



Installation and User Manuals




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0. INTRODUCTION

This manual contains important safety instructions, cautions and warnings, to be followed by qualified personnel responsible for the installation, maintenance and operation of battery chargers.

We recommend this manual to be read and understood entirely, to ensure safe and reliable operation of this equipment. Inspect and understand all warning labels located on the charger. Order and replace labels if they cannot be easily read.

In case of doubts, please contact our service department.

Keep printed and electronic copies of this manual readily available for future needs. Please contact our service department if you need a new copy.

1. IMPORTANT SAFETY INSTRUCTION

1.1 IMPORTANT SAFETY INSTRUCTION

(a) THIS MANUAL CONTAINS IMPORTANT SAFETY AND OPERATING INSTRUCTIONS

(b) 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

(c) TO REDUCE RISK OF BATTERY EXPLOSION, FOLLOW THESE INSTRUCTIONS AND THOSE MARKED ON THE BATTERY

(d) NEVER SMOKE OR ALLOW AN OPEN SPARK OR FLAME IN THE VICINITY OF THE BATTERY OR ENGINE

(e) USE CHARGER FOR CHARGING A LEAD-ACID BATTERY ONLY. IT IS NOT INTENDED TO SUPPLY POWER TO AN EXTRA-LOW-VOLTAGE ELECTRICAL SYSTEM OR TO CHARGE DRY-CELL BATTERIES. CHARGING DRY-CELL BATTERIES MAY CAUSE THEM TO BURST AND CAUSE INJURY TO PERSONS AND DAMAGE TO PROPERTY

(f) NEVER CHARGE A FROZEN BATTERY

(g) IF IT IS NECESSARY TO REMOVE BATTERY FROM VEHICLE TO CHARGE IT, ALWAYS REMOVE GROUNDED TERMINAL FROM BATTERY FIRST. MAKE SURE ALL ACCESSORIES IN THE VEHICLE ARE OFF IN ORDER TO PREVENT AN ARC

(h) STUDY ALL BATTERY MANUFACTURER'S SPECIFIC PRECAUTIONS SUCH AS REMOVING OR NOT REMOVING CELL CAPS WHILE CHARGING AND RECOMMENDED RATES OF CHARGE

(i) FOR A CHARGER HAVING AN OUTPUT VOLTAGE SELECTOR SWITCH, REFER TO THE CAR OWNER'S MANUAL IN ORDER TO DETERMINE THE VOLTAGE OF THE BATTERY AND TO MAKE SURE THE OUTPUT VOLTAGE IS SET AT THE CORRECT VOLTAGE. IF AN OUTPUT VOLTAGE SELECTOR SWITCH IS NOT PROVIDED, DO NOT USE THE BATTERY CHARGER UNLESS THE BATTERY VOLTAGE MATCHES THE

OUTPUT VOLTAGE RATING OF THE CHARGER

(j) 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

(k) DO NOT OPERATE CHARGER IN A CLOSED-IN AREA OR RESTRICT VENTILATION IN ANY WAY

(l) CONNECT AND DISCONNECT DC OUTPUT CLIPS ONLY AFTER SETTING ANY CHARGER SWITCHES TO THE OFF POSITION AND REMOVING AC CORD FROM THE ELECTRIC OUTLET. NEVER ALLOW CLIPS TO TOUCH EACH OTHER

(m) FOLLOW THESE STEPS WHEN BATTERY IS INSTALLED IN VEHICLE. A SPARK NEAR BATTERY MAY CAUSE A BATTERY EXPLOSION. TO REDUCE RISK OF A SPARK NEAR BATTERY:

-(m.1) POSITION AC AND DC CORDS TO REDUCE RISK OF DAMAGE BY HOOD, DOOR, OR MOVING ENGINE PART;

-(m.2) STAY CLEAR OF FAN BLADES, BELTS, PULLEYS, AND OTHER PARTS THAT CAN CAUSE INJURY TO PERSONS;

-(m.3) CHECK POLARITY OF BATTERY POSTS. A POSITIVE (POS, P, +) BATTERY POST USUALLY HAS A LARGER DIAMETER THAN A NEGATIVE (NEG, N, -) POST;

-(m.4) DETERMINE WHICH POST OF BATTERY IS GROUNDED (CONNECTED) TO THE CHASSIS. IF NEGATIVE POST IS GROUNDED TO CHASSIS (AS IN MOST VEHICLES), SEE ITEM (v). IF POSITIVE POST IS GROUNDED TO THE CHASSIS, SEE ITEM (m.6);

-(m.5) FOR A NEGATIVE-GROUNDED VEHICLE, CONNECT THE POSITIVE (RED) CLIP FROM BATTERY CHARGER TO POSITIVE (POS, P, +) UNGROUNDED POST OF BATTERY. CONNECT THE NEGATIVE (BLACK) CLIP TO VEHICLE CHASSIS OR ENGINE BLOCK AWAY FROM BATTERY. DO NOT CONNECT CLIP TO CARBURETOR, FUEL LINES, OR SHEET-METAL BODY PARTS. CONNECT TO A HEAVY GAUGE METAL PART OF THE FRAME OR ENGINE BLOCK;

-(m.6) FOR A POSITIVE-GROUNDED VEHICLE, CONNECT THE NEGATIVE (BLACK) CLIP FROM BATTERY CHARGER TO NEGATIVE (NEG, N, -) UNGROUNDED POST OF BATTERY. CONNECT THE POSITIVE (RED) CLIP TO VEHICLE CHASSIS OR ENGINE BLOCK AWAY FROM BATTERY. DO NOT CONNECT CLIP TO CARBURETOR, FUEL LINES, OR SHEET-METAL BODY PARTS. CONNECT TO A HEAVY GAUGE METAL PART OF THE FRAME OR ENGINE BLOCK;

-(m.7) CONNECT CHARGER AC SUPPLY CORD TO ELECTRIC OUTLET;

-(m.8) WHEN DISCONNECTING CHARGER, TURN SWITCHES TO OFF, DISCONNECT AC CORD, REMOVE CLIP FROM VEHICLE CHASSIS, AND THEN REMOVE CLIP FROM BATTERY TERMINAL

(n) FOLLOW THESE STEPS WHEN BATTERY IS OUTSIDE VEHICLE. A SPARK NEAR THE BATTERY MAY CAUSE A BATTERY EXPLOSION. TO REDUCE RISK OF A SPARK NEAR BATTERY:

-(n.1) CHECK POLARITY OF BATTERY POSTS. A POSITIVE (POS, P, +) BATTERY POST USUALLY HAS A LARGER DIAMETER THAN A NEGATIVE (NEG, N, -) POST;

-(n.2) ATTACH AT LEAST A 60 CM 6-GAUGE (AWG) INSULATED BATTERY CABLE TO A NEGATIVE (NEG, N, -) BATTERY POST;

-(n.3) CONNECT THE POSITIVE (RED) CHARGER CLIP TO THE POSITIVE (POS, P, +) POST OF BATTERY;

-(n.4) POSITION YOURSELF AND THE FREE END OF CABLE AS FAR AWAY FROM BATTERY AS POSSIBLE, THEN CONNECT THE NEGATIVE (BLACK) CHARGER CLIP TO FREE END OF CABLE;

-(n.5) DO NOT FACE BATTERY WHEN MAKING FINAL CONNECTION;

-(n.6) CONNECT CHARGER AC SUPPLY CORD TO ELECTRICAL OUTLET;

-(n.7) WHEN DISCONNECTING CHARGER, ALWAYS DO SO IN REVERSE SEQUENCE OF CONNECTING PROCEDURE AND BREAK FIRST CONNECTION WHILE STANDING AS FAR AWAY FROM BATTERY AS

PRACTICAL

(o) 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

(p) CERTIFIED DC OUTPUT CONNECTOR, SUFFICIENTLY RATED IN VOLTS AND AMPERES, SHALL CONNECTED TO FREE ENDS OF OUTPUT CABLE WITH ATTENTION TO MARKED POLARITY

1.2 IMPORTANT NOTES

- Only experienced and qualified personnel, knowledgeable on batteries and safety requirements involved, most perform installation and maintenance.
- Installation and wiring must comply with all the applicable local and the national electrical codes.
- Protection devices as fuses or circuit breakers, must be located on the AC mains where the charger is connected. Check the product nameplate for voltage and phase requirements.
This charger can only charge motive power batteries of flooded lead-acid type. Strictly follow all setup and operating instructions to prevent damage to the battery and hazardous conditions.

