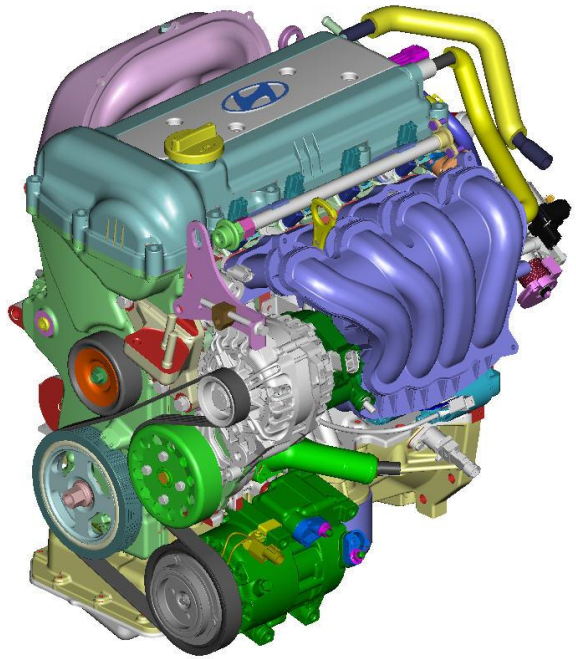
‘06MY ELANTRA (HD)

- Technical Highlights-



Introduction

Powertrain Lineup

Engine	T/M		GEN (May, '06)	* East Europe (Aug, '06)	NA, Aust. (July, '06)	DOM (May, '06)
γ - 1.6CVVT	M/T	M5CF1	●	●	-	●
	A/T	A4CF1				
β - 2.0CVVT	M/T	M5CF2	●	●	●	●
	A/T	A4CF2				
U - 1.6 Diesel	M/T	M5CF3	●	●	-	●
	A/T	A4CF2		-		

Not applied in West EU market □ FD will be launched from April, 07.

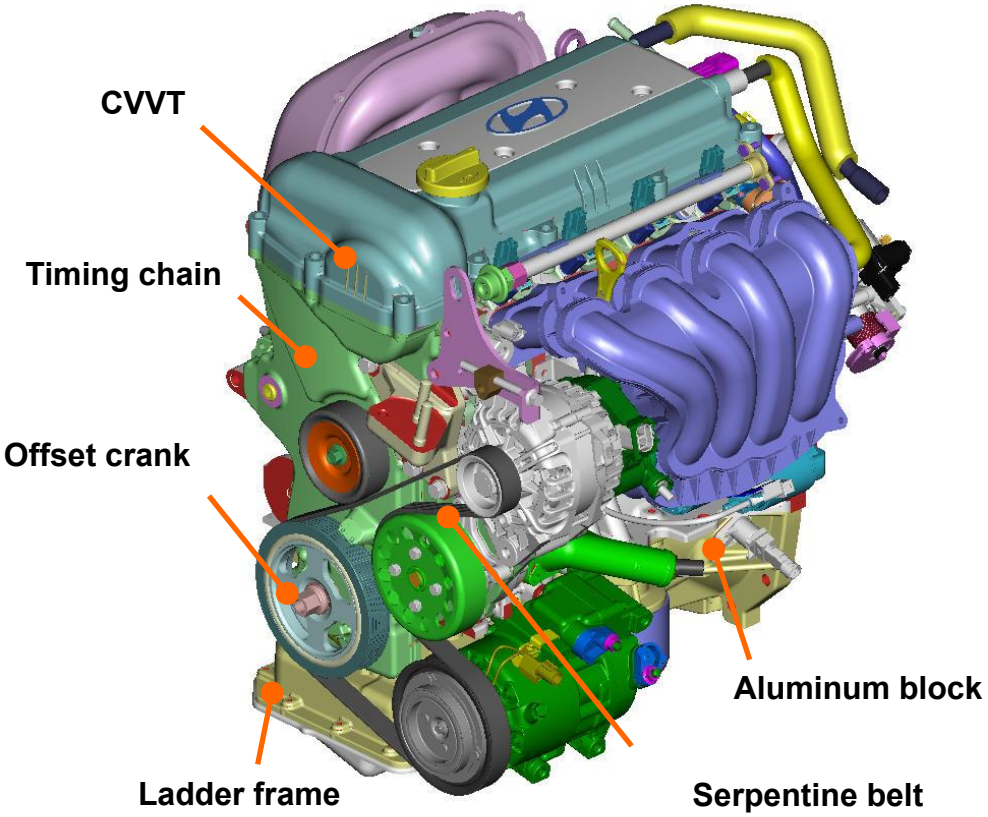
***: East Europe: 3 countries only (Russia, Ukraine, Kazahstan)**

Vehicle dimension

Items	HD	XD	Corolla
OAL	4,505 (-20)	4,525	4,529
OAW	1,755 (+30)	1,725	1,699
OAH	1,490 (+65)	1,425	1,486
Wheel base	2,650 (+40)	2,610	2,601

Engine

Gamma (γ)



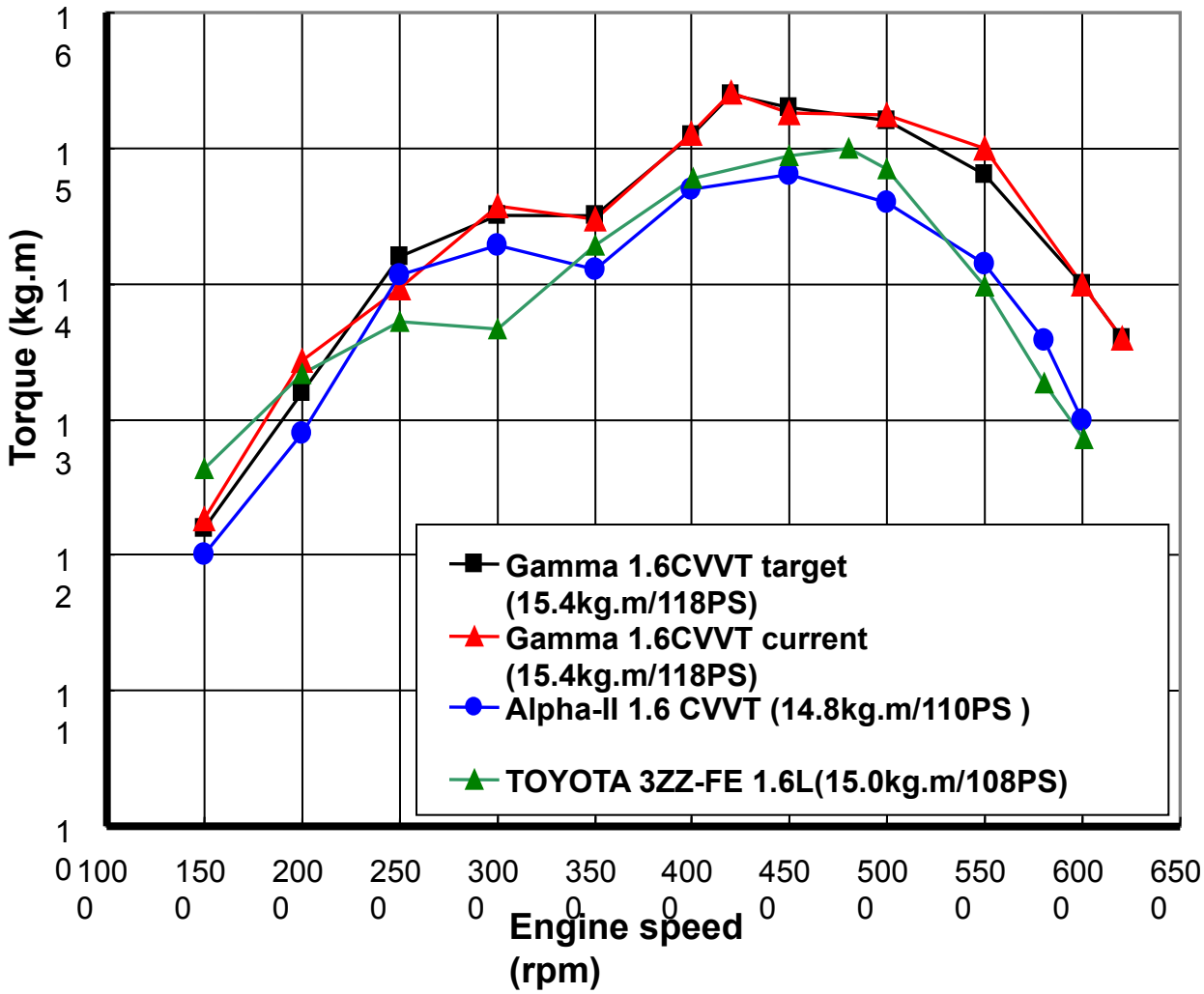
Type	In-line 4 cylinders	
Displacement (cc)	*1,396	1,591
Bore x Stroke (mm)	77 x 75.44	77 x 85.44
Max. power (ps)	105	118
Max. torque (kgf.m)	13.5	15.4
Applied technology	▪ Aluminum cylinder block ▪ CVVT ▪ Timing chain ▪ Direct driving / Mechanical tappet ▪ Ladder frame ▪ Offset crank shaft by 10mm ▪ Directly connected oil pump ▪ Serpentine belt	

