTER 1 INSPECTIONS AT PURCHASE






(1) Confirmation of product

Although this product is under a rigorous quality control, the damages may be made by impact and vibration etc. during transportation. Upon unpacking of the inverter at site, please check the follows accordingly. If there is any defect, contact your local dealer at once.

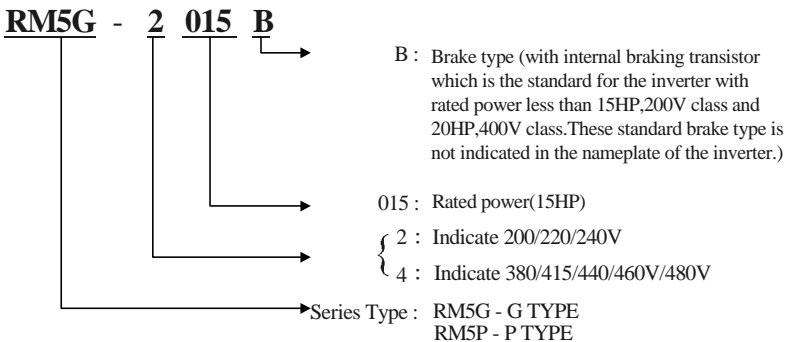
A. Confirmation of appearance

Is there any damage, filth or distortion to the appearance of inverter?

B. Do the rated capacity and specification shown on nameplate confirm to your requirements?

TYPE	RM5G-2015B		→ Model number
INPUT	AC 3PH 200~240V 50/60Hz		→ Input power source specification
OUTPUT	0-400Hz 11KW 46A		→ Output current & capacity
PGM No.	Pxxxxx		→ Version of software
SERIAL No.	8021520		→ Serial number
RHYMEBUS CORPORATION			

C. Model number scheme:



D. Confirmation of accessories

Generally, there is one user's manual. If there are some accessories, such as braking resistor and AC/DC reactor etc., are ordered please check inclusively.

E. Please refer to the standard specifications and confirm to your requirements.

(2) Standard specifications
A. Specification

RM5G-200V Series

Series No. (RM5G)	2001	2001	2002	2003	2005	2007	2010	2015	2020	2025	2030	2040	2050	2060	2075	2100	2125	2150	—	—	—
Rated power of the motor (HP/KW)	0.5/0.4	1/0.75	2/1.5	3/2.2	5/3.7	7.5/5.5	10/7.5	15/11	20/15	20/18.5	30/22	40/30	50/37	60/45	75/55	100/75	125/90	150/110	—	—	—
Rated continuous output power (KVA)	1.3	2	3	4	6	9	13	18	22	28	33	44	55	67	84	115	132	160	—	—	—
Rated continuous output current (A)	3	5	8	11	17	25	33	46	60	74	90	115	145	175	220	295	346	405	—	—	—
Rated output voltage (V)	3 PH 200 ~ 240V																				
Range of output frequency	0.01 ~ 400.00Hz																				
Power source (PH, V, Hz)	IPH/3PH, 200 ~ 240V, 50/60Hz										3 PH, 200 ~ 240V, 50/60Hz										
Tolerance of power source voltage	176 ~ 264V, 50/60Hz																				
Tolerance of frequency fluctuation	± 5%																				
Construction protected	IP20										IP00 (IP20 OPTION)										

RM5G-400V Series

Series No. (RM5G)	4001	4002	4003	4005	4007	4010	4015	4020	4025	4030	4040	4050	4060	4075	4100	4125	4150	4175	4200	4250	4300	4420
Rated power of the motor (HP/KW)	1/0.75	2/1.5	3/2.2	5/3.7	7.5/5.5	10/7.5	15/11	20/15	25/18.5	30/22	40/30	50/37	60/45	75/55	100/75	125/90	150/110	175/132	200/160	250/200	300/220	420/315
Rated continuous output power (KVA)	1.9	3.3	4	7	10	14	18	23	30	34	46	56	66	84	104	134	165	193	232	287	316	445
Rated continuous output current (A)	2.5	4	6	9	14	18	24	30	39	45	61	73	87	110	150	176	210	253	304	377	415	585
Rated output voltage (V)	3 PH 380 ~ 480V																					
Range of output frequency	0.01 ~ 400.00Hz																					
Power source (PH, V, Hz)	3 PH, 380 ~ 480V, 50/60Hz																					
Tolerance of power source voltage	332 ~ 528V, 50/60Hz																					
Tolerance of frequency fluctuation	± 5%																					
Construction protected	IP20											IP00 (IP20 OPTION)										

B. Common specification

	User interface	Digital and analog operating keypads with remote control.	
Control characteristics	Control characteristics	Voltage vector sinusoidal PWM control.	
	Range of frequency control	RM5G: 0.1 ~ 400.00Hz / RM5P: 0.1~120.00Hz	
	Resolution of frequency setting	Digital keypad: 0.01Hz, Analog keypad: 0.06/60Hz	
	Resolution of output frequency	0.01Hz	
	Analog voltage of frequency setting	DC 0 ~ 10V (20KΩ) · 4 ~ 20mA (500Ω)	
	Overload current	RM5G type: 150% inverter rated current output for 1 minute RM5P type: 120% inverter rated current output for 1 minute	
	steps acceleration/deceleration times	Zero sec for free running, 0.1 ~ 3200 seconds for each setting	
	Braking torque	About 20% (For the inverter rated power less than 10 hp, the braking transistor is included, and braking torque can be about 100%)	
	V/F pattern	The pattern can be set arbitrarily.	
	Stall prevention	The current of stall prevention can be set arbitrarily	
Operational characteristics	Start and direction control	FWD/REV control by terminals or by using 3-line sustaining circuit	
	Input	Multiple function inputs	Stop command by using the 3-line sustaining circuit, jogging operation, secondary acc/dec time, multiple-level speed command 1~3, reset, command for fault conditions, command of inhibiting output, command of stop by free running, command of frequency search from the max. frequency, command of frequency search from the set frequency, acc/dec inhibition command, UP/DOWN command, UP/DOWN frequency command clear/enter analog input select, DC braking enable, current limit enable, primary and secondary speed select
		Analog inputs	Vin-GND(0 ~ 10V) · Iin-GND(4 ~ 20mA)
	Output	Multiple function	Running, constant speed, zero speed, frequency detection, overload detection, stall prevention, under voltage, braking, restart after instantaneous power interruption, restart after trouble shooting, fault conditions, programmable contacts a and b.
Analog outputs		Analog voltage, DC 0~10 V with adjustable gain, for representing output frequency, frequency setting, or output current	
Displays	Displays of keypad	Output frequency, frequency settings, output voltage, DC voltage, output current, motor speed, line velocity of motor, status of terminals	
	Displays of external indicators	There are 3 external indicators (96mm x 48mm, 5 digits) can be used simultaneously to indicate the frequency, speed, voltage, current, and line velocity etc.	
Protections	Fault Display	Over current (OC), over voltage (OE), under voltage (LE), motor overload (OL), inverter overload (OL1), over heat (OH), ground fault current(GF), fuse open (SC), disconnection of KP-202C during running (PAdF).	
	Diagnostics	Disconnection of digital keypad (Err_00, Err_01), EEPROM error (EEr)	
	Cooling	Force cooling (natural cooling for rated power of 1/2 and 1 HP)	
Ambient conditions	Environment	Non-corrosive non-conductive, or non-explosive gas or liquid, and non-dusty.	
	Temperature	-10°C (14°F) ~+50°C (122°F), non-freezing and non-condensing	
	Storage temperature	-20°C (-4°F) ~+60°C (140°F)	
	Relative humidity	90% RH or less (non-condensing atmosphere)	
	Vibration	Less than 5.9m /sec ² (0.6G)	
	Altitude	Less than 1000m (3280 ft)	

(1) Basic setup

The inverters have to be incorporated with some elementary devices for driving motor. The essentially elementary devices of basic setup are

A. Power source

The power source should be agreed with the specifications of Inverter.

B. No fuse brake (NFB)

The rating of NFB should be greater than the start current.

C. Inverter

This is main device of driving motor. Referring to the lists of standard specifications of inverter, inverter is chosen in accordance with the specifications of motor driven.

D. Motor

The specifications of motor are determined from the requirement of applications.

(2) Environment

For correct and safety operation, the operational environment of inverter should be cared and described as followings

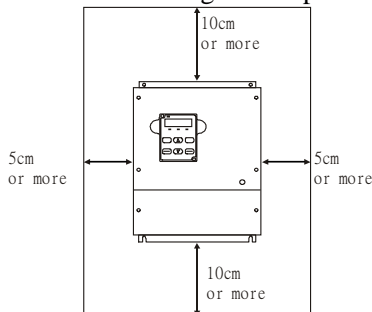
A. Power source

The power source should be agreed with the specifications of inverter.

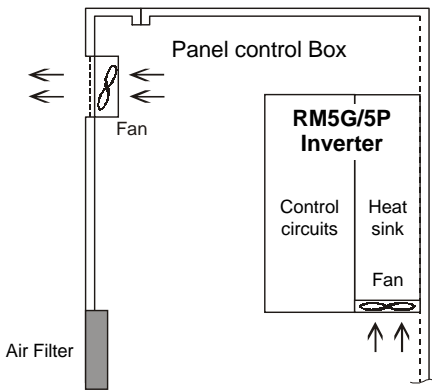
B. Location

For the considerations of heat generated by the operating machine, inverter has to be installed in the ventilate space. The installations of inverter are shown as followings.

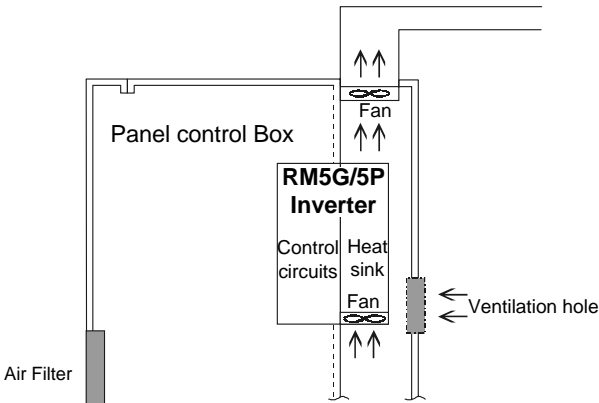
a. The space of installation is good for power dissipation or not



b. The cooling is needed if the inverter is installed in an enclosure.



c. If the inverter is installed in an enclosure (suitable for 7.5~420 hp) and the cooling system is on or outside enclosure, it should be mentioned that the hole for airflow is adequate or not.



C. Specifications of the associated accessories

The specifications of the associated accessories have to be in accordance with the specifications of inverter used. Otherwise, the inverter will be damaged and the lifetime of inverter will be decreased.

D. Cleaning of environment

The ventilation, cleanliness and moisture of the space in which the inverter is installed have to be considered.

E. Operator

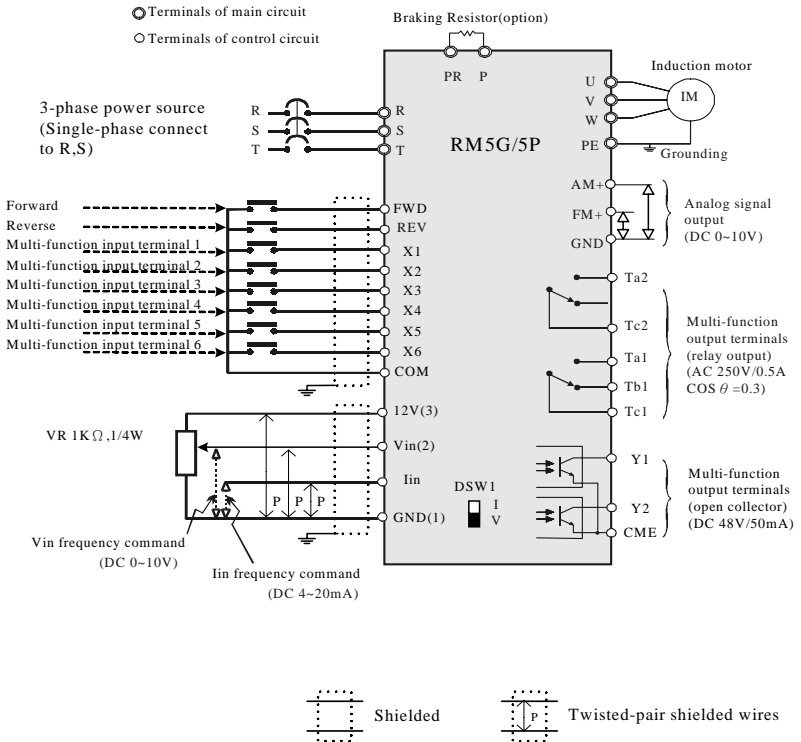
Only experienced peoples can perform operation and trouble shooting.

(3) Descriptions of terminals and wiring diagram

A. Wiring diagram

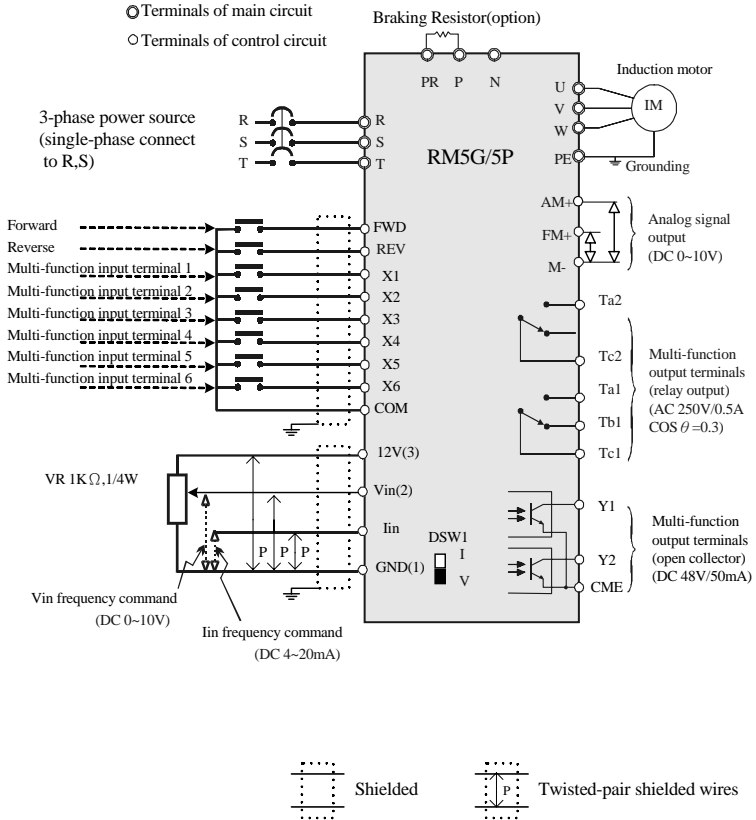
Note that the terminals represented by \bullet and \circ are denoted for main and control circuits, respectively.

a. Wiring diagram for 1/2~5 HP(200V class)/1~5HP(400V class)



※Built-in brake transistor

b. Wiring diagram for 7.5~15 HP(200V class)/7.5~20 HP(400V class)



※ Built-in brake transistor

※ Switch the DIP switch DSW1 on the control board.

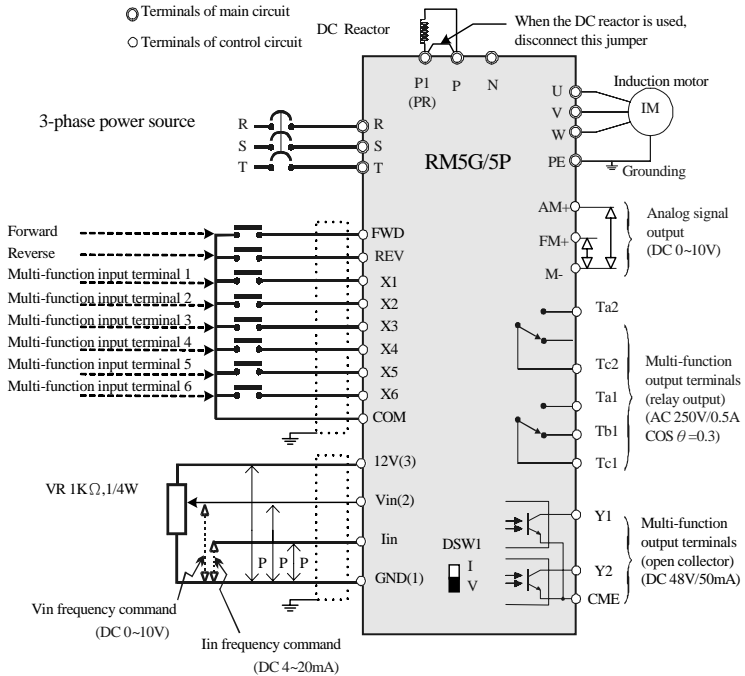
“ I ” side: mean Iin-GND inputting current command.

(Factory setting)

“ V ” side: mean Iin-GND inputting voltage command.

The setting range set by F_126.

c. Wiring diagram for 20~60 HP(200V class)/25~75 HP(400V class)



※ In case 20~60HP(200V)/25~75HP(400V) as build-in brake transistor, the mark of P1 will change to PR.

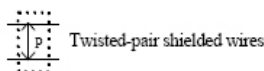
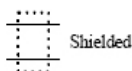
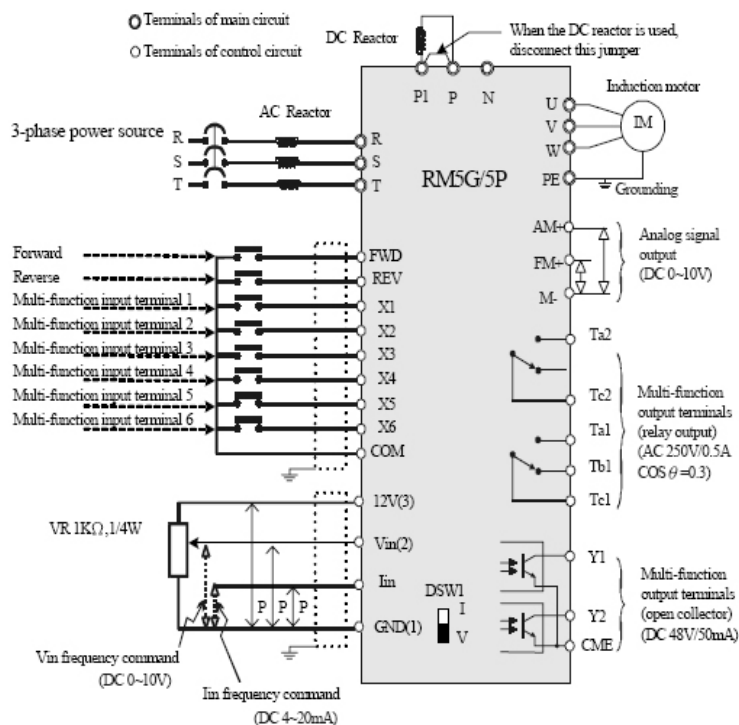
※ For the up to 400V 40HP, there are small terminals,

S0	380V	415V	440V	460V	480V
----	------	------	------	------	------

on the right side of RST, UVW, which are connected to the wire of cooling fan and contactor. Be sure connect to the correct required voltage. (Ex. when power is 380V, then must be connect 0 and 380V. In case the power change to 460V, please connect to 0 and 460V)

~INSTALLATIONS AND CONFIRMATIONS~

d. Wiring diagram for 75~150 HP(200V class)/100~420 HP(400V class)

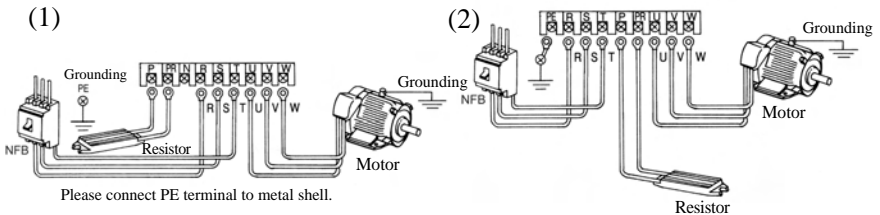


B. Descriptions of terminals
a. Terminals of main circuit

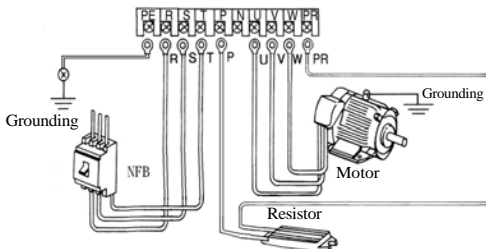
<i>Terminals</i>	<i>Symbols</i>	<i>Name</i>	<i>Descriptions</i>	
Main Circuit	Power source	R,S,T (L1,L2,L3)	Input AC voltage	3-phase power source (for 1Φ , 220V, use R and S only)
	Motor	U,V,W (T1,T2,T3)	Inverter output voltage	3-phase variable voltage and frequency output motor
	Power and braking	P,N	Dynamic brake terminals	Connect to the dynamic brake unit
		PR	External braking resistor	P and PR terminals connect to an external braking resistor(option)
		P1	External reactor	P and P1 terminals are short-circuit or connect to an external reactor for improving power factor. The factory setting is short-circuit.
Grounding	PE	Grounding	Less than 100 Ω for the third grounding method	

b. Main circuit(Terminals subject to change without notice)

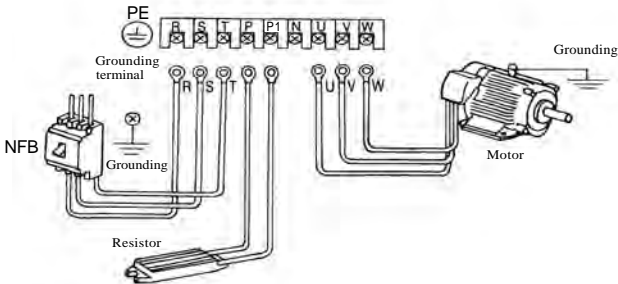
- (1) 1/2~3HP (Built-in brake transistor)
- (2) 5HP (200V class)/5HP (400V class)
(Built-in brake transistor)



- (3) 7.5~15HP(200V class) and 7.5~20HP(400V class) (Built-in brake transistor)

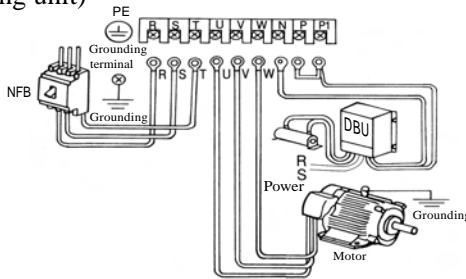


(4) 20~30HP(200V class)/25~40HP(400V class) (Brake type)



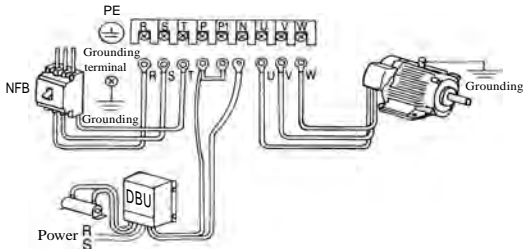
※The polarities of P and N terminals should be wired correctly.

