MOTOR CONTROL

REGAL

MARATHON DRIVES
MDHP HIGH PERFORMANCE
VARIABLE SPEED DRIVES

marathon™ Drives

REGAL

www.regalaustralia.com.au

Table of Contents

The Marathon MDHP drive series offers powerful performance, flexibility through diverse options with a convenient, user-friendly interface... offering you more than you can imagine.

marathon™ Drives

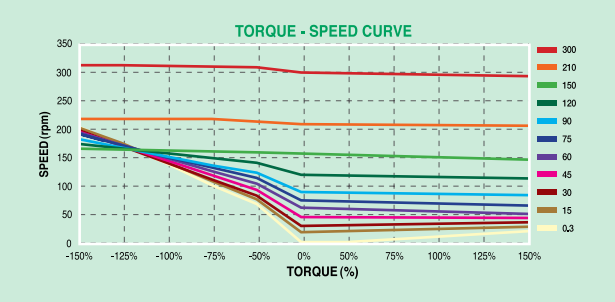
Reliability & High Performance

V/F control, V/F PG, slip compensation, sensorless / sensored vector control.

Powerful electric current type sensorless vector control

The MDHP technology includes a competitive and strong low-speed torque control and a speed-precision-driven vector algorithm.

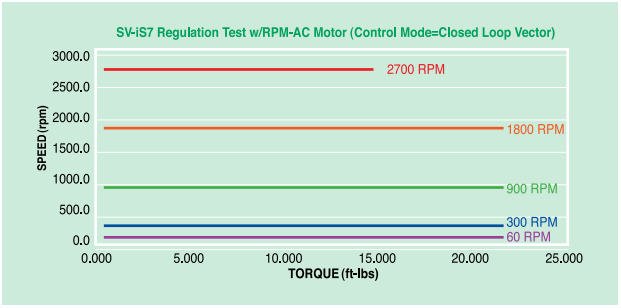
- Speed control range 100:1
- Extremely low torque control capability: 0.1Hz/150% real torque
- Max. torque control capability within the restoration range



Sensored vector realizing precise speed/torque control

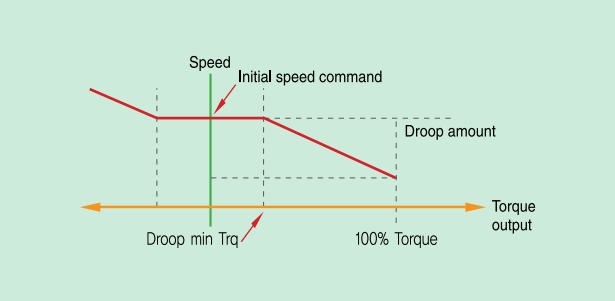
In the entire speed range including zero speed, powerful torque (more than 250%) performance is materialized through receiving Max. 200kHz frequency pulse via encoder-dedicated board.

- Speed control range 1000:1
- Instant Max. torque control capability 250%
- 50Hz speed control response



Automatic torque balance droop control

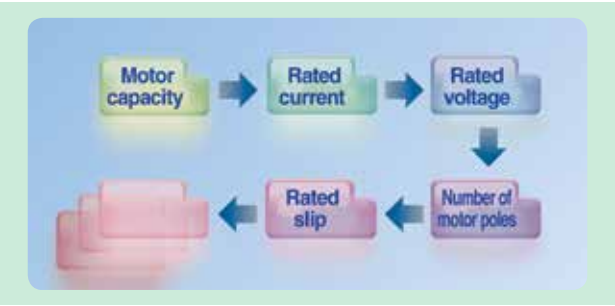
Droop control algorithm adjusts changeable torque driven by speed. This algorithm is easily applicable to open loop linking driving and load sharing driving.



Flying start function

Drive capable of quick reliable smooth restarts into bi-directional rotating loads.

Easy start parameter setting



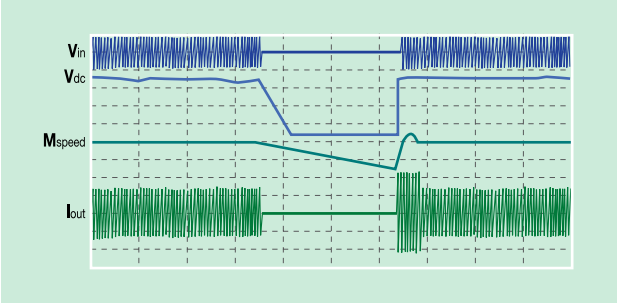
Safety Option

The Safety input function meets EN ISO 13849-1 PLd and EN 61508 SIL2 (EN60204-1, stop category 0). This feature is standard and enables compliance with current safety standards.

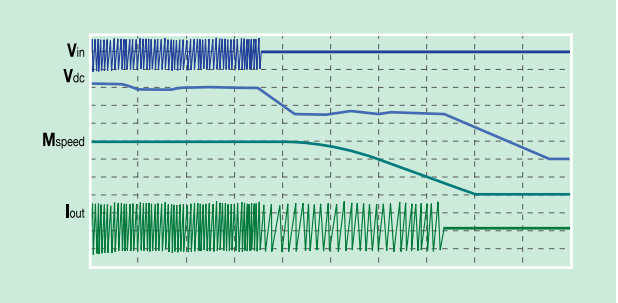
Reliability & High Performance

V/F control, V/F PG, slip compensation, sensorless vector control.

Ride-through (LV trip delay) for sudden power loss



Kinetic Energy Buffering (KEB) for a stable system stop in case of power loss or failure



Flexibility & Expansion

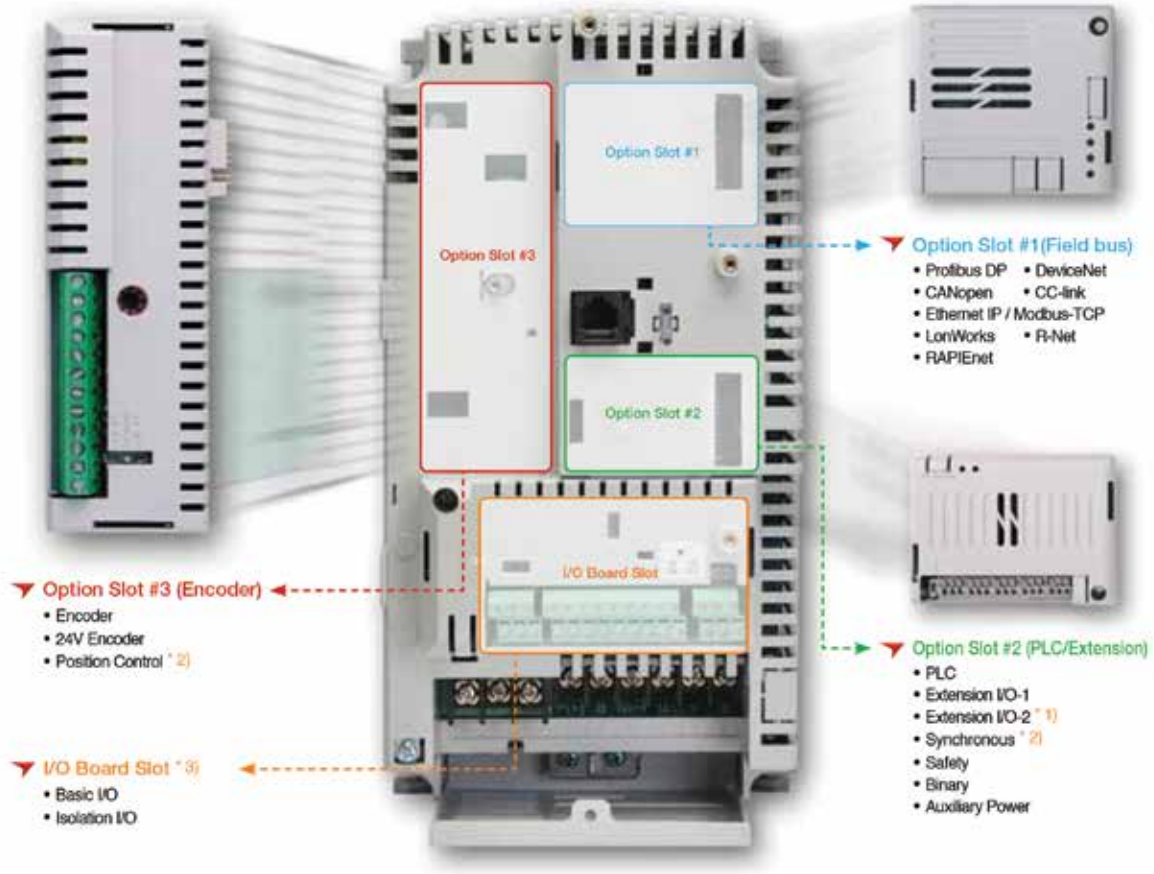
Diverse communication options, expansion I/O options, PLC options, encoder options, IP54 enclosure options

Conduit Kit option

- Acquired UL open type & enclosed type1 certification
- UL open type is offered as default
- UL enclosed type1 needs conduit kit (option) installation
- 0.75~75kW

Flange Option

- The heat sink can be mounted outside of the panel in case the space is limited
- 0.75~75kW

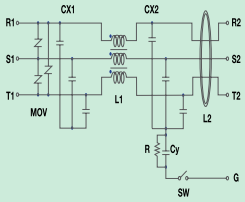


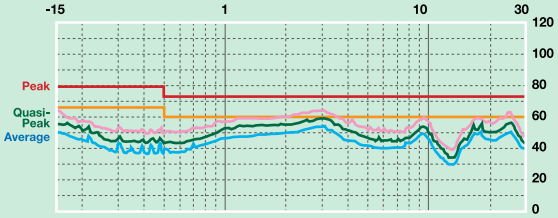
*1) Extension I/O-2 is only dedicated for WEB (Winder) customized models.
*2) In order to use position control and synchronous options, customer have to purchase that customized product or to install customized main software.
*3) Below 22kW : Default Built-in Basic I/O Above 30kW : Default Built-in Isolation I/O
* More information about the options, refer to the 22Page.

Convenience & Environment

Convenience through User-friendly Interface

EMC filter (in conformity with EN61800-3) built-in for protection from excessive electronic distortion

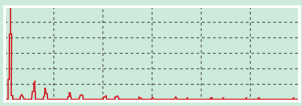




DC reactor built-in for harmonic reduction and power factor improvement

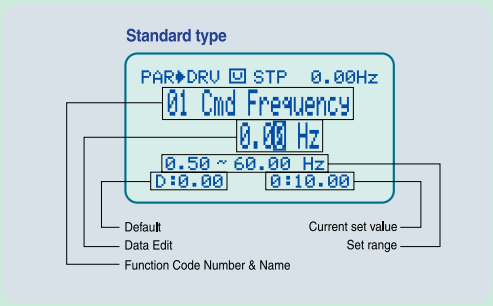
Overloading rate	110% (VT rated standard)
THD	18 ~ 37%
power factor	94 ~ 96%
IP Level	IP21
Insulation Class	155℃ (300˚F)

Input current and THD analysis

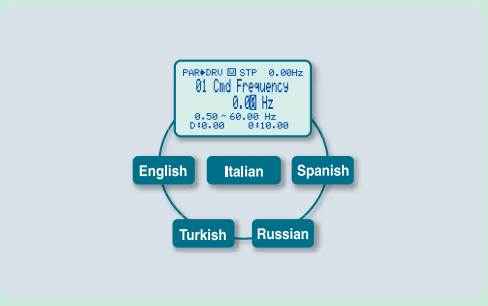


THD : 29.3% PF : 95.9%

Widened graphic LCD keypad



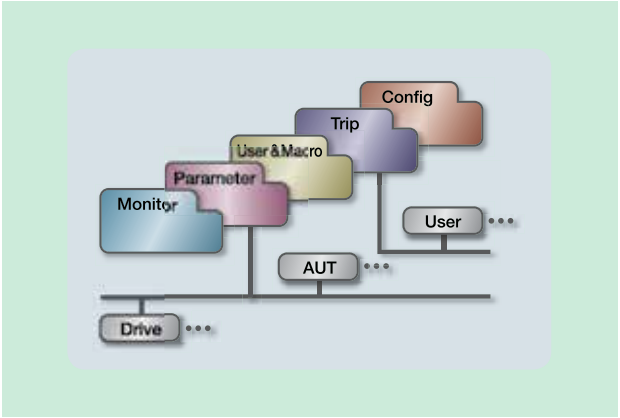
Multi-language support (5 languages)



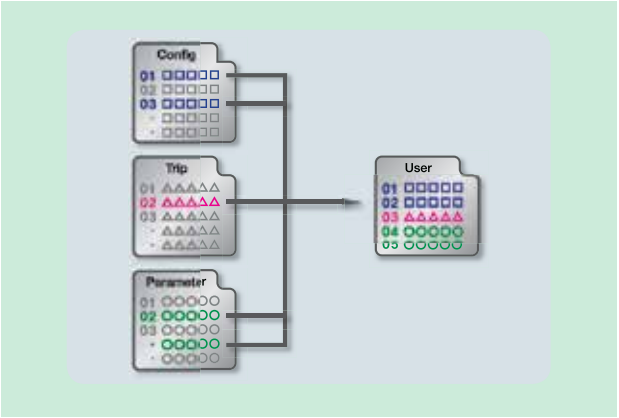
Convenience & Environment

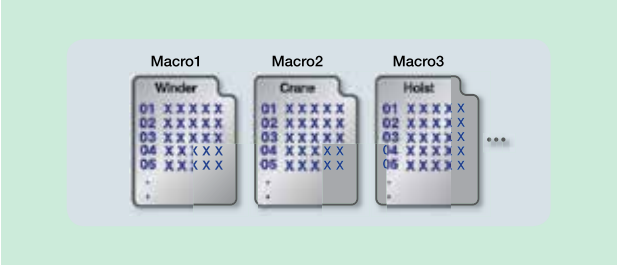
Convenience through User-friendly Interface

