LOADCHAMP

intelligent charging technology // germany

7-STAGE AUTOMATIC

BATTERY CHARGER

MCU CONTROLLED & HIGH FREQENCY SWITCHMODE

Instruction Manual

Please read user manual carefully before use.

CE CB

1. WARNING

- Explosive gases may escape from the battery during charging. Prevent flames and sparks. Provide a degute ventilation.
- Before charging, read the instructions.
- For indoor use. Do not expose to rain.
- For charging 12 Volt or 24 Volt lead acid batteries ONLY.
- Disconnect the 110V/220-240V AC mains supply before making or breaking the connection to the battery.
- The battery charger must be plugged into an earthed socket-outlet.
- Connection to supply mains is to be in accordance with National wiring rules.
- Do not attempt to charge non-rechargeable batteries.
- Never charge a frozen battery.
- If the AC cord is damaged don ot attempt to use. It must be replaced or repaired by a qualified person.
- Corrosive substances may escape from the battery during charging and damage delicate surfaces. Store and charge in a suitable area.
- Ensure all vehicle accessories including lights, heaters, appliances etc are turned off prior to charging.
- This appliance is not intended for use by young children or infirm persons unless they have been adequately supervised by a responsible person to ensure that they can use the appliance safely.
- Young children should be supervised to ensure that they do not play with the appliance.

2. FEATURES

7-STAGE AUTOMATIC CHARGING

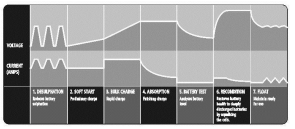
This is a fully automatic battery charger with 7 charge stages.

Automatic charging protects your battery from being overcharged. So you can leave the charger connected to the battery indefinitely.

7-stage charging is a very comprehensive and accurate charging process that gives your battery longer life and better performance compared to using traditional chargers.

7-stage chargers are suitable for most battery types including Calcium, Gel and AGM batteries. They may also help restore drained and sulphated batteries.

The 7 stages are:
Desulphation ; Soft Start; Bulk; Absorption; Battery Test; Recondition and Float.



Desulphation

The Desulphation stage may break down sulphation that occurs in batteries that have been left flat for extended periods of time, returning them back to full charge. sulphation occurs when lead-sulphate hardens and clogs up the battery cells.

Soft Start

A preliminary charge processes that gently introduces power to the battery. This protects the battery and increases battery life.

Bulk (Constant Current)

Bulk mode charges the battery at the maximum rate (constant current) putting a large amount of power into the battery in a short amount of time. This stage will charge the battery to approximately 80%, until the voltage reaches 14.4 volts for 12V charger or 28.8 volts for 24V charger.

Bulk mode for the charging cycle. The start phase continues until the battery's terminal voltage has risen above the set limit, at which point the charger switches to bulk charging. If the terminal voltage has not passed the voltage limit within the time limit, the charger switches to fault mode (lamp ⓫ solid) and discontinues the charging. If so, the battery is faulty or its capacity is too large.

Absorption (Constant Voltage)

The charge rate slows down so the battery can absorb more power and reach 100% charge. The voltage remains at a constant 14.4 volts for 12V charger or 28.8 volts for 24V charge while the current is gradually reduced until no more power can be added without over-charging the battery.

Battery Test

An automatic battery test is conducted immediately after the absorption stage. The test monitors the voltage for 90 seconds to determine if the charge was successful.

- 12V charger if the voltage is below 13.2 volts (fail), the charger will initiate the Recondition stage.
- 12V charger if the voltage is above 13.2 volts (pass), the charger will proceed to the final stage: Float.
- 24V charger if the voltage is below 26.4 volts (fail), the charger will initiate the Recondition stage.
- 24V charger if the voltage is above 26.4 volts (pass), the charger will proceed to the final stage: Float.

Recondition

The battery reconditioning function is initiated automatically in the case that the battery fails the battery test (stage 5). Failing the battery test indicates that the absorption stage was unable to fully charge the battery. The recondition mode will then begin to introduce a low constant current for a period of 4 hours. Then the charger will go into float charging mode.

