

MPPT charging boost constant current controller

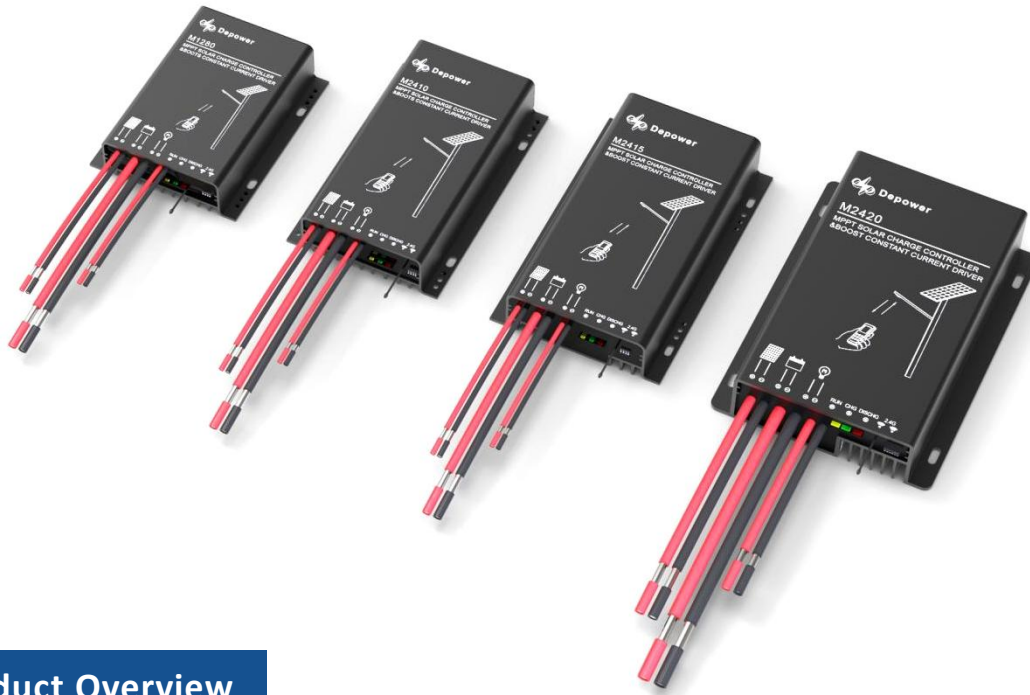
Technical Specification

Model Name: M12 Series

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1. Product introduction



Product Overview

Professional design for enhanced overall system reliability

- Industrial-grade MCU with full digital technology; no need for adjustable resistors, offering strong anti-interference capability and free from aging or drift issues.
- Ultra-high charging and LED driving efficiency, significantly reducing product temperature rise.
- IP68 protection rating.

High-efficiency MPPT Tracking Technology

- MPPT tracking efficiency $\geq 99.9\%$, with overall system power generation efficiency up to 98%, improving system performance and reducing overall cost.

High Conversion Efficiency

- Charging conversion efficiency up to 98.2%.
- Constant current LED driving efficiency up to 97.7%.

Intelligent Battery Management

- The controller adopts a three-stage charging management system, including MPPT charging, constant voltage equalizing, and constant voltage floating, which greatly extends the service life of the battery.
- Intelligent charging and discharging management with temperature compensation, effectively prolonging battery life by more than 50%.
- The intelligent battery energy management system maintains the battery in a shallow charge and discharge state, greatly enhancing its service life.

Intelligent LED Driving Management

- LED Equipped with a light-sensing function that automatically switches the LED on at night and off during the day.
- Five-stage time control.
- Supports dimming control with configurable output power for each time stage.

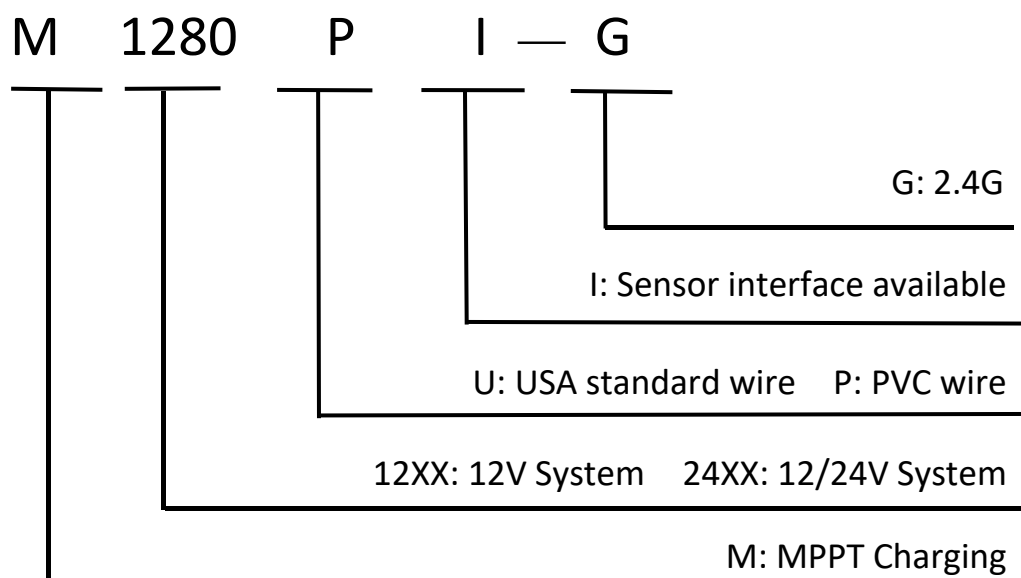
Flexible parameter setting function

- Supports 2.4G, infrared, TTL and RS485 communication.

Comprehensive protection features

- Battery reverse polarity protection.
- Solar panel reverse polarity protection.
- Prevents battery discharge to the solar panel at night.
- Battery undervoltage protection.
- Battery undervoltage recovery protection.
- LED output short-circuit protection.
- LED output open-circuit protection.

2. Model Encoding



3. Product Information

No.	Available Products	No.	Available Products
1	M1260U_G	2	M1260PI_G
3	M1280U_G	4	M1280PI_G
5	M2410U_G	6	M2410PI_G
7	M2415U_G	8	M2420U_G

4. Optional Accessories

Product Type	Product Name	Product Length	Product Specification
Cable	M19 Waterproof Female Connector Cable	400mm	2*1.5mm ²
	M14 Waterproof Female Connector Cable	400mm	2*1.0mm ²
	M14 Waterproof Female Connector Cable	150mm	2*1.0mm ²
	M10 Waterproof Female Connector Cable	300mm	2*0.3mm ²
	M10 Waterproof Female Connector Cable	700mm	2*0.3mm ²
	M10 Waterproof Female Connector Cable	1000mm	2*0.3mm ²
Sensor Head	Square Infrared Sensor Head	300mm	/
	Square Infrared Sensor Head	700mm	/
	Square Infrared Sensor Head	1000mm	/
	Round Infrared Sensor Head	300mm	/
	Round Infrared Sensor Head	700mm	/
	Round Infrared Sensor Head	1000mm	/
	Round Microwave Sensor Head	300mm	/
	Round Microwave Sensor Head	700mm	/
	Round Microwave Sensor Head	1000mm	/
Hybrid power supply	Hybrid power supply	/	10.5V 55W
	Hybrid power supply	/	12V 60W
	Hybrid power supply	/	21V 80W
	Hybrid power supply	/	24V 80W
	Hybrid power supply	/	21V 100W
	Hybrid power supply	/	24V 120W

