

AC Motor Drive Vector Control

RM6G1 Series



RM6G1

Multi-function AC Motor Vector Control Drive

The All-In-One solution, RM6G1 Series, with superior control ability and adaptable to various interface and applications will be your best partner to ensure productivity and quality once and for all.

Take action on the support of sustainable environment idea, the strategies of green building design has been integrated to our factory. The final goal is “Zero Carbon Production” for every unit we produce.



01 All-inclusive Motor Driving Technology

1. Support four control modes: Open Loop V/F Control, Close Loop V/F Control, Sensor Vector Control, and Sensorless Vector Control. IPM/SPM Motor all available, one drive adapt to whole factory for an easy management.



2. Auto-tuning function, including rotational and stationary tuning for each brands of Induction Motor.
3. Applicable for high-accuracy speed, torque and tension control.
4. ODM service for customized electric vehicle motor drive.



Control Mode	V/F Control	Sensorless V/F Control	Vector Control	Sensorless Vector Control *1
Range for speed control	1:40	1:40	1:1500	1:200
Accuracy for speed control	±0.03%	±3%	±0.02%	±0.2%
Speed response	3Hz	3Hz	>50Hz	>10Hz
Start torque	150% / 3Hz	150% / 3Hz	200% / 0rpm	200% / 0.3Hz

Above performance will be affected by motor type, control diagram and system characteristics. For reference only.

*1: on preparation for mating with PM motor.

Product Introduction

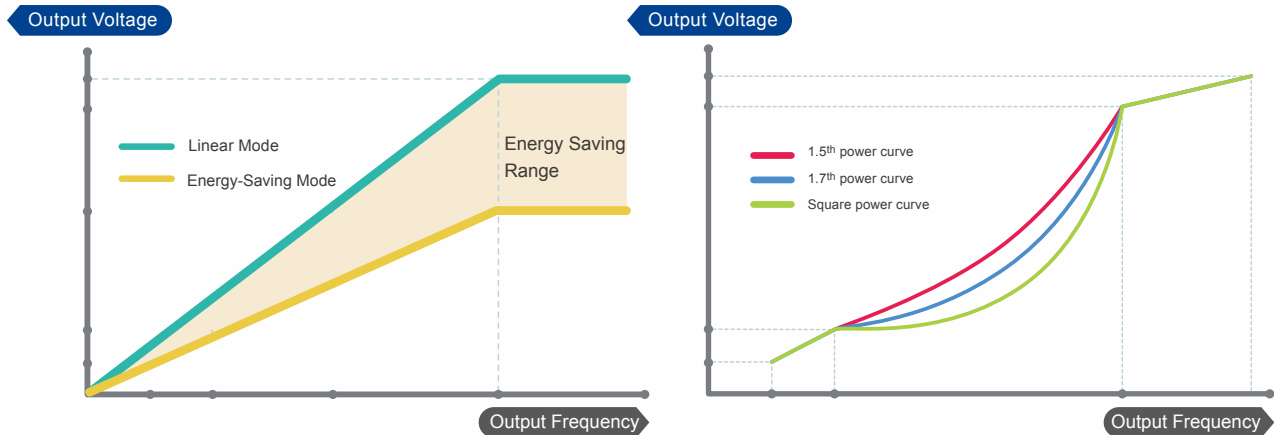
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02 Energy Saving and Cost Effective

1. Built-in 5 types of V/F curve enhanced the energy saving effect compared to traditional linear V/F control.

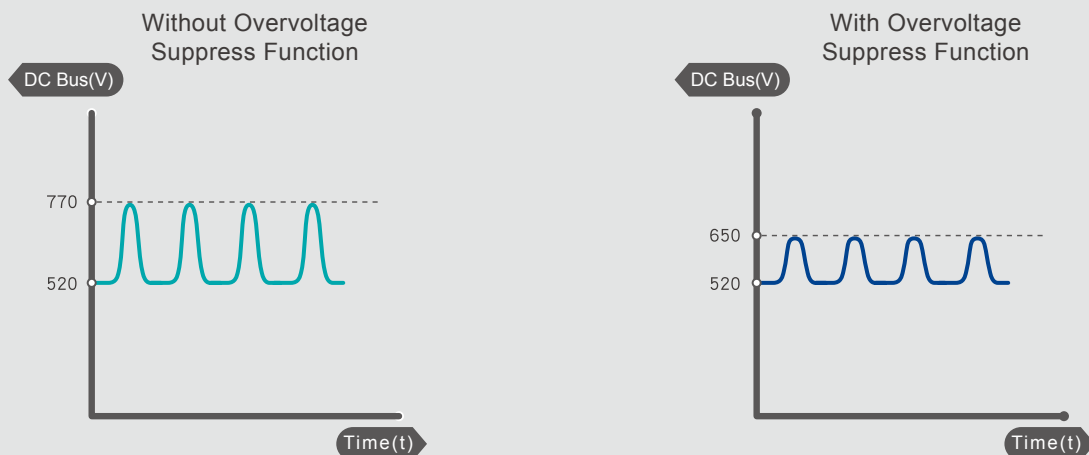
Energy-Saving Mode, auto-adjust V/F pattern according to the load condition.

1.5th, 1.7th and square power curve for variable torque applications.



2. Match with high efficiency motor for a smaller equipment volume and increasing energy efficiency.
3. Overvoltage Suppress Function to lower energy consumption and saving the cost of braking unit. Particularly suitable for pressing or punching machine.

