

RFP #21-980369

FLORIDA ELECTRIC TRANSIT BUSES WITH CHARGING AND ASSOCIATED EQUIPMENT

PINELLAS SUNCOAST TRANSIT AUTHORITY

September 23, 2021



SECTION 1 — TECHNICAL PROPOSAL

SUBMITTED BY:

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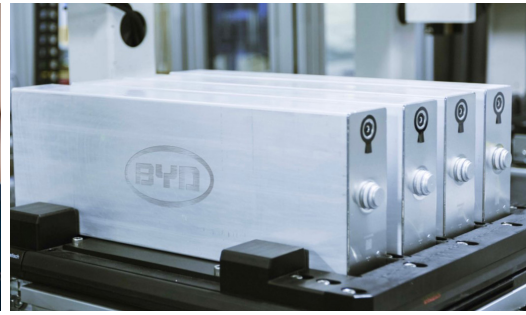
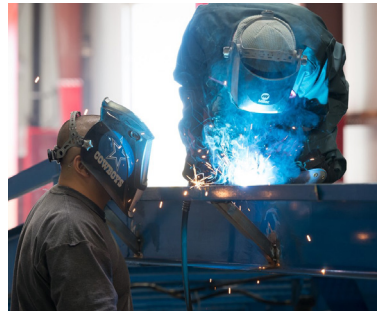
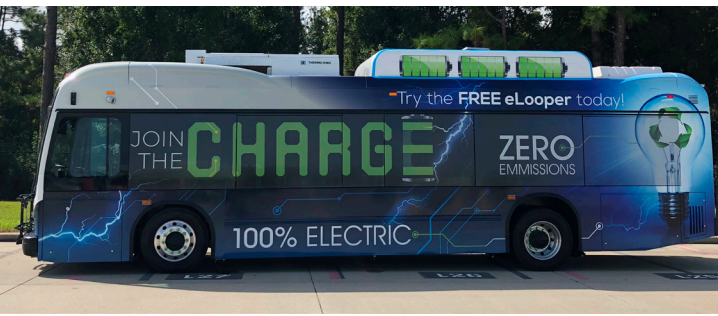
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SUBMITTED TO:

Pinellas Suncoast Transit
Authority
Attn: Alvin R. Burns Jr., Director
of Procurement
3201 Scherer Drive
St. Petersburg, FL 33716

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CER 10 VEHICLE QUESTIONNAIRE

CER 10 K7M 30FT Low-Floor Electric Bus

CER 10 K8M 35FT Low-Floor Electric Bus

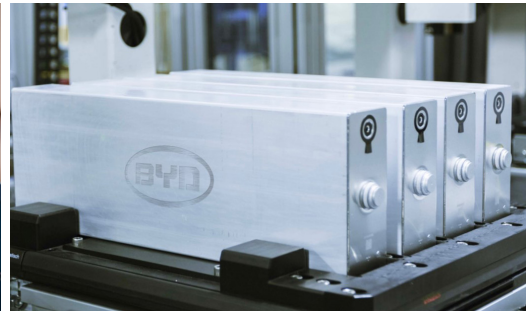
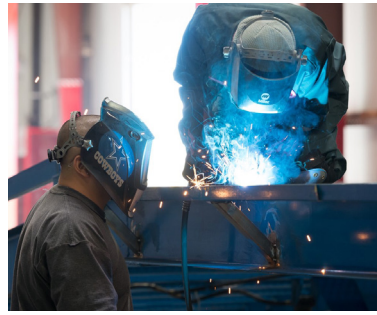
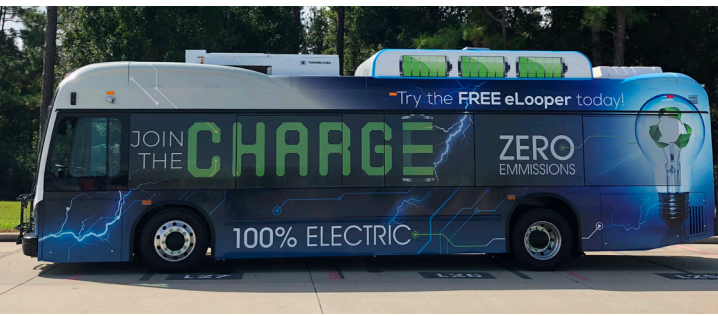
CER 10 K9M 40FT Low-Floor Electric Bus

CER 10 K9MD 40FT Low-Floor Electric Bus

CER 10 C10M 45FT Electric Coach

CER 10 K11M 60FT Low-Floor Articulated Electric Bus

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PRODUCTION SCHEDULE AND OTHER CONTRACT COMMITMENTS FOR THE DURATION OF THIS CONTRACT

QUALITY ASSURANCE PROGRAM

MANAGEMENT PLAN

LETTER OF TRANSMITTAL





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Los Angeles, CA 90015 | www.byd.com

September 20, 2021

Pinellas Suncoast Transit Authority
Attn: Alvin R. Burns Jr., Director of Procurement
3201 Scherer Drive
St. Petersburg, FL 33716

RE: RFP No. 21-980369 – Florida Electric Transit Buses and Charging and Associated Equipment

Dear Mr. Burns,

BYD Coach & Bus LLC. (BYD) is pleased to submit the enclosed proposal in response to Pinellas Suncoast Transit Authority's (PSTA) Request for Proposals (RFP) No. 21-980369 – Florida Electric Transit Buses and Charging and Associated Equipment. BYD stands for "**Build Your Dreams**," and we are a proud American manufacturer and innovator producing 100% Battery Electric Buses. We are dedicated to reducing overall emissions and environmental pollution.

We accept the RFP terms without exception unless specifically indicated within our technical proposal. We submit this letter in response to your RFP as a "Letter of Transmittal" and include the following information for your convenience:

- | | |
|------------------------------|---|
| 1. Contact Information | BYD Coach & Bus LLC
1800 South Figueroa Street
Los Angeles, CA 90015
bids.na@byd.com |
| 2. Authorized Contact Person | Patrick Duan, Senior Vice President of Operations
Phone: 213.880.8597
Email: patrick.duan@byd.com |
| 3. Point of Contact | John Hatch, Southeast Regional Sales Manager
Phone: 407.729.0406
Email: john.hatch@byd.com |

This letter of transmittal is signed by Patrick Duan, Senior Vice President of Operations, who is authorized to bind BYD to terms of the proposal. We are confident that you will find our response to your RFP both thorough and fully responsive. We look forward to your bid opening and favorable response.

Sincerely,

Patrick Duan
Senior Vice President of Operations

EXECUTIVE SUMMARY



BYD COACH AND BUS

BYD is honored to present this proposal for the procurement of electric buses and chargers. After reviewing the following presentation of our qualifications and technical proposal, we are confident that you will agree that BYD stands uniquely qualified to provide you with the most technologically advanced battery-powered buses and be here 12 years from now, continuing to provide world-class support. Our goal with this Introduction of our offer is to firmly establish our overall organizational knowledge of electric buses along with our depth and breadth of vertical integration sets BYD distinctively above the competition.

OUR MISSION

BYD's mission is to make global zero-emission transportation a new **"green standard"** — for cleaner air and water, streamlined public-agency budgets, and reduced reliance on fossil fuels. We developed a sustainable approach: high-efficiency solar panels that generate renewable power stored in battery stations and used to power **safe, efficient, all-electric vehicles and enrich the quality of life for all.**

OUR HISTORY

BYD was founded in 1995 as a battery manufacturer and advanced consumer electronics company and continues to be one of the preeminent manufacturers of smartphones, tablets, and laptops for global partners such as Apple, Dell, Toshiba, Microsoft, Samsung, Motorola, and many more. ***In fact, over the past 25 years, BYD's battery technology and chemistry have been used in everyday consumer electronics by PSTA personnel.*** With an eye and vision for the future, we began manufacturing electric vehicles with cutting edge battery & electric drive propulsion technology in 2003, applying our battery and technology expertise to the manufacturing of alternative and clean public vehicles as well as other vehicles (coaches, trucks, cars, etc.). BYD's unique combination of battery and automotive experience has been revolutionizing every aspect of clean transportation ever since, with our product line of 100% electric buses, heavy-duty trucks, forklifts, passenger vehicles, and monorail systems.

BUILT IN AMERICA



SERVICED IN AMERICA

BUY AMERICA COMPLIANT
OVER 70% OF COMPONENTS
DOMESTICALLY SOURCED



100% US MANUFACTURING
BUILT DOMESTICALLY
FROM CHASSIS TO FINAL
ASSEMBLY

AMERICAN JOBS
OVER 800 US CLEAN
ENERGY MANUFACTURING
JOBS





In 2011, BYD established headquarters in Los Angeles County, and in 2013 we commenced our manufacturing operations in the City of Lancaster, California. This facility houses advanced engineering and cutting-edge manufacturing capabilities to produce up to 1,500 buses per year. BYD is the only electric bus manufacturer with a unionized workforce (SMART Local 105) and a Community Benefits Agreement establishing training and apprenticeship programs for workers with traditionally higher barriers to employment and mandating diversity in hiring. Additionally, BYD is over 60% of BYD investors are from the US, and Berkshire Hathaway has kept 8% of BYD stock since 2008.

Being "**The Safe Choice**" is a moniker that BYD takes pride in extending to each of its transit partners. As transportation agencies start to understand, transition, ultimately embrace battery-electric technology, agencies must have vehicle manufacture that not only understands the technology but can ensure that each bus will be purposely manufactured to be safe, cost-effective, and provide longevity to eliminate the risks. BYD is the only bus manufacturer that understands and produces its high-voltage batteries – the core element of each battery-electric bus – we can deliver full energy- and cost-effective fleet solutions that will ease your mind throughout the transit useful life of the vehicles.

Our key advantages that BYD offers to our transit partners that make us "**The Safe Choice**":

- **BATTERY WARRANTY:** BYD warrants its batteries longer than any other bus battery – we offer our standard full 12 years that is the full transit life expectancy of the bus.
- **BATTERY SAFETY:** BYD's self-developed and -manufactured batteries are uniquely non-toxic, fire-resistant, and collision-resistant. Our batteries do not catch fire or explode even under the most extreme testing.
- **NO 20-CENTURY TECHNOLOGY:** BYD does not rely on gears and belts that frequently require replacement; with no engine or transmission needed, your bus won't waste time out of service for costly repairs.
- **VERTICALLY INTEGRATED MANUFACTURING:** BYD's the only bus manufacturer that designs and builds its buses and power source internally.
- **WORLD-CLASS AFTER-SALES:** BYD provides world-class after-sales support to ensure all customer needs are met. Local administrative support and a technician available, located in Orlando, can be on-site within 3-4 hours.
- **CUSTOMER-FIRST DESIGN:** BYD customizes the styling and design of our buses to meet your specific requirements and ensures that it meets all the federal transit administration requirements in the process.
- **FINANCIALLY SOLID:** As of 2020, BYD was valued at over \$68 Billion. The financial report can be

accessed at the following site <https://www.byd.com/en/InvestorAnnals.html>:

Our depth of heavy-duty electric bus offerings and understanding of the core technology, combined with our customer-first design, enables us to manufacture a bus that will not only meet your specifications but be reliable and efficient for the life of the vehicle. Being a vertically integrated manufacturer provides the peace of mind that each of the key components on the vehicle purposely designs and manufactured to last. **THE SAFE CHOICE.**

THE TEAM

BYD has assembled a highly qualified and experienced team to manufacture a Battery-Electric bus to meet PSTA technical and project objectives. Our team includes key personnel and our engineering department with over 100 years of combined experience designing and manufacturing heavy-duty buses for North American Transit operations. Together our team is committed to producing quality buses PSTA and will work seamlessly from start to finish.

BYD EXPERIENCE AND EXPERTISE

BYD has also set its sights on organizational optimization to enhance its service and add "**Support**" to the list of BYD core strengths: **Safety, Sustainability, Stability, and Savings**. Facility upgrade, expansion, and recent unionization were only the first steps. Ongoing improvements include:

- Teaming with local public and private agencies to increase job outreach and career training to grow the pool of technologically qualified workers and benefit both the local community.
- Consolidating and expanding its North American customer support, to improve immediate access to field service, training, information, parts orders, and claims.
- Enhancing service by decreasing processing times while increasing its US vendor base— including more DBE and veteran-owned small businesses, as well as subcontractors within BYD's client areas.
- BYD has over 20 years of experience in developing safe, non-toxic battery technologies.

CER 1. PROPOSER'S CHECKLIST

SECTION 9: FORMS AND CERTIFICATIONS

CER 1. Proposer's Checklist

RFP [21-980369] Electric Transit Buses with Charging and Associated Equipment

Package 1: Technical Proposal

- ☒ 1. Letter of Transmittal
- ☒ 2. Technical Proposal
- ☒ 3. Acknowledgement of Addenda
- ☒ 4. Form for Proposal Deviation
- ☒ 5. Vehicle Questionnaire
- ☒ 6. References and non-priced information (if provided by Proposer)
- ☒ 7. Engineering organization chart, engineering change control procedure, field modification process
- ☒ 8. Manufacturing facility plant layout, other contracts, staffing
- ☒ 9. Production schedule and other Contract commitments for the duration of this Contract.
- ☒ 10. Quality Assurance Program

Package 2: Price Proposal

- ☒ 1. Letter of Transmittal
- ☒ 2. Pricing Schedule (including option buses, spare parts package, engineering, manuals, training, special tools and test equipment)

Package 3: Qualifications Package

- ☒ 1. Pre-Award Evaluation Data Form
- ☒ 2. A copy of the three (3) most recent audited financial statements or a statement from the Proposer regarding how financial information may be reviewed by the Agency
- ☒ 3. Letter for insurance
- ☒ 4. Letter for performance bond (if applicable)
- ☒ 5. Letter of commitment for parental financial guarantee (if applicable)
- ☒ 6. Proposal Form

Package 4: Proprietary/Confidential Information

- ☒ 1. Proprietary/Confidential Information

There may be items in the first three packages that are included in Package 4 because they are considered to be proprietary/confidential information. When this occurs, the Proposer must note that fact in packages 1 through 3.

DOCUMENTS INCLUDED IN SECTION 4 - PROPRIETARY/ CONFIDENTIAL

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The following documents as required by the RFP are included in Section 4 – Proprietary/Confidential Information for PSTA's review.

- CER 10 Performance Information/Graphs for proposed vehicles
- Battery White Paper, includes:
 - Charge Cycle and cycle life
 - Lifecycle testing procedures
 - Certification of Battery Lifecycle testing by independent testing agency
- Written Confirmation from Battery Manufacturer attesting to the following:
 - Safety of proposed battery system
- Electric Vehicle Charging Equipment
- Comprehensive Battery Warranty Terms
- Altoona Test
 - 30-FT Electric Bus
 - 35-FT Electric Bus
 - 40-FT Electric Bus (K9M)
 - 60-FT Electric Bus
- Anti-Corrosion Plan
- Quality Assurance Program
- Additional Cost Related Information
 - Additional Bus Pricing: Option Years 2 — 5
 - Additional Bus Pricing: Battery Leasing Option
 - Warranty Cost
 - K7M 12 Year Cost of Ownership

- K8M 12 Year Cost of Ownership
- K9M and K9MD 12 Year Cost of Ownership
- C10M 12 Year Cost of Ownership
- K11M 12 Year Cost of Ownership
- Training Cost
- Manual Cost and List
- Special Tools
- Spare Parts

TECHNICAL PROPOSAL



ELECTRIC PROPULSION SYSTEM

ELECTRICAL PROPULSION SYSTEM

BYD's Propulsion System was designed, engineered, and manufactured by BYD 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 65,000 BEB's with over 28,000,000,000 miles driven in daily transit operations. The BYD Propulsion System has been transit industry tested and proven highly efficient, reliable, and durable.

PRIMARY PROPULSION UNIT AND TRACTION MOTORS

BYD'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. BYD's PPU was equipped on all BYD Altoona certified models, including 30ft, 35ft, 40ft, 45ft, and 60ft bus models. In addition, BYD's PPU has been well proven by Altoona Test.

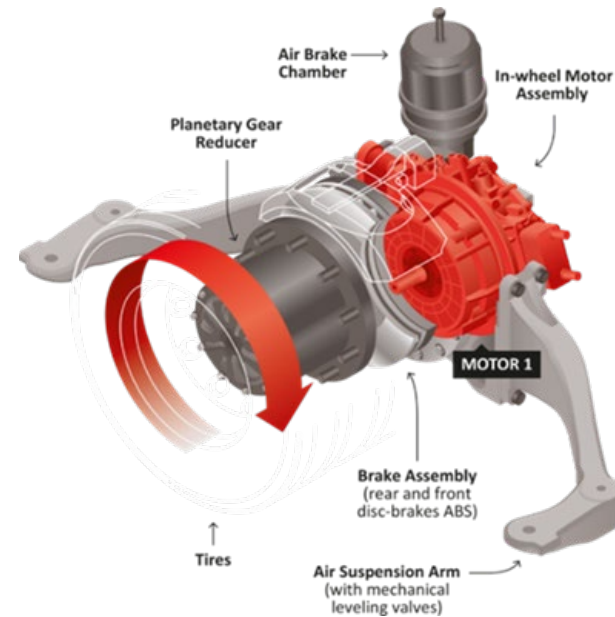
OUR REAR AXLE ASSEMBLY ELIMINATES THE USE OF A TRANSMISSION AND OTHER MOVING PARTS THAT REQUIRE MID-LIFE OVERHAUL AND REPLACEMENT FROM CONSISTENT WEAR AND TEAR



TRACTION MOTORS

BYD'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.



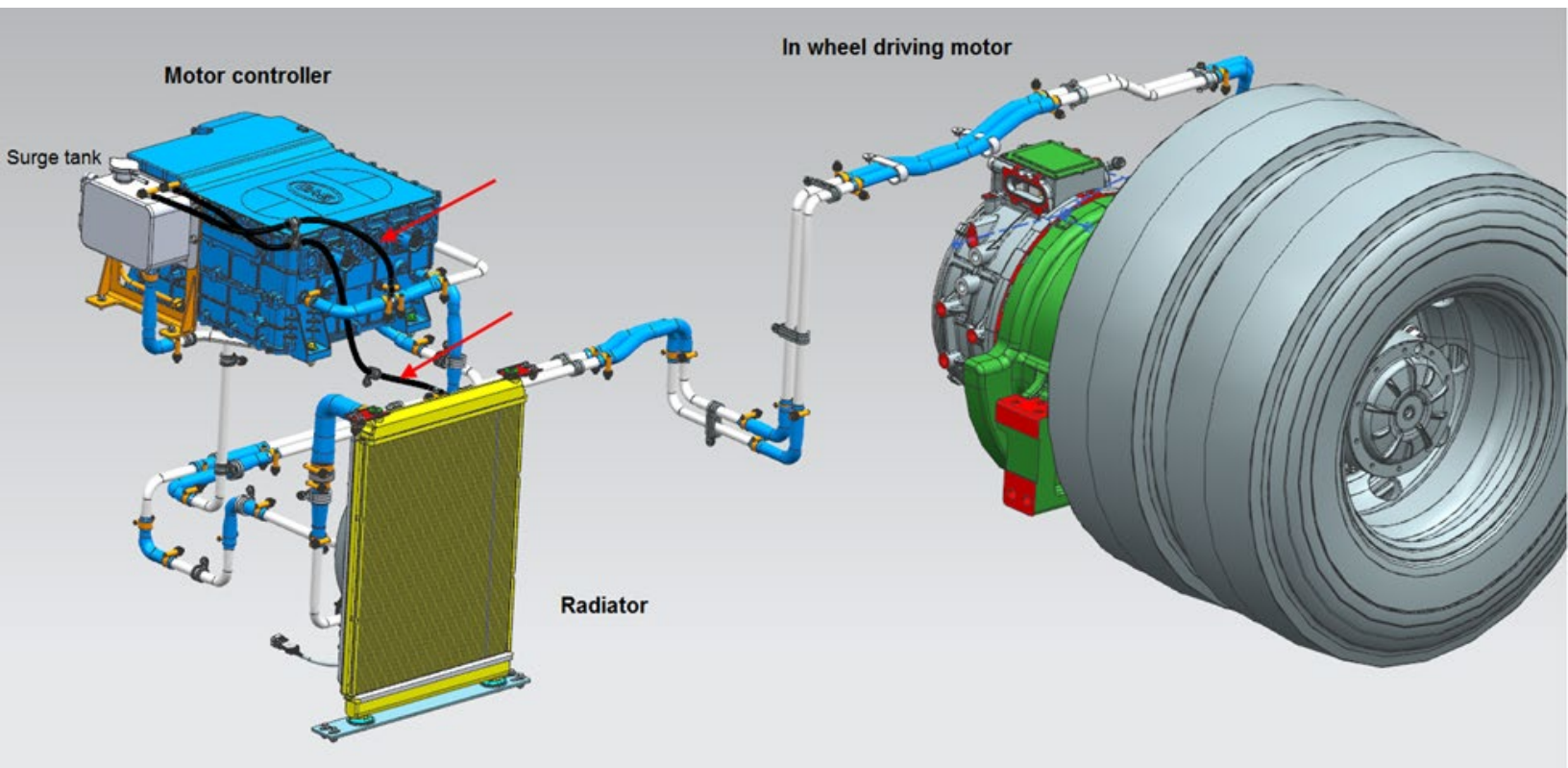
BYD PRIMARY PROPULSION UNIT TESTING

BYD 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"> • Reliability • Durability • Fatigue • Temperature • Vibration 	<ul style="list-style-type: none"> • Environmental • Endurance • In-Service • Motor • Altoona Structural Durability

TRACTION MOTOR COOLING SYSTEM

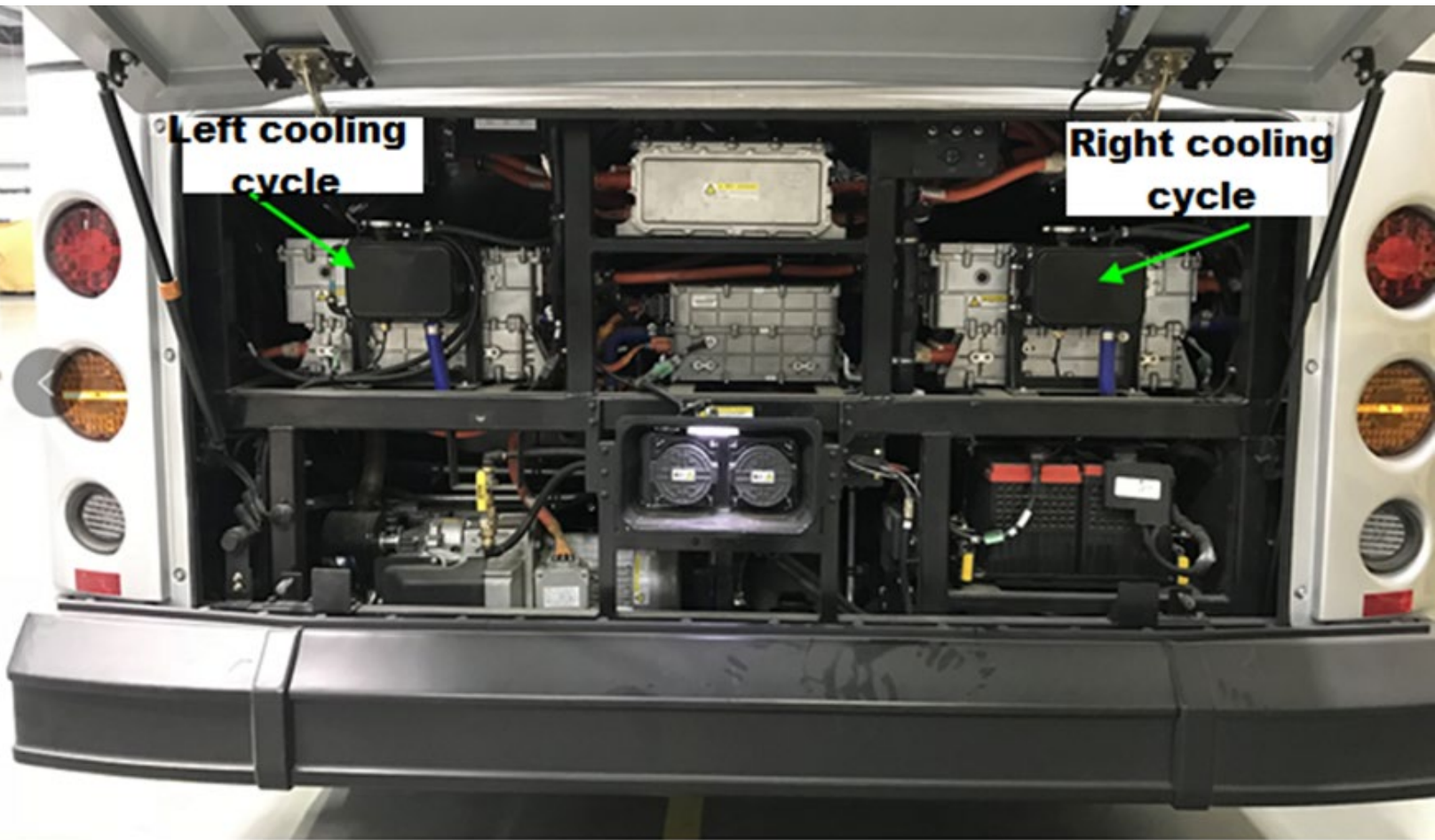
The drive system cooling system is used for cooling the driving motors, 6-IN-1 integrated High-Voltage motor controller, and the Air Compressor.



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. BYD's 60ft articulated Bus has two independent driving motors and motor controllers, and the left and right cooling system are independent

BYD'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 BYD'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 BYD's electrical Bus.



BYD designs and manufactures our twin-radiator cooling system components, which have been sized to maintain the traction motors and high-voltage electronic components at safe, continuous operating temperatures, during the most severe possible operations, with the Bus loaded to GVWR and in any potential ambient conditions, with a 10% reserve capacity. As the manufacturer of the cooling system and the propulsion system and related components, BYD can ensure that the cooling system meets design parameters.

INTEGRATED HIGH-VOLTAGE CONTROLLER

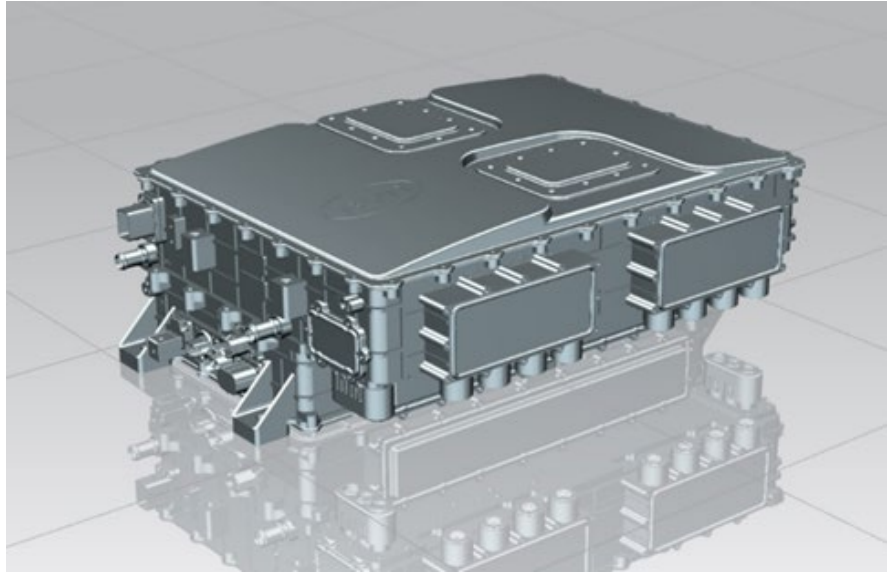
BYD's rear-mounted enclosure houses the Integrated High-Voltage Controller (IHVC) that is multi-functional in use and has been specifically designed to regulate energy flow from the high-voltage battery system to each of the components on the Bus.

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.
- And Power electronics.

The IHVC also distributes power to the following subsystems:

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

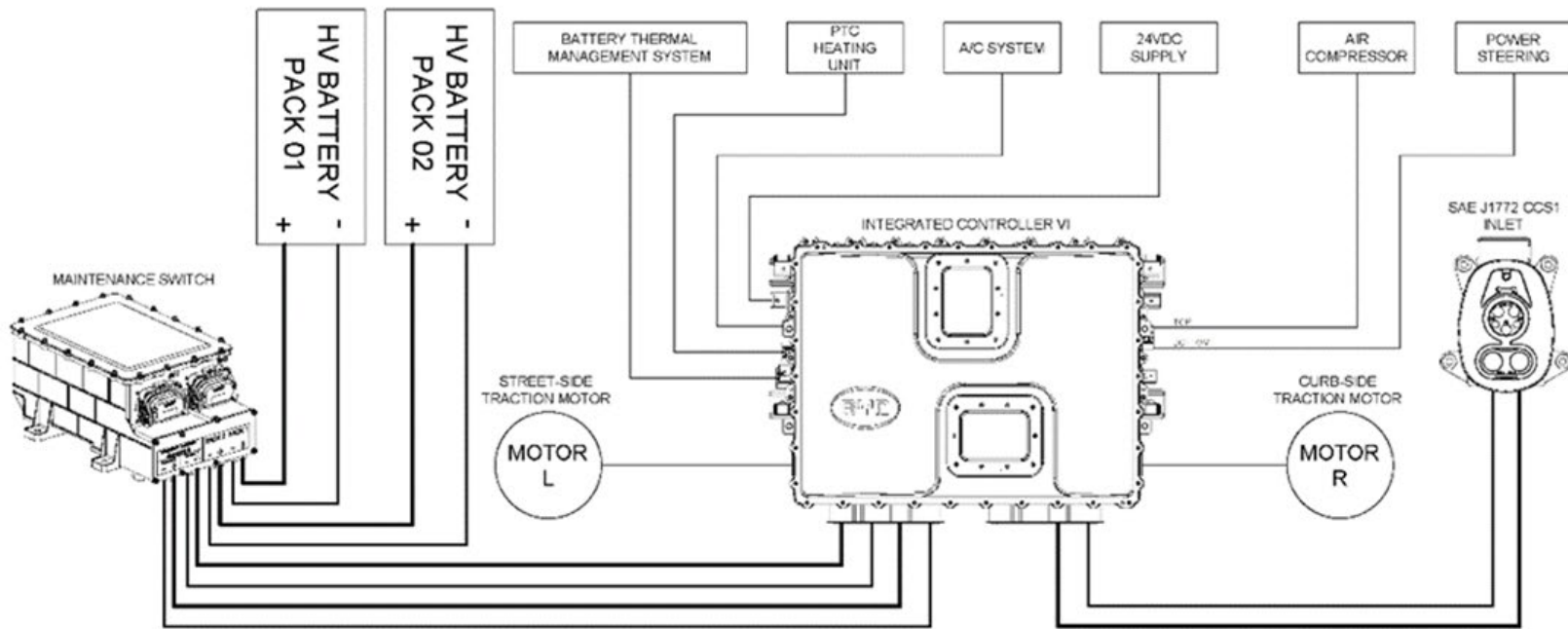


KEY IHVC DESIGN INTEGRATION FEATURES

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

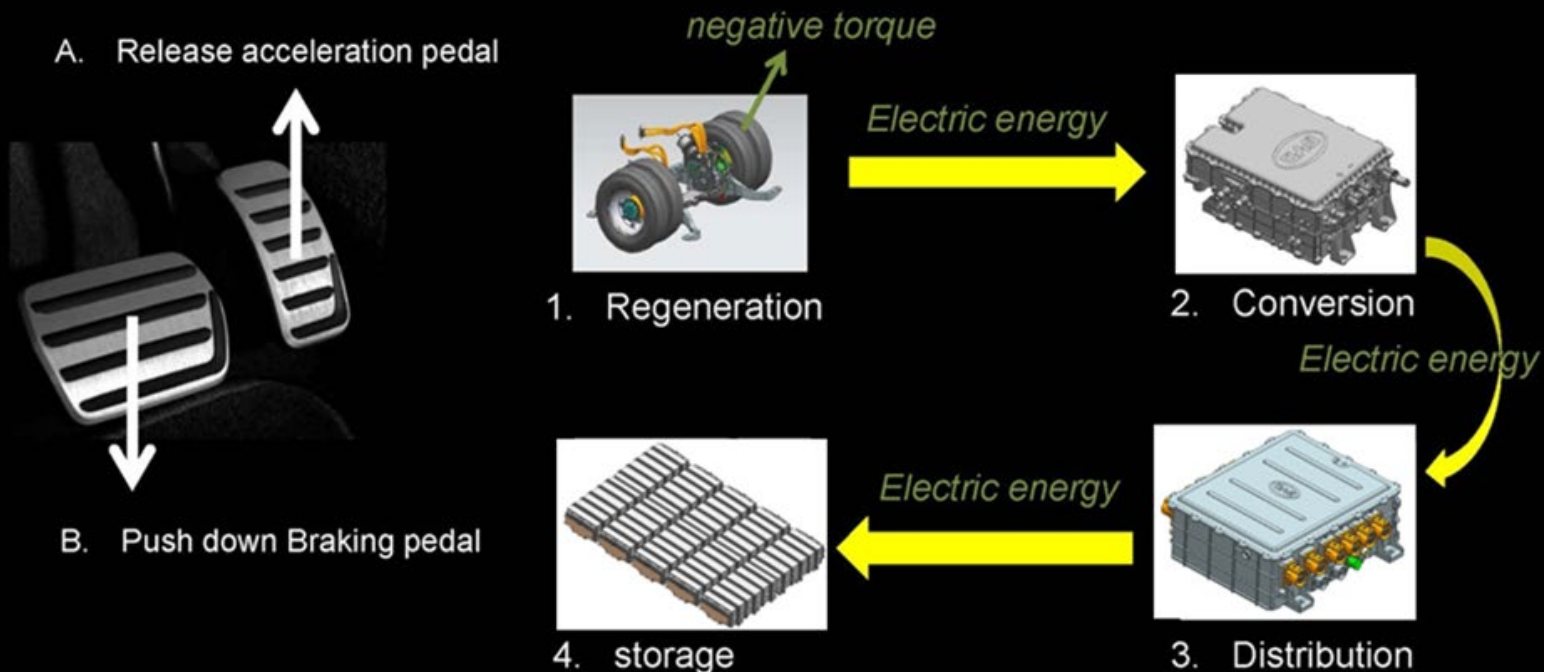
1. Air Compressor Controller
2. Steering Motor Controller
3. Drive Motor Controllers
4. High Voltage Distribution Box
5. DC-DC Converter
6. Leakage Sensor

WORKING PRINCIPAL OF IHVC



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 BYD 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, PSTA'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 BYD 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; BYD will work with PSTA to pre-program these parameters to meet PSTA's optimal needs. For example, in extreme ice conditions, clients require better ABS/ATC override of regeneration.

