MODEL	FTR Diesel
GVWR / GCWR	25,950 lbs. / 30,000 lbs.
WB	152 in, 170 in, 188 in, 200 in, 212 in, 224 in 236 in, 248 in
ENGINE	Isuzu 4-cylinder, In-line 4-cycle, Turbocharged, Intercooled, Direct injection diesel.
Model/Displacement	4HK1-TC/317 CID (5.2 liters)
HP (Gross)	215 HP / 2500 RPM
Torque (Gross)	520 lb-ft / 1600 RPM
EQUIPMENT	Dry element air cleaner with vertical intake; 2 rows 679 square in. radiator; 9 blade 20.1in diameter fan with viscous drive. Cold weather starting device and an oil cooler. Engine oil level check switch and light. Engine warning system with audible warning for low oil pressure, high coolant temperature, and low coolant level. Engine cruise control function. Coolant temperature and low coolant level.
TRANSMISSION	Allison 2550 RDS 6 speed automatic transmission. A single PTO opening on the left hand side of the transmission with a maximum torque value of 250 lb-ft.
STEERING	Integral power steering. Tilt and Telescoping steering column. Steering Ratio of 22.4:1
FRONT AXLE	Reverse Elliot “I”-Beam type steer axle rated at 12,000 lbs. Dana E1254-W
FRONT SUSPENSION	Semi-elliptical steel alloy tapered leaf springs with stabilizer bar and shock absorbers, rated at 12,000 lbs.
FRONT GAWR	12,000 lbs.
REAR AXLE	Single-speed, 19,000 lbs. capacity drive axle. Dana 19060S
REAR SUSPENSION	Semi-elliptical steel alloy multi-leaf springs rated at 21,000 lbs.
REAR GAWR	19,000 lbs.
WHEELS	22.5 x 8.25 inch 10 hole disc wheels, painted white.
TIRES	11R22.5 G LRR (Low Rolling Resistance) tubeless steel belted radials, Premium Highway Tread front tread and Premium Highway Traction rear tread.
BRAKES	Dual circuit S-CAM drum air service brakes with 4 channel anti-lock brake system. An air operated exhaust brake, air controlled parking brake, heated air dryer, and automatic slack adjusters are standard.
FUEL TANK	50 / 100 ga. (depending on chassis wheelbase) rectangular aluminum fuel tank mounted on left hand frame. Includes a fuel water separator with indicator light.
FRAME	Ladder type channel section straight frame rail, 33.5 in wide along the total length of the frame. Yield strength 80,000 psi; Section Modulus 12.69 cub. In, RBM 1,015,000 lb-in
CAB	All steel low cab forward, BBC 81.5 in, 45 degree mechanical tilt with torsion assist.
CAB EQUIPMENT	TRICOT breathable cloth covered high back air ride driver’s seat with rigid passenger seat and center seat with fold down back. Dual cab mounted exterior mirrors with integral convex mirror. Tilt and telescoping steering column. Power windows and door locks, floor mats, tinted glass, AM/FM CD stereo radio with blue tooth.
ELECTRICAL	12 Volt, negative ground, dual maintenance free batteries with threaded posts, 750 CCA each, 140 Amp alternator with integral regulator.
OPTIONS	See last page for options.

Note: These selected specifications are subject to change without notice

VEHICLE WEIGHTS, DIMENSIONS AND RATINGS

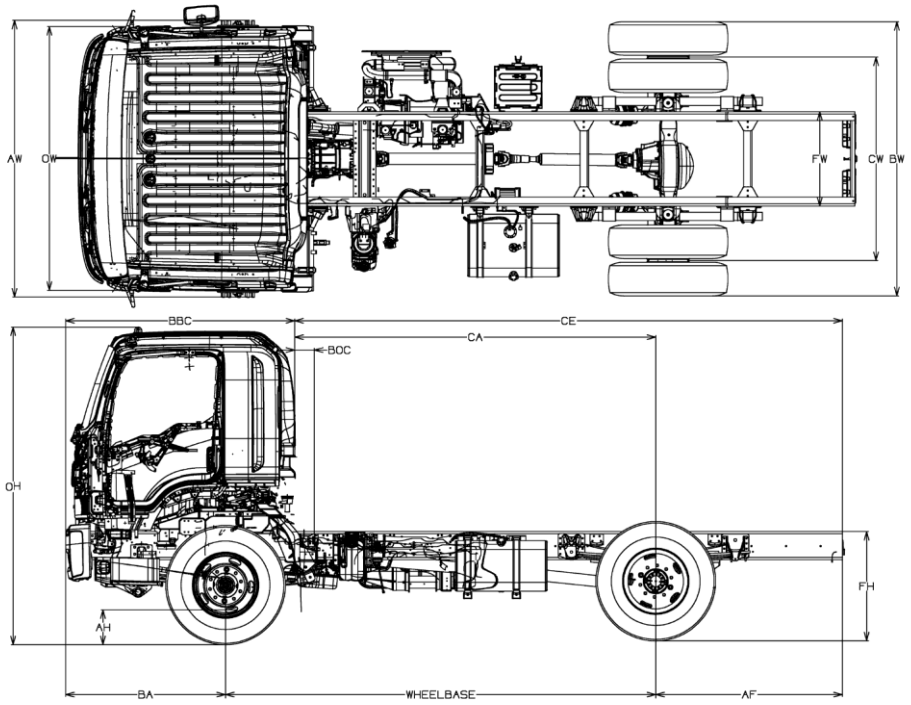


Figure 25.1.1 FTR Diesel Cab Chassis Dimensions

			CURB WEIGHTS			CHASSIS DIMENSIONS				
MODEL CODE	GVWR	PAYLOAD	FRONT	REAR	TOTAL	WB	CA [3]	CE [4]	AF	OAL
	(lbs)	(lbs)	(lbs)	(lbs)	(lbs)	(in)	(in)	(in)	(in)	(in)
MT1	25,950	15690	6527	3733	10260	152	127	192.9	65.9	274.4
MT2		15563	6605	3782	10387	170	154	220	75	301.5
MT3		15061	6882	4007	10889	188	163	247	84.1	328.5
MT4		14978	6933	4039	10972	200	175	264.9	90	346.4
MT5		14894	6984	4072	11056	212	187	283.1	96.1	364.6
MT6		14809	7036	4105	11141	224	199	301	102	382.5
MT7		14725	7087	4138	11225	236	211	319.1	108.1	400.6
MT8		14641	7139	4170	11309	248	223	337	114	418.5

DIMENSION CONSTANTS (in)			
AH = Ground to bottom of axle	12	BW = Overall width across rear axle	96
AW = Front axle track	81.1	CW = Rear axle track	72.2
BA = Front bumper to centerline of axle	56.5	FW = Frame width	33.5
BBC = Bumper to back of cab	81.5	OH = Overall height (w/o clearance lights)	112
BOC = Back of cab clearance	3	OW = Overall width across cab (w/o mirrors)	93.5
FH = Frame height at the end of frame	42.5		

Technical Notes:

[1]Chassis Curb Weight reflects standard equipment and fuel, but no driver or payload.

[2]Maximum Payload Weight is the allowed maximum for equipment, body, payload and driver and is calculated by subtracting chassis curb weight from the GVWR.

[3]Effective CA is CA less BOC.

[4]Effective CE is CE less BOC.

Vehicle Weight Limits:

GVWR	
Designed maximum	**25,950 lbs.**
GAWR, Front	**12,000 lbs.**
GAWR, Rear	**19,000 lbs.**

Model Descriptions

The FTR Diesel features a low cab forward design that is ideally suited for inter-city type applications. The low cab forward design minimizes overall length for a given body length and in conjunction with the set back front axle positioning provides excellent weight distribution. The 50 degrees inside wheel cut angle coupled with integral power steering make it an extremely maneuverable truck.

Engine

The FTR Diesel is powered by the 4HK1-TC engine with a displacement of 317 cubic inches (5.2 liters). This engine is designed for enhanced durability, reliability and clean/efficient combustion. This engine is turbocharged and inter cooled. The air-to-air intercooler provides increased horsepower and torque while maintaining good levels of fuel economy. The 4HK1-TC features a 16 valve, 4-cylinder, in-line overhead camshaft timing train, ladder frame structure and an electronic common rail injection system.

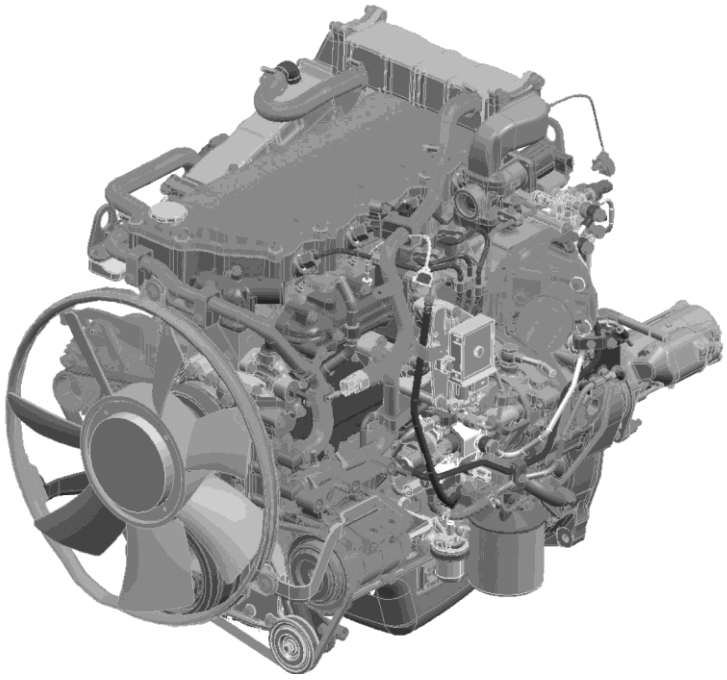


Figure 25.3.1 FTR Diesel 4HK1-TC

Engine Data: 4HK1-TC w/50 State
Heavy Duty Certification

Power (gross)*	215 HP @ 2,500 rpm
Torque (gross)*	520 lb.-ft. @ 1,600 rpm
	Governed RPM 2750 rpm
Injection	Denso common rail direct injection
Displacement	317 CID / 5.2L
Cylinder Bore	4.53 in (115 mm)
Cylinder Stroke	4.92 in (125 mm)
Cylinders	4-cylinder, in-rail OHC
Operating Cycles	4-cycle, turbocharged and inter cooled

*SAE J1349 gross ratings without fan operating.

