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Operating Instructions Battery Manager

Intelli-Control V3

Best.-Nr.: **010 103 6**

Technische Änderungen vorbehalten / Technical content subject to change
File:Manual_IntelliControl_V3_030311.doc

1. Contents

2. General

Dear customer,
Many thanks for deciding to buy a charger from Simprop electronic. Please read carefully through these instructions so that you get to know the functions and get safety advice on its use.

These instructions describe the device with software version 3. On powering up the Intelli-Control, the text "Simprop Intelli-Control V3" appears for 2 seconds.

3. Technical Data

Input voltage	11 - 15 V DC
Input current	max. 12A
Output	1 to 25 NiCd/NiMH cells, 2V to 12V lead-acid, 3.6V to 11.1V Li-Ion batteries
Charging capacity	max. 120W
Charging current	0.1 to 5A dependent on the battery voltage
Discharge capacity	max. 20W
Discharge current	0.5 to 3A dependent on the battery voltage
Discharge end voltage	0.9V per cell (only for NiCd and MiMH batteries)
LCD	2 x 16 characters
Dimensions	145 x 92 x 40mm
Weight	600 grams

4. Supply Voltage - 12V Car Battery or Suitable Mains Adapter

The car battery should have a capacity of at least 7Ah. As the battery discharges, the Intelli-Control displays "Input Power Low Voltage" when the supply voltage drops below 10V.

Using an unsuitably stabilised mains adapter can impair the functioning of the Intelli-Control and even damage it. Suitable mains adapters from Simprop:

12V/10A Order No. 010 101 0
12V/20A Order No. 010 114 1

5. Connect the Intelli-Control to the 12V Power Supply

If a mains adapter is used, it should be switched on before connecting up the Intelli-Control. The red and black insulating ring can be screwed off to allow easier fitting of the pole terminals.

The Intelli-Control is connected the right way round to the terminals of the battery or those of the mains adapter using pole clips. red = plus, black = minus. Red = plus, black = minus. If connected the wrong way round, the Intelli-Control does not work but is not damaged.

6. Which Batteries Can be Charged?

Each rechargeable battery requires its own charging method. Find out exactly what type of battery you want to charge. The Intelli-Control V3 can charge the following types:

Nickel-Cadmium batteries are the most common type used in the model field and can be charged and discharged in automatic mode or manually (cell type: NiCd).

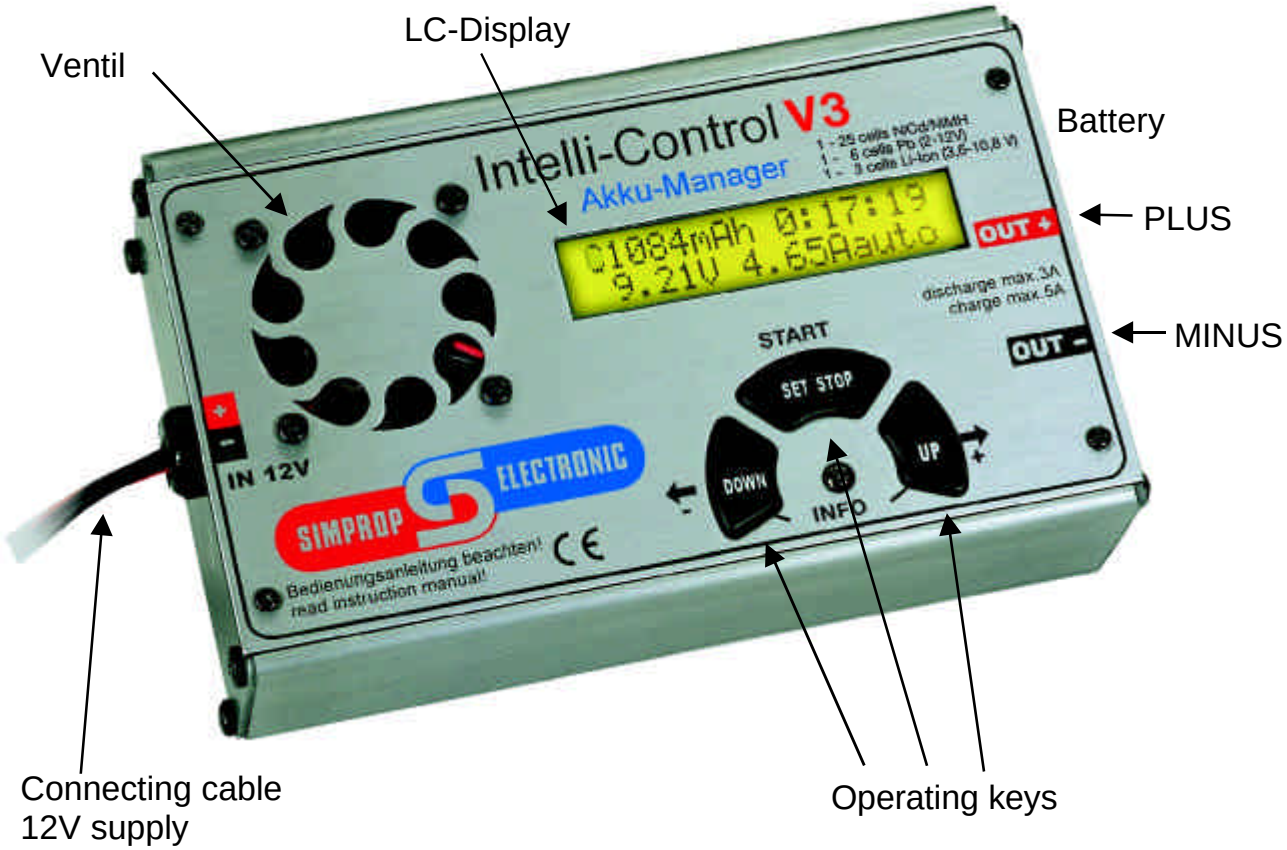
Nickel Metal Hydride batteries are generally charged/discharged using a manual setting (cell type: NiMH).
Lead-acid batteries are generally charged using the manual setting (cell type: PB). The discharge function is blocked for this battery type as they are very sensitive to 100% discharge (mostly with loss of capacity).

