PRODUCT BULLETIN

NISSAN 300ZX

MODEL Z31 SERIES

New Model Introduction

Vol. 130

FOREWORD

This product bulletin has been prepared to provide information necessary for smooth and efficient service activities on the new NISSAN 300ZX, model Z31 series. Please read this bulletin thoroughly in order to have a proper understanding of the features, specifications and mechanism of this new model.

In this bulletin, emphasis is placed on the description of those points that have been changed or modified from the former model S130 series.

The descriptions and specifications contained in this bulletin are based on the vehicle at the time it newly entered production. Rights for alteration at any time of specifications are reserved.

New NISSAN 300ZX, model Z31 series entered production starting with the following vehicle identification number (Chassis number).

Except for Europe	For Europe
HZ31-300001	JN10HGZ31U0000001
HGZ31-000014	

As for detailed specifications particular to your region, please refer to other information such as the price quotations from Nissan's Export Department or the printing concerning the specifications which is contained in the sales kit.

The following materials which describe the units in detail are available as references.

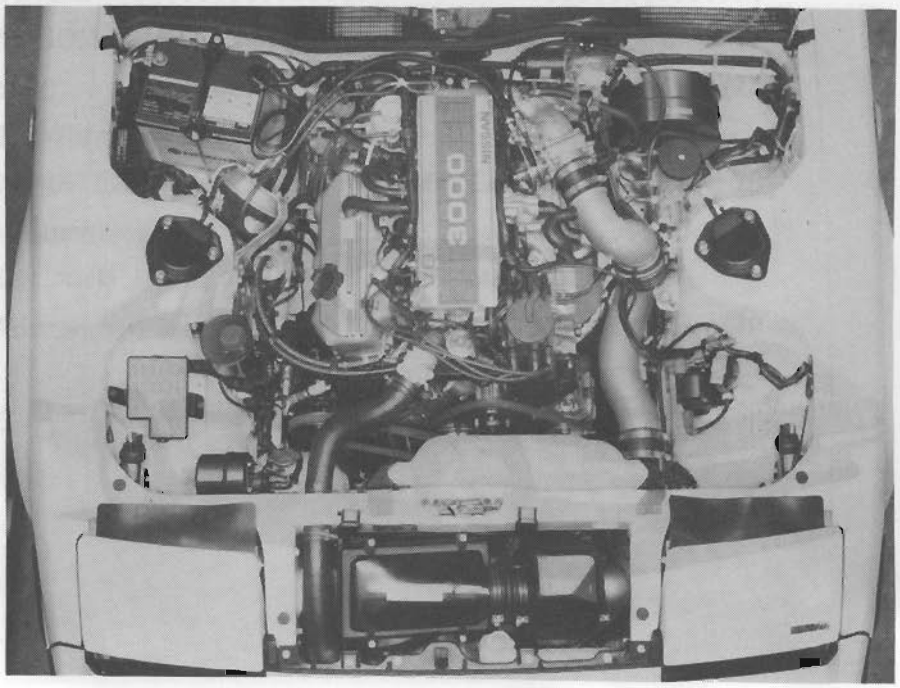
INSTRUCTOR'S MANUAL

- Vol. 24 MODEL VG SERIES ENGINE

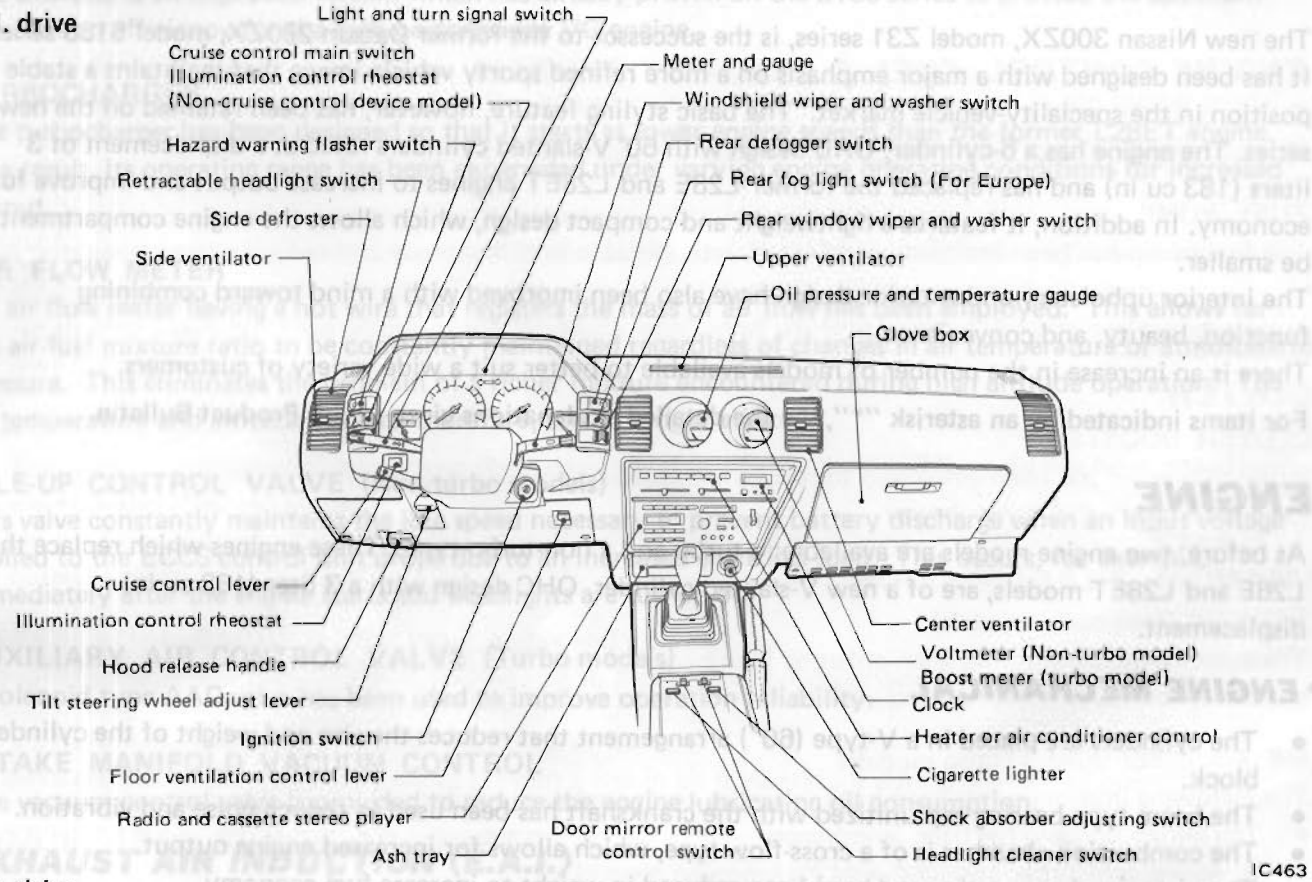
CONTENTS

APPEARANCE

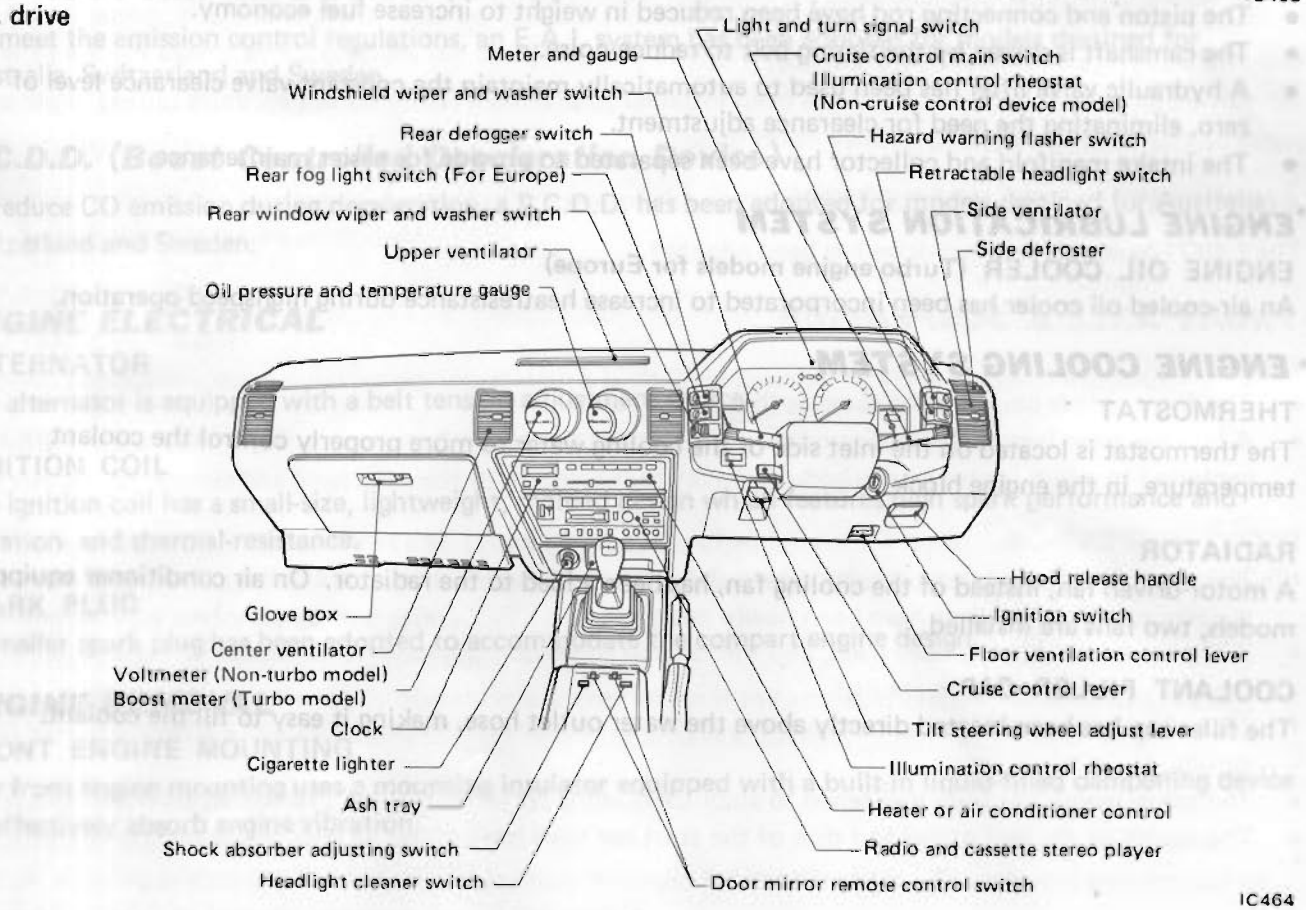
VG30E engine



L.H. drive



R.H. drive



OUTLINE

The new Nissan 300ZX, model Z31 series, is the successor to the former Datsun 280ZX, model S130 series. It has been designed with a major emphasis on a more refined sporty vehicle image that maintains a stable position in the speciality-vehicle market. The basic styling feature, however, has been retained on the new series. The engine has a 6-cylinder, OHC design with 60° V-slanted cylinders rated at a displacement of 3 liters (183 cu in) and has replaced the former L28E and L28ET engines to increase output and improve fuel economy. In addition, it features a lightweight and compact design, which allows the engine compartment to be smaller.
The interior upholstery and exterior design have also been improved with a mind toward combining function, beauty, and convenience.
There is an increase in the number of models available to better suit a wide variety of customers.

For items indicated by an asterisk "*", see the detailed explanations given in this Product Bulletin.

ENGINE

As before, two engine models are available: a turbo and a non-turbo type. These engines which replace the L28E and L28ET models, are of a new V-slanted cylinder, OHC design with a 3 liter (183 cu in) displacement.

* ENGINE MECHANICAL

- The cylinders are placed in a V-type (60°) arrangement that reduces the size and weight of the cylinder block.
- The beam type bearing cap unitized with the crankshaft has been used to reduce noise and vibration.
- The combustion chamber is of a cross-flow type, which allows for increased engine output.
- The piston and connecting rod have been reduced in weight to increase fuel economy.
- The camshaft is driven by the timing belt to reduce noise.
- A hydraulic valve lifter has been used to automatically maintain the constant valve clearance level of zero, eliminating the need for clearance adjustment.
- The intake manifold and collector have been separated to provide for easier maintenance.

*ENGINE LUBRICATION SYSTEM

ENGINE OIL COOLER (Turbo engine models for Europe)
An air-cooled oil cooler has been incorporated to increase heatresistance during highspeed operation.

* ENGINE COOLING SYSTEM

THERMOSTAT
The thermostat is located on the inlet side of the cooling water to more properly control the coolant temperature, in the engine block.

RADIATOR
A motor-driven fan, instead of the cooling fan, has been added to the radiator. On air conditioner equipped models, two fans are installed.

COOLANT FILLER CAP
The filler cap has been located directly above the water outlet hose, making it easy to fill the coolant.

ENGINE FUEL & EMISSION CONTROL SYSTEM

*ELECTRONIC CONCENTRATED ENGINE CONTROL SYSTEM (E.C.C.S.)

The E.C.C.S. is an improved version which has already proven on the S130 series to provide the optimum combustion efficiency for the high-performance VG engine.

TURBOCHARGER

The turbocharger has been designed so that it starts at lower engine speeds than the former L28ET engine. As a result, its operating range has been expaneded under varying engine operating conditions for increased output.

AIR FLOW METER

An air flow meter having a hot wire that registers the mass of air flow has been employed. This allows for the air-fuel mixture ratio to be constantly maintained regardless of changes in air temperature or atmospheric pressure. This eliminates the problem of a richer mixture encountered during high altitude operation. The air temperature and altitude sensors, therefore, are no longer utilized.

IDLE-UP CONTROL VALVE (Non-turbo models)

This valve constantly maintains the idle speed necessary to prevent battery discharge when an input voltage applied to the ECCS control unit drops due to an increased electrical load. This occurs, for example, immediately after the engine starts and headlights are turned on.

AUXILIARY AIR CONTROL VALVE (Turbo models)

A solenoid type AAC valve has been used to improve operation reliability.

*INTAKE MANIFOLD VACUUM CONTROL

The vacuum control valve is provided to reduce the engine lubricating oil consumption.

*EXHAUST AIR INDUCTION (E.A.I.)

To meet the emission control regulations, an E.A.I. system has been adopted for models destined for Australia, Switzerland and Sweden.

*B.C.D.D. (Boost Controlled Deceleration Device)

To reduce CO emission during deceleration, a B.C.D.D. has been adopted for models destined for Australia, Switzerland and Sweden.

ENGINE ELECTRICAL

ALTERNATOR

The alternator is equipped with a belt tension adjustment device.

IGNITION COIL

The ignition coil has a small-size, lightweight, molded design which features high spark performance and vibration- and thermal-resistance.

SPARK PLUG

A smaller spark plug has been adopted to accommodate the compart engine design.

ENGINE REMOVAL

FRONT ENGINE MOUNTING

The front engine mounting uses a mounting insulator equipped with a built-in liquid-filled dampening device to effectively absorb engine vibration.

REAR ENGINE MOUNTING

A newly designed control mode mounting member has been installed to prevent engine vibration in the passenger compartment.

ENGINE CONTROL, FUEL & EXHAUST SYSTEM

FUEL GAUGE UNIT

The fuel gauge unit has been designed to increase the degree of accuracy.

FUEL PUMP

The fuel pump has been built into the fuel tank to increase heat resistance and reduce noise emission.

CHASSIS

CLUTCH

*CLUTCH BOOSTER

A clutch booster has been employed to reduce the clutch depressing effort on the European L.H. drive model equipped with turbocharger.

* *MANUAL TRANSMISSION*

FS5W71C (Non-turbo models)

The synchro mechanism has been enlarged (compared to the FS5W71B transmission) and shift linkages modified, to reduce the effort required to shift from 1st to 2nd gear.

BW T-5 (FS5R90A) (Turbo models)

The following improvements have been made (as compared with the former FS5R90A unit).

- The clutch housing has been lengthened.
- A neutral switch has been installed for emission control.

OIL COOLER (Turbo models for Europe)

An air-cooled transmission oil cooler has been installed to prevent a rise in oil temeprature during highspeed operation on models equipped with air conditioner.

**AUTOMATIC TRANSMISSION*

The L4N71B model with overdrive has been adopted.

**FRONT AXLE & SUSPENSION*

FRONT AXLE

- The front axle is basically the same as that of the former model.
- A hub has been installed to accomodate the change in the road wheel positioning from a wheel bolt centering to a hub centering method.

FRONT SUSPENSION

- The strut, front suspension design, is essentially the same as that used in the existing model. However, to reduce weight, all parts have been newly designed.
- A high caster design has been used, and the tension rod mounting lowered to reduce a "nose down" tendency when brakes are applied.
- An "offset" caster design has been employed to improve straight road driving and stabilize the steering ability.
- The scrub length has been shortened to stabilize braking performance and prevent wheel shimmy.
- The center of the coil spring and that of the strut bar have been offset to improve riding comfort.

REAR AXLE & SUSPENSION

*REAR AXLE

The rear axle is basically the same as that of the former model.

*REAR SUSPENSION

- Rear suspension has the same semi-trailing arm of independent design as that used in the former model.
- The shock absorber and coil spring have been separated to enlarge the open space of the luggage compartment.
- The suspension member and arm have been redesigned to increase steering stability.
- The performance characteristics of the arm bushing, suspension member insulator and final drive mounting insulator have been modified to increase steering stability and reduce noise and vibration.
- An eccentric cam has been placed at the fastening location of the inner side of the arm and suspension member so that the toe-in can be adjusted easily.

REAR DRIVE SHAFT

- The same tripod universal joint, drive shaft design as that used in the 280ZX model has been installed in the non-turbocharged model.
- On the turbocharged model, a Birfied joint rear drive shaft has been used to accommodate the high output engine.

DIFFERENTIAL CARRIER (For Saudi Arabia and Europe)

The differential is now provided with cooling fins to increase heat dissipation.

DIFFERENTIAL CARRIER OIL COOLER (For Europe)

An air-cooled oil cooler has been used to prevent a rise in oil temperature during high-speed operation.

* ADJUSTABLE SHOCK ABSORBER

- A four-wheel, adjustable shock absorber has been installed on the turbocharged model. It is equipped with a small motor which changes the dampening force in three stages.
- The indicator lights will warn you when the malfunction occurs in the electrical circuit.

ROAD WHEEL

The center hole of the road wheel, instead of the seat of the wheel nut, is used as a reference point in determining the road wheel positioning.

BRAKE SYSTEM

*MASTER CYLINDER

A newly developed master cylinder equipped with a built-in proportioning valve has been installed.

BRAKE BOOSTER

The size of the booster has been enlarged to improve the brake performance.

*4-WHEEL SKID CONTROL SYSTEM (Turbo models for Europe)

A 4-wheel skid control system (standard equipment on models destined for Europe and optional elsewhere) improves braking performance and safety.

This system features the following functions:

- A fail-safe function activates to operate the brake system if the anti-skid system becomes inoperative.
- A self-diagnosis function makes it easy to repair the anti-skid system.

STEERING SYSTEM

*STEERING COLUMN

The tilt steering system is provided with a memory function for the tilt angle. The steering column can be raised for the driver to easily get in or out of the vehicle.

*POWER STEERING

- The power steering system is a rack-and-pinion ZF PR24S type.
- The power steering pump has a small-size, vanetype design and is installed independently of the reservoir tank.
- A belt tension adjustment device has been attached to the power steering pump for easier maintenance.

BODY

HOOD

- The hood, a front-end open type, is equipped with gas stay balancers for easy engine access.
- The hood can be opened from 50° (normal) up to 70° by relocating the gas stays.

AIR INTAKE

- On turbocharged models, an air intake has been provided in the hood to cool the turbocharger.

REAR HATCH & FUEL FILLER LID OPENER

To open the rear hatch and gas tank lid, a remote control device has been installed on the left side of the driver's seat. Along with this modification, a remote controlled locking filler lid has replaced the filler cap lock type.

*DOOR MIRROR

To insure proper mirror protection, the door mirror is folded to prevent damage during transit. Before delivering the vehicle to the user, it is placed in the correct position.

INSTRUMENT PANEL

- The basic instrument design has been retained. However, to reduce weight, simplify construction and increase the degree of accuracy during assembly, the instrument panel has been totally padded into a unit construction.
- Improvements have also been made so that noise and vibration are not conveyed via the steering system from the road surface to the instrument panel.
- The mating area of the instrument panel and vehicle body has been modified to prevent the transmission of noise and vibration.

MANUAL MULTI-ADJUSTABLE SEAT

The driver's seat has an optional feature that allows the seat to be manually set in six positions (seat slide, reclining, lifter, lumbar support, side support and thigh support).

REAR SEAT

A foldable rear seat has been employed.

HEATER AND AIR CONDITIONER

CONTROL

- The MODE control has a pushbutton design for easier operation.
- A recirculation (RECIRC) switch has been added.
- A bypass line has been placed between the ventilator outlet duct and floor outlet duct.
- A stepless air flow control device has been adopted so that the desired amount of air flow can be selected.

HEATER

- The capacity of the blower motor has been increased to allow for added air flow.
- The heating system has been designed to not only reduce resistance to the air flow but provide for its quieter operation.

AIR CONDITIONER

*MANUAL CONTROLLED AIR CONDITIONER

- A large thermal exchanging evaporator has been employed to increase cooling performance.
- An electronic thermostat has been installed as a temperature control regulator to prevent the evaporator from freezing.
- A refrigerant leak warning system has been used to warn of an insufficient amount of refrigerant.
- Air-flow performance has been increased by enlarging the ventilator on the instrument panel and also by using a large-capacity blower.
- The MODE control has been changed to a pushbutton type to simplify operating ability.
- In order to operate the vacuum actuator properly, an electric vacuum pump has been adopted for turbo-charged models equipped with ASCD.

*AUTOMATICALLY CONTROLLED AIR CONDITIONER (Option for Australia)

A microcomputer has been employed to automatically control the air-flow mode, outlet air temperature, the amount of air discharged, etc. Correspondingly, the interior temperature is maintained at the set temperature according to temperature changes both inside and outside the vehicle, the amount of sun beam, and vehicle speed.

- Eight sensors have been installed to maintain optimum temperature distribution inside the compartment. Six sensors are placed in the compartment, as well as an ambient temperature sensor and a coolant temperature switch.
- A digital display has been installed in the control section that indicates both the compartment setting temperature and ambient temperature.
- A self-diagnosis system of trouble has been provided to detect a microcomputer malfunction, faulty wiring connection, faulty sensors or actuator malfunction.
- The air-flow mode and the operation of the compressor and blower motor, etc. are displayed in the control section to tell the driver at a glance the condition of the air conditioning system.

ELECTRICAL SYSTEM

*DIGITAL TYPE COMBINATION METER (Option for Australia)

- The speedometer indicator shows the car speed in a digital and a graphic bar display.
- The fuel gauge, coolant temperature gauge, oil pressure gauge and voltmeter indicators are shown in graphic bar displayes.
  The fuel gauge is equipped with a sub-meter. When the amount of fuel falls below 19 liters, this sub-meter registers the remaining amount in a digital display.
- For added driving pleasure, there is a twin tripmeter, average vehicle speed readout and another display showing cruise range available on remaining gas.

COMBINATION METER (Needle type)

- The speedometer, tachometer, fuel meter and coolant temperature gauge are arranged in the same manner as in the existing model. However, the design of the meter and gauge have been simplified for standardization.

*• On turbocharged models for Europe, the speedometer indicates a speed signal from the speed sensor in the transmission.

* COMPASS (Option for Australia)

A compass has been installed that indicates the vehicle's direction in relation to the direction of magnetic north.

* ACCELERATION AND MILEAGE METERS (Option for Australia)

- An acceleration meter and fuel consumption meter have been installed. The acceleration meter displays the amount of acceleration/deceleration. The fuel consumption meter shows the rate of fuel usage at 10 second intervals.

AUDIO

- A multi-function electronic tuner radio & stereo tape deck system has been installed. The system is equipped with a memory of preset stations, as well as for auto program selection, which quickly searches and stops just ahead of the desired music, during cassette tape operation. Furthermore, it has a space diversity system to improve FM reception for Australia.
- A total of eight high quality speakers have been installed in the interior. Placements include the instrument panel, door panels, rear strut towers, etc. (GL-L models only)

CLOCK

A liquid crystal display, multi-function digital clock has been used.

CRUISE CONTROL

A cruise cancel function has been added to the cruise control lever.

HEADLIGHT SYSTEM

A semi-retractable headlight design has been employed.

SWITCH

Switches which have high frequency usage are arranged on each side of the combination meter for easier operation.

WINDSHIELD WIPER & WASHER

- The wiper has a three-speed, raise-up design.
- The washer operates in combination with the wipers.

HARNESS CONNECTOR AND RELAY

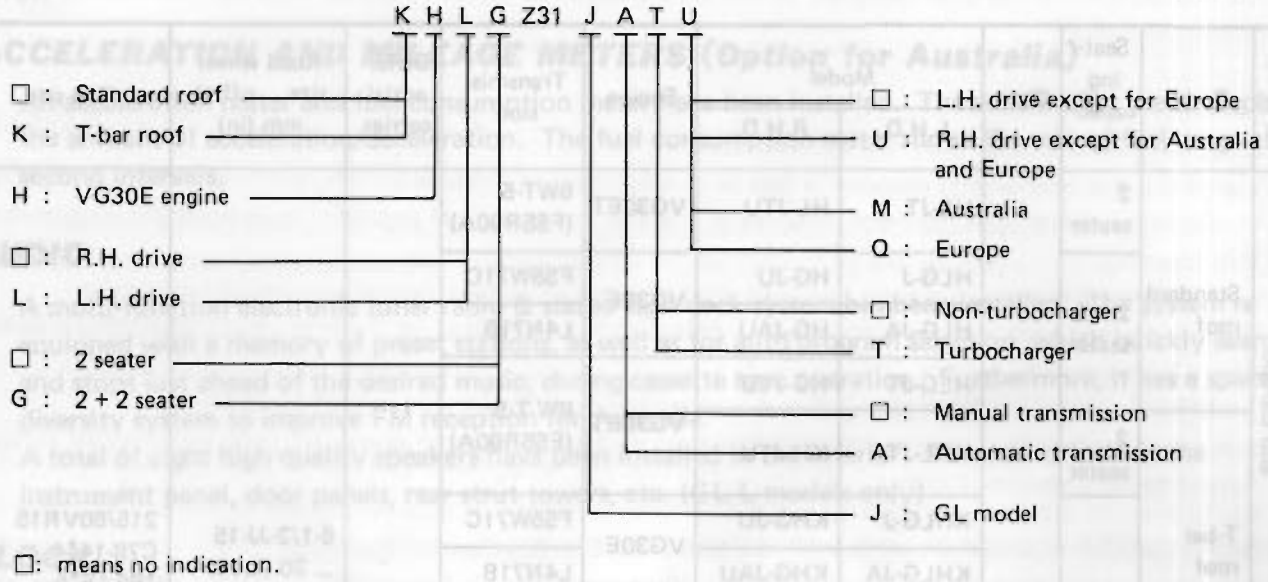
- Relays and harness connectors have been modified to prevent accidental detachment.

MODEL VARIATION

Destination	Body	Seating capacity	Class	Model L.H.D.	Model R.H.D.	Engine	Transmission	Differential carrier	Road wheel size ... offset mm (in)	Tire size
Except for Australia and Europe	Standard roof	2 seater	GL	HL-JT	HL-JTU	VG30ET	BWT-5 (FS5R90A)	R200	6-1/2-JJ-15 ... 30 (1.18)	215/60VR15 C78-14*4 165-15*5
		2 + 2 seater		HLG-J	HG-JU	VG30E	FS5W71C			
				HLG-JA	HG-JAU		L4N71B			
				HLG-JT	HG-JTU	VG30ET	BW T-5 (FS5R90A)			
	T-bar roof	2 seater		KHL-JT	KH-JTU					
		2 + 2 seater		KHLG-J	KHG-JU	VG30E	FS5W71C			
				KHLG-JA	KHG-JAU		L4N71B			
				KHLG-JT	KHG-JTU	VG30ET	BW T-5 (FS5R90A)			
Australia	Standard roof			–	HG-JM	VG30E	FS5W71C			
				–	HG-JAM		L4N71B			
	T-bar roof			–	KHG-JM		FS5W71C			
				–	KHG-JAM		L4N71B			
Europe	Standard roof			HLG-JQ	HG-JQ		FS5W71C		6-1/2-JJ-15 ... 30 (1.18) 5-1/2-JJ-14 ... 30 (1.18)*1	215/60VR15 210/60VR390*1 165-15*6
				HLG-JAQ	HG-JAQ		L4N71B			
				HLG-JTQ	HG-JTQ	VG30ET	BW T-5 (FS5R90A)		7-JJ-16 ... 30 (1.18)	205/55VR16*2 225/50VR16*3 T135/70D16*7
	T-bar roof			KHLG-JQ	KHG-JQ	VG30E	FS5W71C		6-1/2-JJ-15 ... 30 (1.18) 5-1/2-JJ-14 ... 30 (1.18)*1	215/60VR15 210/60VR390*1 165-15*6
				KHLG-JQ	KHG-JAQ		L4N71B			
				KHLG-JAQ	KHG-JTQ	VG30ET	BW T-5 (FS5R90A)		7-JJ-16 ... 30 (1.18)	205/55VR16*2 225/50VR16*3 T135/70D16*7

*1: For England
*2: Front
*3: Rear
*4: Space saver spare tire (Non-turbo model)
*5: Space saver spare tire
*6: Space saver spare tire (L.H. drive model)
*7: T-type spare tire (L.H. drive model)

Prefix and suffix designations



□: means no indication.

GENERAL SPECIFICATIONS

Item				Model	2 seater	2+2 seater	
					VG30ET	VG30E	VG30ET
Dimensions and weights	Overall length			mm (in)	4,335 (170.7)	4,535 (178.5), 4,540 (178.7)*1	
	Overall width			mm (in)	1,690 (66.5) 1,725 (67.9)*2	1,725 (67.9)	
	Overall height			mm (in)	1,295 (51.0)	1,310 (51.6)	
	Wheelbase			mm (in)	2,320 (91.3)	2,520 (99.2)	
	Tread	Front		mm (in)	1,415 (55.7)		
		Rear		mm (in)	1,435 (56.5)		
	Minimum ground clearance (At curb weight)			mm (in)	150 (5.9)		
	Overhang to the body front end			mm (in)	945 (37.2)	945 (37.2), 950 (37.4)*1	
	Overhang to the body rear end			mm (in)	1,070 (42.1)		
	Room space	Length		mm (in)	860 (33.9)	1,525 (60.0)	
		Width		mm (in)	1,440 (56.7)		
		Height		mm (in)	1,075 (42.3)	1,075 (42.3), 1,090 (42.9)*1	
	Curb weight*3	Except for Australia and Europe		kg (lb)	1,335 (2,945) 1,395 (3,075)*4	1,340 (2,955) 1,420 (3,130)*4	1,375 (3,030) 1,435 (3,165)*4
		For Australia		kg (lb)	–	1,405 (3,100)	–
		For Europe		kg (lb)	–	1,385 (3,055) 1,400 (3,085)*5	1,425 (3,140) 1,440 (3,175)*5
	Minimum turning radius (Wall-to-wall)			m (ft)	5.3 (17.4)	5.7 (18.7), 5.8 (19.0)*5	
General specifications of engine	Model				VG30E	VG30ET	
	Classification				Gasoline		
	Cycle				4		
	No. of cylinders and arrangement				6-cylinder, V-slanted at 60°		

*1: For Europe
*2: With side moulding
*3: Values are the maximum weight in each model variation.
*4: For Saudi Arabia
*5: For West Germany

Item \ Model				VG30E	VG30ET
General specifications of engine	Valve arrangement			O.H.C.	
	Bore x stroke		mm (in)	87.0 x 83.0 (3.425 x 3.268)	
	Displacement		cm^3 (cu in)	2,960 (180.62)	
	Compression ratio			9.0	7.8
	Maximum horsepower	(SAE GROSS)	HP/rpm	176/5,200, 182/5,600*1, *3	241/5,400
		(DIN)	PS/rpm	170/5,600	228/5,400
	Maximum torque N·m (kg-m, ft-lb)/rpm	(SAE GROSS)		247 (25.2, 182)/4,400, 257 (26.2, 190)/4,400*1, *3	342 (34.9, 252)/4,400
		(DIN)		235 (24.0, 174)/4,400	326 (33.2, 240)/4,400
Lubrication system	Lubrication system			Pressure feed flow	
	Oil pump type			Gear pump	
	Oil filter type			Paper element (Cartridge)	
Cooling system	Cooling method			Water cooling, forced circulation	
	Engine coolant	Anti-freeze (L.L.C.)	%	30, 50*1	
	Radiator type			Corrugated fin and tube	
	Water pump type			Centrifugal	
	Thermostat	Type		Wax-pellet	
		Temperature °C (°F)		76 (169), 88 (190)*1, 72 (162)*2	
Engine fuel system	Electronic fuel injection type			L-jetronic	
	Fuel pump type			Electrical	
	Air cleaner filter type			Viscous paper, Dry paper*3	
	Air flow meter	Type		Hot wire	
		Model		A36-000007	
	Injector	Type		Electromagnetic	
	Throttle chamber type			1 barrel	
	Air regulator type			Bimetal	
Battery	Model			55D23R-MF*4, 55D23L-MF*5	
	Capacity		V-AH	60	

*1: For Europe
*2: For tropical areas
*3: For Saudi Arabia
*4: L.H. drive model
*5: R.H. drive model

Item				Model	VG30E	VG30ET
Alternator	Capacity			V-A	12-70, 12-70*1	
	Voltage regulator model				I.C. regulator, built-in	
Starter motor	Type				Non-reduction, Reduction gear*2	
	Capacity			kW	1.0, 1.4*2	
Ignition system	Firing order				1-2-3-4-5-6	
	Ignition coil model				HITACHI make CM1T-201	
	Distributor type				With Crank Angle Sensor	
	Spark plug model				BCPR6ES-11	BCPR6E-11
Clutch	Disc model				240TBL	240TBL, 250TBL*3
	Cover	Model			C240S	C240S, C250S*3
		Full load		N (kg, lb)	5,394 (550, 1,213)	6,375 (650, 1,433), 6,669 (680, 1,499)*3
	Clutch control method				Hydraulic	
	Master cylinder inner diameter			mm (in)	15.88 (5/8)	
	Operating cylinder inner diameter			mm (in)	19.05 (3/4)	19.05 (3/4), 17.46 (11/16)*5
Manual transmission	Model				FS5W71C	BW T-5 (FS5R90A)
	Gear ratio		1st		3.321	3.350
			2nd		1.902	2.056
			3rd		1.308	1.376
			4th		1.000	1.000
			5th		0.759	0.779
			Rev.		3.382	3.153
Automatic transmission	Model				L4N71B	–
	Gear ratio		1st		2.458	–
			2nd		1.458	–
			3rd		1.000	–
			4th		0.686	–
			Rev.		2.182	–
Propeller shaft model					3S71A, 2S71A*4	
Differential carrier	Model				R200	
	Gear ratio (Number of teeth)				3.700 (37/10)	3.545 (39/11), 3.364 (37/11)*3
	Gear type & number of pinion gears				Straight bevel gear, 2 side gears and 2 pinion mates	

*1: Turbo model
*2: For cold areas and R.H. drive model except for Europe
*3: For Europe
*4: 2 seater model
*5: L.H. drive for Europe

Item \ Model			VG30E	VG30ET
Front axle and front suspension	Type		Independent strut with coil spring	
	Stabilizer bar type		Torsion bar	
Rear axle and rear suspension	Type		Independent semi-trailing arms with coil spring	
	Stabilizer bar type		Torsion bar	
Brake system	Model and type	Front	Disc-CL28VA, Disc-CL28VB*1	Disc-CL28VB, Disc-CL28VC*1
		Rear	Disc-CL14H, Disc-CL14HB*1	Disc-CL14HB, Disc-CL14HC*1

Item \ Model		2 seater		2+2 seater	
		VG30E	VG30ET	VG30E	VG30ET
Brake system	Master cylinder inner diameter mm (in)	23.81 (15/16)			
	Brake booster model	M20T			
	Pressure control type	Proportioning valve (Within master cylinder)			
	Parking brake type	Mechanical system for rear wheels			
Wheel and tire	Road wheel size [offset mm (in)]	6-1/2-JJ-15 Aluminum [30 (1.18)] 5-1/2-JJ-14 Aluminum [30 (1.18)] *2		6-1/2-JJ-15 Aluminum [30 (1.18)] 7-JJ-16 Aluminum [30 (1.18)]	
	Tire size	215/60VR15 210/60VR390*2		215/60VR15 205/55VR16 (Front)*1 225/50VR16 (Rear)*1	
	Spare tire size (S.S.T. or T-type tire)	C78-14		155/90D15	
Steering system	Type	Rack-and-pinion, Integral power steering			
	Model	PR24S			
Perform-ance	Top gear speed at 1,000 rpm km/h (MPH)	31 (19)		33 (21), 34 (21)*1	

*1: For Europe
*2: For England

VG30 ENGINE

OUTLINE

The VG series engine is provided with six cylinders and has been designed with major emphasis placed on high output, quietness and reliable performance, as well as fuel economy and weight reduction.

