Welcome to the Automated Transmission (AMT) session

Eaton – Isuzu – Volvo

AMT Transmission

Session Chairman – Martin Toomey (Eaton)

Presenters

- Daniel Morello (Isuzu)
- Graham Hannaford (Volvo)
- Douglas Devlin (Eaton)

Isuzu AMT Transmission

Daniel Morello

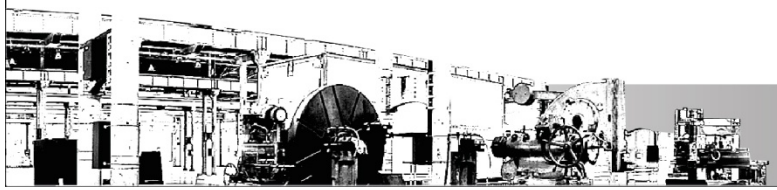
Isuzu Australia Limited

Isuzu's Automated Manual Transmission

- Combines the advantages of a **manual transmission** with the drivability of an automatic

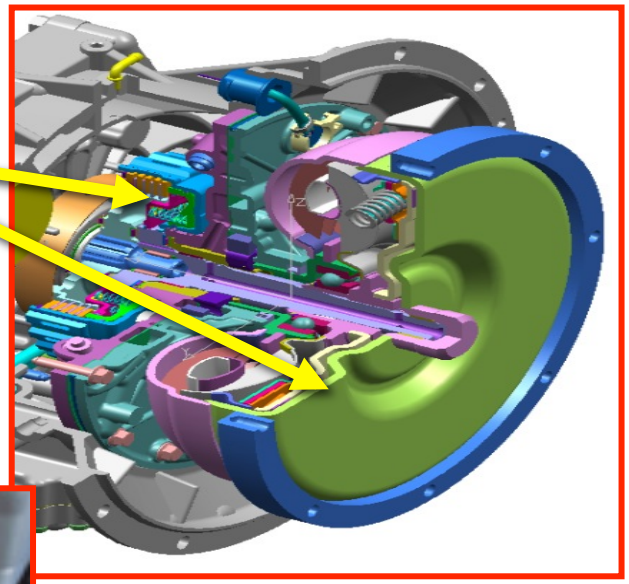
  - Wide availability

– From NLR all the way to FTR.



