Instruction Manual

isl 8-936g

Software versions 3.75-3.80 and V4.xx

Microprocessor controlled
Quick Charger
Discharger
Capacity Tester
Battery Conditioner
for Sealed Ni-Cd, Ni-MH and Lead-acid (Pb) Batteries

- Graphical Display of Charge Voltage
- Data Transfer Interface for Personal Computer (PC)
- Internal fan, temperature controlled

CE

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isl 8 chameleon high end
operating instructions issue 09.01

1. General information

Congratulations! With the **isl 8-936g** you have purchased a top of the line product made in Germany. Reliable SMD technology, outstanding performance and flexibility and last but not least their easy handling have made the previous models very popular. By adding the most up-to-date electronic devices, a third charge output and a modified discharge circuit which re-transfers energy into the car battery, the **chameleon high end** has become even more powerful and flexible.
The **isl 8-936g** requires no maintenance, but needs to be protected against dust and moisture. Openings in the housing are essential for cooling and must not be blocked! The **chameleon high end** provides best operating comfort and maximum reliability. Using the **automatic L** charging option, you will notice that the **isl 8** microprocessor will charge you batteries as fast as possible, yet as carefully as necessary. All three outputs may be in use at the same time. Additionally you can discharge your batteries, measure their capacity and condition them. Same options are available for sintered Ni-Cd-, Ni-MH and Lead-acid-batteries.
The new big graphical LCD (**L**iquid-**C**rystal-**D**isplay) panel provides user guidance via softkey-function-buttons and allows the transfer of charge data and parameters to a personal computer either on-line or from the non-volatile memory.

! In order to make full use of your new charger we strongly recommend you to read the Instruction Manual page by page and take note of the hints in the grey shaded areas. Although the supplied text is rather long, there is valuable information in each sentence. !

Note: In order to get to a certain point in the menu, you may have to change the screen several times. Therefore in this manual you will sometimes find the complete sequence of key-operations, including the appropriate screen text, starting from the initial **powerOn** display.
You will find in **Chapter 27 (MenueTreeStruct.)** an overview of the available function-key descriptions.

2. General remarks and precautions

The CE marking which you will find on all **schulze** products indicated that the equipment has been tested to meet the stringent European safety and radiation requirements; this does not mean that you do not have to follow these instructions!

The cooling fins at the rear of the charger have been precision extruded and then machined; they may have sharp edges; handle with the same care with which this equipment has been manufactured.

Please remember that fast-charging Ni-Cd batteries can push the batteries to their limit; never operate the chargers unattended. The charger as well as the batteries may get warm; when in use, they should be placed on an appropriately sized, non-heat-conducting and non-combustible surface. By following these rules extensive damage will be avoided in case of a mishap.

Many modern transmitters are equipped with an internal reverse-voltage protection diode. No “smart” charger can fast-charge these transmitters unless this diode is bypassed (shunted) (see chapter 12 for additional information when charging transmitters). Preferably, you can remove the transmitter’s battery and fast-charge it outside the transmitter. If you want to bypass the diode, contact the transmitter manufacturer. In no case should the fast-charge current for a transmitter pack exceed 1.2 Amp.

Do not modify the charger’s car battery power cables or connecting clamps; they are very low loss to support the charger’s high-end charge capabilities. Do NOT insert fuses and NOT plug the charger into the car´s cigarette lighter!

Do not cross-connect individual output charge cables or wires thereof; each charger outlet has its own sensing circuitry. Prevent electrical contact between any charger outlet and your car’s body. All this may damage your charger and/or your batteries! It is safest to place the charger on the ground. Place the charger on a safe support, do not “hang” it somewhere under the hood. The best approach is to use a separate, fully charged, dedicated 12-V battery and take it to the flight line.

The internal software is always checking for operational errors.

Do not operate the charger in the case that any of the cables are damaged or frayed, or in case the display panel indicates an ERROR.

The **isl 8** charging devices operate on 11 to 15 VDC, but may only be connected directly to a 12 V car battery!

DO NOT RUN YOUR ENGINE OR ATTEMPT TO CHARGE YOUR CAR BATTERY WITH EXTERNAL EQUIPMENT WHILE OPERATING THE CHARGER, OR AS LONG AS THE CHARGER IS HOOKED UP TO YOUR CAR’S BATTERY.

Should you decide to operate the charger from a (110V AC to 12V or 13.8V DC) power supply (“battery eliminator”), then make sure this power supply is well regulated, can supply continuous DC current as high as 35 ... 45Amps(!), has a very high output capacitance (>5000µF/16V), very low ripple and is insensitive to the frequency of the carger´s internal switching voltage converter. Using any other source is likely to damage your charger or your batteries, and voids the warranty. NEVER use an automotive battery charger as the source for the precision-engineerd **schulze** charger.

Because of the high charge current capabilities of these chargers, you should always use high-quality, gold-plated connectors in the charge cables to your batteries. Also, use heavy-duty (12-g) flex wire. We recommend you use either **schulze** short circuit protected charging cables and/or (in the USA) Astro connectors, the Deans Ultra plug or similar. See you local hobby dealer or call R/C-Direct.

Always connect the banana plugs of your charge cables first; then, connect the charge cable to the battery. Note that “open” banana plugs, when the charge cable and battery are connected, carry the full battery voltage (and current).

Note that all chargers have ventilation holes. Especially in discharge mode or when charging batteries less than 12V, the charger will dissipate energy, and thus get warm (the isl-8 even has an internal cooling fan). Do not block these ventilation holes and make sure you allow free air flow through the cooling fins located at the rear of the charger.

Protect the charger from direct exposure to the sun (the sun´s heat will temporarily turn the LC-display black), dust, moisture and rain(!).

Even though the **schulze** chargers are smart (they are micro-processor equipped and can determine a battery's number of cells and its optimum charge current pattern), attempting to charge the following packs should not be attempted:

- batteries built up from cells of different types and capacities
- batteries made from different types of single cells
- batteries with a different charging level of the cells
- non rechargeable cells (dry cells)
- batteries which are not expressly designed for fast charging and recharging.
- defective or damaged packs or cells
- already fully charged and/or hot batteries
- battery packs with internal charge-current limiting devices
- batteries which are buildt-in (internal) to other equipment

Do not exceed a battery's design (maximum) charge current as specified by its manufacturer; note that the **schulze** chargers will still optimally charge these packs in automatic charging mode; you can program the charger's max (limit) charge current.

When charging high-capacity battery packs with less than 7 cells, exercise extra care to make sure that these are not over-charged; packs which are (too) deeply discharged may cause the charger to cut off too soon.

New batteries will only achieve their maximum capacity after several charge/discharge cycles; **schulze** chargers can be programmed to provide these cycles automatically.

Always verify the charge amount which your battery has absorbed (mAh or Ah) after a full charge (this is indicated on the display panel); this is probably the best gauge of a battery's health and/or the proper operation of the charger. This way, you will avoid unexpected loss of power and/or control.

Please remember that battery packs can heat up considerably during a high-current discharge cycle; program your charger's max discharge current to prevent overheating of the packs unless you provide additional cooling (some of the racing pilots now use a tube with electric fan cooling!). Note that e.g. discharging a 27-cell 1000mAh battery at 5A (=5C rate) will dangerously overheat this battery; the **schulze** charger can (and) should in this case be programmed to the limit discharge rate to a more acceptable level, for instance 1A (=1C) and/or a battery cooler in combination with the temperature sensor for cut-off must be used. You can also use our build in low-temperature-start circuit. (Do not forget to activate temperature sensor to the right pack output and fix it at the right battery.)

An additional important function is the selection of the automatic cut-off circuit. Read the important comments in Chapter 12). Maximum protection against malfunctions of the cut-off automatic is provided by selecting additional cut-off criterias like max. temperature, max. energy input and max. charge time.

Warranty on your new **schulze** charger is **six months** after the date of first purchase. Expressly excluded from this warranty are failures due to incorrect use and/or damage(s) to any object(s) and/or person(s) resulting from the correct or incorrect use of this charger. Before returning a **schulze** charger for repair, please check the charging of a single battery pack using a fully charged car battery; go through the check list at the end of the operating manual; if you still have problems, then, add a [brief] description of the problem you encountered, proof of purchase (date), your address and your telephone number.

Warranty repairs are performed in Germany or in the USA; out-of-warranty work will performed at same locations, for a nominal charge. Return units which are found to be in good operating condition will be subjected to normal manufacturing tests. There will be a nominal charge for this, wether the unit is in warranty or not.

More than a thousand **schulze** chargers are in use around the world every day without any problems. They perform….again and again.

We hope that you, too, will join this happy *schulze* family.

3. CE certification

The products described in this manual are manufactured in accordance with all specific and mandatory European CE guidelines:

EMI 89/336/EEC, 91/263/EEC and 92/31/EEC.

The products have been tested according to these norms:

EMI-emissions: EN 50 081-1:1992
EMI-resistance: EN 50 082-1:1992 or EN 50 082-2:1995

Design and construction of our products comply with the requirements for safe operation.

EMI emissions were tested under realistic conditions, i.e. using maximum charge current and high number of cells.

Further testing is done to ensure adequate EMI-resistance against emissions from other devices. The HF signals used for these tests are similar to those produced by mobile telephones or RC transmitters.

Be sure that the ferrite-ring is not broken.

Be sure, that all cables to pack 1 ... 3 are as short as possible.
The maximum cable length inclusive the cable of the packs must be shorter than 20 cm.

Be sure, that all charge cables are winded 4 times through the CE-Ring.

They avoid transmitting disturbing frequencies.

They may not be mounted more than 5 cm from the 4mm male connectors.

4. Mounting instructions CE ring

Use 2.5 mm^2 cables, 1 cable red, 1 cable black.

Solder 1 male socket at every end of cable.

Slide ring from free end of cables to 4 cm to the male sockets. Make additional 3 windings through the center of the ring.

Cut cables to 15 cm, if cables at the pack have 5 cm (Max. total length 20 cm)

The cables now looks like those of the picture below.

Bind cables with short pieces of heat shrink tubes.

Solder your connectors on to the free ends of the cables now.

You can also use our pre-fabricated charge cables CE-kab-i8.

Additional parts:
CE-kab-i8
not included

CE-ring
3 x included

5. Functions of main output (akku 1)

Charge- and discharge programs of Pack 1 are split into 5 groups, which can be selected using the +/- buttons after you have pressed ***f2:pack 1, f2:p1param und f2:progrm***. The charger will perform the option you select by pressing the **enter** button. All programs use those currents as their maximum, which were chosen under **C-curr** and **D-curr**.

2 Lead-acid Battery Charging programs	PB L, PB l, (at V4.xx: akku2 output)
2 Lead-acid Battery Discharging programs	PB-e, PB-E,
4 Ni-Cd-Battery Automatic-Discharge programs	aut3CD, aut2CD, autoCD, auto-D,
4 Ni-Cd-Battery Manual programs	fixt-D, fixCD, fixDC, fix C,
4 Ni-Cd-Battery Automatic Charge programs	auto C, autoDC, aut2DC, aut3DC

22 Battery Charge/Maximum currents 0.1mA, 0.15, 0.2, 0.25, 0.3, 0.5, 0.4, 0.6, 0.8, 1.0, 1.2, 1.5, 2.0, 2.5, 3.0, 3.5, 4.0, 4.5, 5.0, 5.5, 6.0, 6.5, max.(9A)

22 Battery Discharge/Maximum curr. -0.1mA, -0.15, -0.2, -0.25, -0.3, -0.5, -0.4, -0.6, -0.8, -1.0, -1.2, -1.5, -2.0, -2.5, -3.0, -3.5, -4.0, -4.5, -5.0, -5.5, -6.0, -6.5, max.(9A)

Manual selection of the 9A charge current is not possible (max. 9A only available in automatic mode). The actual charge current may also vary with battery type, number of cells, battery condition etc.

