SWITCHING ON

Connect the battery and switch on the rectifier to start automatic charging. After a few seconds, the microprocessor indicates a reset state and starts the charging cycle (see PAN 1).
The rectifier is switched on by means of the panel switch after having inserted the plug in the mains socket. The type of cycle executed and rated current settings, Vu, Vou subsequently indicated, are shown on the rectifier plate.

GENERAL OPERATION

After switching on, start of charging is signalled by the lighting up of LED "C". When charging trips in the final stage, LED "C" flashes. When the battery is completely charged, LED "C" goes off and LED "S" remains permanently on or flashes. At this point, the battery can be used. The "ON" LED indicates the rectifier is on.
For details of the various cycles, see next paragraphs.

"IUoU" CYCLE

(for gel and internal recombination batteries, cyclic/stationary use)
Stage 'I' starts with a constant current flow to increase battery voltage (see PAN 2). When the voltage has reached the Vu setting the cycle switches to stage 'U'. When stage 'U' starts, battery voltage remains unchanged while current gradually drops. Once the time calculated by the microprocessor has passed (min. 20'-max. 4h), the cycle switches to stage 'oU'. In this stage, battery voltage remains constant at Vou and the current drops to very low levels (MAINTENANCE). This stage is not timed and consequently current supply is never interrupted. If during stage 'oU', the supplied current exceeds 30% of the rated value, the cycle automatically starts again from the beginning. The battery is substantially charged when the cycle switches to 'oU'. Switch off the rectifier before disconnecting the battery.

"IUIoU" CYCLE

CYCLE (for lead-acid batteries, cyclic/stationary use)
This cycle starts in stage 'I' with a constant current flow to increase the battery voltage (see PAN 3). When the voltage has reached Vu setting the cycle switches to stage 'U'. When stage 'U' starts, battery voltage remains unchanged while current gradually drops. Once the time calculated by the microprocessor has passed (min. 20'-max. 4h), the cycle switches to stage 'I'. In this stage, battery voltage remains constant at 30% of rated value and the voltage increases further. When the voltage reaches 2.55V/el. or after 4 h, the cycle switches to stage 'oU'. In this stage, battery voltage remains constant at Vou value and the current falls to very low levels. This stage is not timed and consequently current supply is never interrupted. If during stage 'oU', the supplied current exceeds 30% of the rated value, the cycle automatically starts again from the beginning. The battery is substantially charged when the cycle switches to 'oU'. Switch off the rectifier before disconnecting the battery.

"Wa" CYCLE

(for lead-acid batteries, cyclic use)
When the battery is connected, the first charging stage begins and the rectifier supplies current. This tends to fall when battery voltage increases (see PAN 4). The duration of this stage depends how deeply discharged the batteries are, but it normally lasts 6-8 hours. In the event of such duration being above 9 hours, the rectifier stops and signals the error (see PAN 6). When the battery voltage reaches 2.40V/el, gas production starts and the rectifier enters the second stage. The microprocessor calculates the duration of this stage to complete battery recharging in the best possible manner. At the end of the second stage, the battery can be used after turning off and disconnecting the rectifier. In the event of the battery not being disconnected, the rectifier waits 24 hours before starting the equalisation cycle consisting of 12 charge pulses (duration 10') split up by interval times (duration 50'). The purpose of this latter pulse charge is to rebalance all the battery elements.

"IWa" CYCLE

(for lead-acid batteries, cyclic use)
This cycle begins in stage 'I' with a constant current flow to increase battery voltage (see PAN 5). When voltage reaches 2.40V/el, the second stage of the Wa cycle starts and, if necessary, also the equalisation cycle according to the procedures described in the previous paragraph.

"IUIa" CYCLE

(for gel and/or internal recombination batteries, cyclic use)
This cycle starts in stage 'I' with a constant current flow to increase battery voltage (see PAN 7). When the voltage has reached the Vu setting the cycle switches to stage 'U'. When this stage starts, battery voltage remains unchanged while current gradually drops. Once the time calculated by the microprocessor has passed (duration 4h), the cycle switches to stage 'Ia'. In this stage, charge current remains constant at 5% of the rated value and the voltage further increases. After 4 hours the rectifier stops charging. Switch off the rectifier before disconnecting the battery.

BATTERY

The battery voltage must be the same as the rated voltage of the rectifier. In the case of wrong battery use, with higher voltages (example, 36V instead of 24V), the rectifier immediately signals the error. Conversely, in the case of lower voltages (example 12V instead of 24V), charging starts but at 50% of the rated current and after 1 h, this is interrupted and an error signal is given. In the event of the battery being correct, but completely down or faulty (voltage below 2V/el) charging begins, but at 50% of rated current, and after 1 h stops and an error signal is given if voltage is still below 2V/el, otherwise the normal charging cycle continues.