Efficient architecture of 5-mode 15-parameter groups

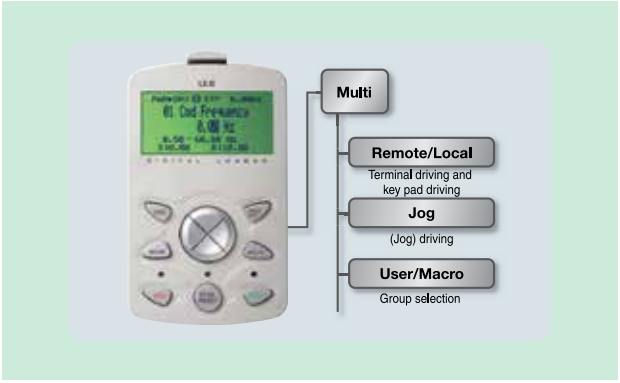


User & macro group support





Multi-function key



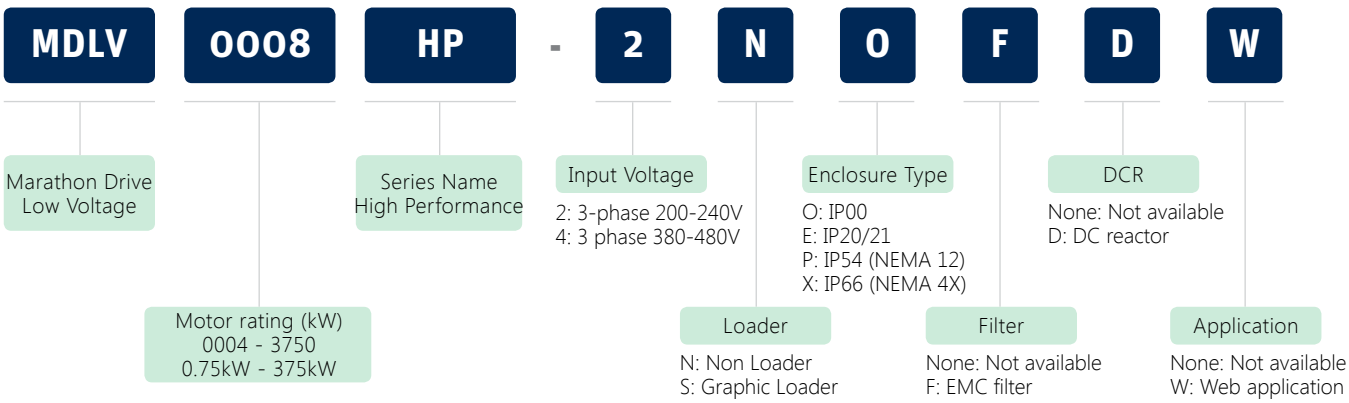
Protective functions dedicated motor control

Standard I/O

Motor Rating	3 Phase 400V
0.75kW	MDLV0008HP-4NO(F)(D)
1.5kW	MDLV0015HP-4NO(F)(D)
2.2kW	MDLV0022HP-4NO(F)(D)
3.7kW	MDLV0037HP-4NO(F)(D)
5.5kW	MDLV0055HP-4NO(F)(D)
7.5kW	MDLV0075HP-4NO(F)(D)
11kW	MDLV0110HP-4NO(F)(D)
15kW	MDLV0150HP-4NO(F)(D)
18.5kW	MDLV0185HP-4NO(F)(D)
22kW	MDLV0220HP-4NO(F)(D)
30kW	MDLV0300HP-4NO(D)
37kW	MDLV0370HP-4NO(D)
45kW	MDLV0450HP-4NO(D)
55kW	MDLV0550HP-4NO(D)
75kW	MDLV0750HP-4NO(D)
90kW	MDLV0900HP-4SOD
110kW	MDLV1100HP-4SOD
132kW	MDLV1320HP-4SOD
160kW	MDLV1600HP-4SOD
185kW	MDLV1850HP-4SOD
220kW	MDLV2200HP-4SOD
280kW	MDLV2800HP-4SO
315kW	MDLV3150HP-4SO
375kW	MDLV3750HP-4SO

※ (F) : Built-in EMC(F) or Non-EMC(Blank) selectable
※ (D) : Built-in DCR(F) or Non-Reactor(Blank) selectable
※ Non DCR products are provided warranty service when used in CT (Heavy Duty) load rating only.
※ Please contact a Regal sales person or office for a UL Type12 (IP54) / Web customized product.

Model Number Identification





marathon™ Drives

3-Phase 400V (0.75 to 375kW) Specifications

MD□□□□HP-4□□□□□		0008	0015	0022	0037	0055	0075	0110	0150	0185	0220	0300	0370
Motor rating	Heavy Duty kW [1]	0.75	1.5	2.2	3.7	5.5	7.5	11	15	18.5	22	30	37
Output rating	Capacity kVa [2]	1.9	3	4.5	6.1	9.1	12.2	17.5	22.9	29.7	34.3	46	57
	Current (CT) A [3]	2.5	4	6	8	12	16	24	30	39	45	61	75
	Current (VT) A	4	6	8	12	16	24	30	39	45	61	75	91
	Voltage	Three phase 380-480V [4]											
	Frequency Hz	0.01-400Hz (Sensorless-1 control: 0.01-300Hz, Sensorless-2 or Sensored control: 0.01-120Hz) [5]											
Input rating	Voltage V	3-phase 380-480V (-15% - +10%)											
	Frequency Hz	50 - 60Hz (±5%)											
	Current (CT) A	4.3	7.2	10.6	15.4	21	25.8	39	44	57	57	57	69
	Current (VT) A	3.5	5.3	7.3	10.8	13.8	22.5	26	33	40	52.2	90	109
Weight kg		5.5	5.5	5.5	5.5	10	10	20	20	30	30	41	41

MD□□□□HP-4□□□□□		0450	0550	0750	0900	1100	1320	1600	1850	2200	2800	3150	3750
Motor rating	Heavy Duty kW	45	55	75	90	110	132	160	185	220	280	315	375
Output rating	Capacity kVa	69	84	116	139	170	201	248	286	329	416	467	557
	Current (CT) A	91	110	152	183	223	264	325	370	432	547	613	731
	Current (VT) A	110	152	183	223	264	325	370	432	547	613	731	877
	Voltage	Three phase 380-480V											
	Frequency Hz	0.01-400Hz (Sensorless-1 control: 0.01-300Hz, Sensorless-2 or Sensored control: 0.01-120Hz)											
Input rating	Voltage V	3-phase 380-480V (-15% - +10%)											
	Frequency Hz	50 - 60Hz (±5%)											
	Current (CT) A	83	113	154	195	239	286	362	404	466	605	674	798
	Current (VT) A	123	162	195	237	282	350	403	463	590	673	796	948
Weight kg		41	63	63	101	101	114	114	200	200	252	352	352

1) Motor Applied indicates the maximum capacity of a standard 4 pole motor.
2) Rated Capacity: the input capacity 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 the setting of the carrier frequency (CON-04).
4) The maximum output voltage does not go over the supplied power voltage. You can select the output voltage as you want below the supplied power voltage.
5) You can set the frequency at up to 300Hz by selecting 3, 4 Sensorless-1, Sensorless-2 as the control mode (DRV-09 Control Mode).

Control Specifications

Control mode	V/F control, V/F PG, slip compensation, sensorless vector control, vector control
Frequency setting resolution	Digital command: 0.01Hz Analog command: 0.06Hz (based on 60Hz)
Frequency tolerance	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 minute, 200% for 22 seconds, VT current rating :110% for 1 minute
Torque boost	Manual torque boost, automatic torque boost

Operation Specifications

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 brake, frequency limit, frequency jump, second function, slip compensation, reverse rotation prevention, auto restart, drive by-pass, auto tune flying start, energy buffering, power braking, flux braking, leakage current reduction, MMC, easy start	
Input	Multifunctional Terminal (8 points) P1 ~ P8 [1]	NPN / PNP selectable	
		Function: forward operation; reverse operation; reset; external trip; emergency stop; jog operation; sequential frequency-high; medium and low; multi-level acceleration and deceleration-high; medium and 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 body operation during option operation; analog command frequency fixation; acceleration and deceleration stop selectable	
Output	Multifunctional open collector terminal	Drive fault output	Below DC 24V 50mA
	Multifunctional relay terminal		Below (N.O., N.C.) AC250V 1A, Below DC 30V 1A
	Analog output	0 ~ 10 Vdc (below 10mA): 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.

Protective Function Specifications

Trip	Over voltage, low voltage, over current, over current detection, drive overheat, motor thermal protection, phase loss protection, overload protection, communication error, frequency command loss, hardware failure, cooling fan failure, pre-PID failure, no motor trip, external brake trip. etc
Alarm	Stall prevention, overload, diminished load, encoder error, fan failure, keypad command loss, speed command loss.
Instantaneous interruption [2]	Below CT class 15 msec (VT class 8 msec): operation continues (within rated input voltage, rated output) Over CT class 15 msec (VT class 8 msec): automatic restart

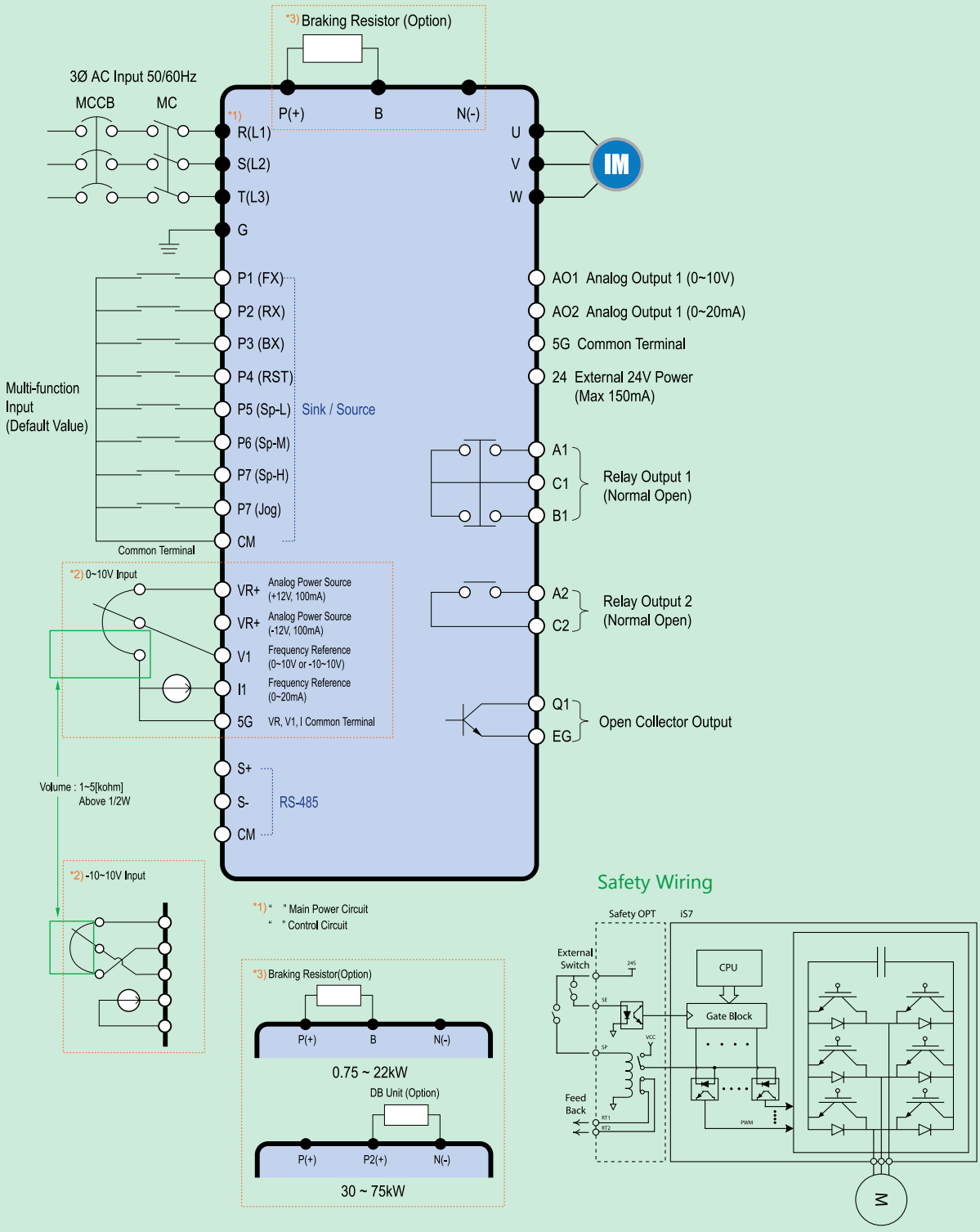
2) Operation at the CT (Heavy Duty) current rating.