5. Technical specifications

Item	Content	Model name					Unit
		M1260	M1280	M2410	M2415	M2420	
Battery Parameters	Battery Type	Lead-acid or lithium①					-
	Rated System Voltage	12V		12/24V (Adjustable)			-
	Max. Charge Current	10			15	20	A
	Charge Voltage Range	0-15		0-30			V
	Boost charge voltage (Adjustable)	14.4		14.4(12V), 28.8(24V)			V
	Float Charge Voltage (Adjustable)	13.8		13.8(12V), 27.6(24V)			v
	Low voltage disconnect (Adjustable)	10.8		11(12V), 22(24V)			V
	Low voltage reconnect (Adjustable)	12		12.5(12V), 25(24V)			V
	Temperature compensation coefficient	-4mV/°C/2V②					-
PV Parameters	Max. PV input voltage	30		55		80	V
	Solar Panel Max. Power	130		130(12V) 260(24V)	180(12V) 360(24V)	260(12V) 520(24V)	W
	MPPT Tracking Range	15≤Vmp≤30		15≤Vmp≤30(12V) 30≤Vmp≤50(24V)		15≤Vp≤70(12V) 30≤Vp≤70(24V)	V
	Lamp Turn-On Voltage (PV)	≤5		≤5(12V), ≤10(24V)		≤5(12V), ≤10(24V)	V
LED Parameters	LED Drive Current	50 ~ 4000				50-5600	mA
	LED Drive Voltage Range	16-35		16-50V(12V); 32-50V(24V)	16-55V(12V); 32-55V(24V)	16-80V(12V); 32-80V(24V)	V
	Maximum LED Drive Power	60	80	80(12V), 120(24V)	120(12V), 200(24V)	130(12V), 260(24V)	W
	Drive-Current Accuracy	≤3%FS					-
	Segmentable Dimming Time	5					-
	LED Dimming Range	0 ~ 100					%
System Parameters	MPPT Efficiency	≥99.9%					-
	Peak Charging-Conversion Efficiency	96.8%		98.2%	98.2%	98.2%	-
	Peak Drive Efficiency	95.8%		97.4%	97.4%	97.7%	-
	Static Power Consumption	≤0.12(Infrared), ≤0.16(2.4G)		≤0.20(Infrared), ≤0.22(2.4G)		≤0.22	W
	Communication Method	2.4G、Infrared、TTL			2.4G、TTL、RS485		-
	Storage / Operating Temperature	-35 ~ 60					℃
	Storage / Operating Humidity	0 ~ 100%					RH
	Altitude	3000					m
	Protection Rating	IP68(1.5m,72h)					-

	Certifications	CQC,CE,ROSH				-
Mechanical Parameters	Weight	0.26	0.34	0.449	1.13	KG
	Dimensions	101*82*24.5	129*82*24.5	142*90*26.2	155*114.5*33.4	mm
	Packaging	54	54	48	20	Units /Carton

① Battery types: lead-acid, LiFePO4, and NCM batteries.

② This option is not available for lithium batteries.

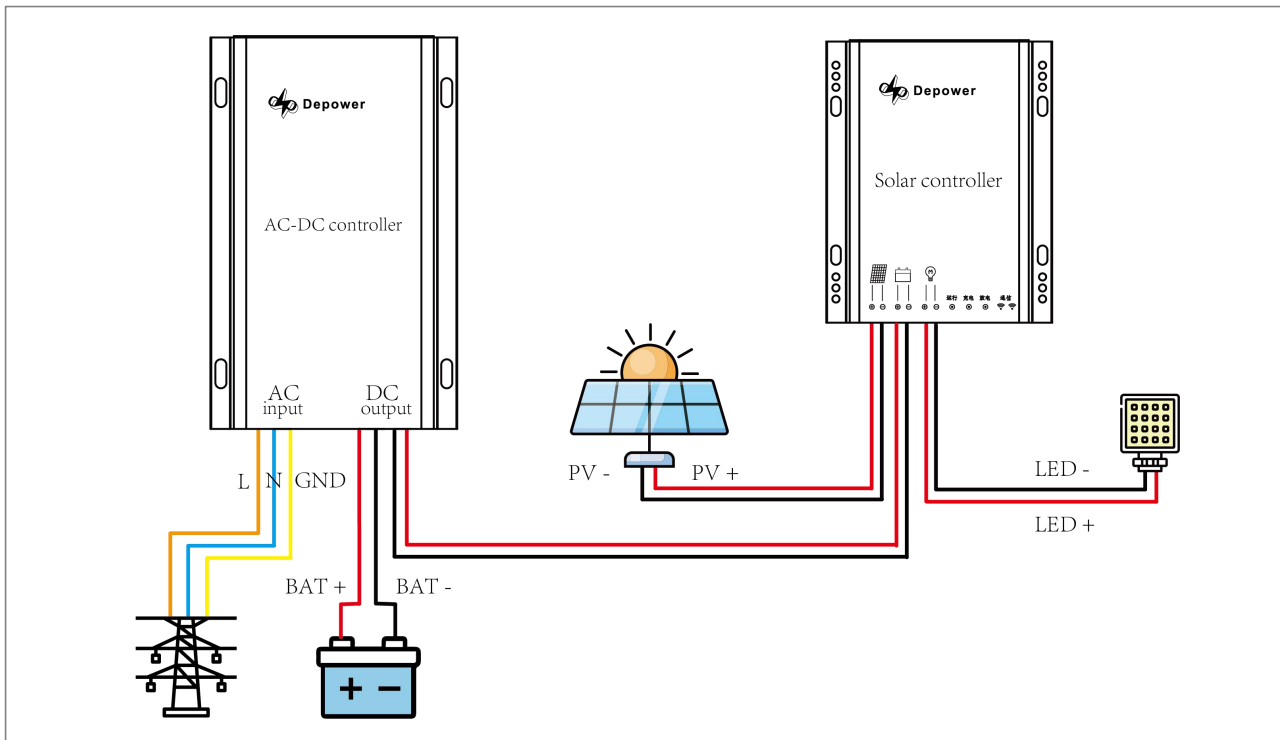
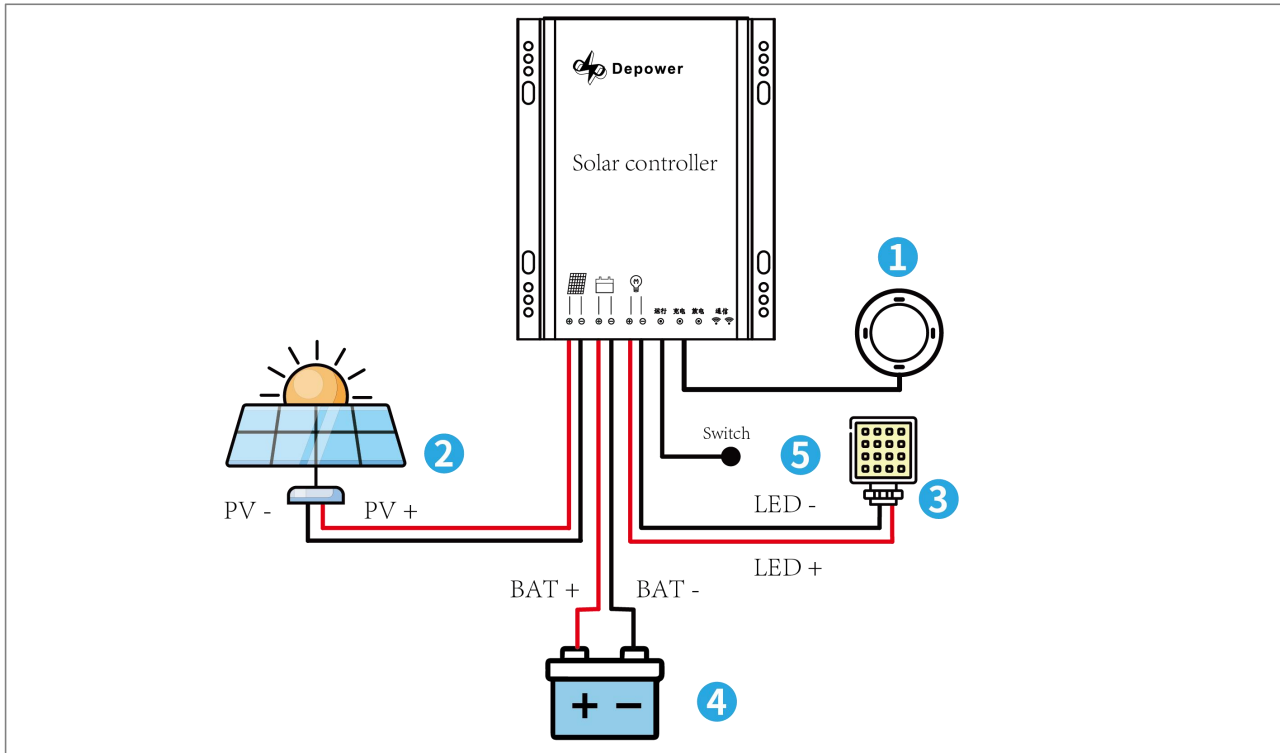
6. Controller Indicator Status