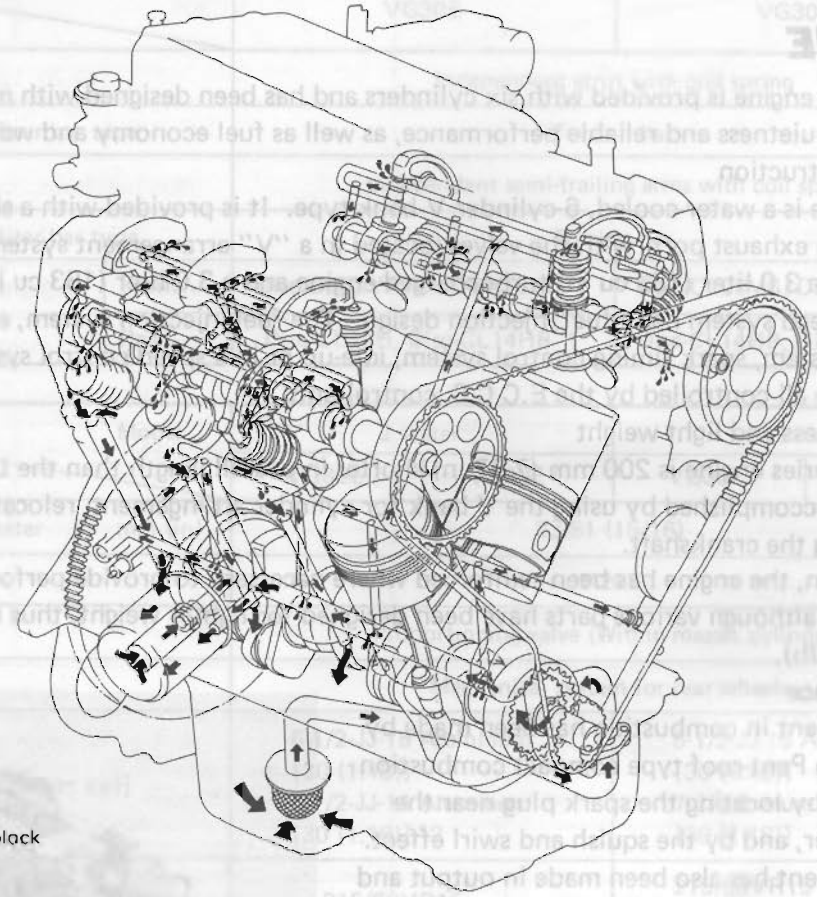
1) Basic construction
   The engine is a water-cooled, 6-cylinder V-bank type. It is provided with a single OHC and cross-flow intake and exhaust ports with the valves located in a "V" arrangement system. Two engine models are available: a 3.0 liter (183 cu in) turbocharged engine and a 3.0 liter (183 cu in) non-turbocharged engine. The fuel feed system has a fuel injection design. The fuel injection system, exhaust gas recirculation control system, spark timing control system, idle-up or idle speed control system and fuel pump control system are all controlled by the E.C.C.S. control unit.
2) Compactness and light weight
   The VG series engine is 200 mm (7.87 in) shorter in overall length than the L20A, L24 and L28 engines. This was accomplished by using the V-bank for cylinder arrangement, relocating auxiliary equipment and shortening the crankshaft.
   In addition, the engine has been reinforced where necessary to provide performance reliability and quiet operation although various parts have been designed for lighter weight, thus reducing the weight by over 10 kg (22 lb).
3) Performance
   Improvement in combustion has been made by adopting a Pent-roof type compact combustion chamber, by locating the spark plug near the bore center, and by the squish and swirl effect. Improvement has also been made in output and fuel economy by reducing the weight of moving parts and the friction of auxiliary equipment.
4) Vibration and noise
   The vibration level has been reduced by improving the combining rigidity of the engine-transmission and optimizing the mounting location. The noise level has been reduced by adopting hydraulic valve lifters, timing belts and long and large port intake manifolds.

SPECIFICATIONS

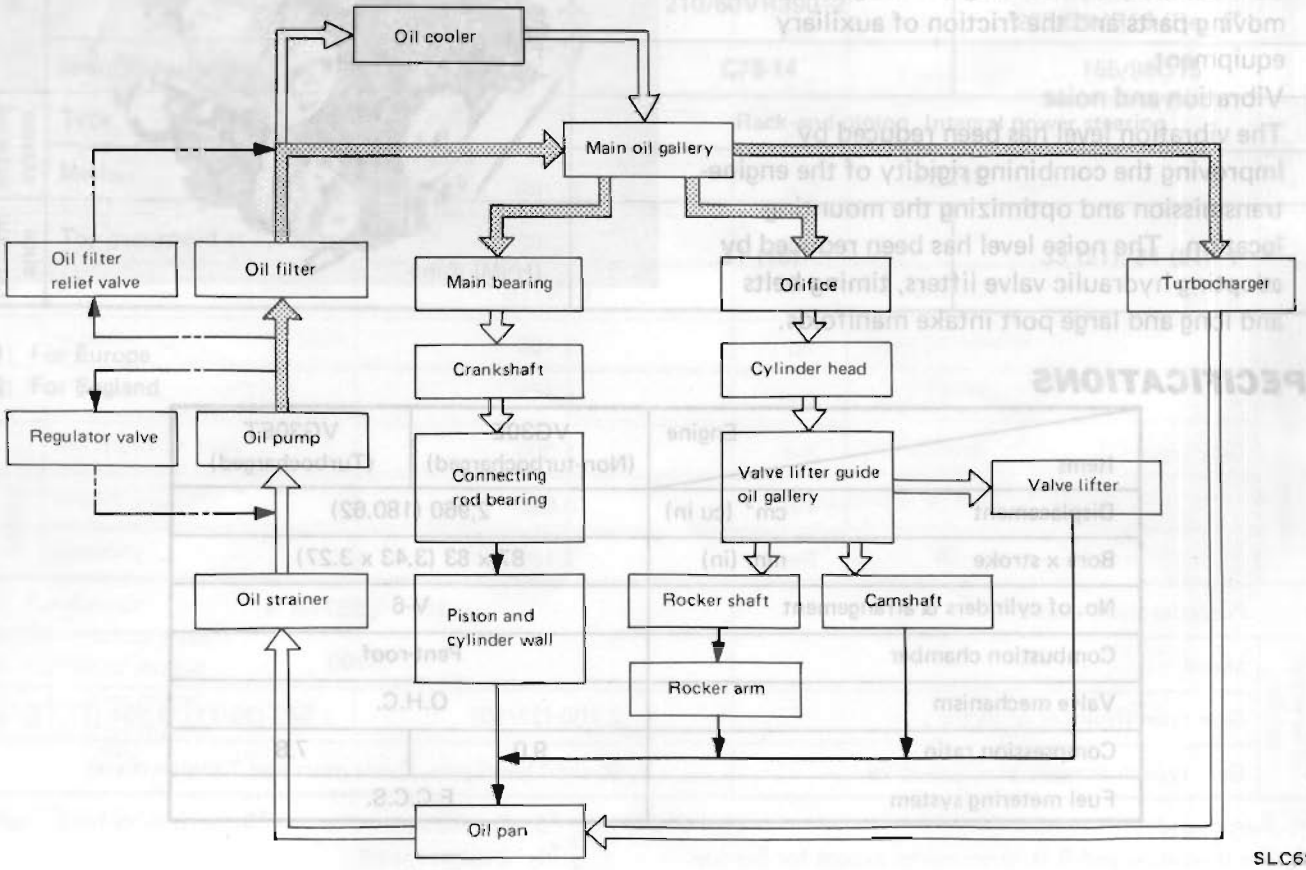
Items \ Engine		VG30E (Non-turbocharged)	VG30ET (Turbocharged)
Displacement	cm^3 (cu in)	2,960 (180.62)	
Bore x stroke	mm (in)	87 x 83 (3.43 x 3.27)	
No. of cylinders & arrangement		V-6	
Combustion chamber		Pent-roof	
Valve mechanism		O.H.C.	
Compression ratio		9.0	7.8
Fuel metering system		E.C.C.S.	

ENGINE LUBRICATION SYSTEM

LUBRICATION CIRCUIT



Note:
: Oil passage
: Oil gallery in cylinder block
: By-pass passage



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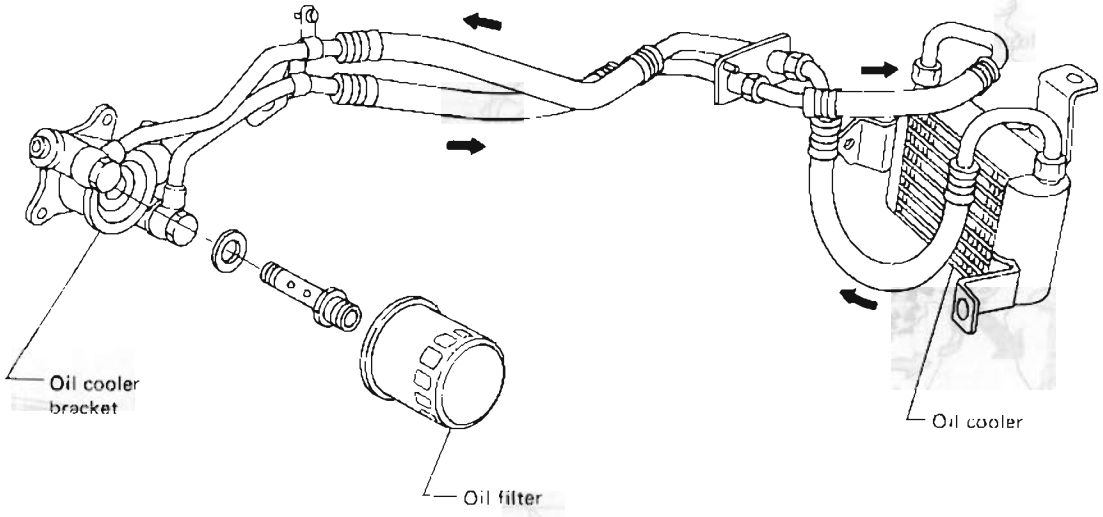
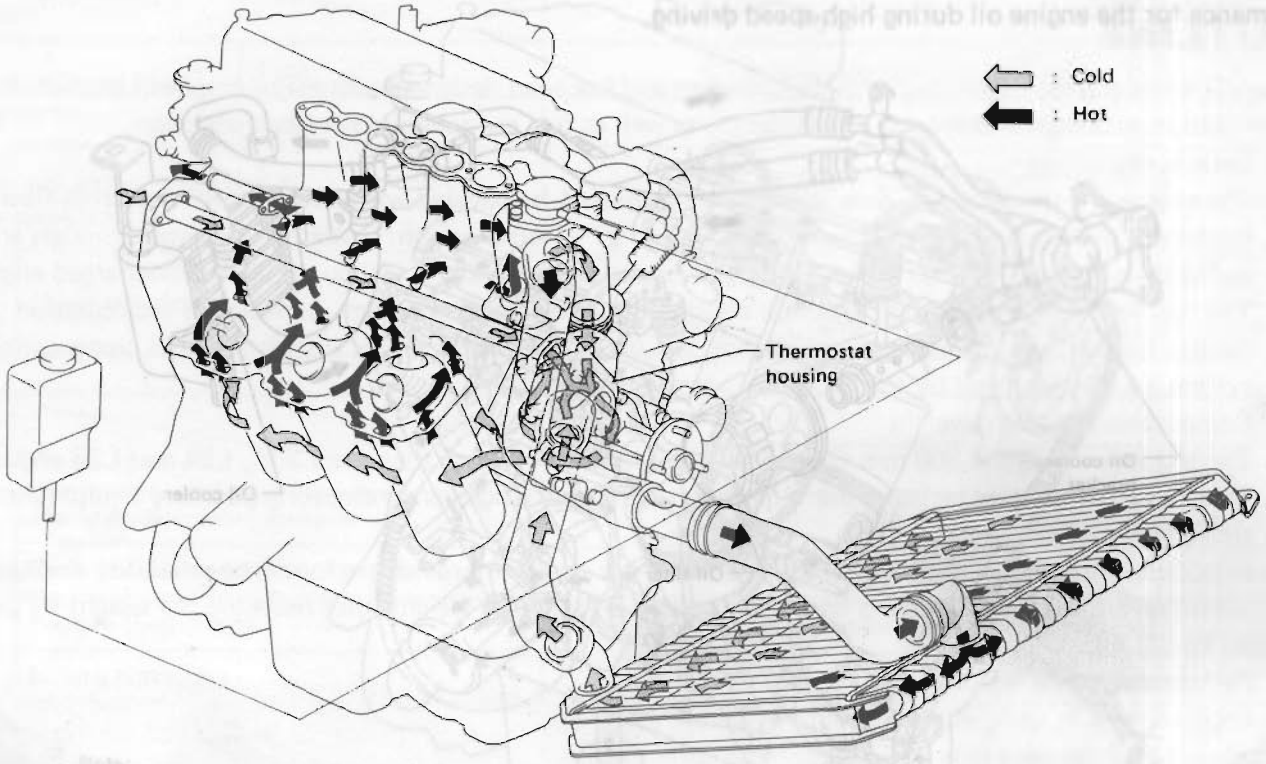
ENGINE OIL COOLER (VG30ET engine for Europe)

An air-cooled oil cooler has been adopted for the VG30ET engine for Europe to improve the cooling performance for the engine oil during high-speed driving.

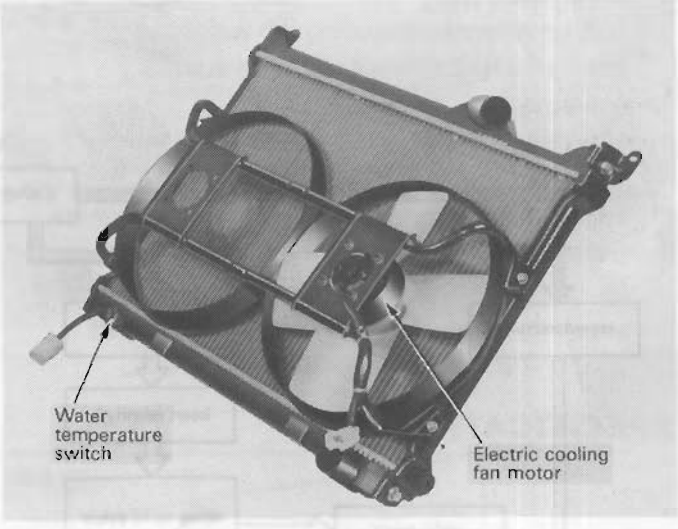


ENGINE COOLING SYSTEM

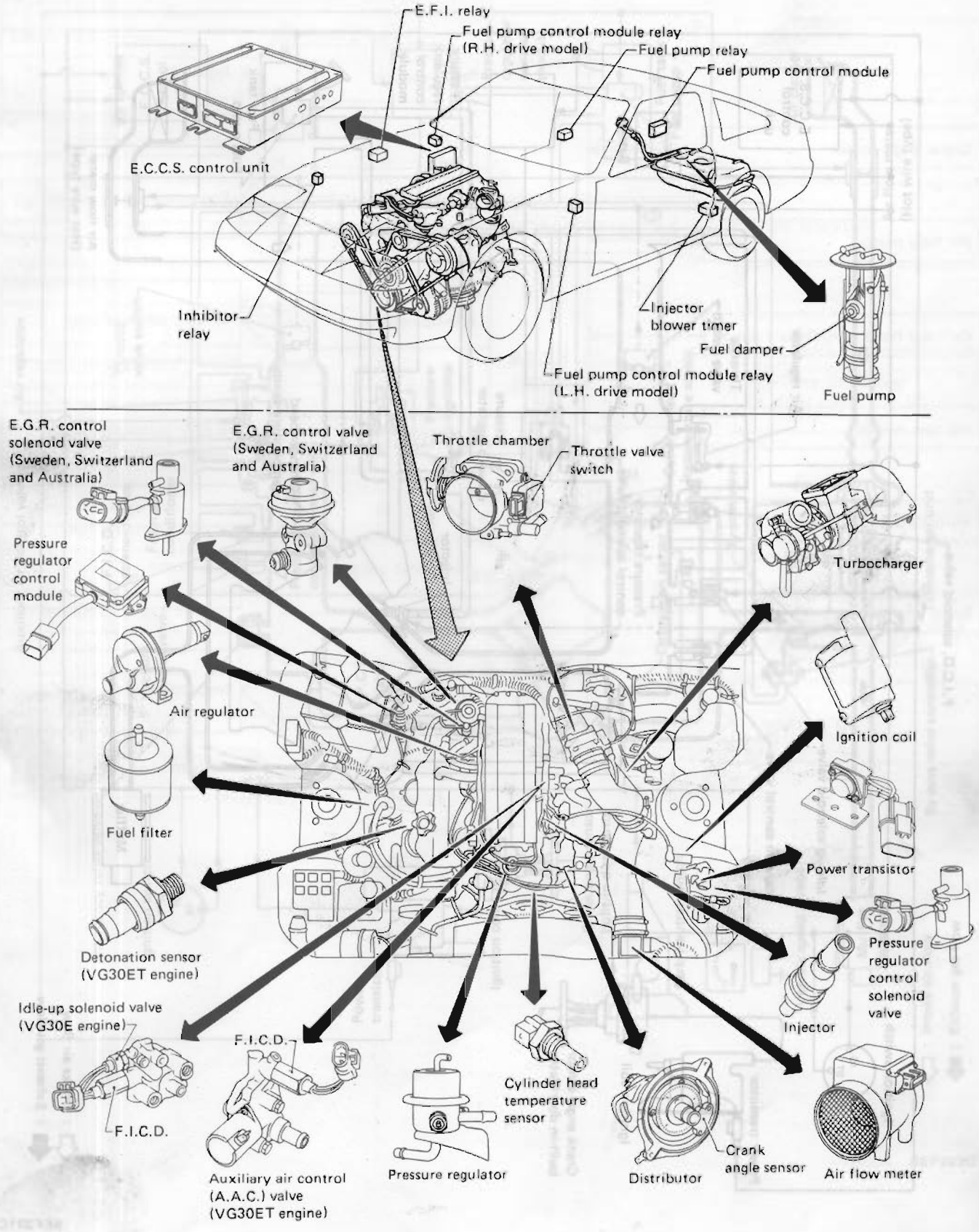


ELECTRIC COOLING FAN

The electric cooling fan is employed except for tropical areas.

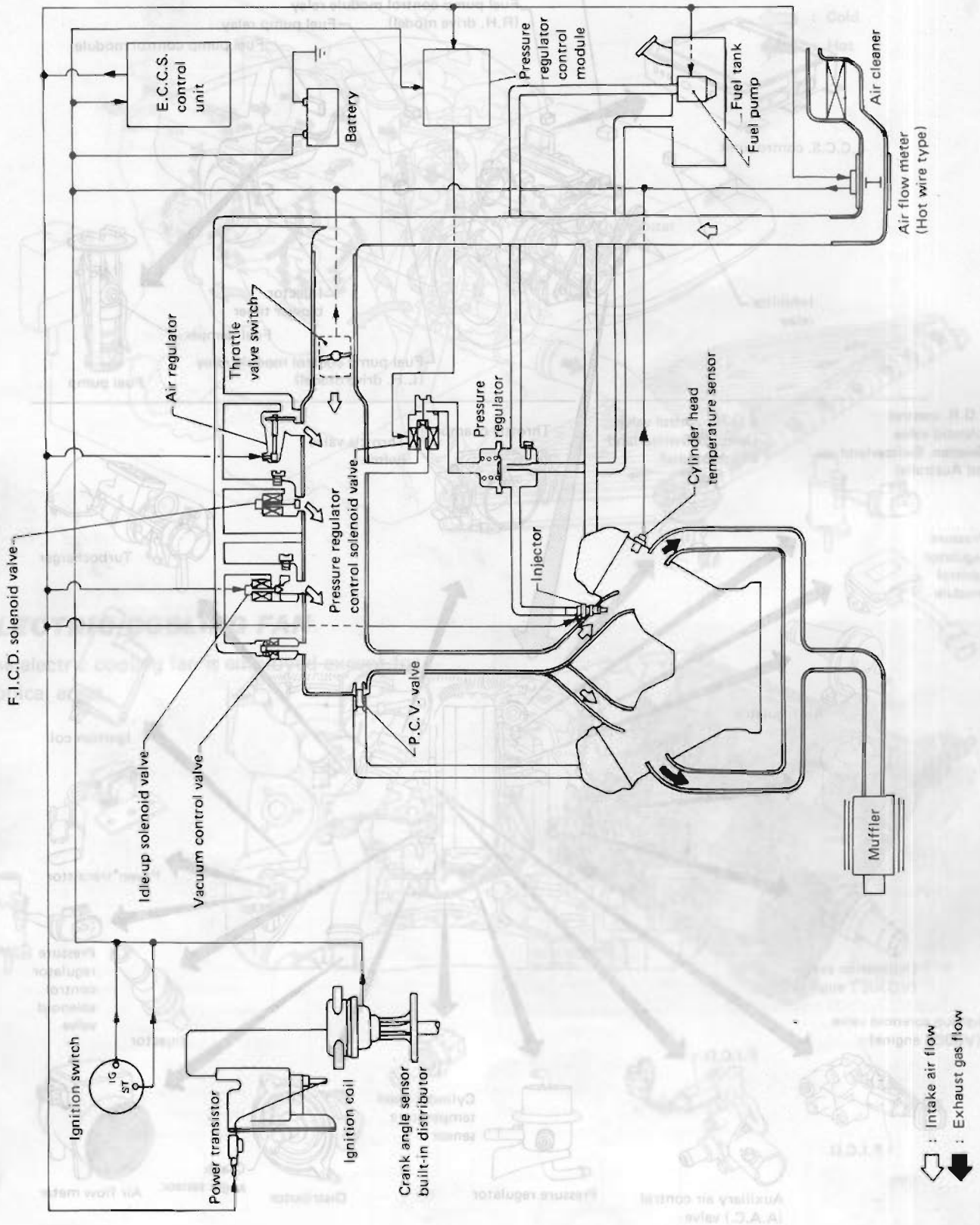


COMPONENT PARTS LOCATION



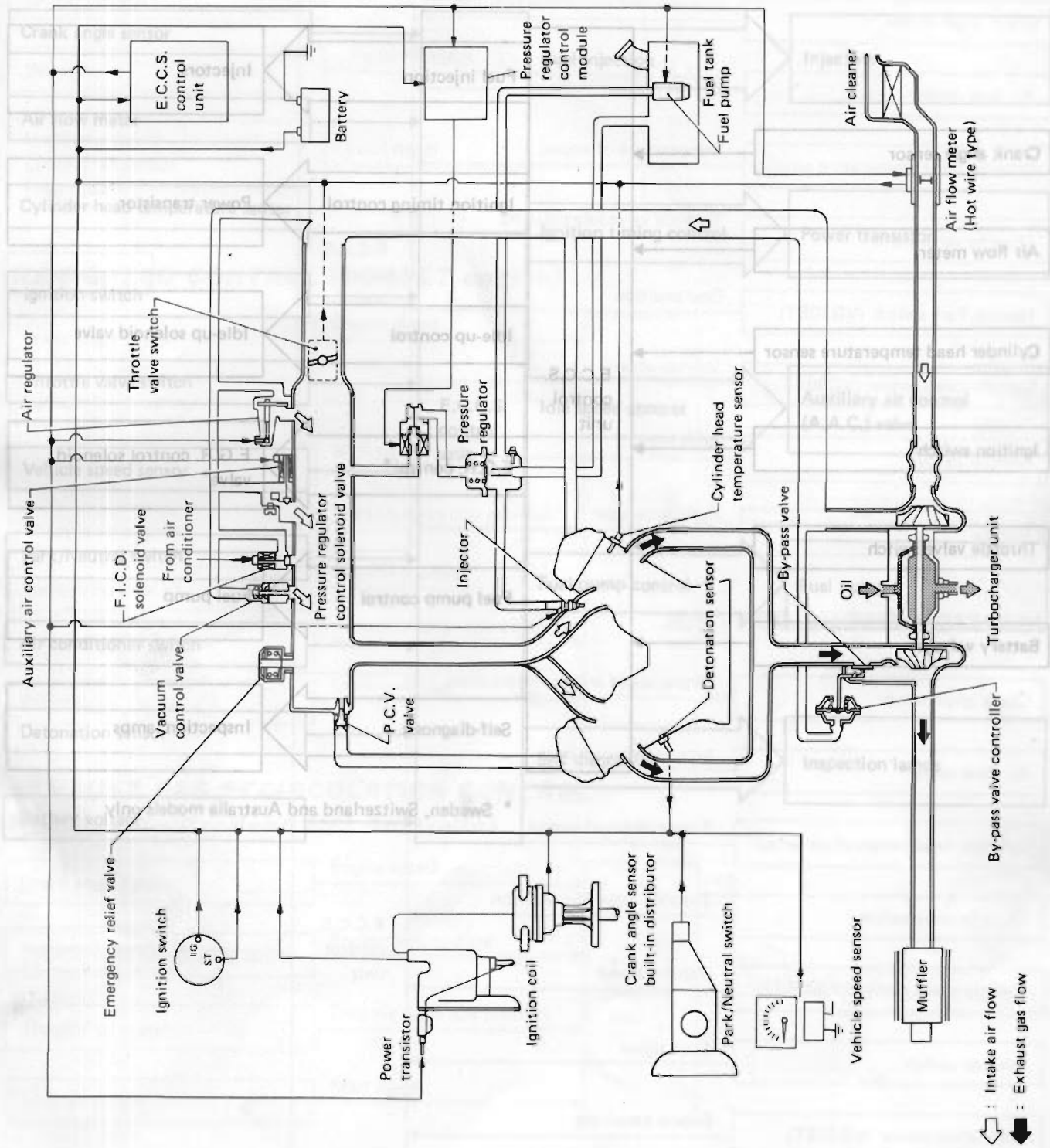
E.C.C.S. DIAGRAM

VG30E ENGINE (Without turbocharger)



SEF231C

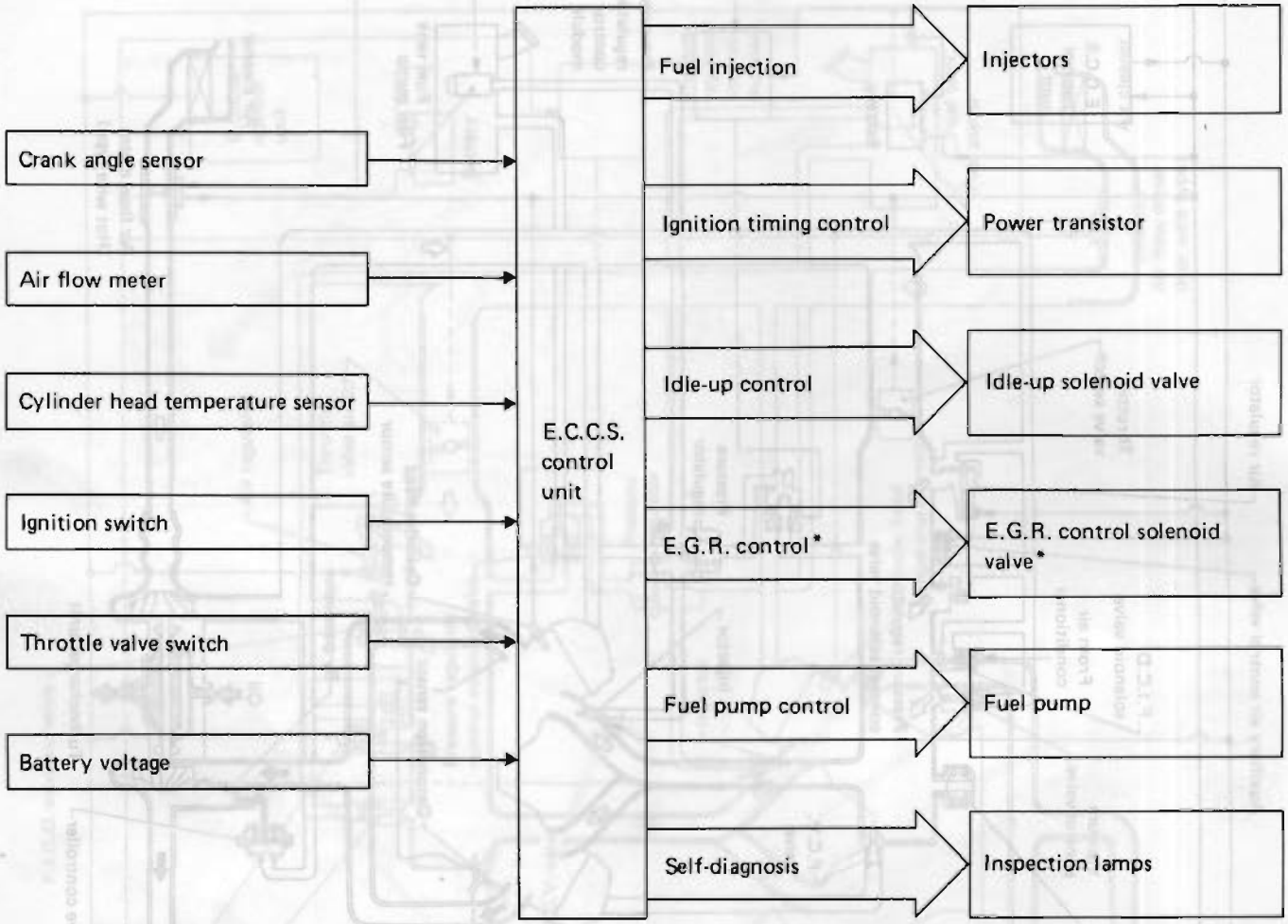
VG30ET ENGINE (With turbocharger)



