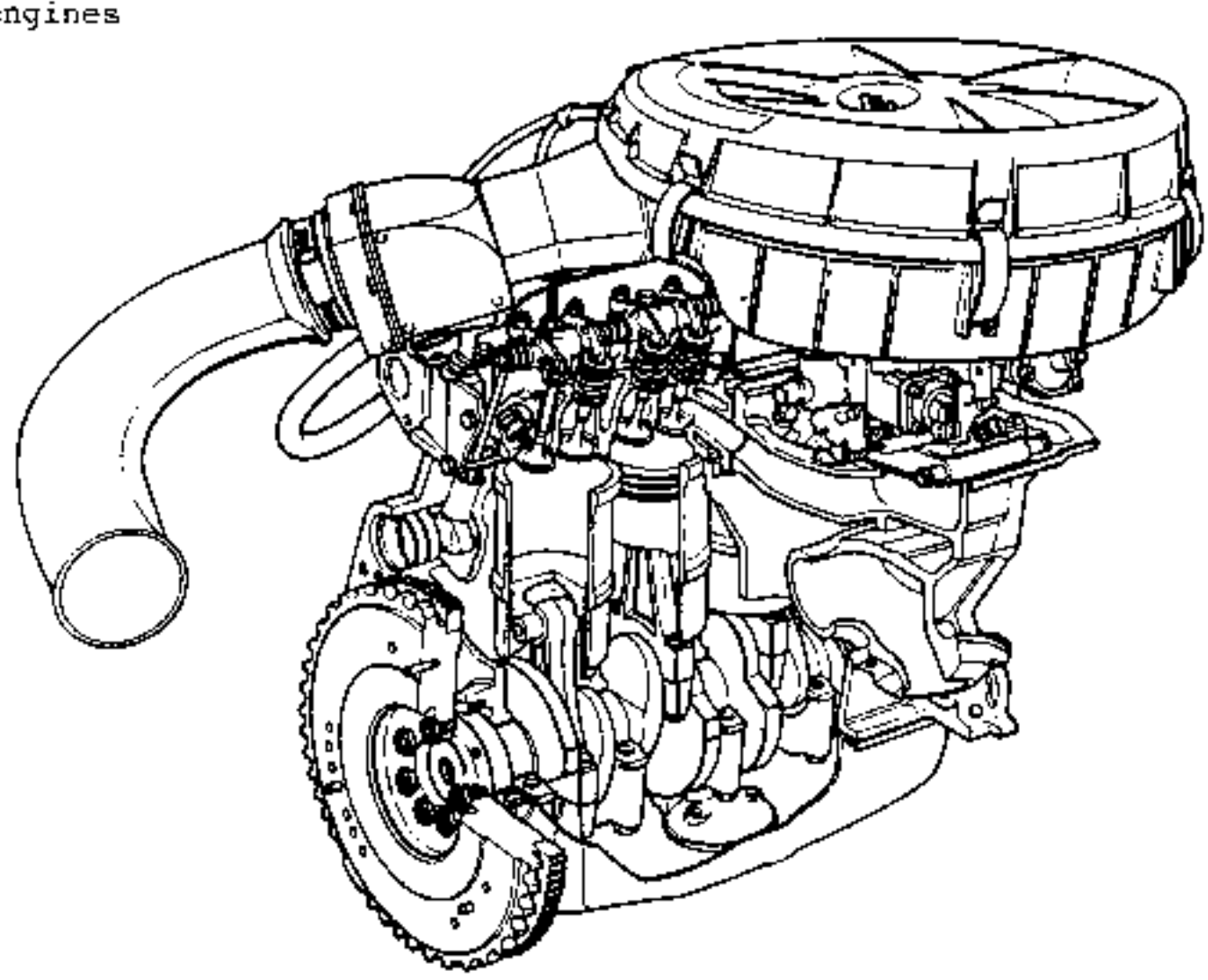
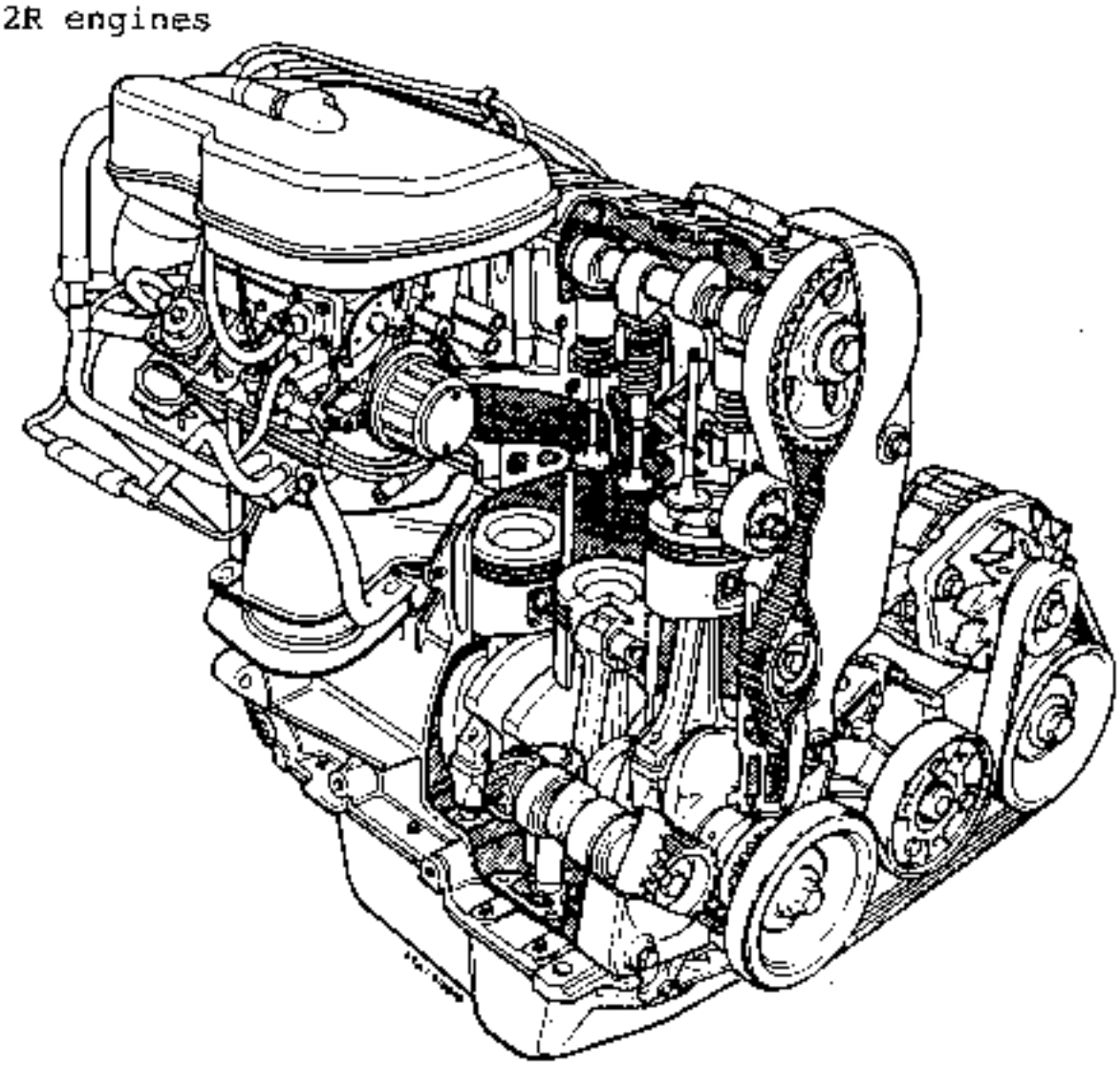
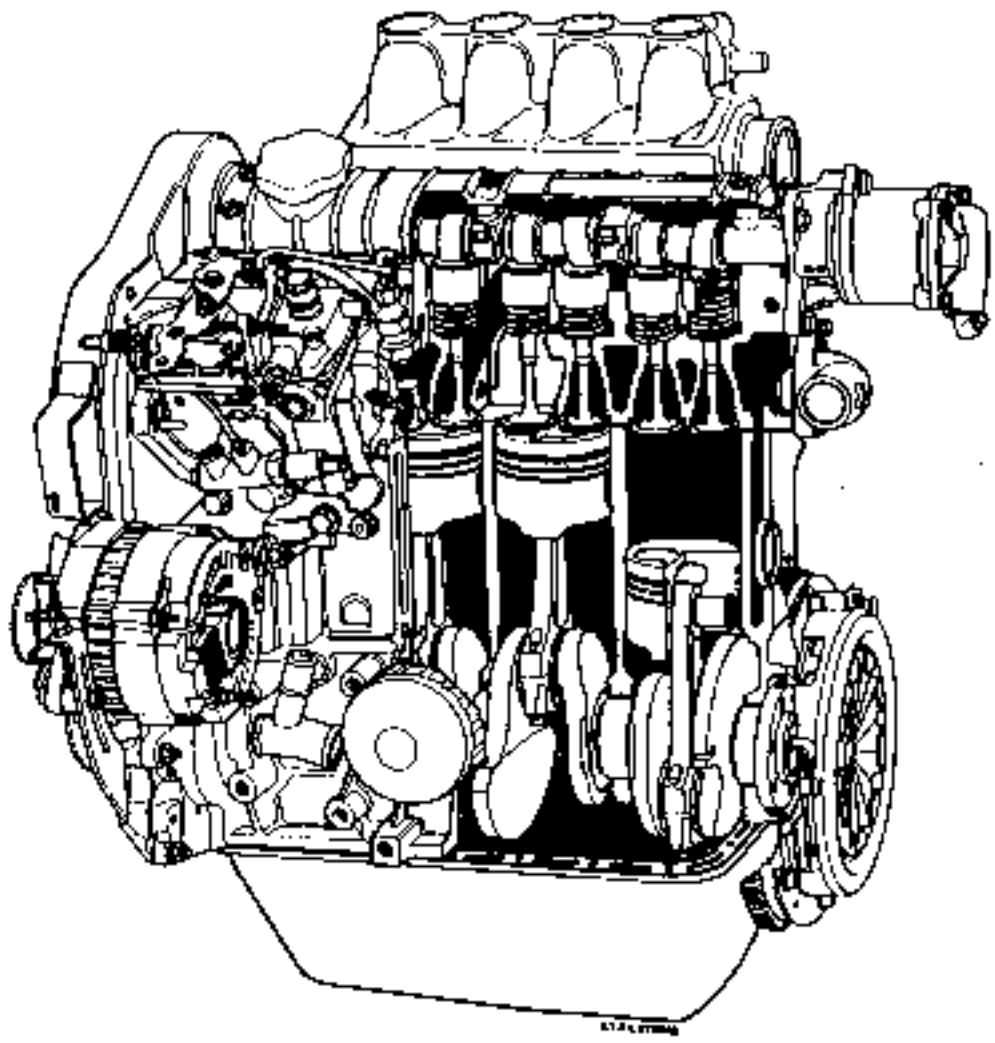
Type C engines



