



Permanent Magnet Synchronous Motor Controller User's Manual

Brief Introduction

The Ezkontrol series permanent magnet synchronous motor (PMSM) controllers, built with the ARM 32-bit Cortex-M4 core processor and by Field Oriented Control (FOC) vector control technology, can achieve real time and efficient control of the motor's torque, field excitation, speed and power.

The voltage range is 24V-240V and the power range is 1KW-30KW.

Because of deep cultivation in the field of new energy motor control for more than ten years, our company has accumulated rich application experience in industries of electric vehicles, ships, machines etc., and also has mastered the core technologies to meet user personalized needs.

Features

- Built-in bluetooth, with host softwares in WeChat Mini apps, can easily:
 - Real-time monitor controller's working status
 - Flexibly set up as many as hundreds of parameters
 - Update firmware online.
- Many communication protocols and interfaces: isolation CAN-BUS, R485, UART, all-in-one connection and etc.
- Self-learning function, match the motor parameters automatically
- Compatible with a variety of motor position sensors: Hall, photoelectric encoder, magnetic coder and etc.
- Compatible with a variety of motor temperature sensors, protect the motor from overheating damage.
- Precise bus current control, protect the battery life from over discharge.
- All five-gear torque, speed, and power can be set separately.
- Integrated DC contactor controls the circuit, and also other modes available.
- Advanced and efficient software

algorithms, guaranteed hardware circuits, excellent mechanical structure and thermal structure, ensure the stable and reliable quality.

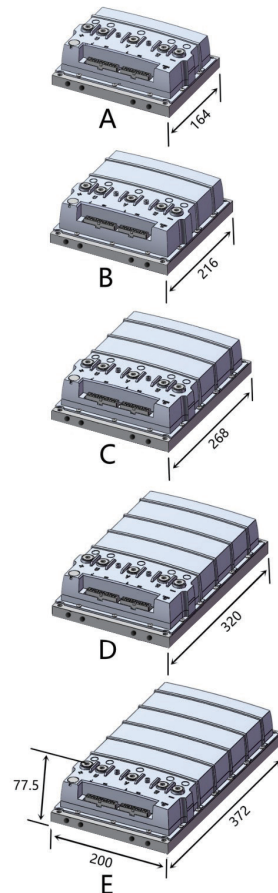
- V-0 flame-retardant shell
- IP66 protection grade.

Applications

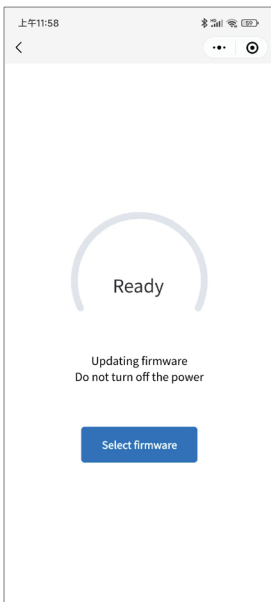
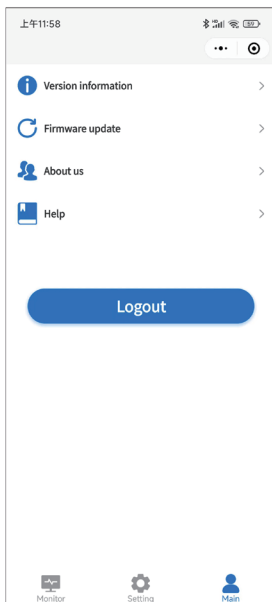
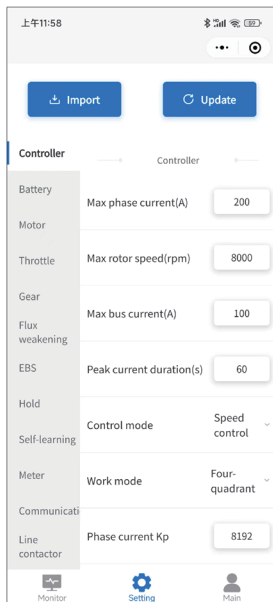
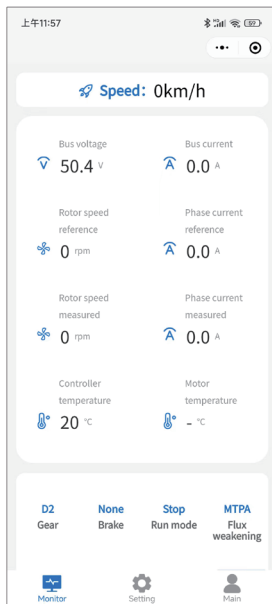
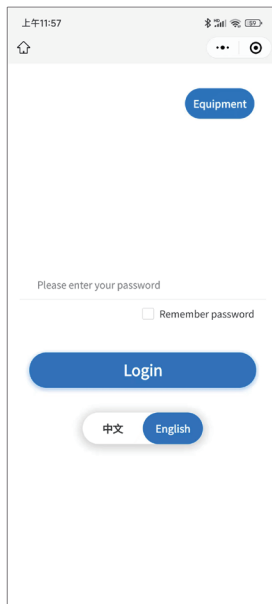
Electric vehicles