**DANGER! High Voltage**

- Dangerous AC and DC voltages and currents are present in these systems even when external indicators and LEDs are completely off. Before performing any maintenance, make sure that the AC power and battery are disconnected.

**DANGER! Explosive Gases**

- Lead-Acid batteries generate an explosive mixture of oxygen and hydrogen during the normal charging process. Never smoke or allow sparks or flames in the vicinity of batteries. Ensure a sufficient ventilation to prevent explosive gases buildup.

**DANGER! Corrosive Substances**

- Lead-Acid batteries contain a sulfuric acid (H_2SO_4) solution, which is capable of causing very severe skin burns and can induce permanent blindness if splashed onto eyes. Always wear correct eye and body protection when near batteries. In case of contact with eyes, flush immediately with clean water for at least 15 minutes, and seek professional medical attention immediately.



DANGER! High Temperature

- The internal parts of the machine are not accessible during normal operation. To access these parts it is necessary to open the front and / or rear doors, closed by screws. Avoid prolonged contact with hot surfaces could cause discomfort or burns. Keep this in mind if you have a physical condition that affects your ability to feel heat on your skin.
- The weight of battery chargers can crush hands and feet if care is not taken when installing and handling them. Use adequate handling equipment and install chargers in a stable location.
- This charger has been designed for indoor use only. It must be installed in a well ventilated, cool, dry and clean place. Do not expose to rain, snow, moisture, dust and corrosive substances.
- To reduce the risk of fire, install chargers on a floor of non-combustible material.
- Never place the charger directly above or below the battery being charged; gases or fluids from the battery may damage the charger. Locate the charger as far away from the battery as DC cables permit.
- The shipping pallets and all packaging materials must be removed for proper and safe operation.
- Do not block the ventilation openings of the charger.
- Do not install or operate charger if it has been dropped during transport or damaged in any way.
- Never charge a frozen battery.
- Inspect AC and DC cables for damage to the insulation. Replace damaged cables immediately, with cables of the same type and length. Do not extend the DC charging cables, as it may cause improper operation of the charger, and damage the battery.
- The manufacturer is not responsible and the warranty is void if the product is damaged due to negligence, abuse, misuse, accident, modification, alteration, tampering and faulty installation.

2. INSTALLATION



CAUTION!

The charger can be installed, configured and serviced by qualified personnel only



CAUTION!

Read and understand Chapter 2 "Important Safety Instructions" before installing, configuring, servicing or using the charger.

PRELIMINARY INSPECTION

- Unbox the charger and remove all packaging materials.
- Inspect the unit for potential damages, loose screws and missing parts.
- Ensure that the ventilation openings are not obstructed.

OPERATING CONDITIONS

Storage Temperature: -25°C to 55°C
 Operating Temperature: -25°C to 40°C
 Humidity: 0% to 70%

The charger has been designed for indoor use only. It must be installed in a well ventilated, cool, dry and clean place. Do not expose to rain, snow, moisture, dust and corrosive substances.

To reduce the risk of fire, install chargers on a floor of non-combustible material.

INSTALLATION OF DC OUTPUT PLUG

Certified DC Output connector, sufficiently rated in volts and amperes, must be installed in the field by a qualified technician.

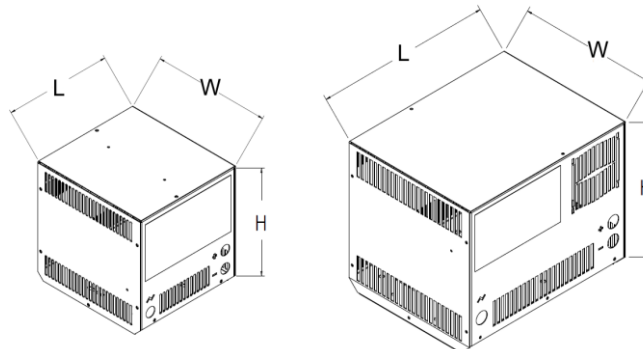
INSTALLATION OF AC INPUT CABLE and PLUG

Depending on the applicable local regulations and the electrical ratings of the chargers, certain units are supplied with AC input cable & plug included (plug-in models) and others are supplied without AC input cable and/or plug (cord connected models).

In cord-connected models, the AC input cable and plug should be installed by a qualified electrician, in accordance to the local and national electrical code, together with the proper fuses, breakers and disconnect switches.

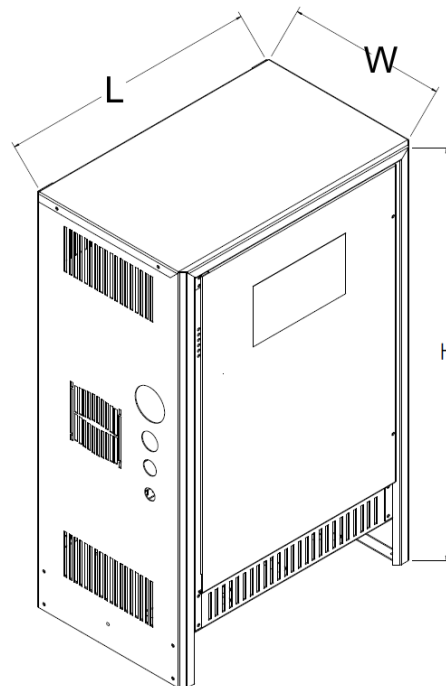
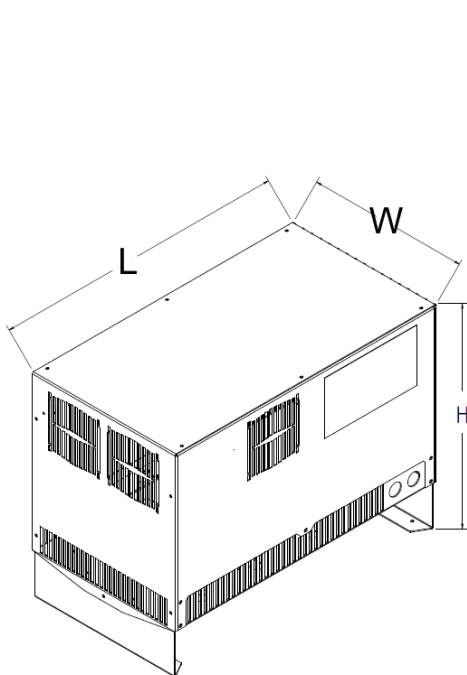
1-PHASE MODEL LIST

OUTPUT		7 to MAX 8HRS charging time (80%Ch) Battery Capacity range (Ah)	10 to MAX 12HRS charging time (80%Ch) Battery Capacity range (Ah)	HOUSING DIMENSIONS (mm)				INSTALLATION /all-Shelf-Flo	WEIGHT (kg)	Pout (max) kW	Pin (app) kVA
(V)	(A)			W	D	H	Type				
12	20	95-120	120-150	242	222	241	T5	S-F	11	0.25	0.36
12	25	120-160	150-200	242	222	241	T5	S-F	12	0.32	0.45
12	30	160-190	200-235	242	222	241	T5	S-F	14	0.38	0.54
12	40	190-250	235-310	242	222	241	T5	S-F	15	0.5	0.7
12	50	250-305	310-380	242	222	241	T5	S-F	16	0.6	0.9
12	60	305-360	380-450	366	283	295	T6	S-F	16	0.8	1.1
12	80	360-480	450-600	366	283	295	T6	S-F	25	1.0	1.4
12	100	480-600	600-750	580	310	355	T7	S-F	28	1.3	1.8
24	20	95-120	120-150	242	222	241	T5	S-F	14	0.5	0.7
24	25	120-160	150-200	242	222	241	T5	S-F	14	0.6	0.9
24	30	160-190	200-235	242	222	241	T5	S-F	16	0.8	1.1
24	40	190-250	235-310	242	222	241	T5	S-F	19	1.0	1.4
24	50	250-305	310-380	242	222	241	T5	S-F	21	1.3	1.8
24	60	305-360	380-450	366	283	295	T6	S-F	23	1.5	2.2
24	80	360-480	450-600	366	283	295	T6	S-F	25	2.0	2.9
24	100	480-600	600-750	580	310	355	T7	S-F	38	2.5	3.6
36	20	95-120	120-150	242	222	241	T5	S-F	19	0.8	1.1
36	25	120-160	150-200	242	222	241	T5	S-F	20	0.9	1.3
36	30	160-190	200-235	242	222	241	T5	S-F	22	1.1	1.6
36	40	190-250	235-310	242	222	241	T5	S-F	24	1.5	2.1
36	50	250-305	310-380	366	283	295	T6	S-F	26	1.9	2.7
36	60	305-360	380-450	366	283	295	T6	S-F	30	2.3	3.2
36	80	360-480	450-600	366	283	295	T6	S-F	35	3.0	4.3
36	100	480-600	600-750	580	310	355	T7	S-F	41	3.8	5.4
48	20	95-120	120-150	242	222	241	T5	S-F	23	1.0	1.4
48	25	120-160	150-200	242	222	241	T5	S-F	24	1.3	1.8
48	30	160-190	200-235	242	222	241	T5	S-F	25	1.5	2.1
48	40	190-250	235-310	366	283	295	T6	S-F	26	2.0	2.9
48	50	250-305	310-380	366	283	295	T6	S-F	28	2.5	3.6
48	60	305-360	380-450	366	283	295	T6	S-F	31	3.0	4.3
48	80	360-480	450-600	580	310	355	T7	S-F	38	4.0	5.7
48	100	480-600	600-750	580	310	355	T7	S-F	53	5.0	7.1