* Gamma - 1.4CVVT : applied in FD (’07)

Engine

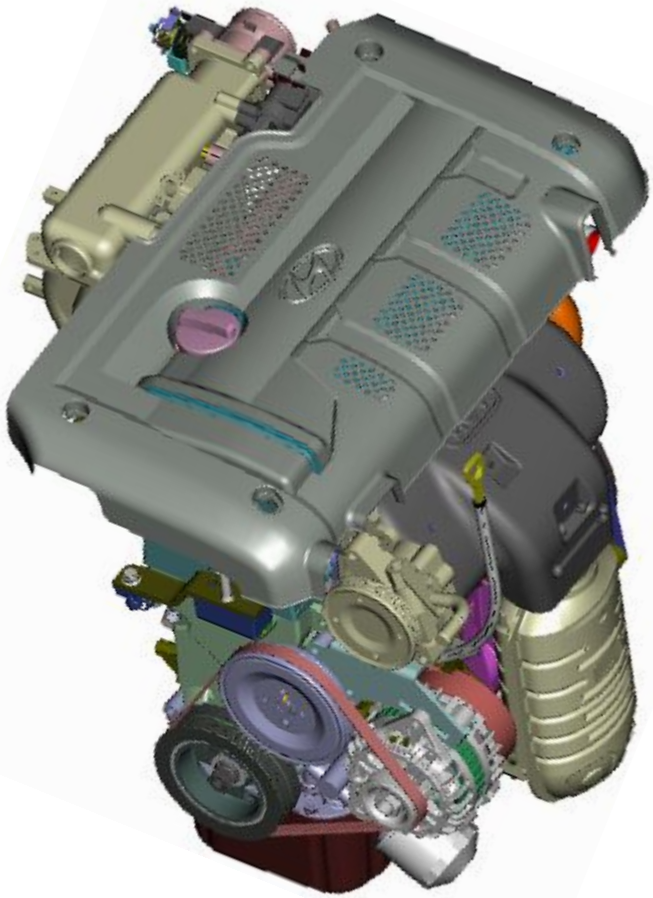
Gamma - 1.6

Gamma 1.6L	
Alpha-II 1.	
Toyota 1.6	



Engine

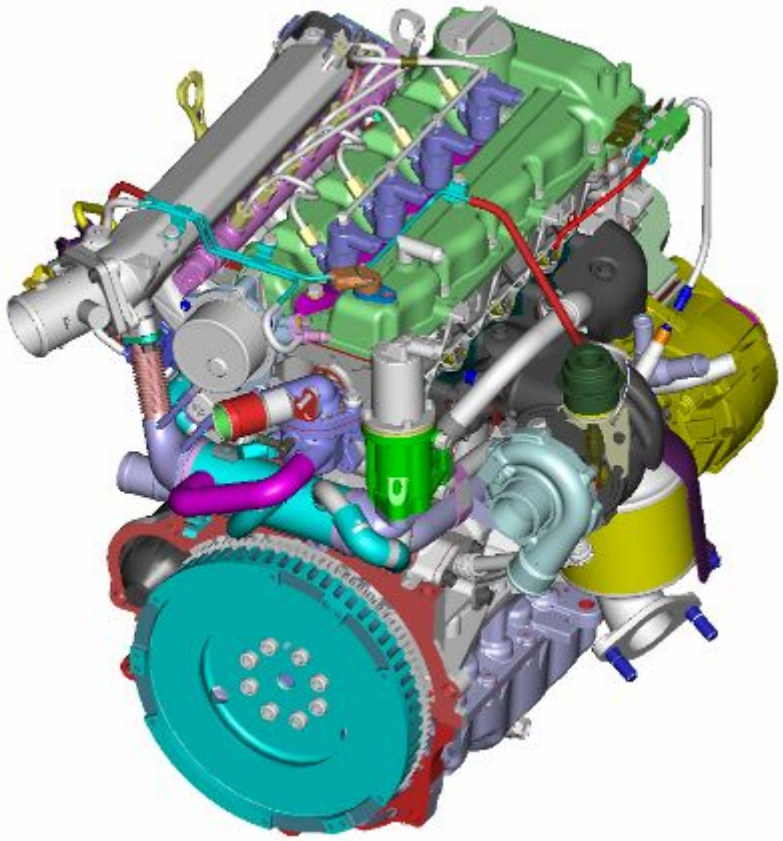
Beta - 2.0



Type	In-line 4 cylinders
Displacement (cc)	1,975
Bore x Stroke (mm)	82.0 X 93.5
Max. power (ps)	(143)
Max. torque (kgf.m)	(19.0)
Applied technology	- Optimized Intake/Exhaust manifold - Beam Bearing Cap applied for lower NVH - 2 layers Metal Cylinder Head Gasket - CVVT - Timing belt auto tensioner - Separating wall inside exhaust manifold - MAF □ MAP - SULEV

