

## SCOPE OF SERVICES

<b>Deliveables</b>	Manuals  Schematics Spare Parts	Operator's Digital & Hard Copy Maintenance Digital & Hard Copy Parts Digital & Hard Copy Electrical & Air Digital & Hard Copy To Include 1 Spare Tire Plus Recommended Parts List
<b>Capacity</b>	Total Number of Seats Total Number of Standees	Permeiter Seating (22) 16
<b>Service Life</b>	Service Life	12 Years/500,000 Miles (Altoona Tested)
<b>Training</b>	Customer Training	Full Training (Driver's & Technician's)
<b>Bus Length</b>	Bus Length	30'
<b>Bus Width</b>	Bus Width	102"
<b>Bus Height</b>	Bus Height	128"
<b>Operating Range</b>	Single Charge	Up To 158 Miles (Calculated With Altoona Cycle w/o HVAC)
<b>Traction Motor</b>	Power Gear Speed Ratio Max Motor Speed (RPM) Type Cooling	90 kW X 2 13.5 7500 In Wheel Water Cooled
<b>Propulsion</b>	Battery Capacity (kWh) Number Of Battery Packs	213 kWh
<b>Fire Supression</b>	Manufacture	Amerex
<b>Electrical System</b>	Multiplex Data Logger Destination Signs Headlights Interior Lights	I/O Control I/O Control I/O Control (Front & Curb) I/O Control I/O Control
<b>Driver's Seat</b>	Manufacture/Model  Seat Belt	Recaro (800.00.7R1.CC11) Arm Rest Both Sides 2 Point (Right to Left)

**Depot Charging**

Charger Included w/ Bus

**Route Charging**

Must Use InductEV (Formerly Momentum Dynamics)

**City of Kansas City Missouri - Procurement Department  
Invitation for Bid#: 62240577  
Zero Emission Bus  
May 20, 2024**



**RIDE Mobility LLC**  
888 E. Walnut St, Suite 200B  
Pasadena, CA 91101  
626.770.4678  
[www.ride.co](http://www.ride.co)

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# COVER LETTER



May 20, 2024

Mia Wilson, Senior Procurement Officer  
General Service Department  
Procurement Services Division  
City Hall, 1<sup>st</sup> Floor, Room 102 W  
414 East 12<sup>th</sup> Street  
Kansas City, Missouri 64106

**RE: City of Kansas City, Missouri-Invitation to Bid#: 62240577 – Zero-Emission Buses**

Dear Mrs. Wilson:

RIDE Mobility LLC (RIDE) is pleased to submit a response to the **City of Kansas City Missouri Invitation to Bid #: 62240577 – Zero-Emission Buses**. RIDE is dedicated to reducing overall emissions and environmental pollution. RIDE commends the Kansas City’s commitment to a cleaner future and are confident and pleased to be able to propose and share details of our bus and services.

Leveraging our battery expertise and bus manufacturing experience, RIDE entered the “Zero-Emission Buses” market with the intent on developing our zero-emissions option that raises the bar for innovation, range, and performance. Loaded with top-notch safety features and showcasing an innovative design, RIDE is revolutionizing battery electric buses across North America.

At RIDE, we understand the details and services solicited in the Kansas City ITB. We will demonstrate our ability to provide the requested information. We feel confident and hopeful that you will find our innovations, technology, experience, and support unparalleled. We look forward to forgoing a partnership that will meet Kansas City goals and visions today, tomorrow and into the future! To assist Kansas City on the journey we have an in-house team to support and guide the agency through its project vision.

Below are a few milestones that hopefully showcase our continued growth, commitment, innovation, and experience in the Clean Energy & BEV industry and how hard we’ve worked to provide our customers the best options and solutions:

- RIDE has over 28 years of experience in developing safe, nontoxic battery technologies. This has made us the world’s largest producer of rechargeable batteries and its leader in electric buses, with the delivery of over 85,000 dependable, battery electric transit buses to public operators, universities, airports, and corporate campuses—all at a lower cost versus what competing buses incur.
- Proud American manufacturer, supported by a local workforce that builds and assembles each bus at our expanded California plant, which can produce up to 1,500 buses a year.
- RIDE’s Lithium Iron Phosphate chemistry (LFP) Systems are designed and manufactured to provide the safest, longest life and most reliable batteries on the EV market today. Our batteries battery

system is designed and manufactured by RIDE, we offer a 12-year warranty, which is the longest in the industry.

- RIDE's existing knowledge of deploying various size electric bus models. Having successfully delivered 30ft, 35ft, 40ft, and 60ft battery electric buses and coaches to transit agencies across the United States.
- RIDE is on several State Purchasing Cooperative Agreements for transit helping to facilitate the procurement process for agencies across the United States (for most of our bus models). This can bypass the extensive and expensive RFP process and instead eliminate any additional cost. This is a process that some of our smallest and largest customers are using for acquiring from less than 10 to more than 100 battery electric buses including infrastructure. A quote would be required for infrastructure.

RIDE has a bus manufacturing plant in Lancaster, CA that features new state-of-the art buses and a newly optimized production workflow. Our staff growth is accompanied by new in-house training, quality, safety, and management programs. Our customer and product support are also expanding, with added project management and aftersales procedures and staff, including a wider network of in-the-field service technicians and nation-wide service and parts facilities. We have Service & Support Centers located throughout North America to provide support all our customers. In addition, RIDE is looking at continued growth and expansion. We welcome Kansas City to visit our plant in Lancaster, CA.

Should you have any questions, please feel free to contact the following RIDE personnel:

- Bella Ma | Account Manager | Email: [bella.ma@ride.co](mailto:bella.ma@ride.co) | Phone: (213) 595-3048
- Jason Yan | Director of Sales Operations | Email: [jason.yan@ride.co](mailto:jason.yan@ride.co) | Phone: (213) 519-8087

Sincerely,

*Enid Santiago*

Proposal Project Manager

Bids and Grants

Phone: (213) 399-0069

Email: [enid.santiago@ride.co](mailto:enid.santiago@ride.co)

## **TECHNICAL RESPONSE**

In the following pages include the equipment technical detail for the RIDE K7M 30ft.- Zero-Emission Bus. Including deviations as requested by the agency.



# VEHICLE DIMENSIONS

Our 30-ft. Electric Bus meets the agency’s specification for overall bus dimensions and the table below provides a breakdown of the key dimensions.

DIMENSIONS/DESCRIPTION	RIDE’S 30-FOOT BUS DIMENSIONS
Length	30.7 ft.
Width (maximum)	95.7 in.
Height (maximum)	128 in.
Approach Angle	8.6°
Departure Angle	8.6°
Ground Clearance	10.1 in.
Axle Clearance	5.8 in
Wheel Clearance	6.6 in.



## **CHARGER CONFIGURATION**

RIDE is proposing multiple charging configurations to meet the agency's technical specifications.

RIDE offers DC SAE J1772 CCS 1 Plug-In Depot Charging at 150kW as the standard depot charging configuration. RIDE would also like to propose DC SAE J3105-1 overhead pantograph charging and DC SAE J2954/2 wireless charging as options for the agency.

## **ELECTRICAL PROPULSION SYSTEM**

RIDE's Propulsion System was designed, engineered, and manufactured by RIDE purposely for heavy-duty transportation operations. Our propulsion system consists of the primary propulsion unit, dual in-wheel traction motors, and Integrated High-Voltage Controller (IHVC).

As an industry leader in producing battery-electric buses and technology, our propulsion system has been used in more than 85,000 BEB's with over 28,000,000,000 miles driven in daily transit operations. The RIDE Propulsion System has been transit industry tested and proven highly efficient, reliable, and durable.

## **PRIMARY PROPULSION UNIT AND TRACTION MOTORS**

RIDE's Rear Axle is not only the axle; it includes Dual in-wheel traction motors, air brake chamber, Disc brakes, air suspension arm, and planetary gears. RIDE's PPU was equipped on all RIDE Altoona certified models, including 30ft, 35ft and 40ft bus models. In addition, RIDE's PPU has been well proven by Altoona Test.

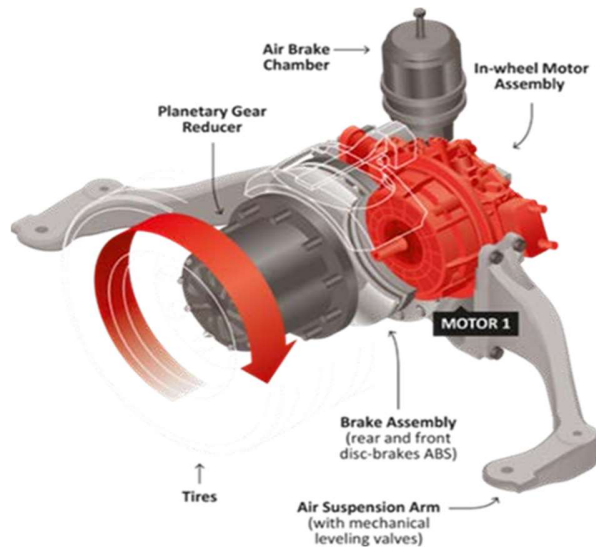
**OUR REAR AXLE ASSEMBLY ELIMINATES THE USE OF A TRANSMISSION AND OTHER MOVING PARTS THAT REQUIRE MID-LIFE OVERHAUL AND REPLACEMENT FROM CONSISTENT WEAR AND TEAR**



## TRACTION MOTORS

RIDE's PPU utilizes racecar-inspired, twin electric, electronically controlled traction motors are located directly in the wheel hubs on each side of the rear-drive axle, along with angle-cut, planetary gear sets.

This combination of design factors removes the need for combustion, an engine compartment, a driveshaft, or a transmission—providing safer, lower-maintenance, higher-efficiency, continuous smooth motion.



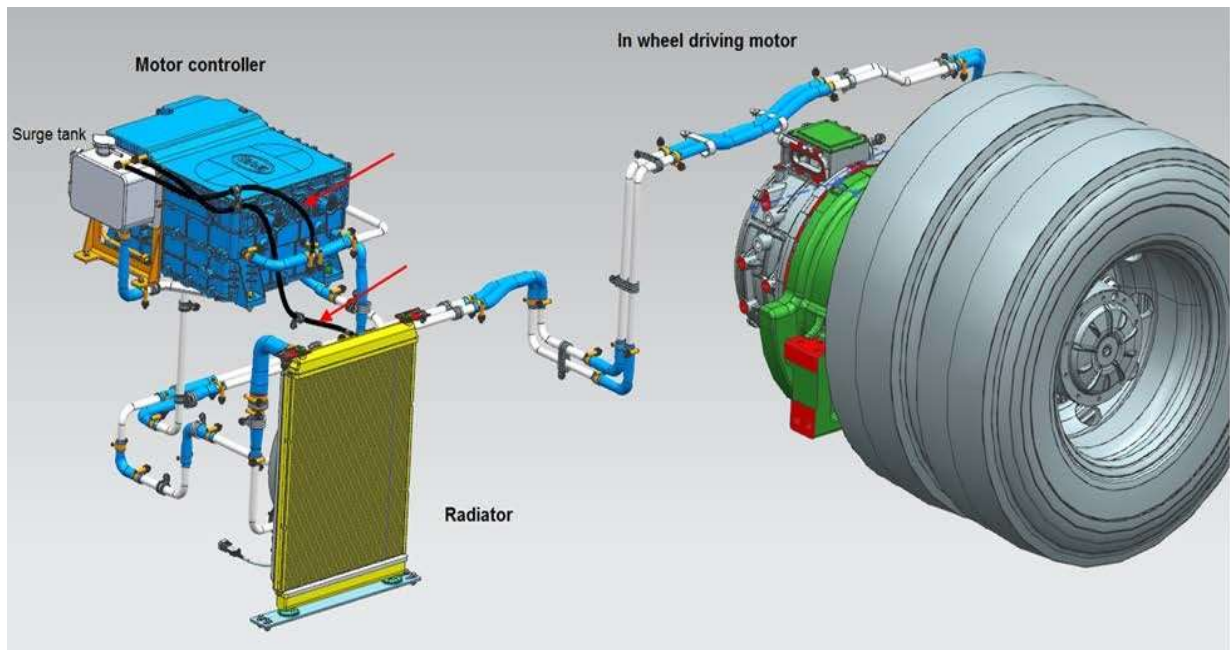
## RIDE PRIMARY PROPULSION UNIT TESTING

RIDE puts its rear axle through an extensive amount of testing for reliability and fatigue strength to continuously improve the overall durability of the axles to meet heavy-duty transit operations and be available for over more than 12 years and 500,000 miles. Each axle that is put on a bus undergoes the following test:

TEST COMPLETED	PURPOSE OF TEST	
In-Wheel Motor Assembly Bench Test	Simulates torque and speed	
Tests based on GB/T 18488 standards	Noise, operating temperature, durability, stress resistance, and stability	
In-Wheel Reducer Bench Test	Running condition; tests sealant, noise, lubricating property, the durability of parts	
In-Wheel Drive Axle Bench Test	Simulates various operating conditions to ensure drive axle intensity and vehicle safety, including reliability demonstration with air cantilever, axle housing, half-axle tube, and the like	
Additional bench testing	<ul style="list-style-type: none"> <li>• Reliability</li> <li>• Durability</li> <li>• Fatigue</li> <li>• Temperature</li> <li>• Vibration</li> </ul>	<ul style="list-style-type: none"> <li>• Environmental</li> <li>• Endurance</li> <li>• In-Service</li> <li>• Motor</li> <li>• Altoona Structural Durability</li> </ul>

## TRACTION MOTOR COOLING SYSTEM

The drive system cooling system is used for cooling the driving motors, 6-IN-1 integrated High-Voltage motor controller, and the Air Compressor.



There are two cooling systems for the drive system. (This does not include the cooling system for the HV batteries.) The two systems are divided Left and Right. Each Cooling System consists of a water pump, radiators, water temperature sensor, a surge tank, and coolant hoses/pipes. RIDE's Bus has two independent driving motors and motor controllers, and the left and right cooling system are independent.

RIDE's Electric buses have two independent driving motors and motor controllers, and the left and right cooling systems are independent.

Due to electrical motors' high energy conversion efficiency in RIDE's electrical Bus, less than 10% of energy is lost for heat. As a result, the coolant operation temperature is only between 80F to 126F in RIDE's electrical Bus.

## **INTEGRATED HIGH-VOLTAGE CONTROLLER**

RIDE's rear-mounted enclosure houses the Integrated High-Voltage Controller (IHVC) that is multi-functional in use and has been specifically designed to regulate energy flow from the high-voltage battery system to each of the components on the Bus.

