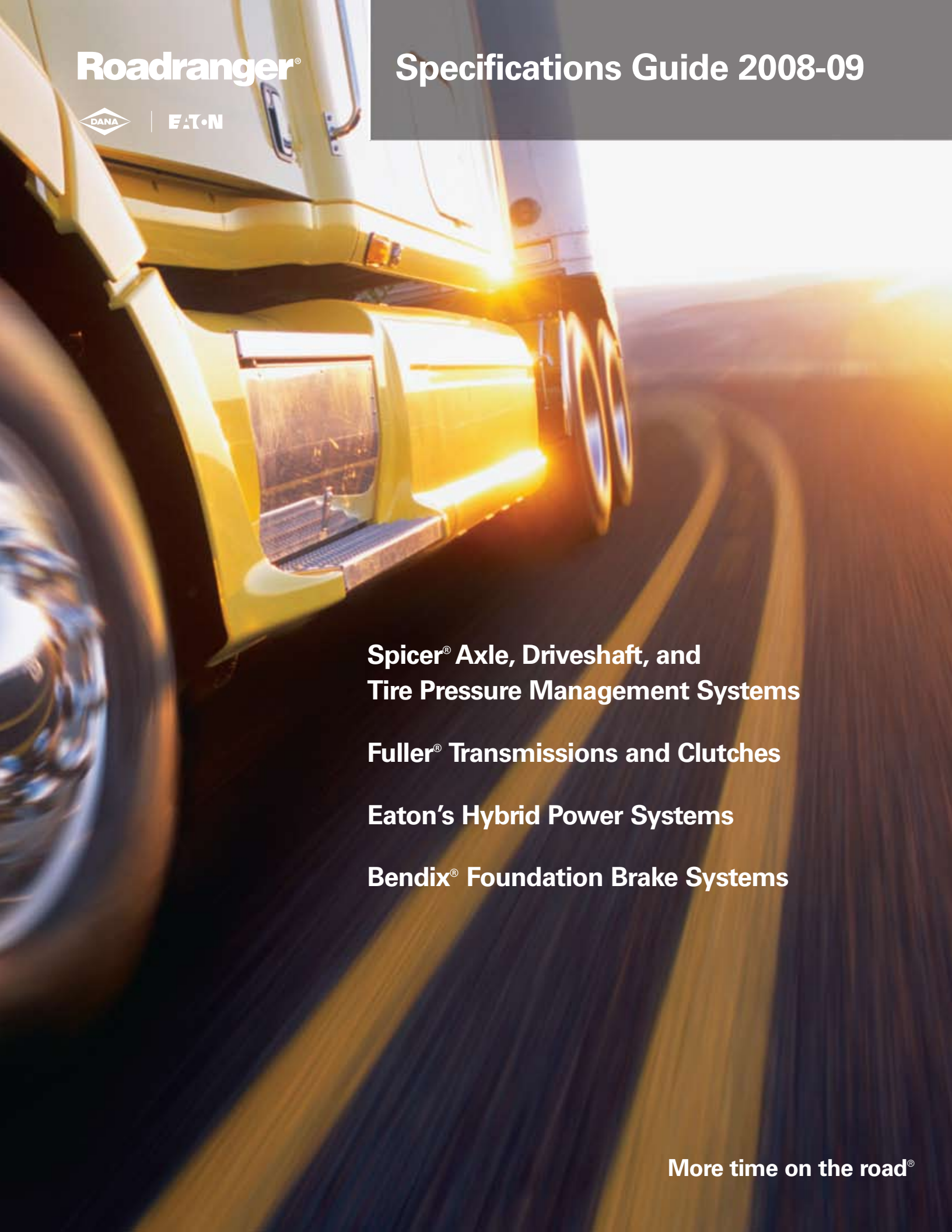
Roadranger®

DANA | EATON

Specifications Guide 2008-09



Spicer® Axle, Driveshaft, and Tire Pressure Management Systems

Fuller® Transmissions and Clutches

Eaton's Hybrid Power Systems

Bendix® Foundation Brake Systems

More time on the road®

Roadranger®

Save Money

Go Farther

Less Downtime

The Value of the Roadranger® System to You

Dana and Eaton created the Roadranger system with a clear purpose: to help you spend more time on the road – resulting in more profit and less downtime. It's founded upon 5 important value pillars:

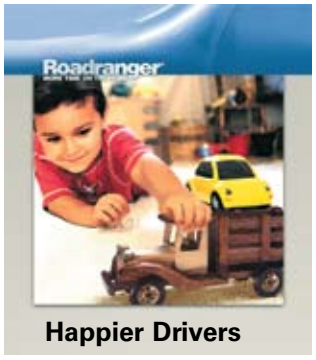
Reliability - Roadranger Drivetrain components are designed and built to last. Spicer® drive axles for line-haul applications have the longest standard warranties in the industry. And the Fuller® UltraShift® LST transmission was subjected to grueling tests racking up over 6 million actual "in-vehicle" miles before marketplace introduction.

Low Maintenance - Fuller Solo® clutches self-adjusting design can save $1,000 plus over the life of the clutch by eliminating adjustments. Spicer Life Series® Driveshafts feature extended lubrication intervals up to 3 years or 350,000 miles to save time and money. Spicer wheel end systems eliminate wheel bearing adjustment, extend seal life, and lower life cycle costs with the Spicer LMS™ (Low Maintenance System).

Driver Benefits - Spicer torsionally-tuned tandem drive axles make the ride smoother, less tiring and more trouble-free. Spicer Driveshafts resist troublesome vibration. And the AutoShift®and UltraShift fully-automated transmissions help the driver focus on his route, not on shifting. They take less training, and can broaden your driver pool.

Safety - VORAD® collision warning systems by Bendix® help save lives and eliminate high accident costs. Current customers have realized accident reduction rates of 35 to 100% with a payback in a year or less.

Support - More than 150 of the most experienced drivetrain consultants and trainers in the business strategically located across North America. Backed by the Roadranger call center, and roadranger.com, featuring free service manual downloads.



Happier Drivers

Depend On Us

More time on the road®

Specifications Guide 2008-09

How Heavy-Duty Drivetrain Specifications Impact Fuel Economy

Fuel economy in Class 8 vehicles is impacted primarily by engine characteristics, driveline specification, resistance factors *(load, aerodynamic drag and rolling resistance)* and driver behavior. This article will focus on the drivetrain, however please note that according to a major engine manufacturer, proper driver technique can account for up to 30% fuel economy variation.

Drivetrain specifications that should be considered include *transmission overall gear ratio, transmission step size, axle ratios and tire sizes.* Although the driver primarily controls engine torque, it is these drivetrain specifications that control engine speed in any given condition and hence affect fuel economy and performance.

A properly specified drivetrain will best keep engines operating at optimum fuel economy. Conversely, faulty drivetrain specification will result in engines operating excessively and not deliver good fuel economy.

The Drivetrain Contribution

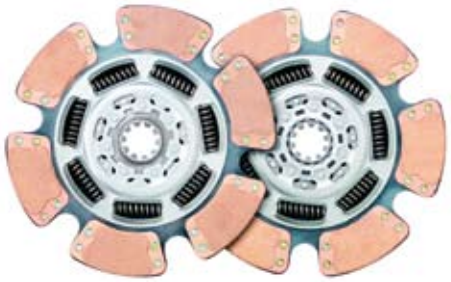
Axle and tire size dictate where the engine will operate during cruise conditions, and should be selected to allow for good fuel efficiency at the road speed and load where the vehicle will spend most of its time. But trade-offs exist. Gearing the vehicle too fast may result in having to shift too often on slight grades. A good rule of thumb – gear *the vehicle to allow it to pull a one percent grade in top gear at nominal load conditions.* With an automated transmission and the burden of shifting removed, gearing the vehicle faster allows the engine to operate closer to its "Sweet Spot," thereby improving fuel economy.

Transmission overall gear ratio range should be selected to provide the required startability in the application, while still providing top end gear ratio for the cruise speed operation. The number of gears and step size should then be selected to keep the engine operating in its best fuel efficiency area at speeds below cruise speeds. Engines with narrow fuel islands require smaller step size transmissions with more gears to get best fuel economy, whereas engines with wider fuel islands use larger step transmissions with fewer gears. *The down side of smaller steps and more gears – more shifting.* Once again, however, automated transmissions will eliminate this drawback. An additional consideration is the use of 13-speed transmissions with larger steps in lower gears and smaller steps in higher gears. The larger steps in lower gears have minimal impact on fuel economy since little time is spent in these gears, and smaller steps in higher gears allow for increased fuel economy in gears where the truck operates the most.

Axle design (apart from ratio selection) may also impact fuel efficiency – especially with the use of a *differential lube pump.* Conventional differentials and lube pumps operate continuously and use energy. Various new axles from Dana have on demand lube pumps that only operate when needed (i.e. compensating for different wheel speeds) to help conserve fuel.

And speaking of lube, tests show "Next Generation" Roadranger FE 75W-90 Fuel Efficient synthetic axle lubrication can save up to 1% fuel costs annually.

The tests, which compared Roadranger FE 75W-90 synthetic gear lubricant to traditional synthetic blends and semi-synthetic blends, included those that were performed with two major U.S. fleets, and a third that was conducted by an independent fuel economy testing company. One-percent savings can mean up to $500 per truck annually with today's fuel prices.



The clutch has little direct impact on fuel economy as it is mostly completely engaged when the vehicle is moving. However, newer engines operate at best fuel economy at lower engine speeds, during which *potentially harmful torsional oscillations may damage other drivetrain components.* But the clutch contains an internal element that dampens these oscillations to prevent damage. So specifying the drivetrain to operate the engine at lower speeds for fuel economy should include a correct damper.

Direct Top-Gear Transmission versus an Overdrive Top-Gear Alternative

For many applications, *use of a direct top geared transmission can be a simple, low cost alternative.* That's because gear and bearing frictional losses during top gear operation (typically 85 to 95 percent of running time for most of today's linehaul trucks) is eliminated. That can result in fuel economy improvements of up to one or two percent versus a comparable overdrive specification. Still, some limitations to the application of direct drives and potential fuel savings do exist, including:

- *The limited availability of very "fast," low numeric axle ratios may not allow for both high cruise speeds and very low engine speeds.* Consequently, some vehicles may perform better with overdrive transmissions.
- *Driveline torque increases by the percentage of one top gear step (typically 29 to 37 percent) for comparable direct versus overdrive transmissions.* This can limit the availability of higher rated engines, force driveline up-charges, and increase shock load sensitivity.
- *Occasionally, vehicles that operate in hilly/mountainous terrain have a low power to weight ratio. Others have average speeds limited by traffic congestion or variable speed limits. These vehicles may spend more running time in a gear one step below the top ratio,* and an overdrive might yield better fuel economy than direct drive in this speed range.

Operating Factors

- GVCW
- Cruise speeds
- Terrain (hilly vs. plains or a combination of both)
- Duty cycle (long periods of constant speed driving or frequent stops and starts)

All of these factors are used to specify the correct drivetrain components for best fuel economy.

How Manufacturers Evaluate Drivetrain Fuel Efficiency

To best evaluate fuel consumption, manufacturers use several *SAE specified tests* that are highly useful in determining relative fuel economy differences between vehicles and components. But like the MPG stickers found on cars, the tests cannot accurately predict actual fuel economy that will be seen in service. A multitude of vehicle specification and operational factors significantly influence fuel economy.

Manufacturers also perform extensive dynamometer testing to determine the efficiency of components. But these components are very efficient to start with, and the biggest gains typically result from correctly specifying the vehicle (engine, transmission, axle and tire size) for the conditions under which it will operate.

Computer simulation is another important tool. These allow manufacturers to evaluate fuel economy much faster and more economically than field tests.

In the end though, what matters most is the *fuel economy that the end user gets.* That's why manufacturers often work with end users to monitor real-life fuel efficiency and compare the results of different configurations.

New Emissions-Compliant Engines Have Caused the Development of More Fuel-Efficient Drivetrain Components

New emissions compliant engines and continuous fuel price increases are further creating growing demand for more fuel efficient solutions. This, of course, means that drivetrain component suppliers are developing new products and features, as well as working to develop new solutions that will enhance fuel efficiency and lower emissions. *Hybrid electric drivetrains are one significant example.* Others include the on demand differential lube pump mentioned earlier, tire inflation management systems, and automated transmissions with shift calibrations tailored for specific engines. All of that reflects a continued focus on efficiency. Yet this is not an entirely new trend. Fuel efficiency has always been a need of the industry and drivetrain components have always been developed and enhanced over time with that in mind.

New Roadranger Drivetrain Technologies Under Development for Improving Fuel Economy

A variety of advanced technologies and product enhancements are constantly under development and evaluation to enhance fuel efficiency and reduce emissions. To that end, Roadranger – representing Eaton and Dana – will continue to launch high value new products over the coming years to help meet the efficiency and environmental needs of the transportation industry.

And as always, working within component supplier's application guidelines is recommended to determine the best vehicle specification for any commercial vehicle application. Visiting Roadranger.com will open the door to a wealth of choices. Meanwhile, Roadranger experts remain available throughout North America to lend additional professional assistance.

Transmission

General Information

How To Use The Specification Guide

Locate the appropriate model in the far left hand column of the tables and follow that row horizontally across the page to find information pertaining to that model. **Shaded boxes are used to indicate availability of features or options.**

Specifications, features and benefits can also be found on our web site at **www.roadranger.com.**

Warranty coverage information is available on our web site or in Warranty Guide TCWY0900.

The models, options and specifications listed in this document were current at the time of publication.

Model availability, options and specifications are subject to change without notice.

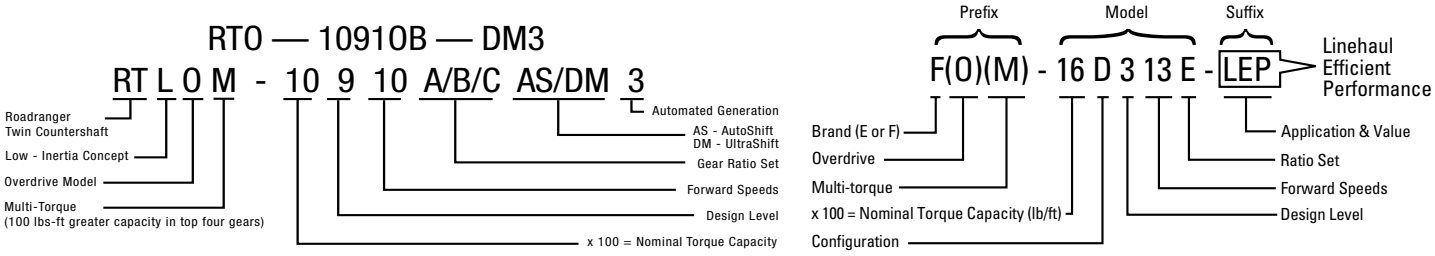
General Transmission Notes

1. **Length –** Listed lengths are installation dimensions from face of clutch housing to front bottoming surface of companion flange or yoke, except AT-1202 and 2-A-92 which are from bottoming surface of input yoke to bottoming surface of output yoke.
2. **Weight –** Listed weights are without clutch housing, controls, and lubricant. All weights are approximate. **Add 7 lbs. [3.15 kgs.] to models with internal oil pump.**
3. **Oil Capacity –** Oil Capacities are approximate, depending on inclination of transmission. Always fill transmission to level of filler opening or center of sight glass. Refer to Form TCMT0020 and TCMT0021 Lubrication Requirements for more information.
4. **Oil Cooler–** Recommended – With engines 350 H.P. and above.
   Required – With engines 400 H.P. and above and GCW's over 90,000 lbs. [40,823 kgs.]
   – With engines 400 H.P. and above and 1400 lb-ft. [1898 Nm] or greater torque.
   – With engines 450 H.P. and above.
   – With engines 1500 lb-ft. [2034 Nm] and above.
5. **Shift Control Systems –** A variety of direct mounted shift lever configurations and mechanical remote controls are readily available for all Medium- and Heavy-Duty Transmissions. Shift bar housings for forward gear shift lever location are standard on 7-speeds and available for all heavy-duty models with exception of RT-6609A and automated products. A variety of automatic style shift controls are available, both shift lever and push button, for automated transmissions. For specific applications contact your OEM.
6. **Oil Filters –** Recommended RTLO-1x913A, RTLO-1x918A-AS3, RTLO-1x918B
   Required RTLO-20913A, RTLO-20918A-AS3, RTLO-22918A-AS3, RTLO-20918B, RTLO-22918B

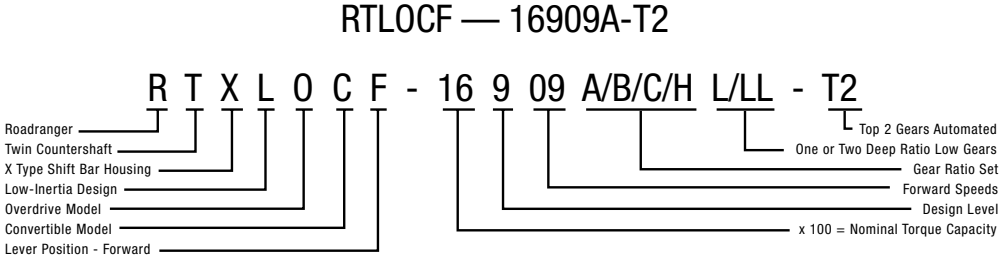
For the latest version of this document (RRSL0001), visit our web site at roadranger.com

Nomenclature

Heavy-Duty Automated Transmission



Heavy-Duty Manual Transmission



Transmission

General Information – Heavy-Duty Automated

Fuller® UltraShift® Automated Transmission

The UltraShift is the two-pedal solution that really improves your bottom line. With very little "street-to-seat" training required, UltraShift dramatically widens the driver pool and reduces training costs. Simpler, computer-contolled shifting makes drivers more productive and helps to improve fuel economy. And, integrated "protection features" minimize the chances for abuse, which improves uptime and reduces repair costs.

The UltraShift LST (Linehaul Standard) enables every truck to perform like it's in the hands of your best driver. The UltraShift LEP (Linehaul Efficient Performance) transmission uses optimized shift calibrations tailored to each engine's unique fuel map. The UltraShift LHP (Linehaul Performance) is ideally suited for on-highway fleets requiring performance in varying terrain with loads up to 110,000 lbs. GCW.

Fuller AutoShift® Transmission

The AutoShift offers operator ease combined with computer controlled efficiency for the ultimate in performance and safety. Once the vehicle is in motion, an AutoShift transmission operates like an automatic transmission, with the efficiency of a manual transmission. The AutoShift family includes 10- and 18-speed heavy-duty models.

General Information – Heavy-Duty Manual

Fuller "Convertible" 9/13-Speeds
RTOC-16909A converts to an RTLO-16913A
RTOC-18909A converts to an RTLO-18913A
RTLOC-16909A-T2 converts to an RTLO-16913A
RTLOC-18909A-T2 converts to an RTLO-18913A

Operates as a simple 9-Speed transmission, easily converts to a 13-Speed to increase vehicle versatility and resale value. Now available in two torque ratings...1650 lb-ft. and 1850 lb-ft.

Fuller Deep Reduction Transmissions RT-8908LL, RTO-11/14/16908LL, RTO-11/14/16909ALL

Deep Reduction 8LL and 9ALL transmissions have 8 forward speeds, 2 low speeds and 3 reverse speeds to provide versatility in on-off highway applications and demanding on-highway duty, with engines up to 1650 lb-ft.

Fuller "B" Ratio FR Series 10-Speeds FR-9210, FR/FRO-11/12/13/14/15210B, FRO-16210B

Fuller "C" Ratio FR Series 10-Speeds FRO-11/12/13/14/15/16/17/18210C

The FR Series establishes a new standard in transmission performance, reliability and durability while delivering more payload carrying capability with engines up to 1850 lb-ft. The FR Series provides improved tolerance to driver abuse and more precise shifting for improved performance and reduced operating costs.

Fuller Low-Inertia "Super 13" Transmissions RTLO-12/14/16/18/20913A

Fuller Low-Inertia "Super 18" Transmissions RTLO-14/16/18/20/22918B

The "Super 13" features the patented low-inertia design concept that makes shifting smoother, faster and easier. The "Super 18" has 18 forward and 4 reverse gears, a 19.7 to 1 overall reduction and a 14.40 low gear for unbeatable versatility. Two overdrive ratios… 0.73 and 0.86…provide efficient cruise RPM's and economical performance.