Example:

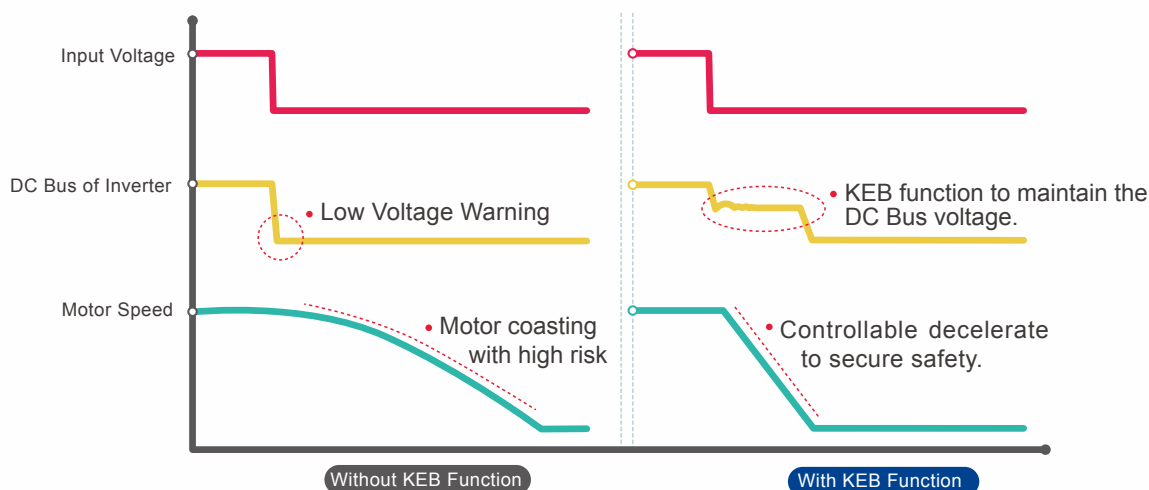


* The suppress performance may be varied from each applications.

4. Besides using PID control function in the inverter, this function is also able to apply for the other device to lower the equipment cost.

03 Safety Standards and Functions

1. All series comply UL, cUL(UL508C, CSA 22.2 NO. 14-05) and CE(EN61800-3, EN61800-5-1) standards.
2. All series comply RoHS2.0 and REACH regulations.
3. Kinetic Energy Backup (KEB) function, decelerate the motor speed safely when a sudden power blackout occurs and accelerate to previous speed when power resumes.



4. Instant monitoring the temperature of inverter and motor for overheat protection and response due by settings. Comply with variety of temperature sensors, PTC/NTC/PT100/RTD392/KTY84.
5. Two sets of Safety Disable inputs for coordinated control. Reduce components costs and assure the safety of labors.
6. Build-in surge voltage absorber and electric surge absorber to reduce the surge damage to the drive.

04 Easy to Deploy and Maintain

1. One touch operation, 60 different kinds of switch selection.(Ex: FWD/REV, Primary/Secondary frequency, 2nd motor parameters, 2nd PID parameters)
2. Build-in two sets of parameter setting for motor. Use single drive to control two different motor for a lower equipment construction costs.



3. 16 sets preset speed to save the time for parameter adjustment.
4. Copying parameter by Keypad for an effortless factory management.
5. 0.5HP~25HP equip with LED Keypad.
Full-color LCD Keypad support multi-language and display 8 status at the same time.
6. Cooling fan for the model above case-5 can be replaced from the front directly and make the maintenance more convenient.

05 Highly Compatible & Adaptable

1. Heavy Duty-RM6G1 and Normal Duty-RM6P1 for all your needs.

Overload protection: RM6G1 - 150% of drive rated output current for 1 min.

RM6P1 - 120% of drive rated output current for 1 min.



Series	Duty	Motor	Example of Applications
RM6G1	Heavy Duty	11kW	<div>Compressor</div> <div>Crane</div> <div>Machining</div> <div>Conveyer</div> <div>Extrusion</div> <div>Winder</div> <div>Press</div> <div>Elevator</div> <div>Textile</div>
RM6P1	Normal Duty	15kW	<div>Pump</div> <div>Fan</div> <div>Blower</div>

(Note) Please be cautious to the motor rated current that must not exceed the drive rated current.

2. Built-in RS-485 Modbus RTU communication for all series and support with additional communication card and pulse generator card to achieve smart management for your factory and make production process more flexible and diversify.

It can also apply to close-loop positioning control, steady-state speed control, high precision speed control and tension control.

Note: “*” symbol means on the process.

Communication Card

CC-Link
Profinet*
CANopen*
EtherCAT*

Smart Management
Multi-Machine Control

Pulse Generator Card

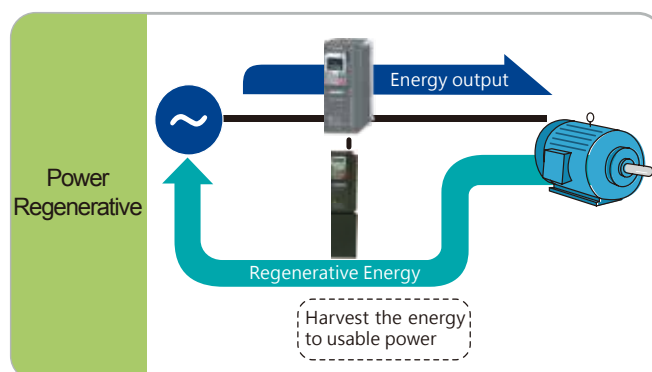
Line Driver
Open Collector / Push Pull
Resolver*

Automatic Warehousing
Elevator
Conveyer Metal Winding
Textile Printing
Film Process

-
- The graph shows the speed of a train across five sections. The y-axis is labeled 'Frequency' and the x-axis is labeled 'Time'. The graph shows a yellow area representing speed over time, with a peak in Section 2 and a constant speed in Section 5. A train icon is shown at the end of the graph.

1. Accumulation for kWh, drive running hours, drive power supplying time and fan operation hours for statistics record and maintenance planning.
2. 10 sets of error record, each sets contains 6 status records for abnormal definition.
3. Temperature pre-warning due by setting value for predictive maintenance and minimize equipment idle time.
4. Temperature controlled cooling fan for reducing fan noise and improve life time of fan.
5. Password locks for parameters to prevent alter it by accident.
6. Easily set parameters by PC software.

