MOTOR CONTROL

REGAL

MDHP Series High Performance Variable Frequency Drive

Brief Manual

marathon™ Drives

A Regal Brand

REGAL

www.regalaustralia.com.au

Safety Instructions

To prevent injury and property damage, follow these instructions. Incorrect operation due to ignoring instructions will cause harm or damage.

The seriousness of which is indicated by the following symbols.

Symbol		Meaning
	**Warning**	**This symbol indicates the possibility of death or serious injury.**
	**Caution**	**This symbol indicates the possibility of injury or damage to property.**

Remark

- Even if the instructions are indicated as 'Caution', it can cause a serious result according to the kind of operation and the environment.

The meaning of each symbol in this manual and on your equipment is as follows.

Symbol	Meaning
	**This is the safety alert symbol.** **Read and follow instructions carefully to avoid dangerous situation.**
	**This symbol alerts the user to the presence of "dangerous voltage" inside the product that might cause harm or electric shock.**

After reading this manual, keep it in the place that the user always can contact easily.

This manual should be given to the person who actually uses the products and is responsible for their maintenance.

WARNING

- **Do not remove the cover while power is applied or the unit is in operation.**
  Otherwise, electric shock could occur.
- **Do not run the inverter with the front cover removed.**
  Otherwise, you may get an electric shock due to high voltage terminals or charged capacitor exposure.

⚠ WARNING

- **Do not remove the cover except for periodic inspections or wiring, even if the input power is not applied.**
  Otherwise, you may access the charged circuits and get an electric shock.
- **Wiring and periodic inspections should be performed at least 10 minutes after disconnecting the input power and after checking the DC link voltage is discharged with a meter (below DC 30V).**
  Otherwise, you may get an electric shock.
- **Operate the switches with dry hands.**
  Otherwise, you may get an electric shock.
- **Do not use the cable when its insulating tube is damaged.**
  Otherwise, you may get an electric shock.
- **Do not subject the cables to scratches, excessive stress, heavy loads or pinching.**
  Otherwise, you may get an electric shock.

⚠ CAUTION

- **Install the inverter on a non-flammable surface. Do not place flammable material nearby.**
  Otherwise, fire could occur.
- **Disconnect immediately the input power if the inverter gets damaged.**
  Otherwise, it could result in a secondary accident and fire.
- **After the input power is applied or removed, the inverter will remain hot for a couple of minutes.**
  Otherwise, you may get bodily injuries such as skin-burn or damage.
- **Do not apply power to a damaged inverter or to an inverter with parts missing even if the installation is complete.**
  Otherwise, electric shock could occur.
- **Do not allow lint, paper, wood chips, dust, metallic chips or other foreign matter into the drive.**
  Otherwise, fire or accident could occur.

Caution for Use

■ Transportation and Installation

- Be sure to carry inverter in a proper way suitable for its weight, or it may result in damage to inverter.
- Be sure to use heat-treated wooden crate when you adopt wooden packaging for the product.
- Do not pile up inverters above allowable limit.
- Be sure to install the inverter as directed in this instruction manual.
- Do not turn off the power supply to the damaged inverter.
- Do not open the front cover while carrying the inverter.
- Do not place the heavy material on the inverter.
- The direction of installation should be observed properly as criterions specified in this manual show.
- Make sure that you should not put screw, metal material, water, oil and the inflammable something else.
- Keep in mind that inverter is very vulnerable to drop from the mid air and strong shock.
- Don't let the inverter exposed to rain, snow, fog, dust, etc.
- Do not cover, nor block, the ventilating system having cooling fan. It may cause the inverter overheated.
- Be sure to check the power is off when installing the inverter.
- To prevent the risk of fire or electric shock, keep the connected wire in a sound condition. Use the wire that meets the standard in a recommended length.
- Be sure to ground the inverter. (Under 10 Ω to 200V class, Under 100 Ω to 400V class)

- Be certain to use the inverter under the following conditions.

Environment	Description
Ambient Temperature	- 10 ~ 40 ℃ (Non-frozen) (Less than 80% load is recommended at 50℃.)

Environment	Description
Ambient Humidity	Below 90% RH (Dewdrop should not be formed)
Storage Temperature	-20 ~ 65°C
Ambient Condition	Free of corrosive gas, inflammable gas, oil sludge and dust, etc
Altitude/Vibration	Below 1000m above sea level, Below 5.9m/sec^2 (=0.6g)
Ambient Air Pressure	70 ~ 106 kPa

■ Wiring

⚠ Caution

- **A professional installer should have done the wiring and checking.**

- Do wiring after installing the inverter body.
- Do not connect phase-leading capacitors, surge filter, radio noise filter to the output of inverter.
- Output terminals (terminals named U, V, W respectively) should be connected in a proper phase sequence.
- Make sure that there is not any short circuit terminal, wrong wiring. It may cause spurious operation or failure.
- Refrain from using a cable other than the cable shielded when you connect control circuit wiring.
- Adopt the shielded wire only when wiring the control circuit. It may cause the failure of inverter in its operation. Use the twisted pair shield wire for the ground terminal of the inverter.

⚠ Warning

- **To prevent an electric shock, be sure to check if MCCB and MC are switched OFF before wiring**

  Otherwise, it may cause an electric shock.

■ Adjustment before starting trial operation

- Do not supply the excessive range of voltage displayed in the user manual to the each terminal. It may cause damage to the inverter.
- Current hunting can be occurred in the low speed territory during testing. It occurs where the capacity is above 110kW with no-load and the axis is not connected.

The current hunting has a gap according to the motor characteristic. It will be disappeared when the load is connected and it is not the indication of abnormal condition.
If the hunting is occurred seriously, please stop the testing and operates with the load.

- Be sure to check relevant parameters for the application before starting trial operation.

■ How to Use

- Be sure not to approach the machine when retry function is selected. The machine may start working suddenly.
- Stop key on the keypad should be set to be in use. For safety, additional emergency stop circuit should be required.
- Inverter restarts if alarm condition is cleared while FX/RX signal is on. Therefore, be sure to operate the alarm reset switch after checking if FX / RX signal is off.
- Never modify the inverter for inappropriate use.
- When a magnetic contactor is installed on the power source, do not frequently start or stop using this magnetic contactor. It may cause the failure of inverter.
- Noise filter should be used for the minimization of troubles by electro-magnetic noise. Electronic equipments close to the inverter should be protected against the damage caused by troubles.
- Be sure to install the AC reactor at the input of inverter in case of input voltage unbalance. Otherwise, generator or phase-leading capacitors may be destroyed by the harmonic current from inverter.
- If 400V class motor is used with the inverter, insulation-enforced motor should be used or countermeasures against the suppression of micro-surge voltage generated by the inverter should be carried out.
  Otherwise, micro-surge voltage is generated across input terminal for the motor and this voltage lowers allowable insulation break-down voltage and then, may cause the destruction of the motor.
- Be sure to set the parameters once more, in case of initialization of parameters, all values of parameters is set to values of factory setting.
- High speed operation can be set easily, therefore be sure to check the performance of motor or machine before changing parameter value.
- DC braking function cannot produce a zero-servo torque. If required, additional equipment should be installed.
- When inverter trip or emergency stop (BX) occurs without keypad connected, LED on the control board will blink by the interval of 0.5 sec. But LED will blink by 1 sec when keypad is connected. This function displays which trip will be occurred according to the connection of keypad.
- Do not change wiring, nor disconnect connector or option card during the operation of inverter.

- Do not disconnect the motor wiring while the voltage of inverter is output. Mishandling may cause damage to the inverter.
- Be sure to handle the inverter and option care in the order recommended in the Electro Static Discharge (ESD) Countermeasure. Mishandling may lead to damage to the circuit on the PCB caused by ESD.

■ Countermeasure against malfunction troubles

- If inverter is damaged and then gets into uncontrollable situation, the machine may lead to the dangerous situation, therefore to avoid this situation, be sure to install the additional equipments such as brake.

■ Maintenance, inspection and parts replacement

- Do not perform the megger (insulation resistance check) test on the control board.
- Please refer to intervals for parts replacement on Chapter 8.

■ Disposal

- Handle the inverter as an industrial waste when disposing of it.
- Our inverter contains the raw material of value that can be recycled from the aspect of energy and resource preservation. All the package materials and metal parts are recyclable. Plastics are also recyclable, but may be burnt under the controllable environment depending on the local regulation.

■ General Instruction

- The drawing in this user manual is represented the details of the inner inverter, so, the drawing is described without cover part and circuit breaker. But, cover and circuit breaker should be mounted before the operation following to the instruction of user manual.
- Turn off the power of inverter when the inverter is not used.

■ Cleaning

- Be sure to operate the inverter under a clean condition.
- When cleaning the inverter, be sure to check the inverter is off. Start cleaning it with all the plugs connected with the inverter socket removed.
- Never clean the inverter using wet cloth or water. Wipe the stained area softly using the cloth completely wet with a neutral detergent or ethanol.

- Never use the solution such as acetone, benzene, toluene, alcohol, etc. They may cause the coating on the surface of the inverter to peel off. In addition, do not clean LCD display, etc. using detergent or alcohol.

■ Storage

Be sure to keep the inverter under the following conditions if you don't use it for a long period of time.

- Make sure that you satisfy the recommended storage environment. (See page v.)
- If the storage period exceeds 3 months, be sure to keep it at the ambient temperature of -10 ~ +30˚C to prevent 『Deterioration by Temperature』 of electrolytic condenser.
- Be sure to keep it in a proper package to prevent moisture, etc. Put the desiccant (Silica Gel), etc., in the package so that the relative humidity in the package can be maintained at 70% or less.
- When it is exposed to moisture or dust (mounted on the 『System』 or 『Control Panel』, etc. installed at the construction site), remove it and then keep it under the environmental condition specified in the page v.

⚠ Caution

- **If the inverter has been left long with electric current not charged, the nature of electrolytic condenser can be deteriorated. So be sure to have it plugged in for 30 ~ 60 minutes once a year. Do not perform wiring and operation of the output side (secondary side).**

Thank you for purchasing Marathon Drive Variable Frequency Drives!

Introduction to the Manual

- This manual describes the specifications, installation, operation, functions and maintenance of MDLV--HP series inverter and is for the users who have basic experience of using an inverter.
- It is recommended you read carefully this manual in order to use MDLV--HP series inverter properly and safely.
- The manual consists as follows.

Chapter	Title	Contents

1	Basics	Describes the precautions and basic items which should be learned before using the Inverter.
2	Specifications	The control specifications, ratings and types of the input and output.
3	Installation	Information on the use environment and installation method.
4	Wiring	Wiring information for the power supply and signal terminals.
5	How to Use Keypad	Descriptions on the display and operation keys on the main body of the Inverter.
6	Basic Functions	Descriptions on the basic functions including frequency setting and operation command.
7	Checking and Troubleshooting	Descriptions on the failures and anomalies which may occur during operation.
8	Table of Functions	Brief summarize of functions.

This User's Manual is aimed at.....

Describing specification, installation, operation, function, and maintenance of MDHP series inverter provided for the users who are familiar with and having basic experience in the inverter.

Be sure to understand function, performance, installation, and operation of the product by reading through this User's Manual completely prior to your use of MDHP series inverter that you have purchased. In addition, you are required to have this User's Manual properly delivered to the end-user and maintenance manager.

■ Option Module Guide

The following Option Module Guides will be provided when you purchase the applicable Option Module. In addition, if you access our homepage http://www.regalaustralia.com.au, you can download it in PDF file.

- MDHP PLC Card Option Module Guide
- MDHP Encoder Card Option Module Guide
- MDHP Profibus-DP Card Option Module Guide
- MDHP Modbus-TCP Card Option Module Guide
- MDHP LonWorks Card Option Module Guide
- MDHP DeviceNet Card Option Module Guide
- MDHP I/O Extension Card Option Module Guide
- MDHP Built-in RS-485 & Modbus-RTU Option Module Guide
- MD-HP CANopen Card Option Module Guide
- MDHP Ethernet Card Option Module Guide
- MDHP CC-Link Card Option Module Guide

1.1 What You Should Know before Use

1.1.1 Check of product

Take the inverter out of the box, check the rating shown on a side of the product body and whether the inverter type and rated output are exactly what you ordered. Check also whether the product has been damaged during delivery.

MD LV	008		HP	-	2	N	O	F	D
	INV Model	Capacity of Applied Motor		Series Name		Input Voltage	Keypad	UL	EMC	DCR
		VT (Normal duty)	CT (Heavy duty)							
MD Inverter	0008	1.5 [kW]	0.75 [kW]	Wide-Use Inverter	-	**2:** 3-Phase 200~230[V] **4:** 3-Phase 380~480[V]	**N:** NON **S:** GLCD (Graphic Loader)	**O:**OPEN **E:** Enclosed UL Type1[note1)] **P:** Enclosed UL Type 12	**Blank:** Non-EMC **F:**EMC	**Blank:** Non-DCR **D:**DCR **R** :DB Resistor (Inner Mounted)
	0015	2.2 [kW]	1.5 [kW]							
	0022	3.7 [kW]	2.2 [kW]							
	0037	5.5 [kW]	3.7 [kW]							
	0055	7.5 [kW]	5.5 [kW]							
	0075	11 [kW]	7.5 [kW]							
	0110	15 [kW]	11 [kW]							
	0150	18.5 [kW]	15 [kW]							
	0185	22 [kW]	18.5 [kW]							
	0220	30 [kW]	22 [kW]							
	0300	37 [kW]	30 [kW]							
	0370	45 [kW]	37 [kW]							
	0450	55 [kW]	45 [kW]							
	0550	75 [kW]	55 [kW]							
	0750	90 [kW]	75 [kW]							
	0900	110 [kW]	90 [kW]							
	1100	132 [kW]	110 [kW]							
	1320	160 [kW]	132 [kW]							
	1600	185 [kW]	160 [kW]							
	1850	220 [kW]	185 [kW]							
	2200	280 [kW]	220 [kW]							
	2800	315 [kW]	280 [kW]							
	3150	375 [kW]	315 [kW]							

3750	450 [kW]	375 [kW]								

Note1) Enclosed UL Type 1 has the conduit option addtionally at 0.75 to 75 kW products.

Note2) DB Resistor of MDHP Product is the option of WEB product. Applicable capacity is from 0.75 to 375 kW of MDHP products.

1.1.2 Parts

If you have any doubt about the product or found the product damaged, call our company's branch offices (see the back cover of the manual).

1.1.3 Preparation of device and Parts for operation

Preparation for operation might slightly vary. Prepare parts according to the use.

1.1.4 Installation

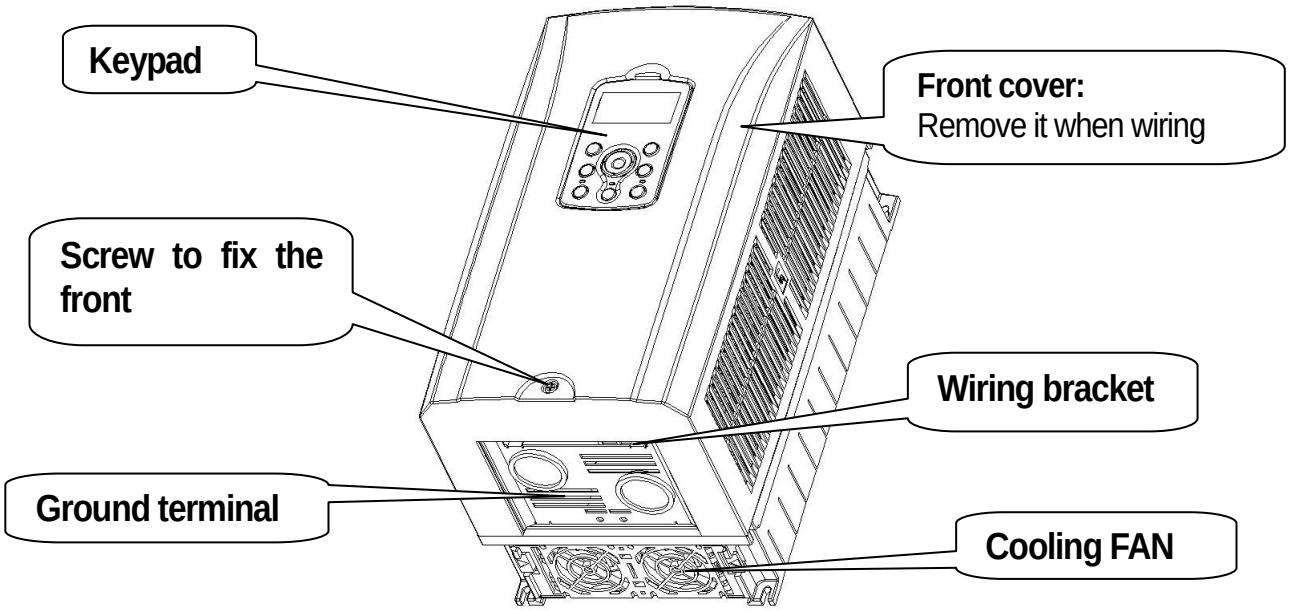
Make sure you install the product correctly considering the place, direction or surroundings in order to prevent decrease in the life and performance of the inverter.

1.1.5 Distribution

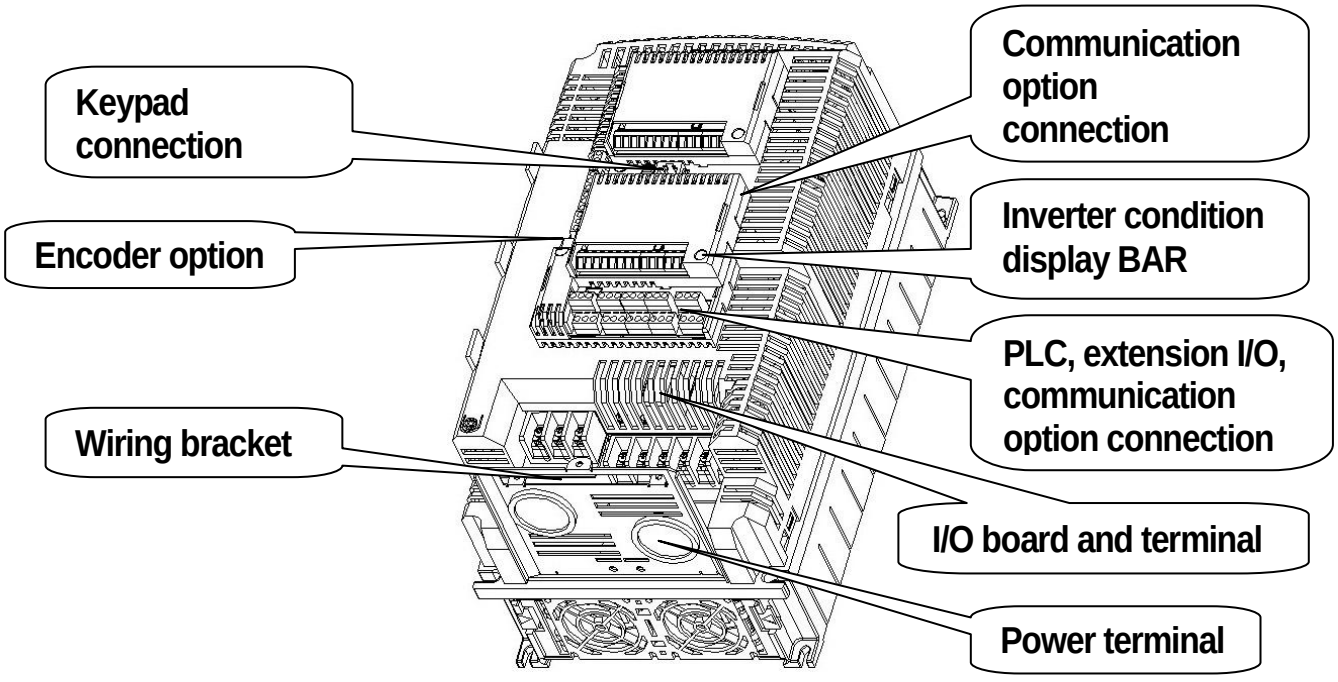
Connect the power supply, electric motor and operating signals (control signals) to the terminal block. If you fail to connect them correctly, the inverter and peripheral devices might be damaged.

1.2 Names and Uses of Parts

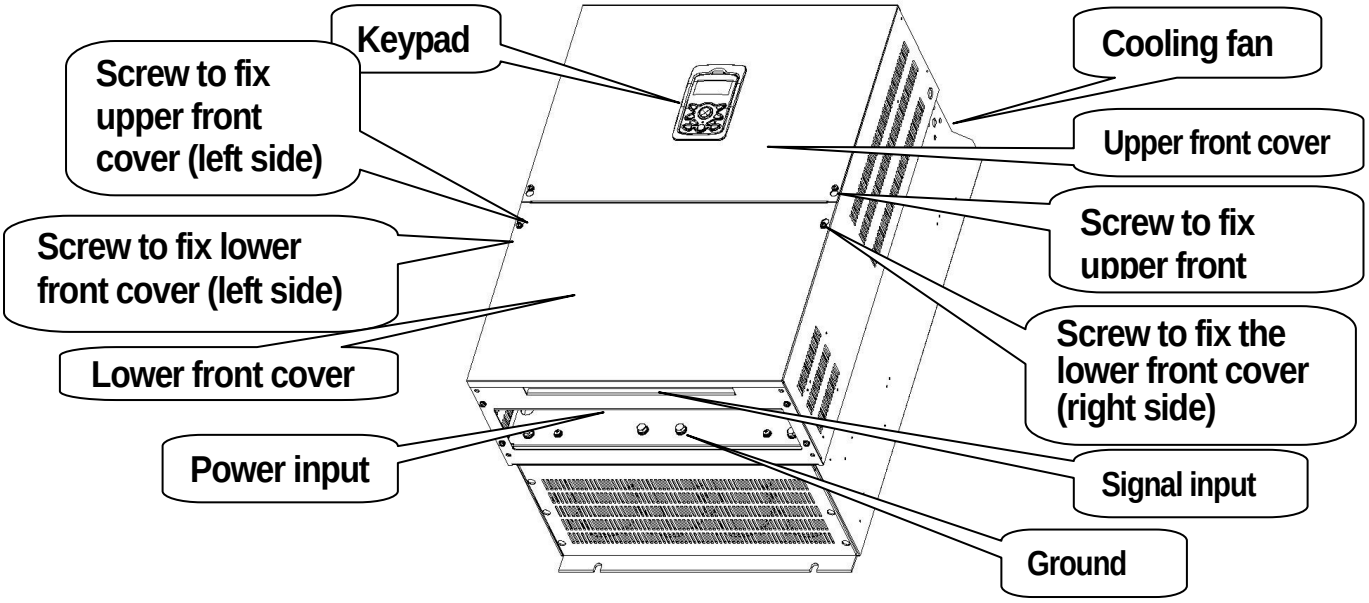
1.2.1 End product (less than 75 kW)



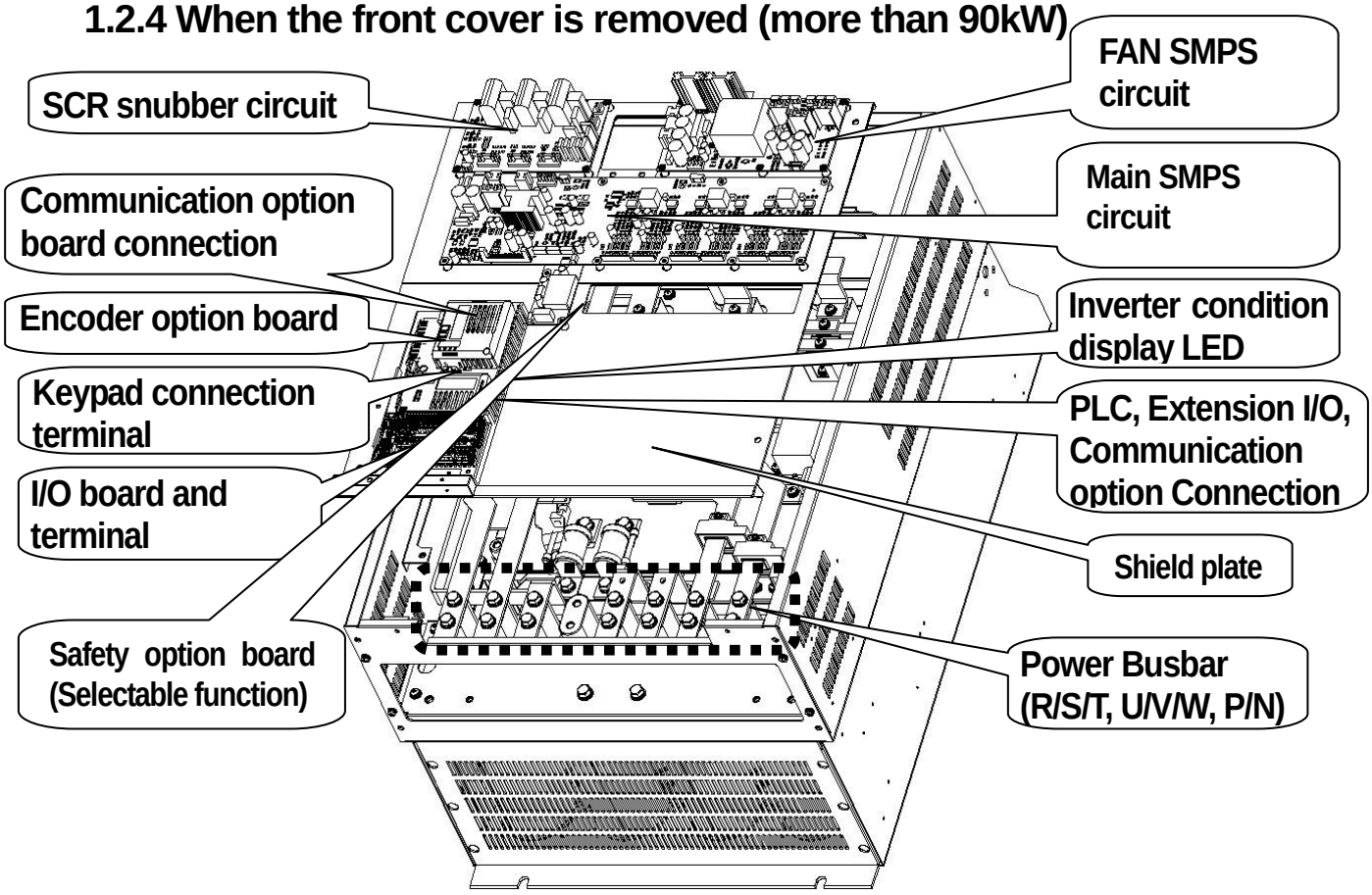
1.2.2 When the front cover is removed (less than 75 kW)



1.2.3 End Product (more than 90kW)



1.2.4 When the front cover is removed (more than 90kW)



Remark

Please refer to option board manual for option board information.

MEMO

2.1 Specifications

2.1.1 Rated Input and Output : Input voltage of 200V class (0.75~22kW)

Type : MDLV xxx HP–2x			0008	0015	0022	0037	0055	0075	0110	0150	0185	0220
[1]Motor Applied	VT	[HP]	2	3	5	7.5	10	15	20	25	30	40
		[kW]	1.5	2.2	3.7	5.5	7.5	11	15	18.5	22	30
	CT	[HP]	1	2	3	5	7.5	10	15	20	25	30
		[kW]	0.75	1.5	2.2	3.7	5.5	7.5	11	15	18.5	22
Rated Output	[2]Rated Capacity [kVA]		1.9	3.0	4.5	6.1	9.1	12.2	17.5	22.9	28.2	33.5
	[3]Rated Current[A]	VT	8	12	16	24	32	46	60	74	88	124
		CT	5	8	12	16	24	32	46	60	74	88
	Output Frequency		[4] 0 ~ 400 [Hz] (Sensorless-1: 0~300Hz, Sensorless-2,Vector: 0~120Hz)									
	Output Voltage [V]		[5] 3-phase 200 ~ 230V									
Rated Input	Available Voltage [V]		3-phase 200 ~ 230 VAC (-15%,+10%,)									
	Input Frequency		50 ~ 60 [Hz] (±5%)									
	Rated Current [A]	VT	6.8	10.6	14.9	21.3	28.6	41.2	54.7	69.7	82.9	116.1
		CT	4.3	6.9	11.2	14.9	22.1	28.6	44.3	55.9	70.8	85.3

2.1.2 Rated Input and Output : Input voltage of 200V class (30~75kW)

Type : MDLV xxx HP–2x			0300	0370	0450	0550	0750	-	-	-	-	-
[1]Motor Applied	VT	[HP]	50	60	75	100	120	-	-	-	-	-
		[kW]	37	45	55	75	90	-	-	-	-	-
	CT	[HP]	40	50	60	75	100	-	-	-	-	-
		[kW]	30	37	45	55	75	-	-	-	-	-
Rated Output	[2]Rated Capacity [kVA]		46	57	69	84	116	-	-	-	-	-
	[3]Rated Current[A]	VT	146	180	220	288	345	-	-	-	-	-
		CT	116	146	180	220	288	-	-	-	-	-
	Output Frequency		[4] 0 ~ 400 [Hz] (Sensorless-1: 0~300Hz, Sensorless-2,Vector:0~120Hz)									
	Output Voltage [V]		[5] 3-phase 200 ~ 230V									
Rated Input	Available Voltage [V]		3-phase 200 ~ 230 VAC (-15%~+10%)									
	Input Frequency		50 ~ 60 [Hz] (±5%)									
	Rated Current [A]	VT	152	190	231	302	362	-	-	-	-	-
		CT	121	154	191	233	305	-	-	-	-	-

* Non DCR products are provided warranty service when used in CT (Heavy duty) load

rating only.

2.1.3 Rated Input and Output : Input voltage of 400V class (0.75~22kW)

Type : MDLV xxx HP–4x			0008	0015	0022	0037	0055	0075	0110	0150	0185	0220
[1]Motor Applied	VT	[HP]	2	3	5	7.5	10	15	20	25	30	40
		[kW]	1.5	2.2	3.7	5.5	7.5	11	15	18.5	22	30
	CT	[HP]	1	2	3	5	7.5	10	15	20	25	30
		[kW]	0.75	1.5	2.2	3.7	5.5	7.5	11	15	18.5	22
Rated Output	[2] Rated Capacity [kVA]		1.9	3.0	4.5	6.1	9.1	12.2	18.3	22.9	29.7	34.3
	[3]Rated Current[A]	VT	4	6	8	12	16	24	30	39	45	61
		CT	2.5	4	6	8	12	16	24	30	39	45
	Output Frequency		[4] 0 ~ 400 [Hz] (Sensorless-1:0~300Hz, Sensorless-2,Vector:0~120Hz)									
	Output Voltage [V]		[5] 3-phase 380 ~ 480V									
Rated Input	Available Voltage [V]		3-phase 380 ~ 480 VAC (-15%~+10%)									
	Input Frequency		50 ~ 60 [Hz] (±5%)									
	Rated Current [A]	VT	3.7	5.7	7.7	11.1	14.7	21.9	26.4	35.5	41.1	55.7
		CT	2.2	3.6	5.5	7.5	11.0	14.4	22.0	26.6	35.6	41.6

2.1.4 Rated Input and Output : Input voltage of 400V class (30~160kW)

Type : MDLV xxx HP–4x			0300	0370	0450	0550	0750	0900	1100	1320	1600	-
[1]Motor Applied	VT	[HP]	50	60	75	100	120	150	180	225	250	-
		[kW]	37	45	55	75	90	110	132	160	185	-
	CT	[HP]	40	50	60	75	100	120	150	180	225	-
		[kW]	30	37	45	55	75	90	110	132	160	-
Rated Output	[2]Rated Capacity [kVA]		46	57	69	84	116	139	170	201	248	-
	[3]Rated Current[A]	VT	75	91	110	152	183	223	264	325	370	-
		CT	61	75	91	110	152	183	223	264	325	-
	Output Frequency		[4] 0 ~ 400 [Hz] (Sensorless-1:0~300Hz, Sensorless-2,Vector:0~120Hz)									
	Output Voltage [V]		[5] 3-phase 380 ~ 480V									
Rated Input	Available Voltage [V]		3-phase 380 ~ 480 VAC (-15%, +10%)									
	Input Frequency		50 ~ 60 [Hz] (±5%)									
	Rated Current[A]	VT	67.5	81.7	101.8	143.6	173.4	212.9	254.2	315.3	359.3	-
		CT	55.5	67.9	82.4	102.6	143.4	174.7	213.5	255.6	316.3	-

* Non DCR products are provided warranty service when used in CT(Heavy duty) load rating only.

2.1.5 Rated Input and Output : Input voltage of 400V class (185~375kW)

Type : MDLV xxx HP–4x			1850	2200	2800	3150	3750	-	-	-	-	-
[1]Motor Applied	VT	[HP]	300	375	420	500	600	-	-	-	-	-
		[kW]	220	280	315	375	450	-	-	-	-	-
	CT	[HP]	250	300	375	420	500	-	-	-	-	-
		[kW]	185	220	280	315	375	-	-	-	-	-
Rated Output	[2]Rated Capacity [kVA]		286	329	416	467	557	-	-	-	-	-
	[3]Rated Current[A]	VT	432	547	613	731	877	-	-	-	-	-
		CT	370	432	547	613	731	-	-	-	-	-
	Output Frequency		[4] 0 ~ 400 [Hz] (Sensorless-1:0~300Hz, Sensorless-2,Vector:0~120Hz)									
	Output Voltage [V]		[5] 3-phase 380 ~ 480V									
Rated Input	Available Voltage [V]		3-phase 380 ~ 480 VAC (-15%, +10%)									
	Input Frequency		50 ~ 60 [Hz] (±5%)									
	Rated Current[A]	VT	463	590	673	796	948	-	-	-	-	-
		CT	404	466	605	674	798	-	-	-	-	-

1) Motor Applied indicates the maximum capacity applied to use of a standard 4 pole standard motor.

2) Rated capacity : the input capacity of a 200V class is based on 220V and that of a 400V class is based on 440V. The current rating is based on CT current.

3) The output of rated current is limited according to setting of the carrier frequency (CON-04).

4) In case of Sensorless-1, you can set the frequency at up to 300Hz by selecting 3 as the control mode (DRV-09 Control Mode). In case of Sensorless-2, you can set the frequency at up to 120Hz by selecting 4 as the control mode (DRV-09 Control Mode).

5) The maximum output voltage does not go up over the supplied power voltage. You can select the output voltage as you want below the supplied power voltage.

2.1.6 Other commons

1) Control

Control Method	V/F control, V/F PG, slip compensation, sensorless vector-1, sensorless vector-2, vector control
Frequency Setting Resolving Power	Digital command : 0.01 Hz Analog command : 0.06 Hz (maximum frequency : 50Hz)

Frequency Degree	Digital command operation : 0.01% of the maximum frequency Analog command operation : 0.1% of the maximum frequency
V/F Pattern	Linear, double reduction, user V/F
Overload Capacity	CT current rating :150% for 1 min., VT current rating :110% for 1 min.
Torque boost	Manual torque boost, Automatic torque boost

* Non DCR products are provided warranty service when used in CT (Heavy duty) load rating only.

2) Operation

Operating Method		Selectable among keypad/ terminal block/ communication operation	
Frequency Setting		**Analog :** 0 ~ 10[V], -10 ~ 10[V], 0 ~ 20[mA] **Digital :** keypad	
Operating Function		PID control, up-down operation, 3-wire operation, DC break, Frequency limit, Frequency jump, Second function, Slip compensation, Reverse rotation prevention, Auto restarting, Inverter By-pass, Auto tunning Flying Start, Energy buffering, Power breaking, Flux breaking, Leakage current reduction, MMC, Easy Start	
Input	**Multi-function Terminal (8 points) P1 ~ P8[1)]**	NPN (Sink) / PNP (Source) selectable	
		Function: forward operation, reverse operation, reset, external trip, emergency stop, jog operation, sequential frequency-high/medium/low, multi - level acceleration and deceleration – high/medium/low, D.C. control during stop, selection of a second motor, frequency increase, frequency decrease, 3-wire operation, change to general operation during PID operation, Main inverter body operation during option operation, analog command frequency fixation, acceleration and deceleration stop selectable	
Output	**Multi-function Open Collector Terminal**	Failure output and inverter operation output	Below DC 26V, 100mA
	Multi-function Relay Terminal		Below (N.O., N.C.) AC250V 1A, Below DC 30V 1A

Analog Output	0 ~ 10 Vdc (below 20mA) : selectable from frequency, current, voltage, direct current voltage

1) The Functions for Multi-function terminal available according to IN-65~72 parameter setting of IN Group.

3) Protective Function

Trip	Over voltage, Low voltage, Over current, Earth current detection, Inverter overheat, Motor overheating, Output imaging, Overload protection, Communication error, Frequency command loss, Hardware failure, Cooling fan failure, Pre-PID failure, No motor trip, External break trip, etc.
Alarm	Stall prevention, Overload, Light load, Encoder error, Fan failure, Keypad command loss, Speed command loss.
Instantaneous Interruption[2)]	Below CT class 15 msec (below VT class 8 msec) : Operation continues (within rated input voltage, rated output) Above CT class 15 msec (above VT class 8 msec) : Availble automatic restarts

2) Operation at the CT (Heavy Duty) current rating

4) Structure and Use Environment

Cooling Method	Forced cooling : 0.75~15kW (200/400V class), 22kW (400V class) Inhalation cooling : 22~75kW (200V class), 30~375kW (400V class)
Protection Structure	- 0.75~22kW(200V), 0.75~75kW(400V): Open type IP 21 (default), UL enclosed type 1 (Option) [3)] - 30~75kW (200V), 90~375kW(400V): Open type IP 00 (default), UL enclosed type 1 (Option) [3)] - 0.75~22kW-2/4 and etc.: Enclosed IP54 type, UL enclosed type 12
Ambient Temperature	- CT (Heavy Duty) load : - 10 ~ 50℃ (without ice or frost) - VT (Normal Duty) load : - 10~ 40℃ (without ice or frost) (It is recommended that you use less than 80% load when you use VT load at 50℃.) - IP54 product: -10~40 ℃ (without ice or frost)
Preservation Temperature	-20°C ~ 65°C
Surrounding Humidity	Below 90% RH of relative humidity (with no dew formation)

Altitude, Vibration	Below 1,000m, below 5.9m/sec^2 (0.6G)
Environment	There should be no corrosive gas, flammable gas, oil mist or dust. (Pollution degree 2 Environment)

3) UL Enclosed type 1 with conduit box installed.
(30~75kW (200V) conduit box has been installed, is Open type IP 20)

□Remark

[English]
The drive is suitable for use in a circuit capable of delivering not more than "Table1" RMS at the drive's maximum rated voltage.

[French]
L'entraînement convient pour une utilisation dans un circuit capable de délivrer pas plus de "Table1" RMS à la tension nominale maximale de l'entraînement.

<Table1>

Model	Rating
All models for except the specified models as below	5,000A
MDLV0450HP, MDLV0550HP, MDLV0750HP, MDLV0900HP, MDLV1100HP ,MDLV1320HP	10,000A
MDLV1600HP, MDLV1850HP, MDLV2200HP, MDLV2800HP	18,000A
MDLV3150HP, MDLV3750HP	30,000A

3.1 Installation

Be sure to check mechanical and electrical installation environment before you start the inverter. Read through the checking list below. Be sure to read through the Caution for Safety on this User's Manual prior to the operation of inverter.

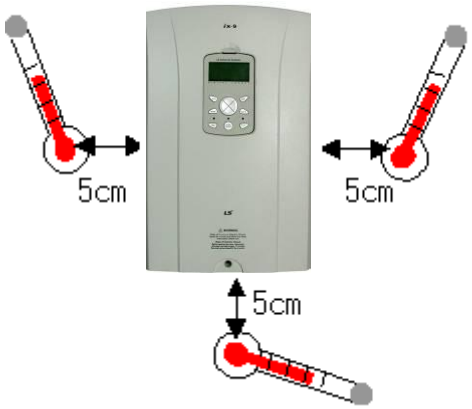
Checking List

- Mechanical Installation Checking List
  - Be sure to check the surrounding environment is allowed for operation. (Read through the 'Caution on Installation')
  - Inverter is a heat-generating device. Be sure to sufficiently secure the surrounding space to prevent thermal saturation phenomenon.
  - Be sure to check air is circulated in a normal condition.
  - Be sure to check motor and drive system are ready to start.

- Electrical Installation Checking List
  - Make sure that the protective grounding is properly done.
  - Replace the condenser with new one if it lasted longer than two years.
  - Set the input voltage to the nominal input voltage of the inverter.
  - Check if the input voltage connected with R, S, T and then fasten them tightly using an accurate torque wrench.
  - Check if input power fuse and circuit breaker are properly installed.
  - Install the motor cable away from the other cable.
  - Check if the ext. input/output is properly connected.
  - Check if the input voltage is properly connected with the output terminal of inverter.

3.1.1 Cautions before installation

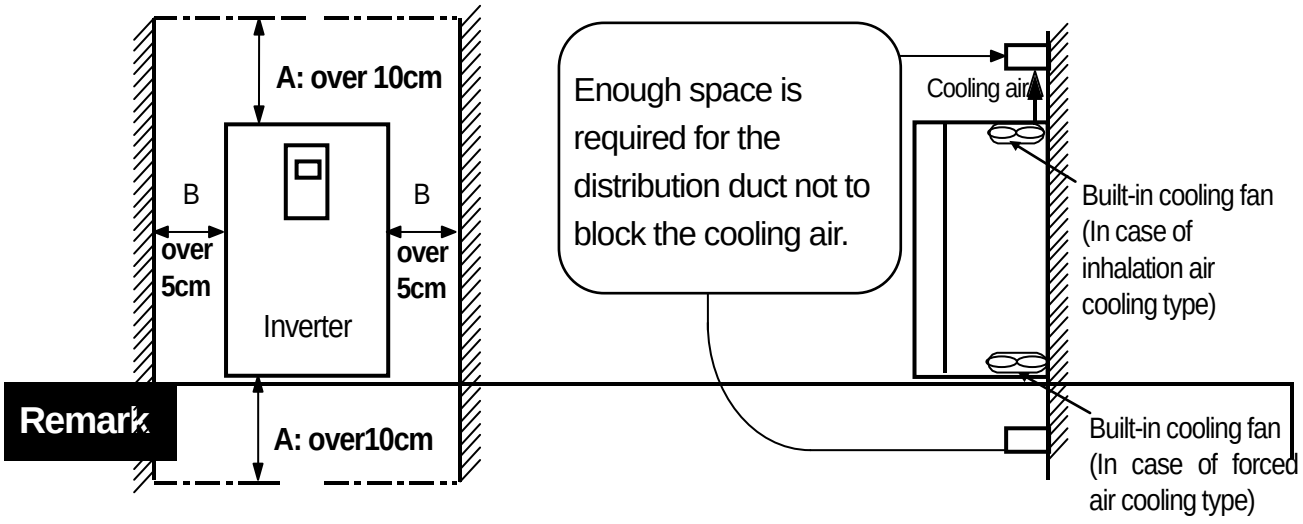
Be careful so that the plastic parts of the inverter may not be damaged. Do not move the product holding the cover only. Do not install the product where there is vibration, a press or truck. Life of the inverter greatly influenced by the surrounding temperatures, make sure that the surrounding temperature does not exceed the permitted temperature (-10 ~ 50°C).
The life of the inverter is affected by ambient temperature. Place that inverter installed in of ambient temperatures should not exceed the following allowable temperature.
When the inverter is installed inside the panel, panel temperature must not exceed the following allowable temperature. In other word, the ambient temperature inside or outside of the panel, regardless of the installation, needs to be measured around 5cm of the inverter.



Allowable Temperature
Characteristics, such as no ice in ambient Temperature CT(Heavy Duty) load: - 10 ~ 50℃ VT(Normal Duty)load: - 10~ 40℃ (However, VT(Normal Duty) in 50℃, less than 80% of the load use recommended) IP54 Product : -10 ~40℃

<Measurement Points of Surrounding Temperature>

Install the inverter on an inflammable surface because its temperature rises high during operation.
Sufficient space is required to prevent heat saturation because the inverter emits heat.

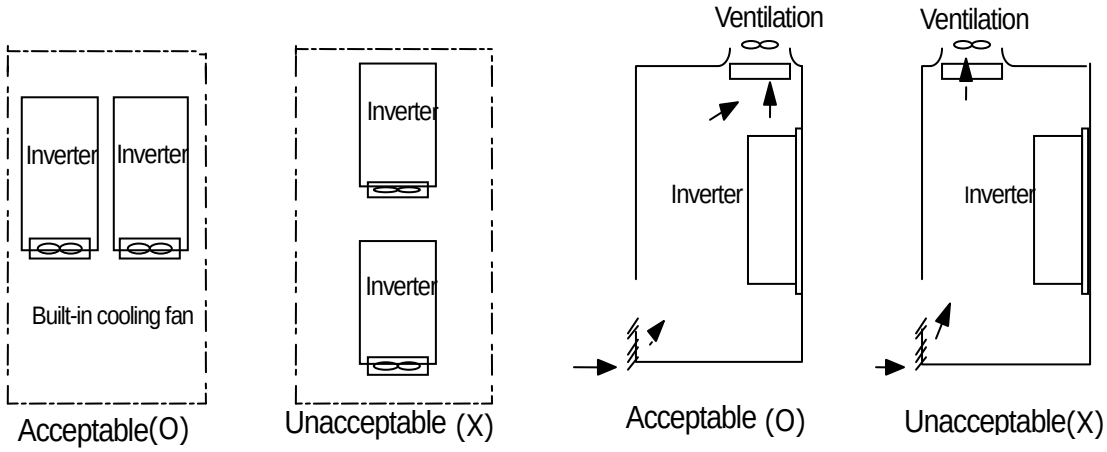


Over 50cm, B : over 20cm is necessary when you install an inverter above 30kW.

⚠ Caution

Avoid direct rays of light or a warm and humid place.
Install the inverter in a closed panel or clean place free from foreign substances such as oil mist and fiber dust.
In order to meet the EMC standard, 200V 30~75kW and more than 90kW product should be installed inside a metal cabinet or panel.

If you install two or more inverters inside the panel, be careful about the location of the ventilation fan and inverter. See the figure below.



When two or more units are installed

Where the ventilation fan is installed

Install the inverter upright using screws or bolts so that the inverter does not move.

Note

Arrange the panels in order to the hot air generated by the heating of the inverter should be released.

⚠ Caution

[English]

- **Risk of Injury or Electric Shock**

• Read the manual carefully and follow the safety Instructions before installing or using the device.
• Before opening the cover, disconnect all power sources and wait for at least 10 minutes.

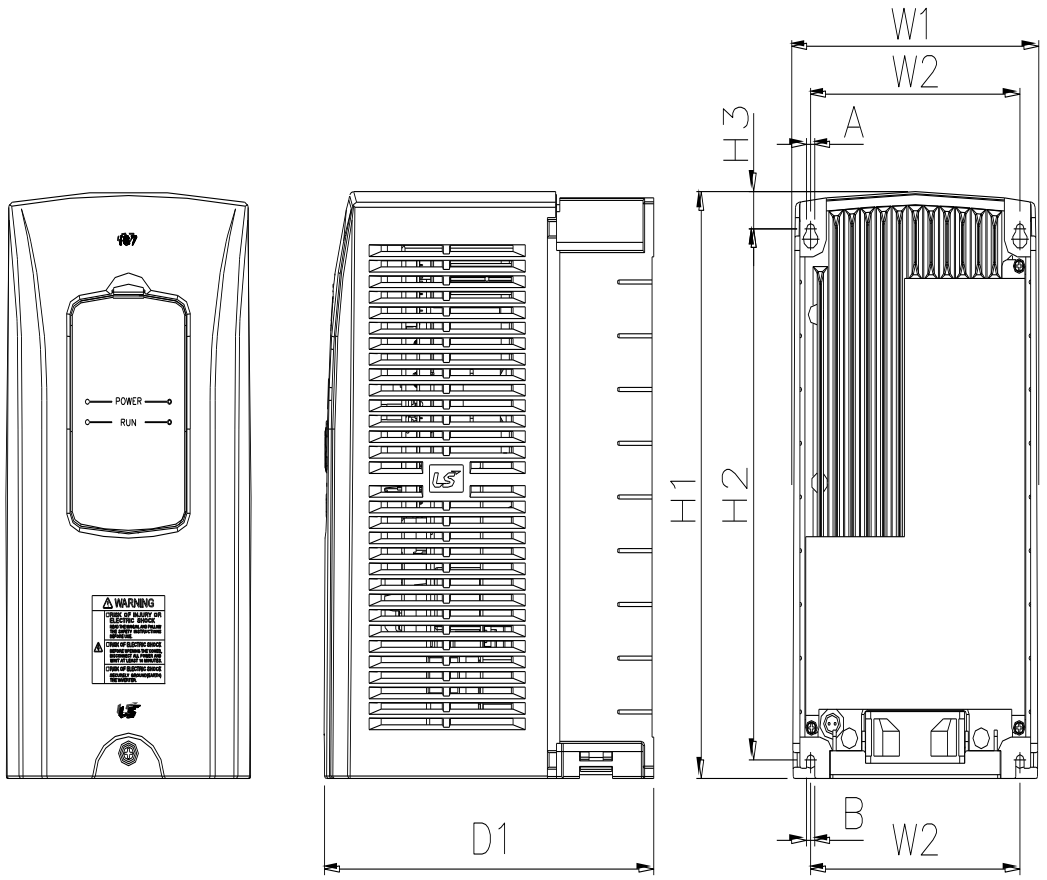
[French]

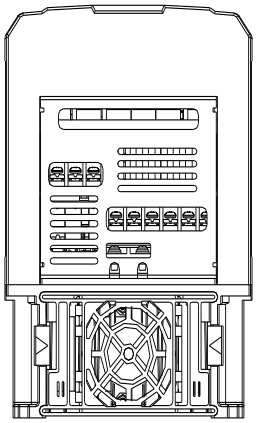
- **Risque de blessure ou de choc électrique**

• Avant d'installer ou d'utiliser l'appareil, vous devez lire attentivement le manuel et suivre les consignes de sécurité.
• Avant d'ouvrir le capot, débrancher toutes les sources d'alimentation et attendre au moins 10 minutes.

3.1.2 Exterior and Dimension (UL Enclosed Type 1, IP21 Type)

1) MDLV0008-0037HP (200V/400V)

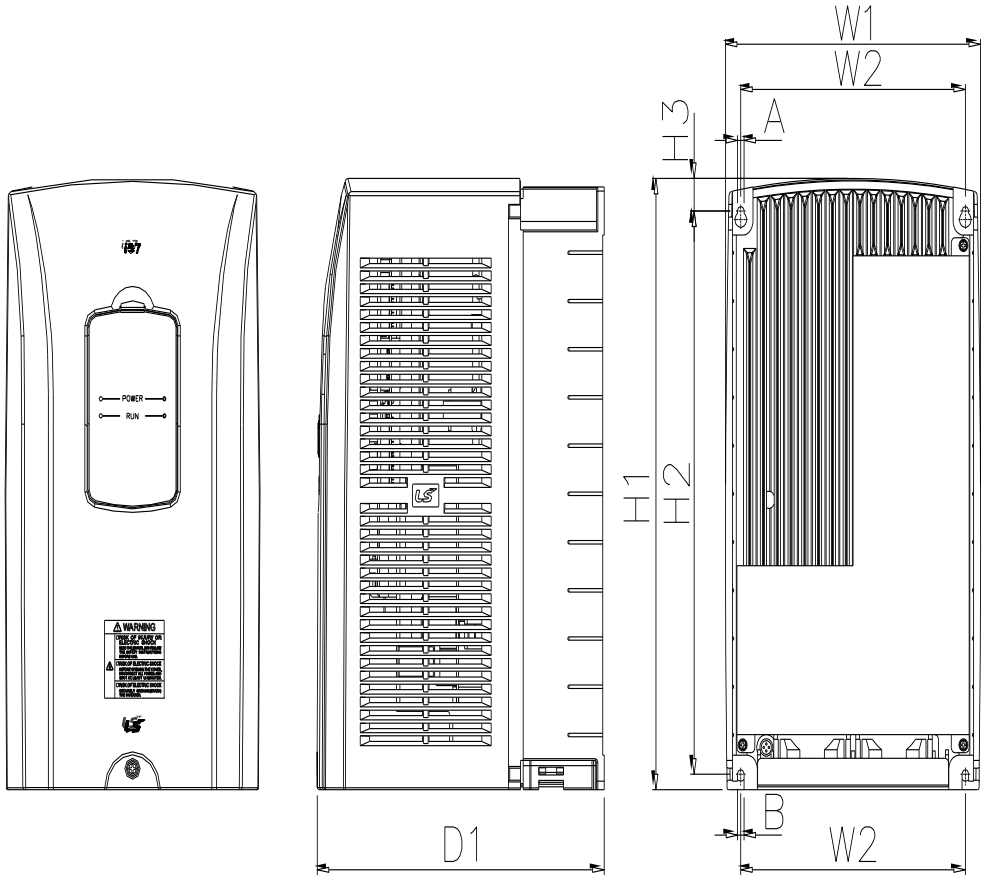


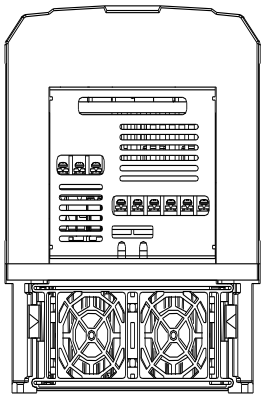


mm (inches)

Inverter capacity	W1	W2	H1	H2	H3	D1	A	B
MDLV0008~0037 HP - 2/4	150(5.90)	127(5.00)	284(11.18)	257(10.11)	18(0.70)	200(7.87)	5(0.19)	5(0.19)

2) MDLV0055-0075HP (200V/400V)



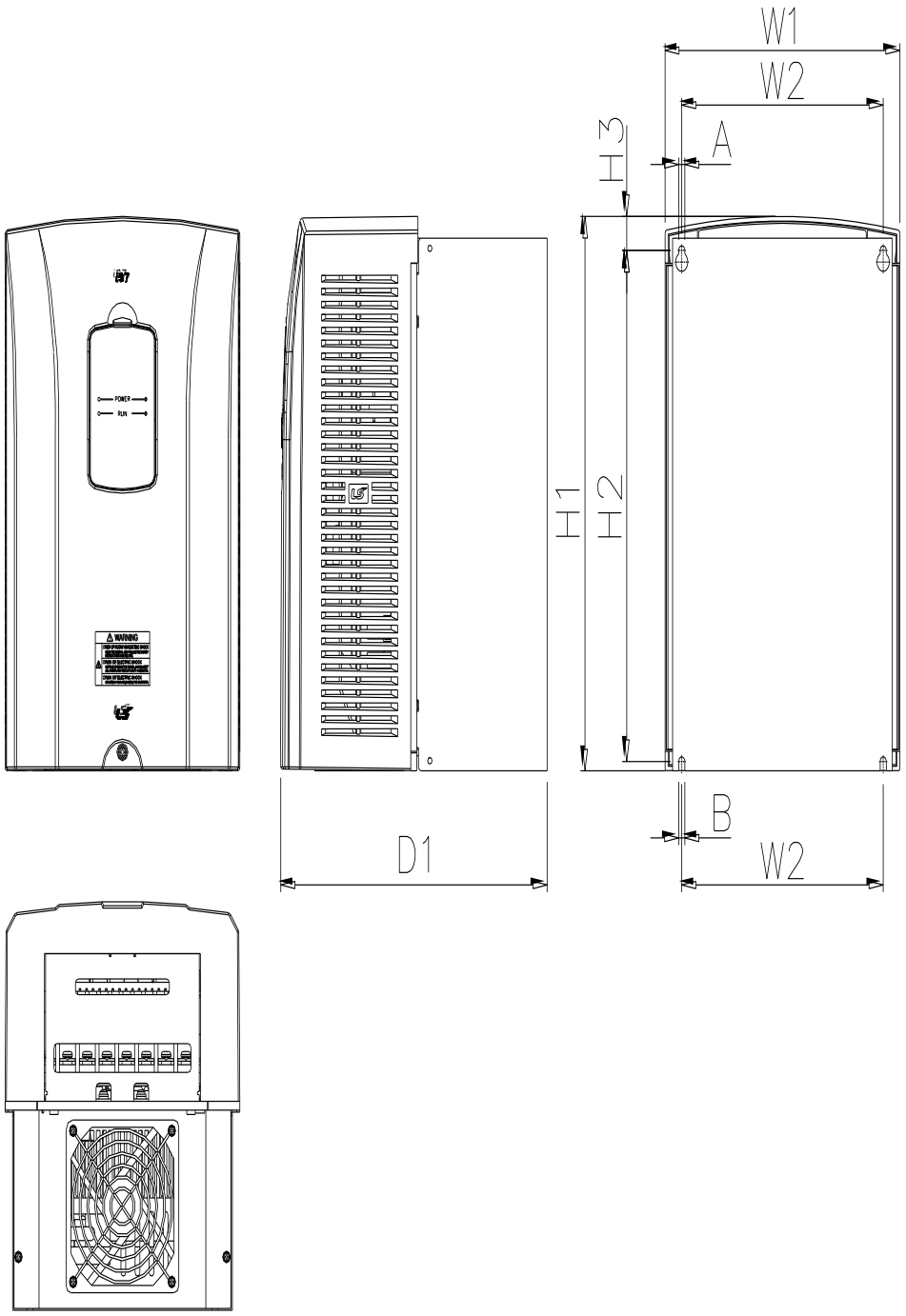


mm (inches)

Inverter capacity	W1	W2	H1	H2	H3	D1	A	B

MDLV0055~0075 HP - 2/4	200(7.87)	176(6.92)	355(13.97)	327(12.87)	19(0.74)	225(8.85)	5(0.19)	5(0.19)

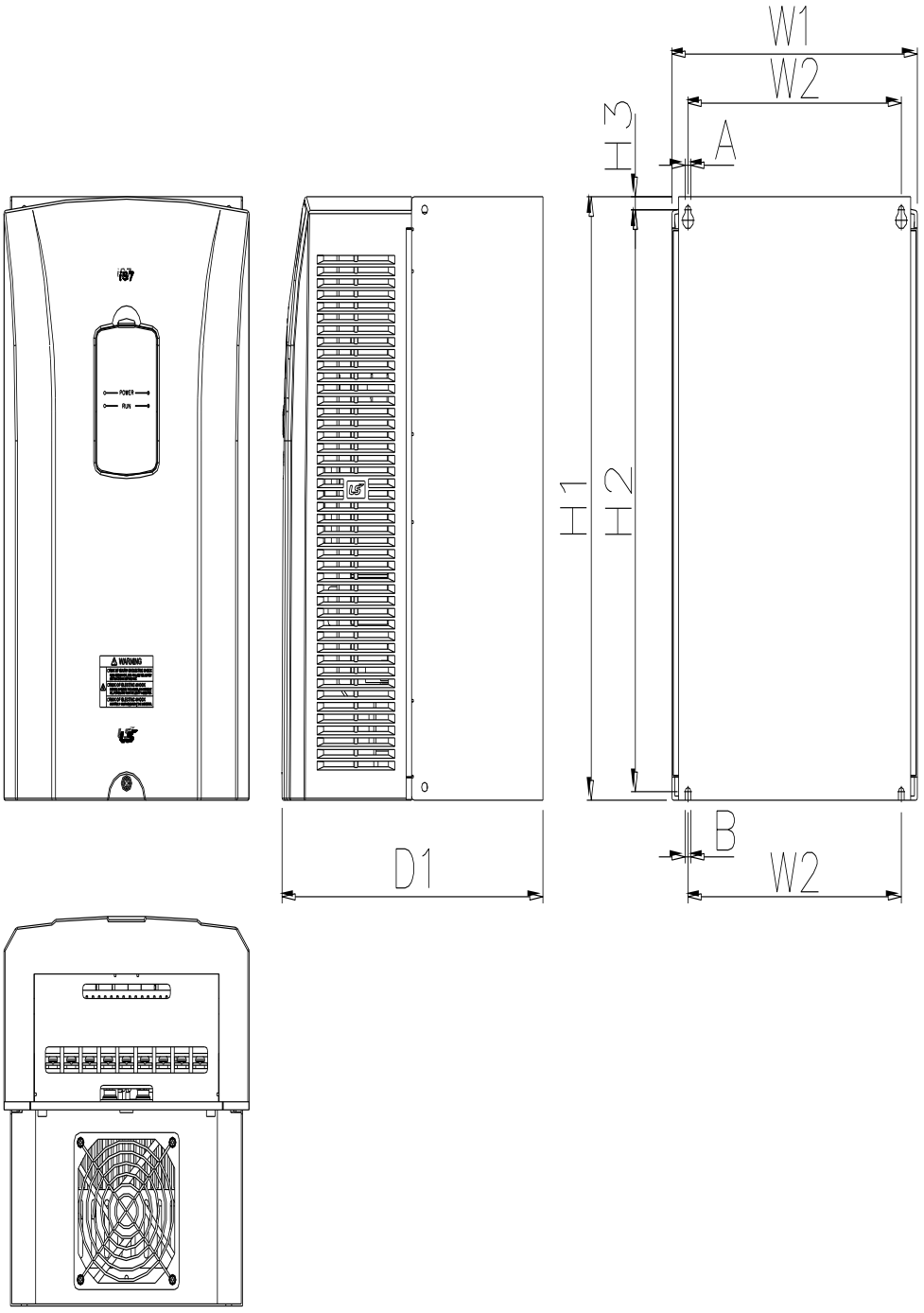
3) MDLV0110-0150HP (200V/400V)



mm (inches)

Inverter capacity	W1	W2	H1	H2	H3	D1	A	B
MDLV0110~0150 HP- 2/4	250(9.84)	214.6(8.44)	385(15.15)	355(13.97)	23.6(0.92	284(11.18)	6.5(0.25)	6.5(0.25)

