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# Solar System



**Current Automation**  
POWER SOLUTION PROVIDERS



phocos Solar Charge Contro  
**Phocos Solar Charge Controllers**

# CX10, CX20, CX40 CXN10, CXN20, CXN40 (CXN-Negative Grounding)

The CX / CXN series is a sophisticated solar charge controller family with **exceptional features** for its price range. Beside a perfect PWM regulation with integrated temperature compensation the controllers provide extraordinary display, programming and safety functions.

The battery state of charge is clearly displayed with a bar chart, as well as energy flows from and to the battery and the load status (e.g. overload, load short circuit). The deep discharge protection function can be set up to three different modes: voltage controlled, SOC controlled or adaptive (fuzzy logic). Acoustic warnings are built in, and also a programmable nightlight function. As an accessory we can provide an Excess Energy Management output to control special Phocos appliances like the SF solar refrigerators/coolers. The compact case design is prepared for DIN rail mounting (mounting device available as an accessory).

Type	CX10	CXN10	CX20	CXN20	CX40	CXN40
Charge current max.	10A	10A	20A	20A	40A	40A
Load current max.	10A	10A	20A	20A	40A	40A
System voltage	12/24V					
Self power consumption	<4mA	<6mA	<4mA	<6mA	<4mA	<6mA
Dimensions	89 x 90 x 39mm					
Type of protection	IP22					
Weight	175g	175g	175g	175g	186g	186g
Ambient Temp. Range	-25 to +50°C					

# CML05, CML08, CML10, CML15, CML20 (NL- Night light)

The CML series is a sophisticated solar charge controller family for **low-cost applications**. The electronic circuit is equipped with a microcontroller that provides high-efficiency charging technology together with a number of outstanding status display, warning and safety functions.

The temperature-compensated three-stage PWM charging method (boost-equalization-float) is now adjustable to sealed and vented lead-acid batteries. The new version also allows an either SOC or voltage controlled low voltage disconnect function. The battery status is clearly indicated by three LEDs. As the first controller on the market in this price range it comes with an acoustic low voltage load disconnect pre-warning feature. The CMLNL series comes with two nightlight function modes. One of them is programmable that switch on the load output for a adjustable number of hours from dusk

Type	CML05 / CML05NL	CML08 / CML08NL	CML10 / CML10NL	CML15 / CML15NL	CML20 / CML20NL
Charge current max.	5A	8A	10A	15A	20A
Load current max.	5A	8A	10A	15A	20A
System voltage	12/24V				
Boost Voltage	14.5V/29.0V@25 °C				
Equalization voltage	14.8V/29.6V@25 °C				
Low voltage Disconnect	11.4-11.9V/22.8-23.8V controlled by state of charge 11.0/22.0V controlled by voltage				
Load reconnect voltage	12.8/25.6V				
Temperature compensation	-4mV/cell*K				
Self power consumption	<4mA	<6mA	<4mA	<6mA	<4mA
Dimensions	80 x 100 x 32mm				
Type of protection	IP22				
Weight	180g				
Temperature range	-20 to +50 °C				

# CMM (Remote Meter)

Phocos' CMM multi-meter is designed to accurately measure and the display panel current, load current and battery voltage of your PV system. CMM can be used in combination with Phocos CA, CML and CMLNL series charge controllers.

Type	CMM
Voltage Range	0 to 35V
Current Range	0 to 25A
System voltage	12/24V
Operating Temperature Range	-25 TO +50°C
Length of Connection Wire	2m
Dimension of Measuring Component	84 x 44 x 32mm
Dimension of Display Component	72 x 68 x 29 mm
Type of protection	IP22

Johannesburg Branch: Phone: 011 462-4253 / 4254 / 4269 / 0390 / 0448 / 1031 / 1620 / 2310 / 2425 / 2503 / 2600

CXCOM



Datalogger Software



CXI-3



USB Interface



CML

Remote Meter

Remote connector



# MPPT100/20 & MPPT100/30

With innovative maximum-power-tracking technology, Phocos' MPP-Tracker ensures maximum performance from your solar array at all times and in all weather conditions. The MPPT can yield an energy gain of up to 30% from your PV array (with the average gain being 10%-25%). The MPPT100/20 includes a sweep-function which runs through the whole solar-panel voltage range once every 2h to find the point of the absolute maximum power output. When a Central Unit is used with the MPPT100/30, up to 16 MPPTs can be used together in one system. The charge regulation is then done via data bus by the Central Unit. This will enable you to increase your system capacity substantially. The temperature-compensated three-stage I-U curve charge regulation algorithm significantly extends the lifespan of your battery. The possibility to use less expensive grid-feed-in solar-panels with up to 95V open circuit voltage for 12V or 24V stand-alone systems will significantly reduce the cost of the total system.



MPPT20

Type	MPPT100/20	MPPT100/30
Nominal Voltage	12 / 24, automatic recognition	12 / 24, automatic recognition
Maximum solar input voltage Voc	95V	95V
Maximum PV input power	300W@12V, 600W@24V	450W@12V, 900W@24V
Maximum battery charge current	20A	33A; (Nominal 30A)
Power conversion efficiency	up to 97 %	up to 98 %
Standby power consumption	< 30mW at 12V system voltage (< 2mA) < 80mW at 24V system voltage (< 3mA)	< 30mW at 12V system voltage (< 2mA) < 80mW at 24V system voltage (< 3mA)
Temperature compensation	-4 mV/cell.K	-4 mV/cell.K
Maximum wire size	32mm <sup>2</sup>	32mm <sup>2</sup>
Dimensions	185 x 150 x 115mm	185 x 150 x 115mm
Weight	1.6kg	1.6kg
Temperature range	-40 to +50°C	-40 to +50°C
Type of protection	IP22	IP22

## SPS series (100 – 300 A)

### High-end Solar Regulation System



SPS

The SPS series Solar Regulation System is an advanced electronic control unit for solar power supplies in remote locations. It will prevent overcharging, reduce electrolyte loss and stop over discharge. This will extend battery life and reduce maintenance.