3-PHASE MODEL LIST

OUTPUT		7 to MAX 8HRS charging time (80%Do)	10 to MAX 12HRS charging time (80%Do)	HOUSING DIMENSIONS (mm)			INSTALLATION	WEIGHT	Port (max)	Pin (app)	
(#)	(A)	Battery Capacity range (Ah)	Battery Capacity range (Ah)	W	D	H	Type	(kg)	LW	LVA	
24	40	195-250	235-310	580	310	355	T7	S-F	40	1.0	1.4
24	60	250-360	310-450	580	310	355	T7	S-F	40	1.5	2.1
24	80	360-480	450-600	580	310	355	T7	S-F	40	2.0	2.8
24	100	480-600	600-750	580	310	355	T7	S-F	46	2.5	3.5
24	120	600-720	750-900	580	310	355	T7	S-F	51	3.0	4.1
24	140	720-840	900-1050	580	310	355	T7	S-F	54	3.5	4.8
24	160	840-960	1050-1200	496	304	782	T9	F	59	4.0	5.5
24	180	960-1080	1200-1350	496	304	782	T9	F	62	4.5	6.2
24	200	1080-1200	1350-1500	496	304	782	T9	F	65	5.0	6.9
36	40	195-250	235-310	580	310	355	T7	S-F	48	1.5	2.1
36	60	250-360	310-450	580	310	355	T7	S-F	50	2.3	3.1
36	80	360-480	450-600	580	310	355	T7	S-F	52	3.0	4.1
36	100	480-600	600-750	580	310	355	T7	S-F	54	3.8	5.2
36	120	600-720	750-900	580	310	355	T7	S-F	59	4.5	6.2
36	140	720-840	900-1050	580	310	355	T7	S-F	62	5.3	7.2
36	160	840-960	1050-1200	496	304	782	T9	F	65	6.0	8.3
36	180	960-1080	1200-1350	496	304	782	T9	F	95	6.8	9.3
36	200	1080-1200	1350-1500	496	304	782	T9	F	100	7.6	10.4
48	40	195-250	235-310	580	310	355	T7	S-F	48	2.0	2.8
48	60	250-360	310-450	580	310	355	T7	S-F	52	3.0	4.1
48	80	360-480	450-600	580	310	355	T7	S-F	53	4.0	5.5
48	100	480-600	600-750	580	310	355	T7	S-F	54	5.0	6.9
48	120	600-720	750-900	580	310	355	T7	S-F	65	6.0	8.2
48	140	720-840	900-1050	496	304	782	T9	F	72	7.1	9.7
48	160	840-960	1050-1200	496	304	782	T9	F	88	8.1	11.0
48	180	960-1080	1200-1350	496	304	782	T9	F	92	9.1	12.4
48	200	1080-1200	1350-1500	496	304	782	T9	F	112	10.1	13.8
72	40	195-250	235-310	580	310	355	T7	S-F	62	3.0	4.0
72	60	250-360	310-450	580	310	355	T7	S-F	64	4.5	6.1
72	80	360-480	450-600	580	310	355	T7	S-F	70	6.0	8.1
72	100	480-600	600-750	496	304	782	T9	F	96	7.6	10.1
72	120	600-720	750-900	496	304	782	T9	F	98	9.1	12.1
72	140	720-840	900-1050	496	304	782	T9	F	110	10.6	14.1
72	160	840-960	1050-1200	558	606	549	TC	F	120	12.1	16.2
72	180	960-1080	1200-1350	558	606	549	TC	F	135	13.6	18.2
72	200	1080-1200	1350-1500	558	606	549	TC	F	140	15.1	20.2
90	40	195-250	235-310	580	310	355	T7	S-F	70	2.4	4.5
90	60	250-360	310-450	580	310	355	T7	S-F	72	5.0	6.7
90	80	360-480	450-600	580	310	355	T7	S-F	98	6.7	9.0
90	100	480-600	600-750	496	304	782	T9	F	78	8.4	11.2
90	120	600-720	750-900	496	304	782	T9	F	112	10.1	13.5
90	140	720-840	900-1050	496	304	782	T9	F	123	11.8	15.7
90	160	840-960	1050-1200	558	606	549	TC	F	139	13.4	18.0
90	180	960-1080	1200-1350	558	606	549	TC	F	144	15.1	20.2
90	200	1080-1200	1350-1500	558	606	549	TC	F	150	16.8	22.5
96	40	195-250	235-310	580	310	355	T7	S-F	78	4.0	5.3
96	60	250-360	310-450	580	310	355	T7	S-F	80	6.0	7.9
96	80	360-480	450-600	496	304	782	T9	F	105	8.1	10.5
96	100	480-600	600-750	496	304	782	T9	F	115	10.1	13.2
96	120	600-720	750-900	558	606	549	TC	F	120	12.1	15.8
96	140	720-840	900-1050	558	606	549	TC	F	130	14.1	18.4
96	160	840-960	1050-1200	558	606	549	TC	F	145	16.1	21.1



INPUT VOLTAGE SETTINGS

The battery chargers are equipped with two adjustment blocks for AC input nominal voltage selection and charging curve optimization.

1. **NOMINAL VOLTAGE SELECTION 3-phase**
This setting is present on chargers designed to operate at different nominal AC input voltages, for specs. 3x230/400 VAC, 3x208/240/480 VAC or 3x480/600 VAC (North American specs).
A screw type terminal block is used for this setting in certain chargers, while a bar-type (delta-wye) standard terminal block is used in other chargers.
2. **NOMINAL VOLTAGE SELECTION 1-phase**
This setting is present on chargers designed to operate at different nominal AC input voltages, for specs 1x230 VAC, 1x120VAC, 1x208/240 VAC or 1x208/240/480 VAC (North American specs).
A screw type terminal block is used for this setting in certain chargers, while a bar-type (delta-wye) standard terminal block is used in other chargers.
3. **CHARGING CURVE OPTIMIZATION**
This setting is present on all chargers, and it's intended to compensate for AC input voltage fluctuations at the installation place.
It is recommended to check the actual value of the available AC input voltage at the installation site, and adjust the output current of the charger accordingly.
A screw type terminal block is used for this setting in all chargers: a single wire needs to be moved in single-phase models, and 3 wires need to be moved in three-phase models.

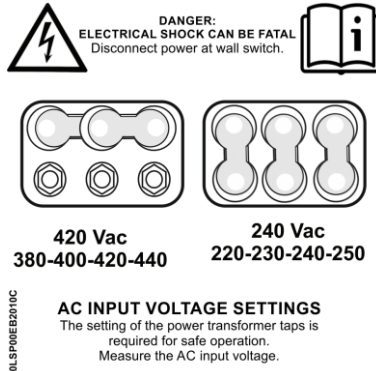
RECOMMENDED OPERATING SEQUENCE

- Disconnect the charger from the AC input and from the battery.
- Measure the AC input voltage, using an adequate voltmeter.
- Open the cabinet or the front door of the charger.
- Find the terminal blocks for NOMINAL VOLTAGE SELECTION and CHARGING CURVE OPTIMIZATION.
- Make the necessary adjustments at the NOMINAL VOLTAGE SELECTION section.
- Make the necessary adjustments at the CHARGING CURVE OPTIMIZATION section.
- Double check that all connections are properly tightened.
- Close the cabinet or the front door of the charger.
- Connect the charger to the AC input.
- Connect the battery to the charger and verify the correct operation, by measuring the DC output current and DC output voltage.