Structure and Use Environment Specifications

Cooling method	Forced air blast cooling: 0.75 ~ 15kW (200/400V class), 22kW (400V class) Inhalation cooling: 22 ~ 75kW (200V class), 30 ~ 160kW (400V class)
Protection structure	Up to 75kW: Open Type(IP21), UL enclosed type 1(Option) [3] The others (Below 22kW): Enclosed IP54 type, UL enclosed type 12
Surrounding temperature	CT (Heavy Duty) load: -10 ~ 50°C without ice or frost VT (Normal Duty) load: -10 ~ 40°C without ice or frost (It is recommended that you use less than 80% load when you use VT load at 50°C (122°F)) IP54 product: -10 ~ 40°C without ice or frost
Preservation temperature	-20 ~ 65°C
Surrounding humidity	Below 90% RH of relative humidity (with no dew formation)
Altitude, Vibration	Below 1,000m (3280 ft), below 5.9m/sec 2 (19.36 ft/sec 2, 0.6G)
Environment	There should be no corrosive gas, flammable gas, oil mist or dust. Pollution Degree 2 Environment
Conformal coating	To meet the below IEC standard In the harsh operating environment and to enhance PCB Ass'y life cycle IEC 60721-3-3(3C2) / IEC 60068-2-43 / IEC 60068-2-60

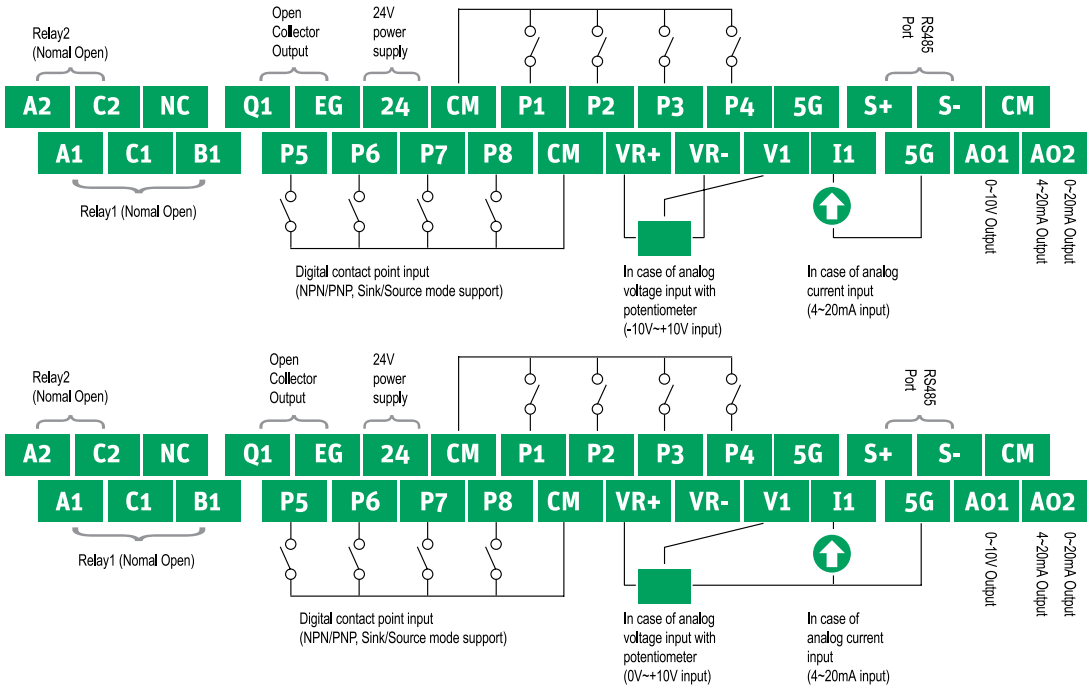
3) UL Enclosed type 1 with conduit box installed.

Wiring


*3) Braking Resistor (Option)
3Ø AC Input 50/60Hz
MCCB
MC
*1)
P(+)
B
N(-)
R(L1)
S(L2)
T(L3)
G
U
V
W
IM
P1 (FX)
P2 (RX)
P3 (BX)
P4 (RST)
P5 (Sp-L)
P6 (Sp-M)
P7 (Sp-H)
P7 (Jog)
CM
Multi-function Input (Default Value)
Sink / Source
Common Terminal
AO1 Analog Output 1 (0~10V)
AO2 Analog Output 1 (0~20mA)
5G Common Terminal
24 External 24V Power (Max 150mA)
A1
C1
B1
Relay Output 1 (Normal Open)
A2
C2
Relay Output 2 (Normal Open)
Q1
EG
Open Collector Output
*2) 0~10V Input
VR+ Analog Power Source (+12V, 100mA)
VR+ Analog Power Source (-12V, 100mA)
V1 Frequency Reference (0~10V or -10~10V)
I1 Frequency Reference (0~20mA)
5G VR, V1, I Common Terminal
Volume : 1~5[kohm] Above 1/2W
S+
S-
CM
RS-485
*2) -10~10V Input
*1) " " Main Power Circuit
" " Control Circuit
*3) Braking Resistor(Option)
P(+)
B
N(-)
0.75 ~ 22kW
DB Unit (Option)
P(+)
P2(+)
N(-)
30 ~ 75kW
Safety Wiring
Safety OPT
iS7
External Switch
CPU
Gate Block
Feed Back
PWM
M

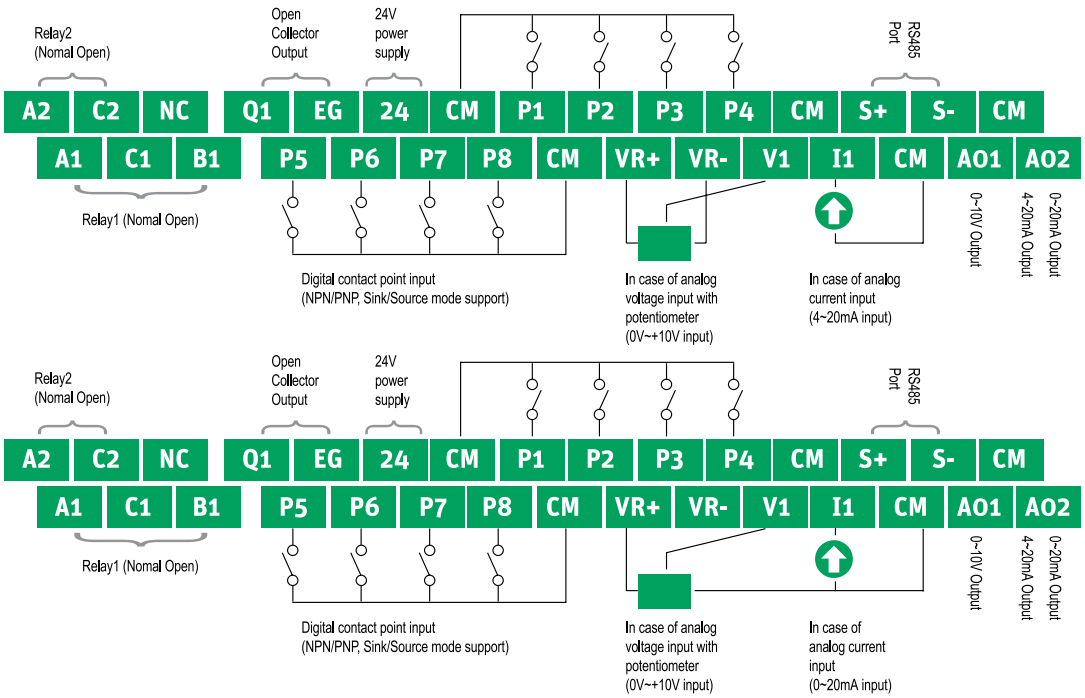
Wiring

0.75~37kW (Basic I/O)



TR terminal located on the above the right side of terminal block is for the terminal resistor of RS485 communication(120)
We recommend the potentiometer for 1/2W, 1k .
*Description of TR teminal and variable resistence are same as those of insulated I/O.

30~375kW (Isolation I/O)



TR terminal located on the above the right side of terminal block is for the terminal resistor of RS485 communication(120Ω).

Peripheral Devices

AC Reactor Specifications

Capacity of Drive	Specifications of the AC reactor			
	Heavy Duty		Normal Duty	
	mH	A	mH	A
MDLV0008HP-4	8.63	2.8	4.81	4.8
MDLV0015HP-4	4.81	4.8	3.23	7.5
MDLV0022HP-4	3.23	7.5	2.34	10
MDLV0037HP-4	2.34	10	1.22	15
MDLV0055HP-4	1.22	15	1.14	20
MDLV0075HP-4	1.14	20	0.81	30
MDLV0110HP-4	0.81	30	0.61	38
MDLV0150HP-4	0.61	38	0.45	50
MDLV0185HP-4	0.45	50	0.39	58
MDLV0220HP-4	0.39	58	0.287	80
MDLV0300HP-4	0.287	80	0.232	98
MDLV0370HP-4	0.232	98	0.195	118
MDLV0450HP-4	0.195	118	0.157	142
MDLV0550HP-4	0.157	142	0.122	196
MDLV0750HP-4	0.122	196	0.096	237
MDLV0900HP-4	0.096	237	0.081	289
MDLV1100HP-4	0.081	289	0..69	341
MDLV1320HP-4	0.069	341	0.057	420
MDLV1600HP-4	0.057	420	0.042	558
MDLV1850HP-4	0.042	558	0.042	558
MDLV2200HP-4	0.042	558	0.029	799
MDLV2800HP-4	0.029	799	0.029	799
MDLV3150HP-4	0.029	799	0.024	952
MDLV3750HP-4	0.024	952	0.024	952

DC Reactor Specifications

Capacity of Drive	Specifications of the DC reactor	
	mH	A
MDLV2800HP-4	0.09	836
MDLV3150HP-4	0.076	996
MDLV3750HP-4	0.64	1195

Peripheral Devices

Dynamic Braking Unit

Voltage	Type	Applied Motor	DB Unit	Dimensions
400V Class	Non UL type	30 ~ 37 kW	SV370DBH-4RG	Refer to the appearance of Group 1
		45 ~ 55 kW	SV075DBH-4RG	Refer to the appearance of Group 3
		75 kW		
		185 ~ 220 kW	SV2200DB-4RG *1)	Refer to the appearance of Group 4
		280 ~ 375 kW	SV2200DB-4RG, 2 set	
	UL type	75 kW	SV370DBU-4URG	Refer to the appearance of Group 2
		90 kW	SV550DBU-4URG	
		110 ~ 132 kW	SV750DBU-4URG	
		160 kW	SV550DBU-4URG, 2 set	
		185 ~ 220 kW	SV750DBU-4URG, 2 set	
		280 ~ 375 kW	SV750DBU-4URG, 3 Set	

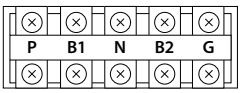
*1) Contact Regal Australia for 185kW and above.

Terminal arrangement

Group 1

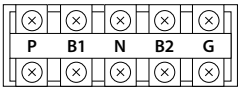
Group 2

Group 3



75kW DB Terminal

Group 4



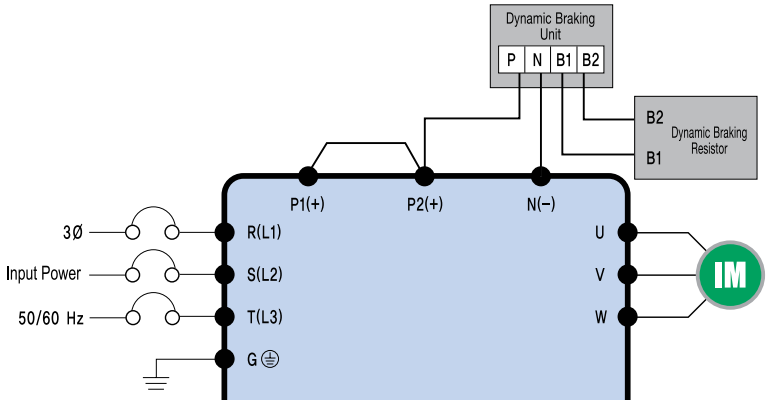
220kW DB Terminal

Terminal	Function
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 Drive
P	Terminal for connection with P1 of Drive

*Note: READ DBU sser manual when selecting DB resistors.

