

Manual

CM360
Charger Manual

TH412150ER1

The Interpretation of the symbol



WARNING:

A WARNING indicates a potentially hazardous situation which, if not avoided, could result in injury and death, or equipment damage..



NOTE:

Provide the user's help is very useful information and tips or alert the operator to the correct operation.

History

No.	Rev.	Date	Editor	Validation	Changes
1	A1	2018.06	L	P	NEW

**WARNING:**

Read this entire manual pertaining to the work to be performed before installing, operating, or servicing this controller. Practice all plant and safety instructions and precautions. Failure to follow instructions can cause personal injury and/or property damage.

The engine or other type of prime mover should be equipped with an overspeed shutdown device to protect against runaway or damage to the prime mover with possible personal injury, loss of life, or property damage.

The overspeed shutdown device must be totally independent of the prime mover control system. An over temperature or low pressure shutdown device may also be needed for safety, as appropriate.

**WARNING:**

To prevent damage to a controller that uses an generator charger or battery-charging device, make sure the power cable of charge or charger and controllers is turned off before disconnecting the battery from the system.

**WARNING:**

The controller includes electrostatic sensors. To avoid damaging these components, it is strictly prohibited to remove the back cover of the controller and touch the electronic components and wires on the printed circuit board.

During installation, care must be taken to prevent static electricity.

1 Description:

CM360 is an intelligent charger for engine, it designed for monitoring and charging of lead-acid and nickel-cadmium batteries used in engine startup and power telecommunications UPS, the professional design makes it suitable for a variety of harsh environments.

Feature:

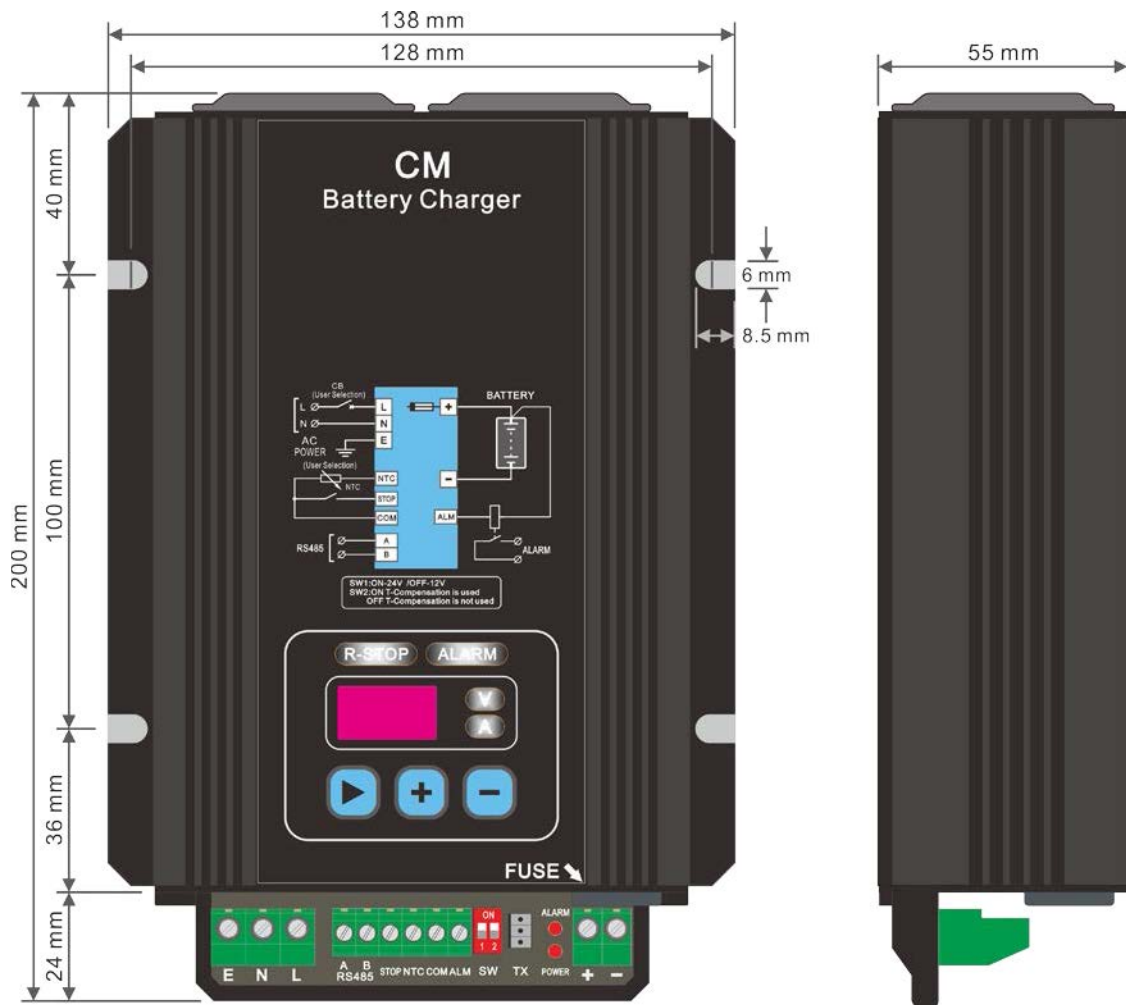
- Microprocessor measurement and control
- 3 stage charging and status display
- Low ripple output of switching power supply
- Digital display battery voltage and charging current
- Temperature compensation function
- 1 digital input for remote charging on/off
- 1 charge fault output
- High temperature protection
- Reverse protection
- Battery high and low voltage failure
- AC power supply high and low voltage protection
- Fault status display and audible alarm
- Charge parameters can be set arbitrarily according to different types of batteries
- RS485 communication port, used for remote control, remote signaling and telemetry, and can realize parallel connection of multiple chargers, increase output power and realize redundancy.



