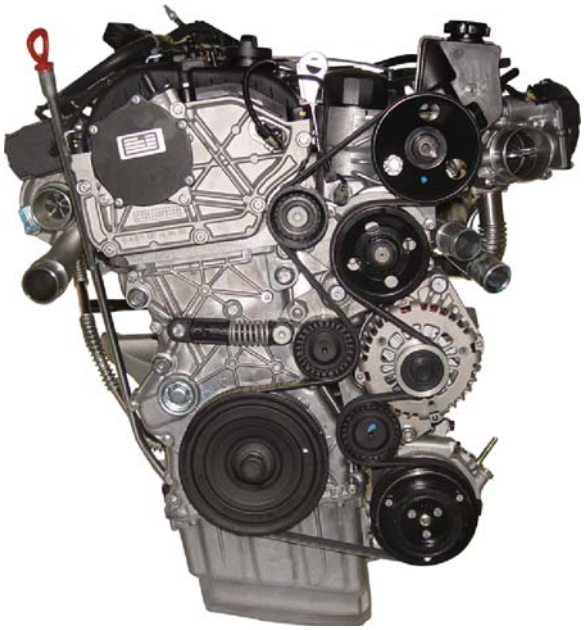
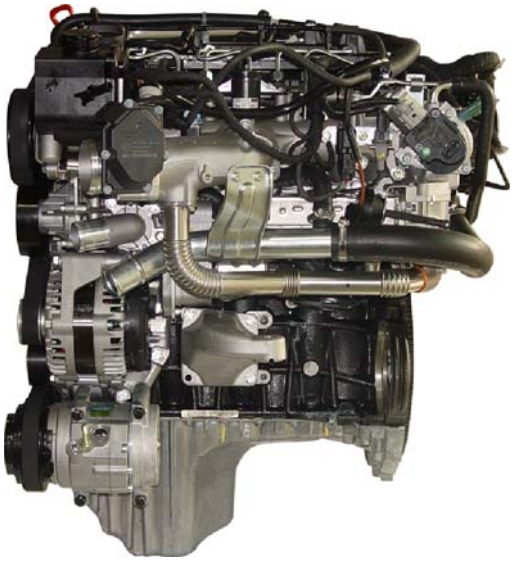
ENGINE GENERAL