ENERGY STORAGE SYSTEM

ENERGY STORAGE SYSTEM

The Energy Storage System (ESS) is the lifeline of BYD'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

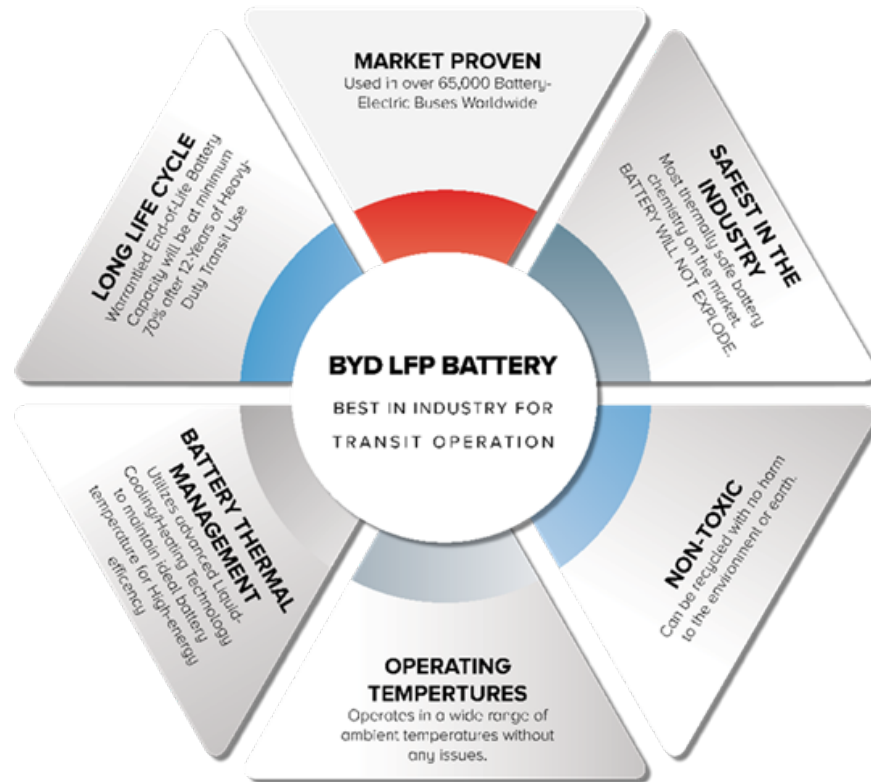
BATTERY CHEMISTRY

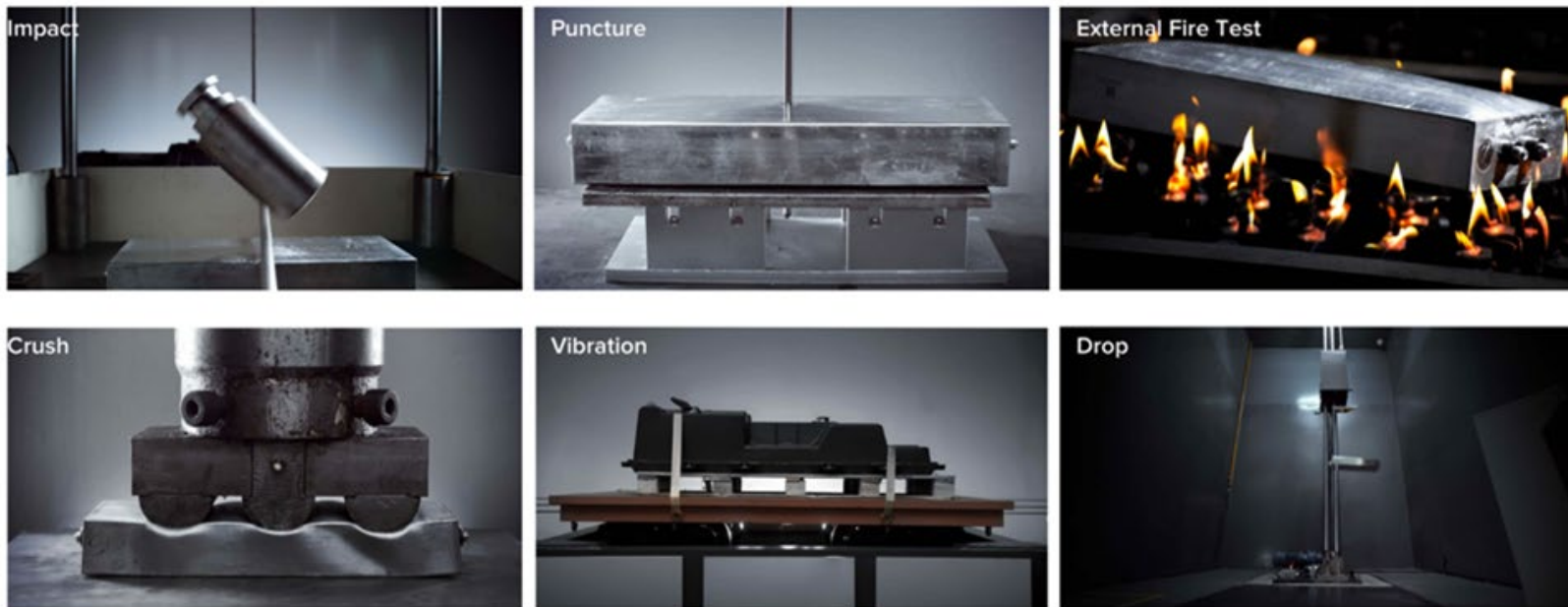
The high-voltage batteries utilize BYD's patented Lithium Iron Phosphate (LFP) cell chemistry, which is a culmination of over 25 years of testing and research that BYD has done. As a battery manufacturer, BYD utilized its supreme understanding of battery technology to develop its LFP chemistry specifically 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

BYD'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 BYD LFP batteries have undergone the following safety test shown in Figure below.





BYD BATTERY CERTIFICATIONS

BYD'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

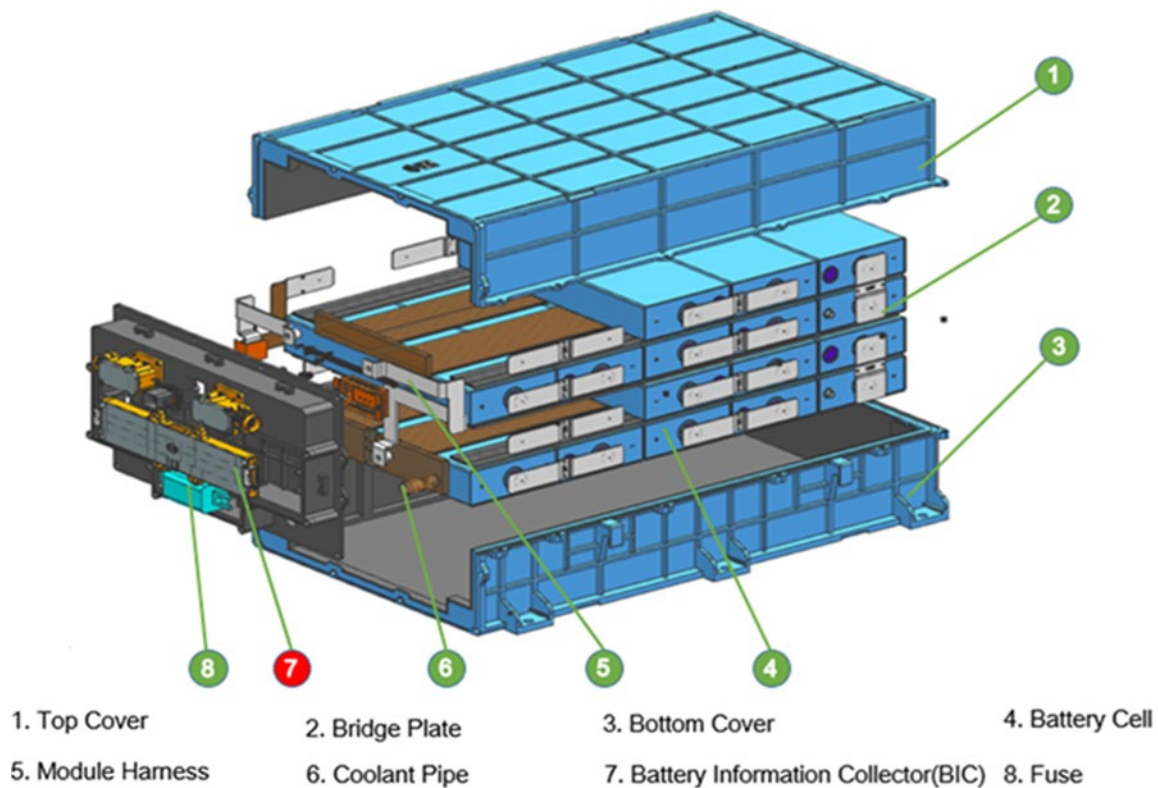
BATTERY LAYOUT

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

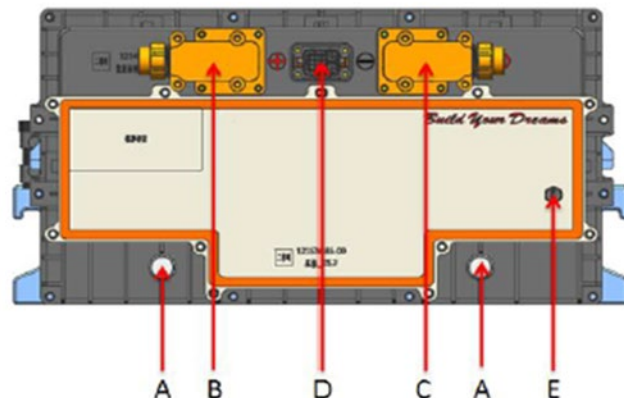
- Better distribution and balance of weight on the vehicle
- Maximize passenger space on the vehicle
- Ease of maintainability and access for service

BYD BATTERY MODULES

Proper design of the cell, battery, and battery compartment ensures optimum, reliable, and safe operation. BYD designed and built our battery modules and packs utilizing our proprietary LFP battery chemistry that provides high energy density and BYD'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 BYD Battery Management System (BMS) was designed, developed, and manufactured by BYD. 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 BYD'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 BYD 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, BYD has designed our battery packs with the following protections:

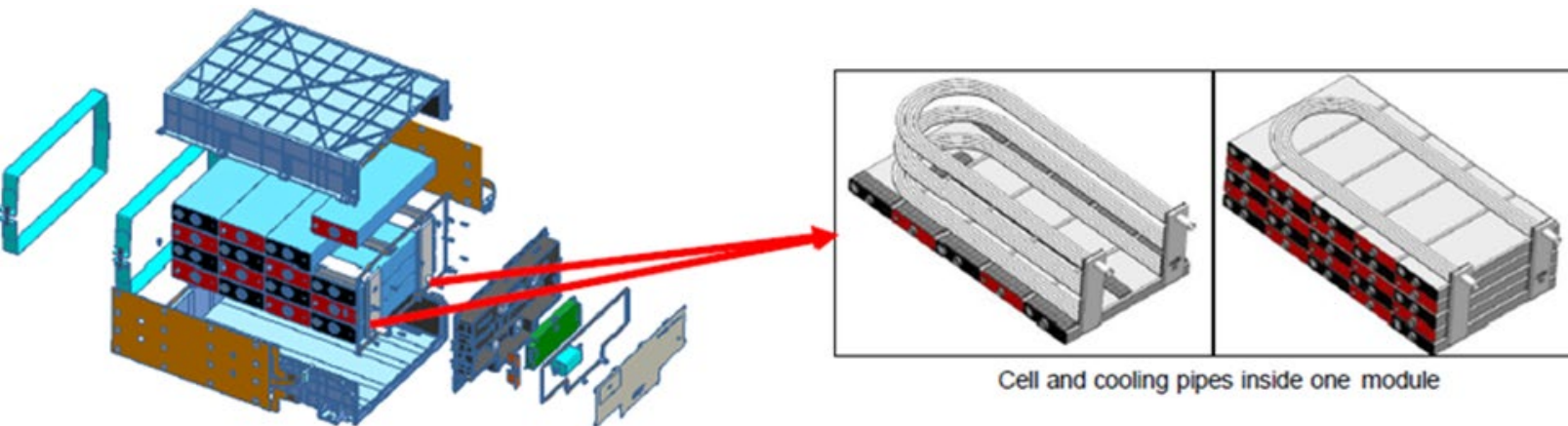
1. Built-In Battery Thermal Management:

Battery Thermal Management is an integral part of BYD'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:

BYD'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.



VEHICLE CHARGING SOLTIONS

VEHICLE CHARGING SOLUTIONS

Each of BYD'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 either on each rear side of the Bus.

PSTA can utilize any J1772 CCS Type 1 or SAE J3068 AC₆ Type Connector plug-in charger to charge its vehicles, and BYD's buses can also support J3105 (overhead pantograph) charging and J2954/2 (wireless inductive charger).

PLUG-IN CHARGER OPTIONS

BYD offers two plug-in charging solutions to provide overnight or intermittent depot charging. In addition, we offer both AC and DC plug-in charging solutions.

BYD OFFERS WIDEST SELECTION OF CHARGING SOLUTIONS



SAE J1772 Level 2

SAE J3068 AC₆ Type
Connector

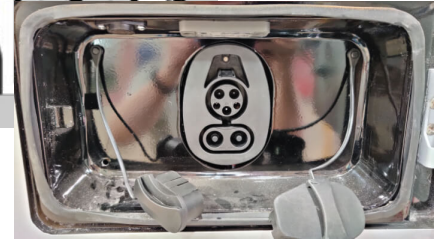
SAE 3105-1 Overhead
Conductive Charger

SAE J2954/2 Wireless
Inductive Charger


	BYD AC CHARGER	BYD DC CHARGER	MULTIPLE DC VENDORS
Manufacturer	BYD	BYD	DC Charger Vendors
Charging Mode	AC	DC	DC
Connector Type	IEC62196-2 Type 2	SAE J1772 CCS Type 1	SAE J1772 CCS Type 1
Maximum Output Power	40kW x 2	150kW	150kW
Max Current/Connector	48A x 2	200A	200A
Voltage	480V	400V	400V
Dimensions	27" x 15.5" x 8"	30" x 48" x 75"	Varies by Vendor

CHARGER LOCATION

BYD's plug-in standard design for the charging receptor location is the curbside rear of the Bus. The Figure below shows the location. BYD 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 Bus's 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

BYD 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.

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



EXPORTABLE POWER SOLUTIONS

EXPORTABLE POWER SOLUTIONS

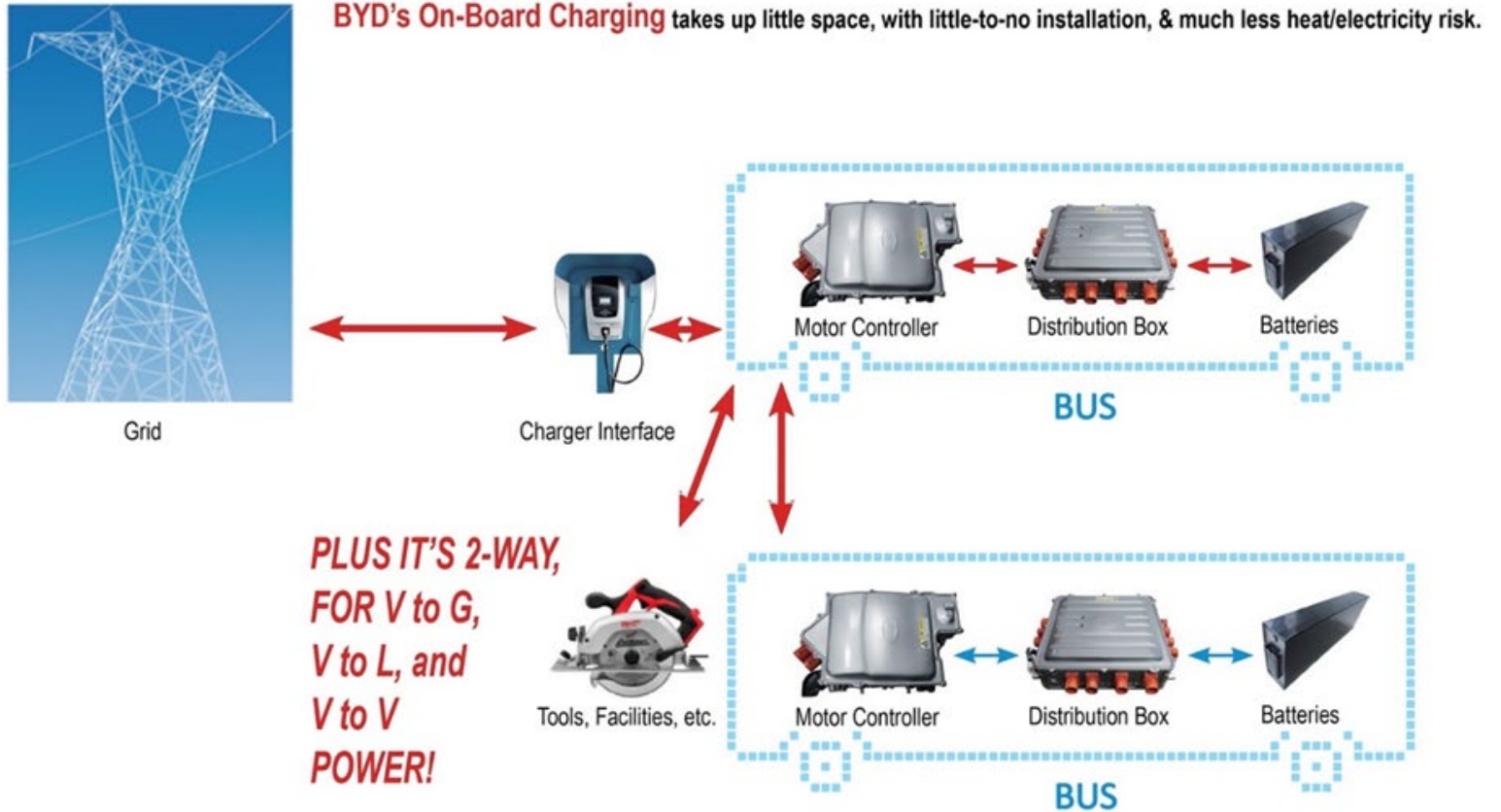
Utilizing BYD's AC charger provided flexible power use options that are an added advantage.

The following provides more detail on how our charge system design offers you greater flexibility to continually revise your charging and power use to meet changing needs:

Easy Installation/Potential Portability: BYD charging interface can be easily wall-mounted or pole-mounted to the floor, using simple bolts. The connection to the 3-Phase, 480 VAC outlet is usually hidden in the wall or underground but does not need to be, so long as appropriate workplace and/or public safety measures are taken, including protection for the connection at the outlet and precautions against trip hazards (if the large connecting cable may be out on the ground). BYD charging interface can even be kept portable by mounting them on wheeled platforms or onto service trucks also equipped with generators for emergency boosts anywhere. If they are installed, they can be easily unbolted and reinstalled (re-bolted) in a new location any number of times. In addition, since they are vandal-resistant and can come with a weather-protective cover, this location can be almost anywhere with an appropriate power source and room to park a bus.

This flexibility opens up a wealth of possibilities for a partnership that you might develop with other public or private entities, such as to put chargers at key destinations like colleges, malls, or sports/entertainment venues, either permanently or temporarily as part of public relations campaigns to support transit and green technology.

Bi-Directional Charge Flow: BYD's charging system controllers offer the ability to discharge power off of any BYD bus and other BYD electric vehicle to several different destinations: the power grid, another vehicle, or to an energy storage system or even through an outlet to power tools, equipment, or even facilities from the Bus.

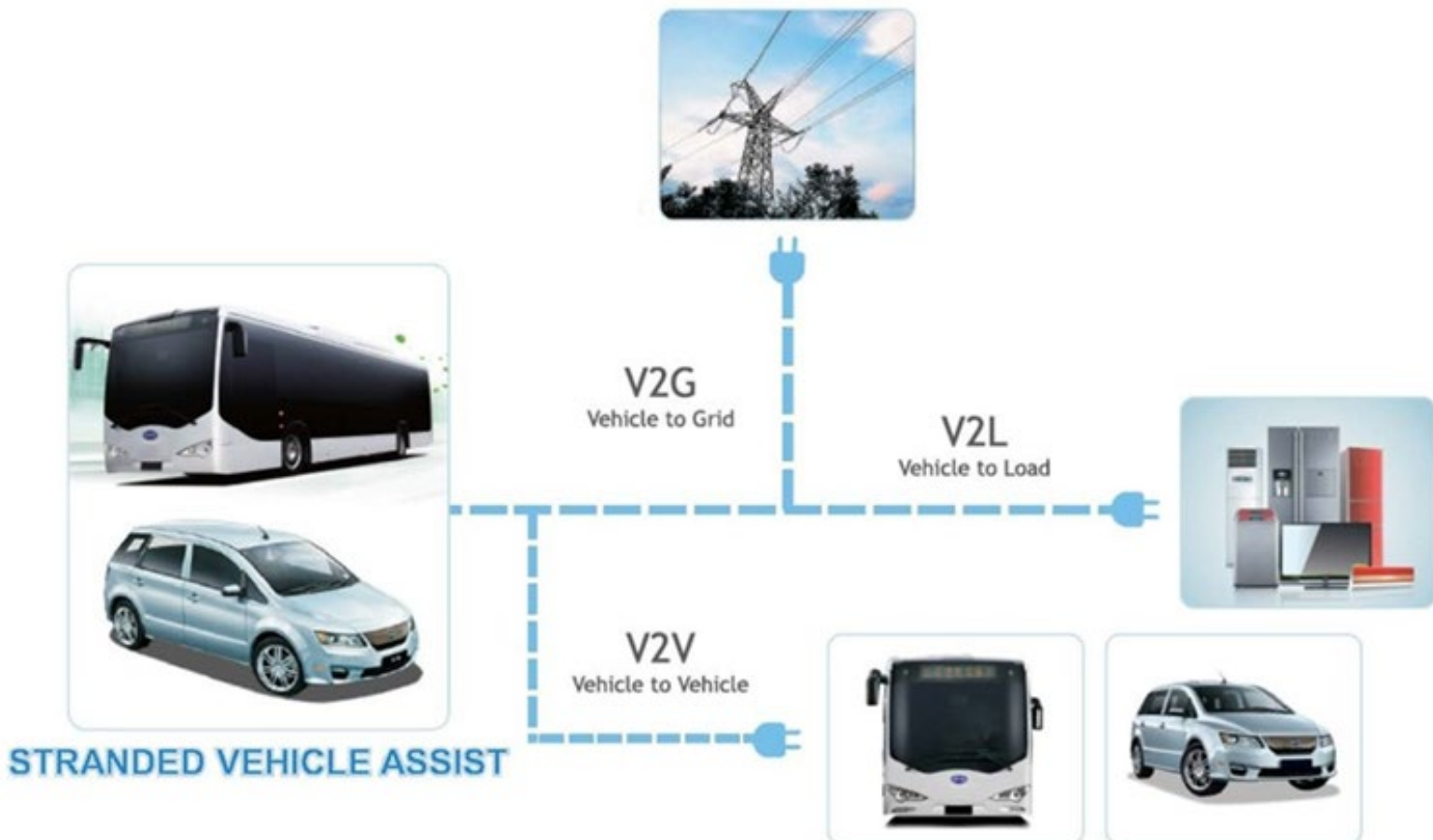


This feature allows each BYD vehicle to act as a mobile generator:

- **Vehicle to Grid (VtoG):** This function provides power back to the grid or a large energy storage system. This provides you with flexible power options, including:
 - **If there is a community power shortage,** you can return power gathered during off-peak periods for peak rebates and help critical facilities such as hospitals and retirement homes.
 - **If there is a grid power outage,** BYD's buses can be connected to the grid to form a large virtual energy storage system.
- **Vehicle to Load (VtoL):** This function can send power to loads, providing different options:
 - **Store energy in storage systems** for later use during peak periods or in emergencies;
 - **Use bus power to send energy through outlets or connectors** that can be provided onboard, power tools/equipment on the road, or even key facility functions in a blackout.
- **Vehicle to Vehicle (VtoV):** This function allows you to use any BYD bus or BYD electric vehicle to

power any other BYD bus or BYD electric vehicle directly. This offers amazing flexibility, such as the ability to:

- **Minimize towing:** In the unlikely event that a bus runs out of power during service, the Bus that comes to pick up the passengers could provide a quick-boost charge to the first to enable it to reach a nearby depot. Alternately, a BYD electric service truck could come out to boost the Bus, rather than tow it (an extra charger mounted to a regular service truck with a generator would achieve a similar result).
- **Allow scheduled boosts:** Some agencies, for certain routes, could schedule deadhead times at key route connection points, such that a bus with a heavy day's service could receive an appropriately-timed boost from a bus with a less demanding service day.
- **Allow in-depot boost options:** Any BYD vehicle, including another bus, an electric service truck, or an electric forklift, could be used in place of your low-voltage charger to provide a quick boost to a bus at any of your facilities.



VEHICLE DATA AND HEALTH MONITORING SYSTEM

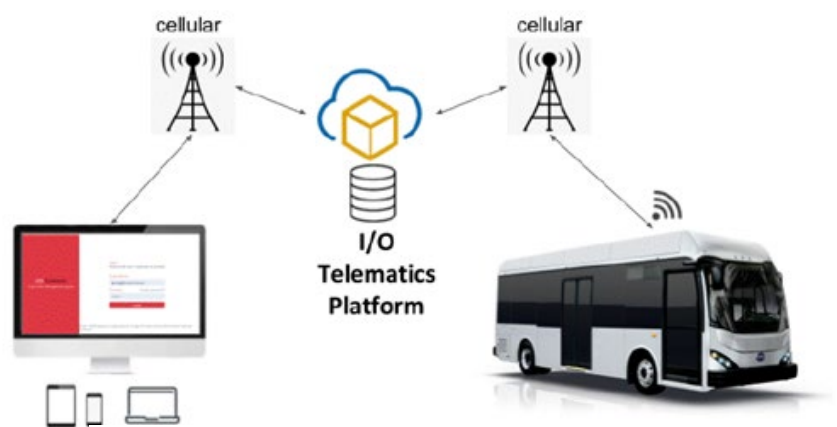
VEHICLE DATA AND HEALTH MONITORING SYSTEM

BYD 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.

BYD 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:

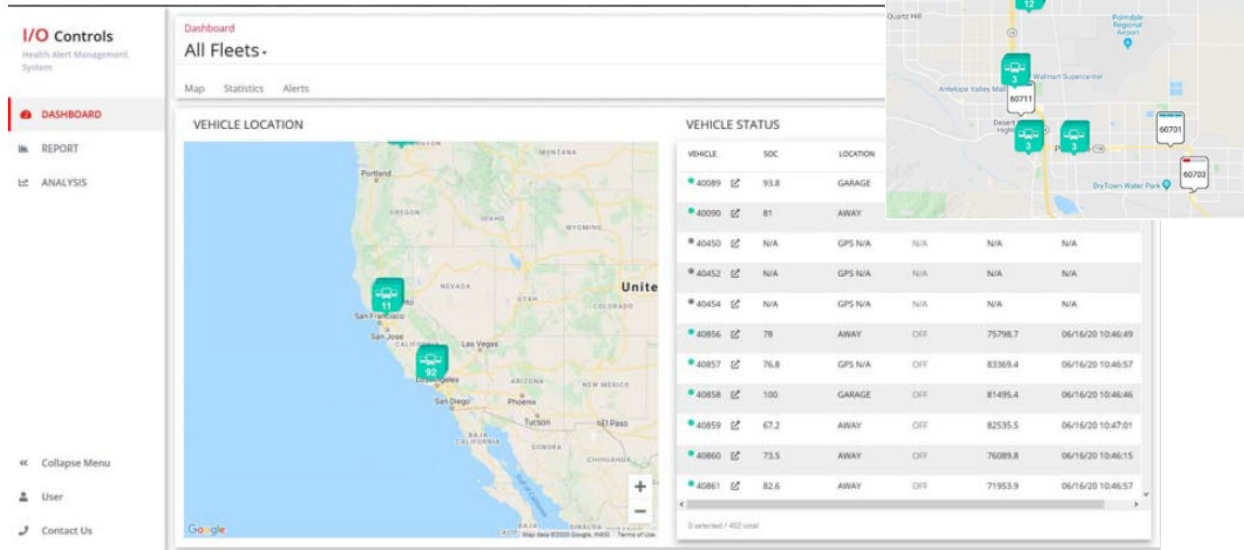
- **Alert:** When the vehicle requires immediate attention, text and email messages are sent. Alerts are vital if a vehicle encounters issues during a charging cycle or revenue service.
- **Manage:** Use cloud-based software to manage, configure and edit the information supplied by the HAMS module.
-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



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.

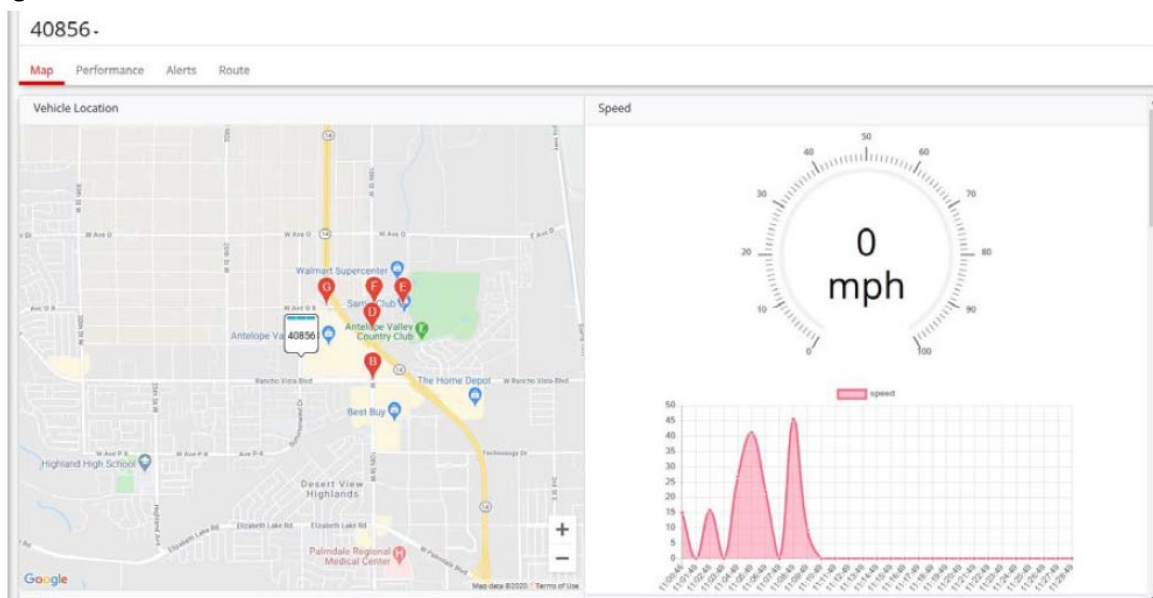
FLEET DASHBOARD VIEW

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:

- **Performance:**

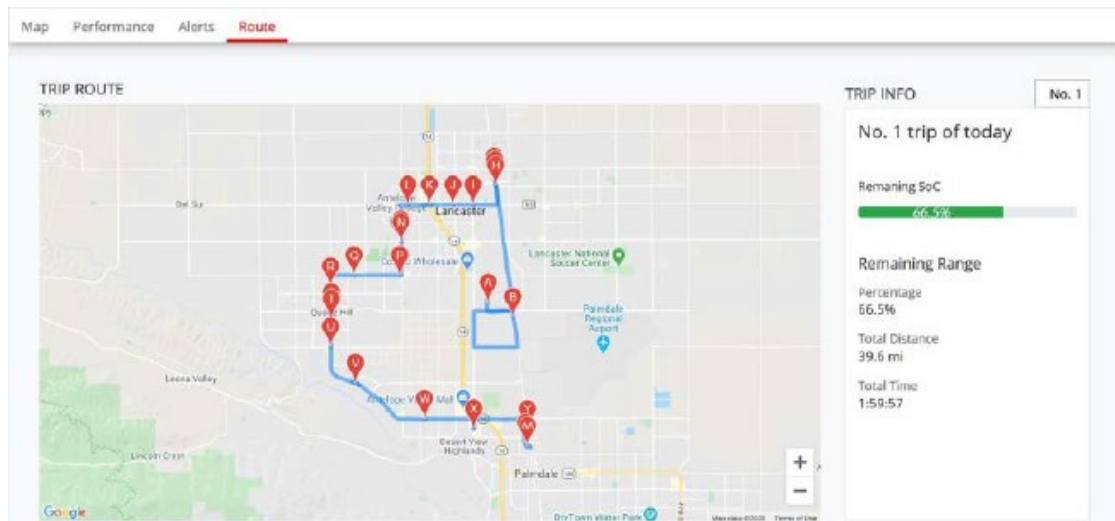
Displays the overall performance of the electrical performance of the vehicle. That includes battery temperature, total energy consumed, and average speed.



- **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.

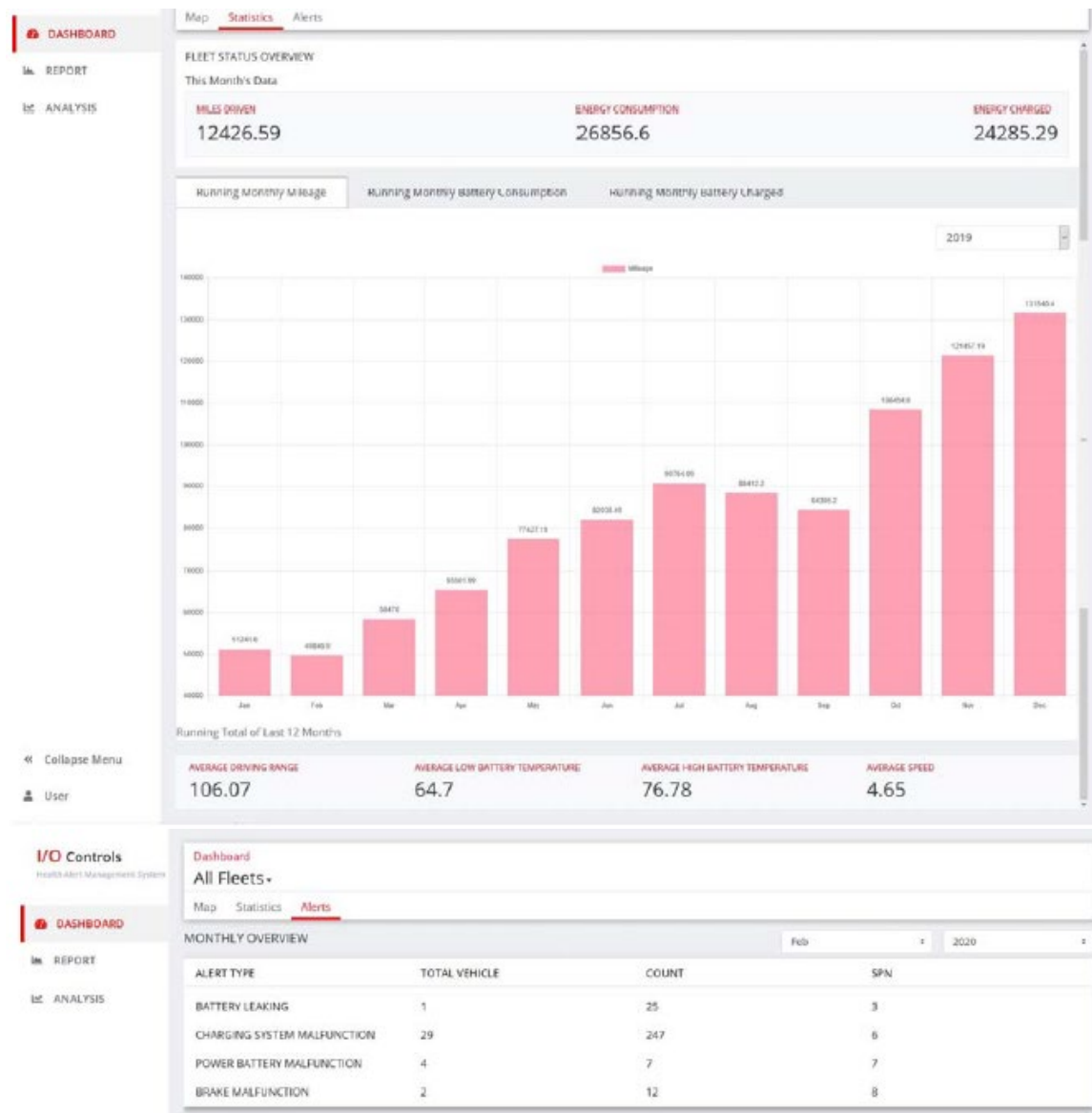
Map	Performance	Alerts	Route
ALERT TYPE			
TOTAL VEHICLE		COUNT	SPN
CHARGING SYSTEM MALFUNCTION		7056	6
POWER BATTERY MALFUNCTION		196	7
BRAKE MALFUNCTION		196	8

- **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 display shows 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

ELECTRIC BUS OPERATING RANGE

Based on RFP and Addendum feedback, BYD needs to provide Altoona On-Road Energy Consumption, and Range Tests requested in TS 8.1.

Below is the data:

The fuel economy data are obtained at the following conditions

1. Air conditioning off
2. Seated load weight during coast down
3. Exterior and interior lights on
4. Defroster off
5. Windows and Doors closed

BUS MODEL	USABLE BATTERY CAPACITY	DUTY CYCLE	ENERGY CONSUMPTION(KWH/MI)	NOMINAL RANGE(MILES)
30ft	266kWh	Manhattan cycle	1.81	146
		Orange County Bus Cycle	1.39	191
		EPA HD-UDDS Cycle	1.53	173
35ft kWh	391kWh	Manhattan cycle	2.453	159
		Orange County Bus Cycle	1.737	225
		EPA HD-UDDS Cycle	1.923	203
40ft(K9M)	313kWh	Central Business District (CBD)	1.994	156
		Arterial (ART)	2.536	123
		Commuter (COM)	1.427	219
40ft(K9MD)	446kWh	Manhattan cycle	2.52	176
		Orange County Bus Cycle	1.93	231
		EPA HD-UDDS Cycle	2.12	210
45ft	446kWh	Manhattan cycle	2.96	150
		Orange County Bus Cycle	2.27	196
		EPA HD-UDDS Cycle	2.49	179
60ft	578kWh	Central Business District (CBD)	3.236	178
		Arterial (ART)	3.744	154
		Commuter (COM)	2.093	276

VEHICLE MAINTAINAILITY

VEHICLE MAINTAINABILITY

One of the primary design goals of BYD's Low-Floor Electric Buses being proposed is to maximize the maintenance accessibility. A direct measure of this goal is the number of person-hours required to maintain each of the vehicles.

VEHICLE MAINTENANCE

First, BYD's major components used to power the Bus is designed and produced by BYD. BYD's buses utilize BYD's proprietary battery-electric propulsion system and drive train without using a standard transmission or other components used on a typical combustion engine. Leveraging our ability to produce these components allows BYD to have a complete understanding of how each of our components will best integrate into our entire bus system to provide the minimal amount of Preventative Maintenance needed to maintain our vehicles.

BYD has designed our buses maintenance components to be easily accessible. For example, the large rear high voltage electronics compartment door, large A/C interior grill with hinges, street and curbside radiator doors, and curbside battery rear battery compartment door have been designed to reduce maintenance hours by increasing access to each of these compartments of Maintenance personnel.

BYD has purposely designed our interior destination sign door that tailors directly to quick and direct access to the sign and window cleaning. In addition, we have placed the multiplex electrical system that can be accessed from the inside of the Bus within the electrical compartment area directly to the rear of the driver area and at the rear bulkhead.