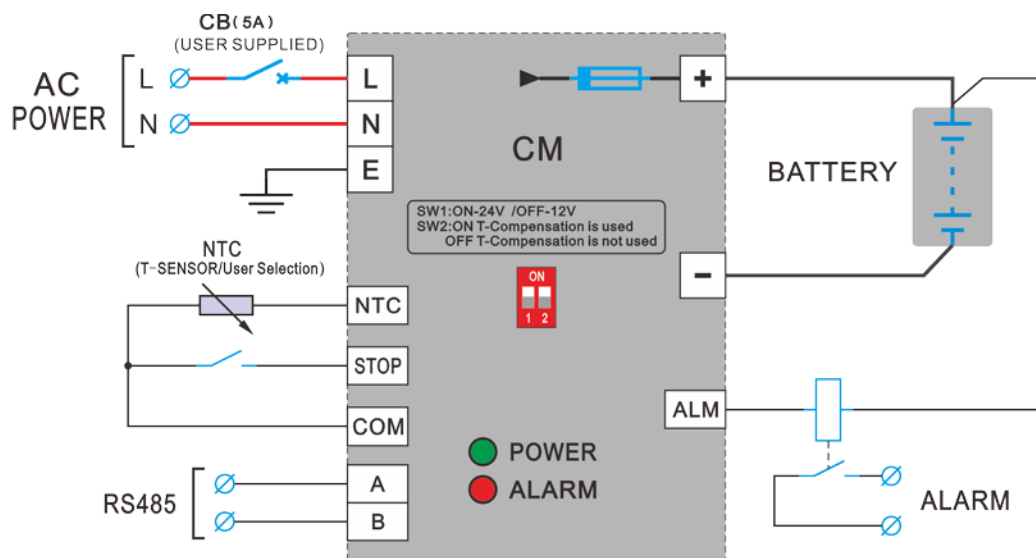
NOTE:

- This manual only applies to CM360 chargers.
- In order to be safe and the charger works properly and the performance is fully utilized, the user must carefully read this manual and follow the instructions.

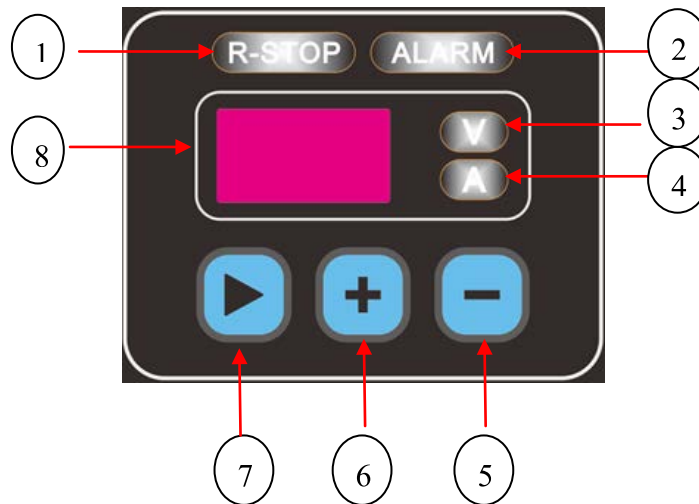
2 Shape and installation dimensions:



3 Typical wiring diagram:



4 Panel operation



- ① Remote stop indicator ② Failure indicator ③ Voltage indicator ④ Current indicator
- ⑤ Descending Button ⑥ Increment Button ⑦ Confirm and Scroll Button ⑧ Digital tube

Setting menu code table:

NO.	Describe	Code	NO.	Describe	Code
1	Exit	888	8	High pressure	888
2	Charging current	888	9	Stage one duration	888
3	Fast charging voltage	888	10	Stage two duration	888
4	Floating charge voltage	888	11	Charging cycle	888
5	Ttemperature compensation	888	12	Auxiliary voltage	808
6	Threshold current	888	13	Mailing address	888
7	Low pressure	888	14	Restore Defaults	888

Instructions:

- Press and hold ⑦ to enter the setup menu, set the menu; press ⑥ or ⑤ to turn up, scroll to the next page, select the parameter code to be modified and press ⑦ to confirm the entry, the digital tube displays the current parameters; press ⑥ or ⑤ will display "PAS " prompt to enter the password (password: ⑦⑥⑦⑥), press ⑥ or ⑤ after entering the password to modify the parameters, the parameter range see "7 parameter setting"; after the modification is completed, press ⑦ to confirm and return to continue to modify other items; after the modification is completed, press ⑦ to save and exit the setup menu.

Restore the default value: long press ⑦ to enter the setting menu, press ⑥ or ⑤ to turn to the code , press ⑦ to enter, the digital tube displays "YES", press ⑤ to confirm, if "PAS" is displayed at this time, enter the password (⑦⑥⑦⑥)) then press ⑤ again to exit the setup menu automatically.

5 Install

Position:

- Keep the charger away from the battery through the connecting wire. Do not install the charger directly above the battery. The gas generated by the battery will corrode and damage the charger.
- The charger has built-in cooling fan, forced convection to discharge internal heat. Do not install the charger in enclosed or air free space.

Fixed:

- Refer to the outline and installation dimensions, with 5mm wires 4 unnumbered to fixed.

Electrical connection:

- Refer to the typical wiring diagram, disconnect the power supply on the charger first.
- Communication port RS485 (Optional)

Terminal	Function Description	Connection
A	RS485-A	2*0.5mm ² shielded wire
B	RS485-B	

The RS485 communication port is used for remote signal, telemetry and remote control.

- STOP

Terminal	Function Description	Connection
STOP	External control stop charging signal input	1mm ²
COM	Common point	1mm ²

A switch is added between this port and the common point. When the switch is closed, the charger stops charging. This port is used to control the switch of the charger output.

- ALARM

Terminal	Function Description	Connection
ALM	Maximum input current 100mA	1mm ²
+B	Battery positive pole	1mm ²

This port can be connected to electrical components such as relays or indicator lights. When the charger fails, the output is valid. For external control or status indication.




WARNING:

- The maximum load current should not exceed 100mA, otherwise it will not work normally.
- Electrical components such as relays or indicator lights operate at the same voltage as the battery voltage.

● NTC temperature sensor

Terminal	Function Description	Connection
NTC	NTC thermistor	1mm ²
COM	Common point	1mm ²

A thermistor is connected between the port and the common point to measure the temperature of the battery to correct the fast charging voltage and the floating charging voltage, and to adapt to changes in internal parameters of the battery under different temperature environments. For the temperature compensation function to be effective, the SW-2 microswitch is set to the "ON" position.



NOTE:

- NTC temperature sensor non charger standard accessories, users choose according to the actual application needs.
- When the temperature compensation function is effective, the open and short-circuit fault monitoring function of the temperature sensor is effective.


