

# TECHNICAL DATA SHEET



## Specifications

Model		AQHF24-25	
Max. Output Power/Nominal Voltage		750W / 24V	
Main Technology		Switching Mode (ZVS & ZCS)	
Mechanical Max. Size, Weight		196L *180W*165H(mm), 5Kg	
The Number of Charging Profiles		2 Profiles	
AC Input	Input Voltage	Single Phase, Auto selectable Dual AC input	
		Rated	AC 100 – 240V
	Operating	85~132VAC / 170 ~264VAC	
	Frequency	50/60 Hz	
Input Current		9A_max at 96VAC, 4.5A_max at 170VAC	
DC Output	Charging Mode	Modified three-stage charging (bulk->absorption->maintenance/off) Two profiles for wet cell and gel or sealed battery	
	Output Voltage	31.7V_max(30.6V@26 °C), for Flooded Lead-acid Batteries 28.3V_max, for GEL Batteries	
	Output Current	25A max ( Derated output current with <95VAC)	
	Current Ripple	Less than 5%	
Efficiency		More than 90%	



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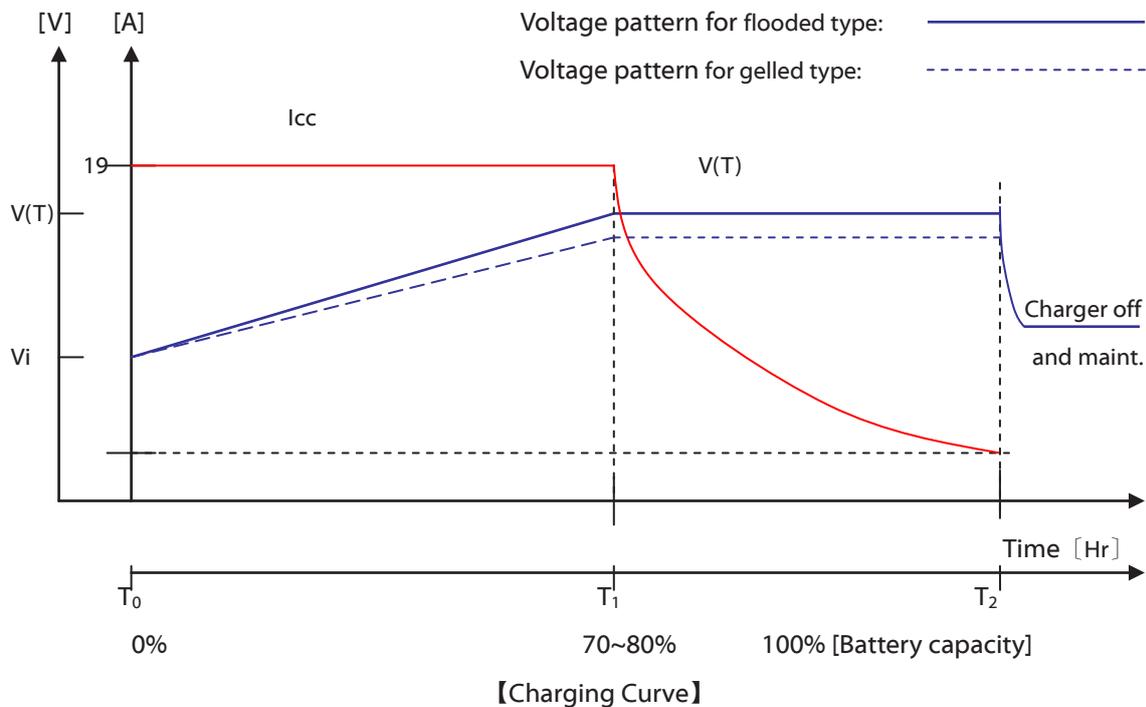
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Features	Current limiting	Yes
	No spark	Yes
	Bad cell discrimination	Yes
	AC line connection interlock	20A, normally closed contact
	Maintenance charging restart	25V
Protective Function	Reverse polarity	Yes
	Short circuit protection	Yes
	Over temperature protection/ Power reduction	Yes
	Input Fuse protection	Yes
	Input and Output Over voltage /Under voltage	Yes
	Output connection open	Yes
	Charging Timer	Yes, 18hr
LED Display		Charging profile / Charging cycle progress / Bad cell discrimination / Fault display
Connector /Lines	Input	72inch long, European Plug 16A/250V
	Output lines (2)	12 AWG, 72 inch, Red (+) / Black (-) 3/8" ring on tail
	AC line connection Interlock lines (2)	20A, B contact Relay, Connector 1-480699-0, Pin 350218-1 14 AWG, 6 inch, White/Black
	Selecting profile (2)	24AWG, Yellow, 3inch, 2-conductor pigtail loop
Cooling & Sealing		Convection cooling / Water-proof (IP66)