1. Additional RM6A6 series to harvest regenerative power and saving energy directly. Especially for constant braking condition.
2. Free from braking resistor. Eliminate waste heat from it.
3. Single RM6A6 module can match with multiple drivers.
4. Adequate for heavy inertia, four-quadrant load, rapidly deceleration and constant braking. Ex: textile drafting, Plano machining center, elevator, lifting crane, stamping process and automatic warehousing.
5. Automatic operation without interfere original equipment.
6. Standard specification: 200V , 10 ~ 35kW*
400V , 14 ~ 53kW*



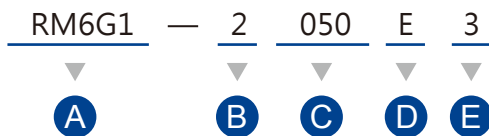
Product Introduction

08 Keypad



1. light on : Primary Frequency Command is set up by Keypad or UP/Down terminal
2. light off : Primary Frequency Command is set up by multi-functional terminal
1. Enter the function setting mode
2. Back to monitor mode
- Adjust settings and parameters
1. Enter the parameter setting mode
2. Back to the function setting mode
3. Switch the monitor mode
- Panel Display
- Indicator for Units
- Frequency pot
Drive start key
Blinking : accelerating / decelerating
Light on : constant speed
Light off : stops
1. Drive stops (Cut off the output frequency of terminals)
2. Fault reset

09 Model Number Scheme

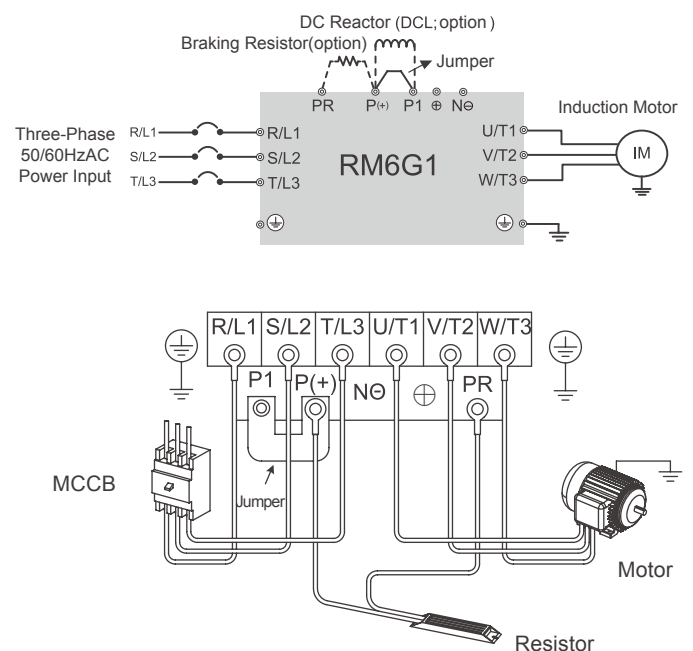


- A ▶ Product Series
RM6G1-Heavy-duty load usage
RM6P1-Normal-duty load usage
- B ▶ Input Voltage
2 : AC 200~240V
4 : AC 380~480V
- C ▶ Model Number
- D ▶ Brake Type:
B :Built-in braking transistor
E :Without braking transistor
- E ▶ Input Power:
1 :Single-phase
3 :Three-phase

10 Main Circuit Terminals

Symbol	Function	Description
R, S, (L1,L2)	AC power source input terminals	Single-phase; sinusoidal power source input terminals.
R, S, T (L1, L2, L3)		Three-phase; sinusoidal power source input terminals.
⊕, N ⊖	DC power source input terminals	External DC power source terminal *Only 20P5~2040,4001~4060 models have ⊕ terminal
U, V, W (T1, T2, T3)	Drive outputs to motor terminals	Output three-phase variable frequency and voltage to motor.
P(+), N ⊖	Dynamic brake unit terminal	The terminals can connect to dynamic braking unit (option).
P(+), PR	External braking resistor terminal	The terminals can connect to external brake resistor(option).
P(+), P1	External reactor terminal	The terminal can connect to DC reactor (DCL) for improving power factor. The default setting is connected by a jumper.
PE 與 ⊕	Grounding terminal	Ground the drive in compliance with the NEC standard or local electrical code.

- Single phase power connect to R,S terminal
→ Three phase power connect to R,S,T terminal



11 Standard specification

Three-phase 200V 系列

Model case (RM6G1-□□□□B3/E3)	20P5	2001	2002	2003	2005	2007	2010	2015	2020	2025	2030	2040	2050	2060	2075	2100	2125	2150	2200	2250
Maximum applicable 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	25/ 18.5	30/ 22	40/ 30	50/ 37	60/ 45	75/ 55	100/ 75	125/ 90	150/ 110	200/ 160	250/ 200
Rated output capacity (kVA)	1.1	1.9	3	4.2	6.9	9.5	13	18	24	29	34	44	55	67	84	112	132	154	223	267
Rated output current (A)	3	5	8	11	18	25	33	47	60	74	90	115	145	175	220	295	346	405	585	700
Maximum Output Voltage (V)	Three-phase 200~240V (Correspond to input voltage)																			
Range of Output Frequency (Hz)	0.1~600.00Hz																			
Power Source (ø, V, Hz)	Three-phase 200~240V 50/60Hz																			
Input current (A)	5	6	10	14	19	30	40	60	69	86	103	132	176	200	240	280	330	380	550	660
Permissible AC power source fluctuation	170~264V 50/60Hz / ±5%																			
Overload Protection	150% of drive rated output current for 1 min																			
Maximum cooling air volume(CFM)	Nature cooling	31	31	62	62	60	60	150	150	216	216	212	394	394	394	591	591	788	788	788
Applicable safety standards	UL508C, CSA C22.2 No.14-05, EN61800-3, EN61800-5-1																			
Protective structure	IP20										IP00 (IP20 OPTION)									
Weight / Mass (kg)	3.0	3.0	3.0	3.0	3.0	3.0	5.4	5.7	12.4	13.1	14.7	14.8	43	44	46	64	89	90	164	167
Case Code	Case 2					Case 3			Case 4				Case 5			Case 6	Case 7		Case 8	