Transmission

General Information – Heavy-Duty

Clutch Housing Weights & Availability

Model Series	SAE NO.1			SAE NO.2		
	Housing Type	Aluminum [kg]	Iron [kg]	Housing Type	Aluminum [kg]	Iron [kg]
RT-6609	Standard	N/A	71 lbs. [32]	Standard	N/A	62 lbs. [28]
	Nodal	N/A	89 lbs. [40]	Nodal	N/A	82 lbs. [37]
All Other RT & FR-Series*	Standard	23 lbs. [10]	76 lbs. [34]	Standard	21 lbs. [10]	68 lbs. [31]
	Nodal	36 lbs. [16]	92 lbs. [42]	Nodal	N/A	88 lbs. [40]

* No SAE NO. 2 Clutch housing on 13 & 18 Speed Models or automated 10 speeds rated 1450 lb-ft or above.
Note: No cast iron clutch housings on UltraShift 10 and 13 speed models.

Hydraulic Clutch Release Options

Model Series	SAE NO.1			SAE NO.2		
	Housing Type	Aluminum	Iron	Housing Type	Aluminum	Iron
RT-6609	Standard					Multi-Piece*
	Nodal					
All Other RT & FR-Series Except for FR w/Internal oil cooler	Standard	Integral**				Multi-Piece*
	Nodal	Multi-Piece*				
	Nodal Forced Lube	Multi-Piece*				
	Std. Forced Lube	Integral**				

***** **Multi-Piece Hydraulic Clutch Release Design**
- Aluminum clutch housing weight is 21 lbs [9.52 kg] (without Clutch Release Components)
- Aluminum clutch housing weight is 38 lbs [17.23 kg] (with Clutch Release Components)
- Cast Iron clutch housing weight is 68 lbs [30.8 kg] (without Clutch Release Components)

****** **Integral Hydraulic Clutch Release System (effective 2nd quarter 2007)**
- Clutch housing weight is 27 lbs [12.24 kgs] (without Clutch Release Components)
- Clutch housing weight is 34 lbs [15.42 kgs] (with Clutch Release Components)

SHADED AREAS INDICATE AVAILABILITY

Transmission

General Information – Heavy-Duty

Power Take-Off (PTO) Specifications

Model	Right Side	Left Side*	Rear-Mount
6609	6 Bolt, 33 Tooth, 6/8 Pitch	8 Bolt, 33 Tooth, 6/8 Pitch	N/A
14607 Series	6 Bolt, 78 Tooth, 10.1 Pitch	8 Bolt, 78 Tooth, 10.1 Pitch	N/A
AT-1202	(Top Mount) 8 Bolt, 30 Tooth, 5 Pitch	6 Bolt, 30 Tooth, 5 Pitch	N/A
All Other Models	6 Bolt, 45 Tooth, 6/8 Pitch Gear	8 Bolt, 47 Tooth, 6/8 Pitch Gear	32 Tooth, 0.5 Pitch, 30° (where available)
FR w/Integral Oil Cooler	Not Available – Interference with cooler	8 Bolt, 47 Tooth, 6/8 Pitch Gear	32 Tooth, 0.5 Pitch, 30° (where available)

* Some Left Side PTO mounts are located on the bottom of the transmission.

Notes:

UltraShift 10 Speeds: Inertia brake is installed on 8-bolt PTO opening. A kit is available to move the inertia brake from the 8-bolt opening to the 6-bolt opening.

UltraShift 13 Speeds: Inertia brake is installed on 8-bolt PTO opening. Inertia brake cannot be moved to 6-bolt opening. See PTO Information Guide, TRIG2600 for more information.

End Yoke Lengths

Transmission Model Series	Yoke Series	Yoke Length Speedo To Cross	
RT-6609	1610	5.75	3.62
	1710	5.25	3.69
	1760	5.65	
	SPL90/100	5.22	
	SPL170	5.75	
	SPL140	6.00	
T-14607 RT-8 thru 13XXX Design Level 6 and 7	1710	4.74	2.74
	1760	5.05	
	1810	5.00	2.74
	SPL170	4.87	
	SPL250	5.18	
	RPL20	4.65	
	RPL25	5.37	
	SPL140	5.96	
RT-14 thru 18XXX Design Level 6 and 7	1710	5.75	
	1760	5.97	4.06
	1810	6.06	
	SPL170	5.85	
	SPL250	6.30	
	RPL20	5.47	
	RPL25	5.47	
	SPL140	6.57	
All FR & RT Design Level 2, 4, 9	1710	5.63	3.31
	1760	5.63	3.31
	1810	5.63	3.31
	SPL170	5.60	
	SPL250	5.71	
	RPL20	5.63	
	RPL25	6.26	
	SPL140	6.32	

Fuller® Auxiliary Transmission Specifications

Model 2 Speeds	Sales Sht. TRSLXXXX	Input & Output Max TQ lb-ft [Nm]	Overall	1	%	2	Midship	Oil Cap Pints [ltr]	Length Inches [mm]	Weight lbs.[kg]	PTO Speed (% of Engine)
AT-1202*	0039	17,500 [23,727]	2.04	2.04	104	1.00	STD	11 [5]	16.5 [419]	353 [160]	93
2A-92		9,700 [13,151]	2.30	2.30	130	1.00	STD	12 [6]	16.2 [411]	310 [141]	

* Aux C/S Pump Available

Transmission – Linehaul

Heavy-Duty Automated Transmission

All transmissions listed in this section are considered appropriate for the following applications:

Linehaul

- Line haul is moving different types of freight in high mileage operation (over 60,000 miles (95,000 km)/year).
- Operation on road surfaces of good to excellent concrete or asphalt.
- Distances are more than 30 miles between starting and stopping.
- Typical vehicle configurations are 4X2, 6X2, and 6X4 tractor / trailer combinations and straight trucks.

Specs, Options & Provisions

Model UltraShift LST 10 Speed	Sales Sht. TRSLXXXX	Integral Oil Pump	Thru Shaft PTO	Dipstick	External Oil-to-Water Cooler[1]	External Oil Filter[1]	Oil Cap. Pints [ltr]	Length Inches [mm]	Weight Lbs. [kg]	PTO Speed (% of Engine)	Combined PTO Torque (lb-ft)
RTO-10910B-DM3	0300		OPT				26 [12]	29.9 [759]	671[2] [304]	94	350*
RTO-12910B-DM3			OPT						671[2] [304]		
RTO-14910B-DM3		STD	OPT						681[2] [309]		
RTO-16910B-DM3		STD	OPT								
RTOM-16910B-DM3		STD	OPT								
FM-14D310B-LST		STD	OPT							70	
FM-15D310B-LST		STD	OPT								

2: Without clutch housing, lubricant, end yoke, shift module, clutch. 23 lbs. [10.43 Kg.] Aluminum DM Clutch Housing. 34 lbs. [15.42 Kg.] Aluminum DM Nodal Mount Clutch Housing.
UltraShift requires appropriate, and Eaton certified, electronic engine. Consult engine OEM for availability.

Model AutoShift 10 Speed	Sales Sht. TRSLXXXX	Integral Oil Pump	Thru Shaft PTO	Dipstick	External Oil-to-Water Cooler[1]	External Oil Filter[1]	Oil Cap. Pints [ltr]	Length Inches [mm]	Weight Lbs. [kg]	PTO Speed (% of Engine)	Combined PTO Torque (lb-ft)
RTO-10910B-AS3	0281		OPT				26 [12]	29.9 [759]	646[3] [293]	94	350*
RTO-12910B-AS3			OPT						656[3] [298]		
RTO-14910B-AS3		STD	OPT								
RTO-16910B-AS3		STD	OPT								
RTO-18910B-AS3		STD	OPT								
RTO-14910C-AS3		STD	OPT							79	
RTO-16910C-AS3		STD	OPT								

3: Without clutch housing, lubricant, end yoke, shift module, clutch. See page 6 for current clutch housing weights.

Model UltraShift LHP 13 Speed	Sales Sht. TRSLXXXX	Integral Oil Pump	Dipstick	External Oil-to-Water Cooler[1]	External Oil Filter[1]	Oil Cap. Pints [ltr]	Length Inches [mm]	Weight Lbs. [kg][4]	PTO Speed (% of Engine)	Combined PTO Torque (lb-ft)
RTLO-16913L-DM3	0314	STD				28 [13]	33.1 [841]	751 [341]	79	350*
RTLOM-16913L-DM3		STD								

4: Without clutch housing, lubricant, end yoke, shift module, Aluminum DM Clutch Housing 34 lbs. [15.42 Kg.] Aluminum DM Nodal Mount Clutch Housing.
UltraShift requires appropriate, and Eaton certified, electronic engine. Consult engine OEM for availability. Note: 8-bolt PTO opening is not available.

Model UltraShift LEP 13 Speed	Sales Sht. TRSLXXXX	Integral Oil Pump	Dipstick	External Oil-to-Water Cooler[1]	External Oil Filter[1]	Oil Cap. Pints [ltr]	Length Inches [mm]	Weight Lbs. [kg][4]	PTO Speed (% of Engine)	Combined PTO Torque (lb-ft)
FO-16D313E-LEP	0318	STD				28 [13]	33.1 [841]	751 [341]	79	350*
FOM-16D313E-LEP		STD								

4: Without clutch housing, lubricant, end yoke, shift module, Aluminum DM Clutch Housing 34 lbs. [15.42 Kg.] Aluminum DM Nodal Mount Clutch Housing.
UltraShift requires appropriate, and Eaton certified, electronic engine. Consult engine OEM for availability. Note: 8-bolt PTO opening is not available.

SHADED AREAS INDICATE AVAILABILITY. 1: Oil pump required. OPT: Option * Transmission can be ordered with heavy-duty input bearing (4301417) to allow 500 lb-ft of combined PTO output torque.

Transmission – Linehaul

Heavy-Duty Automated Transmission

See the Roadranger Warranty Guide, TCWY0900, for complete application descriptions.

Ratios & Steps

Model UltraShift LST 10 Speed	lb-ft Max TQ [Nm]	Overall	Reverse		1	%	2	%	3	%	4	%	5	%	6	%	7	%	8	%	9	%	10
			L	H																			
RTO-10910B-DM3	1050 [1424]	14.81	11.23	2.52	10.96	34	8.18	35	6.07	36	4.46	34	3.32	35	2.46	34	1.83	35	1.36	36	1.00	34	.74
RTO-12910B-DM3	1250 [1695]																						
RTO-14910B-DM3	1450 [1966]																						
RTO-16910B-DM3	1650 [2237]																						
RTOM-16910B-DM3	1650 [2237]																						
FM-14D310B-LST	1450*[1966]	14.74	15.1	3.38	14.78		11.00		8.17		6.00		4.46		3.31		2.46		1.83		1.34		1.00
FM-15D310B-LST	1550**[1966]																						

* 1650 lb-ft. in top two gears ** 1750 lb-ft. in top two gears

Model AutoShift 10 Speed	lb-ft Max TQ [Nm]	Overall	Reverse		1	%	2	%	3	%	4	%	5	%	6	%	7	%	8	%	9	%	10
			L	H																			
RTO-10910B-AS3	1050 [1424]	14.81	11.23	2.52	10.96	34	8.18	35	6.07	36	4.46	34	3.32	35	2.46	34	1.83	35	1.36	36	1.00	34	.74
RTO-12910B-AS3	1250 [1695]																						
RTO-14910B-AS3	1450 [1966]																						
RTO-16910B-AS3	1650 [2237]																						
RTO-18910B-AS3	1850 [2509]																						
RTO-14910C-AS3	1450 [1966]	17.53	13.63	2.78	12.80	38	9.25	37	6.76	38	4.90	37	3.58	37	2.61	38	1.89	37	1.38	38	1.00	37	.73
RTO-16910C-AS3	1650 [2237]																						

Model UltraShift LHP 13 Speed	lb-ft Max TQ [Nm]	Overall	Reverse			L	1	%	2	%	3	%	4	%	5	%	6	%	7	%	8	%	9	%	10	%	11	%	12	%	13
			1	2	3																									
RTLO-16913L-DM3	1650 [2237]	16.70	13.09	11.17	3.5	12.19	10.4	17	8.51	22	6.05	38	4.38	37	3.20	41	2.28	17	1.94	20	1.62	17	1.38	18	1.17	17	1.00	17	.86	17	.73
RTLOM-16913L-DM3	1650** [2237]																													

** 1750 lb-ft. in top two gears only, available in top four with a Catepillar C13 & C15.

Model UltraShift LEP 13 Speed	lb-ft Max TQ [Nm]	Overall	Reverse			1	%	2	%	3	%	4	%	5	%	6	%	7	%	8	%	9	%	10	%	11	%	12	%	13
			1	2	3																									
FO-16D313E-LEP	1650 [2237]	14.25	13.09	11.17	3.5	10.4	43	7.26	41	5.16	38	3.74	37	2.73	20	2.28	17	1.94	20	1.62	17	1.38	18	1.17	17	1.00	17	.86	17	.73
FOM-16D313E-LEP	1650** [2237]																													

** 1750 lb-ft. in top two gears only, available in top four with a Catepillar C13 & C15.

Transmission – Multi-Purpose

All transmissions listed in this section are considered appropriate for the following applications:

Heavy Haul

- Movement of heavy equipment or materials at legal maximums or special permit loadings, typically at GCW in excess of 140,000 lbs.
- Operation on road surfaces of concrete, asphalt and maintained gravel.
- High horsepower engines and auxiliary gear boxes might be used.
- Vehicles may be equipped with two retarders.
- 100% load going and empty return.

Mining

- Movement of rock, ore, gravel, and minerals between mine sites and delivery sites.
- High horsepower engines are typically used in this vocation.
- 3 to 30 miles between starts and stops (typical).
- 90% operation on-highway and up to 10% into sandy or muddy job site.
- 100% load going and empty return.
- Up to 12% grades typical.

Oil Field

- Movement of production related products, supplies, and tools between job sites.
- Movement of processing equipment and laboratories on job sites.
- Low mileage operation on road surfaces made of concrete, asphalt, maintained gravel, crushed rock or hard packed dirt.
- Maximum grades of 12%.

See the Roadranger Warranty Guide, TCWY0900, for complete application descriptions.

Heavy-Duty Automated Transmission
Specs, Options & Provisions

Model AutoShift 18 Speed	Sales Sht. TRSLXXXX	Integral Oil Pump	Dipstick	External Oil-to-Water Cooler[1]	External Oil Filter[1]	Oil Cap. Pints [ltr]	Length Inches [mm]	Weight Lbs. [kg]	PTO Speed (% of Engine)	Combined PTO Torque (lb-ft)
RTLO-14918A-AS3	0285	STD				28 [13]	33.1 [841]	738 [335]	79	350*
RTLO-16918A-AS3		STD								
RTLO-18918A-AS3		STD								
RTLO-20918A-AS3		STD			STD					
RTLO-22918A-AS3		STD			STD					500

Note: AutoShift requires appropriate, and Eaton certified, electronic engine. Consult engine OEM for availability.
1: Oil pump required.
* Transmission can be ordered with heavy-duty input bearing (4301417) to allow 500 lb-ft of combined PTO output torque.

SHADED AREA INDICATES AVAILABILITY

Transmission – Multi-Purpose

Heavy-Duty Automated Transmission

Ratios & Steps

Model / AutoShift 18 Speed	lb-ft Max TQ [Nm]	Overall	Reverse				L	%	1	%	2	%	3	%	4	%	5	%	6	%	7	%	8
			LL	H																			
RTLO-14918A-AS3	1450 [1966]	16.7	11.17	2.99	H	17% Splitter	10.40	22	7.26	20	5.16	18	3.74	17	2.73	20	1.94	20	1.38	18	1.00	17	.73
RTLO-16918A-AS3	1650 [2237]																						
RTLO-18918A-AS3	1850 [2508]																						
RTLO-20918A-AS3	2050 [2779]																						
RTLO-22918A-AS3	2250 [3051]		13.09	3.50	L		12.19		8.51		6.05		4.38		3.20		2.28		1.62		1.17		.86

Transmission

Heavy-Duty Manual Transmission

Specs, Options & Provisions

Model 7 Speeds	Sales Sht. TRSLXXXX	Integral Oil Pump	Oil Cap. Pints [ltr]	Length Inches [mm]	Weight Lbs. [kg]	PTO Speed (% of Engine)	Combined PTO Torque (lb-ft)
T-14607A	N/A		36 [17]	28.9 [734]	575 [261]	51	350*
T-14607B							
TX-14607B						69	

Given weight is less clutch housing, lubricant, and end yoke.

Model 9 Speeds	Sales Sht. TRSLXXXX	Integral Oil Pump	External Oil-to-Water Cooler[1]	Oil Cap. Pints [ltr]	Length Inches [mm]	Weight Lbs. [kg]	PTO Speed (% of Engine)	Combined PTO Torque (lb-ft)
RT-6609A	N/A			12 [6]	28.4 [721]	376 [170]	72	350*
RT-8608L				27 [13]	28.9 [734]	581 [263]	58	
RT-8709B							70	500
RT-11709H								350*
RT-12709H						583 [264]		
RT-13709H						588 [267]		
RT-14709H					29.5 [749]	607 [275]		
RTOC-16909A	3349	STD		28 [13]	33.1 [841]	716 [325]	79	
RTLOC-16909A-T2		STD						
RTOC-18909A		STD	STD					500
RTLOC-18909A-T2		STD	STD					
RTX-11609B	N/A			27 [13]	28.9 [734]	581 [263]		350*
RTX-12609B						583 [264]		
RTX-13609B						588 [267]		
RTX-14609B					29.5 [749]	607 [275]		
RTX-16709B		STD				617 [280]		

Given weight is less clutch housing, lubricant, and end yoke.

1: Oil pump required.

* Transmission can be ordered with heavy-duty input bearing (4301417) to allow 500 lb-ft of combined PTO output torque.

SHADED AREA INDICATES AVAILABILITY

Transmission

Heavy-Duty Manual Transmission

Ratios & Steps

Model 7 Speeds	lb-ft Max TQ [Nm]	Overall	Reverse	1	%	2	%	3	%	4	%	5	%	6	%	7
T-14607A	1400 [1898]	10.50	10.20	10.50	71	6.13	65	3.71	48	2.51	37	1.83	37	1.34	34	1.00
T-14607B	1400 [1898]	12.35	12.03	12.35	73	7.15	66	4.31	58	2.72	49	1.83	37	1.34	34	1.00
TX-14607B	1400 [1898]		8.99	9.24	73	5.35	66	3.22	58	2.04	49	1.37	37	1.00	34	.75

Model 9 Speeds	lb-ft Max TQ [Nm]	Overall	Reverse		L	%	1	%	2	%	3	%	4	%	5	%	6	%	7	%	8	%	9
			L	H																			
RT-6609A	660 [895]	12.72	12.08	3.53	12.72	48	8.61	37	6.27	35	4.66	36	3.42	36	2.52	37	1.83	35	1.36	36	1.00		
RT-8608L	860 [1166]	17.21	17.99	4.70	17.21	68	10.23	42	7.23	38	5.24	37	3.83	43	2.67	42	1.89	38	1.37	37	1.00		
RT-8709B	860 [1166]	13.29	13.89	3.89	13.29	45	9.16	40	6.53	36	4.80	34	3.57	39	2.57	40	1.83	36	1.34	34	1.00		
RT-11709H	1150 [1559]	13.29	13.89	3.89	13.29	45	9.16	40	6.53	36	4.80	34	3.57	39	2.57	40	1.83	36	1.34	34	1.00		
RT-12709H	1250 [1695]																						
RT-13709H	1350 [1830]																						
RT-14709H	1450 [1966]																						
RTOC-16909A	1650 [2237]	14.38	11.28	2.99	10.50	42	7.37	42	5.21	38	3.78	37	2.76	41	1.95	42	1.38	38	1.00	37	.73		
RTLOC-16909A-T2*																				17	.86	17	.73
RTOC-18909A	1850 [2508]						7.33	41												37	.73		
RTLOC-18909A-T2							7.37	42												17	.86	17	.73
RTX-11609B	1150 [1559]	17.21	13.14	3.43	12.57	68	7.47	42	5.28	38	3.83	37	2.79	43	1.95	42	1.38	38	1.00	37	.73		
RTX-12609B	1250 [1695]																						
RTX-13609B	1350 [1830]																						
RTX-14609B	1450 [1966]																						
RTX-16709B	1650 [2237]	17.07	13.03	3.43	12.46	68	7.41	42	5.23	38	3.79	37	2.77	42	1.95	42	1.38	38	1.00	37	.73		

* 1750 lb-ft. in top two gears only, available in top three with a Catepillar C13 & C15. When converted to a 13-speed, the engine has to be re-rated to no greater than maximum rated transmission torque.