BYD designed our buses with our customers in mind. We have ensured that any maintenance actions that need to be undertaken by our customers on our buses do not cause add person-hours or confusion that could lead to our customers having added fear or trepidation with electric buses. Our goal is to provide a reliable bus in vehicle performance, durability, safety, and cost-effectiveness in maintenance matters.

BYD believes that offering our customers next-generation technology does not have to provide next-generation complexity when it comes to maintenance. That's why BYD has designed each of our buses with our customers in mind to keep each Bus maintenance-friendly without compromising our innovative technological advances in transit bus evolution.

PREVENTATIVE MAINTENANCE INTERVALS

BYD's Preventative Maintenance (PM) schedule is based on intervals of 6,000 miles (except for specific major component requirements) beginning at 6,000 miles. BYD understands that many transit properties elect to use intervals of 3,000 miles; however, BYD's bus design minimizes the number of moving parts on the Bus, which affords transit properties the added value of adhering to the standard 6,000-mile intervals. BYD further recommends that the assigned driver perform a daily inspection of each Bus. This daily inspection checklist is often drawn from a portion of the PM program.

On average, the typical time to handle daily inspections is 10 minutes, and the time to conduct brake inspections is 15 minutes.

According to PM information gathered from BYD and our customers, BYD has compiled our PM schedule into three different tier levels A, B, and C. The A level is our standard PM inspection for every 6,000 miles. The B level is our inspection at 18,000 miles, including the first changing of only the Gear Oil. And the final C Level is at 36,000 miles, which includes changing both the gear and motor oils. The following are estimates that would apply to the following activities:

- The 6,000-mile inspection is estimated to take 3.5 person-hours.
- The 18,000-mile inspection is estimated to take 6 person-hours.
- The 36,000-mile inspection is estimated to take 8 person-hours.

BYD believes that PM inspections should not overuse person-hours that causes transit properties to have to keep their buses out of service for a total day. By having an advanced yet simple design for each of our buses, we can have each Bus continue to do what they are built for, to continue to offer full service to each rider within a community.

MEANTIME TO REPAIR

BYD has designed our transit buses to require a minimal amount of mean time to repair (MTTR) for all our components in the event of failure. In addition, our design allows for convenient accessibility for transit maintenance personnel to handle repairs of components after their warranty period has expired. Through our lessons learned from our current customers and Customer Service Department training courses on our vehicles, we have tabulated the expected times for repair for each component on our vehicle. Given that each transit property will have regularly available tools and equipment.

SERVICE TASK	BYD MTTR (HR., MIN.)
REMOVE AND REPLACE	
A/C Blower	0.7 hr.
A/C Condenser Motor	1 hr.
Access for Door Motor Adjustment	< 2 min.
Air Compressor	2.4 hrs.
Air Dryer Desiccant	15 min.
Batteries (Set)	30-45 min./pack
Brake Application Valve	0.3 hr.
Destination Sign System	1.5 hrs.
Driver's Seat	0.7 hr.
Electronics Unit (Regulator, PLC Module, Relay, Fuse, etc.)	15 min.
Exterior Mirror Glass	5 min.
Headlining Panels, Interior Individual (Less Handrails)	1 hr.
HVAC Unit (Complete System)	8 hrs.
Lamps, Passenger Lights	15 min.
Motors on BYD Drive Axle	4.5 hrs.
Motor Controllers/Inverters	1.5 hrs.
Power Steering Gear Box Assembly	1 hr.
PPA Mounts, Complete Set	2.8 hrs.
Radiator (2 mechanics)	2.4 hrs.
Seat Insert	< 1 min.
Shocks, Each	1.4 hrs.
Wheel Change, Front	0.9 hr.
Wheel Change, Rear Dual	0.9 hr.
Window Glazing, Passenger	1 hr.
Window Guard, Passenger Window and Door (If required)	6 min.
Wiper Motor	0.6 hr.

BATTERY END-OF-LIFE

BATTERY END-OF-LIFE

BYD'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, BYD 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.

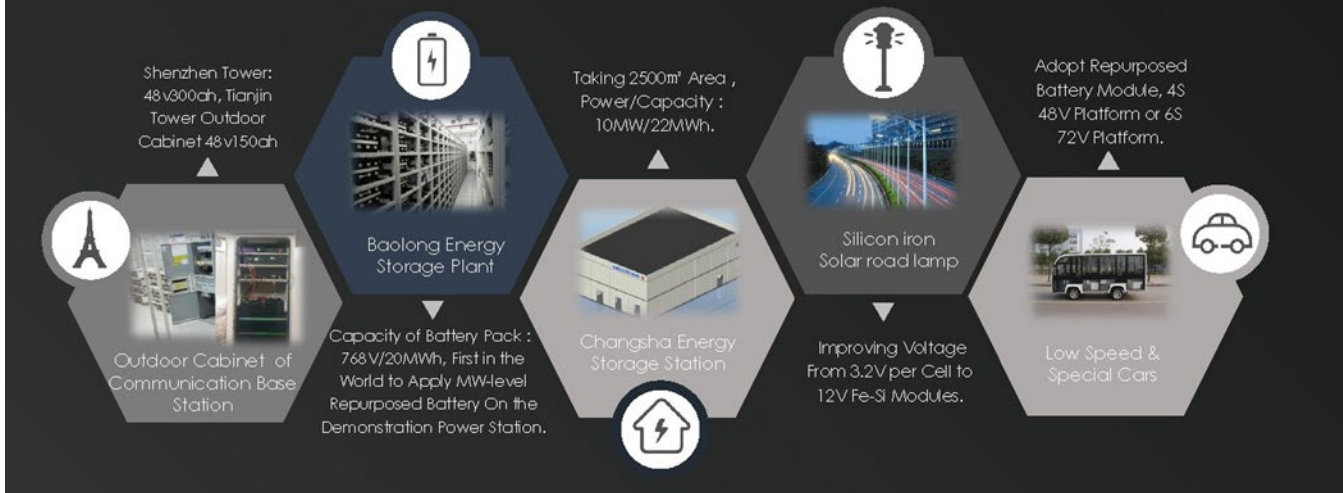
REPURPOSE & RECYCLE



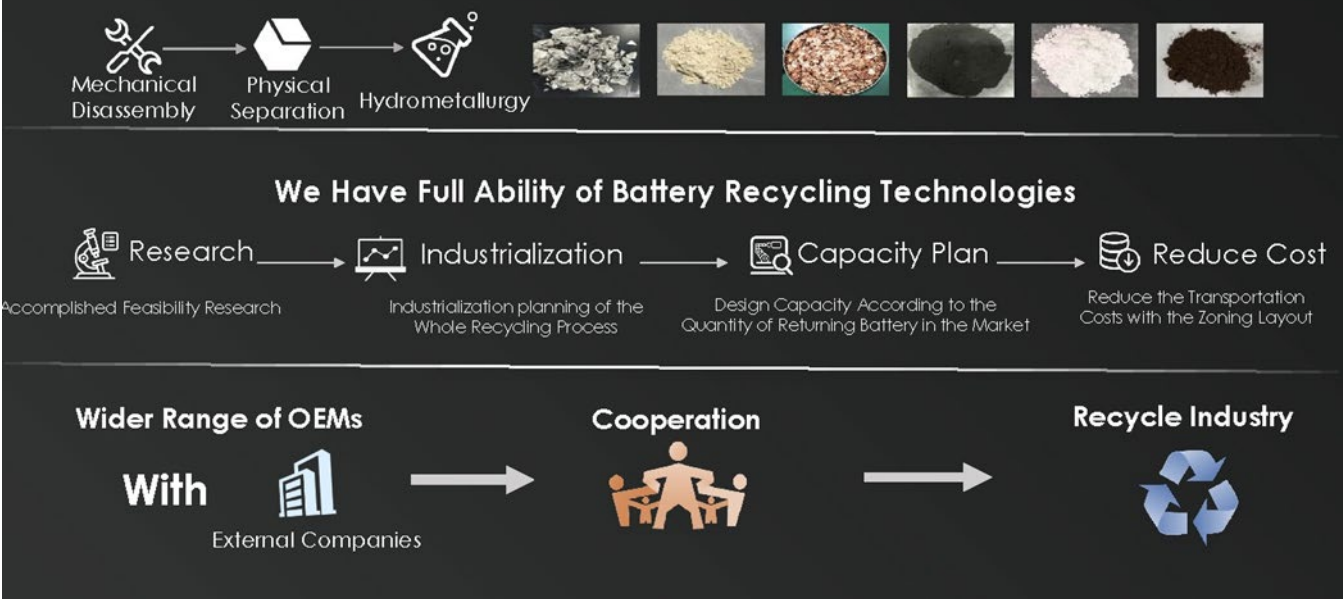
BYD's batteries can be re-purposed and used in a full Utility-Grade Energy Storage System. This second-life of the batteries in a Utility-Grade ESS can provide a complete power solution realizing power output smoothing, peaking shaving, frequency regulation, transient active power responding, and transient voltage supporting to keep the power system running safely, sustainability, and reliably.

BATTERY REPURPOSE APPLICATION

Application to Operators, Energy Storage, Low Speed Vehicles, Street Lamps, etc.



BATTERY RECYCLE OVERVIEW

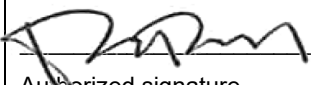


ACKNOWLEDGE OF ADDENDA



CER 3. Acknowledgement of Addenda

Failure to acknowledge receipt of all addenda may cause the Proposal to be considered nonresponsive to the Solicitation. Acknowledged receipt of each addendum must be clearly established and included with the Proposal.

The undersigned acknowledges receipt of the following addenda to the documents:			
Addendum No.: 1	Dated: 7/29/21	Addendum No.: 5	Dated: 9/1/21
Addendum No.: 2	Dated: 8/5/21	Addendum No.: 6	Dated: 9/10/21
Addendum No.: 3	Dated: 8/17/21	Addendum No.: 7	Dated: 9/15/21
Addendum No.: 4	Dated: 8/30/21	Addendum No.: 8	Dated: 9/20/21
Proposer: BYD Coach and Bus LLC Name: Patrick Duan Title: Senior Vice President of Operations Phone: (213) 748-3980 Street address: 1800 S. Figueroa St. City, state, ZIP: Los Angeles, CA 90015			
 Authorized signature			9/21/21 Date

CONTRACTOR SERVICE AND PARTS SUPPORT DATA



CER 4. Contractor Service and Parts Support Data

Location of nearest Technical Service Representative to Agency

Name: East Coast Service Center

Address: 33 Gregg Street Lodi, NJ 07644

Telephone: (201) 843-3052

Describe technical services readily available from said representative:

Service Provided: Customer Support/Troubleshooting, Warranty, Parts, Preventive Maintenance

Location of nearest Parts Distribution Center to Agency:

Name: East Coast Service Center

Address: 33 Gregg Street Lodi, NJ 07644

Telephone: (201) 843-3980

Describe the extent of parts available at said center:

All parts for local east coast model buses.

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

Regular method of shipment:

Cost to Agency:

Cost to Agency:

1. Customer no need to bear any cost if the parts still under warranty.
2. Customer should bear the freight if customer want to purchase parts, it is subject to actual freight. Freight will be listed in the invoice as a separate item.

FORM OF PROPOSAL DEVIATION



CER 5. Form for Proposal Deviation

This form shall be completed for each condition, exception, reservation or understanding (i.e., Deviation) in the Proposal according to “Conditions, Exceptions, Reservations or Understandings.” One copy without any price/cost information is to be placed in the Technical Proposal as specified in “Technical Proposal Requirements,” and a separate copy with any price/cost information placed in the Price Proposal as specified in “Price Proposal Requirements.”

PSTA

[RFP 21-980369]

Deviation No.: 1	Contractor: BYD	RFP section: TS 19 Altoona Testing	Page: 99
Complete description of Deviation: <p>The BYD K9MD will complete the Altoona test on Q2 of 2022</p>			
Rationale (pros and cons): <p>This will ensure that the bus delivered will be Altoona Tested and required by the RFP.</p>			

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PSTA

[RFP 21-980369]

Deviation No.: 2	Contractor: BYD	RFP section: TS 19 Altoona Testing	Page: 99
Complete description of Deviation: <p>The BYD C10M model will complete the Altoona test on Q4 of 2022</p>			
Rationale (pros and cons): <p>This will ensure that the bus delivered will be Altoona Tested and required by the RFP.</p>			

VEHICLE QUESTIONNAIRE



CER 10 VEHICLE TECHNICAL QUESTIONNAIRE K7M 30FT

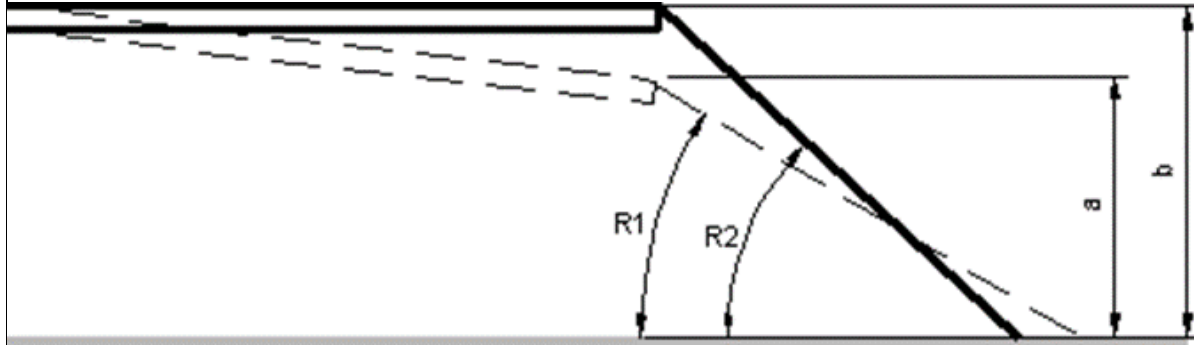
CER 10. Vehicle Technical Information

This form must be completed and included in the Technical Proposal. NOTE—one form must be completed for each type of bus submitted in the response to this RFP

GENERGA COACH DATA SHEET					
Bus manufacturer:		BYD Coach&Bus LLC			
Bus model:		K7M-ER			
Understructure manufacturer:		BYD			
Model number:		NA			
Size/Type of Bus		30ft			
Basic Body Construction					
Type:		Semi-monocoque body			
Tubing or frame member thickness and dimensions					
Overstructure		Aluminum tube from 1.57" × 2" × 0.12" to 11.09" × 2" × 0.12"			
Understructure		Steel tube from 1.18" × 1.18" × 0.06" to 6.3" × 2.36" × 0.24"			
Skin thickness and material					
Roof		0.06 in. Aluminum			
Sidewall		0.08 in. Aluminum			
Skirt panel		0.08 in. Aluminum			
Front end		0.12 in. Fiberglass			
Rear end		0.12 in. Fiberglass			
Dimensions					
Overall length	Over bumpers	29	ft	10.8	in
	Over Body	29	ft	3	in
Overall width	Over body excluding mirrors	8	ft	6	in
	Over body including mirrors-driving position	10	ft	0	in
	Over tires front axles	6	ft	11	in
	Over tires center axle	NA	ft	NA	in
	Over tires rear axles	6	ft	3	in
Overall height (maximum)		11	ft	2	in
Overall height (main roof line)		9	ft	7	in
Angle of approach					
Angle of approach		≥8.6	deg		
Breakover angle		≥8	deg		
Breakover angle (rear)		NA	deg		
Angle of departure		≥8.6	deg		
Doorway Dimensions					
Front		Rear			
Width between door posts	Bottom 45.2 Top 39.1	in.	41.3	in.	

Door width between panels	36.9	in.	36.3	in.
Clear door width	34.8	in.	33.3	in.
Doorway height	79	in.	77.3	in.
Knuckle clearance	>0.8	in.	>0.8	in.

Step height from ground measured at center of doorway



	Front doorway, empty			Ramp angle			Rear Doorway, empty		
Kneeled	a.	12.5	in.	R1	10	deg	a.	12.2	in.
Unkneeled	b.	15.2	in.	R2	12.2	deg	b.	15	in.

Interior head room (center of aisle)

Front axle location	96	in.
Center axle location	NA	in.
Rear axle location	74	in.

Aisle width between transverse seats ≥22 in.

Floor height above ground (centerline of bus)

At front door	15.2	in.
At front axle	16.1	in.
At drive axle	33.6	in.
At rear door	15	in.

Minimum ground clearance (between bus and ground, with bus unkneeled)

Excluding axles	10.1	in.
Including axles	5.8	in.

Horizontal turning envelope (see diagram below)

Outside body turning radius, TR0 (including bumper)	30	ft	10.8	in.
Front inner corner radius, TR1	25	ft	9.6	in.
Front wheel inner turning radius, TR2	20	ft	1	in.
Front wheel outer turning radius, TR3	25	ft	8	in.

Inside Body Turning Radius innermost point, TR4 (including bumper)					12	ft	9.5	in.			
Wheelbase											
Front	174.8	in.									
Rear	NA	in.									
Overhang, centerline of axle over bumper											
Front	87	in.									
Rear	97.4	in.									
Floor											
Interior length		26	ft.	1.5	in.						
Interior width (excluding coving)		7	ft.	6.7	in.						
Total standee area (approximately)		30	sq ft.								
Minimum distance between wheelhouses:		Front			35.5	in.					
		Rear			23.5	in.					
		Center			NA	in.					
Maximum interior floor slope (from horizontal)		3.3	deg								
Passenger capacity provided											
Total maximum seating		20									
Standee capacity		20									
Minimum hip to knee room		26	in.								
Minimum foot room		14	in.								
Weight											
	No. of people	Front axle			Center axle			Rear axle			Total bus
		Left	Right	Total	Left	Right	Total	Left	Right	Total	
Empty bus, full fuel	0	5398	5230	10629	NA	NA	NA	9170	8851	18021	28650

and farebox											
Fully seated, full fuel and farebox	20+1	5568	5276	10843	NA	NA	NA	10092	9514	19607	30450
Fully loaded standee and fully seated, full fuel and farebox	40+1	6591	6276	12866	NA	NA	NA	10845	11089	21934	34800
Crush load (1.5x fully loaded)	60+1	7159	6817	13975	NA	NA	NA	11780	12045	23825	37800
GVWR	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	37479
GAWR	NA	NA	NA	15653	NA	NA	NA	NA	NA	27778	43431

Energy Storage

Batteries – low voltage

Manufacturer	Odyssey
Type	AMG
Model Numbers	31-PC2150
Cold Cranking Amps	1150
Cranking Amps	1370 Amps
Reserve Capacity	205 Amps

Batteries – high voltage

Manufacturer	BYD
Type	LFP
Model Number	K01/K02
Total Battery Capacity (kWh)	295
Standard Charge Time	2-2.5
Charging Capacity	150kW
Operating Temperature Range	10 °F to 115 °F
Cooling/Heating System	BYD

Performance

Fuel Economy (w/full passenger load, HVAC, and all electric accessories in use)	BYD
Fuel Economy (w/full passenger load, HVAC, and all electric accessories in use)	LFP
Max Gradeability	K01/K02

Top Speed	295
Battery Range	2-2.5
Acceleration (20 MPH)	150kW
Acceleration (40 MPH)	10 °F to 115 °F
Top Speed (stated above)	BYD

Performance information/graphs to be attached with this form:

Energy consumption vs. Vehicle speed
 Vehicle speed vs. time (both loaded and unloaded)
 Vehicle speed vs. grade (both loaded and unloaded)
 Acceleration vs. time
 Change of acceleration vs. time

Traction Motor/Drive Motor				
Manufacturer		BYD		
Type		Permanent Magnet Synchronous Motor/3 Phase		
Speeds		Max 10000rpm		
Traction motor horsepower rating		550Nm*2		
Type ventilation/cooling		Liquid cooling		
Gear ratios	Forward:	17.7	Reverse:	17.7
Voltage Equalizer				
Manufacture		Vamer Incorporated		
Model		80-100-015-01-LVD		
Auxiliary Inverter (120/240)				
Manufacturer		COTEK		
Model		SD3500-124		
Inverter Technology		Step-up DC-AC inverter		
Output Voltage		100/110/115/120VAC ±3%		
Traction /Drive Motor				
Manufacturer		BYD		
Type		Permanent Magnet Synchronous Motor/3 Phase		
Model		BYDEQ13B		
Quantity		2		
Torque Rating		400Nm*2		

kWh Rating	110kW*2	
Air Compressor		
Manufacture	Knorr	
Type	Oil Flooded Screw	
Rated Capacity	11.4	CFM
Capacity at idle (approximately)	5.4	CFM
Capacity at maximum speed (engine)	18.3	CFM
Maximum warranted speed	4000	rpm
Speed idle	1500	rpm
Drive Type	Electric	
Governor:		
Cut-in pressure	105+/-5	psi
Cut-out pressure	125+/-5	psi
Axles		
First		
Manufacturer	ZF	
Type	Low Floor Front Axle	
Model Number	RL 82 A	
Gross Axle weight rating	15653	lb.
Axle load	See weight table	lb.
Second		
Manufacturer	BYD	
Type	In-wheel Motor Drive Axle	
Model Number	BYDEQ13B	
Gross Axle weight rating	27778	lb.
Axle load	See weight table	lb.
Third		
Manufacturer	NA	
Type	NA	
Model Number	NA	
Gross Axle weight rating	NA	lb.
Axle load	NA	lb.
Suspension system		
Manufacturer	ZF	

Type	First	Air	
	Second	Air	
	Third	NA	
Springs	First	2	
	Second	4	
	Third	NA	
Joint			
Manufacturer	NA		
Type	NA		
Model Number	NA		
Wheels and Tires			
Wheels			
Make	Alcoa		
Size	22.5 in x 8.25 in		
Capacity	8050 lbs		
Material	Aluminum Alloy		
Tires			
Manufacture	Michelin		
Type	Radial		
Size	305/70R 22.5		
Load range/air pressure	Psi 8050(single)/7390(dual) lbs / 130 psi		
Steering, power			
Pump			
Manufacture and model number	BYD		
Type	EHPS		
Relief pressure	2611	psi	
Booster/gear box			
Manufacture and model number	Bosch 8098 957 124		
Type	Ball-Nut Type		
Ratio	22.2		
Power steering fluid capacity			
Power steering fluid capacity	2.11	gal	

Maximum effort at steering wheel	9.35	lb (unloaded stationary coach on dry asphalt pavement)	
Steering wheel diameter	18	in.	
Brakes			
Make and fundamental brake system	Knorr		
Brake chambers vendor size and part number	First:	24 in Disc Brakes SN7	
	Second:	24 in Disc Brakes SB7	
	Third:	NA	
Brake operation effort	NA		
Slake adjuster's vendors' type and part numbers			
First:	Right:	NA	
	Left:	NA	
Second:	Right:	NA	
	Left:	NA	
Third:	Right:	NA	
	Left:	NA	
Length:	First take-up:	NA	
	Second take-up:	NA	
	Third take-up:	NA	
Brake_____Drums__X__Discs_____ (Placing X denoting type)			
First:	Manufacturer	Knorr	
	Part number	NA	
	Diameter	22.5	in.
Second:	Manufacturer	KNORR	
	Part number	NA	
	Diameter	22.5	in.
Third:	Manufacturer	NA	
	Part number	NA	
	Diameter	NA	in.
Brake lining/pad manufacturer	Knorr		
Type	T7400		
Brake lining/pad identification			

First:	Forward	NA	
	Reverse	NA	
Second:	Forward	NA	
	Reverse	NA	
Third:	Forward	NA	
	Reverse	NA	
Brake linings per shoe			
First	2		
Second	2		
Third	NA		
Brake lining widths			
First	4.3	in.	
Second	4.3	in.	
Third	NA	in.	
Brake lining/pad lengths			
First	9.748	in.	
Second	9.748	in.	
Third	NA	in.	
Brake lining thickness/pad			
		in.	
Brake lining/pad per axle			
First	60.14	sq. in.	
Second	60.14	sq. in.	
Third	NA	sq. in.	
Cooling System			
Radiator			
Manufacturer	Modine		
Type	Liquid Cooling		
Model number	PR0456580001		
Number of tubes			
Tubes outer diameter	0.74×0.05	in.	in.
Fins per inch	18	fins	

Fin thickness	0.0039	in.	
Total cooling and heating system capacity	5	gal	
Radiator fan speed control			
Surge tank capacity	2.28	qt	
Thermostat temperature setting:	Initial opening (fully closed)	104	°F
	Fully open	125.6	°F
Overheat alarm temperature sending unit setting	149	°F	
Shutdown temperature setting	185	°F	
Air reservoir capacity			
Supply reservoir	NA	cu in.	
Primary reservoir	1831	cu in.	
Secondary reservoir	1831	cu in.	
Packing reservoir	1831	cu in.	
Accessory reservoir	5493	cu in.	
Other reservoir type	1831	cu in.	
Heating, ventilation and air conditioning equipment			
Heating system capacity	68243	BTU/hr.	
Air conditioning capacity	81891	BTU	
Ventilating capacity	589	CFM	
Compressor			
Manufacturer	Panasonic		
Model	C650		
Number of cylinders	1		
Drive ratio	NA		
Maximum warranted speed	NA	rpm	
Operating speed	Variable	rpm (recommended)	
Weight	51.8	lb.	
Oil capacity	Dry	0.5	gal
	Wet	NA	gal
Refrigerant:	Type	R410a	14.3 lb.
Condenser			

Manufacturer	NA	
Model	NA	
Number of fins/in.	NA	
Outer diameter of tube	0.08	in.
Fin thickness	NA	in.
Condenser Fan		
Manufacturer	SPAL	
Model	VA89	
Fan diameter	12	in.
Speed maximum	3400	rpm
Flow rate (maximum)	NA	CFM
Receiver		
Manufacturer	NA	
Model		
Capacity		
Condenser fan drive motors		
Manufacturer	SPAL	
Model	NA	
Type	Brushless	
Horsepower	0.27	hp
Operating speed	2600	rpm
Evaporator fan drive motors		
Manufacturer	NA	
Model	NA	
Type	NA	
Horsepower	0.74	hp
Operating speed	1400	rpm
Evaporator(s)		
Manufacturer	BYD	
Model	NA	
Number of rows	18	
Number of fins/in.	NA	
Outer diameter of tube	0.28	in.

Fin thickness	0.004	in.
Number of evaporators	NA	
Expansion valve		
Manufacturer	BYD	
Model	NA	
Filter-drier		
Manufacturer	BYD	
Model	NA	
Heater cores		
Manufacturer	BYD	
Model	PTC	
Capacity	NA	Btu/hr.
Number of rows	NA	
Number of fins/in.	NA	
Outer diameter of tube	NA	in.
Fin thickness	NA	in.
Number of heater cores	NA	
Floor heater blowers		
Front	2 (optional)	
Rear	2 (optional)	
Controls		
Manufacturer	BYD	
Model	PTC	
Driver's heater		
Manufacturer	BYD	
Model	Electric Driven PTC	
Capacity	4095	Btu/hr.
Ventilation system		
Type	Centrifugal	
Coolant Heater		

Make	BYD		
Model	NA		
Capacity	34130	Btu	
Interior lighting			
Manufacturer	I/O Controls		
Type	NICHIA 757 8 LED PCB		
Number of fixtures	12		
Size of fixtures	72"		
Power pack	IOC-8001-803		
Doors			
Front			
Manufacturer of operating equipment	Vapor		
Type of door	Slide Glide		
Type of operating equipment	Electric		
Rear			
Manufacturer of operating equipment	Vapor		
Type of door	Slide Glide		
Type of operating equipment	Electric		
Passenger windows			
Front			
Manufacturer	Ricon		
Model	NA		
Type	Hidden Frame		
Number:	Side	7+1(driver side)	
	Rear	NA	
Sizes:	59.4" x 35.7" (Driver's)	47.5" x 40.9" / 58.6" x 40.9" (L)	44.3" x 40.9" / 58.3" x 40.9" (L)
	45.4" x 40.9" / 39.6" x 40.9" (R)	44.3" x 40.9" / 58.3" x 40.9" (R)	
Glazing:	Type	Tempered	
	Thickness	3/16"	
	Color of tint	Grey	
	Light transmission	≥50%	

Mirrors					
	Size	Type	Manufacturer	Part no.	Model no.
Right side exterior	6.85" x 14.7"	Remote control	Safefleet	RS-7-D815HRFHRCX-OTS	NA
Left side exterior	6.85" x 14.7"	Remote control	Safefleet	CS-2-1 D815HRFHRCX-OTS AR	NA
Center rearview	8" x 16"	Flat	Safefleet	A1706-1	NA
Front entrance area	6"	Round, Convex	Safefleet	A1712	NA
Upper-right corner	6"	Round, Convex	Safefleet	A1712	NA
Rear exit area	12"	Round, Convex	Safefleet	A6011-1	NA
Seats					
Passenger					
Manufacturer			FREEDMAN		
Model			4-ONE GEMINI		
Type			Cantilever		
Operator					
Manufacturer			Recaro		
Model and part number			800.00.7R1.CC11		
Type			Air Control		
Paint					
Manufacturer			Axalta / PPG		
Type			Fast drying, oil based		
Wheelchair ramp equipment					
Manufacturer			Ricon		
Model number			SSR-0M27291Y00		
Capacity			1000	lb.	
Width of platform			30	in.	
Length of platform			51.4	in.	
System fluid capacity			NA	qt	

Type of fluid used	NA	
Operating hydraulic pressure	NA	psi
Hydraulic cylinders:	Size	NA
	Number	NA
Wheelchair securement equipment		
Manufacturer	Q'Straint (or Customer Preference)	
Model number	4-point securement (or Customer Preference)	
Destination signs		
Manufacturer	I/O Controls	
Type	Diamond Dot Destination Sign System	
Character length		
Front destination	4.25	in.
Front route	4.628	in.
Curbside destination	3.75	in.
Rear route	4	in.
Character height		
Front destination	6.625	in.
Front route	8.125	in.
Curbside destination	5	in.
Rear route	6.25	in.
Number of characters		
Front destination	10	
Front route	3	
Curbside destination	9	
Rear route	3	
Message width		
Front destination	64	in.
Front route	14	in.
Curbside destination	44	in.
Rear route	17.25	in.
Electrical		

Multiplex System				
Manufacturer		I/O Controls		
Model number		G4		
Batteries				
Manufacturer		Odyssey		
Model number		31-PC2150		
Type		AGM		
Communication System				
GPS				
Manufacturer		I/O Controls		
Model number		IO VDL G4		
PA system				
	Manufacturer	Model number	Number	
Amplifier	REI	REI-700890	1	Amplifier
Microphone	REI	REI-480054BK	1	Microphone
Internal speakers	REI	220010	8	Internal speakers
External speaker	REI	230049	1	External speaker
Energy Storage				
Type		LFP		
Number of cells		3.2	V	
Battery pack voltage		672	V	
Weight		4,630	lb.	
Security camera system				
Manufacturer		Luminator(or Customer preference)		
Model number		RR-HDRK12-4000		
Number of cameras		10		
Storage capacity		10TB		
Bike racks				
Manufacturer		SportWorks(or Customer preference)		
Model number		2 position		

Fire Detection System		
Manufacturer	Amerex	
Model number	V25 / VH25 ABC	
Fire detectors	Yes	
Type (thermal or optical)	Thermal	
Number of detectors	8	
Automatic voice annunciator system		
Manufacturer	Clever Device – Or Customer Preference	
Model and part number	IVN 3TN/301-221-1029	
Annunciator LED sign		
Number of signs	2	
Housing dimensions	33.24*4 in	
Character length	33	in.
Character height	4	in.
Character width	2.16	in.
GPS antenna		
Manufacturer	Clever Device – Or Customer Preference	
Model and part number	2467	
Automatic passenger counter		
Manufacturer	Clever Device- Or Customer Preference	
Model and part number	a.	118-300-0110PL
	b.	118-300-0101PL
	c.	118-300-0102PL
Sensor type	Reflective Infrared Sensor	
Real-time bus arrival prediction system		
	Manufacturer	Model number
Router	Optional-Customer Preference	
Cellular modem	Optional-Customer Preference	
Charge protection	Optional-Customer Preference	

NOTE: All information above is accurate to the timeframe upon submission. The Agency reserves the right to update above data if changes occur, upon consultation with the customer.

CER 10 VEHICLE TECHNICAL QUESTIONNAIRE K8M 35FT

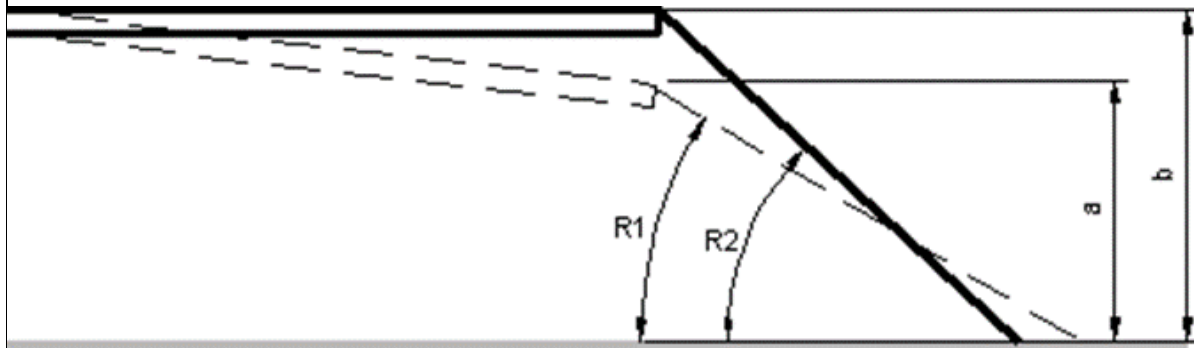
CER 10. Vehicle Technical Information

This form must be completed and included in the Technical Proposal. NOTE—one form must be completed for each type of bus submitted in the response to this RFP

GENERGA COACH DATA SHEET					
Bus manufacturer:		BYD Coach&Bus LLC			
Bus model:		K8M			
Understructure manufacturer:		BYD			
Model number:		NA			
Size/Type of Bus		35ft			
Basic Body Construction					
Type:		Semi-monocoque body			
Tubing or frame member thickness and dimensions					
Overstructure		Aluminum tube from 1.57" × 2" × 0.12" to 11.09" × 2" × 0.12"			
Understructure		Steel tube from 1.18" × 1.18" × 0.06" to 6.3" × 2.36" × 0.24"			
Skin thickness and material					
Roof		0.06 in. Aluminum			
Sidewall		0.08 in. Aluminum			
Skirt panel		0.08 in. Aluminum			
Front end		0.12 in. Fiberglass			
Rear end		0.12 in. Fiberglass			
Dimensions					
Overall length	Over bumpers	35	ft	9.6	in
	Over Body	35	ft	2.9	in
Overall width	Over body excluding mirrors	8	ft	6	in
	Over body including mirrors-driving position	10	ft	0	in
	Over tires front axles	6	ft	11	in
	Over tires center axle	NA	ft	NA	in
	Over tires rear axles	6	ft	3	in
Overall height (maximum)		11	ft	2	in
Overall height (main roof line)		9	ft	7	in
Angle of approach					
Angle of approach		≥8.6	deg		
Breakover angle		≥8	deg		
Breakover angle (rear)		NA	deg		
Angle of departure		≥8.6	deg		
Doorway Dimensions					
Doorway Dimensions		Front		Rear	

Width between door posts	Bottom 45.2 Top 39.1	in.	41.3	in.
Door width between panels	36.9	in.	36.3	in.
Clear door width	34.8	in.	33.3	in.
Doorway height	79	in.	78.5	in.
Knuckle clearance	> 0.8	in.	> 0.8	in.

Step height from ground measured at center of doorway



	Front doorway, empty			Ramp angle			Rear Doorway, empty		
Kneeled	a.	12.5	in.	R1	10	deg	a.	12.2	in.
Unkneeled	b.	15.2	in.	R2	12.2	deg	b.	15	in.

Interior head room (center of aisle)

Front axle location	96	in.
Center axle location	NA	in.
Rear axle location	74	in.

Aisle width between transverse seats ≥22 in.

Floor height above ground (centerline of bus)

At front door	15.2	in.
At front axle	16.1	in.
At drive axle	33.6	in.
At rear door	15	in.

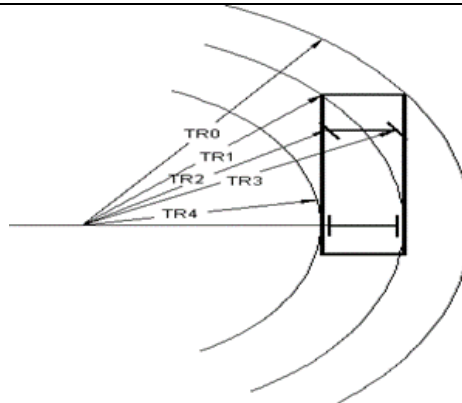
Minimum ground clearance (between bus and ground, with bus unkneeled)

Excluding axles	10.1	in.
Including axles	5.8	in.

