

HIGH FREQUENCY BATTERY CHARGERS

STAR 70
STAR 80
STAR 90
STAR 100
STAR 110
STAR 120
STAR 140

in: 230V

out: 12V-24V

Rev.0 A.A. 30/06/2014

cod.43301

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Tipo modello
N° matricola
Codice

**This manual has to be preserved for all through life of the
gen set to which ago reference**



Thank you for having chosen a product **mase**.

As a leading generator manufacturer, **mase** Generators offers a wide range of generators with an output from 1 KVA portable generators to 1600 KVA units for special applications.

Founded in 1970, the Cesena-based company extends over a area of 16,000 square meters, including a 9,000 sq. mtr. manufacturing facility.

Mase Generators began as a company producing 500 Watt, light and compact portable generators. These generators made the Mase Generators name well known throughout the world. **mase** Generators is a leader in high quality, reliable products, and innovative research performed by Research and Development Department.

The generator you have purchased is the fruit of years of experience in the sector and for the modern conception, the strong sizing, the materials employees, the continuous updatings, constitutes an effective answer to the operators' demands of the sector.

This Manual instructions will furnish you useful information and precious suggestions so you can fully exploit all the possibilities that the generators offers you.

If any part of the manual resulted incomprehensible, please contact us.

In to renew our thanks we cordially greet you.



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Technical data, informations, layouts of the texts and graphic preparations: edited by the Technical Office
mase Generators.

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Before connecting the battery charger to the mains and to the battery, **READ THE FOLLOWING INSTRUCTIONS CAREFULLY.**



WARNING! This is an **EMC complying product** in class A+B as defined by the CEI EN 61000-6-2, CEI EN 61000-6-3 and CEI EN 61000-6-4 regulations, in other words both for use in **RESIDENTIAL ENVIRONMENTS** and in **INDUSTRIAL ENVIRONMENTS**

1) USE AND OPERATION

In order to use the battery charger, safety norms contained in laws and regulations and provisions issued by local authorities must be complied with.

“User” obligations : as per these operating instructions, the “user” is any natural or legal person who directly uses **STAR** charging devices or whomsoever uses them on behalf of the aforementioned person. Under special circumstances, for example, leasing, rental, the “user” is the person who, as per the agreements stipulated between the owner and the user of the **STAR** charging devices, assumes the following obligations.

The “user” shall be responsible for the installation site of the device. He shall check whether particularly sensitive equipment is disturbed by the influence of the battery charger. The installation site shall be chosen so that usage (a high direct current produces magnetic interference) does not affect the operation of electromagnetic devices and magnetic data carriers (for example pace makers, monitors, magnetic disks and diskettes, magnetic tapes, watches etc.).

The “user” shall ensure that the use of **STAR** charging devices complies with regulations in force and that any action which could endanger the life and health of the user or of third parties is prevented, as well as the prevention of damage to property.

The “user” shall ensure that users and operators have read and understood these instructions and that they comply with accident-prevention rules, technical safety rules, and use and maintenance directives.

2) INSTALLATION AND SAFETY WARNINGS

Before connecting the battery charger to the mains and to the battery, **READ THE FOLLOWING INSTRUCTIONS CAREFULLY:**

• **IN ORDER FOR THE BATTERY CHARGER TO OPERATE CORRECTLY AND PERFORM AT ITS BEST IT MUST BE INSTALLED ON A WALL THE RIGHT WAY AND FIXED WITH RAWLPLUGS USING THE LOOPS PROVIDED; ENSURE THE VENTILATION SLITS ARE NOT OBSTRUCTED.**