Terminal	Function
P	Terminal for connection with P of Drive
B1	Terminal for connection with B1 of DBU
N	Terminal for connection with N of Drive
B2	Terminal for connection with B2 of DBU
G	Ground Terminal

Dynamic Braking Unit (DBU) & DB Resistor wiring layout

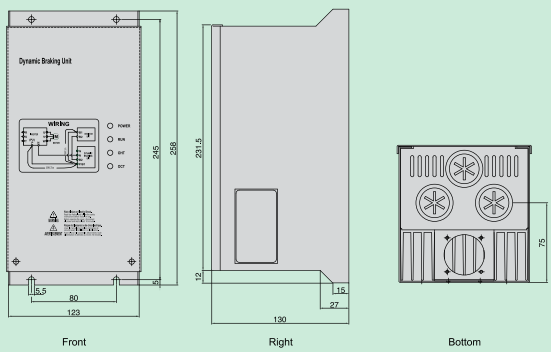


DBU Terminals	Description
B1, B2	Wire correctly refering to diagram. DB Resistors connect with B1,B2 of DB Unit

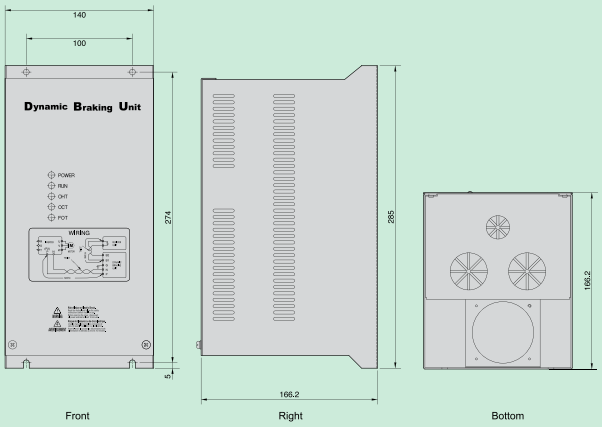
Peripheral Devices

Dimension: Dynamic Braking Unit (DBU)

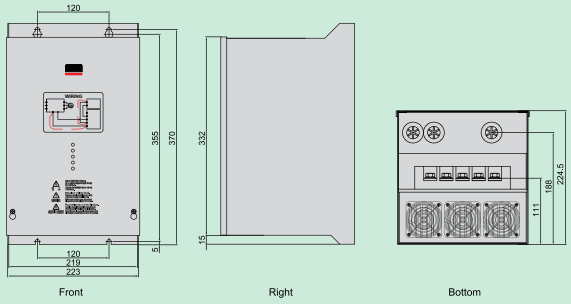
Group 1



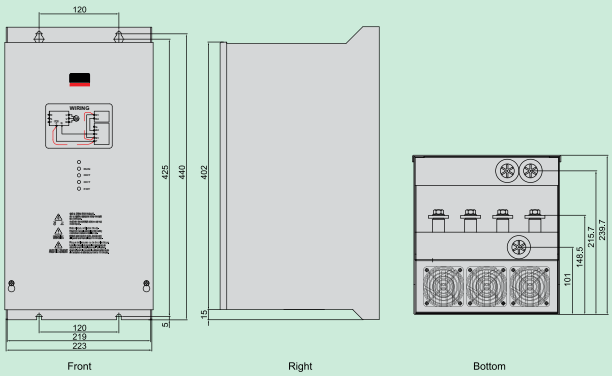
Group 2



Group 3



Group 4



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 braking 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 tum On while main power supplied because DBU is connected with drive"
RUN (Green LED)	RUN LED is turned off while DBU is ON by regenerative energy of Motor.
OHT (Green LED)	Under Braking, if the temperature is exceeded over setting value due to overheat of Heatsink, Cut the Front Rig TURN ON signal of DBU and LED is turned on by working overheat protection function.

Peripheral Devices

Dynamic Braking Resistor (Option)

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

Voltage Class	Drive Capacity (kW)	150% Braking Torque, 5%ED		
		Resistor [ohm]	Watt [W]	Appearance
400V Class	MDLV0008HP-4	600	150	TYPE 1
	MDLV0015HP-4	300	300	TYPE 1
	MDLV0022HP-4	200	400	TYPE 1
	MDLV0037HP-4	130	600	TYPE 2
	MDLV0055HP-4	85	1,000	TYPE 3
	MDLV0075HP-4	60	1,200	TYPE 3
	MDLV0110HP-4	40	2,400	TYPE 3
	MDLV0150HP-4	30	2,400	TYPE 3
	MDLV0185HP-4	20	3,600	TYPE 3
	MDLV0220HP-4	20	3,600	TYPE 3
	MDLV0300HP-4	16.9	6,400	-
	MDLV0370HP-4	16.9	6,400	-
	MDLV0450HP-4	11,4	9,600	-
	MDLV0550HP-4	11.4	9,600	-
	MDLV0750HP-4	8.4	12,800	-
	MDLV0900HP-4	4.5	15,000	-
	MDLV1100HP-4	3.5	17,000	-
	MDLV1320HP-4	3.0	20,000	-
	MDLV1600HP-4	2.5	25,000	-
	MDLV1850HP-4	2	30,000	-
	MDLV2200HP-4	2	30,000	-
	MDLV2800HP-4	1.5	40,000	-
	MDLV3150HP-4	1	60,000	-
	MDLV3750HP-4	1	60,000	-

In case of MDLV 90~160kW, Dynamic braking unit for 220kW (SV2200DB-4) needs above Iisted DB resistor. If Dynamic braking unit (MDLV075DBH-4) is connected in parallel, use above listed DB resistor in parallel.

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Option Slot #1) Fieldbus options

Profibus-DP Card

- Profibus dedicated connector
- Max. 12Mbps communication speed
- Max. 32 stations per segment
- Bus topology
- Enhanced on-line diagnosis

DeviceNet

- Communication speed: 125kbps, 250kbps, 500kbps
- Free/Bus topology
- Max. 64 node connection points
- Max. 500m (1640 ft.) transmission distance (125kbps)

CanOpen Card

- 1Mbps communication speed
- Bus Topology
- Max. 64 node connection points (include master)
- PDO, SDO, Sync, NMC communication support
- Support profile:
  PDO1 (CiA402 drive & motion control device profile)
  PDO3 (LS Profile)

CC-Link Card

- 10Mbps communication speed
- Connecting up to 42 AC drives
- Station type: Remote device station
- 1 connection point for 1 AC drive

Ethernet Card

- Modbus TCP, Ethernet IP Protocol support
- 10Mbps, 100Mbps communication speed
- Half duplex, full duplex support
- Auto negotiation
- Max. 100m(328ft.) transmission distance
- CSMA/CD communication access method

LonWorks

- 78kbps communication speed
- Free/bus topology
- Resistance built-in per topology
- Max. 2700m (8858 ft.) connection distance (bus topology)

R-Net Card

- 1Mbps Communication speed
- Manchester Biphase-L Frame synchronization
- Max. 64 node connection points
- Max. 750m transmission distance (segment each)

RAPIEnet Card

- RAPIEnet Protocol support
- 100Mbps communication speed
- Full Duplex support
- High speed link(8 WORD), P2P(2 WORD) support
- Max. 64 connection points
- Topology: Line/Ring topology

Option Slot #2) PLC/Extension Options

PLC Card

- Master-K 120S platform
- Normal input 6 points (Sink/Source selectable),
- Max. input 14 points when expanded
- Normal output 4 points (N.O. Relay),
- Max. output 7 points when expanded
- RTC (Real Time Clock)
- KGL WIN operating system

I/O Expansion Card

- Insulated I/O 3 points each
- Ext-1
  Analog voltage (-10~10V) I/O 1 point
  Analog current (0~20mV) I/O 1 point
- Ext-2
  Analog voltage (-10~10V) I/O 2 points
  Analog current (0~20mV) I/O 2 points

Safety Card

- 2-Channel STO function (STO : Safety Torque Off)
- Safety standard certified

Synchronization Option Card

- Closed loop control
- 100kHz Max. input frequency
- Position/Speed synchronization
- Synchronization hold (only slave)
- 15 slaves per master(3 serial - 5 parallel max)
- Open collector output : 26V/100mA (2 points)

Binary Input Card

- Operating frequency setting with digital input (NPN/PNP)
- Max. 16bit digital input (8bit / 12bit / 16bit)
- Frequency setting with Bias-Gain or BCD
- Frequency resolution (0.01Hz~10Hz)
- Digital input filter function Input signal read timing terminal

Auxiliary Power Option

- Power supply via external 200~230VAC when main power is off
- 5Vdc power supply to fieldbus cards and control board
- Support fieldbus options (Ret, CANopen, DeviceNet, LonWorks, Profibus-DP, EtherNet, CC-Link, RAPIEnet)

Option Slot #2) PLC/Extension Options

Encoder Card

- Closed loop control
- Pulse train reference
- 5/12/15 V insulated power supply
- Line driver or open collector
- 200kHz Max. input frequency
- Signal loss detection

24V Encoder Card

- Closed loop control
- Pulse train reference
- 24V insulated power supply
- Line driver or open collector
- 200kHz Max. input frequency
- Signal loss detection

Position Control Option Card

- Closed loop control
- Pulse train reference
- 5/12/15V insulated power supply
- Line driver or open collector
- 200kHz Max. input frequency
- Signal loss detection
- External brake control

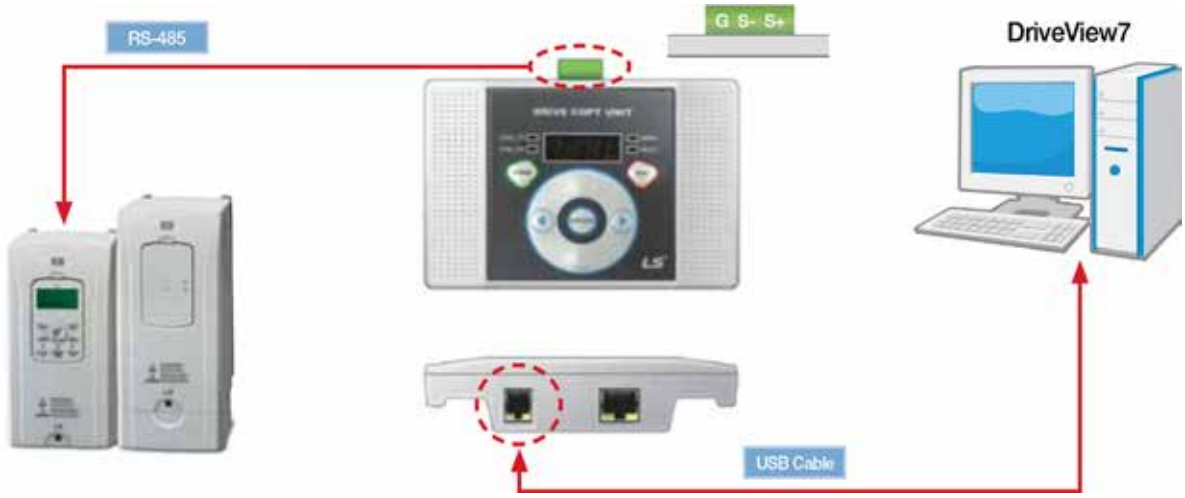
Parameter Copy Unit

Drive Copy Unit (UX-07V1)

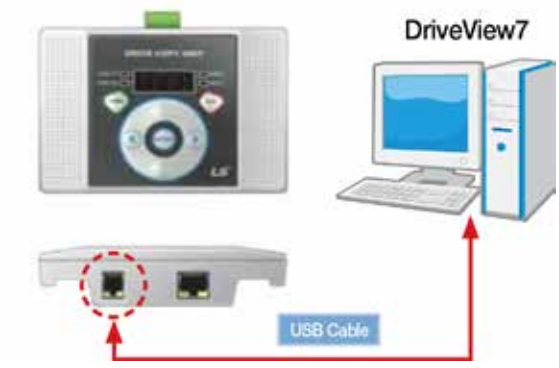
- Support Products: iS7, iE5
- Support function: Parameter copy, RS485 converter
- Copy speed: 9,600bps (iE5) / 19,200bps (iS7)
- Max. save paramete: 5 Sets
- Converter support speed: 1,200 / 2,400 / 9,600 / 19,200 / 38,400 bps

