

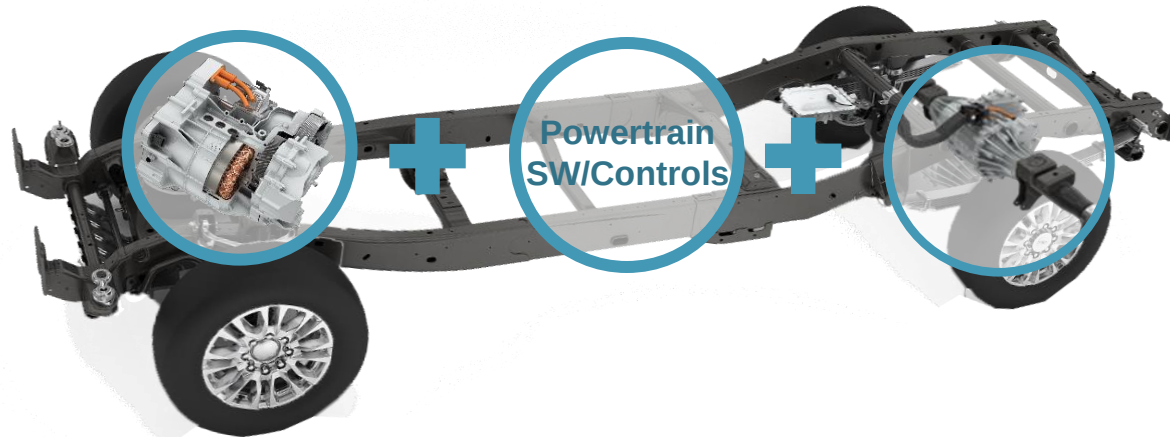
EtelligentForce



# EtelligentForce Uncompromised Payload and Towing Capacity

BEV

Magna EtelligentForce is a battery electric 4WD powertrain system for passenger trucks and light commercial vehicles, designed to maintain the full capabilities of these vehicles with uncompromised payload and towing.



## Front Electric Drive System

- eDS Mid+ w/ Decoupling

## Software/Controls

- Drive controller
- Operation strategy
- Optional decoupling strategy

## Rear Electric Drive System

- eBeam™ High

## EtelligentForce

BEV pickup and light commercial vehicle solution

### Efficiency

Decoupling capability of front axle

### Safety

Vehicle dynamics controller supports excellent vehicle stability

### Convenience

Uncompromised 14,500 pounds towing capability

### Dynamics

Up to 430 kW peak power

### Vehicle Integration

Totally customizable w/o need for architectural changes



Pre-Development

Released for Acquisition

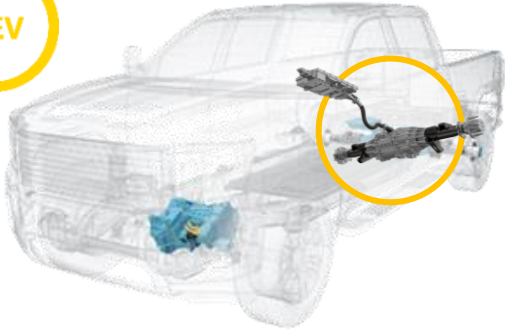
Serial Development

Serial Production

# eBeam™

Primary Axle (Rear)

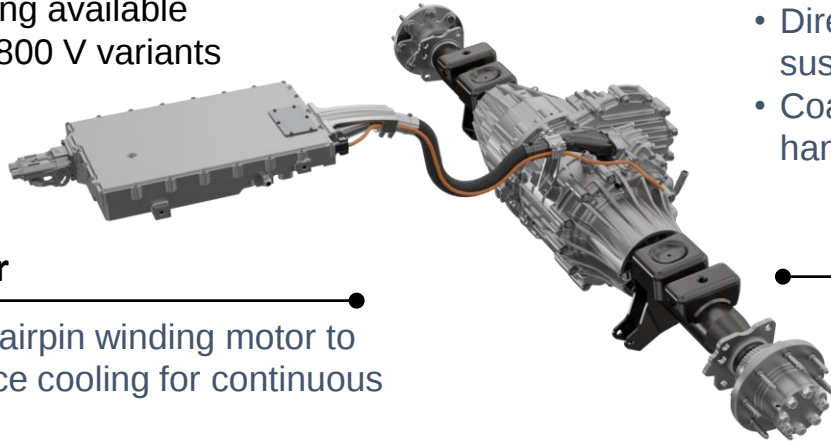
BEV



eBeam™, the electric axle drive system, offers a structure-oriented design to support high payload vehicles with matching power for continuous duty usage. It supports light commercial vehicles, SUVs, and pickups classes 1, 2a, 2b and 3.<sup>1)</sup>

## Inverter

- Si or SiC power electronics
- Remote and on-unit mounting available
- 400 & 800 V variants