- Only specialised, authorised personnel shall be allowed to carry out work requiring the battery charger to be opened.
- Before starting-up the battery charger check insulation on the mains cable and battery connection connectors.
- Only skilled personnel should intervene on electrical equipment.
- Disconnect from mains before connecting or disconnecting the battery.
- **WARNING !!** Charging batteries produce explosive gas, it is therefore strictly forbidden to smoke in the vicinity; naked flames and/or sparks and proximity to other equipment which could endanger people or property are to be prevented.
- This battery charger contains electrical components which can produce voltaic arcs and sparks, therefore if it is used in confined spaces, it must be installed in a suitable location; in any case the standard battery charger (IP 20) must be used indoors, in well-ventilated spaces, which are not exposed to rain and/or water splashes and be positioned on solid, level flooring, in particular dusty areas or areas where water, heat and humidity originate are to be avoided. Furthermore, the battery charger must not be positioned on support structures and/or shelves made of wood or other flammable material, materials must not be stocked in the vicinity of the battery charger and no kind of object or container for liquids must be placed on the cover.
- In order to prevent risk of electrocution, the battery charger **must be connected to an earthed socket**, furthermore the socket which the battery charger is connected to must be proportionate in power to the charger and be protected by an appropriate compliant electrical device (fuse or automatic cut-out switch). In order to obtain sufficient selectivity, the protection must have a calibration at least 10% higher than the power absorption of the device, furthermore the device must be protected from excessive high contact voltage in compliance with Local Authority provisions.
- We recommend using appropriate bipolar connectors.
- The use of extension leads to lengthen existing electrical connections must be avoided at all costs.
- The **STAR** charging device needs no special maintenance, apart from regular cleaning procedures, to be carried out periodically according to the type of working environment. Before starting to clean the device, the mains supply cable and battery cables must be unplugged.

GB 3) TECHNICAL FEATURES

12V Model	Voltage (V)	Output (A)	Battery range (5 Hr Rate)		Weight (kg)
			8-9 hours charging time	10-12 hours charging time	
S <i>STAR 12/70</i>	12	50+10+10	275 - 325	370 - 450	6,80
S <i>STAR 12/80</i>	12	60+10+10	300 - 360	450 - 360	13,50
S <i>STAR 12/90</i>	12	70+10+10	350 - 420	520 - 620	13,50
S <i>STAR 12/100</i>	12	80+10+10	400 - 480	590 - 705	13,50
S <i>STAR 12/110</i>	12	90+10+10	450 - 540	650 - 820	13,50
S <i>STAR 12/120</i>	12	100+10+10	500 - 600	720 - 910	13,50
S <i>STAR 12/140</i>	12	120+10+10	600 - 720	860 - 1100	13,50

24V Model	Voltage (V)	Output (A)	Battery range (5 Hr Rate)		Weight (kg)
			8-9 hours charging time	10-12 hours charging time	
S <i>STAR 24/70</i>	24	50+10+10	275 - 325	370 - 450	6,80
S <i>STAR 24/80</i>	24	60+10+10	300 - 360	450 - 360	13,50
S <i>STAR 24/90</i>	24	70+10+10	350 - 420	520 - 620	13,50
S <i>STAR 24/100</i>	24	80+10+10	400 - 480	590 - 705	13,50
S <i>STAR 24/110</i>	24	90+10+10	450 - 540	650 - 820	13,50
S <i>STAR 24/120</i>	24	100+10+10	500 - 600	720 - 910	13,50
S <i>STAR 24/140</i>	24	120+10+10	600 - 720	860 - 1100	13,50

4) CONNECT TO MAINS

It's absolutely necessary to connect to an electrical outlet adequate to the charger power, checking the data information printed on the technical label.



Perform wiring connection as shown on following picture:

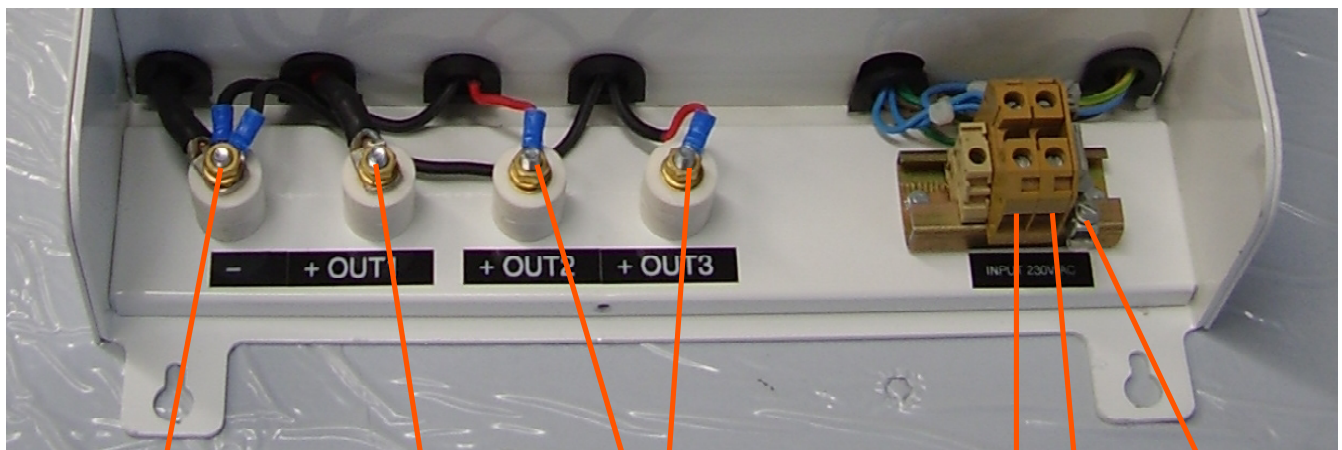
5) CONNECT TO BATTERY PACK

It is recommended to use bipolar connectors in accordance with actual rules without possibility of polarity reverse on the battery; check the proper connection of cables on contacts connector.

Only skilled technician can do this operation.

Connect as shown on following picture:

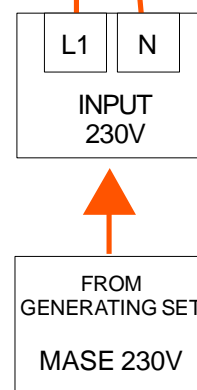
OUT1, OUT2, OUT3 indicate independent outputs, which if necessary can be parallelate to increase maximum output current.



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MAIN OUTPUT
50A - STAR 70
60A - STAR 80
70A - STAR 90
80A - STAR 100
90A - STAR 110
100A - STAR 120
120A - STAR 140

SECONDARY OUTPUTS
OUTPUT 10A



6) VISUAL SIGNALS



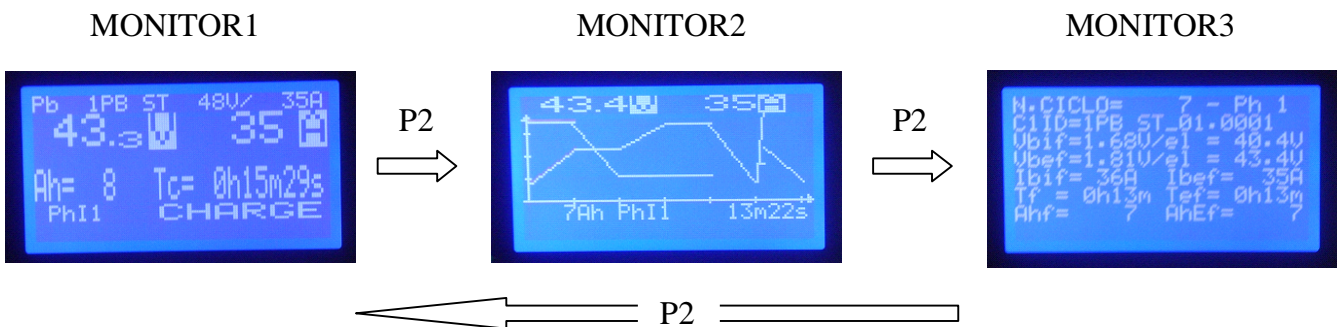
State of 4 Leds (ref.1) during different functioning mode of battery charger.

REF	DESCRIPTION	DL4 LED (green)	DL3 LED (yellow)	DL2 LED (green)	DL1 LED (red)	DISPLAY
S1	Only supply from battery	OFF	OFF	OFF	OFF	OFF
S2	Only supply from mains	OFF	OFF	OFF	OFF	OFF
S3	Both supply from battery and mains	ON	OFF	OFF	OFF	ON
S4	Autostart running	BL	BL	BL	BL	ON
F1	Phase 1 - Initial charge CI	BL	OFF	OFF	OFF	ON
F2-F7	Phase 2 - Phase 7	BL	ON	OFF	OFF	ON
F8	Pause for equalization	ON	ON	ON	OFF	ON
EQU ON	Charge for equalization ON (running)	BL	BL	ON	OFF	ON
EQU OFF	Charge for equalization OFF (pause)	ON	ON	ON	OFF	ON
M	Maintenance	BL	BL	ON	OFF	ON
END	Charge terminated	ON	ON	ON	OFF	ON

OFF = led turned off ON=led turned on BL= led blinking (T=1sec)

Visual signal on Display (ref.2):

During charging, the battery charger offers 3 monitor menus, which you can move between by pressing the P2 button, and whose detailed meaning was previously illustrated

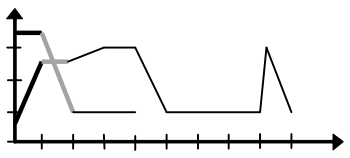


Below is a summary of the information given respectively on the 3 MONITOR displays.