6. The first step

- Take the chameleon high end out of the packaging.
See Chapter 2: General Remarks and Precautions. Lack of air circulation may cause overheating.

- Remove the 5 sockets at the left side of the housing (if not packed separately anyway).

- Connect the chameleon high end to the 12 volt power source car battery.
Note: No batteriepacks must be connected to the charger during this procedure. Try to achieve a good contact to the car battery terminals first time, otherwise you may not get the **power-On** screen on the display. In this case disconnect **immediately** and retry after about 5 seconds.

- The LCD panel shows the *powerOn* Menu screen (*powerOn* visible at right top) with the ms-logo and the name of the device isl 8-936g chamaleon high end plus date and time.

- Press *f2 pack1* to have a look at the screen for Output 1:
The screen will show an empty coordinate-system graph with a horizontal minute scale and a vertical voltage scale. *pack 1* is displayed at top right of the screen.

- Before you connect a batterypack, check the top line of the display (Battery-status) whether the charge program suits your batteries. The selected charge program is displayed after the text *ready / rdy*.

Normally the fully automatic charge program **auto L**, available for Output 1 and 2, will be the best choice. The fully automatic programs will check the battery several times during the charge regarding its energy consumption ability and adjust the charge current accordingly. Therefore no specific knowledge about cell type and number is required, as long as it is a sintered type between 100mAh and 4.0 Ah.

The fully automatic programs can only perform correctly if the charging leads have adequate cross sections **(2.5 mm² - also for Tx- and Rx-batteries!!!)** and the cells are soldered together (i.e.: no spring loaded battery boxes!).

If the charge current stays below 1C (1C=nominal capacity of the battery), the battery is usually not (or no more) quick chargeable. Especially at low cell numbers this may also cause problems for the automatic to detect full condition.
In this case it is advisable to adjust the charge rate manually or even better:
Replace the battery!

If you want to change the parameters for pack 1, press ***f2 p1 param*** again. This will open a new sub-menu giving the function keys ***f1*** to ***f5*** new meanings and names.

It is the ***f2*** button again with which you choose charge or discharge programs. In the second row above the function keys the display shows the current values which have been set at the factory (or later: the ones which you had selected).

Pressing the ***f2:progrm*** key will create a small field of #-letters in the display showing the actual program. The descriptions of the key functions will move up like signatures above the windows which is activated. The bottom line (directly above the keys) will now show the actual functions of the ***esc*** and ***enter*** keys. Furthermore two arrows point at the ***+/-*** keys at the right side. With these keys you can scroll through all available programs for Output 1.
After you have found the program you want, confirm your selection by pressing ***enter***. The new program will become active after connecting the battery. If the old program suits your needs best, it is not necessary to scroll back: Just press ***esc***.

For full batteries with maximum safety the following adjustments are recommended: (Recommendations shown in bold typing)

1

1) Program select: ***f2: progrm:*** **auto C**

Individual charge / discharge currents may be selected manually. The automatic programs will use these manually selected currents as maximum currents. The range of current may vary during charge/ discharge, but will not exceed the selected maximum current.

2

2) Currents: ***f1: D-curr. / f3: C-curr.:*** Discharge **I-2.0A**, Charge **I=max.**

Adjust cut-off automatic mode.
Normal will suit most batteries

3

3) Cut-off automatic: ***f4: cutoff:*** **normal**

Press ***f5: p1param2*** to get the next menu screen.
Number of cells (***f1***) will indicate 0, as no battery is connected yet. Later during charging or discharging, the number calculated by the device may be corrected manually.

Next important step in setting up the safety functions is the max. energy input. To charge a completely empty 1700mAh cell, usually an energy input of more than 2000 mAh is required.

4

4) Max. charge input for empty 1700er cells: ***f2: QUANTmAh:*** **2400mAh.**

Next safety function is the max. charge time. Charge times in automatic mode will vary depending on battery type, number of cells, cell condition etc.
If the required charge time exceeds 3 hours, something is seriously wrong: either the battery is defective or the charge leads and/or the connectors are unsuitable.

5

5) Max. charge time for Ni-Cd-Batteries: ***f3: TIMEmin:*** **30 minutes.**

Next item in the menu determines the initial program for output 1 when the device is connected to a power source:

6

6) Program at Power-On-Reset: ***f4: PORprog:*** **auto C.**

Finaly you can decide whether you want to use short discharge pulses during charge. This methode is recommended to re-activate ´tired´ batteries.
This method should be most useful with Tx- and Rx- batteries which are never completely discharged.

7

7) Refresh charge: ***f5: refresh:*** **ON.**

8

8) Note: The single available thermal sensor may be assigned to different outputs (see Chapter 13). If the sensor was selected to monitor the temperature of a battery and is not plugged into the device, a continous acoustic alarm is initiated.

Please also check the menu for output 2. Here the options are reduced, i. e. there are no discharge functions and currently no PB-charge modes.

By playing with the keys without any batteries connected you get to know the **isl 8**. The selection of functions and the variation of values is always the same. If you are looking for a certain function, please use the Menu-Tree-Structure for reference.

!

- The *esc* key will always get you back to the *powerOn* Menu screen without changing any values!

!

From the **powerOn** Menu screen press ***f5*** *twice* ***(f5:i8param1, f5:i8param2)*** and then ***f4 (f4:name)*** if you want to add a personal word/name.

Default on delivery is the name **schulze elektronik gmbh** with a **"v"** acting as cursor above the first letter "**s**".
Other standard values can be called up with the function keys on the right side
(date: 15. 6.95, time: We 12:30, copy: buffer1 to memory ...).

Use ***f2*** and ***f3*** to move the cursor left or right. ***f1*** and ***f4*** will delete the letter below the cursor before it will move to the next position. To change the letters use the **+/-** key, marked with **sign select**.
Press ***enter*** to store the new name in the non-volatile memory of the **isl 8**, or press ***esc*** to clear all changes and leave this sub-menu.

Note: If a menu item on the display appears inverse (black background), the appropriate function key is temporarily blocked (i.e.: during test phase of Pack 1).
If temperature value appears inverse, battery is not assigned and cutoff is deactivated.
A '*' in front of a menu item indicates, that this function is not available yet, but may be activated during a future software update.

Back to the **pack 1** screen:

- The program which is displayed in the top line will start after the battery is connected.

The charge amount will be continuously updated right next to the program / current display. Next to it you can see the temperature, measured via a connected sensor. At present this is for information only and can not be used for temperature cut-off purposes.

On the right side of the display, below the car battery voltage (inverse for better contrast) the status of the other two charge Outputs is shown.

- A Full indication or the disconnection of a battery will automatically cause a change to the appropriate screen to show this event. The name of *Pack x* (inverse) can be seen in the right top corner of the screen.

Temporarilly connect a battery to Output 1 and watch the screen.

The top line will display from left to right: charge time, battery voltage, charge current, charge amount and temperature.

The **chameleon high end** will complete the charge (if you leave the battery connected) and indicates FULL (or EMPTY after discharge) together with a melody (or a buzz if melody = 0) which will stop after a short time.

You should now know the most important functions. Still, we strongly recommend you to study the rest of the manual to make the best use of your device and learn about further options and how to interprete warnings.

The **chameleon high end** will complete the charge (if you leave the battery connected) and indicates FULL (or EMPTY after discharge or TEMP or TIME or QUAN when cuts-off by the temperature, time or quantity limit) together with a melody or a buzz (Melody=0) which will stop after a short time.

You should now know the most important functions. Still, we strongly recommend you to study the rest of the manual to make the best use of your device and learn about further options and how to interprete warnings and errors.

7. Ni-Cd-battery programs, output 1

After being disconnected from the car battery, the **chameleon high end** will turn back to a chosen program or to the last one (**last**) being selected (see Menu-Tree-Structure).

Last will store the program type when a battery is connected.

If a different program is required, it has to be selected **before connecting a pack**.

After termination of the chosen program - the pack is now full or empty - a buzzer or a melody will play for a short time period and the blinking light output becomes permanently activated. To interrupt just press the **+/-** key. The LCD panel shows the final values.

As the screen only shows the graph for one battery you may want to know what is happening on the other Outputs. Press ***f5:packStat*** from the appropriate screen and the display will provide the status of all connected batteries at the time ***f5*** was pressed. No update will take place in this mode.

Program- and Parameter selection:

While ***pack 1*** screen is shown on the display, press ***f2:p1param*** to get to the parameter sub-menu of Output 1.

By pressing the **- key** you get to the discharge and PB programs. Pressing the **+ key** will get you to the automatic combination programs. The constant current programs are located in between.

To get to and from the Lead-acid programs no battery must be connected.

Whenever an automatic program is selected, **auto** or **aut** will appear in the display.

! Note: Program select is closely linked with the menu items **D-curr.** and **C-curr.**
Please read the following paragraphs.
Ensure the cut-off mode and safety functions selected will suit your battery.

If the safety functions have been set up incorrectly, they may not only loose their intended purpose (avoiding overcharge in case of a malfunction), but may even cause adverse results, i. e.:
Interrupting the charge before the battery is full.

Data like charge time, voltage at end of charge and charged capacity may give valuable information about the charge behaviour, the capacity of the connected battery-pack or improper full indications.

Ni-Cd charge program with manual charge current selection (fix C)

These programs will charge your batteries with the selected current until full condition is detected. Buzzer and display will indicate **FULL** condition and the charger will switch to trickle charge ("**t**").
Please note that the microprocessor may reduce the current if due to the chosen charge rate the rising voltage or current threatens to cause overheating.
Suitable charge currents may be selected by the following rule:
Charge current = 2 x C (C=nominal cell capacity)
Example: Cell capacity C = 1.2 Ah, charge current 2 x 1.2 = 2.4A
Selected charge current: 2.5A

Ni-Cd charge program with automatic charge current selection (auto C)

Using this program, the charger automatically calculates a charge rate which suits the battery. The battery will continuously be checked during the charge and the charge current is adapted to the actual condition. Initially the program starts with 300mA, then increases the current to the calculated values, which may result in a reduced current towards the end of the charge.
The program will not exceed the maximum value set in menu item **C-curr**.
After 'Full indication' the charger switches to trickle charge. Charge time, battery peak voltage and loaded capacity are displayed on the screen. Full indication also starts buzzer or melody module for a short time.
Note: In contrast to other programs, this fully automatic program always starts with a double beep when you connect the battery.

Ni-Cd discharge program with manual current selection (fix D)

! This program starts with the **D-curr** current you have previously chosen, when connecting the batteries, and ends when the discharge voltage is reached. During the whole discharge the current will be kept at the value you selected, or may be reduced in order not to exceed the performance range of the **chameleon high end**.
In contrast to the Capacity Measuring program, the discharge programs enable you to determine the remaining capacity of a partially discharged battery (for example to measure how much is left in your Rx battery after a couple of flights).
At the end of the program discharge time, discharge voltage and discharged capacity will be displayed. A buzz or a melody will be activated for a short time.

Note: For precise measuring of battery capacities a discharge current of 1/10 C is recommended, i.e.: a 1000mAh battery should be discharged with 100mA.
For practical purposes higher discharge rates can be tolerated and may even be more realistic.

Info: The discharge cut-off voltage used for the Ni-Cd-discharge programs is about 0.85V per cell. The microprocessor will detect the number of cells with sufficient accuracy, but manual corrections may be made via menu item **cellnmb**, while the program is running.
This feature is available for all programs of Output 1 and 2 ("**akku 1**" and "**akku 2**").
When deep-discharged cells are connected, the number of cells will automatically be corrected after about 10 minutes.

7.4 Ni-Cd discharge program with automatic currentsselection (auto D)

This program will discharge the battery connected to Output 1 down to the discharge voltage. The discharge current will not exceed any discharge value programmed under ***f2:pack1, f2:p1param, f1:D-curr.***) However, the initial discharge current is always limited by the max. discharge performance or the max. discharge current of the **isl 8**.

Low capacity batteries (Rx-battery) or batteries which allow re-charge into the car battery, may be discharged at a lower rate to prevent damage. Recommended constant discharge rates are 1C to max. 2C.

