Battery Monitor-Watch

The Battery Watch is a smart piece of equipment which monitors the status of the battery and displays it in an intelligent way. The smart design with a minimum of components gives a broad range of information at the glance of an eye.
If the Battery Watch is connected to a voltage between 7 and 32V, it will detect the battery voltage before displaying the status of the battery.
At startup the red LED is activated as a sign of powerup. After half a second the system is ready with the initialisation and processing the necessary data to choose the battery system.
After initialisation the Battery Watch checks the battery voltage and displays this with help of three LED's and a buzzer as following:

LED's 12V
If voltage is higher than 14,8 Volt (default)	-> BUZZER and walking light
If voltage is higher than 13,3 Volt	-> green/yellow/red (WALKING LIGHT)
If voltage is higher than 12,4 Volt	-> green
If voltage is higher than 11,6 Volt	-> green/yellow
If voltage is higher than 11,1 Volt	-> yellow
If voltage is higher than 10,9 Volt	-> yellow/red
If voltage is higher than 10,5 Volt	-> red
If voltage is lower than 10,5 Volt (standaard instelling)	-> ALARM (LED EN BUZZER)

Normal, dim of out

With the switch it is possible to change from Normal View to Dim, from Dim to Off and , by pressing it again, back to normal view. The change is activated at the moment the switch is released. The buzzer sounds the mark the change to the next step.
If the system is manually deactivated the alarm protocols stay active in the background. So if a under- or over-voltage arises the alarm is displayed by the LED's and the buzzer will sound.

High voltage alarm with buzzer and walking light

If the battery voltage rises above the chosen high voltage threshold the buzzer makes a pulsating sound and the walking LED's keep on walking. It does not matter in which mode the Battery Watch is; Normal, Dim or Off.
If the battery voltage lowers again, the alarm stays active. This is useful in for example a caravan. If the voltage has been too high during a ride it is displayed on the Battery Watch.
The high voltage alarm can be stopped if it is irritating, for example while navigating a boat. The switch off is of the audible alarm is done by keeping the switch pressed during a complete "walking light" cycle. A continues buzzer sound marks the moment to release the switch.
The walking light stays on and the alarm is stopped. The Battery Watch continues it's normal program. The alarm is automaticly reactivated if the voltage drops shortly below the overvoltage threshold. After detecting a new overvoltage the alarm is activated again.

Walking light

The walking light is an extra feature which makes the charging of the battery visible. This becomes handy in combination with a Battery Separator like the BS-80. It is directly visible that the second battery is charged also.

Low voltage alarm with LED's and buzzer

If the battery voltage drops below the chosen under voltage threshold, the buzzer makes a pulsating sound and the red and green LED will light up alternately with the orange LED. After ten times the buzzer will stop, but the LED's will be active another 5 seconds. Then the Battery Watch will go into sleep mode. No LED's will light up and no buzzer will sound. If this mode is entered the battery voltage has to rise above the 13,3V to switch on again. If the battery voltage stays under the low voltage threshold the buzzer will sound shortly every minute so it is clear it is not in a "three days off"mode (for explanation see separate chapter).

To change overvoltage and/or undervoltage threshold

The overvoltage and/or undervoltage threshold can be manually changed. To be able to program the battery voltage has to be between 10,5V and 13,3V or 21V and 26,6V in a 24V battery system. (The Battery Watch displays no walking light or under or over voltage alarm).
To start programming the switch should be pressed until the chosen value is reached. The threshold values are shown in table 1.1; for 24V system in table 1.3)
To show the Battery Watch is entering the programming mode all three LED's will blink simultaneously.

Technical specifications:
Voltage	7-32VDC
Current	25mA all LED's on
	2,5mA all LED's on (dim mode)
- Standby current	1,5mA all LED's off

As long as the switch is pressed the following is displayed:

table 1.1

Alarm 12 V
If voltage is higher than 10.5 Volt	-> red BLINK(default)
If voltage is higher than 10.6 Volt	-> red LIGHTS UP
If voltage is higher than 10.7 Volt	-> yellow/red BLINK
If voltage is higher than 10.8 Volt	-> yellow/red LIGHTS UP
If voltage is higher than 10.9 Volt	-> yellow BLINK
If voltage is higher than 11 Volt	-> yellow LIGHTS UP
If voltage is higher than 11.1 Volt	-> green/yellow BLINK
If voltage is higher than 11.2 Volt	-> green/yellow LIGHTS UP

If desired you can program the overvoltage alarm after the undervoltage alarm. First the low voltage program has to be taken completely (keep switch pressed) before programming the overvoltage threshold. As the overvoltage program mode is reached all the LED's will blink simultaneously.
The programming is the same as before. Keep the switch pressed until the desired value is reached and the values are written to memory. The programmed values will stay in memory, even when the battery is disconnected.

table 1.2

If voltage is higher than 14.8 Volt	-> red LIGHTS UP(default)
If voltage is higher than 15.3 Volt	-> yellow LIGHTS UP
If voltage is higher than 16 Volt	-> green LIGHTS UP

After 3 dagen Off
After three days or if the battery voltage drops below 10,4V, the Battery Watch will automaticly switch off. The Battery Watch will be reavtivated after the battery voltage rises above the 13.3V or the switch is pressed.
It is possible to deactivate the 3 days timer. To do that keep the switched pressed until a constant beep sounds. No LED's will be on. To reactivate the timer the switched has to be released if no LED's are on and a short beep sounds.
If waited longer a constant sound marks the moment the timer is off again.

table 1.3

Display possibilities for 24V mode:

LED's 24V
If voltage is lower than 21 Volt	-> ALARMERING (LED EN BUZZER)
If voltage is higher than 21 Volt	-> green/yellow/red (BLINK)
If voltage is higher than 21.4 Volt	-> red
If voltage is higher than 21.8 Volt	-> yellow/red
If voltage is higher than 22.2 Volt	-> yellow
If voltage is higher than 23.2 Volt	-> green/yellow
If voltage is higher than 25 Volt	-> green
If voltage is higher than 26.6 Volt	-> green/yellow/red (WALKING LIGHT)
If voltage is higher than 29.6 Volt	-> CONSTANT BUZZER and WALKING LIGHT

Alarm positions for 24V mode:

low voltage alarm 24 V
If voltage is higher than 21 Volt	-> red BLINK(default)
If voltage is higher than 21.2 Volt	-> red LIGHTS UP
If voltage is higher than 21.5 Volt	-> yellow/red BLINK
If voltage is higher than 21.6 Volt	-> yellow/red LIGHTS UP
If voltage is higher than 21.8 Volt	-> yellow BLINK
If voltage is higher than 22 Volt	-> yellow LIGHTS UP
If voltage is higher than 22.2 Volt	-> green/yellow BLINK
If voltage is higher than 22.4 Volt	-> green/yellow LIGHTS UP

high voltage alarm 24 V
If voltage is higher than 29.6 Volt	-> red LIGHTS UP
If voltage is higher than 30.6 Volt	-> yellow LIGHTS UP
If voltage is higher than 32 Volt	-> green LIGHTS UP