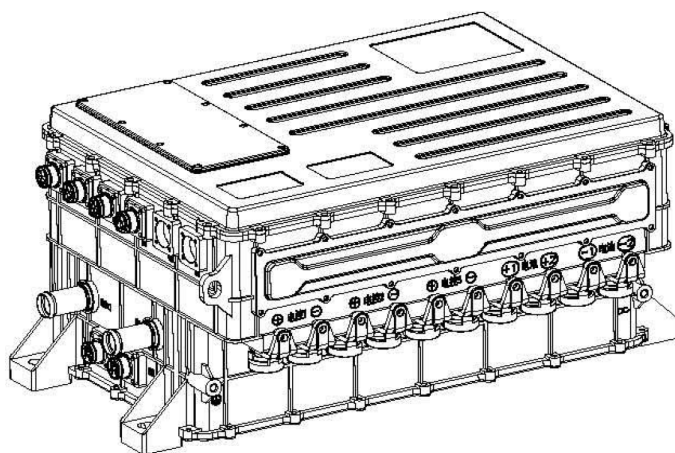




# 4 in 1 640S24V PDU

Model No.: AT-V6-H-4D7.5G



Date: 2024/08/23

Version: V0

\*This specification can not be copied or used for other commercial purposes without permission.



## 1. Product Basic Technical Parameters

Item	Requirement	Remark
DC supply voltage range	DC 350V—750V	
Integrated unit	Oil pump DCAC + Air pump DCAC + DCDC + PDU + Insulation tester (Optional)	
Protection level of control box	IP67	
Cooling method	liquid cooling	Glycol mixtures or other automotive coolants
Outer diameter of spout	25	mm
Controller communication method	CAN 2.0	Support:250kbps/500kbps
Waterway parameters	Rated flow rate25L/min, Capacity: 0.64L	water intake≤60℃, water pressure≤0.4 Mpa
System low-voltage control power supply	Range: DC 24V	18-32V
Low-voltage power consumption	≤100W	Rated working condition
Thermal power consumption	About 1.2KW	Rated working condition
Control box external size	See CAD file for details	
Weight of controller	≤40kg	kg



## 1. 1 Oil and Air Pumps DCAC:

Name	Specification	Remark
Rated power	7.5KW	
Max power	11KW	
Rated input voltage	DC 540V	
Applicable motors	Permanent magnet synchronous motor/ three-phase asynchronous motor	
Rated output current	17Arms	
Max output current	26Arms	60S
Efficiency	$\geq 94\%$	Rated working condition
Output frequency range	0~300Hz	
Speed control range	1:100	Open Loop Speed Mode
Other functions	CAN control, hard-wire control, CAN/hard-wire switching control, speed control, speed limitation, torque limitation, self-learning, fault reset, upper computer software function.	
Protection functions	Over-temperature, overload, short-circuit between phases, over-current, over-voltage, under-voltage, phase failure, loss of speed, sudden change of load during work, etc. instant shutdown to protect the body from damage.	



## 1. 2 DCDC Specification Parameters (Can install two 3KW parallel as 6KW)

Name	Specification	Remark
Battery type	Lead Acid/Lithium Battery	
Rated power(kW)	3KW	
Input voltage	400V-750V	
Max power(kW)	3.6KW	Hold after power on
Rated output characteristic	DC 27.5±0.3V/110A	
Efficiency	≥91%	Rated working condition
Output range	DC 16--18V under-voltage protection (Recoverable); 31---33V over-voltage protection (Recoverable)	
Voltage regulation accuracy	≤±2%	
Ripple voltage	≤500mV (PK-PK)	Rated voltage
Over-temperature protection	Temperature over 100 °C shutdown protection; it can self-recovery when temperature below 95 °C	Can self-recovery



## 1. 3 Insulation Tester Specifications (Optional)

Name	Specification	Remark
Low voltage power rating	DC 24V	
Working voltage range	27.5±0.5V DC	
Power	≤2W	
Input busbar voltage range	0-800VDC	
Input auxiliary power supply range	8-36VDC	
Measured signal	Positive and negative symmetric square wave amplitude≤41V	
Measured current	≤40uA	
Measurement of internal resistance	Positive and negative busbar internal resistance to ground ≥3MΩ	
Static measurement of insulation range	> 5MΩ	
General leakage alarm threshold	200 kΩ<Impedance≤500 kΩ	
Severe leakage alarm threshold	Impedance≤200 kΩ	
Relative measurement error	±15% (100KΩ—10MΩ)	