MONITOR1

LINE	EXAMPLE	DESCRIPTION
(1)	Pb 1Pb ST 48V /35 ^a	Battery Technology, Type of Curve, Battery Charger Rating
(2)	43,3 V 35 ^a	Battery voltage and current
(3)	Ah= 8 Tc= 0h 15m 29s	Ah charged, Charging Time in hours, min, sec
(4)	PhI1 CHARGE	Current charging phase, battery charger STATUS
(5)	-- Messages	(e.g. phase = auto start A0, Status= BATTERY NOT CONNECTED)

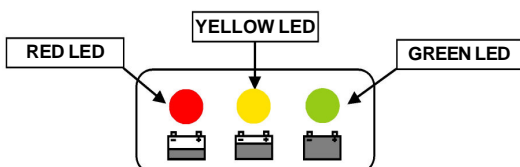
MONITOR2




LINE	EXAMPLE	DESCRIPTION
(1)	43,3V 35 ^a	Battery Voltage and Current Supplied
(2)		Active charge profile with indication : <ul style="list-style-type: none"> - Phases complete (thick line) - Phase in progress (flashing line) - Phases to execute (thin line)
(3)	7Ah PhI1 13m22s	Ah charged, Charging time in hours, min, sec
(4)	-- Message	Possible fault or status messages


MONITOR3


LINE	EXAMPLE	DESCRIPTION
(1)	N.CYCLE= 7 - Ph 1	Number of charge cycle and current charge phase E.g. : charge cycle 5 and Phase 3
(2)	ClID=1PB ST_01.0001	Charging curve unique identification
(3)	Vbif=1.68V/e1 = 40.4V	Battery voltage at start of phase (Vbif) expressed first as element voltage (V/e1), then as absolute voltage (V)
(4)	Vbef=1.81V/e1 = 43.4V	Battery voltage at end of phase (current) (Vbef) expressed first as element voltage (V/e1), then as absolute voltage (V)
(5)	Ibif= 36A Ibef= 35 ^a	Current at start of phase (Ibif) and current at end of phase (Ibef)
(6)	Tf =0h13m Tef=0h13m	Single phase time (Tf) and Overall charge time at end of phase (Tef)
(7)	Ahf= 7 AhEf= 7	Ah supplied in the selected phase (Ahf) and overall charge Ah (AhEf)
(8)	-- Message	Indicates any faults occurring during the charge cycle

Visual signal referred to 10A outputs (ref.3)



