

INTELLIGENT DC-DC BATTERYCHARGER



SAMLEX EUROPE[®] B.V.

ELOGIC

Model No.

EL 12-12/50 (12V/50A)

EL 12-24/30 (24V/30A)

Owners Manual

Please read this manual before operating your Elogic Batterycharger

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1. INTRODUCTION

Thank you for purchasing a Samlex Europe (Samlex) Elogic DC to DC battery charger. Please read this owner's manual for information about using the product correctly and safely. Keep this owner's manual and all other included documentation close to the product for future reference. For the most recent manual revision, please check the downloads section on our website.

The purpose of this owner's manual is to provide explanations and procedures for installing, configuring and operating the battery charger. The installation instructions are intended for installers that should have knowledge and experience in installing electrical equipment, knowledge of the applicable installation codes, and awareness of the hazards involved in performing electrical work and how to reduce those hazards.

1.1 Intended product use

The Elogic DC to DC battery chargers are primarily intended to charge an auxiliary or service battery from a vehicle starter battery. The input battery voltage can be above, below or equal to the output battery voltage. An Elogic DC charger allows the auxiliary battery to be perfectly charged regardless of the input voltage, while being protected against damage due to peak voltages.

The Elogic DC battery chargers are compatible with vehicles that are equipped with variable output smart alternators (EUR 6+). The Elogic DC charger can start charging based on a programmable input voltage range only, or in combination with an engine run signal. There is also a separate (BMS-) control input available that enables external control for charger-on and -standby.

1.2 Important safety information

This section contains important safety information for the Elogic DC battery charger. Each time, before using the Elogic DC battery charger, READ ALL instructions and cautionary markings on or provided with the battery charger, and all appropriate sections of this guide. This battery charger contains no user serviceable parts. Opening up the battery charger will void product warranty.

WARNING

FIRE AND/OR CHEMICAL BURN HAZARD

Do not cover or obstruct any air vent openings and/or install in a zero clearance compartment.

WARNING

SHOCK HAZARD. KEEP AWAY FROM CHILDREN!

Avoid moisture ingress. Never expose the unit to snow, water, etc.



WARNING

FAILURE TO FOLLOW THESE INSTRUCTIONS CAN RESULT IN DEATH OR SERIOUS INJURY:

1. When working with electrical equipment or lead acid batteries, have someone nearby in case of an emergency.
2. Study and follow all the battery manufacturer's specific precautions when installing, using and servicing the battery connected to the charger.
3. Wear eye protection and gloves.
4. Avoid touching your eyes while using this unit.
5. Keep fresh water and soap on hand in the event battery acid comes in contact with eyes. If this occurs, clean right away with soap and water for a minimum of 15 minutes and seek medical attention.
6. Batteries produce explosive gases. DO NOT smoke or have an open spark or fire near the system.
7. Never attempt to re-charge a damaged, frozen or non-rechargeable battery.
8. Keep unit away from moist or damp areas.
9. Avoid dropping any metal tool or object on the battery. Doing so could create a spark or short circuit which goes through the battery or another electrical tool that may create an explosion.
10. There are no user serviceable parts inside in the charger's enclosure.



WARNING

EXPLOSION HAZARD!

Do not use the battery charger in the vicinity of flammable fumes or gases.



CAUTION

LIMITATIONS OF USE

Do not use in connection with life support systems or other medical equipment or devices. This battery charger is not to be used by persons with reduced physical or mental capabilities or lack of knowledge and experience. Not to be operated or used by children.

