

## CSI | Company introduction



Technology for a Greener Planet

# Mission, Vision, Values, and Leadership

**Vision:** To transform the earth to a pollution-free planet.

**Mission:** Provide innovative electrification solutions which use green & sustainable energy to better the earth for people and society.

**Values:** Integrity ♦ Empowering Customers ♦ Excellence ♦ Innovation



**Inspiration: Charles de Coulomb, for his pioneering and transformational discoveries in electricity and magnetism**

$$F = k_e \frac{q_1 q_2}{r^2}$$



**Technology for a Greener Planet**

- ◆ CSI provides high quality, proven products for Commercial EVs at wholesale prices
- ◆ CSI's goal is to enable the rapid adoption of electric drive systems in commercial trucks and buses in North America
- ◆ CSI is the North American distributor and service agency for CATL batteries for commercial vehicle applications
- ◆ CSI offers battery chillers, steering pumps, air compressors, AC compressors, heaters, DC-DC converters, and chargers to fully electrify commercial vehicles



## ◆ Proven Performance

- ◆ Strong and deep sales and technical expertise working with North American commercial vehicle customers and industry.
- ◆ Recognized figures of integrity and pioneers in the industry.
- ◆ Strong background with CATL and proven execution performance.
- ◆ Multiple successful experiences building and leading new businesses to a large scale.



### **President – Lining Zhou**

13+ years of technical and product experience in automotive and commercial vehicle industry. 10 years working in US and 3 years expat in China, business unit head with P&L responsibility and product roadmaps. Innovative – 3 US patents and business strategy development.



### **CEO – Dave Mazaika**

20+ years experience in commercial truck, bus and rail EV/HEV industry. Served as CEO, COO, & CTO private firms, and COO for Nasdaq public firm Serial Entrepreneur built 5 high-performance teams of 50-170 people. Negotiated and managed exclusive supply of hybrid products in US.

- ◆ **Provide the best value, proven components for electric and hybrid commercial vehicles from around the world at wholesale prices**
- ◆ **Customize components for North American requirements and performance**
- ◆ **Support the customer design process to achieve a balance between highest efficiency, best performance, lowest emissions and best value.**
- ◆ **Strong design and application engineering expertise to provide OEMs solutions for easy OEM configurability and quick installation.**
- ◆ **Technical support for customized software interfaces**
- ◆ **Stock components in US for rapid North American delivery**
- ◆ **Prompt service and technical support (within 24 hours) to the customer.**
- ◆ **Provide spare parts nationwide to fleets and to OEMs.**

# Our Products and Services

- ◆ **Advanced Batteries**
  - ◆ **CATL Battery Modules**
  - ◆ **Battery Chillers**
- ◆ **Power Electronics**
  - ◆ **DC-DC Converters**
  - ◆ **AC Chargers**
  - ◆ **DC Fast Chargers**
  - ◆ **Accessory Inverters**
  - ◆ **HV Heaters**
  - ◆ **HV AC Compressors**
  - ◆ **PDU's**
- ◆ **Electro-hydraulics for steering**
- ◆ **Electric air compressors for braking**

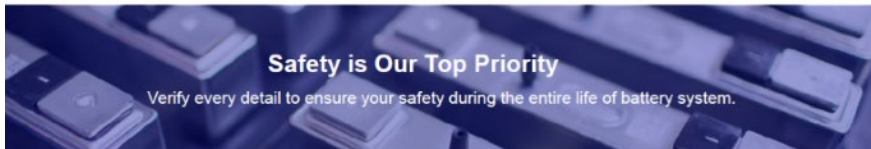




- ◆ **CSI is the North American distributor for CATL batteries for commercial vehicle applications**
  - ◆ **Local service and technical support**
- ◆ **Standardized packs specifically designed for commercial vehicles**
- ◆ **Combine packs to create battery systems from 40 to 1MWh+**
- ◆ **4000 100% DoD cycles (typical) LFP chemistry is ideal for commercial vehicles**
- ◆ **145-160 WH/kg at the pack level**
- ◆ **Liquid cooling and resistive heating enables operation in most any climate.**
- ◆ **Proven in tens of thousands of heavy-duty trucks and buses in all climates**
- ◆ **5 Year, 240,000 mile limited warranty standard**



## Company Goals



### Design Safety

DFMEA model is adopted to maximally ensure excellent battery performance, long battery cycle life and design safety.



### Product Safety

Safety design & comprehensive tests ensure CATL batteries to meet a series of electrical, mechanical, chemical & functional safety requirement



### Production Safety

PFMEA keeps the production process under control and conformed to battery design. Moreover, 273 kinds of battery tests are carried out to eliminate potential hazards.