Lithium-Ion batteries **may only be charged using the manual setting** (cell tape: Li-Ion). The discharge function is blocked here too. The batteries have a very good capacity/weight ratio; are, however, very sensitive and must be handled with great care. **They can be damaged by: overcharging, low discharge, too large current drain, short-circuit, overheating**. It is therefore very important that you use the correct settings. You can read the description of this in section 9 "Operation – Charging / Discharging".

7. Connecting the Battery

Please keep to the following sequence when starting:

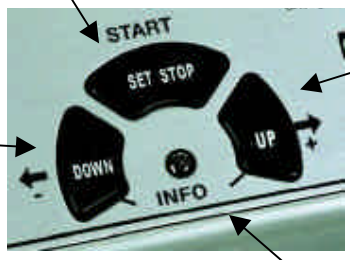
- Connect the ***Intelli-Control*** to the car battery or mains adapter.
- Stick the banana plugs of the charging cable (the right way round: black = minus, red = plus) into the sockets of the ***Intelli-Control***.
- Connect the battery to be charged and set up using the operating keys.
- Once the charging is complete, always disconnect the charged battery first, and then the banana plugs – to avoid a short-circuit.



8. Operating Keys / Menu Structure

The ***Intelli-Control*** has three operating keys with the following functions:

START to start the charging process
STOP to stop the charging process
SET to confirm value settings

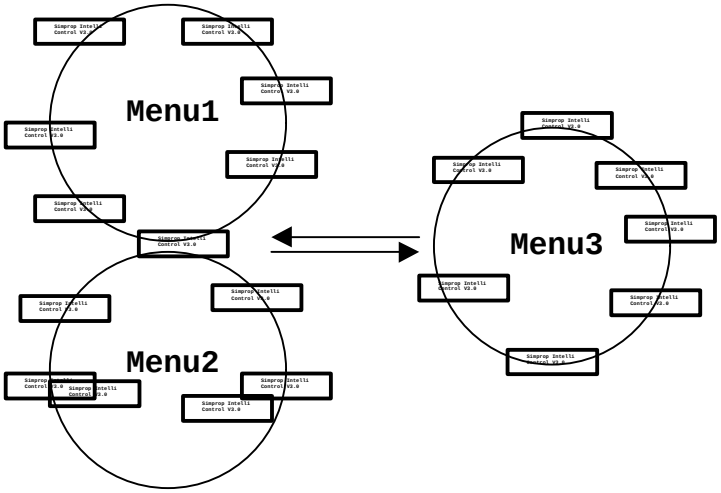


PLUS to set values or to move **RIGHT** in the menu

MINUS to set values or to move left in the menu **LEFT**

INFO
by simultaneously pressing the **UP** and **DOWN** keys, the Info menu appears.

Operating the Intelli-Control V3 is extremely simple. The arrangement of the keys corresponds to the positions of the following menus and functions. The Intelli-Control V3 is divided into three menu levels. In these levels you can select the function using the [UP] and [DOWN] keys. The menus are always built in a circular form so that by pressing one or other of the keys a number of times, you come back to the starting point. The key [SET STOP] starts, stops or confirms actions.