2. INSTALLATION

2.1 Unpacking

The charger package should contain the following items :

- Battery charger
- 3x rubber cable grommets
- Battery temperature sensor (3m)
- Owner's manual
- 3x M6 crimp terminals

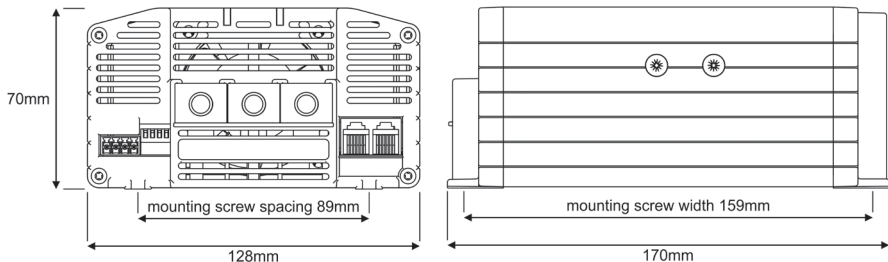


CAUTION

After unpacking, check if the product shows any mechanical damage. Never use the product when the enclosure shows any visual damage caused by harsh handling, or when it has been dropped accidentally. Contact your local supplier for further information.

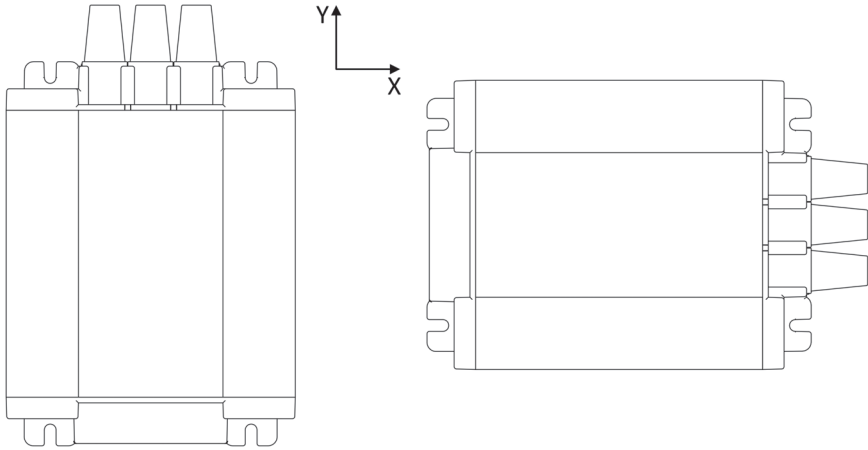
2.2 Mounting

Please see the image below for the product dimensions and mounting screw distances.



Further location and mounting details:

1. Choose an appropriate mounting location in a well ventilated room that is protected against rain, snow, spray, vapour, moisture and dust.
2. Make sure that the ambient temperature is between -20°C and +60°C. Above +40°C the charge will automatically derate the output power.
3. Do not expose the charger to any heat source (such as direct sunlight or heating). Avoid additional heating of the product. Also avoid charger exposure to excessive vibration.
4. Never install the charger in an environment where there is danger of gas or dust explosions, like in the same compartment as the batteries or directly above vented batteries.
5. When installing the charger horizontally (floor-mounting), any mounting direction is acceptable. When installing vertically, please observe the following preferred enclosure orientations:



6. Use the base of the charger as a mounting template to mark the positions of the fixing screws.



CAUTION

Keep a clear space of at least 10 cm around this product for cooling purposes!

2.3 Wiring details



WARNING

For user safety during installation, please make sure that the output of the supplying source is switched off (temporary remove fuses from the fuseholders) and that no consumers are connected to the batteries.



CAUTION

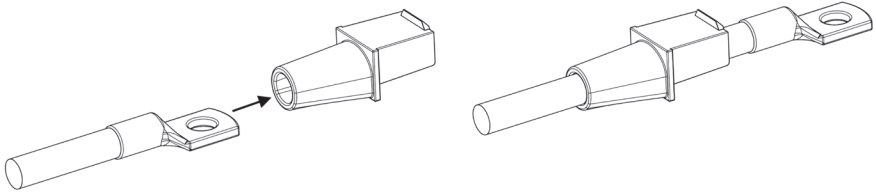
Please double check if the battery voltages match the specifications of the used charger model.



