

MUSSO

Service Manual

FOREWORD

This manual includes procedures for maintenance, adjustment, service operations, and removal and installation of components for the MUSSO vehicle.

When reference is made in this manual to a brand name, number, or specific tool, an equivalent product may be used in place of the recommended item.

All information, illustrations and specifications contained in this manual are based on the latest product information available at the time of publication approval. The right is reserved to make changes at any time without notice.

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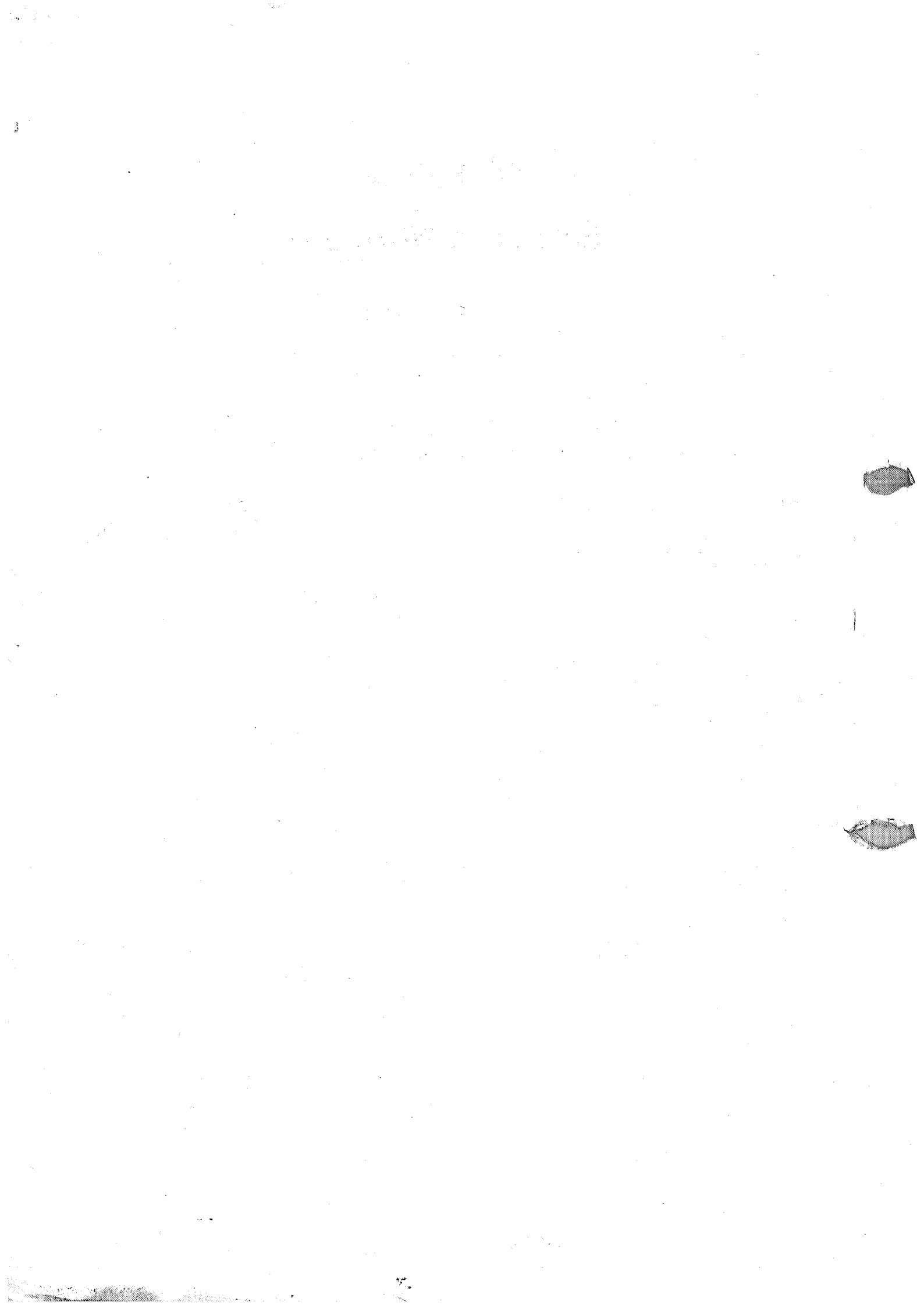


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SECTION 0B

GENERAL INFORMATION

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SPECIFICATIONS

TECHNICAL DATA

Transaxle Performance

Application	661LA	662NA	662LA	2.0L DOCH	2.3L DOCH	3.2L DOCH
Maximum Speed (Km/h)	143	145	156	168	176	190
Minimum Turning Radius (m)	5.7	5.7	5.7	5.7	5.7	5.7

Performance-Autumatic Transaxle (MB)

Application	2.3L DOCH	3.2L DOCH
Maximum Speed (Km/h)	171	190
Minimum Turning Radius (m)	5.7	5.7

Performance-Autumatic Transaxle (BTRA)

Application	661LA	662NA	662LA	2.3L DOCH	3.2L DOCH
Maximum Speed (Km/h)	143	138	156	171	188
Minimum Turning Radius (m)	5.7	5.7	5.7	5.7	5.7

0B-2 GENERAL INFORMATION

Engine

Application	661LA	662NA	662LA	2.0L DOCH	2.3L DOCH	3.2L DOCH
Engine Type	4Cylinder DIESEL	5Cylinder DIESEL	5Cylinder DIESEL	4Cylinder GASOLINE	4Cylinder GASOLINE	6Cylinder GASOLINE
Bore (mm)	89	89	89	89.9	90.9	89.9
Stroke (mm)	92.4	92.4	92.4	78.7	88.4	84
Total Displacement (cc)	2299	2874	2874	1998	2295	3199
Compression Ratio	22:1	22:1	22:1	9.6:1	10.4:1	10:1
Maximum Power (ps/rpm)	101/4000	95/4000	120/4000	135/5500	149/5500	222/5500
Maximum Torque (kg.m/rpm)	21.5/2400	19.6/2400	25.5/2400	19.3/4000	22.4/4000	31.6/3750

Ignition System

Application	2.0L DOHC	2.3L DOHC	2.0L DOHC
Ignition Type	Distributorless Ignition		
Ignition Timing (BOTH)	6° ± 2°	6° ± 2°	8° ± 2°
Ignition Sequence	1-3-4-2	1-3-4-2	1-5-3-6-2-4
Spark Plug Gap (mm)	0.8 ± 0.1	0.8 ± 0.1	0.8 ± 0.1
Spark Plug Maker	Bosch, Chapion, Beru		
Spark Plug Type	F8DC4(BOSCH) C11YCC(CHAMPION) 14F8DU4(BERU)		

Clutch - Manual Type

Application	661LA	662NA	662LA	2.0L DOHC	2.3L DOHC	3.2L DOHC
Type	Single Dry Diaphragm					
Outside Diameter (mm)	225	225	240	225	225	240
Inside Diameter (mm)	150	150	150	150	150	155
Thickness	9.2	9.2	9.2	9.2	9.2	9.3
Fluid	Common use :Brake Fluid					

Manual Transmission

Application	661LA	662NA	662LA	2.0L DOHC	2.3L DOHC	3.2L DOHC
Maker	TREMEC	TREMEC	TREMEC	TREMEC	TREMEC	TREMEC
Type or Model	T5	T5	T5	T5	T5	T5
Gear Ratio : 1st	3.969	3.969	3.969	3.969	3.969	3.969
2nd	2.341	2.341	2.341	2.341	2.341	2.341
3rd	1.457	1.457	1.457	1.457	1.457	1.457
4th	1.000	1.000	1.000	1.000	1.000	1.000
5th	0.851	0.851	0.851	0.851	0.851	0.851
Reverse	3.705	3.705	3.705	3.705	3.705	3.705
Final Drive Ratio	4.55	4.55	4.27	4.55	4.55	3.73
Oil Capacity (L)	3.4	3.4	3.4	3.4	3.4	3.4

Auto Transmission (MB)

