PLUS 25, PLUS 30, PLUS 40, PLUS 40/L, PLUS 12-24/20, PLUS 24-24/20
GOLD 25-M, GOLD 30-M, GOLD 40-M, GOLD 40-M/L, GOLD 12-24-M, GOLD 24-24-M

POWERSERVICE

POWER CHARGER

PLUS

GOLD

USER MANUAL

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INTRODUCTION

POWERSERVICE IS THE SPECIAL LINE OF DC-DC/AC-DC CHARGERS DESIGNED, **PATENTED** AND ASSEMBLED BY **NDS**, WHICH ENSURE AN EFFICIENT CHARGE TO THE SERVICE BATTERIES, GUARANTEEING 50% MORE CHARGE THAN THE ALTERNATOR ONLY. **POWERSERVICE** UNITS SAFEGUARD BATTERY LIFE WITH SPECIFIC CHARGE CURVES FOR ALL TYPES OF BATTERIES.

ESSENTIAL EQUIPMENT FOR INSTALLATION

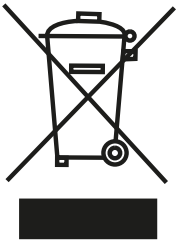
CERTAIN MEASURING INSTRUMENTS ARE ESSENTIAL FOR A CORRECT INSTALLATION:

- **MULTIMETER** WITH CONTINUOUS VOLTAGE MEASUREMENT (20V SCALE OR AUTOSCALE) AND CONTINUITY MEASUREMENT.
- **CLAMP METER** WITH DC CURRENT MEASUREMENT (40A SCALE AND ABOVE).

WARNING

- CHILD SAFETY: KEEP THE DEVICE OUT OF REACH.
- CAREFULLY CHECK THE INTEGRITY OF THE DEVICE AND CONNECTORS.
- TO AVOID OVERHEATING AND POSSIBLE FIRES DO NOT INSTALL THE DEVICE IN A SEALED ENVIRONMENT, ALWAYS CHOOSE A WELL VENTILATED AREA.
- DO NOT PLACE THE DEVICE ON HIGHLY FLAMMABLE SURFACES OR ENVIRONMENTS (EG: PAPER, CLOTH, ETC.).
- DO NOT COVER THE COOLING SLITS ON THE SIDE AND THE FAN ON THE TOP.
- DO NOT INSTALL THE DEVICE NEAR FLOODED BATTERIES: THEY PRODUCE FLAMMABLE, CORROSIVE AND EXPLOSIVE GAS WHILE WORKING, AND IT CAN DAMAGE THE PRODUCT.
- PROTECT THE DEVICE FROM SUNLIGHT OR DIRECT SOURCES OF HEAT.
- TO AVOID MALFUNCTIONS, DO NOT INSTALL AND USE THE DEVICE IN VERY HUMID ENVIRONMENTS, IN CONTACT WITH WATER SPLASHES, VARIOUS LIQUIDS, OR EXPOSED TO RAIN.
- TO AVOID RISK OF ELECTRIC SHOCK AND/OR FIRE, THE VEHICLE'S FUEL SYSTEM MUST BE IN GOOD CONDITION.

- IN CASE OF DAMAGED CONNECTING CABLES OR INADEQUATE SECTION, IMMEDIATELY REPLACE THEM WITH SUITABLE CABLES AS SPECIFIED BY THIS MANUAL OR BY A QUALIFIED ELECTRICIAN.
- DO NOT USE THE DEVICE WITH DAMAGED CABLES AND/OR INADEQUATE SECTION.
- IN CASE OF ANOMALIES IN THE CONFORMITY OF THE PRODUCT DO NOT USE IT! IT IS STRICTLY FORBIDDEN TO OPEN THE DEVICE. REPAIRS MAY ONLY BE CARRIED OUT BY QUALIFIED TECHNICAL PERSONNEL USING ORIGINAL SPARE PARTS.
- KEEP THE INSTRUCTION MANUAL NEAR THE DEVICE FOR EASY ACCESS TO THE ESSENTIAL SAFETY, USE AND MAINTENANCE INFORMATION.
- THE INFORMATION CONTAINED IN THIS MANUAL MAY BE CHANGED WITHOUT NOTICE. NDS ENERGY S.R.L. RESERVES THE RIGHT TO MAKE CHANGES AND IMPROVEMENTS TO THE PRODUCT AT ANY TIME WITHOUT NOTICE AND WITHOUT OBLIGATION TO APPLY THESE CHANGES TO THE DEVICES PREVIOUSLY DISTRIBUTED.
- THE IMAGES OF THE PRODUCTS ARE PURELY INDICATIVE AND MAY THEREFORE NOT BE FULLY REPRESENTATIVE OF THE CHARACTERISTICS OF THE PRODUCT, DIFFERING IN COLOR, SIZE OR ACCESSORIES.

	THIS ELECTRONIC DEVICE IS SUBJECT TO THE EUROPEAN DIRECTIVE 2012/19/EU. ACCORDING TO THE LOCAL WASTE DISPOSAL ROULES, DO NOT DISPOSE OF OLD PRODUCTS WITH NORMAL HOUSEHOLD WASTE. THE PROPER DISPOSAL OF PRODUCTS THAT CAN NO LONGER BE USED PREVENTS POTENTIAL NEGATIVE CONSEQUENCES FOR THE ENVIRONMENT AND FOR THE POPULATION.

DESCRIPTION

THE **POWERSERVICE** CHARGER LINE HAS BEEN DESIGNED TO GUARANTEE RELIABILITY AND MAXIMUM CHARGING PERFORMANCE SIMPLY AND AUTOMATICALLY, RESPONDING TO THE NEEDS OF THE MOST DEMANDING TRAVELLERS TO GET MAXIMUM ENERGY IN THE SHORTEST POSSIBLE TIME. **POWERSERVICE** ALLOWS YOU TO CORRECTLY CHARGE ONE OR MORE LEISURE/SERVICE BATTERIES (WITH CAPACITIES EXCEEDING 75AH) TO MAXIMUM POWER, MAKING THE MOST OF ALL AVAILABLE SOURCES OF ENERGY ON A MOTORHOME OR CAMPERVAN.

POWERSERVICE INCLUDES TWO ADVANCED MODELS

- **PLUS: CHARGER DC-DC** - CHARGES FROM ALTERNATOR AND SOLAR PANEL.
- **GOLD: CHARGER DC-DC | AC-DC** - CHARGES FROM ALTERNATOR, SOLAR PANEL AND EXTERNAL MAIN ELECTRICITY SUPPLY.

MAIN FEATURES:

- RECHARGING AT UP 40 AMPS PER HOUR OF TRAVEL.
- HIGH EFFICIENCY, UP TO 92%.
- 5 STEP RECHARGING
- SELECTABLE CHARGING CURVE: AGM, GEL, FLOODED, LITHIUM.
- AUX CONNECTION FOR EXISTING SYSTEMS.
- SPLIT-CHARGE RELAY SEPARATES ENGINE AND SERVICE BATTERIES.
- COMPATIBLE WITH EURO 6 SYSTEMS WITH SMART ALTERNATOR.
- CHARGE MANAGEMENT WITH MICROPROCESSOR.
- FAN SPEED REGULATED BY TEMPERATURE AND OPERATING POWER, FOR A SILENT AND EFFICIENT DEVICE.
- PROTECTION BY INTERNAL FUSES.
- ALTERNATOR PROTECTION (IN CASE OF OVERLOAD).
- CHARGING PHASE & POWER SOURCE INDICATION BY LEDS.
- POWER SUPPLY FUNCTION IF BATTERY IS NOT PRESENT.
- EMERGENCY SWITCH REVERTS TO ORIGINAL CHARGING SYSTEM IN CASE OF FAILURE.
- QUIET, COMPACT AND EASY TO INSTALL.

THE INNOVATIVE CIRCUITRY IN THE **POWERSERVICE** UNIT GUARANTEES GREATER EFFICIENCY BY REDUCING ENERGY EXPENDITURE. OUTPUT CURRENT IS REGULATED BOTH ACCORDING TO THE NEEDS OF SERVICE BATTERIES AND TO THE QUANTITY OF INPUT ENERGY. WHILE TRAVELLING THE DEVICE GRADUALLY REDUCES THE OUTPUT CURRENT IN THE EVENT THAT THE ALTERNATOR IS IN OVERLOAD CONDITIONS (EG: AT NIGHT WITH LIGHTS ON, AIR CONDITIONER ON, ENGINE IDLING AND ENGINE FAN ON, ETC ...). THE COOLING FAN IS ACTIVATED ONLY IF NECESSARY AND THE ROTATION SPEED IS ELECTRONICALLY CONTROLLED ACCORDING TO THE TEMPERATURE INSIDE THE DEVICE KEEPING FAN NOISE TO MINIMUM.

