

# Super High Energy Ni-MH Battery Module

## Nickel-Metal Hydride

### VH Module

The VH Module includes latest improvements achieved by Saft with cells, housing, connections and electronic devices for safety, cycle and calendar life, reliability and cost.

#### Features

Basic configuration:

Core pack packaging including terminal discharge connections, charge connector, thermal sensor and protection fuse, integrated in the plastic housing.

Options:

- Integrated charge controller (to be connected with a 3A Constant Current Power Supply: CCPS)
- Integrated end of discharge controller maximising battery service life
- State of charge indicator (LEDs and push button and/or 2 wires bus for communication with the application design)

#### Benefits

- Plug-and-play design
- Extended cycle life duration with charge and discharge integrated controllers
- Protection against common mishandling (high temperature, short-circuit...)
- Same constant current power supply adapted to the whole VH module range
- Electrically isolated
- Easy maintenance
- Easy mechanical integration
- Excellent performance in deep cycling
- High gravimetric and volumetric energy density
- Recyclability and respect for the environment



Electrical characteristics	VH Module with					
	VH D			VH F		
Configuration	10S	20S	30S	10S	20S	30S
Nominal voltage (V)	12	24	36	12	24	36
Typical capacity at 25A drain rate, + 2 0°C (Ah)	8.5	8.5	8.5	13.5	13.5	13.5
Specific energy (Wh/kg)	49	54	55	54	58	60
Energy density (Wh/dm <sup>3</sup> )	79	99	108	97	114	121
Specific power at 80 % depth of discharge 25A (W/kg)	122	135	137	88	96	101
Power density (W/dm <sup>3</sup> )	199	248	270	158	188	203
Mechanical characteristics						
Height (mm)	99	159	219	129	219	309
Length (mm)	178					
Width (mm)	73.5					
Weight (kg)	2.1	3.8	5.6	3.0	5.6	8.1
Volume (dm <sup>3</sup> )	1.3	2.1	2.8	1.7	2.8	4.0
Operating conditions						
Operating temperature range (°C) (0 to + 35)	Normal conditions					
(- 10 to + 45)	Extended conditions with performance slightly reduced					
Transport and storage temperature range (°C)	+ 5 to + 25					
Typical charge time						
95 % of capacity (h)	3			5		
100 % of capacity (balanced) (h)	8			10		
Maximum discharge current						
Maximum continuous current (A)	25					
Maximum peak current (A) (0.1s)	80					
(0.5s)	50					
(5s)	30					



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## Applications

- Electric bicycles, scooters, wheelchairs and other light electric vehicles
- Professional appliances
- Lawn and gardening tools

## Technology

- Plastic flanges (ABS)
- Integrated battery management and protection electronic circuits: charge, discharge, state of charge.

## Recommendations

- Recharge up to 6 months after full charge
- Storage temperature around  $20 \pm 5^\circ\text{C}$
- Do not expose to water projection
- For serial / parallel module configurations, please consult Saft

## Outputs

- Terminal type for discharge: M8 or O.25 PC QUICK FIT male terminal
- Charge and communication connector: HIROSE 547-0085-8-MDF6-8DP-3.5DSA
- Remote functions connector: HIROSE 547-0088-6-MDF6-14DP-3.5DSA

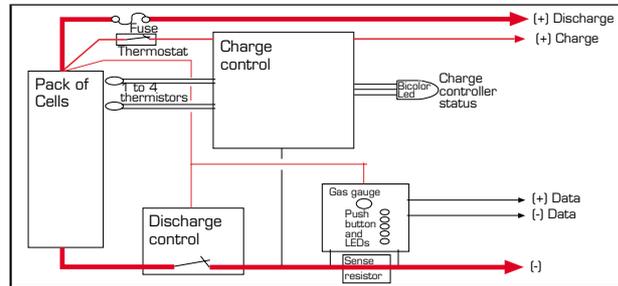
## Components

- NTC: 5kOhms, (2 sensors ref 103AT-4)
- Fuse: charge 5A ATO (replaceable)
- Fuse: discharge 30A ATO (replaceable)



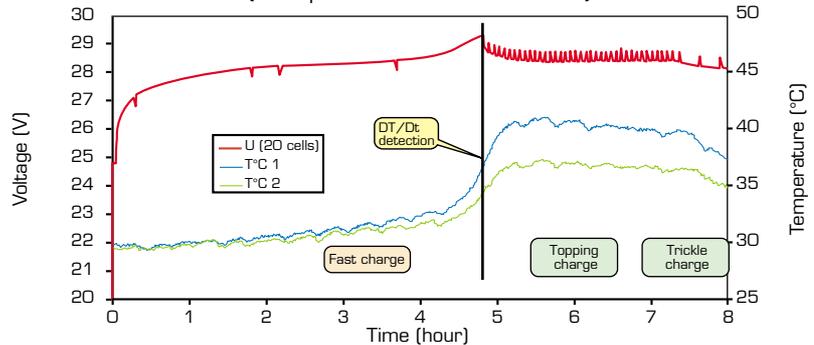
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## Global view of a system with integrated battery management functions



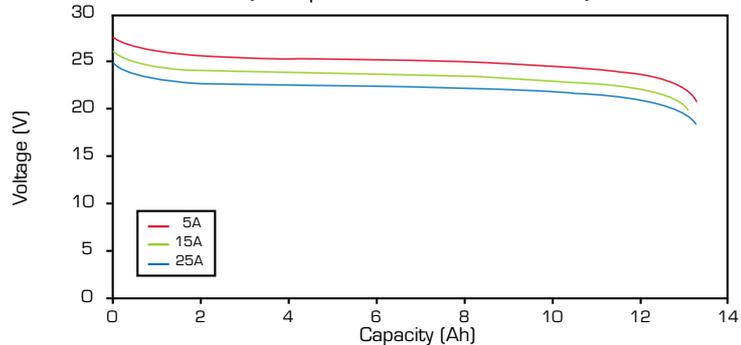
## Charge at RT with Saft integrated charge controller

(example for a 20S VH F module)



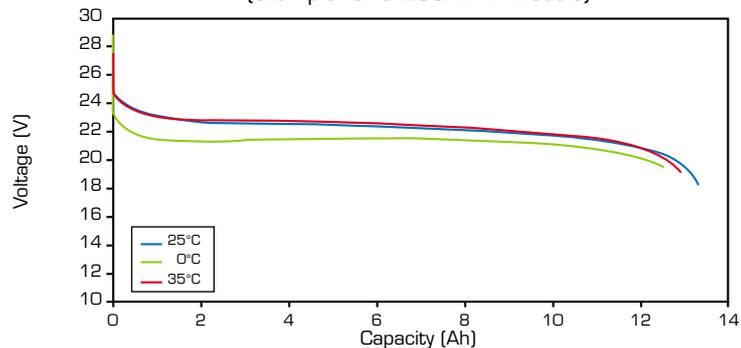
## Discharge at different rates, at RT, after standard charge

(example for a 20S VH F module)



## Discharge at 25A, at different temperatures, after standard charge

(example for a 20S VH F module)



## Saft Rechargeable Battery Systems

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