The IHVC is the hub of communication for the whole propulsion system. It is responsible for providing direct instructions and system commands to the following:

- Traction Motors
- High-Voltage batteries
- Charging equipment
- Power electronics

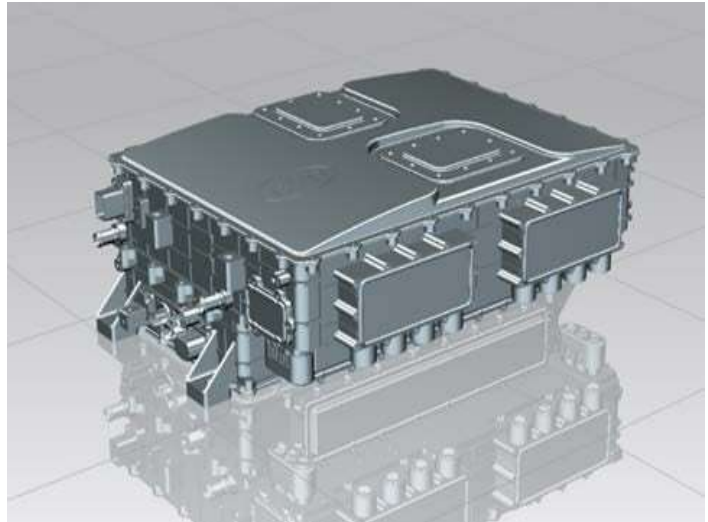
The IHVC also distributes power to the following subsystems:

- Heating, Air Conditioning, and Ventilation System
- Power Steering
- Air System

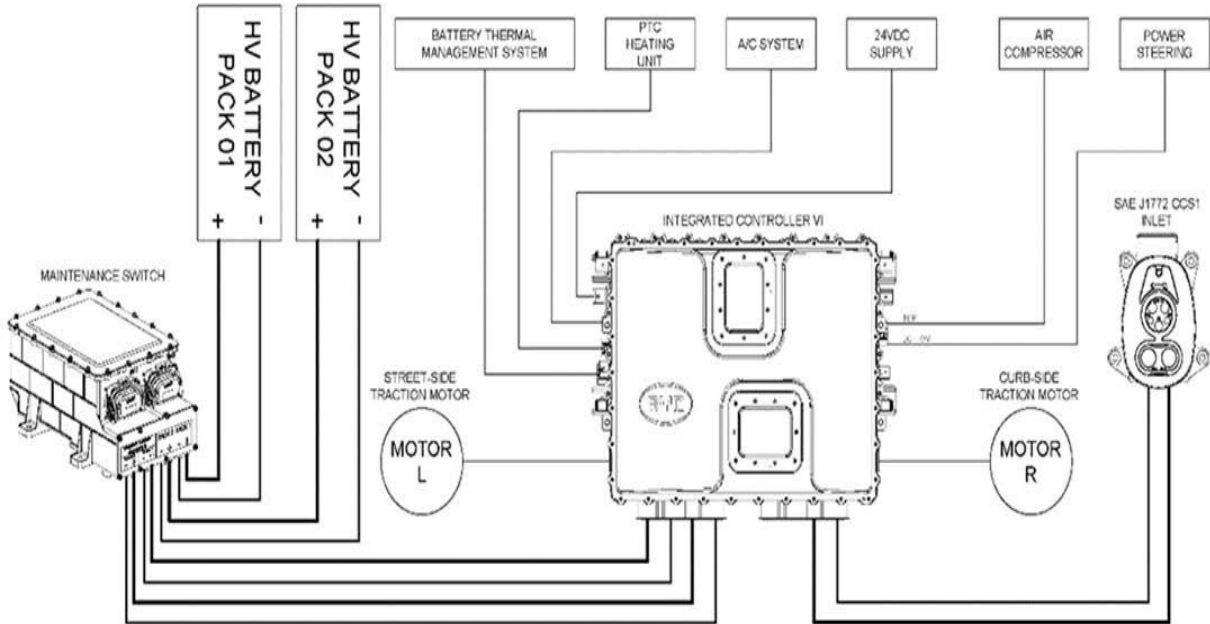
## **KEY IHVC DESIGN INTEGRATION FEATURES**

RIDE's IHVC was designed to integrate six standard bus systems into one powerful system. It integrates:

- Air Compressor Controller
- Steering Motor Controller
- Drive Motor Controllers
- High Voltage Distribution Box
- DC-DC Converter
- Leakage Sensor



## WORKING PRINCIPAL OF IHVC



## DISCONNECT SYSTEM

RIDE buses come equipped with a 24V battery disconnect switch and a main power disconnect switch. The 24V battery disconnect switch is in the street-side access panel at the front of the bus while the main power disconnect switch is located at the rear of the bus as seen in the figure below.





Clear labeling is provided on the access panels or covers to limit access to high voltage components. All such access covers are permanently labeled with “DANGER: HIGH VOLTAGE” signs. Appropriate warning signs and labels are also used to alert maintenance personnel and/or emergency crews to the presence of HV batteries and cabling within the bus.








The high voltage (HV) system is made up of a number of harnesses throughout the unit. The harnesses are orange in color to identify them easier as HV harnesses. The use of a key is also required to unlock or remove at least one (1) threaded fastener to open covers or panels to gain access to HV components.

Additionally, compartments are constructed of corrosion-resistant material, electrically insulated, and treated for fire resistance. Non-conductive covers for component compartments are also provided to prevent inadvertent human contact including service personnel working on or inside the bus. All high voltage compartments are finger-proof, and the protection degree is IPXXB and IPXXD.

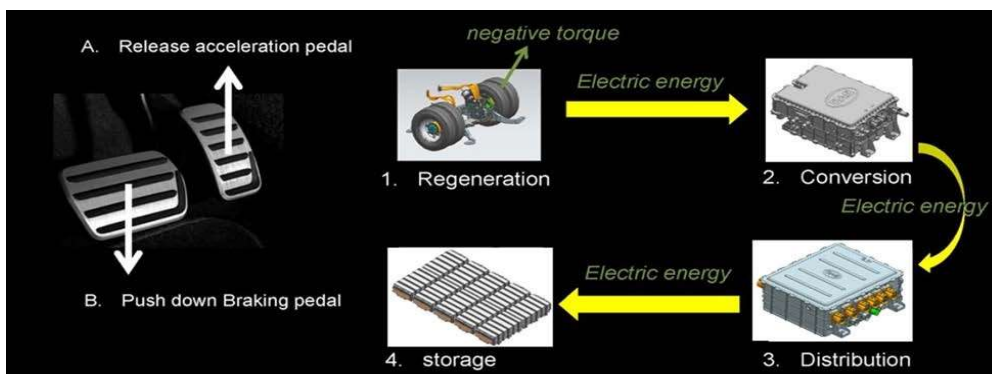
All high voltage load components are also monitored independently. When the faults occur, the load monitoring system will generate warning signals and the indicators on dash will be turned on as shown in the table below.

Monitored Component	Sensor Location	Indicator/Alarm	Cause
High Voltage Battery	BMS	 High Voltage Battery Malfunction	<ol style="list-style-type: none"> <li>1. Single cell battery voltage &gt; 3.65 V</li> <li>2. Single cell battery voltage &lt; 2.7 V</li> <li>3. Single cell battery temperature &gt; 140°F</li> <li>4. One of the battery packs is malfunctioning</li> </ol>
		 High Voltage Battery Overheated	<ol style="list-style-type: none"> <li>1. Single cell battery temperature &gt; 140°F</li> </ol>

Steering Motor	Steering Motor Controller	 Steering System Malfunction	<ol style="list-style-type: none"> <li>1. No high voltage input to 3-in-1 controller</li> <li>2. CAN PCB chip is malfunctioning</li> </ol>
Air Compressor	Air Compressor Controller	 Brake System Malfunction	<ol style="list-style-type: none"> <li>1. Air brake system loop pressure &lt; 0.65 psi</li> <li>2. Loop pressure sensor is damaged</li> </ol>
DC-DC	DC-DC Controller	 Smart Charging Malfunction	<ol style="list-style-type: none"> <li>1. No high voltage input to 3-in-1 controller</li> <li>2. No low voltage power supply to 3-in-1 controller</li> <li>3. CAN PCB chip is malfunctioning</li> </ol>
Driver Motor	VTOG	 Critical Motor Overheated	<ol style="list-style-type: none"> <li>1. Motor oil temperature &gt; 194°F</li> <li>2. Motor winding temperature &gt; 212°F</li> </ol>
		 Propulsion System Malfunction	<ol style="list-style-type: none"> <li>1. Insulated gate bipolar transistor (IGBT) or intelligent power module (IPM) in the VTOG are malfunctioning</li> </ol>

## REGENERATIVE BRAKING

The Regenerative Braking function further increases energy efficiency and extends brake lining service life. Regenerative braking on all vehicle types keeps the motor's energy from being lost when the Bus slows, whether from the driver easing up on the accelerator pedal or pressing the brake pedal. Typically, an alternator transforms kinetic energy lost by the motors into electrical power.



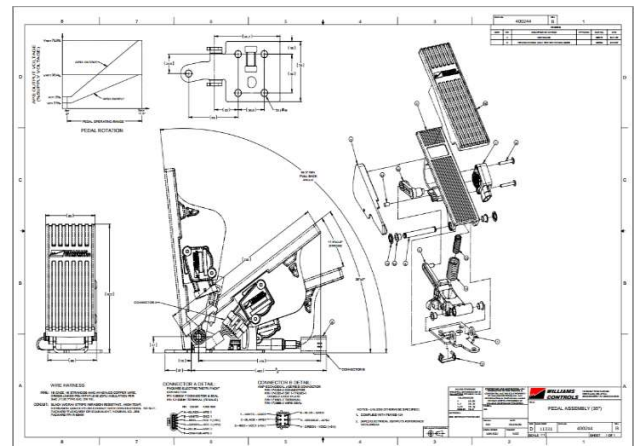
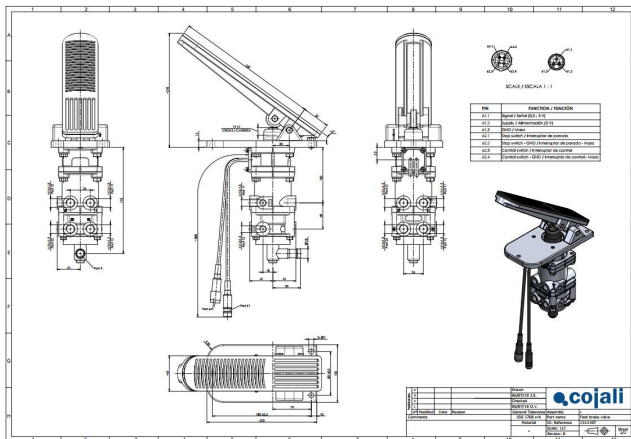


On a RIDE bus, there is no alternator because there is no need to capture kinetic energy. Since the motors are powered directly by electricity and their motion is fully electronically controlled, the Motor Controllers/Inverters receive the energy back from the motors directly as electricity. As shown below, excess AC electricity bounces back from our twin 3-Phase AC motors whenever the driver presses the brake and/or eases up on the accelerator to the twin Motor Controllers/Inverters, which invert the AC power to DC and send it through the HV Distribution Box to the ESS. The ESS then stores it for later use. Between Regenerative Braking and the placement of electrically powered, electronically controlled motors and gears directly in the wheel hubs on the drive axle, WI Dept of Transportation's Bus uses only as much energy as it needs to run, with almost no efficiency lost to friction.

**A Regenerative Braking Disable Switch is a unique RIDE safety feature;** systems on other buses cannot currently be turned off in this manner. This switch provides a potentially important safety feature: if, for example:

- The driver notices that the ABS/ATC is not functioning as expected, or if the failsafe to prevent ESS overcharge does not seem to be working.
- **Regenerative braking parameters are programmable adjustable,** and activation causes a smooth blending of both regenerative and service brake function, minimizing jerk.

Adjustable parameters include the mph at which regenerative braking will kick in; RIDE will work with WI Dept of Transportation to pre-program these parameters to meet WI Dept of Transportation's optimal needs. For example, in extreme ice conditions, clients require better ABS/ATC override of regeneration.





## ALTOONA TEST

RIDE is proud to announce that RIDE's proposed 30-ft K7M bus has completed and passed the Altoona Test with exceptional results as of Q2, 2017. The results of the test can be found at the link below.

K7M Altoona Test Results: <https://www.altoonabustest.psu.edu/bus-details.aspx?BN=1605>

# ENERGY STORAGE SYSTEM

The Energy Storage System (ESS) is the lifeline of RIDE's battery-electric Bus. The ESS in totality consists of the following major systems: high-voltage batteries and the battery management system.

## HIGH-VOLTAGE BATTERIES

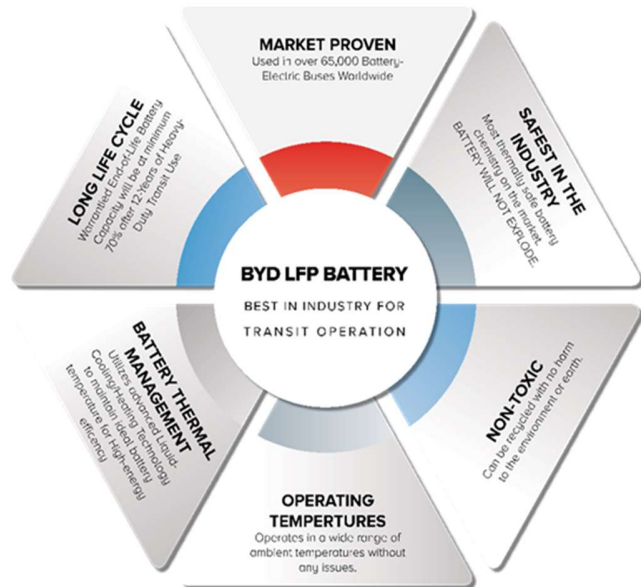
### BATTERY CHEMISTRY

The high-voltage batteries utilize RIDE's patented Lithium Iron Phosphate (LFP) cell chemistry, which is a culmination of over 25 years of testing and research that RIDE has done. As a battery manufacturer, RIDE utilized its supreme understanding of battery technology to develop its LFP chemistry specifically for heavy-duty transit operations because it offers an extended life cycle, overall energy density, and safety attributes.

We have attached our Battery White paper report for the agency's review.

### BATTERY SAFETY

RIDE's 25 years of battery research, design, and manufacturing have provided the knowledge required to build the safest battery for heavy-duty transit operations. The RIDE LFP batteries have undergone the following safety test shown in Figure in the next page.