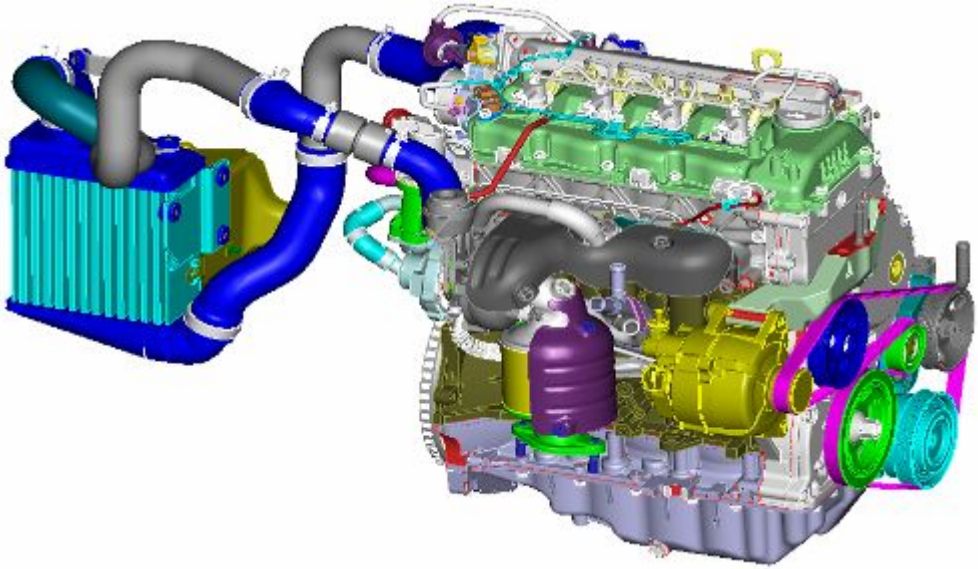
Engine

U - 1.6

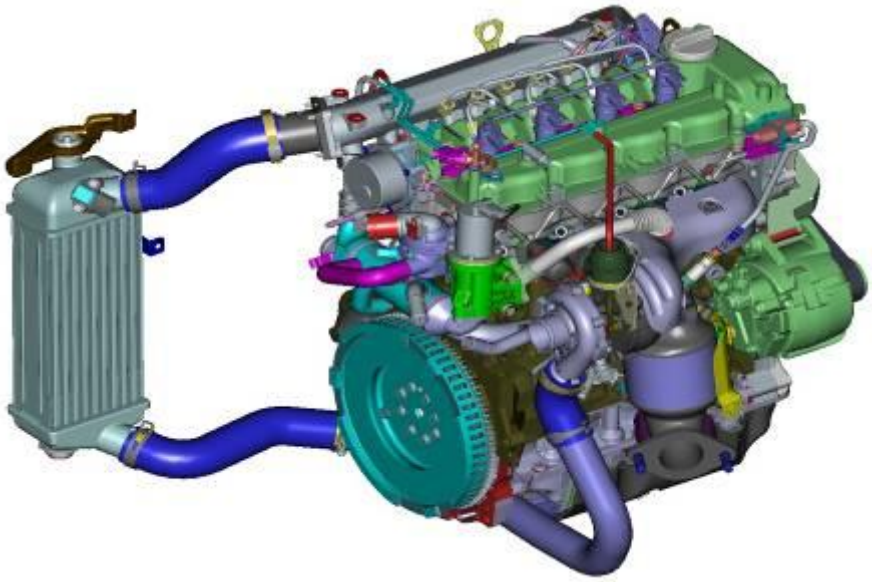


Items	U-1.5 (EURO 4)	U-1.6 (EURO 4)
Cylinders	4 cylinders	
Displacement (CC)	1,493	1,582
Bore (mm)	75	77.2
Stroke (mm)	84.5	
Valve type	DOHC-4 valves	
Cam driving	Chain	
Fuel injection	Common rail (1,600bar)	
Max. Power (PS)	112	117
Max. Torque (kg.m)	24.5	26.5

Intercooler system



XD U1.5 VGT EU3



HD U1.6 VGT EU4

Engine performance

γ-1.6 AT

Items		HD γ-1.6L AT	XD F/L 1.6L AT
Max. Power (ps/rpm)		118	110
Max. Torque (kg·m/rpm)		15.4	14.8
Max. speed (kph)		179	176
Acceleration (sec)	0→100kph	12.7	13.0
	60→100kph	7.2	7.2
Fuel consumption (kpl)		11.4	10.8

β-2.0 AT

Items		HD β-2.0 AT	XD F/L 2.0L AT	COROLLA 1.8L AT
Max. Power (ps/rpm)		140/6000	140/6000	130/6000
Max. Torque (kg·m/rpm)		18.8/4500	18.8/4500	17.3/4200
Max. speed (kph)		190 F/CUT	194	187 F/CUT
Acceleration (sec)	0→100kph	11.1	11.2	11.0
	60→100kph	6.9	6.9	6.6
Fuel consumption (kpl)		11.0	9.9	12.1

Transaxle

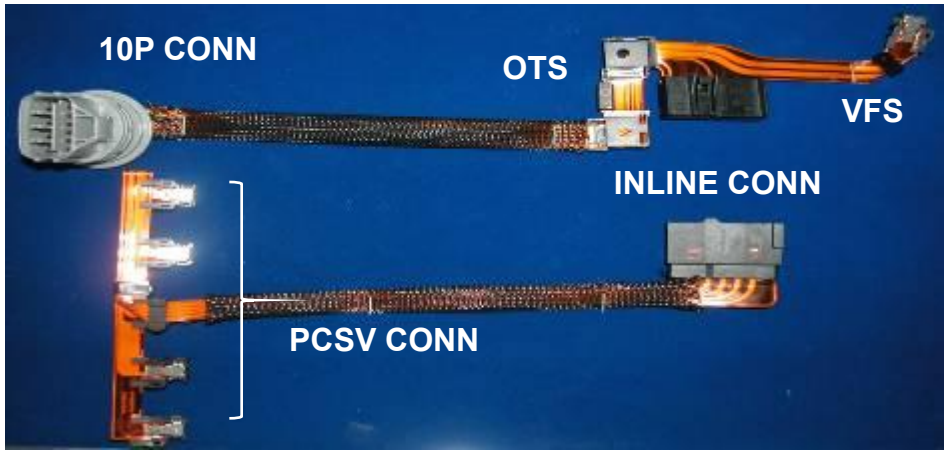
New alpha automatic transaxle (A4CFx)

1. 3 Clutches, 2 Brakes, 1 OWC
   U/D, O/D, REV, LR, 2nd
2. VFS valve for line pressure control
3. 6 Solenoid valves applied
   PWM (4EA), On-Off (1EA), VFS (1EA)
4. FPC (Flexible Printed Circuit) applied for solenoid valve wiring
5. Flat torque converter
6. Double planetary carrier (2EA)
7. Vehicle speed sensor eliminated

Transaxle

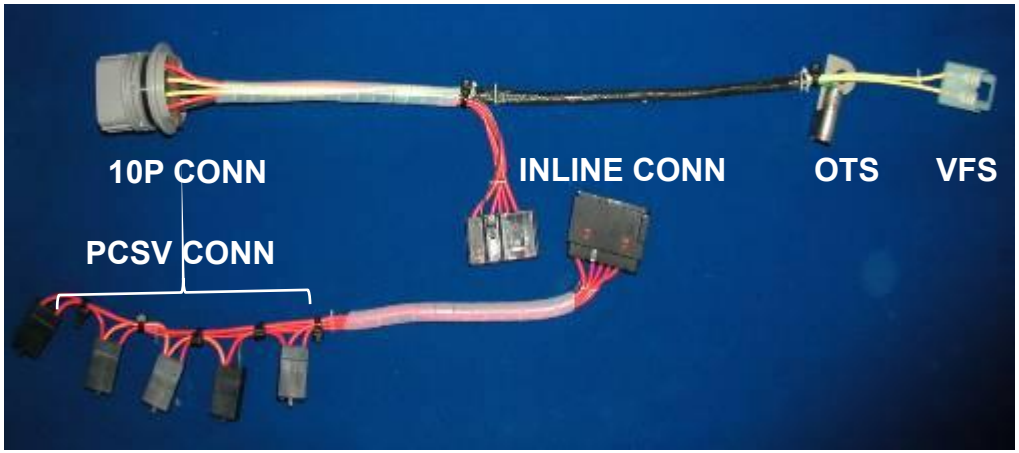
New alpha automatic transaxle (A4CFx)