Application	662LA	2.3L DOHC	3.2L DOHC
Maker	MB	MB	MB
Type or Model	W4A040	W4A040	W4A040
Gear Ratio : 1st	3.871	3.871	3.871
2nd	2.247	2.247	2.247
3rd	1.436	1.436	1.436
4th	1.000	1.000	1.000
Reverse	5.586	5.586	5.586
Final Drive Ratio	5.38	4.27	3.73
Oil Capacity (L)	9 - 9.5	9 - 9.5	9 - 9.5

Auto Transmission (BTRA)

Application	661LA	662LA	2.3L DOHC	3.2L DOHC
Maker	BTRA	BTRA	BTRA	BTRA
Type or Model	M74 4WD	M74 4WD	M74 4WD	M74 4WD
Gear Ratio : 1st	2.741	2.741	2.741	2.741
2nd	1.508	1.508	1.508	1.508
3rd	1.000	1.000	1.000	1.000
4th	0.708	0.708	0.708	0.708
Reverse	2.429	2.429	2.429	2.429
Final Drive Ratio	5.38	4.89	5.86	4.89
Oil Capacity (L)	9	9	9	9

Brake

Application	Specifications
Booster Size	non-ABS
	ABS 5.0
	ABS 5.3
Master Cylinder Diameter (mm)	ϕ 25.4
Booster Ratio	5.6 : 1
Front Brake : Disc Type	Ventilated
Rear Brake : Disc Type	Solid

Tire and Wheel

Application	Specifications
Standard Tire Size	P235/75 R15, 255/70 R15
Standard Wheel Size	7JJ x 15
Inflation Pressure At Full Load	
P235 / 75 : Front	30 Psi
Rear	30 Psi
P255 / 75 : Front	30 Psi
Rear	30 Psi

0B-4 GENERAL INFORMATION

Steering System

Application	Specifications
Gear Type	RACK & PINION
Wheel Alignment:	
Front Toe-in	0 - 4 mm
Front Caster	2°30'± 30'
Front Camber	0° ± 30'
Oil Capacity	1L

Suspension

Application	Specifications
Front Type	Double Wishbone
Rear Type	5 - Link

Fuel System

Application	Specifications
Fuel Pump Type	Electric Motor Pump
Fuel Filter Type	Cartridge
Fuel Capacity	70 L

Lubricating System

Lubricating Type	661LA	662NA	662LA	2.0L DOHC	2.3L DOHC	3.2L DOHC
Oil Pump Type	External Gear pump					
Oil Filter Type	Combination(Full & Part)			Full Flow		
Oil Capacity (L) (Including Oil Filter)	8.0	9.0	9.5	7.2	7.5	8.2

Cooling System

Cooling Type	661LA	662NA	662LA	2.0L DOHC	2.3L DOHC	3.2L DOHC
Coolant Capacity (L)	9.5-10	10.5	10.5-11	10.5	10.5	11.3
Radiator Type	Forced Circulation					
Water Pump Type	Centrifugal					

Electric System

Application	661LA	662NA	662LA	2.0L DOHC	2.3L DOHC	3.2L DOHC
Battery (MF)	12V - 90AH			12V - 75AH		
Generator	75A	75A	75A	115A	115A	115A
Starter	2.2kw	2.2kw	2.2kw	1.2kw	1.2kw	1.7kw

VEHICLE DIMENSIONS AND WEIGHTS**Vehicle Dimensions**

Application	Application
Overall Length (mm)	4656
Overall Width (mm)	1864
Overall Height (mm)	1735
Wheel Base (mm)	2630
Tread : Front (mm)	1510
Rear (mm)	1520

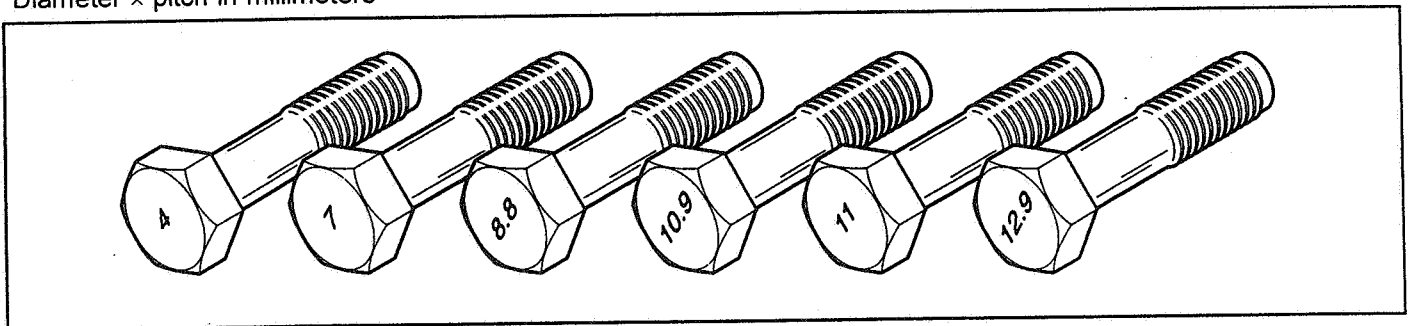
Vehicle Weights

Application	661LA	662NA	662LA	2.0L DOHC	2.3L DOHC	3.2L DOHC
Manual : Curb Weight (kg)	1860	1968	1890	1937	1850	1930
Gross Vehicle Weight (kg)	2520	2520	2520	2520	2520	2520
Automatic : Curb Weight (kg)	1916	1989	2005	-	1942	2025
Gross Vehicle Weight (kg)	2520	2520	2520	-	2520	2520
Passenger Capacity	5	5	5	5	5	5

STANDARD BOLTS SPECIFICATIONS

Bolt*	Torque (N•m / lb-in)					
	Standard			Limit		
	4T	7T	9T	4T	7T	9T
M3 × 0.5	0.5 N•m (4.5 lb-in)	0.9 N•m (8 lb-in)	1.3 N•m (12 lb-in)	0.7 N•m (6.3 lb-in)	1.2 N•m (11 lb-in)	17 N•m (15 lb-in)
M4 × 0.7	1.2 N•m (11 lb-in)	2.0 N•m (18 lb-in)	3.0 N•m (27 lb-in)	1.6 N•m (14 lb-in)	2.6 N•m (23 lb-in)	4.0 N•m (36 lb-in)
M5 × 0.8	2.4 N•m (22 lb-in)	4.0 N•m (36 lb-in)	5.6 N•m (50 lb-in)	3.1 N•m (28 lb-in)	5.2 N•m (47 lb-in)	7.6 N•m (68 lb-in)
M6 × 1.0	4.0 N•m (36 lb-in)	6.7 N•m (60 lb-in)	9.7 N•m (87 lb-in)	5.4 N•m (49 lb-in)	9.0 N•m (81 lb-in)	12.7 N•m (114 lb-in)
M8 × 1.25	8.6 N•m (77 lb-in)	15.7 N•m (12 lb-in)	22.5 N•m (17 lb-in)	12.7 N•m (9 lb-in)	20.6 N•m (15.2 lb-in)	30.4 N•m (22 lb-in)
M10 × 1.25	18.6 N•m (14 lb-in)	32.3 N•m (24 lb-in)	46.0 N•m (34 lb-in)	25.5 N•m (19 lb-in)	42.1 N•m (31 lb-in)	60.8 N•m (31 lb-in)
M10 × 1.5	18.6 N•m (14 lb-in)	30.4 N•m (22 lb-in)	44.1 N•m (33 lb-in)	24.5 N•m (18 lb-in)	41.2 N•m (30 lb-in)	58.8 N•m (44 lb-in)
M12 × 1.25	34.3 N•m (25 lb-in)	56.8 N•m (42 lb-in)	82.3 N•m (61 lb-in)	45.0 N•m (33 lb-in)	75.5 N•m (56 lb-in)	107.8 N•m (80 lb-in)
M12 × 1.75	32.3 N•m (24 lb-in)	53.9 N•m (40 lb-in)	77.4 N•m (57 lb-in)	43.1 N•m (32 lb-in)	71.5 N•m (53 lb-in)	98.0 N•m (73 lb-in)
M14 × 1.5	54.0 N•m (40 lb-in)	89.2 N•m (66 lb-in)	127.4 N•m (94 lb-in)	71.6 N•m (53 lb-in)	117.6 N•m (87 lb-in)	166.6 N•m (123 lb-in)
M16 × 1.5	81.3 N•m (60 lb-in)	107.8 N•m (80 lb-in)	196.0 N•m (145 lb-in)	107.8 N•m (80 lb-in)	186.2 N•m (138 lb-in)	264.6 N•m (196 lb-in)
M18 × 1.5	117.6 N•m (87 lb-in)	196.0 N•m (145 lb-in)	284.2 N•m (210 lb-in)	156.8 N•m (116 lb-in)	264.6 N•m (196 lb-in)	372.4 N•m (276 lb-in)
M20 × 1.5	166.6 N•m (123 lb-in)	274.4 N•m (203 lb-in)	392.0 N•m (290 lb-in)	215.6 N•m (160 lb-in)	362.6 N•m (268 lb-in)	519.4 N•m (384 lb-in)
M22 × 0.5	225.4 N•m (167 lb-in)	372.4 N•m (276 lb-in)	529.2 N•m (392 lb-in)	294.0 N•m (218 lb-in)	490.0 N•m (362 lb-in)	705.6 N•m (522 lb-in)
M24 × 1.5	284.2 N•m (210 lb-in)	480.2 N•m (355 lb-in)	686.0 N•m (508 lb-in)	382.2 N•m (283 lb-in)	637.0 N•m (471 lb-in)	921.2 N•m (682 lb-in)
M24 × 2.0	274.4 N•m (203 lb-in)	460.6 N•m (341 lb-in)	666.4 N•m (493 lb-in)	372.4 N•m (276 lb-in)	617.4 N•m (457 lb-in)	891.8 N•m (660 lb-in)