(5) 40~100HP(200V)/50~150HP(400V)(connect dynamic braking unit)



※The polarities of P and N terminals should be wired correctly.

(6) 125~150HP(200V class)/175~420HP(400V class)(connect dynamic braking unit)



※The polarities of P and N terminals should be wired correctly.

※Connect dynamic braking unit, set the F₀₉₃(AVR)=0.

※20~60HP (200V Class) / 25~75HP (400V Class) The P1 terminal will be revised to PR, when brake transistor built in.(Brake type)

c. Terminals of control circuit

<i>Terminals</i>	<i>Symbols</i>	<i>Name</i>	<i>Descriptions</i>	
Control circuit	Input terminals	FWD	Forward operation	FWD-COM is short-circuit for forward operation
		REV	Reverse operation	REV-COM is short-circuit for reverse operation
		X1	Multiple function input terminal 1	Function is determined by F_052
		X2	Multiple function input terminal 2	Function is determined by F_053
		X3	Multiple function input terminal 3	Function is determined by F_054
		X4	Multiple function input terminal 4	Function is determined by F_055
		X5	Multiple function input terminal 5	Function is determined by F_056
		X6	Multiple function input terminal 6	Function is determined by F_057
		COM	Common of input terminals	Common of input terminal signals
		Vin	Voltage type of frequency command input	Input range 0 ~ 10V
		Iin	Current type of frequency command input DSW1-> I side (current input) DSW1-> V side (voltage input)	Input range DC4~20 mA (2~10V) /0~20mA(0~10V) The range determined by F_126
	Power Source	+12V	Reference voltage of control signals	12V reference voltage with maximum current 20mA
GND		Ground of control signals	Ground of control signals	

~INSTALLATIONS AND CONFIRMATIONS~

<i>Terminals</i>	<i>Symbols</i>	<i>Name</i>	<i>Descriptions</i>		
Control circuit	Output terminals	FM+ AM+	Analog output	1.Use a 10V full scale meter (impedance: 10K Ω or higher) 2.The maximum output current is 1mA.	
		M- GND	Ground of analog output signals	Ground of analog output signals	
		Ta1	Multiple function output terminals (Relay outputs)	The function of contact a (normal open) is determined by F_060. (The capacity of contact is 250VAC, 0.5A and Cos φ =0.3)	
		Tb1		The function of contact b (normal close) is determined by F_060. (The capacity of contact is 250VAC, 0.5A and Cos φ =0.3)	
		Tc1		Common terminals of Ta1 and Tb1	
		Ta2		The function of contact a (normal open) is determined by F_131. (The capacity of contact is 250VAC, 0.5A and Cos φ =0.3)	
		Tc2		Common terminals of Ta2	
		Y1		Multiple function output terminals (Open-collector outputs)	Function is determined by F_058/F_059. (The maximum capacity is DC48V,50mA)
		Y2			
		CME			Common terminals of Y1 and Y2

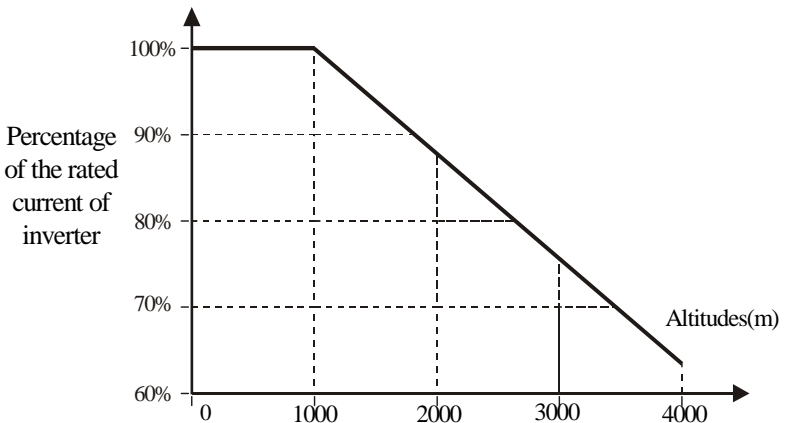
C. The notes and specifications of wiring

- a. The leakage current between ground and the wires that are connected between inverter and motor, is not the same for different rated power. The setting of carry frequency (F_81) relate to the rated power and wire distance. Referred to the figure shown below.

Distance Rated Power	10m	25m	50m	100m	Above 100m
1/2~5HP	12.5KHz or less	10KHz or less	7.5KHz or less	5KHz or less	2.5KHz
7.5~10HP	10KHz or less	7.5KHz or less	5KHz or less	2.5KHz	2.5KHz
15~30HP	7.5KHz or less	5KHz or less	2.5KHz	2.5KHz	2.5KHz
40~75HP	5KHz or less	2.5KHz	2.5KHz	2.5KHz	2.5KHz
100~420HP	2.5KHz	2.5KHz	2.5KHz	2.5KHz	2.5KHz

P.S. The carry frequency is determined by F_081.

- b. If the inverter is used where the altitude is greater than 1000 m, the relationship between current and altitude should be mentioned and referred to the figure shown below.



c. Precautions



DANGER

1. Do not connect or disconnect wiring, or perform signal check while the power supply is turned ON.
2. R, S and T terminals connected to power source are power input terminals of inverter. U, V and W terminals connected to motor are power output terminals of inverter. Never connect them to terminals P, N, P1 and PR .
3. After turn off power source, please don't touch the inverter and change the wiring when indicator is light.
4. The terminals of main power circuit and control circuit can not be connected to PE terminal.
5. After wiring is completed, please put on the inverter cover for avoiding the other people's touch.
6. For 200 V class, 346/380/415/440/460/480 V power source can not be used.
7. In the restart after instantaneous power interruption, running is resumed and the people around motor and machinery should be controlled for avoiding danger and damage.
8. The wiring of main circuit and control circuit should be separated for avoiding interference.
9. Only experienced people can perform installation, wiring, operation and trouble-shooting.
10. The RM5G/5P series are not designed against explosion and then should be kept away from gas, oil and explosion etc.



CAUTION

1. The RM5G/5P series should be kept away from corrosive gas, oil, dust or metallic particles in the air, high temperature, high humidity and explosion etc.
2. If inverter is installed in an enclosure, the ambient temperature can not exceed +50 °C.
3. Use shielded wire when inputting the control signals externally. Noise and grounding have to be considered for avoiding interference.
4. Wiring terminals and installation:
 - (1) Wiring should be made according to the symbols of terminals. Tighten the screw on the main circuit and control circuit terminals.
 - (2) Appropriate wiring size should be used. Connect R, S and T terminals to power source (In the case of single phase power source connect R and S terminals to power source).
 - (3) Use no-fuse brake (NFB), magnetic contact or fuse at power source input terminals, and use a thermal relay (TH-RY) to protect motor if the motor capacity is smaller than inverter.
 - (4) After U, V and W terminals of motor have been disconnected, the insulation of motor can be then tested. Note that testing motor and inverter can be performed only by experienced peoples.

~INSTALLATIONS AND CONFIRMATIONS~

d. Recommended wiring size (for reference only)

MOTOR (HP)	200V Series (mm ²)			400V Series (mm ²)		
	Main circuit	Control circuit	Grounding wire	Main circuit	Control circuit	Grounding wire
1	2	0.75 ~1.25	The same as main circuit	2	0.75 ~1.25	The same as main circuit
2	2			2		
3	2			2		
5	3.5			3.5		
7.5	5.5			3.5		
10	8			5.5		
15	14			8		
20	22			8		
25	30			14		
30	38			22		
40	60			30		
50	80			30		
60	100			38		
75	60X2			60		
100	100X2			80		
125	150X2			100		
150	200X2	60X2				
175	-	100X2				
200	-	100X2				
250	-	150X2				
300	-	200X2				
420	-	250X2				

CHAPTER 3 TYPES OF KEYPADS

(1) Digital keypad (KP-201C)

- 1.If LED is light, speed is command by keypad.
- 2.If LED is not light,speed is command by terminals.

- 1.T.S : Indicator of the status of terminals.
- 2.Indicator of unit.

- 1.Enter function code setting mode.
- 2.Back to monitor mode.

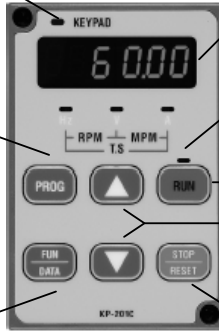
- 1. Constant speed : LED is light.
- 2. Acc./dec. : LED flashes.

- 1.Enter parameter setting mode.
- 2.Back to function code setting mode.
- 3.Switch the monitor mode.

Inverter begins to output frequency.

Increase or decrease setting.

- 1.Inverter stops frequency output.
- 2.Reset.



(2) Analog keypad (KP-202C)

- 1.If LED is light, speed is command by keypad.
- 2.If LED is not light,speed is command by terminals.

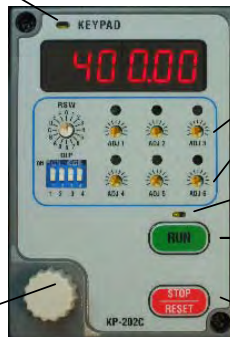
The LED will be light, if the corresponding ADJ has been chosen by RSW.

- 1. Constant speed : LED is light.
- 2. Acc./dec. : LED flashes.

Inverter begins to output frequency.

- 1.Inverter stops frequency output.
- 2.Reset.

Setting potentiometer

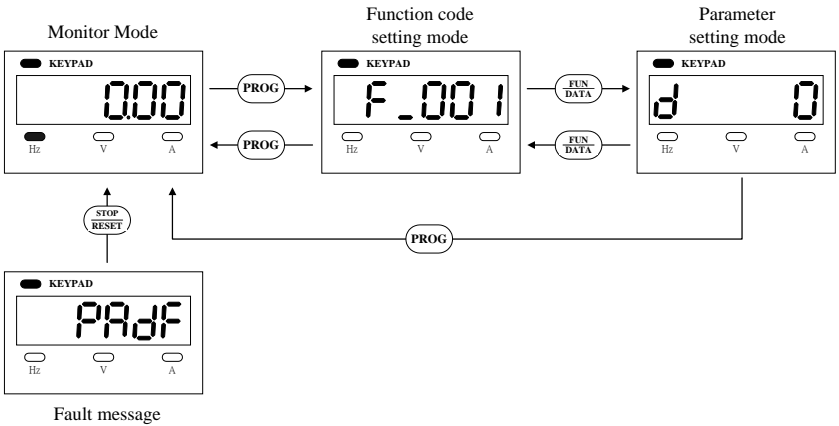


Note: Keypad KP-201B and KP-202B still can be used in the RM5G/5P inverter.

CHAPTER 4 OPERATIONS OF KEYPADS

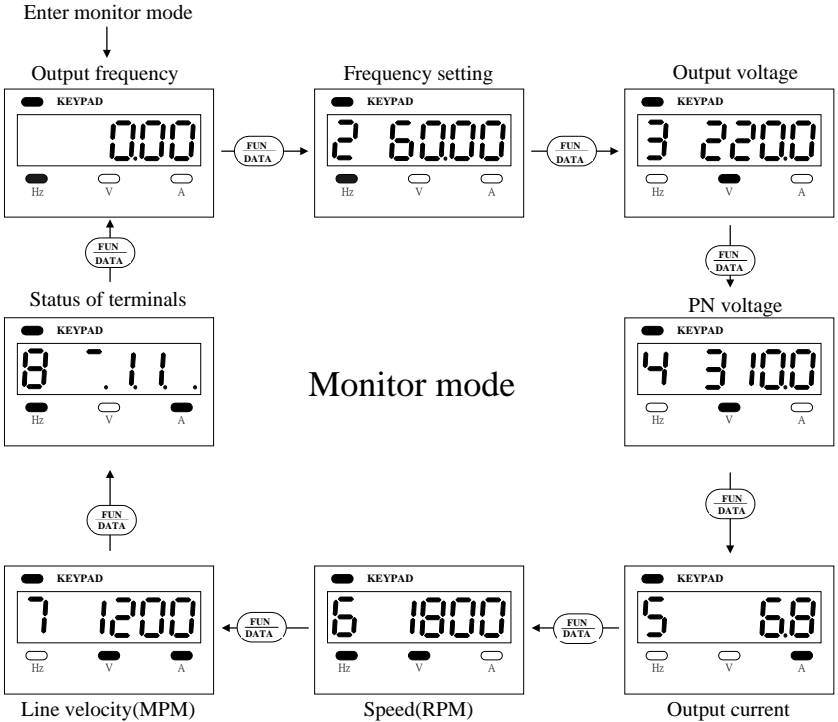
(1) Settings of digital keypad(KP-201C)

A. Digital keypad has three modes and displays for fault conditions.
The switching among these is shown in the setting diagram below.



P.S. Keypad connection wire have two types, one is 8Pin telephone cable, it can use within the 5M; the other is net connect cable (AMP), it can use above the 5M. The maximum distance is 25M.

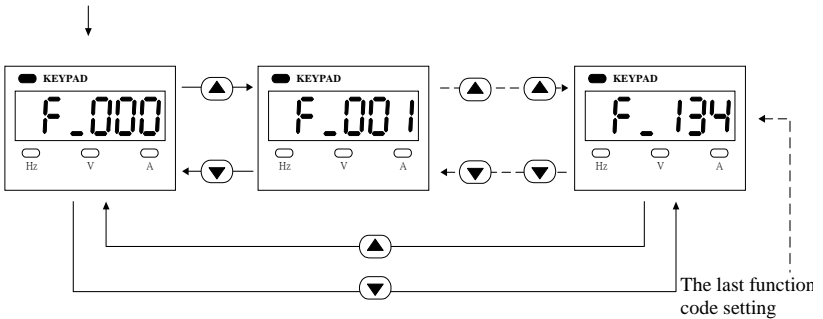
B. In the monitor mode, there are 8 displays, 1 main display and 7 auxiliary displays, used to indicate the status of inverter. The most left digit indicates the number of auxiliary display (2~8), and the most left digit is turned off for indicating main display.



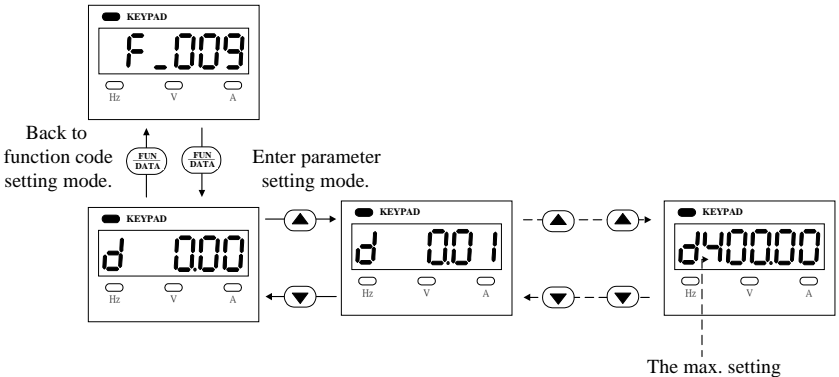
- a. Any display can be set to be the main display by F_006.
- b. The function that the user defines own main display is convenient to choose the most important status of inverter as main display for certain applications. If the keypad has not been operated and the auxiliary display has been displayed for about 3 minutes, the main display is shown automatically for user to monitor the most important status of inverter.

C. In the function code setting mode, there are 135 function codes (F_000~F_134) to be set and the setting diagram is shown in the figure below.

Enter function code setting mode

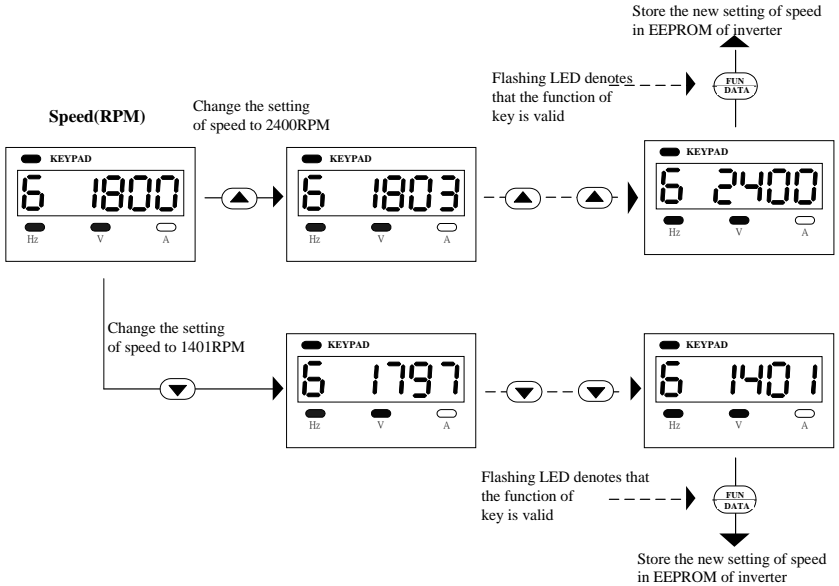


D. In the parameter setting mode, the range of setting is defined in function code and the setting diagram is shown in the figure below.



The range of parameter setting of F_009 is 0.00 ~ 400.00 Hz.

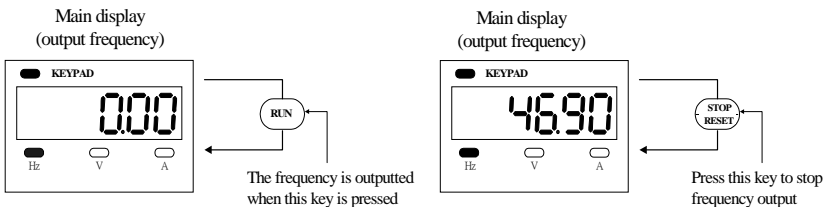
E. In the monitor mode, the frequency command, speed (RPM) and line velocity (MPM) can be changed. For example, the setting diagram of changing speed is shown in the figure below.



a. In the monitor mode, and on keypad are used to increase and decrease speed, respectively.

b. After speed setting, the LED of keypad is flashing with the value of setting, press within 5 seconds to store speed setting.


F. Only in the monitor mode, the frequency output can be controlled by pressing and .




G. Copy and resume factory settings

- a. The function of copy is defined to store settings in digital keypad (KP-201C) or write settings from digital keypad to inverter.

(1) Store settings in digital keypad(KP-201C)


To disconnect digital keypad and press  until that digital keypad is connected to inverter, the LED of keypad will display ' r d . E E ' to indicate that the setting is storing in digital keypad (KP-201C).


(2) Write setting from digital keypad(KP-201C) to inverter

To disconnect digital keypad and press  until that digital keypad is connected to inverter, the LED of keypad will display ' U U r . E E ' to indicate that the setting is writing from digital keypad (KP-201C) to inverter.


- (3) If the inverters have different software versions, they can not read /write setting to inverter each other. The digital keypad (KP-201C) display will show the ' U U r . F ' .

b. Resume factory settings

- (1) To disconnect digital keypad (KP-201C) and press  until that digital keypad is connected to inverter, the LED of keypad will display ' d E F 5 0 ' to indicate that resume the factory settings of 60HZ.






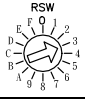

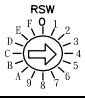







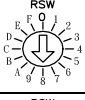

- (2) To disconnect digital keypad (KP-201C) and press  until that digital keypad is connected to inverter, the LED of keypad will display ' d E F 5 0 ' to indicate that resume the factory settings of 50HZ.

c. Resume last settings

To disconnect digital keypad (KP-201C) and press  until that digital keypad is connected to inverter, the LED of keypad will display ' r E S ' to indicate that the last settings have been resumed.

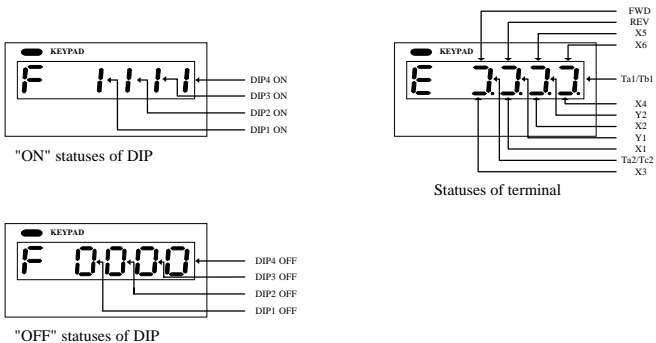
(2) Settings of analog keypad (KP-202C)

A. Descriptions of RSW functions





RSW	Functions	Corresponding VR	Range	Factory setting
	Output frequency	----	----	----
	Boost voltage		0.1~127.5V	8.0V(200V class) 12.0V(400V class)
	Primary acceleration time		0.0~165.0 sec	0.5~5HP : 5.0 sec 7.5~30HP:15.0 sec above 40HP:30.0 sec
	Primary deceleration time		0.0~165.0 sec	0.5~5HP : 5.0 sec 7.5~30HP:15.0 sec above 40HP:30.0 sec
	Speed level 1		0.0~120.0Hz	10.0Hz
	Max. output frequency		0.0~120.0Hz	60.0Hz
	Secondary Acc/Dec time		0.0~165.0 sec	0.5~5HP : 5.0 sec 7.5~30HP:15.0 sec above 40HP:30 sec
	Primary setting		0.0~120.0Hz	----
	Indicate frequency setting	----	----	----
	Indicate output voltage	----	----	----

RSW	Functions	Corresponding VR	Range	Factory setting
	Indicate DC voltage	----	----	----
	Indicate output current	----	----	----
	Indicate speed Of motor	----	----	----
	Indicate line velocity	----	----	----
	Indicate status of terminals	----	----	----
	Indicate status of DIP	----	----	----








- a. The function code associated with VR can be changed, besides the ADJ1~ADJ3.
- b. The status of terminals and DIP are shown as the figure below.