MODELS

HERE ARE THE TWO **POWERSERVICE** MODELS:

POWERSERVICE PLUS:

- **CHARGES FROM ALTERNATOR.**
- **CHARGES FROM SOLAR PANEL (INTEGRATED PWM SOLAR REGULATOR)**

12V			
CODE	MAX OUTPUT CURRENT WITH 12V ALTERNATOR	MAXIMUM POWER WITH SOLAR PANEL	MAXIMUM VOLTAGE OPEN CIRCUIT WITH SOLAR PANEL
PLUS 25	25A	250W	28V
PLUS 30	30A	250W	28V
PLUS 40	40A	250W	28V

24V			
PLUS 12-24/20	20A	N/D	N/D
PLUS 24-24/20	20A	N/D	N/D

POWERSERVICE GOLD:

- CHARGES FROM ALTERNATOR
- CHARGES FROM SOLAR PANEL (INTEGRATED PWM SOLAR REGULATOR)
- CHARGES FROM EXTERNAL MAINS ELECTRICITY SUPPLY

12V				
CODE	MAX OUTPUT CURRENT WITH 12V ALTERNATOR	MAXIMUM POWER WITH PANEL	MAXIMUM VOLTAGE OPEN CIRCUIT WITH SOLAR PANEL	MAXIMUM CURRENT FROM GRID 90VAC-250VAC
GOLD 25-M	25A	250W	28V	20A
GOLD 30-M	30A	250W	28V	20A
GOLD 40-M	40A	250W	28V	20A
24V				
GOLD 12-24-M	20A	N/D	N/D	10A
GOLD 24-24-M	20A	N/D	N/D	10A

PROTECTION

POWERSERVICE UNITS ARE EQUIPPED WITH SEVERAL PROTECTION SYSTEMS TO ENSURE A HIGH LEVEL OF SAFETY AND SECURITY:

- START-UP WITHOUT SUDDEN CHANGES IN CURRENT AND VOLTAGE (SOFT START)
- ALTERNATOR OVERLOAD PROTECTION
- BATTERY OVERVOLTAGE ALARM
- OUTPUT FUSE FAILURE ALARM
- SOLAR PANEL OVERVOLTAGE ALARM
- UNDER AND OVER-TEMPERATURE PROTECTION

BATTERY OVERVOLTAGE ALARM	THE INTERNAL ACOUSTIC BUZZER IS ACTIVATED BY A BATTERY VOLTAGE ABOVE 17V, THE CHARGE IS INTERRUPTED
PROTECTION FOR ALTERNATOR OVERLOAD	POWER SERVICE AUTOMATICALLY SHUTS OFF IF THE INPUT VOLTAGE FROM THE ALTERNATOR AND / OR THE ENGINE BATTERY FALLS BELOW 12.8V
OVER-TEMPERATURE PROTECTION	REDUCES THE OUTPUT CURRENT IN RELATION TO THE SYSTEM OVERHEATING AND TURNS OFF, REACTIVATING AUTOMATICALLY WHEN THE TEMPERATURE OF THE DEVICE RETURNS TO AN ACCEPTABLE LEVEL
ALARM FOR OUTPUT FUSE FAILURE	THE INTERNAL ACOUSTIC BUZZER WARNS WITH AN ALARM IF THERE IS A SUDDEN FAILURE OF THE OUTPUT FUSES
SOLAR PANEL OVERVOLTAGE ALARM	THE ACOUSTIC BUZZER WARNS IF THE PHOTOVOLTAIC PANEL CONNECTED TO THE DEVICE HAS AN INCORRECT OPERATING VOLTAGE, HIGHER THAN 28V
TEMPERATURE TOO LOW ALARM	THE LEDS INDICATES THAT THE EXTERNAL TEMPERATURE IS -2°C

INSTALLATION

POWERSERVICE CAN BE INSTALLED EASILY AND SECURELY THANKS TO THE EXTERNAL FLANGES (ALUMINUM FEET).

THE IDEAL MOUNTING POSITION IS SMOOTH, WELL VENTILATED AND NOT SUBJECT TO OVERHEATING; AVOID SURFACES COVERED WITH FABRIC OR CARPET. INSTALL THE DEVICE AS CLOSE AS POSSIBLE TO THE SERVICE BATTERIES.

POWERSERVICE CAN WORK IN ANY POSITION; IF INSTALLED ON A VERTICAL WALL, IT IS RECOMMENDED TO KEEP THE SHORT SIDE PARALLEL TO THE FLOOR, WITH CONNECTIONS DOWNWARDS. DO NOT INSTALL THE DEVICE CLOSE TO SOURCES OF HEAT OR IN A PLACE THAT IS NOT ADEQUATELY VENTILATED AND THAT COULD REACH VERY HIGH TEMPERATURES (EG. ENGINE COMPARTMENT).

CONNECTIONS

THE DEVICE HAS A SEVEN (7) TERMINAL BLOCK FOR POWER CONNECTIONS FOR CABLES UP TO 16mm^2.

PLUS

GOLD

1. - (NEGATIVE) CONNECTION FROM THE STARTER BATTERY
2. - (NEGATIVE) CONNECTION OF THE SERVICE BATTERY
3. + (POSITIVE) CONNECTION FROM THE STARTER BATTERY
4. D+ SIGNAL FROM THE ALTERNATOR OR IGNITION+ SIGNAL LINE
5. AUX: CONNECTION OF THE EXISTING CONTROL UNIT (SARGENT, SCHAUDT, ETC.)
6. OUTPUT OF THE CHARGER (CONNECTS TO THE POSITIVE TERMINAL OF THE SERVICE BATTERY)
7. SOLAR PANEL DIRECT CONNECTION 12V NOMINAL (MAXIMUM VOLTAGE WITH OPEN CIRCUIT LOWER THAN 28V).
8. DEBUG AND UPDATE CONNECTION (NDS INTERNAL USE).
9. IEC SOCKET FOR THE CONNECTION OF THE MAINS POWER SUPPLY (ONLY FOR GOLD SERIES)

NOTE: THE NEGATIVE PINS N°1 AND 2 ARE INTERNALLY CONNECTED TO EACH OTHER.

SPECIFIC AUX CONNECTION (PIN NO. 5) FOR THE FOLLOWING MODELS: PLUS 25, PLUS 30, PLUS 40, PLUS 24-24 / 20, GOLD 25-M, GOLD 30-M, GOLD 40-M, GOLD 24-24-M.

POWERSERVICE HAS AN AUXILIARY TERMINAL: (TERMINAL N°5) DEDICATED TO THE ORIGINAL CONTROL UNIT OUTPUT (EG CBE, SARGENT, SCHAUDT, NORD ELETTRONICA) OR TO THE SPLIT-CHARGE RELAY. THIS TERMINAL IS USED TO CONNECT APPLIANCES SUCH AS THE FRIDGE, LIGHTS, PUMP, ETC. ALL THE CABLES THAT WERE ORIGINALLY CONNECTED TO THE LEISURE BATTERY'S POSITIVE TERMINAL SHOULD BE CONNECTED TO THIS AUXILARY INPUT (5).
A RELAY WITH NORMALLY CLOSED CONTACT IS ACTIVE ON PIN N°5 (AUX) AND INTERNALLY CONNECTED TO PIN N°6 (EXIT PIN). THE NORMALLY OPEN CONTACT IS CONNECTED TO INPUT B+ (PIN N°3), SO IF THE IGNITION+ SIGNAL LINE IS NOT ACTIVE (ENGINE OFF) THE APPLIANCE WILL BE POWERED BY THE SERVICE BATTERY. WHEN THE ENGINE IS RUNNING THE INTERNAL RELAY WILL SWITCH ON THE AUX AND THE LOADS WILL BE POWERED DIRECTLY BY THE ALTERNATOR, INPUT B+. THE SERVICE BATTERY WILL BE FREE OF LOADS, ALLOWING THE **POWERSERVICE** TO FURTHER ACCELERATE THE CHARGE WHILE DRIVING.
IN CASE OF VEHICLES WITHOUT A CONTROL UNIT (SELF-BUILD VEHICLES FOR EXAMPLE), AND/OR A VEHICLE WITH THE ELECTRICAL SYSTEM BEING INSTALLED FOR THE FIRST TIME,, THE AUX INPUT (PIN N°5) WILL HAVE THE SAME OPERATION INDICATED ABOVE. IT IS ALWAYS ADVISABLE TO INSTALL AN EXTERNAL "SPLIT-CHARGE RELAY", SINCE IT GUARANTEES THE RECHARGING OF THE SERVICE BATTERY IN CASE OF MALFUNCTIONS, TAKING POWER DIRECTLY FROM THE ALTERNATOR.

NOTE: TO TAKE ADVANTAGE OF DIRECT CHARGING FROM THE ALTERNATOR, THE POWERSERVICE SWITCH MUST BE MOVED TO POSITION O. THE NORMAL POSITION IS 1.