*Diameter × pitch in millimeters



MAINTENANCE AND REPAIR

MAINTENANCE AND LUBRICATION

NORMAL VEHICLE USE

The maintenance instructions contained in the maintenance schedule are based on the assumption that the vehicle will be used for the following reasons:

- To carry passengers and cargo within the limitation of the tire inflation pressure. Refer to "Tire and Wheel" in section 2E.
- To be driven on reasonable road surfaces and within legal operating limits.

EXPLANATION OF SCHEDULED MAINTENANCE SERVICES

The services listed in the maintenance schedule are further explained below. When the following maintenance services are performed, make sure all the parts are replaced and all the necessary repairs are done before driving the vehicle. Always use the proper fluid and lubricants.

Engine Oil and Oil Filter Change

Always use above the API SH grade or recommended engine oil.

Engine Oil Viscosity

Engine oil viscosity (thickness) has an effect on fuel economy and cold weather operation. Lower viscosity engine oils can provide better fuel economy and cold weather performance; however, higher temperature weather conditions require higher viscosity engine oils for satisfactory lubrication. Using oils of any viscosity other than those viscosities recommended could result in engine damage.

Cooling System Service

Drain, flush and refill the system with new coolant. Refer to "Recommended Fluids And Lubricants" in this section.

Air Cleaner Element Replacement

Clean the air cleaner element every.

- Gasoline Engine : 15,000km (10,000 miles)
- Diesel Engine : 10,000km (6,000 miles)

Replace the air cleaner element every .

- Gasoline Engine : 60,000km (36,000 miles)
- Diesel Engine : 30,000km (18,000 miles)

Replace the air cleaner more often under dusty conditions.

Fuel Filter Replacement

Replace the engine fuel filter every.

- Gasoline Engine : 60,000km (36,000 miles)
- Diesel Engine : 45,000km (24,000 miles)

Spark Plug Replacement

Replace spark plugs with same type.

- Type : BOSCH : F8DC4
BERU : 14F-8DU4
Champion : C11YCC

- Gap : 0.8 ± 0.1 mm

Spark Plug Wire Replacement

Clean wires and inspect them for burns, cracks or other damage. Check the wire boot fit at the Distributor and at the spark plugs. Replace the wires as needed.

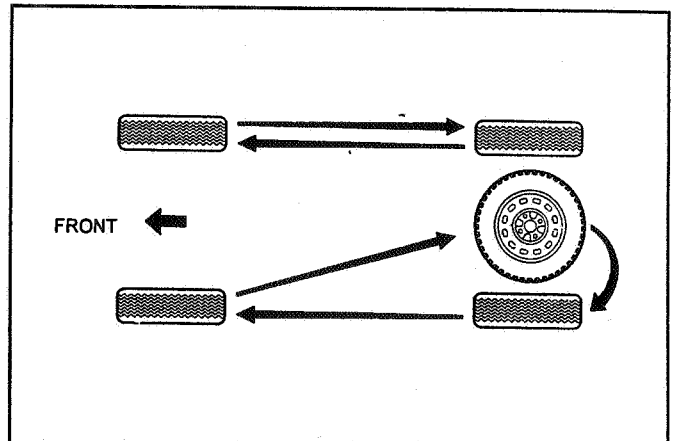
Brake System Service

Check the disc brake pads or the drum brake linings. Check the pad and the lining thickness carefully.

Tire and Wheel Inspection and Rotation

Check the tires for abnormal wear or damage. To equalize wear and obtain maximum tire life, rotate the tires. If irregular or premature wear exists, check the wheel alignment and check for damaged wheels. While the tires and wheels are removed, inspect the brakes.

Tire Rotation (Left - Hand Drive Type)



SCHEDULED MAINTENANCE CHARTS (GASOLINE ENGINE)

Engine

MAINTENANCE INTERVAL MAINTENANCE ITEM	Kilometers or time in months, whichever comes first									
	x1,000 km	1	15	30	45	60	75	90	105	120
	Months	-	12	24	36	48	60	72	84	96
Drive belt		I	I	I	I	I	I	I	I	I
Engine oil & filter (1) (3)		I	R	R	R	R	R	R	R	R
Cooling system hose & connections		I	I	I	I	I	I	I	I	I
Engine coolant (3)		I	I	I	I	R	I	I	I	R
Fuel filter (2)		-	-	-	-	R	-	-	-	R
Fuel line & connections		I	I	I	I	I	I	I	I	I
Air cleaner (2)			I	I	I	R		I	I	R
Ignition timing			I	I	I	I	I	I	I	I
Spark plugs		-	I	R	I	R	I	R	I	R
Charcoal canister & vapor lines		-	-	-	I	-	-	I	-	-

Chart Symbols:

I - Inspect these items and their related parts. If necessary, correct, clean, replenish, adjust or replace.
 R - Replace or change.

- (1) If vehicle is operated under severe condition : short distance driving, extensive idling or driving in dusty condition. Change engine oil and the filter every 7,500 km or 6 months, whichever comes first.
- (2) More frequent maintenance is required if under dusty driving condition.
- (3) Refer to "Recommended fluids and lubricants".

Chassis and Body

MAINTENANCE INTERVAL MAINTENANCE ITEM	Kilometers or time in months, whichever comes first									
	x1,000 km	1	15	30	45	60	75	90	105	120
	Months	-	12	24	36	48	60	72	84	96
Exhaust pipes & mountings										
Brake/Clutch fluid (3)(4)	-		R		R		R		R	
Parking brake/Brake pads F & R (5)	-									
Brake line & connections (including booster)										
Manual transmission oil (3)				R			R			
Clutch & brake pedal free play	-									
Front & Rear Differential Fluid (3)				R			R			
Transfer case fluid				R			R			
Automatic transmission fluid (MB W4A040) (6)				R			R			
Automatic transmission fluid (BTRA M74)										
Chassis & underbody bolts & nuts tight/secure										
Tire condition & inflation pressure										
Wheel alignment (7)	Inspect & ADJUST when abnormal condition is noted									
Steering wheel & linkage										
Power steering fluid & lines* (3)										
Drive shaft boots										
Seat belts, buckles & anchors										
Lubricate locks, hinges & bonnet latch										

Chart Symbols :

I - Inspect these items and their related parts. If necessary, correct, clean, replenish, adjust or replace.