Transmission

Heavy-Duty Manual Transmission

Specs, Options & Provisions

Model 10 Speeds	Sales Sht. TRSLXXXX	Integral Oil Pump	Thru Shaft PTO	Internal Oil Cooler	External Water-to-Oil Cooler[1]	External Oil Filter[1]	Oil Cap. Pints [ltr]	Length Inches [mm]	Weight Lbs. [kg]	PTO Speed (% of Engine)	Combined PTO Torque (lb-ft)
FR-9210B	0261		◊ OPT				23.5 [11]	29.9 [759]	592 [269]	65	350*
FR-11210B			◊ OPT								
FR-12210B			◊ OPT								
FR-13210B			◊ OPT								
FR-14210B			◊ OPT								
FR-15210B		STD	◊ OPT								
FRM-15210B		STD	◊ OPT								
FRO-11210B			◊ OPT							87	
FRO-12210B			◊ OPT								
FRO-13210B			◊ OPT								
FRO-14210B			◊ OPT								
FRO-15210B		STD	◊ OPT								
FRO-16210B		STD	◊ OPT								
FRO-11210C			◊ OPT							84	
FRO-12210C			◊ OPT								
FRO-13210C			◊ OPT								
FRO-14210C			◊ OPT								
FRO-15210C		STD	◊ OPT								
FRO-16210C		STD	◊ OPT								
FRO-17210C		STD	◊ OPT								
FRO-18210C			◊ OPT	STD							
RT-8908LL	0116						28 [13]	33.1 [841]	690 [313]	70	500
RTO-11908LL										94	
RTO-14908LL			◊ OPT								
RTO-16908LL		STD	◊ OPT								

These (950 lb-ft. - 1750 lb-ft.) transmissions can be rated at 100 additional lb-ft. torque above the stated limit in the top two gears only.
Note: Pump standard for external coolers only – not required for internal coolers. Aux C/S pump available through aftermarket.
◊ Two Thru-shaft PTO provisions available.
OPT: Optional
1: Oil pump required.
Given weight is less clutch housing, lubricant, and end yoke.
1: Oil pump required.
* Transmission can be ordered with heavy-duty input bearing (4301417) to allow 500 lb-ft of combined PTO output torque.

SHADED AREA INDICATES AVAILABILITY

Transmission

Heavy-Duty Manual Transmission

Ratios & Steps

Model	lb-ft Max TQ [Nm]	Overall	Reverse			LL	%	L	%	1	%	2	%	3	%	4	%	5	%	6	%	7	%	8	%	9	%	10
10 Speeds			LL	L	H																							
FR-9210B*	950 [1288]	14.80		16.21	3.63					14.80	34	10.95	36	8.09	34	5.97	38	4.46	35	3.32	36	2.45	34	1.81	35	1.35	34	1.00
FR-11210B*	1150 [1559]																											
FR-12210B*	1250 [1695]																											
FR-13210B*	1350 [1830]																											
FR-14210B*	1450 [1966]																											
FR-15210B*	1550 [2102]																											
FRM-15210B**	1550 [2102]																											
FRO-11210B*	1150 [1559]	14.80		12.12	2.72					11.06	35	8.19	35	6.05	35	4.46	34	3.34	35	2.48	35	1.83	35	1.36	35	1.00	34	.75
FRO-12210B*	1250 [1695]																											
FRO-13210B*	1350 [1830]																											
FRO-14210B*	1450 [1966]																											
FRO-15210B*	1550 [2102]																											
FRO-16210B*	1650 [2237]																											
FRO-11210C*	1150 [1559]	17.17		13.75	2.80					12.69	37	9.29	38	6.75	38	4.90	35	3.62	40	2.59	37	1.90	38	1.38	38	1.00	35	.74
FRO-12210C*	1250 [1695]																											
FRO-13210C*	1350 [1830]																											
FRO-14210C*	1450 [1966]																											
FRO-15210C*	1550 [2102]																											
FRO-16210C*	1650 [2237]																											
FRO-17210C*	1750 [2373]	17.51		13.75	2.80					12.94	39	9.29	38	6.75	38	4.90	35	3.62	37	2.64	39	1.90	38	1.38	38	1.00	35	.74
FRO-18210C	1850 [2508]																											
RT-8908LL	860 [1166]	19.58	20.47	13.24	3.89	19.58	55	12.67	51	8.39	35	6.23	36	4.58	34	3.40	38	2.46	35	1.83	36	1.34	34	1.00				
RTO-11908LL	1150[1559]	19.58	15.22	9.85	2.89	14.56	55	9.42	51	6.24	35	4.63	36	3.40	34	2.53	38	1.83	35	1.36	36	1.00	34	.74				
RTO-14908LL	1450[1966]																											
RTO-16908LL	1650 [2237]																											

* These (950 lb-ft. - 1750 lb-ft.) transmissions can be rated at 100 additional lb-ft. torque above the stated limit in the top two gears only.
** This (950 lb-ft. - 1750 lb-ft.) transmission can be rated at 200 additional lb-ft. torque above the stated limit in the top two gears only.

Transmission

Heavy-Duty Manual Transmission

Specs, Options & Provisions

Model 11 Speeds	Sales Sht. TRSLXXXX	Integral Oil Pump	Thru Shaft PTO	External Water-to-Oil Cooler[1]	External Oil Filter[1]	Oil Cap. Pints [ltr]	Length Inches [mm]	Weight Lbs. [kg]	PTO Speed (% of Engine)	Combined PTO Torque (lb-ft)
RTO-11909ALL	0253					28 [13]	33.1 [841]	671 [304]	79	500
RTO-14909ALL			1 OPT							
RTO-16909ALL		STD	OPT					698 [317]		

Given weight is less clutch housing, lubricant, and end yoke.

Model 13 Speeds	Sales Sht. TRSLXXXX	Integral Oil Pump	External Water-to-Oil Cooler[1]	External Oil Filter[1]	Oil Cap. Pints [ltr]	Length Inches [mm]	Weight Lbs. [kg]	PTO Speed (% of Engine)	Combined PTO Torque (lb-ft)
RTLO-12913A	0249	STD			28 [13]	33.1 [841]	714 [324]	79	350*
RTLO-14913A		STD							
RTLO-16913A		STD					716 [325]		
RTLO-18913A		STD							
RTLO-20913A		STD		STD					

Given weight is less clutch housing, lubricant, and end yoke.
* Transmission can be ordered with heavy-duty input bearing (4301417) to allow 500 lb-ft of combined PTO output torque.

Model 15 Speeds	Sales Sht. TRSLXXXX	Integral Oil Pump	External Water-to-Oil Cooler[1]	External Oil Filter[1]	Oil Cap. Pints [ltr]	Length Inches [mm]	Weight Lbs. [kg]	PTO Speed (% of Engine)	Combined PTO Torque (lb-ft)
RT-14915	0215	STD			28 [13]	33.1 [841]	696 [316]	70	500
RTO-14915		STD						89	
RTO-16915		STD							

Given weight is less clutch housing, lubricant, and end yoke.

Model 18 Speeds	Sales Sht. TRSLXXXX	Integral Oil Pump	External Water-to-Oil Cooler[1]	External Oil Filter[1]	Oil Cap. Pints [ltr]	Length Inches [mm]	Weight Lbs. [kg]	PTO Speed (% of Engine)	Combined PTO Torque (lb-ft)
RTLO-14918B	0250	STD			28 [13]	33.1 [841]	716 [325]	79	350*
RTLO-16918B		STD							
RTLO-18918B		STD							
RTLO-20918B		STD		STD					
RTLO-22918B		STD		STD					500

Note: Aux C/S pump available through aftermarket.
1: Oil pump required.
OPT: Optional
Given weight is less clutch housing, lubricant, and end yoke.
* Transmission can be ordered with heavy-duty input bearing (4301417) to allow 500 lb-ft of combined PTO output torque.

SHADED AREA INDICATES AVAILABILITY

Transmission

Heavy-Duty Manual Transmission

Ratios & Steps

Model 11 Speeds	lb-ft Max TQ [Nm]	Overall	Reverse			LL1	%	L	%	LL2	%	1	%	2	%	3	%	4	%	5	%	6	%	7	%	8
			LL	L	H																					
RTO-11909ALL	1150 [1559]	35.71	20.84	13.03	3.43	26.08	60	16.30	37	11.85	60	7.41	42	5.23	38	3.79	37	2.77	42	1.95	42	1.38	38	1.00	37	.73
RTO-14909ALL	1450 [1966]																									
RTO-16909ALL	1650 [2237]																									

Model 13 Speeds	lb-ft Max TQ [Nm]	Overall	Reverse				L	%	1	%	2	%	3	%	4	%	5	%	6	%	7	%	8
			LL	H																			
RTLO-12913A	1250 [1695]	16.86	13.22	3.50	H	17% Splitter	12.31	42	8.64	42	6.11	38	4.43	37	3.23	41	1.95	21	1.38	18	1.00	17	.73
RTLO-14913A	1450 [1966]																						
RTLO-16913A	1650 [2237]																						
RTLO-18913A	1850 [2508]				L												2.29		1.62		1.17		.86
RTLO-20913A	2050 [2779]																						

Model 15 Speeds	lb-ft Max TQ [Nm]	Overall	Reverse				1	%	2	%	3	%	4	%	5	%	6	%	7	%	8	%	9	%	10
			DR	L	H																				
RT-14915	1450 [1966]	16.94	16.72	9.84	2.76		9.96	31	7.63	29	5.90	30	4.54	27	3.57	28	2.79	31	2.14	29	1.65	30	1.27	27	1.00
RTO-14915	1450 [1966]					DEEP RED.	16.94		12.98		10.03		7.73		6.07										
RTO-16915	1650 [2237]		13.14	7.73	2.17		7.83		6.00		4.63		3.57		2.81		2.19		1.68		1.30		1.00		.79
						DEEP RED.	13.31		10.20		7.88		6.07		4.77										

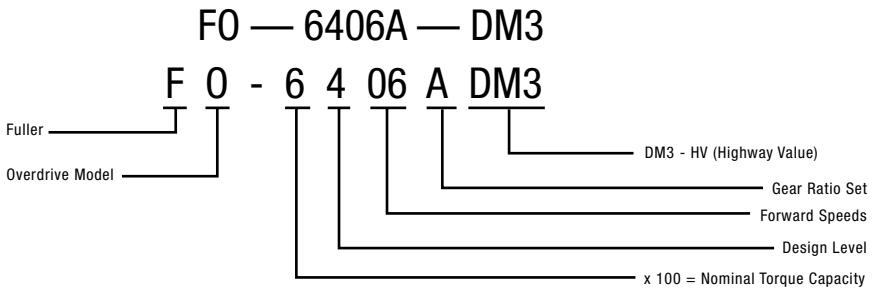
Model 18 Speeds	lb-ft Max TQ [Nm]	Overall	Reverse				L	%	1	%	2	%	3	%	4	%	5	%	6	%	7	%	8
			LL	H																			
RTLO-14918B	1450 [1966]	19.72	12.85	3.43	H	17% Splitter	12.29	44	7.30	21	5.16	18	3.74	17	2.73	19	1.95	21	1.38	18	1.00	17	.73
RTLO-16918B	1650 [2237]																						
RTLO-18918B	1850 [2509]																						
RTLO-20918B	2050 [2780]		15.06	4.03	L		14.40		8.56		6.05		4.38		3.20		2.29		1.62		1.17		.86
RTLO-22918B	2250 [3051]																						

Transmission

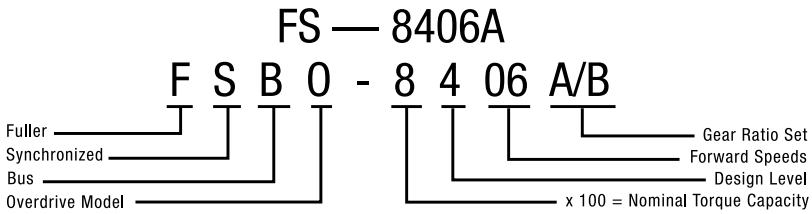
General Information – Medium Duty

Nomenclature

Automated Transmission



Manual Transmission



Fuller® UltraShift® HV (Highway Value) Transmission FO-5506B-DM3, FO-6506B-DM3, FO-5406B-DM3, FO-6406B-DM3

Depending on your application, the **UltraShift HV could save you up to $1,622 per truck, per year.** With no scheduled maintenance for 500,000 miles, and up to 19% better fuel economy* vs. a conventional automatic, it's clear that UltraShift is "automatically the best."

*Results are based upon tests conducted by an independent firm in accordance with SAE J1526 "Joint TMC/SAE Fuel Consumption In-Service Test Procedure, Type III." Assumes 30,000 miles per year in an urban setting, with fuel priced at $2.85 / gallon. Service and maintenance costs include 5 year predicted average clutch life and associated cost of parts and labor. Your results may vary.

Fuller Medium-Duty 6-Speeds FS-5406A, FS-6406A, FSO-6406A, FSO-8406A

Eaton "Synchro-6" transmissions are synchronized in all gears, with reduced shift stroke and patented "low-force" synchronizer technology to deliver faster, easier shifting.

Transmission

General Information – Medium Duty

Clutch Housing Weights

Model Series	SAE NO.2				SAE NO.3			
	Housing Type	Housing Depth in. [mm]	Aluminum lbs. [kg]	Iron lbs. [kg]	Housing Type	Housing Depth in. [mm]	Aluminum lbs. [kg]	Iron lbs. [kg]
FS Series 4205	Standard	4.75 [120.7mm]	13 [6]	47 [21]	Standard	4.75 [120.7mm]	N/A	31.5 [14 kg]
		6.625 [168mm]*	17 [8]	60 [27]				
FS Series 5206, 6205, 6305, 5406, 6406, 8406		4.75 [120.7mm]	13 [6]	47 [21]		N/A		N/A
		6.625 [168mm]*	17 [8]	60 [27]				

* Standard for all FS Series transmissions is 6.625 in SAE No. 2 aluminum clutch housing.

Hydraulic Clutch Release Options

Model Series	SAE NO.2			SAE NO.3		
	Housing Type	Aluminum lbs. [kg]	Iron lbs. [kg]	Housing Type	Aluminum lbs. [kg]	Iron lbs. [kg]
FS Series 4205, 5206, 6205, 6305, 5406, 6406, 8406	Standard	OPTIONAL	N/A	Standard	N/A	N/A
	Nodal	N/A		Nodal		

Note: Medium Duty aluminum hydraulic clutch housing weight is 21 lbs. without clutch release components.

Power Take-Off (PTO) Specifications

Model	Right Side	Left Side	Rear-Mount
FS-4205A FS-4205B	6 Bolt, 28 Tooth, 6.1 Pitch, 29° R.H. Helix		N/A
FS-5205A FS-5205B	6 Bolt, 33 Tooth, 7.00 Pitch, 30.8° R.H. Helix	6 Bolt, 19 Tooth, 6.1 Pitch, 18.68° L.H. Helix	26 Tooth, 45°
FS-6205A/6305A	6 Bolt, 39 Tooth, 6.35 Pitch, 22° R.H. Helix		
FS-6205B/6305B	6 Bolt, 41 Tooth, 6.5 Pitch, 23° R.H. Helix		
FS-5406/6406A	6 Bolt, 38 Tooth, 6.35 Pitch, 22° R.H. Helix		
FSB-5406B/6406B	6 Bolt, 38 Tooth, 6.35 Pitch, 22° R.H. Helix		
FSO-6406A/8406A	6 Bolt, 48 Tooth, 7.00 Pitch, 26° R.H. Helix		
F/O-5405B-DM3 F/O-6406B-DM3	6 Bolt, 48 Tooth, 7.00 Pitch, 26° R.H. Helix	With kit available to switch from left to right	

* Rear mount (extended countershaft) PTO provision is available. See PTO information guide TRIG2600 for more details.
All medium-duty transmissions have a combined PTO output limit of 500 lb-ft.

SHADED AREA INDICATES AVAILABILITY

Transmission

Medium-Duty Automated Transmission

Specs, Options & Provisions

Model UltraShift HV 6 Speed	Sales Sht. TRSLXXXX	Extended C/S PTO Provision	Trans. Oil Cap. Pints [ltr]	Length Inches [mm]	Weight Lbs. [kg]*	PTO Speed (% of Engine)
FO-5406B-DM3	0315	STD	20.75 [10]	25.6 [650]	391 [177]	67
FO-6406B-DM3						
FO-5506B-DM3 w/park pawl					417 [189]	
FO-6506B-DM3 w/park pawl						

* Transmission dry weight, less lube, including clutch housing, but not the clutch. UltraShift DM clutch weights 100 additional lbs.

Ratios & Steps

Model UltraShift HV 6 Speed	lb-ft Max TQ [Nm]	Overall	Reverse	1	%	2	%	3	%	4	%	5	%	6
FO-5406B-DM3	620 [840]	8.39	6.27	6.55	59	4.13	64	2.52	58	1.59	59	1.00	28	.78
FO-6406B-DM3	660 [895]													
FO-5506B-DM3 w/park pawl	620 [840]													
FO-6506B-DM3 w/park pawl	660 [895]													

SHADED AREA INDICATES AVAILABILITY

Transmission

Medium-Duty Manual Transmission

Fuller® Medium-Duty Transmission Specifications

Model	Sales Sht. TRSL XXXX	lb-ft Max TQ	Overall	Rev.	1	%	2	%	3	%	4	%	5	%	6	Extended C/S PTO Provision	Neutral Switch Provision	Oil Cap. Pints [ltr]	Length* Inches [mm]	Weight** Lbs. [kg]	PTO Speed (% of Engine)
FS-4205A	0191	420 [569 Nm]	8.05	8.06	8.05	85	4.35	78	2.45	66	1.48	48	1					12.5 [6]	22.3 [566]	232 [105]	46
FS-4205B		420 [569 Nm]	6.99	6.99	6.99	85	3.78	78	2.13	66	1.28	28	1					12.5 [6]	22.3 [566]	232 [105]	53
FS-5205A		520 [705 Nm]	7.52	6.27	7.52	73	4.35	71	2.54	67	1.52	52	1			STD		12.5 [6]	23.1 [587]	260 [118]	R-46/ L-44
FS-5205B		520 [705 Nm]	6.82	5.3	6.82	85	3.68	71	2.15	67	1.28	28	1			STD		12.5 [6]	23.1 [587]	260 [118]	R-54/ L-52
FS-6305A		660 [895 Nm]	7.22	7.22	7.22	86	3.89	75	2.22	60	1.39	39	1			STD		19.5 [9]	25.6 [650]	369 [167]	46
FS-6305B		660 [895 Nm]	7.22	7.22	7.22	86	3.89	75	2.22	75	1.27	27	1			STD		19.5 [9]	25.6 [650]	369 [167]	46
FS-5406A		560 [759 Nm]	9.01	8.63	9.01	71	5.27	64	3.22	58	2.04	50	1.36	36	1	STD		19.5 [9]	25.6 [650]	359 [163]	52
FS-6406A		660 [895 Nm]	9.01	8.63	9.01	71	5.27	64	3.22	58	2.04	50	1.36	36	1	STD		19.5 [9]	25.6 [650]	359 [163]	52
FSO-6406A		660 [895 Nm]	9.04	6.75	7.05	71	4.13	64	2.52	58	1.59	29	1	28	0.78	STD		19.5 [9]	25.6 [650]	359 [163]	68
FSO-8406A		860 [1166 Nm]	9.04	6.75	7.05	71	4.13	64	2.52	58	1.59	59	1	28	0.78	STD		19.5 [9]	25.6 [650]	359 [163]	68
FSB-5406B	N/A	560 [759 Nm]	8.03	7.70	8.03	59	5.06	64	3.09	58	1.95	49	1.31	1	1	STD		19.5 [9]	25.6 [650]	359 [163]	52
FSB-6406B		660 [895 Nm]	8.03	7.70	8.03	59	5.06	64	3.09	58	1.95	49	1.31	1	1	STD		19.5 [9]	25.6 [650]	359 [163]	52

* Length is from front face of clutch housing to front bottoming surface of yoke or companion flange. SAE NO. 2 (6.625" [168.3 mm] depth).

** With SAE NO. 2 Aluminum clutch housing, standard controls, less clutch release components and shift tower. Dry weight

Given weights are without clutch and lube.