**RIDE BATTERY CERTIFICATIONS**

RIDE's Battery System complies with SAE J2929 Safety Standard for Electric and Hybrid Vehicle Propulsion Battery Systems Utilizing Lithium-based Rechargeable Cells. Our batteries additionally meet the following certifications:

CERTIFICATION CODE	DESCRIPTION OF BATTERY CERTIFICATIONS
UL – 2580	Batteries for Use in Electric Vehicles
UL – 1642	The standard for Lithium Batteries
UN 38.3	Lithium Metal and Lithium-Ion Batteries
UN ECE R100	Battery Standards for Electric Vehicles

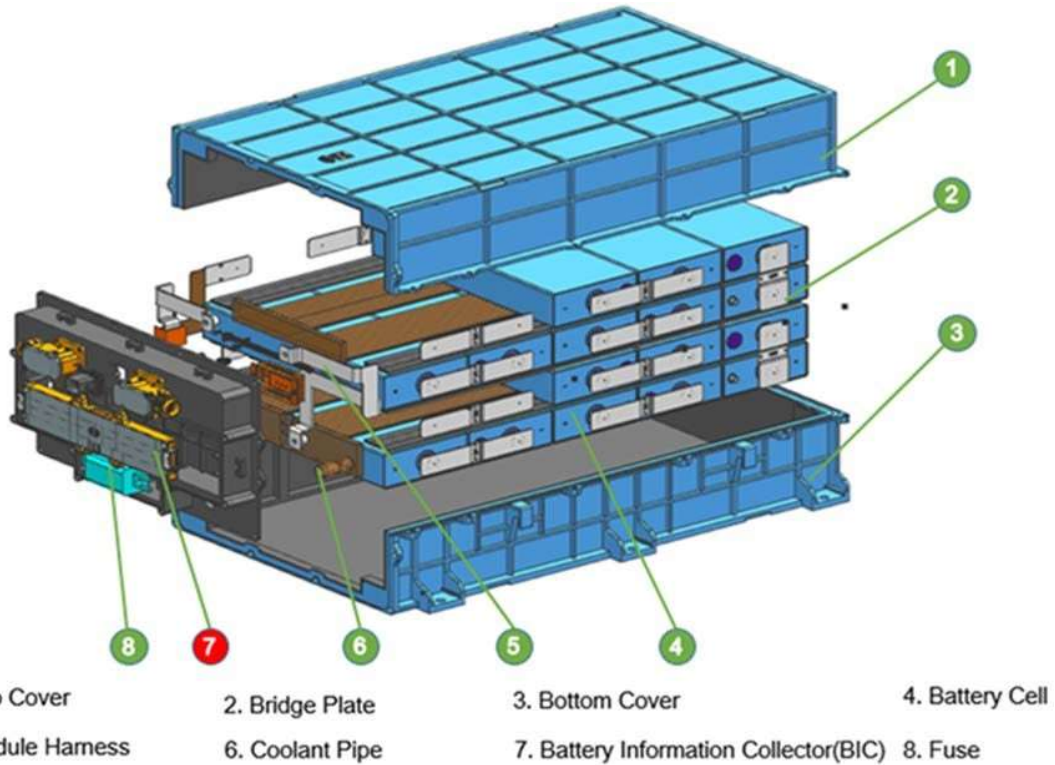
**BATTERY LAYOUT**

RIDE designed each of its bus platforms to have specific battery layout to provide the following benefits for vehicle operation:

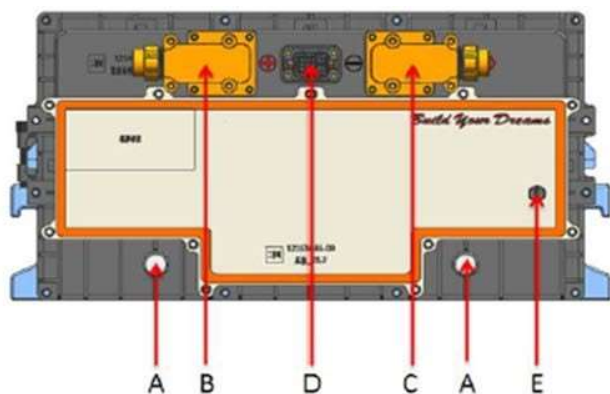
- Better distribution and balance of weight on the vehicle.
- Maximize passenger space on the vehicle.
- Ease of maintainability and access for service

## RIDE BATTERY MODULES

Proper design of the cell, battery, and battery compartment ensures optimum, reliable, and safe operation. RIDE designed and built our battery modules and packs utilizing our proprietary LFP battery chemistry that provides high energy density and RIDE's Battery Management System technology to maintain peak performance to produce a more extended daily vehicle range.



NO.	DESCRIPTION
A	Cooling Water Pipe Connection
B	Positive High-Voltage Connector
C	Negative High-Voltage Connector
D	Low Voltage Connector
E	Exhaust Vent



## BATTERY MANAGEMENT SYSTEM

The RIDE Battery Management System (BMS) was designed, developed, and manufactured by RIDE. Our BMS system has built-in Smart Technology to manage, monitor, and calculate critical system information for the entire ESS. The BMS consists of a Main Battery Management Controller (BMC) per Bus, Auxiliary BMC per battery pack, and Battery Communication Controller (BCC).



Since RIDE's BMS is part of our vertical manufacturing process, it seamlessly integrates into our "one bus" vehicle design. The BMS utilizes Controller Area Network (CAN) communication to transfer information from the individual cell level to the overall battery packs to generate real-time vehicle monitoring.

The BMS offers the following distinct advantages:

- **Smart Charging System:** Enables the High-Voltage Batteries to charge the Low-Voltage Batteries, which supply a consistent vehicle ignition power resource.
- **Battery Thermal Management:** Monitors and reports the temperature of each pack, Module, and cell on the vehicle to provide a safer bus.
- **Cell Balancing:** Monitors and calculates the voltage levels of the battery cells to maintain consistent battery function throughout the cells.
- **State of Charge (SOC) Calculations:** Calculates the overall vehicle SOC for a more energy-efficient use of power.

## BATTERY COOLING AND HEATING

Maintaining the battery temperature on the vehicle is vital to maintaining a safe, reliable, and efficient transit service. That is why RIDE has taken extensive measures to design a battery cooling and heating system ideal for bus applications. To protect our batteries for the life of the vehicle, RIDE has designed our battery packs with the following protections:

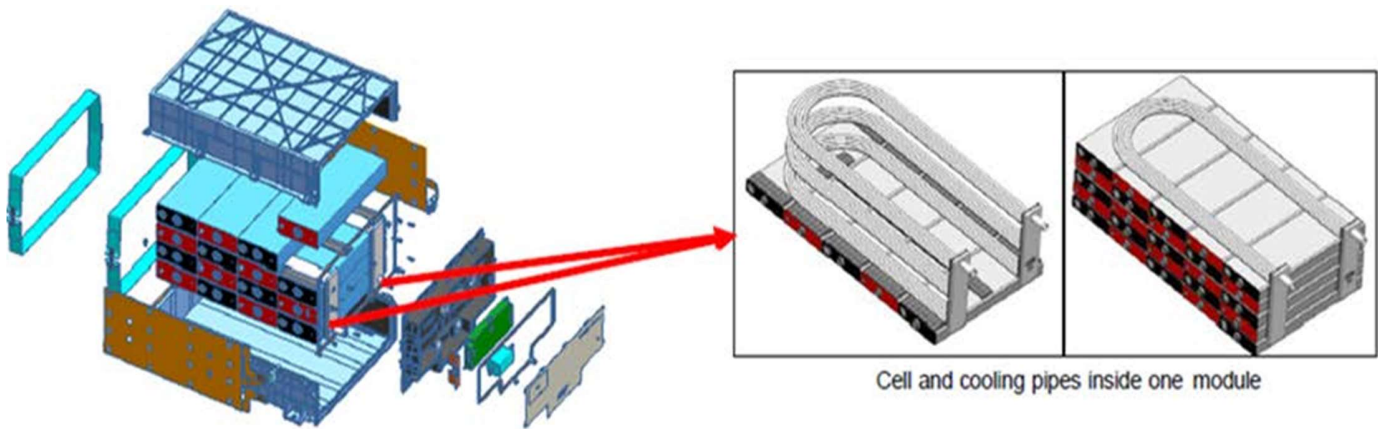
### 1. Built-In Battery Thermal Management:

Battery Thermal Management is an integral part of RIDE's BMS. Our design utilizes the same sensor and system as our BMS to:

- Monitor battery Temperature.
- Provide automatic shut-off for any cell that overheats.

### 2. Piped-Liquid Cooling/Heating Control:

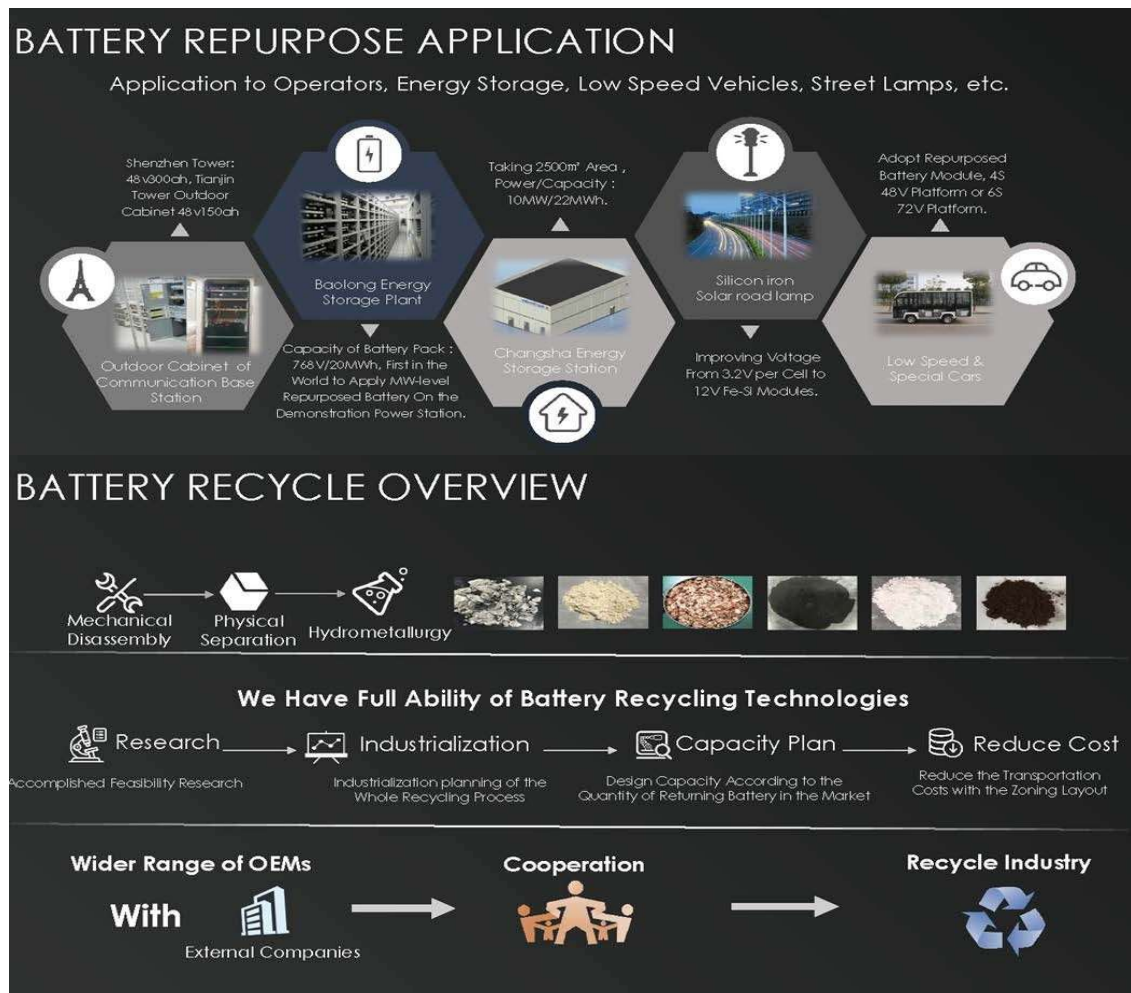
RIDE's battery modules have a built-in piped liquid cooling system. Figure 6 shows the design of the Piped-Liquid cooling/heating system in the Module. It keeps the battery cell at an ideal temperature during the winter and summer months.



## BATTERY END-OF-LIFE

RIDE's LFP batteries have the added value of providing each of our customers a full second useful life after the Bus's 12-year End-of-Life (EOL) full transit duty cycle. Unlike other battery chemistries that have a simple "Cradle-to-Grave" battery disposal, where at the EOL the battery chemistry can only be recycled, RIDE is in a unique position, because of our vertical integration, to re-purpose batteries from

Our transit buses (once they reach their useful life cycle) into our own Energy Storage Systems. We are our customer for re-purposing, recycling, and re-certifying packs and modules for use in additional applications. RIDE's batteries can be re-purposed and used in a full Utility-Grade Energy Storage System. This second- life of the batteries in a Utility-Grade ESS can provide a complete power solution realizing power output smoothing, peaking shaving, frequency regulation, transient active power responding, and transient voltage supporting to keep the power system running safely, sustainability, and reliably.





## COOLING SYSTEM

RIDE also provides two separate cooling systems for electric buses – one is for electric motor cooling, and another is for battery cooling.

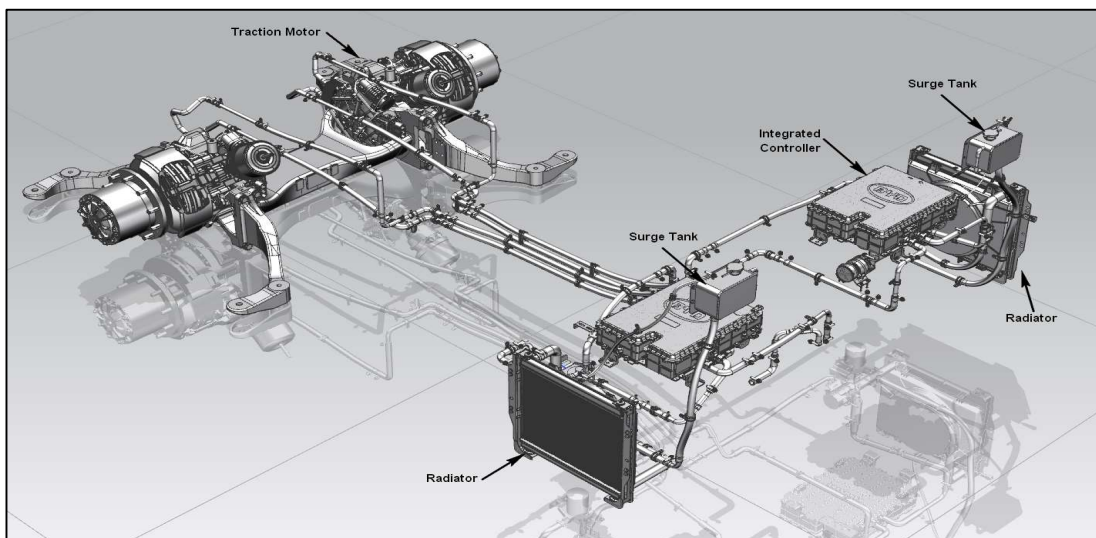
### MOTOR COOLING

RIDE has designed and manufactured our own radiator cooling system components in-house. The cooling components have been designed to maintain the traction motors and high-voltage electronic components at safe and continuous operating temperatures during the most severe operating conditions with the bus loaded to GVWR and a 10% reserve capacity.

