



Telehandlers for Agricultural and Construction Applications



Dana's Spicer® and Brevini® technologies for telehandlers are engineered to improve performance and efficiency across applications.

Drive and Motion Systems for Construction and Agricultural Telehandlers

Telehandlers are used globally across many markets for a wide variety of purposes with both individual purchaser and rental fleets. Such diversity in end-use requires the providers of the major vehicle systems to develop a deep understanding of end-user needs and expectations to determine success.

Based on more than 50 years of experience, Dana has emerged as the market and technology leader for telehandler applications. Spicer® drivetrain systems make telehandlers operate more efficiently on the worksite, while maximizing speed

and fuel economy on the road between work assignments. Now with Brevini® motion systems – specifically developed to perform high-efficiency working functions – Dana supplies a comprehensive range of products. Through integrated electronic,

mechanical, and hydraulic systems, our technologies improve the maneuverability, efficiency, speed, and safety of work functions performed by both the machine and its attachments.



Vehicle Development Lab

Pursuing Dana's mission to be the global technology leader in efficient power conveyance and energy-management solutions, the company operates state-of-the-art vehicle labs equipped with innovative systems as turnkey prototype solutions for customers or for internal product and technology development purposes.

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.



Emissions Reduction



Noise, Vibration, and Harshness (NVH)

The Right Partner for Your Telehandler

Spicer® Drivetrain Systems

Our goal is to enhance performance and productivity by offering a range of products to constantly meet evolving global customer needs:

- Spicer axles deliver the high turning angle required for telehandlers.
- Spicer hydrostatic and hydrodynamic transmissions provide the power to enhance productivity while maximizing fuel efficiency.
- Spicer driveshafts are designed to exacting durability standards and ease of maintenance.

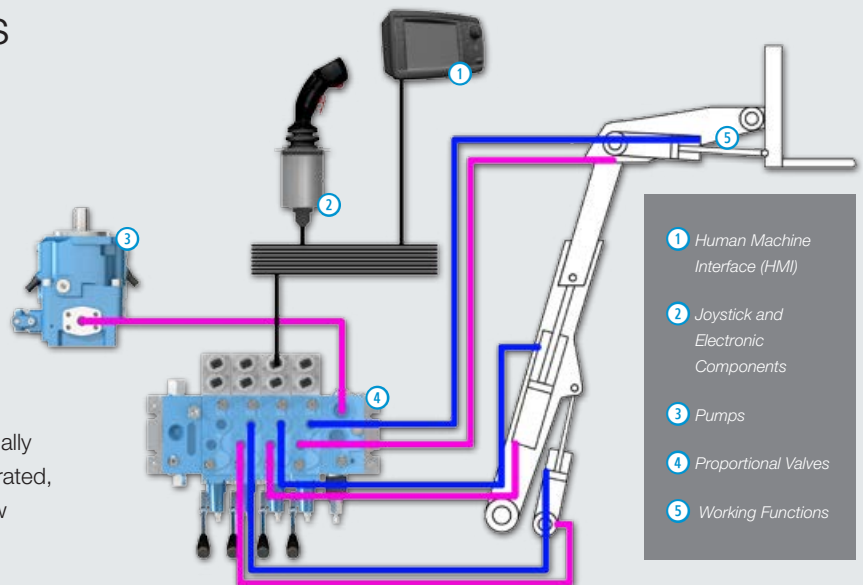
Lift Capacity Lbs (Tonnes)	Spicer® Drivetrain System Solutions			
	Transmission		Axle	Driveshaft*
	Hydrodynamic	Hydrostatic		
4,000-5,000 (1.8-2.3)	–	603, 311	211	1410
6,000-8,000 (2.7-3.6)	T12000, VDT12000	357, 367, 318	212	1480
9,000-12,000 (4.0-5.4)	T12000, VDT12000	357, 367, 318	212	1480
12,000-15,000 (5.4-6.8)	T13000	357, 367, 318	223	1550
15,000-28,000 (6.8-12.7)	T20000	360, 319, 2+3	213	1550
29,000-50,000 (13.2-22.7)	–	360, 319, 2+3	214	1550

*Other driveshaft series and end-fitting designs available.