This recondition stage can recover batteries from a deeply discharged state increasing performance and battery life.

RECOND- This mode is used to recover deep discharged flooded batteries where you could expect a stratified acid (high acid weight in the bottom, low on top). Check with battery manufacturer when in doubt. Use this mode with care, because the high voltage will cause some water loss. 16V/32V is normally no problem for electronics in 12V/24V system. Consult your supplier when in doubt. Life of light bulbs will be reduced at higher voltage. Try to disconnect light from the battery during this phase. Maximum effect and minimum risk for electronics is achieved by charging a disconnected battery.

Float

The Float stage maintains the battery at 100% charge without overcharging or damaging the battery. This means the charger can be left connected to the battery indefinitely.

The battery charger has an 7-step fully automatic charging cycle. the cycle is repeated in finitely. If the terminal voltage drops below a lower limit, the charger automatically goes back to the beginning of the charging curve.

3. SWITCHMODE TECHNOLOGY

Using the latest technology in battery chargers, switch mode chargers convert 110V/220-240V AC power to 12V/24V DC power using electronic components unlike traditional battery chargers that rely on heavy transformers. This allows the charger to be light weight and compact without sacrificing on performance.

4. PROTECTIVE FEATURES

POLARITY PROTECTION

Prevents the output leads from sparking due to accidental reverse connection or short circuit, making the charger safer to use around batteries.

OUTPUT SHORT PROTECTION

Short circuit connection of the clips: Check clips are not touching each other OR Check the clips are correctly connected to the battery.

NON BATTERY LINK PROTECTION

Bif battery charger connects with non battery load,it will go into protection state.

FAULTY BATTERY

Bulk charging has timed out and stopped after 24 hours. Battery is faulty and may need to be replaced.

OVER VOLTAGE PROTECTION

The 12V charger will automatically protection if the voltage is higher than 17.5V. The 24V charger will automatically protection if the voltage is higher than 35V.

OVER TEMPERATURE PROTECTION

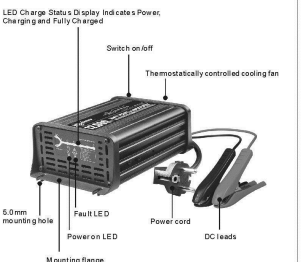
Internal temperature is above 65°C or +-5°C

COOLING FAN

The charger is fitted with a thermostatically controlled fan to cool onboard electronics and maintain charging performance. The cooling fan will engage automatically when there is a high load on the battery or there is sufficient heat build up.

5. PRODUCT OVERVIEW

The 7-stage automatic charging consists of the following components:



6. CHARGE STATUS INDICATOR

The CHARGING and FULLY CHARGED LEDs will illuminate and flash in various patterns to indicate the different stages of charging. See below for flash patterns.

	Red LED ●Power On	Yell LED ●Charging	Green LED ●Fully Charged	Red LED ●Fault
Power Off	—	—	—	—
Power On	□	—	—	—
Charging 1. Desulphation	□	☆	—	—
2. Soft Start	□	☆	—	—
3. Bulk	□	☆	—	—
4. Absorption	□	☆	—	—
5. Battery Test	□	☆	—	—
6. Recondition	□	☆	—	—
7. Float	□	☆	—	—
Fully Charged	□	—	□	—
Non Battery Link Protection	□	—	—	☆
Output Polarity Reverse Protection	□	—	—	☆
Output Short Protection	□	—	—	☆
Over Voltage Protection	□	—	—	☆
Faulty Battery	□	□(Bulk Led)	—	☆
Thermal Protection	□	—	□	□

Note: □ SOLID ☆: FLASH —: EXTINGUISH

POWER ON LED: Red LED illuminates (solid) when power on.
CHARGING LED: Yellow LED illuminates and flashes when 7-stage charging process.
FULLY CHARGED LED: Green LED illuminates (solid) when fully charged.
FAULT LED: When Red LED illuminates and flashes, it may be caused by:
1. Reverse connection between positive and negative of the DC lead.
2. Battery charger output short.
3. Non battery link.
4. 12V charger connects to a battery voltage higher than 17.5V or 24V charger connects to a battery voltage higher than 35V.
5. Charger's internal temperature is higher than 70°C
6. When Red LED flashes and Yellow LED illuminates (solid) means bulk charging has timed out and stopped after 24 hours.