FPC Type Harness



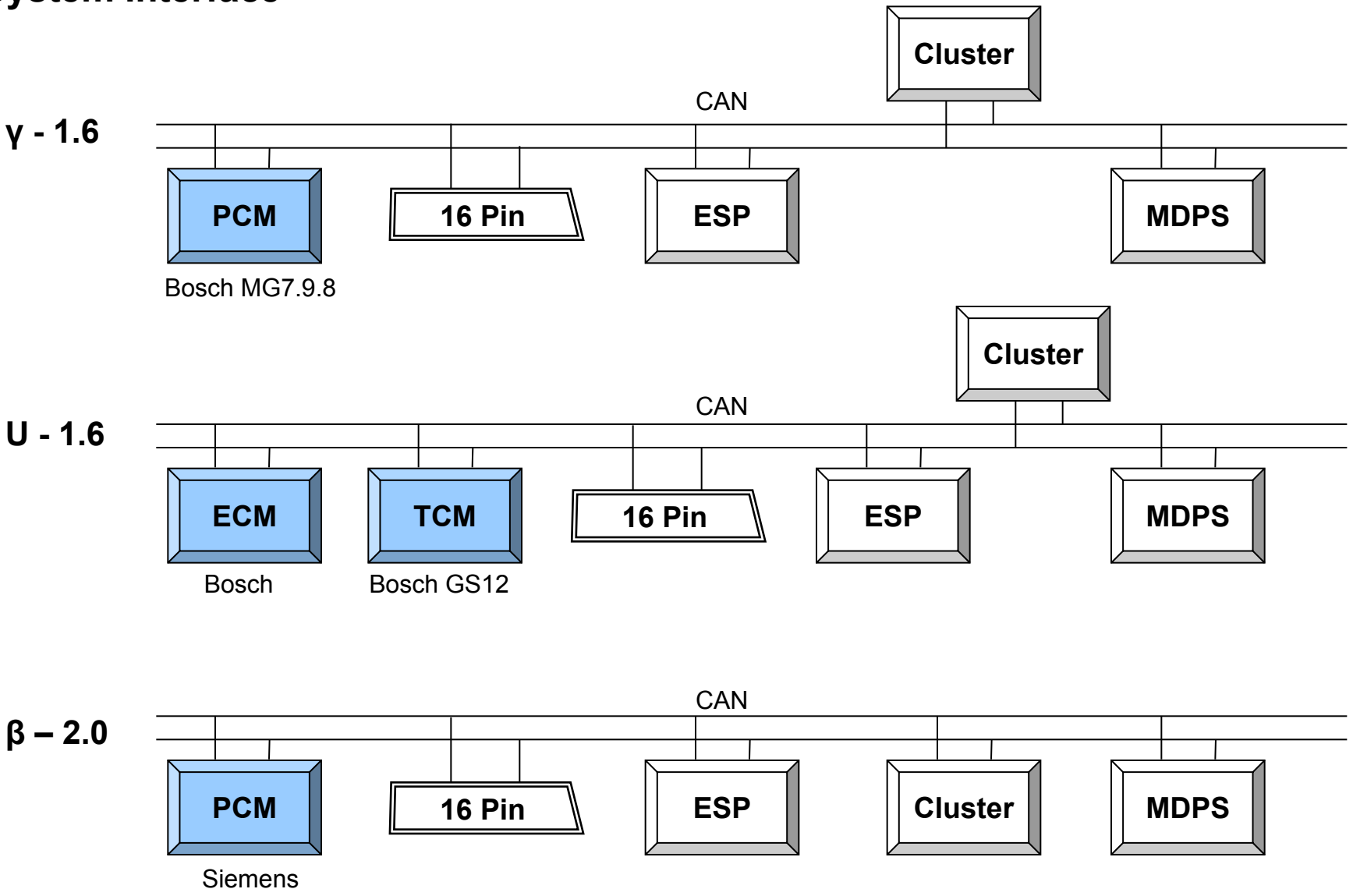
A4CFx

Round Wire Type Harness



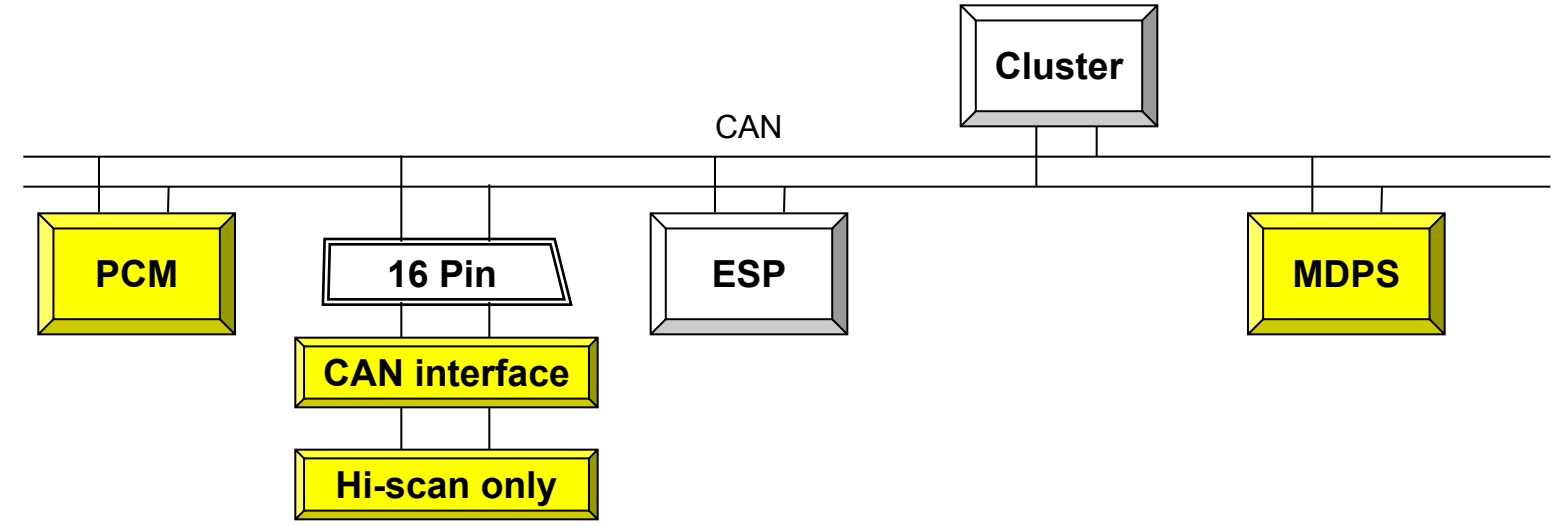
A4AF3

System Interface

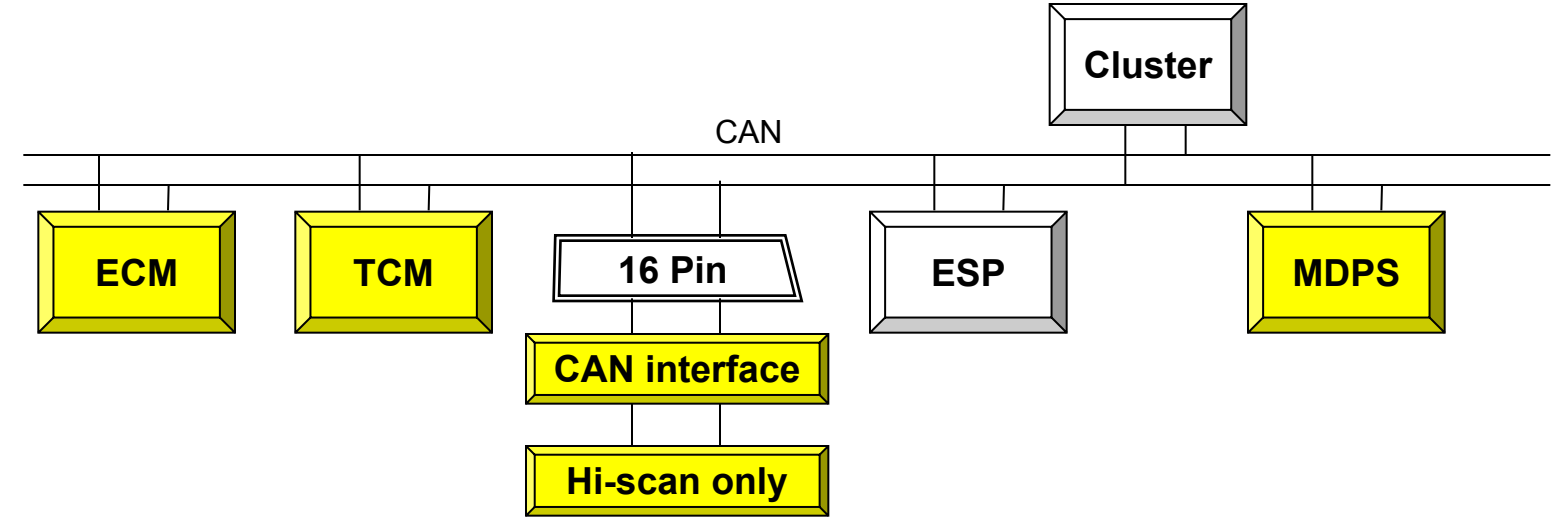


Diagnosis

γ - 1.6,
β – 2.0



U - 1.6



Independent K-line for BCM, FATC, ESP, Airbag and TPMS.

