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MWM MC 196 Controller

Space vector & direct torque control
PM motor driver

Description

MWM MC 196 Controller the latest product by MW Motors, specially designed for EV or Scooters use the PM motors for its main drive power. By the method of space vector and direct torque control, based on the 32bit ARM processer, and embedded the MW Motors private algorithm, the product's features mostly presented are large torque and high speed, as well as high reliability. The pc software can set most of the drive parameter and can take the intelligent & individuation scheme to the rider.

Depth Matching

By the software Drive Manager and its debug kit, all the parameters of the controller are opening to the fans, it allows the professional user can make a deep adjustment till the perfect riding experience was reached.

Multi-choise Communication

- Standard configuration with RS-232C
- UART port for Bluetooth or wireless is selectable
- CANBUS can selected to build a network with indicators and BMS etc.

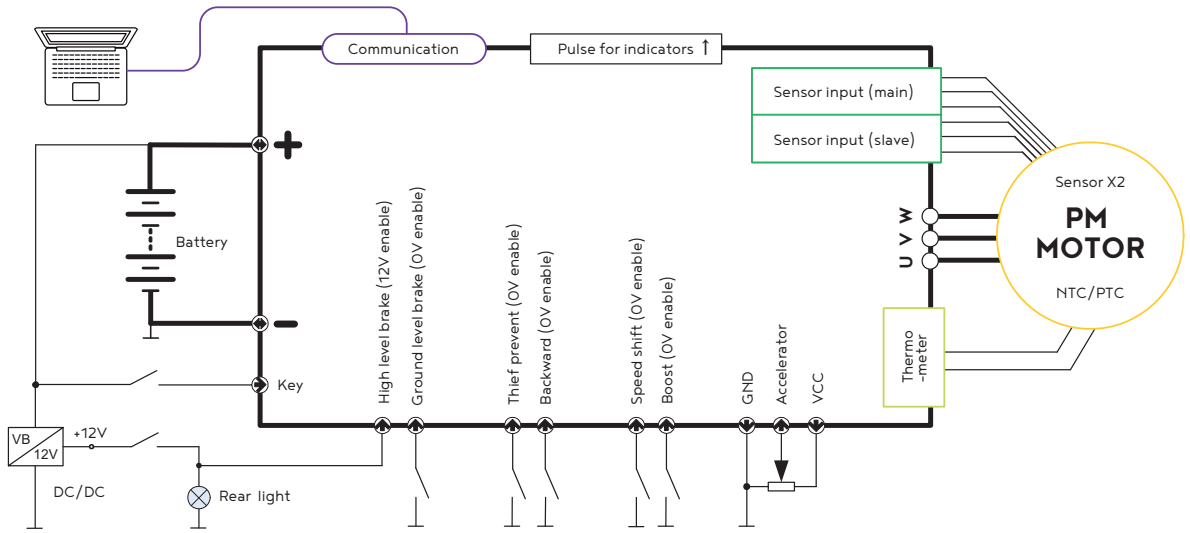
Protection Features

- NTC/PTC external can be connected to the O.T.P function
- current, voltage, heat be monitored and protected
- The input signal will be checked to its reasonable range

Product Info	
Size	346×148×76 mm
Water Proof	Fully embed in glue
Work Surroundings	-15°C-50°C
Humidity	Completely Waterproof
Assemble advise	Air Flow, No blanket
Body material	A6061
Weight	5 kg

Electric Characteristics			
Rated Voltage **(V)**	60	72	96
Voltage range **(V)**	42-84		42-120
Peak current **(A)**	600		

Schematic diagram for electric scooter



Warning: All the parameter list in this document are standard substance, any value set out of this range need calibration by MWM.