SEF232C

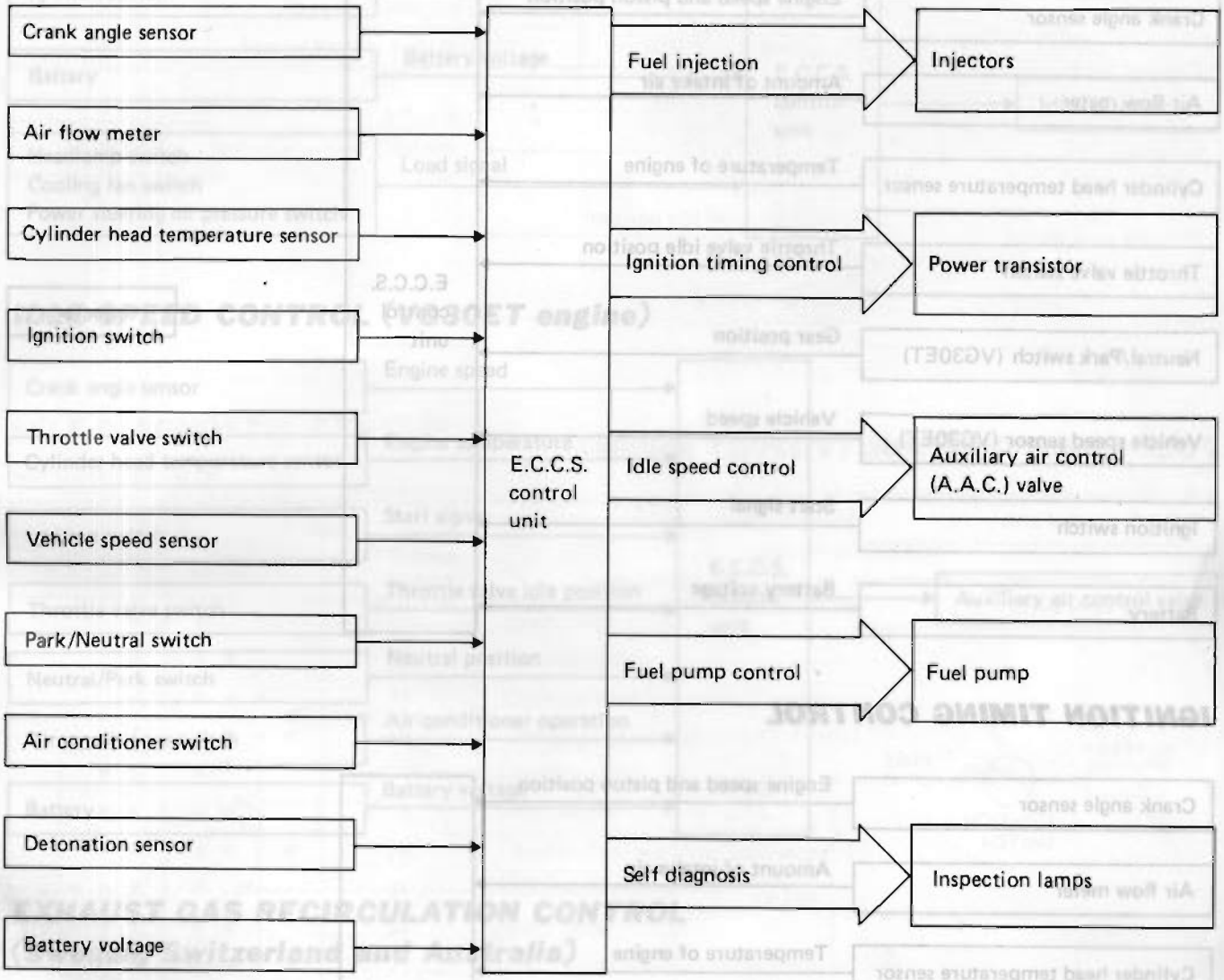
E.C.C.S. CHART

VG30E ENGINE (Without turbocharger)

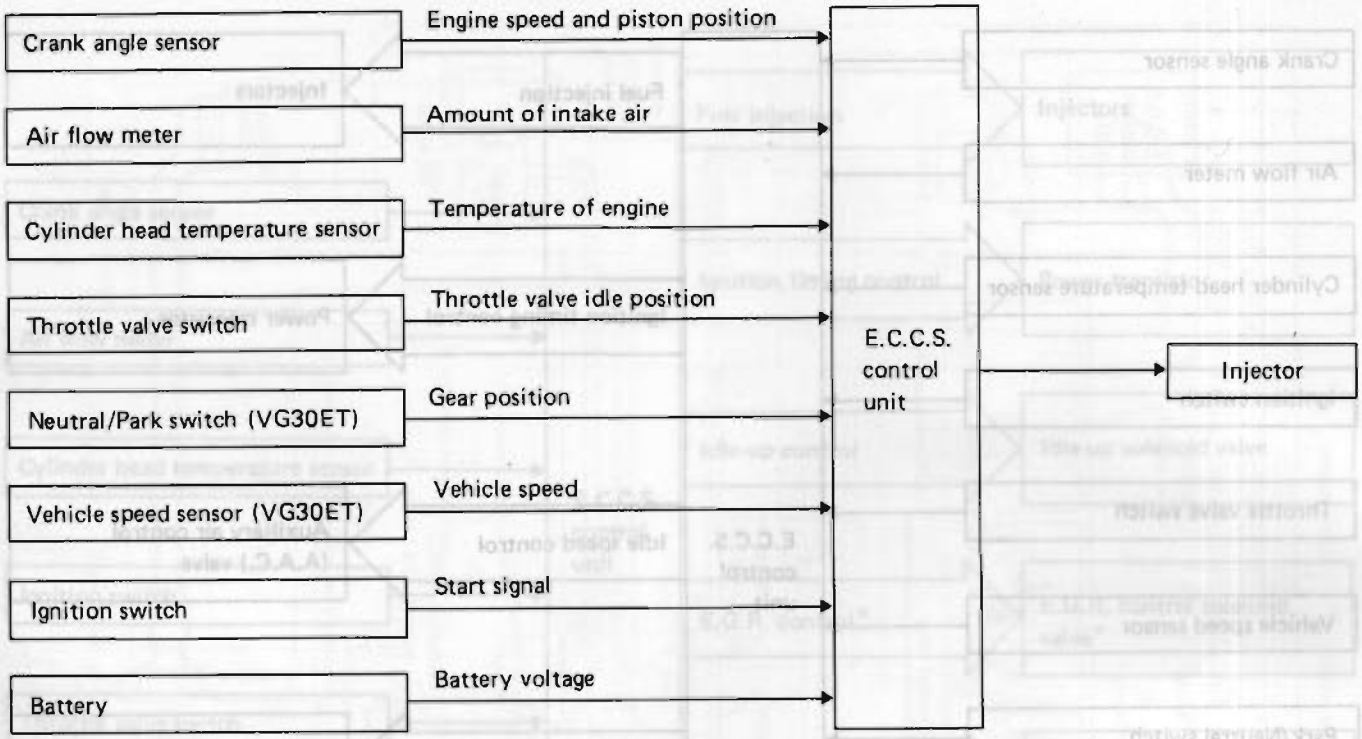


* Sweden, Switzerland and Australia models only

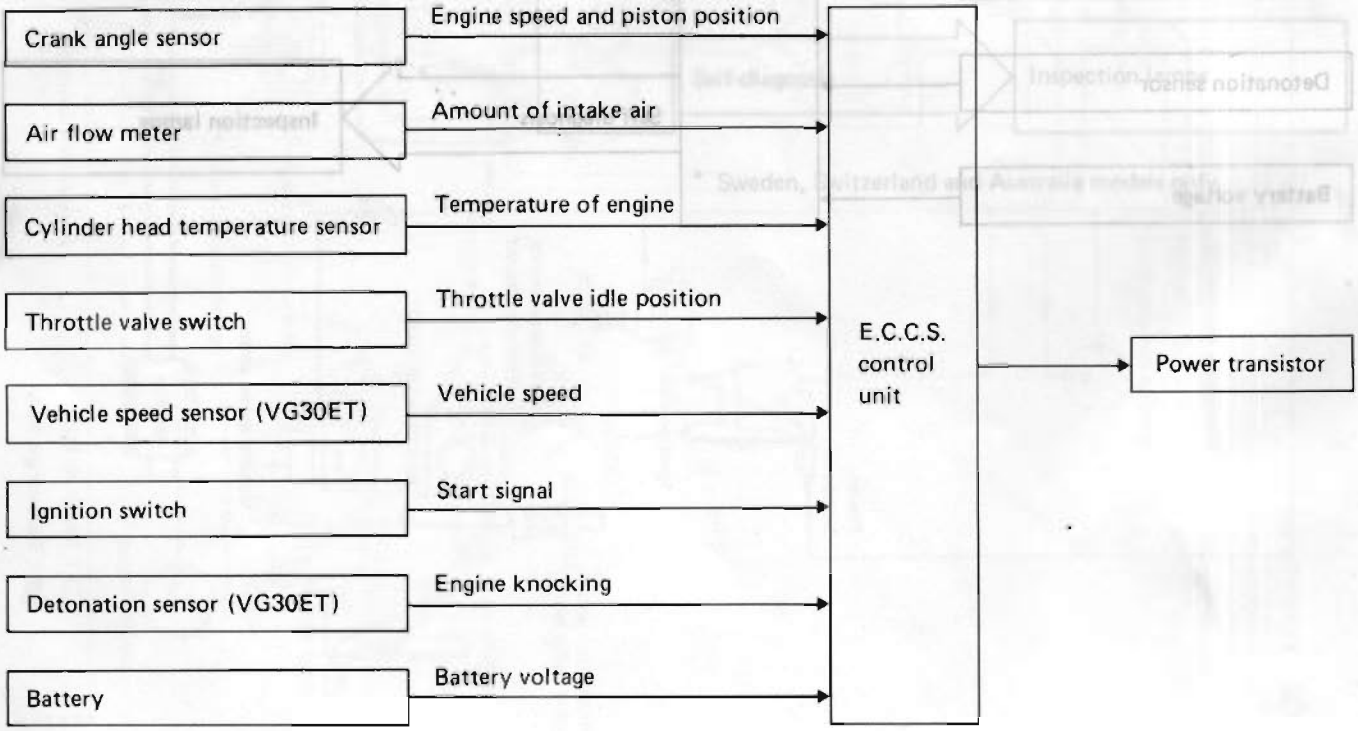
VG30ET ENGINE (With turbocharger)



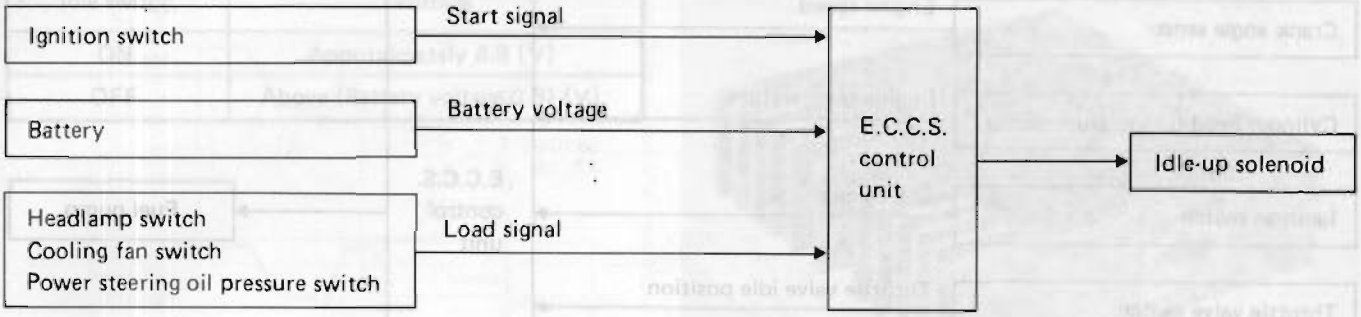
FUEL INJECTION CONTROL



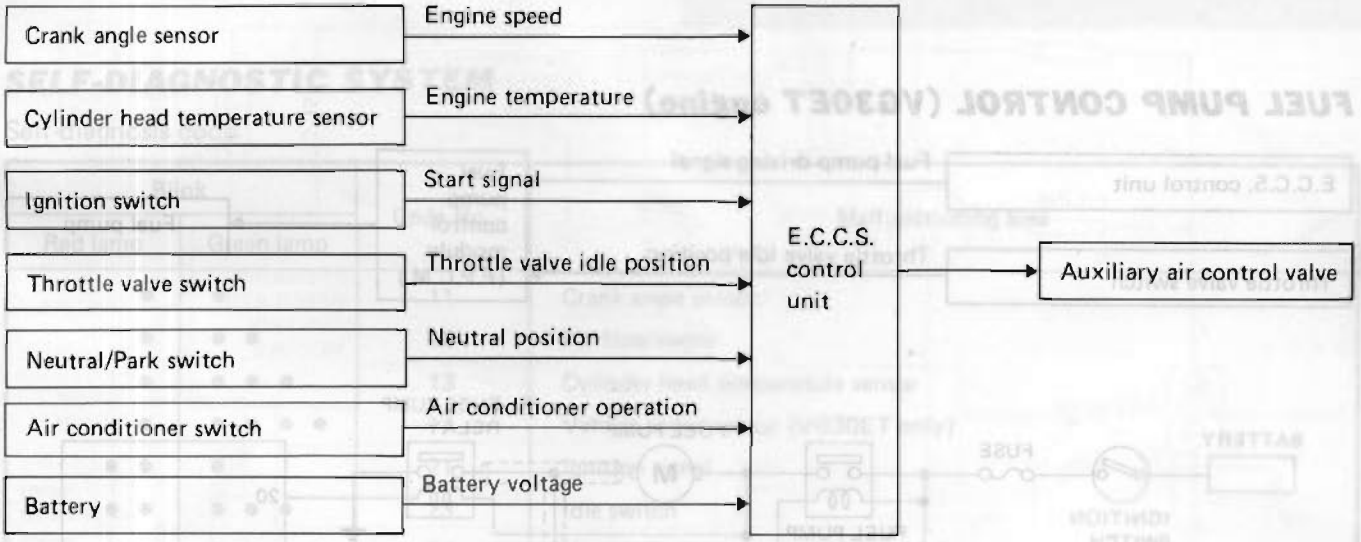
IGNITION TIMING CONTROL



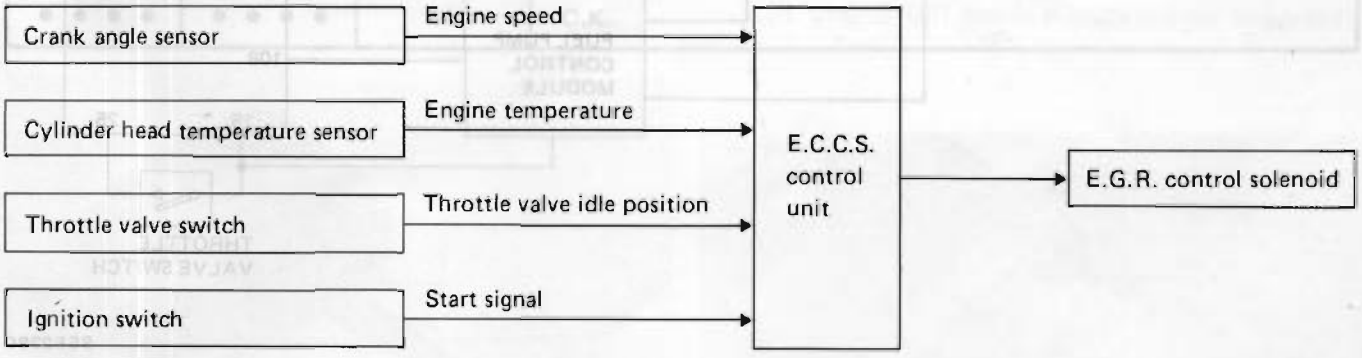
IDLE-UP CONTROL (VG30E engine)



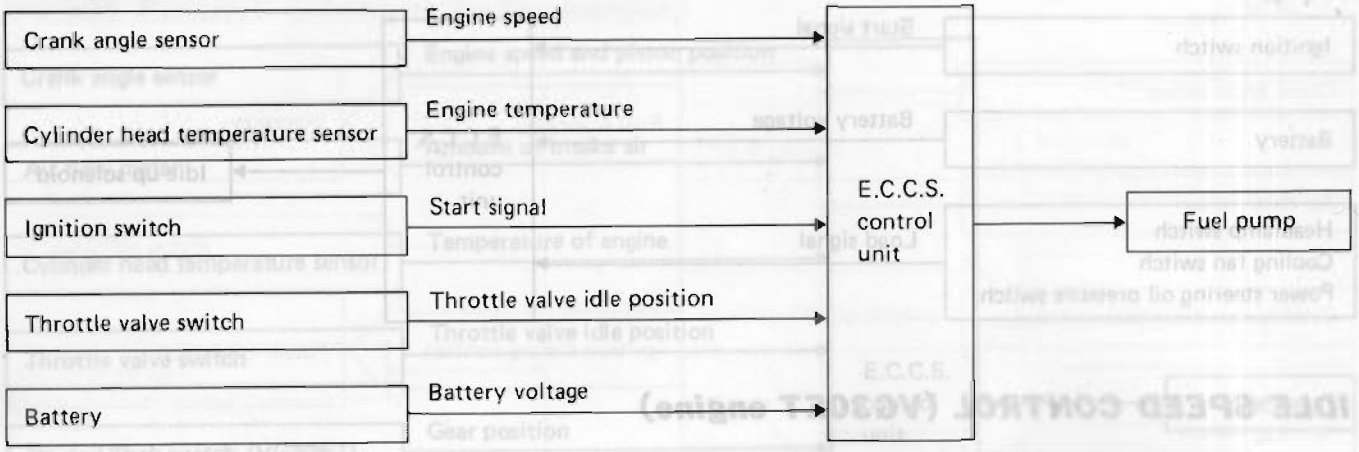
IDLE SPEED CONTROL (VG30ET engine)



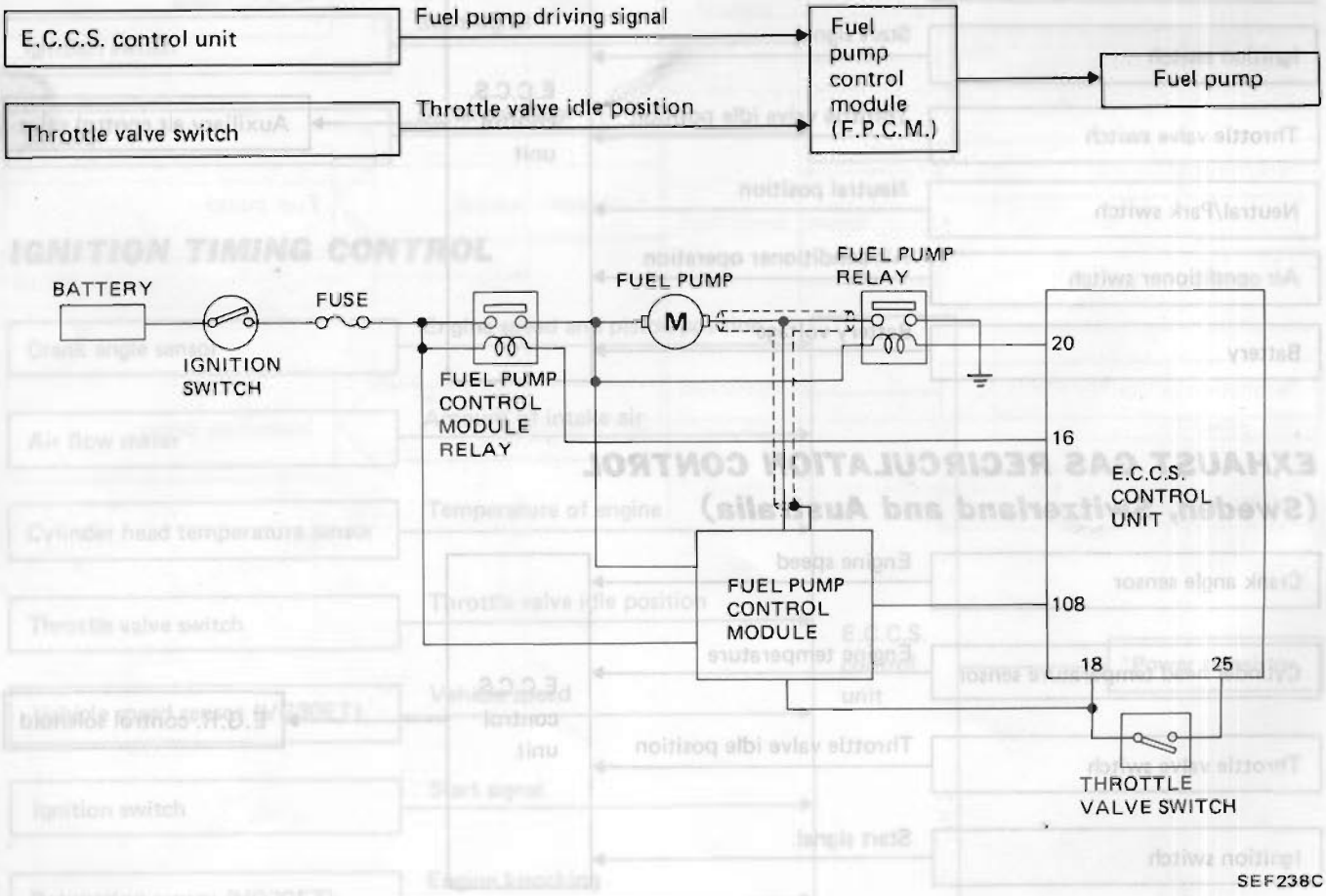
EXHAUST GAS RECIRCULATION CONTROL (Sweden, Switzerland and Australia)



FUEL PUMP CONTROL (VG30E engine)

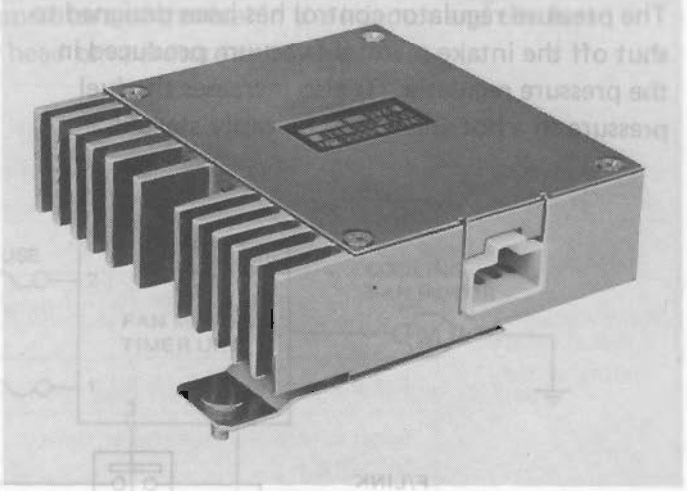


FUEL PUMP CONTROL (VG30ET engine)



Fuel pump voltage control

Idle switch	Voltage
ON	Approximately 8.9 [V]
OFF	Above (Battery voltage-0.8) [V]



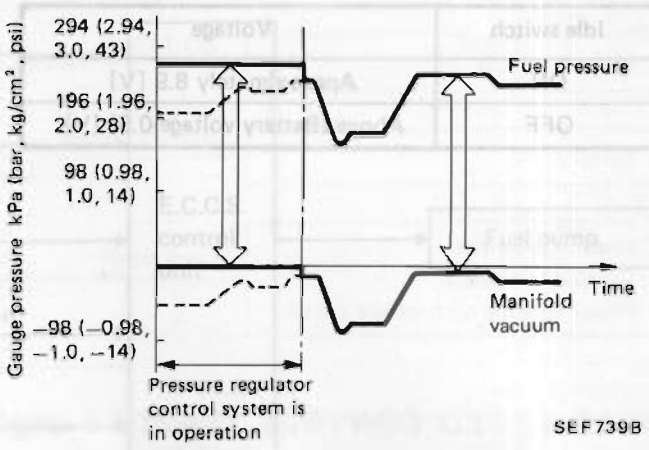
SELF-DIAGNOSTIC SYSTEM

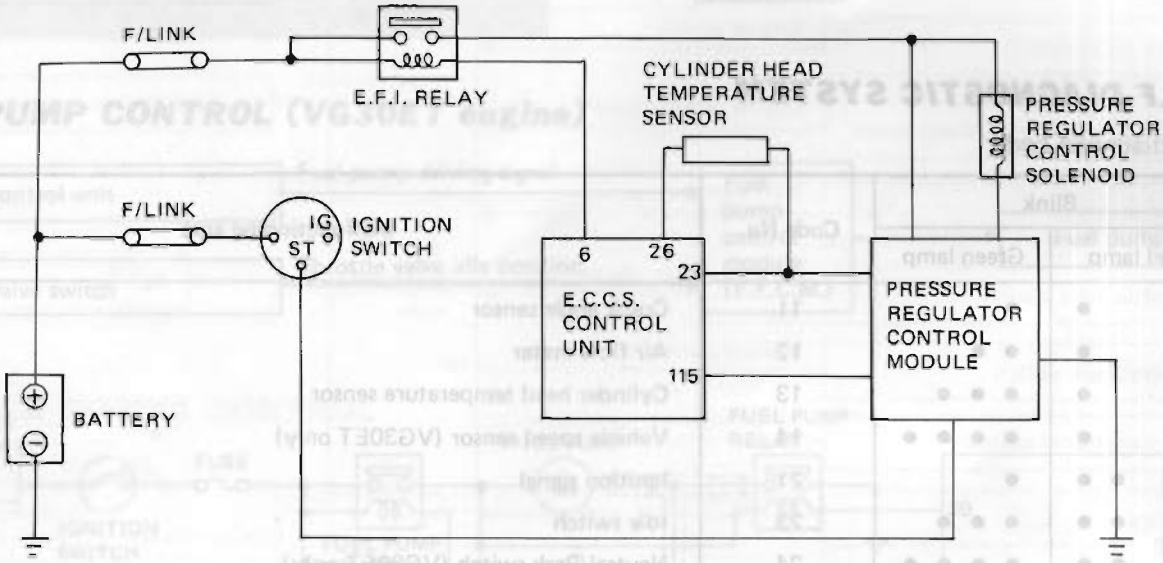
Self-diagnosis code

Blink		Code No.	Malfunctioning area
Red lamp	Green lamp		
●	●	11	Crank angle sensor
●	● ●	12	Air flow meter
●	● ● ●	13	Cylinder head temperature sensor
●	● ● ● ●	14	Vehicle speed sensor (VG30ET only)
● ●	●	21	Ignition signal
● ●	● ● ●	23	Idle switch
● ●	● ● ● ●	24	Neutral/Park switch (VG30ET only)
● ● ●	●	31	Air conditioner
● ● ●	● ●	32	Start signal
● ● ●	● ● ● ●	34	Detonation sensor (VG30ET only)
● ● ● ●	● ● ● ●	44	O.K.

PRESSURE REGULATOR CONTROL

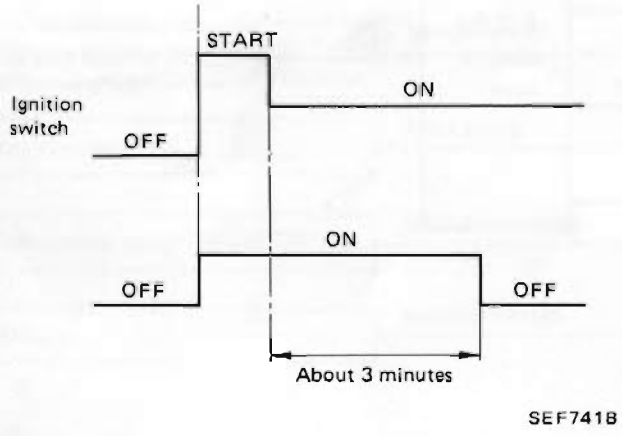
The pressure regulator control has been designed to shut off the intake manifold vacuum produced in the pressure regulator. It also increases the fuel pressure so a hot engine can be easily started.

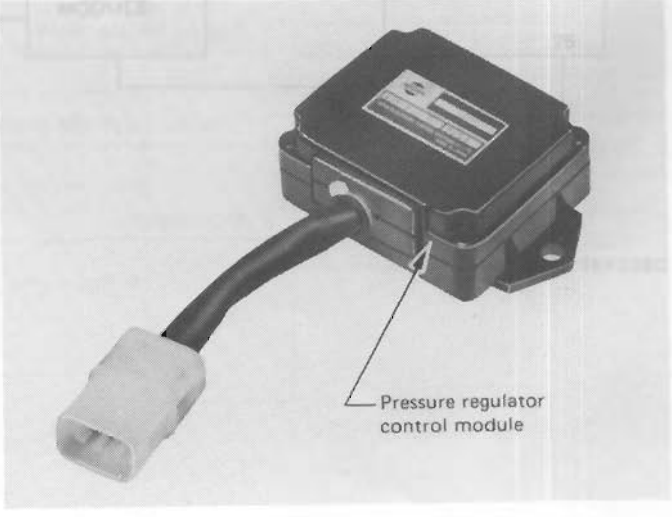




OPERATION

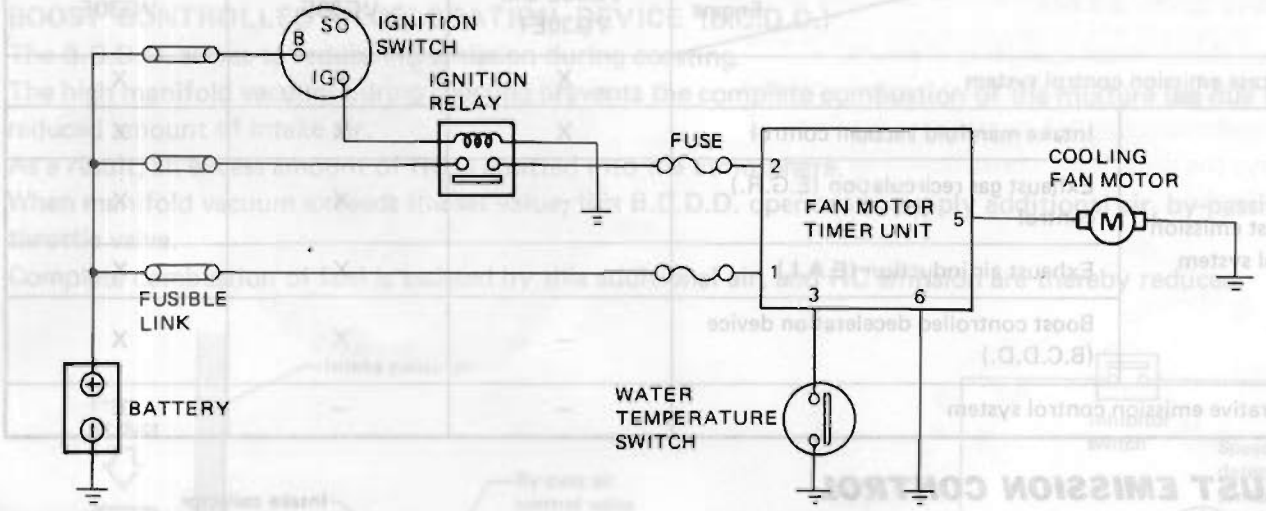
This system operates under the following conditions: During starting and for 3 minutes after starting when the water temperature is above 100°C (212°F).





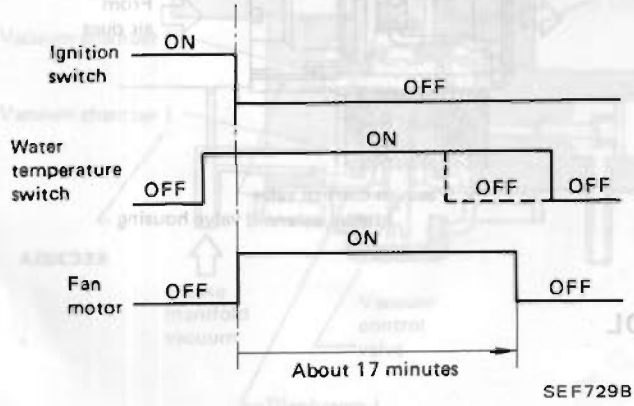
INJECTOR COOLING FAN

The injector cooling fan operates to cool down the temperature of the fuel in the injector and the fuel gallery when the engine is stopped under high cylinder head temperature condition.