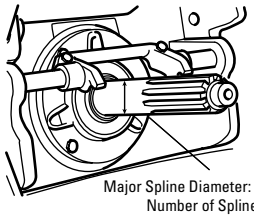
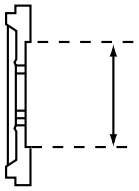
SHADED AREA INDICATES AVAILABILITY

Clutch

General Information – Heavy and Medium Duty

Fuller® Heavy- and Medium-Duty Clutch Selector

1. You must know these three specs to use this chart:

Spline Diameter	Flywheel Bore Opening (15.5" only)	Engine Torque
 Major Spline Diameter: 2" or 1.75" Number of Splines: 10 or 14		The Clutch Torque Rating listed in the chart must equal or exceed your Engine Torque Rating

2. Narrow down your choices starting with Clutch Diameter (15.5 or 14)

Additional options that are in the chart:

Disc Type

D CF CO

D = Dampened

CF = Ceramic Facing
OF = Organic Facing

CO = Coaxial
FT = Free Travel
SD = Super Duty
VCT = Vibration Control Technology

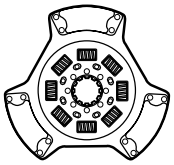
Cover Type

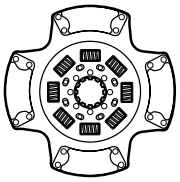
AF
Adjustment-Free

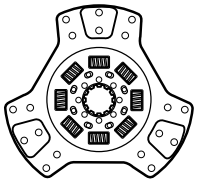
AFG
Adjustment-Free Greaseable Bearing

MG
Manual Adjust w/ Greaseable Bearing

Damper Type


3 Super Button (3 SB)


4 Super Button (4 SB)


3 Super Traps (3 ST)

3. The part number along any horizontal row are alternatives for the specifications.

Fuller Heavy-Duty Solo® Self-adjusting Clutch

As a fully self-adjusting clutch, the Solo not only stays in constant adjustment giving it extremely long life, but adjusts without the need to incur additional labor costs. Two sliding and baffle protected cams maintain release bearing position eliminating the cost of adjustments. Through the elimination of adjustments, the Solo can save a customer up to $1245 per truck over the life of the clutch. The Solo XL offers an extended lubrication interval, and a roller release yoke, which extends clutch life and lowers down time even further.

Fuller 15.5" Easy-Pedal™ 2000 and 14" Easy-Pedal Plus®

Longer life and trouble-free operation mean less down time…a significant cost savings for you. The Easy-Pedal Clutch features the reliability and durability you need while ensuring driver comfort, vehicle performance and cost effective operations. Powerthread technology, an improved internal thread design, enhances clutch adjustment, requiring approximately half the movement compared to a standard adjusting ring. From the ease of adjustment to the extended life of components, the assurance of quality that comes with the Easy-Pedal Clutch is vital to your driving success.

Fuller Medium-Duty Solo Self-adjusting Clutch

As a fully self-adjusting clutch, the Solo stays in constant adjustment giving it extremely long life. Designed for rugged use in Class 6 & 7 stop-and-go operations, exclusive Solo technology can reduce maintenance and labor costs by eliminating adjustments.

Fuller Medium-Duty Stamped Angle Spring Clutch

The Fuller Stamped Angle Spring Clutch has all the features of the well proven Cast Angle Spring plus low inertia driven discs for improved shift effort, positive separator pins for reduced clutch drag, and the Kwik-Adjust® for easier set-up and adjustment.

Clutch

General Information – Heavy and Medium Duty

Fuller® Heavy-Duty Specs, Options & Provisions

15.5 Inch Cast Two Plate Heavy-Duty						New				Remanufactured		ValueLine™
Spline Diameter & No. of Splines	Flywheel Bore Opening	Number of Springs	Clutch Torque (must exceed engine torque)	Disk Type	Facing	Easy-Pedal™ MG	Solo® AFG	Easy-Pedal™ w/Predamper AFG	Solo® w/Predamper AFG	Easy-Pedal™ New Int Plate MG	Solo® AFG	ValueClutch™ MG
2" - 10	7"	8	1070	DOF-CO-FT	Organic							107091-83B
			1250									107091-77B
			1400	DCF-CO-FT	Cer-4	108391-81				108391-81MO		107091-81B
				DOF-CO-FT	Organic	108391-82				108391-82MO		
	8.5"	10	1450	DOF-CO-FT	Organic	108391-78						
			1650	DCF-CO-FT	Cer-4	108391-74	109701-74			108391-74MO	109700-74MO**	107091-74B
	10"	9 (Mack/ Volvo*)	1650	DCF-CO	Cer-4	108935-51*	109700-51*					107935-51B*
					Cer-6	108935-91*	109700-91*					
			1760	DCF-CO	Cer-4	108935-61*	109700-61*			108935-61MO*	109700-61MO*	
					Cer-6	108935-92*	109700-92*					
		7 (Mercedes)	1650	DCF-FT	Cer-4	108925-14	109701-14					
		7	1650	DCF	Cer-4	108925-82	109701-82			108935-82MO**	109700-82MO**	
					Cer-6	108925-85	109701-85					
		7-VCT Plus	1750	DCF-CO-VCT/ DCF-CO-VCT-PD	Cer-4	108925-24	109701-24	108925-34	109701-34			
			1850		Cer-6	108925-20	109701-20	108925-30	109701-30		109700-20MO**	
			2050			108925-25	109701-25	108925-35	109701-35			

14 Inch Cast Two Plate Heavy-Duty						New				Remanufactured		ValueLine
Spline Diameter & No. of Splines	Flywheel Bore Opening	Number of Springs	Clutch torque (must exceed engine torque)	Disk Type	Facing Number	Easy-Pedal MG	Solo AFG	Easy-Pedal w/Predamper MG	Solo w/Predamper AFG	Easy-Pedal New Int Plate MG	Solo MG	ValueClutch MG
2" - 10	7"	8	1000	DCF-CO-FT	Cer-3	108034-61B	N/A	N/A	N/A	108034-61MO	N/A	107034-61B
			1150	DOF-CO-FT	Organic	108034-82B				10834-82MO		
			1400	DCF-CO-FT-SD	Cer-4	108050-59B				108050-59MO		107050-59B

* Dual Zerk-Mack engines only ** Dual Zerk
Note: VCT 7 spring design replaced by VCT Plus 7 spring design.

Fuller Medium-Duty Clutch Selector

Standard Stroke: .500" to .560" Bearing Travel					New				Remanufactured	
Spline Diameter & No. of Splines	Number of Discs	Clutch Torque must equal or exceed engine torque	Damper Type	Disc Type	SAS MANUAL ADJUSTMENT	SAS MANUAL ADJUST SEVERE DUTY*	SOLO SELF ADJUST	SOLO SELF ADJUST SEVERE DUTY*	SAS MANUAL ADJUSTMENT	SOLO SELF ADJUST
1.75"-10**	1	620	Free Travel	DCF-CO-FT	107683-5 (3SB)	N/A	109400-4 (3SB)	N/A	107683-5MO (3SB)	109400-5MO (3SB)
	2	860	7 + 1	DCF-CO-LR	107237-10 (3ST)	107237-22 (3SB)	109500-10 (3ST)	109500-22 (3SB)	107237-10MO (3ST)	109500-10MO (3ST) 109500-22MO* (3SB)
2.00"-10**	2	860	7 + 1	DCF-CO-LR	107342-12 (3SB)	N/A	109504-12 (3SB)	N/A	N/A	N/A
	2	1000	7 + 1	DCF-CO-LR	N/A	N/A	109504-24 (4SB)	109504-3 (6SB)	N/A	109504-24MO (3SB)
	2	1050	8-Spring	DCF-CO-LR	N/A	N/A	109504-20 (4SB)	N/A	N/A	N/A

Short Stroke: .410" to .470" Bearing Travel					New				Remanufactured	
Spline Diameter & No. of Splines	Number of Discs	Clutch Torque must equal or exceed engine torque	Damper Type	Disc Type	SAS MANUAL ADJUSTMENT	SAS MANUAL ADJUST SEVERE DUTY*	SOLO SELF ADJUST	SOLO SELF ADJUST SEVERE DUTY*	SAS MANUAL ADJUSTMENT	SOLO SELF ADJUST
1.75"-10	1	620	Free Travel	DCF-CO-FT	N/A	N/A	109404-5 (3SB)	N/A	N/A	109404-5MO (3SB)
	2	860	7 + 1	DCF-CO-FT	N/A	N/A	109503-10 (3ST)	N/A	N/A	109503-10MO (3ST)

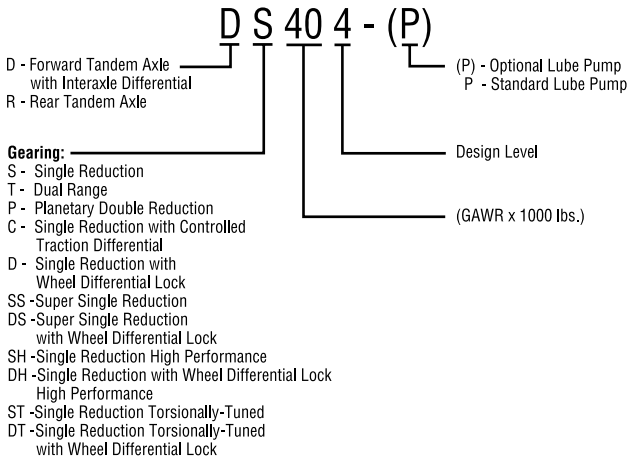
*Severe Service: A combination of higher plate load, super buttons, or an additional number of facings.
**Two Plate Clutches: Fits in place of single plate (pull type), however, this increases inertia to the transmission and may affect shiftability.

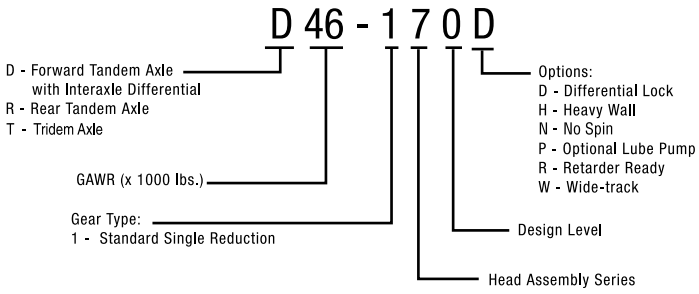
Drive Axle

General Information – Heavy and Medium Duty

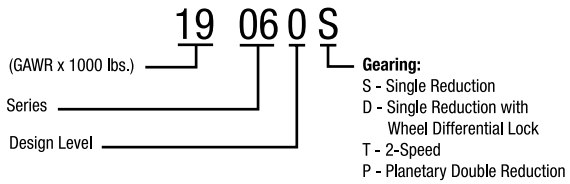
Nomenclature

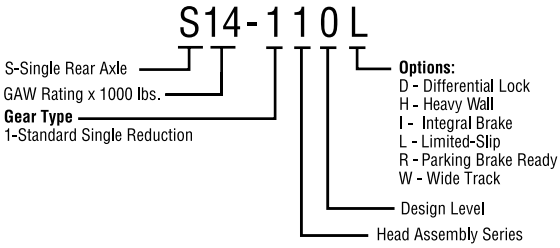
Tandem Drive Axle

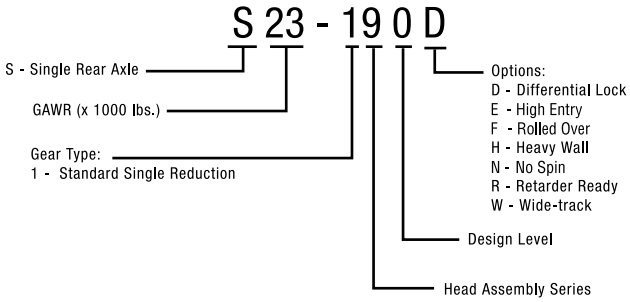




Single Drive Axle







Drive Axle

General Information

Spicer® Tandem Drive Axles

Spicer DS404 Single Reduction Tandem Axle

Built stronger, lighter and tougher. "Fast-fade" housing design for lower fifth wheel heights increase payload capacity and improve vehicle stability.

Spicer High Performance-40® Tandem Axle

The High Performance-40 DSH40 tandem drive axle features a high power density design, providing optimal axle performance with high torque, high horsepower engines in increased payload applications.

Spicer Torsionally-Tuned 40® Tandem Axle

The Torsionally-Tuned 40 DST40 tandem drive axle is specially "tuned" and designed to significantly reduce damaging driveline torsionals that can destroy many drivetrain components.

Spicer Super 40® Tandem Axle

Designed for compatibility with today's air-ride suspension. The D40-170 is larger, has more durable primary gearing bearings and is a great fit for today's higher performance, on-highway drivetrain specifications and high GCW applications.

Spicer Planetary Double Reduction Tandem Axles

High resistance to spin-out and shock loading, involute splines on drive pinions and shafts for greater torque capacity and precision flow forged differential gears for greater strength and impact resistance.

Driver-controlled wheel differential lock option is field-upgradeable on D190 and S190 series axles.

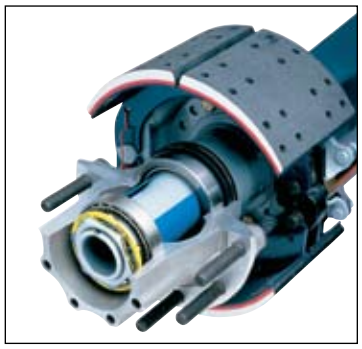
Spicer Single Drive Axles

Spicer Single Reduction Single Axles

Low maintenance features provide superior spin-out protection while precision flow forged differential gears offer greater strength and impact resistance.

Spicer Two-Speed and Planetary Double Reduction Single Axles

Planetary double reduction gearing lowers pinion and ring gear stress and driveline load for heavy duty, off-highway hauling.



The Spicer LMS™ Hub design controls bearing adjustment and eliminates installation variables that cause excessive end play leading to premature wheel seal failures.

Patented, on-demand lube pump for optimal spin-out protection without the added heat.

Drive Axle

Heavy-Duty Drive Axle

Spicer® Single Reduction Single Drive Axles

Axle Model	Ratings		Ratios	Axle Shaft			Ring Gear Dia. in. [mm]	Axle Housing			Weight lbs. [kg] (Nominal)	Spindle Type	Options				
	Max. GAW lbs. [kg]	Max. GCW lbs. HWY [kg]		Body Diameter in. [mm]	Number of Splines	Spline Diameter in. [mm]		Box Section Width	Box Section Height	Wall thickness at spring seat			LMS™ Hub	Tire Pressure Mgmt. System	Differential Lock	Electromagnetic Retarder	No Spin
S21-170	21,000 [9,525]	100,000 [45,359]	3.07, 3.21, 3.42, 3.58, 3.73, 3.91, 4.10, 4.30, 4.56, 4.78, 5.25, 5.38, 5.57, 6.14, 6.83, 7.17	2.06 [52]	46	2.35 [60]	17.7 [450]	4.61 [117]	5.24 [133]	0.43 [11]	735 [333]	R	■	■	■	■	■
S23-170	23,000 [10,433]												■	■	■	■	■
S23-190		125,000 [56,699]	2.53, 2.69, 2.87, 2.93, 3.07, 3.21, 3.42, 3.58, 3.73, 3.91, 4.10, 4.30, 4.56, 4.78, 5.25, 5.38, 5.57, 6.14, 6.83, 7.17, 7.83				18.5 [470]			0.50 [13]	809 [367]		■	■	■	■	
S25-170	25,000 [11,340]	100,000 [45,359]	3.42, 3.58, 3.73, 3.91, 4.10, 4.30, 4.56, 4.78, 5.25, 5.38, 5.57, 6.14, 6.83, 7.17	2.25 [57]			17.7 [450]				767 [348]		■	■	■	■	■
S26-190	26,000 [11,793]	125,000 [56,699]	3.42, 3.58, 3.73, 3.91, 4.10, 4.30, 4.56, 4.78, 5.25, 5.38, 5.57, 6.14, 6.83, 7.17, 7.83				18.5 [470]			0.63 [16]	879 [399]		■	■	■	■	
S30-190	30,000 [13,608]							5.31 [135]	5.91 [150]		896 [406]	W			■	■	

Spicer High Entry Single Reduction Single Drive Axles

Axle Model	Ratings		Ratios	Axle Shaft			Ring Gear Dia. in. [mm]	Axle Housing			Weight lbs. [kg] (Nominal)	Spindle Type	Options				
	Max. GAW lbs. [kg]	Max. GCW lbs. HWY [kg]		Body Diameter in. [mm]	Number of Splines	Spline Diameter in. [mm]		Box Section Width	Box Section Height	Wall thickness at spring seat			LMS Hub	Tire Pressure Mgmt. System	Differential Lock	Electromagnetic Retarder	No Spin
S21-170E	21,000 [9,525]	100,000 [45,359]	3.07, 3.21, 3.42, 3.58, 3.73, 3.91, 4.10, 4.30, 4.56, 4.78, 5.25, 5.38, 5.57, 6.14, 6.83, 7.17	2.06 [52]	46	2.35 [60]	17.7 [450]	4.61 [117]	5.24 [133]	0.43 [11]	816 [371]	R	■	■	■	■	■
S23-170E	23,000 [10,433]										837 [381]		■	■	■	■	■
S23-190E		125,000 [56,699]	3.42, 3.58, 3.73, 3.91, 4.10, 4.30, 4.56, 4.78, 5.25, 5.38, 5.57, 6.14, 6.83, 7.17, 7.83				18.5 [470]			0.50 [13]	885 [402]		■	■	■	■	
S25-170E	25,000 [11,340]	100,000 [45,359]	3.42, 3.58, 3.73, 3.91, 4.10, 4.30, 4.56, 4.78, 5.25, 5.38, 5.57, 6.14, 6.83, 7.17	2.25 [57]			17.7 [450]				868 [395]		■	■	■	■	■
S26-190E	26,000 [11,793]	125,000 [56,699]	3.42, 3.58, 3.73, 3.91, 4.10, 4.30, 4.56, 4.78, 5.25, 5.38, 5.57, 6.14, 6.83, 7.17, 7.83				18.5 [470]			0.63 [16]	926 [421]		■	■	■	■	
S30-190E	30,000 [13,608]							5.31 [135]	5.91 [150]		984 [447]	W			■	■	

SHADED AREAS INDICATE AVAILABILITY.

Drive Axle

Heavy-Duty Drive Axle

Spicer® Single Reduction Tandem Drive Axles

Axle Model	Ratings		Ratios	Axle Shaft			Ring Gear Dia. in. [mm]	Axle Housing			Weight lbs. [kg] (Nominal)	Spindle Type	Options			
	Max. GAW lbs. [kg]	Max. GCW lbs. HWY [kg]		Body Diameter in. [mm]	Number of Splines	Spline Diameter in. [mm]		Box Section Width	Box Section Height	Wall thickness at spring seat			LMS™ Hub	Tire Pressure Mgmt. System	Differential Lock	Pump
DS404	40,000 [18,144]	110,000 [49,895]	2.64, 2.85, 2.93, 3.08, 3.25, 3.36, 3.55, 3.70, 3.90, 4.11, 4.33, 4.63, 4.88, 5.29, 5.57, 6.17, 6.50	1.88 [48]	41	2.10 [53]	15.4 [391]	4.61 [117]	5.24 [133]	0.37 [9]	1239 [562]	R				
DS405										0.43 [11]	1274 [577]					
DST40			2.64, 2.93, 3.08, 3.25, 3.36, 3.55, 3.70, 3.90, 4.11, 4.33				15.4 [391] / 16.5 [419]			0.37 [9]	1272 [577]				**	
DST41										0.43 [11]	1332 [604]				**	
DSH40			3.08, 3.25, 3.36, 3.55, 3.70, 3.90, 4.11, 4.33, 4.63, 4.88				15.75 [400]				1277 [579]					
DSH44	44,000 [19,958]	72,000 [32,659] (GVW)	3.36, 3.55, 3.70, 3.90, 4.11, 4.33, 4.63, 4.88, 5.29, 5.57, 6.17, 6.50, 7.17							0.50 [13]	1332 [604]					

** Forward rear axle only.

Spicer Single Reduction Heavy Tandem and Tridem Drive Axles

Axle Model	Ratings		Ratios	Axle Shaft			Ring Gear Dia. in. [mm]	Axle Housing			Weight lbs. [kg] (Nominal)	Spindle Type	Options					
	Max. GAW lbs. [kg]	Max. GCW lbs. HWY [kg]		Body Diameter in. [mm]	Number of Splines	Spline Diameter in. [mm]		Box Section Width	Box Section Height	Wall thickness at spring seat			LMS Hub	Tire Pressure Mgmt. System	Differential Lock	Pump	Electromagnetic Retarder	No Spin
D40-170	40,000 [18,144]	160,000 [72,575]	3.07, 3.21, 3.42, 3.58, 3.73, 3.91, 4.10, 4.30, 4.56, 4.78, 5.25, 5.38, 5.57, 6.14, 6.83, 7.17	2.06 [52]	46	2.35 [60]	17.7 [450]	4.61 [117]	5.24 [133]	0.43 [11]	1658 [751]	R						
D46-170	46,000 [20,865]									0.50 [13]	1702 [771]							
D50-170	50,000 [22,680]									0.63 [16]	1739 [788]							
D52-190P	52,000 [23,587]	225,000 [102,058]	3.42, 3.58, 3.73, 3.91, 4.10, 4.30, 4.56, 4.78, 5.25, 5.38, 5.57, 6.14, 6.83, 7.17	2.25 [57]			18.5 [470]	5.31 [135]	5.91 [150]		1903 [862]					STD		
D60-190P	60,000 [27,216]										1909 [865]	W						
T69-170HP*	69,000 [31,298]	160,000 [72,575]	3.07, 3.21, 3.42, 3.58, 3.73, 3.91, 4.10, 4.30, 4.56, 4.78, 5.25, 5.38, 5.57, 6.14, 6.83, 7.17	2.06 [52]			17.7 [450]	4.61 [117]	5.24 [133]		2701 [1228]	R						
T78-190P*	78,000 [35,454]	240,000 [108,862]	3.42, 3.58, 3.73, 3.91, 4.10, 4.30, 4.56, 4.78, 5.25, 5.38, 5.57, 6.14, 6.83, 7.17	2.25 [57]			18.5 [470]	5.31 [135]	5.91 [150]		3010 [1368]							

* Tridem axle configuration.