● AC POWER

Terminal	Function Description	Connection
L	AC power supply, AC100 to 277V	10A Power cord
N		
E	Protected area	

● BATTERY

Terminal	Function Description	Connection
+	Battery positive	2.5mm ²
-	Battery negative	2.5mm ²

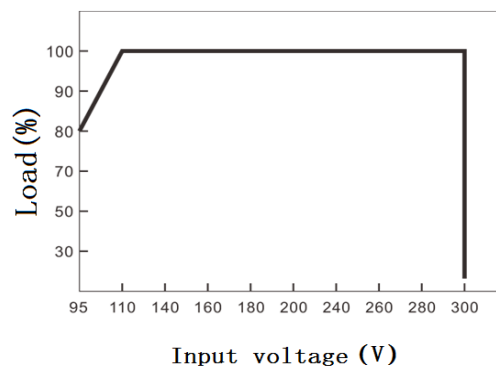
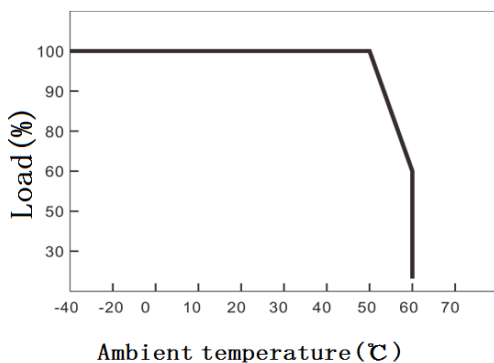
The '+' port is connected to the positive battery and the '-' is connected to the negative battery. It is the power output port of the charger.



WARNING:

- The connection between the charger and the battery must be large enough, and the line size on the meter should be the lowest recommended value, so as to avoid large voltage drop between the lines when the current is high and affect the charging effect.
- The specifications of the connection must also meet local regulations and regulations.

6 Reduction curve



7 Parameter setting

NO.	Items	Setting Range	Preset
1.0	Quit		
1.1			
1.2	Boost volt	12V:12.0 to 15.0VDC	14.0V
		24V:24.0 to 30.0VDC	28.0V
1.3	Float volt	12V:12.0 to 15.0VDC	13.6V
		24V:24.0 to 30.0VDC	27.2V
1.4	Charge current Stage one duration	12V: 3 to 15A	15A
		24V: 3 to 12A	12A
1.5	Stage two duration	1 to 50h	10h
1.6	Thershold current	1 to 50h	10h
1.7	Charge cycle	2 to 10A	3A
1.8	T-compensation	1 to 100 days	10 days
1.9	Under volt	-10.0 to +10.0mV/°C	-3.0mV/°C
1.10	Over volt	12V:10.0 to 16.0VDC	10.0V
		24V:20.0 to 32.0VDC	20.0V
1.11	Comm. address	12V:10.0 to 17.5VDC	14.5V
		24V:20.0 to 35.0VDC	29.0V
1.12	Default settings	1 to 247	1
1.13	Quit		



WARNING:

Before the power is turned on, the control mode and parameters of the charger must be set as required. Otherwise, the charger will not work properly, causing damage to the charger and battery, and even more personal safety.

Menu descriptions:

Boost volt

- It is used to set the constant voltage of the charger in the second stage of charging (constant voltage charging).

Float volt

- It is used to set the constant voltage when the charger is charged in the third stage (floating charge).
- Normally, the floating charge voltage setting parameter will be lower than the fast charge voltage setting parameter value.

Charge current

- It is used to set the charging current of the charger during the stage one duration of charging (constant current charging) and the maximum output current of the charger at any time.

Stage one duration

- It is used to set the maximum time of the first stage of charging (constant current charging) of the charger. Once the duration reaches, regardless of whether the battery voltage reaches the preset value, the first stage charging ends immediately and enters the second stage of charging.

Stage two duration

- It is used to set the maximum time of the second phase of charging (constant voltage charging). Once the duration reaches, regardless of whether the battery voltage reaches the preset value, the second stage charging ends immediately and enters the third stage of charging.

Threshold current

- It is used to set the charging current value of the second phase (constant voltage charging) charging of the charger. Under normal circumstances, the charging current in the second stage charging will gradually decrease. When the charging current is lower than this setting, the second stage Charging is over.

Charge cycle

- The longest time to set the three stages of charger recharge.
- The timer starts counting when the charger enters the third phase of charging. When the accumulated time reaches the set value, the three phases of charging are restarted regardless of whether the voltage of the battery is lower than a preset value.
- The unit of the parameter is "day".