INSTALLATION

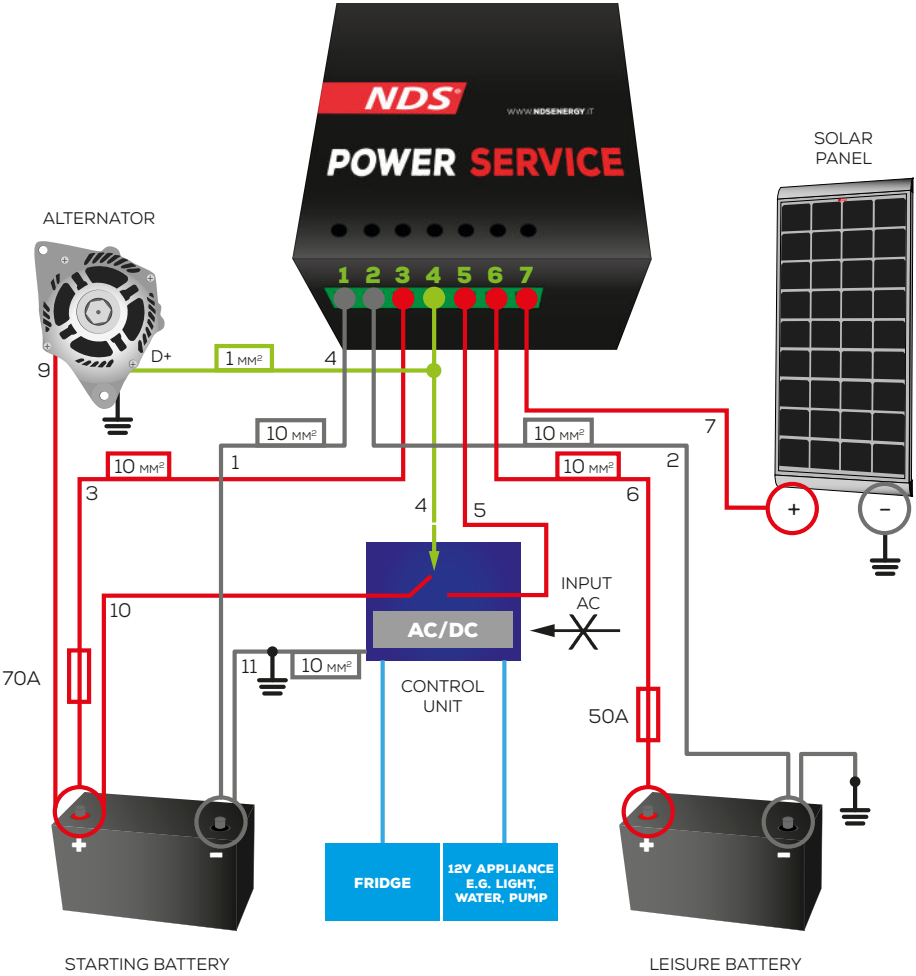
POWER SERVICE GOLD VERSION INTEGRATES A 230VAC BATTERY CHARGER, THEREFORE OTHER PRE-EXISTING CHARGERS, BOTH EXTERNAL OR INTEGRATED INTO THE CONTROL UNIT MUST NOT TO BE USED.

1. SET THE POWER SWITCH TO 0.
2. CONNECT THE NEGATIVE POLE OF THE STARTER BATTERY TO **POWERSERVICE** PIN N°1.
3. CONNECT THE FUSE HOLDER TO THE POSITIVE POLE OF THE STARTER BATTERY.
4. CONNECT THE OTHER END OF THE FUSE HOLDER TO PIN N°3 OF THE **POWERSERVICE.**
5. INSERT A 70A FUSE INTO THE FUSE HOLDER.
6. CONNECT THE NEGATIVE TERMINAL OF THE SERVICE BATTERY TO PIN NO. 2 OF THE **POWERSERVICE**.
7. DISCONNECT ALL THE CABLES ON THE POSITIVE POLE OF THE SERVICE BATTERY AND CONNECT THEM TO PIN N°5 OF THE **POWERSERVICE** (NOT VALID FOR MODELS PLUS 12-24 AND GOLD 12-24)
8. CONNECT THE SERVICE BATTERY POSITIVE POLE TO PIN N°6 OF THE **POWERSERVICE**
9. CONNECT THE D+ OR IGNITION+ SIGNAL WIRE TO THE **POWERSERVICE** PIN N°4.
10. ONLY FOR GOLD MODELS: CONNECT THE 230VAC MAINS SUPPLY TO THE INPUT IEC CONNECTOR. LINK THE CONNECTION AFTER THE GENERAL SYSTEM SAFETY SWITCH (RCD SWITCH).

NOTE

- THE DATA CONNECTOR (PLACED ON THE RIGHT OF THE POWER CONNECTOR) IS FOR TECHNICAL USE. IT IS STRICTLY FORBIDDEN TO CONNECT ANY DEVICE IN THIS SOCKET, ANY TAMPERING COULD IRREPARABLY DAMAGE THE APPLIANCE.
- USE CABLES WITH A CROSS-SECTION OF AT LEAST 10mm² FOR: CONNECTIONS BETWEEN ENGINE BATTERY AND POWER SERVICE, AND IN THE OUTPUT TOWARDS THE SERVICE BATTERY. IF THE DISTANCE BETWEEN THE MOTOR BATTERY AND THE DEVICE EXCEEDS 2 METERS, IT'S RECOMMENDED TO INCREASE THE CABLE SECTION, TO REDUCE VOLTAGE DROP AND POWER LOSSES.

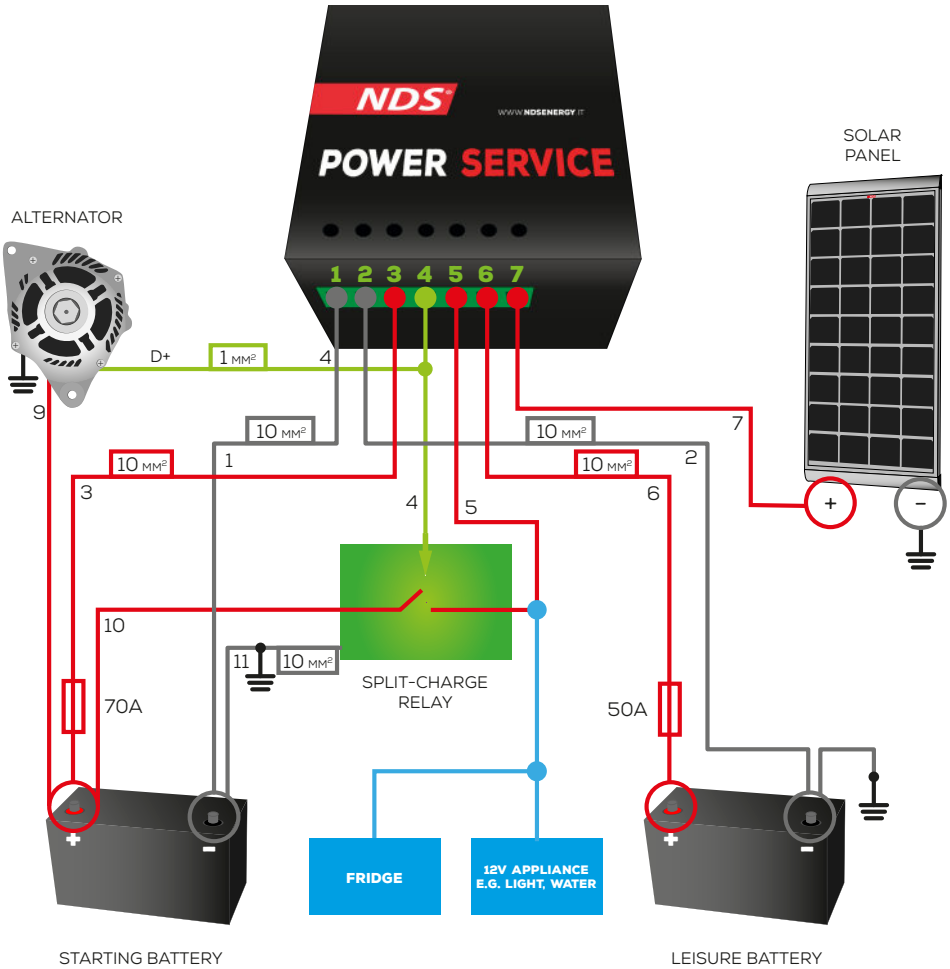
INSTALLATION IN VEHICLE WITH EXISTING CHARGING SYSTEM USING CONTROL UNIT/PARALLEL RELAY



FOR CABLES LONGER THAN 2 METERS USE 16mm² CABLES

FOR THE CONTROL UNIT WE MEAN THE UNIT OF CONTROL AND DISTRIBUTION OF ENERGY ON THE HABITATION PART OF THE VEHICLE (EG.: CBE DS300, SCHAUDT EBL163, NORD ELETTRONICA NE287, SARGENT, BCA, ETC.).