B. Descriptions of DIP functions

No. Switch	DIP	Functions	Descriptions	Remark
1		Carry frequency	ON: Carry frequency is 2.5KHz OFF: use KP-201C set the carry Frequency(Factory setting)	Refer to P.70
2		Selections of base frequency	ON: Base frequency at 50.00Hz OFF: Base frequency at 60.00Hz	Refer to P.70
3		Selections of speed setting	ON: frequency set by terminal OFF: frequency set by KP-201C primary speed or KP-202C setting (Factory setting)	Refer to P.70
4		Selections of start command	ON: start with the FWD/REV terminal OFF: use the KP-202C start (Factory setting)	Refer to P.70

C. Descriptions of ADJ functions

ADJ	Functions	Range	Factory setting	Remark
	Boost voltage	0.1~127.5V	8.0V(200V class) 12.0V(400V class)	Refer to P.71
	Primary acceleration time	0.0~165.0 sec	0.5~5HP : 5.0 sec 7.5~30HP:15.0 sec above 40HP:30.0 sec	Refer to P.71
	Primary deceleration time	0.0~165.0 sec	0.5~5HP : 5.0 sec 7.5~30HP:15.0 sec above 40HP:30.0 sec	Refer to P.71
	Speed level 1	0.0~120.0Hz	10.0Hz	Refer to P.71
	Max. output frequency	0.0~120.0Hz	60.0Hz	Refer to P.71
	Secondary Acc/Dec time	0.0~165.0 sec	0.5~5HP : 5.0 sec 7.5~30HP:15.0 sec above 40HP:30 sec	Refer to P.71
	Primary setting	0.0~120.0Hz	----	Refer to P.71

CHAPTER5 LIST OF FUNCTION CODE SETTING

Function	Name	Descriptions				Range of setting	Resolution	Factory setting	No. page reference for detail
F_000	Version of software	Display the version of software				—	—	P5103d	33
F_001	Selections of start command		Start command	Direction command		0 3	—	3	33
		0:	FWD and REV terminal						
		1:	FWD terminal	REV terminal					
		2:	Start signal is generated by keypad						
3:	FWD and REV terminals are useless								
F_002	Select source of speed setting	0:Indicate the frequency is set by terminals				0~4	—	1	34
		1:Indicate the frequency is set by keypad							
		2:RPM set by keypad							
		3:MPM set by keypad							
F_003	Selection of validity of STOP on keypad	0:Indicate terminals generate start signal then STOP on keypad is invalid				0,1	—	1	35
		1:Indicate terminals generate start signal then STOP on keypad is valid							
F_004	Selection function of changing frequency for KP-201C	0:Indicate KP-201C is in monitor mode and the frequency setting can not be changed				0,1	—	1	35
		1:Indicate KP-201C is in monitor mode and the frequency setting can be changed							
F_005	Selection function of storing frequency for KP-201C	0:Indicate KP-201C is in monitor mode and the frequency setting can not be stored automatically				0,1	—	1	35
		1:Indicate KP-201C is in monitor mode and the frequency setting can be stored automatically after 3 minutes							
F_006	Select main display of KP-201C	Select one of 8 display as main display				1~8	—	1	35
F_007	Speed constant	Set the value of MPM displayed on keypad				0.00 ~500.00	0.01	20.00	36
F_008	No. decimal of speed display	Set the no. decimal of speed displayed on keypad				0~3	—	0	36
F_009	Main speed	Jog	X3	X2	X1	0.00 ~400.00	0.01HZ	50.00 (Re.1)	37
		OFF	OFF	OFF	OFF			60.00 (Re.2)	
F_010	Speed level 1	OFF	OFF	OFF	ON	0.00~400.00	0.01HZ	10.00	37
F_011	Speed level 2	OFF	OFF	ON	OFF	0.00 ~400.00	0.01HZ	20.00	37
F_012	Speed level 3	OFF	OFF	ON	ON	0.00 ~400.00	0.01HZ	30.00	37
F_013	Speed level 4	OFF	ON	OFF	OFF	0.00 ~400.00	0.01HZ	0.00	37
F_014	Speed level 5	OFF	ON	OFF	ON	0.00 ~400.00	0.01HZ	0.00	37
F_015	Speed level 6	OFF	ON	ON	OFF	0.00~400.00	0.01HZ	0.00	37
F_016	Speed level 7	OFF	ON	ON	ON	0.00~400.00	0.01HZ	0.00	37
F_017	Jog speed	ON	X	X	X	0.00~400.00	0.01HZ	6.00	37
F_018	Base freq. of acc./dec.	The frequency is correspond to acc./dec. time				0.01~400.00	0.01HZ	50.00 (Re.1) 60.00 (Re.2)	39
F_019	Primary acceleration time	The acceleration time of main speed, speed level 4~7, and jog speed				0.0~3200.0	0.1S	15.0 (Re.5)	39
F_020	Primary deceleration time	The deceleration time of main speed, speed level 4~7, and jog speed				0.0~3200.0	0.1S	15.0 (Re.5)	39
F_021	Acceleration time of speed level 1	Acceleration time of speed level 1				0.0~3200.0	0.1S	15.0 (Re.5)	39

X: means don't care The color as means which can be set during peration.

~LIST OF FUNCTION CODE SETTING~

Function	Name	Descriptions	Range of setting	Resolution	Factory setting	No. page reference for detail
F_022	Deceleration time of speed level 1	Deceleration time of speed level 1	0.0~3200.0	0.1S	15.0 (Re.5)	39
F_023	Acceleration time of speed level 2	Acceleration time of speed level 2	0.0~3200.0	0.1S	15.0 (Re.5)	39
F_024	Deceleration time of speed level 2	Deceleration time of speed level 2	0.0~3200.0	0.1S	15.0 (Re.5)	39
F_025	Acceleration time of speed level 3	Acceleration time of speed level 3	0.0~3200.0	0.1S	15.0 (Re.5)	39
F_026	Deceleration time of speed level 3	Deceleration time of speed level 3	0.0~3200.0	0.1S	15.0 (Re.5)	39
F_027	Secondary acceleration time	Multiple function-input terminals control the situation of the determination of secondary acceleration time	0.0~3200.0	0.1S	15.0 (Re.5)	39
F_028	Secondary deceleration time	Multiple function-input terminals control the situation of the determination of secondary deceleration time	0.0~3200.0	0.1S	15.0 (Re.5)	39
F_029	Setting of S-curve acc./dec. time	Setting of acceleration/deceleration time of S-curve acceleration/deceleration	0.0~5.0	0.1S	0.0	39
F_030	Limitation of output voltage	0:Output voltage of V/F pattern is not limited	0,1	—	0	41
		1:Output voltage of V/F pattern is limited				
F_031	Max. output frequency	Operational maximum output frequency by inverter	0.1~400.0	0.1HZ	50.0 (Re.1)	41
					60.0 (Re.2)	
F_032	Start frequency	Start frequency of inverter output frequency	0.1~10.0	0.1HZ	0.5	41
F_033	Boost voltage	Output voltage associated with output start frequency	0.1~50.0	0.1V	8.0 (Re.3)	41
			0.1~100.0		12.0 (Re.4)	
F_034	Base frequency	The frequency associated with base voltage in V/F pattern	0.1~400.0	0.1HZ	50.0 (Re.1)	41
					60.0 (Re.2)	
F_035	Base voltage	The voltage associated with base frequency in V/F pattern	0.1~255.0	0.1V	220.0 (Re.3)	41
			0.1~510.0		380.0 (Re.4)	
F_036	Frequency at the changing point 1	Frequency at the changing point 1 of V/F pattern	0.0~399.9	0.1HZ	0.0	41
F_037	Voltage at the changing point 1	Voltage at the changing point 1 of V/F pattern	0.0~255.0	0.1V	0.0	41
			0.0~510.0			
F_038	Frequency at the changing point 2	Frequency at the changing point 2 of V/F pattern	0.0~399.9	0.1HZ	0.0	41
F_039	Voltage at the changing point 2	Voltage at the changing point 2 of V/F pattern	0.0~255.0	0.1V	0.0	41
			0.0~510.0			
F_040	Vin frequency command gain	Proportional gain between Vin analog frequency command and output frequency	0.00~2.00	0.01	1.00	43
F_041	Vin frequency command bias	Gain of Vin analog bias frequency	-1.00~1.00	0.01	0.00	43
F_042	Ratio of upper bound of output frequency	The upper bound of output voltage is defined as the percentage of the maximum output frequency (1.00 denotes the maximum frequency)	0.00~1.00	0.01	1.00	45
F_043	Ratio of lower bound of output frequency	The lower bound of output voltage is defined as the percentage of the maximum output frequency (1.00 denotes the maximum frequency)	0.00~1.00	0.01	0.00	45

The color as means which can be set during operation.

~LIST OF FUNCTION CODE SETTING~

Function	Name	Descriptions	Range of setting	Resolution	Factory setting	No. page reference for detail
F_044	Selection of FM+ analog output signal	0:Analog signal indicates output frequency 1:Analog signal indicates frequency command 2:Analog signal indicates output current 3:Analog signal indicates Vin frequency command 4:Analog signal indicates lin frequency command	0~4	—	0	46
F_045	FM+ analog output gain	Gain=max output frequency/output frequency. Or Gain=rated current of inverter/output current	0.00~2.00	0.01	1.00	46
F_046	Overload protection selection	0:No overload protection for motor 1:Overload protection for motor 2:Overload protection for motor with independence heat fan	0~2	—	1	47
F_047	Reserved	Reserved	—	—	0	47
F_048	Rated current of motor	According to the spec. of motor	10~150% by the inverter rated current	0.1A	According to the spec. of motor	47
F_049	No-load current of motor	According to the spec. of motor	0~motor rated current	0.1A	1/3 motor rated current	47
F_050	Slip compensation	According to the load condition, slip is compensation for constant speed	-9.9~10.0	0.1HZ	0.0	47
F_051	No. poles of motor	Setting of poles of motor for conversion of RPM	2~10	2P	4P	47
F_052	Input terminal X1 setting	X1=0:UP/DOWN command enter key ±1:jog command ±2:switch between the secondary acceleration and deceleration	-16~ +16 (Re.9)	—	3	48
F_053	Input terminal X2 setting	X2=0:DC braking enable (stop) ±3:multiple speed level 1 command ±4:multiple speed level 2 command			4	
F_054	Input terminal X3 setting	X3=0:current limit enable ±5:multiple speed level 3 command ±6:reset command ±7:external fault command			1	
F_055	Input terminal X4 setting	X4=0:primary and secondary speed select ±8:inhibition command for output ±9:stop in free running ±10:speed search from the maximum frequency			2	
F_056	Input terminal X5 setting	X5=0 : stop command with 3-line sustaining circuit (contact a) ±11:speed search from the set frequency ±12:inhibition command for acceleration and deceleration			7	
F_057	Input terminal X6 setting	X6=0 : stop command with 3-line sustaining circuit (contact b) ±13:up command ±14:down command ±15:clear up/down frequency command ±16:select analog input source			6	
F_058	Output terminal Y1 Setting	0: useless ±1:running detection ±2:constant speed detection	-11~+11 (Re.9)	—	3	54
F_059	Output terminal Y2 Setting	±3:zero speed detection ±4:frequency detection ±5:overload detection ±6:stall prevention detection			2	
F_060	Settings of output terminals Ta1 and Tb1	±7:under voltage detection ±8:detection of braking ±9:detection of restart after instantaneous power interruption ±10:detection of restart after fault conditions ±11:detection of fault conditions			11	
F_061	Frequency range for constant speed detection	Frequency range for constant speed detection	0.0~10.0	0.1HZ	2.0	59
F_062	Frequency detection range	Frequency detection range	0.0~10.0	0.1HZ	2.0	59
F_063	Level of frequency detection	Level of frequency detection for multiple function output terminal	0.0~400.0	0.1HZ	0.0	59

The color as means which can be set during operation.

~LIST OF FUNCTION CODE SETTING~

Function	Name	Descriptions	Range of setting	Resolution	Factory setting	No. page reference for detail
F_064	Gain of the automatic torque boost	According to the load condition, adjust the output voltage of the certain V/F pattern	0.0~25.5	0.1	1.0	59
F_065	Selection of overload detection(OLO)	0:There is no output for overload detection	0,1	—	0	60
		1:There is output for overload detection (Re.6)				
F_066	Status of overload detection(OLO)	0:There is output for the condition of constant frequency only	0,1	—	0	60
		1:There is output for any frequency				
F_067	Output setting for overload(OLO)	0:Inverter is still running after overload has been detected	0,1	—	0	60
		1:Output of inverter is inhibited after overload has been detected				
F_068	Level of overload setting(OLO)	The setting of level of current for overload detection	30%~200% by the inverter rated current	1%	160	60
F_069	Time interval for overload detection	The time interval, in which the output current is larger than the setting of F_068, required for overload detection	0.1~10.0	0.1S	0.1	60
F_070	Level of stall prevention during acceleration	If stall is occurred during acceleration, motor is kept at constant speed	30%~200% by the inverter rated current	1%	170	61
F_071	Level of stall prevention at the constant speed	If stall is occurred at the constant-speed running, the motor speed is decreased	30%~200% by the inverter rated current	1%	160	61
F_072	Acceleration time of recovery after stall prevention at the constant speed	Setting of acceleration time of recovery after stall prevention at the constant speed	0.1~3200.0	0.1S	15.0 (Re.5)	61
F_073	Deceleration time of recovery after stall prevention at the constant speed	Setting of deceleration time of recovery after stall prevention at the constant speed	0.1~3200.0	0.1S	15.0 (Re.5)	61
F_074	Select function of stall prevention during dec.	0:There is no stall prevention during deceleration	0,1	—	1	61
		1:There is stall prevention during deceleration				
F_075	Current of DC braking	Setting of level of current for DC braking setting	0~150% by the inverter rated current	1%	50	62
F_076	Time interval of DC braking in stop	In stop the required time interval for DC braking setting	0.0~20.0	0.1S	0.5	62
F_077	Time interval of DC braking in start	In start the required time interval for DC braking setting	0.0~20.0	0.1S	0.0	62
F_078	Selection of resumption	0:Inverter can not be restarted after instantaneous power interruption	0~3	—	0	63
		1:Inverter will be restarted after instantaneous power interruption				
		2:Shutdown				
		3:Enable controlled deceleration stop (F_103,F_104,F_105,F_106)				
F_079	Level of power source for shutdown	Level of power source for shutdown	150.0~192.0	0.1V	175.0 (Re.3)	63
			300.0~384.0			
F_080	Number of restart	Number of restart for fault conditions	0~16	1	0	67
F_081	Carry frequency setting	The setting value is higher then the noise is lower. The carry frequency is inversely proportional to the distance between inverter and motor	1~6	—	4 (Re.10)	67

The color as means which can be set during operation.

~LIST OF FUNCTION CODE SETTING~

Function	Name	Descriptions	Range of setting	Resolution	Factory setting	No. page reference for detail
F_082	Types of stop	0: Indicate stop by deceleration 1: Indicate stop by free running	0,1	—	0	67
F_083	Inhibition of reversal rotation	0: Indicate that reversal rotation is allowed 1: Indicate that reversal rotation is not allowed	0,1	—	0	67
F_084	Jumping frequency 1	To avoid the resonance of machinery, the jump of frequency command is occurred in frequency 1	0.0~400.0	0.1Hz	0.0	64
F_085	Jumping frequency 2	To avoid the resonance of machinery, the jump of frequency command is occurred in frequency 2	0.0~400.0	0.1Hz	0.0	64
F_086	Jumping frequency 3	To avoid the resonance of machinery, the jump of frequency command is occurred in frequency 3	0.0~400.0	0.1Hz	0.0	64
F_087	Jump of frequency	The setting of the jump of frequency command in frequency 1,2,3	0.0~25.5	0.1Hz	0.0	64
F_088	Current for speed tracking	If the current is larger than speed tracking, the output frequency is decreased	0~200% by the inverter rated current	1%	150	65
F_089	Time interval for speed tracking	The time interval, with zero output frequency, preceding with speed tracking	0.5~5.0	0.1S	0.5	65
F_090	V/F pattern of speed tracking	In the speed tracking, the setting of percentage of output voltage obtained from the original V/F pattern.	0~100%	1%	100	65
F_091	Fault records	Display the last 5 records of faults.	—	—	no_Err	67
F_092	Lock of parameters	0: Parameters are changeable. Max. frequency can not over 120.0Hz. 1: Parameters are locked. Max. frequency can not over 120.0Hz. 2: Parameters are changeable. Max. frequency can over 120.0Hz. 3: Parameters are locked. Max. frequency can over 120.0Hz.	0~3	—	0	67
F_093	Selection of automatic voltage regulation	0: Indicate that voltage is not regulated automatically. (Re.7) 1: Indicate that voltage is regulated automatically.	0,1	—	1	67
F_094	Selection of the overload protection of inverter (OLI)	0: Indicate that there is no overload protection. 1: Indicate that there is overload protection.	0,1	—	1	68
F_095	Voltage level of power source	The range of setting is in accordance with power source.	190.0~240.0 340.0~480.0	0.1V	220.0 (Re.3) 380.0 (Re.4)	68
F_096	Creeping Frequency setting	The output frequency is accelerated to creeping frequency and then is in constant frequency.	0.0~400.0	0.1Hz	0.5	65
F_097	Time duration of creep	The time interval for output frequency to be accelerated to creeping frequency.	0.0~25.5	0.1S	0.0	65
F_098	Reserved	Reserved	—	—	0	66
F_099	Selection of display of external indicator 1	Selection of display of external indicator 1	0 ~ 8	—	1 (Re.8)	66
F_100	Selection of display of external indicator 2	Selection of display of external indicator 2	0 ~ 8	—	2 (Re.8)	66
F_101	Selection of display of external indicator 3	Selection of display of external indicator 3	0 ~ 8	—	3 (Re.8)	66
F_102	Selection of energy saving device	0: Do not equip energy-saving device. 1: Equip energy-saving device.	0,1	—	0	68
F_103	Decrease frequency of deceleration time of shutdown power source	If power source shutdown, then the Frequency = output frequency - decrease frequency.	0.0~20.0	0.1Hz	3.0	63
F_104	Deceleration time 1 of power source for shutdown	Deceleration time when output frequency larger than switch frequency (F_106)	0.0~3200.0	0.1S	15.0 (Re.5)	63

The color as means which can be set during operation

~LIST OF FUNCTION CODE SETTING~

Function	Name	Descriptions	Range of setting	Resolution	Factory setting	No. page reference for detail
F_105	Deceleration time 2 of power source for shutdown	Deceleration time when output frequency smaller than switch frequency (F_106)	0.0~3200.0	0.1S	15.0 (Re.5)	63
F_106	Switch frequency of power source for shutdown	Frequency setting value of switch the deceleration time of speed level 2.	0.0~400.0	0.1HZ	0.0	63
F_107	ADJ1 parameter setting	ADJ1 of KP-202C function is boost voltage , it can't be changed	—	—	0	69
F_108	ADJ2 parameter setting	ADJ2 of KP-202C function is primary acc. time , it can't be changed.	—	—	0	69
F_109	ADJ3 parameter setting	ADJ3 of KP-202C function is primary dec. time , it can't be changed	—	—	0	69
F_110	Selection of parameter of ADJ4	Selecting parameter of ADJ4 of KP-202C	0~49	—	1	69
F_111	Selection of parameter of ADJ5	Selecting parameter of ADJ5 of KP-202C	0~49	—	20	69
F_112	Selection of parameter of ADJ6	Selecting parameter of ADJ6 of KP-202C	0~49	—	17	69
F_113	Selection of parameter of DIP1	Selecting parameter of DIP1 of KP-202C	0~15	—	8	69
F_114	Selection of parameter of DIP2	Selecting parameter of DIP2 of KP-202C	0~15	—	5	69
F_115	Selection of parameter of DIP3	Selecting parameter of DIP3 of KP-202C	0~15	—	3	69
F_116	Selection of parameter of DIP4	Selecting parameter of DIP4 of KP-202C	0~15	—	1	69
F_117	Setting potentiometer of KP-202C	Selecting parameter of setting potentiometer of KP-202C	0~49	—	0	69
F_118	Selection of UP/DOWN memory control	0:Clear UP/DOWN frequency for shutdown power 1:Store UP/DOWN frequency for shutdown power	0,1	—	0	51
F_119	UP/DOWN adjust frequency	0: 0.01Hz , 1~8:*0.05Hz , 9:0.5Hz , 10~250:*0.1Hz	0 250	—	0	51
F_120	UP/DOWN adjust Time	1~5:Terminal adjust response time, continuous acceleration (deceleration) when over setting time 6:Edge trigger	1~6	—	1	51
F_121	UP/DOWN frequency adjust	Adjust UP/DOWN frequency from KEYPAD directly	0.00~400.00	0.01HZ	0.00	52
F_122	Selection of secondary speed	0:Indicate the frequency is set by terminals 1:Indicate the frequency is set by keypad 2:Indicate the frequency is set by UP/DOWN terminals	0~2	—	0	53
F_123	Select source of analog input	0: Vin+Iin 1:Vin - Iin 2:Iin-Vin 3: Vin or Iin (switch by multi-function input terminal)	0~ 3	—	0	44
F_124	Selection of Vin analog input	0: Analog input gain 1: Frequency command 2: Current limit level 3: Output voltage adjustment of V/F pattern	0~ 3	—	1	44
F_125	Selection of Iin analog input	0: Analog input gain 1: Frequency command 2: Current limit level 3: Output voltage adjustment of V/F pattern	0~ 3	—	1	44
F_126	Selection of Iin analog input range	0: 4~20mA (2~10V) 1: 0~20 mA (0~10V)	0,1	—	0	44
F_127	Iin frequency command gain	Proportional gain between Iin analog frequency command and output frequency	0.00~2.00	0.01	1.00	43
F_128	Iin frequency command bias	Gain of Iin analog bias frequency	-1.00~1.00	0.01	0.00	43

The color as means which can be set during operation

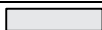
~LIST OF FUNCTION CODE SETTING~

Function	Name	Descriptions	Range of setting	Resolution	Factory setting	No. page reference for detail
F_129	Selection of AM+ analog output signal	0:Analog signal indicates output frequency 1:Analog signal indicates frequency command 2:Analog signal indicates output current 3:Analog signal indicates Vin frequency command 4:Analog signal indicates Iin frequency command	0~4	—	2	46
F_130	AM+ analog output gain	Gain=max output frequency/output frequency. Or Gain=rated current of inverter/output current	0.00~2.00	0.01	1.00	46
F_131	Setting of output terminals Ta2 and Tc2	Refer the setting of multiple function outputs	-11 11 (Re.9)	—	1	54
F_132	Frequency of DC braking in stop	Start frequency of DC braking in stop	0.1~60.0	0.1HZ	0.5	62
F_133	Current limit level	Monitor the current limit level setting	—	—	—	53
F_134	Selections of resumption of factory setting	0 : Useless	—	—	0	36
		CLF : Clear fault records				
		dEF60 : Resume the factory setting of 60 Hz				
		dEF50 : Resume the factory setting of 50 Hz				
		SAv : Store setting				
		rES : Resume setting				
		rd-EE : Digital keypad (KP-201C) inverter parameters				
Wr-EE : Digital keypad (KP-201C) inverter parameters						

Remark:

- | | |
|--|---|
| (1) Factory settings for 50 Hz | (6) Display 'OLO ' |
| (2) Factory settings for 60 Hz | (7) The dynamic braking unit is installed. |
| (3) Specifications of 200V class. | (8) The setting is zero to denote that there is no display. |
| (4) Specifications of 400V class . | (9) + : represents contact a (normally open)
- : represents contact b (normally close) |
| (5) 0.5~5 HP: 5 sec
7.5~30 HP:15 sec
above 40 HP: 30 sec | UP/DOWN control wiring must be less than 20M. |
| | (10) Above 125HP for RM5P series, the factory setting of F_081=3 |

The color as



means which can be set during operation

6.DESCRPTIONS OF FUNCTION CODE SETTINGS

(1) Settings of keypad

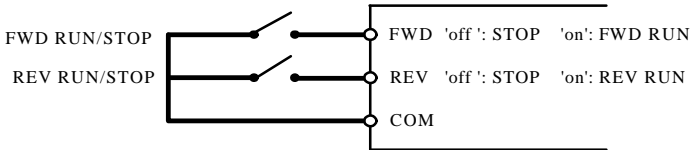
A. F_000 : Version of software

This manual has to be incorporated with software version P5103d. If the inverters have different software versions, they can not read /write setting to inverter each other. The KP-201C keypad display will show the " UU_r _F ".