R - Replace or change.

(3) Refer to "Recommended fluids and lubricants".

(4) Change the brake / clutch fluid every 15,000 km if the vehicle is mainly driven under severe conditions:

- Driving in hilly or mountainous terrain, or
- Towing a trailer frequently

(5) More frequent maintenance is required if under severe condition : short distance driving, extensive idling, frequent low - speed operation in stop-and-go traffic or driving in dusty condition.

(6) Change automatic transaxle fluid and filter every 75,000 km if the vehicle is mainly driven under severe conditions.

- In heavy city traffic where the outside temperature regularly reaches 32°C (90°F) or higher, or
- In hilly or mountainous terrain, or
- When doing frequent trailer towing, or
- Uses such as found in taxi, police or delivery service.

(7) If necessary, rotate and balance wheels.

SCHEDULED MAINTENANCE CHARTS (DIESEL ENGINE)

Engine

MAINTENANCE INTERVAL ITEM	Kilometers or time in months, whichever comes first											
	x1,000 km	1	10	20	30	40	50	60	70	80	90	100
	Months	-	6	12	18	24	30	36	42	48	54	60
Drive belt		I	I	I	I	I	I	I	I	I	I	I
Engine oil & filter (1) (3)		R	R	R	R	R	R	R	R	R	R	R
Cooling system hose & connections				I	I	I	I	I	I	I	I	I
Engine coolant (3)				I				R				I
Fuel filter (2)						R					R	
Fuel line & connections		I	I	I	I	I	I	I	I	I	I	I
Glow plug				I				I		R		I
Pre - fuel filter			I	I	I	I	I	I	I	I	I	I
Air cleaner (2)			I	I	R	I	I	R	I	I	R	I
Ignition timing (see NOTE 1)			I	I	I	I	I	I	I	I	I	I

NOTE 1 : Injection Timing :
 Adjust as required :
 - When excessive smoke is visible (black or white)
 - Poor performance/economy

Chart Symbols:
 I - Inspect these items and their related parts. If necessary, correct, clean, replenish, adjust or replace.
 R - Replace or change.
 (1) If vehicle is operated under severe condition : short distance driving, extensive idling or driving in dusty condition, change engine oil every 5,000km or 3 months, whichever comes first.
 (2) More frequent maintenance is required if under dusty driving conditing.
 (3) Refer to "Recommended fluids and lubricants".

Chassis and Body

MAINTENANCE INTERVAL ITEM	Kilometers or time in months, whichever comes first											
	x1,000 km	1	10	20	30	40	50	60	70	80	90	100
	Months	-	6	12	18	24	30	36	42	48	54	60
Exhaust pipes & mountings												
Brake/clutch fluid (3) (4)				R			R			R		
Parking brake/Brake pads (F & R) (5)												
Brake line & connections (including booster)												
Manual transmission fluid (3)						R					R	
Clutch & brake pedal free play												
F & R Differential fluid (3)						R					R	
Transfer case fluid (3)						R					R	
Automatic transmission fluid (BTRA M74) (6)												
Chassis & underbody bolts & nuts tight/secure												
Tire condition & inflation pressure												
Wheel alignment (7)	Inspect & ADJUST when abnormal condition is noted											
Steering wheel & linkage												
Power steering fluid & lines* (3)												
Drive shaft boots												
Seat belts, buckles & anchors												
Lubricate locks, hinges & bonnet latch												

Chart Symbols :

I - Inspect these items and their related parts. If necessary, correct, clean, replenish, adjust or replace.

R - Replace or change.

(3) Refer to "Recommended fluids and lubricants".

(4) Change the brake / clutch fluid more regularly if the vehicle is mainly driven under severe conditions :

- Driving in hilly or mountainous terrain, or
- Towing a trailer frequently

(5) More frequent maintenance is required if under severe condition : short distance driving, extensive idling, frequent low - speed operation in stop-and-go traffic or driving in dusty condition.

(6) Change automatic transmission fluid every 70,000 km if the vehicle is mainly driven under severe conditions.

- In heavy city traffic where the outside temperature regularly reaches 32°C (90°F) or higher, or
- In hilly or mountainous terrain, or
- When doing frequent trailer towing, or
- Uses such as found in taxi, police or delivery service.

(7) If necessary, rotate and balance wheels.

OWNER INSPECTIONS AND SERVICES

WHILE OPERATING THE VEHICLE

Horn Operation

Blow the horn occasionally to make sure it works. Check all the button locations.

Brake System Operation

Be alert for abnormal sounds, increased brake pedal travel or repeated pulsing to one side when braking. Also, if the brake warning light goes on, or flashes, something may be wrong with part of the brake system.

Exhaust System Operation

Be alert to any changes in the sound of the system or the smell of the fumes. These are signs that the system may be leaking or overheating. Have the system inspected and repaired immediately.

Tires, Wheels and Alignment Operation

Be alert to any vibration of the steering wheel or the seats at normal highway speeds. This may mean a wheel needs to be balanced. Also, a pull right or left on a straight, level road may show the need for a tire pressure adjustment or a wheel alignment.

Steering System Operation

Be alert to changes in the steering action. An inspection is needed when the steering wheel is hard to turn or has too much free play, or if unusual sounds are noticed when turning or parking.

Headlight Aim

Take note of the light pattern occasionally. Adjust the headlights if the beams seem improperly aimed.

AT EACH FUEL FILL

A fluid loss in any (except windshield washer) system may indicate a problem. Have the system inspected and repaired immediately.

Engine Oil Level

Check the oil level and add oil if necessary. The best time to check the engine oil level is when the oil is warm.

1. After stopping the engine, wait a few minutes for the oil to drain back to the oil pan.
2. Pull out the oil level indicator (dip stick).
3. Wipe it clean, and push the oil level indicator back down all the way.
4. Pull out the oil level indicator and look at the oil level on it.

5. Add oil, if needed, to keep the oil level above the lower mark. Avoid overfilling the engine, since this may cause engine damage.
6. Push the indicator all the way back down into the engine after taking the reading.

If you check the oil level when the oil is cold, do not run the engine first. The cold oil will not drain back to the pan fast enough to give a true oil level reading.

Engine Coolant Level and Condition

Check the coolant level in the coolant reservoir tank and add coolant if necessary. Inspect the coolant. Replace dirty or rusty coolant.

Windshield Washer Fluid Level

Check the washer fluid level in the reservoir. Add fluid if necessary.

AT LEAST TWICE A MONTH

Tire And Wheel Inspection and Pressure Check

Check the tire for abnormal wear or damage. Also check for damaged wheels. Check the tire pressure when the tires are cold (check the spare also, unless it is a stowaway). Maintain the recommended pressures. Refer to "Tire and Wheel" in section 0B.

AT LEAST MONTHLY

Light Operation

Check the operation of the license plate light, the headlights (including the high beams), the parking lights, the fog lights, the taillight, the brake lights, the turn signals, the backup lights and the hazard warning flasher.

Fluid Leak Check

Periodically inspect the surface beneath the vehicle for water, oil, fuel or other fluids, after the vehicle has been parked for a while. Water dripping from the air conditioning system after use is normal. If you notice fuel leaks or fumes, find the cause and correct it at once.

AT LEAST TWICE A YEAR

Power Steering System Reservoir Level

Check the power steering fluid level. Keep the power steering fluid at the proper level. Refer to *Section 6A, Power Steering System*.

Brake Master Cylinder Reservoir Level

Check the fluid and keep it at the proper level. A low fluid level can indicate worn disc brake pads which may need to be serviced. Check the breather hole in the reservoir cover to be free from dirt and check for an open passage.

Weather-Strip Lubrication

Apply a thin film silicone grease using a clean cloth.

EACH TIME THE OIL IS CHANGED**Brake System Inspection**

This inspection should be done when the wheels are removed for rotation. Inspect the lines and the hoses for proper hookup, binding, leaks, cracks, chafing, etc. Inspect the disc brake pads for wear. Inspect the rotors for surface condition. Inspect other brake parts, the parking brake, etc., at the same time. Inspect the brakes more often if habit or conditions result in frequent braking.