CAUTION

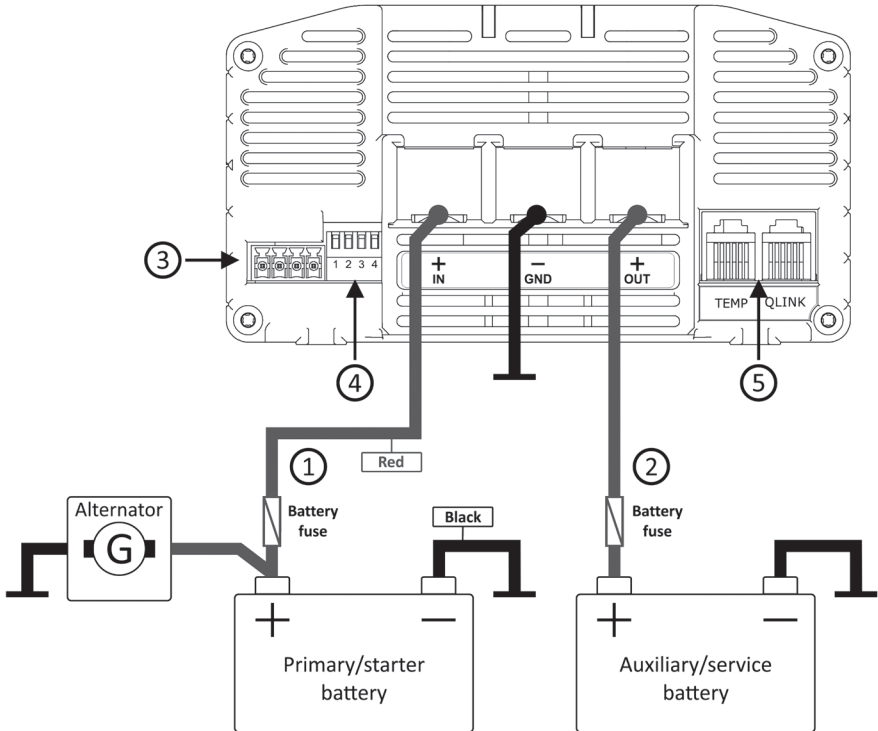
Always connect ground (- GND) first followed by the service (+ OUT) battery and lastly the starter (+ IN) battery.

Before connecting the main DC cables, make sure to slide the included rubber grommets over these cables like shown in the next image.



When the DC cables are connected to the charger, the rubber grommets can be slid towards the charger's front panel until the screw connections are completely covered.

Please see the image below for further wiring details.



 **CAUTION**

Double check for correct polarity, before connecting the battery cables to the battery!
Wrong polarity will blow an internal fuse and the charger must be returned for service.

Always keep positive and negative cables close to each other to minimize electromagnetic fields.

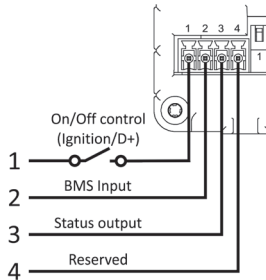
- ① Please consult the following table to determine the correct input battery cable- and fuse size for each model. Using a smaller cable size will cause additional losses and may result in improperly charged batteries. Fire and burning hazards are present if the battery cables are insufficiently sized for the expected current. Always keep the cable length as short as possible!

Model	Minimum Cable size	Recommended Cable size	Battery fuse (quick type)
EL 12-12/50	16mm ² (AWG6)	25mm ² (AWG4)	70-90Amp
EL 12-24/30	16mm ² (AWG6)	25mm ² (AWG4)	70-90Amp

- ② Please consult the following table to determine the correct output battery cable- and fuse size for each model. Using a smaller cable size will cause additional losses and may result in improperly charged batteries. Fire and burning hazards are present if the battery cables are insufficiently sized for the expected current. Always keep the cable length as short as possible!

Model	Minimum Cable size	Recommended Cable size	Battery fuse (quick type)
EL 12-12/50	16mm ² (AWG6)	25mm ² (AWG4)	60-80Amp
EL 12-24/30	10mm ² (AWG8)	16mm ² (AWG6)	40-50Amp

③ Please see the image below for the control wire connection locations.



