



Battery Electric 4 Tonne LHD



• Zero-Emission Battery Electric Powertrain

Traction Motor

Torque, Peak	1200 Nm	885 ft-lb
Torque, Continuous	525 Nm	387 ft-lb
Power		
Peak Combined	270 kW	362 hp
Continuous Combined	150 kW	201 hp

Auxiliary Motor

Torque, Continuous	360 Nm	265.5 ft-lb
Power	100 kW	134.1 hp

Batteries (LiFePO₄)

Primary Pack	
Nominal Energy	88 kWh

• A4 FEATURES

High Performance Powertrain

The A4 uses a powerful battery electric motor generating 150 kW and 800 Nm of torque. We use Lithium-Iron Phosphate chemistry (LiFePO_4) for our patented battery system. Our power is not constrained by ventilation limitations and therefore we use the most powerful electric motors available which directly improves productivity.

Regenerative Braking

SAHR with electric regeneration allows for the battery to recharge during the braking process by converting mechanical energy into electrical energy. This feature is making the industry rethink their mine designs in order to support this valuable technology. In the right environment, a battery electric vehicle could potentially operate for an entire shift on a single charge. This directly translates to added production and increased revenue for the mine.

Zero-Emissions

All of our vehicles have zero-emissions which provide a healthier environment for the operator. The implementation of battery electric vehicles will have a significant reduction in ventilation, heat and overall operating cost resulting in a positive impact on the mine's bottom line.

Innovative Design

Designed to offer the most power in the smallest footprint. The A4 has 350% of the power of a diesel 2.0 yd. LHD. This vehicle loads quicker, hauls up steep grades faster and provides precise, responsive operator commands.

The A4 produces zero diesel emissions thereby reducing demand on your mine's ventilation and cooling systems making deep mining possible. It improves working conditions and enables the incalculable benefits of a healthier underground environment.



The A4 LHD is by far the smallest LHD capable of carrying 4 tonnes. Its compact stance allows for the best line of sight visibility - far better than any machine in its class. It is more maneuverable with a 20% tighter turning radius. It has 350% of the power and far more torque than its diesel rival while producing only 1/8th of the heat. All of this translates to higher productivity, more tonnes moved per shift and a greater return on your investment.

