

# Display on Battery

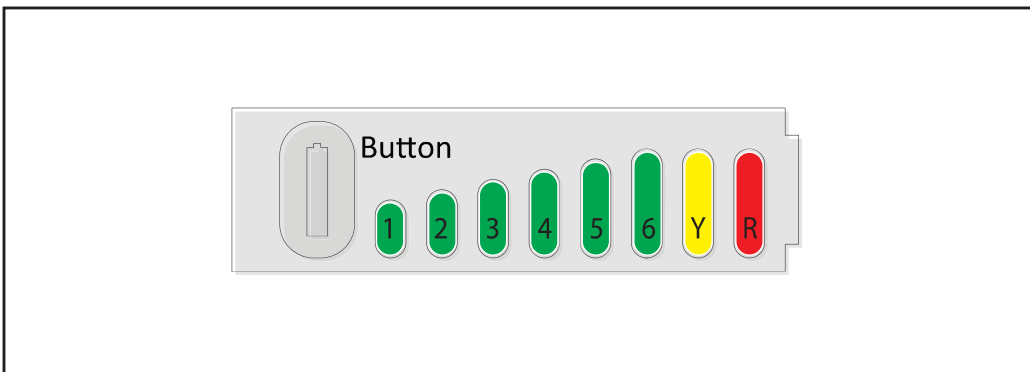


Figure 6

The battery pack contains the above “Display”, which consists of a Button to activate the display if not under charge or discharge, 6 green LED’s to indicate the remaining capacity, a Yellow LED to give warnings and a Red LED to show errors. The available battery capacity is indicated by the first 6 LED’s as follows:

1st Green LED (Flashing)	< 15 %
1st Green LED (Solid)	≥ 15 %
2nd Green LED	≥ 30 %
3nd Green LED	≥ 45 %
4nd Green LED	≥ 60 %
5nd Green LED	≥ 75 %
6nd Green LED	≥ 90 %

The 6 green LED’s are “rolling” during charge and static during discharge.

The **Yellow LED** and **Red LED** gives the following information during charging:

- **Yellow LED (Solid): High or low temperature**

The battery pack temperature is high or low and the charging time is prolonged, depending on the charger type. Regular charging will start automatically when the battery temperature is within the recommended temperature range.

- **Yellow LED (Flashing): No charging**

The charger has been disconnected before the battery pack was fully charged.

- **Red LED (Flashing): No charging**

The battery cell temperature is lower than 0°C (32°F) or higher than +50°C (+122°F). Charging will start automatically when the battery temperature is within a chargeable temperature.

The **Yellow LED** and **Red LED** gives the following information during discharging:

- **Yellow LED (Flashing): Low capacity**

A flashing Yellow LED together with a flashing Green LED indicates that the capacity is low and that the battery pack needs recharging.

A flashing Yellow LED without a flashing Green LED indicates that the battery pack is empty and needs recharging.

- **Red LED (Fast flashing): No discharging**

The battery temperature is lower than -20°C (-4°F) or higher than +55°C (+131°F). (Wait until the battery temperature is within operative temperature) The Red LED will also give a fast flashing if the battery pack is overloaded. (Remove the overload)

**Red LED** (3 Fast flashes followed by pause)

The battery pack is defect and beyond repair and should not be used anymore.

**All LED’s** will go off approx. 10 seconds after fully charge has been detected in order to reduce the energy consumption. All the LED’s will also go off approx. 10 seconds after a “Button” activation or after deactivation of the application.

For more detail see table on the Battery LED behavior paragraph.

## Troubleshooting

Trouble	Possible Causes	Remedy
The machine is not working	Battery (BAT) flat or connections faulty	Charge the battery or clean the connections
	Battery (BAT) broken	Check the battery no-load voltage
The battery will not charge	The battery charger (CH) is broken	Replace



*Note: Damage to the battery charger or its connections can prevent the machine from operating properly.*

## Battery LED behavior

Scenario	Yellow LED	Red LED	Description	Consequence	Indication on the machine display battery LEDs
Charging in High temperature	ON	OFF	Indicates slow charge above +40°C	None, only slower charging than usual	No indication
Charging in Low temperature	ON	OFF	Indicates slow charge below +10°C	None, only slower charging than usual	No indication
Charge temperature too high	OFF	200mS On/Off	No charging above +50°C (Relevant Green LED On)	Stop charging	1 solid Green LED, indicating actual capacity.
Charge temperature too low	OFF	200mS On/Off	No charging below 0°C (Relevant Green LED On)	Stop charging	1 solid Green LED, indicating actual capacity.
Charge current too low	400mS On/Off	OFF	Indicates that charger is removed before fully charged	None	1 solid Green LED, indicating actual capacity. (10 sec.)
Charge current too high	400mS On/Off	400mS Off/On	Indicates that the charge current is too high	Stop charging	1 solid Green LED, indicating actual capacity.
Charge current overload	ON	200mS On/Off	Indicates a charge overcurrent (Inrush)	Stop charging	1 solid Green LED, indicating actual capacity. (10 sec.)
Discharge temperature too high	OFF	200mS On/Off	Indicates a discharge temperature above 55°C	Stop machine functions	1 solid Green LED, indicating actual capacity. (10 sec.)
Discharge temperature too low	OFF	200mS On/Off	Indicates a discharge temperature below -20°C	Stop machine functions	1 solid Green LED, indicating actual capacity. (10 sec.)
Discharge current too high	OFF	200mS On/Off	Indicates a discharge current above 25 Amp (5 seconds)	Stop machine functions	1 solid Green LED, indicating actual capacity. (10 sec.)
Discharge overload	OFF	200mS On/Off	Indicates a discharge current above 30 Amp (400mS)	Stop machine functions	1 solid Green LED, indicating actual capacity. (10 sec.)
Battery capacity low warning	400mS On/Off	OFF	Indicates capacity below 10% or cell below 3.2-V	None	1 flashing Green LED
Battery empty	400mS On/Off	OFF	Indicates empty battery pack	No machine functions	No indication
Mosfet temperature too high	400mS On/Off	400mS On/Off	Indicates that the Mosfets is too hot (>90%)	Stop machine functions	1 solid Green LED, indicating actual capacity. (10 sec.)
Battery pack defect	OFF	Special	Indicates that the battery pack should be replaced	Stop machine functions	1 solid Green LED, indicating actual capacity. (10 sec.)