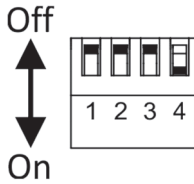
Connection 1 is the main On/Off control input and can only be used when DIP switch 4 is set to off. This input can be used to enable or disable the charger and is 'active high'. When a voltage higher than 2V is applied to this input, the charger turns on. When a voltage lower than 1V is applied, the charger turns off and draws zero current. The maximum input voltage is 32V. In a vehicle application it is recommended to connect this input to the engine run signal. Contact your vehicle distributor to find out the most suitable connection.

BMS input connection 2 can be used to force the charger in standby mode. In this mode the charger stops charging, but the internal circuits stay active to immediately resume charging once allowed again. This input can be used to connect to a Lithium battery BMS in order to stop the charging process if required. By default this input is 'active low' (< 1V is On and > 3V is Stand by), but this can be changed to 'active high' as well by the Samlex Dashboard or Dashboard Mobile app. The maximum input voltage is 32V.

Connection 3 is an open collector output that can be used to for example connect to a remote indicator light. The maximum switching voltage and current are respectively 32V and 150mA. By default this output is active (low) when the charger is charging or when charging is finished. Other active conditions can be selected in the Samlex Dashboard or Dashboard Mobile apps.

Connection 4 is reserved for future use and has no active functionality yet.

④ DIP switch settings



DIP switch 1 and 2 are used select the desired charge program for the connected output battery. Please see the table below:

DIP1	DIP2	Battery type / Charge program ^{1) 2)}
Off	Off	Flooded (default setting) Bulk/Abs voltage = 14.4V (28.8V) Float voltage = 13.5V (27.0V)
Off	On	GEL Bulk/Abs voltage = 14.2V (28.4V) Float voltage = 13.5V (27.0V)
On	Off	AGM Bulk/Abs voltage = 14.7V (29.4V) Float voltage = 13.6V (27.2V)
On	On	LiFePo4 Bulk/Abs voltage = 14.4V (28.8V) Float voltage = 13.8V (27.6V)

¹⁾ Charge voltage value between brackets are for EL 12-24/30 model.

²⁾ All standard charge voltage values are configurable using the Samlex Dashboard and Dashboard Mobile apps.

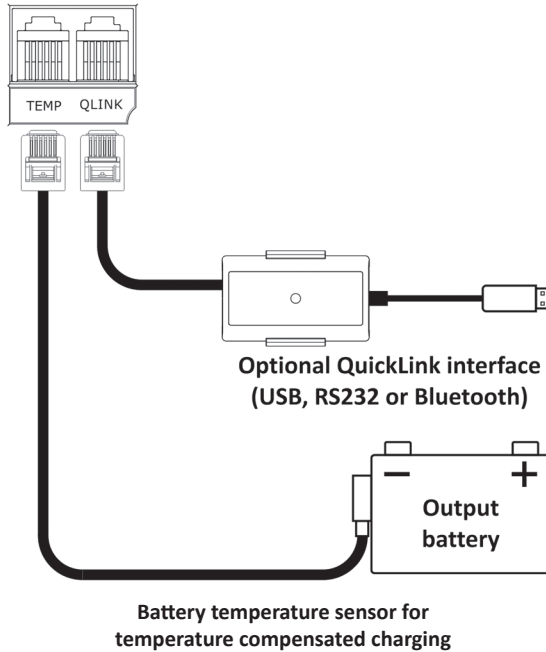
DIP switch 3 is reserved for future use (default off).

DIP switch 4 can be used to bypass the On/Off control input (see point 3 above). When this DIP switch is set to On (default setting), the On/Off control input is bypassed and the charger will always operate, independent of the status at the control input. When this DIP switch is set to Off, the charger is controlled by the On/Off control input. This setting is recommended for vehicle applications with a proper engine run signal.

 **CAUTION**

Invalid battery type settings can cause serious damage to your batteries and/or connected battery loads. Always consult your battery's documentation for the correct charge voltage settings.

