

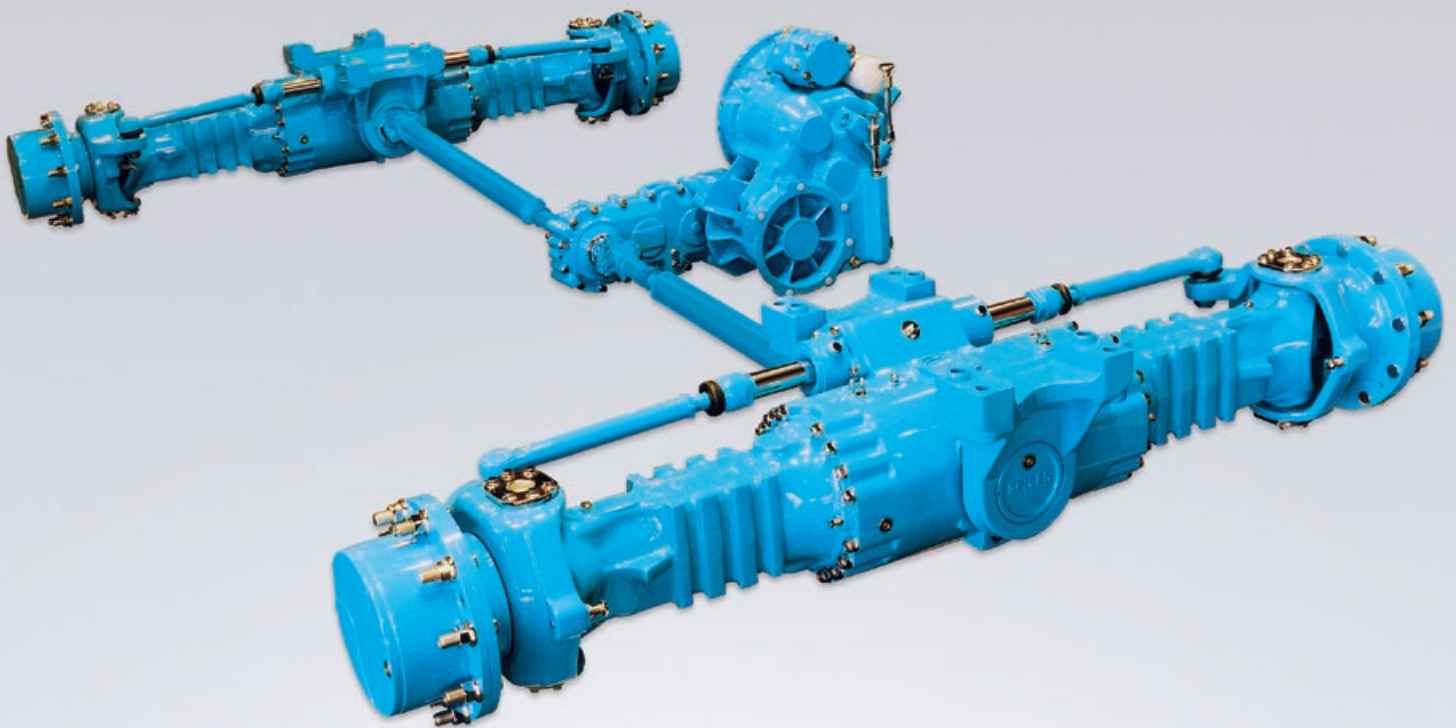
Condensed Specifications

Axles, Transaxles, Driveshafts, Transmissions,
Torque Converters, and Electronic Controls



SPICER®

Off-Highway Systems



Construction



Agriculture



Mining



Forestry



Material Handling



Outdoor Power Equipment and Leisure/Utility Vehicles



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Innovative People Who Give You the World Dana is a global leader in providing drivetrain solutions for the automotive, commercial vehicle, and off-highway markets. Dana offers Spicer® axles and transaxles, driveshafts and end-fittings, transmissions, torque convertors, electronic controls, and brake assemblies for off-highway vehicles that come with the flexibility, quality, and value Dana is known for around the world.

Dana Holding Corporation's customer base includes virtually every major vehicle manufacturer in the world. Based in Maumee, Ohio, USA, the company operates nearly 100 manufacturing, technology, and customer service facilities around the globe.

The Dana Off-Highway Products Group includes research and development and manufacturing operations in Belgium, Brazil, China, Hungary, India, Italy, Mexico, the United Kingdom, and the United States. It designs, manufactures, assembles, and markets Spicer® axles and transaxles, driveshafts and end-fittings, transmissions, torque converters, electronic controls, and brake assemblies.

The Dana Off-Highway Products Group serves more than 1,000 vehicle assembly and manufacturing facilities in 30 countries. Dana also supports off-highway customers in more than 100 countries by supplying genuine Spicer service parts, operating two global service parts distribution centers, and certifying 66 Authorized Spicer Service Centers. Construction, agriculture, forestry, underground mining, material handling, outdoor power, leisure/utility vehicles, and industrial equipment are just some of the markets that demand the quality found in Spicer products and genuine service parts.

Dana Research and Development Capability

We Know the Global Terrain

You need partners who know the off-highway industry and who understand the importance of consistent performance and support. That's why Dana engineers are committed to finding better ways to meet the needs of customers like you. Backed by global research and development centers, we are able to deliver the ideas, resources, and information sharing you depend on, no matter your time zone.



Dana Brugge Facility, Belgium

techniques such as computer-aided design (CAD), finite element analysis (FEA), failure modes and effects analysis (FMEA), and rapid prototyping. These capabilities allow us to quickly design and model complex structures and systems, identify any potential issues, and ensure robust designs for final products relative to their applications.

In conjunction with computer-based testing, we offer a complete line of laboratory testing, including fatigue, environmental simulation, and metallurgical testing. Complex mathematical models and arithmetic analysis provide for advanced development. Beyond the lab, we provide on- and off-road test tracks

that inflict real-world conditions on our components and systems.

From increasing the life of bearings, sealing products, gears, and shafts to designing and delivering a completely balanced drivetrain system, we are committed to improving our processes, products, and systems to meet all your off-highway needs, now and in the future.

Advanced electronic design and application to our systems and components ensure improvements in safety; productivity; comfort; efficiency; ease of operation; maintenance; and reduced noise, vibration, and harshness.



Test Lab – Dana Arco Facility, Italy

Solving your challenges requires advanced capabilities beyond traditional product design, testing, and prototyping. That's why we provide state-of-the-art design



Dana Corporate Offices and Technology Center – Maumee, OH, USA

Spicer® Products, Modules, and Systems

Systems Integration

You depend on your partners to bring more and more to the table. To that end, we're committed to continually enhancing our product and systems integration capabilities – everything from innovative systems design and multiple-component modular assembly to total systems solutions for the entire driveline.

Dana offers many value-added services and benefits to complement our complete line of products, advanced processes, systems capabilities, and specific product design and engineering centers.

Electronic Controls

Spicer electronic controls are available for our driveline systems and provide not only control, but also monitoring and diagnostic capabilities.

Transmissions

Dana manufactures a full range of Spicer transmissions and torque converters capable of handling performance needs ranging from 37 to 746 kW. Dana offers a transmission solution for any off-highway need, including transfer cases, hydrostatic transmissions, powershift transmissions, and torque converters.

Driveshafts

We offer the most extensive line of products available, including a wide variety of driveshafts and end-fittings, with both round and wing bearing-style joints.

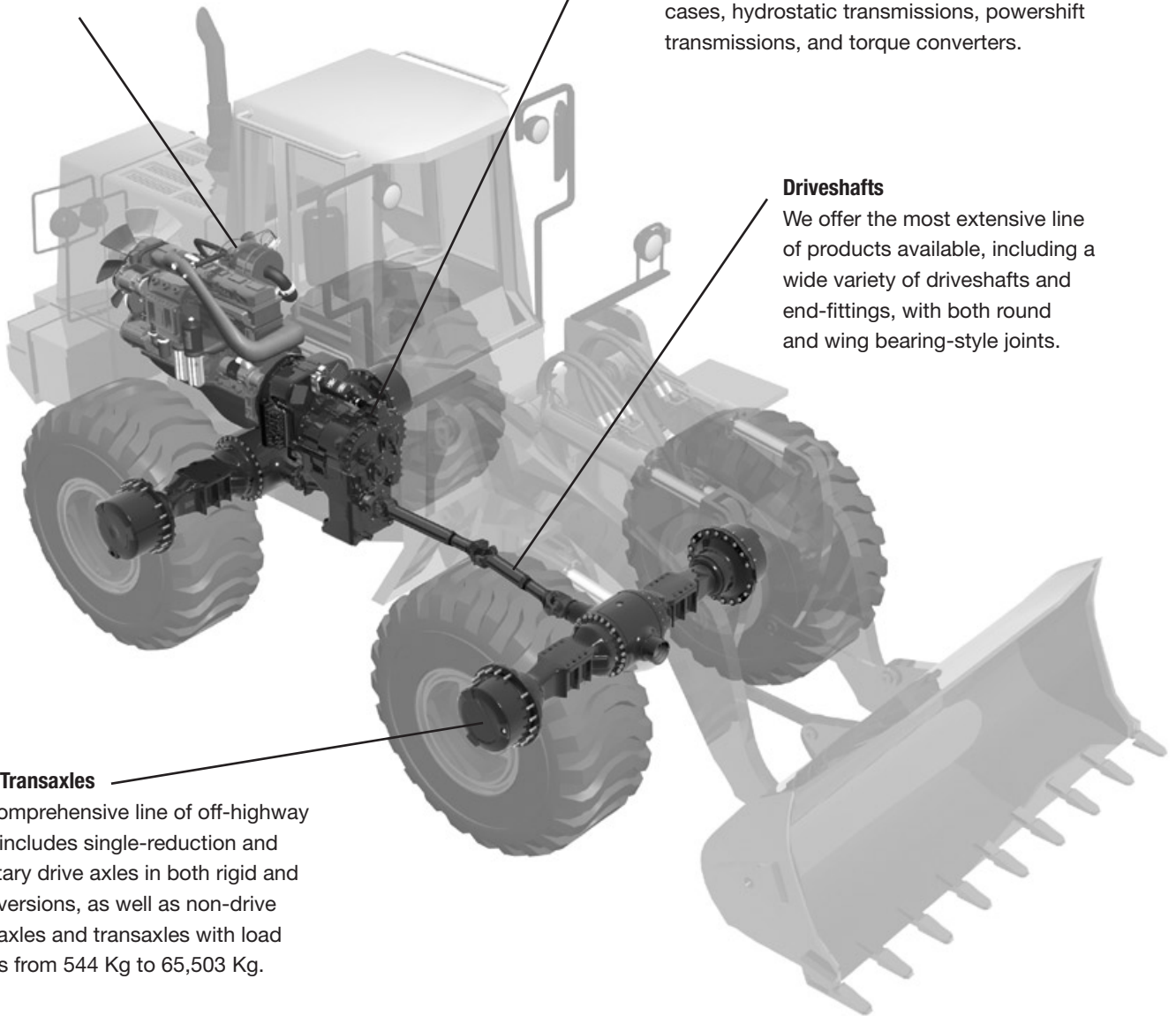
Axles/Transaxles

Our comprehensive line of off-highway axles includes single-reduction and planetary drive axles in both rigid and steer versions, as well as non-drive steer axles and transaxles with load ratings from 544 Kg to 65,503 Kg.

Complete Systems Solutions

Whether it's for withstanding the harsh environment of the construction or mining industry or for customizing a niche vocational vehicle, Dana is capable of providing more than just components. Our complete product line provides

integrated systems solutions and offers technically advanced driveline systems engineered for superior performance. See our website at www.dana.com/offhighway to download current condensed and in-depth specifications.

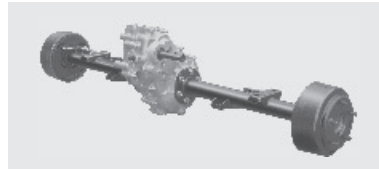
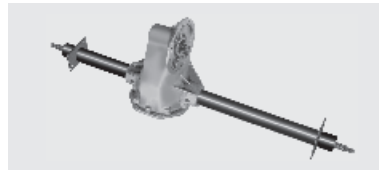


Outdoor Power Equipment

Leisure/Utility Vehicle Transaxles

Manufacturers of outdoor power equipment and leisure/utility vehicles rely on Dana for custom driveline solutions across a variety of applications, including:

- All-Terrain Vehicles (ATVs)
- Utility Vehicles
- Light-Duty Haulers
- Golf Carts
- Front- and Rear-Engine Riding Mowers
- Neighborhood Electric Vehicles
- Small Utility Vehicles
- Personnel Carriers
- Garden Tractors
- Walk-Behind Mowers



Model H-12 Electric

- Nominal Load Rating Is 680 Kg/1,500 lbs. (Heavy-Duty Version Is Available)
- Designed to Accept Electric Motors
- Available Ratios Range from 8.91 to 14.76
- Input Torque Ratings: 16.3 daNm/12 ft-lbs. Continuous; 65 daNm/48 ft-lbs. Maximum Intermittent

Model H-12 FNR

- Nominal Load Rating Is 680 Kg/1,500 lbs. (Heavy-Duty Version Is Available)
- Mechanical “Rotary Actuating” Ground Speed Governor (Optional)
- Mechanical “Rotary” Shift Forward to Reverse
- Standard Torque Ratings: 32.5 daNm/24 ft-lbs. Continuous

Model GT-20 Axles

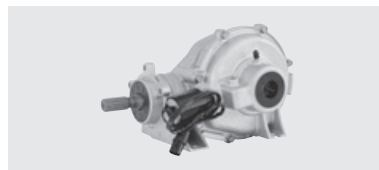
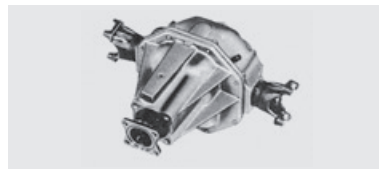
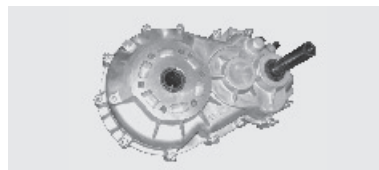
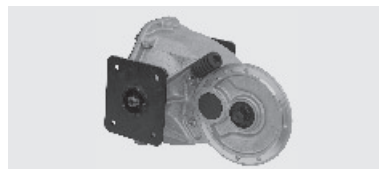
- In-Line Hydrostatic Transaxle Design
- Nominal Load Rating Is 866.5 Kg/1,800 lbs. (Heavy-Duty Version Is Available)
- Available Ratios: 15.17:1, 20.9:1, 30.0:1

Model 18 Axles

- Feature Conventional Driveshaft Design
- Nominal Load Rating Is 866.5 Kg/1,800 lbs. (Heavy-Duty Version Is Available)
- Designed and Rated for 9 to 13 kW/12- to 18-HP Engines
- Available Ratios: 5.17:1, 12.25:1

Leisure/Utility Vehicle Transaxles – Independent Suspension

At Dana there are no “off-the-shelf” systems. Dana designs application-specific customization in any area of the assembly, including wheel-to-wheel mounting dimensions, bracketry, angle of the carrier assembly, and left- and right-hand axle shaft and tube lengths.



