

NEW TECHNOLOGY



EN USER'S MANUAL



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## MAIN PARTS OF THE ELECTRICAL SYSTEM

- > CONTROL PANEL "PC380-KT" mains' control, battery test, tank test and clock function.
- > 12V DISTRIBUTION BOX "DS520-AN" main relays, battery parallel relays (12V 70A), fridge relays, pump relays, car battery recharging device, ampere meter, protection fuses.
- > BATTERY CHARGER supplies charge to batteries.
- > ELECTRONIC TANK PROBE it measures the content of the fresh and waste water tanks.
- > LEISURE BATTERY "B2" it gives power to all users.
- > CHASSIS BATTERY "B1" chassis power.
- > ENGINE ALTERNATOR it recharges in parallel both the chassis and the leisure battery.
- > 240V CIRCUIT BREAKER it switches power and protects all users.
- > "50A" CHASSIS (B1) AND LEISURE (B2) BATTERY PROTECTION FUSES.



## **ADVICE AND CHECKS**



**IMPORTANT:** Maintenance on the electric equipment must be carried out by a qualified technician. Before carrying out maintenance, disconnect the battery and the 240V mains power supply.

#### BATTERIES

Read with care the instructions of use and maintenance of the batteries.

The acid kept in the batteries is poisonous and corrosive. Avoid any contact with skin and eyes.

If the battery is completely discharged it needs recharging for up to 10 hours. If discharged for more than 8 weeks it may be damaged.

Check periodically the level of the liquid of the battery (with acid); the GEL battery does not need any maintenance but does require countinuous recharging.

Check the correct tightening of the terminal connection binding screw and ensure terminals are clean.

If the leisure battery is removed, isolate the positive pole (in order to avoid a short circuit during an accidental car engine starting).

In case of a prolonged period, all batteries should be disconnected or recharged regularly.

#### **BATTERY CHARGER**

The battery charger must be installed in a dry and ventilated place.

The installation of this device must be carried out by a qualified technician.

In case of battery charger's misuse, the guarantee is void and the manufacturer declines all responsibility for damages to people and property.

Do not carry out any maintenance when the battery charger is connected to the 240V mains power supply. Do not cover air vents, the charger requires appropriate ventilation.

Before disconnecting the battery charger from 240V mains power supply, turn the circuit breaker off.

#### **TANK PROBES**

Never leave water in the tanks for a prolonged period of time, in order to avoid fouling, especially in the waste water tank.

#### 240V CIRCUIT BREAKER

IMPORTANT: maintenance on the electric equipment must be carried out by a qualified technician. Before carrying out maintenance, disconnect the battery and the 240V mains power supply.

Before taking off the cover, check that the 240V mains power supply is disconnected.

In order to avoid damage to the circuit breaker, check that the connections are tightened correctly.

In order to turn the power off to the whole 240V system, please ensure that the 240V main circuit breaker is in the (OFF) position.

Connect and disconnect the external 240V power supply only when the main switch is off.

If the circuit breaker trips, ensure to find the problem before turning the power back on.

#### FUSES

Replace the fuses after finding out the real cause of the damage only.

When the fuses are replaced inspect the value of the amperage established.

# **CONTROL PANEL "PC380-KT"**



## DESCRIPTIONS

- «12V» button to switch the light circuit on and off (lights and awning light).
- 2) Button to switch the water pump on and off.
- Awning light button; the awning light switches automatically off when you start up the engine (it depends on the 12V button).
- 4) Button with integrated twilight sensor to set the intensity of the LED backlighting in a "night" situation (see also the "TWILIGHT" function).
- 5) On/off main button (to turn on/off press for 2 seconds): at the start-up the display carries out a functioning test and shows all symbols (including unused symbols).

If the relevant LED is green the control panel is on, if it is red an alarm is on (batteries, tanks, etc.).

- **6)** "PROG" button for system setting (see SETTING).
- 7) Button for the control of fresh and waste water tank (in %), for the information on the programmable parameters' setting (see SETTING).
- 8) Button for control of chassis and leisure batteries voltage (in Volt), load and recharge current (in Ampere) for the leisure battery and for the parameters' setting (see SETTING).
- NOTE: The digital clock power is supplied from the leisure battery (B2). Should B2 be disconnected, the clock will keep working, without visualization, for

approx 1 week.

