YUASA

by GS YUASA

YCX6 YCX12

YCX SMART BATTERY CHARGER & MAINTAINER

USER GUIDE

MANUEL DE L'UTILISATEUR / BEDIENUNGSANLEITUNG / GUIDA UTENTE / GUÍA DEL USUARIO / ANVÄNDARHANDBOK / РЪКОВОДСТВО ЗА УПОТРЕБА / KORISNIČKI PRIRUČNIK / NÁVOD K POUŽITÍ / BRUGERANVISNING / KASUTUSJUHEND / KÄYTTÖOPAS / ΕΓΧΕΙΡΙΔΙΟ ΧΡΗΣΗΣ / HASZNÁLATI UTASÍTÁS / NOTKUNARLEIÐBEININGAR / TREOIR D'ÚSÁIDEOIRÍ / LIETOŠANAS INSTRUKCIJA / NAUDOTOJO VADOVAS / MANWAL TAL-UTENT / GEBRUIKERSHANDLEIDING / BRUKERVEILEDNING / PODRĘCZNIK UŻYTKOWNIKA / GUIA DE UTILIZADOR / MANUAL DE UTILIZARE / РУКОВОДСТВО ПОЛЬЗОВАТЕЛЯ / PRÍRUČKA POUŽÍVATEĽA / NAVODILA ZA UPORABO / KULLANIM KILAVUZU

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www.yuasa.com

GS Yuasa Battery Sales UK Ltd.
Unit 8, Ignition Park, Swindon, Wiltshire, SN3 5FB, United Kingdom
+44 (0) 1793 833555
info@gs-yuasa.uk

GS Yuasa Battery France S.A.S.
107 rue Santoyon, ZAC des Chesnes Nord, CS 90880,
38297 Saint Quentin Fallavier Cedex, France
+33 (0) 4 74 95 90 90
info@gs-yuasa.fr

GS Yuasa Battery Germany GmbH.
Europark Fichtenhain B 17, 47807 Krefeld, Germany
+49 (0) 2151 82095 00
info@gs-yuasa.de

GS Yuasa Battery Iberia S.A.
C/ Alcañiz, 23 2ª Planta, 28042 Madrid, Spain
+34 91 748 98 19
info@gs-yuasa.es

GS Yuasa Battery Italy srl.
Via Gallarate, 94, 20151 Milano MI, Italy
+39 0238009108
info@gs-yuasa.it

GS Yuasa Battery Nordic.
Sjöåkravägen 28, 56431 Bankeryd, Sweden
+46 (0)36 47110
info@gs-yuasa.se

English

Safety warning

READ ALL SAFETY INFORMATION AND INSTRUCTIONS BEFORE USING THIS PRODUCT. Failure to follow these correctly may result in ELECTRIC SHOCK, EXPLOSION, FIRE, INJURY, DEATH or PROPERTY DAMAGE.

- Designed to charge 12V conventional lead acid batteries (WET, MF, SMF, CaCa, EFB, AGM and GEL) and compatible lithium (lithium-ion and LiFePO4) batteries only.
- Always refer to your battery manufacturer's recommendations before charging. (Some lithium-ion and LiFePO4 batteries are not suitable for charging).
- For suitable lithium types, ensure the battery is compatible with a 14.5V charge Voltage.
- Do not charge a lithium battery using lead acid settings or a lead acid battery on a lithium setting.
- Do not charge dry-cell or non-rechargeable batteries.
- Working in the vicinity of a lead acid battery is hazardous.
- Ensure adequate ventilation as gas generated during charging is potentially explosive if allowed to accumulate in an enclosed area.
- Never smoke or allow flames or sparks in the vicinity of the charger or battery.
- Do not block battery valve or vent ports.
- Never charge a frozen battery.
- Avoid outdoor use and exposure to liquids.
- Only use accessories supplied with or manufactured for this charger by Yuasa.
- Unplug from mains power before maintenance cleaning.
- Turn off mains power before making or breaking connections to the battery.
- Avoid use with an extension cord.
- Do not operate if dropped or damaged in any way.
- Do not use if any cables are damaged.
- Do not disassemble the charger.
- Not to be used by children.
- Remove jewellery or personal metal items before handling the charger or battery.

The charger's power supply mode is designed for batteries only. Not for any other application.

- When using power supply mode, do not allow reverse polarity connection to battery terminals.

Usage instructions

Connecting the charger to your battery

Always connect your charger to the battery before connecting to mains power.