## MPS (45~80) for hybrid systems

MPS is Phocos' innovative new multi-functional power switching module for stand-alone power supplies. It can be configured to operate as a charge controller, load controller or diversion controller by simple toggling of DIP switch settings.

A single MPS unit can control up to 80 A of current at 12, 24 or 48 V and switching can be set for pulse-width modulation or two-point series switching. When configured as a diversion controller, MPS can also control a diversion load for wind and micro-hydro turbine systems.

MPS offers integrated, adjustable low voltage disconnect as a load controller and sophisticated overcharge protection as a solar charge controller. The new flexible power electronics allow for positive or negative grounding.



MPS

## LCC02/06, LCC04/08

LCC solar charge controller series is especially designed for small solar systems with the need of a battery disconnect feature.

The regulation circuit provides serial regulation to prevent single cell overheat problems (Hotspot) of short-circuited solar panels.



LCC

Type	LCC02/06	LCC04/08
Nominal Voltage	12V	12V
Boost voltage	14.4V	14.4V
Float voltage	13.8V	13.8V
Load disconnect voltage	11.5V	11.5V
Load reconnect voltage	12.8V	12.8V
Max. solar charge current	2A	2A
Max. load current	6A	8A
Self consumption	<4mA	<4mA
Ambient temperature range	-40 to +50°C	-40 to +50°C
Dimensions	72 x 65 x 29mm	72 x 65 x 29mm
Weight	69g	69g
IP protection	IP22	IP22

# PL20, PL40, PL60

The PL series controllers offer complete control over the charge cycle and gives information about current and past performance.

PL regulators have a built-in low battery disconnect switch. In addition, the versatile event controller can switch power on or off according to criteria set by the user. This allows the PL to do extra tasks such as switching a light on at night or keeping a water tank full by operating a pump when needed. Regulation can be done in slow speed switching and PWM in both series and shunt modes. Other features include backup generator control and charging a second battery.

## CIS series (5 – 20 A) IP 68

CIS is an industrial-grade charge controller that is suitable for all practical PV applications. It conforms to the IP68 protection system. Four-stage PWM-charging is combined with low-voltage disconnect, flexible load timer functions, and a multi-LED system status display.

Type	CIS 05 CIS-2L 05	CIS 10 CIS-2L 10	CIS 20 CIS-2L 20
System voltage	12/24 V auto recognition		
Max. charge/load current	5 A	10 A	20 A
Overvoltage protection	15.5/31.0 V		
Max. panel voltage	55 V		
Temperature compensation	-25 mV/K at 12 V		
Dimensions (W x H x D)	82 x 58 x 20 mm		
Weight	150 g		
Wire cross section	1.5mm <sup>2</sup>	1.5mm <sup>2</sup>	2.5mm <sup>2</sup>

## CL 12 (3 – 11 W), CL 12 (15 – 30 W), CL 24 (15 W)

CL 12 (3 – 11 W)

### DC compact fluorescent lamps

Phocos' CFL lamps provide very high illumination levels at low power consumption. This high quality 12 V DC lamp can be used directly in 12 V battery or solar systems. The life span of the lamp is more than 8,000 hours. The new version of CFL lamps is now regulated by a DC-preheating circuit which makes an extremely high number of switching cycles possible (IEC925).

Furthermore the lamps are equipped with an over temperature protection (OTP) which causes the lamps to automatically switch off prior to overheating (especially when operated at too extreme environmental conditions) and therefore prevents damage to the lamp. Thus, the product life span is significantly increased. It is an excellent choice for any illumination purpose which requires more than 100 lumens.



CL 12

CL 24

Type	CL 1215C	CL 1230C	CL 1203C	CL 1205C	CL1207C	CL 1209C	CL 1211C	CL 2415C
	CL 1215W	CL 1230W	CL1203W	CL1205W	CL1207W	CL 1209W	CL 1211W	CL 2415W
Voltage range	11–15 V			11–15 V			20–30 V	
Nominal power	15 W	30 W	3 W	5 W	7 W	9 W	11 W	15 W
Nominal current	1,200 mA	2,400 mA	240 mA	400mA	560 mA	720mA	900 mA	600 mA
Light intensity	925 lm (C) 950 lm (W)	1,500 lm (C) 1,500 lm (W)	100 lm	250lm	350lm	520lm	630lm (C) 670 lm (C)	900 lm
Light temperature	6,400 K (C)			6,400 K (C)			6,400 K (C)	
	2,700 K(W)			2,700 K (C)			2,700 K (W)	
Temperature range	-10 to +40°C	-10 to +35°C	-10 to +50°C				-10 to +40°C	-10 to +50°C
Socket	E27 (Edison)							E27/B22

### FR freezer units



Phocos refrigeration devices are especially suited to solar-powered applications. 12 V or 24 V DC operating voltage

The TV 07 by Phocos can be used as a TV receiver and as a monitor for VHS/VCD/DVD players. The device is directly operable in a 12-volt solar system.



TV Receiver monitor



PL40

CIS



Pico