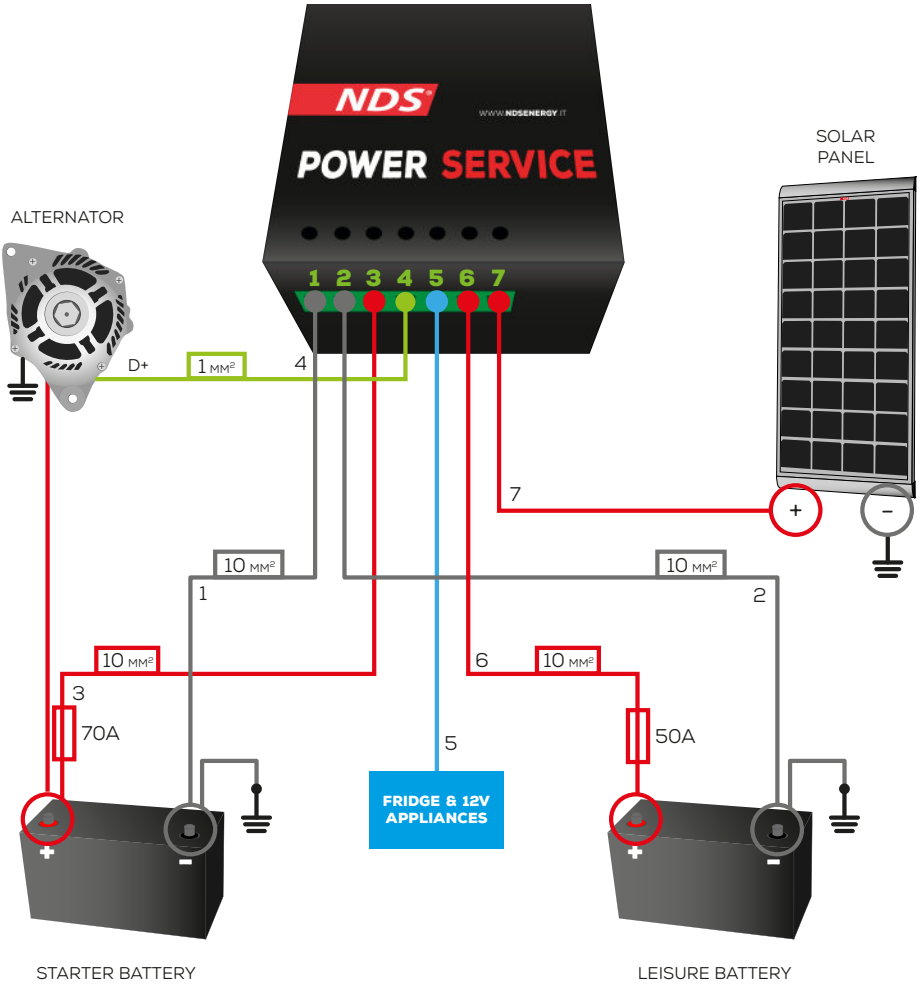
INSTALLATION WITH SPLIT CHARGE RELAY ONLY



FOR CABLES LONGER THAN 2 METERS USE 16mm² CABLES

THE PARALLEL RELAY REFERS TO THE PRE-EXISTING RELAY WHICH, WHEN THE VEHICLE ENGINE IS SWITCHED ON, MAKES THE CONNECTION BETWEEN THE SERVICE BATTERY AND THE ENGINE BATTERY.

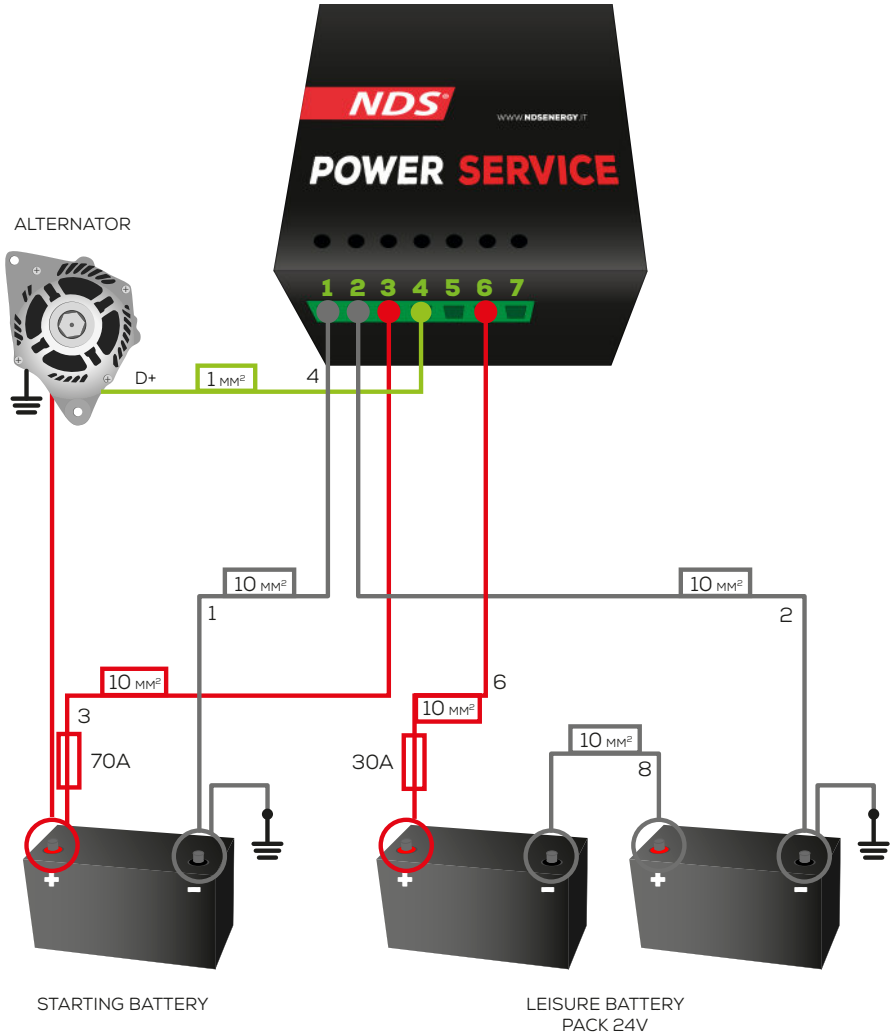
INSTALLATION IN VEHICLE WITH NO CONTROL UNIT OR SPLIT CHARGE RELAY



FOR CABLES LONGER THAN 2 METERS USE 16mm² CABLES

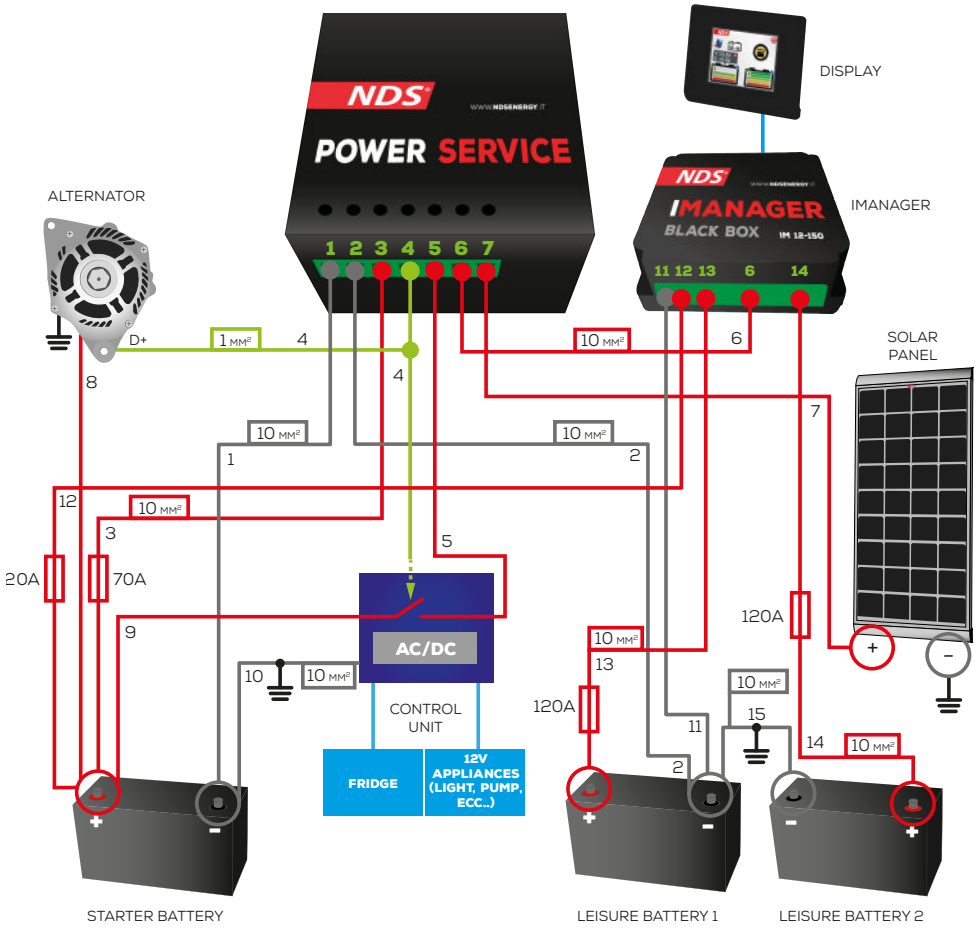
IN THIS CASE, FOR ORDINARY VEHICLES TO BE TRANSFORMED TO RV OR VEHICLES THAT NEED AN AUXILIARY BATTERY, THE **POWERSERVICE** CAN BE USED TO MANAGE THE CHARGE AND THE DISTRIBUTION OF ENERGY.

PLUS AND GOLD 12-24-M INSTALLATION IN VEHICLE WITH 12V ALTERNATOR AND 24V SERVICE/LEISURE BATTERIES



FOR CABLES LONGER THAN 2 METERS USE 16mm² CABLES

INSTALLATION WITH I-MANAGER IN SYSTEMS WITH TWO LEISURE BATTERIES



FOR CABLES LONGER THAN 2 METERS USE 16mm² CABLES

THE **POWERSERVICE** OUTPUT MUST BE CONNECTED TO THE COMMON POSITIVE OF THE I-MANAGER, IN ORDER TO SUPPLY THE TWO SERVICE BATTERIES.