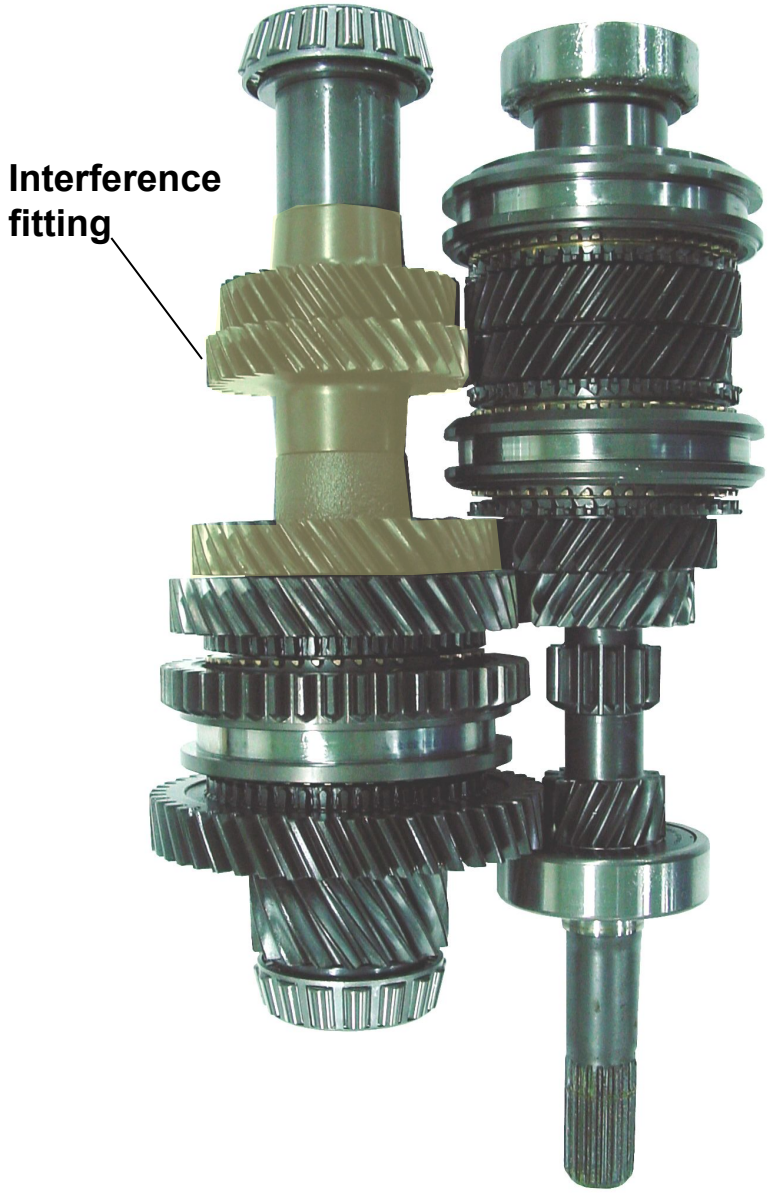
Transaxle

Manual transaxle

Engine		Γ 1.6	β 2.0	U 1.6
Designation		M5CF1	M5CF2	M5CF3
TM Type		Front drive	Front drive	Front drive
Number of gears		5 speed	5 speed	5 speed
Gear ratio	1st gear	3.615	3.308	3.636
	2nd gear	1.950	1.962	1.962
	3rd gear	1.370	1.257	1.189
	4th gear	1.031	0.976	0.844
	5th gear	0.780	0.778	0.660
	R	3.583	3.583	3.583
	FGR	4.294	4.188	3.941

Multi cone synchronizer:

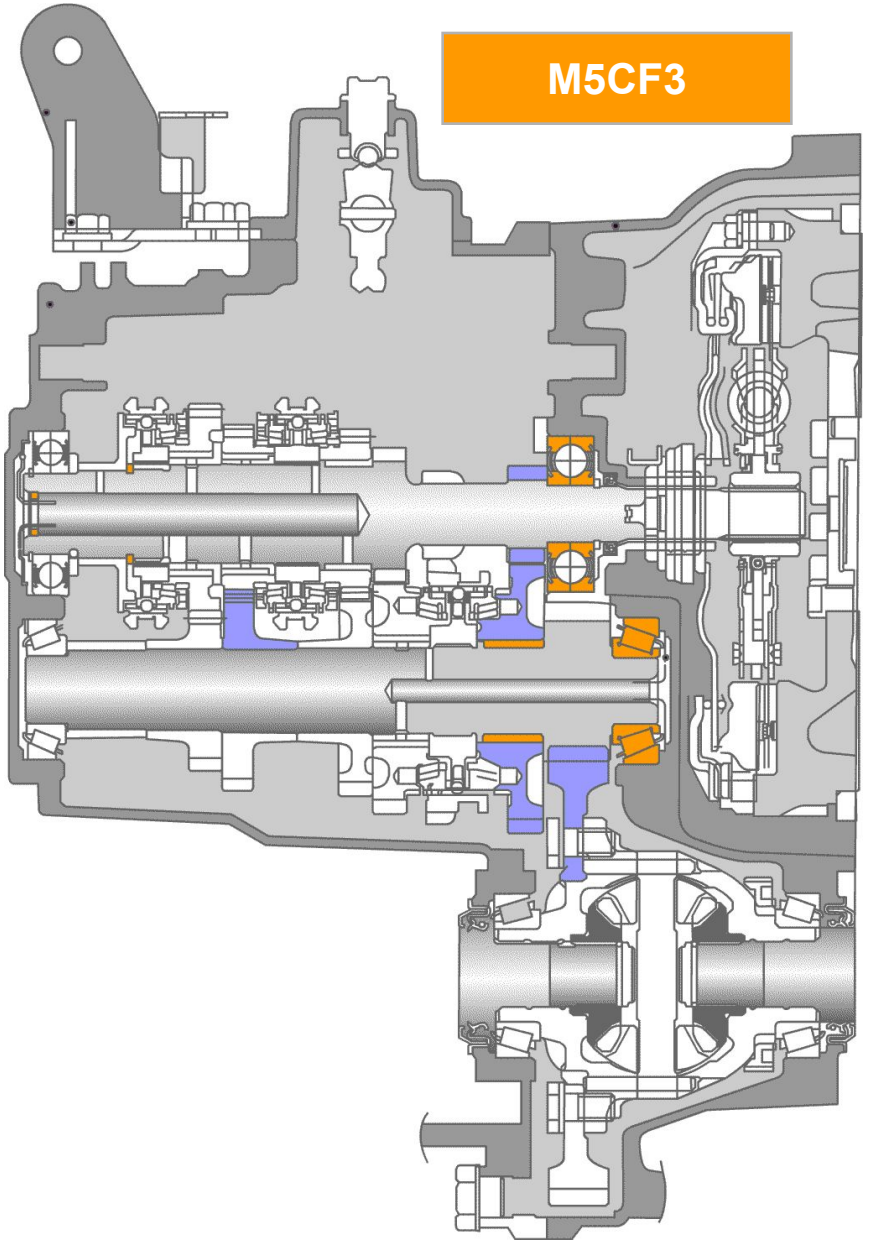
- **Triple cone : M5/6CF2,3 1st, 2nd**
- **Double cone : M5/6CF2,3 3rd ~ 6th**
  M5/6CF1 1st, 2nd, 3rd