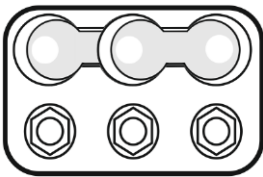
2.1 INSTALLATION 3-phase 3x230/400Vac 50/60Hz

2.1.1 NOMINAL VOLTAGE SELECTION

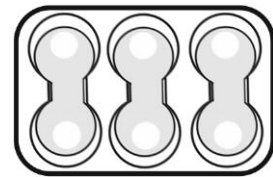
Remove screws from the top and left/right sides in order to open the top cover of the charger.
 If the charger model is designed for AC Multi Input. Please set the internal terminal board according to the nominal AC Mains provided from the grid



AC Mains
380-400-420-440 Vac

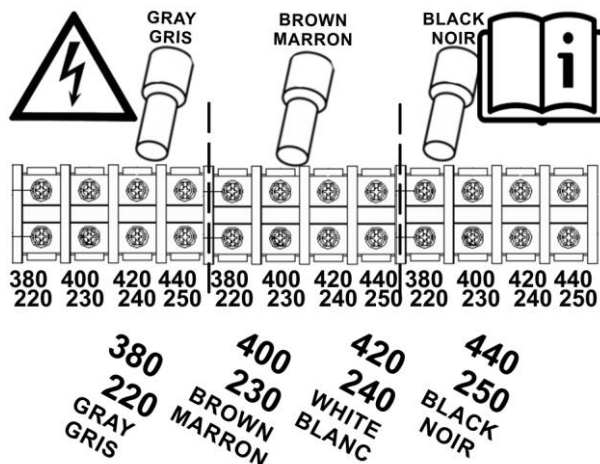


AC Mains
220-230-240-250 Vac



2.1.2 CHARGING CURVE OPTIMIZATION

Please set the internal adjust terminal block with correct AC voltage setting according to AC voltage detect in the AC input line



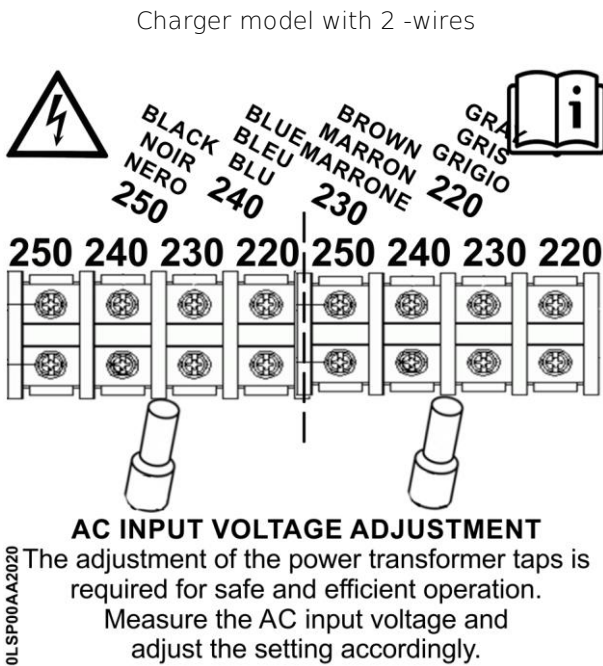
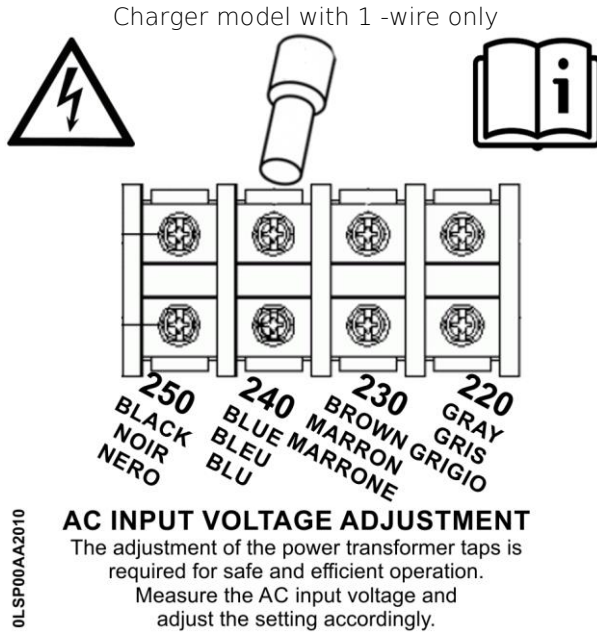
AC INPUT VOLTAGE ADJUSTMENT
 The adjustment of the power transformer taps is required for safe and efficient operation.
 Measure the AC input voltage and adjust the setting accordingly.

0LSP00EB2010

2.2 INSTALLATION 1-phase 1x230Vac 50/60Hz

2.2.1 CHARGING CURVE OPTIMIZATION

Remove screws from the top and left/right sides in order to open the top cover of the charger.
Please set the internal adjust terminal block with correct AC voltage setting according to AC voltage detect in the AC input line

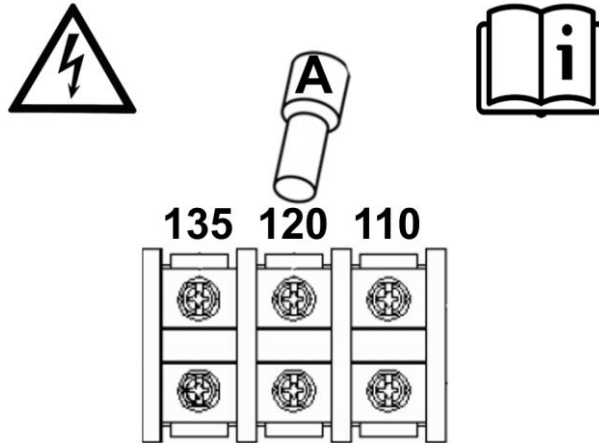


2.3 INSTALLATION 1-phase 1x120Vac 60Hz

2.3.1 CHARGING CURVE OPTIMIZATION

Please remove screws from the top and left/right sides in order to open the top cover of the charger.
Please set the internal adjust terminal block with correct AC voltage setting according to AC voltage detect in the AC input line

Charger model with 1 -wire only



0LSP00BA2010

AC INPUT VOLTAGE ADJUSTMENT


The adjustment of the power transformer taps is required for safe and efficient operation.

Measure the AC input voltage and adjust the setting accordingly.


2.4 INSTALLATION 3-phase 3x208/240/480Vac 60Hz

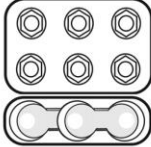
2.4.1 NOMINAL VOLTAGE SELECTION

Remove screws from the top and left/right sides in order to open the top cover of the charger.
 If the charger model is designed for AC Multi Input. Please set the internal terminal board according to the nominal AC Mains provided from the grid

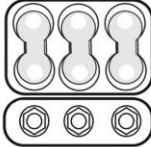


DANGER:
ELECTRICAL SHOCK CAN BE FATAL
 Disconnect power at wall switch.
HAUTE TENSION
 Assurez-vous que alimentation AC
 e la batterie sont déconnectées





480 Vac
455-480-510

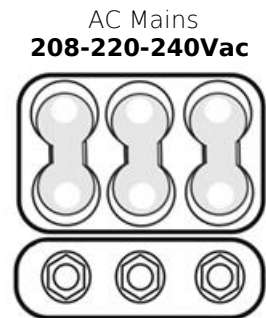


240 Vac
208-225-240

AC INPUT VOLTAGE SETTINGS
 The setting of the power transformer taps is
 required for safe operation.
 Measure the AC input voltage.