OPERATION

POWERSERVICE CHARGERS PROVIDE THE RIGHT CHARGING CURVE TO THE MOST COMMON SERVICE BATTERY TECHNOLOGIES BY INCREASING THE VOLTAGE COMING FROM THE ALTERNATOR USING A DC-DC CONVERTER. THE CHARGE CURVE RELATED TO THE SERVICE BATTERY TECHNOLOGY IN USE (WET LEAD-ACID, GEL, AGM, LITHIUM), MUST BE SELECTED USING INTERNAL JUMPER SWITCHES. THE 5 CHARGING PHASES OPERATE INDEPENDENTLY FROM THE INPUT ENERGY SOURCE, AND FOR EACH PHASE THE VOLTAGE AND CURRENT SUPPLIED ARE CONTINUOUSLY MONITORED, SO AS TO QUICKLY CHARGE THE BATTERY AS EFFICIENTLY AS POSSIBLE.

CHARGING FROM THE ALTERNATOR

AFTER THE ENGINE HAS STARTED (AND THE ALTERNATOR), THE IGNITION+ OR D+ SIGNAL CONNECTED TO THE **POWERSERVICE** INPUT WILL BE ACTIVE AND THE DEVICE WILL MONITOR THE VOLTAGE OF THE ENGINE BATTERY TO CHECK ITS CHARGE.
WITH A VOLTAGE HIGHER THAN 13.3V (26.6V FOR 24-24 VERSIONS), THE **POWERSERVICE** WILL START CHARGING THE SERVICE BATTERIES.
DURING CHARGING, THE VOLTAGE OF THE STARTER BATTERY WILL BE CONSTANTLY MONITORED TO CHECK ANY PROBLEMS OF SUPPLY OR OVERLOAD BY THE ALTERNATOR, INTERVENING PROMPTLY, IF NECESSARY, REDUCING THE OUTPUT CURRENT OR STOPPING THE CHARGE COMPLETELY.
THE OUTPUT CURRENT IS LIMITED IF THE **POWERSERVICE** DETECTS AN ACTIVE SIGNAL D+ (OR IGNITION+) AND STARTER BATTERY VOLTAGE BELOW 13V.
THE DEVICE SWITCHES OFF COMPLETELY IF IT DETECTS A VOLTAGE OF 12.8V AT THE STARTER BATTERY, OR IF THE SIGNAL D+ OR IGNITION+ (IE ENGINE SHUTDOWN) IS NO LONGER DETECTED.

CAUTION: WHEN SELECTING THE INTELLIGENT ALTERNATOR (EURO6) CHARGING CURVE, THE ACTIVATION AND DEACTIVATION THRESHOLDS OF THE DEVICE ARE AS FOLLOWS: ACTIVATION >12V AND DEACTIVATION <11.8V. IN THE LATTER CASE, THE ACTIVATION TIMES WILL ALSO BE DELAYED.

IF YOU CHOOSE THE IGNITION+ SIGNAL INSTEAD OF THE D+, DON'T LEAVE THE POWER ON FOR MORE THAN 30 SECONDS.

POWER SUPPLY FROM SOLAR PANEL

IF THE FOLLOWING SITUATIONS OCCUR:

- IGNITION+ OR D + SIGNAL NOT ACTIVE,
- SOLAR PANEL ILLUMINATED BY SUNLIGHT WITH AN OPEN-CIRCUIT VOLTAGE HIGHER THAN 16V,

THE **POWERSERVICE** STARTS CHARGING USING THE INTEGRATED SOLAR REGULATOR WITH PWM TECHNOLOGY; CHARGING PHASES ARE THE SAME AS THOSE PROVIDED BY THE ALTERNATOR AND BY AN EXTERNAL MAINS SUPPLY.
THE DEVICE STOPS CHARGING USING THE SOLAR CONTROLLER WHEN THE PANEL VOLTAGE BECOMES LOWER THAN THE SERVICE BATTERY (THERE IS NOT ENOUGH LIGHT TO SUSTAIN A CHARGING CURRENT).

POWER SUPPLY FROM 230V MAINS CONNECTION (GOLD SERIES ONLY)

IF THE IGNITION+ OR D+ SIGNAL IS NOT ACTIVE, AND THE POWER SUPPLY IS CONNECTED AND ACTIVE, THE **POWERSERVICE** GOLD GIVES PRIORITY TO THE MAINS POWER SUPPLY AND STOPS USING THE SOLAR PANEL.

THE POWER SOURCE IS SELECTED BY POWER PRIORITY, AS BELOW:

1. **ALTERNATOR.**
2. **MAINS POWER SUPPLY (GOLD ONLY).**
3. **SOLAR PANEL.**

THE CHARGING SOURCE USED WILL BE DISPLAYED BY THE RELEVANT LED.

CHECKING THE SYSTEM'S OPERATION

AFTER INSTALLATION, IT'S NECESSARY TO CHECK THE CORRECT OPERATION OF THE APPLIANCE. TO DO THIS, FIRST DISCHARGE THE SERVICE BATTERY BY 25% BY SWITCHING ON SOME OF THE APPLIANCES CONNECTED TO THE SYSTEM: LIGHTS AND TV FOR EXAMPLE.

ALTERNATOR CHARGING CHECK-UP

1. WITH THE ENGINE OFF, MEASURE (WITH THE MULTIMETER) THE SERVICE BATTERY'S VOLTAGE.
2. SET THE DEVICE SWITCH TO **1**.
3. START-UP THE ENGINE.
4. WHEN THE LED RELEVANT TO ALTERNATOR CHARGING STARTS TO BLINK, CHECK THAT THE SERVICE BATTERY'S VOLTAGE IS GREATER THAN THE PREVIOUSLY MEASURED VALUE.
5. WAIT FOR TWO FLASHES OF THE DEVICE LED, FOLLOWED BY A PAUSE AND CHECK WITH A CURRENT CLAMP METER THAT THE CHARGE CURRENT IS EQUAL TO THE MAXIMUM CURRENT OF THE POWER SERVICE UNIT (THIS PHASE COULD LAST A FEW SECONDS IF THE SERVICE BATTERY IS COMPLETELY CHARGED).
6. WITH A MULTIMETER MEASURE THE VOLTAGE ON THE STARTER BATTERY POLES, THEN MEASURE THE VOLTAGE BETWEEN TERMINAL N°.1 AND TERMINAL N°.3 OF THE POWER SERVICE UNIT AND VERIFY THAT THE DIFFERENCE BETWEEN THE TWO IS NOT HIGHER THAN 0.7V. IF IT IS, A CABLE WITH A LARGER CROSS SECTION IS NEEDED TO CONNECT TO TERMINAL N°.3. IT MAY ALSO BE NECESSARY TO IMPROVE THE GROUND CONNECTION (ALWAYS TAKE THE MEASUREMENT WHILE THE ENGINE IS RUNNING).

SOLAR PANEL CHARGING CHECK (CAN ONLY BE DONE WHEN VEHICLE IS OUTSIDE AND DURING DAYLIGHT HOURS!)

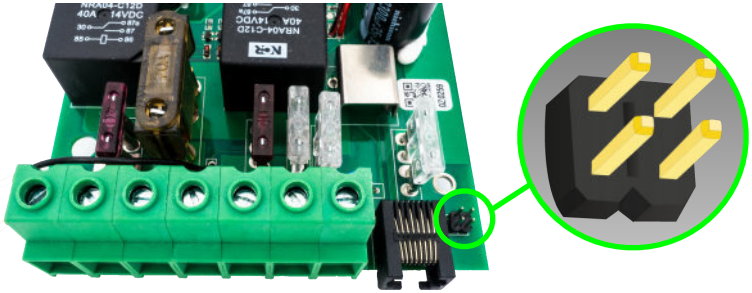
1. TURN OFF THE VEHICLE ENGINE.
2. IF THE SOLAR PANEL IS CORRECTLY INSTALLED AND ORIENTED TO THE SUN, AFTER A FEW SECONDS THE LED RELEVANT TO THE SOLAR PANEL INPUT WILL FLASH.
3. MEASURE WITH THE CURRENT CLAMP METER THAT THERE IS A CHARGE CURRENT GOING TO THE SERVICE BATTERY.

EXTERNAL MAINS POWER SUPPLY CHARGING CHECK (GOLD SERIES ONLY)

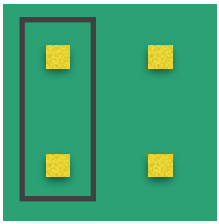
1. KEEP THE ENGINE OFF AND CONNECT THE POWER SUPPLY.
2. CHECK WITH THE CURRENT CLAMP METER THAT THERE IS A CHARGE CURRENT GOING TO THE SERVICE BATTERY.

CHARGING CURVES

POWERSERVICE UNITS SUPPORT BATTERY CHARGING FOR AGM, GEL AND FLOODED LEAD-ACID BATTERIES INCLUDING THOSE RATED AT VMAX 14.5V. THERE IS ALSO A SPECIAL CURVE FOR EURO 6 SYSTEMS WITH "SMART" ALTERNATORS AND LIFEPO4 LITHIUM BATTERIES ("L" VERSION). THE CHARGE CURVES ARE SELECTABLE USING TWO JUMPERS.