⑤ The remaining connection options are shown below



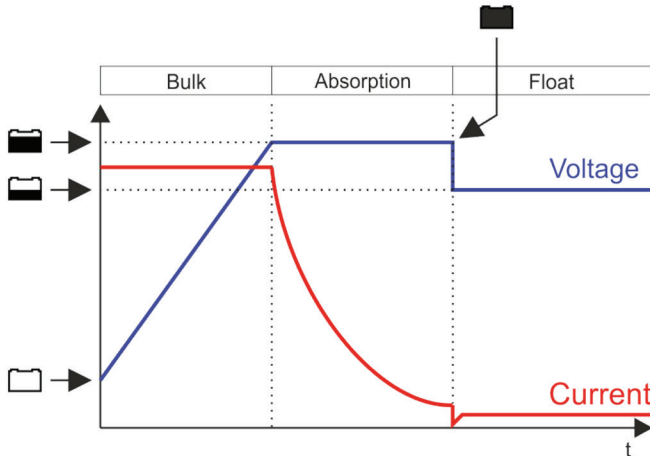
The optional QuickLink communication Kits allow the charger to be programmed and monitored using the Samlex Dashboard software on PC (via USB or RS232) or the Dashboard Mobile app on iOS and Android platforms (via Bluetooth).

Always connect the battery temperature sensor to the battery that is being charged (output battery). The charger automatically compensates the charge voltages against battery temperature. This means that the charge voltages are slightly increased at lower temperatures and decreased at higher temperatures (-30mV/°C at 12V chargers and -60mV/°C at 24V chargers). This way, overcharging is prevented which prolongs your battery's lifetime. When the LiFePo4 charge program is selected, the charge voltages are not compensated against temperature. However, the temperature sensor is still used to prevent charging the lithium battery when the temperature has dropped below 0°C.

3. GENERAL FUNCTIONALITY

3.1 The charging process

All selectable charge programs, perform a three stage IUoUo charging process comprising of a “Bulk”, an “Absorption”, and a “Float” stage. The image below visualizes the three stage charging process:



When charger is turned on, it will start in the Bulk stage. In this stage the charger delivers full output current and typically returns approximately 80% of charge back into the battery once the absorption voltage is reached. When this voltage has been reached, the Absorption stage will be entered. This stage will return the final 20% of charge to the battery. The output voltage is kept at a constant level and the charge current decreases as a function of the battery's state of charge. When the charge current has dropped below a certain value, the Float stage will be entered. For lithium batteries, more than 80% of charge has been returned to the battery already. So for this chemistry the Absorption stage will be relatively short.

In the Float stage the battery voltage will be held constant at a safe level for the battery. It will maintain the battery in optimal condition for as long as the battery remains connected to the activated charger. Connected battery loads will be directly powered by the charger up to the charger's maximum output current level.

3.2 Charger operation using the main On/Off control input


In order to activate the charger, a positive (high) signal must be applied to the main On/Off control input while DIP switch 4 must be in the Off position. In a vehicle application, this is typically the engine run signal. After a short delay of a few seconds, the charger will normally

start the charging process. There is however a second condition that must be met before the charger starts the charging process and this is the input voltage level. The input battery voltage must be above a certain level in order to allow the output battery to be charged. Additionally, this condition must also be met for a preset amount of time. Please see the table below showing all factory default voltage and time delay values that are stored inside the ELogic DC charger:

Parameter ¹⁾	Default value EL 12-12/50	Default value EL 12-24/30
Turn on input voltage	> 12.5V	> 12.5V
Delay	10 sec	10 sec
Turn off input voltage (slow)	< 12.4V	< 12.4V
Delay	3 min	3 min
Turn off input voltage (fast)	< 12.0V	< 12.0V
Delay	1 sec	1 sec


¹⁾ All parameters are configurable using the Samlex Dashboard and Dashboard Mobile apps.

As can be seen in the above table, there are two low input voltage turn off levels. The ‘slow’ off level is allowed to be exceeded for a longer time than the ‘fast’ off level. This results in a stable charge process while still avoiding a too deeply discharged input battery.

 CAUTION
If the main On/Off control input is connected to the ignition- instead of an engine running signal, while the turn off input voltage levels are set to relatively low values, please make sure to start the engine in a timely manner to avoid discharging the starter battery too much.