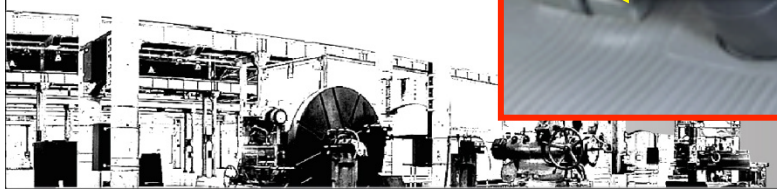
Automated Manual Transmission

Features a Wet Clutch & Fluid Coupling



Smooth takeoff & “creep” at idle speeds

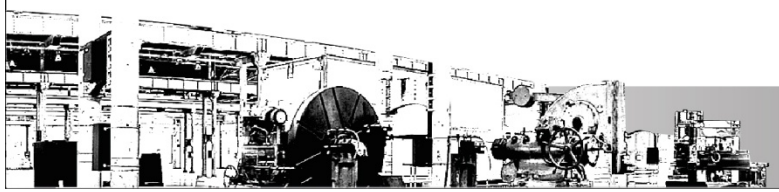
- No clutch pedal



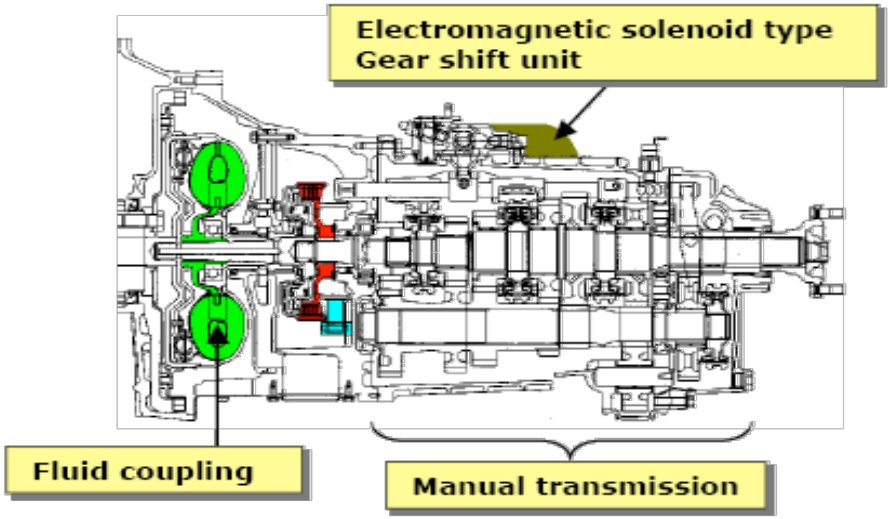
AMT Advantages

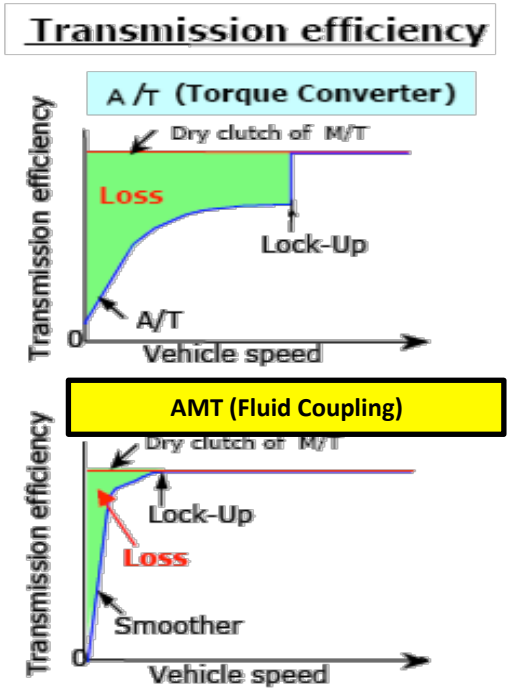
- Fuel consumption is the same as a manual transmission
- AMT is free of a clutch
- Maintenance costs reduced

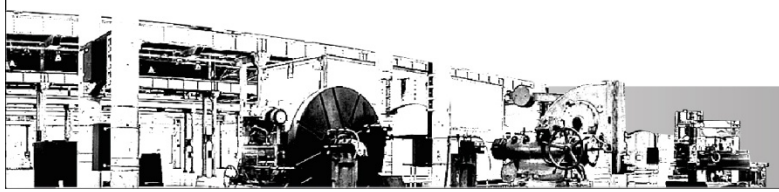
		MT	AMT	AT Torque Converter
Number of Pedals		3	2	2
Transmission		MT	Automated MT	AT
Power Disengaging Mechanism		Dry Clutch	Fluid Coupling + Lock Up Clutch	Torque Converter + Lock Up Clutch
Operability	Clutch Operation	Required	Not Required	Not Required
	Shift Lever Operation	Required	Optional	Optional
Economy	Fuel Economy	Good	Good (Same as MT)	Poor
	Clutch Maintenance	Must be replaced	Maintenance Free Only ATF to be replaced	Maintenance Free Only ATF to be replaced
	Brake Lining	Good	Good (Same as MT)	Poor



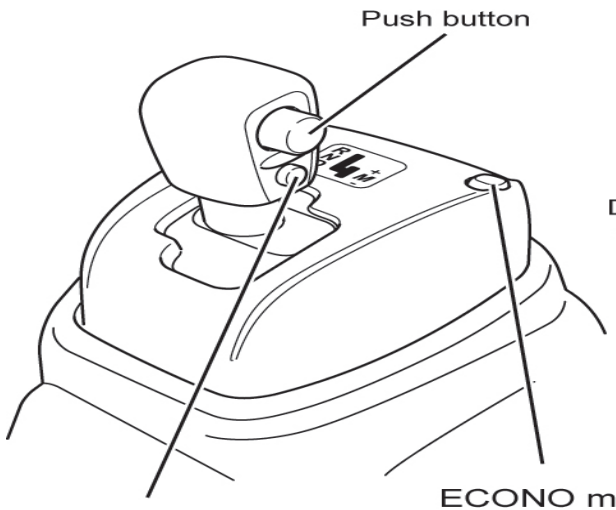
Automated Manual Transmissions







Gear Shift Lever



Reverse **R**

(While pressing the push button)

Neutral **N**

Drive-Auto mode
(automatic gearshift) **D**

Switch between auto and
manual modes

M Drive-Manual mode
(manual gearshift)

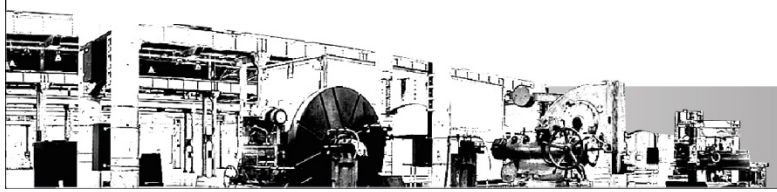
+ Upshift

— Downshift

: Shift is possible without depressing the brake pedal.

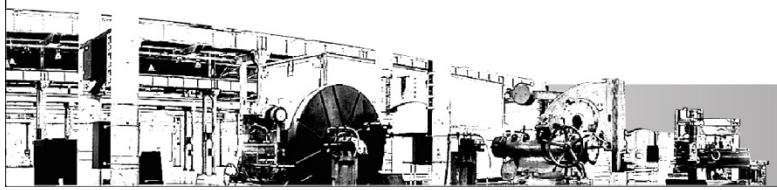
: Shift is possible only with the brake pedal depressed.

: Lever automatically returns to the "M" position
when it is released.



AMT: On the Road

- Rolling back should be avoided. The vehicle may roll back in the time it takes to move your foot from the brake to the accelerator pedal.
- Use the park brake on a slope.