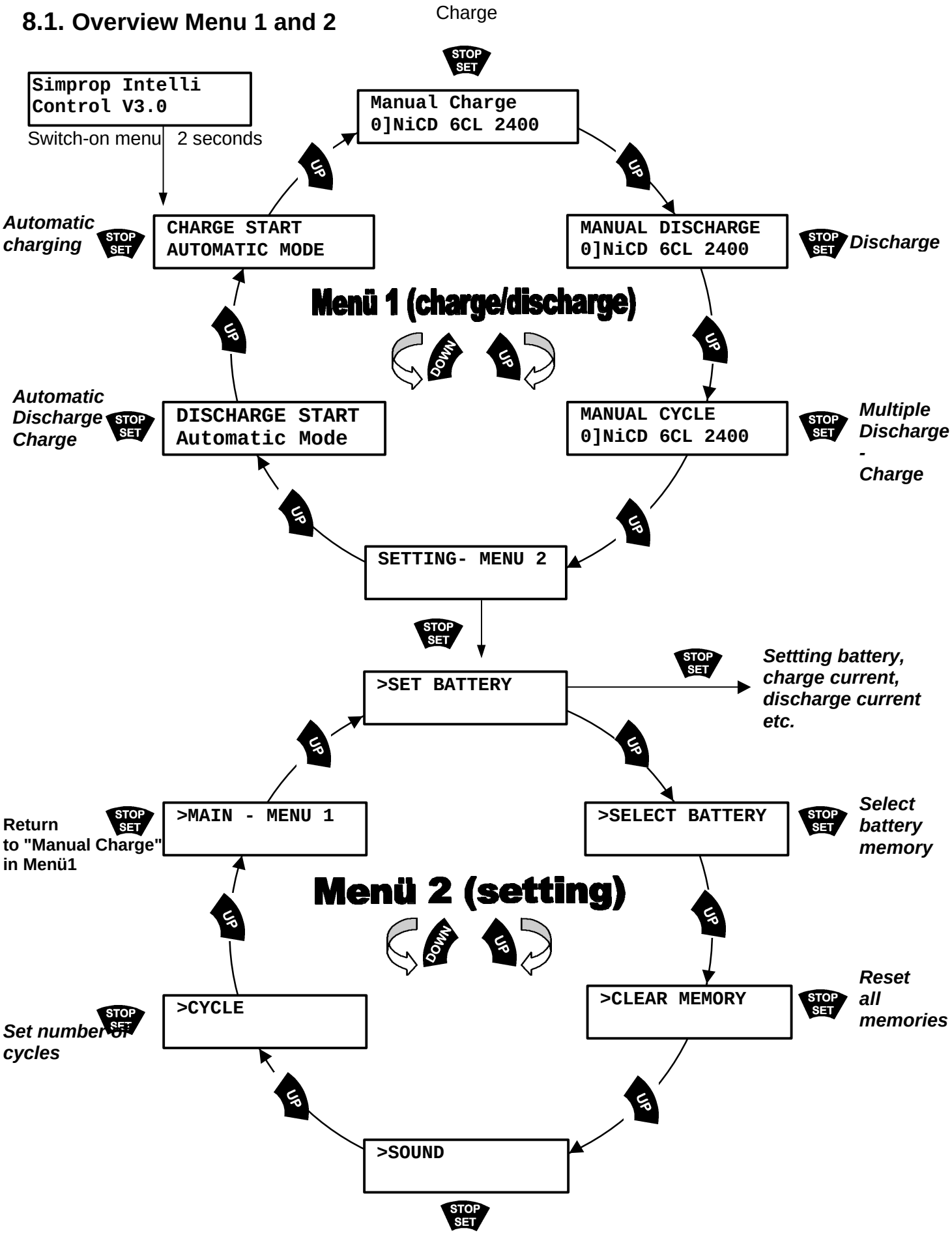


Menu 1 On the first menu level, the charging, discharging or charge/discharge cycles are started using the [SET STOP] key. The keys [UP] or [DOWN] are used are used to select the particular charge or discharge programme.

Menu 2 Settings are made here for battery type, sounds, number of cycles memory and resetting to the original factory settings.