T-compensation

- It is used to define the temperature compensation value of the constant voltage and float voltage of the charger.

Under volt

- Used to set the low alarm value of the charged battery voltage.
- When the charger detects that the voltage value of the battery is lower than this setting value, the fault output is valid, and the fault indicator flashes 5 times every 3 seconds, and the charging does not stop.

Over volt

- Used to set the high alarm value of the charged battery voltage.
- When the charger detects that the voltage value at the output is higher than this setting value, the fault output is valid, and the fault indicator flashes twice every 3 seconds, and the charging stops.

Comm. address

- Used for address setting of devices on the MODBUS
- Each controller on the same MODBUS has a unique communication address.

Default settings

- Used to restore parameters to factory defaults.

8 Charging process

According to the charging characteristics of the battery, the charger adopts 3-stage charging mode. The automatic charging process is as follows:

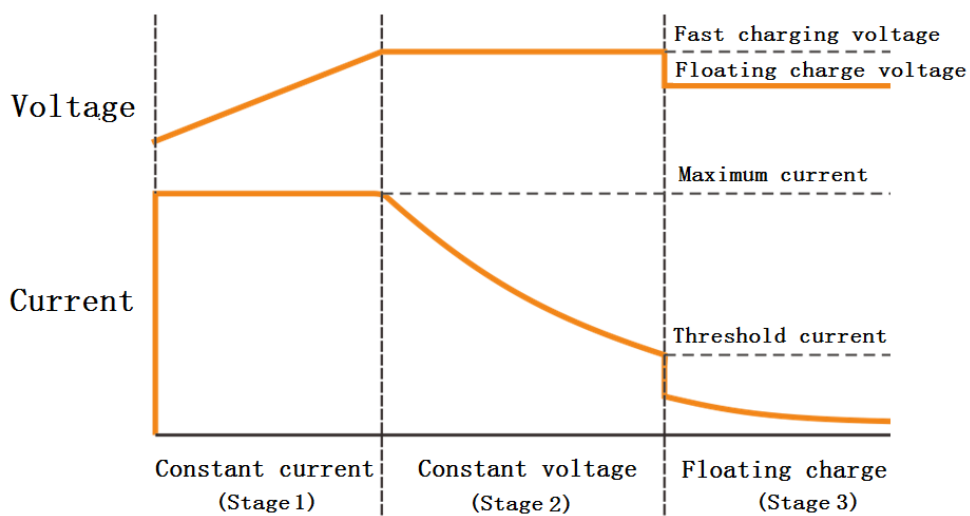
Stage 1 (Constant Current Charging): The charger charges the battery with a constant current (the setting value of the charging current parameter). At this stage, the voltage of the battery rises gradually. When the battery voltage reaches the setting value of the fast charging voltage parameter, the charger enters the charging stage 2. In another case, when the constant current charging duration reaches the setting value of the first-order time of the parameter, even if the battery voltage does not reach the setting value of the fast charging voltage parameter, the charger immediately enters the charging stage 2.

Stage 2 (Constant Voltage Charging): The charger charges the battery at a constant voltage (the setting value of the parameter fast charging voltage). At this stage, the charging current gradually decreases. When the charging current drops to the threshold current, the charger continues to charge at the floating charging voltage, and the charger enters the charging stage 3. In another case, when the duration of constant voltage charging reaches the setting value of the second-order time of the parameter, even if the charging current is not lower than the setting value of the threshold current parameter, the charger immediately enters the charging stage 3.

Phase 3 (Floating Charge): the charger recharges the battery at constant voltage (set value of floating charge voltage). In the floating charging process, the charging current is generally less, which is used to maintain the full charge state of the battery. At 3 charging stage, the charger will limit the charging current output.

There are two cases: when the duration of the charger in stage 3 reaches the set value of the parameter charging cycle, the charger enters and recharges again from stage 1; and when the charger detects that the battery voltage is lower than the set value, the charger enters and recharges from stage 1.