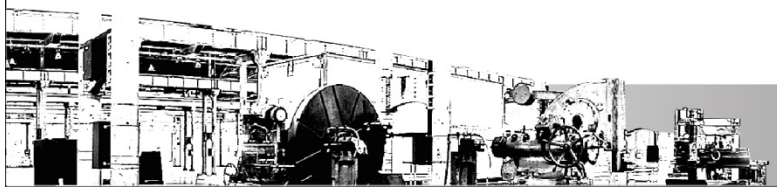


AMT: On the Road

Auto or Manual ??

Auto is best used in traffic and urban conditions:

- Auto shifts prevent inadvertent over revving.
- Auto lets you concentrate on other drivers actions.



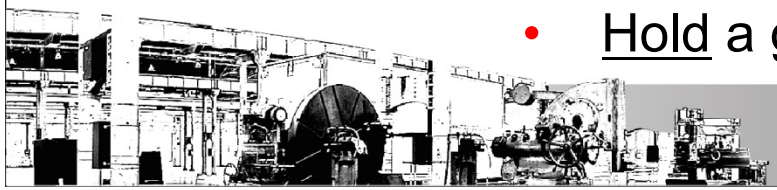
AMT: On the Road

Auto or Manual ??

AMT cannot see the road ahead.

Use manual mode to prevent:

- Poorly timed up or downshifts.
- Hunting through gears in slow traffic.
- Downshifting just as you crest a rise.
- Hold a gear when maneuvering in traffic

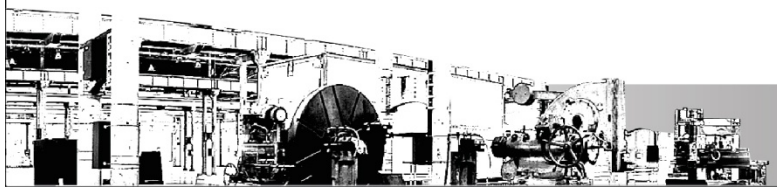


AMT: On the Road

Auto or Manual ??

AMT cannot see the road ahead.

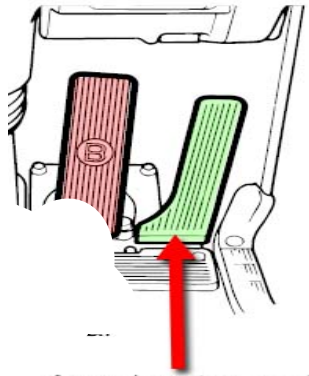
- Use manual mode If the road rises sharply
- Select the appropriate gear prior to the sharp rise

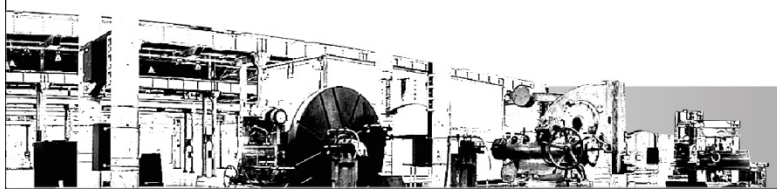


AMT: On the Road

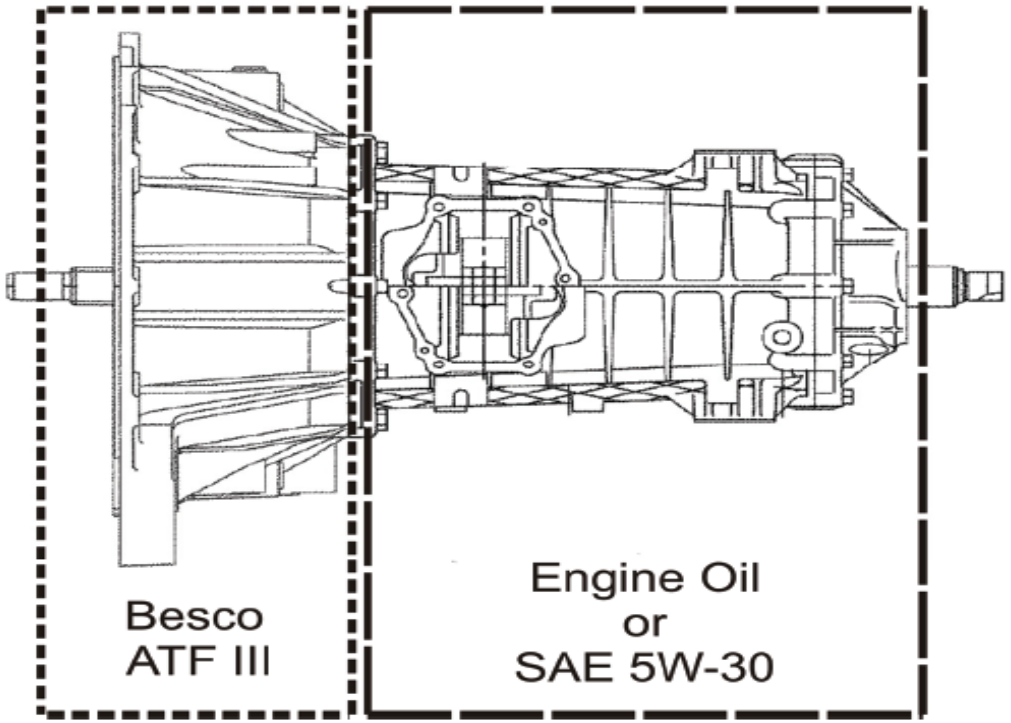
Final Tip:

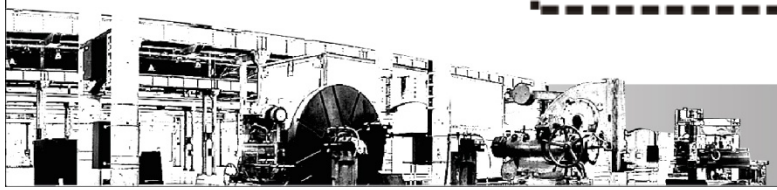
- Hold accelerator pedal steady during shifts



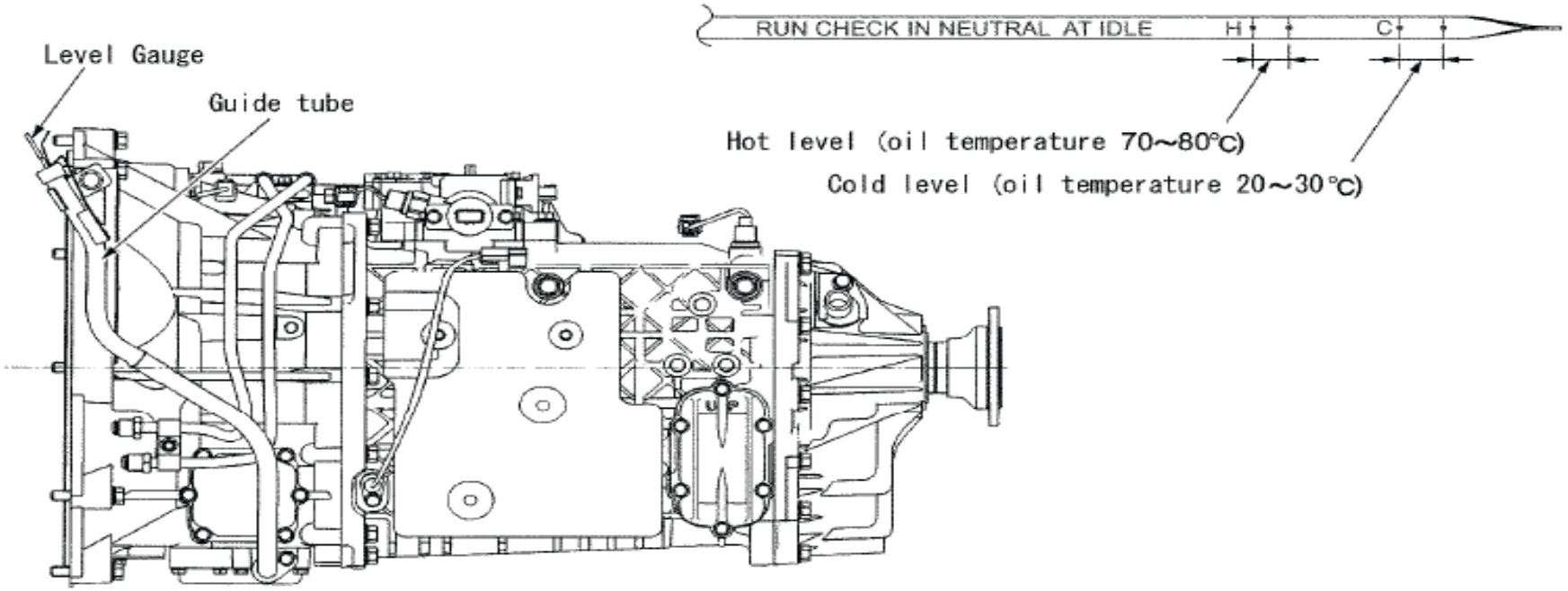


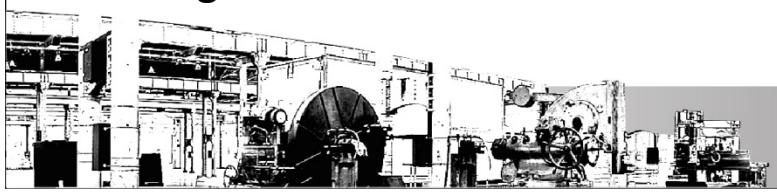
Service Operations





Fluid Level Check & Replacement





Replacement Procedure

The oil changes should be every 45,000km (or every 1.5 years).