HP Series Parameter Copy Unit

Drive <-----> Parameter copy unit <-----> PC

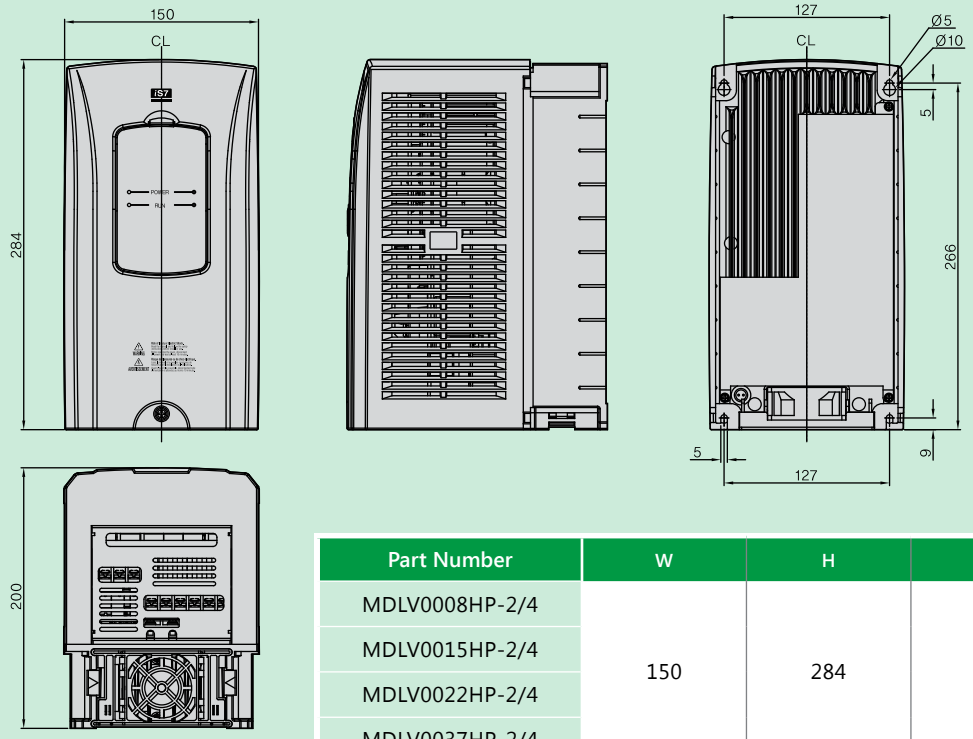


Parameter copy unit <-----> PC



Parameter copy unit <-----> Drive

MDLV0008-0037HP (200V & 400V Class) Dimensions

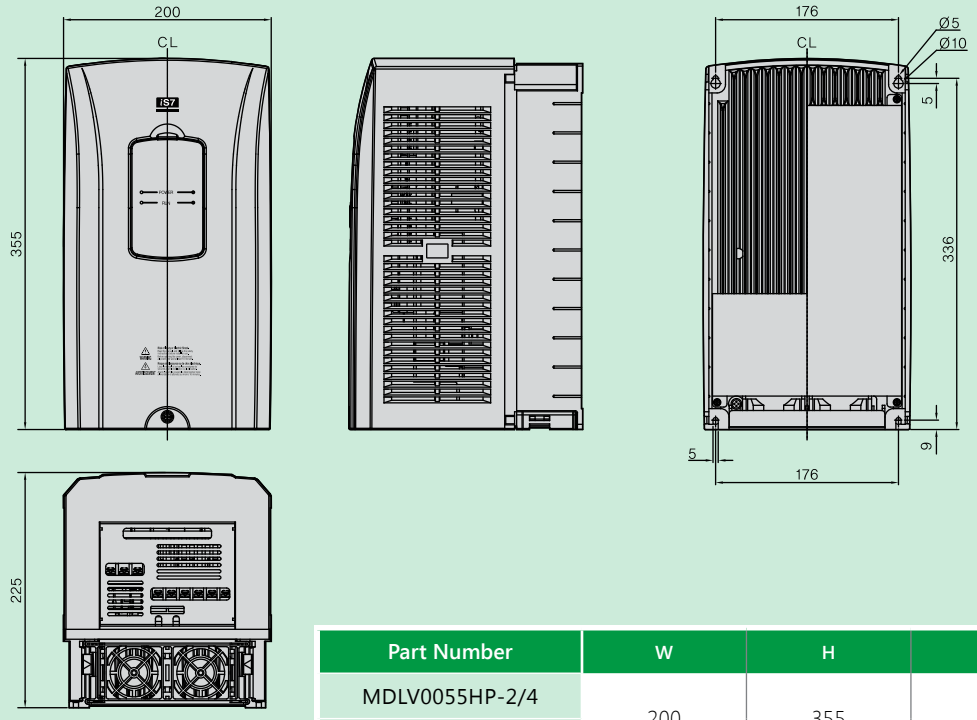


Unit: mm & kg

Part Number	W	H	D	Weight
MDLV0008HP-2/4	150	284	200	5.5
MDLV0015HP-2/4				
MDLV0022HP-2/4				
MDLV0037HP-2/4				

The weight above represents the total weight including EMC filter and DCL.

MDLV0055-0075HP (200V & 400V Class) Dimensions

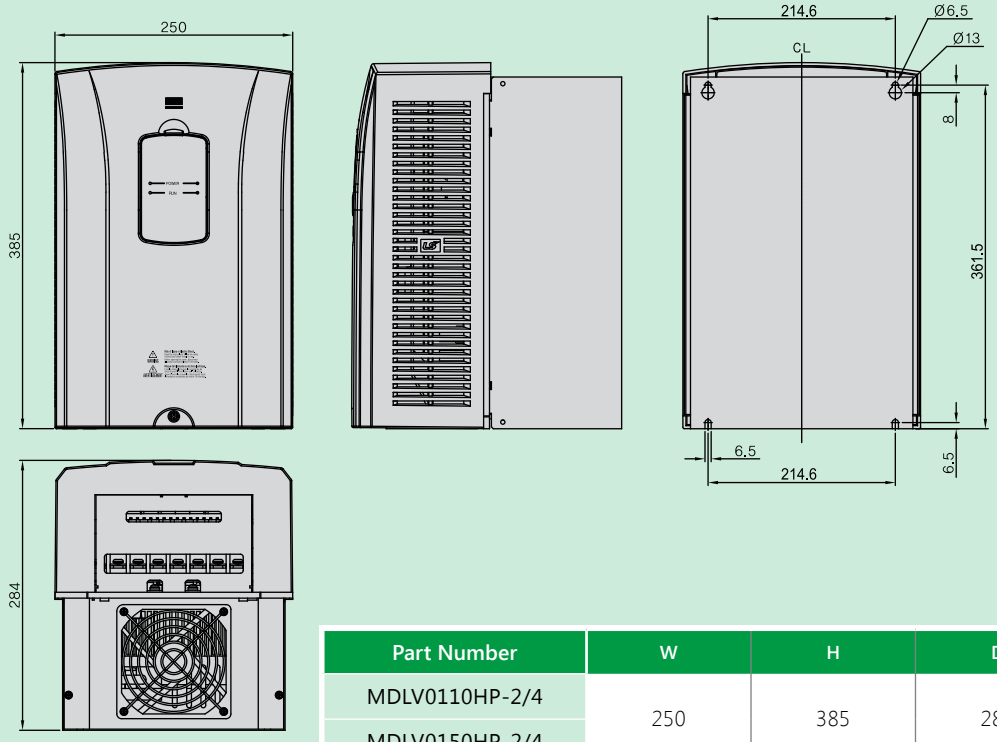


Unit: mm & kg

Part Number	W	H	D	Weight
MDLV0055HP-2/4	200	355	225	10
MDLV0075HP-2/4				

The weight above represents the total weight including EMC filter and DCL.

MDLV0110-0150HP (200V & 400V Class) Dimensions

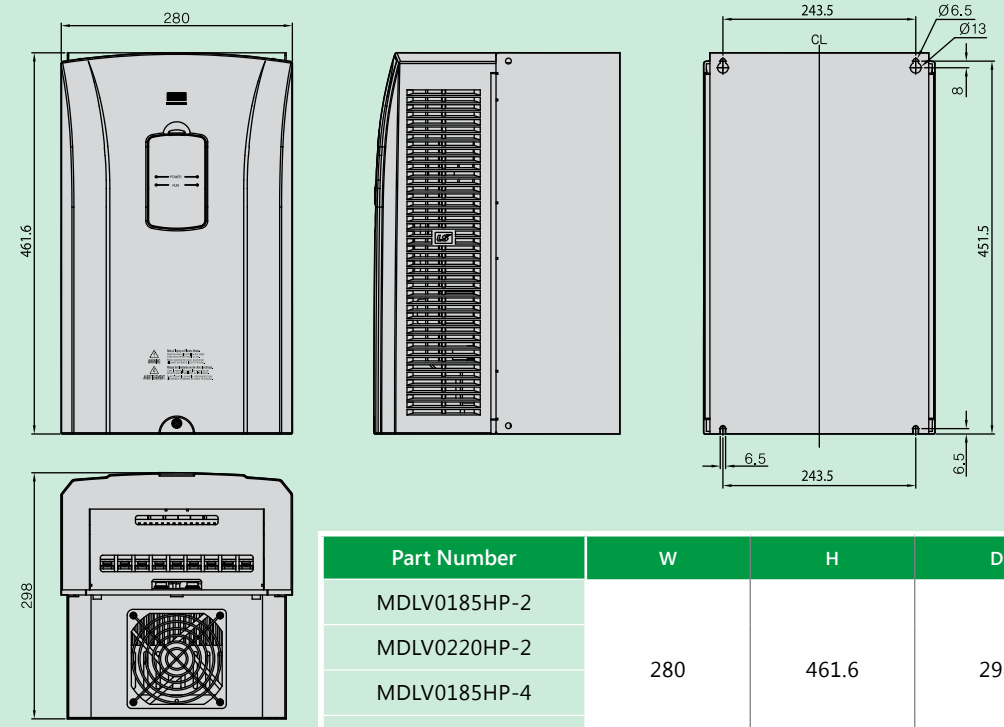


Unit: mm & kg

Part Number	W	H	D	Weight
MDLV0110HP-2/4	250	385	284	20
MDLV0150HP-2/4				

The weight above represents the total weight including EMC filter and DCL.

MDLV0185-0220HP (200V & 400V Class) Dimensions

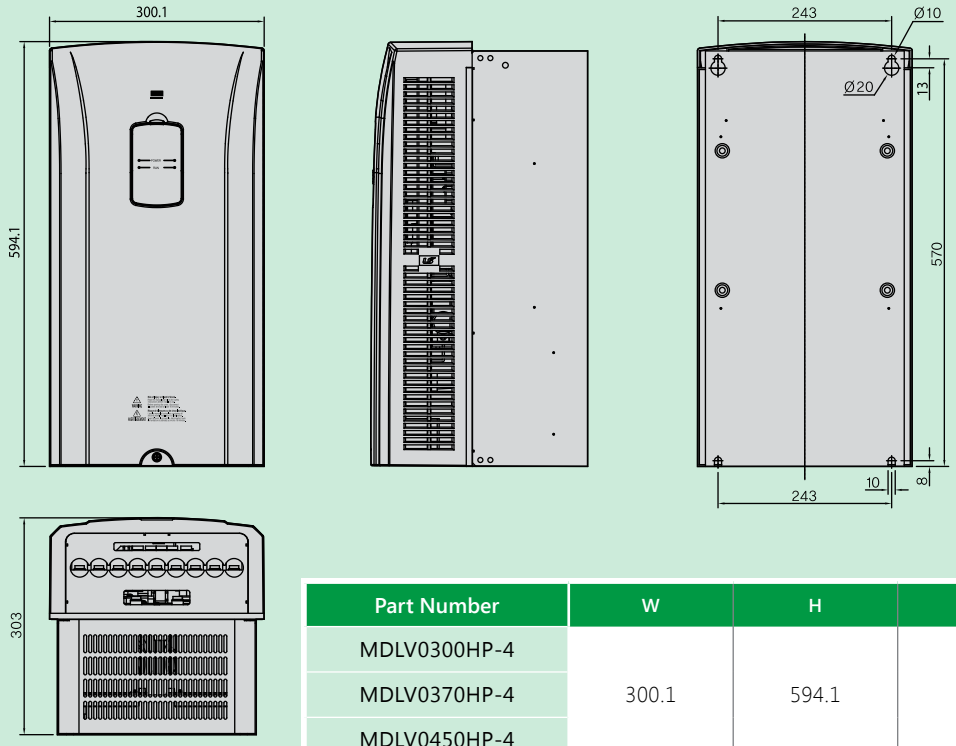


Unit: mm & kg

Part Number	W	H	D	Weight
MDLV0185HP-2	280	461.6	298	30
MDLV0220HP-2				
MDLV0185HP-4				
MDLV0220HP-4				

The weight above represents the total weight including EMC filter and DCL.