ERRORS

The rectifier can signal an ERROR (see PAN 6) for the following reasons:

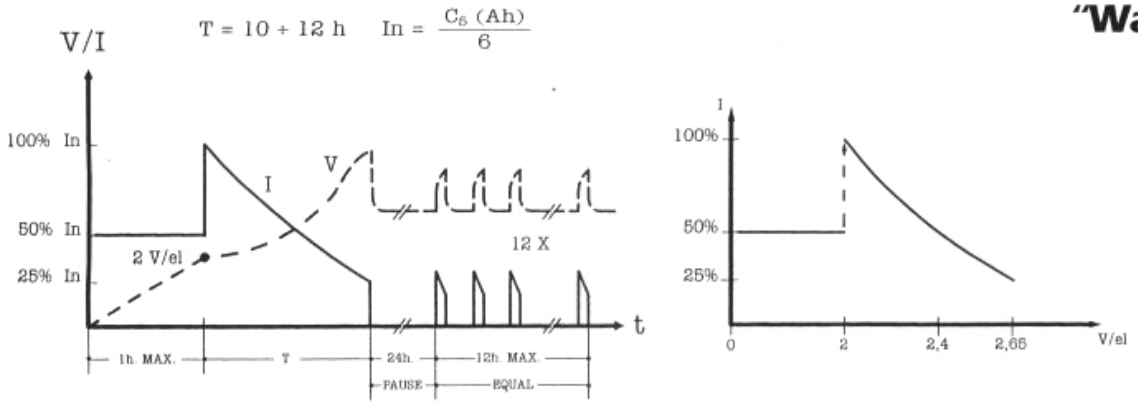
- internal overheating
- over current
- battery voltage too high
- battery voltage too low
- first stage maximum time reached (for cycles “Wa” and ”IWa”)

IMPORTANT

Before disconnecting the battery, always remember to turn off the rectifier by means of the switch.
If the microprocessor fails to light up any of the LEDs, check the mains power supply, battery connection or the integrity of the internal fuses. Before opening the rectifier, disconnect both the battery and the power cable.

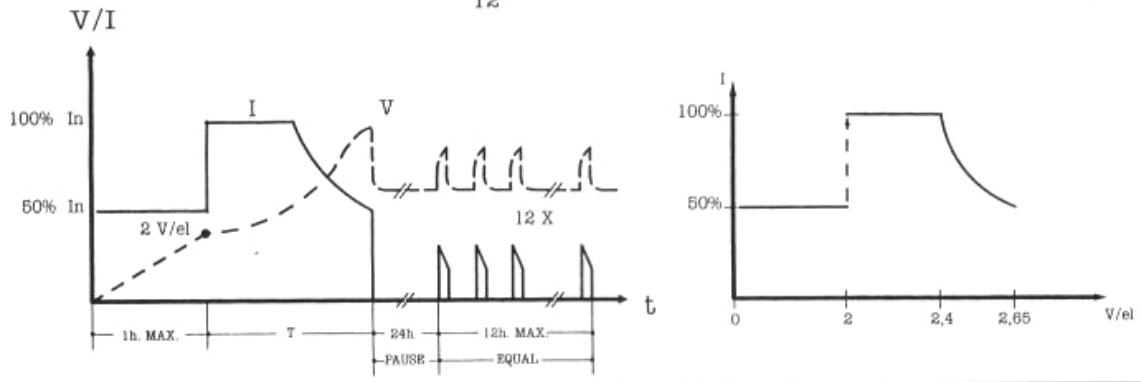
"Wa"

$T = 10 \div 12\ h \quad In = \frac{C_5\ (Ah)}{6}$



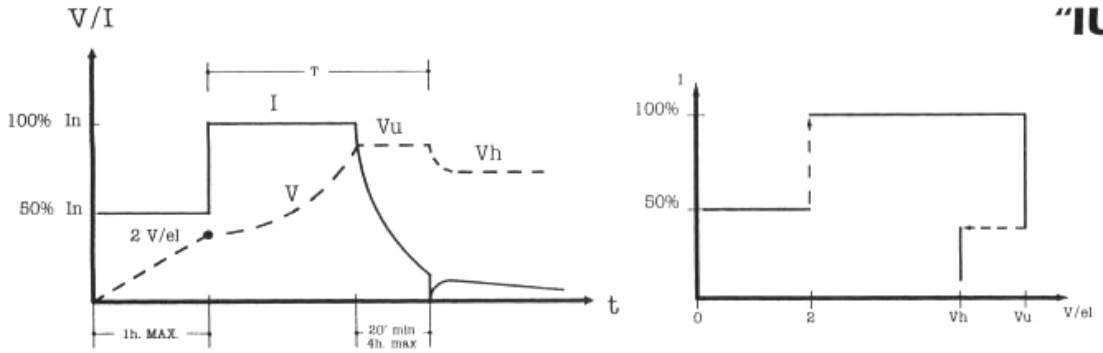
"IWa"