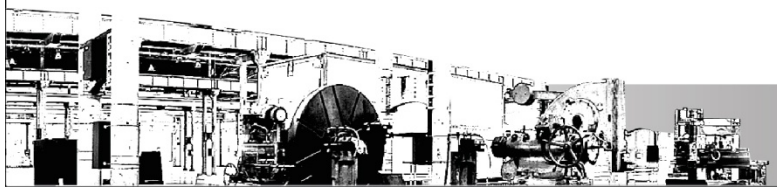
Note: This schedule may be changed. See the Owner's Manual for the detail.

1. Prepare an oil pan or other receptacle under the drain plug.
2. Pull out the level gauge.
3. Extract the drain plug, and allow the oil to drain.
4. Attach the drain plug and tighten to the specified torque. 39 Nm
5. Refill with Besco ATF III from the guide tube on the level gauge.

Maintenance Schedule

I = Inspect, clean, correct, replace as necessary **R** = Replace
T = Retighten to specified torque **L** = Lubricate **A** = Adjust

SERVICE INTERVAL:	Initial	Every				
x 1,000 kilometres	5	15	30	45	60	120
or years	0.1	0.5	1	1.5	2	4
or hours	100	300	600	900	1200	2400
ENGINE & DRIVE LINE						
*Manual transmission oil	R	I		R		
*Clutch (Automated Manual Transmission)				R		



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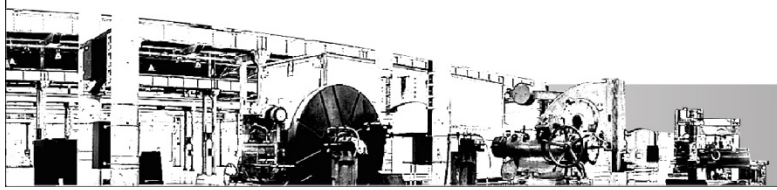


Volvo AMT Transmission

Graham Hannaford

Volvo Group Australia

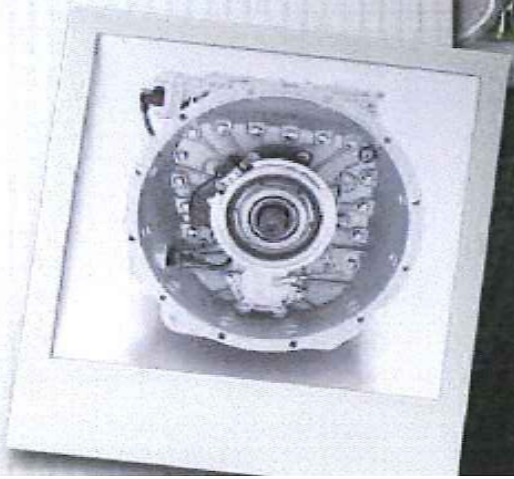
I-SHIFT

THE TRANSMISSION

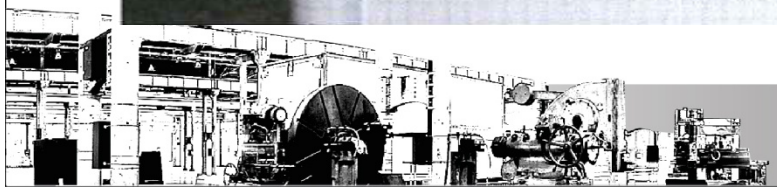
I-Shift is a 12-speed range-change and splitter transmission. Splitter is integrated into the base gearbox. The range-change section is of planetary type and is fitted behind the base unit.

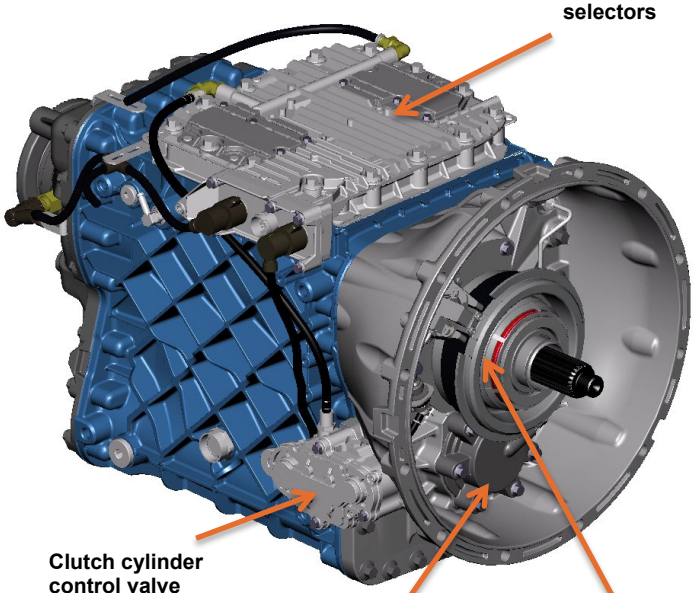
The base unit has no mechanical synchromesh. Instead, the engine and transmission are synchronized with each other electronically, via the engine management system. Throttle opening increases if engine revs are too low and the engine brake quickly lowers engine speed to the appropriate revs during gearchanging.