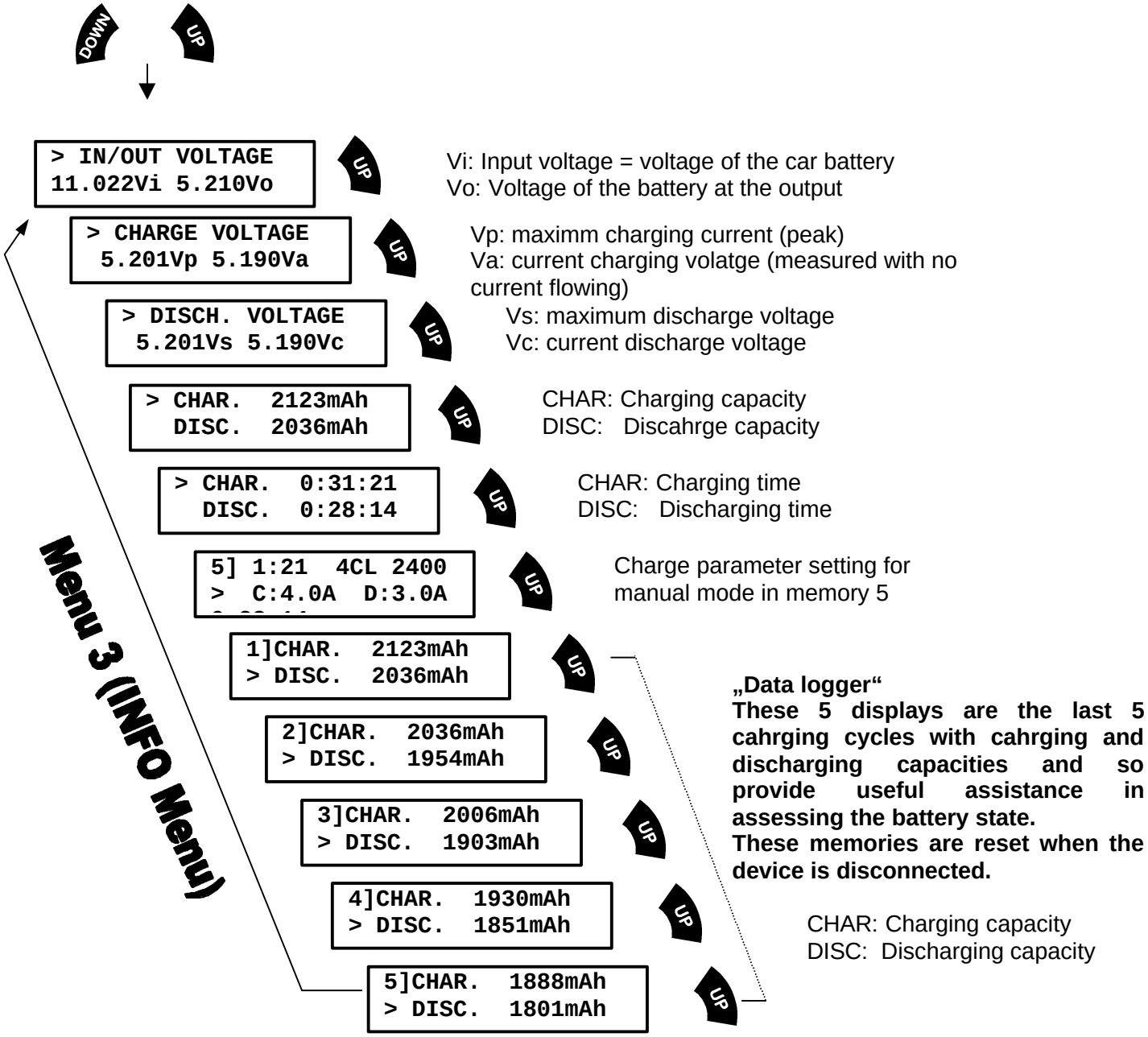
Menu 3 his level is exclusively for detailed information on the charging process and can be called up at any time by simultaneously pressing the [UP] and [DOWN] keys and be ended by pressing the [SET STOP] key. The individual displays are described in "Overview Menu 3".

8.1. Overview Menu 1 and 2



8.2. Overview INFO Menu (Menu 3)

Menu 3 can be called up at any time by simultaneously pressing the [UP] and [DOWN] keys and be ended by pressing the [SET STOP] key.



With the key STOP SET you can return at any time to the previous menu.

9. Operation – Charging / Discharging

The Intelli-Control is a device with a large variety of charging and discharging possibilities. There are 5 charging programmes each of which can be started from Menu 1 using the [SET STOP] key:

Charging programme (Menu 1)

>DISCHARGE AUTOMATIC MODE<	Discharge and charge with automatic switch off and automatic parameter setting.
>CHARGE AUTOMATIC MODE<	Charge with automatic switch off and automatic parameter setting.
>MANUAL CHARGE<	Charge with automatic switch off and manual parameter setting.
>MANUAL DISCHARGE<	Discharge with automatic switch off and manual parameter setting.
>MANUAL CYCLE<	Multiple (1 to 99 times) discharge and charge with automatic switch off and manual parameter setting.