Electric boats

Electric machines



WeChat Host Softwares

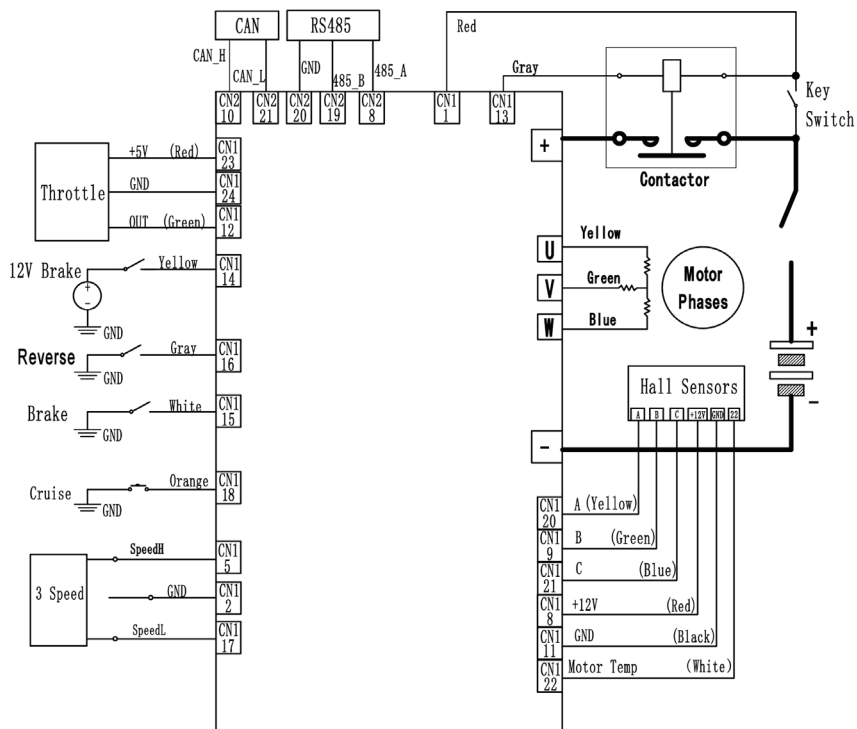


Models

Rated Voltage (V)	Item No.	Max. Voltage (V)	Max. Phase Current (A)	Rated Phase Current (A)	Max. Bus Current (A)
48	EZkontrol A48400	75	400	160	200
	EZkontrol B48800		800	320	400
	EZkontrol C481200		1200	480	600
	EZkontrol D481600		1600	640	800
	EZkontrol E482000		2000	800	1000
48	EZkontrol A48500	75	500	200	250
	EZkontrol B481000		1000	400	500
	EZkontrol C481500		1500	600	750
	EZkontrol D482000		2000	800	1000
	EZkontrol E482500		2500	1000	1250
72	EZkontrol A72400	95	400	160	200
	EZkontrol B72800		800	320	400
	EZkontrol C721200		1200	480	600
	EZkontrol D721600		1600	640	800
	EZkontrol E722000		2000	800	1000
72	EZkontrol A72500	95	500	200	250
	EZkontrol B721000		1000	400	500
	EZkontrol C721500		1500	600	750
	EZkontrol D722000		2000	800	1000
	EZkontrol E722500		2500	1000	1250
96	EZkontrol A96300	120	300	120	150
	EZkontrol B96600		600	240	300
	EZkontrol C96900		900	360	450
	EZkontrol D961200		1200	480	600
	EZkontrol E961500		1500	600	750
96	EZkontrol A96400	130	400	160	200
	EZkontrol B96800		800	320	400
	EZkontrol C961200		1200	480	600
	EZkontrol C961600		1600	640	800
	EZkontrol E962000		2000	800	1000
120	EZkontrol A120300	145	300	120	150
	EZkontrol B120600		600	240	300
	EZkontrol C120900		900	360	450
	EZkontrol D1201200		1200	480	600
	EZkontrol E1201500		1500	600	750

144	EZkontrol A144200	190	200	80	100
	EZkontrol B144400		400	160	200
	EZkontrol C144600		600	240	300
	EZkontrol D144800		800	320	400
	EZkontrol E1441000		1000	400	500
192	EZkontrol A192150	240	150	60	75
	EZkontrol B192300		300	120	150
	EZkontrol C192450		450	180	225
	EZkontrol D192600		600	240	300
	EZkontrol E192750		750	300	375
240	EZkontrol A240100	290	100	40	50
	EZkontrol B240200		200	80	100
	EZkontrol C240300		300	120	150
	EZkontrol D240400		400	160	200
	EZkontrol E240500		500	200	250