Horizontal turning envelope (see diagram below)

Outside body turning radius, TR0 (including bumper)	35	ft	4.8	in.
---	----	----	-----	-----

Front inner corner radius, TR1	29	ft	10.8	in.
Front wheel inner turning radius, TR2	24	ft	4.8	in.
Front wheel outer turning radius, TR3	30	ft	0	in.
Inside Body Turning Radius innermost point, TR4 (including bumper)	12	ft	2.4	in.

**Wheelbase**

Front	222.7	in.
Rear	NA	in.

Overhang, centerline of axle over bumper

Front	87	in.
Rear	120	in.

Floor

Interior length	30	ft.	0	in.
Interior width (excluding coving)	7	ft.	6	in.
Total standee area (approximately)	42	sq ft.		
Minimum distance between wheelhouses:	Front		35.5	in.
	Rear		23.5	in.
	Center		NA	in.
Maximum interior floor slope (from horizontal)	3.3	deg		

Passenger capacity provided

Total maximum seating	32	
Standee capacity	28	
Minimum hip to knee room	26	in.
Minimum foot room	14	in.

Weight

	No. of people	Front axle			Center axle			Rear axle			Total bus
		Left	Right	Total	Left	Right	Total	Left	Right	Total	

Empty bus, full fuel and farebox	0	5502	5477	10979	NA	NA	NA	10592	10539	21141	32120
Fully seated, full fuel and farebox	32+1	6084	5909	11993	NA	NA	NA	12733	12344	25077	37070
Fully loaded standee and fully seated, full fuel and farebox	60+1	7142	6962	14108	NA	NA	NA	13780	13382	27162	41270
Crush load (1.5x fully loaded)	90+1	7921	7721	15646	NA	NA	NA	15283	14841	30124	45770
GVWR	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	41888
GAWR	NA	NA	NA	15653	NA	NA	NA	NA	NA	27778	43431
Energy Storage											
Batteries – low voltage											
Manufacturer							Odyssey				
Type							AMG				
Model Numbers							31-PC2150				
Cold Cranking Amps							1150				
Cranking Amps							1370 Amps				
Reserve Capacity							205 Amps				
Batteries – high voltage											
Manufacturer							BYD				
Type							LFP				
Model Number							K01/K02				
Total Battery Capacity (kWh)							435				
Standard Charge Time							3-3.5				
Charging Capacity							150kW				
Operating Temperature Range							10 °F to 115 °F				
Cooling/Heating System							BYD				
Performance											

Fuel Economy (w/full passenger load, HVAC, and all electric accessories in use)	2kwh/mile
Fuel Economy (w/full passenger load, HVAC, and all electric accessories in use)	15.35
Max Gradeability	≥18
Top Speed	65
Battery Range	196
Acceleration (20 MPH)	≤10
Acceleration (40 MPH)	≤30
Top Speed (stated above)	≤60

Performance information/graphs to be attached with this form:

Energy consumption vs. Vehicle speed
Vehicle speed vs. time (both loaded and unloaded)
Vehicle speed vs. grade (both loaded and unloaded)
Acceleration vs. time
Change of acceleration vs. time

Traction Motor/Drive Motor				
Manufacturer		BYD		
Type		Permanent Magnet Synchronous Motor/3 Phase		
Speeds		Max 10000rpm		
Traction motor horsepower rating		550Nm*2		
Type ventilation/cooling		Liquid cooling		
Gear ratios	Forward:	17.7	Reverse:	17.7
Voltage Equalizer				
Manufacture		Vamer Incorporated		
Model		80-100-015-01-LVD		
Auxiliary Inverter (120/240)				
Manufacturer		COTEK		
Model		SD3500-124		
Inverter Technology		Step-up DC-AC inverter		
Output Voltage		100/110/115/120VAC ±3%		
Traction /Drive Motor				
Manufacturer		BYD		

Type	Permanent Magnet Synchronous Motor/3 Phase	
Model	BYDEQ13B	
Quantity	2	
Torque Rating	400Nm*2	
kWh Rating	110kW*2	
Air Compressor		
Manufacture	Knorr	
Type	Oil Flooded Screw	
Rated Capacity	11.4	CFM
Capacity at idle (approximately)	5.4	CFM
Capacity at maximum speed (engine)	18.3	CFM
Maximum warranted speed	4000	rpm
Speed idle	1500	rpm
Drive Type	Electric	
Governor:		
Cut-in pressure	105+/-5	psi
Cut-out pressure	125+/-5	psi
Axles		
First		
Manufacturer	ZF	
Type	Low Floor Front Axle	
Model Number	RL 82 A	
Gross Axle weight rating	15653	lb.
Axle load	See weight table	lb.
Second		
Manufacturer	BYD	
Type	In-wheel Motor Drive Axle	
Model Number	BYDEQ13B	
Gross Axle weight rating	27778	lb.
Axle load	See weight table	lb.
Third		
Manufacturer	NA	
Type	NA	
Model Number	NA	
Gross Axle weight rating	NA	lb.

Axle load	NA	lb.
Suspension system		
Manufacturer	ZF	
Type	First	Air
	Second	Air
	Third	NA
Springs	First	2
	Second	4
	Third	NA
Joint		
Manufacturer	NA	
Type	NA	
Model Number	NA	
Wheels and Tires		
Wheels		
Make	Alcoa	
Size	22.5 in x 8.25 in	
Capacity	8050 lbs	
Material	Aluminum Alloy	
Tires		
Manufacture	Michelin	
Type	Radial	
Size	305/70R 22.5	
Load range/air pressure	Psi 8050(single)/7390(dual) lbs / 130 psi	
Steering, power		
Pump		
Manufacture and model number	BYD	
Type	EHPS	
Relief pressure	2611	psi
Booster/gear box		
Manufacture and model number	Bosch 8098 957 124	
Type	Ball-Nut Type	

Ratio	22.2		
Power steering fluid capacity	2.11	gal	
Maximum effort at steering wheel	9.35	lb (unloaded stationary coach on dry asphalt pavement)	
Steering wheel diameter	18	in.	
Brakes			
Make and fundamental brake system	Knorr		
Brake chambers vendor size and part number	First:	24 in Disc Brakes SN7	
	Second:	24 in Disc Brakes SB7	
	Third:	NA	
Brake operation effort	NA		
Slake adjuster's vendors' type and part numbers			
First:	Right:	NA	
	Left:	NA	
Second:	Right:	NA	
	Left:	NA	
Third:	Right:	NA	
	Left:	NA	
Length:	First take-up:	NA	
	Second take-up:	NA	
	Third take-up:	NA	
Brake _____ Drums _X_ Discs _____ (Placing X denoting type)			
First:	Manufacturer	Knorr	
	Part number	NA	
	Diameter	22.5	in.
Second:	Manufacturer	KNORR	
	Part number	NA	
	Diameter	22.5	in.
Third:	Manufacturer	NA	
	Part number	NA	
	Diameter	NA	in.
Brake lining/pad manufacturer	Knorr		

Type	T7400	
Brake lining/pad identification		
First:	Forward	NA
	Reverse	NA
Second:	Forward	NA
	Reverse	NA
Third:	Forward	NA
	Reverse	NA
Brake linings per shoe		
First	2	
Second	2	
Third	NA	
Brake lining widths		
First	4.3	in.
Second	4.3	in.
Third	NA	in.
Brake lining/pad lengths		
First	9.748	in.
Second	9.748	in.
Third	NA	in.
Brake lining thickness/pad		
	0.827	in.
Brake lining/pad per axle		
First	60.14	sq. in.
Second	60.14	sq. in.
Third	NA	sq. in.
Cooling System		
Radiator		
Manufacturer	Modine	
Type	Liquid Cooling	
Model number	PR0456580001	

Number of tubes	72			
Tubes outer diameter	0.74×0.05	in.		in.
Fins per inch	18		fins	
Fin thickness	0.0039		in.	
Total cooling and heating system capacity	5		gal	
Radiator fan speed control	1200 – 4750 rpm			
Surge tank capacity	2.28		qt	
Thermostat temperature setting:	Initial opening (fully closed)		104	°F
	Fully open		125.6	°F
Overheat alarm temperature sending unit setting	149		°F	
Shutdown temperature setting	185		°F	
Air reservoir capacity				
Supply reservoir	NA	cu in.		
Primary reservoir	1831	cu in.		
Secondary reservoir	1831	cu in.		
Packing reservoir	1831	cu in.		
Accessory reservoir	5493	cu in.		
Other reservoir type	1831	cu in.		
Heating, ventilation and air conditioning equipment				
Heating system capacity	68243	BTU/hr.		
Air conditioning capacity	81891	BTU		
Ventilating capacity	589	CFM		
Compressor				
Manufacturer	Panasonic			
Model	C650			
Number of cylinders	1			
Drive ratio	NA			
Maximum warranted speed	NA	rpm		
Operating speed	Variable	rpm (recommended)		
Weight	51.8	lb.		
Oil capacity	Dry	0.5	gal	
	Wet	NA	gal	

Refrigerant:	Type	R410a	14.3	lb.
Condenser				
Manufacturer		NA		
Model		NA		
Number of fins/in.		NA		
Outer diameter of tube		0.08	in.	
Fin thickness		NA	in.	
Condenser Fan				
Manufacturer		SPAL		
Model		VA89		
Fan diameter		12	in.	
Speed maximum		3400	rpm	
Flow rate (maximum)		NA	CFM	
Receiver				
Manufacturer		NA		
Model				
Capacity				
Condenser fan drive motors				
Manufacturer		SPAL		
Model		NA		
Type		Brushless		
Horsepower		0.27	hp	
Operating speed		2600	rpm	
Evaporator fan drive motors				
Manufacturer		NA		
Model		NA		
Type		NA		
Horsepower		0.74	hp	
Operating speed		1400	rpm	
Evaporator(s)				
Manufacturer		BYD		
Model		NA		

Number of rows	18	
Number of fins/in.	NA	
Outer diameter of tube	0.28	in.
Fin thickness	0.004	in.
Number of evaporators	NA	
Expansion valve		
Manufacturer	BYD	
Model	NA	
Filter-drier		
Manufacturer	BYD	
Model	NA	
Heater cores		
Manufacturer	BYD	
Model	PTC	
Capacity	NA	Btu/hr.
Number of rows	NA	
Number of fins/in.	NA	
Outer diameter of tube	NA	in.
Fin thickness	NA	in.
Number of heater cores	NA	
Floor heater blowers		
Front	2 (optional)	
Rear	2 (optional)	
Controls		
Manufacturer	BYD	
Model	PTC	
Driver's heater		
Manufacturer	BYD	
Model	Electric Driven PTC	
Capacity	4095	Btu/hr.
Ventilation system		

Type	Centrifugal		
Coolant Heater			
Make	BYD		
Model	NA		
Capacity	34130	Btu	
Interior lighting			
Manufacturer	I/O Controls		
Type	NICHIA 757 8 LED PCB		
Number of fixtures	12		
Size of fixtures	72"		
Power pack	IOC-8001-803		
Doors			
Front			
Manufacturer of operating equipment	Vapor		
Type of door	Slide Glide		
Type of operating equipment	Electric		
Rear			
Manufacturer of operating equipment	Vapor		
Type of door	Slide Glide		
Type of operating equipment	Electric		
Passenger windows			
Front			
Manufacturer	Ricon		
Model	NA		
Type	Hidden Frame		
Number:	Side	8+1(driver side)	
	Rear	NA	
Sizes:	57.8" x 45.2" / 60.2" x 45.2" (L)	47.8" x 45.2" / 60.0" x 45.2" (L)	60.0" x 45.2" / 60.0" x 45.2" (L)
	54.0" x 45.2" / 57.8" x 45.2" (R)	37.4" x 45.2" / 45.9" x 45.2" (R)	60.0" x 45.2" / 60.0" x 45.2" (R)
Glazing:	Type	Tempered	

	Thickness	3/16"			
	Color of tint	Grey			
	Light transmission	≥50%			
Mirrors					
	Size	Type	Manufacturer	Part no.	Model no.
Right side exterior	6.85" x 14.7"	Remote control	Safefleet	RS-7-D815HRFHRCX-OTS	NA
Left side exterior	6.85" x 14.7"	Remote control	Safefleet	CS-2-1 D815HRFHRCX-OTS AR	NA
Center rearview	8" x 16"	Flat	Safefleet	A1706-1	NA
Front entrance area	6"	Round, Convex	Safefleet	A1712	NA
Upper-right corner	6"	Round, Convex	Safefleet	A1712	NA
Rear exit area	12"	Round, Convex	Safefleet	A6011-1	NA
Seats					
Passenger					
Manufacturer			FREEDMAN		
Model			4-ONE GEMINI		
Type			Cantilever		
Operator					
Manufacturer			Recaro		
Model and part number			800.00.7R1.CC11		
Type			Air Control		
Paint					
Manufacturer			Axalta / PPG		
Type			Fast drying, oil based		
Wheelchair ramp equipment					
Manufacturer			Ricon		
Model number			SSR-0M27291Y00		
Capacity			1000	lb.	

Width of platform	30	in.
Length of platform	51.4	in.
System fluid capacity	NA	qt
Type of fluid used	NA	
Operating hydraulic pressure	NA	psi
Hydraulic cylinders:	Size	NA
	Number	NA
Wheelchair securement equipment		
Manufacturer	Q'Straint (or Customer Preference)	
Model number	4-point securement (or Customer Preference)	
Destination signs		
Manufacturer	I/O Controls	
Type	Diamond Dot Destination Sign System	
Character length		
Front destination	4.25	in.
Front route	4.628	in.
Curbside destination	3.75	in.
Rear route	4	in.
Character height		
Front destination	6.625	in.
Front route	8.125	in.
Curbside destination	5	in.
Rear route	6.25	in.
Number of characters		
Front destination	10	
Front route	3	
Curbside destination	9	
Rear route	3	
Message width		
Front destination	64	in.
Front route	14	in.
Curbside destination	44	in.
Rear route	17.25	in.

Electrical				
Multiplex System				
Manufacturer		I/O Controls		
Model number		G4		
Batteries				
Manufacturer		Odyssey		
Model number		31-PC2150		
Type		AGM		
Communication System				
GPS				
Manufacturer		I/O Controls		
Model number		IO VDL G4		
PA system				
	Manufacturer	Model number	Number	
Amplifier	REI	REI-700890	1	
Microphone	REI	REI-480054BK	1	
Internal speakers	REI	220010	8	
External speaker	REI	230049	1	
Energy Storage				
Type		LFP		
Number of cells		3.2	V	
Battery pack voltage		640	V	
Weight		6,835	lb.	
Security camera system				
Manufacturer		Luminator(or Customer preference)		
Model number		RR-HDRK12-4000		
Number of cameras		10		
Storage capacity		10TB		
Bike racks				

Manufacturer		SportWorks(or Customer preference)	
Model number		2 position	
Fire Detection System			
Manufacturer		Amerex	
Model number		V25 / VH25 ABC	
Fire detectors		Yes	
Type (thermal or optical)		Thermal	
Number of detectors		8	
Automatic voice annunciator system			
Manufacturer		Clever Device – Or Customer Preference	
Model and part number		IVN 3TN/301-221-1029	
Annunciator LED sign			
Number of signs		2	
Housing dimensions		33.24*4 in	
Character length		33	in.
Character height		4	in.
Character width		2.16	in.
GPS antenna			
Manufacturer		Clever Device – Or Customer Preference	
Model and part number		2467	
Automatic passenger counter			
Manufacturer		Clever Device- Or Customer Preference	
Model and part number	a.	118-300-0110PL	
	b.	118-300-0101PL	
	c.	118-300-0102PL	
Sensor type		Reflective Infrared Sensor	
Real-time bus arrival prediction system			
	Manufacturer	Model number	

Router	Optional-Customer Preference	
Cellular modem	Optional-Customer Preference	
Charge protection	Optional-Customer Preference	
NOTE: All information above is accurate to the timeframe upon submission. The Agency reserves the right to update above data if changes occur, upon consultation with the customer.		

CER 10 VEHICLE TECHNICAL QUESTIONNAIRE K9M 40FT

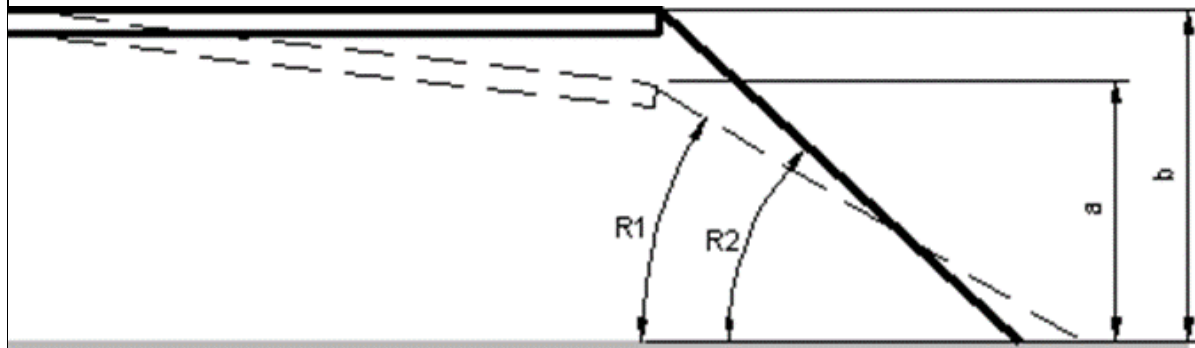
CER 10. Vehicle Technical Information

This form must be completed and included in the Technical Proposal. NOTE—one form must be completed for each type of bus submitted in the response to this RFP

GENERGAL COACH DATA SHEET					
Bus manufacturer:		BYD Coach&Bus LLC			
Bus model:		K9M			
Understructure manufacturer:		BYD			
Model number:		NA			
Size/Type of Bus		40ft			
Basic Body Construction					
Type:		Semi-monocoque body			
Tubing or frame member thickness and dimensions					
Overstructure		Aluminum tube from 1.57" × 2" × 0.12" to 11.09" × 2" × 0.12"			
Understructure		Steel tube from 1.18" × 1.18" × 0.06" to 6.3" × 2.36" × 0.24"			
Skin thickness and material					
Roof		0.06 in. Aluminum			
Sidewall		0.08 in. Aluminum			
Skirt panel		0.08 in. Aluminum			
Front end		0.12 in. Fiberglass			
Rear end		0.12 in. Fiberglass			
Dimensions					
Overall length	Over bumpers	40	ft	2.4	in
	Over Body	39	ft	7.1	in
Overall width	Over body excluding mirrors	8	ft	6	in
	Over body including mirrors-driving position	10	ft	0	in
	Over tires front axles	6	ft	11	in
	Over tires center axle	NA	ft	NA	in
	Over tires rear axles	6	ft	3	In
Overall height (maximum)		11	ft	2	in
Overall height (main roof line)		9	ft	7	in
Angle of approach					
Angle of approach		≥8.6	deg		
Breakover angle		≥8	deg		
Breakover angle (rear)		NA	deg		
Angle of departure		≥8.6	deg		
Doorway Dimensions					
Doorway Dimensions		Front		Rear	

Width between door posts	Bottom 48.3 Top 43.5	in.	42.3	in.
Door width between panels	42.8	in.	38.3	in.
Clear door width	34.8	in.	36	in.
Doorway height	76	in.	77.5	in.
Knuckle clearance	>0.8	in.	>0.8	in.

Step height from ground measured at center of doorway



	Front doorway, empty			Ramp angle			Rear Doorway, empty		
Kneeled	a.	13	in.	R1	10.4	deg	a.	15.8	in.
Unkneeled	b.	14.4	in.	R2	12.4	deg	b.	15.8	in.

Interior head room (center of aisle)

Front axle location	96	in.
Center axle location	NA	in.
Rear axle location	74	in.

Aisle width between transverse seats ≥22 in.

Floor height above ground (centerline of bus)

At front door	15.4	in.
At front axle	16.1	in.
At drive axle	37	in.
At rear door	15.8	in.

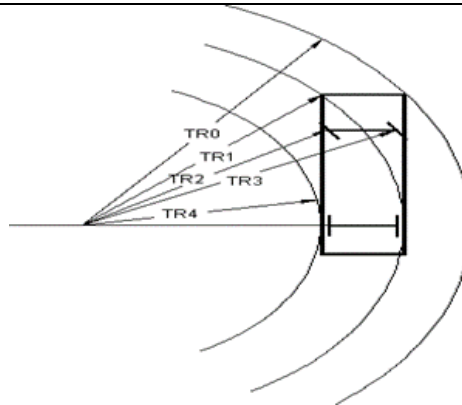
Minimum ground clearance (between bus and ground, with bus unkneeled)

Excluding axles	10.1	in.
Including axles	5.8	in.

Horizontal turning envelope (see diagram below)

Outside body turning radius, TR0 (including bumper)	41	ft	8.4	in.
---	----	----	-----	-----

Front inner corner radius, TR1	35	ft	9.6	in.
Front wheel inner turning radius, TR2	29	ft	9.6	in.
Front wheel outer turning radius, TR3	35	ft	3.6	in.
Inside Body Turning Radius innermost point, TR4 (including bumper)	21	ft	0	in.

**Wheelbase**

Front	246.1	in.
Rear	NA	in.

Overhang, centerline of axle over bumper

Front	102.4	in.
Rear	134.49	in.

Floor

Interior length	35	ft.	10.6	in.
Interior width (excluding coving)	7	ft.	11	in.
Total standee area (approximately)	46.6	sq ft.		
Minimum distance between wheelhouses:	Front	35.5	in.	
	Rear	23.5	in.	
	Center	NA	in.	
Maximum interior floor slope (from horizontal)	3.3	deg		

Passenger capacity provided

Total maximum seating	37	
Standee capacity	29	
Minimum hip to knee room	26	in.
Minimum foot room	14	in.

Weight

	No. of people	Front axle			Center axle			Rear axle			Total bus
		Left	Right	Total	Left	Right	Total	Left	Right	Total	

Empty bus, full fuel and farebox	0	5591	5642	11233	NA	NA	NA	10429	10528	20957	32190
Fully seated, full fuel and farebox	37+1	6356	6257	12613	NA	NA	NA	12744	12533	25277	37890
Fully loaded standee and fully seated, full fuel and farebox	66+1	7494	7401	14905	NA	NA	NA	14015	13320	27335	42240
Crush load (1.5x fully loaded)	99+1	8372	8268	16652	NA	NA	NA	15657	14881	30538	47190
GVWR	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	43431
GAWR	NA	NA	NA	15653	NA	NA	NA	NA	NA	27778	43431
Energy Storage											
Batteries – low voltage											
Manufacturer							Odyssey				
Type							AMG				
Model Numbers							31-PC2150				
Cold Cranking Amps							1150				
Cranking Amps							1370 Amps				
Reserve Capacity							205 Amps				
Batteries – high voltage											
Manufacturer							BYD				
Type							LFP				
Model Number							K01/K02				
Total Battery Capacity (kWh)							348				
Standard Charge Time							2-2.5				
Charging Capacity							150kW				
Operating Temperature Range							10 °F to 115 °F				
Cooling/Heating System							BYD				
Performance											
Fuel Economy (w/full passenger load, HVAC, and all electric accessories in use)							2.0kWh/mil				
Fuel Economy (w/full passenger load, HVAC, and all electric accessories in use)							16.85				
Max Gradeability							≥17				
Top Speed							65				
Battery Range							157				

Acceleration (20 MPH)	<=10
Acceleration (40 MPH)	<=30
Top Speed (stated above)	65mph

Performance information/graphs to be attached with this form:

Energy consumption vs. Vehicle speed
 Vehicle speed vs. time (both loaded and unloaded)
 Vehicle speed vs. grade (both loaded and unloaded)
 Acceleration vs. time
 Change of acceleration vs. time

Traction Motor/Drive Motor				
Manufacturer		BYD		
Type		Permanent Magnet Synchronous Motor/3 Phase		
Speeds		Max 10000rpm		
Traction motor horsepower rating		550Nm*2		
Type ventilation/cooling		Liquid cooling		
Gear ratios	Forward:	17.7	Reverse:	17.7
Voltage Equalizer				
Manufacture		Vamer Incorporated		
Model		80-100-015-01-LVD		
Auxiliary Inverter (120/240)				
Manufacturer		COTEK		
Model		SD3500-124		
Inverter Technology		Step-up DC-AC inverter		
Output Voltage		100/110/115/120VAC ±3%		
Traction /Drive Motor				
Manufacturer		BYD		
Type		Permanent Magnet Synchronous Motor/3 Phase		
Model		BYDEQ13B		
Quantity		2		
Torque Rating		400Nm*2		
kWh Rating		110kW*2		

Air Compressor		
Manufacture	Knorr	
Type	Oil Flooded Screw	
Rated Capacity	11.4	CFM
Capacity at idle (approximately)	5.4	CFM
Capacity at maximum speed (engine)	18.3	CFM
Maximum warranted speed	4000	rpm
Speed idle	1500	rpm
Drive Type	Electric	
Governor:		
Cut-in pressure	105+/-5	psi
Cut-out pressure	125+/-5	psi
Axles		
First		
Manufacturer	ZF	
Type	Low Floor Front Axle	
Model Number	RL 82 A	
Gross Axle weight rating	15653	lb.
Axle load	See weight table	lb.
Second		
Manufacturer	BYD	
Type	In-wheel Motor Drive Axle	
Model Number	BYDEQ13B	
Gross Axle weight rating	27778	lb.
Axle load	See weight table	lb.
Third		
Manufacturer	NA	
Type	NA	
Model Number	NA	
Gross Axle weight rating	NA	lb.
Axle load	NA	lb.
Suspension system		
Manufacturer	ZF	
Type	First	Air
	Second	Air

	Third	NA
Springs	First	2
	Second	4
	Third	NA
Joint		
Manufacturer	NA	
Type	NA	
Model Number	NA	
Wheels and Tires		
Wheels		
Make	Alcoa	
Size	22.5 in x 8.25 in	
Capacity	8050 lbs	
Material	Aluminum Alloy	
Tires		
Manufacture	Michelin	
Type	Radial	
Size	305/70R 22.5	
Load range/air pressure	Psi 8050(single)/7390(dual) lbs / 130 psi	
Steering, power		
Pump		
Manufacture and model number	BYD	
Type	EHPS	
Relief pressure	2611	psi
Booster/gear box		
Manufacture and model number	Bosch 8098 957 124	
Type	Ball-Nut Type	
Ratio	22.2	
Power steering fluid capacity	2.11	gal
Maximum effort at steering wheel	9.35	lb (unloaded stationary coach on dry asphalt pavement)
Steering wheel diameter	18	in.

Brakes			
Make and fundamental brake system	Knorr		
Brake chambers vendor size and part number	First:	24 in Disc Brakes SN7	
	Second:	24 in Disc Brakes SB7	
	Third:	NA	
Brake operation effort	NA		
Slake adjuster's vendors' type and part numbers			
First:	Right:	NA	
	Left:	NA	
Second:	Right:	NA	
	Left:	NA	
Third:	Right:	NA	
	Left:	NA	
Length:	First take-up:	NA	
	Second take-up:	NA	
	Third take-up:	NA	
Brake _____ Drums _X_ Discs _____ (Placing X denoting type)			
First:	Manufacturer	Knorr	
	Part number	NA	
	Diameter	22.5	in.
Second:	Manufacturer	KNORR	
	Part number	NA	
	Diameter	22.5	in.
Third:	Manufacturer	NA	
	Part number	NA	
	Diameter	NA	in.
Brake lining/pad manufacturer			
Type	T7400		
Brake lining/pad identification			
First:	Forward	NA	
	Reverse	NA	
Second:	Forward	NA	

	Reverse	NA
Third:	Forward	NA
	Reverse	NA
Brake linings per shoe		
First	2	
Second	2	
Third	NA	
Brake lining widths		
First	4.3	in.
Second	4.3	in.
Third	NA	in.
Brake lining/pad lengths		
First	9.748	in.
Second	9.748	in.
Third	NA	in.
Brake lining thickness/pad	0.827	in.
Brake lining/pad per axle		
First	60.14	sq. in.
Second	60.14	sq. in.
Third	NA	sq. in.
Cooling System		
Radiator		
Manufacturer	Modine	
Type	Liquid Cooling	
Model number	PR0456580001	
Number of tubes	72	
Tubes outer diameter	0.74×0.05	in.
Fins per inch	18	fins
Fin thickness	0.0039	in.
Total cooling and heating system capacity	5	gal
Radiator fan speed control	1200 – 4750 rpm	

Surge tank capacity	2.28	qt	
Thermostat temperature setting:	Initial opening (fully closed)	104	°F
	Fully open	125.6	°F
Overheat alarm temperature sending unit setting	149	°F	
Shutdown temperature setting	185	°F	
Air reservoir capacity			
Supply reservoir	NA	cu in.	
Primary reservoir	1831	cu in.	
Secondary reservoir	1831	cu in.	
Packing reservoir	1831	cu in.	
Accessory reservoir	5493	cu in.	
Other reservoir type	1831	cu in.	
Heating, ventilation and air conditioning equipment			
Heating system capacity	68243	BTU/hr.	
Air conditioning capacity	81891	BTU	
Ventilating capacity	589	CFM	
Compressor			
Manufacturer	Panasonic		
Model	C650		
Number of cylinders	1		
Drive ratio	NA		
Maximum warranted speed	NA	rpm	
Operating speed	Variable	rpm (recommended)	
Weight	51.8	lb.	
Oil capacity	Dry	0.5	gal
	Wet	NA	gal
Refrigerant:	Type	R410a	14.3 lb.
Condenser			
Manufacturer	NA		
Model	NA		
Number of fins/in.	NA		

Outer diameter of tube	0.08	in.
Fin thickness	NA	in.
Condenser Fan		
Manufacturer	SPAL	
Model	VA89	
Fan diameter	12	in.
Speed maximum	3400	rpm
Flow rate (maximum)	NA	CFM
Receiver		
Manufacturer	NA	
Model		
Capacity		
Condenser fan drive motors		
Manufacturer	SPAL	
Model	NA	
Type	Brushless	
Horsepower	0.27	hp
Operating speed	2600	rpm
Evaporator fan drive motors		
Manufacturer	NA	
Model	NA	
Type	NA	
Horsepower	0.74	hp
Operating speed	1400	rpm
Evaporator(s)		
Manufacturer	BYD	
Model	NA	
Number of rows	18	
Number of fins/in.	NA	
Outer diameter of tube	0.28	in.
Fin thickness	0.004	in.
Number of evaporators	NA	

Expansion valve		
Manufacturer	BYD	
Model	NA	
Filter-drier		
Manufacturer	BYD	
Model	NA	
Heater cores		
Manufacturer	BYD	
Model	PTC	
Capacity	NA	Btu/hr.
Number of rows	NA	
Number of fins/in.	NA	
Outer diameter of tube	NA	in.
Fin thickness	NA	in.
Number of heater cores	NA	
Floor heater blowers		
Front	2 (optional)	
Rear	2 (optional)	
Controls		
Manufacturer	BYD	
Model	PTC	
Driver's heater		
Manufacturer	BYD	
Model	Electric Driven PTC	
Capacity	4095	Btu/hr.
Ventilation system		
Type	Centrifugal	
Coolant Heater		
Make	BYD	
Model	NA	
Capacity	34130	Btu

Interior lighting			
Manufacturer		I/O Controls	
Type		NICHIA 757 8 LED PCB	
Number of fixtures		12	
Size of fixtures		72"	
Power pack		IOC-8001-803	
Doors			
Front			
Manufacturer of operating equipment		Vapor	
Type of door		Slide Glide	
Type of operating equipment		Electric	
Rear			
Manufacturer of operating equipment		Vapor	
Type of door		Slide Glide	
Type of operating equipment		Electric	
Passenger windows			
Front			
Manufacturer		Ricon	
Model		NA	
Type		Hidden Frame	
Number:		Side	7+1(driver side)
		Rear	NA
Sizes:	59.4" x 35.7" (Driver's)	47.5" x 40.9" / 58.6" x 40.9" (L)	44.3" x 40.9" / 58.3" x 40.9" (L)
	45.4" x 40.9" / 39.6" x 40.9" (R)	44.3" x 40.9" / 58.3" x 40.9" (R)	
Glazing:		Type	Tempered
		Thickness	3/16"
		Color of tint	Grey
		Light transmission	≥50%
Mirrors			

	Size	Type	Manufacturer	Part no.	Model no.			
Right side exterior	6.85" x 14.7"	Remote control	Safefleet	RS-7-D815HRFHRCX-OTS	NA			
Left side exterior	6.85" x 14.7"	Remote control	Safefleet	CS-2-1 D815HRFHRCX-OTS AR	NA			
Center rearview	8" x 16"	Flat	Safefleet	A1706-1	NA			
Front entrance area	6"	Round, Convex	Safefleet	A1712	NA			
Upper-right corner	6"	Round, Convex	Safefleet	A1712	NA			
Rear exit area	12"	Round, Convex	Safefleet	A6011-1	NA			
Seats								
Passenger								
Manufacturer			FREEDMAN					
Model			4-ONE GEMINI					
Type			Cantilever					
Operator								
Manufacturer			Recaro					
Model and part number			800.00.7R1.CC11					
Type			Air Control					
Paint								
Manufacturer			Axalta / PPG					
Type			Fast drying, oil based					
Wheelchair ramp equipment								
Manufacturer			Ricon					
Model number			SSR-0M27291Y00					
Capacity			1000	lb.				
Width of platform			30	in.				
Length of platform			51.4	in.				
System fluid capacity			NA	qt				
Type of fluid used			NA					
Operating hydraulic pressure			NA	psi				

Hydraulic cylinders:	Size	NA
	Number	NA
Wheelchair securement equipment		
Manufacturer	Q'Straint (or Customer Preference)	
Model number	4-point securement (or Customer Preference)	
Destination signs		
Manufacturer	I/O Controls	
Type	Diamond Dot Destination Sign System	
Character length		
Front destination	4.25	in.
Front route	4.628	in.
Curbside destination	3.75	in.
Rear route	4	in.
Character height		
Front destination	6.625	in.
Front route	8.125	in.
Curbside destination	5	in.
Rear route	6.25	in.
Number of characters		
Front destination	10	
Front route	3	
Curbside destination	9	
Rear route	3	
Message width		
Front destination	64	in.
Front route	14	in.
Curbside destination	44	in.
Rear route	17.25	in.
Electrical		
Multiplex System		
Manufacturer	I/O Controls	
Model number	G4	

Batteries				
Manufacturer		Odyssey		
Model number		31-PC2150		
Type		AGM		
Communication System				
GPS				
Manufacturer		I/O Controls		
Model number		IO VDL G4		
PA system				
	Manufacturer	Model number	Number	
Amplifier	REI	REI-700890	1	
Microphone	REI	REI-480054BK	1	
Internal speakers	REI	220010	8	
External speaker	REI	230049	1	
Energy Storage				
Type		LFP		
Number of cells		3.2	V	
Battery pack voltage		512	V	
Weight		5,467	lb.	
Security camera system				
Manufacturer		Luminator(or Customer preference)		
Model number		RR-HDRK12-4000		
Number of cameras		10		
Storage capacity		10TB		
Bike racks				
Manufacturer		SportWorks(or Customer preference)		
Model number		2 position		
Fire Detection System				
Manufacturer		Amerex		

Model number	V25 / VH25 ABC	
Fire detectors	Yes	
Type (thermal or optical)	Thermal	
Number of detectors	8	
Automatic voice annunciator system		
Manufacturer	Clever Device – Or Customer Preference	
Model and part number	IVN 3TN/301-221-1029	
Annunciator LED sign		
Number of signs	2	
Housing dimensions	33.24*4 in	
Character length	33	in.
Character height	4	in.
Character width	2.16	in.
GPS antenna		
Manufacturer	Clever Device – Or Customer Preference	
Model and part number	2467	
Automatic passenger counter		
Manufacturer	Clever Device- Or Customer Preference	
Model and part number	a.	118-300-0110PL
	b.	118-300-0101PL
	c.	118-300-0102PL
Sensor type	Reflective Infrared Sensor	
Real-time bus arrival prediction system		
	Manufacturer	Model number
Router	Optional-Customer Preference	
Cellular modem	Optional-Customer Preference	
Charge protection	Optional-Customer Preference	

NOTE: All information above is accurate to the timeframe upon submission. The Agency reserves the right to update above data if changes occur, upon consultation with the customer.