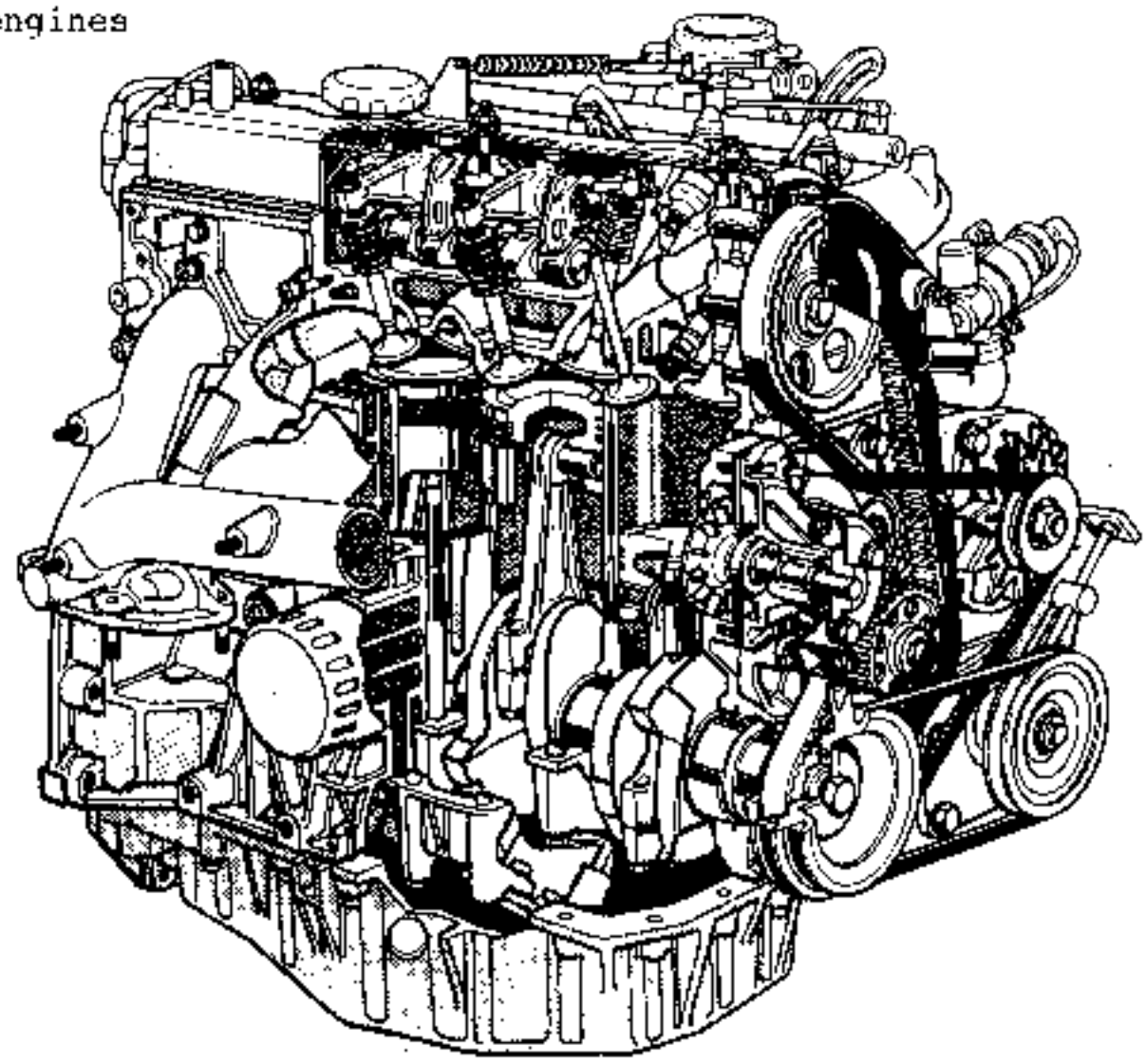
Type F2N-F3N-F2R engines



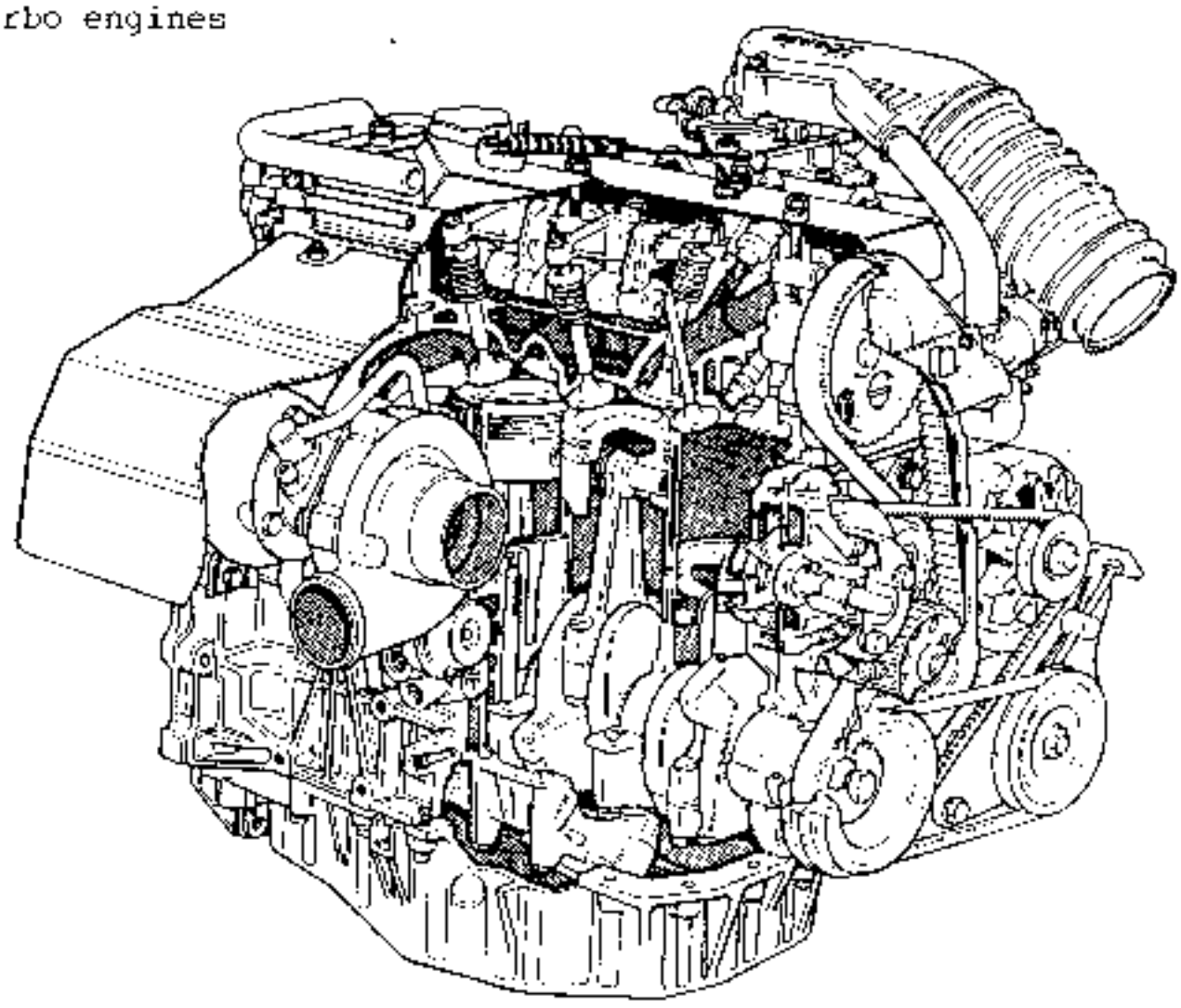
Type F8Q engines



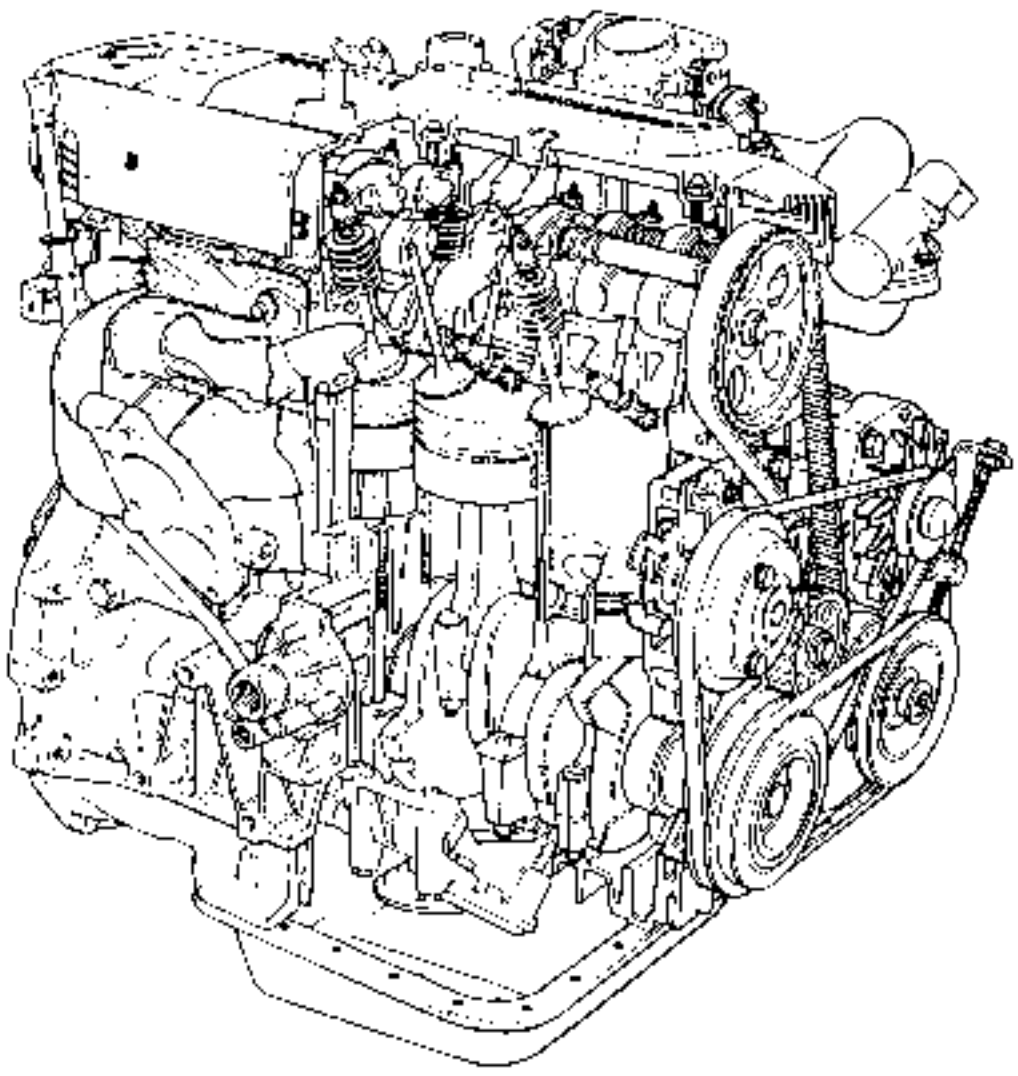
Type J6R-J7R-J7T engines



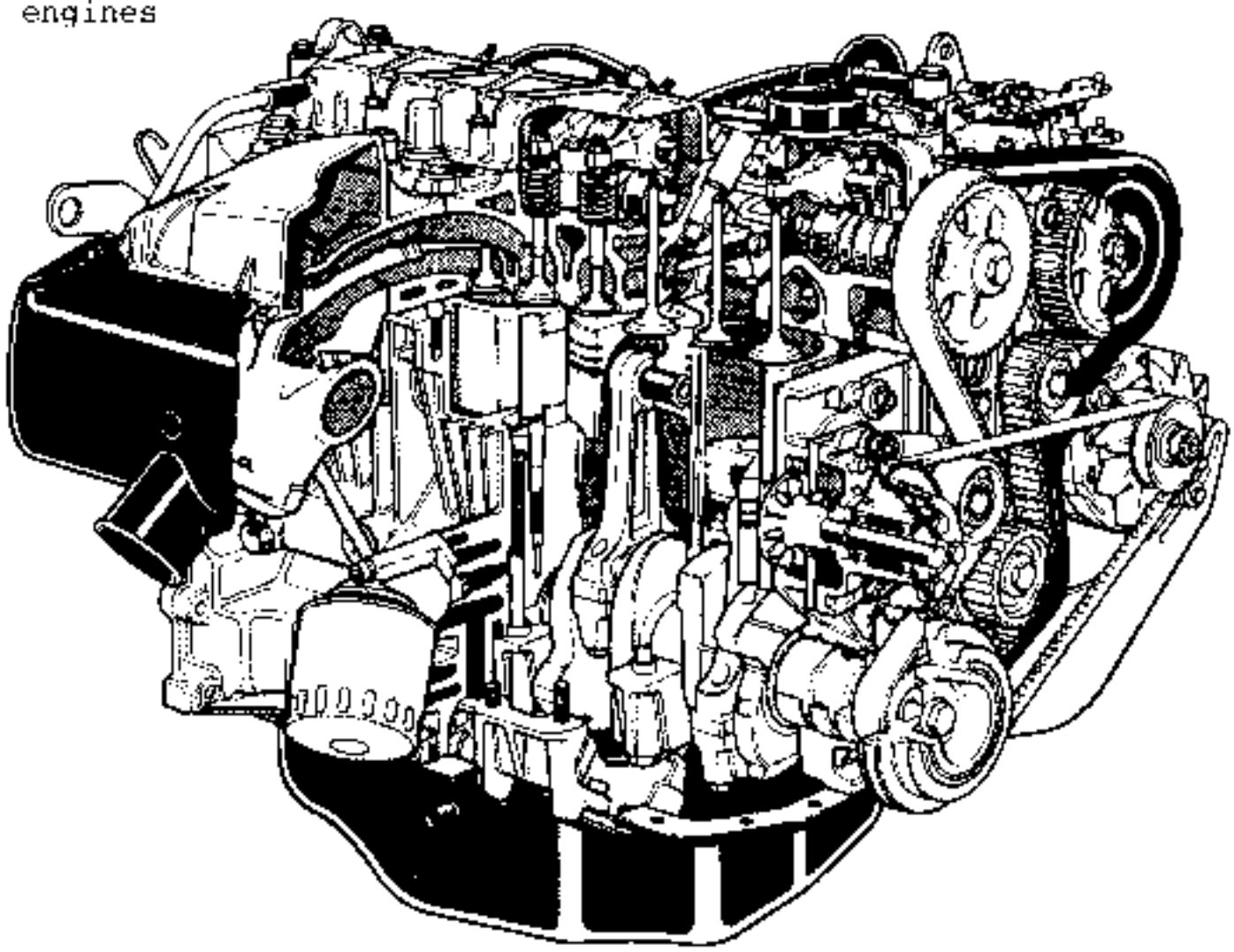
Type J7R Turbo engines



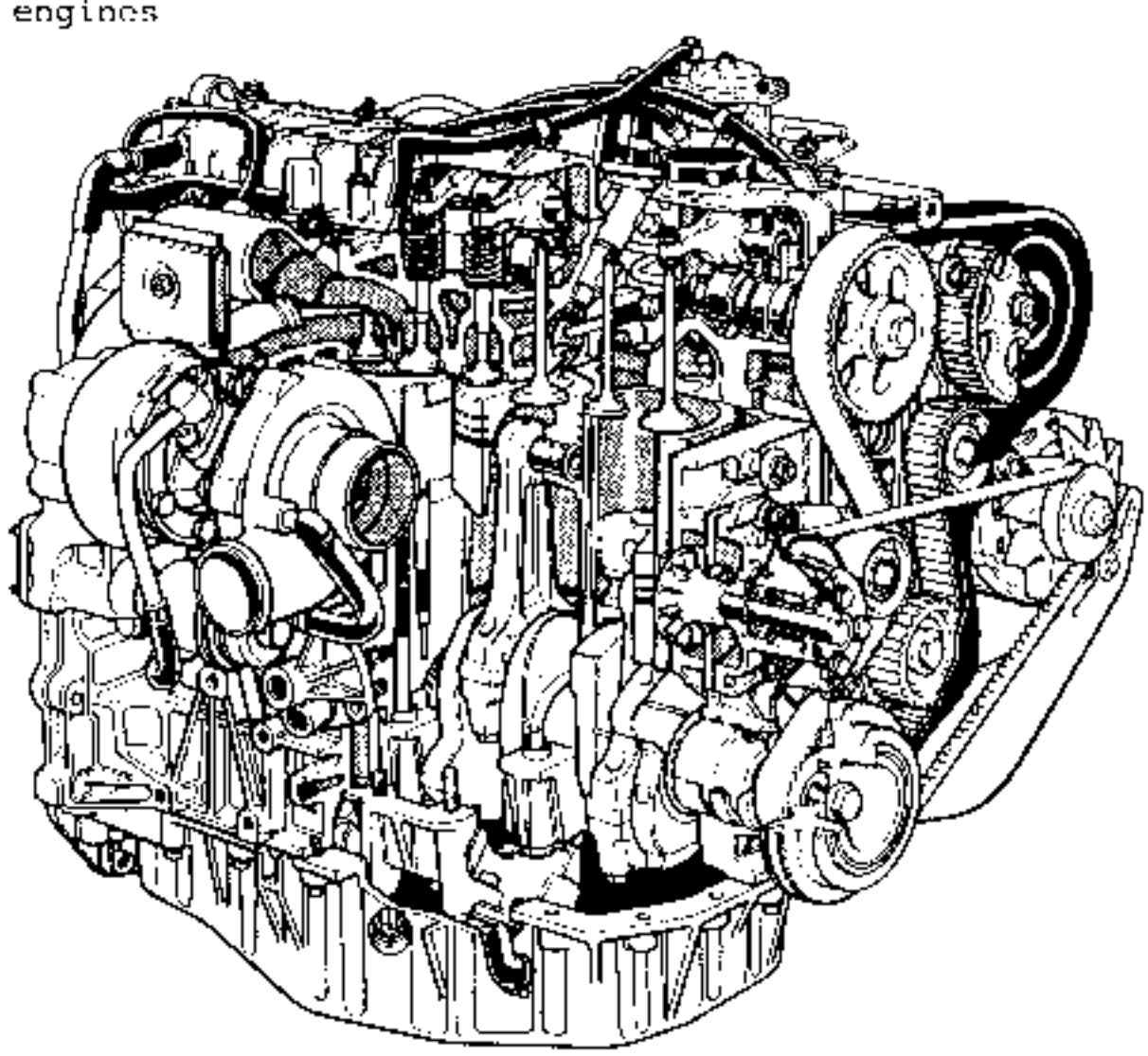
Type J7R 12 Valve engines



Type J8S engines



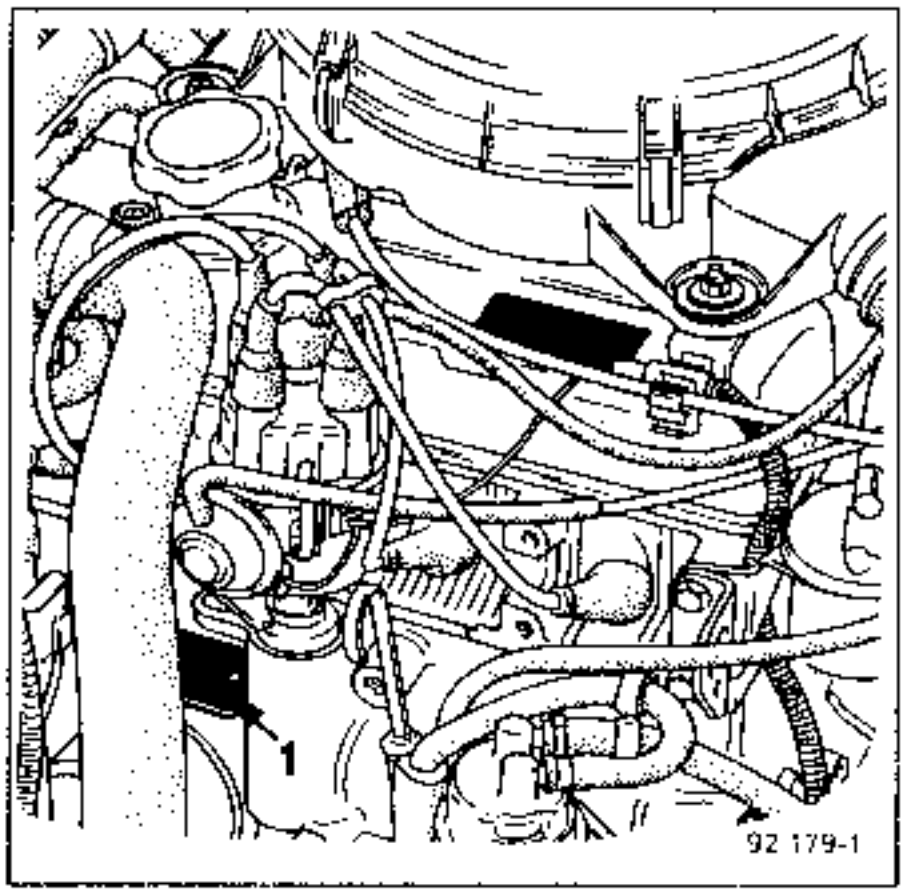
Type J8S Turbo engines



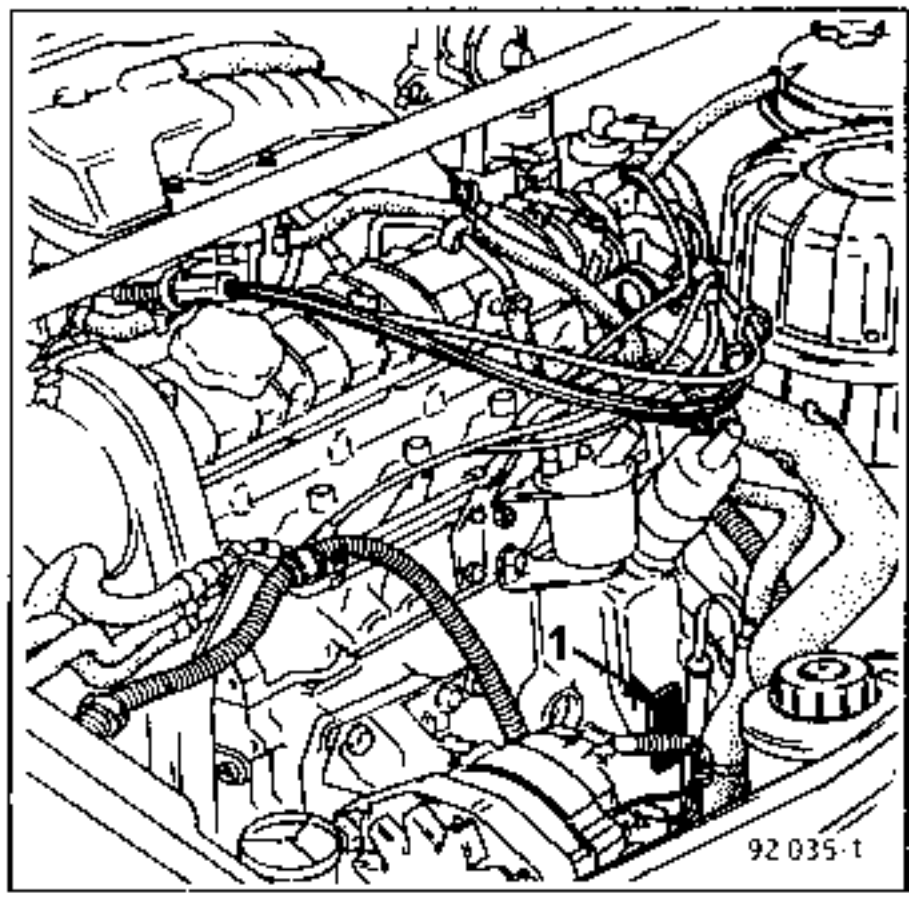
Vehicle type	Engine	Capacity (cm^3)	Bore (mm)	Stroke (mm)	Comp. ratio
B.L.K.S 481	F2N 712 F2N 716	1 721	81	83,5	9,25
L.K.S 482	F2N 710	1 721	81	83,5	10
B.L.K.S 482	F2N 754	1 721	81	83,5	9,5
B.L.K. 483	J7R 750	1 995	88	82	10
L 485	J7R 752	1 995	88	82	8
B.L.K.S 486	J8S 704	2 068	86	89	21,5
B.L.K 488	J8S 714	2 068	86	89	21,5
L 489	J6R 758	1 995	88	82	8,6
B.L 48 D	C2J 770	1 397	76	77	9,25
B.L.K 48 E	F3N 722	1 721	81	83,5	9,5
B.L.K 48 F	F3N 726	1 721	81	83,5	9,5
B.L.K.S 48 H	F8Q 710	1 870	80	93	21,5
B.L.K 48 J	F2R 702	1 965	82	93	8,4
B.L.K 48 K	J7T 754	2 165	88	89	9,2
L.K 48 M	F2N 750	1 721	81	83,5	9,2
L.K 48 N	F2N 752 F2N 756	1 721	81	83,5	9,5
B.L 48 Q B.L 48 Y	J7R 754	1 995	88	82	9,3
B.L.K.S 48 V	J8S 740	2 068	86	89	21,5
K 483 K 486 K 48 K } 4 x 4	J7R 750 J8S 704 J7T 754	1 995 2 068 2 165	88 86 88	82 89 89	10 21,5 9,2
B.L.K 483 BVA B.L.K 48 K BVA L 489 BVA	J7R 751 J7T 755 J6R 759	1 995 2 165 1 995	88 88 88	82 89 82	10 9,2 8,6

THE POSITION OF THE ENGINE IDENTIFICATION PLATE (1)

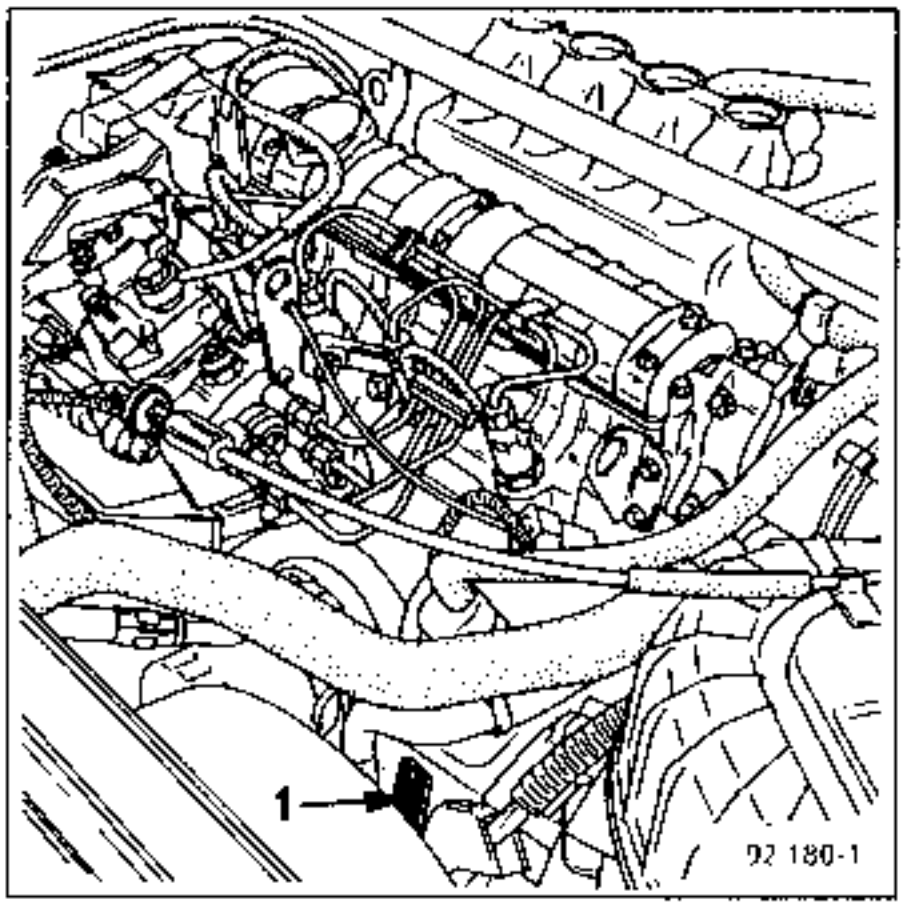
Type C engines



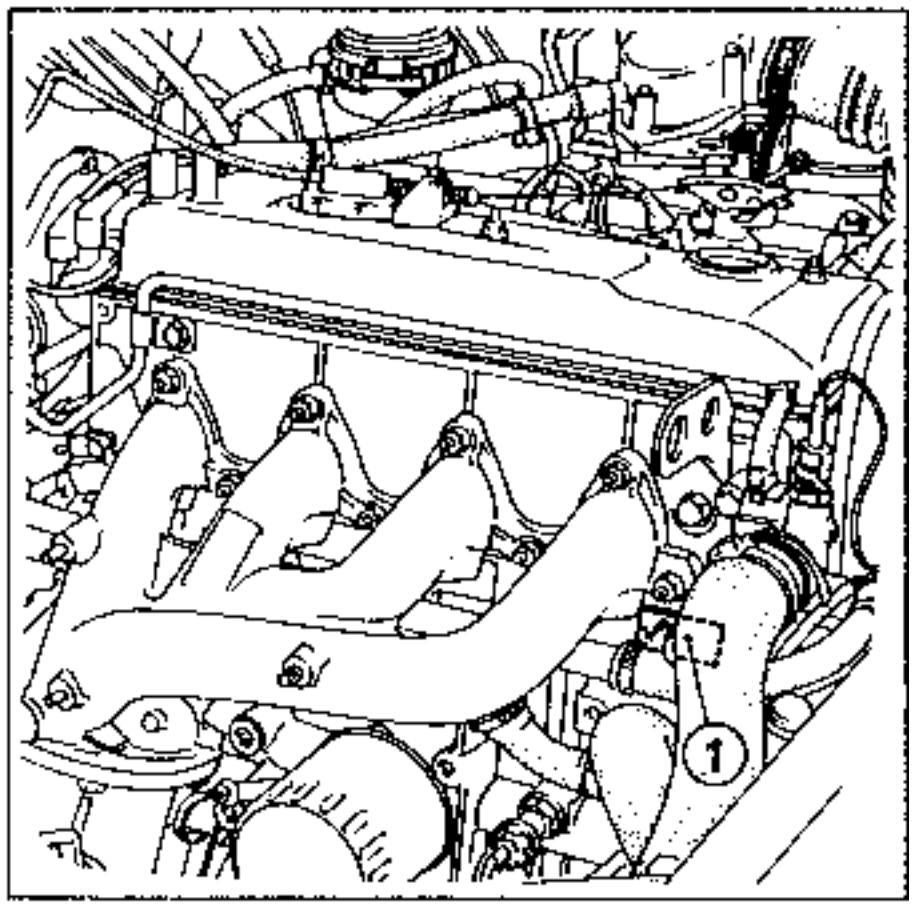
Type F2N-F3N-F2R engines



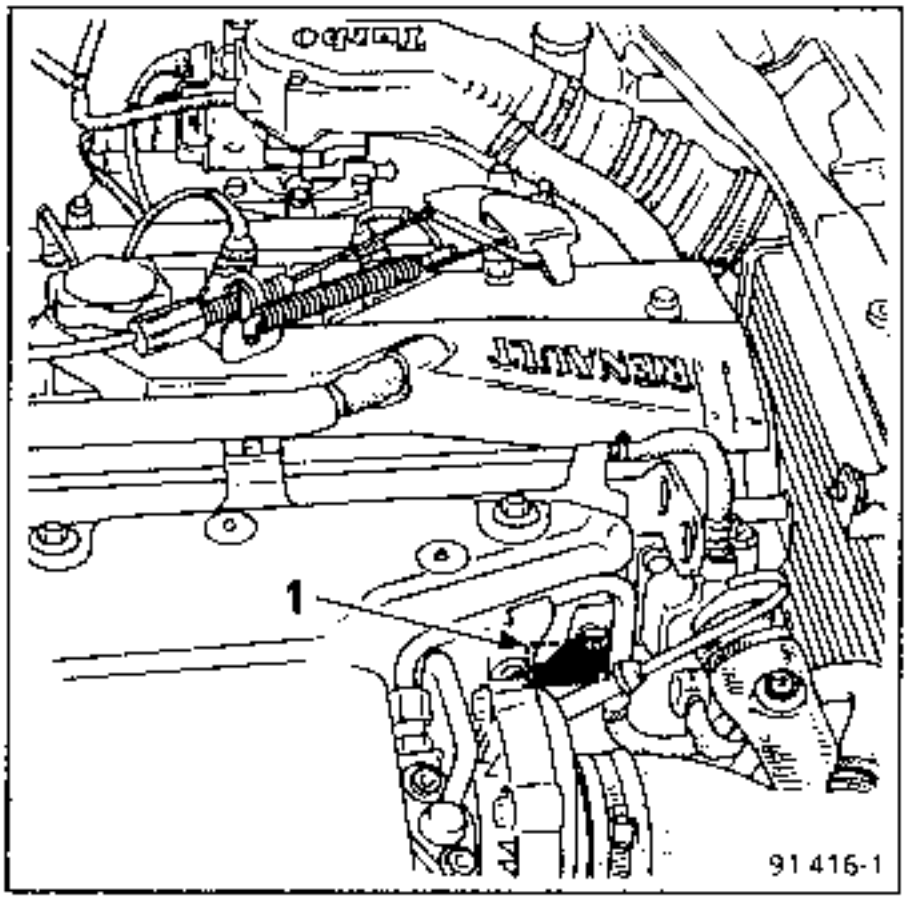
Type F8Q engines



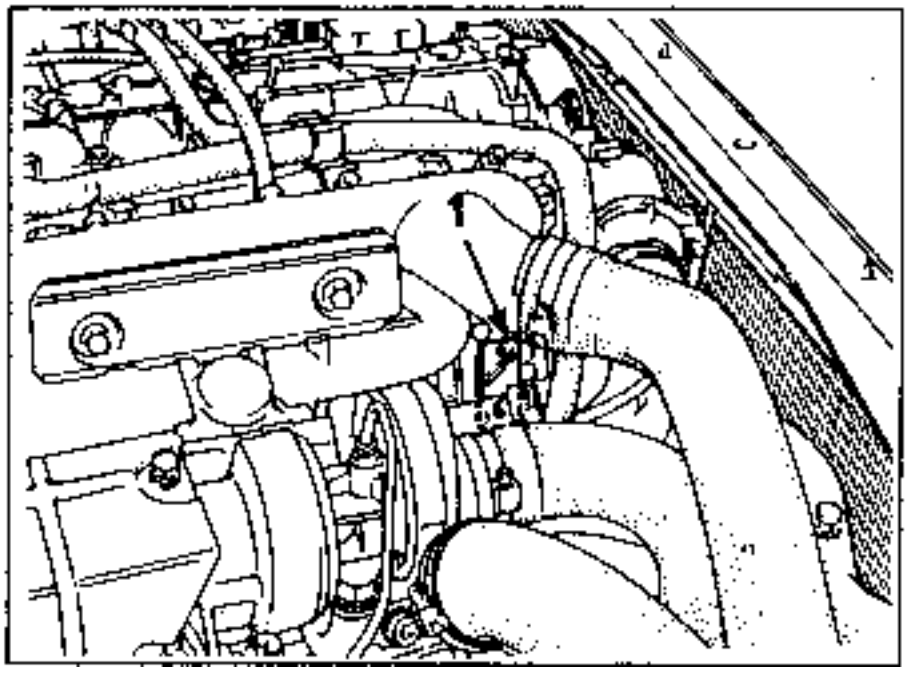
Type J7R-J7T-J6R engines



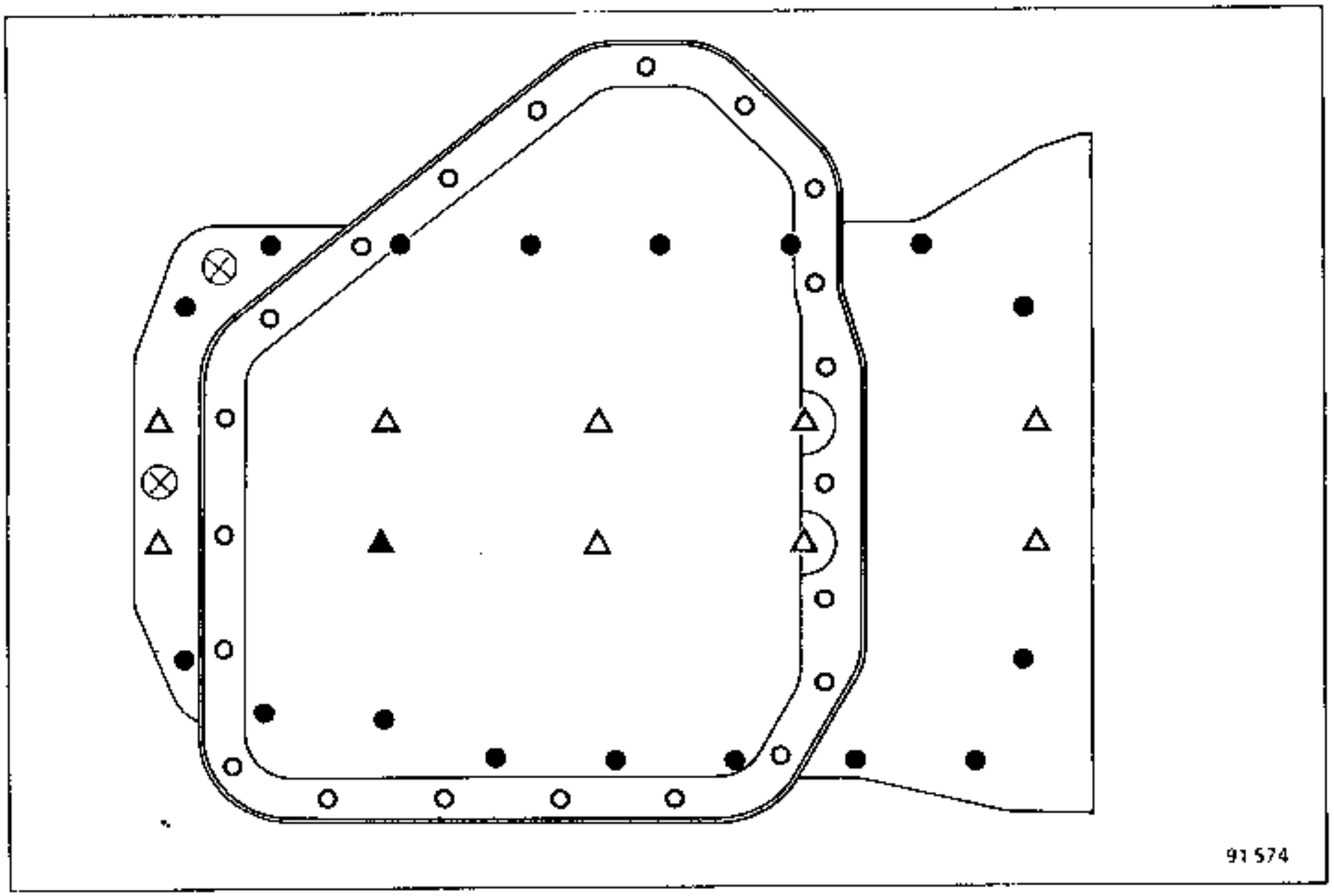
Type J7R Turbo engines



Type J8S engines



Identification of the screws securing the base to the cylinder and the sump to the base.



There are 4 types of screw, identified as follows:

● : 17 screws (M7 x 100-50), tightening torque: 1.2 to 1.8 daN.m.

o : 21 screws (M6 x 100-16), tightening torque: 0.7 to 1.1 daN.m.

▲: 1 screw (M10 x 150-40), tightening torque: 3.2 to 4.8 daN.m.

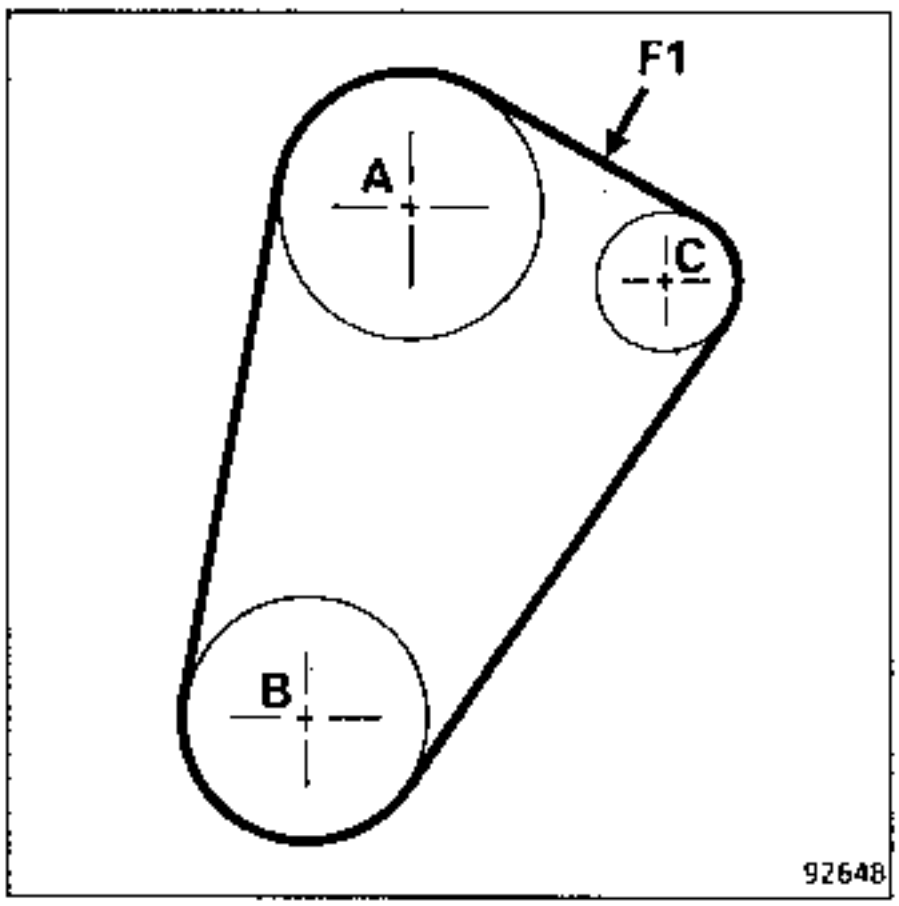
△: 9 screws (M10 x 150-75), tightening torque: 3.2 to 4.8 daN.m.

⊗: screws not used

Checking the Belt Tension

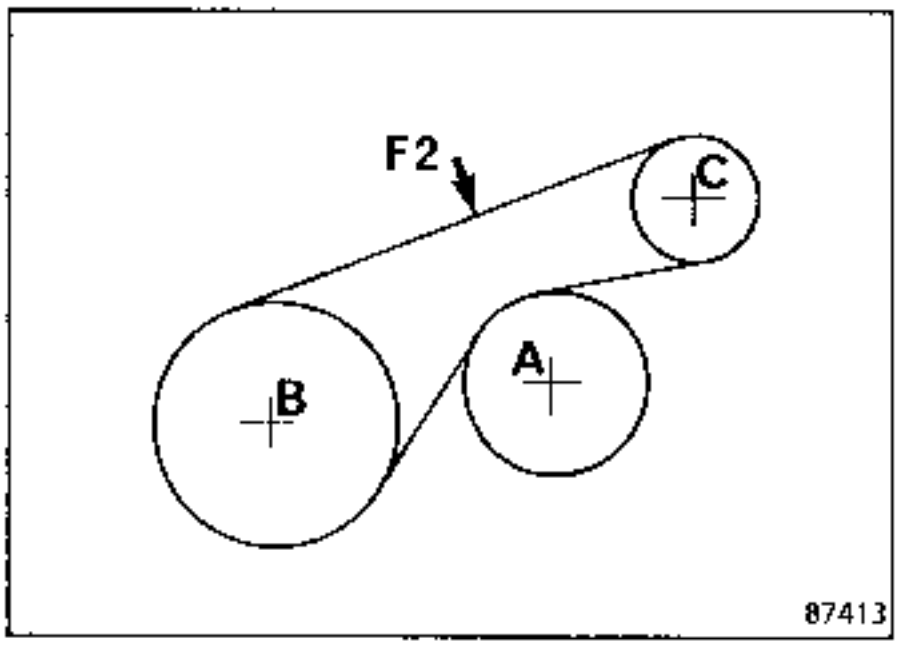
Fit the belt and apply the "cold" tension. Run the engine until the electric fan cuts in and readjust the tension if it is less than that specified for a "warm" belt.

ENGINE TYPE C



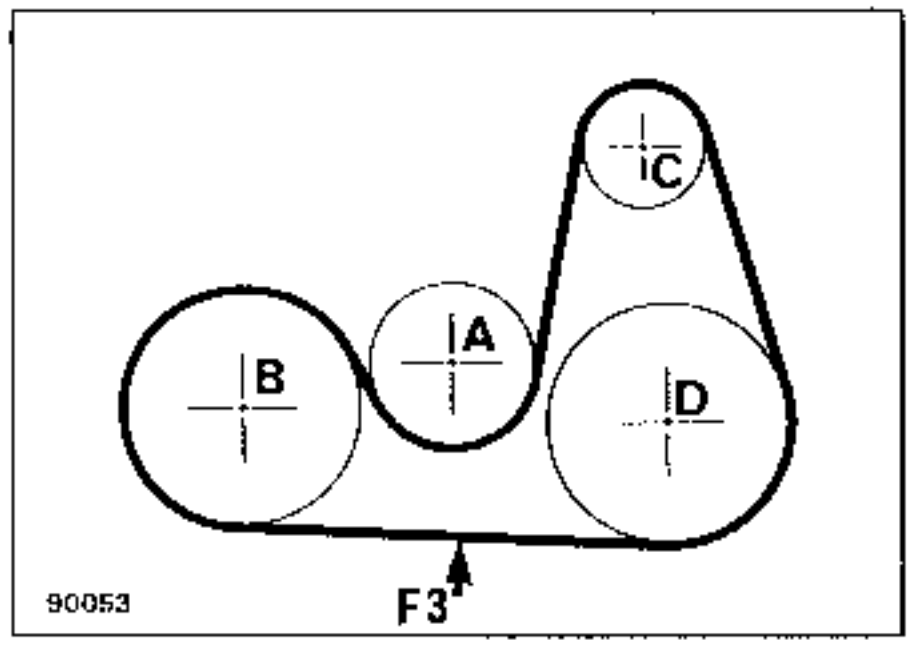
Alternator drive belt: F1 = 4mm.