When charging batteries, it is very important that you, as the user, know which battery types you are using and which charging currents / discharging currents are allowed. Intelli-Control has ten memories in which you can store ten battery types. You can, however, also set parameters before each charging process. When using nicads, you also have the possibility of allowing Intelli-Control to make all the settings (automatic charge). More about this in section 9.1 "Fully Automatic Programme" or section 9.2 "Manual Setting of Charging Parameters".

Get acquainted, however, first with section 8 "Operating Keys / Menu Structure". Especially the menus 1 and 2 that are used in "normal" operation.

9.1. Fully Automatic Program --- only for NiCd Batteries --

! **The fully automatic programme is only suitable for NiCd batteries. NiMH, lead-acid and Li-Ion batteries are not to be charged using the fully automatic programme as they could be damaged by incorrectly set parameters with the consequent danger of fire and explosion.** !

- **CHARGING**

The fully automatic programme is the simplest way to charge or discharge a battery. After connecting the charger to the car battery, it is always the fully automatic programme that is preset. To start the charging process, simply press the [SET STOP] key

Automatic charging: connect Intelli-Control to the supply, connect the battery, press the [SET STOP] key.

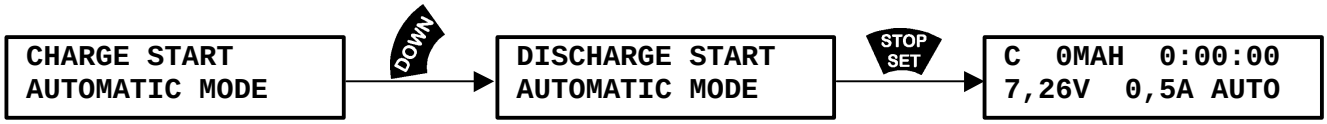
As a result, the Intelli-Control immediately begins to charge the battery. In the first three minutes, the battery is carefully measured (current swings) and the correct current selected automatically. The current is set such that a gentle but fast as possible charging takes place.

Once the battery is fully charged, this is recognised by Intelli-Control and the charging operation is ended. A tone is then emitted and at the top left of the display the charge indicator C (for charge) is replaced by F (for full). If the charging is complete, you can read off the charging time and the charged capacity in the first line of the display.

- **Discharging / Charging**

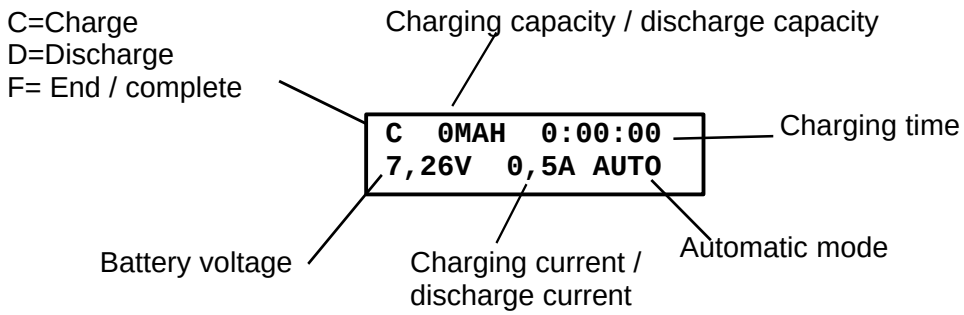
If the battery is to be discharged before the charging, e.g. to prevent memory effect or determine the size of the remaining capacity, select the charging programme [DISCHARGE AUTOMATIC].

Automatic discharging / charging: connect Intelli-Control to the supply, connect the battery, press [DOWN] key then the [SET STOP] key.



As a result, the Intelli-Control immediately begins to discharge the battery and a "D" (for discharge) appears in the top left corner of the display. The discharge current is automatically adjusted so that a gentle but as fast as possible discharging takes place. Once the battery is discharged, a pause of three minutes is made. The battery is then automatically re-charged. At the end of the charging a tone is emitted and at the top left of the display the charge indicator C (for charge) is replaced by F (for full). If the charging is complete, you can read off the charging time and the charged capacity in the first line of the display.