0000-00

GENERAL INFORMATION

1. ENGINE LAYOUT

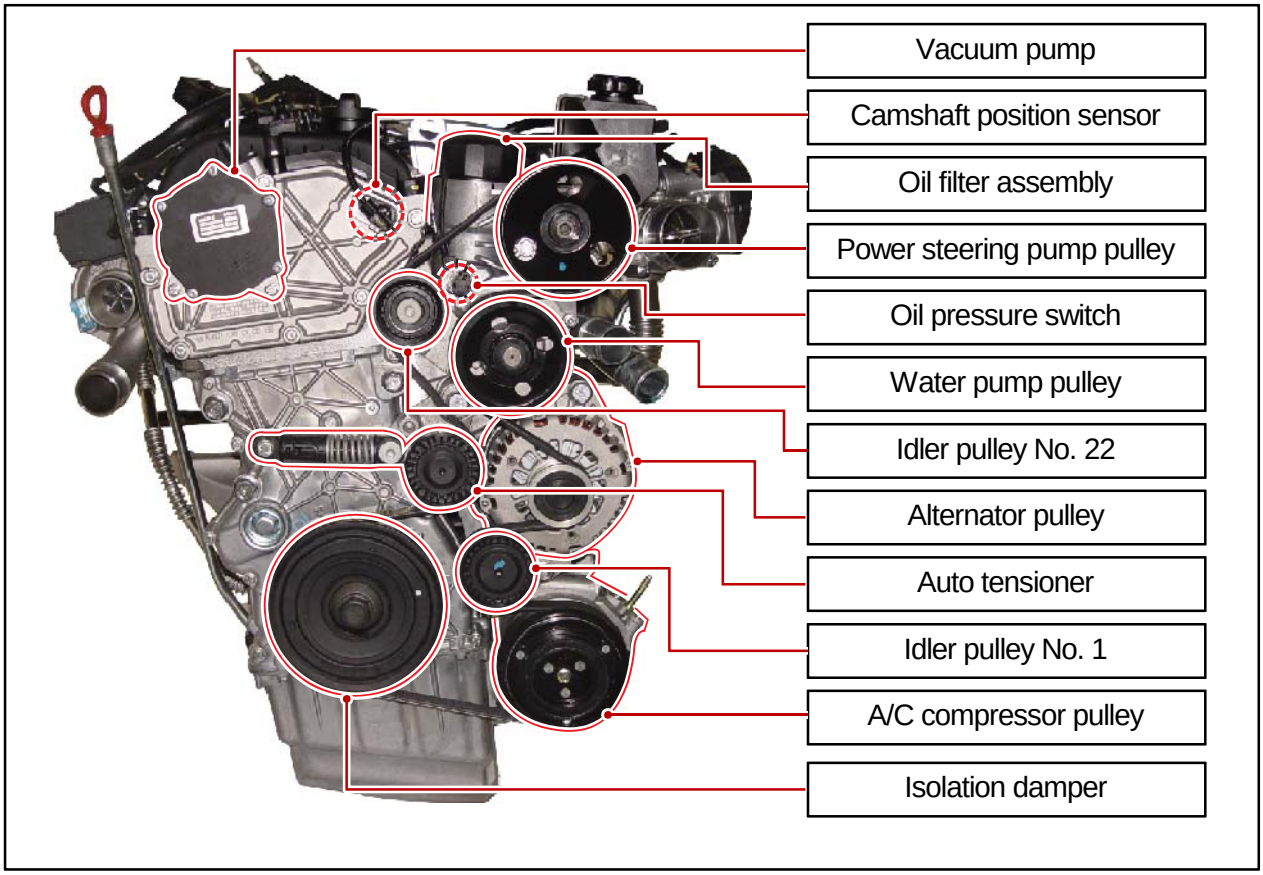
Front view	Rear view
	

Right view	Left view
	

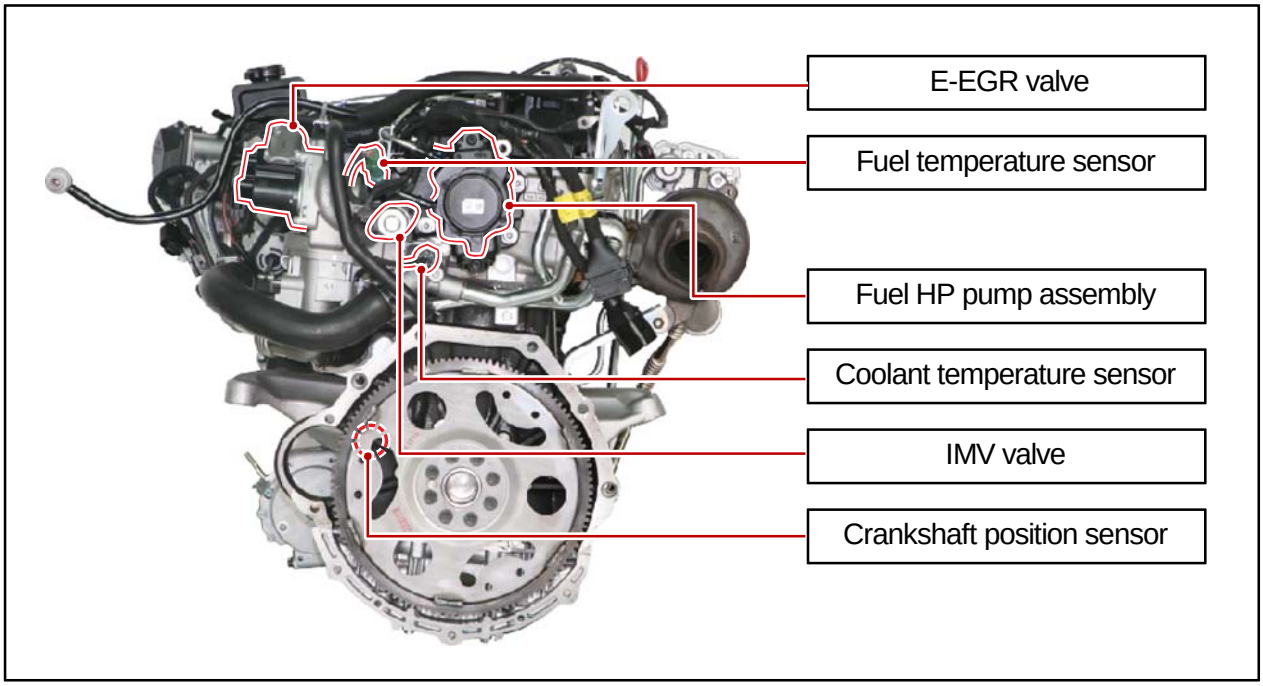
Modification basis	
Application basis	
Affected VIN	