ENGINE TYPE F



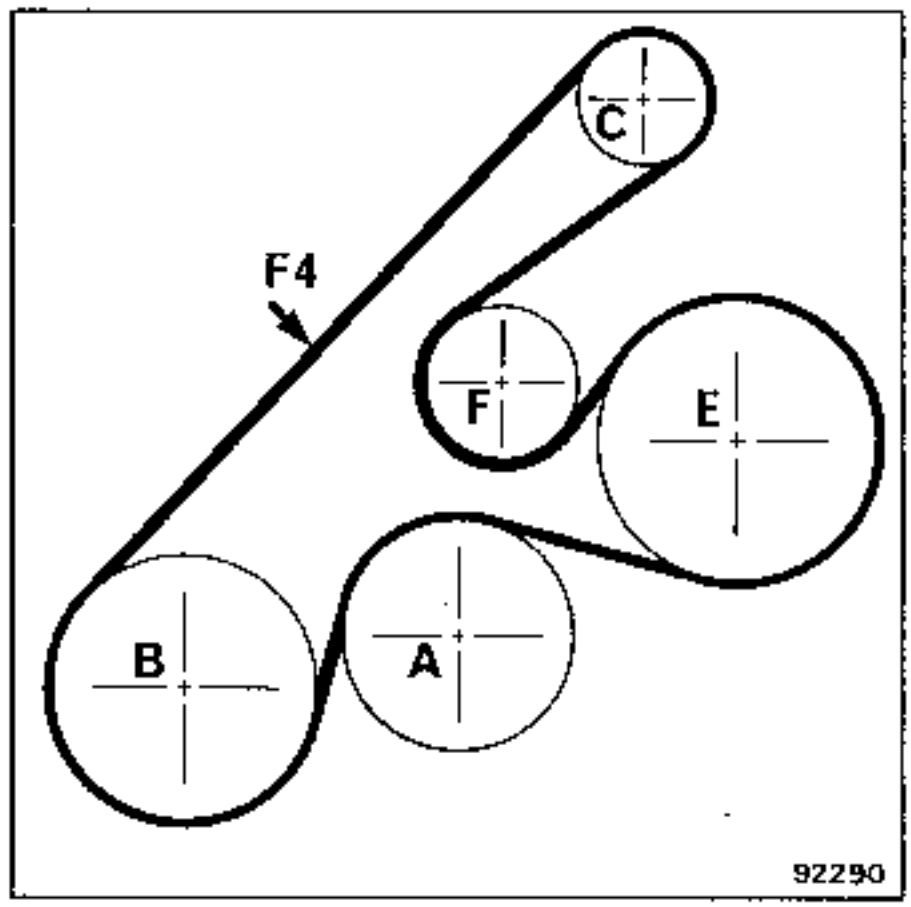
Coolant pump-alternator belt

Deflection "cold" (F2) = 3mm
Deflection "warm" (F2) = 4mm



Coolant pump-Power steering- alternator belt

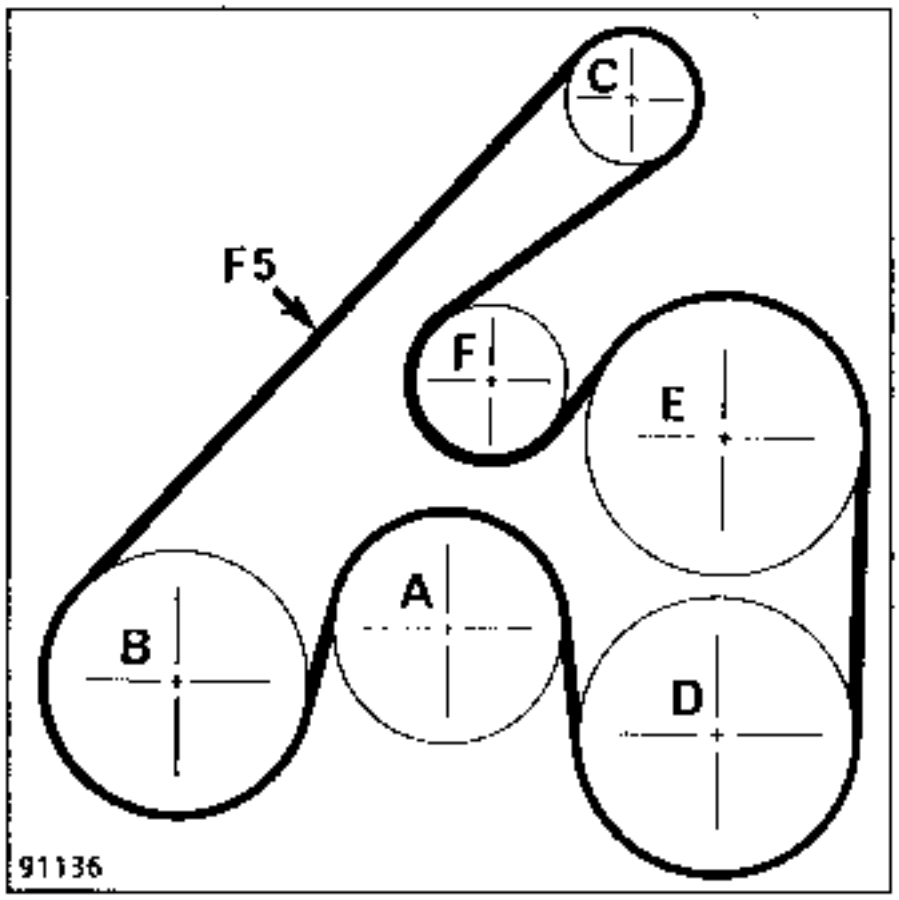
Deflection "cold" (F3) = 2.5 to 3mm
Deflection "warm" (F3) = 3 to 3.5 mm



Coolant pump-compressor-alternator belt

Deflection "cold" (F4) = 4 to 5mm

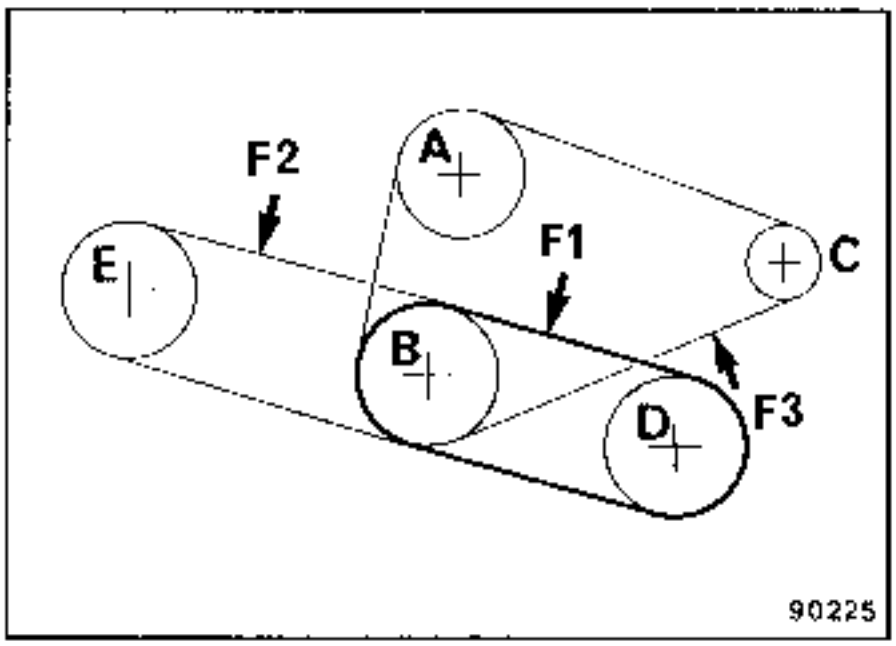
ENGINE TYPE F



Coolant pump-power steering
Compressor-alternator belt

Deflection "cold" (F5) = 4 to 5mm
Deflection "warm" (F5) = 6 to 6.5mm

ENGINE TYPE J



Deflection "cold":
F1 = 3 to 3.5mm
F2 = 4mm
F3 = 4.5 to 5mm

Deflection "warm":
F1 = 4 to 5mm
F2 = 4.5 to 5.5mm
F3 = 6 to 6.5mm

Pulley identification:
A Coolant pump pulley
B Crankshaft pulley
C Alternator pulley
D Power steering pump pulley
E Compressor pulley
F Tensioner roller

IDLING SPEEDS

Vehicle	Engine	Capacity (cm³)	Fuel	Fuel System	Idling (rpm.)	C.O. (%)
X 481	F2N 712 F2N 716	1721 C Ratio 9,2/1	Regular I.O. 92	SOLEX 28-34 Z10 Rep. 867 Rep. 867 (D) Rep. 970 (D)	700 ± 25	1 ± 0,5
	F2N 716	1721 C Ratio 9,2/1	Super I.O. 98	SOLEX 28-34 Z10 Rep. 913	700 ± 25	1 ± 0,5
X 482	F2N 710	1721 C Ratio 10/1	Super I.O. 98	SOLEX 28-34 Z10 Rep. 889 (D)	700 ± 50	1,5 ± 0,5
	F2N 754	1721 C Ratio 9,5/1	Super I.O. 95 (1)	SOLEX 28-34 Z13 Rep. 967 (C) (D)	800 ± 50	1,5 ± 0,5
X 483	J7R 750 (BM) J7R 751 (TA)	1995 C Ratio 10/1	Super I.O. 95 (1)	Bendix Multipoint Injection	775 ± 50 775 ± 50 (N)	1,5 ± 0,5
X 485	J7R 752 (Turbo)	1995 C Ratio 8/1	Super I.O. 95 (1)	Multipoint Injection	800 ± 25	1,5 ± 0,5
X 486	J8S 704	2068 C Ratio 21,5/1	Diesel	BOSCH or CAV Roto Diesel Injection	825 ± 25	-
X 488 Turbo	J8S 714 J8S 742	2068 C Ratio 21,5/1	Diesel	BOSCH Injection	825 ± 25	- -
X 489	J6R 758 (BM) J6R 759 (TA)	1995 C Ratio 8,6/1	Ordinary I.O. 89	WEBER 32 DARA 59 WEBER 32 DARA 60	800 ± 50 900 ± 50 (N)	1,5 ± 0,5 1 ± 0,5
X 48 D	C2J 770	1397 C Ratio 9,25/1	Super I.O. 98	WEBER 32 DRT 21	800 ± 50	1,5 ± 0,5
X 48 E	F3N 722	1721 C Ratio 9,5/1	Regular (2) I.O. 91 min.	Bendix Multipoint Injection	800 ± 50 (3)	-
X 48 F	F3N 726	1721 C Ratio 9,5/1	Regular (2) I.O. 91	Bendix Monopoint Injection	750 ± 50 (3)	-
X 48 H	F8Q 710	1870 C Ratio 21,5/1	Diesel	BOSCH or CAV Roto Diesel Injection	850 ± 50 825 ± 25	-
X 48 J	F2R 702	1965 C Ratio 8,4/1	Regular I.O. 91 min.	SOLEX 28-34 Z9 Rep. 915 (C)	700 ± 25	1,5 ± 0,5
X 48 K	J7T 754 (BM) J7T 755 (TA)	2165 C Ratio 9,2/1	Regular (2) I.O. 91 min.	Bendix Multipoint Injection	800 ± 25 (3) 800 ± 25 (3)	- -
X 48 M	F2N 750	1721 C Ratio 9,2/1	Regular (2) I.O. 91 min.	SOLEX 28-34 Z10 Rep. 926	725 ± 25	1 ± 0,5 w/out pulsair
X 48 N	F2N 752	1721 C Ratio 9,5/1	Euro Super I.O. 95 (4)	SOLEX 28-34 Z10 Rep. 927 (D)	850 ± 50	1,25 ± 0,25 w/out pulsair
X48 Q X 48 Y	J7R 754	1995 C Ratio 9,3/1	Super I.O. 95 (1)	Bendix Multipoint Injection	850 ± 75	1,8 ± 0,2
X 48 V	J8S 740	2068 C Ratio 21,5/1	Diesel	BOSCH or CAV Roto Diesel Injection	850 ± 50 825 ± 25	-

(1) Compatible with Eurosuper I.O.95
(2) Operates on unloaded fuel I.O. 91.
(I.O. = octane rating)
(3) These figures are non adjustable.
(4) Operates on unleaded Eurosuper I.O.95

For those items not dealt with in this workshop manual, see manuals M.R. Carb. S and W, INJ R(E), M.R. INJ(D) latest edition.

Vehicle	Engine						Gearbox	Injection type	Ignition Type
	Type	Index	Bore (mm)	Stroke (mm)	Capacity (cm^3)	Comp Ratio			
X 48 F	F3N	726	81	88,5	1 721	9,5	Manual	Monopoint + Mixture Regulation	I.P.M. with pinking detector

Engine	Idling		Fuel	
	Speed (rpm)	Mixture (CO)	Special features	Octane Rating
F3N 726	700 to 800* (non adjustable)	0.5% max (non adjustable)	Unleaded	I.O. 92

* At a coolant temperature of between 80 and 100°C.

Fuel System Type	Monopoint Renix Regulated Injection System
Fuel pump (on the front of the rear cross member, right hand side)	Voltage: 12 volts Pressure: 3 bars Delivery: 130 l/h
Fuel filter (beside fuel pump)	Replacement: 50 000 km
Paper cartridge air filter	Replacement: 20 000 km
Pressure regulator (integral part of throttle unit)	Pressure 1,2 ± 0,05 bar
Electromagnetic injector	Voltage: : 12 volts Resistance: 1,4 Ω must be less than 10 Ω
Catalyzer (under the floor)	◇ C02 N° 8934202175
Oxygen sensor or Lambda sensor	Make: Autolite n° 8933002455 A 800 °C : - Rich mixture : 625- 1 100 mV - Lean mixture : 0 to 150 mV
E.G.R.	WITH Valve No. 8933003184
Anti-evaporation system	With or without depending on the country

Computer mounted in the engine compartment				REMARKS
Renix No.	Approval No.	RNUR No.	Diagnostic Code	- mixture adjusted by oxygen sensor - speed adjusted by electro-actuator - pinking detector - transitory defects not placed on memory - inj. warning light non operational
S 100 811 101	77 00 731 802	77 00 738 169	202.3	
S 100 811 102	77 00 731 802	77 00 744 410	204.3	

Specifications and Adjustments

Vehicle	Engine						Gearbox	Injection Type	Ignition Type
	Type	Index	Bore (mm)	Stroke (mm)	Capacity (cm^3)	Comp. Ratio			
X48E	F3N	722	81	83,5	1721	9,5	Manual	Renix Multipoint + Mixture Regulation	I.P.M. with pinking detector

Engine	Idling		Fuel	
	Speed (rpm)	Mixture (CO)	Special Features	Octane Rating
F3N 722	750 to 850* (non adjustable)	0,5 % max (non adjustable)	Unleaded	I.O. 91 min.

* At a coolant temperature of between 80 and 100°C.

Fuel System Type	Regulated Multipoint Injection
Fuel pump mounted on the right hand side of the rear cross member	Voltage: 12 volts Pressure: 3 bars Delivery: 130 l/h
Fuel filter mounted above the fuel pump.	Replacement : 50 000 km
Pressure regulator	Pressure: - zero vacuum (A)(B): 2.5 ± 0.2 bars (C) : 3.0 ± 0.2 bars - at a vacuum of 500 mbars (A)(B): 2.0 ± 0.2 bars (C) : 2.5 ± 0.2 bars
Electromagnetic injectors	Will only operate with a computer: Voltage : 12 volts Resistance : $2,5 \pm 0,5\ \Omega$
Throttle unit	WEBER: double-barrelled Ø32 x 36 CFR Ref.: 2
Full throttle/no throttle switch, with three wires	A: idling: throttle open less than 1° B: partial load: throttle open more than 1° C: fully open: throttle open more than 70°
Idling speed regulator valve	Bosch - voltage: 12 volts

For the meanings of the references, see next page.

Specifications and Adjustments

Computer	Rénix No.	Approval No.	R.N.U.R. No.	Diagnostic Code
Renix or Bendix mounted in the engine compartment	S 100 812 101 S 100 812 101 S 100 812 101 S 101 263 101	77 00 735 559 77 00 735 559 77 00 735 559 77 00 746 044	77 00 736 401 77 00 740 149 77 00 745 344 77 00 744 412	210 - 3 (A) 211 - 3 (B) 213 - 3 or 215 - 3 (B) 216 (C)

(A) Without an anti-fuel evaporation system
(B) With an anti-fuel evaporation system
(C) With a pressure regulator (3 bars)

Air temperature sensor	Bendix: type CTP (A and B) CTN(C)
Coolant temperature sensor	Bendix: type CTP (A and B) CTN(C)

Oxygen Sensor	Make: BOSCH at 800°C: - Rich mixture: 625 to 100 mV - Lean mixture: 0 to 150 mV
Catalyzer (mounted under the floor)	Type : three function Reference: CO 5
Paper cartridge air filter	Replacement: 20,000 km
E.G.R.	
Anti-evaporation system (for certain countries)	Using GM Canister (B)
Ignition system	Curves: programmed into the injection computer M.P.A.: Ignition Power Module with (I.P.M.) pinking detector

Specifications and Adjustments

Vehicle	Engine						Gearbox	Injection Type	Ignition Type
	Type	Index	Bore (mm)	Stroke (mm)	Capacity (mm)	Comp. Ratio			
X 483	J7R J7R	750 751	88	82	1995	10	BM (A) TA (B) (E)	Renix Multipoint	I.P.M. with pinking detector

Engine	Idling		Fuel	
	Speed (rpm)	Mixture (CO)	Special Features	Octane Rating
J7R 750 J7R 751	775 50* (non adjustable)	1,5 ± 0,5	Super (Premium)	I.O. 98

* At a coolant temperature of between 80 and 100°C.

Fuel System Type	Multipoint Injection
Fuel pump, mounted on the rear right hand side member	Voltage : 12 volts Pressure : 3 bars Delivery : 130 l/h
Fuel filter: mounted above the fuel pump	Replacement: 50 000 km
Pressure Regulator	Pressure: - at zero vacuum 2,5 ± 0,2 bars - at a vacuum of 500 mbar 2,0 ± 0,2 bars
Electromagnetic injectors	Will only operate with a computer: Voltage : 12 volts Resistance : 2,5 ± 0,5 Ω
Throttle unit	SOLEX: single barrel Ø 50mm Ref. : 863 BM ; 864 TA
Full throttle/no throttle switch, with three wires	A : idling: throttle open less than 1° B : partial load: throttle open more than 1° C : fully open: throttle open more than 70°
Idling regulator valve	Bosch - voltage: 12 volts

Specifications and Adjustments

Computer	Renix No.	Approval No.	R.N.U.R. No.	Diagnostic Code
Renix or Bendix mounted in the engine compartment	S 100 805 101 S 100 805 101 S 100 805 103 S 100 805 201 S 100 805 204	77 00 731 803 77 00 731 803 77 00 731 803 77 00 731 804 77 00 740 605	77 00 733 848 77 00 740 150 77 00 736 594 77 00 733 984 77 00 740 932	20 - 3 (A) 20 - 3 (A) 20 - 3 (A) 23 - 3 (B) 22 - 3 (E)

(E) BVA AR4 (Automatic transmission)

Air temperature sensor	Bendix: type CTP
Coolant temperature sensor	Bendix: type CTP

Oxygen sensor	
Catalyzer	
Paper cartridge air filter	Replacement : 20 000 km
E.G.R.	
Anti-evaporation system	
Ignition system	Curves: programmed into the injection computer M.P.A. (I.P.M.) : Ignition Power Module with pinking detector

Specifications and Adjustments

Vehicle	Engine						Gearbox	Injection Type	Ignition Type
	Type	Index	Bore (mm)	Stroke (mm)	Capacity (cm^3)	Comp. Ratio			
L 485	J7R	752	88	82	1995	8	Manual	Renix Multipoint	I.P.M. with pinking detector

Engine	Idling		Fuel	
	Speed (rpm)	Mixture (CO)	Special features	Octane Rating
J7R 752	800 ± 25 * (non adjustable)	1,5 ± 0,5 %	Super	I.O. 98

* For a coolant temperature of between 80 and 100°C.

Fuel System Type	Multipoint injection
Fuel pump: mounted on the rear right hand side member	Voltage : 12 volts Pressure : 3 bars Delivery : 130 l/h
Fuel filter: mounted above the fuel pump	Replacement: 50 000 km
Pressure Regulator	Pressure: - at zero vacuum : 2,5 ± 0,2 bars - at a vacuum of 500 mbar : 2,0 ± 0,2 bars
Electromagnetic injectors	Will only operate with a computer: Voltage : 12 volts Resistance : 2,5 ± 0,5 Ω
Throttle unit	SOLEX: single barrel Ø 50mm Ref.: 875
Load potentiometer	A : idling: XR25 reading = 5 to 15 B : partial load: XR25 reading = 20 to 190 C : fully open: XR25 reading = 225 min
Idling regulator valve	Bosch - voltage: 12 volts

Specifications and Adjustments

Computer	Renix No.	Approval No.	R.N.U.R. No.	Diagnostic Code
Renix or Bendix mounted in the engine compartment	S 100 805 102 S 101 100 103 S 101 100 104	77 00 731 805 77 00 731 805 77 00 745 306	77 00 733 985 77 00 733 985 77 00 744 404	25 - 3 83 - 3 27 - 3 (1)

NOTE: The computer controls a turbocharger pressure regulator.

(1) Fitted, after manufacture, with an oxydization catalyzer - Germany.

Air temperature sensor	Bendix : type CTN
Coolant temperature sensor	Bendix : type CTN

Oxygen Sensor	
Catalyzer	
Paper cartridge air filter	Replacement : 20 000 km
E.G.R.	
Anti-evaporation system	
Ignition system	Curves: programmed into the injection computer M.P.A. (I.P.M.) : Ignition Power Module with pinking detector

Specifications and Adjustments

Vehicle	Engine						Gearbox	Injection Type	Ignition Type
	Type	Index	Bore (mm)	Stroke (mm)	Capacity (cm^3)	Comp. Ratio			
X 48 K	J7T J7T	754 755	88	89	2 165	9,2	Manual BM (1) Automatic TA (2)	Renix Multipoint + Mixture Regulator	I.P.M. with Pinking Detector

Engine	Idling		Fuel	
	Speed (rpm)	Mixture (CO)	Special Features	Octane Rating
J7T 754 J7T 755	800 ± 25* (non adjustable)	0,5 % max (non adjustable)	Unleaded	I.O. 91

* For a coolant temperature of between 80 and 100°C with the automatic transmission in (N).

Fuel system type	Regulated multipoint injection
Fuel pump: mounted on the rear right hand side member	Voltage : 12 volts Pressure : 3 bars Delivery : 130 l/h
Fuel filter: mounted above the fuel pump	Replacement : 50,000 km
Pressure regulator	Pressure: - at zero vacuum : 2,5 ± 0,2 bars - at a vacuum of 500 mbar : 2,0 ± 0,2 bars
Electromagnetic injectors	Will only operate with a computer: Voltage : 12 volts Resistance : 2,5 ± 0,5 Ω
Throttle unit	SOLEX : single barrel Ø 50mm Ref. 863 manual; 864 automatic
Full throttle/no throttle switch with three wires	A : idling: throttle open by less than 1° B : partial load: throttle open more than 1° C : fully open: throttle open more than 70°
Idling regulator valve	Bosch - voltage: 12 volts

Specifications and Adjustments

Computer		Renix No.	Approval No.	R.N.U.R. No.	Diagnostic Code
Renix or Bendix mounted in the engine compartment	(1)	S 100 810 101	77 00 735 562	77 00 736 398	32 - 3
	(1)	S 101 108 103	77 00 735 562	77 00 748 183	45 - 3
	(2)	S 100 810 201	77 00 735 563	77 00 736 399	33 - 3
	(2)	S 100 810 204	77 00 742 418	77 00 742 313	41 - 3 (A)
	(2)	S 101 108 203	77 00 742 418	77 00 748 184	47 - 3 (A)

(A) BVA AR4 (Automatic Transmission)

Air temperature sensor	Bendix: type CTP
Coolant temperature sensor	Bendix: type CTP
Oxygen sensor	Make : BOSCH At 800°C: - Rich mixture : 625 to 1,100mV - Lean mixture : 0 to 150mV
Catalyzer (mounted under the floor)	Type : Three function Reference: CO 1
Paper cartridge air filter	Replacement: 20,000 km
E.G.R.	
Anti-evaporation system	In certain countries, by means of GM Canister
Ignition system	Curves : programmed into the injection computer M.P.A. (I.P.M.) : ignition power module without pinking detector

Specifications and Adjustments

Vehicle	Engine						Gearbox	Injection Type	Ignition Type
	Type	Index	Bore (mm)	Stroke (mm)	Capacity (cm^3)	Comp. Ratio			
X 48 Q X 48 Y	J7R	754	88	82	1 995	9,3	Manual	Renix Multipoint	I.P.M. with pinking detector

Engine	Idling		Fuel	
	Speed (rpm)	Mixture (CO)	Special Features	Octane Rating
J7R 754	850 ± 75* (non adjustable)	1,8 ± 0,2 %	Super Eurosuper Unleaded	I.O. 98 I.O. 95

* At a coolant temperature of between 80 and 100°C.

Fuel system type	Multipoint injection
Fuel pump: mounted on the rear right hand side member	Voltage : 12 volts Pressure : 3 bars Delivery : 130 l/h
Fuel filter: mounted above the fuel pump	Replacement: 50 000 km
Pressure regulator	Pressure: - at zero vacuum : 3,0 ± 0,2 bars - at a vacuum of 500 mbars : 2,5 ± 0,2 bars
Electromagnetic injectors	Will only operate with a computer: Voltage : 12 volts Resistance : 2,5 ± 0,5 Ω
Throttle unit	SOLEX: single barrel Ø 55mm Ref. : 937
Load potentiometer	A : idling: XR 25 reading = 4 to 10 B : partial load: XR 25 reading = 20 to 190 C : fully open: XR 25 reading = 225 min
Idling regulator valve	HITACHI: Voltage : 12 volts Coil resistance : 9 - 30 Ω

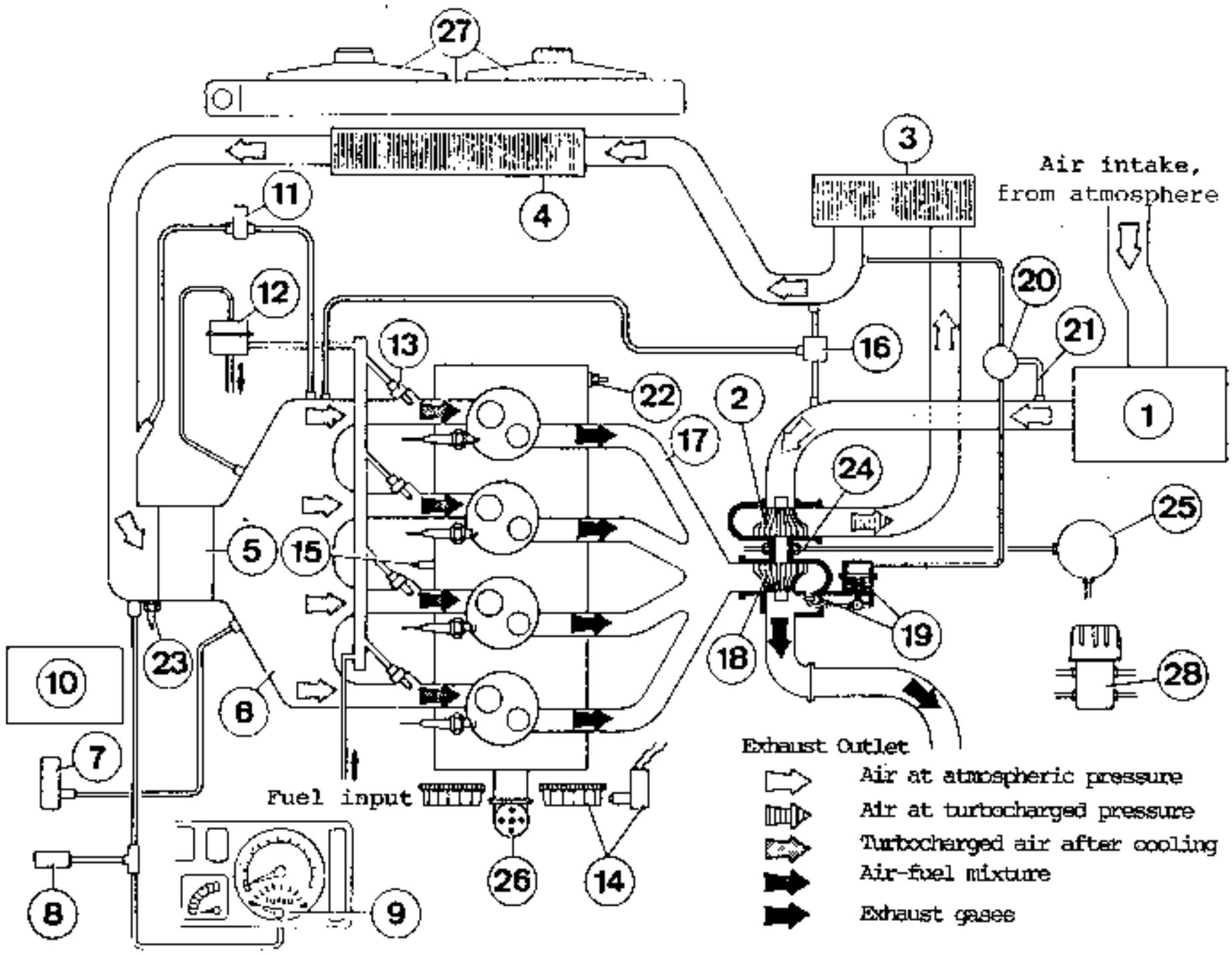
Specifications and Adjustments

Computer	Renix No.	Approval No.	R.N.U.R. No.	Diagnostic Code
Renix or Bendix mounted in the engine compartment	S 101 266 101	77 00 745 990	77 00 744 407	28 - 3

Air temperature sensor	Bendix: type CTN
Coolant temperature sensor	Bendix: type CTN

Oxygen sensor	
Catalyzer	
Paper cartridge air filter	Replacement : 20 000 km
E.G.R.	
Anti-evaporation system	
Ignition system	Curves : programmed into the injection computer M.P.A. (I.P.M.) : Ignition Power Module with pinking detector
Spark plugs: EYQUEM	FC62LS3 spark gap 1.2mm (non adjustable)

FUEL SYSTEM DIAGRAM (X 485)



1 - Air filter
2 - Compressor
3)
4) Intercoolers
5 - Throttle unit and potentiometer
6 - Inlet manifold
7 - Engine air intake pressure sensor
8 - Safety pressure switch
9 - Turbocharged pressure gauge
10 - Engine electronic management computer
11 - Idling speed regulator solenoid valve
12 - Fuel pressure regulator
13 - Injectors
14 - Flywheel position/speed sensor
15 - Pinking detector
16 - Turbo bypass valve
17 - Exhaust manifold
18 - Turbine
19 - Turbo regulator capsule and valve
20 - Solenoid valve which controls the turbocharging pressure regulation
21 - Variable "leak" across solenoid valve 20
22 - Coolant temperature sensor
23 - Air temperature sensor
24 - Turbine bearing water cooling system
25 - Electric coolant pump which operates with the ignition switched off
26 - Ignition distributor
27 - Engine cooling radiator with 2 electric blower fans
28 - Oil cooler

INLET MANIFOLD ELECTRIC HEATER

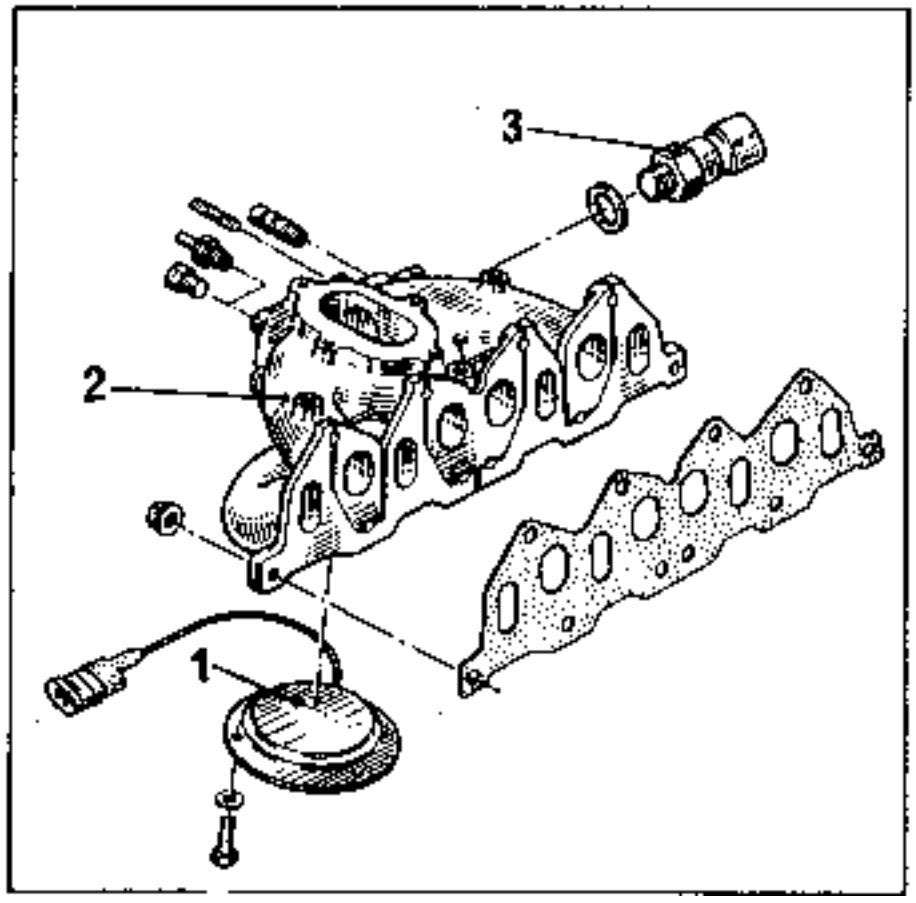
Vehicles fitted with type F2N 754 engines are fitted with an electric heater (1) in the lower part of the inlet manifold (2).