Model H-12 Electric Independent Suspension

- Designed for Electric Golf Cars, Utility Vehicles, Low-Speed Vehicles
- High Efficiency, Featuring Constant Mesh Helical Gears

Model H-12 FNR Independent Suspension

- High-Efficiency Model Features Quiet Helical Gear Design
- Optional Independent Suspension Design

Model 18 Independent Suspension

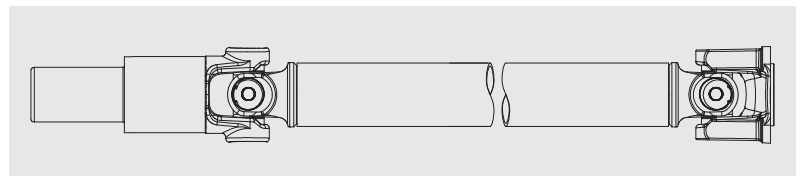
- Optional Limited-Slip Differential
- Optional Independent Suspension Design

Model 26 Independent Suspension

- Lightweight Aluminum “Die-Cast” Housings
- Maximum Output Torque: 298 daNm/2,200 ft-lbs.
- Maximum Continuous Output Torque: 74 daNm/545 ft-lbs.
- Typical Applications: On/Off-Road Utility Vehicles, All-Terrain Vehicles, Turf Maintenance Vehicles, etc.

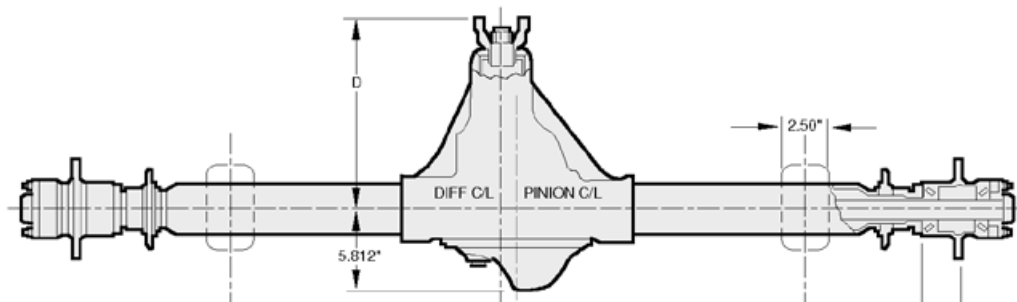
Driveshafts

The Spicer S103, S1125, and S1300 Series allow us to offer a complete driveline solution for smaller applications, such as ATVs and leisure/utility vehicles.



Single Reduction and Non-Drive Axles

Rigid Drive



Model 70-HD shown

RIGID DRIVE												
Product Model	Nominal G.A.W. Rating	Available Ratio Range (Overall)	Minimum FI - FI	Standard Wheel Bolt Mounting Circle	Differentials				Differential Ring Gear Diameter	Brake Type		
					Open	No Spin	Air Locker	L/S		Drum Hyd.	Disc Hyd.	H/S Input W/Brake
44	1,500 Kg/ 3,300 lbs	3.070 to 5.890	813 mm to 1727 mm 32.000 in to 68.000 in	5 on 140 mm/5.500 in	●	●		●	216 mm/8.500 in	●	●	●
60-SF	1,900 Kg/ 4,200 lbs	3.540 to 7.170	813 mm to 1478 mm 42.200 in to 58.200 in	5 on 127 mm/5.500 in	●	●		●	248 mm/9.750 in	●	●	
60-FF	2,700 Kg/ 5,900 lbs	3.540 to 7.170	1067 mm to 1778 mm 42.200 in to 70.000 in	8 on 165.1 mm/6.500 in	●	●	●	●	248 mm/9.750 in	●	●	
70	3,400 Kg/ 7,500 lbs	3.540 to 7.170	1524 mm to 1778 mm 60.000 in to 70.000 in	8 on 165.1 mm/6.500 in	●	●		●	267 mm/10.500 in	●	●	
70-HDOS	3,400 Kg/ 7,500 lbs	9.730 to 19.720	1392 mm to 1778 mm 54.800 in to 70.000 in	8 on 165.1 mm/6.500 in	●			●	267 mm/10.500 in	●	●	
70-HD	4,500 Kg/ 10,000 lbs	3.540 to 7.170	1392 mm to 1778 mm 54.800 in to 70.000 in	6 on 222.2 mm/8.750 in	●	●		●	267 mm/10.500 in	●	●	
80	5,200 Kg/ 11,500 lbs	3.310 to 5.130	1524 mm to 1778 mm 60.000 in to 70.000 in	6 on 222.2 mm/8.750 in	●	●		●	286 mm/11.250 in		●	

Steering Non-Drive

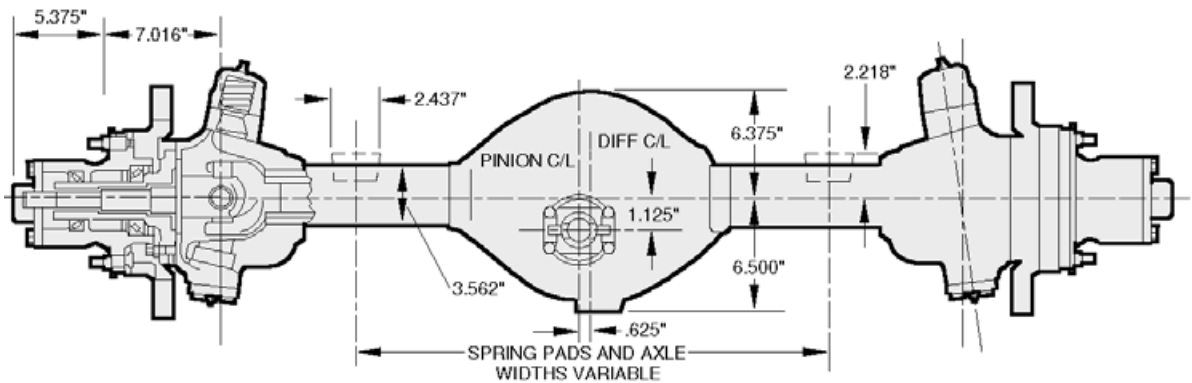


Model 44-DF shown

STEERING NON-DRIVE				
Product Model	Nominal G.A.W. Rating	Typical Track Width	Standard Wheel Mounting Bolt Circle	Brake Type and Size
44-DF	1,500 Kg/ 3,300 lbs	Variable	5 on 139.70 mm/5.500 in or 8 on 165.10 mm/6.500 in	Disc 297.69 mm/11.720 in Diameter (5-Bolt) Disc 317.5 mm/12.500 in Diameter (8-Bolt)
70-DF	2,600 Kg/ 5,700 lbs	Variable	8 on 165.10 mm/6.500 in	Disc 327.15 mm/12.880 in Diameter (8-Bolt)

Single Reduction and Non-Drive Axles (cont.)

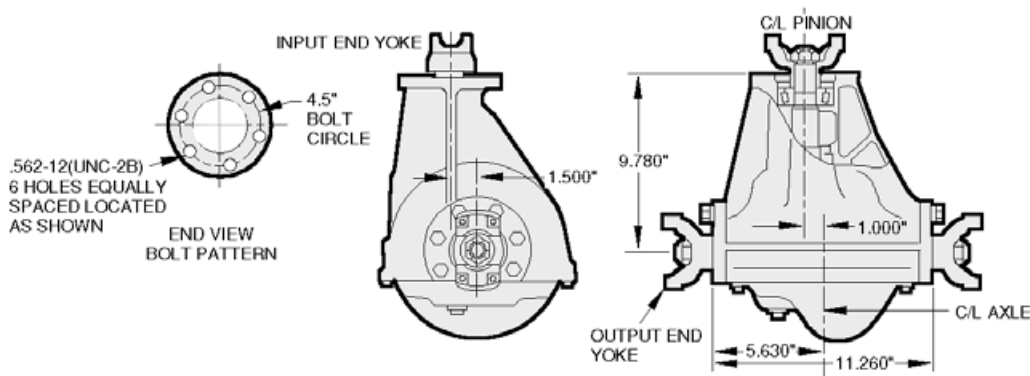
Steering Drive



Model 70-BF shown

STEERING DRIVE												
Product Model	Nominal G.A.W. Rating	Available Ratio Range (Overall)	Minimum FI – FI	Standard Wheel Bolt Mounting Circle	Differentials				Differential Ring Gear Diameter	Brake Type		
					Open	No Spin	Air Locker	L/S		Drum Hyd.	Disc Hyd.	H/S Input W/Brake
44	1,500 Kg/ 3,300 lbs	3.540 to 5.890	1016 mm to 1778 mm 40.000 in to 70.000 in	5 on 139.70 mm/5.500 in or 8 on 165.10 mm/6.500 in	●	●		●	216 mm/8.500 in	●	●	●
60	1,950 Kg/ 4,300 lbs	3.540 to 7.170	1135 mm to 1880 mm 44.700 in to 74.000 in	8 on 165.10 mm/6.500 in	●	●		●	248 mm/9.750 in	●	●	
70	2,580 Kg/ 5,700 lbs	4.100 to 6.170	1298 mm to 2135.6 mm 51.100 in to 84.000 in	8 on 165.10 mm/6.500 in	●	●	●	●	267 mm/10.500 in	●	●	

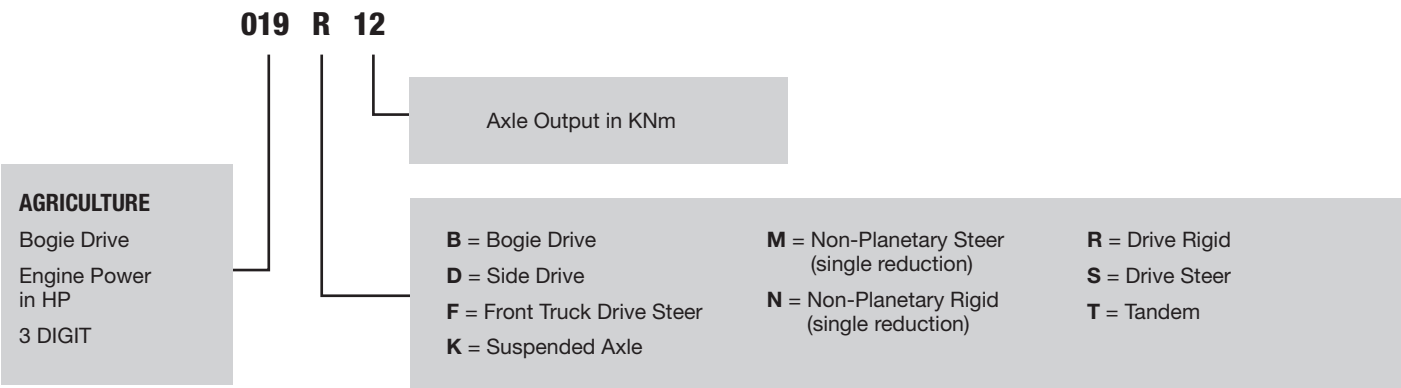
Independent Carriers



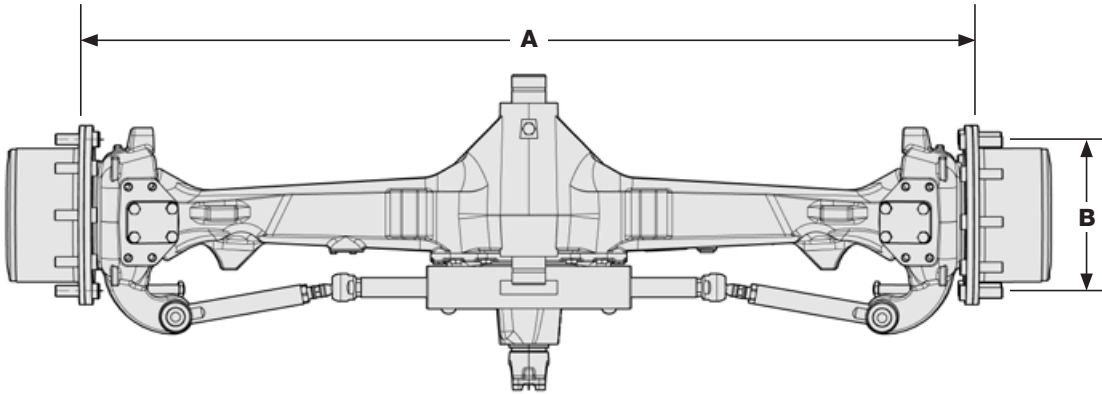
Model 44 shown

INDEPENDENT CARRIERS		
Product Model	Available Ratio Range (Overall)	Differential Ring Gear Diameter
44-IC	2.730 to 5.890	216 mm/8.500 in
70-IC	3.540 to 7.170	267 mm/10.500 in

Agricultural Planetary Axle Model Number Nomenclature



Agricultural Planetary Axles

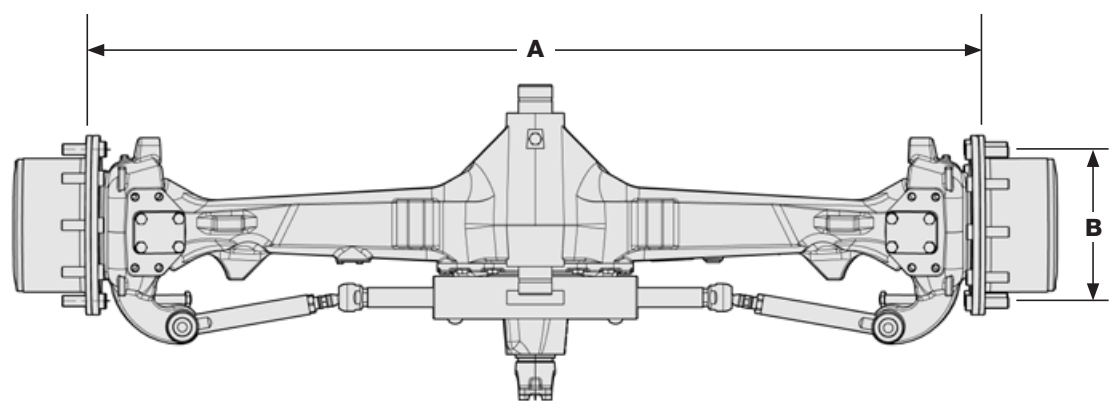


Model 750 shown

AGRICULTURAL PLANETARY AXLES											
Product Model	Generic Designation	Engine HP	Max Output		Available Planetary Ratio	Ratio Range (Overall)	Steer Angle	Flange to Flange A	BCD B	Brakes	Multidisc Differential Lock
			Nm	ft-lb							
708	095S12	95	12,000	8,900	4.235	9.88	58°	925 mm to 1025 mm 36.420 in to 40.350 in	205	No	Yes
709	095S12	95	12,000	8,900	4.235	11.07	58°	1250 mm to 1458 mm 42.210 in to 57.400 in	205	No	No
712	055S09	55	9,490	7,000	4.150	10.00 to 19.00	52°	1360 mm 54.540 in	275	No	No
715	095S20	95	20,000	14,800	6.000	12.00 to 19.00	60°	1400 mm to 1580 mm 55.120 in to 62.210 in	275	No	Yes
715F	095S14	95	14,000	10,300	4.600	13.38 to 15.80	52°	1232 mm to 1442 mm 50.470 in to 56.780 in	152	Yes	Yes
720	100S22	100	22,000	16,200	6.000	12.00 to 26.00	55°	1580 mm to 1760 mm 62.200 in to 62.290 in	275	Yes	Yes
725	100S24	100	24,000	17,700	6.000	11.57 to 16.00	60°	1641 mm 64.610 in	275	No	Yes
730	120S28	120	28,000	20,700	6.000	11.70 to 20.73	55°	1680 mm to 1800 mm 66.140 in to 70.870 in	275	Yes	Yes