4HK1-TC ENGINE PERFORMANCE CURVES

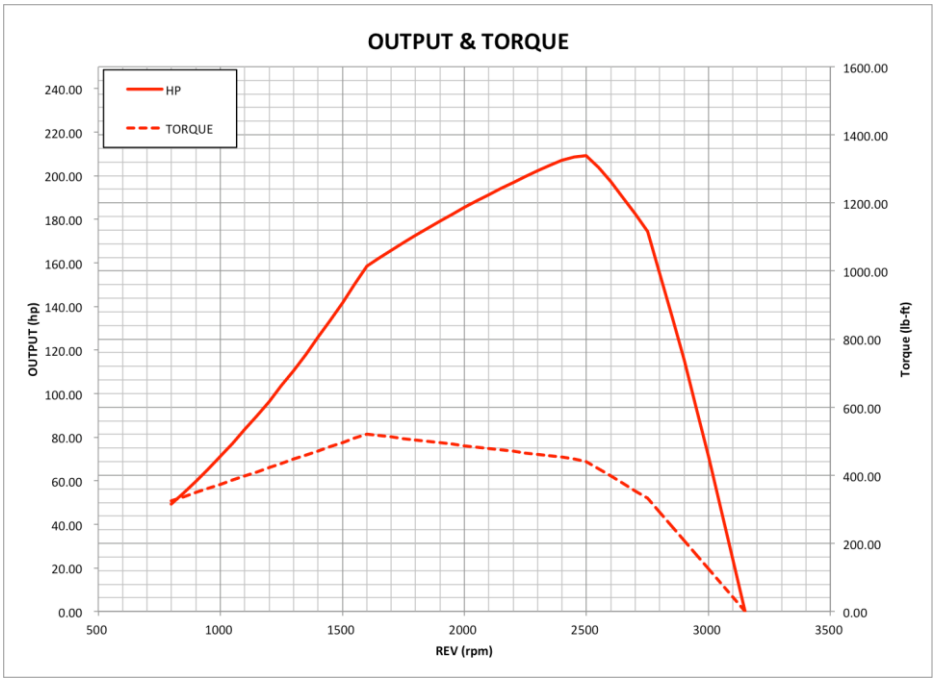


Figure 25.4.1 FTR Diesel 4HK1-TC US10 4HK1 Engine Curve

Engine Feature
The FTR uses the proven Isuzu 4Hk1-TC engine. This engine uses a high pressure common rail injection system design which has been combined with the water cooled EGR system to achieve levels of performance previously not attainable. The 4HK1-TC is turbocharged and intercooled with a 50-state emission certification. The turbocharger is an IHI Variable Geometry Turbo-charger (VGT) that provides excellent boost response over the entire RPM range of the engine. The turbocharger compressor wheel is a high efficiency wheel which improves fuel consumption and emissions. The turbocharger housing structure is strengthened mechanically to also improve reliability. Each and every engine is test run prior to installation to assure rated performance and quality.

Cylinder Block
The cylinder block is made of cast iron and is a parent bore design with five bearings. The cylinder walls are induction hardened for enhanced durability and long life. The bearing cap has a ladder frame structure integrating with the crankcase to increase block rigidity for greater strength against mechanical loads and stresses. The cylinder block water passages are designed to improve coolant circulation and eliminate hot spots. Additionally, the block is strengthened and stiffened in several key areas to reduce stress and increase engine life.

Cylinder Head
The cylinder head features 4 valves per cylinder and a direct injection fuel system. The cylinder head is made from a high strength cast iron material and is held in place by 20 high strength head bolts. Additional stiffening ribs have been added to the casting to increase head stiffness in order to improve head gasket retention and improve engine reliability. The intake and exhaust port geometry is designed to improve air flow and combustion efficiency. The cylinder head bolt engagement length has been designed to improve clamping force and engine stiffness, which increases reliability while reducing transmitted combustion noise.

Overhead Camshaft
The camshaft is located directly above the cylinders this minimizes valve train losses by eliminating the push rods and other components. The camshaft followers are a roller type for reduced friction losses. Valve timing has been designed for improved engine performance.

Crankshaft
The crankshaft is made from forged steel. It has 5 main bearings and is fully counterweighted. The crankshaft is retained by 27 bolts connecting the lower ladder structure crankcase to the engine block. The crank case bolt thread engagement to the block is designed to increase the clamping force and further stiffen the block for improved reliability and reduced combustion noise.

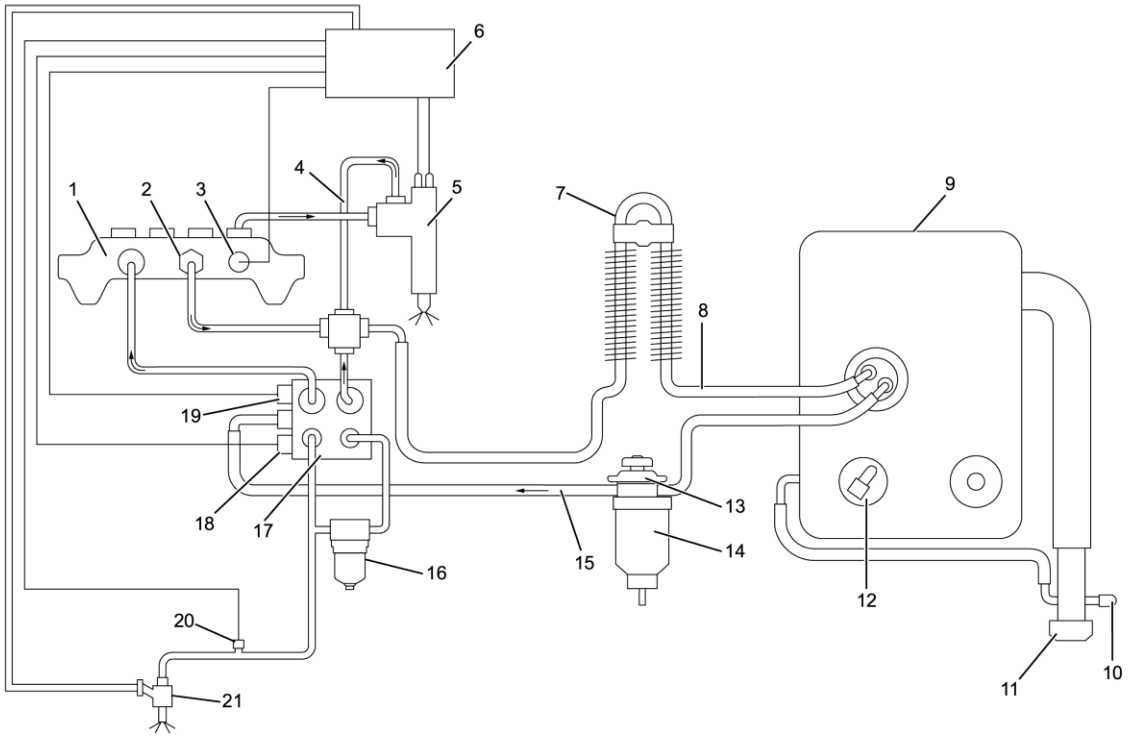
Pistons
The aluminum alloy pistons are cam-ground. This process allows them to assume a round shape when warm so they will precisely match the shape of the cylinder. This means that the piston ring assembly seals better, and results in longer engine life. The top ring carrier is cast into the top ring groove, and four sides of the top ring are nitride and the outside is coated with hard metal to ensure sufficient strength and wear resistance between the ring and groove. The piston is made of high strength aluminum alloy. Additionally, the wrist pin diameter is 50 mm to improve strength under high combustion pressures. The combustion chamber has been designed to achieve reduced emissions and improved fuel consumption.

Valves
Two intake and two exhaust valves are forged from heat resistant steel. The valve tappets are roller type for reduced friction and better performance.

Cold Start
As an aid for cold weather starting, the 4HK1-TC is equipped with glow plugs located in the cylinder head. This provides for easy starting in cold weather climate areas.

Lubrication
The engine lubrication system features a gear-driven pump which provides direct lubrication of the main, connecting rod and cam shaft bearings. The piston crowns are also oil cooled. The oil pump capacity is high to provide increased oiling for reduced wear and improved reliability. The 4HK1-TC engine also features a plate type oil cooler in the water jacket to help control oil temperature. The Closed Crankcase Ventilation (CCV) System is designed to dramatically reduce oil carryover. This will improve emissions performance and engine reliability, and reduce oil in the intake system. The oil cooler capacity has been increased to improve cooling performance. A full flow oil filter is standard. The engine uses only low ash oil as specified in the owner’s manual for vehicles equipped with SCR and Diesel Particulate Filter emission systems. Oil change intervals are 10,000 miles. Oil Capacity is 2.91 gallons (11.0 liters).