Wiring Diagram with DC Contactor



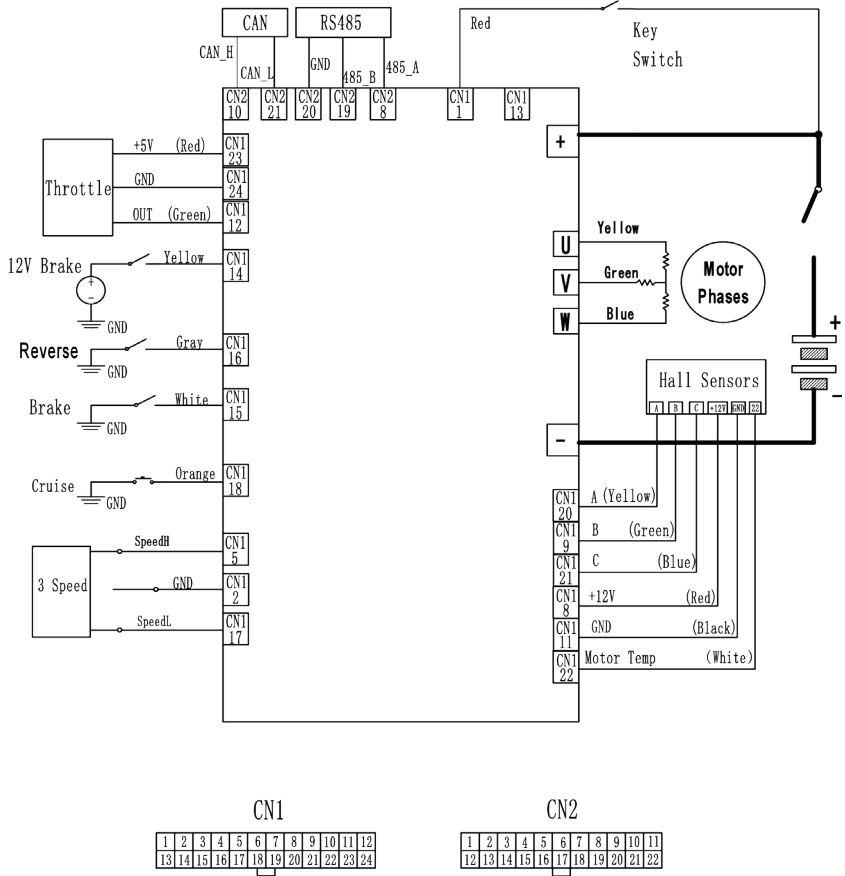
CN1

1	2	3	4	5	6	7	8	9	10	11	12
13	14	15	16	17	18	19	20	21	22	23	24

CN2

1	2	3	4	5	6	7	8	9	10	11
12	13	14	15	16	17	18	19	20	21	22

Wiring Diagram without DC Contactor



Interface Definition

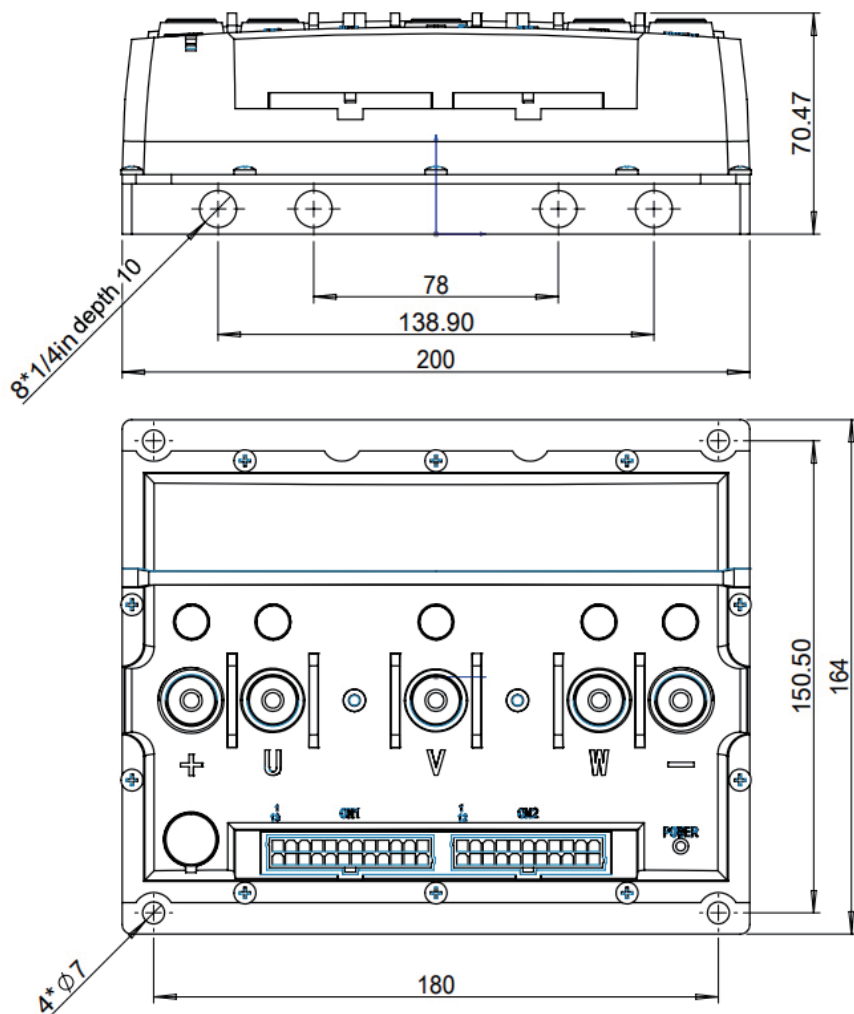
Pin No.	Wiring Color	Function Definition	Function Description
CN1-1	Red	KI	Key Switch
CN1-13	Grey	LCON	DC Contactor Coil
CN1-2	Black	GND	Ground
CN1-14	Yellow	BrakeH+	High Brake +
CN1-3	Black	BrakeH-	High Brake -
CN1-15	White	BrakeL	Low Brake
CN1-4	Green	FWD	Forward
CN1-16	Grey	REV	Reverse
CN1-5	Blue	peedH	High Speed
CN1-17	Brown	peedL	Low Speed
CN1-18	Orange	Cruise	Cruise
CN1-8	Red	+12V	Motor main position sensor power +12V
CN1-20	Yellow	HA_A_M	Motor main position sensor signal, Hall HA or encoder A
CN1-9	Green	HB_B_M	Motor main position sensor signal, Hall HB or encoder B
CN1-21	Blue	HC_Z_M	Motor main position sensor signal, Hall HC or encoder Z
CN1-22	White	TEMP_M	Motor Temperature Sensor
CN1-11	Black	GND	Motor position sensor power GND
CN1-23	Red	+5V	Main Throttle Power +5V
CN1-12	Green	ThrottleM	Main Throttle Signal
CN1-24	Black	GND	Main Throttle Power GND
CN2-5	Black	PDO-	Speed Pulse power supply -
CN2-16	Purple	IF	All-in-one Connection/Speed Pulse signal output
CN2-8	White	R485_A	R485 A
CN2-19	Purple	R485_B	R485 B
CN2-9	Brown	R485_TERM	R485 120Ω matching resistance
CN2-20	Black	GND	GND
CN2-10	Yellow	CAN_H	CAN H
CN2-21	Green	CAN_L	CAN L
CN2-11	Brown	CAN_TERM	CAN 120Ω matching resistance
CN2-22	Black	CAN_GND	CAN GND