Transaxle

Manual transaxle (M5CF3 for U-1.6)

Color shows the changed parts
comparing with M5CF2



Transaxle

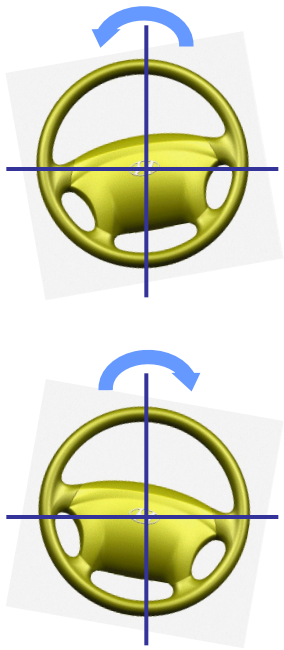
Manual transaxle (M5CF3) for U-1.6

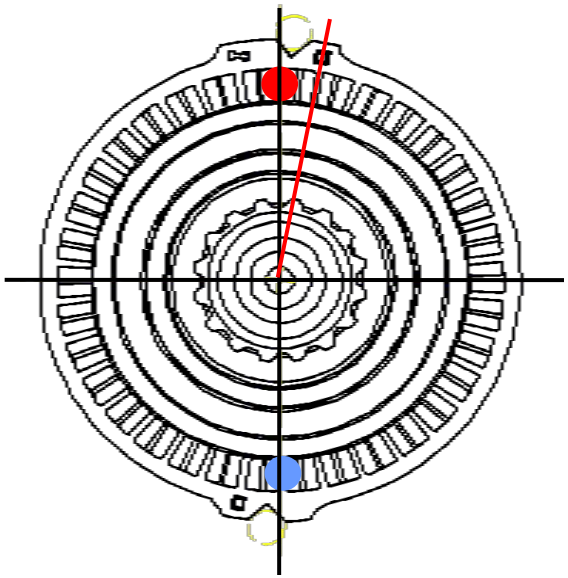
- Increasing the strength of M5/6CF2 (Torque 24kgm), developed M5/6CF3(Torque 26kgm) in order to adopt U-1.6 engine (from XD: Sep,2005)

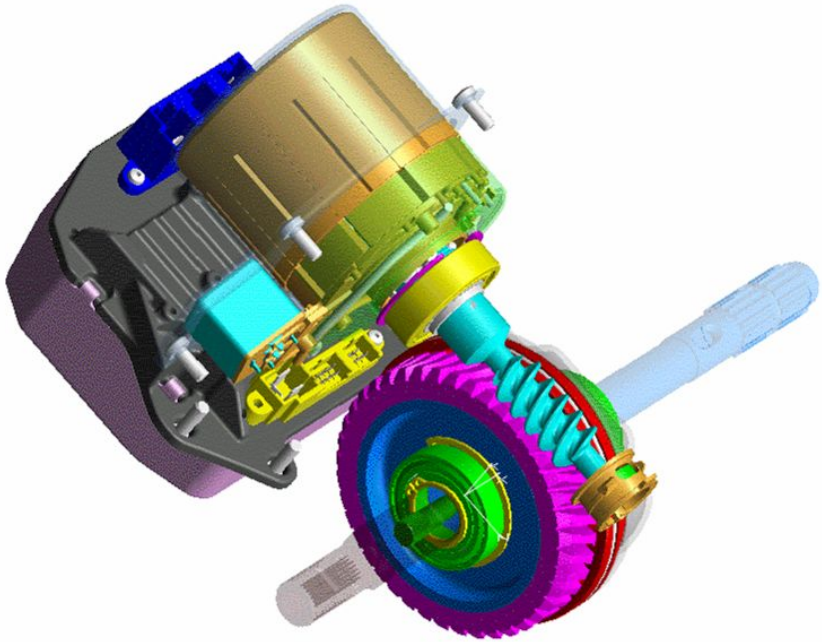
Items	Part name	Description	Remarks
Gear shaft	1st gear	Increased strength (different dimension)	
	4th Output gear	High strength steel applied	
	Output shaft	-1st gear portion outer diameter increased (Φ39→43) -Gear width increased by 2.65mm and length enlarged.	
	5th Snap Ring	Type changed (Snap → Half-circle)	
Case	Clutch housing, Case	Enhanced lubricating passage for Diff' bearing	
	Differential case	The rib added for higher strength	
Bearing	Input shaft front ball bearing	Size increased (Outer diameter: 4mm, Width: 1mm)	
	Output shaft front thrust bearing	Size increased (Outer diameter: 7mm)	
	1st Needle bearing	Size increased (Inner diameter: 4mm, Width: 3mm)	

MDPS

- Applied as a standard for all areas (LHD/RHD) including NA
- Safety Mechanism :
  The motor will assist the steering when the engine is off while driving for the safety.
- CAN interface for diagnosis with scanner (K-line eliminated)
- TRW/MOBIS
- New optical type torque (angle) sensor with higher resolution







Body Control Module

▸ Concept

1) Following units were built in,

· Chime buzzer

· Auto light control unit

· Keyless receiver

2) Improved product value

· Increased maximum distance for RKE operation

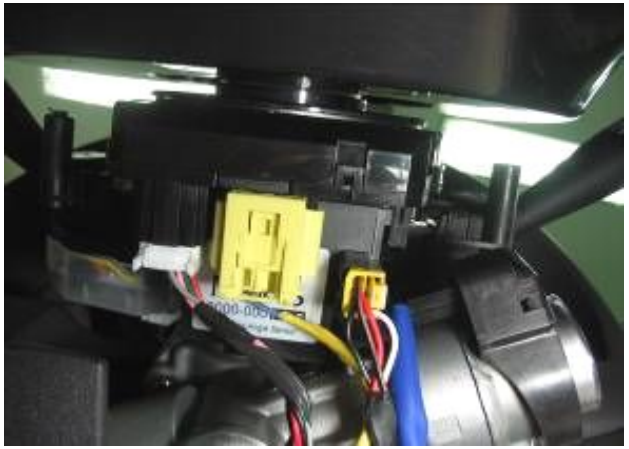
XD : about 10m HD : about 30m

· Keyless antenna is built in BCM.