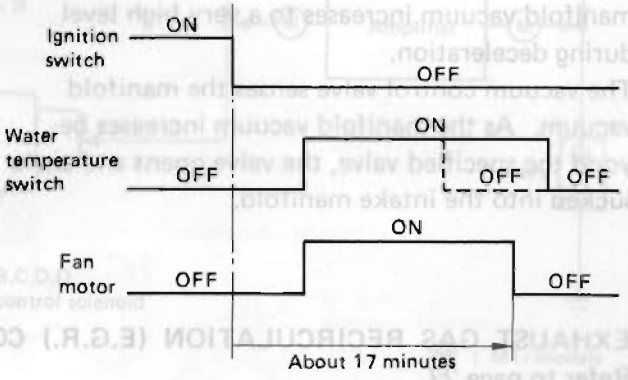
SEF728B

Operation 1:



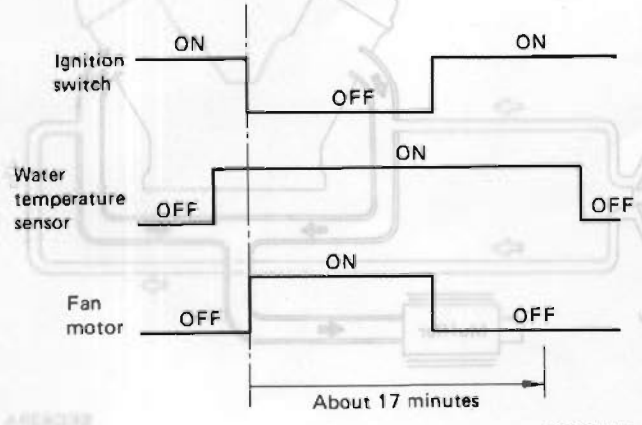
SEF729B

Operation 2:

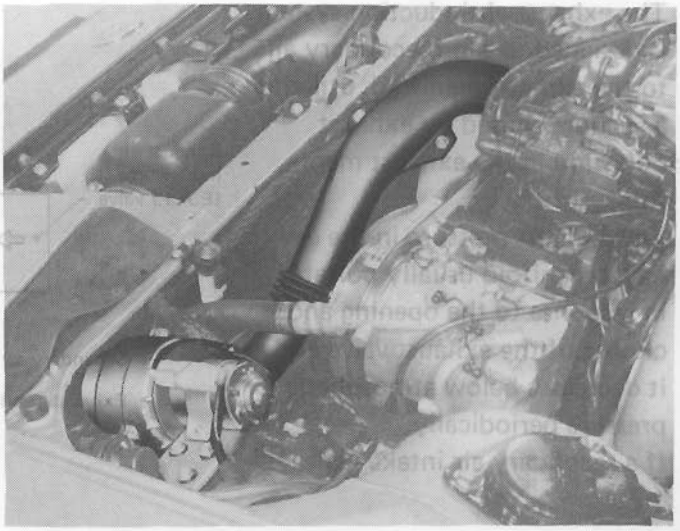


SEF730B

Operation 3:



SEF731B



EMISSION CONTROL SYSTEM

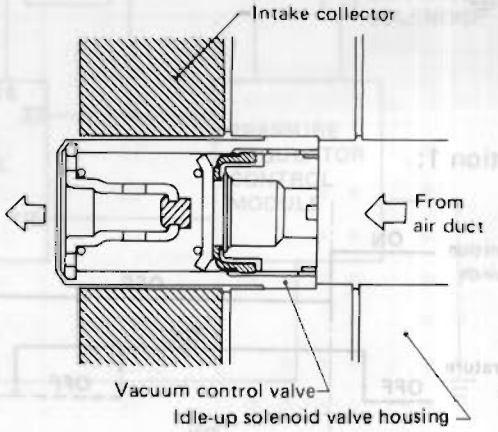
Destination / Engine		Europe and general areas	Sweden and Switzerland	Australia
		VG30E and VG30ET	VG30E	VG30E
Crankcase emission control system		X	X	X
Exhaust emission control system	Intake manifold vacuum control	X	X	X
	Exhaust gas recirculation (E.G.R.) control	–	X	X
	Exhaust air induction (E.A.I.)	–	X	X
	Boost controlled deceleration device (B.C.D.D.)	–	X	X
Evaporative emission control system		–	–	X

EXHAUST EMISSION CONTROL SYSTEM

INTAKE MANIFOLD VACUUM CONTROL

The vacuum control valve is provided to reduce the engine lubricating oil consumption when the intake manifold vacuum increases to a very high level during deceleration.

The vacuum control valve senses the manifold vacuum. As the manifold vacuum increases beyond the specified valve, the valve opens and air is sucked into the intake manifold.



SEC303A

EXHAUST GAS RECIRCULATION (E.G.R.) CONTROL

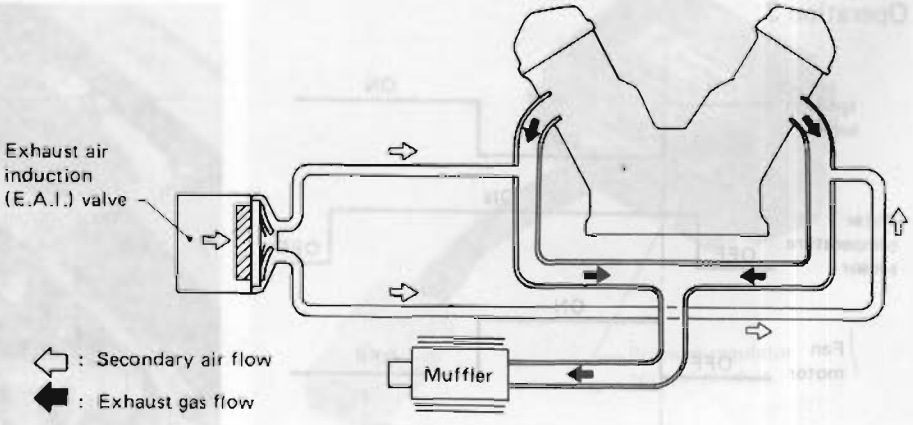
Refer to page 27.

EXHAUST AIR INDUCTION (E.A.I.)

The exhaust air induction system is designed to send secondary air to the exhaust manifold, utilizing a vacuum caused by exhaust pulsation in the exhaust manifold.

The exhaust pressure in the exhaust manifold usually pulsates in response to the opening and closing of the exhaust valve and it decreases below atmospheric pressure periodically.

If a secondary air intake gallery

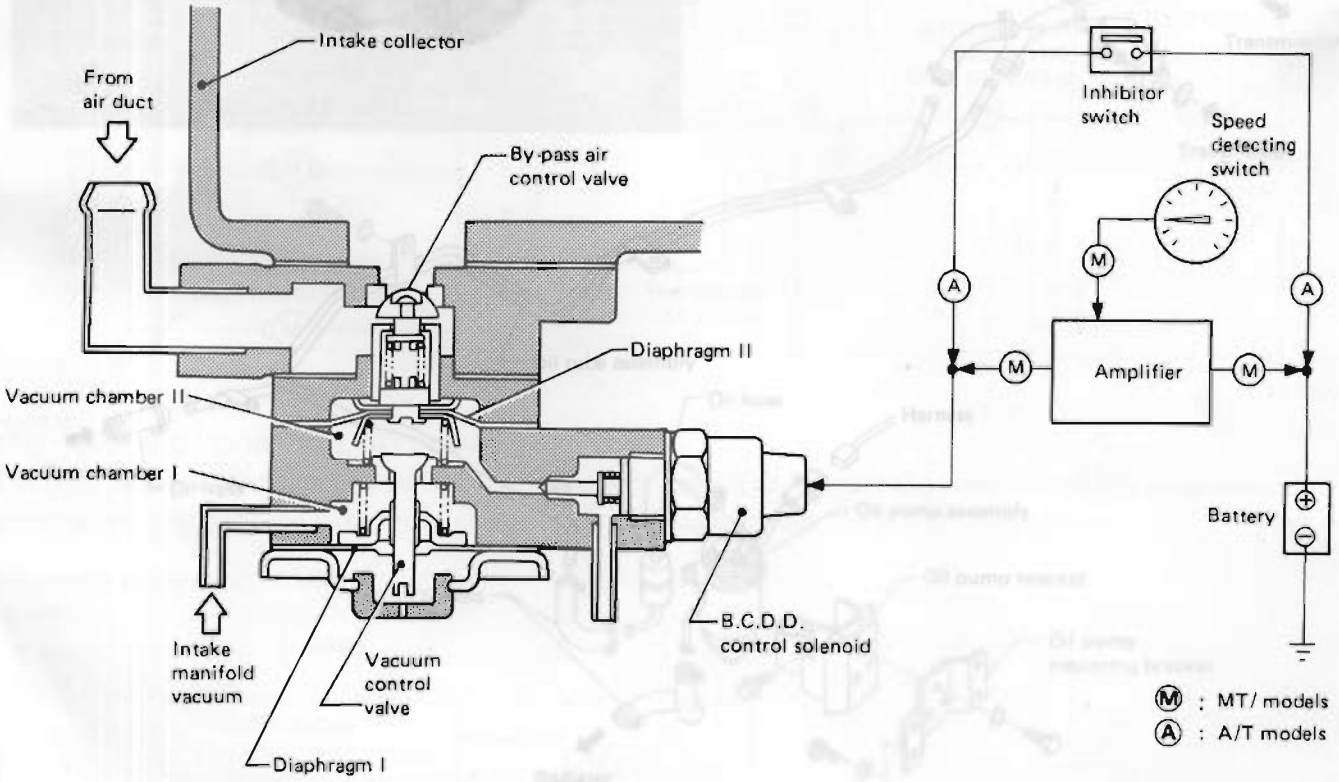


SEC439A

is opened to the atmosphere under vecuum conditions, secondary air can be drawn into the exhaust manifold in proportion to the vacuum.
Therefore, the exhaust air induction system reduces CO and HC emissions in exhaust gases. The system consists of an air induction valve, a filter, hose and E.A.I. gallery.

BOOST CONTROLLED DECELERATION DEVICE (B.C.D.D.)

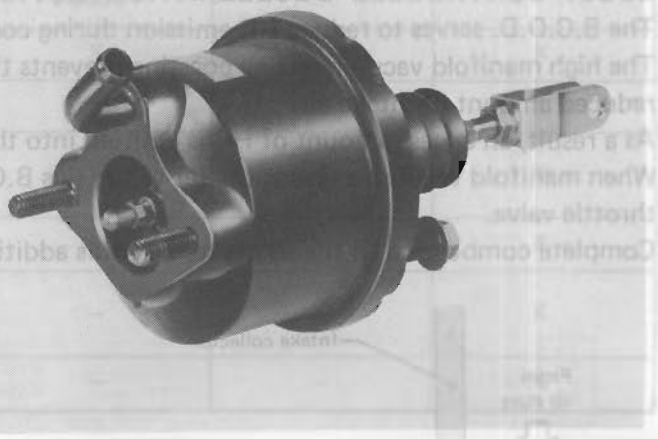
The B.C.D.D. serves to reduce HC emission during coasting.
The high manifold vacuum during coasting prevents the complete combustion of the mixture gas due to the reduced amount of intake air.
As a result, an excess amount of HC is emitted into the atmosphere.
When manifold vacuum exceeds the set value, this B.C.D.D. operates to supply additional air, by-passing the throttle valve.
Complete combustion of fuel is assisted by this additional air, and HC emission are thereby reduced.



CLUTCH

CLUTCH BOOSTER

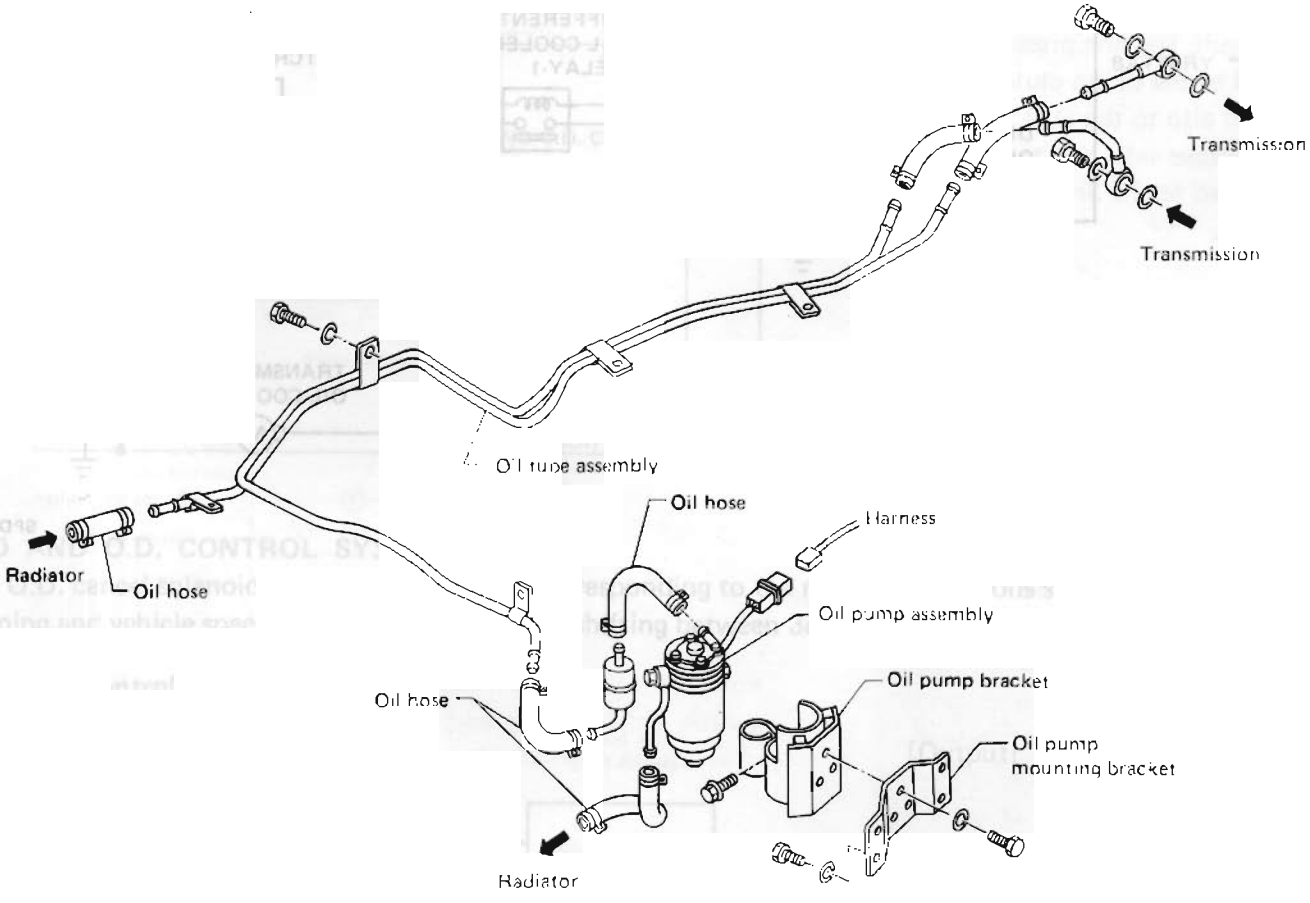
To reduce clutch pedal operating pressure, a vacuum booster (clutch booster) has been added to the conventional clutch control mechanism. It employs the same basic construction as that used with the brake.



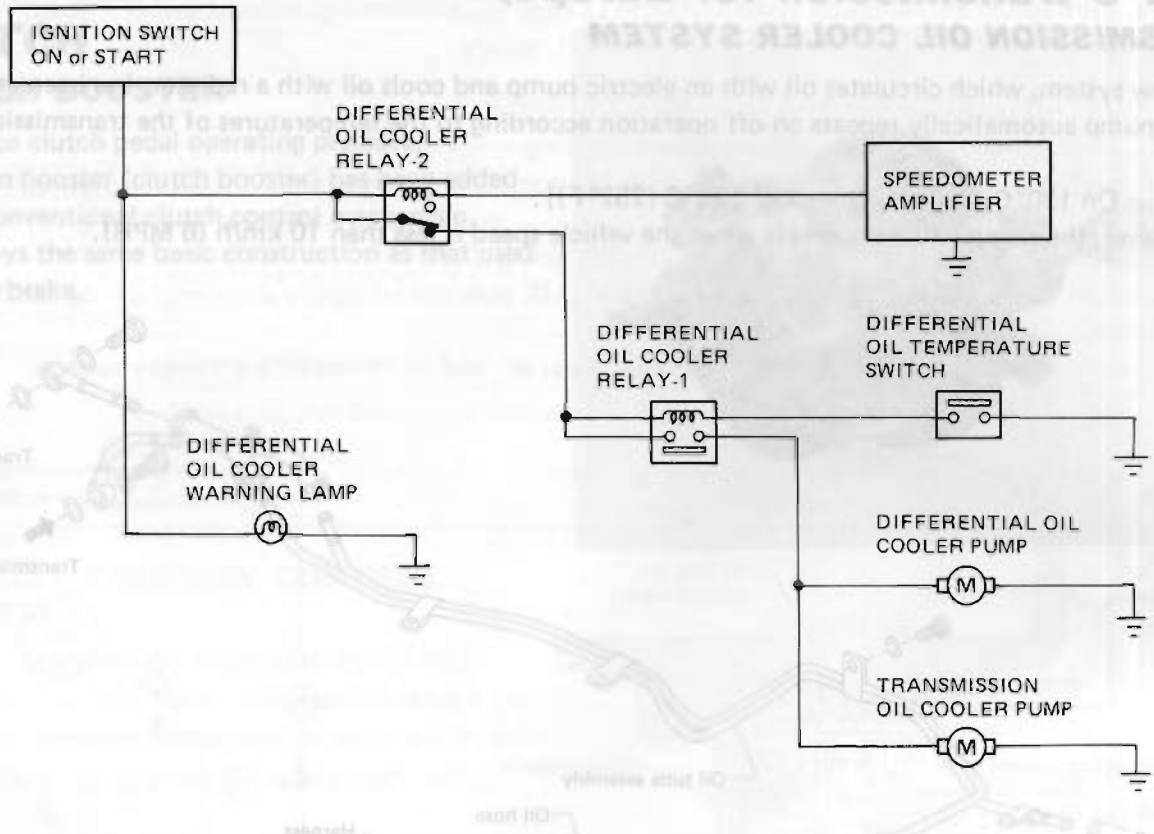
TRANSMISSION OIL COOLER (BWT-5 transmission for Europe)

TRANSMISSION OIL COOLER SYSTEM

- A new system, which circulates oil with an electric pump and cools oil with a radiator, has been adopted.
- The pump automatically repeats on off operation according to the temperatures of the transmission gear oil.
  [Off → On 130°C (266°F), On → Off 125°C (257°F)].
  However, the pump will not operate when the vehicle speed is less than 10 km/h (6 MPH).



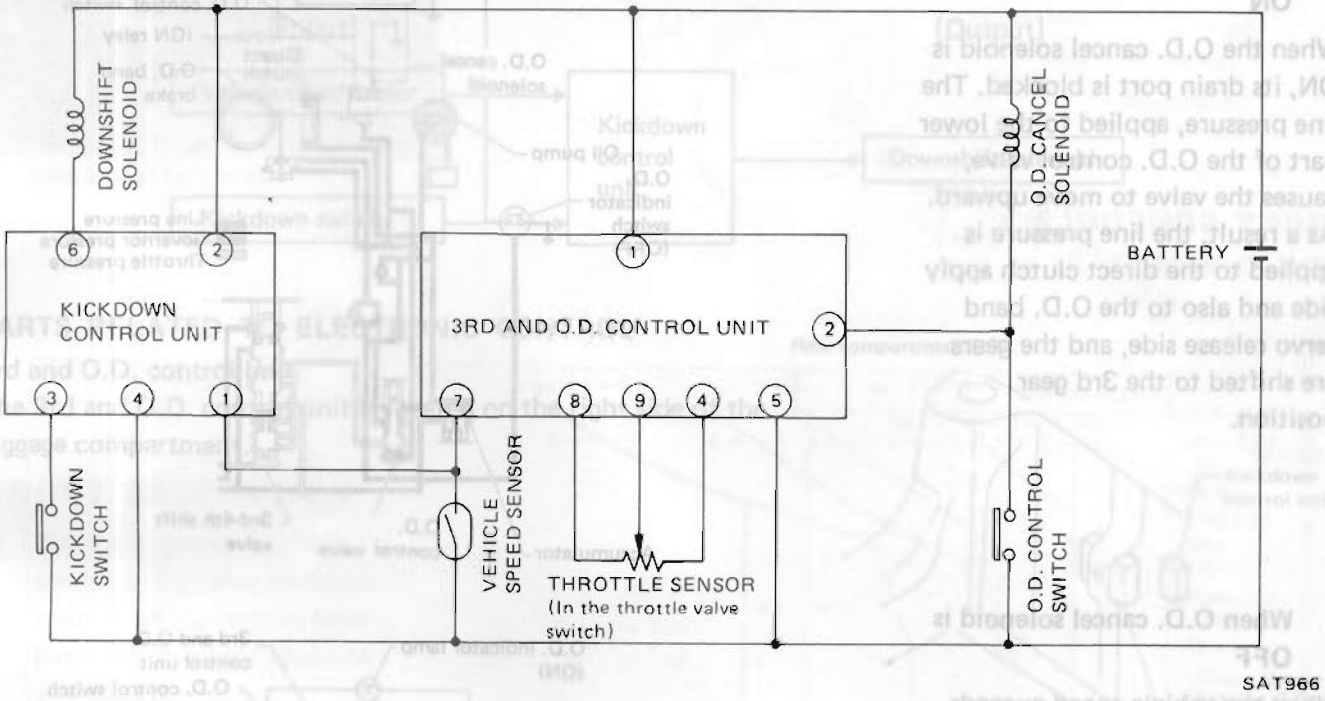
SYSTEM SCHEMATIC



AUTOMATIC TRANSMISSION

The L4N71B-type automatic transmission which is installed in the Y30 and R30 models has been adopted. An electronic control system has been adopted for Europe models.

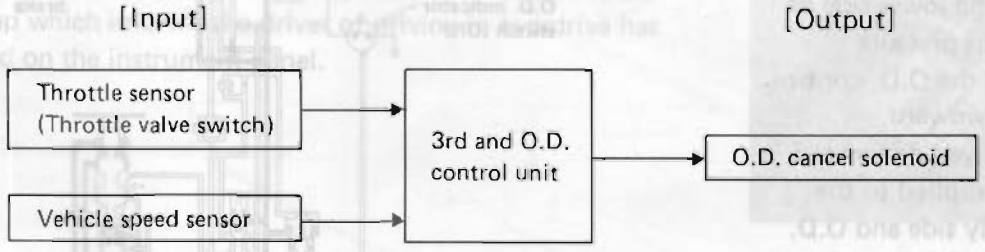
ELECTRONIC CONTROL SYSTEM (For Europe)



3RD AND O.D. CONTROL SYSTEM

The O.D. cancel solenoid is turned ON or OFF corresponding to the running conditions such as accelerator opening and vehicle speed in order to control gear shifting between 3rd and O.D. positions.

Electronic control

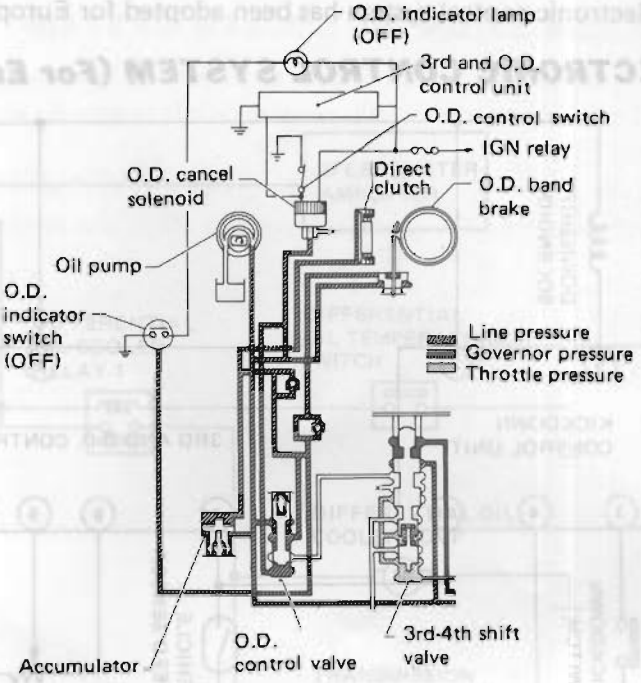


The O.D. cancel solenoid is turned ON and OFF corresponding to the accelerator opening and vehicle speed programmed in the lock-up control unit.

Hydraulic control

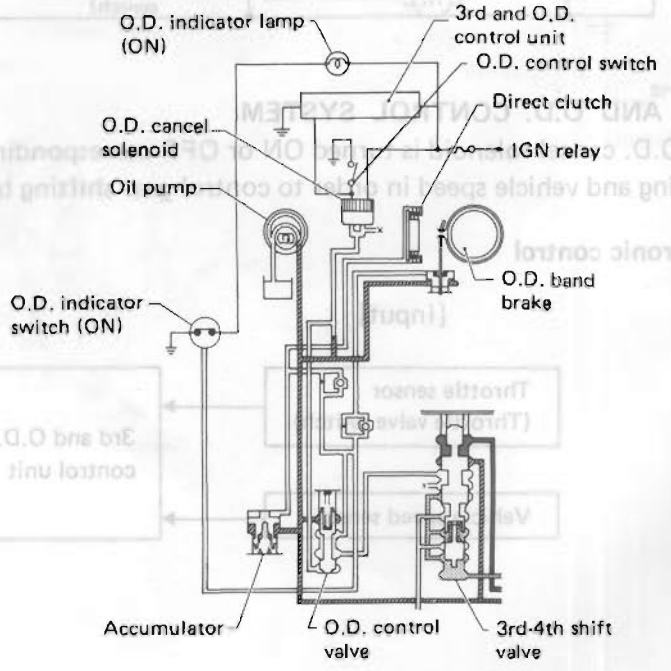
- **When O.D. cancel solenoid is ON**

When the O.D. cancel solenoid is ON, its drain port is blocked. The line pressure, applied to the lower part of the O.D. control valve, causes the valve to move upward. As a result, the line pressure is applied to the direct clutch apply side and also to the O.D. band servo release side, and the gears are shifted to the 3rd gear position.



- **When O.D. cancel solenoid is OFF**

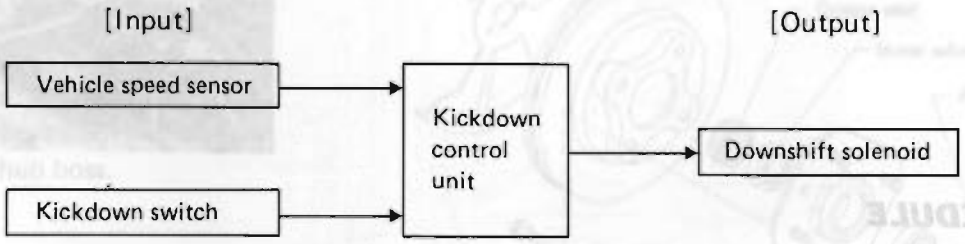
When the vehicle speed exceeds the programmed level, the governor pressure applied to the upper side of the 3rd-4th shift valve becomes larger than the sum of the throttle pressure and spring force applied to the lower side of that valve, and this pressure imbalance causes the O.D. control valve to move downward.
As the valve is moved downward, the line pressure applied to the direct clutch apply side and O.D. band servo release side is released, while the line pressure is applied to the O.D. band servo apply side. Thus the gears are set in the O.D. position.



KICKDOWN CONTROL SYSTEM

This system inactivates the kickdown function while driving in O.D. gear at speeds over 150 km/h (93 MPH), thereby preventing the engine from overrevving.

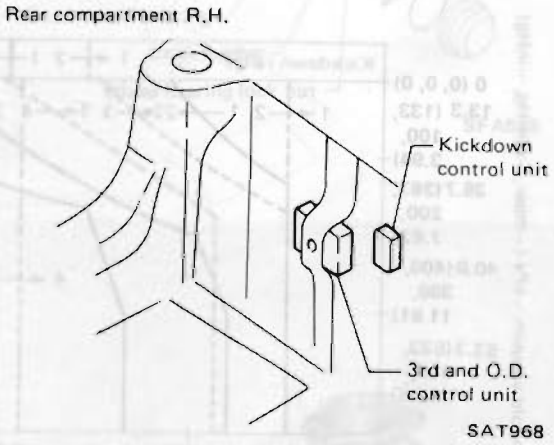
Electronic control



PARTS RELATED TO ELECTRONIC CONTROL

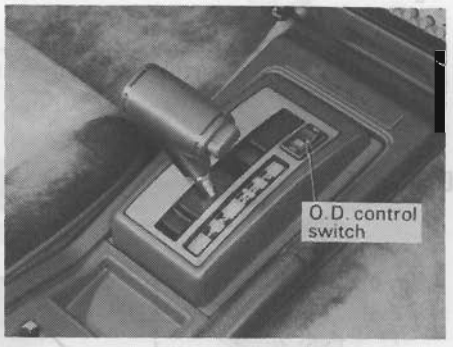
3rd and O.D. control unit

The 3rd and O.D. control unit is located on the right side of the luggage compartment.



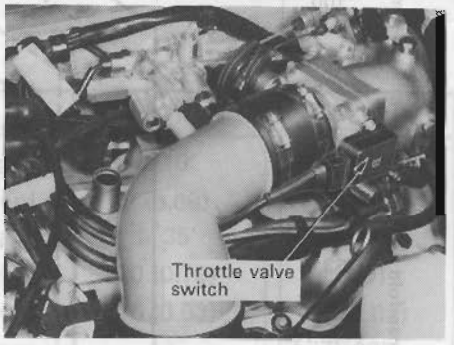
O.D. control switch and O.D. indicator lamp

An O.D. control switch has been provided inside the console box, thereby making it possible to cancel or operate overdrive. Also an indicator lamp which informs the driver of driving in overdrive has been provided on the instrument panel.



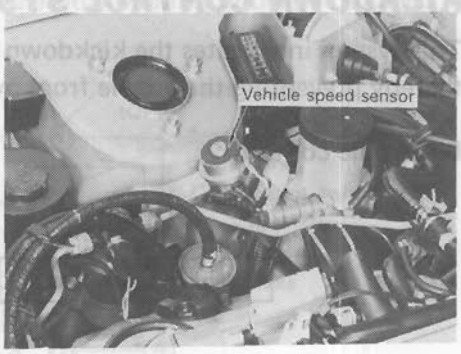
Throttle valve switch

The idle contact switch and potentiometer type throttle sensor are adopted to detect the opening of the accelerator.



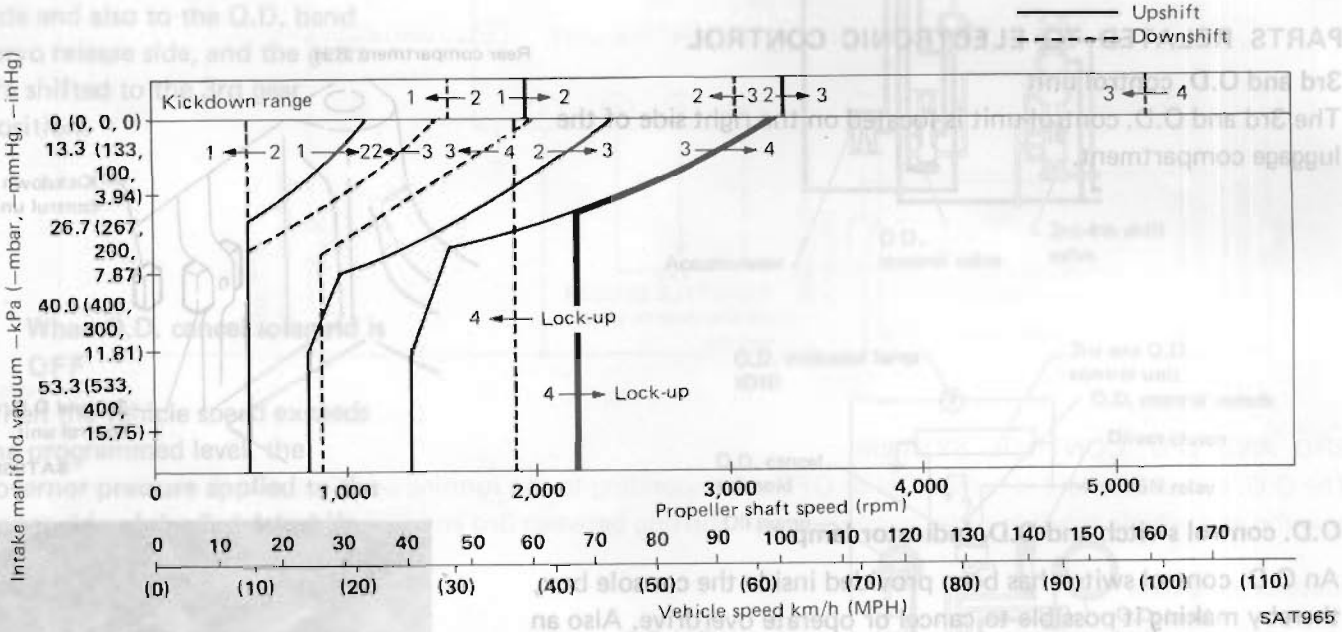
Vehicle speed sensor

Signals are sent from the vehicle speed sensor to sense the vehicle speed.