Its current supply is from the + after ignition switch circuit during the engine warmup phase.

A temperature switch (3) switches off the circuit at temperatures above 60°C.

Temperature switch:

- switches off the circuit: 63 ± 3°C,
- switches the circuit back on: 56 ± 3°C



METHOD OF ADJUSTING THE IDLING SPEED

This adjustment must be carried out accurately to obtain a CO percentage that remains stable between two maintenance inspections. We should also like to remind you that its adjustment must be carried out under accurately defined conditions:

1) The vehicle must be run in for a minimum of 1,000 km (600 miles)(any adjustment carried out on a vehicle which is not run-in could change very quickly.)

2) The choke must not be operating (check this).

3) The engine must be at its normal operating temperature. To obtain this, run the engine at approximately 2,000 rpm until the thermostat opens; however, do not leave it to warm up at idling speed as an engine which has run at idling speed for only a few minutes provides a CO reading which is not valid.

4) The idling speed must be within the manufacturer's limits (see chart).

5) The air filter must be fitted and its cartridge clean.

6) The ignition system must be in good condition and correctly adjusted.

7) There are to be no air leaks into the system (vacuum pipes, emission control system etc...).

8) There should be no extensive leakage of the exhaust system.

9) None of the heavy electrical consumers is to be operating (electric fan, heated rear screen etc...).

For the carburettor settings, consult the data sheets in the following workshop manuals,

M.R. Carb. S
M.R. Carb. W
M.R. Carb. Z

and the latest editions of their data sheets.

ADJUSTING THE IDLING SPEED USING AN EXHAUST GAS ANALYZER

In those countries where they are fitted, remove the tamper proofing cap from the mixture screw (B).

Turn screw (A) to obtain the average idling speed stated on the chart for the vehicle concerned.

Turn screw (B) to obtain the CO percentage stated on the chart.

Turn screw (A) to obtain the correct idling speed.

Repeat these two operations until both the CO percentage and the idling speed are correct.

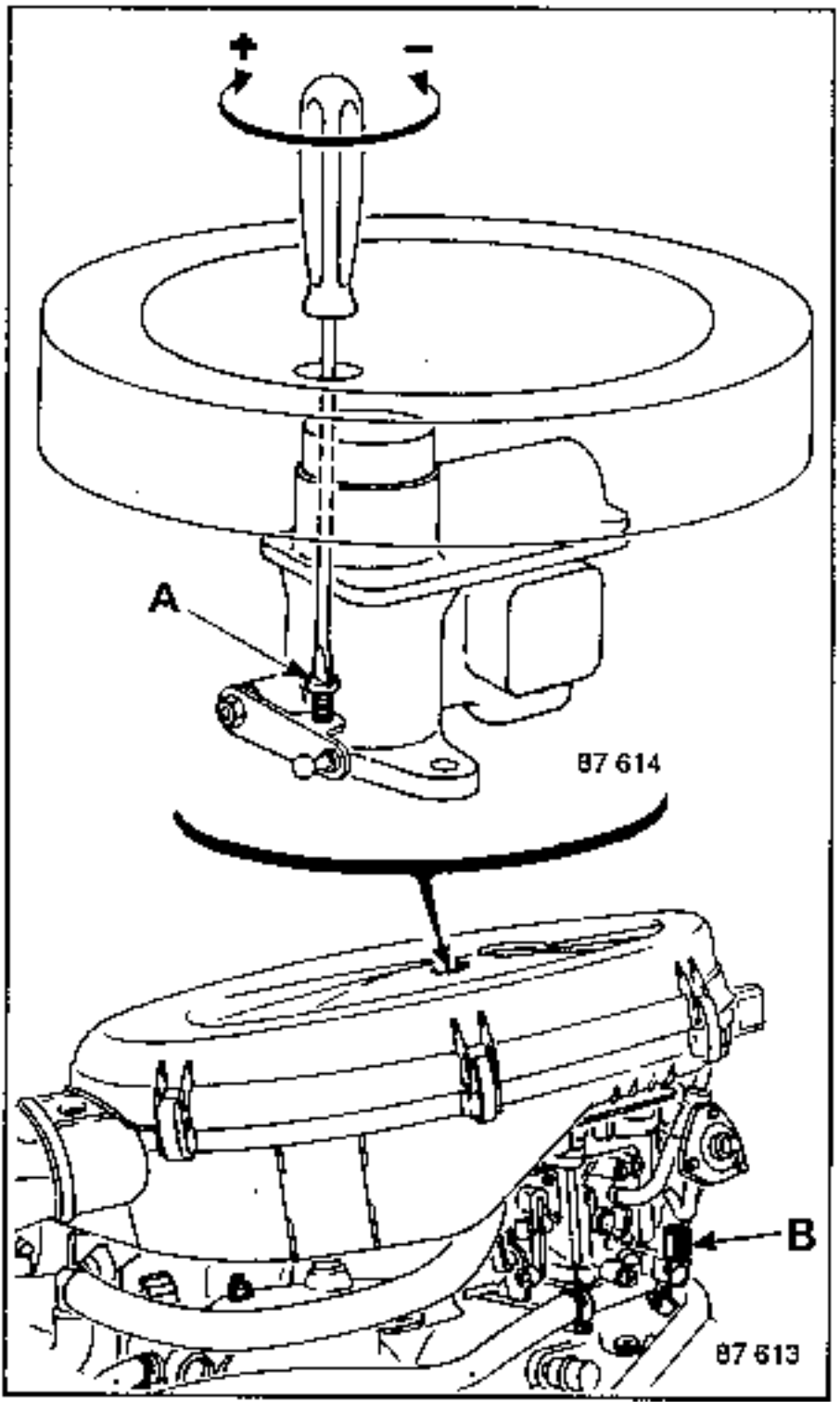
In those countries where the regulations require it, fit a tamper proofing cap to screw (B) after the adjustment.

TAMPER PROOFING CAP

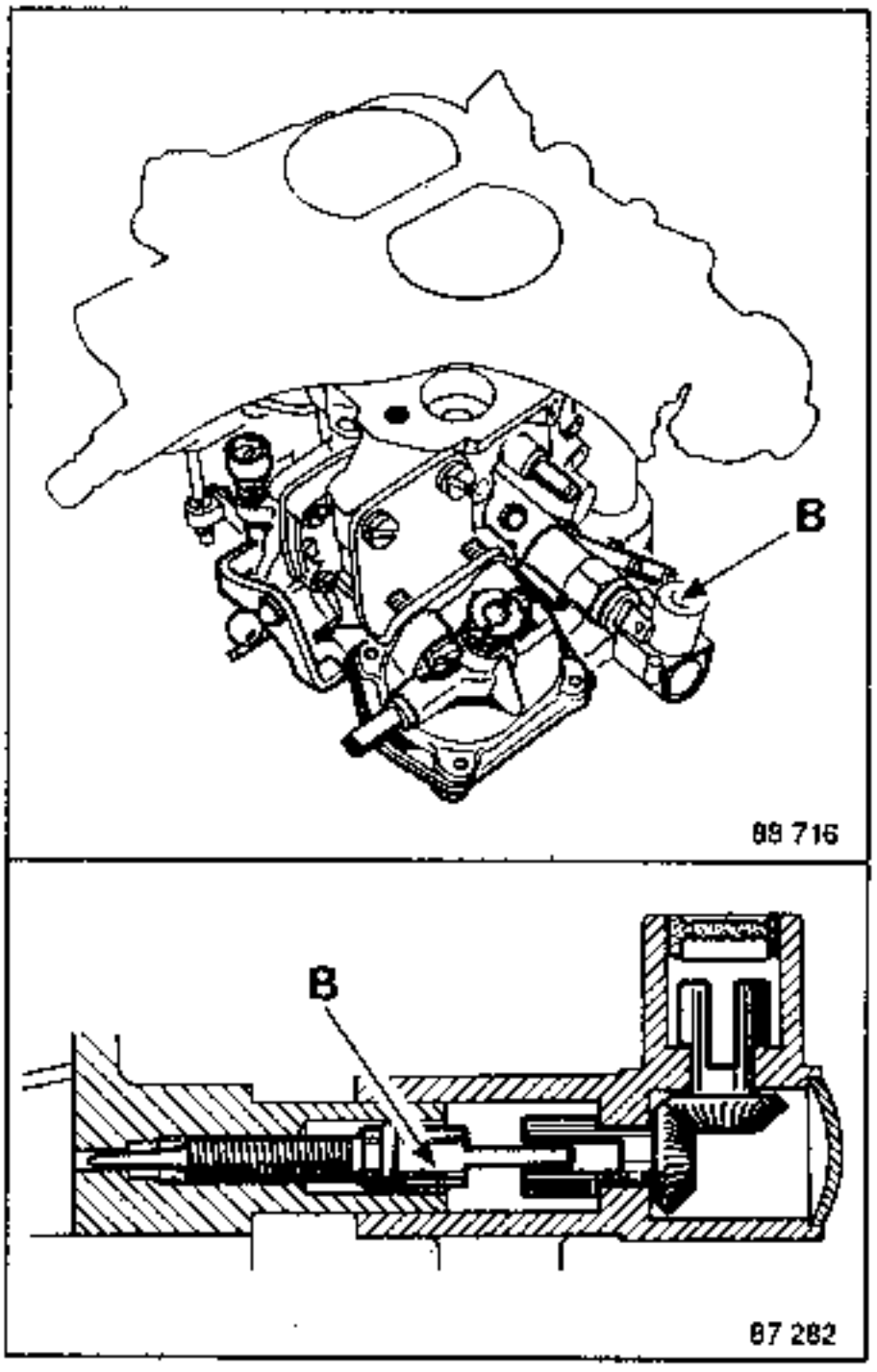
CARBURETTOR	Tamper Proofing Cap Part No.
SOLEX 28 x 34 Z	77 01 200 831
WEBER 32 DRT	77 01 200 833
Injection Bendix	77 01 200 832

Method of Adjusting the Idling Speed:
WEBER 32 DRT

Screw A:

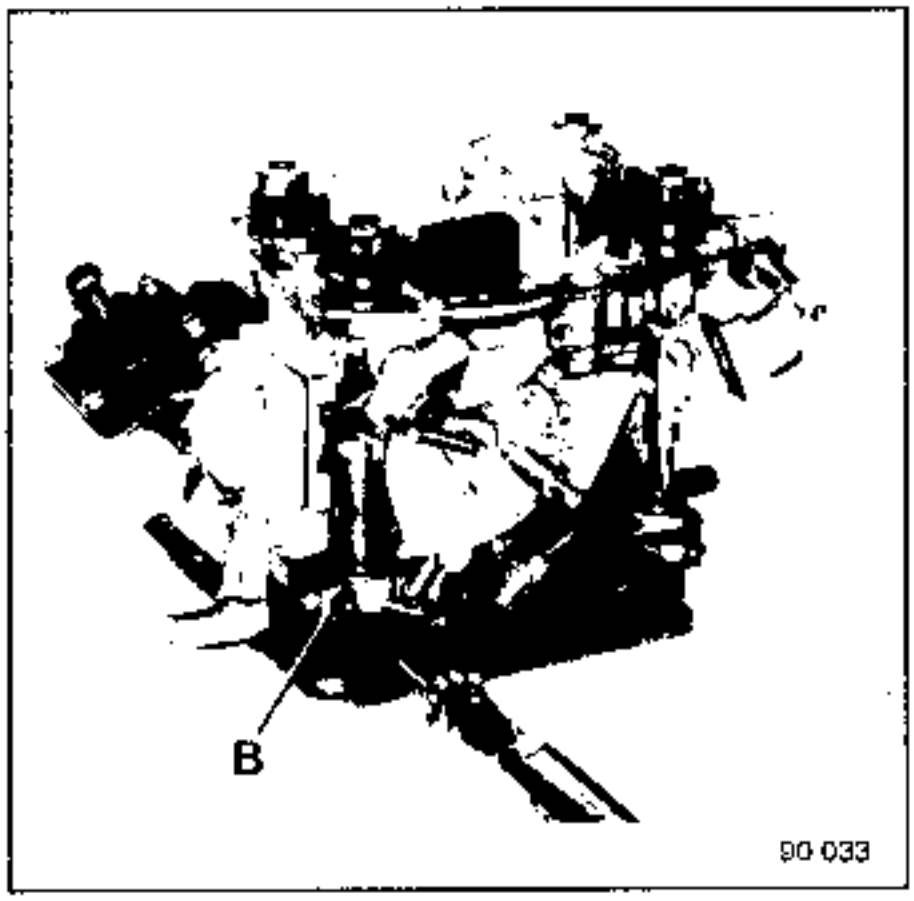


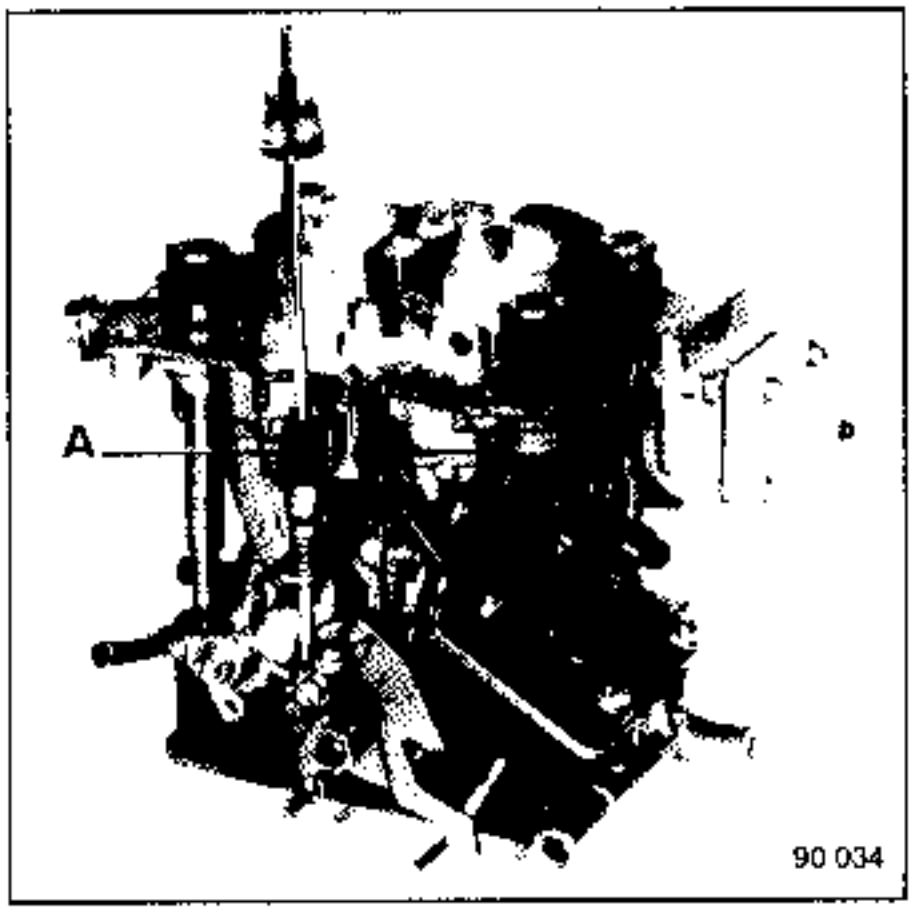
Screw B:



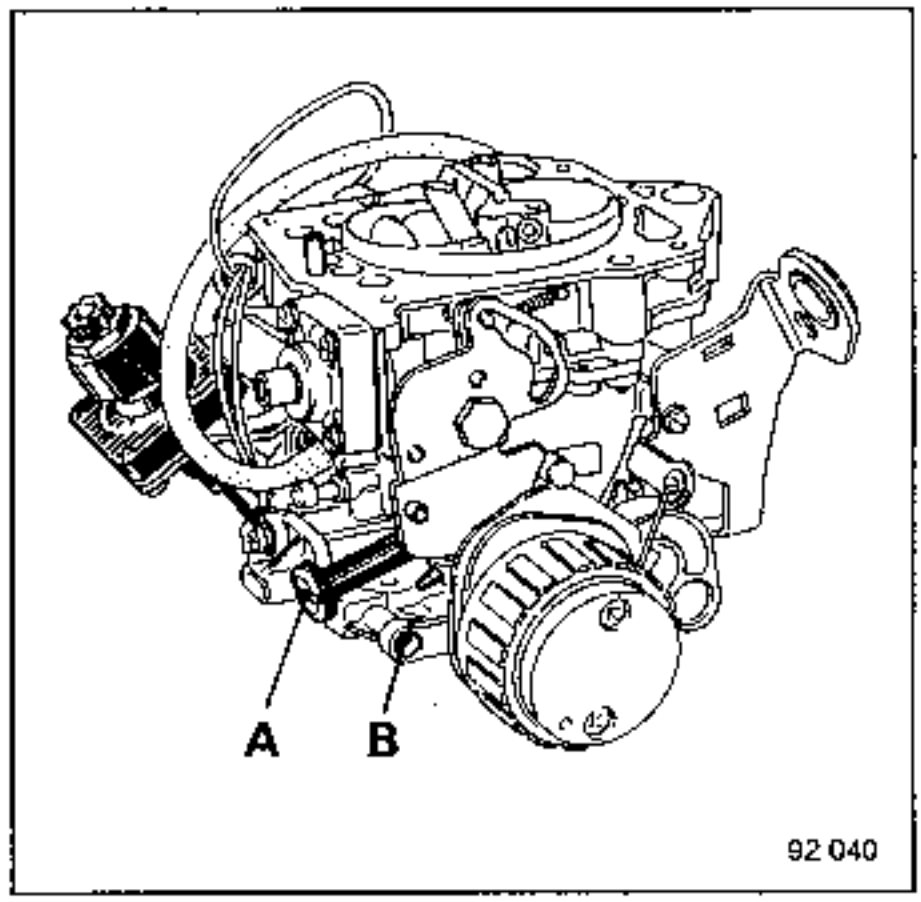
Method of Adjusting the Idling Speed:

SOLEX 28 x 34 Z 10

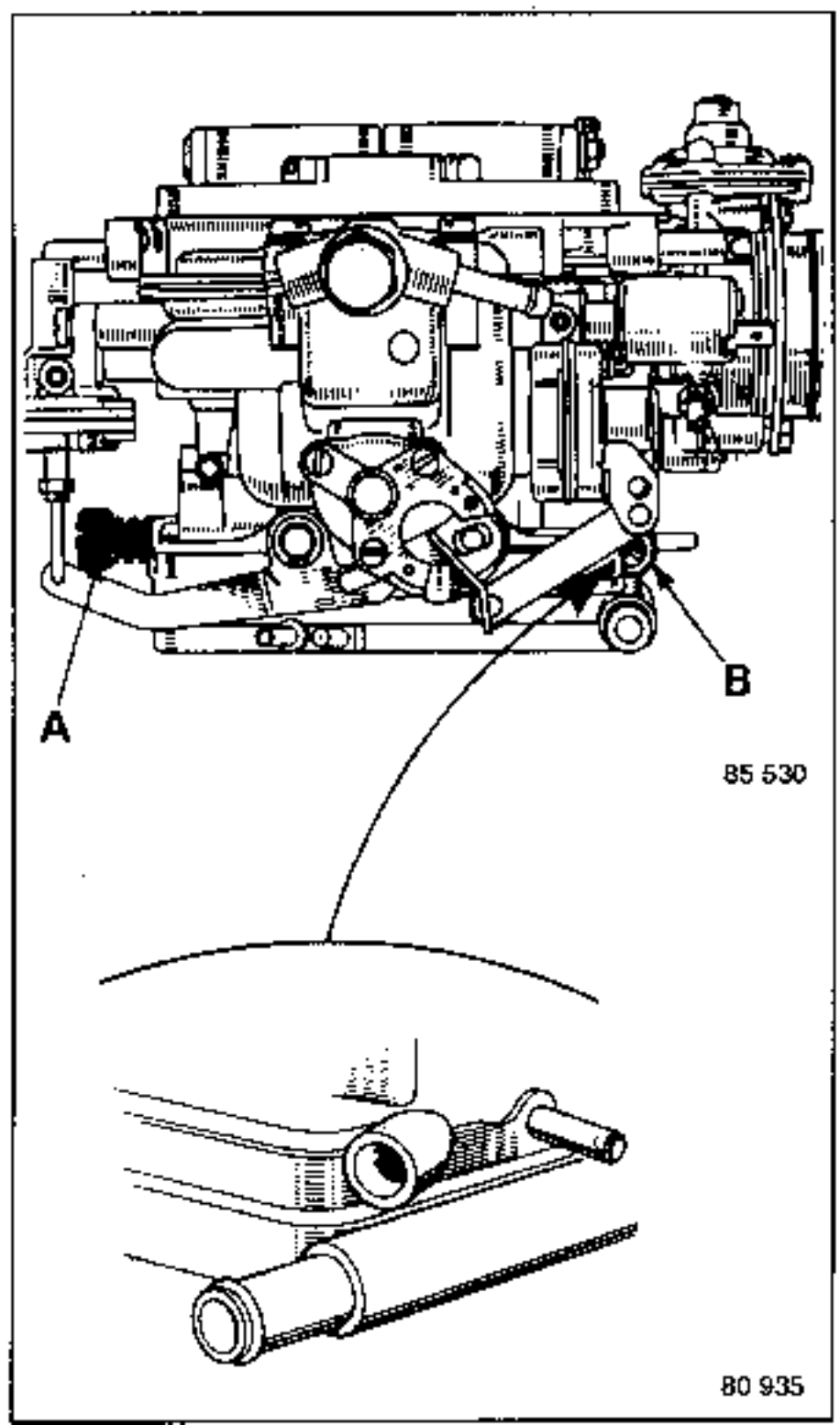




SOLEX 32 x 34 Z 13

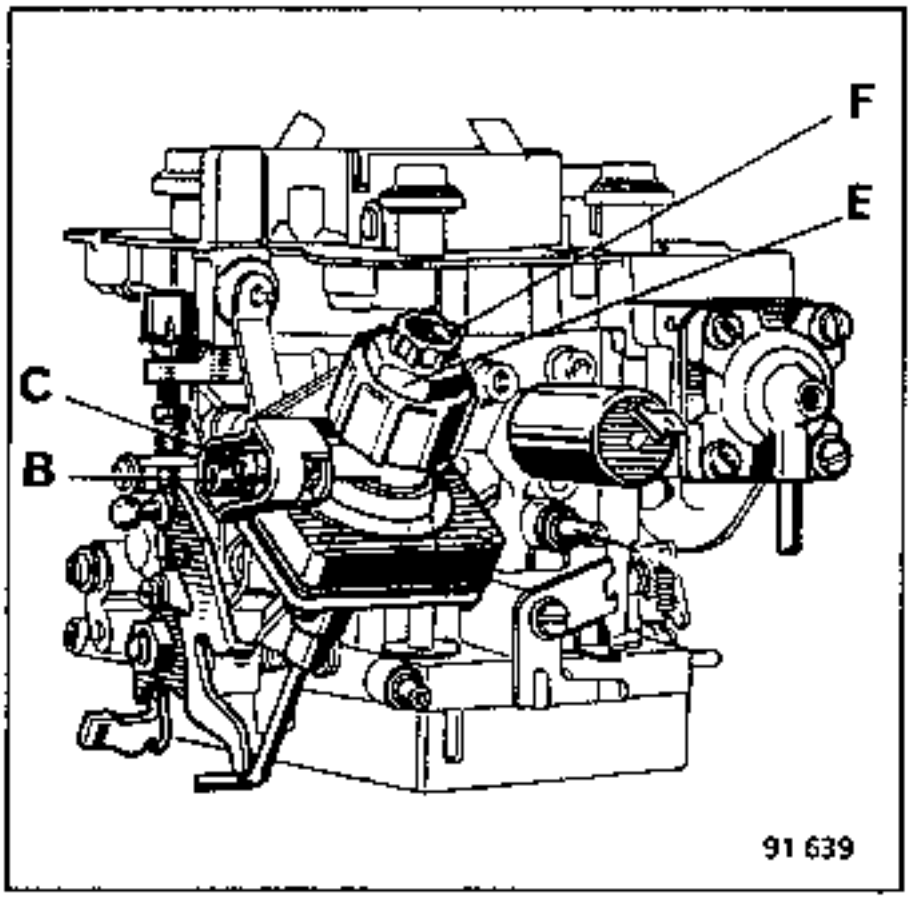


WEBER 32 DARA



VEHICLES X 481 and X 482

Fast Idling A.C. or P.S. or AC and PS



NOTE: Before adjusting the fast idling P.S. or A.C. or P.S. + A.C., check that the normal idling speed is correctly adjusted.

Adjustment on P.S. Vehicles:

With the engine warm, apply a vacuum of 600 mbars or the manifold vacuum to the throttle actuator (blue ring). With the electric fan switched off and the steering straight ahead, the speed should be 955 ± 50 rpm (with the steering turned through full lock, the speed should be 700 to 730 rpm).

Adjustment on A.C. Vehicles:
(after the P.S. adjustment, with the steering straight ahead and the electric fan switched off).

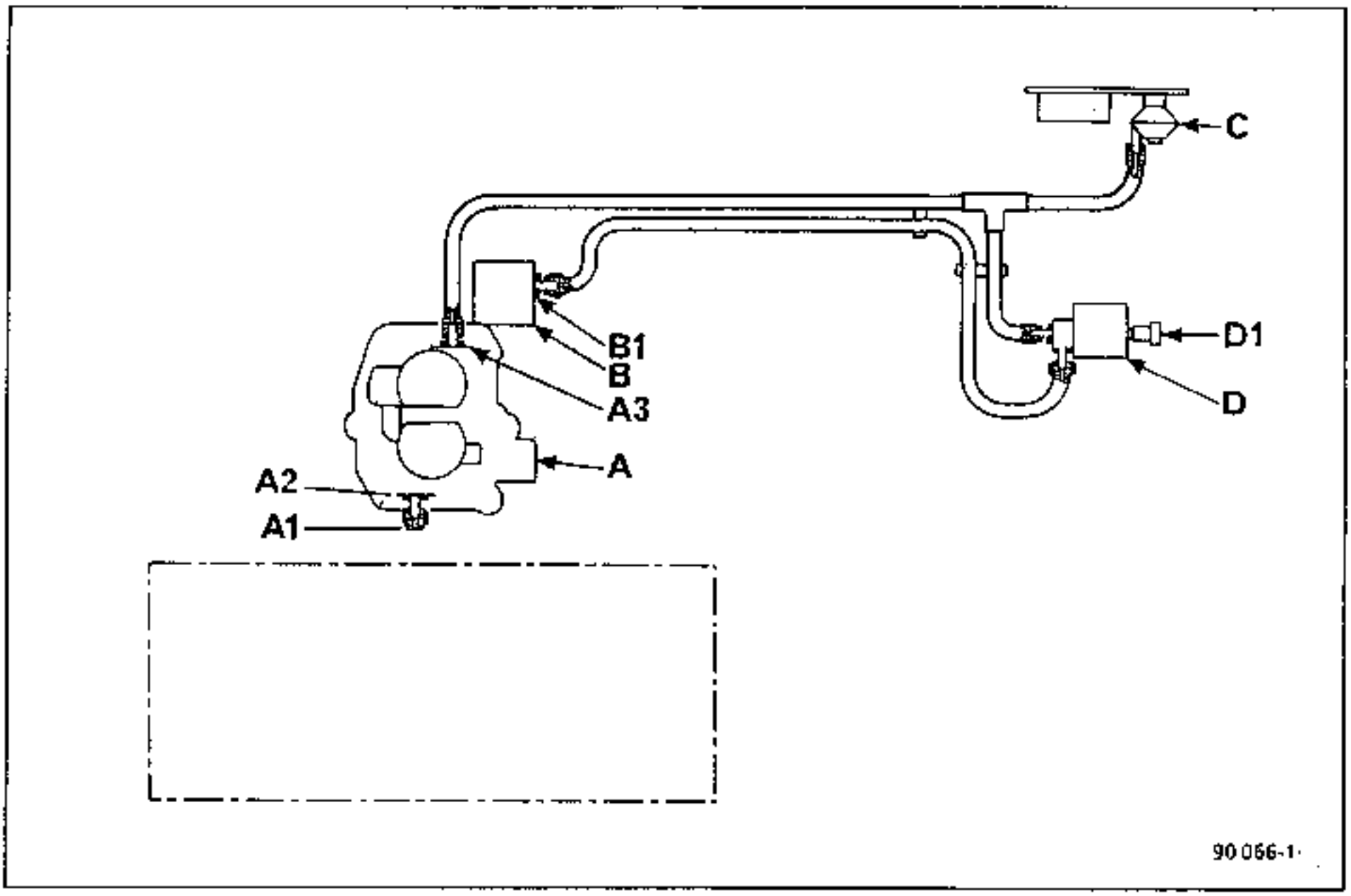
With the air conditioning on maximum, the speed should be 950 rpm.

P.S.: Power Steering
A.C.: Air Conditioning

B : Take-off point on actuator for PS
C : Take-off point on actuator for AC
E : Adjusting screw for P.S.
F : Adjusting screw for A.C.