System Protection Characteristics

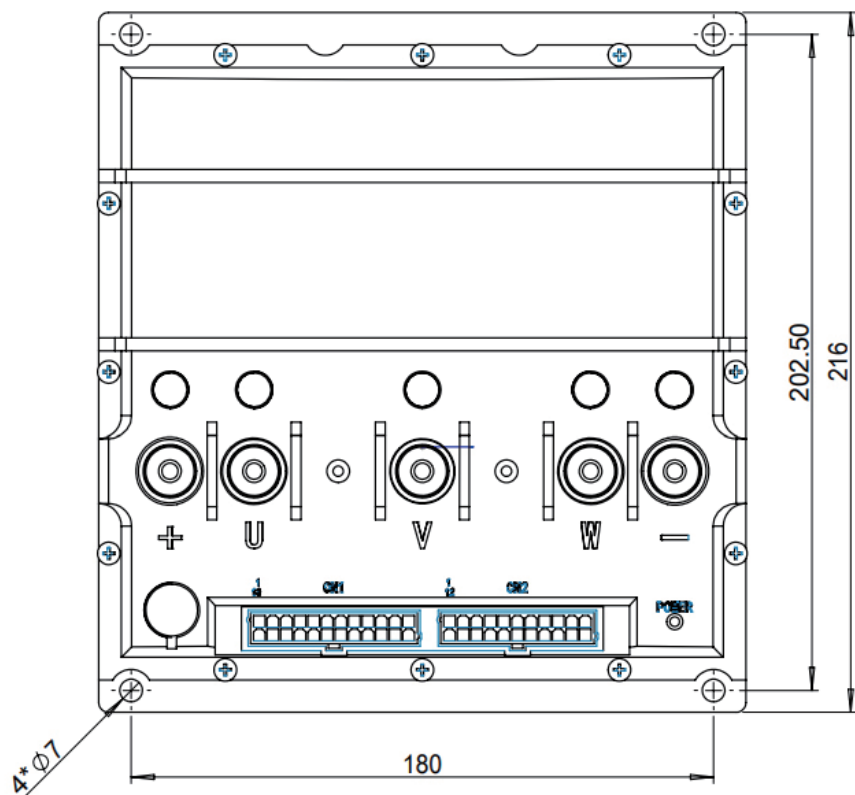
LED Blinking Times	Error	Error Description	Solution
1	Overcurrent	The current of phase wires are abnormal.	Check if the phase wires are damaged or there is any short circuit.
2	Overload	The load exceeds the controller's capacity.	Change a controller with bigger power.
3	Overvoltage	The bus voltage exceeds the controller's default value.	Check if the bus voltage matches the controller's default value, or check the controller's default value.
4	Undervoltage	The bus voltage is lower than the controller's default value.	Check the bus voltage and the battery capacity, or check the controller's default value.
5	Controller Overtemperature	The temperature of the controller is higher than 70 ℃ .	Improve the controller's heat dissipation, or lower the controller's value of Max. phase current, or change a controller with bigger power.
6	Motor Overtemperature	The temperature of the motor exceeds its default value.	Improve the motor's heat dissipation, or lower the controller's value of Max. phase current, or change a motor with bigger power.
7	Motor Stall/Block	Motor stall/Block time exceeds default value.	Check if there is stall/block condition on motor shaft.
8	Motor Phase Wire Disconnection	The phase wires are not connected correctly or disconnected.	Check the wire connections of the motor and controller.
9	Motor Main Sensor	The throttle output signal is valid when powered on.	Check if the motor's main sensor is good.
10	Motor Auxiliary Sensor	Motor Auxiliary Sensor Error	Check if the motor's auxiliary sensor is good.
11	Encoder Alignment	Encoder Alignment Error	Check if the motor's encoder alignment signal is good.
12	Throttle Protection	The throttle output signal is valid when powered on.	Check the throttle or the min. value of its error parameters.
13	Main Throttle	The output voltage of main throttle is abnormal.	Check the main throttle or the max. and min. values of its error parameters.
14	Auxiliary Throttle	The output voltage of auxiliary throttle is abnormal.	Check the auxiliary throttle or the max. and min. values of its error parameters.
15	Precharge	Precharge Error	Return to factory service.
16	DC Contactor	DC Contactor Error	Check if the DC Contactor is good or the contact is good.
17	MOSFET	The controller's MOS detection is abnormal.	Return to factory service.
18	Current Sensor	The controller's current sensor detection is abnormal.	Return to factory service.
19	Self-learning	Self-learning Failure	Check the self-learning parameter settings and if the self-learning method is correct.
20	RS485	RS485 Communication Error	Only the RS485 control mode is valid, check if the RS485 communication wire or VCU is normal.
21	CAN	CAN Communication Error	Only the CAN control mode is valid, check if the CAN communication wire or VCU is normal.
22	Softwares	System Softwares Error	Return to factory service.