These figures are also valid for the **fix D** program.

In contrast to **fix D, auto D** will automatically decrease the discharge currents towards the end of the discharge. the current will be reduced in steps and finally turned off.

This way, the cells may be discharged to a lower level.

The **isl 8** then begins first with a calibration cycle of the 16Bit AD-converter, which takes several seconds. The discharge time shows 0:00 in the display.

After finishing calibration, time begins to run and the discharge stage starts slowly discharging up to the maximum allowable performance.

A buzz or a melody will be activated for a short time.

7.5 Ni-Cd battery conditioning programs (autoDC, fixDC)

This program will discharge the battery connected to Output 1, starting with a value as described under **auto D**, then further reducing the current in steps down to the discharge voltage, followed by an **auto C** charge.

This program is intended to erase any memory effect and is particularly suited to freshen up Tx and Rx-batteries which are usually never completely discharged in normal use.

The **autoDC** program will run **auto D** and **auto C** in sequence.

Please read the descriptions of the individual programs to understand the way they work and how to set the currents.

For new or irregular maintained batteries a single discharge/charge-cycle may not be enough to achieve a complete formatting of the cells. In this case **auto 2** or **3DC** provides the option of automatically running two or three automatic-discharge-charge programs.

These programs will finish like an **auto C** program, with buzzer or melody.

Only the usual charge data, but no information about the discharge cycle will be displayed on graphic display.

The **packStat** menu will show the capacity values of all charge/discharge cycles.

7.6 Ni-Cd capacity measuring program (autoCD, fixCD)

This program will automatically fully charge the battery connected to Output 1 and then discharge down to the discharge voltage

This program enables you to monitor the performance of your batteries during their lifetime, allowing you to estimate their usefulness.

The **autoCD** program will run **auto C** and **auto D** in sequence.

Please read the descriptions of the individual programs to understand the way they work and how to set the currents.

The programs can run automatically for two or three times (**...2CD, ...3CD**).

At the end of the discharge the graphic display will show discharge time, discharge voltage and capacity, and a buzz or a melody will be activated for a short time.

The **packStat** menu will show the capacity values of all charge/discharge cycles.

8. Lead-acid (Pb) battery programs, output 1

The Lead-acid Charge Programs can be easily identified by the symbols ‘PB’. PB stands for Plumbum, the 82nd element in the periodical system of the elements.

The PB-programs with their automatic cell number detection are a real innovation, but require intact and pre-charged batteries for correct voltage and current selection.

The charge current will be calculated according to the battery voltage. Nearly full batteries or old batteries mostly do not charge with the current you expect.

Due to the automatic cell number detection, **the program can only be used for** charging/discharging of **Lead-acid and Lead-gel batteries with nominal voltages of 2, 6, 12 and 24V** (1,3,6, 12 cells).

Press the ‘-’ in **progrm** menu to get to the PB-Programs.

To change from Ni-Cd-Programs to PB-Programs and vice versa, no battery should be connected to Output 1.

PB-Batteries act completely different from sintered Ni-Cd-Batteries which are commonly used to power model aircraft, cars or racing-boats. Despite their high capacity, PB-batteries are not suited to provide high curents without a significant loss of useable capacity and a noticable drop in voltage. The same applies to the charging procedures, where most manufacturers recommend a **20 hour** period (at 0.1C with max. voltage limitation) for a full charge.

The PB-Programs of the **chameleon high end** will gradually increase the charge current until the maximum voltage is reached, after which it will be reduced.

The PB-Programs provided will enable you to charge PB-Batteries to an almost full level in just a few hours. First time the voltage limit for **cycle charge (ca. 2.45V/cell)** is reached, an ‘a’ will show up behind the charge time on the display. At this time the battery is about 75% full. Further charging will take considerably longer. About every 5% increase in capacity will change the indication letter to ‘b’,’c’,... and it may take the same time for the last 25% as it took for the first 75%. After full indication a buzz or a melody will be activated for a short time and the charge voltage limit will be set to the level for **continuous charge (ca. 2.275V/cell)** by reducing the charge current. This allows one to keep the battery in full condition or may even increase the charge. The charged Amp-hours will be further added and displayed.

The above explanations contain no specific data but will give you some idea what happens when you run the PB-Charge Programs.

Don’t be amazed if the **chameleon high end** indicates a full battery after only 70% of the nominal capacity has been charged, especially on capacities below 3Ah. Be reminded that the capacity (i.e. the performance) of a PB-Battery may have suffered during previous use and bad maintenance (Overcharges, many 100% discharges or even deep discharges). For further information please check the battery manuals.

PB-charge programs (at V4.xx: akku2 output)

PB-C and PB-c. Both charge programs perform an initial battery check to calculate a suitable charge current but the actual charge differs: **PB-c** uses a lower current than **PB-C**. **PB-c** will provide a more gentle charge and may achieve a higher capacity level, especially on smaller batteries. **PB-C** is recommended for faster charges and to fresh up batteries before use.

PB-discharge programs

PB-D and **PB-d**. Both discharge differ according to their intended use.

For more precise capacity measuring purposes we recommend **PB-d** which limits the maximum discharge current to 200mA.

For general discharge or bigger batteries (3Ah+) you can use **PB-D**. This program will initially discharge with the highest possible current (if you do not limit the current in the menue; same as the Ni-Cd Program **auto D**) which will be reduced towards the end of the discharge.

Both programs will terminate discharge at about **1.72V per cell**.

9. Charging / discharging 1-3 cells, output 1

Note following safety warnings and hints:

Charging: Normally buzzer and display warns when cells are connected which voltage are too low. After 30s, charging cycle will be finished, if charging voltage does not increase above a certain value. These warnings and the previous switch off can be oppressed when pushing the plus button within the first 30 seconds of charging. When pushing the button, you must be in the corresponding graphical ***akku x*** screen.

Warning: Voltage peak of the cells is not very high when charging less than 4 cells. Cut of automatic function is not guaranteed. It is possible, that automatic stops charging too early, too late ore not. Be sure, that charging current is as high as possible for the charger and near the maximum for the cells.

Discharging: No special procedures necessary.
Note: The hardware is not specially designed to discharge 1 Ni-Cd cell. Discharging currents are reduced, when voltage is lower than 1 volt.

10. Output 2 for Ni-Cd batteries

Output 2 works similar to Output 1, but with the following limitations:
1) The charge performance of Output 2 is only 1/3 of Output 1.
2) The missing discharge facility does not allow for discharge or combination programs.
   Program select and charge current select have been combined under **C-curr**.

All currents witht **I=....** use the **fix C** programm, **auto5A** uses the **auto C** programm limited to a maximum of 5A

The Ni-Cd-battery needs to be connected to the Output 2 ("akku 2") sockets.

11. Output 3 for Ni-Cd (Rx) batteries

Starting from the **p3param** menu, select the number of cells **cellnmb**, the discharge current **D-curr.**, the charge current **C-curr.** and the desired program (charge: **fix C**, discharge: **fix D** or a simple combination: **D**ischarge-**C**harge: **fixDC** or **C**harge-**D**ischarge: **fixCD**. Furthermore, there is a combination program autoD+fixC **aufiDC**. You will find it beyond the temperature on/off menue points by pressing continuously + pushbutton).

Connect a 4- to 6-cell Rx-battery to Output 3. The charge or discharge will automatically start with the selected current and / or discharge with a maximum of 2 watts.

! Ensure that you have selected the correct number of cells and a current to suit your batteries. If necessary re-program the values for Output 3. !

12. Cut-off automatic

Output 1 and Output 2 ("akku 1" and "akku 2"):
Before going into detail with the various cut-off automatics, please be reminded:
Selecting **normal** will usually give you the best results.

tmpON, tmpOFF: Temperature monitoring and cut-off, switching ON (enable) and OFF (disable):
When temperature-cut-off is assigned to a pack (activated), the temperature is displayed in normal figures (not inverse) on the screen. If the sensor is not connected or the cable is broken, the display shows **--°** and an acoustic warning is initiated. A connected battery will not be charged / discharged, charging or discharging will be interrupted. **Toff** will appear in the upper status line.
When temperature monitoring is activated, **isl 8** is waiting before it starts to charge or discharge until temperature is below 41°C. When **chameleon high end** is waiting, you can see **temp.lim** on the LCD.
Note: It is your responsibility to attach the sensor to the correct battery!!!
After chosen **tmpON** or **tmpOFF** the display will show you the last cut-off choice again.

peakOFf: disable delta peak cut-off:
Continuous charging is possible, the charge current will not be interrupted by delta-peak cut-off. **C-curr** is automatically set to 100mA when chosen **tmpOFF** or when chosen **tmpON** and the temperature sensor is not connected. It is not possible to increase current without connected battery when temperature cut-off is disabled. Maximum charge current without peak cut-off and without temperature-cut-off is 500mA.
Continuous charging lower than 250mA is made by pulse current (the display shows a "**m**" instead of the leading zero of the charge current).
strict: Delta Peak cutoff with very stringent criteria:
This peak detection mode should only be used if there have been premature cut-offs in **normal** mode. This could be the case with deep discharged 1700 N-SCRC cells.

! **Warning: Using selected cells will increase the risk of failing to cut-off the charge. Depending on the cell type (e. g. mixed cells), the charge current using the auto C program may become so low towards the end of the charge, that there will be no voltage peak and consequently no cut-off.** !

This mode can be used with or without temperature monitoring (see **Chapter 13**).

normal: Delta Peak cut-off with well proven cut-off criteria:
This mode is recommended for most cases.
This mode can be used with or without temperature monitoring (see **Chapter 13**).

sens+d, sensit: Delta Peak cut-off with sensitive characteristic:
This mode is recommended for mixed cells with a very flat peak voltage curve.
Deep discharged batteries may cause a cut-off very early during the charge. To avoid that, the mode **sens+d** includes a delay of 8 minutes before the sensitive cut-off is activated.
Warning: If you use this mode on fully charged cells they may become very hot, because they will be charged for at least 10 minutes.
This mode can be used with or without temperature monitoring (see **Chapter 13**).

trns+V, transm: Delta Peak cut-off with sensitive characteristic for Tx:
Delta Peak cut-off specially designed for transmitters with build-in discharge protection diodes.
This mode switches automatically to the **fix C** program and charge current is initially set to 1.2A. You cannot change the program while in transmitter charge modes. It is possible to change current only up to 2 A.

In case the charger does not detect the connection of the diode protected Tx, press the **+** key.

This mode can be used with or without temperature monitoring (see **Chapter 13**).

Of course, transmitter-batteries with build-in diode cannot be discharged.

Ni-MH batteries: it is possible to charge them with the two **sensitive** and two **transmitter** cutoff modes.
Only use the **fix C** program and do not use currents higher than 1C (e. g. 1100mAh packs with a current of 1.0 A!). If **isl 8** will not cut-off in the sensitive modes, use the transmitter modes.
Additional temperature cut-off is recommended.

Output 3 ("akku 3"):
The cut-off method on Output 3 cannot be changed. Due to the relatively low charge currents compared to Output 1 and 2, a voltage level cut-off method is used.
When the voltage exceeds a certain level, the charge current is turned off. After dropping to a lower level, it is turned on again. Starting with a constant current, the charge will turn into a pulsed charge with increasing pauses. If the pause length exceeds several minutes, i. e. the battery keeps its voltage over this period of time, th **isl 8** indicates **FULL**.
The voltage limits are set by selecting the number of cells.
If the number selected is too high, the cut-off voltage of the battery may not be reached. In this case you can get a continous charge!
(In some cases the charge may still become interrupted, because a Delta Peak automatic works in the background. Although you should never rely on that!)

This mode can be used with or without temperature monitoring (see **Chapter 13**).

