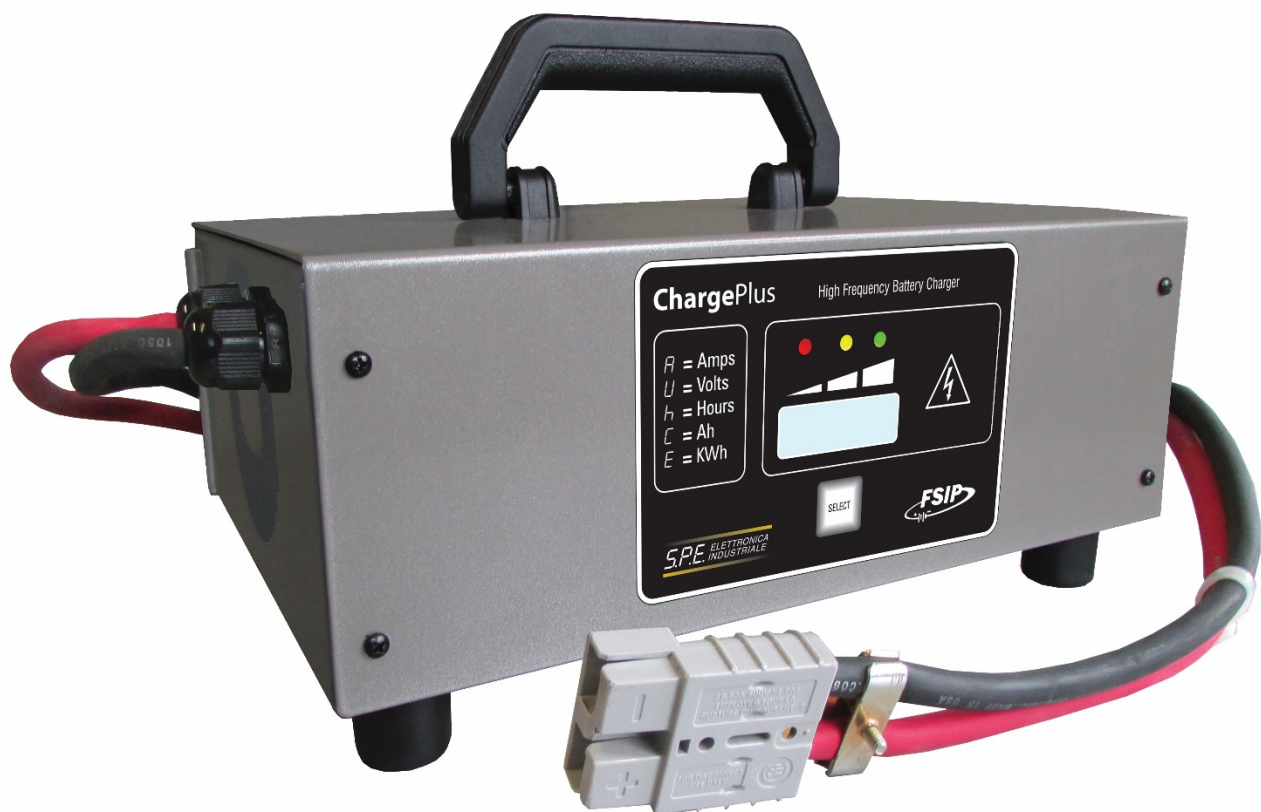


CHARGEPLUS

User Manual

High Frequency Battery Charger

Important Safety,
Installation and
Operation
Instructions



**S.P.E. ELETTRONICA
INDUSTRIALE**


















Attention: Read the user manual carefully before using the battery charger.

IMPORTANT SAFETY INSTRUCTIONS



LOOK FOR THIS SYMBOL TO POINT OUT SAFETY PRECAUTIONS. IT MEANS: BE ALERT—YOUR SAFETY IS INVOLVED. IF YOU DO NOT FOLLOW THESE SAFETY INSTRUCTIONS, INJURY OR PROPERTY DAMAGE CAN OCCUR.