## E-motor

- PSM hairpin winding motor to enhance cooling for continuous usage
- Dual media (oil/coolant) cooling

## Features

- Locking differential
- Optional ePark-lock
- Direct integration to current vehicle suspension
- Coaxial design for optimum ride & handling

## Reduction Unit

- High contact ratio for quiet operation
- Optional ratios via final drive gearset change
- Coaxial arrangement for reduced space claim

Pre-Development Released for Acquisition Serial Development Serial Production

## Magna eBeam™

### Safety

Robust design for safe towing and hauling

### Convenience

Unsprung mass increase eBeam™ vs. traditional rigid axle by only 18 kg / 40 lbs ensures ride and handling performance

### Dynamics

Scalable power to 250 kW with up to 10,000 Nm axle torque

### Vehicle Integration

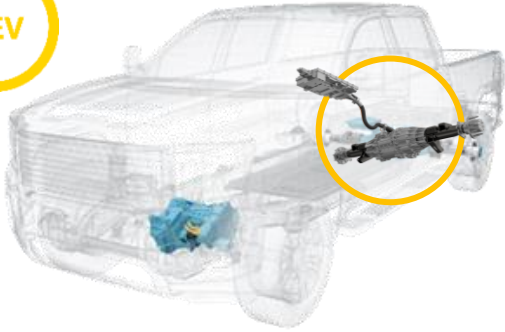
Adaptable to current suspension, achieves required clearances during full suspension movement



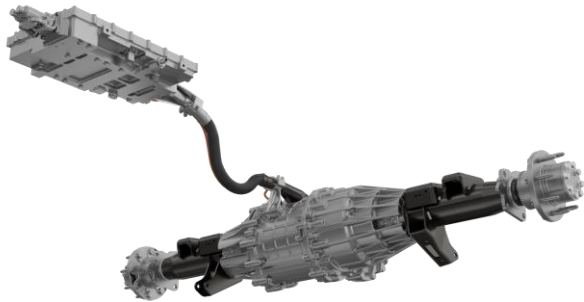
<sup>1)</sup> according to commercial motor vehicle classification FHWA

# eBeam™

Primary Axle (Rear)



eBeam™, the electric axle drive system, offers a structure-oriented design to support high payload vehicles with matching power for continuous duty usage. It supports light commercial vehicles, SUVs, and pickups classes 1, 2a, 2b and 3.<sup>1)</sup>



## eBeam™ Mid

|                   |                                     |
|-------------------|-------------------------------------|
| Peak axle power:  | up to 250 kW for 30 s <sup>2)</sup> |
| Peak axle torque: | up to 10,000 Nm <sup>3)</sup>       |
| Output speed:     | 1,400 rpm                           |
| GRWR:             | 3,400 kg                            |
| Feature:          | electric locking differential       |

<sup>1)</sup> according to commercial motor vehicle classification FHWA

<sup>2)</sup> A-sample application limitation by software for protection reasons

<sup>3)</sup> A-sample application limitation by software for protection reasons

## Magna eBeam™

### Safety

Robust design for safe towing and hauling

### Convenience

Unsprung mass increase eBeam™ vs. traditional rigid axle by only 18 kg / 40 lbs ensures ride and handling performance

### Dynamics

Scalable power to 250 kW with up to 10,000 Nm axle torque

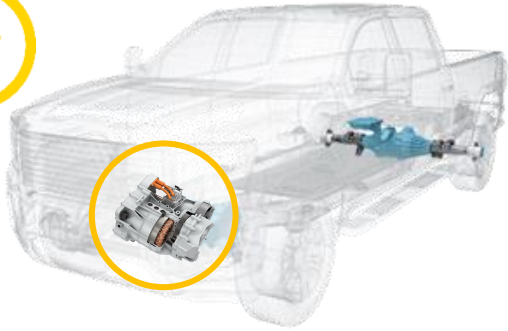
### Vehicle Integration

Adaptable to current suspension, achieves required clearances during full suspension movement



# eDS Mid+ with Next-Gen Technologies

Secondary Axle (Front)