· User option mode in the scanner

ESC (Electronic Stability Control)

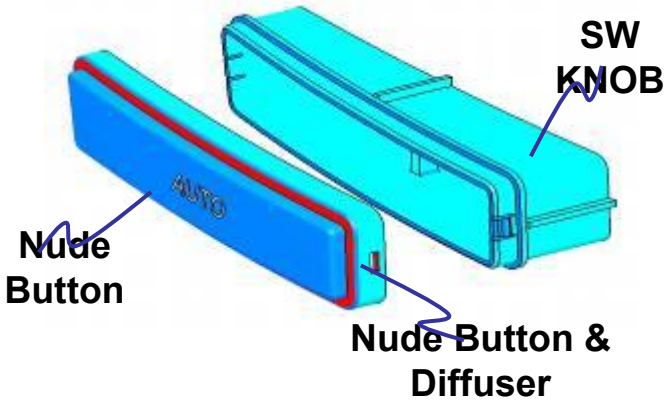
- Same system (Bosch 8) as one for TG, NF and CM
- Improved product value (XD: TCS, HD: ESC)



Air conditioning

- Variable compressor
- APT (Automotive Pressure Transducer)
- PTC heater for U-1.6
- Nude button for FATC switch panel

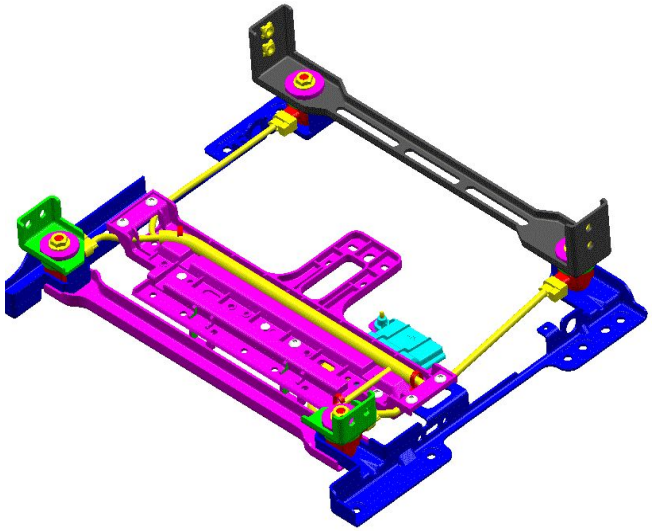
FATC



Manual

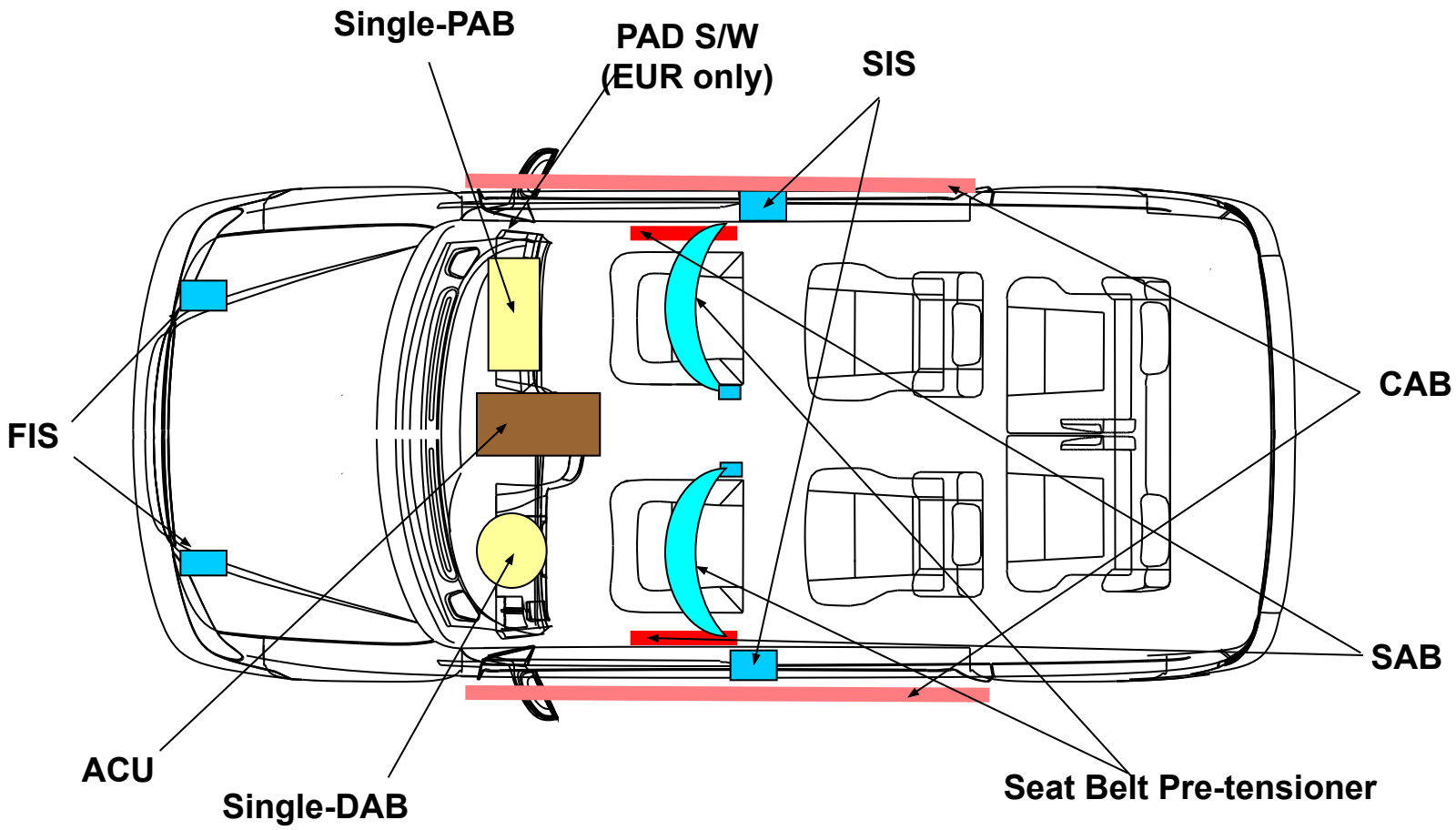
SRS

- TRW GEN 5.6 (Same as one for NF)