SELECTION DE LA TENSION NOMINAL
 Reglécé bar delta-wye

OLSPO0EC2010C



2.4.2 CHARGING CURVE OPTIMIZATION


Please set the internal adjust terminal block with correct AC voltage setting according to AC voltage detect in the AC input line

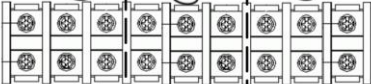


BLACK
NOIR

RED
ROUGE

BLUE
BLEU





455 480 510 455 480 510 455 480 510
 208 225 240 208 225 240 208 225 240

455 480 505
 BROWN BLUE BLACK
 MARRON BLEU NOIR

AC INPUT VOLTAGE ADJUSTMENT
 The adjustment of the power transformer taps is
 required for safe and efficient operation.
 Measure the AC input voltage and
 adjust the setting accordingly.

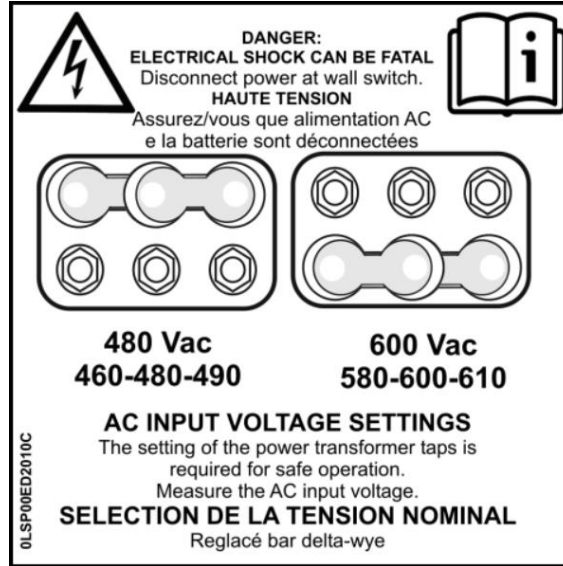
OPTIMISATION DE LA COURBE DE CHARGE

OLSPO0EC2010

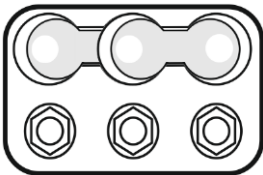
2.5 INSTALLATION 3-phase 3x480/600Vac 60Hz

2.5.1 NOMINAL VOLTAGE SELECTION

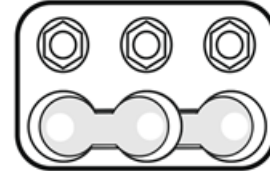
Remove screws from the top and left/right sides in order to open the top cover of the charger.
 If the charger model is designed for AC Multi Input. Please set the internal terminal board according to the nominal AC Mains provided from the grid



AC Mains
 460-480-490 Vac

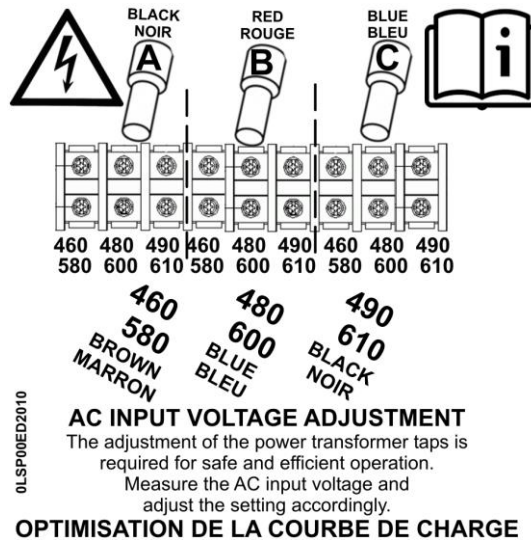


AC Mains
 580-600-610Vac



2.5.2 CHARGING CURVE OPTIMIZATION

Please set the internal adjust terminal block with correct AC voltage setting according to AC voltage detect in the AC input line

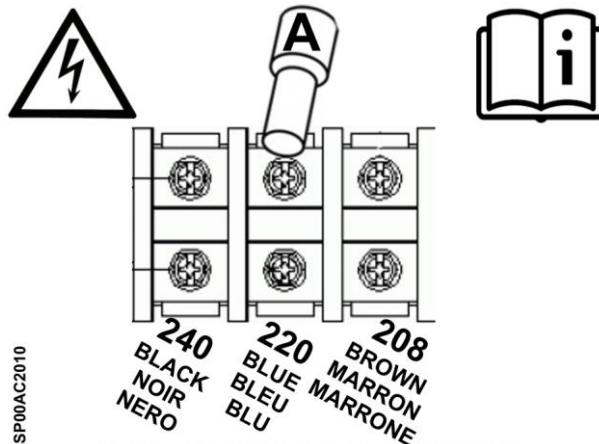


2.6 INSTALLATION 1-phase 1x208/240Vac 60Hz

2.6.1 CHARGING CURVE OPTIMIZATION

Remove screws from the top and left/right sides in order to open the top cover of the charger. Please set the internal adjust terminal block with correct AC voltage setting according to AC voltage detect in the AC input line

Charger model with 1 -wire only



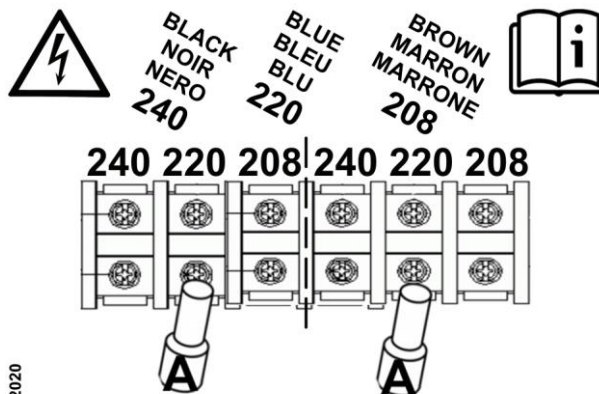
AC INPUT VOLTAGE ADJUSTMENT

The adjustment of the power transformer taps is required for safe and efficient operation.

Measure the AC input voltage and adjust the setting accordingly.

OPTIMISATION DE LA COURBE DE CHARGE

Charger model with 2 -wires



AC INPUT VOLTAGE ADJUSTMENT

The adjustment of the power transformer taps is required for safe and efficient operation.

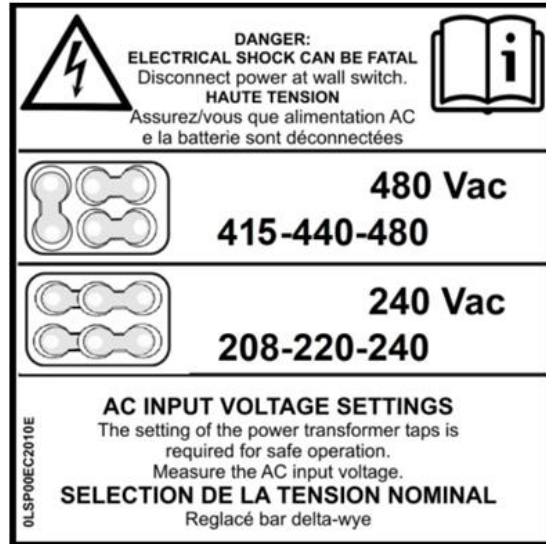
Measure the AC input voltage and adjust the setting accordingly.

OPTIMISATION DE LA COURBE DE CHARGE

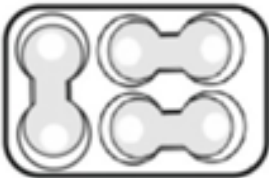
2.7 INSTALLATION 1-phase 1x208/240/480Vac 60Hz

2.7.1 CHARGING CURVE OPTIMIZATION

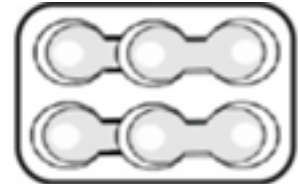
Remove screws from the top and left/right sides in order to open the top cover of the charger. Please set the internal adjust terminal block with correct AC voltage setting according to AC voltage detect in the AC input line



AC Mains
415-440-480 Vac

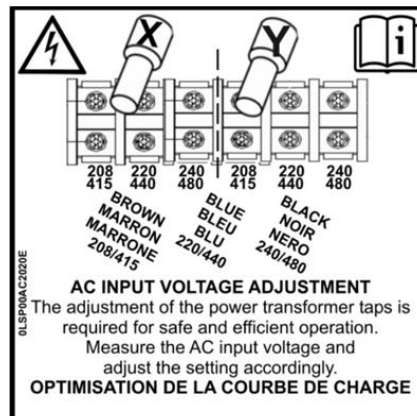


AC Mains
208-220-240 Vac



2.7.2 CHARGING CURVE OPTIMIZATION

Please set the internal adjust terminal block with correct AC voltage setting according to AC voltage detect in the AC input line



3. OPERATION

CONTROL BOARD OPERATION

At the connection of the battery, the Control Board turns on. If the battery and the AC input are properly connected, the charger cycle starts automatically.