CER 10 VEHICLE TECHNICAL QUESTIONNAIRE K9MD 40FT

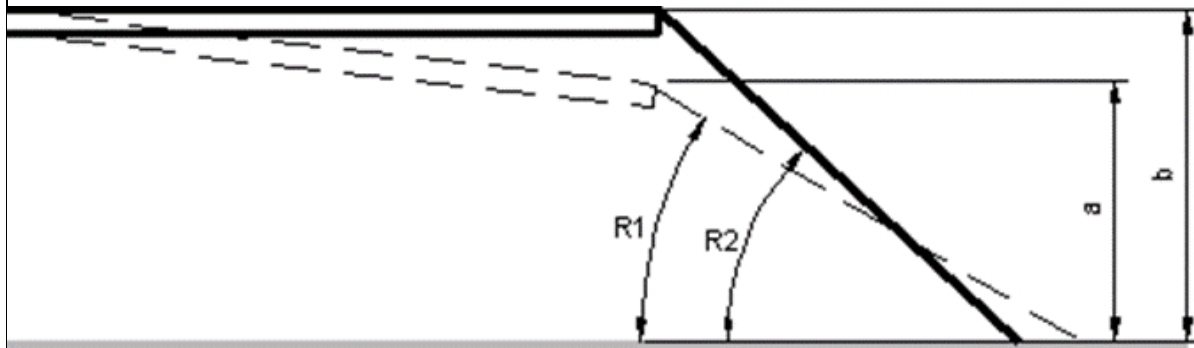
CER 10. Vehicle Technical Information

This form must be completed and included in the Technical Proposal. NOTE—one form must be completed for each type of bus submitted in the response to this RFP

GENERGAL COACH DATA SHEET					
Bus manufacturer:		BYD Coach&Bus LLC			
Bus model:		K9MD			
Understructure manufacturer:		BYD			
Model number:		NA			
Size/Type of Bus		40ft			
Basic Body Construction					
Type:		Semi-monocoque body			
Tubing or frame member thickness and dimensions					
Overstructure		Aluminum tube from 1.57" × 2" × 0.12" to 11.09" × 2" × 0.12"			
Understructure		Steel tube from 1.18" × 1.18" × 0.06" to 6.3" × 2.36" × 0.24"			
Skin thickness and material					
Roof		0.06 in. Aluminum			
Sidewall		0.08 in. Aluminum			
Skirt panel		0.08 in. Aluminum			
Front end		0.12 in. Fiberglass			
Rear end		0.12 in. Fiberglass			
Dimensions					
Overall length	Over bumpers	40	ft	10.8	in
	Over Body	39	ft	3.5	in
Overall width	Over body excluding mirrors	8	ft	6	in
	Over body including mirrors-driving position	10	ft	0	in
	Over tires front axles	6	ft	11	in
	Over tires center axle	NA	ft	NA	in
	Over tires rear axles	6	ft	3	in
Overall height (maximum)		11	ft	2	in
Overall height (main roof line)		9	ft	7	in
Angle of approach					
Angle of approach		≥8.6	deg		
Breakover angle		≥8	deg		
Breakover angle (rear)		NA	deg		
Angle of departure		≥8.6	deg		
Doorway Dimensions					
Doorway Dimensions		Front		Rear	

Width between door posts	Bottom 45.2 Top 39.1	in.	41.3	in.
Door width between panels	36.9	in.	37.9	in.
Clear door width	33.7	in.	33.7	in.
Doorway height	77	in.	77	in.
Knuckle clearance	> 0.8	in.	> 0.8	in.

Step height from ground measured at center of doorway



	Front doorway, empty			Ramp angle			Rear Doorway, empty		
Kneeled	a.	11.7	in.	R1	9.4	deg	a.	13	in.
Unkneeled	b.	14.8	in.	R2	11.9	deg	b.	14.2	in.

Interior head room (center of aisle)

Front axle location	96	in.
Center axle location	NA	in.
Rear axle location	74	in.

Aisle width between transverse seats ≥22 in.

Floor height above ground (centerline of bus)

At front door	14.8	in.
At front axle	16.1	in.
At drive axle	37	in.
At rear door	14.2	in.

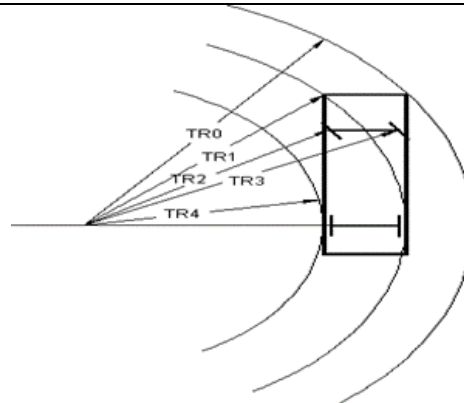
Minimum ground clearance (between bus and ground, with bus unkneeled)

Excluding axles	10.3	in.
Including axles	5.8	in.

Horizontal turning envelope (see diagram below)

Outside body turning radius, TR0 (including bumper)	43	ft	7.2	in.
---	----	----	-----	-----

Front inner corner radius, TR1	38	ft	2.4	in.
Front wheel inner turning radius, TR2	33	ft	3.6	in.
Front wheel outer turning radius, TR3	38	ft	10.8	in.
Inside Body Turning Radius innermost point, TR4 (including bumper)	23	ft	0	in.

**Wheelbase**

Front	284	in.
Rear	NA	in.

Overhang, centerline of axle over bumper

Front	87	in.
Rear	120	in.

Floor

Interior length	36	ft.	5.8	in.
Interior width (excluding coving)	7	ft.	11	in.
Total standee area (approximately)	47.6	sq ft.		
Minimum distance between wheelhouses:	Front	35.5	in.	
	Rear	23.5	in.	
	Center	NA	in.	
Maximum interior floor slope (from horizontal)	3.3	deg		

Passenger capacity provided

Total maximum seating	42	
Standee capacity	18	
Minimum hip to knee room	26	in.
Minimum foot room	14	in.

Weight

	No. of people	Front axle			Center axle			Rear axle			Total bus
		Left	Right	Total	Left	Right	Total	Left	Right	Total	

Empty bus, full fuel and farebox	0	6118	6172	12290	NA	NA	NA	11371	11479	22850	35140
Fully seated, full fuel and farebox	42+1	7013	6912	13925	NA	NA	NA	13947	13718	27665	41590
Fully loaded standee and fully seated, full fuel and farebox	60+1	7868	7788	15656	NA	NA	NA	14344	14290	28634	44290
Crush load (1.5x fully loaded)	90+1	8134	8052	16186	NA	NA	NA	16333	16271	32604	48790
GVWR	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	44754
GAWR	NA	NA	NA	16090	NA	NA	NA	NA	NA	29100	44754
Energy Storage											
Batteries – low voltage											
Manufacturer							Odyssey				
Type							AMG				
Model Numbers							31-PC2150				
Cold Cranking Amps							1150				
Cranking Amps							1370 Amps				
Reserve Capacity							205 Amps				
Batteries – high voltage											
Manufacturer							BYD				
Type							LFP				
Model Number							K01/K02				
Total Battery Capacity (kWh)							496				
Standard Charge Time							3-3.5				
Charging Capacity							150kW				
Operating Temperature Range							10 °F to 115 °F				
Cooling/Heating System							BYD				
Performance											
Fuel Economy (w/full passenger load, HVAC, and all electric accessories in use)							2.2 kWh/mil				
Fuel Economy (w/full passenger load, HVAC, and all electric accessories in use)							13.96				
Max Gradeability							≥23				
Top Speed							65				
Battery Range							203				

Acceleration (20 MPH)	≤10
Acceleration (40 MPH)	≤30
Top Speed (stated above)	≤60

Performance information/graphs to be attached with this form:

Energy consumption vs. Vehicle speed
 Vehicle speed vs. time (both loaded and unloaded)
 Vehicle speed vs. grade (both loaded and unloaded)
 Acceleration vs. time
 Change of acceleration vs. time

Traction Motor/Drive Motor				
Manufacturer		BYD		
Type		Permanent Magnet Synchronous Motor/3 Phase		
Speeds		Max 5000rpm		
Traction motor horsepower rating		750Nm*2		
Type ventilation/cooling		Liquid cooling		
Gear ratios	Forward:	8.6	Reverse:	8.6
Voltage Equalizer				
Manufacture		Vamer Incorporated		
Model		80-100-015-01-LVD		
Auxiliary Inverter (120/240)				
Manufacturer		COTEK		
Model		SD3500-124		
Inverter Technology		Step-up DC-AC inverter		
Output Voltage		100/110/115/120VAC ±3%		
Traction /Drive Motor				
Manufacturer		BYD		
Type		Permanent Magnet Synchronous Motor/3 Phase		
Model		BYDEQ13A		
Quantity		2		
Torque Rating		750Nm*2		
kWh Rating		150kW*2		

Air Compressor		
Manufacture	Knorr	
Type	Oil Flooded Screw	
Rated Capacity	11.4	CFM
Capacity at idle (approximately)	5.4	CFM
Capacity at maximum speed (engine)	18.3	CFM
Maximum warranted speed	4000	rpm
Speed idle	1500	rpm
Drive Type	Electric	
Governor:		
Cut-in pressure	105+/-5	psi
Cut-out pressure	125+/-5	psi
Axles		
First		
Manufacturer	ZF	
Type	Low Floor Front Axle	
Model Number	RL 82 A	
Gross Axle weight rating	16090	lb.
Axle load	See weight table	lb.
Second		
Manufacturer	BYD	
Type	In-wheel Motor Drive Axle	
Model Number	BYDEQ13A	
Gross Axle weight rating	29100	lb.
Axle load	See weight table	lb.
Third		
Manufacturer	NA	
Type	NA	
Model Number	NA	
Gross Axle weight rating	NA	lb.
Axle load	NA	lb.
Suspension system		
Manufacturer	ZF	
Type	First	Air
	Second	Air

	Third	NA
Springs	First	2
	Second	4
	Third	NA
Joint		
Manufacturer	NA	
Type	NA	
Model Number	NA	
Wheels and Tires		
Wheels		
Make	Alcoa	
Size	22.5 in x 8.25 in	
Capacity	8050 lbs	
Material	Aluminum Alloy	
Tires		
Manufacture	Michelin	
Type	Radial	
Size	305/70R 22.5	
Load range/air pressure	Psi 8050(single)/7390(dual) lbs / 130 psi	
Steering, power		
Pump		
Manufacture and model number	BYD	
Type	EHPS	
Relief pressure	2611	psi
Booster/gear box		
Manufacture and model number	Bosch 8098 957 124	
Type	Ball-Nut Type	
Ratio	22.2	
Power steering fluid capacity		
	2.11	gal
Maximum effort at steering wheel	9.35	lb (unloaded stationary coach on dry asphalt pavement)
Steering wheel diameter	18	in.

Brakes			
Make and fundamental brake system	Knorr		
Brake chambers vendor size and part number	First:	24 in Disc Brakes SN7	
	Second:	24 in Disc Brakes SB7	
	Third:	NA	
Brake operation effort	NA		
Slake adjuster's vendors' type and part numbers			
First:	Right:	NA	
	Left:	NA	
Second:	Right:	NA	
	Left:	NA	
Third:	Right:	NA	
	Left:	NA	
Length:	First take-up:	NA	
	Second take-up:	NA	
	Third take-up:	NA	
Brake _____ Drums _X_ Discs _____ (Placing X denoting type)			
First:	Manufacturer	Knorr	
	Part number	NA	
	Diameter	22.5	in.
Second:	Manufacturer	KNORR	
	Part number	NA	
	Diameter	22.5	in.
Third:	Manufacturer	NA	
	Part number	NA	
	Diameter	NA	in.
Brake lining/pad manufacturer			
Type	T7400		
Brake lining/pad identification			
First:	Forward	NA	
	Reverse	NA	
Second:	Forward	NA	

	Reverse	NA
Third:	Forward	NA
	Reverse	NA
Brake linings per shoe		
First	2	
Second	2	
Third	NA	
Brake lining widths		
First	4.3	in.
Second	4.3	in.
Third	NA	in.
Brake lining/pad lengths		
First	9.748	in.
Second	9.748	in.
Third	NA	in.
Brake lining thickness/pad	0.827	in.
Brake lining/pad per axle		
First	60.14	sq. in.
Second	60.14	sq. in.
Third	NA	sq. in.
Cooling System		
Radiator		
Manufacturer	Modine	
Type	Liquid Cooling	
Model number	PR0456580001	
Number of tubes	72	
Tubes outer diameter	0.74x0.05	in. in.
Fins per inch	18	fins
Fin thickness	0.0039	in.
Total cooling and heating system capacity	5	gal
Radiator fan speed control	1200 – 4750 rpm	

Surge tank capacity	2.28	qt	
Thermostat temperature setting:	Initial opening (fully closed)	104	°F
	Fully open	125.6	°F
Overheat alarm temperature sending unit setting	149	°F	
Shutdown temperature setting	185	°F	
Air reservoir capacity			
Supply reservoir	NA	cu in.	
Primary reservoir	1831	cu in.	
Secondary reservoir	1831	cu in.	
Packing reservoir	1831	cu in.	
Accessory reservoir	5493	cu in.	
Other reservoir type	1831	cu in.	
Heating, ventilation and air conditioning equipment			
Heating system capacity	68243	BTU/hr.	
Air conditioning capacity	81891	BTU	
Ventilating capacity	589	CFM	
Compressor			
Manufacturer	Panasonic		
Model	C650		
Number of cylinders	1		
Drive ratio	NA		
Maximum warranted speed	NA	rpm	
Operating speed	Variable	rpm (recommended)	
Weight	51.8	lb.	
Oil capacity	Dry	0.5	gal
	Wet	NA	gal
Refrigerant:	Type	R410a	14.3 lb.
Condenser			
Manufacturer	NA		
Model	NA		
Number of fins/in.	NA		

Outer diameter of tube	0.08	in.
Fin thickness	NA	in.
Condenser Fan		
Manufacturer	SPAL	
Model	VA89	
Fan diameter	12	in.
Speed maximum	3400	rpm
Flow rate (maximum)	NA	CFM
Receiver		
Manufacturer	NA	
Model		
Capacity		
Condenser fan drive motors		
Manufacturer	SPAL	
Model	NA	
Type	Brushless	
Horsepower	0.27	hp
Operating speed	2600	rpm
Evaporator fan drive motors		
Manufacturer	NA	
Model	NA	
Type	NA	
Horsepower	0.74	hp
Operating speed	1400	rpm
Evaporator(s)		
Manufacturer	BYD	
Model	NA	
Number of rows	18	
Number of fins/in.	NA	
Outer diameter of tube	0.28	in.
Fin thickness	0.004	in.
Number of evaporators	NA	

Expansion valve		
Manufacturer	BYD	
Model	NA	
Filter-drier		
Manufacturer	BYD	
Model	NA	
Heater cores		
Manufacturer	BYD	
Model	PTC	
Capacity	NA	Btu/hr.
Number of rows	NA	
Number of fins/in.	NA	
Outer diameter of tube	NA	in.
Fin thickness	NA	in.
Number of heater cores	NA	
Floor heater blowers		
Front	2 (optional)	
Rear	2 (optional)	
Controls		
Manufacturer	BYD	
Model	PTC	
Driver's heater		
Manufacturer	BYD	
Model	Electric Driven PTC	
Capacity	4095	Btu/hr.
Ventilation system		
Type	Centrifugal	
Coolant Heater		
Make	BYD	
Model	NA	
Capacity	34130	Btu

Interior lighting			
Manufacturer		I/O Controls	
Type		NICHIA 757 8 LED PCB	
Number of fixtures		12	
Size of fixtures		72"	
Power pack		IOC-8001-803	
Doors			
Front			
Manufacturer of operating equipment		Vapor	
Type of door		Slide Glide	
Type of operating equipment		Electric	
Rear			
Manufacturer of operating equipment		Vapor	
Type of door		Slide Glide	
Type of operating equipment		Electric	
Passenger windows			
Front			
Manufacturer		Ricon	
Model		NA	
Type		Hidden Frame	
Number:		Side	12+1(driver side)
		Rear	NA
Sizes:	57.8" x 45.2" / 60.2" x 45.2" (L)	47.8" x 45.2" / 60.0" x 45.2" (L)	60.0" x 45.2" / 60.0" x 45.2" (L)
	54.0" x 45.2" / 57.8" x 45.2" (R)	37.4" x 45.2" / 45.9" x 45.2" (R)	60.0" x 45.2" / 60.0" x 45.2" (R)
Glazing:		Type	Tempered
		Thickness	3/16"
		Color of tint	Grey
		Light transmission	≥50%
Mirrors			

	Size	Type	Manufacturer	Part no.	Model no.			
Right side exterior	6.85" x 14.7"	Remote control	Safefleet	RS-7-D815HRFHRCX-OTS	NA			
Left side exterior	6.85" x 14.7"	Remote control	Safefleet	CS-2-1 D815HRFHRCX-OTS AR	NA			
Center rearview	8" x 16"	Flat	Safefleet	A1706-1	NA			
Front entrance area	6"	Round, Convex	Safefleet	A1712	NA			
Upper-right corner	6"	Round, Convex	Safefleet	A1712	NA			
Rear exit area	12"	Round, Convex	Safefleet	A6011-1	NA			
Seats								
Passenger								
Manufacturer			FREEDMAN					
Model			4-ONE GEMINI					
Type			Cantilever					
Operator								
Manufacturer			Recaro					
Model and part number			800.00.7R1.CC11					
Type			Air Control					
Paint								
Manufacturer			Axalta / PPG					
Type			Fast drying, oil based					
Wheelchair ramp equipment								
Manufacturer			Ricon					
Model number			SSR-0M27291Y00					
Capacity			1000	lb.				
Width of platform			30	in.				
Length of platform			51.4	in.				
System fluid capacity			NA	qt				
Type of fluid used			NA					
Operating hydraulic pressure			NA	psi				

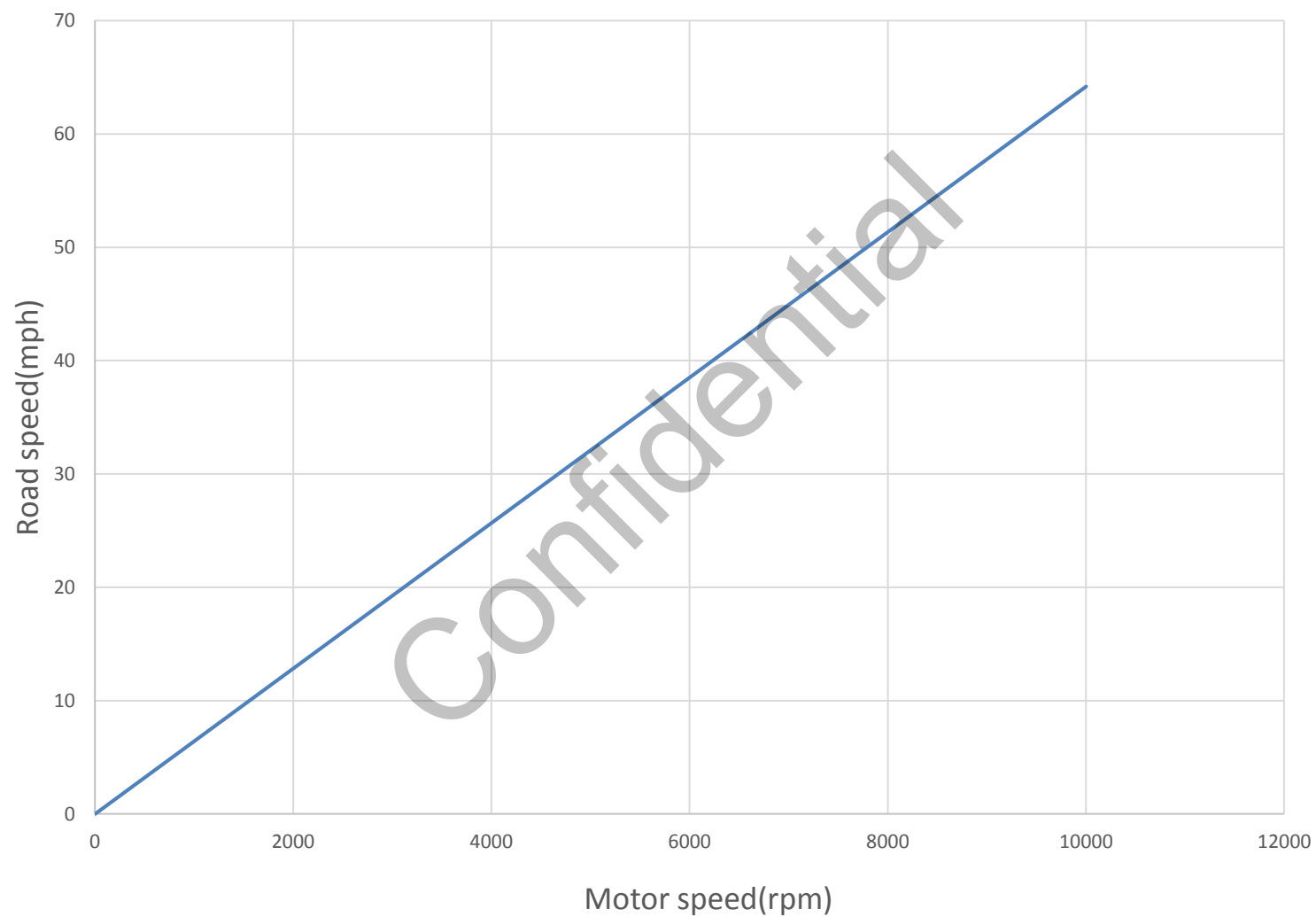
Hydraulic cylinders:	Size	NA
	Number	NA
Wheelchair securement equipment		
Manufacturer	Q'Straint (or Customer Preference)	
Model number	4-point securement (or Customer Preference)	
Destination signs		
Manufacturer	I/O Controls	
Type	Diamond Dot Destination Sign System	
Character length		
Front destination	4.25	in.
Front route	4.628	in.
Curbside destination	3.75	in.
Rear route	4	in.
Character height		
Front destination	6.625	in.
Front route	8.125	in.
Curbside destination	5	in.
Rear route	6.25	in.
Number of characters		
Front destination	10	
Front route	3	
Curbside destination	9	
Rear route	3	
Message width		
Front destination	64	in.
Front route	14	in.
Curbside destination	44	in.
Rear route	17.25	in.
Electrical		
Multiplex System		
Manufacturer	I/O Controls	
Model number	G4	

Batteries				
Manufacturer		Odyssey		
Model number		31-PC2150		
Type		AGM		
Communication System				
GPS				
Manufacturer		I/O Controls		
Model number		IO VDL G4		
PA system				
	Manufacturer	Model number	Number	
Amplifier	REI	REI-700890	1	
Microphone	REI	REI-480054BK	1	
Internal speakers	REI	220010	8	
External speaker	REI	230049	1	
Energy Storage				
Type		LFP		
Number of cells		3.2	V	
Battery pack voltage		730	V	
Weight		7,800	lb.	
Security camera system				
Manufacturer		Luminator(or Customer preference)		
Model number		RR-HDRK12-4000		
Number of cameras		10		
Storage capacity		10TB		
Bike racks				
Manufacturer		SportWorks(or Customer preference)		
Model number		2 position		
Fire Detection System				
Manufacturer		Amerex		

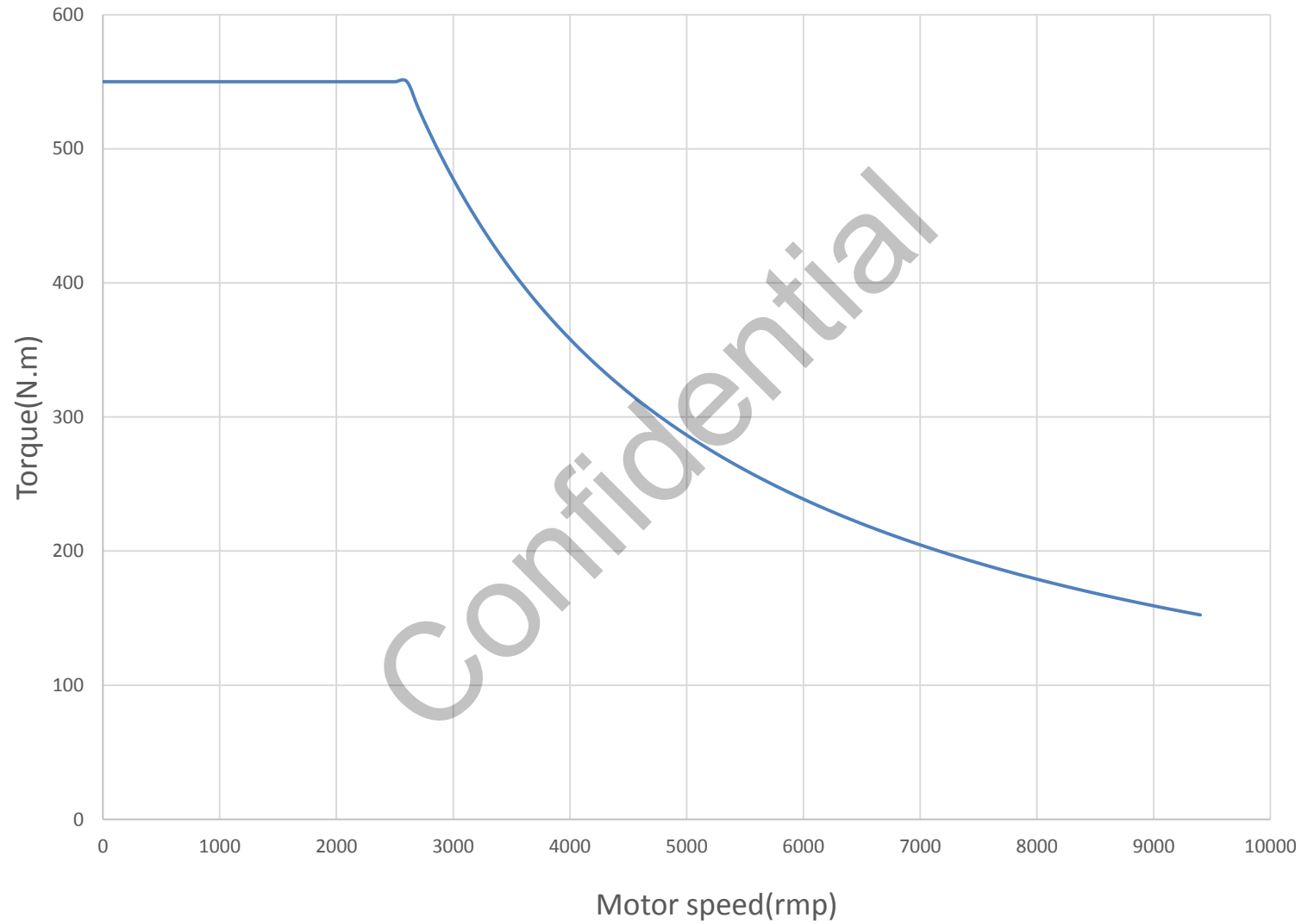
Model number	V25 / VH25 ABC	
Fire detectors	Yes	
Type (thermal or optical)	Thermal	
Number of detectors	8	
Automatic voice annunciator system		
Manufacturer	Clever Device – Or Customer Preference	
Model and part number	IVN 3TN/301-221-1029	
Annunciator LED sign		
Number of signs	2	
Housing dimensions	33.24*4 in	
Character length	33	in.
Character height	4	in.
Character width	2.16	in.
GPS antenna		
Manufacturer	Clever Device – Or Customer Preference	
Model and part number	2467	
Automatic passenger counter		
Manufacturer	Clever Device- Or Customer Preference	
Model and part number	a.	118-300-0110PL
	b.	118-300-0101PL
	c.	118-300-0102PL
Sensor type	Reflective Infrared Sensor	
Real-time bus arrival prediction system		
	Manufacturer	Model number
Router	Optional-Customer Preference	
Cellular modem	Optional-Customer Preference	
Charge protection	Optional-Customer Preference	

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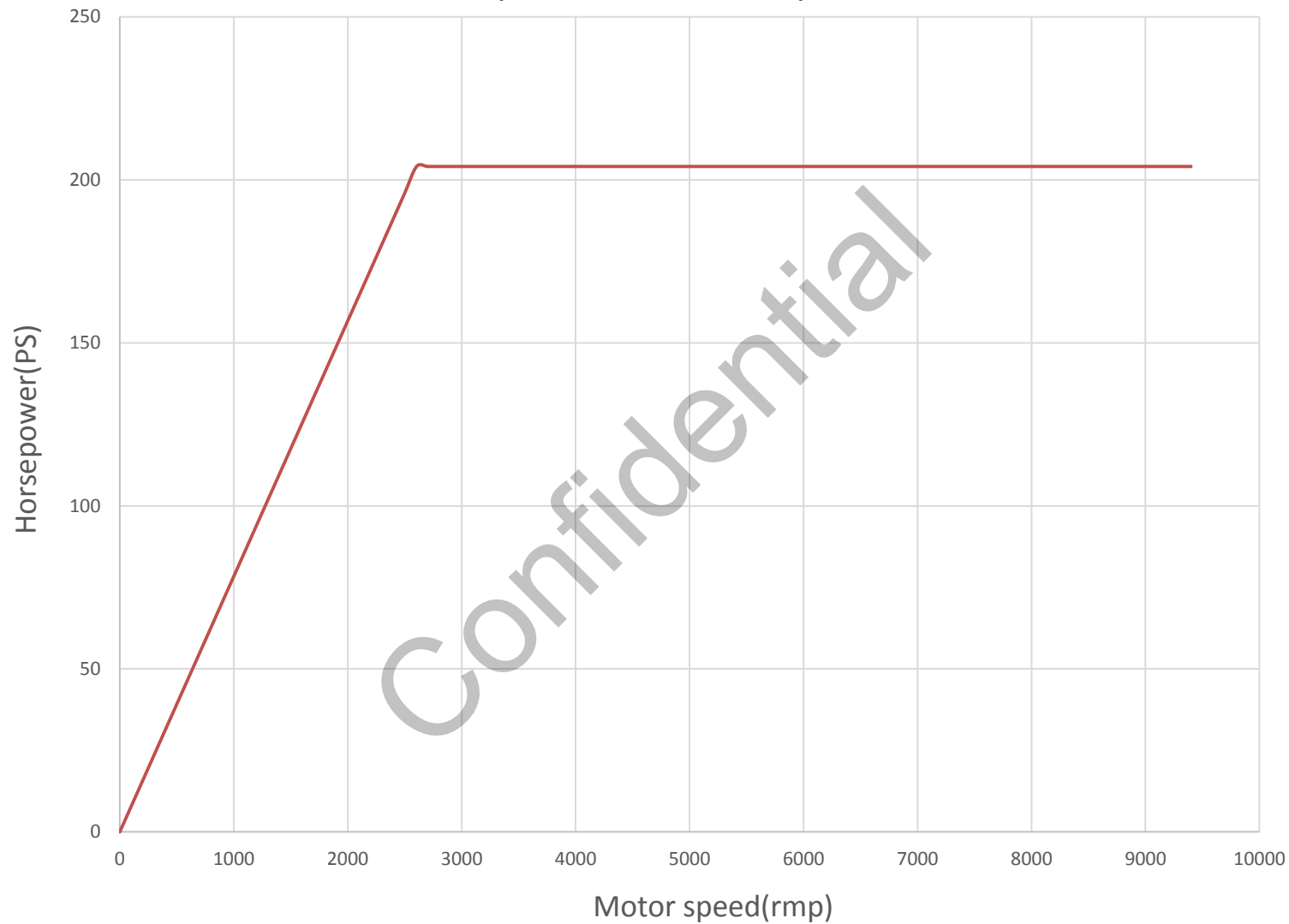
Motor speed VS Road speed



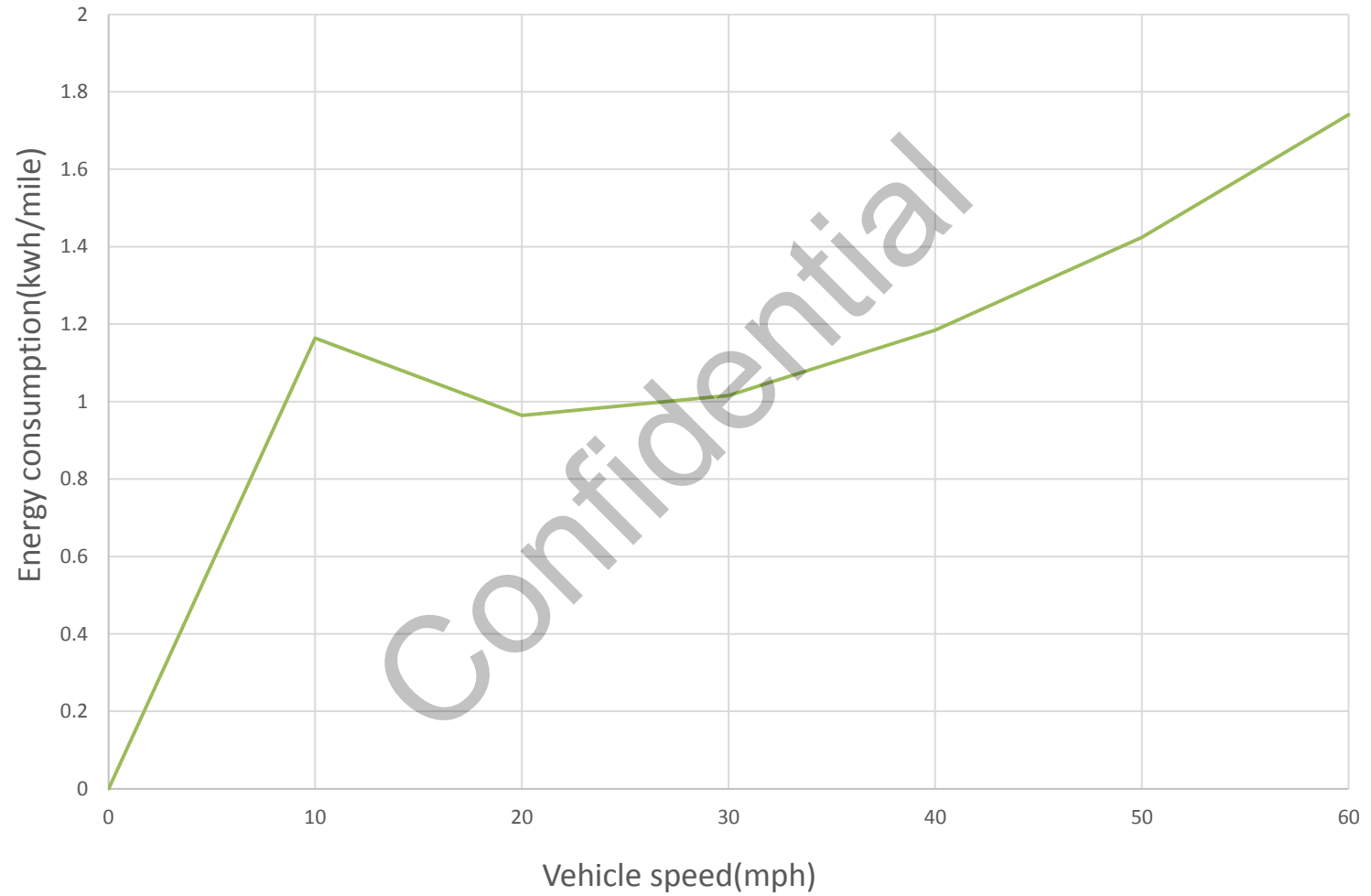
Torque VS Motor speed



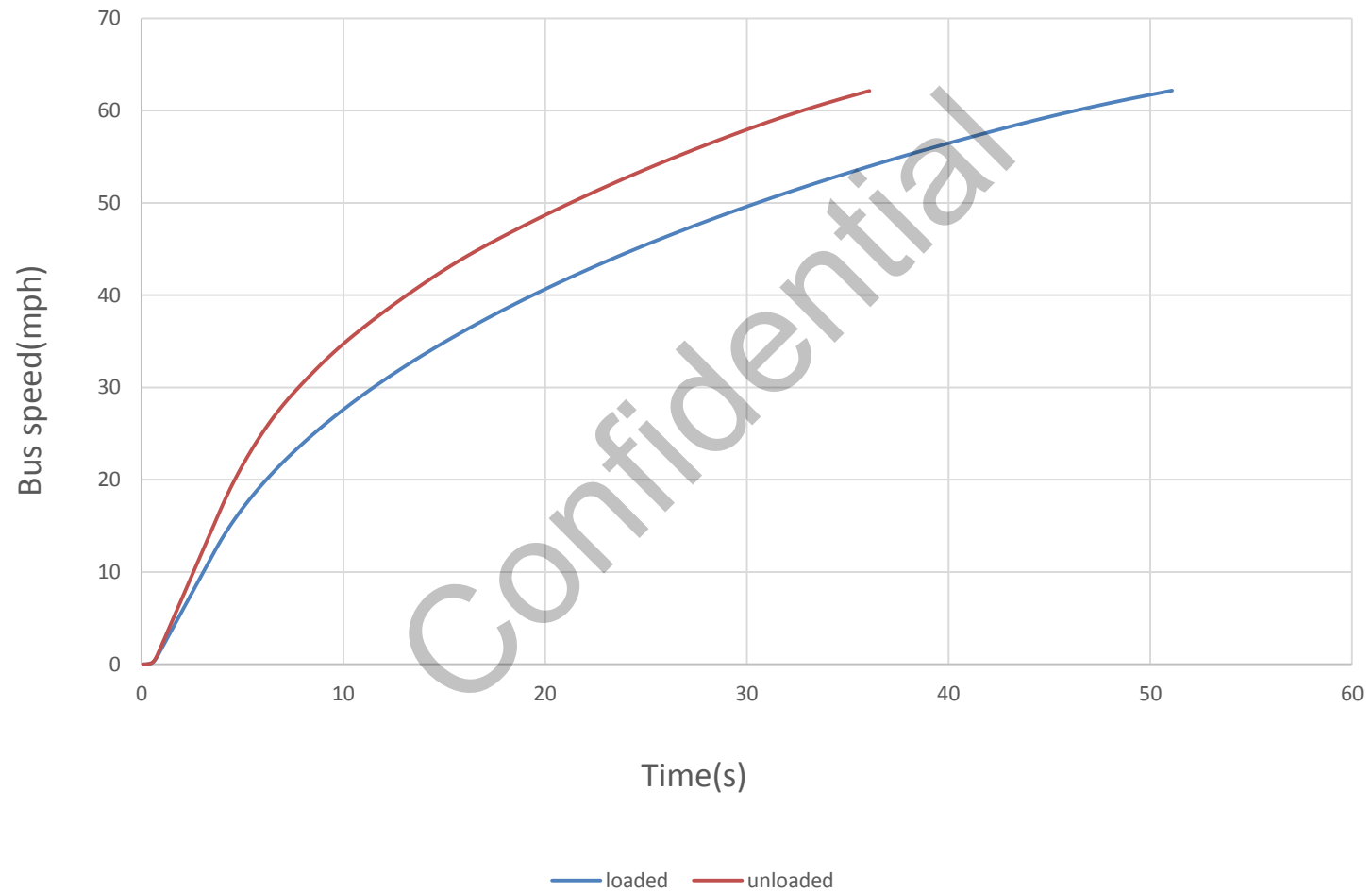
Horsepower VS Motor speed



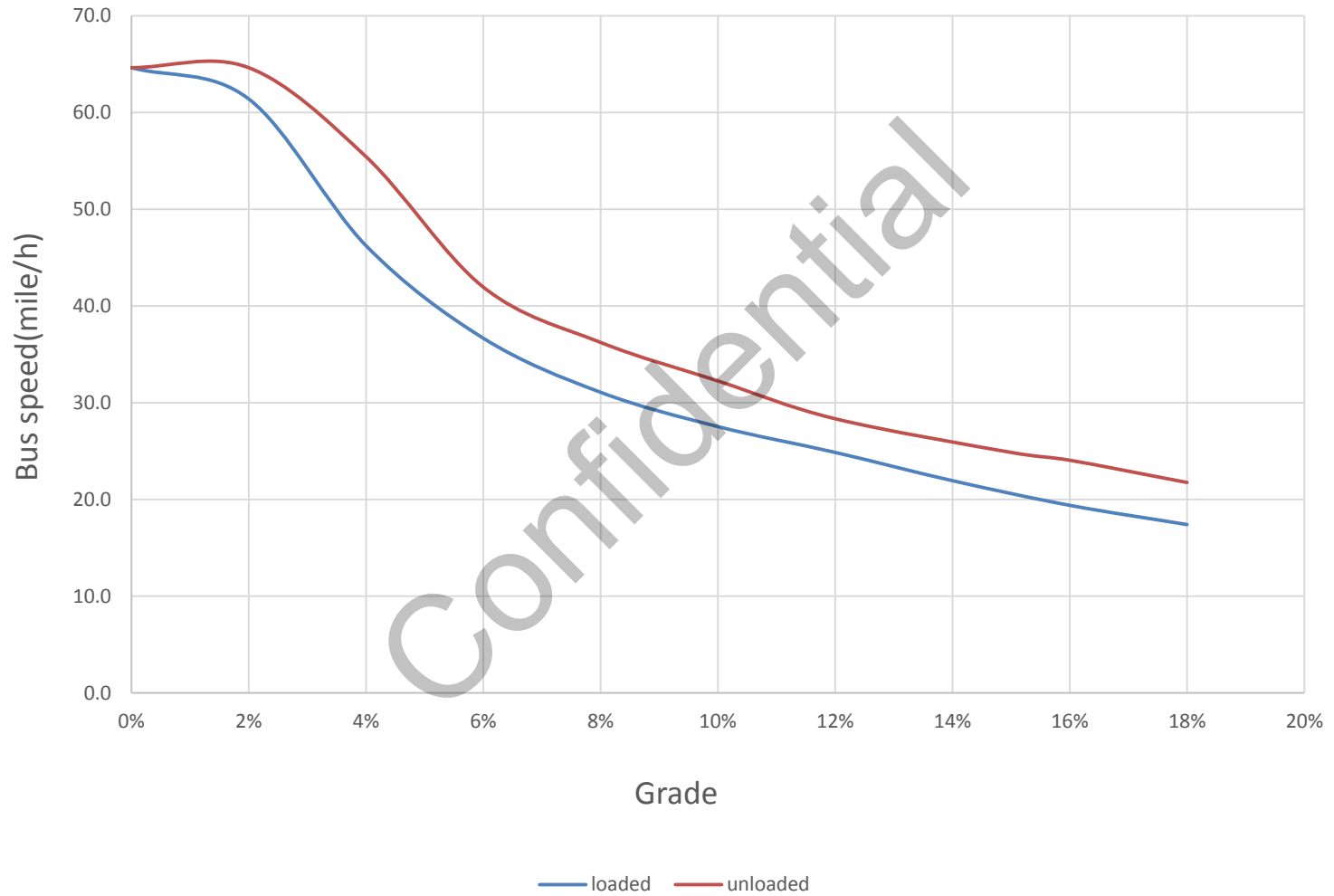
Energy consumption VS Vehicle speed
(SLW Load, level roadway, HVAV ON)