SHADED AREAS INDICATE AVAILABILITY.

Drive Axle

Heavy-Duty Drive Axle

Spicer® Two-Speed and Double Reduction Single Drive Axles

Axle Model	Ratings		Ratios	Axle Shaft			Ring Gear Dia. in. [mm]	Axle Housing			Weight lbs. [kg] (Nominal)	Spindle Type	Options		
	Max. GAW lbs. [kg]	Max. GCW lbs. HWY [kg]		Body Diameter in. [mm]	Number of Splines	Spline Diameter in. [mm]		Box Section Width	Box Section Height	Wall thickness at spring seat			LMS™ Hub	Tire Pressure Mgmt. System	Electromagnetic Retarder
23082T	23,000 [10,433]	80,000 [36,287]	3.70/5.04, 3.90/5.31, 4.11/5.60, 4.33/5.90, 4.56/6.20, 4.88/6.64, 5.43/7.39, 6.17/8.40, 6.67/9.08	2.06 [52]	36	2.31 [59]	18 [457]	4.61 [117]	5.24 [133]	0.43 [11]	759 [344]	R			
26082T	26,000 [11,793]									0.55 [14]	779 [353]				
S23-590	23,000 [10,433]	125,000 [56,699]	4.75, 4.99, 5.19, 5.44, 5.70, 5.98, 6.34, 6.65, 7.30, 7.48, 7.75, 8.55, 9.51, 9.97, 10.90	2.25 [57]	46	2.35 [60	18.5 [470]			0.50 [13]	885 [402]				
S26-590	26,000 [11,793]									0.63 [16]	926 [421]				
S30-590	30,000 [13,608]							5.31 [135]	5.91 [150]		984 [447]	W			
S35-590	35,000 [15,876]							5.63 [143]	6.73 [171]	0.87 [22]	1104 [502]				

Spicer Two-Speed and Double Reduction Tandem and Tridem Drive Axles

Axle Model	Ratings		Ratios	Axle Shaft			Ring Gear Dia. in. [mm]	Axle Housing			Weight lbs. [kg] (Nominal)	Spindle Type	Options		
	Max. GAW lbs. [kg]	Max. GCW lbs. HWY [kg]		Body Diameter in. [mm]	Number of Splines	Spline Diameter in. [mm]		Box Section Width	Box Section Height	Wall thickness at spring seat			LMS Hub	Tire Pressure Mgmt. System	Pump
DT463-P	46,000 [20,865]	160,000 [72,575]	3.70/5.04, 3.90/5.32, 4.11/5.60, 4.33/5.90, 4.56/6.21, 4.88/6.64, 5.43/7.39, 6.17/8.40	2.06 [52]	36	2.31 [59]	18 [457]	4.61 [117]	5.24 [133]	0.55 [14]	1883 [854]	R			STD
D46-590HP		240,000 [108,862]	4.75, 4.99, 5.19, 5.44, 5.70, 5.98, 6.34, 6.65, 7.30, 7.48, 7.75, 8.55, 9.51, 9.97, 10.90	2.25 [57]	46	2.35 [60]	18.5 [470]			0.63 [16]	1910 [868]				
D52-590P	52,000 [23,587]							5.31 [135]	5.91 [150]		2098 [954]				
D60-590P	60,000 [27,216]											W			
D70-590P	70,000 [31,751]							5.63 [143]	6.73 [171]	0.87 [22]	2238 [1017]				
T78-590P*	78,000 [35,454]							5.31 [135]	5.91 [150]	0.63 [16]	3212 [1460]	R			

* Tridem axle configuration.

SHADED AREAS INDICATE AVAILABILITY.

Drive Axle

Medium-Duty Drive Axle

Spicer® Single Reduction Single Drive Axles

Axle Model	Ratings		Ratios	Axle Shaft			Ring Gear Dia. in.	Axle Housing			Weight lbs. [kg] (Nominal)	Spindle Type	Options					
	Max. GAW lbs. [kg]	Max. GCW lbs. HWY [kg]		Body Diameter in. [mm]	Number of Splines	Spline Diameter in. [mm]		Box Section Width	Box Section Height	Wall thickness at spring seat			LMS™ Hub	Tire Pressure Mgmt. System	Differential Lock	Parking Brake	Limited Slip	No Spin
S14-110 ◊	14,000 [6,364]	35,000 [15,876]	3.73, 3.91, 4.10, 4.30, 4.56, 4.78, 4.88, 5.13, 5.38, 5.57, 5.86, 6.14, 6.50	1.57 [40]	34	1.75 [44]	11.8 [300]	4.25 [108]	4.25 [108]	0.31 [8]	345 [156]	Varies by OEM						
S16-130 ◊	16,000 [7,273]	40,000 [18,144]		1.61 [41]	36	1.89 [47]	12.2 [310]			0.39 [10]	367 [167]							
17060S ◊	17,000 [7,711]	60,000 [27,216]	3.08, 3.25, 3.36, 3.55, 3.70, 3.90, 4.11, 4.30, 4.33, 4.63, 4.78, 4.88, 5.29, 5.57, 6.17, 6.50, 7.17	1.81 [46]	39	2.00 [51]	15.4 [391]	4.61 [117]	5.24 [133]	0.37 [9]	519 [235]	L						
19060S ◊	19,000 [8,618]																	
21060S ◊	21,000 [9,525]			1.89 [48]	41	2.10 [53]						R						
22060S ◊	22,000 [9,979]									0.43 [11]	562 [255]							

◊ Optional GenTech™ gearing for coach and bus applications available in this model.

Spicer Two-Speed and Planetary Double Reduction Single Drive Axles

Axle Model	Ratings		Ratios		Axle Shaft			Ring Gear Dia. in.	Axle Housing			Weight lbs. [kg] (Nominal)	Spindle Type	Options		
	Max. GAW lbs. [kg]	Max. GCW lbs. HWY [kg]	Two Speed	Double Reduction	Body Diameter in. [mm]	Number of Splines	Spline Diameter in. [mm]		Box Section Width	Box Section Height	Wall thickness at spring seat			LMS Hub	Tire Pressure Mgmt. System	No Spin
19055T 19055P	19,000 [8,618]	60,000 [27,216]	3.90/5.32, 4.11/5.61, 4.33/5.91, 4.63/6.31, 4.88/6.65, 5.29/7.21, 5.57/7.60, 6.17/8.42, 6.50/8.87, 7.17/9.77	5.32, 5.61, 5.91, 6.31, 6.65, 7.21, 7.60, 8.42, 8.87, 9.77	1.81 [46]	39	2.00 [51]	See Note	4.61 [117]	5.24 [133]	0.37 [9]	605 [274]	L			
21065T 21065P	21,000 [9,525]				1.89 [48]	41	2.10 [53]						R			
22065T 22065P	22,000 [9,979]										0.43 [11]	634 [288]				

Note: 16" [406mm] diameter ring gear for 3.55/4.83 and 3.70/5.05 ratios only. Ring gear diameter is 16.5" [419mm] for all other ratios.

Spicer Single Reduction Tandem Drive Axles

Axle Model	Ratings		Ratios	Axle Shaft			Ring Gear Dia. in.	Axle Housing			Weight lbs. [kg] (Nominal)	Spindle Type	Options	
	Max. GAW lbs. [kg]	Max. GCW lbs. HWY [kg]		Body Diameter in. [mm]	Number of Splines	Spline Diameter in. [mm]		Box Section Width	Box Section Height	Wall thickness at spring seat			Limited Slip	No-Spin Differential
DS344	34,000 [15,422]	90,000 [40,823]	3.36, 3.55, 3.70, 3.90, 4.11, 4.33, 4.63, 4.88, 5.29, 5.57, 6.17, 6.50	1.81 [46]	39	2.00 [51]	15.4 [391]	4.61 [117]	5.24 [133]	0.37 [9]	1202 [545]	L		

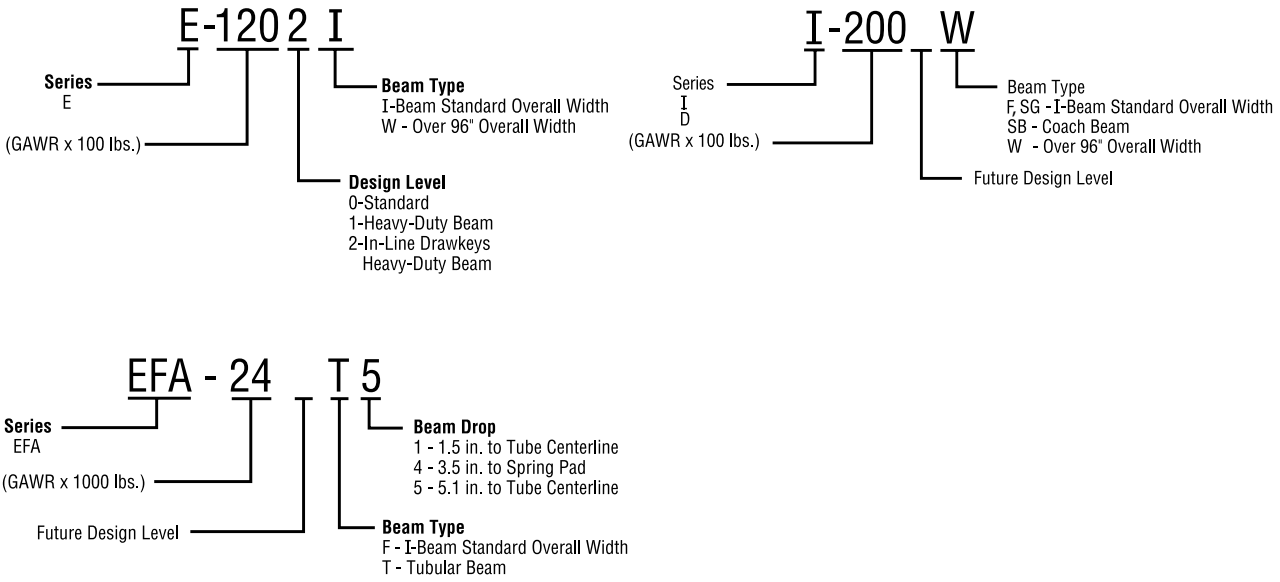
SHADED AREAS INDICATE AVAILABILITY.

Steer Axle

General Information – Heavy and Medium Duty

Nomenclature

Steer Axle



Spicer® Integral Arm Steer Axle

Spicer Steer Axles improve vehicle performance, whether it's on-highway, city delivery or bus chassis applications. The exclusive combination of larger kingpin bushings and a kingpin sealing system helps ensure long service life and reduced maintenance. In addition, the unique two-drawkey and spring washer kingpin retention system, along with a robust beam forging design, provides improved total vehicle alignment capability and axle durability.

Spicer Conventional Arm Steer Axle

A full lineup of Conventional Arm Steer Axles, in both traditional and wider tracks, are designed to improve steering under a variety of driving conditions.

About this publication.

Nominal ratings indicated here are general guidelines. Permitted use of products described in this publication vary by vocation. Please refer to Steer Axle Application Guidelines, item AXAG0400, for detailed steer axle application information (available on-line at www.roadranger.com).

Shaded areas indicate product availability.

For details, contact Dana's Commercial Vehicle Systems Application Engineering at 1-800-487-8301.

Steer Axle

Heavy- and Medium-Duty Steer Axle

Spicer® Integral Arm Steer Axles

Nominal Load Rating lbs. [kg]	Model	Beam Width** (KPI) in. [mm]	Beam Drop in [mm]			LMS™ Hub Option	Unitized Hub Spindle Option	Tire Pressure Management (optional)	Bearing Cone Inner / Outer*
			3.5 [89]	3.74 [95]	5.0 [127]				
10,000 [4,536]	E-1002I	69.0 [1753]	■			■			HM212049/ 3782
	E-1002W	71.0 [1803]	■			■			
		71.5 [1816]		■		■			
12,000 [5,443]	E-1202I	69.0 [1753]	■			■	■		
	E-1202W	71.0 [1803]	■			■	■		
		71.5 [1816]		■		■			
13,200 [5,987]	E-1322I	69.0 [1753]	■		■	■	■		
	E-1322W	71.0 [1803]	■		■	■			
		71.5 [1816]		■		■			
14,600 [6,622]	E-1462I	69.0 [1753]	■		■	■		■	
	E-1462W	71.0 [1803]	■		■	■		■	
		71.5 [1816]		■		■		■	

Outrunner™ Seal Number with Standard Outside Diameter: 128847 and Optional Outside Diameter: 128855

* Standard bearing numbers shown. Does not apply with LMS hub or Unitized Hub Spindle option. **"W" version models provide additional turning angle. Beam width dimension contingent on vehicle manufacturer.

Spicer Conventional Arm Steer Axles

Nominal Load Rating lbs. [kg]	Model	Beam Width (KPI) in. [mm]	Beam Drop in [mm]			LMS Hub Option	Unitized Spindle Option	Tire Pressure Management (optional)	Bearing Cone Inner/Outer*
			3.5 [89]	3.74 [95]	5.0 [127]				
6,000 [2,722]	D-600N	62.7 [1593]		■		N/A	N/A		45284/25880
7,000 [3,175]	D-700N	62.7 [1593]		■					
	D-700F	71.0 [1803]	■						JM207049A/ 25877
8,000 [3,629]	D-800F	71.0 [1803]	■						
	D-800W	72.0 [1829]	■						
8,500 [3,856]	D-850F	71.0 [1803]	■						
	D-850W	72.0 [1829]	■						
10,000 [4,536]	I-100SG	69.0 [1753]	■			■	N/A		HM212049A/ 3782
	I-100W	71.5 [1816]		■		■			
12,000 [5,443]	I-120SG	69.0 [1753]	■			■			
	I-120W	71.5 [1816]		■		■			
13,000 [5,897]	I-130SG	69.0 [1753]	■			■			
	I-130W	71.5 [1816]		■		■			
13,200 [5,987]	I-132SG	69.0 [1753]	■			■			
14,600 [6,622]	I-140SG	69.0 [1753]	■			■			
	I-140W	71.5 [1816]		■		■			
16,000 [7,257]	I-160SG	69.0 [1753]	■			N/A	N/A	■	6461A/ 555S
	I-160W	71.5 [1816]		■				■	
18,000 [8,165]	I-180SG	68.5 [1740]	■					■	
	I-180W	71.0 [1803]		■				■	
16,000 [7,257] - 20,000 [9,072]	I-200SG	68.5 [1740]	■					■	
	I-200W	71.0 [1803]		■				■	
	D-2000F	68.0 [1727]	■		■	■		■	
	D-2000W	70.66 [1795]			5.24 [133]	■		■	
22,000 [9,979]	EFA-22T2	Variable	1.5 [38]			N/A		■	
	EFA-22T5	Variable			5.1 [130]			■	
22,800 [10,342]	I-220W	71.0 [1803]		■				■	
	D-2200F	68.0 [1727]	■		■	■		■	
	D-2200W	70.66 [1795]			5.24 [133]	■		■	
24,000 [10,886]	EFA-24T2	Variable	1.5 [38]			N/A		■	
	EFA-24T5	Variable			5.1 [130]			■	

SHADED AREAS INDICATE AVAILABILITY.

Outrunner Seal Number for nominal load ratings of 10,000 - 14,600 lbs [4,536 - 6,622 kg] with standard outside diameter: 128847 and optional outside diameter: 128855
Outrunner Seal Number for nominal load ratings of 16,000 - 24,000 lbs [7,257 - 10,886 kg] with standard outside diameter: 129863
Outrunner™ is a registered trademark of Freudenberg-NOK.

Driveshaft

General Information – Heavy and Medium Duty

Extending Your Life On The Road

Dana is once again setting the pace in the heavy vehicular marketplace with Spicer Life Series® driveshafts. For on and off-highway applications, the Spicer Life Series meets the industry's demands for components with longer life, higher reliability and lower maintenance. Spicer Life Series driveshafts offer lower life cycle costs with minimum lifetime maintenance requirements.

Our Spicer Life Series® 55, 70 and 100 driveshafts replace Spicer 1480, 1550, 1610 and SPL90 series driveshafts. In addition to the same reduced maintenance intervals and improved bearing package designs developed for our heavy-duty line, Spicer Life Series medium-duty driveshafts also feature our Quick Disconnect™ tube yoke. This innovative design features the same attachment configuration as our industry standard half round end yokes, but addresses the shipping and handling concerns of multi-piece assemblies. In addition, an optional Spicer Life XL® U-joint offers zero maintenance operation for those applications requiring extended service.

Spicer Life Series Driveshafts offer:

- longer life
- lower lifetime maintenance
- increased strength for higher engine torque and lower axle ratios
- less driveshaft rotating diameter

Nearly every component on the driveshaft assembly has been redesigned to increase life and decrease maintenance.

Spicer® Driveshafts Designed to Tackle Heavy Workloads

Spicer® products are designed and tested to ensure durable, reliable performance with minimum maintenance. It's no surprise that they're the preferred brand in the U.S. by OEMs, fleet specifiers, dealership sales, and replacement parts professionals.

NOTE: Refer to publication DSAG0200 for Driveshaft Application Guidelines.