13. Monitoring and safety facilities

The charger contains two types of monitoring and safety facilities:
1) Those which protect the device itself, e.g.: the demagnetization-sensor or the maximum charge performance control to avoid over-heating of the **isl 8**, and
2) Those which protect the batteries connected.
For those under 1) please see **Chapter 18**.
As already mentioned in **Chapter 6 - The first Step -**, correctly set safety facilities may prevent damage/destruction of your battery in case of cut-off automatic malfunction.
But be aware: Incorrect set-ups may not be able to prevent over-charge and may even cause premature cut-offs.

13.1) Temperature monitoring

Temperature monitoring can be used for charge- and discharge programs.
The max. temperature limit can be set via ***f5:i8param1, f2:temp***.
The temperature values can be adjusted in steps of 2°, the resolution of the sensor. To switch from odd to even values you just have to go for the limits. The upper limit will turn to even, the lower limit to odd numbers.
Only one temperature sensor is available, but it can be used in many different ways.

13.1.1) If the sensor is not assigned to any of the three Outputs, it will turn off the device when the selected temperature is exceeded.

13.1.2) The sensor can be assigned to any of the three Outputs.

13.1.3) It is also possible to assign the sensor to multiple Outputs. This makes sense if the sensor is used for emergency cut-off at 75°C. At 'normal' cut-off temperatures of 45°C all assigned Outputs would be turned off, independant of their state of charge, as the sensor can only monitor one battery.

13.1.4) Assignment of the temperature sensor:

For the temperature sensor no separate menu item is available.

13.1.4.1) Assignments from Output 1 to Output 3:
Start from menu item **cutoff** (output1,2) or **progrm** (output 3).
Turn-Off: Turn-off is activated by pressing **tmpOFF**.
After pressing ***enter*** the display will return to the old program.
Turn-On: Turn-On is activated by pressing **tmpON**.
After pressing ***enter*** the display will return to the old cut-off choice/program.
You can now change the cut-off automatic or program without changing temperature assignment.
Temperature on each Output will be monitored (or not) until you change assignment again by pressing **tmpON** or **tmpOFF**.

Note:
• Never use Temperature-cut-off on PB-batteries, as it will more likely lead to the destruction of the battery rather than to a proper charge. Selection of excessive charge currents or constant charges exceeding the max. voltage will cause permanent damage (loss of capacity) or even destruction of the battery.
• Using Temperature cut-off for Combination programs (DC, CD, 3DC, 2CD ...) without Delta-peak monitoring (**peakOF**), the battery temperature **must not** exceed the cut-off temperature during discharge (Select a low discharge current, otherwise the cut-off will cause a premature end of the discharge cycle).
If Delta-peak monitoring is activated, exceeding the selected temperature will cause an emergency cut-off.
• Disconnected temperature sensors or sensors with defective wires will stop the program together with the **Toff** (**T**emperature sensor **dis**connected) message.

13.1.4.3) Control:

Activated temperature monitoring can be identified by normal letters on the battery screens. If temperature monitoring is inactive, the value is displayed inverse.

13.1.4.4) Message:

If programs are terminated because the set temperature values are exceeded, the display will show **TEMP** instead of the usual **FULL** or **EMPT**y message. When using a combination program (Output 1 or 2), the display shows **T(f)** or **T(e)** (**e**mpty means in this case: discharging interrupted, not really empty) in addition to **temp.lim** in the second line of the LCD, when temperature limit is exceeded.

13.2) Charge quantity monitoring:

As the name implies, this function is limited to charge programs.
For activation and set-up of this function, press **p1param2, QUANTmAh** for Output 1, **p2param, QUANTmAh** for Output 2 or **p3param2, QUANTmAh** for Output 3.
The procedure is very easy: Just add about 10% to what it takes to charge your battery and program this value. A "**>**" sign in front of the quantity value means, that quantity monitoring is disabled.
The charge quantity must be selected for Ni-Cd and Pb packs separately.
The QUANTity units used in the menu are mAh (milli-Ampere-hours; the graphic display usually shows Ah (Ampere-hours).
Example: A standard 1700mAh cell requires about 2Ah for a complete charge. The safety cut-off for this type of battery should be set at a minimum of 2200mAh.
Some selected 1700mAh may even require 2600mAh for a complete charge. If the charge is frequently terminated by the charge monitoring function, the set value may need to be increased.
Be reminded that a partially charged battery will not be able to consume a full nominal capacity charge (To avoid the memory effect you should discharge your batteries anyway).
If programs are terminated because set charge quantity values are exceeded, the display will show **QUAN**. instead of the usual **FULL** or **EMPT**y message.

13.3) Charge time monitoring:

As the name implies, this function is limited to charge programs.
For activation and set-up of this function, press **TIMEmin** (time / minute) in the parameter menu item of the three packs.
The charge time must be selected for Ni-Cd and Pb packs separately.
Setting the max. charge times is quite easy: Just add about 10% to what it takes to charge your battery and program this value. A "**>**" sign in front of the time value means, that time monitoring is disabled.
The units used in the menu are min (minutes; the graphic display usually uses seconds).
While the expected charge time can be easily estimated for the **fix C** programs, the times in **auto C** will vary according to the calculated charge current.
Still, checking the charge times in automatic mode may give you an indication on the condition of your battery: Fit batteries require less charge time.
For comparison you have to ensure similar conditions: Identical charge lead (2.5mm²) and similar temperatures of batteries and surroundings. Cold batteries take longer than warm batteries.
If programs are terminated because set charge time values are exceeded, the display will show **TIME** instead of the usual **FULL** or **EMPT**y message.

Note:
All the known and the following adjustments will be stored in the **chameleon high end's** non-volatile memory and will be readily available even after the device has been disconnected.

14. Special adjustments

Operation from an external car battery
When using an external battery which is not used for starting the car, it can be discharged to a lower voltage level. Via the Menu-Items ***f1:i8param, f1:carbatt*** you can change the threshold value for the low-voltage warning.
Based on years of experience this value is set at 11.2V, displayed as *11.200mV. In this case the "*" stands for recommended value.
You can now choose your desired value.
The **chameleon high end** will stop all operations if the supply voltage drops 600mV below this value and will display an appropriate error message.

Operation from a car battery charger
Never connect the **isl 8** directly to a car battery charger as it will be damaged. Even when using a car battery as a buffer the remaining peaks from the car battery charger may cause the **chameleon high end** to display irregular error messages.

Operation from an AC/DC power supply
Although operation from a well stabilized Power Supply is possible, it is not recommended due to the **isl 8**'s high performance and its capability of energy re-transfer which may cause damage to the power supply and/or the charger.

When operating from an AC/DC power supply in car battery mode never connect more than 12 cells (at the beginning of the discharge - also when using the **autoCD** program - the battery voltage has to be below 18V) or manually set the discharge current limit to 750mA or less.

With Menu-items ***f5:i8param1, f3:mns/bat*** the maximum charge performance on Output 1 (310W) can be limited to lower values to keep the current from the mains power supply below the maximum. Also the energy re-transfer option will be deactivated.
(Options: ***carbat***=Car battery, full performance+re-transfer; ***mains***=AC/DC Power, no re-transfer)

Simultaneous operation of all three outputs with reduced power is possible, but power of output 2 and output 3 must be added to the power of output 1 (max. power consumption is higher than the chosen value).

! **Note:** Be sure, that the power consumption of **isl 8** is always lower or equal than the allowed continuous current of the power supply. Attention: Primary current differs also by the variable charge voltage of the connected packs! !

Note: Power of output 2 is always 1/3 power of output 1. If you are reducing power of output 1, you are reducing power of output 2 simultaneous.

Safe operation of the **chameleon high end** from an AC/DC Power Supply may be effected by further factors like ripple-voltage, continous power performance, compatibility with the frequency of the voltage converter, adequately sized capacitors (an area where laboratory power supplies sometimes show deficiencies) etc.
! It is the responsibility of the operator to check the reliable function of the combination power supply and charger. We can not be held liable for problems and damages resulting from unsuitable combinations !

Output 3: Cell number and current adjustment
Charge Output 3 must be configured to the used number of cells and the desired charge- or discharge current. Cut-off automatic works quite differently from that of Output 1 or 2.
Chose a charge current, which does not heat cells too much otherwise they cannot obtain cut-off voltage!

Output1 - Program after reset
You can select the initial program for Output 1 when the charger is connected to a power source.
Press ***f2:pack1, f2:p1param, f5:p1param2, f4:PORprog*** and decide whether you want the charger to start with the last used program ('last' will store the program type when a battery is connected) or

starts with the program, you chose in the menu.

Blinking light output
You have the option of blinking light or continuous light at the end of a program. Press ***f5 i8param1, f5 i8param2, f1 light*** to get to the menu-item and use the +/- keys for changes. There is a 12V Output for loads up to 25W.

Melody selection (only for devices with device number 7627 and lower. Now the internal piezo-buzzer is on/off switchable).
You can choose between 12 short melodies. Press ***f5:i8param1, f4:melody*** to get to the menu-item and use the +/- keys for changes. Melody 0 means: buzzer is activated. The volume cannot be changed. Note: The scrolling speed in this menu will vary according to the numbers.

Fan ON/OFF
This function key, available in the ***pack x*** screens, will operate a battery cooler fan connected to the additional pin board. The shown menu item shows the next function of the key, not the actual state of the fan.
Note: The internal fan can not be turned off. It runs permanently on 12V to cool the display.
Avoid operation in direct sunlight as the display will become dark!

Refresh
The Refresh option is available for Output 1 and 3. Refresh charging is supposed to get older, stored or intermittently used batteries faster up to speed and is particularly suited for Rx- and Tx-battery maintenance.
We do not take part in advertisement myths: A healthy battery will not become fuller than full. Using refresh you probably will not detect any increase in capacity or any decrease in internal resistance on properly maintained batteries.
Refresh is turned off in transmitter charge modes. It is not possible to charge batteries with an additional discharge protection diode in refresh mode.

15. Additional sockets (side-mounted pin-board)

On the left side of the housing there is a two pole pin board row for external devices.

! Note: Please remove all pin board sockets (if not packed seperately) prior to the first use of the **chameleon high end** in order to avoid short circuits between the non-insulated pins. !
If you solder some cables to the pins, please insulate carefully with heat shrink tube to avoid short circuits and glue with 5 minute epoxy (do not use cyanoacrylate glue) to fix them.
The positive poles are protected by an internal M16 A fuse.

External discharge resistor ("entladelast")
An external resistor of at least 1.5Ohm/150W can be connected to the pin board.
Ensure that the connecting cables are soldered to all 4 '+' pins and all 4 '-' pins of the socket and use heat shrink tube for insulation.
The discharge resistor will automatically connect in parallel with the car battery when during the energy re-transfer the car battery reaches the 15V limit. The output is coded against reverse polarity.

How to connect the 1.5 Ohm or other discharge resistors to discharge less than 15 cells with higher currents **read Section 22: Output1. Discharging up to 14 cells with external discharge resistors.**

! **Warning:** Commercially available resistors will become very hot during discharge (over 100°C) and are susceptible to short circuits if the windings are not insulated. !
They present a potential danger for injuries (burns) or fires. We recommend resistors which are covered by a housing with an integrated cooling fan or with large cooling ribs to dissipate the heat (accessories).

Blinking light output ("blinklicht")
To connect an ordinary car indicator bulb 12V/25W for optical full/empty indication.
To turn off the light signal (and/or the buzzer/melody) just press the +/- keys.

Fan output ("lüfter")
To connect a 12V battery cooler. The output is coded against reverse polarity.

Temperature sensor ("temp. sensor")
To connect the temperature sensor provided (LM335Z).

PC-output ("PC")
To connect to a COM-Interface socket of an IBM compatible PC using our 9-pin interface cable. For more details see Chapter 20, Data Interface (PC-Interface).