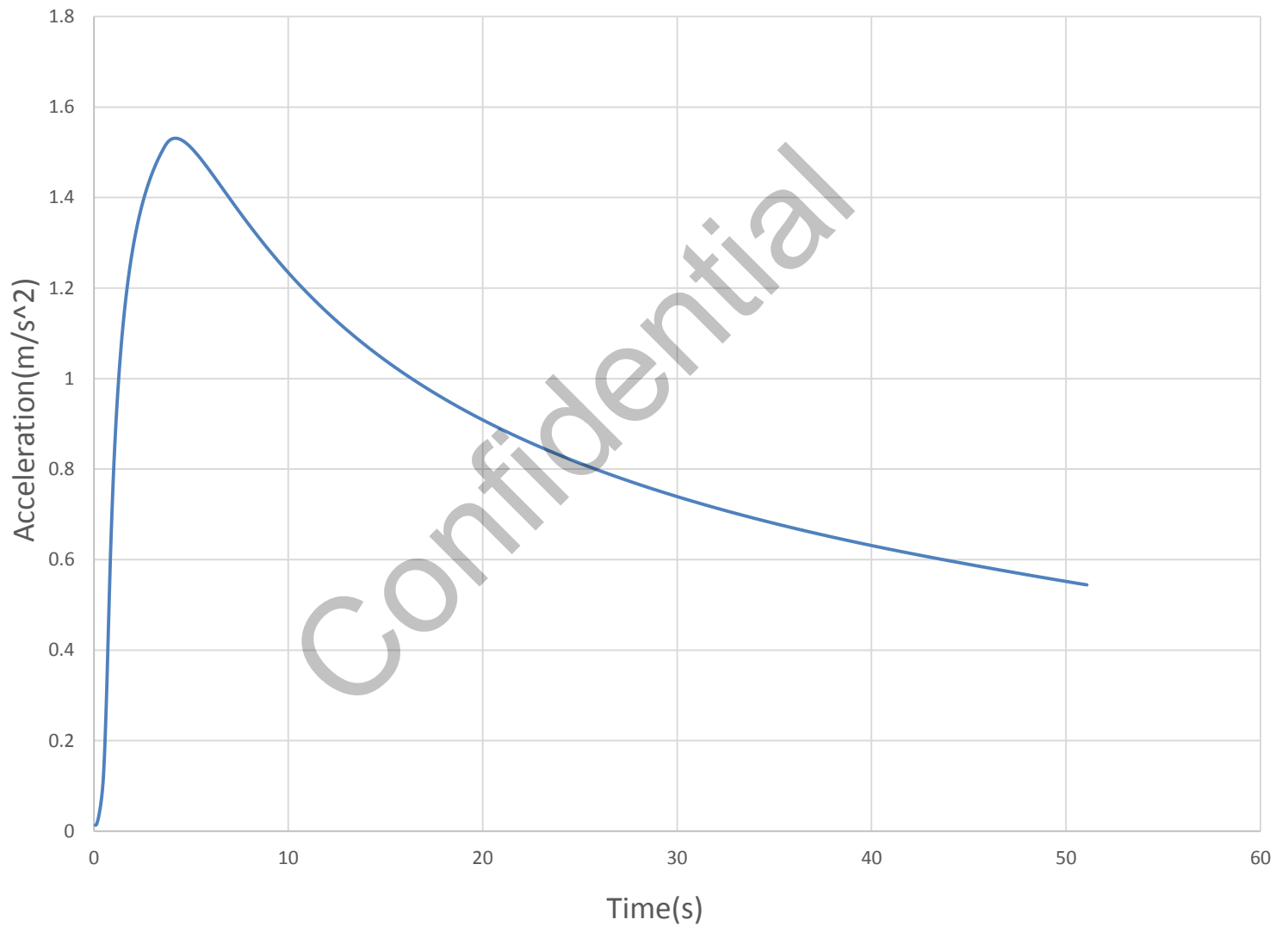
Bus speed VS Time



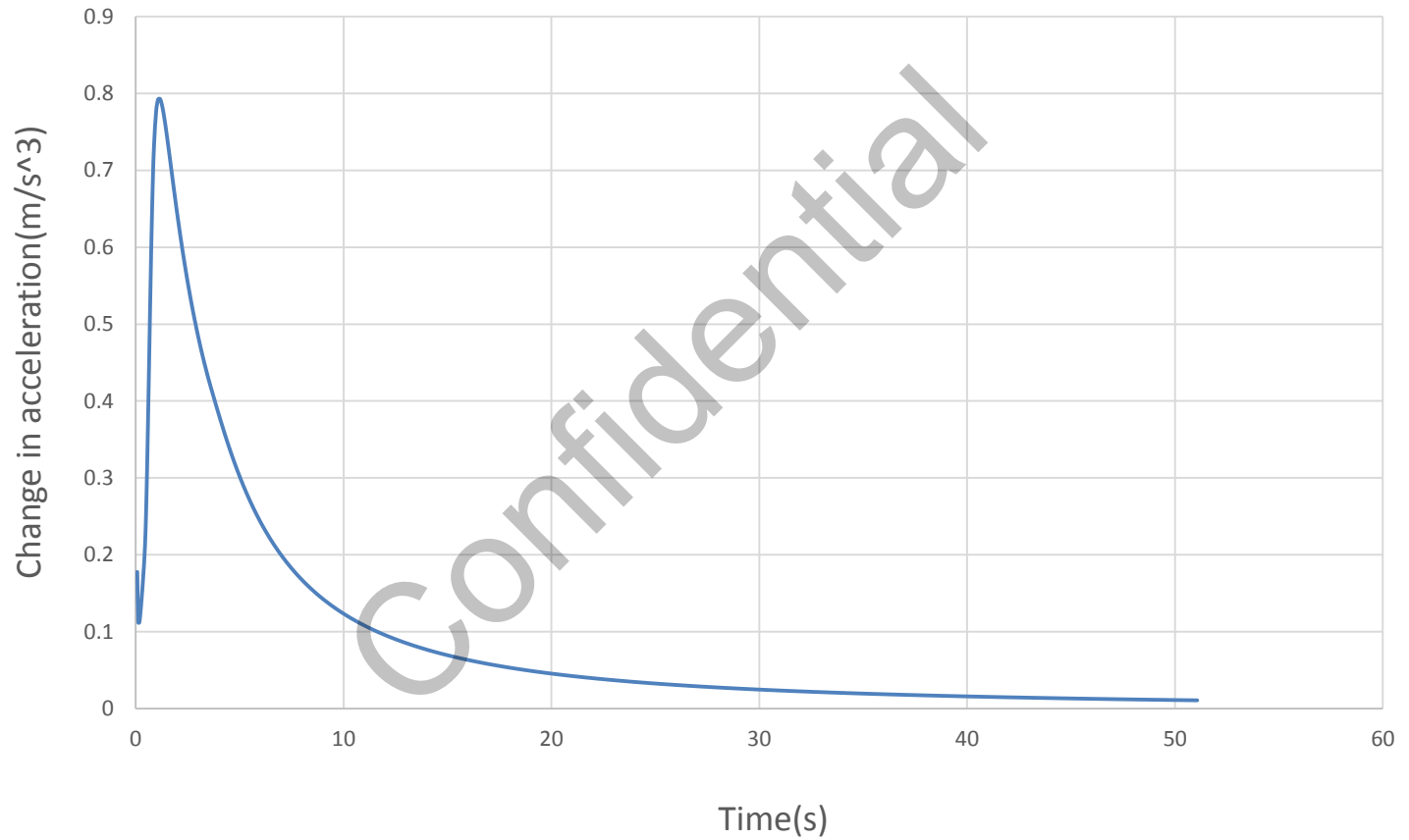
Bus speed vs Grade



Acceleration VS Time



Change in acceleration VS Time



CER 10 VEHICLE TECHNICAL QUESTIONNAIRE C10M 45FT

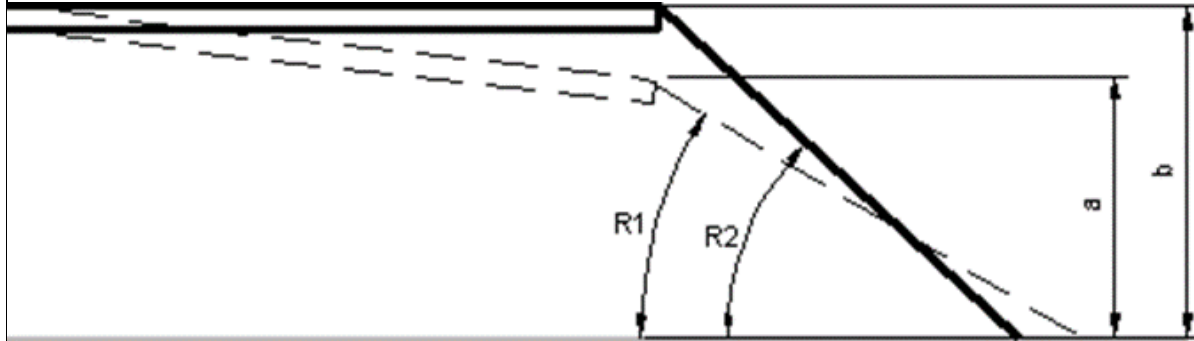
CER 10. Vehicle Technical Information

This form must be completed and included in the Technical Proposal. NOTE—one form must be completed for each type of bus submitted in the response to this RFP

GENERAL COACH DATA SHEET					
Bus manufacturer:		BYD Coach&Bus LLC			
Bus model:		C10M			
Understructure manufacturer:		BYD			
Model number:		NA			
Size/Type of Bus		45ft			
Basic Body Construction					
Type:		Semi-monocoque body			
Tubing or frame member thickness and dimensions					
Overstructure		StainlessSteel (2" x 4" with 0.1" thickness, major tubing)			
Understructure		StainlessSteel (2"x3" with 0.18 thickness, major tubing)			
Skin thickness and material					
Roof		0.06 in. Aluminum and 0.12 in. Fiberglass			
Sidewall		0.12 in. Fiberglass			
Skirt panel		0.08 in. Aluminum			
Front end		0.12 in. Fiberglass			
Rear end		0.12 in. Fiberglass			
Dimensions					
Overall length	Over bumpers	45	ft	9.6	in
	Over Body	44	ft	11.6	in
Overall width	Over body excluding mirrors	8	ft	5.6	in
	Over body including mirrors-driving position	10	ft	0.7	in
	Over tires front axles	8	ft	1.7	in
	Over tires center axle	8	ft	3.1	in
	Over tires rear axles	8	ft	3.1	In
Overall height (maximum)		11	ft	7.4	in
Overall height (main roof line)		11	ft	7.4	in
Angle of approach					
Angle of approach		≥8.6	deg		
Breakover angle		≥8	deg		
Breakover angle (rear)		NA	deg		
Angle of departure		≥8.6	deg		
Doorway Dimensions					
Front		Rear			
Width between door posts	N/A	in.	N/A	in.	

Door width between panels	36	in.	47.8	in.
Clear door width	30	in.	42	in.
Doorway height	90	in.	68	in.
Knuckle clearance	N/A	in.	N/A	in.

Step height from ground measured at center of doorway



	Front doorway, empty			Ramp angle			Rear Doorway, empty		
Kneeled	a.	12	in.	R1	/	deg	a.	54.6	in.
Unkneeled	b.	14.8	in.	R2	/	deg	b.	57.4	in.

Interior head room (center of aisle)

Front axle location	≥77	in.
Center axle location	≥77	in.
Rear axle location	≥77	in.

Aisle width between transverse seats ≥22 in.

Floor height above ground (centerline of bus)

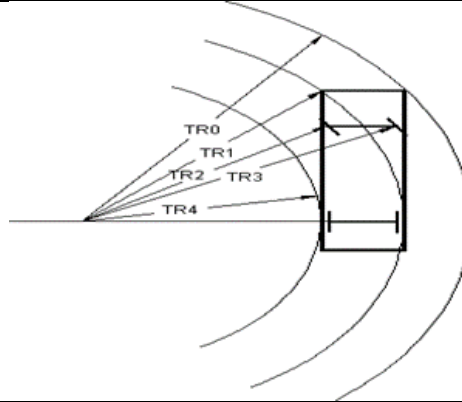
At front door	14.8	in.
At front axle	52.7	in.
At drive axle	57.4	in.
At rear door	57.4	in.

Minimum ground clearance (between bus and ground, with bus unkneeled)

Excluding axles	9	in.
Including axles	7.5	in.

Horizontal turning envelope (see diagram below)

Outside body turning radius, TR0 (including bumper)	49	ft	0	in.
Front inner corner radius, TR1	42	ft	9.6	in.
Front wheel inner turning radius, TR2	38	ft	2.4	in.
Front wheel outer turning radius, TR3	43	ft	10.8	in.
Inside Body Turning Radius innermost point, TR4 (including bumper)	27	ft	4.8	in.

**Wheelbase**

Front	313.8	in.
Rear	53.2	in.

Overhang, centerline of axle over bumper

Front	81	in.
Rear	101.6	in.

Floor

Interior length	40	ft.	0.1	in.
Interior width (excluding coving)	7	ft.	11.6	in.
Total standee area (approximately)	0	sq ft.		
Minimum distance between wheelhouses:	Front		22	in.
	Rear		22	in.
	Center		22	in.
Maximum interior floor slope (from horizontal)	3.3	deg		

Passenger capacity provided

Total maximum seating	57	
Standee capacity	0	
Minimum hip to knee room	26	in.
Minimum foot room	14	in.

Weight

	No. of people	Front axle			Center axle			Rear axle			Total bus
		Left	Right	Total	Left	Right	Total	Left	Right	Total	
Empty bus, full fuel and farebox	0	6665	6881	13546	9774	10146	19920	4684	4840	9524	42990

Fully seated, full fuel and farebox	57+1	8477	8488	16965	11746	11800	23546	5586	5593	11179	51690
Fully loaded standee and fully seated, full fuel and farebox	57+1	8477	8488	16965	11746	11800	23546	5586	5593	11179	51690
Crush load (1.5x fully loaded)	85+1	9165	9178	18343	12700	12759	25459	6040	6048	12088	55890
GVWR	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	54000
GAWR	NA	NA	NA	17,640	NA	NA	29100	NA	NA	17,640	64380

Energy Storage

Batteries – low voltage

Manufacturer	Odyssey
Type	AMG
Model Numbers	31-PC2150
Cold Cranking Amps	1150
Cranking Amps	1370 Amps
Reserve Capacity	205 Amps

Batteries – high voltage

Manufacturer	BYD
Type	LFP
Model Number	K01/K02
Total Battery Capacity (kWh)	496
Standard Charge Time	2-2.5
Charging Capacity	100kWx2, AC
Operating Temperature Range	10 °F to 115 °F
Cooling/Heating System	BYD

Performance

Fuel Economy (w/full passenger load, HVAC, and all electric accessories in use)	2.6 kWh/mile
Fuel Economy (w/full passenger load, HVAC, and all electric accessories in use)	12.96
Max Gradeability	≥16
Top Speed	65
Battery Range	172
Acceleration (20 MPH)	≤10

Acceleration (40 MPH)	≤30
Top Speed (stated above)	≤60

Performance information/graphs to be attached with this form:

Energy consumption vs. Vehicle speed
 Vehicle speed vs. time (both loaded and unloaded)
 Vehicle speed vs. grade (both loaded and unloaded)
 Acceleration vs. time
 Change of acceleration vs. time

Traction Motor/Drive Motor				
Manufacturer		BYD		
Type		Permanent Magnet Synchronous Motor/3 Phase		
Speeds		Max 5000rpm		
Traction motor horsepower rating		750Nm*2		
Type ventilation/cooling		Liquid cooling		
Gear ratios	Forward:	8.6	Reverse:	8.6
Voltage Equalizer				
Manufacture		Vamer Incorporated		
Model		80-100-015-01-LVD		
Auxiliary Inverter (120/240)				
Manufacturer		COTEK		
Model		SD3500-124		
Inverter Technology		Step-up DC-AC inverter		
Output Voltage		100/110/115/120VAC ±3%		
Traction /Drive Motor				
Manufacturer		BYD		
Type		Permanent Magnet Synchronous Motor/3 Phase		
Model		BYDEQ13A		
Quantity		2		
Torque Rating		750Nm*2		
kWh Rating		150kW*2		
Air Compressor				

Manufacture	Knorr	
Type	Oil Flooded Screw	
Rated Capacity	11.4	CFM
Capacity at idle (approximately)	5.4	CFM
Capacity at maximum speed (engine)	18.3	CFM
Maximum warranted speed	4000	rpm
Speed idle	1500	rpm
Drive Type	Electric	
Governor:		
Cut-in pressure	105+/-5	psi
Cut-out pressure	125+/-5	psi
Axles		
First		
Manufacturer	ZF	
Type	Low Floor Front Axle	
Model Number	RL 82 A	
Gross Axle weight rating	17,600	lb.
Axle load	See weight table	lb.
Second		
Manufacturer	BYD	
Type	In-wheel Motor Drive Axle	
Model Number	BYDEQ13A	
Gross Axle weight rating	28,660	lb.
Axle load	See weight table	lb.
Third		
Manufacturer	ZF	
Type	RL82A	
Model Number	4474 075 501	
Gross Axle weight rating	17,600	lb.
Axle load	See weight table	lb.
Suspension system		
Manufacturer	ZF	
Type	First	Air
	Second	Air
	Third	Air

Springs	First	2
	Second	4
	Third	2
Joint		
Manufacturer	NA	
Type	NA	
Model Number	NA	
Wheels and Tires		
Wheels		
Make	Alcoa	
Size	22.5 in x 8.25 in	
Capacity	9090 lbs	
Material	Aluminum Alloy	
Tires		
Manufacture	Goodyear (Customer Options)	
Type	Radial	
Size	315/80 R22.5	
Load range/air pressure	Psi 9090(single)/8270(dual) lbs / 130 psi	
Steering, power		
Pump		
Manufacture and model number	BYD	
Type	EHPS	
Relief pressure	2611	psi
Booster/gear box		
Manufacture and model number	Henglong Z17-3411005	
Type	Z17-3411005	
Ratio	23.27	
Power steering fluid capacity		
Power steering fluid capacity	2.11	gal
Maximum effort at steering wheel	9.35	lb (unloaded stationary coach on dry asphalt pavement)
Steering wheel diameter	18	in.

Brakes			
Make and fundamental brake system	Knorr		
Brake chambers vendor size and part number	First:	24 in Disc Brakes SN7	
	Second:	24 in. HFL1 Disc Brakes SN7	
	Third:	24 in. Disc Brakes SN7	
Brake operation effort	NA		
Slake adjuster's vendors' type and part numbers			
First:	Right:	NA	
	Left:	NA	
Second:	Right:	NA	
	Left:	NA	
Third:	Right:	NA	
	Left:	NA	
Length:	First take-up:	NA	
	Second take-up:	NA	
	Third take-up:	NA	
Brake_____Drums__X__Discs_____ (Placing X denoting type)			
First:	Manufacturer	Knorr	
	Part number	NA	
	Diameter	22.5	in.
Second:	Manufacturer	KNORR	
	Part number	NA	
	Diameter	22.5	in.
Third:	Manufacturer	Knorr	
	Part number	NA	
	Diameter	22.5	in.
Brake lining/pad manufacturer			
Type	T7400		
Brake lining/pad identification			
First:	Forward	NA	
	Reverse	NA	
Second:	Forward	NA	
	Reverse	NA	

Third:	Forward	NA	
	Reverse	NA	
Brake linings per shoe			
First	2		
Second	2		
Third	2		
Brake lining widths			
First	4.3	in.	
Second	4.3	in.	
Third	4.3	in.	
Brake lining/pad lengths			
First	9.748	in.	
Second	9.748	in.	
Third	9.748	in.	
Brake lining thickness/pad			
	0.827	in.	
Brake lining/pad per axle			
First	60.14	sq. in.	
Second	60.14	sq. in.	
Third	60.14	sq. in.	
Cooling System			
Radiator			
Manufacturer	BYD		
Type	Liquid Cooling		
Model number	K7A-1300010		
Number of tubes	60		
Tubes outer diameter	0.63x0.059	in.	in.
Fins per inch	3.87	fins	
Fin thickness	0.003	in.	
Total cooling and heating system capacity	6.8	gal	
Radiator fan speed control	800-900 rpm		
Surge tank capacity	2.75	qt	

Thermostat temperature setting:	Initial opening (fully closed)	98.6	°F
	Fully open	125.6	°F
Overheat alarm temperature sending unit setting	149	°F	
Shutdown temperature setting	185	°F	
Air reservoir capacity			
Supply reservoir	NA	cu in.	
Primary reservoir	3661	cu in.	
Secondary reservoir	1831	cu in.	
Packing reservoir	1831	cu in.	
Accessory reservoir	5493	cu in.	
Other reservoir type	NA	cu in.	
Heating, ventilation and air conditioning equipment			
Heating system capacity	68243	BTU/hr.	
Air conditioning capacity	81891	BTU	
Ventilating capacity	589	CFM	
Compressor			
Manufacturer	Panasonic		
Model	C650		
Number of cylinders	1		
Drive ratio	NA		
Maximum warranted speed	NA	rpm	
Operating speed	Variable	rpm (recommended)	
Weight	51.8	lb.	
Oil capacity	Dry	0.5	gal
	Wet	NA	gal
Refrigerant:	Type	R410a	14.3 lb.
Condenser			
Manufacturer	NA		
Model	NA		
Number of fins/in.	NA		
Outer diameter of tube	0.08	in.	

Fin thickness	NA	in.
Condenser Fan		
Manufacturer	SPAL	
Model	VA89	
Fan diameter	12	in.
Speed maximum	3400	rpm
Flow rate (maximum)	NA	CFM
Receiver		
Manufacturer	NA	
Model		
Capacity		
Condenser fan drive motors		
Manufacturer	SPAL	
Model	NA	
Type	Brushless	
Horsepower	0.27	hp
Operating speed	2600	rpm
Evaporator fan drive motors		
Manufacturer	NA	
Model	NA	
Type	NA	
Horsepower	0.74	hp
Operating speed	1400	rpm
Evaporator(s)		
Manufacturer	BYD	
Model	NA	
Number of rows	18	
Number of fins/in.	NA	
Outer diameter of tube	0.28	in.
Fin thickness	0.004	in.
Number of evaporators	NA	
Expansion valve		

Manufacturer	BYD	
Model	NA	
Filter-drier		
Manufacturer	BYD	
Model	NA	
Heater cores		
Manufacturer	BYD	
Model	PTC	
Capacity	NA	Btu/hr.
Number of rows	NA	
Number of fins/in.	NA	
Outer diameter of tube	NA	in.
Fin thickness	NA	in.
Number of heater cores	NA	
Floor heater blowers		
Front	2 (optional)	
Rear	2 (optional)	
Controls		
Manufacturer	BYD	
Model	PTC	
Driver's heater		
Manufacturer	BYD	
Model	Electric Driven PTC	
Capacity	4095	Btu/hr.
Ventilation system		
Type	Centrifugal	
Coolant Heater		
Make	BYD	
Model	NA	
Capacity	34130	Btu

Interior lighting			
Manufacturer		I/O Controls	
Type		NICHIA 757 8 LED PCB	
Number of fixtures		12	
Size of fixtures		72"	
Power pack		IOC-8001-803	
Doors			
Front			
Manufacturer of operating equipment		Domestic suppliers	
Type of door		Air-operated Swing Plug	
Type of operating equipment		Rockswitch	
Rear			
Manufacturer of operating equipment		Ventura	
Type of door		Manual hinged door	
Type of operating equipment		Rockswitch	
Passenger windows			
Front			
Manufacturer		Ricon	
Model		NA	
Type		Hidden Frame	
Number:		Side	16+1(driver side)
		Rear	NA
Sizes:	51.1"x41.1"	58.3"x56.6" / 56.6"x55.9"	47.5"x41.1" /47.5"x41.1"
	51.3"x41.1"	47.5"x41.1" /47.5"x41.1"	47.5"x41.1" /47.5"x41.1"
	52.4"x41.1" /52.4"x41.1"	52.4"x41.1" /52.4"x41.1"	52.4"x41.1" /40"x41.1"
Glazing:		Type	Tempered
		Thickness	3/16"
		Color of tint	Grey
		Light transmission	≥50%
Mirrors			