2. MAJOR COMPONENTS

▶ **Front view**

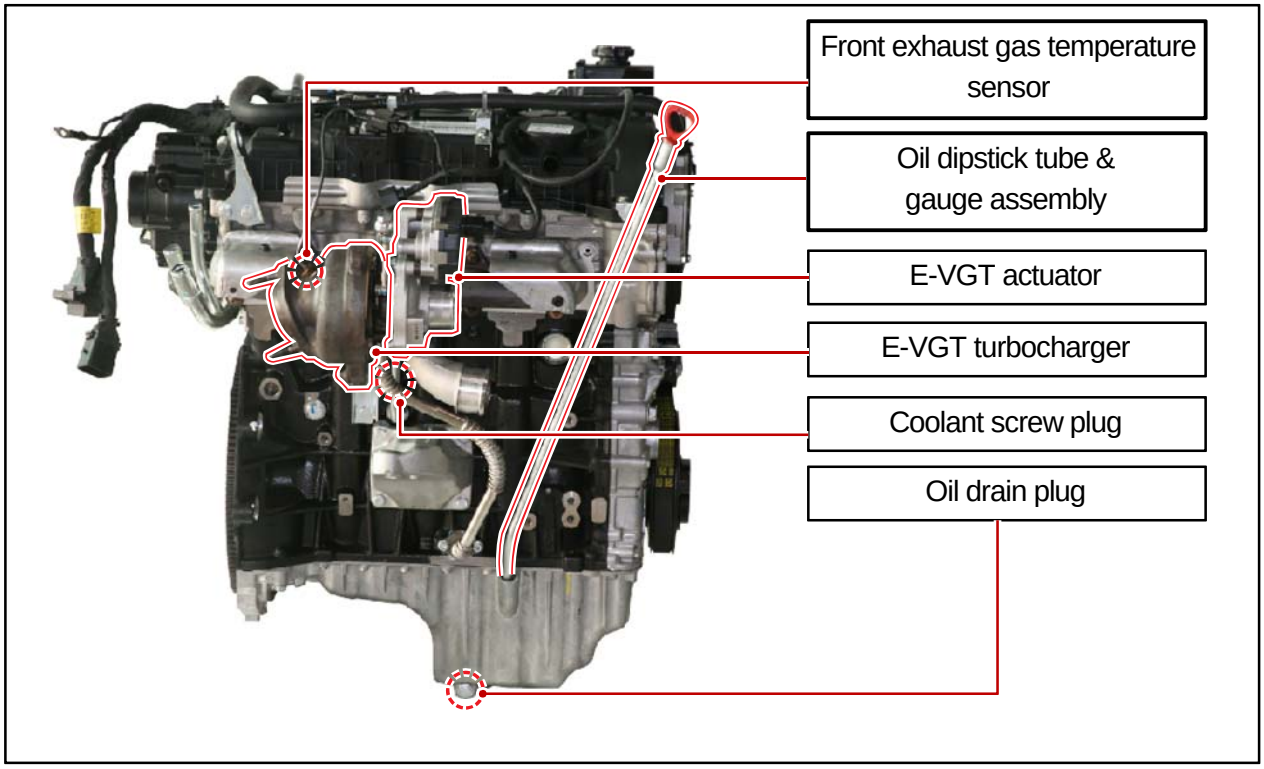


▶ **Rear view**

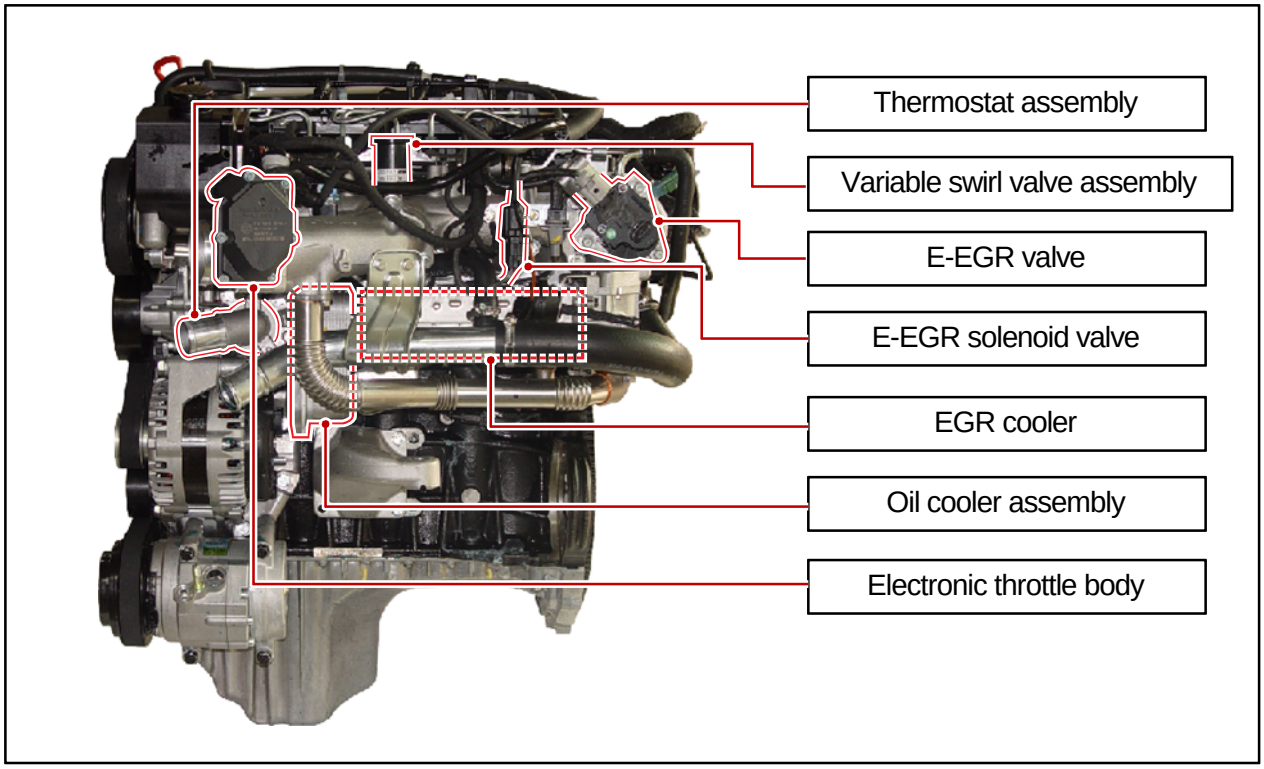


Modification basis	
Application basis	
Affected VIN	

▶ Right view

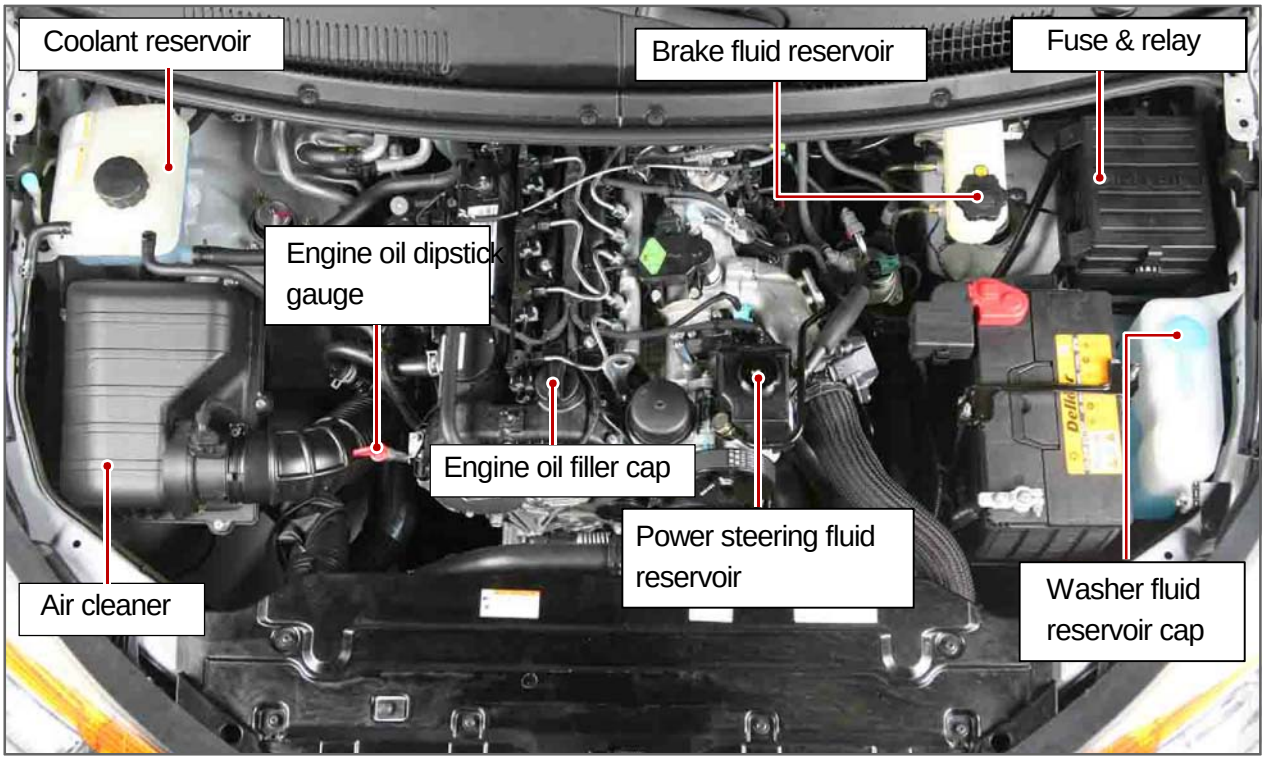


▶ Left view



Modification basis	
Application basis	
Affected VIN	

3. ENGINE COMPARTMENT LAYOUT



CAUTION

- Do not work on the engine compartment while the engine, radiator, exhaust manifold, muffler or catalytic converter is hot. Always turn the engine off and allow it to cool before starting the maintenance.
- Regularly check the engine oil level and add Ssangyong genuine engine oil if necessary.
- Clean the dipstick with clean cloth so that any foreign materials cannot get into the engine.

WARNING

Operating vehicle with insuffi cient amount of oil can damage the engine. Make sure the engine oil level is correct and add oil if necessary.

Modification basis	
Application basis	
Affected VIN	

1) Service Interval

Description	Daily inspection	Weekly inspection	Service interval		
Engine oil & oil filter	Inspection	-	EU	Change every 20,000 km or 12 months (The service interval should be shortened under severe conditions)	