The table below lists the indicator-light states. Users can determine the system status by observing each light's flashing pattern; if a fault occurs, the indicator-light code lets you pinpoint and resolve the issue quickly.

Item	Machine Status	Yellow Indicator Light (RUN)	Green Indicator Light (CHG)	Red Indicator Light (DISCHG)
1	Initializing	Flashing	Flashing	Flashing
2	Charging Normally	Steady On	Steady On	Off
3	LED Driving Normally	Steady On	Off	Steady On
4	Machine in Standby	Steady On	Off	Off
5	Parameter Setting Error	Slow Flashing	Slow Flashing	Off
6	LED Open-Circuit or Short-Circuit	Off	Off	Fast Flashing
7	Battery Reverse Connection	Off	Fast Flashing	Off
8	Battery Waiting to Recover from Undervoltage	Off	Slow Flashing	Off
9	Drive Time Elapsed	Off	Off	Slow Flashing
10	Battery Overvoltage	Slow Flashing	Off	Off
11	PV Overvoltage	Fast Flashing	Off	Off
12	PV Reverse Connection	Fast Flashing	Fast Flashing	Off

7. Product Wiring Diagram

Wiring sequence: Please follow the sequence indicated on the controller leads — first connect the sensor, then the solar panel, followed by the load, then the battery, and finally the switch.

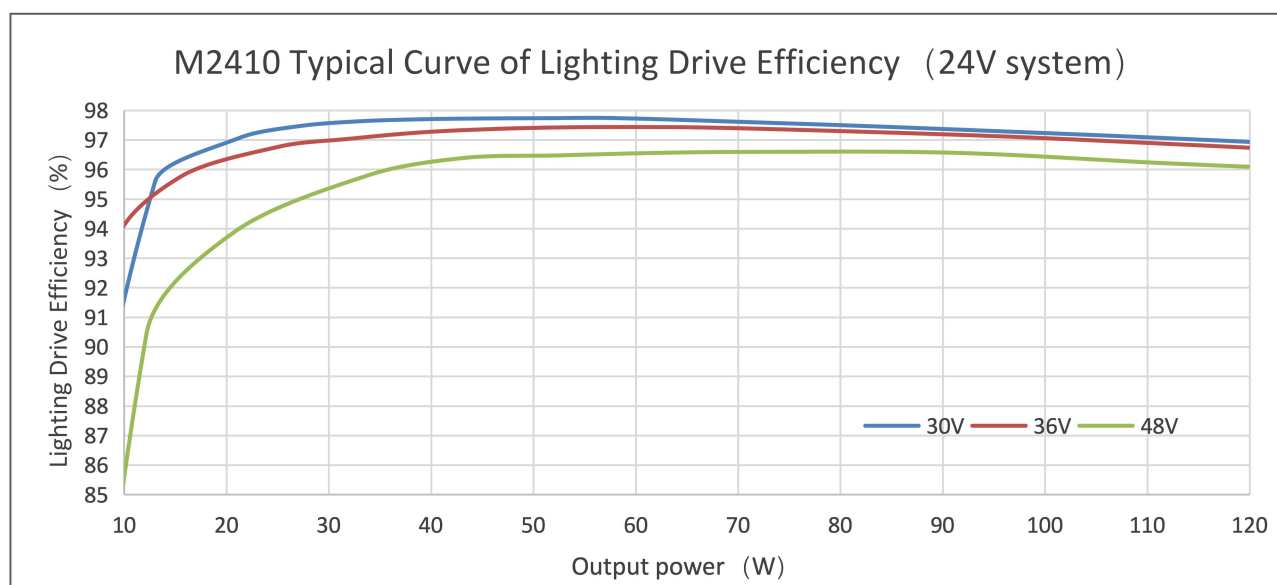
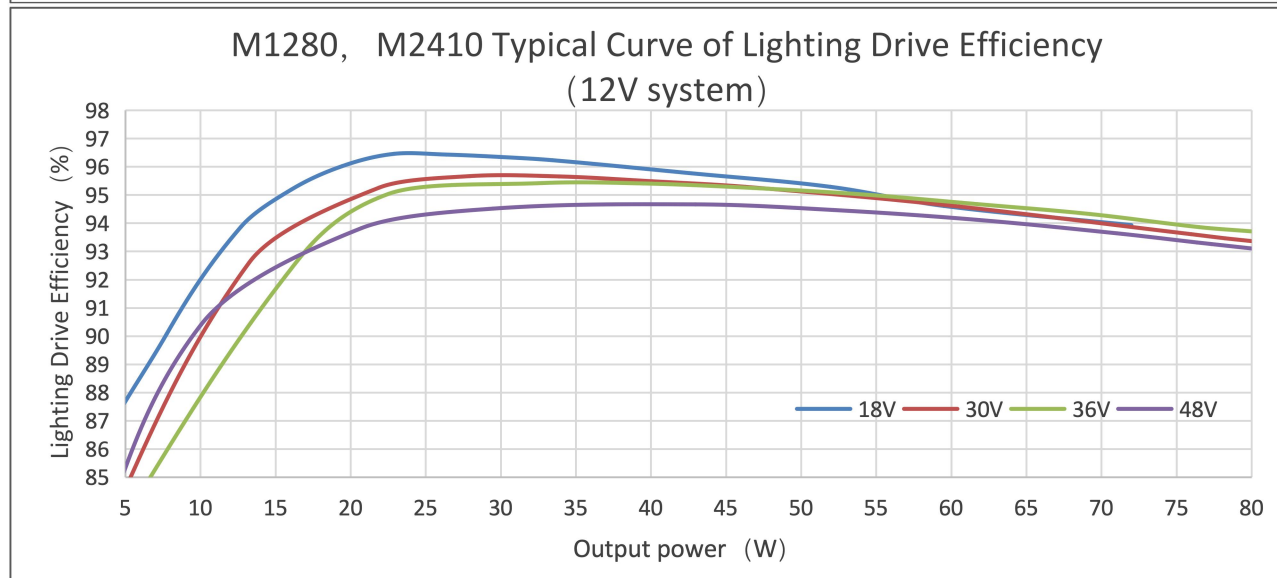
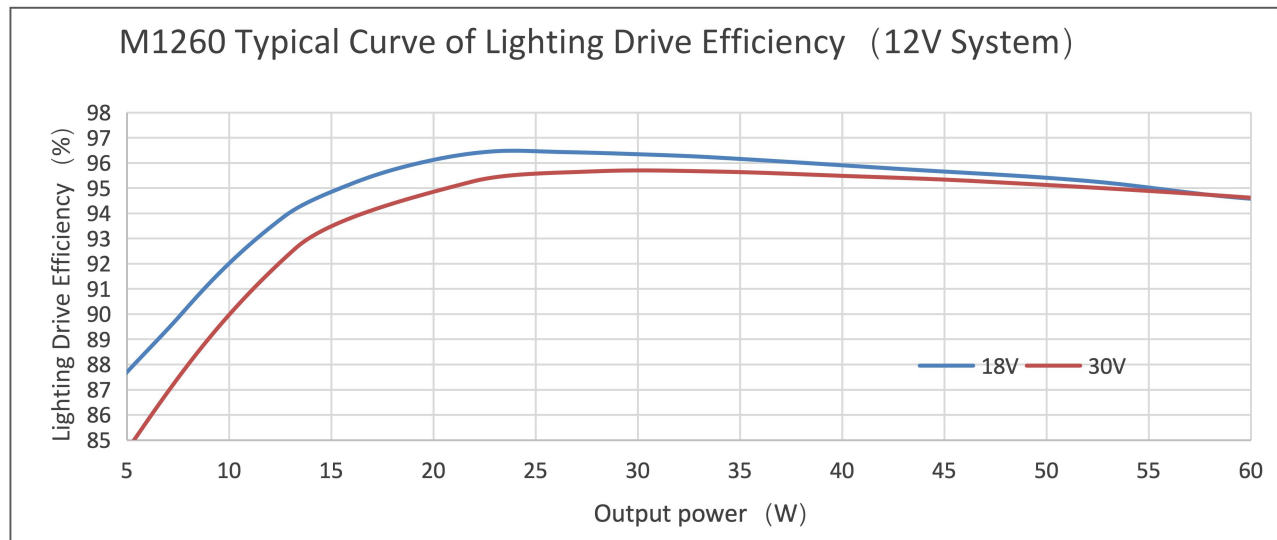