• A4 FEATURES

ROPS / FOPS Certified Canopy

Peak Combined / Continuous 250 / 135 kW
Liquid Cooled Brushless Electric Motor

LiFePO₄ 88 kWh Battery Pack
Available Upgrade to 133 kWh

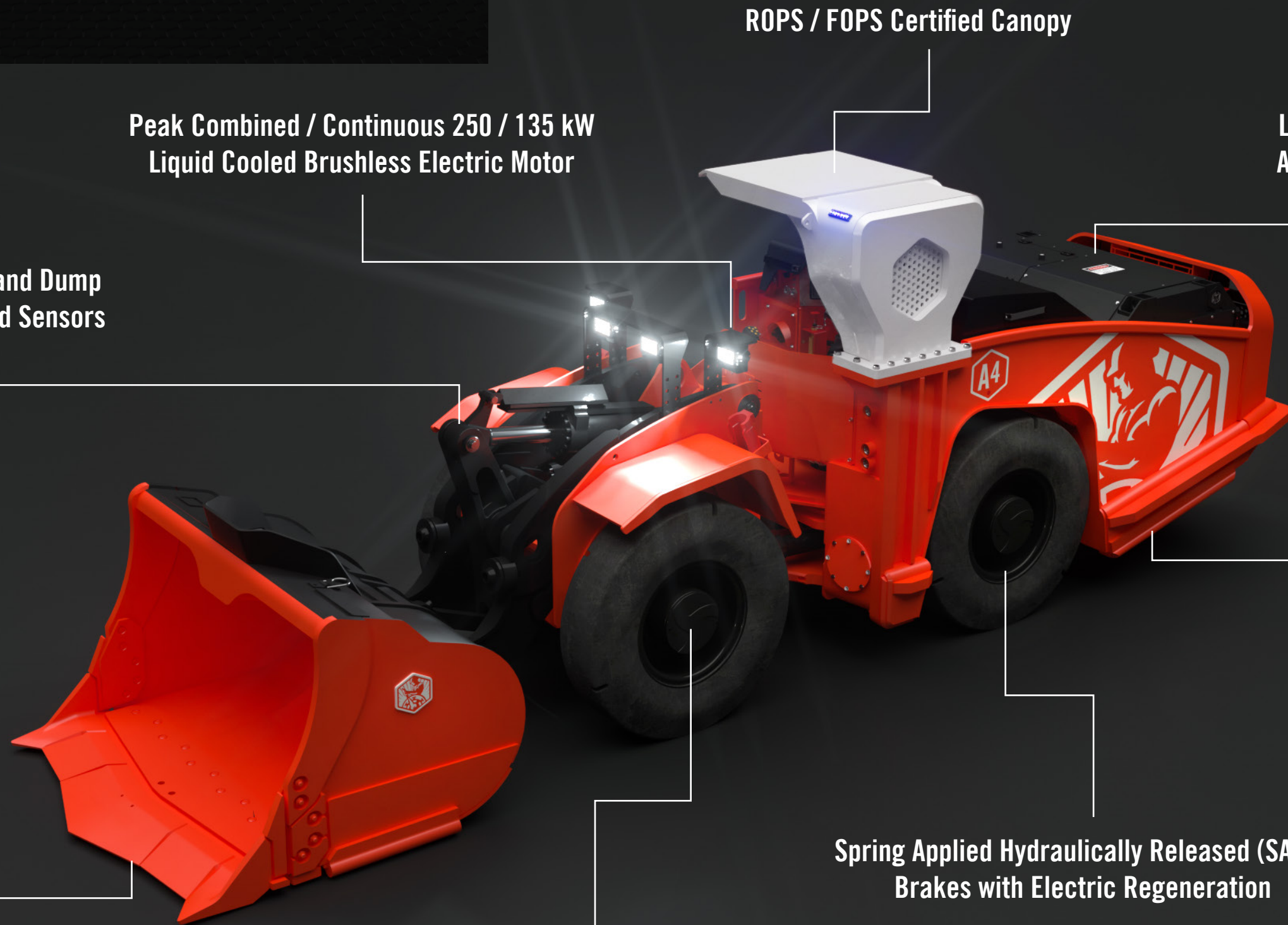
Heavy Duty Hoist and Dump
Cylinders with Load Sensors

Battery Management
System (BMS)

