Drive and Motion Systems for Aerial Work Platforms

Dana’s Spicer® and Brevini® lines of drivetrain and motion system solutions for AWPs
NVH

Emissions Reduction Noise, Vibration, and Harshness (NVH)

Market-Driven Innovations

We deliver innovative technologies that meet customer demands worldwide. By anticipating market trends, Dana uses its industry expertise to deliver product solutions that achieve customer goals.

Dana has a complete range of advanced drive and motion products for AWPs that address these trends while boosting productivity. We design and manufacture fully integrated drive and motion products for many types of AWPs, including scissor lifts, vertical mast lifts, articulating and telescopic boom lifts, crawler lifts, and truck-mounted lifts.

By adding Brevini® motion systems to its Spicer® drive systems, Dana has a full array of mechanical, hydraulic, and electronic advanced technologies to support customer application designs.

Vehicle Development Lab

As part of Dana’s mission to be a global technology leader in efficient power conveyance and energy maintenance solutions, we operate a state-of-the-art vehicle development lab in Arco, Italy. Dana’s flexibility and engineering expertise deliver the right solution for your vehicle.

Your Single-Source Provider of Aerial Work Platform Drive and Motion Systems

The aerial work platform (AWP) market is transforming rapidly. OEMs must respond to more stringent emissions regulations, while end-users are looking to lower noise levels and environmental impact.

By adding Brevini® motion systems to its Spicer® drive systems, Dana has a full array of mechanical, hydraulic, and electronic advanced technologies to support customer application designs.
The Right Partner for Your AWP

Dana’s engineering capabilities and broad portfolio allow us to team with our customers to provide optimal solutions. Our integrated solutions deliver the performance necessary to support high levels of efficiency. Meanwhile, as a single supplier, we can help optimize supply chains and serve the overall performance needs of our customers.

Spicer® wheel drives can be paired with a motor for electric-driven AWPs ranging from 3 to 7 tonnes (3 to 8 tons), with additional solutions in development for wheel-drive and axle-based solutions up to 24 tonnes (26 tons). Additionally, Dana is developing drive systems that integrate advanced electric motor and wheel-drive technologies in a single, compact package to optimize the performance of electric-powered AWPs with overall weights of 8 to 12 tonnes (9 to 13 tons).
Complete **System Solutions**
for Telescopic Boom Lifts and Scissor Lifts

**Drivetrain Systems**

- **Planetary Rigid Steering Axle**
  - With integrated Intelligent Load Monitoring System (ILMS)

- **Wheel Drive Range with Plug-In Motor**
  - Designed for new generation machines as well as for electromobility

- **Hydraulic Motor Direct Drive**
  - With integrated brake

**Power Electronics**

- **Angle/Length Transducer ASu Series**
  - Simultaneously provides data on boom tilt and outreach

- **Tilt Sensor SP Series**
  - Constantly measures platform tilt

- **Tilt Switch IDXYmp Series**
  - Provides safety alarm in case of exceeded tilt threshold

- **Safety Controller M92sc Series**
  - Provides safety alarm signal in case of basket overload

- **Master Control Vehicle BMS Series**
  - ECU for overall platform management

- **Load Sensors TPE/TT Series**
  - Directly measures load on basket

- **Angle Sensor TAC Series**
  - Indirectly measures platform height

- **Graphic Display Opus Series**
  - Provides information about platform status
Variable and Fixed Displacement Motor
Customized solutions

Slewing Drive Unit
Swing gearbox with plug-in hydraulic motor and shockless type pressure relief valves

Gearpumps and Power Units
Customized solutions

Compact Hydraulic Power Unit
Powered with DC and AC motors

Hydraulic Pumps
High and medium duty, open and closed circuit

Pressure Compensated Proportional Bankable Valve
Fully controls all machine movements and load independently

On-Off and Proportional (Not Compensated) Bankable Valve
Fully controls all machine movements

Flow Sharing Bankable Valve
Fully controls all machine movements and load independently