Measurement error	$\pm 10K\Omega$ ( $0K\Omega$ — $100K\Omega$ )	
Measurement response Time	3s(RF=100k $\Omega$ , Ce=200nF and Busbar voltage stabilization)	
	$\leq 3s$ (Ce $\leq 200nF$ )	
Output method	NPN transistor collector output, cut-off during normal, on during fault (Ground)	
Output voltage	30V/30mA max (Alarm output low)	
Communication protocol	CAN2.0	

#### 1. 4 PDU Specification

Name	Specification	Remark
MCU1 power distribution	Pre-charging resistor R1: 80 $\Omega$ /100W, Pre-charging relay K6: 40A/750V, Main relay K7: 600A/1000V, Insurance: 800A/750V	Standard
MCU2 power distribution	Pre-charging resistor R2: 80 $\Omega$ /100W, Pre-charging relay K8: 40A/750V, Main relay K9: 400A/750V, Insurance: 800A/750V	Optional
MCU3 power distribution	Pre-charging resistor R3: 150 $\Omega$ /60W, Pre-charging relay K10: 40A/750V, Main relay K11: 200A/750V, Insurance: 400A/750V	Optional



Auxiliary drive power distribution (DCAC+DCDC)	Pre-charging resistor R4: 200Ω/10W, Pre-charging relay K14: 16A, Main relay K5: 40A/750V, Insurance: 50A/800V*3	Standard
Air conditioning power distribution	Pre-charging resistor R5: 200Ω/10W, Pre-charging relay K13: 16A, Main relay K4: 40A/750V, Insurance: 50A/800V (或or100A/750V)	Pre-charging is optional
Electric defrost power distribution	Relay K3: 40A/750V, Insurance: 50A/800V	Standard
Reserve power distribution 1	Relay K2: 40A/750V, Insurance: 50A/800V	Optional
Reserve power distribution 2	Relay K1: 40A/750V,  Insurance: 50A/800V	Optional
Reserve power distribution 3	Insurance : 50A/800V	Optional

1. 5 Fuses, relays, buffer resistors, plug-ins, fans, etc. are wearing parts, please pay attention to the use of working conditions, is strictly prohibited overuse.

1. 6 Outline installation dimensions (See attachment)



## 2. Conditions of use

### 2.1 Operating environment, storage environment

- Operating environment temperature:  $-40^{\circ}\text{C}\sim+55^{\circ}\text{C}$
- Operating relative humidity: 5%~95%, condensation is not allowed
- Ititude: up to 4000 meters working
- Allowable Storage Ambient Temperature:  $-40^{\circ}\text{C}\sim+85^{\circ}\text{C}$
- Allowable storage relative humidity: 5%~95%, condensation is not allowed

## 3. Product Performance Description

### 3.1 Low Voltage Interface Definition

Control Wire Harness Interface Definition Client Plug Model: AMP 776164-1, Pin: AMP 770520-1 (or Client Plug Model:C- GE01-P008-35NN B- Y01,Pin: C-S06-0017P-NA-N)	Pin No.	Whole vehicle side definition	Controller side definition	Remark
	1	K1 relay coil positive	Reserved for distribution K1+	Reserve power distribution 2 hard-wire control coil power supply
	2	K1 relay coil negative	Reserved for distribution K1-	
	3	Not connected	/	
	4	Not connected	/	
	5	Charge wake-up signal	High voltage board charge wake up HX2	Active high
	6	Not connected	/	





	7	VIN1+	(Air Pump VIN+/Oil Pump VIN+/High Voltage Board 24V+/DCDC24V+)	First low voltage power supply positive
	8	Not connected	/	
	9	Vehicle bus CANH0	DCAC, DCDC communication CANH	CAN for vehicle communication, without termination resistor on the electronic control side
	10	Not connected	/	
	11	Not connected	/	
	12	Oil pump temperature sensor PT100+	Positive oil pump temperature detection (oil pump PTA)	
	13~17	Not connected	/	
	18	VIN1-	Air pump VIN- / Oil pump VIN- / High pressure plate 24V- / DCDC24V-	First low voltage power supply negative
	19	CANL0	Communication CANL for DCAC, DCDC	CAN for vehicle communication, without termination resistor on the electronic control side
	20	Not connected	/	
	21	Air pump temperature sensor PT100+	Positive air pump temperature detection (air pump PTA)	



	22	Air pump temperature sensor PT100-	Air pump temperature detection ground (pump PTA_GND)	
	23	Oil pump temperature sensor PT100-	Oil pump temperature detection ground (oil pump PTA_GND)	
	24	Not connected	/	
	25	Whole vehicle bus CANH1	Communication CANH1 for high voltage boards	CAN for vehicle communication, without termination resistor on the electronic control side
	26	Whole vehicle bus CANH1	Communication CANL1 for high voltage boards	
	27	VIN2+	(Air Pump VIN+/Oil Pump VIN+/High Voltage Board 24V+/DCDC24V+)	Second low voltage power supply positive
	28	Not connected	/	
	29	VIN2-	Air Pump VIN-/Oil Pump VIN-/High Pressure Plate 24V-/DCDC24V-	Second low-voltage power supply negative
	30			
	31	ON key signal	Oil Pump X3 & Air Pump X3 & High Pressure Plate HX1	Key signal, active high
	32	Not connected	/	
	33			
	34			
	35	DCDC start command	Active High EN	High effective $9 \leq U \leq 36V$ .