Three-phase 400V 系列

Model case (RM6G1-□□□□B3/E3)	4001	4002	4003	4005	4007	4010	4015	4020	4025	4030	4040	4050	4060	4075	4100	4125	4150	4175	4200	4250	4300	4350	4420	4500	4600
Maximum applicable 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	350/ 250	420/ 315	500/ 375	600/ 450
Rated output capacity (kVA)	1.9	3	4.6	6.9	11	14	18	23	30	34	46	56	66	84	114	134	160	193	232	287	316	366	446	533	655
Rated 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	480	585	700	860
Maximum Output Voltage (V)	Three-phase 380~480V (Correspond to input voltage)																								
Range of Output Frequency (Hz)	0.1~600.00Hz																								
Power Source (ø, V, Hz)	Three-phase 380~480V 50/60Hz																								
Input current (A)	3.5	5	8	12	16	22	28	38	45	52	70	84	100	130	155	177	196	217	282	355	385	440	540	650	800
Permissible AC power source fluctuation	323~528V 50/60Hz / ±5%																								
Overload Protection	150% of drive rated output current for 1 min																								
Maximum cooling air volume(CFM)	Nature cooling	31	31	31	63	63	60	60	60	150	216	216	216	212	394	394	394	394	591	591	788	788	788	1182	1182
Applicable safety standards	UL508C, CSA C22.2 No.14-05, EN61800-3, EN61800-5-1																								
Protective structure	IP20												IP00 (IP20 OPTION)												
Weight / Mass (kg)	2.9	2.9	3.0	3.2	3.1	3.1	5.6	5.7	5.8	12.8	12.9	15	15.3	44	46	46	64	65	95	97	159	163	164	217	272
Case Code	Case 2					Case 3			Case 4				Case 5			Case 6	Case 7	Case 8			Case 9				

*Besides the series of RM6G1 heavy-duty load usage, this series also has RM6P1 normal-duty load usage.