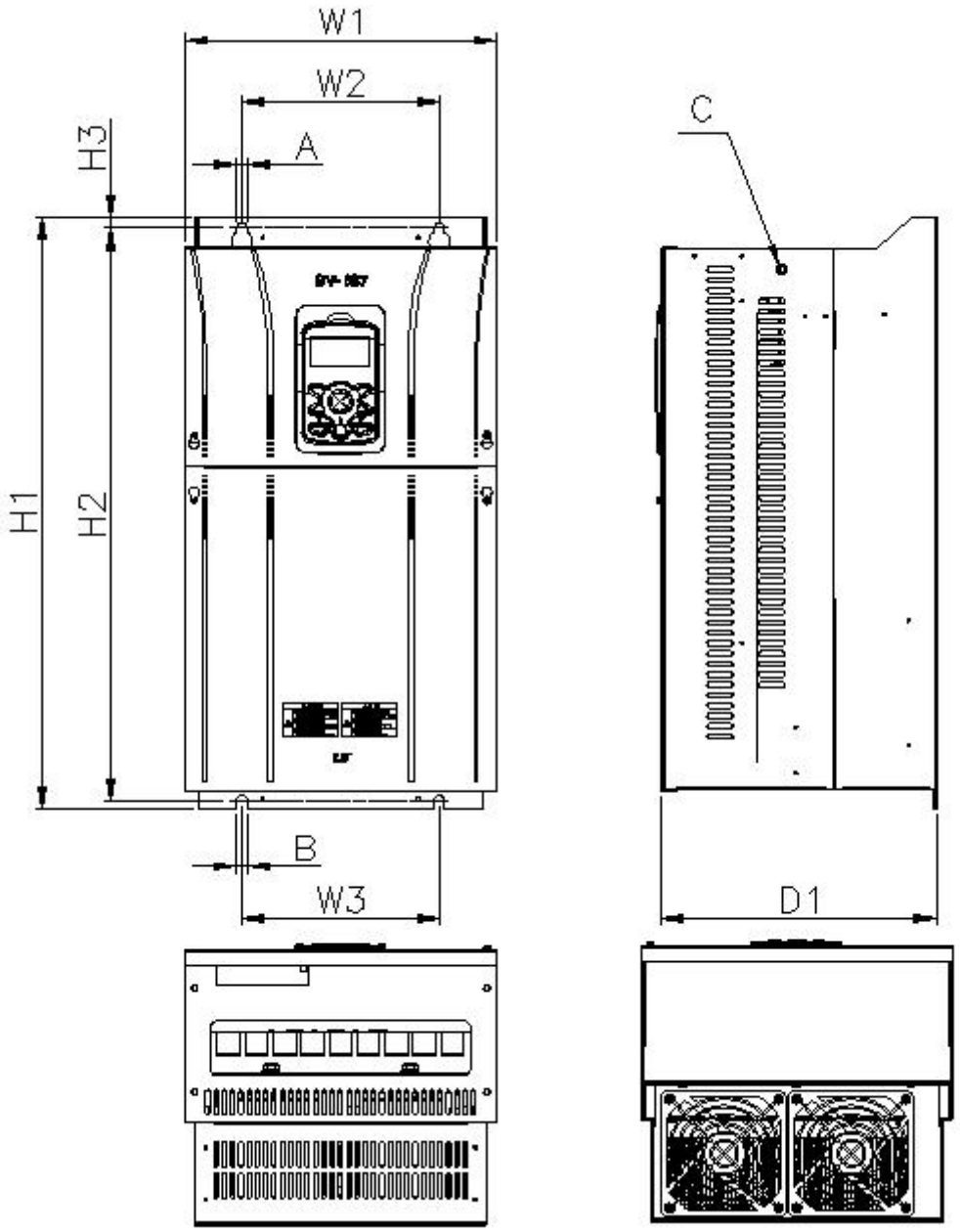
4) MDLV0185-0220HP (200V/400V)



mm (inches)

Inverter capacity	W1	W2	H1	H2	H3	D1	A	B
MDLV0185~0220 HP- 2/4	280(11.02)	243.5(9.58)	461.6(18.17)	445(17.51)	10.1(0.39)	298(11.73)	6.5(0.25)	6.5(0.25)

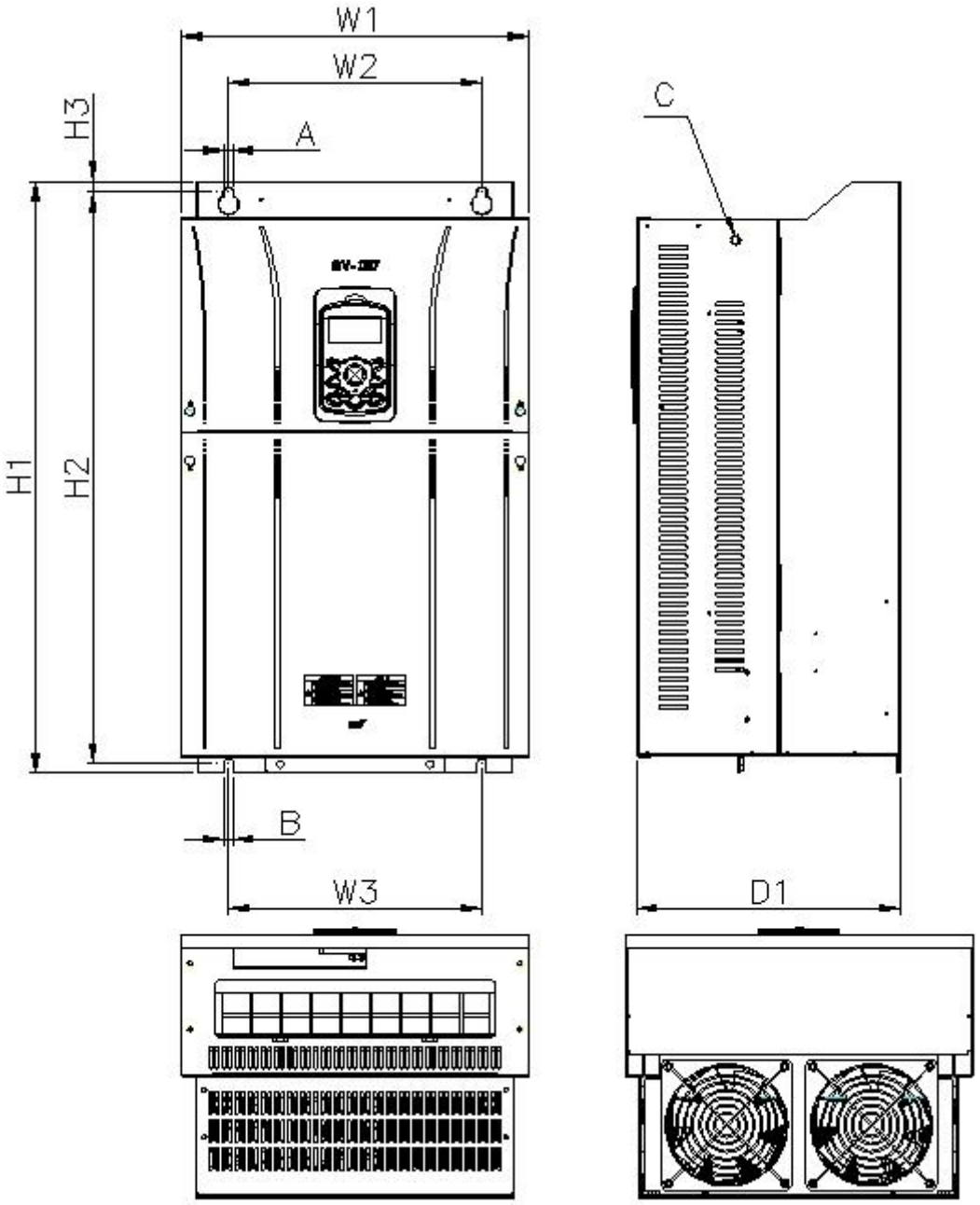
5) MDLV0300-HP (200V, IP00 Type)



mm (inches)

Inverter capacity	W1	W2/W3	H1	H2	H3	D1	A	B	C
MDLV0300 HP-2	300 (11.81)	190 (7.48)	570 (22.44)	552 (21.73)	10 (0.39)	265.2 (10.44)	10 (0.39)	10 (0.39)	M8

6) MDLV0370-0450HP (200V, IP00 Type)

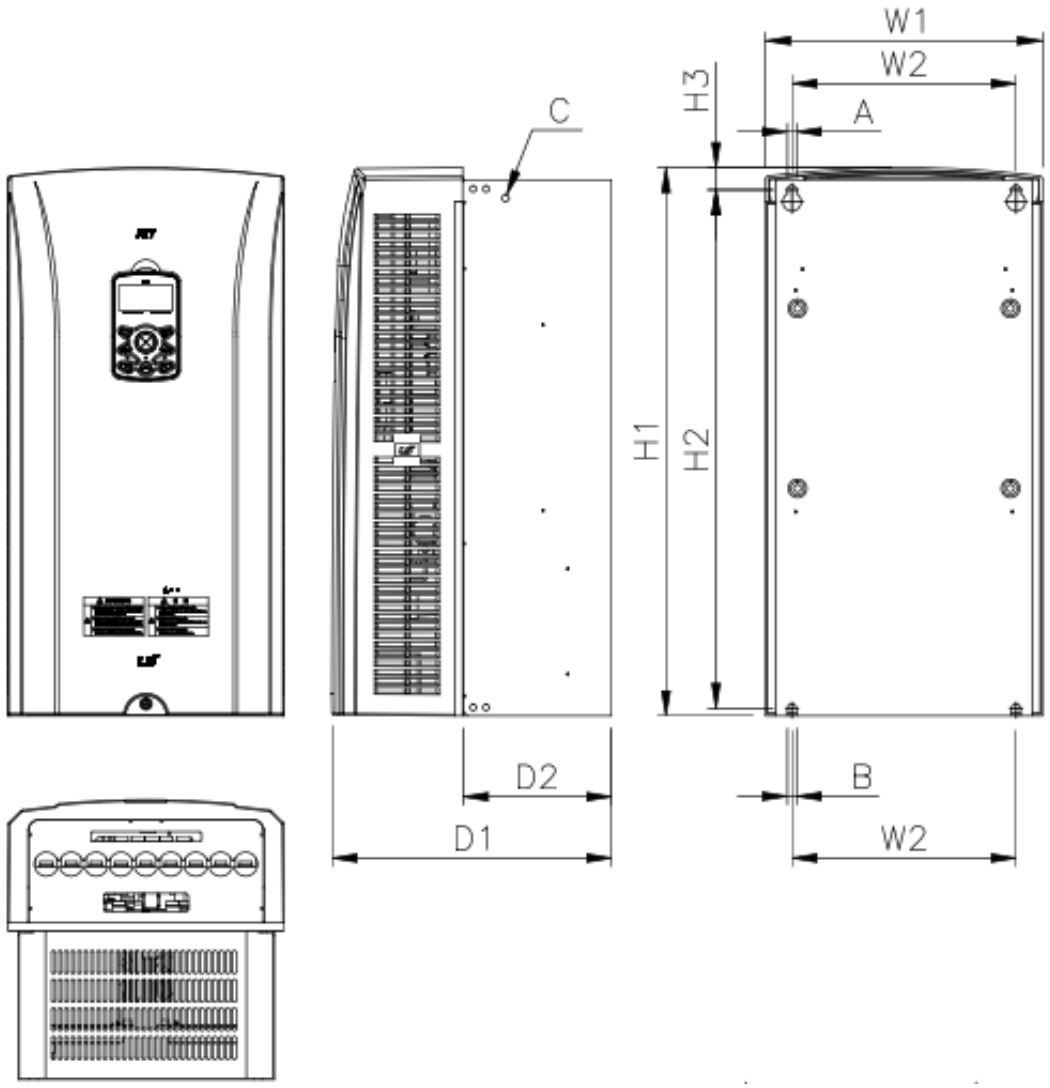


mm (inches)

Inverter capacity	W1	W2/W3	H1	H2	H3	D1	A	B	C
MDLV0370~0450	370 (14.56)	270 (10.63)	630 (24.8)	609 (23.97)	11 (0.43)	281.2 (11.07)	10 (0.39)	10 (0.39)	M10

HP-2									

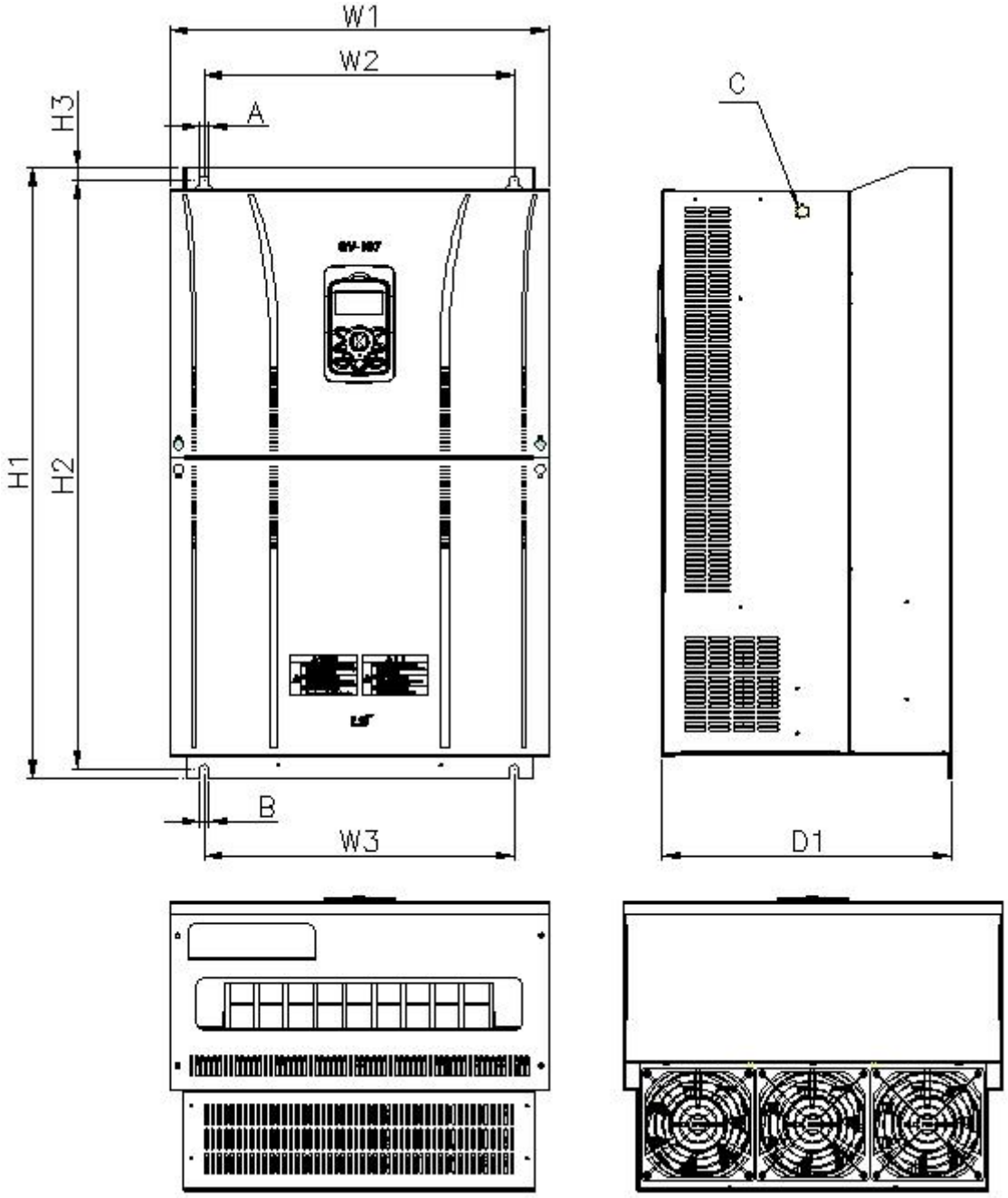
7) MDLV0300-0450HP (400V)



mm (inches)

Inverter capacity	W1	W2	H1	H2	H3	D1	D2	A	B	C
MDLV300~450 HP-4	300.1 (11.81)	242.8 (9.55)	594.1 (23.38)	562 (22.12)	24.1 (0.94)	DCR Type		10 (0.39)	10 (0.39)	M8
						303.2 (11.93)	161 (6.33)			
						Non-DCR Type				
						271.2 (10.67)	129 (5.78)			

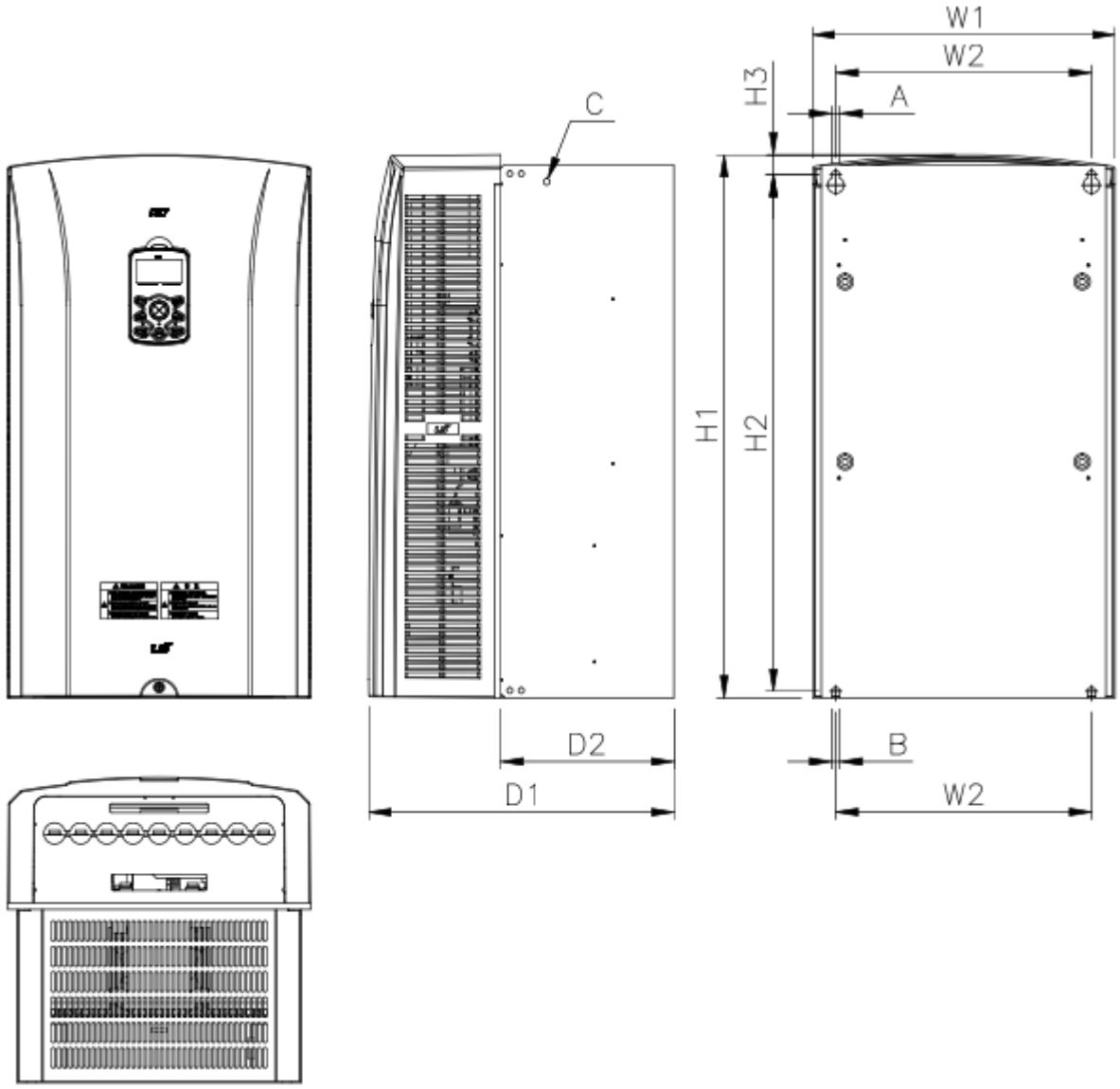
8) MDLV0550-0750HP (200V, IP00 Type)



mm (inches)

Inverter capacity	W1	W2/W3	H1	H2	H3	D1	A	B	C
MDLV0550~0750 HP-2	465 (18.3)	381 (15.0)	750 (29.52)	723.5 (28.48)	15.5 (0.61)	355.6 (14.0)	11 (0.43)	11 (0.43)	M16

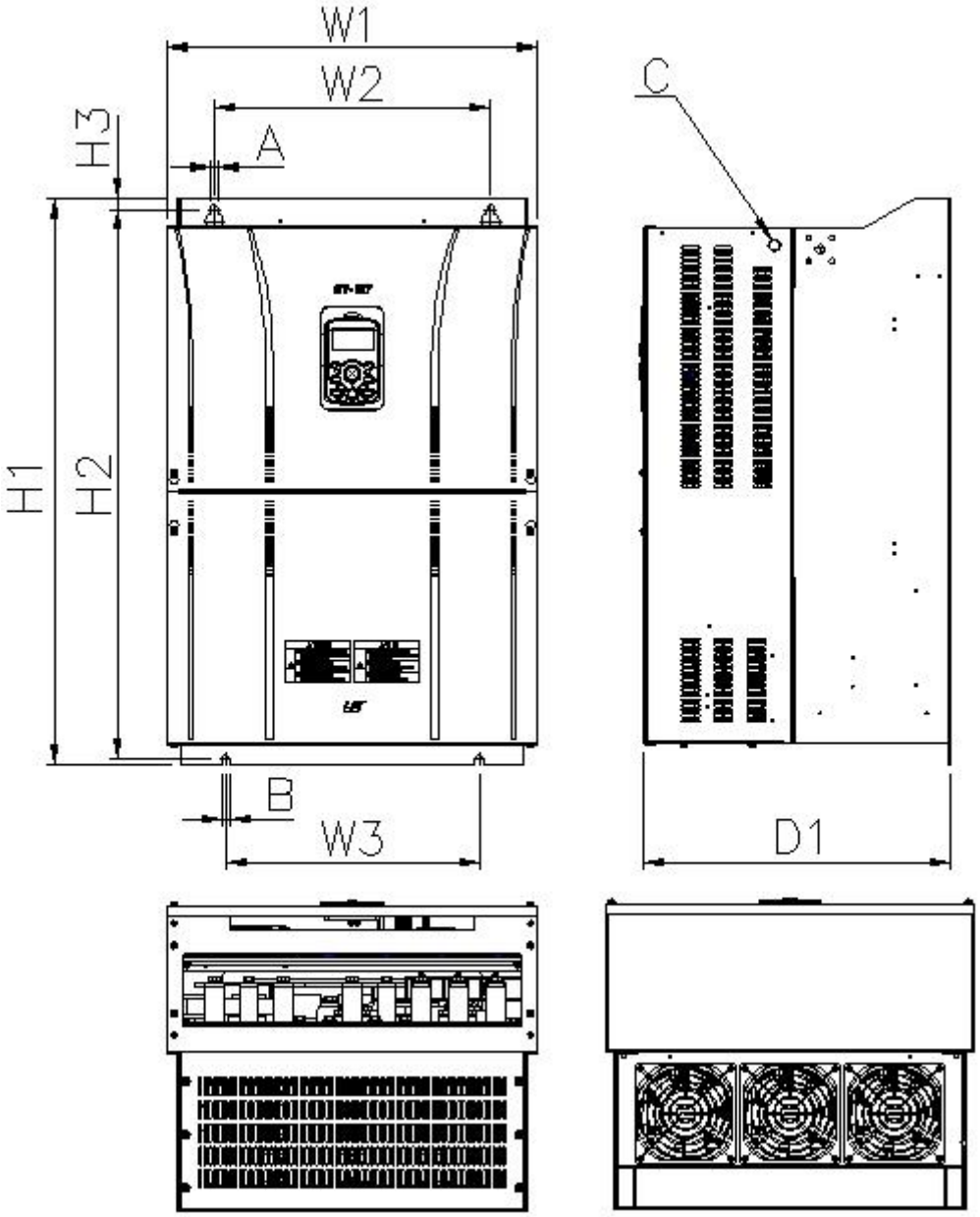
9) MDLV0550-0750HP (400V)



mm (inches)

Inverter capacity	W1	W2	H1	H2	H3	D1	D2	A	B	C
MDLV0055~0075HP-4	370.1 (14.57)	312.8 (12.31)	663.5 (26.12)	631.4 (24.85)	24.1 (0.94)	DCR Type		10 (0.39)	10 (0.39)	M8
						373.3 (14.69)	211.5 (8.32)			
						Non-DCR Type				
						312.4 (12.29)	150.6 (5.92)			

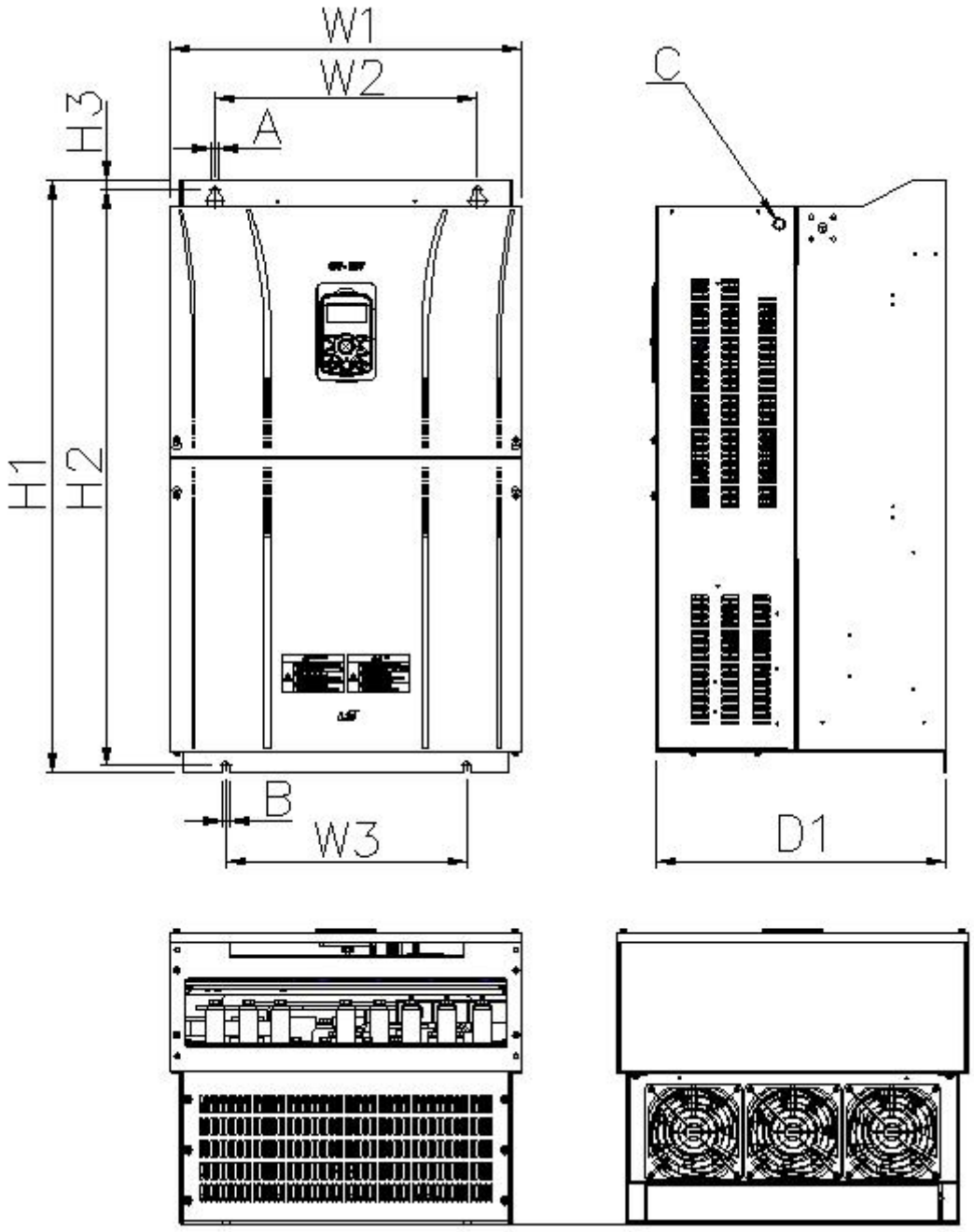
10) MDLV0900-1100HP (400V, IP00 Type)



mm (inches)

Inverter capacity	W1	W2	W3	H1	H2	H3	D1	A	B	C
MDLV0900~1100 HP-4	510 (20.07)	381 (15.0)	350 (13.77)	783.5 (30.84)	759 (29.88)	15.5 (0.61)	422.6 (16.63)	11 (0.43)	11 (0.43)	M16

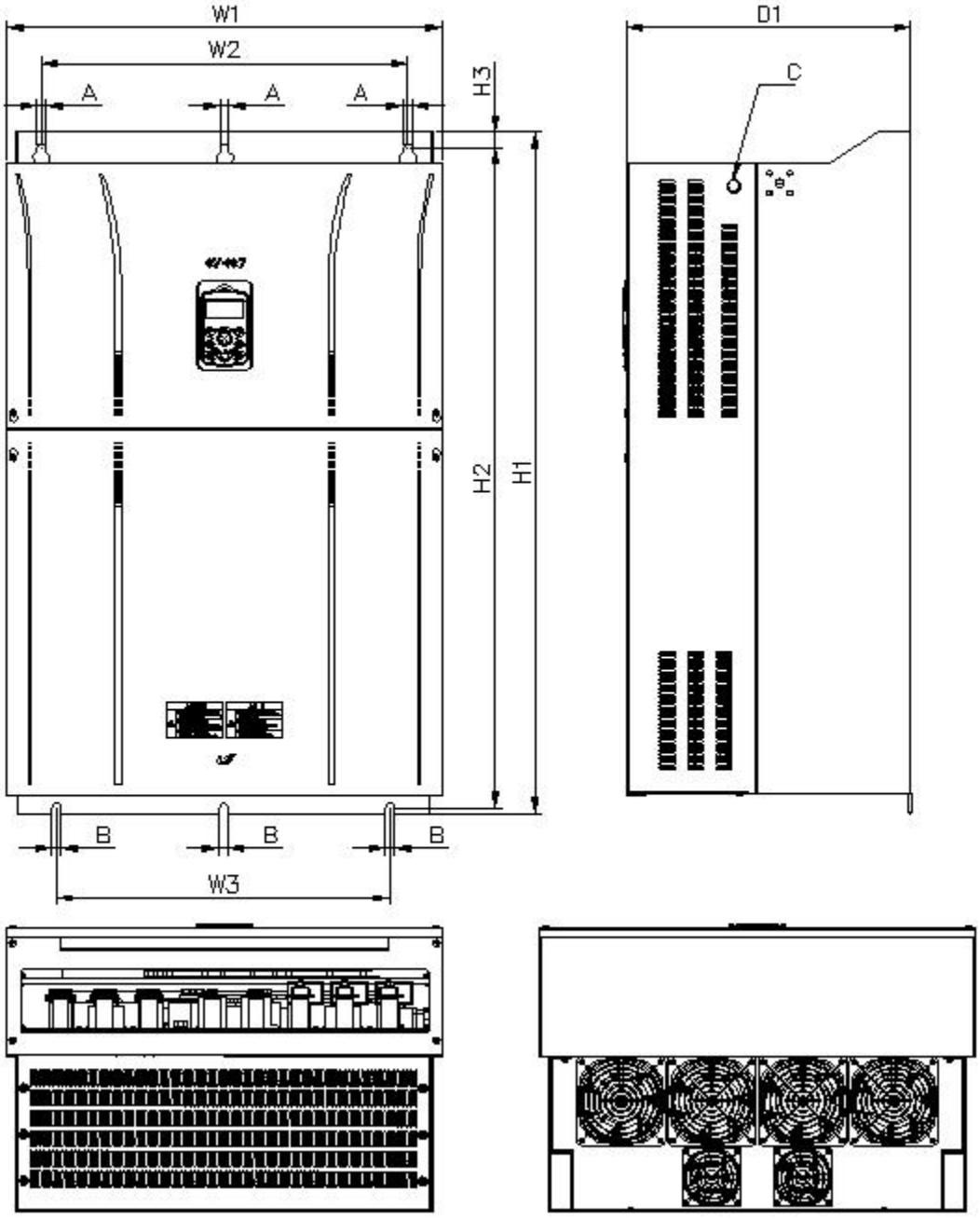
11) MDLV1320-1600HP (400V, IP00 Type)



mm (inches)

Inverter capacity	W1	W2	W3	H1	H2	H3	D1	A	B	C
MDLV1320~1600 HP-4	510 (20.07)	381 (15.0)	350 (13.77)	861 (33.89)	836 (32.93)	15.5 (0.61)	422.6 (16.63)	11 (0.43)	11 (0.43)	M16

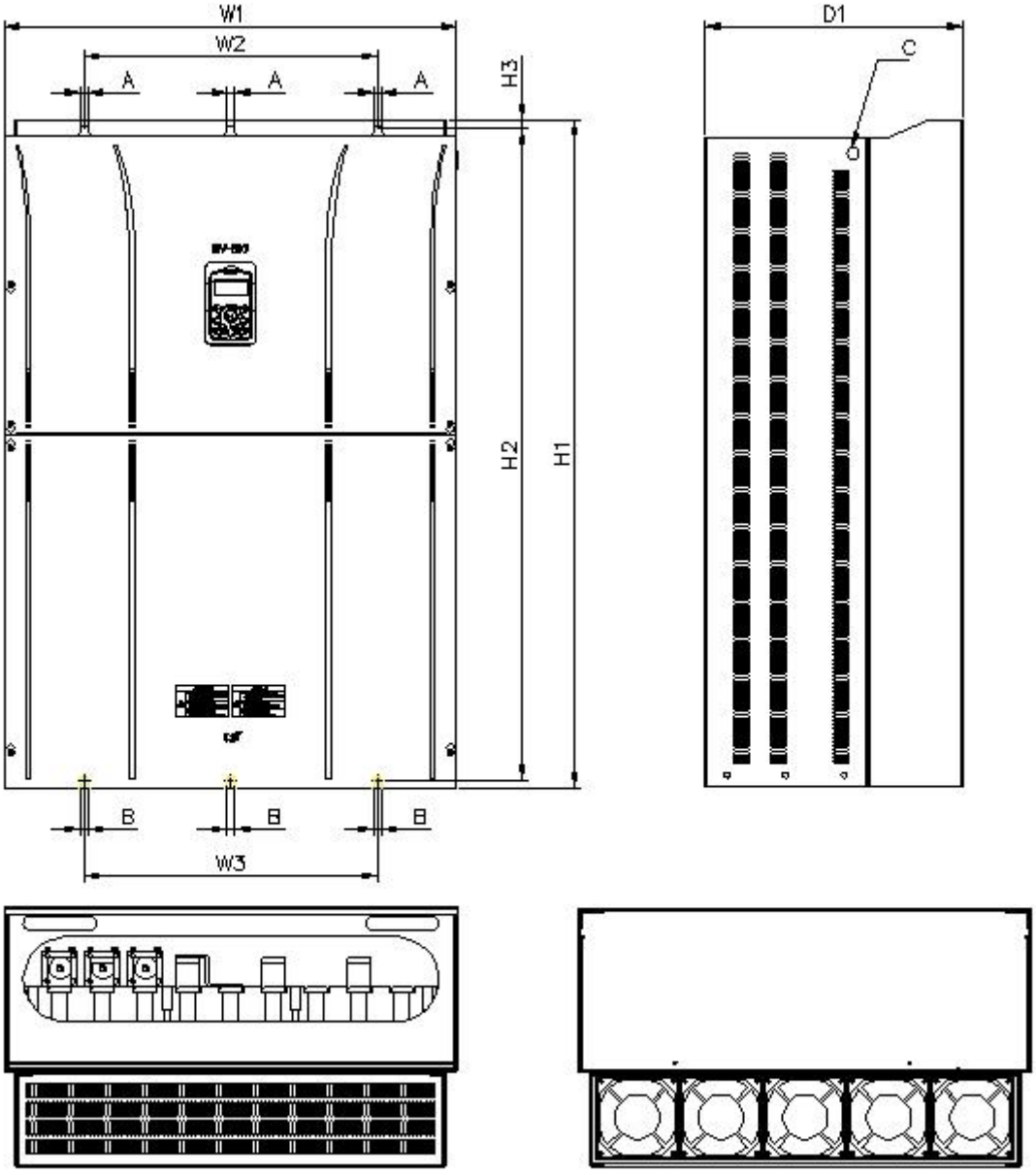
12) MDLV1850-2200HP (400V, IP00 TYPE)



mm (inches)

Inverter capacity	W1	W2	W3	H1	H2	H3	D1	A	B	C
MDLV1850/ 2200HP-4	690 (27.16)	581 (22.87)	528 (20.79)	1078 (42.44)	1043.5 (41.08)	25.5 (1.00)	450 (17.72)	14 (0.55)	15 (0.59)	M20

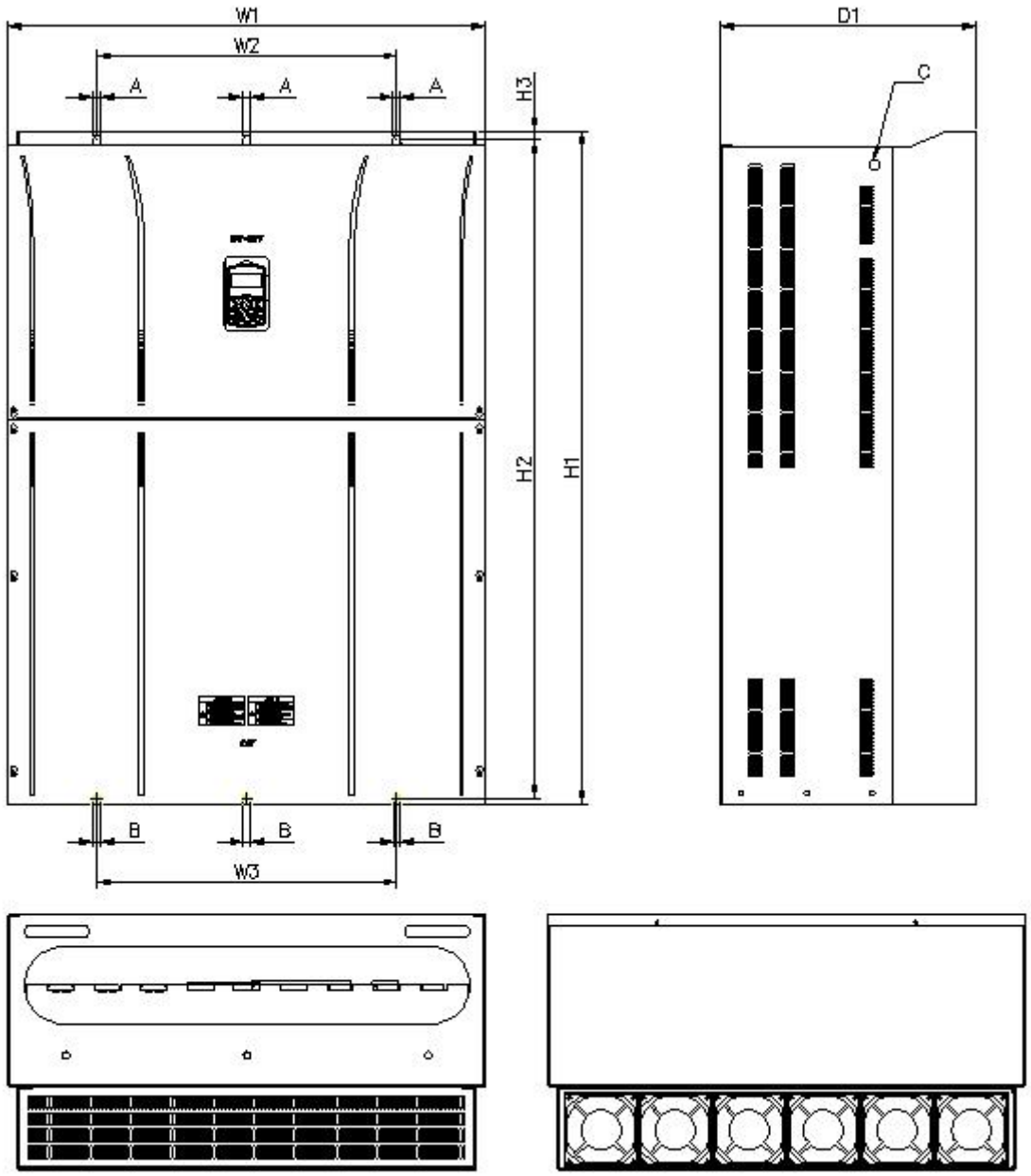
13) MDLV2800HP (400V, IP00 TYPE)



mm (inches)

Inverter capacity	W1	W2	W3	H1	H2	H3	D1	A	B	C
MDLV2800HP-4	771 (30.35)	500 (19.69)	500 (19.69)	1138 (44.80)	1110 (43.70)	15 (0.59)	440 (17.32)	13 (0.51)	13 (0.51)	M16

14) MDLV3150-3750HP (400V, IP00 TYPE)

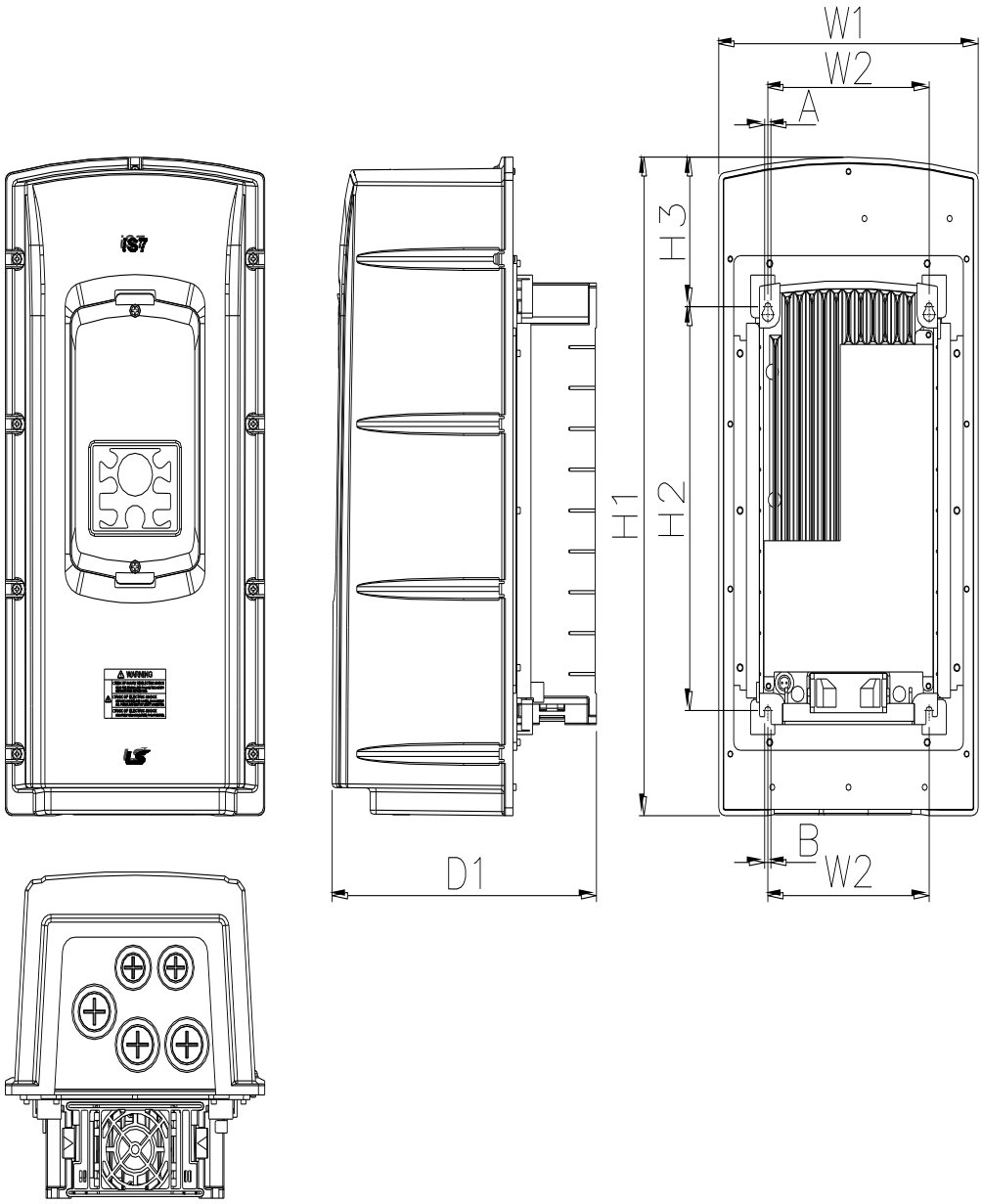


mm (inches)

Inverter capacity	W1	W2	W3	H1	H2	H3	D1	A	B	C
MDLV3150/ 3750HP-4	922 (36.30)	580 (22.83)	580 (22.83)	1302.5 (51.28)	1271.5 (50.06)	15 (0.59)	495 (19.49)	14 (0.55)	14 (0.55)	M16

3.1.3 External dimension (UL Enclosed Type12, IP54 Type)

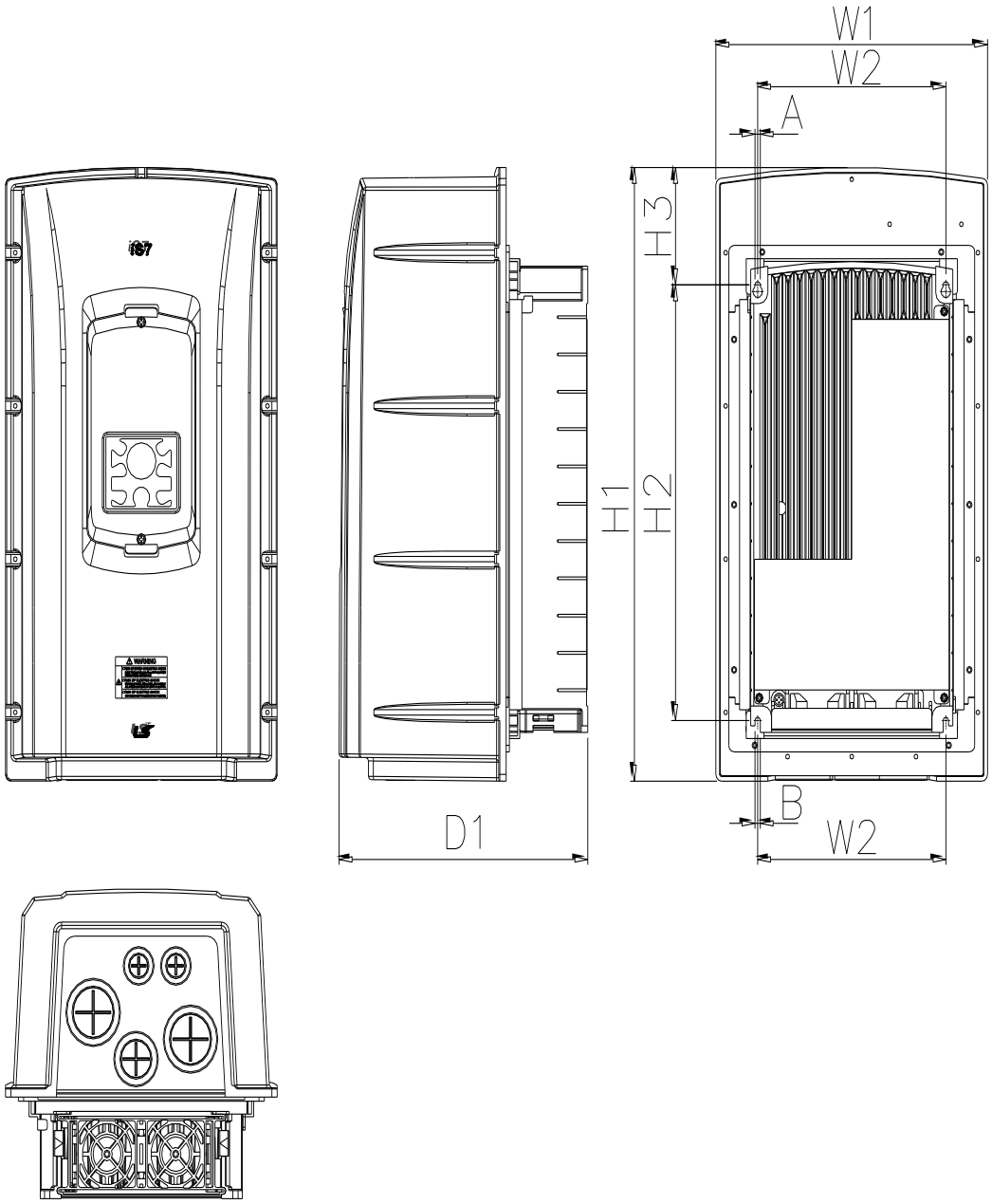
1) MDLV0008-0037HP (200V/400V)



mm (inches)

Inverter capacity	W1	W2	H1	H2	H3	D1	A	B
MDLV0008~0037 HP-2/49	204.2 (8.03)	127 (5.0)	419 (16.49)	257 (10.11)	95.1 (3.74)	208 (8.18)	5 (0.19)	5 (0.19)

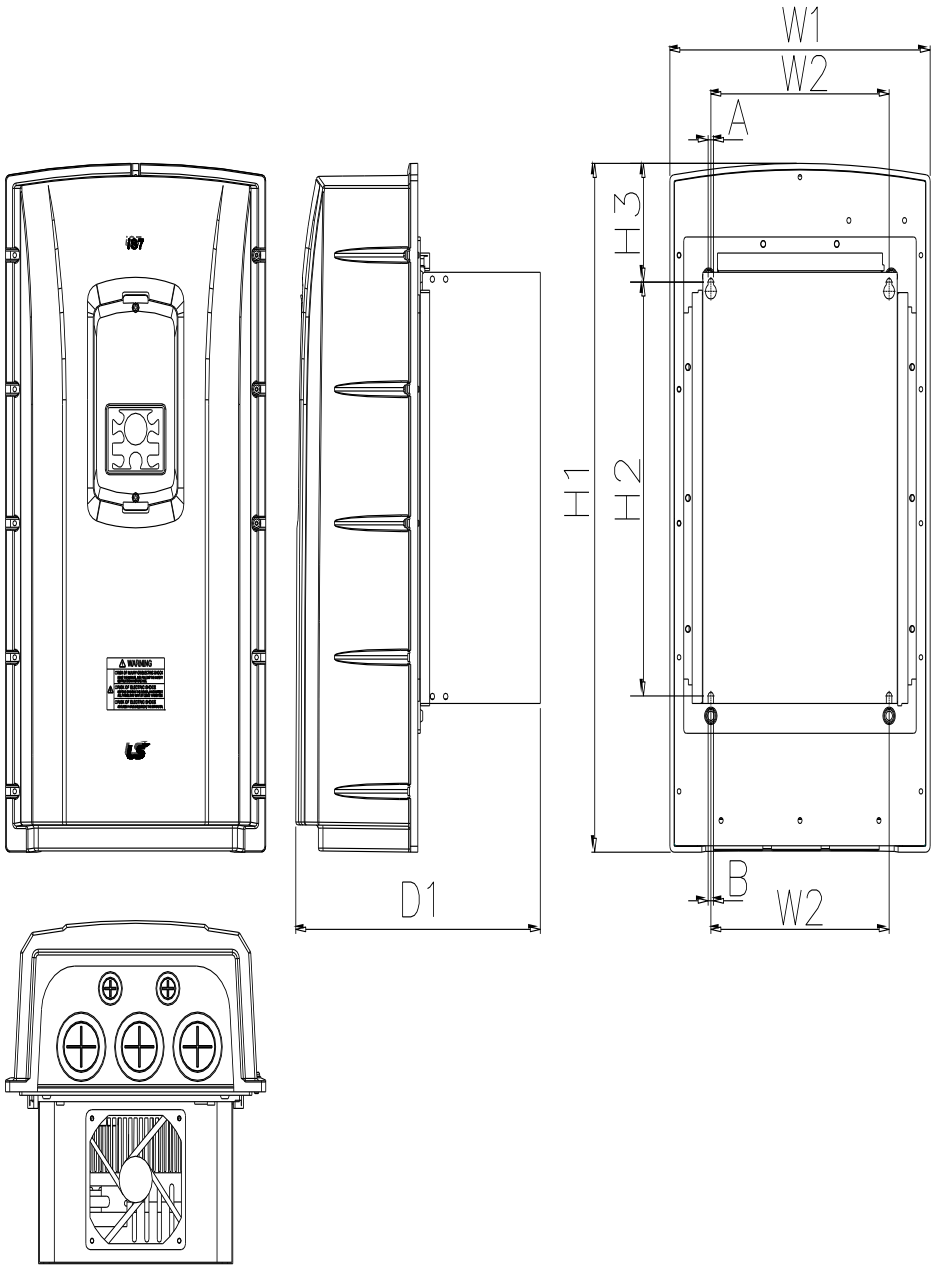
2) MDLV0055-0075HP (200V/400V)



mm (inches)

Inverter capacity	W1	W2	H1	H2	H3	D1	A	B
MDLV0055~0075 HP- 2/4	254 (10.0)	176 (6.92)	460.6 (18.13)	327 (12.87)	88.1 (3.46)	232.3 (9.14)	5 (0.19)	5 (0.19)

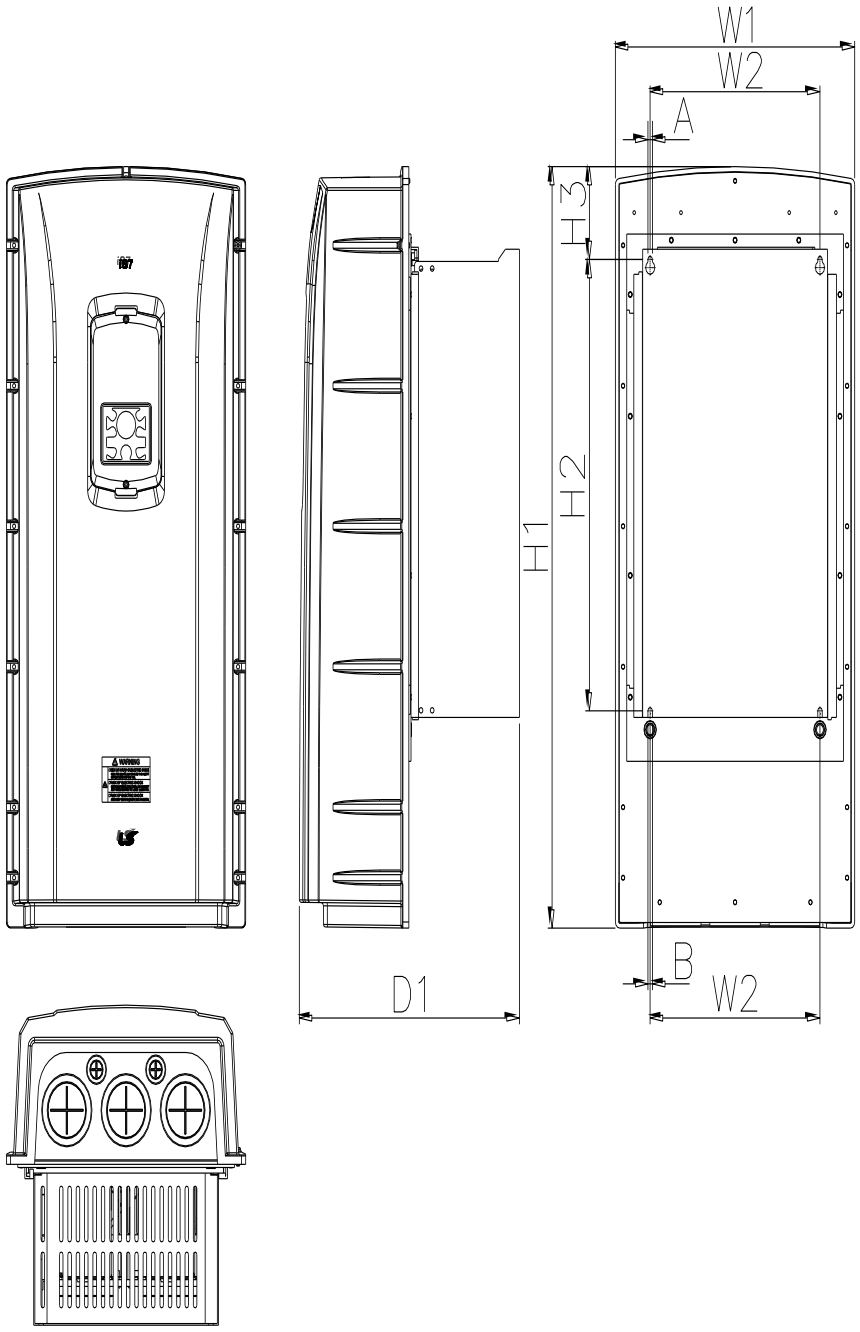
3) MDLV0110-0150HP (200V/400V)



mm (inches)

Inverter capacity	W1	W2	H1	H2	H3	D1	A	B
MDLV0110~0150 HP-2/4	313.1 (12.32)	214.6 (8.44)	590.8 (23.25)	355 (13.97)	101.7 (4.0)	294.4 (11.59)	6.5 (0.25)	6.5 (0.25)

4) MDLV0185-0220HP (200V/400V)



mm (inches)

Inverter capacity	W1	W2	H1	H2	H3	D1	A	B
MDLV0185~0220 HP-2/4	343.2 (13.51)	243.5 (9.58)	750.8 (29.55)	445 (17.51)	91.6 (3.60)	315.5 (12.42)	6.5 (0.25)	6.5 (0.25)

3.1.4 Dimension and Weight of frame (UL Enclosed Type 1, IP 21 Type)

Inverter Capacity	W [mm]	H [mm]	D [mm]	EMC&DCL Weight [Kg]	Only EMC Product weight[Kg]	Only DCL Product weight[Kg]	Non EMC and DCL Product weight[Kg]
MDLV0008HP-2/4	150	284	200	5.5	4.5	5.0	4.5
MDLV0015HP-2/4	150	284	200	5.5	4.5	5.0	4.5
MDLV0022HP-2/4	150	284	200	5.5	4.5	5.0	4.5
MDLV0037HP-2/4	150	284	200	5.5	4.5	5.0	4.5
MDLV0055HP-2/4	200	355	225	10	8.4	9.3	7.7
MDLV0075HP-2/4	200	355	225	10	8.4	9.3	7.7
MDLV0110HP-2/4	250	385	284	20	17.2	16.8	14
MDLV0150HP-2/4	250	385	284	20	17.2	16.8	14
MDLV0185HP-2	280	461.6	298	30	27	25.9	22.9
MDLV0220HP-2	280	461.6	298	30	25.8	25.9	22.9
MDLV0300HP-2	300	570	265.2	-	-		29.5
MDLV0370HP-2	370	630	281.2	-	-		44
MDLV0450HP-2	370	630	281.2	-	-		44
MDLV0550HP-2	465	750	355.6	-	-		72.5
MDLV0750HP-2	465	750	355.6	-	-		72.5
MDLV0185HP-4	280	461.6	298	27.4	23.5	23.3	19.7

Inverter Capacity	W [mm]	H [mm]	D [mm]	EMC&DCL Weight [Kg]	Only EMC Product weight[Kg]	Only DCL Product weight[Kg]	Non EMC and DCL Product weight[Kg]
MDLV0220HP-4	280	461.6	298	27.4	23.5	23.5	20.1
MDLV0300HP-4	300.1	594.1	300.4	-	-	41	28
MDLV0370HP-4	300.1	594.1	300.4	-	-	41	28
MDLV0450HP-4	300.1	594.1	300.4	-	-	41	28
MDLV0550HP-4	370	663.4	371.	-	-	63	45
MDLV0750HP-4	370	663.4	371.	-	-	63	45
MDLV0900HP-4	510	783.5	422.6	-	-	101	-
MDLV1100HP-4	510	783.5	422.6	-	-	101	-
MDLV1320HP-4	510	861	422.6	-	-	114	-
MDLV1600HP-4	510	861	422.6	-	-	114	-
MDLV1850HP-4	690	1078	450	-	-	-200	-
MDLV2200HP-4	690	1078	450	-	-	-200	-
MDLV2800HP-4	771	1138	440	-	-	-	252-
MDLV3150HP-4	922	1302.5	495	-	-	-	-352
MDLV3750HP-4	922	1302.5	495	-	-	-	-352

Note

Weight[Kg] above indicates the total weight including EMC FILTER and DCL. (excluding box packing) 30 through75 kW (200V) products don't have an option type. 30 through 160kW(400V) products have only DCL option type. 280 through 375kW (400V) products have not EMC and DCL option.

3.1.5 Dimension and Weight of Frame

(UL Enclosed Type 12, IP54 Type)

Inverter Capacity	W [mm]	H [mm]	D [mm]	EMC&DCL Weight[Kg]	Only EMC Weight[Kg]	Only DCL Weight[Kg]	Non EMC&DCL Weight[Kg]
MDLV0008HP-	204.2	419	208	8.2	7.2	7.7	6.7
MDLV0015HP-	204.2	419	208	8.2	7.2	7.7	6.7
MDLV0022HP-	204.2	419	208	8.2	7.2	7.7	6.7
MDLV0037HP-	204.2	419	208	8.2	7.2	7.7	6.7
MDLV0055HP-	254	460.6	232.3	12.8	10.2	12.1	9.5
MDLV0075HP-	254	460.6	232.3	12.9	10.3	12.2	9.6
MDLV0110HP-	313.1	590.8	294.4	25.6	22.8	22.4	19.6
MDLV0150HP-	313.1	590.8	294.4	25.9	23.1	22.7	19.9
MDLV0185HP-	343.1	750.8	315.5	38.3	34.2	34.1	29.9
MDLV0220HP-	343.2	750.8	315.5	38.3	34.2	34.1	29.9
MDLV0185HP-	343.2	750.8	315.5	34.9	31	31	27.1
MDLV0220HP-	343.2	750.8	315.5	34.9	31	31	27.1

Note

Weight[Kg] above indicates total weight. (excluding packing)
0.75~22 kW products have only IP54 type product.