LC Display during Charging / Discharging



Automatic Operation Override
Intelli-Control has as of version 3 an interesting special feature: The automatic operation can be, as it were, overridden using the [UP] and [DOWN] keys without interrupting the charging process. Pressing one of these keys causes a selection menu for current adjustment to be opened. The new, desired current value can be entered here. Pressing the [SET STOP] key confirms this current and returns to the charging menu. The battery is then charged with this current till the charging is completed.

Automatic Current Setting
The evaluated charging/discharging current is dependent on the cell type, charging cable, plug and socket connection and charged state. In case of doubt, a lower charging/discharging current is always set to prevent damage to the battery. The following list gives several hints on avoiding and repairing faults:

Charge current too low	• Charging cable has too low cross-sectional area. We recommend a minimum of 0.75mm^2. • Plug internal resistance too high. We recommend gold-plated contacts. • Battery has not been charged for some time or has "memory effect" • Wrong battery type connected, e.g. dry batteries, lead-acid, NiMH • Battery defective
Charging process broken off	• Battery defective • With some transmitters, a diode is soldered into the charging cable. The diode does prevent charging in the wrong direction but makes discharging impossible. • Wrong battery type connected, e.g. dry batteries, lead-acid, NiMH

9.2. Manual Setting of the Charging Parameters

! Always check the charging/discharging currents allowed by the manufacturer before starting to charge the battery Incorrectly set currents or cell types can damage the battery, set it on fire or even cause it to explode. Take special care with Li-Ion batteries as these are not forgiving of mistakes !

- Setting the Battery Type

Before charging or discharging, the battery type must be set or selected from memory.

- **Selection of the Battery from Memory**

The Intelli-Control has ten battery memories. following parameters are stored in each memory:

Battery type (NiCd, NiMH, PB, Li-Ion)
Number of cells
Capacity
Charging current
Discharge current (not for PB and Li-Ion)

The memories are numbered from 0 to 9 and can be selected from Menu 2 => "SELECT BATTERY". The battery settings are shown there in abbreviated form. The first place is the number of the memory, then follows the battery type and the nominal capacity. The second row shows the charging current and the discharge current. You can switch between memories using the [UP] [DOWN] keys. You can select the desired memory using [SET STOP] key. The last selected memory is stored, even after the Intelli-Control is switched off and is called up when the device is again in operation.

Examples of several memories:

...

```
5]NICD 24CL 1300
> C:5.0A  D:2.0A
```

```
6]NIMH  4CL 3000
> C:3.0A  D:2.0A
```

```
7]PB  12V   6000
> C:3.2A
```

...

- **Setting Battery Memory**

Setting the parameters always overwrites the currently selected memory. The following parameters can be set for each memory in Menu 2 => "SET BATTERY":

BATTERY TYPE:	Battery type (NiCd, NiMH, PB, Li-Ion)
BATTERY CELLS:	Number of cells
BATT CAPACITY:	Nominal capacity of the battery
CHARGE CURRENT:	Charging current
DISCH. CURRENT:	Discharge current (not for PB and Li-Ion)

- **Charging**

The charging process is started by pressing the [SET STOP] key with the display "MANUAL CHARGE" in Menu 1. The battery is then charged using the settings in the current memory. When the battery is fully charged, the current is automatically switched off and a tone is emitted. The sound can be switched off by pressing the [SET STOP] key.

- **Discharging** (only for NiCd and NiMH batteries)

The discharge process is started by pressing the [SET STOP] key with the display "MANUAL DISCHARGE" in Menu 1. The battery is then discharged using the settings in the current memory and automatically switches off when the battery is discharged and a tone is emitted. The sound can be switched off by pressing the [SET STOP] key. Die The discharge end-voltage corresponds to 0.85V per cell.

- **Multiple Discharging / Charging => Cycles** (only NiCd and NiMH batteries)

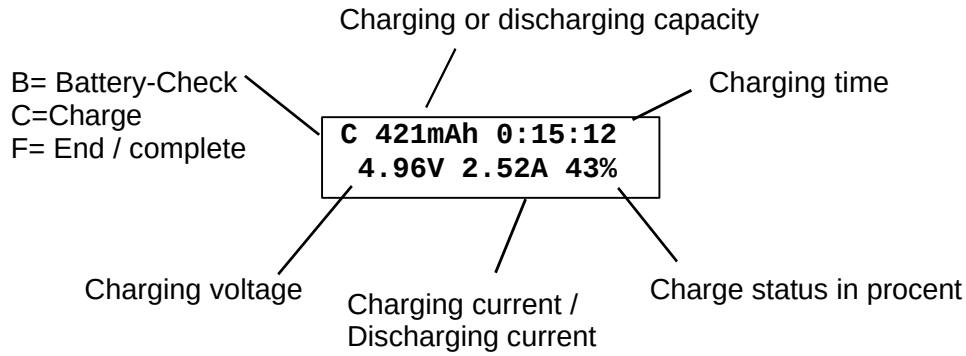
he multiple charging cycles are started by pressing the [SET STOP] key with the display "MANUAL CYCLE" in Menu 1. The battery is then discharged using the settings in the current memory and re-charged. How often this operation takes place depends on the setting "CYCLE" in Menu 2. The number can be set from 1 to 99. A tone is emitted to indicate the end of the cycles. The sound can be switched off by pressing the [SET STOP] key.