If the battery is out of the vehicle:
Connect the red lead from the charger to the positive (+) battery terminal.
Connect the black lead from the charger to the negative (-) battery terminal.
If battery is in the vehicle:

The below is a guide, please consult your vehicle's owner manual for information and procedures on your specific vehicle.

Determine if the vehicle is positively or negatively earthed.

If negatively earthed (most common) - First connect the red lead from the charger to the positive (+) battery terminal and then connect the black lead from the charger lead to the vehicle's chassis and far away from the fuel line. (Only if access to negative terminal is not possible).

If positively earthed - First connect the black lead from the charger to the negative (-) battery terminal and then connect the red lead from the charger to the vehicle's chassis and far away from the fuel line. (Only if access to positive terminal is not possible).

Once connected to the battery, connect the charger to mains power.

The charger will automatically start when mains power is connected and switched on.

(Note: If the LED fault indicator illuminates red, please check your connections as it is likely that the positive and negative leads are reversed. Refer to *Troubleshooting* for further information).

Disconnecting the battery charger from battery

If the battery is out of the vehicle:
Switch OFF and remove the mains power socket from the outlet and wait for a minimum of five minutes before disconnecting the charging leads.
Remove the black lead followed by the red lead.
Check electrolyte levels if possible. (They may need topping up with distilled water after charging).

If the battery is in the vehicle:
Switch OFF and remove the mains power socket from the outlet and wait for a minimum of five minutes before disconnecting the charging leads.
Remove the black lead from the battery or vehicle chassis.
Remove the lead from the vehicle's chassis.
Remove the lead from the battery.
Check electrolyte levels if possible. (They may need topping up with distilled water after charging).

Dual clamp to eyelet conversion

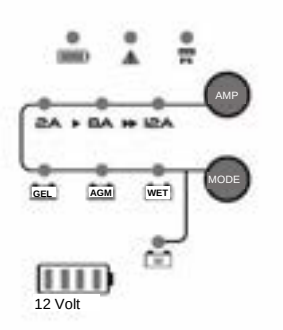
The charger is supplied with clamps that feature integrated eyelets. To convert the clamp into an eyelet, simply remove the retaining screw and washer. To reattach the clamps, follow this process in reverse (image 1).

1

2

The eyelets can be used for permanent connection to a battery whilst it is fitted in a vehicle. They should be securely tucked out of the way and connected to the charger when using the connection plug when charging is required (image 2).

Selecting the correct MODE for your battery type



Press the MODE button to select the correct charging mode for your battery type. The charger will automatically remember the previous setting.

When Li mode is selected, the charger will detect that it is connected to a lithium-ion or LifePO4 battery.

If the battery's BMS protection has been triggered due to low Voltage, the charger will automatically compensate for this to enable the battery to be charged.

WET	**MF, SMF, EFB, CaCa, CaSb, SbSb**
AGM	**AGM**
GEL	**GEL**
Li	**Lithium-ion, LifePO4**

Selecting the correct charging rate

To select the correct charging rate (A) consult the Ah rating displayed on the label of the battery.

Find this Ah rating in the table below and use the AMP button on the charger to select the suggested A rating. Where two A ratings are available, the higher option will result in a faster charge time.

	YCX6			**YCX12**		
Charge rate	1A	4A	6A	2A	8A	12A
Charging	3-20Ah	12-80Ah	18-120Ah	2-60Ah	24-160Ah	36-240Ah
Maintenance	Up to 100Ah	Up to 120Ah	Up to 180Ah	Up to 120Ah	Up to 240Ah	Up to 360Ah

Selecting power supply mode

Power supply mode is designed for recovery of overdischarged batteries which would be too low for the smart charger function to recognise. We do not recommend using power supply mode for any other application.

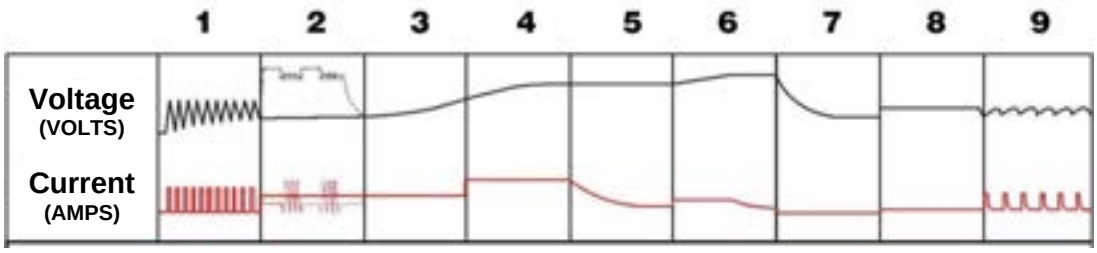
- Do not use as a stand-alone power supply for other 12V devices.
- Do not use as a vehicle memory maintainer (risk of damage to pyrotechnic components and vehicle damage).