Brevini® Motion Systems

Proven Power Conveyance for Work Functions on Machines and Attachments

- Brevini hydraulic systems deliver reliable power through a combination of robust and efficient motors and pumps designed for both open and closed circuits. These products operate with smoothness and precision even at high pressure and low flow.
- Brevini mobile valves range from a simple, manually actuated design to a sophisticated, remote-operated, proportional configuration that optimizes the flow of hydraulic fluid.
- Brevini advanced mobile valves are supported by a top-of-the-line electronic control system incorporating inclinometers, leveling systems, sensors, and human machine interfaces powered by proprietary software.



- 1 Human Machine Interface (HMI)
- 2 Joystick and Electronic Components
- 3 Pumps
- 4 Proportional Valves
- 5 Working Functions



Cost of Ownership



Hybridization



Mobility and Performance



Emerging Markets

Complete **System Solutions** for Construction and Agricultural Telehandlers

Drivetrain System



Spicer® 318 Hydrostatic Continuously Variable Transmission (CVT)

Unique two-motor design offers CVT functionality without torque interruption

Increased efficiency at high travel speeds

Increased tractive effort at low travel speeds

Accommodates various combinations of hydraulic motors from 80cc to 115cc



Spicer® 223 Planetary Rigid Steering Axles

Modular design to fulfill market demands

Greater customization of features

Reliable experience across many applications

Static Load Capacity daN 24000 and Maximum Output Torque daNm 5300

Optimum maneuverability and traction on all ground conditions



Spicer® Driveshafts

A century of quality and innovation

Ideal for the rigorous demand of most off-highway applications

Multiple driveshaft and end-fitting combinations

Designed for minimal maintenance and reduced operating cost

Electronic Controllers and Displays



Brevini® Master Programmable Electronic Control Unit (ECU) BM55 Series

Available dual microprocessor for PLd EN13849 compliance

Fully programmable through specific SW and with 2 CANbus lines

Waterproof aluminum compact body and available from 15 to 77 I/Os per item



Brevini® Graphic Display Opus Series

Indoor/outdoor usage: waterproof, robust plastic body, bright TFT screen

Available with touchscreen or standard keyboard

Different panel sizes available, 32-bit @532 MHz processor

Motion Systems



Brevini® Proportional High Efficiency CFS3 Bankable Valve

Compact design electro-proportional directional flow sharing valve

Energy saving: very low pressure drop

No need for relief valves to avoid zero flow with actuators at end of stroke

Regulated flow up to 60lpm @ 310bar



Brevini® Proportional Directional Valve HPV Series

Wide range: regulated flow up to 600lpm – 370bar working pressure

High flexibility with valve and block combinations

Precise operations: load sensing and pressure compensated functions



Brevini® Hydraulic High-Pressure Pump HD1/S6CV Series

Wide range of controls covering different working needs

Through drive for mounting of further pumps

Smooth changes in flow direction ensure steady operation when swashplate moves from neutral position