16. Principle of the energy re-transfer functions (limits, warnings)

If the battery pack voltage is higher than about 18V, it is possible to discharge back into the car battery. (Hint: Two smaller (maybe 10 cells) packs of identical batteries with identical charge level may be connected in series to use this feature). The built in voltage transformer is used in a kind of 'reverse'-mode. As energy is not transformed into heat (common practice and still performed at lower cell numbers), discharge currents can be as high as charge currents.
The energy re-transfer function may be activated during the automatic combined programs or at manual selected discharge currents from 1.0A, provided that the function has not been de-activated by choosing AC mains power supply mode.
Currents below 350mA will not be re-transferred for higher measuring precision.
The discharge current will be gradually increased until the selected value or the performance limit of the **chameleon high end** has been reached.
If the car battery voltage reaches 15V, the discharge current will automatically reduced in order not to exceed the 15V.
If an external discharge resistor is connected, the charger will try first to lower the car battery voltage by connecting the resistor in parallel, before reducing the discharge current. If, due to the resistor and/or other consumers (e.g. pack 2), the car battery voltage drops below about 13 V, the discharge resistor is disconnected automatically by the microprocessor.

You have two options: If you want your flight packs discharged as fast as possible, you should connect the external resistor. If you want to get (or keep) your car battery charged as full as possible (maximum 15V in cycle use), then don't.

For energy re-transfer a car battery must be connected
The use of an AC/DC Power Supply, **even with an external resistor connected**, will usually cause serious damage to the power supply and/or the charger due to over-voltages and over-currents during the above mentioned process.
If **mains**-operation has been selected the energy re-transfer function is blocked.

When operating from an AC/DC power supply in car battery mode never connect more than 12 cells (at the beginning of the discharge - also when using the **autoCD** program - the battery voltage has to be below 18V) or manually set the discharge current limit to 750mA.

22. Output 1. Discharging up to 14 cells with external discharge resistors

17. Monitoring functions on the LCD-panel

Car battery - discharge quantity- and discharge current- control indication
You will find the indications in in the graphic screens accumulator 1 to accumulator 3 above the inverse car battery voltage.
A negative sign indicates a consumption from the car battery (or power supply). If no accumulator is connected, the power consumption the **isl 8** device itself (220mA) is indicated.
Current quantity will be reset when connecting **isl 8** to the car battery.
The current- and quantity indication for the primary energy source (car battery / mains power supply) is a calculated value, which is matched quite well with the reality.

Maximum load control
If the current figures during charge/discharge are lower than expected, usually the charger has automatically reduced the current because a limit has been reached.
For example: When reaching the maximum performance of the voltage transformer, or of the charge/ discharge stage, the display will show a "*" in front of the charge current.

Discharge / energy re-transfer control
Discharge currents are marked with a "**-**" in front of the current. As soon as energy is re-transfered into the car battery the "**-**" is replaced by an "**r**".
If the charger reaches one of its limits and has to reduce the discharge current, the "**-**" or "**r**" will intermittently replaced by a "*****".
If the external 1.5ohm/150watt resistor is switched on (wether it is connected or not) the "**r**" will become "**R**".

Status display
Press ***f5:pckState*** from the ***pack x*** screens to get an overview about the status of all connected batteries and especially if combined programs are used on Output 1 or 3:
e.g. which combined program has been selected, which part of it is currently running (charge or discharge) and which phase of the 3DC-program is running:
a: first discharge/charge cycle, **b:** second cycle, **c:** third cycle.
In the second quarter of a display line you will either see the manually set up value (e.g. 9A for the 9A discharge program), or the name of the automatic program.

If the charge current on the LCD panel is smaller than the value in the status display, the charger has reached a limit and has automatically reduced the current. Usually the maximum transformer performance has been reached and a "*" is shown in front of the current display. (When you connect already fully charged batteries, defective ones or batteries which are not quick chargeable, the charge current will also be lower than the calculated value, but no max. load indication will appear.

Note:
The status screen will not be updated during display.
If you change from a discharge to a charge program without disconnecting the battery, the capacity displayed may be positive or negative, depending on the total resulting energy balance.

18. Protection circuits, error-messages and warnings

The **chameleon high end** is equipped with various protection and control circuits to monitor car battery voltage, charger temperature, maximum performance etc.
Exceeding the limits will, in some cases, interrupt the charge (e.g. car battery over-voltage), the cause will be displayed and the buzzer will be activated for a short time. The symbols < and > may be displayed. '**>**' means **bigger**, '**<**' means **smaller**.
As error-messages with description and code # , like '**warning # 5, car battery voltage = min**' are self-explanatory, the table below should be sufficient. The first digit of the code indicates the Output number where an error was detected.

Code:	**1-99**	**Warnings without charge interrupt**
	100-999	**Error, interrupt of all programs**

Error text with code numbers for	pack 1,	pack 2,	pack 3,
Battery voltage below min.	11,	21,	31
Max. Battery voltage exceeded	13,	23,	33
Max. Charge voltage of converter exceeded	159,	259,	-----
Max. Charge current exceeded	161,	261,	361
Max. Discharge current converter exceeded	162,	-----,	-----
Max. Discharge current converter exceeded	163,	-----,	-----
Max. Loss performance of power source exceeded	175,	275,	375
Max. Loss performance of discharge sink exceeded	176,	-----,	-----
Max. Charge performance of converter exceeded	177,	277,	-----
Max. Discharge performance of converter exceeded	178,	-----,	-----
Max. Device input current (primary current) exceeded		961	
Max. Device temperature exceeded		981	
Car battery voltage exceeded		906	
Car battery voltage at minimum		5	
Car battery voltage below minimum		904	
Internal fuse (for pin board) blown		9	
Charge -time /-quantity /-temperature /-voltage exceeded		TIME / QUAN / TEMP / Umax	
Temperature sensor activated, but disconnected or broken lead		Toff	

Some typical user errors will be listed in more detail, which we strongly recommend you to read before sending the **isl 8** for a repair as you may simply avoid them:

TIME, Charge time exceeded
If a battery charges for more than 3 hours, we cannot say, that this is quick-charging. If you use **auto C** program and your battery is not full within 3 hours, auto C did calculate a wrong current (mostly when you charge a receiver pack with the original charge leads).
For correct function of the automatic charge current selection **a charge lead with 2.5 mm² is mandatory**. We recommend the use of a charge lead for the flight pack combined with a short (< 50mm) adapter piece to connect your Rx-battery. The short lead of the Rx-battery normally will not affect the performance, but no on-off switches with build-in charge sockets must be interconnected.

Disconnect Pack x
Error x77, Charge converter performance over maximum
Error x55, Battery voltage over maximum (e.g. > 50V on a 10 cell pack)
other nonsense errors
These and other unexplainable errors the charger may display, when ...
... connected to a car battery with an operating car battery charger.
... connected to an unsuitable Power Supply.
Keep in mind that due to a different environment or situation, even with time consuming tests it may not be possible to find the cause of some error displays.
If there are no malfunctions you will still be charged for the time spent on testing!
Before you return the device for a check, **test it several times connected to a full car battery to ensure the problem has not been caused by reasons mentioned above**.

EMPTy or RPOL (reverse polarity) - Display during Ni-Cd-Program after about 30s.
To delete the memory-effect batteries may have been completely discharged down to 0V (not possible with this device). The charging of these packs is possible, but up to a certain voltage a warning will be displayed.

Attention:
The warning mentioned above appears if the voltage does not rise fast enough. This could be an indication of reversed polarity, if a completely discharged battery was incorrectly connected. It may even get 'reverse-charged'.

Hint: The **chameleon** high end can not detect reversed polarity if a pack is discharged to 0V. It will always start a normal charge cycle, normally ending after 30s with the message reversed polarity (Rpol) or deep discharged (EMPTy), if the battery has not reached a minimum voltage by then. For safety reasons you may have to restart the charge program several times, e.g. when using high capacity cells.
- With completely discharged batteries (< 1V) it may take up to ten minutes until the correct number of cells is identified.
- A battery voltage below 0.5V on Output 3 is interpreted as reverse polarity.

Disconnect Packs
This message will be displayed if batteries are already connected to the charger while connecting it to a power source. The device can not decide by itself whether to select a Ni-Cd- or a PB-program or if Output 2 and 3 may be started uncontrolled. The same message will appear if during the program the watchdog detects the microprocessor in a state not foreseen by the software (e.g. due to external interference).

Error #9, blown fuse
This error message will be displayed if a short circuit has been caused between the positive pins of the external sockets and the negative terminal of the car battery.
In this case the internal M 16 A glass fuse (size: 5x20mm) needs to be replaced.
Before opening the housing, disconnect the device from the power source.
To open: Remove all three visible Philips screws and all external sockets!

19. Important notes

- Charging leads are only to be connected to the appropriate Outputs.

- Cross wiring between Outputs may cause short circuits and damage the device and the batteries (even may cause melting or explosion!).

- Charge/Discharge currents may be displayed without the leading zero, for higher resolution within the space provided (e.g.: A current of 0.333A will be displayed as .33A instead of 0.3A).

- Transmitters are often protected against discharge by a diode. For quick charge this feature needs to be disenabled (see Tx-Manual) or must be charged with the **transmitter** charge option (see **cutoff** menu).
To avoid possible damage inside the Tx, the charge current must not exceed 1.2A (Graupner mc-18/20). Watch the charge current when using an automatic program. The resistance of the printed circuit board may cause the microprocessor to select a charge current too low for safe peak detection. When in doubt: Choose manual selection.

- A common cause for insufficient charge currents in automatic mode are unsuitable charge leads. The automatic charge current calculation is based on the measurement of the internal resistance of the connected battery. The lower the internal resistance, the higher the possible charge current.
a) as the charger can only measure the total resistance (internal resistance+ resistance of the leads + resistance of the connectors), for correct calculation of the charge current it is essential to keep the additional resistance at a minimum by using charging leads with adequate cross sections (**2.5mm²**, also for Rx-batteries!), high quality (gold) connectors, and a maximum length of 75 cm.
When using thin charging leads and/or on-off switches with build-in charging sockets on low voltage batteries, the additional resistance of the connectors and cables could be higher than the actual battery resistance. In this case the automatic charge current would be less than half of what it should be! In such cases manual current selection is recommended. The microprocessor will also consider the condition of the cells when calculation the charge current in automatic modes.
Be reminded that on a full car battery the charge current for a 4 cell battery (e.g. Rx-pack) will be restricted to a maximum of about 2A to avoid overheating of the charger. Even with high capacity cells a higher charge current will only be selected if the limits of the charger are not exceeded.

- Don't be amazed if your battery packs seem to absorb lower currents in automatic programs during the winter months - a cold cell does not perform like a warm one.

- If the charger technically can not provide the charge current manually selected or automatically calculated (see example above, or e.g. 6.0A at 30 cells), a "*" will appear between voltage and current values on the display. In this case the actual charge current will be displayed.

- During the measuring phases (a "!" appears between voltage and current figures), some function keys are blocked. They are also inoperative when the charger has noticed a drop in the charge voltage, so that peak detection will not be disturbed.
The cut-off automatic can be monitored: it takes several, closely followed voltage drops before the charge on Output 1 is terminated. The voltage drops detected will appear as a, b, ... between charge time and voltage values on the display and can be used as an indication for the Full-probability (Also see the PB-**Chapter 8**).
With a full battery at this point a "t" indicating trickle-charge will be displayed. To keep the battery full, the Ni-Cd programs use a pulsed current, the PB-programs use a low constant current.

- Safety Note: As a standard procedure you should check whether the charged capacity after full indication is about what can be expected. This will allow you to identify any premature full detections and may also avoid crashs due to only partly charged batteries. The probabilities for premature full indications depend on several factors. It happens most likely with deep discharged batteries, low cell numbers or certain battery types.

- Especially on low cell numbers you should perform some test charges to verify correct peak detection. Full batteries may become over-charged if the peak is not very pronounced.

-If an **error** (not a **warning**) appears, all current programs will be interrupted and previous information about charge time and battery voltage is lost.

- It may take several seconds before the software detects the disconnection of a PB-battery. This is for technical reasons is to be considered normal.