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## MAIN VISUALIZATIONS



- 1) It indicates that the engine is on.
- 2) It displays that the battery parallel is on when engine is on.
- **3)** It displays that the chassis battery recharging unit is on.
- **4)** It indicates that the 240V battery charger is on.
- 5) External temperature digital indicator.
- 6) Internal temperature digital indicator.
- 7) Clock digital display.
- 8) It displays the setting menu.

- 9) It displays that the tones are off.
- **10)** It displays that alarm clock is set.
- 11) Fresh water tank status display.
- **12)** "B2" leisure battery status display.
- 13) It displays that the fresh water tank is empty.
- **14)** It displays that the waste water tank is full.
- **15)** It displays the minimum voltage device is on.
- **16)** It displays that the chassis battery (B1) has run down.
- **17)** It displays that the leisure battery (B2) has run down.

# **FUNCTIONS**

#### **CHASSIS BATTERY ALARM (B1)**

When the chassis battery voltage drops down to 12V, the Chassis Battery Discharge alarm goes on and the symbol ref. 16 starts blinking.

Alarm goes off when the voltage gets over 12.5V.

#### **LEISURE BATTERY ALARM (B2)**

When leisure battery voltage drops down to 11.5V the Leisure Battery Reserve alarm goes automatically on, the symbol ref. 17 starts blinking and you hear a short beep.

When the leisure battery voltage drops down to 10.5V, the Leisure Battery Discharge alarm goes automatically on, the symbol ref. 17 starts blinking and you hear two short beeps. Alarms go off when the voltage gets over 12.5V.

# MINIMUM VOLTAGE CONTROL (BATTERY PROTECTION)

The electronic battery protection device cuts off the 12V fuses when leisure battery reaches 10V and disables: pump, lights, awning light, exit "RH", TV sockets and stove.

Symbol ref. 15 is the visual alarm signal.

It is possible to reactivate all fuses for one minute by pressing the on/off button (ref. 5 on control panel).

The control panel automatically turns off with a voltage lower than 9.5V.

Fuses are automatically reactivated when voltage is greater than 13.5V.

This device doesn't control the the 12V users connected directly to the leisure battery B2.

#### AMMETER

The ammeter is inside the DS520-AN module.

- It measures the current of the leisure battery, users' consumption and recharge through battery charger, engine alternator and solar panels.

- Measurement range is: -40A ÷ +40A.

- Measurement is carried out as difference between charging and discharging currents: a positive value indicates a charging current, a negative value indicates a discharging current. To measure the charging of a sole source (battery charger, alternator or solar panels), turn off all items and other charging sources.

To measure the consumption of a sole user, disconnect all charging sources and turn off all unused items.

#### **AWNING LIGHT AUTOMATIC TURN OFF**

An electronic device switches off the awning light when engine is turned on.

#### **DIGITAL CLOCK**

To set clock see "SETTING".

#### ALARM CLOCK

To set and activate/deactivate the alarm clock see "SETTING".

To reset alarm press any test button; there is no delayed alarm!

#### TEMPERATURE

- Both int. and ext. temperatures have a sensor, which is placed inside or outside of the vehicle.

- The precision of the temperature value is ±1°C.

#### **TWILIGHT FUNCTION**

In a "night" situation, a sensor positioned near the display causes the intensity of the LED backlight to automatically be reduced to the level preset by the user (to set see SETTING).

#### **BROKEN FUSE ALARM**

Under each fuse is positioned a red LED.

The lighting of the LED signals that the fuse is broken and it is necessary to replace it with another fuse with the same value. The alarm is activated only when the control panel is on and the user related to the fuse is switched on.

NOTE: before replacing the fuse find out the problem that determined the intervention of the protection (blown fuse) and fix it, it may be necessary to have a qualified technician assist.

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### **USER'S SETTING**

- To enter the set mode, press the "PROG" button (ref. 6) for more than 2 seconds from the main clock screen.
- Select, by pushing the arrow keys ref. 7 and 8, the setting menu you want to operate and then confirm by pushing the "PROG" button (ref. 6);
  - by selecting "CLOCK" you operate the menu to set the parameters clock and alarm clock
  - by selecting "DISPLAY" you operate the menu to set the display parameters.
  - by selecting "SETTING" you operate the menu to set the system parameters .
- **CLOCK MENU**

**CLOCK** 



- By using the arrow keys ref. 7 and 8 you can modify the setting of the parameters.
- Confirm the setting by pushing the "PROG" button (ref. 6), you then go automatically to next parameter.
- To abandon programming and save changes, select "EXIT" and then choose to save or not save changes.
- To exit without saving wait 20 seconds without pressing any key.