X 481 - X 482 - 1st Arrangement

Pneumatic control system on vehicled fitted with air conditioning or power steering

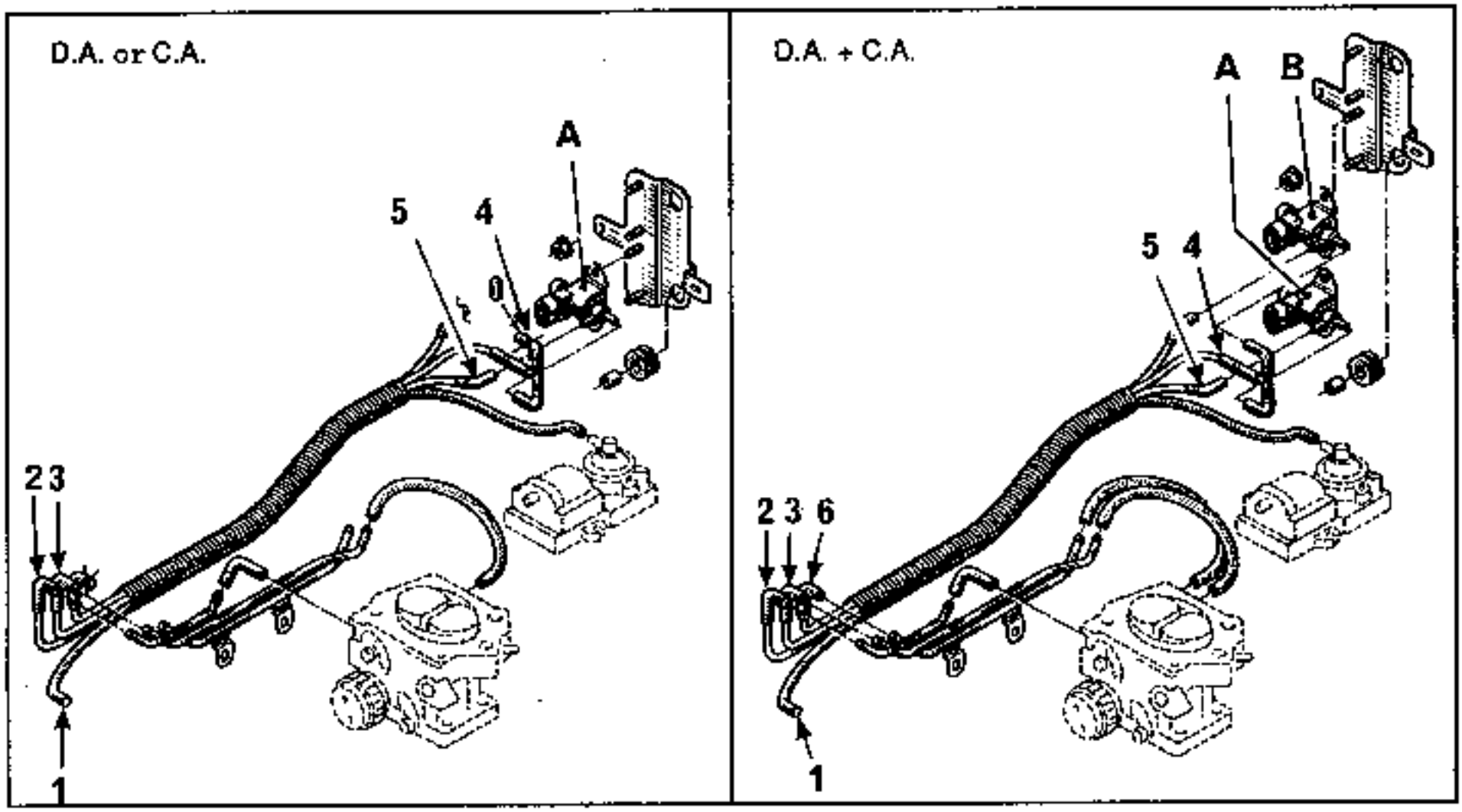


A : Carburettor
A1: Plug on pipe, colour black
A2: Identification ring on carburettor, colour red
A3: Identification ring on carburettor, colour black

B : Throttle actuator
B1: Identification ring, colour dark blue, on actuator
C : Electronic ignition system
On electronic ignition unit: no identification
D : Solenoid valve: near electronic ignition unit
D1: Filter on solenoid valve

X 482 - 2nd Arrangement

Fast Idling P.S. or A.C. or P.S. + A.C.



A.C. or P.S. Arrangement:

1 - Electronic ignition vacuum pipe
2 - Pipe, yellow ring
3 - Pipe, mauve ring
4 - Pipe, red rings
5 - Pipe, blue ring
A - P.S. or A.C. solenoid valve

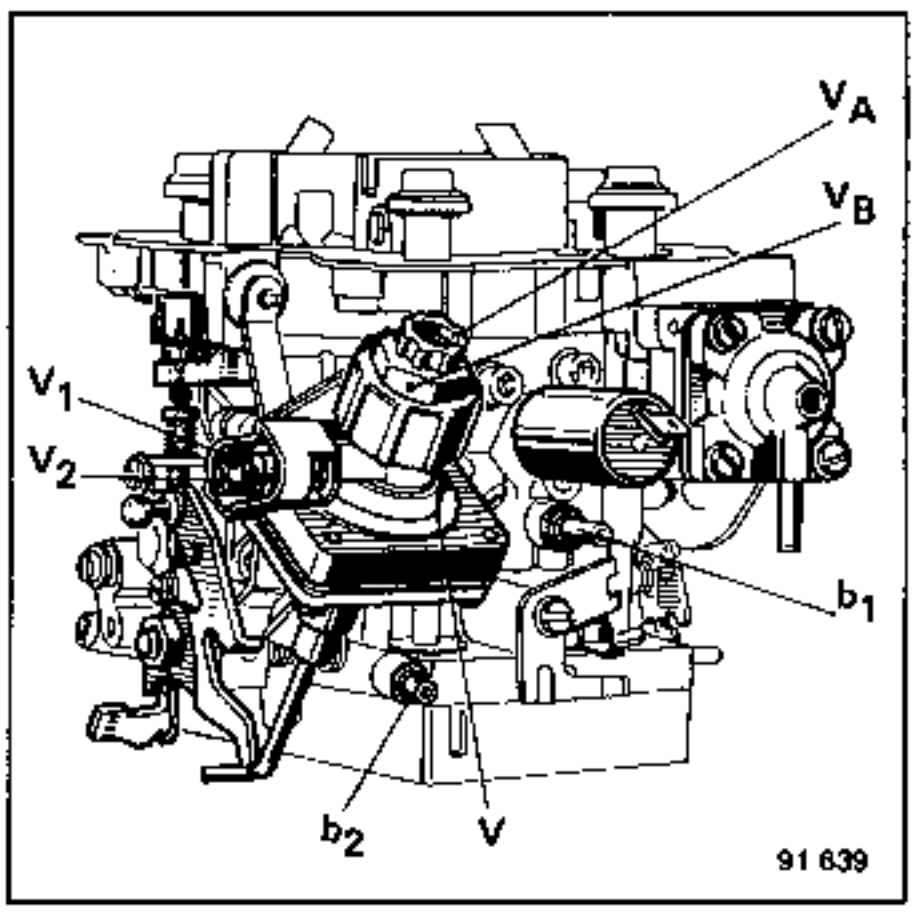
P.S. + A.C. Arrangement:

1 - Electronic Ignition vacuum pipe
2 - Pipe, yellow ring
3 - Pipe, mauve ring
4 - Pipe, red rings
5 - Pipe, blue ring
6 - Pipe, orange ring
7 - Pipe, grey ring
A - P.S. solenoid valve
B - A.C. solenoid valve

A.C.: Air Conditioning
P.S.: Power Steering

VEHICLES X 48 M and X 48 N

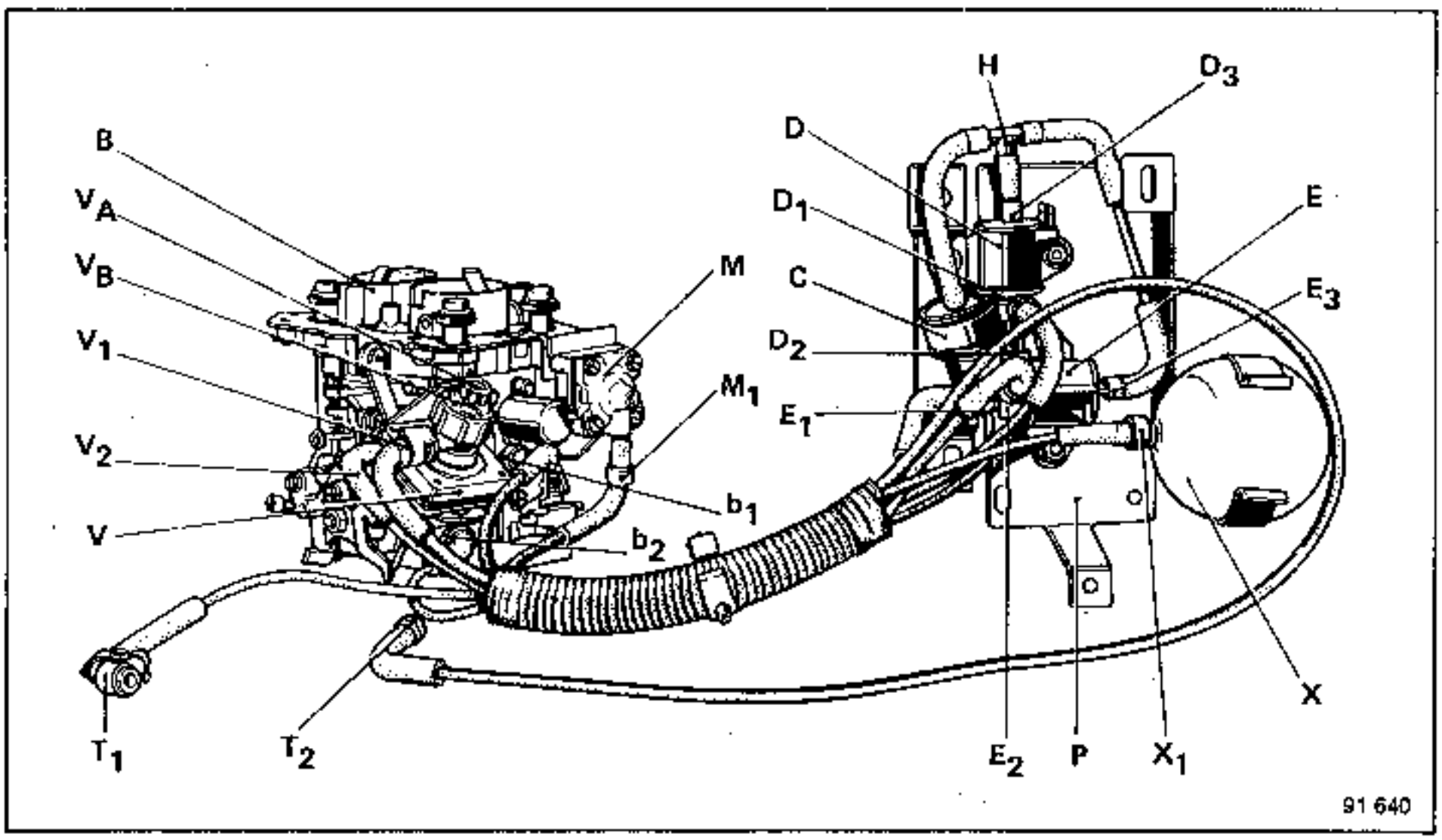
These vehicles are fitted with a two stage actuator. Each stage is controlled separately by its own solenoid valve.



V - Two stage throttle actuator
- V_A - Adjusting screw for air conditioned and emission control models
- V_B - Adjusting screw for power steering models
- V_1 - Take-off point on actuator for air conditioned models
- V_2 - Take-off point on actuator for power steering models
- b_1 - Emission control take-off
- b_2 - Take-off for power steering and air conditioned models

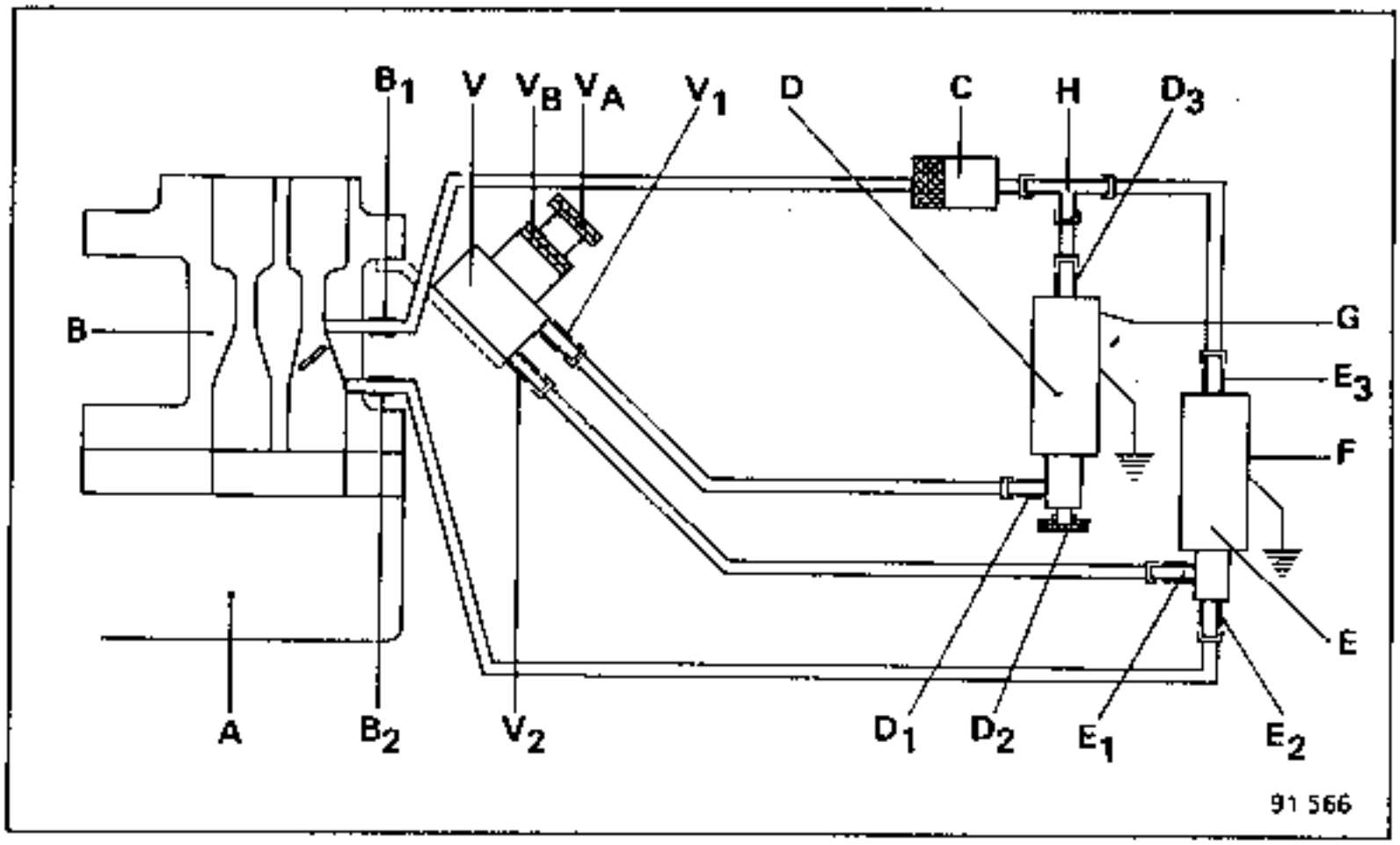
The adjustment of vehicles with air conditioning and power steering:

- Fast idling for power steering (screw V_B): 1050 $\pm$ 50 rpm.
- Fast idling for air conditioned and emission control models (screw V_A): 1500 $\pm$ 100 rpm.



VEHICLES X 48 M and X 49 N

Pneumatic control system circuit diagram:



A - Inlet manifold
B - Carburettor
- B_1 - White identification ring
- B_2 - Red identification ring

C - Retardation valve (coloured face towards carburettor)
D - Solenoid valve controlling stage V_1 on the throttle actuator V
- D_1 - Grey identification ring
- D_2 - Filter
- D_3 - White identification ring

E - Solenoid valve controlling stage V_2 on the throttle actuator V
- E_1 - Light blue identification ring
- E_2 - Red identification ring
- E_3 - White identification ring

F - Power steering signal
G - Air conditioning signal
H - T junction
V - Throttle actuator (on carburettor)
- V_1 - Grey identification ring
- V_2 - Light blue identification ring
- V_A - Adjusting screw for air conditioned and emission control models
- V_B - Adjusting screw for power steering models

M - Starting assistance diaphragm
- M_1 - Green identification ring

X - Starting assistance accumulator
- X_1 - Green identification ring

P - Support plate
T_1 - Electronic ignition take-off on manifold, yellow identification ring
T_2 - Electronic ignition take-off point, yellow identification ring

VEHICLES X 48 M and X 48 N

ADJUSTING THE IDLING SPEED

IMPORTANT:

It is essential, when adjusting or checking the idling mixture:

- **to cut out the exhaust air intake. Using clamp Mot. 453-01, pinch flat the air hose connecting the air filter to the pulsair valve.**
- **to start the adjusting procedure on the vehicle when its engine is cold.**

Adjusting Procedure:

- With the engine cold, the exhaust air intake shut off and the exhaust analyser connected.
- Start the engine on full choke, push in the choke to obtain approximately 900 rpm, and run it at this for approximately 1 minute, then fully push in the choke.
- Wait until the engine cooling fan cuts in for the first time before adjusting the idling speed.

IMPORTANT:

- It is essential to follow this adjusting procedure, and above all not to accelerate the engine to avoid the risk of engaging the catalyzer.
- If, during the gas analysis, the CO percentage tends to fall to 0 and the CO2 percentage rises to above 14%, the catalyzer will be engaged:
  - recommence the adjusting procedure when the engine has cooled down.

NOTE: On vehicles with a CO take off point before the catalyzer, use tool 843-01 to measure the CO percentage. In this case, the engagement of the catalyzer will have no effect on the idling speed adjustment operation.

Adjustment Figures:

Vehicle	Speed (rpm)	Mixture (CO %)	Conditions
K 48 M L 48 M	725 ± 25	1 ± 0,5	No air entering the exhaust system. Carry out the procedure described above.
K 48 N L 48 N	850 ± 50	1,25 ± 0,5	

VEHICLES X 48 M and X 48 N

OVERRUN FAST IDLING SPEED ADJUSTMENT

Vehicles without power steering:

Speeds to be Adjusted	Conditions	Adjustment Figures	Remarks
Normal idling speed	- Engine warm, after warmup procedure and electric fan cutting in. - Hose between pulsair and air filter pinched flat	850 ± 50 rpm CO : 1,25 ± 0,5 % KL 48 N 725 ± 25 rpm CO : 1 ± 0,5 % KL 48 M	Carry out the adjustment, after the electric fan has stopped, with the engine warm, running at idling speed, and the pipe between the air filter and the pulsair pinched flat. The catalyzer will disengage itself. After adjusting the normal idling speed, with the electric fan stopped.
Fast idling	- Engine warm (after normal idling speed adjustment). - Apply a vacuum of 800 mbars to the throttle actuator.	1 500 ± 100 rpm	

Vehicles with power steering:

Speeds to be Adjusted	Conditions	Adjustment Figures	Remarks
Normal idling speed	Identical to vehicle without power steering	See preceding section	Identical to vehicle without power steering
Fast idling speed on power steering model (screw V_B)	- Engine warm (after adjustment of normal idling speed). - Disconnect the pipe from the second stage of the actuator at solenoid valve D (grey identification ring). - Disconnect the pipe with the light blue ring from the first stage of the throttle actuator. - Apply a vacuum of 800 mbars to the first stage of the actuator (V_2 on the diagram).	1 050 ± 50 rpm	- After adjusting the normal idling speed. - Electric fan stopped. - Steering straight ahead.

VEHICLES X 48 M and X 48 N

Overrun Fast Idling Speed Adjustment

Vehicles with power steering:

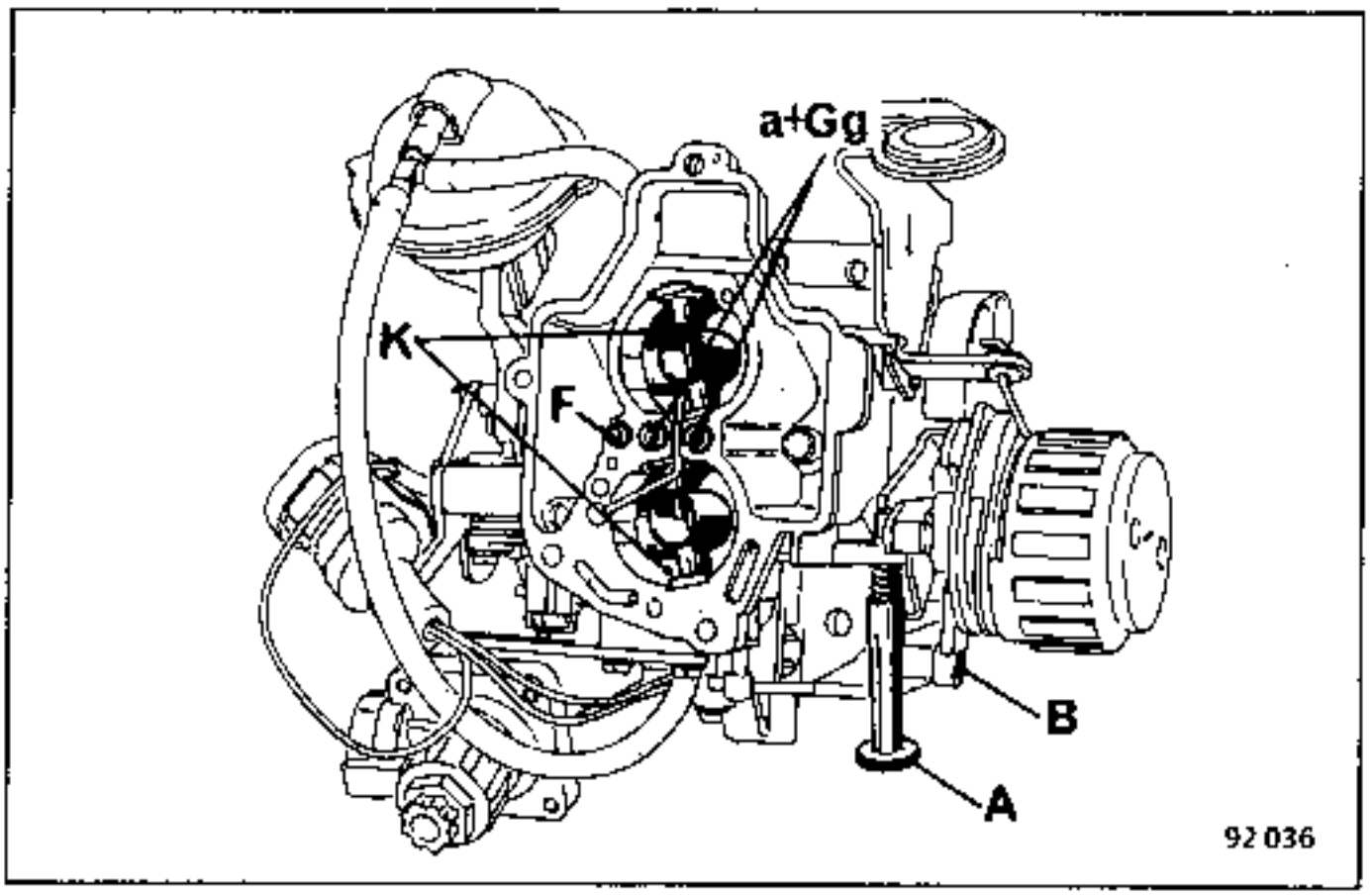
Speeds to be Adjusted	Conditions	Adjustment Figures	Remarks
Fast idling on emission control models (screw V_A).	- Disconnect the pipe from the first stage of the actuator at solenoid valve E (light blue identification ring). - Disconnect the pipe with the grey ring from the second stage of the throttle actuator. - Apply a vacuum of 800 mbars to the second stage of the actuator V_1 on the diagram).	1,500 ± 100 rpm.	- After adjusting the normal idling speed. - With the electric fan stopped. - The power steering stage of the actuator must already have been adjusted.

VEHICLES X 48 M and X 48 N

OVERRUN FAST IDLING SPEED ADJUSTMENT

Test Equipment	Conditions	Requirements	Remarks
NORMAL IDLING SPEED			
Tachometer exhaust gas analyzer	- With the engine warm, after warmup procedure, and electric fan cutting in. - Hose between pulsair and filter pinched flat.	Figures: - speed: 850 ± 50 rpm (2) 725 ± 25 rpm (1) - mixture: CO: 1.25 ± 0.5% (2) 1 ± 0.5% (1)	- Carry out the correct engine warmup procedure. - Adjust, if outside tolerances, with electric fan switched off.
POWER STEERING FAST IDLING (FIRST STAGE) (screw marked VB on the diagram)			
- Tachometer. - Keep the idling speed at the normal figure whilst operating the power steering.	- Engine warm. - Turn the power steering against the lock stop.	- Despite the power steering movement, the engine should maintain its normal idling speed of: 850 ± 50 rpm. DEFECTS: Speed dropping or too high.	- Adjust, if necessary. - Check the electrical connections on the pressure switch and solenoid valves. - Check the solenoid valve pneumatic connection.
EMISSION CONTROL FAST IDLING (SECOND STAGE) PLUS RETARDATION VALVE (screw marked V_A on the diagram)			
- Tachometer. - Stopwatch. - Time to fall from fast idling to normal idling speed.	- Engine warm. - Accelerate the engine to 3,000 rpm, then release the throttle.	- The engine speed should gradually fall after remaining constant at 1,500 ± 100 rpm for a period of 3 to 7 seconds. DEFECTS: Immediate return to idling speed. Return to idling speed after a very long period.	- Throttle actuator operating correctly (second stage). - Check that the retardation valve is fitted the correct way round (coloured face towards carburettor) and the force required to return the throttle. - Check: - The pneumatic connections on the two solenoid valves. - That the retardation valve is of the correct type. - The throttle control.

SOLEX 32 x 34 Z 13 CARBURETTORS (see MANUAL M.R. CARB S and NTs Nos. 1162 and 1380)



SETTINGS

ITEM	967 (C) (1) 967 (D) (2)	
	1st barrel	2nd barrel
Choke tube (K)	24	27
Main jet (Gg)	115	137,4
Air correction jet (a)	165	190
Idling jet (g)	43	50
Econostat	-	120
Enrichener	50	-
Needle valve	1,8	
Float level (mm)	33,5 ± 0,5	
Gauge number	71 644 082	
Accelerator pump injector	40 | 35	
Accelerator pump travel	cam	
Positive throttle opening (mm or °)	0,75 (22°30')	
Pneumatic initial opening (mm) COAS	3,5	
Degassing valve (mm)	0,30	
Fast idling (P.S. + A.C.)	13°	
Fast idling (P.S. or A.C.)	11°15'	
Clearance before diaphragm starts to move dim. X in mm	-	
Idling speed in rpm	800 ± 50	
CO %	1,5 ± 0,5	

(1) : P.S. or A.C.
(2) : P.S. and A.C.
A : Air adjustment screw
B : Mixture adjustment screw
F : Filter in idling fuel circuit

GENERAL - SPECIFICATIONS

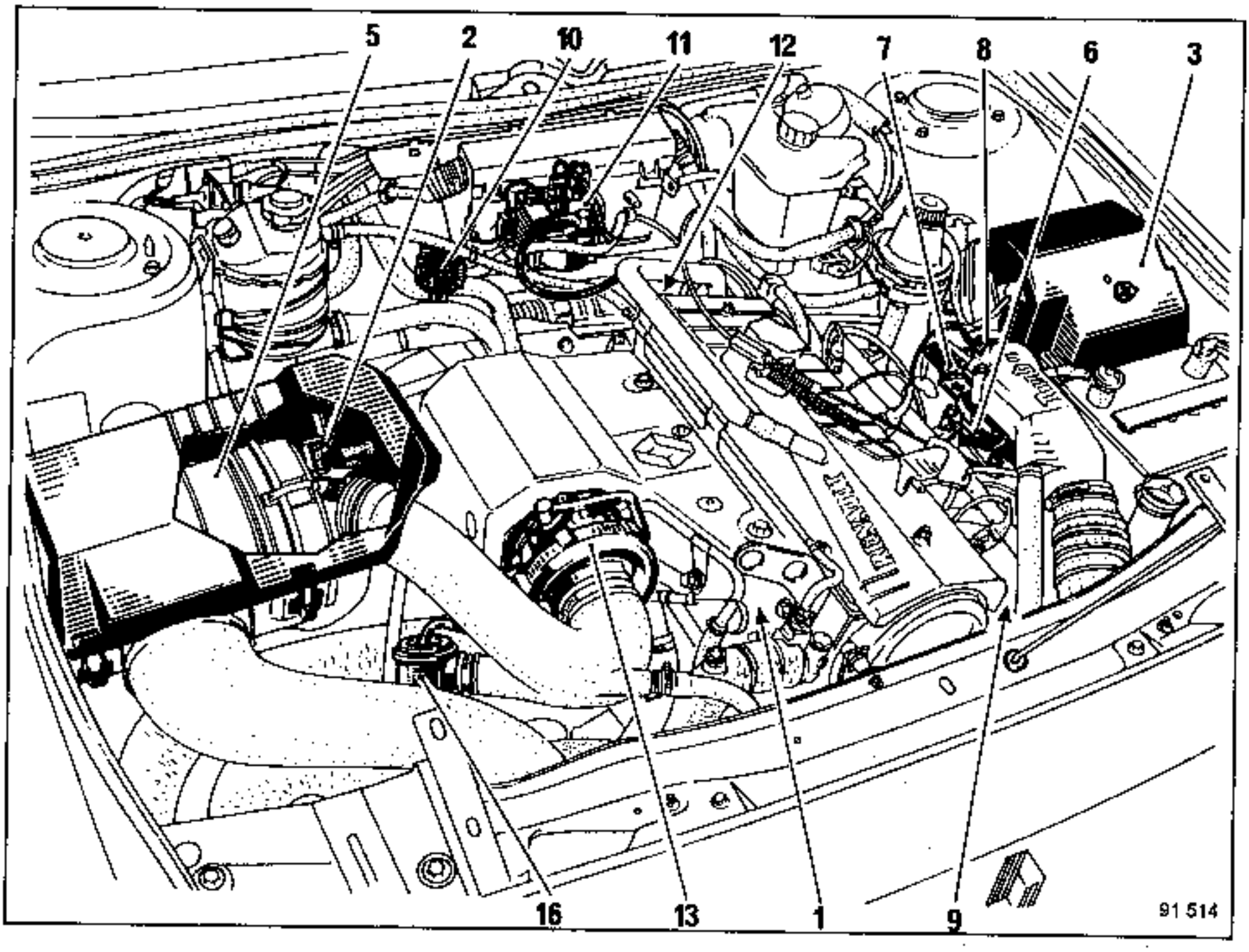
Vehicle Type	Engine	Turbocharger
RENAULT 21 X 488	J8S 714 J8S 742	GARRETT T2

Turbocharger	GARRETT T2	Turbocharging pressure: 0.6 - 0.025 bars at 2500 ± 250 rpm. Static opening pressure: 730 ± 30 mbars for an adjusting rod travel of 0.38 ± 0.02mm.