### Application Safety

Collecting and analyzing big data to keep track of and send feedback of battery working condition, together with the 5-star after-sales service, CATL safeguards customers.

## Partnerships



### International Passenger Vehicle Clients



### Domestic Passenger Vehicle Clients



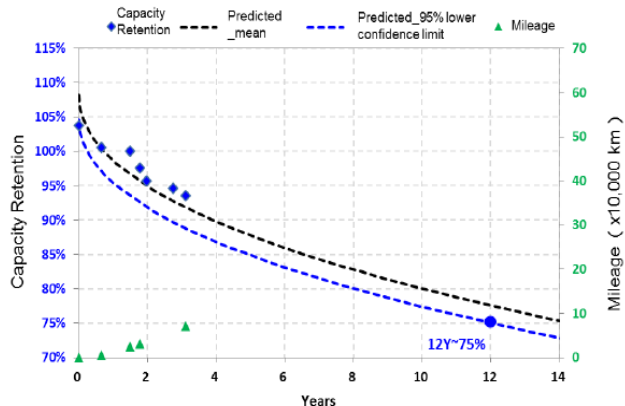
### Commercial Vehicle Clients



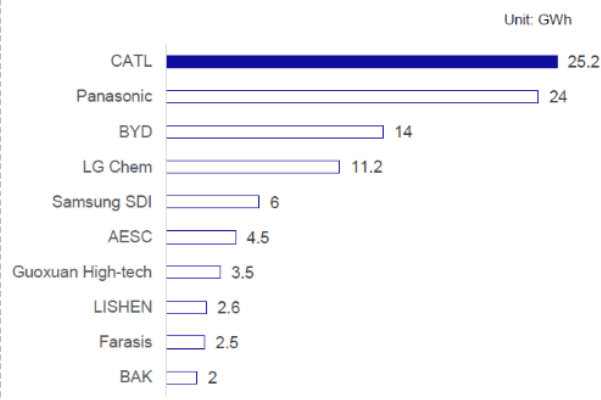
### Energy Storage System Clients



## E-Bus Capacity Retention & Mileage



## Global Top 10 EV Battery Manufacturers in 2018\*



## System Quality Assurance:

- External customer quality audits > 100 times per year.
- First Time Yield of customer project audit = 100%.
- Accredited by BMW, VW & other famous automakers.
- Certifications:



## ◆ Heavy Truck and Bus

35 kWh



Pack Group	C-Pack: 1060mm*630mm*240mm
	G-Pack: 950mm*630mm*240mm

## ◆ Heavy Truck and Bus

70 kWh



Pack Group	H01-Pack: 2050mm*640mm*240mm
	H02-Pack: 1850mm*640mm*240mm

## ◆ Delivery Vans

40 kWh



Pack Group	V1-Pack: 1200mm*970mm*240mm
	V2-Pack: 1200mm*970mm*249mm

**Systems from 40kWh to 1MWh**

**Used in Over 200,000 Commercial Vehicles**

**Standard 5 Year, 240,000 Mile Warranty**

## ◆ Medium Duty Truck and Bus

27 kWh

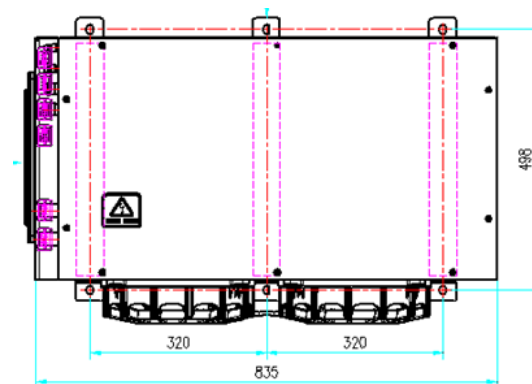


TX8-Pack: 1720mm*520mm*240mm
TB1-Pack: 1090mm*460mm*240mm
TB2-Pack: 1300mm*460mm*240mm

- Fully Integrated Design
- Includes Condenser, Compressor, Coolant Pump
- CAN Controlled
- Actively Chills Battery Coolant
- 12V/24V Available
- Meets Conventional Truck & Bus Requirements
- Low Maintenance