8. SPECIFICATIONS

P/No.	LC 7.0	LC 12.0	LC 20.0
Charger type	7-Stage automatic	7-Stage automatic	7-Stage automatic
Input Voltage	220-240V~, 50/60Hz	110V~, 50/60Hz	
Input Power	215W	332W	554W
Output Voltage	12V DC	12V DC	12V DC
Output Current	7A	12A	20A
Minimum Start Voltage	2V	2V	2V
Current Fuse Rating	250 VAC, T3.15A	250 VAC, T3.15A	250 VAC, T5A
Current Fuse Rating			
Desulphation	Pulse charge up to 11V		
Soft Start	Half the rated set current up to 12V		
Bulk	7A (Upto 14.4V)	12A (Up to 14.4V)	20A (Up to 14.4V)
Absorption	Constant voltage until current drops to 1.05A	Constant voltage until current drops to 1.8A	Constant voltage until current drops to 3.0A
Battery Test	Monitors voltage for 90 seconds		
Recondition	Constant current (1.05A) for 4 hours limited to 16V	Constant current (1.8A) for 4 hours limited to 16V	Constant current (3.0A) for 4 hours limited to 16V
Float	13.8V also with pulse feature		
Efficiency	App.85%		
Thermal Protect	65°C +/-5°C		
Cooling Fan	Automatic temperature controlled		
Ambient temperature	-20°C to +50°C, output power is reduced automatically at high temperatures		
Over Voltage Protection	The 12V charger will automatically protection if the voltage is higher than 17.5V		
BATTERY RANGE			
Deep Cycle	12-150 Ah	20-240 Ah	40-400 Ah
Types of Batteries	Most types of lead acid batteries including Calcium, GEL and AGM		
Dimension(LxWxH)	195x115x62mm	195x115x62mm	215x115x62mm
Weight	1.05Kg	1.2Kg	1.3Kg

***Specifications are subjected to change without prior notice.**

9. SPECIFICATIONS

P/No.	LC 2410
Charger type	7-Stage automatic
Input Voltage	220-240V~, 50/60Hz 110V~, 50/60Hz
Input Power	547W
Output Voltage	24V DC
Output Current	10A
Minimum Start Voltage	4V
Current Fuse Rating	250 VAC, T5A
Current Fuse Rating	
Desulphation	Pulse charge up to 22V
Soft Start	Half the rated set current up to 24V
Bulk	10A (Up to 28.8V)
Absorption	Constant voltage until current drops to 1.5A
Battery Test	Monitors voltage for 90 seconds
Recondition	Constant current (1.5A) for 4 hours limited to 32V
Float	27.6V also with pulse feature
Efficiency	App.85%
Thermal Protect	65°C +/-5°C
Cooling Fan	Automatic temperature controlled
Ambient temperature	-20°C to +50°C, output power is reduced automatically at high temperatures
Over Voltage Protection	The 24V charger will automatically protection if the voltage is higher than 35V
BATTERY RANGE	
Deep Cycle	60-230 Ah
Types of Batteries	Most types of lead acid batteries including Calcium, GEL and AGM
Dimension(LxWxH)	215x115x62mm
Weight	1.3Kg

***Specifications are subjected to change without prior notice.**

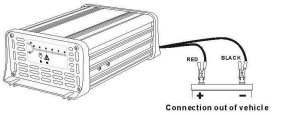
10. CHARGING INSTRUCTIONS

STEP 1 CHECK THE ELECTROLYTE LEVEL

Prior to charging the battery, remove the vent caps and check the electrolyte level (not required on sealed & maintenance free batteries). The electrolyte should be 6mm (1/4") above the battery's plates. If low, top up with distilled water to the correct level and refit the vent caps.