Steering, Suspension and Front Drive Axle Boot And Seal Inspection

Inspect the front and rear suspension and the steering system for damaged, loose or missing parts, signs of wear or lack of lubrication. Inspect the power steering line and the hoses for proper hookup, binding, leaks, cracks, chafing, etc. Clean and inspect the drive axle boot and seals for damage, tears or leakage. Replace the seals if necessary.

Exhaust System Inspection

Inspect the complete system (including the catalytic converter if equipped). Inspect the body near the exhaust system. Look for broken, damaged, missing, or out-of-position parts as well as open seams, holes, loose connections, or other conditions which could cause heat buildup in the floor pan or could let exhaust fumes seep into the trunk or passenger compartment.

Throttle Linkage Inspection

Inspect the throttle linkage for interference or binding, damaged, or missing parts. Lubricate all linkage joints and throttle cable joints, the intermediate throttle shaft bearing, the return spring at throttle valve assembly, and the accelerator pedal sliding face with suitable grease. Check the throttle cable for free movements.

Engine Drive Belts

Inspect all belts for cracks, fraying, wear and proper tension. Adjust or replace the belts as needed.

Hood Latch Operation

When opening the hood, note the operation of the secondary latch. It should keep the hood from opening all the way when the primary latch is released. The hood must close firmly.

AT LEAST ANNUALLY**Lap and Shoulder Belts Condition and Operation**

Inspect the belt system including: the webbing, the buckles, the latch plates, the retractor, the guide loops and the anchors.

Movable Head Restraint Operation

On vehicles with movable head restraints, the restraints must stay in the desired position.

Spare Tire and Jack Storage

Be alert to rattles in the rear of the vehicle. The spare tire, all the jacking equipment, and the tools must be securely stowed at all times. Oil the jack ratchet or the screw mechanism after each use.

Key Lock Service

Lubricate the key lock cylinder.

Body Lubrication Service

Lubricate all the body door hinges including the hood, the fuel door, the rear compartment hinges and the latches, the glove box and the console doors, and any folding seat hardware.

Underbody Flushing

Flushing the underbody will remove any corrosive materials used for ice and snow removal and dust control. At least every spring clean the underbody. First, loosen the sediment packed in closed areas of the vehicle. Then flush the underbody with plain water.

Engine Cooling System

Inspect the coolant and freeze protection fluid. If the fluid is dirty or rusty, drain, flush and refill the engine cooling system with new coolant. Keep the coolant at the proper mixture in order to ensure proper freeze protection, corrosion protection and engine operating temperature. Inspect the hoses. Replace the cracked, swollen, or deteriorated hoses. Tighten the clamps. Clean the outside of the radiator and the air conditioning condenser. Wash the filler cap and the neck. Pressure test the cooling system and the cap in order to help ensure proper operation.

RECOMMENDED FLUIDS AND LUBRICANTS

Usage		Capacity	Fluid/Lubricant
Engine Oil (Change with filter)	3.2L DOHC	8.2 L	Quality class - API ; SH grade or above ACEA ; A2 or A3 MB sheet ; 229.1 Viscosity - MB sheet ; 224.1
	2.3L DOHC	7.5 L	
	662LA	9.5 L	Quality class - API ; CG grade or above ACEA ; B2 or B3 MB sheet ; 228.1, 228.3, 228.5, 229.1 Viscosity - MB sheet ; 224.1
	661LA	8.0 L	
Engine Coolant	3.2L DOHC	11.3 L	ALUTEC P-78
	2.3L DOHC	10.5 L	
	662LA	10.5 - 11.0 L	
	661LA	9.5 - 10.0 L	
Brake / Clutch Fluid		Approx. 0.5L level must be maintained between MAX & MIN level	DOT-3 & SAE J 1703
Power Steering System		1.0 L	ATF DEXRON-II
Parking Brake Cable		As required	Grease
Hood Latch Assembly		As required	Grease
Hood and Door Hinges Fuel Door Hinge Rear Compartment Lid Hinges		As required	Spray type grease
Weatherstrips		As required	Silicone grease

GENERAL DESCRIPTION AND SYSTEM OPERATION

GENERAL REPAIR INSTRUCTIONS

- If a floor jack is used, the following precautions are recommended.
- Park the vehicle on level ground, "block" the front or rear wheels, set the jack against the frame, raise the vehicle and support it with chassis stands and then perform the service operation.
- Before performing the service operation, disconnect the negative battery cable in order to reduce the chance of cable damaged and burning due to short-circuiting.
- Use a cover on the body, the seats and the floor to protect them against damage and contamination.
- Handle brake fluid and antifreeze solution with care as they can cause paint damage.
- The use of proper tools, and the recommended essential and available tools where specified, are important for efficient and reliable performance of the service repairs.
- Use genuine DAEWOO parts.
- Discard used cotter pins, gaskets, O-rings, oil seals, lock washers and self-locking nuts. Prepare new ones for installation. Normal function of these parts cannot be maintained if these parts are reused.
- Keep the disassembled parts neatly in groups to facilitate proper and smooth reassembly.
- Keep attaching bolts and nuts separated, as they vary in hardness and design depending on the position of the installation.
- Clean the parts before inspection or reassembly.
- Also clean the oil parts, etc. Use compressed air to make certain they are free of restrictions.
- Lubricate rotating and sliding faces of parts with oil or grease before installation.
- When necessary, use a sealer on gaskets to prevent leakage.
- Carefully observe all specifications for bolt and nut torques.
- When service operation is completed, make a final check to be sure service was done properly and the problem was corrected.

VEHICLE IDENTIFICATION NUMBER SYSTEM

K P T P 0 A 1 9 S W P 122357

12~17. Production Serial Number
: 000001- 999999

11. Plant Code
P : PyongTaek Plant

10. Model Year
M : 1991
N : 1992
P : 1993
R : 1994
S : 1995
T : 1996
V : 1997
W : 1998
X : 1999
Y : 2000

9. Check Digit
Constant "S"

8. Engine Type
3 : 2299cc, In-line 4Cylinder, Diesel (OM601)
4 : 2874cc, In-line 5Cylinder, Diesel (OM602)
8 : 1998cc, In-line 4Cylinder, Gasoline (E20)
6 : 2295cc, In-line 4Cylinder, Gasoline (E23)
9 : 3199cc, In-line 6Cylinder, Gasoline (E32)
A : 2299cc, In-line 4Cylinder, Diesel (OM601)
B : 2874cc, In-line 5Cylinder, Diesel (OM602)
C : 2299cc, In-line 4Cylinder, Diesel (SY662LA)
D : 2874cc, In-line 5Cylinder, Diesel (SY662LA)