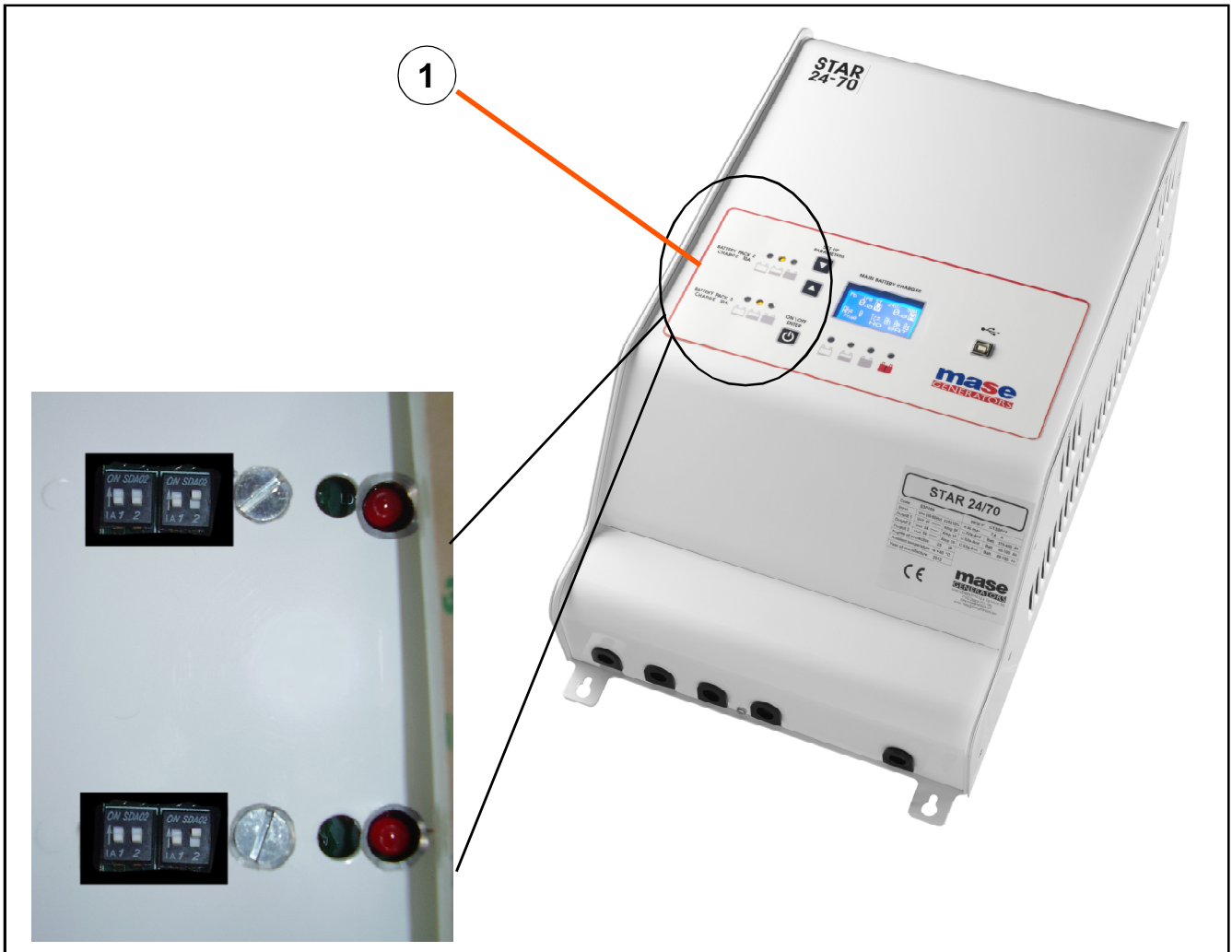
CHARGE		
Signals	Meaning	
	Red led fixed	First phase of normal charge
	Yellow led fixed	Second phase of normal charge
	Green led fixed	End of charger or charger maintaining

FAILURES		
Signals	Meaning	
	Red led blinking	Not suitable battery or battery not connected Exceeded security timer Internal short circuit

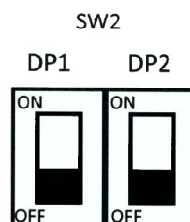
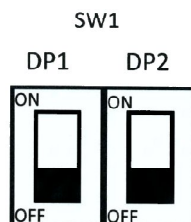
INITIAL TEST		
Signals	Meaning	
	Green led fixed	Battery charged

GB 7) BATTERY-CHARGER settings through DP switches:

With battery charger turned off and mains disconnected, gently detach the label (ref.1) and have access to DP switches.



Set the switches in order to features required. See chart below.



SW 1			
DP1	VALUE	DP2	VALUE
ON	GEL	ON	12V
OFF	WET	OFF	24V

SW 2		
DP1	DP2	Modbus Address
ON	ON	160
OFF	ON	161
ON	OFF	162
ON	ON	163

8) TRANSPORT, PACKAGING AND STORAGE

8.1 TRANSPORT AND STORAGE

Packaging: Supplied directly by Mase Generators. The total weight of the packed generator is given in **Paragraph 2.3 “Table of technical characteristics”**.

Transport: During transport the generator (with or without packaging) must be protected against atmospheric agents, it must not be turned upside down and must be protected against knocks.

⚠ CAUTION

It is strictly prohibited to pollute the environment with the packaging

Storage: Battery charger must be stored in horizontal position and away from atmospheric agents and humidity.