Wiring Diagram for Hybrid System Wiring

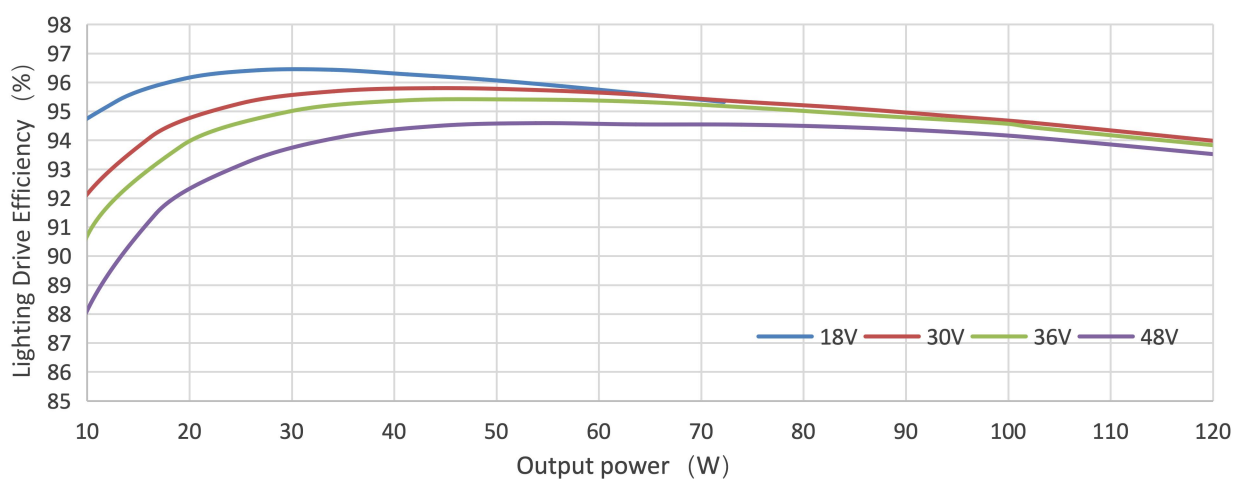
⚠ Please connect the DC input of the controller to the output of a 12V or 24V AC/DC power supply. Do not connect 220VAC directly to the controller!