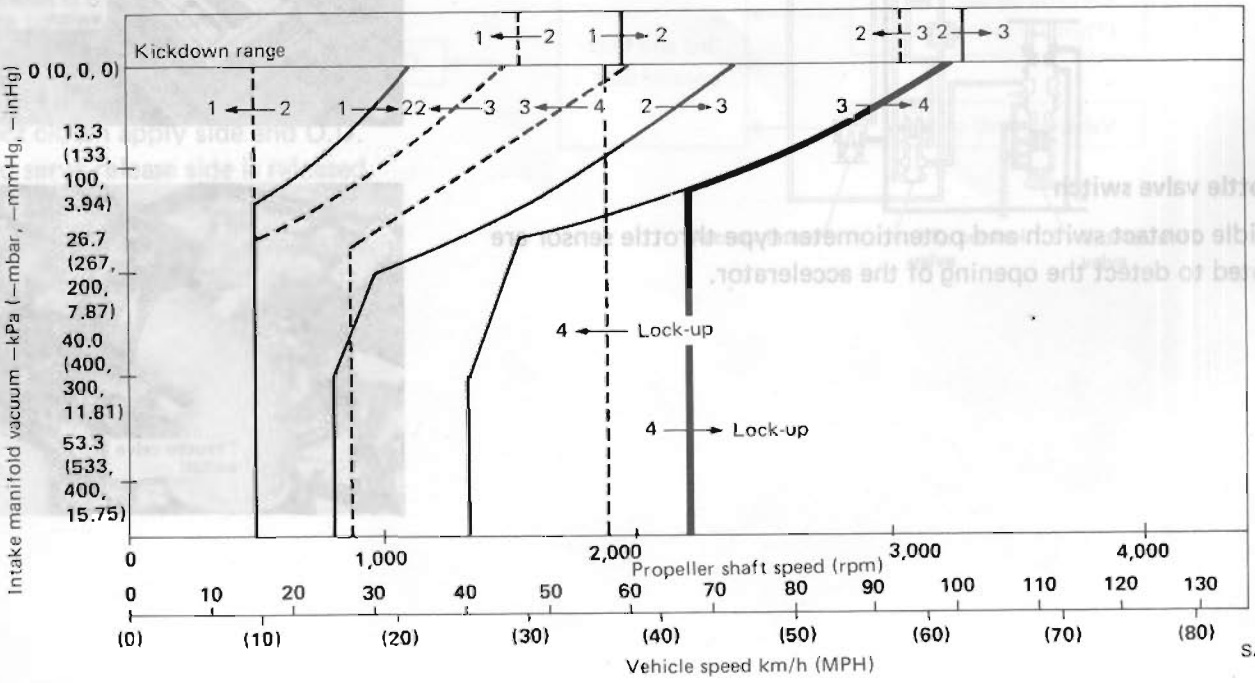
SHIFT SCHEDULE

FOR EUROPE



SAT965

EXCEPT EUROPE

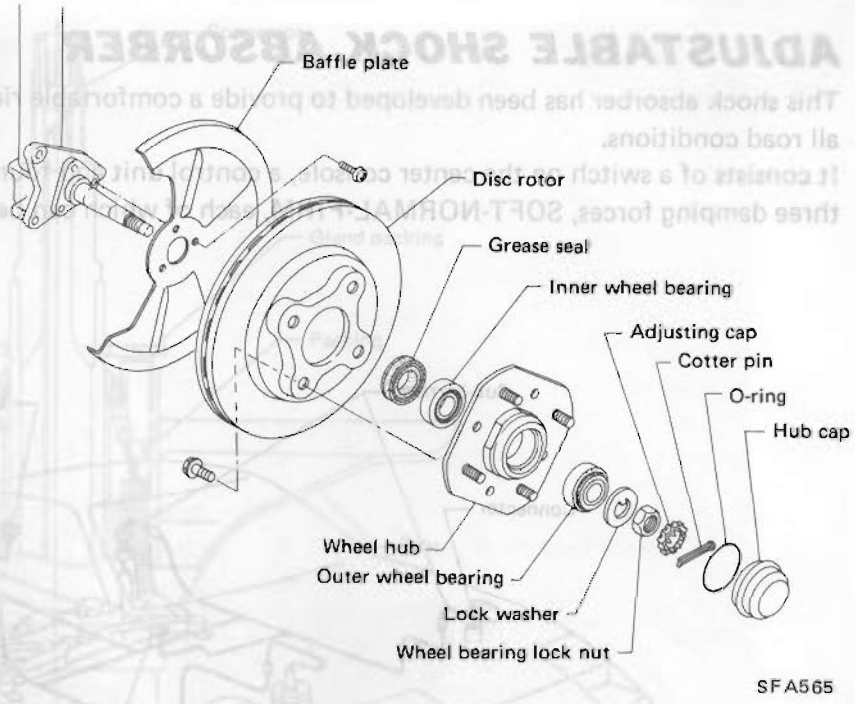


SAT971

FRONT AXLE AND FRONT SUSPENSION

FRONT AXLE

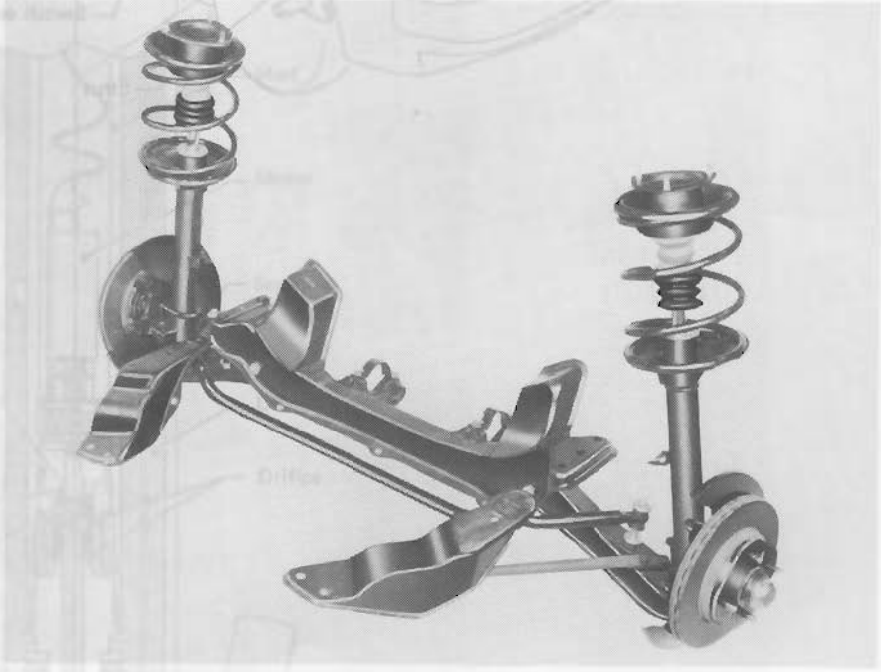
- The front axle is basically the same as the S130 model.
- The wheel hub has been improved so that the road wheel can be installed using the wheel hub boss.



SFA565

FRONT SUSPENSION

- Driving alignment at high speeds and driving performance in taking corners have been improved by adopting an offset caster.
- The nose dive when braking has been reduced by adopting a higher caster.
- Braking stability and anti-shimmy performance have been improved by adopting a smaller scrub radius.
- The offset coil spring provides a comfortable ride.
- Precision in taking corners has been improved by adopting a wider tread.

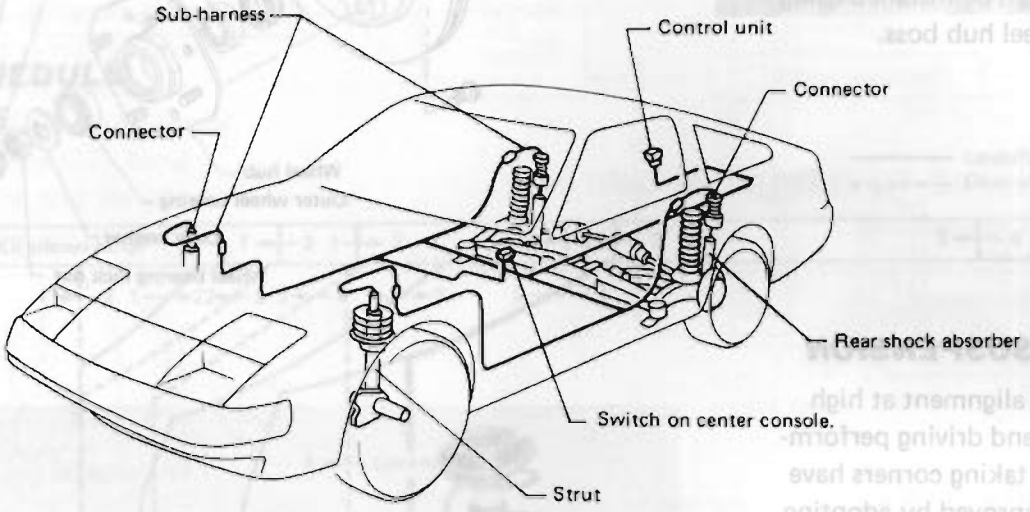


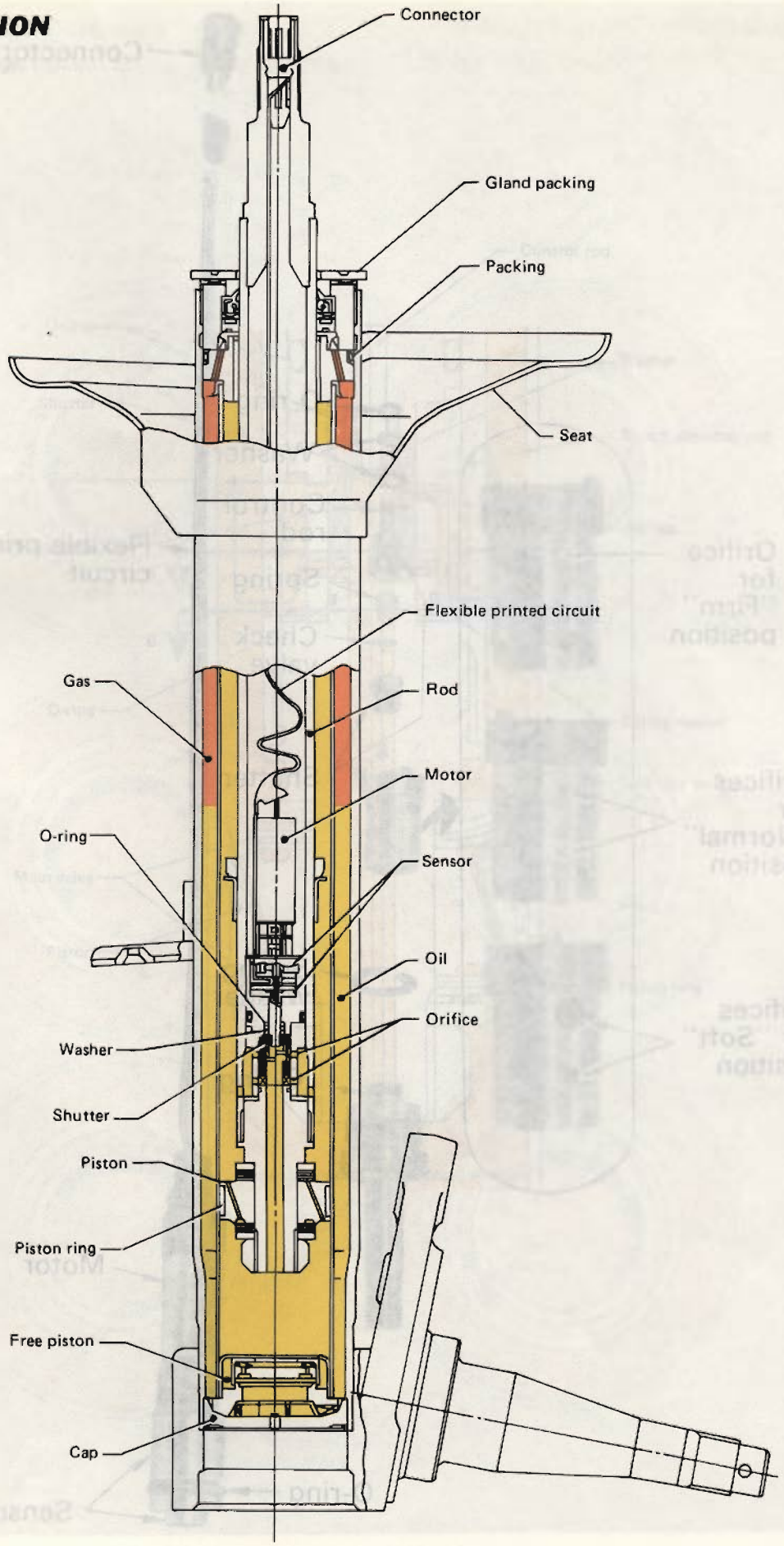
		Z31	S130
Camber	degree	0°10′	0°10′
Toe-in	mm (in)	2 (0.08)	2 (0.08)
Caster	degree	6°35′	4°55′
Caster offset	mm (in)	20 (0.79)	0 (0)
Trail	mm (in)	16 (0.63)	26 (1.02)
Kingpin inclination	degree	13°	9°20′
Scrub radius	mm (in)	15 (0.59)	54.5 (2.146)

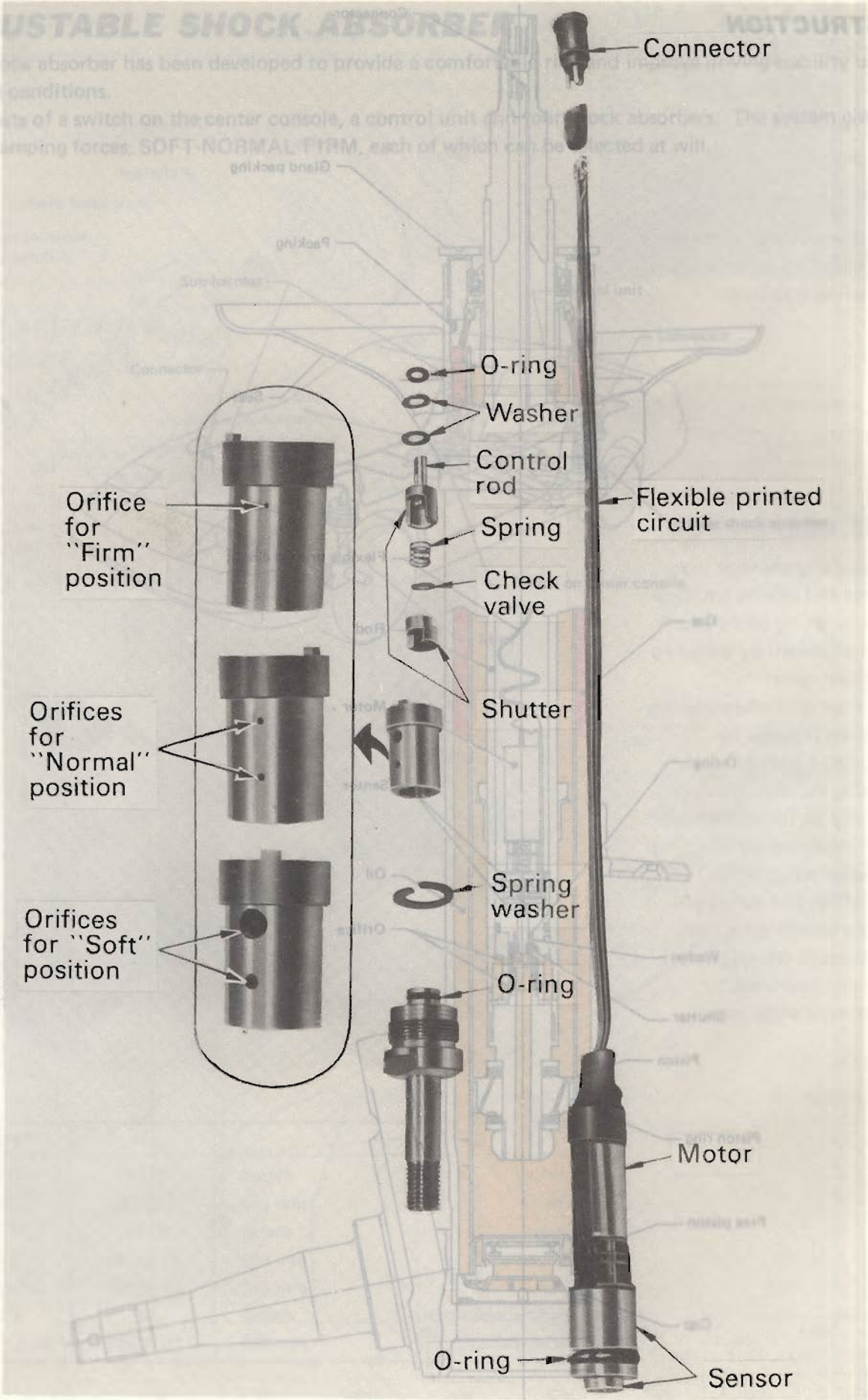
ADJUSTABLE SHOCK ABSORBER

This shock absorber has been developed to provide a comfortable ride and improve driving stability under all road conditions.

It consists of a switch on the center console, a control unit and four shock absorbers. The system gives you three damping forces, SOFT-NORMAL-FIRM, each of which can be selected at will.

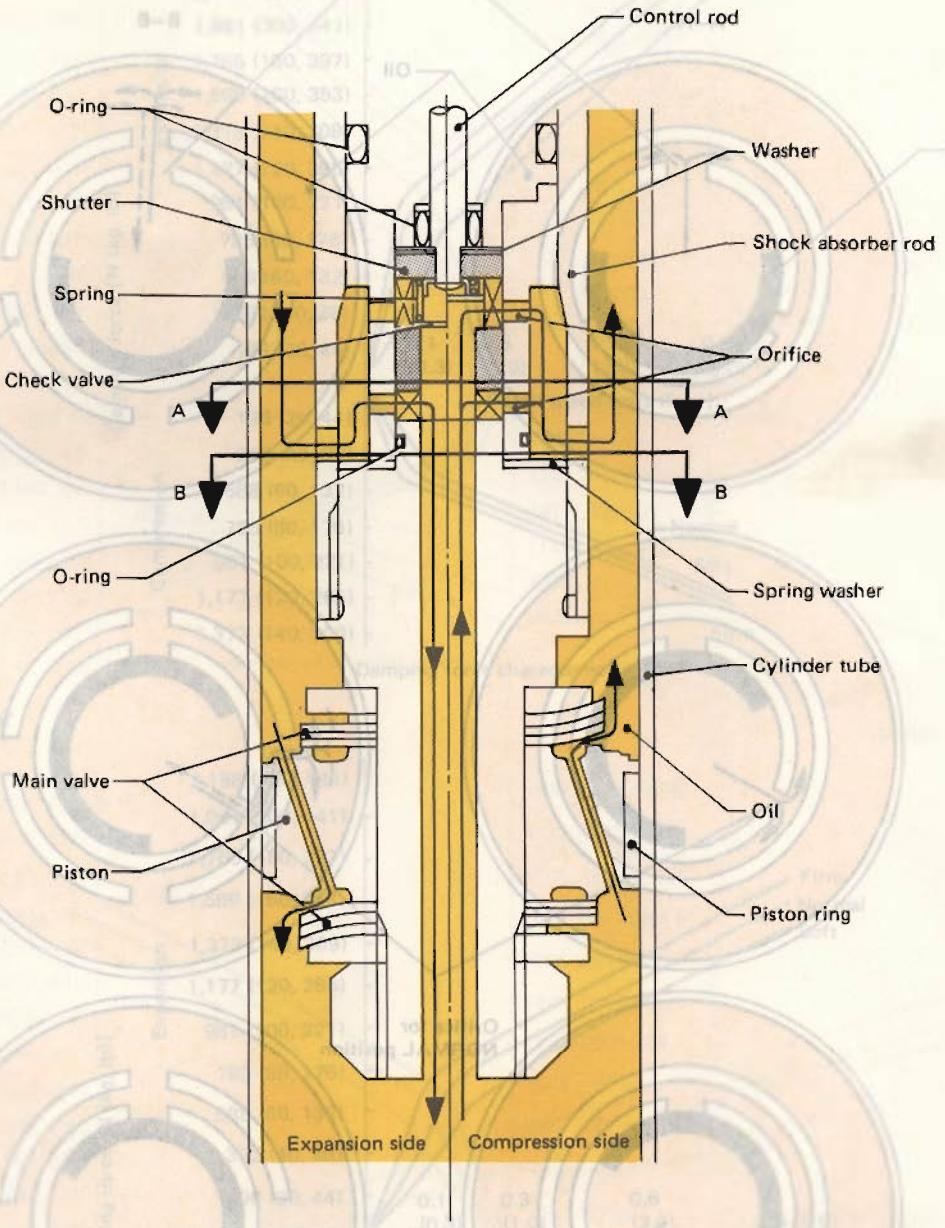



Connector
Gland packing
Packing
Seat
Flexible printed circuit
Gas
Rod
Motor
O-ring
Sensor
Oil
Orifice
Washer
Shutter
Piston
Piston ring
Free piston
Cap


Connector
O-ring
Washer
Control rod
Flexible printed circuit
Spring
Check valve
Orifice for "Firm" position
Shutter
Orifices for "Normal" position
Spring washer
Orifices for "Soft" position
O-ring
Motor
O-ring
Sensor