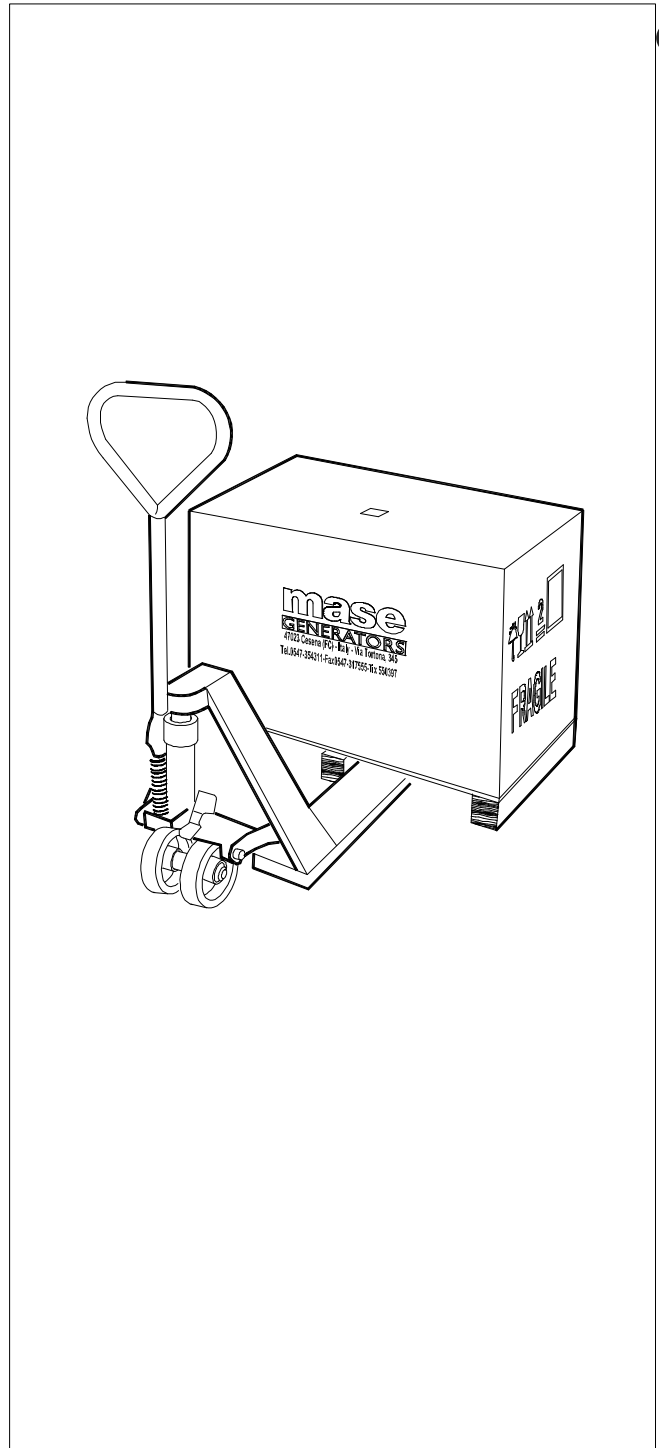
8.2 LIFTING AND HANDLING OF THE PACKED UNIT

⚠ CAUTION

Always check that the capacity of the lifting means and its accessories is greater than the weight of the generator printed on the identification plate.

For handling on level ground, a transpallet is sufficient with a suitable capacity according to the table of technical characteristics of the Use and Maintenance Manual.

i INFORMATION *The centre of gravity of the generator corresponds to about the centre of its geometrical volume.*



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9) GUARANTEE AND RESPONSIBILITY

9.1 GUARANTEE

- **mase** battery charger is guaranteed 12 months from the date of installation.
- The guarantee covers parts found to be defective in manufacturing or assembly.
- The guarantee does NOT cover damage caused by incorrect usage and/or installation.
- The guarantee lapses if any tampering is discovered.
- For any problems, please refer to an AUTHORISED RETAILER or directly to **mase generators S.p.A**
- Not covered by the guarantee are: failed observance of the installation regulations, damage caused by natural disasters, accidents, defects of the electrical system including the load to which the generator is connected, negligence, improper use or abuse by the operator and damage caused by repairs carried out by unqualified personnel.
- Repairs that cannot be carried out at the place of installation can be carried out at **mase** laboratories or at authorised workshops. Transport expenses will be borne by the Customer.
- Under no circumstances does the Customer have the right to claim compensation for damages or side effects caused by use of the machine in a manner not conform to what is described in this manual.

9.2 LIMITS OF RESPONSIBILITY

mase generators S.p.A. is responsible for anything regarding the safety, reliability and performance of the Generator on the condition that:

- The generator is used by persons trained through the use and maintenance manual.
- The installation is carried out according to **mase** instructions.
- The service procedures are carried out exclusively by **mase** specialised technical personnel.
- The electrical system and the loads to which the generator is connected is in conformity with the applicable CEI regulations.
- The battery charger is installed and used in accordance with the installations provided in this manual.
- Use original spare parts specific to each model.