8. Efficiency Curve

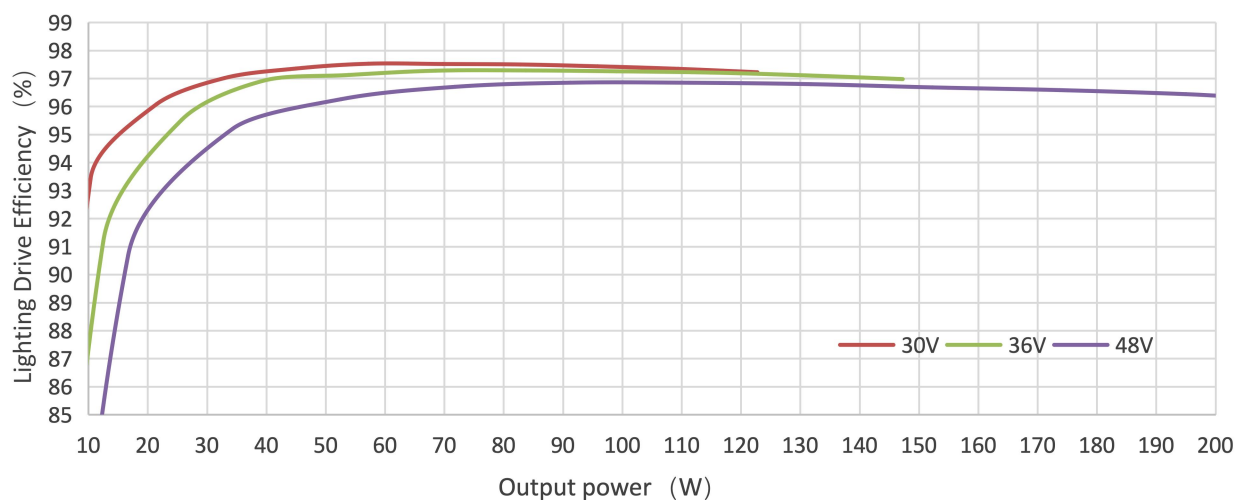
8.1 LED Driving Efficiency Curve



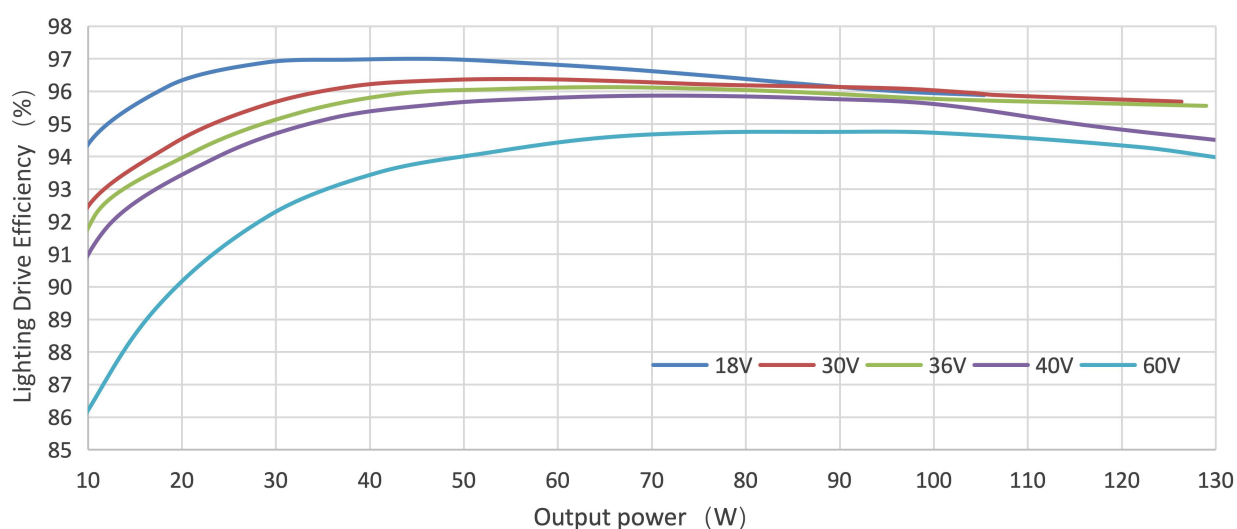
M2415 Typical Curve of Lighting Drive Efficiency (12V system)



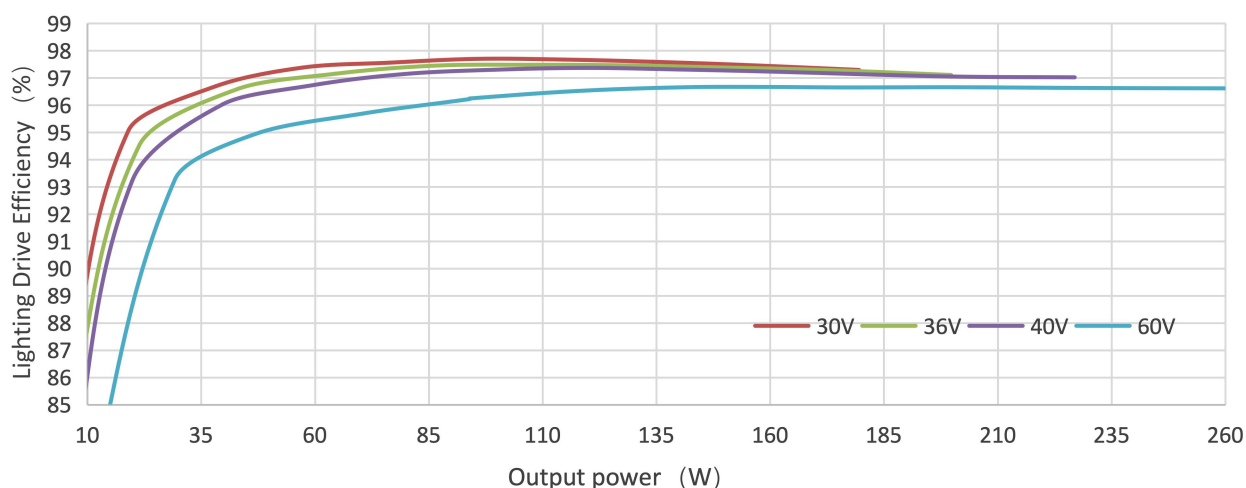
M2415 Typical Curve of Lighting Drive Efficiency (24V system)



M2420 Typical Curve of Lighting Drive Efficiency (12Vsystem)

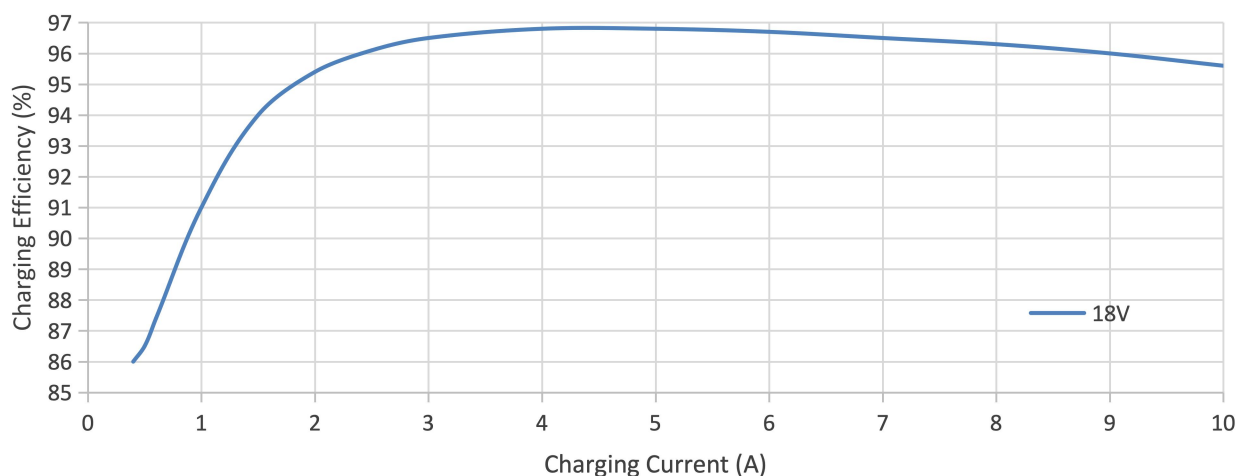


M2420 Typical Curve of Lighting Drive Efficiency (24V system)