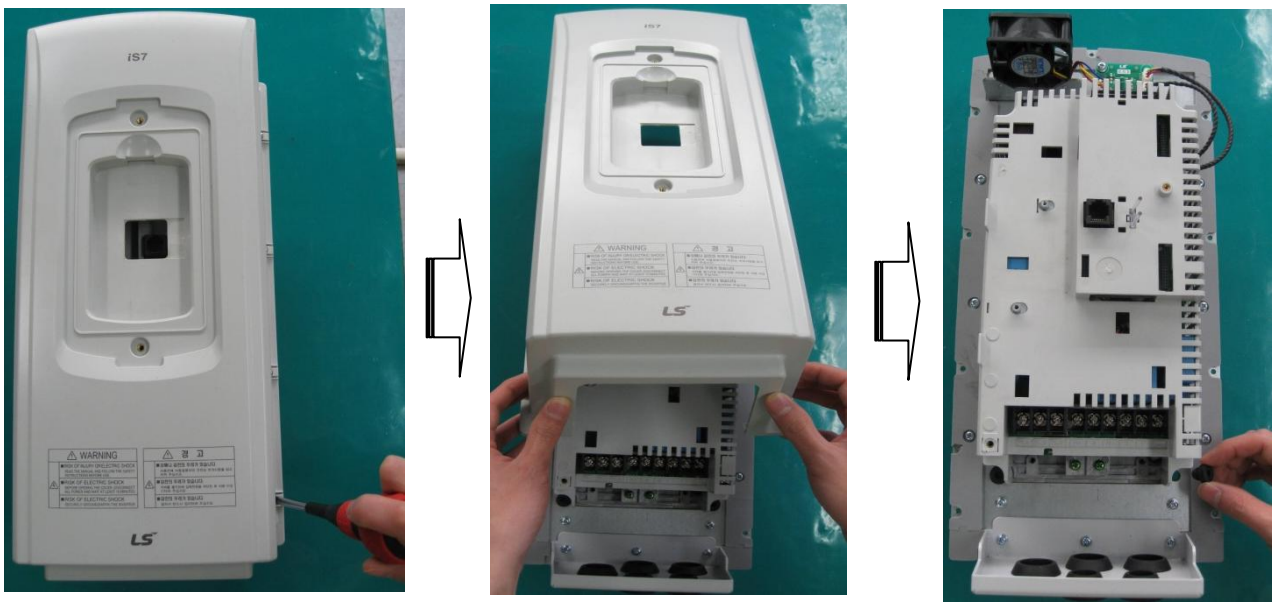
3.1.6 Installation Guide (UL Enclosed Type12, IP54 Type)

1) How to separate IP54 keypad cover and keypad

- Release the upper/lower screw on the transparent keypad cover and then separate the transparent cover from the inverter.
- Separate the keypad from the inverter.

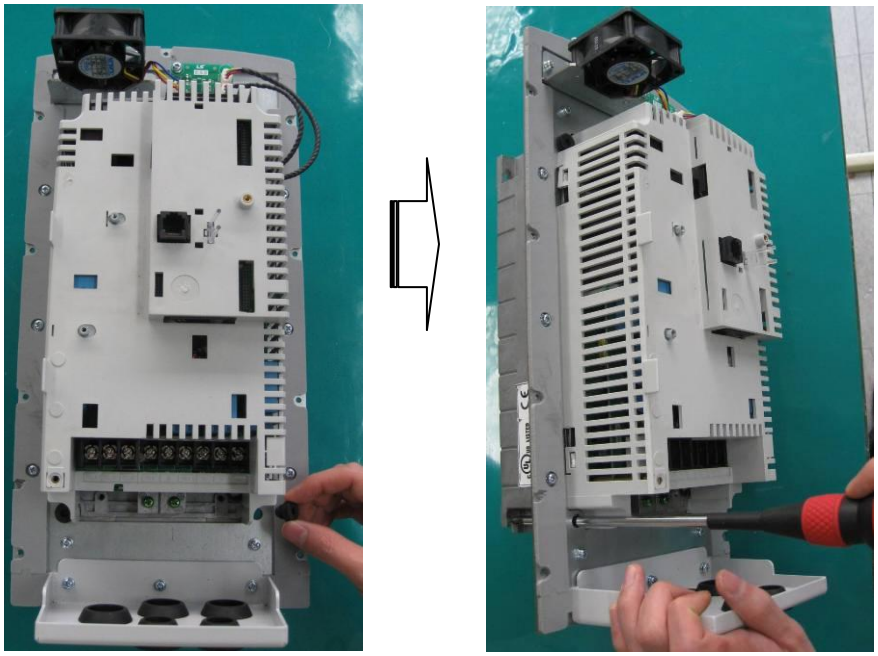
2) How to separate IP54 front cover

- Loosen the captive screws (nine or thirteen, depending on the size of the frame) around the edge of the cover.
- Remove the cover.



3) Mounting the inverter

- Remove the four rubber packings on the corner.
- Mount the inverter onto fixing hole on the panel and securely tighten the four screws or bolts.
- Place the four rubber packings to the each corner.

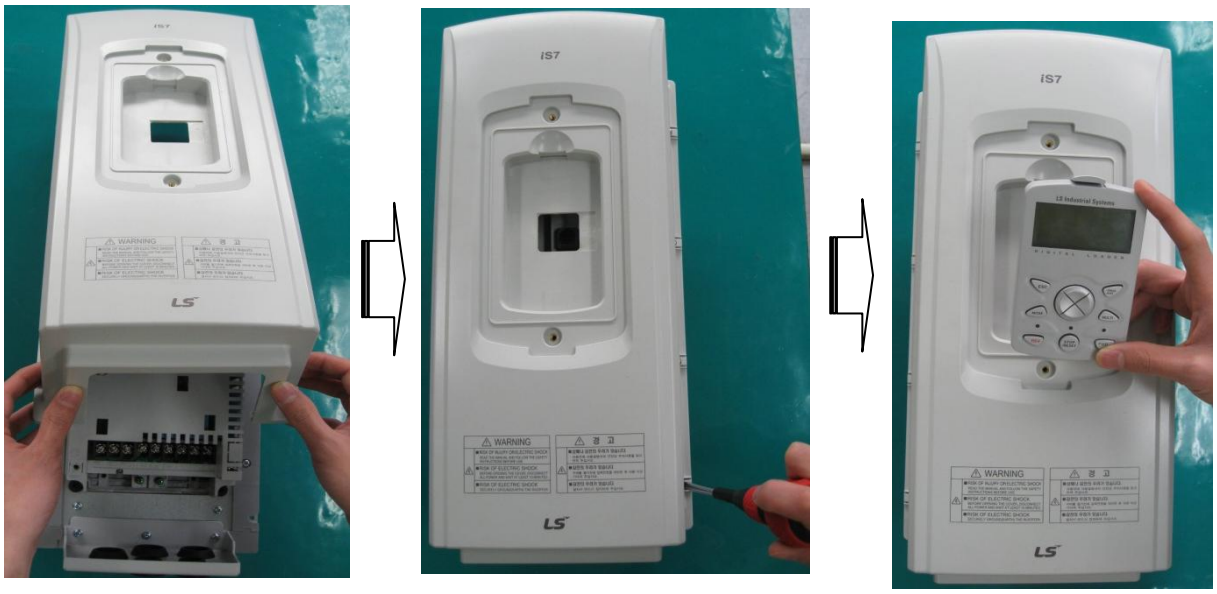


4) Power cable wiring

- Connects the input/output power cable as followed picture.
- Refer to Chapter 4 Wiring for the detailed wiring.

5 How to attach the IP54 front cover

- Place the front cover matching with plate hole.
- Securely tighten the screw at the corner of front cover.
- Connect the cable to the keypad and then place the front cover on the inverter.
- Place the transparent keypad cover on the keypad and tighten the upper/lower screw.



MEMO

4.1 Wiring

Do the wiring of inverter and then check the wiring of main circuit and control circuit before starting it. Read through the checking list as below.

Checking List

Inverter, Peripherals, Option card

Is the inverter supplied in the form as ordered?

- Are the type and numbers of peripherals (Resistance, DC reactor, Noise filter, etc.) supplied as ordered?
- Is the type of option supplied as supplied?

Place of the inverter to be installed and how to install it

- Is the inverter installed on a right place in a right way?

Power voltage, Output voltage

- Is power voltage within the range of inverter input voltage specified?
- Does the rated output comply with the inverter output specification?
- Is the rating done properly?

Main Circuit Wiring

- Is the power input using the circuit breaker?
- Is the rating of the circuit breaker done properly?
- Is the power wiring input properly to the inverter input terminal? [If the input power is connected with the input terminal (U, V, W) it may cause damage to the inverter]
- Is the motor wiring connected with the inverter output terminal in a proper phase sequence? (Otherwise, the motor will be rotated adversely.)
- Is 600V vinyl insulation wire adopted for the power and motor wires?
- Is the main circuit wire in a proper size?
- Is the ground line installed in a proper way?
- Are the screws of the main circuit terminal and the ground terminal fastened tightly?
- In the event several motors are operated with one inverter, does each motor have a overload protecting circuit?
- In the event it adopts braking resistance or braking resistance unit, is an electronic contactor installed at the inverter power side so as to isolate the inverter from the power by protecting the resistance from overload?
- Isn't power condenser, surge killer, or radio noise filter connected with the output side?

Checking List

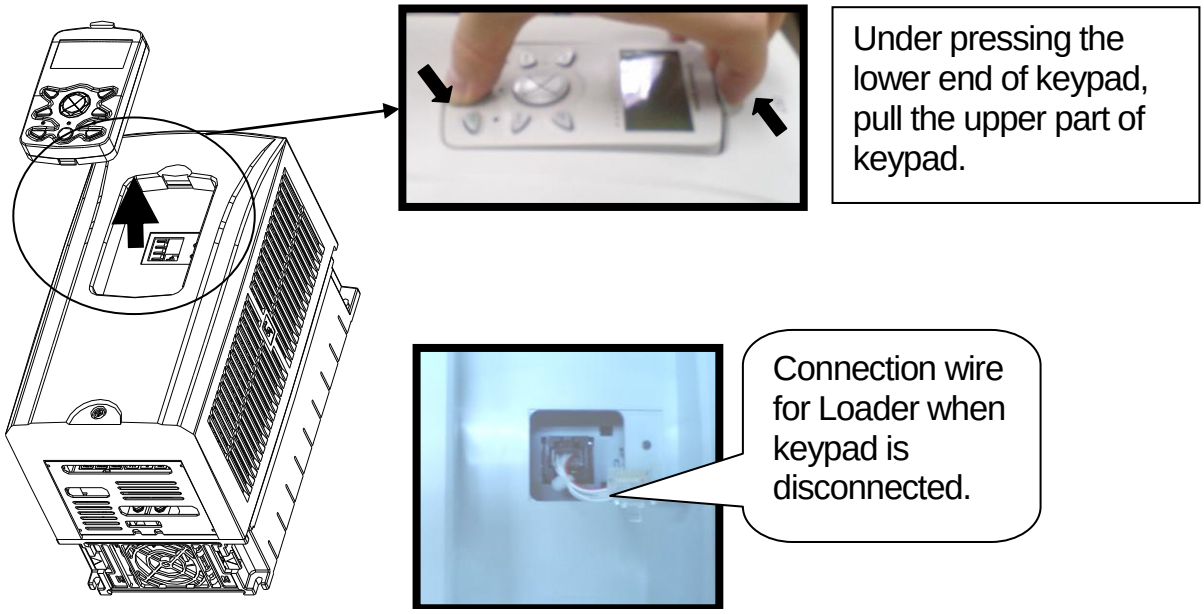
Control Circuit Wiring

- Is a twisted pair shielded wire adopted for the inverter control circuit wiring?
- Is the covered wire with shield connected with the ground terminal?
- In the event it is operated in 3-Wire sequence, is the control circuit wiring done after the parameter of multi-function contact input terminal is modified?
- Is the wiring of the optional devices done properly?
- Aren't there any wiring mis-connected?
- Are the inverter control circuit terminal screws fastened tightly?
- Aren't there any wire fragments or screw left?
- Doesn't the remaining wire connected with the terminal contact the terminals nearby?
- Is the control circuit wiring isolated from the main circuit wiring in the duct or control panel?
- Doesn't the length of wiring exceed 300m ? (In the case of the produce of 3.7kW or less, the entire length of wiring should be 100m or less)
- Doesn't the wiring of safety input exceed 30m?

4.1.1 How to separate front cover when wiring

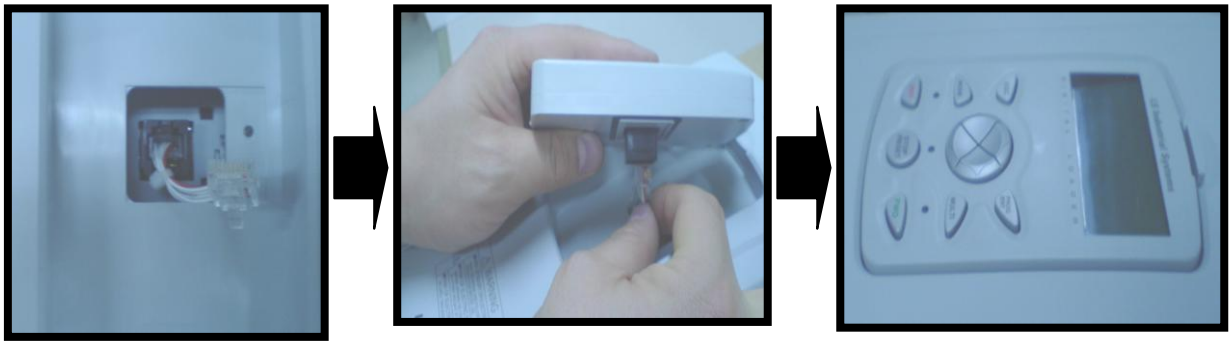
Remove Keypad on the product and release fixed volt of the lower end of up cover.

1) How to separate Keypad



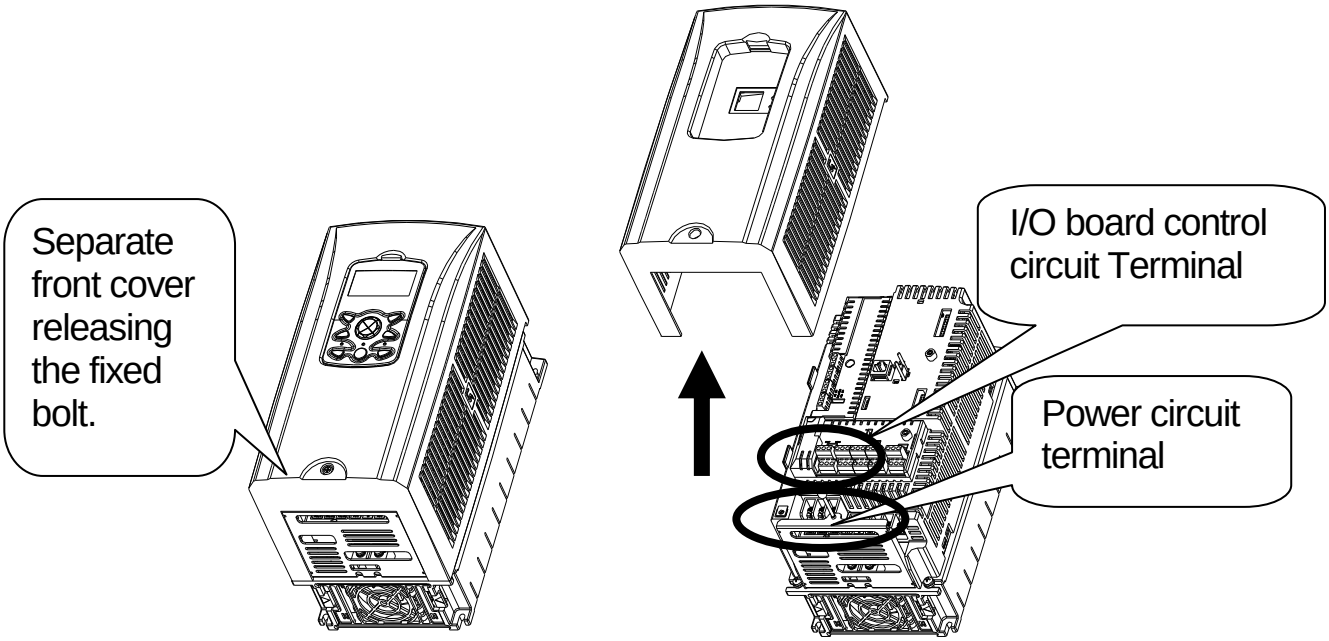
2) How to assemble plug when connecting Keypad

As showing figures below, install the keypad after connecting the plug.



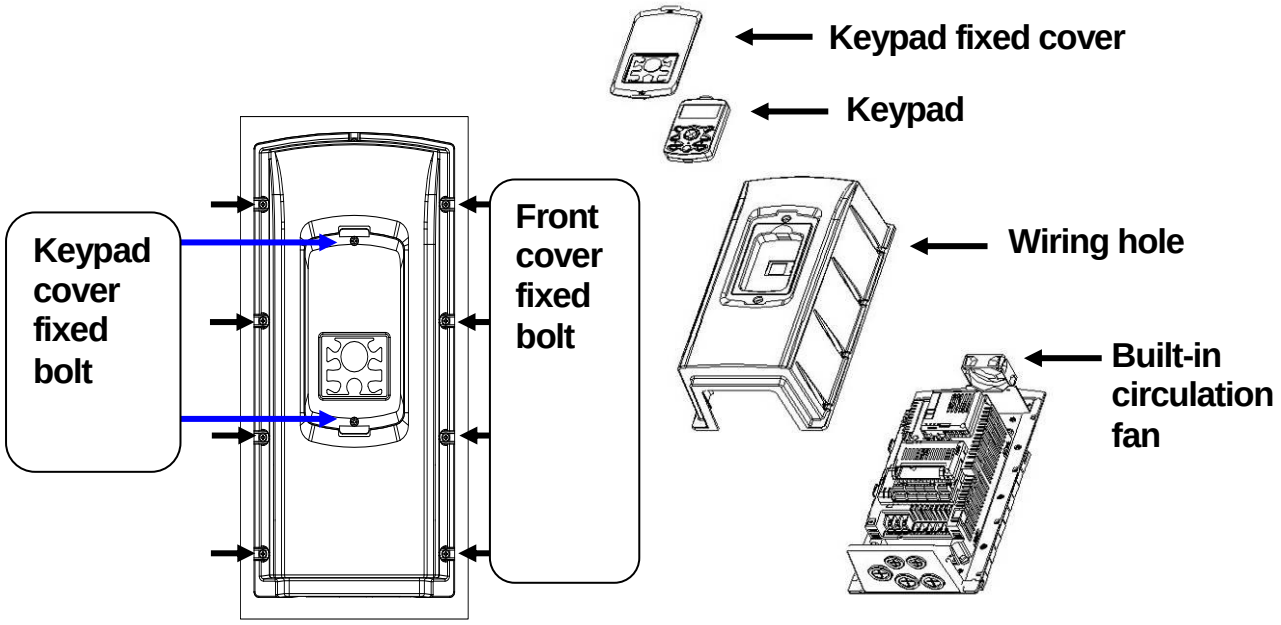
3) How to separate front cover

[IP21 Type]



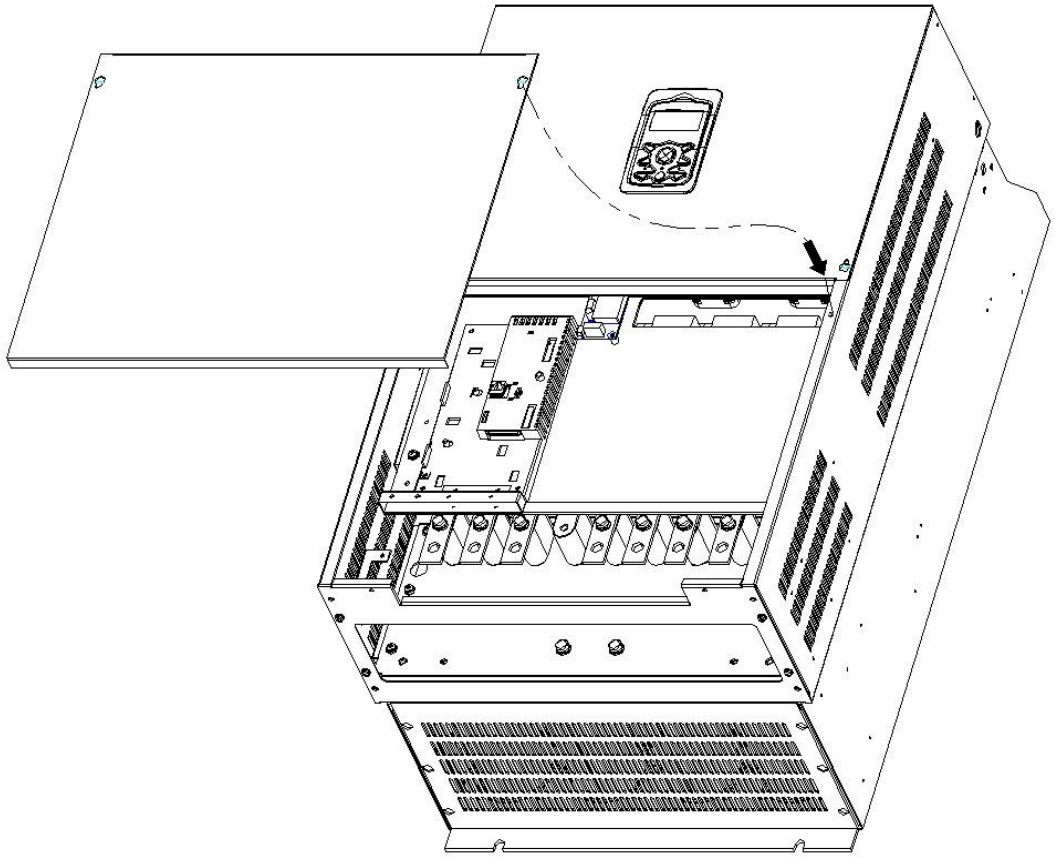
[IP54 Type]

Separate the transparent keypad cover releasing fixed bolt and then separate keypad.
Separate the front cover releasing fixed bolt.
Before wiring, IP54 product must be installed on the panel.



4.1.2 How to separate front cover when wiring (90~375 kW 400V, 30-75kW 200V)

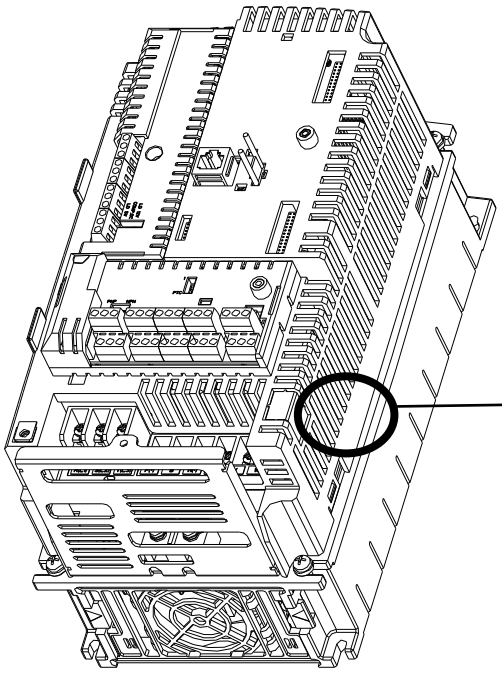
Releasing the right/left fixed bolt on the lower front cover and get down the lower front cover and then open it. Now, you can wire power part (R/S/T, P/N, U/V/W) and signal cable (terminal block, encoder option, communication option, PLC option etc.).



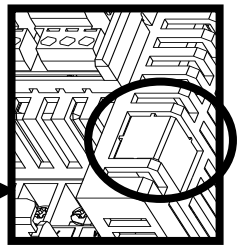
4.1.3 Built-in EMC Filter

The product which has a built-in EMC filter is efficient for reducing conductive and radiated noise from the input part of inverter. Turns On the On/Off switch of EMC filter to perform the EMI function if you are select the product which has a built-in EMC filter. (However, when unable to use EMC filter or due to the asymmetric structure of the ground to use, EMC filter of on/off swich is set to off

1) How to set EMC Filter functions (Less than 7.5kW Products)



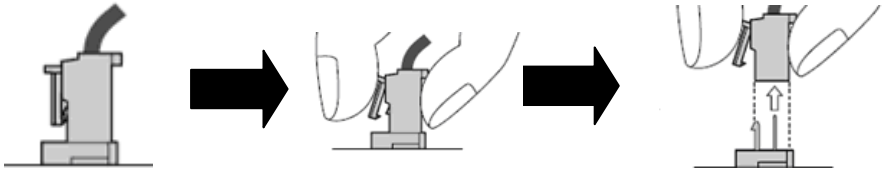
- Cut off plastic cover which marked below.
- If short circuit connector is connected with SW1 which is inside, EMC Filter works.



EMC filter OFF

EMC filter ON

2) How to remove EMC Filter ON/OFF connector (Less than 7.5kW Product)

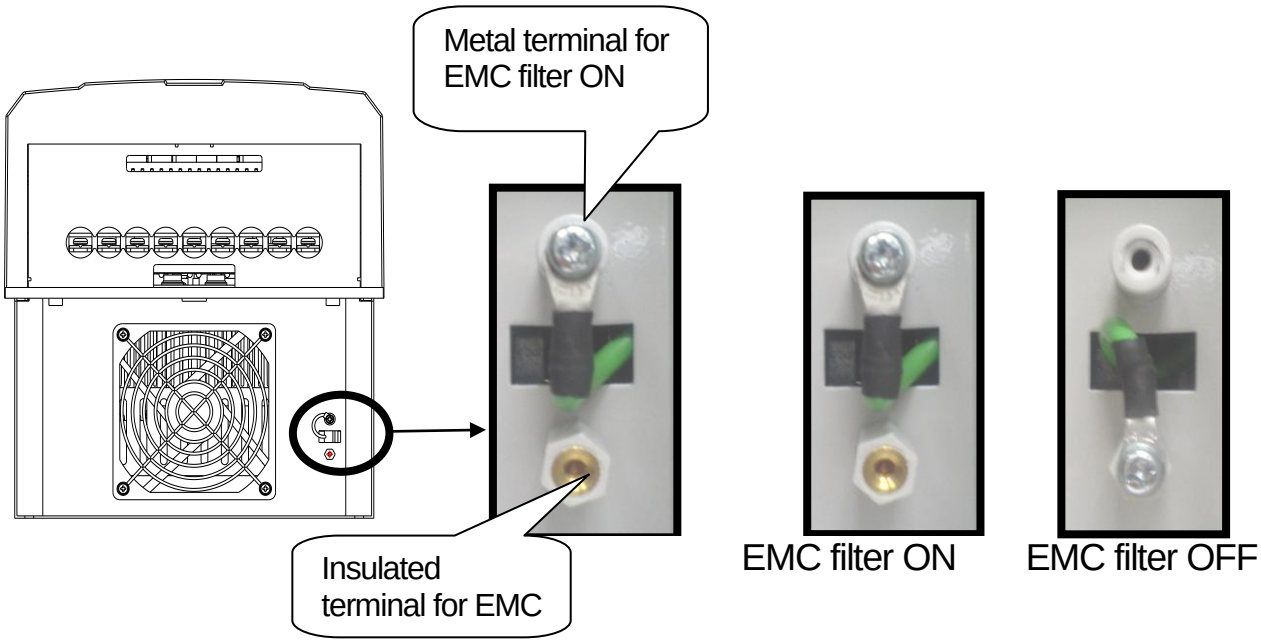


EMC filter ON EMC filter OFF

Check the voltage by a tester in 10minute after cutting the power supply. In case separate with connector, pull the connector while pressing fixed hasp. When reinstalling, be sure to hook the hasp of the connector. (If it is hard to separate them, please use radio pincher or tweezers.)

3) How to set EMC Filter functions (11~22kW Products)

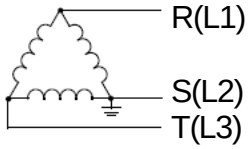
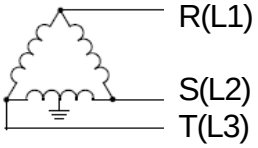
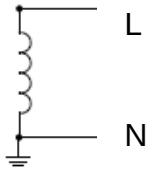
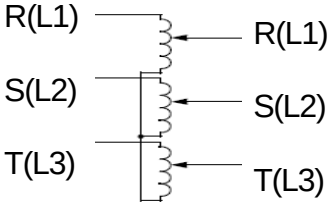
EMC filter ON/OFF set terminal is located in lower part of the 11~22KW Terminal as shown figure below. Initial set isON. When the green wire is connected in upper metal connection terminal, EMC filter is ON and EMC filter is OFF if it is connected in insulated connection terminal.



EMC filter has effect in reducing air electronic wave while being used in power source of symmetrical ground method. Be sure to use EMC filter in symmetrical ground method such as Y connection.

⚠ Caution

Leakage current increases while EMC filter is ON. Do not use EMC filter when the input is asymmetrical way such as Delta connection. It may cause an electric shock.

Asymmetrical Ground structure			
1-phase is grounded in Delta connection		Grounded middle tap of 1-phase in Delta connection	
Grounded in 1-phase end		Non-grounded 3-Phase connection	

4.1.4 Wiring precaution

1) The internal circuits of the inverter will be damaged if the incoming power is connected and applied to output terminals (U, V, W).
2) Use ring terminals with insulated caps when wiring the input power and motor wiring.
3) Do not leave wire fragments inside the inverter. Wire fragments can cause faults, breakdowns, and malfunctions.
4) For input and output, use wires with sufficient size to ensure voltage drop of less than 2%. Motor torque may drop of operating at low frequencies and a long wire run between inverter and motor.
5) The cable length between inverter and motor should be less than 150m (492ft). Due to increased leakage capacitance between cables, overcurrent protective feature may operate or equipment connected to the output side may malfunction. [But for products of less than 3.7kW, the cable length should be less than 50m (164ft).]
6) The main circuit of the inverter contains high frequency noise, and can hinder communication equipment near the inverter. To reduce noise, install line noise filters on the input side of the inverter.
7) Do not use power factor capacitor, surge killers, or RFI filters on the output side of the inverter. Doing so may damage these components.
8) Always check whether the LCD and the charge lamp for the power terminal are OFF before wiring terminals. The charge capacitor may hold high-voltage even after the power is disconnected. Use caution to prevent the possibility of personal injury.
9) Do not connect with MC at output pare of inverter and make MC On/Off during operation. It can cause the Trip or damage of inverter.
10) When using a DC common with 30~75kW product, please be careful.
    30~75kW product provides P1(+) and P2(+) terminal. In the case of DCR type of product, P1(+) terminal is before reactor and P2(+) terminal is after reactor.
    Therefore When using DC Common, you mush use P2(+) and N.
    So, inevitablely to use DC Common, before using that, you muse contact with sales team in advance. Because various matters need to be considered except for wiring.
    Similary, when you connected to an external braking unit, you must use P2(+) and N terminal.
    Otherwise, products can be damaged(ex. Using P1(+) and N Terminal)

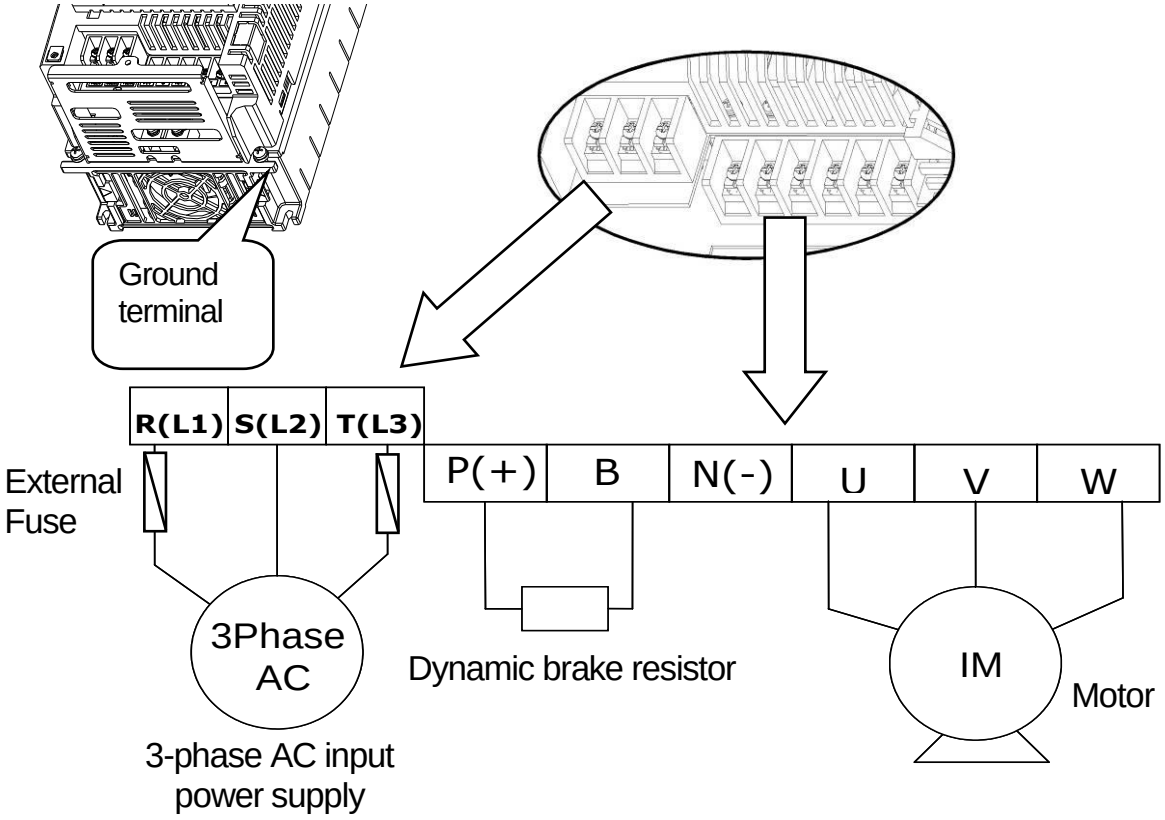
4.1.5 Grounding

1) The inverter is a high switching device, and leakage current may flow. Ground the inverter to avoid electrical shock.
2) The ground impedance for 200V class is 100 ohm or less and 400V class 10ohm or less .
3) Connect only to the dedicated ground terminal of the inverter. Do not use the case or the chassis screw for grounding.
4) As a minimum, grounding wire should meet the specifications listed below. Grounding wire should be as short as possible and should be connected to the ground point as near as possible to the inverter.

Inverter Capacity	Grounding wire size (mm²)	
	200V class	400V class
0.75 ~ 3.7kW	3.5	2
5.5 ~ 7.5 kW	5.5	3.5
11 ~ 15 kW	14	8
18.5 ~ 22 kW	22	14
30 ~ 45 kW	22	22
55 ~ 75 kW	38	38
90 ~ 110 kW	-	60
132 ~ 220 kW	-	100
280 ~ 315 kW	-	185
375 kW	-	240

4.1.6 Terminal wiring diagram (POWER terminal block)

1) Wiring of Inverter below 7.5kW



2) Wiring of 11~22kW Product

R(L1)	S(L2)	T(L3)	P(+)	B	N(-)	U	V	W

3) Wiring of 30~75kW Product

R(L1)	S(L2)	T(L3)	P1(+)	P2(+)	N(-)	U	V	W

4) Wiring of 90~160kW Product

R(L1)	S(L2)	T(L3)	P2(+)	N(-)	U	V	W

5) Wiring of 185~220kW Product

R(L1)	S(L2)	T(L3)	P2(+)	N(-)	U	V	W

6) Wiring of 280~375kW Product

R(L1)	S(L2)	T(L3)	P1(+)	P2(+)	N(-)	U	V	W

Remark

Products over 11kW have a linear arrangement of terminal blocks. Products for 0.75~22kW have built-in DC Reactor, so it does't necessary any other DC Reactor connection. Ground terminal must be grounded. Do not use ground to command for ground cable, welding machine and power machine etc. Ground cable must be wire as short as possible. If ground terminal of inverter is far from the inverter,electric potential of inverter terminal ground can be unstable because leakage current of inverter can be gernerated form inverter.

□Remark

[English]

If the forward command (Fx) is on, the motor should rotate counterclockwise when viewed from the load side of the motor. If the motor rotates in the reverse direction, switch the cables at the U and V terminals.

[French]

Si la commande avant (Fx) est activée, le moteur doit tourner dans le sens anti-horaire si on le regarde côté charge du moteur. Si le moteur tourne dans le sens inverse, inverser les câbles aux bornes U et V.

⚠□Caution

[English]

• Apply rated torques to the terminal screws. Loose screws may cause short circuits and malfunctions. Tightening the screw too much may damage the terminals and cause short circuits and malfunctions.

• Use copper wires only with 600V, 75℃ rating for the power terminal wiring, and 300V, 75℃rating for the control terminal wiring.

• Power supply wirings must be connected to the R, S, and T terminals. Connecting them to the U, V, W terminals causes internal damages to the inverter. Motor should be connected to the U, V, and W Terminals. Arrangement of the phase sequence is not necessary.

[French]

• Appliquer des couples de marche aux vis des bornes. Des vis desserrées peuvent provoquer des courts-circuits et des dysfonctionnements. Ne pas trop serrer la vis, car cela risque d'endommager les bornes et de

provoquer des courts-circuits et des dysfonctionnements.

• Utiliser uniquement des fils de cuivre avec une valeur nominale de 600 V, 75 ℃ pour le câblage de la borne d'alimentation, et une valeur nominale de 300 V, 75 ℃ pour le câblage de la borne de commande.

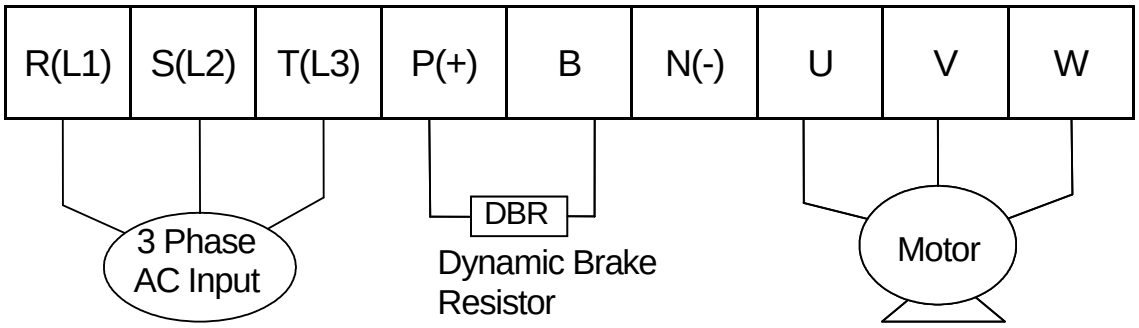
• Les câblages de l'alimentation électrique doivent être connectés aux bornes R, S et T. Leur connexion aux bornes U, V et W provoque des dommages internes à l'onduleur. Le moteur doit être raccordé aux bornes U, V et W. L'arrangement de l'ordre de phase n'est pas nécessaire.

4.1.7 **Terminals of main circuit**

1) 0.75 ~ 22 kW (200V/400V)

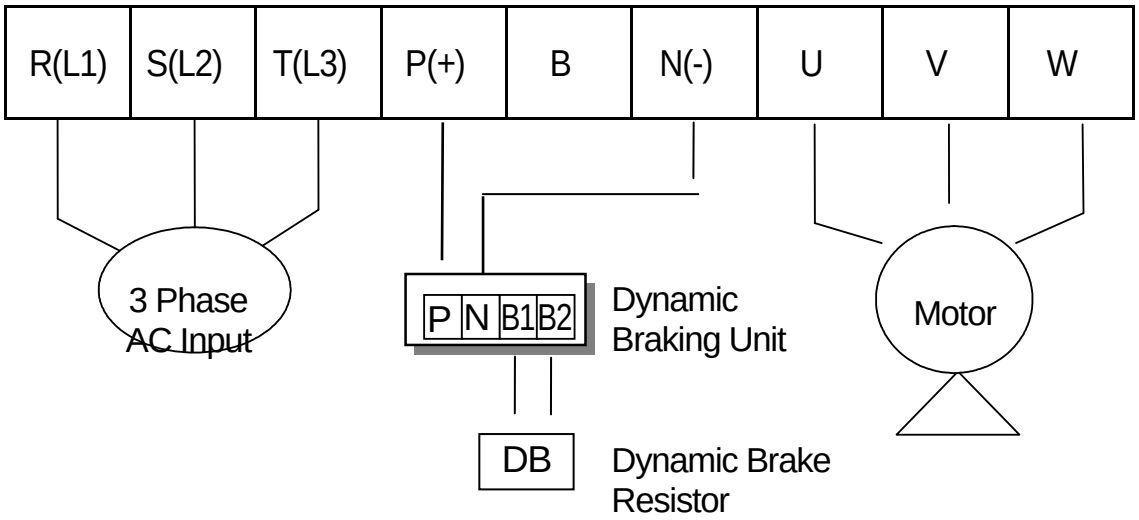
(1) Built-in dynamic braking unit used

Connect P(+) and B terminal of inverter to the dynamic braking unit when built-in dynamic unit is used.



(2) Optional dynamic braking unit used

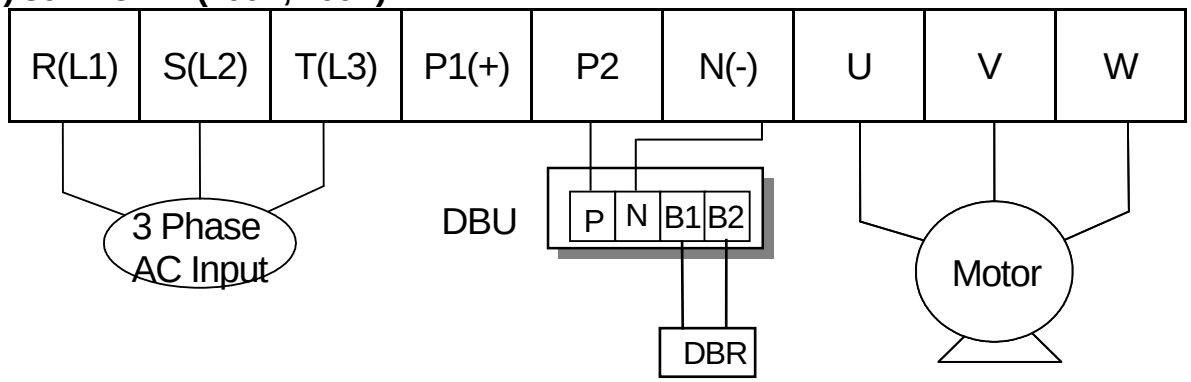
Connects P(+) terminal of inverter to P/(+) terminal of the dynamic braking unit and N(-) terminal of inverter to N/(-) terminal of the dynamic braking unit. B terminal of inverter is not used.



Terminal Symbol	Terminal Name	Description
R(L1),S(L2),T(L3)	AC power supply input	Connects normal AC input
P(+)	(+) DC voltage terminal	(+) DC link voltage terminal
N(-)	(-) DC voltage terminal	(-) DC link voltage terminal.
P(+),B	Dynamic brake resistor	Connects dynamic brake resistor.

U,V,W	Inverter output	Connects the 3 phase induction motor

2) 30 ~ 75 kW (200V, 400V)



Terminal Symbol	Terminal Name	Description
R(L1), S(L2), T(L3)	AC power supply input	Connects normal AC input
P1(+)	(+)DC voltage terminal	(+)DC link voltage terminal, It is located in front of DCL terminal.
P2, N(-)	Dynamic brake unit connection, DC common terminal [1)]	Voltage terminal connecting Dynamic brake unit, DC common terminal
N(-)	(-)DC voltage terminal	(-)DC link voltage terminal.
U, V, W	Inverter output	Connects the 3-phase induction motor.

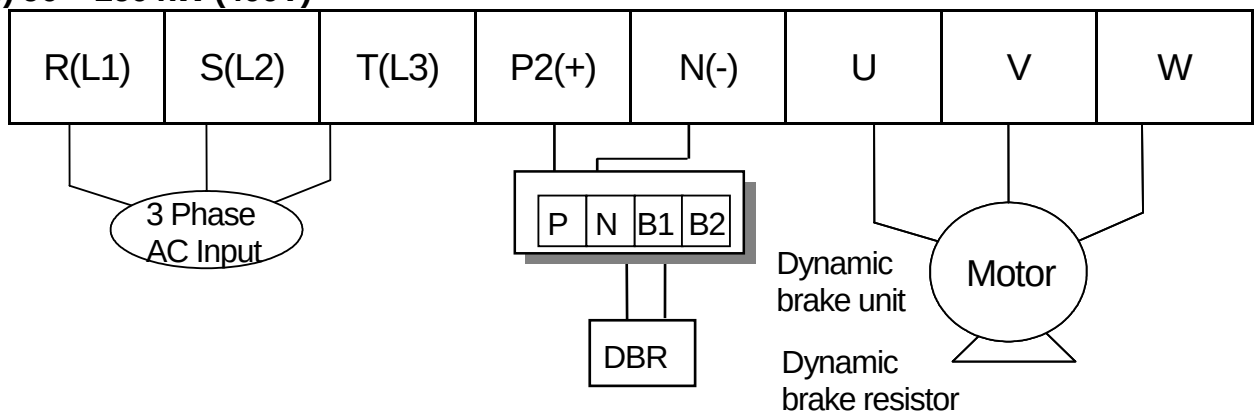
[1)] When using this terminal as a DC common, special considerations are required. Be sure to consult with our sales representative.
For 30 ~ 75kW 200V type P1-P2 terminals are short-circuited by jumper.

Remark

Pay close attention when using 30~75W product for DC Common.
Buying DC reactor from the outside, it can not be installed with 30~75kW product. If you want to use DC reactor of product, please purchase type of 30~75kW product mounted with DC reactor. P1(+) terminal is at the Reactor's front end while P2(+) terminal at its back-end.
In the event of using such other DCR-mounted product for DC Common, you must use P2(+) and N(-) terminals without fail. When using P1(+) and N(-) terminals for DC Common, it may casue damage to the product.
Use for DC Common requires several considerations besides wiring. Therefore, in the event it should be used for DC Common inevitably, be sure to contact our Sales Department in advance.
Likewise, in the event of connecting with exterial braking unit, you must use P2(+) and N(-) terminals without fail. When connecting with P1(+) and N(-) terminals, it may cause

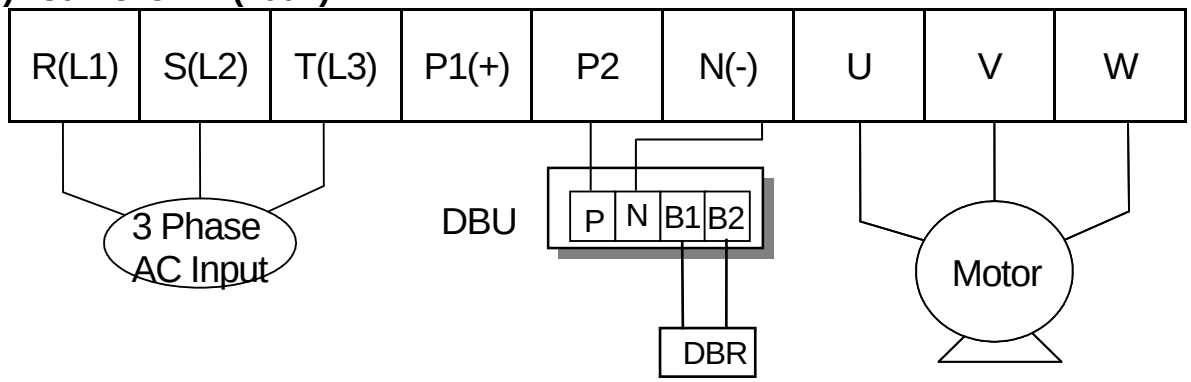
damage to the product.

3) 90 ~ 160 kW (400V)



Terminal Symbol	Terminal Name	Description
R(L1), S(L2), T(L3)	AC power supply input	Connects normal AC input
P(+)	(+)DC voltage ternimal	(+)DC link voltage terminal
N(-)	(-)DC voltage terminal	(-)DC link voltage terminal
P(+), N(-)	External brake unit connection	Voltage terminal connecting Dynamic brake unit.
U, V, W	Inverter output	Connects the 3-phase induction motor.

4) 280 ~ 375 kW (400V)



Terminal Symbol	Terminal Name	Description
R(L1), S(L2), T(L3)	AC power supply input	Connects normal AC input
P1(+)	(+)DC voltage terminal	(+)DC link voltage terminal, It is located in front of DCL terminal.
P2, N(-)	Dynamic brake unit connection, DC common terminal [1)]	Voltage terminal connecting Dynamic brake unit, DC common terminal
N(-)	(-)DC voltage terminal	(-)DC link voltage terminal.

U, V, W	Inverter output	Connects the 3-phase induction motor.

1) When using this terminal as a DC common, special considerations are required. Be sure to consult with our sales representative.

4.1.8 Specifications of power terminal block and Exterior fuse

Inverter applied		Terminal Screw size	Screw torque[1] (Kgf·cm)	Cable[2] mm²		AWG		Exterior fuse	
				R,S,T	U,V,W	R,S,T	U,V,W	Current	Voltage
200V	0.75 kW	M4	7.1~12	2.5	2.5	14	14	10A	500V
	1.5 kW	M4	7.1~12	2.5	2.5	14	14	15A	
	2.2 kW	M4	7.1~12	2.5	2.5	14	14	20A	
	3.7 kW	M4	7.1~12	4	4	12	12	32A	
	5.5 kW	M4	7.1~12	6	6	10	10	50A	
	7.5 kW	M4	7.1~12	10	10	8	8	63A	
	11 kW	M6	30.6~38.2	16	16	6	6	80A	
	15 kW	M6	30.6~38.2	25	25	4	4	100A	
	18.5 kW	M8	61.2~91.8	35	35	2	2	125A	
	22 kW	M8	61.2~91.8	50	50	1	1	160A	
	30 kW	M8	61.2 ~ 91.8	70	70	1/0	1/0	200A	
	37 kW	M8	61.2 ~ 91.8	95	95	2/0	2/0	250A	
	45 kW	M8	61.2 ~ 91.8	95	95	2/0	2/0	350A	
	55 kW	M10	89.7 ~ 122.0	120	120	3/0	3/0	400A	
	75 kW	M10	89.7 ~ 122.0	150	150	4/0	4/0	450A	
400V	0.75~1.5kW	M4	7.1~12	2.5	2.5	14	14	10A	500V
	2.2 kW	M4	7.1~12	2.5	2.5	14	14	15A	
	3.7 kW	M4	7.1~12	2.5	2.5	14	14	20A	
	5.5 kW	M5	24.5~31.8	4	2.5	12	14	32A	
	7.5 kW	M5	24.5~31.8	4	4	12	12	35A	
	11 kW	M5	24.5~31.8	6	6	10	10	50A	
	15 kW	M5	24.5~31.8	10	10	8	8	63A	
	18.5 kW	M6	30.6~38.2	16	10	6	8	70A	
	22 kW	M6	30.6~38.2	25	16	4	6	100A	
	30 kW	M8	61.2~91.8	25	25	4	4	125A	
	37 kW	M8	61.2~91.8	25	35	4	2	125A	
	45 kW	M8	61.2~91.8	50	50	1	1	160A	
	55 kW	M8	61.2~91.8	70	70	1/0	1/0	200A	
	75 kW	M8	61.2~91.8	95	95	2/0	2/0	250A	
	90 kW	M12	182.4~215.0	100	100	4/0	4/0	350A	

Inverter applied	Terminal Screw size	Screw torque[1] (Kgf·cm)	Cable[2] mm²		AWG		Exterior fuse	
			R,S,T	U,V,W	R,S,T	U,V,W	Current	Voltage
110 kW	M12	182.4~215.0	100	100	4/0	4/0	400A	
132 kW	M12	182.4~215.0	150	150	300	300	450A	
160 kW	M12	182.4~215.0	200	200	400	400	450A	
185 kW	M12	182.4~215.0	200	200	400	400	620A	
220 kW	M12	182.4~215.0	250	250	500	500	800A	
280 kW	M12	182.4~215.0	325	325	650	650	1000A	
315 kW	M12	182.4~215.0	2x200	2x200	2x400	2x400	1200A	
375 kW	M12	182.4~215.0	2x250	2x250	2x500	2x500	1400A	

1) : Apply the prescribed torque for the terminal screws. If the screws are loose, it might cause a failure.

2) : Use higher specification than 600V 75℃ copper cable.

1) Wiring length of motor cable

The maximum cable length of the inverter and the motor is shown in <Table 1) Maximum wire length by inverter capacity> as follows. It should be installed that total wiring length is within the maximum wiring length even when you connect more than one motor. Due to an increase the stray capacitance of inside the wiring, overcurrent protection function or the malfunction of the device connected to the secondary side can be occurred if you connect a particularly long distance motor. In addition, more than 5.5kW products, the settable maximum carrier frequency is shown in <Table 2) the maximum carrier frequency according wire length>

<Table 1) Maximum wiring length by inverter capacity>

Inverter capacity	**Below 3.7kW**	**More than 5.5kW**
Maximum wiring length	**Within 50 m**	**Within 150m**

<Table 2) The maximum carrier frequency according wire length>

Wire length between the inverter and the motor	**Shorter than 50 m**	**Shorter than 100 m**	**Longer than 100 m**
The maximum carrier frequency	**Below 15 kHz**	**Below 5 kHz**	**Below 2.5 kHz**

Please apply below according to the installation site because output peak voltage depending on the installation environment.

a) If output peak voltage is high even when the motor wiring length is shorter than maximum wiring length by inverter capacity,

- Use a motor with high insulation rating.
- Use an output circuit filter (Micro Surge Filter).
- Use dv/dt filter or sine wave filter.

b) If the wiring length is long,

- Please use the thick wire if you want to reduce the line-to-line voltage drop.

Line-to-line voltage drop [V] = (√ 3 X wire resistance [mΩ / m] X wiring length [m] X Current [A]) / 1000

- Do not use a 3-core cable.
- Set the carrier frequency low.

2) Protect the inverter and the motor

The inverter output voltage is DC link voltage with very short rising time pulse regardless of output frequency. Due to the transmission line effect of the motor, output peak voltage can rise up to twice the DC link voltage, 2.8 times main power voltage.

Then, if the switching part (MC or relay) is connected to the output of the inverter, high surge voltages can be introduced regardless of the length of the motor wiring whenever switcing part operates.

In this case, insulation of motor and motor cable, and Inverter output parts (such as the current sensor) can be destructed because of high voltage. Even if the motor wiring length is shorter then the maximum wiring length by inverter capacity, do not use the switching parts at output of inverter or connect output filters(output reactor dv/dt filter, sine wave filter) in order to protect inverter and motor form surge voltage.

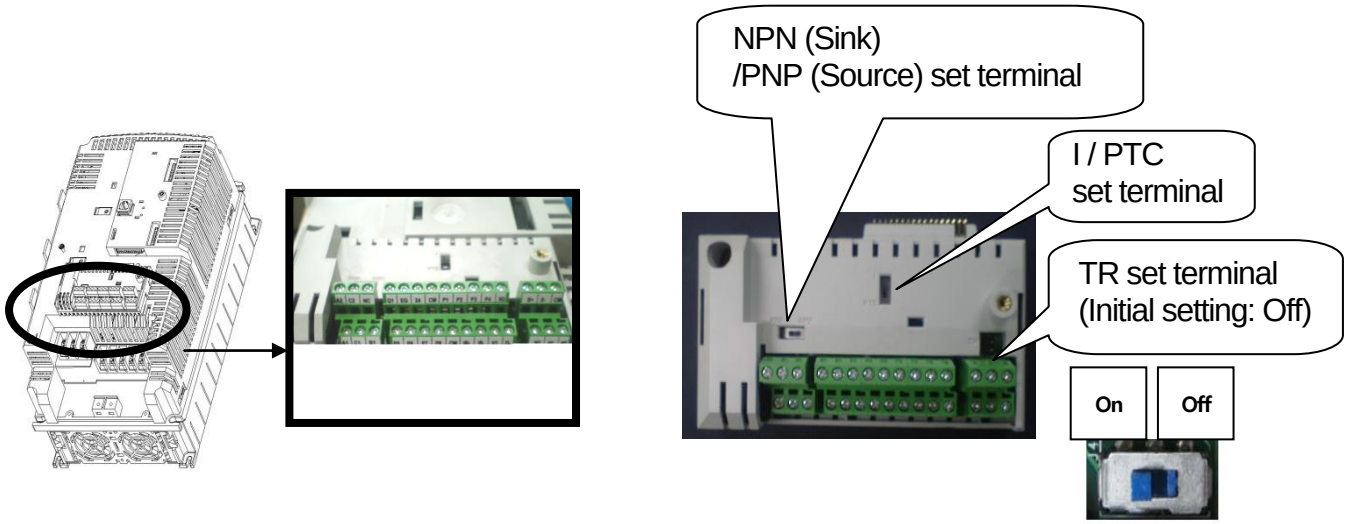
The output voltage with high switching frequency and fast rising time occur the motor shaft current that flow through the motor bearing. This motor shaft current corrode surface of the bearing slowly, eventually motor burning accident may occur.

To decrease the motor shaft current and protect the motor insulation, refer to <Table 1) Maximum wiring length by inverter capacity>.

And, we recommend dv/dt filter or Sine Wave filter regardless of the length of the motor wiring.

⚠ Caution
[English] **Use Class H or RK5 UL listed Input fuses and UL listed breakers ONLY. See the table above for the voltage and current ratings for the fuses and breakers.** **[French]** **Utiliser UNIQUEMENT des fusibles d'entrée homologués de Classe H ou RK5 UL et des disjoncteurs UL . Se reporter au tableau ci-dessus pour la tension et le courant nominal des fusibless et des disjoncteurs.**

4.1.9 Control terminal line diagram (Basic I/O terminal block, below 22kW)



1) How to set NPN (Sink)/PNP (Source)

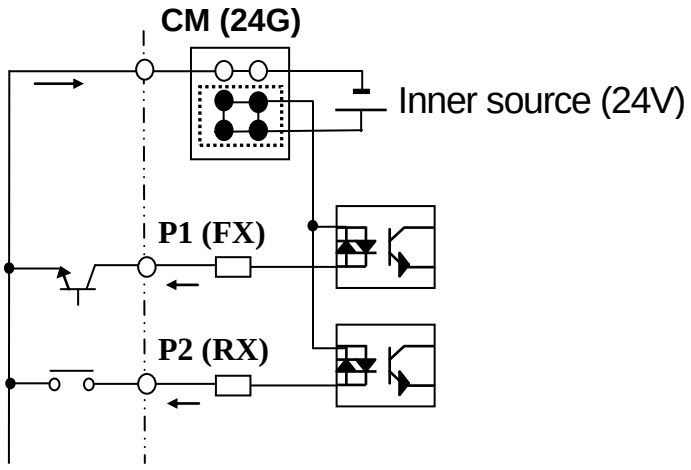
HP serves 2 sequence input terminals of control circuit: NPN mode (Sink mode) and PNP mode (Source mode). It is possible to change the logic of input terminal with NPN mode (Sink mode) and PNP mode (Source mode) by using NPN (Sink)/PNP (Source) set terminal. Each mode connecting methods are follows.

(1) NPN mode (Sink mode)

Set NPN (Sink)/PNP (Source) switch into NPN. CM (24V GND) is common terminal of contact point input signal. Initial set of Factory default is NPN mode (Sink mode).

NPN mode (Sink mode)

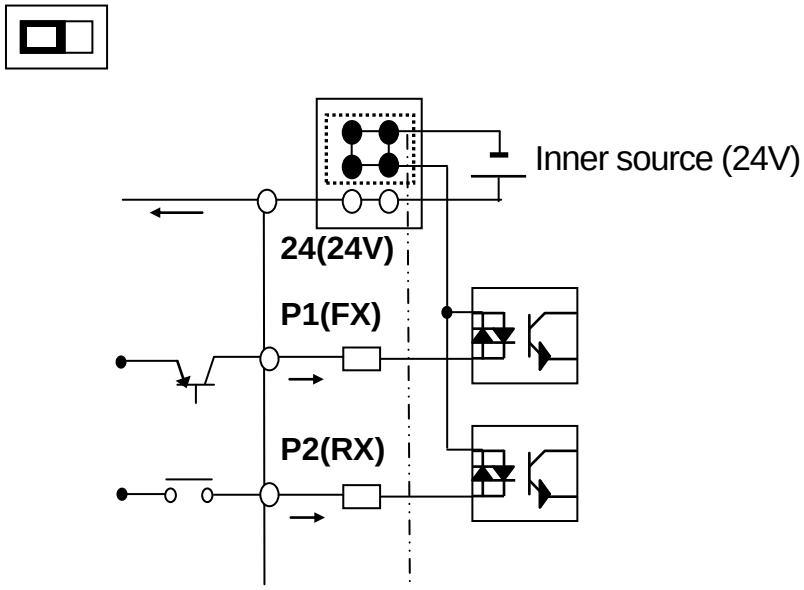
PNP  NPN



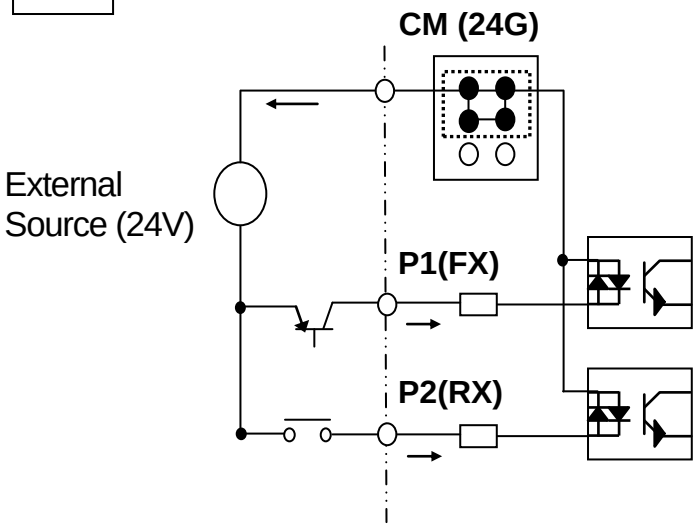
(2) PNP mode (Source mode) – When use inner source

Set NPN (Sink)/PNP (Source) switch into PNP. 24 (24V inner source) is common terminal of contact point input signal. PNP mode (Source mode) – Set NPN (Sink)/PNP (Source) switch into PNP When use exterior source.
If you want try to use exterior 24V source, connect exterior source (-) terminal with CM (24V GND).