Driveshaft

Heavy-Duty Driveshaft

Spicer Life Series® Operating Parameters

Series	Max. momentary joint angle	Standard slip of d/s		Rotating Diameter of D/S		Rotating Diameter of End Yoke	
SPL-140	25 Deg.	110 mm	4.33 in	160 mm	6.30 in	158 mm	6.22 in
SPL-170	25 Deg.	110 mm	4.33 in	185 mm	7.28 in	193 mm	7.60 in
SPL-170I/A	45 Deg.	150 mm	5.90 in	185 mm	7.28 in	193 mm	7.60 in
SPL-250	25 Deg.	110 mm	4.33 in	185 mm	7.28 in	193 mm	7.60 in
SPL-250HD	25 Deg.	110 mm	4.33 in	185 mm	7.28 in	193 mm	7.60 in

Tubing sizes for Spicer Life Series:

Series	Tubing OD		Wall thickness	
SPL-140	110 mm	4.33 in	5 mm	.197 in
SPL-170	126 mm	4.96 in	3 mm	.118 in
SPL-170 HD	129 mm	5.06 in	4.25 mm	.167 in
SPL-170 I/A	120 mm	4.72 in	5 mm	.197 in
SPL-250	129 mm	5.06 in	4.25 mm	.167 in
SPL-250 HD	130 mm	5.12 in	5 mm	.197 in
SPL-250 SHD	132 mm	5.20 in	6 mm	.236 in

Journal Cross and Bearing Kits:

Series	Kit P/N For Quick Disconnect™ End Yoke
SPL-140	SPL140X
SPL-170	SPL170X
SPL-170 HD	SPL170X
SPL-170 I/A	SPL170X
SPL-250	SPL250X
SPL-250 HD	SPL250X
SPL-250 SHD	SPL250X

HD = Heavy Duty D/S= Driveshaft SHD = Super Heavy Duty P/N = Part Number I/A = Interaxle

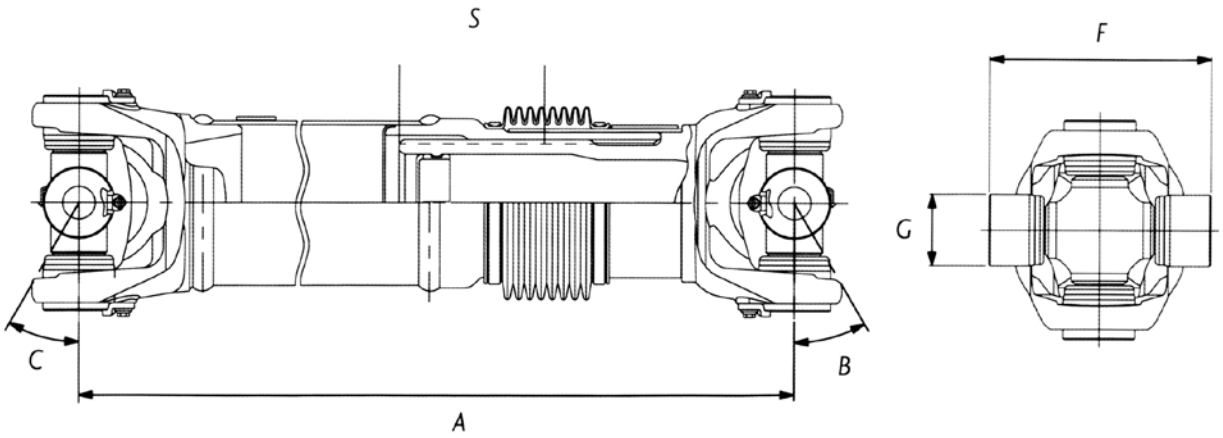
Driveshaft

Heavy-Duty Driveshaft

Slip Between Center Driveshaft

Driveshaft Assembly Part Number	Minimum Length Collapsed Centerline to Centerline of Cross "A"		Slip Joint End			Tight Joint End			U-Joint SPAN		Bearing Cup Diameter	
			Slip "S"		Maximum Angle "B"	Tube Size		Maximum Angle "C"	"F"		"G"	
	MM	IN	MM	IN		MM	IN		MM	IN	MM	IN
SPL-140 140DS55001	430	16.93	110	4.33	25°	110 x 5.0 DOM	4.33 x .197 DOM	25°	139	5.46	49	1.93
SPL-170 170DS55001C	440	17.34	110	4.33	25°	126 x 3.0 DOM	4.96 x .118 DOM	25.5°	164	6.46	55	2.16
SPL-170HD 170DS55002C	439	17.28	110	4.33	25°	128.5 x 4.25 DOM	5.06 x .167 DOM	25°	164	6.46	55	2.16
SPL-170I/A 170IA55006C	512	20.15	150	5.91	45°	120.0 x 5.0 DOM	4.72 x .197 DOM	45°	164	6.46	55	2.16
SPL-250 250DS55005C	450.3	17.73	110	4.33	25°	128.5 x 4.25 DOM	5.06 x .167 DOM	25°	163	6.42	60	2.37
SPL-250HD 250DS55006C	450.3	17.73	110	4.33	25°	130.0 x 5.0 DOM	5.12 x .197 DOM	25°	163	6.42	60	2.37
SPL-250SHD 250DS55001C	450	17.72	110	4.33	25°	132.0 x 6.0 DOM	5.20 x .236 DOM	25°	163	6.42	60	2.37

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



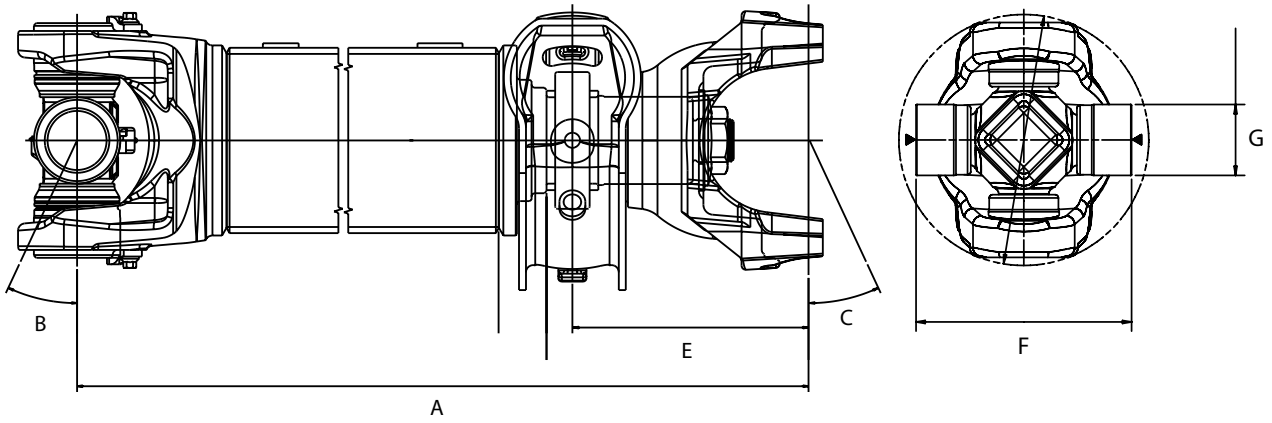
Driveshaft

Heavy-Duty Driveshaft

Fixed Yoke Coupling Shaft Assembly with Center Bearing

Coupling Shaft Part Number	Minimum Length Centerline of Cross to Centerline of End Yoke "A"		Maximum Angle "B"	Tube Size		Centerline of Bearing to Centerline of End Yoke "E"		Maximum Angle "C"	U-Joint SPAN "F"		Bearing Cup Diameter "G"	
	MM	IN		MM	IN	MM	IN		MM	IN	MM	IN
SPL-140 140CS54013	350	13.79	25°	110.0 x 5.0 DOM	4.33 x .197 DOM	154	6.08	25°	139	5.46	49	1.93
SPL-170 170CS54018C	368	14.47	25°	126.0 x 3.0 DOM	4.96 x .118 DOM	160	6.30	25°	164	6.46	55	2.17
SPL-170HD 170CS54016C	367	14.45	25°	128.5 x 4.25 DOM	5.06 x .167 DOM	160	6.30	25°	164	6.46	55	2.17
SPL-250 250CS54005C	382	15.05	25°	128.5 x 4.25 DOM	5.06 x .167 DOM	164	6.46	25°	164	6.46	60	2.37
SPL-250HD 250CS54006C	382	15.05	25°	130.0 x 5.0 DOM	5.12 x .197 DOM	164	6.46	25°	163	6.42	60	2.37
SPL-250SHD 250CS54001C	384	15.12	25°	132.0 x 6.0 DOM	5.20 x .236 DOM	164	6.46	25°	163	6.42	60	2.37

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



Driveshaft

Medium-Duty Driveshaft

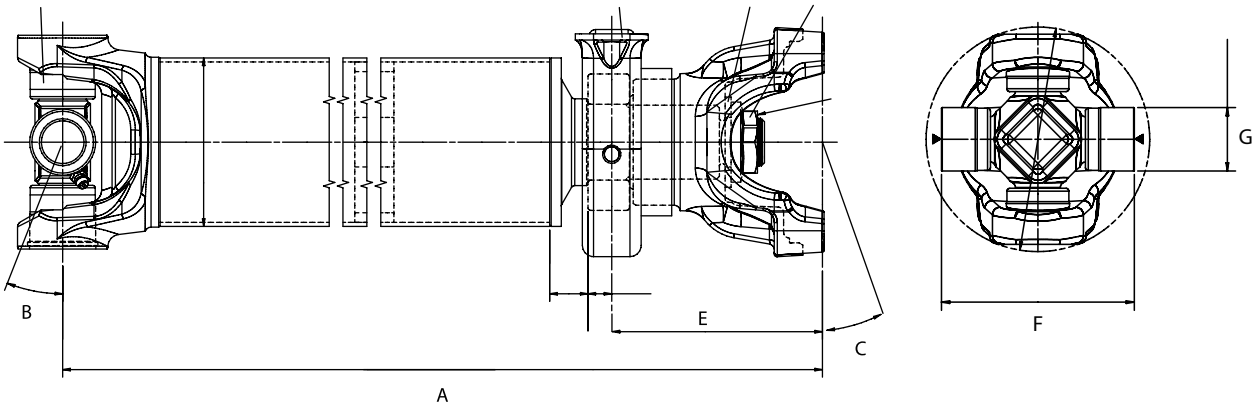
Medium Duty Service Kits

Driveshaft Series	U-Joint Kit Used	Kit Type
SPL55	SPL55-1X	Re-Lube
SPL55XS	SPL55-2X	Pre-Lube
SPL70	SPL70-1X	Re-Lube
SPL70XS	SPL70X	Pre-Lube
SPL100	SPL100-1X	Re-Lube
SPL100XS	SPL100X	Pre-Lube

Fixed Yoke Coupling Shaft

Coupling Shaft Part Number	Minimum Length Centerline of Cross to Centerline of End Yoke "A"		Maximum Angle "B"	Tube Size		Centerline of Bearing to Centerline of End Yoke "E"		Maximum Angle "C"	U-JOINT SPAN "F"		Bearing Cup Diameter "G"	
	MM	IN		MM	IN	MM	IN		MM	IN	MM	IN
SPL-55 055CS54006	233	9.17	21.5°	89	3.50	112	4.39	30°	106	4.19	35	1.37
SPL-55XS 055CS54006G	233	9.17	21.5°	89	3.50	112	4.39	30°	106	4.19	35	1.37
SPL-70 070CS54004	249	9.80	26°	89	3.50	120	4.71	22.5°	126	4.96	35	1.37
SPL-70XS 070CS54004G	249	9.80	26°	89	3.50	120	4.71	22.5°	126	4.96	35	1.37
SPL-100 100CS54003	289	11.39	25°	102	4.00	115	4.52	13.5°	126	4.96	41	1.63
SPL-100XS 100CS54003G	289	11.39	25°	102	4.00	115	4.52	13.5°	126	4.96	41	1.63

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



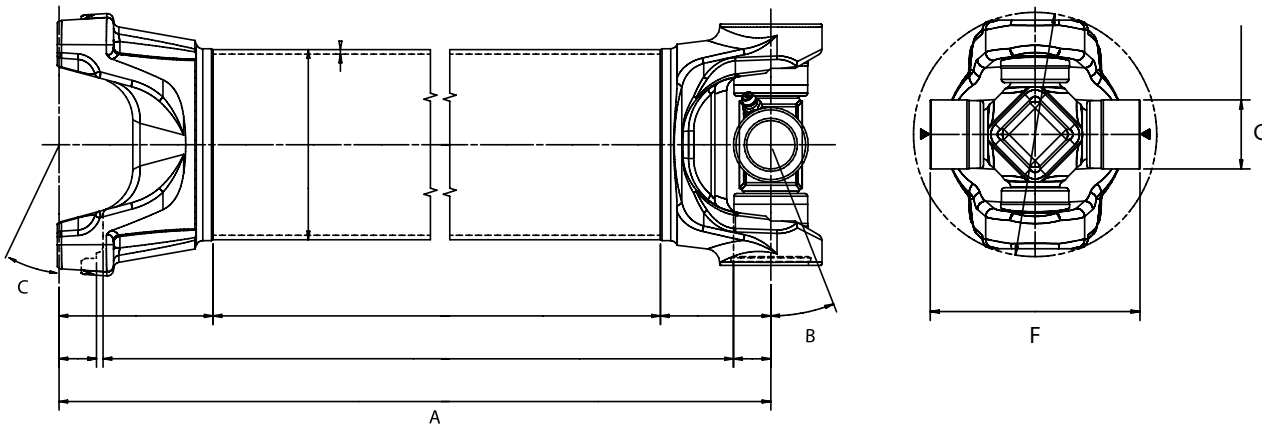
Driveshaft

Medium-Duty Driveshaft

Driveshaft

Drive-shaft Part Number	Minimum Length Centerline of Cross to End Yoke "A"		Maximum Angle "B"	Tube Size		Maximum Angle "C"	U-JOINT SPAN "F"		Bearing Cup Diameter "G"	
	MM	IN		MM	IN		MM	IN	MM	IN
SPL-55 055DS05003	160	6.28	21.5°	89	3.50	25°	106	4.19	35	1.37
SPL-55XS 055DS05003G	160	6.28	21.5°	89	3.50	25°	106	4.19	35	1.37
SPL-70 070DS5003	168	6.62	26°	89	3.50	25°	126	4.96	35	1.37
SPL-70XS 070DS05003G	168	6.62	26°	89	3.50	25°	126	4.96	35	1.37
SPL-100 100DS05002	203	8.00	25°	102	4.00	15°	126	4.96	41	1.63
SPL-100XS 100DS05002G	203	8.00	25°	102	4.00	15°	126	4.96	41	1.63

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



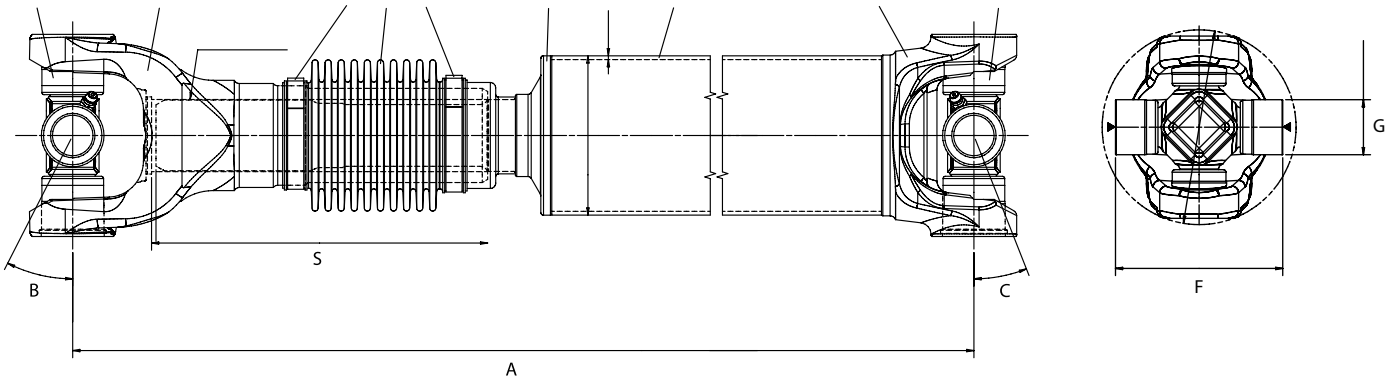
Driveshaft

Medium-Duty Driveshaft

Slip Between Center Driveshaft

Driveshaft Assembly Part Number	Minimum Length Collapsed Centerline to Centerline of Cross "A"		Slip Joint End			Tight Joint End			U-Joint SPAN		Bearing Cup Diameter	
			Slip "S"		Maximum Angle "B"	Tube Size		Maximum Angle "C"	"F"		"G"	
	MM	IN	MM	IN		MM	IN		MM	IN	MM	IN
SPL-55 055DS55006	356	14.00	110	4.33	27°	89	3.50	21.5°	106	4.19	35	1.37
SPL-55XS 055DS55006G	356	14.00	110	4.33	27°	89	3.50	21.5°	106	4.19	35	1.37
SPL-70 070DS55007	366	14.41	110	4.33	25°	89	3.50	26°	126	4.96	35	1.37
SPL-70XS 070DS55007G	366	14.41	110	4.33	25°	89	3.50	26°	126	4.96	35	1.37
SPL-100 100DS55006	421	16.58	110	4.33	25°	102	4.00	25°	126	4.96	41	1.63
SPL-100XS 100DS55006G	421	16.58	110	4.33	25°	102	4.00	25°	126	4.96	41	1.63

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



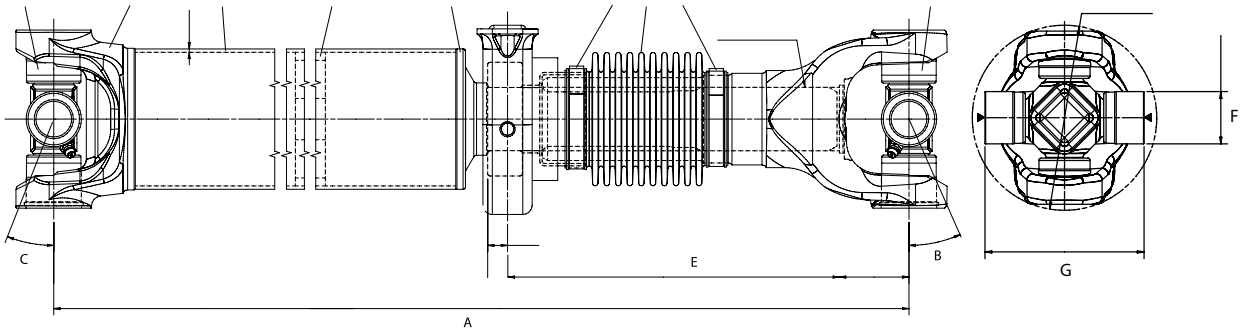
Driveshaft

Medium-Duty Driveshaft

Outboard Slip Coupling Shaft

Driveshaft Assembly Part Number	Minimum Length Collapsed Centerline to Centerline of Cross "A"		Slip Joint End			Tight Joint End					U-Joint SPAN		Bearing Cup Diameter	
			Slip "S"		Maximum Angle "B"	Centerline of Bearing to Centerline of Slip Yoke "E"		Tube Size		Maximum Angle "C"	"F"		"G"	
	MM	IN	MM	IN		MM	IN	MM	IN		MM	IN	MM	IN
SPL-55 055CS55003	375	14.77	110	4.33	27°	250	9.84	89	3.50	21.5°	106	4.19	35	1.37
SPL-55XS 055CS55003G	375	14.77	110	4.33	27°	250	9.84	89	3.50	21.5°	106	4.19	35	1.37
SPL-70 070CS55003	390	15.34	110	4.33	25°	259	10.2	89	3.50	26°	126	4.96	35	1.37
SPL-70XS 070CS55003G	390	15.34	110	4.33	25°	259	10.25	89	3.50	26°	126	4.96	35	1.37
SPL-100 100CS55002	449	17.66	110	4.33	25°	273	10.75	102	4.00	25°	126	4.96	41	1.63
SPL-100XS 100CS55002G	449	17.66	110	4.33	25°	273	10.75	102	4.00	25°	126	4.96	41	1.63

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



Brake

General Information – Heavy and Medium Duty

Nomenclature

Brake

ES – 150 – 08D

Manufacturer
Bendix Spicer
Foundation Brake LLC

Service
B – Standard Service
S – Extended Service

Drum Diameter
122 – 12.25" [311mm]
150 – 15" [318mm]
165 – 16.5" [419mm]
180 – 18" [457mm]

Shoe Size
04 – 4" [102mm]
05 – 5" [127mm]
06 – 6" [152mm]
07 – 7" [178mm]
07 – 7.5" [191mm]
08 – 8.63" [219mm]
10 – 10" [254mm]

Configurations
A – Fab Shoe Weld on Spider Self-Contained Cam Bracket SAP
B – Fab Shoe Weld on Spider Self-Contained Cam Bracket DAP
D – Fabricated Shoe/Cast Spider SAP
F – Fabricated Shoe Weld on Spider SAP (Non Self-Contained)
H – Cast Shoe/Heavy Cast Spider DAP
L – Fabricated Shoe/Fabricated Spider SAP
M – Fabricated Shoe/Cast Spider (DAP Closed A/P)
P – Fabricated Shoe/Weld on Spider (DAP Closed A/P)
R – Cast Shoe/Heavy Cast Spider SAP
S – Reinforced Fabricated Shoe/Heavy Cast Spider (SAP)
T – Fabricated Shoe/Weld on Spider DAP (Non Self-Contained)

Bendix® Air Disc Brake Systems

Bendix® air disc brake calipers and rotors are available for steer, drive, and trailer axles. Bendix® air disc brake systems also feature synchronized dual pistons, an internal automatic wear adjuster, and extended service linings. Our quick-change linings also provide easy access to minimize maintenance labor and expense, and all components are optimally balanced for long-term vehicle performance.

Bendix® ES™ (Extended Service) Brakes

Extended Service (ES™) brakes last longer and provide lower maintenance by combining proprietary linings and advanced shoe construction. The superior performance in the Bendix® ES™ brake will save you money and downtime.