*The weight of RM6G1 series in the standard specifications exclude ACL and DCL

12 Common standard

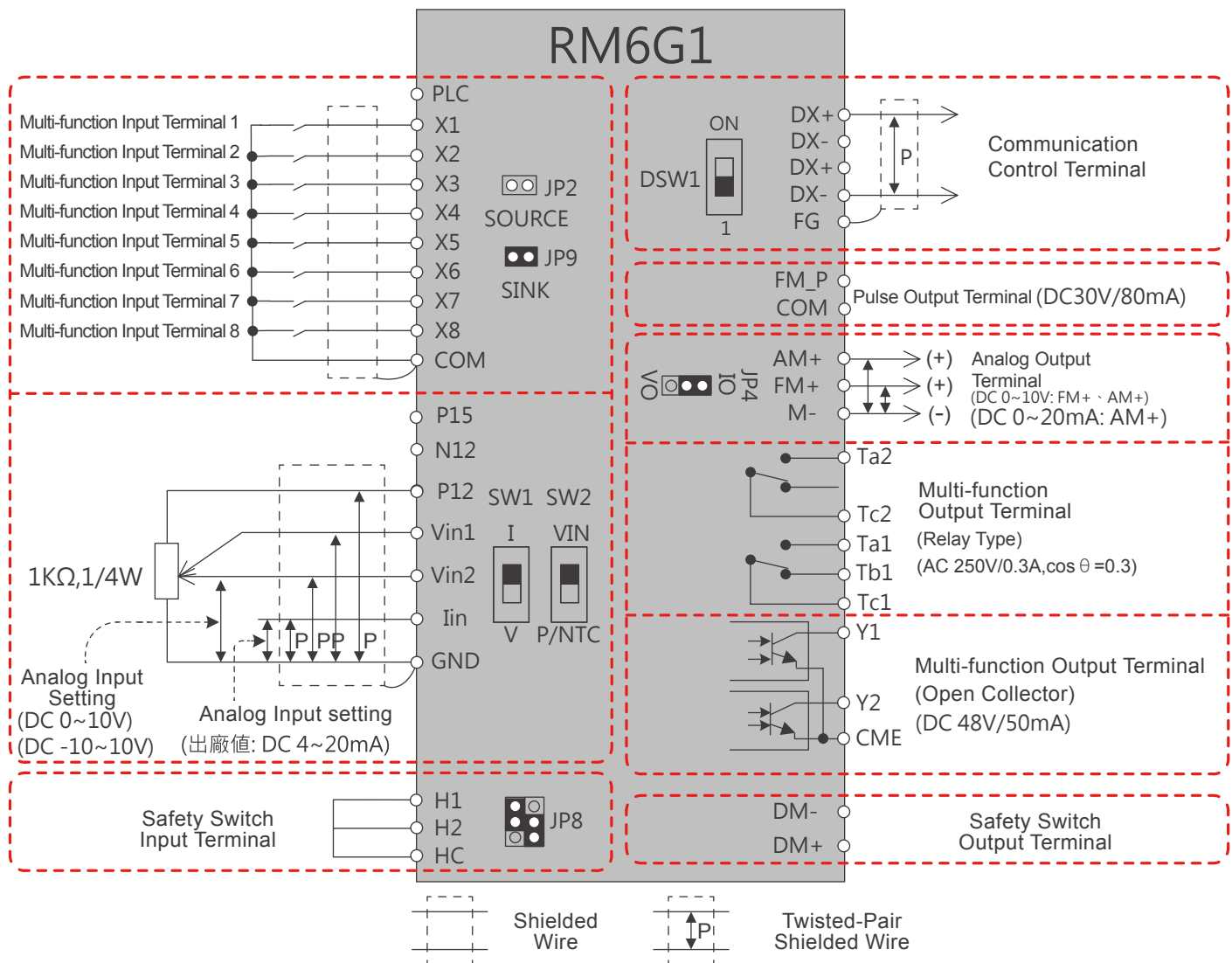
Control Characteristics	Control method		<ul style="list-style-type: none"> • V/F control • V/F control+ PG card • Vector control(*) • Vector control+ PG card
	Range of frequency setting		0.01~600Hz
	Resolution of frequency setting		<ul style="list-style-type: none"> • Digital Keypad (KP-601A): 0.01Hz • Analog signal: 0.03Hz / 60Hz (11 bit)
	Resolution of output frequency		0.001Hz
	Frequency setting signal		- 10~10V、0~10V、4~20mA, Pulse Input
	Overload protection	Heavy duty	RM6G1-150% of drive rated output current for 1 min.
		Normal duty	RM6P1-120% of drive rated output current for 1 min.
	DC braking		<ul style="list-style-type: none"> • Time of DC braking after stop / before start: 0~60.0sec • DC braking frequency at stop: 0.1~60Hz • DC braking level: 0~150% of rated current
	Braking torque		Approximately 20%(with built-in braking resistor connected, braking torque is approximately 100%)
	Acceleration/ deceleration time		<ul style="list-style-type: none"> • 0.1~3200.0sec or 0.01~320.0sec • The setting of acceleration /deceleration time can adjust from 0.01Hz to 600.00Hz
	Stall prevention		<ul style="list-style-type: none"> • Acceleration/constant speed stall prevention (Current level 30~200%) • Stall prevention when decelerate
	Other functions		slip compensation, auto-torque compensation, auto-adjustment for output voltage stability, auto-operation for energy-saving, auto-adjustment of switching frequency, restart after instantaneous power failure, speed tracing, overload detection, acceleration/deceleration switch, parameters copy, dynamic brake unit duty control, 16 sections of operating procedures control, kWh accumulation value, counter, timer, Modbus communication, jump frequency, holding frequency, upper and lower limits output frequency, 16 sections speed, S curve acceleration and deceleration, motor temperature display and protection, drive temperature display, fan temperature control start and stop, pulse input/output, password lock, predictive maintenance information, error record, PID control (two-stage PID), upper and lower limits detection feedback, Traverse Textile, 2 independent motors parameter switch, automatic adjustment, torque limit, KEB function, Overvoltage suppress function.
	Expansion card		PG card(Line Driver, Open Collector*, Resolver*) Communication card(CC-Link, Profinet*, CAN-Open*)
Operation Characteristics	Input	Multi-function inputs	<ul style="list-style-type: none"> • 8 sets programmable input terminals: X1~X8 • X8 also has function of pulse input
		Analog inputs	<ul style="list-style-type: none"> • Vin/Vin2 – GND: DC 0~10V/DC-10~+10V • Iin – GND: DC 4~20mA / 2~10V or DC 0~20mA / 0~10V
		Simulate analog inputs	Vin3, Vin4 (function=Vin1, Vin2): Analog is set by parameter/communication setting.
	Output	Multi-function outputs	5 sets programmable output detection: Ta2–Tc2, Ta1–Tb1–Tc1, Y1–CME, Y2–CME, FM_P-COM 2 sets programmable output detection: Y3, Y4 (detection function=Y1, Y2)
		Analog outputs	<ul style="list-style-type: none"> • “FM+” – “M” – : DC 0~10V • “AM+” – “M” – : DC 0~10V or DC 0~20 mA/dc 4~20 mA
Display	LED keypad (KP-601A)		Monitor the frequency of drive, voltage, current, drive temperature, terminal situation...information
	LCD keypad (KP-602)		Full-color display, multiple languages and 8 descriptions of monitor modes are shown at the same time.
Protections	Fault protection	Error trip messages of drive	EEPROM error(EEr), A/D converter error(AdEr), Fuse open(SC), Under voltage during operation(LE1), Drive over current(OC), Grounding fault (GF), Over voltage(OE), Drive overheat (OH), Motor overload(OL), Drive overload(OL1), System overload(OLO), External fault(EF), Keypad interruption during copy(PAdF)
		Warning messages of drive	Power source under voltage(LE), Drive output interruption (bb), Coast to stop(Fr), Dynamic brake transistor over voltage(db), Keypad cable trip before connecting(Err_00), Keypad cable trip during operation(Err_01), Direction command error(dFt), version copy error(FAult)
Environment	Atmosphere		Non-corrosive or non-conductive, or non-explosive gas or liquid, and non-dusty
	Surrounding temperature		<ul style="list-style-type: none"> • Heavy : -10° C (14° F) ~ +50° C (122° F) (Non-freezing and non-condensing) • Normal Duty : -10° C (14° F) ~ +40° C (104° F) (Non-freezing and non-condensing)
	Storage temperature		-25° C (-13° F) ~ +70° C (158° F)
	Relative humidity		95% RH or less (No-condensing atmosphere)
	Vibration		Less than 5.9m/sec ² (0.6G)
	Altitude		Less than 1000m (3280 ft.)

*symbol means on the process.