B. F_001 : Select start and direction commands

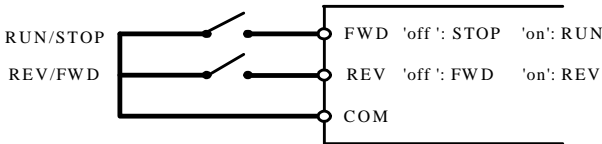
a. F_001 =0

- (1) FWD and REV control both start and direction commands
- (2) FWD and REV are either open or closed simultaneously to stop running.



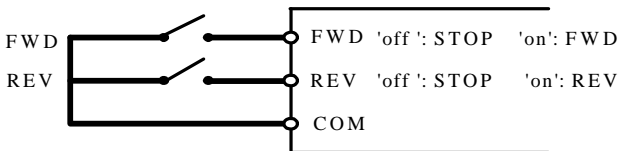
b. F_001 =1

Start control by FWD terminal, Rotation control by REV terminal.



c. F_001 =2

- (1) Keypad generates start command, and FWD and REV generate direction command.
- (2) FWD and REV are either open or closed simultaneously to stop running.



d. F_001 = 3

Start signal is generated by keypad, FWD and REV terminals are useless, and the running is in the positive direction.

Note : that for F_001=0, 2, if FWD-COM and REV-COM are open simultaneously, the frequency display in the monitor mode will display flashed '-----', and if FWD-COM and REV-COM are closed simultaneously, the frequency display in the monitor mode will display flashed 'dEF'

C. F_002 : Select source of speed setting

a. F_002=0

Indicate the frequency is set by terminals (select Vin, Iin analog input by F_123)

(1) Vin-GND: range of input is 0~10V

Note: The gain and bias of analog signals refer the setting in F_040 and F_041.

(2) Iin-GND: switch the DIP switch DSW1 on the control board.

“I” side: inputting current reference range 4~20mA or 0~20mA(select by F_126)

“V” side: inputting voltage reference range 2~10V or 0~10V(select by F_126)

Note : The gain and bias of analog signals refer the setting in F_127 and F_128.

b. F_002 = 1

Indicate the speed is set by keypad.

(1) For KP-201C, main speed and the multiple level speeds can be set, besides, the frequency can be set in the monitor mode.

(2) For KP-202C, using setting potentiometer knob on the panel to set speed

c. F_002 = 2

RPM set by keypad.



d. F_002 = 3

MPM set by keypad.

e. F_002 = 4

Indicate the frequency is set by UP/DOWN terminals

By multi-function input terminals set UP command / DOWN command / UP/DOWN frequency command clear/enter functions.

Note : When F_002=1~3, in the monitor mode to change the frequency command, push the  and  key one time, the frequency command will blink but the value doesn't changed, push the key again then can start to change the value.

D. F_003 : Selection of validity of STOP on keypad

a. F_003 = 0

Indicate terminals generate start signal and STOP on keypad is invalid.

b. F_003 = 1

Indicate terminals generate start signal and STOP on keypad is valid.

Indicate terminals generate start signal and STOP on keypad is valid.

c. The usage of "STOP" key

(I) When "STOP" key use as urgent stop like following:

When Inverter start and running control by input terminal (F_001=0 or 1), it needs to push "STOP" key during Inverter working, then output frequency will down to 0.00HZ, the KP-201C will show "000". The usage of restart action is, to release the FWD or REV terminal between COM first, then to do restart action.

(II) "STOP" key use as common stop:

When F_001=2 or 3, the start action is control by KP-201C "RUN" Key, then stop action is control by KP-201C "STOP" key.

E. F_004 : Select function of changing frequency for KP-201C

a. F_004 = 0

Indicate KP-201C is in monitor mode and the frequency setting can not be changed.

b. F_004 = 1

Indicate KP-201C is in monitor mode and the frequency setting can be changed.

F. F_005 : Select function of storing frequency for KP-201C

a. F_005 = 0

Indicate KP-201C is in monitor mode, the main speed setting value can not be stored automatically.

b. F_005 = 1

Indicate KP-201C is in monitor mode, the main speed setting value can be stored automatically after 3 minutes later.

G. F_006: Select main display of KP-201C

This function is designed for KP-201C. In the monitor mode, there are 8 displays as followings.

1. Output frequency

2. Frequency setting

3. Output voltage

4. PN voltage

5. Output current

6. Motor speed (RPM)

7. Line velocity (MPM)

8. Status of terminals

Note : that any display can be set to be the main display, and that if the keypad has not been operated and the auxiliary display has been displayed for about 3 minutes, the main display is shown.

H. F_007: Speed constant

The range of setting is 0.00~500.00 to set the value of MPM displayed on keypad Line velocity = speed constant(F_007) × output frequency, which is the value of MPM, displayed in the monitor mode.

I. F_008: No. decimal of speed display

Increasing the no. decimal to display the monitored signal more precisely. The range of F_008 is 0~3.

J. F_134: Selections of resumption of factory setting

This function is used to resume the factory settings and store/write settings between inverter and KP-201C. This is the last item of the function.

0 : Useless

CLF : Clear fault records

dEF60 : Resume the factory settings of 60 Hz.

dEF50 : Resume the factory settings of 50 Hz.

SAw : Store settings

rES : Resume last settings

rd_EE : Digital keypad (KP-201C) inverter parameters

UUr_EE : Digital keypad (KP-201C) inverter parameters

Note: The codes **rd_EE** and **UUr_EE** are copy function to be used for the case of several inverters with the same settings.(Ref.Page22)

(2) Multiple speed level settings

- A. F_009 : Main speed with range 0.00 ~ 400.00 Hz
- B. F_010 : Speed level 1 with range 0.00 ~ 400.00 Hz
- C. F_011 : Speed level 2 with range 0.00 ~ 400.00 Hz
- D. F_012 : Speed level 3 with range 0.00 ~ 400.00 Hz
- E. F_013 : Speed level 4 with range 0.00 ~ 400.00 Hz
- F. F_014 : Speed level 5 with range 0.00 ~ 400.00 Hz
- G. F_015 : Speed level 6 with range 0.00 ~ 400.00 Hz
- H. F_016 : Speed level 7 with range 0.00 ~ 400.00 Hz
- I. F_017 : Jog speed with range 0.00 ~ 400.00 Hz

a. The corresponding function codes

(1) Acceleration and deceleration time for multiple speed level (F_018~F_019)

(2) Multiple function input terminal settings (F_052~F_057)

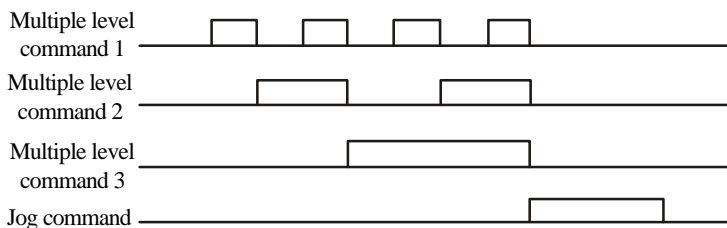
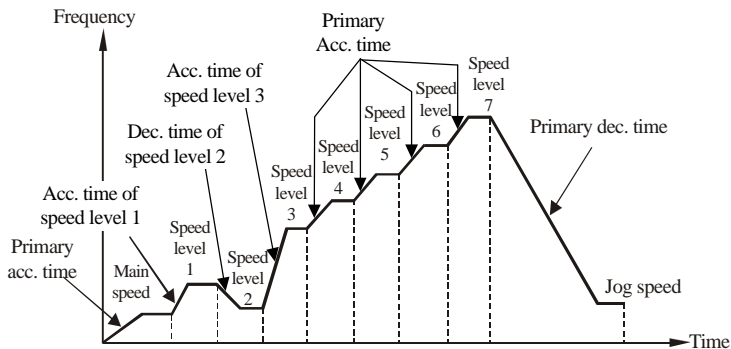
b. Production of multiple speed level

Jog command	Multiple level Command 3	Multiple level Command 2	Multiple level Command 1	
ON	X	X	X	Jog speed
OFF	OFF	OFF	OFF	Main speed
OFF	OFF	OFF	ON	Speed level 1
OFF	OFF	ON	OFF	Speed level 2
OFF	OFF	ON	ON	Speed level 3
OFF	ON	OFF	OFF	Speed level 4
OFF	ON	OFF	ON	Speed level 5
OFF	ON	ON	OFF	Speed level 6
OFF	ON	ON	ON	Speed level 7

Note:

- (1) ' X ' denotes " don't care ".
- (2) Jog speed has the highest priority.
- (3) Jog speed and multiple speed levels are determined by the status, ON or OFF, of multiple function input terminals which are programmed by the settings of the multiple function inputs (F_052~F_057).
- (4) ' ON ' denotes that the contact a (normally open) is short circuit and contact b (normally close) is open. 'OFF' denotes that the contact a (normally open) is open and contact b (normally close) is short circuit.

c. Multiple speed level and the associated acc/dec time.



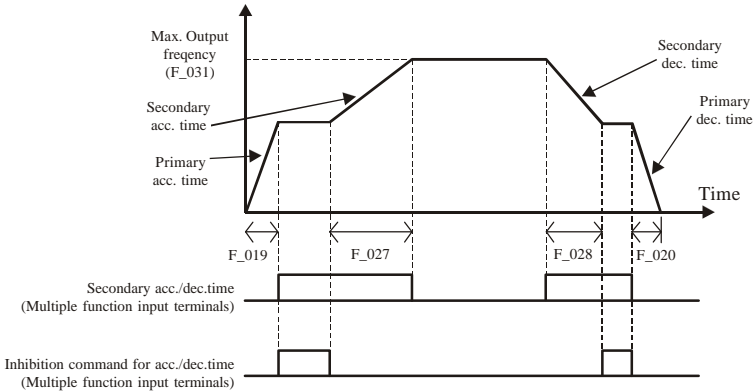
Note:

- (1) The acceleration/deceleration times of jog speed and speed level 4~7 are primary acceleration / deceleration time.
- (2) In stop if the jog speed command is generated, motor will be running without start command.
- (3) Except main speed, the analog inputs (V_{in} and I_{in}) are useless in multiple speed levels.
- (4) Acceleration and deceleration times are set in F_018~F_029.

(3) Acc./dec. time of multiple speed level

- A. F_018 : Base frequency of acc./dec. with range 0.01~400.00 Hz
- B. F_019 : Primary acceleration time with range 0.0~3200.0 seconds
- C. F_020 : Primary deceleration time with range 0.0~3200.0 seconds
- D. F_021 : Acceleration time of speed level 1 with range 0.0~3200.0 seconds
- E. F_022 : Deceleration time of speed level 1 with range 0.0~3200.0 seconds
- F. F_023 : Acceleration time of speed level 2 with range 0.0~3200.0 seconds
- G. F_024 : Deceleration time of speed level 2 with range 0.0~3200.0 seconds
- H. F_025 : Acceleration time of speed level 3 with range 0.0~3200.0 seconds
- I. F_026 : Deceleration time of speed level 3 with range 0.0~3200.0 seconds
- J. F_027 : Secondary acceleration time with range 0.0~3200.0 seconds
- K. F_028 : Secondary deceleration time with range 0.0~3200.0 seconds
- L. F_029 : S-curve acceleration/deceleration time with range 0.0~5.0 seconds
 - a. Multiple acc./dec. times are the time duration in which output frequency is form 0 to base frequency (F_018).Multiple level command can control the multiple speed level and acc./dec. time of multiple speed level.
 - b. The acceleration/deceleration times of jog speed and speed level 4~7 are the same as those of main speed
 - c. Secondary acc./dec. times have the higher priority. Multiple function input terminals can be programmed to enable secondary acc./dec. The timing chart is shown in figure below.

Secondary acc./dec. and the inhibition command for acc. and dec. chart



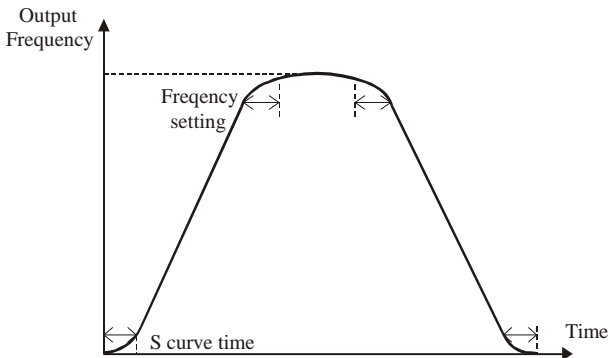
d. If the stop signal is generated, the command of inhibiting acc./dec. is useless.

Note: that there are 4 types of STOP signal described as followings:

- (1) If F_001=0 or 2, FWD and REV are either open or close simultaneously.
- (2) If F_001=1, FWD is open.
- (3) If F_003=1, press STOP.
- (4) If start command is generated by keypad, press STOP.

e. The acceleration/deceleration times of S curve acceleration/deceleration are set for smooth running, for example, to avoid the drop of object in transmission line or shock of elevator.

S-curve acc./dec. time chart



(4) V/F pattern settings

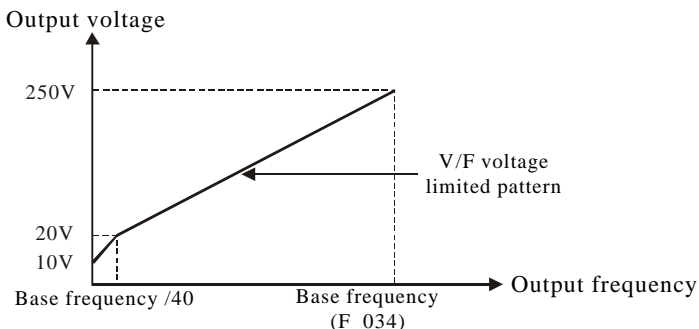
A. F_030 : Limitation of output voltage

a. F_030 = 0

Output voltage is not limited

b. F_030 = 1

Output voltage is limited and can not be greater than the limited voltage of V/F pattern. (200V class max. limited voltage= 250.0V, 400V class max. limited voltage= 500.0V)



B. F_031 : Max. output frequency

RM5G series: Max. output frequency range 0.1~ 400.0Hz

RM5P series: Max. output frequency range 0.1~ 120.0Hz

C. F_032 : Start frequency with range 0.1~10.0 Hz.

D. F_033 : Boost voltage. (Range 0.1~50.0 V for 200V class, and 0.1~100.0 V for 400V class)

E. F_034 : Base frequency with range 0.1~400.0 Hz

F. F_035 : Base voltage. (Range 0.1~255.0 V for 200V class, and 0.1~510.0 V for 400V class)

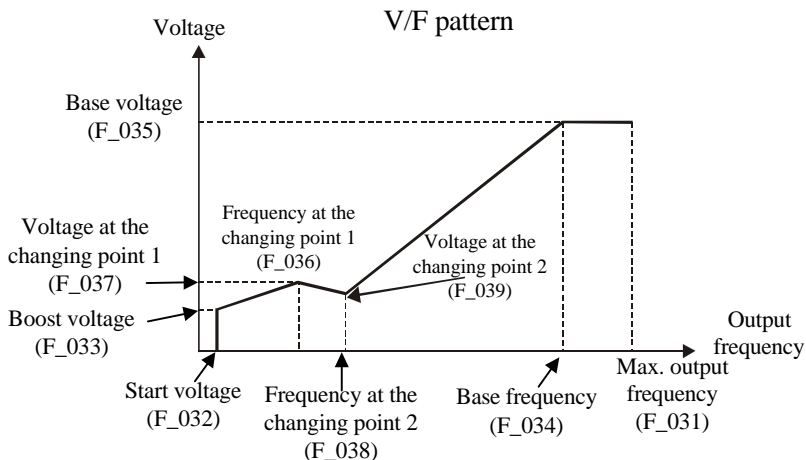
G. F_036 : Frequency at the changing point 1 with range 0.0~399.9Hz

H. F_037 : Voltage at the changing point 1. (Range 0.0~255.0 V for 200V class, and 0.0~510.0 V for 400V class)

I. F_038 : Frequency at the changing point 2 with range 0.0~399.9 Hz

J. F_039 : Voltage at the changing point 2. (Range 0.0~255.0 V for 200V class, and 0.0~510.0 V for 400V class)

The relationship among the settings of F_031~F_039 is shown in the following figure.



Note:

- (1) Base frequency > frequency at changing point 2 > frequency at changing point 1 > start frequency.
- (2) If frequency at changing point 2 < frequency at changing point 1, frequency at changing point 2 is useless.
- (3) If frequencies at changing point 1 and 2 < start frequency, frequency at changing point 1 and 2 are useless.
- (4) The F_033、 F_035、 F_037、 F_039 is not confined each other.

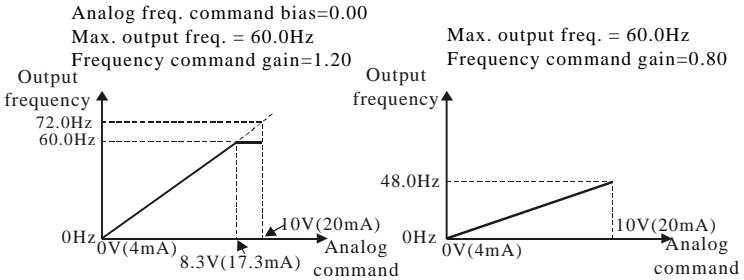
(5) Analog input commands

A. F_040: Vin frequency command gain with range 0.00~2.00.

F_127: Iin frequency command gain with range 0.00~2.00.

a. Analog input terminals are Vin range 0~10V; Iin range 4~20mA(2~10V) or 0~20mA(0~10V).

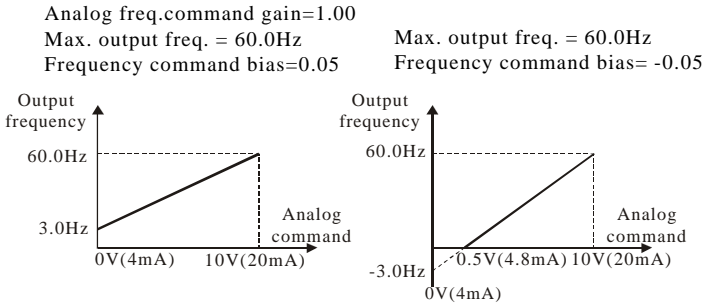
b. The maximum frequency setting = max. output freq. (F_031) analog command gain (F_040/F_127)



B. F_041: Vin frequency command bias with range -1.00~1.00.

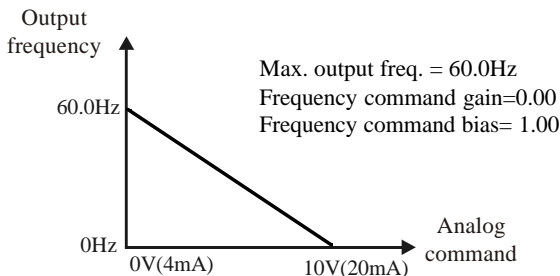
F_128: Iin frequency command bias with range -1.00~1.00.

a. Bias frequency = max. output freq. (F_031) × analog command bias (F_041/F_128).



b. Frequency setting =
$$\frac{(\text{Max. frequency setting} - \text{bias frequency})}{10\text{V}(20\text{mA})} \times \text{analog command input} + \text{bias frequency}$$

C. Reverse command example:



D. F_123: Select source of analog input

- 0: Vin+Iin 2: Iin-Vin
 1: Vin-Iin 3: Vin or Iin (switch by multi-function input terminal)

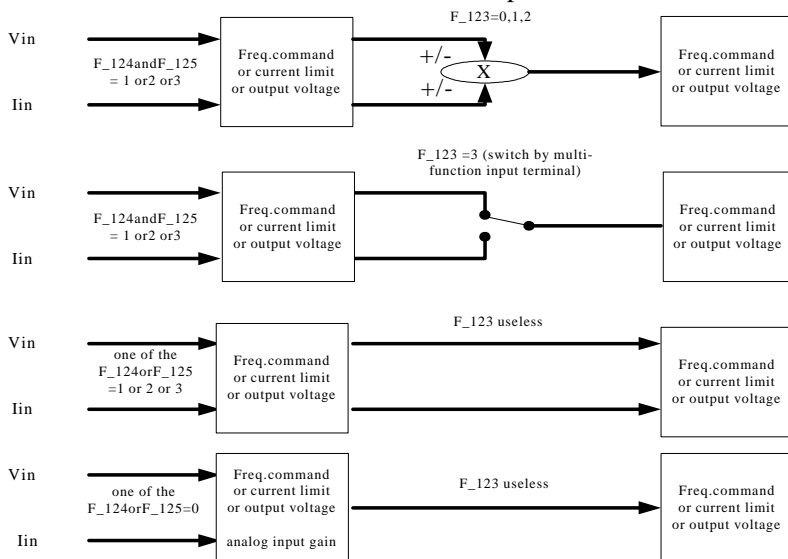
E. F_126: Selection of Iin analog input range

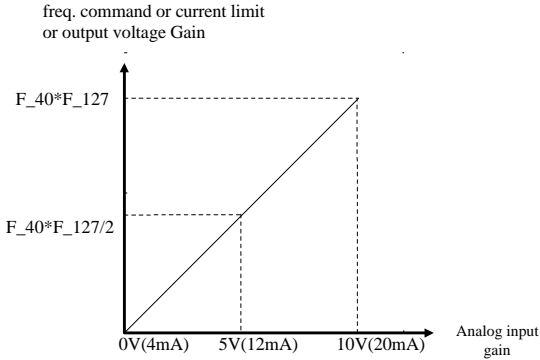
- 0: 4~20mA(2~10V) 1: 0~20mA(0~10V)

F. F_124: Selection of Vin analog input

G. F_125: Selection of Iin analog input

- 0: analog input gain 1: frequency command
 2: current limit level 3: output voltage adjustment of the V/F pattern





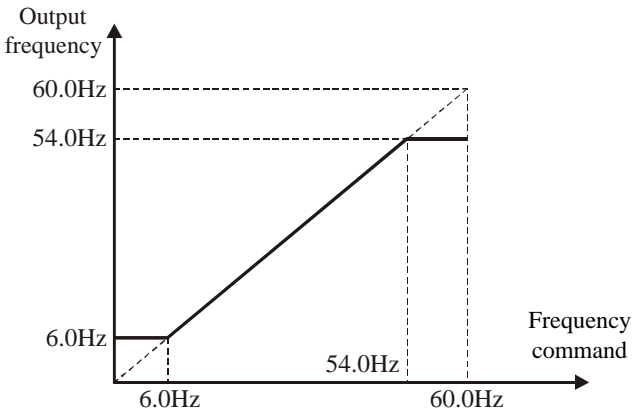
(6) Upper and lower bound of output frequency

- A. F_042 : Ratio of upper bound of output frequency (range 0.00~1.00)
- B. F_043 : Ratio of lower bound of output frequency (range 0.00~1.00)

For example: Max. output freq. = 60.0Hz

Ratio of upper bound of output freq.=0.90

Ratio of lower bound of output freq.=0.10



- a. Upper bound of output freq. = Ratio of upper bound of output freq. (F_042) x Max. output freq. (F_031)
- b. Lower bound of output freq. = Ratio of lower bound of output freq. (F_043) x Max. output freq. (F_031)

(7) Analog outputs

A. F_044: FM+ analog output signal

F_129: AM+ analog output signal

0: output frequency (when inverter is in the running)

1: frequency setting (when inverter is either in the running or stop)

2: output current

3: Vin frequency command

4: Iin frequency command

(when inverter is either in the running or stop, there is no output when F_124 and F_125 = 0,2,3 .)