Specifications continued on next page

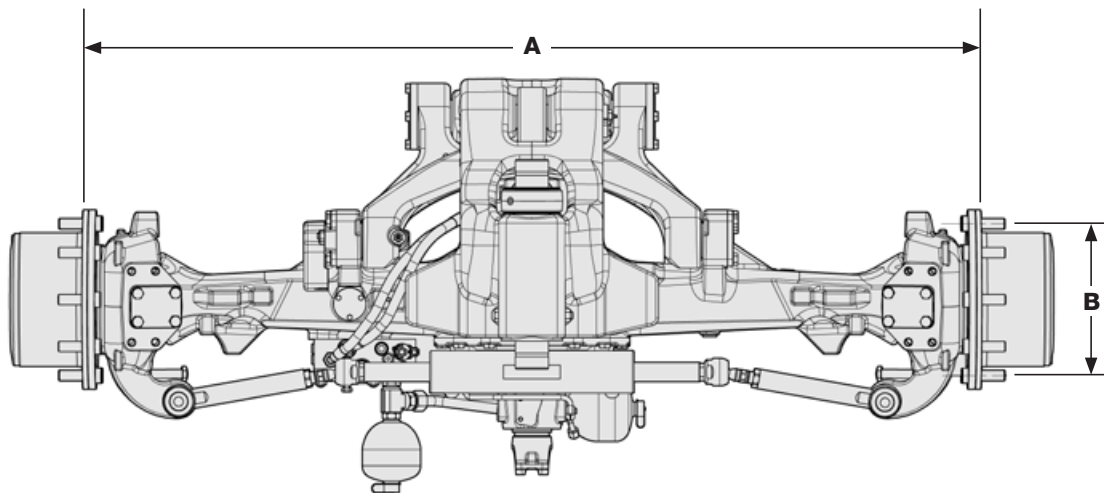
Agricultural Planetary Axles (cont.)



Model 750 shown

AGRICULTURAL PLANETARY AXLES (cont.)											
Product Model	Generic Designation	Engine HP	Max Output		Available Planetary Ratio	Ratio Range (Overall)	Steer Angle	Flange to Flange A	BCD B	Brakes	Multidisc Differential Lock
			Nm	ft-lb							
733	130S32	130	32,000	23,600	6.000	13.12 to 19.09	55°	1680 mm to 1800 mm 66.140 in to 70.870 in	275	Yes	Yes
750	200S56	200	56,000	41,300	6.000	13.29 to 20.40	55°	1780 mm to 1892 mm 70.080 in to 74.490 in	325	Yes	Yes
755	230S59	250	62,000	45,700	6.000 to 6.350	12.16 to 21.00	52°	1780 mm to 1995 mm 70.080 in to 78.540 in	325	Yes	Yes
760	280S65	280	65,000	47,900	6.400	17.37	52°	1882 mm 74.090 in	425	No	Yes
760	300S65	300	65,000	47,900	6.400	15.75 to 16.80	55°	1892 mm 74.490 in	425	No	Yes
770	340S72	340	72,000	53,100	7.070	16.86 to 18.50	55°	1892 mm to 1916 mm 74.490 in to 75.430 in	425	Yes	Yes

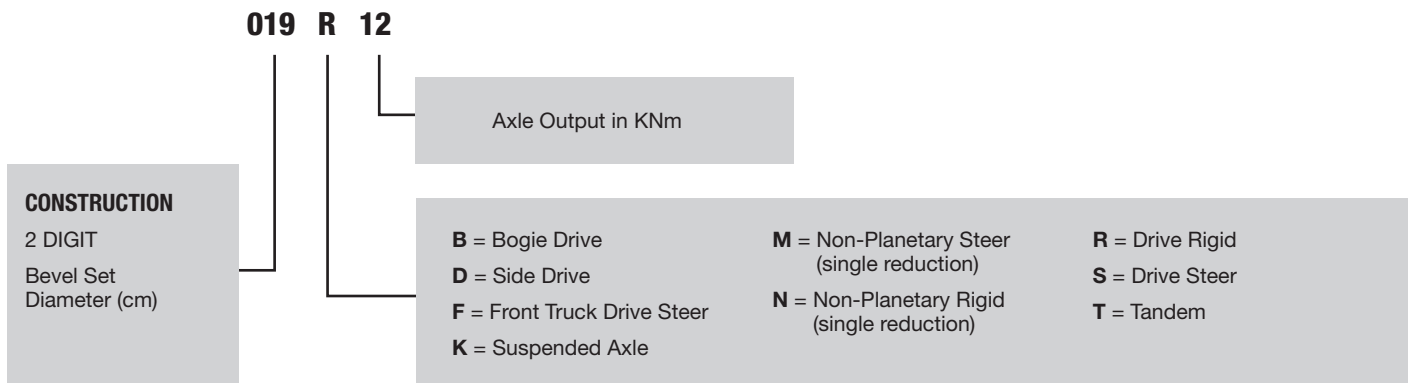
Agricultural Planetary Suspended Axles



Model 750 shown

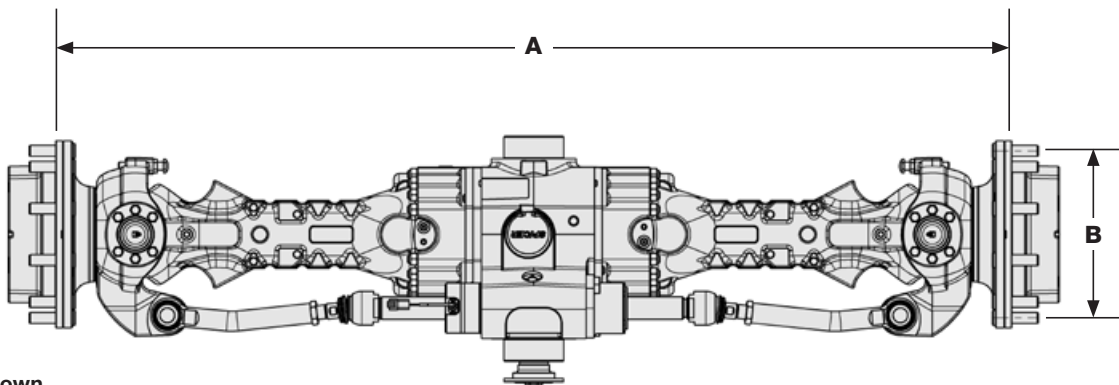
AGRICULTURAL PLANETARY SUSPENDED AXLES												
Product Model	Generic Designation	Engine HP	Max Output		Available Planetary Ratio	C Suspension Travel	Ratio Range (Overall)	Steer Angle	Flange to Flange A	BCD B	Brakes	Multi-disc Diff.
			Nm	ft-lb								
730	120K28	120	28,000	20,700	6.000	+/-45 mm	14.57 to 20.72	55°	1867 mm 73.504 in	275	Yes	Yes
735	140K38	140	38,000	28,000	6.000	+/-45 mm	13.85 to 20.73	55°	1800 mm 70.870 in	275	No	Yes
740	160K42	160	42,000	30,950	6.000	+/-45 mm	13.85 to 17.00	55°	1774 mm to 1892 mm 70.236 in to 74.490 in	335	Yes	Yes
745	180K42	180	45,000	33,200	6.000	—	12.29 to 20.73	55°	1892 mm 74.49 in	335	Yes	Yes
750	200K56	200	56,000	41,300	6.000	+/-45 mm	13.84 to 20.40	55°	1892 mm 74.490 in	335	Yes	Yes
755	250K62	250	62,000	45,700	6.000 to 6.350	+/-45 mm	19.63	52°	1892 mm 74.490 in	335	Yes	Yes
760	300K65	300	65,000	47,900	6.400	+/-45 mm	16.80	55°	1892 mm 74.490 in	425	No	Yes
770	340K72	340	72,000	53,100	7.070	+/-45 mm	16.49 to 16.97	55°	1892 mm to 1916 mm 74.490 in to 75.430 in	425	Yes	Yes

Industrial Planetary Axle Model Number Nomenclature



Industrial Planetary Axles – Compact

Planetary Steer

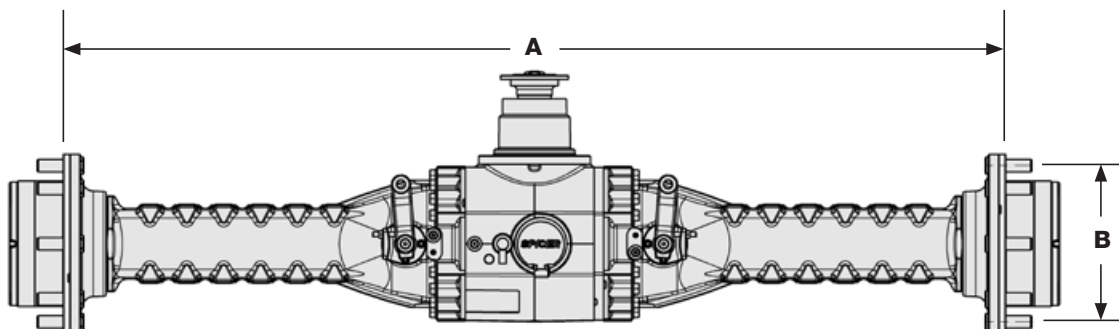


Model 212HD shown

INDUSTRIAL PLANETARY STEER AXLES – COMPACT											
Product/ Generic Model	Nominal G.A.W. Rating Kg	Nominal G.A.W. Rating lb	Max Output Nm	Max Output ft-lb	Planetary Ratio	Ratio Range (Overall)	Input RPM	A		B	
								mm	in	mm	in
209 17S12	3,500	7,700	12,000	8,850	4.235	10.400 to 15.400	4000	1010 1530	39.760 60.230	205	8.070
211 19S14	5,000	11,250	13,990	10,318	4.250	11.900 to 15.400	4000	1400 1920	55.120 75.590	205	8.070
211HD 19S20	6,000	13,500	19,990	14,740	6.000	14.800 to 21.800	4000	1400 1920	55.120 75.590	275	10.830
262LD 23S27	8,000	18,000	26,980	19,899	6.000	12.800 to 23.300	4000	1660 2180	65.350 85.830	275	10.830
262UP 23S34	8,000	18,000	33,970	25,058	6.000	12.800 to 23.300	4000	1660 2180	65.350 85.830	275 335	10.830 13.190
262 23S27	8,000	18,000	26,980	19,899	6.000	14.800 to 22.000	4000	1920	75.590	275	10.830
262HD 23S34	10,000	22,500	33,970	25,058	6.000	14.800 to 22.000	4000	1920	75.590	275 335	10.830 13.190
212HD 23S34	11,000	24,750	33,970	25,058	6.000	12.800 to 23.300	4000	1920 2180	75.590 85.830	335	13.190
263 26S53	11,500	25,875	52,960	39,061	6.000	14.800 to 22.000	4000	1850	72.830	335	13.190
223 26S53	13,000	29,250	52,960	39,061	6.000	14.800 to 22.000	4000	1920 2180	75.590 85.830	335	13.190
213 29S65	15,000	33,750	64,950	47,905	6.000	14.800 to 22.000	4000	2050 2180	80.710 85.830	335	13.190
263UP 26S65	15,000	33,750	64,950	47,905	6.000	14.800 to 22.000	4000	1850	72.830	335	13.190

Industrial Planetary Axles – Compact (cont.)

Planetary Rigid



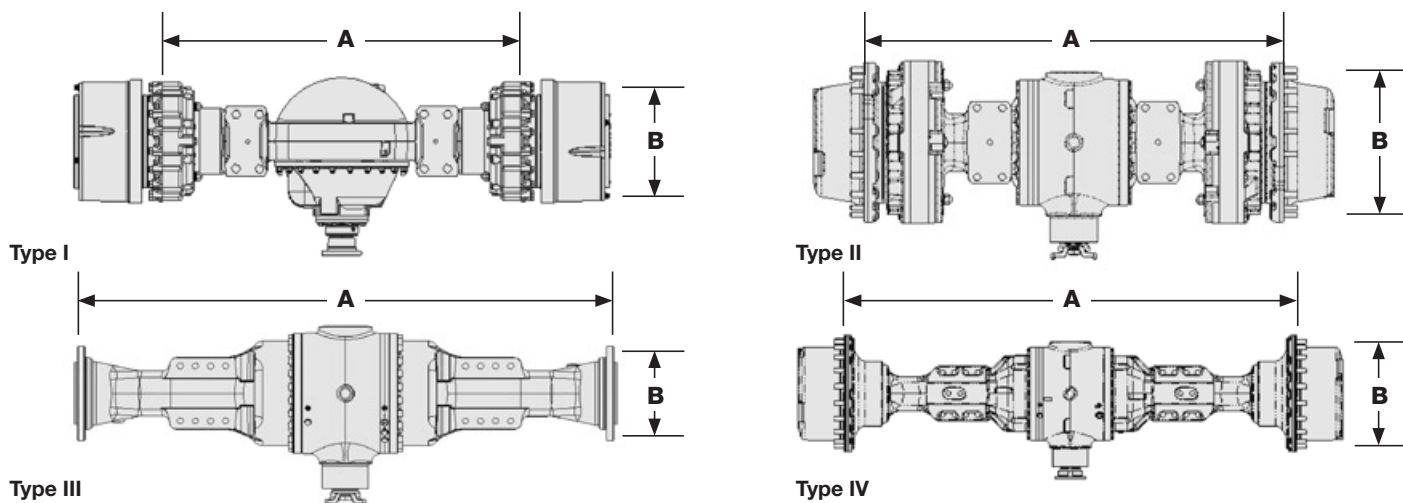
Model 112 shown

INDUSTRIAL PLANETARY RIGID AXLES – COMPACT											
Product/ Generic Model	Nominal G.A.W. Rating Kg	Nominal G.A.W. Rating lb	Max Output Nm	Max Output ft-lb	Planetary Ratio	Ratio Range (Overall)	Input RPM	A		B	
								mm	in	mm	in
110 17R12	3,500	7,700	12,000	8,850	4.235	10.400 to 15.400	4000	1010 1530	39.760 60.230	205	8.070
111 19R14	5,500	12,375	14,000	10,318	4.235	10.400 to 15.400	4000	1010 1920	39.760 75.590	205	8.070
111HD 19R20	5,500	12,375	19,990	14,740	6.000	14.800 to 20.600	4000	1010 1920	39.760 75.590	275	10.830
112 23R27	8,000	18,000	33,970	19,899	6.000	12.800 to 23.300	4000	1400 2050	55.120 80.710	275	10.830
162UP 23R34	8,000	18,000	33,970	20,058	6.000	12.800 to 23.300	4000	1400 2050	55.120 80.710	275 335	10.830 13.190
162LD 23R27	8,000	18,000	33,970	19,899	6.000	14.800 to 22.000	4000	1920	75.590	275	10.830
192 24R34	8,000	18,000	33,970	20,058	6.000	43.714	3000	1270	50.000	275	10.830
192LD 24R28	8,000	18,000	27,980	20,636	6.000	43.714	3000	1270	50.000	275	10.830
192HD 26R53	9,000	20,250	53,000	39,061	6.000	43.714	3000	1660	65.350	335	13.190
193 30R53	10,000	22,500	52,960	39,061	6.000	65.500 to 108.900	3000	1660	65.350	335	13.190
194 29R53	10,000	22,500	64,950	39,061	6.000	43.714	3000	1660	65.350	335	13.190
163 26R53	11,500	25,875	64,950	39,061	6.000	14.800 to 22.000	4000	1850	72.830	335	13.190
123 26R53	12,000	27,000	52,960	39,061	6.000	14.800 to 22.000	4000	1790 2050	70.470 80.710	335	13.190
193HD 30R92	12,000	27,000	91,930	67,804	6.000	65.500 to 108.900	3000	1740	68.500	425	16.730
113 30R70	15,000	33,750	64,950	51,590	6.000	14.800 to 22.000	4000	1920 2050	75.590 80.710	335 425	13.190 16.730
114 35R92	20,000	44,090	110,000	67,850	6.000	18.600 to 24.700	4000	1920 2180	75.590 85.830	425	16.730

NOTE: Different service parking brake options are available for all models except 110/17R12.