1. **SAVE THESE INSTRUCTIONS** – THIS MANUAL CONTAINS IMPORTANT SAFETY AND OPERATING INSTRUCTIONS.
2. BEFORE USING BATTERY CHARGER, READ ALL INSTRUCTIONS AND CAUTIONARY MARKINGS ON BATTERY CHARGER, BATTERY, AND PRODUCT USING BATTERY.
3.  FAILURE TO INSTALL AND OPERATE THE CHARGER IN ACCORDANCE WITH THESE INSTRUCTIONS MAY RESULT IN DAMAGE TO THE CHARGER OR INJURY TO THE OPERATOR.
4.  WORKING IN THE VICINITY OF A LEAD-ACID BATTERY IS DANGEROUS. BATTERIES GENERATE EXPLOSIVE GASES DURING NORMAL BATTERY OPERATION. FOR THIS REASON, IT IS OF THE UTMOST IMPORTANCE THAT EACH TIME BEFORE USING YOUR CHARGER, YOU READ AND FOLLOW THE INSTRUCTIONS PROVIDED EXACTLY.
5.  TO REDUCE RISK OF BATTERY EXPLOSION, FOLLOW THESE INSTRUCTIONS AND THOSE MARKED ON THE BATTERY.
6.  EXPLOSIVE GASES MAY RESULT FROM CHARGING. BE SURE TO PROVIDE ADEQUATE VENTILATION DURING CHARGING. NEVER SMOKE OR ALLOW AN OPEN SPARK OR FLAME IN THE VICINITY OF THE BATTERY.
7.  TO REDUCE THE RISK OF INJURY, CHARGE ONLY LEAD-ACID, GEL OR AGM TYPE BATTERIES (*BE SURE THAT THE SELECTED CHARGING CURVE IS SUITABLE FOR THE TYPE OF BATTERIES THAT HAVE TO BE CHARGED*). DO NOT ATTEMPT TO CHARGE ANY OTHER TYPE OF CHARGEABLE OR NON-RECHARGEABLE BATTERY; THESE BATTERIES MAY BURST, CAUSING PERSONAL INJURY AND DAMAGE.
8.  THIS CHARGER IS NOT INTENDED FOR USE BY PEOPLE (INCLUDING CHILDREN) WITH REDUCED PHYSICAL, SENSORY OR MENTAL CAPABILITIES, OR LACK OF EXPERIENCE AND KNOWLEDGE, UNLESS THEY HAVE BEEN GIVEN SUPERVISION OR INSTRUCTION CONCERNING USE OF THE APPLIANCE BY A PERSON RESPONSIBLE FOR THEIR SAFETY. YOUNG CHILDREN SHOULD BE SUPERVISED TO ENSURE THAT THEY DO NOT PLAY WITH THE APPLIANCE.
9.  STUDY ALL BATTERY MANUFACTURER'S SPECIFIC PRECAUTIONS SUCH AS REMOVING OR NOT REMOVING CELL CAPS WHILE CHARGING AND RECOMMENDED RATES OF CHARGE.
10.  NEVER PLACE THE CHARGER DIRECTLY ABOVE OR BELOW THE BATTERY BEING CHARGED; GASES OR FLUIDS FROM THE BATTERY WILL CORRODE AND DAMAGE THE CHARGER. LOCATE THE CHARGER AS FAR AWAY FROM THE BATTERY AS DC CABLES PERMIT.
11.  DO NOT ATTEMPT TO OPEN THE CHARGER. THERE IS RISK OF ELECTRIC SHOCK EVEN IF THE CHARGER IS UNPLUGGED. THERE ARE NO USER SERVICEABLE COMPONENTS INSIDE.