FUEL SYSTEM



1	Fuel Rail	12	Fuel Level Sensor
2	Pressure Limiter	13	Priming Pump
3	Fuel Rail Pressure (FRP) Sensor	14	Sedimenter
4	Leak Off Pipe	15	Fuel Feed Pipe
5	Fuel Injector	16	Fuel Filter
6	Engine Control Module (ECM	17	Fuel Supply Pump
7	Fuel Cooler	18	Fuel Rail Pressure (FRP) Regulator
8	Fuel Return Pipe	19	Fuel Temperature (FT) Sensor
9	Fuel Tank	20	Diesel Particulate Filter (DPF) Fuel Pressure Sensor
10	Vent Valve	21	Diesel Particulate Filter (DPF) Fuel Injector
11	Fuel Filler Cap		

Figure 25.6.1 FTR Diesel 4HK1-TC

Biodiesel Blends

Isuzu recognizes the importance of using Biodiesel Fuels as an alternative and renewable fuel based on global trends and requirements such as energy security and reducing contributions to global warming. Based on current circumstances, Isuzu supports the utilization of B20 (20% Fatty Acid Methyl Ester (FAME) Blended Diesel Fuel) in our diesel trucks with some requirements/restrictions, since B20 has unique properties and is different from conventional (distilled) diesel fuels. Biodiesel blends containing more than 5% and up to 20% biodiesel must meet the latest version of ASTM Specification D7467 (biodiesel blends B6 - B20). Also, the FAME (B100) to be blended with conventional diesel fuel must meet the latest version of ASTM D6751, regardless of concentration. We recommend that biodiesel users purchase biodiesel blends from a BQ-9000 certified vendor.

Fuel System
The fuel system is standard with a rectangular aluminum fuel tank mounted on the left hand frame rail. The fuel system features dual fuel filters, one mounted on the frame, and the other mounted on the engine. This dual filter arrangement significantly increases fuel filtration and will extend the life of fuel system components. The engine-mounted fuel filter is pressurized, which allows for a fine micron rating and significantly improved filtration performance relative to previous models. The frame-mounted fuel filter has a coarse mesh which prevents large contaminants from entering the fuel pump. The frame mounted filter also incorporates a fuel/water separator and a hand operated fuel primer pump should priming the engine be required.

Injection System
The fuel injection system is a Denso common rail type fuel system. Pressure is supplied by a high pressure pump to the common rail. Fuel is then distributed to the injectors which are controlled by the engine Electronic Control Module (ECM). The injectors deliver the correct amount of fuel regardless of speed and altitude. The injection pressure IS 200 MPa (29,000 psi) which will help to reduce emissions and improve fuel consumption. Combustion noise has also been significantly reduced. Use only Ultra Low Sulfur diesel fuel grade 2-D (S15); Use only Ultra Low Sulfur diesel fuel grade 1-D (S15) in cold weather conditions. Due to the fact that the 1-D (S15) has a lower heat value, performance and fuel economy will be slightly affected.

Cooling System
The water pump is a belt driven centrifugal unit. The cooling system has a capacity of 7.04 gallons. The radiator has an integrated transmission oil cooler. The radiator is a two row tube and corrugated fin type with a frontal area of 679 in2. The fan is 9-blade type, 20.1 inch (510 mm) diameter, with a viscous drive hub to reduce noise and increase engine fuel economy.

Exhaust Gas Recirculation (EGR) System
In order to reduce emissions of harmful Oxides of Nitrogen (NOx), all Diesel vehicles utilize EGR cooler. The EGR system on the 4HK1-TC engine has increased cooling capacity for improved emissions performance. The secondary EGR cooler is mounted across the top of the valve cover and features two ports that allow air to be bled from the system and coolant to be added to the cooling system. These ports improve serviceability and reduce the time required to bleed the cooling system. Additionally, the EGR valve motor design is brushless, which will increase service life of the motor and valve.

Air Cleaner System
Donaldson air cleaner canister with an 11.0 inch diameter paper element. The air cleaner snorkel is incorporated into the back of the cab and incorporates a resonator. The Air cleaner system is standard with an air restriction indicator in the instrument cluster that will indicate when the element is due for service. This will help ensure maintenance is performed at the correct time.

Engine Warning System
The 4HK-1TC engine is standard with an engine warning system that will provide an audible warning in the event of detection of a Low oil pressure, High coolant temperature and Low coolant level event. As a port installed option in addition to the audible warning the engine warning system can shut the engine down 30 seconds after an audible warning is sounded. This delay will allow the driver to safely move the vehicle off of the road.

Clean Idle
The Isuzu FTR diesel will have the “Clean Idle” label. This label indicates that the manufacture has certified the engine to a lower NOx standard and therefore is not required to have an engine idle shutdown on the vehicle.

PROPELLER SHAFT

The propeller shaft assembly is made up of shafts of various lengths. The propeller shaft center support bearings are a grease seal type with a dust seal, and are attached to the rear of the front/intermediate shafts and mounted to the cross member by a rubber cushion and steel support bracket. The sliding spline, located on the front portion of the rear shaft, is an involute spline type. Attachment of the propeller shaft assembly is by yokes with four bolts each.

Wheelbase	152	170	188	200	212	224	236	248
No. of Shafts	2	2	2	3	3	3	3	3
Shaft #1 O.D.	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
Thickness	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Length	43.0	43.0	67.9	43.0	67.9	67.9	67.9	67.9
Type	A	A	A	A	A	A	A	A
Shaft #2 O.D.	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
Thickness	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Length	41.2	58.9	51.8	31.7	31.7	43.7	41.1	52.9
Type	B	B	B	A	A	A	A	A
Shaft #3 O.D.	N/A	N/A	N/A	4.00	4.00	4.00	4.00	4.00
Thickness	N/A	N/A	N/A	0.95	0.95	0.95	0.95	0.95
Length	N/A	N/A	N/A	57.3	44.3	44.3	58.9	58.9
Type	N/A	N/A	N/A	B	B	B	B	B

Type **A**

Type **B**

Figure 25.8.1 Shaft Dimensions

ALLISON 2550 RDS AUTOMATIC TRANSMISSION

The Allison 2550 RDS is the standard transmission in the FTR Diesel. The key drivetrain components in the FTR Diesel (engine, transmission and rear axle) are all engineered and matched to operate as a team to provide optimal performance and economy.

Allison Automatic Transmission
Model: RDS2550
Gear and Ratios

1st	3.51:1
2nd	1.90:1
3rd	1.44:1
4th	1.00:1
5th	0.74:1
6th	0.64:1
Rev.	5.09:1
A/T Fluid	14 liters
Weight/Wet	362 lbs. (164 kg)

Other Specifications

PTO:	Automatic torque converter lockup in stationary PTO mode.
Bolt Pattern:	SAE 6-bolt PTO opening
PTO Rating:	Maximum 250 lb.-ft.

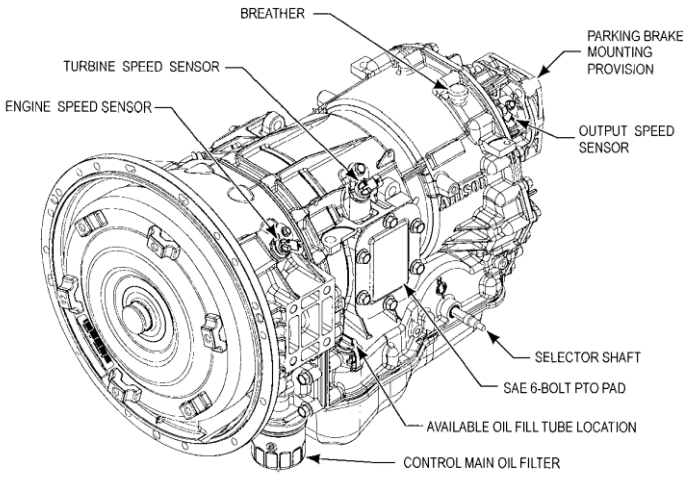


Figure 25.9 FTR Diesel Allison Transmission

Features:

- 6-speed double overdrive with lock-up converter in 2nd, 3rd, 4th, 5th and 6th gear, acceleration and deceleration.
- Electronic microprocessor shift control
- 1.730:1 torque converter multiplication ratio

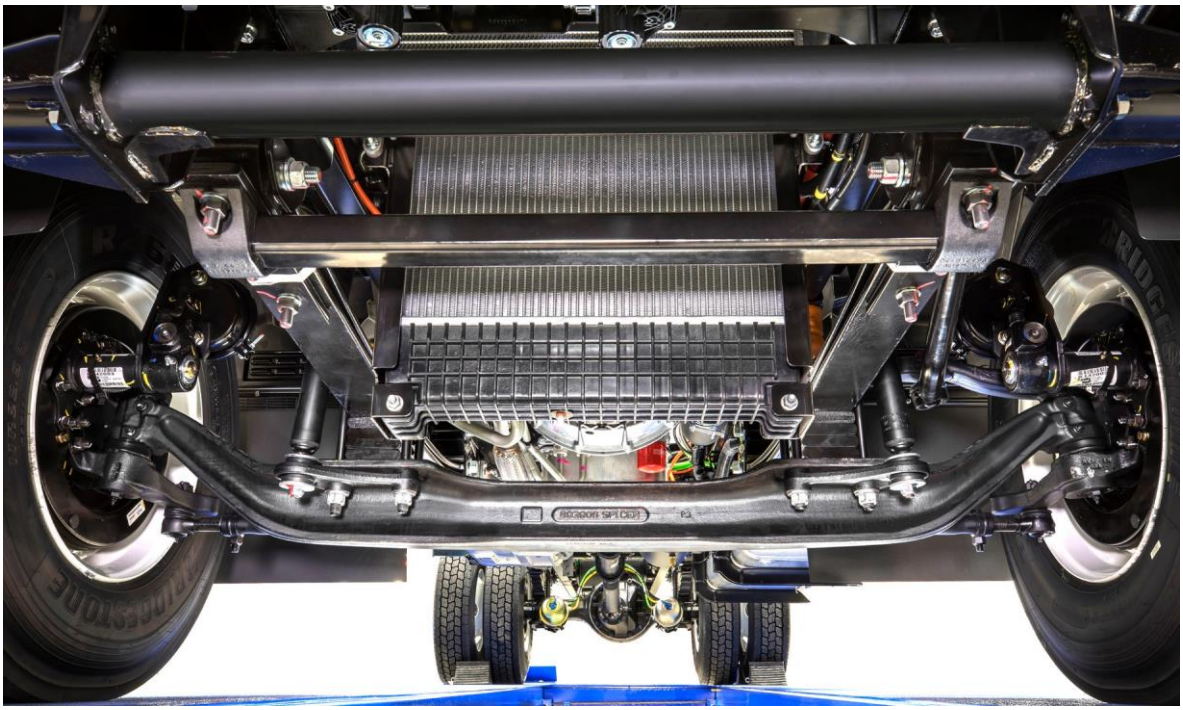


Figure 25.10.1 Front Axle and Suspension

FRONT AXLE

The FTR Diesel front axle is a drop forged steel, reverse Elliot, “I”-Beam.

Front Axle Specifications:

Type	Steel drop forged Reverse Elliot, “I”-Beam. Dana model E1254-W
Rated Capacity	12,000 lbs.
Tread Width	65.8 in.
King Pin Type	Bronze Bushings Ball
Thrust Bearing	TYPE (RH) Roller (LH)
Hub Lubrication	Oil

FRONT SUSPENSION

The front suspension is tapered leaf springs with increased spring rates for higher capacity with stabilizer bar and shock absorbers.

Front Suspension Specifications:

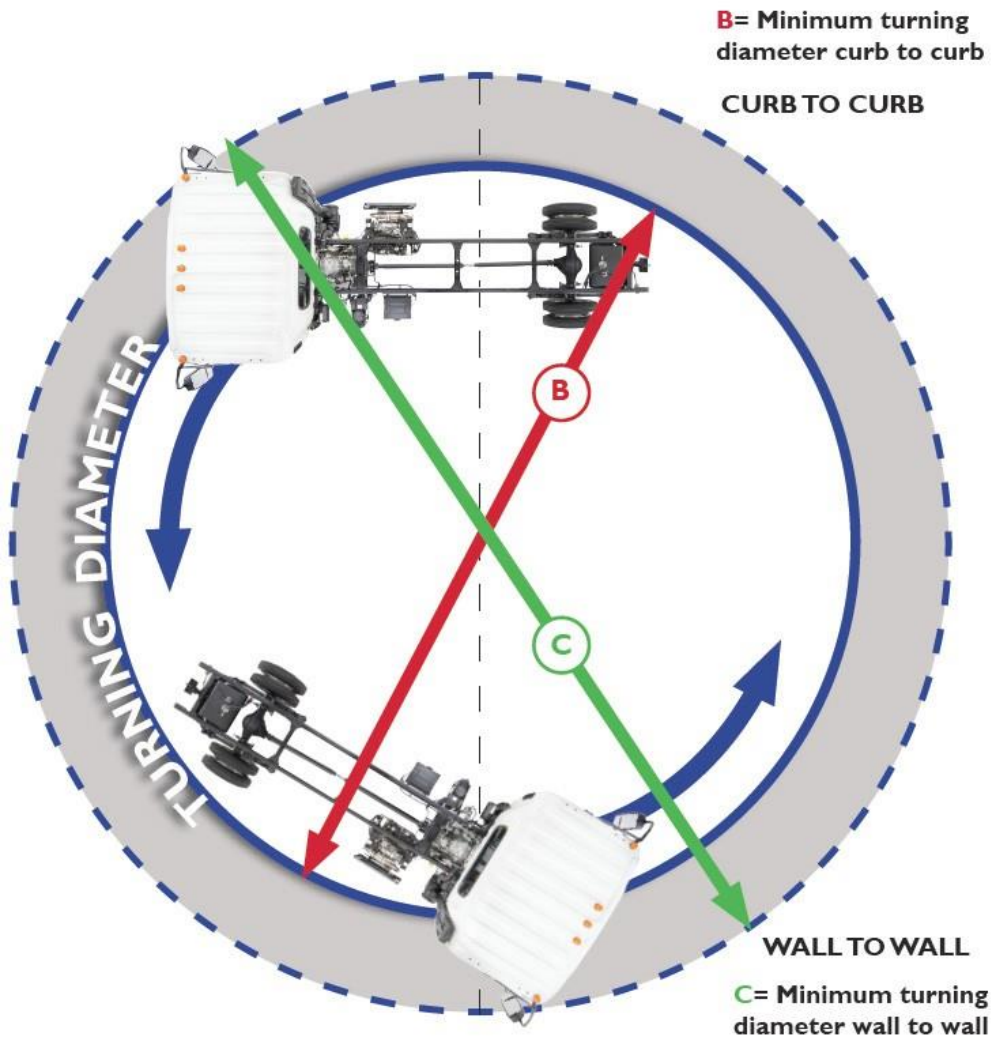
Type	Semi Elliptical
Capacity	12,000 lbs.
Effective Length	59.8 in
Width	3.5 in
Deflection Rate	1249.4 lbs./in. (218.8 N/mm)
No. Leaves	2
Leaf Thickness	2 @ 0.866 in.
Stabilizer Bar Diameter	1.65 in
Thickness	0.16 in

STEERING SYSTEM

The FTR Diesel is equipped with a high capacity integral power steering with a 22.4:1 gear ratio. The system also features a tilt and telescopic steering column that allows adjustment of the steering wheel location for driver comfort and convenience.

TURNING DIAMETERS

The FTR Diesel’s steering also features a 50 degree inside wheel cut angle. This coupled with the integral power steering, makes the FTR Diesel an extremely maneuverable truck.



Wheelbase	in	152	170	188	200	212	224	236	248
B - Curb-to-Curb	ft	43.7	47.4	51.8	54.7	56.5	59.3	62.2	65.0
C - WALL-TO-WALL (Bumper)	ft	48.7	52.5	56.9	59.9	61.7	64.6	67.5	70.3
WALL-TO-WALL (96" Mirrors)	ft	48.6	52.5	56.9	59.8	61.6	64.5	67.3	70.2
WALL-TO-WALL (102" Mirrors)	ft	49.0	52.9	57.2	60.2	62.0	64.8	67.7	70.6

Figure 25.11.1 FTR Diesel Turning Circle Diagram

REAR AXLE

The FTR Diesel has full floating rear axle with a banjo type housing and separable carrier. The wheel bearings are tapered roller type for long service life and feature oil bath lubrication.

Rear Axle Specifications:

Model	Dana 19060S
Type	Single Reduction
Rated Capacity	19,000 lbs.
Tread Width	65.8 in
Gear Type	Hypoid
Ring Gear Diameter	12.6 in
Differential type	4 Pinion Gear
Ratio	6.197
Hub Lubrication	Oil
Oil Type	See owner’s manual

REAR SUSPENSION

The rear suspension consists of a multi leaf spring with shock absorbers designed to handle the loads. The long effective spring length design provides excellent ride characteristics.

Rear Suspension Specifications:

Type	Multi Leaf Spring
Capacity	21,000 lbs.
Main Springs	
No. Leaves	9
Effective Length	63.18 in
Width	2.9 in
Leaf Thickness	4 @ 0.812 in 4 @ 0.446 in 1 @ 0.668 in
Deflection Rate	1054.1 lbs. /in. (184.6 N/mm)
Auxiliary Springs	
No. Leaves	1
Effective Length	43.85
Width	2.9 in
Leaf Thickness	0.748 in
Deflection Rate	3,447 lbs./in. (609 N/mm)

Figure 24.12.1 Rear Axle, Differential, and Suspension

FRAME

The frame in the FTR Diesel is a ladder-type, channel section, straight rail from bumper to end of frame with a rivet-less top flange. The frame material is a heat treated, carbon manganese, low alloy steel with good weldability. The chassis is equipped with a steel front bumper for greater cab protection and improved styling.
Section modulus:12.69 in^3; RBM: 1,015,000 lb-ft/in; Strength: 80,000 psi

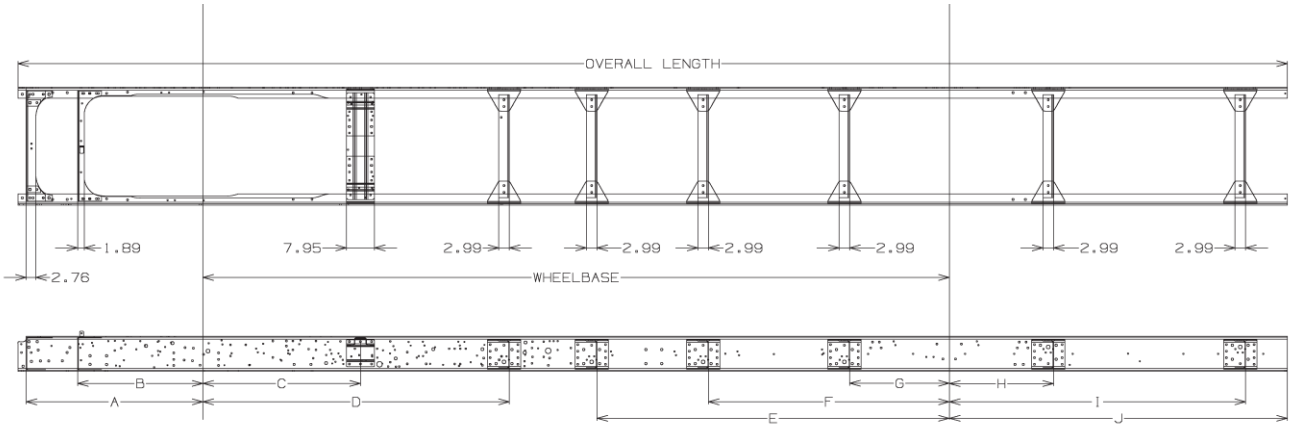


Figure 25.13.1 FTR Diesel Frame

FUEL TANK

The fuel tank is aluminum with a rectangular profile, and the standard mounting location is the left hand frame rail. A 50 gallon tank is standard on the 152” and 170” wheelbases. All other wheelbases have a 100 gallon fuel tank.

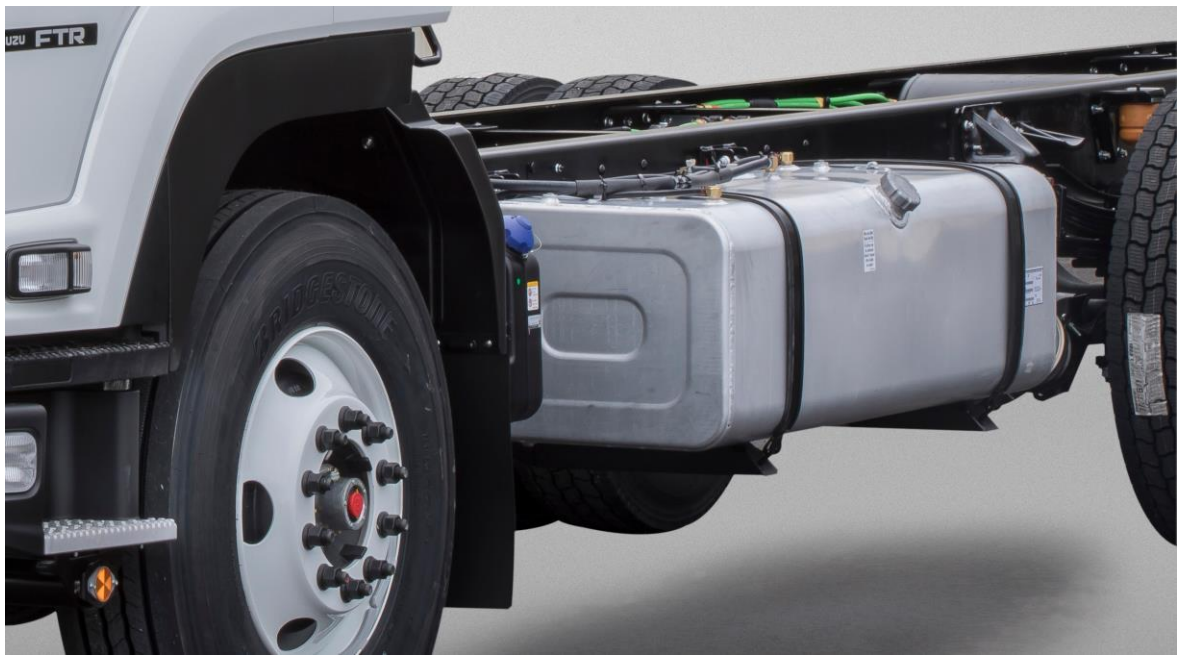


Figure 25.13.2 Side Fuel Tank

BRAKE SYSTEM

The service brake system is a full air dual circuit system. The FTR is standard with front and rear S-CAM drum brakes. The system incorporates an Anti-lock Braking System (ABS). The ABS is designed to avoid the locking of the wheels and ensure the stability of the vehicle during deceleration for a stop. The system has a fail-safe mode that will turn the ABS brake system off if a malfunction in the system is detected. The ABS system has a self-diagnostic function that will improve ease of serviceability of the system.

ABS BRAKE SYSTEM OPERATION

The ABS control unit increases, decreases, or keeps air pressure the same by operating the brake actuator unit in response to the wheel speed sensor signals. The control unit also calculates wheel speed, wheel deceleration and vehicle speed. When the brakes are applied in a manner that the wheel rapidly decelerates and the difference between wheel speed and vehicle speed becomes larger that a predetermined value the control unit senses that the wheel is about to lock up and the unit keeps the air pressure as it is. If the wheel further decelerates the control unit senses that the wheel is locking up and reduces the brake air pressure. When the control unit senses that the wheel is unlocked, the unit maintains or increases brake air pressure repeatedly.

OVERRIDING ACCELERATOR WITH BRAKES

ECM logic has been adopted that will reduce the engine RPM to engine idle RPM when the brake and accelerator pedals are applied simultaneously above 5 mph in a forward gear position. This ECM logic has been adopted to enhance the safe operation of the vehicle.

AIR COMPRESSOR

The air pressure for the system is supplied via a compressor pump that is driven off of the rear gear drive of the engine. The system has a Bendix AD-IS heated air dryer and drain valves on both tanks.

BRAKE SPECIFICATIONS

Model	**Cab Chassis**
Type	**Full Air System Dual Circuit**
Front Drum:	
Diameter	16.50 in
Width	5.00 in
Shoe Thickness Useable	0.25 in
Lining Area	154.3 sq.in.
Lining Material	Bendix EES402
Rear Drum:	
Diameter	16.50 in
Width	7.00 in
Thickness	0.25 in
Lining Area	215.6 sq.in.
Lining Material	Bendix EES402

Figure 25.14.1 Bendix Air Dryer

Exhaust Aftertreatment System

The stainless steel engine exhaust system routes to a horizontally mounted Diesel Particulate Filter (DPF) and Selective Catalytic Reduction System (SCR) unit. This combination unit along with an enhanced EGR system and variable vane turbocharger allow the FTR chassis to meet the 2010 EPA emission standards. The exhaust system monitors the particulate status of the DPF and levels of the Diesel Exhaust Fluid (DEF) needed for the SCR system to operate. These functions are reported to the driver via the Multi Information Display (MID) in the instrument cluster. Under normal highway operating conditions the system will regenerate itself and remove NOX and Particulate Matter automatically. Under slow speed or long idle times the system may require the vehicle operator to initiate a DPF regeneration cycle manually. The DEF tank has a 4.2 gallon (16L) capacity and will need to be replenished when the DEF supply runs low. Only DEF that carries the seal of certification from the American Petroleum Institute (API) should be used. Vehicle operators should familiarize themselves with the monitoring system (see the owner’s manual or decal in cab) to ensure smooth efficient operation of the vehicle.

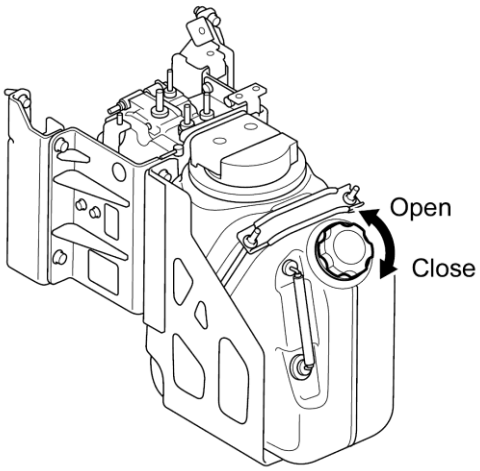


Figure 25.15.1 FTR Diesel Exhaust Fluid

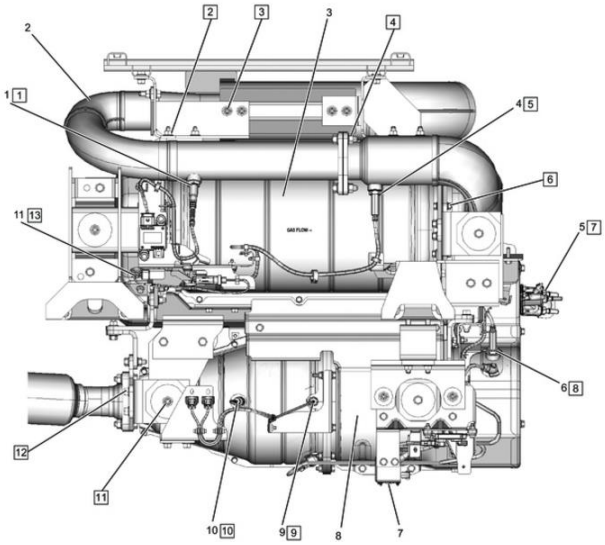


Figure 25.15.2 FTR Diesel Exhaust Treatment

Exhaust Routing Description

The exhaust system routes to a horizontally mounted package containing a stainless steel DPF and SCR Chamber on the right side of the chassis. The exhaust tail pipe then exits to the rear on the right side of this package.

DPF (Diesel Particulate Filter) dimensions:
OD: 9.0 inches
Length: 25.1 inches
Material: Stainless Steel

SCR Chamber dimensions:
OD: 10.0 inches
Length: 22.6 inches
Material: Stainless Steel

Exhaust Cooler:
At the end of the exhaust system is an exhaust gas cooler. This device will lower exhaust gas temperatures created during regeneration to pre-2007 exhaust gas temperature levels.

ELECTRICAL

Electrical System:
12V with negative ground

Batteries:
Two 12V Group 31 750 CCA maintenance-free type batteries with threaded posts are wired in parallel. The individual battery has a 160 minute reserve capacity rating.
The battery box has a lockable battery hold down to prevent theft.

Starter Motor:
Reduction speed type solenoid controlled with over running clutch.

Alternator:
12V-140 AMP output with integral regulator.

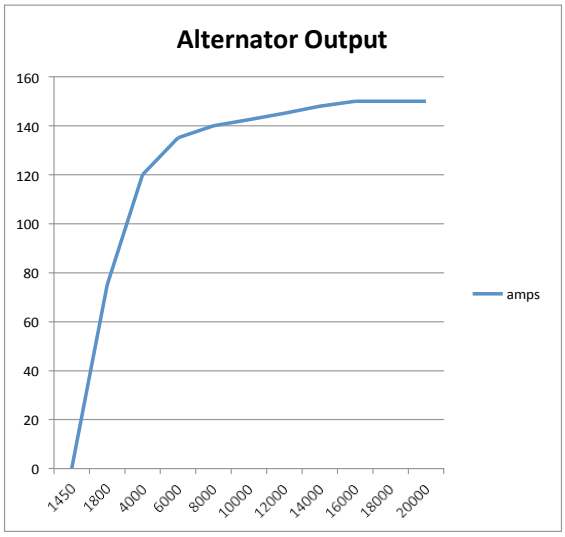


Figure 25.16.1 FTR Diesel Alternator Output Curve

Lighting Specifications:
- Flush surface halogen headlamps with integral parking light and turn signal
- Independent side turn signals and cornering lamps
- Combined rear lamps:Turn Signal, Stop, and Backup
- Identification/clearance lamp (shock mounted for extended bulb life)
- Day time running lights
- LED compatible flasher
- License plate lamp

Upfitter Connections:
- Back up alarm electrical connector
- Body mounting electrical connector
- Auxiliary power connector behind dash

TIRES/WHEELS

Standard Tire Specifications:

Manufacturer	Bridgestone Continental
Type	Low Rolling Resistance Tubeless Steel Radial
Size	11R22.5G
Ply Rating	14
Tread	Highway rib (Front) Highway traction (Rear)
Max. Rating per tire	@105 psi - Cold Inflation Pressure 5840 lbs. (Dual / Rear) 6175 lbs. (Single / Front)
Rev/Mile	Bridgestone: 500 Continental: 498

Standard Wheel Specifications:

Size (in)	22.5 in. x 8.25 in.
Bolt Holes	10
Bolt Circle Diameter	11.25 in.
Outside Offset	5.0 in
No. Pc. Rim	1
Rim Type	15° DC
Manufacturer	Accuride
FT/RR Nut Size+	1.6142 in (41 mm) Bud Hex
Rear Stud Size+	0.8268 in (21 mm) Square
Nut/Stud Torque Specs.	325 ft.-lb. (440 N-M)

*Manufacturer specification is not permissible.
+O.D. wrench sizes.

CAB FEATURES

Cab Over Engine Design

The FTR cab design brings an exciting look to the product. Based on the “Hexapod Design Concept” the cab has been redesigned to meet new emerging market demands. Cab panels, radiator grill, headlights, and bumper are designed to embrace the design concept that brings maximum space to the cab interior while creating a bold look on the outside of the cab. The sleek design conveys a solid clean vehicle with a bold presence in the market place. These enhancements in the product continue to bring customer driven improvements in LCF design to the market place. The cab interior features improved driver comfort with ample head room, leg room, storage room, and a wider door opening and larger step for easier access to the cab. Once inside the driver is greeted by pleasing interior color scheme and enhanced vehicle information provided by the instrument cluster.

The low cab forward (LCF) design used by the FTR Diesel has been recognized in urban centers throughout the world for the following features:

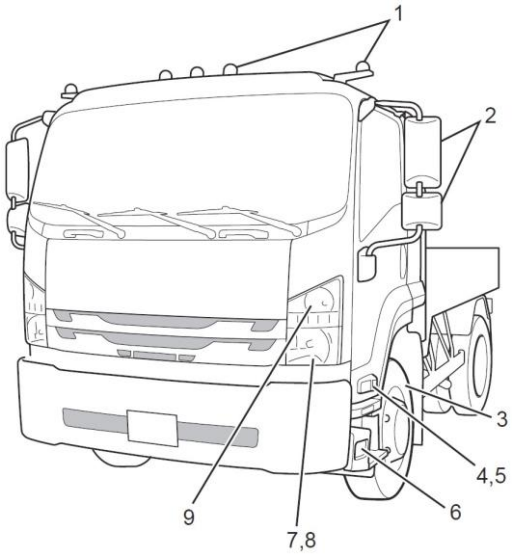
- More cargo space within a given overall length.
- Shorter overall length with a given body length.
- Small turn diameters.
- Better driver visibility.
- Ease of entry and exit. (Wider self-cleaning entry step and door opening with 90 degree door swing)

The Hexapod cab has been designed to meet all current and future market trends and offers additional value to the customer in many other areas.

Engine Accessibility

The FTR Diesel tilt cab design provides complete and easy access to the engine area for service. By following the procedure shown in the owners’ manual the cab can be tilted a full 45 degrees with great ease on improved cab mounts. More engine access is provided with the tilt cab than by any conventional or van cabs offered by the competition. This ease of access allows quicker service that will translate to lower maintenance costs leading to a lower cost of operation for the LCF design. The cab floor is insulated to improve the drivers cab environment by reducing engine and noise and heat penetration into the cab interior.

Convenience of operation and service are highlights of the improved cab. Fuses and electrical relays are located behind a removable panel below the center of the dash. This location is within easy reach for access by the driver or a technician. The windshield washer bottle is located behind the front hood panel. The washer bottle feeds intermittent wet arm wipers that put the washer fluid directly on the windshield where it
is needed. The cab roof cap is designed to channel water off of the roof to the side not down the windshield to improve driver visibility in wet weather. The windshield is bonded to the cab for increased cab rigidity, less wind noise, and no leaks. The windshield has an tinted upper area for improved visibility and safety. The dash mounted engine oil level check system allows the engine oil level to be quickly verified from inside the cab on a daily basis with the key in the off position. The coolant reservoir is located at the back of cab and is also easily checked without tilting the cab.



No.	Equipment Description
1	Roof marker light (Identification light/Clearance light)
2	Outside rearview mirrors
3	Tires
4	Side turn signal light
5	Side marker light
6	Cornering light
7	Headlight
8	Parking light
9	Front turn signal light

Figure 25.17.1 FTR Diesel Cab Features

Cab Environmental Systems

The cab environmental system has been designed to provide enhanced air flow through the ventilation system in the cab. The system provides plenty of air flow and heat to keep the driver comfortable, ventilate the cab, and keep the windshield glass clear. The standard air conditioning system uses environmentally friendly 134a refrigerant. A larger air-conditioning condenser has been located vertically and raised for greater protection of this component for improved operation and less maintenance.

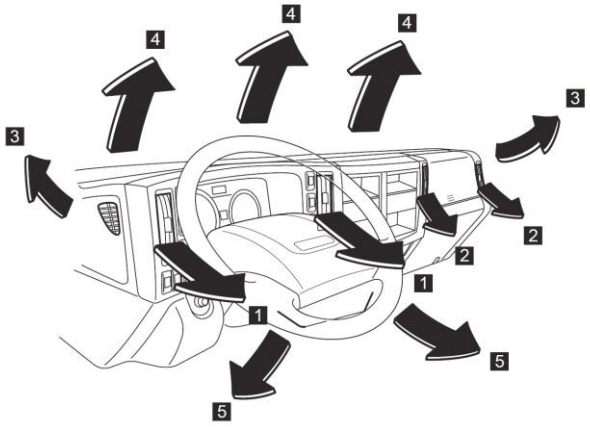


Figure 25.18.1 FTR Diesel Cab Ventilation

No.	Outlet	Features
1	Driver side outlet	Air flow direction is adjustable with the tab.
2	Passenger side outlet	Air flow direction is adjustable with the tab.
3	Door windows outlet	Air is delivered towards the door windows.
4	Windshield outlet	Air is delivered towards windshield
5	Foot outlet	Air is delivered towards the feet