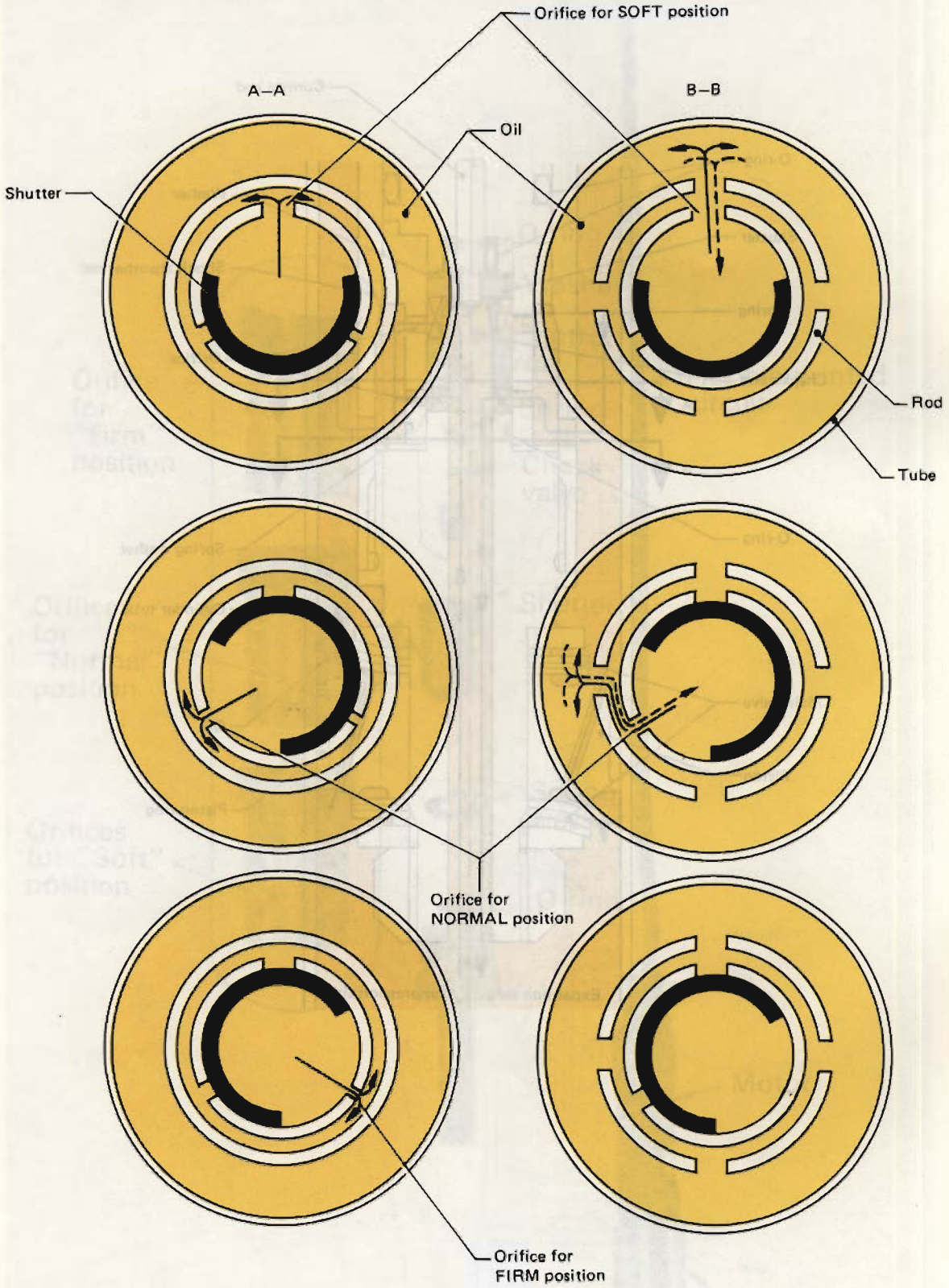
OPERATION

(1) Oil flow image



(2) Relationship between Shutter and Orifice

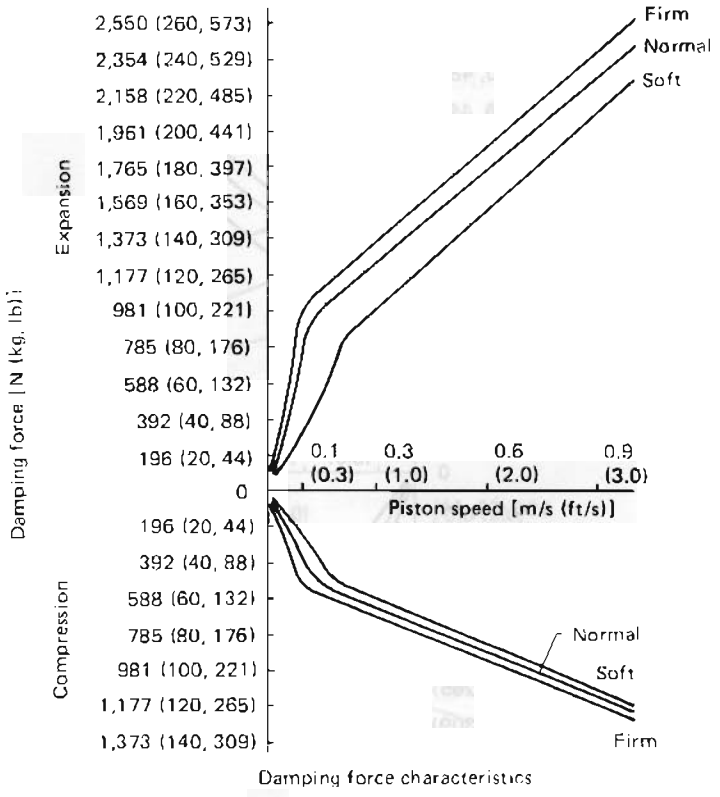
——— Compression – – – – Expansion



DAMPING FORCE CHART

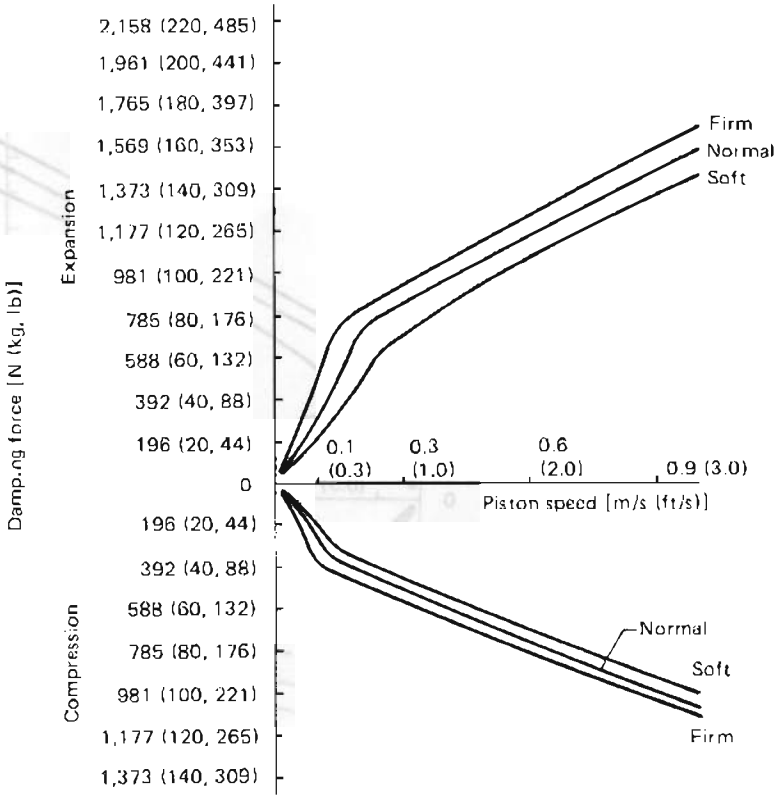
TURBO MODEL WITH 4-WHEEL SKID CONTROL SYSTEM FOR EUROPE

Front strut



Damping force characteristics

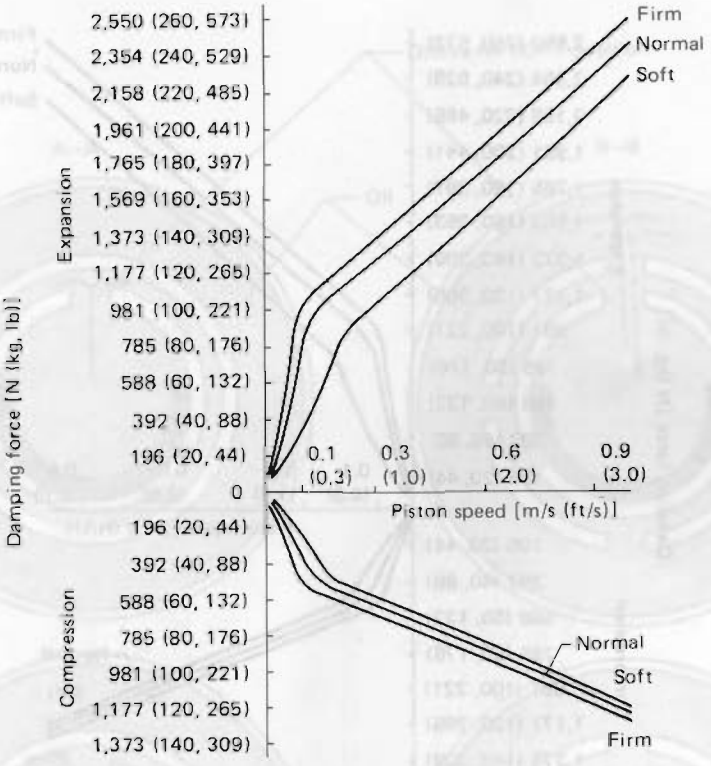
Rear shock absorber



Damping force characteristics

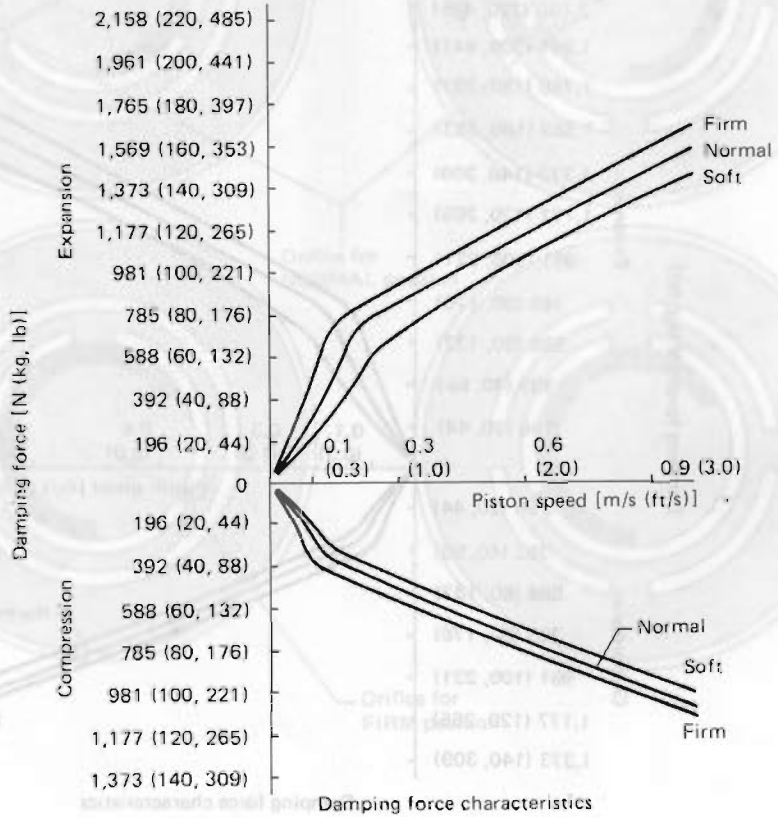
TURBO MODEL WITHOUT 4-WHEEL SKID CONTROL SYSTEM FOR EUROPE

Front strut



Damping force characteristics

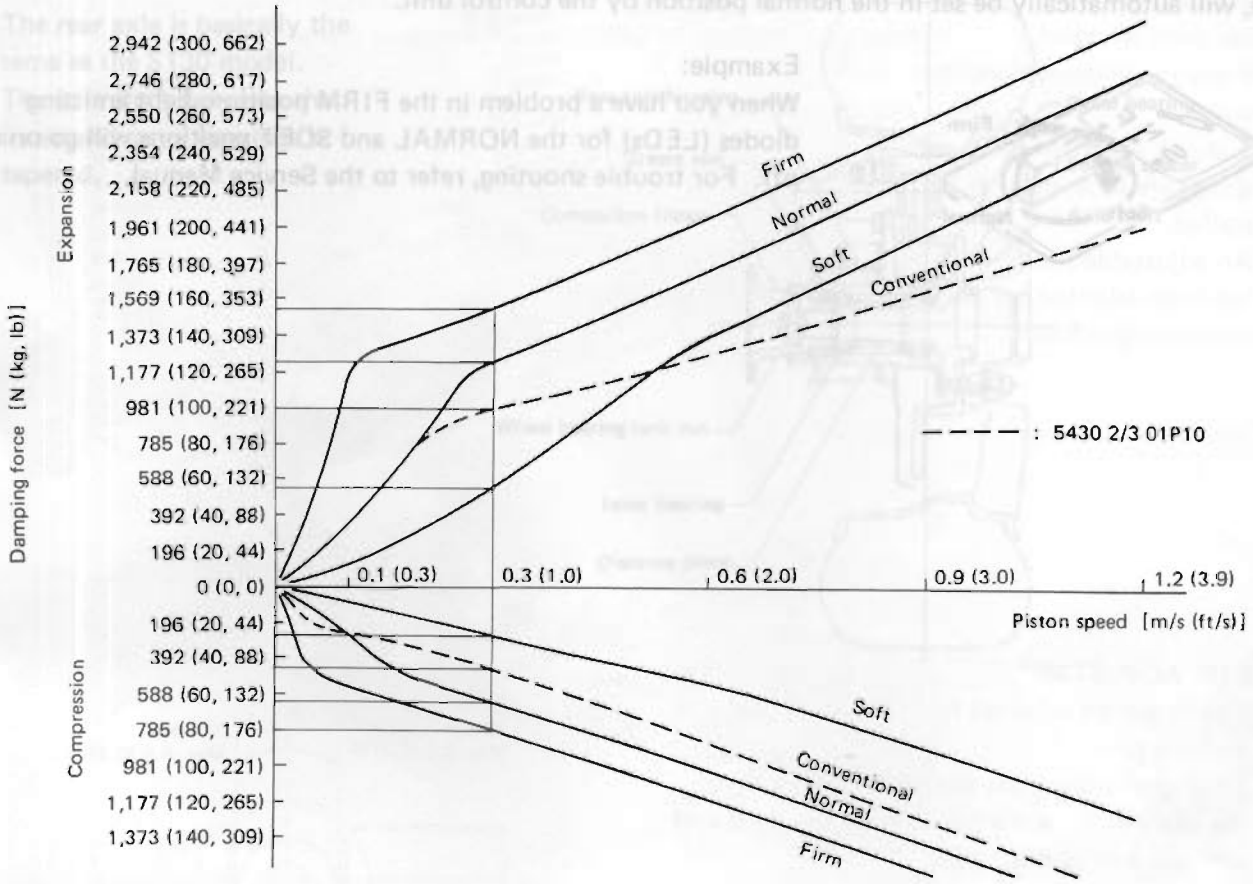
Rear shock absorber



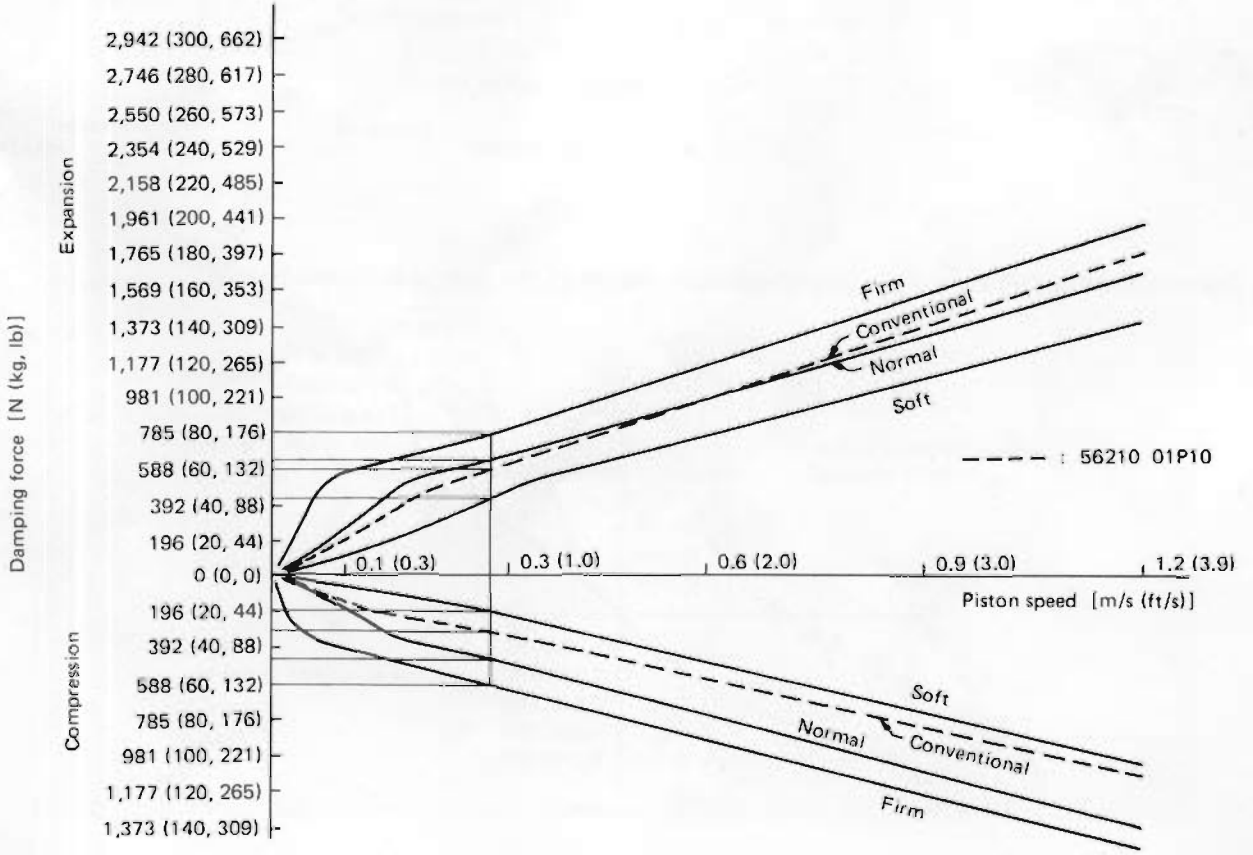
Damping force characteristics

NON-TURBO MODEL FOR EUROPE AND TURBO MODEL EXCEPT FOR EUROPE

Front strut

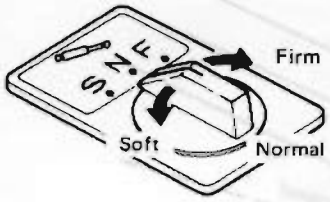


Rear shock absorber



IF ANYTHING SHOULD GO WRONG WITH THIS SHOCK ABSORBER SYSTEM:

The indicator on the switch goes on and off as shown below and the shock absorbers, except the damaged one, will automatically be set in the normal position by the control unit.

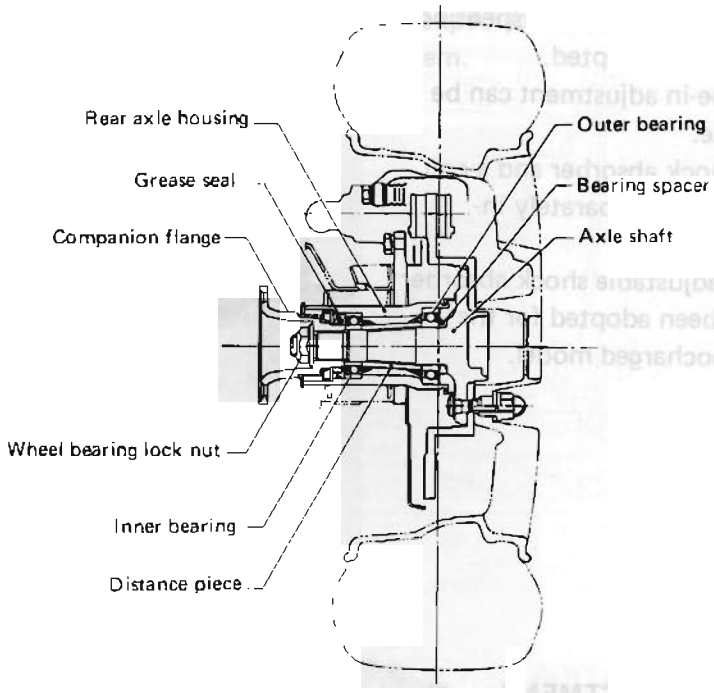


Example:
When you have a problem in the FIRM position, light emitting diodes (LEDs) for the NORMAL and SOFT positions will go on and off. For trouble shooting, refer to the Service Manual.

REAR AXLE AND REAR SUSPENSION

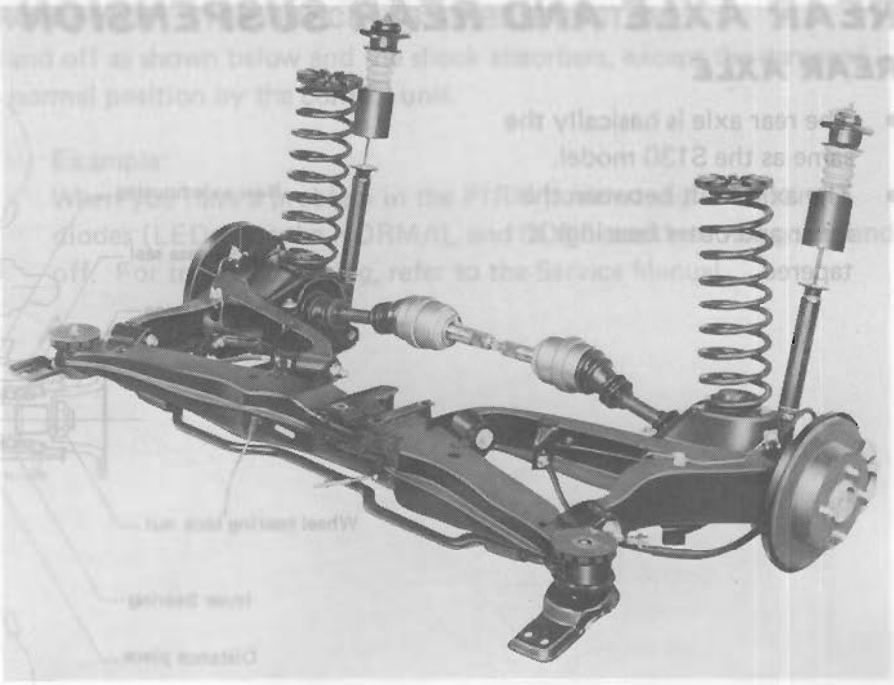
REAR AXLE

- The rear axle is basically the same as the S130 model.
- The axle shaft between the inner and outer bearings is tapered.



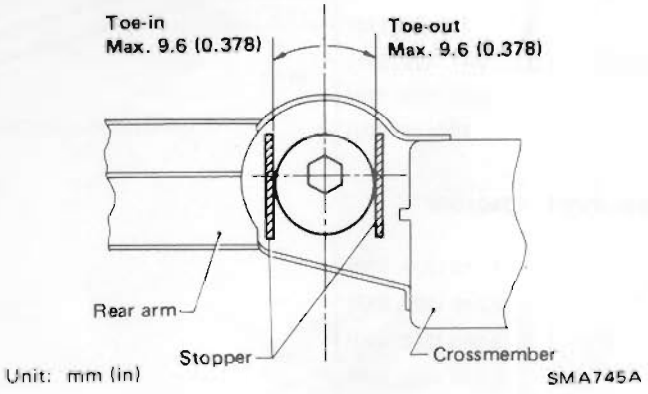
REAR SUSPENSION

- A semi-trailing-type independent rear suspension has been adopted.
- A toe-in adjustment can be made.
- A shock absorber and a coil spring are separately installed.
- An adjustable shock absorber has been adopted for the turbocharged model.

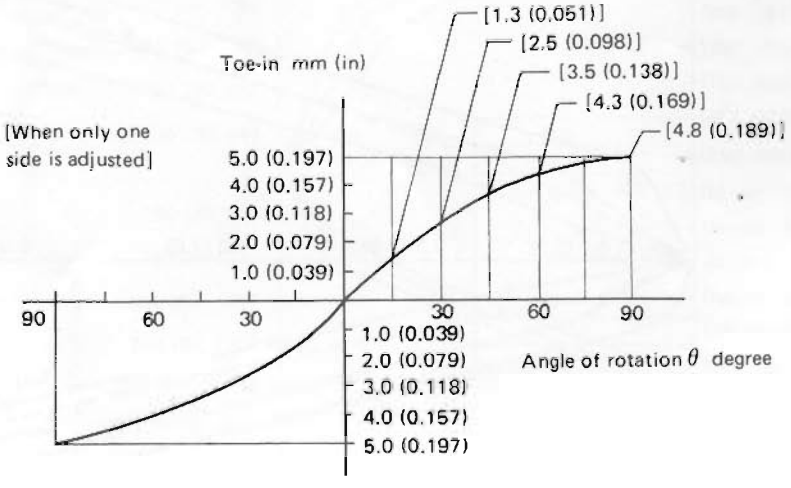


TOE-IN ADJUSTMENT:

- Toe-in can be adjusted from inside of rear arm bushing pins.
- When performing toe adjustment, always set the cams in the same position on the right and left rear arm bushing pins.



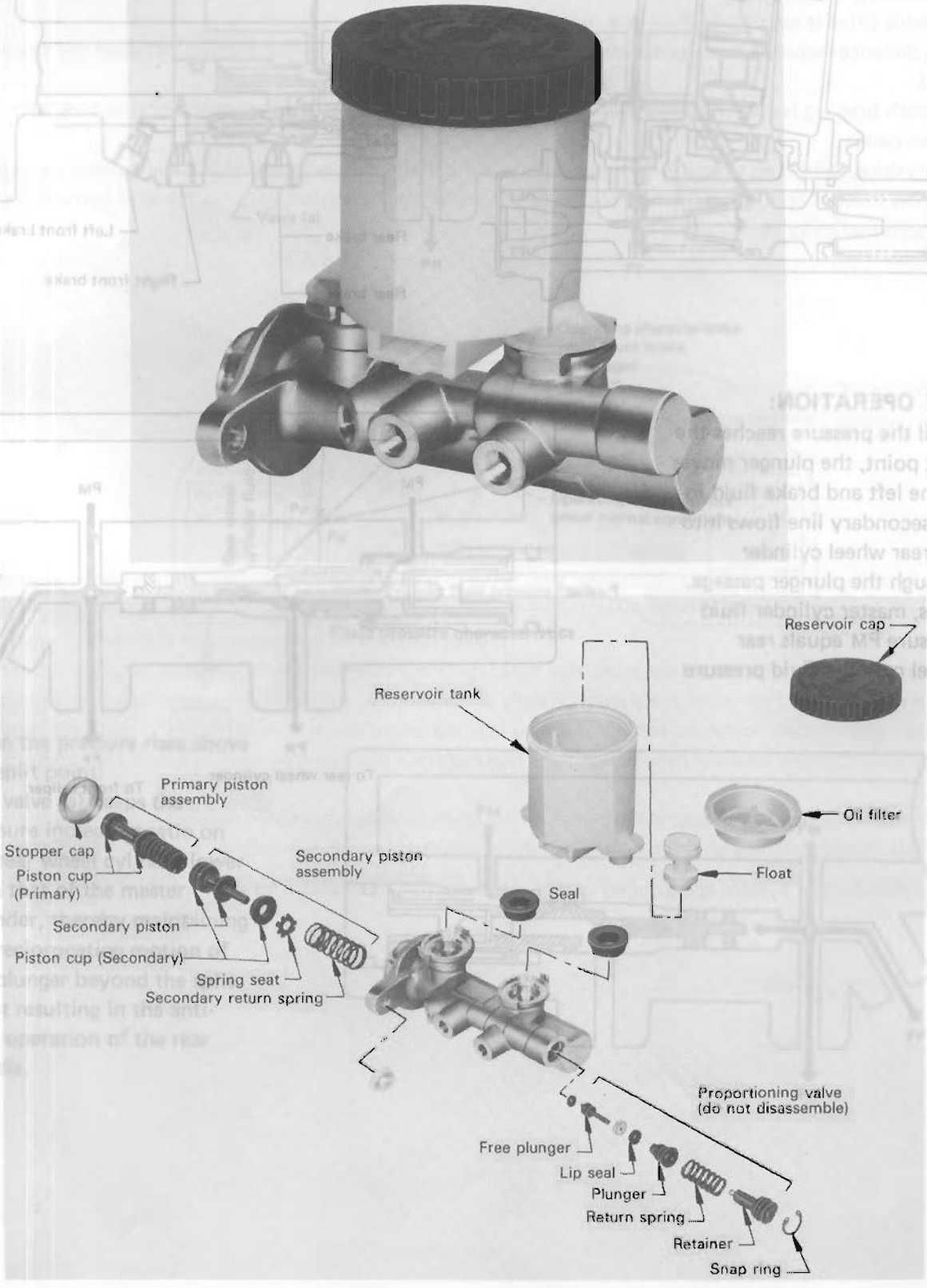
- The relationship between a toe-in and rotation degree of the cam is as shown below.

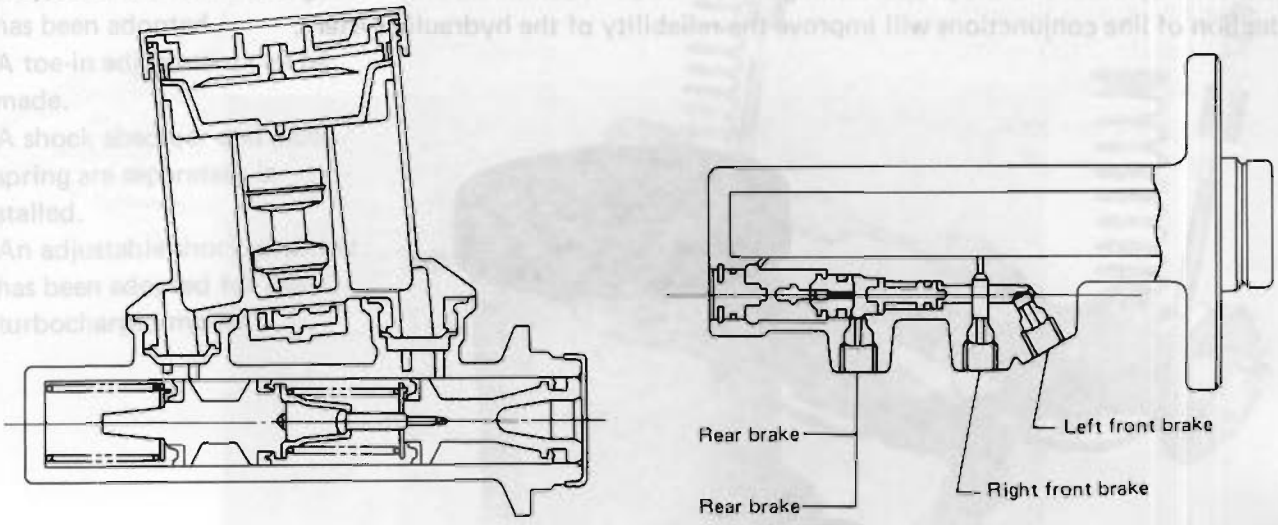


BRAKE SYSTEM

PROPORTIONING VALVE MASTER CYLINDER

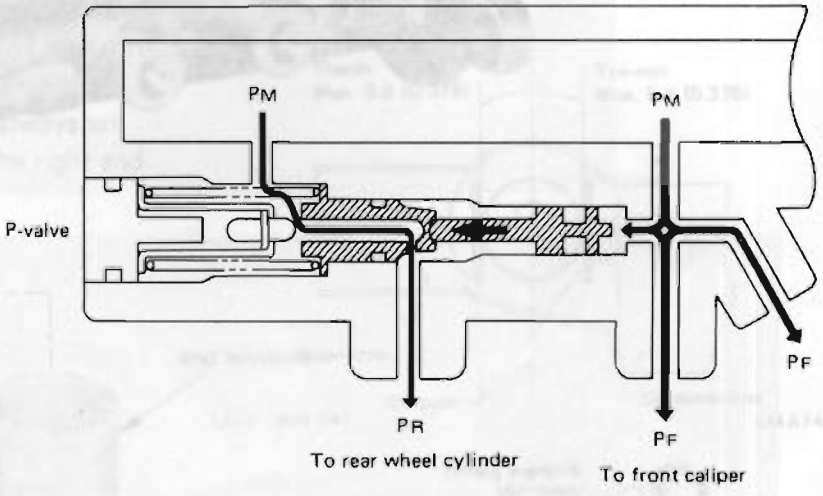
The master cylinder and the proportioning valve have been combined and it is expected that the subsequent reduction of line conjunctions will improve the reliability of the hydraulic system.



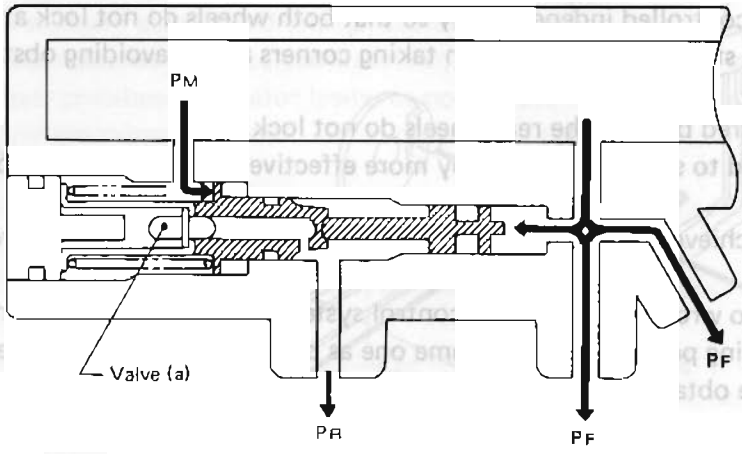


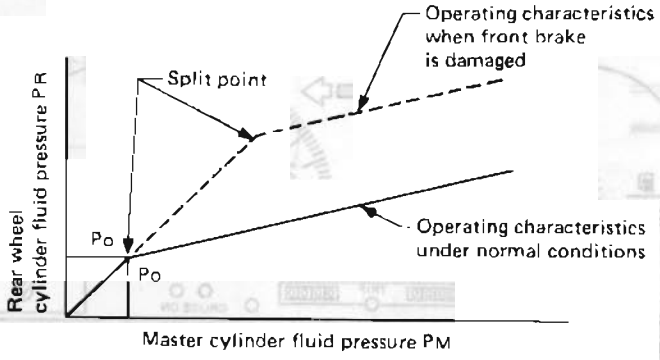
VALVE OPERATION:

(1) Until the pressure reaches the split point, the plunger moves to the left and brake fluid in the secondary line flows into the rear wheel cylinder through the plunger passage. Thus, master cylinder fluid pressure PM equals rear wheel cylinder fluid pressure PR.



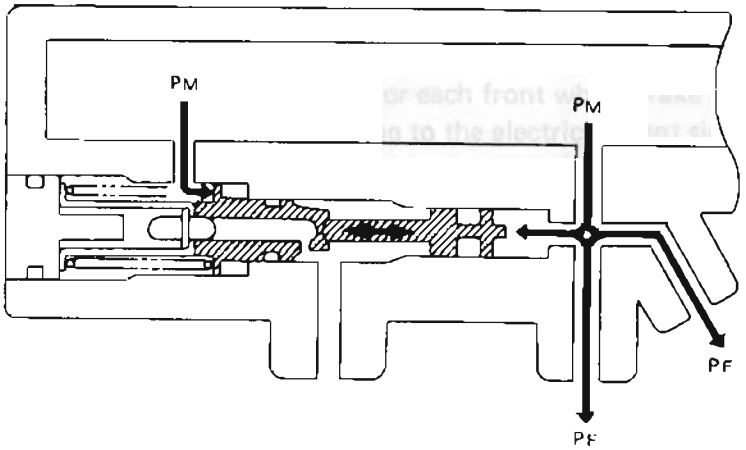
(2) When the pressure reaches the split point:
The valve (a) closes and fluid flowing from the master cylinder to the rear wheel cylinder is shut off. At this time, the fluid pressure in both front-brake and rear-brake wheel cylinders is equal to Po.





Fluid pressure characteristics

(3) When the pressure rises above the split point:
The valve (a) keeps the pressure increasing ratio on the rear wheel cylinder lower than that of the master cylinder, thereby maintaining the reciprocating motion of the plunger beyond the split point resulting in the anti-lock operation of the rear wheels.

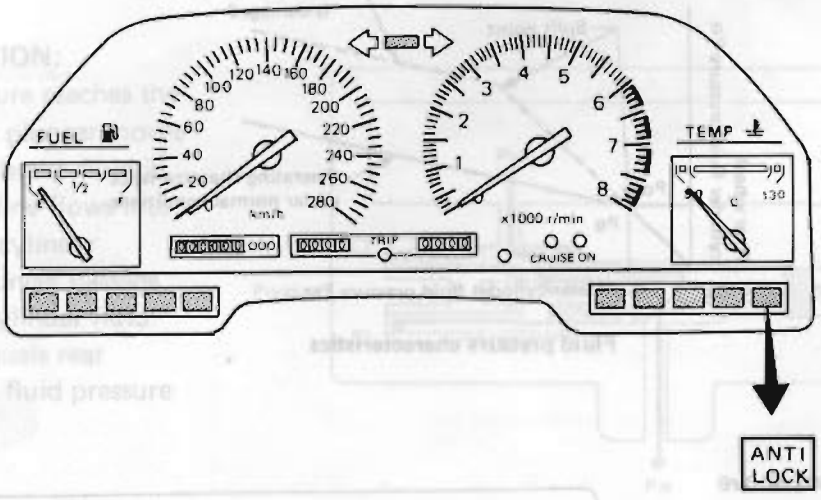


4-WHEEL SKID CONTROL SYSTEM

This system prevents all wheels from locking together by electronic control of the brake system.

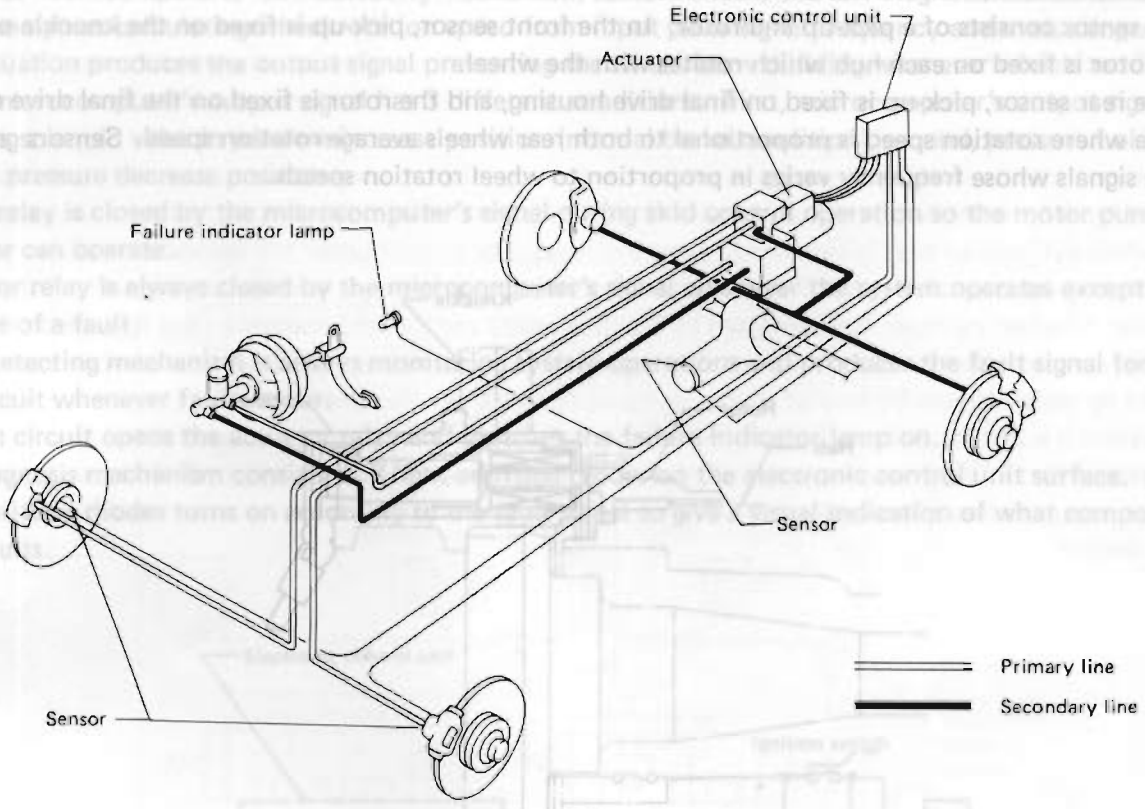
CHARACTERISTICS

- Each front wheel is controlled independently so that both wheels do not lock at the same time. Thus, you obtain the same steering performance in taking corners and in avoiding obstacles as you do without the braking system.
- A stable drive is assured because the rear wheels do not lock.
- The distance required to stop is shortened by more effective use of the friction between the tire and road.
- Smooth braking is achieved by the presence of a mechanism in the actuator preventing kick back to the brake pedal.
- If anything should go wrong with this skid control system, the indicator in the instrument panel goes on and the normal braking performance (the same one as on the vehicle without the skid control system) can automatically be obtained.



- This skid control system is equipped with a self-diagnosis mechanism to spot trouble.

CONSTRUCTION



This system is comprised of 3 sensors: an electronic control unit, an actuator and a failure indicator lamp. 2 sensors are situated at the 2 front axles and another one at the differential. These sensors output pulse signals whose frequencies vary according to rotation speeds.

Electronic control unit, situated at the luggage room right side calculates wheel rotation speeds from sensor output signals, and evaluates wheel rotation situations. It then outputs electric current signals to prevent wheels from skidding. Furthermore, the electronic control unit has a function which detects unexpected fault and returns the brake system automatically to standard braking (as with vehicles without skid control system).

Actuator situated at the luggage room right side controls brake pressure for each front wheel brake cylinder and common brake pressure for the rear 2 wheel brake cylinders according to the electric current signal.

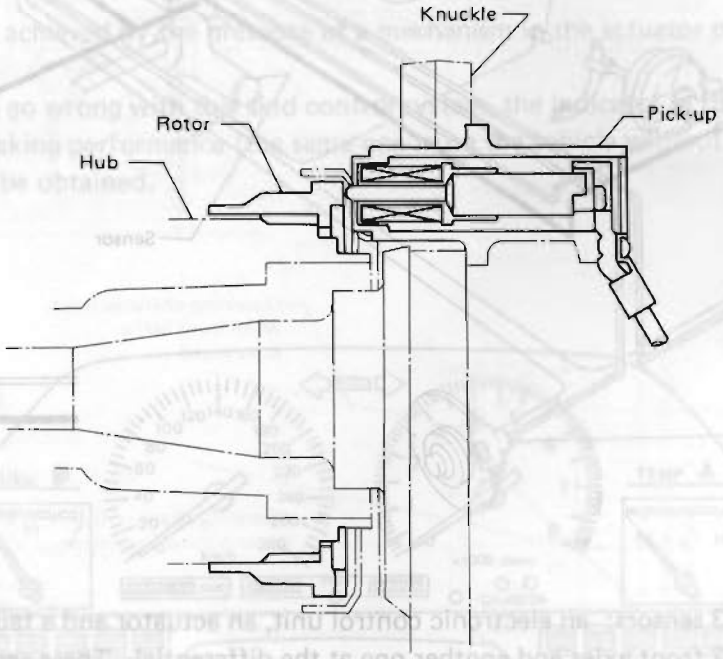
Failure indicator lamp situated in the instrument panel is switched on in the case of fault by the electronic control unit.

Sensor

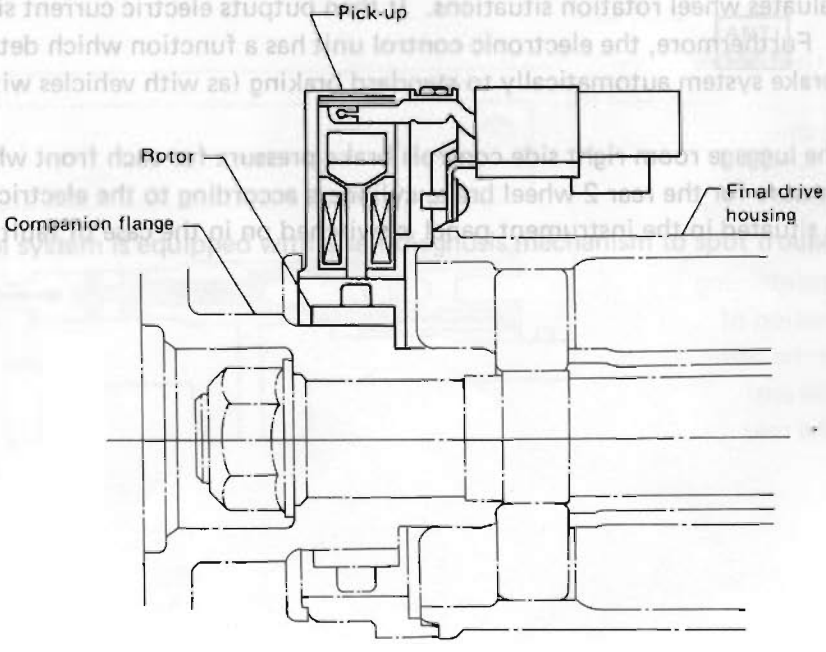
Sensors are situated on front axles and final drive.

Each sensor consists of a pick-up and rotor. In the front sensor, pick-up is fixed on the knuckle of each axle, and rotor is fixed on each hub which rotates with the wheel.

In the rear sensor, pick-up is fixed on final drive housing, and the rotor is fixed on the final drive companion flange where rotation speed is proportional to both rear wheels average rotation speed. Sensors generate pulse signals whose frequency varies in proportion to wheel rotation speeds.