Press and hold the MODE button for three seconds to select power supply mode.
When selected, press and hold the MODE button for three seconds again to turn off power supply mode.

After selecting power supply mode, do not allow reverse polarity connection to battery terminals as it will cause permanent damage to the charger.

	ON	Power supply mode selected

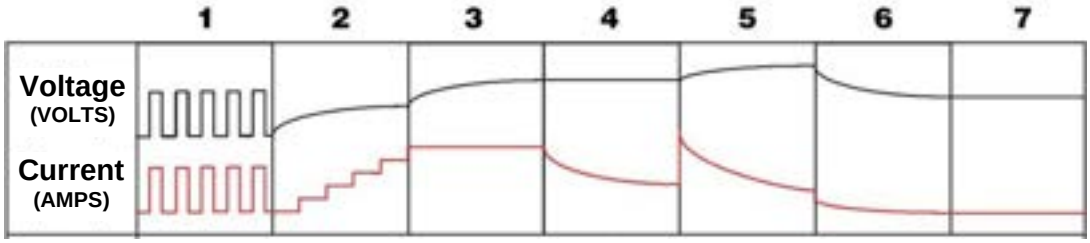
Lead acid charging and maintaining process (WET, AGM, GEL)



1) **Qualification -** When the charger is switched on, it checks the battery condition to determine whether it needs reconditioning. During this process, it tests the internal impedance and initial voltage to determine how much charge current, if any, it will accept.
2) **Rejuvenation -** If the initial qualification detected that the battery was in a poor condition, the patented rejuvenation process will automatically begin. During this process, a high voltage equalising charge and peak pulse reconditioning charge are used to repair the battery if possible. Lead-sulphate crystal build-up on the battery's internal plates will be broken down and balance the concentration of acid across the battery cells. The equalisation stage operates at 16 Volts.
   If the battery will not accept a charge current of more than 0.1 Amps after 24 hours, the charger will not proceed to the next stage and the fault LED will illuminate whilst the 25%, 50%, 75% and 100% LEDs flash sequentially. If this occurs, the battery is no longer serviceable.
3) **Soft start -** This stage gently charges the battery using a reduced output until it reaches 11 Volts. If this doesn't happen within six hours, the safety timer protection will stop the unit from charging and the fault LED will illuminate whilst the 25% LED flashes. This means that the battery is no longer serviceable.
4) **Bulk charge -** The bulk charge stage uses the maximum selected charge output until the battery voltage reaches 14.2V (GEL) / 14.5V (WET) / 14.8V (AGM). If this does not happen within 20 hours, the safety timer protection will stop the unit from charging and the fault LED, 50% LED or 75% LED will flash depending on the battery voltage. This happens to stop thermal runaway and means that the battery is either unserviceable or nearing the end of its service life.
5) **Absorption -** This stage uses a constant voltage while reducing the charging current to ensure the battery receives a full charge without overcharging.
6) **Equalisation -** The equalisation stage carefully overcharges the battery to restore it to its full capacity. When the charger is in WET mode this occurs on every charge. When in AGM or GEL mode it only occurs if the battery's voltage was below 11 Volts when the charging process was started.
7) **Analysis -** The analysis stage checks the condition of the battery after steps one to six are completed and the battery is fully charged. If the voltage drops too quickly during analysis, this means the battery is probably faulty and should be replaced, this will be indicated by the green full LED flashing.
8) **Float -** The charger can be connected and switched on continuously to ensure your battery is well-maintained and kept fully charged. Float mode will maintain the battery at a constant 13.6 Volts. The battery is continuously monitored during this stage.
9) **Maintenance -** When the charger is connected for a long period of time, the unit will constantly monitor the battery and apply a special pulse charge at regular intervals.

Every 21 days the charging and maintaining process detailed above will be repeated. Both actions help to keep the battery fully charged and in optimal condition.