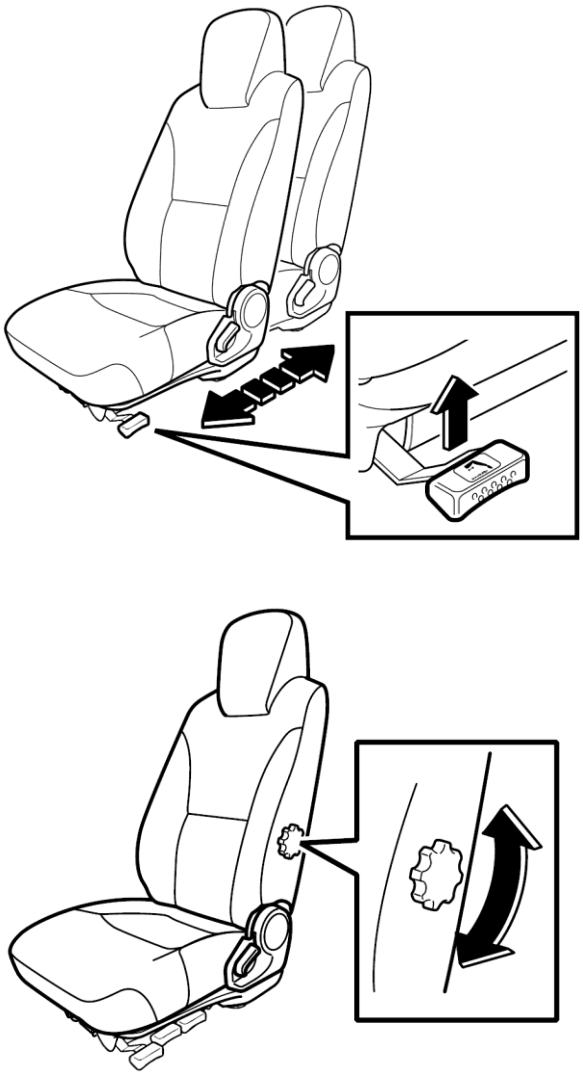
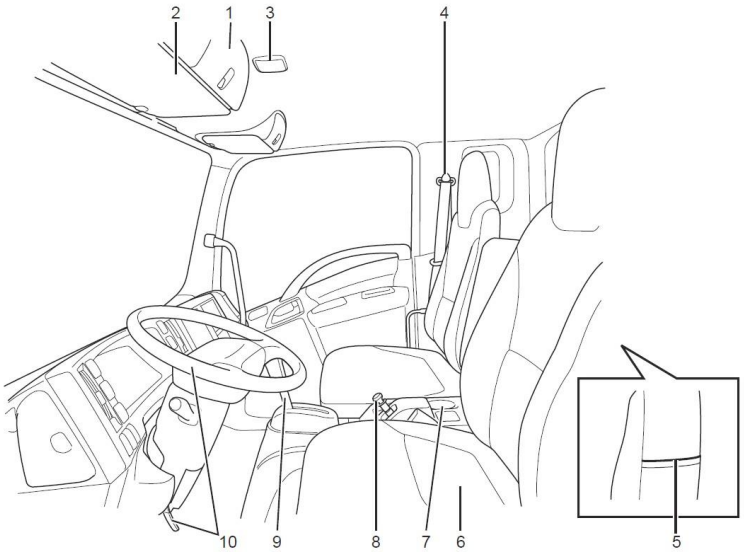


Figure 25.18.2 FTR Driver’s Seat Features

Interior Trim Features

To enhance driver comfort the seat cushions have been designed for maximum support. The seat material is a durable Tricot flat woven material on the seat base and on the seat back. This seat material will provide a tough long lasting seat that breathes for enhanced driver comfort in hot or cold climates. The driver’s seat fore and aft travel has been increased allowing more room to tilt and adjust the seat for maximum driver comfort. Adjustable lumbar support, a right side arm rest, and an air ride suspensions system have all been introduced as standard features on the FTR's driver seat. A center seat adds room for a third passenger, and when folded doubles as a working surface and storage area.

Seat belt design has been enhanced for easier operation. A new interior dome light is installed for a brighter cab during night time operations. Additional storage for maps and other papers is provided in easy to reach door pockets, seat backs as well as several built in storage areas in the dash. Overhead shelves with latching doors are standard on the FTR. In addition, there is plenty of extra storage space behind the seats of the FTR full cab configuration.



No.	Equipment Description
1	Overhead shelf
2	Sun visor
3	Dome light
4	Seat belt
5	Seatback pocket (driver's side)
6	Seat
7	Cup holder
8	Parking brake lever
9	Selector lever
10	Fully adjustable steering

Figure 25.19.1 FTR Driver Side Interior

The steering wheel is designed to provide maximum visibility of the instrument cluster. The column tilts and telescopes to adjust for varying driver profiles.

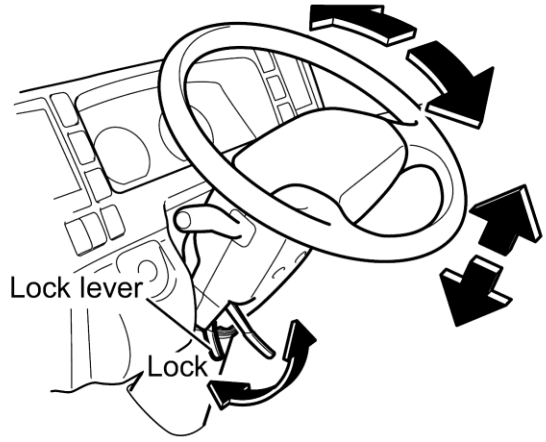


Figure 25.19.2 FTR Diesel Steering Column

The parking brake handle is located between the driver’s seat and the center passenger seat. This location provides an unobstructed floor for increased driver comfort. The rubber floor cover is durable and easy to maintain.

A Heavy duty floor mats are standard. The automotive style instrument panel has a low profile design for improved downward visibility. The cab is fully trimmed to provide a quieter environment. Two cup holders are mounted between the seats within convenient reach of the driver and will handle large convenience store cups. A slide out, dash mounted cup holder accommodates two smaller sized cups. The rear cab panel incorporates a coat hook for improved driver comfort.

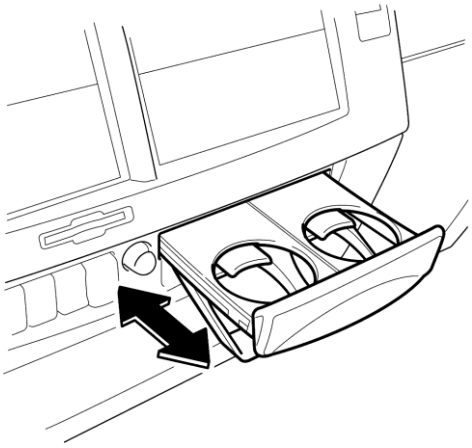


Figure 25.19.3 FTR Diesel Cup Holder

Instrumentation

The instrument cluster includes a Multi Information Dis- play (MID) in addition to the speedometer, tachometer, fuel gauges and temperature gauges, combined with the redesigned steering wheel, instrument visibility is greatly enhanced. The MID will provide information to driver that will enable him to improve his fuel economy, monitor the emission system and be alerted to warning messages from the engine. Frequently used switches are styled for easy operation, and illuminated for operation at night. ISO symbols are used on the switches and instrument panel for standard recognition of control components.

The combination switches are designed to fit naturally in the hand. Their function is clearly marked on the lever for easy recognition. The odometer has a three way mode switch used to navigate the various information menus of the MID. The current operational status of the Diesel Particulate Filter (DPF) and levels of Diesel Exhaust Fluid (DEF) are also indicated on the MID. Cornering lights are standard to improve night time visibility when the turn signals are operated and headlights are on. Cruise control is standard and the controls are post mounted for easier operation and greater driver comfort. PTO functions can also be accessed through the cruise control by the addition of the optional PTO/ engine idle up switches on the dash or through connectors on the frame. An AM/FM/CD radio with Bluetooth is standard equipment. The dash also has a “5 DIN” opening suitable for other electronic equipment.

No.	Description
1	Instruments, warning lights, and indicator lights
2	Horn button
3	DPF switch
4	Cruise control main switch
5	Hazard warning flasher switch
6	Remote control mirror switch (optional)
7	Odometer and Engine oil level check switch
8	Door lock switch
9	Instrument panel light level control
10	PTO main switch (optional)
11	PTO engine speed control switch (optional)
12	Rear body interior light switch (optional)

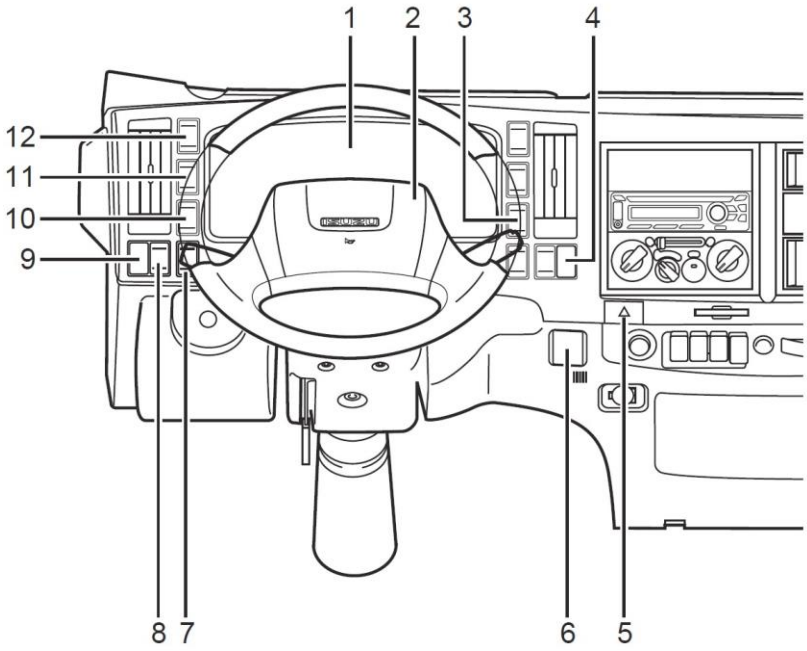
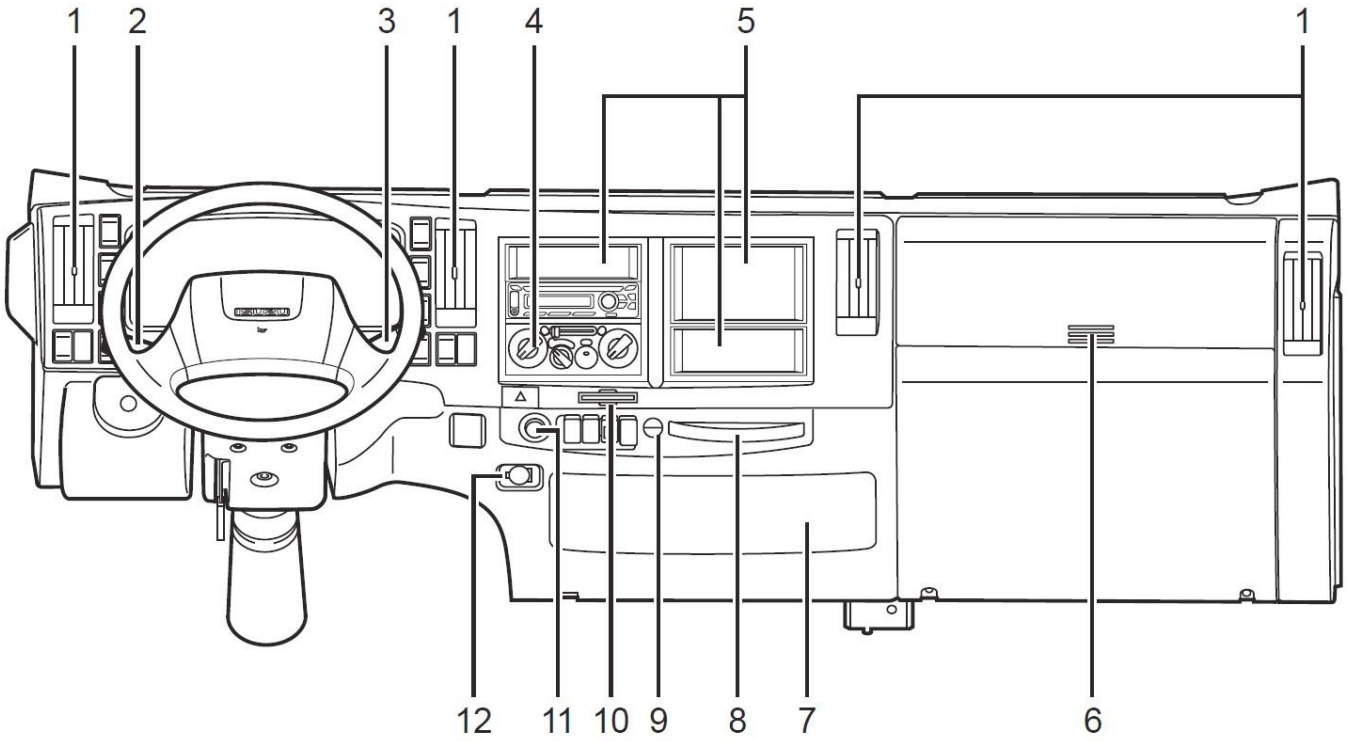
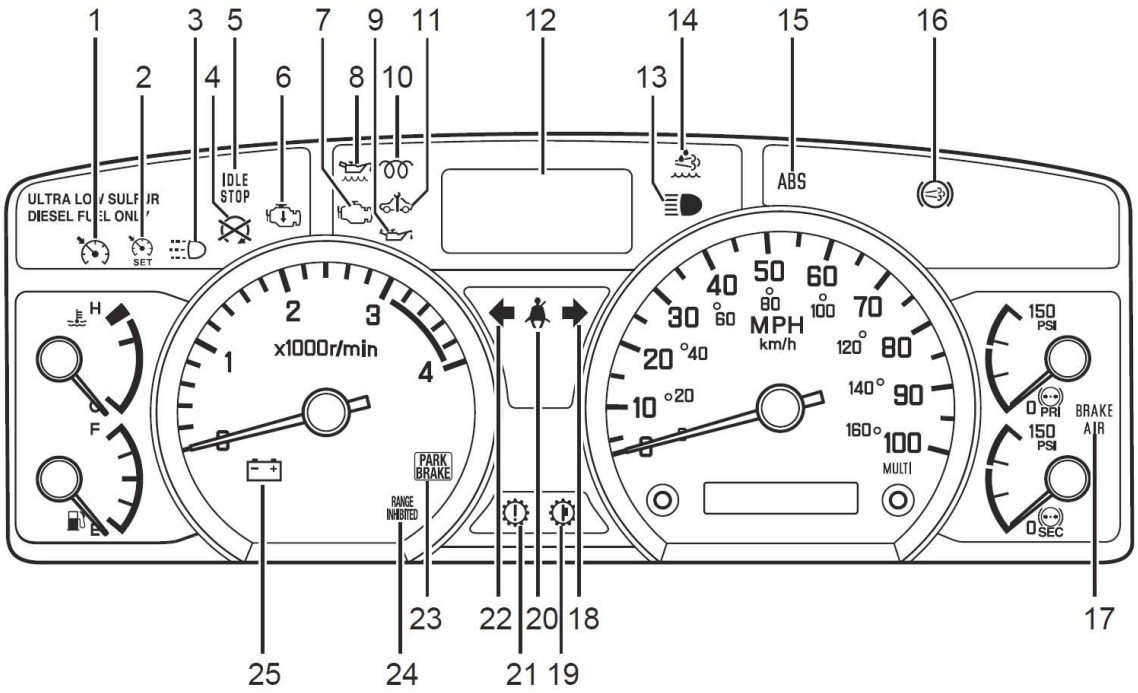


Figure 25.20.1 FTR Dash Panel and Driver Controls



No.	Equipment Description	No.	Equipment Description
1	Air flow direction control lever	6	Glove compartment
	Combination light control switch	7	Relay box
2	Cruise control set switch/resume switch	8	Cup holder
	Exhaust brake switch	9	Hook
3	Windshield wiper and washer switch	10	Card holder
4	Manual air conditioner	11	Accessory power outlet type 1
5	Small article storage pocket	12	Accessory power outlet type 2

Figure 25.21.1 FTR Diesel Instrument Panel



No.	Description	No.	Description
1	Cruise main indicator light	14	Diesel exhaust fluid (DEF) indicator light
2	Cruise set indicator light	15	ABS warning light
3	Daytime running lights (DRL) indicator light	16	Exhaust brake indicator light
4	Engine alarm (shutdown) warning light	17	Air pressure warning light
5	Idling stop indicator light	18	Turn signal and hazard warning indicator light (right)
6	Reduced engine power indicator light	19	Automatic transmission fluid (ATF) temperature warning light
7	Check engine malfunction indicator light		
8	Engine oil level indicator light	20	Seat belt warning light
9	Engine oil pressure warning light	21	Check transmission warning light
10	Glow plug indicator light	22	Turn signal and hazard warning indicator light (left)
11	Service vehicle soon (SVS) indicator light	23	Parking brake warning light
12	Multi-information display (MID)	24	Range inhibited warning light
13	Headlights high beam indicator light	25	Battery discharge warning light

Figure 25.22.1 FTR Diesel Instrument Layout

Weights for Options		
RPO	Option Description	Front / Rear (lbs)
I1L	Speed Limited to 58 MPH	0 / 0
I2L	Speed Limited to 65 MPH	0 / 0
I3L	Speed Limited to 68 MPH	0 / 0
I4L	Speed Limited to 70 MPH	0 / 0
I4K	Keyless entry	1 / 0
I6K	Locking DEF tank cap	0 / 0
IY9	Engine Idle Shutdown (Timer set at 3 minutes for engine shutdown)	0 / 0
I9A	Engine Idle Shutdown (Timer set at 5 minutes for engine shutdown)	0 / 0
I2Q	96" Wide Heated Mirrors (Flat & Convex)	1 / 0
I3Q	96" Wide Heated Remote Mirrors (Heated Flat & Convex, Remote Flat Only)	2 / 0
I4Q	102’’ Wide Standard Mirror Heads	2 / 0
I5Q	102" Wide Heated Mirrors (Flat & Convex)	2 / 0
I6Q	102" Wide Heated Remote Mirrors (Heated Flat & Convex, Remote Flat Only)	3 / 0
IF6	Fire Extinguisher (2.5 lbs) and Triangle Kit	22 / 0
I8P	Fire Extinguisher (5 lbs.) and Triangle Kit	27 / 0
I0M	Cold Weather Package (Block Heater and Heated Fuel Filter)	1 / 0
IH2	Engine emergency shutdown system HWT, LWL, LOP	0 / 0
IL9	PTO Enable Switch and Engine Idle Up Switch recommended for PTO and Idle applications only	0 / 0
IX2	Rear Body Dome Lamp Switch	0 / 0
IY4	Delete Radio	-3 / 0
UZF	Back up alarm	0 / 1
V22	Chrome Grille	1 / 0
I4H	CAN Interface Converter	0 / 0
I5L	Locking DEF Cap (all keyed alike on multiple chassis ordered together)	0 / 0
I7L	High Visibility Seat Belt (red color, Driver seat only, available on standard cab and crew cab)	0 / 0
I8L	High Visibility Seat Belt (red color, Driver and RH passenger seat only, available on standard cab and crew cab)	0 / 0