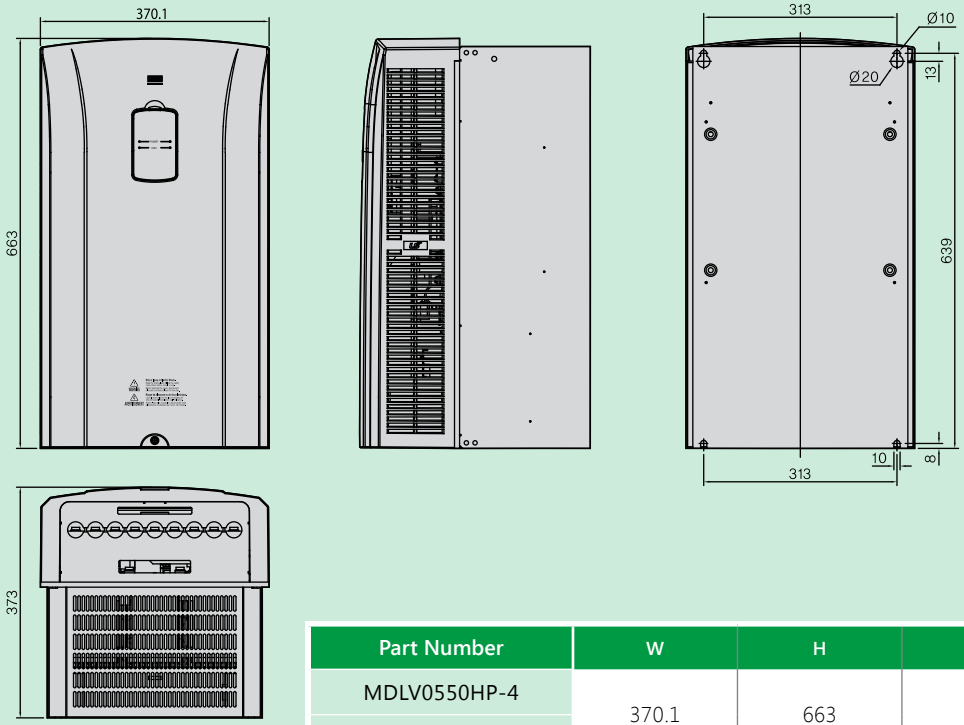
MDLV0300-04150HP (400V Class) Dimensions



Unit: mm & kg

Part Number	W	H	D	Weight
MDLV0300HP-4	300.1	594.1	303	41
MDLV0370HP-4				
MDLV0450HP-4				

MDLV0550-0750HP (400V Class) Dimensions



Unit: mm & kg

Part Number	W	H	D	Weight
MDLV0550HP-4	370.1	663	373	63
MDLV0750HP-4				

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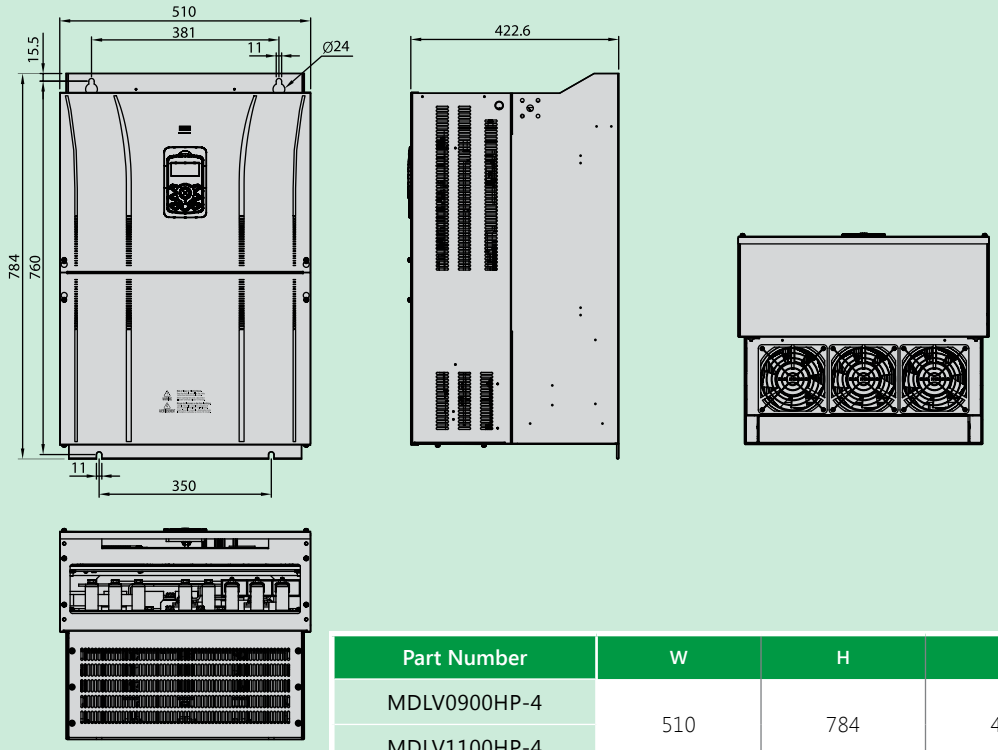
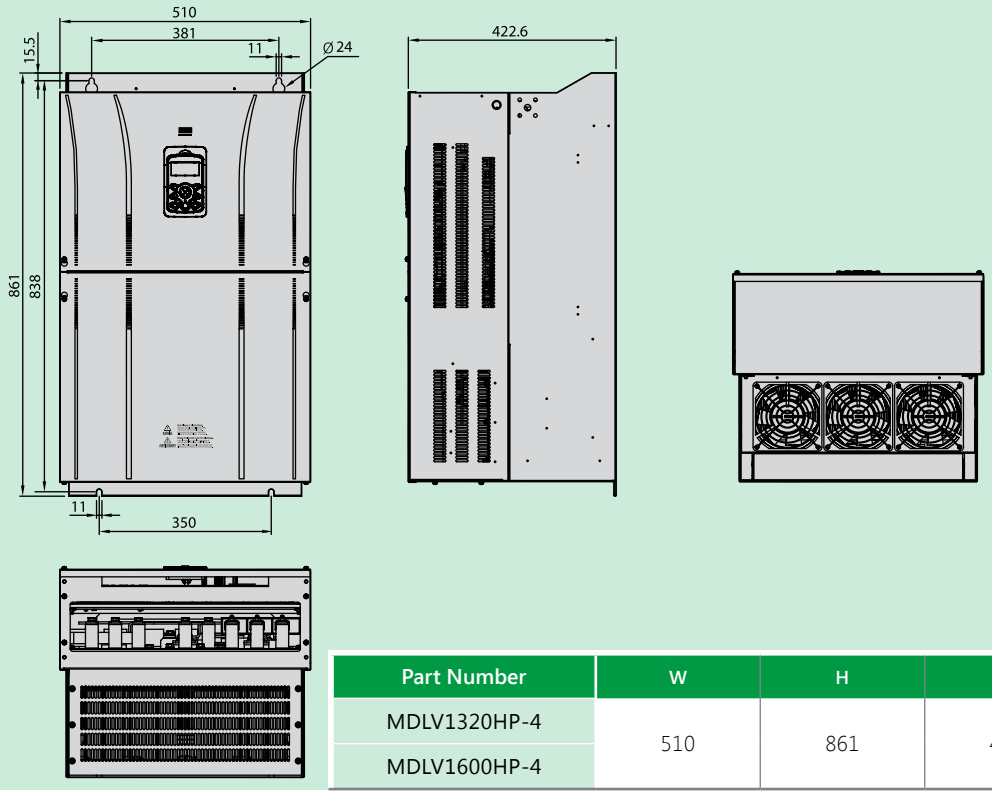
MDLV0900-1100HP (400V Class) Dimensions