			General	Change every 15,000 km or 12 months (The service interval should be shortened under severe conditions)	
Coolant	Inspection	-	Change every 200,000 km or 5 years		
Air cleaner element	-	Inspection	Diesel	EU	Change every 20,000 km (The service interval should be shortened under severe conditions)
				General	Change every 15,000 km (The service interval should be shortened under severe conditions)
Fuel filter	-	-	EU	Change every 40,000 km (Draining water from fuel filter: whenever replacing the engine oil)	
			General	Change every 45,000 km (Draining water from fuel filter: whenever replacing the engine oil)	

Modification basis	
Application basis	
Affected VIN	

2) Specification and Capacity

Engine oil	Specification	Quality class: Ssangyong genuine engine oil (Total Quartz INEO ECS 5W 30, SK ZIC SY 5W 30) or oil Approved by MB Sheet 229.51
	Capacity	approx. 6.0 litter
Engine coolant	Specification	Ssangyong genuine coolant Anti-Freeze SYC-1025
	Capacity	approx. 11.5 litter

Severe condition

- Frequent stop-and-go traffic, extended idling, short driving distance below 6 km, driving distance below 16 km when the outside temperature remains below freezing
- Driving in a hilly or mountainous terrain, sandy, or dusty area
- High load driving such as trailer towing
- Taxi, patrol service or delivery service (extended idling and excessive driving with low speed)

Modification basis	
Application basis	
Affected VIN	

4. CAUTION WHEN SERVICING THE ENGINE

1) Cleaness

Engine has a lot of precisely machined (grinding, polishing, lapping) surfaces. Thus, there should be great cautions for cleaness when servicing the engine components. Apply the engine oil on the sliding surfaces when assemblying the components. Every component should be disassembled and reassembled in accordance with the correct sequences. Before servicing the engine, the negative cable should be diconnected from the battery. Otherwise, some electric or electronic components could be damaged.

2) Servicing

CAUTION

Before service work, be sure to disconnect battery negative (-) terminal to prevent damages by bad wire and short.

CAUTION

To prevent the foreign material from getting into engine cylinder, cover the inlet of air cleaner if the air cleaner has been removed.