- You risk malfunctions and damage to the device, if...
... switches or fuses are used between charger and battery
... terminal clamps are replaced by others than 4mm gold connectors
... the device is operated while car engine is running and/or connected to the cigarette lighter socket.
... an unsuitable Power Supply is used
... energy re-transfer into a Power Supply is tried.

20. Data interface - serial port

Note: The Data Interface can be reached from the ***powerOn*** screen provided no battery is connected (***data*** shown inverse if access is not possible).
Charge data (Currents, voltages) can be stored in a non-volatile memory and/or transfered and displayed from the a) screen buffer, b) buffer, or c) memory.

Explanation to a), b) and c):

a) Screen Buffer
For each pack a certain part of the RAM area (no data storage after power is disconnected) is reserved. These areas only contain the data for the voltage curve display.

b) Buffer
The **chameleon high end** is currently equipped with three buffers (RAM areas with no data storage after power is disconnected). Data can be stored in 1 second intervals for a period of 40 minutes. To extend the maximum storage capability, every other value of a full buffer will be automatically deleted and replaced by a new value to achieve 40 / 80 / 160 minute periods with reduced resolution. The last resolution used by the **chameleon high end** can be called up by pressing the following key combination from the ***powerOn*** screen: ***f1:data, f1:buffer and memory resolution***.
The resolution of the voltage is 16 bit.
The charge current is always stored using 8 bit resolution, i.e. there is a small data reduction. (Also see **Chapter 20**, Data-Transfer).

It is advisable to designate buffer 1-3 to Output 1-3. This can be done by pressing ***f1:data, f2:pack to buffer assignment, f5:standard values****, or with the same result:* ***f1:data, f5:standard values for f2***, or make your own selection.

Note: The chosen selection can only be changed after a charge process has been stored in a buffer. E.g.: If Buffer 1 was used for Output 1, Data from the next charge at Output 1 may be assigned to Buffer 2. As long as the same buffer is not used again, previously stored data can be recalled until power is disconnected.

c) Memory:
The **chameleon high end** has a non-volatile memory with the size of one buffer area. The complete information of one buffer can be stored, even if power is disconnected.
Data from the buffer to the memory will be transfered by pressing ***f1 data, f3 copy buffer to memory.***
The copy menu also shows (in square brackets) the latest Output - Buffer configuration.

Data Transfer:
a) Online, i.e. simultaneous while charging/discharging
With only pack 1 connected, data is transferred every second via the serial PC-port, otherwise data is linked into a 3 second block.
Online data transfer provides the best voltage (16 bit) and current (10 bit) resolution as well as additonal transfer of State and Temperature values.
These data can be monitored on a PC-screen with our windows software ***winsoft*** and may also be shown or printed (in color).

b) From a buffer or the memory.
Each data transfer starts with a commentary line, which contents the (record-) date, the start time of the data recording, the data source, the pack number and the used program.

Data transfer will take place as fast as possible with simultaneous display on the LCD.
Data transfer may be started without connection to a PC for visual control of the data. You can stop and start data transfer by pressing **-** or **+** button.
Data transfer can be terminally interrupted by pressing the ***esc*** key.

Note: Due to technical reasons the 16 bit voltage of the (discrete) analog to digital converter (ADC) of the peak detection facility are not as precise as the analog 10 bit values of the microprocessor. The 16 bit resolution (in mV) however makes trends appear more noticable.
During the first 15 seconds of a charge/discharge program the 16 bit voltage values will be calibrated for better resolution of the data transfer to the **winsoft**.

21. Windows software *winsoft*

With ***winsoft*** you can receive data from the **isl 8**, store them in global or selective files, recall them and display them graphically, compare curves, transform pack voltages in average cell values, show energy figures, print curves (in color) and much more.
Using a standard windows text program you may also have a look at the raw data as transferred from the **isl 8**.

To run the windows software you need Microsoft DOS 6.22 and Microsoft Windows for Workgroups™ 3.11. The program may run with earlier versions, ***winsoft*** version 3.06 or higher works also with Win´95™.
Installation instructions can be found on the 3.5" disk under ***readme.txt.***
Instructions how to use our winsoft evaluation program are integrated as help lines, which can also be printed in page form.
Please note that although the program is not copy protected, it will only fully work when it matches with the registered serial number of your device.
When ordering the windows software we need the serial number of your device.
A wrong number will cause the program to stop after a value of seconds of more than three minutes displaying ‘demo-version’ on the PC-screen.

(***winsoft*** is available in english and german language)

22. Output 1. Discharging up to 14 cells with external discharge resistors

From now, the isl 8 can discharge few cell numbers with more than 2.5A.
For doing this, there is the need of an additional high power resistor, which is automatically paralleled to the battery by the **isl 8** if necessary.
4 types of discharge resistors are available in 3 different resitance-values:
The 2 types with 1.5Ohms, originally used to discharge the car battery, can now be used to discharge up to 14 cells.
1) **i8-elast-kk**, 1.5Ohm/150W, 200 x 60 x 60mm, with cooling-rips.
2) **i8-elast-vent**, 1.5Ohm/150W, 85 x 85 x 105mm, with fan-cooling.
To connect the 1.5Ohm resistors to the **isl 8**, a low-priced additional cable is necessary. This cable makes possible that **isl 8** can parallel the resistor to the battery with its internal switch, which is designed for a maximum of 10A.
3) **i8-elast-0.66**, 0.66Ohm/300W for maximum of 12 cells, 85 x 85 x 105mm, with fan.
4) **i8-elast-0.33**, 0.33Ohm/200W for maximum of 7 cells, 85 x 85 x 105mm, with fan.

Instruction for the connection of the additional cable for the 1.5 Ohm discharge resistors:
Because of short-circuits, use exactly the following sequence.
a) Put the 9 pin wire wrap male socket of the additional cable in the 9 pin female socket of the discharge resistor. Fasten with tape.
b) Put the 9 pin female socket of the additional cable into the „entladelast“ male socket of the **isl 8.** Only those 4 pins with negative polarity are used.
c) The red banana plug of the additional cable must be stuck in the + akku 1 banana socket of the **isl 8**.
d) The battery to be discharged must be stuck at beginning of discharge with the + pole piggyback in the rear socket of the banana plug. The - pole must be stuck quite normally into the - akku 1 banana socket.

Connection of 0.66 and 0.33Ohm discharge resistors:
These resistors are switched by high current relays in parallel to the accumulator to be discharged.
The switching of the high current relay is initialised by the „entladelast“ output of the **isl 8**.
a) The 9 pin socket of the thin cable of the discharge resistor must be stuck into the „entladelast“ socket at the left side of the **isl 8**.
b) The both banana plugs of the discharge resistors must be stuck in the both akku 1 banana sockets outputs.
c) The plugs of the charging cables must be stuck now on the top of the banana sockets of the discharge resistor.

Table of the possible and permissible discharge currents:

Type	resistance	area	current at:	6V	8V	10V	12V	14V
i8-elast-kk	1.5Ohm/150W	1-14 cells		4A	5.3A	6.7A	8A	9.3A
i8-elast-vent	1.5Ohm/150W	10-14 cells		-*	-*	6.7A	8A	9.3A
i8-elast-0.66	0.66Ohm/300W	1-12 cells		9A	12A	15A	18A	-**
i8-elast-0.33	0.33Ohm/300W	1-7 cells		18A	24A	-**	-**	-**

[-*]not permissible, ventilator does not run.
[-**]not permissible, overload of maximum performance.

Remark:
The actual discharge currents are higher, cause of the isl 8 internally additional discharge current up to 2.5A.

Adjustments at the isl 8:
To be able to activate the external connected discharge resistor, you must first
a) select the fix-d discharge program.
b) the discharge current on the upper side of the max. current must be adjusted on one of the three possible resistor values. This means, that you find at the upper end of the discharge current scale three further values with R=1.5, R=0.66 and R=0.33.
It is essential that you chose the right resistor value. Only then the correct discharge current value can be calculated and shown. The **isl 8** can not measure the external discharge current, it only can calculate from the battery voltage and the connected resistor value!
c) Then the accumulator can be connected as described on page 27.
The **isl 8** then begins first with a calibration cycle of the 16Bit AD-converter, which takes several seconds. The discharge time shows 0:00 in the display.
After finishing calibration, time begins to run and the linear discharge stage starts slowly discharging up to the maximum allowable performance (<= 2.5A).
Then the connected cell number is calculated.
After that, the external discharge resistor is switched on. The fan begins turning.
If the undervoltage limit of the battery is reached, the discharge resistor is separated from the accumulator and switched off as well as the internal discharge stage of the **isl 8**. the **isl 8** shows „empt“y.
Notes:
- If you chose one of the three above named current areas for the direct discharge with the external discharge resistor, the energy re-transfer stage into the car battery is blocked. The **isl 8** discharges with 2.5A or less, according to the connected number of cells.
- Discharging does not occur with constant current. Analogously to a connected motor to the accumulator, discharge current decreases with lower battery voltage.
- Do not use wrong resistor values an and/or do not forget to connect the discharge resistor. The **isl 8** otherwise shows wrong current values.
- For safety reasons (overheating of the accumulator), the external discharge resistor will only be switched on by the software in the **isl 8** at the permissible cell number and the **fix-e** discharge program. (Not at auto-d and not at the combination programs . ..cd and/or. . ..dc).
- Notice when comparing measured data with your colleague using the same measuring equipment, that the data can be compared only conditionally with each other. Relatively high tolerances (approx. 10%) of the high performance discharge resistor(s) are normal.
- In exceptions, the calibration procedure of the 16 bit converter fails. If your battery shows unrealistic voltages, better do 1-2 control measurements before cutting the battery into its components.

Important notes:
It is your responsibility, whether the external connected discharge resistor functions as you expect, since the **isl 8** has no possibility to examine the regular function.
- Be sure that the fan turns at maximum rotations - otherwise fire damage is possible!
- Never leave **isl 8** discharging without looking on it and its proper function!
- After discharging with high currents, batteries have much higher temperature as normally. Cool them down.
- If you want to discharge more than 14 cells, remove the discharge resistor (with all cables) from the **isl 8**. Otherwise, if you use a normal discharge program, the resistor could be switched on parallell to your flight battery instead of parallel to the car battery.

23. Technical data

Pack 1 Output:
Ni-Cd-Batteries:

Number of cells (@ 1.65V / cell)	4-36
Capacity	0,1 - 4 Ah
Charge currents (9A autom.)	0.25 - 6.5A
Charge performance (@ 34V)	~ 310 W
Charge performance (@ 50V)	~ 280 W
@ 6V (~4 cells)	~ 3.1 A
@ 9V (~6 cells)	~ 5.7 A
@ 11 - 34V (~8-20 Z.)	**~ 9.0 A**
@ 40V (~24 cells)	~ 7.5 A
@ 45V (~27 cells)	~ 6.4 A
@ 50V (~30 cells)	~ 5.6 A

Lead acid (PB) Batteries:

Voltage	2, 6, 12, 24 V
Capacity from	1 Ah
Charge currents	0.25 - 5.5A
Trickle charge	few mA

(Linear) Discharge stage:
PB- und Ni-Cd-Batteries below 18V:

Discharge currents	50mA...2.5A or
max. loss performance	20 W

Energy re-transfer stage:

Number of cells (@ 1.22V / cell)	15 - 34
Capacity	from 1 Ah
Discharge currents	0.35 - 9A
Discharge performance	~200 W
@ 23V (~19 cells)	**~ 9 A**
@ 30V (~24 cells)	~ 6.7 A
@ 36V (~30 cells)	~ 5.7 A

Pack 2 Output:
Ni-Cd-Batteries:

Number of cells (@ 1.65V / cell)	4 - 27
Capacity	0,1 - 4 Ah
Charge performance (@ 26V)	~115 W
Charge performance (@ 40V)	~ 95 W
Charge currents	0.25 - 5A
@ 6V (~4 cells)	~ 1.7 A
@ 9V (~6 cells)	~ 3.0 A
@ 10.5 - 25V (~7-15 cells)	**~ 5.0 A**
@ 33V (~20 cells)	~ 3.3 A
@ 40V (~24 cells)	~ 2.4 A