According to the internal settings, the charge DC current follows the programmed curve.

When the charger output is active and a DC output current is present, the RGB LED blinks.

Colour RED (blink)

During the 1-phase when the battery voltage is low and the output DC current is high

Colour GREEN (blink)

During the Final Phase when the battery voltage is high and the output DC current is low

Colour BLUE (blink)

During the EQ-phase when the battery voltage is very high and the output DC current is very low

Colour WHITE (blink)- (only in the charge profile Wsa-Taper)

During the Final Phase the charger alternates high current pulses and pauses at zero current in order to reduce the battery temperature. The colour WHITE (blink) identifies the pauses.

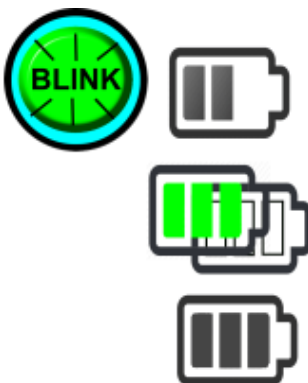
During the first phase of charge, the LED RGB blinks in RED and the Alarm/Warning LED is off.

In this condition the battery voltage is still low, and the output current of the charger is high.



First Phase of Charge

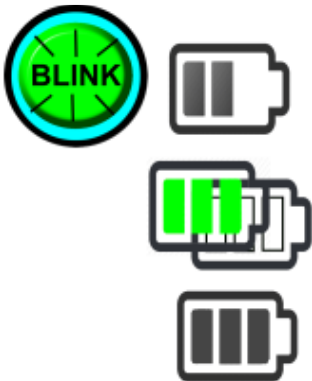
The First Phase will be completed when the battery voltage reaches the Gassing point, after that the charger will begin the Final Phase, where the led RGB blinks in GREEN and the Alarm/Warning LED is off. In this condition the battery voltage is becoming high, and the output current of the charger is low.



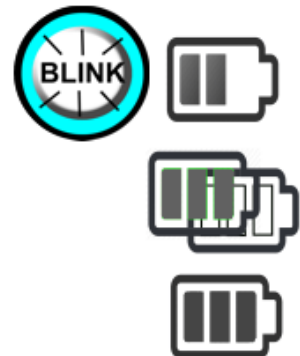
Final Phase of Charge

If the charger is set for WSa charging profile, during the Final phase the charger alternates pulses with high current and pauses with zero current.

The colour WHITE (blink) identifies the pause.

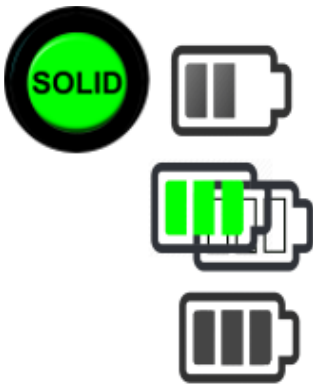


Wsa mode – charger output current high



Wsa mode – charger output current low/pause

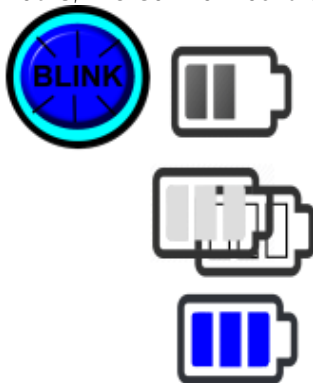
When the Final Charge is completed the control board stops the charge process. The LED RGB is solid in colour GREEN; the charge process is successfully completed.



End of the charge process

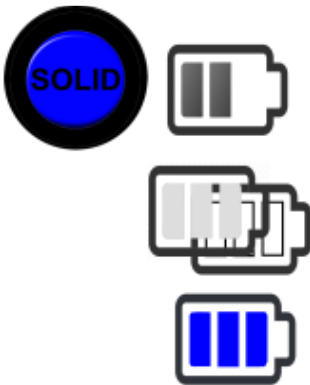
EQUALIZATION CYCLE

After the end of the charge process, if the battery remains connected to the charger for more than 14 hours, the Control Board executes the Equalization cycle.



Equalization Cycle

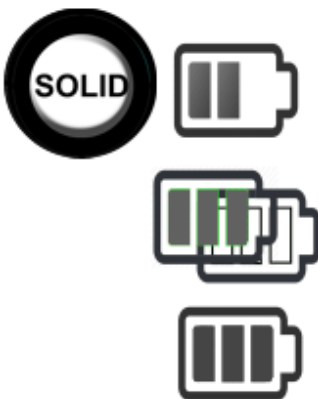
The EQUALIZATION has the function of bringing all the cells to the same state of charge, and to compensate for natural imbalances that occur during the service life of the battery
 At the End of the Equalization Cycle the RGB LED remains on with solid BLUE colour.



End of the charge process and equalization cycles

DELAY ON START

It is possible to set a delay on start, in order to allow the battery to cool down before to begin the charging process, or to allow to the charger to operate during an off-peak energy time window.
 In this case, the charger will wait 1 hour before starting the charge process, and the LED configuration will be WHITE solid during the countdown.
 The delay can be bypassed by pressing the STOP/RE-START button.



Delay on start

WARNING SIGNALS

The RED LED will start blinking in these cases: Manual Stop, Manual EQ, AC input frequency out of range.



Warning Events

MANUAL STOP



DANGER!

Do not disconnect the battery while it's being charged! RISK OF EXPLOSION!
 Always stop the charger by pushing the STOP button, before disconnecting the battery.
 The RGB LED needs to be in solid light, before to disconnect the battery.

Before to disconnect the battery, please check that the charging status, the RGB LED must have a solid light.

If the charger is providing current, it is recommended to press button "STOP/RE-START" in order to interrupt the charging.

When the RED LED flashes and the RGB LED is solid GREEN, it means that the user has properly interrupted the charging or the equalization cycle by pressing the button "STOP/RE-START".

If the user will press again the button "STOP/RE-START", the charger will restart the cycle from where it left off.



Stop Push-button pressed during the charge cycle or during an equalization cycle

MANUAL EQUALIZE

During the charging time, it will be possible to request a manual equalize by pressing the EQ button.

If the RED LED is blinking and the RGB LED is blinking in colour RED or GREEN, it means that the user requested an immediate Equalize cycle after the termination of the standard charge cycle.

The charger is performing a standard cycle, and at the end it will immediately apply the EQ cycle, instead to wait the defined delay.

AC MAINS FREQUENCY OUT OF RANGE

If the RED LED is blinking and the RGB LED is blinking in colour RED or GREEN or BLUE, it means that the charger is detecting a wrong AC input frequency (Hz).

In this condition, the charger keeps working tries to compensate the issue and optimize the charging profile, but due to the wrong frequency coming from the AC line, the total charging time could be extended or reduced.

If this warning persists, it is recommended to check the AC Mains and identify the reason of the wrong frequency. This type of issue may damage other electrical devices, and dramatically impact their efficiency.



BLINK very slowly Wrong frequency detected – slow BLINK

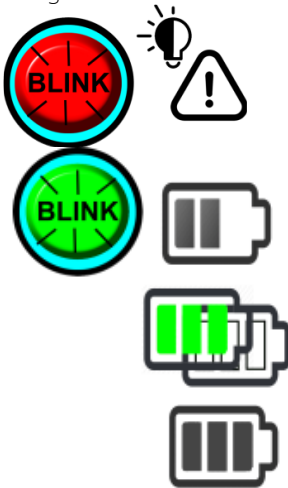
HOT DISCONNECTION



DANGER!

Do not disconnect the battery while it's being charged! RISK OF EXPLOSION!
Always stop the charger by pushing the STOP button, before disconnecting the battery.

When the RGB blinks, the charger is active. Do not disconnect the battery!
When the RGB LED shows a SOLID colour (including white), it is possible to disconnect the battery.
The charger is able to detect the "HOT DISCONNECTION". In this case the charger will show this LED configuration for a few seconds (refer also to UNEXPECTED EVENTS), before turning off completely.



Unexpected disconnection!