- **Data logger**

Intelli-Control stores the last five charging cycles with charged and discharged capacities in the INFO menu (Menu 3). This can be accessed by simultaneously pressing the [UP] and [DOWN] keys. Then use the [UP] or [DOWN] key to call up the desired memory. See also "Overview Menu 3“

These displays are of valuable assistance in judging the state of the battery. Once the device is disconnected, these memories are reset.

LC display on charging, discharging or in cycle:



10. Error messages

Error message	Explanation	Possible causes
Output Battery Connect error	Battery is not correctly connected	Break in charging cable or battery defect
Input Power Low Voltage	Input voltage is smaller as 10.0V	Car battery is discharged or mains adapter is overloaded
Output Power Over Voltage	Battery voltage is too large for the set number of cells	Actual number of cells does not agree with the set value
Output Power Over Voltage	Battery voltage is too low for the set number of cells	Actual number of cells does not agree with the set value
Output Battery Reverse Polarity	Battery voltage is reverse connected	Polarity of the charging plug reversed
Input Power Over Voltage	Input voltage is higher than 15V	Mains adapter is wrongly set or 24V supply in the truck

11. Charging Current Recommendations

Battery manufacturers are as a rule very careful in any information they issue on charging and discharge currents. If one kept to these recommendations, the result would be a very long lifetime but a relatively long charging time of about an hour. In the following table, we would like to give several recommendations that are a good compromise between lifetime and charging time.

Cell Type	Fast Charge Current	Charge Time approx.	Discharge current	Discharge Time approx.
Sanyo 10N RC -270	0.8A	22min.	0.5A	32min.
Sanyo N-500 AR	1.5A	24min.	2.0A	15min.
Sanyo N-600 AA	0.6A	66min.	0.6A	60min.
Sanyo N-700 AR	2.0A	25min.	2.0A	21min.
Sanyo N-1250 SCR	5.0A	18min.	3.0A	25min.
Sanyo N-1300 SC	1.5A	59min.	2.0A	39min.
Sanyo N-1700 SCR	5.0A	24min.	3.0A	34min.
Sanyo RC2000	5.0A	28min.	3.0A	40min.
Sanyo RC2400	5.0A	34min.	3.0A	48min.
Saft Li-Ion 2200 Simpr.	1.5A	~ 4hr.	-	-
Sanyo RS3300 NiMH	3.3A	66min.	3.0A	70min
12V 6Ah Lead-acid	2.0A	~ 4 hr.	-	-

12. Technical Expressions

Word or Abbreviation	Explanation
NiCd	Nickel Cadmium
NiMH	Nickel Metal Hydride
Li-Ion	Lithium Ionen
Pb	Plumbum = lead acid battery
Delta Peak	Switch-off process for NiCd / NiMH cells by voltage measurement
A / V / W	Ampere / Volt / Watt
mAh	Milliamperehour => capacity of the battery

13. Intelli-Control Charging Current Table

The charging / discharge currents are automatically limited by Intelli-Control in order to prevent an overheating of the device.

cells	Maximum charging current	Maximum discharge current
1	1.6A	2.6A
2	1.8A	3.0A
4	2.6A	3.0A
6	5A	3.0A
7	5A	3.0A
8	5A	2.5A
10	5A	2.0A
12	5A	1.7A
14	5A	1.6A
16	5A	1.5A
18	4.4A	1.2A
20	3.6A	1.0A
24	3.5A	0.8A
25	3.3A	0.8A

14. Other Matters

Manufacturer's declaration in favour of consumers

Simprop products are manufactured or sold by

Company: SIMPROP electronic
Walter Claas GmbH & Co KG
Ostheide 5, D 33428 Harsewinkel

Should this equipment acquired by a consumer and sold by SIMPROP electronic in the Federal Republic of Germany (§ 13 BGB) be defective, we undertake to repair the defects in the equipment to the extent as described below. This manufacturer's declaration does not affect the claims or legal rights of the consumer in the purchase contract with the seller (dealer).