13 Control terminal

Type	Symbol	Function	Description	
Control Circuit Terminal	Control Powe	PLC	Output DC+24V; Maximum supplied current is 100 mA.	
		P12	Output DC+12V; Maximum supplied current is 20 mA.	
		N12	Output DC-12V; Maximum supplied current is 20 mA.	
		P15	Output DC+15V	
		GND	Common terminal for control power(P12 、N12 、P15)	
	Input Terminals	X1	Multi-function input terminal 1	• The description of function is set up by the setting value(H1-00).Default setting: Forward command
		X2	Multi-function input terminal 2	• The description of function is set up by the setting value(H1-01).Default setting: Reverse command
		X3	Multi-function input terminal 3	• The description of function is set up by the setting value(H1-02).Default setting: Jog command
		X4	Multi-function input terminal 4	• The description of function is set up by the setting value(H1-03) .Default setting: External fault command
		X5	Multi-function input terminal 5	• The description of function is set up by the setting value(H1-04) .Default setting: Reset command
		X6	Multi-function input terminal 6	• The description of function is set up by the setting value(H1-05) .Default setting: Disable
		X7	Multi-function input terminal 7	• The description of function is set up by the setting value(H1-06) .Default setting: Disable
		X8	Multi-function input terminal 8	• The description of function is set up by the setting value(H1-07) .Default setting: Disable
		COM	Common of digital input terminals	• Common of input control terminal (X1~X8) , control power (PLC) ,pulse input signal(FM_P)
		Vin1	Analog input terminal 1	• Input range DC 0~10V or DC -10~10V,input impedance 20k Ω
		Vin2	Analog input terminal 2	• Selective function of DIP switch-SW2:Thermistor or external voltage signal
		Iin	Analog input terminal 3	• Selective function of DIP switch-SW1:Current signal or voltage signal
	Output Terminals	FM_P	Pulse output signal terminal	• NPN open collector isolated output: Maximum value: 30VDC/80mA.Default setting: Output frequency
		AM +	Analog output terminal1	• Selective output signal –JP4:Current signal or voltage signal
		FM +	Analog output terminal 2	• The description of function is set up by the setting value (H4-00). Default setting: Output frequency
		M -	Common of analog output terminals	• Common of analog output terminal
		Ta1	Multi-function output terminals (relay type)	• The description of function is set up by the setting value(H2-04).Default setting: Error detection
		Tb1		• The description of function is set up by the setting value(H2-04). Default setting: Error detection
		Tc1		• Common of Ta1,Tb1 terminals
		Ta2	Capacity: AC 250V 、0.5A _{Max} 、 $\cos \theta =0.3$	• The description of function is set up by the setting value(H2-05). Default setting: Detection during operation
		Tc2		• Ta2 common terminal
		Y1	Multi-function output terminals (open collector type)	• The description of function is set up by the setting value(H2-00). Default setting: Zero speed detection
		Y2		• The description of function is set up by the setting value(H2-01). Default setting: Zero speed detection
		CME		• Common of Y1,Y2 terminals