B. F_045: FM+ analog output gain (range 0.00~2.00)

F_130: AM+ analog output gain (range 0.00~2.00)

a. Analog output terminal FM+(AM+) ~ M- (0~10V)

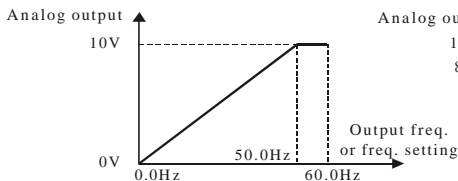
(1/2HP~5HP Analog output terminal FM+(AM+)~ GND)

b. F_044,F_129 determine what kind of signal is outputted

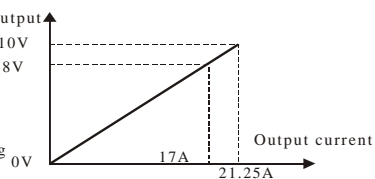
c. Gain = $\frac{\text{max. output frequency}}{\text{output frequency(frequency command)}}$ or $\frac{\text{rated current of inverter}}{\text{output current}}$

d. Analog output curves

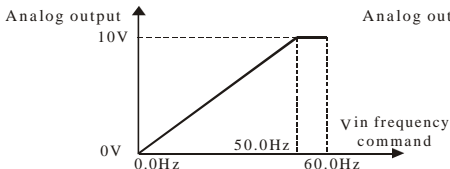
max. output freq.= 60.0Hz
analog output signal=0,1
analog output gain=1.20



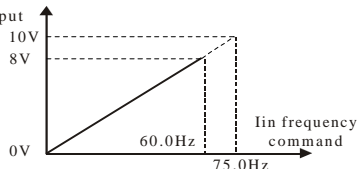
rated current of inverter=17A
analog output signal=2
analog output gain=0.80



max. output freq.= 60.0Hz
analog output signal=3
analog output gain=1.20



max. output freq.= 60.0Hz
analog output signal=4
analog output gain=0.80



(8) Settings for motor protection

A. F_046 : Selection of overload protection

Prevent motor running in the overload condition for a long time.

0 : No overload protection for motor

1 : Overload protection for motor

2 : Overload protection for motor with independence heat fan.

B. F_047 : Reserved

C. F_048 : Rated current of motor (range 10~150% of inverter rated current)

D. F_049 : No load current of motor (range 0~motor rated current)

E. F_050 : Slip compensation with range -9.9 ~ 10.0 Hz

The slip of motor is changed due to the change of load. For the constant speed, the slip compensation is needed and calculated as following

$$\text{Compensation frequency} = \frac{\text{loaded current} - \text{no_load current(F_049)}}{\text{rated current(F_048)} - \text{no_load current(F_049)}} \times \text{slip compensation(F_050)}$$

F. F_051 : No. poles of motor

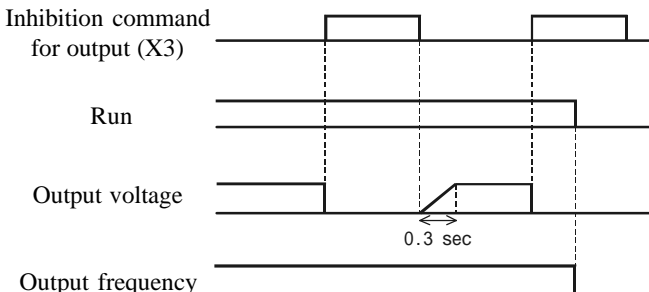
Setting of poles of motor for conversion of RPM.

$$\text{Motor speed (RPM)} = \frac{120}{\text{F_051 no. poles of motor}} \times \text{output frequency}$$

(9) Multiple function input terminals

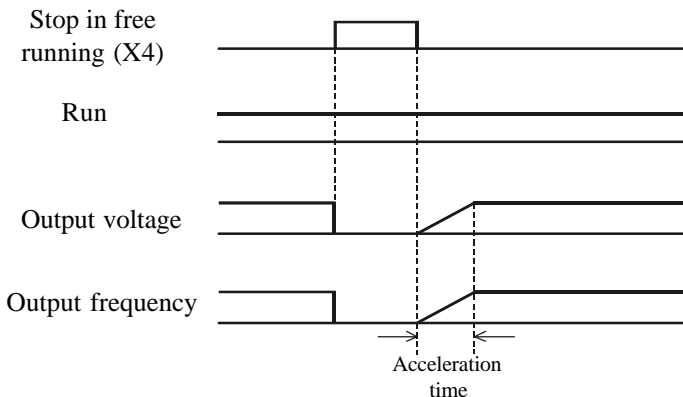
- A. F_052 : Multiple function input terminal X1 setting
- B. F_053 : Multiple function input terminal X2 setting
- C. F_054 : Multiple function input terminal X3 setting
- D. F_055 : Multiple function input terminal X4 setting
- E. F_056 : Multiple function input terminal X5 setting
- F. F_057 : Multiple function input terminal X6 setting
 - a. ' + ' represents contact a (normally open) and ' - ' represents contact b (normally close)
 - b. Multiple function input terminals mean that the input terminals X1~X6 can be programmed as followings:
 - ±1: jog command (refer to the descriptions of multiple speed level)
 - ±2: switching between the secondary acceleration and deceleration (refer to the descriptions of multiple level acc/dec time)
 - ±3: multiple speed levels 1 command (refer to the descriptions of multiple speed level)
 - ±4: multiple speed levels 2 command (refer to the descriptions of multiple speed level)
 - ±5: multiple speed levels 3 command (refer to the descriptions of multiple speed level)
 - ±6: reset command (in the fault conditions, reset command is used to reset the inverter)
 - ±7: external fault command (in the running, this command enables inverter to be shutdown, and in stop, this command is useless)
 - ±8: inhibition command for output (inhibit voltage output of inverter)

Inhibition command for input (F_054=8)



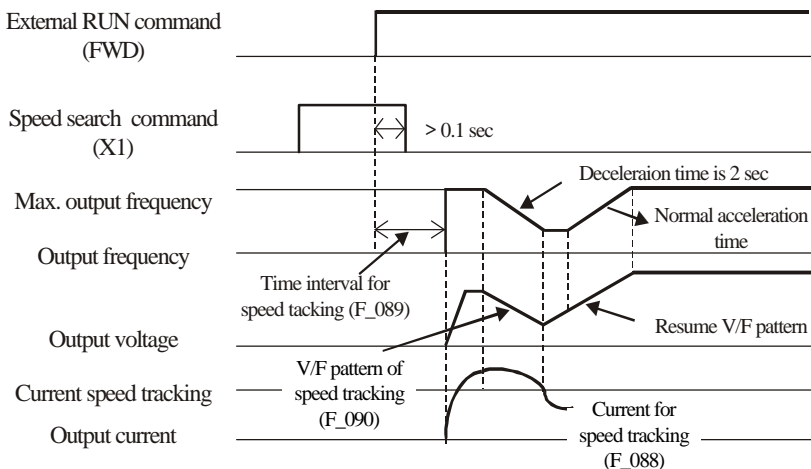
±9: stop in free running (motor is disconnected electrically to inverter)

Stop in free running (F_055=9)



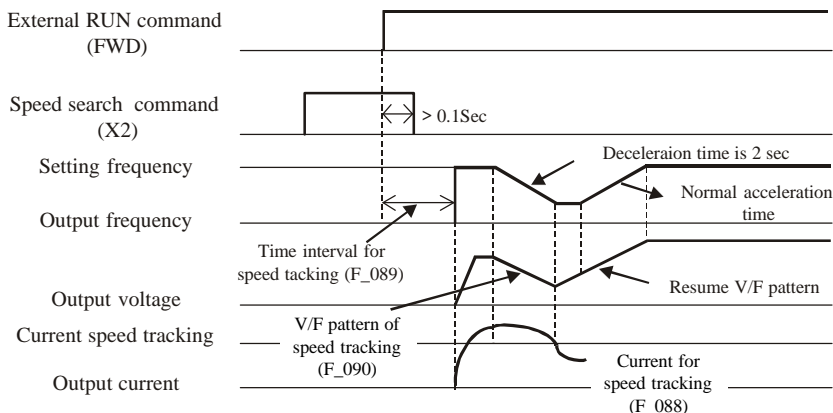
±10 : speed search from the maximum frequency

Speed search command by input terminals (F_052 = 10)



±11 : speed search from the set frequency

Speed search command by input terminals (F_053 = 11)



±12 : inhibition command for acceleration and deceleration
 (refer to the descriptions of multiple level acc/dec time)

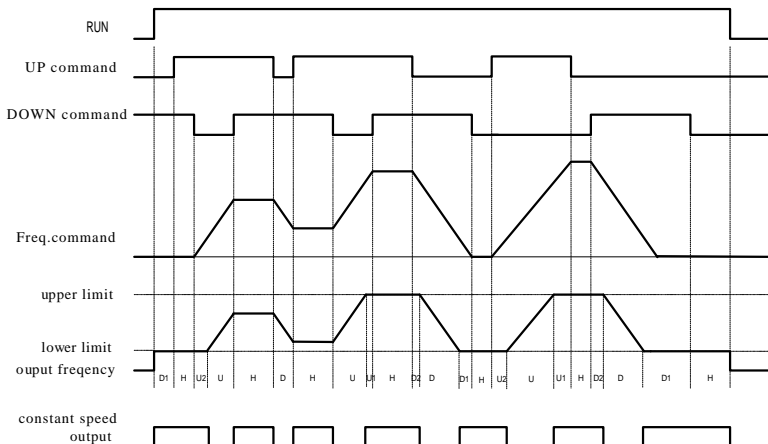
c. UP/DOWN command

± 13: UP command

± 14: DOWN command

± 15: clear UP/DOWN frequency command (frequency command clear to 0.00 Hz)

Time chart at UP/DOWN command Input



U=UP (accelerating) status D=DOWN (decelerating) status

H=HOLD (constant speed) status

U1=UP status, clamping at upper limit speed

U2=UP status, clamping at the lower limit speed

D1=DOWN status, clamping at lower limit speed

D2=DOWN status, clamping at lower upper speed

F_118: Selection of UP/DOWN memory control

0: clear UP/DOWN frequency for shutdown power
(The resumption of frequency command=0.00)

1: store UP/DOWN frequency for shutdown power
(The resumption of frequency command=store value<same as F_121> before shutdown power)

F_119: UP/DOWN adjust frequency

Setting value mean the frequency range of UP/DOWN command trigger per step.

0: 0.01HZ

1~8: *0.05HZ setting value=8, means frequency change value=8*0.05HZ=0.4HZ

9: 0.5HZ

10~250: *0.1HZ setting value=250, means frequency change value=250*0.1HZ=25HZ

F_120: UP/DOWN adjust time

1~5: Terminal adjust response time, continuous acceleration /deceleration when over response time, (Unit: second)

Terminal ON/OFF over response time, continuous accelerating (decelerating) to maximum output frequency (zero speed).

6: edge trigger

Adjust response time get out of control, edge trigger by input signal, signal response time=30ms

F_121: UP/DOWN frequency adjust

Adjust UP/DOWN frequency setting from KEYPAD directly

UP/DOWN instruction changes frequency setting

(Store automatically to F_121 after 5 seconds)

± 16: select analog input source

F_123=3: Vin or Iin (by multi-function input switch)

Input terminal setting equal=+16,contact a(open),select Vin
contact b(close),select Iin

Input terminal setting equal=-16,contact a(close),select Iin
contact b(open),select Vin

d. Multiple function input terminals X1~X6 programmed to 0, the function as followings:

(1) F_052:Input terminal X1 setting

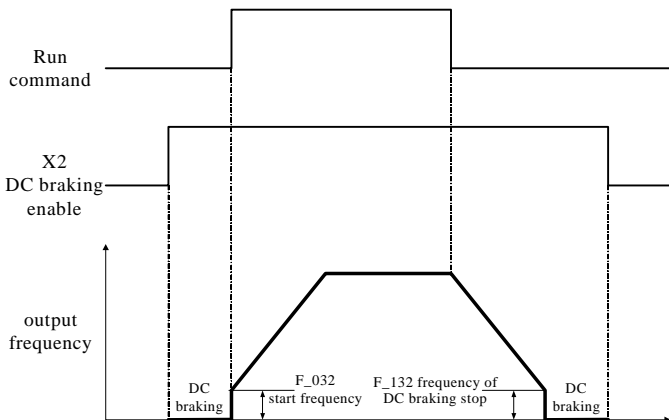
0:UP/DOWN command enter key

X1 and COM open UP/DOWN command set the frequency value, but output frequency did not change.

X1 and COM close output frequency acc./ dec. until frequency setting command .

(2) F_053:Input terminal X2 setting

0:DC braking enable(stop status)

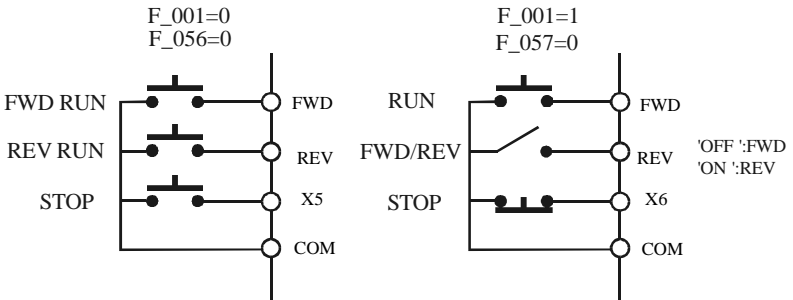


When inverter is stop, terminal X2 ON(DC braking enable), it produces the DC braking status. The output current follows the F_075 current of the DC braking.

When the run command or jog command enable, the DC braking status stops then motor starts running to the frequency setting value.

When the run command or jog command disable, the output frequency decelerates to F_132 DC braking stop frequency, then DC braking enable.

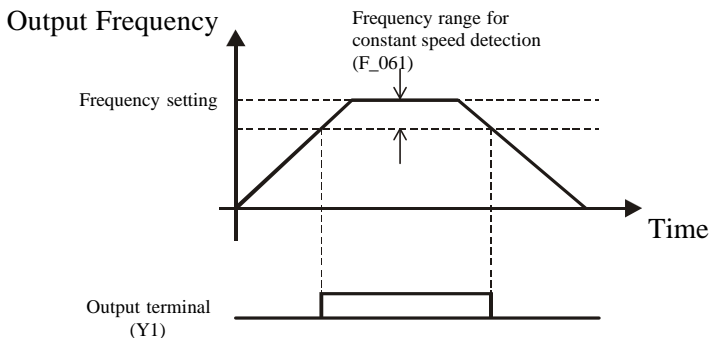
- (3) F_054: Input terminal X3 setting
 F_133: current limit level
 F_054=0 current limit enable
 Use KP-201C digital keypad
 X3 and COM close F_124 or F_125=2 the current limit enable monitor F_133(range 1~150% inverter rated current)
 X3 and COM open monitor F_133 the value is the same as the F_071.
 Use KP-202C analog keypad
 X3 and COM close current limit enable the setting potentiometer of KP-202C function is current limit(range 1~150% monitor the RSW 7)
 EX:F_054=0 , X3 and COM close , F_124=2, F_125=1, the Vin input 0~10V 1~150% inverter rated current.
- (4) F_055: Input terminal X4 setting
 0: primary and secondary speed select
 F_122: Selection of secondary speed
 0: indicate that the frequency is set by terminals
 1: indicate that the frequency is set by keypad
 2: indicate that the frequency is set by UP/DOWN terminals
- (5) F_056: Input terminal X5 setting
- (6) F_057: Input terminal X6 setting
 0: STOP command with 3line sustaining circuit in which X5 is contact a, X6 is contact b, and other terminals are useless.



(10) Settings of multiple function outputs

- A. F_058 : Output terminal Y1 setting
- B. F_059 : Output terminal Y2 setting
- C. F_060 : Settings of output terminals Ta1 and Tb1
- D. F_131 : Settings of output terminals Ta2 and Tc2
 - a. The outputs of the terminals Y1 and Y2 are open collector with maximum ratings DC 48V/50mA.
 - b. Ta (normally open) and Tb (normally close) contacts, with maximum ratings of AC 250V/0.5A $\cos \phi = 0.3$.
 - c. ' + ' represent a contact (normally open), ' - ' represent b contact (normally close)
 - d. The functions of output terminals Y1, Y2, Ta and Tb can be programmed as followings.
 - 0: Terminals are useless
 - ± 1 : running detection (there is output once inverter is in the running)
 - ± 2 : constant speed detection (there is output once inverter is running at constant speed.)

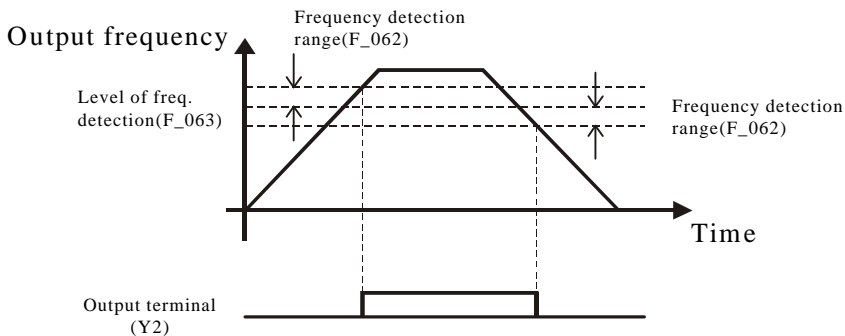
Constant speed detection (F_058=2)



- ± 3 : zero speed detection running (there is output once inverter does not output, but in the DC braking, there is no output.)

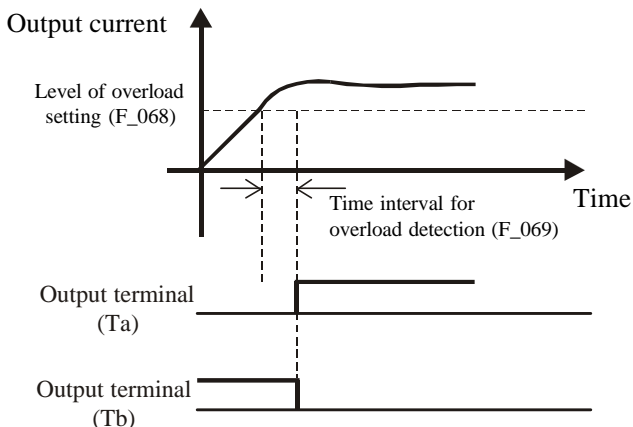
±4: frequency detection

Frequency detection (F_059=4)



±5: overload detection

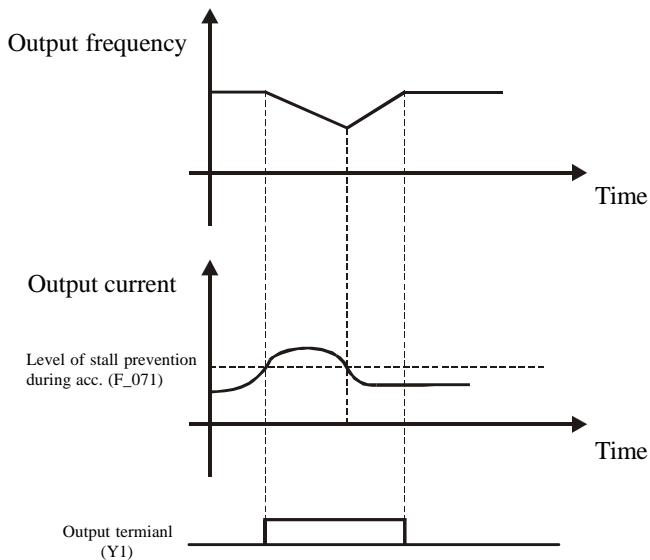
Overload detection (F_060=5)



Note : that in the condition of overload detected, contact a is short circuit and contact b is open.

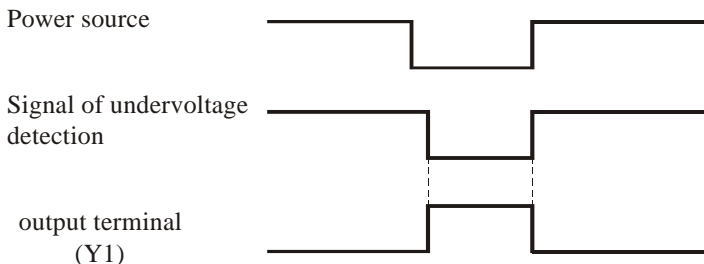
±6: stall prevention detection

Stall prevention detection (F_058=6)



±7: under voltage detection

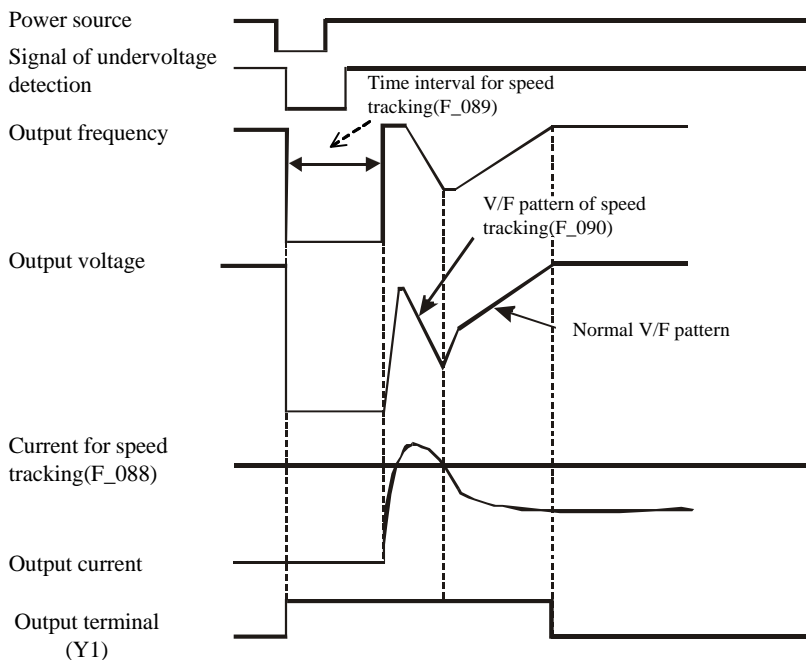
Under voltage detection (F_058=7)



±8: detection of braking (there is output once the voltage level of PN terminal is greater than that of dynamic braking.)