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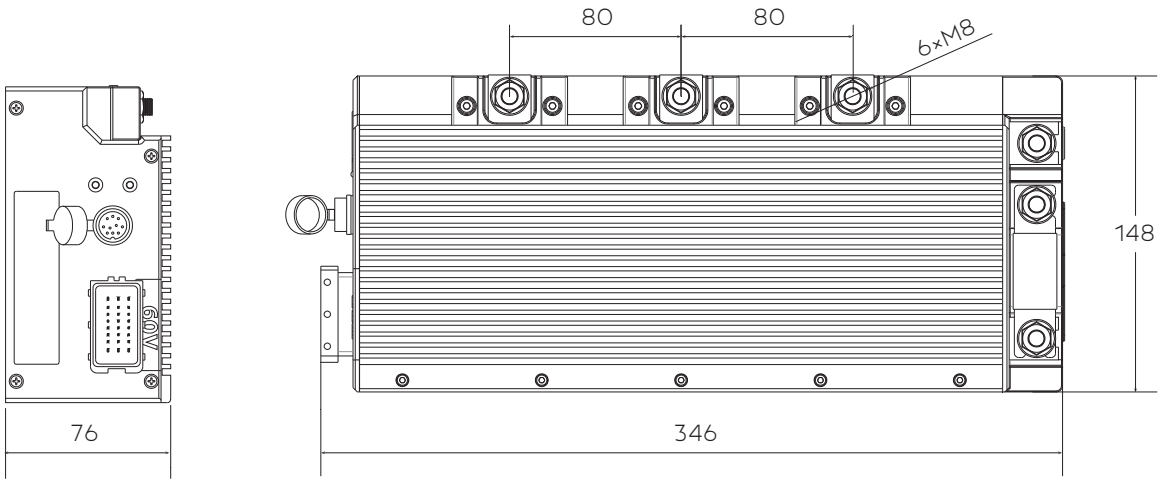
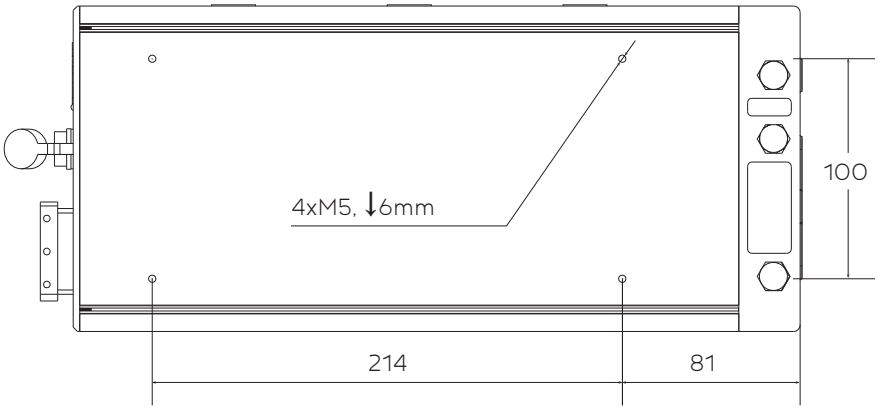
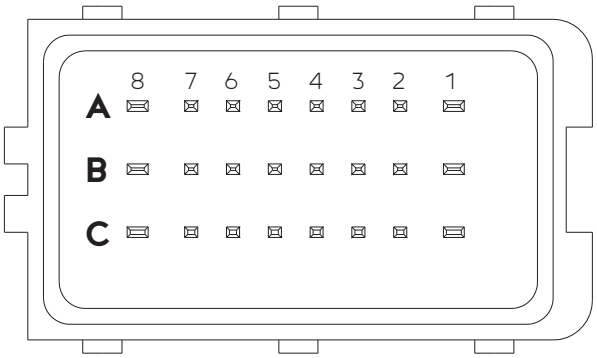
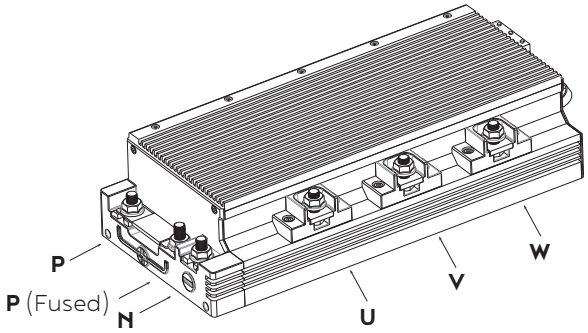
Outline Dimension



Vehicle Assemble Dimension







	8	7	6	5	4	3	2	1
A	**VH**	**1HC**	**OUT**	**BST**	**STL**	**ACC+**	**12V+/HA**	**RTN**
	DC+ for motor sensor	Hall sensor C	Logic output	BOOST GND enable	STOP control GND enable	DC+ for accelerator	Slave HA	Power supply negative
B	**THM**	**1HB**	**MS**	**IN1**	**R**	**ACC-OUT**	**L-/HB**	**Vkey**
	Motor inside thermistor	Hall sensor B	Pulse Output for indicator	ECO MODE GND enable	BACKWARD GND enable	Accelerator	Slave HB	power on
C	**RTN**	**1HA**	**BEMF**	**ALM**	**F**	**STH**	**12V-/HC**	**NC**
	Power supply GND	Hall sensor A	Back Electro -motive Force	MOTOR LOCK GND enable	FORWARD GND enable	STOP Control	Slave HC	No use

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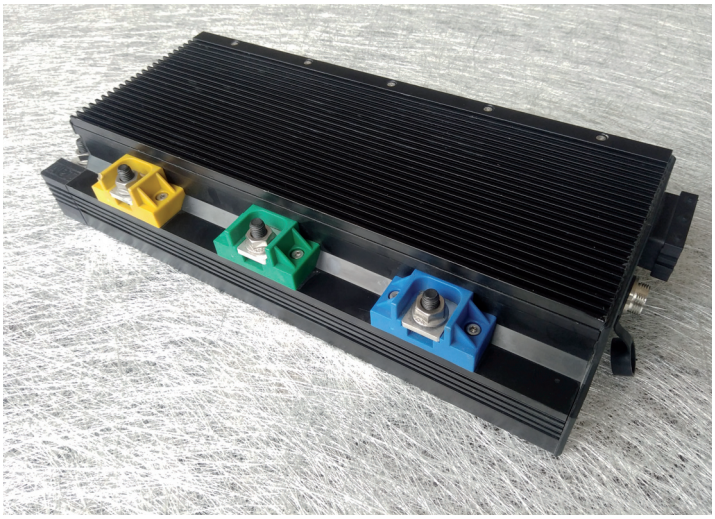
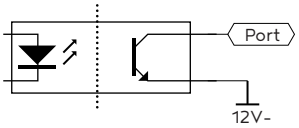