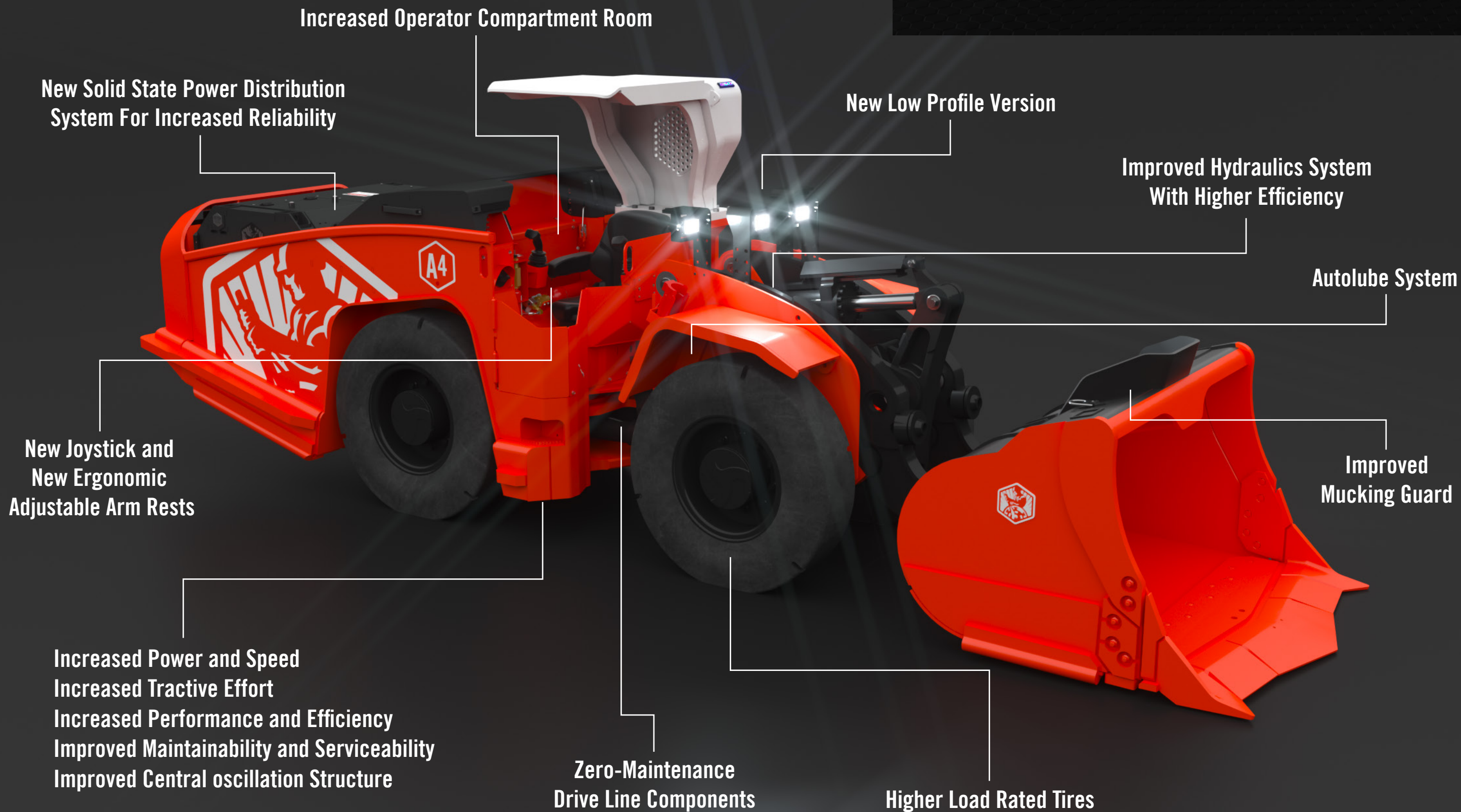
Spring Applied Hydraulically Released (SAHR)
Brakes with Electric Regeneration

Alternate Bucket Sizes
for Different Ore Density

Dana Axles



• **A4 2019 FEATURE UPDATES**



• A4 SPECIFICATIONS

The A4 LHD is more than a meter shorter than its diesel rival, offering superior agility and far greater visibility than any machine in its class. Operators prefer the A4 for its powerful and productive mucking capability as well as its cool, quiet performance with zero diesel fumes.



- 4 second raising time
- 3 second lowering time
- 2.5 second dump time

• A4 SPECIFICATIONS

General Information

Main Dimensions		
Overall Length	6,200 mm	244.1 in
Overall Width	1,680 mm	66.1 in
Overall Height	1,650 mm	65 in
Overall Height with ROPS/ FOPS	2,160 mm	85 in

Turning Radius		
Inner	2,070 mm	81.5 in
Outer	4,170 mm	164.1 in

Operating		
Total Operating Weight	10,886.2 kg	24,000 lb
Front Axle	2,721.6 kg	6,000 lb
Rear Axle	8,164.7 kg	18,000 lb

Loaded		
Total Loaded Weight	14,886 kg	32,818 lb
Front Axle	9,526.4 kg	21,002 lb
Rear Axle	5,359.7 kg	121,037 lb

Capacities		
Tramming Capacity	4,000 kg	8,818.5 lb
Break Out Force, Lift	7,000 kgf	15,432.4 lbf
Break Out Force, Tilt	8,000 kgf	17,637 lb
Standard Bucket	1.5 m³	2.0 yd³

Bucket Motion Times	
Raising Time	4 sec.
Lowering Time	3 sec.
Dumping Time	2.5 sec.