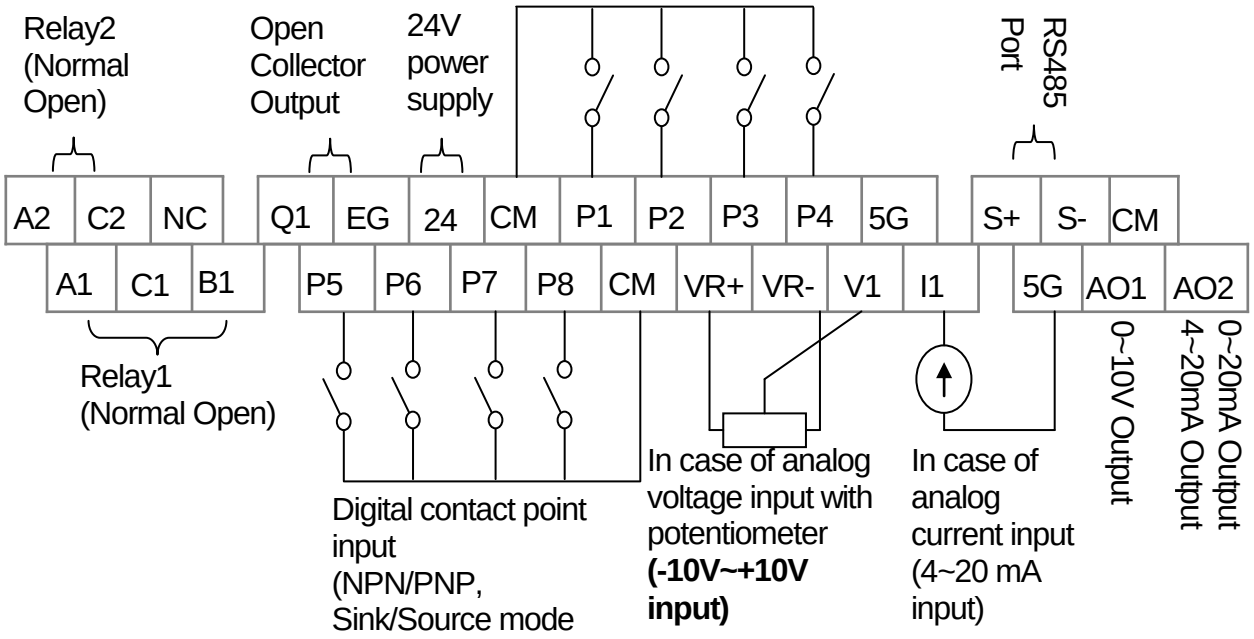
PNP NPN **PNP mode (Source mode) – When using inner source**

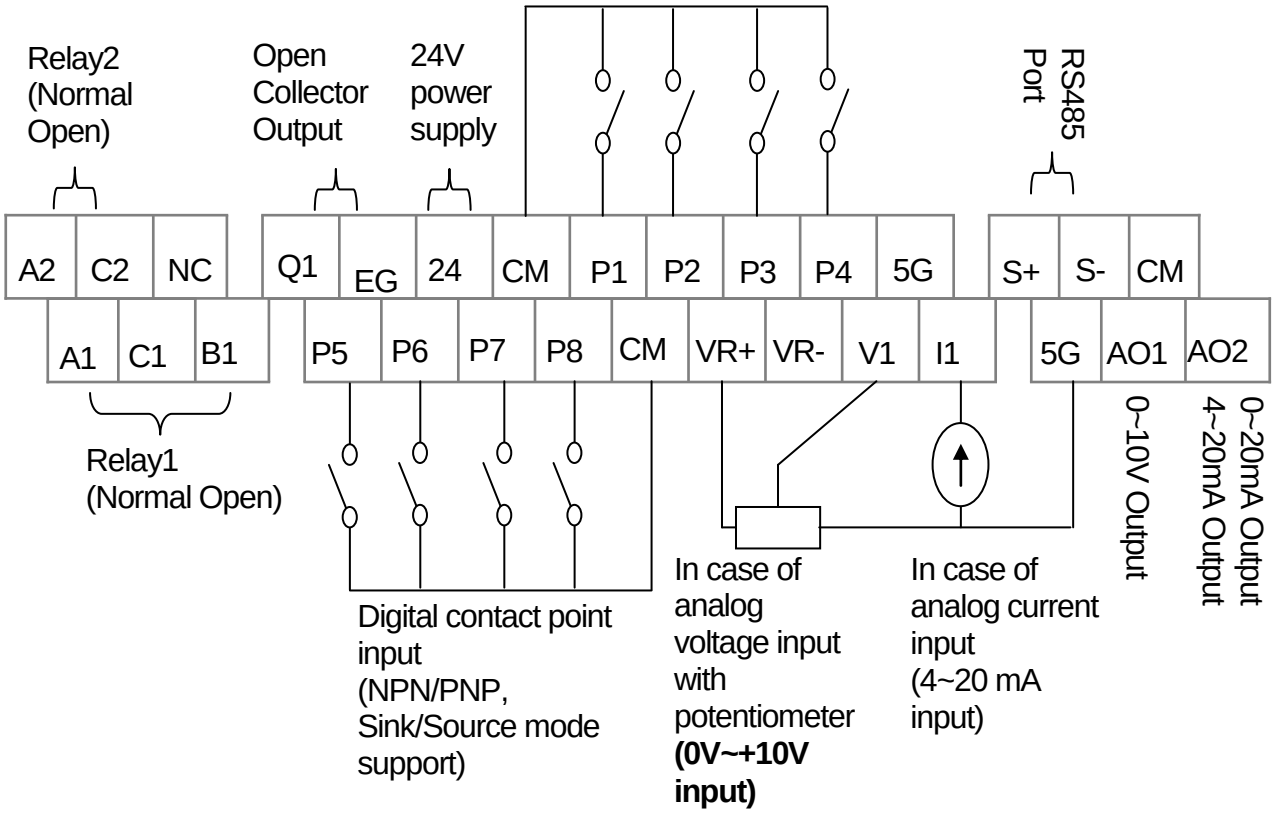


PNP NPN **PNP mode (Source mode) – When using external source**



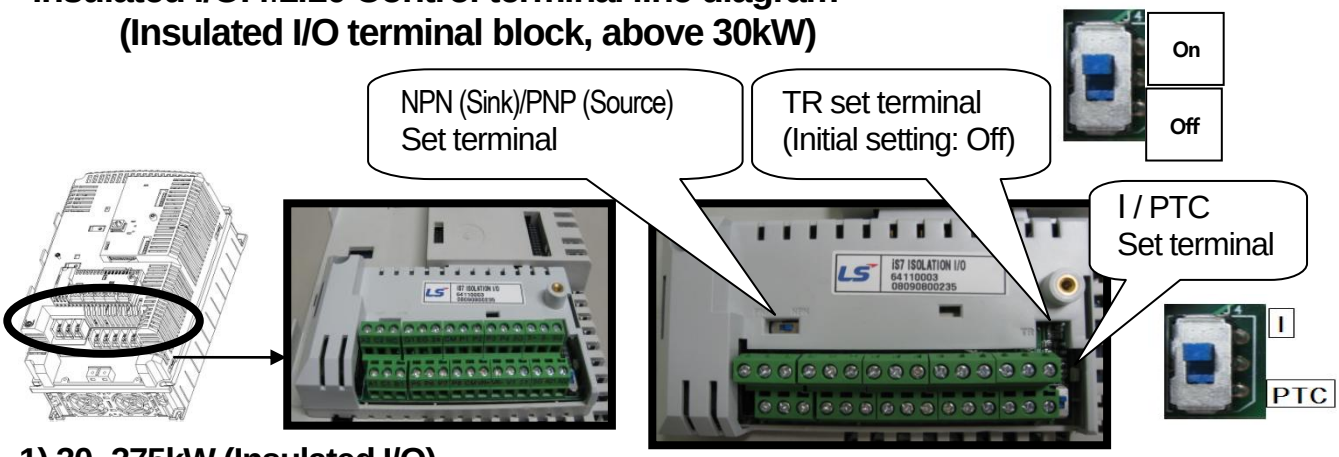
1) 0.75 ~ 22kW (Basic I/O)



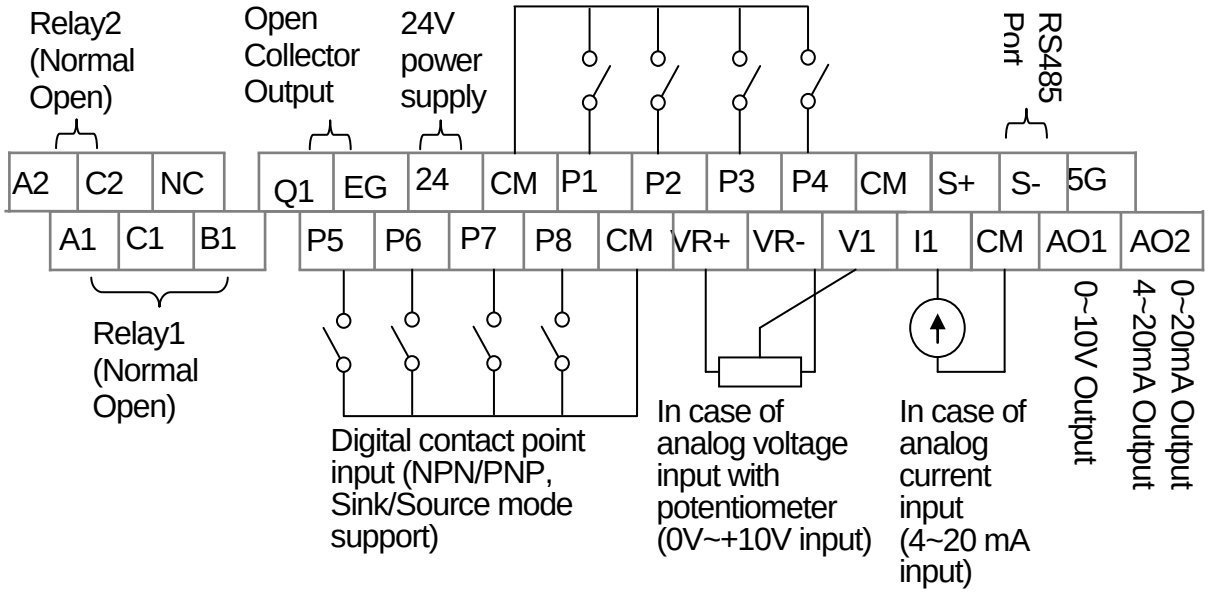


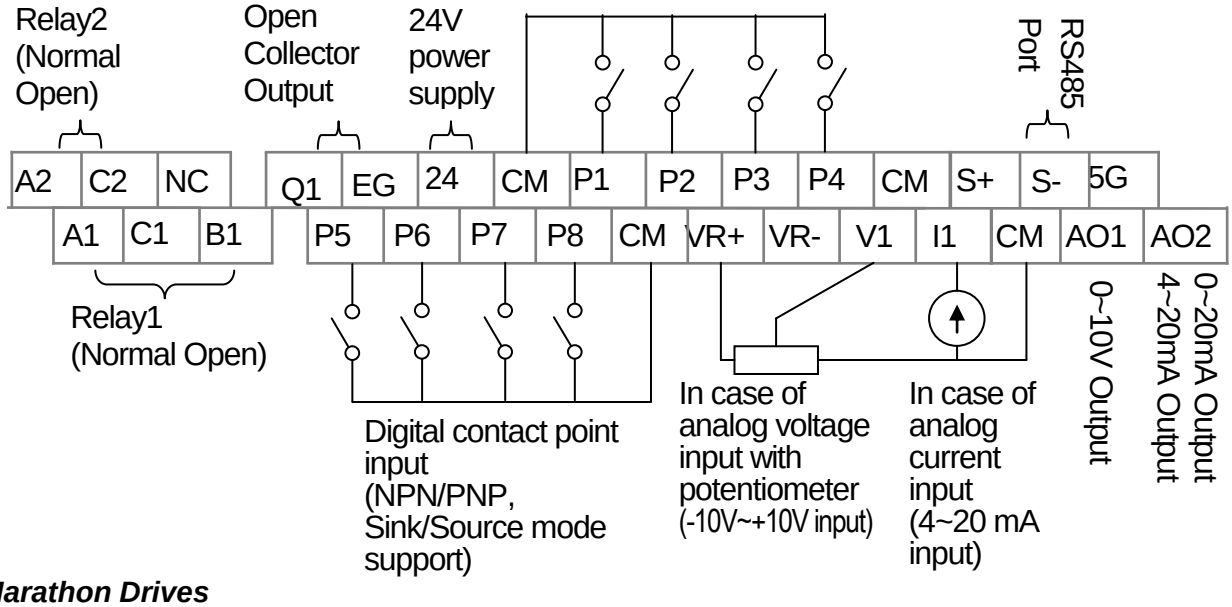
TR terminal is RS485 communication terminal resistor (120 **Ω).**
We recommend the potentiometer for 1/2W, 1k **Ω**..

*** Description of TR terminal and variable resistence are same as those of insulated I/O.4.1.10 Control terminal line diagram (Insulated I/O terminal block, above 30kW)**



1) 30~375kW (Insulated I/O)





TR terminal is RS485 communication terminal resistor (120 **Ω).**
We recommend the potentiometer for 1/2W, 1k **Ω**.
When setting the frequency reference source with analog voltage (V) or current (I), the reflection of frequency for the analog input is based on when the analog input is actually received. Taking the voltage input for instance, the state no voltage is applied to V1 is not 0V, but 0V is input to V1 in fact is 0V
In case of analog voltage input, accurate linear property is shown by Bipolar at the state -10 ~ 0 ~ 10V input is received while by Unipolar at the state 0 ~ 10V input if received.

Warning: If the analog voltage input is interrupted with the frequency reference source at the state of analog voltage input, i.e. if no voltage is applied, it may cause the occurrence of offset voltage enabling the frequency command approx. 4~5Hz.

4.1.11 Control circuit terminal

1) Contact point start function selection

Type		Terminal Symbol	Terminal Name	Terminal Description
Input Signal	Contact point start functon selection	P1~P8	Multi-function input1~8	Available by defining as multi-function input
		CM	Sequence common terminal	Common terminal of the contact point input terminal (note : In case of Basic I/O, common terminal is different from the 5G common terminal)
	Analog Frequency	VR(+)	Frequency setting Power (+) terminal	Power supply for analog frequency setting Maximum output is +12V, 100mA.
		VR(-)	Frequency setting power (-) terminal	Power supply for analog frequency setting Maximum output is -12V, 100mA.
		V1	Frequency setting (voltage)	Becomes set frequency with input of DC -10~10V. Unipolar 0~+10[V]),Biopolar(-10[V] ~10[V]) input resistance 20kΩ
		I1	Frequency setting (current)	Becomes set frequency with input of DC 0~20mA input resistance 249Ω
		5G	Frequency setting common terminal	Common terminal of analog frequency setting signal and analog voltage and current terminals (**note :** In case Basic I/O, common terminal are different from the CM common terminal.)
Output Signal	Analog	A01	Multi-function analog voltage output terminal	Select the one among Output frequency, Output current, DC voltage. - Ouput voltage : 0~10V - Maximum output voltage : 10V - Maximum output current: 10mA
		A02	Multi-function analog current output terminal	Select the one among Output frequency, Output current,Output voltage, DC voltage. - Output current: 4~20mA (0~20mA) - Maximum output current: 20mA
	Contact Point	Q1	Multi-function terminal (open collector)	DC 26V, below 100mA
		EG	Common terminal for open collector	External power supply common earth terminal of the open collector
		24	Exterior 24Vpower	Maximum output current: 150mA
		A1, B1, C1	Fault signal output	Protection function is activated to break output. (below AC 250V 5A, DC 30V 5A) - Fault signal : A1-C1 electrified (B1-C1 unelectrified) - Normal signal : B1-C1 electrified (A1-C1 unelectrified)
		A2, C2	Multi-function relay 2 output A contact point	Output the signal while running. User defined multi-function output terminal. (below AC 250V 5A, DC 30V 5A)
		S+,S-, CM	RS-485 signal input terminal	RS-485 signal line (Refer to 'Communication Function' contained in HP User Manual. You can download it from Marathon Drive website. (www.regalaustralia.com.au). This provided manual is the simple version of HP User Manual.

Type		Terminal Symbol	Terminal Name	Terminal Description

4.1.12 Specifications of signal terminal block distribution

Terminal		Cable size [1]		Electric specifications
Type	Name	mm^2	AWG	
P1~P8	Multi-function input terminal	0.33 ~1.25	16~22	-
CM	Contact point common terminal (In case of Basic I/O, CM is different from 5G)			Common earth for multi function input terminal
VR+	Analog frequency setting (+) power supply			Output voltage : +12V Maximum output voltage : 100mA
VR-	Analog frequency setting (-) power supply			Output voltage : -12V Maximum output voltage : 100mA
V1	Multi-function analog voltage input terminal			Input voltage : 0~10V or -10~10V
I1	Multi-function analog current input terminal			0~20mA input Internal resistance : 249Ω
AO1	Multi-function analog voltage output terminal	0.33 ~2.0	14~22	Maximum output voltage : 10V Maximum output current : 10mA
AO2	Multi-function analog current output terminal			Maximum output current : 20mA
5G	Frequency setting common terminal (In case of Basic I/O, 5G is different from CM)			Common terminal of analog frequency setting signal and analog current and voltage terminals
Q1	Multi-function terminal (open collector)			DC26V, below 100mA
EG	Earth terminal for external power supply	0.33 ~1.25	16~22	Maximum output current : 150mA
24	External 24V power supply			
A1	Multi function relay 1 output A contact point	0.33 ~2.0	14~22	Below AC250V/5A, Below DC30V/5A
B1	Multi function relay 1 output B contact point			Below AC250V/5A, Below DC30V/5A
C1	Multi function relay 1 contact point common terminal			Below AC250V/5A, Below DC30V/5A
A2	Multi function relay 2 output A contact point			Below AC250V/5A, Below DC30V/5A
C2	Multi function relay 2 contact point common terminal			Below AC250V/5A, Below DC30V/5A
S+,S-	RS485 signal input terminal	0.75mm^2 (18AWG)		RS485 signal line
CM	RS485 common terminal			For multi connection, RS485 power ground (Shield) connection terminal

1) Apply the shielded type of twisted-pare wire.

⚠ Caution

Do not use more than 3M remote cable for the keypad. Failure of the signals on the keypad might occur. To prevent radiated emissions in the analogical and digital signals, you must put a ferrite in the wires of these signals.
Ex. Brand Würth Elektronik ref. 74271132

4.1.13 Input varistor and Y-CAP connection description

HP series include a filter which consists of Y-CAP and varistors between input phase and grounding for surge absorption and lightning protection. However, in a non-grounded power system that a special type of earth fault occurs frequently in the field, adequate measures are required in order to avoid damage of inverter as shown in the table below.

Power supply system and a grounding type	Varistors and Y-CAP connection	Effect
Directly grounded system	2Pin connector(On)	Voltage stress and noise can be reduced
Non grounded or impedance grounded system	2Pin connector(Off)	Damage of inverter risk can be reduced at the time of earth fault

Note

0.75~22KW(400V) and 0.75~75KW(200V) proudct do not support this function.

⚠ Caution

In order to prevent accidents, remove the switch after the internal voltage of the inverter power off completely.
Switch can be removed if there are no lightning and incoming surge voltage on the system.

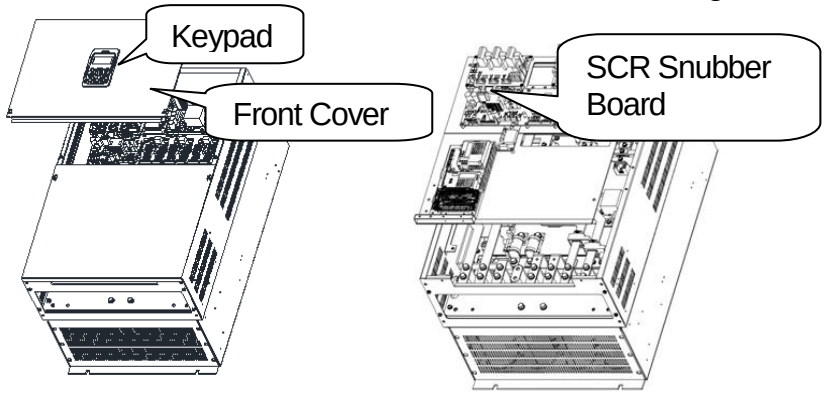
4.1.14 How to remove the front cover and set up on/off connector functionality

1) HP 30~75KW(400V) product set up

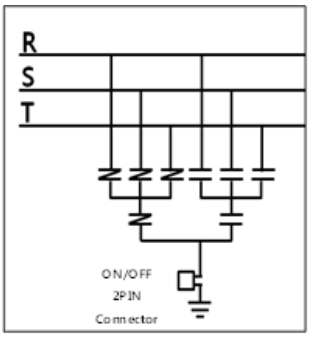
If you use a connection switch off varistors and Y-CAP with 30~75KW(400V) product, be sure to contact our sales team or a customer support team to receive action.

2) HP 90~375KW(400V) product set up

After removing the keypad, release the left/right of the fixed bolt at the top of the front cover and push up the front cover and open it. If you remove the front cover with the keypad connected, the cable of keypad can be damaged. After removing the front cover, you can select ON/OFF with 2Pin connector as shown in the figure below.



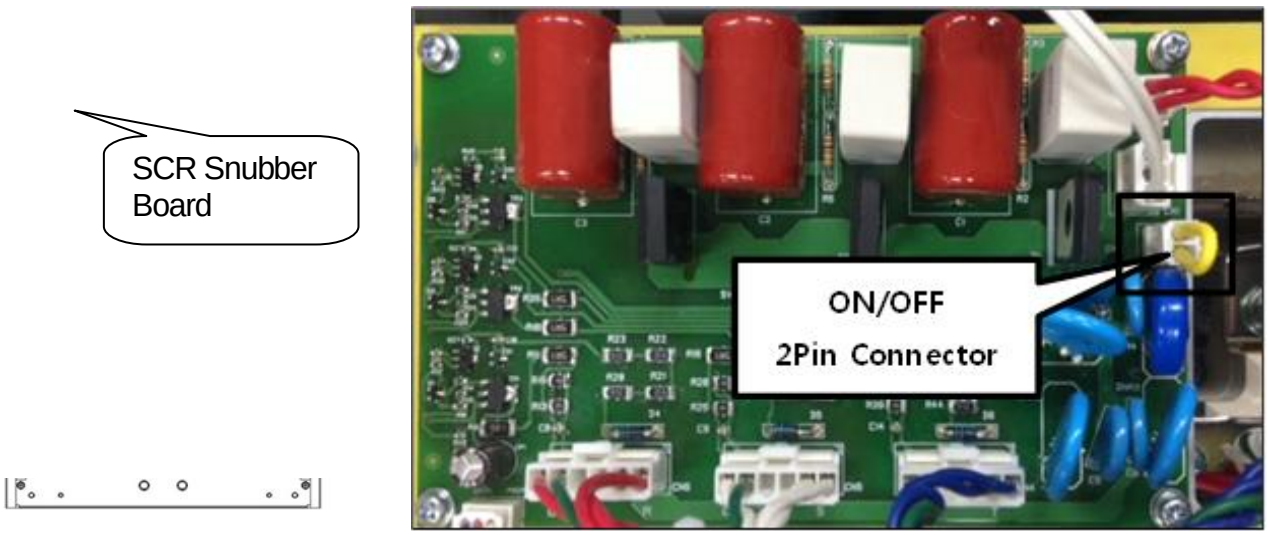
<Removing the front cover(Ex : 90~160KW)>



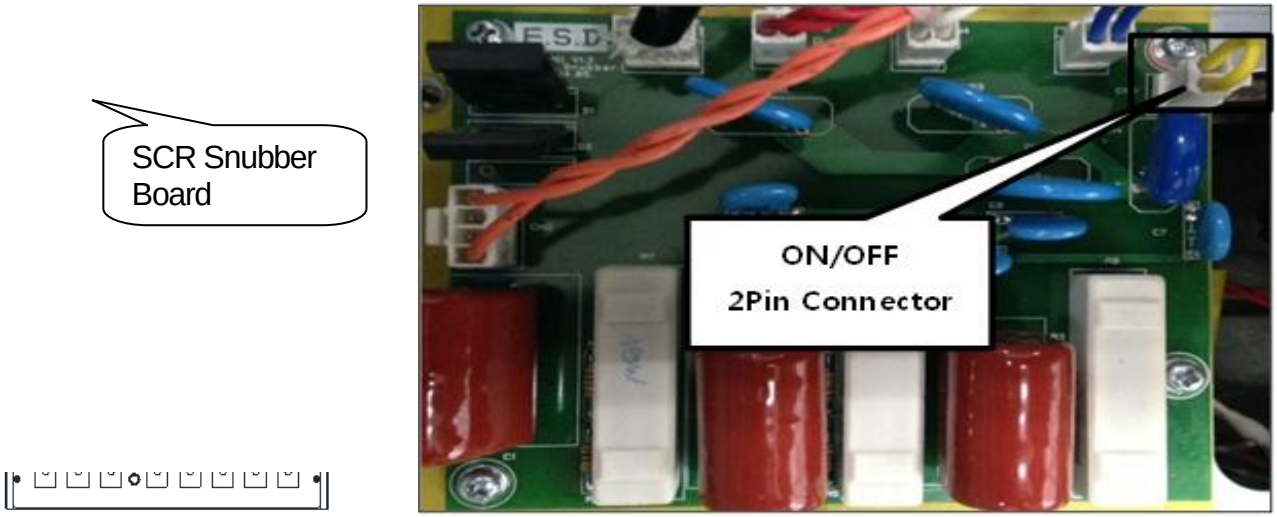
<Input surge protection and AC EMI Capacitor circuit>

4.1.15 The grounded ON/OFF connection removal

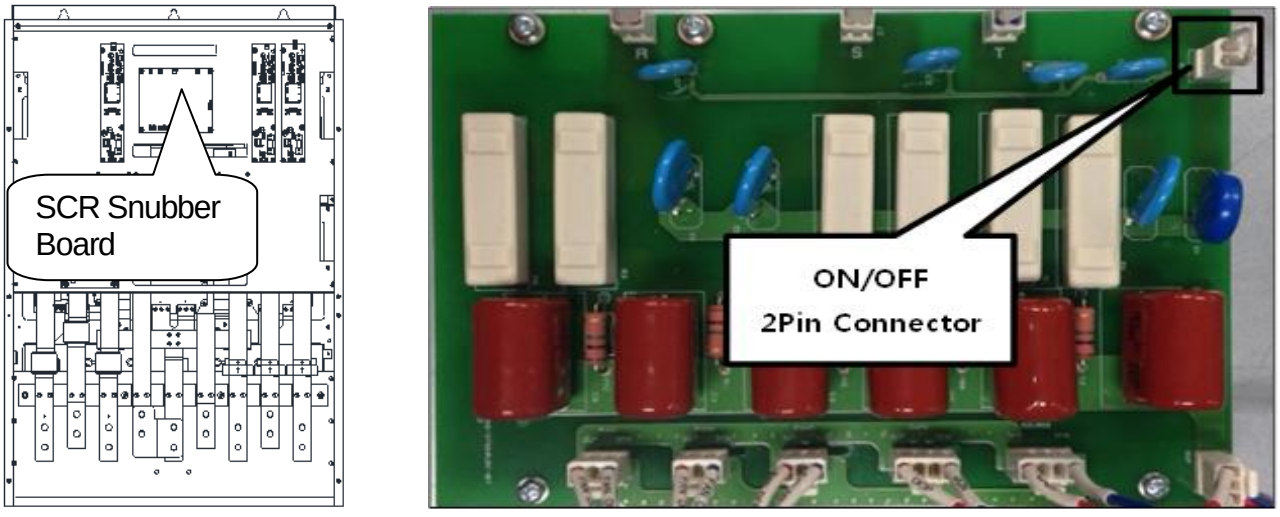
1) MDLV0900-1600HP(400V)



2) MDLV1850-2200HP(400V)



3) MDLV2800-3750HP(400V)



4.2 Operation Checking

HP provides EASY START MODE helping with the basic parameter setting using the keypad by distribution shown above when power is first supplied.

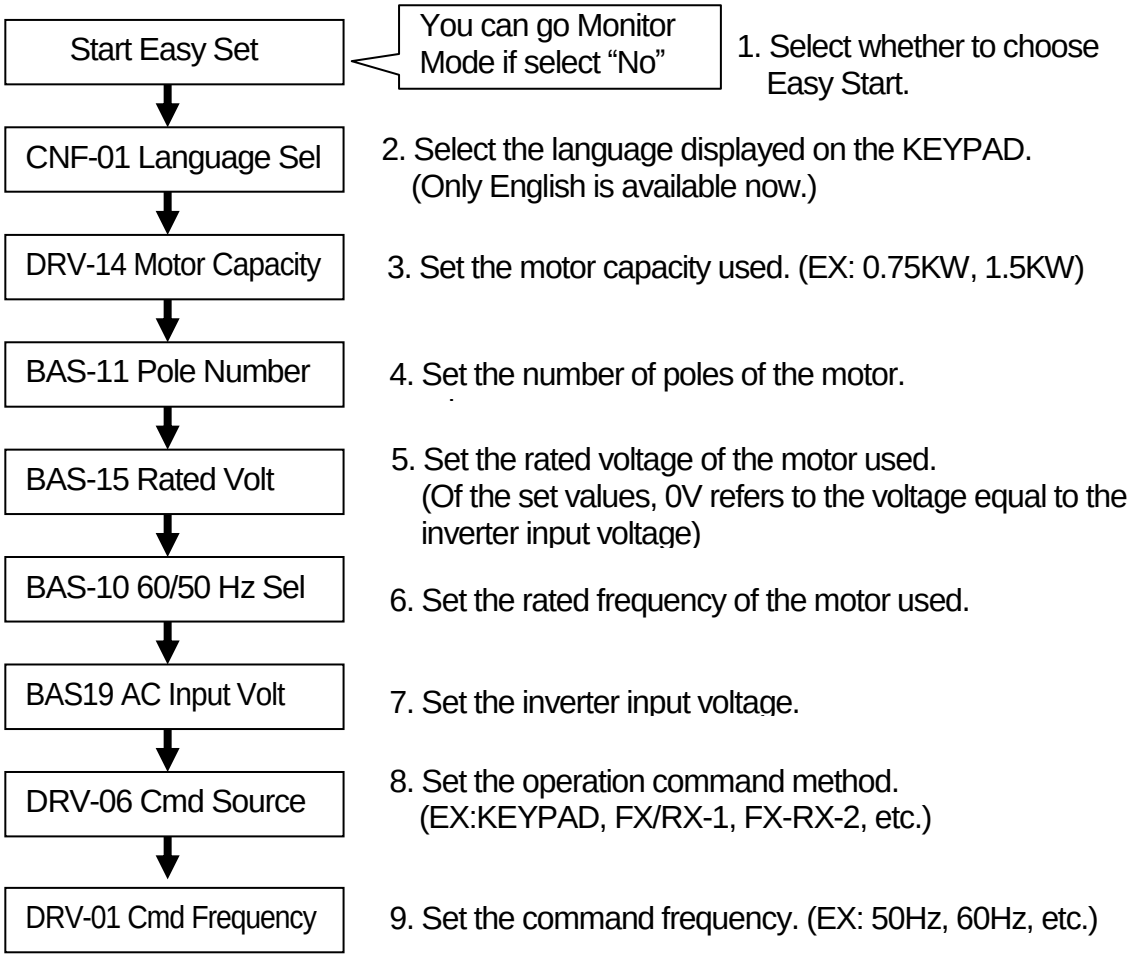
4.2.1 Easy start

Easy Start gets started when power is first supplied after you purchase the product or power is re-supplied after the set parameters are all initialized.

- Easy Start Mode gets started first even in case of an inverter trip.
- Easy Start Mode does not operate during the inverter running.

4.2.2 Easy start operation

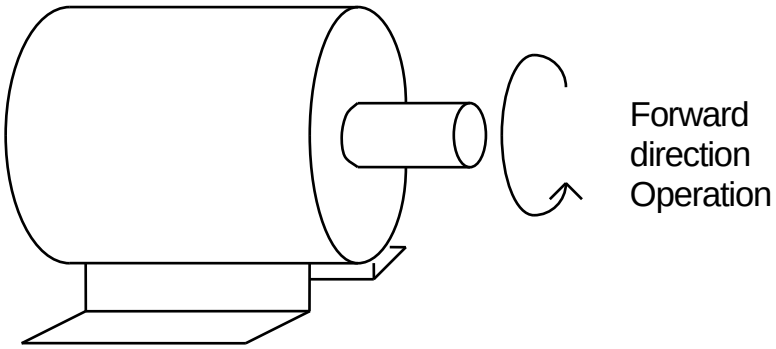
It operates in the following sequence.



* You can move to Monitor Mode by pressing ESC at any time while you set the Easy Start mode.

4.2.3 Checking for normal working

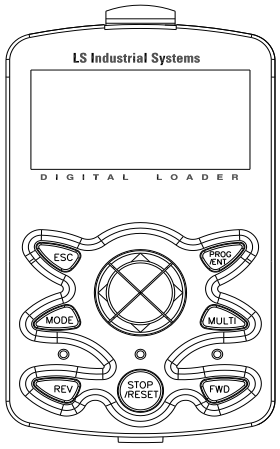
1) Motor forward/reverse direction and Normal working checking by KEYPAD operation
After setting Cmd Source of DRV-06 is 0 : Keypad, Freq Ref Src of DRV-07 is 0 : Keypad-1 and set DRV-01 : Cmd Frequency into temporary speed, Command forward operation by pressing FWD please. At this time, shaft of motor at the side of load rotates into counterclock wise direction. Otherwise, it must be changed 2 terminals among the inverter output terminal U, V, W.



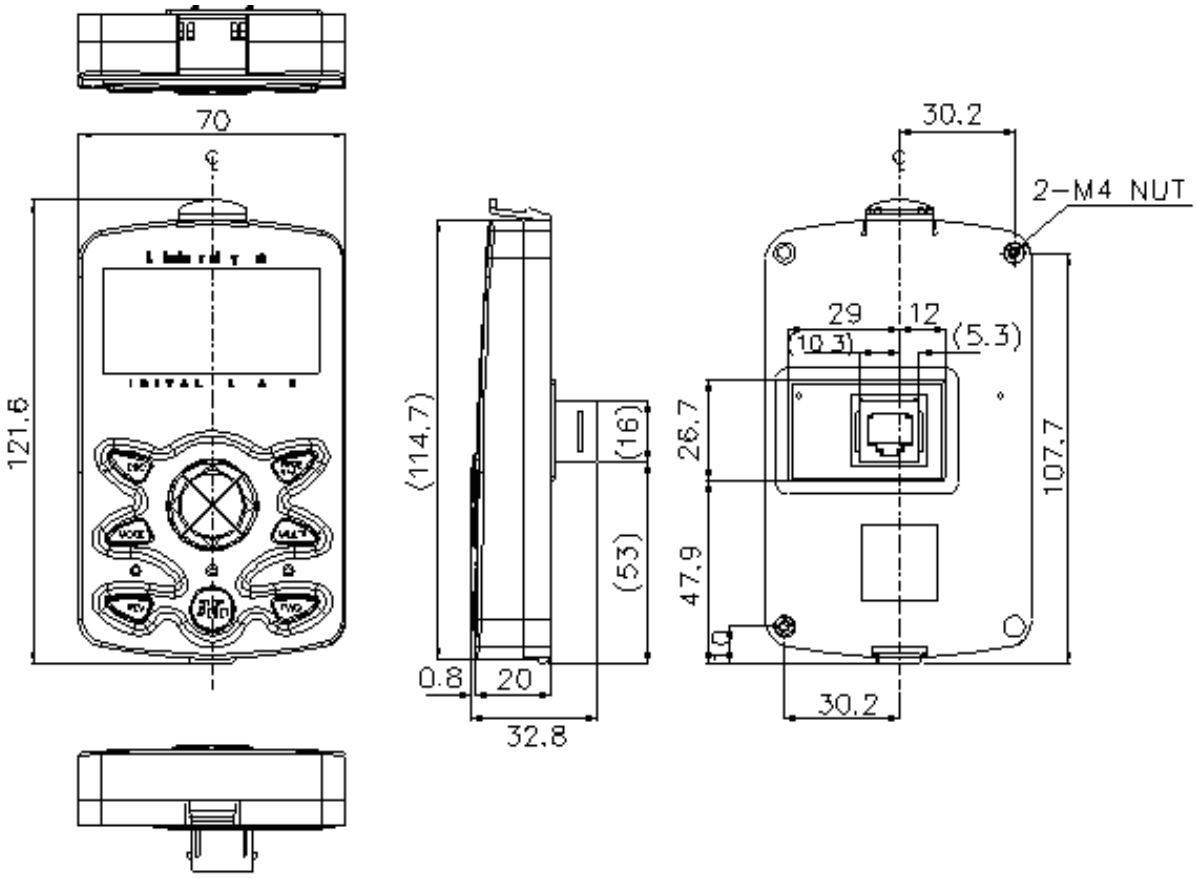
5.1 How to Use Keypad

5.1.1 Standard KEYPAD appearance and description (Graphic keypad)

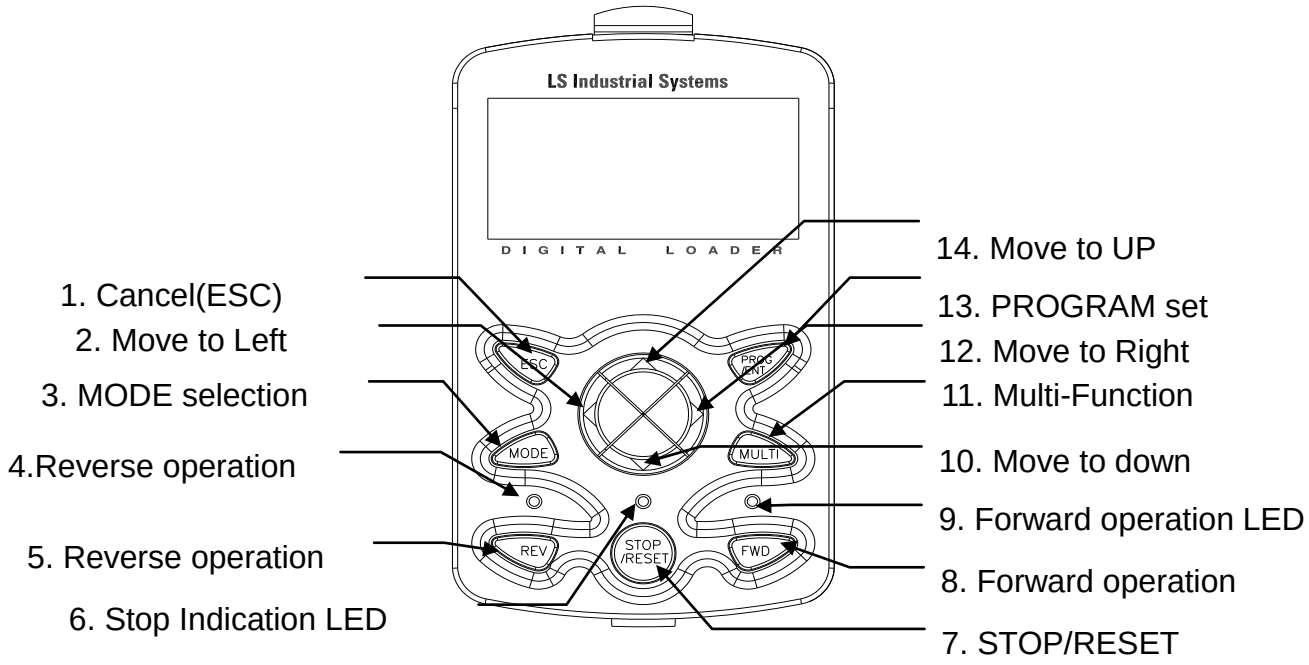
Standard Keypad is used in Inverter parameter setting, Monitor display and Inverter operations.



1) Dimensions



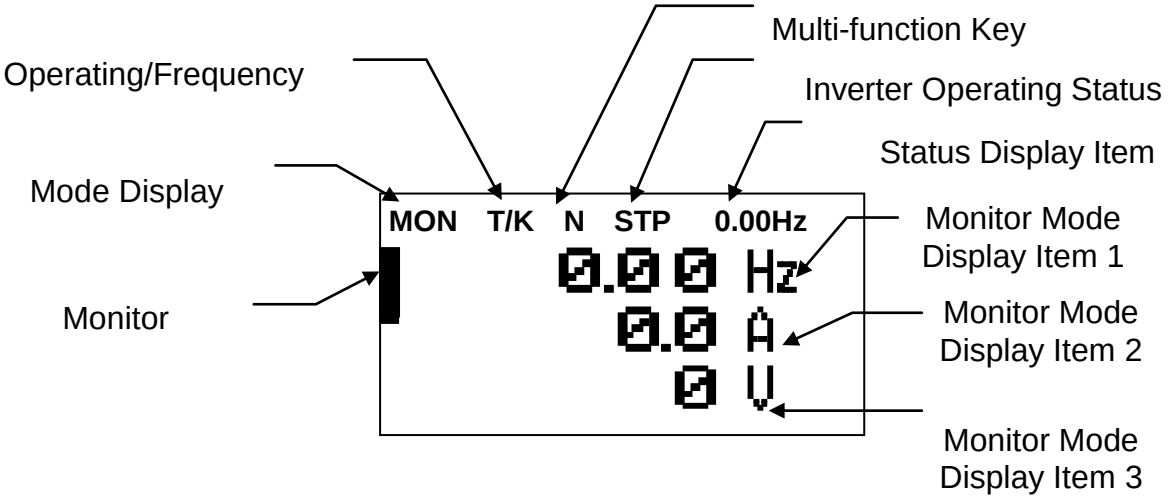
2) Key Functions



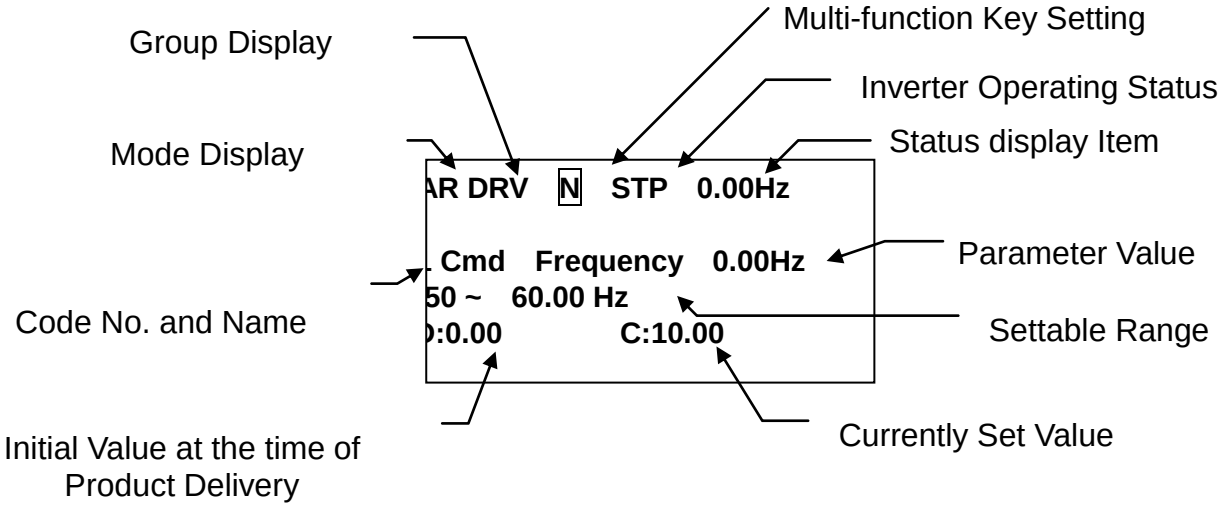
Section	Buttons	Key Name	Function Description
KEY	MODE	Mode Key	- Change MODE
	PROG /ENT	Program Key	- Write, change and save data in parameter codes.
		Up key	- Used when writing data or move codes.
		Down Key	
		Left/Right Key	- Movement among groups. - Movement of cursor in writing.
	MULTI	Multi Function Key	- Register Jog or User codes.
	ESC	Cancel Key	- In writing, it is possible to use saved data previously if press this button before pressing Program Key. - Move to first code when code moving is required in a group. - Move to Monitor mode when Mode moving.
	FWD	Forward Key	- Motor rotates Forward direction.
	REV	Reverse Key	- Motor rotates Reverse direction.
	STOP /RESET	Stop/Reset Key	- Stop Under operating. - Trip release when a trip occurs.

3) Composition of Display

(1) Monitor Mode



(2) Parameter change display



4) Display Item List

(1) Mode Display Items : see “Mode shift” on this chapter 5.1.3.

(2) Group Display Items : see “Group shift” on this chapter 5.1.4.

(3) Operation Command/Frequency Command Display Items (Type of Seq and number of steps are displayed during auto sequence operation

(4) Monitor Display Items

No	Function	Display	Description
1	Mode Display	MON	Monitor Mode
		PAR	Parameter Mode
		U and M	USR & Macro Mode
		TRP	Trip Mode
		CNF	Config Mode
2	Operating Command	K	Keypad operation command
		O	FBus Option operation command
		A	Application Option operation command
		R	Built-in 485 operation command
		T	Terminal block operation command
3	Frequency Command	K	Keypad frequency command
		V	V1 input frequency command
		I	I1 input frequency command
		P	Pulse input frequency command
		U	Frequency command during UP operation (Up-Down operation)
		D	Frequency command during DOWN operation (Up-Down operation)
		S	Frequency command during STOP operation (Up-Down operation)
		O	FBus Option frequency command
		X	V2, I2 frequency command of sub-terminal block
		J	Jog frequency command
		R	Internal 485 frequency command
		1~9 A~F	Sequential frequency command
4	Multi Function Key Setting	JOG Key	Used for shift to Keypad JOG mode
		Local/Remote	Used to select local or remote operation
		UserGrp SelKey	Used to register parameters as a user group in the parameter mode or delete parameters in the user group.
5	Inverter	STP	Motor stopped

No	Function	Display	Description
	Operating Status	FWD	Operating forward
		REV	Operating reversely
		DC	DC output
		WAN	Warning
		STL	Stalling
		SPS	Speed Search
		OSS	SW OC controlled
		OSH	HW OC controlled
		TUN	Auto Tuning

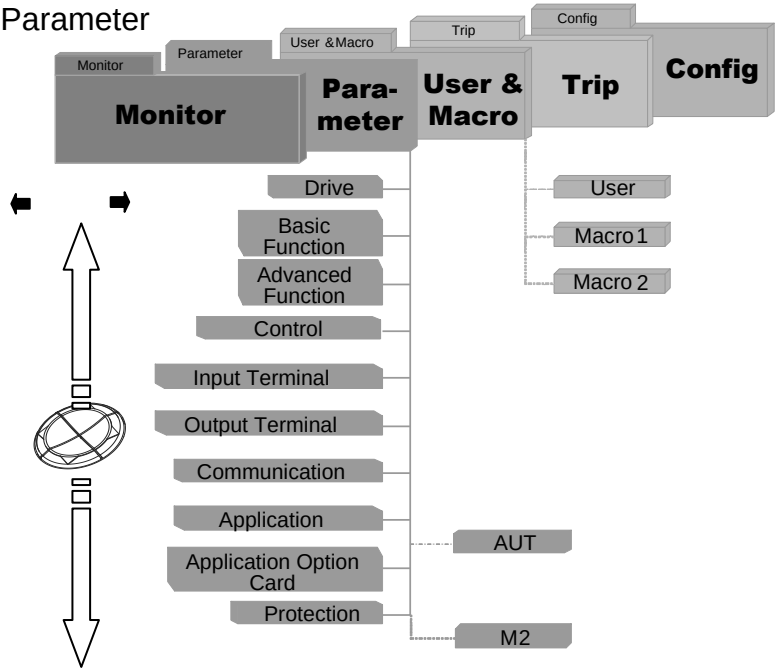
(5) Status Display Items: see “Operating status monitoring” on this chapter 5.1.7.
(6) Monitor Mode Display Items: see “Operating status monitoring” on this chapter 5.1.7.

5.1.2 Menu composition

MDHP series inverter consists of the following 5 modes. Each mode has its own function items suitable for the properties and especially the parameter mode displays the functions necessary for inverter operation in groups.

Group movable by MODE Key
Ex) Monitor→Parameter

Movable by left / right key in Parameter Group
Ex) Drive→Basic Function



Mode	Display	Description
Monitor mode	MON	Displays information on the operating status of the inverter. Can monitor frequency setting, operating frequency display, output current and voltage, etc.
Parameter mode	PAR	Can set functions necessary for operation. Divided into a total of 12 groups, each suitable for the functional difficulty and objective.
User and Macro mode	U and M	You can group only necessary functions by using user group and macro group. This is not displayed when the user code is not registered or when the user/macro mode shifts with the mode key unless the macro is not selected.

Mode	Display	Description
Trip mode	TRP	In case of a failure during operation, the failure type and information on the operating frequency/current/ voltage at the time of the failure occurring are displayed. You can also monitor the type of the trips that previously occurred. Trip Mode is not displayed when there is no previous failure history during normal operation.
Config mode	CNF	You can set the use environment for the inverter itself that is not directly related to operating functions such as keypad language selection, monitor mode environment selection, display of the option card type mounted on the inverter, parameter initialization and copying.

1) Parameter mode

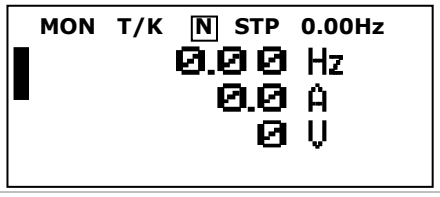
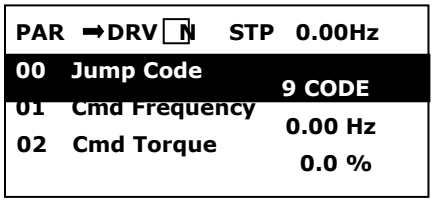
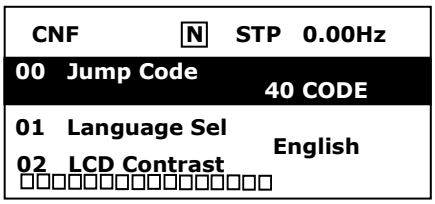
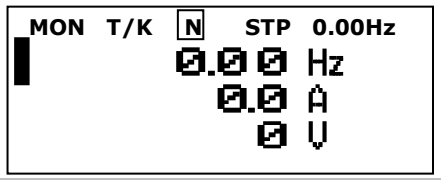
Mode	Display	Description
Drive group	DRV	Has functions necessary for operation including frequency/acceleration/deceleration time setting and operation command selection, etc.
Basic group	BAS	Can set the basic functions such as the motor parameter and sequential frequency, etc.
Advanced function group	ADV	Can set the acceleration/deceleration pattern and frequency control function, etc.
Control function group	CON	Can set functions related to sensorless and vector control.
Input terminal function group	IN	Can set functions related to the inverter input terminal block including multi-function digital input and analog input.
Output terminal function group	OUT	Can set the inverter output terminal block functions such as the relay and analog output.
Communication function group	COM	Sets the functions related to built-in 485 communication and communication option card in such a case.
Application function group	APP	Sets functions such as PID control and auto sequence operation.
Auto Sequence run group	AUT	This group is displayed if Auto Sequence Group in APP is selected and sets the functions necessary for auto sequence operation.

Mode	Display	Description
Application option group	APO	Sets functions related to the encoder option and PLC option card, if they are used.
Protection group	PRT	Can set functions for protecting the motor and inverter.
Motor 2 function group(Motor 2)	M2	This group is displayed if you select Motor #2 among the multi-function input terminal functions and sets functions related to Motor #2.

2) User and Macro mode

Group	Display	Description
User group	USR	Of the function items of each group of the parameter mode, the items that need to be monitored or that are frequently set by the user are grouped and displayed. It is registered by using the multi-function key of the keypad.
Macro group	MCx	The functions necessary for the inverter according to the load type can be grouped and selected at the time of delivery from the factory. If the user selects a desired operation type, the groups displayed in MC1 or MC2 are shown. You can select them in CNF Mode. For more details, see 8-48 page, 8.1.31 Addition to Macro group in detailed user's manual from website.

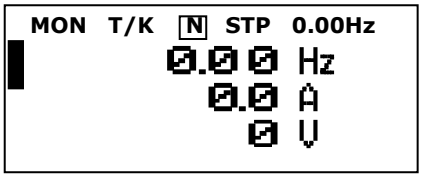
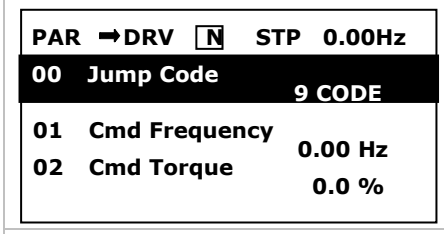
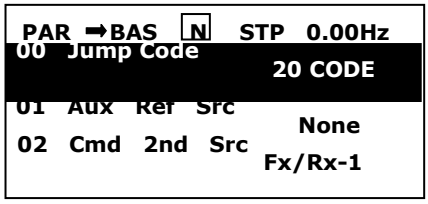
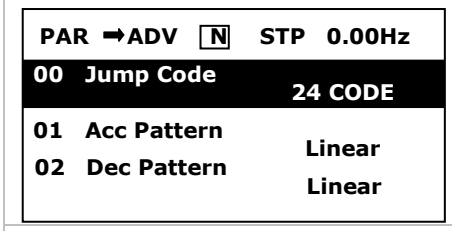
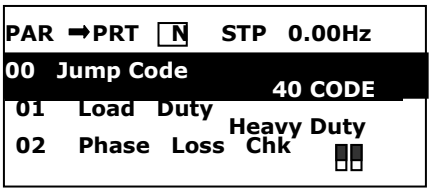
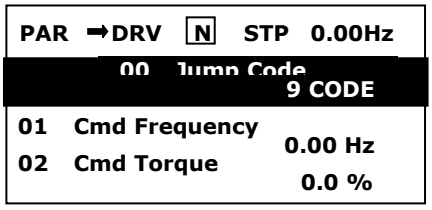
5.1.3 Mode shift

	- Power on, a display emerges as shown on the left. The present mode is the monitor mode. - Press Mode key once.
	- You have shifted to Parameter Mode. - Press Mode key once.
	- You have shifted to Config Mode. - Press Mode key once.
	- You come back to Monitor Mode.

5.1.4 Group shift

1) Group Shift in Parameter Mode

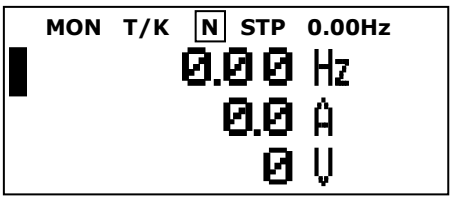
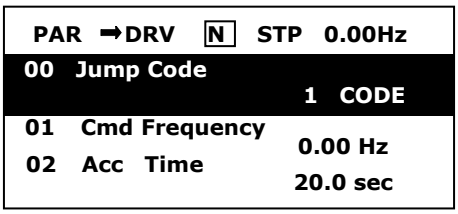
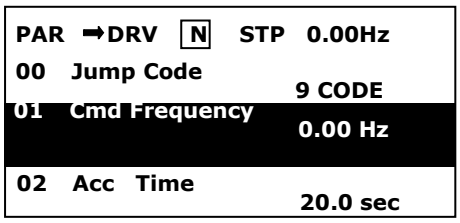
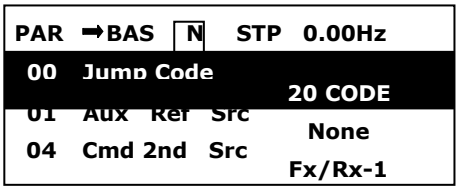
If you press Right key in the Parameter Mode, the display changes as follows. If you press Left key, the display order will be reversed.

	- Power on, a display emerges as shown on the left. The present mode is the monitor mode. - Press Mode key once.
	- You have shifted to Parameter Mode. - The drive group of Parameter Mode is being displayed. - Press Right key once.
	- You shift to Basic Function Group(BAS). - Press Right key once.
	- You shift to Advanced Function Group(ADV). - Press Right Shift key 7 times.
	- The group changed in sequence, PRT is displayed. - Press Right Shift key once.
	- You come back to the Drive Group(DRV) of Parameter Group.

5.1.5 Code (Function Item) shift

1) Code shift (function Items) in modes and groups

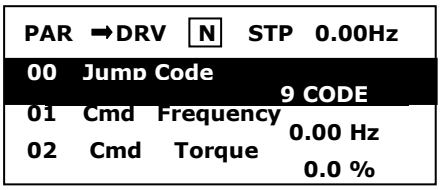
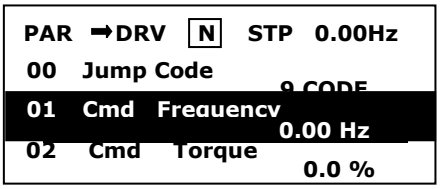
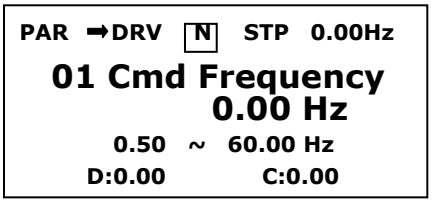
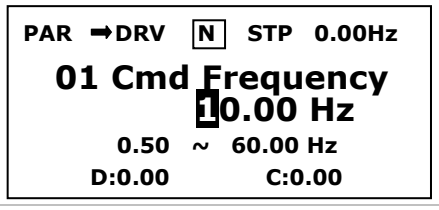
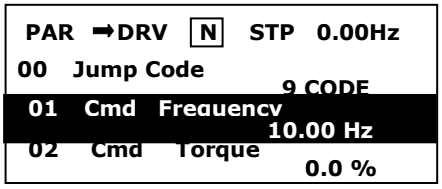
Using Up and Down keys: The following figures give an example of shifting the code by using Up and Down keys in DRV and BAS of Parameter Mode. Code shift in other modes are the same.

	- Power on, the display emerges as on the left. The present mode is Monitor Mode (MON). - Press Mode key once.
	- The display shows DRV of Parameter Mode. If DRV is not displayed, press Mode key until DRV emerges or press ESC once.
	- If you press Down key, you will shift to code No. 0 in DRV of Parameter Mode as shown on the left. - Press Right key once.
	- You shift to BAS of Parameter Mode. - You can shift the code by using Up or Down key.

5.1.6 Parameter setting

1) Parameter setting in modes and groups

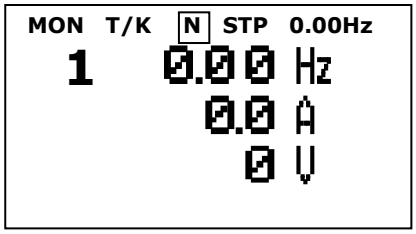
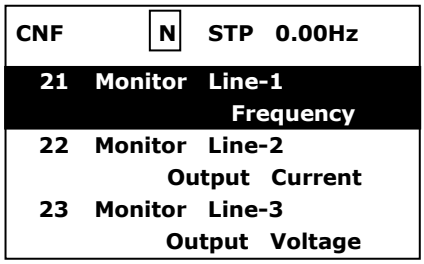
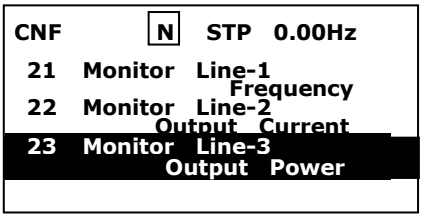
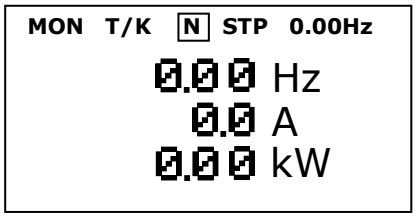
This gives an example of changing frequency in the Drive Group of Parameter Mode. You can do so too in other modes or groups.

	- This is the initial display of Parameter Mode. - Press Down key.
	- You have shifted to 01 frequency setting code. - Press PROG.
	- The cursor flashes so that you can enter frequency. - If you want to set the frequency at 10Hz, move the cursor to the desired place using Left/Right keys.
	- Enter 10Hz using Up key and press PROG.
	- The desired frequency has been changed to 10Hz.

5.1.7 Operating status monitoring

1) Using monitor mode

You can monitor 3 items at a time in Monitor Mode. Some items including frequency can be edited. Displayed items can be selected by the user in Config Mode(CNF).

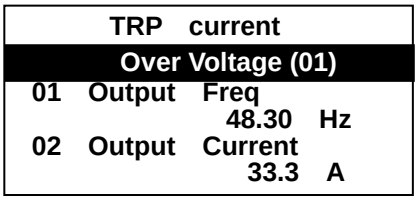
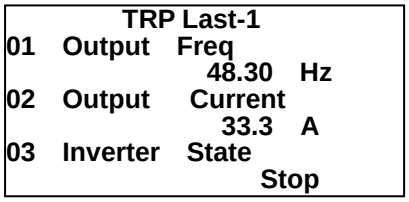
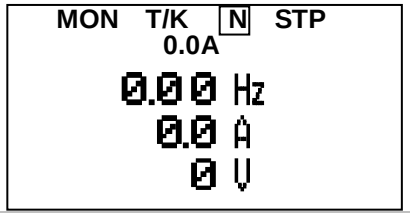
	- This is the initial display of Monitor Mode. - The frequency, current and voltage are set as the default monitor items at the time of product delivery. - Of the displayed items, for frequency, the goal frequency is displayed during stop and operating frequency during operation.
	- You can set the items to display in Monitor Mode in sequence at 21~23 in CNF. - Move to 23 using Down key.
	- Change the 23 item in Monitor Mode to output power.
	- The third displayed item in Monitor Mode has been changed to output power.