## GENERAL SPECIFICATIONS

<b>Model #:</b>	<b>eBC7.0HV</b>
<b>Cooling Capacity:</b>	<b>7.0kW</b>
<b>HV Refrigeration Input Power Max</b>	<b>3.2kW</b>
<b>Input Voltage Range:</b>	<b>200V-720V</b>
<b>Control Voltage:</b>	<b>12V/24V</b>
<b>Ambient Temperature Range:</b>	<b>-30°C~+50°C</b>
<b>Coolant Type</b>	<b>Water/Glycol</b>
<b>Coolant Flow Rate</b>	<b>5.3gpm/20 lpm</b>
<b>Refrigerant Type/Qty</b>	<b>R134/400g</b>
<b>Environmental Protection:</b>	<b>IP67</b>
<b>Weight:</b>	<b>90.2 lbs (41 kg)</b>
<b>Dimensions:</b>	<b>33.6"L x 23.2"W x 11.4"H (854x590x290mm)</b>



- Highly Efficient
- CAN Controlled
- Various Protection Modes
- Reliable & Powerful
- 12V/24V
- Compact Design
- Natural Air Cool
- Meets Conventional Truck & Bus Requirements
- Extremely Low Maintenance

**GENERAL SPECIFICATIONS**

<b>Model #:</b>	<b>eACCINV5.5HV</b>
<b>Rated Power:</b>	<b>5.5KW@380VAC Output</b>
<b>Input Voltage Range:</b>	<b>200V-750V</b>
<b>Control Voltage:</b>	<b>12V/24V</b>
<b>Working Ambient Temperature:</b>	<b>-40°C~+55°C</b>
<b>Rated Current (AC):</b>	<b>11A</b>
<b>Peak Current (AC):</b>	<b>19.5A</b>
<b>Environmental Protection:</b>	<b>IP67</b>
<b>Weight:</b>	<b>13.3 lbs (6 kg)</b>
<b>Dimensions:</b>	<b>13.3”L x 9.3”W x 4.1”H (340x235x104mm)</b>

Proven in Thousands of Commercial EVs & HEVs



- Highly Efficient
- Permanent Magnet Motor
- Pre-Assembled Reservoir
- Integral 600V Inverter
- Light Weight Assembly
- Compact Design
- Very Low Noise
- Meets Conventional Truck & Bus Requirements
- Extremely Low Maintenance

Proven in Thousands of Commercial EVs & HEVs

## GENERAL SPECIFICATIONS

<b>Model #:</b>	<b>ePS2.4HV</b>
<b>Motor Type:</b>	<b>2.4kW Highly Efficient PM</b>
<b>Inverter Voltage:</b>	<b>500-750 VDC</b>
<b>Inverter Control</b>	<b>CAN 2B</b>
<b>Rated Flow at Pressure:</b>	<b>4.2 gpm@1856psi (12.8Mpa@16.0lpm)</b>
<b>Peak Flow/Pressure:</b>	<b>4.5 gpm/2320 psi (17.0 lpm/16MPa)</b>
<b>Ambient Temperature:</b>	<b>-40C to 85C</b>
<b>Environmental Protection:</b>	<b>IP67</b>
<b>Weight:</b>	<b>38.5 lbs (17.5 kg)</b>
<b>Dimensions:</b>	<b>12.3”L x 8.7”W x 9.0”H (312x220x229mm)</b>



- **Highly Efficient**
- **Permanent Magnet Motor**
- **Reservoir Included**
- **Optional matched 5.5kW 600V Inverter (eAD5.5HV)**
- **Compact Design**
- **Very Low Noise**
- **Meets Conventional Truck & Bus Requirements**
- **Extremely Low Maintenance**

**Proven in Thousands of Commercial EVs & HEVs**

## GENERAL SPECIFICATIONS

<b>Model #:</b>	<b>eHPS3.0HV</b>
<b>Motor Type:</b>	<b>3.0kW Highly Efficient PM</b>
<b>Inverter Voltage:</b>	<b>500-750 VDC</b>
<b>Inverter Control</b>	<b>CAN 2B</b>
<b>Rated Flow at Pressure:</b>	<b>4.2gpm (16lpm) at 1450 psi (10MPa) continuous 4.2gpm (16lpm) at 2755psi (17MPa) for 2 minutes</b>
<b>Peak Flow/Pressure:</b>	<b>4.2 gpm/2900 psi (16lpm/20MPa)</b>
<b>Ambient Temperature:</b>	<b>-40C to 85C</b>
<b>Environmental Protection:</b>	<b>IP67</b>
<b>Weight:</b>	<b>84.7 lbs (38.5 kg)</b>
<b>Dimensions:</b>	<b>16.3"L x12.7"W x 10.0"H (414x323x254mm)</b>