4. CONTROL BOARD ALARMS AND TROUBLESHOOTING

If the Alarm/Warning RED LED is solid means that the charge cycle or an Equalization cycle has been interrupted due to an alarm.



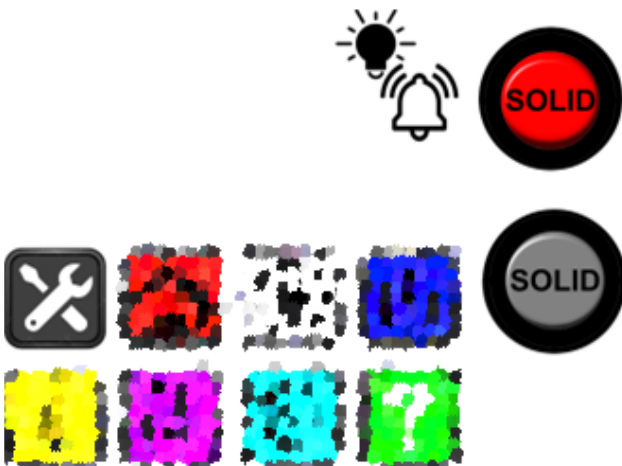
The RGB LED shows the cause of the alarm:

- AC Line contactor failure
- Battery voltage too high
- AC Input failure
- Gassing Voltage not reached. Exceeded charging Time Out in First Phase
- Battery Temperature too high
- Battery type mismatch
- Control Board fails or wrong AC Input setting
- Unexpected events

4.1 AC LINE CONTACTOR FAILURE (only models 3-phase)



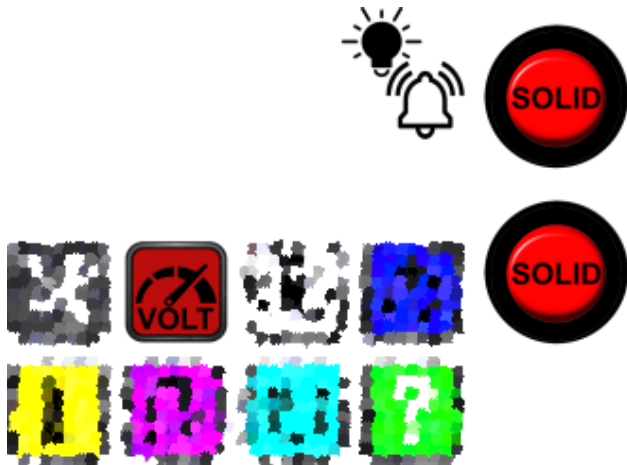
The control board is equipped with an internal circuit designed to automatically detect if the AC line contactor is faulty. In order to fix this issue, it will be necessary to replace the failed component. Please see troubleshooting guide. Section: AC Line contactor



4.2 BATTERY VOLTAGE TOO HIGH



The battery voltage reached during the charging cycle or during the equalization cycle is too high, the charge cycle is terminated.
 In order to fix this issue, it will be important check the battery status, evaluate voltage of every cell and check intercell connections.
 It is recommended to check also the power connections in the DC Plug and DC Socket and in the charger inner parts, in order to identify if the torque of a power connection is insufficient.



ISSUE	CAUSES	FIX
Alarms appear. During the charging cycle	Battery sulphated	Repair battery.
	Battery nominal voltage is not correct	Check compatibility between battery voltage and charger voltage
	One or more cells are shorted.	Repair battery.

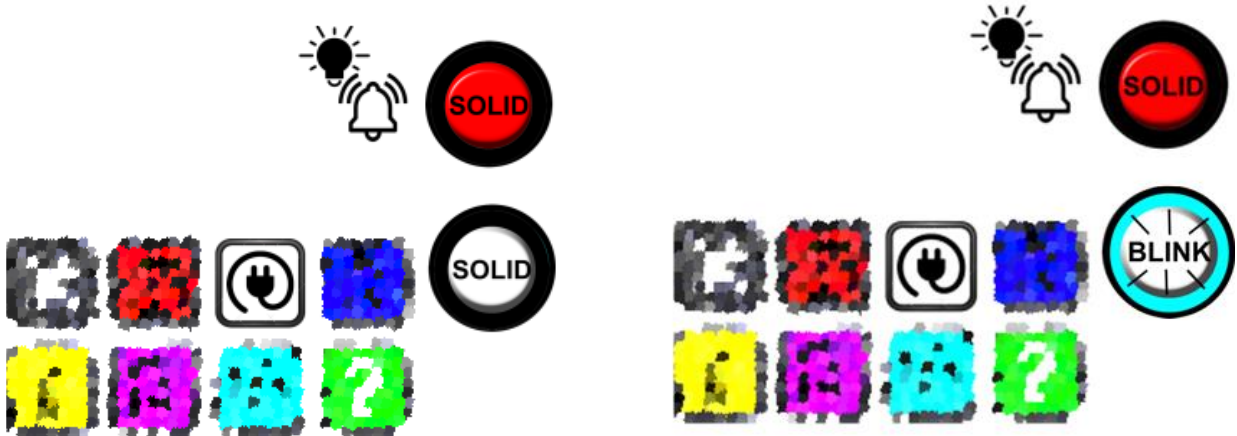
4.3 AC INPUT FAILURE, OUTPUT CURRENT TOO HIGH



If, during the charge process, the AC Input fails, the Control Board stores in memory the status of the charge process. After 20 minutes, If the AC Input is restored, the charge process restarts automatically from the point of interruption.

While the AC Input fails or missing, the Red Alarm LED is solid and the RGB LED is solid colour white.

In order to fix this issue, it will be important check the AC input voltage and the internal AC input settings. Please see troubleshooting guide. Section: AC Input voltage



SOLID WHITE: AC INPUT FAILURE

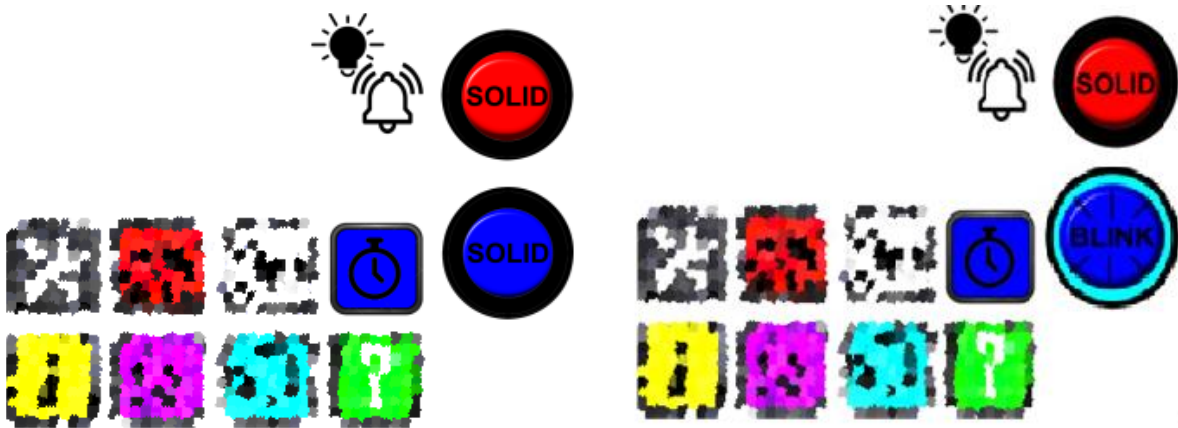
BLINK WHITE: OUTPUT CURRENT TOO HIGH

ISSUE	CAUSES	FIX
Alarms appear. During the charging cycle	Wrong AC input settings.	Adjust AC input settings to lower voltage.
	Output fuse blown.	Replace output fuse and adjust AC input setting.

4.4 TIME OUT – GASSING VOLTAGE NOT REACHED



The battery voltage hasn't reached the gassing point within 12 hours of charge. Please check the battery nominal voltage and the charger nominal matching. Please check the AC input mains value, and check the internal AC input setting of the charger. it will be important check the battery status, evaluate voltage of every cell and check intercell connections.



Solid Blue: Overtime during charge, The battery Did not reach the gassing voltage

Blink Blue: Overtime during max power operation

ISSUE	CAUSES	FIX
Alarms appear. During the charging cycle	Wrong AC input settings.	Adjust AC input settings to lower voltage.
	Battery nominal voltage is not correct	Check compatibility between battery voltage and charger voltage
	Output fuse blown.	Replace output fuse and adjust AC input setting.
	One or more cells are shorted.	Repair battery.

