



phocos CIS-N-LED 1400mA Charge Controller User Manual

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phocos CIS-N-LED 1400mA Charge Controller



Please read the instructions carefully and thoroughly before using the product. It comes with a number of outstanding features, such as:

- LED driver inside, maximum output voltage up to 49 V
- Dimming function & double timer inside
- True color PWM dimming
- Type of protection: IP68, in 1.5 m water depth 72 hours
- Control unit (CIS-CU-LCD) to configure CIS-N-LED charge controller via infra-red data link
- External temperature sensor for temperature compensation of charging levels
- 4 stage charging (main, boost, equalization, float) for flooded battery, 3 stage charging (main, boost, float) for sealed battery
- Input signal for motion sensor (PIR)

General Safety Information

- This manual contains important installation, set up, and safety operating instructions.
- Please read the instructions and warnings in this manual carefully before beginning any installation.
- Please do not disassemble or attempt to repair Phocos products. Phocos charge controllers do not contain user-serviceable parts.
- Please observe all instructions with regards to external fuses/breakers as indicated.
- The information contained in this manual must be observed in its full extent. The manual contains information regarding installation, set up, and operation.

Maintenance and installation notes

- When installing or working on the PV system, please disconnect the PV (solar) modules from the charge controller first, to prevent any damages to the charge controller!
- Please verify that all cable/wire connections are done properly and well insulated and that no water or humidity can ingress. This avoids any bad or loose connections that would result in excessive heating or further damage.
- Please install a fuse or breaker near the battery before installing or adjusting the controller!

High voltage risks

- Never touch any electrical conductors in order to avoid electrical shock.
- Never work on live (energized) electrical equipment.
- When working around a battery, do not allow tools to bridge the battery terminals, or short circuit any part of the battery.
- Use only tools with insulated handles.
- Operation of this device may produce high voltage which can cause severe injuries or death in case of improper installation or operation of the device.
- PV modules can generate high DC voltages!

Mains and charging current risks

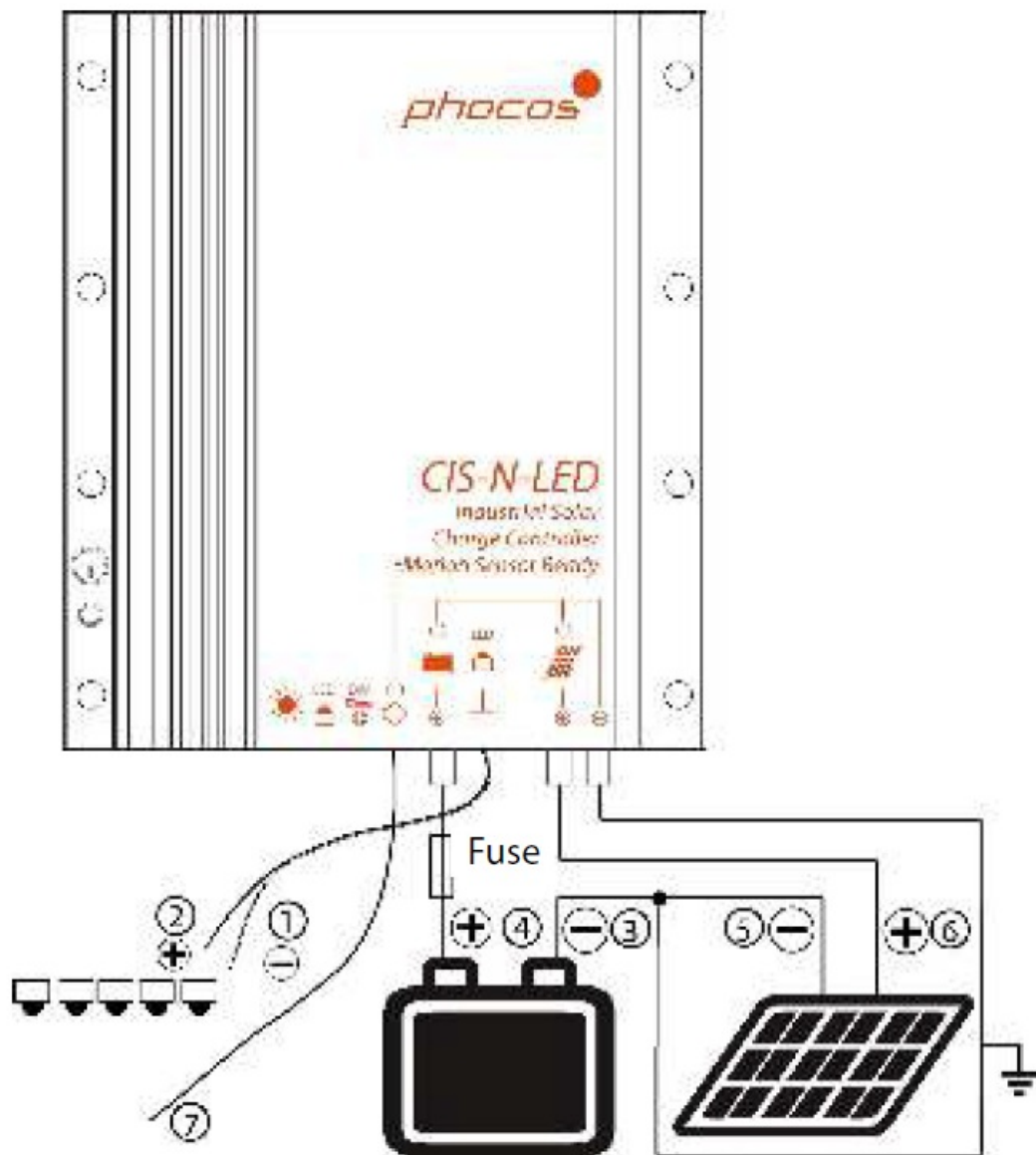
- Make sure the cables are always connected to the correct terminal. An electrical shock can be lethal. In general, any electric shock can be dangerous to your health.