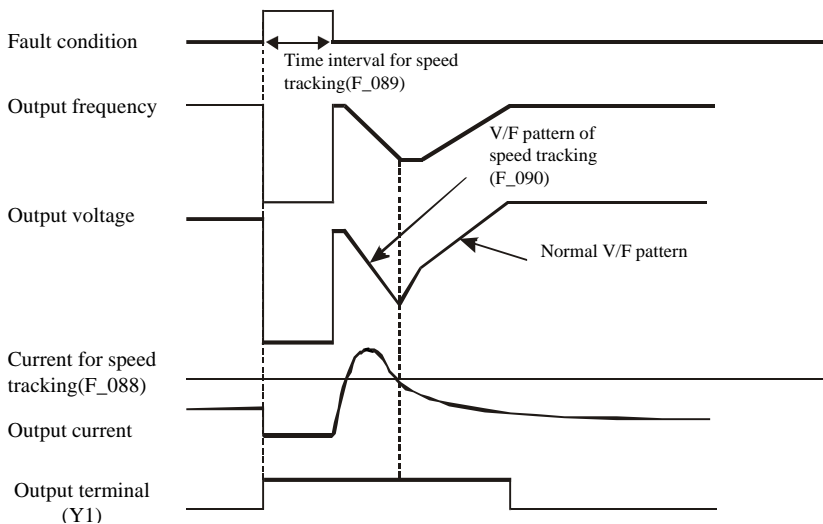
±9: detection of restart after instantaneous power interruption
(F_078=1)

Detection of restart after instantaneous power interruption
(F_058=9)



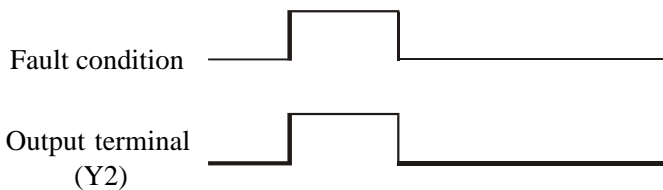
±10 : detection of restart after fault conditions

Detection of restart after fault conditions (F_058=10)



±11: detection of fault conditions

Detection of fault conditions (F_059=11)



(11) Frequency detection

A. F_061 : Frequency range for constant speed detection with range 0.0~10.0 Hz

Refer to the constant speed detection of multiple function output terminals (Ref.Page54).

B. F_062 : Frequency detection range with range 0.0~10.0 Hz

Refer to the frequency detection of multiple function output terminals (Ref.Page55).

C. F_063 : Level of frequency detection with range 0.0~400.0 Hz

Refer to the frequency detection of multiple function output terminals (Ref.Page55).

(12) Gain of the torque boost

A. F_064 : Gain of the automatic torque boost with range 0.0~25.5

a. This function is designed by using the automatically dynamic voltage compensation for heavy load.

b. According to the load condition, adjust the output voltage of the certain V/F curve for minimum current and optimal power factor.

(13) Settings of overload detection

- A. F_065 : Selection of overload detection (OLO)
 - 0 : There is no output for overload detection.
 - 1 : There is output for overload detection.
- B. F_066 : Status of overload detection (OLO)
 - 0 : There is output for the condition of constant frequency only.
 - 1 : There is output for inverter running.
- C. F_067 : Output setting for overload (OLO)
 - 0 : Inverter is still running after that overload has been detected.
 - 1 : Output of inverter is inhibited after that overload has been detected.

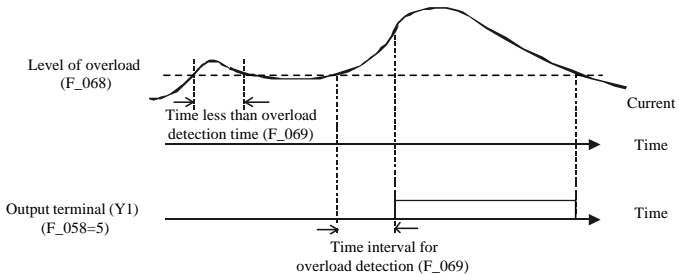
D. F_068 : Level of overload setting (OLO)

The range of setting is 30~200% of rated current of inverter.

E. F_069 : Time interval for overload detection

The time interval, in which the output current is greater than the setting of F_068, is required for overload detection. The range of setting is 0.1~10.0 seconds.

a. The function of overload detection is shown in the timing chart

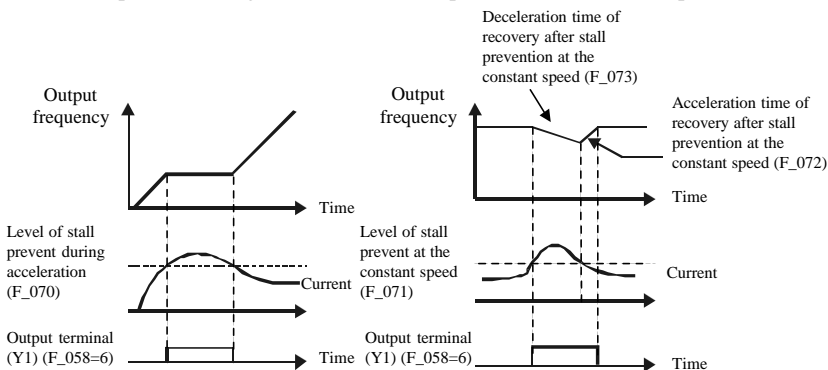


- b. The time interval in which the overload is occurred greater than time interval for overload detection, the overload is then detected and keypad displays ' OLO '
- c. In the running, the overload is detected during the running interval.
- d. After overload, the inverter does output or not in according with the F_067 setting.
- e. The primary purpose of overload detection is to protect system from damage so that the level and time interval of overload detection are determined by application.

(14) Settings of stall prevention

- A. F_070 : Level of stall prevention during acceleration with range 30~200% of rated current of inverter.
 - B. F_071 : Level of stall prevention at the constant speed with range 30~200% of rated current of inverter.
 - C. F_072 : Acceleration time of recovery after stall prevention at the constant speed with range 0.1~3200.0 seconds.
 - D. F_073 : Deceleration time of recovery after stall prevention at the Constant speed with range 0.1~3200.0 seconds.
 - E. F_074 : Select function of stall prevention during deceleration.
 - 0 : There is no stall prevention during deceleration
 - 1 : There is stall prevention during deceleration.
- a. The function of stall prevent is shown in the timing chart:

Stall prevent during acceleration Stall prevent at the constant speed



Note:

- b. The function of stall prevention during deceleration is to maintain a constant speed in the stall condition.
- c. If the dynamic braking device is installed, the F_074 function of stall prevention during deceleration may be disabled.
- d. When the inverter is stop and the DC bus voltage is higher than the DC braking level, the display show the db.(the RUN key is useless now); when the DC bus voltage is lower than the DC braking level, recover to the main display automatically.

(15) DC braking

A. F_075 : Current of DC braking

Setting of level of current for DC braking setting with range 0~150% of rated current of inverter.

B. F_076 : Time interval of DC braking in stop with range 0.0~20.0 seconds.

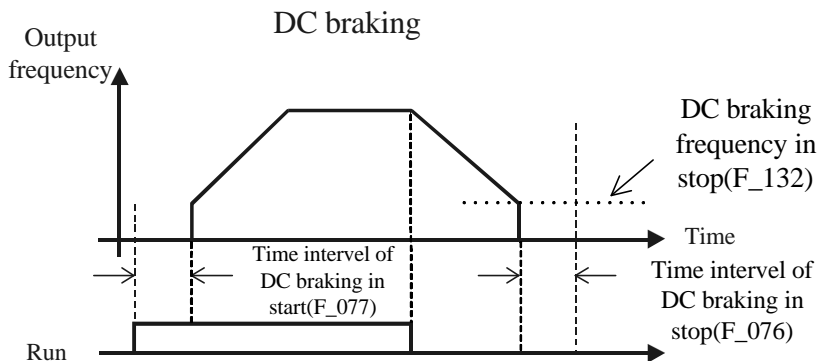
C. F_077 : Time interval of DC braking in start with range 0.0~20.0 seconds.

D. F_132 : DC braking frequency in stop

Start frequency of DC braking in stop

a. The function of DC braking in stop can prevent the motor from rotation in stop.

b. The function of DC braking in start can prevent the motor from free running in undetermined direction ,caused by load, in start.



If start/stop inverter by change frequency command, DC braking enable when frequency command adjust down to F_032 start frequency, and F_132 no effect.

(16) Resumption after instantaneous power interruption

A. F_078 : Selection of resumption

0 : Inverter can not be restarted after instantaneous power interruption.

1 : Inverter will be restarted after instantaneous power interruption. (Refer to detection of restart after instantaneous power interruption)

2 : Shutdown

3 : Inverter will decelerate at the moment then restart after the instantaneous power interruption.

B. F_079 : Level of power source for shutdown

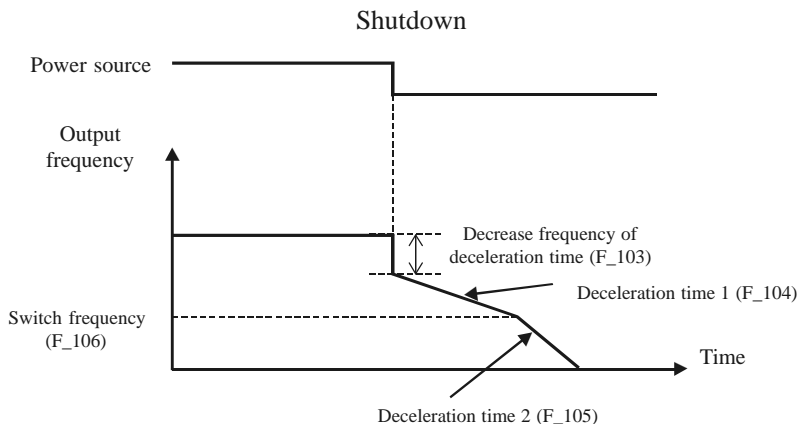
The ranges of the level of power source for shutdown are 150.0 ~192.0 V for 200V class and 300.0~384.0 V for 400V class.

C. F_103 : Decrease frequency of shutdown with range 0.0 ~20.0Hz.

D. F_104 : Deceleration time 1 of shutdown with range 0.0 ~ 3200.0 seconds.

E. F_105 : Deceleration time 2 of shutdown with range 0.0 ~ 3200.0 seconds.

F. F_106 : Switch frequency of shutdown with range 0.0 ~ 400.0Hz.



Note : This shutdown function is proper to inertial load.

(17) Jump of frequency

A. F_084 : Jumping frequency 1

The range of jumping frequency 1 is 0.0~400.0 Hz.

B. F_085 : Jumping frequency 2

The range of jumping frequency 2 is 0.0~400.0 Hz.

C. F_086 : Jumping frequency 3

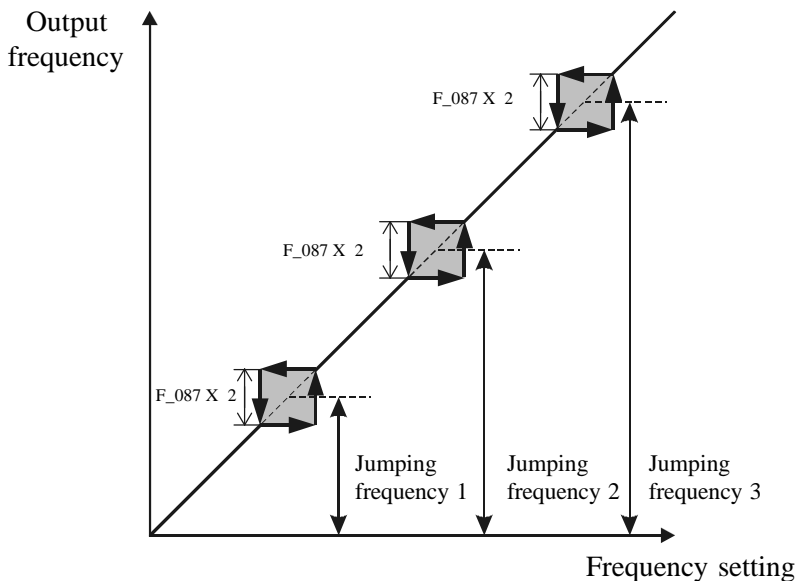
The range of jumping frequency 3 is 0.0~400.0 Hz.

D. F_087 : Jumping frequency range

The jump of frequency command in frequency 1, 2 and 3.

The range of jump of frequency is 0.0~25.5 Hz.

- a. The jump of frequency is to avoid the resonance of machinery.
- b. There are 3 jumping frequencies and 1 jumping frequency range.

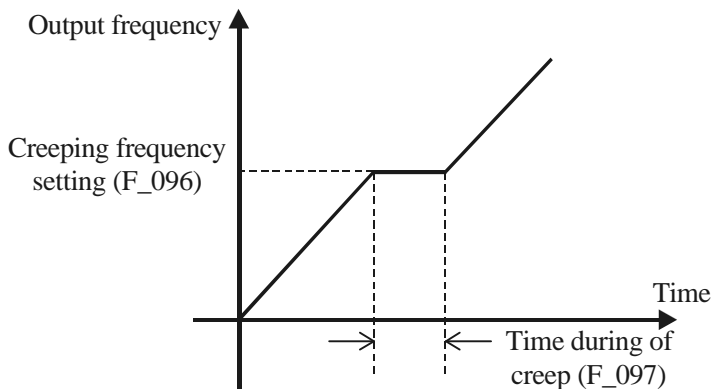


(18) Speed tracking

- A. F_088 :Current for speed tracking
The range of level of current for speed tracking is 0~200% of the rated current of inverter.
- B. F_089 :Time interval for speed tracking
The range of time interval for speed tracking is 0.5~5.0 seconds.
- C. F_090 : V/F pattern of speed tracking
The range of this function is 0~100 % of voltage of the V/F pattern
 - a. The function of speed tracking is primarily used to resume speed after instantaneous power interruption, fault conditions and search speed commanded by external input terminals.
 - b. Refer to the speed search programmed by multiple function input terminals.

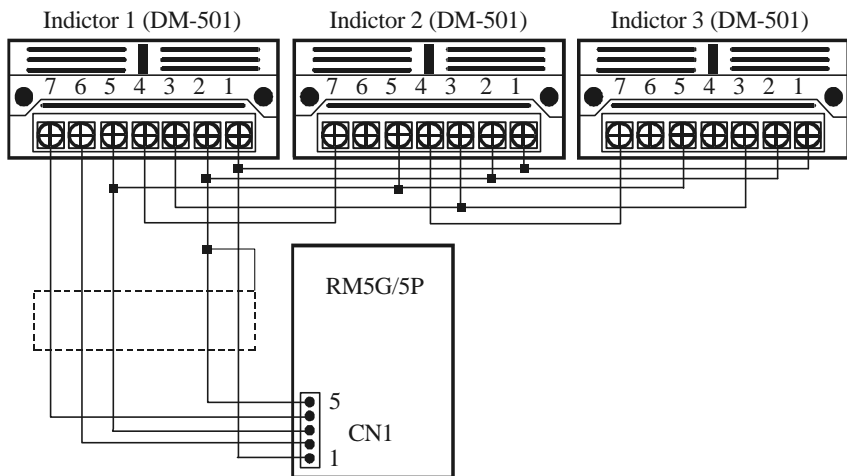
(19) Settings of creep

- A. F_096 : Creeping frequency setting
The range of creeping frequency setting is 0.0~400.0 Hz.
- B. F_097 : Time duration of creep
The range of time duration of creep is 0.0~25.5 seconds.
The function of creep is to avoid the higher slip in acceleration.

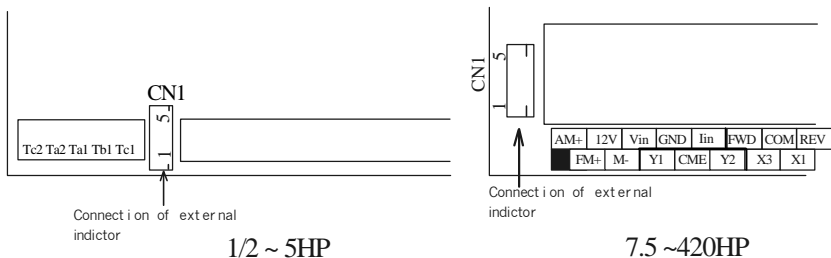


(20) External indicators

- A. F_098 : Reserved
- B. F_099 : Selection of display of external indicator 1 (0~8)
- C. F_100 : Selection of display of external indicator 2 (0~8)
- D. F_101 : Selection of display of external indicator 3 (0~8)
 - a. The settings of F_099~F_101 are the same as those of F_006.
 - b. The example of connecting diagram for external indicators is shown in the following figure.



c. Position of external indicator :



(21) Miscellaneous

A. F_080 : Number of restart

Number of restart for fault conditions is 0~16.

B. F_081 : Carry frequency setting ,The range of setting is 1~6.

The carry frequency =F_081 x 2.5 kHz.

The higher the setting is, the lower the noise is.

The carry frequency is inversely proportional to the distance between inverter and motor.

Note: the carry frequency maximum value

RM5G TYPE 1/2HP~75HP-->Max.15KHz

Above 100HP-->Max.10KHz

RM5P TYPE 10HP~30HP-->Max.15KHz

40HP~100HP-->Max.10KHz

Above 125HP -->Max.7.5KHz

C. F_082 : Types of stop

0 : Indicate stop by deceleration.

1 : Indicate stop by free running.

D. F_083 : Inhibition of reversal rotation

0 : Indicate that reversal rotation is allowed.

1 : Indicate that reversal rotation is not allowed.

E. F_091 : Fault records

Display the last 5 records of faults.

F. F_092 : Lock of parameters

0 : Parameters are changeable. Max. frequency can not over 120.0Hz.

1 : Parameters are locked. Max. frequency can not over 120.0Hz.

2 : Parameters are changeable. Max. frequency can over 120.0Hz.

3 : Parameters are locked. Max. frequency can over 120.0Hz.

G. F_093 : Selection of automatic voltage regulation

0 : Indicate that voltage is not regulated automatically.

1 : Indicate that voltage is regulated automatically.

Note: Connect dynamic braking unit, set the F_093(AVR)=0.

H. F_094 : Selection of the overload protection of inverter (OL1)

0 : Indicate that there is no overload protection.

1 : Indicate that there is overload protection.

The overload protection of inverter

RM5G type - the time duration for 150% rated current over 1 minute.

RM5P type - the time duration for 120% rated current over 1 minute.

I. F_095 : Voltage level of power source

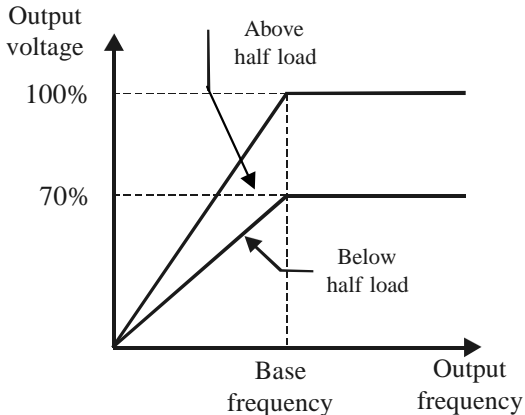
The ranges of setting are 190.0~240.0 V for 200V class and 340.0~480.0 V for 400V class.

Please according the power source voltage set the values, It influence the LE voltage level and V/F output.

J. F_102 : Selection of energy saving device

0 : Do not equip energy saving device

1 : Equip energy saving device



Note: that in the condition of fan, pump or light load, this function can save electricity.

(22) Settings of KP-202C analog keypad

- A. F_107 : ADJ1 function is boost voltage, it can not be changed.
- B. F_108 : ADJ2 function is primary acc. time, it can not be changed.
- C. F_109 : ADJ3 function is primary dec. time, it can not be changed.
- D. F_110 : Selection of parameter of ADJ4 (0~49)
- E. F_111 : Selection of parameter of ADJ5 (0~49)
- F. F_112 : Selection of parameter of ADJ6 (0~49)
- G. F_113 : Selection of parameter of DIP1 (0~15)
- H. F_114 : Selection of parameter of DIP2 (0~15)
- I. F_115 : Selection of parameter of DIP3 (0~15)
- J. F_116 : Selection of parameter of DIP4 (0~15)
- K. F_117 : Selection potentiometer of KP-202C (0~49)
 - a. Although the functions of ADJ4~ADJ6, setting potentiometer of KP-202C and DIP switches of analog keypad KP-202C have been defined in the factory settings, they can be redefined by using the digital keypad KP-201C to change the settings of F_110 ~ F_117.
 - b. The contents of the settings of F_113 ~ F_116 are listed in the following table.

~DESCRIPTIONS OF FUNCTION CODE SETTINGS~

Settings	Function code be affected	Descriptions of DIP functions	Settings	Function code be affected	Descriptions of DIP functions
0	none	Useless	8	F_081	ON: Carry frequency at 2.5KHz OFF: use KP-201C set the carry Frequency
1	F_001	ON: start with the FWD/REV terminal	9	F_078	ON: restart after instantaneous power interruption
		OFF: use the KP-202C start			OFF: use KP-201C set the restart after instantaneous power interruption
2	F_001	ON: start with the FWD terminal	10	F_082	ON: Free run stop
		OFF: use the KP-202C start			OFF: use KP-201C set stop
3	F_002	ON: frequency set by terminal	11	F_083	ON: Reversal rotation inhibit
		OFF: frequency set by KP-201C primary speed or KP-202C setting (Re.A)			OFF: use KP-201C set the reversal rotation
4	F_003	ON: STOP key unavailable	12	F_093	ON: Non AVR function
		OFF: use the KP-201C set STOP			OFF: use KP-201C set AVR function
5	F_034	ON: Base frequency at 50.00	13	F_046	ON: motor over load protection unavailable
		OFF: Base frequency at 60.00			OFF: use KP-201C set the motor over load protection
6	F_074	ON: unavailable for stall prevention during deceleration	14	F_094	ON: inverter over load protection unavailable
		OFF: use KP-201C set the stall prevention during deceleration			OFF: use KP-201C set inverter over load protection
7	none	ON: Non DC braking	15	F_102	ON: energy saving device available
		OFF: DC braking			OFF: use KP-201C set the energy saving device

(Re.A) When none of the F_110~F_112、 F_117 set to 0, then the frequency command set by the KP-201C primary speed; when one of the F_110~F_112、 F_117 set to 0, then frequency command set by KP-202C ADJ4~ADJ6 or setting potentiometer.

~DESCRIPTIONS OF FUNCTION CODE SETTINGS~

c. The contents of the settings of F_110 ~ F_112 & F_117 are listed in the following table.