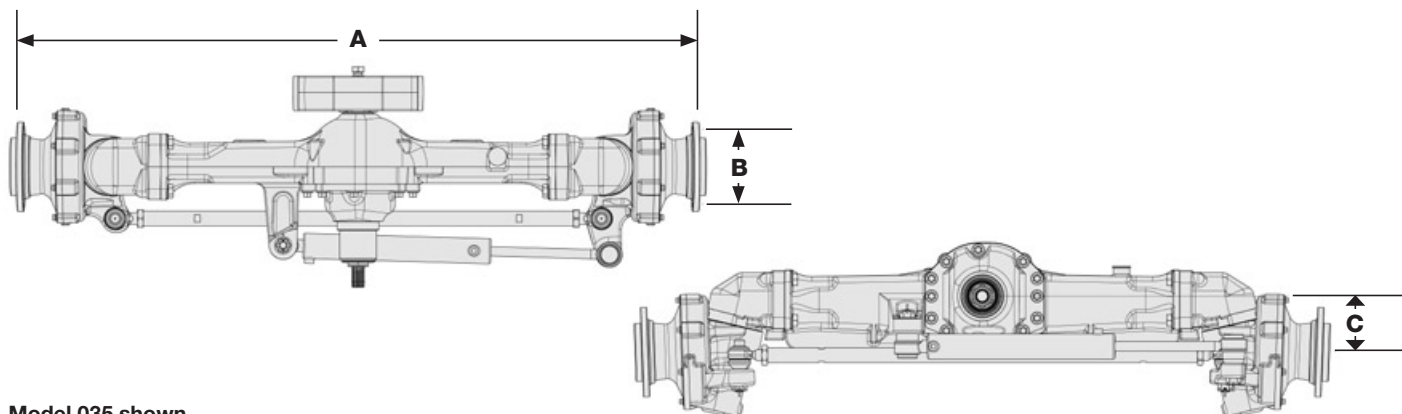
Industrial Planetary Axles – Heavy

Planetary Rigid



INDUSTRIAL PLANETARY AXLES – HEAVY												
Product/ Generic Model	Axle Type	Nominal G.A.W. Rating		Max Output		Planetary Ratio	Ratio Range (Overall)	SAHR Brake	Flange to Flange A		Bolt Circle B	
		Kg	lb	Nm	ft-lb				mm	in	mm	in
37RF116	III	16,200	36,000	116,000	85,492	6.000	22.36 to 30.75	No	1953 2311	76.900 91.000	305	12.000
35R68 14D2149	I	18,140	40,000	67,000	50,000	4.940	19.22 to 31.05	Yes	1155	45.460	511	20.130
37RM116	II	18,500	41,000	116,000	85,492	6.000	22.36 to 30.75	PosiStop®	1236 1472	48.660 57.950	511	20.130
42R112 16D2149	I	19,050	42,000	112,000	80,976	4.941	22.51 to 31.06	PosiStop®	1764	69.460	511	20.130
37R116	IV	19,800	44,000	116,000	85,492	6.000	22.36 to 30.75	No	2050 2134 2515	80.710 84.000 99.000	500	19.690
37R118	IV	19,800	44,000	118,000	86,966	6.000	22.36 to 30.75	No	2134	84.000	500	19.690
43RF175	III	20,400	45,000	175,000	128,975	6.000	24.60 to 33.75	No	2311	91.000	305	12.000
48R150 19D2748	I	24,950	55,000	150,000	111,000	4.765	25.89 to 32.67	PosiStop®	1702 1997	67.000 78.620	511	20.130
43RM175	II	26,500	59,000	175,000	128,975	6.000	24.60 to 32.75	PosiStop®	1997	78.620	511	20.130
48R151 19D3847	I	27,000	60,000	151,000	110,833	4.667	25.34 to 32.00	PosiStop®	2678 2897	105.440 114.070	495	19.500
43R175	IV	27,000	60,000	175,000	128,975	6.000	24.60 to 33.75	No	2134 2515 2852	84.020 99.020 112.280	500	19.690
43R183	IV	27,000	60,000	183,000	134,871	6.250	25.63 to 35.15	No	2852	112.280	508	20.000
53R211 21D3847	I	27,000	60,000	211,000	155,507	4.667	19.13 to 30.67	PosiStop®	2329 2748	91.690 108.190	495	19.500
53R300	I	49,500	110,000	300,000	221,000	6.250	25.63 to 41.07	PosiStop®	2433 2852 2957	95.790 112.280 116.420	508 610	20.000 24.000
53R305	I	54,000	120,000	305,000	224,785	6.474	26.54 to 42.54	PosiStop®	2721	126.740	695	27.380
58R397	I	54,000	120,000	397,000	292,589	6.474	29.49 to 35.14	PosiStop®	2721	107.130	695	27.380
63R492 25D8860	I	67,500	150,000	492,000	362,604	6.000	22.36 to 37.72	No	2543	100.120	838	33.000

Portal Axles

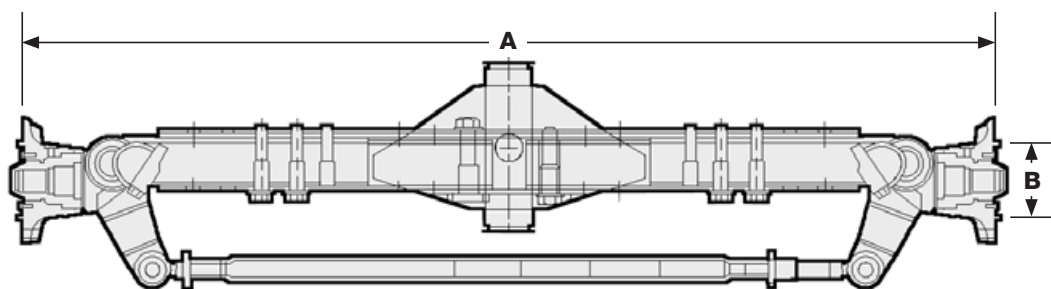


Model 035 shown

PORTAL AXLES											
Product/ Generic Model	Generic Designation	Engine HP	Max Output		C Portal Drop	Ratio Range (Overall)	Steer Angle	A		B	
			Nm	Ft-lb				mm	in	mm	in
020*	025S03	25	3,000	2,220	98.00 mm/3.86 in	14.630	55°	1160	45.670	152	6.000
025*	025S05	25	5,220	3,850	113.10 mm/4.46 in	21.380	62°	1241	48.840	152	6.000
035*	035S08	35	8,140	6,000	113.10 mm/4.46 in	15.950	62°	1384	54.480	152	6.000
050*	050S10	50	10,010	7,400	113.10 mm/4.46 in	15.900	62°	1384	54.480	152	6.000

*NOTES: The portal axles are double reduction with bevel gear wheel-ends, not planetaries.
HP rating is maximum engine HP offering in current tractor.

2WD Adjustable Axles

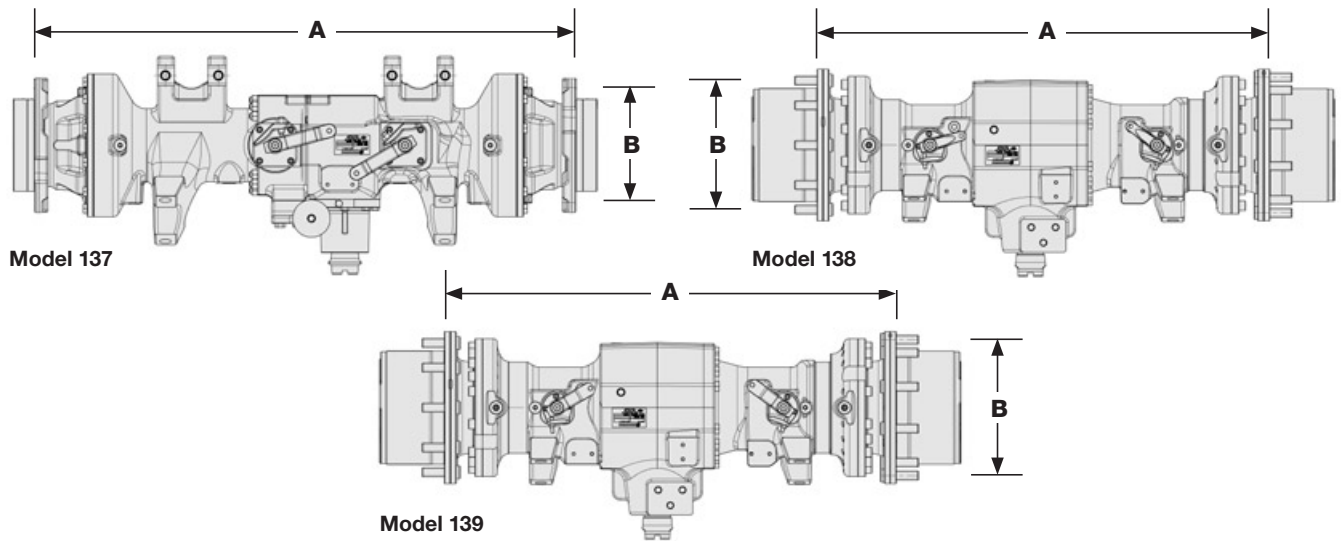


Model 700 shown

2WD ADJUSTABLE AXLES							
Product Model	Engine HP	Steering Angle	A		B		Steering
			mm	in	mm	in	
700*	47	53°	1370	53.940	152	6.000	Manual, Power
700*	55	53°	1275 to 1375 to 1475	50.200 to 54.130 to 58.070	152	6.000	Power
700*	55	53°	1409	55.470	152	6.000	Power
700*	35	63°	1354	53.310	152	6.000	Manual
700*	45	50°	1368 to 1468 to 1568 to 1668	53.860 to 57.800 to 61.730 to 65.670	152	6.000	Power

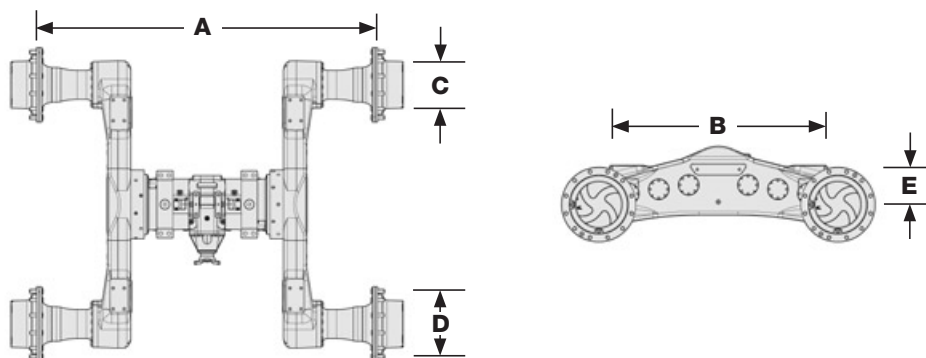
* Not adjustable

Planetary Rigid Axles



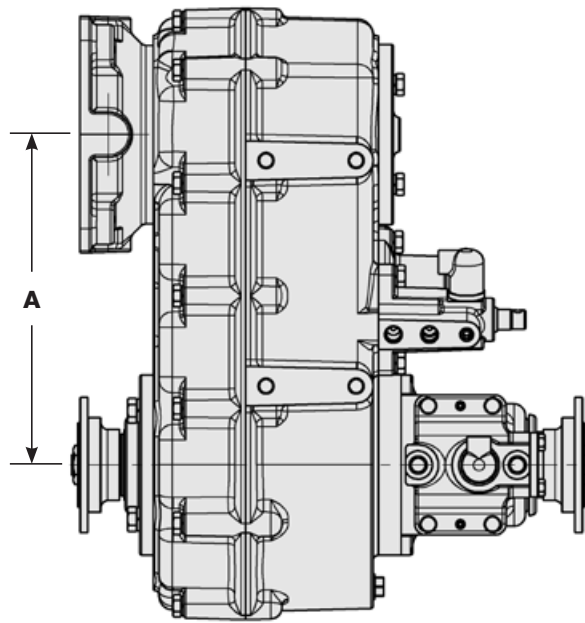
PLANETARY RIGID AXLES												
Product Model	Generic Designation	Nominal G.A.W. Rating Kg	Nominal G.A.W. Rating lb	Max Output Nm	Max Output ft-lb	Planetary Ratio	Ratio Range (Overall)	Input RPM	A		B	
									mm	in	mm	in
137	C4	9,000	19,841.60	10,000	7,375.50	6	12.24 to 26.25	2350	1080	42,5196	275	10,82675
137	C5	12,000	26,455.47	11,000	8,113.00	6	12.24 to 26.25	2350	1100	43,307	275	10,82675
137	P	12,000	26,455.47	16,000	11,801.00	6	12.24 to 26.25	2350	1300	51,181	275	10,82675
138	C	16,700	36,817.20	16,500	12,170.00	6	12.86 to 16.91	2350	1118	44,01566	335	13,18895
138	P	18,400	40,565.06	18,000	13,276.00	6	12.86 to 16.91	2350	1553 dual	61,14161	275	10,82675
139	CS	20,500	45,194.76	16,500	12,170.00	6	12.86 to 16.91	2350	1118	44,01566	330	12,9921
139	CW	20,500	45,194.76	16,500	12,170.00	6	12.86 to 16.91	2350	1218	47,95266	335	13,18895
139	P	21,500	47,399.39	22,000	16,226.50	6	12.86 to 16.91	2350	1710 dual	67,32227	275	10,82675