Based on RIDE's motor cooling system capabilities, a maximum heat rejection requirement of 25.64 kW can be achieved via RIDE's motor cooling system. The cooling system configuration consists of:

- Radiator C6B-1315010 with a heat dissipation area of 11.1 m<sup>2</sup> (which is larger than the required 7.77 m<sup>2</sup>)
- Water Pump C7A-1315010 that generates a coolant flow rate of greater than 116 L/min with a 40 kPa inlet/outlet pressure difference (which is larger than required 85.5 L/min)
- Electric Fan VA113-BBL506P/N-94A from SPAL with a maximum air flow rate of 3700 m<sup>3</sup>/h (which is larger than required 3233 m<sup>3</sup>/h)

RIDE has purposefully designed the cooling system with components that exceed typical requirements to provide the best cooling performance possible for its customers.



**Sample of the Basic Cooling Configuration with Major Cooling Components**

Due to the high energy conversion efficiency of electrical motors in RIDE’s electrical bus, less than 10% of energy is lost due to heat while the coolant operation temperature is maintained between 80°F to 126°F. The driving motor and controllers are the main heat source, and the coolant temperature will never exceed more than 180°F in the worst conditions.

The electric Modine radiator with the cooler fan is easy to clean and release. Two rubber hoses are used as breathers to prevent air recirculation – one is located on the top of the radiator, and another is located on top of the entire cooling system.

The cooling system fan controls the temperatures of the operating fluids and the intake air to determine whether the cooling fan shall be engaged to provide safe operating conditions. The fan control system is designed with a fail-safe mode of “FAN ON.” Coolant is filtered through an inhibitor-free, spin-on replaceable filter, further serviced by two quarter-turn shut-off valves for ease of replacement.

The recommended coolant/antifreeze is Valvoline-Dexcool which is a patented carboxylate formulation with a service life of up to five years or 150,000 miles. It incorporates state-of-the-art organic acid technology in an ethylene glycol base for protection of all cooling system metals including aluminum.

## **BATTERY COOLING**

**RIDE provides 3 levels of ESS thermal protection**, out of an abundance of caution, which are characteristic to all RIDE buses:

### **1. Built-in Battery Thermal Management**

Battery Thermal Management is an integral part of RIDE’s BMS, utilizing the same sensors and battery controllers described in the prior subsection to:

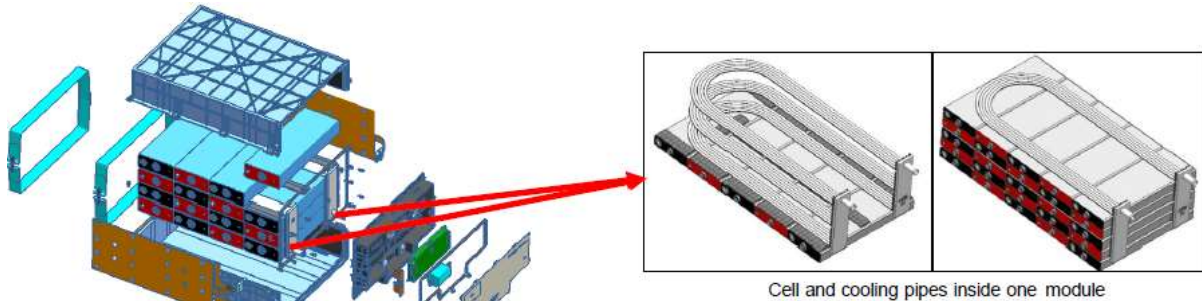
- Monitor battery temperatures
- Provide automatic shutoff of any cells, modules, or packs that exhibit over-temperature conditions.

### **2. Uniquely Compact, Piped-Liquid Temperature Control**

RIDE’s battery module has a piped-liquid cooling-and-heating system with coils built-in to each battery module to:

- Save space
- Save energy by targeting temperature “first aid” to modules of high priority

This system is separate from the piped-liquid cooling system that serves the traction motors and High-Voltage (HV) components in the Rear Electrical/Electronic Compartment.

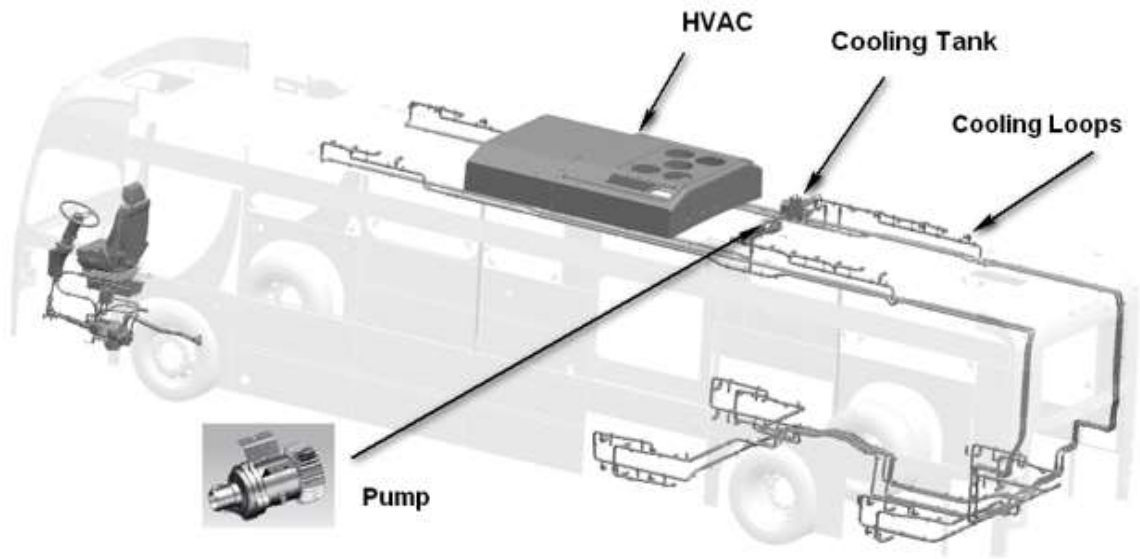


### Cooling System in the Battery Module

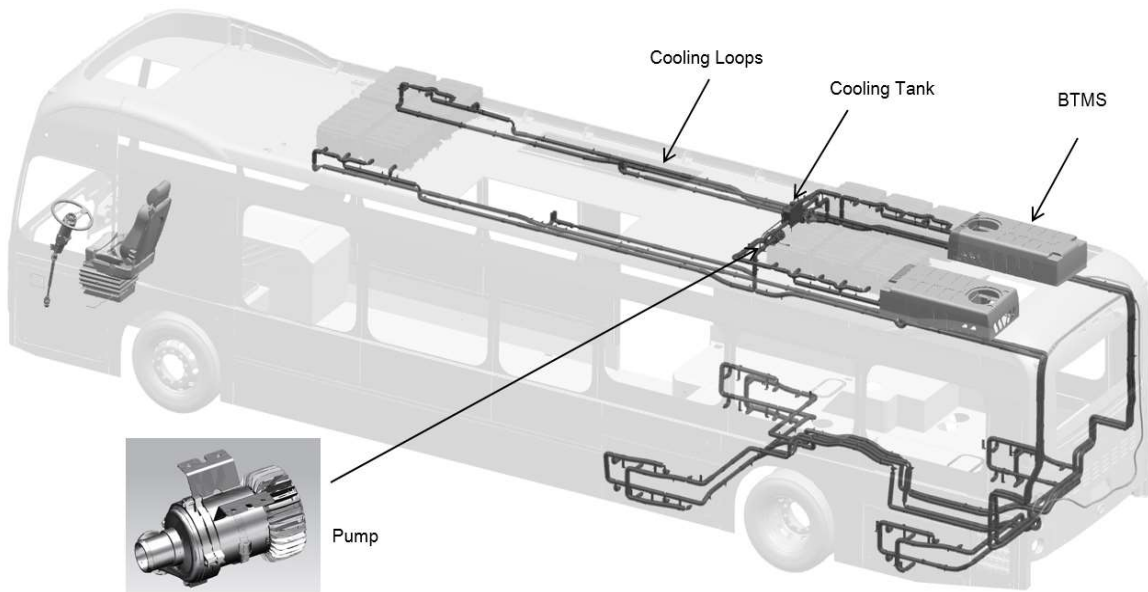
Although it is different from the cooling system serving the Electric Drive and HV components, the cooling system for the HV batteries operates in an essentially similar manner:

- Temperature sensors determine if any modules need temperature change.
- Pumps and tanks connected to aluminum piping in potentially vulnerable locations distribute temperature-modulating fluid to any locations that need it.
- The fluid is a simple blend of water and ethylene glycol.

A key difference is that the ESS cooling system cools or heats as necessary by routing the liquid through the RIDE main passenger HVAC system, past either the heating or cooling element to keep the batteries at optimal operating temperatures. In accordance with safety regulations, venting for the HVAC is not linked to the ESS in any way. The following figure shows two sample layouts. If the agency prefers RIDE HVAC, the battery cooling system will be integrated into the RIDE HVAC. If the agency prefers, RIDE can also provide a separate battery thermal management system (BTMS). On each bus model, the number of sensors, pumps, and tanks, and their locations, are customized to fit the battery pack distribution and capacity.



**RIDE HVAC (Integrated Battery Cooling) in the Bus**



**RIDE BTMS in the Bus**

Specification	HVAC	BTMS
<b>Vendor</b>	RIDE	RIDE
<b>Refrigerant</b>	410a	R134a
<b>Charge Volume</b>	14.33 lbs. (6.5 kg)	1.5 lbs. (700 g)
<b>Input Power DC</b>	400V – 800V DC	400V – 800V DC
<b>Rated Refrigerating Capacity</b>	75,067 BTU (22 kW)	27,297 BTU (8 kW)
<b>Rated Heating Capacity</b>	68,243 BTU (20 kW)	34,121 BTU (10 kW)

**3. Additional Fire Detection-and-Suppression System**

RIDE is proud to work with Amerex to custom-design Amerex Fire Detection and Suppression Systems for each bus model to serve both ESS compartments.

This system is also provided out of abundance of caution since fire risk is inherently low on RIDE buses. RIDE LFP batteries do not catch fire or explode unlike competing batteries, and RIDE buses use no combustion-based or other extreme-heat mechanics.

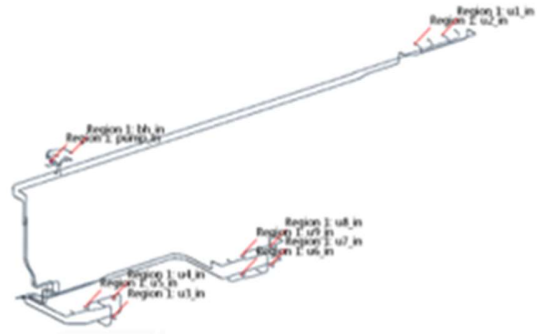
**TESTING AND VALIDATION**

RIDE has designed the battery thermal management system (BTMS) with consideration for fuel economy efficiency, weight distribution, space, and the balance point of heating and rejection. With years of experience and millions of bus operation data, the BTMS provides an intelligent logic to service the battery system.

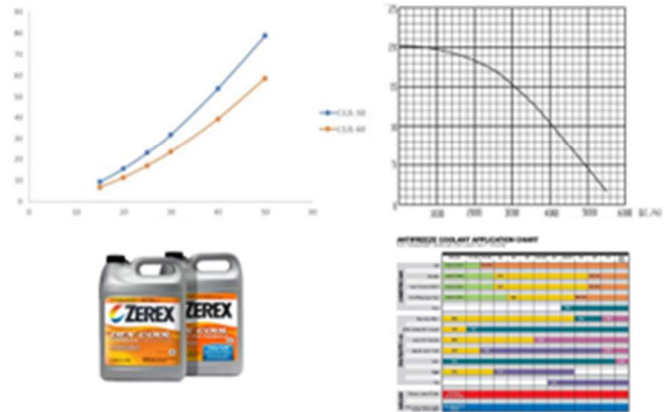
RIDE’s dedicated computer aided engineering simulation (CAE) has provided valuable experience on vehicle structure strength and liquid flow analysis. Simulation is required on each bus platform when the design team has completed the pipe routing system. The system model is created and imported to the simulation software (STAR-CCM+) to analyze the system performance.

**Simulation**

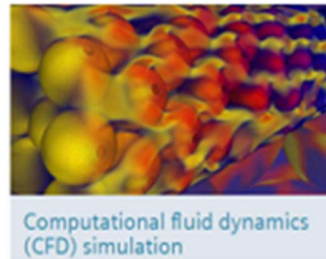
● Build up Critical Liquid System Model



● Determine System Apparatus Specification

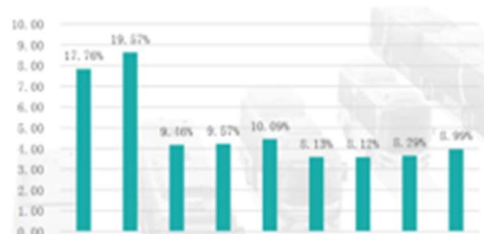


● Import data and Simulation by using STAR-CCM+



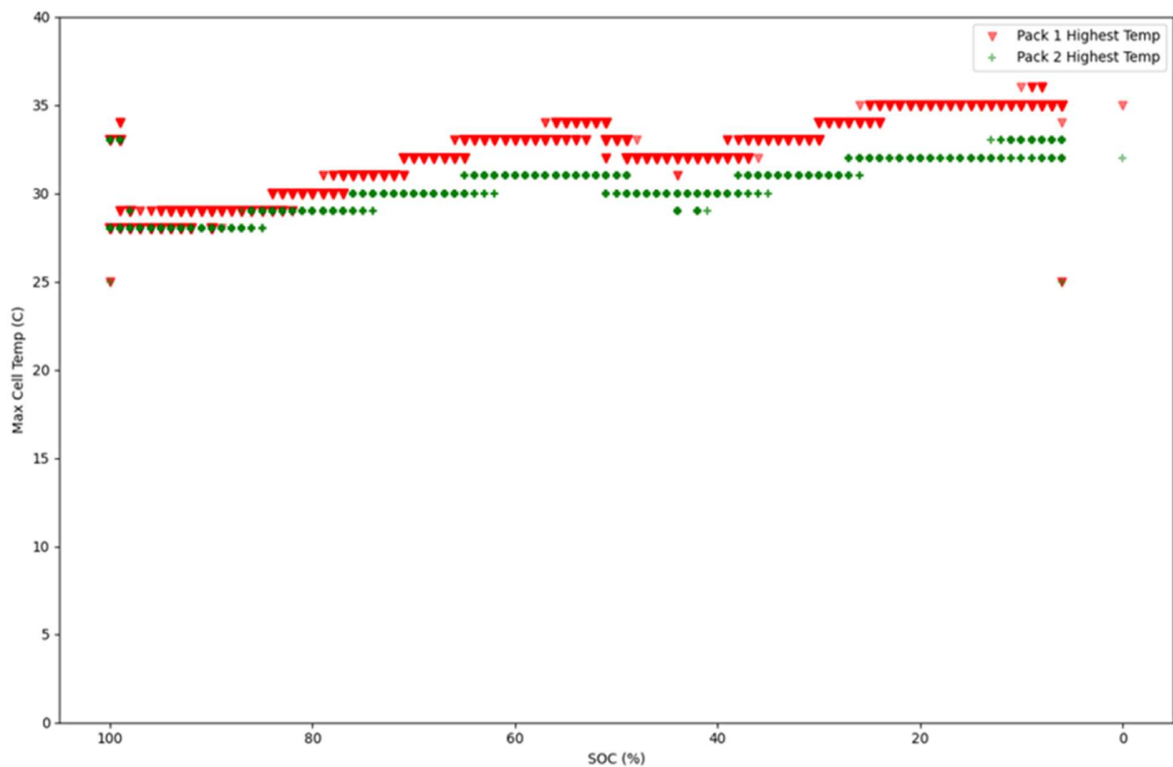
**SIEMENS**

● Value the result and feedback to design



To form a design-in-the-loop, real world data is collected to help validate and optimize the logic. With the efficient system and intelligent logic, the test battery temperatures in the real world can be maintained within

the expected threshold. The battery thermal test data for the RIDE 35-foot bus as performed in the fuel economy efficiency test at the Altoona testing center in Pennsylvania can be seen below.