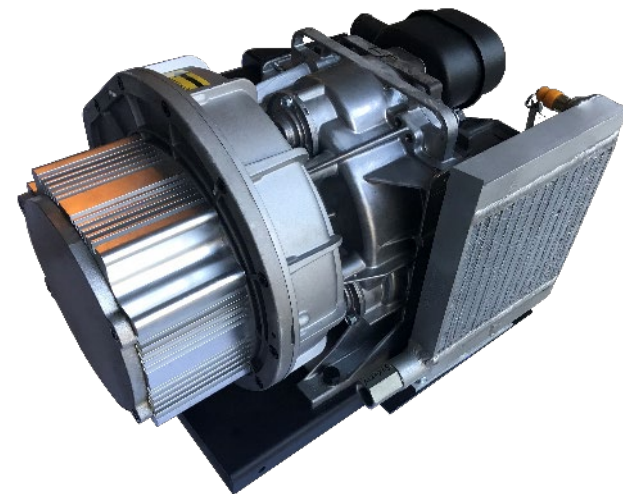


- Highly Efficient
- Permanent Magnet Motor
- Oil Less Operation
- Integral Air Cooler
- Available 600V Inverter
- Compact Design
- Very Low Noise
- Meets Conventional Truck & Bus Requirements
- Extremely Low Maintenance

Proven in Thousands of Commercial EVs & HEVs

## GENERAL SPECIFICATIONS

<b>Model #:</b>	<b>eAC3.7HV</b>
<b>Motor Type:</b>	<b>3.7kW Highly Efficient PM</b>
<b>Voltage:</b>	<b>380VAC</b>
<b>Air Compressor Type:</b>	<b>Oil Less Scroll</b>
<b>Air Compressor CFM @ PSI:</b>	<b>13.4 CFM@ 116 PSI</b>
<b>Rated/Peak Pressure:</b>	<b>116/170 psi</b>
<b>Ambient Temperature:</b>	<b>-30C to 55C</b>
<b>Weight:</b>	<b>80 lbs.</b>
<b>Dimensions:</b>	<b>452x367x355mm 17.7" L x 14.5" H x 14" W</b>



\* Optional Inverter: Model eAD55HV

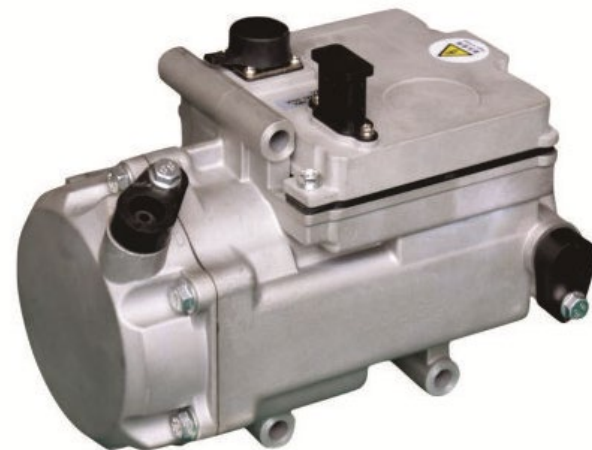


- Highly Efficient
- Permanent Magnet Motor
- CAN or PWM Controlled
- Scroll Type
- Integral 600V Inverter
- Compact Design
- Very Low Noise
- Meets Conventional Truck & Bus Requirements
- Extremely Low Maintenance

Proven in Thousands of Commercial EVs & HEVs

## GENERAL SPECIFICATIONS

<b>Model #:</b>	<b>eACC3.0HV</b>
<b>Motor Type:</b>	<b>3kW Highly Efficient PM</b>
<b>Inverter Voltage:</b>	<b>400-750 VDC</b>
<b>Inverter Control</b>	<b>CAN 2B or PWM</b>
<b>Displacement (gpm):</b>	<b>53.9 gpm @6000 RPM</b>
<b>Rated Cooling Capacity:</b>	<b>5940W (@6000RPM, w/ R134a)</b>
<b>Rated Power Consumption:</b>	<b>2700W</b>
<b>Environmental Protection:</b>	<b>IP67</b>
<b>Weight:</b>	<b>13.8 lbs (6.2 kg)</b>
<b>Dimensions:</b>	<b>8.2"L x 4.8"W x 6.7"H (209x121x169mm)</b>



- Highly Efficient
- Ceramic PTC Heater
- CAN Control with Feedback
- Protection Modes Built-in
- 12V/24V available
- Compact Design
- Very Low Noise
- Meets Conventional Truck & Bus Requirements
- Designed for long working life