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12.  IF SAFE OPERATION OF THE CHARGER CAN NO LONGER BE ENSURED, STOP AND SECURE IT AGAINST OPERATION.
 13.  IF THE SUPPLY CORD IS DAMAGED, IT MUST BE REPLACED BY A QUALIFIED PERSON IN ORDER TO AVOID HAZARD.
 14. IT IS RECOMMENDED TO DISCONNECT THE AC POWER BEFORE CONNECTING OR DISCONNECTING THE CHARGER TO AND FROM THE BATTERY.
 15. THE CHARGER IS NOT INTENDED FOR OUTDOOR USE.
 16.  CHARGER SURFACE MAY BE HOT WHILE PLUGGED IN AND FOR A PERIOD OF TIME AFTER CHARGE IS COMPLETE.
 17.  FAILURE TO INSTALL AND OPERATE THE CHARGER IN ACCORDANCE WITH THESE INSTRUCTIONS MAY IMPAIR THE PROTECTION PROVIDED BY THE CHARGER AND MAY VOID THE MANUFACTURERS WARRANTY.
 18.  DO NOT INSTALL THE CHARGER IN A CLOSED-IN AREA OR RESTRICT VENTILATION IN ANY WAY. UNITS WITH FANS MUST HAVE AT LEAST 30 mm OR 1.25 INCHES OF CLEARANCE ON THE VENTED ENDS OF THE CHARGER.
 19. USE OF AN ADAPTER IS NOT ALLOWED IN CANADA. IF A GROUNDING TYPE RECEPTACLE IS NOT AVAILABLE, DO NOT USE THIS APPLIANCE UNTIL THE PROPER OUTLET IS INSTALLED BY A QUALIFIED ELECTRICIAN.
 20.  DO NOT INSTALL ON OR OVER COMBUSTIBLE SURFACES.
 21. THE CHARGER IS NOT AUTHORIZED FOR USE AS A CRITICAL COMPONENT IN LIFE SUPPORT DEVICES OR SYSTEMS WITHOUT EXPRESS WRITTEN APPROVAL OF SPE.
 22. SPECIFICATIONS MENTIONED IN THIS PUBLICATION ARE SUBJECT TO CHANGE WITHOUT ANY NOTICE. THIS PUBLICATION SUPERSEDES AND REPLACES ALL INFORMATION PREVIOUSLY SUPPLIED.

SAVE THESE INSTRUCTIONS

GENERAL INFORMATION AND WARNINGS

- CHARGEPLUS IS AN ELECTRONIC, AUTOMATIC BATTERY CHARGER WITH A MICROPROCESSOR THAT IS SUITABLE FOR ANY BATTERY TYPE.
- THE CHARGER FEATURES AUTOMATIC CHARGING CYCLES WITH ELECTRONIC SETTINGS AND IS PROTECTED AGAINST OVERLOADS, SHORT-CIRCUITS AND REVERSED POLARITY.
- NEVER DISCONNECT THE BATTERY WHILE CHARGING; THIS COULD CAUSE SPARKS.
- NEVER USE THE CHARGER IN THE RAIN, ANY AREA USED FOR WASHING, OR A DAMP ENVIRONMENT.
- BEFORE STARTING A CHARGE, BE SURE THAT THE VOLTAGE OF THE EQUIPMENT MATCHES THE VOLTAGE OF THE BATTERY, AND THAT THE CHARGING CURRENT SUITS THE CAPACITY OF THE BATTERY.
- BE SURE THAT THE SELECTED CHARGING CURVE (FOR LEAD-ACID OR GEL/AGM BATTERIES) IS CORRECT FOR THE TYPE OF BATTERY BEING CHARGED. IN ADDITION, MAKE SURE THAT THE RATED INPUT VOLTAGE OF THE CHARGER SUITES THE AVAILABLE SUPPLY VOLTAGE AND THAT THE SYSTEM IS EQUIPPED WITH A GROUND.
- IF NECESSARY, REPLACE THE FUSE WITH ANOTHER OF THE SAME TYPE AND VALUE AS INDICATED ON THE RATING PLATE.
- USE THE BATTERY CHARGER ONLY IN WELL VENTILATED AREAS.
- PAY ATTENTION TO ANY WARNINGS OR REMARKS FROM THE MANUFACTURER OF THE BATTERIES.