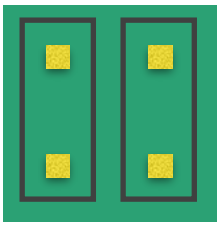
1. AGM



YES NO

MODEL	12V	24V
MAX VOLTAGE	14,8V	29,6V
FLOAT VOLTAGE	13,8V	27,6V
MAX DESULFATION VOLTAGE	15,8V	31,6V

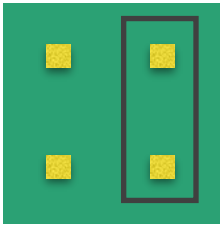
2. GEL



YES YES

MODEL	12V	24V
MAX VOLTAGE	14,3V	28,6V
FLOAT VOLTAGE	13,6V	27,2V
MAX DESULFATION VOLTAGE	15,8V	31,6V

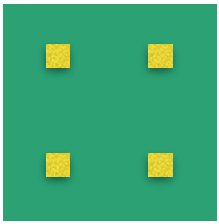
3. GENERIC CHARGING CURVE (FLOODED, $LiFePO_4$)



NO YES

MODEL	**12V**	**24V**
MAX VOLTAGE	14,5V	29V
FLOAT VOLTAGE	13,5V	27V
NO DESULPHATION PHASE		

4. GENERIC CHARGING CURVE FOR SMART ALTERNATOR, EURO 6 ($LiFePO_4$)

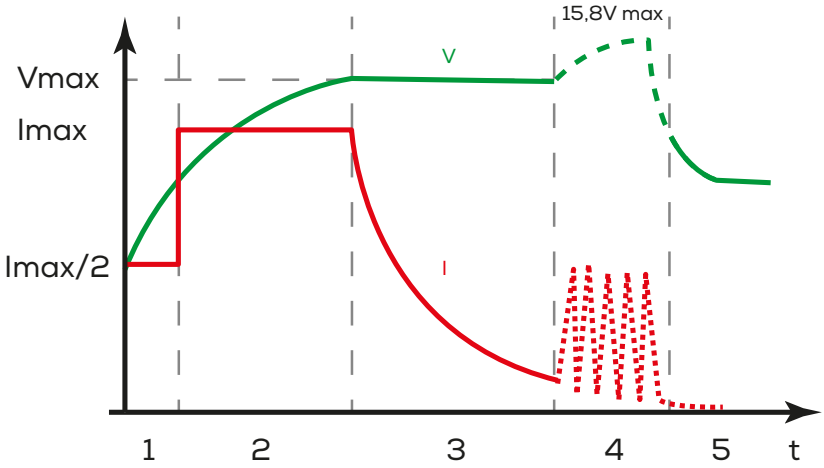


NO NO

MODEL	**12V**	**24V**
MAX VOLTAGE	14,6V	29,2V
FLOAT VOLTAGE	13,7V	27,4V
NO DESULPHATION PHASE		

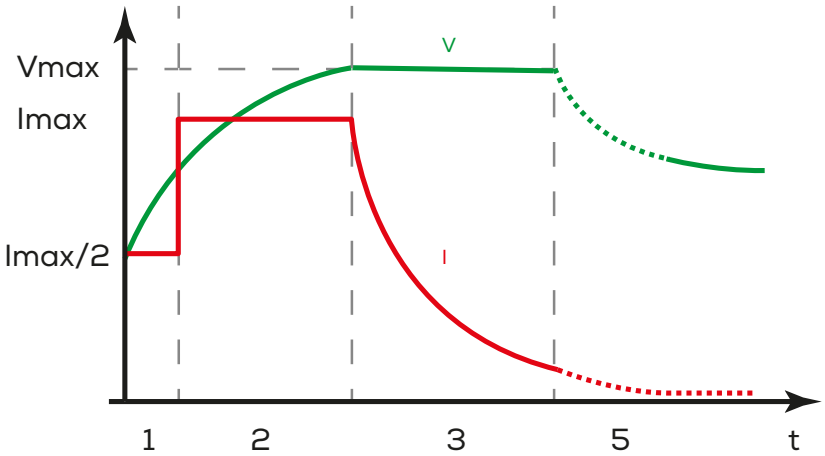
THIS LAST CURVE IS SPECIFIC FOR EURO 6 ENGINES WITH **SMART ALTERNATORS** AND ENTAILS A DELAY OF SEVERAL SECONDS FOR THE ACTIVATION OF THE SYSTEM, WAIT UNTIL THE END OF THE PROCEDURE..

AGM/GEL CURVE



THE CHARGE CURVES ARE COMPOSED OF 5 PHASES, EXCEPT FOR THE VMAX 14.5V OR WET LEAD-ACID CURVE IN WHICH DESULPHATION IS MISSING (PHASE N ° 4).

GENERIC CHARGING CURVE (FLOODED, $LiFePO_4$)



DURING CHARGING, THE DEVICE'S LED INDICATORS WILL EMIT FLASHES CORRESPONDING TO THE CHARGING PHASE BEING USED AT THE TIME. THE VARIOUS PHASES ARE INDICATED AT THE BASE OF THE ABOVE GRAPHS.

LED INDICATORS

POWERSERVICE IS EQUIPPED WITH LED INDICATORS TO SIGNAL THE SOURCE OF INCOMING CHARGE AND THE CHARGE PHASE THAT THE DEVICE IS USING. THE CHARGING PHASE IN PROGRESS IS SHOWN WITH A CORRESPONDING NUMBER OF FLASHES ON THE RELEVANT LEDS.

PLUS

ALTERNATOR SOLAR PANEL

GOLD

ALTERNATOR GRID 230V SOLAR PANEL

USE THE TABLE ON THE NEXT PAGE TO UNDERSTAND THE LED SIGNALS.

WARNINGS, POSSIBLE PROBLEMS AND SOLUTIONS

SIGNAL	PROBLEM	SOLUTION
ALL THE LEDS FLASH 5 TIMES ACCOMPANIED BY THE SOUND OF THE BUZZER.	1. FUSE FAILURE RELATED TO THE CABLE CONNECTED TO THE OUTPUT. 2. SOLAR PANEL VOLTAGE TOO HIGH. 3. ELECTRONIC BOARD OVERHEATING.	CHECK THE INTEGRITY OF THE 2 X 25A FUSES AT THE "OUT" PIN. CHECK FOR BAD CONNECTIONS. CHECK THAT THE SOLAR PANEL VOLTAGE (PIN 7) IS LESS THAN 27V. WAIT FOR THE SYSTEM TO COOL DOWN AND RESTART THE DEVICE AT FULL SPEED (WITH BATTERY NOT FULLY CHARGED)
ALL THE LEDS FLASH 10 TIMES ACCOMPANIED BY THE SOUND OF THE BUZZER. PAUSES AND REPEATS	INTERNAL ELECTRONICS PROBLEMS	RESET THE DEVICE: DISCONNECT THE CABLE ATTACHED AT TERMINAL 3 FOR 10 SECONDS AND REINSERT IT. RUN TE SYSTEM AT FULL POWER (IE WITH THE BATTERY NOT FULLY CHARGED) FOR 30 MINUTES. IF THE PROBLEM OCCURS AGAIN CONTACT NDS SUPPORT.
CENTRAL LED FLASHING	PROBLEM WITH THE D+	FOLLOW THE STEPS BELOW: 1. DISCONNECT THE CABLE ON TERMINAL 3 2. WAIT 10 SECONDS 3. SELECT 0 ON THE MAIN SWITCH 4. CONNECT THE CABLE BACK TO TERMINAL 3 5. WAIT FOR THE BUZZER SOUND AT THE SAME TIME FLASHING THE 3 LEDS 6. SET THE SWITCH TO 1 7. IF EVERYTHING IS OK, TURN ON THE ENGINE. 8. PUT THE SWITCH FIRST ON 0, THEN ON 1, MAKING SURE THAT THE DEVICE TURNS ON AND OFF WITHOUT A PROBLEM.

THE ALTERNATOR LED FLASH 6 TIMES	1. DETECTED VOLTAGE DROP ON THE ALTERNATOR 2. ALTERNATOR INSUFFICIENT POWER 3. POWER COMPONENT OVERHEATING 4. POWER LOSS ON THE CABLES	CABLES MUST HAVE 10mm^2 (MIN) SECTION. CHECK THE CONNECTIONS ON TERMINALS 1,2,3 AND 6. CONNECT THE CABLE ATTACHED TO TERMINAL 1 DIRECTLY TO THE NEGATIVE POLE OF THE ENGINE BATTERY (OR SERVICES), THE CABLE ATTACHED TO TERMINAL 2 DIRECTLY TO THE NEGATIVE POLE OF THE SERVICE BATTERY (OR MOTOR), THE CABLE RELATIVE TO TERMINAL 3 TO THE POSITIVE POLE OF THE ENGINE BATTERY, OR POSITIVE POLE OF THE ALTERNATOR, THE CABLE RELATIVE TO TERMINAL 6 TO THE POSITIVE POLE OF THE SERVICE BATTERY. IN CASE OF OVERHEATING OF THE POWER COMPONENTS OF THE ELECTRONIC BOARD, THE SYSTEM AUTOMATICALLY REDUCES THE CURRENT SUPPLIED FOR CHARGING, UNTIL THE ALARM RETURNS.
ALTERNATOR AND SOLAR PANEL LEDS ARE ON CONTINUOUSLY	EXTERNAL TEMPERATURE DETECTED UNDER -2°C	IT'S A SECURITY SYSTEM IN CASE OF CHARGING CURVE 3 OR 4 WERE SELECTED. THE LED TURNS OF WHEN TEMPERATURE RISES ABOVE 0°C.