7. Restraint System
0 : NO Seat Belt,
1 : 3-Point Seat Belts, 2 : 2-Point Seat Belts

6. Trim Level
A : Standard, B : Deluxe, C : Super Deluxe

5. Body Type
0 : 5-Door
1 : 4-Door
2 : 3-Door


4. Line Models
P : Musso, LHD, R : Musso, RHD

3. Vehicle Type
T (Passengr Cars)

2. Name of Manufacturer : P

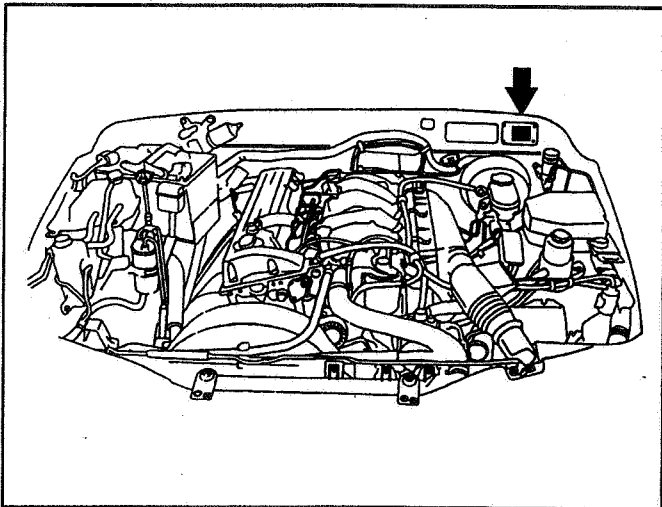
1. Nation : K

Manufacturer's Plate

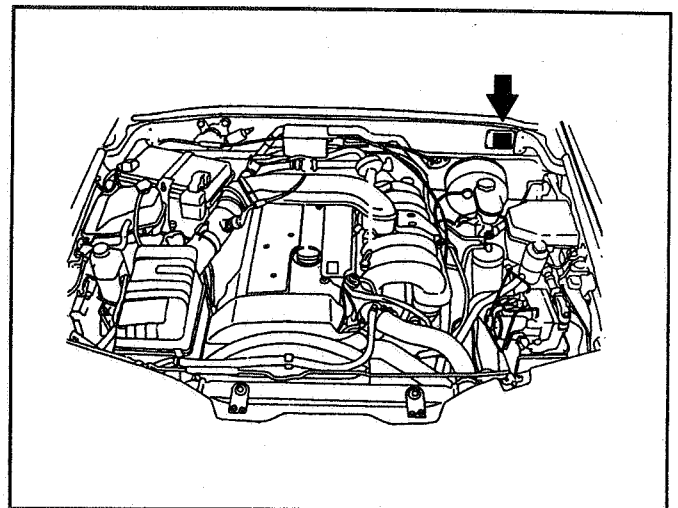
 SsangYong Motor Company	
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2	<input type="text"/>
GROSS VEHICLE WEIGHT RATING	<input type="text"/> KG
GROSS VEHICLE WEIGHT TRAILER WITH BRAKE	<input type="text"/> KG
FRONT AXLE MAX WEIGHT RATING	<input type="text"/> KG
REAR AXLE MAX WEIGHT RATING	<input type="text"/> KG
BODY PAINT COLOR	<input type="text"/>

1.Type Approval No. 2.Vehicle Identification Number.