Circuit protection with standard cut-off valve

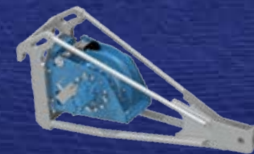


Brevini® Slew Drive

Compact solution with hydraulic motors for a perfect fit in machine frames

Range of motor valves matches various functional demands

Output pinion variations allow customized configurations



Brevini® Hoisting Winch WPL10C

Designed to be embedded in the structure of the attachment

Complete package with hydraulic motor and brake valve

Better control of the winch due to electronic devices

Perfect spooling is ensured by special grooved drum and tension roller design



Brevini® Boom Angle/Length Extension Sensor AS Series

Robustly constructed draw-wire length sensor

Available with dual/redundant output for PLd EN13849 compliance

Voltage: 4-20mA or CANbus output

From 5 to 12.5m length range

Smart Technologies for Tomorrow's Needs

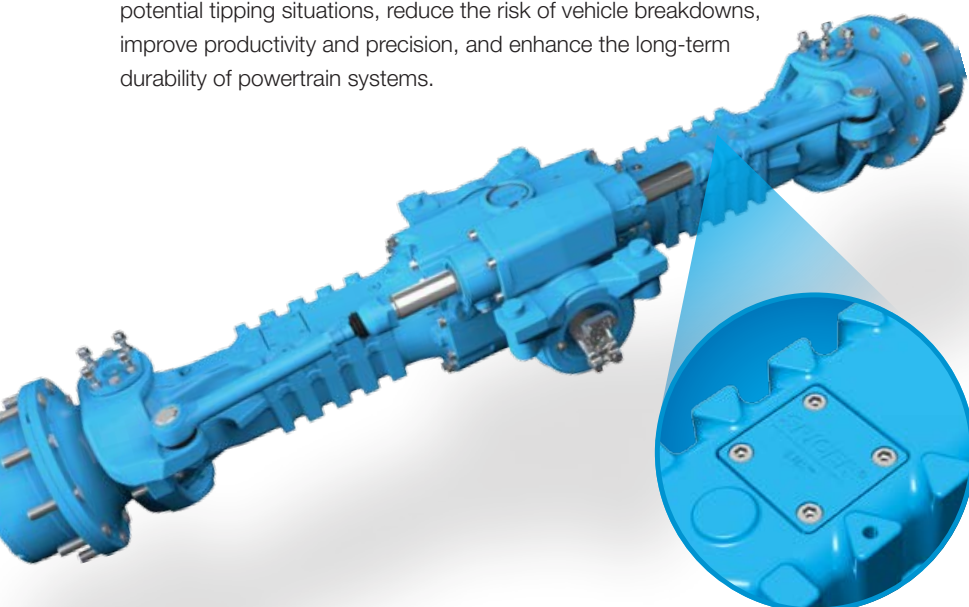
Spicer® Smart Suite™ for telehandlers uses patented and proprietary data-collecting technologies across the vehicle.

SMART SUITE™ Connected Drivetrain Technology



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.



Durable Driveshaft Technology, Built for Extreme Angles.

More than 100 years ago, Clarence Spicer developed the first practical application of the cardan universal joint. Since then, Dana has continuously developed new designs, materials, and processes for Spicer® driveshafts that provide more power, greater efficiency, and better overall performance.

Dana's Spicer driveshafts with cardan universal joints cover a wide variety of off-highway vehicles. Our double cardan technology is ideal for off-road applications. Typically used with independent and beam axles, it can accommodate high angles and high temperatures. Designed with advanced sealed center bearings and snap ring retention, double cardan joints allow easier maintenance and reduced drivetrain weight. Aluminum, steel, and additional yoke options are available for further customization.

Today, Dana can meet any need through the Spicer 10™ Series, Spicer Wing® Series, Spicer Life® Series, Spicer Compact™ Series, and Spicer centered double joint lines of driveshafts. Dana also offers multiple end-fittings, including wing-style end yokes and full round or Quick Disconnect™ options for round-style bearings. SAE, DIN, and cross-serrated flanges are also available.



Since every vehicle is different, Dana works closely with OEMs to deliver custom-made driveshafts that live up to the Spicer® reputation for performance.





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 drivetrain and motion systems for telehandlers at dana.com/offhighway.

dana.com/oh/contact



SPICER® **BREVINI®**

Application Policy

Capacity ratings, features, and specifications vary depending upon the model and type of service. Application approvals must be obtained from Dana; contact your representative for application approval. We reserve the right to change or modify our product specifications, configurations, or dimensions at any time without notice.