\* Top Speed takes a 75% of SOC consumption.

Following the Orange County-Manhattan-UDDS-Max Speed, the BTMS can maintain the battery’s highest temp stable and reach a balance point of heating and rejection.

## VEHICLE CHARGING SOLUTIONS

Each of RIDE's buses supports SAE charging standards J1772. In addition, each Bus comes standard with a single manual charging port located at the rear curbside of the Bus that meets the SAE J1772 CCS Type 1 North American standard for plug-in charging. Additional options are available for dual charge ports located on each rear side of the Bus.

RDU can utilize any J1772 CCS Type 1 Connector plug-in charger to charge its vehicles, and RIDE's buses can also support J3105 (overhead pantograph) charging and J2954/2 (wireless inductive charger).



### PLUG-IN CHARGER OPTIONS

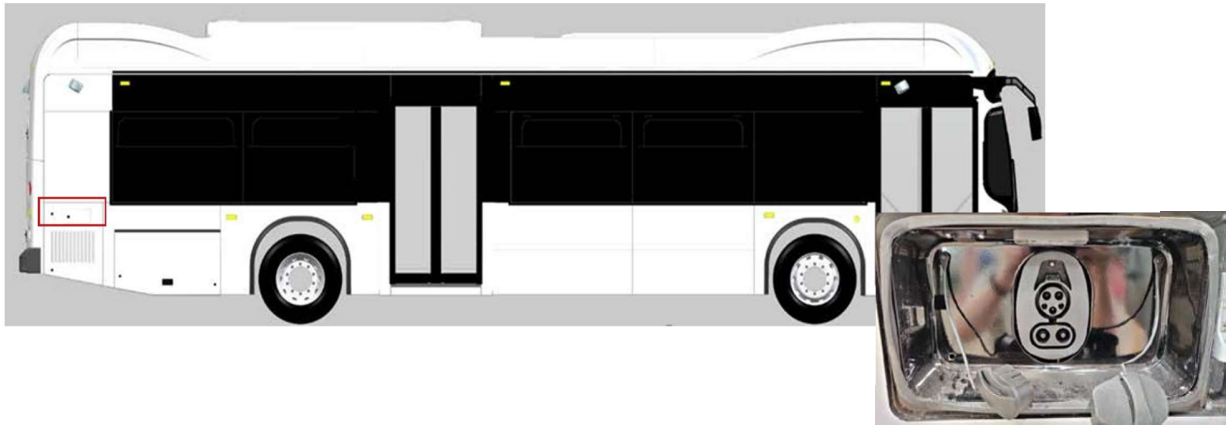
To accommodate the needs of the agency, RIDE offers a DC plug-in charging solution which is fully compatible with SAE J1772 CCS 1 connectors.

DESCRIPTION	DC CHARGER
Manufacturer	J1772 CCS Compatible OEM
Power Type	DC
Connector Type	SAE J1772 CCS 1
Maximum Output Power	150kW
Max Current per Connector	200A
Input Voltage	480VAC
Dimensions	Varies by OEM

### CHARGER LOCATION

RIDE's plug-in standard design for the charging port location is the curbside rear of the Bus. The Figure below shows the location. RIDE can work with each transit agency to locate in a different location if desired.





Note: Once charging has started, the vehicle's built-in safety mechanism will **activate to ensure that the plug-in connector will remain connected to the vehicle** until charging is completed or manually stopped. Furthermore, the propulsion system will be deactivated to keep the vehicle from moving.

## OVERHEAD PANTOGRAPH

Additional vehicle charging can be completed by using an overhead charging system solution utilizing the SAE J3105-1 connections. Roof-mounted overhead conductive charging equipment can be used either as the primary charging or as an opportunity charge during vehicle layover time for additional SOC. Utilizing this system can add up to 75kWh of additional SOC per 10 min. of charge using the maximum 450kW charging power.



## WIRELESS INDUCTIVE CHARGING

RIDE can be equipped with wireless inductive charging solutions from each equipment manufacturer utilizing SAE J2954/2. In-ground wireless inductive charging can be used as an opportunity charge during vehicle layover time for additional SOC. Using this system can add up to 50kWh of additional SOC per 10 min. of charge using the maximum 300kW charging power.

RIDE is fully compliant with SAE J2954/2 wireless inductive charging positions on vehicles. The Figure below provides the approximate location of the on-vehicle charging equipment.



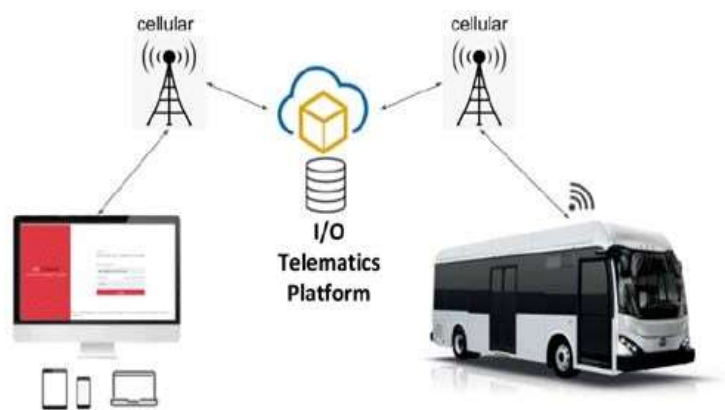
## VEHICLE DATA AND HEALTH MONITORING SYSTEM

RIDE developed its data, health monitoring, and energy management systems, HAMS, and ELMS, with I/O Controls Corporation, a web-/cloud-based solution real-time monitoring of both the driver and vehicle performance on an individual vehicle and fleet-wide basis as well as complete charge management.

### RIDE HAMS

HAMS generates data on each vehicle in the fleet to improve driver safety, driving performance, and overall fuel economy. In all HAMS provide the key features and functionality:

- **Alert:** When the vehicle requires immediate attention, text and email messages are sent. Alerts are vital if a vehicle encounters issues during a charging cycle or revenue service.
- **Manage:** Use cloud-based software to manage, configure and edit the information supplied by the HAMS module.
- **Inquire:** Health status (SOC, mileage, battery voltage, other defined J1939 messages, etc.) is updated once per minute.



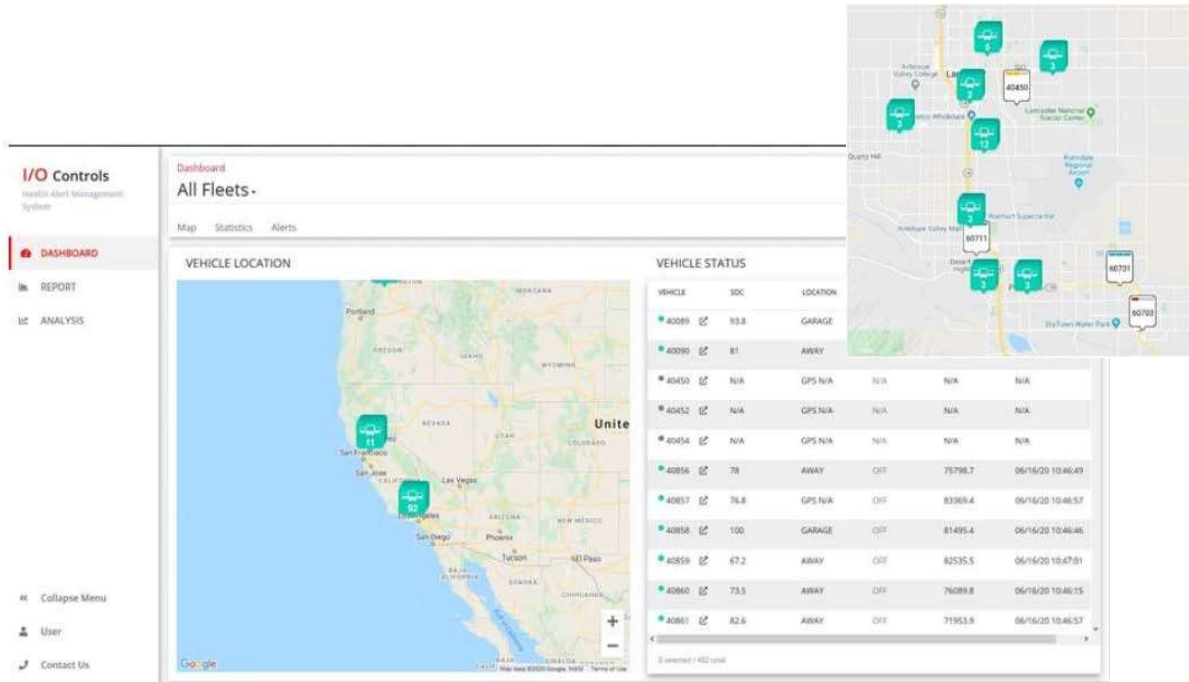
**THE HAMS SOFTWARE IS USEFUL AS A CONTROL CENTER TO MONITOR THE SOC AND GPS LOCATION OF ANY VEHICLE IN THE FLEET, AT ANY TIME DURING CHARGING AND REVENUE SERVICE. EXTERNAL API ACCESS IS SUPPORTED.**

- **Store:** Monitor and log the health status of vital and key subsystems. Data may be uploaded to the cloud for future use.

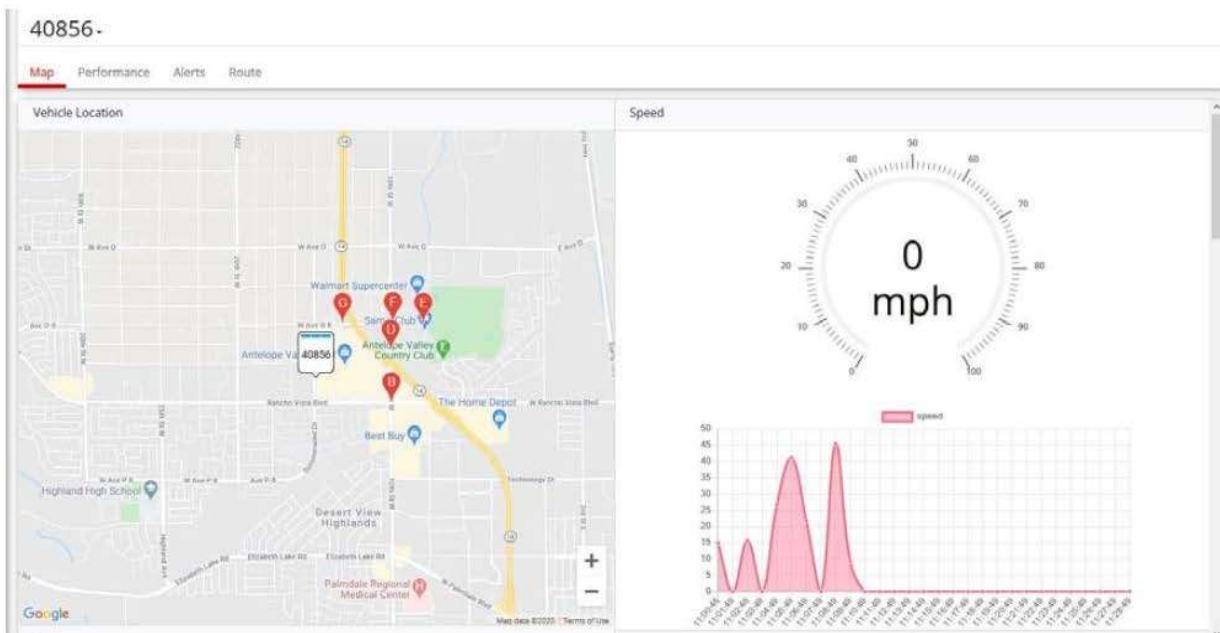
## FLEET DASHBOARD VIEW

HAMS displays an "All Fleet Map" that shows each vehicle status in the fleet that currently includes location, the current state of charge (SOC), current mileage, current charge status, and time of the last update.

**VEHICLE DASHBOARD VIEW**



The individual vehicle dashboard displays real-time for a specific vehicle in the fleet. In addition, it displays the following information: SOC, location, fuel efficiency, and range remaining on a single charge.



Additional information provided within the vehicle dashboard included:

**1. Performance:**

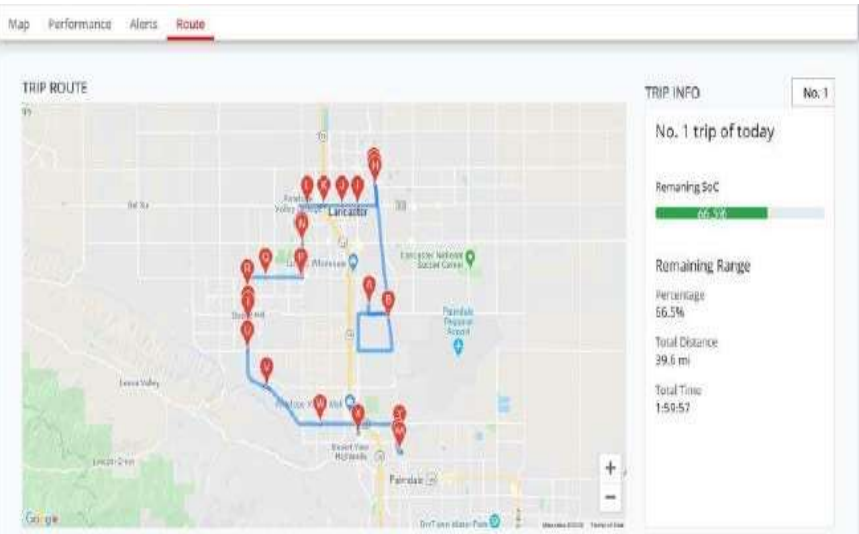
Displays the overall performance of the electrical performance of the vehicle. That includes battery temperature, total energy consumed, and average speed.



**2. Alerts:** Shows all the vehicle alerts. For instance, when the SOC is below 20%, the charging system malfunctions, brake malfunctions, or other critical information on the vehicle.