CE labeling

The product is **CE-compliant**.

Connecting and Grounding




- Connect wires in the order as indicated in the system drawing 1, 2, 3, 4, 5, 6, 7 to avoid installation faults
- To avoid any voltage on the wires, first connect the wire to the controller, then to the battery, panel or load
- Make sure the wire length between battery and controller is as short as possible
- Maximum cable length from charge controller to LEDs: < 2m
- Be aware that the negative terminals of CIS-N-LED are connected together and therefore have the same electrical potential. If any grounding is required, always do this on the negative wires



	Function	Cablemarker	Wiresize(cro section)	Color
①	NegativewireLED-output	–	AWG20(0.5mm ²)	Blue
②	PositivewireLED-output	–	AWG20(0.5mm ²)	Red
③	Negativebatteryterminal	COMMON-	AWG13(2.5mm ²)	Black
④	Positivebatteryterminal	BATTERY+	AWG13(2.5mm ²)	Red
⑤	Negativepanelterminal	COMMON-	AWG13(2.5mm ²)	Black
⑥	Positivepanelterminal	SOLAR+	AWG13(2.5mm ²)	Yellow
⑦	DIM-Overrideinput	PIR	AWG24(0.25mm ²)	Black

Warning: The wires to the LEDs must not be connected to ground or anything else than the LEDs.

Display & Warning Functions

LED	Status	Function
	On	Controller connected to battery, night detected
	Flash	Controller connected to battery, day detected
	Off	No battery connected
	On	Load low/high voltage disconnect (LVD/HVD)
	Flash	Load overcurrent
	Off	Load OK
	On	Dimming due to of LVD/HVD
	Off	No dimming
All LED	Green->Red->Green->	Programming

LED Driver Description

- **Output voltage up to** 49 V 5 to 15 LEDs in series for 12 V system, 10 to 15 LEDs in series for 24 V system
- **Nominal output current:** 350 mA, 600 mA, 700 mA, 1050 mA, 1400 mA, 2800 mA (depending on the type)
- **Two timer** inside to control LED brightness
- **PIR Input:** Switches the LED driver to the nominal output current (100% brightness). To be used with an external motion detector.

Dimming Function (output “logics”)

	No dimming	Dimming	Load of
Timer1	on	on	of
Timer2	on	of	N/A

The timer and dimming settings can be adjusted using the CIS-CU-LCD (Infrared remote control) or MXI-IR (Infrared to USB adapter) and CISCOM (PC-program).