Vehical Performance (Loaded)		
Tramming Speed (HI/LO)	16 / 24 km/h	9.9 / 15 mph
Tractive Effort	98/68 kN	61 / 42 klpf

Powertrain

Motor		
Type	Permanent Magnet, AC, 3 phase	
Torque, <small>Peak / Continuous</small>	1200 / 525 Nm	885 / 387 ft-lb
Power <small>Peak / Continuous</small>	170 / 100 kW	228 / 114 hp
Max Motor Speed	4,500 rpm	

Transfer Case	
Dana 360	2 speed (optional)

Axles	
All Axles	Dana 113 Limited Slip 45%
Center Articulation / Oscillation	+/-40 Deg / +/- 9 Deg

Tires	
Tyre Size / Type	9.00 R 20 / Michelin XMine D2 LR5

Batteries	
Voltage	600 VDC
Energy	88 kWh (132 kWh optional)
Chemistry	LiFePO ₄

Main Hydraulic Componnts

Pressure / Capacity		
Main Relief	290 bar	4,206 psi
Oil Tank Capacity	90.8 L	24 US gal.

- Variable displacement, load sensing, axial piston, 75 cc / rev pump
- Electronically controlled load-sensing valve with post compensation

Motor / Pump		
Type	Permanent Magnet, AC, 3 phase	
Torque <small>peak / continuous</small>	360 / 190 Nm	265.5 / 140.1 ft-lb
Power <small>peak / continuous</small>	100 / 50 kW	134.102 / 67.1 hp
Max. Motor Speed	2800 rpm	

- Steering
- Two double-acting steer cylinders for balanced articulation rate

- Brakes
- Dynamic service braking through the electric drive motor, additional service braking through multi disc hydraulically applied brakes in each axle. The parking brake is an internal SAHR multi disc brake in each axle.
- MICO electric proportioning valve
 - MICO accumulator charge valve and piston type accumulator

- Bucket
- Fully hydraulic closed center load sense system with axial piston pump
 - Electronic z-axis joystick with dual lift cylinders and single dump cylinder
 - Z-bar linkage for higher rollback force and faster bucket articulation

• A4 SPECIFICATIONS

Electrical Equipment

Low-Voltage Batteries	2 x 12 V, 38 Ah
Driving and Working Lights	5 Front (4 white 1 blue) 5 Back (2 white 3 red)
24 V Power Supply	130 A @ 27 V