ALERT TYPE	TOTAL VEHICLE	COUNT	SPN
CHARGING SYSTEM MALFUNCTION	1	7056	6
POWER BATTERY MALFUNCTION	1	196	7
BRAKE MALFUNCTION	1	196	8

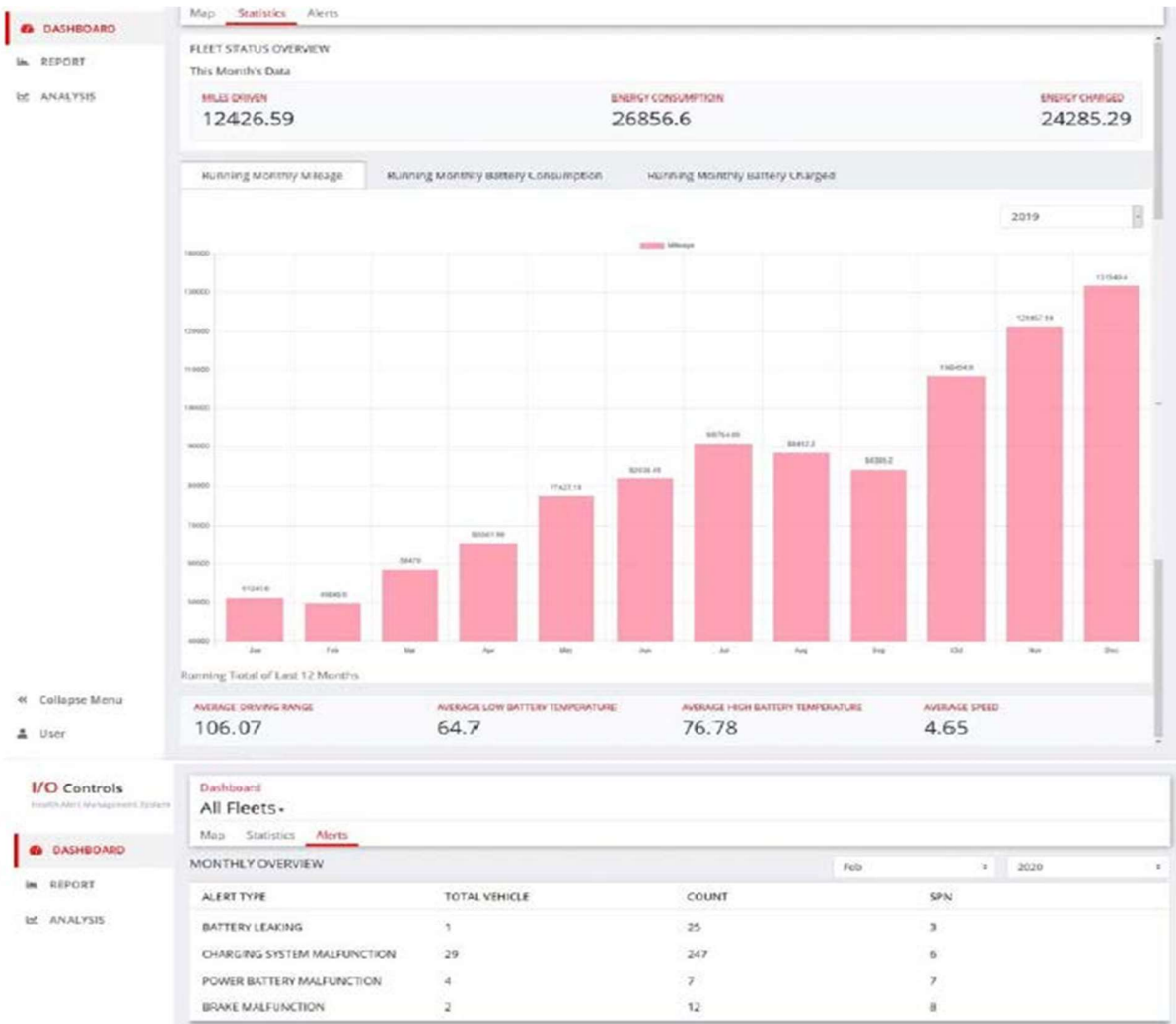
**3. Route:** Shows the route of the current vehicle, including remaining SOC, total distance traveled, and total time on the route.



**FLEET ANALYSIS**

The HAMS also provides historical data from the entire fleet to the individual vehicle in graphic printout over time. The fleet analysis displays show running yearly, monthly, or daily mileage, battery consumption, and battery charge. Also, agencies can view all fleet alerts by clicking on the alerts tab.

This information can be filtered by a given year and month to show historical records of the fleet's performance.



## REPORTS

HAMS generates reports to show data for all, some, or one vehicle graphically to show the overall vehicle performance for the day, week, month, or year. The agency can select the following parameters for its reports:

- Energy Charged
- Energy Used in Service
- Energy Used in Idle
- Energy Regeneration
- SOC Charged

- **SOC Used in Service**
- **SOC Used in Idle**
- **Miles Driven**
- **Remaining Range**
- **Average Speed**
- **Average Speed in Service**

The information presented in the report can be emailed or downloaded directly for full analysis.



## ELECTRIC BUS OPERATING RANGE

Based on RFP and Addendum feedback, RIDE would like to provide Altoona On-Road Energy Consumption, and Range Tests for reference.

Below is the data:

The fuel economy data are obtained at the following conditions.

- Air conditioning off
- Seated load weight during coast down
- Exterior and interior lights on
- Defroster off
- Windows and Doors closed



Energy Economy Summary Sheet					
Bus Manufacture	BYD				
Bus Model	Electric				
Bus Number	1605				
Test Date	10/18/2016				
Fuel Type	Electric				
On-Road (CCW)					
Cycle	Average Phase Energy Used [kWh]	Phase Distance [Miles]	Total Distance Traveled [Miles]	Fuel Economy [kWh/Mile]	Fuel Economy [MPG] Diesel Equivalent <sup>4</sup>
CBD	2.25	1.91	45.84	1.18	31.96
ART	3.52	1.91	30.56	1.84	20.45
COM	4.38	3.82	30.56	1.15	32.80
Summary					
				Fuel Economy [kWh/Mile]	Fuel Economy [MPG] Diesel Equivalent <sup>4</sup>
Average CBD Phase Consumption				1.18	31.96
Average Arterial Phase Consumption				1.84	20.45
Average Commuter Phase Consumption				1.15	32.80
Overall Average Consumption				1.36	27.71
Fuel Economy [MPG] Diesel Equivalent <sup>4</sup> : EPA EV Mode Fuel Economy Fuel Economy Labeling of Advanced Technologies (neglecting 5-cycle corrections)					
$FE_{MPGe} = (E_D \times 100) / FC_{EV}$					
where:					
$FE_{MPGe}$ = Fuel Economy in miles per gallon diesel equivalent					
$FC_{EV}$ = Measured unadjusted electrical consumption [kWh/100Mile]					
$E_D$ = Energy content per gallon of diesel = 128,450 BTU/gallon = 37.64 kWh/gallon					
[US DoE, Alternative Fuels & Advanced Vehicles Data Center]					
Total Energy Use Run # 1/2 [kWh] <sup>5</sup> : Total energy used during phases used for fuel economy calculation					

As a baseline, we used the Average Fuel Economy results from the Altoona Bus report of 1.988 kWh/ mile, shown in figure above. All results demonstrated are only a simulation, real range is only determined after the vehicle has been in RFP required revenue service.

## ABBREVIATIONS AND TERMINOLOGY

**BOL** Battery Capacity at beginning of vehicle life, 100% maximum usable energy

**kWh** Kilowatt hours

- mi** Miles
- MPGe** Electric equivalent to diesel miles per gallon
- SLW** Seated Load Weight, based on 150 lbs. Per passenger

## RESULTS

The results of our simulation are based on the following conditions:

- 1. BOL:** The BOL Usable Battery Capacity is 213kWh, which is 90% of the Total Battery Capacity
- 2. SLW:** The SLW is 22 passengers in addition to vehicle weight for our 30-ft Battery-Electric Bus
- 3. Ambient Temperatures:** The average temperature is 62.5°F.

### Single Depot Charger

DUTY CYCLE	ENERGY CONSUMPTION (KWH/MILE)	100% BATTERY CAPACITY BOL RANGE
Average Altoona Cycle	1.36	158 miles

As operating range will vary depending on terrain, traffic conditions, weather, idle time, driver behavior, bus final configuration, and other factors, RIDE would like to clarify that the operating range is an expected range goal and not a guaranteed minimum range.

## **DELIVERY SCHEDULE**

In the following pages you will find the standard delivery details for vehicles provided.



Real Innovation Delivered with Excellence™

### RIDE K7M 4X BEB Delivery Schedule

WBS	Task Name	Duration in Workdays	Planned Start	Planned Finish	Dpeartment
<b>1</b>	<b>Design Phase</b>	<b>56 days</b>	<b>8/1/2024</b>	<b>10/18/2024</b>	<b>Design</b>
1.1	PO Signed (Milestone)	0 days	8/1/2024	8/1/2024	Commercial
1.2	V1 Technical Document (Specs Sheet)	8 days	8/1/2024	8/12/2024	Design
1.3	Pre-Production Meeting	7 days	8/13/2024	8/21/2024	PM
1.4	V2 Technical Document (Specs Sheet)	8 days	8/22/2024	9/3/2024	Design
1.5	Technical Document (Specs Sheet) Signoff	5 days	9/4/2024	9/10/2024	PM
1.6	Technical Document (Specs Sheet) Input	5 days	9/11/2024	9/17/2024	Design
1.7	Design Start (Milestone)	0 days	9/17/2024	9/17/2024	Design
1.8	R&D Takt Time	5 days	9/18/2024	9/24/2024	Design
1.9	Tube List	5 days	9/25/2024	10/1/2024	Deisgn
1.1	Long Lead-Time Bill of Materials	6 days	9/25/2024	10/2/2024	Design
1.1	Design Frozen	7 days	10/3/2024	10/11/2024	Design
1.1	Complete Bill of Materials	5 days	10/14/2024	10/18/2024	Design
<b>2</b>	<b>Procurement Phase</b>	<b>66 days</b>	<b>9/30/2024</b>	<b>1/6/2025</b>	<b>Supply Chain</b>
2.1	Sourcing	10 days	9/30/2024	10/11/2024	Sourcing
2.2	Procure Frame Materials	43 days	10/14/2024	12/13/2024	Procurement
2.3	Procure Welding Materials	33 days	10/21/2024	12/6/2024	Procurement
2.4	Procure Chassis Materials	63 days	10/3/2024	1/6/2025	Procurement
2.5	Procure Assembly Materials	43 days	10/23/2024	12/24/2024	Procurement
<b>3</b>	<b>Vendors Production Phase</b>	<b>43 days</b>	<b>12/9/2024</b>	<b>2/10/2025</b>	<b>Supply Chain</b>
3.1	Design Validation	5 days	12/9/2024	12/13/2024	Design
3.2	Welding & Frame Materials in Stock	21 days	12/16/2024	1/16/2025	Procurement
3.3	Chassis Materials in Stock	25 days	1/7/2025	2/10/2025	Procurement
3.4	Assembly Materials in Stock	15 days	12/27/2024	1/17/2025	Procurement
<b>4</b>	<b>Vendors Shipping Phase</b>	<b>53 days</b>	<b>1/17/2025</b>	<b>4/2/2025</b>	<b>Supply Chain</b>
4.1	Welding & Frame Materials Packed and Picked Up	10 days	1/17/2025	1/30/2025	Material Control
4.2	Welding & Frame Materials Freight Shipping	21 days	1/31/2025	3/3/2025	Material Control
4.3	Welding & Frame Materials to Lancaster	5 days	3/4/2025	3/10/2025	Logistics
4.4	Chassis Materials Packed and Picked Up	10 days	2/11/2025	2/25/2025	Material Control
4.5	Chassis Materials Freight Shipping	21 days	2/26/2025	3/26/2025	Material Control
4.6	Chassis Materials to Lancaster	5 days	3/27/2025	4/2/2025	Logistics
4.7	Assembly Materials Packed and Picked Up	10 days	1/20/2025	1/31/2025	Material Control
4.8	Assembly Materials Freight Shipping	21 days	2/3/2025	3/4/2025	Material Control
4.9	Assembly Materials to Lancaster	5 days	3/5/2025	3/11/2025	Logistics
<b>5</b>	<b>Production Phase</b>	<b>153 days</b>	<b>3/11/2025</b>	<b>10/13/2025</b>	<b>Planning</b>
5.1	IQC	6 days	3/11/2025	3/18/2025	Quality
5.2	Welding Station	31 days	3/19/2025	4/30/2025	Planning
5.3	Paint Station	19 days	5/1/2025	5/28/2025	Planning
5.4	Chassis Station	31 days	5/29/2025	7/10/2025	Planning
5.5	Assembly Station	33 days	7/11/2025	8/26/2025	Planning
5.6	Test Line Station	33 days	8/27/2025	10/13/2025	Planning
5.7	Production Complete (Milestone)	0 days	10/13/2025	10/13/2025	Quality

## **WARRANTY**

In the following pages you will find our standard warranty.



## RIDE BATTERY ELECTRIC VEHICLE LIMITED WARRANTY

### *1. Beneficiary of the Warranty; Subject of Warranty; Spatial Area of Coverage of the Warranty*

RIDE Mobility LLC ("RIDE") provides the following exclusive limited product warranty for each Subject of the Warranty sold to a Customer within the Spatial Area of Coverage (this "Warranty").

"Subject of the Warranty" means the RIDE electric buses sold pursuant to the purchase and sale agreement that this Warranty is attached to.

"Customer" means the natural person or legal entity which acquires the Subject of the Warranty for the purpose of reasonable vehicular transportation uses.

"Spatial Area of Coverage" means the United States of America.

### *2. Term of the Warranty*

The term of this Warranty for the Subject of the Warranty which RIDE provides to the Customer is stated in the chart titled "Warranty Period" as attached in Schedule 1 (hereinafter (the "Term of Product Warranty") and begins: on the date the Subject of the Warranty is delivered (the "Commencement Date"). RIDE shall have no obligation to provide warranty service for the Subject of the Warranty after the end of the Term of the Product Warranty. For the avoidance of doubt, if Schedule 1 contains multiple warranty subcategories, then RIDE shall have no obligation to provide warranty service for any subcategory after the end of that subcategory's stipulated warranty term.

### *3. Exclusion of Warranty*

RIDE's warranty shall not cover defects or non-conformities in the Subject of the Warranty which are caused by normal wear and tear, inadequate maintenance, transportation, improper installation or storage or repair (not done by RIDE), misuse, neglect, accident or abuse, modification to the Subject of the Warranty by a third party other than RIDE or RIDE's agent approved by RIDE, failure to observe the maintenance or operating instructions provided by RIDE. The warranty shall not apply to defects caused by external influences including unusual physical or electrical stress (power failure surges, lightning, flood, fire, accidental breakage), which are not the responsibility of RIDE. No warranty shall apply to any damages caused by goods to which the Subject of the Warranty is incorporated or installed into, or used together with, including any parts thereof. RIDE will not honor the warranty for any Subject of Warranty: (i) that have defaced or altered VIN or odometer; (ii) that do not have clean title or designated, labeled or branded as dismantled, fire-damaged, flood-damaged, junk, rebuilt, salvage, reconstructed, irreparable or total loss; (iii) that have been determined to be a total loss by an insurance company; or, (iv) that have been operated outside of the Spatial Area of Coverage.