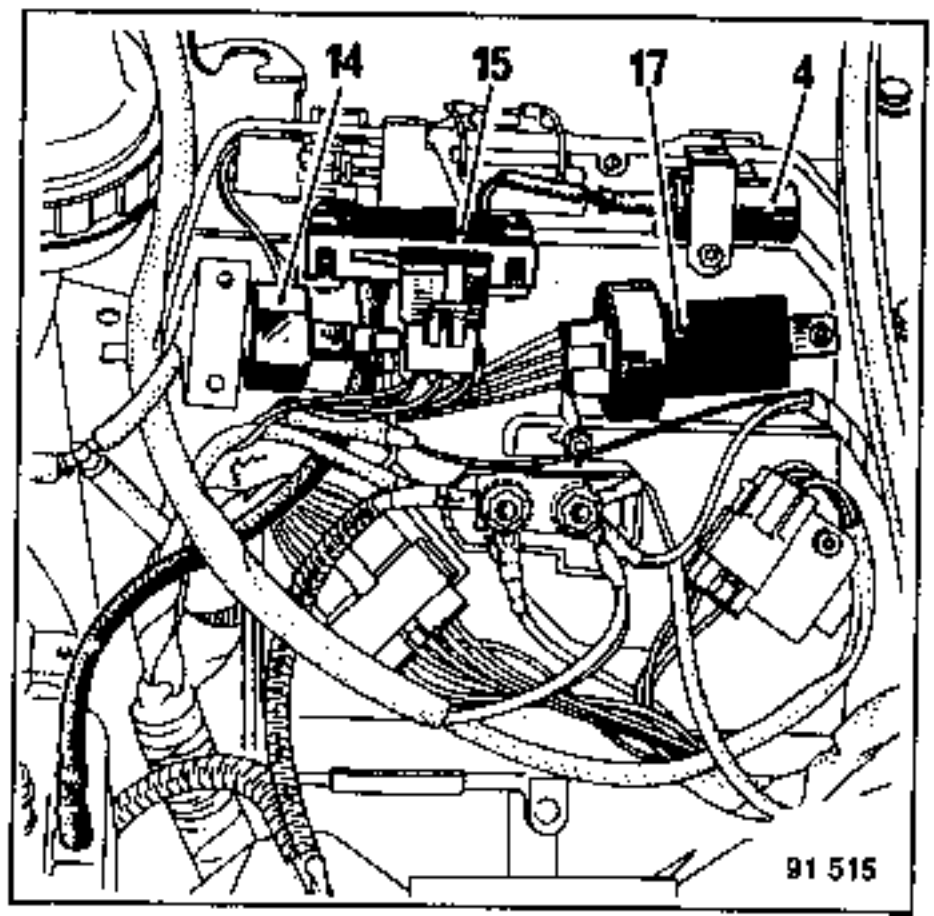
Vehicle Type	Engine	Turbocharger
RENAULT 21 X 485	J7R 752	GARRETT T3 with electronic turbocharging regulation

Turbocharger	GARRETT Type T3 with pressure limiting valve: Static pressure 520 ± 30 mbars for an adjusting rod travel of 0.38 ± 0.02mm
Turbocharging pressure (at full load, on the open road) NOTE: The maximum pressure is controlled by a solenoid valve operated by the injection computer.	Manifold pressure (measured with the XR 25) 900 ± 50 mbars between 2500 & 4000 rpm. (1,900 ± 50 mbars absolute pressure) 800 ± 50 mbars at maximum speed (1,800 ± 50 mbars absolute pressure)
Engine pressure safety switch	Operating pressure: 1,300 to 1,480 mbars
By-pass valve	Opens at a vacuum of: 200 ± 20 mbars

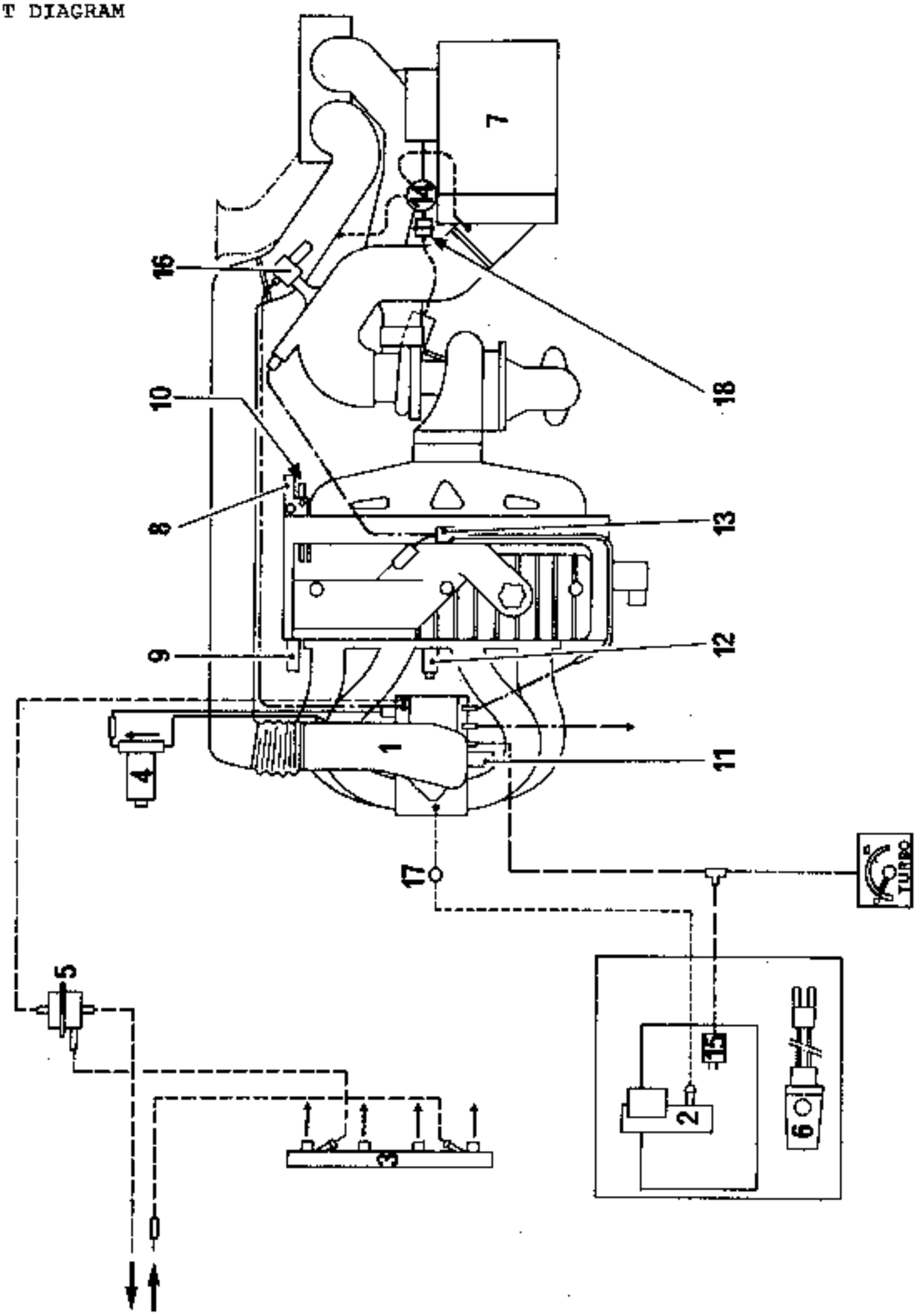
POSITIONS OF COMPONENT UNITS



1 - Coolant temperature sensor
2 - Turbocharging pressure regulator solenoid valve
3 - Computer + protective casing
4 - Idling adjustment potentiometer (CO%)
5 - Air filter
6 - Throttle unit
7 - Throttle potentiometer
8 - Air temperature sensor
9 - Idling speed regulator valve
10 - Diagnostic plug
11 - Ignition module
12 - Distributor
13 - Turbocharger
14 - Turbocharging pressure limiting pressure switch
15 - Pressure sensor
16 - By-pass valve
17 - Electric coolant pump timed relay



PIPE CIRCUIT DIAGRAM



91 575-1

1 - Throttle unit
2 - Absolute pressure sensor
3 - Fuel injection gallery
4 - Electronic idling regulator
5 - Fuel pressure regulator
6 - Idling mixture potentiometer
7 - Resonator type air filter
8 - Coolant output pipe
9 - Combined temperature switch/ thermistor
10 - Coolant temperature sensor
11 - Air temperature sensor
12 - Pinking detector
13 - Non-return valve
14 - Turbocharging circuit pilot solenoid valve
15 - Turbocharger safety pressure switch
16 - Turbocharger by-pass valve
17 - 1.5mm diameter jet
18 - Resonator

ESSENTIAL SPECIAL TOOLS	
Mot. 1014	Turbocharging pressure checking and adjusting kit

CHECKING - REPLACING AND ADJUSTING THE TURBOCHARGING PRESSURE REGULATOR GATE)

The performance and reliability of a turbocharged petrol engine depends directly on the turbocharging pressure regulator adjustment. It is essential to adjust this component to the specified adjustment figures.

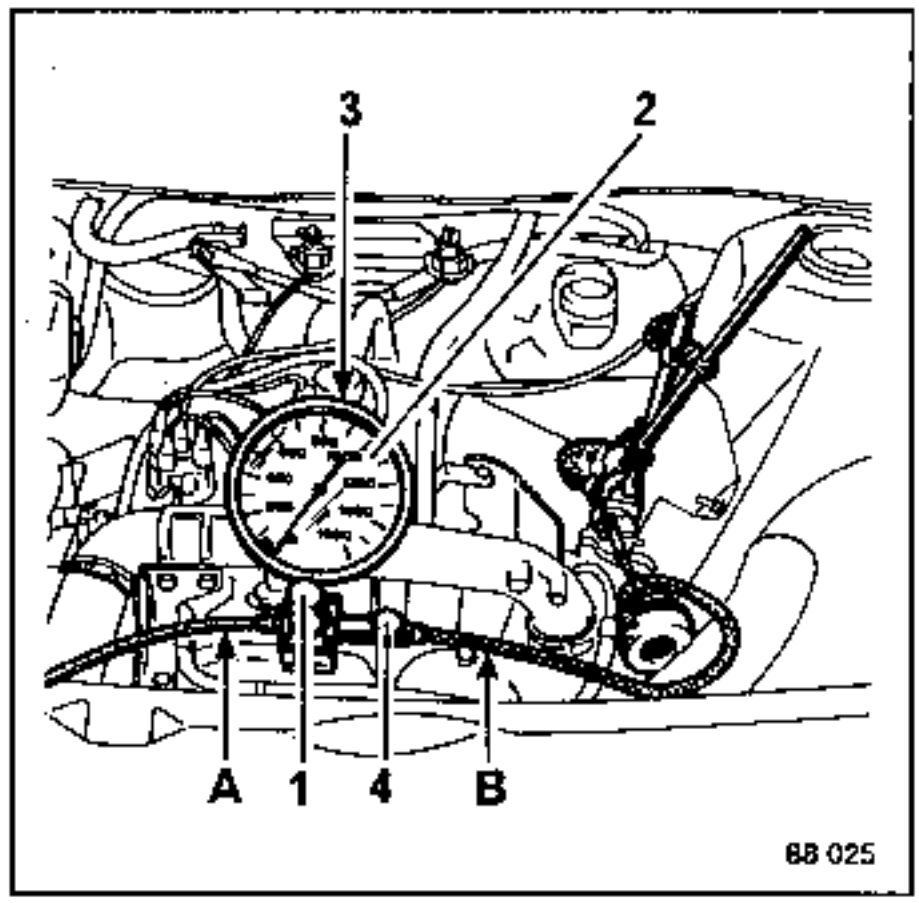
Checking, adjusting or replacing the turbocharging regulator can be carried out with the engine still on the vehicle and the turbocharger in place, by removing the adjacent components such as the heat shield, air filter and its support.

CHECKING AND ADJUSTMENT FIGURES

Checking Figure	Adjustment Figure	Adjustment Rod Travel
490 to 550 mbars	520 to 550 mbars	0.36 to 0.40 mm

METHOD OF USING SPECIAL TOOL KIT Mot. 1014

This kit consists of an adjustable pressure reducing valve (1), a test pressure gauge (2) graduated from 0 to 1.6 bars, fitted with a zeroing screw (3) and a leak screw (4).



Before using the equipment, zero the pressure gauge (screw 3), fully unscrew the pressure reducing valve screw (1) and the leak screw (4) and connect the inlet pipe (A) to the compressed air supply.

Connect the output pipe (B) to the take-off point on the turbocharging pressure regulator under test and tighten the leak screw (4).

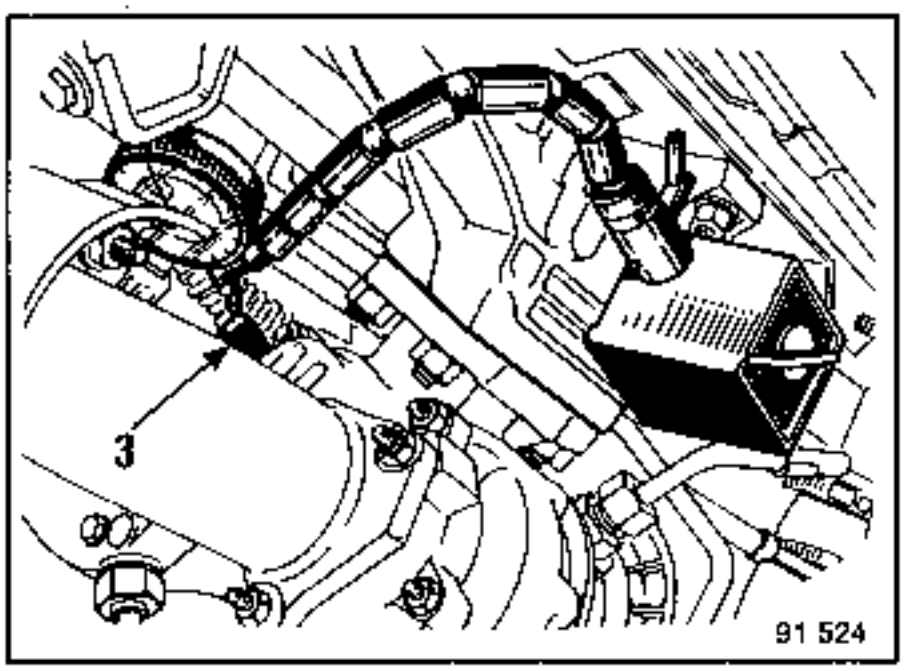
Then slowly screw in the screw on the pressure reducing valve (1) to obtain the required air pressure or the specified regulator rod travel (one stabilizes the pressure by slightly turning back the screw (1).

CHECKING THE SETTING PRESSURE

Remove the heat shield, the air filter and its support.

Disconnect the hose from the regulator unit take-off and connect tool Mot.1014.

Place a dial indicator, mounted on a magnetic base secured to the exhaust manifold, against the end of the adjusting rod (3) and zero the dial indicator.



Slowly increase the pressure until the adjusting rod has moved by 0.38 ± 0.02mm and note the pressure gauge reading which should be within the checking values stated.

If the setting pressure is outside these tolerances, replace the regulator unit (punch marked end fitting and rod) or adjust it (rod "sealed" with a dab of lacquer).

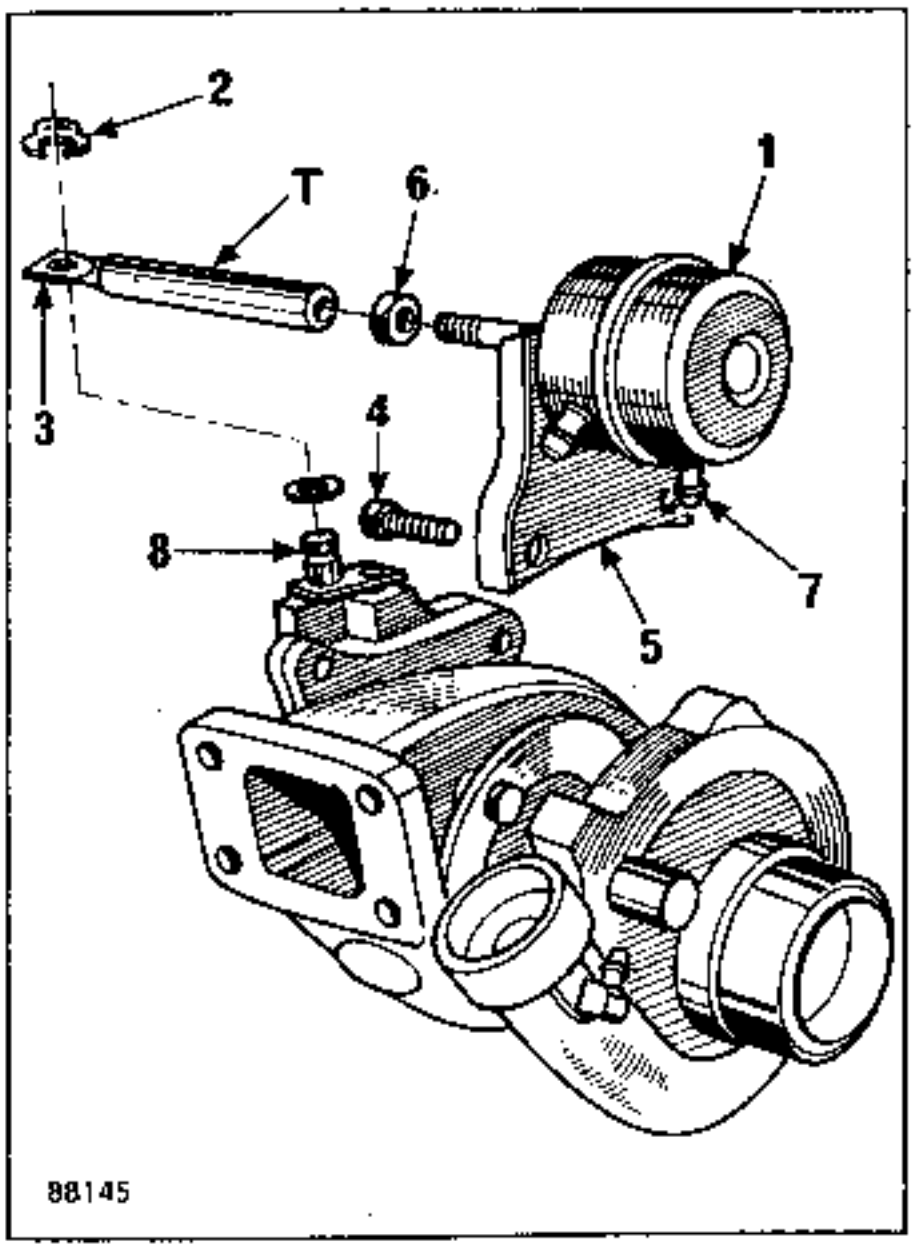
REPLACING THE REGULATOR UNIT

It may be necessary to remove the turbocharger coolant input pipe to facilitate access to the regulator unit.

Disconnect the pipe connected to the regulator unit (1).

Remove the circlip (2) and take off the screwed end fitting (3).

Remove the securing bolts (4) and take off the regulator unit.



Place the new unit in position, securing it with new bolts (tightening torque 1.65 to 1.85 daN.m).

Tighten the locknut (6) and the screwed end fitting (3) on the rod.

ADJUSTING THE SETTING PRESSURE

NOTE: Regulators the end fitting of which is locked by punching cannot be adjusted.

Connect tool Mot. 1014 to the take-off point (7) and apply the specified air pressure (see chart).

WARNING:

Ensure that there is no air leakage from between the pressure gauge and the regulator unit.

Push down the valve control arm (8) to keep the valve closed.

In this position, adjust the end fitting (3) so that the hole in its clevice just fits over the control arm (8) when it is held in the valve closed position.

Allow the pressure at the take-off point (7) to drop to zero.

Mount a dial indicator, with a magnetic base, against the end of the adjusting rod and zero the dial indicator.

Slowly increase the pressure until the adjusting rod has moved by 0.38 ± 0.02mm and note the pressure gauge reading, which should be within the tolerances (adjusting pressure) stated on the chart.

If the pressure is outside these tolerances, alter the position of the screwed end fitting (3) (screw it in to increase the pressure or screw it out to reduce the pressure) until the adjusting pressure required is obtained.

Screw up the locknut (6) against the end fitting (3) and tighten it to a torque of 0.6 to 0.7 daN.m

Apply a dab of paint across the locknut and end fitting (area T).

Tube of high temperature paint:
Part No. 77 01 407 679.

WARNING:
Do not get any of the paint on the smooth part of the regulator rod.

ENGINE TURBOCHARGING PRESSURE

Use tester XR 35 to check the actual turbocharging pressure (see injection system test procedure).

CHECKING THE SAFETY PRESSURE SWITCH

Remove the switch.

Connect it to tool Mot. 1014.

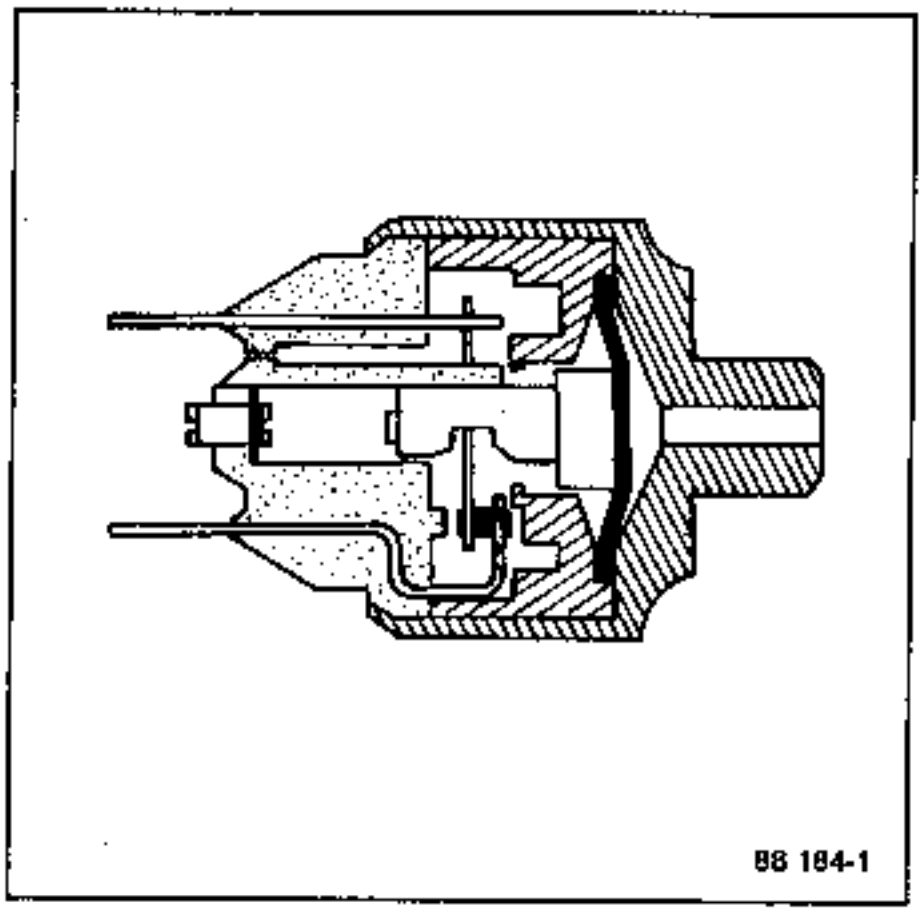
Connect up an ohmmeter.

Apply a rising pressure.

Pressure:
- less than 1,300 mbars
  resistance = 0 Ω

Pressure:
- 1,300 to 1,480 mbars
  resistance = infinity
  (check the readings with the pressure falling)

Pressure:
- approximately 1,100 mbars
  resistance = 0 Ω



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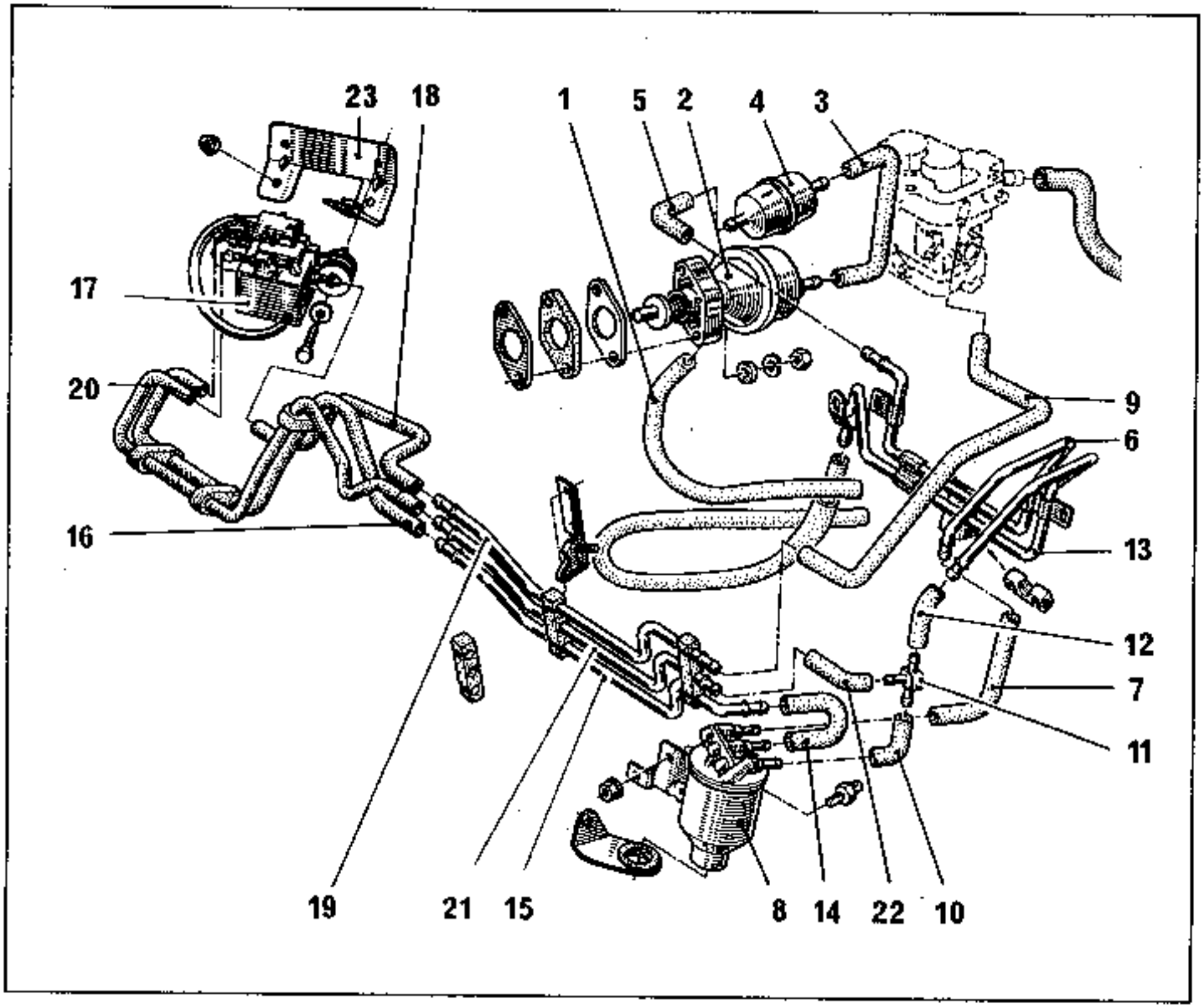
CHECKING THE AIR INTAKE SYSTEM FOR LEAKS

If the idling speed is unstable (hunting), check the condition of the air intake system pipes and connections.

At the same time check the no load/full load switch, which can cause similar symptoms.

A degassing valve is fitted between the fuel pump and the carburettor to improve starting when hot.



1 - Input pipe
2 - Fuel pump
3 - Pipe between pump and filter
4 - Fuel filter
5 - Connecting pipe
6 - Rigid fuel pipe on the engine
7 - Connecting pipe
8 - Degassing valve
9 - Pump between degassing valve and carburettor
10 - Connecting pipe
11 - "T" union
12 - Connecting pipe
13 - Rigid return pipe on engine
14 - Connecting pipe
15 - Rigid flow sensor input pipe
16 - Connecting pipe
17 - Flow sensor
18 - Connecting pipe
19 - Rigid pipe to carburettor
20 - Connecting pipe
21 - Rigid return to tank pipe
22 - Connecting pipe
23 - Flow sensor support

NOTE:

- components 10 to 12 and 14 to 23 are only fitted when the vehicle is fitted with a trip computer,
- on vehicles with no trip computer, pipes 10 and 12 and the "T" union 11 are replaced by a single pipe.

F2N... and C2J... Engines

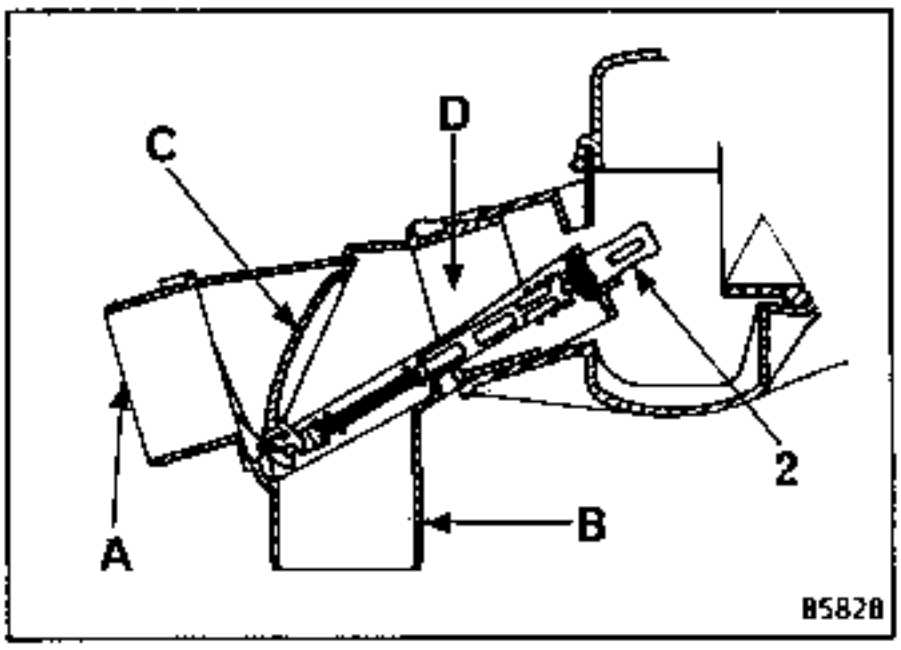
Vehicles fitted with F2N and C2J engines are equipped with an air intake heater.