(1) Lifting up the vehicle

- Always keep the safety precautions.
- To prevent the vehicle from rolling down, put the chocks under the tires (when using a 4-post lift). Make sure to support the correct lifting points (when using a 2-post lift)
-

(2) Exhaust system

- Wear the safety glove when removing the exhaust pipe.
- Make sure that the exhaust pipe is cooled before removing it.

Modification basis	
Application basis	
Affected VIN	

(3) Cautions before service

Scalding hot coolant and steam could be blown out under pressure, which could cause serious injury. Never remove the coolant reservoir cap when the engine and radiator are hot.

(4) Lubrication system

- Prolonged exposure to the engine oil make cause a skin cancer or an irritation.
- Used engine cotains the hazardous material that may cause the skin cancer. Do not allow the used engine to make contact with your skin.
- Make sure to wear the protection gloves and goggle when handling the engine oil. If contact happens, rinse affected areas immediately with plenty of water. Do not wash it with gasoline or solvent. If irritation persists, consult a doctor.
  Improperly disposed engine oil can pollute the environment. Dispose used engine oil in accordance with local environmental regulations.

(5) Tightening the fastener

1. Clean the mating surfaces before tightening.
2. Place the marks with paint to tighten by angle if the angle wrench is not available.

3) Fuel and Oil System

- If work on the fluid system such as fuel and oil, working area should be well ventilated and smoking should be prohibited.
- Gasket or seal on the fuel/lubrication system should be replaced with new ones and bolts and nuts should be tightened as specified.

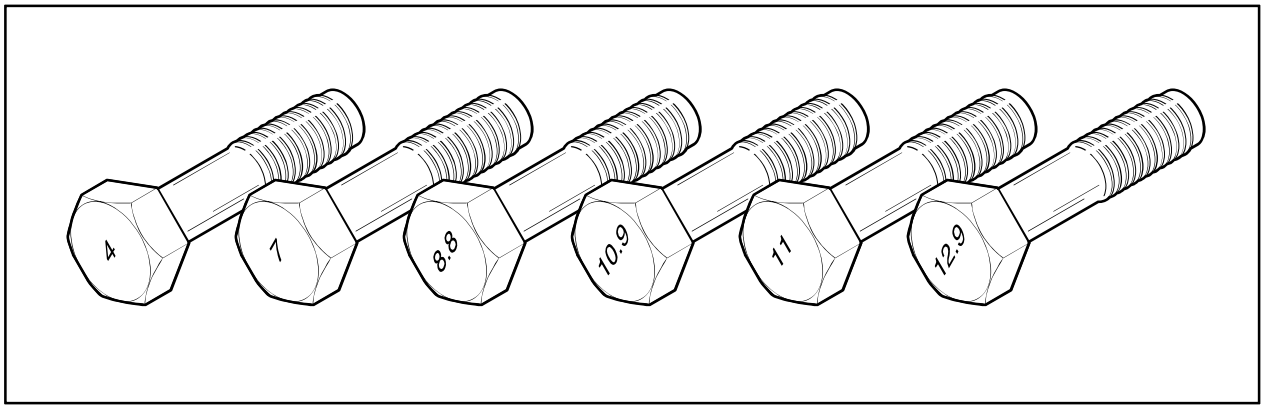
NOTE

1. If fine dust or foreign material enters into DI engine's fuel system, there can be serious damages between HP pump and injectors. So, be sure to cover removed fuel system components with cap and protect removed parts not to be contaminated with dirt. (Refer to cleanness in this manual while working on DI engine fuel system)
2. When working on the fuel line between priming pump and injector (including return line), always plug the openings with caps to prevent foreign materials or dust from entering to the openings and connections.
3. The HP fuel supply pipe (HP pump to fuel rail) and HP fuel pipe (Fuel rail to injector) should be replaced with new ones when removed.