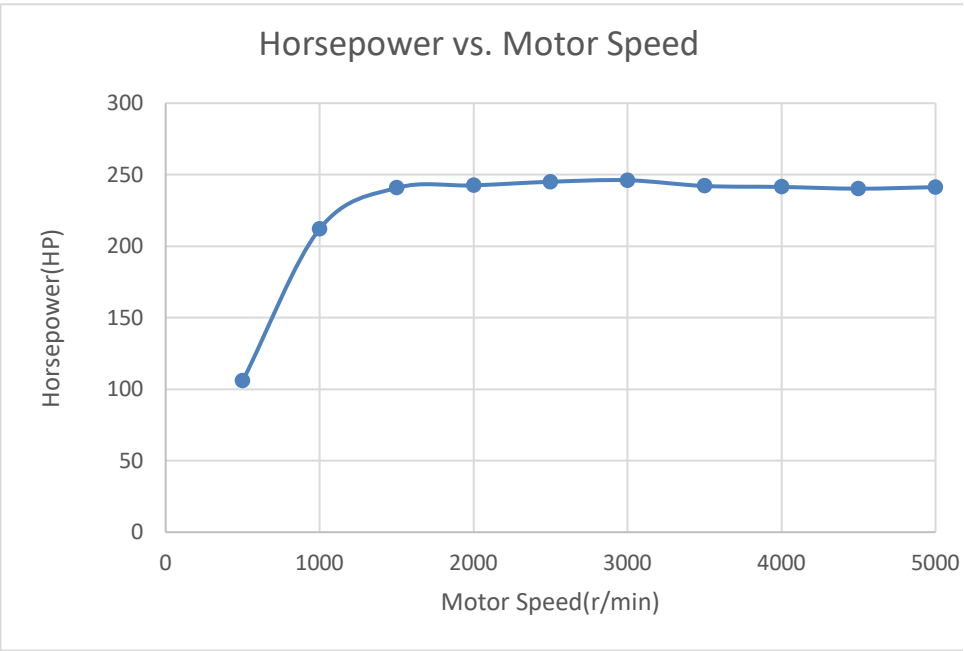
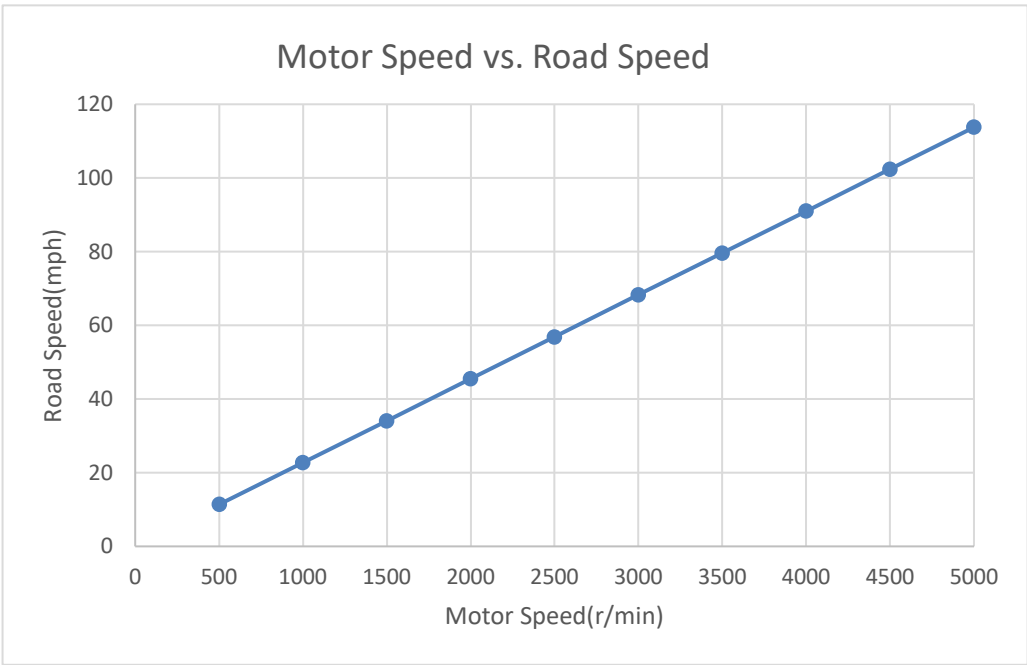
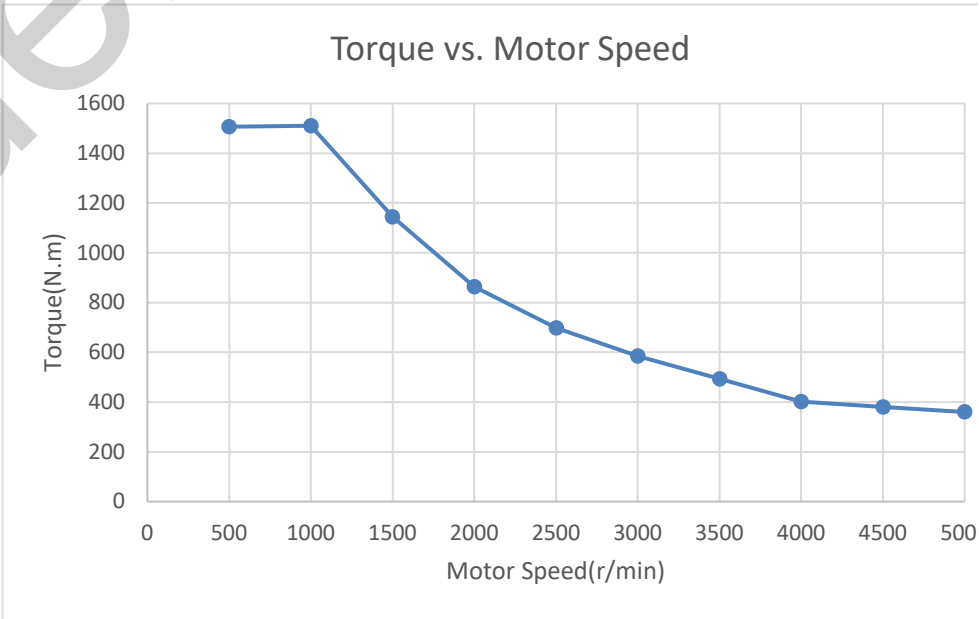
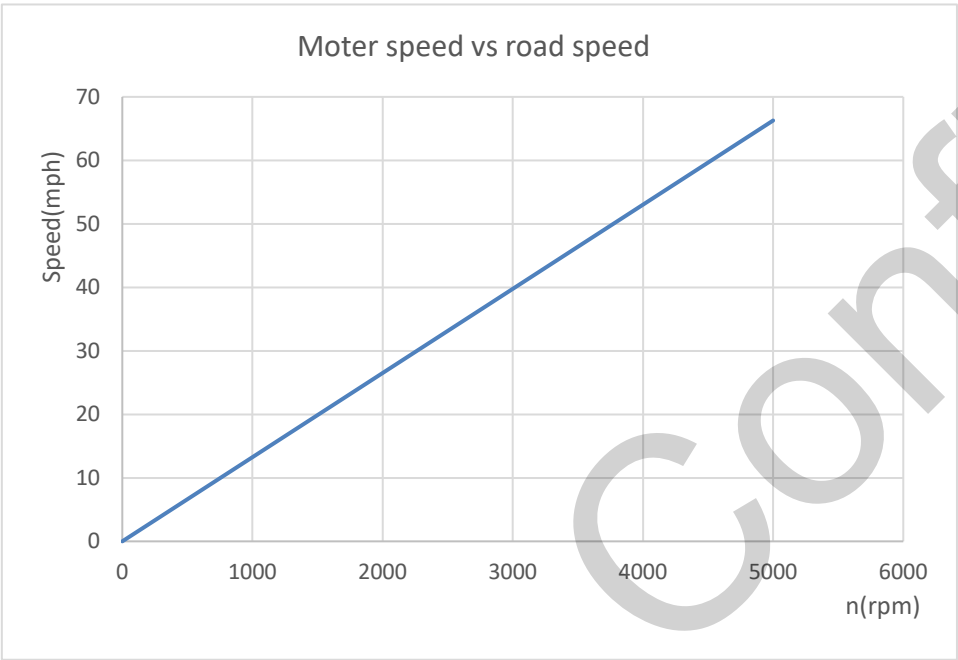
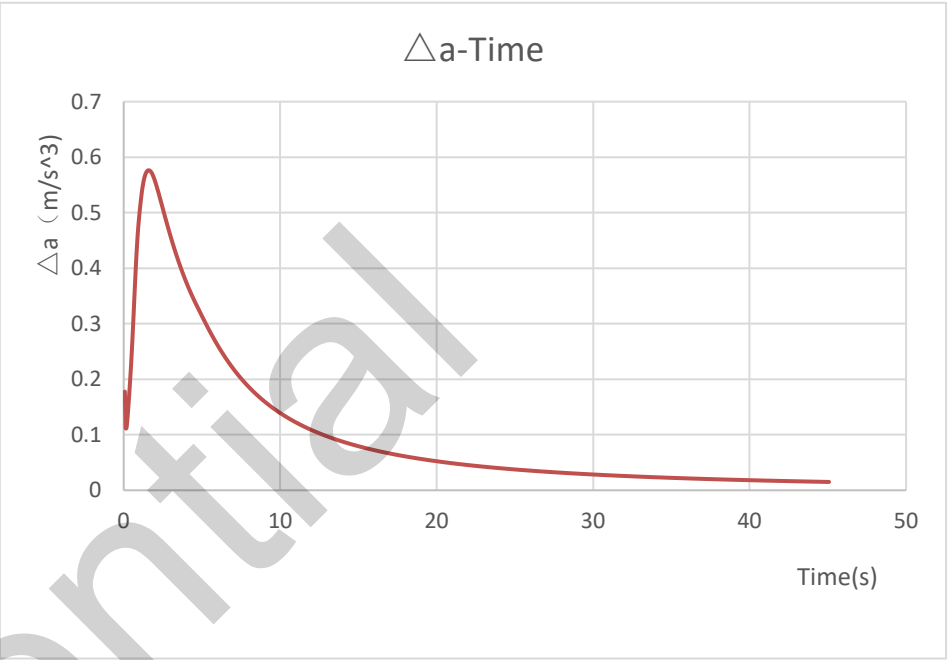
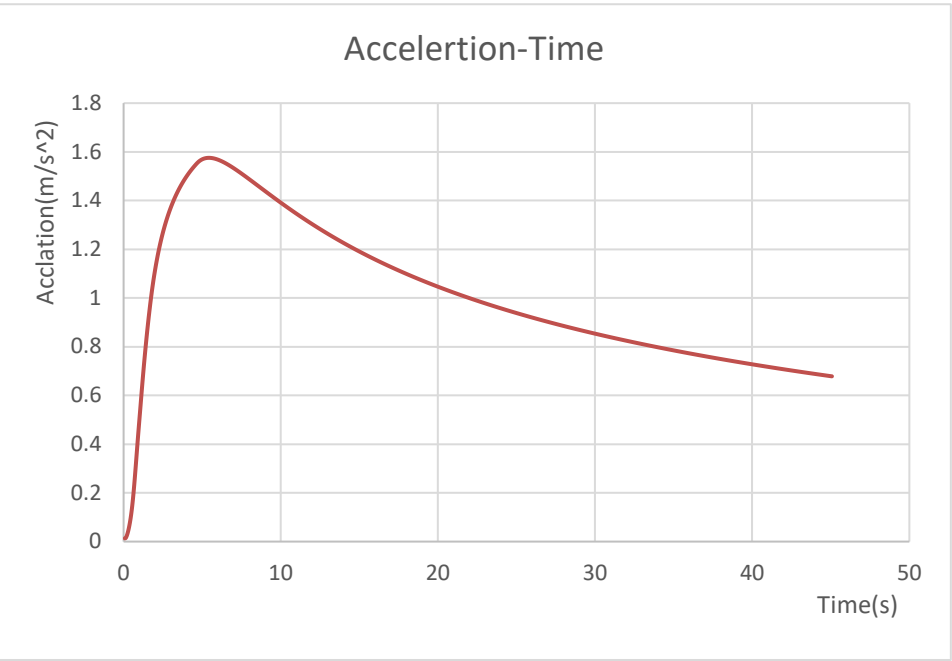
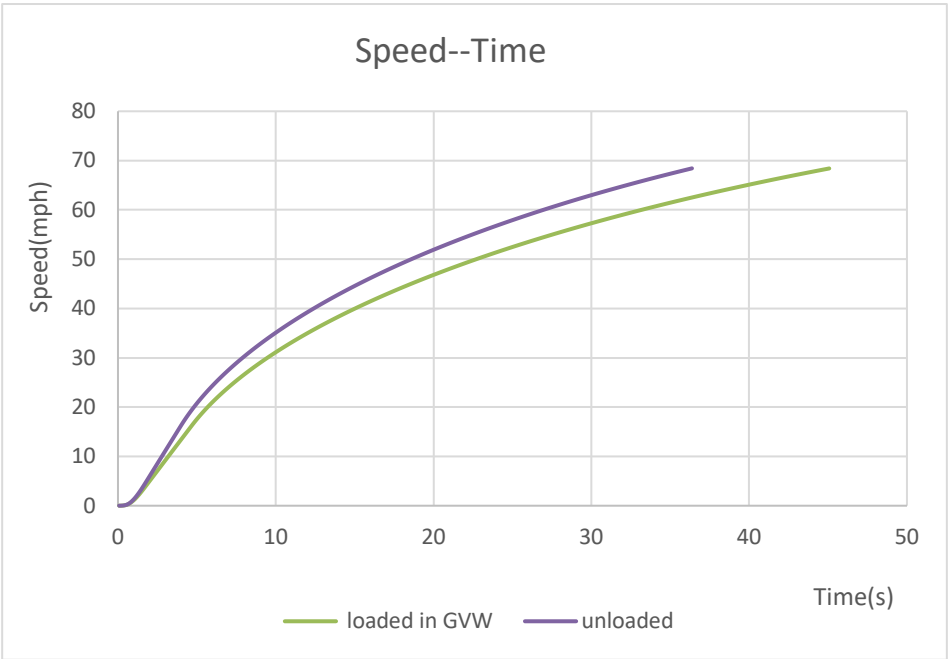
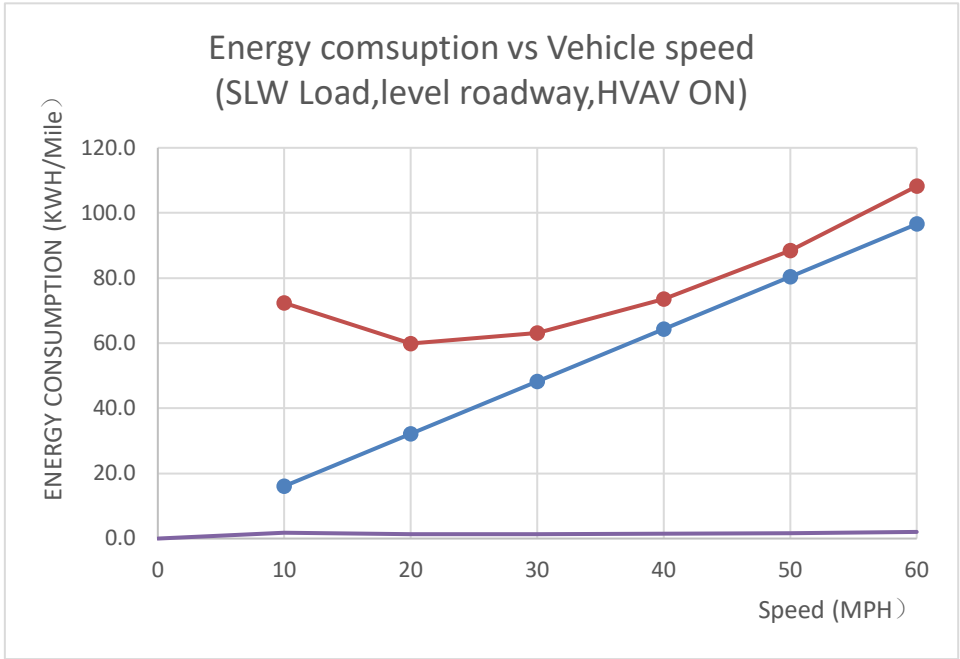
	Size	Type	Manufacturer	Part no.	Model no.
Right side exterior	8" x 18"	Flat/Convex	Safefleet	/	M14F13AC-6-TS1
Left side exterior	8" X 18"	Flat/Convex	Safefleet	/	M14F12AC-TS1
Center rearview	9.5" X 6.5"	Convex	Hadley-transit	/	A1709-2
Front entrance area	N/A	N/A	N/A	N/A	N/A
Upper-right corner	N/A	N/A	N/A	N/A	N/A
Rear exit area	N/A	N/A	N/A	N/A	N/A
Seats					
Passenger					
Manufacturer			Freedman 4 One/ Torino G/ Viscount Hi-Tech		
Model			PREMIUM		
Type			3 point seat belt		
Operator					
Manufacturer			Recaro		
Model and part number			800.00.7R1.CC11		
Type			Air Control		
Paint					
Manufacturer			Axalta / PPG		
Type			Fast drying, oil based		
Wheelchair ramp equipment					
Manufacturer			NA		
Model number					
Capacity				lb.	
Width of platform				in.	
Length of platform				in.	
System fluid capacity				qt	
Type of fluid used					
Operating hydraulic pressure				psi	

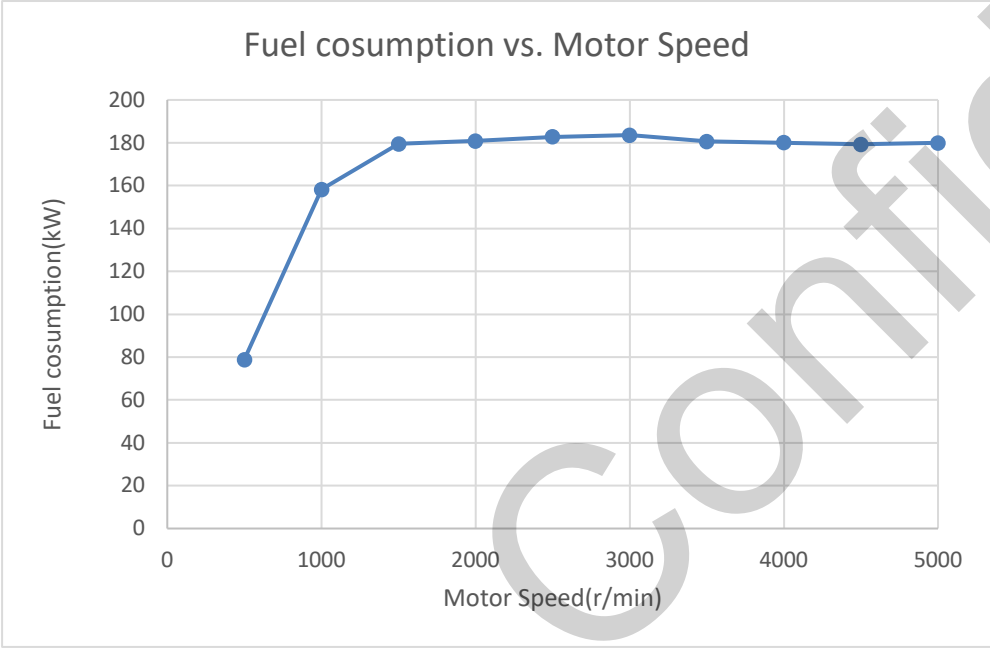
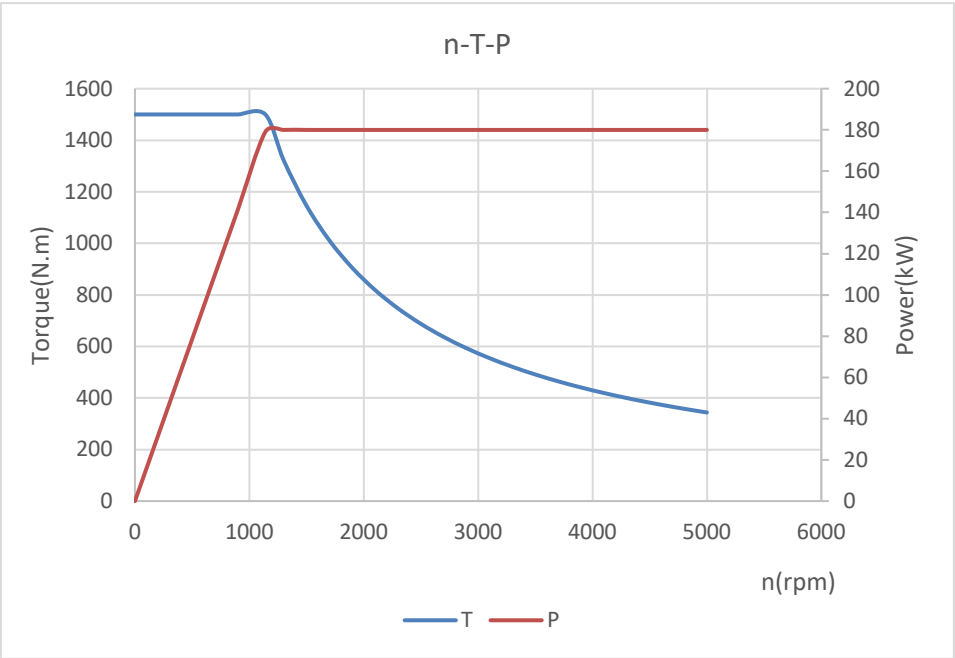
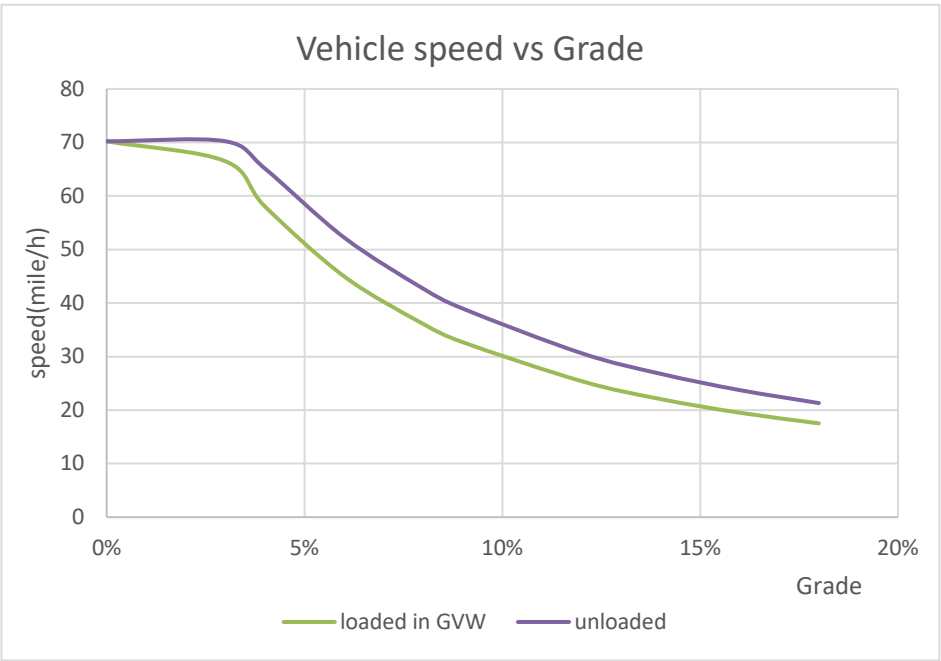
Hydraulic cylinders:	Size	NA
	Number	NA
Wheelchair securement equipment		
Manufacturer	X2 (Or Customer Preference)	
Model number	NA	
Destination signs		
Manufacturer	I/O Controls	
Type	Diamond Dot Destination Sign System	
Character length		
Front destination	4.25	in.
Front route	4.628	in.
Curbside destination	3.75	in.
Rear route	4	in.
Character height		
Front destination	6.625	in.
Front route	8.125	in.
Curbside destination	5	in.
Rear route	6.25	in.
Number of characters		
Front destination	10	
Front route	3	
Curbside destination	9	
Rear route	3	
Message width		
Front destination	64	in.
Front route	14	in.
Curbside destination	44	in.
Rear route	17.25	in.
Electrical		
Multiplex System		
Manufacturer	I/O Controls	
Model number	G4	

Batteries				
Manufacturer		Odyssey		
Model number		31-PC2150		
Type		AGM		
Communication System				
GPS				
Manufacturer		I/O Controls		
Model number		IO VDL G4		
PA system				
	Manufacturer	Model number	Number	
Amplifier	REI	REI-700890	1	
Microphone	REI	REI-480054BK	1	
Internal speakers	REI	220010	8	
External speaker	REI	230049	1	
Energy Storage				
Type		LFP		
Number of cells		3.2	V	
Battery pack voltage		730	V	
Weight		7,800	lb.	
Security camera system				
Manufacturer		Luminator(or Customer preference)		
Model number		RR-HDRK12-4000		
Number of cameras		10		
Storage capacity		10TB		
Bike racks				
Manufacturer		SportWorks(or Customer preference)		
Model number		2 position		
Fire Detection System				
Manufacturer		Amerex		

Model number	V25 / VH25 ABC	
Fire detectors	Yes	
Type (thermal or optical)	Thermal	
Number of detectors	8	
Automatic voice annunciator system		
Manufacturer	Clever Device – Or Customer Preference	
Model and part number	IVN 3TN/301-221-1029	
Annunciator LED sign		
Number of signs	2	
Housing dimensions	33.24*4 in	
Character length	33	in.
Character height	4	in.
Character width	2.16	in.
GPS antenna		
Manufacturer	Clever Device – Or Customer Preference	
Model and part number	2467	
Automatic passenger counter		
Manufacturer	Clever Device- Or Customer Preference	
Model and part number	a.	118-300-0110PL
	b.	118-300-0101PL
	c.	118-300-0102PL
Sensor type	Reflective Infrared Sensor	
Real-time bus arrival prediction system		
	Manufacturer	Model number
Router	Optional-Customer Preference	
Cellular modem	Optional-Customer Preference	
Charge protection	Optional-Customer Preference	

NOTE: All information above is accurate to the timeframe upon submission. The Agency reserves the right to update above data if changes occur, upon consultation with the customer.





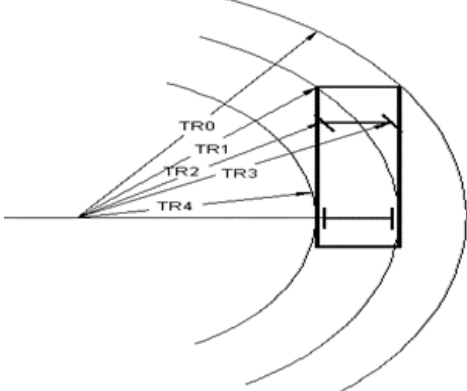
CER 10 VEHICLE TECHNICAL QUESTIONNAIRE K11M 60FT

CER 10. Vehicle Technical Information

This form must be completed and included in the Technical Proposal. NOTE—one form must be completed for each type of bus submitted in the response to this RFP

GENERGAL COACH DATA SHEET					
Bus manufacturer:		BYD Coach&Bus LLC			
Bus model:		K11M			
Understructure manufacturer:		BYD			
Model number:		NA			
Size/Type of Bus		60ft			
Basic Body Construction					
Type:		Semi-monocoque body			
Tubing or frame member thickness and dimensions					
Overstructure		Aluminum tube from 1.57" × 2" × 0.12" to 11.09" × 2" × 0.12"			
Understructure		Steel tube from 1.18" × 1.18" × 0.06" to 6.3" × 2.36" × 0.24"			
Skin thickness and material					
Roof		0.06 in. Aluminum			
Sidewall		0.08 in. Aluminum			
Skirt panel		0.08 in. Aluminum			
Front end		0.12 in. Fiberglass			
Rear end		0.12 in. Fiberglass			
Dimensions					
Overall length	Over bumpers	60	ft	8.4	in
	Over Body	59	ft	9	in
Overall width	Over body excluding mirrors	8	ft	6	in
	Over body including mirrors-driving position	10	ft	0	in
	Over tires front axles	6	ft	11	in
	Over tires center axle	6	ft	3	in
	Over tires rear axles	6	ft	3	In
Overall height (maximum)		11	ft	2	in
Overall height (main roof line)		9	ft	7	in
Angle of approach					
Angle of approach		≥8.6	deg		
Breakover angle		≥8	deg		
Breakover angle (rear)		NA	deg		
Angle of departure		≥8.6	deg		
Doorway Dimensions					
Doorway Dimensions		Front		Rear	

Width between door posts	Bottom 45.2 Top 39.1	in.	43	in.					
Door width between panels	36.9	in.	36.8	in.					
Clear door width	34.3	in.	34.7	in.					
Doorway height	77.2	in.	76.5	in.					
Knuckle clearance	> 0.8	in.	> 0.8	in.					
Step height from ground measured at center of doorway									
	Front doorway, empty		Ramp angle		Rear Doorway, empty				
Kneeled	a.	12.6	in.	R1	10	deg	a.	12.6	in.
Unkneeled	b.	15.4	in.	R2	12.4	deg	b.	15.4	in.
Interior head room (center of aisle)									
Front axle location	96	in.							
Center axle location	92	in.							
Rear axle location	74	in.							
Aisle width between transverse seats									
	≥22	in.							
Floor height above ground (centerline of bus)									
At front door	15.4	in.							
At front axle	15.4	in.							
At drive axle	38.6	in.							
At rear door	15.4	in.							
Minimum ground clearance (between bus and ground, with bus unkneeled)									
Excluding axles	10.4	in.							
Including axles	5.8	in.							
Horizontal turning envelope (see diagram below)									
Outside body turning radius, TR0 (including bumper)	39	ft	4.8	in.					
Front inner corner radius, TR1	33	ft	8.4	in.					
Front wheel inner turning radius, TR2	25	ft	9.6	in.					

Front wheel outer turning radius, TR3				34	ft	2.4	in.				
Inside Body Turning Radius innermost point, TR4 (including bumper)				15	ft	3.6	in.				
											
Wheelbase											
Front	239.6	in.									
Rear	275.6	in.									
Overhang, centerline of axle over bumper											
Front	87	in.									
Rear	126.6	in.									
Floor											
Interior length		54	ft.	7	in.						
Interior width (excluding coving)		7	ft.	11	in.						
Total standee area (approximately)		51	sq ft.								
Minimum distance between wheelhouses:		Front			35.5	in.					
		Rear			35.8	in.					
		Center			23.1	in.					
Maximum interior floor slope (from horizontal)		3.3	deg								
Passenger capacity provided											
Total maximum seating		55									
Standee capacity		34									
Minimum hip to knee room		26	in.								
Minimum foot room		14	in.								
Weight											
	No. of people	Front axle			Center axle			Rear axle			Total bus
		Left	Right	Total	Left	Right	Total	Left	Right	Total	

Empty bus, full fuel and farebox	0	4880	4756	9636	9894	9692	19596	11735	12183	23918	53150
Fully seated, full fuel and farebox	55+1	5730	5588	11318	11349	11131	22480	13,614	14104	27718	61550
Fully loaded standee and fully seated, full fuel and farebox	89+1	6792	6732	13524	13670	11724	25394	13910	13822	27732	66650
Crush load (1.5x fully loaded)	133+1	7465	7399	14,863	15024	12885	27909	15287	15191	30478	73250
GVWR	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	67450
GAWR	NA	NA	NA	15652	NA	NA	25353	NA	NA	28660	67450

Energy Storage

Batteries – low voltage

Manufacturer	Odyssey
Type	AMG
Model Numbers	31-PC2150
Cold Cranking Amps	1150
Cranking Amps	1370 Amps
Reserve Capacity	205 Amps

Batteries – high voltage

Manufacturer	BYD
Type	LFP
Model Number	K01/K02
Total Battery Capacity (kWh)	642
Standard Charge Time	4-4.5
Charging Capacity	150kW
Operating Temperature Range	10 °F to 115 °F
Cooling/Heating System	BYD

Performance

Fuel Economy (w/full passenger load, HVAC, and all electric accessories in use)	3.0 kWh/mil
Fuel Economy (w/full passenger load, HVAC, and all electric accessories in use)	11.235
Max Gradeability	≥15

Top Speed	65
Battery Range	193
Acceleration (20 MPH)	≤10
Acceleration (40 MPH)	≤30
Top Speed (stated above)	≤60

Performance information/graphs to be attached with this form:

Energy consumption vs. Vehicle speed
 Vehicle speed vs. time (both loaded and unloaded)
 Vehicle speed vs. grade (both loaded and unloaded)
 Acceleration vs. time
 Change of acceleration vs. time

Traction Motor/Drive Motor					
Manufacturer			BYD		
Type			Permanent Magnet Synchronous Motor/3 Phase		
Speeds			Max 5000rpm		
Traction motor horsepower rating			750Nm*2		
Type ventilation/cooling			Liquid cooling		
Gear ratios	Forward:	8.6	Reverse:	8.6	
Voltage Equalizer					
Manufacture			Vamer Incorporated		
Model			80-100-015-01-LVD		
Auxiliary Inverter (120/240)					
Manufacturer			COTEK		
Model			SD3500-124		
Inverter Technology			Step-up DC-AC inverter		
Output Voltage			100/110/115/120VAC ±3%		
Traction /Drive Motor					
Manufacturer			BYD		
Type			Permanent Magnet Synchronous Motor/3 Phase		
Model			BYDEQ13A		
Quantity			2		
Torque Rating			750Nm*2		

kWh Rating	150kW*2	
Air Compressor		
Manufacture	Knorr	
Type	Oil Flooded Screw	
Rated Capacity	11.4	CFM
Capacity at idle (approximately)	5.4	CFM
Capacity at maximum speed (engine)	18.3	CFM
Maximum warranted speed	4000	rpm
Speed idle	1500	rpm
Drive Type	Electric	
Governor:		
Cut-in pressure	105+/-5	psi
Cut-out pressure	125+/-5	psi
Axles		
First		
Manufacturer	ZF	
Type	Low Floor Front Axle	
Model Number	RL 75 A	
Gross Axle weight rating	15652	lb.
Axle load	See weight table	lb.
Second		
Manufacturer	ZF	
Type	Center Axle	
Model Number	AVN132	
Gross Axle weight rating	25353	lb.
Axle load	See weight table	lb.
Third		
Manufacturer	BYD	
Type	In-wheel Motor Drive Axle	
Model Number	BYDEQ13A	
Gross Axle weight rating	28660	lb.
Axle load	See weight table	lb.
Suspension system		
Manufacturer	ZF	

Type	First	Air	
	Second	Air	
	Third	Air	
Springs	First	2	
	Second	4	
	Third	4	
Joint			
Manufacturer		Hubner	
Type		14220035000	
Model Number		NA	
Wheels and Tires			
Wheels			
Make		Alcoa	
Size		22.5 in x 8.25 in	
Capacity		8050 lbs	
Material		Aluminum Alloy	
Tires			
Manufacture		Goodyear (Customer Options)	
Type		Radial	
Size		305/70R 22.5	
Load range/air pressure		Psi 8050(single)/7390(dual) lbs / 130 psi	
Steering, power			
Pump			
Manufacture and model number		BYD	
Type		EHPS	
Relief pressure		2611	psi
Booster/gear box			
Manufacture and model number		Bosch 8098 957 124	
Type		Ball-Nut Type	
Ratio		22.2	
Power steering fluid capacity		2.11	gal

Maximum effort at steering wheel	9.35	lb (unloaded stationary coach on dry asphalt pavement)	
Steering wheel diameter	18	in.	
Brakes			
Make and fundamental brake system	Knorr		
Brake chambers vendor size and part number	First:	24 in Disc Brakes SN7	
	Second:	24 in Disc Brakes SB7	
	Third:	24 in Disc Brakes SN7	
Brake operation effort	NA		
Slake adjuster's vendors' type and part numbers			
First:	Right:	NA	
	Left:	NA	
Second:	Right:	NA	
	Left:	NA	
Third:	Right:	NA	
	Left:	NA	
Length:	First take-up:	NA	
	Second take-up:	NA	
	Third take-up:	NA	
Brake_____Drums__X__Discs_____ (Placing X denoting type)			
First:	Manufacturer	Knorr	
	Part number	NA	
	Diameter	22.5	in.
Second:	Manufacturer	KNORR	
	Part number	NA	
	Diameter	22.5	in.
Third:	Manufacturer	Knorr	
	Part number	NA	
	Diameter	22.5	in.
Brake lining/pad manufacturer	Knorr		
Type	T7400		
Brake lining/pad identification			

First:	Forward	NA	
	Reverse	NA	
Second:	Forward	NA	
	Reverse	NA	
Third:	Forward	NA	
	Reverse	NA	
Brake linings per shoe			
First	2		
Second	2		
Third	2		
Brake lining widths			
First	4.3	in.	
Second	4.3	in.	
Third	4.3	in.	
Brake lining/pad lengths			
First	9.748	in.	
Second	9.748	in.	
Third	9.748	in.	
Brake lining thickness/pad			
	0.827	in.	
Brake lining/pad per axle			
First	60.14	sq. in.	
Second	60.14	sq. in.	
Third	60.14	sq. in.	
Cooling System			
Radiator			
Manufacturer	Modine		
Type	Liquid Cooling		
Model number	PR0456580001		
Number of tubes	72		
Tubes outer diameter	0.74x0.05	in.	in.
Fins per inch	18	fins	

Fin thickness	0.0039	in.	
Total cooling and heating system capacity	5	gal	
Radiator fan speed control	1200-4750 rpm		
Surge tank capacity	2.28	qt	
Thermostat temperature setting:	Initial opening (fully closed)	104	°F
	Fully open	125.6	°F
Overheat alarm temperature sending unit setting	149	°F	
Shutdown temperature setting	185	°F	
Air reservoir capacity			
Supply reservoir	NA	cu in.	
Primary reservoir	1831	cu in.	
Secondary reservoir	1831	cu in.	
Packing reservoir	1831	cu in.	
Accessory reservoir	5493	cu in.	
Other reservoir type	1831	cu in.	
Heating, ventilation and air conditioning equipment			
Heating system capacity	68243x2	BTU/hr.	
Air conditioning capacity	81891x2	BTU	
Ventilating capacity	589x2	CFM	
Compressor			
Manufacturer	Panasonic		
Model	C650		
Number of cylinders	1		
Drive ratio	NA		
Maximum warranted speed	NA	rpm	
Operating speed	Variable	rpm (recommended)	
Weight	51.8	lb.	
Oil capacity	Dry	0.5	gal
	Wet	NA	gal
Refrigerant:	Type	R410a	14.3 lb.
Condenser			

Manufacturer	NA	
Model	NA	
Number of fins/in.	NA	
Outer diameter of tube	0.08	in.
Fin thickness	NA	in.
Condenser Fan		
Manufacturer	SPAL	
Model	VA89	
Fan diameter	12	in.
Speed maximum	3400	rpm
Flow rate (maximum)	NA	CFM
Receiver		
Manufacturer	NA	
Model		
Capacity		
Condenser fan drive motors		
Manufacturer	SPAL	
Model	NA	
Type	Brushless	
Horsepower	0.27	hp
Operating speed	2600	rpm
Evaporator fan drive motors		
Manufacturer	NA	
Model	NA	
Type	NA	
Horsepower	0.74	hp
Operating speed	1400	rpm
Evaporator(s)		
Manufacturer	BYD	
Model	NA	
Number of rows	18	
Number of fins/in.	NA	
Outer diameter of tube	0.28	in.

Fin thickness	0.004	in.
Number of evaporators	NA	
Expansion valve		
Manufacturer	BYD	
Model	NA	
Filter-drier		
Manufacturer	BYD	
Model	NA	
Heater cores		
Manufacturer	BYD	
Model	PTC	
Capacity	NA	Btu/hr.
Number of rows	NA	
Number of fins/in.	NA	
Outer diameter of tube	NA	in.
Fin thickness	NA	in.
Number of heater cores	NA	
Floor heater blowers		
Front	2 (optional)	
Rear	2 (optional)	
Controls		
Manufacturer	BYD	
Model	PTC	
Driver's heater		
Manufacturer	BYD	
Model	Electric Driven PTC	
Capacity	4095	Btu/hr.
Ventilation system		
Type	Centrifugal	
Coolant Heater		

Make	BYD		
Model	NA		
Capacity	34130	Btu	
Interior lighting			
Manufacturer	I/O Controls		
Type	NICHIA 757 8 LED PCB		
Number of fixtures	12		
Size of fixtures	72"		
Power pack	IOC-8001-803		
Doors			
Front			
Manufacturer of operating equipment	Vapor		
Type of door	Slide Glide		
Type of operating equipment	Electric		
Rear			
Manufacturer of operating equipment	Vapor		
Type of door	Slide Glide		
Type of operating equipment	Electric		
Passenger windows			
Front			
Manufacturer	Ricon		
Model	NA		
Type	Hidden Frame		
Number:	Side	15+1(driver side)	
	Rear	NA	
Sizes:	42.2" x 44.6" / 46.5" x 44.6" (L)	47.8" x 44.6" / 57.8" x 44.6" (L)	47.8" x 44.6" / 45.7" x 44.6" (L)
	54.1" x 44.6" / 42.2" x 44.6" (R)	42.2" x 44.6" / 57.8" x 44.6" (R)	45.7" x 44.6" / 52.0" x 44.6" (R) 62.7" x 44.6" (R)
	52.0" x 44.6" / 62.7" x 44.6" (L)		
Glazing:	Type	Tempered	
	Thickness	3/16"	

	Color of tint	Grey			
	Light transmission	≥50%			
Mirrors					
	Size	Type	Manufacturer	Part no.	Model no.
Right side exterior	6.85" x 14.7"	Remote control	Safefleet	RS-7-D815HRFHRCX-OTS	NA
Left side exterior	6.85" x 14.7"	Remote control	Safefleet	CS-2-1 D815HRFHRCX-OTS AR	NA
Center rearview	8" x 16"	Flat	Safefleet	A1706-1	NA
Front entrance area	6"	Round, Convex	Safefleet	A1712	NA
Upper-right corner	6"	Round, Convex	Safefleet	A1712	NA
Rear exit area	12"	Round, Convex	Safefleet	A6011-1	NA
Seats					
Passenger					
Manufacturer			FREEDMAN		
Model			4-ONE GEMINI		
Type			Cantilever		
Operator					
Manufacturer			Recaro		
Model and part number			800.00.7R1.CC11		
Type			Air Control		
Paint					
Manufacturer			Axalta / PPG		
Type			Fast drying, oil based		
Wheelchair ramp equipment					
Manufacturer			Ricon		
Model number			SSR-0M27291Y00		
Capacity			1000	lb.	

Width of platform	30	in.
Length of platform	51.4	in.
System fluid capacity	NA	qt
Type of fluid used	NA	
Operating hydraulic pressure	NA	psi
Hydraulic cylinders:	Size	NA
	Number	NA
Wheelchair securement equipment		
Manufacturer	Q'Straint (or Customer Preference)	
Model number	4 point securement (or Customer Preference)	
Destination signs		
Manufacturer	I/O Controls	
Type	Diamond Dot Destination Sign System	
Character length		
Front destination	4.25	in.
Front route	4.628	in.
Curbside destination	3.75	in.
Rear route	4	in.
Character height		
Front destination	6.625	in.
Front route	8.125	in.
Curbside destination	5	in.
Rear route	6.25	in.
Number of characters		
Front destination	10	
Front route	3	
Curbside destination	9	
Rear route	3	
Message width		
Front destination	64	in.
Front route	14	in.
Curbside destination	44	in.
Rear route	17.25	in.

Electrical				
Multiplex System				
Manufacturer		I/O Controls		
Model number		G4		
Batteries				
Manufacturer		Odyssey		
Model number		31-PC2150		
Type		AGM		
Communication System				
GPS				
Manufacturer		I/O Controls		
Model number		IO VDL G4		
PA system				
	Manufacturer	Model number	Number	
Amplifier	REI	REI-700890	1	
Microphone	REI	REI-480054BK	1	
Internal speakers	REI	220010	8	
External speaker	REI	230049	1	
Energy Storage				
Type		LFP		
Number of cells		3.2	V	
Battery pack voltage		730	V	
Weight		10,065	lb.	
Security camera system				
Manufacturer		Luminator(or Customer preference)		
Model number		RR-HDRK12-4000		
Number of cameras		10		
Storage capacity		10TB		
Bike racks				

Manufacturer		SportWorks(or Customer preference)	
Model number		2 position	
Fire Detection System			
Manufacturer		Amerex	
Model number		V25 / VH25 ABC	
Fire detectors		Yes	
Type (thermal or optical)		Thermal	
Number of detectors		14	
Automatic voice annunciator system			
Manufacturer		Clever Device – Or Customer Preference	
Model and part number		IVN 3TN/301-221-1029	
Annunciator LED sign			
Number of signs		2	
Housing dimensions		33.24*4 in	
Character length		33	in.
Character height		4	in.
Character width		2.16	in.
GPS antenna			
Manufacturer		Clever Device – Or Customer Preference	
Model and part number		2467	
Automatic passenger counter			
Manufacturer		Clever Device- Or Customer Preference	
Model and part number	a.	118-300-0110PL	
	b.	118-300-0101PL	
	c.	118-300-0102PL	
Sensor type		Reflective Infrared Sensor	
Real-time bus arrival prediction system			
	Manufacturer	Model number	

Router	Optional-Customer Preference	
Cellular modem	Optional-Customer Preference	
Charge protection	Optional-Customer Preference	
NOTE: All information above is accurate to the timeframe upon submission. The Agency reserves the right to update above data if changes occur, upon consultation with the customer.		