DESCRIPTION

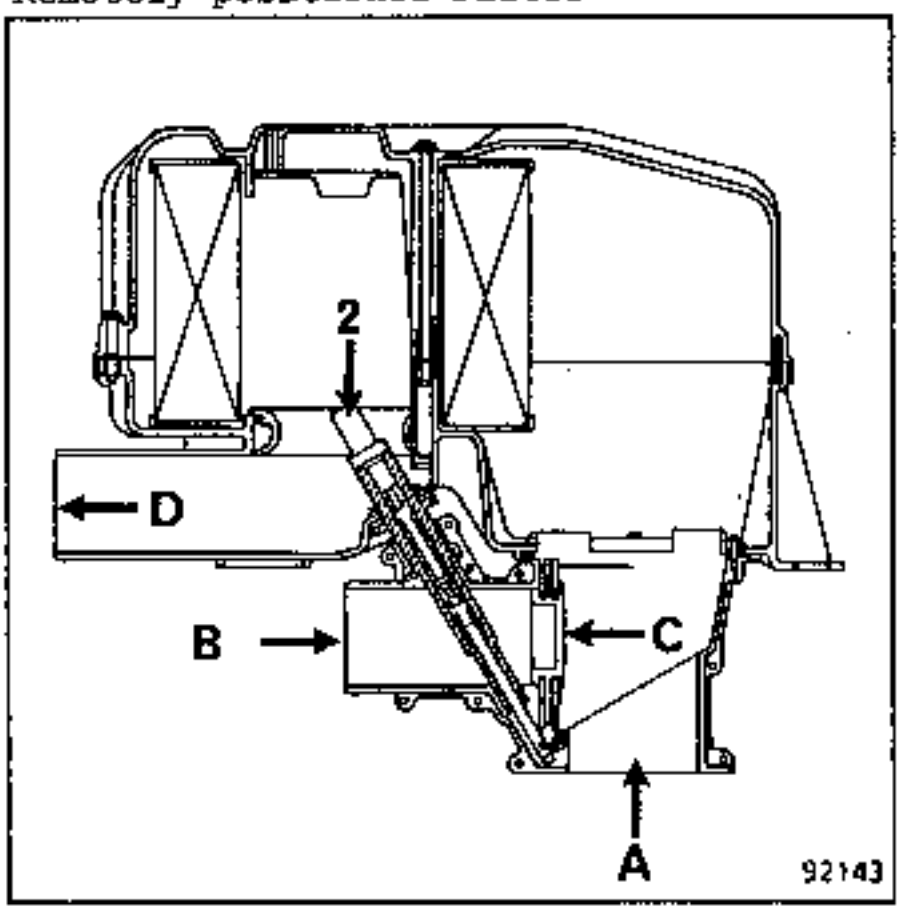
The system comprises an air filter with two inputs and a flap to control the amount of cold air entering the engine.

The control flap is operated by a wax element thermostat (2) mounted on the air filter body in the flow of mixed hot/cold air.

Filter Mounted on top of the Carburettor



Remotely positioned Filter



A - Cold air inlet
B - Warm air inlet
C - Flap
D - Mixed air passed to the carburettor

CHECKING

Immerse the air filter in water up to the height of the filter element.

After 5 minutes immersion:

in water at 26°C, the flap should close off the cold air inlet,

in water at 36°C, the flap should close off the warm air inlet.

ADJUSTING

The air regulator cannot be adjusted.

Replace the control valve and thermostat assembly with a new one.

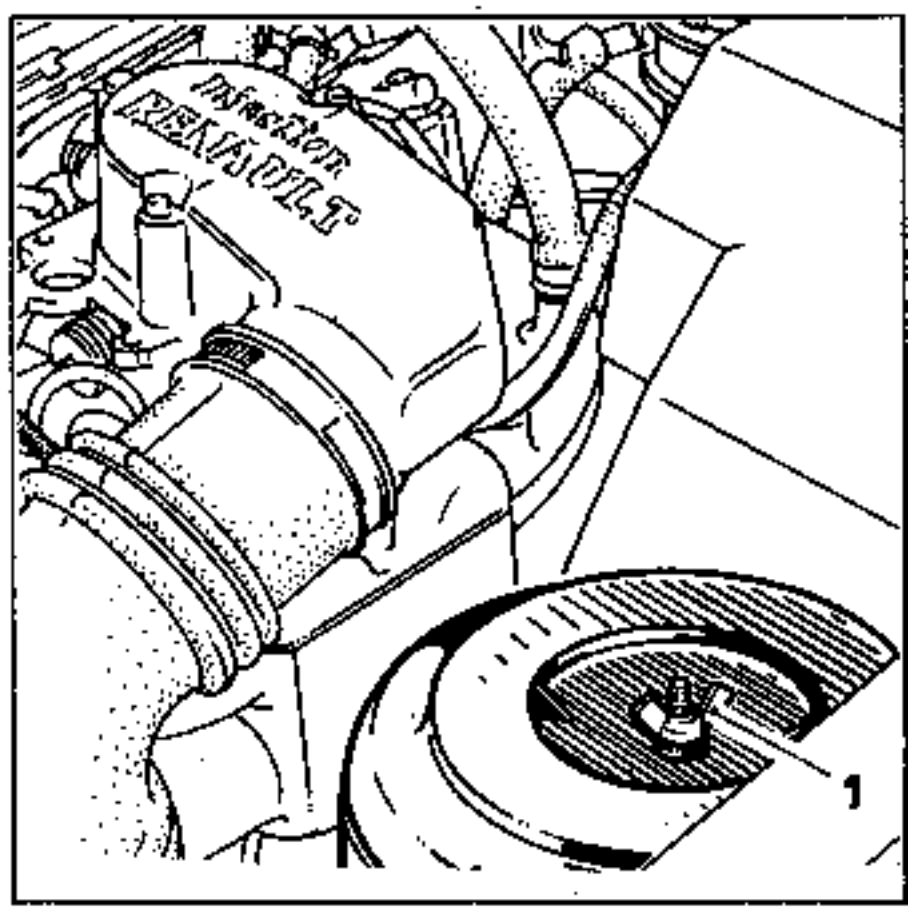
REPLACING THE FILTER ELEMENT (every 12,000 miles (20,000 km))

Remove the air filter cover.

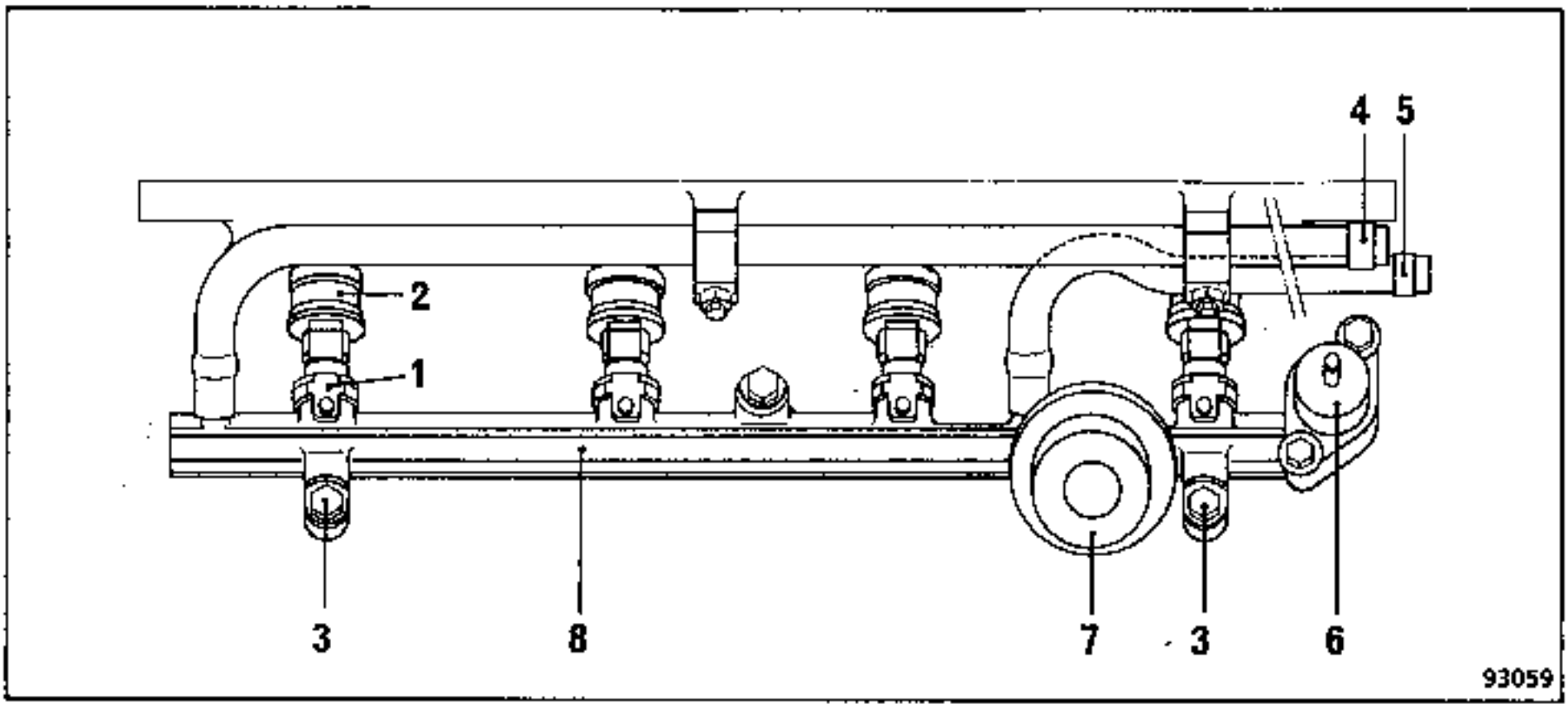
Remove the dirty filter element and replace it with a new one.

Refit the air filter cover and secure it in place.

Remotely positioned Air Filters on JXX Engines



Note: There may be screws round the periphery of the cover instead of the butterfly nut (1).



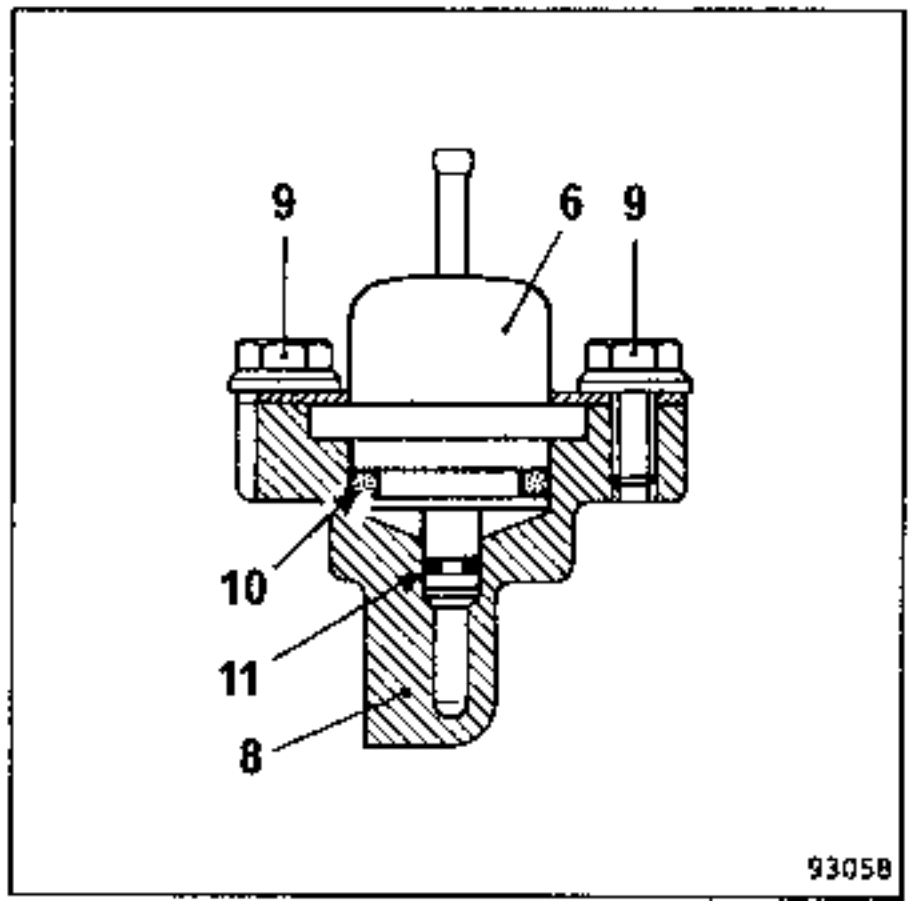
1 - Injector retaining clip
2 - Injector
3 - Injection gallery securing bolt
4 - Fuel input pipe (green colour code)
5 - Fuel return to tank pipe (pink colour code)
6 - Fuel pressure regulator
7 - Pulse damper
8 - Injection gallery.

The fuel pressure regulator is secured to the injection gallery by two bolts (9).

It is sealed by "O" rings (10 and 11).

On refitting:

Replace the seals (10 and 11) if necessary (smear silicone grease (e.g. MOLYKOTE 33 MEDIUM) on the new seals).



SPECIFICATIONS

NOTE: for all rectification or fault finding operations on this system see the "Diesel Injection" workshop manual.

Vehicle Type	Engine	Injection Equipment
RENAULT 21 X 486	J8S 704	BOSCH

Description	Make and Type	Remarks
Injection pump	BOSCH VE 4/9 F 2250 R 158	Single piston rotary pump with a mechanical centrifugal governor, hydraulic automatic advance, cold starting system, automatic fast idling and solenoid shut-off.
Pump timing (pump piston lift with engine at T.D.C.)	0,70 ± 0,02 mm	
Injector holders	BOSCH KBE 48 S 5/4	
Injectors	BOSCH DN OSD 189/	Opening pressure $^{+8}_{+0}$ bars, max. variation 8 bars
Fuel filter	BOSCH or ROTO DIESEL	With built in priming pump Since 1987, the Roto Diesel filter has a heater connected to the engine cooling system.
Injector pipes		Outside ø 6mm Inside ø 2mm Length 290mm

SETTINGS

Idling speed	825 $\pm$ 25 rpm
Maximum speed	4,900 $\pm$ 100 rpm
Smoke Density:	
Type approval figure	1,11m-1: 36%
Max. legal	2m-1: 55%

CHECKING THE TIMING (on diagnostic bay)

Injection Pump	Idling Speed rpm	Injection commences before T.D.C.
BOSCH VE... R 158	825 ± 25	13,5 ± 1°

SPECIFICATIONS

Vehicle Type	Engine	Injection Equipment
RENAULT 21 X 486	J8S 704	ROTO - DIESEL

Description	Make and Type	Remarks
Injection Pump	ROTO DIESEL R8443 A 400 A (A) R8443 A 401 B (A)	Single distributor rotary pump with two pressure pistons, mechanical centrifugal governor, automatic hydraulic advance, automatic fast idling system and solenoid shut-off.
	R8443 B 402 B (B) R8443 B 403 C (B)	
Pump timing T.D.C. Locked with a rod		1.80mm (A) Dimension (X) on pump (B)
Injector holders	ROTO DIESEL RKB 45 S 5456	
Injectors	ROTO DIESEL RDN OSDC 6751 C	Opening pressure 118 $^{+7}_{-5}$ bars Maximum variation 8 bars
Fuel filter	ROTO DIESEL	With built in priming pump. Note: Since 1987, the filter has a heater connected to the engine cooling system
Injector pipes		Outside Ø 6mm Inside Ø 1.5mm Length 330mm
Fast idling thermostat	CALORSTAT	Travel 7 to 8.5mm between 30 and 67°C

SETTINGS

Idling speed 825 $\pm$ 25rpm

Maximum speed 4,750 to 4900rpm

Smoke Density:

Type approval figures 1.11m-1: 36%

Maximum legal 2m-1: 55%

CHECKING THE TIMING (on diagnostic bay)

Injection Pump	Idling Speed in rpm	Injection commences before T.D.C.
ROTO DIESEL R 8443	825 ± 25	9,5 ± 1°

SPECIFICATIONS

Vehicle Type	Engine	Injection Equipment
RENAULT 21 X 488	J8S 714 (1) J8S 742 (2)	BOSCH BOSCH

Description	Make and Type	Remarks
Injection Pump	BOSCH VE 4/9 F 2200 R 153 (1) VE 4/9 F 2200 R 345 (2)	Single piston rotary pump with mechanical centrifugal governor, automatic hydraulic advance, automatic cold starting and fast idling system and solenoid shut-off. Corrector that adjusts the delivery to suit the turbocharging pressure (L.D.A.)
Pump timing (engine at T.D.C., pump piston lift)	0,70 ± 0,02 mm	
Injector holders	BOSCH KBE 48 S 7	
Injectors	BOSCH DN OSD 264	Opening pressure 130 +8 bars -0 Max. variation 8 bars
Fuel filter	BOSCH ROTO DIESEL	With built in priming pump. Since 1987 the Roto Diesel filter has a heater connected to the engine cooling system
Injector pipes		Outside Ø 6mm Inside Ø 2mm Length 275mm
Thermostat (fast idling)	(2) VERNET (CALORSTAT)	Travel 7 to 9.5mm between 15° and 45°C
Preheater unit	(2) CARTIER	With preheat and postheat functions (3 minutes max.)
Heater plugs	BERU	Current approx. 15A after heating 8sec
Heater plug post-heat temperature switch	(2)	Circuit opens: 65° ± 2°C Circuit closes: 55° ± 2°C
Turbocharger	GARRETT T2	Turbocharging pressure: 0.6 ± 0.025 bars at 2,500 ± 250 rpm Static opening pressure: 730 ± 30 mbars at an adjusting rod travel of 0.38 ± 0.02mm

SETTINGS

Idling speed 825 ± 25rpm (1) and (2)

Fast idling (2) 1,000 ± 50 rpm

Maximum speed 4,700 to 4,800 rpm

Smoke Density:

Type approval figure 1.6m-1: 48%
Maximum legal 2m-1: 55%

CHECKING THE TIMING (on diagnostic bay)

Injection Pump	Idling Speed in rpm	Injection commences before T.D.C.
BOSCH VE... R 153 VE... R 345	825 ± 25	13,5 ± 1°

SPECIFICATIONS

Vehicle Type	Engine	Injection Equipment
RENAULT 21 X 48H	F8Q 710	ROTO DIESEL

Description	Make and Type	Remarks
Injection Pump	ROTO DIESEL DPC : R8443 B471 C	Single distributor rotary pump with two pressure pistons, mechanical centrifugal governor, hydraulic automatic advance, automatic fast idling system and solenoid shut-off.
Pump timing at T.D.C. Locked with a rod		Dimension (x) on the pump
Injector holders	ROTO DIESEL LCR 67334	
Injectors	ROTO DIESEL RDN 4 SDC 6868C	Opening pressure 118 $^{+7}_{-5}$ bars Max. variation 8 bars
Fuel filter	ROTO DIESEL	With built in priming pump. The filter is fitted with a heater connected to the engine cooling system.
Injector pipes		Outside Ø 6 mm Inside Ø 2.5mm Length 330 mm
Fast idling thermostat	CALORSTAT	Travel 7 to 8.5mm between 15° and 45°C
Preheater unit	CARTIER	With preheating and postheating functions (3 minutes max.)
Heater plugs	BERU	Current approximately 15A after heating for 8 seconds
Heater plug post-heating temperature switch		Circuit opens: 65° $\pm$ 2°C Circuit closes: 55° $\pm$ 2°C

SETTINGS

Idling speed 825 $\pm$ 25rpm

Maximum speed 5,200 $\pm$ 100rpm

Smoke Density:

Type approval figure 1.17m-1: 38%

Maximum legal 2m-1: 55%

CHECKING THE TIMING (on diagnostic bay)

Injection Pump	Idling Speed in rpm	Injection commences before T.D.C.
ROTO DIESEL R 8443	825 ± 25	-

SPECIFICATIONS

Vehicle Type	Engine	Injection Equipment
RENAULT 21 X 48V	J8S 740	BOSCH

Description	Make and Type	Remarks
Injection Pump	BOSCH VE4/9F 2350 R 309	Single piston rotary pump with mechanical centrifugal governor, hydraulic automatic advance, thermo-stat controlled fast idling system and solenoid shut-off.
Pump timing (engine at T.D.C. - pump lift)	0,75 ± 0,02 mm	
Injector holders	BOSCH KCA 15S 66	
Injectors	BOSCH DN OSD 252 +	Opening pressure 130 $^{+8}_{-5}$ bars Maximum variation 8 bars
Fuel filter	ROTO DIESEL	With built in primer pump and heater connected to the engine cooling system
Injector pipes		Outside Ø 6 mm Inside Ø 2.5mm Length 400 mm
Thermostat (fast idling)	VERNET (CALORSTAT)	Travel 7 to 9.5mm between 15° and 45°C
Preheater unit	CARTIER	With preheating and postheating functions (3 minutes max.)
Heater plugs	BERU	Current approximately 15A after heating for 8 seconds
Heater plug postheat temperature switch		Circuit opens: 65° $^{+}_{-}$ 2°C Circuit closes: 55° $^{+}_{-}$ 2°C

SETTINGS

Idling speed	825 $^{+}_{-}$	25rpm
Fast idling	1,000 $^{+}_{-}$	50rpm
Maximum speed	5,200 $^{+}_{-}$	100rpm

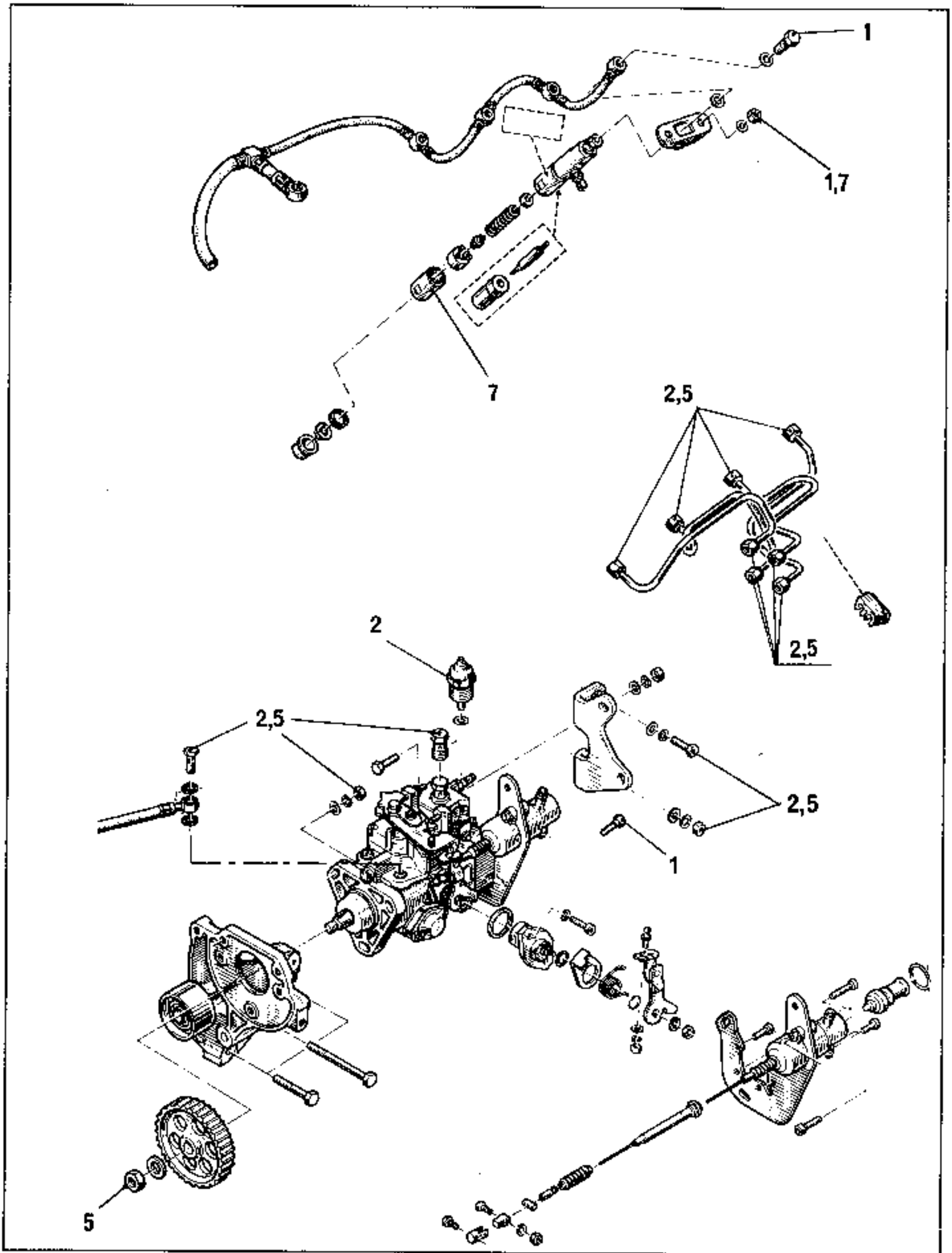
Smoke Density:

Type approval figure	0.77m-1:	28%
Maximum legal	2m-1:	55%

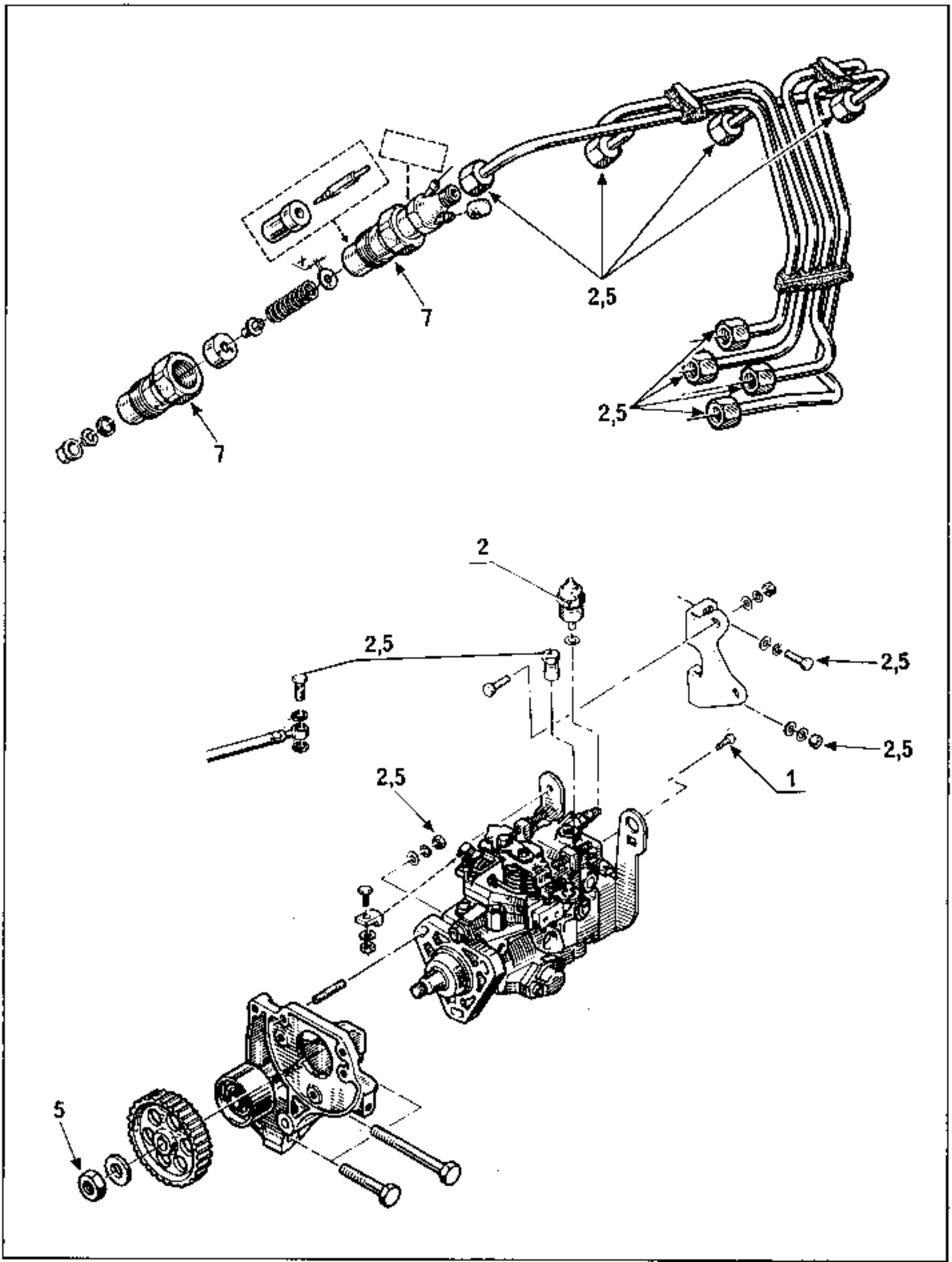
CHECKING THE TIMING (on diagnostic bay)

Injection Pump	Idling Speed in rpm	Injection commences before T.D.C.
BOSCH VE...R309	825 ± 25	14 ± 1°