Manufacturer's Plate Location



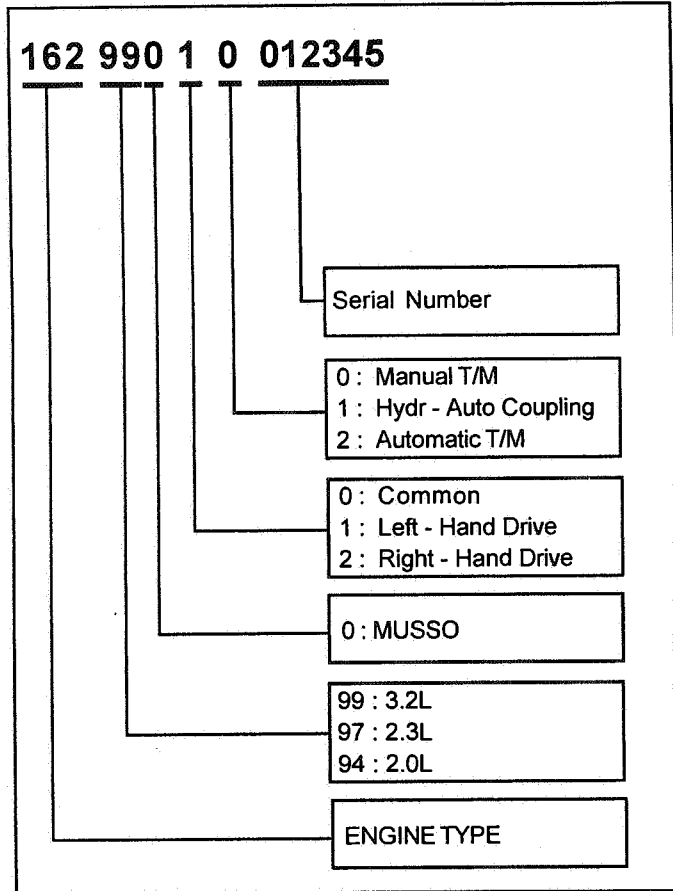
Diesel Engine



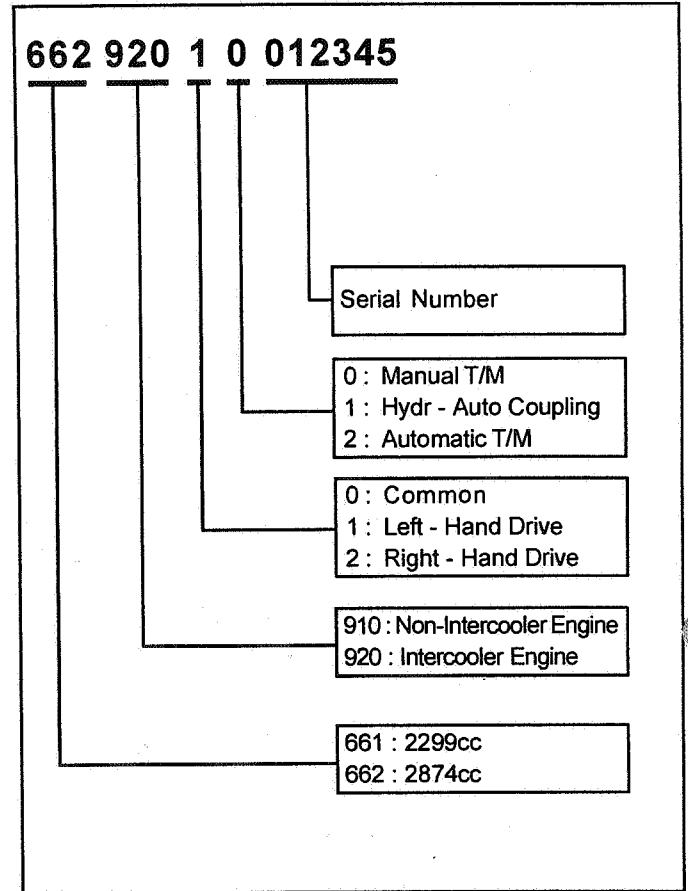
Gasoline Engine

0B-18 GENERAL INFORMATION

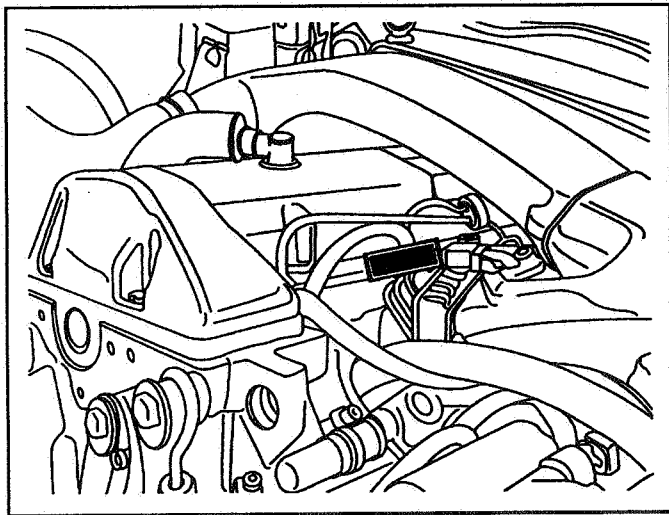
Gasolind Engine Number



Diesel Engine Number

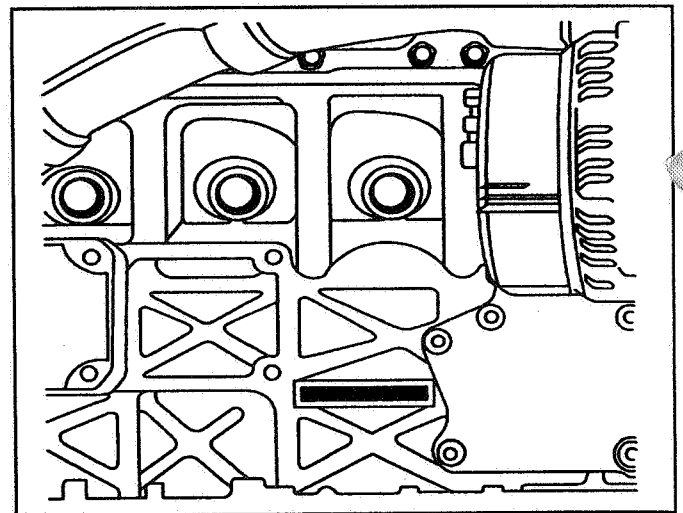


Engine Number Location



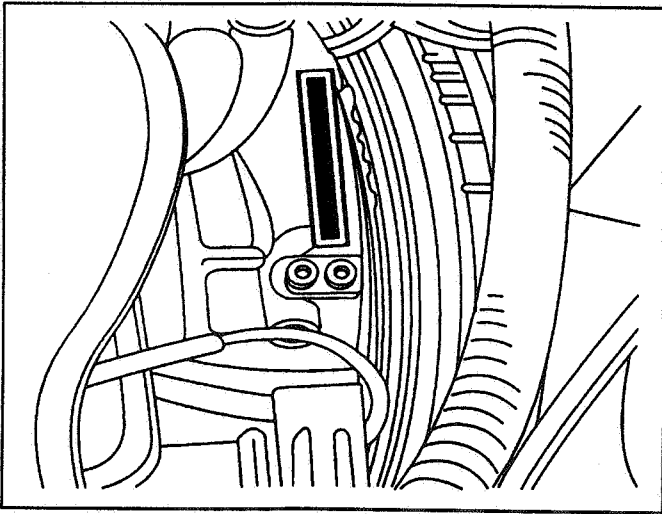
Diesel Engine

The engine number is stamped on the cylinder block in front of injection pump.



IL6 3200

The engine number is stamped on the lower rear side of the alternator.

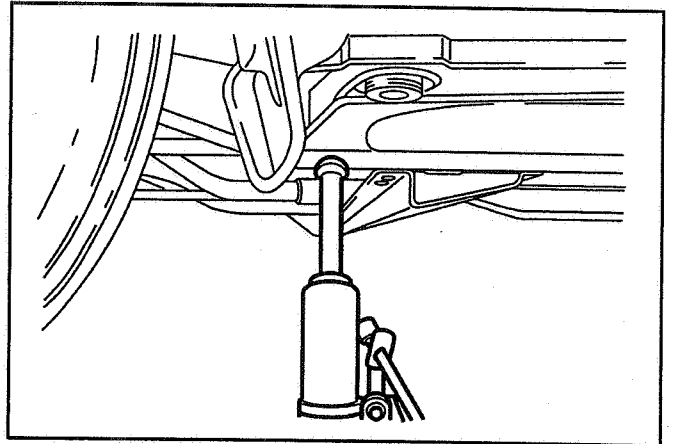
**2300 DOHC**

The engine number is stamped on the upper rear left-hand side of the cylinder block.

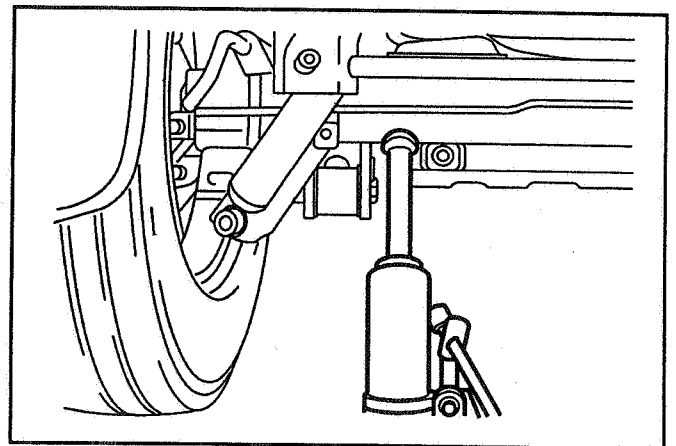
VEHICLE LIFTING PROCEDURES

To raise the vehicle, place the lifting equipment only at the points indicated. Failure to use these precise positions may result in permanent vehicle body deformation.

Many dealer service facilities and service stations are equipped with automotive hoists that bear upon some parts of the frame in order to lift the vehicle. If any other hoist method is used, take special care to avoid damaging the fuel tank, the filter neck, the exhaust system, or the underbody.

Vehicle Lifting Points

Using Jack
(Rearward of Front Tire)



Using Jack
(Forward of Rear Tire)



ENGINE

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SECTION 1B1	M162	ENGINE MECHANICAL
SECTION 1D1	M162	ENGINE COOLING
SECTION 1E1	M162	ENGINE ELECTRICAL
SECTION 1F1	M162	ENGINE CONTROLS
SECTION 1G1	M162	ENGINE INTAKE & EXHAUST
SECTION 1A2	M161	GENERAL ENGINE INFORMATION
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SECTION 1G2	M161	ENGINE INTAKE & EXHAUST
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SECTION 1B3	OM600	ENGINE MECHANICAL
SECTION 1D3	OM600	ENGINE COOLING
SECTION 1E3	OM600	ENGINE ELECTRICAL
SECTION 1F3	OM600	ENGINE CONTROLS
SECTION 1G3	OM600	ENGINE INTAKE & EXHAUST

QUESTION

The first part of the question asks for the
 definition of a function. A function is a
 set of ordered pairs where each first element
 is associated with exactly one second element.
 The second part of the question asks for the
 domain and range of the function defined by
 the set of ordered pairs $\{(1, 2), (2, 3), (3, 4), (4, 5)\}$.
 The domain is the set of all first elements, which is
 $\{1, 2, 3, 4\}$. The range is the set of all second elements, which is
 $\{2, 3, 4, 5\}$.

SECTION 1

ENGINE

SECTION 1A1(M162 ENGINE)

GENERAL ENGINE INFORMATION

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SPECIFICATIONS

ENGINE SPECIFICATIONS

Application			E32 Engine
Engine Model			M162.990
Displacement (CC)			3199
Cylinder (Bore x Stroke) (mm)			89.9 x 84.0
Fuel Injection / Ignition System			MSE 3.62S
Compression Ratio			10 : 1
Number of Cylinders			6
Camshaft Valve Arrangement			DOHC
Camshaft Drive Type			Chain-Driven
Max. Output (ps/rpm)			222 / 5500
Max. Torque (kg•m/rpm)			31.6 / 3750
Firing Order			1-5-3-6-2-4
Ignition Type			Distributorless Double Ignition
Ignition Timing			BTDC 8° ± 2°
Valve Timing	Intake	Open/Close	ATDC 11° / ABDC 34°
	Exhaust	Open/Close	BBDC 31° / BTDC 14°
Valve Clearance Adjustment			Automatic Control

1A1-2 GENERAL ENGINE INFORMATION

ENGINE SPECIFICATIONS (Cont'd)