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<p>Additional Features</p>	<p><u>Temperature compensation:</u> The charge curve is temperature compensated to ensure correct charging in cold or hot conditions. Charger under heated condition before starting charging may cause a problem. Internal charger temperature higher than ambient temperature results in under-charging. Actually, charging system composed of battery and charger will be under the same temperature</p> <p><u>Reduction of output power due to internal temperature:</u> Charger starts to reduce output current gradually according to internal temperature when internal temperature reaches a specific value. Charger stops at excessive temperature, and restarts automatically if internal temperature resumes normal temperature..</p> <p><u>Extremely low voltage charging:</u> The charger will charge very deeply discharged batteries greater than 1.0 VDC.</p>
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## Modified two stage charging cycle (I-V-S)



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Voltage  $V_i$  is initial battery voltage when battery is connected with charger.

- 1) At bulk mode from  $T_0$  to  $T_1$ , approximately 80% of battery capacity is returned. This is also called the “constant current” stage of charging. The charging current  $I_{cc}$  generally vary between 24-25A with most batteries during this portion of charging and there is some variation of charging current due to AC input voltage.
- 2) At absorption mode from  $T_1$  to  $T_2$ , approximately 20% of battery capacity is returned. In the charging curve, constant voltage  $V(T)$  varies depending on charger’s internal temperature.
- 3) At float mode after  $T_2$ , charger is turned off and goes into maintenance mode. The batteries are maintained above the 85% charge condition when the batteries are in storage for long periods of time. If the voltage drops below 25V due to self-discharge during storage, the charger will restart and complete a charge cycle.

## Procedure Selecting Charging Profile

Manual charger profile is selectable by connecting two lines before power-up and the selected profile is valid until power is turned off.

Before power on, keep two lines short for wet gassing or flooded lead acid batteries. For sealed valve regulated, gelled/AGM type lead acid batteries, keep two lines open. And then, turn on power. Selected charge profile is identified by lamp “Charger Profile” on front panel. If the lamp is off, charger is operated in a charging profile for flooded lead acid batteries.

## Normal operation

1. Connect the DC output wires to the battery.
2. Connect the power supply cord to a properly grounded 115V/60Hz or 230V/60 or 50Hz socket. This charger automatically senses and adjusts to 115V/230V.
3. The charger will start automatically within a few seconds. Once the charging starts, the LED’s indicate the charging progress as described in the following Charging State & LED display table. If all 3 LED’s blink together there is a problem. Take proper action according to the protection and fault display found later in this manual. The charger will start even with severely discharged batteries (down to 1V terminal voltage).

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4. The charger goes into SHUT OFF mode after the batteries are fully charged, and then all 3 LED's are "ON", indicating the charge is complete. At this mode, the charger no longer supplies power to the batteries, but it continues to monitor battery voltage. If the voltage drops due to self-discharge during storage, the charger will re-start and complete a charge cycle.

5. Turn off the charger by disconnecting AC cord.

Note1) Abnormal cycle: If a charge cycle does not finish in 18 hours, 100% LED blinks while 50% and 75% LED stay off.

Note 2) The charger is not damaged if the equipment is operated while charging. The charger's current limit function and over voltage protection allows this operation. Any and all safety issues related to operation of the equipment while charging must be examined before use.

Note 3) The charging time is affected by numerous factors including battery Amp-Hour capacity, depth of discharge, battery temperature, and battery condition (new, old, or defective).

## Charging State & LED Display

	50%	75%	100%	GEL
<b>LED</b>				
<b>Charging State</b>				
0 to 50% charged	Blinking	Off	Off	X
50% to 75% charged	On	Blinking	Off	X
75% to 100% charged	On	On	Blinking	X
100% charged	On	On	On	X
Charge for flooded type batteries	X	X	X	Off
Charge for Sealed type batteries	X	X	X	On
Abnormal Cycle	Off	Off	Blinking	X

Note1) X in the table means "don't care".

Note2) Abnormal cycle means the charge cycle is not finished within specific period.

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## Protection and Fault Display

	LED status	Description
Fault	3 LED lamps blink once simultaneously.	Output is open or short, or output voltage is over a limit, or output terminals are reversed.
	3 LED lamps blink twice simultaneously.	Input voltage is out of the range
	3 LED lamps blink three times simultaneously.	The internal temperature of the charger exceeds a limit.
	3 LED lamps blink four times simultaneously.	Output current exceeds a limit.
Warning	100% LED lamp blinks while 50% and 75% LED stay off.	Charger 18 hour timer has timed out due to battery problem.

\* "3 LED lamp" means green LEDs marked as 50%, 75%, and 100%.

\* When a fault occurs a buzzer sounds in the charger. If the fault is removed, the charger restarts automatically.