North America's FIRST ALL Electric Mobile Railcar Mover

ELECTRIC SHUTTLEWAGON

FAST CHARGE

ZERO EMISSIONS

REGENERATIVE BRAKING

PRECISION DRIVE TECHNOLOGY
STANDARD FEATURES

- Zero Emissions
- Continuous Power Electric Motor
- Regenerative Braking
- Precision Drive Technology
- Lithium Ion Batteries
- Battery Management System
- SAE J1772 Connector
- Level 1, 2, & 3 Charging Capability
- External Recharge Strobe Light Indicator
- CAN-Bus Electric System
- Radiator – 12 VDC fans provide air flow for cooling; transmission, traction motors, electrical components and batteries
- 66cfm Air Compressor
- Separate High Voltage Disconnect Boxes
- ABS Vehicle Brakes
- Air Knife
- Anti-Slip Traction Control
- Speed-Based Rail Guidance Pressure
- Lockable EV Electronic Door
- Two Air Ride Operator Seats
- 180 degree Rotating Operator Console
- (4) Video Cameras with Monitor Inside Cab
- (2) 12 Volt DC Power Ports
- (2) USB Charge Ports
- (1) 120 Volt AC 15 Amp Outlet
MACHINE SPECIFICATION

- Height: 143.5” (13,465mm)
- Width: 120” (13,048mm)
- Length: 296” (7,518mm)
- Wheelbase: 168” (4,267mm)
- Weight: 66,000lbs (29,484kg)

TRACTION EFFORT
- 45,000lbs Single coupled, without weight-transfer
- Forward and reverse both road and rail

DETAILS
- Electric Motor:
  - Continuous power 155kW
  - Intermittent power 230kW
  - Continuous torque 1400Nm
  - Max torque 2700Nm
- Lithium Ion Batteries with Battery Management System
  - 108 or 162kW Package
- IP65 rated compatible components
**KEY DRIVE COMPONENTS**

**Electric Motor and Inverter/Controller:**

- **Traction Motor**
- **Inverter**

Automotive grade  
Readily available & dependable  
Utilized globally for heavy duty applications
BATTERY PACK & BATTERY MANAGEMENT SYSTEM

- **Batteries- Lithium Ion:**
  - 400 VDC, 108kWh-standard offering
  - Optional 162kWh
  - 8-10 year life span
  - End of life capacity = 145kWh
  - *Life span based on # of charge & discharge cycles

- **Battery Management System (BMS):**
  - Integrated cell monitoring includes:
    - Amps, Voltage, Temperature
    - Balancing and over current protection
  - Maximize battery and cell life

Built and certified for the automotive industry
Over 1 million cells in operation since 2004
Driven over 20 million miles since 2004
LEVEL 1 CHARGING

- Charge provided through 120 volt (V) alternating-current (AC) plug
- Requires dedicated circuit
- Level 1 charging is comparable to a standard household outlet
- Does not require special installation of charging equipment
- Utilizes standard 3-prong household plug with a special connector to vehicle
- 120V, 20A service with 15A of charging power
- Charges at 1.8kWh
- Takes 60 hours for 4 batteries for full charge
- Takes 90 hours for 6 batteries for full charge

LEVEL 2 CHARGING

- Charge provided through 240 volt (V) AC plug
- Requires installation of charging equipment
- Installation requires dedicated 40 amp circuit
- Level 2 charging is compatible with all electric vehicles & plug-in hybrid vehicles
- Charging equipment has a cord that plugs directly into the vehicle in same location used for level 1 equipment
- 208-240V, 30-100A service with 20-80A of charging power
- Charges between 4.1kWh-15kWh
- Takes 7.2 hours for 4 batteries for full charge

LEVEL 3 CHARGING

- Equipped with CHAdeMO technology (DC fast charging)
- Charge provided through 480 volt (V) direct-current (DC) plug
- Requires installation of charging equipment
- 480V, with 50-100kWh of charging power
- 50kWh charges 4 batteries in 2.2 hours
- 50kWh charges 6 batteries in 3.2 hours
- 100kWh charges 4 batteries in 1.1 hours
- 100kWh charges 6 batteries in 1.6 hours

Level 3 charging typically provides an 80% charge in 30 minutes
(Cold temperature may lengthen time)
SHUTTLEWAGON DUTY CYCLE
(10 HOUR SHIFT)

ENGINE EFFICIENCY

25% VS 92%

1.8 GAL/HR (equals 73.26kWh)

18 GAL (732.6 kWh)

ELECTRIC MOTOR EFFICIENCY

15.69 kWh

156.9 kWh

Values have been validated during testing at multiple locations.
**OPERATIONAL COST** (10 HOUR SHIFT)

**DIESEL**

- **GAL/DAY**
  - 18 Gallons

- **Cost/Shift** ($2.5/gal)
  - $45.00

- **Cost/Year** (260 days)
  - $11,700

- **Cost/Life** (10 Years)
  - $117,000

**ELECTRIC**

- **kWh/DAY**
  - 156.9 kWh

- **Cost/Shift** (.08/kWh)
  - $10.05

- **Cost/Year** (260 days)
  - $3,263

- **Cost/Life** (10 Years)
  - $32,630

**Cost Savings**:

- $34.95/Shift
- $8,437/Year
- $84,370/Life
MAINTENANCE COST

- 10 year machine life (2,000 hrs per year baseline)

**DIESEL**= $66,000
(Engine oil, filter, fuel filter, transmission fluid, filter, etc.)

**ELECTRIC**= $17,200
(Coolant, axle oil)

74% savings over life of machine
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