Clock setting:

- HOURS (blinking)
- MINUTES (blinking)

### ALARM CLOCK



ALM. CLOCK

Activation of alarm clock:

- ON (activation) - OFF (deactivation)

Set alarm clock time (only if alarm clock has been previously activated):

- HOURS (blinking) - MINUTES (blinking)

## 

## DISPLAY BUTTONS BACKLIGHT SETTING



Intensity setting of the buttons LED backlight in a "night" situation (see also the "TWILIGHT" function):

- (0÷100 %)

### **DISPLAY BACKLIGHT SETTING**



Display's backlight setting when control panel is in stand-by:

- (0÷100 %)

## **DISPLAY BACKLIGHT COLOUR**



Display backlight colour selection

### **DISPLAY CONTRAST**



Display contrast setting (0÷100%):

(0÷100 %)

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# SETTING

### **ACOUSTIC ALARMS**



Activation/Deactivation of acoustic alarms:

- ON (activation) - OFF (deactivation)

### TEMPERATURES



Setting internal temperature, step 0.5°C



Setting external temperature, step 0.5°C

### **CALIBRATION AMMETER**



Calibration of « 0 » in ammeter (A). Setting steps: 0.1A.

### **VOLTMETERS SETTING**



Setting of the leisure battery "B2" voltmeter. Max. value +/- 0.5V, step 0.1V.



Setting of the car battery "B1" voltmeter. Max. value +/- 0.5V, step 0.1V.

#### SMITTER



Activation/Deactivation visualization in bars of the leisure battery and fresh water tank status in the starting page.

- ON (activation)
- OFF (deactivation)

# **DISTRIBUITION BOX "DS520-AN"**



#### **PROTECTION FUSES**

- 5A fuse to give power the AUX auxiliary exit (awning light), turns automatically off when engine is on.
- **2)** 3A Spare.
- 15A fuse for the RH auxiliary roof fans etc (if fitted).
- 20A fuse for TV sockets and TV antenna (if fitted).
- 15A fuse for the RH auxiliary range hood and 2<sup>nd</sup> water pump switch (if fitted).
- 6) 30A fuse for 12V fridge element (when connected through bridge 16 it turns off automatically when engine is off).
- 7) 10A fuse for Heater/Hot Water System (HWS).
- 20A fuse for the AUX (i.e. Gas detector, radio memory etc), it is connected directly to the leisure battery (constant supply) (B2).
- **9)** 25A fuse for the motorized step (if fitted), it is connected directly to the leisure battery (B2).

- **10)** 3A fuse for spark ignitions for the fridge, oven & stove, it is connected directly to the leisure battery (B2).
- **11)** Not actived.
- **12)** 10A fuse for the water pump.
- 13) 20A fuse for lights circuit "A".
- 14) 20A fuse for lights circuit "B".
- **15)** 3A fuse from ignition to protect the OUT D+ simulated exit.
- **16)** AES fridge connection; It is a bridge, which excludes the 3 way function fridge and is used to connect the AES fridge directly to the B2.
- **17)** Output + for the control of the auxiliary relays (e.g. motorized step, AES fridge, electric water discharge valve, electric antenna motor, etc.) which works only when the engine is started. which works only when the engine is started.