Dimensions

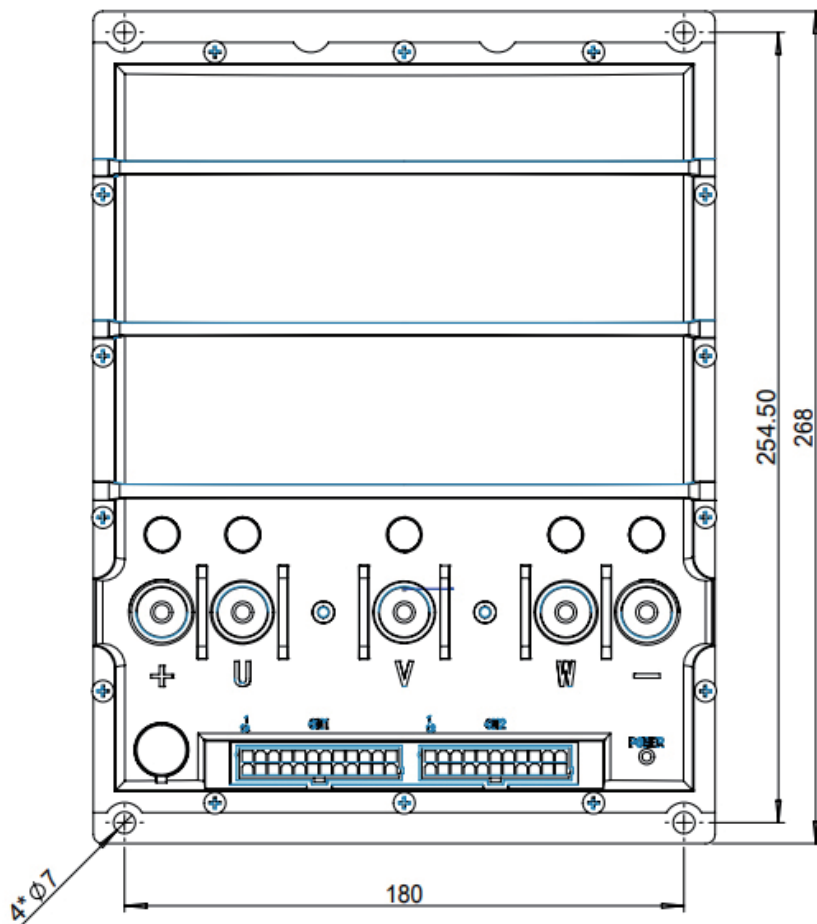
A Series Dimensions



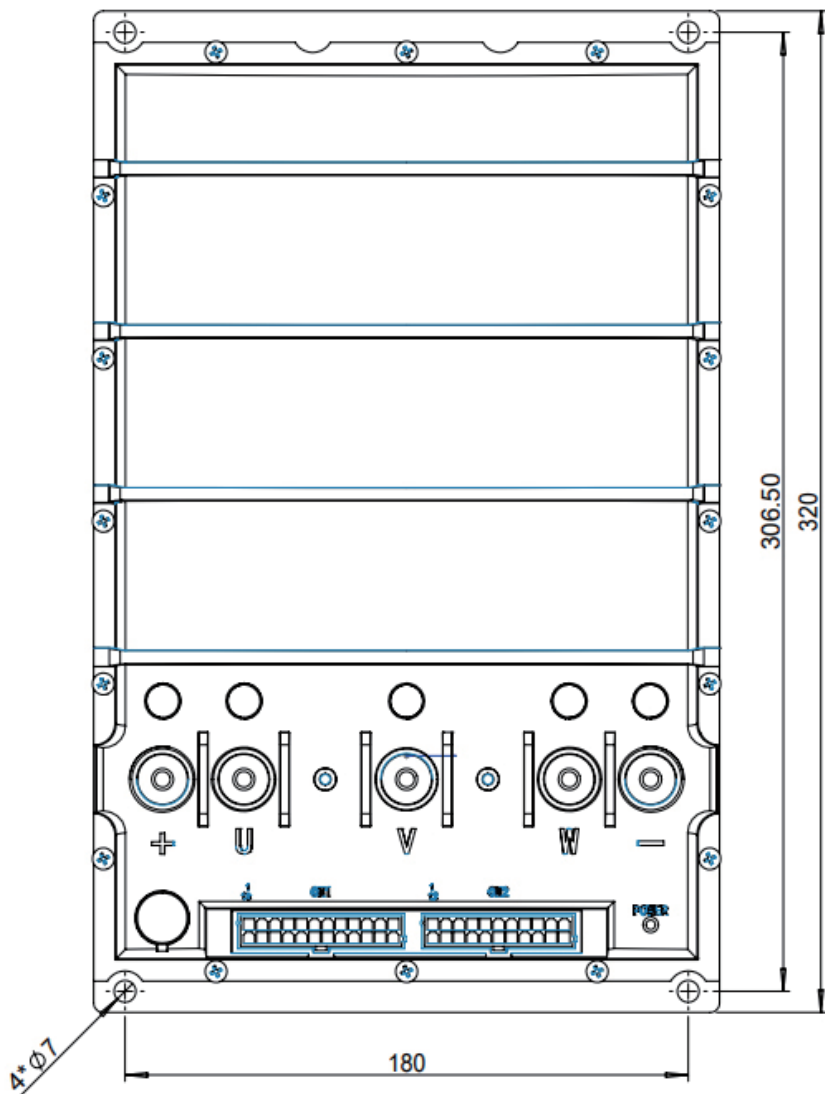
B Series Dimensions



C Series Dimensions



D Series Dimensions



E Series Dimensions