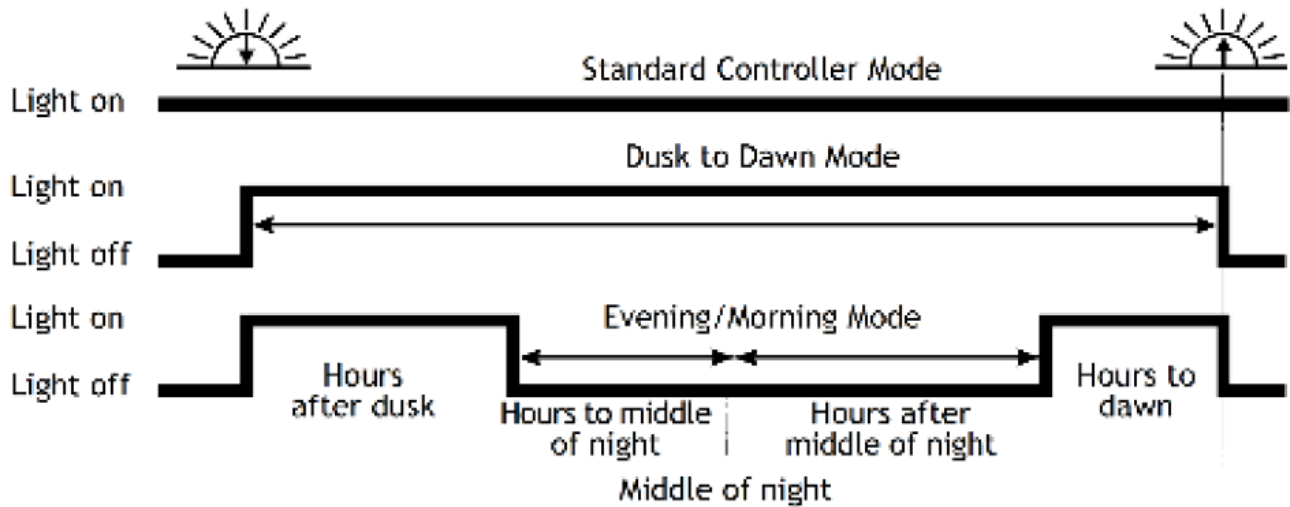
PIR-Dimming override input: (0-0.5 V Off, 4-30 V On)

- Input for a signal from a motion sensor (PIR), to override the dimming and set the light to full brightness in case a person is detected.
- In this way, one can set a low dimming level to ensure a minimum light level, for sufficient orientation and to save energy.
- When a motion is detected, the light is switched to 100%.
- The duration of the activation has to be adjusted on the motion sensor.

Night-Light Function

The CIS-N-LED controller comes with a sophisticated night-light function. It controls the load output at night and is widely programmable.

There are 3 operating modes available:



Standard Controller, Dusk to Dawn and Evening/Morning modes.

"Middle of night" is detected automatically as the midpoint between dusk and dawn, no setting of a clock is required. It may take several days until the controller has "learned" the middle of the night precisely. "Middle of night" may be different from 12:00 midnight depending on your location.

The controller recognizes day and night based on the solar array open circuit voltage.

This day/night threshold can be adjusted by programming according to local light conditions and the solar array used.

Testing Function

By pushing the "Test Button" on the CIS-CU-LCD (control unit), the LED-driver will be switched "on" for one minute.

Remark: If pressing the button causes a load disconnect event (LVD/SOC, overcurrent) the load will be switched off immediately.

Safety Features

	Solar terminal	Battery terminal	LED-output	PIR-input
Reverse polarity	Protected(1)	Protected(1)	N/A	Protected
Shortcircuit(2)	Protected	Protected(3)	Not protected	Protected
Overcurrent	N/A	N/A	N/A	N/A
Reverse current	Protected(4)	N/A	N/A	N/A
Overvoltage	Max.50V(5)	Max.36V	Switches above 15.5/31.0 V battery voltage	Max.30V (50V short time)

Undervoltage	N/A	N/A	Switches of	N/A
Over- temperature	Reduce the charging current by PWM if over temperature occurs and switched of the load if the temperature reaches a high level.			N/A

1. **Up panel-Battery** is limited to 40 V.
2. **Short circuit:** >3x – 20x nominal current.
3. **Battery must** be protected by a fuse, or it can be permanently damaged in case of a short circuit.
Remark: It is recommendable to use a fuse which amperage corresponds to the nominal current of the charge controller. E.g. CIS-N-LED (10 A) needs a 10 A fuse.
4. **Reverse current** through solar panel is blocked by serial MOSFET. This function is tested and activated approx. one time in 1min +/-5s.
5. The solar panel voltage should not exceed this limit for a longer period of time as surge protection is present by varistor.

WARNING: The combination of different error conditions may cause damage to the controller. Always remove the error before you continue connecting the controller!

Low Voltage Disconnect Function (LVD)

- **State of charge (SOC) controlled: Disconnect at**
 - 11.00/22.00 V to 11.70/23.40 V (SOC1), 11.12/22.24 V to 11.76/23.52 V (SOC2),
 - 11.25/22.50 V to 11.83/23.63 V (SOC3), 11.38/22.72 V to 11.89/23.78 V (SOC4),
 - 11.51/23.02 V to 11.96/23.92 V (SOC5), 11.64/23.28 V to 12.02/24.04 V (SOC6).
- **Voltage controlled (LVD):**
Disconnect at a fixed voltage between 11.0/22.0 V and 11.9/23.8 V (Step 0.1/0.2 V).

Note: Battery voltage must be below setting for longer than 2 minutes for LVD to take effect.