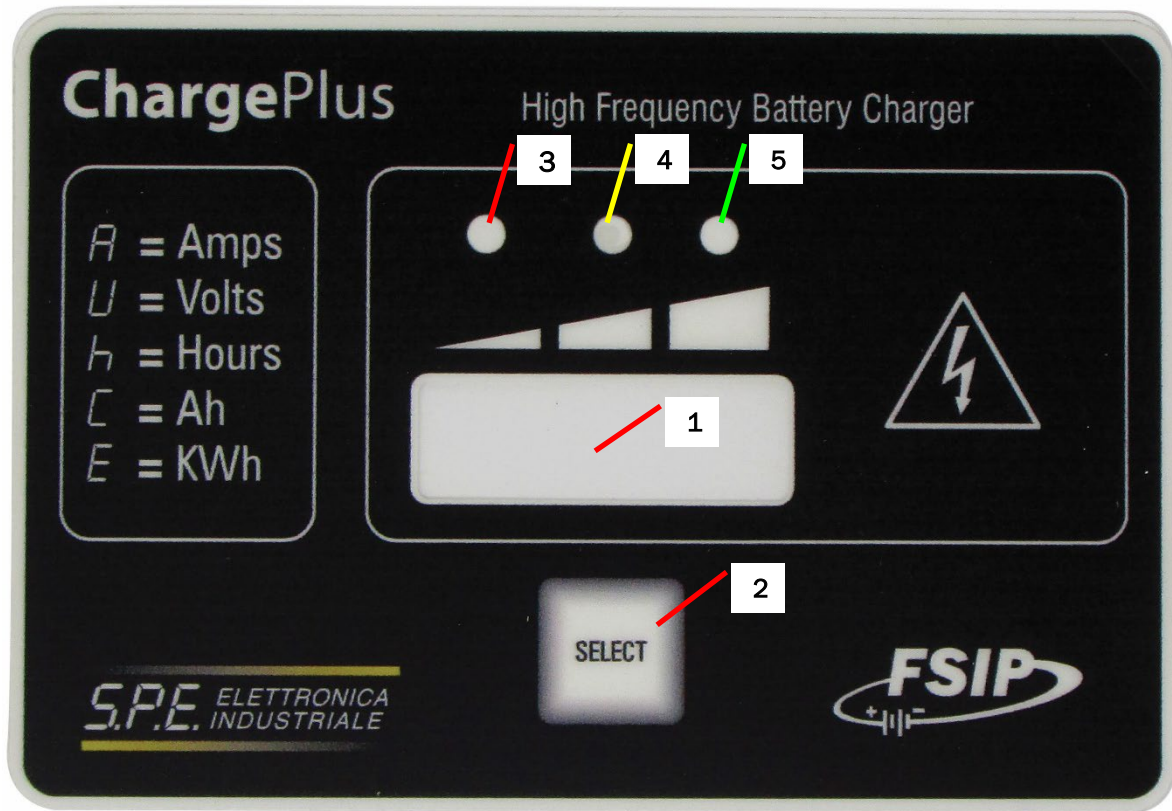
FOR LEAD-ACID BATTERIES WITH LIQUID ELECTROLYTE

- CONTROL THE WATER LEVEL AFTER EACH CHARGING PROCESS.
- REFILL WITH DISTILLED WATER ONLY.
- **CAUTION!** THE GASES GENERATED DURING CHARGING ARE EXPLOSIVE. DO NOT SMOKE IN THE VICINITY OF THE BATTERIES. WHEN WORKING WITH CABLES AND ELECTRICAL EQUIPMENT, AVOID OPEN FLAMES AND SPARKS.