Bendix® Foundation Brakes

GAW Range lbs. [kg]	Model	Size in. [mm]	Configuration			Applications Option	LMS™ Brake
			Shoe	Spider	Anchor*		
10,000-13,200 [4,536-5,987]	ES-150-04L	15.0 x 4.0 [381 x 102]	Fabricated	Fabricated	SAP	Steer Axles	
	ES-150-04D	15.0 x 4.0 [381 x 102]	Fabricated	Cast	SAP	Steer Axles	
10,000-14,600 [4,536-6,622]	ES-150-06D	15.0 x 6.0 [381 x 152]	Fabricated	Cast	SAP	Steer Axles w/19.5" [mm] wheels	
15,000-20,000 [6,804-9,072]	ES-150-08D	15.0 x 8.63 [381 x 219]	Fabricated	Cast	SAP	Drive Axles w/19.5" [mm] wheels	
10,000-14,600 [4,536-6,622]	ES-165-05D	16.5 x 5.0 [419 x 127]	Fabricated	Cast	SAP	Steer Axles	
	ES-165-05L	16.5 x 5.0 [419 x 127]	Fabricated	Fabricated	SAP	Steer Axles	
14,600-20,000 [6,622-9,072]	ES-165-06D	16.5 x 6.0 [419 x 152]	Fabricated	Cast	SAP	On/Off Hwy Steer Axles	
	ES-165-06L	16.5 x 6.0 [419 x 152]	Fabricated	Fabricated	SAP	On/Off Hwy Steer Axles	
17,000-23,000 [7,711-10,433]	ES-165-07D	16.5 x 7.0 [419 x 178]	Fabricated	Cast	SAP	Drive Axles	
	ES-165-07S	16.5 x 7.0 [419 x 178]	Fabricated	Cast	SAP	On/Off Hwy Drive Axles	
	ES-165-07L	16.5 x 7.0 [419 x 178]	Fabricated	Fabricated	SAP	Drive Axles	
	ES-165-08D	16.5 x 8.63 [419 x 219]	Fabricated	Cast	SAP	Drive Axles	
	ES-165-08S	16.5 x 8.63 [419 x 219]	Fabricated	Cast	SAP	On/Off Hwy Drive Axles	
	ES-165-08L	16.5 x 8.63 [419 x 219]	Fabricated	Fabricated	SAP	Drive Axles	
23,000-26,000 [10,433-11,793]	ES-165-07M	16.5 x 7.0 [419 x 178]	Fabricated	Heavy Cast	DAP	On/Off Hwy Drive Axles	
26,000-30,000 [11,793-13,608]	ES-165-07H	16.5 x 7.0 [419 x 178]	Cast	Heavy Cast	DAP	On/Off Hwy Drive Axles	
26,000-32,500 [11,793-14,742]	EB-180-07R	18.0 x 7.0 [457 x 178]	Cast	Heavy Cast	SAP	On/Off Hwy Drive Axles	
10,000-23,000 [4,536-10,433]	ADB22X	Air Disc for 22.5" & Larger Wheels	–	Cast	–	Steer, Drive, Trailer	
7,000-17,500 [3,175-7,938]	EB-122-07T	12.25 x 7.5 [311 x 190]	Fabricated	–	DAP	Trailer	
11,700-20,000 [5,307-9,072]	EB-165-05T	16.5 x 5 [419 x 127]	Fabricated	–	DAP	Trailer	
16,000-20,000 [7,257-9,072]	ES-150-08T	15 x 8.63 [381 x 219]	Fabricated	–	DAP	Trailer XLII	
16,000-17,500 [7,257-7,938]	ES-150-08F	15 x 8.63 [381 x 219]	Fabricated	–	SAP	Trailer	
17,500-22,500 [7,938-10,206]	ES-165-07F	16.5 x 7 [419 x 178]	Fabricated	–	SAP	Trailer	
18,000-22,500 [8,164-10,206]	ES-165-08F	16.5 x 8.63 [419 x 219]	Fabricated	–	SAP	Trailer	
14,600-23,000 [6,622-10,433]	EB-165-07T	16.5 x 7 [419 x 178]	Fabricated	–	DAP	Trailer	
16,000-23,000 [7,257-10,433]	ES-165-07T	16.5 x 7 [419 x 178]	Fabricated	–	DAP	Trailer XLII	
18,000-23,000 [8,164-10,433]	ES-165-08T	16.5 x 8 [419 x 203]	Fabricated	–	DAP	Trailer XLII	
	ES-165-07A	16.5 x 7 [419 x 178]	Fabricated	–	SAP	Trailer Suspension	
	ES-165-07B	16.5 x 7 [419 x 178]	Fabricated	–	DAP	Trailer Suspension XLII	
	EB-165-07B	16.5 x 7 [419 x 178]	Fabricated	–	DAP	Trailer Suspension	
Above 23,000 [Above 10,433]	EB-180-07T	18 x 7 [457 x 178]	Cast	–	DAP	Trailer	
	EB-200-08T	20 x 8 [508 x 178]	Cast	–	DAP	Trailer	

NOTE: Applications require Bendix Spicer Foundation Brake LLC Application Engineering approval. *SAP=Single Anchor Pin DAP=Dual Anchor Pin

Brake

Heavy- and Medium-Duty Brake

Bendix® ASA-5™ Automatic Slack Adjusters

Brake Size in. [mm]	Application	Spline Dia. in./ No. Teeth [mm]	Arm Length in. [mm]	Push Rod Thread Size	Yoke Offset in.	
					0	5/8
15.0 x 4.0 [381 x 102]	Steer	1-1/4 [31.8] 10 Tooth	5 [127.0]	1/2 – 20	■	■
			5 [127.0]	5/8 – 18	■	■
			5-1/2 [139.7]	5/8 – 18	■	■
			5-1/2 [139.7]	1/2 – 20	■	■
		1-1/4 [31.8] 24 Tooth	5 [127.0]	1/2 – 20		■
			5-1/2 [139.7]	5/8 – 18	■	
			5-1/2 [139.7]	1/2 – 20	■	
			5-1/2 [139.7]	1/2 – 20		■
			5-1/2 [139.7]	1/2 – 20	■	
			5-1/2 [139.7]	5/8 – 18	■	
15.0 x 6.0 [381 x 152], 15.0 x 8.0 [381 x 203] 15.0 x 8.6 [381 x 218], 16.5 x 5.0 [419 x 127] 16.5 x 6.0 [419 x 152], 16.5 x 7.0 [419 x 178] 16.5 x 8.0 [419 x 203], 16.5 x 8.6 [419 x 218] 18.0 x 7.0 [457 x 178]	Steer, Drive and Trailer	1-1/2 [38.1] 10 Tooth	5 [127.0]	1/2 – 20	■	
			5-1/2 [139.7]	1/2 – 20		■
			5-1/2 [139.7]	5/8 – 18	■	
			6 [152.4]	5/8 – 18	■	
15.0 x 4.0 [381 x 102], 15.0 x 8.0 [381 x 203] 15.0 x 8.6 [381 x 218], 16.5 x 5.0 [419 x 127] 16.5 x 6.0 [419 x 152], 16.5 x 7.0 [419 x 178] 16.5 x 8.0 [419 x 203], 16.5 x 8.6 [419 x 218] 18.0 x 7.0 [457 x 178]		1-1/2 [38.1] 28 Tooth	5 [127.0]	1/2 – 20	■	
			5-1/2 [139.7]	5/8 – 18	■	
			6 [152.4]	5/8 – 18	■	
			6 [152.4]	1/2 – 20		■
16.5 x 7.0 [419 x 178], 16.5 x 8.6 [419 x 218]	Trailer	1-5/8 [41.3] 37 Tooth	5-1/2 [139.7]	5/8 – 18	■	
			6 [152.4]	5/8 – 18	■	

Spicer® Automatic Slack Adjusters

Brake Size in. [mm]	Application	Spline Dia. in./ No. Teeth [mm]	Arm Length in. [mm]	Clevis Dia. in.		Arm Offset in.			
				1/2	5/8	0	5/8	1-1/2	2-3/8
15.0 x 4.0 [381 x 102]	Steer	1-1/4 [31.8] 10 Tooth	5 [127.0]	■	■	■	■		
			5-1/2 – 6-1/2 [139.7 – 165.1]	■		■			
		1-1/4 [31.8] 24 Tooth	5-1/2 [139.7]	■	■	■	■		
15.0 x 6.0 [381 x 152], 15.0 x 8.0 [381 x 203], 15.0 x 8.6 [381 x 218], 16.5 x 5.0 [419 x 127], 16.5 x 6.0 [419 x 152], 16.5 x 7.0 [419 x 178], 16.5 x 8.0 [419 x 203], 16.5 x 8.6 [419 x 218], 18.0 x 7.0 [457 x 178]	Steer, Drive and Trailer	1-1/2 [38.1] 10 Tooth	5 [127.0]	■		■			
			5 – 6 [127.0 – 152.4]	■	■	■	■		
			5-1/2 [139.7]	■	■	■	■	■	
			6 [152.4]	■	■	■	■	■	■
			5-1/2 – 6-1/2 [139.7 – 165.1]	■	■	■			
12.25 x 7.0 [311 x 178], 15.0 x 4.0 [381 x 102], 15.0 x 8.0 [381 x 203], 15.0 x 8.6 [381 x 218], 16.5 x 5.0 [419 x 127], 16.5 x 6.0 [419 x 152], 16.5 x 7.0 [419 x 178], 16.5 x 8.0 [419 x 203], 16.5 x 8.6 [419 x 218], 18.0 x 7.0 [457 x 178]		1-1/2 [38.1] 28 Tooth	5 [127.0]	■		■			
			5 – 6 [127.0 – 152.4]	■	■	■	■		
			5-1/2 [139.7]	■	■	■	■	■	
			6 [152.4]	■	■	■	■	■	■
			5-1/2 – 6-1/2 [139.7 – 165.1]	■	■	■			
12.25 x 8.0 [311 x 203]	Trailer	1-5/8 [41.3] 37 Tooth	5-1/2 [139.7]	■		■			
16.5 x 7.0 [419 x 178], 16.5 x 8.6 [419 x 218]			6 [152.4]	■		■			

Bendix® brand and Spicer® automatic slack adjusters are brought to you by Bendix Spicer Foundation Brake LLC.
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Spicer® is a registered trademark of Dana Limited.

SHADED AREAS INDICATE AVAILABILITY.

Collision Warning System

VORAD® by Bendix®

VORAD Collision Warning Systems

The VORAD collision warning system's success is no accident. Current customers have realized accident reduction rates of 35 to 100%. VORAD's proven radar based safety products are effective in rain, fog, snow and at night.

VORAD safety products are now options at the following OEM's:

- Freightliner
- Mack Trucks
- Volvo
- Sterling
- Western Star
- Peterbilt
- Kenworth
- International

Complete Solution

VORAD provides a complete solution by supplying the system controls and hardware to perform the following functions:

- Front Collision Warning
- BlindSpotter™ Side Object Detection
- Audible and Visual Warning Alerts
- Optional SmartCruise® Adaptive Cruise Control

VORAD can help you avoid costly accidents. Ask your dealer for more information on how you can spec or retrofit this valuable system on your next truck purchase.

For the latest information on VORAD products, visit roadranger.com

Diagnostic Tools

Eaton® MD Tools

Are you dealing with excessive labor charges and unnecessary part changes every time you try to fix a vibration problem? The Eaton MD-300-V Basic Vehicle Vibration Analyzer is designed specifically for use by technicians on the shop floor. The MD-300-V Basic will pinpoint the root cause of a vibration, isolate the location of the problem, and will finally supply a suggested repair procedure to fix it. Increase your technician's efficiency, reduce vehicle downtime, and minimize part-swapping!

Features

- Easy to use – isolate complex vibration problems in just minutes!
- Select the correct driveline configuration from a drop-down list for more accurate diagnosis.
- Color-coded results allow technicians to easily pick out the vibration source.
- Comes with suggested repair procedures to help the technician correct the problem.
- Software includes sensor inputs for signal verification and data accuracy.
- Save data to your computer or email it to experts for further analysis.
- Create and print reports for customer review.

The layout of the data input screen mimics the format of a repair order for easy data entry. The Basic Vehicle Vibration Analyzer includes a function that automatically determines the number of flywheel teeth — there's no need to manually count them! A detailed explanation of the vibration complaint and file information can be included in the comment section of the screen for quick association with test conditions.

The Basic Vehicle Vibration Analyzer generates speed readouts that can be checked against the vehicle's gauges and a "Speed Stable" indicator to help ensure data accuracy. The Basic VVA's fundamental frequency chart provides colorcoded indicators for quick vibration isolation. The software's data file collection capability allows users to easily save and send data to vibration experts for further review if required.

System Requirements

A PC should meet the following minimum configuration:

IBM PC-compatible computer – Pentium III or equivalent, 1Ghz or higher
256 MB of RAM
1024 x 768 screen resolution
CD-ROM drive
400 MB of free space on hard drive
Operates on Windows 2000, XP and NT

Kit Includes:

Software CD
PC Card
Signal Conditioner
Accelerometer
3/4" Tap
Speedometer Sensor
6 Speedometer Pickup Adapter Cables
2 Gray Speed Cables
1 Data Cable
Flywheel Sensor
Carrying Case

MD300V Vibration Analysis tools and services can be purchased at this distributor:

Truck Vibration Technology, 269-743-9372

Diagnostic Tools

ServiceRanger powered by Eaton Mobile Diagnostics

ServiceRanger is a PC-based service bay tool used to diagnose, configure, and update most Roadranger automated products including:

- Fuller® AutoShift® and UltraShift® Transmissions (not GEN I AutoShift)
- VORAD® Collision Warning Systems
- Eaton's Hybrid Electric Transmissions

The process for obtaining a ServiceRanger CD is one of the following:

- Dealer contacts the Roadranger call center, and the call center agent has a CD sent to the dealer location.
- Dealer contacts their Roadranger Sales or Service territory representative for a CD.
- Dealer sends a technician to attend a Roadranger Academy Automated Products training class; technicians are given a CD for attending.

Data Links

J1587 Link

The SAE J1587 link is a low speed communication link that is designed to share information between electronic components installed on a vehicle. The rate of communication on the link is 9600 bits per second. This is much slower than the typical Internet dial-up rate, 56000 bits per second. The primary use of the communication link is for diagnostic purposes. This includes viewing fault codes, clearing codes, and viewing data such as engine speed, road speed, accelerator pedal position, etc.

J1939 Link

The SAE J1939 link is a high-speed communication link that is designed to share data and send control information between electronic components on a vehicle. This link is designed around CAN (controller area network). It is capable of providing data exchange (such as J1587) as well as providing a mechanism that allows one component to control another (i.e. automated transmission controls the engine during a shift sequence). The rate of communication is 250,000 bits per second, which is much greater than that of J1587.

Hardware Requirements

In order to successfully run ServiceRanger, you will need the following components:

A PC should meet the following minimum configuration:

- IBM® PC compatible computer- 1 GHz or higher
- 514 MB of RAM
- 1024 x 800 screen resolution
- CD-ROM drive
- 100 MB of free space on hard drive
- Microsoft Windows 2000, XP, Vista
- Internet Explorer 6.0 or greater

RP-1210A Compliant Adapter

ServiceRanger supports the TMC RP-1210 standards for vehicle communications. The following is a list of vehicle link adapters that have been tested with ServiceRanger and are approved for ECU reprogramming. If your adapter is not in the list, there may be a compatibility issue or Eaton has not completed testing for that particular adapter.

NOTE: Never use a wireless adapter for ECU programming. Damage to an ECU from using an adapter that has not been approved can result in a void of warranty.

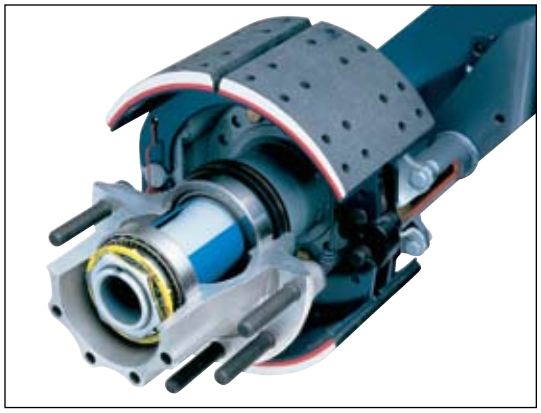
RP1210A Compatible Adapters

These adapters support J1708\J1587 and J1939 communications

- NEXIQ: USB-Link* (USB only, not wireless)
- Noregon: JPRO USB-Data Link Adapter
- NEXIQ: MagiKey™ Parallel Data Module (PDM)

Wheel End Systems

Eliminate Wheel Bearing Adjustment, Extend Seal Life, and Lower Life Cycle Costs at Every Wheel End with Spicer® LMS™ (Low Maintenance System)



Spicer® LMS™ Hub

- The Spicer LMS Hub design controls bearing adjustment and eliminates installation variables that cause excessive end play leading to premature wheel seal failures
- LMS Hubs extend seal life because they are built to install precisely without manual adjustment
- LMS Hubs combine long-lasting Bendix® foundation brakes with proven Outrunner™ Seal technology to provide a wheel end system that reduces the need for wheel end maintenance for on-highway vehicles
- Available for drive, steer, and trailer axles

Outrunner™ PH™ Seals

- Performance Hybrid Design
- These enhanced wheel seals feature an innovative rubber and metal hybrid outside diameter to help prevent leakage and ensure optimum seal retention and contaminant exclusion
- Cultivating industry-proven Outrunner wheel seal technology and component design processes has lead to this industry-leading innovation
- Outrunner continues to provide extended wheel-end life and durability

Spicer® LMS™ Hubcap and Vent

- New Spicer LMS hubcaps reduce and simplify maintenance, prevent contamination and ensure the longevity of wheel-end components
- The new Spicer LMS hubcaps are lighter and stronger than aluminum hubcaps
- The vent offers a patented contaminant exclusion system through a high-precision, multi-labyrinth design. Proven to prevent water ingestion from both high-pressure washer sprays and wheel-end submersion

BLUE VENT – For Spicer steer and trailer LMS Hub systems only.

BLACK VENT – For Non-LMS industry conventional adjusted steer and trailer axle wheel ends.

Outrunner™ is a registered trademark of Freudenberg-NOK.

Tire Monitor and Maintenance Systems

Spicer® TIMS™ (Tire Inflation and Monitor System) for Trailers

Intelligent tire inflation management pays off with longer life.

It's a proven fact. When trailer tires are under-inflated, fleets lose money. That's why proper tire pressure inflation is one of the most pressing concerns in the trucking industry today.

When trailer tires are routinely under-inflated, fleet maintenance managers face unexpected expenses in several different ways:

- Added costs from poor fuel economy.
- Increased tire expense due to premature wear.
- Time lost to checking and inflating tires.

Spicer® TIMS™ (Tire Inflation and Monitor System) can help you significantly reduce costs in each of these areas. It's a smart system – smart enough to generate real savings that can pay for itself in as little as six months.

Avoid premature wear. Spicer® TIMS™ extends tread life by maintaining proper inflation. Ideal for maximizing tire performance and safety, particularly for wide-based singles.

Spicer® TIMS™ for trailers is one of a family of tire pressure management products that improves the productivity of commercial vehicle fleets.

Bendix® TABS-6 trailer ABS controller is available integrated with Spicer® TIMS™ – the world's first integrated, full-function, smart tire inflation and monitor system for trailers.

SmartWave™ Tire Pressure Monitoring System (TPMS)

SmartWave™ Tire Pressure Monitoring System (TPMS) is the first of a new series of products to help reduce overall fleet costs by actively monitoring vehicle tires.

The SmartWave tire pressure monitoring system simplifies and automates the tire maintenance process, resulting in an overall reduction of fleet operating costs. Whether it is the driver being alerted to tire under-inflation and able to make regular adjustments on the road, or fleet maintenance staff being able to quickly and accurately measure tire pressure for every vehicle in their fleet, SmartWave TPMS will quickly become an invaluable tool for fleets around the world.

Features include:

- Early warning of pressure loss before tire is damaged.
- Temperature compensation provides highly accurate pressure deviation readings.
- Suitable for all wheel and tire types.
- Interfaces with standard diagnostic tools and on-board communications protocols.
- Can be installed at any point in the vehicle's life.

Display

Wireless Gateway/Receiver

Battery life for the sensor/transmitter exceeds 5 years and/or 1 million miles

Advanced Mobility Systems

Dana is the world's leading supplier of advanced mobility systems. Spicer® Central Tire Inflation System (CTIS) is an intelligent mobility system that gives military vehicles a powerful tactical advantage; the ability to keep rolling.

Through sand, mud, soft soils, or steep grades, Spicer CTIS delivers battle-proven performance earned in decades of military operations around the world.

Rocker switches and Driver Display Module (DDM) provide operator interface and built-in diagnostic messaging.

Spicer® TPCS is the smart choice on and off the job site.

Dana experience in advanced mobility is not limited to the battlefield. No matter what your business is - concrete, construction, logging, mining or exploration – the Spicer® Tire Pressure Control System (TPCS) allows you to carry more payload, over varying ground surfaces, without the weight or cost of an all-wheel drive system.