Modification basis	
Application basis	
Affected VIN	

5. STANDARD BOLTS SPECIFICATIONS

Bolt	Pitch	Tightening torque(kgf.cm)					
		Standard			Limit		
		4T	7T	9T	4T	7T	9T
M3	0.5	5	9	13	7	12	17
M4	0.7	12	20	30	16	27	40
M5	0.8	24	40	57	32	53	77
M6	1.0	41	68	99	55	91	130
M8	1.25	88	160	230	130	210	310
M10	1.25	190	330	470	260	430	620
	1.5	190	310	450	250	420	600
M12	1.25	350	580	840	460	770	1,100
	1.75	330	550	790	440	730	1,000
M14	1.5	550	910	1,300	730	1,200	1,900
M16	1.5	830	1,100	2,000	1,100	1,900	2,700
M18	1.5	1,200	2,000	2,900	1,600	2,700	3,800
M20	1.5	1,700	2,800	4,000	2,200	3,700	5,300
M22	1.5	2,300	3,800	5,400	3,000	5,000	7,200
M24	1.5	2,900	4,900	7,000	3,900	6,500	9,400
	2.0	2,800	4,700	6,800	3,800	6,300	9,100



1) Metric bolt strength is embossed on the head of each bolt. The strength of bolt can be classified as 4T, 7T, 8.8T, 10.9T, 11T and 12.9T in general.
2) Observe standard tightening torque during bolt tightening works and can adjust torque to be proper within 15 % if necessary. Try not to over max. allowable tightening torque if not required to do so. Determine extra proper tightening torque if tightens with washer or packing.
3) If tightens bolts on the below materials, be sure to determine the proper torque.
4)
   - Aluminum alloy: Tighten to 80 % of above torque table.
   - Plastics: Tighten to 20 % of above torque table.

Modification basis	
Application basis	
Affected VIN	

6. TIGHTENING TORQUE

Name	Size	Numbers of fastener	Tightening torque (Nm)	Note (total tightening torque)
Main bearing cap	M12×82	10	55±5Nm, 180˚	Not-reusable
Connecting rod cap	M9×52	8	40±5Nm, 90˚+10˚	50 ~80Nm
Crankshaft rear seal	M6×20	6	10±1Nm	-
Oil pump	M8×35	3	25±2.5Nm	-
Drive plate	M10×22	8	45±5Nm, 90˚+10˚	Not-reusable
Isolation damper center bolt	M18×50	1	200±20Nm, 180˚+20˚	660 ~ 720Nm Not-reusable
Oil pan	M6×20	18	10±1Nm	-
	M6×35	2	10±1Nm	-
	M6×85	2	10±1Nm	-
	M6×120	2	10±1Nm	-
	M8×40	2	25±2.5Nm	-
Mounting nut for high pressure pump	M14×1.5-8-1	1	65±5Nm	-
Mounting bolt for high pressure pump	M8×30	3	25±2.5Nm	-
Cylinder head	M13×150	12	85Nm 270°±10°	-
Camshaft cap	M6×30	16	10±1Nm	-
	M8×60	4	25±2.5Nm	-
Exhaust stud bolt		10	15±1.5Nm	-
Exhaust sprocket	M11×40	1	30±3Nm	-
Chain tensioner screw plug	M38×1.5	1	25±2.5Nm	-
Coolant temperature sensor		1	20±2.0Nm	-
Belt auto tensioner	M8×30(LOW)	1	25±2.5Nm	-
	M10×75(Upper)	1	55±5.5Nm	-
Water pump	M6×50	7	10±1.0Nm	-

Modification basis	
Application basis	
Affected VIN	

Name	Size	Numbers of fastener	Tightening torque (Nm)	Note (total tightening torque)
Hot water inlet pipe	M6×12	2	10±1Nm	-
Alternator	M10×90	1	(LO) 25±2.5Nm	-
	M10×116	1	(HI) 46±4.6Nm	-
Air conditioner compressor	M8×85	4	25~2.5Nm	-
Air conditioner bracket	M6×25	4	10±1Nm	-
Intake manifold	M8×35	2	25±2.5Nm	-
	M8×110	6	25±2.5Nm	-
Oil filter module	M8×40	6	25±2.5Nm	-
	M8×20	1	25±2.5Nm	-
	M8×140	2	25±2.5Nm	-
Knock sensor	M8×28	2	20±5Nm	-
Camshaft position sensor	M8×14	1	10~14Nm	-
T-T-MAP pressure sensor	M6×20	1	10±1Nm	-
Exhaust manifold	M8	10	40±4Nm	-
Turbocharger	M8	3	25±2.5Nm	-
T/C support bolt	M8	1	25±2.5Nm	-
T/C oil supply pipe	M6(to block)	1	10±1.0Nm	-
	M6 (to turbocharger)	1	17±2.0Nm	-
T/C oil return pipe	M6×16(to block)	2	10±1Nm	-
	M6×16 (to turbocharger)	2	10±1Nm	-
EGR valve	M8×22	3	25±2.5Nm	-
EGR pipe bolt (to exhaust manifold)	M8×16	2	10±1Nm	-
EGR pipe bolt (to EGR cooler)	M8×16	2	25±2.5Nm	-