ATTENTION: USE PROTECTIVE GLASSES AND GLOVES DURING BATTERY MAINTENANCE. BATTERY ACID CAUSES INJURIES. IN CASE OF CONTACT WITH BATTERY ACID, WASH THE AFFECTED PART WITH FRESH WATER AND CONSULT A DOCTOR IF NECESSARY.

FRONT PANEL OF BATTERY CHARGER



CONTROLS

1. THE MAIN DISPLAY: THREE-DIGIT DISPLAY + SYMBOL. THE MAIN DISPLAY WILL SHOW THE FOLLOWING
 - a. A = THE CHARGING CURRENT
 - b. U = THE BATTERY VOLTAGE
 - c. H = THE CHARGING TIME
 - d. C = THE CHARGING AMPERE-HOURS(Ah)
 - e. E = KILOWATT ENERGY USED
2. SELECT BUTTON: THIS BUTTON IS USED FOR SELECTING BETWEEN THE ABOVE DISPLAY MODES (A, U, H, C, E). AFTER ABOUT 10 SECONDS, THE DISPLAY WILL RETURN TO SHOWING THE CHARGING CURRENT.
3. RED CONTROL INDICATOR: WHEN THIS LED IS LIT, THE CHARGING CYCLE HAS STARTED.
4. YELLOW CONTROL INDICATOR: WHEN THIS LED IS LIT, THE FINAL PHASE OF THE CHARGING CYCLE HAS STARTED.
5. GREEN CONTROL INDICATOR: WHEN THIS LED IS LIT, THE CHARGING CYCLE HAS FINISHED.

INTRODUCTION

THE CHARGEPLUS BATTERY CHARGER IS A HIGH FREQUENCY, MICROPROCESSOR CONTROLLED CHARGER DESIGNED TO OPTIMIZE BOTH BATTERY CAPACITY AND OVERALL BATTERY LONGEVITY. IT PLUGS DIRECTLY INTO A STANDARD 120V A/C OUTLET FOR USE IN OFF-BOARD (SHELF) APPLICATIONS. THIS CHARGER FEATURES FULLY-AUTOMATIC OPERATION AND LED INDICATORS WITH STATUS SCREEN TO MONITOR CHARGE CYCLE AND STATUS.

STORAGE

WHEN STORING THE CHARGER, BE SURE THAT IT IS STORED INDOORS IN A CLEAN AND DRY ENVIRONMENT. IF POSSIBLE, THE CHARGER SHOULD BE STORED IN ITS ORIGINAL PACKAGING. THIS WILL HELP PROTECT THE CHARGER FROM ANY DUST OR ABRASION. IT SHOULD BE STORED IN AN AREA WHERE IT IS NOT LIKELY TO BE DAMAGED. DO NOT STACK ANYTHING ON TOP OF THE CHARGER.

BATTERY TYPE

THIS CHARGER IS DESIGNED TO CHARGE DEEP-CYCLE LEAD ACID BATTERIES OF WET/FLOODED, AGM (ABSORBED GLASS MAT), OR GEL DESIGN.