ON-OFF (0-1) SWITCH

THE SWITCH ON THE DEVICE MUST ALWAYS BE LEFT IN THE ON POSITION (1), FOR NORMAL OPERATION.
IF THE SWITCH IS SET TO OFF (0), THE **POWERSERVICE** IS DISABLED ONLY FROM THE "ALTERNATOR" CHARGE SOURCE, THEN IT CONTINUES TO OPERATE FROM THE SOLAR PANEL AND / OR 230V MAINS (FOR THE GOLD MODEL), BUT IT WILL NOT WORK WHILE THE ENGINE IS RUNNING. THE SWITCH SHOULD BE SET TO OFF (0) ONLY IF THE DEVICE MALFUNCTIONS, DISCONNECTING IT WHEN THE ENGINE IS SWITCHED ON, AND ALLOWING THE BATTERY TO BE CHARGED USING THE ALTERNATOR DIRECTLY, USING THE ORIGINAL SYSTEM.

POSSIBLE RADIO INTERFERENCE

SOME INEXPENSIVE AUDIO SYSTEMS CAN MAKE A NOISE FROM THE SPEAKERS WHEN THEY ARE ACTIVE AT THE SAME TIME AS THE **POWERSERVICE**.
WE SUGGEST THAT YOU FOLLOW THESE RECOMMENDATIONS:

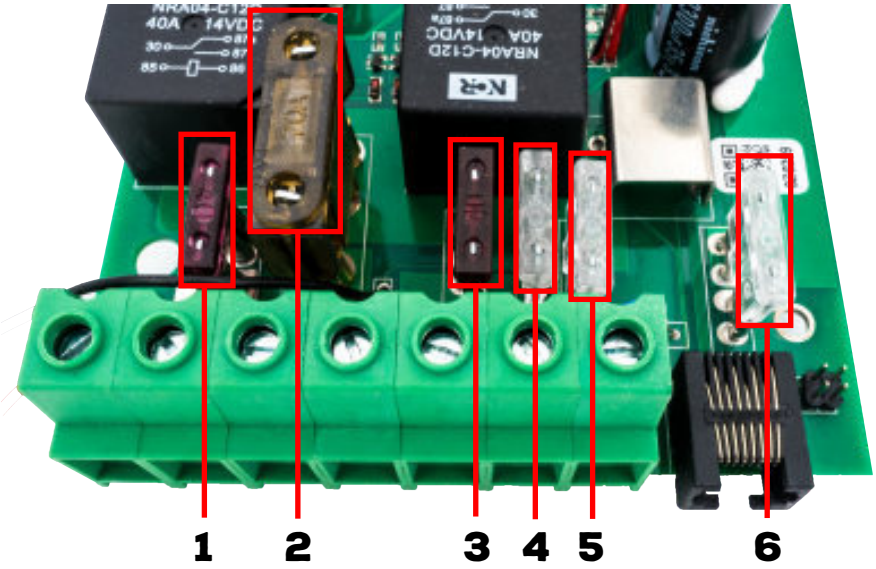
- MAKE SURE THAT THE ANTENNA CABLE OF YOUR TV OR ANY RADIO TRANSMITTING EQUIPMENT IS IN GOOD CONDITION AND IS FAR FROM BOTH THE INPUT AND OUTPUT **POWERSERVICE** POWER CABLES.
- THE CABLES BETWEEN THE BATTERY AND **POWERSERVICE** MUST BE AS SHORT AS POSSIBLE. KEEP THE CABLES AS CLOSE TOGETHER AS POSSIBLE TO REDUCE THE EMISSIONS OF THE DEVICE.
- MOVE SENSITIVE EQUIPMENT AS FAR AS POSSIBLE FROM THE **POWERSERVICE**.
- MOVE THE POWER CABLES OF THE SENSITIVE EQUIPMENT AWAY FROM THE AC CABLES AND THE POWER CABLES OF THE **POWERSERVICE**.

NOTE: SOME EQUIPMENT MAY BE SENSITIVE OR MAY INDICATE ANOMALIES OR OPERATE ABNORMALLY WITH VOLTAGES ON THE SERVICE BATTERY ABOVE 15V, IN THIS CASE IT IS ADVISABLE TO ELIMINATE THE DESULFATION PHASE FROM THE **POWERSERVICE** CHARGE CURVE, BY SELECTING THE VMAX 14.5 CURVE V OR WET LEAD-ACID.

FUSE REPLACEMENT

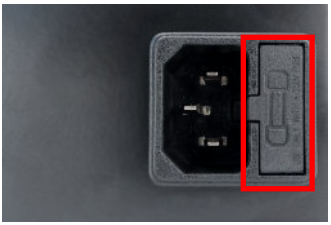
POWERSERVICE UNITS ARE ELECTRONICALLY PROTECTED, BUT FEATURE FUSE PROTECTIONS FOR EACH OF THE INPUT AND OUTPUT TERMINALS.

TO ACCESS THE DC PART FUSE, YOU MUST UNSCREW 4 SIDE SCREWS (2 ON EACH SIDE) AND LIFT THE FRONT COVER, TAKING CARE NOT TO DAMAGE THE WIRES CONNECTED TO THE LEDS AND TO THE SWITCH:



1. **230 VAC MAINS POWER SUPPLY (GOLD ONLY).**
2. **STARTING BATTERY INPUT.**
3. **AUX (NOT FOR PLUS 12-24 AND GOLD 12-24).**
4. **OUT.**
5. **OUT.**
6. **SOLAR PANEL INPUT (NOT FOR MODEL WITH CON 24V OUTPUT).**

THE **POWERSERVICE** GOLD, IS ALSO EQUIPPED WITH A 10A 5X20 GLASS FUSE INTEGRATED INTO THE IEC SOCKET FOR THE 230V MAINS INPUT AS SHOWN IN THE ILLUSTRATIONS BELOW.



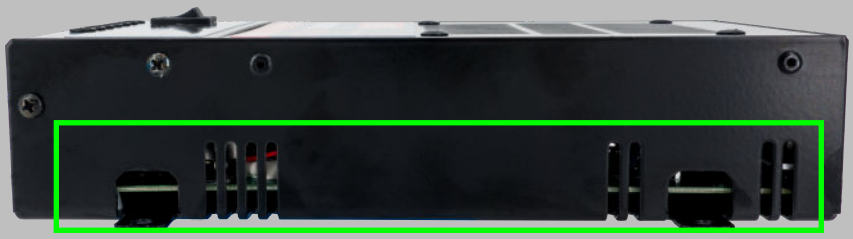
BY REPLACING THE FUSES, THE **POWERSERVICE** WILL PERFORM AN AUTOMATIC RESTART. IN CASE OF FURTHER ADDITIONAL FAULTS, CONTACT THE NDS ENERGY SERVICE CENTER PROMPTLY.

STARTER BATTERY POWER LINE (PIN N°3)	70A BLADE FUSE MAXVAL TYPE (FUSE N°2)
AUX LINE (PIN N°5)	40A BLADE FUSE UNIVAL TYPE (FUSE N°3)
OUT LINE (PIN N°6)	2X25A BLADE FUSE UNIVAL TYPE (FUSE N°4-5)
SOLAR PANEL LINE (PIN N°7)	25A BLADE FUSE UNIVAL TYPE (FUSE N°6)
230V MAINS INPUT LINE (IEC CONNECTOR)	10A GLASS TYPE 5X20 FUSE (FUSE N°1)

MAINTENANCE

THE **POWERSERVICE** REQUIRES MINIMAL MAINTENANCE TO CONTINUE OPERATING PROPERLY. WE PERIODICALLY RECOMMEND::

- CLEAN EXTERNALLY TO PREVENT ACCUMULATION OF DUST AND DIRT.
- CHECK THAT THE INPUT CONNECTIONS AND THE BATTERY POLES ARE TIGHT AND SECURE.
- MAKE SURE THAT THE VENTILATION SLOTS ARE NOT OBSTRUCTED BY DIRT OR ANY MATERIAL..



TECHNICAL FEATURES

POWER SERVICE PLUS 25	
MAXIMUM OUTPUT CURRENT	25A FROM ALTERNATOR
	20A FROM SOLAR PANEL
MAXIMUM YIELD	92%
MAX SIZE	230mm X 135mm X 51mm
WEIGHT	950g

POWER SERVICE PLUS 30	
MAXIMUM OUTPUT CURRENT	30A FROM ALTERNATOR
	20A FROM SOLAR PANEL
MAXIMUM YIELD	92%
SIZE	230mm X 135mm X 51mm
WEIGHT	950g

POWER SERVICE PLUS 40	
MAXIMUM OUTPUT CURRENT	40A FROM ALTERNATOR
	20A FROM SOLAR PANEL
MAXIMUM YIELD	90%
MAX SIZE	230mm X 135mm X 51mm
WEIGHT	950g

POWER SERVICE PLUS 12-24/20	
MAXIMUM OUTPUT CURRENT	20A FROM ALTERNATOR
	SOLAR PANEL NOT MANAGED
MAXIMUM YIELD	81%
MAX SIZE	230mm X 135mm X 51mm
WEIGHT	950g

POWER SERVICE PLUS 24-24/20	
MAXIMUM OUTPUT CURRENT	20A FROM ALTERNATOR
	SOLAR PANEL NOT MANAGED
MAXIMUM YIELD	92%
MAX SIZE	230mm X 135mm X 51mm
WEIGHT	950g