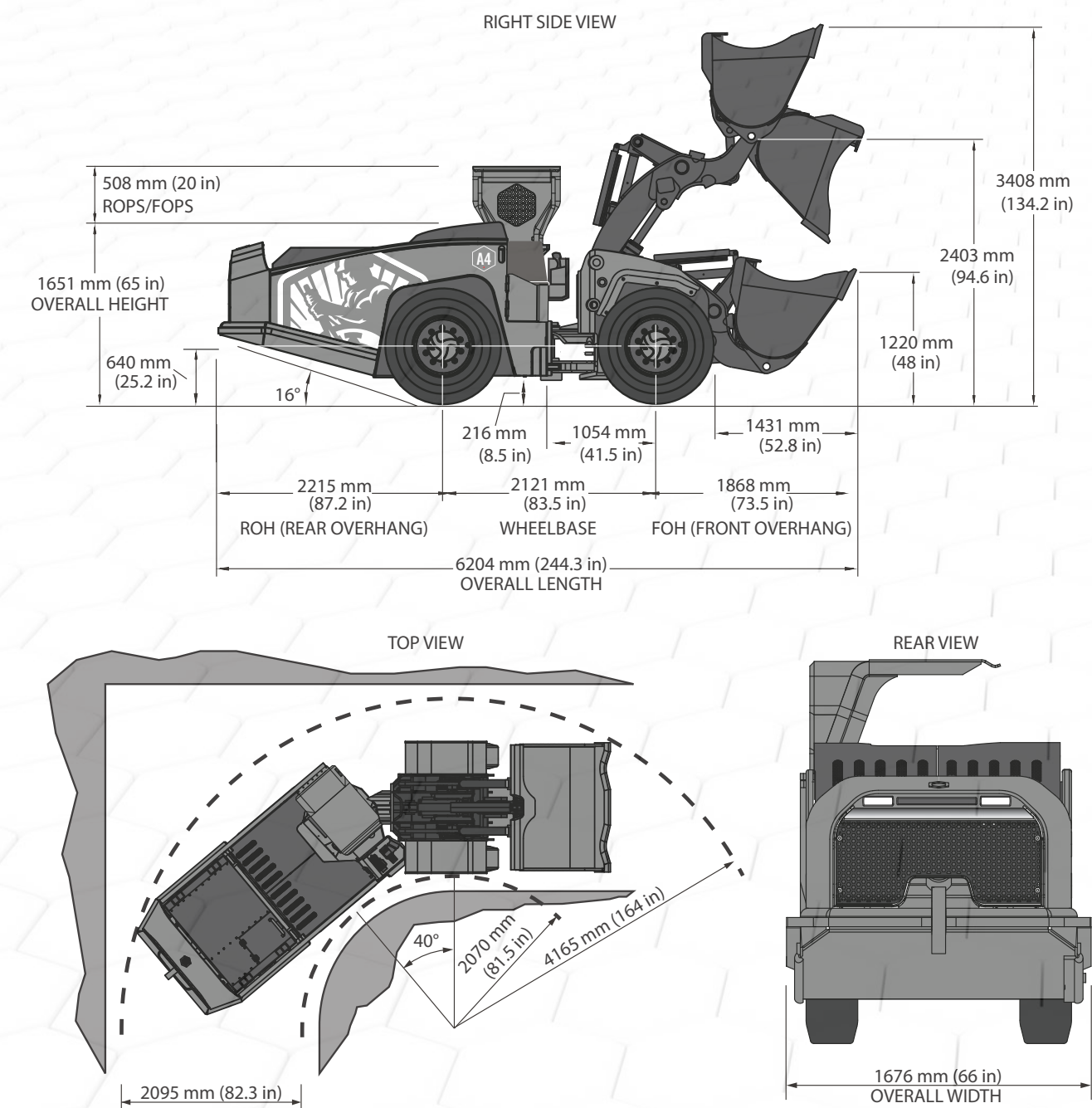
Other Standard Equipment

- Digital Touchscreen Display
- Central Manual Lubrication System
- SAE JIC Hose Fittings