Remark:

- 1、CAN line, rotary variable line need to use twisted shielded wire;
- 2、The controller needs to be grounded shielding;
- 3、Debugging CAN needs to be led to the driver's cab maintenance port for debugging and maintenance;
- 4、High effective ( $9 \leq U \leq 36V$ );
- 5、Oil pump, air pump, DC hard-wire enable default is not enabled, if you need to enable the hard-wire enable, need to be in the supplemental agreement control mode to make a note of the description.

### 3.2 High Voltage Interface Definitions

Name	Socket type	Type of docking plug on the Part A-side	Pin defines	Function define	Remark
Battery1+	M10 bolt connection	95-10/70-10/50-10 A1 Key	Battery+	Power battery positive (+)	According to the specific project needs to choose the corresponding plug-ins, you can choose to install keyless plug-ins
Battery1-	M10 bolt connection	95-10/70-10/50-10, B1 Key	Battery-	Power battery negative (-)	
Battery2+	M10 bolt connection	95-10/70-10/50-10 A2 Key	Battery+	Power battery positive (+)	
Battery2-	M10 bolt connection	95-10/70-10/50-10, B1 Key	Battery-	Power battery negative (-)	
Electric control 1+	M10 bolt connection	95-10/70-10/50-10, A3 Key	Electric control 1+	Electric 1 positive +	
Electric control 1-	M10 bolt	95-10/70-10/50-10, B2 Key	Electric control 1-	Electric 1 negative-	



		connection				
Electric control 2+		M10 bolt connection	95-0/70-10/50-10 A4 Key	Electric control 2+	Electric 2 positive +	
Electric control 2-		M10 bolt connection	95-10/70-10/50-10, B2 Key	Electric control 2-	Electric 2 negative-	
Electric control 3+		M10 bolt connection	70-10/50-10/35-10, B3 Key	Electric control 3+	Electric 3 positive +	
Electric control 3-		M10 bolt connection	70-10/50-10/35-10, B2 Key	Electric control 3-	Electric 3 negative-	
DC+		HPL00X-20 0-M6-V	HPL18X-200-35	DC output +	DC-DC output +	
DC-		M8 bolt connection	M8 bolt	Equipment ground	DC-DC output-	35/50mm <sup>2</sup> Shielded cables
G1 Air pump		EX40302A  HVG30F4 Terminal:H VG30F4	EX40306A02I Terminal: HVG30M4  (or HVG30M2)	1	Air pump controller U-phase	4.0mm <sup>2</sup> Shielded cables (or2.5mm <sup>2</sup> )
				2	Air pump controller V-phase	
				3	Air pump controller W-phase	
G2 Oil pump		EX40302C  HVG30F4 Terminal:H VG30F4	EX40306C02I  Terminal: HVG30M4  (or HVG30M2)	1	Oil pump controller U-phase	4.0mm <sup>2</sup> Shielded cables (or2.5mm <sup>2</sup> )
				2	Oil pump controller V-phase	
				3	Oil pump controller W-phase	
	Option	EX40202A	EX40206A06I :HVG30MS6	1	Air conditioning 1	6.0mm <sup>2</sup> Shielded cables