POWER SERVICE GOLD 25-M	
MAXIMUM OUTPUT CURRENT	25A FROM ALTERNATOR
	20A FROM SOLAR PANEL
	20A FROM MAINS POWER SUPPLY
MAXIMUM YIELD	92%
MAX SIZE	230mm X 135mm X 95mm
WEIGHT	1400g

POWER SERVICE GOLD 30-M	
MAXIMUM OUTPUT CURRENT	30A FROM ALTERNATOR
	20A FROM SOLAR PANEL
	20A FROM MAINS POWER SUPPLY
MAXIMUM YIELD	92%
MAX SIZE	230mm X 135mm X 95mm
WEIGHT	1400g

POWER SERVICE GOLD 40-M	
MAXIMUM OUTPUT CURRENT	40A FROM ALTERNATOR
	20A FROM SOLAR PANEL
	20A FROM MAINS POWER SUPPLY
MAXIMUM YIELD	90%
MAX SIZE	230mm X 135mm X 95mm
WEIGHT	1400g

POWER SERVICE GOLD 12-24-M	
MAXIMUM OUTPUT CURRENT	20A FROM ALTERNATOR
	10A FROM MAINS POWER SUPPLY
	SOLAR PANEL NOT MANAGED
MAXIMUM YIELD	81%
MAX SIZE	230mm X 135mm X 95mm
WEIGHT	1400g

POWER SERVICE GOLD 24-24-M	
MAXIMUM OUTPUT CURRENT	20A FROM ALTERNATOR
	20A FROM MAINS POWER SUPPLY
	SOLAR PANEL NOT MANAGED
MAXIMUM YIELD	87%
MAX SIZE	230mm X 135mm X 95mm
WEIGHT	1400g

FAQ

1. **WHAT IS THE MAXIMUM VOLTAGE SUPPORTED FOR SOLAR PANELS?**
   POWERSERVICE UNITS SUPPORT A MAXIMUM VOLTAGE OF 28V.
2. **HOW MUCH CURRENT DOES THE POWERSERVICE UNIT CONSUME?**
   13,0mA.
3. **IT IS POSSIBLE TO RECHARGE THE STARTING BATTERY WITH THE POWERSERVICE?**
   CURRENTLY IT IS NOT POSSIBLE TO RECHARGE THE ENGINE BATTERY, ONLY THE SERVICE BATTERIES. THE ENGINE BATTERY IS NOT CHARGED BY THE **POWERSERVICE**, EVEN IF THE DEVICE IS CONNECTED TO THE MAINS POWER SUPPLY ELECTRICITY MAINS POWER SUPPLY OR TO THE SOLAR PANEL. PLEASE ASK YOUR INSTALLER OR SUPPLIER FOR ADVICE.
4. **SOMETIMES THE VOLTAGE AT THE LEISURE BATTERY RISES ABOVE 15.8/16V, IS THIS NORMAL?**
   THIS IS NORMAL DURING THE DESULFATION PHASE.
5. **HOW LONG IS THE DESULFATION PHASE?**
   DESULPHATION HAS A VARIABLE DURATION, DEPENDING ON THE LENGTH OF THE GENERAL CHARGE. IT CAN LAST UP TO 2 HOURS.
6. **IT IS POSSIBLE TO CONNECT A REMOTE CONTROL TO THE POWERSERVICE?**
   NO, IT IS NOT POSSIBLE TO USE A REMOTE CONTROL TO CONTROL OR DISPLAY THE FUNCTIONING OF THE **POWERSERVICE**. WE RECOMMEND USING THE NDS I-MANAGER DEVICE TO GET ALL THE INFORMATION ON THE BATTERY CHARGE STATUS.
7. **CAN A SOLAR PANEL BE CONNECTED TO THE POWERSERVICE OR IS ANOTHER DEVICE NEEDED?**
   NO INTERMEDIATE DEVICE IS REQUIRED, THE **POWERSERVICE** INCORPORATES A PWM CHARGE CONTROLLER, SO YOU ONLY NEED TO CONNECT THE PANEL TO TERMINAL 7

DECLARATION OF EU CONFORMITY - PWS PLUS

COMPANY:	NDS ENERGY S.R.L.
ADDRESS:	VIA GIOVANNI PASCOLI 65010 - CAPPELLE SUL TAVO (PE) ITALY

DECLARES UNDER ITS OWN RESPONSIBILITY THAT THE PRODUCT:

COMMERCIAL NAME:	**POWER SERVICE**
MODELS:	**PLUS 25, PLUS 30, PLUS 40, PLUS 12-24/20, PLUS 24-24/20**

TO WHICH THIS DECLARATION REFERS, IS IN COMPLIANCE WITH THE PROVISIONS OF THE DIRECTIVE OF THE COUNCIL OF THE EUROPEAN UNION CONCERNING THE ELECTROMAGNETIC COMPATIBILITY (EMC) **DIRECTIVE 2014/30 / EC**, DEMONSTRATED TO THE OBSERVANCE OF THE FOLLOWING NORMS:

- ✓ **EN55022:2010**
- ✓ **EN55024:2010+A1:2015**
- ✓ **EN61000-3-2:2014**
- ✓ **EN61000-3-3:2013**

COMPLIANCE FOR THE RESTRICTION OF THE USE OF HAZARDOUS SUBSTANCES IS DEMONSTRATED IN COMPLIANCE WITH **DIRECTIVE 2011/65 / EU (ROHS 2)**, ACCORDING TO THE LAW:

- ✓ **EN 50581:2012**

CAPPELLE SUL TAVO, 30/03/2016

STAMP AND SIGNATURE

NDS ENERGY s.r.l.

DECLARATION OF EU CONFORMITY - PWS GOLD

COMPANY:	NDS ENERGY S.R.L.
ADDRESS:	VIA GIOVANNI PASCOLI 65010 - CAPPELLE SUL TAVO (PE) ITALY

DECLARES UNDER ITS OWN RESPONSIBILITY THAT THE PRODUCT:

COMMERCIAL NAME:	**POWER SERVICE**
MODELS:	**GOLD 25-M, GOLD 30-M, GOLD 40-M, GOLD 12-24-M, GOLD 24-24-M**

TO WHICH THIS DECLARATION REFERS, IS IN COMPLIANCE WITH THE PROVISIONS OF THE DIRECTIVE OF THE COUNCIL OF THE EUROPEAN UNION CONCERNING THE ELECTROMAGNETIC COMPATIBILITY (EMC) **DIRECTIVE 2014/30 / EC**, DEMONSTRATED TO THE OBSERVANCE OF THE FOLLOWING NORMS:

- ✓ **EN55022:2010**
- ✓ **EN55024:2010+A1:2015**
- ✓ **EN61000-3-2:2014**
- ✓ **EN61000-3-3:2013**

RELATED TO THE ELECTRICAL SECURITY (BT), **DIRECTIVE 2014/35/EU**, THE CONFORMITY DEMONSTRATED TO THE OBSERVANCE OF THE FOLLOWING NORMS:

- ✓ **EN60335-1:2012+A11:2014**

COMPLIANCE FOR THE RESTRICTION OF THE USE OF HAZARDOUS SUBSTANCES IS DEMONSTRATED IN COMPLIANCE WITH **DIRECTIVE 2011/65 / EU (ROHS 2)**, ACCORDING TO THE LAW:

- ✓ **EN 50581:2012**

CAPPELLE SUL TAVO, 30/03/2016

STAMP AND SIGNATURE

NDS ENERGY s.r.l.

WARRANTY

THE MANUFACTURER SHALL GUARANTEE THE PROPER FUNCTIONING OF THE SMART-IN POWER INVERTER AND UNDERTAKE TO MAKE FREE REPLACEMENT OF PART WHICH SHOULD BE DETERIORATED DUE TO DEFECTS IN CONSTRUCTION WITHIN 24 MONTHS FROM THE PURCHASING DATE, AS EVIDENCED BY THE VALIDATION SLIP (TO BE FILLED IN EACH PART AND RETURNED TO THE MANUFACTURER).
THE DEFECTS RESULTING FROM IMPROPER INSTALLATION, USE, TAMPERING OR NEGLIGENCE SHALL NOT BE COVERED BY WARRANTY. FURTHERMORE, WE ASSUME NO LIABILITY FOR ANY DIRECT OR INDIRECT DAMAGES.THE SMART-IN POWER INVERTER RETURNED, EVEN IF UNDER WARRANTY, WILL HAVE TO BE SHIPPED "FREIGHT PAID" AND SHALL BE RETURNED AND ON A "FREIGHT COLLECT" BASIS.
THE WARRANTY CERTIFICATE SHALL BE VALID ONLY IF ACCOMPANIED BY A OFFICIAL RECEIPT OR DELIVERY DOCUMENT.
ANY DISPUTE WILL BE UNDER THE COMPETENT JURISDICTION OF THE COURT OF PESCARA (ITALY)

NDS

WARRANTY COUPON

MODEL_____

SERIAL NUMBER_____

PURCHASE DATE_____

STAMP AND SIGNATURE OF THE SELLER

NDS ENERGY S.R.L.
VIA G. PASCOLI, 169
65010 CAPPELLE SUL TAVO (PE)
ITALY

EMAIL: COMMER@NDSENERGY.IT
TEL: +39 085 4470396
FAX: +39 085 9112263

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TUTTA L'ENERGIA CHE TI SERVE

ALL THE ENERGY YOU NEED

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EMAIL: COMMER@NDSENERGY.IT

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V. 03:2018