STEP 2A CONNECTION OUT OF THE VEHICLE

Connect the RED lead (battery clip) from the charger to the Positive (+) battery post.
Connect the BLACK lead (battery clip) from the charger to the Negative (-) battery post.



Connection out of vehicle

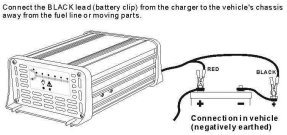
STEP 2B CONNECTION IN VEHICLE

Determine if the vehicle is Positively (+) or Negatively (-) earthed. Negatively earthed vehicles have a cable (usually black) from the Negative battery terminal to the vehicle's chassis.

11. Negatively earthed (most vehicles)

Connect the RED lead (battery clip) from the charger to the Positive (+) battery terminal.

Connect the BLACK lead (battery clip) from the charger to the vehicle's chassis away from the fuel line or moving parts.

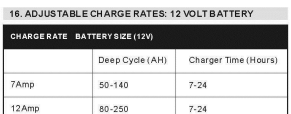


Connection in vehicle (negatively earthed)

12. Positively earthed

Connect the BLACK lead (battery clip) from the charger to the Negative (-) battery terminal.

Connect the RED lead (battery clip) from the charger to the vehicle's chassis away from the fuel line or moving parts.



Connection in vehicle (positively earthed)

13. CHASSIS EARTHING

The chassis earthing lug should be connected to an earthing point which will be depending on where the battery charger is installed. In a vehicle, connect the chassis ground lug to the chassis of the vehicle. In a boat, connect to the boat's grounding systems. In a fixed location, connect to earth.

STEP 3 CONNECT TO 110V/220-240V AC MAINS POWER

Connect the battery charger to the 110V/220-240V AC mains powered socket and turn on the mains power.

STEP 4 CHARGING

During the charge process, the CHARGING and FULLY CHARGED LED will flash various patterns. This is normal and indicates the various charge stages. Refer to "How can I know what stage the battery charger is in" in the FAQ section, page 16.
When the FULLY CHARGED LED remains on, this is known as the float stage and the charger can be left connected to the battery without over charging. If the POWER LED is flashing, there is fault; refer to "Fault Codes" explanation on page 14 of this manual.

STEP 5 DISCONNECTION

Ensure the 110V/220-240V AC mains switch is turned off and the charger is disconnected from the 110V/220-240V AC mains power.

Battery out of vehicle

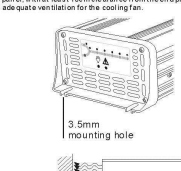
Remove the BLACK lead (battery clip) from the battery.
Remove the RED lead (battery clip) from battery.

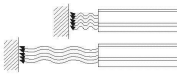
Battery in vehicle

Remove the chassis connection.
Remove the battery terminal connection.

14. MOUNTING INSTRUCTIONS

7-stage chargers are designed for indoor, out of weather use only. Ensure that both charger and battery are in a well-ventilated space during charging.
The battery charger end plates include a mounting flange for easy mounting. If permanently fixed the charger should be mounted to a suitable horizontal or vertical panel, with at least 10cm clearance from the end plates to provide adequate ventilation for the cooling fan.



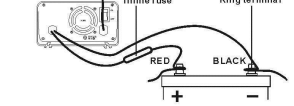


15. PERMANENT WIRING TO BATTERY

It is possible to hard wire the DC charging lead to the battery for permanent installations.
You will need 2 x ring terminals, an inline fuse holder and a fuse with a rating equal to or more than twice of the chargers output. (See below)

4A = 8 Amp fuse
5A = 10 Amp fuse
7A = 15 Amp fuse
10A = 20 Amp fuse
12A = 25 Amp fuse
15A = 30 Amp fuse
20A = 40 Amp fuse

Connection:
1. Cut off the supplied battery clips; ensure you leave sufficient cable to reach the battery terminals. (DO NOT extend the battery charger DC cables, as the added voltage drop will cause incorrect charging).
2. Fit a ring terminal to the BLACK Negative (-) wire.
3. Connect the inline fuse to the RED Positive (+) wire.
4. Connect a ring terminal to the other end of the inline fuse.
5. Connect the RED lead (with inline fuse and ring terminal) to the Positive (+) battery post.
6. Connect the BLACK lead (with ring terminal) to the Negative (-) battery post.
7. Fit the correctly rated fuse.