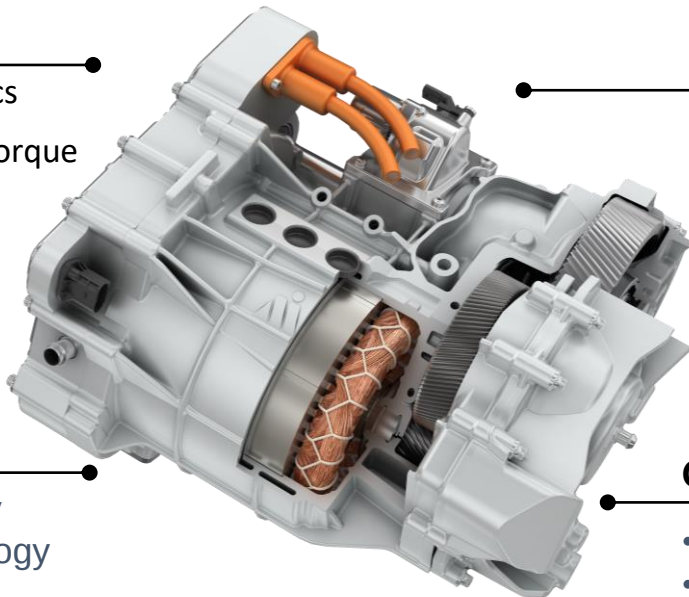
Magna's eDrive system on the front provides up to 180 kW. It can be applied to both hybrid and battery electric vehicles. Next-gen technologies support best-in-class efficiency, safety, convenience and dynamics.

## Inverter

- Si or SiC power electronics
- Boost option for higher torque & power
- Native speed interface for fast interaction w/ vehicle controls

## E-motor

- PSM e-motor with highly efficient winding technology



## Decoupling+

Proven AWD technology combined with new controls strategy leading to improved efficiency (2WD) while maintaining performance and safety

## Gearset

- Rotor shaft with 2 bearings
- Ball bearing or roller bearing w/o preload
- Low loss gears applied for 2nd gearset

## Magna eDS Mid+

### Efficiency

Low parasitic losses < 35 W (50 kph)

### Safety

< 200 ms fast reconnect time

### Convenience

1 ms control loop of native speed interface

### Dynamics

+ 8 % torque boost (7 sec.)  
+ 22 % power boost (7 sec.)

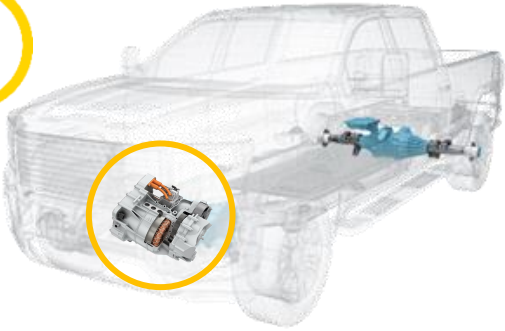
### Sustainability

Optional ASM rare earth free dedicated secondary drive available

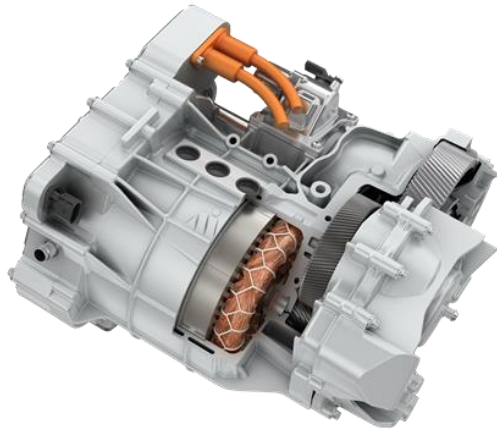


# eDS Mid+ with Next-Gen Technologies

Secondary Axle (Front)



Magna's eDrive system on the front provides up to 180 kW. It can be applied to both hybrid and battery electric vehicles. Next-gen technologies support best-in-class efficiency, safety, convenience and dynamics.



## eDS Mid+ w/ Decoupling

|                   |                        |
|-------------------|------------------------|
| Peak axle power:  | up to 180 kW for 10s * |
| Peak axle torque: | 3,770 Nm               |
| Output speed:     | 1,400 rpm              |
| Feature:          | Decoupling+            |

\* depending on battery performance and duration

## Magna eDS Mid+

### Efficiency

Low parasitic losses < 35 W (50 kph)

### Safety

< 200 ms fast reconnect time

### Convenience

1 ms control loop of native speed interface

### Dynamics

+ 8 % torque boost (7 sec.)

+ 22 % power boost (7 sec.)

### Sustainability

Optional ASM dedicated secondary drive available



# EtelligentForce Uncompromised Towing and Payload Capacity

BEV

Magna EtelligentForce is a battery electric 4WD powertrain system for passenger trucks and light commercial vehicles, designed to maintain the full capabilities of these vehicles with uncompromised payload and towing.



## Features/Specifications

### Rear Axle Electric Drive System Magna eBeam™

Peak axle power up to 250 kW <sup>1)</sup>

Peak axle torque 10,000 Nm <sup>2)</sup>

Ratio rear axle 12,67

### Front Electric Drive System Magna eDS Mid+ w/ Decoupling

Peak axle power up to 180 kW

Peak axle torque 3,770 Nm

Ratio front axle 11,720

### Motion & Energy Control



Pre-Development Released for Acquisition Serial Development Serial Production

<sup>1)</sup> A-sample application limitation by software for protection reasons

<sup>2)</sup> A-sample application limitation by software for protection reasons