4.5 TEMPERATURE TOO HIGH



CASE A) Temperature sensor not installed on the battery and not installed on the charger

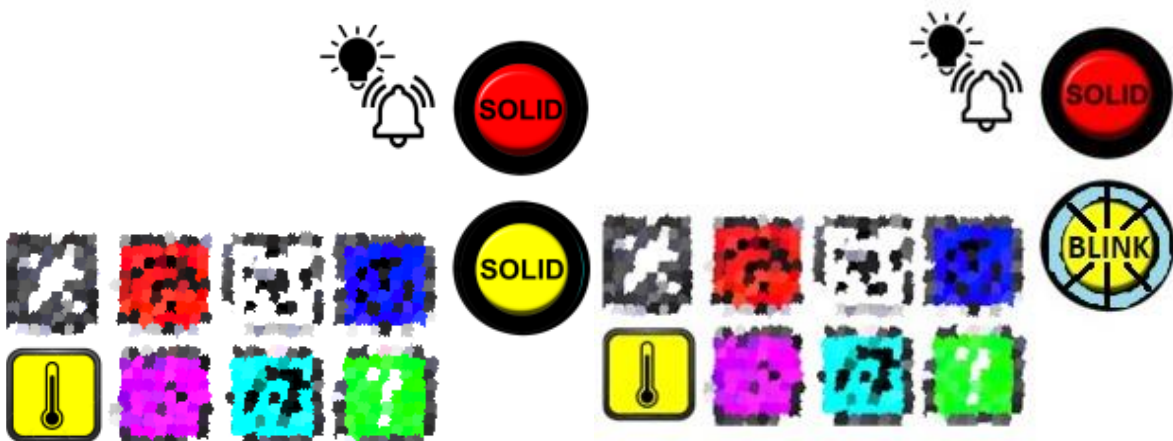
During normal operation, if the control board detects an overtemperature condition inside the charger, it will automatically shut down the charger and apply a cooling pause of approximately 30 minutes. If the problem persists, check the internal parts of the charger, clean internal components from dust, Check connections and other main components, check the internal and external ventilation. Please evaluate to install the charger in a different position
See section: INSTALLATION

CASE B) Temperature sensor installed on the battery

If an NTC100 sensor has been installed on the battery. During normal operation, if the control board detects an high temperature condition on the battery sensor, the charger will interrupt the charge and apply a cooling pause, at the end of the pause, the charger will restart from the point where it stopped.

CASE C) Temperature sensor installed on the charger

If an NTC100 sensor has been installed inside or outside the charger. During normal operation, if the control board detects an high temperature condition on the NTC100 sensor, the charger will interrupt the charge and apply a cooling pause, at the end of the pause, the charger will restart from the point where it stopped.



Solid Yellow: High temperature detected from NTC100 installed in the Battery or Charger

Blink Yellow: High temperature detected from the internal charger sensor

ISSUE	CAUSES	FIX
Alarms appear. During the charging cycle	AC input mains is too high or it is too low	Please check AC mains and the charger AC input setting
	Charger ventilation slots obstructed or bad location	Please check charger installation and location, in order to allow ventilation. Remove objects which may obstruct slots.
	Battery high temperature	Please check battery installation and battery location, in order to allow ventilation. Please evaluate to reduce the charger current

4.6 BATTERY TYPE MISMATCH



Possible faulty conditions:

The battery voltage is too low: the charge cycle doesn't begin.

The battery voltage is too high: the charge cycle doesn't begin.

The charge current is too high: the charger shuts down immediately.



BATTERY NOMINAL VOLTAGE ERROR
 BATTERY NOMINAL VOLTAGE LOW
 BATTERY NOMINAL VOLTAGE HIGH



BATTERY VOLTAGE TOO LOW AFTER 1 HOUR
 OF CHARGING

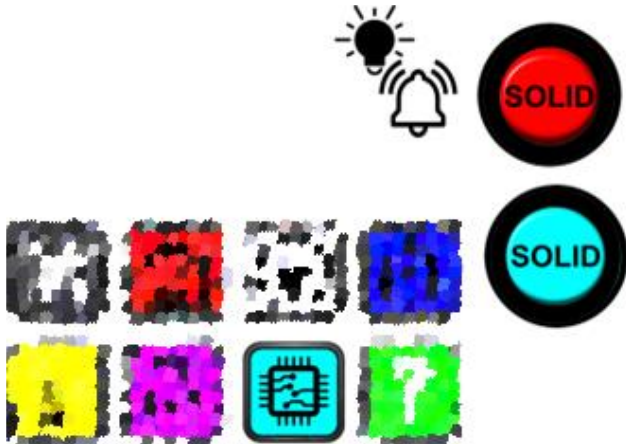
ISSUE	CAUSES	FIX
Alarms appear. The charger is not starting	Battery not connected properly.	Check battery connectors/harness.
	Output cables reversed.	Check charger, connectors and battery polarities. Output fuse is probably blown.
	Battery nominal voltage is not correct	Check compatibility between battery voltage and charger voltage

4.7 CONTROL BOARD FAILURE



If this alarm appears immediately after the connection of the battery, the control board has been damaged or some internal component failed. Please replace the control board.

If this alarm appears during the charging, it will be necessary to check the AC input voltage and the transformer tap settings. Please see troubleshooting guide. Section: AC Input voltage



<i>ISSUE</i>	<i>CAUSES</i>	<i>FIX</i>
Charger connected to the battery, and LED controls are OFF.	Battery not connected properly.	Check battery connectors/harness.
	Output cables reversed.	Check charger, connectors and battery polarities. Output DC fuse is probably blown.
	Bad control board connection.	Check board connectors
	Bad control board.	Replace control board.

4.8 GENERIC MALFUNCTION



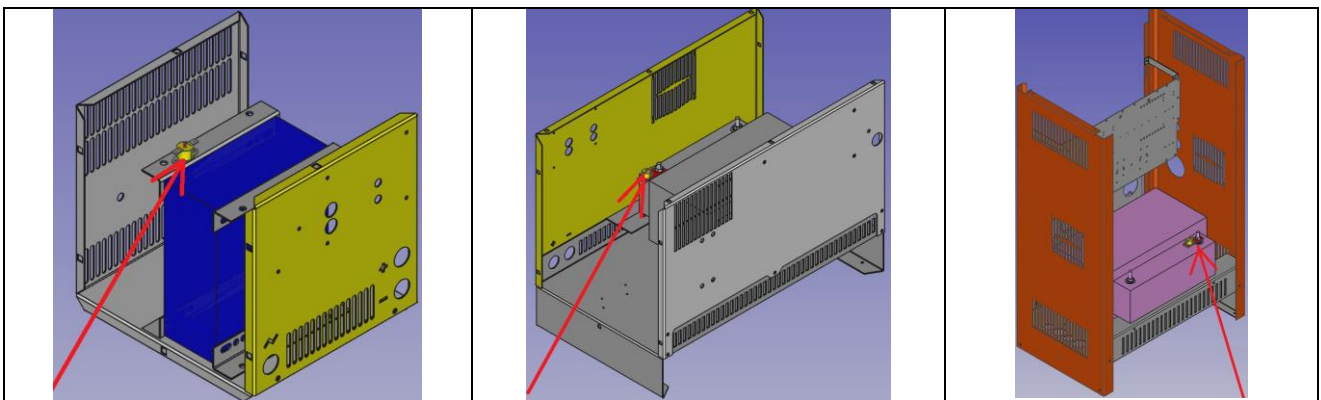
The control board detected a generic malfunction, but it is not able to identify the cause. Please check input and output cables and internal connections. It's recommended to clean the charger, remove the accumulated dust and do a visual inspection.



4.9 NO ALARM – LEDs NO FLASHING

After the connection of the DC plug, the charger is not starting to charge. Both Led and RGB Led are not providing any light information. The charger seems totally OFF.

ISSUE	CAUSES	FIX
The charger is not starting, Leds are not flashing	Battery not connected properly.	Check battery connectors/harness.
	Output cables reversed.	Check charger, connectors and battery polarities. Output fuse is probably blown.
	Internal Thermal protector is enabled	Please check charger installation and location, in order to allow ventilation. Remove objects which may obstruct slots. Manually Reset the Thermal Protector



Push the button, in order to apply a Manual Reset to the Internal Thermal protector