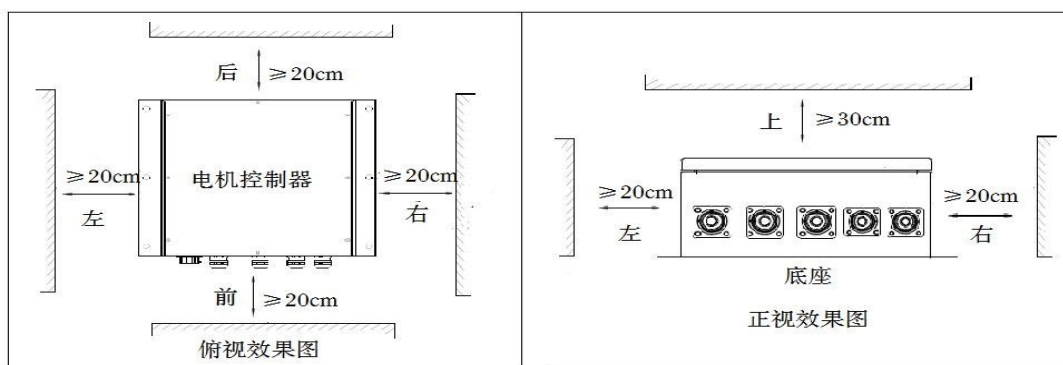


G3 Air Conditioner	1	HVG30FS6 Terminal:H VG30FS6	Terminal: HVG30MS6		high voltage distribution positive	
				2	Air conditioning 1 high voltage distribution negative	
	Option 2	EX40202A : HVG30F4 Terminal:H VG30F4	EX40206A04I Terminal: HVG30M4 (or HVG30M2)	1	Air conditioning 1 high voltage distribution positive	4.0mm <sup>2</sup> Shielded cables ( or2.5mm <sup>2</sup> )
				2	Air conditioning 1 high voltage distribution negative	
G4 Reserved Power Distribution 1		EX40202E : HVG30F4 Terminal:H VG30F4	EX40206E04I : HVG30M4 Terminal: HVG30M4 (or HVG30M2)	1	Electric heater distribution positive	4.0mm <sup>2</sup> Shielded cables ( or2.5mm <sup>2</sup> )
				2	Electric heater distribution negative	
G5 Electric Defrost		EX40202D  HVG30F4 Terminal:H VG30F4	EX40206D04I : HVG30M4 Terminal: HVG30M4 (or HVG30M2)	1	Electric defrost distribution Positive	4.0mm <sup>2</sup> Shielded cables ( or2.5mm <sup>2</sup> )
				2	Electric defrost distribution negative	
G6 Reserved Distribution 2		EX40202C HVG30F4 Terminal:H VG30F4	EX40206C04I Terminal: HVG30M4 (or HVG30M2)	1	Reserve power distribution positive	4.0mm <sup>2</sup> Shielded cables ( or2.5mm <sup>2</sup> )
				2	Reserve power distribution negative	



## 4. Installation Requirements

- The controller should be horizontally mounted on the flame retardant bracket, fixed with bolts with spring pads, and please increase the vibration damping pads, the whole machine grounding mark must be effectively grounded, low-voltage signal harnesses need to be effectively shielded.
- At least 20cm of space should be reserved in front, back, left and right of the controller (excluding the space occupied by the connector when there is an electrical harness connection), and more than 30cm of space should be reserved above it; make sure that there is space for the operation of tightening bolts during maintenance.



- Electrical wiring harnesses should be natural and neat, strong and weak power must be separated, do not lay out the signal and power lines side by side, and the connecting wiring harnesses are easy to identify and dismantle.

## 5. referenced standard

- QC/T413-2002 Basic Technical Conditions for Vehicle Electrical Equipment
- GB/T 18488.1-2015 Electric motors and their controllers for electric vehicles Part I: Technical conditions



- GB/T 18488.2-2015 Electric motors and their controllers for electric vehicles Part II: Experimental methods
- GBT 18384.1-2015 Safety requirements for electric vehicles Part 1: On-board energy storage devices
- GBT 18384.2-2015 Safety Requirements for Electric Vehicles Part 2: Functional Safety and Failsafe
- GBT 18384.3-2015 Safety requirements for electric vehicles Part 3: Protection of personnel against electric shock
- GB4942.2-1993 Low-voltage Electrical Appliance Shell Protection Grade
- GB 4208-2008 Enclosure protection level (IP code)
  - SAE J1939/11  
SAE J1939/11 Communication Protocol for Commercial Vehicle Control System Local Area Network (CAN Bus)
  - GB/T 18655-2015  
GB/T 18655-2015 Vehicles, ships and internal combustion engines Radio nuisance characteristics Limits and measurement methods for the protection of on-board receivers
  - GB/T 24347-2009  
GB/T 24347-2009 DC/DC converter for electric vehicles
  - GB/T 12668.3  
GB/T 12668.3 Speed-regulating electrical drive systems Part 3 Electromagnetic compatibility requirements and its specific test methods.
  - GB/T 12668.5  
GB/T 12668.5 Speed-regulated electrical drive systems-Part 5: Safety requirements
  - QC/T 29106-2014  
QC/T 29106-2014 Technical conditions for automotive low-voltage wire harnesses
  - GB/T 2423.17  
GB/T 2423.17 Basic Environmental Test Specification for Electro-industrial and Electronic Products Test Ka: Salt spray test method



## Appendix 1: Outline Installation Dimension Drawing