Font sensor

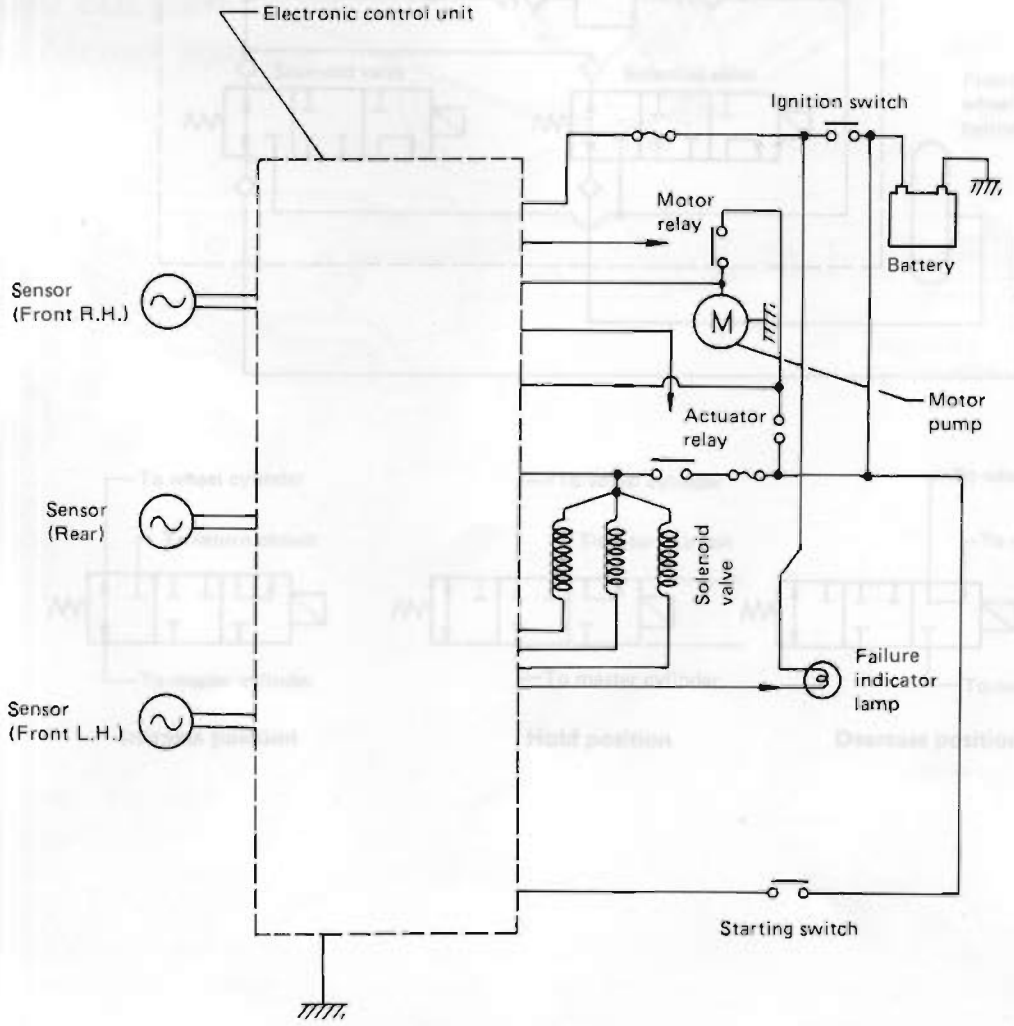


Rear sensor

Electronic control unit

This includes microcomputers, fault detecting mechanism, failsafe circuit and self diagnosis mechanism. The microcomputer calculating wheel rotation speed from input pulse signal frequency and evaluating wheel rotation situation produces the output signal preventing the wheel from skidding whenever wheels tend to slip. This microcomputer's output signal has 3 different conditions. First, microcomputer's output signal controls the solenoid valve in pressure increase position (normal brake condition), second, pressure hold position, third, pressure decrease position.

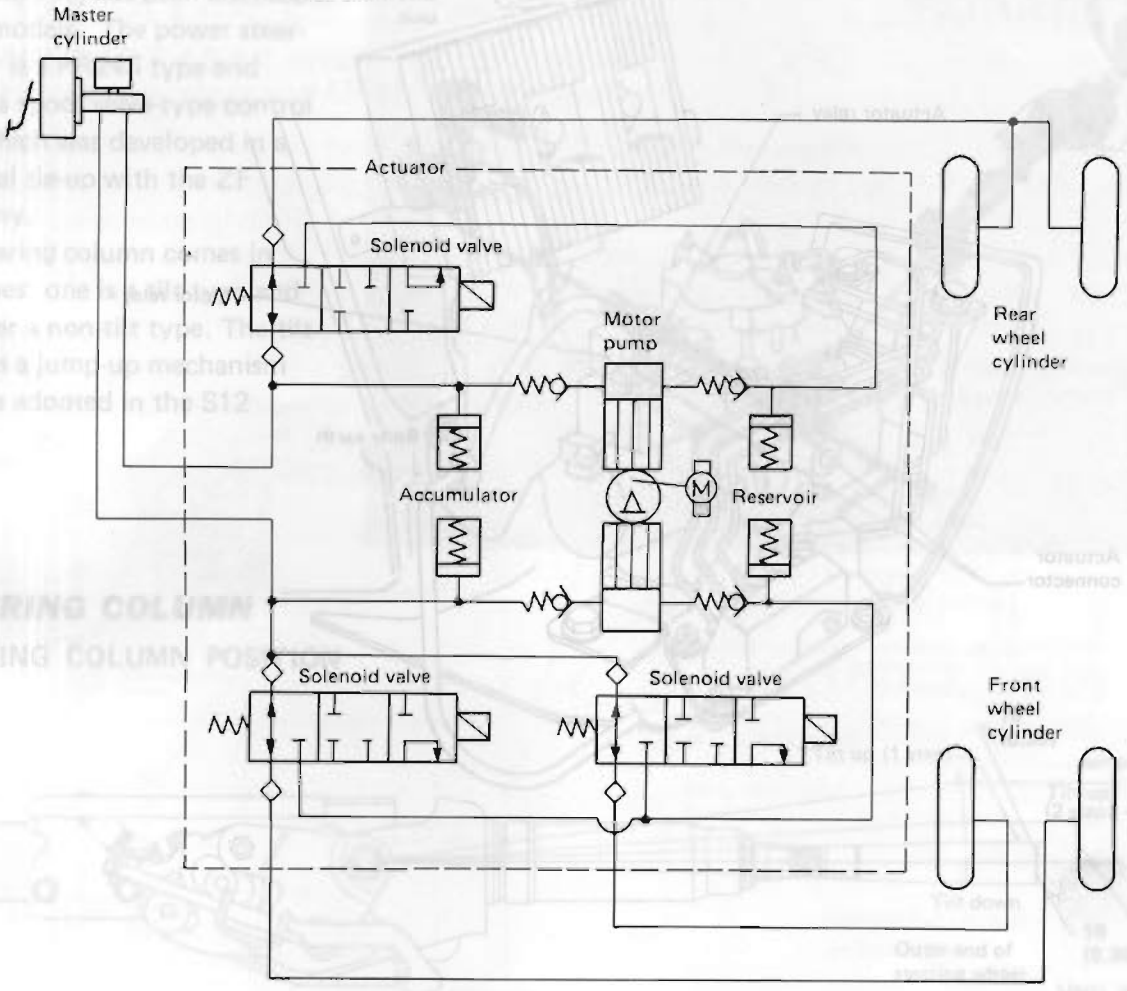
- Motor relay is closed by the microcomputer's signal during skid control operation so the motor pump in actuator can operate.
- Actuator relay is always closed by the microcomputer's signal whenever the system operates except in the case of a fault.
- Fault detecting mechanism is always monitoring system operations and produces the fault signal for failsafe circuit whenever faults occur.
- Failsafe circuit opens the actuator relay and switches the failure indicator lamp on.
- Self diagnosis mechanism consists of 8 light-emitting-diodes on the electronic control unit surface. Each light-emitting diodes turns on according to the fault signal to give a visual indication of what components have faults.

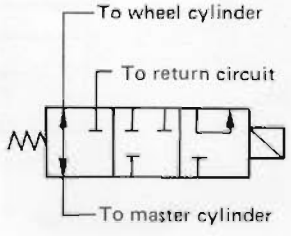


HYDRAULIC SYSTEM

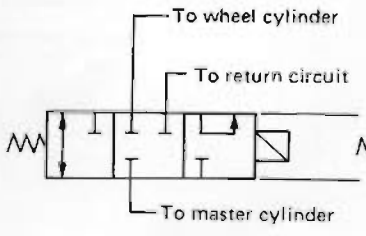
Hydraulic system comprises a master cylinder, an actuator, and wheel cylinders for all 4 wheels.
The actuator connected between the master cylinder and 4 wheel cylinders controls front right wheel cylinder pressure and front left wheel cylinder pressure and regular rear two wheel cylinder pressure. The actuator includes three solenoid valves, two reservoirs, two accumulators and motor pumps.
A solenoid valve has 3 positions according to its electric current.
For the microcomputer's output signal under the first condition: electric current of solenoid valve controlled by solenoid driver is zero ampere, and there is unrestricted through-flow from the master cylinder to the wheel cylinder so that brake pressure can increase. For output under the second condition: electric current of solenoid valve controlled by solenoid driver is two amperes, and through-flow from the master cylinder to wheel cylinder is interrupted so brake pressure can be held constant. For the third condition: electric current of solenoid valve controlled by solenoid driver is five amperes, and the wheel cylinder is connected to return circuit by way of motor pump so pressure can decrease.
As system is a 3 channel type, each solenoid valve operates in the above-mentioned way.
The return circuit leads to accumulators by way of reservoirs and motor pumps which pump brake fluid back to two accumulators when brake fluid is removed from the wheel cylinders to reduce pressure during anti-skid control.

Hydraulic circuit diagram

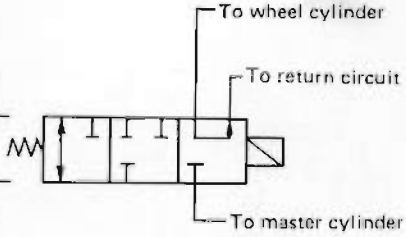




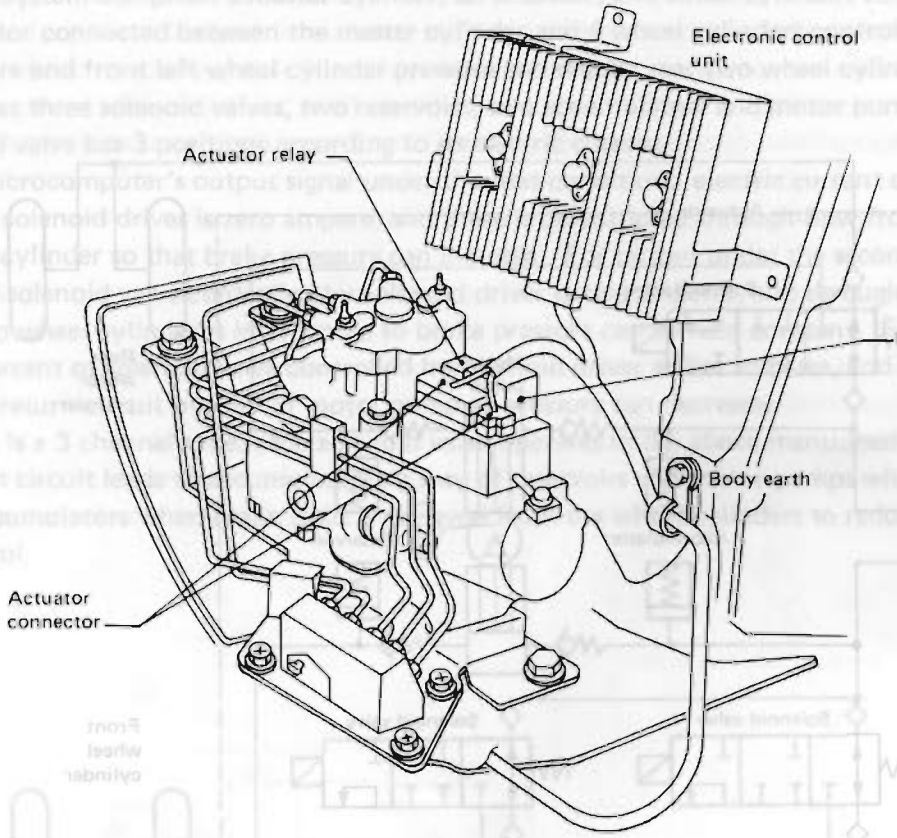
Increase position



Hold position

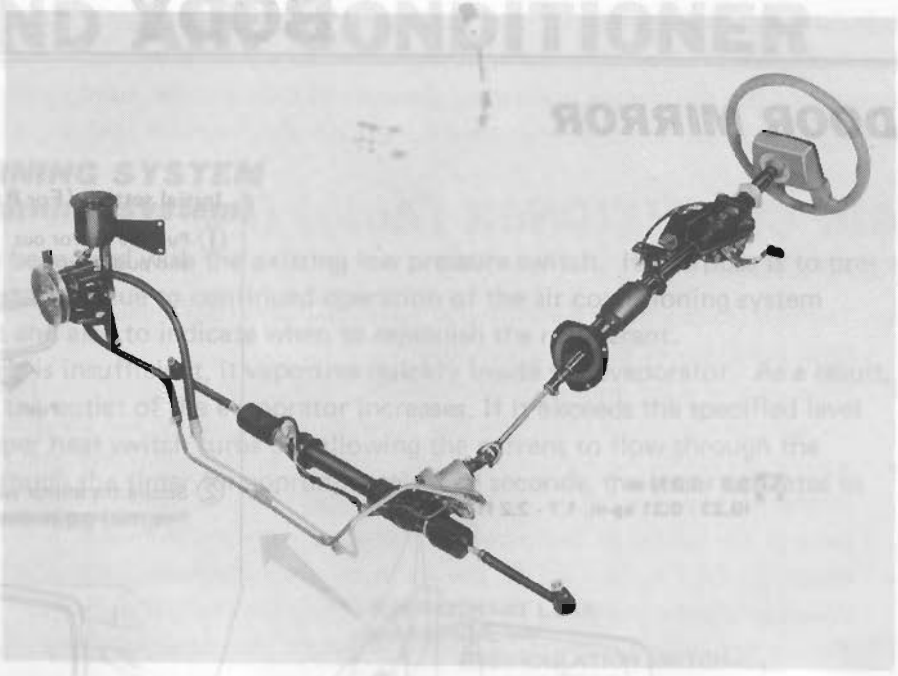


Decrease position


Electronic control unit
Actuator relay
Motor relay
Body earth
Actuator connector

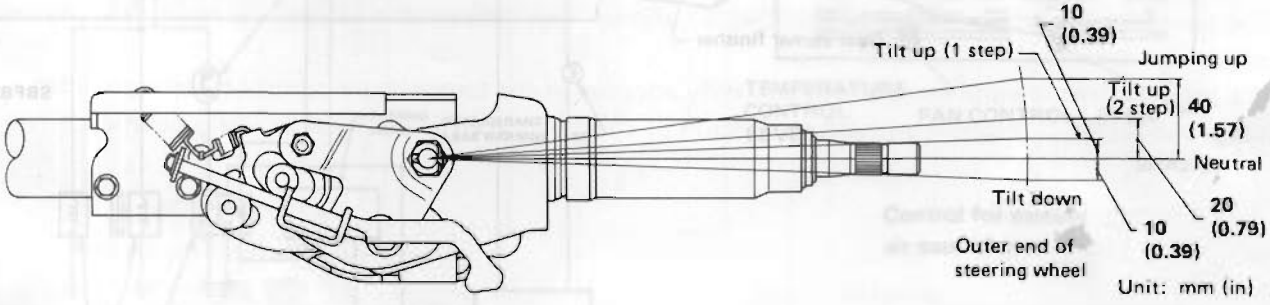
STEERING SYSTEM

Power steering has been adopted for all models. The power steering gear is a PR24S type and adopts a spool valve-type control valve which was developed in a technical tie-up with the ZF Company.
The steering column comes in two types: one is a tilt type and the other a non-tilt type. The tilt type has a jump-up mechanism which is adopted in the S12 series.

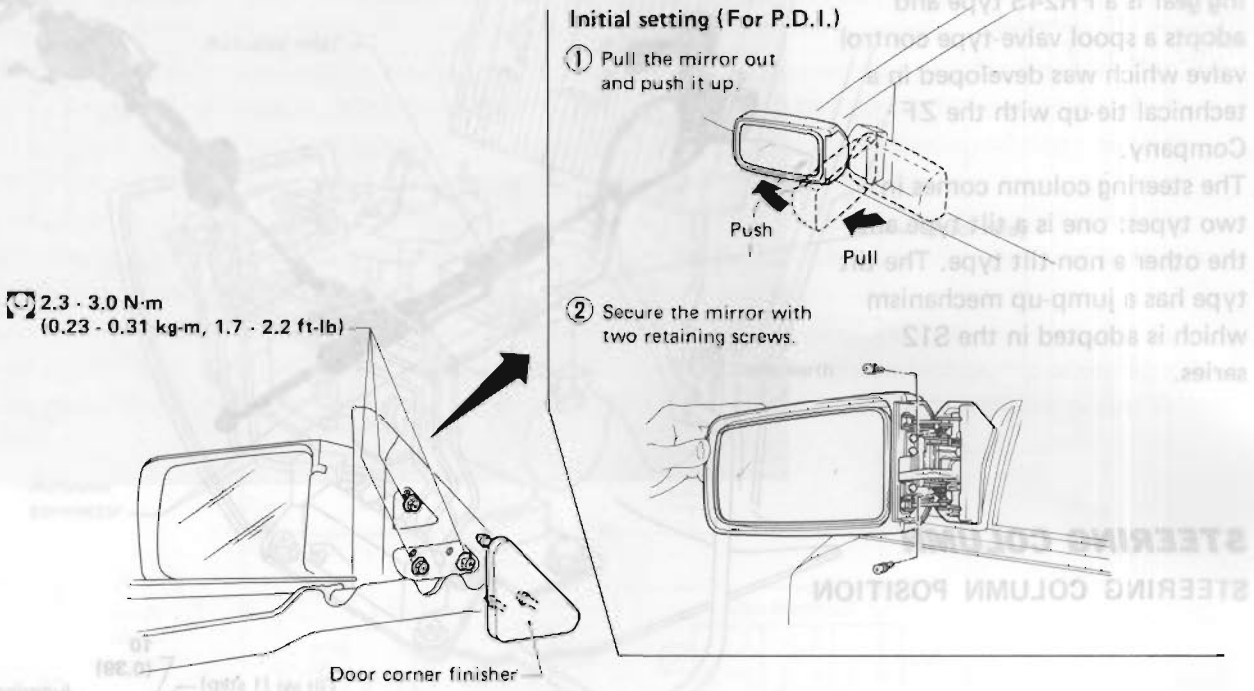


STEERING COLUMN

STEERING COLUMN POSITION



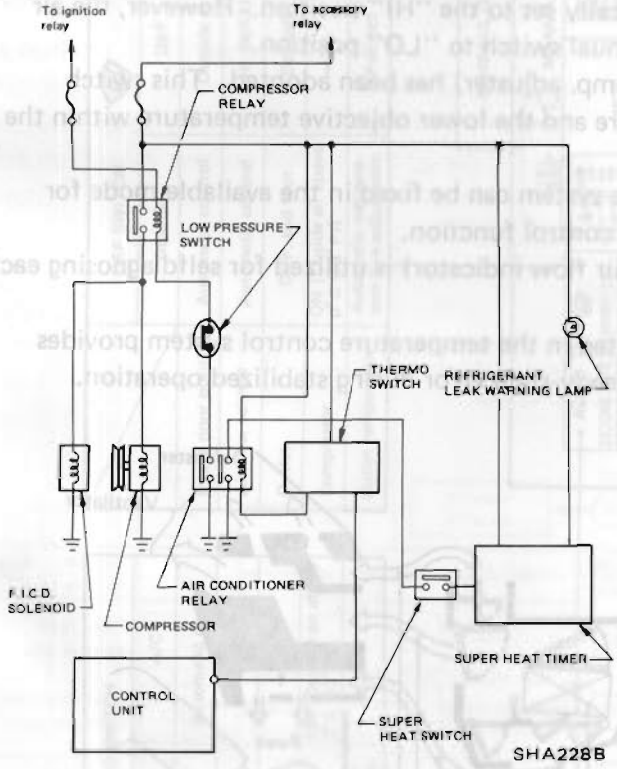
DOOR MIRROR


Initial setting (For P.D.I.)
1 Pull the mirror out and push it up.
Push
Pull
2.3 - 3.0 N·m
(0.23 - 0.31 kg-m, 1.7 - 2.2 ft-lb)
2 Secure the mirror with two retaining screws.
Door corner finisher
SBF835B

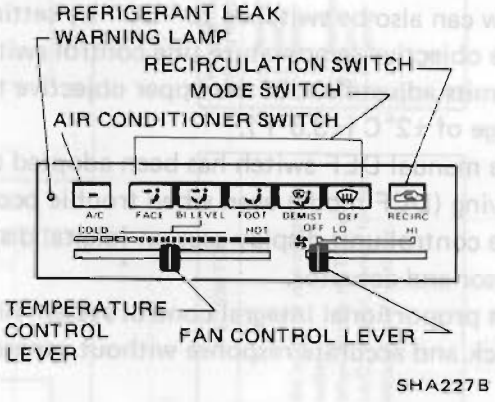
AIR CONDITIONER

REFRIGERANT LEAK WARNING SYSTEM (Insufficient refrigerant warning system)

A refrigerant leak warning system has been used with the existing low pressure switch. Its purpose is to prevent the cooler cycle from sustaining damage due to continued operation of the air conditioning system when there is a shortage of refrigerant and also to indicate when to replenish the refrigerant.
When the refrigerant in the cooler cycle is insufficient, it vaporizes quickly inside the evaporator. As a result, the "super heat" of the refrigerant at the outlet of the evaporator increases. If it exceeds the specified level [approximately 45°C (81°F)], the super heat switch turns on, allowing the current to flow through the timer. If current continues to flow through the timer for approximately 140 seconds, the timer activates to close the contacts which turn on the warning lamp.



SHA228B

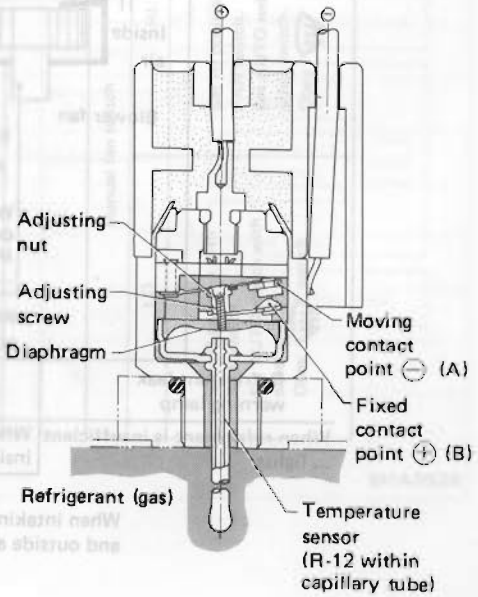


SHA227B

Control for manual air conditioner

SUPER HEAT SWITCH

The super heat switch consists essentially of a diaphragm, which monitors the refrigerant line pressure, a temperature sensor, which detects the refrigerant line temperature, a moving contact point (A) and a fixed contact point (B).
When the temperature in the refrigerant line increases, the gas charged inside the temperature sensor expands.
When the relationship between the detected temperature and the saturated temperature in relation to the detected pressure reaches a specified condition, contact points (A) and (B) come together, thus turning on the super heat switch. The super heat switch is placed in the refrigerant line at the outlet of the evaporator.



SHA229B

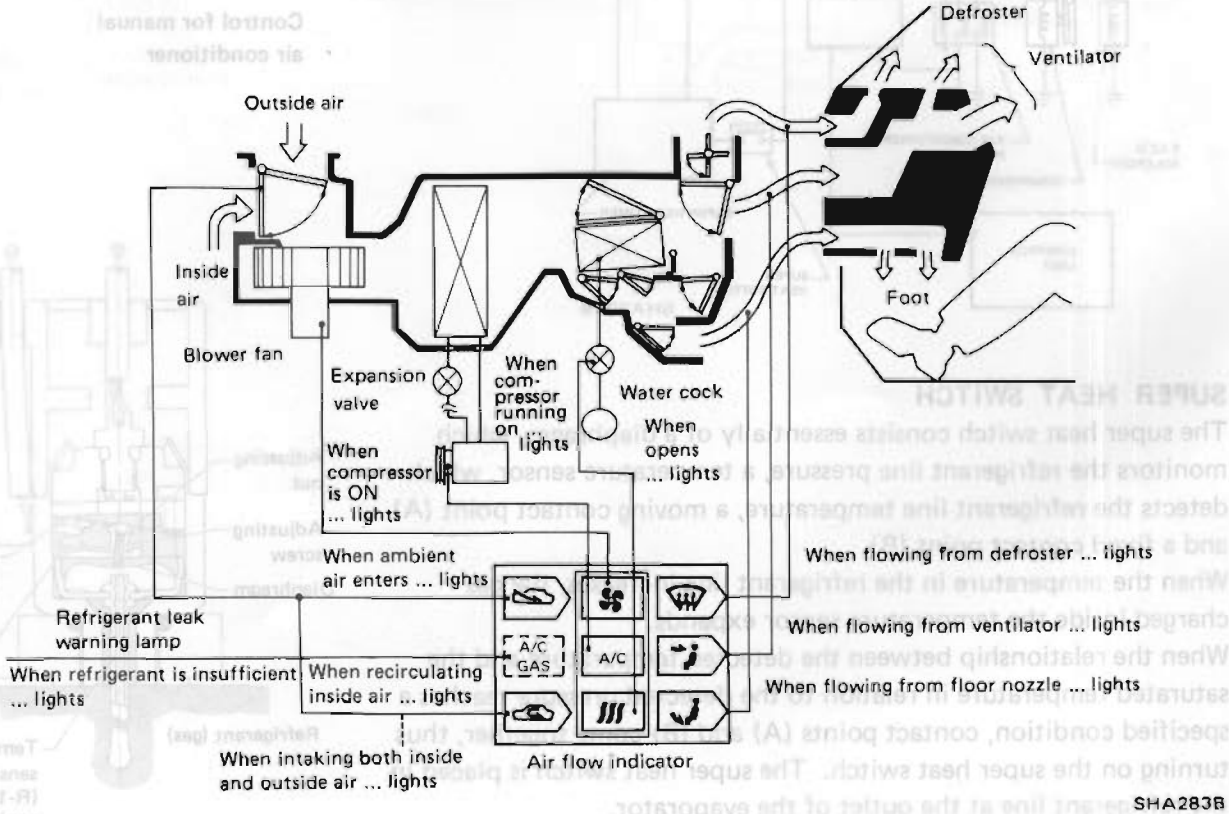
SUPER HEAT TIMER

The "super heat" increases momentarily during rapid acceleration. It can also increase even when the amount of the refrigerant is normal. Because of this, a timer, used in the warning system, detects a steady increase in "super heat" only when the amount of refrigerant is short, thereby preventing erroneous signals.

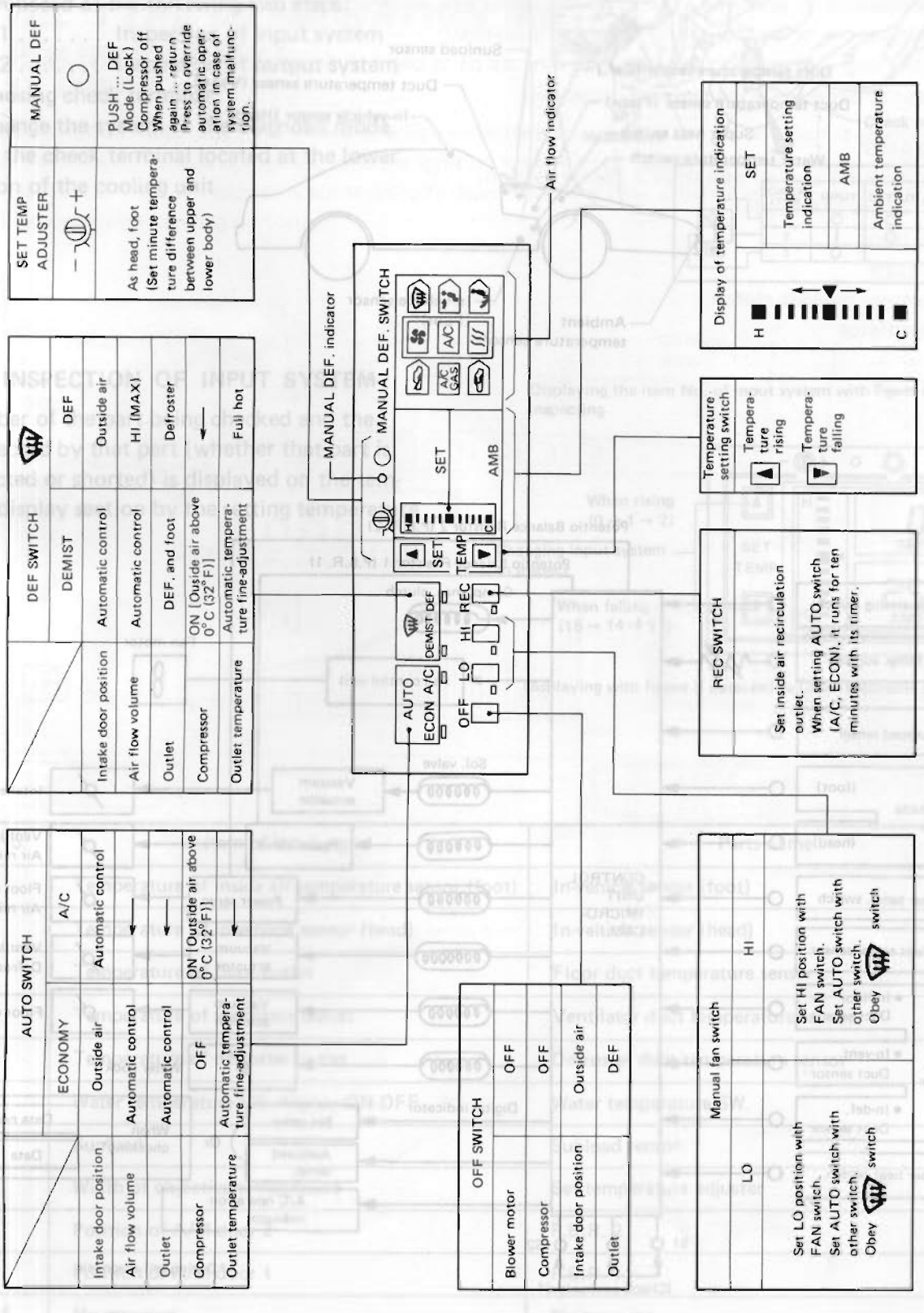
AIR CONDITIONER (Auto) (For Australia)

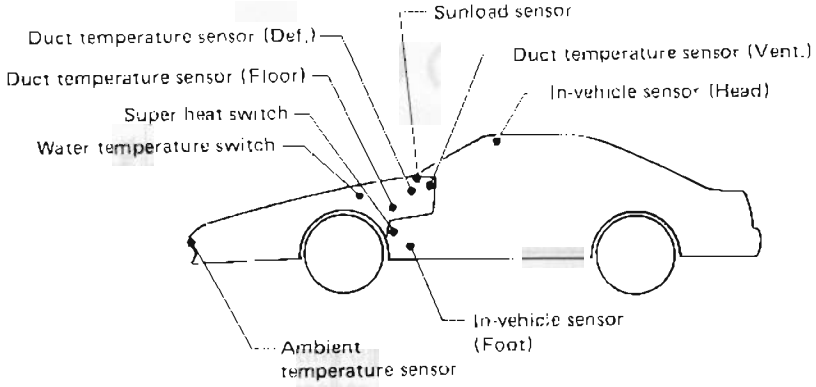
FEATURES

- The vehicle sensors are installed at head level and foot level, in order to maintain the temperatures of both positions at the optimum levels.
- When starting the engine in cold season, the system immediately operates in the defroster mode until the coolant temperature rises, thereby preventing fogging on the windshield.
- As the coolant temperature rises high enough to use the heater, the outlet door is automatically switched to the foot level for starting the heating operation. The system begins to control the air flow automatically as the outlet air temperature reaches the optimum level.
- When the DEF switch is ON, the air flow is automatically set to the "HI" position. However, the air flow can also be switched to "LO" by setting the manual switch to "LO" position.
- The objective temperature fine control switch (Set temp. adjuster) has been adopted. This switch permits adjustment of the upper objective temperature and the lower objective temperature within the range of ±2°C (±3.6°F).
- The manual DEF switch has been adopted so that the system can be fixed in the available mode for driving (DEF mode) even when trouble occurs in the control function.
- The control unit display section (digital display and air flow indicator) is utilized for selfdiagnosing each sensor and actuator.
- The proportional integral control system newly adopted in the temperature control system provides quick and accurate response without generation of steady-state error during stabilized operation.