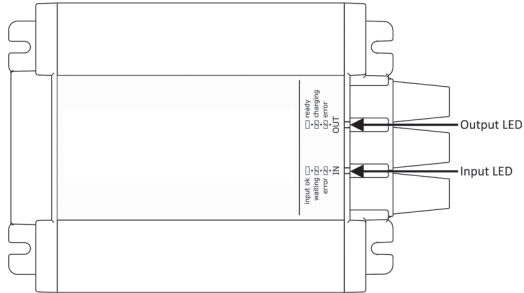
3.3 Charger operation without using the main On/Off control input

When there is no engine run signal available or when the charger must always remain activated, DIP switch 4 must be set to ON. In this mode however, the input voltage requirements as shown in the table of chapter 3.2 still applies. So the charger will only start charging when these requirements are met.

 CAUTION
Please be aware that in this always on mode, the charger will continue to draw a small current (< 35mA) from the input battery, even when the turn on input voltage condition has not been met. This could result in a discharged input battery if allowed for an extended amount of time.

3.4 LED indicators

The Elogic DC units are equipped with individual LEDs for the input- and the output side. Please see the image below for the location of these LEDs:



The table below explains all available LED conditions:

LED	Status	Explanation
Input LED	Off	Charger off
	Flashing orange	Input voltage too low or turn on delay not expired yet
	Continuous green	All input conditions are OK for charging
	Flashing red	Error (see LED error table below)
Output LED	Off	Charger off, or charging still blocked by input conditions not being met
	Flashing green	Charging in progress
	Continuous green	Charging finished (Float stage)
	Flashing red	Error (see LED error table below)

The LED error table below explains what error types are linked to what LED blinking sequences:

Input LED	Output LED	Error type
Flashing red (1 blink)		Input overvoltage
	Flashing red (1 blink)	Output overvoltage, Output undervoltage, battery temperature too low or too high
Flashing red (2 blinks)		Output overload / short circuit
Flashing red (3 blinks)		Charger high temperature

4. TROUBLESHOOTING GUIDELINE

Please see the table below if you experience any problems with the Elogic DC battery charger and/or the installation.

Problem	Possible cause	Remedy
Elogic DC is not working at all.	No input voltage.	Check wiring and input fuse.
	Input voltage is too low.	Check input voltage, adjust the input voltage settings, start engine.
	No positive signal on main On/Off control wire.	Check wiring, fuses and status of engine run signal.
	Positive signal on BMS input.	Check output battery BMS status.
	Very poor input battery condition.	Replace battery.
The battery is not being charged up to it's maximum capacity.	Incorrect absorption charge voltage setting.	Check the battery type selection for correct setting. Or adjust the absorption voltage.
	Incorrect charge current setting.	Make sure that the maximum output current setting is at maximum level (check if allowed by battery manufacturer).
	Too much voltage loss in battery cables and/or connections.	Make sure that the battery cables have a large enough diameter. Check if all DC connections are solidly made.
	Additional battery loads are consuming too much current during charging.	Turn-off or disconnect all battery loads.
Charge current is too low.	High ambient temperature.	Try to lower the ambient temperature around the charger.
	Charger is operating in the absorption charging stage.	Do nothing. The battery is almost fully charged and consumes less current by itself.

Charge voltage is too low.	The charge voltage is being compensated by the battery temperature sensor to protect the battery.	Do nothing or try to cool down the ambient temperature around the battery.
	Wrong battery type selected, or charge voltage needs to be adjusted.	Select the correct battery type or adjust the charge voltage in the setup menu.
	DC cables too thin.	Install larger DC cables. See the DC cable size table in chapter 2.3.
	Battery load current is higher than the charger's output current.	Reduce or remove the battery load.
LEDs blink red.	Error detected.	Check LED error table in chapter 3.4.

If none of the above remedies will help solving the problem you encounter, it's best to contact your local Samlex distributor for further help and/or possible repair of your Elogic DC unit. Do not disassemble the charger yourselves as this will void your warranty.