14 Wiring Diagram & Control Terminals

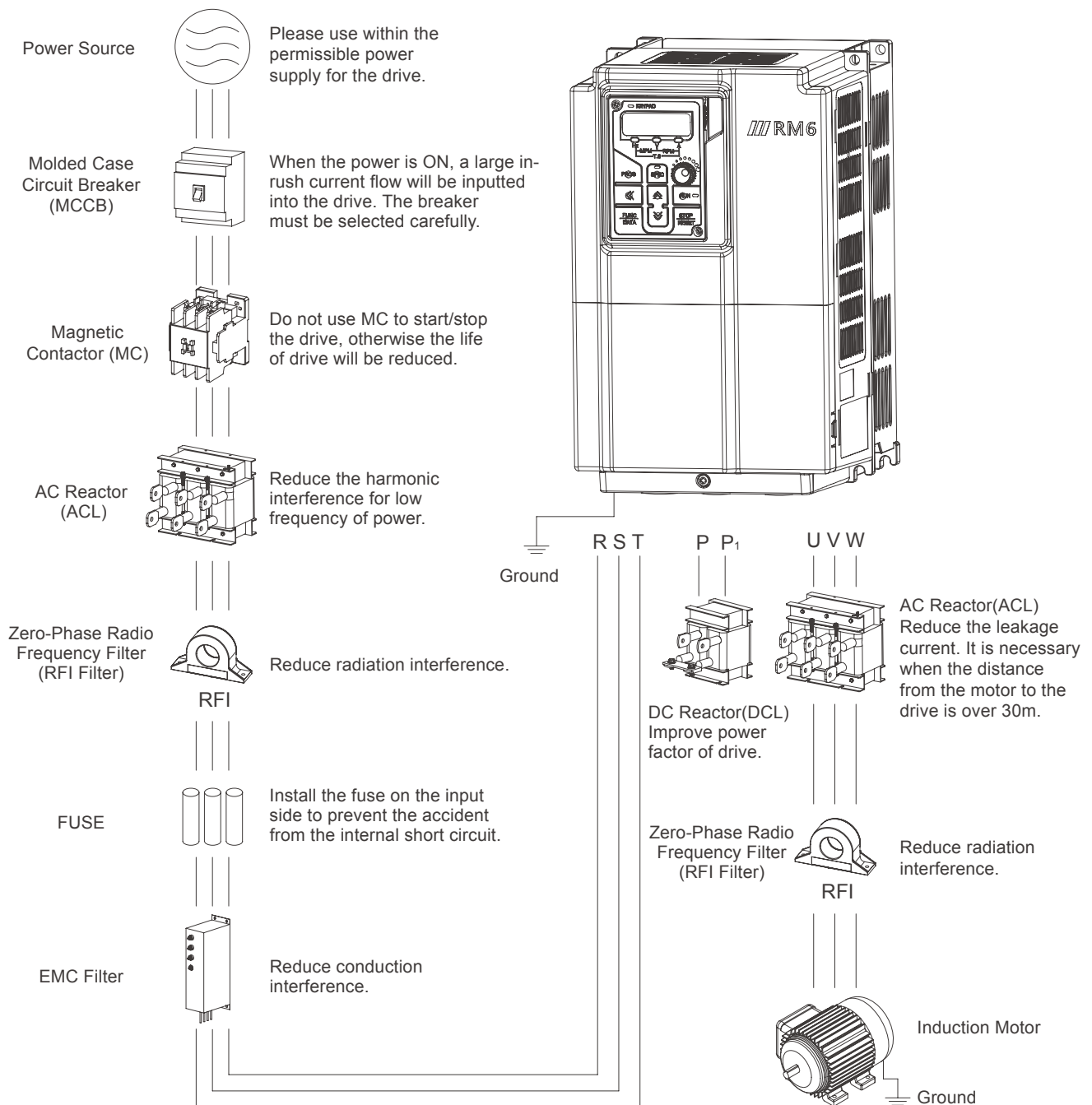


15 Communication control terminal

Type	Symbol	Function	Description
Communication terminal	DX +	MODBUS communication terminal	<ul style="list-style-type: none"> With HMI/NB to control RM6G1/RM6P1 series of drive Communication protocol: Modbus(interface: RS-485) Terminal resistor switch-DSW1 ; terminal resistor=120Ω
	DX -		
	FG	MODBUS communication terminal	Grounding terminal of shielding wire

Note: The total length of connecting cable can not exceed 500 meters.

16 Peripheral equipment of drive



1. ACL appropriate using time

RST input side

- When the power capacity is over than 500 kVA or 10 times larger than the rated capacity.
- When the heater (with the SCR), air compressor, high frequency equipment or welding machine is installed at the same power source sysem, the harmonic current will interface the drive.

UVW output side :

- Cable length between the drive and the motor is over than 30 meters or multiple motors are used in parallel

2. RM6G1 –ACL is standard equipment when the horse power is over than 100 HP;DCL is standard equipment when the horse power is over than 175 HP

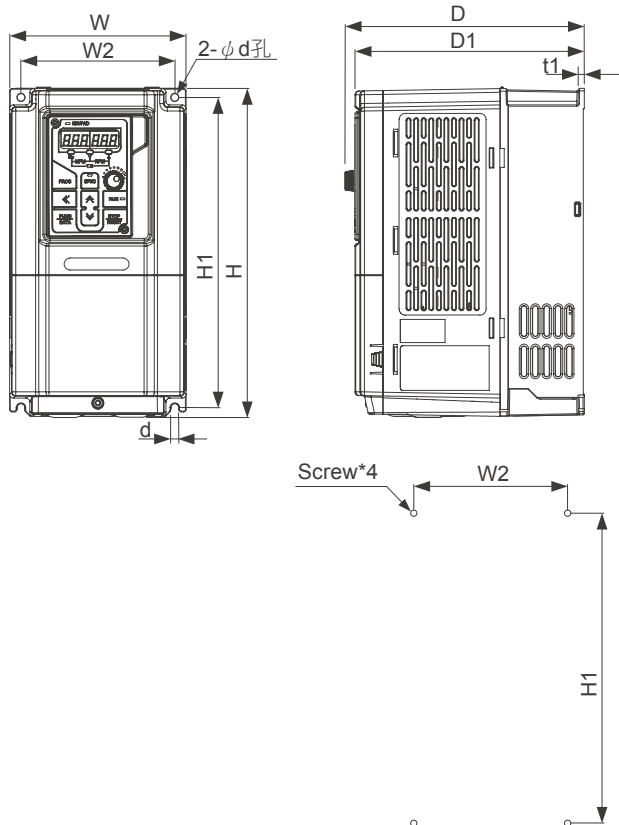
RM6P1 –ACL is standard equipment when the horse power is over than 125 HP;DCL is standard equipment when the horse power is over than 200 HP

3. Please refer to the manual for details of connection

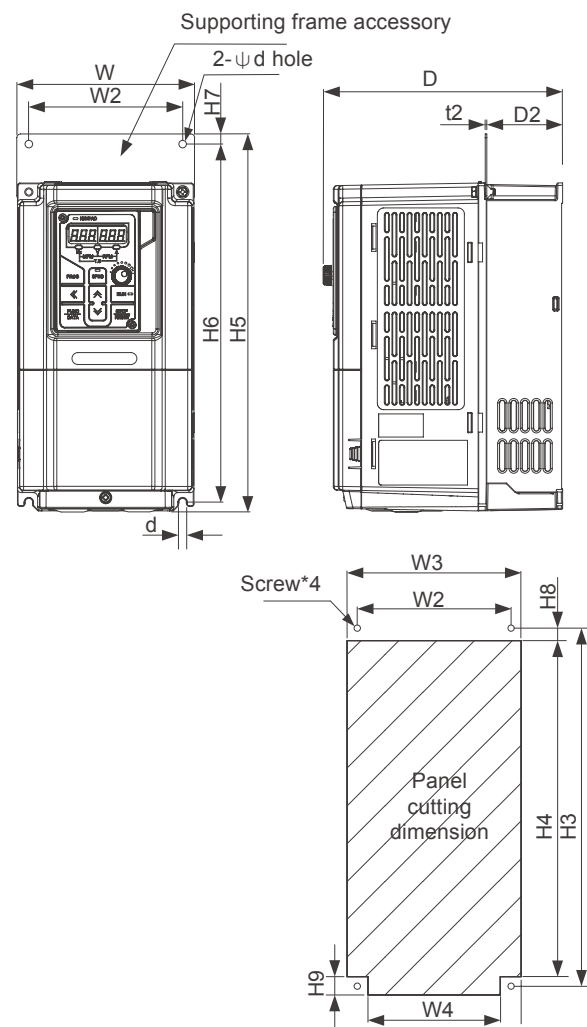
17 Outline dimension(visual)

Case 2~4

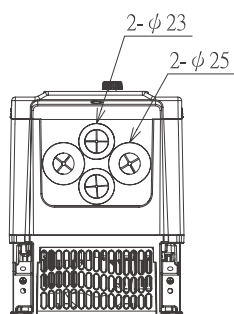
Internal cooling type



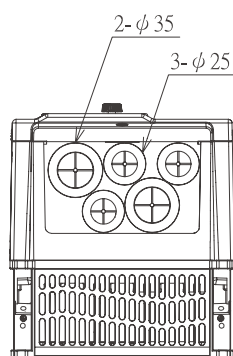
External cooling type



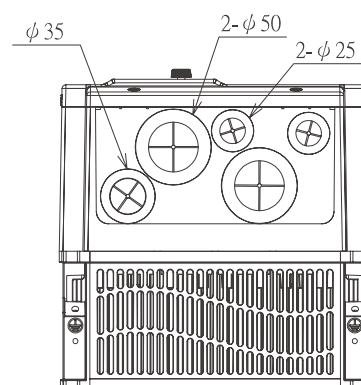
Case 2



Case 3

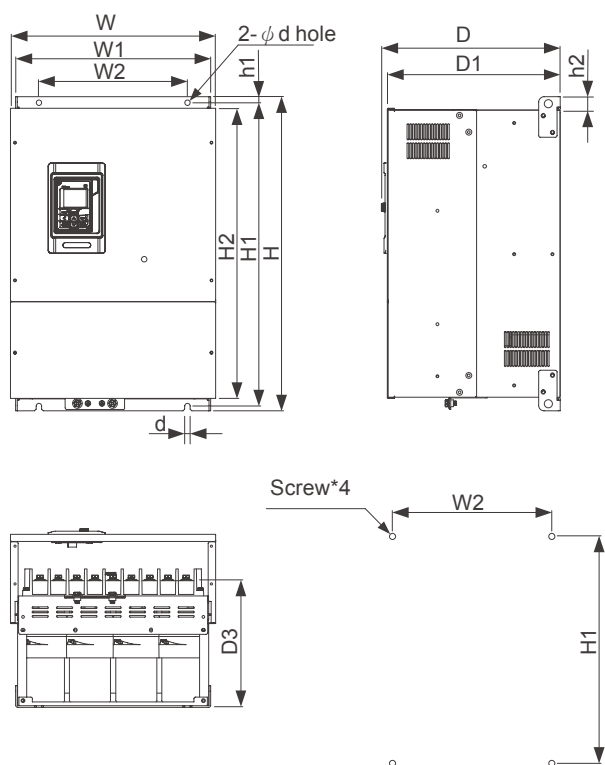


Case 4

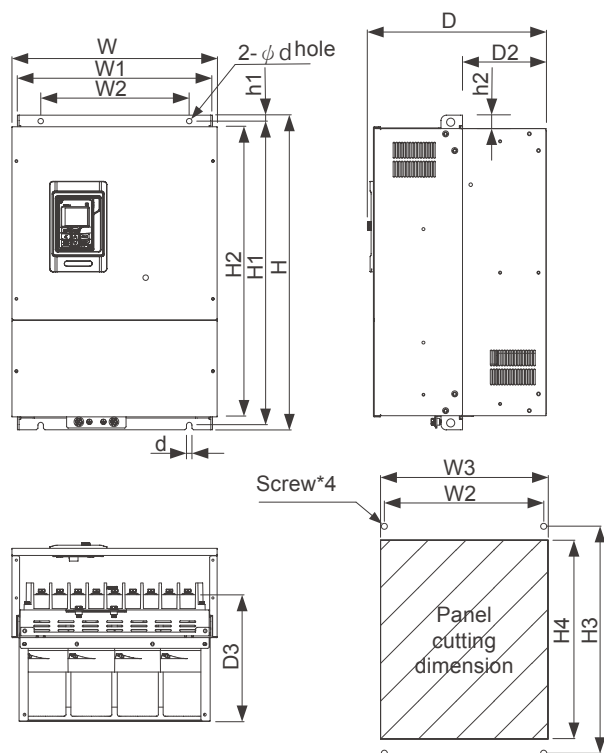


Case 5~9

Internal cooling type



External cooling type



RM6G1

Case	Model Number		Dimension																								Screw
	200V	400V	W	W1	W2	W3	W4	H	H1	H2	H3	H4	H5	H6	H7	H8	H9	h1	h2	t1	t2	D	D1	D2	D3	d	(mm)
CASE2	20P5~2007	4001~4010	140	-	122	138.5	105	260	246	-	284	267	300	284	8	10	14.5	-	-	4.7	1.2	190	182	60	-	6	M5
CASE3	2010~2015	4015~4025	180	-	162	178.5	149	290	277	-	313	290	329	313	8	10	20	-	-	9	1.6	207	199	74	-	6.5	M5
CASE4	2020~2040	4030~4060	250	-	230	248.5	212	400	380	-	427	396	448	427	10	11.5	29	-	-	9.5	2	258	250	103	-	9	M8
CASE5	2050~2075	4075~4125	386	361	275	365	-	584	562	539	564	545	-	-	-	-	-	11	25	-	-	331	323	155	242	10	M8
CASE6	2100	4150~4175	446	418	275	427	-	685	660	630	662	634	-	-	-	-	-	14	30	-	-	334	326	163	246	12	M10
CASE7	2125~2150	4200~4250	508	479	275	487	-	818	785	751	788	758	-	-	-	-	-	19	35	-	-	374	366	183	257	15	M12
CASE8	2200~2250	4300~4420	696	654	580	657	-	1000	974	929	978	936	-	-	-	-	-	15	39	-	-	413	405	182	294	15	M12
CASE9	-	4500~4600	992	954	710	958	-	1030	1003	963	1007	968	-	-	-	-	-	15	39	-	-	427	419	185	308	15	M12

Green Tech

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Formosa Sika Deer, an endemic species in Taiwan. Once, they were critically endangered. Fortunately, a success restoration has been achieved in southern Taiwan during 1994. Now, the Formosa Sika Deer should live prosperous on the Formosa Island for every spring to come.

RHYMEBUS CORPORATION, cultivating in Taiwan for the last 30 years while reaching out to every corner of the world by our adaptable green technology and make contribution to global environment.



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