Bogie Axles



BOGIE AXLES															
Product Model	Nominal G.A.W. Rating		Max Output		Planetary Ratio	Total Ratio Range	A		B		C		D		E
	Kg	lb	Nm	ft-lb			mm	in	mm	in	mm	in	mm	in	mm
150R	15,000	33,000	42,000	30,900	6.000	14.640 to 25.070	1940	76.400	1300	51.200	280	11.000	335	13.200	200 7.870
151R	18,900	41,600	65,000	48,000	6.000	16.840 to 30.400	2140	84.250	1500	59.100	370	14.600	425	16.700	150 5.910

Off-Highway Transfer Cases



Model 360 shown

OFF-HIGHWAY TRANSFER CASES											
Product Model	Continuous Input Torque		Shift Type	Speeds	Max. Input RPM	Ratio Range		A		Weight	
	Nm	ft-lb				1 st	2 nd	mm	in	Kg	lb
305	691	516	—	1	4500	0.890 to 6.370		276	10.900	70	154
311	587	433	—	1	4500	0.970 to 2.460		172	6.770	60	132
315	587	433	—	1	4500	1.700 to 2.2300		170	6.690	*	—
357	599	442	Mechanical or Hydraulic	2	4500	1.930 to 3.250	1.120 to 1.600	160	6.300	60	132
360	1020	752	Hydraulic	2	4500	3.280 to 7.075	0.92 to 3.13	293	11.540	120	265
602	599	442	—	1	4500	1.610 to 2.130		151	5.950	**	
603	587	433	—	1	4500	0.970 to 2.460		172	6.770	***	

* Drop box only sold attached to axle assembly

** Integrated to the 212 axle

*** Integrated to the 211 axle

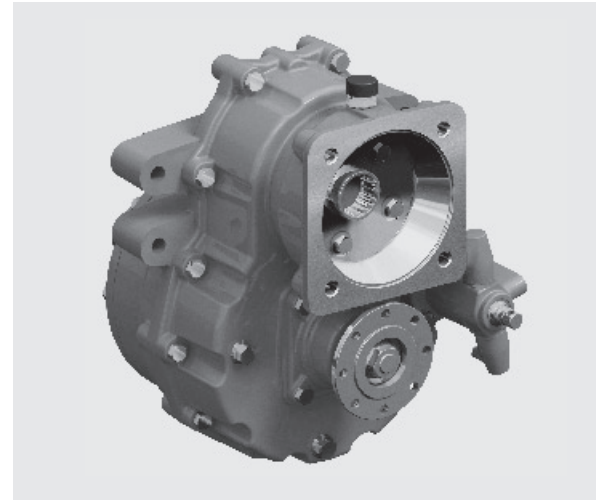
Shift-on-Fly Hydrostatic Transmission

Model 367 – 2-Speed Shift-on-Fly Hydrostatic Transmission – 80 kW (107 HP)

Mobility for compact construction, mining, and material-handling vehicles.

The 2-speed Shift-on-Fly hydrostatic transmission Model 367 is extremely compact and versatile, thanks to its wide range of ratios available and to its gear shifting technology. It has been designed for compact industrial vehicles with the need of a slow working speed and a fast speed for traveling, such as compact front-end loader, wheeled excavator, telescopic boom handler, and site dumper.

- Remote Mounted or Directly Flanges to Spicer Axles
- Available for Open or Closed Loop Hydraulic Systems
- With or Without Disconnectable PTO
- With or Without Wet Disc Parking Brake (SAHR)
- With or Without External Dry Disc Parking Brake



Design Features

- Compact Layout
- Gear Shifting by Synchronizer
- Increased Driver Comfort
- Low Power Losses (no clutch drag)
- Optimum Performance/ System-Cost Balance

Options Available

- Basic or Fully Electronic Shifting Management
- Different Flanges
- Parking Brake
- PTO Disconnect

Summation Hydrostatic Transmissions

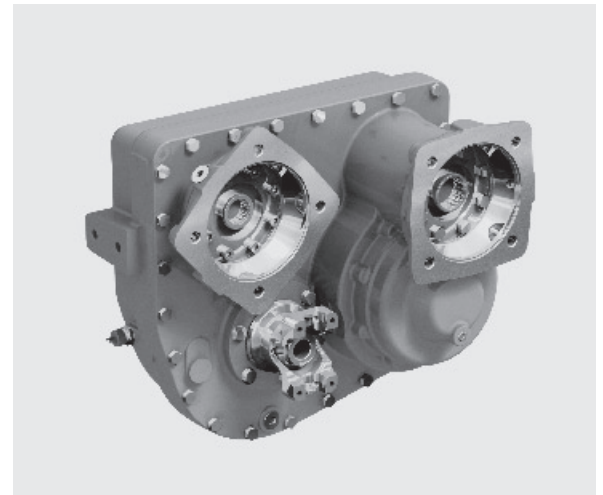
Model 319 – Summation Transfer Case – 120 kW (161 HP)

Adjusts to working environment to maximize efficiency of front-end loaders by seamlessly moving between full speed forward and reverse.

The possibility to obtain continuous speed variation with no need of gear shifting is the main feature of the summation motor gearbox Model 319. This gearbox is specifically designed for industrial vehicles, hydrostatically driven, which require high top speed, high efficiency, and high tractive effort, such as front-end loaders and other heavy-duty applications.

It can accommodate various combinations of hydraulic motors from 55cc up to 160cc. The second motor can be disconnected at high speed and re-engaged when high torque is needed. The high efficiency of the system reduces power loss and consequently the fuel consumption of the vehicle.

- With or Without Disconnectable PTO
- With or Without External Dry Disc Parking Brake
- Remote Mounted or Directly Flanges to Spicer Axles



Design Features

- Compact Layout
- Continuous Variable Transmission (CVT) Functionality
- Different Possibilities for Hydraulic Motor Size Combinations
- Increased Driver Comfort
- Maximize System Efficiency
- Possibility to Use a Constant Displacement Motor 2 (Smaller Size)
- System Flexibility

Options Available

- Different Flanges
- Parking Brake
- PTO Disconnect

Summation Hydrostatic Transmissions (cont.)

Model HSE 2+3 – 200 kW (268 HP)

The HSE transmission offers complete flexibility in mounting and design.

A new concept in transmissions, the HSE 2+3 is designed for front-end loaders and other high duty cycle applications. New shift strategies from the use of recently developed hydrostatic component technology result in shock-free shifting during the total speed range of the vehicle. The HSE 2+3 features a 304 mm drop with 3 speeds forward and 3 speeds reverse with ratios of 6.103 – 1st, 3.033 – 2nd, and 1.342 – 3rd.

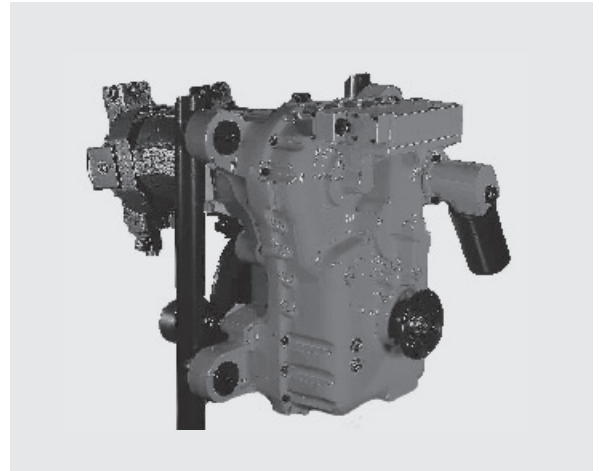
- Better Fuel Economy
- Better Shift Quality
- Increased Driver Comfort
- Increased Vehicle Performance
- Reduced Axle Braking
- Reduced Vehicle Noise

Requirements

- Reduced Cooling Requirements

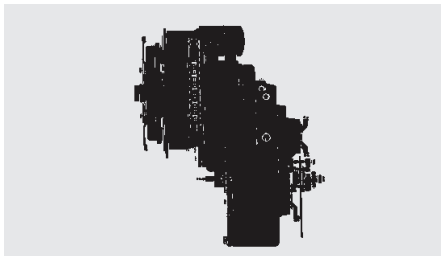
Options Available

- Different Flanges
- Parking Brake



Powershift Transmissions

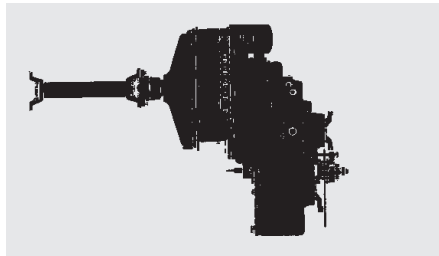
Configurations



T (HR) Model

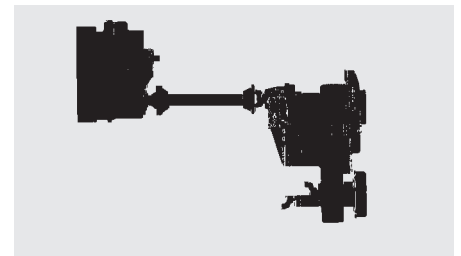
The T arrangement is an integral transmission and converter assembly mounted directly to the engine. As a single compact package, it minimizes external piping and eliminates a drive shaft.

For powershift transmission applications that demand the highest level of simplicity and serviceability, Dana offers a full range of models with on-off electric solenoid control. These transmissions can be used with a simple switched cab control



MT (MHR) Model

The MT or midship mounting is an integral transmission and converter assembly mounted remote from the engine. This assembly allows for installation flexibility while minimizing external piping.



RT (R) Model

The RT model is a remote-mounted transmission with an engine-mounted converter. This allows for flexibility of the transmission installation.

or in combination with Dana's ECON or PCON controllers, providing advanced control (e.g., diagnostic monitoring and automatic shifting, CAN-BUS).

Powershift Transmissions (cont.)

T08 Series – 60 to 100 kW (80 to 135 HP)

Increased power transfer and simplified vehicle control for compact forklift truck applications.

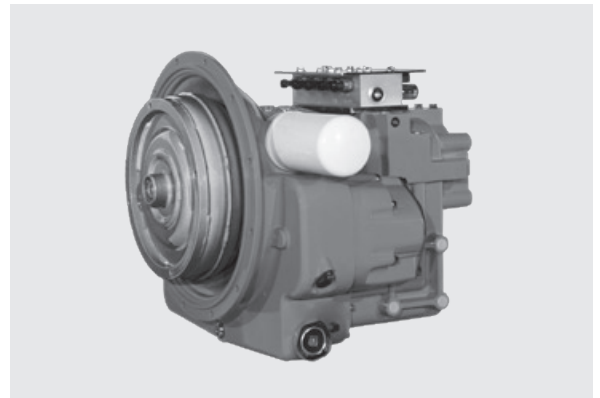
The T08 Series is a further addition to the family of powershift transmissions and is targeted at the material-handling market. It is available in a 2-speed configuration.

Design Features

- Helical Gearing
- Short Drop Only
- 12-Inch Converter Wheels
- Auxiliary Pump Drive
- Engine Mount Only
- Hydraulic Inching Option

Options Available

- Automatic Shifting
- Brake by Clutch
- Single Pedal Control



T08 Series Technical Data

Maximum Engine Power 100 kW

Speeds (Fwd X Rev) 2X2

SAE Flywheel Housing 3

Drop	Short	145 mm
	Intermediate	—
	Long	—
	Inline	—

Lateral Offset 32 mm

Configurations T

T12000 Series – 37 to 82 kW (50 to 110 HP)

This full powershift transmission is designed for up to 82 kW/110 HP for smaller off-highway machines.

The Spicer® T12000 Series is designed for versatile equipment that requires the power and performance of a rugged powershift transmission. It is ideal for applications such as backhoes, trenchers, small loaders, small graders, telescopic boom handlers, and rough terrain lift trucks.

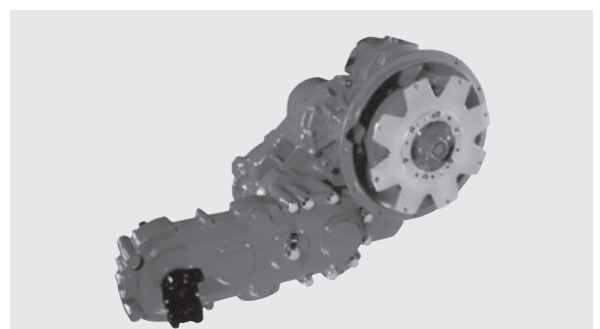
- Auxiliary Pump Drive
- Clutch Modulation
- Electric Controls
- Externally Mounted Charging Pump and Filter

Design Features

- 3-, 4-, and 6-Speed Full Powershifted Transmissions
- Short, Intermediate, and Long Drops
- Variable (Lateral) Drop Transmission (VDT)
- 11-Inch Converter Wheels
- Available in Wide Range of Ratios
- Engine and Midship Mountings
- Integral Converter-Transmission Unit

Options Available

- Automatic Shifting
- Converter Freewheel
- Disc Parking Brakes
- Electric Declutch
- Inching
- Integral or Remote Filter
- Variable Drop Transmission (VDT)



T12000 Series Technical Data

Maximum Engine Power 82 kW

Speeds (Fwd X Rev) 3X3, 4X3, 6X3

SAE Flywheel Housing 3

Drop	Short	138 mm
	Intermediate	321 mm
	Long	459 mm
	Inline	—

Lateral Offset 511.8 mm
648.4 mm

Configurations T, MT

T20000 Series – 87 to 97 kW (90 to 130 HP)

Proven long-life components engineered to your application.

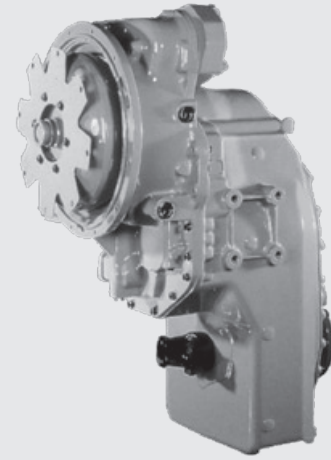
The T20000 Series is ideally suited for applications such as rough terrain lift trucks, wheel loaders, small scrapers, and other mining, industrial, and construction machinery.

Design Features

- 2-, 3-, 4-, and 6-Speed Full Powershifted Transmissions and 6-Speed Range Shift
- Inline, Short, Intermediate, and Long Drops
- SAE B Pump Drive
- Available in Wide Range of Ratios
- Externally Mounted Control Valves, Pumps, and Filters
- Flex Plate Drive
- Helical Gearing

Options Available

- Axle Disconnect
- Clutch Modulation
- Clutch Release: Air or Hydraulic
- Converter Freewheel
- Electric or Mechanical Shift
- Ground Driven Pump Drive
- Horizontal or Vertical Control Mount
- Inching Valve: Manual or Hydraulic
- Parking Brake: Mechanical or SAHR
- Remote Control Valve
- Remote or Integral Mounted Oil Filter
- SAE C Pump Drive
- Speedometer Drive
- Vehicle Towing Disconnect (Internal)



T20000 Series Technical Data

Maximum Engine Power		97 kW
Speeds (Fwd X Rev)		2X2, 3X3, 6X3, 6X6
SAE Flywheel Housing		3
Drop	Short	155 mm
	Intermediate	311 mm
	Long	508 mm
	Inline	0 mm
Configurations		T, MT, RT

24000 Series – 97 to 119 kW (130 to 160 HP)

A full powershift transmission.