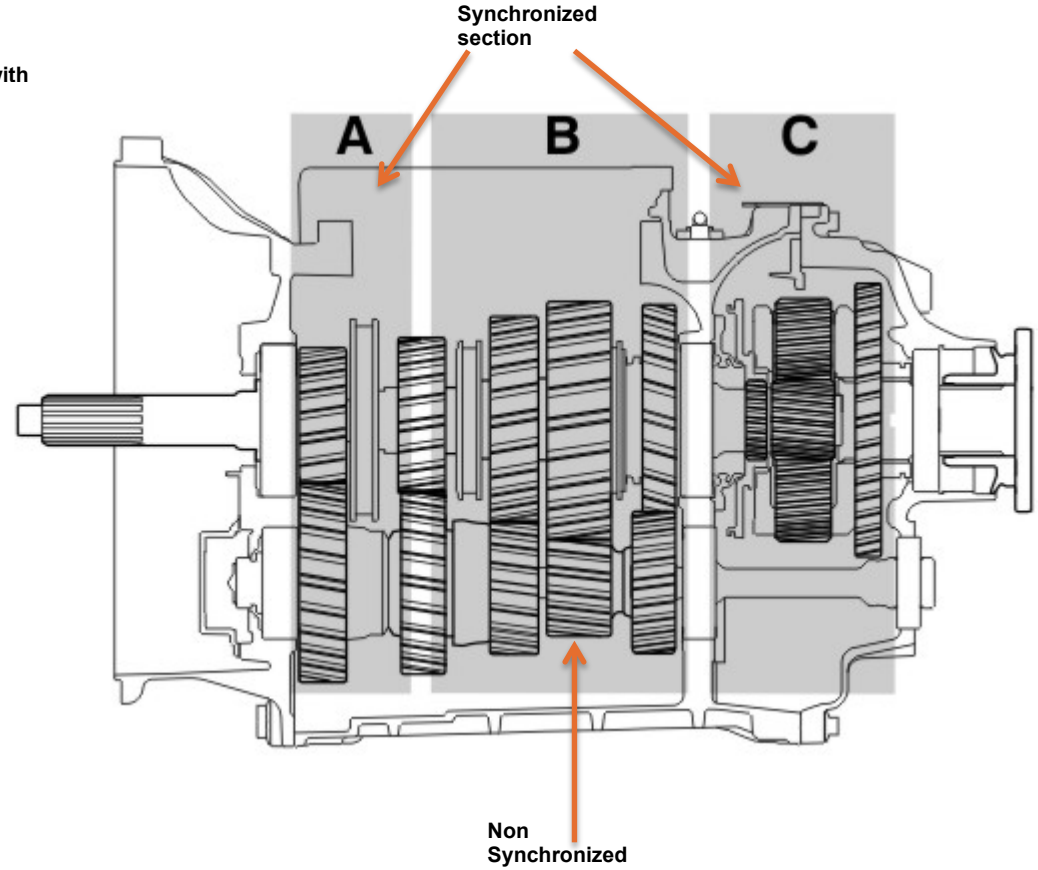
On top of the gearbox is the I-Shift control box that handles all the transmission functions. It is from here too that the transmission's shift forks are operated pneumatically.

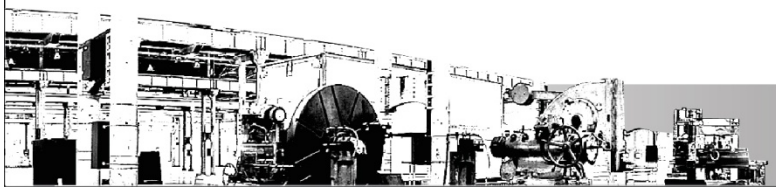


VOLVO

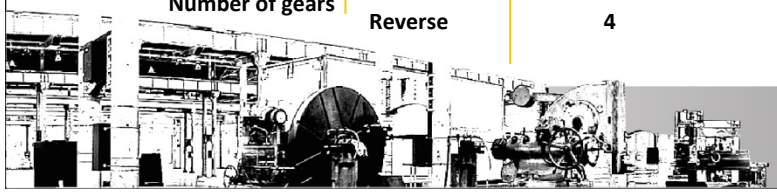



Control Housing with selectors
Clutch cylinder control valve
Counter Shaft Brake
Clutch Cylinder with position sensor


Synchronized section
A
B
C
Non Synchronized

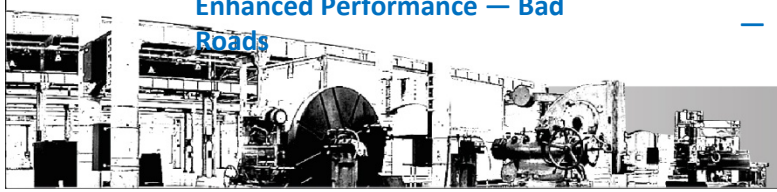


Make	VOLVO	
Type	AT2412D AT2612D AT2812D ATO2612D ATO3112D	Unsynchronized main gearbox
Special markings	ATO2612D	A - Automatic T - Transmission O - Overdrive 26 - Torque 2600 Nm 12 - Number of forward gears D - Generation
Range gear	Synchronised	
Split gear	Synchronised	
Number of gears	Forwards	12
	Reverse	4