Settings	Functions	Range of ADJ	Settings	Function	Range of ADJ
0	Primary speed	0.0~120.0	25	Voltage at the changing point 2	0.0~setting of F_035
1	Multiple speed level 1	0.0~120.0	26	Vin Frequency command gain	0.00~2.00
2	Multiple speed level 2	0.0~120.0	27	Vin frequency Command bias	-1.00~1.00
3	Multiple speed level 3	0.0~120.0	28	Ratio of upper bound of output frequency	0.00~1.00
4	Multiple speed level 4	0.0~120.0	29	Ratio of lower bound of output frequency	0.00~1.00
5	Multiple speed level 5	0.0~120.0	30	FM+ analog output gain	0.00~2.00
6	Multiple speed level 6	0.0~120.0	31	Slip compensation	-9.9~10.0
7	Multiple speed level 7	0.0~120.0	32	Level of freq. Detection	0.0~setting of F_031
8	Jog speed	0.0~120.0	33	Gain of the automatic torque boost	0.0~25.5
9	Primary acc. Time	0.0~165.0	34	Level of overload setting	30~200
10	Primary dec. Time	0.0~165.0	35	Level of stall prevention during acc.	30~200
11	Acc. time of speed level 1	0.0~165.0	36	Level of stall prevention in the running.	1~150
12	Dec. time of speed level 1	0.0~165.0	37	Acceleration time of recovery after stall prevention in the running.	0.0~165.0
13	Acc. time of speed level 2	0.0~165.0	38	Deceleration time of recovery after stall prevention in the running.	0.0~165.0
14	Dec. time of speed level 2	0.0~165.0	39	Current of DC braking	0~150
15	Acc. time of speed level 3	0.0~165.0	40	Jumping frequency 1	0.0~setting of F_031
16	Dec. time of speed level 3	0.0~165.0	41	Jumping frequency 2	0.0~setting of F_031
17	Secondary acc/dec time	0.0~165.0	42	Jumping frequency 3	0.0~setting of F_031
18	Start freq.	0.1~10.0	43	Jump of frequency	0.0~25.5
19	Boost voltage	0.0~127.5	44	Creeping frequency setting	0.0~setting of F_031
20	Max. output frequency	0.0~120.0	45	Time duration of creep	0.0~25.5
21	Base voltage	0.0~255.0 for 200V class 0.0~510.0 for 400V class	46	Proportional factor for line velocity	0.01~100.00
22	Frequency at the changing point 1	0.0~setting of F_034	47	Iin frequency command gain	0.00~2.00
23	Voltage at the changing point 1	0.0~setting of F_035	48	Iin frequency command bias	-1.00~1.00
24	Frequency at the changing point 2	0.0~setting of F_034	49	AM+ analog output gain	0.00~2.00

7. OPERATIONAL PROCEDURES, MAINTENANCE, AND TROUBLE SHOOTING

(1) Operational procedure and operations



DANGER

1. After turn off power source, please don't touch the inverter and change the wiring when indicator is light.




CAUTION

1. After wiring, double check is absolutely necessary.
 2. Keep terminal connected tightly with wire.
- A. Be sure that the voltages of power source, motor and inverter are matched.
- B. Connect power source lines to R, S and T terminals of inverter.
- C. Turn on the power source, set the function codes and parameters, and check that the voltages of U, V and W terminals are correct or not. Then, turn off the power source.
- D. Turn off the power source and wait until that the LED is off, motor lines are connected to U, V and W terminals of inverter.
- E. Turn on the power source and check the rotating direction of motor with low speed.
- F. User has to use the ON/OFF switch on keypad to start/stop inverter. If the switch of power source is used to start/stop inverter, the lifetime of inverter will be reduced.
- G. It is not permitted that use of a magnetic contact installed between an inverter and the motor to start/stop motor. In general, the start current of motor is about 5 to 8 times of its rated current.
- H. How to properly size an inverter for a single-phase power supply with a three-phase motor.
Determine motor horsepower required for particular application. Divide the motors full load amperage by 0.5 the result of that calculation is the basis of sizing the inverter. Select an inverter with continuous amperage rating that is equal to or greater than the result.
Formula: FLA of motor / 0.5 = Inverter Amps
EXAMPLE:
a. Invert selection: 230Vac, 3HP motor = 9.6A $9.6A/0.5 = 19.2A$
 230Vac, 3HP inverter = 11A continuous
 230Vac, 7.5HP inverter = 25A continuous
 You would select the 7.5HP inverter for this application.
- b. Parameters setting: Without doing this setup could result in drive and/or motor failure
F_048 motor rated current = 9.6A (according to the spec. of motor)
F_068 Level of overload setting = 80 (The half of original setting 160%)
F_071 Level of stall prevention at the constant speed = 80 (The half of original setting 160%)

**~OPERATIONAL PROCEDURES, MAINTENANCE,
AND TROUBLE SHOOTING~**

(2) Fault, maintenance and trouble shooting

A. Descriptions

The inverter equips with complete protective functions. If protective function is activated, power transistors will be turned off and display will show what fault is. After proper trouble shooting, to short RST and COM, or press  in keypad, inverter will operate.

B. Protections and trouble shooting:

Protections and display	Functions	Trouble Shooting
Over current for loss speed (acceleration)	During acceleration, if output current exceeds the stall prevention limit during acceleration (F_070), acceleration will be terminated. Until output current less than the setting value, acceleration will be continuous.	Increase acceleration time or use the higher capacity inverter.
Over voltage for loss speed (deceleration)	During deceleration, too high regenerative voltage will cause termination of deceleration. Until the regenerative voltage is not too high, deceleration will be continuous.	Increase deceleration time or use dynamic brake unit.
Over current O.C.	Output current exceeds 220% of rated current of inverter. Inverter is shutdown.	Output terminals(U.V.W.) is short-circuited, overload, acceleration time too small, start at free running, or mismatched characteristics of motor.
Over voltage O.E.	Due to the higher regenerative voltage or voltage of power source, the main circuit DC voltage exceeded the over voltage detection level . 200V series : Approx. DC410V 400V series : Approx. DC820V	Increase deceleration time, or use high braking torque and dynamic brake unit. Decrease input voltage.
Over load O.L.	Motor overload protection operates by build-in electronic thermal overload relay.	Decrease motor load.
Over load OL1	RM5G series 150% inverter rated output current for one minute. RM5P series 120% inverter rated output current for one minute.	Use high-capacity inverter
Over heat O.H.	When the temperature of heat sink is too high or external thermal relay to be activated, inverter is shutdown	Improve the cooling system or clear heat sink.
Under voltage L.E.	the main circuit DC voltage is decreased 33% of rated value, inverter will display " LE ".	Increase the capacity of power source for avoiding line voltage of power source to be decreased significantly.

**~OPERATIONAL PROCEDURES, MAINTENANCE,
AND TROUBLE SHOOTING~**

Protections and display	Functions	Trouble Shooting
" - - - - " and the set frequency display alternately	Forward/Reverse operation error (When F_001=0)	Check the wiring of FWD and REV terminals.
GF protection	Protection for unbalanced output current. Break of fuse inside the inverter	Check the leakage current of motor. Change inverter
EEr	EEPROM error	Change inverter
Err_00, Err_01	Disconnection of operating keypad, KP-201C or KP-202C.	Check keypad and inverter connections
S.C.	Break of fuse inside the inverter Break of IGBT module	Change inverter
PAdF	KP-202C is removed in running.	Resume KP-202C
Ad_Err	AD converter fault	Change inverter
OLO	Overload detection	Lower the motor load
thr	External fault detection	Check the external fault input terminal
db.	When the inverter is stop, the main circuit DC voltage exceed the voltage detection level. 200V series : Approx. DC385V 400V series : Approx. DC785V	Check the power supply voltage .

(1) Outline drawings

Unit:(mm)

Fig.1

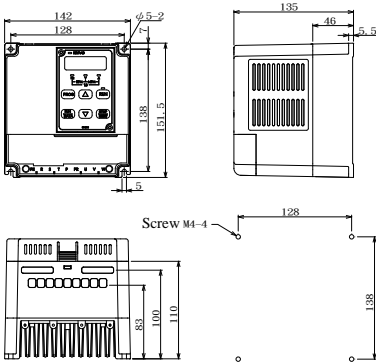
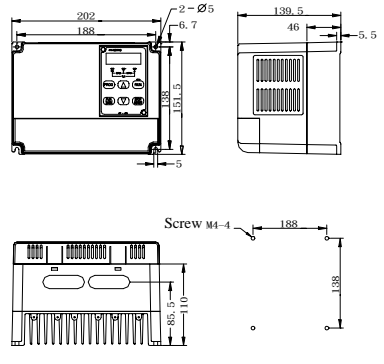


Fig.2

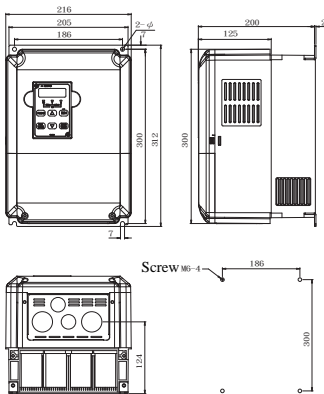


RM5G - 2001/2, 2001,2002,2003
RM5G - 4001, 4002,4003

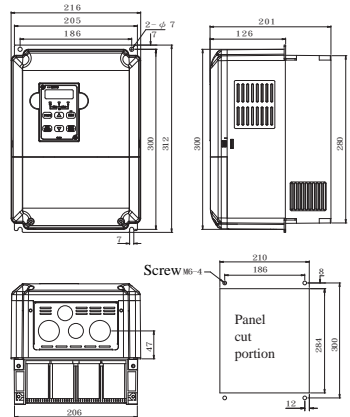
RM5G - 2005
RM5G - 4005

Fig.3

Internal cooling type



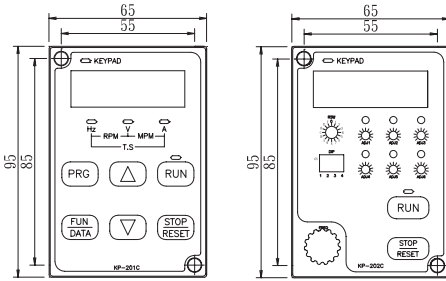
External cooling type



RM5G - 2007,2010,2015,4007,4010,4015,4020

Fig.4

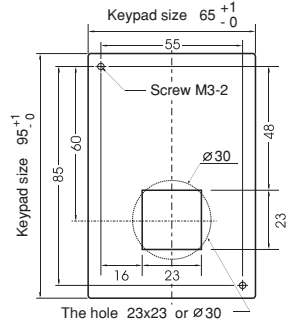
Keypad size



KP-201C

KP-202C

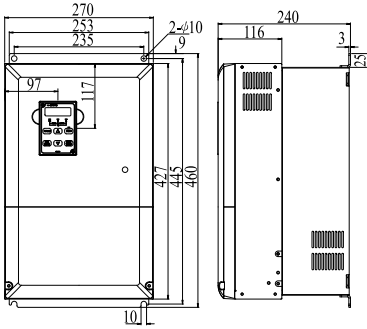
Unit:(mm)
Keypad hole size



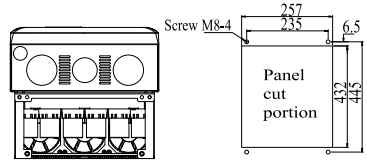
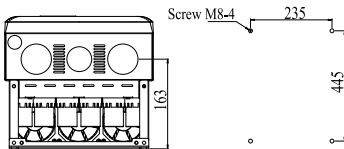
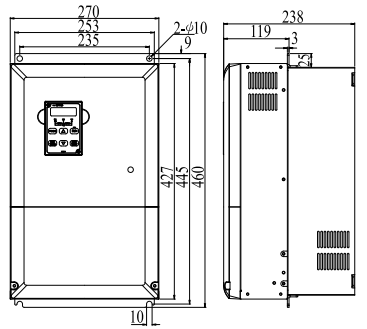
RM5G/5P Keypad

Fig.5

Internal cooling type



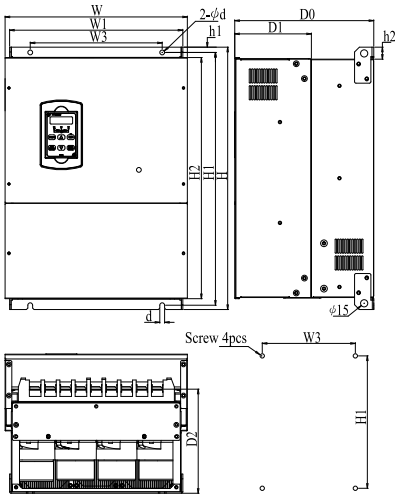
External cooling type



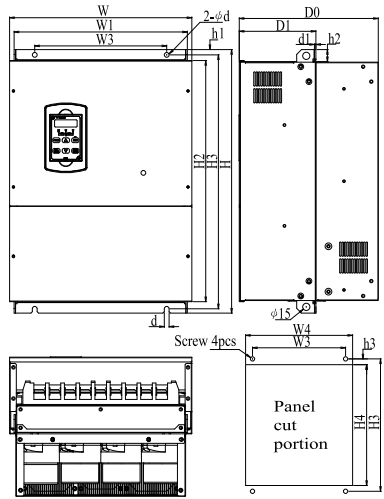
RM5G-2020, 2025, 2030, 2040, 4025, 4030, 4040, 4050

Fig.6

Internal cooling type



External cooling type



※Specifications subject to change without notice.

RM5G -200V Series

Motor (HP/KW)	Size (mm)													Screw (mm)					
	W	W1	W3	W4	H	H1	H2	H3	H4	h1	h2	h3	D0		D1	D2	d	d1	Ref
50/37	380	361	275	365	547	527	503	529	509	11	25	8.5	290	160	217	10	3	Fig.6	M8
60/45																			
75/55	440	419	275	427	685	660	630	661	636	15	30	10	310	170	205	12	2	Fig.6	M10
100/75	502	479	275	487	818	786	750	788	758	18	35	12	317	200	237	15	3		
125/90																		Fig.6	M12
150/110	540	514	275	520	1000	971	930	973	936	17	37	16.5	362	244	296	15	3		

RM5G -400V Series

Motor (HP/KW)	Size (mm)													Screw (mm)					
	W	W1	W3	W4	H	H1	H2	H3	H4	h1	h2	h3	D0		D1	D2	d	d1	Ref
60/45	380	361	275	365	549	527	503	529	509	11	25	8.5	290	160	217	10	3	Fig.6	M8
75/55																			
100/75	440	419	275	427	685	660	630	661	636	15	30	10	310	170	205	12	2	Fig.6	M12
125/90	502	479	275	487	818	786	750	788	758	18	35	12	317	200	237	15	3		
150/110	540	514	275	520	1000	971	930	973	936	17	37	16.5	362	244	296	15	3	Fig.6	M12
175/132																			
200/160																		Fig.6	M12
250/200																			
300/220	808	765	580	768	1000	973	929	973	935	17	37	15.5	383	268	263	15	6	Fig.6	M12
420/315																			

(2) Auxiliary control equipment (ACE series)

Descriptions of items and their functions:

ACE-01 series	DYNAMIC BRAKING UNIT	To improve the breaking capacity of inverter, apply to the fast deceleration or regenerative voltage situation.
ACE-02	DEVIATION DETECTOR	Converse the angular displacement, tensile, weight and both motors angular displacement error detected by synchro into DC voltage signal. This can be used for synchronous motion control and constant tensile control.
ACE-03	SOFTSTARTER	This is a low pass filter for frequency command to reduce the mechanical impact. It may also control equilibrate running, stop and paralleled running for the group of inverters.
ACE-04	RATIO SETTER	A ratio setter may connect with 5 inverters to control their frequency ratio.
ACE-05A	PRE - AMPLIFIER	To adjust and convert the current output signal of detector into voltage signal as inverter's frequency setting. Besides, there are voltage input for frequency setting and output frequency limit setting.
ACE-06	LEVEL SHIFT SETTER	Set the difference of speed for several motors operated simultaneously.
ACE-07	COMBINATION CONTROLLER	Select the source of frequency command from several inverters operated simultaneously.
ACE-08	SPEED COMBINATION SETTER	Convert the signal from tach generator or photo-interrupter into the DC voltage, proportional to the speed. By using speed combination setter, the speed feedback signal can be obtained which can be used as the frequency setting.
ACE-09A	SPEED FEED BACK REGULATOR	It can be used with tach generator, for example, to control the linear speed and tensile of the winding plastic or cloth.
ACE-10	MEMORABLE REMOTE SPEED SETTER	Through numerous controller, Inverter may be set to start, accelerate, decelerate and stop by remote control with in 200M. It may also keep the memory of motor running frequency under interrupted power.(within 200M)
ACE-11	UNMEMORABLE REMOTE SPEED SETTER	Same as ACE-10, But un-memorable under interrupted power.(within 200M)

(3) Dynamic brake and resistor

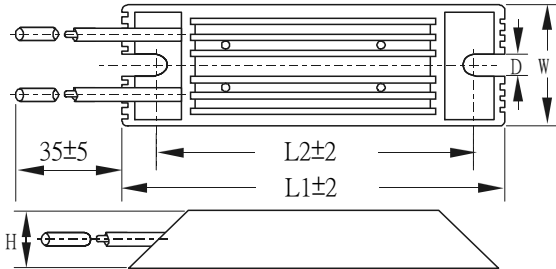
A. Braking transistor can be installed inside the following inverters:

Standard: RM5G-2001/2~2010 and RM5G-4001~4015

RM5P-2007~2010 and RM5P-4007~4015

Option: RM5G/P-2015~2030 and RM5G/P-4020~4040.

B. The size of Braking Resistor (option parts)



Type	Size	Size (mm)					Max.Weight (g)
		L1	L2	W	H	D	
MHL100-100	100W/100Ω	165	150	40	20	5.3	200
MHL100-400	100W/400Ω	165	150	40	20	5.3	200
MHL500-40	500W/40Ω	335	320	60	30	5.3	1100

Note: The wire length of Braking Resistor is 35cm.

C. About external Dynamic Brake unit, please refer to ACE-01(DBU5) series.

D. Reference of standard Braking Resistor :

220V			380V/440V		
Inverter Type	Min. Requested Resistance	Available Braking Resistance	Inverter Type	Min. Requested Resistance	Available Braking Resistance
2001/2	100Ω	MHL100-100*1	4001	400Ω	MHL100- 400*1
2001	100Ω	MHL100-100*1	4002	200Ω	MHL100- 400*2 in parallel
2002	100Ω	MHL100-100*1	4003	133Ω	MHL100- 400*3 in parallel
2003	40~50Ω	MHL500- 40*1	4005	100Ω	MHL100- 400*4 in parallel
2005	40~50Ω	MHL500- 40*1	4007	80Ω	MHL500- 40*2 in serial
2007	20~40Ω	MHL500- 40*1	4010	80Ω	MHL500- 40*2 in serial
2010	20~40Ω	MHL500- 40*1	4015	40Ω	2 sets of MHL500- 40*2 pcs in parallel first, then to serial these two sets together.
2015	13.3Ω	MHL500- 40*3 in parallel	4020	40Ω	2 sets of MHL500- 40*2 pcs in parallel first, then to serial these two sets together.
2020	10Ω	MHL500- 40*4 in parallel	4025	27Ω	2 sets of MHL500- 40*3 pcs in parallel first, then to serial these two sets together.
2025	8Ω	MHL500- 40*5 in parallel	4030	20Ω	2 sets of MHL500- 40*4 pcs in parallel first, then to serial these two sets together.
2030	6.6Ω	MHL500- 40*6 in parallel	4040		
2040	3.3Ω	MHL500- 40*12 in parallel	4050	13.3Ω	2 sets of MHL500- 40*6 pcs in parallel first, then to serial these two sets together.
2050	2.5Ω	MHL500- 40*16 in parallel	4060	10Ω	2 sets of MHL500- 40*8 pcs in parallel first, then to serial these two sets together.
2060	3.3Ω	MHL500- 40*16 in parallel	4075	6.6Ω	2 sets of MHL500- 40*12 pcs in parallel first, then to serial these two sets together.

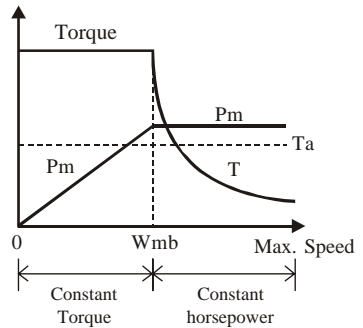
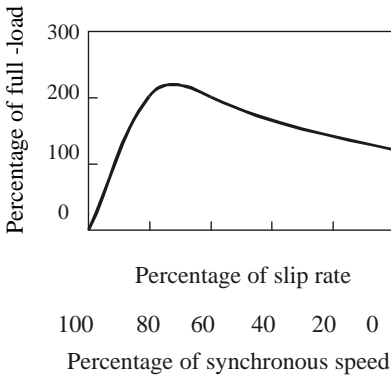
Note: 1. Upgrade the braking resistor size when in heavy load or frequent braking operations.

2. The Aluminum Housed wire wound resistor have high heat dissipation, if use the wound resistor should be 600W 50Ω.

(4) Selections of motor

A. Standard motors

- a. The load should be a standard three phase induction motor.
- b. Motor can not be operated at low speed for a long time, because that the low speed of cooling fan will result high temperature. This is improved by using the motor with independence fan.
- c. The characteristics of the standard three phase induction motor (NEMA B) are shown as followings.



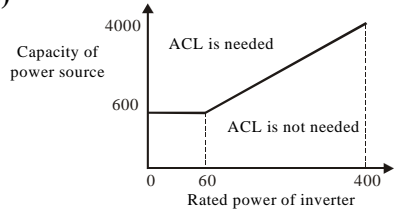
- d. As the speed of motor is greater than 60 Hz, the torque is decrease drastically.
- e. Is the insulation of motor good or not? The minimum requirement is $100 M\Omega$ at 500 V.

B. Special motors

- a. Synchronous motor: Starting current is greater than that of standard induction motor. V/F ratio is lower than that of standard induction motor. The ratings of inverter should be increased.
- b. Waterproof motor: The rated current is greater than that of standard induction motor. And the V/F pattern and the limitation of minimum speed should be mentioned. Sometimes, the insulation may be poor due to the sand and the other objects.
- c. Explosion proof motor: RM5G series is not designed against explosion. In installation, operation and maintenance, care must be made for safety considerations.

(5) Selections of AC reactor (ACL)

A. If the capacity of the power source is greater than that of inverter, an ACL has to be installed in the R, S and T terminals.



- B. If the source power, supplying for inverter, is also for SCR, high rated power motor or welding machine, ACL is needed.
- C. In the case of several inverters are used simultaneously, ACL is needed to avoid interference and improve the quality of electricity for harmonics.
- D. The specifications, determined according to the rated power of motor used, are shown in following table.