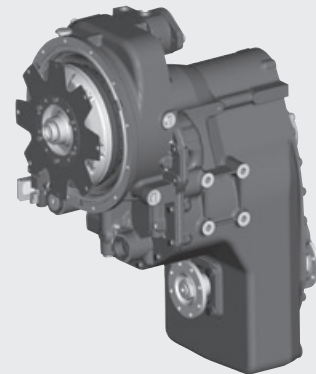
The 24000 Series has been designed for heavy-duty applications including lift trucks, rough terrain lift trucks, wheel loaders, rough terrain cranes, and other mining, construction, and industrial machinery.

Design Features

- 3-, 4-, and 6-Speed Full Powershifted Transmissions
- Short and Long Drops
- SAE B Pump Drive
- Available in Wide Range of Ratios
- Engine Driven Auxiliary Pump Drives
- Helical Gearing

Options Available

- 90-Degree Control Valve
- Clutch Release: Air or Hydraulic
- Converter Lock-Up: Manual or Auto
- Emergency Steering Pump Drive
- Engine and Output Speed Sensors
- Front or Rear Disconnect
- Inching Valve
- Parking Brake (Drum or Disc)
- Provision for Variable Displacement Pumps
- Remote Mechanical Control Valve
- Trans. Hydraulic Brakes
- Unidirectional PTO



24000 Series Technical Data

Maximum Engine Power		119 kW
Speeds (Fwd X Rev)		3X3, 4X3, 6X3
SAE Flywheel Housing		3
Drop	Short	311 mm
	Intermediate	—
	Long	508 mm
	Inline	—
Configurations		T, MT, RT

Powershift Transmissions (cont.)

32000 Series – 112 to 168 kW (150 to 225 HP)

Proven, dependable full powershift transmissions.

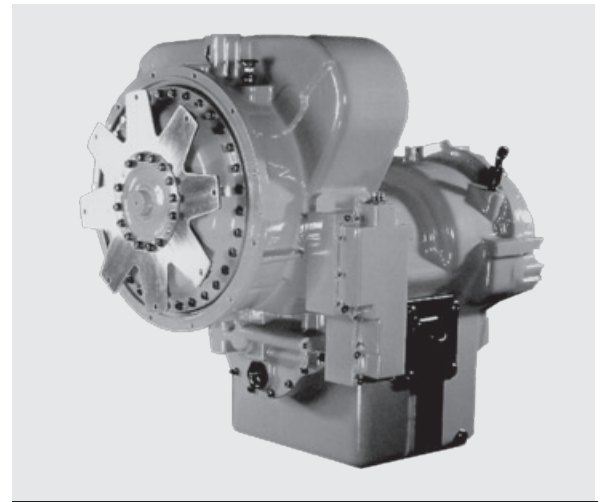
The 32000 Series is designed for vehicles used in the construction, logging, underground mining, material-handling, and other industrial applications.

Design Features

- 3- and 4-Speed Full Powershifted Transmissions
- 6- and 8-Speed Range Shift: 6-Speed Full Powershift (S32)
- Short and Long Drops
- 12-Inch, 13-Inch Converter Wheels
- Flex Plate Drive
- Helical Output Gearing

Options Available

- 90-Degree Control Valve
- Auxiliary Pump Drives
- Clutch Release: Air or Hydraulic
- Converter Lock-up: Manual or Auto
- Electric Shift
- Emergency Steering Pump
- Engine and Output Speed Sensors
- Front or Rear Axle Disconnect
- Inching Valve
- Modulation
- Offset Pump Drives
- Parking Brake: Drum or Disc
- Provision for Variable Displacement Pumps
- Remote Filter
- Remote Mechanical Control Valve
- Trans. Hydraulic Brakes
- Unidirectional PTO



32000 Series Technical Data

Maximum Engine Power		168 kW
Speeds (Fwd X Rev)		3X3, 4X4, 6X6, 8X8
SAE Flywheel Housing		3
Drop	Short	245 mm
	Intermediate	—
	Long	470 mm
	Inline	—
Configurations		T, MT, RT

TZL 16 Series – 150 to 180 kW (200 to 245 HP)

Engineered to supply front-end loaders with higher horsepower capability, reduced maintenance, and smoother, quieter operation.

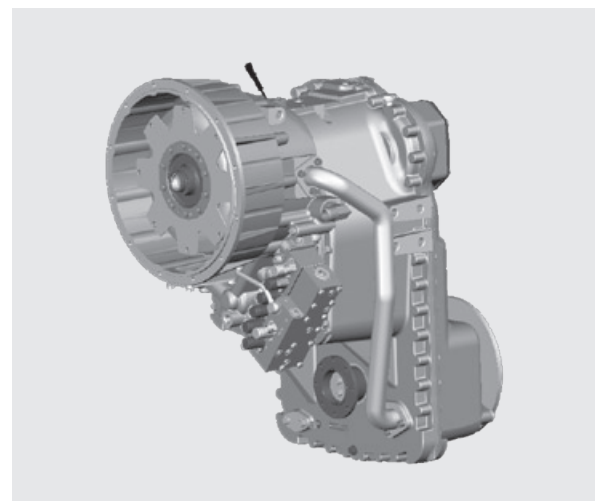
The Spicer® TZL 16 four-speed transmission platform uses proven internal components from the extensive line of Spicer powershift transmissions already available for the off-highway market. High-energy-capacity forward and reverse clutches, adaptive clutch modulation, and helical gears deliver a robust transmission with improved shift quality.

Design Features

- 4 Speeds Forward, 3 Speeds Reverse Full Powershift
- 340 mm Stamped Steel Converter Wheels
- Helical Gearing
- Internal Plumbing
- High-Capacity Clutches
- Adaptive Modulation
- Flex Plate Drive
- 1,000:1 Pump Drive or +/- 10% Overdrive
- 2 SAE C Customer Pump Drives
- Electric Shift Valve

Options Available

- Remote Filter
- Engine Speed Sensor
- Parking Brake: Drum or Disc
- Flywheel Adapter
- Emergency Steering Pump
- Dipstick



TZL 16 Series Technical Data

Maximum Engine Power		180 kW
Speeds (Fwd X Rev)		4X3
SAE Flywheel Housing		2 or 3
Drop	Short	—
	Intermediate	—
	Long	555 mm
	Inline	—
Configurations		T, MT

36000 Series – 149 to 239 kW (200 to 320 HP)

Heavy-duty full powershift transmissions.

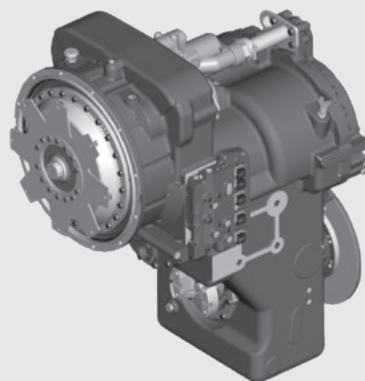
The 36000 Series has been designed for heavy-duty applications, including rough terrain lift trucks, wheel loaders, rough terrain cranes, all terrain cranes, and other mining, construction, and industrial machinery.

Design Features

- 3-, 4-, and 6-Speed Full Powershifted Transmissions
- Short and Long Drops
- Available in Wide Range of Ratios
- Engine, Midship, or Remote Mounting
- Flex Plate Drive

Options Available

- Automatic Lock-up
- Automatic Shift
- Axle Disconnect: Front or Rear, Towing Disconnect
- Clutch Modulation (3- and 4-Speed Models Only)
- Clutch Release: Air or Hydraulic
- Converter Lock-up
- Emergency Steering Pump Drive (Only on Long Drop)
- Mechanical or Electric Controls
- Parking Brake (Only on Long Drop)
- Provision for Variable Displacement Pumps
- Pump Disconnect
- Speedometer Drive



36000 Series Technical Data

Maximum Engine Power		239 kW
Speeds (Fwd X Rev)		3X3, 4X4, 6X3
SAE Flywheel Housing		1
Drop	Short	318 mm
	Intermediate	—
	Long	625 mm
	Inline	—
Configurations		T, MT

T40000 Series – 224 to 313 kW (300 to 420 HP)

Heavy-duty full powershift transmissions.

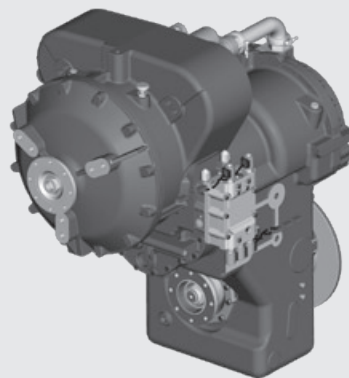
The T40000 Series has been designed for heavy-duty applications including rough terrain lift trucks, wheel loaders, rough terrain cranes, all terrain cranes, and other mining, construction, and industrial machinery.

Design Features

- 3- and 4-Speed Full Powershifted Transmissions
- Short and Long Drops
- Available in Wide Range of Ratios
- Engine or Midship Mounting
- Heavy-Duty Torque Converter with Stall Torque Ratios between 1.8 and 3.1

Options Available

- Automatic Shifting
- Bi-Directional PTO Drive
- Clutch Modulation
- Clutch Release: Air or Hydraulic
- Flex Plate Drive
- Ground Driven Pump Drive
- Pump Disconnect



T40000 Series Technical Data

Maximum Engine Power		313 kW
Speeds (Fwd X Rev)		3X3, 4X4
SAE Flywheel Housing		1
Drop	Short	318 mm
	Intermediate	—
	Long	625 mm
	Inline	—
Configurations		T, MT

Powershift Transmissions (cont.)

1000 Series – 224 to 746 kW (300 to 1000 HP)

Heavy-duty full powershifts for off-highway vehicles.

The 1000 Series is designed for heavy-duty applications, such as wheel loaders, mining loaders, and other mining, industrial, and construction machinery.

Design Features

- Long Drop
- Interchangeable Clutches, Accessible from Outside of the Transmission
- Parts Interchangeability Within the Line
- Separate Unit Construction of Torque Converter and Transmission

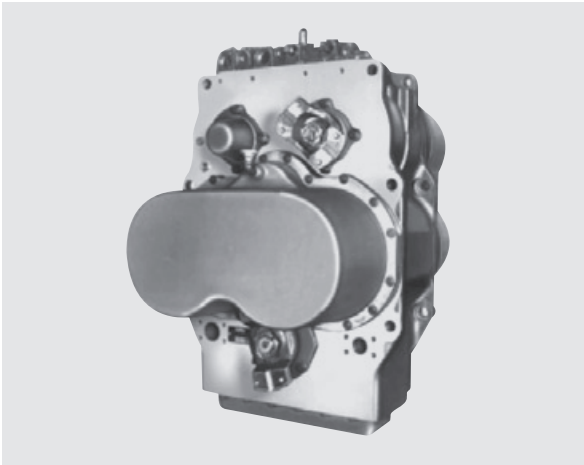
- Hydraulic Remote Control
- Modulation
- Output Speed Sensor
- PTO
- Retarder

16000 Series

- 4 or 8 Speeds Forward/Reverse
- Automatic Shift
- Axle Disconnect
- Clutch Disconnect
- Electric Shift
- Emergency Steering Pump
- Engine Power: 410-746 kW/550-1000 HP
- Hydraulic Remote Control
- Modulation
- PTO

6000 and 8000 Series

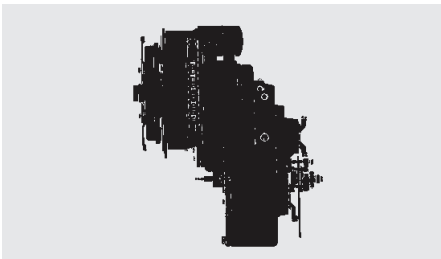
- 4 or 8 Speeds Forward/Reverse
- Automatic Shift
- Axle Disconnect
- Clutch Disconnect
- Electric Shift
- Emergency Steering Pump
- Engine Power:
6000 Series – 223-298 kW/300-400 HP
8000 Series – 261-410 kW/350-550 HP



1000 Series				
Technical Data		6000	8000	16000
Maximum Engine Power		298 kW	410 kW	746 kW
Speeds (Fwd X Rev)		4X4, 8X4	4X4, 8X4	4X4, 8X4
SAE Flywheel Housing		n/a	n/a	n/a
Drop	Short	—	—	—
	Intermediate	—	—	—
	Long	501 mm	605 mm	641 mm
	Inline	—	—	—
Configurations		RT	RT	RT

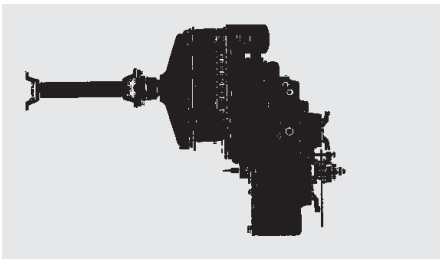
Powershift Transmissions with Valve-Proportional Control

Configurations



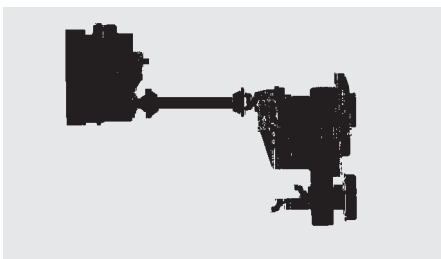
T (HR) Model

The T arrangement is an integral transmission and converter assembly mounted directly to the engine. As a single compact package, it minimizes external piping and eliminates a drive shaft.



MT (MHR) Model

The MT or midship mounting is an integral transmission and converter assembly mounted remote from the engine. This assembly allows for installation flexibility while minimizing external piping.



RT (R) Model

The RT model is a remote-mounted transmission with an engine-mounted converter. This allows for flexibility of the transmission installation.

Dana offers a full line of state-of-the-art powershift transmissions with electronically modulated clutches. Proportional management of clutches enables complete control of the transmission, providing enhanced shift quality, precise inching, and hydrostatic

simulation capability. Dana is the market leader in providing basic to advanced functions that offer five levels of control sophistication.

Powershift Transmissions with Valve-Proportional Control (cont.)

TE08 Series – 60 to 100 kW (80 to 135 HP)

Compact design and simplified vehicle control for industrial lift trucks.

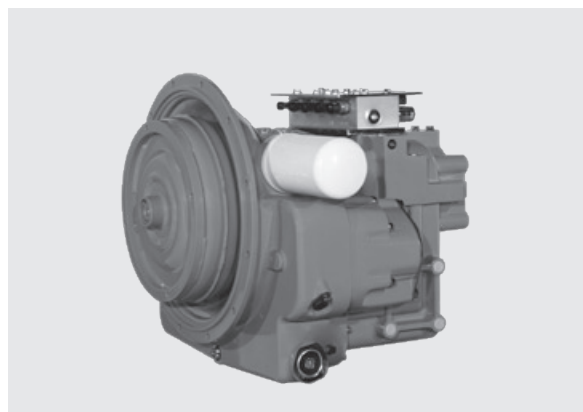
The TE08 is a further addition to the family of electronically controlled transmissions and is targeted at the material-handling market. It is available in both 2- and 3-speed options and, in addition to the full electronically controlled version, can also be supplied with standard electric controls.