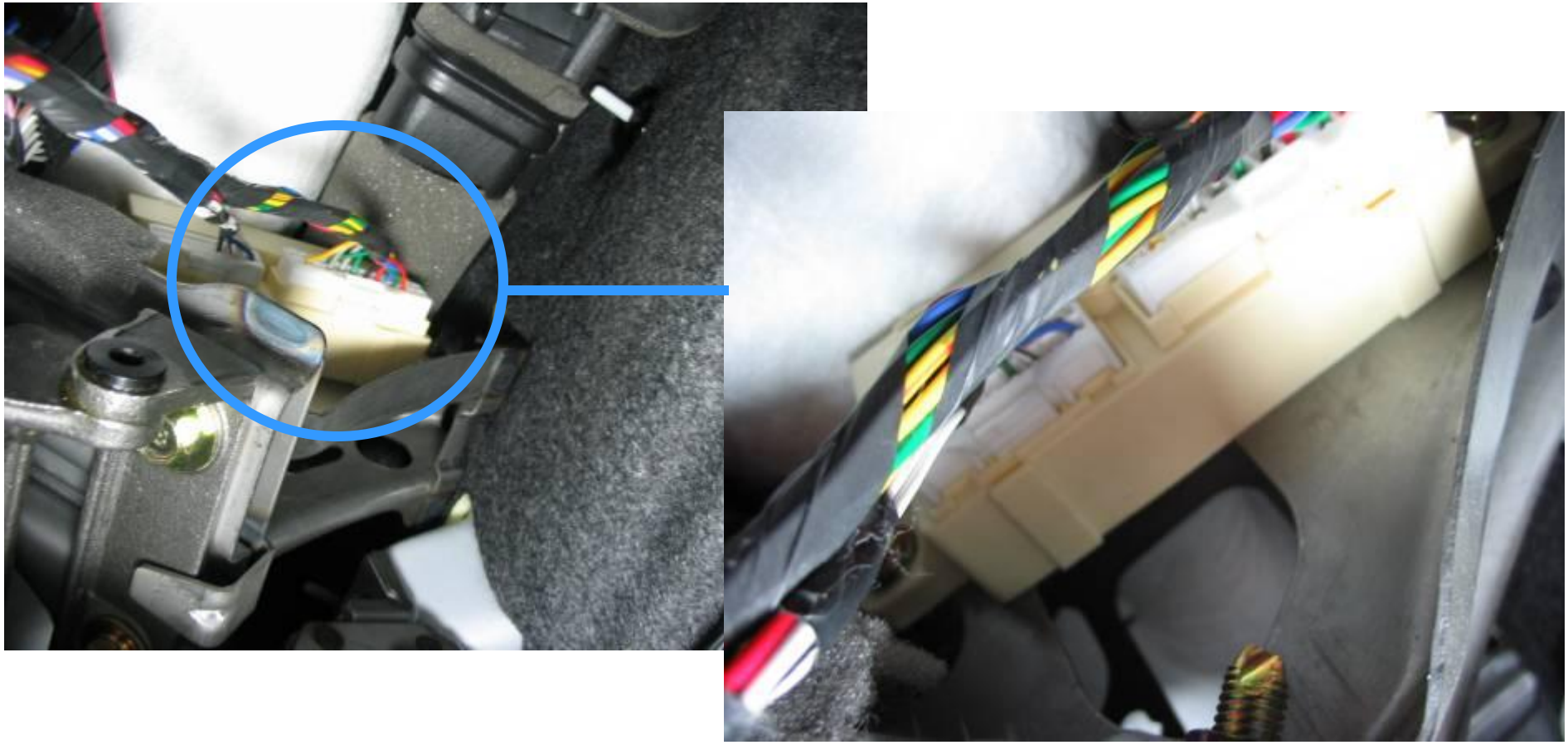
SRS

De-powered Airbag System (General/EUR)



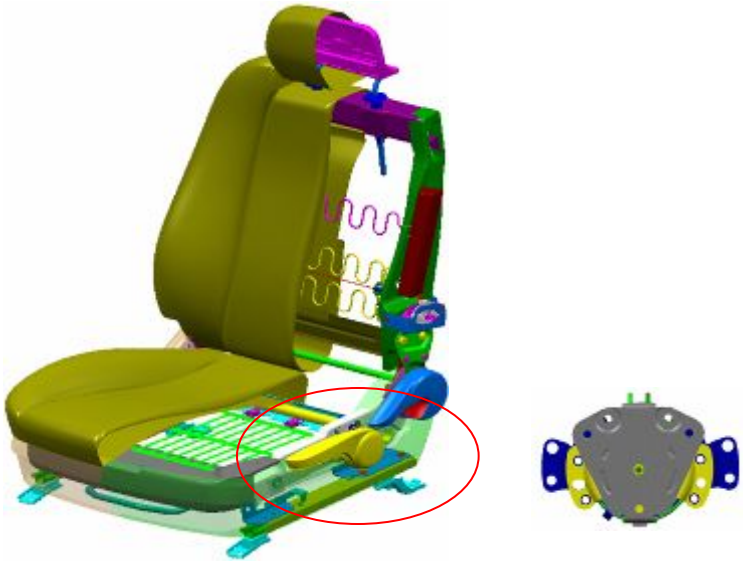
ICM (Integrated Circuit Module)

Application: Burglar alarm / Rain sensor relay, Windshield glass deicer relay, Door lock relay, Door unlock relay, Rear fog lamp relay, Burglar alarm horn relay



Convenience items

- Safety power window (driver side)
  XD: X, HD: O



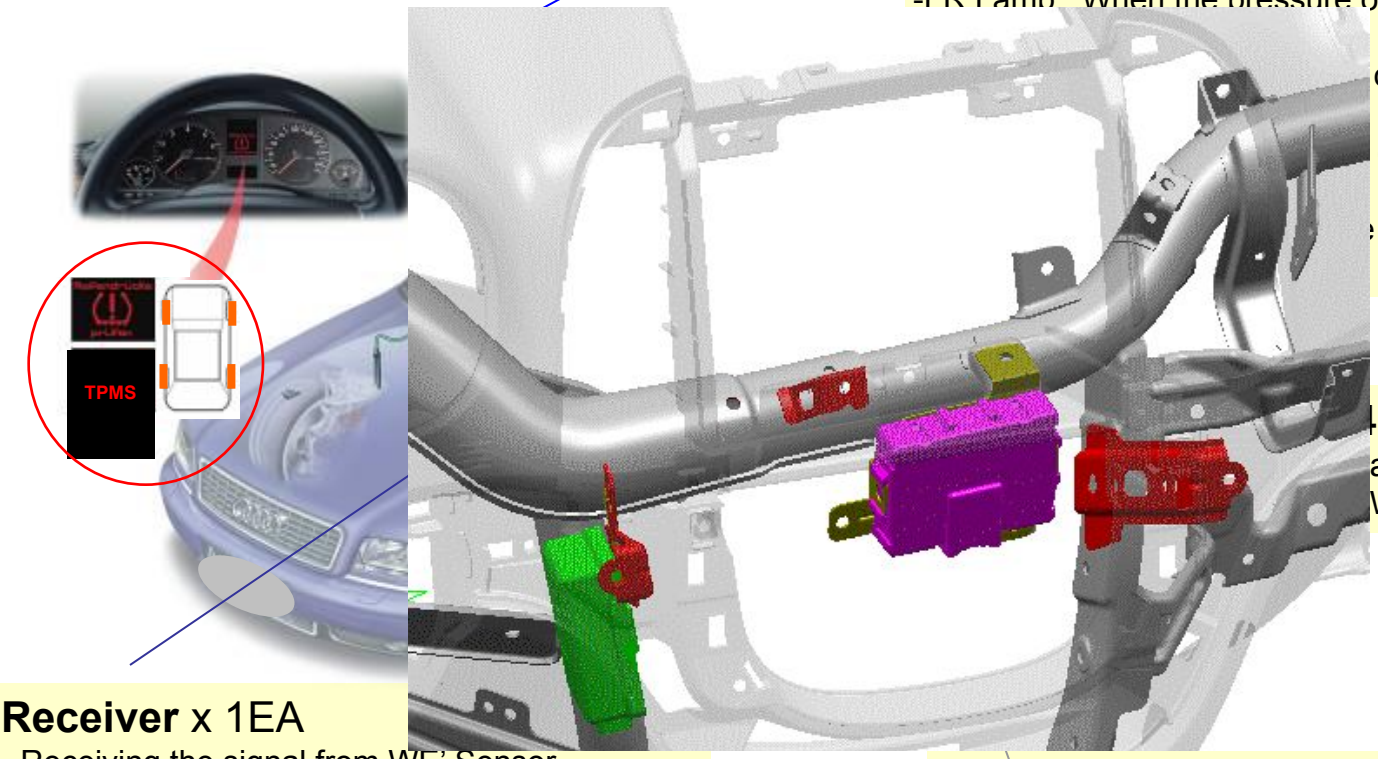
- Pumping type seat height adjuster

- Electical driven trunk lid latch
  (Open by RKE) XD: X, HD: O

TPMS (Low line) – NA only (from June, ,07)

LEAR : CM, TG, EN, HD, EP

TRW : JM, NF



Display

-TPMS Lamp : When the fault from Receiver, LFI, Wheel Electronics is detected in TPMS.

- TREAD Lamp : When the measured pressure from one or more Tires is lower than warning limit level

-FR Lamp : When the pressure of Front Right Tire is lower

of Front Left Tire is lower

of Rear Left Tire is lower

of Rear Right Tire is lower

(Only High-Line)

EA (Only High-Line)

al from Receiver, send LF

WE' Sensor

Receiver x 1EA

- Receiving the signal from WE' Sensor, analyzing it and perform the warning algorithm to control the logic

-Drive the display when 'Tire Event' occurs

- Controls LF Initiator

Wheel Electronics(WE') Sensor x4EA

- Periodically it measures the pressure, temperature, Acceleration inside tire and send RF(315MHz) to receiver

- Receive LF(125KHz) signal from Initiator

SRS

Advanced Airbag System (USA, Canada): Same as one for EP (WCS system)