$T = 13 \div 15\ h \quad In = \frac{C_5\ (Ah)}{12}$



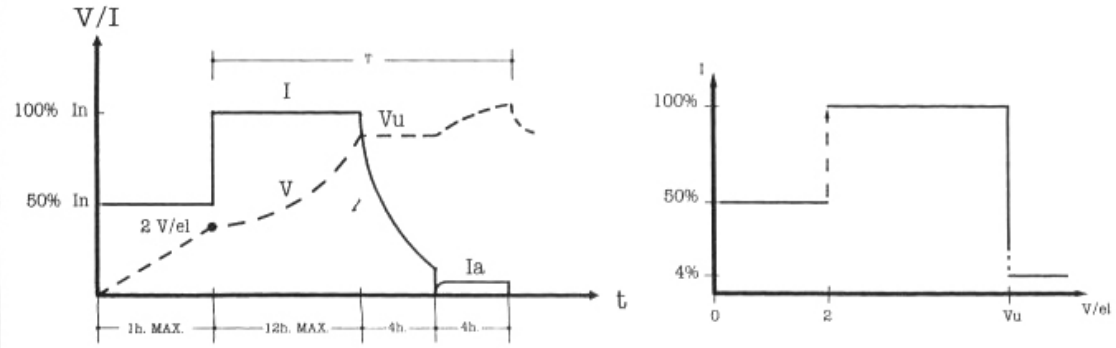
"IUoU"

$T = 9 \div 10\ h \quad In = \frac{C_6\ (Ah)}{6}$ $T = 10 \div 12\ h \quad In = \frac{C_5\ (Ah)}{8}$ $T = 12 \div 14\ h \quad In = \frac{C_6\ (Ah)}{10}$



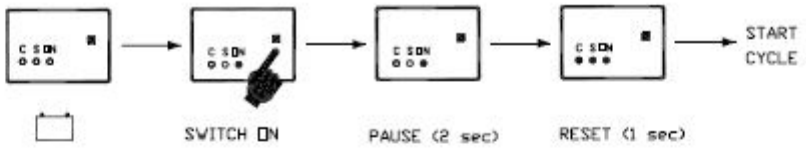
"IUIa"

$T = 12 \div 14\ h \quad In = \frac{C_6\ (Ah)}{6}$ $T = 14 \div 16\ h \quad In = \frac{C_6\ (Ah)}{8}$

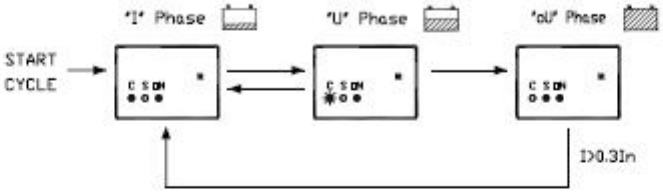


MICRO-GOLF-A FUNCTIONS

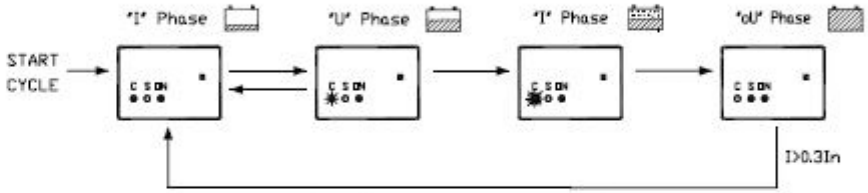
PAN 1: Start Phase



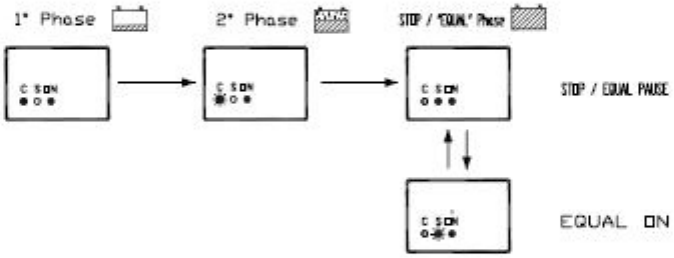
PAN 2: IUoU Cycle



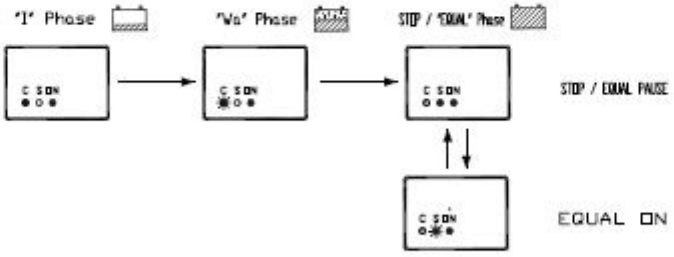
PAN 3: IUIoU Cycle



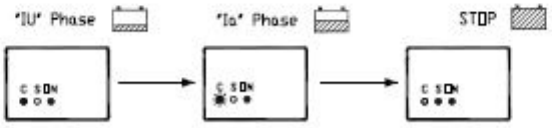
PAN 4: Wa Cycle



PAN 5: IWa Cycle



PAN 7: IUIa Cycle



PAN 6: ERRORS

- over Temperature
- over Time max
- over I max
- Battery error