Design Features

- Short Drop Only
- 12-Inch Converter Wheels
- Auxiliary Pump Drive
- CAN-BUS Interface
- Electronic Inching and Modulation
- Engine Mount Only
- Helical Gearing
- Hydraulic Inching Option

Options Available

- Automatic Shifting
- Brake by Clutch
- Single Pedal Control



TE08 Series Technical Data

Maximum Engine Power		100 kW
Speeds (Fwd X Rev)		3X2, 2X2
SAE Flywheel Housing		3
Drop	Short	145 mm
	Intermediate	—
	Long	—
	Inline	—
Lateral Offset		32 mm
Configurations		T

TE10 Series – 97 to 120 kW (130 to 160 HP)

Compact design and simplified vehicle control.

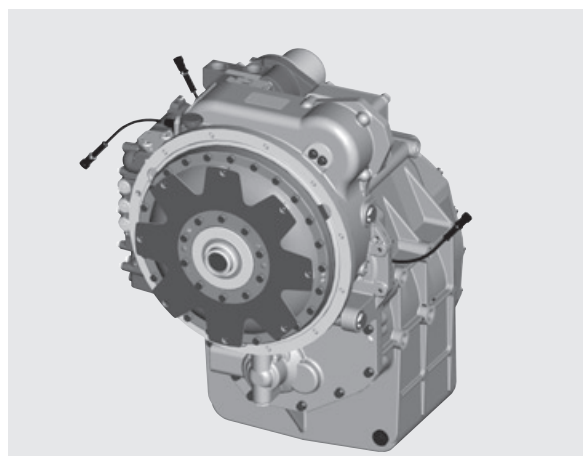
The TE10 Series of electronically controlled transmissions is specifically engineered for the material-handling market. It is a 3-speed powershift transmission with the new generation electronic control.

Design Features

- Short Drop Only
- CAN-BUS Interface
- Dual Auxiliary Pump Drive
- Electronic Inching and Modulation
- Engine Mount Only
- Helical Gearing

Options Available

- 10-Inch X 1-1/2-Inch Drum Brake
- Automatic Shifting



TE10 Series Technical Data

Maximum Engine Power		120 kW
Speeds (Fwd X Rev)		3X3
SAE Flywheel Housing		3
Drop	Short	311 mm
	Intermediate	—
	Long	—
	Inline	—
Configurations		T

Powershift Transmissions with Valve-Proportional Control (cont.)

TE15 Series – 120 to 190 kW (160 to 250 HP)

Proven, dependable full powershift transmissions with state-of-the-art electronic controls.

The TE15 incorporates high contact ratio spur gears and helical gearing for noise reduction. The TE15 offers the next generation electronic controls with clutch modulation. Features such as electronic inching and automatic shifting are optional.

Design Features

- Short and Long Drops
- CAN-BUS Interface Capability
- Dual Auxiliary Pump Drives
- Electronically Controlled Modulation
- Engine, Midship, or Remote Mount
- Flex Plate Drive
- Helical Gearing

Options Available

- Automatic Shifting
- Electronically Controlled Inching
- SAHR Parking Brake



TE15 Series Technical Data

Maximum Engine Power		190 kW
Speeds (Fwd X Rev)		3X3, 4X4, 6X6, 8X8
SAE Flywheel Housing		3 (dry)
Drop	Short	245 mm
	Intermediate	—
	Long	470 mm
	Inline	—
Configurations		T, MT, RT

TE13 Series – To 165 kW (220 HP)

TE17 Series – 165 to 215 kW (220 to 266 HP)

Compact design and simplified vehicle control.

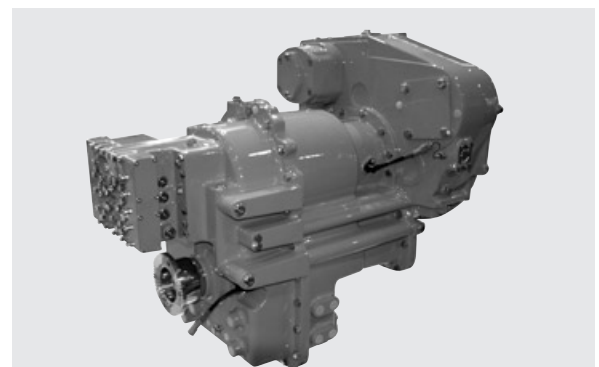
The TE13 and TE17 Series full powershift transmissions are engineered specifically to meet the needs for improved productivity and reliability in the material-handling market. They are 3-speed powershifts that incorporate the latest in manufacturing and the next generation electronic control systems, resulting in the smoothest operation in the market.

Design Features

- Short Drop Only
- CAN-BUS Interface Capability
- Dual Auxilliary Pump Drives
- Electronically Controlled Modulation
- Engine, Midship, or Remote Mount
- Flex Plate Drive
- Helical Gearing

Options Available

- Automatic Shifting
- Electronically Controlled Inching
- SAHR Parking Brake



TE13/TE17 Series Technical Data

		TE13	TE17
Maximum Engine Power		165 kW	215 kW
Speeds (Fwd X Rev)		3X3	3X3
SAE Flywheel Housing		—	3
Drop	Short	225 mm	225 mm
	Intermediate	—	—
	Long	—	—
	Inline	—	—
Configurations		T	T

TE27 Series – 215 to 270 kW (290 to 360 HP)
TE32 Series – 270 to 320 kW (360 to 430 HP)

Powerful, efficient transmissions for large construction, mining, and material-handling vehicles.

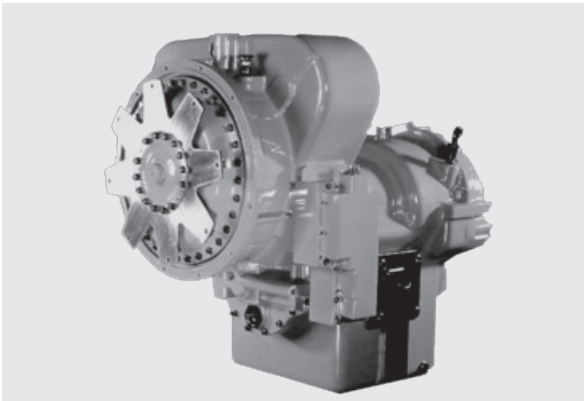
The TE27 and TE32 Series are designed to serve material-handling, wheel loader, mining, and construction market segments. These are 4-speed full powershift transmissions with helical gearing and the next generation electronic controlled technology, featuring electronically controlled modulation with overlap control.

Design Features

- Long Drop and Short Drop Versions
- CAN-BUS Interface
- Electronically Controlled Modulation
- Engine, Midship, or Remote Mount
- Flex Plate Drive
- Helical Gearing

Options Available

- Automatic Shifting
- Electronically Controlled Inching
- SAHR Parking Brakes

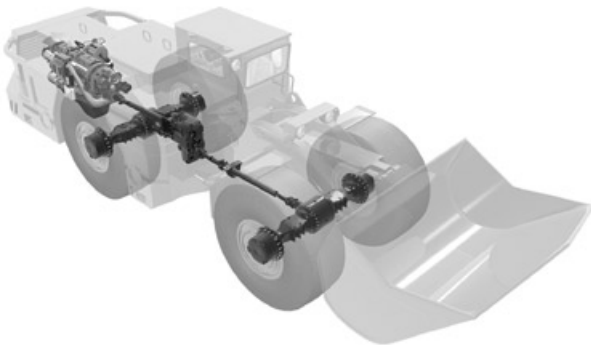


TE27/TE32 Series Technical Data		TE27	TE32
Maximum Engine Power		270 kW	320 kW
Speeds (Fwd X Rev)		4X4	4X4
SAE Flywheel Housing		1	1
Drop	Short	318 mm	318 mm
	Intermediate	—	—
	Long	625 mm	625 mm
	Inline	—	—
Configurations		T, MT	T, MT

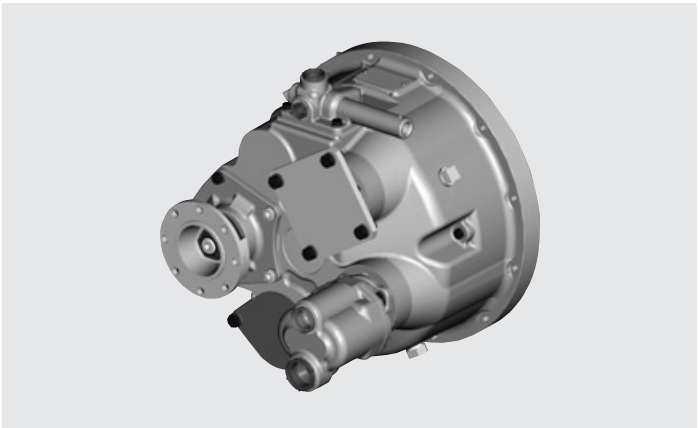
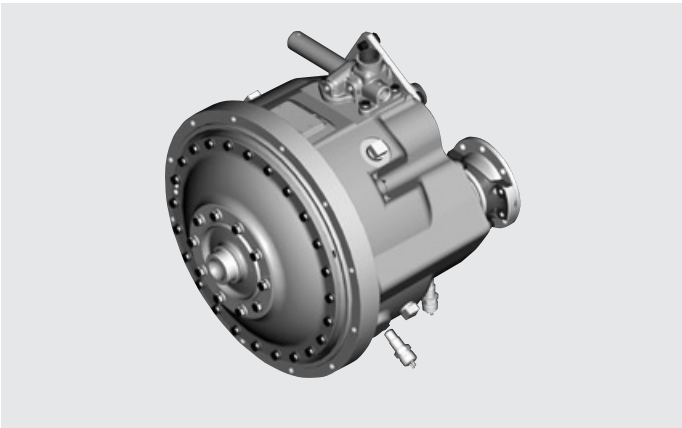
Torque Converters

Spicer® torque converters teamed with Spicer powershift transmissions provide high operating efficiency for virtually any application. Spicer torque converters are engineered specifically for off-highway equipment using optimized cast blading, resulting in high efficiencies. Spicer has 36 torque converter wheel configurations with stall torque ratios to match most engine requirements.

All Spicer torque converters are built with at least 3 pump drives. One is used for charging and 2 for mounting accessory drive pumps. The C330 has 4 pump drives with inline output only.



TORQUE CONVERTER AVAILABLE FEATURES											
Product Model	Straight Through Drive	Offset Drive	Turbine Tachometer Drive	SAE A, B & C Pump Mounting	Lock-Up	Engine Inductive Sensor	Turbine Inductive Sensor	Flex Plate Drive	Variable Displacement Pump Drive	Free Wheel	SAE Flywheel Housing
C270	●	●		●	●	●	●	●		●	3
C320	●	●		●	●	●	●	●	●		3
C330	●			●		●		●	●		3
C5000	●	●	●	●	●	●	●	●	●		1
C8000		●	●	●	●	●	●	●			1
C9000	●	●		●	●	●	●	●			1
C16000	●	●	●	●	●	●	●				0



Electronic Shift Controls

New Transmission Control Systems for All Off-Highway Vehicle Applications

Dana Off-Highway Products Group offers 5 new control system solutions for application to the mobile off-highway industry incorporating the latest technologies. All Spicer® control products utilize state-of-the-art design and manufacturing technology, assuring the highest reliability in the rugged, abusive off-highway environment.

All of the Spicer controllers support SAE J1939 and customer specific CAN2.0B protocols facilitating vehicle networking. Integration with other compatible on-board systems keeps the total system cost low through elimination of redundancy and by reducing the amount of copper required to implement the system.

Customized CAN-BUS implementations allow seamless integration with the central vehicle display, providing a common user interface to all vehicle functions including the transmission controller. Thanks to the CAN2.0B, the controllers can be further put to work in applications requiring integrated use of transmission and engine for vehicle control under the most demanding conditions. Further, an advanced PC tool (Dashboard tool) is available for system optimization and troubleshooting, as well as tools to support end-of-line programming. This tool also supports a user-friendly parameter and configuration editor, allowing the OEM to optimize controller parameters. All controllers are available in 12V or 24V configuration.

A remote display, the RD.120, is available for the APC120, which provides basic operating information and diagnostic codes.

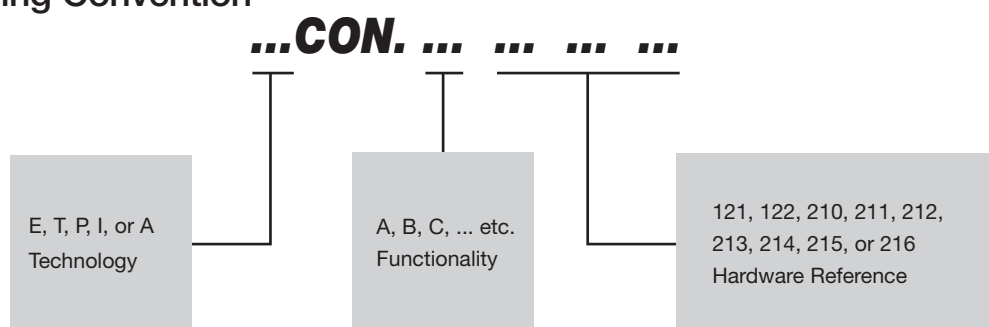
Dana Off-Highway Products Group is also introducing a second generation, user-friendly, PC-based software interface which is compatible with these new hardware products. The software editor allows the customer to optimize and edit controller parameters, as well as perform diagnostics.

Which controller meets the requirements of your application?

ELECTRONIC SHIFT CONTROLS					
Control System Function	ECON	PCON	TCON	ICON	ACON
Application to all Spicer transmissions					
Vehicle speed-triggered automatic shifting	•	•	•	•	•
Vehicle load-sensed automatic shifting	•	•	•	•	•
Shift inhibits (e.g., downshift protection)	•	•	•	•	•
System monitoring (pressure, temperatures)*	•	•	•	•	•
System diagnostics / troubleshooting	•	•	•	•	•
Single pedal drive (precise speed control)		•		•	
Application to all Spicer TE Series Transmissions					
Electronically monitored clutch engagement*			•	•	•
Electronically monitored inching – operator controlled*			•	•	•
Single pedal drive combination with inching				•	
Application to some Spicer TE Series (TE08)					
Brake by clutch (supplemental service brake)*					•

* Depending on the transmission

Model Naming Convention



Electronic Shift Controls (cont.)

ECON – Essential, PCON – Powertrain

The ECON and PCON advanced programmable control systems bring new levels of technology to serve synchro shuttle and the standard powershift (with on/off technology) transmission families.

They both provide drivetrain protection and speed- or load-sensed automatic shifting, where PCON adds single pedal drive technology.