5. TECHNICAL SPECIFICATIONS

Parameter	EL 12-12/50	EL 12-24/30
Nominal input voltage	12Vdc	
Input voltage range	10.0 – 16.0Vdc	
Maximum input current	65A _{dc}	
Current consumption (inactive)	< 0.25mA	
Current consumption (noload/standby)	< 35mA	< 45mA
Nominal output voltage	12Vdc	24Vdc
Output voltage range	12.0 – 16.0Vdc	24.0 – 32.0Vdc
Maximum output current ¹⁾	50A	30A
Charge characteristic	IUoUo, intelligent 3-stage, temp. Compensated	
Supported battery types ²⁾	Flooded / Gel / AGM / LiFePO4	
Operating temperature range	-20°C ... +60°C	
Storage temperature range	-30°C ... +70°C	

Parameter	EL 12-12/50	EL 12-24/30
Cooling	Variable speed fan	
Communication port	Samlex QuickLink	
Temperature sensor port	Yes (sensor included)	
Engine run / activate input port	Yes (> 2.0Vdc = Active and < 1.0Vdc = Inactive)	
BMS input port	Yes (> 3.0Vdc = Standby and < 1.0Vdc = Active)	
Status output port	Yes (open drain, 32Vdc / 150mA max, five assignable status types)	
Protections	High/low input voltage, high temperature, output short circuit and reverse battery polarity (input + output)	
Indications	Input status, output (charge-) status, error	
Battery connections	3x M6 screw terminal	
Enclosure body size (HxWxD)	70 x 128 x 170mm	
Total weight	1.2kg	
Protection class	IP21	
Standards	EMC: 2014/30/EU, Low voltage directive: 2014/35/EU, RoHS: 2011/65/EU, Automotive: EN50498 („E“ pending)	

Note: the given specifications are subject to change without notice.

- 1) Maximum output current tolerance is +/-10%. Automatic output current derating at Tambient > 40°C.
- 2) Selectable by DIP switch. All standard charge voltages can also be modified by the Samlex Dashboard application.

	<p>Please act according to your local rules and do not dispose of your old products with your normal household waste. The correct disposal of your old product will help prevent potential negative consequences for the environment and human health.</p>
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6. WARRANTY CONDITIONS

Samlex Europe (Samlex) warrants this product to be free from defects in workmanship or materials for 24 months from the date of purchase. During this period Samlex will repair the defective product free of charge. Samlex is not responsible for any costs of the transport of this product.

This warranty is void if the product has suffered any physical damage or alteration, either internally or externally, and does not cover damage arising from improper use, or from use in an unsuitable environment.

This warranty will not apply where the product has been misused, neglected, improperly installed or repaired by anyone other than Samlex. Samlex is not responsible for any loss, damage or costs arising from improper use, use in an unsuitable environment, improper installing of the product and product malfunctioning.

Since Samlex cannot control the use and installation (according to local regulations) of their products, the customer is always responsible for the actual use of these products. Samlex products are not designed for use as critical components in life support devices or systems, that can potentially harm humans and/or the environment. The customer is always responsible when implementing Samlex products in these kind of applications. Samlex does not accept any responsibility for any violation of patents or other rights of third parties, resulting from the use of the Samlex product. Samlex keeps the right to change product specifications without previous notice.

Examples of improper use are:

- Too high AC input voltage applied
- Reverse connection of battery polarity
- Connecting wrong batteries (too high battery voltages)
- Mechanical stressed enclosure or internals due to harsh handling or incorrect packaging
- Contact with any liquids or oxidation caused by condensation

7. DECLARATION OF CONFORMITY

MANUFACTURER : Samlex Europe BV
ADDRESS : Aris van Broekweg 15
1507 BA Zaandam.
The Netherlands

Declares that the following products:

PRODUCT TYPE : Elogic DC to DC battery charger
MODELS : EL 12-12/50, EL 12-24/30

Conforms to the requirements of the following Directives of the European Union:

EMC Directive 2014/30/EU
Low voltage Directive 2014/35/EU
Automotive Directive 2004/108/EC
RoHS Directive 2011/65/EU

The above product is in conformity with the following harmonized standards:

EMC : EN55014-1, EN55014-2, EN 61000-4-2(3/4/5/6), EN50498
Safety : EN60335-1, EN60335-2-29



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