1. Extent of the Protection

This declaration is only valid when the equipment is unusable or the usability is considerably impaired (defect) as a consequence of a design, manufacturing or material fault already present in the equipment at the time of handing over to the consumer. It is not valid especially when the impairment of the equipment's usability is due to natural wear and tear, improper use (including installation) or external influences.

2. Consumer Claims Based on this Declaration

In the case of a properly validated claim based on this declaration, SIMPROP electronic will either remove the defect in the equipment (repair) or supply a defect-free equipment solely at its own discretion. The consumer cannot make any further claims or interpret further rights into this declaration.

3. Period of Validity

This declaration is only valid during the claim period and for claims that have been accepted by SIMPROP electronic on the basis of this declaration. The claim period is **24 months** from the date of equipment purchase by the consumer from a dealer in the Federal Republic of Germany ("date of purchase"); it ends, however, in any case, 30 months at the latest after the manufacturing date of the equipment as printed on the device.

4. Enforcement is wrongly **on this Declaration**

To establish a claim based on this declaration, the following must be sent in at the cost and risk of the consumer:

- the equipment which is the subject of the complaint
- detailed description of the claimed defect
- the bill, delivery note or other suitable documents (the original in each case) as proof of date and place of purchase.

The shipment shall be made to the company address above.

6. Lapsing of Claim Period

If SIMPROP electronic does not acknowledge a properly asserted claim based on this declaration within the claim period, all claims based on this declaration lapse 6 months after the time of the assertion; not, however, before the end of the claim period.

7. Law Applying

This declaration and the claims, rights and obligations resulting therefrom are subject solely to German material law to the exclusion of the standards of international private law and to the exclusion of the UN purchasing law.

Please note in addition:

A detailed description of the fault can simplify enormously the search for the fault and assists in reducing the repair costs. **So, please include an extensive fault description with every repair and complaint.**

15. Safety Advice !!! Please take special note !!!

- **When charging or discharging a battery, never leave the Intelli-Control unsupervised.**
- In an unfavourable situation, e.g. charging a defective battery, overheating of the battery can occur because of incorrect current settings. This gives rise to a danger of fire and explosion.
- Place the Intelli-Control and the battery so that no damage can arise from overheating. (place the charger and the battery on an electrically non-conducting and non-combustible surface, e.g. tiles or an a glass plate). Do not place the equipment directly in the sun, the openings in the housing should not be restricted in any way.
- The battery terminals should not make contact with the housing of the charger, otherwise a short-circuit could occur. In the case of a battery short-circuit, overheating can cause the battery to catch fire with the danger of an explosion.
- The following batteries, chargeable batteries, cells may **not** be charged with this equipment:

  - Batteries that consist of different cells or of new and old cells.
  - Batteries that are built into equipment.
  - Batteries that are electrically in contact with other parts.
  - Batteries with integral charging and switch-off devices (often in Li-Ion batteries, e.g. in mobile phones).
  - Defects, mechanically damaged or oxidised batteries
  - Already fully charged or hot batteries.
  - Battery cells connected in parallel or two batteries simultaneously.
  - Batteries that are not expressly approved by the manufacturer for charging currents that occur with this equipment.
- Only Li-Ion batteries that are expressly declared as drive or receiver batteries can be charged by Intelli-Control V3. **Li-Ion batteries with built-in charging/safety electronics may not be charged using the Intelli-Control.**
- The current automatically set by the device must be monitored in every case. If the current is greater than that approved by the manufacturer, the charging process must be stopped immediately. If not, the battery can be overcharged and, in an unfavourable situation, catch fire or explode.
- With manual current setting: the charging current may never be set higher than that value approved by the manufacturer.
- The setting for the charging current in the Li-Ion and lead-acid charging programme must correspond to that of the batteries, otherwise there is danger of **explosion**!.
- **Li-Ion and lead-acid batteries may under no circumstances be charged with the automatic programme – danger of explosion!**
- Protect the Intelli-Control against moisture.
- The length of the charging cable should not be more than 25cm – as according to CE.
- The use of a car battery is only allowed when the engine is not running.
- The simultaneous operation of the Intelli-Control and a car battery charging device on a car battery is not permitted.
- Using an unsuitably stabilised mains adapter can impair the functioning of the Intelli-Control and damage it (and also damage the battery => fire and explosion danger).
- Defective batteries can be disposed of at your dealer – they are special refuse and do not belong in the household refuse.
- The charging and discharging of single cells in battery packs should only be made using the current permitted by the manufacturer. With larger currents the spring contacts are often damaged.