2) Possible to monitoring items

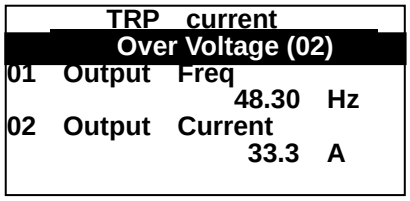
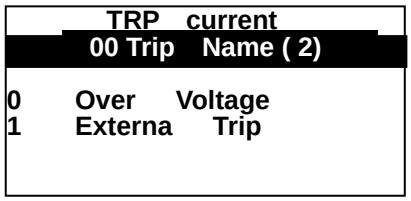
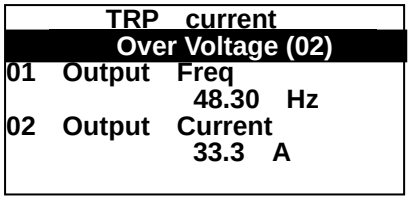
Mode	Code	Function Display	Setting Range		Initial Value
CNF	20	Anytime Para	0	Frequency	0 : Frequency
	21	Monitor Line-1	1	Speed	0 : Frequency
	22	Monitor Line-2	2	Output Current	2 :Output Current
	23	Monitor Line-3	3	Output Voltage	3 :Output Voltage
			4	Output Power	
			5	WHour Counter	
			6	DCLink Voltage	
			7	DI State	
			8	DO State	
			9	V1 Monitor[V]	
			10	V1 Monitor[%]	
			11	I1 Monitor[mA]	
			12	I1 Monitor[%]	
			13	V2 Monitor[V]	
			14	V2 Monitor[%]	
			15	I2 Monitor[mA]	
			16	I2 Monitor[%]	
			17	PID Output	
			18	PID ref Value	
			19	PID Fdb Value	
			20	Torque	
			21	Torque Limit	
			22	Trq Bias Ref	
			23	Speed Limit	
			24	Load Speed	
			25	Temperature	

5.1.8 Failure status monitoring

1) Failure during operation

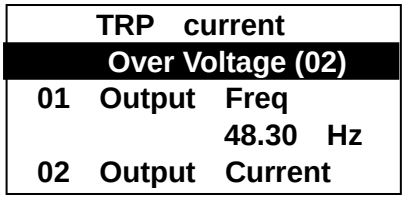
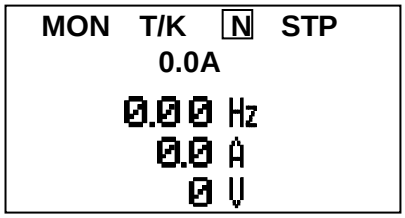
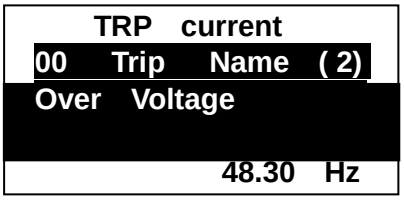
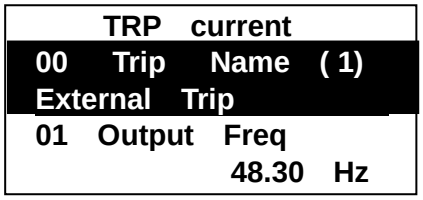
	- In case of a failure during operation, the mode automatically shifts to Trip Mode and the type of the current failure is displayed.
	- If you press Down key, the output frequency, current and operating status at the time of the failure occurring are displayed.
	- If the failure status is terminated by Reset, the keypad before the failure comes back.

2) Multiple failures at a time

	- In case of multiple failures, the number of failures is displayed next to the failure type. - Press PROG.
	- The type of failures is displayed. - Press PROG.
	- The display mode before failure checking comes back.

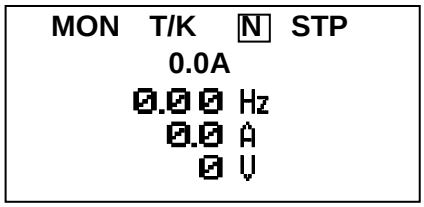
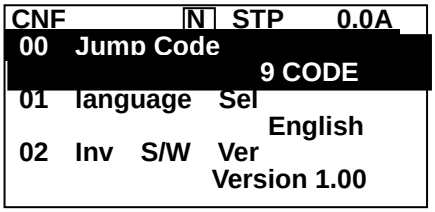
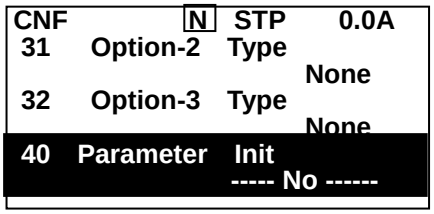
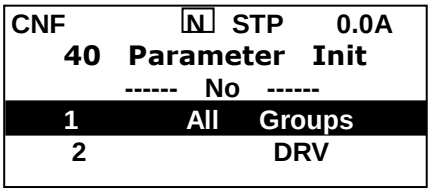
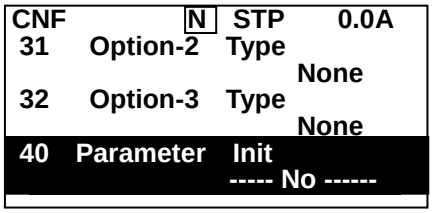
3) Saving and monitoring of failure history

Previous failures are saved in Trip Mode. Up to 5 failures can be saved. Failure history is saved not only by Reset but also in case of a low voltage failure due to power off.
If the number of failure exceeds 5, the failures before the latest 5 ones are automatically deleted.

	- In case of a failure during operation, the mode automatically shifts to Trip Mode with the trip displayed.
	- If you press Reset or the terminal is entered, the failure above is automatically saved and the display goes back to the place before the failure. - Move to Trip Mode using Mode key.
	- The most recent failure is saved in Last-1 code. - Press Right key.
	- A previous failure is saved in Last-2 code. - If another failure occurs, what was in Last-2 moves to Last-3.

5.1.9 How to initialize parameter

You can initialize the parameter that has been changed by the user to the initial state at the time of delivery. Not only the entire parameter but a group of the parameter mode can be selected and initialized.

	- Monitor Mode is displayed.
	- Shift to CNF by using Mode key.
	- Shift to code 40 using Down key. - Press PR OG.
	- Of the Parameter items to initialize, select All Groups and press PROG.
	- Initialization finished, you come back to the initialization selection display.

6.1Basic Functions

6.1.1 How to set frequency (When you want to set frequency)

Group	Code No.	Function Display	Initial Display	
DRV	07	Freq Ref Src	0	KeyPad-1
			1	KeyPad-2
			2	V1
			3	I1
			4	V2
			5	I2
			6	Int 485
			7	Encoder
			8	Fied Bus
			9	PLC

Select the frequency setting method in code 07 of DRV Group. Digital setting by using the keypad, analog setting by using voltage (V1) and current (I1) input of the control terminal block and built-in RS485 port or communication option are available for operating frequency setting from the external controller.

1) Frequency Setting Using Keypad 1 : KeyPad-1

Group	Code No.	Function Display	Initial Setting		Setting Range	Unit
DRV	01	Cmd Frequency	-	0.00	0.00~Max Frequency	Hz
	07	Freq Ref Src	0	KeyPad-1	0~9	-

You can change the frequency by changing the frequency using the keypad and pressing PROG.
Set DRV group 07 at KeyPad-1. The frequency changes is saved in the memory if you change the frequency at DRV group 01 and press PROG.

2) Frequency Setting Using Keypad 2 : KeyPad-2

Group	Code No.	Function Display	Setting Displayed		Setting Range	Unit
DRV	01	Cmd Frequency	-	0.00	0.00~Max Frequency	Hz
	07	Freq Ref Src	1	KeyPad-2	0~9	-

You can change the frequency using Up and Down keys on the keypad. Set DRV group 07 at KeyPad-2.
Frequency is changed if you press PROG in DRV Group 01 and then press Up or Down. If you press PROG, it will be saved in the memory and if you press ESC, it will not be saved.

3) Frequency setting by voltage input (V1 terminal) of the terminal block: V1

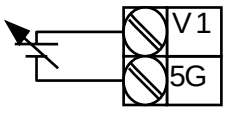
Group	Code No.	Function Display	Setting Displayed		Unit
DRV	07	Freq Ref Src	2	V1	-

Enter -10~+10V or 0~+10V using the voltage (V1) input terminal of the terminal block. If you enter -10~+10V, you can change the revolution direction of the motor according to the symbol of the voltage signals.

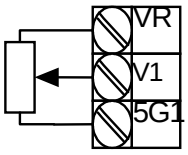
(1) If you enter 0~+10V,

Group	Code No.	Function Display	Setting Displayed		Setting Frequency	Unit
DRV	07	Freq Ref Src	**2**	V1	-	-
IN	01	Freq at 100%	-	50.00	0.00~ Max Frequency	Hz
	05	V1 Monitor	-	0.00	0~10	V
	06	V1 Polarity	0	Unipolar	Unipolar/Bipolar	-
	07	V1 Filter	-	10	0~10000	msec
	08	V1 volt x1	-	0.00	0~10	V
	09	V1 Perc adj y1	-	0.00	0~100	%
	10	V1 Volt x2	-	10.00	0~10	V
	11	V1 Perc adj y2	-	100.00	0~100	%
	16	V1 Inverting	-	No	No/Yes	-
	17	V1 Quantizing	-	0.04	0.04~10	%

Set No.06 of the input terminal block group (IN) at Unipolar. Enter the volume resistance into the V1 terminal by using the voltage output of the external voltage output or VR output terminal of the inverter control terminal block as follows.



When connecting external power source



When connecting internal power source

(2) If you use 0~+10V of the external circuit,

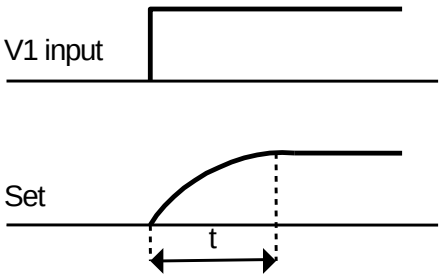
If the volume resistance is connected to the terminal block (IN-01 Freq at 100%) : set the operating frequency of the maximum voltage input. Set the operating frequency of which the values set in the input terminal block function group (IN) No. 11 or 15 is 100%.

E.g.1) When IN-01 is 40.00 and the default value is set to IN-16, if 10V is input into the V1 terminal, operation is at 40.00Hz.

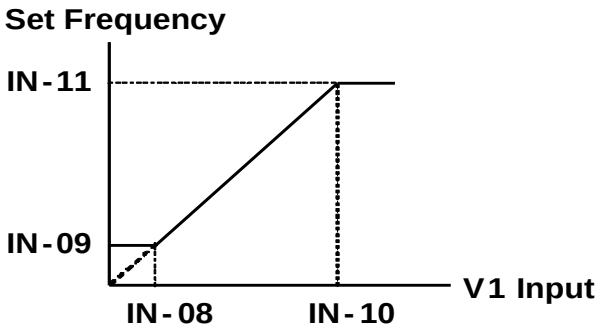
E.g.2) When IN-11 is 50% and the default value is set between IN-01 and IN-16, if 10V is input into the V1 terminal, operation is at 25.00Hz (50% of max 50Hz).

IN-05 V1 Monitor : displays the voltage input into the V1 terminal. This is used for monitoring the currently input voltage.

IN-07 V1 Filter : used when the set frequency value fluctuates greatly due to the environment such as noise. If you set the filter time constant high, you can reduce the frequency fluctuation but the response gets slower. The higher the time constant is, the time (t) becomes longer. The set time refers to the time it takes the frequency set in the inverter to increase by up to about 63% when the voltage input is input by step as follows.



IN-08 V1 Volt X1 ~ IN-11 V1 Perc y2: You can set the slope and offset value for the input voltage.

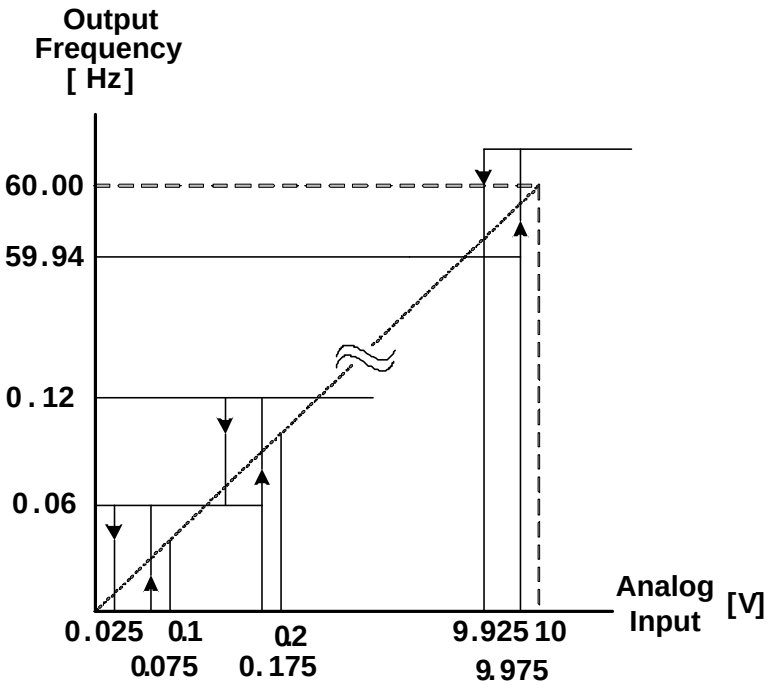


IN-16 V1 Inverting : If you set at No. 1 Yes, you can reverse the present revolution direction.

IN-17 V1 Quantizing : used when there is a lot of noise in the analog signals input into the terminal. You can also reduce noise to some extent by using the IN-07 low pass filter value but the higher the value is, the responsiveness becomes slower and pulsation of a long cycle might occur. The resolving power of output frequency for analog input decreases but the noise effect is reduced by the quantizing function in a system sensitive to noise.

The set quantization value is the percentage of the maximum analog input value. Therefore if the maximum input value is 10V and the quantization value is set at 1%, the frequency changes by 0.05Hz (when the maximum frequency is 50Hz) at an interval of 0.1V. The output frequency when the input value increases and decreases differs so that the effect of analog input value fluctuation is removed.

If the quantization value is quadrisect and the analog input value increases, when a value three fourths the quantization value is input, the output frequency changes and from the next step it increases along with the quantization value as follows. If the analog input value decreases by 1/4 of the quantization value, the output frequency changes.

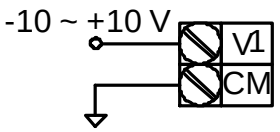


(3) If -10~+10V is input,

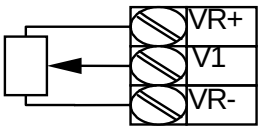
Group	Code No.	Function Display	Setting Displayed		Setting Range	Unit
DRV	07	Freq Ref Src	2	V1	-	-
IN	01	Freq at 100%	-	50.00	0.00~Max. Freq.	Hz
	05	V1 Monitor	-	0.00	0~10V	V
	06	V1 Polarity	1	Bipolar	Unipolar/ Bipolar	-
	12	V1 -volt x1'	-	0.00	0~10V	V
	13	V1 -Perc y1'	-	0.00	0~100%	%
	14	V1 -Volt x2'	-	-10.00	0~10V	V
	15	V1 -Perc y2'	-	-100.00	0~100%	%

Set IN-06 at Bipolar. Codes between 12 and 15 are displayed only when they are Bipolar and you can set the voltage between 0 and 10V which is input into the V1 terminal.

As follows, input into the V1 terminal in volume resistance by using the voltage output of the external controller or the VR output terminal of the inv erter control terminal block.

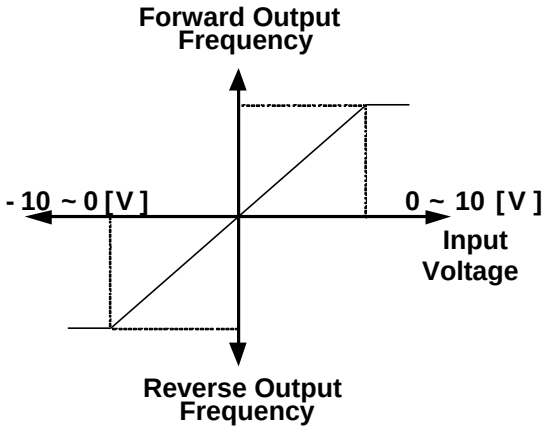


When -10~10V is used from the external circuit

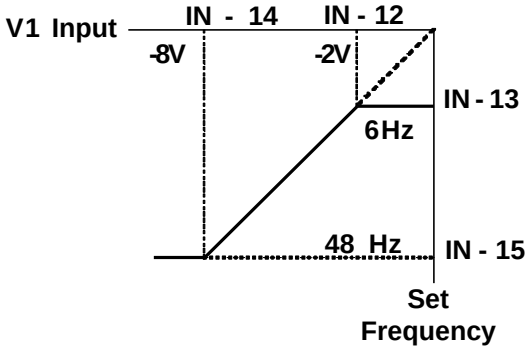


When connecting inner power source

The output frequency of bipolar voltage input (-10~+10V) is as follows.



IN-12 V1 –volt x1'~ IN-15 V1 –Perc y2': You can set the slope and offset value of the output frequency of (-) input voltage as follows.
E.g.) If the minimum (-) input voltage if V1 is -2V, the output ratio of -2V is 10% and maximum voltage is -8V and then you set the output ratio at 80%, the output frequency moves between 6Hz~48Hz.



For setting of 0~+10V, see IN-08 V1 Volt X1 ~ IN-11 V1 Perc y2.

The selection of keypad or terminal block directions and motor rotation by bipolar voltage input is shown in the following table.

Operating Command	Voltage Input	
	0~10V	-10~0V
FWD	FWD	REV
REV	REV	FWD

4) Frequency setting by current input into terminal block (I1 Terminal)

Group	Code No.	Function Display	Setting Displayed		Setting Range	Unit
DRV	07	Freq Ref Src	3	I1	-	-
IN	01	Freq at 100%	-	50.00	0.00~ Max Freq	Hz
	20	I1 Monitor	-	0.00	0~20	mA
	22	I1 Filter	-	10	0~10000	msec
	23	I1 Curr x1	-	4.00	0~20	mA
	24	I1 Perc y1	-	0.00	0~100	%
	25	I1 Curr x2	-	20.00	0~20	mA
	26	I1 Perc y2	-	100.00	0~100	%
	31	I1 Inverting	0	No	No/Yes	-
	32	I1 Quantizing	-	0.04	0.04~10	%

Select I1 in DRV Group 07. Input current of 0~20mA into the I1 terminal of the terminal block to set frequency.

IN-01 Freq at 100% : sets the operating frequency at the maximum current input. The operating frequency when the value set in IN-26 is 100% is set.

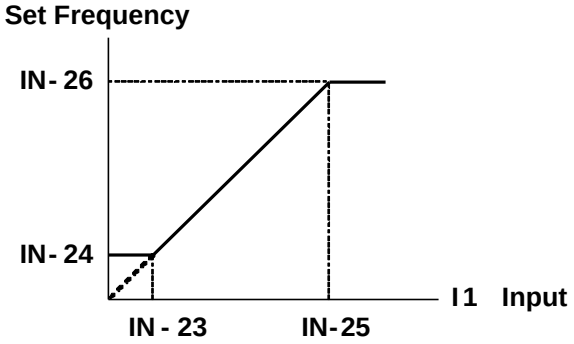
E.g.1) If IN-01 is 40.00 and IN-23~26 is set at the default value, when 20mA is input into the I1 terminal, the operation is at 40.00Hz.

E.g.2) If IN-26 is 50% and IN-01, 23~26 are set at the initial value, when 20mA is input into the I1 terminal, the operation is at 30.00Hz.

IN-20 I1 Monitor : displays the current input into the I1 terminal. This is used for monitoring the current input at the moment.

IN-22 I1 Filter : The set time refers to the time it takes the input current which has been step input to reach about 63% of the I1 value that has been step input in the inverter.

IN-23 I1 Curr x1 ~ IN-26 I1 Perc y2 : You can set the slope of the output frequency and offset value against the current as follows.



IN-31 I1 Inverting : You can turn the direction of the rotation.

IN-32 I1 Qunatizing : the same as quantizing function of IN-17. See "IN-17 V1 Quantizing" on page 6-3 in detailed user's manual from website.

5) Frequency command by advanced I/O option card

You can input the frequency command by using -10~+10V (V2 terminal) and 0~20mA (I2terminal) if you mount an extended I/O card on the inverter option slot.

▶ -10~+10V Input

Group	Code No.	Function Display	Setting Displayed		Setting Range	Unit
DRV	07	Freq Ref Src	4	V2	-	-
IN	35	V2 Monitor	-	0.00	0~20	mA
	37	V2 Filter	-	10	0~10000	msec
	38	V2 Volt x1	-	0.00	0~10V	V
	39	V2 Perc y1	-	0.00	0~100	%
	40	V2 Volt x2	-	10.00	0~10	V
	41	V2 Perc y2	-	100.00	0~100	%
	42	V2 -Volt x1'	-	0.00	0~10	V
	43	V2 -Perc y1'	-	0.00	0~100	%
	44	V2 -Volt x2'	-	-10.00	0~10	V
	45	V2 -Perc y2'	-	-100.00	-100~0	%
	46	V2 Inverting	0	No	No/Yes	-
	47	V2 Quantizing	-	0.04	0.04~10	%

The voltage input of the extended I/O inputs bipolar voltage at -10V ~ +10V. Its operating method is the same as the Bipolar input of the V1 terminal, which was described on page 6-2 in detailed user's manual from website.

▶0 ~ 20mA Input

Group	Code No.	Function Display	Setting Displayed		Setting Range	Unit
DRV	07	Freq Ref Src	5	I2	-	-
IN	50	I2 Monitor	-	0.00	0~20	mA
	52	I2 Filter	-	15	0~10000	msec
	53	I2 Curr x1	-	4.00	0~20	mA
	54	I2 Perc y1	-	0.00	0~100	%
	55	I2 Curr x2	-	20.00	4~20	mA
	56	I2 Perc y2	-	100.00	0~100	%
	61	I2 Inverting	-	No	No/Yes	-
	62	I2 Quantizing	-	0.04	0.04~10	%

See the description of the I1 terminal on Page 6- 6in detailed user's manual from website.

6) Frequency setting by Encoder Option Card (If you want use pulse input to frequency command)

Group	Code No.	Function Display	Setting Displayed		Setting Frequency	Unit
DRV	07	Freq Ref Src	7	Encoder	-	-
IN	01	Freq at 100%	-	50.00	0.00~Max. Freq.	Hz
APO	01	Enc Opt Mode	2	Reference	0~2	-
	04	Enc Type Sel	0	-	0~2	-
	05	Enc Pulse Sel	2	A	0~2	-
	06	Enc Pulse Num	-	-	10~4096	-
	09	Pulse Monitor	-	-	-	kHz
	10	Enc Filter	-	10	0~10000	msec
	11	Enc Pulse x1	-	0.0	0~100	kHz
	12	Enc Perc Y1	-	0.00	0~100	%
	13	Enc Pulse x2	-	100.0	0~100	kHz
	14	Enc Perc y2	-	100.00	0~100	%

If you mount the encoder option card on the main body of the inverter, the code is displayed from APO-01.

APO-01 Enc Opt Mode, APO-05 Enc Pulse Sel : Select No.2 Reference for APO-01 in order to set the frequency with the encoder. Set APO-05 at No.2 A.

APO-04 Enc Type Sel, APO-06 Enc Pulse Se l : inputs the output method and number of pulses in harmony with the encoder specification.

APO-10 Enc Filter ~ APO-14 Enc Perc y2 : sets the filter time constant and minimum and maximum input frequency of the encoder input. The output frequency corresponding to the encoder input frequency is the same as that of voltage (V1) or current (I1) input.

APO-09 Pulse Monitor: displays the frequency of the pulse which is input when APO-01 Enc Opt Mode is set as Reference.

7) Frequency setting by RS-485 Communication : Int 485

Group	Code No.	Function Display	Setting Displayed		Setting Frequency	Unit
DRV	07	Freq Ref Src	6	Int 485	-	-
COM	01	Int485 St ID	-	1	0~250	-
	02	Int485 Proto	0	ModBus RTU	0~2	-
			1	ModBus ASCII	0~2	-
			2	LS Inv 485	0~2	-
	04	Int485 BaudR	3	9600	1200~38400	bps
	07	Int485 Mode	0	D8 / PN / S1	0~3	-
			1	D8 / PN / S2	0~3	-
			2	D8 / PE / S1	0~3	-
			3	D8 / PO / S1	0~3	-

If you set DRV-07 Freq Ref Src at Int 485, you can control the inverter through communication with the higher controller (PLC or PC) by using the RS485 (+S, -S) terminal of the terminal block. For details, see Communication Functions, Chapter 11.

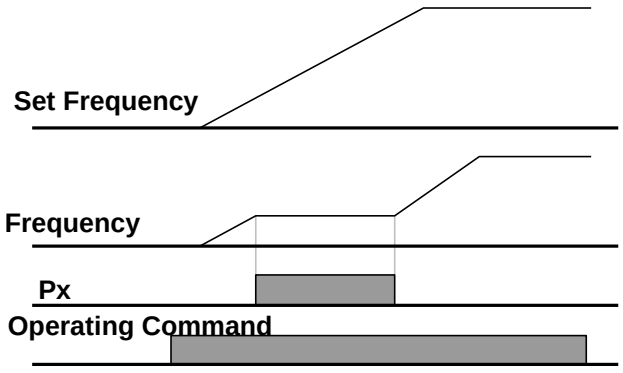
Note: Please refer to User manual for communication options such as Profibus, Device-net, and PLC options.

6.1.2 Analog command frequency fixation

Group	Code No.	Function Display	Setting Displayed		Setting Range	Unit
DRV	07	Freq Ref Src	0	Keypad-1	0~9	-
			1	Keypad-2	0~9	-
			2	V1	0~9	-
			3	I1	0~9	-
			4	V2	0~9	-
			5	I2	0~9	-
			6	Int 485	0~9	-
			7	Encoder	0~9	-
			8	Fied Bus	0~9	-
			9	PLC	0~9	-
IN	65~75	*Px Define	21	Analog Hold	65~75	-

*Px : P1~P8, P9~P11 (option)

This is the function of fixing the operating frequency when the terminal selected as the Analog Hold among the multi-function terminals if you set the frequency by using the analog input of the control terminal block.



6.1.3 Changing frequency to revolution

If you set the Hz/Rpm Sel value at "1: Rpm Display, the frequency will change into revolution.

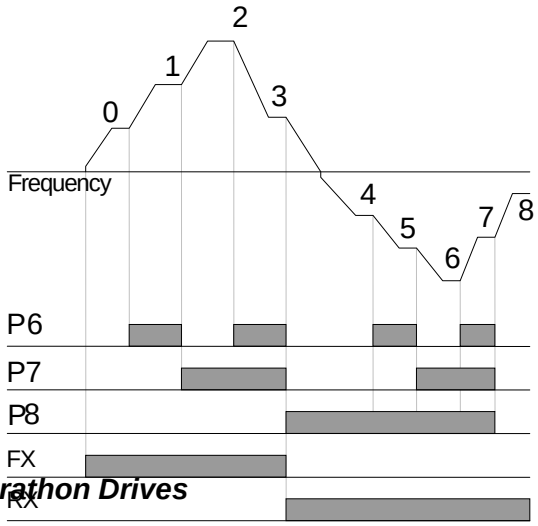
Group	Code No.	Function Display	Setting Displayed		Setting Range	Unit
DRV	21	Hz/Rpm Sel	1	Rpm Display	-	rpm

6.1.4 Sequential frequency setting

Group	Code No.	Function Display	Setting Displayed		Setting Range	Unit
DRV	07	Freq Ref Src	-	-	-	-
BAS	50~64	Step Freq - x	-	-	--	Hz
IN	65~75	Px Define	7	Speed-L	-	-
			8	Speed-M	-	-
			9	Speed-H	-	-
			10	Speed-X	-	-
	89	InCheck Time	-	1	-	msec

*Step Freq – x : Step Freq -1~15, Px: P1~P8, P9~P11 (Option)

Sequential operation is available by using the multi-function terminal. Speed 0 frequency uses the frequency command selected in DRV Group No. 07.
Enter the desired step frequency in codes 50~64 of BAS.
Select the terminal to use as sequential input among multi-function terminals P1~P11 and set one of the sequential functions (Speed-L, Speed-M, Speed-H, Speed-X) for each.
Speed-L, Speed-M, Speed-H and Speed-X are identified as binary codes and operation starts with the frequency set in BAS-50 ~ BAS-64 selected.
If multi-function terminals P6, P7 and P8 are set at Speed-L, Speed-M and Speed-H respectively, you can operate it as follows. In case of Speed-X being used, you can set up to Speed 16 when the highest bit is Speed-X.



Speed	FX or RX	P8	P7	P6
0	✓	-	-	-
1	✓	-	-	✓
2	✓	-	✓	-
3	✓	-	✓	✓
4	✓	✓	-	-
5	✓	✓	-	✓
6	✓	✓	✓	-

7	✓	✓	✓	✓

[**Example of speed-8**]

If multi-function terminals P5, P6, P7 and P8 are set at Speed-L, Speed-M, Speed-H and Speed-X respectively, you can operate it as follows.

Speed	FX or RX	P8	P7	P6	P5
0	✓	-	-	-	-
1	✓	-	-	-	✓
2	✓	-	-	✓	-
3	✓	-	-	✓	✓
4	✓	-	✓	-	-
5	✓	-	✓	-	✓
6	✓	-	✓	✓	-
7	✓	-	✓	✓	✓
8	✓	✓	-	-	-
9	✓	✓	-	-	✓
10	✓	✓	-	✓	-
11	✓	✓	-	✓	✓
12	✓	✓	✓	-	-
13	✓	✓	✓	-	✓
14	✓	✓	✓	✓	-
15	✓	✓	✓	✓	✓

IN-89 In Check Time: If you use the multi-function terminal for sequential frequency setting, you can set the in check time for the terminal block input within the inverter. For example, if you set the in check time at 100msec and input multi-function terminal P6, it will be checked whether another terminal block input is input for 100msec. After 100msec, it is accelerated or decelerated by the frequency corresponding to P6 terminal.

6.1.5 Operating command setting method

Group	Code No.	Function Display	Initial Display	
DRV	06	Cmd Source	0	Keypad
			1	Fx/Rx-1
			2	Fx/Rx-2
			3	Int 485
			4	Field Bus
			5	PLC

Select the operating command setting method in DRV Group code 06. For operating command, other than the basic operation using the keypad and multi-function terminal, you can also use the built-in RS485 communication, Fieldbus and Application Option Card.

1) Keypad Operating Command: KeyPad

Group	Code No.	Function Display	Initial Display		Unit
DRV	06	Cmd Source	0	KeyPad	-

If you set the DRV Group 06 with the keypad, operation starts using the FWD and REV keys on the inverter keypad and stops using Stop key.

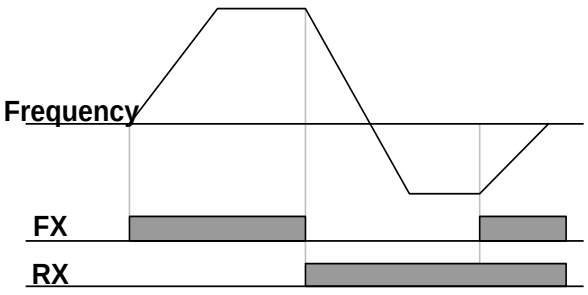
2) Terminal Block operating command 1 : Fx/Rx-1

Group	Code No.	Function Display	Setting Display		Setting Range	Unit
DRV	06	Cmd Source	1	Fx/Rx-1	-	-
IN	65~75	Px Define	1	FX	-	-
	65~75	Px Define	2	RX	-	-
	88	Run On Delay	-	1.00	0.00~100	sec

*Px : P1~P8, P9~P11 (option)

Set DRV Group 06 at Fx/Rx-1. Select the terminal used for FX and RX operating commands among multi-function terminals P1~P11 and set the function of the appropriate terminal of IN 65~75 at FX and RX. It stops if the FX and RX terminals are ON or OFF at the same time.

IN-88 Run On Delay: Operation starts after the set time, too when the FX or RX terminal is input. It can be used where operation start synchronization with an outside sequence is necessary.



3) Terminal Block operating command 2 : Fx/Rx-2

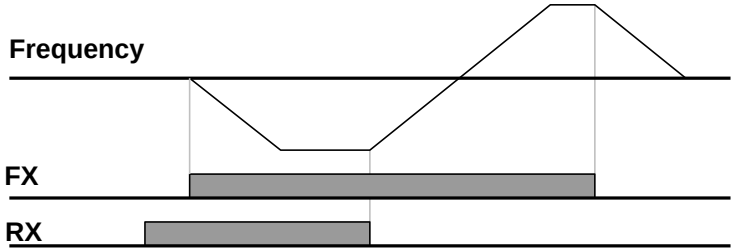
Group	Code No.	Function Display	Setting Display	Setting Range	Unit

DRV	06	Cmd Source	2	Fx/Rx-2	-	-
IN	65~75	Px Define	1	FX	-	-
	65~75	Px Define	2	RX	-	-
	88	Run On Delay	-	1.00	0.00~100	sec

*Px : P1~P8, P9~P11 (option)

FX terminal is used for operating command and RX terminal is for selecting the rotation direction. Set DRV Group 06 at Fx/Rx-2. Select the terminal used for FX and RX operating commands among multi-function terminals P1~P11 and set the function of the appropriate terminal of IN 65~75 at FX and RX.

IN-88 Run On Delay: Operation starts after the set time, too when the FX or RX terminal is input. It can be used where operation start synchronization with an outside sequence is necessary.



4) Operating Command by RS-485 Communication: Int 485

Group	Code No.	Function Display	Setting Display		Setting Range	Unit
DRV	06	Cmd Source	3	Int 485	-	-
COM	04	Int485 St ID	-	1	0~250	-
	05	Int485 Proto	0	ModBus RTU	-	-
	06	Int485 BaudR	3	9600	1200~38400	bps
	07	Int485 Mode	0	D8 / PN / S1	-	-

You can control the inverter through communication with a higher controller (PLC or PC) by using terminal RS485 (+S, -S) on the terminal block if you set DRV-06 Cmd Src at Int 485.

6.1.6 Prevention of forward or reverse rotation: Run Prevent

Group	Code No.	Function Display	Setting Display		Setting Range	Unit
ADV	09	Run Prevent	0	None	0~2	-

You can select a motor rotation direction to prevent.

None : Both forward and reverse are available.

Forward Prev : Forward operation is prevented.

Reverse Prev : Reverse operation is prevented.

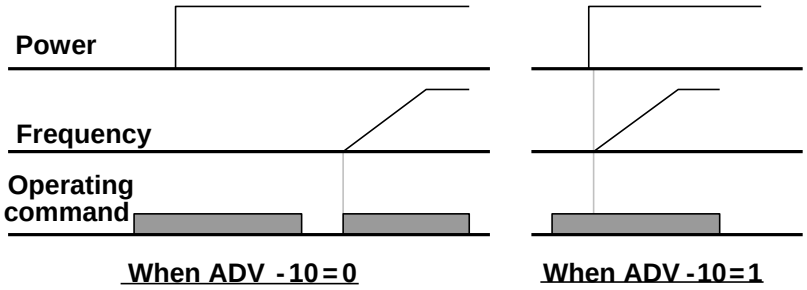
6.1.7 Run immediately with power On: Power-on Run

Group	Code No.	Function Display	Setting Display		Setting Range	Unit
DRV	06	Cmd Source	-	1 ~ 2	-	-
ADV	10	Power-on Run	1	--- yes ---	No/Yes	-

With power supplied to the inverter and the terminal block operating command being ON, the inverter starts operating.

This is effective only when the DRV Group 06 command source is set at 1 (Fx/Rx-1) or 2 (Fx/Rx-2). At this time, if load (Fan load) is on the status of Free-Run, Trip may be occurred while operating. Change the bit 4 to 1 at CON-71 Speed Search and it makes the inverter can start with Speed Search. If not, inverter will be accelerating normal V/F pattern without Speed Search.

If this function is not selected, operation resumes after the operating commands is turned OFF and ON again.



⚠ Caution

Be careful with this function, which causes the motor to rotate as soon as the power is supplied.

6.1.8 Setting of accelerating/decelerating time and pattern

1) Setting of accelerating/decelerating time on the basis of the maximum frequency

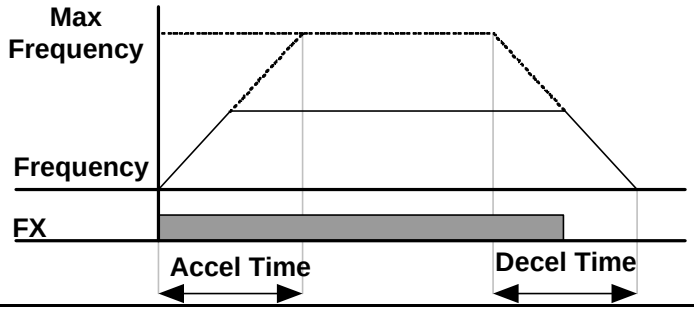
Group	Code No.	Function Display	Setting Display			Setting Range	Unit
DRV	03	Acc Time	-	Below 75kW	20.0	0~600	sec
				Above 90kW	60.0		
	04	Dec Time	-	Below 75kW	30.0	0~600	sec
				Above 90kW	90.0		
	20	Max Freq	-	50.00		0~400	Hz
BAS	08	Ramp T Mode	0	Max Freq		Max Freq/Delta Freq	-
	09	Time scale	1	0.1		0.01/0.1/1	sec

If you set BAS-08 at Max Freq, you can accelerate or decelerate at an equal slope on the basis of the maximum frequency regardless of the operating frequency.

The acceleration time set in DRV-03 is the time it takes the frequency to reach the maximum value from 0 Hz and the deceleration time of 04 is the time it takes the

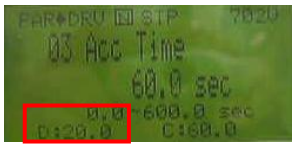
frequency to stop at 0 Hz from the maximum frequency.

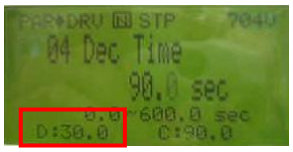
E.g.) If you set the maximum frequency at 50.00 Hz, Acc/Dec time at 5 seconds and operating frequency at 30 Hz, the time required is 2.5 seconds.



Caution

90 ~ 160 kW product's acceleration initial value is 60.0sec and deceleration initial value is 90.0sec. Please do not confuse that displayed value at left bottom of keypad is D : 20.0, D : 30.0 it is applied for below 75kW product.





BAS-09 Time scale : Used when precise Acc/Dec time is required due to the load characteristics or it is necessary to increase the maximum set time. It changes the units of all the functions related to time.

Setting		Range of Acc/Dec Time	Precision
0	0.01 sec	0.00 ~ 60.00	Settable to 0.01 second
1	0.1 sec	0.0 ~ 600.0	Settable to 0.1 second
2	1 sec	0 ~ 6000	Settable to 1 second

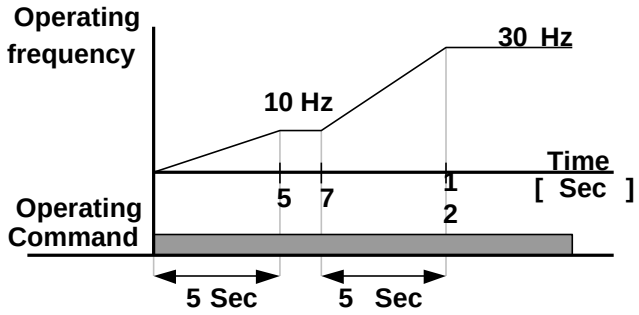
Caution

Be careful because change of the unit leads to change of maximum settable time. If you change BAS-09 Time scale to 0(0.01sec) with Acc time set at 1000.0 seconds, the Acc time becomes 600.00 seconds.

2) Setting of Acc/Dec Time Based on Operating Frequency

Group	Code No.	Function Display	Setting Display		Setting Range	Unit
DRV	03	Acc Time	-	20.0	0~600	sec
	04	Dec Time	-	30.0	0~600	sec
BAS	08	Ramp T Mode	1	Delta Freq	Max Freq/Delta Freq	-

If you set BAS-08 as Delta Freq, you can set the Acc/Dec time by the time it takes the current frequency during operation at steady speed to reach the target frequency of the next step. If you set the Acc time at 5 seconds in case of step operation between 10Hz and 30Hz while it is static, the Acc time is as follows.

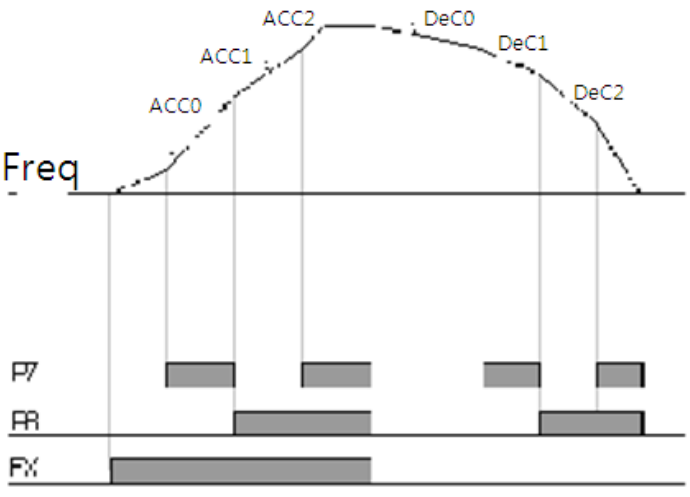


3) Setting of Acc/Dec Time by using Multi-Function Terminal Based on Operating Frequency

Group	Code No.	Function Display	Setting Display			Setting Range	Unit
DRV	03	Acc Time	-	Below 75kW	20.0	0~600	sec
				Above 90kW	60.0		
DRV	04	Dec Time	-	Below 75kW	30.0	0~600	sec
				Above 90kW	90.0		
BAS	70~82	Acc Time-x	-	x.xx		0~600	sec
BAS	71~83	Dec Time-x	-	x.xx		0~600	sec
IN	65~75	Px Define	11	XCEL-L		-	-
IN	65~75	Px Define	12	XCEL-M		-	-
IN	65~75	Px Define	49	XCEL-H		-	-
IN	89	In Check Time	-	1		1~5000	msec

* Acc Time-x : Acc Time-1~3, Dec Time-x: Dec Time-1~3

Using the multi-function terminal, you can change deceleration time.
You can set the time of acc/dec - 0 in Drive Group -03 and -04 and the time of acc/dec – 1~3 in Drive Group -70 ~75.
Choose the terminal for using acc/dec time command between multi-function terminals(P1~P11), and one of the multi- acc/dec command should be set.
XCEL-L and XCEL-M are recognized as a binary code, the acc/dec time will be operated as set in BAS-70~75.
Multi-function terminal P7and P8, respectively, operate as below if XCEL-L and XCEL-M are set.



Acc/Dec Time	P8	P7
0	-	-
1	-	✓
2	✓	-
3	✓	✓

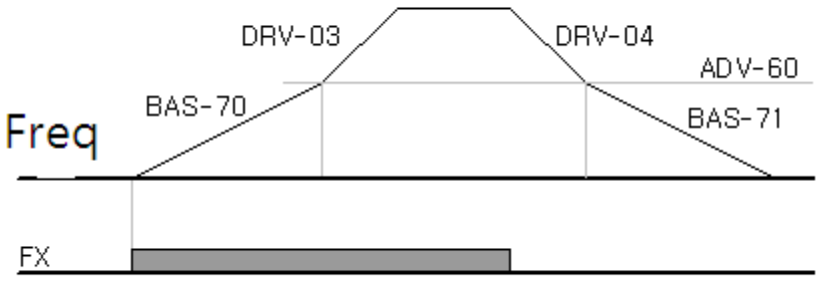
IN-89 In Check Time : when using multi-function input terminal as setting multi-acc/dec, you can set up the time for checking terminal input inside the inverter.
For example, if you set terminal input check time for 100msec and multi-function P6 is entered, you can check if other terminal input is entered for 100msec.
After 100mse, the P6 terminal related to the acc/dec time is set.

4) Acc/Dec time Set by Setting the Acc/Dec Time of Switching Frequency

Group	Code No.	Function Display	Setting Display		Setting Range	Unit
DRV	03	Acc Time	-	10.0	0~600	sec
	04	Dec Time	-	10.0	0~600	sec
BAS	70	Acc Time-1	-	20.0	0~600	sec
	71	Dec Time-1	-	20.0	0~600	sec
ADV	60	Xcel Change Fr	-	30.00	0~Max Freq	Hz/RPM

You can Change the slop of acc/dec without the use of multi-function terminal.

Inverter operates as a slop set at BAS-70 and 71 if operating frequency is less switching frequency at ADV-60. However, if operating frequency increases more than acc/dec switching frequency, inverter operates as a slop set at DRV-03 and 04.
If you set multi-function input terminal as multi-acc/dec(XCEL-L and XCEL-M), inverter operates with multi-acc/dec input regardless of the acc/dec switching frequency.

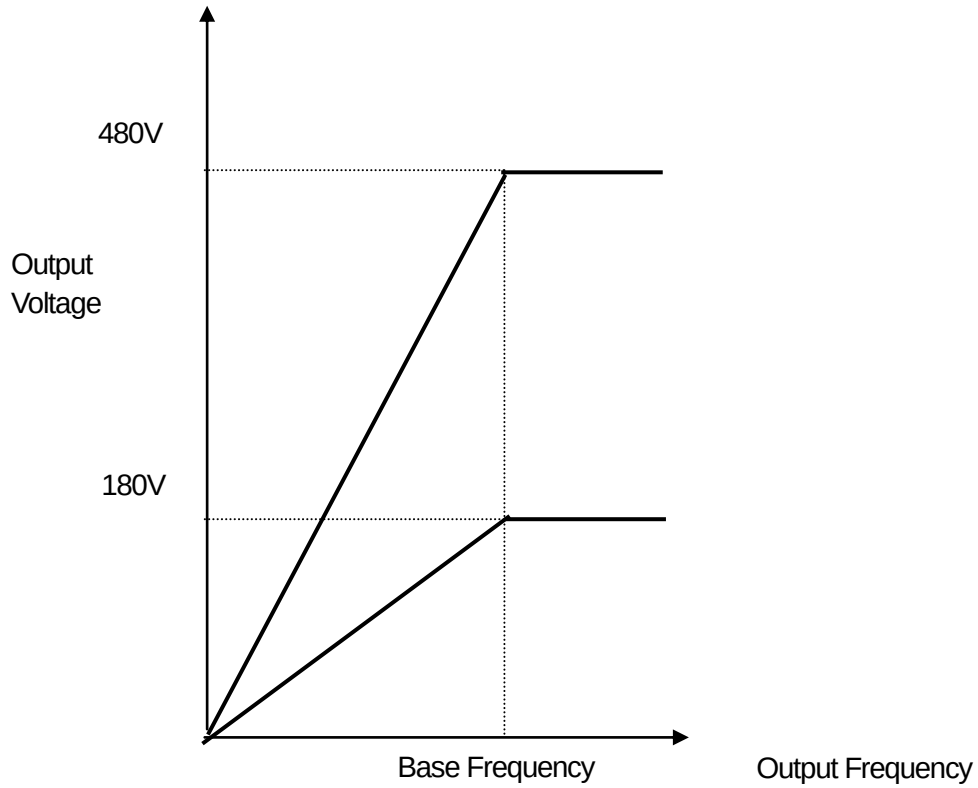


6.1.9 Motor output voltage adjustment

(Adjusting motor voltage when input power specification differs from motor voltage specification)

Group	Code No.	Function Display	Setting Display		Setting Range	Unit
BAS	15	Rated Volt	-	220	180~480	V

Inputs the voltage of the motor plate. The set voltage value is the output voltage value of the base frequency. Above the base frequency, if the input voltage is higher than the set voltage, the output is in proportion to the set value but if the input voltage is lower than the set voltage, the input voltage is produced. When 0 is set, the output voltage is corrected according to the input voltage when the inverter is static. Above the base frequency, if the input voltage is lower than the set voltage, the input voltage is produced.



7.1 Checking and Troubleshooting

7.1.1 Protective functions

1) Protection from output current and input voltage

Type	Category	Details
Over Load	Latch	A failure occurs when you select the motor overload failure and the load exceeds the set degree. Operation can resume after PRT-20 is set at values other than 0.
Under Load	Latch	A failure occurs when you select the underload protection function and the motor load is within the set underload level. Operation can resume after PRT-27 is set at values other than 0.
Over Current1	Latch	A failure occurs when the inverter output exceeds 200% of the rated current.
Over Voltage	Latch	A failure occurs when the DC circuit voltage exceeds the prescribed amount.
Low Voltage	Level	A failure occurs when the DC circuit voltage goes down below the prescribed degree.
Ground Trip	Latch	A failure occurs when current above the prescribed amount flows due to earth in the inverter output part. The earth causing current varies according to the capacity of the inverter.
E-Thermal	Latch	A failure occurs in order to prevent overheat during overload operation according to the inverse time thermal characteristic. Operation resumes if you set PRT-40 at values other than 0.
Out Phase Open	Latch	A failure occurs when one of the three phases output of the inverter is phase open. Operation resumes if you set PRT-05 bit 1 at 1.
In Phase Open	Latch	A failure occurs when one of the three phases input of the inverter is phase open. Operation resumes if you set PRT-05 bit 2 at 1.
Inverter OLT	Latch	This is the inverse time thermal characteristic protection against heat between 150% 1 minute to 200% 0.5 second on the basis of the inverter rated current. 200% 0.5 second might differ according to the inverter capacity.
Low Voltage2	Latch	If DC circuit's voltage falls below rated value, failure ocurr during inverter in operation,.

SafetyOpt Err	Latch	During an emergency, a safety feature to shut off the inverter output operation will occur.(see Chapter11 safety features)

2) Protection by internal circuit abnormality or external signals

Type	Category	Details	Remark
Fuse Open	Latch	A failure occurs when the inverter DC fuse responds to over current only above 30kW.	-
Over Heat	Latch	A failure occurs when the temperature of the inverter cooling fan rises over the prescribed degree.	-
Over Current2	Latch	A failure occurs when the DC part in the inverter detects short circuit current.	-
External Trip	Latch	This is an external failure signal by function selection of the multi-function terminal. Of the IN65~75 functions, No.3 External Trip is selected.	-
BX	Level	The inverter output is blocked by function selection of the multi-function terminal. Of the IN65~75 functions, No.4 BX is selected.	-
H/W-Diag	Fatal	Trouble with the memory device within the inverter(EPP ROM), analog-digital switch output(ADC Off Set) or CPU malfunction(Watch Dog-1, Watch Dog-2). - EEP Err : In the event of problems during Parameter Read/Write because of KPD EEP ROM damage, etc - ADC Off Set : In the event of trouble in the current sensing area (U/V/W CT etc.) - Gate Pwr Loss : In the event of trouble in the power of IGBT Gate of the product 30kW or higher. (When trouble occurs in 22kW product, it requires checking the capacity settings of the product)	-
NTC Open	Latch	A failure occurs when abnormality is detected with the temperature detecting sensor of the power switch(IGBT).	-
Fan Trip	Latch	A failure occurs when abnormality is detected	-

Type	Category	Details	Remark
		with the cooling fan. Operation resumes if PRT-79 is set at 0.	
IP54 FAN Trip	Latch	Detected when IP54 product has a fault of internal circulation at FAN.	Only applied to IP54 product
Thermal Trip	Latch	A failure occurs when resistance goes beyond the prescribed value after the external temperature sensor is connected to the terminal block. Operation resumes if PRT-34 is set at values other than 0.	-
ParaWrite Trip	Latch	Trouble during parameter writing with the inverter's main body from the keypad.	-
Over Speed Trip	Latch	A failure occurs when the motor speed goes up above the overspeed detection level. The detection level is set in PRT-70.	-
Dev Speed Trip	Latch	A failure occurs when the speed that got feedback from the encoder goes up above the set variation value. Operation resumes if PRT-73 is set at 1.	-
Encoder Trip	Latch	A failure occurs when PRT-77 Enc Wire Check is set at 1 and abnormality is detected for the set period of time.	-
Pre-PID Fail	Latch	A failure occurs when the control amount(PID feedback) is continuously input below the set value during Pre-PID operation by the function setting between APP-34 ~36, which is regarded as an abnormal state of the system.	-
Ext-Brake	Latch	1. When Control Mode(DRV-09) is V/F or Sensorless1 or Sensorless2 : The trip occurs when OUT-31~32 is set up to BR control and output current is low than ADV-41 value(% for BAS-13) for about 10 seconds. 2. When Control Mode(DRV-09) is Vector : The trip occurs when OUT-31~32 is set up to BR Control and current is low than half of the BAS-14 value.	-

3) Protection by KEYPAD and option

Type	Category	Details
Lost Keypad	Level	A failure occurs when operating commands come from the keypad or there is any problem with the communication between the keypad and inverter's main body in the Keypad JOG Mode. Operation resumes if PRT-11 is set at values other than 0. (occurs 2 seconds after the communication is interrupted)
Lost Command	Level	When there is a problem with the command if frequency or operating commands are given by the terminal block or communication command other than the keypad. Operation resumes if PRT-12 is set at values other than 0.
Option Trip-1	Latch	When the option gets out of the option slot No. 1 after it was inserted during power supply or when communication is not available with the inverter.
Option Trip-2	Latch	When the option gets out of the option slot No. 2 after it was inserted during power supply or when communication is not available with the inverter.
Option Trip-3	Latch	When the option gets out of the option slot No. 3 after it was inserted during power supply or when communication is not available with the inverter.
I/O Board Trip	Latch	When the basic and insulated I/O boards are disconnected or have a fault of connection.

Note) **Level :** automatically terminates when the failure is solved. This is not saved in the failure history.

Latch : terminates when the reset signals are input after the failure is solved.

Fatal : The failure state terminates when you cut the power supply to the inverter and then supply power again with the internal charging lamp is turned off after the failure is solved.
Failure history will be saved and the fault output signal will be outputted.
If the inverter keeps the fault state after re-inputting of power, please contact to sales representative of MARATHON DRIVE.

* The functions of the save of failure history and the output of fault signal could not be operated in case the functions have not set or the inverter got damaged seriously.

7.1.2 Alarm functions

Type	Description

Type	Description
Over Load	An alarm signal is released in case of overload to the motor. Operation resumes if you set PRT-17 at 1. If signals are necessary for the output contact point, No. 4 overload is selected among the functions of OUT31~33.
Under Load	Set PRT-25 at 1 if an alarm is necessary for an underload situation. As the output signal, No. 6 Under Load is selected among the functions of OUT31~33.
Inv Over Load	An alarm is released if time equal to 60% of the level at which the inverter IOLT functions is accumulated. As the output signal, No. 5 IOL is selected among the functions of OUT31~33.
Lost Command	An alarm signal can be released as well when PRT-12 Lost Cmd Mode is 0. The alarm is released in a certain condition between PRT13~15. As the output signal, No. 12 Lost Command is selected among the functions of OUT31~33.
Fan Warning	An alarm is released if a problem is detected with the cooling fan with PRT-79 FAN Trip Mode set at 1. As the output signal, No.8 Fan Warning is selected among the functions of OUT31~33.
DB Warn %ED	An alarm is released if the DB resistance consumption rate is above the prescribed degree. The detection level is set at PRT-66.
Enc Conn Check	An alarm is signified if No. 3 Enc Test is selected from BAS-20 Auto Tuning and no signal is input during the encoder test. Signals are released if ENC Tune is set among the functions of OUT31~33.
Enc Dir Check	An alarm is signified if No. 3 Enc Test is selected from BAS-20 Auto Tuning and the setting is wrongly changed between encoder phase A and B during the encoder test or the rotation direction is reverse. Signals are released if ENC Dir is set among the functions of OUT31~33.
Lost Keypad	An alarm is signified if the operating command is keypad or any problem is detected with the communication between the keypad and the main body of the inverter in Keypad JOG Mode with PRT-11 Lost KPD Mode set 0. As the output signal, No. 29 Lost Keypad is selected among the functions of OUT31~33.
Check Line PLZ	An alarm is signified if the communication error is detected between Control CPU and Keypad. It might be occurred from the connection cable between Control CPU and Keypad.
Fire Mode	When fire function is activated, the alarm signal will occur. If you need a contact signal ouput, you will select OUT31~33 Fire Mode function.

7.1.3 Troubleshooting

Type	Cause of Trouble	Solution
Over Load	■ The load is higher than the rated load of the motor. ■ The load set at the overload failure level (PRT-21) is small.	☞ Raise the capacity of the motor and inverter. ☞ Increase the set value.
Under Load	■ There is a problem with the connection between the motor and load. ■ The underload level (PRT-29, 30) is lower than the minimum system load.	☞ Raise the capacity of the motor and inverter. ☞ Increase the set value.
Over Current1	■ Acc/Dec time is too short compared with the inertia of the load (GD^2). ■ The load of the inverter is bigger than its rated load. ■ Inverter output is ON during idling of the motor. ■ The braking of the motor is too fast.	☞ Raise the Acc/Dec time. ☞ Replace the inverter for one with bigger capacity. ☞ Operate the inverter after the motor stops or use speed search (CON-60). ☞ Check the machine brake.
Over Voltage	■ Decelerating time is too short compared with the inertia of the load (GD^2). ■ Regenerative load is located at the inverter output. ■ The supply voltage is too high.	☞ Set the decelerating time higher. ☞ Use a braking resistance device. ☞ Check whether the supply voltage is above the prescribed degree.
Low Voltage/ Low Volatage2	■ The supply voltage is too low. ■ Load larger than the power supply capacity is connected(a welder or motor direct on line). ■ Nonconformity of the electronic contactor, etc. on the power supply side.	☞ Check whether the supply voltage is below the prescribed degree. ☞ Raise the power supply capacity. ☞ Replace the electronic contactor.
Ground Trip	■ Earth of the outlet cord of the inverter. ■ Deterioration of the insulation of the motor.	☞ Check the output terminal distribution of the inverter. ☞ Replace the motor.
E-Thermal	■ The motor is overheated. ■ The load of the inverter is bigger than its rated load. ■ The electronic thermal level is set	☞ Reduce the load or frequency. ☞ Raise the capacity of the inverter. ☞ Set the electronic thermal level

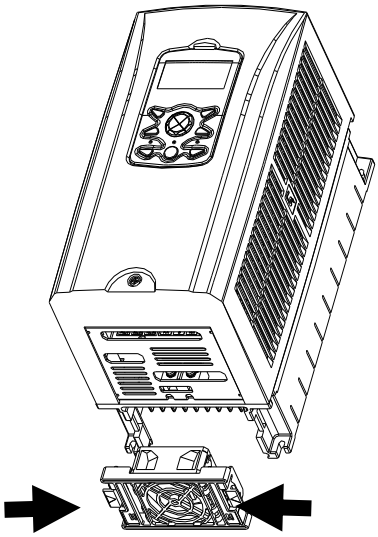
Type	Cause of Trouble	Solution
	too low. ■ The inverter has operated for a long time at a low speed.	properly. ☞ Replace the motor for one that can separately supply power to the cooling fan.
Out Phase Open	■ Contact trouble of the electronic contactor of the output side. ■ Bad distribution of output	☞ Check the electronic contactor of the output side of the inverter. ☞ Check the output distribution.
In Phase Open	■ Contact trouble of the electronic contactor of the input side ■ Bad distribution of input ■ The DC condenser of the inverter needs replacing.	☞ Check the electronic contactor of the input side of the inverter. ☞ Check the input distribution. ☞ You should replace the DC condenser of the inverter. Get customer service from an agency.
Inverter OLT	■ The load of the inverter is bigger than it's the inverter rating. ■ Torque boost is too high.	☞ Raise the capacity of the inverter and motor. ☞ Reduce the torque boost amount.
Over Heat	■ There is a problem with the cooling system. ■ The inverter has been used longer than the replacement cycle of the cooling fan. ■ The surrounding temperature is too high.	☞ Check whether there is any foreign substance in the vent, air duct or outlet. ☞ Replace the inverter cooling fan. ☞ Keep the temperature around the inverter below 50°C.
Over Current2	■ Earth of the output cord of the inverter ■ There is a problem with the inverter power switch (IGBT).	☞ Check the output terminal distribution of the inverter. ☞ Inverter operation is impossible. Contact a near service provider.
NTC Open	■ The surrounding temperature is out of the prescribed range. ■ There is a problem with the internal temperature sensor of the inverter.	☞ Keep the temperature around the inverter below the prescribed degree. ☞ Contact a near service provider.
FAN Trip	■ There is foreign substance in the inverter vent where the fan is. ■ The cooling fan of the inverter needs replacing.	☞ Check the vent or air outlet. ☞ Replace the cooling fan of the inverter.
IP54 FAN Trip	■ Internal fan connector is not connected.	☞Connect internal Fan connector.

Type	Cause of Trouble	Solution
	■ Internal fan PCB board's power connector is not connected. ■ Inverter cooling fan become to change period time.	☞Internal fan PCB board's power connector is connected. ☞Inverter cooling fan have to changed.
No Motor Trip	■ The motor is disconnected to the output of inverter. ■ The current level of detection of Trip is incorrect.	■ Check the connection of wiring. ■ Check the value of parameter both BAS-13 (Rated current) and PRT-32 (No Motor Level).

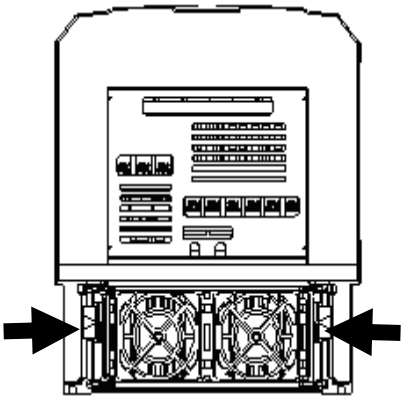
7.1.4 Replacement of cooling fan

1) Replacement steps of the product below 7.5kW

Push the bracket on the bottom to the arrow direction and pull it forward. Disconnect the connector of the fan, then you can replace the fan.



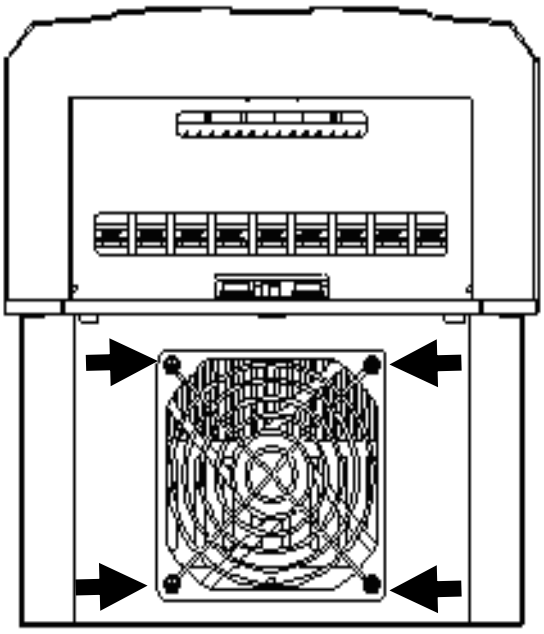
<below 3.7kW>



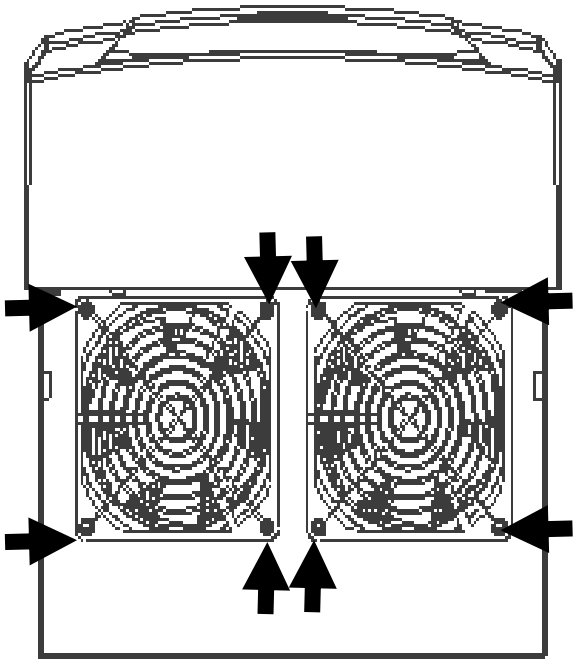
<below 7.5 kW>

2) Replacement steps of product of 11~15kW 200V/400V, 18.5~22 kW 400V

Release the volts under the In-Out put terminals and disconnect the connector of the fan, then you can replace the fan.



3) Replacement steps of product of 18.5~22 kW 200V, 30~75kW 200V/400V (Check capacity.) Release the volts upper of the product and disconnect the connector of the fan, then you can replace the fan.



7.1.5 Daily and regular checkup list

MD Vector Inverter, MDHP, is an industrial electronic product that adopts up-to-date semiconductor device. It may have a failure caused by the ambient environment such as temperature, humidity, vibration, etc. or an excessive use of the component over its duration. It requires a routine checking to prevent such failure in advance.

⚠ CAUTION

- Before starting the maintenance work, the operator must check out the power input of the inverter.
- Large-capacity electrolytic condenser in the power electronic circuit remains charged with power even after the power is off. So be sure to start the maintenance work after you acknowledged the power has been completely discharged using a proper tester.
- Be sure to use a rectifier type volt meter to obtain an accurate voltage when directly measuring the output voltage of inverter. General volt meter or digital volt meter may result in spurious operation or indicate wrong value due to high frequency PWM output voltage of the inverter.

(1) Checking Points

Electronic product is not intended for a permanent use. When it exceeds the duration even under the normal service environment, the product may have trouble in its operation due to change in the nature of the parts. To prevent such circumstance, it requires a routine and regular checking.

Especially if you use it under the following environment, have it checked with a shorter interval than the regular checking.

- When the temperature is relatively high in the installed place
- When the product is operated with a frequent start and stop
- When the input AC power and load vary seriously
- When it has severe vibration or shock
- When there is corrosive gas, combustible gas, oil sludge, dust, salts, metal powder, etc

⚠ CAUTION

■ The failure of the device used in the inverter may not be predicted in advance. The failure of the device may cause the error of input power fuse or the fault trip. If you are suspicious of the failure of device, please contact our sales representative.

(2) Routine Checking

Area	Checking points	Description	How to Check	Judgment Criterion	Instrument
Overview	Ambient environment	Check ambient temperature, humidity, existence of dust, etc..	See the Caution for Safety.	Ambient temperature should be -10 ~ +40 degree C; Freezing is not allowed; Ambient humidity to be 50% or less; Dew is not allowed.	Temperature meter, Humidity meter, Recorder
	Entire system	Isn't there any vibration or unusual sound?	Judgement by visual or auditory sense.	There must be no unusual record.	-
	Power, Voltage	Is the main circuit voltage normal	Check the voltage among R, S, and T phases on the inverter terminal .block	-	Digital Multi Meter /Tester
Main circuit	Flat condenser	1) Isn't the liquid inside leaked? 2) Isn't the safety vent protruded? No sagging phenomenon?	Check 1) and 2) by eyes.	There must be no unusual result from 1) and 2).	-
Cooling system	Cooling fan	1) Isn't there any unusual vibration or unusual sound?	1) Turn it using hand with the power Off.	1) Rotate it softly	-

Area	Checking points	Description	How to Check	Judgment Criterion	Instrument
	Inverter, Motor	Do they have excessive heat?	1) Check if it is from overload or not. 2) Fasten the screw tightly. 3) Check if the inverter's heat sink is polluted. 4) Check the ambient temperature.	There must be no unusual record.	Temperature meter
Indicator	Meter	Is the indicator value normal	Check the indicator value on the display of the panel surface.	Check the value under the regulation and standard value.	Volt Meter, Current Meter, etc.
Motor	Entire system	1) Isn't there any unusual vibration or unusual sound? 2) Isn't there any unusual smell?	1) Check by ear, hand, and eye. 2) Check overheat, damage, etc. 3) Check the area connected with the machine. 4) Measure the vibration of the motor. 5) Fasten the screw on the junction tightly.	There must be no unusual record.	-

(3) Regular Checking (1 year interval)

Area	Checking points	Description	How to Check	Judgment Criterion	Instrument
Main circuit	Entire system	1) Megger checking (between the main circuit terminal and ground terminal) 2) Isn't any fixed area missing? 3) Isn't there any trace of overheat on each component?	1) Unfasten the connection of inverter, connect R, S, T, U, V, and W terminals, and then measure the gap between this area and the ground terminal using a megger. 2) Fasten the screws. 3) Check it visually	1) To be 5MΩ or more There must be no unusual result from 2) and 3)	DC 500V Class Megger
	Conductor /Wire	1) Isn't there any corrosion on the conductor??2) Isn't there any damage to the wire sheath?	1) Switch the power Off and then turn it with a hand. 2) Fasten it once again.	1) Rotate it softly 2) There must be no unusual record	-
	Terminal block	Isn't it damaged?	Check by eyes.	There must be no unusual record	-
	Flat condenser	Measure the electrostatic capacity	Measure using the capacity meter.	85% or more of the rated capacity	Capacity meter.
	Relay	1) Isn't there any chattering sound? 2) Isn't there any damage to the contact point?	1) Check by ears. 2) Check by eyes.	There must be no unusual record	-
	Resistance	1) Isn't there any damage to the insulation resistance? 2) Check the existence of the clue	1) Check by eyes. 2) Remove the connection at one side, and measure it using a tester.	1) There must be no unusual record 2) It should be within ±10% tolerance range	Digital Multi-Meter/Analog Tester

Area	Checking points	Description	How to Check	Judgment Criterion	Instrument
	Diode, IGBT	Check if they are stained with trash or dust	Check by eyes.	Remove them by blowing a dry air.	-
	Circuit Board	1) Check if they generate unusual smell are discolored, rusted, covered with dust or oil mist 2) Check if the connector is mounted	Check by eyes	1) Clean it using anti-static cloth or cleaner. If not, replace with new circuit board 2) Do not clean the circuit board using the solution. 3) Remove trash or dust by blowing a dry air. 4) Mount the connectors again. 5) If the damaged area cannot be repaired or is the part that cannot be replaced, replace the inverter itself.	-
Control circuit protecting circuit	Operation	1) Check the unbalance of the output voltage during the operation of inverter 2) Display circuit must not have any unusual phenomenon after the sequence protecting operation test is done	1) Measure the voltage among the U, V, and W at the Inverter output terminal. 2) Have the inverter protecting circuit output shorted out or open it by force.	1) Balance of inter-phase voltage 200V (400V) Use: Within 4V(8V) 2) Unusual circuit to be operated in sequence	Digital Multi-Meter/ DC type Volt Meter
Cooling System	Cooling fan, Cooling pin	1) Isn't there any looseness on the junction? 2) Isn't cooling pin or cooling fan covered with dust	1) Fasten it once again. 2) Check with eyes and then remove dust	1) There must be no unusual record 2) There must be no dust	-

Area	Checking points	Description	How to Check	Judgment Criterion	Instrument
Indicator	Meter	Is the indicator value normal?	Check the indicator value on the display of the panel surface.	Check the value under the regulation and standard value	Volt Meter/ Current Meter, etc.

(4) Regular Checking (2 year interval)

Area	Checking points	Description	How to Check	Judgment Criterion	Instrument
Main circuit	Entire system	Megger Checking (between the main circuit terminal and the ground terminal	Unfasten the connection of the inverter, and then measure the gap among R, S, T, U, V, and W terminals and this area after having them shorted out.	5MΩ or more	DC 500V Class Megger
Motor	Resistance Insulation	Megger checking (between the output terminal and the ground terminal)	Unfasten the connection among U, V, and W, and then bind the motor wiring.	5MΩ or more	500V Class Megger

8.1 Table of Functions

8.1.1 Parameter mode – DRV group(➔DRV)

* The number of page is for User's manual uploaded at Marathon Drive website. You can download the User's manual which is described detailed function of parameter from website. (http://www.regalaustralia.com.au)

Control mode abbreviation: V/F: V/F (PG included), SL: Sensorless-1, 2, VC: Vector, SLT: Sensorless-1, 2 Torque, VCT: Vector Torque

No.	Comm. No.	Function Display	Name	Setting Range	Initial Value	Shift in Operation	Control Mode (Note1)				
							V/F	SL	VC	SLT	VCT
00	-	Jump Code	jump code	1 ~ 99	9	O	O	O	O	O	O
01	0h1101	Cmd Frequency	target frequency	Start freq. ~ max. freq.[Hz]	0.0	O	O	O	O	X	X
02	0h1102	Cmd Torque	torque command	-180 ~ 180 [%]	0.0	O	X	X	X	O	O
03	0h1103	Acc Time	accelerating time	0 ~ 600 [s]	Below 75kW 20.0 Above 90kW 60.0	O	O	O	O	O	O
04	0h1104	Dec Time	decelerating time	0 ~ 600 [s]	Below 75kW 30.0 Above 90kW 90.0	O	O	O	O	O	O
06	0h1106	Cmd Source	operating command method	0 Keypad 1 Fx/Rx-1 2 Fx/Rx-2 3 Int 485 4 Field Bus 5 PLC	1 : Fx/Rx-1	X	O	O	O	O	O
07	0h1107	Freq Ref Src	frequency setting method	0 Keypad-1	0 : Keypad-1	X	O	O	O	X	X
08	0h1108	Trq Ref Src	torque command method	0 Keypad-1 1 Keypad-2 2 V1 3 I1 4 V2 5 I2 6 Int 485 7 Encoder 8 Fied Bus 9 PLC	0 : Keypad-1	X	X	X	X	O	O
09 (Note1)	0h1109	Control Mode	control mode	0 V/F 1 V/F PG 2 Slip Compen 3 Sensorless-1 4 Sensorless-2 5 Vector	0 : V/F	X	O	O	O	O	O

* Note 1) The grey code refers to hidden code, emerging only in case of setting of the code. Effectiveness of each code according to the Control Mode setting
Refer to Option manual for options.

No.	Comm. No.	Function Display	Name	Setting Range	Initial Value	Shift in Operation	Control Mode				
							V/F	SL	VC	SLT	VCT
10	0h110A	Torque Control	torque control	0 No 1 Yes	0 : No	X	X	X	X	O	O
11	0h110B	Jog Frequency	jog frequency	0.5 ~ max. freq.[Hz]	10.00	O	O	O	O	O	O
12	0h110C	Jog Acc Time	jog operation Acc time	0 ~ 600 [s]	20.0	O	O	O	O	O	O
13	0h110D	Jog Dec Time	jog operation Dec time	0 ~ 600 [s]	30.0	O	O	O	O	X	X
14	0h110E	Motor Capacity	motor capacity	0: 0.2kW, 1: 0.4kW 2: 0.75kW, 3: 1.5kW 4: 2.2kW, 5: 3.7kW 6: 5.5kW, 7: 7.5kW 8: 11kW, 9: 15kW 10: 18.5kW, 11:22kW 12: 30kW, 13:37kW 14: 45kW, 15: 55kW 16: 75kW, 17: 90kW 18: 110kW, 19: 132kW 20: 160kW, 21: 185kW 22: 220kW, 23: 280kW 24: 315kW, 25: 375kW 26: 450kW	depends on inverter capacity	X	O	O	O	O	O
15	0h110F	Torque Boost	torque boost method	0 Manual 1 Auto	0: Manual	X	O	X	X	X	X
16 Note2)	0h1110	Fwd Boost	forward torque boost	0 ~ 15 [%]	Below 75kW 2.0 Above 90kW 1.0	X	O	X	X	X	X
17	0h1111	Rev Boost	reverse torque boost		Below 75kW 2.0 Above 90kW 1.0	X	O	X	X	X	X
18	0h1112	Base Freq	base frequency	30 ~ 400 [Hz]	50.00	X	O	O	O	O	O
19	0h1113	Start Freq	Start frequency	0.01 ~ 10 [Hz]	0.50	X	O	X	X	X	X
20	0h1114	Max Freq	maximum frequency	40 ~ 400	50.00	X	O	O	O	O	O
21	0h1115	Hz/Rpm Sel	speed unit selection	0 Hz Display 1 Rpm Display	0: Hz	O	O	O	O	O	O
25	0h1119	Output Freq	Monitoring the Output Speed	0~Max Freq[Hz]	0.00Hz	O	O	O	O	O	O

* ▭ The grey code refers to hidden code, emerging only in case of setting of the code.

Note 2) DRV-16-17 code is displayed only when DRV-15 (Torque Boost) code value is “Manual”.

8.1.2 Parameter mode – Basic function group (➔BAS)

No.	Comm. No.	Function Display	Name	Setting Range		Initial Value	Shift in Operation	Control Mode				
								V/F	SL	VC	SLT	VCT
00	-	Jump Code	jump code	0 ~ 99		20	O	O	O	O	O	O
01	0h1201	Aux Ref Src	auxiliary command Setting method	0	None	0:None	X	O	O	O	X	X
				1	V1							
				2	I1							
				3	V2							
				4	I2							
				5	Pulse							
02 Note3)	0h1202	Aux Calc Type	auxiliary command Movement selection	0	M+(G*A)	0: M+(G*A)	X	O	O	O	X	X
				1	M*(G*A)							
				2	M/(G*A)							
				3	M+(M*2(G*A))							
				4	M+G*2(A-50%)							
				5	M*(G*2(A-50%))							
				6	M/(G*2(A-50%))							
				7	M+M*G*2(A-50%)							
03	0h1203	Aux Ref Gain	auxiliary command gain	-200.0 ~ 200.0 [%]		100.0	O	O	O	O	X	X
04	0h1204	Cmd 2nd Src	2nd operation command method	0	Keypad	1:Fx/Rx-1	X	O	O	O	O	O
				1	Fx/Rx-1							
				2	Fx/Rx-2							
				3	Int 485							
				4	FieldBus							
				5	PLC							
05	0h1205	Freq 2nd Src	2nd frequency Setting method	0	Keypad-1	0:Keypad-1	O	O	O	O	X	X

* The grey code refers to hidden code, emerging only in case of setting of the code.

Note 3) BAS-02 code is displayed only when BAS-01 (Aux Ref Src) code has a value other than "NONE".

No.	Comm. No.	Function Display	Name	Setting Range	Initial Value	Shift in Operation	Control Mode				
							V/F	SL	VC	SLT	VCT
06	0h1206	Trq 2nd Src	2nd torque command method	1 Keypad-2 2 V1 3 I1 4 V2 5 I2 6 Int 485 7 Encoder 8 FieldBus 9 PLC 10 Synchro 11 Binary Type 12 Keypad-2	0 : Keypad-1	O	X	X	X	O	O
07	0h1207	V/F Pattern	V/F pattern	0 Linear 1 Square 2 User V/F 3 Square2	0 : Linear	X	O	O	X	X	X
08	0h1208	Ramp T Mode	Acc/Dec standard frequency	0 Max Freq 1 Delta Freq	0 : Max Freq	X	O	O	O	X	X
09	0h1209	Time Scale	time unit setting	0 0.01sec 1 0.1sec 2 1sec	1 : 0.1sec	X	O	O	O	X	X
10	0h120A	60/50 Hz Sel	input power frequency	0 60Hz 1 50Hz	1 : 50Hz	X	O	O	O	O	O
11	0h120B	Pole Number	motor pole	2 ~ 48	It depends on inverter capacity	X	O	O	O	O	O
12	0h120C	Rated Slip	rated sleep speed	0 ~ 3000 [rpm]		X	O	O	O	O	O
13	0h120D	Rated Curr	motor rated current	1 ~ 1000 [A]		X	O	O	O	O	O
14	0h120E	Noload Curr	motor no load current	0.5 ~ 1000 [A]		X	O	O	O	O	O
15	0h120F	Rated Volt	motor rated voltage	180 ~ 480 [V]	0	X	O	O	O	O	O
16	0h1210	Efficiency	motor efficiency	70 ~ 130 [%]	It depends on inverter capacity	X	O	O	O	O	O
17	0h1211	Inertia Rate	load inertial ratio	0 ~ 8		X	O	O	O	O	O
18	0h1212	Trim Power %	Power display adjustment	70 ~ 130 [%]		O	O	O	O	O	O
19	0h1213	AC Input Volt	input power Voltage	170 ~ 230 [V] 320 ~ 480 [V]	220V 220 440V 380	O	O	O	O	O	O
20	-	Auto Tuning	auto tuning	0 None 1 All 2 ALL(Stdstl) 3 Rs+Lsigma 4 Enc Test 5 Tr 6 Tr (Stdstl)	0 : None	X	X	O	O	O	O

No.	Comm.No.	Function Display	Name		Setting Range	Initial Value	Shift in Operation	Control Mode				
								V/F	SL	VC	SLT	VCT
21	-	Rs	stator resistance		It depends on motor	-	X	X	O	O	O	O
22	-	Lsigma	leak inductance			-	X	X	O	O	O	O
23	-	Ls	stator inductance			-	X	X	O	O	O	O
24 Note4)	-	Tr	rotor time constant		25 ~ 5000 [ms]	-	X	X	O	O	O	O
41 Note5)	0h1229	User Freq 1	user frequency 1		0 ~ max. freq.[Hz]	15.00	X	O	X	X	X	X
42	0h122A	User Volt 1	user voltage 1		0 ~ 100 [%]	25	X	O	X	X	X	X
43	0h122B	User Freq 2	user frequency 2		0 ~ max. freq.[Hz]	30.00	X	O	X	X	X	X
44	0h122C	User Volt 2	user voltage 2		0 ~ 100 [%]	50	X	O	X	X	X	X
45	0h122D	User Freq 3	user frequency 3		0 ~ max. freq.[Hz]	45.00	X	O	X	X	X	X
46	0h122E	User Volt 3	user voltage 3		0 ~ 100 [%]	75	X	O	X	X	X	X
47	0h122F	User Freq 4	user frequency 4		0 ~ max. freq.[Hz]	50.00	X	O	X	X	X	X
48	0h1230	User Volt 4	user voltage 4		0 ~ 100 [%]	100	X	O	X	X	X	X
50 Note6)	0h1232	Step Freq-1	step frequency	1	Start freq. ~ max. freq.[Hz]	10.00	O	O	O	O	X	X
51	0h1233	Step Freq-2		2		20.00	O	O	O	O	X	X
52	0h1234	Step Freq-3		3		30.00	O	O	O	O	X	X
53	0h1235	Step Freq-4		4		40.00	O	O	O	O	X	X
54	0h1236	Step Freq-5		5		50.00	O	O	O	O	X	X
55	0h1237	Step Freq-6		6		60.00	O	O	O	O	X	X
56	0h1238	Step Freq-7		7		60.00	O	O	O	O	X	X
57	0h1239	Step Freq-8		8		55.00	O	O	O	O	X	X
58	0h123A	Step Freq-9		9		50.00	O	O	O	O	X	X
59	0h123B	Step Freq-10		10		45.00	O	O	O	O	X	X
60	0h123C	Step Freq-11		11		40.00	O	O	O	O	X	X
61	0h123D	Step Freq-12		12		35.00	O	O	O	O	X	X
62	0h123E	Step Freq-13		13		25.00	O	O	O	O	X	X
63	0h123F	Step Freq-14		14		15.00	O	O	O	O	X	X
64	0h1240	Step Freq-15		15		5.00	O	O	O	O	X	X
70	0h1246	Acc Time-1	sequential acc. time 1		0 ~ 600 [s]	20.0	O	O	O	O	X	X
71	0h1247	Dec Time-1	sequential dec. time 1			20.0	O	O	O	O	X	X
72 Note7)	0h1248	Acc Time-2	sequential acc. tim 2		0 ~ 600 [s]	30.0	O	O	O	O	X	X
73	0h1249	Dec Time-2	sequential dec. time 2			30.0	O	O	O	O	X	X
74	0h124A	Acc Time-3	sequential acc. tim 3			40.0	O	O	O	O	X	X
75	0h124B	Dec Time-3	sequential dec. time 3			40.0	O	O	O	O	X	X

No.	Comm.No.	Function Display	Name	Setting Range	Initial Value	Shift in Operation	Control Mode				
							V/F	SL	VC	SLT	VCT
76	0h124C	Acc Time-4	Acc/Dec Time 4	0~600[sec]	50.0	O	○	○	○	X	X
77	0h124D	Dec Time-4	Acc/Dec Time 4	0~600[sec]	50.0	O	○	○	○	X	X
78	0h124E	Acc Time-5	Acc/Dec Time 5	0~600[sec]	60.0	O	○	○	○	X	X
79	0h124F	Dec Time-5	Acc/Dec Time 5	0~600[sec]	60.0	O	○	○	○	X	X
80	0h1250	Acc Time-6	Acc/Dec Time 6	0~600[sec]	70.0	O	○	○	○	X	X
81	0h1251	Dec Time-6	Acc/Dec Time 6	0~600[sec]	70.0	O	○	○	○	X	X
82	0h1252	Acc Time-7	Acc/Dec Time 7	0~600[sec]	80.0	O	○	○	○	X	X
83	0h1253	Dec Time-7	Acc/Dec Time 7	0~600[sec]	80.0	O	○	○	○	X	X

* ▭ The grey code refers to hidden code, emerging only in case of setting of the code.

Note 4) BAS-24 is shown only when DRV-09 Control Mode is set as “Sensorless-2” or “Vector”.

Note 5) BAS-41~48 is displayed only when it is set as “User V/F” even if there is only one BAS-07 or M2-V/F Patt (M2-25).

Note 6) BAS-50~64 is displayed only when it is set as “sequential” (Speed –L.M.H,X) even if there is only one multi-function input of IN-65-75.

Note 7) BAS-72~75 is displayed only when it is set as “sequential Acc/Dec” (Xcel-L,M,H) even if there is only one multi-function input of IN-72~75.

8.1.3 Parameter mode –Extended function group (PAR➔ADV)

No.	Comm.No.	Function Display	Name	Setting Range		Initial Value	Shift in Operation	Control Mode				
								V/F	SL	VC	SLT	VCT
00	-	Jump Code	jump code	0 ~ 99		24	O	O	O	O	O	O
01	0h1301	Acc Pattern	accelerating pattern	0	Linear	0:Li-near	X	O	O	O	X	X
02	0h1302	Dec Pattern	decelerating pattern	1	S-curve		X	O	O	O	X	X
03	0h1303	Acc S Start	S accelerating starting slope	1 ~ 100 [%]		40	X	O	O	O	X	X
04	0h1304	Acc S End	S accelerating end slope				X	O	O	O	X	X
05	0h1305	Dec S Start	S decelerating starting slope				X	O	O	O	X	X
06	0h1306	Dec S End	S decelerating end slope				X	O	O	O	X	X
07	0h1307	Start Mode	starting method	0	Acc	0: Acc	X	O	O	O	X	X
				1	Dc-Start							
08	0h1308	Stop Mode	stop method	0	Dec	0: Dec	X	O	O	O	X	X
				1	Dc-Brake							
				2	Free-Run							
				3	Reserved							
				4	Powr Braking							
09	0h1309	Run Prevent	rotation preventing direction selection	0	None	0: None	X	O	O	O	X	X
				1	Forward Prev							
				2	Reverse Prev							
10	0h130A	Power-on Run	power input starting	0	No	0:No	O	O	O	O	X	X
				1	Yes							
12 Note8)	0h130C	Dc-Start Time	starting DC braking time	0 ~ 60 [s]		0.00	X	O	O	O	X	X
13	0h130D	Dc Inj Level	DC supply	0 ~ 200 [%]		50	X	O	O	O	X	X
14 Note9)	0h130E	Dc-Block Time	Pre-DC braking output block time	0 ~ 60 [s]		0.10	X	O	O	O	X	X
15	0h130F	Dc-Brake Time	DC braking time			1.00	X	O	O	O	X	X
16	0h1310	Dc-Brake Level	DC braking	0 ~ 200 [%]		50	X	O	O	O	X	X
17	0h1311	Dc-Brake Freq	DC braking frequency	Start freq. ~ 50 [Hz]		5.00	X	O	O	O	X	X
20	0h1314	Acc Dwell Freq	Accelerating dwell frequency	Start freq. ~ max. freq.[Hz]		5.00	X	O	O	O	X	X
21	0h1315	Acc Dwell Time	Accelerating dwell operation time	0 ~ 60.0 [s]		0.00	X	O	O	O	X	X
22	0h1316	Dec Dwell Freq	Decelerating dwell frequency	Start freq. ~ max. freq. [Hz]		5.00	X	O	O	O	X	X
23	0h1317	Dec Dwell Time	Decelerating dwell operation time	0 ~ 60.0 [s]		0.00	X	O	O	O	X	X

No.	Comm.No.	Function Display	Name	Setting Range	Initial Value	Shift in Operation	Control Mode				
							V/F	SL	VC	SLT	VCT
24	0h1318	Freq Limit	frequency limit	0 No 1 Yes	0:No	X	O	O	O	X	X
25 Note10)	0h1319	Freq Limit Lo	frequency lower limit	0 ~ upper limit [Hz]	0.50	O	O	O	O	X	X
26	0h131A	Freq Limit Hi	frequency upper limit	0.5 ~ max. freq. [Hz]	50.00	X	O	O	O	X	X
27	0h131B	Jump Freq	frequency jump	0 No 1 Yes	0:No	X	O	O	O	X	X
28 Note 11)	0h131C	Jump Lo 1	jump freq. lower limit 1	0 ~ jump freq. upper limit 1 [Hz]	10.00	O	O	O	O	X	X
29	0h131D	Jump Hi 1	jump freq. upper limit 1	Jump freq. lower limit 1 ~ max. freq. [Hz]	15.00	O	O	O	O	X	X
30	0h131E	Jump Lo 2	jump freq. lower limit 2	0 ~ jump freq. upper limit 2 [Hz]	20.00	O	O	O	O	X	X
31	0h131F	Jump Hi 2	jump freq. upper limit 2	Jump freq. lower limit 2 ~ max. freq. [Hz]	25.00	O	O	O	O	X	X
32	0h1320	Jump Lo 3	jump freq. lower limit 3	0 ~ jump freq. upper limit 3 [Hz]	30.00	O	O	O	O	X	X
33	0h1321	Jump Hi 3	jump freq. upper limit 3	Jump freq. lower limit 3 ~ max. freq. [Hz]	35.00	O	O	O	O	X	X
41 Note12)	0h1329	BR Rls Curr	brake open current	0 ~ 180.0 [%]	50.0	O	O	O	O	X	X
42	0h132A	BR Rls Dly	brake open delay time	0 ~ 10.00 [s]	1.00	X	O	O	O	X	X
44	0h132C	BR Rls Fwd Fr	brake open forward frequency	0 ~400 [Hz]	1.00	X	O	O	O	X	X
45	0h132D	BR Rls Rev Fr	brake open reverse frequency		1.00	X	O	O	O	X	X
46	0h132E	BR Eng Dly	brake close delay time	0 ~ 10 [s]	1.00	X	O	O	O	X	X
47	0h132F	BR Eng Fr	brake close frequency	0 ~400 [Hz]	2.00	X	O	O	O	X	X
50	0h1332	E-Save Mode	energy saving operation	0 None 1 Manual 2 Auto	0: None	X	O	O	X	X	X
51 Note13)	0h1333	Energy Save	energy saving amount	0 ~ 30 [%]	0	O	O	O	O	X	X
60	0h133C	Xcel Change Fr	Acc/Dec time exchange frequency	0 ~ max. freq. [Hz]	0.00	X	O	O	O	X	X

* ▭ The grey code refers to hidden code, emerging only in case of setting of the code.

Note 8) ADV-12 is displayed only when ADV-07 “Stop Mode” is set as “Dc-Start”.

Note 9) ADV-14~17 is displayed only when ADV-08 “Stop Mode” is set as “DC-Brake”.

Note 10) ADV-25~26 is displayed only when ADV-24 (Freq Limit) is set as “Freq Limit”.

Note 11) ADV-28~33 is displayed only when ADV-27 (Jump Freq) is set as “Yes”.

Note 12) ADV-41~47 is displayed only when a code of OUT-31~33 is set as “BR Control”.

Note 13) ADV-51 is displayed only when ADV-50 (E-Save Mode) is set as values other than “None”.

No.	Comm. No.	Function Display	Name	Setting Range	Initial Value	Shift in Operation	Control Mode				
							V/F	SL	VC	SLT	VCT
61	-	Load Spd Gain	revolution display gain	0.1 ~ 6000.0 [%]	100.0	O	O	O	O	X	X
62	-	Load Spd Scale	revolution display scale	0 x 1 1 x 0.1 2 x 0.01 3 x 0.001 4 x 0.0001	0:x 1	O	O	O	O	X	X
63	0h133F	Load Spd Unit	revolution display unit	0 rpm 1 mpm	0:rpm	O	O	O	O	O	O
64	0h1340	FAN Control	cooling fan control	0 During Run 1 Always ON 2 Temp Control	0 : During Run	O	O	O	O	X	X
65	0h1341	U/D Save Mode	up/down Operation frequency saving	0 No 1 Yes	0 : No	O	O	O	O	X	X
66	0h1342	On/Off Ctrl Src	-	0 None 1 V1 2 I1 3 V2 4 I2	0 : None	X	O	O	O	O	O
67	0h1343	On-C Level	Output contact point ON level	10 ~ 100 [%]	90.00	X	O	O	O	O	O
68	0h1344	Off-C Level	Output contact point OFF level	-100.00 ~ output contact point ON level [%]	10.00	X	O	O	O	O	O
70	0h1346	Run En Mode	safety operation selection	0 Always Enable 1 DI Dependent	0 : Always Enable	X	O	O	O	O	O
71 Note14)	0h1347	Run Dis Stop	safety operation stop method	0 Free-Run 1 Q-Stop 2 Q-Stop Resume	0 : Free-Run	X	O	O	O	O	O
72	0h1348	Q-Stop Time	safety operation decelerating time	0 ~ 600.0 [s]	5.0	O	O	O	O	O	O
74	0h134A	RegenAvd Sel	Selection of regeneration and avoidance function for press	0 No 1 Yes	No	X	O	O	O	O	O
75	0h134B	RegenAvd Level	Operational Voltage level of regeneration anc avoidance for press	200V: 300 ~ 400 400V: 600 ~ 800	350V 700V	X	O	O	O	X	X

No.	Comm. No.	Function Display	Name	Setting Range	Initial Value	Shift in Operation	Control Mode				
							V/F	SL	VC	SLT	VCT
76 Note15)	0h134C	CompFreq Limit	Restriction of compensational frequency of regeneration anc avoidance for press	0 ~ 10.00 [Hz]	1.00 [Hz]	X	O	O	O	X	X
77	0h134D	RegenAvd Pgain	P-gain of regeneration anc avoidance for press	0 ~ 100.0 [%]	50.0 [%]	O	O	O	O	X	X
78	0h134E	RegenAvd Igain	I-gain of regeneration anc avoidance for press	20 ~ 30000 [ms]	500 [ms]	O	O	O	O	X	X
79	0h134F	DB Turn On Lev	DB Unit Operating Voltage	200V : 350~400[V]	390[V]	X	O	O	O	O	O
				400V : 600~800[V]	780[V]						
80	0h1350	Fire Mode Sel	Fire Function Select	0 None 1 Fire Mode 2 Fire Test	0:None	X	O	O	O	X	X
81주16)	0h1351	Fire Mode Freq	Fire Mode Frequency	0~Max Freq[Hz]	50.00	X	O	O	O	X	X
82	0h1352	Fireq Mode Dir	Fire Mode Operating Direction	0 Forward 1 Reverse	0:Forward	X	O	O	O	X	X
83	-	Fire Mode Cnt	Fire Mode Counter	0~99	0	X	O	O	O	X	X

* ▭ The grey code refers to hidden code, emerging only in case of setting of the code.

Note 14) ADV-71~72 is displayed only when ADV-70 (Run En Mode) is set as “DI Dependent”.

Note15) ADV-76~78 is displayed only when ADV-75 (RegenAvd Sel) is set as “Yes”.

Note 16) ADV-81~83 is displayed only when it is set as “Fire Mode” or “Fire Test” at ADV-80.

8.1.4 Parameter mode – Control function group (➔CON)

No.	Comm. No.	Function Display	Name	Setting Range	Initial Value	Shift in Operation	Control Mode				
							V/F	SL	VC	SLT	VCT
00	-	Jump Code	jump code	0 ~ 99	51	O	O	O	O	O	O
04	0h1404	Carrier Freq	carrier frequency	Below 22kW: 0.7 ~ 15 [kHz]	5.0	O	O	O	O	O	O
				30 ~ 45kW: 0.7 ~ 10 [kHz]	5.0						
				55 ~ 75kW: 0.7 ~ 7 [kHz]	200V: 3.0 / 400V: 5.0						
				90 ~ 110kW: 0.7 ~ 6 [kHz]	3.0						
				132 ~ 160kW: 0.7 ~ 5 [kHz]	3.0						
				185 ~ 220kW: 0.7 ~ 3 [kHz]	2.0						
				280 ~ 375kW: 0.7 ~ 2 [kWz]	2.0						
05	0h1405	PWM Mode	switching mode	0 Normal PWM 1 Lowleakage PWM	0 : Normal PWM	X	O	O	O	O	O
09	0h1409	PreExTime	Initial flux time	0 ~ 60 [s]	1.00	X	X	X	O	O	O
10	0h140A	Flux Force	Initial flux power supply	100 ~ 500 [%]	100.0	X	X	X	O	O	O
11	0h140B	Hold Time	permanent operation sustaining time	0 ~ 60 [s]	Depends on control mode	X	X	X	O	X	X
12	0h140C	ASR P Gain 1	speed control period proportional gain1	10 ~ 500 [%]	50.0	O	X	X	O	X	X
13	0h140D	ASR I Gain 1	speed control period integral calculus gain 1	10 ~ 9999 [ms]	300	O	X	X	O	X	X
15	0h140F	ASR P Gain 2	speed control period Proportional gain2	1 ~ 500 [%]	50.0	O	X	X	O	X	X
16	0h1410	ASR I Gain 2	speed control period integral calculus gain2	10 ~ 9999 [ms]	300	O	X	X	O	X	X
18	0h1412	Gain SW Freq	gain exchange frequency	0 ~ 120 [Hz]	0.00	X	X	X	O	X	X
19	0h1413	Gain Sw Delay	gain exchange time	0 ~ 100 [s]	0.10	X	X	X	O	X	X
20	0h1414	SL2 G View Sel	Sensorless 2 2nd gain display setting	0 No 1 Yes	0 : No	O	X	X	X	X	X
21	0h1415	ASR-SL P	sensorless1, 2	0 ~ 5000 [%]	Depends on	O	X	O	X	X	X

No.	Comm. No.	Function Display	Name	Setting Range	Initial Value	Shift in Operation	Control Mode				
							V/F	SL	VC	SLT	VCT
		Gain1	speed control period proportional gain1		motor capacity						
22	0h1416	ASR-SL I Gain1	sensorless1, 2 speed control period integral calculus gain 1	10 ~ 9999 [ms]		0	X	O	X	X	X
23 Note 16)	0h1417	ASR-SL P Gain2	Sensorless 2 speed control period proportional gain 2	1.0 ~ 1000.0 [%]	Depends on motor capacity	0	X	X	X	X	X
24	0h1418	ASR-SL I Gain2	Sensorless 2 speed control period integral calculus gain 2			0	X	X	X	X	X
26	0h141A	Observer Gain1	Sensorless 2 measurer gain 1	0 ~ 30000	10500	0	X	X	X	X	X
27	0h141B	Observer Gain2	Sensorless 2 measurer gain 2	1 ~ 1000 [%]	100.0	0	X	X	X	X	X
28	0h141C	Observer Gain3	Sensorless 2 measurer gain 3	0 ~ 30000	13000	0	X	X	X	X	X
29	0h141D	S-Est P Gain1	Sensorless 2 speed estimator proportional gain 1	0 ~ 30000	Depends on motor capacity	0	X	X	X	X	X
30	0h141E	S-Est I Gain1	Sensorless 2 speed estimator integral calculus gain1			0	X	X	X	X	X
31	0h141F	S-Est P Gain2	Sensorless2 speed estimator proportional gain2	1.0 ~ 1000.0 [%]	Depends on motor capacity	0	X	X	X	X	X
32	0h1420	S-Est I Gain2	Sensorless2 speed estimator integral calculus gain2			0	X	X	X	X	X
34	0h1422	SL2 OVM Perc	Sensorless2 overvoltage modulation range adjustment	100 ~ 180 [%]	120	X	X	O	X	X	X
45 Note17)	0h142D	PG P Gain	PG operation proportional gain	0 ~ 9999	3000	0	O	X	X	X	X
46	0h142E	PG I Gain	PG operation integral calculus		50	0	O	X	X	X	X

No.	Comm. No.	Function Display	Name	Setting Range	Initial Value	Shift in Operation	Control Mode				
							V/F	SL	VC	SLT	VCT
			gain								
47	0h142F	PG Slip Max%	PG operation maximum sleep	0 ~ 200	100	X	O	X	X	X	X
48	-	ACR P Gain	Current control period P gain	0 ~ 10000	1200	O	X	O	O	O	O
49	-	ACR I Gain	Current control period I gain		120	O	X	O	O	O	O
51	0h1433	ASR Ref LPF	speed control period reference filter	0 ~ 20000 [ms]	0	X	X	O	O	X	X
52	0h1434	Torque Out LPF	Torque control period Output filter	0 ~ 2000 [ms]	0	X	X	X	X	O	O
53	0h1435	Torque Lmt Src	Torque limit Setting method	0 Keypad-1 1 Keypad-2 2 V1 3 I1 4 V2 5 I2 6 Int 485 7 Encoder 8 FiedBus 9 PLC 10 Synchro 11 Binary Type	0 :Keypad-1	X	X	X	X	X	O	O
54 Note18)	0h1436	FWD +Trq Lmt	forward offsetting Torque limit	0 ~ 200 [%]	180.0	O	X	X	X	O	O
55	0h1437	FWD –Trq Lmt	forward regenerative torque limit			O	X	X	X	O	O
56	0h1438	REV +Trq Lmt	reverse offsetting torque limit			O	X	X	X	O	O
57	0h1439	REV –Trq Lmt	reverse regenerative torque limit			O	X	X	X	O	O

* ▭ The grey code refers to hidden code, emerging only in case of setting of the code.

Note 16) CON-23~28, 31~32 are displayed only when DRV-09 (Control Mode) is “Sensorless2” and CON-20 (SL2 G View Sel) is set as “YES”.

Note 17) CON-45~47 are displayed when Encoder Board is inserted and Control mode is V/F PG.

Note 18) CON-54~57 are displayed only when DRV-09(Control Mode) is set as “Sensorless-1, 2” or “Vector”. The initial value of torque limit will be changed to 150% with the setting of ADV-74.

No.	Comm. No.	Function Display	Name	Setting Range	Initial Value	Shift in Opera-tion	1)Control Mode				
							V/F	SL	VC	SLT	VCT
58	0h143A	Trq Bias Src	torque bias setting method	0 Keypad-1 1 Keypad-2 2 V1 3 I1 4 V2 5 I2 6 Int 485 7 FiedBus 8 PLC	0:Keypad-1	X	X	X	O	X	X
59	0h143B	Torque Bias	torque bias	-120 ~ 120 [%]	0.0	O	X	X	O	X	X
60	0h143C	Torque Bias FF	torque bias compensation	0 ~ 100 [%]	0.0	O	X	X	O	X	X
62	0h143E	Speed Lmt Src	Speed limit setting method	0 Keypad-1 1 Keypad-2 2 V1 3 I1 4 V2 5 I2 6 Int 485 7 FiedBus 8 PLC	0:Keypad-1	O	X	X	X	X	O
63	0h143F	FWD Speed Lmt	forward speed limit	0 ~ max. freq.[Hz]	50.00	O	X	X	X	X	O
64	0h1440	REV Speed Lmt	reverse speed limit			O	X	X	X	X	O
65	0h1441	Speed Lmt Gain	Speed limit operation gain	100 ~ 5000 [%]	500	O	X	X	X	X	O
66	0h1442	Droop Perc	droop operation amount	0 ~ 100 [%]	0.0	O	X	X	X	X	O
67 Note19)	0h1443	Droop St Trq	droop start torque	0 ~ 100 [%]	100.0	O	X	X	X	X	O
68	0h1444	SPD/TRQ Acc T	torque mode→speed mode exchange accelerating time	0 ~ 600 [s]	20.0	O	X	X	X	X	O
69	0h1445	SPD/TRQ Acc T	torque mode→speed mode exchange decelerating time		30.0	O	X	X	X	X	O

* ▭ Note 19) The grey code refers to hidden code, emerging only in case of setting of the code. CON-67 is displayed only when Encoder option board is mounted.

No.	Comm. No.	Function Display	Name	Setting Range	Initial Value	Shift in Operation	1)Control Mode				
							V/F	SL	VC	SLT	VCT
70	0h1446	SS Mode	Speed search mode selection	0 Flying Start-1 1 Flying Start-2	0	X	O	O	O	X	X
71	0h1447	Speed Search	Speed search operation selection	Bit 0000 ~ 1111 1 accelerating speed search selection 2 Reset start after trip 3 Re-start after instantaneous interruption 4 Start immediately after power ON	0000	X	O	O	O	X	X
72 Note20)	0h1448	SS Sup-Current	speed search standard current	80 ~ 200 [%]	Below 75kW 150 Above 90kW 100	O	O	O	X	X	X
73	0h1449	SS P-Gain	speed search proportional gain	0 ~ 9999	100	O	O	O	X	X	X
74	0h144A	SS I-Gain	speed search integral calculus gain	0 ~ 9999	200	O	O	O	X	X	X
75	0h144B	SS Block Time	Pre-speed search output block time	0 ~ 60 [s]	1.0	X	O	O	X	X	X
77	0h144D	KEB Select	energy buffering selection	0 None 1 KEB-1 2 KEB-2	0:None	X	O	O	O	X	X
78 Note20)	0h144E	KEB Start Lev	energy buffering start amount	110 ~ 200 [%]	125.0	X	O	O	O	X	X
79	0h144F	KEB Stop Lev	energy buffering stop amount	125 ~ 210 [%]	130.0	X	O	O	O	X	X
82 Note21)	0h1452	ZSD Frequency	permanent detection frequency	0 ~ 10 [Hz]	2.00	O	X	X	O	X	O
83	0h1453	ZSD Band	permanent detection frequency band	0 ~ 2 [Hz]	1.00	O	X	X	O	X	O
86 Note 22)	0h1456	KEB P Gain	Energy Buffering P Gain	0~20000	1000	O	O	O	O	X	X

87	0h1457	KEB I Gain	Energy Buffering I Gain		1~20000	500	O	O	O	O	X	X
88	0h1458	KEB Slip Gain	Energy Buffering Slip Gain		0~2000.0[%]	30.0	O	O	O	O	X	X
89	0h1459	KEB Acc Time	Energy Buffering Return Acceleration Time		0~600[sec]	10.0	O	O	O	O	X	X
90	0h145A	New AHR Sel	Selcting the Current anti-hunting	0	No	0:No	o	X	X	X	X	
				1	Yes							
91	0h145B	AHR P-Gain	Current Anti-hunting Function Protection		0~32767	1000	X	o	X	X	X	X

* ▭ The grey code refers to hidden code, emerging only in case of setting of the code.

Note 20) CON-72~75 are displayed only when CON-71,77 (KEB Select) is set as bit or other than "None".

Note 21) CON-82~83 are displayed only when DRV-09 (Control Mode) is set as "Vector".

Note 22) CON-78~79,86~89 are displayed only when CON-77 (KEB Select) is set as "KEB-1" or "KEB-2".

8.1.5 Parameter mode – Input terminal block function group (➔IN)

No.	Comm. No.	Function Display	Name	Setting Range	Initial Value	Shift in Operation	Control Mode				
							V/F	SL	VC	SLT	VCT
00	-	Jump Code	jump code	0 ~ 99	65	O	0	0	0	0	0
01	0h1501	Freq at 100%	Analog maximum input frequency	Start freq. ~ max. freq.[Hz]	50.00	O	0	0	0	X	X
02	0h1502	Torque at100%	Analog maximum input torque	0 ~ 200 [%]	100.0	O	X	X	0	0	0
05	0h1505	V1 Monitor [V]	V1 input amount display	0 ~ 10 [V]	0.00	O	0	0	0	0	0
06	0h1506	V1 Polarity	V1 input polar selection	0 Unipolar 1 Bipolar	0: Unipolar	X	0	0	0	0	0
07	0h1507	V1 Filter	V1 input filter time constant	0 ~ 10000 [ms]	10	O	0	0	0	0	0
08	0h1508	V1 Volt x1	V1input minimum voltage	0 ~ 10 [V]	0.00	O	0	0	0	0	0
09	0h1509	V1 Perc y1	V1minimum voltage output %	0 ~ 100 [%]	0.00	O	0	0	0	0	0
10	0h150A	V1 Volt x2	V1input maximum voltage	0 ~ 10 [V]	10.00	O	0	0	0	0	0
11	0h150B	V1 Perc y2	V1maximum voltage output %	0 ~ 100 [%]	100.00	O	0	0	0	0	0
12 Note 22)	0h150C	V1 (–)Volt x1'	V1(–)input minimum voltage	-10 ~ 0 [V]	0.00	O	0	0	0	0	0
13	0h150D	V1(–)Perc y1'	V1(–)minimum voltage output %	-100 ~ 0 [%]	0.00	O	0	0	0	0	0
14	0h150E	V1(–)Volt x2'	V1(–)input maximum voltage	-10 ~ 0 [V]	-10.00	O	0	0	0	0	0
15	0h150F	V1(–)Perc y2'	V1(–)maximum voltage output %	-100 ~ 0 [%]	-100.00	O	0	0	0	0	0
16	0h1510	V1 Inverting	rotation direction change	0 No 1 Yes	0: No	O	0	0	0	0	0
17	0h1511	V1 Quantizing	V1 quantization level	0.04 ~ 10 [%]	0.04	O	0	0	0	0	0
20	0h1514	I1 Monitor [mA]	I1input amount display	0 ~ 20 [mA]	0.00	O	0	0	0	0	0
22	0h1516	I1 Filter	I1input filter time constant	0 ~ 10000 [ms]	10	O	0	0	0	0	0
23	0h1517	I1 Curr x1	I1input minimum current	0 ~ 20 [mA]	4.00	O	0	0	0	0	0
24	0h1518	I1 Perc y1	Output at I1 minimum current %	0 ~ 100 [%]	0.00	O	0	0	0	0	0
25	0h1519	I1 Curr x2	I1input maximum current	4 ~ 20 [mA]	20.00	O	0	0	0	0	0
26	0h151A	I1 Perc y2	Output at I1maximumcurrent	0 ~ 100 [%]	100.00	O	0	0	0	0	0
31	0h151F	I1 Inverting	rotation direction change	0 No 1 Yes	0: No	O	0	0	0	0	0
32	0h1520	I1 Quantizing	I1 quantization level	0.04 ~ 10 [%]	0.04	O	0	0	0	0	0

Note 22) IN-12~15 codes are displayed only when IN-06 (V1 Polarity) is set as “Bipolar”.

No.	Comm. No.	Function Display	Name	Setting Range	Initial Value	Shift in Operation	Control Mode				
							V/F	SL	VC	SLT	VCT
35 Note 23)	0h1523	V2 Monitor [V]	V2 input amount display	0 ~ 10 [V]	0.00	O	O	O	O	O	O
36	0h1524	V2 Polarity	V1 input polarity selection	0 Unipolar 1 Bipolar	1: Bipolar	O	O	O	O	O	O
37	0h1525	V2 Filter	V2 input filter time constant	0 ~ 10000 [ms]	10	O	O	O	O	O	O
38	0h1526	V2 Volt x1	V2input minimum voltage	0 ~ 10 [V]	0.00	O	X	X	O	O	O
39	0h1527	V2 Perc y1	output% at V2 minimum voltage	0 ~ 100 [%]	0.00	O	O	O	O	O	O
40	0h1528	V2 Volt x2	V2 input maximum voltage	0 ~ 10 [V]	10.00	O	X	X	O	O	O
41	0h1529	V2 Perc y2	output% at V2 maximum voltage	0 ~ 100 [%]	100.00	O	O	O	O	O	O
42	0h152A	V2 –Volt x1'	V2 –input minimum voltage	-10 ~ 0 [V]	0.00	O	O	O	O	O	O
43	0h152B	V2–Perc y1'	output% at V2–minimum voltage	-100 ~ 0 [%]	0.00	O	O	O	O	O	O
44	0h152C	V2 –Volt x2'	V2 –input maximum voltage	-10 ~ 0 [V]	-10.00	O	O	O	O	O	O
45	0h152D	V2 –Perc y2'	output% at V2–maximum voltage	-100 ~ 0 [%]	-100.00	O	O	O	O	O	O
46	0h152E	V2 Inverting	rotation direction change	0 No 1 Yes	0 : No	O	O	O	O	O	O
47	0h152F	V2 Quantizing	V2 quantization level	0.04 ~ 10 [%]	0.04	O	O	O	O	O	O
50	0h1532	I2 Monitor [mA]	I2 input amount display	0 ~ 20 [mA]	0.00	O	O	O	O	O	O
52	0h1534	I2 Filter	I2 input filter time constant	0 ~ 10000 [ms]	15	O	O	O	O	O	O
53	0h1535	I2 Curr x1	I2 input minimum current	0 ~ 20 [mA]	4.00	O	O	O	O	O	O
54	0h1536	I2 Perc y1	output% at I2 minimum current	0 ~ 100 [%]	0.00	O	O	O	O	O	O
55	0h1537	I2 Curr x2	I2 input maximum current	4 ~ 20 [mA]	20.00	O	O	O	O	O	O
56	0h1538	I2 Perc y2	output% at I2 maximum current	0 ~ 100 [%]	100.00	O	O	O	O	O	O
61	0h153D	I2 Inverting	rotation direction change	0 No 1 Yes	0 : No	O	O	O	O	O	O
62	0h153F	I2 Quantizing	I2 quantization level	0.04 ~ 10 [%]	0.04	O	O	O	O	O	O

*[ ] The grey code refers to hidden code, emerging only in case of setting of the code.

Note 23) IN-35~62 codes are displayed only when the extended IO board is mounted.

INo.	Comm. No.	Function Display	Name		Setting Range		Initial Value	Shift in Operation	Control Mode				
									V/F	SL	VC	SLT	VCT
65	0h1541	P1 Define	Terminal function setting	P1	0	NONE	1 : FX	X	0	0	0	0	0
					1	FX							
66	0h1542	P2 Define		P2	2	RX	2 : RX	X	X	X	0	0	0
67	0h1543	P3 Define		P3	3	RST	5 : BX	X	0	0	0	0	0
68	0h1544	P4 Define		P4	4	External Trip	3 :RSTt	X	0	0	0	0	0
69	0h1545	P5 Define		P5	5	BX	7 : Sp-L	X	0	0	0	0	0
70	0h1546	P6 Define		P6	6	JOG	8: Sp-M	X	0	0	0	0	0
71	0h1547	P7 Define		P7	7	Speed-L	9: Sp-H	X	0	0	0	0	0
72	0h1548	P8 Define		P8	8	Speed-M	6: JOG	X	0	0	0	0	0
73 Note24)	0h1549	P9 Define		P9	9	Speed-H	0: NONE	X	0	0	0	0	0
74	0h154A	P10 Define		P10	10	Speed-X		X	0	0	0	0	0
75	0h154B	P11 Define		P11	11	XCEL-L		X					
-	-	-	-		12	XCEL-M	-	-	-	-	-	-	-
					13	RUN Enable							
					14	3-Wire							
					15	2nd Source							
					16	Exchange							
					17	Up							
					18	Down							
					19	U/D Save							
					20	U/D Clear							
					21	Analog Hold							
					22	I-Term Clear							
					23	PID Openloop							
					24	P Gain2							
					25	XCEL Stop							
					26	2nd Motor							
					27	Trv Offset Lo							
					28	Trv Offset Hi							
					29	Interlock 1							
					30	Interlock 2							
					31	Interlock 3							
					32	Interlock 4							

*[ ] The grey code refers to hidden code, emerging only in case of setting of the code.

Note 24) IN73~75 codes are displayed only when the extended IO board is mounted.

No.	Comm. No.	Function Display	Name	Setting Range	Initial Value	Shift in Operation	Control Mode				
							V/F	SL	VC	SLT	VCT
-	-	-	-	33 -Reserved- 34 Pre Excite 35 Speed/Torque 36 ASR Gain 2 37 ASR P/PI 38 Timer In 39 Thermal In 40 Dis Aux Ref 41 SEQ-1 42 SEQ-2 43 Manual 44 Go Step 45 Hold Step 46 FWD JOG 47 REV JOG 48 Trq Bias 49 XCEL-H 50 KEB Select 51 Fire Mode	-	-	-	-	-	-	-
85	0h1555	DI On Delay	multi-function input terminal ON filter	0 ~ 10000 [ms]	10	O	O	O	O	O	O
86	0h1556	DI Off Delay	multi-function input terminal OFF filter		3	O	O	O	O	O	O
87	0h1557	DINC/NO Sel	multi-function input contact point selection	P8 – P1 0 A contact point (NO) 1 B contact point (NC)	0000 0000	X	O	O	O	O	O
88	0h1558	RunOn Delay	operating command delay time	0 ~ 100 [s]	0.00	X	O	O	O	O	O
89	0h1559	InCheck Time	sequential command delay time	1 ~ 5000 [ms]	1	X	O	O	O	O	O
90	0h155A	DI Status	multi-function input terminal status	P8 – P1 0 On 1 OFF	0000 0000	O	O	O	O	O	O

8.1.6 Parameter mode – Output terminal block function group (➔OUT)

IN o.	Comm. No.	Function Display	Name	Setting Range	Initial Value	Shift in Operation	Control Mode				
							V/F	SL	VC	SLT	VCT
00	-	JumpCode	jump code	0 ~ 99	30	O	O	O	O	O	O
01	0h1601	AO1 Mode	analog output1 item	0 Frequency 1 Current 2 Voltage 3 DC Link Volt 4 Torque 5 Watt 6 Idse 7 Iqse 8 Target Freq 9 Ramp Freq 10 Speed Fdb 11 Speed Dev 12 PIDRef Value 13 PIDFbk Value 14 PID Output 15 Constant	0: Frequency	O	O	O	O	O	O
02	0h1602	AO1 Gain	analog output1 gain	-1000 ~ 1000 [%]	100.0	O	O	O	O	O	O
03	0h1603	AO1 Bias	analog output 1 bias	-100 ~ 100 [%]	0.0	O	O	O	O	O	O
04	0h1604	AO1 Filter	analog output1 filter	0 ~ 10000 [ms]	5	O	O	O	O	O	O
05	0h1605	AO1 Const %	analog constant output 1	0 ~ 100 [%]	0.0	O	O	O	O	O	O
06	0h1606	AO1 Monitor	analog output 1 monitor	0 ~ 1000 [%]	0.0	-	O	O	O	O	O
07	0h1607	AO2 Mode	analog output 2 item	0 Frequency 1 Current 2 Voltage 3 DC Link Volt 4 Torque 5 Watt 6 Idse 7 Iqse 8 Target Freq 9 Ramp Freq 10 Speed Fdb 11 Speed Dev 12 PIDRef Value 13 PIDFbk Value 14 PID Output 15 Constant	0: Frequency	O	O	O	O	O	O

No.	Comm. No.	Function Display	Name	Setting Range	Initial Value	Shift in Operation	Control Mode				
							V/F	SL	VC	SLT	VCT
08	0h1608	AO2 Gain	analog output 2 gain	-1000 ~ 1000 [%]	80.0	0	0	0	0	0	0
09	0h1609	AO2 Bias	analog output 2bias	-100 ~ 100 [%]	20.0	0	0	0	0	0	0
10	0h160A	AO2 Filter	analog output 2 filter	0 ~ 10000 [ms]	5	0	0	0	0	0	0
11	0h160B	AO2Const %	analog constant output 2	0 ~ 100 [%]	0.0	0	0	0	0	0	0
12	0h160C	AO2 Monitor	analog output 2 monitor	0 ~ 1000 [%]	0.0	0	0	0	0	0	0
14 Note25)	0h160E	AO3 Mode	analog output3 item	0 Frequency 1 Current 2 Voltage 3 DC Link Volt 4 Torque 5 Watt 6 Idse 7 Iqse 8 Target Freq 9 Ramp Freq 10 Speed Fdb 11 Speed Dev 12 PID Ref Value 13 PID Fbk Value 14 PID Output 15 Constant	0 : Frequency	0	0	0	0	0	0
15	0h160F	AO3 Gain	analog output 3 gain	-1000 ~ 1000 [%]	100.0	0	0	0	0	0	0
16	0h1610	AO3 Bias	analog output 3bias	-100 ~ 100 [%]	0.0	0	0	0	0	0	0
17	0h1611	AO3 Filter	analog output 3 filter	0 ~ 10000 [ms]	5	0	0	0	0	0	0
18	-	AO3 Const %	analog constant output 3	0 ~ 100 [%]	0.0	0	0	0	0	0	0
19	0h1613	AO3 Monitor	analog output 3 monitor	-1000 ~ 1000 [%]	0.0	0	0	0	0	0	0
20	0h1614	AO4 Mode	analog output4 item	0 Frequency 1 Current 2 Voltage 3 DC Link Volt 4 Torque 5 Watt 6 Idse 7 Iqse 8 Target Freq 9 Ramp Freq 10 Speed Fdb 11 Speed Dev 12 PID Ref Value 13 PID Fdb Value 14 PID Output 15 Constant	0 : Frequency	-	0	0	0	0	0

No.	Comm. No.	Function Display	Name	Setting Range		Initial Value	Shift in Operation	Control Mode				
								V/F	SL	VC	SLT	VCT
21	0h1615	AO4 Gain	analog output 4 gain	-1000 ~ 1000 [%]		80.0	-	O	O	O	O	O
22	0h1616	AO4 Bias	analog output 4 bias	-100 ~ 100 [%]		20.0	O	O	O	O	O	O
23	0h1617	AO4 Filter	analog output 4 filter	0 ~ 10000 [ms]		5	O	O	O	O	O	O
24	-	AO4 Const %	analog constant output 4	0 ~ 100 [%]		0.0	O	O	O	O	O	O
25	0h1619	AO4 Monitor	analog output 4 monitor	0 ~ 1000 [%]		0.0	O	O	O	O	O	O
30	0h161E	Trip Out Mode	failure output item	Bit	000 ~ 111	010	O	O	O	O	O	O
				1	low voltage							
				2	Failure other than low voltage							
				3	Final failure of automatic re-start							
31	0h161F	Relay 1	multi-function relay1item	0	NONE	29 : Trip	O	O	O	O	O	O
32	0h1620	Relay 2	multi-function relay 2 item	1	FDT-1	14 : Run	O	O	O	O	O	O
33	0h1621	Q1 Define	multi-function output 1 item	2	FDT-2	1 : FDT-1	O	O	O	O	O	O
34 Note26)	0h1622	Relay 3	multi-function output 3 item	3	FDT-3	2 : FDT-2	O	O	O	O	O	O
35	0h1623	Relay 4	multi-function output 4 item	4	FDT-4	3 : FDT-3	O	O	O	O	O	O
36	0h1624	Relay 5	multi-function output 5 item	5	Over Load	4 : FDT-4	O	O	O	O	O	O
-	-	-	-	6	IOL	-	-	-	-	-	-	-
				7	Under Load							
				8	Fan Warning							
				9	Stall							
				10	Over Voltage							
				11	Low Voltage							
				12	Over Heat							
				13	Lost Command							
				14	Run							
				15	Stop							
				16	Steady							
				17	Inverter Line							
				18	Comm Line							
				19	Speed Search							
				20	Step Pulse							
				21	Seq Pulse							
				22	Ready							
				23	Trv Acc							
				24	Trv Dec							
				25	MMC							
				26	Zspd Dect							
				27	Torque Dect							
				28	Timer Out							

Note 25) OUT 14~25 codes are displayed only when the extended IO board is mounted.

Note 26) OUT 34~36 codes are displayed only when the extended IO board is mounted.

No.	Comm. No.	Function	Name	Setting Range	Initial	Shift in	Control Mode

		Display				Value	Operation	V/F	SL	VC	SLT	VCT
-	-	-	-	29	Trip	-	-	-	-	-	-	-
				30	Lost Keypad							
				31	DB Warn%ED							
				32	ENC Tune							
				33	ENC Dir							
				34	On/Off Control							
				35	BR Control							
				36	KEB Operating							
				37	Fire Mode							
41	0h1629	DO Status	multi-function output monitoring	-		000	X	-	-	-	-	-
50	0h1632	DO On Delay	multi-function output ON delay	0 ~ 100 [s]		0.00	O	O	O	O	O	O
51	0h1633	DO Off Delay	multi-function output OFF delay			0.00	O	O	O	O	O	O
52	0h1634	DO NC/NO Sel	multi-function output contact point selection	Q1,Relay2,Relay1		000	X	O	O	O	O	O
				0	A contact point (NO)							
				1	B contact point (NC)							
53	0h1635	TripOut OnDly	failure output ON delay	0 ~ 100 [s]		0.00	O	O	O	O	O	O
54	0h1636	TripOut OffDly	failure output OFF delay	0 ~ 100.00 [s]		0.00	O	O	O	O	O	O
55	0h1637	TimerOn Delay	timer ON delay			0.00	O	O	O	O	O	O
56	0h1638	TimerOff Delay	timer OFF delay			0.00	O	O	O	O	O	O
57	0h1639	FDT Frequency	detection frequency	0 ~ max. freq.[Hz]		30.00	O	O	O	O	O	O
58	0h163A	FDT Band	detection frequency width			10.00	O	O	O	O	O	O
59	0h163B	TD Level	detection torque amount	0 ~ 150 [%]		100	O	X	X	O	X	O
60	0h163C	TD Band	detection torque width	0 ~ 10 [%]		5.0	O	X	X	O	X	O

*▭ The grey code refers to hidden code, emerging only in case of setting of the code.