Absolute maximum ratings

Items		60V	72V & 96V	Unit
Battery use	(Max.)	84	140	V
Equivalent Capacitance	(Max.)	4000	4000	uF
Control (key on) power input	(Range)	42 ~ 84	42~120	V
Control (key on) power current	(Max.)	300	300	mA
Control (key on) return current	(Max.)	1.0	1.0	A
Motor phase current release	(Peak to Peak)	600	600	A
Case heat	(Max.)	120	120	°C
Ground level voltage stop effect	(Max.)	0.3	0.3	V
High level voltage stop effect	(Min.)	5	5	V
Hall signal input port voltage proof	(Max.)	500	500	V
Accelerator DC+ port voltage proof	(Max.)	40	40	V
Power terminal tightening force	(Min.)	10	10	N.m.

Electrical characteristics

Items	Parametr	Selectable	Unit
Supply voltage for Motor hall sensor	13V @ load free 7V @30mA	5V	V
Supply voltage for Accelerator	4.75 ± 0.1	12V V-battery	V
Acceptable voltage from Accelerator Scooter handle 1.0~3.9V EV pedal 0.9~4.2V	Programable	V	
Signal output (A6)	OC output	12V, 5V pull up	-
Signal output (B6)	5V 1.2K0.1W resister pull up	OC, 12V pull up	-
Optoelectronic isolation	No isolation		-

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I/O Port description

ID	Type	Description	Program-able
A1	In	Ground of control board, connected to battery negative inside	-
B1	In	Power DC+ input for control board, can be battery Positive but not definite equal to.	-
A2	In	For EV, Relay use, isolated DC12V+ input	-
		For scooter, used for Hall sensor A as slave is advised	-
B2	In&Out	For EV, Relay use, connect to one side of the coil	-
		For scooter, used for Hall sensor B as slave is advised	-
C2	Out	For EV, Relay use, connect to another side of the coil	-
		For scooter, used for Hall sensor C as slave is advised	-
A3	Out	Power DC+ input for Accelerator, standard set to 5V, 12V or battery voltage is selectable	-
B3	In	Accelerator signal input	Voltage Range Section set
C3	In	High level voltage stop effect	Enable/Disable
A4	In	Low level voltage stop effect	Enable/Disable
B4	In	Backward control, motor runs reverse when connect to Ground	Enable/Disable
C4	In	For EV, forward control, motor runs forward when connect to Ground (B4 float)	Enable/Disable
		For scooter, port not used	-
A5	In	Boost, the released power and speed will increase as port connect to Ground once	Enable/Disable Ratio set Flux weakening
B5	In	Eco mode, speed will limit as port connect to Ground	Enable/Disable Speed level set
C5	In	Motor lock as port connect to Ground	Enable/Disable
A6	Out	Signal out, default set to alert of motor fail and OC output	-
B6	Out	Signal out, default set to pulse output synchronous to single hall	Divider 1/2/4
C6	Out	BEMF output, used for Thief Prevent Alert kit	-
A7	In	Main hall input C	-
B7	In	Main hall input B	-
C7	In	Main hall input A	-
A8	Out	Power DC+ for hall sensor	-
B8	In	Themistor input	Enable/Disable Protect point Torque curves
C8	In	Ground DC- for hall sensor	-

Note: Ground, means connect to the negative of battery, or connect to A1 port suggested for better EMC.

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Fault indicator and examination

Item	Red LED	Check
Accelerator Fault	☀ ☀	Check the teminal Check the accelerator
Themistor for motor fault	☀ ☀ ☀	Check the teminal connect Check the themistor charactors
Hall sensor fault	☀ ☀ ☀ ☀ ☀ ☀	Check the cable and teminal
Battery fault	☀ ☀ ☀ ☀	Confirm the voltage range
Other fault	☀ ☀ ☀ ☀ ☀ ☀ ☀ ☀ ☀ ☀ ☀	USE PC software

Multiplex comunicate port use

	8	7	6	5	4	3	2	1
A			RS485A UART-TX	CAN-H				
B				CAN-L				
C				RS485B UART-RX				

Selectable isolated input/output port

	8	7	6	5	4	3	2	1
A			OUT	BST	STL			
B			MS	IN1	R			
C				ALM	F	STH		

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Accessories – Contact cover (optional)

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