## 

# **±** CONNECTIONS

| 18)        |                                   | NOT CONNECT  |                                       |  |
|------------|-----------------------------------|--|---------------------------------------|--|
| 19)        |                                   | <ul> <li>USERS</li> <li>1) + exit RH, it depends on the main button ON/OFF.</li> <li>2) + exit spare, it depends on the main button ON/OFF.</li> <li>3) + exit AUX (awning light), it depends on the awning light button.</li> <li>4-5) + exit TV sockets, it depends on the main button ON/OFF.</li> <li>6) + exit RH, it depends on the main button ON/OFF.</li> </ul> | FUSE<br>3<br>2<br>1<br>4<br>5         |  |
| <b>20)</b> |                                   | USERS<br>1) + exit AUX (direct "B2")<br>2-3) + exit 3 way function fridge / AES<br>4) + exit electric step (direct "B2")<br>5-6-8-9) exit gas users (fridge, kitchen, ecc) (direct "B2")   | FUSE<br>8<br>6<br>9<br>10             |  |
| 21)        |                                   | <ul> <li>USERS</li> <li>1) + exit heater/HWS, it depends on the main button ON/OFF.</li> <li>2) + exit water pump; it depends on the pump button.</li> <li>3) /</li> <li>4-5-6) + exit lights circuit "A"; it depends on 12V button.</li> <li>7-8-9) + exit lights circuit "B"; it depends on 12V button.</li> </ul>   | FUSIBILE<br>7<br>12<br>11<br>13<br>14 |  |
| 1          | BLACK BLACK                       | WASTE WATER TANK PROBE WITH SCREWS (RE-VI)<br>To connect to the waste water tank probe with screws or to the el<br>waste water tank probe.<br>NB: Do not connect both types of tank probes!  | ectronic                              |  |
| -          |                                   | ELECTRONIC WASTE WATER TANK PROBE (RE-EL)<br>FRESH WATER TANK (POT)  |                                       |  |
| 24)        | BLACK<br>0000<br>1234             | To connect to the fresh water tank probe.  |                                       |  |
|            | 9 16<br><b>9</b> 16<br><b>1</b> 8 | CONTROL PANEL<br>To connect to the 16 poles connector of the contro  | l panel.                              |  |
| 26A)       |                                   | <ul> <li>SIGNALS (OPTION "A")</li> <li>1) + input signal contact key engine starting.</li> <li>2) + input signal "S" net coming from the CBE battery charger.</li> </ul>   |                                       |  |
| 26B)       |                                   | <ul> <li>SIGNALS (OPTION "B")</li> <li>1) - input "D+" negative signal (-)</li> <li>2) + input signal contact key engine starting.</li> </ul>  |                                       |  |
| -          |                                   | <ol> <li>+ input signal "S" net coming from the CBE battery charger.</li> <li>/</li> </ol>   |                                       |  |
| 27)        |                                   | NOT CONNECTED  |                                       |  |



| 28) | WHITE     | EARTH<br>To connect to the mains' earth.  |
|-----|-----------|---|
| 29) | - B2      | <b>EARTH</b><br>To connect to the negative pole of the leisure battery or to the chassis of the<br>vehicle. |
| 30) | + B2      | <b>LEISURE BATTERY</b><br>To connect to the positive pole of the leisure battery.                           |
| 31) | + OUT 12V | <b>12V EXIT</b><br>To connect to the positive pole (battery charger, solar regulator).                      |
| 32) | + B1      | <b>CHASSIS BATTERY</b><br>To connect to the positive pole of the chassis battery.                           |

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## **ELECTRICAL SYSTEM FUNCTIONS**

#### CHASSIS BATTERY (B1) RECHARGING

When the battery charger is charging, an electronic device allows a recharging (nominal current 2A) of the chassis battery (B1), the system gives priority to the leisure battery (B2).

#### LEISURE BATTERY (B2) RECHARGING

#### a) Throught engine alternator:

through separate relays when engine is on. The ignition electronically controls the relays: parallel, fride, awning light etc.

- b) Throught 240V mains power: mains power throught battery charger.
- c) Throught solar panel: through solar charge regulator.

#### **D+FUNCTIONS**

#### **Operation without SMART ALTERNATOR:**

An electronic device controlled by the "+ key" ON switches on the D+ functions (batteries parallel, OUT D+ simulated output, awning light etc.) when the car battery voltage is > 13.5V and switches them off with the "+ key" OFF or with voltage < 12.5V.

The D+ functions can be activated only if the B2 leisure battery is connected.

# Operation with SMART ALTERNATOR (present on all DS520 distribution boxes manufactured since September 2019):

For vehicles equipped with SMART ALTERNATOR, an electronic device switches on the D+ functions (batteries parallel, OUT D+ simulated output, awning light etc.) when the engine is running. The D+ functions are activated in presence of at least one of following conditions:

**Condition A:** with "+ key" ON signal and car battery voltage > 13,5V. The functions are deactivated with "+ key" OFF or with voltage < 12,5V.

**Condition B:** with "+ key" ON signal and "D+" negative signal (-). The functions are deactivated in absence of one of those two signals.

**N.B.:** In presence of both conditions, the functions are deactivated in absence of the "+ key" signal.

The D+ functions can be activated only if the B2 leisure battery is connected.



IMPORTANT: in the case of installation of equipment that needs permanent exclusion of the battery parallel relay (ref. 1), you must remove the R72 resistor (ref. 2). The resistor can be removed using a wire cutter, being careful not to damage the PCB traces below. This resistor is present on all DS520 distribution boxes manufactured since Juny 2020.



#### **INSTALLATION "PC380-KT"**



## NOTE

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## NOTE

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## NOTE

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