8.1.7 Parameter mode – Communication function group (➔COM)

No.	Comm. No.	Function Display	Name	Setting Range	Initial Value	Shift in Operation	Control Mode				
							V/F	SL	VC	SLT	VCT
00	-	Jump Code	jump code	0 ~ 99	20	0	0	0	0	0	0
01	0h1701	Int485 St ID	built-in communication inverter ID	1 ~ 250	1	0	0	0	0	0	0
02	0h1702	Int485 Proto	built-in communication protocol	0 ModBus RTU 1 --Reserved -- 2 Serial Debug	0: ModBus RTU	0	0	0	0	0	0
03	0h1703	Int485 BaudR	built-in communication speed	0 1200 bps 1 2400 bps 2 4800 bps 3 9600 bps 4 19200 bps 5 38400 bps	3: 9600 bps	0	0	0	0	0	0
04	0h1704	Int485 Mode	built-in communication frame setting	0 D8/PN/S1 1 D8/PN/S2 2 D8/PE/S1 3 D8/PO/S1	0: D8/PN/S1	-	0	0	0	0	0
05	0h1705	Resp Delay	Transmission delay after reception	0 ~ 1000 [ms]	5ms	0	0	0	0	0	0
06 Note27)	0h1706	FBus S/W Ver	communication option S/W version	-	1.00	0	0	0	0	0	0
07	0h1707	FBus ID	communication option inverter ID	0 ~ 255	1	0	0	0	0	0	0
08	0h1708	FBUS BaudRate	FBus communication speed	-	12Mbps	-	0	0	0	0	0
09	0h1709	FieldBus LED	communication option LED status	-	-	0	0	0	0	0	0
30	0h171E	ParaStatus Num	-	0 ~ 8	3	0	0	0	0	0	0
31	0h171F	Para Stauts-1	output address 1	0000 ~ FFFF Hex	000A	0	0	0	0	0	0
32	0h1720	Para Stauts-2	output address 2		000E	0	0	0	0	0	0
33	0h1721	Para Stauts-3	output address 3		000F	0	0	0	0	0	0
34	0h1722	Para Stauts-4	output address 4		0000	0	0	0	0	0	0
35	0h1723	Para Stauts-5	output address 5		0000	0	0	0	0	0	0
36	0h1724	Para Stauts-6	output address 6		0000	0	0	0	0	0	0
37	0h1725	Para Stauts-7	output address 7		0000	0	0	0	0	0	0
38	0h1726	Para Stauts-8	output address 8		0000	0	0	0	0	0	0

*[ ] Note 27) The grey code refers to hidden code, emerging only in case of setting of the code. COM 06~17 codes are displayed only when the communication option card is mounted. Refer to Option manual for Option.

No.	Comm. No.	Function Display	Name		Setting Range		Initial Value	Shift in Opera-tion	Control Mode				
									V/F	SL	VC	SLT	VCT
50	0h1732	Para Ctrl Num	-		0 ~ 8		2	0	0	0	0	0	0
51	0h1733	Para Control-1	input address	1	0000 ~ FFFF Hex		0005	X	0	0	0	0	0
52	0h1734	Para Control-2		2			0006	X	0	0	0	0	0
53	0h1735	Para Control-3		3			0000	X	0	0	0	0	0
54	0h1736	Para Control-4		4			0000	X	0	0	0	0	0
55	0h1737	Para Control-5		5			0000	X	0	0	0	0	0
56	0h1738	Para Control-6		6			0000	X	0	0	0	0	0
57	0h1739	Para Control-7		7			0000	X	0	0	0	0	0
58	0h173A	Para Control-8		8			0000	X	0	0	0	0	0
68	0h1744	FBus Swap Sel	Profibus swap		0	No	0:No	X	0	0	0	0	0
					1	Yes							
70	0h1746	Virtual DI 1	communication multi-function input	1	0	None	0 : None	0	0	0	0	0	0
71	0h1747	Virtual DI 2		2	1	FX		0	0	0	0	0	0
72	0h1748	Virtual DI 3		3	2	RX		0	0	0	0	0	0
73	0h1749	Virtual DI 4		4	3	RST		0	0	0	0	0	0
74	0h174A	Virtual DI 5		5	4	External Trip		0	0	0	0	0	0
75	0h174B	Virtual DI 6		6	5	BX		0	0	0	0	0	0
76	0h174C	Virtual DI 7		7	6	JOG		0	0	0	0	0	0
77	0h174D	Virtual DI 8		8	7	Speed-L		0	0	0	0	0	0
78	0h174E	Virtual DI 9		9	8	Speed-M		0	0	0	0	0	0
79	0h174F	Virtual DI 10		10	9	Speed-H		0	0	0	0	0	0
80	0h1750	Virtual DI 11		11	10	Speed-X		0	0	0	0	0	0
81	0h1751	Virtual DI 12		12	11	XCEL-L		0	0	0	0	0	0
82	0h1752	Virtual DI 13		13	12	XCEL-M		0	0	0	0	0	0
83	0h1753	Virtual DI 14		14	13	RUN Enable		0	0	0	0	0	0
84	0h1754	Virtual DI 15		15	14	3-Wire		0	0	0	0	0	0
85	0h1755	Virtual DI 16		16	15	2nd Source		0	0	0	0	0	0
-	-	-	-		16	Exchange	0 : None	0	0	0	0	0	0
					17/18	Up/Down							
					19	Reserved							
					20	U/D Clear							
					21	Analog Hold							
					22	I-Term Clear							
					23	PID Openloop							
					24	P Gain2							
					25	XCEL Stop							
					26	2nd Motor							
					27	Trv Offset Lo							
					28	Trv Offset Hi							
					29	Interlock 1							
					30	Interlock 2							

No.	Comm. No.	Function Display	Name	Setting Range		Initial Value	Shift in Opera-tion	Control Mode				
								V/F	SL	VC	SLT	VCT
				31	Interlock 3							
				32	Interlock 4							
				33	Reserved							
				34	Pre Excite							
				35	Speed/Torque							
				36	ASR Gain 2							
				37	ASR P/PI							
				38	Timer In							
				39	Thermal In							
				40	Dis Aux Ref							
				41	SEQ-1							
				42	SEQ-2							
				43	Manual							
				44	Go Step							
				45	Hold Step							
				46	FWD JOG							
				47	REV JOG							
				48	Trq Bias							
				49	XCEL-H							
				50	KEB Select							
				51	Fire Mode							
86	0h1756	Virt DI Status	Comm. Multi-function input monitoring	-	-	0	X	O	O	O	O	O
90	0h175A	Comm Mon Sel	monitor type selection	0	Int 485	0: Int 485	O	O	O	O	O	O
				1	Keypad							
91	0h175B	RcvFrame Num	Number of reception frames	-		0	-	O	O	O	O	O
92	0h175C	Err Frame Num	Number of error frames	-		0	-	O	O	O	O	O
93	0h175D	Nak Frame Num	Number of writing error frames	-		0	-	O	O	O	O	O
94 note 27-2)	-	Comm Update	-	0	No	0	-	O	O	O	O	O
				1	Yes							

note27-2) COM 94 is displayed when communication option board is inserted.

8.1.8 Parameter mode – Applied function group (➔APP)

No.	Comm. No.	Function Display	Name	Setting Range	Initial Value	Shift in Opera-tion	Control Mode				
							V/F	SL	VC	SLT	VCT
00	-	Jump Code	jump code	0 ~ 99	20	O	O	O	O	O	O
01	0h1801	App Mode	applied function selection	0 None 1 Traverse 2 Proc PID 3 Reserved 4 Auto Sequence	0: None	X	O	O	O	X	X
08 Note28)	0h1808	Trv Apmlit %	traverse operating range	0 ~ 20 [%]	0.0	O	O	O	O	X	X
09	0h1809	Trv Scramb %	traverse scramble magnitude	0 ~ 50 [%]	0.0	O	O	O	O	X	X
10	0h180A	Trv Acc Time	traverse accelerating time	0.1 ~ 600.0 [s]	2.0	O	O	O	O	X	X
11	0h180B	Trv Dec Time	traverse decelerating time		3.0	O	O	O	O	X	X
12	0h180C	Trv Offset Hi	traverse offset upper limit	0 ~ 20.0 [%]	0.0	O	O	O	O	X	X
13	0h180D	Trv Offset lo	traverse offset lower limit		0.0	O	O	O	O	X	X
16 Note 29)	0h1810	PID Output	PID output monitor	[%]	0.00	-	O	O	O	X	X
17	0h1811	PID Ref Value	PID reference monitor		50.00	-	O	O	O	X	X
18	0h1812	PID Fdb Value	PID feedback monitor		0.00	-	O	O	O	X	X
19	0h1813	PID Ref Set	PID reference setting	-100 ~ 100 [%]	50%	O	O	O	O	X	X
20	0h1814	PID Ref Source	PID reference selection	0 Keypad 1 V1 2 I1 3 V2 4 I2 5 Int 485 6 Encoder 7 FieldBus 8 PLC 9 Synchro 10 Binary Type	0: Key pad	X	O	O	O	X	X

*[ ] The grey code refers to hidden code, emerging only in case of setting of the code.

Note 28) APP 08~13 codes are displayed only when APP-01 (App Mode) is set as “Traverse”.

Note 29) APP 16~45 codes are displayed only when APP-01 (App Mode) is set as “Proc PID” or APP-01(App Mode) is set as “MMC” and Requl Bypass(APO-34) is set as “No”.

No.	Comm. No.	Function Display	Name	Setting Range	Initial Value	Shift in Operation	Control Mode				
							V/F	SL	VC	SLT	VCT
21	0h1815	PID F/B Source	PID Feedback selection	0 V1 1 I1 2 V2 3 I2 4 Int 485 5 Encoder 6 FieldBus 7 PLC 8 Synchro 9 Binary Type	0 : V1	X	O	O	O	X	X
22	0h1816	PID P-Gain	PID proportional gain	0 ~ 1000 [%]	50.0	O	O	O	O	O	X	X
23	0h1817	PID I-Time	PID integral calculus time	0 ~ 200.0 [s]	10.0	O	O	O	O	O	X	X
24	0h1818	PID D-Time	PID differential time	0 ~ 1000 [ms]	0	O	O	O	O	O	X	X
25	0h1819	PID F-Gain	PID Feed forward gain	0 ~ 1000.0 [%]	0.0	O	O	O	O	O	X	X
26	0h181A	P Gain Scale	Proportional gain scale	0 ~ 100.0 [%]	100.0	X	O	O	O	O	X	X
27	0h181B	PID Out LPF	PID output filter	0~10000 [ms]	0	O	O	O	O	O	X	X
28	0h181C	PID Mode	PID mode select	0 Process PID 1 Normal PID	0:Process PID	X	O	O	O	O	X	X
29	0h181D	PID Limit Hi	PID upper limit frequency	PID lower limit frequency [Hz] ~ 300 [Hz]	50.00	O	O	O	O	O	X	X
30	0h181E	PID Limit Lo	PID lower limit frequency	-300 ~ PID upper limit frequency [Hz]	-50.00	O	O	O	O	O	X	X
31	0h181F	PID Out Inv	PID output reversal	0 No 1 Yes	0 : No	X	O	O	O	O	X	X
32	0h1820	PID Out Scale	PID output scale	0.1 ~ 1000 [%]	100.0	X	O	O	O	O	X	X
34	0h1822	Pre-PID Freq	PID control period movement frequency	0 ~ max. freq.[Hz]	0.00	X	O	O	O	O	X	X
35	0h1823	Pre-PID Exit	PID control period movement level	0 ~ 100 [%]	0.0	X	O	O	O	O	X	X
36	0h1824	Pre-PID Delay	PID control period movement delay time	0 ~ 9999 [s]	600	O	O	O	O	O	X	X
37	0h1825	PID Sleep DT	PID sleep mode delay time		60.0	O	O	O	O	O	X	X
38	0h1826	PID Sleep Freq	PID Sleep mode frequency	0 ~ max. freq.[Hz]	0.00	O	O	O	O	O	X	X
39	0h1827	PID WakeUp Lev	PID Wake up level	0 ~ 100 [%]	35	O	O	O	O	O	X	X
40	0h1828	PID WakeUp Mod	PID Wake up mode setting	0 Below Level 1 Above Level	0: Below	O	O	O	O	O	X	X

No.	Comm. No.	Function Display	Name	Setting Range		Initial Value	Shift in Operation	Control Mode				
								V/F	SL	VC	SLT	VCT
				2	Beyond Level	Level						
42	0h182A	PID Unit Sel	PID control period unit selection	0	%	0:%	O	O	O	O	X	X
				1	Bar							
				2	mBar							
				3	Pa							
				4	KPa							
				5	Hz							
				6	rpm							
				7	V							
				8	I							
				9	kW							
				10	HP							
				11	℃							
				12	°F							
43	0h182B	PID Unit Gain	PID unit gain	0 ~ 300 [%]		100.00	O	O	O	O	X	X
44	0h182C	PID Unit Scale	PID unit scale	0	X 100	2: x 1	O	O	O	O	X	X
				1	X 10							
				2	X 1							
				3	X 0.1							
				4	X 0.01							
45	0h182D	PID P2-Gain	PID 2nd proportional gain	0 ~ 1000 [%]		100.0	X	O	O	O	X	X

*[ ] The grey code refers to hidden code, emerging only in case of setting of the code.

Note 29) APP 16~45 codes are displayed only when APP-01 (App Mode) is set as “Proc PID” or APP-01(App Mode) is set as “MMC” and Requl Bypass(APO-34) is set as “No”.

8.1.9 Parameter mode – Auto sequence operation group (➔AUT)

No.	Comm. No.	Function Display	Name	Setting Range	Initial Value	Shift in Operation	Control Mode				
							V/F	SL	VC	SLT	VCT
00	-	Jump Code	jump code	0 ~ 99	10	O	O	O	O	X	X
01	0h1901	Auto Mode	auto operation type	0 Auto-A 1 Auto-B	0: Auto-A	X	O	O	O	X	X
02 Note30)	0h1902	Auto Check	Auto operation terminal delay time	0.02 ~ 2.00 [s]	0.10	X	O	O	O	X	X
03	0h1903	Seq Select	sequence type selection	1 ~ 2	1	O	O	O	O	X	X
04 Note31)	0h1904	Step Number 1	Number of sequence 1 steps	1 ~ 8	2	O	O	O	O	X	X
05 Note32)	0h1905	Step Number 2	Number of sequence 2 steps			O	O	O	O	X	X
10 Note33)	0h190A	Seq 1/1 Freq	1/1 step frequency	0.01 ~ maximum frequency[Hz]	11.00	O	O	O	O	X	X
11	0h190B	Seq 1/1 XcelT	1/1 Acc/Dec time	0.1 ~ 600.0 [s]	5.0	O	O	O	O	X	X
12	0h190C	Seq 1/1 SteadT	1/1 steady speed operation time			O	O	O	O	X	X
13	0h190D	Seq 1/1 Dir	1/1 operation direction	0 Reverse 1 Forward	1: Forward	O	O	O	O	X	X
14	0h190E	Seq 1/2 Freq	1/2 step frequency	0.01 ~ maximum frequency[Hz]	21.00	O	O	O	O	X	X
15	0h190F	Seq 1/2 XcelT	1/2 Acc/Dec time	0.1 ~ 600.0 [s]	5.0	O	O	O	O	X	X
16	0h1910	Seq 1/2 SteadT	1/2 steady speed operation time			O	O	O	O	X	X
17	0h1911	Seq 1/2 Dir	1/2 operation direction	0 Reverse 1 Forward	1: Forward	O	O	O	O	X	X
18	0h1912	Seq 1/3 Freq	1/3 step frequency	0.01 ~ maximum frequency[Hz]	31.00	O	O	O	O	X	X
19	0h1913	Seq 1/3 XcelT	1/3 Acc/Dec time	0.1 ~ 600.0 [s]	5.0	O	O	O	O	X	X
20	0h1914	Seq 1/3 SteadT	1/3 steady speed operation time			O	O	O	O	X	X
21	0h1915	Seq 1/3 Dir	1/3 operation direction	0 Reverse 1 Forward	1: Forward	O	O	O	O	X	X
22	0h1916	Seq 1/4 Freq	1/4 step frequency	0.01 ~ maximum frequency[Hz]	41.00	O	O	O	O	X	X
23	0h1917	Seq 1/4 XcelT	1/4 Acc/Dec time	0.1 ~ 600.0 [s]	5.0	O	O	O	O	X	X
24	0h1918	Seq 1/4 SteadT	1/4 steady speed operation time	0.1 ~ 600.0 [s]	5.0	O	O	O	O	X	X

No.	Comm. No.	Function Display	Name	Setting Range		Initial Value	Shift in Operation	Control Mode				
								V/F	SL	VC	SLT	VCT
25	0h1919	Seq 1/4 Dir	1/4 operation direction	0	Reverse	1: Forward	O	O	O	O	X	X
				1	Forward							
26	0h191A	Seq 1/5 Freq	1/5 step frequency	0.01 ~ maximum frequency[Hz]		51.00	O	O	O	O	X	X
27	0h191B	Seq 1/5 XcelT	1/5 Acc/Dec time	0.1 ~ 600.0 [s]		5.0	O	O	O	O	X	X
28	0h191C	Seq 1/5 SteadT	1/5 steady speed operation time				O	O	O	O	X	X
29	0h191D	Seq 1/5 Dir	1/5 operation direction	0	Reverse	1: Forward	O	O	O	O	X	X
				1	Forward							
30	0h191E	Seq 1/6 Freq	1/6 step frequency	0.01 ~ maximum frequency[Hz]		50.00	O	O	O	O	X	X
31	0h191F	Seq 1/6 XcelT	1/6 Acc/Dec time	0.1 ~ 600.0 [s]		5.0	O	O	O	O	X	X
32	0h1920	Seq 1/6 SteadT	1/6 steady speed operation time				O	O	O	O	X	X
33	0h1921	Seq 1/6 Dir	1/6 operation direction	0	Reverse	1: Forward	8-59	O	O	O	X	X
				1	Forward							
34	0h1922	Seq 1/7 Freq	1/7 step frequency	0.01 ~ maximum frequency[Hz]		51.00	O	O	O	O	X	X
35	0h1923	Seq 1/7 XcelT	1/7 Acc/Dec time	0.1 ~ 600.0 [s]		5.0	O	O	O	O	X	X
36	0h1924	Seq 1/7 SteadT	1/7 steady speed operation time				O	O	O	O	X	X
37	0h1925	Seq 1/7 Dir	1/7 operation direction	0	Reverse	1: Forward	O	O	O	O	X	X
				1	Forward							
38	0h1926	Seq 1/8 Freq	1/8 step frequency	0.01 ~ maximum frequency[Hz]		21.00	O	O	O	O	X	X
39	0h1927	Seq 1/8 XcelT	1/8 Acc/Dec time	0.1 ~ 600.0 [s]		5.0	O	O	O	O	X	X
40	0h1928	Seq 1/8 SteadT	1/8 steady speed operation time				O	O	O	O	X	X
41	0h1929	Seq 1/8 Dir	1/8 operation direction	0	Reverse	1: Forward	O	O	O	O	X	X
				1	Forward							
43 Note34)	0h192B	Seq 2/1 Freq	2/1 step frequency	0.01 ~ maximum frequency[Hz]		12.00	O	O	O	O	X	X
44	0h192C	Seq 2/1 XcelT	2/1 Acc/Dec time	0.1 ~ 600.0 [s]		5.0	O	O	O	O	X	X
45	0h192D	Seq 2/1 SteadT	2/1 steady speed operation time				O	O	O	O	X	X
46	0h192E	Seq 2/1 Dir	2/1 operation direction	0	Reverse	1: Forward	O	O	O	O	X	X
				1	Forward							

No.	Comm. No.	Function Display	Name	Setting Range		Initial Value	Shift in Operation	Control Mode				
								V/F	SL	VC	SLT	VCT
47	0h192F	Seq 2/2 Freq	2/2 step frequency	0.01 ~ maximum frequency[Hz]		22.00	O	O	O	O	X	X
48	0h1930	Seq 2/2 XcelT	2/2 Acc/Dec time	0.1 ~ 600.0 [s]		5.0	O	O	O	O	X	X
49	0h1931	Seq 2/2 SteadT	2/2 steady speed operation time				O	O	O	O	X	X
50	0h1932	Seq 2/2 Dir	2/2 operation direction	0	Reverse	1: Forward	O	O	O	O	X	X
				1	Forward							
51	0h1933	Seq 2/3 Freq	2/3 step frequency	0.01 ~ maximum frequency[Hz]		32.00	O	O	O	O	X	X
52	0h1934	Seq 2/3 XcelT	2/3 Acc/Dec time	0.1 ~ 600.0 [s]		5.0	O	O	O	O	X	X
53	0h1935	Seq 2/3 SteadT	2/3 steady speed operation time				O	O	O	O	X	X
54	0h1936	Seq 2/3 Dir	2/3 operation direction	0	Reverse	1: Forward	O	O	O	O	X	X
				1	Forward							
52	0h1937	Seq 2/4 Freq	2/4 step frequency	0.01 ~ maximum frequency[Hz]		42.00	O	O	O	O	X	X
56	0h1938	Seq 2/4 XcelT	2/4 Acc/Dec time	0.1 ~ 600.0 [s]		5.0	O	O	O	O	X	X
57	0h1939	Seq 2/4 SteadT	2/4 steady speed operation time				O	O	O	O	X	X
58	0h193A	Seq 2/4 Dir	2/4 operation direction	0	Reverse	1: Forward	O	O	O	O	X	X
				1	Forward							
59	0h193B	Seq 2/5 Freq	2/5 step frequency	0.01 ~ maximum frequency[Hz]		52.00	O	O	O	O	X	X
60	0h193C	Seq 2/5 XcelT	2/5 Acc/Dec time	0.1 ~ 600.0 [s]		5.0	O	O	O	O	X	X
61	0h193D	Seq 2/5 SteadT	2/5 steady speed operation time				O	O	O	O	X	X
62	0h193E	Seq 2/5 Dir	2/5 operation direction	0	Reverse	1: Forward	O	O	O	O	X	X
				1	Forward							
63	0h193F	Seq 2/6 Freq	2/6 step frequency	0.01 ~ maximum frequency[Hz]		50.00	O	O	O	O	X	X
64	0h1940	Seq 2/6 XcelT	2/6 Acc/Dec time	0.1 ~ 600.0 [s]		5.0	O	O	O	O	X	X
65	0h1941	Seq 2/6 SteadT	2/6 steady speed operation time				O	O	O	O	X	X
66	0h1942	Seq 2/6 Dir	2/6 operation direction	0	Reverse	1:Forward	O	O	O	O	X	X
				1	Forward							
67	0h1943	Seq 2/7 Freq	2/7 step frequency	0.01 ~ maximum frequency[Hz]		52.00	O	O	O	O	X	X

No.	Comm. No.	Function Display	Name	Setting Range		Initial Value	Shift in Operation	Control Mode				
								V/F	SL	VC	SLT	VCT
68	0h1944	Seq 2/7 XcelT	2/7 Acc/Dec time	0.1 ~ 600.0 [s]		5.0	O	O	O	O	X	X
69	0h1945	Seq 2/7 SteadT	2/7 steady speed operation time				O	O	O	O	X	X
70	0h1946	Seq 2/7 Dir	2/8 operation direction	0	Reverse	1: Forward	O	O	O	O	X	X
				1	Forward							
71	0h1947	Seq 2/8 Freq	2/8 step frequency	0.01 ~ maximum frequency[Hz]		22.00	O	O	O	O	X	X
72	0h1948	Seq 2/8 XcelT	2/8 Acc/Dec time	0.1 ~ 600.0 [s]		5.0	O	O	O	O	X	X
73	0h1949	Seq 2/8 SteadT	2/8 steady speed operation time				O	O	O	O	X	X
74	0h194A	Seq 2/8 Dir	2/8 operation direction	0	Reverse	1: Forward	O	O	O	O	X	X
				1	Forward							

*▭ The grey code refers to hidden code, emerging only in case of setting of the code.

Note 30) AUT group is displayed only when APP-0 1(App Mode) is set as “Auto Sequence”.
Note 31) AUT-04 codes are displayed only when AUT-03 Seq Select) is set as “1”.
Note 32) AUT-05 codes are displayed only when AUT-03 (Seq Select) is set as “2”.
Note 33) AUT-10~41 codes are displayed only when AUT-03 (Seq Select) is set as “1”.
Note 34) AUT-43~74 codes are displayed only when AUT-03 (Seq Select) is set as “2”.

8.1.10 Parameter mode – Option card function group (➔APO)

No.	Comm. No.	Function Display	Name	Setting Range	Initial Value	Shift in Operation	Control Mode				
							V/F	SL	VC	SLT	VCT
00	-	Jump Code	jump code	0 ~ 99	20	O	O	O	O	O	O
01 Note35)	0h1A01	Enc Opt Mode	encoder function item	0 None 1 Feed-Back 2 Reference	0:None	O	O	O	O	O	O
04	0h1A04	Enc Type Sel	encoder type selection	0 Line Driver 1 Totem or Com 2 Open Collector	0 : Line Driver	X	O	O	O	O	O
05	0h1A05	Enc Pulse Sel	encoder pulse direction	0 (A+B) 1 -(A+B) 2 A	0 : (A+B)	X	O	O	O	O	O
06	0h1A06	Enc Pulse Num	Number of encoder pulses	10 ~ 4096	1024	X	O	O	O	O	O
08	0h1A08	Enc Monitor	Feed Back monitor	-	-	O	O	O	O	O	O
09	0h1A09	Pulse Monitor	Reference monitor	-	-	O	O	O	O	O	O
10	0h1A0A	Enc Filter	encoder input filter	0 ~ 10000 [ms]	3	O	O	O	O	O	O
11	0h1A0B	Enc Pulse x1	Enc input minimum pulse	0 ~ 100 [kHz]	0.0	O	O	X	O	X	O
12	0h1A0C	Enc Perc y1	output% at Enc minimum pulse	0 ~ 100 [%]	0.00	O	O	X	O	X	O
13	0h1A0D	Enc Pulse x2	Enc input maximum pulse	0 ~ 200 [kHz]	100	O	O	X	O	X	O
14	0h1A0E	Enc Perc y2	Enc maximum pulse시 output%	0 ~ 100 [%]	100	O	O	X	O	X	O
20 Note36)	0h1A14	Aux Motor Run	display of number of auxiliary motor movement	0 ~ 4	0	O	O	O	O	X	X
21	0h1A15	Starting Aux	starting auxiliary motor selection	1 ~ 4	1	X	O	O	O	X	X
22	0h1A16	AutoOp Time	auto change operation time	XX:XX [Min]	0:00	O	O	O	O	X	X
23	0h1A17	Start Freq 1	1st auxiliary motor Start frequency	0 ~ 50[Hz]	49.99	O	O	O	O	X	X
24	0h1A18	Start Freq 2	2nd auxiliary motor Start frequency			O	O	O	O	X	X
25	0h1A19	Start Freq 3	3nd auxiliary motor Start frequency			O	O	O	O	X	X
26	0h1A1A	Start Freq 4	4thauxiliary motor Start frequency			O	O	O	O	X	X
27	0h1A1B	Stop Freq 1	1st auxiliary motor stop frequency		15.00	O	O	O	O	X	X
28	0h1A1C	Stop Freq 2	2nd auxiliary motor stop frequency			O	O	O	O	X	X
29	0h1A1D	Stop Freq 3	3nd auxiliary motor stop frequency			O	O	O	O	X	X
30	0h1A1E	Stop Freq 4	4th auxiliary motor stop frequency			O	O	O	O	X	X
31	0h1A1F	Aux Start DT	auxiliary motor starting delay time	0 ~ 3600.0 [s]	60.0	O	O	O	O	X	X
32	0h1A20	Aux Stop DT	auxiliary motor stop delay time			O	O	O	O	X	X
33	0h1A21	Num of Aux	auxiliary motor number selection	0 ~ 4	4	X	O	O	O	X	X
34	0h1A22	Regul Bypass	bypass selection	0 No 1 Yes	0 : No	X	O	O	O	X	X
35	0h1A23	Auto Ch Mode	auto change mode selection	0 None	1: Aux	X	O	O	O	X	X

No.	Comm. No.	Function Display	Name	Setting Range	Initial Value	Shift in Operation	Control Mode				
							V/F	SL	VC	SLT	VCT
				1 Aux							
				2 Main							
36	0h1A24	Auto Ch Time	auto change time	0 ~ 99:00[min]	72:00	O	O	O	O	X	X
38	0h1A26	Interlock	interlock selection	0 No	0 : No	O	O	O	O	X	X
				1 Yes							
39	0h1A27	Interlock DT	interlock movement delay time	0.1 ~ 360.0 [s]	5.0	O	O	O	O	X	X
40	0h1A28	Actual Pr Diff	auxiliary motor movement pressure difference	0 ~ 100 [%]	2	O	O	O	O	X	X
41	0h1A29	Aux Acc Time	main motor accelerating time when number of pumps decreases	0 ~ 600.0 [s]	2.0	O	O	O	O	X	X
42	0h1A2A	Aux Dec Time	main motor decelerating time when number of pumps increases			O	O	O	O	X	X
58 Note37)	0h1A3A	PLC LED Status	PLC option LED status	-	-	O	O	O	O	O	O
59	0h1A3B	PLC S/W Ver	PLC option card S/W version	-	1.X	O	O	O	O	O	O
60	0h1A3C	PLC Wr Data 1	PLC write data 1	0 ~ FFFF[Hex]	0000	O	O	O	O	O	O
61	0h1A3D	PLC Wr Data 2	PLC write data 2			O	O	O	O	O	O
62	0h1A3E	PLC Wr Data 3	PLC write data 3			O	O	O	O	O	O
63	0h1A3F	PLC Wr Data 4	PLC write data 4			O	O	O	O	O	O
64	0h1A40	PLC Wr Data 5	PLC write data 5			O	O	O	O	O	O
65	0h1A41	PLC Wr Data 6	PLC write data 6			O	O	O	O	O	O
66	0h1A42	PLC Wr Data 7	PLC write data 7			O	O	O	O	O	O
67	0h1A43	PLC Wr Data 8	PLC write data 8			O	O	O	O	O	O
76	0h1A4C	PLC Rd Data 1	PLC read data 1			O	O	O	O	O	O
77	0h1A4D	PLC Rd Data 2	PLC read data 2			O	O	O	O	O	O
78	0h1A4E	PLC Rd Data 3	PLC read data 3			O	O	O	O	O	O
79	0h1A4F	PLC Rd Data 4	PLC read data 4			O	O	O	O	O	O
80	0h1A50	PLC Rd Data 5	PLC read data 5			O	O	O	O	O	O
81	0h1A51	PLC Rd Data 6	PLC read data 6			O	O	O	O	O	O
82	0h1A52	PLC Rd Data 7	PLC read data 7			O	O	O	O	O	O
83	0h1A53	PLC Rd Data 8	PLC read data 8			O	O	O	O	O	O

*[ ] The grey code refers to hidden code, emerging only in case of setting of the code.

Note 35) APO-01~14 codes are displayed only when the encoder board is mounted.

Note 36) APO-20~42 codes are displayed only when APP-01 (App Mode) is set as “MMC”.

Note 37) APO-58~83 codes are displayed only when PLC option board is mounted.

8.1.11 Parameter mode – Protective function group (➔PRT)

No.	Comm. No.	Function Display	Name	Setting Range	Initial Value	Shift in Operat-ion	Control Mode				
							V/F	SL	VC	SLT	VCT
00	-	Jump Code	jump code	0 ~ 99	40	O	O	O	O	O	O
04	0h1B04	Load Duty	Load amount setting	0 Normal Duty 1 Heavy Duty	1:Heavy Duty	X	O	O	O	O	O
05	0h1B05	Phase Loss Chk	input/output phase open protection	Bit 00 ~ 11 1 Output phase open 2 Input phase open	00	X	O	O	O	O	O
06	0h1B06	IPO V Band	input phase open voltage band	1 ~ 100 [V]	40	X	O	O	O	O	O
07	0h1B07	Trip Dec Time	decelerating time in case of failure	0 ~ 600 [s]	3.0	O	O	O	O	O	O
08	0h1B08	RST Restart	starting selection in case of failure reset	0 No 1 Yes	0:No	O	O	O	O	O	O
09	0h1B09	Retry Number	Number of auto restarts	0 ~ 10	0	O	O	O	O	O	O
10 Note38)	0h1B0A	Retry Delay	Auto restart delay time	0 ~ 60.0 [s]	1.0	O	O	O	O	O	O
11	0h1B0B	Lost KPD Mode	movement in case of Keypad command loss	0 None 1 Warning 2 Free-Run 3 Dec	0 : None	O	O	O	O	O	O
12	0h1B0C	Lost Cmd Mode	movement in case of speed command loss	0 None 1 Free-Run 2 Dec 3 Hold Input 4 Hold Output 5 Lost Preset	0 : None	O	O	O	O	O	O
13 Note39)	0h1B0D	Lost Cmd Time	Speed command loss judgment time	0.1 ~ 120 [s]	1.0	O	O	O	O	O	O
14	0h1B0E	Lost Preset F	operation frequency in case of speed command loss	Start freq. ~ maximum frequency[Hz]	0.00	O	O	O	O	O	O
15	0h1B0F	AI Lost Level	Analog input loss judgment level	0 Half of x1 1 Below x1	0: Half of x1	O	O	O	O	O	O
17	0h1B11	OL Warn Select	overload alarm selection	0 No 1 Yes	0 : No	O	O	O	O	O	O
18	0h1B12	OL Warn Level	overload alarm level	30 ~ 180 [%]	150	O	O	O	O	O	O
19	0h1B13	OL Warn Time	overload alarm time	0 ~ 30.0 [s]	10.0	O	O	O	O	O	O
20	0h1B14	OL Trip Select	movement in case of overload failure	0 None 1 Free-Run 2 Dec	1 : Free-Run	O	O	O	O	O	O
21	0h1B15	OL Trip Level	overload failure level	30 ~ 200 [%]	180	O	O	O	O	O	O
22	0h1B16	OL Trip Time	overload failure time	0 ~ 60 [s]	60.0	O	O	O	O	O	O
25	0h1B19	UL Warn Sel	light load alarm selection	0 No 1 Yes	0 : No	O	O	O	O	O	O

No.	Comm. No.	Function Display	Name	Setting Range	Initial Value	Shift in Operation	Control Mode				
							V/F	SL	VC	SLT	VCT
26	0h1B1A	UL Warn Time	light load alarm time	0 ~ 600.0 [s]	10.0	O	O	O	O	O	O
27	0h1B1B	UL Trip Sel	light load failure selection	0 None 1 Free-Run 2 Dec	0:None	O	O	O	O	O	O
28	0h1B1C	UL Trip Time	light load failure time	0 ~ 600 [s]	30.0	O	O	O	O	O	O
29	0h1B1D	UL LF Level	light load lower limit level	10 ~ 30 [%]	30	O	O	O	O	O	O
30	0h1B1E	UL BF Level	light load upper limit level	30 ~ 100 [%]	30	O	O	O	O	O	O
31	0h1B1F	No Motor Trip	movement in case of no motor detection	0 None 1 Free-Run	0: None	O	O	O	O	O	O
32	0h1B20	No Motor Level	no motor detection current level	1 ~ 100 [%]	5	O	O	O	O	O	O
33	0h1B21	No Motor Time	no motor detection delay	0.1 ~ 10.0 [s]	3.0	O	O	O	O	O	O
34	0h1B22	Thermal-T Sel	movement selection after motor overheat detection sensor detection	0 None 1 Free-Run 2 Dec	0 : None	O	O	O	O	O	O
35	0h1B23	Thermal In Src	motor overheat detection sensor input selection	0 None 1 V1 2 I1 3 V2 4 I2	0 : None	X	O	O	O	O	O
36	0h1B24	Thermal-T Lev	motor overheat detection sensor failure level	0 ~ 100 [%]	50.0	O	-	-	-	-	-
37	0h1B25	Thermal-T Area	motor overheat detection sensor failure area	0 Low 1 High	0 : Low	O	O	O	O	O	O
40	0h1B28	ETH Trip Sel	electric thermal failure selection	0 None 1 Free-Run 2 Dec	0 : None	O	O	O	O	O	O
41	0h1B29	Motor Cooling	motor cooling fan type	0 Self-cool 1 Forced-cool	0:Self-cool	O	O	O	O	O	O
42	0h1B2A	ETH 1min	electric thermal 1 minute rating	120 ~ 200 [%]	150	O	O	O	O	O	O
43	0h1B2B	ETH Cont	electric thermal consecutive rating	50 ~ 200 [%]	120	O	O	O	O	O	O
45	0h1B2D	BX Mode	BX mode select	0 [sec] Free-run 0.1~600.0 [sec] Dec	0.0 (Free-run)	O	O	O	O	X	X
50	0h1B32	Stall Prevent	stall preventing movement	Bit 0000 ~ 1111 1 Accelerating 2 Steady speed 3 Decelerating 4 Flux Braking	0000	X	O	O	X	O	X

No.	Comm. No.	Function Display	Name	Setting Range	Initial Value	Shift in Operation	Control Mode				
							V/F	SL	VC	SLT	VCT
51	0h1B33	Stall Freq 1	stall frequency 1	Start frequency 1 ~ Stall frequency 1 [Hz]	50.00	O	O	O	X	O	X
52	0h1B34	Stall Level 1	stall level 1	30 ~ 250 [%]	180	X	O	O	X	O	X
53	0h1B35	Stall Freq 2	stall frequency 2	stall frequency 1 ~ stall frequency 2[Hz]	50.00	O	O	O	X	O	X
54	0h1B36	Stall Level 2	stall level 2	30 ~ 250 [%]	180	X	O	O	X	O	X
55	0h1B37	Stall Freq 3	stall frequency 3	stall frequency 2 ~ stall frequency 4[Hz]	50.00	O	O	O	X	O	X
56	0h1B38	Stall Level 3	stall level 3	30 ~ 250 [%]	180	X	O	O	X	O	X
57	0h1B39	Stall Freq 4	stall frequency 4	stall frequency 3 ~ max. freq.[Hz]	50.00	O	O	O	X	O	X
58	0h1B3A	Stall Level 4	stall level 4	30 ~ 250 [%]	180	X	O	O	X	O	X
66	0h1B42	DB Warn %ED	DB resistance warning level	0 ~ 30 [%]	0	O	O	O	O	O	O
70	0h1B46	Over SPD Freq	overspeed judgment frequency	20 ~ 130 [%]	120.0	O	X	X	O	X	O
72	0h1B48	Over SPD Time	overspeed judgment time	0.01 ~ 10.00 [s]	0.01	O	X	X	O	X	O
73	0h1B49	Speed Dev Trip	speed error failure	0 No 1 Yes	0 : No	O	X	X	O	X	X
74	0h1B4A	Speed Dev Band	speed error width	2 ~ max. freq.[Hz]	20.00	O	X	X	O	X	X
75	0h1B4B	Speed Dev Time	speed error judgment time	0.1 ~ 1000.0 [s]	1.0	O	X	X	O	X	X
77	0h1B4D	Enc Wire Check	Encoder option connection check	0 No 1 Yes	0 : No	O	X	X	O	X	O
78	0h1B4E	Enc Check Time	Encoder connection check time	0.1 ~ 1000.0 [s]	1.0	O	X	X	O	X	O
79	0h1B4F	FAN Trip Mode	cooling fan failure selection	0 Trip 1 Warning	0 : Trip	O	O	O	O	O	O
80	0h1B50	Opt Trip Mode	movement selection in case of option trip	0 None 1 Free-Run 2 Dec	1 : Free-Run	O	O	O	O	O	O
81	0h1B51	LVT Delay	low voltage failure judgment delay time	0 ~ 60.0 [s]	0.0	X	O	O	O	O	O
82	0h1B52	LV2 Enable	Choose low-voltage operation failure	0 No 1 Yes	0:No	X	O	O	O	O	O

*[ ] The grey code refers to hidden code, emerging only in case of setting of the code.

Note 38) PRT-10 code is displayed only when PRT-09(Retry Number) is set the value more than “0”.

Note 39) PRT-13~15 codes are displayed only when PRT-12(Lost Cmd Mode) is not set as “NONE”.

8.1.12 Parameter mode – 2nd motor function Group (➔M2)

No.	Comm. No.	Function Display	Name	Setting Range	Initial Value	Shift in Operation	Control Mode				
							V/F	SL	VC	SLT	VCT
00	-	Jump Code	jump code	0 ~ 99	14	O	O	O	X	O	X
04	0h1C04	M2-Acc Time	accelerating time	0 ~ 600 [s]	Below 75kW 20.0 Above 90kW 60.0	O	O	O	X	O	X
05	0h1C05	M2-Dec Time	decelerating time	0 ~ 600 [s]	Below 75kW 30.0 Above 90kW 90.0	O	O	O	X	O	X
06	0h1C06	M2-Capacity	motor capacity	0 ~ 0.2 kW 21 185 kW	-	X	O	O	X	O	X
07	0h1C07	M2-Base Freq	base frequency	30 ~ 400[Hz]	50.00	X	O	O	X	O	X
08	0h1C08	M2-Ctrl Mode	control mode	0 V/F 1 V/F PG 2 Slip Compen 3 Sensorless-1 4 Sensorless-2	0:V/F	X	O	O	X	O	X
10	0h1C0A	M2-Pole Num	motor pole	2 ~ 48	Depends on motor capacity	X	O	O	X	O	X
11	0h1C0B	M2-Rated Slip	rated sleep speed	0 ~ 3000 [rpm]		X	O	O	X	O	X
12	0h1C0C	M2-Rated Curr	motor rated current	1.0 ~ 1000.0 [A]		X	O	O	X	O	X
13	0h1C0D	M2-Noload Curr	motor no load current	0.5 ~ 1000.0 [A]		X	O	O	X	O	X
14	0h1C0E	M2-Rated Volt	motor rated voltage	180 ~ 480 [V]		X	O	O	X	O	X
15	0h1C0F	M2-Efficiency	motor efficiency	70 ~ 100 [%]		X	O	O	X	O	X
16	0h1C10	M2-Inertia Rt	load inertia ratio	0 ~ 8		X					
17	-	M2-Rs	stator resistance	0 ~ 999.9 [Ω]		X					
18	-	M2-Lsigma	leak inductance	0 ~ 9.999 [mH]		X					
19	-	M2-Ls	stator inductance	0 ~ 99.99 [mH]		X	O	O	X	O	X
20	-	M2-Tr	rotor time constant	25 ~ 5000 [ms]		X	O	O	X	O	X
25	0h1C19	M2-V/F Patt	V/F pattern	0 Linear 1 Square 2 User V/F	0:Linear	X	O	O	X	O	X
26	0h1C1A	M2-Fwd Boost	forward torque boost	0 ~ 15 [%]	Below 75kW: 2.0 Above 90kW: 1.0	X	O	O	X	O	X
27	0h1C1B	M2-Rev Boost	reverse torque boost			X	O	O	X	O	X
28	0h1C1C	M2-Stall Lev	stall preventing level	30 ~ 150 [%]	150	X	O	O	X	O	X
29	0h1C1D	M2-ETH 1min	electric thermal 1 minute rating	100 ~ 200 [%]		X	O	O	X	O	X
30	0h1C1E	M2-ETH Cont	electric thermal consecutive rated	50 ~ 150 [%]	100	X	O	O	X	O	X
40	0h1C28	M2-LoadSpdGain	revolution display gain	0.1 ~ 6000.0%	100.0	O	O	O	O	O	O
41	0h1C29	M2-LoadSpdScal	revolution display scale	0 x 1 1 x 0.1 2 x 0.01 3 x 0.001 4 x 0.0001	0:x 1	O	O	O	O	O	O
42	0h1C2A	M2-LoadSpdUnit	revolution display unit	0 rpm 1 mpm	0:rpm	O	O	O	O	O	O

8.1.13 Trip mode (TRP current (or Last-x))

No.	Function Display	Name	Setting Range		Initial Value
00	Trip Name (x)	failure type display	-		-
01	Output Freq	operation frequency in case of failure	-		-
02	Output Current	output current in case of failure	-		-
03	Inverter State	Acc/Dec status in case of failure	-		-
04	DCLink Voltage	DC voltage	-		-
05	Temperature	NTC temperature	-		-
06	DI State	status of Input terminals	-		0000 0000
07	DO State	status of output terminals	-		000
08	Trip On Time	failure time since power on	-		0/00/00 00:00
09	Trip Run Time	failure time since start to run	-		0/00/00 00:00
10	Trip Delete?	deletion of failure history	0	No	0 : No
			1	Yes	

8.1.14 Config Mode (CNF)

No.	Function Display	Name	Setting Range		Initial Value
00	Jump Code	jump code	0 ~ 99		1
01	Language Sel	keypad language selection	0. English		0. English
			1. Russian		
			2. Español		
			3. Polski		
			4. Turkish		
02	LCD Contrast	LCD brightness adjustment	-		-
10	Inv S/W Ver	body S/W version	-		1.XX
11	KeypadS/W Ver	keypad S/W version	-		1.XX
12	KPD Title Ver	keypad S/W version	-		1.XX
20 Note35)	Anytime Para	status display item	0	Frequency	0 : Frequency
21	Monitor Line-1	monitor mode display item1	1	Speed	0: Frequency
22	Monitor Line-2	monitor mode display item2	2	Output Current	2 Output Current
23	Monitor Line-3	monitormodedisplayitem3	3	Output Voltage	3:Output Voltage
			4	Output Power	
			5	WHour Counter	
			6	DCLink Voltage	
			7	DI State	

No.	Function Display	Name	Setting Range		Initial Value
			8	DO State	
			9	V1 Monitor[V]	
			10	V1 Monitor [%]	
			11	I1 Monitor [mA]	
			12	I1 Monitor [%]	
			13	V2 Monitor[V]	
			14	V2 Monitor [%]	
			15	I2 Monitor [mA]	
			16	I2 Monitor [%]	
			17	PID Output	
			18	PID Ref Value	
			19	PID Fdb Value	
			20	Torque	
			21	Torque Limit	
			22	Trq Bias Ref	
			23	Speed Limit	
			24	Load Speed	
			25	Temperature	
24	Mon Mode Init	monitor mode initialization	0	No	0 : No
			1	Yes	
30	Option-1 Type	option slot 1 type display	0	None	0 : None
31	Option-2 Type	option slot 2 type display	1	PLC	0 : None
32	Option-3 Type	option slot 3 type display	2	Profi	0 : None
			3	Ext. I/O	
			4	Encoder	
40	Parameter Init	parameter initialization	0	No	-
			1	All Grp	
			2	DRV Grp	
			3	BAS Grp	
			4	ADV Grp	
			5	CON Grp	
			6	IN Grp	
			7	OUT Grp	
			8	COM Grp	
			9	APP Grp	
			10	AUT Grp	
			11	APO Grp	
			12	PRT Grp	
			13	M2 Grp	
41	Changed Para	changed parameter display	0	View All	0 : View All
			1	View Changed	
42	Multi Key Sel	multi-function key item	0	None	0 : None
			1	JOG Key	

No.	Function Display	Name	Setting Range		Initial Value
			2	Local/Remote	
			3	UserGrp SelKey	
43	Macro Select	macro function item	0	None	0 : None
			1	Draw App	
			2	Traverse	
44	Erase All Trip	deletion of failure history	0	No	0 : No
			1	Yes	
45	UserGrp AllDel	deletion user registration code	0	No	0 : No
			1	Yes	
46	Parameter Read	parameter reading	0	No	0 : No
			1	Yes	
47	Parameter Write	parameter writing	0	No	0 : No
			1	Yes	
48	Parameter Save	communication parameter saving	0	No	0 : No
			1	Yes	
50	View Lock Set	parameter mode hiding	0 ~ 9999		Un-locked
51	View Lock Pw	parameter mode hiding password			Password
52	Key Lock Set	parameter editing lock			Un-locked
53	Key Lock Pw	parameter editing lock			Password
60	Add Title Del	Keypad title version up	0	No	0 : No
			1	Yes	
61	Easy Start On	Easy parameter setting	0	No	1: Yes
			1	Yes	
62	WHCount Reset	consumed power amount initialization	0	No	0 : No
			1	Yes	
70	On-time	inverter movement cumulative time	mm/dd/yy hh:mm		-
71	Run-time	inverter operation cumulative time			-
72	Time Reset	inverter operation cumulative time initialization	0	No	0 : No
			1	Yes	
74	Fan Time	cooling fan operation cumulative time	mm/dd/yy hh:mm		-
75	Fan Time Rst	cooling fan operation cumulative time initialization	0	No	-
			1	Yes	

Note 35) Item 7 and 8 are not exist in Anytime Para item

8.1.15 User/Macro Mode – Draw operation function group ➔MC1

No.	Function Display	Name	Setting Range	Initial Value
00	Jump Code	jump code	0 ~ 99	1
01	Acc Time	accelerating time	0 ~ 600 [s]	Below 75kW 20
				Above 90kW 60
02	Dec Time	decelerating time		Below 75kW 30
				Above 90kW 90
03	Cmd Source	operating command method	0 ~ 5	1 : Fx/Rx-1
04	Freq Ref Src	frequency setting method	0 ~ 9	2 : V1
05	Control Mode	control mode	0 ~ 5	0 : V/F
06	Aux Ref Src	auxiliary command setting method	0 ~ 4	2 : I1
07	Aux Calc Type	auxiliary command movement selection	0 ~ 7	0
08	Aux Ref Gain	auxiliary command gain	-200 ~ 200 [%]	100.0
09	V1 Polarity	V1 input polar selection	0 ~ 1	0 : Unipolar
10	V1 Filter	V1 input filter time constant	0 ~ 10000 [ms]	10
11	V1 Volt x1	V1input minimum voltage	0 ~ 10[V]	0.00
12	V1 Perc y1	output% at V1 minimum voltage	0 ~ 100 [%]	0.00
13	V1 Volt x2	V1input maximum voltage	0 ~ 10[V]	10.00
14	V1 Perc y2	Output % at V1 maximum voltage	0 ~ 100 [%]	100.00
15	V1 –Volt x1’	V1 –input minimum voltage	-10 ~ 0[V]	0.00
16	V1 –Perc y1’	output% at V1 –minimum voltage	-100 ~ 0 [%]	0.00
17	V1 –Volt x2’	V1–input maximum voltage	-10 ~ 0[V]	-10.00
18	V1 –Perc y2	output% at V1 –maximum voltage	-100 ~ 0 [%]	-100.00
19	V1 Inverting	rotation direction change	0 ~ 1	0 : No
20	I1 Monitor [mA]	I1 input amount display	0 ~ 20 [mA]	0.00
21	I1 Polarity	I1 polarity display	0 ~ 1	0
22	I1 Filter	I1 input filter time constant	0 ~ 10000 [ms]	10
23	I1 Curr x1	I1input minimum current	0 ~ 20 [mA]	4.00
24	I1 Perc y1	Output% at I1minimumcurrent	0 ~ 100 [%]	0.00
25	I1 Curr x2	I1input maximum current	4 ~ 20 [mA]	20.00
26	I1 Perc y2	output% at I1 maximum current	0 ~ 100 [%]	100.00
27	I1 Curr x1’	I1 – Input minimal current	-20 ~ 0 [mA]	0.00
28	I1 Perc y1’	Output %at I1 - minimal current	-100 ~ 0 [%]	0.00
29	I1 Curr x2’	I1 - Input maximum current	-20 ~ 0 [mA]	-20.00
30	I1 Perc y2’	Output% at I1 maximum current	-100 ~ 0 [%]	-100.00
31	I1 Inverting	rotation direction change	0 ~ 1	0 : No
32	P1 Define	P1 terminal function setting	0 ~ 48	0 : FX
33	P2 Define	P2 terminal function setting		1 : RX
34	P3 Define	P3 terminal function setting		5 : BX

8.1.16 User/Macro mode – Traverse operation function group (➔MC2)

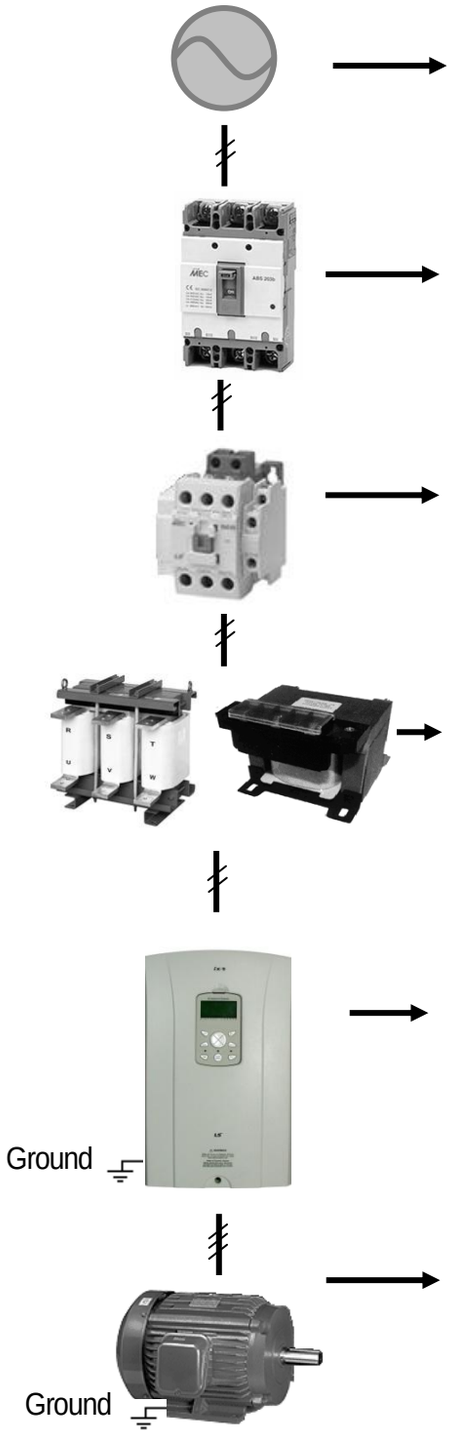
No.	Function Display	Name	Setting Range	Initial Value	
00	Jump Code	jump code	0 ~ 99	1	
01	Acc Time	accelerating time	0 ~ 600 [s]	Below 75kW	20
				Above 90kW	60
02	Dec Time	decelerating time		Below 75kW	30
				Above 90kW	90
03	Cmd Source	operating command method	0 ~ 5	1 : Fx/Rx-1	
04	Freq Ref Src	frequency setting method	0 ~ 9	0 : Keypad-1	
05	Control Mode	control mode	0 ~ 5	0 : V/F	
06	Trv Apmlit %	traverse operating range	0 ~ 20 [%]	0.0	
07	Trv Scramb %	traverse scramble magnitude	0 ~ 50 [%]	0.0	
08	Trv Acc Time	traverse accelerating time	0.1 ~ 600 [s]	2.0	
09	Trv Dec Time	traverse decelerating time		3.0	
10	Trv Offset Hi	traverse offset upper limit	0 ~ 20 [%]	0.0	
11	Trv Offset lo	traverse offset lower limit		0.0	
12	P1 Define	P1terminal function setting	0 ~ 48	0 : FX	
13	P2 Define	P2terminal function setting		1 : RX	
14	P3 Define	P3terminal function setting		5 : BX	
15	P4 Define	P4terminal function setting		27 : Trv	
16	P5 Define	P5terminal function setting		28 : Trv	

MEMO

9.1 Peripheral Devices

9.1.1 Composition of peripheral devices

It is required to connect the inverter correctly by selecting proper peripheral devices. Wrong system composition or connection might impair normal operation or cause significant life span decrease. At worst, the inverter might be damaged, so use the product properly according to the manual and cautions.



Power Supply specification	Use within the power supply specification for the inverter. 200V Class:200~230V(-15%~+10%) 400V Class:380~480V(-15%~+10%)
Distribution switch or short circuit switch	High current flows in the inverter while power is supplied. Be careful when you select the switch because the inverter
Electric contactor (Possible to Select)	This does not have to be necessarily installed, but if you do, do not start or stop the inverter frequently with the contactor. It might decrease the life of the inverter.
AC and DC reactor (Possible to Select)	The reactor is necessary for installation where power factor improvement or input power capacity is high(over 1000kVA, distribution distance below 10m). Be careful when you select.
Inverter installation place and Wiring	The life of the inverter greatly affected by the surrounding temperature, make sure the temperature does not exceed the permitted range. Wrong wiring might cause damage to the product, therefore follow the installation guide. Ground terminal must be grounded.
Inverter output	Do not connect static condenser, surge killer, radio noise filter to output. It might cause damage or failure. Ground terminal must be grounded.

9.1.2 Specifications of wiring switch, Electronic contactor and Reactor

1) Specifications of Wiring switch and Electronic contactor

Inverter capacity	Wiring switch				Short circuit switch		Electronic contactor	
	METASOL		SUSOL					
	Model	Rated Current [A]	Model	Rated Current [A]	Model	Rated Current [A]	Model	Rated Current [A]
0008HP-2	ABS33c	15	UTE100	15	EBS33c	15	MC-9b	11
0015HP-2	ABS33c	15	UTE100	15	EBS33c	15	MC-12b	13
0022HP-2	ABS33c	30	UTE100	30	EBS33c	30	MC-18b	18
0037HP-2	ABS33c	30	UTE100	30	EBS33c	30	MC-32a	32
0055HP-2	ABS53c	50	UTS150	50	EBS53c	50	MC-40a	40
0075HP-2	ABS63c	60	UTS150	60	EBS63c	60	MC-50a	55
0110HP-2	ABS103c	100	UTS150	100	EBS103c	100	MC-65a	65
0150HP-2	ABS103c	125	UTS150	125	EBS203c	125	MC-100a	105
0185HP-2	ABS203c	150	UTS150	150	EBS203c	150	MC-130a	130
0220HP-2	ABS203c	175	UTS250	175	EBS203c	175	MC-150a	150
0300HP-2	ABS203c	225	UTS250	225	EBS203c	225	MC-150a	150
0370HP-2	ABS403c	300	UTS400	300	EBS403c	300	MC-225a	225
0450HP-2	ABS403c	350	UTS400	350	EBS403c	350	MC-330a	330
0550HP-2	ABS603c	500	UTS600	500	EBS603c	500	MC-400a	400
0750HP-2	ABS603c	630	UTS600	600	EBS603c	630	MC-630a	630
0008HP-4	ABS33c	15	UTE100	15	EBS33c	15	MC-9b	9
0015HP-4	ABS33c	15	UTE100	15	EBS33c	15	MC-9b	9
0022HP-4	ABS33c	15	UTE100	15	EBS33c	15	MC-12b	12
0037HP-4	ABS33c	15	UTE100	15	EBS33c	15	MC-18b	18
0055HP-4	ABS33c	30	UTE100	30	EBS33c	30	MC-22b	22
0075HP-4	ABS33c	30	UTE100	30	EBS33c	30	MC-32a	32
0110HP-4	ABS53c	50	UTS150	50	EBS53c	50	MC-40a	40
0150HP-4	ABS63c	60	UTS150	60	EBS63c	60	MC-50a	50
0185HP-4	ABS103c	80	UTS150	80	EBS103c	75	MC-65a	65
0220HP-4	ABS103c	100	UTS150	100	EBS103c	100	MC-65a	65
0300HP-4	ABS103c	125	UTS150	125	EBS203c	125	MC-100a	105
0370HP-4	ABS203c	150	UTS150	150	EBS203c	150	MC-130a	130
0450HP-4	ABS203c	175	UTS250	175	EBS203c	175	MC-150a	150
0550HP-4	ABS203c	225	UTS250	225	EBS203c	225	MC-185a	185
0750HP-4	ABS403c	300	UTS400	300	EBS403c	300	MC-225a	225
0900HP-4	ABS403c	400	UTS400	400	EBS403c	400	MC-330a	330
1100HP-4	ABS603c	500	UTS600	500	EBS603c	500	MC-400a	400
1320HP-4	ABS603c	630	UTS600	600	EBS603c	630	MC-400a	400
1600HP-4	ABS603c	630	UTS600	600	EBS603c	630	MC-630a	630
1850HP-4	ABS803c	800	UTS800	800	EBS803c	800	MC-630a	630
2200HP-4	ABS803c	800	UTS800	800	EBS803c	800	MC-800a	800
2800HP-4	ABS1003b	1000	UTS1200	1000	EBS1003c	1000	1000A	1000
3150HP-4	ABS1203b	1200	UTS1200	1200	EBS1203c	1200	1200A	1200
3750HP-4	1400A	1400	1400A	1400	1400A	1400	1400A	1400

⚠ Note
(1) If you apply the recommended reactor, More than 85% power factor and THD 40% less operation is possible in generally power environment. However, the condition is based on the rated load. Improvement in the case of light load is reduced. **(2) During operation, the input power factor and harmonic wave is affected by the impedance of the line** **Therefore, even applying the reactor, the input power factor and THD improvement can be lowered than the displayed in (1) by the installed transformer capacity, the transformer impedance, line length** **(3) Generally, the higher the value of the inductance L of applied reactor, improvement of power factor and harmonic effects increases. But loss due to voltage drop will increase. Therefore, use the recommended reactor.** **(4) MDHP has a mounted DC reactor products based on the Normal Duty load factor. In operation Heavy Duty, Improvement may be lower than the displayed in (1)**
⚠ Caution
[English] **Use Class H or RK5 UL listed Input fuses and UL listed breakers ONLY. See the table above for the voltage and current ratings for the fuses and breakers.** **[French]** **Utiliser UNIQUEMENT des fusibles d'entrée homologués de Classe H ou RK5 UL et des disjoncteurs UL . Se reporter au tableau ci-dessus pour la tension et le courant nominal des fusibless et des disjoncteurs.**

2) Specifications of the reactor

2.1) Specifications of the DC reactor

MDHP 200V 30 ~ 75kW, 400V 280 ~ 375kW capacity products does not have a built-in DC reactor. If you wish to use the product by applying a DC reactor, please refer to the specifications of the DC reactor.