Unit: mm & kg

Part Number	W	H	D	Weight
MDLV0900HP-4	510	784	423	101
MDLV1100HP-4				

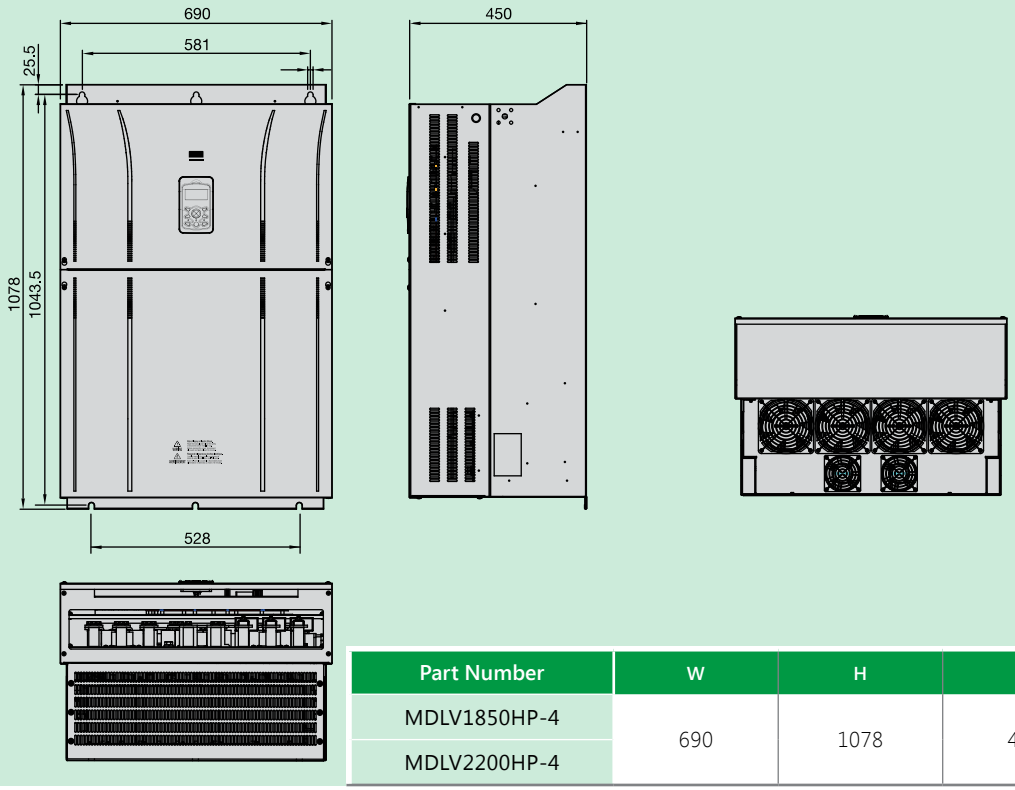
MDLV1320-1600HP (400V Class) Dimensions



Unit: mm & kg

Part Number	W	H	D	Weight
MDLV1320HP-4	510	861	423	114
MDLV1600HP-4				

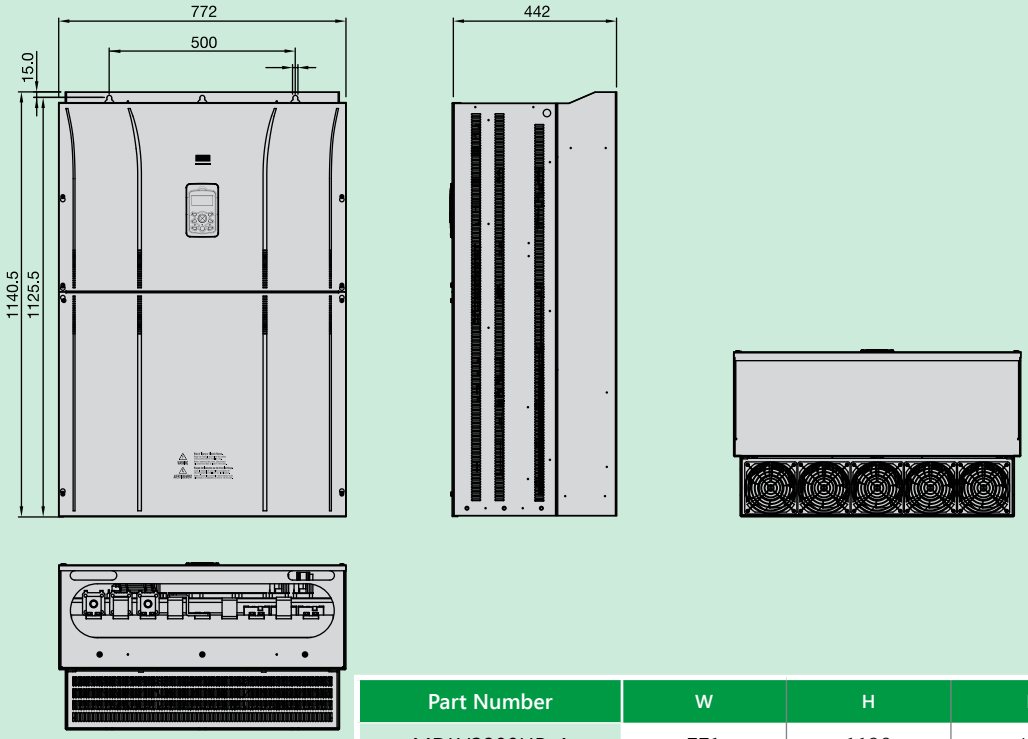
MDLV1850-2200HP (400V Class) Dimensions



Unit: mm & kg

Part Number	W	H	D	Weight
MDLV1850HP-4	690	1078	450	200
MDLV2200HP-4				

MDLV2800HP (400V Class) Dimensions



Unit: mm & kg

Part Number	W	H	D	Weight
MDLV2800HP-4	771	1138	440	252

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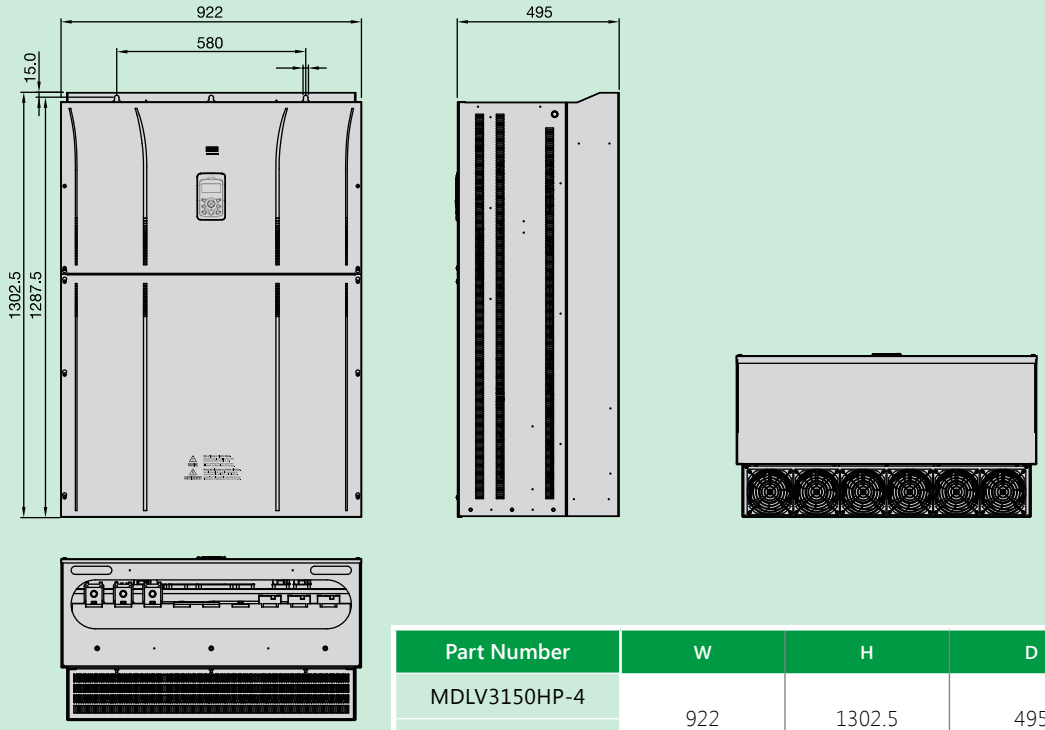
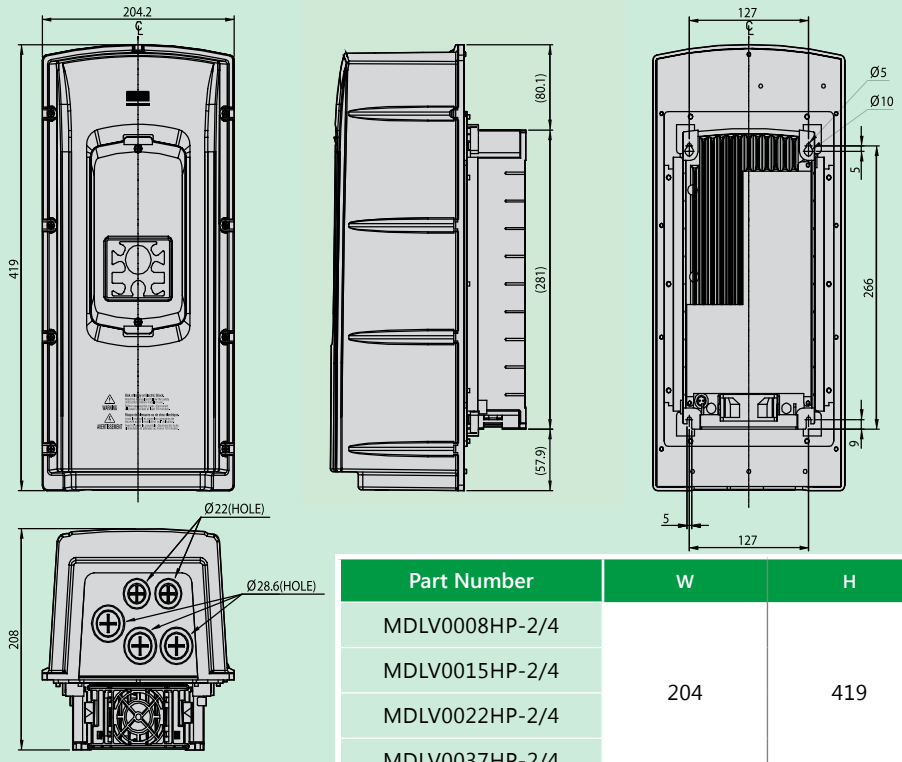
MDLV3150-3750HP (400V Class) Dimensions



Unit: mm & kg

Part Number	W	H	D	Weight
MDLV3150HP-4	922	1302.5	495	352
MDLV3750HP-4				

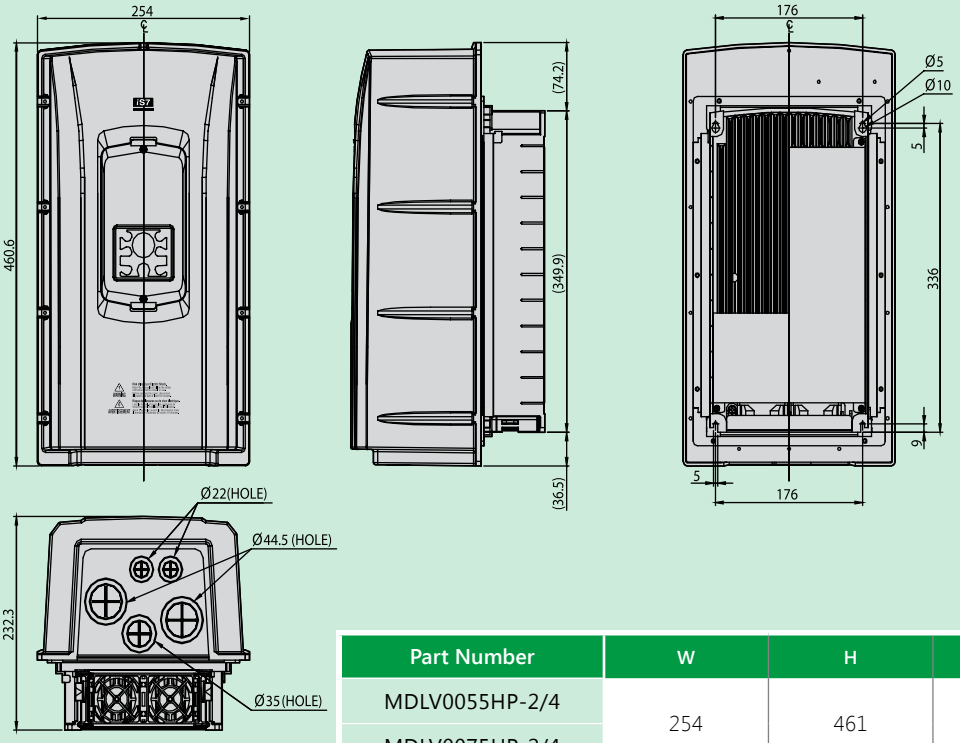
MDLV0008-0037HP (200V & 400V Class), IP54 Dimensions



Unit: mm & kg

Part Number	W	H	D	Weight
MDLV0008HP-2/4	204	419	208	6.7
MDLV0015HP-2/4				
MDLV0022HP-2/4				
MDLV0037HP-2/4				

MDLV0055-0075HP (200V & 400V Class), IP54 Dimensions



Unit: mm & kg

Part Number	W	H	D	Weight
MDLV0055HP-2/4	254	461	232	9.5
MDLV0075HP-2/4				9.6

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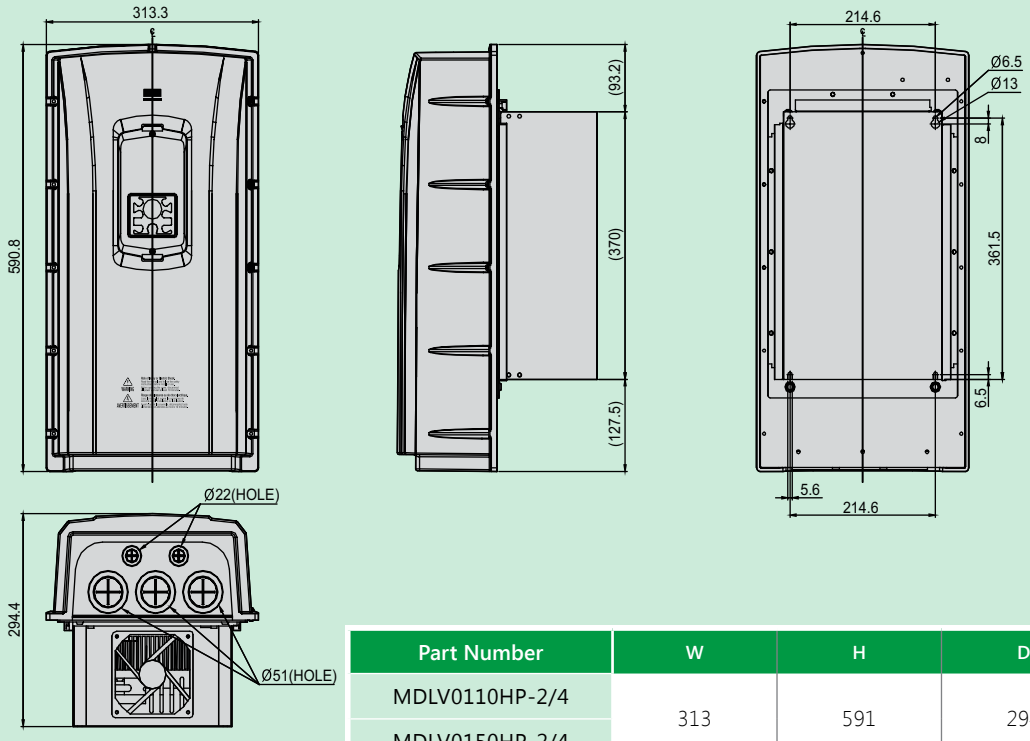
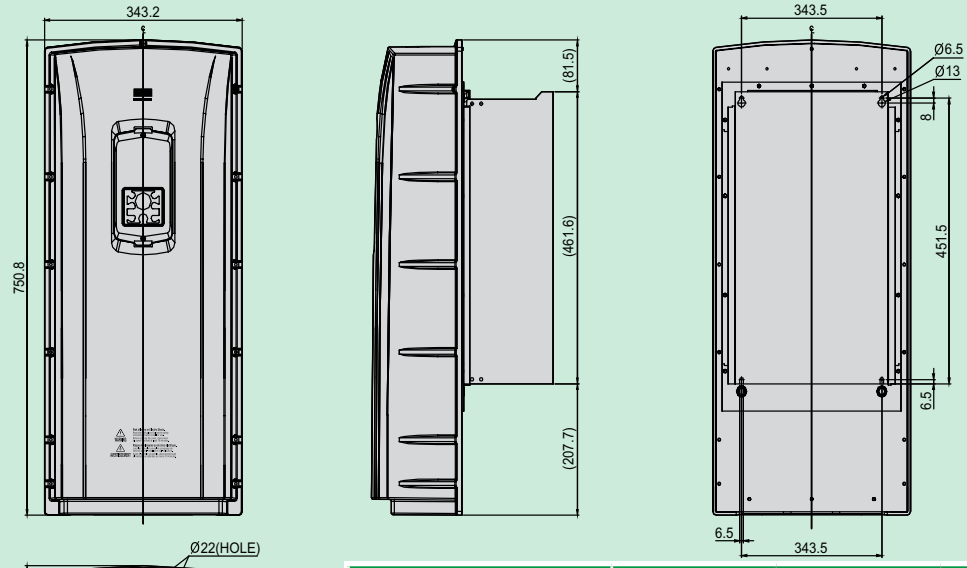
MDLV0110-0150HP (200V & 400V Class), IP54 Dimensions



Unit: mm & kg

Part Number	W	H	D	Weight
MDLV0110HP-2/4	313	591	294	19.6
MDLV0150HP-2/4				19.9

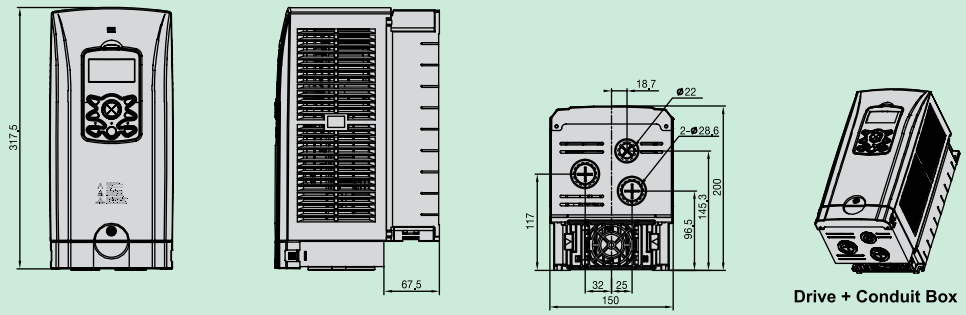
MDLV0185-0220HP (200V & 400V Class), IP54 Dimensions



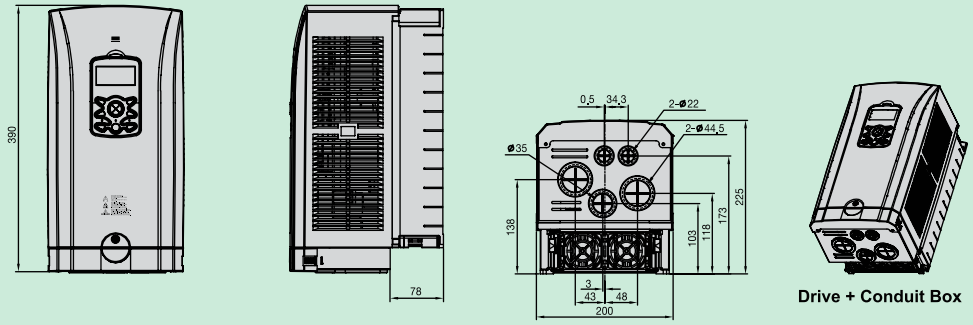
Unit: mm & kg

Part Number	W	H	D	Weight
MDLV0185HP-2	343	571	316	29.9
MDLV0220HP-2				
MDLV0185HP-4				27.1
MDLV0220HP-4				