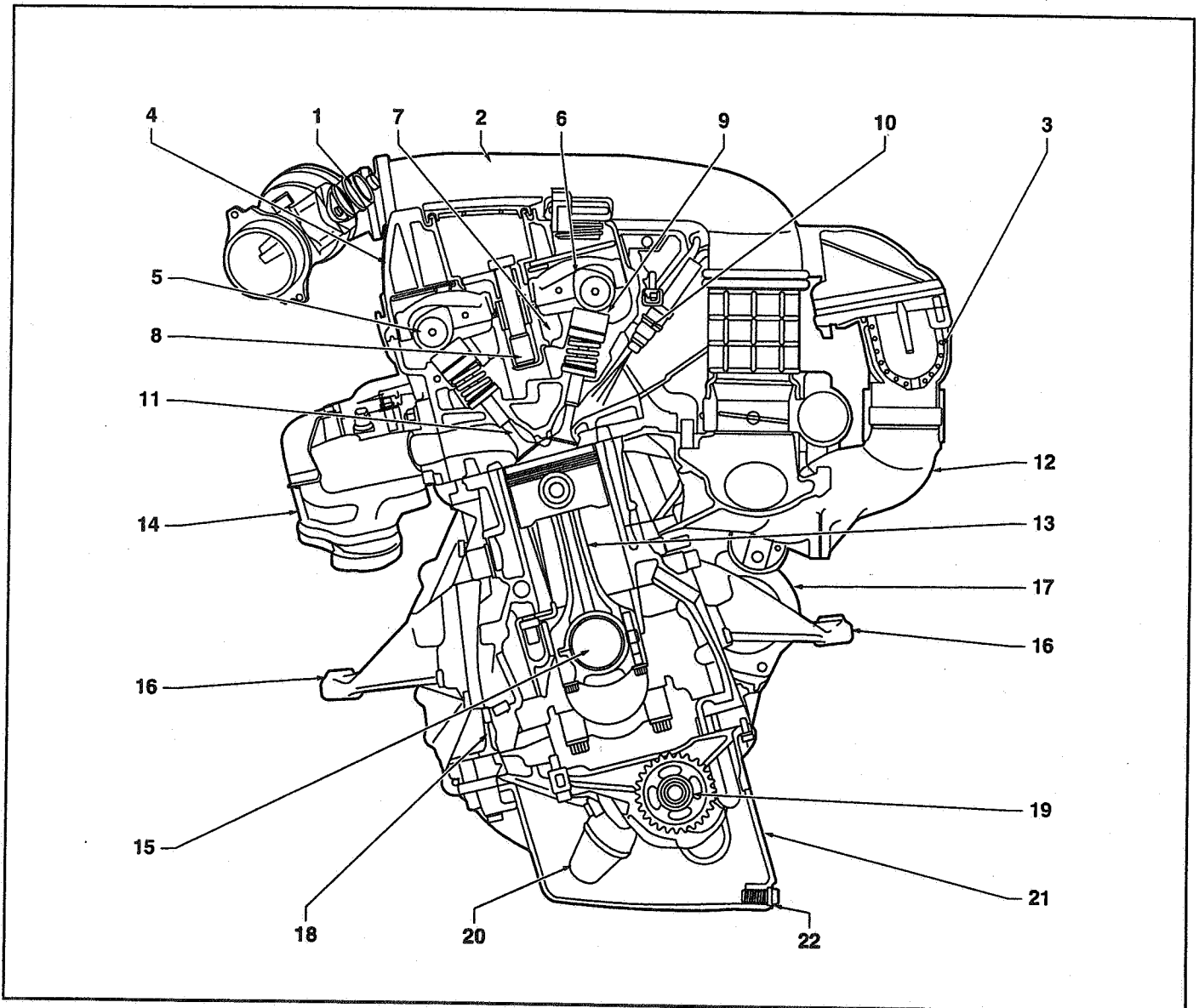
Application	E32 Engine
Idle Speed (rpm)	700 ± 50
Fuel Injection Pressure (kg/cm ²)	3 - 4
Oil Capacity (liter)	8.2
Lubrication Type	Forced by Gear Pump
Oil Filter Type	Full Flow with Paper Filter
Fuel	Unleaded Gasoline

MSE 3.62S/3.53S (Motorsteuer Elektronik : German)

MSE : Engine Control Electronic

3.62S : 6 Cylinder Version

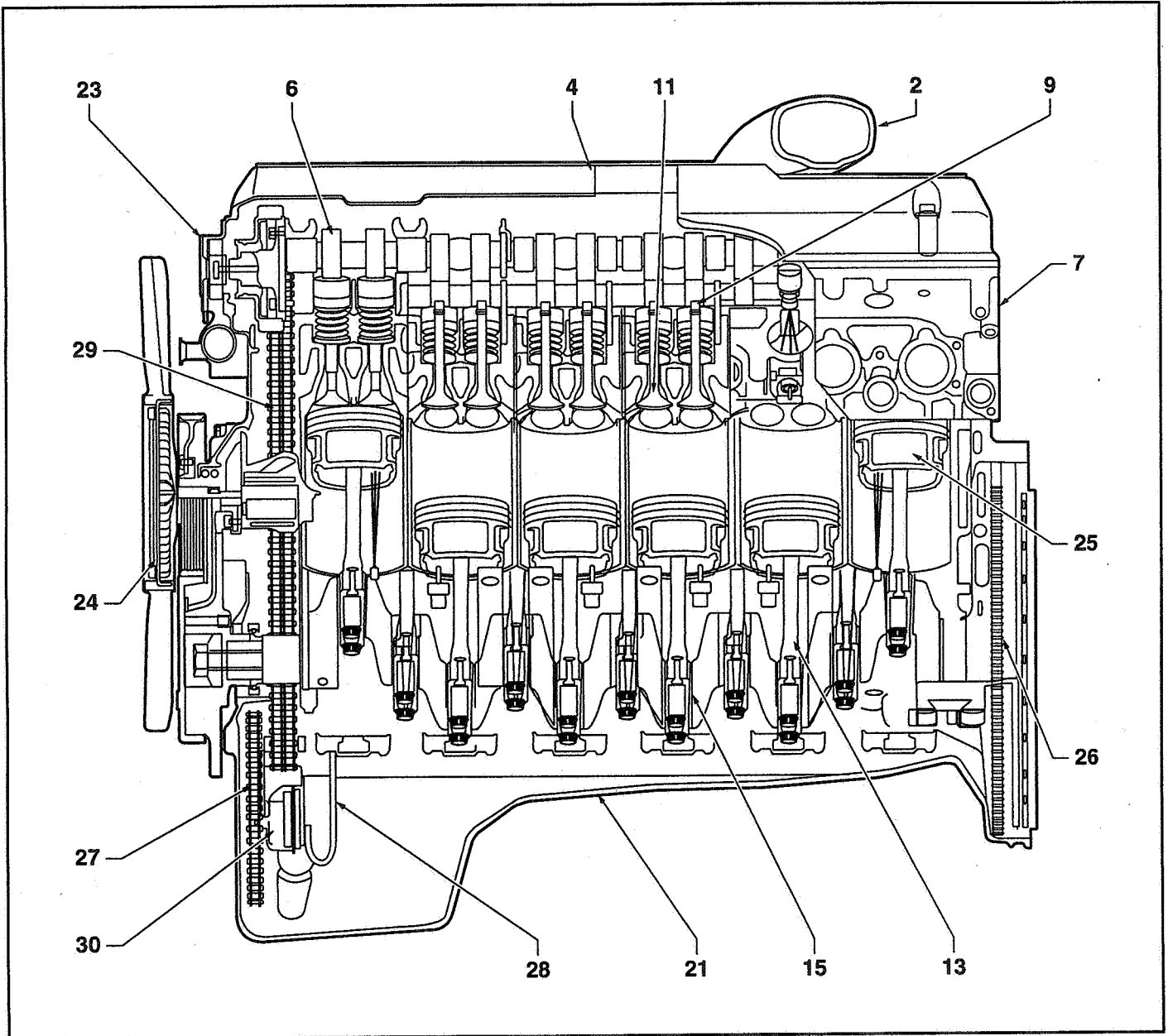
3.53S : 4 Cylinder Version

COMPONENT LOCATOR**FRONT VIEW**

- | | |
|------------------------|----------------------------|
| 1 HFM Sensor | 12 Intake Manifold |
| 2 Intake Air Duct | 13 Connecting Rod |
| 3 Resonance Flap | 14 Exhaust Manifold |
| 4 Cylinder Head Cover | 15 Crankshaft |
| 5 Exhaust Camshaft | 16 Engine Mounting Bracket |
| 6 Intake Camshaft | 17 Starter |
| 7 Cylinder Head | 18 Crankcase |
| 8 Spark Plug Connector | 19 Oil Pump Sprocket |
| 9 Valve Tappet | 20 Oil Strainer |
| 10 Injector | 21 Oil Pan |
| 11 Exhaust Valve | 22 Drain Plug |

1A1-4 GENERAL ENGINE INFORMATION

SIDE VIEW



- 23 Camshaft Adjuster
- 24 Cooling Fan and Viscous Clutch
- 25 Piston
- 26 Flywheel of Drive Plate

- 27 Oil Pump Drive Chain
- 28 Oil Return Pipe
- 29 Timing Chain
- 30 Oil Pump

PERFORMANCE CURVE

E32 ENGINE