If the charger is used in a Permanent / Hard Wired application and the vehicle will not be used for some time, it is best to leave the charger connected to mains power (turned "On") so that it can maintain the battery fully charged.

Ensure any modification to the 110V/220-240V AC mains lead is carried out by a qualified person and that connection to supply mains is in accordance with National wiring rules.

16. ADJUSTABLE CHARGE RATES: 12 VOLT BATTERY

CHARGE RATE BATTERY SIZE (12V)		
	Deep Cycle (AH)	Charger Time (Hours)
7Amp	50-140	7-24
12Amp	80-250	7-24
20Amp	134-400	7-24

17. ADJUSTABLE CHARGE RATES: 24 VOLT BATTERY

CHARGE RATE BATTERY SIZE (24V)		
	Deep Cycle (AH)	Charger Time (Hours)
10Amp	60-230	7-24

18. FAULT CODES

There are error codes that may be displayed. These will be displayed in the following way:

Error Code	Charging LED	Fully Charged LED	Fault LED	Cause	Remedy
Polarity Reverse / Output Short	—	—	☆	Short circuit or reverse connection of the clips	Check clips are not touching each other OR Check the clips are correctly connected to the battery.
Non Battery Link	—	—	☆	Non battery link	Please choose the right battery type for connection.
Faulty Battery	□(Bulk Led)	—	☆	Bulk charging has time d out and stopped after 24 hours.	Battery is faulty and may need to be replaced.
Over Voltage	—	—	☆	The 12V battery voltage is above 17.5V. The 24V battery voltage is above 35V.	Disconnect the charger and check the battery voltage. This charger is suitable for 12V or 24V Batteries only.
Over Temperature	—	—	□	Internal temperature is above 65°C +/- 5°C	Turn off charger and allow to cool.

FREQUENTLY ASKED QUESTIONS

Q. How do I know if the battery is charged

A. The charger's FULLY CHARGED LED will illuminate (solid). Alternatively use a Battery. Hydrometer A reading of 1.250 or more in each cell indicates a fully charged battery.

Q. I have connected the charger properly but the "CHARGING LED" does not come on

A. In some cases batteries can be flattened to the point where they have very little or no voltage. This can occur if a small amount of power is used for a long time, for example a map reading light is left on for a week or more. 7-Stage chargers are designed to charge from as little as 12V charger 2.0 Volts and 24V charger 4.0 Volts. If the voltage is lower than 2.0 Volts and 4.0 Volts use a pair of booster cables to connect between two batteries to provide more than 2.0 Volts and 4.0 Volts to the battery being charged. The charger can then start to charge the battery and the booster cables can be removed.

Q. Can I use the charger as a power supply?

A. 7-Stage chargers are designed to only supply power to the battery clips when they are connected correctly to a battery. This is to prevent sparks during connection to the battery or if connected incorrectly by mistake. This safety feature prevents the charger from being used as a "Power Supply". No Voltage will be present at the clips until connected to the battery.

Q. How can I know what stage the battery charger is in?

A. Below are the conditions that are displayed by the LEDs for each of the charge stages.

	① Desulphation	② Soft Start	③ Bulk	④ Absorption	⑤ Battery Test	⑥ Recondition	⑦ Float	Fully Charged
Charging	☆	☆	☆	☆	☆	☆	☆	□

CAUTION

ALWAYS PLACE THE BATTERY CHARGER IN AN ENVIRONMENT WHICH IS:
A. WELL VENTILATED.
B. NOT EXPOSED TO DIRECT SUNLIGHT OR HEAT SOURCE.
C. OUT OF REACH FROM CHILDREN.
D. AWAY FROM WATER / MOISTURE, OIL OR GREASE.
E. AWAY FROM ANY FLAMMABLE SUBSTANCE.
F. SECURE NO RISK OF FALLING.