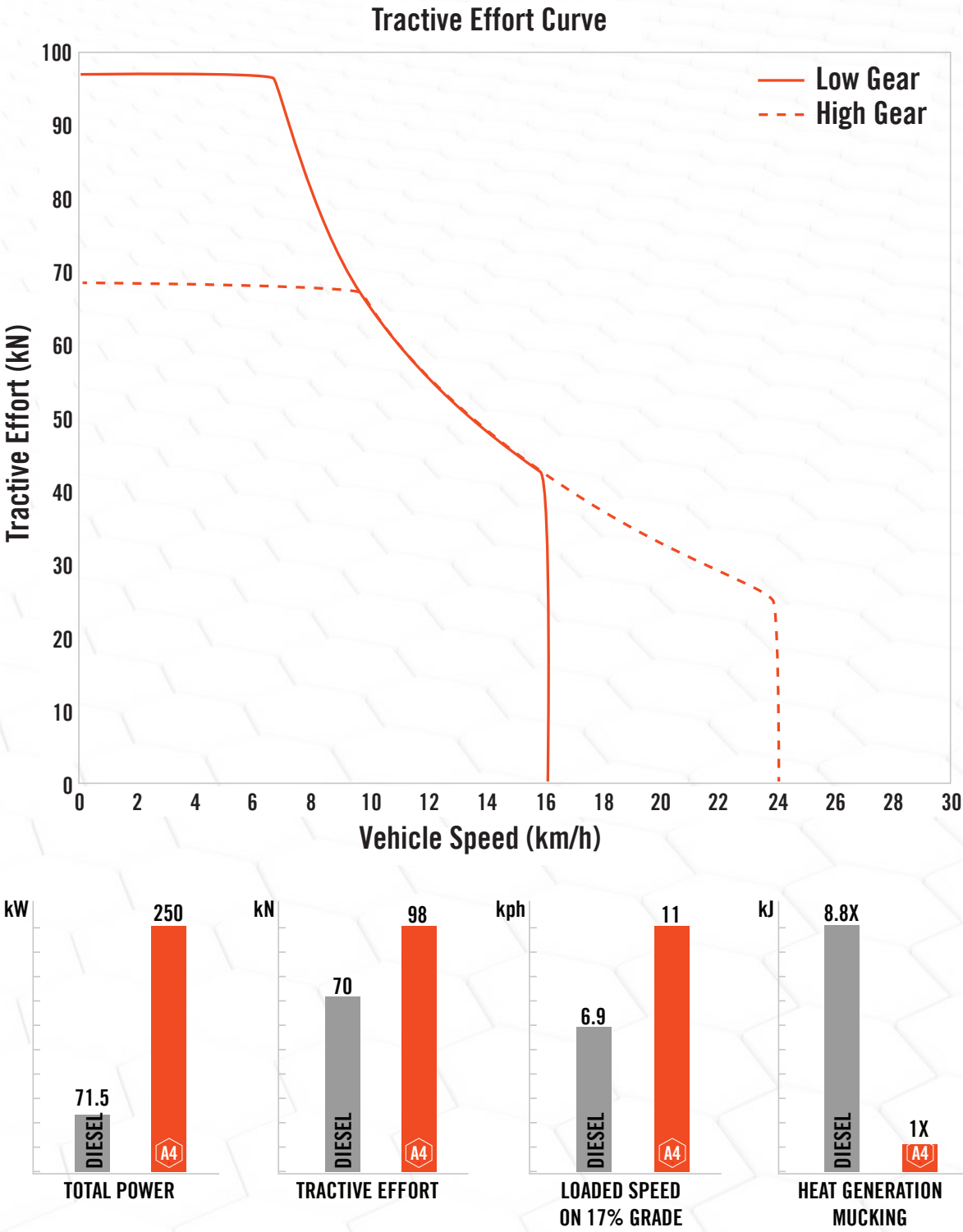
Optional Equipment

- Radio Remote Control
- Traction Control
- High-Capacity 132 kWh battery pack
- Foam-Filled Tires
- ROPS/FOPS canopy
- Auto Lubrication System
- Cast Bucket Lip
- Ejector Bucket
- 2.5yd Bucket (0.5yd capacity increase)
- Bucket Wear Package

• A4 SPECIFICATIONS



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• SERVICEABILITY

Keeping your A4 available for continuous production

Our highly skilled Field Service Team is specifically trained to work on our moderately complex electro-mechanical and hydraulic systems to provide our customers with on-site diagnosis, maintenance, repair and all installations needed to ensure your vehicle is available for continuous production.

Comprehensive hands-on training by members of our engineering and leadership team on all computer and battery systems including:

- Powertrain Control Module (PCM)
- Artisan Control Interface (ACI)
- Battery System Controller (BSC)
- Battery Management System (BMS)
- Human Machine Interface (HMI) Systems

Artisan Vehicles delivers underground battery loaders and trucks with zero exhaust emissions. With over 300,000 operating hours underground and 10 years of experience, today, most battery loaders and trucks operating underground use Artisan Vehicles technology.



Artisan Vehicles is part of Sandvik Mining and Rock Technology, Load and Haul division.