<200V 30~75kW>

Capacity of inverter	Specifications of the DC reactor	
	mH	A
0300HP-2	0.24	200
0370HP-2	0.2	240
0450HP-2	0.17	280
0550HP-2	0.12	360
0750HP-2	0.1	500

<400V 280~375kW>

Capacity of inverter	Specifications of the DC reactor	
	mH	A
2800HP-4	0.09	836
3150HP-4	0.076	996
3750HP-4	0.064	1195

2.2) AC Reactor Specifications

If you want to install the AC reactor, the wire of AC reactor connect to R,S,T terminal. And, if DC reactor already installed, it is not necessary to install AC reactor.

So please contact customer center before you install AC reactor additionally, because input voltage loss might be occur.

Capacity of inverter	Specifications of the AC reactor			
	Heavey Duty		Normal Duty	
	mH	A	mH	A
0008HP-2	2.13	5.7	1.20	10
0015HP-2	1.20	10	0.88	14
0022HP-2	0.88	14	0.56	20
0037HP-2	0.56	20	0.39	30
0055HP-2	0.39	30	0.28	40
0075HP-2	0.28	40	0.20	59
0110HP-2	0.20	59	0.15	75
0150HP-2	0.15	75	0.12	96
0185HP-2	0.12	96	0.10	112
0220HP-2	0.10	112	0.07	160
0300HP-2	0.07	160	0.05	200
0370HP-2	0.05	200	0.044	240
0450HP-2	0.044	240	0.038	280
0550HP-2	0.038	280	0.026	360
0750HP-2	0.026	360	0.02	500

Capacity of inverter	Specifications of the AC reactor			
	Heavey Duty		Normal Duty	
	mH	A	mH	A
0008HP-4	8.63	2.8	4.81	4.8
0015HP-4	4.81	4.8	3.23	7.5
0022HP-4	3.23	7.5	2.34	10
0037HP-4	2.34	10	1.22	15
0055HP-4	1.22	15	1.14	20
0075HP-4	1.14	20	0.81	30
0110HP-4	0.81	30	0.61	38
0150HP-4	0.61	38	0.45	50
0185HP-4	0.45	50	0.39	58
0220HP-4	0.39	58	0.287	80
0300HP-4	0.287	80	0.232	98
0370HP-4	0.232	98	0.195	118
0450HP-4	0.195	118	0.157	142
0550HP-4	0.157	142	0.122	196
0750HP-4	0.122	196	0.096	237
0900HP-4	0.096	237	0.081	289
1100HP-4	0.081	289	0.069	341
1320HP-4	0.069	341	0.057	420
1600HP-4	0.057	420	0.042	558
1850HP-4	0.042	558	0.042	558
2200HP-4	0.042	558	0.029	799
2800HP-4	0.029	799	0.029	799
3150HP-4	0.029	799	0.024	952
3750HP-4	0.024	952	0.024	952

9.1.3 Dynamic breaking unit (DBU) and Resistors

1) Dynamic Breaking Unit type

Voltage	UL form	Capacity of applied motor	Braking unit	Dimensions
200V	UL type	30 ~ 37 kW	MDLV370DBU-2U	Refer to the appearance of Group 2.
		45 ~ 55 kW	MDLV550DBU-2U	
		75 kW	MDLV370DBU-2U, 2Set	
400V	Non UL type	30 ~ 37 kW	MDLV370DBH-4	Refer to the appearance of Group 1.
		45 ~ 55 kW	MDLV750DB-4	Refer to the appearance of Group 3.
		75 kW		
		185~220kW	MDLV2200DB-4 Note1)	Refer to the appearance of Group 4.
		280~375Kw	MDLV2200DB-4, 2Set	
	UL type	30 ~ 37 kW	MDLV370DBU-4U	Refer to the appearance of Group 2.
		45 ~ 55 kW	MDLV550DBU-4U	
		75 kW	MDLV750DBU-4U	
		90 kW	MDLV550DBU-4U, 2Set	
		110~132kW	MDLV750DBU-4U, 2Set	
		160kW	MDLV750DBU-4U, 3Set	

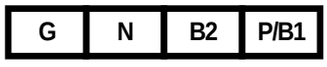
⚠ Note

(1) It is not necessary to use option type dynamic braking unit for HP 0.75~22kW(200V, 400V) because basically the dynamic braking unit is built in.

(2) you must refer to dynamic braking unit manual for usage recommended dynamic braking unit in the table above due to changeable table.

2) Terminal arrangement

Group 1:

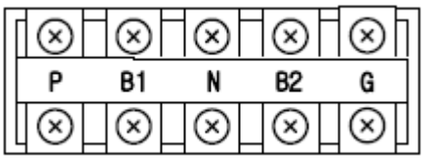


Group 2:

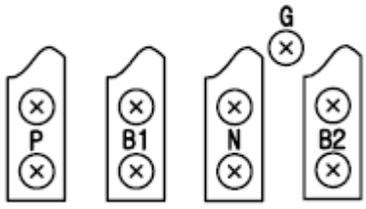
Terminals	Functions
G	Ground Terminal
B2	Terminal for connection with B2 of DBU
B1	Terminal for connection with B1 of DBU
N	Terminal for connection with N of Inverter
P	Terminal for connection with P1 of Inverter

☞ Note: READ DBU User manual certainly when selecting DB resistors.

Group 3:



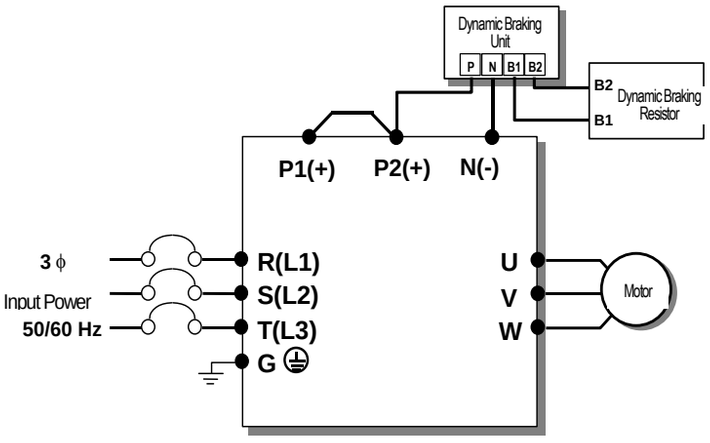
Group 4:



Terminals	Functions
G	Ground Terminal
B2	Terminal for connection with B2 of DBU
B1	Terminal for connection with B1 of DBU
N	Terminal for connection with N of Inverter
P	Terminal for connection with P of Inverter

⚠ Note
You must refer to dynamic braking unit manual for choice of the braking resistor to use the dynamic braking unit.

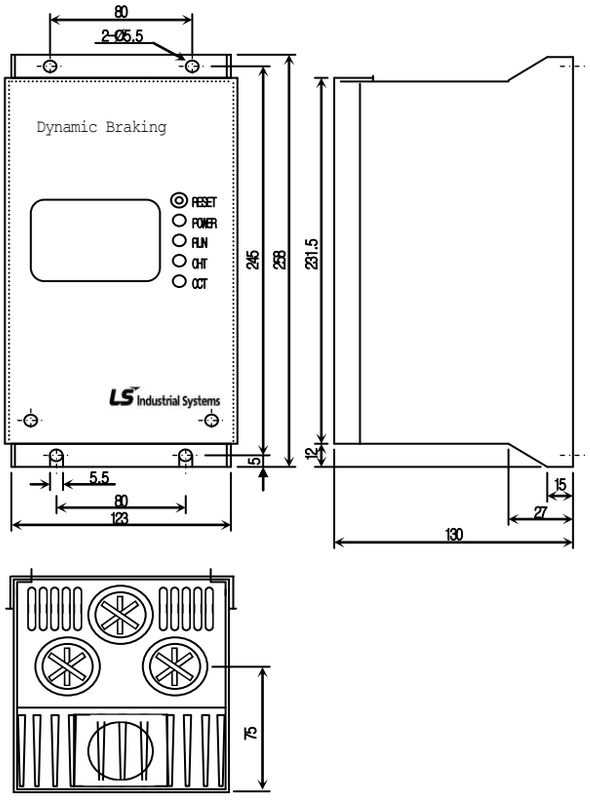
3) Dynamic Breaking (DB)Unit & DB resistor basic wiring



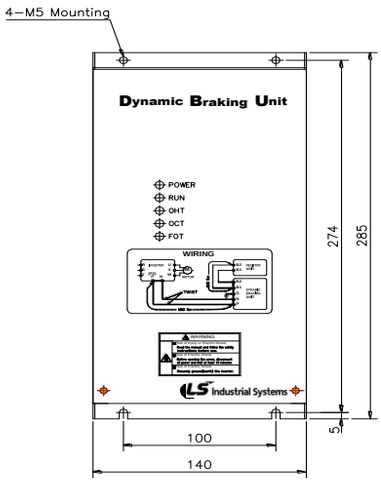
DBU Terminals	Description
B1,B2	Wire correctly referring to wiring diagram. DB Resistors connect with B1, B2 of DB Unit.

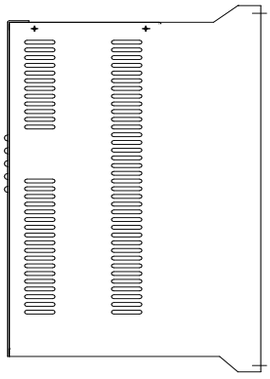
4) Dimensions

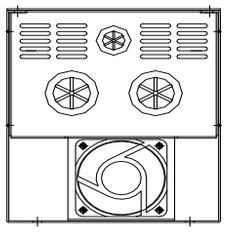
- Group 1



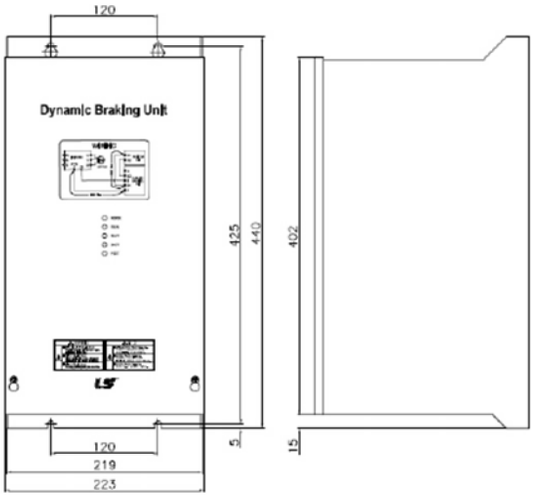
- Group 2

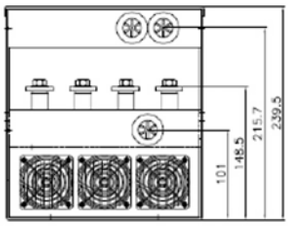




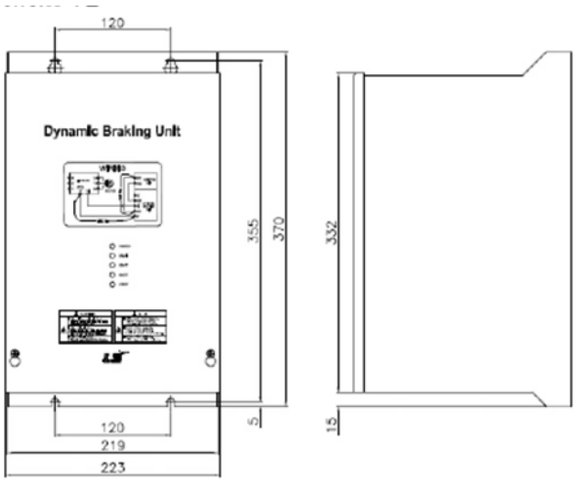


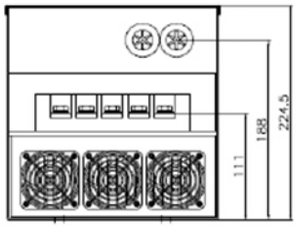
- Group 3





- Group 4





5) Display Functions

DB Resistors connect with B1, B2 of DB Unit. DBU has 3 LEDs. Red LED which is located in middle displays supplying main power, one Green LED which is right side displays under breaking and another green LED which is left side displays Over Heat Trip(OHT).

Displays	Function description
POWER (Red LED)	POWER LED is turned On when main power is supplied. Generally, POWER LED is turn On while main power supplied because DBU is connected with inverter.
RUN (Green LED)	RUN LED is turned off while DBU is ON by regenerative energy of Motor.
OHT (Green LED)	Under Breaking, if the temperature is exceeded over setting value due to over heat of Heatsink, Cut the TURN ON signal of DBU and LED is turn on by working overheat protection function.

6) DB Resistors

(1) Option type Dynamic Breaking Unit

Following table has reference that DC breaking torque: 150%, %ED: 5%. Rating Watt of DBU has to be doubled when %ED is 10%.

Voltage	Applied inverter capacity (kW)	Format	150% braking torque, 5%ED			Wiring [mm^2]
			Resistance [ohm]	Watt [W]	Appearance	
200V Class	0.75	BR0400W150J	150	150	TYPE 1	1.25
	1.5	BR0400W060J	60	300	TYPE 1	1.25
	2.2	BR0400W050J	50	400	TYPE 1	2
	3.7	BR0600W033J	33	600	TYPE 2	3.5
	5.5	BR0800W020J	20	800	TYPE 3	6.63
	7.5	BR1200W015J	15	1200	TYPE 3	6.63
	11	BR2400W010J	10	2400	TYPE 3	13.3
	15	BR2400W008J	8	2400	TYPE 3	13.3
	18.5	BR3600W005J	5	3600	TYPE 3	13.3
	22	BR3600W005J	5	3600	TYPE 3	13.3
	30	-	5	5000	-	-
	37	-	4.5	7000	-	-
	45	-	3.5	10000	-	-
	55	-	3.0	15000	-	-
	75	-	2.5	20000	-	-
400V Class	0.75	BR0400W600J	600	150	TYPE 1	1.25
	1.5	BR0400W300J	300	300	TYPE 1	2
	2.2	BR0400W200J	200	400	TYPE 1	2
	3.7	BR0600W130J	130	600	TYPE 2	2
	5.5	BR1000W085J	85	1000	TYPE 3	2.62
	7.5	BR1200W060J	60	1200	TYPE 3	2.62
	11	BR2000W040J	40	2000	TYPE 3	13.3
	15	BR2400W030J	30	2400	TYPE 3	13.3
	18.5	BR3600W020J	20	3600	TYPE 3	13.3
	22	BR3600W020J	20	3600	TYPE 3	13.3
	30	-	16.9	6,400	-	-
	37	-	16.9	6,400	-	-
	45	-	11.4	9,600	-	-
	55	-	11.4	9,600	-	-
	75	-	8.4	12,800	-	-
	90	-	4.5	15,000	-	-
	110	-	3.5	17,000	-	-
	132	-	3,0	20,000	-	-
	160	-	2.5	25,000	-	-
	185	-	2	30,000	-	-
	220	-	2	30,000	-	-
	280	-	1.5	40,000	-	-
	315	-	1	60,000	-	-
	375	-	1	60,000	-	-

Caution

Please refer the following if you use option type dynamic braking unit to MDHP.

1) Refer the resistance value in the table above if you use a MDHP2200DB-4.

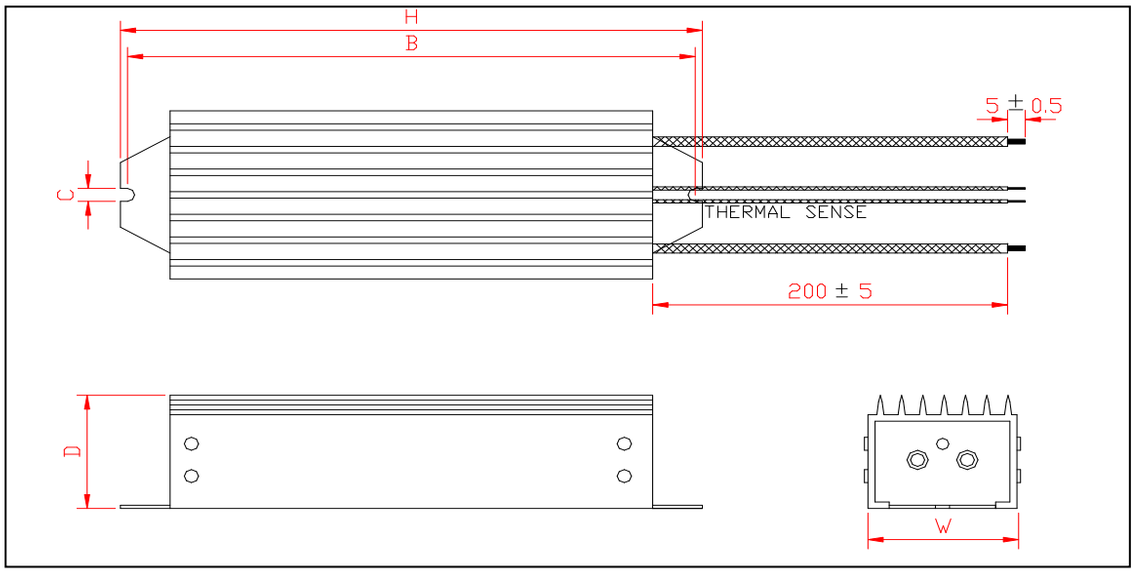
2) If you use the MDLV075DBH-4 in parallel, the combined resistance value must match the resistance value in the table above.

3) If the braking resistor type name is not listed in the table above, purchase separately a braking resistor reference to resistance and wattage in the table above.

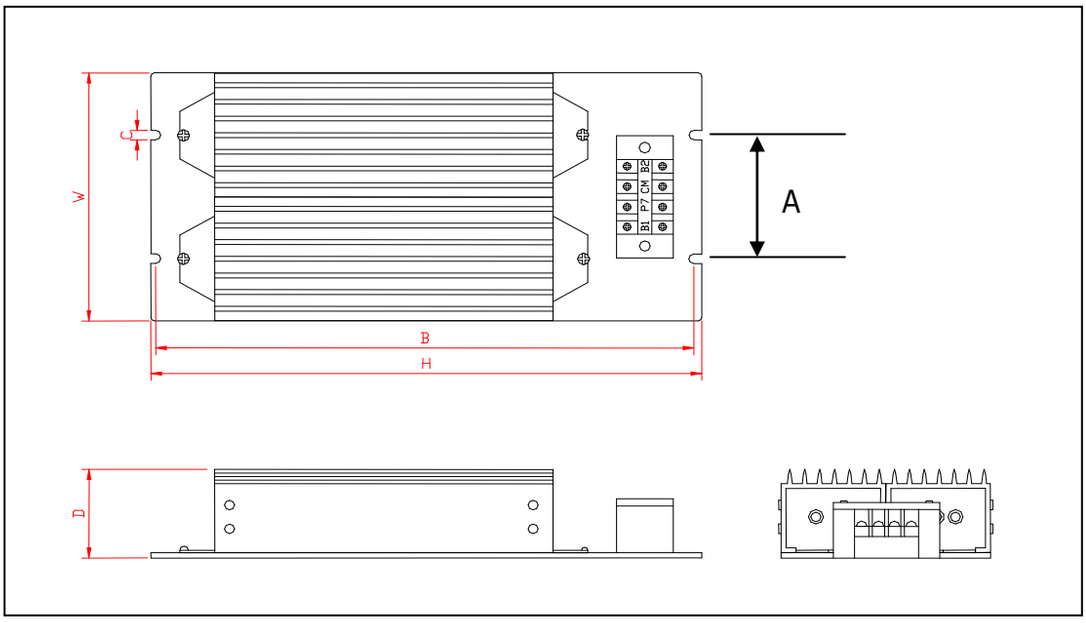
(2) Appearance and size of braking resistor

TYPE	Size [mm]					
	W	H	D	A	B	C
1	64	410	30	-	392	6
2	128	390	43	65	373	6
3	220	345	93	140	330	7.8
4	220	445	93	140	428	7.8
5	220	445	165	140	430	7.8

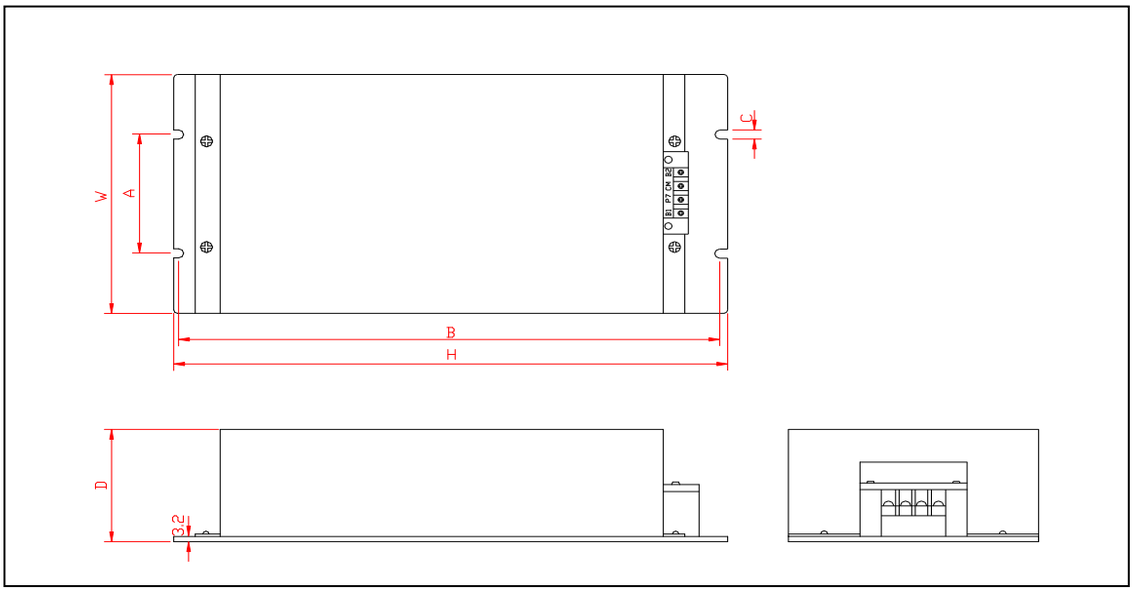
* TYPE 1 (Maximum 400 Watt)



* TYPE 2 (Maximum 600 Watt)

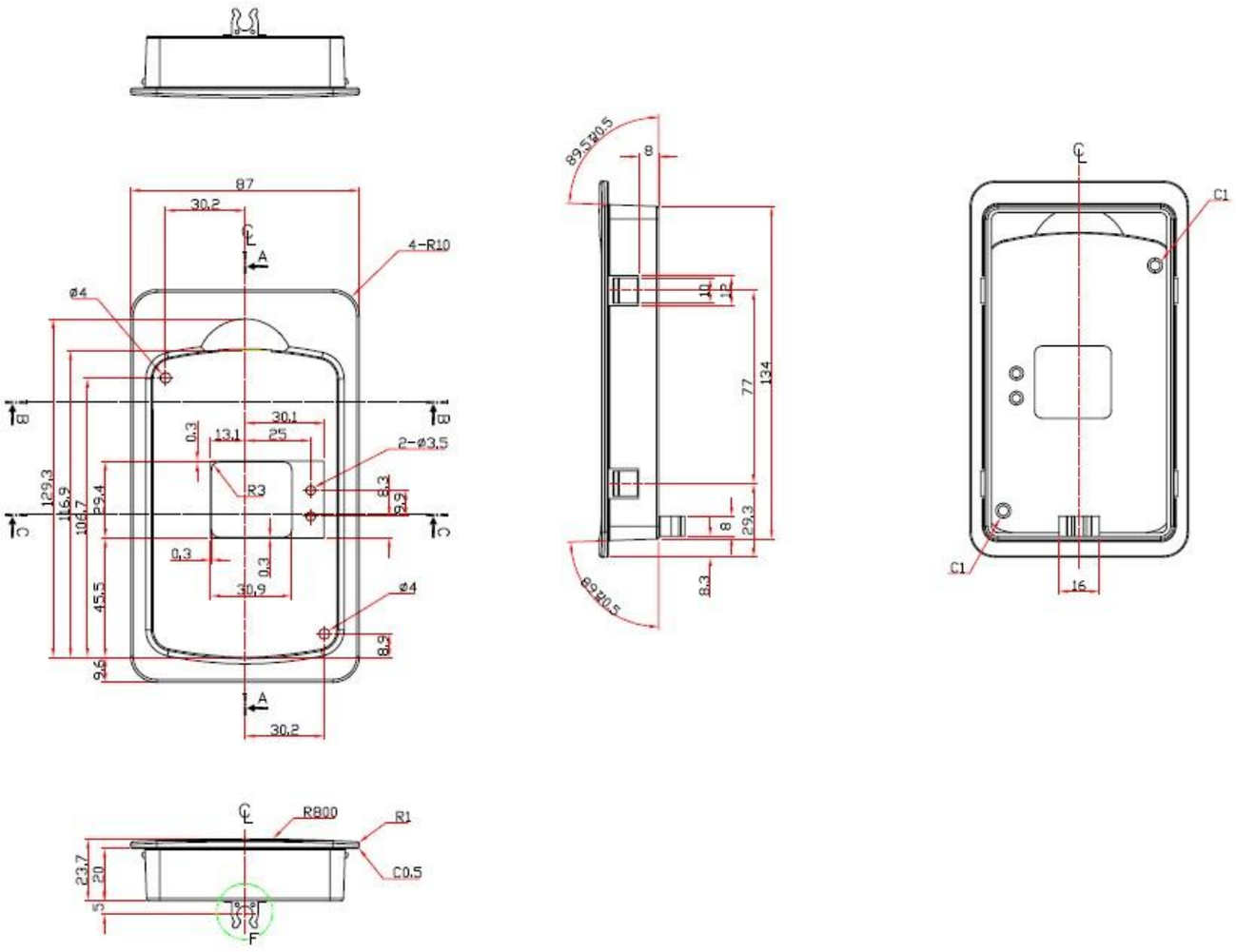


* TYPE 3



9.1.4 MDHP Remote cable options

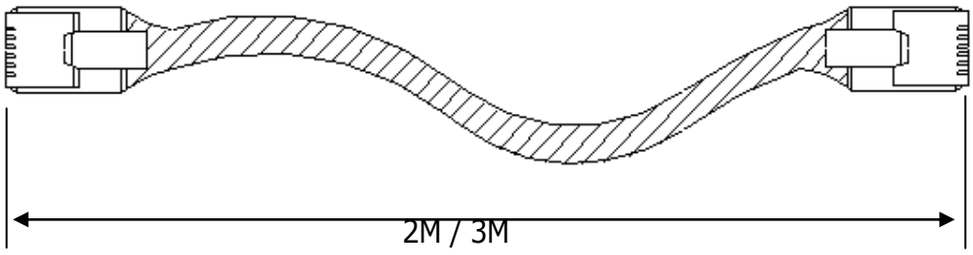
1) Components
   - Keypad Bracket, Remote cable
2) Keypad bracket drawings



2) Remote cable
   (1) Product code

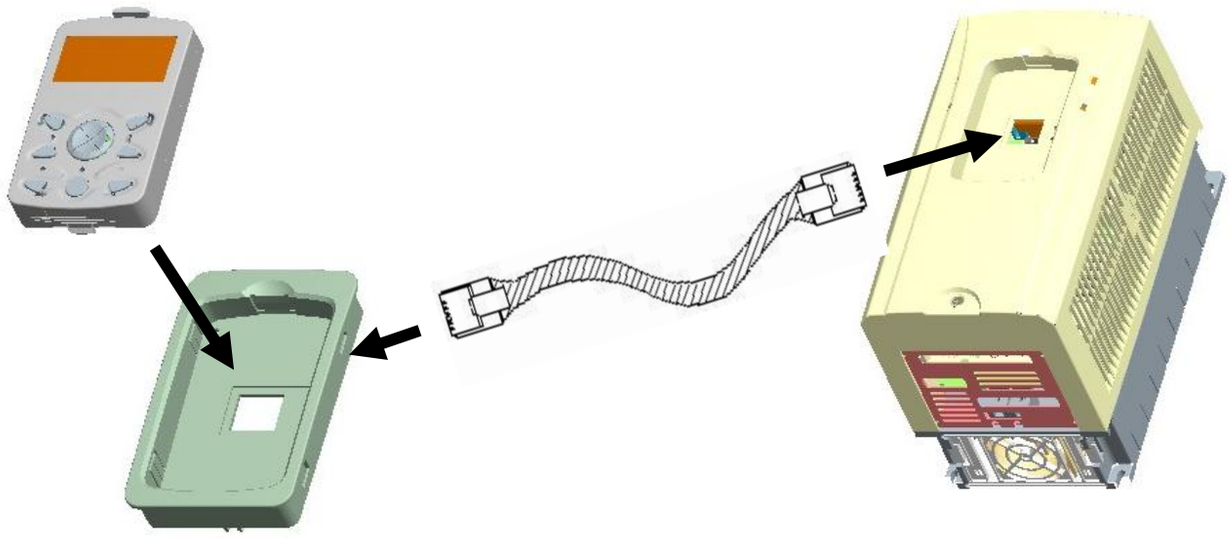
Product code	Product Name	Note
64110009	INV,MDHP REMOTE CABLE(2M)	
64110010	INV,MDHP REMOTE CABLE(3M)	

(2) Drawings (2M, 3M)



3) Connection of remote cable

As shown in the figure below, keypad connected to the Bracket keypad, and then connects the remote cable, and use after connect the other side of cable to the product.



⚠ Note
(1) When you use remote cable at unspecified products, you must use only the specified because keypad may lead to malfunction by power supply voltage drop and inflow noise **(2) After connecting the remote cable, if unusually display at LCD keypad as "line check", cable may be in poor contact, so please check.**

10.1 Functional Safety

10.1.1 Safety Standard product

MDHP Inverter offers safety option to reduce the risk of an emergency situation by off the inverter output to protect the operator when using the machine. Performance level of safety features are as follows.

.

- EN ISO 13849-1 : Category 3, PL Class d
- EN 61508 : SIL 2

⚠ **Caution**
When using the safety function, make sure that the system of risk assessment need to be carried out and if it meets the safety requirements.

Note

Operating wiring or manintenance, inverter must be turnd off.
Safety function is not electrically isolated or completely block the power of motor.

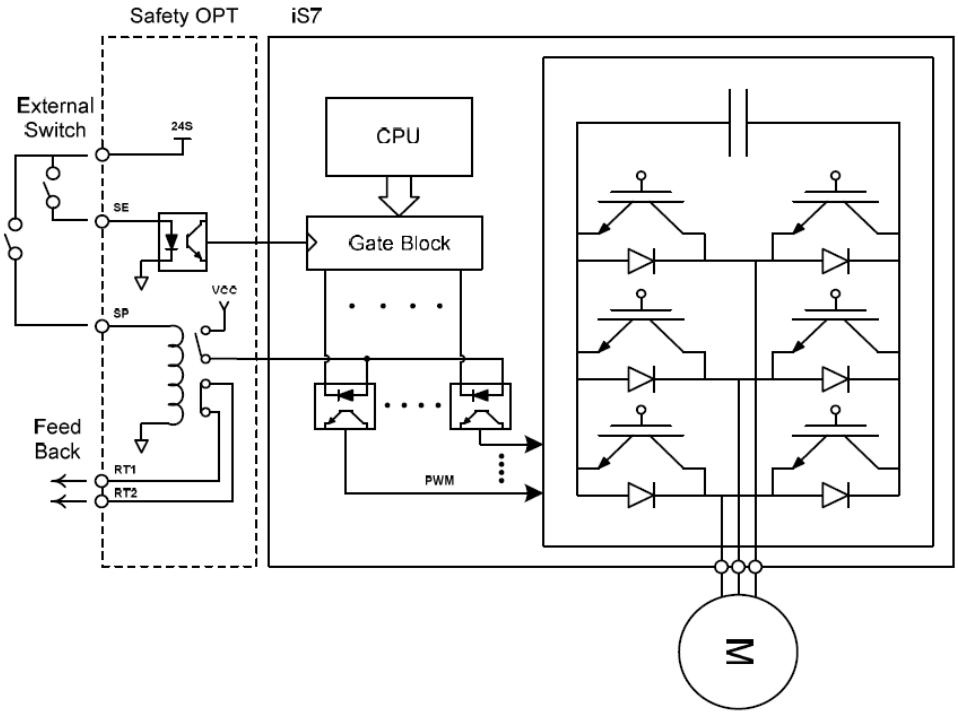
10.1.2 Safety function description and wiring diagram

Safety Function is STO function to cut off power supply from motor(Cutting off inverter output current) by impeding gate with hard-wired and not to cause a torque.

- STO : Safety Torque Off : IEC61800-5-2

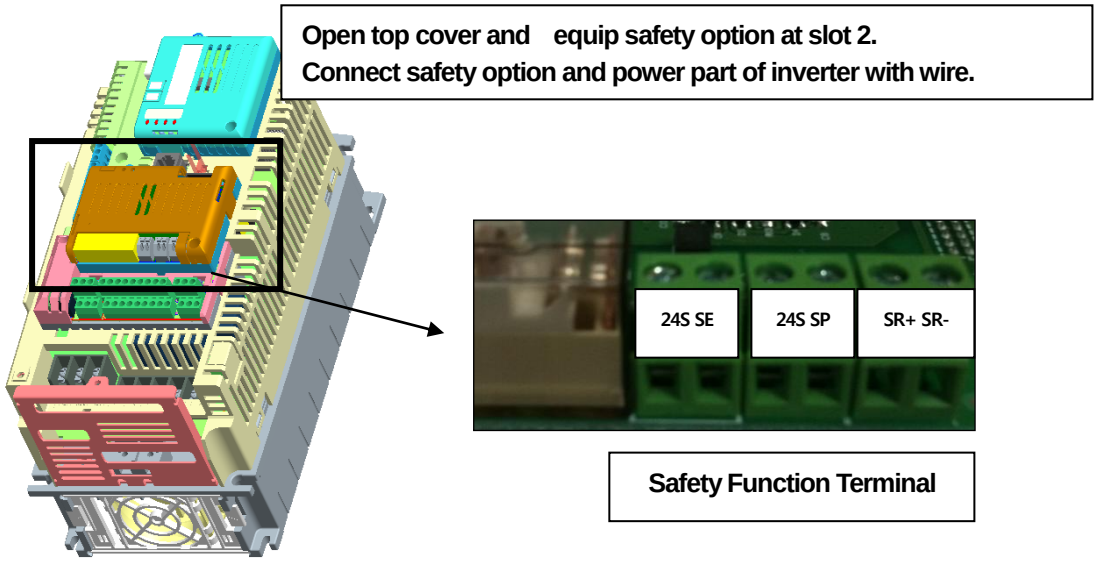
STO function has 2 channels(SFT1, SFT2) the input signal is connected to independently. The signal cut off the output of the inverter control circuit drive signal and power module. During operation, safety function is activated, the inverter cut off the output and the status of motor is “Free Run”. And message is displayed on the KEYPAD(“Safety Opt Err” message) To turn off the trip, when inverter of state is normal, press the reset key.

1)Example of safety input wiring

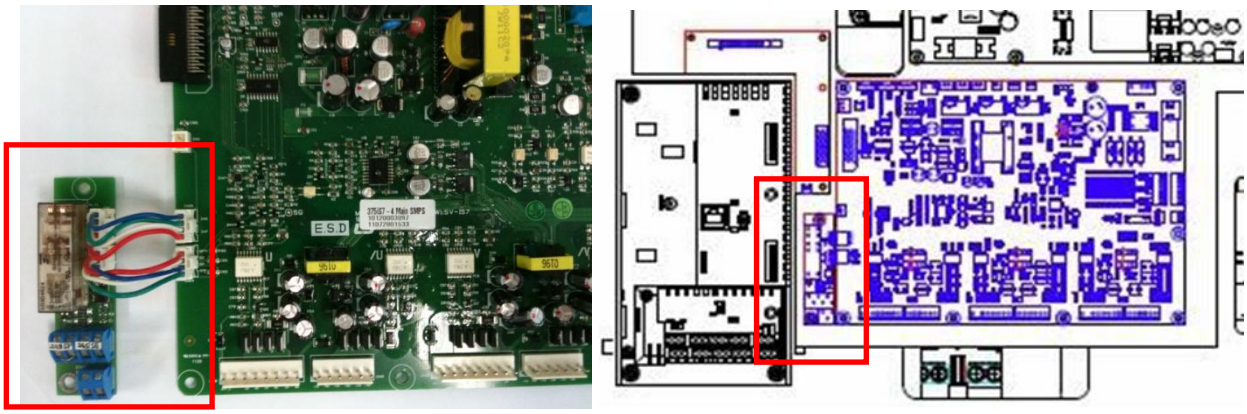


2) 0.75~160KW Product Installation

EX) 3.7KW Product



3) 185~375KW Product Installation



- Connect main SMPS board and safety option board with Safety Wire as above.

4) Description of Safety Function Terminal

24SE – SE (SFT1)	24S – SP (SFT2)	SR + SR-
Short : Normal operation	Short : Normal operation	B Contact Relay Output Terminal
Open : Safety Trip (output disconnect)	Open : Safety Trip (output disconnect)	

5) Signal Terminal Block Wiring Standard

Terminal		Wire Thickness		Electrical Standard
variety	Name	mm2	AWG	
24SE	Safety Input Power	0.33~1.25mm2 (16~22 AWG) Shield Type Twisted-pare Wire		24Vdc , Max. 10mA
SE	Safety Input 1(SFT1)			Short : Safety Function Stop(24SE-SE or SP) Open : Safety Function Operation (24SE-SP or SP)
SP	Safety Input 2(SFT2)			
SR+,SR-	Complete Output Relay Safety Features			DC24V, 5A below (B contact)

Caution

The length of wiring safety input terminal is not used for more than 30m.
Safety Function can malfunction during operation.

11.1 Classification Product

11.1.1 Classification Standard

Classification is that the structure and equipment of the ship has been estimated from the test with the certain standards for certificate issued and given by classification society.

MDLV-HP Series is certificated with product testing, process, production equipment and test equipment to install on the shipping.

11.1.2 Classification standard acquisition

- DNV(Det Norske Veritas) Classification[CERTIFICATE NO. E-11815]

MDLV	008	HP	-	2	N	O	F	D	W

	Capacity of Applied Motor		Series Name		Input Voltage	Keypad	UL	EMC	DCR	CLASS
Marathon Drive Inverter	0008	0.75	Wide-Use Inverter	-	2: 3-Phase 200~230[V] 4: 3-Phase 380~480[V]	N: NON S: GLCD (Graphic Loader)	O:OPEN E: Enclosed UL Type1[Note1)] P: Enclosed UL Type	Blank: Non-EMC F:EMC	Blank: Non-DCR D:DCR R :DB Resistor (Inner Mounted)	V: Classification
	0015	1.5								
	0022	2.2								
	0037	3.7								
	0055	5.5								
	0075	7.5								
	0110	11								
	0150	15								
	0185	18.5								
	0220	22								
	0300	30								
	0370	37								
	0450	45								
	0550	55								
	0750	75								
	0900	90								
	1100	110								

1320	132					12			
1600	160								

11.1.3 Classification Model MDLV-HP Products

Note1) Enclosed UL Type 1 has the conduit add on option at 0.75 to 75 kW products.

Note2) DB Resistor of IS7 Product is the option of WEB product. Applicable capacity is from 0.75 to 375 kW of the MDHP products.

12.1 UL Marking

12.1.1 Short Circuit Rating

Suitable For Use On A Circuit Capable Of Delivering Not More Than Table1 RMS Symmetrical Amperes, 240V for 240V rated inverters, 480V for 480V rated inverters Volts Maximum.

Table 1. RMS Symmetrical Amperes for MDHP series.

Model	Rating
All models for except the specified models as below	5,000A
MDLV0450HP, MDLV0550HP, MDLV0750HP, MDLV0900HP, MDLV1100HP ,MDLV1320HP	10,000A
MDLV1600HP, MDLV1850HP, MDLV2200HP, MDLV2800HP	18,000A
MDLV3150HP, MDLV3750HP	30,000A

12.1.2 Branch circuit protective device

Use Class H or RK5 UL Listed Input Fuse and UL Listed Breaker Only. See the table below for the Voltage and Current rating of the fuses and the breakers.

Input Voltage	Motor [kW]	Inverter	External Fuse		Breaker		Internal Fuse			
			Current [A]	Voltage [V]	Current [A]	Voltage [V]	Current [A]	Voltage [V]	Manufact-urer	Model Number
200V Class	0.75	0008HP-2	10	500	15	230	-			
	1.5	0015HP-2	15	500	15	230				
	2.2	0022HP-2	20	500	30	230				
	3.7	0037HP-2	32	500	30	230				
	5.5	0055HP-2	50	500	50	230				
	7.5	0075HP-2	63	500	60	230				
	11	0110HP-2	80	500	100	230				
	15	0150HP-2	100	500	125	230				
	18.5	0185HP-2	125	500	150	230				
	22	0220HP-2	160	500	175	230				
	30	0300HP-2	200	500	225	230	250	250	Hinode	250GH 250SUL
	37	0370HP-2	250	500	300	230	350	250	Hinode	250GH 350SUL
	45	0450HP-2	350	500	350	230	350	250	Hinode	250GH 350SUL
	55	0550HP-2	400	500	500	230	250x2	250	Hinode	250GH 250SUL
	75	0750HP-2	450	500	600	230	250x2	250	Hinode	250GH 250SUL
400V Class	0.75	0008HP-4	10	500	15	460	-			
	1.5	0015HP-4	10	500	15	460				
	2.2	0022HP-4	15	500	15	460				
	3.7	0037HP-4	20	500	15	460				
	5.5	0055HP-4	32	500	30	460				
	7.5	0075HP-4	35	500	30	460				
	11	0110HP-4	50	500	50	460				

Input Voltage	Motor [kW]	Inverter	External Fuse		Breaker		Internal Fuse			
			Current [A]	Voltage [V]	Current [A]	Voltage [V]	Current [A]	Voltage [V]	Manufact-urer	Model Number
400V Class	15	0150HP-4	63	500	60	460				
	18.5	0185HP-4	70	500	80	460	-			
	22	0220HP-4	100	500	100	460				
	30	0300HP-4	125	500	125	460	160	660	Hinode	660GH 160Sul
	37	0370HP-4	125	500	150	460	160	660	Hinode	660GH 160SUL
	45	0450HP-4	160	500	175	460	200	660	Hinode	660GH-200SUL
	55	0550HP-4	200	500	225	460	250	660	Hinode	660GH-250SUL
	75	0750HP-4	250	500	300	460	315	660	Hinode	660GH-315SUL
	90	0900HP-4	350	500	400	460	200x2	660	Hinode	660GH-200SUL
	110	1100HP-4	400	500	500	460	250x2	660	Hinode	660GH-250SUL
	132	1320HP-4	450	500	600	460	315×2	660	Hinode	660GH-315SUL
	160	1600HP-4	450	500	600	460	315×2	660	Hinode	660GH-315SUL
	185	1850HP-4	600	500	800	460	250×3	660	Hinode	660GH-250SUL
	220	2200HP-4	800	500	800	460	315×3	660	Hinode	660GH-315SUL
	280	2800HP-4	1000	500	1000	460	800×3	690	Bussman	170M5464
	315	3150HP-4	1200	500	1200	460	1000x3	690	Bussman	170M5466
	370	3750HP-4	1400	500	1400	460	1000x3	690	Bussman	170M5466

12.1.3 Over Load Protection

IOLT: IOLT(inverter Overload Trip) protection is activated at 150% of the inverter rated current for 1 minute and greater.

OLT: Inverter shuts off its output when inverter output current exceeds its overload trip level for overload trip time.

OLT is selected when PRT17 is set to “Yes” and activated at 180% of BAS13 [Motor rated current] for 60 sec set in PRT22.

12.1.4 Over Speed Protection

Not provided with overspeed protection

12.1.5 Field Wiring Terminal

1. Tightening torque of power terminal blocks

2. Use copper wires only with 600V, 75℃ ratings , Above 315kW products, please connect using the two wires.

Inverter Capacity [kW]		Terminal Screw Size	Screw Torque 1		Wire 2	
			kgf·cm	lb-in	mm²	AWG or kcmil
200V Class	0.75	M4	7.1~12	6.2 ~ 10.6	2.5	14
	1.5	M4	7.1~12	6.2 ~ 10.6	2.5	14
	2.2	M4	7.1~12	6.2 ~ 10.6	2.5	14
	3.7	M4	7.1~12	6.2 ~ 10.6	4	12
	5.5	M4	7.1~12	6.2 ~ 10.6	6	10
	7.5	M4	7.1~12	6.2 ~ 10.6	10	8
	11	M6	30.6~38.2	26.6 ~ 33.2	16	6
	15	M6	30.6~38.2	26.6 ~ 33.2	25	4
	18.5	M8	61.2~91.8	53.1 ~ 79.7	35	2
	22	M8	61.2~91.8	53.1 ~ 79.7	35	2
	30	M8	61.2~91.8	53.1 ~ 79.7	70	1/0
	37	M8	61.2~91.8	53.1 ~ 79.7	95	2/0
	45	M8	61.2~91.8	53.1 ~ 79.7	95	2/0
	55	M10	89.7~122	77.9 ~ 105.9	120	3/0
	75	M10	89.7~122	77.9 ~ 105.9	150	4/0
400V Class	0.75	M4	7.1~12	6.2 ~ 10.6	2.5	14
	1.5	M4	7.1~12	6.2 ~ 10.6	2.5	14
	2.2	M4	7.1~12	6.2 ~ 10.6	2.5	14
	3.7	M4	7.1~12	6.2 ~ 10.6	2.5	14
	5.5	M4	7.1~12	6.2 ~ 10.6	4	12
	7.5	M4	7.1~12	6.2 ~ 10.6	4	12
	11	M5	24.5~31.8	21.2 ~ 27.6	6	10
	15	M5	24.5~31.8	21.2 ~ 27.6	16	6
	18.5	M6	30.6~38.2	26.6 ~ 33.2	16	6
	22	M6	30.6~38.2	26.6 ~ 33.2	25	4
	30	M8	61.2~91.8	53.1 ~ 79.7	25	4
	37	M8	61.2~91.8	53.1 ~ 79.7	25	4
	45	M8	61.2~91.8	53.1 ~ 79.7	70	1/0
	55	M8	61.2~91.8	53.1 ~ 79.7	70	1/0
	75	M8	61.2~91.8	53.1 ~ 79.7	70	1/0
	90	M12	182.4~215.0	158.3 ~ 186.6	100	4/0
	110	M12	182.4~215.0	158.3 ~ 186.6	100	4/0
	132	M12	182.4~215.0	158.3 ~ 186.6	150	300
	160	M12	182.4~215.0	158.3 ~ 186.6	200	400
	185	M12	182.4~215.0	158.3 ~ 186.6	200	400
	220	M12	182.4~215.0	158.3 ~ 186.6	250	500
	280	M12	182.4~215.0	158.3 ~ 186.6	325	650
	315	M12	182.4~215.0	158.3 ~ 186.6	2x200	2x400
	375	M12	182.4~215.0	158.3~186.6	2x250	2x500

EC DECLARATION OF CONFORMITY

We, the undersigned,

Representative:	**Regal Beloit Australia Pty Ltd**
Address:	19 Corporate Rd, Rowville **Victoria 3178, Australia**
Manufacturer:	**LSIS Co., Ltd.**
Address:	**181, Samsung-ri, Mokchon-Eup,** **Chonan, Chungnam, 330-845,** **Korea**

Certify and declare under our sole responsibility that the following apparatus:

Type of Equipment:	**Inverter (Power Conversion Equipment)**
Model Name:	***MDLVHP* series**
Trade Mark:	**Marathon Drives**

conforms with the essential requirements of the directives:

2006/95/EC Directive of the European Parliament and of the Council on the harmonisation of the laws of Member States relating to Electrical Equipment designed for use within certain voltage limits

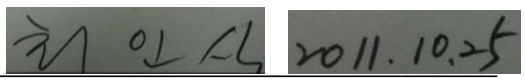
2004/108/EC Directive of the European Parliament and of the Council on the approximation of the laws of the Member States relating to electromagnetic compatibility

based on the following specifications applied:

EN 61800-3:2004
EN 61800-5-1:2007

and therefore complies with the essential requirements and provisions of the 2006/95/CE and 2004/108/CE Directives.

Place: **Chonan, Chungnam,**
Korea



(Signature /Date)

Mr. In Sik Choi / General Manager
(Full name / Position)

Warranty

Maker	**Regal Australia**		**Installation (Start-up) Date**	
Model No.	***MDLV-HP***		**Warranty Period**	
Customer Information	Name			
	Address			
	Tel.			
Sales Office (Distributor)	Name			
	Address			
	Tel.			

This product has been manufactured through a strict quality management and inspection process by MD Technical Team. The warranty period is 12 months from the date of sale, subject to Regal standard terms and conditions of sale.

FOC Service

If there is any failure in the product during the warranty period you can have it repaired FOC by requesting our distributor or designated service center subject that you are found to have used it under our recommended environment. For further details, please refer to out company's T&Cs.

Charged Service

■ In the event of any of the following cases, the service will be charged.

- The failure occurred from the consumer's improper storage, handling, and careless handling
- The failure occurred from the consumer's error in the design of software or hardward
- The failure occurred from the error of power source and the defect of the connector
- The failure occurred from the force majeure (fire, flood, gas disaster, earthquake, etc.)
- The product was modified or repaired at the discretion of the consumer in the place other than our Distributor or the Service Center.
- The name plate provided by MD is not attached on the product
- The product was used in an improper way or beyond the operating range.

■ Repair Warranty Period for the Discontinued Model

- For the product discontinued, the repair service will be provided with charge for five years from the date discontinued.

■ Waiver of the warranty for the mechanical loss, etc.

Regal Australia. doesn't bear any responsibility to indemnify indirect, special, incidental, or consequential loss (including the indemnification of sales loss, loss profit, etc.

Revision History

No.	Date	Edition	Changes
1	30.04.2015	First edition	-

Environment management

Regal Australia regards the environmental preservation as a high priority, and all our employees do our best for the environmental preservation fresh earth.

Disposable product

MD inverter is designed for preserving environment.
When you disuse the products, you can recycle by separating them to iron, aluminum, bronze, and synthetic plastic (cover).

EMI / RFI POWER LINE FILTERS

Marathon Drive inverters, MDHP series

RFI FILTERS

THE LS RANGE OF POWER LINE FILTERS FEP (Standard) SERIES, HAVE BEEN SPECIFICALLY DESIGNED WITH HIGH FREQUENCY LSIS INVERTERS. THE USE OF LS FILTERS, WITH THE INSTALLATION ADVICE OVERLEAF HELP TO ENSURE TROUBLE FREE USE ALONG SIDE SENSITIVE DEVICES AND COMPLIANCE TO CONDUCTED EMISSION AND IMMUNITY STANDARDS TO EN 50081.

CAUTION

IN CASE OF A LEAKAGE CURRENT PROTECTIVE DEVICES IS USED ON POWER SUPPLY, IT MAY BE FAULT AT POWER-ON OR OFF.
IN AVOID THIS CASE, THE SENSE CURRENT OF PROTECTIVE DEVICE SHOULD BE LARGER

RECOMMENDED INSTALLATION INSTRUCTIONS

To conform to the **EMC** directive, it is necessary that these instructions be followed as closely as possible. Follow the usual safety procedures when working with electrical equipment. All electrical connections to the filter, inverter and motor must be made by a qualified electrical technician.

1-) Check the filter rating label to ensure that the current, voltage rating and part number are correct.

2-) For best results the filter should be fitted as closely as possible to the incoming mains supply of the wiring enclousure, usually directly after the enclousures circuit breaker or supply switch.

3-) The back panel of the wiring cabinet of board should be prepared for the mounting dimensions of the filter. Care should be taken to remove any paint etc... from the mounting holes and face area of the panel to ensure the best possible earthing of the filter.

4-) Mount the filter securely.

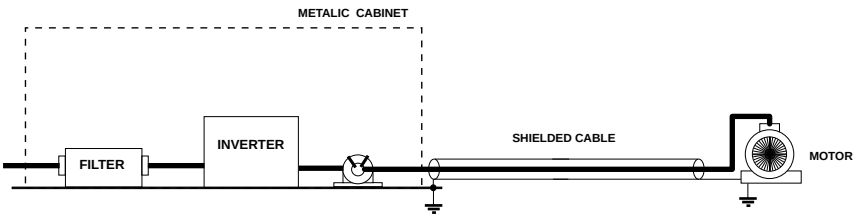
5-) Connect the mains supply to the filter terminals marked **LINE**, connect any earth cables to the earth stud provided. Connect the filter terminals marked **LOAD** to the mains input of the inverter using short lengths of appropriate gauge cable.

6-) Connect the motor and fit the ferrite core (output chokes) as close to the inverter as possible. Armoured or screened cable should be used with the 3 phase conductors only threaded twice through the center of the ferrite core. The earth conductor should be securely earthed at both inverter and motor ends. The screen should be connected to the enclousure body via and earthed cable gland.

7-) Connect any control cables as instructed in the inverter instructions manual.

IT IS IMPORTANT THAT ALL LEAD LENGHTS ARE KEPT AS SHORT AS POSSIBLE AND THAT INCOMING MAINS AND OUTGOING MOTOR CABLES ARE KEPT WELL SEPARATED.

FE SERIES (Standard)



MDHP series / Standard Filters

INVERTER	POWER	CODE	CURRENT	VOLTAGE	LEAKAGE CURRENT	DIMENSIONS L W H	MOUNTING Y X	WEIGHT	MOUNT	FIG.	OUTPUT CHOKES
THREE PHASE					NOM. MAX.						
MDLV0300**HP**-2	30kW	FEP-T180	180A	220-480VAC	0.7mA 80mA	332 x 170 x 120	115 x 155	8.4 Kg	---	B	FS – 3
MDLV0370**HP**-2	37kW	FEP-T250	250A	220-480VAC	0.7mA 80mA	392 x 190 x 116	240 x 165	9.1 Kg	---		
MDLV0450**HP**-2	45kW	FEP-T320	320A	220-480VAC	0.7mA 80mA	392 x 260 x 116	240 x 235	9.8 Kg	---	B	FS – 4
MDLV0550**HP**-2	55kW										
MDLV0750**HP**-2	75kW	FEP-T400	400A	220-480VAC	0.7mA 80mA	392 x 260 x 116	240 x 235	10.3 Kg	---	B	FS – 4

MDLV0300~0750 HP-2 EN 55011 CLASS A GROUP 2 IEC/EN 61800-3 C3

MDHP series / Standard Filters

INVERTER	POWER	CODE	CURRENT	VOLTAGE	LEAKAGE CURRENT	DIMENSIONS L W H	MOUNTING Y X	WEIGHT	MOUNT	FIG.	OUTPUT CHOKES
THREE PHASE					NOM. MAX.						
MDHP0300**HP**-4	30kW	FE-T100-2	100A	220-480VAC	1.3mA 150mA	420 x 200 x 130	408 x 166	13.8 Kg	---	A	FS – 3
MDHP0370**HP**-4	37kW										
MDHP0450**HP**-4	45kW	FEP-T150	150A	220-480VAC	1.3mA 150mA	332 x 170 x 120	115 x 155	8 Kg	---	B	FS – 3
MDHP0550**HP**-4	55kW										
MDHP0750**HP**-4	75kW	FEP-T180	180A	220-480VAC	1.3mA 150mA	332 x 170 x 120	115 x 155	8.4 Kg	---	B	FS – 3
MDHP0900**HP**-4	90kW	FEP-T250	250A	220-480VAC	1.3mA 150mA	392 x 190 x 116	240 x 165	9.1 Kg	---	B	FS – 4
MDHP1100**HP**-4	110kW	FEP-T400	400A	220-480VAC	1.3mA 150mA	392 x 260 x 116	240 x 235	10.3 Kg	---	B	FS – 4
MDHP1320**HP**-4	132kW										
MDHP1600**HP**-4	160kW	FEP-T600	600A	220-480VAC	1.3mA 150mA	392 x 260 x 116	240 x 235	11 Kg	---	B	FS – 4
MDHP1850**HP**-4	185kW										
MDHP2200**HP**-4	220kW	FEP-T1000	1000A	220-480VAC	1.3mA 150mA	460 x 280 x 166	290 x 255	18 Kg	---	B	FS – 4
MDHP2800**HP**-4	280kW										
MDHP3150**HP**-4	315kW										
MDHP3750**HP**-4	375kW	FEP-T1600	1600A	220-480VAC	1.3mA 150mA	592 x 300 x 166	340 x 275	27 Kg	---	B	FS – 4

MDHP0300~2200 HP-4 EN 55011 GROUP 2 IEC/EN 61800-3 C3

CLASS A MDLV2800~3750 iS7-4 EN IEC/EN 61800-3 C4

55011 CLASS A

FE SERIES (Standard)

FIG.A

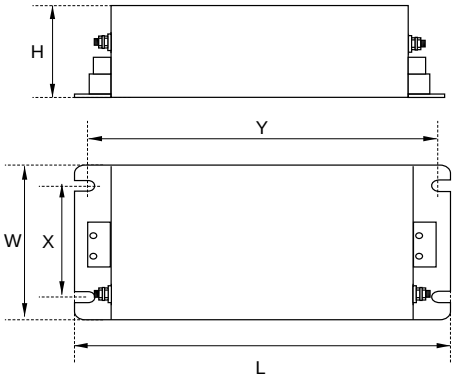
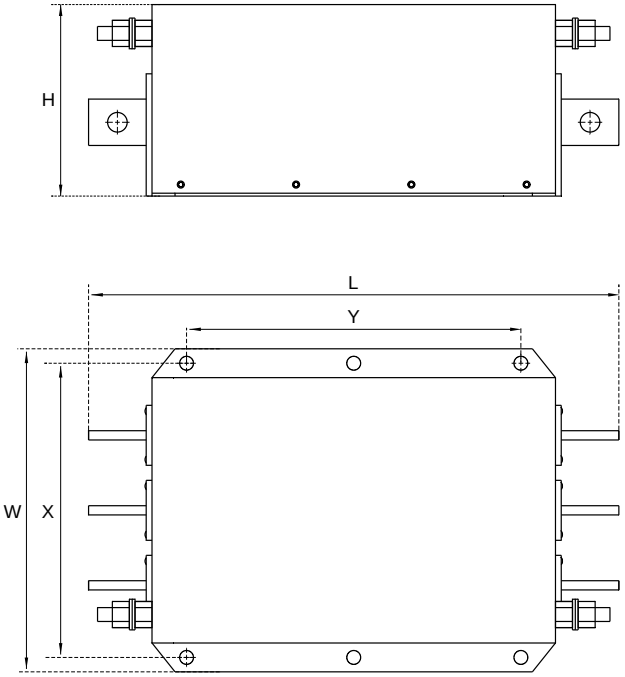
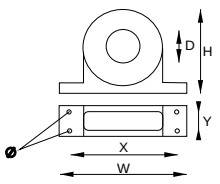


FIG.B



Vector Motor Control Ibérica S.L.
C/ Mar del Caribu, 10
Pol. Ind. La Torre del Rector
08130 Santa Perpètua de Mogoda
(BARCELONA) ESPAÑA
Tel. (+34) 935 748 206
Fax (+34) 935 748 248
info@vmc.es
www.vmc.es



FS SERIES (output chokes)

CODE	D	W	H	X	Ø
FS – 3	48	150	110	125 x 30	5
FS – 4	58	200	170	180 x 45	5

HEAD OFFICE

19 Corporate Ave / PO Box 2340
Rowville VIC 3178 AUSTRALIA

Tel: +61 (0)3 9237 4000
Fax:+61 (0)3 9237 4010

AUSTRALIA

National Sales
1300 888 853
Drives Technical Support
1800 724 149
www.regalaustralia.com.au
www.regalbeloit.com

REGAL BELOIT AUSTRALIA Pty Ltd
ABN 61 122 303 084

VICTORIA
MELBOURNE
19 Corporate Avenue
Rowville VIC 3178
Tel: +61 (0)3 9237 4040
Fax:+61 (0)3 9237 4050

NEW SOUTH WALES
SYDNEY
6-7 Bushells Place
Wetherill Park NSW 2164
Tel: +61 (0)2 8781 3100
Fax:+61 (0)2 8781 3131

TASMANIA
DEVONPORT
115 Don Road
Devonport TAS 7310
Tel: +61 (0)3 6424 8574
Fax:+61 (0)3 6424 9393

NEW ZEALAND

CMG Electric Motors (NZ) Ltd
18 Jomac Place
Avondale Auckland
NEW ZEALAND
Tel: +64 9820 3550
Fax: +64 9820 8504

SINGAPORE

CMG Electric Motors
(Asia Pacific) Pte Ltd
12 Tuas Loop 637346
SINGAPORE
Tel: +65 6863 3473
Fax: +65 6863 3476

QUEENSLAND
BRISBANE
7 Mahogany Court
Willawong QLD 4110
Tel: +61 (0)7 3246 3246
Fax:+61 (0)7 3246 3210

CAIRNS ("Service - Repairs - Sales")
2/159-161 Newell Street
Bungalow QLD 4870
Tel: +61 (0)7 4033 1109
Fax:+61 (0)7 4033 5553

MACKAY
Paget Mackay QLD 4740
Tel: +61 (0)7 4952 6244
Fax:+61 (0)7 4952 6277

THAILAND

FASCO Motors (Thailand) Limited
29/7-8 Bangkruay-Sainoi Road
Bangkrang, Muang Nonthaburi
District Nonthaburi 11000 THAILAND
Tel: +66 2447 3300
Fax: +66 2447 3500

MALAYSIA

Torin Industries SND BHD
(MALAYSIA)
No. 6536A Jalan Bukit Kemuning
Batu 6 Seksyen 34
40470 Shah Alam Selangor
Tel: +60 3 51246157
Fax: +60 3 51211467

SOUTH AUSTRALIA
ADELAIDE
47 Research Road
Pooraka SA 5095
Tel: +61 (0)8 8359 1321
Fax: +61 (0)8 8359 5675

WESTERN AUSTRALIA
PERTH
21 Colin Jamieson Drive
Welshpool WA 6106
Tel: +61 (0)8 6253 3700
Fax:+61 (0)8 6253 3710