Hydraulic Integrated Circuit (HIC)
Fully controls all machine movements
# Aerial Work Platform Product Range

## Drivetrain System
- **Hydraulic transmission**: 
  - Scissor: •
  - Articulated Boom: •
  - Telescopic Boom: •
  - Truck Mounted: •
- **Steering**: 
  - Scissor: •
  - Articulated Boom: •
  - Telescopic Boom: •
  - Truck Mounted: •

## Work Functions
- **Swing drive package**: 
  - Scissor: •
  - Articulated Boom: •
  - Telescopic Boom: •
  - Truck Mounted: •
- **Complete hydraulic system for functional control**: 
  - Scissor: •
  - Articulated Boom: •
  - Telescopic Boom: •
  - Truck Mounted: •
- **Outrigger control**: 
  - Scissor: •
  - Articulated Boom: •
  - Telescopic Boom: •
  - Truck Mounted: •

## Controls
- **Hydraulic electronic management**: 
  - Scissor: •
  - Articulated Boom: •
  - Telescopic Boom: •
  - Truck Mounted: •
- **Human machine interface (HMI)**: 
  - Scissor: •
  - Articulated Boom: •
  - Telescopic Boom: •
  - Truck Mounted: •

## Safety
- **Tilt control**: 
  - Scissor: •
  - Articulated Boom: •
  - Telescopic Boom: •
  - Truck Mounted: •
- **Basket overload control**: 
  - Scissor: •
  - Articulated Boom: •
  - Telescopic Boom: •
  - Truck Mounted: •
- **Working area limitation**: 
  - Scissor: •
  - Articulated Boom: •
  - Telescopic Boom: •
  - Truck Mounted: •
- **Moment limitation**: 
  - Scissor: •
  - Articulated Boom: •
  - Telescopic Boom: •
  - Truck Mounted: •

## Options
- **Basket electro-hydraulic self-leveling**: 
  - Scissor: •
  - Articulated Boom: •
  - Telescopic Boom: •
  - Truck Mounted: •
- **Outrigger electro-hydraulic self-leveling**: 
  - Scissor: •
  - Articulated Boom: •
  - Telescopic Boom: •
  - Truck Mounted: •

- Solution available
- Not available in machine
Spicer® Smart Suite™ for aerial work platforms uses patented and proprietary data-collecting technologies across the vehicle.

**Spicer® Smart Suite™ Intelligent Load Monitoring System (ILMS)**

Spicer® Smart Suite™ ILMS is designed to alert the operator of potential tipping situations, reduce the risk of vehicle breakdowns, improve productivity and precision, and enhance the long-term durability of powertrain systems.

**Monitors Load Weight**
Utilizes proprietary data-collecting technologies across the vehicle to proactively estimate static loads.

**Prevents Boom Overextension**
Detects improper operating maneuvers that may lead to tip-over incidents.

**Assists with Sloped Surfaces**
Autonomously monitors and adapts to various operating conditions and shifts in weight.
Technologies Customized to Every Part of the Globe

With a global presence in 33 countries, Dana Incorporated boasts more than 100 engineering, manufacturing, and distribution facilities. With a worldwide network of local service centers, each customer is assured of the local proximity and responsiveness they need.

About Dana Incorporated

Dana is an integral partner for virtually every major vehicle and engine manufacturer worldwide. We are a leading supplier of drivetrain, sealing, and thermal technologies to the global automotive, commercial-vehicle, and off-highway markets. Founded in 1904, we employ thousands of people across six continents.

About Dana Off-Highway Drive and Motion Technologies

Dana delivers fully optimized Spicer® drivetrain systems and individual product solutions to customers in construction, agriculture, material-handling, underground-mining, and forestry markets, plus Brevini® motion systems for machine working functions. We bring our global expertise to the local level with technologies customized to individual requirements through a network of strategically located technology centers, manufacturing locations, and distribution facilities.

Learn more about Dana’s axles and wheel drives for aerial work platforms at dana.com/offhighway.