RIDE shall not be liable for any inability to performance hereunder which is due to causes beyond its control, including, without limitation, strike, lockout, riot, war, crime, scarcity, fire, plague, act of God, extreme weather, natural disaster, change in law or regulation, or any governmental action or inaction.

The Subject of Warranty's battery, like all lithium-ion batteries, will experience gradual energy and power loss with time and use. The loss of battery energy or power over time or due to or resulting from battery usage is normal and natural. Subject of Warranty's driving range is an estimation only and subject to variation and change due to a variety of factors such as age, battery condition, terrain, temperature, weather, proper maintenance, driver habit, manner use, and other factors -- driving range is in no way guaranteed.

The Subject of Warranty is made from metal, and as such it may experience rust or corrosion over time arising from extreme or unexpected environmental conditions such as submersion in salt water or exposure to corrosive chemicals.



The performance of necessary repairs and parts replacement by RIDE is the exclusive remedy under this warranty. RIDE does not authorize any person or entity to create for it any other obligation or liability in connection with this warranty. The decision of whether to repair or replace a part or to use a new, reconditioned, or remanufactured part will be made by RIDE in its sole discretion.

EXCEPT AS HEREIN EXPRESSLY STATED, THERE ARE NO WARRANTIES OR CONDITIONS, EXPRESS OR IMPLIED, BY OPERATION OF LAW OR OTHERWISE, FOR ANY SUBJECT OF THE WARRANTY THEREOF FURNISHED HEREUNDER. THE PARTIES AGREE THAT THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE AND ALL OTHER WARRANTIES AND/OR GUARANTEES, EXPRESS OR IMPLIED, ARE EXCLUDED FROM THIS TRANSACTION AND SHALL NOT APPLY FOR THE SUBJECT OF THE WARRANTY.

IN NO EVENT SHALL RIDE BE LIABLE FOR ANY SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES OF ANY NATURE WHATSOEVER FOR ANY REASON (INCLUDING, WITHOUT LIMITATION, LOST PROFITS, LOSS OF USE, LOSS OF EQUIPMENT OR LOSS OF REVENUES) REGARDLESS OF THE LEGAL THEORY ON WHICH ANY SUCH CLAIM MAY BE MADE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

IN NO EVENT AND UNDER NO LEGAL THEORY, WHETHER IN TORT (INCLUDING NEGLIGENCE), CONTRACT, OR OTHERWISE, UNLESS REQUIRED BY APPLICABLE LAW (SUCH AS DELIBERATE AND GROSSLY NEGLIGENT ACTS) OR AGREED TO IN WRITING, SHALL RIDE'S MAXIMUM LIABILITY UNDER THIS WARRANTY EXCEED THE SUBJECT OF WARRANTY'S PAID-UP PURCHASE PRICE AS NORMALLY AND NATURALLY DEPRECIATED OVER TIME.

#### *4. Assertion of Warranty Claims*

RIDE appoints the Customers' place of purchase as service center for receiving and processing warranty claims. Upon discovering a potential warranty claim regarding the Subject of the Warranty, the Customer must immediately submit the prospective claim in writing along with the original purchase agreement and invoice. Customer's claims regarding the warranty hereunder shall be made within 30 days after Customer detects that the Subject of the Warranty has developed potential warranty issues.

Some jurisdictions or local governments may require that tax be collected on warranty reports. Where applicable law allows, Customer is solely responsible for the payment of these taxes.

The Customer must allow RIDE a reasonable time for completion of warranty repair or service. Upon notification by RIDE of the completion of the repair or service, the Customer must immediately pick up the Subject of Warranty at the Customer's own expense, or reasonable daily storage fees will be assessed.

#### *5. Governing Law and Dispute Resolution*

This Warranty and any disputes arising from or relating to the same shall be governed exclusively by the governing law and dispute resolution provisions stipulated in the purchase and sale agreement this warranty is attached to.










Schedule 1 – Warranty Period

<b>STANDARD LIMITED WARRANTY</b>				
This warranty covers 100% of the material (with exception to vulnerable consumable parts, friction material), workmanship and any associated freight costs during the warranty time period identified below.				
No.	Major Component & Subsystem	Description (what is covered)	Warranty Period (which occurs first)	
			Years	Miles
1	<u>Complete Bus</u>	All parts with exception to components or subsystems noted below.	2	100,000
2	<u>Basic Bus Structure</u>	Body, and body structure shall consist of the components that are mechanically fastened or adhesively bonded or glued as part of the structure.	3	150,000
3	<u>Exterior Paint</u>	Requires supporting documentation of PM records.	3	150,000
4	<u>Chassis Structure (Integrity)</u>	Consists of all components that are welded together to form the main frame (skeleton) and body construction. The structural integrity guarantee covers against a significant loss of structural integrity of the assembly or its functional performance due to non corrosion related failures.	12	500,000
5	<u>Chassis Structure (Corrosion)</u>	Consists of all components that are welded together to form the main frame (skeleton) and body construction. The corrosion guarantee covers against a significant loss of structural integrity of the assembly or its functional performance, resulting from a pertinent loss of cross-section due to corrosion caused by normal environmental elements but excludes corrosion caused by aggressive road de-icers such as Magnesium Chloride or equivalents, unless RIDE approved preventative measures are taken.	12	500,000
6	<u>Propulsion System/Drive Axle</u>	Traction Motor/s, Hub Reduction Gear Assembly, Gearbox, Gearbox Housing Assembly Requires supporting documentation of PM records.	5	250,000
7	<u>High-Voltage Energy Storage System</u>	Remaining Rate of usable capacity is no less than 70% of initial usable capacity. There is no limitation on gross discharging kWh throughout warranty period.	12	Unlimited
8	<u>High-Voltage Components &amp; Control System</u>	Drive motor controller, Bidirectional inverter charge-discharge motor controller, DC and auxiliary motor controller assembly, Service plug assembly, High-voltage distribution box, High-voltage harness, 3-phase cable junction box.	5	250,000
9	<u>Low-Voltage Control System</u>	Vehicle control unit, Rear auxiliary controller.	5	250,000
10	<u>Non-Drive Axles</u>	Requires supporting documentation of PM records.	3	150,000
11	<u>Defroster System BYD</u>	Defroster, PTC driver, Defroster controller.	3	150,000
12	<u>Air Conditioning System SongZ</u>	Requires supporting documentation of PM records.	5	100,000
13	<u>Door System Vapor</u>	Excluding maintenance items & items that are not covered by the OEM's warranty.	2	Unlimited
14	<u>Wheel Chair Lift &amp; Ramp System Ricon</u>	Lift and/or ramp parts and mechanical only.	2	Unlimited
15	<u>Brake System</u>	Friction Material Excluded.	2	100,000
16	<u>Flooring</u>	The wear layer floor coverings shall be free from defects in material.	10	Unlimited
17	<u>Air Compressor</u>	Requires supporting documentation of PM records.	2	100,000
18	<u>Destination Sign (I/O Controls Dinex)</u>	Requires supporting documentation of PM records.	5	Unlimited
19	<u>Tire</u>	Requires wheel alignment records. Warranty does not apply to normal wear and tear or deterioration.	2	24,000

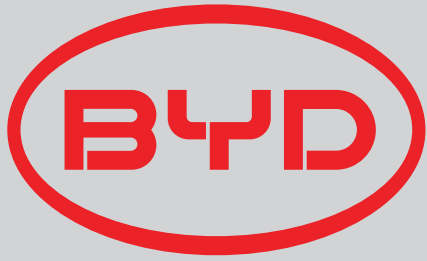
All maintenance records should be retained by the owner/operator as specified by Ride preventive maintenance manual.

## DIAGNOSTIC TOOLS

SAP No.	English Description	Qty.	Picture	Function	Remark
10782795-00	CAN Box	1		To connect computer and bus when use monitoring software to diagnose vehicle	Buy from BYD
10986210-00	VDCI_Data Logger	1		Use to store CAN message for about one week, useful for accidental failure	Buy from BYD
12341589-00	Vehicle Diagnosis System_VDS2100-CE-S+	1		Use to diagnose bus through OBD port.	Buy from BYD
13774334-00	Diagnostic Tool kit for Amerex system	1		To do maintenance test with Amerex system	Buy from BYD or Amerex
RD-0000287	DIAGNOSTIC LAPTOP (INCLUDING SOFTWARE & TRAINING HOUR)	1		To monitor the status of the battery, motor, controller and air compressor	Buy from BYD

## **TRAINING**

In the following pages you will find our standard training.



# COACH AND TRANSIT BUS

## TRAINING PROGRAM



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# TRAINING INTRODUCTION

## Training Mission

At RIDE we know it's human nature to be apprehensive of change. Effective adoption of new technologies depends on getting users comfortable with new systems.

Success as a manufacturer, success of electric buses and ultimately the success of green transit and related careers, depends on our customers and especially our customers' staff –*your staff* – becoming comfortable with these systems.

It's our mission to get you excited about RIDE battery electric buses and their benefits — benefits that you can bring to your community.

We can help to upgrade career skills by positioning your staff at the forefront of the 21<sup>st</sup> century global environmental and technological revolution.

## Training Objective

This training program is designed to ensure that maintenance staff can safely and effectively maintain, troubleshoot, and respond to issues with RIDE electric buses. It provides a structured and comprehensive approach to building the skills and knowledge required for successful electric bus maintenance.



## Training Program Foundation

- **Expert trainers:** Our trainers know *how to do*, *how to listen*, and *how to teach*. They have extensive knowledge and experience such as:
  - Electric bus technicians**, who know our buses and systems and can answer questions that might come up during training.
  - Traditional heavy vehicle technicians and/or operators**, who grew up on the systems your staff is accustomed to and understand their questions.
  - Transportation-specific trainers**, skilled in combining lectures, visuals, question- and-answer sessions, and hands-on work to maximize learning.
- **Classes taught when you choose:** Training can be held on site at one or more of your facilities (or any location you provide). RIDE will work with you to schedule your training request. Training takes place during regular daytime business hours, but RIDE is flexible towards any special requests.

Scheduling and site arrangements will be finalized between you and our training staff during pre-production. Training typically commences upon delivery of the pilot bus, as some sessions require a RIDE bus to be available at the training site.

- **Small class sizes:** We suggest limiting training classes to fewer than 10 students. Although this may increase the number of sessions to accommodate all your staff, RIDE is committed to providing hands-on experience and ample time to ask questions.
- **Certification:** The Bus Training Program offers a comprehensive learning experience for technicians covering a wide range of topics related to RIDE bus maintenance and repair. With the **Bronze**, **Silver**, and **Gold** certification levels, technicians can progress from beginner to expert, acquiring the necessary knowledge and capabilities to effectively service and maintain RIDE buses. These courses are intended to complement traditional automotive technical education; 14 modules cover the entire course.





# PROGRAM ADMINISTRATION

**Scheduling and site arrangements** for training will be finalized between you and our Training Manager. This program will cover training for your maintenance and operations departments.

### Provided by RIDE:

- Final training plan, including list of deliverables and required resources, for your review prior to training.
- Trainer(s) and instruction materials (electronic version) for each session.
- An attendance sheet, at the conclusion of each session.
- Copies of all documentation (test scores, written and practical) for each trainee, upon completion of each session.

## Required Resources

The following resources, sufficient for up to 10 students, are required at a location that can accommodate:

### Provided by You:

- Classroom, desk, and chairs
- Space sufficient for a bus
- Whiteboard
- Projector / Screen or
- Large TV / Monitor
- Standard service tools
- Bus

## COURSE OUTLINES

The following outlines our standard curriculum for operators and service technicians.

**OEM training** will be coordinated by our Training Department and include all relevant courses.

**Vendor accessory training** will be performed by the vendors themselves. RIDE can help coordinate technical training requests.



## TRAINING LEVELS

The RIDE Electric Bus Technician Training Course is a comprehensive program designed to train technicians in the maintenance and repair of RIDE buses. This course is intended to complement traditional automotive technical education and help inform technicians who will work on these new vehicles. The course is divided into three certification levels: **Bronze**, **Silver**, and **Gold**. 14 modules cover the entire course.

This document presents an overview of the objectives and capabilities obtained from each module, highlighting the progression from beginner to expert levels.

### Bronze Level

(Modules 1-4): Serves as the beginner certification level. These modules are prerequisites for the silver level.

#### Completion of Bronze level training will allow a technician to:

1. Understand the features and functions of a RIDE electric bus.
2. System overview – system layout, system operation, key components layout.
3. Learn the standard of personal protective equipment (PPE) required to work on a RIDE electric bus.
4. Safely Lockout/Tagout the bus high-voltage system.
5. Perform preventative maintenance.
6. Understand specific towing requirements and procedures for RIDE electric buses.

### Silver Level

(Modules 4-13): To qualify for the Silver Level, technicians must complete the bronze level modules.

#### Completion of Silver Level training will allow a technician to:

1. Explain the principles of the RIDE bus low voltage electrical system.
2. Explain the various levels of electric vehicle charging.
3. Explain the working principles of the air conditioning cooling and heating modes.
4. Analyze various HVAC and high-voltage defroster failures.
5. Describe the working principles of the RIDE air brake and suspension system.
6. Understand the operation of the RIDE bus steering system.

## Gold Level

Modules (Module 14): To qualify for the Gold Level, technicians must complete the bronze and silver level modules.

### Completion of Gold level training will allow a technician to:

1. Explain how to connect diagnostic laptop or tablet to the vehicle.
2. Provide basic diagnosis information.

## TECHNICIAN TRAINING

### Bronze Level

#### Module 1: Introduction to RIDE Electric Bus

This module is designed to offer an introduction to technicians who will service a RIDE electric bus.

- **Audience:** All technicians
- **Performed by:** RIDE Trainer
- **Numbers of Trainees:** Up to 10
- **Duration:** Classroom: 2 hours / Bus 2 hours
- **Training Location:** Classroom and Bus
- **Objectives:**
  1. Technicians will learn features and controls of operation for the RIDE school bus.
  2. Learn how to perform a “Pre-Drive Walkaround” Inspection.
  3. Learn how to turn “ON” and “OFF” the vehicle and apply recommended Safe Driving Techniques.
  4. Become familiar with how to handle an emergency, recommended best practices.



### Module 2: High-Voltage Safety & Lockout / Tagout

This module is designed to familiarize technicians with high-voltage components and how to safely lockout, service, identify HV components.

- **Audience:** All technicians
- **Performed by:** RIDE Trainer
- **Numbers of Trainees:** Up to 10
- **Duration:** Classroom 2 hours / Bus 1 hour
- **Training Location:** Classroom / Bus
- **Objectives:**
  1. Technicians will learn what high-voltage AC and DC current is and associated risks.
  2. Learn about the RIDE LiFePO<sub>4</sub> high-voltage battery system.
  3. Identify high-voltage components and their location on the vehicle.
  4. Become familiar with required personal protective equipment (PPE) when servicing high-voltage systems.
  5. Technicians will learn the Lock/Out Tag/Out, LOTO procedure for safely de-energizing the bus for general maintenance and high voltage service.