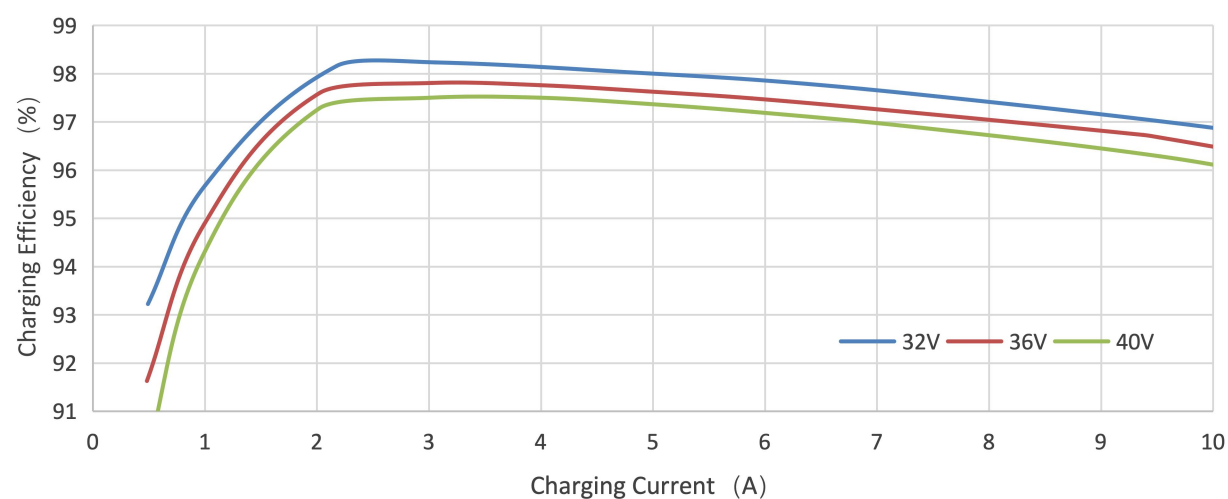


8.2 Typical Charging Efficiency Curve

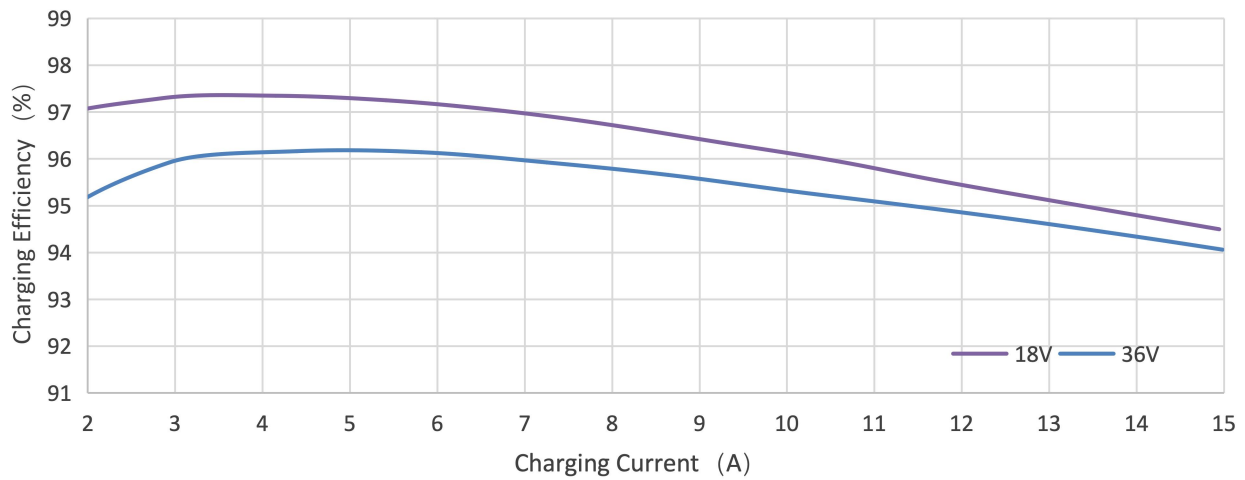
M1260、M1280、M2410 Charging Efficiency Curve (12V system)



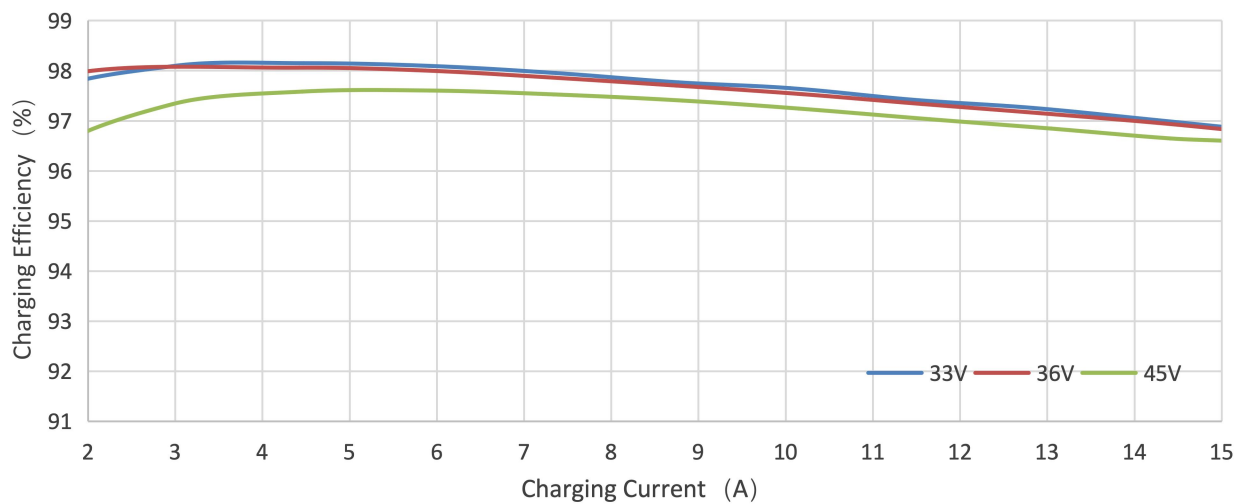
M1260、M1280、M2410 Charging Efficiency Curve (24V system)



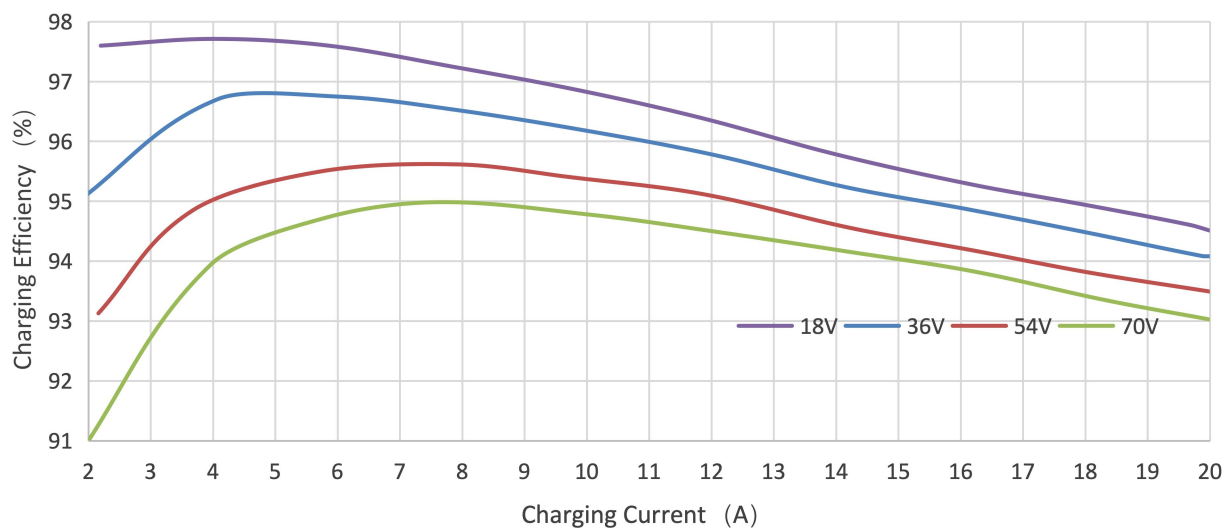
M2415 Charging Efficiency Curve (12V system)