CHARGER OPERATION

- UNPACK YOUR CHARGER AND INSPECT FOR ANY DAMAGE.
- IF YOUR CHARGER COMES WITH AN OPTIONAL VEHICLE PIGTAIL, PLEASE ATTACH IT TO THE CONNECTED SB50 ANDERSON CONNECTOR.
- PLUG THE A/C CABLE INTO AN AVAILABLE 120VAC OUTLET.
- CONNECT THE D/C CABLE TO THE BATTERY PACK CONNECTOR ON THE VEHICLE.
- ONCE CONNECTED, THE CHARGEPLUS WILL DISPLAY A SEQUENCE OF DETAILS ON THE CHARGERS INTERNAL PROGRAMMING.
- ONCE THE CHARGEPLUS DISPLAYS THE NAME "SPE", IT WILL SHOW THE FOLLOWING IN SEQUENCE.
 - SOFTWARE RELEASE/REVISION INSTALLED IN THE CHARGER
 - BATTERY VOLTAGE
 - CHARGING CURRENT (AMPS)
 - CHARGING CURVE NUMBER
 - FINALLY THE WORDS "GEL" OR "Acd" WILL BE DISPLAYED DEPENDING ON THE SETUP OF THE CHARGER
 - **MAKE SURE THAT THE BATTERY TYPE BEING CHARGED MATCHES THE BATTERY TYPE DISPLAYED ON THE SCREEN. IF IT DOES NOT, CONTACT THE DEALER THAT THE UNIT WAS PURCHASED FROM.**
- AT THIS POINT, A TEST IS RUN ON THE BATTERY VOLTAGE TO DETERMINE IF THE CHARGING PROCESS SHOULD BEGIN. IF THE BATTERY IS NOT CONNECTED TO THE CHARGER, THE DISPLAY WILL SHOW THE WORD "bat". THIS WORD WILL STAY ON THE DISPLAY EVEN IF THE TEST HAS FAILED (FOR INSTANCE, REVERSE POLARITIES OR INCORRECT BATTERY CONNECTION). IF THE TEST IS PASSED, THE DISPLAY WILL SHOW THE BATTERY VOLTAGE FOR APPROXIMATELY 5 SECONDS. ONCE THIS TIME HAS ELAPSED, THE CHARGER WILL BEGIN CHARGING.
- THE CHARGE CYCLE PROGRESS WILL BE SHOWN BY RED (3), YELLOW (4), AND GREEN (5) LED INDICATORS.
- WHEN THE CHARGE CYCLE HAS COMPLETED, THE GREEN (5) LED INDICATOR WILL BE LIT.

FAULTS AND TROUBLESHOOTING

| PROBLEMS | SOLUTIONS AND CHECKS |
|--|---|
| THE BATTERY CHARGER DOES NOT SWITCH ON. | CHECK THAT THE A/C AND D/C PLUGS ARE CONNECTED, AND THAT THE A/C OUTLET IS RECEIVING POWER. |
| THE CHARGING CYCLE DOES NOT START AND THE MESSAGE “bat” IS DISPLAYED. | CHECK THE CONNECTION TO THE BATTERY AND THE POLARITY. |
| THE YELLOW INDICATOR (4) WILL NOT LIGHT UP EVEN AFTER 15 HOURS FROM THE STARTING OF THE CHARGE CYCLE, AND THE DISPLAY SHOWS “E03”. | CHECK THE BATTERY FOR POSSIBLE FAULTY COMPONENTS. |
| THE MESSAGE “E01” IS DISPLAYED. | THE MAXIMUM VOLTAGE ADMISSIBLE BY THE BATTERY HAS BEEN EXCEEDED. THE CHARGING IS INTERRUPTED. |
| IF THE BATTERY CHARGER IS PROVIDED WITH A SAFETY THERMOSTAT AND THE MESSAGE “E02” IS DISPLAYED. | THE MAXIMUM TEMPERATURE HAS BEEN EXCEEDED. THE CHARGING IS INTERRUPTED. |
| THE MESSAGE “E03” IS DISPLAYED. | THE MAXIMUM TIME FOR THE CHARGING PHASE HAS BEEN EXCEEDED. THE CHARGING IS INTERRUPTED. |
| THE MESSAGE “Sct” IS DISPLAYED. | THE TOTAL SAFETY TIMER HAS INTERRUPTED THE CHARGING. |
| THE MESSAGE “Srt” IS DISPLAYED. | THERE IS A POSSIBLE INTERNAL SHORT CIRCUIT. THE UNIT NEEDS TO BE SENT TO A REPAIR CENTER. |

NOTES



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