Pack 3 Output:
Ni-Cd-Batteries:

Cells (at 1.5V / cell)	4 - 6
Capacity from	100 mAh
Charge current	~ 100 - 1500mA
Full voltage limit	~ 1.5V / cell

General:

Weight	~ 1350g
Dimensions	~ 207x151x68mm
Supply Voltage	11 - 15.1 V
Low voltage warning	~ 11.6-10.4V
Low voltage cut-off	~ 11.0- 9.8V
Max. supply current	~ 45 A
Idle current	~ 220 mA

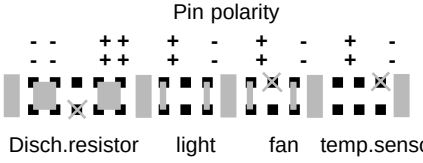
External sockets (pins):

Internal fuse (5 x 20mm)	M 16 A
Discharge resistor (1.5Ω /150W)	12.5V/10 A
External Light (21W-bulb)	12.5V / 2.5A
Fan for battery cooler (1.5-3W)	12.5V / 0.5A

Temperature sensor: steps of 2°C

All Data given is based on a 12.5V car battery voltage.
Recommended battery size: 12V/> 90 Ah, min. 12 V/ 63 Ah
Tolerances at Pack 1/2 currents: typ. 5%; max. ~15% or 250mA (larger value counts)
Tolerances at Pack 3 currents: typ. 5%; max ~10% or 100mA (larger value counts)

24. External pin board sockets layout (Viewing on soldering side of female sockets)



soldered separation pins
Coded, pin missing, dummy pin in female socket required
Solder bridge on socket

25. PC interface, View on soldering side of female sockets

RS 232 Interface	SUB D socket	9-pins	(25-pins)
T = Transmit; connect with	RXD	Pin 2	(Pin 3)
R = Receive; connect with	TXD	Pin 3	(Pin 2)
Signal GND; connect with	GND	Pin 5	(Pin 7)

26. Data format PC interface

Data transfer rate: 9600 Baud

Data block: **`P:sssss:uuuuu:iiiiiVSttt##`**

Legend:

`P`	Output/Pack No.
`:`	Separation sign
`sssss`	time in seconds
`:`	Separation sign
`uuuuu`	Battery voltage in millivolts
`:`	Separation sign
`iiiii`	Current in milliamperes
`V[:,-]`	Charge/Discharge indicator
`S[l,L,E,P,v...]`	Charge-/Discharge-Status
`ttt[-, ,0..9]`	Temperature
`##`	~~Device number, coded~~ (not in V4)

Commentary line: **`* Date Day Time DataSource OutputPackNo. SelectedProgram NumberOfCells`**

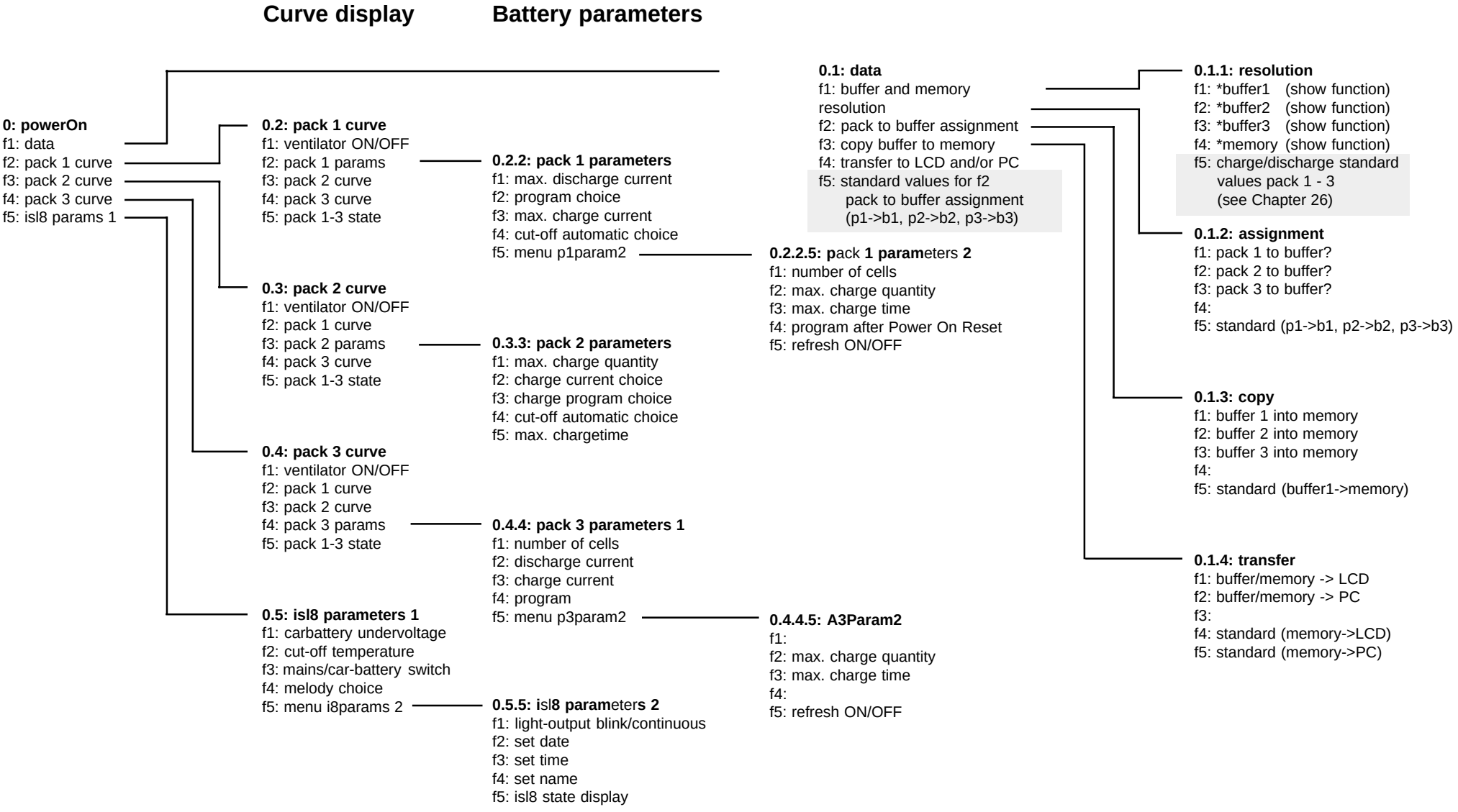
Number of cells: calculated cell number on Output 1 and 2,
cell number as selected on Output 3

27. Standard setup charge-/discharge programs

value	pack 1	pack 2	pack 3
D current	-2.5A	-	-0.3A
C current	max.	auto5A	0.6A
Programm	auto C	auto5A	fix C
Cut off	normal	normal	-
C/D Quantity	2600mAh	2600mAh	2600mAh
C Time	180min	180min	180min
Refresh	ein	-	ein
Number of Cells	-	-	4
PowerOnProgram	auto L	last*	last*
CarBattery-MinimumVoltage		11.2V	[*] not selectable
Temperature		60°C	
Mains Power Supply/CarBattery			CarBattery
Melody		5 (buzzer ON from device number 7628 and higher)	
Full/Empty Light Output		Flashlight	

isl 8 chameleon high end

28. Menu-Tree-Structure



29. New features in version 4.xx

Our software has remained unchanged for a long period, but we can now offer a new version which features many of the ideas and wishes which our customers have expressed to us. However, space in the memory of the program EPROM is limited, so we have had to exclude some of those ideas. Even so, we are sure you will agree with us that the results are impressive. Here are the new features:

29.1 The maximum charge and discharge current for the Battery 1 output is now 8 A (manual charge current selection) and 10 A (fully automatic charge current selection).

29.2 The -2LE and -3EL programs have now been discontinued, and are superseded by the facility to pre-select 1 ... 5 charge and discharge cycles at the Battery 1 output. The program with 5 charge/discharge processes is indicated by an "X" instead of the numeral 5, and offers a special feature: if, during the discharge process, the unit detects that the last discharged capacity is lower than the previous discharged capacity, it is clear that the cycling process is not increasing the pack's capacity, and the cycle is therefore halted. If an -XEL program is in progress, the battery is still fully charged when the cycle has been halted. In each case the number of cycles is set in a sub-menu (***program ->fixDC/fixCD/ autoDC/ autoDC -> 1 ... 5***) of the combination program menus. The number of cycles you set applies to all the four programs listed above.

29.3 The Battery 2 output now features separate adjustment facilities for program selection (***program -> fixC and autoC***) and charge current (***C-curr -> 0.25A ... 5.0 A***).

29.4 It is now possible to configure 12 "ready-made" charge/discharge programs each separate for the Battery 1 and Battery 2 outputs. You can store one of the 12 configurations using the menu point (***program -> save -> 1 ... 12 -> name***) with a self-made name (6 characters long) for this configuration. Using the menu point (***program -> recall -> 1 ... 12***) you can read one of the 12 stored configurations. If you select a number which does not correspond to a ready-made configuration or saved data are not valid (data are not multiple saved), the program jumps back to the current menu with a multiple beep to warn you of the error.
Data is stored in the following menu points: D-curr, C-curr, program, cutoff, refresh, No. of charge/discharge cycles, QUANTmAh, TIMEmin.

29.5 The lead-acid charge program is now available at the Battery 2 output; this means that a protracted lead-acid charge process does not prevent you using the discharge facility at the Battery 1 output. Of course, you can still discharge lead-acid batteries at the Battery 1 output. The values for charge quantity and charge time limit for lead-acid batteries are stored at different memory locations, which means that you can set different limit values for Ni-Cd / Ni-MH batteries and PB batteries (already implemented in Version 3.75).

29.6 The display of discharged capacity which is removed from the car battery is now no longer reset every time you connect the ***isl 8*** to the car battery. Instead the reset only occurs automatically if the unit detects a change of date when you re-connect the charger. The point of this change is as follows: if your car battery at the flying site is of relatively low capacity, you can avoid wasting energy by disconnecting the ***isl 8*** between charging processes, without losing the ability to check the total discharged capacity at the end of the day. If you operate the ***isl 8*** from a mains PSU in the meantime (we only recommend this option with the use of our NT40A PSU) and you switch the ***isl 8*** from car battery mode (***Batt***) to mains PSU mode (for example ***N299W***), the charger stops calculating the total discharged capacity, but does not erase the stored data. When you subsequently switch back to battery mode, the unit resumes its measurement of the discharged capacity. You can erase the total discharged capacity manually in the same menu (***i8Param1 -> mns/bat***) using the menu point ***BatRes*** (***Bat***tery discharge quantity ***Res***et, above ***Batt***).

29.7 The voltage resolution of the Battery 3 output has been improved; this makes it possible to increase the maximum level of charge pushed into the pack. The maximum value is now virtually 100%.

29.8 The temperature display is also much more sensitive and therefore more accurate, with increments of one degree Celsius.

29.9 The ***isl 8*** now stores the owner's name in three locations. This means that the inversion of a single bit in memory no longer invalidates the stored name, as error correction is possible if individual letters in the name become corrupted and illegible.

29.10 The owner's name entered in the charger is now password-protected. If you now attempt to change the owner's name and press ***enter***, the unit asks you to enter the stored password. As supplied, the charger accepts the password "***keyword***". The unit always suggests this password, and you should change it as soon as possible to make it impossible for unauthorised users to change your stored name. The charger expects a name with 7 characters (which can include the space character). It differentiates between capital letters and small letters, and also accepts numerals and special symbols.
When you have entered the correct password, you can then change that password by pressing the ***f5*** button (***New-Pass*** (instead of ***enter***)). To exclude the possibility of errors when entering the name, the ***isl 8*** asks you to enter it twice. You have to enter the new password twice, i.e. the password must be entered one time in the ***NewPass1*** menue and a second time in the ***NewPass2*** menu - every time confirmed by pressing ***enter.***
Memorise the name carefully. If you forget your password, we can restore it at the factory, but only if you can prove that the charger you sent to us is actually your property. The easiest way to convince us of this is to enter the charger's serial number on the guarantee card when you purchase the unit, and send it in to us.
To see the charger's serial number, connect the unit to the car battery and press the ***f5*** button **three** times.