Program packages	VDA variants	Display
Basic	TP-BAS	B
Distribution & Construction	TP-DICON	DC
Long Haul & Economy	TP-FUEC	FE
Heavy Duty transports	TP-HD	HD

Functions	Program packages			
	TP-BAS	TP-DICON	TP-FUEC	TP-HD [1]
Basic Power Take Off Functions	X	X	X	X
Basic Gear Selection Adjustment	X	X	X	X
Basic Vocational Functions	X	X	X	X
Basic Shift Strategy	X	X	X	X
Performance Shift	X	X	X	X
Gearbox Oil Temperature Monitor	X	X	X	X
Heavy Start Engagement	X	X	X	X
Enhanced Shift Strategy	—	X	X	X
Launch Control	—	X	X	X
I-Roll	—	—	X	X
Smart Cruise Control	—	—	X	X
Heavy Duty GCW Control	—	—	—	X
Possible optional functions				
Enhanced Power Take Off Functions	O	O	O	O
Enhanced Gear Selection Adjustment, incl. Kick-down	—	O	O	O
Enhanced Performance — Bad Roads	—	O	O	O



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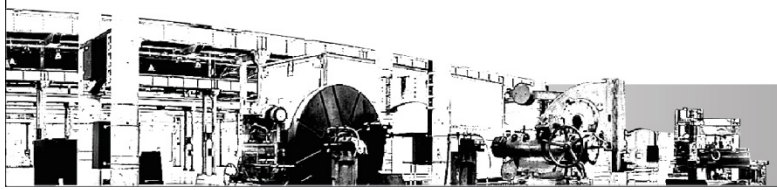


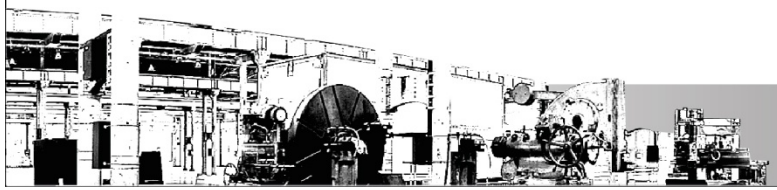
Automated Transmission diagnostic needs

Douglas Devlin

Eaton Vehicle Group

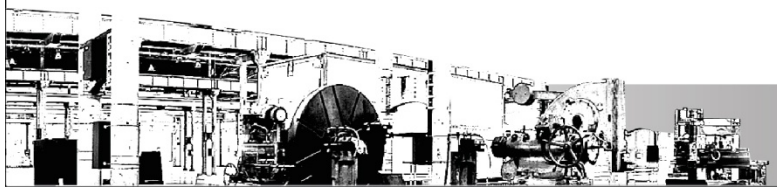
Diagnostic needs

- Automated mechanical transmissions
  - Diagnostics
  - Electrical system
  - CAN Bus
  - Automated Clutch



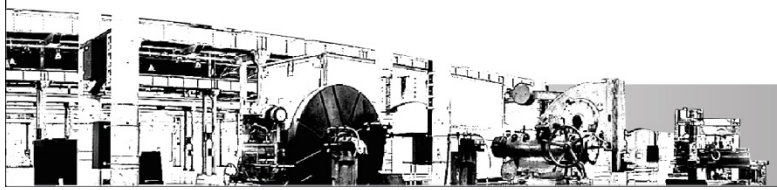
Equipment

- Multi meter
- Communication adaptor
- Lap top (internet ready)
- Service ranger Version 3
- TRTS 0930 (Dated August 2011)



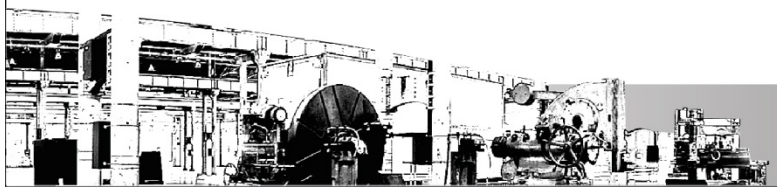
Basic checks

- Confirm the fault code including the FMI
- Electrical Health check every 12-18 months
- Inspect and maintain power and ground points for all systems ECU's.
  - Clean and dry all vehicle connectors.
  - Use a high quality connector lubricant. (Nyogel)



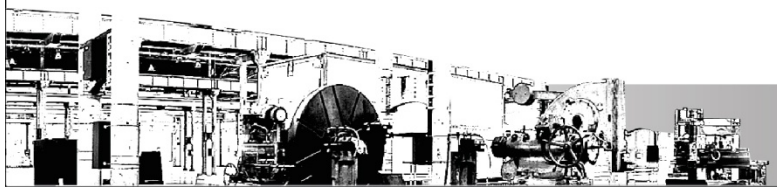
Electrical items

- The transmission ECU is not the only ECU involved in transmission operation - Engine Control, Drive Control and ABS are all involved in the process.
- Integrity of the complete system is important



