New Car Features 1981
USA and Canada

VOLVO

Contents

TP 30309
6500.9.80
Printed in USA

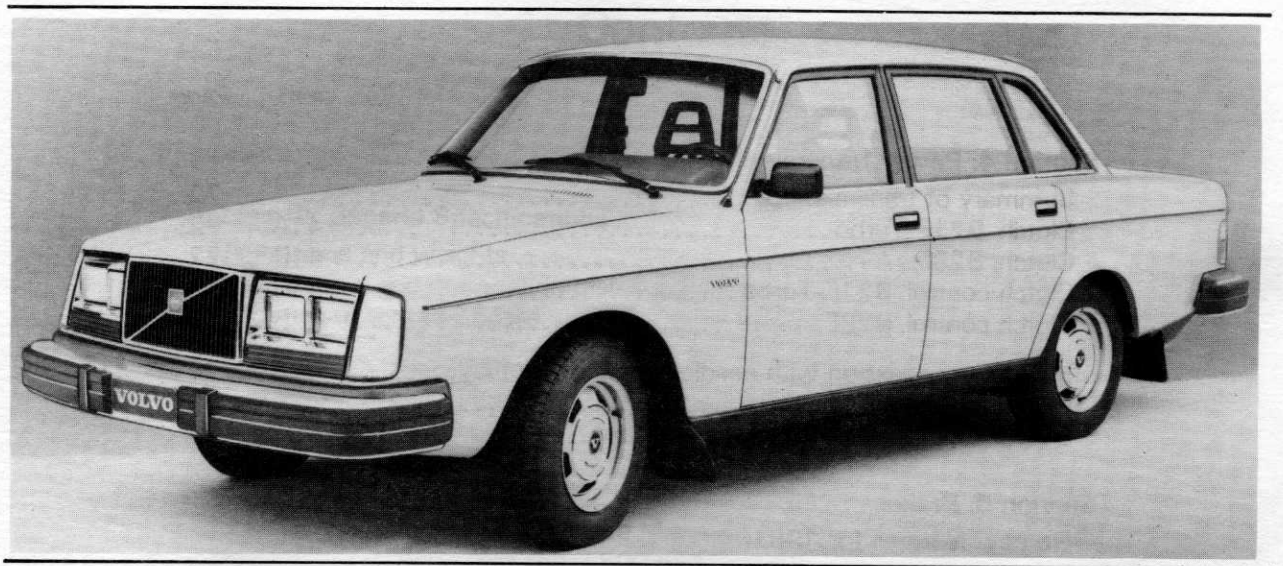
Introduction

This manual contains information on various items introduced to 1981 model product line.

Information is presented in the same sequence as it would appear in the Binder System (Sections 0–8).

The specification section provides a complete listing of all pertinent data and appears also in complete form in the front sections of the following new manuals:

TP 30310 Pre-Delivery Service
TP 30311 600–1,200 mile (1,000–2,000 km) Maintenance Service
TP 30312 7,500 mile (12,500 km) Maintenence Service



DL USA

2, 4 or 5 doors (wagon). Equipped with B21F engine. 2-door models also come equipped with the new B21F–MPG engine (optional).

DL Canada

With 2, 4 or 5 doors (wagon). Equipped with B21A engine.

Emission systems:
- Pulsair in combination with 4-speed manual transmissions M45 and M46.
- EGR type "on/off" + Pulsair in combination with automatic transmission for 2-and 4-door models.
- EGR type "proportional" + Pulsair in combination with automatic transmission for wagons.

GL USA

2- and 4-door models with engine B21F.
4- and 5-door (wagon) models also with D24 diesel engine.

GL Canada

4- and 5-door (wagon) models equipped with B23E engine.

Emission systems:
- Pulsair used with 4-speed manual transmissions M45 and M46.
- EGR type "on/off" + Pulsair used with automatic transmission 2- and 4-door models.
- EGR type "proportional" + Pulsair used with automatic transmission wagons.

4- and 5-door models also equipped with D24 diesel engine.

GLT USA

2-door model equipped with B21F-Turbo engine.

GLT Canada

2-door model equipped with B23E engine.

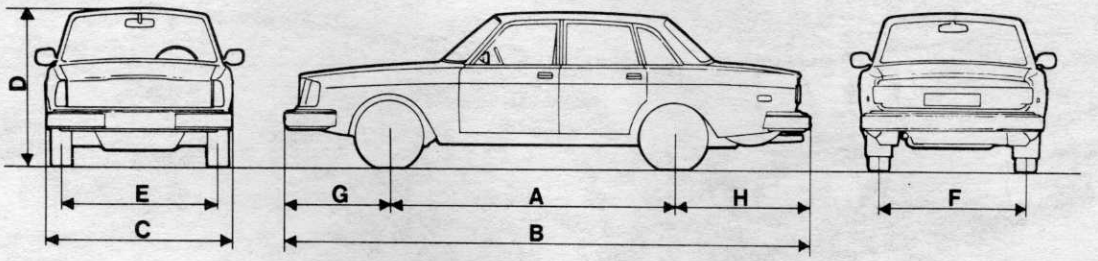
GLE USA and Canada

4- and 5-door (wagon) models with B28F engine.

COUPE USA and Canada

2-door sports model with B28F engine.
Assembled by Bertone, Italy.

Section O: General Specifications
Dimensions and weights



A Wheel base
Manual steering ..... **2640 mm**
104.0"

Power steering ..... **2650 mm**
104.3"

B Length ..... **4888 mm**
192.4"

C Width ..... **1707 mm**
67.2"

D Height
GLT, GL, GLE: at curb weight ..... **1427 mm**
56.2"

at Gross Vehicle Weights (GVW) ..... **1392 mm**
54.8"

Wagons: at curb weight ..... **1460 mm**
57.5"

at Gross Vehicle Weight (GVW) ..... **1430 mm**
56.3"

Coupe: at curb weight ..... **1368 mm**
53.9"

E Track, front ..... **1430 mm**
56.3"

F Track, rear ..... **1360 mm**
53.5"

G Overhang, front
Manual steering ..... **978 mm**
38.5"

Power steering ..... **968 mm**
38.1"

H Overhang, rear ..... **1270 mm**
50"

Turning circle (between curbs) ..... **9.8 m**
32.6 feet

Curb weights (depending on model, for "California" versions generally add 3 kg = 7 lbs). AC = 28 kgs included.

GLT, DL	**1312–1362 kg** 2891–2999 lbs
GL	**1332–1392 kg** 2933–3065 lbs
GLE	**1416–1430 kg** 3120–3149 lbs
Wagon, 4-cyl	**1421–1436 kg** 3129–3162 lbs
Wagon, 6-cyl	**1471–1485 kg** 3241–3271 lbs
Coupe	**1410–1415 kg** 3105–3115 lbs

Gross Vehicle Weight Rating (GVWR)

GLT, GL, DL, Coupe	**1830 kg** 4030 lbs
GLE	**1900 kg** 4190 lbs
Wagons:	
– with gasoline engine (except GLT)	**1950 kg** 4300 lbs
GLT wagon	**1900 kg** 4190 lbs
– with diesel engine	**2000 kg** 4410 lbs

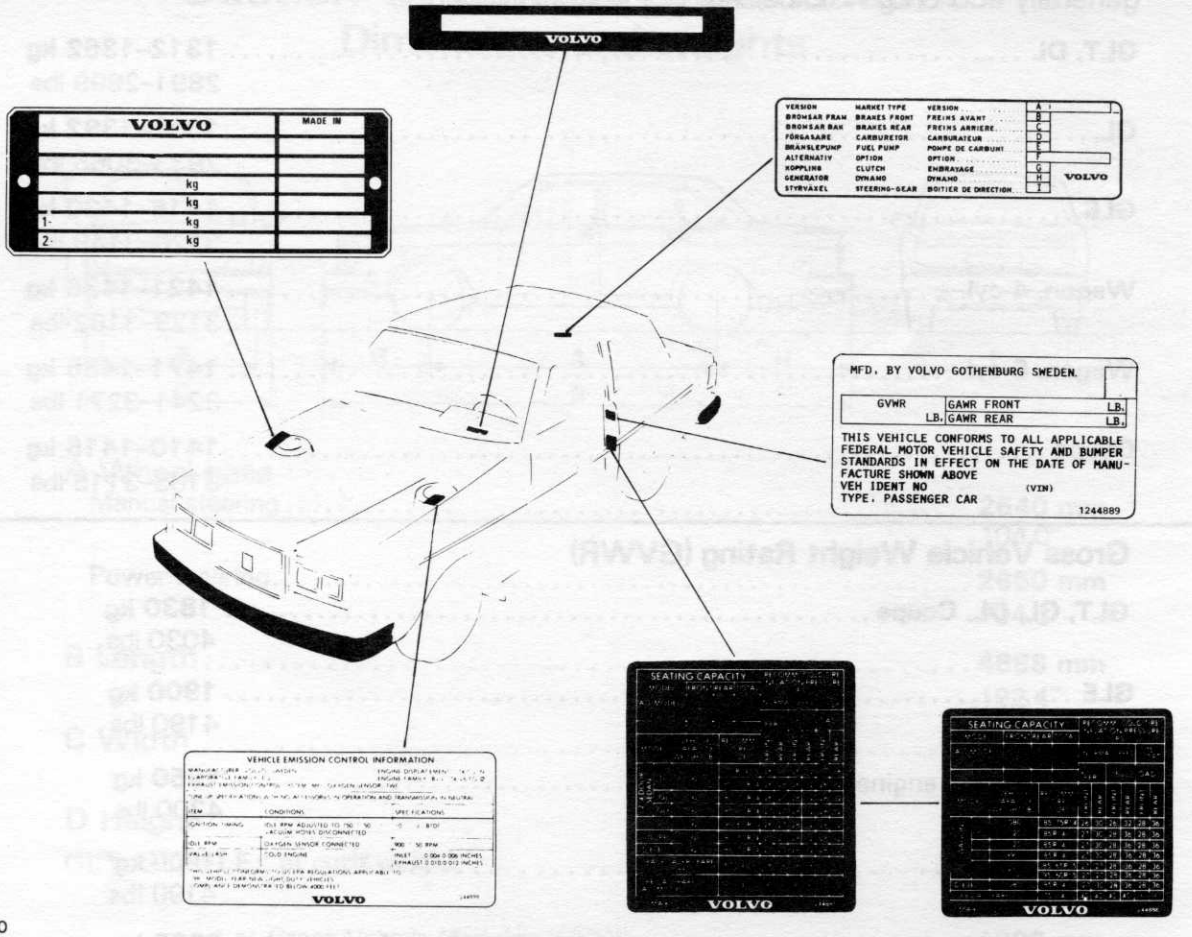
Gross Axle Weight Rating (GAWR), front

GLT, DL, GL, 4-cyl Wagon	**855 kg** 1885 lbs
GLE, 6-cyl Wagon, Coupe	**930 kg** 2050 lbs

Gross Axle Weight Rating (GAWR), rear

GLT, DL, GL, GLE Coupe	**990 kg** 2180 lbs
Wagons (except GLT)	**1180 kg** 2600 lbs
GLT Wagon	**1060 kg** 2340 lbs
Max. trailer weight	**908 kg** 2000 lbs
Max. hitch load	**90 kg** 200 lbs

Identification and designation plates and labels



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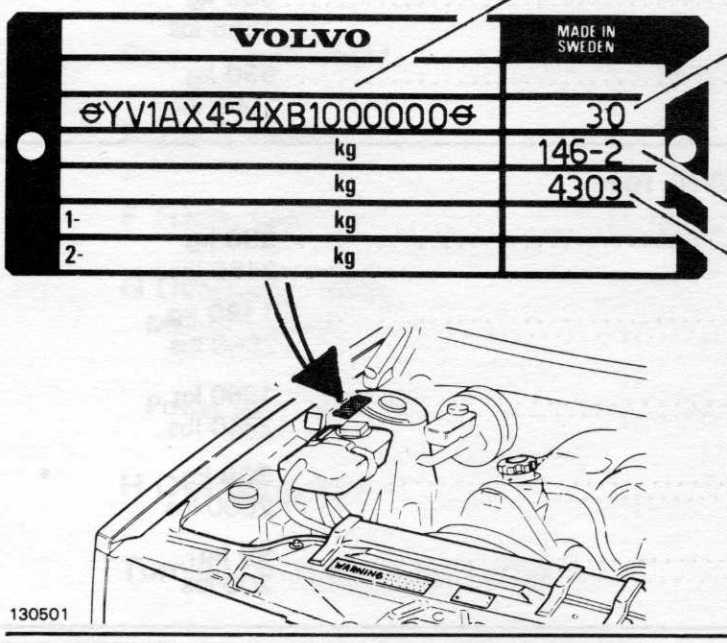
Vehicle Identification Number (VIN)
For decoding, see next page.



Market Code
30 = USA/Federal
31 = USA/California
39 = Canada, manufactured in Sweden
83 = Canada, manufactured in Canada

Paint Code

Upholstery Code

130501

Decoding of Vehicle Identification Number (VIN)

YV1AX454XB1000000

Manufacturer code
Assigned by ISO

Series and safety system
A = 240 with 3-point safety belt
B = 260 with 3-point safety belt

Vacant

Engine
41 = B21A
45 = B21F 47 = B21F–Turbo 49 = B21F–MPG
69 = B28F
77 = D24 (diesel)
84 = B23E

Body
2 = 2-door, not Coupe, standard wheelbase
4 = 4-door, standard wheelbase
5 = 5-door (wagon), standard wheelbase
7 = 2-door, Coupe, standard wheelbase

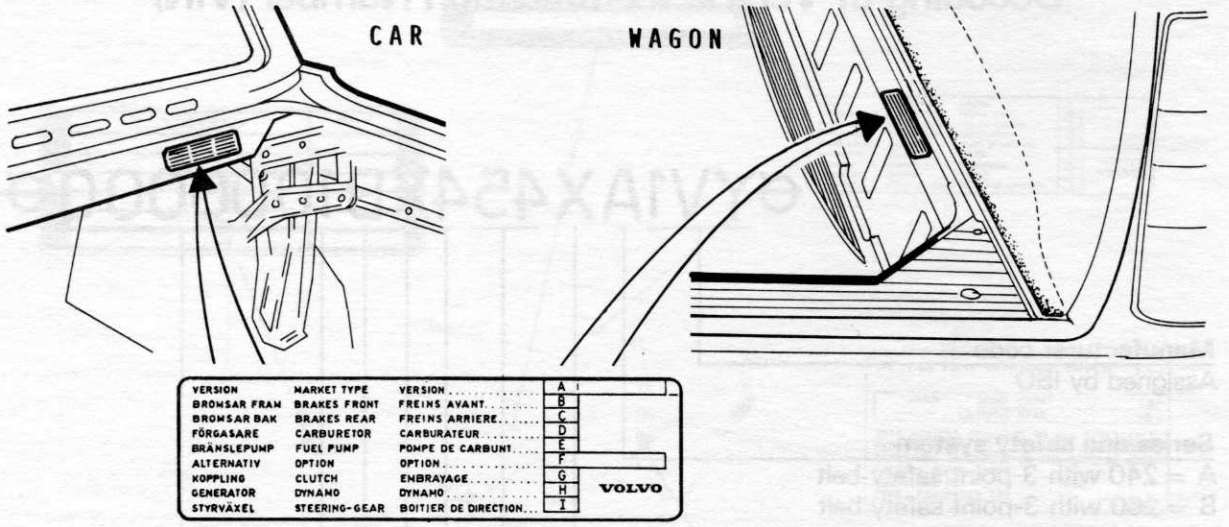
Check figure
Calculated from other digits.

Year model code
Assigned by FMVSS

Manufacturing plant
0 = Kalmar/Sweden
1 = Torslanda/Sweden
2 = Volvo Europe
3 = Canada
D = Italy (assembled by Bertone)

Serial number ("chassis number")
For 1981 year models, the serial numbers start at:
189180 for 4-cylinder, 2-door
592110 for 4-cylinder, 4-door
317940 for 4-cylinder, 5-door (wagon)
8375 for 6-cylinder, 2-door (Coupe)
107610 for 6-cylinder, 4-door
28320 for 6-cylinder, 5-door (wagon)

Service label



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130498

A. Version.
See "Decoding of Version Identification Code (VIC), next page.

B. Front brakes.
Code number 1 = Girling

C. Rear brakes.
Code number 1 = Girling
2 = ATE

D. Carburetor.
Code number 1 = Zenith-Stromberg
2 = SU

E. Fuel pump.
Code number 1 = SEV Marchal
2 = Pierburg
3 = Bosch
4 = AC-Delco

F. Option.
Special code number with several digits identifies special equipment, such as aluminum wheels, air conditioning, air dam, central lock etc.

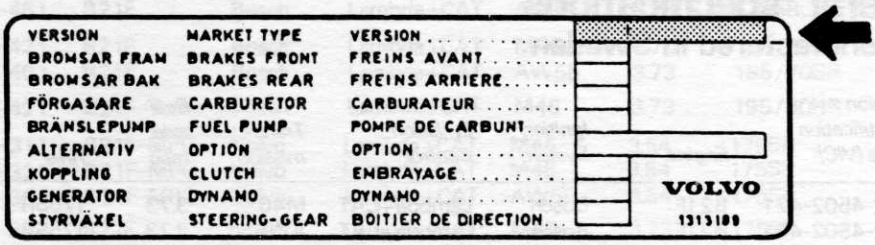
G. Clutch.
Code number 1 = Borg & Beck
2 = Fichtel & Sachs

H. Alternator.
Code number 1 = Bosch
2 = SEV Marchal

I. Steering gear.
Code number 1 = Cam Gear
2 = ZF

Decoding of Version Identification Code (VIC)

These numbers identify the vehicle model, body type, engine type, fuel system, emission equipment and other market features.



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Service label

VIC number breakdown

24 2 84 06 4 2 1

Vehicle model
24 = 240 Series
26 = 260 Series

Number of doors
2 = 2 doors, Coupe
4 = 4 doors
5 = 5 doors, wagon

Engine
41 = B21A
45 = B21F 47 = B21F–Turbo 49 = B21F–MPG
69 = B28F
77 = D24
84 = B23E

Sales model
02 = DL
03 = GL
06 = GLT
07 = Coupe

Body model
3 = Without sunroof USA/Canada
4 = With sunroof USA/Canada

Transmission
1 = M45
2 = M46
6 = AW55
8 = BW55

Steering wheel position
1 = Left hand drive
2 = Right hand drive

Version Identification Codes (VIC)

Gasoline engines

US "Federal" specifications

Vehicles manufactured in Sweden

NA = Not Applicable

Model and doors	*Version Identification Code (VIC)*	*Engine*	*Ignition System*	*Emission Control*	*Trans-mission*	*Rear axle ratio*	*Tires*	*Steering*	*Sun-roof*
DL 2-d	242-4502-421	B21F	Bosch	Lambda+CAT	M46	3.73	175SR	Power	Yes
DL 2-d	242-4502-461	B21F	Bosch	Lambda+CAT	AW55	3.73	175SR	Power	Yes
GL 2-d	242-4503-421	B21F	Bosch	Lambda+CAT	M46	3.73	185/70SR	Power	Yes
GL 2-d	242-4503-461	B21F	Bosch	Lambda+CAT	AW55	3.73	185/70SR	Power	Yes
GLT 2-d	242-4706-421	B21F–Turbo	Bosch	Lambda+CAT	M46	3.73	195/60HR	Power	Yes
DL 2-d	242-4902-311	B21F–MPG	Volvo	Lambda+CAT	M45	3.54	175SR	Manual	No
DL 2-d	242-4902-321	B21F–MPG	Volvo	Lambda+CAT	M46	3.54	175SR	Manual	No
DL 2-d	242-4902-361	B21F–MPG	Volvo	Lambda+CAT	AW55	3.54	175SR	Power	No
DL 4-d	244-4502-311	B21F	Bosch	Lambda+CAT	M45	3.73	175SR	Manual	No
DL 4-d	244-4502-321	B21F	Bosch	Lambda+CAT	M46	3.73	175SR	Manual	No
DL 4-d	244-4502-361	B21F	Bosch	Lambda+CAT	AW55	3.73	175SR	Power	No
DL 4-d	244-4502-421	B21F	Bosch	Lambda+CAT	M46	3.73	175SR	Power	Yes
DL 4-d	244-4502-461	B21F	Bosch	Lambda+CAT	AW55	3.73	175SR	Power	Yes
DL 5-d	245-4502-311	B21F	Bosch	Lambda+CAT	M45	3.73	185SR	Power	NA
DL 5-d	245-4502-321	B21F	Bosch	Lambda+CAT	M46	3.73	185SR	Power	NA
DL 5-d	245-4502-361	B21F	Bosch	Lambda+CAT	BW55	3.73	185SR	Power	NA
Coupe 2-d	262-6907-321	B28F	Bosch	Lambda+CAT	M46	3.73	185/70SR	Power	No
Coupe 2-d	262-6907-381	B28F	Bosch	Lambda+CAT	BW55	3.54	185/70SR	Power	No
GL 4-d	264-4503-421	B21F	Bosch	Lambda+CAT	M46	3.73	185/70SR	Power	Yes
GL 4-d	264-4503-461	B21F	Bosch	Lambda+CAT	AW55	3.73	185/70SR	Power	Yes
GLE 4-d	264-6904-421	B28F	Bosch	Lambda+CAT	M46	3.73	185/70ST	Power	Yes
GLE 4-d	264-6904-481	B28F	Bosch	Lambda+CAT	BW55	3.54	185/70SR	Power	Yes
GLE 5-d	265-6904-321	B28F	Bosch	Lambda+CAT	M46	3.73	185/70SR	Power	NA
GLE 5-d	265-6904-381	B28F	Bosch	Lambda+CAT	BW55	3.54	185/70SR	Power	NA

Canada

Vehicles manufactured in Sweden

NA = Not Applicable

Model and doors	*Version Identification Code (VIC)*	*Engine*	*Ignition System*	*Emission Control*	*Trans-mission*	*Rear axle ratio*	*Tires*	*Steering*	*Sun-roof*
Coupe 2-d	262-6907-321	B28F	Bosch	Lambda+CAT	M46	3.73	185/70SR	Power	No
Coupe 2-d	262-6907-381	B28F	Bosch	Lambda+CAT	BW55	3.54	185/70SR	Power	No
GLE 4-d	264-6904-421	B28F	Bosch	Lambda+CAT	M46	3.73	185/70SR	Power	Yes
GLE 4-d	264-6904-481	B28F	Bosch	Lambda+CAT	BW55	3.54	185/70SR	Power	Yes
GLE 5-d	265-6904-321	B28F	Bosch	Lambda+CAT	M46	3.73	185SR	Power	NA
GLE 5-d	265-6904-381	B28F	Bosch	Lambda+CAT	BW55	3.54	185SR	Power	NA

US "California" specifications

Vehicles manufactured in Sweden

NA = Not Applicable

Model and doors	*Version Identification Code (VIC)*	*Engine*	*Ignition System*	*Emission Control*	*Trans-mission*	*Rear Axle ratio*	*Tires*	*Steering*	*Sun-roof*
DL 2-d	242-4502-421	B21F	Bosch	Lambda+CAT	M46	3.73	175SR	Power	Yes
DL 2-d	242-4502-461	B21F	Bosch	Lambda+CAT	AW55	3.73	175SR	Power	Yes
GL 2-d	242-4503-421	B21F	Bosch	Lambda+CAT	M46	3.73	185/70SR	Power	Yes
GL 2-d	242-4503-461	B21F	Bosch	Lambda+CAT	AW55	3.73	185/70SR	Power	Yes
GLT 2-d	242-4706-421	B21F–Turbo	Bosch	Lambda+CAT	M46	3.73	195/60HR	Power	Yes
DL 2-d	242-4902-311	B21F–MPG	Volvo	Lambda+CAT	M45	3.54	175SR	Manual	No
DL 2-d	242-4902-321	B21F–MPG	Volvo	Lambda+CAT	M46	3.54	175SR	Manual	No
DL 2-d	242-4902-361	B21F–MPG	Volvo	Lambda+CAT	AW55	3.54	175SR	Power	No
DL 4-d	244-4502-311	B21F	Bosch	Lambda+CAT	M45	3.73	175SR	Manualk	No
DL 4-d	244-4502-321	B21F	Bosch	Lambda+CAT	M46	3.73	175SR	Manual	No
DL 4-d	244-4502-361	B21F	Bosch	Lambda+CAT	AW55	3.73	175SR	Power	No
DL 4-d	244-4502-421	B21F	Bosch	Lambda+CAT	M46	3.73	175SR	Power	Yes
DL 4-d	244-4502-461	B21F	Bosch	Lambda+CAT	AW55	3.73	175SR	Power	Yes
DL 5-d	245-4502-311	B21F	Bosch	Lambda+CAT	M45	3.73	185SR	Power	NA
DL 5-d	245-4502-321	B21F	Bosch	Lambda+CAT	M46	3.73	185SR	Power	NA
DL 5-d	245-4502-361	B21F	Bosch	Lambda+CAT	BW55	3.73	185SR	Power	NA
Coupe 2-d	262-6907-321	B28F	Bosch	Lambda+CAT	M46	3.73	185/70SR	Power	No
Coupe 2-d	262-6907-381	B28F	Bosch	Lambda+CAT	BW55	3.54	185/70SR	Power	No
GL 4-d	264-4503-421	B21F	Bosch	Lambda+CAT	M46	3.73	185/70SR	Power	Yes
GL 4-d	264-4503-461	B21F	Bosch	Lambda+CAT	AW55	3.73	185/70SR	Power	Yes
GLE 4-d	264-6904-421	B28F	Bosch	Lambda+CAT	M46	3.73	185/70SR	Power	Yes
GLE 4-d	264-6904-481	B28F	Bosch	Lambda+CAT	BW55	3.54	185/70SR	Power	Yes
GLE 5-d	265-6904-321	B28F	Bosch	Lambda+CAT	M46	3.73	185SR	Power	NA
GLE 5-d	265-6904-381	B28F	Bosch	Lambda+CAT	BW55	3.54	185SR	Power	NA

Canada

Vehicles manufactured in Canada

NA = Not Applicable

Model and doors	*Version Identification Code (VIC)*	*Engine*	*Ignition System*	*Emission Control*	*Trans-mission*	*Rear axle ratio*	*Tires*	*Steering*	*Sun-roof*
DL 2-d	242-4102-311	B21A	Bosch	Pulsair	M45	3.91	DR78/185	Manual	No
DL 2-d	242-4102-381	B21A	Bosch	EGR on/off+Pulsair	BW55	3.73	DR78/185	Power	No
DL 2-d	242-4102-421	B21A	Bosch	Pulsair	M46	3.91	DR78/185	Power	Yes
GLT 2-d	242-8406-421	B23E	Bosch	EGR on/off+Pulsair	M46	3.73	195/60HR	Power	Yes
DL 4-d	242-4102-311	B21A	Bosch	Pulsair	M45	3.91	DR78/185	Manual	No
DL 4-d	244-4102-381	B21A	Bosch	EGR on/off+Pulsair	BW55	3.73	DR78/185	Power	No
DL 4-d	244-4102-421	B21A	Bosch	Pulsair	M46	3.91	DR78/185	Power	Yes
GL 4-d	244-8403-421	B23E	Bosch	EGR on/off+ Pulsair	M46	3.73	185/70SR	Power	Yes
GL 4-d	244-8403-481	B23E	Bosch	EGR prop.+Pulsair	BW55	3.54	185/70SR	Power	Yes
DL 5-d	245-4102-311	B21A	Bosch	Pulsair	M45	3.91	DR78/185	Power	NA
DL 5-d	245-4102-321	B21A	Bosch	Pulsair	M46	3.91	DR78/185	Power	NA
DL 5-d	245-4102-381	B21A	Bosch	EGR on/off+Pulsair	BW55	3.73	DR78/185	Power	NA
GL 5-d	245-8403-321	B23E	Bosch	EGR on/off+Pulsair	M46	3.73	185SR	Power	NA
GL 5-d	245-8403-381	B23E	Bosch	EGR prop.+Pulsair	BW55	3.54	185SR	Power	NA

Diesel engines

US "Federal" specifications

Vehicles manufactured in Sweden

NA = Not Applicable

Model and doors	*Version Identification Code (VIC)*	*Engine*	*Trans-mission*	*Rear axle ratio*	*Tires*	*Steering*	*Sun-roof*
GL 4-d	264-7703-321	D24	M46	3.54	185/70SR	Power	No
GL 4-d	264-7703-381	D24	BW55	3.31	185/70SR	Power	No
GL 4-d	264-7703-421	D24	M46	3.54	185/70SR	Power	Yes
GL 4-d	264-7703-481	D24	BW55	3.31	185/70SR	Power	Yes
GL 5-d	265-7703-321	D24	M46	3.54	185SR	Power	NA
GL 5-d	265-7703-381	D24	BW55	3.31	185SR	Power	NA

Canada

Vehicles manufactured in Canada

Model and doors	*Version Identification Code (VIC)*	*Engine*	*Trans-mission*	*Rear axle ratio*	*Tires*	*Steering*	*Sun-roof*
GL 4-d	264-7703-321	D24	M46	3.73	185/70SR	Power	No
GL 4-d	264-7703-381	D24	BW55	3.54	185/70SR	Power	No
GL 4-d	264-7703-421	D24	M46	3.73	185/70SR	Power	No
GL 4-d	264-7703-481	D24	BW55	3.54	185/70SR	Power	Yes
GL 5-d	265-7703-321	D24	M46	3.73	185SR	Power	NA
GL 5-d	265-7703-381	D24	BW55	3.54	185SR	Power	NA

Anniversary wagon

Special GLT-model equipped with 15 in. aluminum wheels, ribbed plush upholstery etc.

US "Federal" Specifications

Model and doors	*Version Identification Code (VIC)*	*Engine*	*Ignition System*	*Emission Control*	*Trans-mission*	*Rear axle ratio*	*Tires*	*Steering*
GLT 5-d	245-4506-321	B21F	Bosch	Lambda+CAT	M46	3.73	185/65SR	Power
GLT 5-d	245-4506-381	B21F	Bosch	Lambda+CAT	BW55	3.73	185/65SR	Power

US California Specifications

Model and doors	*Version Identification Code (VIC)*	*Engine*	*Ignition System*	*Emission Control*	*Trans-mission*	*Rear axle ratio*	*Tires*	*Steering*
GLT 5-d	245-4506-321	B21F	Bosch	Lambda+CAT	M46	3.73	185/65SR	Power
GLT 5-d	245-4506-381	B21F	Bosch	Lambda+CAT	BW55	3.73	185/65SR	Power

Canada

Model and doors	*Version Identification Code (VIC)*	*Engine*	*Ignition System*	*Emission Control*	*Trans-mission*	*Rear axle ratio*	*Tires*	*Steering*
GLT 5-d	245-8406-321	B23E	Bosch	EGR on/off+Pulsair	M46	3.73	195/60HR	Power
GLT 5-d	245-8406-381	B23E	Bosch	EGR prop.+Pulsair	BW55	3.54	195/60HR	Power

129320

VIN ("chassis number") plate.

Location:
On top of dashboard

May be read from outside of vehicle. Also stamped on right side door pillar.

VEHICLE EMISSION CONTROL INFORMATION

MANUFACTURER: VOLVO, SWEDEN — ENGINE DISPLACEMENT: 130 CU IN
EVAPORATIVE FAMILY: E 2 — ENGINE FAMILY: BVV 13 Ø V6 FFX
EXHAUST EMISSION CONTROL SYSTEM: MFI, OXYGEN SENSOR, TWC

TUNE-UP SPECIFICATIONS WITH NO ACCESSORIES IN OPERATION AND TRANSMISSION IN NEUTRAL

ITEM	CONDITIONS	SPECIFICATIONS
IGNITION TIMING	IDLE RPM ADJUSTED TO 750 ± 50 VACUUM HOSES DISCONNECTED	8° ± 2° BTDC
IDLE RPM	OXYGEN SENSOR CONNECTED	900 ± 50 RPM
VALVE LASH	WARM ENGINE	0.016 - 0.018 INCHES

THIS VEHICLE CONFORMS TO US EPA REGULATIONS APPLICABLE TO
1981 MODEL YEAR NEW LIGHT DUTY VEHICLES.
COMPLIANCE DEMONSTRATED BELOW 4000 FEET.

VOLVO 1244856

130503

Vehicle emission control information label.

Location:
On left front wheel housing.

Black text on white background.

The label to the left is typical for B21F.

VEHICLE EMISSION CONTROL INFORMATION

MANUFACTURER: VOLVO, SWEDEN — ENGINE DISPLACEMENT: 130 CU IN
EVAPORATIVE FAMILY: E 2 — ENGINE FAMILY: BVV 13 Ø V6 FA 5
EXHAUST EMISSION CONTROL SYSTEM: MFI, OXYGEN SENSOR, TWC

TUNE-UP SPECIFICATIONS WITH NO ACCESSORIES IN OPERATION AND TRANSMISSION IN NEUTRAL

ITEM	CONDITIONS	SPECIFICATIONS
IGNITION TIMING	VACUUM HOSES DISCONNECTED	8° ± 2° BTDC
VALVE LASH	WARM ENGINE	0.016 - 0.018 INCHES

THIS VEHICLE CONFORMS TO US EPA AND CALIFORNIA REGULATIONS APPLICABLE TO
1981 MODEL YEAR NEW LIGHT DUTY VEHICLES.
COMPLIANCE DEMONSTRATED BELOW 4000 FEET.

VOLVO 1244968

130504

The label to the left is typical for B21F–MPG.

Note that no idle rpm is specified (Constant Idle Speed System on B21F–MPG).
Ignition timing is set at normal idle speed.

80.08.14-81.02.01 **VOLVO 1981 MODELS**

APPLICABLE CALIFORNIA EXHAUST CONTROL STANDARDS

HC – G/M	CO – G/M	NOX – G/M
0.41	7.0	0.7
HIGHEST VALUES FROM THE ENGINE FAMILY EMISSION DATA FLEET		
0.41	7.0	0.7

THIS VEHICLE HAS BEEN TESTED UNDER AND CONFORMS TO CALIFORNIA ASSEMBLY LINE TEST REQUIREMENTS

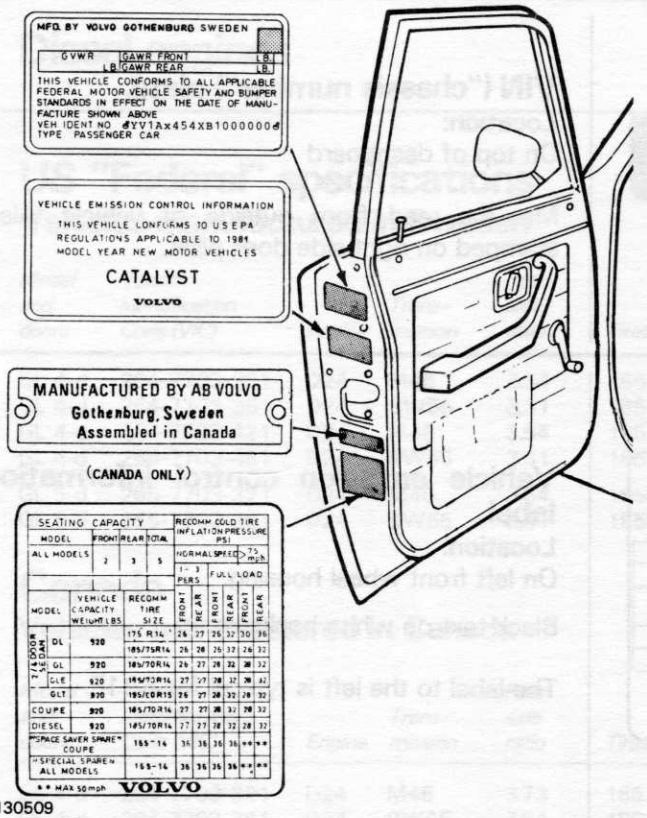
VOLVO 1313291

130508

California, conformity label.

Location:
On left rear side window.

Black text on transparent background.
(The information on this label may change during the production run.)



130509

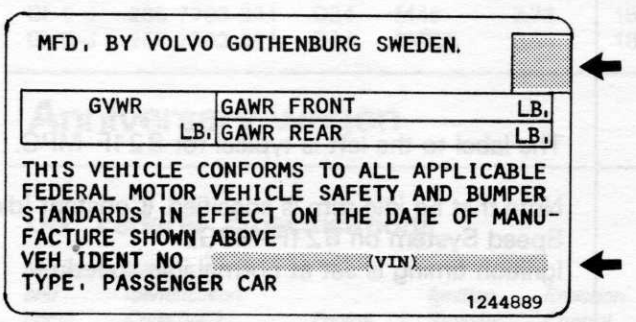
Left front door labels.

On the left front door are displayed several information labels for the driver's immediate attention.

Loads, catalytic converter warning, seating capacity and tire pressures are displayed.

Also the Vehicle Identification Number (VIN) is stated. It can be found on the FMVSS label.

Further explanations of the labels on the left front door appear below.



GVWR = Gross Vehicle Weight Rating
GAWR = Gross Axle Weight Rating

130505

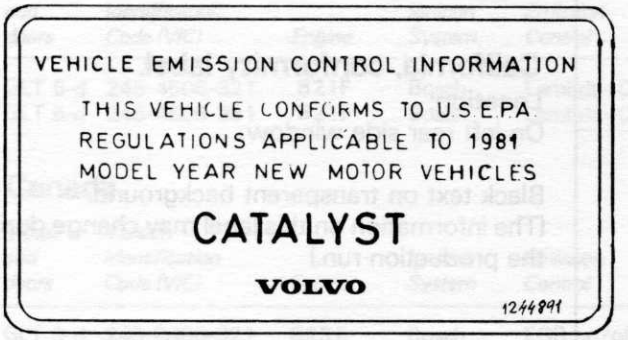
Federal Motor Vehicle Safety Standards (FMVSS) label.

USA label displays lb., Canada label kg.

Location:
Rear facing end of left front door.

Black text on red background.
In the upper right hand corner is a code letter (A, B, C, etc) which has been assigned to a particular model or group of models. This code letter will make it easier for the customer to identify his model among other models listed in the Consummer Information data booklet.

This label also carries the Vehicle Identification Number (VIN).



130507

Catalytic converter label

Location:
Rear facing side of left front door.

Black text on red background.

SEATING CAPACITY				RECOMM COLD TIRE INFLATION PRESSURE PSI					
MODEL	FRONT	REAR	TOTAL	NORMAL SPEED				75 mph	
ALL MODELS	2	3	5	1 3 PERS		FULL LOAD			
MODEL	VEHICLE CAPACITY WEIGHT LBS	RECOMM TIRE SIZE		FRONT	REAR	FRONT	REAR	FRONT	REAR
2 4 DOOR SEDAN DL	920	175 R14		26	27	26	32	30	36
		185 75 R14		26	28	26	32	26	32
GL	920	185 70 R14		26	27	28	32	28	32
GLE	920	185 70 R14		27	27	28	32	28	32
GLT	920	195 60 R15		26	27	28	32	28	32
COUPE	920	185/70 R14		27	27	28	32	28	32
DIESEL	920	185/70 R14		27	27	28	32	28	32
SPACE SAVER SPARE COUPE		165 14		36	36	36	36	* *	* *
SPECIAL SPARE ALL MODELS		165 14		36	36	36	36	* *	* *

* * MAX 50 mph VOLVO 1244885

130506

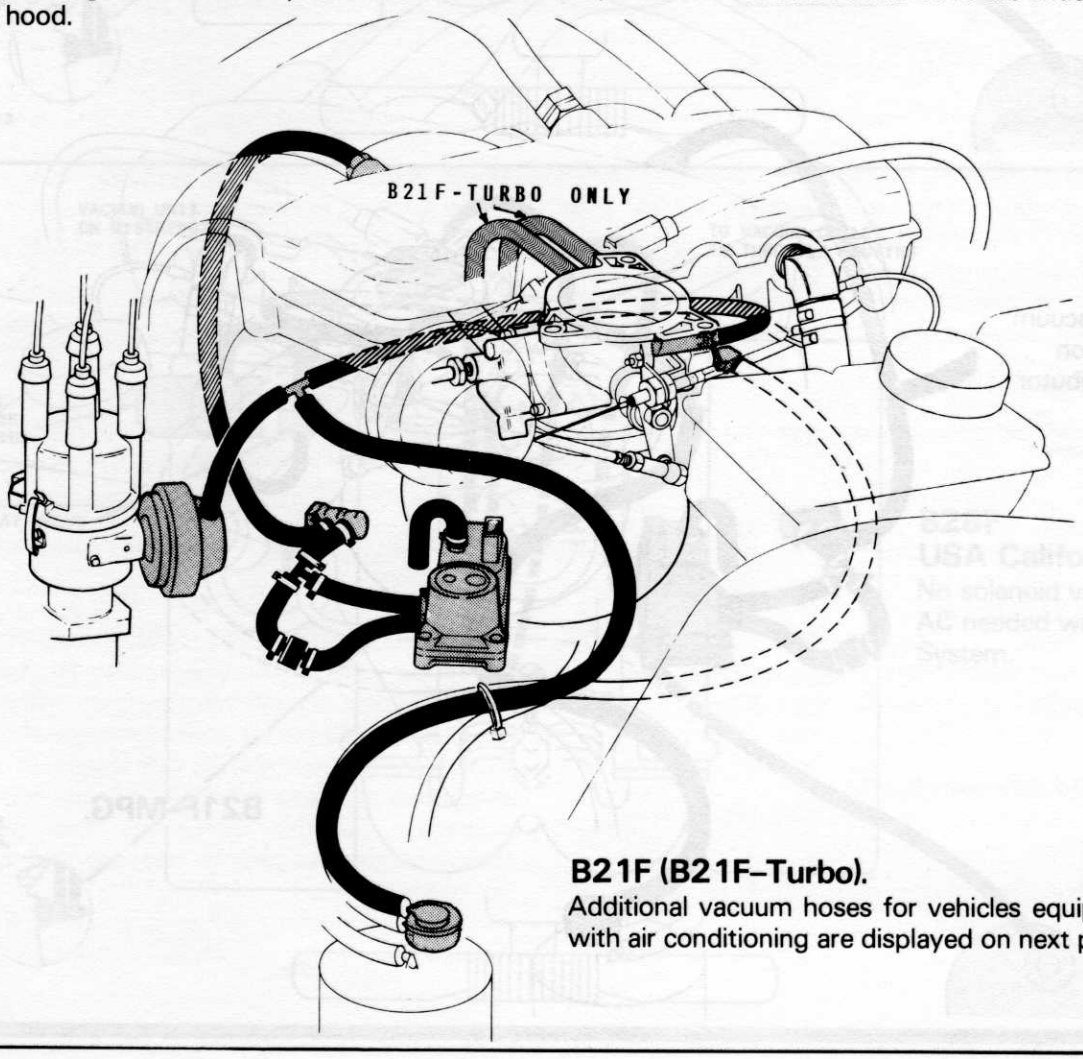
Vehicle carrying capacity and tire information label

Location:
Rear facing end of left front door.

White text on red background.

Routing of vacuum hoses

Corresponding information may be attached to the vehicle, in the form of labels attached to the underside of the hood.



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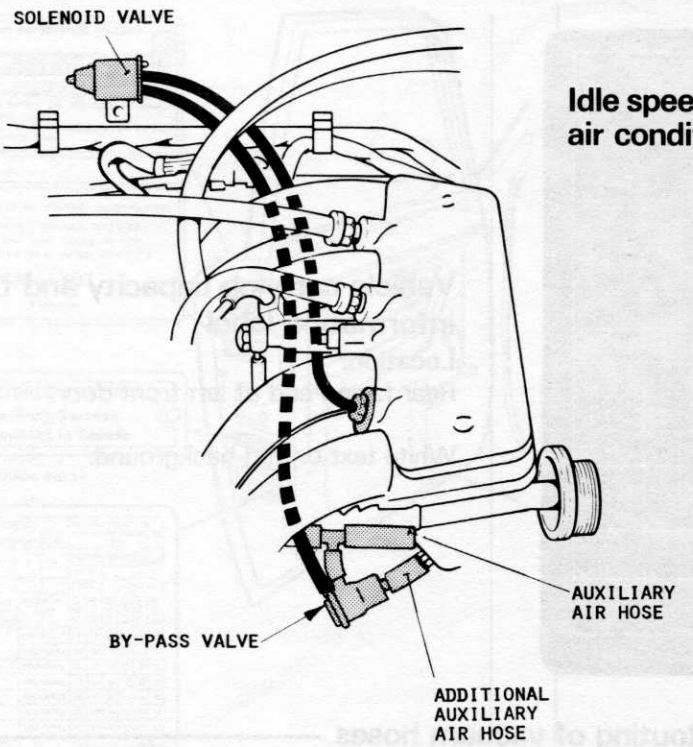
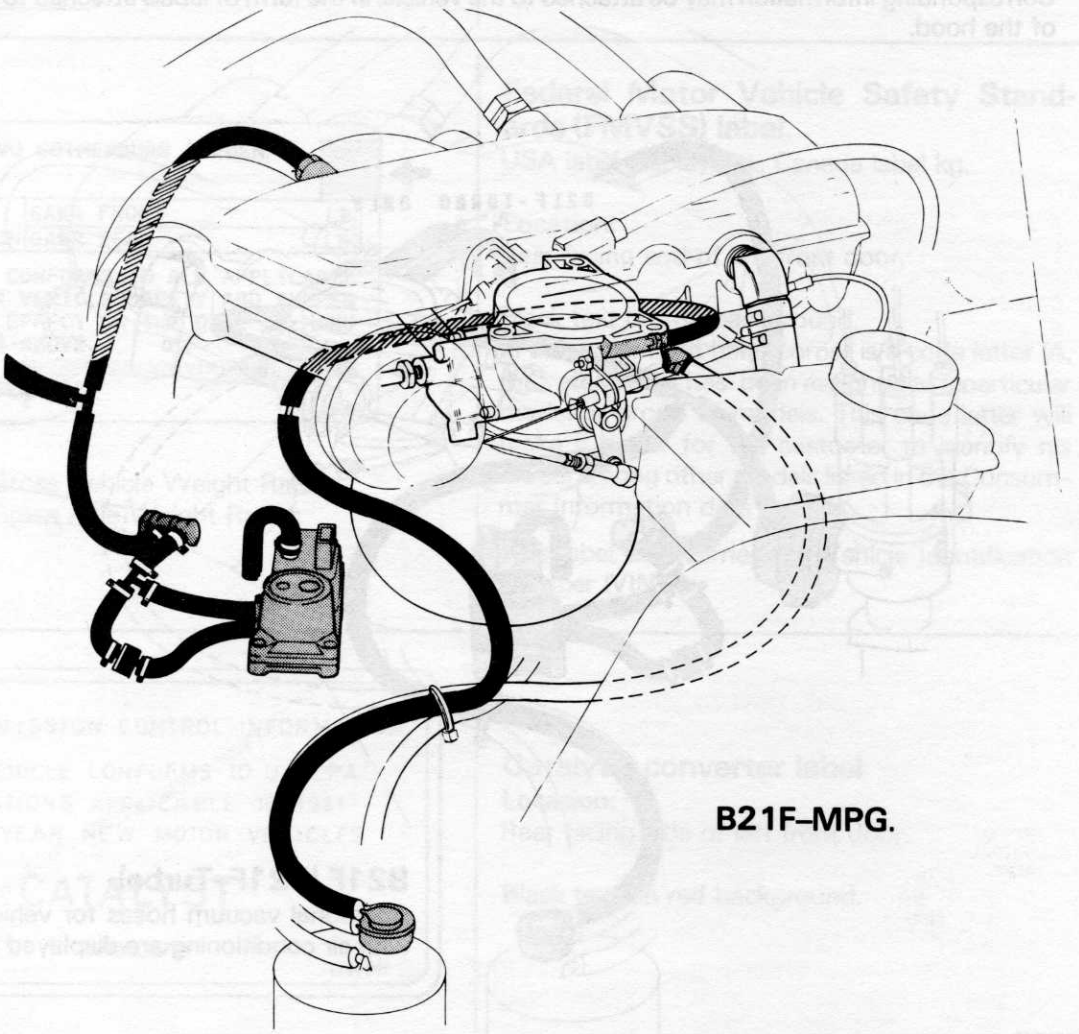
B21F (B21F–Turbo).
Additional vacuum hoses for vehicles equipped with air conditioning are displayed on next page.



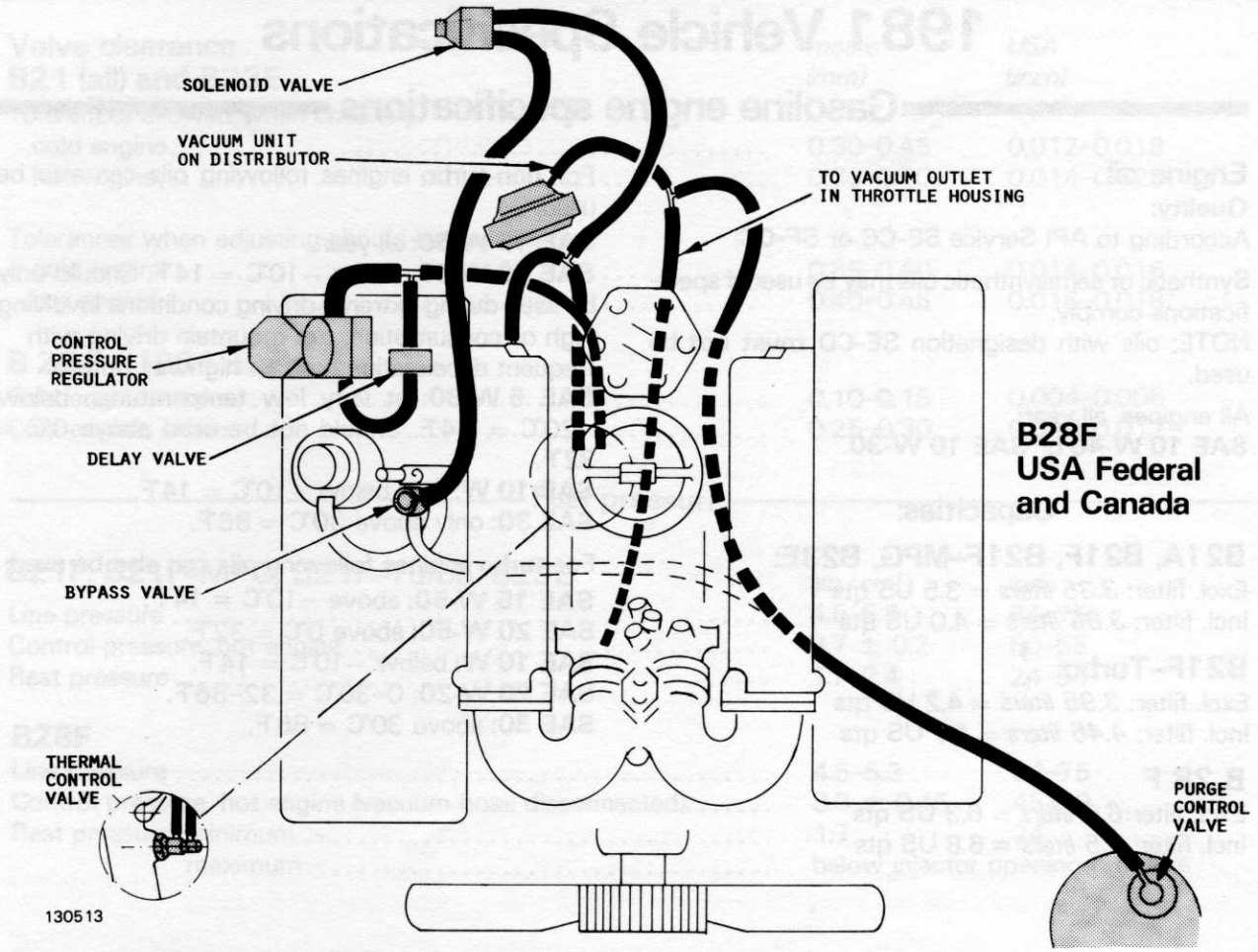
Idle speed compensation for B21F with air conditioning.

130511

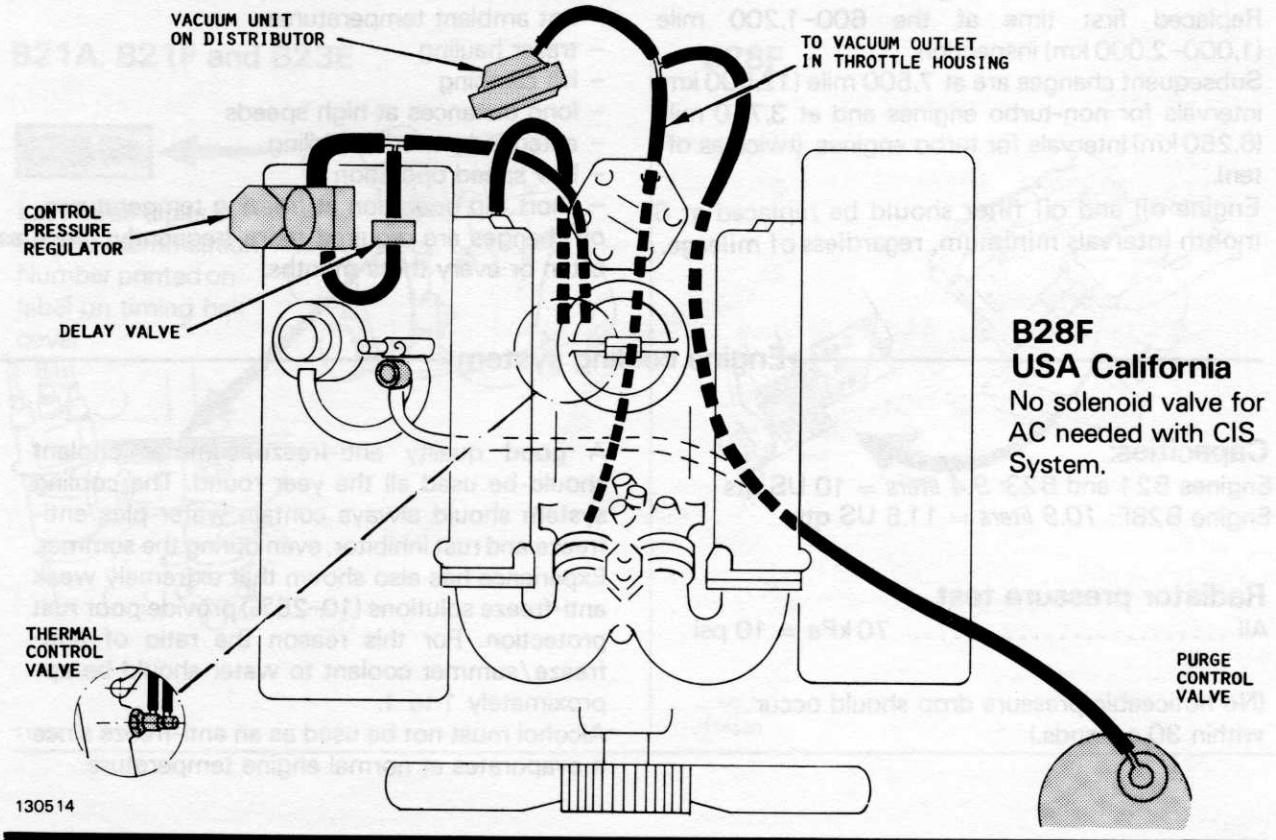


B21F–MPG.

130512



B28F
USA Federal and Canada



B28F
USA California
No solenoid valve for AC needed with CIS System.

1981 Vehicle Specifications

Gasoline engine specifications

Engine oil

Quality:
According to API Service SE-CC or SF-CC.

Synthetic or semisynthetic oils may be used if specifications comply.
NOTE: oils with designation SE-CD **must not** be used.

All engines, all year:
SAE 10 W-40 or **SAE 10 W-30**.

Capacities:

B21A, B21F, B21F–MPG, B23E:
Excl. filter: *3.35 liters* = 3.5 US qts
Incl. filter: *3.85 liters* = 4.0 US qts

B21F–Turbo:
Excl. filter: *3.95 liters* = 4.2 US qts
Incl. filter: *4.45 liters* = 4.7 US qts

B 28 F
Excl. filter: *6.0 liters* = 6.3 US qts
Incl. filter: *6.5 liters* = 6.8 US qts

For **non-turbo** engines following oils can also be used:
SAE 15 W-50: all year.
SAE 20 W-50: above −10°C = 14°F. Should only be used during extreme driving conditions involving high oil consumption, e.g. mountain driving with frequent decelerations or fast highway driving.
SAE 5 W-30: at very low temperatures, below −20°C = −4°F. Should not be used above 0°C = 32°F.
SAE 10 W: only below −10°C = 14°F.
SAE 30: only above 30°C = 86°F.

For **turbo** engines following oils can also be used:
SAE 15 W-50: above −10°C = 14°F.
SAE 20 W-50: above 0°C = 32°F.
SAE 10 W: below −10°C = 14°F.
SAE 20 W-20: 0–30°C = 32–86°F.
SAE 30: above 30°C = 86°F.

Oil and oil filter changes.

Replaced first time at the 600–1,200 mile (1,000–2,000 km) inspection.
Subsequent changes are at 7,500 mile (12,500 km) intervals for non-turbo engines and at 3,750 mile (6,250 km) intervals for turbo engines (twice as often).
Engine oil and oil filter should be replaced at 6 month intervals minimum, regardless of mileage.

Under adverse conditions, such as:
- hot ambient temperatures
- trailer hauling
- hill climbing
- long distances at high speeds
- extended periods of idling
- low speed operation
- short trip operation at freezing temperatures

oil changes are required more frequently; twice as often or every three months.

Engine cooling system

Capacities:

Engines B21 and B23: *9.4 liters* = 10 US qts
Engine B28F: *10.9 liters* = 11.5 US qts

Radiator pressure test

All ..... 70 kPa = 10 psi

(No noticeable pressure drop should occur within 30 seconds.)

A good quality anti-freeze/summer coolant should be used all the year round. The cooling system should always contain water plus anti-freeze and rust inhibitor, even during the summer. Experience has also shown that extremely weak anti-freeze solutions (10–25%) provide poor rust protection. For this reason the ratio of anti-freeze/summer coolant to water should be approximately 1 to 1.
Alcohol must not be used as an anti-freeze since it evaporates at normal engine temperature.

Valve system

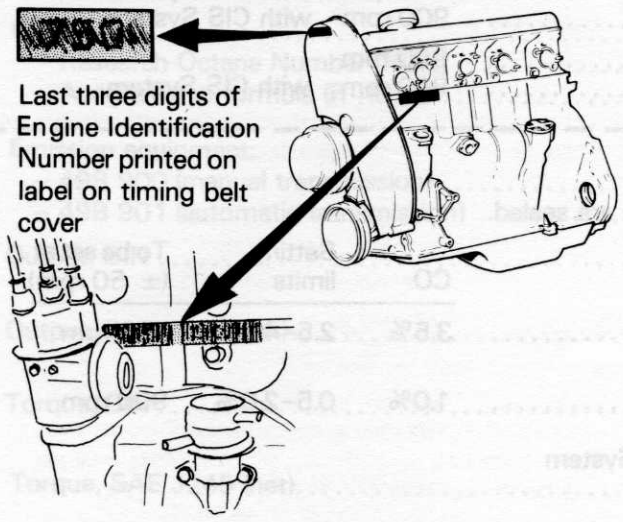
Valve clearance	*metric*	*USA*
B21 (all) and B23E	*(mm)*	*(inch)*
Tolerances allowed when checking:		
cold engine	0.30–0.45	0.012–0.018
hot engine	0.35–0.50	0.014–0.020
Tolerances when adjusting should be kept within:		
cold engine	0.35–0.40	0.014–0.016
hot engine	0.40–0.45	0.016–0.018
B 28 F (1981 models)		
Cold engine, intake	0.10–0.15	0.004–0.006
Cold engine, exhaust	0.25–0.30	0.010–0.012

Fuel pressure

B21F, B21F–MPG, B21F–Turbo, B23E	(kp/cm²)	(psi)
Line pressure	4.5–5.2	64–75
Control pressure, hot engine	3.7 ± 0.2	50–55
Rest pressure	1.7–2.4	24–34
B28F		
Line pressure	4.5–5.3	64–75
Control pressure, hot engine (vacuum hose disconnected)	3.3 ± 0.15	45–49
Rest pressure, minimum	1.7	24
maximum	below injector opening pressure	

Engine Identification Number

B21A, B21F and B23E



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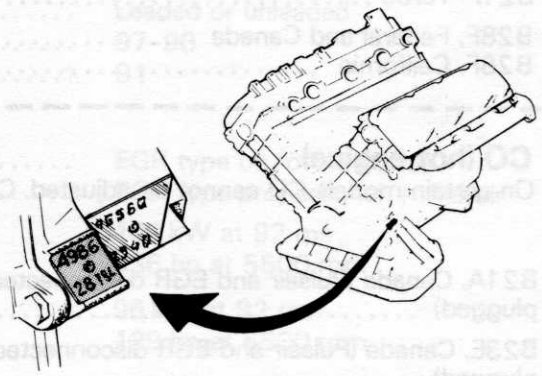
B28F



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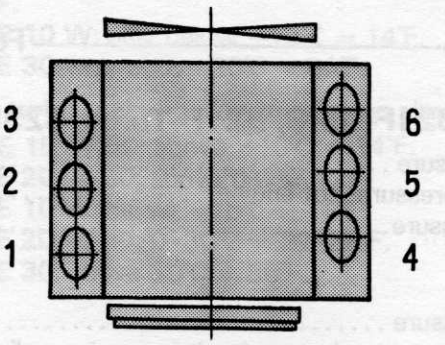
Engine tuning specifications

Ignition timing	Ignition timing (tolerance ± 2°)	To be set at speed (tolerance ± 50 rpm)
B21A, Canada	12°	750 rpm
B23E, Canada	5°	750 rpm
B21F, Federal	8°	750 rpm
B21F, California	8°	900 rpm
B21F–MPG	12°	750 rpm
B21F–Turbo	12°	900 rpm
B28F, Federal and Canada	10°	750 rpm
B28F, California	10°	900 rpm

Firing order:

B21 (all) and B23E:
1–3–4–2
Cyl. 1 up front

B28F:
1–6–3–5–2–4
Cyl. numbering:



Engine idle speed

On certain models (with Constant Idle Speed System = CIS system) idle speed cannot be adjusted. Controls are sealed.

	Idle speed (tolerance ± 50 rpm)	
B21A, Canada	900 rpm	
B23E, Canada	900 rpm	
B21F, Federal	900 rpm	
B21F, California	900 rpm	with CIS System
B21F–MPG	750 rpm	with CIS System
B21F–Turbo	900 rpm	with CIS System
B28F, Federal and Canada	900 rpm	
B28F, California	900 rpm	with CIS System

CO (hot engine)

On certain models CO cannot be adjusted. Controls are sealed.

	CO	Setting limits	To be set at (± 50 rpm)
B21A, Canada (Pulsair and EGR disconnected and plugged)	3.5%	2.5–4.0%	900 rpm
B23E, Canada (Pulsair and EGR disconnected and plugged)	1.0%	0.5–2.0%	900 rpm
Following should be checked with Oxygen Sensor System (Lamba sond) disconnected. When the System is reconnected, CO should drop below 1.0%.			
B21F, USA Federal/California	1.0%	0.7–1.3%	900 rpm
B21F–MPG	1.0%	0.7–1.3%	750 rpm
B21F–Turbo	1.0%	0.7–1.3%	900 rpm
B28F, Canada and USA Federal/California	1.0%	0.7–1.3%	900 rpm

Engines

B21A Canada

Engine Identification Number:	
– B 21 A, manual transmission	498 914
– B 21 A, automatic transmission	498 915
Compression ratio	8.5:1
Gasoline	Leaded or unleaded
– Research Octane Number (RON)	93
– According to formula (R+M)/2	87
Emission equipment:	
– 498 914 (manual transmission)	EGR type on/off + Pulsair
– 498 915 (automatic transmission)	EGR type proportional + Pulsair
Output, DIN	74 kW at 88 rps 100 hp at 5250 rpm
Output, SAE J245 (net)	72 kW at 88 rps 96 hp at 5250 rpm
Torque, DIN	169 Nm at 42 rps 17.2 kpm at 2500 rpm
Torque, SAE J245 (net)	163 Nm at 42 rps 121 ft. lbs. at 2500 rpm
Carburetor	SU HIF 6
Ignition system	w. breaker points
– Type	Bosch SZ

B23E Canada

Engine Identification Number:	
– B23E, manual transmission	498 900
– B23E, automatic transmission	498 901
Compression ratio	10:1
Gasoline	Leaded or unleaded
– Research Octane Number (RON)	97–98
– According to formula (R+M)/2	91
Emission equipment:	
– 498 900 (manual transmission)	EGR type on/off + Pulsair
– 498 901 (automatic transmission)	EGR type proportional + Pulsair
Output, DIN	100 kW at 92 rps 136 hp at 5500 rpm
Output, SAE J245 (net)	96 kW at 92 rps 129 hp at 5500 rpm
Torque, DIN	190 Nm at 75 rps 19.4 kpm at 4500 rpm
Torque, SAE J245 (net)	183 Nm at 75 rps 135 ft.lbs. at 4500 rpm
Fuel injection system	Bosch CI System
Ignition system	w. breaker points
– Type	Bosch TSZ-2

B21F	**USA Federal**
Engine type	B21–5
– Camshaft type	B
– Camshaft, Volvo P/N	1219030
Engine Identification Number:	
– B21F, manual transmission	498 920
– B21F, automatic transmission	498 921
Compression ratio	9.3:1
Gasoline:	Unleaded
– Research Octane Number (= RON)	91
– Acc. to formula (R+M)/2	87
Emission equipment, all	Oxygen sensor system, catalytic converter
Output, DIN	83 kW at 92 rps 113 hp at 5500 rpm
Output, SAE J245 (net)	80 kW at 92 rps 107 hp at 5500 rpm
Torque, DIN	160 Nm at 42 rps 16.3 kpm at 2500 rpm
Torque, SAE J245 (net)	154 Nm at 42 rps 114 ft. lbs. at 2500 rpm
Fuel injection system	Bosch CI system
Ignition system	Breakerless
– Type	Bosch TSZ-2

B21F	**California**
Engine type	B21–5
– Camshaft type	B
– Camshaft, Volvo P/N	1219030
Engine Identification Number:	
– B21F, manual transmission	498 892
– B21F, automatic transmission	498 893
Compression ratio	9.3:1
Gasoline	Unleaded
– Research Octane Number (= RON)	91
– Acc. to formula (R+M)/2	87
Emission equipment	Oxygen sensor system, catalytic converter, Constant Idle Speed System
Output, DIN	83 kW at 92 rps 113 hp at 5500 rpm
Output, SAE J245 (net)	80 kW at 92 rps 107 hp at 5500 rpm
Torque, DIN	160 Nm at 42 rps 16.3 kpm at 2500 rpm
Torque, SAE J245 (net)	154 Nm at 42 rps 114 ft. lbs. at 2500 rpm
Fuel injection system	Bosch CI System
Ignition system	Breakerless
– Type	Bosch TSZ-2

B21F–MPG USA/Federal and California

Engine type	B21–9
– Camshaft type	A
– Camshaft, Volvo P/N	1306887
Engine Identification Number:	
– B21F, manual transmission	498 896
– B21F, automatic transmission	498 897
Compression ratio	9.3:1
Gasoline	Unleaded
– Research Octane Number (= RON)	91
– Acc. to formula (R+M)/2	87
Emission equipment	Oxygen sensor system, catalytic converter. Constant Idle Speed System
Output, DIN	77 kW at 83 rps 105 hp at 5000 rpm
Output, SAE J245 (net)	74 kW at 83 rps 99 hp at 5000 rpm
Torque, DIN	160 Nm at 50 rps 16.3 kpm at 3000 rpm
Torque, SAE J245 (net)	154 Nm at 50 rps 114 ft. lbs. at 3000 rpm
Fuel injection system	Bosch CI System
Ignition system	Breakerless electronic
– Type	Volvo

B21F-Turbo USA/Federal and California

Engine Identification Number:	
B21F–Turbo, manual transmission	498 898
Compression ratio	7.5
Gasoline	Unleaded
– Research Octane Number (= RON)	91
– Acc. to formula (R+M)/2	87
Emission equipment	Oxygen sensor system, catalytic converter Constant Idle Speed System
Output, DIN	98 kW at 90 rps 133 hp at 5400 rpm
Output, SAE J245 (net)	93 kW at 90 rps 126 hp at 5400 rpm
Torque, DIN	210 Nm at 63 rps 21.4 kpm at 3750 rpm
Torque, SAE J245 (net)	200 Nm at 63 rps 150 ft. lbs. at 3750 rpm
Fuel injection system	Bosch CI System
Iginition system	Breakerless
– Type	Bosch TSZ–2

B28F USA/Federal and Canada

Engine Identification Number:	
– Manual transmission	498 640
– Automatic transmission	498 641
Compression ratio	8.8:1
Gasoline	Unleaded
– Research Octane Number (= RON)	91
– Acc. to formula (R+M)/2	87
Emission equipment	Oxygen sensor system., catalytic converter
Output, DIN	100 kW at 92 rps 136 hp at 5500 rpm
Output, SAE J245 (net)	97 kW at 92 rps 130 hp at 5500 rpm
Torque, DIN	215 Nm at 46 rps 21.9 kpm at 2750 rpm
Torque, SAE J245 (net)	208 Nm at 46 rps 153 ft. lbs. at 2750 rpm
Fuel injection system	Bosch CI System
Ignition system	Breakerless
– Type	Bosch TSZ–4

B28F California

Engine Identification Number:	
– Manual transmission	498 638
– Automatic transmission	498 639
Compression ratio	8.8:1
Gasoline	Unleaded
– Research Octane Number (= RON)	91
– Acc. to formula (R+M)/2	87
Emission equipment	Oxygen sensor system, catalytic converter. Constant Idle Speed System
Output, DIN	100 kW at 92 rps 136 hp at 5500 rpm
Output, SAE J245 (net)	97 kW at 92 rps 130 hp at 5500 rpm
Torque, DIN	215 Nm at 46 rps 21.9 kpm at 2750 rpm
Torque, SAE J245 (net)	208 Nm at 46 rpm 153 ft. lbs. at 2750 rpm
Fuel injection system	Bosch CI System
Ignition system	Breakerless
– Type	Bosch TSZ–4

Electrical

Battery

Voltage	12.0 V
Starting voltage	9.5 V
Specific gravity of electrolyte:	
Fully charged	1.28
Recharge at	1.21

Distributor, B 21 A/Canada

Dwell angle	62° ± 3°

Spark plugs

NOTE:
Spark plugs must be tightened to specified torque for proper operation and to avoid damage to threads.
Spark plug removal and installation must be performed when engine is cold (low reading on temperature gauge).

B 21 A	Volvo P/N 273592-6 (set of four) or Bosch W7DC
Gap	0.7–0.8 mm = 0.028–0.032"
Torque (plug threads not oiled)	20–30 Nm = 15–18 ft. lbs.
B 23 E	Volvo P/N 273591-8 (set of four) or Bosch W6DC
Gap	0.7–0.8 mm = 0.028–0.032"
Torque (plug threads not oiled)	20–30 Nm = 15–18 ft. lbs.
B 21 F, B 21 F-MPG, B 21 F-Turbo	"Super" spark plug Volvo P/N 273594-2 (set of four) or Bosch WR7DS
Gap	0.7–0.8 mm = 0.028–0.032"
Torque (plug threads not oiled)	20–30 Nm = 15–22 ft. lbs.
B 28 F	"Super" spark plug Volvo P/N 273593-4 (set of six) or Bosch HR6DS
Gap	0.7–0.8 mm = 0.028–0.032"
Torque (plug threads not lubricated)	10–14 Nm = 7–10 ft. lbs.

Transmission, rear axle

Clutch

Clutch fork play

B21A, B21F and B23E	3–4 mm = 0.12–0.16"
B21F-Turbo	1–3 mm = 5/64" negative play
B28F	No play, no adjustment

Manual transmission

Manual 4-speed transmission, M45

Capacity: 0.75 liters = 0.8 US qt.
Fluid type: Automatic transmission Fluid type F or G (FLM).

Replace: at the 600–1200 mile (1 000–2 000 km) service only.

The oil level should be up to the filler plug hole. Drain the oil while it is still hot from driving by removing the drain plug.

Manual 4-speed transmission with overdrive, M46

Capacity: 2.3 liters = 2.4 US qts.
Fluid type: Automatic Transmission Fluid type F or G (FLM).

Replace: at the 600– 1200 mile (1 000–2 000 km) service only.

The oil level should be up to the filler plug hole. Transmission and overdrive are lubricated by the same oil. Therefore, when the oil is drained, remove cover on overdrive and clean strainer. Drain the oil while it is still hot from driving by removing the drain plug.

Automatic transmission

AW55/BW55

Capacity: 6.75 liters = 7.3 US qts.

Fluid type: Automatic Transmission Fluid, type F or G.
Replace: no fluid changes necessary under normal driving conditions.

Driving under adverse conditions such as trailer hauling, driving long distances at high speeds etc. should have the oil changed every 30,000 miles (50,000 km). If an additional oil cooler has been installed this oil change is not necessary.

When checking fluid level, the car should be on level ground in PARK position with the engine idling. If topping up is necessary, fill through the dipstick tube.
NOTE: the dipstick has graduations for hot and cold transmission fluid. When checking the fluid level use a clean rag that will not leave lint.

Shift speeds, AW55/BW55 and engine B21 (all) and B23E

	km/h	mph
Kick-down upshift 1–2, 5200 engine rpm	55–70	35–44
Kick-down upshift 2–3, 5400 engine rpm	100–115	62–71
Kick-down downshift 3–2	min. 90	min. 56
Kick-down downshift 3–1	35–55	22–35

Shift speeds, BW 55 and engine B 28 F

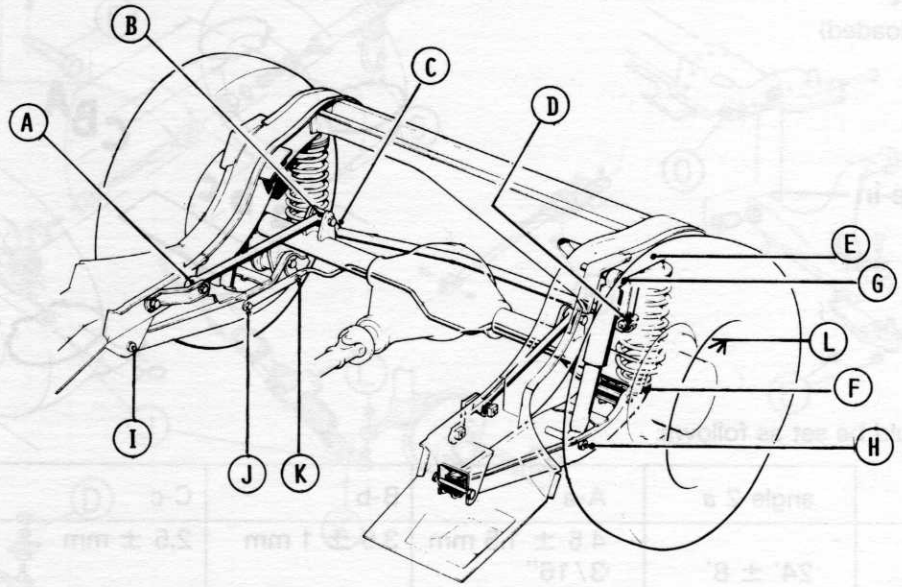
Kick-down upshift 1–2	65–80	39–48
Kick-down upshift 2–3	110–130	66–78
Kick-down downshift 3–1	40–58	24–35
Kick-down downshift 3–2	min. 105	min. 63
When manually shifting into first gear, 2–1 downshift is obtained at	40–58	24–35

Rear axle

Capacity: 1.6 liters = 1.7 US qts.
Fluid type: API GL-5 (MIL-L-2105 B or C).
Viscosity: SAE 90
Replace: between first 600–1200 miles only.

The oil level should be up to the filler plug hole. Drain rear axle oil by removing drain plug. When the temperature is steadily below 15° F = –10° C, use API GL-5 SAE 80 W oil. Use oils with proper additives for cars equipped with limited-slip differential.

Rear end torques



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		Nm	ft. lbs.
	Reaction rod:		
A	Body attachment	85	62
B	Rear axle attachment	85	62
	Track rod (Panhard rod):		
C	Rear axle attachment	60	44
D	Body attachment	85	62
	Rear spring:		
E	Upper attachment	45	32
F	Lower attachment	19	14
	Shock absorber:		
G	Upper attachment	85	62
H	Lower attachment	85	62
	Trailing arm:		
I	Body attachment	115	85
F	Rear attachment (= spring lower attachment)	19	14
	Stabilizer:		
J	Front attachment (= shock absorber)	85	62
K	Rear attachment	45	32
	Wheels:		
L	Nuts, tightened criss-cross	115	85

Brakes

Brake fluid

Fluid type: DOT 4
Replace: every third year or 45,000 miles = 75,000 km.

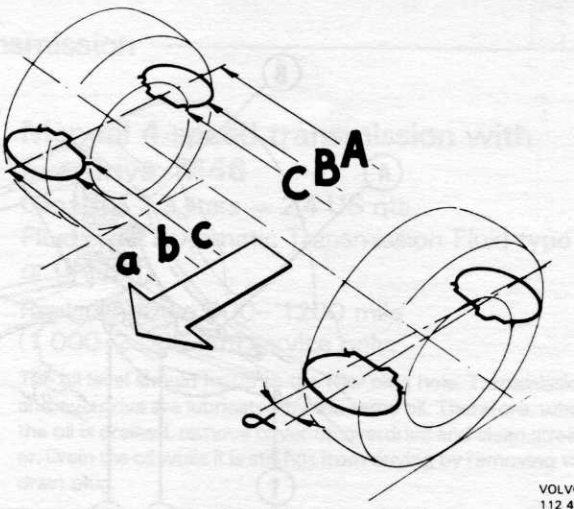
Check (without removing the cap) that the level is above the "MIN" mark of the fluid reservoir.
Change brake fluid every year when the car has been driven under extremely hard conditions: mountain driving etc., and if the vehicle is equipped with an air dam.

Front end

Alignment

(vehicles unloaded)

Toe-in



Toe-in should be set as follows:

	angle 2 *a*	A-a	B-b	C-c
Manual steering	24' ± 8'	4.5 ± 1.5 mm 3/16" (0.18 ± 0.06")	3.5 ± 1 mm (0.14± 0.04")	2.5 ± mm (0.10 ± 0.04")
Power steering	16' + 8'	3.0 ± 1.5 mm 1/8" (0.12 ± 0.06")	2.0 ± 1 mm (0.08 ± 0.04")	1.5 ± 1 mm (0.06 ± 0.04")

Vehicle should not be loaded. Measurements must be made at center (hub) height, a is an angle, read on certain instruments. A, B, and C refer to tire outer diameter, tire inner shoulder and rim, respectively.

Camber, caster

Caster (not to exceed 1/2° difference between sides)
– manual steering ..... + 2° to + 3°
– power steering ..... + 3° to + 4°

Camber (not to exceed 1/2° difference between sides)
– all, except GLT ..... +1° to +1 1/2°
– GLT ..... +1/4° to +3/4°

(Reduce camber if excessive wear on tire outer shoulder is observed)

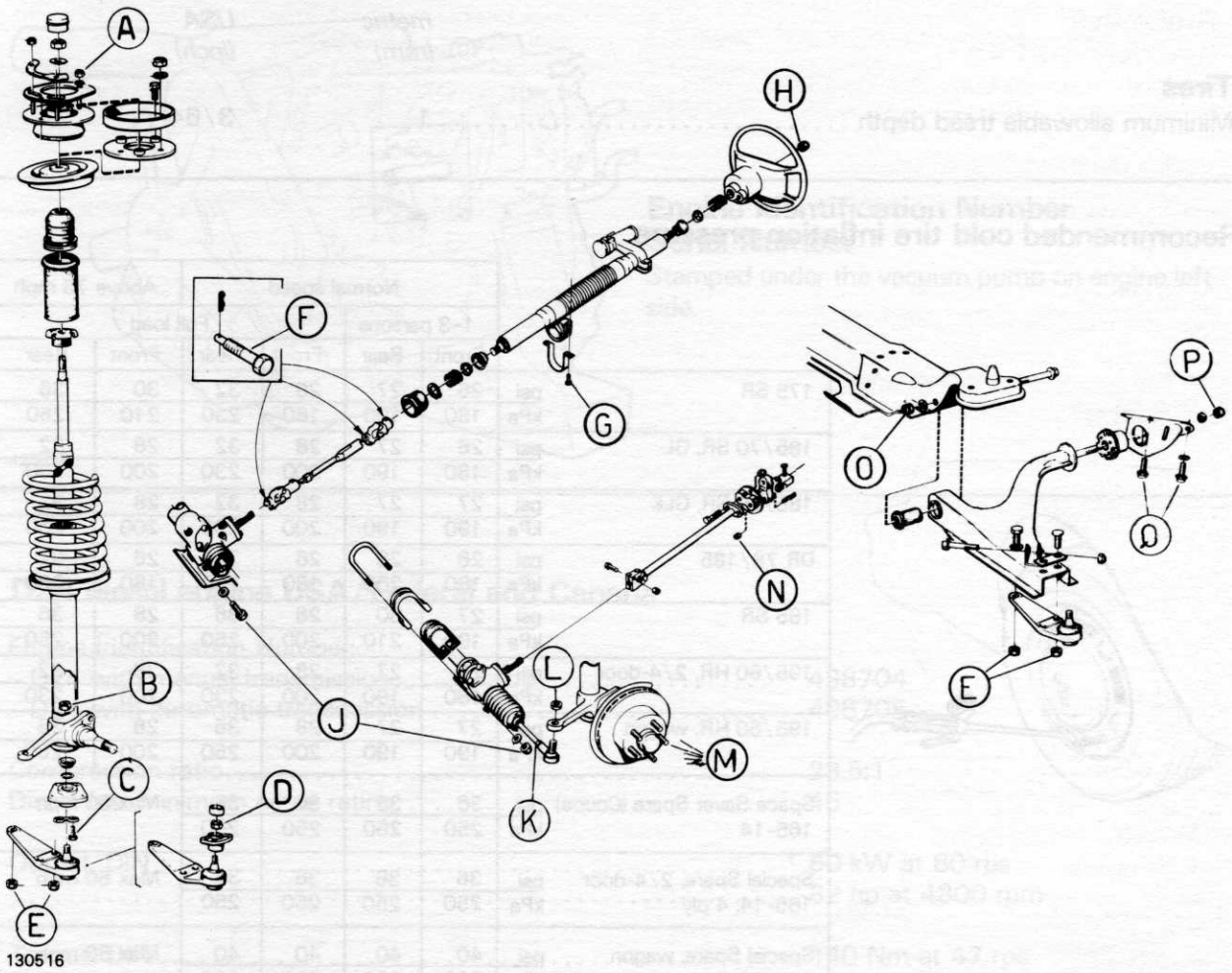
Power steering

Fluid type: ATF
Replace: no fluid change required.

Check fluid level with engine idling while the fluid is still hot from driving. Wipe the reservoir clean. The fluid level should be within the markings on the dipstick which is attached to the cover.

Capacities:
B21 (all) and B23E: *0.7 liters* = 0.8 US qts.
B 28 F: *1.2 liters* = 1.3 US qts

FRONT END TORQUES

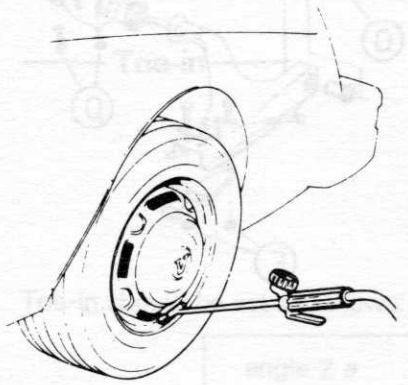


		Nm	Ft.lbs.
A	Nuts for upper journalling	**20**	**14**
B	Ball joint nut in strut (early prod.)	**60**	**43**
C	Ball joint bolts	**23**	**17**
D	Ball joint nut (late prod.)	**60**	**43**
E	Nuts, ball joint to control arm	**115**	**85**
F	Bolts for steering shaft joints	**23**	**17**
G	Bolts for steering column attachment	**20**	**14**
H	Steering wheel center nut	**60**	**44**
J	Bolts/nuts retaining steering gear	**20**	**14**
K	Lock nut on steering rod	**70**	**50**
L	Nut, tie rod to steering arm	**60**	**44**
M	Wheel nuts	**120**	**90**
N	Bolts for steering shaft rubber coupling	**20**	**14**
O	Front bolt for control arm bushing	**75**	**54**
P	Nut for control arm rear bushing	**55**	**40**
Q	Bolts for control arm rear bushing bracket	**40**	**29**

Wheels

	metric (mm)	*USA (inch)*
Tires		
Minimum allowable tread depth	1	3/64

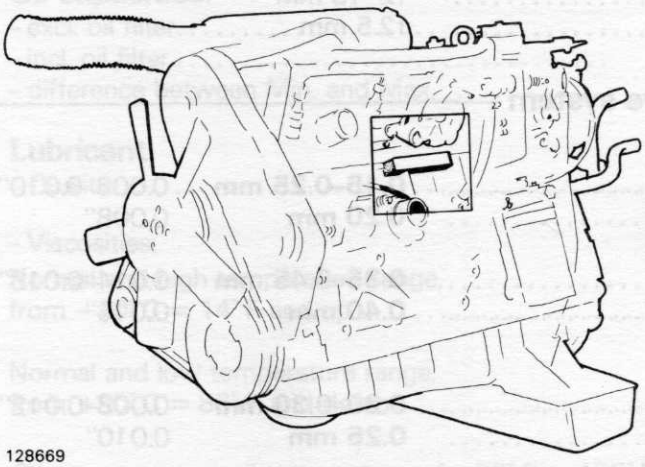
Recommended cold tire inflation pressure.



		Normal speed				Above 75 mph	
		1–3 persons		Full load			
		Front	Rear	Front	Rear	Front	Rear
175 SR	psi	26	27	26	32	30	36
	kPa	180	190	180	230	210	250
185/70 SR, GL	psi	26	27	28	32	28	32
	kPa	180	190	200	230	200	230
185/70 SR, GLE	psi	27	27	28	32	28	32
	kPa	190	190	200	230	200	230
DR 78/185	psi	26	28	26	32	26	32
	kPa	180	200	180	230	180	230
185 SR	psi	27	30	28	36	28	36
	kPa	190	210	200	250	200	250
195/60 HR, 2/4-door	psi	26	27	28	32	28	32
	kPa	180	190	200	230	200	230
195/60 HR, wagon	psi	27	27	28	36	28	36
	kPa	190	190	200	250	200	250
Space Saver Spare (Coupe) 165-14	psi	36	36	36	36	Max 50 mph	
	kPa	250	250	250	250		
Special Spare, 2/4-door 165-14, 4 ply	psi	36	36	36	36	Max 50 mph	
	kPa	250	250	250	250		
Special Spare, wagon 175-14, 8 ply	psi	40	40	40	40	Max 50 mph	
	kPa	280	280	280	280		

For driving with full load, speed must be limited to 75 mph = 120 km/h.
50 mph = 80 km/h is max speed for Space Saver Spare and Special Spare.

Diesel engine specifications



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Engine Identification Number
Serial Number
Stamped under the vacuum pump on engine left side.

D24 diesel engine USA/Federal and Canada

Engine Identification Number:	
– D24 with manual transmission	498704
– D24 with automatic transmission	498705
Compression ratio	23.5:1
Diesel fuel minimum cetan rating	45
Output, DIN	60 kW at 80 rps
	82 hp at 4800 rpm
Torque, DIN	140 Nm at 47 rps
	14.3 kpm at 2800 rpm
Cylinders	6
Firing order	1–5–3–6–2–4
Displacement	2.383 liters = 145 cu.in.
Cylinder bore	76.5 mm = 3.0118"
Stroke	86.4 mm = 3.4016"
Compression pressures:	
– New engine	3.4 MPa = 485 psi
– Minimum	2.8 MPa = 400 psi
– Max difference between cylinders	0.5 MPa = 70 psi

Gear belts

Belt tension (check with tool 5197)	
– Value when checking	12–13 mm
– Value when setting	12.5 mm

Valve system

Valve clearances, cold engine:		
– Intake valve, checking	**0.15–0.25 mm**	0.006–0.010"
setting	**0.20 mm**	0.008"
– Exhaust valve, checking	**0.35–0.45 mm**	0.014–0.018"
setting	**0.40 mm**	0.016"
Valve clearances, warm engine:		
– Intake valve, checking	**0.20–0.30 mm**	0.008–0.012"
setting	**0.25 mm**	0.010"
– Exhaust valve, checking	**0.40–0.50 mm**	0.016–0.020"
setting	**0.45 mm**	0.018"
Adjusting disc thicknesses	**3.30 to 4.25 mm in increments of 0.05 mm** 0.1299" to 0.1673" in increments of 0.0020"	

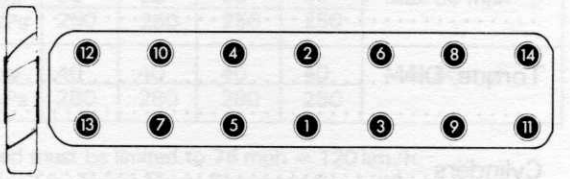
Tightening torques

Cylinder head bolts

After driving 1000–2000 km = 600–1,200 miles, bolt torque should be checked with warm engine. Apply torque wrench and torque to: **85 Nm** = 62 ft.lbs.

Cylinder head bolts should NOT be loosened before re-torquing.

Tightening sequence for cylinder head bolts.



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	Nm	*ft.lbs.*
Crankshaft pulley (vibration damper):		
– Center bolt, with wrench 5188	350	255
– Center bolt, torque wrench	450	330

NOTE:
Sealing fluid, Volvo P/N 277961-9, should be applied to bolt threads and bolt head contact surface. Note difference in torque when using special tool 5188 and an ordinary torque wrench.

– Inhex screws	20	15
Flywheel bolts (use new bolts and sealing fluid, Volvo P/N 277961-9)	75	55
Camshaft gears:		
– front	45	33
– rear	100	73
Camshaft bearing cap nuts	20	15

Engine lubricating system

Oil capacities:

– excl. oil filter	6.2 liters	=6.6 US qts
– incl. oil filter	7.0 liters	=7.4 US qts
– difference between Min. and Max.	1.0 liters	=1 US qt

Lubricant:

– Quality	API Service SE/CC	
– Viscosities:		
Normal and high temperature range, from −10° C = 14° F and up	SAE 15W/50 or 20W/50	
Normal and low temperature range, from +30° C = 86° F and down	SAE 10W/40 or 10W/30	
Oil pressure at an oil temperature of +80° C = 175° F and 2000 rpm, minimum	**200 kPa**	28 psi

Oil pressure sender

Oil pressure warning light goes out at	**15–45 kPa**	2–6 psi

Oil pump

Relief valve opens at	**600–700 kPa**	85–100 psi

Fuel system

General

Injection sequence	1–5–3–6–2–4	
Low idle	12.5 rps	= 750 rpm
High idle	87 rps	= 5200 rpm

Fuel

Standards	ASTM-D 975-No 2D DIN 51601 CEC-ERF-DI	
Cetan rating, minimum	45	
Surphur content, max. weight proportion	0.5 %	

Injection pump

Injection timing (distributor plunger stroke at top dead center)

– when checking	**0.65–0.73 mm**	0.0256–0.0287"
– when setting	**0.70 mm**	0.02"

Injectors

Injector opening pressure:

– when checking	**12–13 MPa**	1700–1845 psi
– when setting	**12.5–13.5 MPa**	1775–1920 psi

Tightening torques

	Nm	*ft.lbs.*
Injector to cylinder head	70	50
Injector top to bottom	70	50
Gear on injection pump	45	33
Delivery pipes	25	18

Cooling system

General

Capacity:

– vehicles with manual transmission	9.4 liters	= 10 US qts
– vehicles with automatic transmission	9.2 liters	= 9.8 US qts

Expansion tank

Pressure valve in cap opens at:

– overpressure	**65–85 kPa**	9–12 psi
– vacuum	**7 kPa**	1 psi

Thermostat

Marking	87° C	
Starts to open at	**87° C**	186° F
Fully open at	**102° C**	236° F
Slit opening	8 mm	5/16"

Fan belt

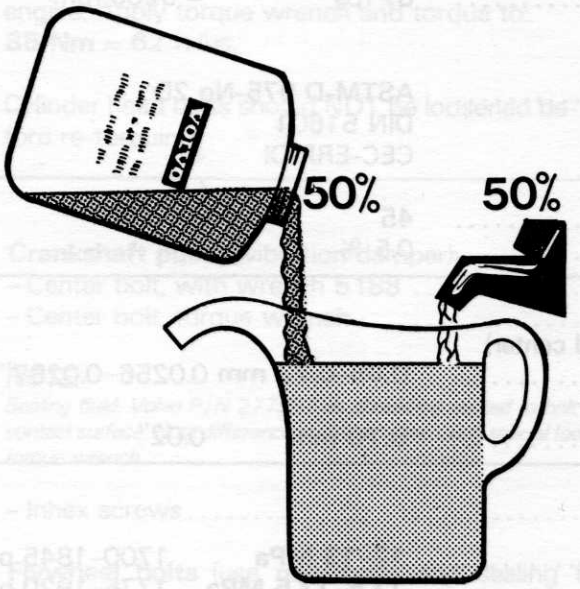
Designation	HC 38×800
Volvo P/N (kit, containing two belts)	958347

Tightening torques

	Nm	*ft. lbs.*
Fan to hub	9 Nm	6.5 ft.lbs.
Cap nuts for oil pipes at oil cooler	30 Nm	22 ft.lbs.
Oil cooler connections	6 Nm	4.5 ft.lbs.

(Hold oil cooler connections when tightening oil pipe cap nuts)

Coolant



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A new type coolant has been introduced for the Volvo diesel engines. It has a special chemical composition and is marked BLUE.

Only coolant supplied from Volvo under the following Part Numbers must be used:

1 kg can P/N 1188500-1
5 kg can P/N 1188501-9

Different types of coolant must not be mixed. The cooling system must be flushed when changing to the new coolant.

- DO NOT use water alone. Use Volvo coolant, mixed with equal amount of **clean** water.
- Replace coolant every third Fall or according to Maintenance Program. The coolant loses the protective properties after being used for a certain time.

Section 1: Maintenance

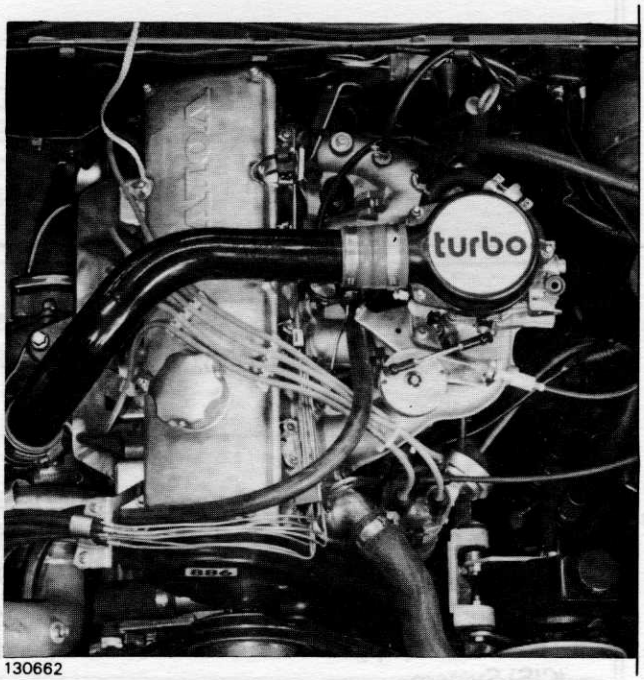
New Manuals:

Pre-Delivery Service, 1981 Models with gasoline engines.
TP 30310.

600–1,200 Mile Maintenance Service, 1981 models with gasoline engines.
TP 30311.

7,500 Mile Maintenance Service, 1981 models with gasoline engines.
TP 30312.

Important changes to Maintenance Manuals:



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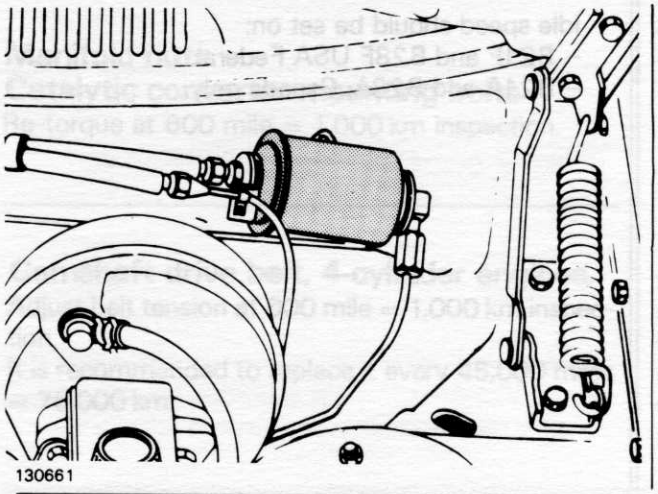
Information changes because of new equipment:

New engines:
- B21F-Turbo
- B21F-MPG
- B23E (Canada)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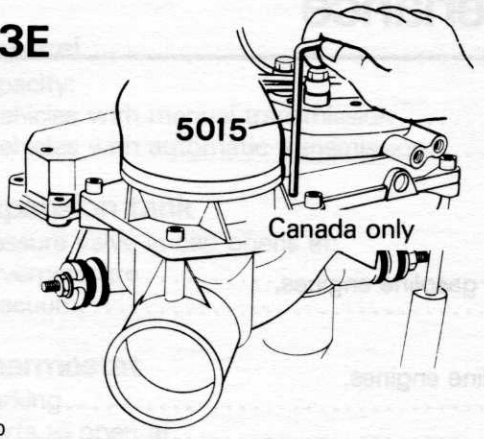
Information changes because of changes to service intervals:

Example:
- Fuel filter change at 45,000 miles = 75,000 km.

Previously 15,000 miles = 25,000 km.

B23E



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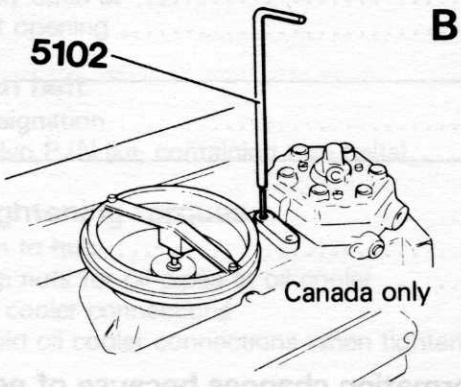
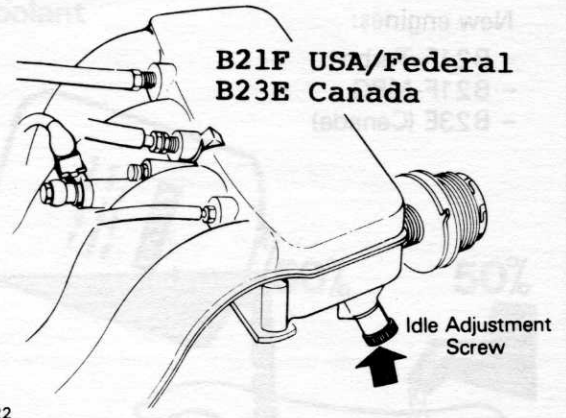


130521

CO

For USA vehicles (Federal and California), no CO setting should be made. CO adjustment points are plugged and CO can be adjusted only after removing plug.
Thus all procedures regarding check of CO, setting of CO and balance are eliminated.

For Canada, CO setting is performed as before.



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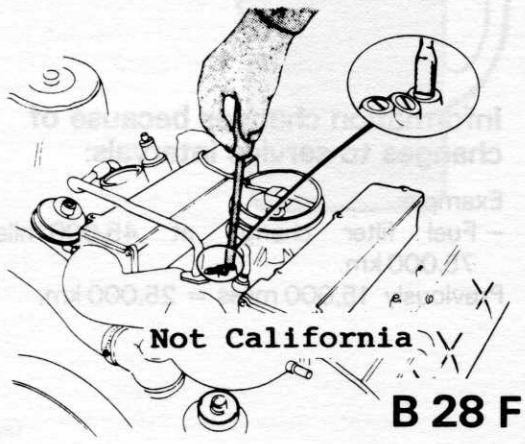


130523

Idle speed.

Idle speed setting is deleted on several engines. These are equipped with Constant Idle Speed (CIS) System.

Idle speed should be set on:
- B21F and B28F USA Federal.
- B21A and B23A, Canada only.

Summary of

600–1,200 and 7,500 mile maintenance inspections

(Also see "Special for Canada")

Emission systems

Engine oil and filter.
Except Turbo:
Replace at 600 mile = 1,000 km inspection and every 7,500 miles = 12,500 km. Minimum every sixth month.

Turbo:
Replace at 600 mile = 1,000 km inspection and every 3,750 miles = 6,250 km. Minimum every sixth month.

Driving under adverse conditions may require oil and filter changes more frequently.

Cooling system hoses.
Engine drive belts.
Check at 600 mile = 1,000 km inspection and every 30,000 miles.

Air cleaner filter.
Replace every 30,000 miles = 50,000 km.

Vacuum hoses, fittings and connections.
Fuel system cap, tank, lines and connections.
Check at 600 mile = 1,000 km inspection.

Manifold nuts.
Catalytic converter mounting bolts.
Re-torque at 600 mile = 1,000 km inspection.

Camshaft drive belt, 4-cylinder engines.
Adjust belt tension at 600 mile = 1,000 km inspection.
It is recommended to replace it every 45,000 miles = 75,000 km.

Valve clearance.
Adjust every 30,000 miles = 50,000 km.

Oxygen sensor (Lambda Sond).
Replace every 30,000 miles = 50,000 km. Reset service indication light on dashboard.

Manual transmission oil.
Rear axle oil.
Replace at 600 mile = 1,000 km inspection and check level and for leaks every 15,000 miles = 25,000 km.

Spark plugs.
Replace every 30,000 miles = 50,000 km.

Ignition timing.
Check at 600 mile = 1,000 km inspection.

Idle rpm.
Models with Constant Idle Speed System are sealed and cannot be adjusted.
Other models should have idle rpm checked at 600 mile = 1,000 km inspection and every 15,000 miles = 25,000 km.

Automatic transmission oil.
Inspect oil level at 600 mile = 1,000 mile inspection and every 15,000 miles = 25,000 km.
For cars used for hard driving or hilly terrain etc, change oil every 30,000 miles = 50,000 km. If the vehicle is equipped with extra oil cooler, this requirement can be deleted.

Miscellaneous maintenance

(Most items should be checked also at the 600–1,200 mile = 1,000–2,000 km "warranty inspection").

Fuel line filter.
Fulfills the 50,000 mile = 80,000 km replacement requirement. It is recommended to replace it at the major 45,000 mile = 75,000 km service interval. More frequently if fuel is dirty.

Fuel tank filter.
Replace every 60,000 miles = 100,00 km.

Engine coolant.
Every 30,000 miles = 50,000 km or every second year, the cooling system should be drained, flushed and refilled. 50/50 solution of water and good quality antifreeze/summer colant should be used.

Crankcase ventilation.
Clean nipple (orifice) every 60,000 miles = 100,00 km.
Check rubber hoses for damage and deterioration.

Brakes.
Every 7,500 miles = 12,500 km:
- Check hoses, lines and parking brake.

Every 15,000 miles = 25,000 km:
- Check brake pad thickness.

Every 45,000 miles = 75,000 km:
- Replace brake fluid.

Vehicles equipped with air dam:
- Replace brake fluid every 15,000 miles = 25,000 km.

Steering and wheels.
Every 7,500 miles = 12,500 km:
- Check tire wear (align front end if necessary).
- Check wheel bearing play.
- Check front shock absorbers and springs.
- Check control arms, steering rods, ball joints, steering gear etc.
- Check power steering fluid.

Body.
Every 7,500 miles = 12,500 km:
- Lubricate hinges for hood, trunk lid, doors etc.

Special for Canada

CO
Check/adjust CO every 15,000 miles = 25,000 km.

Spark plugs.
Replace every 15,000 miles = 25,000 km.

Crankcase ventilation.
Check every 15,000 miles = 25,000 km.

Choke and fast idle (B21A).
Check every 7,500 miles 12,500 km.

Carburetor damper oil level (B21A).
Check/adjust oil level every 7,500 miles = 12,500 km.

Breaker points, dwell angle. (B21A).
Check/adjust every 7,500 miles = 12,500 km:

Fuel pump strainer.
Clean every 30,000 miles = 50,000 km. More often if fuel is dirty and/or contaminated with water.

Section 2: Engine

Engines

B21, general.
Gasoline in-line 4-cylinder engine with overhead valve arrangement.
Several versions have been derived from the basic B21, as noted below.

B21A.
For Canada only. With carburetor and leaded/unleaded fuel.
Emission systems: EGR type "on/off" or "proportional" in combination with Pulsair air injection system.

B21F, USA Federal and California.
With Continuous Injection fuel injection system (CI). Unleaded fuel is required because of emission system.
California models equipped with Constant Idle Speed (CIS) System.

Emission system: Lambda-sond (= oxygen sensor feedback system) in combination with 3-way catalytic converter.

Two additional versions of the B21F engine have been developed, which share many of the features of the original engine: B21F-MPG and B21F-Turbo, below.

B21F-MPG.
Equipped with an electronic spark control system This engine is used in combination with a low rear axle ratio of 3.54 to provide improved gas mileage.

B21F-Turbo.
Equipped with an exhaust driven turbo-compressor to improve performance and fuel economy.

B23E, Canada only.
Essentially a B21 engine with increased displacement and compression. The same CI fuel injection system as for B21F is used. Many specifications are the same as for B21F.

Emission system: EGR type "on/off" or "proportional" in combination with Pulsair air injection system.

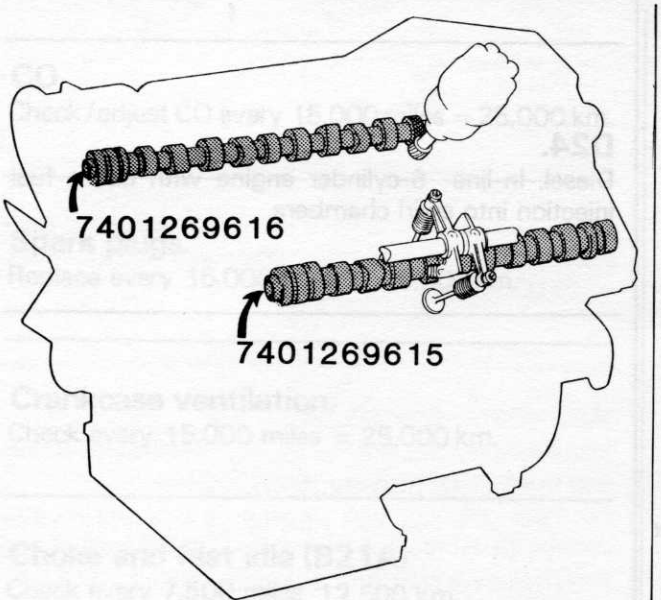
B28F, USA and Canada.
Gasoline, V-6 engine with overhead valve system. Equipped with Continuous Injection fuel injection system (CI). Unleaded fuel only.
The same specifications apply for USA/Federal, California and Canada with the exception that California vehicles are equipped with Constant Idle Speed (CIS) System.

Emission system: Lambda-sond (oxygen sensor feedback system) in combination with 3-way catalytic converter.

D24.
Diesel. In-line- 6-cylinder engine with direct fuel injection into swirl chambers.

Summary of engine new features

B21A Canada	B23E Canada	B21F Federal	B21F California	B21F-Turbo	B21F-MPG	B28F Federal and Canada	B28F California	*Feature*	*Reference*
						X	X	Camshafts	21A
	X							New Engine B23E	21B
				X				New Engine B21F-Turbo	21C
					X			New engine B21F-MPG	21D
X								Crankcase ventilation, 4-cyl. A-engine	22A
	X	X	X	X	X			Crankcase ventilation, 4-cyl. E- and F-engines	22B
		X	X	X	X	X	X	Increased capacity fuel filter	23A
		X	X	X	X	X	X	CO-adjustment sealed	23B
		X	X	X	X	X	X	Electronic module for Lambda-sond System	23C
		X	X		X			Acceleration enrichment	23D
						X	X	Warm start enrichment	23E
						X	X	Location of frequency valve	23F
			X	X	X		X	Constant Idle Speed (CIS) System	23G



B28F 21 A

Camshafts.

Part Number:
– Left side: 1269615-9
– Right side: 1269616-7

Also valve clearances have been changed.
Cold engine:
– Intake: **0.10–0.15 mm** = 0.004–0.006"
– Exhaust: **0.25–0.30 mm** = 0.010–0.012"

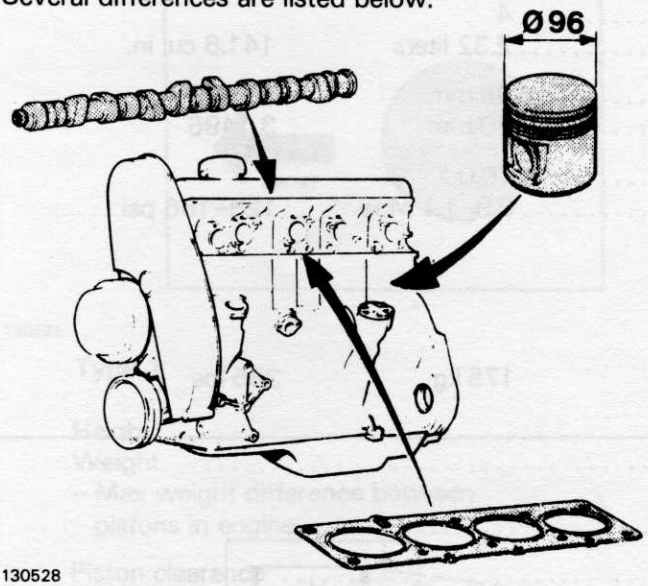
If a set of these camshafts is installed in a 1980 B28F engine, the new valve clearances must be used.

Camshafts identified by numbers stamped on front end. Numbers are 740 followed by Part Number.

Engine B23E
(Canada only)

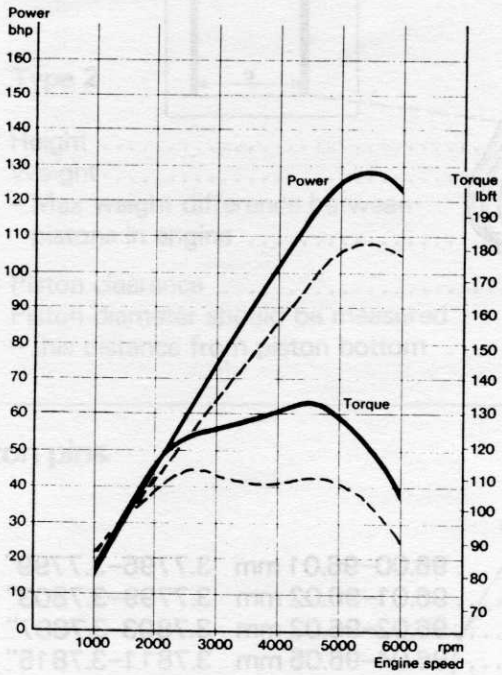
21B

Basically, the B23E engine is a B21 engine with increased displacement and compression. Several differences are listed below:



130528

- The cylinder block is a new casting, NOT a bored B21 block.
- The cylinder head has sand core casted intake valve channels. Provide improved gas flow.
- Forged light alloy pistons. Two types are used, see Specifications.
- Camshaft with 11.95 mm lifting heights. Marked K.
- Cylinder head gasket of new design. Same thickness as for B21.
- Air passage in air/fuel control unit has new design.



130517

Output curve, B23E, SAE J 245 Net.

The B21F output curve is shown in dotted lines for comparison.

Fuel injection system.

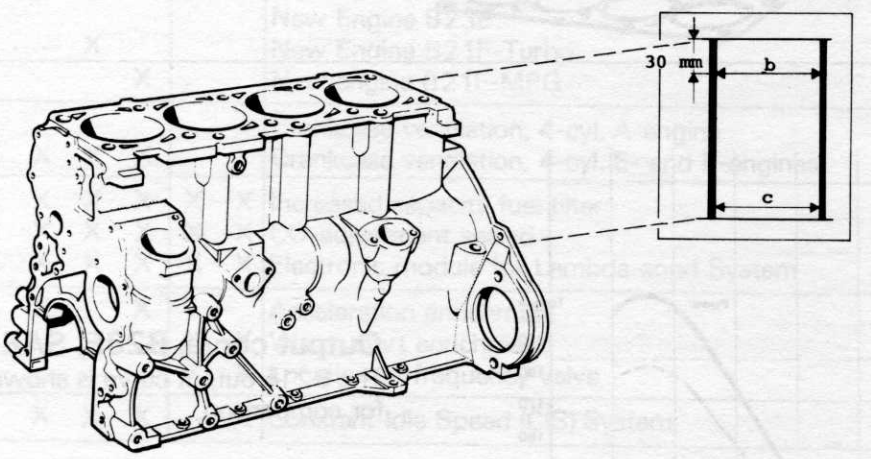
The B23E engine is equipped with a fuel injection system of the same type as for B21F (CI System). The same specifications apply.

Specifications for engine B23E

General

No. of cylinders	4	
Displacement	2.32 liters	141.6 cu. in.
Bore	96 mm	3.7795"
Stroke (same as B21)	80 mm	3.1496"
Compression ratio	10.0:1	
Compression pressure (measured with engine at operating temperature, throttle wide open and cranking starter motor 250–300 rpm)	0.9–1.1 Mpa	128–156 psi
Engine weight, incl. engine electrical and injection equipment	175 kg	385 lbs

Cylinder block

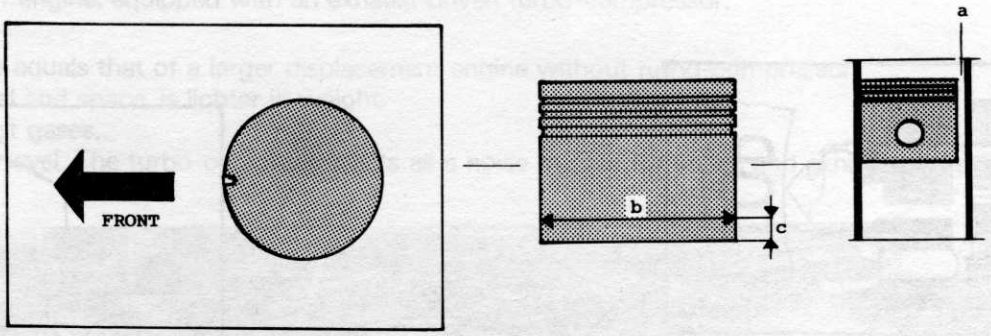


130524

Cylinder diameter (measured at points b and c):

Standard (marked C)	96.00–96.01 mm	3.7795–3.7799"
marked D	96.01–96.02 mm	3.7799–3.7803"
marked E	96.02–96.03 mm	3.7803–3.7807"
marked G	96.04–96.05 mm	3.7811–3.7815"
Oversize 1	96.3 mm	3.7913"
Oversize 2	96.6 mm	3.8032"
Bore cylinders if oil consumption is excessive and wear, measured on cylinder bores, exceeds	0.1 mm	0.004"

Pistons



130525

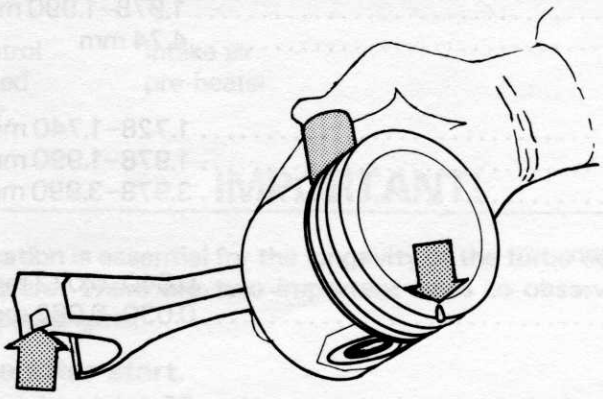
Type 1

	Height	80.4 mm	3.1654"
	Weight	555 ± 6 grams	
	– Max weight difference between pistons in engine	12 grams	
a	Piston clearance	0.05–0.07 mm	0.0020–0.0028"
b	Piston diameter should be measured		
c	– this distance from piston bottom	15 mm	0.6"

Type 2

	Height	76.4 mm	3.0079"
	Weight	565 ± 6 grams	
	– Max weight difference between pistons in engine	12 grams	
a	Piston clearance	0.01–0.03 mm	0.0004–0.0012"
b	Piston diameter should be measured		
c	– this distance from piston bottom	8 mm	0.32"

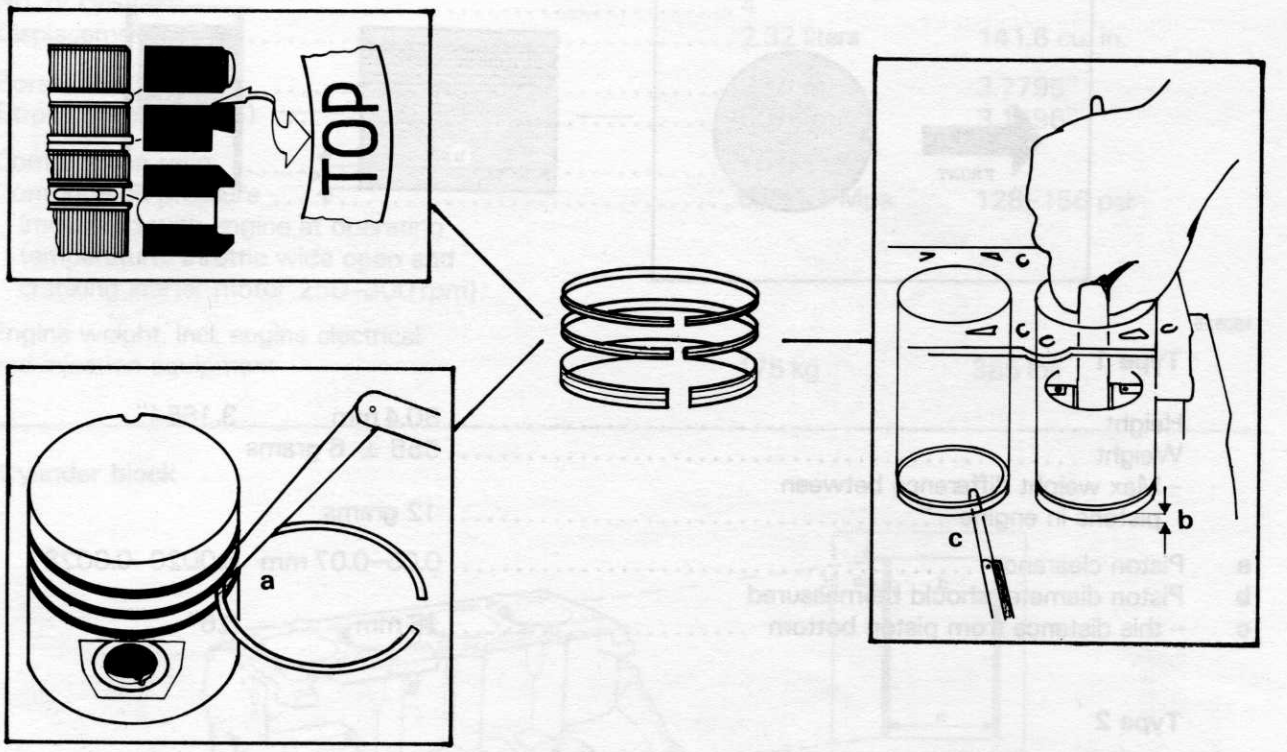
Piston pins



130526

Fit, in connecting rod	close running fit	
in piston	sliding fit	
Diameter, standard	24.00 mm	0.9449"
oversize	24.05 mm	0.9468"

Piston rings



130527

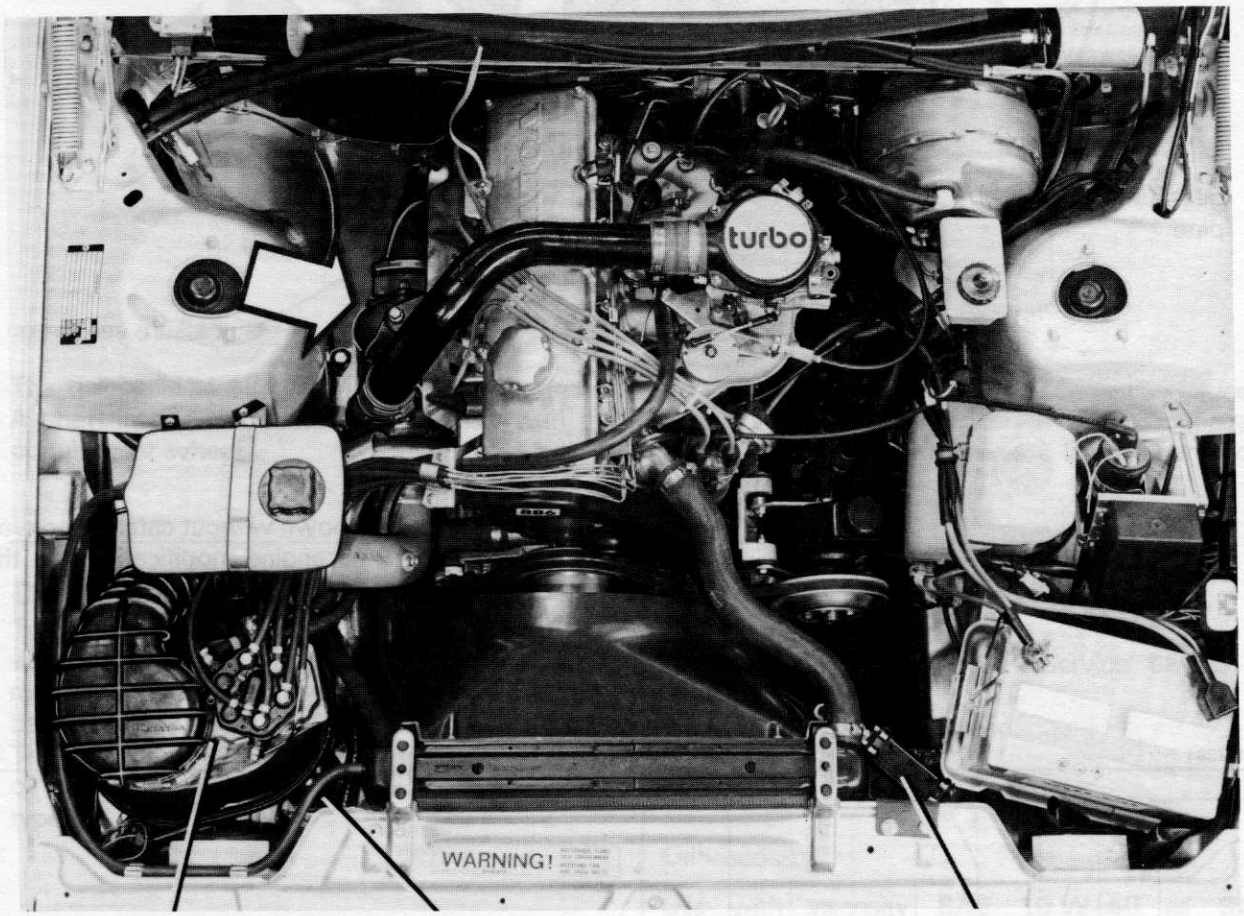
	Ring thickness, Type 1:		
	– Two compression rings	1.978–1.990 mm	0.0779–0.0783"
	– Oil scraper ring	4.74 mm	0.1866"
	Ring thickness, Type 2:		
	– Upper compression ring	1.728–1.740 mm	0.0680–0.0685"
	– Lower compression ring	1.978–1.990 mm	0.0779–0.0783"
	– Oil scraper ring	3.978–3.990 mm	0.1566–0.1571"
a	Side clearance, ring on piston:		
	– Compression rings	0.040–0.072 mm	0.0016–0.0028"
	– Oil scraper ring	0.030–0.062 mm	0.0012–0.0024"
	Ring gap:		
b	– Distance measured from cylinder lower edge	15 mm	0.6"
c	– Ring gap, upper compression ring	0.35–0.65 mm	0.014–0.026"
c	– Ring gap, lower compression ring	0.35–0.55 mm	0.014–0.022"
c	– Ring gap, oil scraper ring	0.25–0.60 mm	0.010–0.024"

Engine B21F-Turbo

21C

Basically a B21 engine, equipped with an exhaust driven turbo-compressor.
Benefits:

- Performance equals that of a larger displacement engine without turbo-compressor.
- Uses less fuel and space, is lighter in weight.
- Clean exhaust gases.
- Lower noise level. The turbo-compressor acts as a noise muffler for intake and exhaust systems.



131380

Air/fuel control unit integrated in air cleaner.

Intake air pre-heater.

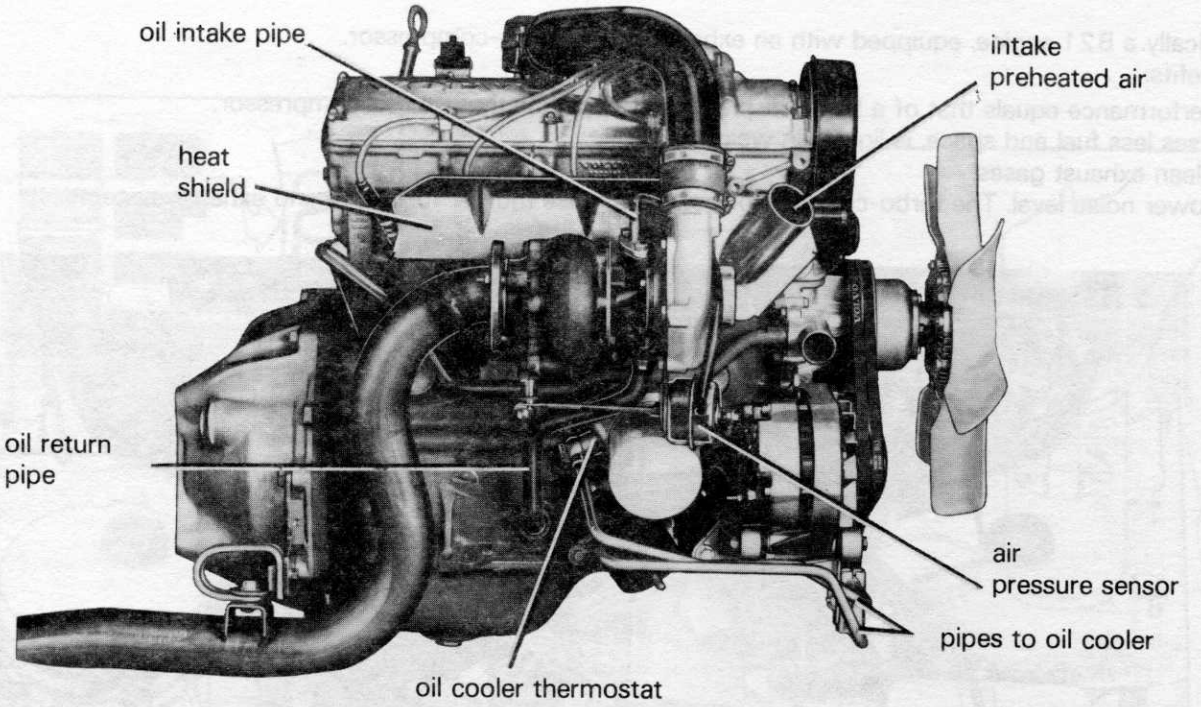
Engine oil cooler.

IMPORTANT!

Satisfactory lubrication is essential for the longevity of the turbo-compressor. It is lubricated by engine oil pressure. There are two important rules to observe when driving a turbo-compressor equipped engine:

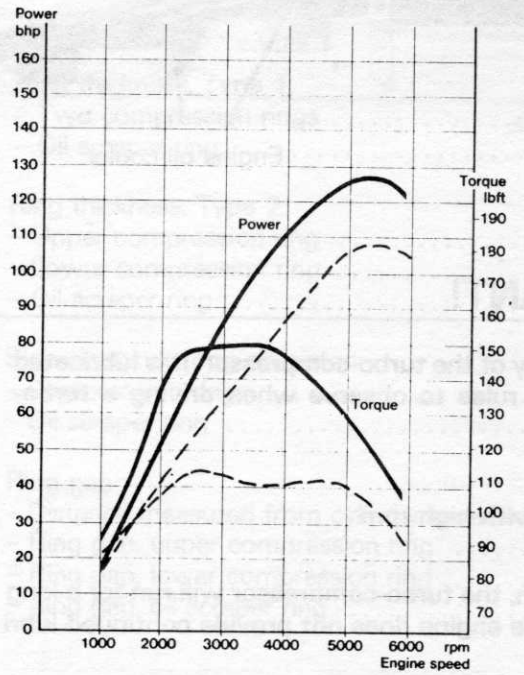
– Let engine idle after start.
This will provide initial lubrication. Never start with high rpm.

– Let engine idle before shut-off.
If the engine is shut off while running at high rpm, the turbo-compressor will run for a long time. This will harm the turbo-compressor as the engine does not provide continued lubrication after stopping.
Idling before shut-off will also reduce turbine temperatures.



– This engine is shown without catalytic converter. See "Turbo engine modifications" in this manual.

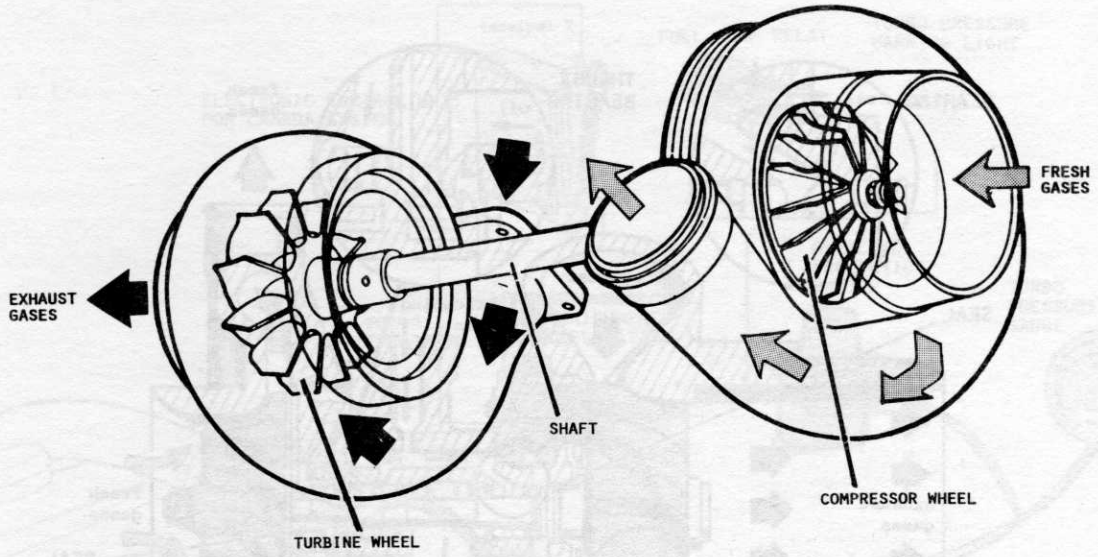
131381



130518

Output curve, B21F-Turbo, SAE J 245 Net.

B21F output curve shown in dotted lines for comparison.



130663

The **turbine wheel** is driven by the exhaust gases. A **shaft** interconnects the turbine wheel with the **compressor wheel.**

Increased exhaust gas flow increases turbine speed and consequently the compressor discharge increases. The engine receives a larger charge of air/fuel mixture.

Design.

Turbo-compressor wheels rotate at a very high speed. Max speed is approx. 120 000 rpm which means that the assembly must be very carefully balanced.
The shaft is supported by bearings using pressurized oil for lubrication. The shaft seals are of piston ring type.

Lubrication.

Proper lubrication is of vital importance. The turbo-compressor is connected to the standard engine lubricating oil system. Oil supply and pressure must be adequate, therefore the requirement not to run the turbo-compressor at high speeds at start and stop should be observed.
Lubricating oil must be clean. It is important to replace oil and oil filter at regular intervals.
Engine lubricating oil correct **quality** and **viscosity** must be used.

Oil quality.

Oil quality according to API Service **SE-CC** or **SF-CC.**
SE-CD oils must not be used.

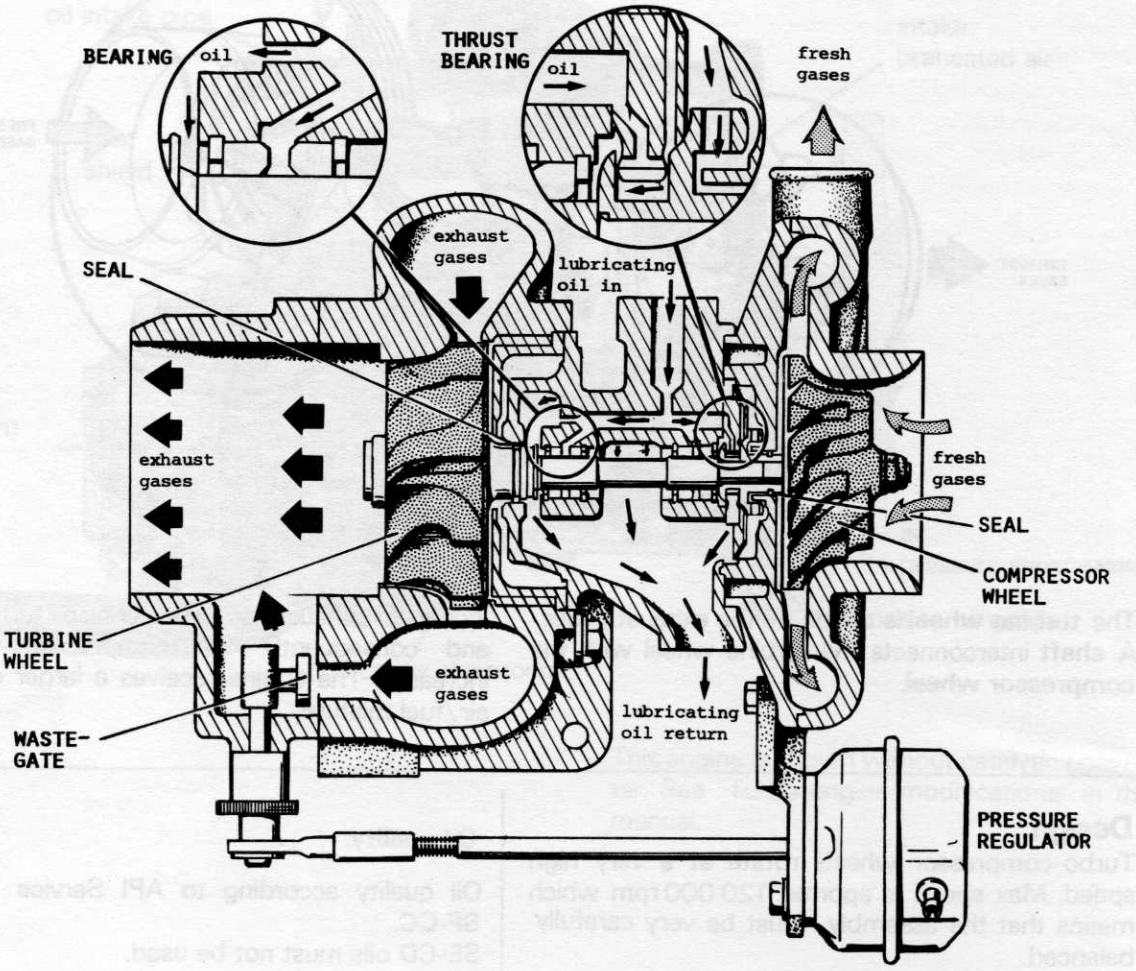
Oil viscosity.

Oils with viscosity **SAE 10 W–40** or **SAE 10 W–30** can be used all year.

Following oils can be used with limitations:
SAE 10 W: only below −10°C = 14°F.
SAE 15 W–50: only above −10°C = 14°F.
SAE 20 W–50: only above 0°C = 32°F.
SAE 20 W–20: only 0–30°C = 32–86°F.
SAE 30: only above 30°C = 86°F.

Oil changes.

Engine oil should be replaced every 3,750 miles = 6,250 km or at least every 6 months. This is twice as often as for other gasoline engines.



130529

Turbo controls

Control equipment.

The turbo-compressor is designed to provide a relatively high discharge pressure at middle range rpms.

Therefore several controlling and regulating functions are necessary to avoid excessive pressures at high speeds.

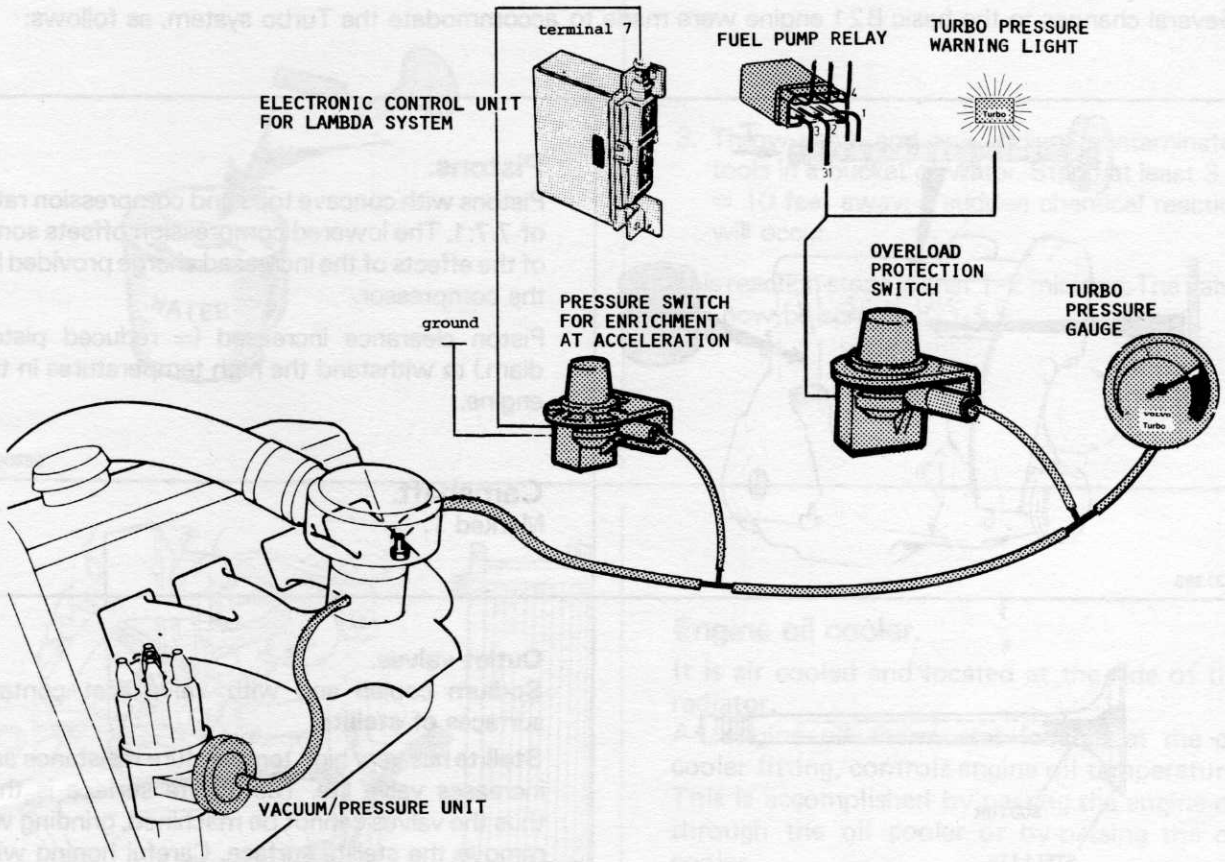
Pressure sensor (regulator) and wastegate actuator.

Monitors the discharge pressure from the compressor. Starts to open the **wastegate** at a compressor pressure of 41 kPa = 6 psi.

Gradually increases wastegate opening with increasing compressor pressure. A control rod stroke of approx. 10 mm = 3/8" is achieved just before the maximum pressure switch cuts out the fuel pump relay.

Wastegate.

Will let part of the exhaust gases bypass the turbine wheel.



130530

Pressure switch for enrichment at acceleration.

A pressure switch on the firewall receives compressor pressure from a fitting on the intake manifold. It closes when compressor pressure reaches 20.3 kPa = 2.9 psi. When closing it grounds terminal 7 of the Lambda sond electronic module. This will cause the Lambda system to operate on a special fixed cycle of 58.5°, measured with a dwell meter of good quality.

Overload protection switch.

Excessive compressor pressures may damage the engine by inducing overload.
Excessive pressures are normally prevented by the pressure sensor and wastegate actuator.
In case of failures of that system, there is a second overload protection feature.

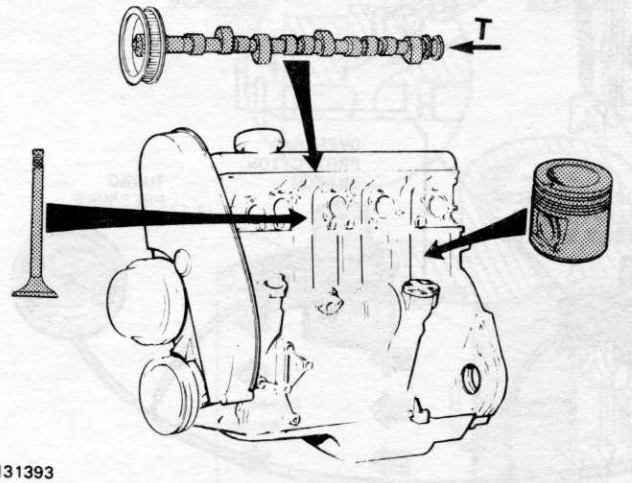
(Overload protection switch, continued)
It is a pressure switch, also receiving pressure input from the intake manifold which opens the ground circuit for the fuel pump relay at a pressure of 70 kPa 10 psi. This will momentarily stop fuel pump and engine and reduce compressor pressure.

Pressure control of spark timing.

The distributor centrifugal advance mechanism provides a spark timing which is too advanced when the turbo engine operates at high load. To counteract this, the pressure control unit at the distributor has a double function. Under normal operating conditions, it can advance the spark by max. 15°.
At high pressures it **retards** the spark timing: maximum 8° at a compressor pressure of 36 kPa = 5 psi.

Turbo engine modifications

Several changes to the basic B21 engine were made to accommodate the Turbo system, as follows:



131393

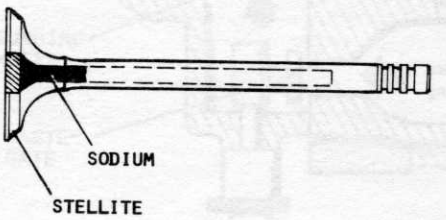
Pistons.

Pistons with concave tops and compression ratio of 7.7:1. The lowered compression offsets some of the effects of the increased charge provided by the compressor.

Piston clearance increased (= reduced piston diam.) to withstand the high temperatures in the engine.

Camshaft.

Marked T.



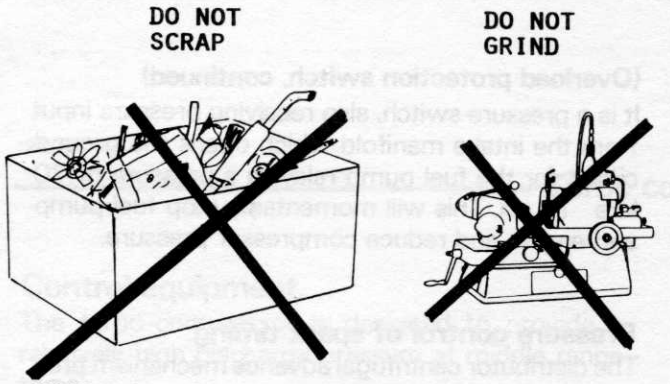
130656

Outlet valves.

Sodium cooled and with valve seat contact surfaces of **stellite.**

Stellite has very high temperature resistance and increases valve life. The stellite surface is thin, thus the valves cannot be machined, grinding will remove the stellite surface. Careful honing with grinding paste against the head surface is permitted.

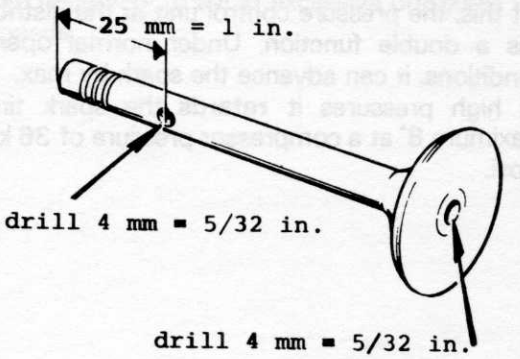
Sodium becomes fluid when heated and splashes back and forth in the valve cavity. This provides conduction of excess heat from the valve head to the cooler valve stem.



130657

WARNING!

Sodium- filled valves MUST NOT be mixed with ordinary scrap iron. The sodium must first be removed when being discarded otherwise explosions might occur when the scrap is melted.



130658

How to remove the sodium content.

Warning! Sodium is extremely explosive in presence of water.

1. Drill a 4 mm = 5/32" hole in the valve center, down to the sodium filled cavity.
2. Drill a 4 mm = 5/32" hole through the valve stem, approx 25 mm = 1" from the end. Alternate: cut the stem approx 25 mm from the end.