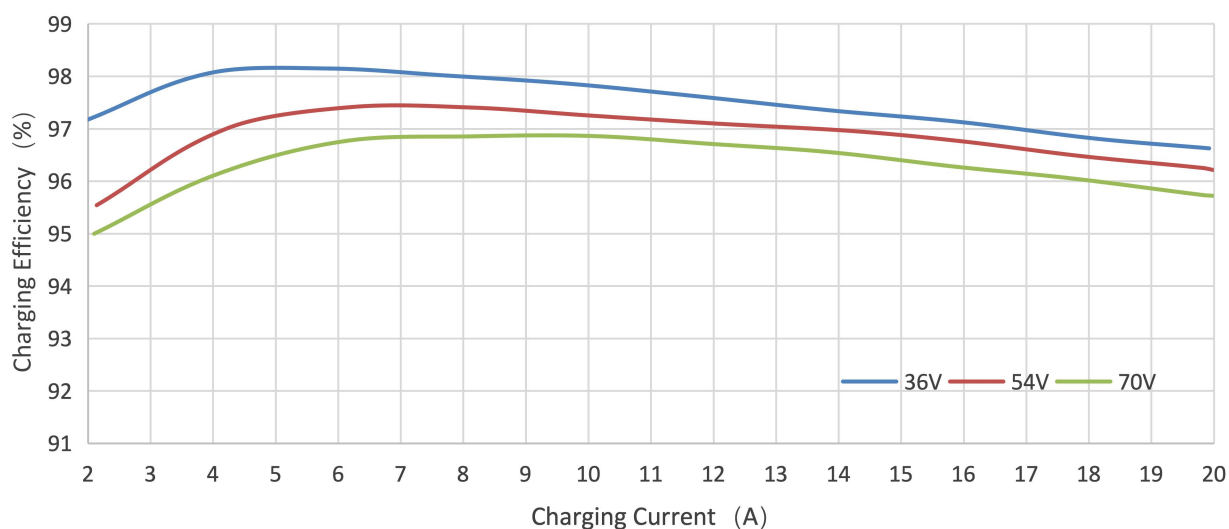
M2415 Charging Efficiency Curve (24V system)



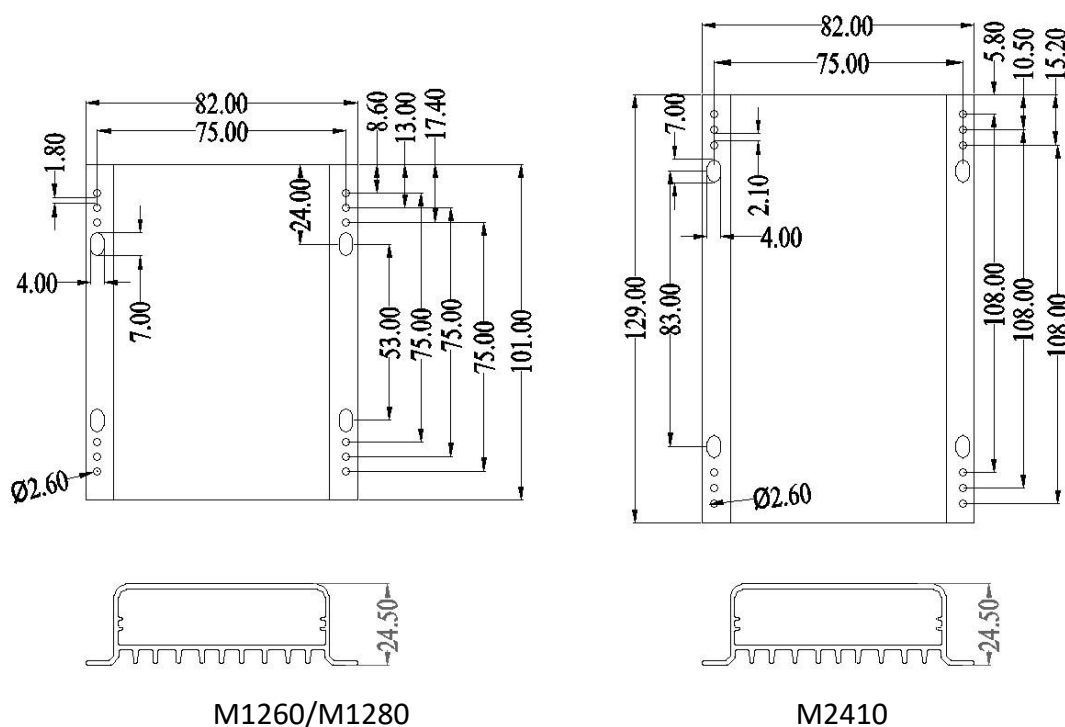
M2420 Charging Efficiency Curve (12V system)

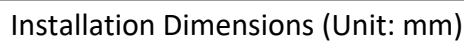


M2420 Charging Efficiency Curve (24V system)