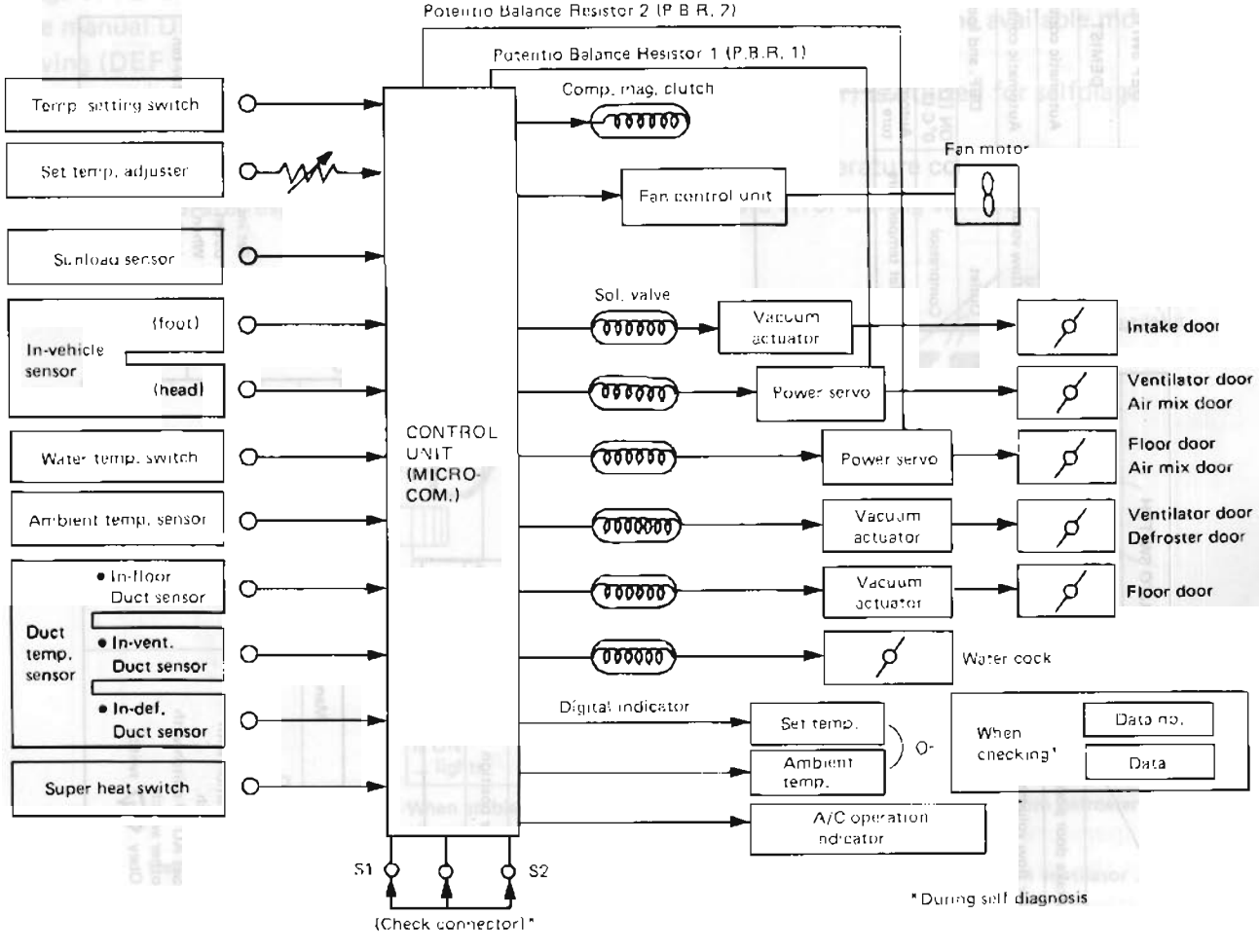


FUNCTION OF THE SWITCHES ON CONTROL UNIT





SHA337B



SHA338B

SELF-DIAGNOSIS OF TROUBLE

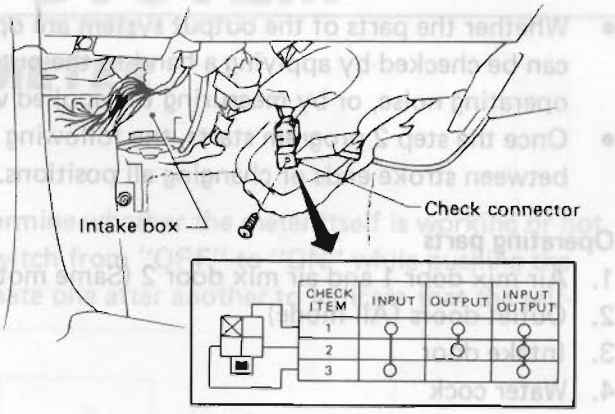
The self-diagnosis program is used to locate trouble and is composed of the following two steps:

Step 1 . . . . . Inspection of input system

Step 2 . . . . . Inspection of output system

- Diagnosing check terminal

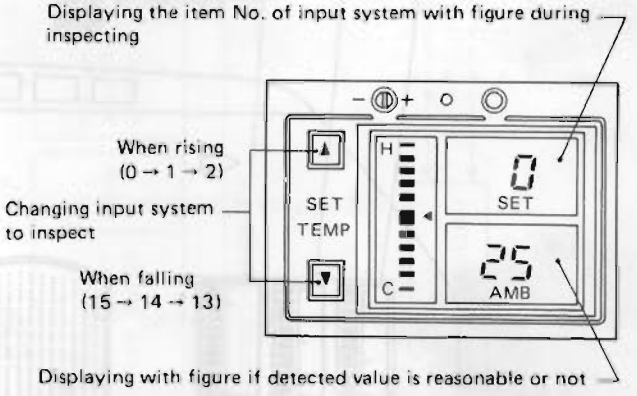
  To change the system to the diagnosis mode, short the check terminal located at the lower portion of the cooling unit



SHA434B

STEP 1 INSPECTION OF INPUT SYSTEM

The number of the part being checked and the value detected by that part (whether that part is disconnected or shorted) is displayed on the temperature display section by the setting temperature switch.



SHA317B

Display No.	Item of input signal	Parts name
0	Temperature of inside air temperature sensor (foot)	In-vehicle sensor (foot)
1	Temperature of in-vehicle sensor (head)	In-vehicle sensor (head)
2	Temperature of floor outlet	Floor duct temperature sensor
3	Temperature of ventilator outlet	Ventilator duct temperature sensor
4	Temperature of defroster outlet	Defroster duct temperature sensor
5	Water temperature SW. display ON-OFF	Water temperature SW.
6	Sunload	Sunload sensor
7	Width of objective temperature	Set temperature adjuster
8	Position of A/M door 2	P.B.R. 2
9	Position of A/M door 1	P.B.R. 1
10 ~ 15	No meaning	No meaning

STEP 2 INSPECTION OF OUTPUT SYSTEM

- Whether the parts of the output system are operating normally according to the predetermined pattern can be checked by applying a hand to the outlet door, observing the air flow indicator, listening to the operating noise, or by measuring the applied voltage.
- Once the step 2 program starts, the following six parts begin their operation sequentially, moving between stroke ends or changing all positions.

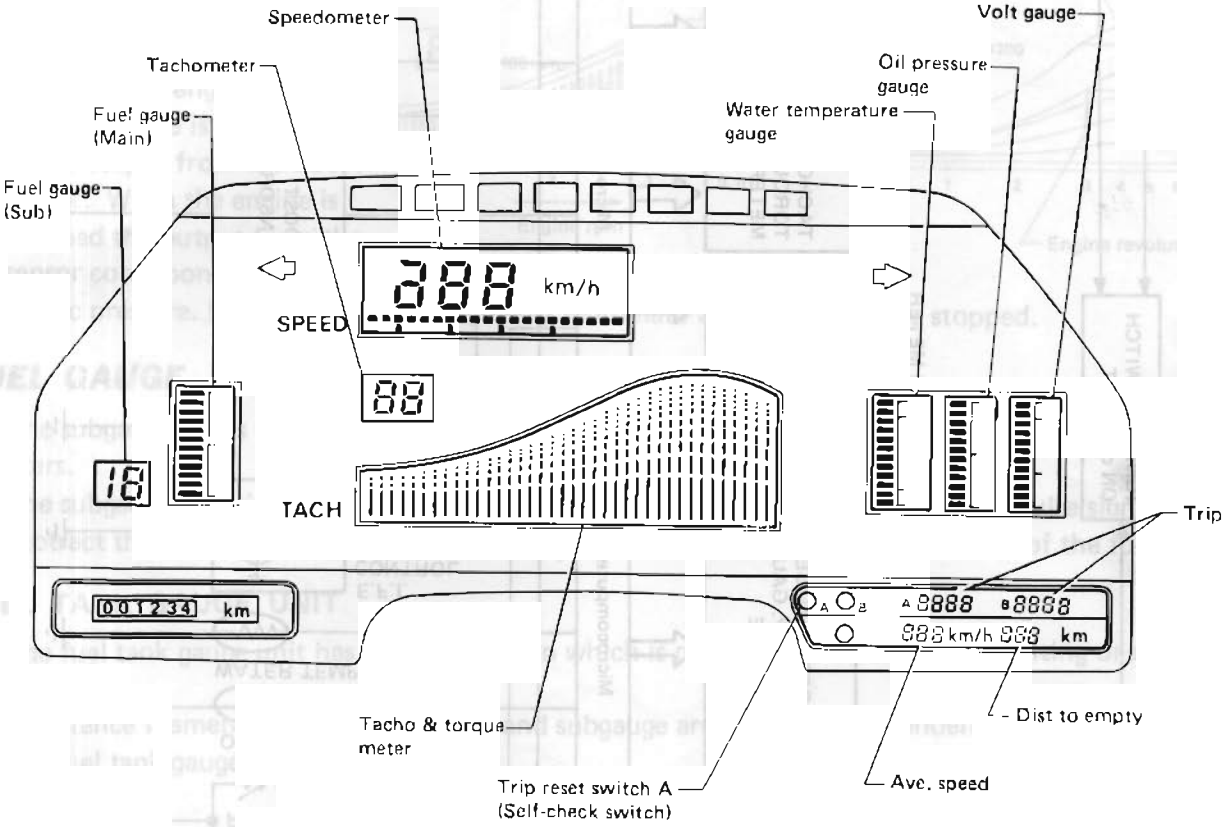
Operating parts

1. Air mix door 1 and air mix door 2 (Same motion)
2. Outlet doors (All mode)
3. Intake door
4. Water cock
5. Compressor magnet clutch
6. Blower motor

DIGITAL TYPE COMBINATION METER (For Australia only)

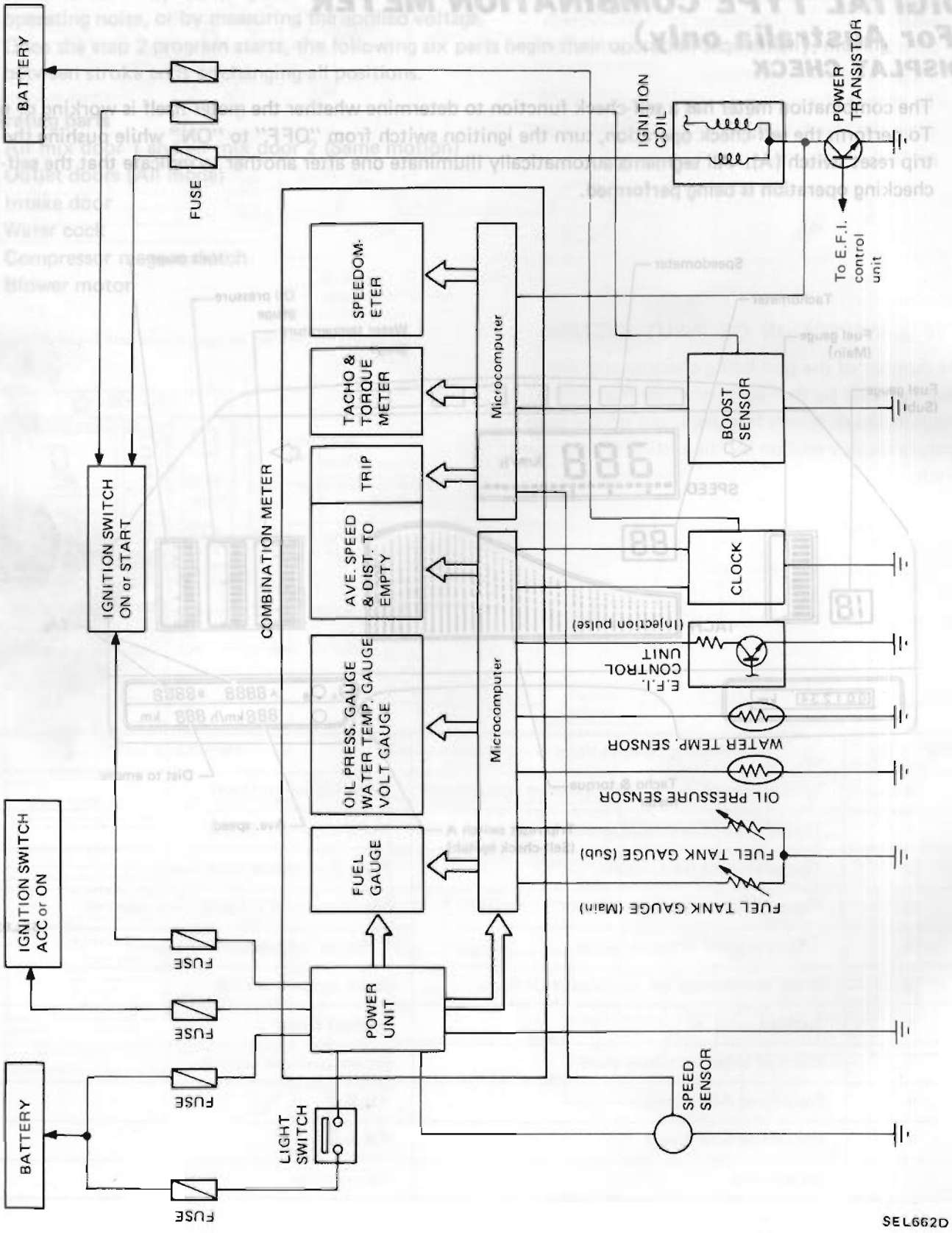
DISPLAY CHECK

- The combination meter has a self-check function to determine whether the meter itself is working or not.
- To perform the self-check operation, turn the ignition switch from "OFF" to "ON" while pushing the trip reset switch (A). All segments automatically illuminate one after another to indicate that the self-checking operation is being performed.



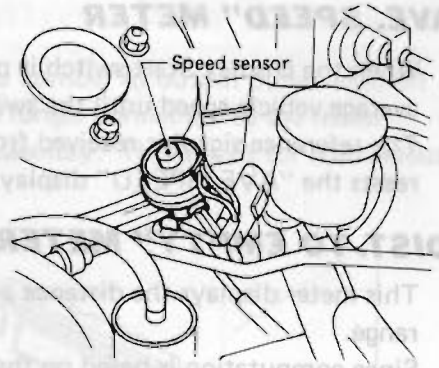
SEL827E

SCHEMATIC


BATTERY
FUSE
IGNITION SWITCH ON or START
IGNITION SWITCH ACC or ON
BATTERY
FUSE
FUSE
FUSE
FUSE
LIGHT SWITCH
POWER UNIT
COMBINATION METER
FUEL GAUGE
OIL PRESS. GAUGE
WATER TEMP. GAUGE
VOLT GAUGE
AVE. SPEED & DIST. TO EMPTY
TRIP
TACHO & TORQUE METER
SPEEDOM-ETER
Microcomputer
Microcomputer
IGNITION COIL
POWER TRANSISTOR
To E.F.I. control unit
BOOST SENSOR
CLOCK
E.F.I. CONTROL UNIT
(Injection pulse)
WATER TEMP. SENSOR
OIL PRESSURE SENSOR
FUEL TANK GAUGE (Sub)
FUEL TANK GAUGE (Main)
SPEED SENSOR
SEL662D

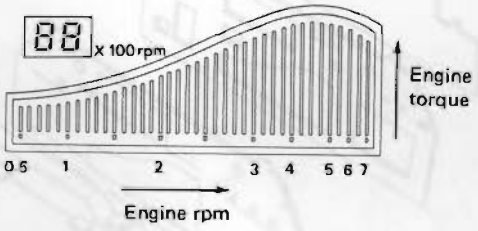
SPEEDOMETER

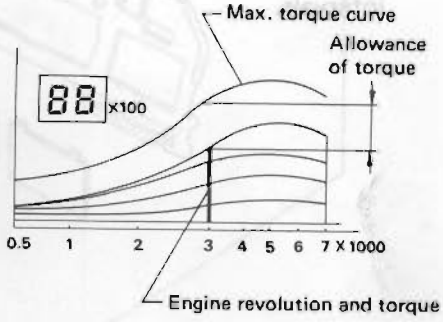
- Since the speed sensor is located inside the engine compartment, disconnection of the speedometer cable is not necessary when removing the speedometer.



TACHO & TORQUE METER

- The horizontal axis refers to engine rpm while the vertical axis refers to engine torque.
- Engine torque is computed by an output from the boost sensor. When the engine is stopped the output from the sensor corresponds to atmospheric pressure. For this reason, all segments illuminate when the engine is stopped.



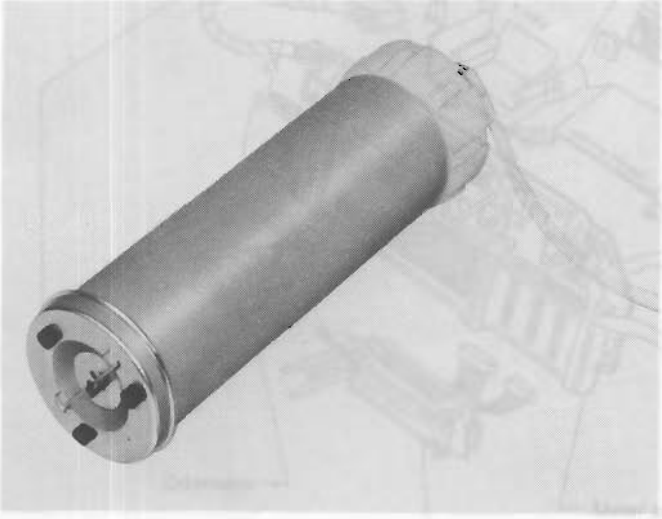


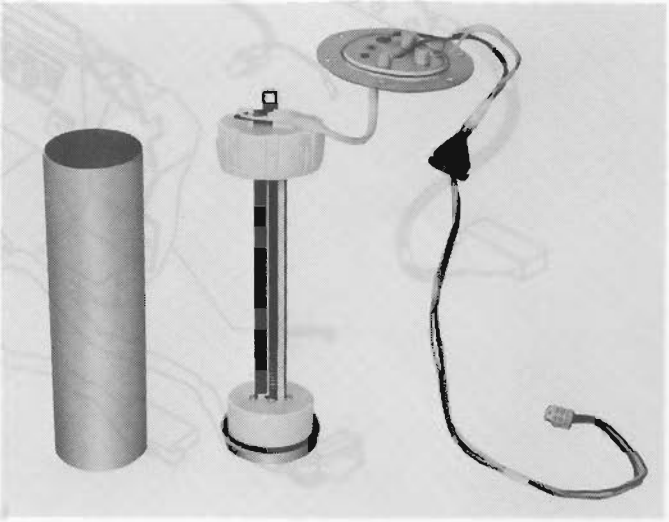
FUEL GAUGE

- The subgauge starts to display the amount of fuel left in the fuel tank after it has dropped below 19 liters.
- The subgauge is designed to a high degree of accuracy. It receives a fuel injection pulse signal used to subtract the amount of fuel consumed. The display is not affected by movements of the fuel.

FUEL TANK GAUGE UNIT

- The fuel tank gauge unit has a vertical design which is not affected by the vehicle tilting or movements of the fuel.
- Resistance filaments for the main gauge and subgauge are installed independently of each other inside the fuel tank gauge unit.





"AVE. SPEED" METER

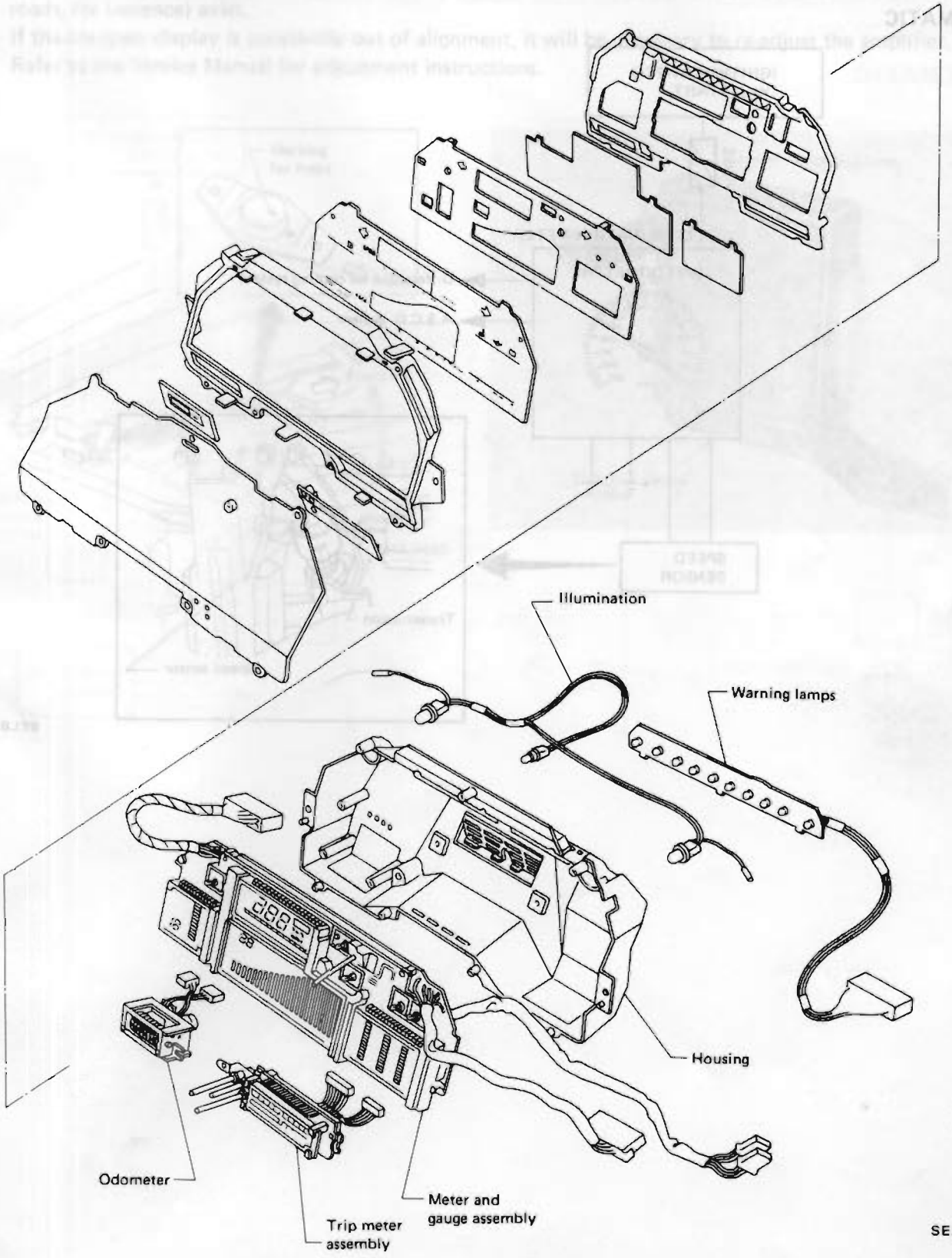
- When the Display Start switch is pushed once, the "AVE. SPEED" meter continues to display the average vehicle speed until the switch is pushed again. The display will be updated at 1 km intervals.
- The reference signal is received from the digital clock, so correcting the clock by more than 10 minutes resets the "AVE. SPEED" display.

"DIST. TO EMPTY" METER

- This meter displays the distance available on remaining fuel from the full to 7 liters (remaining fuel) range.
- Since computation is based on the rate of fuel used for the last 1 km, the display will be updated at 1 km intervals.

ODOMETER

- The odometer is designed so that its motor is driven by counting the number of output pulses emitted from the speed sensor. For this reason, the speedometer cable is no longer connected to the meter.
- The odometer alone can be removed from the combination meter assembly. This allows for continuous use even when the combination meter is replaced.

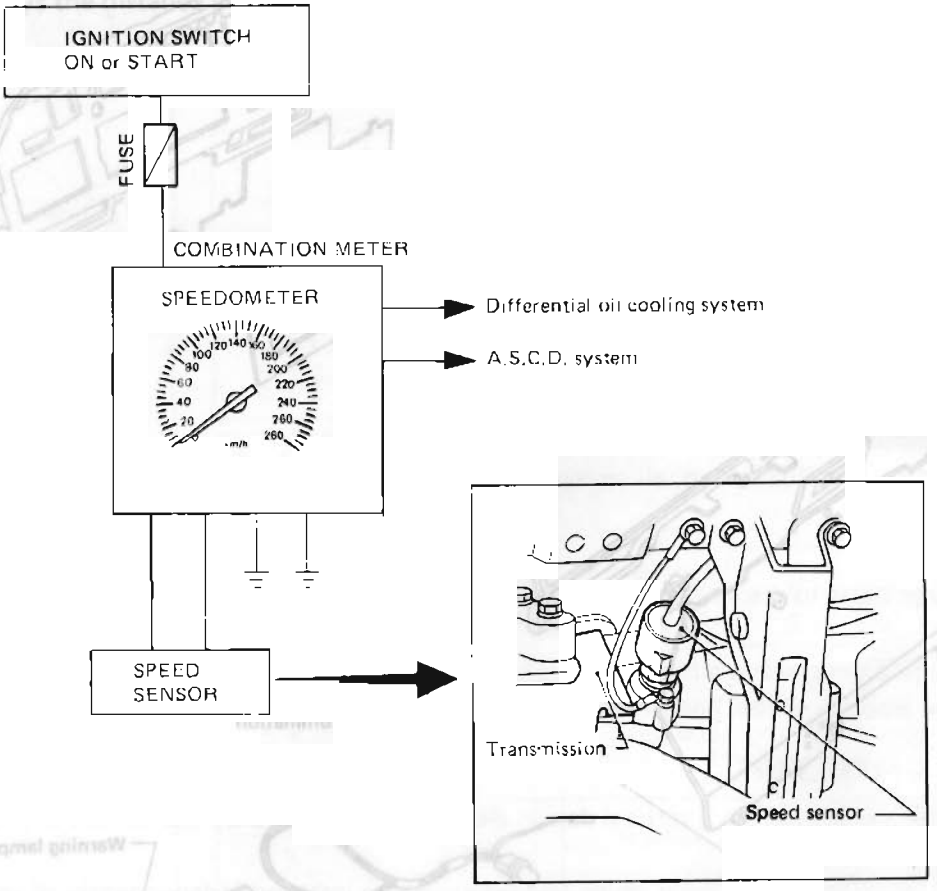


SEL660D

NEEDLE TYPE (Without speedometer cable) COMBINATION METER (Turbocharged model for Europe only)

- This type meter does not have a speedometer cable. It receives a speed signal from the speed sensor which is installed in the transmission.

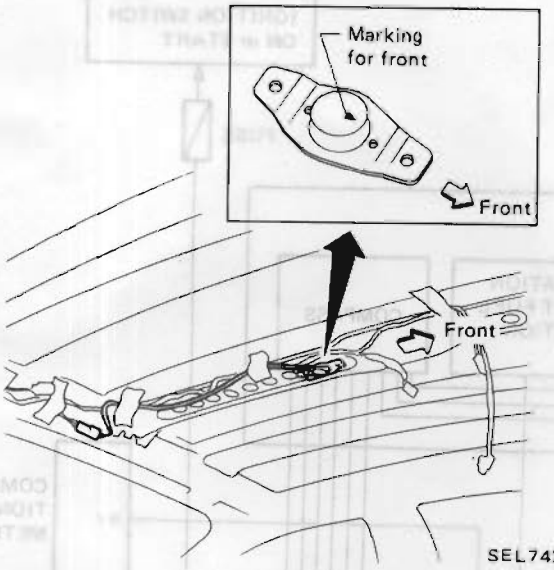
SCHEMATIC

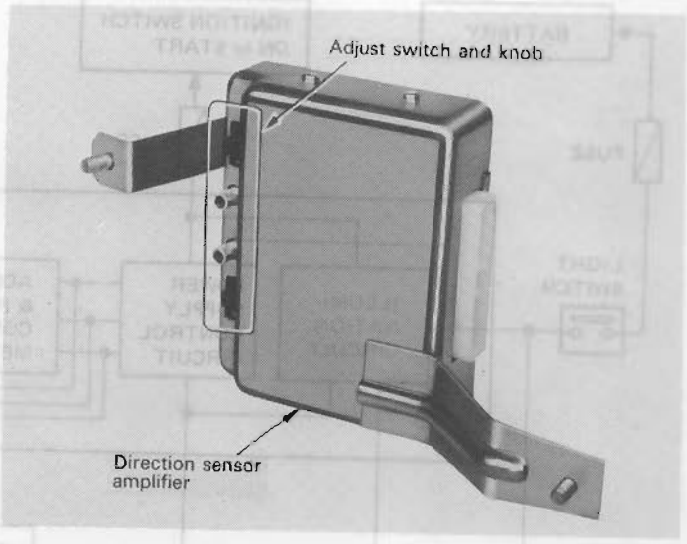


SEL870E

COMPASS (For Australia only)

- A direct sensor is installed in the center of the roof to detect terrestrial magnetism so that the compass indicates the car's direction in relation to magnetic north. Therefore, the compass display may differ slightly from north on the map.
- The compass will not show the correct direction when the magnetic force is weak, such as tunnels, etc.
- The direct sensor amplifier may become "out-of-alignment" in areas where strong magnetic fields (railroads, for instance) exist.
  If the compass display is constantly out of alignment, it will be necessary to re-adjust the amplifier. Refer to the Service Manual for adjustment instructions.

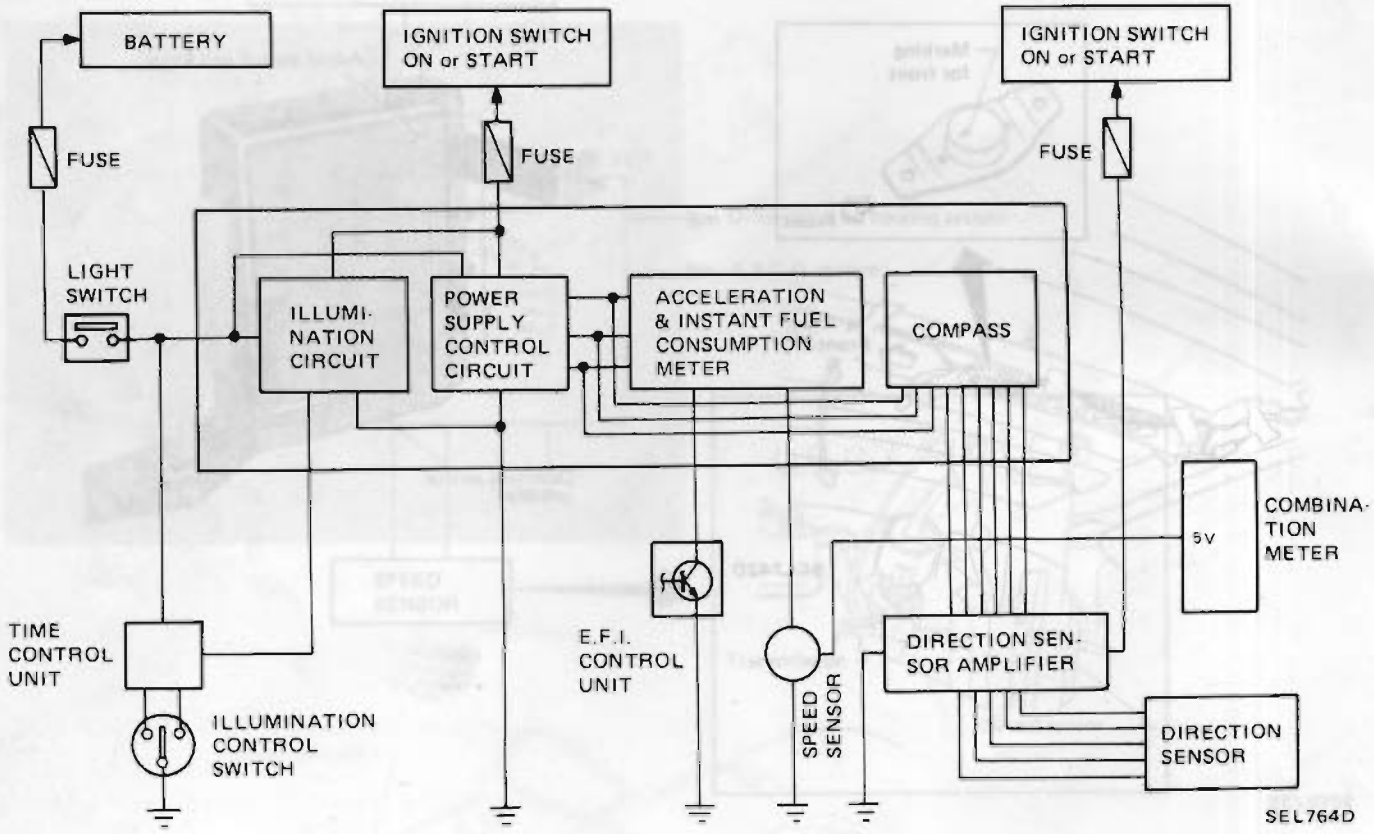




ACCELERATION AND INSTANT FUEL CONSUMPTION METER (For Australia)

- The acceleration meter displays the rate of acceleration in units of gravitational force. This is computed from speed sensor outputs in relation to the amount of change in vehicle speed.
  The display ranges from –0.5 G to +0.5 G. 0G is shown when the vehicle is driven at a constant speed.
- The instant fuel consumption meter counts the number of fuel injection pulses and indicates the rate of fuel usage for each 1 km of operation.

SCHEMATIC



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