Minor improvements:

29.11 When the charger has detected that the pack at the Battery 3 output is full or empty, the screen displays the charge termination voltage (as with Battery 1 and Battery 2) instead of the current pack voltage.

29.12 The calibration ("thinking") interval, which used to occur before a discharge process started at the Battery 1 output, has now been discontinued, as it has been replaced by a dynamic calibration process.

29.13 The dynamic calibration process has also eliminated an earlier problem: when extremely deep-discharged cells were discharged at the Battery 1 and Battery 2 outputs, the battery voltage was displayed incorrectly; this is now not the case.

29.14 Previous versions of the software produced inaccuracies in the value for current which was passed to the PC when transferring data in graph form from the isl 8's internal memory to winsoft, but this has now been much reduced by the adoption of an improved data compression process.

29.15 When you initiate a discharge program, the charger emits a longer beeping sound in order to differentiate the process from the charge programs. The purpose of the new beeping pattern is to remind you that you may have started to discharge the battery by mistake, perhaps by selecting the wrong program.

A shortage of program memory has made it impossible to implement the following features:

a ... automatic commencement of charging or discharging using the internal clock.
However, we are working on an alternative version of the software which includes this feature (it is already implemented in the eco-charger). This will be possible by omitting the lead-acid battery charge program.

b ... a POR-Prg menu for Battery 2 and Battery 3 (for Battery 2: use one of the 12 configurations)

c ... the facility to correct the number of cells for the Battery 2 output.
(To be precise: this menu point has been omitted due to the expansion of the program select and storage facilities.) However, there is no drawback to this change - apart from the transfer of the exact number of cells to winsoft.

d ... voltage indices on the Y axis.

We have also **not** implemented a program for charging Li-ion batteries. At present the accuracy of the voltage display is not good enough to cope with the highly sensitive Li-ion cells, and this means that they could be damaged by overcharging.

30. Character-table for name and password input:

..../0 1 2 3 4 5 6 7 8 9 : ; < = > ? @ A B C D E F G H I J K L M N O P Q R S T U V W X Y Z [Y] ^ _ ` a b c d e f g h i j k l m n o p q r s t u v w x y z { | } > < space ! “ # ä ö ü ° ( ) * + , - . / 0 1 2...

31. Standard ready-made configurations of version 4.xx

The 2 x 12 pre-set configurations are not available if you have upgraded the charger yourself, i.e. if you have installed an exchange program Eprom yourself at home.

Of course, you still have the option to transfer all these settings manually from the table printed below.

If you have your own ideas about configuration names (e.g. you wish to use the name of the battery), or if you wish to alter the order of the configurations, you can certainly do this exactly as you wish within the limits of the software's facilities. For example, to copy a particular configuration to a different number, simply read in the configuration with the old number, then store it under the new number. Only the name has to be altered.

For the factory settings listed below there is no automatic correction facility for inverted bits in the memory. As a result changes in the configuration may occur by themselves in rare cases.

#Pack1	**Name(g.)**	**Name(e.)**	**Program**	**Current**	**Cutoff**	**QUANT**[mAh]	**TIME**[min]
1	auL10	auC10	autoL	10 A	normal	2700	180
2	feL5.0	fxC5.0	fixL	5.0 A	normal	2700	180
3	auE10	auD10	auto-E	10 A	normal	2700	180
4	auE2.5	auD2.5	auto-E	2.5 A	normal	2700	180
5	feE2.5	feD2.5	fix-E	2.5 A	normal	2700	180
6	nim3.0	nim3.0	fixL	3.0 A	sensit.	3300	66
7	nim2.0	nim2.0	fixL	2.0 A	sensit.	2200	75
8	nim2.0	nim2.0	fixL	1.0 A	sensit.	1200	75
9	aEL10	aDC10	aut1EL	10 A	normal	2700	180
10	fEL2.5	fDC2.5	fix1EL	2.5 A	normal	2700	180
11	aLE10	aCD10	aut1LE	10 A	normal	2700	180
12	fLE2.5	fCD2.5	fix1LE	2.5 A	normal	2700	180

#Pack2	**Name(g.)**	**Name(e.)**	**Program**	**Current**	**Cutoff**	**QUANT**[mAh]	**TIME**[min]
1	aut5.0	aut5.0	autoC	5.0 A	normal	2700	180
2	fes5.0	fix5.0	fixC	5.0 A	normal	2700	180
3	fes2.5	fix2.5	fixC	2.5 A	normal	2700	180
4	fes1.0	fix1.0	fixC	1.0 A	normal	2700	180
5	fes0.6	fix0.6	fixC	0.6 A	normal	2700	180
6	nim3.0	nim3.0	fixC	3.0 A	sensit.	3300	66
7	nim2.0	nim2.0	fixC	2.0 A	sensit.	2200	75
8	nim2.0	nim2.0	fixC	1.0 A	sensit.	1200	75
9	nim0.6	nim0.6	fixC	0.6 A	sensit.	1000	75
10	sen1.5	tra1.5	fixC	1.5 A	sensit.	2700	180
11	sen1.2	tra1.2	fixC	1.2 A	sensit.	2700	180
12	PB L	PB C	PB C	5 A	(normal)	2700	180

32. Installing a software-update Eprom:

As soon as we have completed a new version of the software which includes significant improvements over the previous version, we will inform you by letter. If your charger is less than one year old, you will automatically be sent the new software version at no cost to you.

Of course, for this system to work you must fill in the guarantee card and send it in to us!

If you have received an Eprom (multi-pin chip) from us, please...

• Ensure that any static charge in your body is dissipated before you touch the Eprom.

• Disconnect the isl 8 from its power supply and unscrew the three cross-point screws.

• Open the case by lifting the front; there is a rubber seal on the underside at the rear, and you will need to squeeze it tightly to compress it.

• The old Eprom (there is only one in the charger; it is the chip with the silver sticker) can now be levered up and out of its socket using a screwdriver. Work carefully, raising the chip evenly left and right, and take care not to tilt it to the rear, as this will bend the pins out of line. The best method is to slip the blade of the screwdriver into the slot between the Eprom body and the socket, working from the side of the charger where the auxiliary socket row is located.

• Ensure that the distance between the two rows of pins matches the spacing of the Eprom socket. If we have not already done this, you will find that it is usually necessary with new Eproms to bend the pins inward slightly until they are at right-angles to the chip body. This can be done simultaneously for all pins on one side by laying the pins flat on a table, so that the chip's body is standing up at an angle, then bending the body over further until it is vertical. Important: ensure that you simply increase the angle of the bend at the existing "elbow"; don't bend them where the pins start to taper!

• The new Eprom can now be placed lightly in the socket, the same way round as the old Eprom; note that the notch on one end of the Eprom body must face the square micro-processor. Check that all the pins are located in the correct position, between the pairs of metal contacts in the socket, then press down firmly to engage it; usually you will hear the pins "crunch" into place.

• Check briefly that the charger is working by connecting it to the car battery (or - preferably - a current-limited 12 ... 13.8 V mains PSU). If the screen does not immediately show the usual Power-On display, disconnect instantly and check the installation of the Eprom (see previous paragraph)! If you install the chip the wrong way round, it will be ruined. Guarantee invalid!

• If you previously disconnected the cable to the cooling fan and the loudspeaker, re-connect the cable now, with the brown or black wire facing the sockets for Battery 3. If your charger has a loudspeaker, the connector will be at a slight angle; this is deliberate due to space restrictions in the case, and must be maintained.

• Re-assemble the charger by reversing the procedure outlined above, i.e. first push the grommet and power cable into the slot in the case, place the rubber seal on the internal side of the heatsink, and press together firmly, at the same time sliding the bottom part of the case forward under the case cover. Don't forget to fit and tighten the three screws.

Dear customer,

If your charger appears not to work as you expect it to, please run through the measures outlined below step by step before assuming that it is faulty.

Only if you have completed all these checks, and the problem is still present, ring on our hotline for technical advice. Even better, fill in the service questionnaire (next page) and send or fax it to us. We will then ring you back with advice.

From long years of experience with our battery chargers we know that most problems do not arise if the points listed below are followed to the letter.

If we receive your charger but can find no fault with it ("no fault found") - which usually means that the measures described below have been ignored - please note once again that we incur costs in checking the unit, and that those costs are payable by you even if the charger is within the warranty period.

1. Connect the charger to a fully charged car battery with a capacity of at least 60 Ah. Do not use a mains-powered Power Supply Unit!

2. For the power supply to the charger use only the original cables and terminal clips. Connectors such as wander plugs, car cigar lighter plugs etc. are not suitable! If you have made changes, kindly restore the original cables and clips. Take care to produce sound soldered joints - no "solder blobs" or dry joints, please!

3. Charge cables for all batteries should have a conductor cross-section of 2.5 sq mm. The charger's automatic current setting circuitry is only capable of setting a suitable (i.e. high) charge current for your battery if the cable is of this cross-section. Give the automatic circuit a fair chance!

4. Just as important as the charge cables are the connectors attached to them. Use the proven 4 mm gold-contact connectors at the charger end (don't use expensive wander plugs). Your flight packs should already be fitted with gold-contact connectors. Tin-plated connectors are completely unsuitable as their transfer resistance is high and they are prone to intermittent contact. Be sure that your cables are well soldered to the plugs and sockets. Do not fasten with screws.

5. If you observe Points 3) and 4) and connect a discharged battery to the charger, the fully automatic charge mode should set a current of at least 1C, usually as much as 2C, after about 5 - 10 min-utes. If this is not the case, then the internal resistance of the battery is probably excessive. In short, your battery has "had it", or is not suitable for rapid-charging.

6. Ensure that there are no defective cells in the battery pack. Bad cells usually heat up early in the charge, and then cause the charger to switch off prematurely, and/or to set too low a charge current in automatic mode.

7. If the 3-hour limit is exceeded when you are charging from the Akku 1 or Akku 2 output in automatic mode, then something is wrong with your charge cable, your connectors or your battery. Perhaps too small a cross-section in the charge cable? Connectors not good-quality gold-contact types? Dry solder joints? Battery ready for the bin, or not designed for rapid-charging?
Establish the reason! Attempting to alter the 3-hour time limit is not the way forward, as in most cases a charge period of one hour already indicates that something is amiss. After 5 - 10 minutes the automatic circuitry should have set a charge current of at least 1C!

8. Have you read the information in Chapter 1 (Warnings) and 2 (How to obtain reliable, trouble-free operation) and observed the recommendations?

Please fill out the form completely and as precisely as possible:

Form can be sent alone for technichal assessment/advice but must be sent with any repair!

Battery:	**Your Data:**	**Example:**
Usage (Tx, Rx, Propulsion)		Transmitter
Manufacturer		Sanyo
Number of cells / Voltage		8cells / 9.6V
Capacity		1700mAh
Type		1700SCE
Cells soldered/welded/clamped		soldered
Charge lead connector		audio type
Charge lead:		Original <xyz>
Length		1,5m
Cross section		0.14mm^2
Connectors to charger		4mm gold
Power Source:		
Malfunction during AC/DC operation:		Yes
Manufacturer		Graupner
Type		Power 150
Data: Voltage/Amps		13V / 11A
Malfunction during DC operation:		no
Capacity car battery		45 Ah
Charger:		
Type		isl 8
Output used		akku1
Program used		auto C
Max. current (at automatik:)		0.83A
Current at/before error		0.25A
Charge time		133 min
Battery temperature		30°C
Error code		# 52

Descriptions of malfunction / Comments: