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Technical information

DIMENSIONS

SPECIFICATION	XL-40	XL-45
Overall length	40.0' (12 190 mm)	45.0' (13 716 mm)
Overall width	102" (2 590 mm)	102" (2 590 mm)
Overall height (over closed roof hatch(es))	130.7" (3 320 mm)	130.7" (3 320 mm)
Entrance door width	26" (660 mm)	26" (660 mm)
Headroom (Floor to ceiling)	76.5" (1 943 mm)	76.5" (1 943 mm)
Aisle width	14" (355 mm)	14" (355 mm)
Step height from ground	15" (381 mm)	15" (381 mm)
Other step height	8.5" (216 mm)	8.5" (216 mm)
Cabin floor height	48.5" (1 232 mm)	48.5" (1 232 mm)
Ground clearance	11" (279 mm)	11" (279 mm)
Wheel base (Front axle's center to drive axle's center)	280" (7 112 mm)	315" (8 000 mm)
Front overhang	69" (1 753 mm)	69" (1 753 mm)
Rear overhang	82.7" (2 100 mm)	107.7" (2 736 mm)
Front track	85.67" (2 176 mm)	85.67" (2 176 mm)
Drive track	76.5" (1 943 mm)	76.5" (1 943 mm)
Rear track (Tag axle)	82" (2 083 mm)	82" (2 083 mm)
Turning circle radius (Exterior front corner)	41' 5" (12 624 mm)	45' 7" (13 894 mm)

WEIGHTS

Dry weight (w/series 60 & World trans.)

XL-40	29 350 lbs (13 341 kg)
XL-45	30 850 lbs (14 023 kg)

Dry weight (w/series 50 & World trans.)

XL-40	28 940 lbs (13 155 kg)
XL-45	30 440 lbs (13 836 kg)

Gross vehicle weight rating

XL-40	42 690 lbs (19 400 kg)
XL-45	46 800 lbs (21 270 kg)

Gross axle weight rating

Front axle	14 400 lbs (6 545 kg)
Drive axle	20 400 lbs (9 270 kg)
Tag axle	12 000 lbs (5 455 kg)

The Gross Vehicle Weight Rating (G.V.W.R.) and the Gross Axle Weight Ratings (G.A.W.R.) for front, drive and rear axles are listed on a certification plate located on the panel at the L.H. side of driver's seat, under the side control panel.

CAPACITIES

Engine oil (series 60)

Crankcase	37 U.S. qts (35 liters)
Reserve tank	10 U.S. qts (9,5 liters)

Engine oil (series 50)

Crankcase	29.5 U.S. qts (28 liters)
Reserve tank	10 U.S. qts (9,5 liters)

Fuel tank

XL-40	180 U.S. gal. (681 liters)
XL-45	208 U.S. gal. (787 liters)

Cooling system.....27.6 U.S. gal. (104 liters)

Transmissions

Automatic transmission
(excluding external circuits) 10 U.S. gal. (38 liters)

Manual transmission
7 speed.....24 U.S. qts (22,7 liters)
6 speed.....20.5 U.S. qts (19,4 liters)

Differential oil 13.7 U.S. qts (13 liters)

Power steering reservoir 4.0 U.S. qts (3,8 liters)

Windshield washer reservoir5 U.S. gal. (19 liters)

Refrigerant
Driver's and central system24 lbs (11 kg)
Auxiliary system (opt.).....3.5 lbs (1,6 kg)

FUEL TYPE

ASTM specification D-975
Recommended grade 1-D
Acceptable grade 2-D

WHEELS AND TIRES

Steel wheels..... 8.25 X 22.5
Inner drive axle..... 8.25 X 22.5

Aluminum forged wheels..... 9 X 22.5
Except inner drive axle (steel) 8.25 X 22.5

Tires.....12 R 22.5 or 315/80 R 22.5

NOTE: *It is recommended that all tires on coach be of the same type.*

Recommended tire inflation pressure (cold)

Front axle 115 psi (792 kPa)
Drive axle 90 psi (620 kPa)
Tag axle..... 95 psi (655 kPa)

CAUTION: *These tire pressures are established in accordance with the maximum allowable load on each axle. A lower pressure is recommended if the axle load is less than the above specifications. Weigh vehicle fully loaded and pressurize according to tire manufacturer's recommendations.*

For other tire and wheel specifications, refer to the "Prévost Special Specifications" label affix on the panel at the L.H. side of driver's seat, below the certification plate.

BELTS

Radiator fan drive (transfer) (series 60 only)
 Make: Dayco
 Model: AX 74
 Qty: 3

Radiator fan drive (transfer) (series 50 only)
 Make: Dayco
 Model: AX 73
 Qty: 3

Radiator fan drive (fan)
 Make: Dayco
 Model: Multi-V, 5100510
 Qty: 1

A/C compressor (Driver's and central system)
 Make: Gates
 Model: BX 97
 Qty: 2

A/C compressor (Auxiliary system, opt.)
 Make: Gates
 Model: Hi-Power A 35
 Qty: 1

Alternator 24 V 270 amps
 Make: Dayco
 Model: Multi-V, 23521337 20-6966
 Qty: 1

ENGINES

Detroit Diesel DDEC III Series 60, 12.7 liters inline 6 cylinders, 400 BHP.

Detroit Diesel DDEC III Series 60, 11.1 liters inline 6 cylinders, 325 BHP.

Detroit Diesel DDEC III Series 50, 8.5 liters inline 4 cylinders, 315 BHP.

TRANSMISSIONS

Automatic transmission
 Allison six speed automatic World Transmission B500 or B500R with Electronic Control.

Gear	Ratio
1 st	3.51
2 nd	1.91
3 rd	1.43
4 th	1.00
5 th	0.74
6 th	0.64
Rev	4.80

Converter (Series 60, 12.7 liters)..... 1.79

Converter (Series 60, 11.1 liters and Series 50)..... 2.34

Output retarder..... (Optional)

NOTE: Gear ratios do not include torque converter multiplication.

Manual transmissions

Spicer PS145-7A, 7-speed

Gear	Ratio
1 st	10.13
2 nd	5.99
3 rd	3.56
4 th	2.57
5 th	1.84
6 th	1.33
7 th	1.00
Rev	10.13

Spicer PS130-6B, 6-speed

Gear	Ratio
1 st	8.53
2 nd	4.87
3 rd	3.00
4 th	1.90
5 th	1.33
6 th	1.00
Rev	8.53

DRIVE AXLE RATIO

World transmission (Series 60) 4.89:1 (std)
 4.56:1 (opt)
 World transmission (Series 50) 4.89:1

Manual transmissions (Series 60) 3.07:1 (std)
 3.21:1 (opt)
 Manual transmissions (Series 50) 3.21:1

BRAKES

- Air operated, disc type on front axle and tag axle, drum operated type on drive axle.
- On XL-40, Brake chamber type 24 on front axle, 30/36 on drive axle and 16 on tag axle.
- On XL-45, Brake chamber type 30 on front axle, 30/36 on drive axle and 16/24 on tag axle.
- Automatic slack adjuster.
- Two cylinder air compressor, engine gear driven, water-cooled and lubricated.
- Air dryer.
- Nylon color-coded air lines.

ANTILOCK BRAKING SYSTEM (ABS) (optional)

Components: Electronic Control Module (ECM)
Solenoid control valves
Sensors
Clamping bushes
Wiring harnesses

Electronic control module technical data

Voltage:.....24 ± 6 volts
Thermal operating range:..... -40 to 167 °F
(-40 to 75 °C)

Protection system for sealed multi-pin plug according to DIN 40050

Electrical connection is made through a 35 pin plug

Maintenance:..... none

Solenoid control valve technical data

Voltage: 24 (+4.8, -2.4) volts
Current:DC
Rated current: 1.65 amps
Protection system according to DIN 40050
Maximum service pressure: 10 bars (145 psi)
Thermal operating range: -40 to 176 °F
(-40 to 80 °C)
Electrical connector:..... 894 601 010 2
Maintenance:..... none

Sensor technical data

Two cored screened cable: AWG 18 (1 mm²)
Force needed to tear out lead: 11.2 lbs (50 N)
Force needed to pull off shrink-fitted tube:
11.2 lbs (50 N)
Thermal operating range: -40 to 176 °F
(-40 to 80 °C)
Protection system according to DIN 40050

STEERING

- Tilt steering wheel and telescopic steering column.
- Integral hydraulic-assisted steering gear.
- System pressure: 2175 psi (14990 kPa).

ELECTRICAL SYSTEM

24 & 12 volt negative grounded

Alternator - 270 amps (at 28 volts)

Four (4) model 31, 12 volt maintenance-free batteries, each with a 930 cold cranking amp. capacity.

Battery equalizer(s)

Wiring protection: fuses, manual and automatic resettable circuit breakers

12 volt and 24 volt main disconnect switch(es)

SOUND SYSTEM

- AM/FM/Stereo cassette receiver.
- AM/FM/Stereo CD receiver (optional).
- 2 Microphones with 6-foot extension cords.
- Wireless microphone and receiver (optional).
- Microphone jacks (two standard).
- P.A. and Back-up P.A.
- 12 Blaupunkt Hi-Fi speakers.
- 45 watts, two channel, 24 volts audio amplifier.
- Digital audio / video control unit for driver's control.
- Two Hi-Fi speakers in driver's area (optional).
- Compact disc player - 6 stacks (optional).
- Cellular phone antenna (optional).
- CB antenna (optional).

VIDEO SYSTEM (optional)

- VHS video cassette player.
- TV monitors (mounted under parcel racks) (qty 3, 4, or 5).
- TV receiver (with video system only).

SUSPENSION

Front axle

- 2 air springs.
- 2 shock absorbers.
- 3 longitudinal radius rods.
- 1 transversal radius rod.
- 1 height control valve.
- 1 sway bar.

Drive axle

- 4 air springs.
- 4 shock absorbers.
- 3 longitudinal radius rods.
- 1 transversal radius rod.
- 2 height control valves.

Tag axle

- 2 air springs.
- 2 shock absorbers.
- 3 longitudinal radius rods.
- 1 transversal radius rod.

Extra lift and/or extra low suspension

Hi-Buoy system (optional).

Low-Buoy system (optional).

Kneeling system (optional).

ALIGNMENT

Front axle

Toe-in: +3/32" ± 1/32" (2,4 mm ± 0,8 mm)
Caster: + 2 3/4° ± 3/4
Camber: - 1/8° ± 3/8°

Tag axle

Toe: 0" ± 1/16" (0 mm ± 1,6 mm)

HEATING AND AIR CONDITIONING

Driver's system

Air conditioning capacity: 19,000 Btu/hr.
Refrigerant type: R-134a
Heating capacity: 37,800 Btu/hr.
Air flow: 450 cfm (12,7 m³/min.)

Central system

Air conditioning capacity: . 110,000 Btu/hr. (XL-45)
Air conditioning capacity: 98,000 Btu/hr. (XL-40)
Refrigerant type: R-134a
Heating capacity: 152,000 Btu/hr.
Air flow: 2,700 cfm (76,4 m³/min.)

A/C COMPRESSOR (Driver's and Central system)

Number of cylinders:6
Operating speed:400 to 2,200 rpm
(1,750 rpm, nominal)
Minimum speed for lubrication: 400 rpm
Oil capacity: 4.5 U.S. qts (4,3 liters)
Approved oils: Castrol SW-68 (POE)
Mobil Artic 1 (POE)

A/C COMPRESSOR (Auxiliary system, opt.)

Number of cylinders:2
Maximum rpm: 6,000
Factory oil charge: 10 U.S. oz (296 ml)
Approved oils: Castrol SW-68 (POE)
Mobil Artic 1 (POE)

NOTE: *The above oils are suitable for use with reciprocating compressors using refrigerant R-134a and with evaporator temperatures above -40°F (-40°C).*

OIL SPECIFICATIONS

Engine

Heavy-duty engine oil SAE 15W-40, API classification CF-4, HT/HS Viscosity 3.7 cP minimum. Synthetic oil may be used if it meets the performance and chemical requirements of non-synthetic oils outlined previously. Some engine operating conditions may require exceptions to this recommendation.

NOTE: *To avoid engine damage, do not use single grade (monograde) lubricants, regardless of API classification.*

Transmissions

Automatic

The transmission must be filled with DEXRON IIE or Dexron III automatic transmission fluid or any equivalent Class C4 fluids.

Manual

Heavy duty engine oil meeting MIL-L-2104D: SAE 30 (Northern climate), SAE 40, SAE 50.

Straight mineral gear oil R & O type API-GL-1: SAE 80 (Northern climate), SAE 90

Differential

Multigrade gear oil meeting MIL-L-2105-D: 85W140 is recommended for use in drive axle. This lubricant performs well over a broad temperature range, providing good gear and bearing protection in a variety of climates.

If temperature drops below 10°F (-12°C), 80W90 should be used, and below -15°F (-26°C), 75W90 should be used. In extreme conditions or for better performance, full synthetic gear oil can be used.

Fan gearbox

Synthetic oil Mobil SHC 634 is recommended for the fan gearbox.

Power steering reservoir

This reservoir must be filled with automatic transmission oil, *Dexron IIE* or *Dexron III*.

Wheel bearings

The front and tag axle wheel bearings must be filled to the level mark in the cap using differential oil. Drive axle wheel bearings are lubricated by the differential oil. Maintain differential oil level to ensure adequate lubrication of drive axle wheel bearings at all times.

On vehicles equipped with grease-lubricated wheel bearings, pack with wheel bearing grease.

Clutch master cylinder

This reservoir must be filled with DOT 3 heavy-duty brake fluid.

PREHEATING SYSTEMS (Optional)

ESPAR (EBERSPÄCHER)

Heater: Model D12W
 Heating capacity: 12 kW
 Heating output: 41,000 Btu/hr
 Fuel type: Same as engine
 Fuel consumption: 0.44 U.S. gal.
 (1,65 liters) / hour
 Rated voltage:24 ± 4 volts
 Electric power consumption:55 watts

WEBASTO

Heater: Model DBW2020
 Heating capacity: 23.3 kW
 Heating output: 80,000 Btu/hr
 Fuel type: Same as engine
 Fuel consumption: 0.8 U.S. gal.
 (3 liters) / hour
 Rated voltage:24 ± 4 volts
 Electric power consumption: 120 watts

Heater: Model DBW2010
 Heating capacity: 13.1 kW
 Heating output: 45,000 Btu/hr
 Fuel type: Same as engine
 Fuel consumption: 0.4 U.S. gal.
 (1.5 liters) / hour
 Rated voltage:24 ± 4 volts
 Electric power consumption: 85 watts

STORAGE VOLUME

Exterior baggage compartments:

XL-40315ft³ / 8,9m³
 XL-45407ft³ / 11,5m³

Parcel racks:

XL-4075ft³ / 2,13m³
 XL-4586ft³ / 2,43m³

SEATS

Seating capacity:

XL-4047 passengers
 XL-4555 passengers

Several seating layouts may be achieved through a combination of available equipment with the addition or removal of some items such as passenger seats, card table(s), galley, lavatory etc..

DATA PLATE AND CERTIFICATION

Data plates

The main components of the vehicle such as engine, transmission, axles and chassis are identified by different serial numbers. It may be necessary to locate these numbers for warranty purposes.

Engine

The engine serial number is stamped on the cylinder block under the exhaust manifold (oil filter side) close to the water pump. In addition, four plates are located on the rocker cover (oil filter side). Contents of the plates include the engine serial and model numbers and a list of the optional equipment on the engine. The information is primarily used when ordering replacement parts.

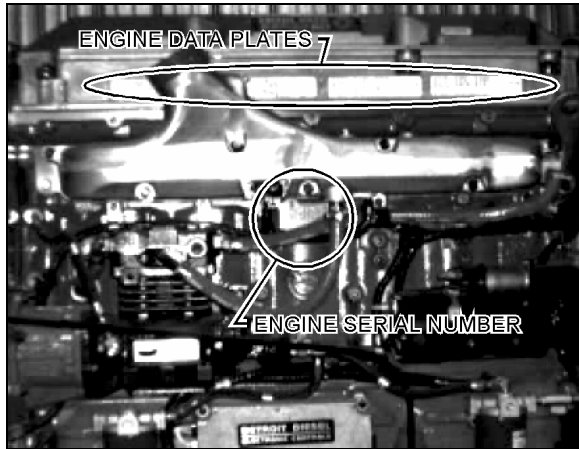


FIGURE 94
01012

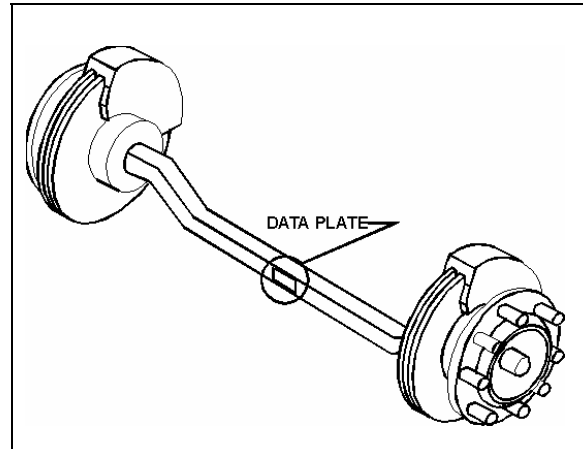


FIGURE 97: Front axle 10003

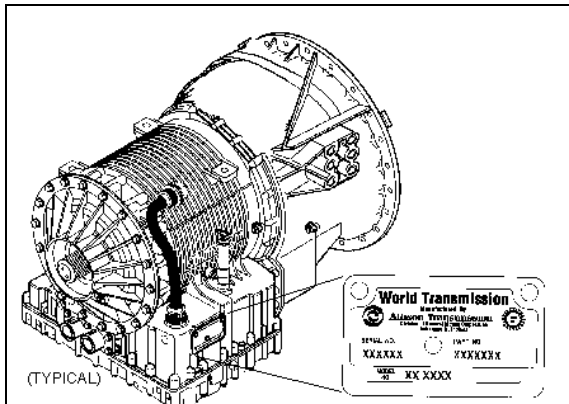


FIGURE 95: Transmission data plate 07019

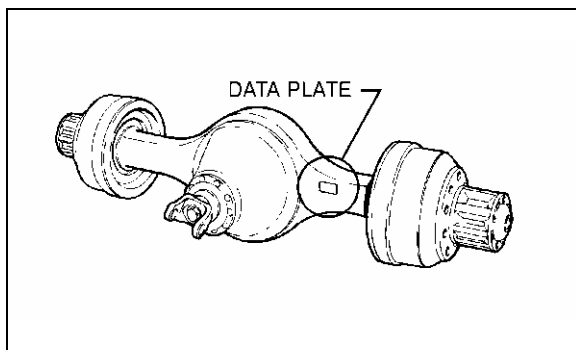


FIGURE 96: Drive axle
11004

Vehicle identification number (V.I.N.)

The vehicle identification number is stamped on a plate located on dashboard louver (entrance door side), so that it is visible from the outside through the windshield. It is extremely important to give the correct vehicle identification number when ordering replacements parts. Use of these numbers will prevent delay and errors in obtaining the correct material.

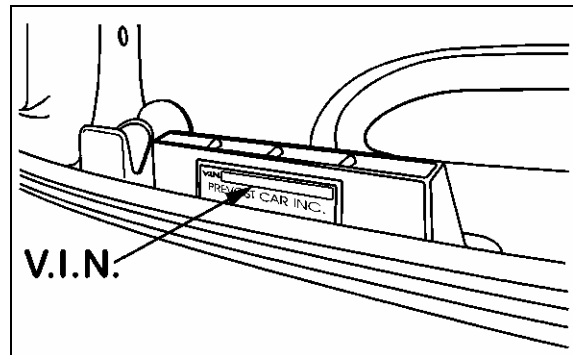


FIGURE 98: V.I.N.
18041A

Coach final record

This is a complete and detailed record of all data pertaining to the assembly of the vehicle. This information sheet is included in the technical publication box delivered with the new vehicle

and should be kept in vehicle where it will be readily available for reference.

Safety attestation

All the components on this vehicle meet government requirements:

- Material and parts conform to ASTM and/or SAE standards in effect at time of manufacturing.
- Welding is in accordance with Canadian and US standards.
- All factory-installed interior materials meet F.M.V.S.S. 302 on fire resistance.
- Certified according to Provincial, State and Federal Safety standards (Can. & US) B.M.C.S.S., F.M.V.S.S., C.M.V.S.S.

Other certification labels are affixed to the specific components on the vehicle.

DOT certification label

This is your assurance that your new vehicle complies with all applicable Federal Motor Vehicle Safety Standards which were in effect at the time the vehicle was manufactured. You can find this label affixed below L.H. Side Control Panel in driver's compartment.

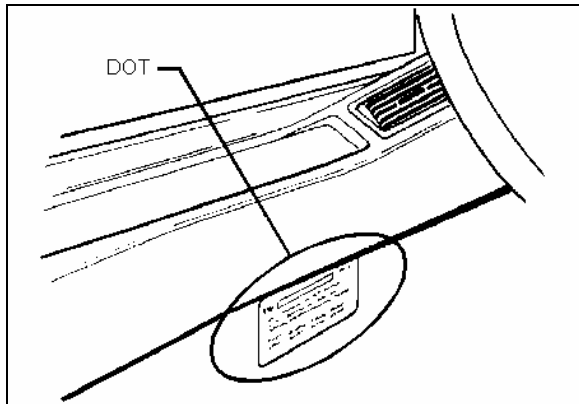


FIGURE 99
18042

EPA engine label

The exhaust emission certification label affixed on the lower R.H. side corner of the rear junction box certifies that the engine conforms to federal and any state exhaust emission regulations. It gives the operating conditions at which certification was made.

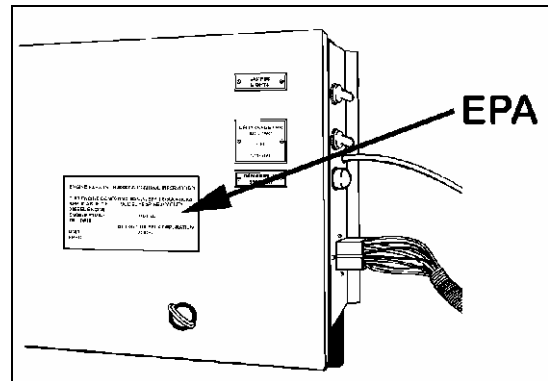


FIGURE 100

01011

LIGHT BULB DATA

When replacing a light bulb, special attention must be paid to the voltage rating (refer to light bulb data hereafter).

Note: All exterior lights are 12 volts and interior lights are 24 volts, except for the Check engine and Stop engine warning lights and flasher indicator lights which are also on 12 volt system.

EXTERIOR LIGHTING						
APPLICATION	PREVOST PART NO.	TRADE OR SAE NUMBER	WATTS OR CANDLE POWER	VOLTS	QTY XL-40	QTY XL-45
Headlight Hi/Lo	930291	9004	65 W/45 W	12	2	2
Fog (Optional)	561882	H3(Osram)	55 W	12	2	2
License plate (sealed)	930266	---	12 W	12	2	2
Side directional	561917	1893	2 cp	12	12	12
Side marker	561917	1893	2 cp	12	12	12
Identification	562059	194	2 cp	12	6	6
Clearance	562059	194	2 cp	12	8	8
Front directional (hazard & marker)	562135	3057	32/3 cp	12	2	2
Rear directional	560589	1156	32 cp	12	8	8
Stop	560589	1156	32 cp	12	8	8
Back-up	560589	1156	32 cp	12	4	4
Center stop	560589	1156	32 cp	12	2	2
Tail	560123	67	4 cp	12	8	8
Exterior compartment (except engine)	562278	6429 (78207)	10 W	24	12	12
Engine compartment	560601	456	2 cp	24	6	6

TECHNICAL INFORMATION

INTERIOR LIGHTING						
APPLICATION	PREVOST PART NO.	TRADE OR SAE NUMBER	WATTS OR CANDLE POWER	VOLTS	QTY XL-40	QTY XL-45
Check engine	562048	E-9 (Norma)	2 W	12	1	1
Stop engine	562048	E-9 (Norma)	2 W	12	1	1
Flasher indicator	562048	E-9 (Norma)	2 W	12	2	2
Other indicator - 1/unit	562049	(Osram)	2 W	24	AR	AR
Speedometer	560145	1829	1 cp	24	2	2
Pyrometer (Opt)	560601	456	2 W	24	1	1
Tachometer	560145	1829	1 cp	24	2	2
Turbo boost (Opt)	561167	3899 (Osram)	3 W	24	1	1
Tachograph (Opt)	561006	1-405-804	1.2 cp	24	3	3
Other instrument - 1/unit	560144	1820	1.6 cp	24	AR	AR
Step	562278	6429 (78207)	10 W	24	3	3
Driver's area	561553	78236	10 W	24	4	4
Lavatory	561553	78236	10 W	24	2	2
Lavatory night light	560601	456	2 cp	24	1	1
Lavatory "Occupied"	560702	1843	0.2 cp	24	2	2
Parcel racks	560144	1820	1.6 cp	24	12	14
"Emergency exit"	560601	456	2 cp	24	14	16
Aisle	560141	1251	3 cp	24	6	7
Switch 1/unit	561123	2741 (Osram)	1 W	24	AR	AR
Reading	562033	961-4940	8 W	24	AR	AR
Fluorescent	830102	F15T8 CW	15 W	---	24	27
Destination sign	560125	16911F	15 W	24	4	4
Parcel rack front neon	830108	PL7	7 W	---	14	16
Rear roof	561553	78236	10 W	24	2	2
R.H. lateral console	562278	6429 (78207)	10 W	24	1	1

DDEC III DIAGNOSTIC CODES

To read codes:

Use a diagnostic data reader plugged in receptacle on L.H. side control panel (item #17 on page 2-4) or momentarily depress the Stop engine "OVERRIDE" switch (located on the L.H. lower switch panel) with the ignition on, engine at idle or not running. Active codes will be flashed on the stop engine telltale (located on central dashboard), followed by the inactive codes being flashed on the check engine telltale (located on central dashboard). The cycle repeats until the operator depresses again the Stop engine "OVERRIDE" switch. A code "43" consists of four flashes, followed by a short pause, then three flashes in quick succession.

DDC Code Number (Flashed)	Description
11	VSG sensor input voltage low
12	VSG sensor input voltage high
13	Coolant level sensor input voltage low
14	Oil, coolant, or intercooler, temp. sensor input voltage high
15	Oil, coolant, or intercooler, temp. sensor input voltage low
16	Coolant level sensor input voltage high
17	Bypass or throttle, valve position sensor input voltage high
18	Bypass or throttle, valve position sensor input voltage low
21	TPS input voltage high
22	TPS input voltage low
23	Fuel temp. sensor input voltage high
24	Fuel temp. sensor input voltage low
25	No active codes
26	Aux. engine shutdown #1, or #2, input active
27	Air inlet or intake air, temp. sensor input voltage high
28	Air inlet or intake air, temp. sensor input voltage low
31	Aux. high side output open circuit or short to ground
32	CEL or SEL short to battery (+) or open circuit
33	Turbo boost sensor input voltage high
34	Turbo boost sensor input voltage low
35	Oil pressure sensor input voltage high
36	Oil pressure sensor input voltage low
37	Fuel pressure sensor input voltage high
38	Fuel pressure sensor input voltage low
41	Too many SRS (missing TRS)
42	Too few SRS (missing SRS)
43	Coolant level low

DDC Code Number (Flashed)	Description
44	Oil, coolant, intercooler or intake air, temp. high
45	Oil pressure low
46	ECM battery voltage low
47	Fuel, air inlet, or turbo boost, pressure high
48	Fuel or air inlet pressure low
52	ECM A/D conversion fault
53	ECM non volatile memory fault
54	Vehicle speed sensor fault
55	J1939 data link fault
56	J1587 data link fault
57	J1922 data link fault
58	Torque overload
61	Injector response time long
63	PWM drive short to battery (+) or open circuit
64	Turbo speed sensor input fault
65	Throttle valve position input fault
66	Engine knock sensor input fault
67	Coolant or air inlet, pressure sensor input voltage fault
68	TPS idle validation switch open circuit or short to ground
71	Injector response time short
72	Vehicle overspeed
73	Gas valve position input fault or ESS fault
74	Optimized idle safety loop short to ground
75	ECM Battery voltage high
76	Engine overspeed with engine brake
81	Oil level, crankcase prs, dual fuel BOI, or exh. temp. volt. high
82	Oil level, crankcase prs, dual fuel BOI, or exh. temp. volt. low
83	Oil level, crankcase prs, exhaust temp., or external pumps prs., high
84	Oil level or crankcase pressure, low
85	Engine overspeed
86	External pump or barometer, pressure sensor input voltage high
87	External pump or barometer, pressure sensor input voltage low
88	Coolant pressure low

WORLD TRANSMISSION (WT) DIAGNOSTIC CODES

Diagnostic code memory

Diagnostic codes are logged in a list in memory (sometimes referred to as the queue), positioning the most recently occurring code first and containing up to five codes. The codes continued in the list have the information recorded as shown in the chart below. Access to the code list position, main code, sub code and active indicator is through either the shifter display or the Pro-Link Diagnostic Data reader (DDR). Access to the ignition cycle counter and event counter is through the DDR only.

Code List Position	Main Code	Sub Code	Active Indicator	Ignition Cycle Counter	Event Counter
d1	21	12	YES	00	10
d2	41	12	YES	00	04
d3	23	12	NO	08	02
d4	34	12	NO	13	01
d5	56	11	NO	22	02
Displayed on shifter display and DDR			YES= ACTIVE= "MODE ON"	Ignition cycle counter and event counter are not available on shifter display	

NOTE: All information is available with a DDR.

The following paragraphs define the different parts of the code list.

Code list position:

The position 1 through 5 which a code occupies in the code list in memory. Positions are shown as "d1" (Diagnostic Code #1) through "d5."

Main code

The general condition or area of fault detected by ECU.

Sub Code

The specific area or condition under the main code in which the condition was detected.

Active Indicator

Will be turned "on" when a fault condition is active (shifter will display "MODE ON" or the DDR will display "YES"). Will be set to "off" when conditions exist to indicate fault condition is gone.

Ignition cycle counter

Used to clear diagnostic codes that are inactive from the code list in memory. Counter is incremented each time a normal ECU powerdown occurs following clearing of the Active Indicator. Code will be cleared from the list when the counter exceeds 25.

Event counter

Used to count the number of occurrences of a diagnostic code that occur prior to the incident being cleared from the code list. The most recent code will be in position "d1". If the most recent code is one which is already in the code list, that code will be moved to position "d1", the Active Indicator will be turned "on" (shifter will display "MODE ON" or the DDR will display "YES"), the Ignition Cycle Counter is cleared and "1" is added to the Event counter.

Clearing the Active Indicator and code records from the Code list in memory:

If the conditions causing a diagnostic code to be set are cleared, the Active Indicator can be manually cleared by holding the "MODE" button down continuously for 3 seconds until a tone is heard from the shifter. To clear code records from the list, hold the "MODE" button down continuously for ten seconds until a second tone sounds. All diagnostic records in the list that are not active will then be cleared and the remaining records will then be moved up the list.

Code reading and code clearing procedures

Diagnostic codes can be read and cleared by two methods: by using the Pro-Link 9000 DDR plugged in receptacle located on L.H. lateral console or by using the shifter display. The use of the Pro-Link 9000 DDR is described in the instruction manual furnished with each tool. The

method of reading and clearing codes described in this section refers to only entering the Diagnostic Display Mode by the proper button.

The Diagnostic Display Mode may be entered for viewing of codes at any speed. Codes can only be cleared when the output speed = 0 and no output speed sensor failure is active.

The following descriptions explain how to use the shifter to read and clear codes:

Reading Codes:

1. Enter the diagnostic display mode by pressing the "↑" and "↓" (upshift and downshift arrows) buttons at the same time on the pushbutton shifter.

NOTE: If a "DO NOT SHIFT" condition is present at this time, the lever should be in the same position as it was at time of code detection. If not, this shifter tone will sound continuously.

NOTE: If an oil level sensor is present, then oil level will be displayed first. Diagnostic code display is achieved by depressing the upshift and downshift arrows or display mode button a second time.

2. Read the first code in the first of five code positions on the digital display of the shifter. For example, we will read code 25 11 in the first position. The display will change every two seconds as follows:

- a. Code list position --"d1"
- b. Main code --"25"
- c. Sub code --"11"
- d. Display will repeat cycle of a., b. and c. above

3. Press the "MODE" button momentarily to view the second position (d2) in the same way as 2. above.

4. To view the third, fourth and fifth positions (d3,d4 and d5), momentarily press the "MODE" button as explained above.
5. Pressing the "MODE" button momentarily after the fifth position is displayed will cause the sequence of code positions to start over with the first position.
6. Any code which is active will be indicated by the "MODE ON" indicator (active indicator) being turned on while in that code position (while in the normal operating mode, the "MODE ON" indicator is turned on to indicate "ECONOMY" mode operation.
7. Any code position in the list which does not have a diagnostic code logged will display "- -" for both the main and sub code displays. All positions after a code position without any code will also not contain any codes.

Clearing Codes:

1. Clearing of the active indicator is automatically done at ECU powerdown on all codes except 69 34 (see code list, page 5-17).
2. Some codes will clear the active indicator automatically when the condition causing the code is no longer detected by the ECU.
3. Manual clearing is possible while in the diagnostic display mode and after the condition causing to code is corrected (output speed must be zero).
 - a. To clear all active indicators, hold the "MODE" button down continuously for 3 seconds until the shifter tone sounds for 0.5 seconds.
 - b. Release the "MODE" button to return to normal operating mode. If the condition

causing the code was not active at the time, the active indicator will turn off.

CAUTION: *If clearing a code while locked in a Forward or Reverse position (fail-to-range), the transmission will still be in Drive or Reverse when the clearing procedure is completed. Neutral must be manually selected.*

Exiting the diagnostic display mode:

The diagnostic display mode can be exited by any of the following procedures:

1. Press the "↑" and "↓" (upshift and downshift) buttons at the same time on the pushbutton shifter.
2. Press any range button, "D", "N" or "R", on the pushbutton shifter (the shift will be commanded if it is not inhibited by an active code).
3. Do nothing and wait until the calibrated time (approximately 10 minutes) has passed and the system automatically returns to the normal operating mode.
4. Turn off power to the ECU (turn off the vehicle at the ignition switch).
5. After the clearing the active indicator procedure described above has been performed.

Clearing records from the code list in memory

If the requirements for Manual Clearing the Active Indicator have been satisfied, and the "MODE" button is held down continuously for ten seconds while in the display mode until a tone sounds, all diagnostic records in the code list that are not active will be cleared and the remaining records will be moved up in the code list.

Abbreviation found in the code chart

The following responses are used throughout the following chart to command safe operation when diagnostic codes are set.

• **DNS (Do Not Shift)** Response

- Turn off lockup clutch and inhibit lockup operation.
- Inhibit all shifts.
- Turn on *DO NOT SHIFT* light.

- Pulse the tone generator for 8 seconds when the condition is first detected.

- Blank the select digit in the display.

- Ignore any range selection inputs and disable the button feedback tone for the pushbutton shifter.

• **SOL OFF (Solenoid Off)** Response

- All solenoids are commanded off (turning solenoids "A" and "B" off electrically causes them to be on hydraulically).

• **RPR (Return to Previous Range)** Response

- When the ratio or C3 pressure switch tests associated with a shift are not passed, the ECU commands the same range as commanded at the beginning of the shift.

• **NNC (Neutral No Clutches)** Response

- When certain ratio or C3 pressure switch tests are not passed, the ECU commands a neutral condition with no clutches applied.

World Transmission (WT) Diagnostic code list and description

MAIN CODE	SUB CODE	DESCRIPTION	DO NOT SHIFT LIGHT	INHIBITED OPERATION DESCRIPTION
12	12	Oil level, low	No	No upshift above a calibration range
12	23	Oil level, high	No	No upshift above a calibration range
13	12	ECU input voltage, low	Yes	DNS, SOL OFF (Hydraulic default)
13	13	ECU input voltage, medium low	No	None: Shift adaptive feature will not function.
14	12	Oil level sensor, low	No	None

TECHNICAL INFORMATION

MAIN CODE	SUB CODE	DESCRIPTION	DO NOT SHIFT LIGHT	INHIBITED OPERATION DESCRIPTION
14	23	Oil level sensor, high	No	None
21	12	Throttle position sensor, low	No	Use Throttle default value
21	23	Throttle position sensor, high	No	Use Throttle default value
22	14	Engine speed sensor reasonableness test	No	Use default engine speed
22	15	Turbine speed sensor reasonableness test	Yes	DNS, Lock in current range
22	16	Output speed sensor reasonableness or rapid decel test	Yes	DNS, Lock in current range
23	12	Primary Shifter or RSI Link Fault	No	Hold in last valid direction
23	13	Primary Shifter Mode Function Fault	No	Mode change not permitted
23	14	Secondary Shifter or RSI Link Fault	No	Hold in last valid direction
23	15	Secondary Shifter Mode Function Fault	No	Mode change not permitted
24	12	Sump oil temperature, cold	Yes	DNS
24	23	Sump oil temperature, hot	No	No upshifts above a calibration range
25	00	Output speed reasonableness test, detected at 0 speed, (L)	Yes	DNS, Lock in current range (L)
25	11	Output speed reasonableness test, detected at 0 speed, (1st)	Yes	DNS, Lock in current range (1 st)
25	22	Output speed reasonableness test, detected at 0 speed 2nd	Yes	DNS, Lock in current range (2nd)
25	33	Output speed reasonableness test, detected at 0 speed, 3rd	Yes	DNS, Lock in current range (3rd)
25	44	Output speed reasonableness test, detected at 0 speed, 4th	Yes	DNS, Lock in current range (4th)
25	55	Output speed reasonableness test, detected at 0 speed, 5th	Yes	DNS, Lock in current range (5th)
25	66	Output speed reasonableness test, detected at 0 speed, 6th	Yes	DNS, Lock in current range (6th)
25	77	Output speed reasonableness test, detected at 0 speed, R	Yes	DNS, Lock in current range (R)

TECHNICAL INFORMATION

MAIN CODE	SUB CODE	DESCRIPTION	DO NOT SHIFT LIGHT	INHIBITED OPERATION DESCRIPTION
32	00	C3 pressure switch open, L range	Yes	DNS, Lock in current range (L)
32	33	C3 pressure switch open, 3rd range	Yes	DNS, Lock in current range (3rd)
32	55	C3 pressure switch open, 5th range	Yes	DNS, Lock in current range (5th)
32	77	C3 pressure switch open, R range	Yes	DNS, Lock in current range (R)
33	12	Sump oil temperature sensor, low	No	Use default value of 200° F (93° C)
33	23	Sump oil temperature sensor, high	No	Use default value of 200° F (93° C)
34	12	EEPROM, factory cal. compatibility number wrong	Yes	DNS, SOL OFF (Hydraulic default)
34	13	EEPROM, factory calibration block checksum	Yes	DNS, SOL OFF (Hydraulic default)
34	14	EEPROM, Power Off Block checksum	Yes	Use previous location, or factory calibration and reset adaptive
34	15	EEPROM, Diagnostic Queue Block Checksum	Yes	Use previous location, or clear diagnostic queue
34	16	EEPROM, Real Time Block Checksum	Yes	DNS, SOL OFF (Hydraulic default)
35	00	Power interruption (Code set after power restored)	No	NONE (Hydraulic default during interruption)
35	16	Real Time EEPROM Write Interruption	Yes	DNS, SOL OFF (Hydraulic default)
36	00	Hardware/Software not compatible	Yes	DNS, SOL OFF (Hydraulic default)
41	12	Open or short to ground, A solenoid circuit	Yes	DNS, SOL OFF (Hydraulic default)
41	13	Open or short to ground, B solenoid circuit	Yes	DNS, SOL OFF (Hydraulic default)
41	14	Open or short to ground, C solenoid circuit	Yes	DNS, SOL OFF (Hydraulic default)

TECHNICAL INFORMATION

MAIN CODE	SUB CODE	DESCRIPTION	DO NOT SHIFT LIGHT	INHIBITED OPERATION DESCRIPTION
41	15	Open or short to ground, D solenoid circuit	Yes	DNS, SOL OFF (Hydraulic default)
41	16	Open or short to ground, E solenoid circuit	Yes	DNS, SOL OFF (Hydraulic default)
41	21	Open or short to ground, F solenoid circuit	No	Lock-up inhibited
41	22	Open or short to ground, G solenoid circuit	Yes	DNS, SOL OFF (Hydraulic default)
41	23	Open or short to ground, H solenoid circuit	No	Retarder allowed, differential lock inhibited
41	24	Open or short to ground, J solenoid circuit	No	Low and 1st inhibited
41	25	Open or short to ground, K solenoid circuit	No	K solenoid operation inhibited
41	26	Open or short to ground, N solenoid circuit	No	Low and 1st inhibited
42	12	Short to battery, A solenoid circuit	Yes	DNS, Lock in a range
42	13	Short to battery, B solenoid circuit	Yes	DNS, Lock in a range
42	14	Short to battery, C solenoid circuit	Yes	DNS, Lock in a range
42	15	Short to battery, D solenoid circuit	Yes	DNS, Lock in a range
42	16	Short to battery, E solenoid circuit	Yes	DNS, Lock in a range
42	21	Short to battery, F solenoid circuit	No	Lock-up inhibited
42	22	Short to battery, G solenoid circuit	Yes	DNS, Lock in a range
42	23	Short to battery, H solenoid circuit	No	Retarder allowed, differential lock inhibited

TECHNICAL INFORMATION

MAIN CODE	SUB CODE	DESCRIPTION	DO NOT SHIFT LIGHT	INHIBITED OPERATION DESCRIPTION
42	24	Short to battery, J solenoid circuit	No	Low and 1st inhibited
42	25	Short to battery, K solenoid circuit	No	K solenoid operation inhibited
42	26	Short to battery, N solenoid circuit	No	Low and 1st inhibited
43	21	Low side driver, F solenoid circuit	No	Lock-up inhibited
43	25	Low side driver, K solenoid circuit	No	K solenoid operation inhibited
43	26	Low side driver, N solenoid circuit	No	Low and 1st inhibited
44	12	Short to ground, A solenoid circuit	Yes	DNS, SOL OFF (Hydraulic default)
44	13	Short to ground, B solenoid circuit	Yes	DNS, SOL OFF (Hydraulic default)
44	14	Short to ground, C solenoid circuit	Yes	DNS, SOL OFF (Hydraulic default)
44	15	Short to ground, D solenoid circuit	Yes	DNS, SOL OFF (Hydraulic default)
44	16	Short to ground, E solenoid circuit	Yes	DNS, SOL OFF (Hydraulic default)
44	21	Short to ground, F solenoid circuit	No	Lock-up inhibited
44	22	Short to ground, G solenoid circuit	Yes	DNS, SOL OFF (Hydraulic default)
44	23	Short to ground, H solenoid circuit	No	Retarder allowed. differential lock inhibited
44	24	Short to ground, J solenoid circuit	No	Low and 1st inhibited
44	25	Short to ground, K solenoid circuit	No	K solenoid operation inhibited
44	26	Short to ground, N solenoid circuit	No	Low and 1st inhibited

TECHNICAL INFORMATION

MAIN CODE	SUB CODE	DESCRIPTION	DO NOT SHIFT LIGHT	INHIBITED OPERATION DESCRIPTION
45	12	Open circuit, A solenoid circuit	Yes	DNS, SOL OFF (Hydraulic default)
45	13	Open circuit, B solenoid circuit	Yes	DNS, SOL OFF (Hydraulic default)
45	14	Open circuit, C solenoid circuit	Yes	DNS, SOL OFF (Hydraulic default)
45	15	Open circuit, D solenoid circuit	Yes	DNS, SOL OFF (Hydraulic default)
45	16	Open circuit, E solenoid circuit	Yes	DNS, SOL OFF (Hydraulic default)
45	21	Open circuit, F solenoid circuit	No	Lock-up inhibited
45	22	Open circuit, G solenoid circuit	Yes	DNS, SOL OFF (Hydraulic default)
45	23	Open circuit, H solenoid circuit	No	Retarder allowed differential lock inhibited
45	24	Open circuit, J solenoid circuit	No	Low and 1st inhibited
45	25	Open circuit, K solenoid circuit	No	K solenoid operation inhibited
45	26	Open circuit, N solenoid circuit	No	Low and 1st inhibited
51	10	Offgoing ratio test (during shift), 1 to L	Yes	Low and 1st inhibited
51	12	Offgoing ratio test (during shift), 1 to 2	Yes	DNS, RPR
51	21	Offgoing ratio test (during shift), 2 to 1	Yes	DNS, RPR
51	23	Offgoing ratio test (during shift), 2 to 3	Yes	DNS, RPR
51	43	Offgoing ratio test (during shift), 4 to 3	Yes	DNS, RPR
51	45	Offgoing ratio test (during shift), 4 to 5	Yes	DNS, RPR

TECHNICAL INFORMATION

MAIN CODE	SUB CODE	DESCRIPTION	DO NOT SHIFT LIGHT	INHIBITED OPERATION DESCRIPTION
51	65	Offgoing ratio test (during shift), 6 to 5	Yes	DNS, RPR
52	01	Offgoing C3PS test (during shift), L to 1	Yes	DNS, RPR
52	08	Offgoing C3PS test (during shift), L to N1	Yes	DNS, NNC
52	32	Offgoing C3PS test (during shift), 3 to 2	Yes	DNS, RPR
52	34	Offgoing C3PS test (during shift), 3 to 4	Yes	DNS, RPR
52	54	Offgoing C3PS test (during shift), 5 to 4	Yes	DNS, RPR
52	56	Offgoing C3PS test (during shift), 5 to 6	Yes	DNS, RPR
52	71	Offgoing C3PS test (during shift), R to 1	Yes	DNS, NNC
52	72	Offgoing C3PS test (during shift), R to 2	Yes	DNS, NNC
52	78	Offgoing C3PS test (during shift), R to N1	Yes	DNS, NNC
52	79	Offgoing C3PS test (during shift), R to 2 (R to NNC to 2)	Yes	DNS, NNC
52	99	Offgoing C3PS test (during shift), N3 to N2	Yes	DNS, RPR
53	08	Offgoing speed test (during shift), L to N1	Yes	DNS, NNC
53	18	Offgoing speed test (during shift), 1 to N1	Yes	DNS, NNC
53	28	Offgoing speed test (during shift), 2 to N1	Yes	DNS, NNC
53	29	Offgoing speed test (during shift), 2 to N2	Yes	DNS, RPR
53	38	Offgoing speed test (during shift), 3 to N1	Yes	DNS, NNC

TECHNICAL INFORMATION

MAIN CODE	SUB CODE	DESCRIPTION	DO NOT SHIFT LIGHT	INHIBITED OPERATION DESCRIPTION
53	39	Offgoing speed test (during shift), 3 to N3	Yes	DNS, RPR
53	48	Offgoing speed test (during shift), 4 to N1	Yes	DNS, NNC
53	49	Offgoing speed test (during shift), 4 to N3	Yes	DNS, RPR
53	58	Offgoing speed test (during shift), 5 to N1	Yes	DNS, NNC
53	59	Offgoing speed test (during shift), 5 to N3	Yes	DNS, RPR
53	68	Offgoing speed test (during shift), 6 to N1	Yes	DNS, NNC
53	69	Offgoing speed test (during shift), 6 to N4	Yes	DNS, RPR
53	78	Offgoing speed test (during shift), R to N1	Yes	DNS, NNC
53	99	Offgoing speed test (during shift), N2 to N3 or N3 to N2	Yes	DNS, RPR
54	01	Oncoming ratio test (after shift), L to 1	Yes	DNS, RPR
54	07	Oncoming ratio test (after shift), L to R	Yes	DNS, NNC
54	10	Oncoming ratio test (after shift), 1 to L	Yes	DNS, RPR
54	12	Oncoming ratio test (after shift), 1 to 2	Yes	DNS, RPR
54	17	Oncoming ratio test (after shift), 1 to R	Yes	DNS, NNC
54	21	Oncoming ratio test (after shift), 2 to 1	Yes	DNS, RPR
54	23	Oncoming ratio test (after shift), 2 to 3	Yes	DNS, RPR

TECHNICAL INFORMATION

MAIN CODE	SUB CODE	DESCRIPTION	DO NOT SHIFT LIGHT	INHIBITED OPERATION DESCRIPTION
54	27	Oncoming ratio test (after shift), 2 to R	Yes	DNS, NNC
54	32	Oncoming ratio test (after shift), 3 to 2	Yes	DNS, RPR
54	34	Oncoming ratio test (after shift), 3 to 4	Yes	DNS, RPR
54	43	Oncoming ratio test (after shift), 4 to 3	Yes	DNS, RPR
54	45	Oncoming ratio test (after shift), 4 to 5	Yes	DNS, RPR or SOL OFF (Hydraulic default)
54	54	Oncoming ratio test (after shift), 5 to 4	Yes	DNS,RPR
54	56	Oncoming ratio test (after shift), 5 to 6	Yes	DNS,RPR
54	65	Oncoming ratio test (after shift), 6 to 5	Yes	DNS,RPR
54	70	Oncoming ratio test (after shift), R to L	Yes	DNS,NNC
54	71	Oncoming ratio test (after shift), R to 1	Yes	DNS,NNC
54	72	Oncoming ratio test (after shift), R to 2	Yes	DNS,NNC
54	80	Oncoming ratio test (after shift), N1 to L	Yes	DNS,RPR
54	81	Oncoming ratio test (after shift), N1 to 1	Yes	DNS,RPR
54	82	Oncoming ratio test (after shift), N1 to 2	Yes	DNS,RPR
54	83	Oncoming ratio test (after shift), N1 to 3	Yes	DNS,RPR
54	85	Oncoming ratio test (after shift), N1 to 5	Yes	DNS,RPR

TECHNICAL INFORMATION

MAIN CODE	SUB CODE	DESCRIPTION	DO NOT SHIFT LIGHT	INHIBITED OPERATION DESCRIPTION
54	86	Oncoming ratio test (after shift), N1 to 6	Yes	DNS, RPR
54	92	Oncoming ratio test (after shift), R to 2 (R to NNC to 2)	Yes	DNS, NNC
54	92	Oncoming ratio test (after shift), N1 to 2 (N1 to NNC to 2)	Yes	DNS, RPR
54	92	Oncoming ratio test (after shift), N2 to 2	Yes	DNS, RPR
54	93	Oncoming ratio test (after shift), N3 to 3	Yes	DNS, RPR
54	95	Oncoming ratio test (after shift), N3 to 5	Yes	DNS, RPR
54	96	Oncoming ratio test (after shift), N4 to 6	Yes	DNS, RPR
54	97	Oncoming ratio test (after shift), 2 to R (2 to NNC to R)	Yes	DNS, NNC
55	17	Oncoming C3PS test (after shift), 1 to R	Yes	DNS, NNC
55	27	Oncoming C3PS test (after shift), 2 to R	Yes	DNS, NNC
55	80	Oncoming C3PS test (after shift), N1 to L	Yes	DNS, RPR
55	87	Oncoming C3PS test (after shift), N1 to R	Yes	DNS, RPR
55	97	Oncoming C3PS test (after shift), 2 to R or NVL to R (2 to NNC to R)	Yes	DNS, NNC
56	00	Range verification test, L	Yes	DNS, 1st, Low, or SOL OFF (Low)
56	11	Range verification test, 1st	Yes	DNS, 6th
56	22	Range verification test, 2nd	Yes	DNS, 6th or 5th
56	33	Range verification test, 3rd	Yes	DNS, 5th or SOL
56	44	Range verification test, 4th	Yes	DNS, 3rd or 5th
56	55	Range verification test, 5th	Yes	DNS, SOL OFF (5th) or 3rd

TECHNICAL INFORMATION

MAIN CODE	SUB CODE	DESCRIPTION	DO NOT SHIFT LIGHT	INHIBITED OPERATION DESCRIPTION
56	66	Range verification test, 6th	Yes	DNS, 5th, 3rd, or SOL OFF (3rd)
56	77	Range verification test, R	Yes	DNS, N2 or N3
57	11	Range verification C3PS test, 1st	Yes	DNS, SOL OFF (3rd)
57	22	Range verification C3PS test, 2nd	Yes	DNS, 3rd
57	44	Range verification C3PS test, 4th	Yes	DNS, 5th or SOL OFF (3rd)
57	66	Range verification C3PS test, 6th	Yes	SOL OFF (5th), DNS
57	88	Range verification C3PS test, N1	Yes	DNS, N3
57	99	Range verification C3PS test, N2 or N4	Yes	DNS, N3
61	00	Retarder oil temperature, hot	No	None
62	12	Retarder oil temperature sensor, low	No	None
62	23	Retarder oil temperature sensor, high	No	None
63	00	Special function input	No	Depends on special function
64	12	Retarder modulation request sensor, low	No	Retarder operation inhibited
64	23	Retarder modulation request sensor, high	No	Retarder operation inhibited
65	00	Engine rating too high	Yes	DNS
66	00	Serial communications interface fault	No	Use default throttle values
69	12	ECU, A solenoid driver open	Yes	DNS, SOL OFF (hydraulic default)
69	13	ECU, B solenoid driver open	Yes	DNS, SOL OFF (hydraulic default)
69	14	ECU, C solenoid driver open	Yes	DNS, SOL OFF (hydraulic default)
69	15	ECU, D solenoid driver open	Yes	DNS, SOL OFF (hydraulic default)
69	16	ECU, E solenoid driver open	Yes	DNS, SOL OFF (hydraulic default)
69	21	ECU, F solenoid driver open	No	Lock-up inhibited

TECHNICAL INFORMATION

MAIN CODE	SUB CODE	DESCRIPTION	DO NOT SHIFT LIGHT	INHIBITED OPERATION DESCRIPTION
69	22	ECU, G solenoid driver open	Yes	DNS, SOL OFF (Hydraulic default)
69	23	ECU, H solenoid driver open	No	Retarder allowed, differential lock inhibited
69	24	ECU, J solenoid driver open	No	Low and 1 st inhibited
69	25	ECU, K solenoid driver open	No	K solenoid operation inhibited
69	26	ECU, N solenoid driver open	No	Low and 1st inhibited
69	32	ECU, SPI communications link fault	No	Hold in last valid direction
69	33	ECU, Central Operating Processor (COP) timeout	Yes	Reset ECU, Shutdown ECU on 2nd occurrence (power loss: hydraulic defaults)
69	34	ECU, EEPROM write timeout	Yes	DNS, SOL OFF (Hydraulic default)
69	35	ECU, EEPROM checksum	Yes	Induce COP timeout (reset ECU)
69	36	ECU, RAM self test	Yes	Induce COP timeout (reset ECU)
69	41	ECU, I/O ASIC addressing test	Yes	Induce COP timeout (reset ECU)
70	12	Software, minor loop overrun	Yes	Induce COP timeout (reset ECU)
70	13	Software, illegal write to address \$0000	Yes	Induce COP timeout (reset ECU)
70	14	Software, major loop overrun	Yes	Induce COP timeout (reset ECU)