ECON – ESSENTIAL, PCON – POWERTRAIN													
Transmissions	Transmission Type	Valve	Firmware	Single Pedal Drive	Hardware								
					121	122	210	211	212	213	214	215	216
T12000	Powershift	On/Off Solenoid	ECON.A PCON.A	No Yes		• •							
VDT12000	Powershift	On/Off Solenoid	ECON.A PCON.A	No Yes		• •							
T13000	Powershift	On/Off Solenoid	ECON.A PCON.A	No Yes		• •							
VDT13000	Powershift	On/Off Solenoid	ECON.A PCON.A	No Yes		• •							
20000	Powershift	On/Off Solenoid	ECON.A PCON.A	No Yes		• •							
24000	Powershift	On/Off Solenoid	ECON.A PCON.A	No Yes		• •							
32000	Powershift	On/Off Solenoid	ECON.A PCON.A	No Yes		• •							
T32000	Powershift	On/Off Solenoid	ECON.A PCON.A	No Yes		• •							
36000	Powershift	On/Off Solenoid	ECON.A PCON.A	No Yes		• •							
T40000	Powershift	On/Off Solenoid	ECON.A PCON.A	No Yes		• •							
1000	Powershift	On/Off Solenoid	ECON.A PCON.A	No Yes		•							

TCON – Transmission, ICON – Intelligent, ACON – Advanced

The TCON, ICON, and ACON advanced programmable control systems bring new levels of technology to serve synchro shuttle and the standard powershift transmissions, of which at least the direction has electronic modulation. They all provide drivetrain

protection and speed- or load-sensed automatic shifting, where ICON adds single pedal drive technology and ACON adds brake by clutch technology.

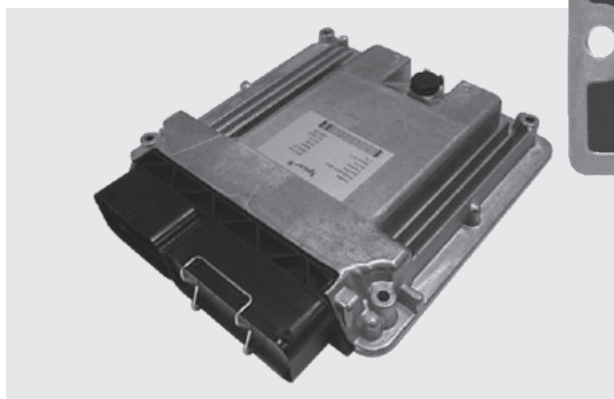
TCON – TRANSMISSION, ICON – INTELLIGENT, ACON – ADVANCED													
Transmissions	Transmission Type	Valve	Firmware	Single Pedal Drive	Brake By Clutch	Hardware							
						121	122	210	211	212	213	214	215
TE08	Powershift	Proportional Control 2	TCON.I ICON.C ACON.A	No Yes Yes	No No Yes							• • •	
TE10	Powershift	Proportional Control 2	TCON.F ICON.A	No Yes	No No			• •	• •	• •	• •		
TE13/17	Powershift	Proportional Control 1	TCON.F ICON.A	No Yes	No No			• •	• •	• •	• •		
TE15	Powershift	Proportional Control 2	TCON.H ICON.B	No Yes	No No								• • • •
TE27/32	Powershift	Proportional Control 2	TCON.F ICON.A	No Yes	No No			• •	• •	• •	• •		

Controller Hardware Overview

CONTROLLER HARDWARE OVERVIEW									
	121	122	210	211	212	213	214	215	216
Power Supply	12 and 24 Volt		12 Volt	24 Volt	12 Volt	24 Volt	12 Volt	12 Volt	24 Volt
H-Bridge for Servomotor	No				Yes		No		
Digital Inputs	8		10				8	10	
Digital Outputs	0		4				3	4	
Analog Inputs	2 Voltage + 2 Resistive or 4 Voltage or 4 Resistive		4 Voltage + 2 Resistive				5 Voltage + 2 Resistive	5 Voltage + 1 Resistive	
Analog Outputs (PWM)	9 of which 2 are closed loop		7 of which 4 are closed loop		5 of which 4 are closed loop		7 of which 5 are closed loop		
Speed Circuits	2 inductive/ current/ hall-effect		2 inductive/ current/ hall-effect						
Communication	CAN2B		RS232 and CAN2B						
Sealing	IP65		IP65, IP67, and IP69K						
Display	Optional RD.120		Integrated						

RD.120 – Remote Display for APC120

The remote display, the RD.120, is available for the APC120. The display provides basic operating information and diagnostic codes.



APC120 Controller



Driveshafts

Spicer Life Series®

Leading-edge features and substantial operating benefits.

As with the Spicer 10™ Series, Spicer Life Series® driveshafts offer features such as longer life, reduced maintenance, and Quick Disconnect™ end yokes that can provide operating benefits to our customers. With torque capacities ranging from 5,500 to more than 25,000 Nm, Dana has the right driveshaft to fit all your on- and off-highway needs.

Design Features

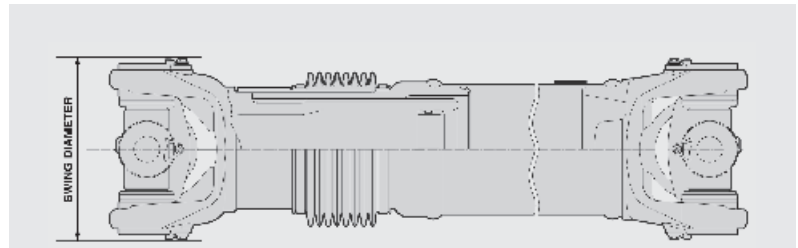
- Centrally Located Grease Fitting
- Increased Torque Capacity
- Larger Diameter Slip Member with Longer Splines
- Permanently Lubricated Slip Spline
- Smaller Swing Diameter
- Two Boot Options: Thermoplastic Hytrel®* or Seal Can Style

Available on Request

- DIN Flanges
- Extended Lubrication
- Paint
- Permanent Lubrication
- SAE Flanges
- Special Types

For additional configurations, contact Spicer Driveshaft Engineering for specific application information.

*Hytrel is a registered trademark of DuPont.



SPICER LIFE SERIES® DRIVESHAFTS

Driveshaft	Functional Torque Limit		Swing Diameter	
	Nm	ft-lb	mm	in
SPL®55	5,500	4,057	134.9	5.300
SPL®70	7,000	5,163	152.4	6.000
SPL®100	10,000	7,376	154.0	6.630
SPL140®	12,000	8,851	194.0	7.640
SPL140®HD	14,000	10,326	194.0	7.640
SPL170®	17,000	12,537	193.0	7.600
SPL250®	22,000	16,226	193.0	7.600
SPL250®HD	25,500	18,808	193.0	7.600

Spicer® Compact™ Series

An industry standard with unparalleled adaptability.

From the industry standard in Europe to the commercial vehicle market, the Spicer® Compact™ Series offers a wide variety of end-fittings, from SAE to DIN and cross-serrated, allowing Spicer driveshafts to attach to nearly any axle or transmission. With torque capacities ranging from 2,400 to 35,000 Nm, Dana has the right driveshaft to fit all your on- and off-highway needs.

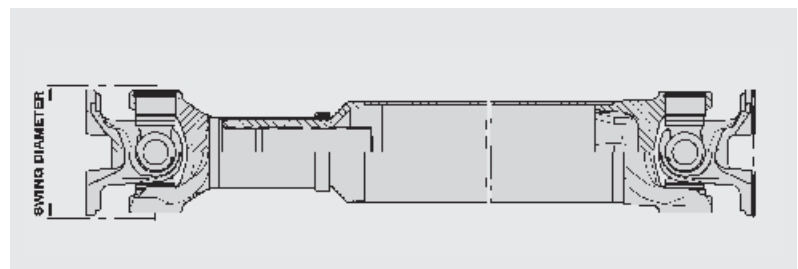
Design Features

- Bearing Package with Reduced Maintenance or Maintenance-Free Options
- Increased Torque Capacity
- Smaller Swing Diameters

Available on Request

- DIN Flanges
- Paint
- Permanent Lubrication for High and Low Temperatures
- SAE Flanges
- Special Types

For additional configurations, contact Spicer Driveshaft Engineering for specific application information.



SPICER® COMPACT™ SERIES DRIVESHAFTS

Driveshaft	Functional Torque Limit		Swing Diameter	
	Nm	ft-lb	mm	in
2015	2,400	1,770	90.0	3.540
2020	3,500	2,580	98.0	3.860
2025	5,000	3,690	113.0	4.440
2030	6,500	4,800	127.0	5.000
2035	10,000	7,380	144.0	5.670
2040	14,000	10,330	160.0	6.300
2045	17,000	12,540	174.0	6.850
2047	19,000	14,010	174.0	6.850
2055	25,000	18,440	178.0	7.010
2060	30,000	22,130	196.0	7.720
2065	35,000	25,810	206.0	8.110

Spicer® Wing™ Series

Optimized efficiency in a wing-style driveshaft.

Spicer® Wing™ bearing style driveshafts are designed for longer life, minimal maintenance, and lower operating cost. Dana is capable of offering the most comprehensive range of wing style driveshafts today. With torque capacities ranging from 1,500 to more than 120,000 Nm and lubrication packages ranging from extended to permanently lubricated, Dana has the right driveshaft to fit all your off-highway needs.

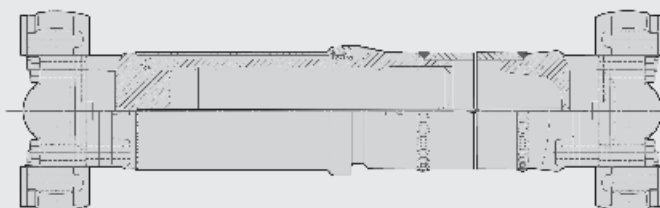
Design Features

- Increased Torque Capacity
- Reduced Maintenance
- Sealed Slip Spline System
- Triple-Lip Seal, Thrust Washer, and Seal Guard Package

Available on Request

- Paint
- Permanent Lubrication for High and Low Temperatures
- Special Types

For additional configurations, contact Spicer Driveshaft Engineering for specific application information.



SPICER® WING™ SERIES DRIVESHAFTS

Driveshaft	Functional Torque Limit		Swing Diameter	
	Nm	ft-lb	mm	in
2C	1,500	1,106.0	87.0	3.430
4C	3,300	2,434.1	116.0	4.570
5C	5,600	4,180.3	123.0	4.840
6C	7,200	5,310.0	150.0	5.910
7C	10,700	7,892.0	158.0	6.220
8C	15,500	11,432.0	216.0	8.500
8.5C	20,300	14,972.0	175.0	6.890
9C	27,400	20,206.0	223.0	8.730
10C	39,700	29,284.0	225.0	8.860
11C	41,600	30,668.0	235.0	8.860
12C	62,200	45,876.0	301.0	11.850
12.5C	63,000	46,466.0	295.0	11.620
14.5C	108,000	79,657.0	326.0	12.840
15C	75,400	55,612.0	273.0	10.750
14C	120,600	88,950.0	360.0	14.170

Spicer 10™ Series

A long legacy of driveshaft quality.

The Spicer 10™ Series driveshafts have been an industry standard for more than 50 years, and are ideal for the rigorous demands for most mobile off-highway applications. With torque capacities ranging up to 15,700 Nm, Spicer has the right driveshaft to fit all your needs in the construction, mining, irrigation, forestry, material handling, specialty chassis, and agriculture markets.

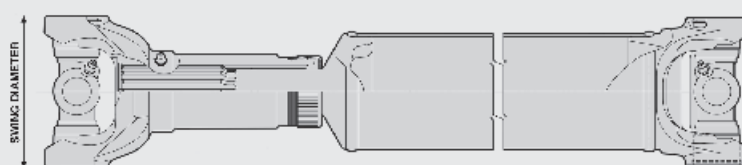
Design Features

- Easy to Service Universal Joints
- Extended Spline Life
- Low Friction Under Load
- Reduced Thrust Load Under Pressure
- Superior Needle Bearing Retention

Available on Request

- DIN Flanges
- Extended Lubrication
- Paint
- Permanent Lubrication
- SAE Flanges
- Special Types

For additional configurations, contact Spicer Driveshaft Engineering for specific application information.



SPICER 10™ SERIES DRIVESHAFTS

Driveshaft	Functional Torque Limit		Swing Diameter	
	Nm	ft-lb	mm	in
1310	2,000	1,500	101.6	4.000
1350	3,400	2,500	115.8	4.560
1410	3,600	2,600	125.5	4.940
1480	5,500	4,000	134.9	5.310
1550	7,000	5,100	152.4	6.000
1610	Use Spicer Life Series® (SPL®100)			
1710	15,700	11,500	200.2	7.880
1760	Use Spicer Life Series® (SPL170®)			
1810	Use Spicer Life Series® (SPL250®)			
1810HD	Use Spicer Life Series® (SPL250® or SPL250®HD)			
1880	Use Spicer® Wing™ Series (9C and above) Use Spicer® Compact™ 2000 (2060 or SPL2065)			

Notes

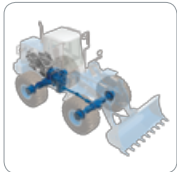
About Dana Holding Corporation

Dana is a world leader in the supply of driveline products (axles and driveshafts), power technologies (sealing and thermal-management products), and genuine service parts for light and heavy manufacturers. The company's customer base includes virtually every major vehicle manufacturer in the global automotive, commercial vehicle, and off-highway markets. Based in Maumee, Ohio, the company operates nearly 100 major facilities in 26 countries, supporting end customers in more than 125 countries.

About the Dana Off-Highway Products Group

The Dana Off-Highway Products Group includes research and development and manufacturing operations in Belgium, Brazil, China, Hungary, India, Italy, Mexico, the United Kingdom, and the United States. It designs, manufactures, assembles, and markets Spicer® axles and transaxles, driveshafts and end-fittings, transmissions, torque converters, electronic controls, and brake assemblies.

The Dana Off-Highway Products Group serves more than 1,000 vehicle assembly and manufacturing facilities in 30 countries. Dana also supports off-highway customers in more than 100 countries by supplying genuine Spicer service parts, operating two global service parts distribution centers, and certifying 66 Authorized Spicer Service Centers. Construction, agriculture, forestry, underground mining, material handling, outdoor power, leisure/utility vehicles, and industrial equipment are just some of the markets that demand the quality found in Spicer products and genuine service parts.



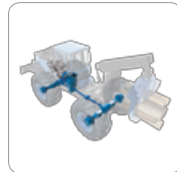
Construction



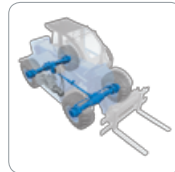
Agriculture



Mining



Forestry



Material Handling



Outdoor Power Equipment and Leisure/Utility Vehicles

Dana Holding Corporation Off-Highway Products Group

Asia Pacific (China): 86.21.5258.5577
Asia Pacific (South Korea): 82.2.701.7401
Europe (Italy): 39.0464.580227
North America (USA): 269.366.4360
South America (Brazil): 55.15.3238.6092

www.dana.com/offhighway



SPICER®

Off-Highway Systems

APPLICATION POLICY

Capacity ratings, features, and specifications vary depending upon the model and type of service. Application approvals must be obtained from the Dana Off-Highway Products Group. We reserve the right to change or modify our product specifications, configurations, or dimensions at any time without notice.