Modification basis	
Application basis	
Affected VIN	

Name	Size	Numbers of fastener	Tightening torque (Nm)	Note (total tightening torque)
Idler pulley/tensioner pulley		1	45±4.5Nm	-
Glow plug	M5	4	20±2Nm	-
Vacuum pump	M8×25	3	10±1Nm	-
Timing gear case cover	M6×40	7	10±1Nm	-
	M6×45	1	10±1Nm	-
	M6×50	3	10±1Nm	-
Cylinder head cover	M6×35	21	10±1Nm	-
Oil dipstick gauge cover	M6×16	1	10±1Nm	-
Oil filter cap		1	25±2.5Nm	-
Fuel rail	M8×25	2	25±2.5Nm	-
Injector clamp bolt	M6×44	2	9±1.0Nm 130°±10°	-
High pressure pipe (between high pressure pump and fuel rail assembly)	M17	1	30±3Nm	-
High pressure pipe (between fuel rail assembly and injector)	M17	4	30±3Nm	-
Crankshaft position sensor	M5×14	1	8±0.4Nm	-
Main wiring	M6×16	5	10±1Nm	-
Intake duct	M8×25	3	25±2.5Nm	-
Power steering pump	M8×100	3	25±2.5Nm	-
Cylinder head front cover	M6×10	5	10±1Nm	-
Ladder frame	M8×16	5	30±3Nm	-

Modification basis	
Application basis	
Affected VIN	

7. CODING AND INITIALIZATION

1) Engine Variant Coding

Unit	Selection	Description
PTC auxiliary heater	NO	For PTC auxiliary heaterequipped vehicle, select"YES".
	YES	
Glow plug	Relay (K-line)	Select "AQGS".
	AQGS (CAN)	
Transmission	MT 5-speed	Select the appropriate system.
	MT 6-speed	
	AT 5-speed (DC 5AT)	
	AT 6-speed (DSI 6AT)	
	AT 7-speed (DC 7AT)	
Pressure sensor forA/C refrigerant	NO	Select “Refrigerant pressure sensor”.
	Refrigerant Pressure Sensor	
Immobilizer	NO	Select "YES" if the vehicle has immobilizer.
	YES	
Vehicle speed input type	CAN	Select "CAN" if the vehicle has ABS or ESP
	WIRE	
Cooling fan	Relay	Select "PWM".
	PWM	
Auto cruise	NO	Select "YES" if the vehicle hascruise control.
	YES	
Engine level control	NO	Select "NO".
	YES	
G-sensor	NO	ABS: Select “NO”. 4WD ABS or ESP: Select “YES”.
	YES	
SMART key	NO	Select "NO".
	YES	

2) Chassis Variant Coding

Unit	Selection	Description
Region	GENERAL	Select the region.
	EUROPE	
EAS	NOT EQUIPPED	Select "NO".
	ECS	
	EAS 2-corner	
	EAS 4-corner	
EPB	NO	Select "NO".
	YES	
Telematics	NO	Select "NO".
	YES	
T/M shift lever	DC lever (CAN)	A/T: Select “DURA lever (CAN)”. M/T: Select “M/T”.
	DURA lever (CAN)	
	M/T	
	DSI lever (NO-CAN)	
Brake system	NOT EQUIPPED	Select “ABS” or “ESP”.
	ABS	
	TCS	
	ESP	
SSPS	NO	Select "NO".
	YES	
TPMS	NO	Select "NO".
	YES	
4WD	2WD	Select “2WD” or “P/T 4WD”.
	TOD	
	P/T 4WD	
	AWD	
Transmission	M/T	Select “M/T” or “DC AT”.
	DC AT	
	DSI AT	

Modification basis	
Application basis	
Affected VIN	

Unit	Selection	Description
Sedan/Limousine	Sedan (RV)	Select "Sedan (RV)".
	Limousine	
Vehicle code (Platform)	Rodius	Select "Rodius".
	Rexton	
	Korando C	
	Kyron	
	Korando Sport	
Vehicle code (Engine)	D32DT	Select “D20DTR”.
	D27DT	
	D27DTP	
	D20DTR	
ECU coding status	ECU not coded	Select “ECU coded”.
	ECU coded	
	Signal not valid	
	Not defind	