Spicer TPCS increases your vehicle mobility over soft soil, including unimproved roads, sand and mud. TPCS eliminates the need for all-wheel drive in soft soil, which:

- Avoids more than 1,000 lbs. of extra vehicle weight typical for all-wheel drive solutions.
- Allows lower vehicle height by 12-14" for improved stability and accessibility to the cab.
- Reduces overall vehicle cost, complexity, and required maintenance.

TPCS automatically maintains proper tire pressure for extended tread life and improved fuel economy. TPCS also optimizes tire pressure to reduce instances of costly punctures and tread chunk-out, including automatic run flat, limp home vehicle operation in the presence of major tire leaks.

Spicer TPCS is OEM installed and warranted for reliable performance and service support.

Spicer TPCS features integrated drive axle air seals with no vulnerable, external lines to avoid costly repairs and downtime. All rotating seals are internally mounted for reliable operation.

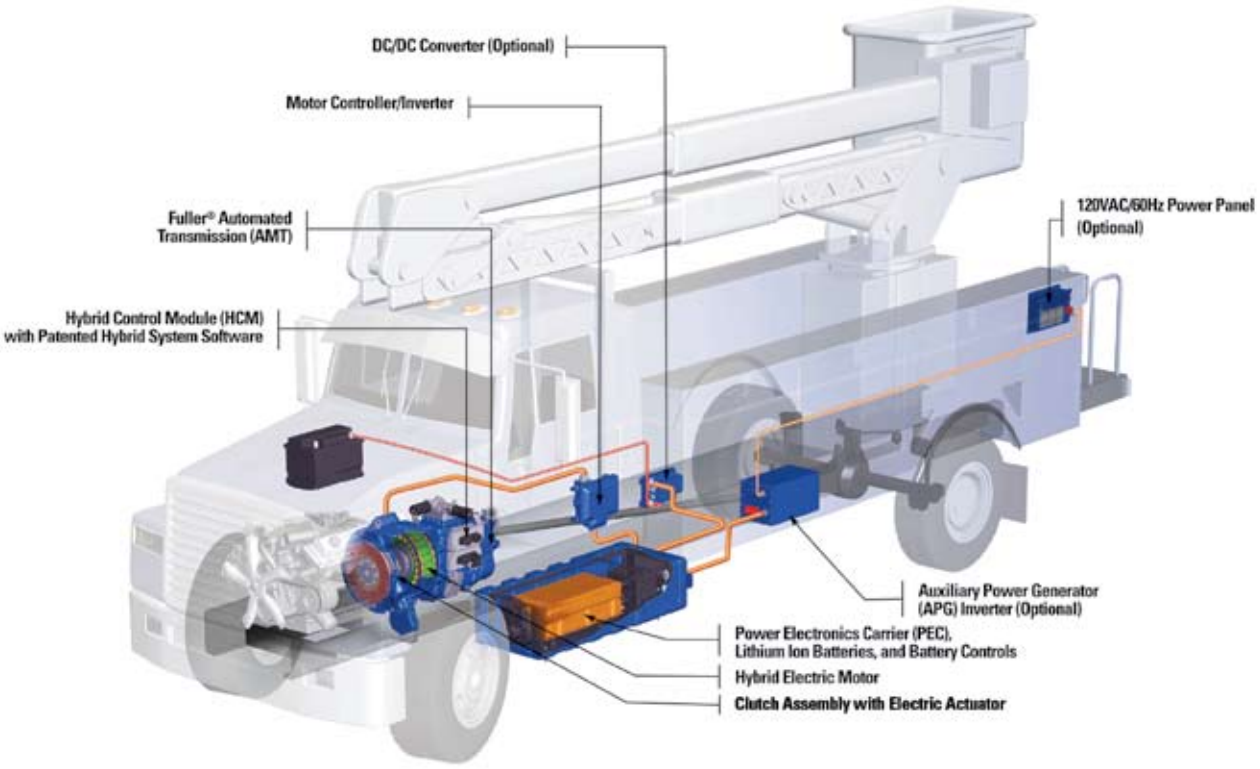
Lower pressure results in larger tire footprint.

The Dana® Diagnostic Tool, available as a free download from Roadranger.com, is a PC-based application that maintenance professionals can use to diagnose and support Spicer® TIMS™, TPCS and SmartWave™ TPMS.

- Enables user to set or change tire pressure
- Provides full diagnostic capability
- Compatible with all operating systems
- User-friendly graphical interface
- Delivers quick and easy results

Hybrid Power Systems

Medium-Duty Hybrid Electric System



The Eaton Hybrid Electric Power System

Eaton's medium-duty Hybrid Electric Power System uses a Fuller automated transmission with a parallel hybrid system. It incorporates an electric motor/generator located between the output of an automated clutch and input of the transmission. Using Eaton's patented hybrid solutions, the system recovers and stores energy normally lost during braking into batteries. When electric torque is blended with engine torque, the stored energy is used to improve fuel economy and vehicle performance for a given speed, or operate with electric power only...and provides energy for use during engine-off worksite operations.

Eaton's Medium-Duty Hybrid Electric System base system is designed to support typical city delivery applications and includes:

- Hybrid drive unit
- Power electronics carrier (battery system)
- Push button shift console
- Automated clutch control

For applications that require engine off, ePTO capability (such as utility applications), the additional content includes:

- DC/DC converter
- PTO vocational software
- Push button shift console (to support engine off requirements)

Note: Availability of the optional Auxiliary Power Generator (APG) feature is planned for 2008.

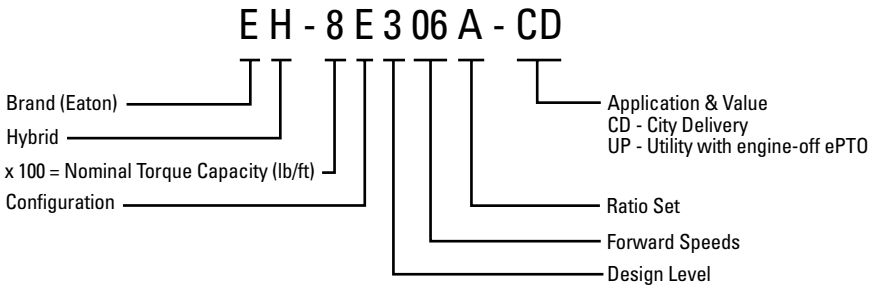
Content may vary by application. For specific details on content and applications, consult your Roadranger representative.

Hybrid Power Systems

Medium-Duty Hybrid Electric System

Nomenclature

Medium Duty



Specs, Options & Provisions

Model Hybrid Electric System	Sales Sht. TRSLXXXX	Extended C/S PTO Provision	Oil Cap. Pints [ltr]	Length Inches [mm]	System Weight* Lbs. [kg]	PTO Speed (% of Engine)
EH-8E306A-CD	5002	STD	19.5 [9]	33.4 [848]	940 [426]	67
EH-8E306A-UP	5001					

* Includes the hybrid drive unit, clutch, batteries, high voltage cables and associated hardware. Does not include the auxiliary power unit. Also, the weight savings achieved by the elimination of an automatic transmission is not included here, but it should be included in the final weight estimation.

Transmission: Proven, Fuller Medium-Duty Automated Manual Transmission
Clutch Housing: SAE #2 aluminum
Electric Motor: 44 kW Peak / 26 kW Continuous
Battery System: Nominal 340 VDC / Lithium Ion

Ratios & Steps

Model Hybrid Electric System	lb-ft Max TQ [Nm]	Overall	Reverse	1	%	2	%	3	%	4	%	5	%	6
EH-8E306A-CD	860 [1166]	9.04	6.75	7.05	71	4.13	64	2.52	58	1.59	59	1.00	28	.78
EH-8E306A-UP														

Availability of Auxiliary Power Generator (APG) feature is planned for 2008. Content may vary by application.
For specific details on content and applications, consult your Roadranger representative.

SHADED AREA INDICATES AVAILABILITY

Service & Support

Call Center

The Roadranger® Call Center is an excellent support source for your questions about:

- Warranty coverage and model eligibility information
- Verification of extended warranty registration
- Warranty limits and exclusions
- Vehicle specification
- Component specifications and information
- Parts information (dimensions and fit-up only, not for ordering parts)
- Assistance in correct ordering procedures for parts and service literature
- Technical assistance and repair strategy advice (except Real Time Warranty claims)
- Customer inquiries on warranty claim decisions (reduced or rejected claims, including Real Time Warranty claims)
- and more …

You can contact the Roadranger Call Center at 800-826-4357 (HELP) from anywhere in North America. In Mexico call 001-800-826-4357.

Service

Our comprehensive support network demonstrates our commitment to you. From our 24-hour-a-day Roadranger Support System to an exhaustive online library of product manuals and service bulletins, you can quickly get the latest information you need.

Service Updates

Download the latest service manual or service bulletin for virtually every genuine transmission, axle and brake product.
Click on roadranger.com.

Looking For InfoRanger

You can still access InfoRanger for online viewing of Fuller transmission parts documentation and other product service information.

Service & Support

Warranty & Lubricant Requirements

WARRANTY

From the instant you develop drivetrain specifications, the Roadranger team provides easy-to-understand warranty coverage based on the vehicle's intended use. Which means fairer- and faster- warranty administration.

Matching Coverage to Use

Roadranger plans set the standard for the most comprehensive drivetrain warranty coverage in the trucking industry. The Roadranger Warranty Manual gives a comprehensive look at what drives Roadranger Warranty Coverage for the United States and Canada. By matching the vehicle type to the job to be performed, the Roadranger Warranty Guide accurately and fairly aligns warranty coverage.

Purchase Peace of Mind with Extended Protection Plans

Extended protection plans lengthen the parameters of standard coverage and are available for purchase up to three years following a vehicle's in-service date. To purchase an extended protection plan, see your local dealer, go to go.roadranger.com/warranty1 or contact a Roadranger representative.

Warranty Claim Procedures and Guidelines

Filing a warranty claim can be a confusing process that often times leads to reduced or rejected claims if some or all of the requirements are not met. To receive your maximum reimbursement in a timely manner be sure to read through the Claim Procedures section of the Warranty Manual before you begin the warranty claim process.

Real Time Warranty System

The Real Time Warranty System saves time for more than 800 dealers in the U.S. and Canada with over-the-phone warranty claim approval and online claim status tracking.

Roadranger Support System

The Roadranger Call Center plays a major role in the support of Eaton and Dana products. The Call Center is made up of two different teams: the General Tech Team and the Real Time Warranty Team.

You can reach a Call Center Representative from anywhere in North America by dialing 800-826-4357 (HELP).

LUBRICANTS

Tests Show "Next Generation" Roadranger Drivetrain Full Synthetic Lubricants* Provide up to 1% Annual Fuel Savings

Roadranger synthetic products have a unique formula containing high quality raw materials and additives to offer the best heavy duty truck drive system performance and economy. In addition to **SAE 50** Transmission fluid, **SAE 75W-90** and **80W-140** synthetic drivetrain fluids, Roadranger systems now offers 4 new products to provide more time on the road.

Roadranger FE 75W-90 Fuel Efficient Synthetic Gear Lubricant

- One test fleet claims savings of up to $500 per truck based on today's fuel costs.**
- You can calculate your savings by visiting roadranger.com/lube

Roadranger SAE 50 Synthetic Wheel Hub Lubricant

- Provides maximum performance in wheel ends for increased durability and extended drain intervals.

Roadranger Grease MP-2

- High temperature multi-purpose grease for applications all around the truck.
- Excellent anti-corrosion and low friction properties make it your first choice when it comes to grease.
- Meets NLGI Class 2 specifications.

Roadranger Grease S-00

- High temperature EP semi fluid is mainly used in "non-driven" wheel ends.
- Provides excellent low temperature performance.
- Conforms to NLGI Class 00 specs.

Safeguard Your Warranty

- Approved for ALL Roadranger extended warranty programs
- Extended drain intervals up to 500,000 miles
- Increases component life
- Use in medium duty, heavy duty and high torque drivetrains.

Further details and data sheets are available on roadranger.com.

** Meets Eaton Specification PS-164 Rev 7 and Dana Specification SHAES 256 Rev C*
*** Test methods and results available upon request. Your actual results may vary.*

Service & Support

Aftermarket & Parts

The Roadranger service team helps keep you on the road and your business moving. From our Roadranger® Support System to a comprehensive network of dealers across North America, you can quickly get the parts and service you need.

Roadranger Support System

You can call for sales, service or parts assistance from anywhere in North America, at: **800-826-4357.**

In Mexico call **001-800-826-4357.**

Genuine Parts Testing

Our intense and comprehensive testing regimen ensures that every part you get will deliver the long-lasting performance you depend on. So, if you're looking for the difference between Fuller parts and everyone else's, the answer is strength of character.

The Value of Genuine Parts

Fuller® and Spicer® parts are certified to meet or exceed original equipment manufacturer's (OEM) specifications and are made with quality materials for longer life.

- Save money
- Reduce downtime
- Lower operating costs
- Provide smooth drivetrain operation

Your truck is manufactured with approved, quality parts. is there any reason why you wouldn't use the same quality for your service replacement parts?

Products

- Fuller Reman Transmissions & Clutches
- Fuller Clutch Installation Kits
- Fuller Transmission Rebuild & Overhaul Kits
- Spicer Axle Service Parts Kits
- Spicer Driveshafts & U-Joints
- Spicer Reman Axle Carriers
- Outrunner™ Oil Bath Seals

Genuine Parts Tests

Gear Wear Test: Assures the wear rate will meet or exceed gear design guidelines due to a process, material or lubricant change. Gears are measured for wear after hours of testing at high torque inputs.

Full Load Gear Bending Test: Full rated torque test to validate the endurance against design guidelines. Comprehensively evaluates surface treatment effects. The gears are tested to failure and cycles are compared to design guidelines.

Geometry Measurement: Continually tests manufacturing capability with regards to spacing, crown, lead and profile.

Hardness Test: Tests to insure the proper material and heat treat were performed from a surface hardness viewpoint only. This is a very high level judgment on whether the manufacturing process uses the proper material and heat treat process.

Microstructure Test:Takes the surface hardness test to a finer level. This test analyzes the material grain structure and can tell with better confidence that the correct material was used in manufacturing and the capability of the heat treat process meets specifications.

Bearing Durability Test: Measures surface fatigue and material strength under full load conditions.

Accelerated Material Wear Test: Test the material's ability to live under higher than design life stresses. Running an equivalent 1,000,000 miles would literally take years.

Service & Support

Online Support and Training

Roadranger Support

Roadranger.com is your "virtual" Roadranger support vehicle. Whether you are a truck maker, dealer, distributor, owner or driver, you can find instant answers when you need them most.

On Roadranger.com you can quickly and conveniently find:

- The latest Service Updates
- Approved Roadranger lubricants
- The Roadranger Literature Library
- Warranty information
- ServiceRanger

Bookmark **roadranger.com** on your desktop today. Use roadranger.com to save hundreds of dollars by downloading service material rather than purchasing printed copies from the Roadranger literature library. **You can also sign up for the free Roadranger e-newsletter.** You'll receive automatic Roadranger drivetrain updates to keep you in the know with money saving and money making news.

Roadranger Academy

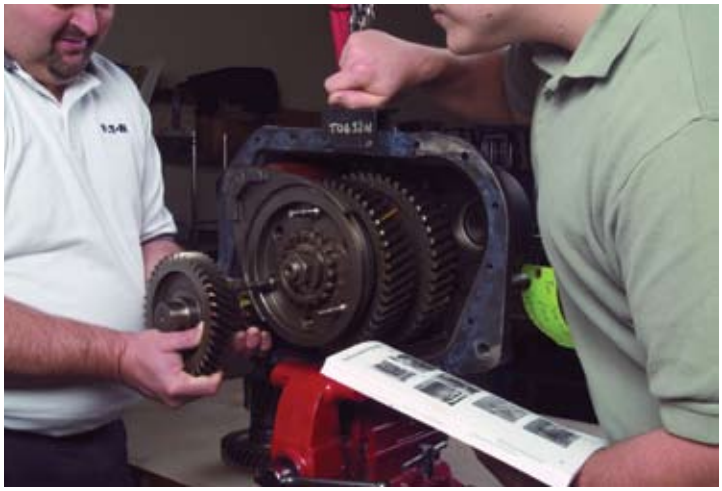
Keep Ahead of the Curve with Training from the Experts

The Roadranger Academy offers the classroom and hands-on instruction your technicians need to move more trucks through the bays and reduce comebacks.

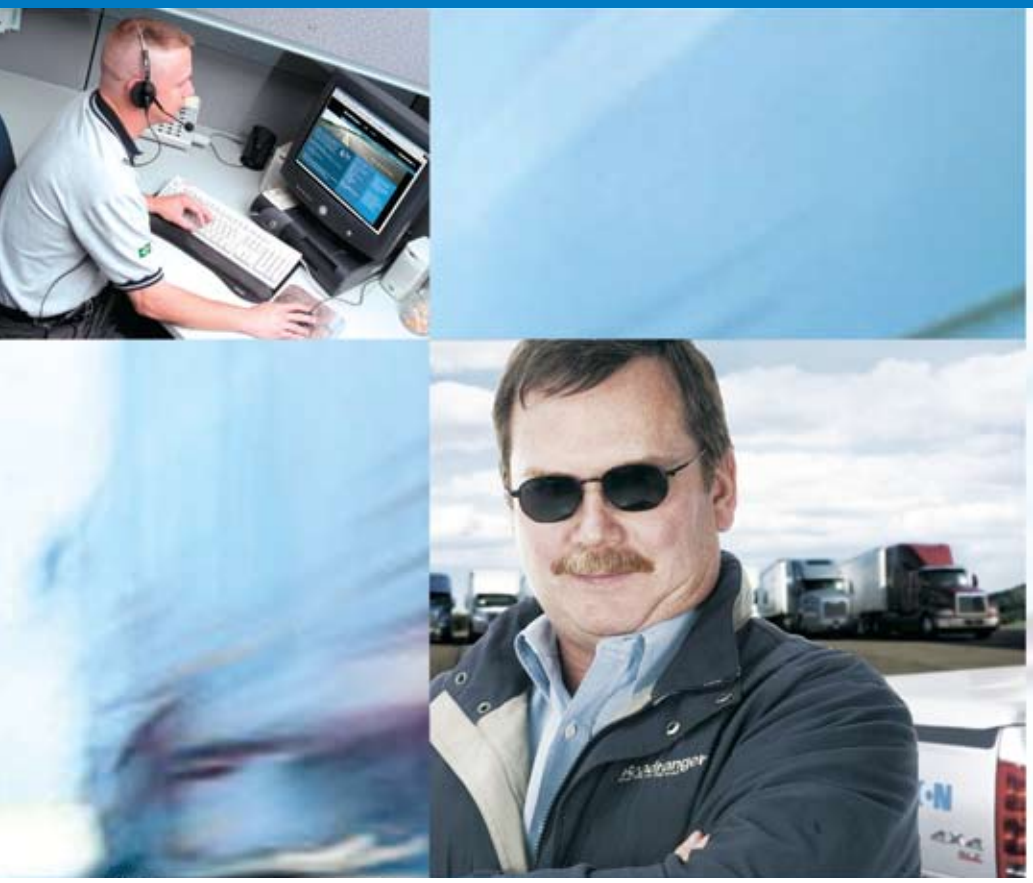
With the Roadranger Academy they will:

- Learn timesaving techniques and shortcuts used by the experts.
- Learn how to more accurately diagnose a problem through hands-on training.
- Receive valuable class materials to reference what they learned, including service bulletins, Roadranger service manuals and troubleshooting guides.

To register for classes in your area or see what computer and web based training is available, go to roadranger.com.



Roadranger



The Roadranger® Promise

The Roadranger® System is an unbeatable combination of the best products from Eaton and Dana, backed by the Roadranger team – the most experienced, expert, and accessible drivetrain consultants in the business. The Roadranger team mission is to provide the most comprehensive customer support offerings available. This begins with a technical support call center network, an excellent source of information on warranty coverage, parts and vehicle specifications, parts and service literature, repair strategies, and warranty claim decisions.

Roadranger®

DANA | EATON

For spec'ing or service assistance, call 1-800-826-HELP (4357) or visit our web site at www.roadranger.com. In Mexico, call 001-800-826-4357.

Roadranger: Eaton, Dana, and other trusted partners providing the best products and services in the industry, ensuring more time on the road.

Roadranger Marketing • P.O. Box 4013 • Kalamazoo, MI 49003 • U.S.A. • www.roadranger.com