10) DISPOSAL

10.1 DISPOSAL OF THE WASTE MATERIALS DERIVING FROM MAINTENANCE AND SCRAPPING

- The packaging used for transport is biodegradable and thus easy to dispose of by companies authorised for paper collection.
- The electrical components must be taken to companies authorised for the collection of electronic material.
- All the painted metal parts must be taken to companies authorised for the collection of metals.

⚠ WARNING

Please note that the system and its components contain materials that, if dispersed in the environment, may cause significant ecological damage.

- Any other material not listed above must be taken to companies authorised for the collection of industrial waste.

11) BATTERY CHARGER STAR series: General infos

Technical features:

- **High frequency** battery charger system.
- Charging parameters are insensitive to the AC input line voltage variations.
- Charging process fully controlled by microprocessor.
- Resident charging curves for lead-acid, AGM and Gel batteries.
- Protection against polarity inversions, short circuits, over-voltages or anomalies.
- Efficiency > 85%.
- Output ripple at maximum charge lower than 100mV.
- Charge cycle begins with batteries as low as 2V.
- Thermal protection against over heating.
- Forced ventilation.
- Possibility to remote to bridge deck the charging information (optional available upon request).
- Operating temperature: -10°C ÷ +45°C

12V Models	Voltage (V)	Output (A)	Battery range (5 Hr Rate)		Weight (kg)
			8-9 hours charging time	10-12 hours charging time	
STAR 12/15	12	15	80 - 110	100 - 150	2,00
STAR 12/25	12	25	120 - 160	180 - 258	2,00
STAR 12/35	12	25+10	120 - 160	180 - 258	5,50
STAR 12/50	12	30+10+10	145 - 190	215 - 310	5,50
STAR 12/60	12	40+10+10	220 - 260	295 - 360	6,80
STAR 12/70	12	50+10+10	275 - 325	370 - 450	6,80
STAR 12/80	12	60+10+10	300 - 360	450 - 360	13,50
STAR 12/90	12	70+10+10	350 - 420	520 - 620	13,50
STAR 12/100	12	80+10+10	400 - 480	590 - 705	13,50
STAR 12/110	12	90+10+10	450 - 540	650 - 820	13,50
STAR 12/120	12	100+10+10	500 - 600	720 - 910	13,50
STAR 12/140	12	120+10+10	600 - 720	860 -1100	13,50