### Module 3: Towing

This module is designed to equip individuals with the knowledge and skills required to tow RIDE electric buses safely and effectively.

- **Audience:** All technicians
- **Performed by:** RIDE Trainer
- **Numbers of Trainees:** Up to 10
- **Duration:** Classroom 1 hour / Bus 1 hour
- **Training Location:** Classroom / Bus
- **Objectives:**
  1. Identify RIDE vehicles for towing.
  2. Learn the RIDE vehicle specifications as it relates to towing.
  3. Learn proper methods for securing a vehicle.
  4. Review all towing methods.
  5. Learn additional related vehicle and towing information.



## Module 4: Preventive Maintenance

This module is designed to familiarize technicians with recommended preventive maintenance on a RIDE bus.

- **Audience:** All technicians
- **Performed by:** RIDE Trainer
- **Numbers of Trainees:** Up to 10
- **Duration:** Classroom 2 hours / Bus 2 hours
- **Training Location:** Classroom / Bus
- **Objectives:**
  1. Identify systems that require regular maintenance.
  2. Learn the RIDE Maintenance Schedule.
  3. Learn technical information about RIDE vehicle components.
  4. Learn oil and fluid specifications for systems requiring regular maintenance.
  5. Learn torque specifications where applicable.

## Silver Level

### Module 5: Low Voltage Electrical System

This module is designed to familiarize technicians with the low voltage electrical system on a RIDE bus.

- **Audience:** All technicians
- **Performed by:** RIDE Trainer
- **Numbers of Trainees:** Up to 10
- **Duration:** Classroom 2 hours / Bus 2 hours
- **Training Location:** Classroom / Bus
- **Objectives:**
  1. Discuss low voltage basics.
  2. Provide an understanding of RIDE wiring diagrams.
  3. Show the locations of various low voltage components.
  4. Provide an overview of the Dinex I/O system.



### Module 6: High-Voltage Charging

This module is designed to introduce technicians to the levels, operations, and methods of high-voltage charging.

- **Audience:** All technicians
- **Performed by:** RIDE Trainer
- **Numbers of Trainees:** Up to 10
- **Duration:** Classroom 1 hour / Bus 2 hours
- **Training Location:** Classroom / Charging Station
- **Objectives:**
  1. Familiarize technicians with the basics of high-voltage charging.
  2. Introduce charging levels.
  3. Identify charger plug types.
  4. Illustrate the differences between AC and DC charging.

### Module 7: HVAC & High-Voltage Defroster

This module is designed to provide an overview of the HVAC system and high-voltage defroster on a RIDE bus.

- **Audience:** All technicians
- **Performed by:** RIDE Trainer
- **Numbers of Trainees:** Up to 10
- **Duration:** Classroom 2 hours / Bus 2 hours
- **Training Location:** Classroom / Bus
- **Objectives:**
  1. Explain the working principles of the air conditioning cooling and heating modes.
  2. Describe the function of the high-voltage defroster and electric heater.
  3. Identify HVAC system electrical connector pins and functions.
  4. Provide basic disassembly and assembly procedures for the PTC driver, electric heater, and radiators.
  5. Analyze various HVAC and high-voltage defroster failures.



### Module 8: Air Brakes & Suspension

This module is designed to familiarize technicians with the air operated system components and how they operate.

- **Audience:** All technicians
- **Performed by:** RIDE Trainer
- **Numbers of Trainees:** Up to 10
- **Duration:** Classroom 2 hours / Bus 2 hours
- **Training Location:** Classroom / Bus
- **Objectives:**
  1. Provide an overview of the air suspension and brake system.
  2. Describe the working principles.
  3. Familiarize technicians with air brake components and their locations.
  4. Analyze various system and components failures.

### Module 9: Steering System

This module is designed to familiarize technicians with the steering system on a RIDE bus.

- **Audience:** All technicians
- **Performed by:** RIDE Trainer
- **Numbers of Trainees:** Up to 10
- **Duration:** Classroom 1 hour / Bus 1 hour
- **Training Location:** Classroom / Bus
- **Objectives:**
  1. Provide an overview of the RIDE bus steering system.
  2. Illustrate the components of the steering system.
  3. Describe the working principles.
  4. Identify steering system electrical connector pins and functions.
  5. Analyze of various steering system failures.



### Module 10: Chassis & Power Battery Cooling Systems

This module is designed to familiarize technicians with components on the bus and how they operate.

- **Audience:** All technicians
- **Performed by:** RIDE Trainer
- **Numbers of Trainees:** Up to 10
- **Duration:** Classroom 2 hours / Bus 1 hour
- **Training Location:** Classroom / Bus
- **Objectives:**
  1. Understand the cooling systems for the high-voltage power battery and drive motor/controller.
  2. Explain the functionality of the cooling systems and their components.

### Module 11: High-Voltage Power Battery System

This module is designed to provide technicians with an overview of the working principles, terminology, and failure analysis of the RIDE Power Battery System.

- **Audience:** All technicians
- **Performed by:** RIDE Trainer
- **Numbers of Trainees:** Up to 10
- **Duration:** Classroom 2 hours / Bus 1 hour
- **Training Location:** Classroom / Bus
- **Objectives:**
  1. Provide an overview of the RIDE high-voltage power battery system.
  2. Describe the working principles of the high-voltage power battery system.
  3. Introduce high-voltage battery terminology.
  4. Illustrate the standard battery module structure.
  5. Analyze various power battery system failures.





### Module 12: High-Voltage Motor Controllers & Distribution

This module is designed to introduce technicians to the RIDE high-voltage distribution system.

- **Audience:** All technicians
- **Performed by:** RIDE Trainer
- **Numbers of Trainees:** Up to 10
- **Duration:** Classroom 2 hours / Bus 2 hours
- **Training Location:** Classroom / Bus
- **Objectives:**
  1. Introduce the RIDE high-voltage distribution system.
  2. Provide information on the working principles.
  3. Identify high-voltage system components.
  4. Understand the high-voltage distribution box (5-in-1 or 6-in-1).

### Module 13: High-Voltage Drivetrain

This module is designed to familiarize technicians with the RIDE High-Voltage drivetrain systems.

- **Audience:** All technicians
- **Performed by:** RIDE Trainer
- **Numbers of Trainees:** Up to 10
- **Duration:** Classroom 2 hours / Bus 1 hour
- **Training Location:** Classroom / Bus
- **Objectives:**
  1. Provide an overview of the high-voltage drivetrain.
  2. Identify the drivetrain components.
  3. Describe the traction motor types used in RIDE buses.

## Gold Level

### Module 14: Diagnostic Tool

This module is designed to familiarize and aid technicians with the diagnostic tool troubleshooting process.

- **Audience:** All technicians
- **Performed by:** RIDE Trainer
- **Numbers of Trainees:** Up to 10
- **Duration:** Classroom 2 hours / Bus 2 hours
- **Training Location:** Classroom / Bus
- **Objectives:**
  1. Provide an overview of the RIDE Computer Area Network.
  3. Explain how to connect diagnostic laptop or tablet to the vehicle.
  4. Provide basic diagnosis information.

## AUXILIARY TRAINING

### Operator

#### Operator Training

This module is designed to offer necessary training and understanding for personnel that will drive the bus.

- **Audience:** All bus operators
- **Performed by:** RIDE Trainer
- **Numbers of Trainees:** Up to 10
- **Duration:** Classroom 2 hours / Bus 2 hours
- **Training Location:** Classroom / Bus
- **Objectives:**
  1. Technicians will learn features and controls of operation for the RIDE bus.
  2. Learn how to perform a “Pre-Drive Walkaround” Inspection.
  3. Learn how to turn “ON” and “OFF” the vehicle and apply recommended Safe Driving Techniques.
  4. Become familiar with how to handle an emergency, recommended best practices.
  5. Learn proper towing procedures associated with a Battery Electric Vehicle.

## First Responder

### First Responder Training

This module is designed to offer necessary training for all First Responders to an incident or emergency involving a RIDE electric bus.

- **Audience:** All bus operators / Local emergency response
- **Performed by:** RIDE Trainer
- **Numbers of Trainees:** Up to 10
- **Duration:** Classroom 1 hour / Bus 1 hour
- **Training Location:** Bus
- **Objectives:**
  1. Understand how to identify a RIDE vehicle.
  2. Learn features and controls for the RIDE bus.
  3. Learn the technology of the RIDE LifePo4 High Voltage Batteries.
  4. Learn how to Immobilize and Disable a RIDE bus.
  5. Understand all methods of ingress and egress to and from the vehicle.
  6. Become familiar with all High Voltage components on the RIDE bus.
  7. Learn the RIDE bus safety equipment.
  8. Become familiar with High Voltage Battery Charging and Chargers.

Items	INTERNAL/EXTERNAL (I or E)	Class hours	How many times/year	How many years training	Total Hours	Suggestion hours	Price	Remark
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Please refer to the RIDE Coach and Bus Training Program for information regarding training for Instructors, Technicians, Operators, and First Responders. The Training Program outlines specific topics to meet the unique training needs of our customers. If you have questions about training, feel free to reach out via email at [training@ride.co](mailto:training@ride.co). We are eager to discuss your training needs and assist in scheduling training events. We offer complimentary training hours based on the total number of buses ordered. Additional training hours are offered at \$200 per instructor hour plus travel expenses.

Bus Quantity	Free Hours
9 and less	40
10--20	80
20-49	160
50 and above	200
<b>Notes:</b>	
1. RIDE is providing above free hours of BYD training which is included in base bus price.	
2. Additional training price 200 USD/HRS	
3. Every combined PO enjoys up to 2 physical on-site training locations.	
4. Each on-site training session needs to be minimum 20 hours at one site.	
5. Each on-line training session needs to be minimum 4 hours.	

RIDE/BYD TRAINING PROGRAM	Level	Classroc	Bus	Total	By Section
Operator Training		2	2	4	
First Responder	AUX	1	1	2	6
Module 1: Introduction to RIDE Electric Bus		2	2	4	
Module 2: High-Voltage Safety & Lockout / Tagout		2	1	3	
Module 3: Towing		1	1	2	
Module 4: Preventive Maintenance	Bronze	2	2	4	13
Module 5: Low Voltage Electrical System		2	2	4	
Module 6: High-Voltage Charging		1	2	3	
Module 7: HVAC & High-Voltage Defroster		2	2	4	
Module 8: Air Brakes & Suspension		2	2	4	
Module 9: Steering System		1	1	2	
Module 10: Chassis & Power Battery Cooling Systems		2	1	3	
Module 11: High-Voltage Power Battery System		2	1	3	
Module 12: High-Voltage Motor Controllers & Distribution		2	2	4	
Module 13: High-Voltage Drivetrain	Silver	2	1	3	30
Module 14: Diagnostic Tool	Gold	2	2	4	4
		28	25	53	53

## **SERVICE AND PARTS CENTER AND GENERAL CONTACT**

In the following page you will find the Service and Parts Center and General Contact.

## Service and Parts Support Data

### Location of nearest Technical Service Representative to Agency

Name: Danny Lambertus

Address: 1211 Roosevelt Ave, Indianapolis, IN 46202

Telephone: 213-421-9055

Describe technical services readily available from said representative:

1. Assigned technician working hours 7:00 AM to 3:30 PM weekdays EDT.
2. Ride Coach & Bus Customer Service and Engineering Team working hours 7 :00 AM to 3:30 PM weekdays PST.

### Location of nearest Parts Distribution Center to Agency:

Name: Ride Mid-west Service Center

Address: 1211 Roosevelt Ave, Indianapolis, IN 46202

Telephone: (317)426-3372

Describe the extent of parts available at said center:

1. Maintenance parts: including air filter, oil filter, wiper blade etc.
2. Frequently used parts: including mirror, lamps, brake pads, fuse, contactor/relay etc.
3. Critical parts: including inverter/converter, DC-DC, charging port, charging gun, breaker, reducer, motor etc.
4. Tools: diagnostic tools, repair/maintenance tools.
5. Other parts: doors, bumpers, glass/window, switches, panel charger device parts and other basic parts.

### Policy for delivery of parts and components to be purchased for service and maintenance:

Regular method of shipment: Ground deliver service provided by UPS or FedEx.

Cost to Agency: Parts sale price + Delivery fee.

## **Bus Manufacturer Service and Parts Support Data West Cost**

### **Location of nearest Technical Service Representative to Agency**

Name: Darwin Johnston

Address: 501 Bragato Road San Carlos, CA 94070

Telephone: 661-779-2003

Describe technical services readily available from said representative:

3. Assigned technician working hours 7:00 AM to 3:30 PM weekdays PST.
4. Ride Coach & Bus Customer Service and Engineering Team working hours 7 :00 AM to 3:30 PM weekdays PST

### **Location of nearest Parts Distribution Center to Agency:**

Name: Ride West Coast Service Center

Address: 501 Bragato Road San Carlos, CA 94070

Telephone: (650)226-3634

Describe the extent of parts available at said center:

5. Maintenance parts: including air filter, oil filter, wiper blade etc.
6. Frequently used parts: including mirror, lamps, brake pads, fuse, contactor/relay and etc.
7. Critical parts: including inverter/converter, DC-DC, charging port, charging gun, breaker, reducer, motor and etc.
8. Tools: diagnostic tools, repair/maintenance tools.
9. Other parts: doors, bumpers, glass/window, switches, panel charger device parts and other basic parts.

### **Policy for delivery of parts and components to be purchased for service and maintenance:**

Regular method of shipment: Ground deliver service provided by UPS or FedEx

Cost to Agency: Parts sale price + Delivery fee.

## Bus Manufacturer Service and Parts Support Data East

### Location of nearest Technical Service Representative to Agency

Name: Danny Lambertus

Address: 33 Gregg Street Lodi, NJ 07644

Telephone: 213-421-9055

Describe technical services readily available from said representative:

10. Assigned technician working hours 7:00 AM to 3:30 PM weekdays EDT.
11. Ride Coach & Bus Customer Service and Engineering Team working hours 7 :00 AM to 3:30 PM weekdays PST.

### Location of nearest Parts Distribution Center to Agency:

Name: Ride East Coast Service Center

Address: 33 Gregg Street Lodi, NJ 07644

Telephone: 201-843-3052

Describe the extent of parts available at said center:

1. Maintenance parts: including air filter, oil filter, wiper blade etc.
2. Frequently used parts: including mirror, lamps, brake pads, fuse, contactor/relay etc.
3. Critical parts: including inverter/converter, DC-DC, charging port, charging gun, breaker, reducer, motor etc.
4. Tools: diagnostic tools, repair/maintenance tools.
5. Other parts: doors, bumpers, glass/window, switches, panel charger device parts and other basic parts.

### Policy for delivery of parts and components to be purchased for service and maintenance:

Regular method of shipment: Ground deliver service provided by UPS or FedEx.

Cost to Agency: Parts sale price + Delivery fee.