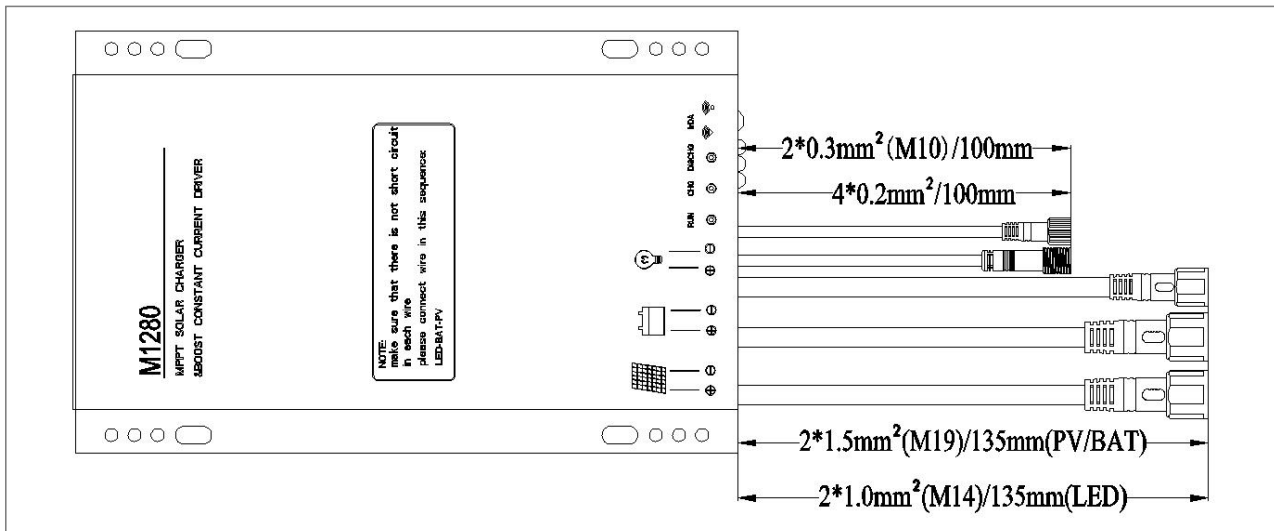


9. Installation dimension

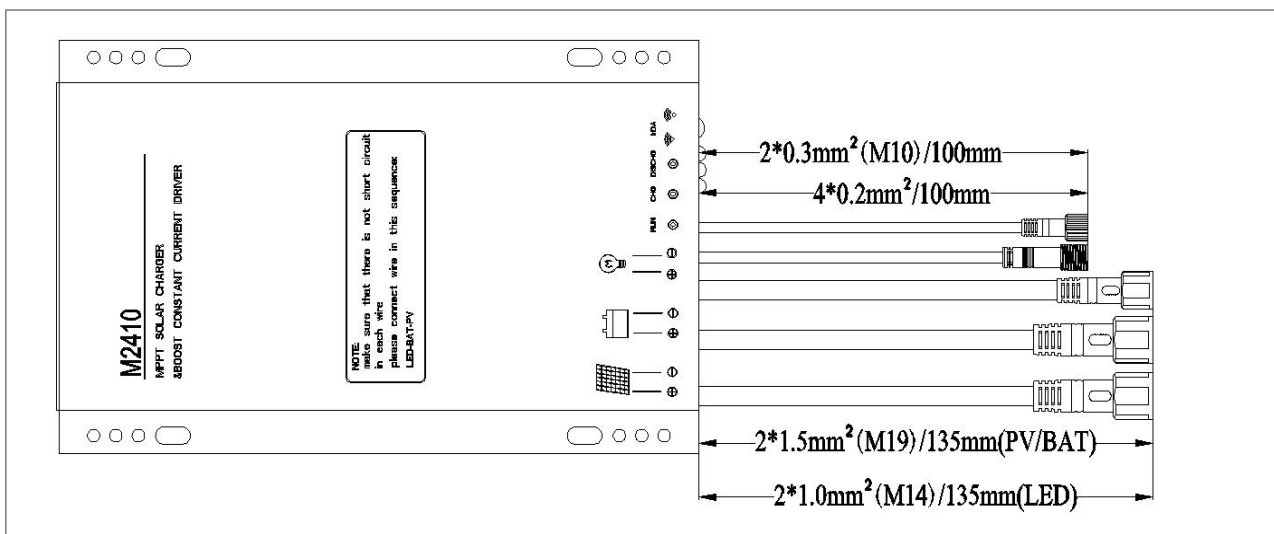




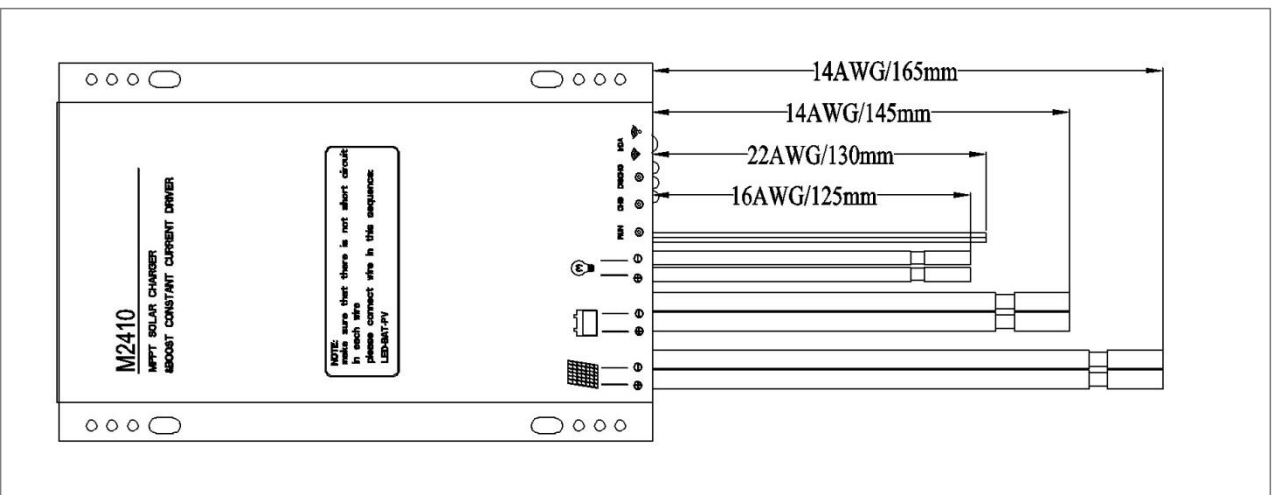
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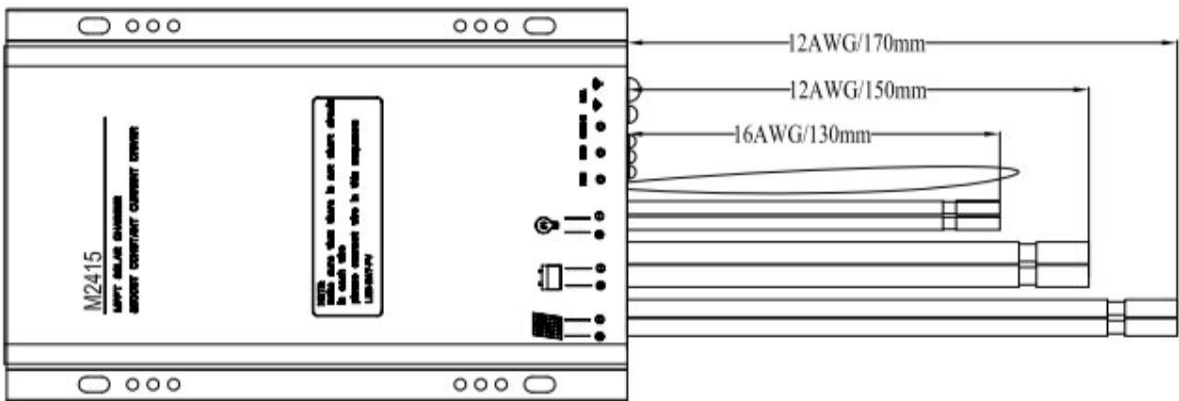
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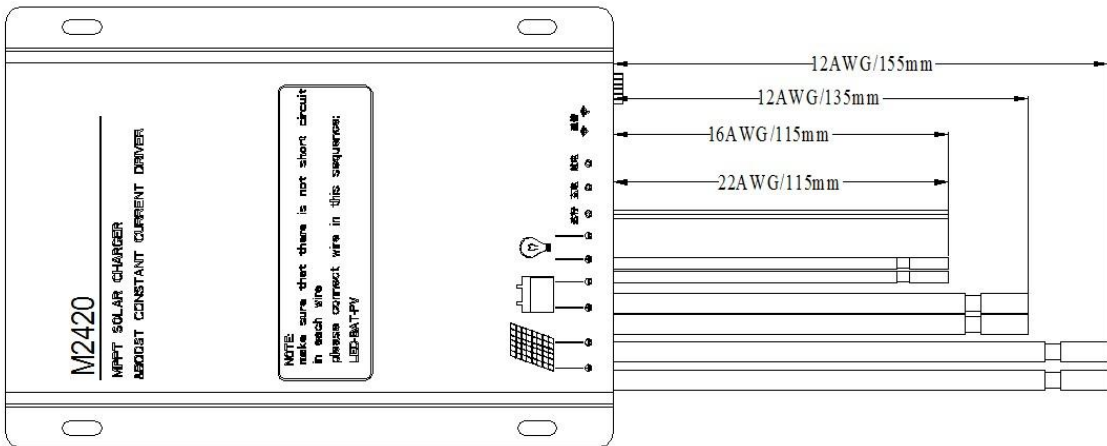
M2410PI_G/M2410PI



M2410U_G/M2410U



M2415U-G



M2420U-G

10.2 Waterproof Connector Used on Controller Diagram