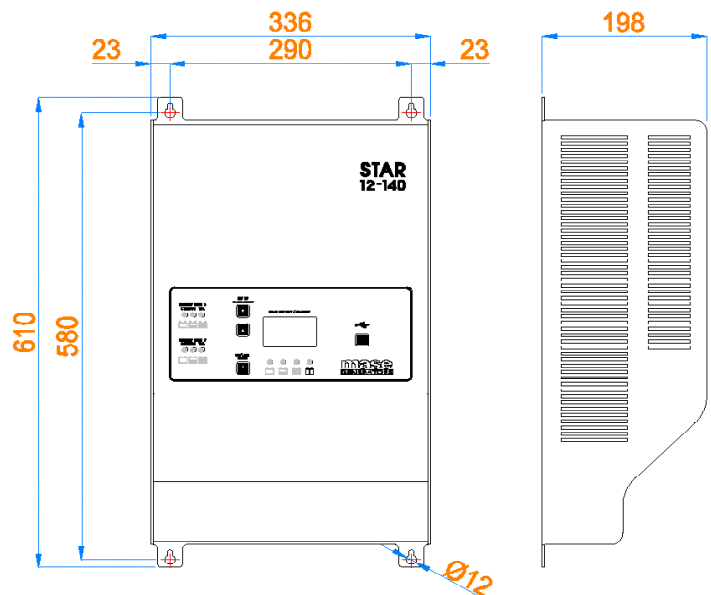
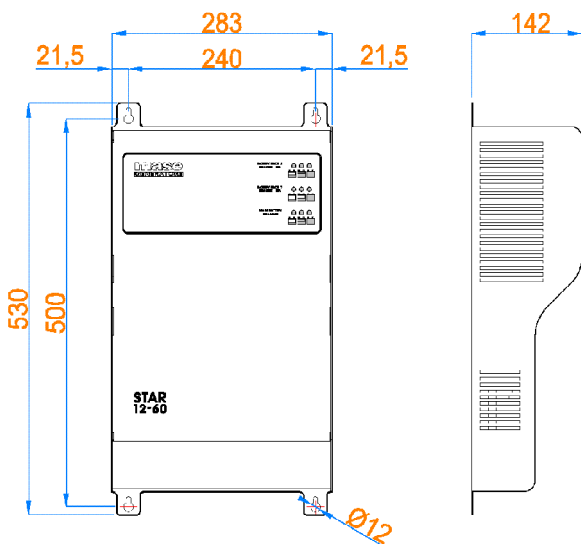
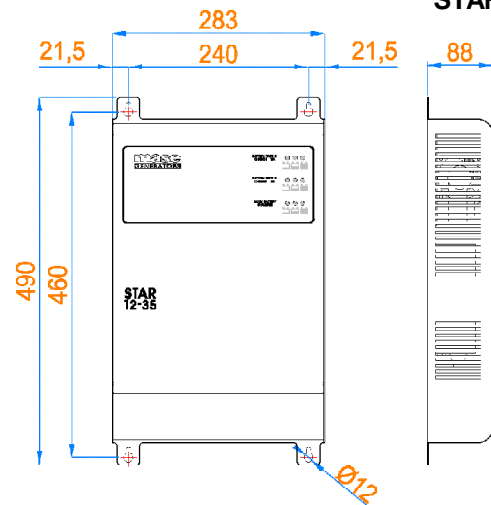
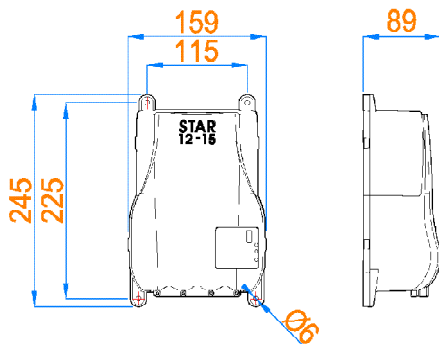
24V Models	Voltage (V)	Output (A)	Battery range (5 Hr Rate)		Weight (kg)
			8-9 hours charging time	10-12 hours charging time	
STAR 24/15	24	15	80 - 110	100 - 150	2,00
STAR 24/25	24	25	120 - 160	180 - 258	2,00
STAR 24/35	24	25+10	120 - 160	180 - 258	5,50
STAR 24/50	24	30+10+10	145 - 190	215 - 310	5,50
STAR 24/60	24	40+10+10	220 - 260	295 - 360	6,80
STAR 24/70	24	50+10+10	275 - 325	370 - 450	6,80
STAR 24/80	24	60+10+10	300 - 360	450 - 360	13,50
STAR 24/90	24	70+10+10	350 - 420	520 - 620	13,50
STAR 24/100	24	80+10+10	400 - 480	590 - 705	13,50
STAR 24/110	24	90+10+10	450 - 540	650 - 820	13,50
STAR 24/120	24	100+10+10	500 - 600	720 - 910	13,50
STAR 24/140	24	120+10+10	600 - 720	860 -1100	13,50

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STAR 12/15
STAR 24/15

STAR 12/25
STAR 24/25

STAR 12/35
STAR 24/35



STAR 12/50
STAR 24/50

STAR 12/60
STAR 24/60

STAR 12/70 STAR 12/80 STAR 12/90 STAR 12/100
STAR 24/70 STAR 24/80 STAR 24/90 STAR 24/100

STAR 12/110 STAR 12/120 STAR 12/140
STAR 24/110 STAR 24/120 STAR 24/140

[mm]

Dealer

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In line with our continued development, innovation and voice of customer program, we reserve the right to change data without notice. For more information, you may contact your local mase dealer.



STAR 12-15
STAR 24-15

STAR 12-25
STAR 24-25

STAR 12-50
STAR 24-50

STAR 12-60
STAR 24-60



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STAR 12-35
STAR 24-35

STAR 12-35
STAR 24-35

STAR 12/70
STAR 24/70
STAR 12/80
STAR 24/80

STAR 12/90
STAR 24/90

STAR 12/100
STAR 24/100
STAR 12/110
STAR 24/110

STAR 12/120
STAR 24/120
STAR 12/140
STAR 24/140