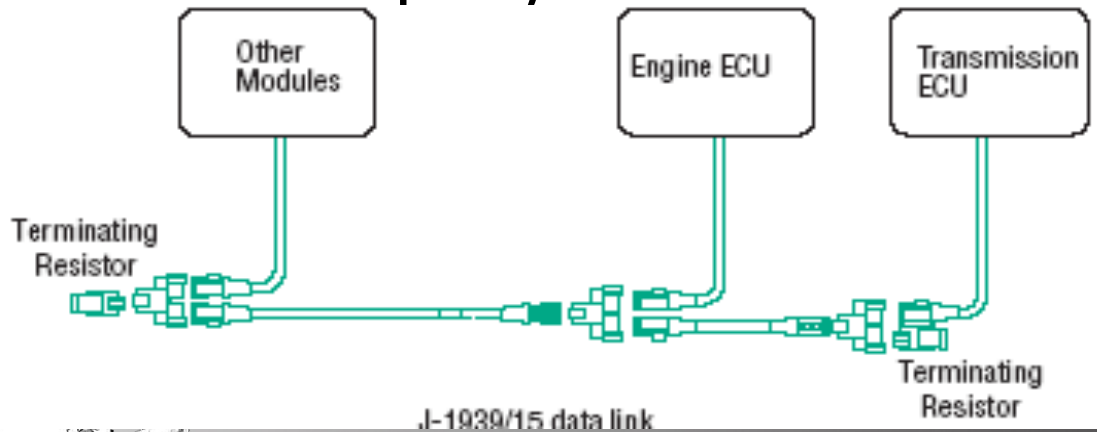
Electrical

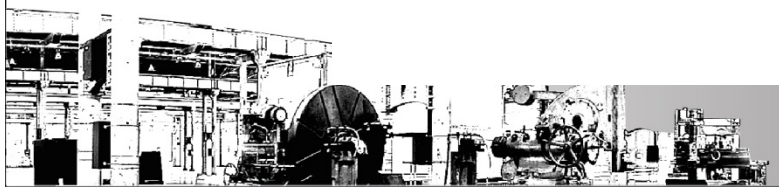
- Network integrity is key.
  - Watch out for add-on installations like GPS systems and fleet managers.
  - Eaton recommends high quality cable and gold connector pins.30



“Back bone” communication link

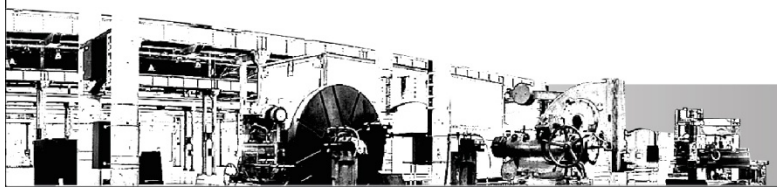
- J1939-11 Physical Layer (250 Kbps, shielded twisted pair)
- J1939-15 Reduced Physical Layer (250 Kbps, unshielded twisted pair)





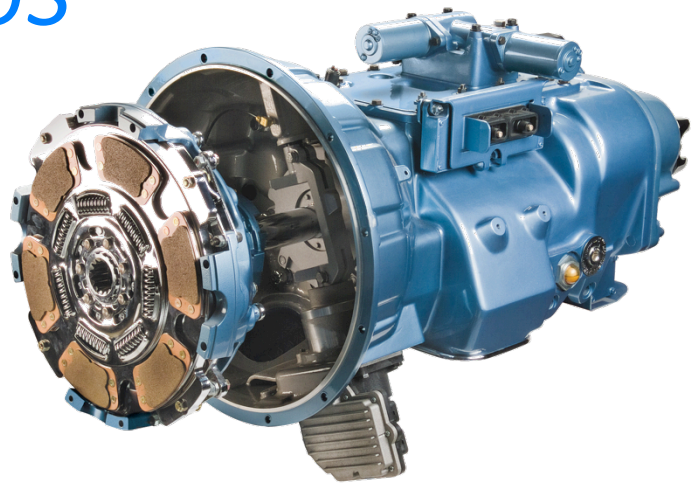
Operation

- Driver can help
  - Snapshots
  - Collects data for 9 before and 2 secs after the fault occurs
  - VPA (vehicle performance analysis)
  - Operational information on the vehicle

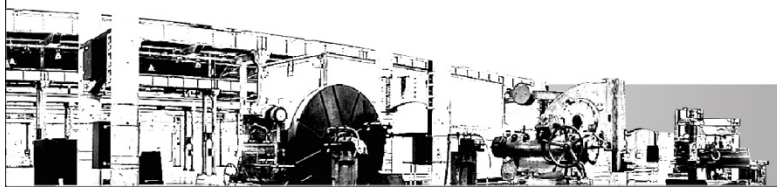


Two pedal Automation
UltraShift *PLUS*

- Electronically controlled clutch
- Clutch abuse protection algorithms
- Advanced shift logic



- ServiceRanger tool is key for servicing & diagnostics



Thank You for attending

Are there any questions for the panel?