**GENERAL SPECIFICATIONS**

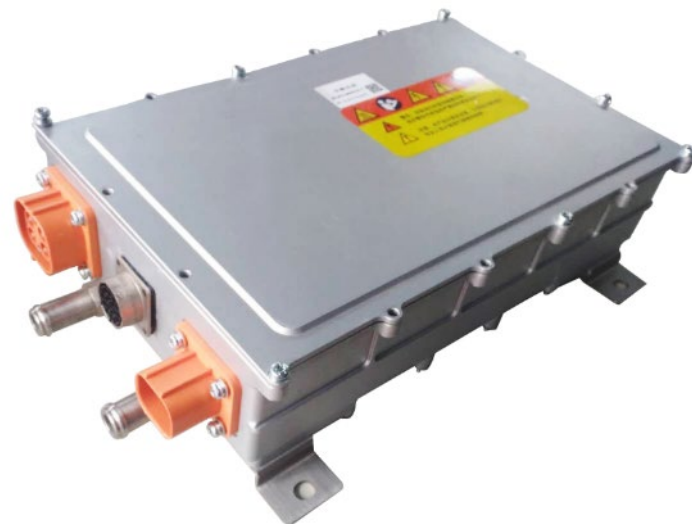
Model #:	eWH5HV	eWH7HV	eWH12HV
Controls:	500Kbps CAN	500Kbps CAN	500Kbps CAN
Input Voltage:	450VDC-750VDC	450VDC-750VDC	450VDC-750VDC
Control Voltage:	12VDC	12VDC	12VDC
Working Temperature:	-40°C to +105°C	-40°C to +105°C	-40°C to +105°C
Rated Power:	5000W	7000W	12,000W
Environmental Protection:	IPX7	IP67	IP67
Weight (Dry):	4.9 lbs (2.2 kg)	5.9 lbs (2.7 kg)	9.7 lbs (4.4 kg)
Dimensions (LxWxH):	7.9" x 5.0" x 4.4" (201x126x111mm)	12.2" x 5.7" x 4.2" (310x144x108mm)	13.2" x 6.7" x 4.4" (336x170x111mm)



- Use 1, 2 or 3 for 6kW, 12.0kW or 18.0kW
- Highly Efficient
- CAN Controlled
- Wide Range AC Input
- Compact Design
- Liquid Cooled
- Meets Conventional Truck & Bus Requirements
- Standard SAE J1772 Protocol

## GENERAL SPECIFICATIONS

Model #:	eOBC6.6HV
Rated Power:	6.0KW Output
Input Voltage Range:	90-264 VAC, 45-65 Hz
Control Voltage:	12V
Output Voltage Range:	450-750 VDC
Output Current:	12.0 A
Low Voltage Output:	7.5A @13.7VDC
Cooling:	Liquid Cooled Water Glycol
Environmental Protection:	IP66
Working Ambient Temperature:	-40°C ~ +60°C
Weight:	35.2 lbs (16 kg)
Dimensions:	16.7"L x 10.8"W x 4.2"H (424x274x106mm)



- User Friendly Interface
- Payment Platform Solution
- CCS Combo 1 Std., Combo 2 & CHAdeMO Options
- Remote Monitoring & Assist
- Units from 20-200kW Available
- Power Factor 99%+
- Highly Efficient Soft-Switching
- Robust & Low Maintenance
- Built-in Safety Features

## GENERAL SPECIFICATIONS

<b>Model #:</b>	<b>eDCFC150HV</b>
<b>Line Voltage (VAC):</b>	<b>300-520</b>
<b>Output Power (KW):</b>	<b>150</b>
<b>Output Voltage Range (V):</b>	<b>200-750</b>
<b>Rated Current (A):</b>	<b>200</b>
<b>Cooling:</b>	<b>Forced Ventilation</b>
<b>Operating Temperature:</b>	<b>-25°C: to +50°C</b>
<b>Environmental Protection:</b>	<b>IP54</b>
<b>Weight:</b>	<b>≤556 lbs (≤250kg)</b>
<b>Dimensions:</b>	<b>48"L x 33"W x 71"H (1220x850x1800mm)</b>



# Market Segments Summary

## CSI's North American commercial electrified vehicle applications:

- ◆ Terminal tractors (yard hustler)



- ◆ Port drayage trucks



- ◆ Medium duty delivery trucks

- ◆ Class 8 short haul trucks



- ◆ Utility service trucks

- ◆ School buses



- ◆ Hotel shuttle buses

- ◆ Locomotive





# Coulomb Solutions

- **High Quality Products for Commercial EVs at wholesale prices.**
- **North American CATL Battery Sales and Service for Commercial Vehicles**

**Thank you for your business!**

**Contact: [Sales@coulombsolutions.com](mailto:Sales@coulombsolutions.com)**