REFERENCES AND NON-PRICED INFORMATION





ANTELOPE VALLEY TRANSPORTATION AUTHORITY

LANCASTER, CA

Customer Contact: Macy Neshati, CEO; P. 661.729.2229 E. mneshati@avta.com

Contract Date: 3.10.2016 - 6.15.2024 (Expected)

BYD was awarded this \$72-million contract to design and build 85 battery electric buses of multiple sizes for the Antelope Valley Transportation Authority (AVTA). BYD will provide AVTA 30-FT, 35-FT, 40-FT, 60-FT Battery-Electric Buses along with the associated charging equipment. As of today, BYD has delivered 46 of the vehicles.

LOS ANGELES DEPARTMENT OF TRANSPORTATION

LOS ANGELES, CA

Customer Contact: Corinne Ralph, Chief of Transit Programs; P. 213.972.8408 E. corinne.ralph@lacity.org

Contract Date: 10.25.2019 - 10.1.2022 (Expected)

BYD was awarded this \$88-million contract to design and build 130 30-FT battery electric buses for Los Angeles Department of Transportation (LADOT). This contract is the largest single order for Battery-Electric Buses in the USA.



LOS ANGELES WORLD AIRPORT

LOS ANGELES, CA

Customer Contact: Charles Nelson, P. 310.703.4313 E. cnelson@lawa.org

Contract Date: 5.8.2018 - 5.8.2021

BYD was awarded this \$22-million contract to design and build 20 60-FT articulated battery electric buses for one of the largest airports in the world, Los Angeles World Airport (LAWA). This contract is part of the State of California goal to reduce emissions throughout the state.



ANAHEIM TRANSPORTATION NETWORK ANAHEIM, CA

Customer Contact: Jim Appleby; P. 714.563.5287 E. jappleby@atnetwork.org

Contract Date: 7.23.2019 - 12.30.2021 (Expected)

This \$25-million bus procurement contract was awarded to BYD. The scope of work for this project involves the manufacturing and supply of 40 Battery-Electric buses sizes 30F-FT, 40-FT, and 60-FT. These buses will be operated as part of the Anaheim Resort Transportation (ART) deploying vehicles to Disney and other tourist locations in Anaheim.

LINK TRANSIT WENATCHEE, WA

Customer Contact: Richard DeRock, General Manager; P. 509.664.7610 E. Richard@linktransit.com

Contract Date: 4.25.2019 - 4.30.2021

As part of the Washington State Department of Enterprise Services (DGS), Link Transit bought 10 35-FT Electric buses along with BYD's 80kW AC Depot Chargers. As part of this contract, BYD installed 300kW Wireless Inductive Charging Systems for extended range extension. Contract value \$7-million



TRANSIT SERVICES OF FREDERICK COUNTY

FREDERICK, MD 21702

Customer Contact: Roman Steichen, Director P. 301.600.3538 E. rsteichen@frederickcountymd.gov

Contract Date: 10.15.2018 - 9.30.2020

TransIT Services decided to procure three 30-FT bus options from BYD's contract with Martha's Vineyard Transit Authority. BYD designed and manufactured to meet TransIT expectations of an electric bus. Total Contract value: \$1.6-million.

Photo Credit: Frederick County.

ENGINEERING ORGANIZATION CHART, ENGINEERING CHANGE CONTROL PROCEDURE, FIELD MODIFICATION PROCESS



ENGINEERING ORGANIZATION CHART, ENGINEERING CHANGE CONTROL PROCEDURE, FIELD MODIFICATION PROCESS

ENGINEERING TEAM

Research and Development (R&D)—continual innovation in producing planet-safe, people- safe, and pocket-safe technology—is the heart and soul of BYD. Engineers make up nearly 10% of our global workforce: over 20,000 engineers in energy and vehicle development, organized into a network of innovation sharing and review, including—the BYD Auto Engineering Research Institute, which includes eight global departments comprising some 400 engineers in electric bus design alone.

BYD’s vertical integration means that any major innovation that is conceived must prove itself in multiple levels of engineering reviews, as well as regulatory compliance assessments, comprehensive risk management analyses and tests, and strong quality control throughout.

This ensures that all innovations represent improvements, that are of highest quality, safety, and actual benefit to customers, as well as in full regulatory compliance—and that such innovations can be shared across the world

to maintain consistency throughout company products to the optimal extent (while also staying true to the different customer needs and regulatory requirements across our global markets).

For components manufactured by outside vendors, our engineering team works directly with these manufacturers to customize products to meet our unique specifications—and yours.

INNOVATIVE ENGINEERING

Innovation combined with diligence reflects

BYD’s core values, which include:

- Continually pushing the boundaries of what counts as “our best work;” and
- Customer satisfaction, through creating products to meet clients’ unique needs within their markets’ framework of regulations and industry standards.
- Because we believe in continual improvement, our development process considers any and every

element that could improve product reliability and/or robustness.

- Because we also believe in caution and control, we develop, test, and implement modifications in six (6) month cycles to capture field issues and/or improve overall bus performance. This continuous and incremental improvement process allows us control, so each change can be fully tracked and assessed, without errors that might occur if too much were changed too quickly.

NEW PRODUCT DESIGN

In assessing our products, developing new or improved models, and even in making minor design changes based on client specifications, our executive and engineering teams consider both:

1. Safety concerns, including:

- Meeting all regulations and standards, including but not limited to all applicable national, state/province, and local regulations, FMVSS (Federal Motor Vehicle Safety Standards) and FMCSR (Federal Motor Carrier Safety Regulations),
- Identifying and taking steps to minimize any hazards, to the full extent possible, including any conceivable risk that could arise in any conceivable instance, given any conceivable condition; and

2. Efficiency concerns, i.e., to the extent possible given any safety considerations, which designs, and specifications will optimize such additional considerations as:

- Performance of the vehicle, charger, etc.,
- Operation ease,
- Maintenance ease and cost,
- Comfort and accessibility for passengers and driver, and
- Aesthetics of design.

In addressing these two concerns, past designs, and experience with these designs in practice, as well as potential innovations or improvements, are all fully considered.

One tool we use to minimize risks and ensure both safety and continual performance, such as the risk of battery power loss, is planned redundancy: providing a backup component or system in case one fails, or an alternate option for achieving the desired result in case the first method needs to be supplemented or is less preferable to a client. Modularity goes hand in hand with planned redundancy, so that backup components are identical to the original, and so that elements used for one bus can be used for others as well.

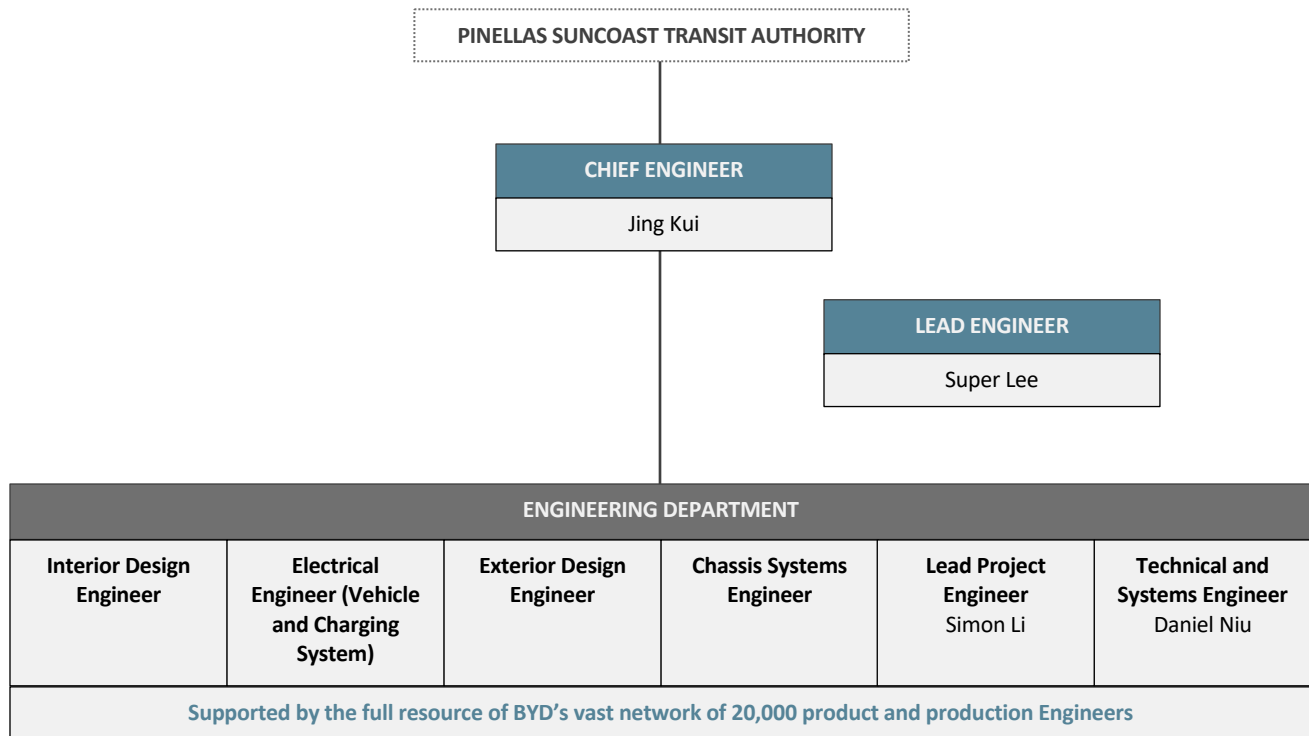
ENGINEERING TEAM

Our Engineering team will have a direct involvement in your project. We have more than 30 engineers in the US that are fully supported about our global network of 20,000 engineers.

Our Chief Engineer, JK will lead both our Design and Aftersales Engineering Departments.

- Design Engineering is split into further teams for various design areas, each with a senior engineer and other engineers.
- This team develops designs and specifications for your buses, including making any customizations to our standard designs to meet your preferences. They are also involved in any engineering changes needed or desired.
- Aftersales Engineering, which works to make any field modifications (design changes desired after delivery).

ENGINEERING ORGANIZATION CHART



ENGINEERING CHANGE CONTROL PROCEDURE AND FIELD MODIFICATION PROCESS

BYD uses documented procedures for full control of engineering changes so that no changes are made to the baseline bus design without going through a review process and obtaining BYD and Long Beach approval as required. Engineering Change Control Procedures and forms are a part of BYD's CMP. Engineering changes can be initiated from a variety of sources and involve multiple documents. Additionally, separate forms will be used for Engineering Change Notice (ECN) and Field Modification Instruction (FMI). ECN information will include the reason for the change, updated drawings, and other documentation, plan and schedule modification, vehicles affected (effectively), and FMI procedures specifying parts required, tooling, and other relevant information. Engineering changes initiating because of form, fit, function, or corrective/preventive changes are captured. The Engineering Change Management procedure also contains provisions to prioritize a change via a High Priority/Emergency classification to allow rapid processing and approval of critical changes.

CONFIGURATION MANAGEMENT PLAN

BYD's Configuration Management Plan (CMP) has been established to ensure that designs are traceable to requirements, changes are controlled and documented, and there is consistency between the product and its supporting documentation.

The CMP identifies and describes the overall procedures for configuration management of the vehicles throughout the transit life cycle of the vehicles.

Scope begins at the Notice to Proceed (NTP) and ends at the completion of general warranty. The CMP is closely associated with technical data management and interface management. The CMP will further outline the methodologies through which BYD will establish and document any changes to the baseline design.

The CMP describes procedures for the following functions:

- **Configuration Identification:** Identify all parts requiring serial numbering; specify procedures for serialization, and record serial numbers for all required items per vehicle specifying the revision level of each part for configuration control of hardware and software.
- **Change Control:** Procedures will document and control any changes to hardware and software configuration that may be initiated by suppliers, BYD, contract change orders (Modifications), engineering changes, and field modifications.

The configuration control process ensures that submittal of deliverable, such as drawings, (especially final as-built drawings), specifications, and manuals accurately record the latest revisions levels for all equipment.

MANUFACTURING FACILITY PLANT LAYOUT, OTHER CONTRACTS, STAFFING



MANUFACTURING FACILITY PLANT LAYOUT, OTHER CONTRACTS, STAFFING

BYD COACH & BUS LLC

BYD completes all major engineering, manufacturing, and assembly portions at our manufacturing facility in Lancaster, CA.



BYD's Lancaster facilities house a world-class engineering team, leading-edge manufacturing equipment, and a rapidly growing workforce for middle-class clean technology jobs. In 2017, BYD more than tripled the size of its original Coach and Bus manufacturing facility to over 600,000 square feet. This factory expansion critically enables more efficient production line layouts and vastly expanded production capacity, as well as more offices, parking, and employee facilities. This expansion will support local workforce growth from the current 800+ employees up to 1,500 staff and will also enable production of up to 1,500 American-made buses per year.

BYD's manufacturing facility is fully permitted to build electric buses from bare frame assembly to finished product, with full capabilities of welding, painting, chassis and electrical installation, final assembly, and testing.

In addition to manufacturing, this facility houses all departments relevant to bus builds, including Engineering, the Quality Department, Equipment (Warehouse), Purchasing/Procurement, Financial,

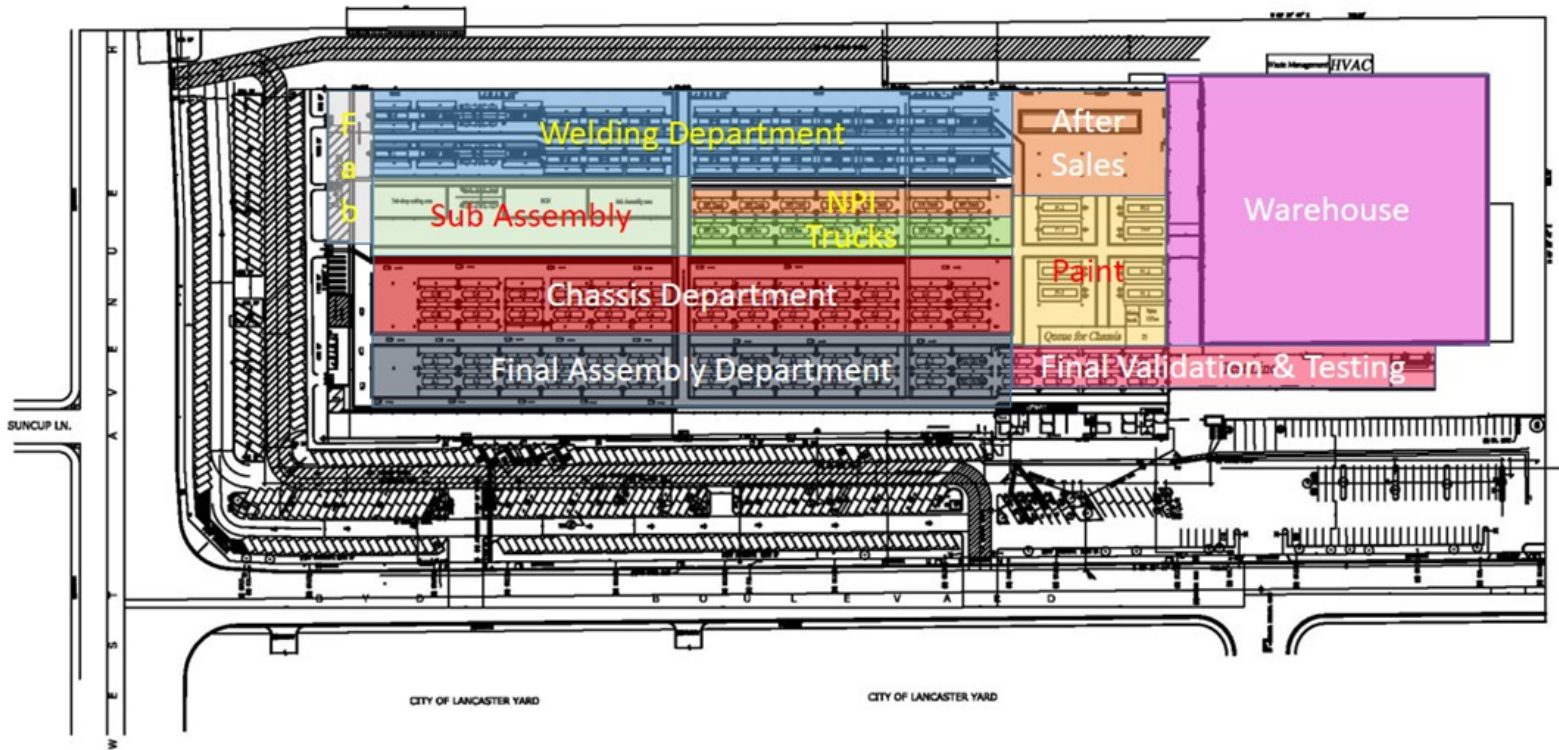
Human Resources, and Management. These departments complete the following vital project roles:

- Project management and plant management tasks
- Engineering and design modifications to existing models, for example to meet project-specific client specifications regarding seating, systems, etc.
- Purchasing, receipt, and inspection of all materials and parts
- Fabrication of select parts if/as needed, when allowed by the specifications.
- Assembling/welding of all elements within each bus structure, beginning with the body frame, which is built on-site, and its “marriage” to the chassis frame, which is shipped from our global parent.
- Painting and finishing of each bus, including full corrosion protection.
- Wiring of each bus and installation of all chassis systems and components (including from BYD and outside manufacturers) along with necessary hoses, piping, etc. (with elements from U.S. companies wherever possible)
- All final assembly tasks, including interior assembly (using products/materials from U.S. companies wherever possible), and installation of additional wiring and electronic and mechanical components/ systems (including from BYD and outside manufacturers, from the U.S. wherever possible)

Performance of all needed inspections and tests, including inspection of received materials, sub-station, and station-level inspections and (if/as relevant) tests, subline/work area (Welding, Painting, Chassis, Electrical and Assembly) inspections and (if/as relevant) tests, and all pre- delivery inspections and tests of the completed buses.

FACILITY PLANT LAYOUT

Each of the electric coaches for the City of Montebello’s project will be designed, built, and delivered by BYD, the world’s leading electric bus manufacturer. We will handle every aspect of this project from design through manufacturing and on to inspection and delivery at our one manufacturing facility in Lancaster, CA at 46147 BYD Blvd., Lancaster, CA 93534. Our Lancaster, CA facility covers a total area of approximately 600,000 sq ft, at which there are dedicated locations for welding; chassis and electrical equipment installation; material storage; final assembly; six state-of-the-art paint booths; and a water spray booth capable of fitting an articulated 60-foot bus, as well as a 45-foot double-decker coach.



PRODUCTION SCHEDULE AND OTHER CONTRACT COMMITMENTS FOR THE DURATION OF THIS CONTRACT



PRODUCTION SCHEDULE AND OTHER CONTRACT COMMITMENTS FOR THE DURATION OF THIS CONTRACT

PROJECT PHASES

A detailed five phase project plan is developed to identify the following key milestones in the process considering key dates that agreed upon in the contract.

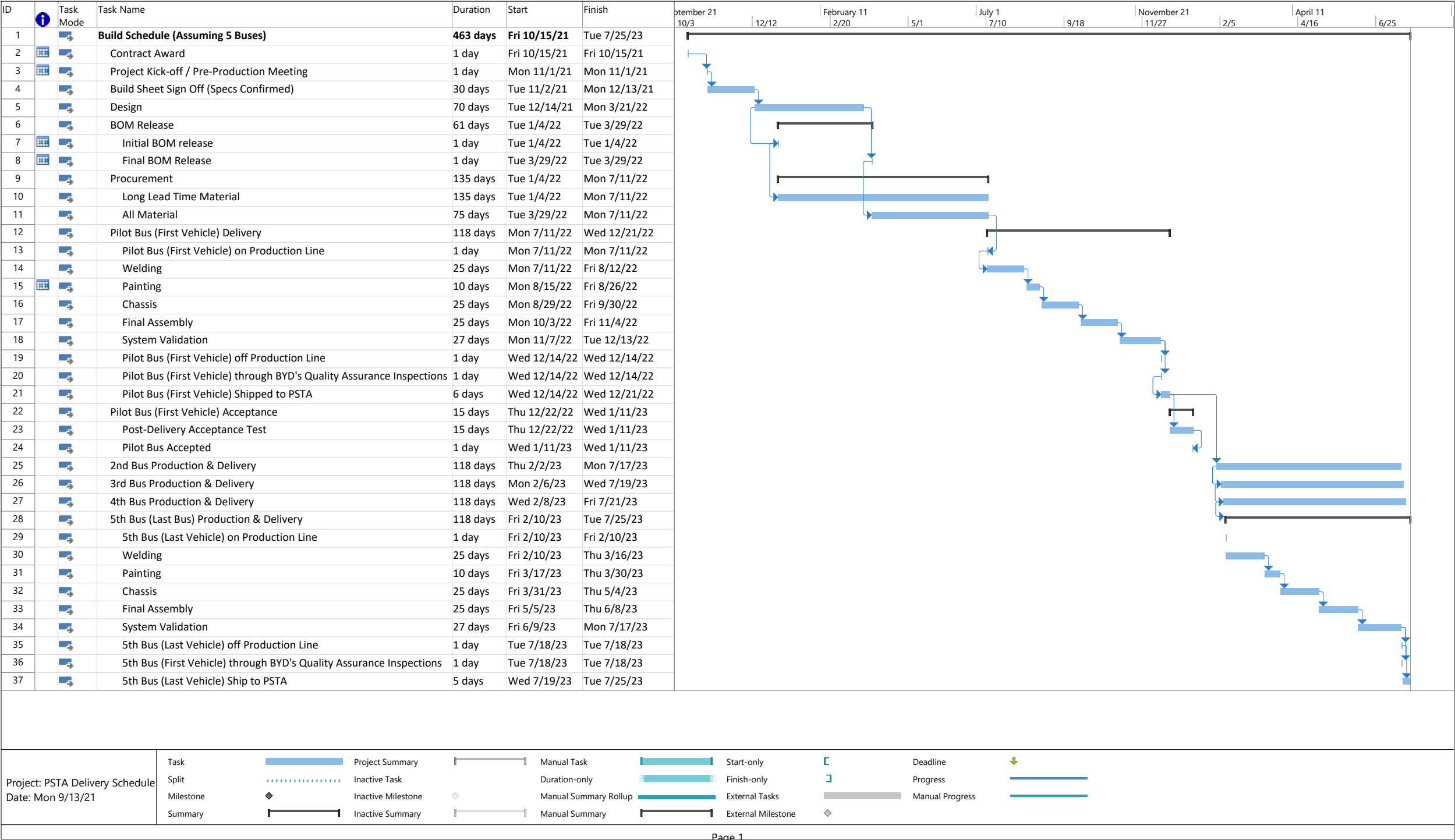
Pre-Project Phase	Project Initiation/ Design Phase	Production/Build Phase	Inspections/Test & Delivery Phase	Aftersales Phase
<ul style="list-style-type: none"> • Review customer specifications to develop strategies to build a compliant bus • Assign a specific Project Manager and Lead Engineer • Establish initial vehicle design • Develop Preliminary Milestone Schedule 	<ul style="list-style-type: none"> • Pre-Production Meeting to establish detailed schedule, task assignments, designs, and list of materials and parts • Discussion of bus and charger design, creates Sales and Production Order • Develop full production project milestone schedule • Create Bill of Materials (BOM) • Engineering Design freeze 	<ul style="list-style-type: none"> • Procurement of materials • Bus Build • Charger Configuration 	<ul style="list-style-type: none"> • First Article Inspection & Test • Pre-Delivery Inspection and Test (at BYD manufacturing facility) • Delivery and installation of charging infrastructure • Delivery of Vehicles to customer depot • Post-Delivery Inspection & Test (Customer Acceptance) 	<ul style="list-style-type: none"> • Acceptance of Vehicles constitute transition of communication and collaboration responsibilities from the Bus Project Manager to Aftersales Department

STANDARD BUS PRODUCTION SCHEDULE

- Week 1** Frame assembly, Wheel well sheet metal
- Week 2** Skin, Inside sheet aluminum, Front/rear fiberglass
- Week 3** Compartment door, Electric component box, Insulation in roof, Undercoating in compartment and wheel well, Axles
- Week 4** Chassis low voltage harness, ceiling low voltage harness, ABS low voltage harness, Dashboard low voltage harness, High voltage harness, Air tanks and electric components in rear compartment, Brake system, Steering system
- Week 5** Cooling system, Batteries (both high voltage and low voltage), Brake/acceleration pedals & headlight foot control switch, Floor, Floor bondo and sanding, Vinyl Floor covering, Floor molding
- Week 6** Painting
- Week 7** Amerex system, A/C, Roof hatch, Roof slip resistant tape, Gutter, Exterior rearview mirror, Roof decorative fiberglass, Roof wires (for interior cameras), Bumpers, Bike rack, Ramp, Exterior lights, step lights, Destination signs, Defroster, Wiper
- Week 8** Driver area fiberglass (dash fiberglass, side console fiberglass, front electric component fiberglass, steering column fiberglass), Electric control panel switches, Defroster pipe, Side wall trim (side wall panels, door pillar fiberglass, battery
- Week 9** Ceiling trim (driver overhead fiberglass, front door fiberglass, windshield fiberglass, interior sign fiberglass, front middle fiberglass), Middle ceiling panel, Interior cameras, PA system, GPS antenna, Air duct, Passenger seat
- Week 10** Handrail, Driver seat, Sunshade, Interior rearview mirror, Triangle flare kit and coat hanger, Fire extinguisher, Front hatch, Labels
- Week 11** Quality issue rework, Test line
- Week 12** Road Test
- Week 13** Customer Presentation

PROJECT SCHEDULE

BYD generated the following GANTT chart schedule for design, production, and delivery of all buses to PSTA. In this schedule, we have included milestones and specified contract deliverables for total vehicle delivery.



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ON-GOING PROJECTS

AGENCY NAME	AGENCY LOCATION	NUMBER OF BUS REMAINING
Antelope Valley Transit Authority	Lancaster, CA	10
Anaheim Resort Transportation	Anaheim, CA	10
Capital Area Transit System (CATS)	Baton Rouge, LA	3
Fresno County Rural Transit Agency	Fresno, CA	12
LADOT	Los Angeles, CA	130
LA Metro	Los Angeles, CA	87
Link Transit	Wenatchee, WA	3
Long Beach Transit	Long beach, CA	14
Macon-Bibb County Transit Authority	Macon, GA	2
Martha's Vineyard Regional Transit Authority (VTA)	Edgartown, MA	1
San Francisco Municipal Transportation Agency	San Francisco, CA	2
Solano County Transit (SolTrans)	Vallejo, CA	1
Sonoma County Transit	Santa Rosa, CA	3
Bauer's Intelligent Transportation Services Inc	San Francisco, CA	10
Steamship Authority	Falmouth, MA	3
Santa Barbara County Association of Governments	Santa Barbara, CA	6

QUALITY ASSURANCE PROGRAM



QUALITY ASSURANCE PROGRAM

We have included our Quality Assurance Program is included in Section 4 – Proprietary/Confidential Information.

MANAGEMENT PLAN



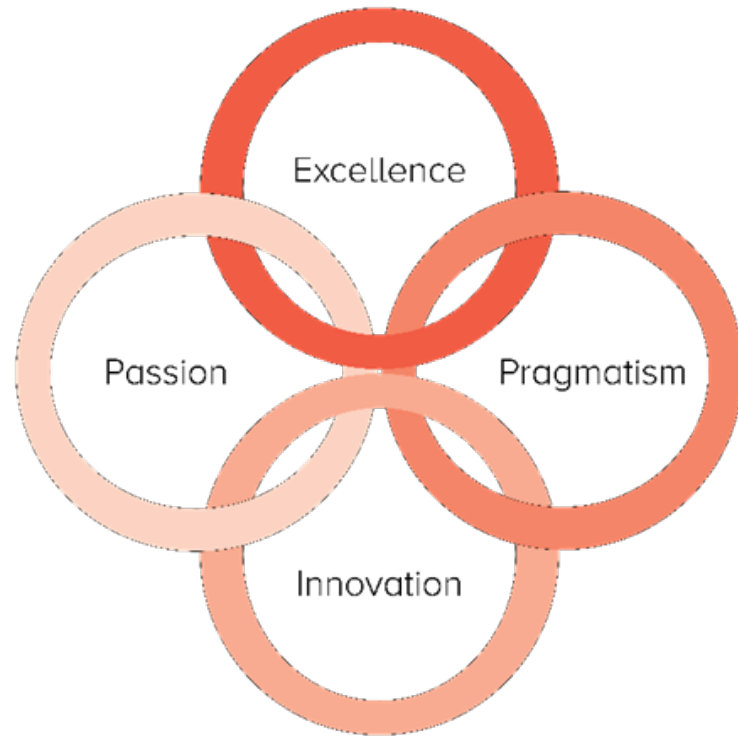
MANAGEMENT PLAN

Excellence. Passion. Innovation. Pragmatism.

These BYD Core Values guide our collaboration with clients and teammates, our vision and strategic plan, the way we do business, and who we want to be as professionals and as a firm.

PROJECT APPROACH

The overriding objective of each project is to deliver quality products that are built consistently, cost-effective, and in a timely manner. BYD's Customer Project Management (CPM) team is comprised a vast network of professionals each with a vested interest of designing, engineering, and manufacturing every Battery-Electric Bus in compliance with our customer's contracts from the moment the contract has been signed to final in-service delivery of the last bus.



Upon contract award, our dedicated Project Manager will begin working with our internal team to develop a plan of action to delivering on-time and on-budget. His primary responsibilities will be:

- Ensuring that each of your requirements and expectations as specified in the contract are fully understood, communicated, and delivered through the whole contract.
- Acting as the primary liaison between BYD and your project team after the contract Notice-of-Award until all buses are fully delivered and in full revenue service.
- Manage project goals and schedule milestones and provide key subject matter experts to project efforts to deliver quality.

ORGANIZATION CHART

BYD has assembled a highly qualified and experience team to manufacture a Battery-Electric bus to meet the PSTA's technical and project objectives. Our team includes key personnel with over 100 years of combined experience designing and manufacturing heavy-duty buses for North American Transit operations. Together our team is committed to producing quality buses for PSTA and will work seamlessly from start to finish.

John Hatch will be the Point-Of-Contact Representative for the PSTA. He will be responsible for contract and customer management for the duration of the project. He will be a liaison between the PSTA personnel and BYD project team members.

Ralph Serrano will be the Project Manager for the PSTA bus build. He will provide direct schedule, contract, vehicle compliance, technical, and project management for the build of the vehicle. He will be responsible for communicating any schedule conflicts or major issues to the PSTA directly. He will manage a team of engineers led by Chief Engineering, Jing Kui. He will also have direct discussions with the Supply Chain management team to ensure that all specific components, subsystems are ordered on time to avoid any delays to the schedule.

Patrick Duan will be the Project Executive for this project. Patrick will provide direct oversight for the project. He will ensure that BYD is properly staffed to complete the project on time.

PROJECT PLAN

A detailed five phase project plan is developed to identify the following key milestones in the process considering key dates that agreed upon in the contract.

PRE-PROJECT PHASE	PROJECT INITIATION/DESIGN PHASE	PRODUCTION/BUILD PHASE	INSPECTION/TEST & DELIVERY PHASE	AFTERSALES PHASE
<ul style="list-style-type: none"> Review customer specifications to develop strategies to build a compliant bus. Assign a specific Project Manager and Lead Engineer Establish initial vehicle design. Develop Preliminary Milestone Schedule 	<ul style="list-style-type: none"> Pre-Production Meeting to establish detailed schedule, task assignments, designs, and list of materials and parts. Discussion of bus and charger design, creates Sales and Production Order Develop full production project milestone schedule. Create Bill of Materials (BOM) Engineering Design freeze 	<ul style="list-style-type: none"> Procurement of materials Bus Build Charger Configuration 	<ul style="list-style-type: none"> First Article Inspection & Test Pre-Delivery Inspection and Test (at BYD manufacturing facility) Delivery and installation of charging infrastructure Delivery of Vehicles to customer depot Post-Delivery Inspection & Test (Customer Acceptance) 	<ul style="list-style-type: none"> Acceptance of Vehicles constitute transition of communication and collaboration responsibilities from the Bus Project Manager to Aftersales Department

SCHEDULE MANAGEMENT

BYD utilizes Project Management Tools of Wrike and Microsoft Project to generate a detailed GANTT Chart and assign tasks to maintain the schedule. By using these tools, it enables BYD to build a detailed schedule to monitor milestone, contract deliverables, identify critical problem areas.

COVID-19 EFFECT ON SCHEDULE MANAGEMENT

As the world begins to reopen from COVID-19 Pandemic, BYD understands there will be inherent difficulties in our supply chain line. Many companies will struggle to revamp up production. Understanding that this will be a key factor in maintaining our schedule of delivery, BYD will prepare a plan to address the possibilities of delays associated with that. Our Project Manager will provide the detailed plan during the Pre-Production Meeting.

MANAGEMENT OF SCHEDULE DELAYS

The Production Lead will schedule overtimes if they are unable to meet production schedule. In the past we have also established a second shift to address critical projects and meet production deadlines. Along with additional shifts, BYD is continuously monitoring production KPI and finding new ways to reduce production time. Before the start of on a new project, the project manager and the production team have a pre-production meeting to address all the issues including material delay/shortage; this ensures that we can minimize production delay. Any delay that it is anticipated to due to material long lead times or for any other reason is communicated verbally and in writing to the PSTA by the Project Manager in charge of the project. At time this will even be escalated to our executive team.

RISK MANAGEMENT

The overall aim of risk and opportunity management within BYD Coach & Bus LLC is to ensure that organizational capabilities and resources are employed in an efficient and effective manner to take advantage of opportunities and to mitigate risks.

Top management is responsible for incorporating risk-based thinking into our organization's culture. This includes the establishment of risk management policies and targets to ensure effective implementation of risk and opportunity management principles and activities by:

- Providing sufficient resources to carry out risk and opportunity management activities.
- Assigning responsibilities and authorities for risk and opportunity management activities
- Reviewing information and results from audits and risk and opportunity management activities

The scope of BYD Coach & Bus LLC risk and opportunity management process includes the assessment of

the internal and external issues, and the assessment of the needs and expectations of any interested parties. Risk and opportunity management is undertaken as part of BYD Coach & Bus LLC day-to-day operations and is captured at the following hierarchy:

- Strategic Level
- Program Level
- Departmental Level
- Process Level

Establishing such a hierarchy for capturing risk and opportunity ensures that each is managed at the most appropriate level within our organization.

BYD Coach & Bus LLC has classified its 'risk appetite' as the amount of risk that we are willing to accept in pursuit of an opportunity or the avoidance of risk where each pertains to product and/or system conformity, and which reflect the following considerations:

- Risk management philosophy per product or process
- Capacity to take on or mitigate risk.
- Our objectives, business plans and respective customer demands
- Evolving industry and market conditions
- Tolerance for failures

COMMUNICATION PLAN

Our approach to project management is developed on principles of strong communication that focus on responding to each of our customer's needs and relaying information about our projection efforts. Communication and coordination with our customers are pillars to successfully delivering on projects. To BYD, there is no substitute for maintaining clear, open lines of communication with our customers to build strong relationships. We dedicate our team to building and maintaining these relationships throughout the life cycle of the contract.

In addition to having face-to-face meetings to build these strong communications, BYD will utilize technological tools such as Zoom to communicate project schedule and key project milestone deliverables. By leveraging these tools, BYD will be able to achieve seamless coordination and collaboration, while mitigating potential project management risks.

- BYD's Communication Plan will include:
- Primary and backup points of contact
- Key personnel contact information
- Weekly/Monthly meetings
- Meeting Agendas and dates
- Review of customer specification in a formal kick-off meeting
- Specific email protocols between BYD and the customer personnel
- Document Management System for deliverables

CONFIGURATION MANAGEMENT PLAN

BYD's Configuration Management Plan (CMP) has been established to ensure that designs are traceable to requirements, changes are controlled and documented, and there is consistency between the product and its supporting documentation. The CMP identifies and describes the overall procedures for configuration management of the vehicles throughout the transit life cycle of the vehicles. Scope begins at Notice of Proceed (NTP) and ends at the completion of general warranty. The CMP is closely associated with technical data management and interface management. The CMP will further outline the methodologies through which BYD will establish and document any changes to the baseline design.

The CMP describes procedures for the following functions:

- **Configuration Identification:** Identify all parts requiring serial numbering; specify procedures for

serialization, and record serial numbers for all required items per vehicle specifying the revision level of each part for configuration control of hardware and software.

- **Change Control:** Procedures will document and control any changes to hardware and software configuration that may be initiated by suppliers, BYD, contract change orders (Modifications), engineering changes, and field modifications.

The configuration control process ensures that submittal of deliverable, such as drawings, (especially final as-built drawings), specifications, and manuals accurately record the latest revisions levels for all equipment.

RFP #21-980369

FLORIDA ELECTRIC TRANSIT BUSES WITH CHARGING AND ASSOCIATED EQUIPMENT

PINELLAS SUNCOAST TRANSIT AUTHORITY

September 21, 2021



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