Continuous rated power (HP/KW/KVA)	200V series				Continuous rated power (HP/KW/KVA)	400V series			
	INPUT(RST)		OUTPUT(UVW)			INPUT(RST)		OUTPUT(UVW)	
	(mH)	(A)	(mH)	(A)		(mH)	(A)	(mH)	(A)
0.5/0.4/1.3	0.4	15	0.4	15	1/0.75/1.9	0.4	15	0.4	15
1/0.75/2	0.4	15	0.4	15	2/1.5/3.3	0.4	15	0.4	15
2/1.5/3	0.4	15	0.4	15	3/2.2/4	0.4	15	0.4	15
3/2.2/4	0.4	15	0.3	30	5/3.7/7	0.4	15	0.55	22
5/3.7/6	0.3	30	0.26	40	7.5/5.5/10	0.55	22	0.55	22
7.5/5.5/9	0.26	40	0.26	40	10/7.5/14	0.55	22	0.26	40
10/7.5/13	0.26	40	0.16	75	15/11/18	0.26	40	0.26	40
15/11/18	0.16	75	0.16	75	20/15/23	0.26	40	0.16	75
20/15/22	0.16	75	0.09	110	25/18.5/30	0.16	75	0.16	75
25/18.5/28	0.09	110	0.06	180	30/22/34	0.16	75	0.09	110
30/22/33	0.06	180	0.06	180	40/30/46	0.09	110	0.09	110
40/30/44	0.06	180	0.04	300	50/37/56	0.09	110	0.09	110
50/37/55	0.04	300	0.04	300	60/45/66	0.09	110	0.06	180
60/45/67	0.04	300	0.04	300	75/55/84	0.06	180	0.06	180
75/55/84	0.04	300	0.02	560	100/75/104	0.06	180	0.04	300
100/75/115	0.02	560	0.02	560	125/90/134	0.04	300	0.04	300
125/90/132	0.02	560	0.02	560	150/110/165	0.04	300	0.04	300
150/110/160	0.02	560	0.01	850	175/132/193	0.04	300	0.02	560
-	-	-	-	-	200/160/232	0.02	560	0.02	560
-	-	-	-	-	250/200/287	0.02	560	0.02	560
-	-	-	-	-	300/220/316	0.02	560	0.01	850
-	-	-	-	-	420/315/445	0.01	850	0.01	850

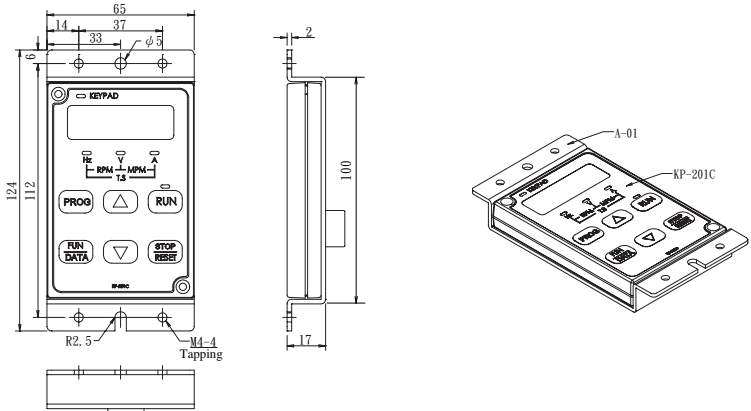
APPENDIX B

(1) Remote controllers

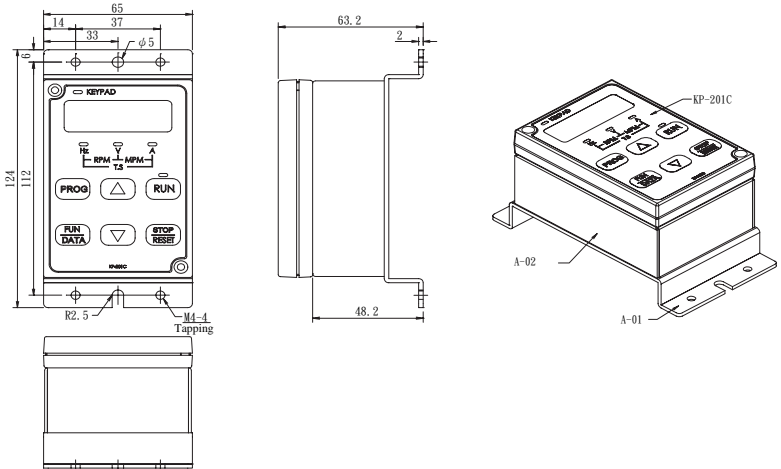
A. Remote controllers

There are two types, one is inverter mount type and the other is stand alone type. Their appearances and functions are the same as those of KP-201C or KP-202C.

a. Dimensions of the inverter mount type (Assembled by A-01, KP-201C)

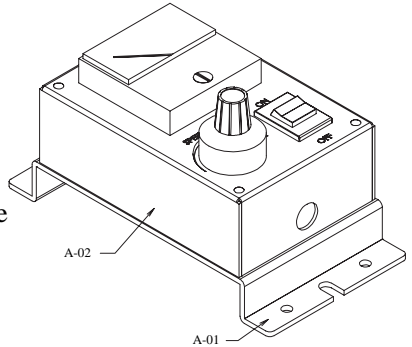


b. Dimensions of the stand alone type (Assembled by A-01, A-02, KP-201C)

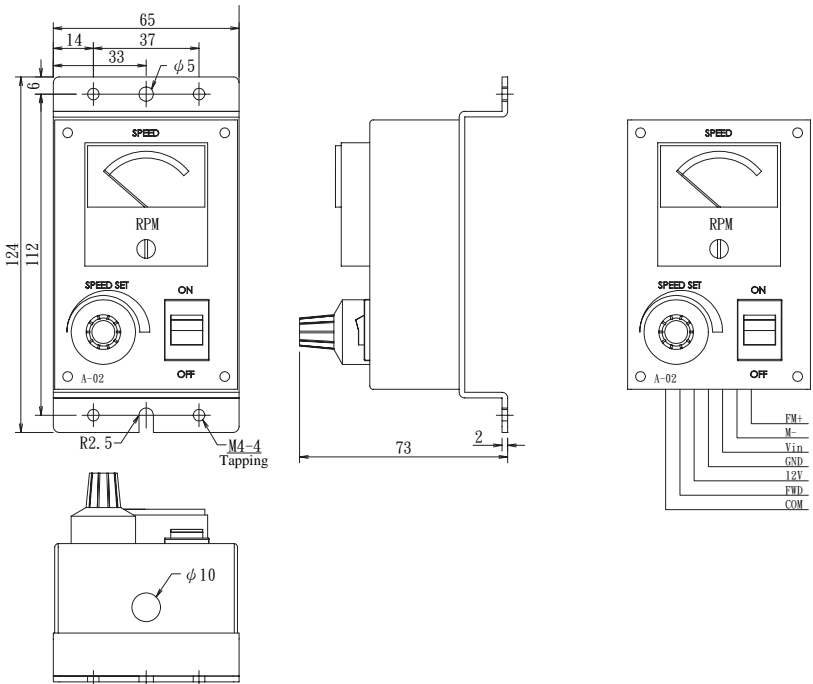


B. Remote controller RAC-01

- a. RAC-01 assembled by A-01 and A-02
- b. RAC-01 is applied to remote control or panel control box.
- c. Pointer meter. $1K\Omega$ (1/2W) with accuracy 10 turn VR, use this VR to adjust frequency. ON/OFF switch for start and stop.

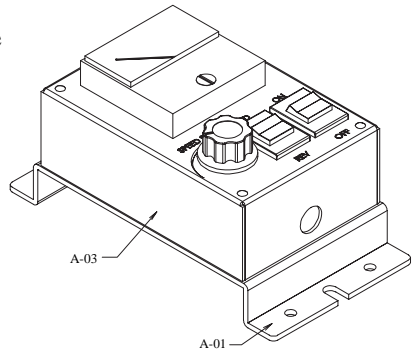


d. Dimension and wires name.

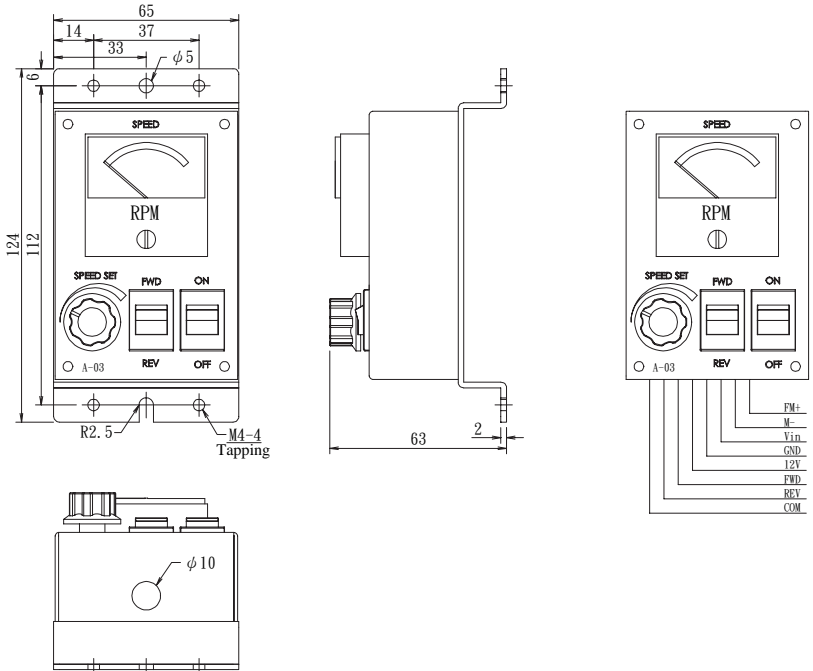


C. Remote controller RAC-02

- a. RAC-02 assembled by A-01 and A-03
- b. RAC-02 is applied to remote control or panel control box.
- c. Pointer meter. $1K\Omega$ (1/2W) VR, use this VR to adjust frequency. The left of ON/OFF is forward and reverse switch, the right one is for start and stop switch.



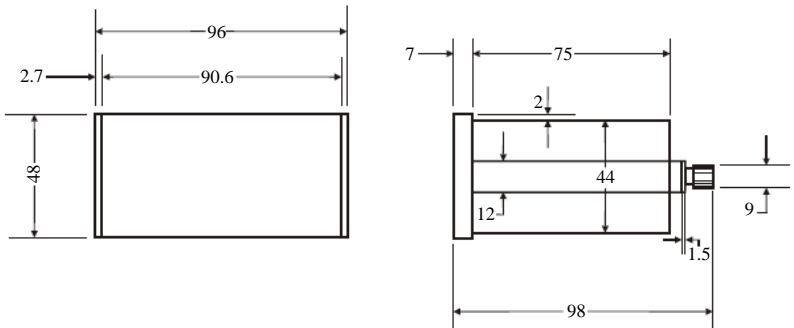
d. Dimension and wires name.



(2) Remote indicators DM-501

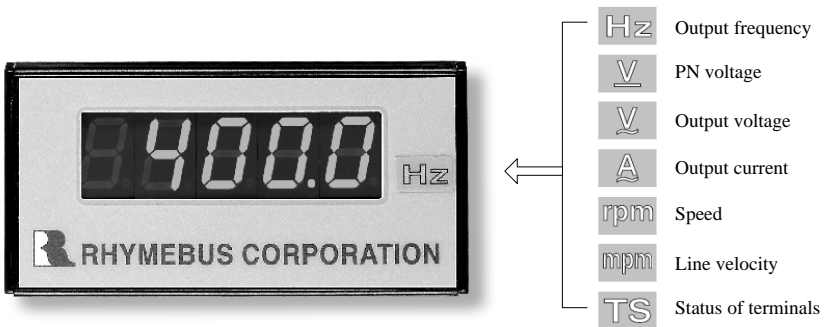
A. Dimensions

DM-501 is specially designed for above RM5 V2.0 version, which does not need extra power, just connect from inverter. This display can be separately display voltage, current, frequency, line velocity etc. (Ref.Page66)



Unit : mm

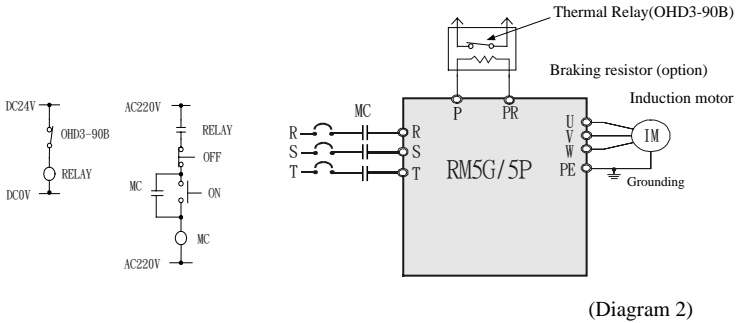
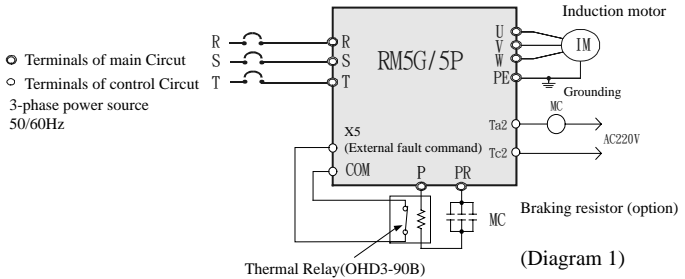
B. DM-501 display



C. The cable connector is 2.54-5 Pins, the length are 1.5M and 1.8M, Don't use over these length.

APPENDIX C

(1)Connect Braking Resistor



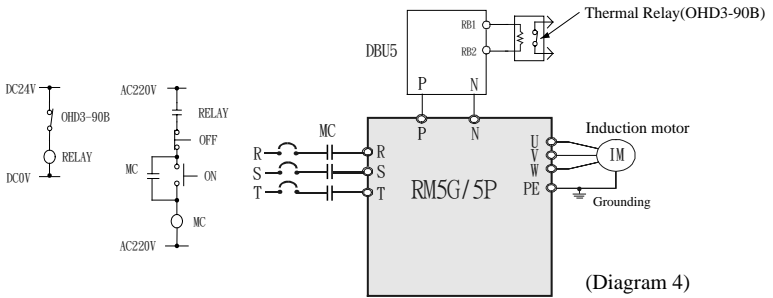
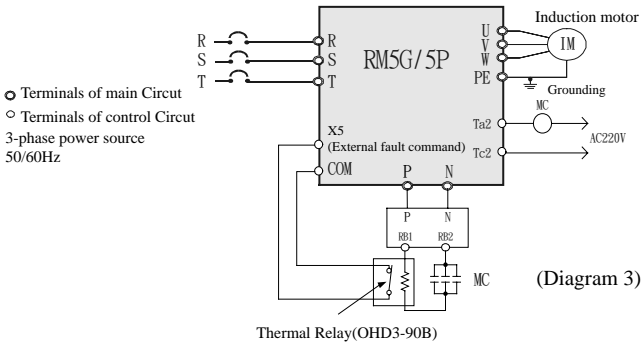
To avoid braking resistor over heat causing accident, strongly recommend to install thermal relay for protection.
 The wire diagram are as above diagram 1, diagram 2.

Diagram 1: Using thermal relay to control magnetic contactor indirectly, when braking resistor is over heat, inhibit the magnetic contactor.

Diagram 2: When the power source of inverter is controlled by magnetic contactor indirectly, Using thermal relay to control magnetic contactor indirectly, when braking resistor is over heat, inhibit the magnetic contactor.

APPENDIX C

(2)Connect D.B. unit

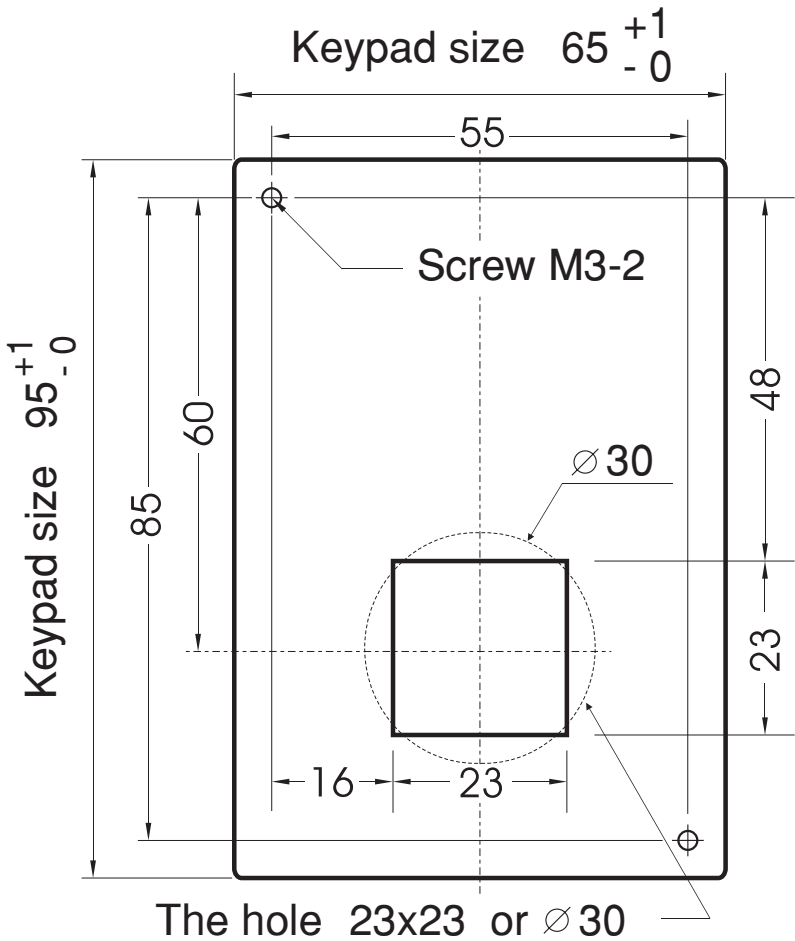


To avoid braking resistor over heat causing accident, strongly recommend to install thermal relay for protection.
 The wire diagram are as above diagram 3, diagram 4.

Diagram 3: Using thermal relay to control magnetic contactor indirectly, when braking resistor is over heat, inhibit the magnetic contactor.

Diagram 4: When the power source of inverter is controlled by magnetic contactor indirectly, Using thermal relay to control magnetic contactor indirectly, when braking resistor is over heat, inhibit the magnetic contactor.

APPENDIX 1:
DIMENSIONS OF OPENING OF KP-201C AND KP-202C



Scale: 1:1 Unit:mm

APPENDIX 2: SETTING MEMO

Function code	Descriptions	Factory Setting	Setting	Function code	Descriptions	Factory Setting	Setting
F_000		P5103d		F_020		15.0	
F_001		3		F_021		15.0	
F_002		1		F_022		15.0	
F_003		1		F_023		15.0	
F_004		1		F_024		15.0	
F_005		1		F_025		15.0	
F_006		1		F_026		15.0	
F_007		20.00		F_027		15.0	
F_008		0		F_028		15.0	
F_009		60.00 (50.00)		F_029		0.0	
F_010		10.00		F_030		0	
F_011		20.00		F_031		60.0 (50.0)	
F_012		30.00		F_032		0.5	
F_013		0.00		F_033		200V:8.0 400V:12.0	
F_014		0.00		F_034		60.0 (50.0)	
F_015		0.00		F_035		220.0 (380.0)	
F_016		0.00		F_036		0.0	
F_017		6.00		F_037		0.0	
F_018		60.00 (50.00)		F_038		0.0	
F_019		15.0		F_039		0.0	

Function code	Descriptions	Factory Setting	Setting	Function code	Descriptions	Factory Setting	Setting
F_040		1.00		F_060		11	
F_041		0.00		F_061		2.0	
F_042		1.00		F_062		2.0	
F_043		0.00		F_063		0.0	
F_044		0		F_064		1.0	
F_045		1.00		F_065		0	
F_046		1		F_066		0	
F_047		0		F_067		0	
F_048		Rated current of motor		F_068		160	
F_049		1/3 rated current of motor		F_069		0.1	
F_050		0.0		F_070		170	
F_051		4P		F_071		160	
F_052		3		F_072		15.0	
F_053		4		F_073		15.0	
F_054		1		F_074		1	
F_055		2		F_075		50	
F_056		7		F_076		0.5	
F_057		6		F_077		0.0	
F_058		3		F_078		0	
F_059		2		F_079		200V:175.0 400V:320.0	













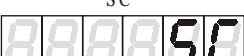
Function code	Descriptions	Factory Setting	Setting	Function code	Descriptions	Factory Setting	Setting
F_080		0		F_100		2	
F_081		4		F_101		3	
F_082		0		F_102		0	
F_083		0		F_103		3.0	
F_084		0.0		F_104		15.0	
F_085		0.0		F_105		15.0	
F_086		0.0		F_106		0.0	
F_087		0.0		F_107		0	
F_088		150		F_108		0	
F_089		0.5		F_109		0	
F_090		100		F_110		1	
F_091		no_Err		F_111		20	
F_092		0		F_112		17	
F_093		1		F_113		8	
F_094		1		F_114		5	
F_095		200V:220.0 400V:380.0		F_115		3	
F_096		0.5		F_116		1	
F_097		0.0		F_117		0	
F_098		0		F_118		0	
F_099		1		F_119		0	

Function code	Descriptions	Factory Setting	Setting
F_120		1	
F_121		0.00	
F_122		0	
F_123		0	
F_124		1	
F_125		1	
F_126		0	
F_127		1.00	










Function code	Descriptions	Factory Setting	Setting
F_128		0.00	
F_129		2	
F_130		1.00	
F_131		1	
F_132		0.5	
F_133		Monitor	
F_134		0	

APPENDIX 3: FAULT DISPLAY

RM 5G/5P Error Trip

<p>EER</p>  <p>EEPROM error</p>	<p>AD_Err</p>  <p>AD Converter error</p>	<p>OC</p>  <p>Over current</p>
<p>OE</p>  <p>Over voltage</p>	<p>LEI</p>  <p>Under voltage during operation</p>	<p>GF</p>  <p>Grounding fault</p>
<p>OH</p>  <p>Over heat</p>	<p>OL</p>  <p>Motor over load</p>	<p>OLI</p>  <p>Inverter over load</p>
<p>OLO</p>  <p>Over load detect</p>	<p>thr</p>  <p>External thermal relay protection</p>	<p>PA dF</p>  <p>KP-202C error</p>
<p>SC</p>  <p>Inverter fuse shutoff</p>		

RM 5G/5P Warning Display

<p>Err 00</p>  <p>Keypad interrupt</p>	<p>Err 01</p>  <p>Keypad interrupt during operation</p>	<p>LE</p>  <p>Main power source under level</p>
<p>OLO</p>  <p>Over load detect</p>	<p>bb</p>  <p>Inhibition output</p>	<p>Fr</p>  <p>Free running</p>
<p>dtF</p>  <p>Direction terminal error</p>	<p>db</p>  <p>Over voltage in stop</p>	<p>Wr_F</p>  <p>Write to inverter fault</p>