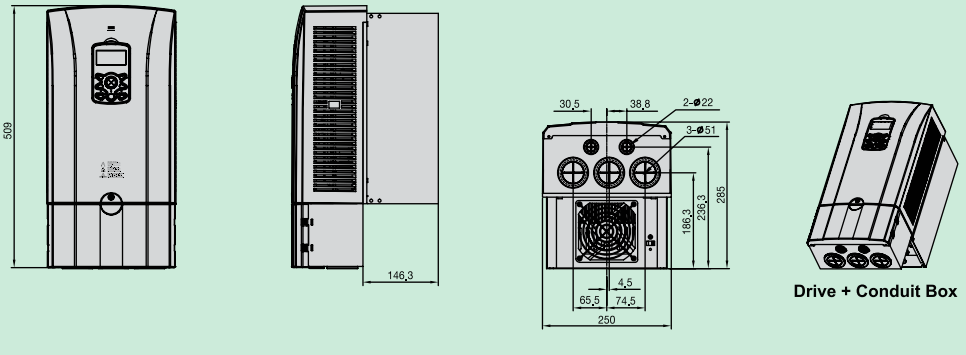
MDLV0008-0037HP (200V & 400V Class) Dimensions, Conduit Option



MDLV0055-0075HP (200V & 400V Class) Dimensions, Conduit Option



MDLV0110-0150HP (200V & 400V Class) Dimensions, Conduit Option



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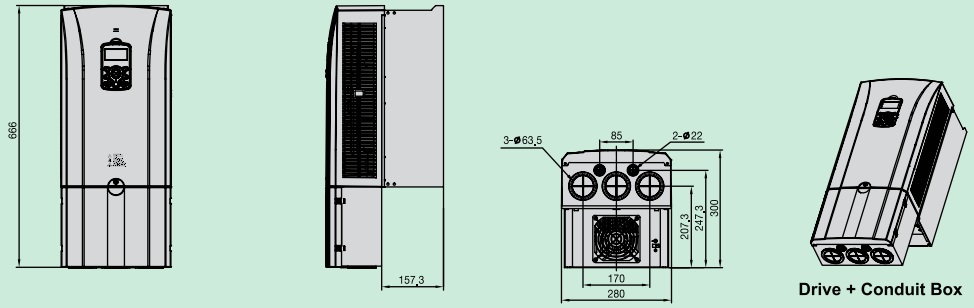
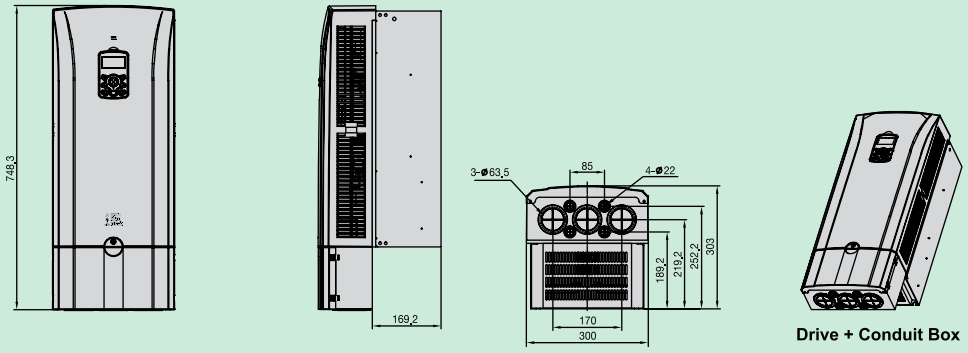
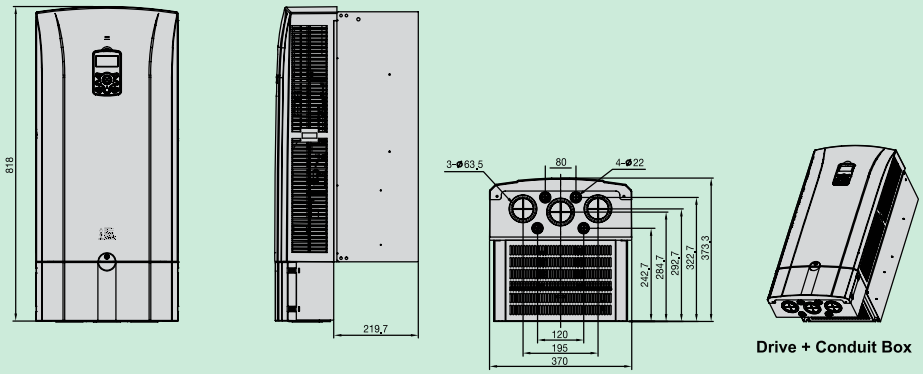
MDLV0185-0220HP (400V Class) Dimensions, Conduit Option



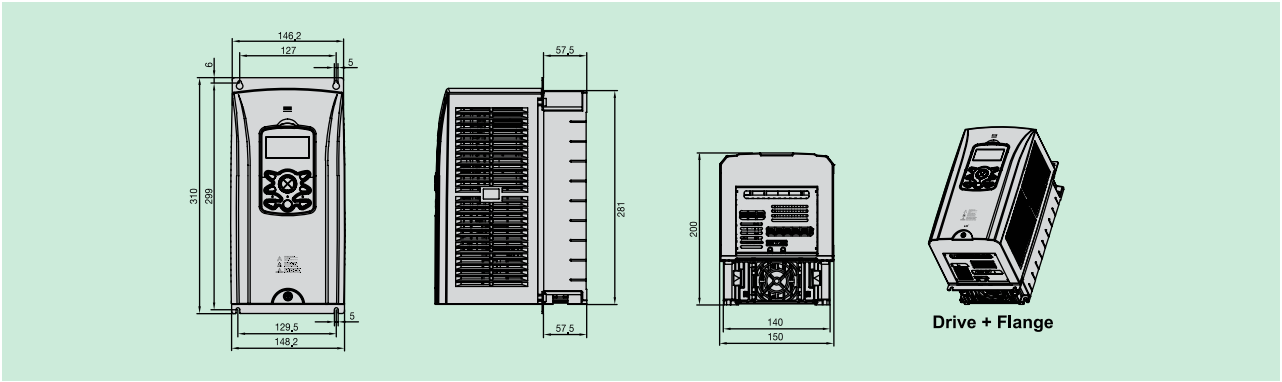
MDLV0300-0450HP (400V Class) Dimensions, Conduit Option



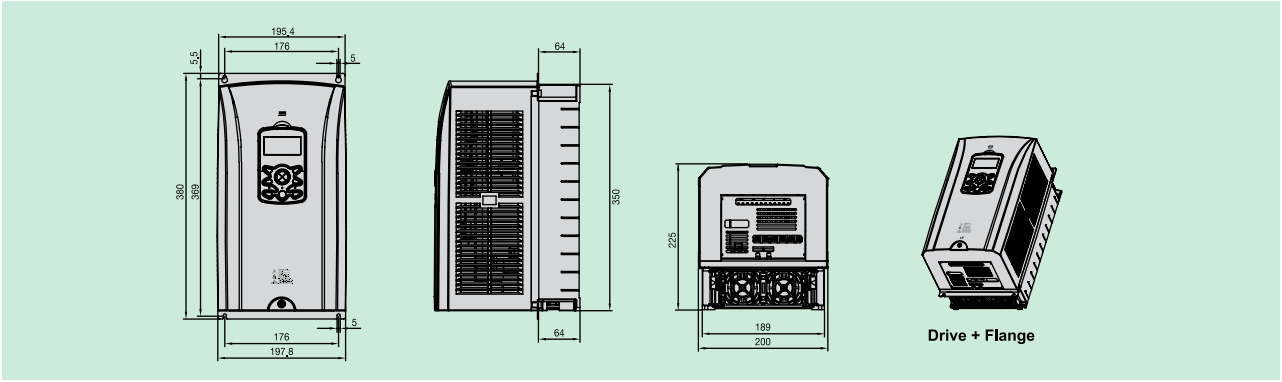
MDLV0550-0750HP (400V Class) Dimensions, Conduit Option



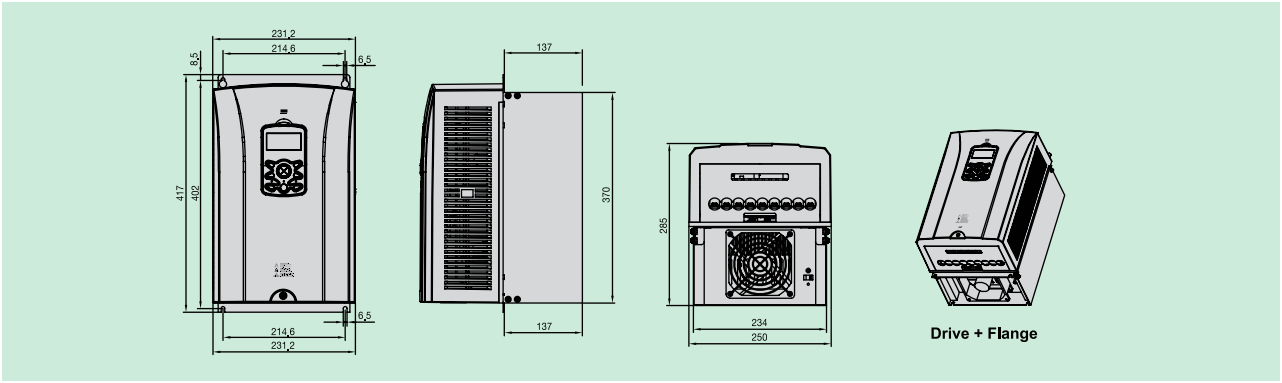
MDLV0008-0037HP (200V & 400V Class) Dimensions, Flange Option



MDLV0055-0075HP (200V & 400V Class) Dimensions, Flange Option



MDLV0110-0150HP (200V & 400V Class) Dimensions, Flange Option



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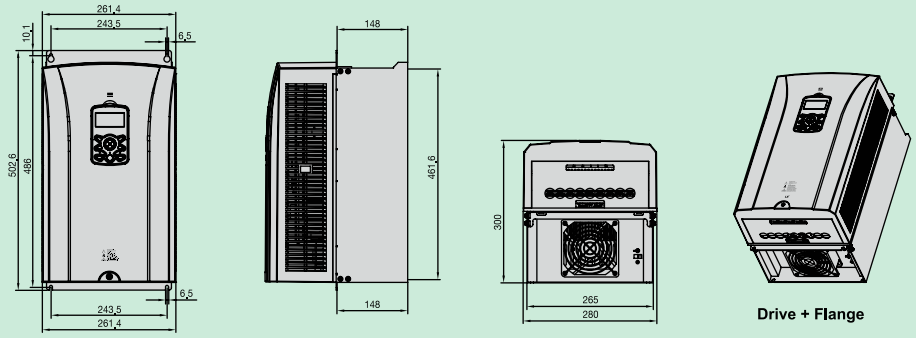
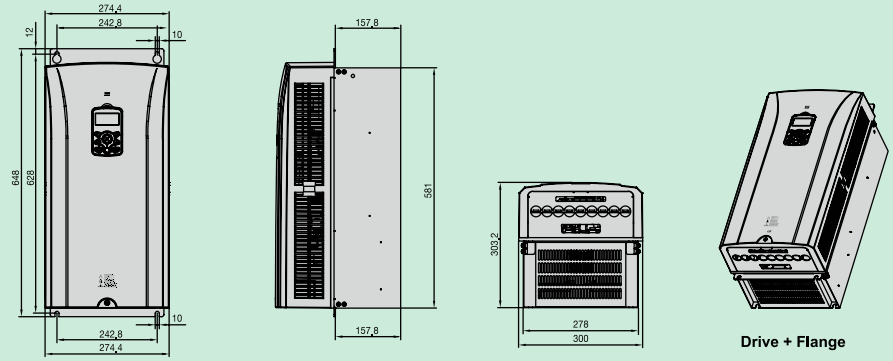
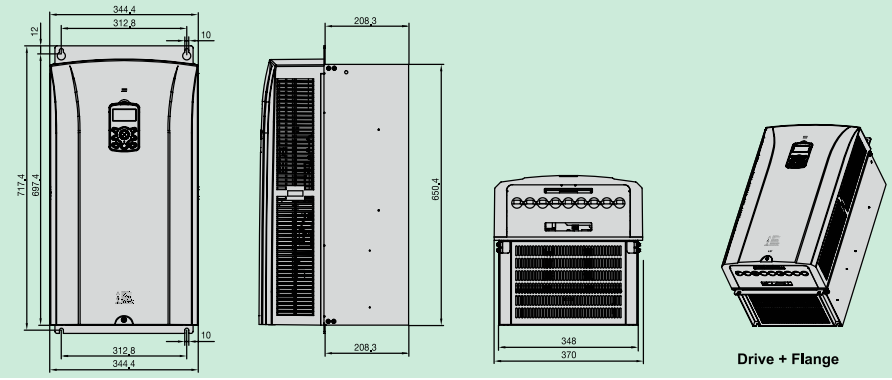
MDLV0185-0220HP (400V Class) Dimensions, Flange Option



MDLV0300-0450HP (400V Class) Dimensions, Flange Option



MDLV0550-0750HP (400V Class) Dimensions, Flange Option



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