Lithium-ion charging and maintaining process (lithium-ion and LiFePO4)



1) **Activation -** The charger sends an electronic signal to turn on the lithium battery management system (BMS). The charger will then detect the battery voltage and commence charging if safe to do so. If the BMS cannot be activated, the charging cycle will not start.
2) **Soft Start -** Gently charges the battery using a reduced charge output until the battery voltage reaches 11V. If the battery voltage doesn't reach 11V within six hours, the safety timer protection will stop the unit from charging. This safety feature prevents charging of a battery that is otherwise damaged or has an internal cell short circuit.
3) **Bulk Charge -** Uses the maximum possible current output within the charging rate (AMP) selected by the user until the battery voltage reaches 14V. If the battery voltage doesn't reach 14V within 20 hours, the safety timer protection will stop the unit from charging. This safety feature prevents charging of a battery that is otherwise damaged or has an internal cell short circuit.

4) **Absorption 1 -** Uses a constant voltage of 14V while reducing the charging output current to ensure the battery is charged to approximately 90% capacity. This ensures it is not overcharged. If the charging time in this stage exceeds 20 hours, or the charger detects thermal issues or low charge acceptance, the charger will move to the Absorption 2 stage.
5) **Absorption 2 -** Steps up the constant voltage to 14.5V while reducing the charging output current. This brings the battery up to fully charged without overcharging. If the charging time in this stage exceeds 20 hours, or the charger detects thermal issues or low charge acceptance, the charger will move to the Full stage.
6) **Full -** Once the battery is fully charged, the green full LED will illuminate. The charger output will stop and it will enter Analysis mode.
7) **Analysis -** During analysis, the charger will monitor the battery level and reactivate the charging output if its voltage drops below 12.9V. The charger will remain in this mode whilst connected to ensure the battery is fully charged and ready to use when in storage.

LED warning indicators

					LED			
Description	**25%**	**50%**	**75%**	**100%**		**MODE**	**AMP**	
ECO Mode - energy saving (no battery connected)	X	X	X	X	X	F	F	X
AC Power on - no battery connected / detected	X	X	X	X	X	✓	✓	X
Auto Rejuvenation mode	**Sequential Flash**				X	✓	✓	X
Soft Start Charging	F	X	X	X	X	✓	✓	X
Bulk Charging <13.0V	✓	F	X	X	X	✓	✓	X
Bulk Charging >13.0V	✓	✓	F	X	X	✓	✓	X
Absorption Charging	✓	✓	✓	F	X	✓	✓	X
Equalisation Charging	✓	✓	✓	F	X	✓	✓	X
Float Charge (lead acid) Fully Charged (lithium only)	✓	✓	✓	✓	✓	✓	✓	X
Float Analysis (lead acid sulphation check failed)	✓	✓	✓	✓	F	✓	✓	X
Auto Rejuvenation - Failed	**Sequential Flash**				X	✓	✓	✓
Soft Start Charge - Time Out	F	✓	F	X	X	✓	✓	F
Bulk Charge - Time Out <13.0V	✓	F	X	X	X	✓	✓	F
Bulk Charge - Time Out >13.0V	✓	✓	F	X	X	✓	✓	F
Reverse Polarity / Short Circuit	X	X	X	X	X	✓	✓	✓
Sulphation / Shorted cell fail <11.8V	F	F	F	F	X	✓	✓	✓
Over Temperature protection	X	X	X	X	X	✓	✓	F
Power Supply Mode overload <9.0V	X	X	X	X	X	✓	✓	B

✓	ON
X	OFF
F	Flashing
B	Blinking

Troubleshooting

Types of problems	Indication	Possible causes	Suggested solution
Charger does not work.	No indicator lights on.	No mains power.	Check mains connections and make sure power is switched ON.

Charger has no DC output.	LED fault indicator is ON.	Output is short circuited. Reverse polarity connection to battery.	Check DC connection between charger and battery and make sure they are not short circuited. Check that the crocodile clips haven't fallen off the battery. Check that the crocodile clips / eyelets are connected to the correct polarity.
No charging current.	LED fault indicator is ON and charging percentage LED bar flashing or blinking in sequence.	Battery is severely sulphated. Battery has a damaged cell.	Check the battery condition, age etc. Battery may need replacement. Check the battery capacity.
No charging current.	LED fault indicator is fast flashing.	Overheat protection mode.	Move battery and charger to cooler environment. Check the battery charger.
Full / float light won't come on or full LED flashing.	LED fault indicator is flashing. The charging percentage LED bar is flashing or ON.	Battery capacity too large for the battery charge setting and it has timed out or battery is slightly sulphated.	Check the charger specification matches the battery capacity. Battery cannot be charged and must be replaced. Charge rate selected might be too low. Switch charger off and on and try a higher charge rate setting, providing it doesn't exceed the maximum charge limit for your battery.