Charging process is shown.:



9 Failure

Failure	Describe	Reasons and measures
Under volt	<p>When the charger detects that the battery voltage is lower than the set value of the parameter low voltage, the battery low voltage fault.</p> <p>When this failure occurs:</p> <ul style="list-style-type: none"> ● The fault indicator flashes 3 times every 5 seconds, and cycle. ● The fault (ALARM) output is valid. ● The alarm buzzer sounds. 	<p>Reason:</p> <ul style="list-style-type: none"> ● Battery damage ● The battery will not be charged or discharged for a long time. <p>Corresponding measures:</p> <ul style="list-style-type: none"> ● Check the battery and replace the battery when necessary. ● Continue normal charging.
Over volt	<p>When the charger detects that the battery voltage is higher than the set value of the parameter high voltage, the battery high voltage is faulty.</p> <p>When this failure occurs:</p> <ul style="list-style-type: none"> ● The charger stops charging. ● The fault indicator flashes 3 times every 2 seconds, and cycle. ● The fault (ALARM) output is valid. ● The alarm buzzer sounds. 	<p>Reason:</p> <ul style="list-style-type: none"> ● The voltage from the external device is imported. ● The charger has failed. <p>Corresponding measures:</p> <ul style="list-style-type: none"> ● Open the battery terminal and check the output voltage of the charger.
Overcurrent	<p>When the charger detects that the charging current is higher than the set current value by 15%, it lasts 10S, which is an overcurrent fault; when it is higher than the charging current setting value of 20%, it is an overcurrent fault.</p> <p>When an overcurrent fault occurs:</p> <ul style="list-style-type: none"> ● Stop charging and disconnect the output. ● The fault indicator flashes for 3 times, then stops for 3 seconds, then flashes for 3 times, and so on. ● The fault (ALARM) output is valid. ● After the overcurrent is released, the delay is 30S to resume charging. 	<p>Reason:</p> <ul style="list-style-type: none"> ● There is an external current sink. ● Charger malfunction <p>Corresponding measures:</p> <ul style="list-style-type: none"> ● Disconnect other devices. ● Check the charger's output current.
Charge fail	<p>When the charger completes the phase two charging process, the battery voltage fails to reach or exceed the set value (12.5V for 12V battery and 25V for 24V battery).</p> <p>When this failure occurs:</p> <ul style="list-style-type: none"> ● The charger stops charging until the power returns to normal. ● The fault indicator flashes 3 times every 8 seconds, and cycle. ● The fault (ALARM) output is valid. <p>The alarm buzzer sounds.</p>	<p>Reason:</p> <ul style="list-style-type: none"> ● Battery damage. ● The battery connector is seriously corroding. ● The fuse attached to the output circuit is blown. <p>Corresponding measures:</p> <ul style="list-style-type: none"> ● Replace batteries. ● Clean the battery connector or replace it. ● Replace the fuse.

<p>Over temperature</p>	<p>During the charging process, the temperature inside the charger is too high, triggering the built-in temperature switch, ie high temperature fault. When this failure occurs:</p> <ul style="list-style-type: none"> ● The charger stops charging. ● The fault indicator flashes 3 times every 4 seconds, and cycle. ● The fault (ALARM) output is valid. <p>The alarm buzzer sounds.</p>	<p>Reason:</p> <ul style="list-style-type: none"> ● The installation environment of the charger is closed, or there is a device with high temperature heating nearby. ● The fan of the charger is damaged. <p>Corresponding measures:</p> <ul style="list-style-type: none"> ● Install another location to ensure air convection, away from high temperature heating devices. ● Return the charger to the factory for repair.
<p>T-Sensor error</p>	<p>When the micro switch SW-2 selects the temperature compensation is valid, the charger will detect whether the temperature sensor is open or shorted. When this failure occurs:</p> <ul style="list-style-type: none"> ● The charger continues to charge and the temperature compensation function is disabled. ● The fault indicator flashes 3 times every 7 seconds, and cycle. ● The fault (ALARM) output is valid. ● The alarm buzzer sounds. 	<p>Reason:</p> <ul style="list-style-type: none"> ● SW2 is set to use ON ● The temperature sensor is damaged or installed wrong, leading to open circuit or short circuit. <p>Corresponding measures:</p> <ul style="list-style-type: none"> ● Check the installation mode of the temperature sensor. ● Replace the temperature sensor.

10 Technical Specification

Model	CM360
AC voltage range	100 to 277VAC
Frequency	45 to 65Hz
Maximum AC power	360W
Maximum output current	12V15A / 24V12A
Temperature range	-30 to 60°C
Storage temperature range	-40 to 80°C