Factory Settings

You can configure CIS-N-LED charge controllers via the control unit (CIS-CU-LCD). See CIS-CU-LCD manual for details.

	Factory settings
Load mode	Standard controller (night light of)
Lowvoltage disconnect	SOC4
Battery type	GEL
Dimming value	50%
Night detect level	8/16V(1)
Timer 1 evening hours	0h
Timer 1 morning hours	0h
Timer 2 evening hours	0h
Timer 2 morning hours	0h

PV panel open circuit voltage: Day level = night level + 1.5/3.0 V

Technical Data

Note: The two voltage levels before/after the slash are valid for 12 V and 24 V systems respectively.

TechnicalData	CIS-N-LED 350mA	CIS-N-LED 6 0mA	CIS-N-LED 7 0mA	CIS-N-LED 1050mA	CIS-N-LED 14 0mA	CIS-N-LED 28 0mA
Systemvoltage	12/24Vauto recognition					
Max.chargecurrent	10A(15A,≤50°C*)			20A(30A,≤50°C*)		
Floatcharge	13.8/27.6V(25°C)					
Maincharge	14.4/28.8V(25°C),0.5h(daily)					
Bostcharge	14.4/28.8V(25°C),2h Activation:batteryvoltage<12.3/24.6V					
Equalization	14.8/29.6V(25°C),2h Activation:batteryvoltage<12.1/24.2V (atleastevery30days)					
D epdischarge protecti on Cut-ofvoltage	1.0-12.02/2.0-24.04VbySOC 1.0/2.0-1.9/23.8Vbyvoltage(adjustablestep0.1/0.2V)					
Reconnectlevel	12.8/25.6V					

Overvoltage protection	15.5/31.0V
Undervoltage protection	10.5/21.0V
Max.panelvoltage (Surgeprotectionby varistor)	50V
Temperature compensation (Chargevoltage)	-4.2mV/K(2Vcel)
Max.self consumption	5–8mA
Grounding	Negativegrounding
Ambient temperature	–40to+60°C
Max.altitude	4, 0mabovesealevel
Baterytype	Leadacid(GEL,AGM,floded)
Adjustmentrange: Evening/morning	0–15h/0–14h

hours Nightdetection Daydetection	2.5–10.0V/5.0–20.0V(adjuststep0.5/1.0V) 4.0– 1.5V/8.0–23.0V(adjuststep0.5/1.0V)	
Wire length	20cm	
Dimensions (WxHxD)	82x97x20mm	92x 9x 2mm
Weight	210g	250g
Wirecross section	AWG13(2.5mm ²)	
Type of protection	IP68(1.5m,72h)	

LEDdriverdata	CIS-N-LED 350mA	CIS-N-LED 60mA	CIS-N-LED 70mA	CIS-N-LED 1050mA	CIS-N-LED 140mA	CIS-N-LED 280mA*
Output voltage	15Vto49Vfor12Vsystem(5to15LEDsinseries) 30Vto49Vfor24Vsystem(10to15LEDsinseries)					
Nominal output current perstring	350mA	60mA	70mA	1050mA	140mA	280mA
Max.load power	15W	25W	30W	45W	60W	60W(12V)/ 120W(24V)

Dimming level	0–10%(adjuststep10%)
PIR-input	4V.30Vwithrespectobaterynegative,>=0.7mA; limited protection up to 50V

- **12 V:** 15-24 V (5-8 LEDs in series)
- **Without simultaneous** LED output current at a maximum ambient temperature of 50°C Please notice:

The CIS-N-LED features integrated overtemperature protection that will reduce the average charge current in case of too high temperatures.


Liability Exclusion

The manufacturer shall not be liable for damages, especially to the battery, caused by use other than as intended or as mentioned in this manual or if the recommendations of the battery manufacturer are neglected. The manufacturer shall not be liable if there has been service or repair carried out by any unauthorized person, unusual use, wrong installation, or bad system design.

Subject to change without notice. Version: 20150130 Made in one of the following countries: Germany – China – Bolivia – India

Phocos AG – Germany www.phocos.com

Documents / Resources

 <p>Phocos CIS-N-LED 300 mA, 600 mA, 700 mA, 1050 mA, 1400 mA, 2800 mA</p>	<p>phocos CIS-N-LED 1400mA Charge Controller [pdf] User Manual CIS-N-LED, 1400mA Charge Controller, CIS-N-LED 1400mA Charge Controller, Charge Controller, Controller, CIS-N-LED 350 mA, CIS-N-LED 600 mA, CIS-N-LED 700 mA, CIS-N-LED 1050 mA, CIS-N-LED 2800 mA</p>
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References

-  [Solar Power Charge Controllers, Inverters, and More | Phocos](#)