Maintenance

The charger is maintenance free. If the power cord is damaged, the charger must not be used. The case should be cleaned occasionally. The charger should be disconnected from the power while cleaning.

Technical specifications and features

Model number	YCX6	YCX12
Type	Smart	Smart
Input Voltage range	100-240Vac	200-240Vac
Input frequency	50/60Hz	50/60Hz
Output	1/ 4/ 6A @ 12V	2/ 8/ 12A @ 12V
Start Voltage	2V	2V
Battery capacity	3-120Ah	2-240Ah
Charge Voltage	LFP - 14.5V	LFP - 14.5V
	GEL - 14.2V	GEL - 14.2V
	AGM - 14.8V	AGM - 14.8V
	WET - 14.5V	WET - 14.5V
Float Voltage	13.6V	13.6V
Size (L x W x H) mm	185 x 87 x 50	220 x 100 x 58
Weight	870g	1.29kg
Approvals	CE, EMC, UKCA, RoHS	CE, EMC, UKCA, RoHS
Operating temperature	-10 to 40°C	-10 to 40°C
Storage temperature	-25 to 85°C	-25 to 85°C
Operating humidity range	90% RH max	90% RH max
IP rating	IP44	IP44

Integrated cooling fan
When the highest charge output is selected the charger's integrated fan is automatically activated for active cooling. If required, the fan can be turned off by switching to a lower Amp output.

Automatic battery diagnosis and charging
The charger will assess the battery's condition. Then, depending on the result, will automatically select either the rejuvenation or charging phase as required.

Enhanced battery rejuvenation phase – patented battery rejuvenation technology
The charger features fully automatic rejuvenation technology, which includes high Voltage equalisation and peak pulse reconditioning to repair heavily sulphated batteries. This is automatically triggered if the battery's internal impedance indicates it is required.

Charge & maintain – automatic maintenance
Once a battery is fully charged, the charger automatically switches to an ongoing maintenance mode. This monitors the battery Voltage and maintains it at an optimum state of charge. The charger can be left unattended whilst connected to a battery and is ideal for seasonal battery storage.

Short circuit and reverse polarity protection
The charger is designed to protect against short circuits or reverse polarity connection. If detected it will automatically turn off to prevent damage.

Never overcharge your battery
The charger will protect against and prevent overcharging.

Heavy duty cables and dual clamp
Supplied with robust cables for longevity. Innovative design featuring clamp and eyelets means only one cable set is required.

Temperature and safety protection
Internal overheat, timer, reverse polarity, and short circuit protection.

Eco mode
This charger has a built in ultra-low power consumption circuit. If mains power is connected and the battery is disconnected, after 30 seconds the charger will automatically go into eco mode. During this mode, the power drawn is less than 0.36W which totals 0.01kWh per day.

If mains power is connected and the battery is connected, once the battery is fully charged and during the maintenance stage, the total power consumption is around 0.03kWh per day.

The power LED light will flash green to indicate eco mode is on.

Disposal and warranty information

WEEE marking (disposal)

All GS Yuasa products shipped from 13 August 2005 that are subject to the WEEE directive are compliant with the WEEE marking requirement. Such products are marked with the WEEE symbol (shown right) in accordance with European Standard EN50419.

All old electrical equipment can be recycled. Please do not throw any electrical equipment ‘including those marked with this symbol’ in your bin.

Customer information

The symbol on the product or its packaging indicates that this product must not be disposed of with your other household waste. Instead, it is your responsibility to dispose of your waste equipment by handing it over to a designated collection point for the recycling of waste electrical and electronic equipment. For more information about where you can drop off your waste for recycling, please contact your local authority, or where you purchased your product.

Warranty

This product is guaranteed against premature failure due to manufacturing or material defects for a period of three years from the date of purchase. Within the warranty period, the customer must contact the authorised supplier or retailer where the product was purchased with proof of purchase in order to process the warranty claim.

Resellers may underwrite and offer extended warranties to end-users. Please consult your place of purchase for further details.

The warranty period commences on the date shown on the proof of purchase. The warranty is valid only for the purchaser of the battery charger and is not transferable.

If a replacement battery charger is offered, the warranty period runs from the date of purchase of the original battery charger.