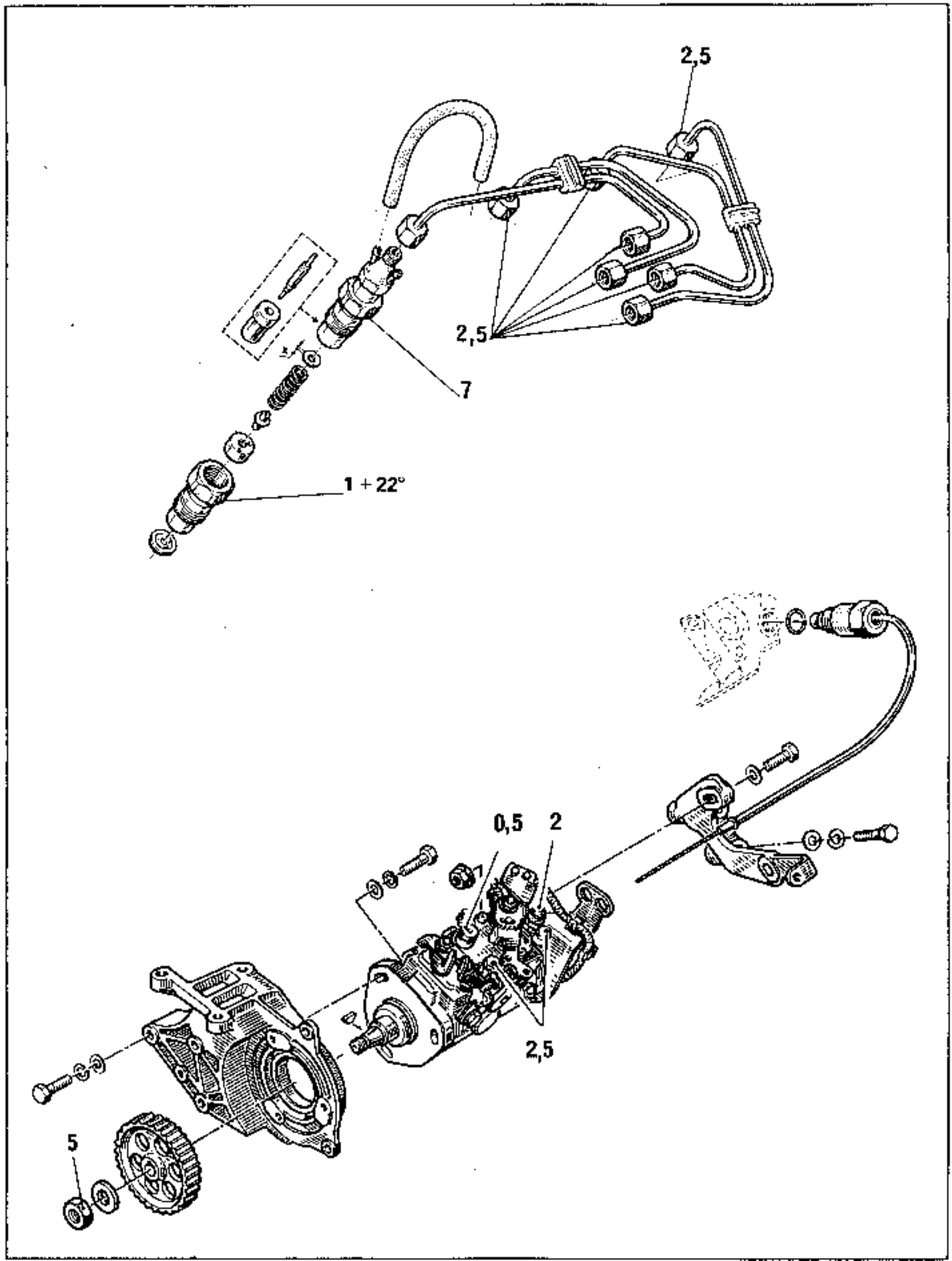
EXPLODED VIEWS - TIGHTENING TORQUES (in daN.m)



EXPLODED VIEWS - TIGHTENING TORQUES (in daN.m)



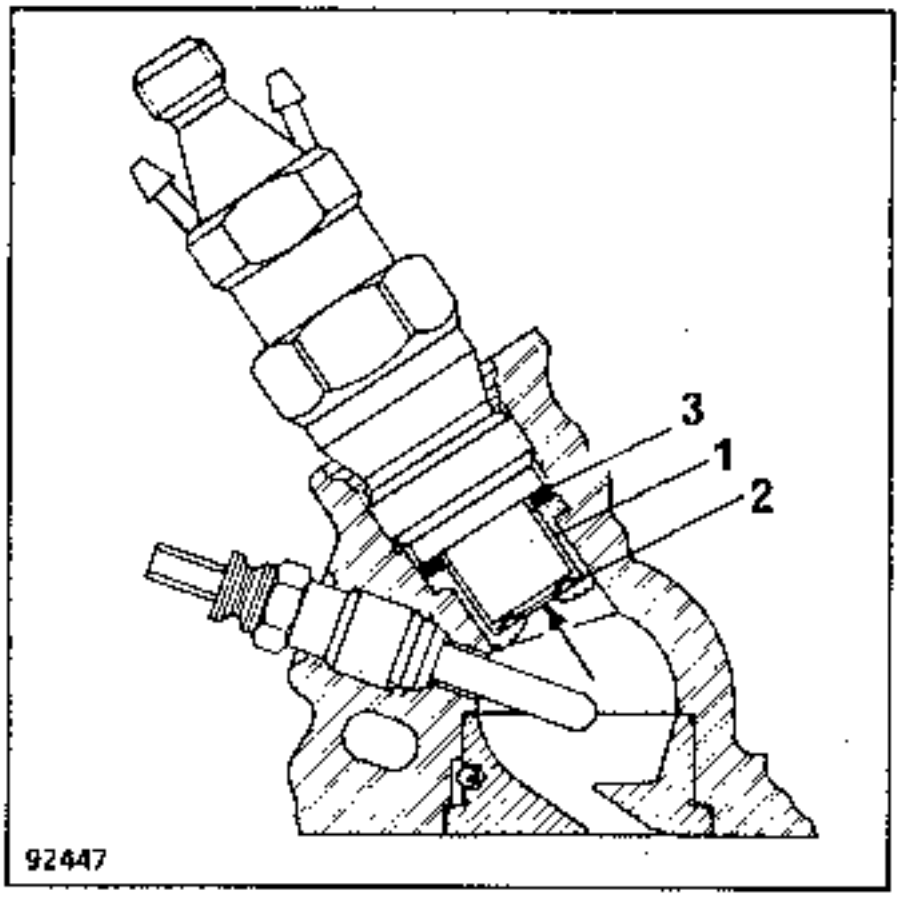
EXPLODED VIEWS - TIGHTENING TORQUES (in daN.m)



Injector Holders (Special Features)

The cylinder head is machined to accommodate a flame baffle cap (1) and a flame baffle washer (2).

NOTE: with screw-in injector holders, the washer (2) is fitted the other way round.



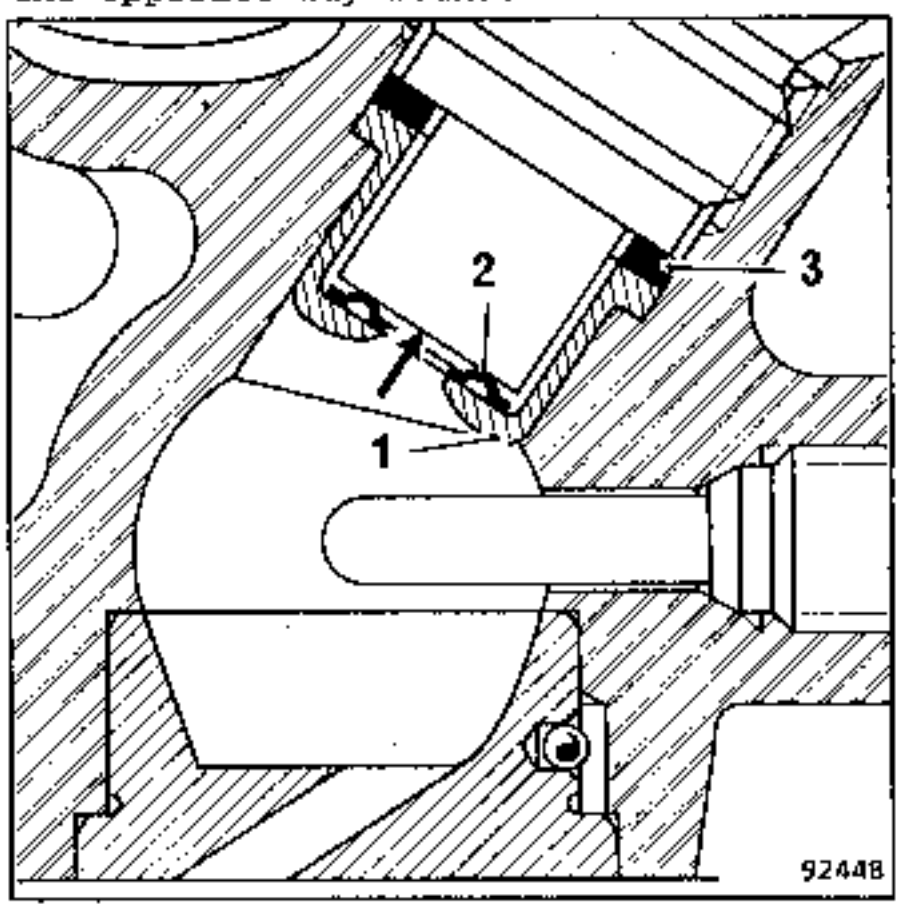
Each time an injector holder is refitted, fit a new seal (3) and a new flame baffle washer (2) (positioned as shown by the arrow).

Tighten the injector holder, using tool Mot.997, to a torque of 7 daN.m.

Injector Holders - Special Features

The cylinder head has been modified to accommodate screw-in injector holders of the BOSCH "KCA" type.

NOTE: with the screw-in injector holder the flame baffle washer (2) is fitted the opposite way round.



1 - Flame baffle cap

2 - Flame baffle washer

3 - Seal

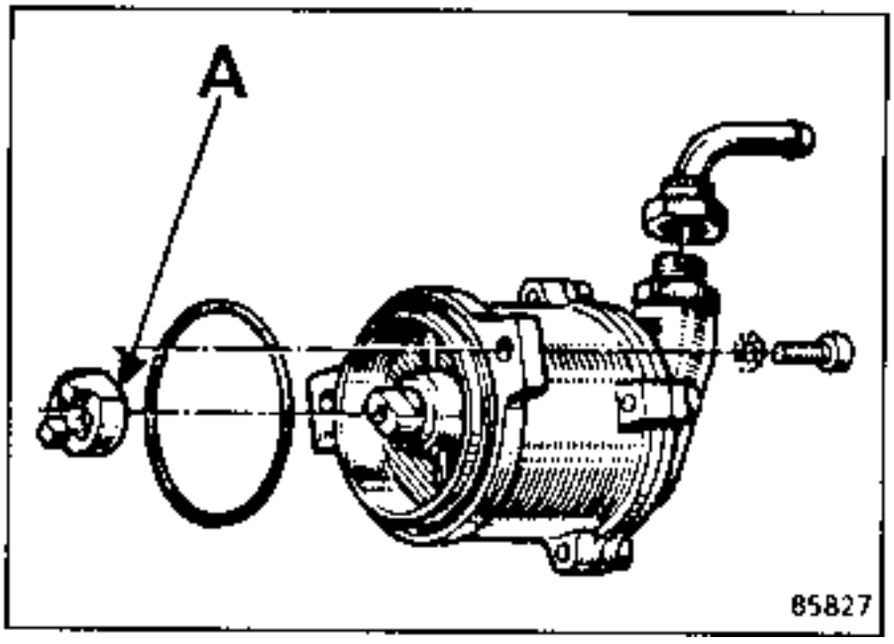
Each time an injector holder is refitted, fit a new seal (3) and flame baffle washer (2) (positioned as shown by the arrow).

Tighten the injector holder, using tool Mot.997, to a torque of 7 daN.m.

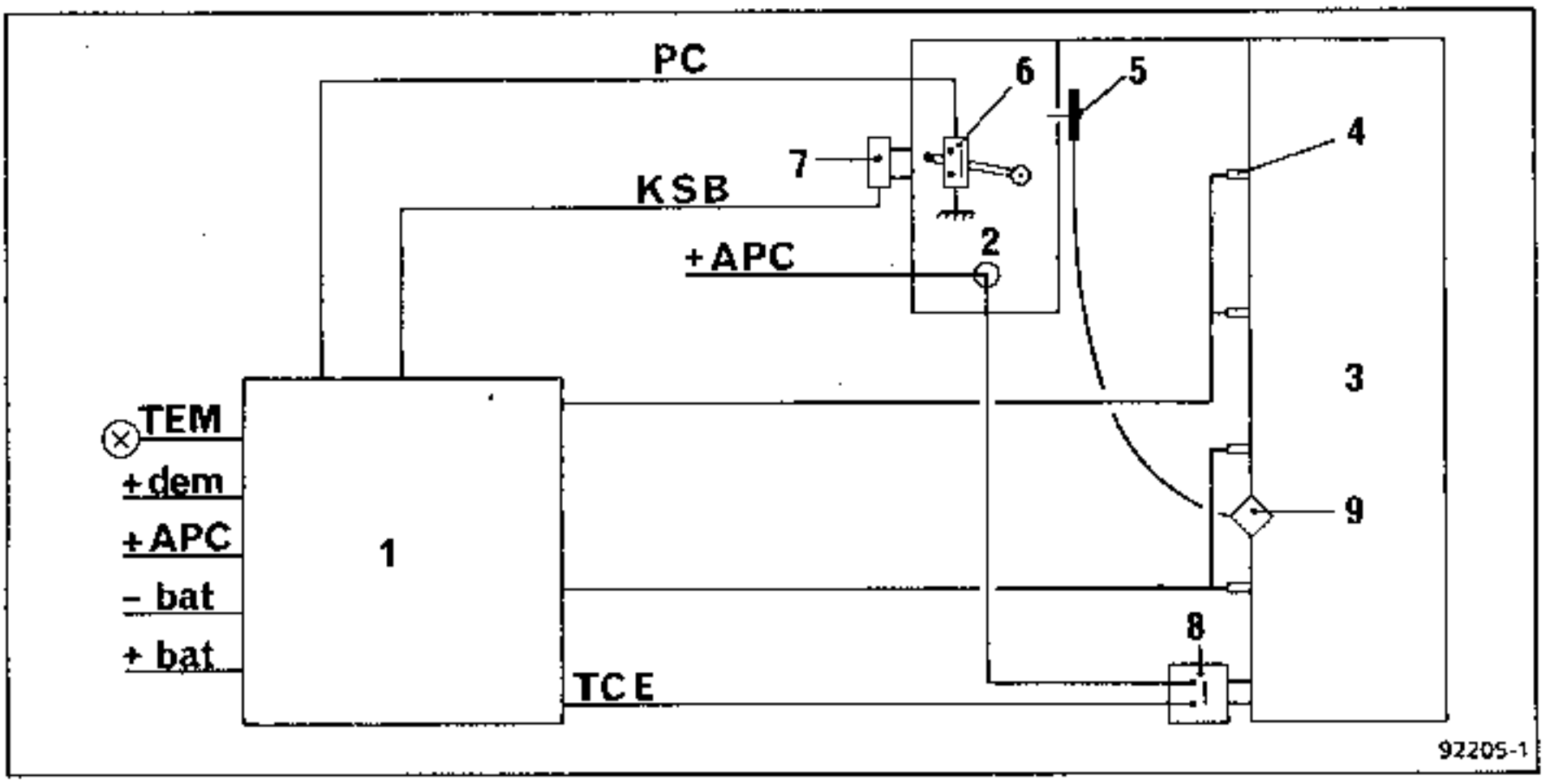
ESSENTIAL SPECIAL TOOLS
M.S. 870 Vacuum gauge

Whenever replacing the exhauster, its drive dog (A) must be replaced by a new one.

CHECKING: with the engine warm and running at 4,000 rpm, the vacuum should be a minimum of 700 mbars (525 mmHg) within 3 seconds.



COLD STARTING SYSTEM CIRCUIT DIAGRAM



1 - Electronic preheater unit

2 - Injection pump

3 - Engine

4 - Preheater plugs

5 - Idling and fast idling lever

6 - Solenoid valve (circuit closed at idling)

7 - Cold advance solenoid (KSB)

8 - Temperature switch (circuit closed temperatures below approx. 60°C)

9 - Thermostat (providing fast idling when the engine is cold)

Principle of Operation of Electronic Preheater Unit

A - System switched on (ignition - starting switch)(T.I.: preheater plug warmup time)

NOTE: the time the warning light is switched on will vary depending on the temperature of the unit:
- approximately 20 seconds at -30°C
- switches off immediately at 80°C

B - Preheater plug switched off (if the starter does not operate, supply to plug ceases after 4.5 seconds T.2).

C - Engine starts (after the starter operates, the current supply to the plugs continues at 100% for approximately 10 seconds T.3).

D - Postheating period T.4. This period may last for a maximum of 3 minutes during which the preheater plugs are supplied with current, alternately, 2 by 2.

NOTE: period T.3 may be interrupted:

- by the cooling temperature exceeding approx. 60°C (temp. switch 8).
- 3 seconds after the load switch(6) opens, the supply to the plugs is reestablished as soon as the circuit PC is open.

E - Cold starting advance. The KSB solenoid valve is supplied with current, whilst the starter is operating and for 5 to 10 seconds after it stops.

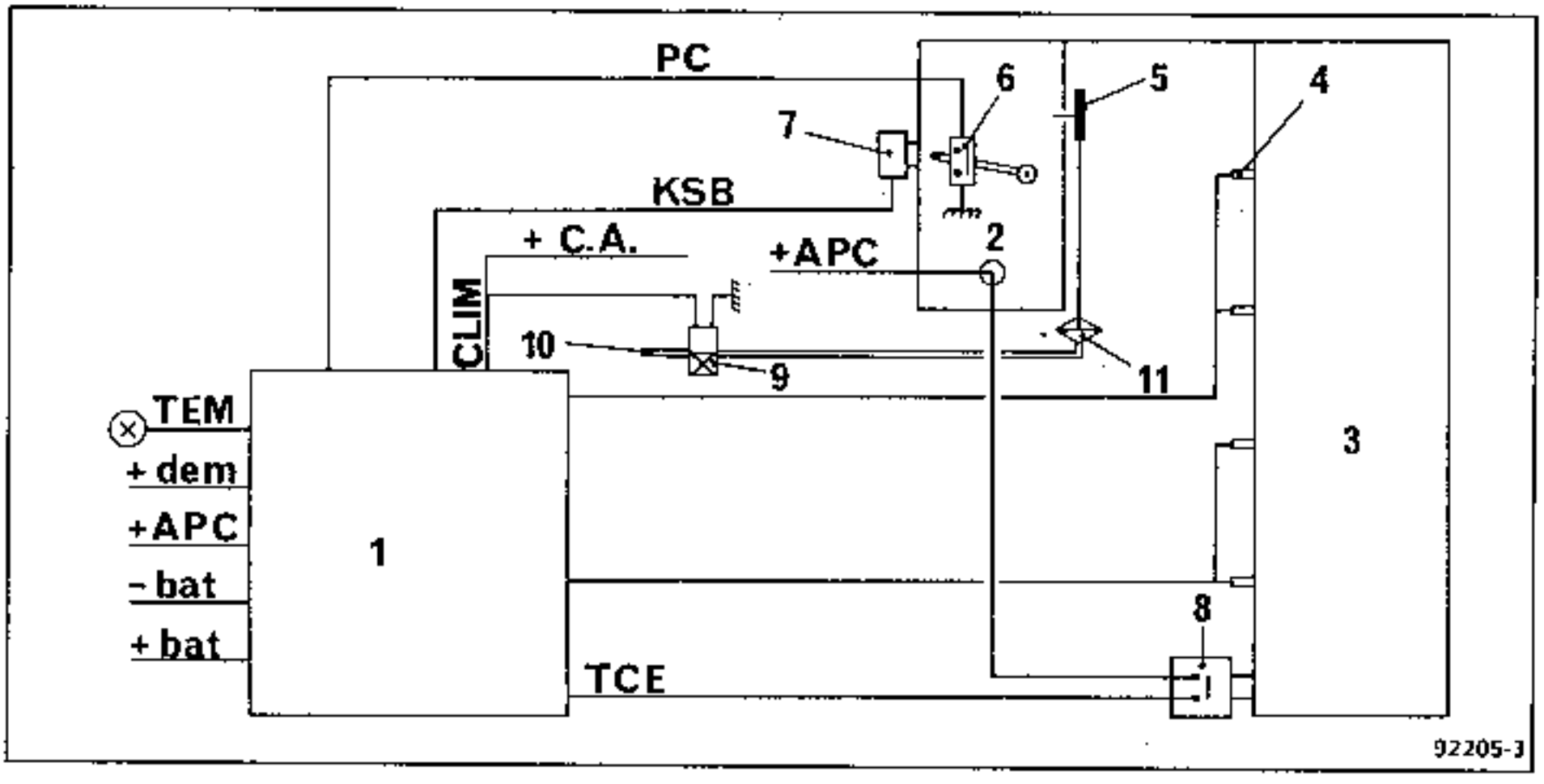
Supplying the KSB solenoid valve with current causes an increase in the injection pump automatic advance.

Fast Idling when the Engine is Cold

A thermostat (9) holds the idling lever (5) in the fast idling position.

As the temperature rises, the lever gradually returns to the normal idling position.

COLD STARTING SYSTEM CIRCUIT DIAGRAM (AIR CONDITIONED VEHICLES)



1 - Electronic preheater unit

2 - Injection pump

3 - Engine

4 - Preheater plugs

5 - Idling and fast idling lever

6 - Solenoid valve (circuit closed at idling)

7 - Cold advance solenoid valve (KSB)

8 - Temperature switch (circuit closed at temperatures lower than approximately 60°C)

9 - Fast idling control solenoid valve (on cold starting and when A.C. is operating)

10 - Vacuum

11 - Fast idling control vacuum capsule

Principle of Operation of Electronic Preheater Unit

A - Circuit closed (ignition-starting switch)(T.1: preheater plug warmup time).

NOTE: the time the warning light is switched on will vary depending on the temperature of the unit:

- approximately 20 seconds at -30°C
- it switches off immediately at 80°C

B - Current supply to plugs switched off (if the starter does not operate, the supply to the plugs ceases after 4.5 seconds T.2).

C - Engine starts (after the starter operates, the current supply to the plugs continues at 100% for approximately 10 seconds T.3).

D - Postheating period T.4. This period may last for a maximum of 3 minutes during which the plugs are supplied alternately at 50% (2 by 2).

NOTE: period T.3 can be interrupted:

- as soon as the coolant temperature exceeds approximately 60°C (temperature switch (8)),
- 3 seconds after the load switch (6) opens. The supply to the plugs is reestablished as soon as circuit PC is open.

E - Cold starting advance. The KSB solenoid valve is supplied with current whilst the starter is operating and 5 to 10 seconds after it has stopped.

Supplying the KSB solenoid valve with current increases the injection pump automatic advance.

F - Fast Idling

On vehicles fitted with air conditioning, the fast idling system (5) is controlled by a vacuum capsule (11) connected to the servo circuit exhaust (10).

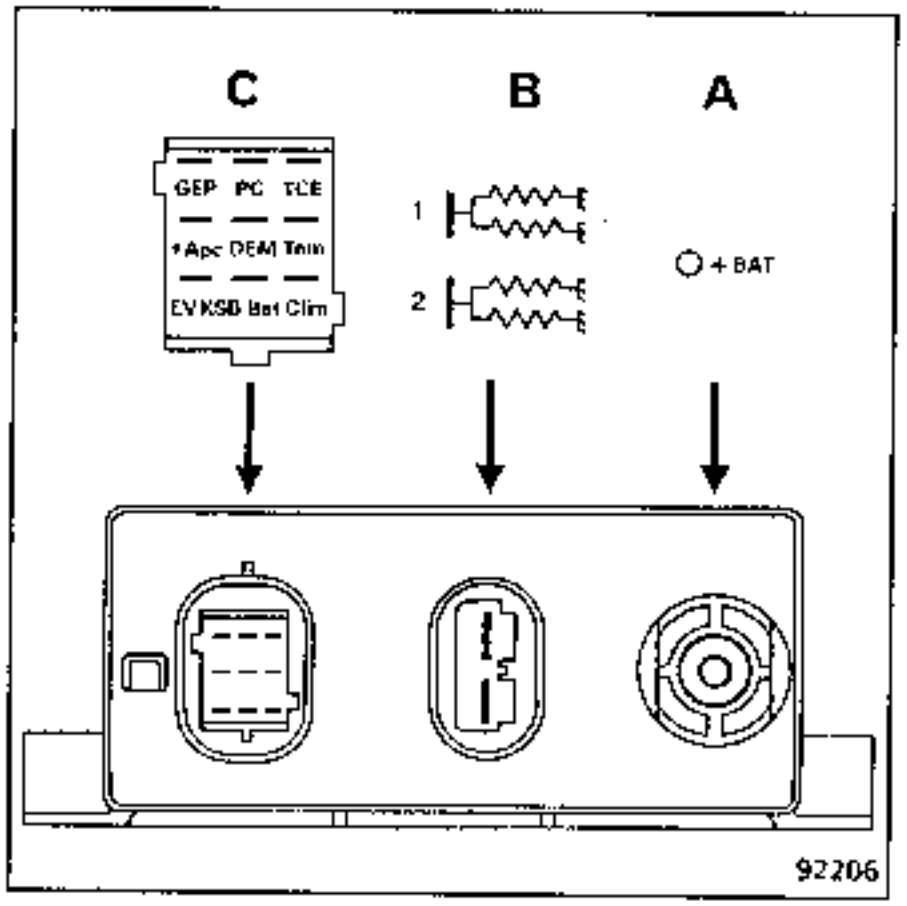
a - Fast Idling when the Engine is Cold

Solenoid valve (9) is supplied with current during the same period as the preheater plugs (T.1 + T.2 + T.3 + T.4).

b - When the Air Conditioning is Operating

The solenoid valve (9) is supplied with current as soon as the air conditioning compressor engages.

ELECTRONIC PREHEATER UNIT



Circuit Channel Functions

A - + BAT = battery +

B - 1: Power supply to plugs 1 and 2
2: Power supply to plugs 3 and 4

C - GEP: not used (electrically driven power steering pump).

P.C.: load switch on injection pump control lever (circuit closed at idling speed)

TCE: coolant temperature switch (circuit open at temperatures above approximately 60°C).

+ APC: + after ignition switch.

DEM: + starter signal

TEM: preheater warning light

EV KSB: cold starting advance solenoid valve.

-BAT: battery earth (ground).

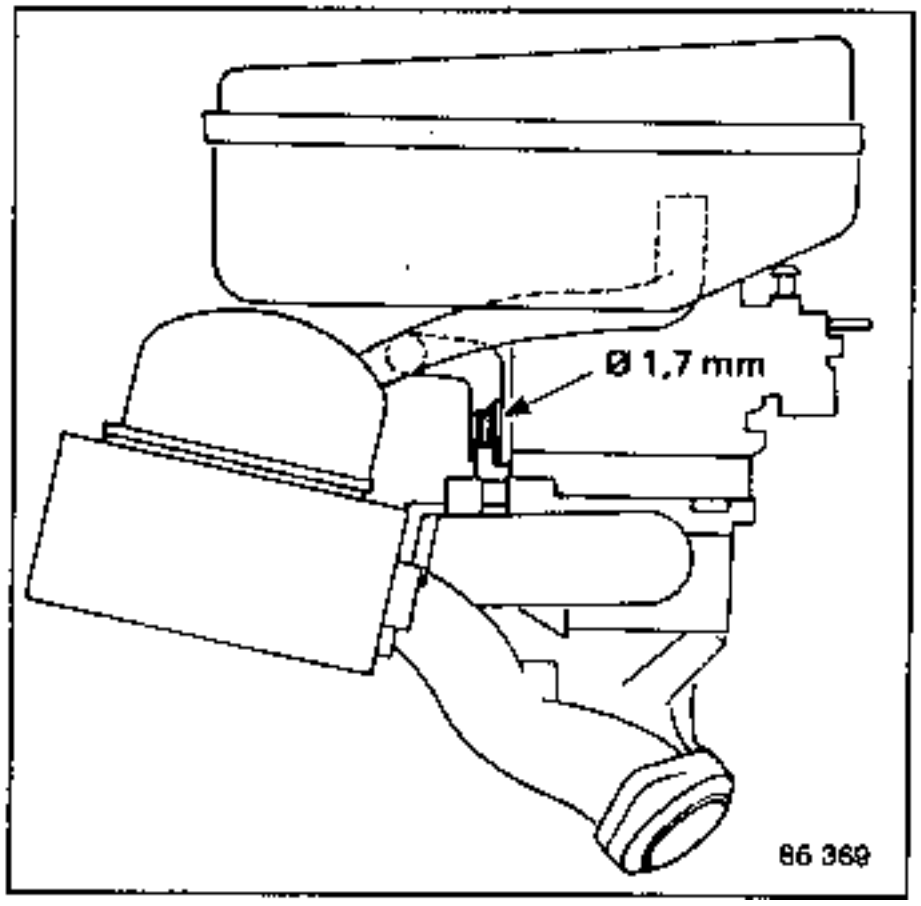
Clim: + fast idling solenoid valve supply (air conditioning option).

The crankcase gases are recirculated by being passed from the rocker arm cover into the inlet manifold through a dual circuit (input and output) so that they are burnt in the combustion chambers.

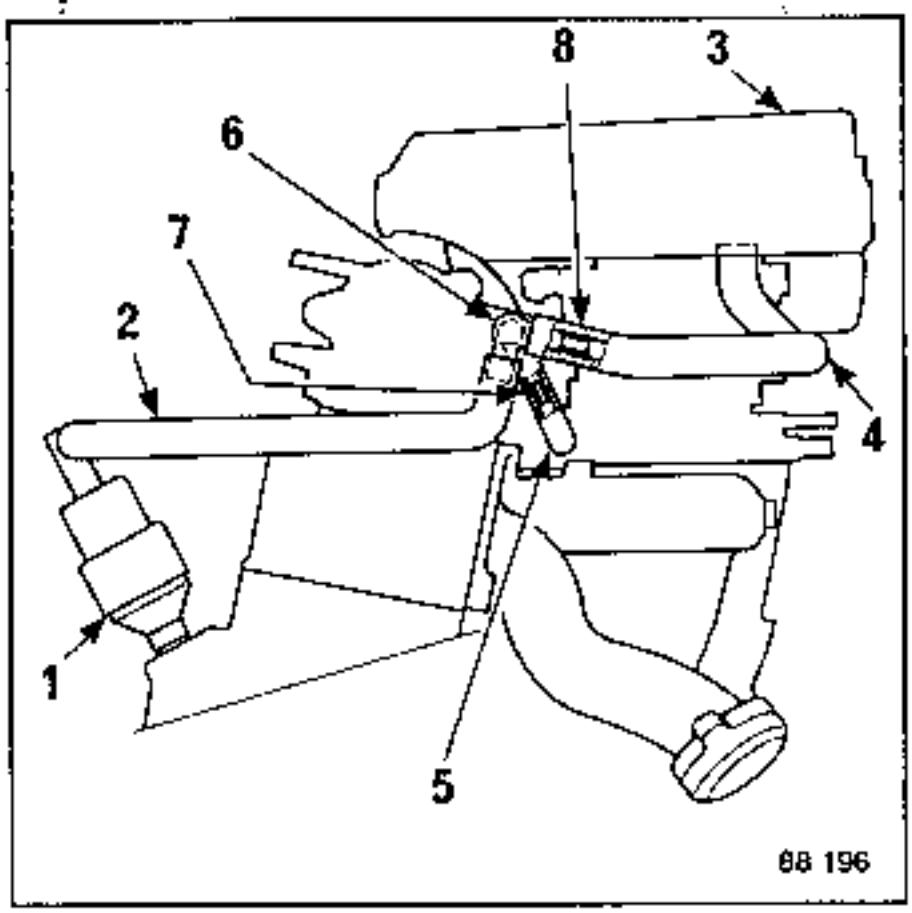
CHECKING

To ensure that the emission control system is operating correctly, the crankcase oil vapour reintake system must always be kept clean and in good condition. Check that the jets are in place and are of the correct sizes.

C2J Engine

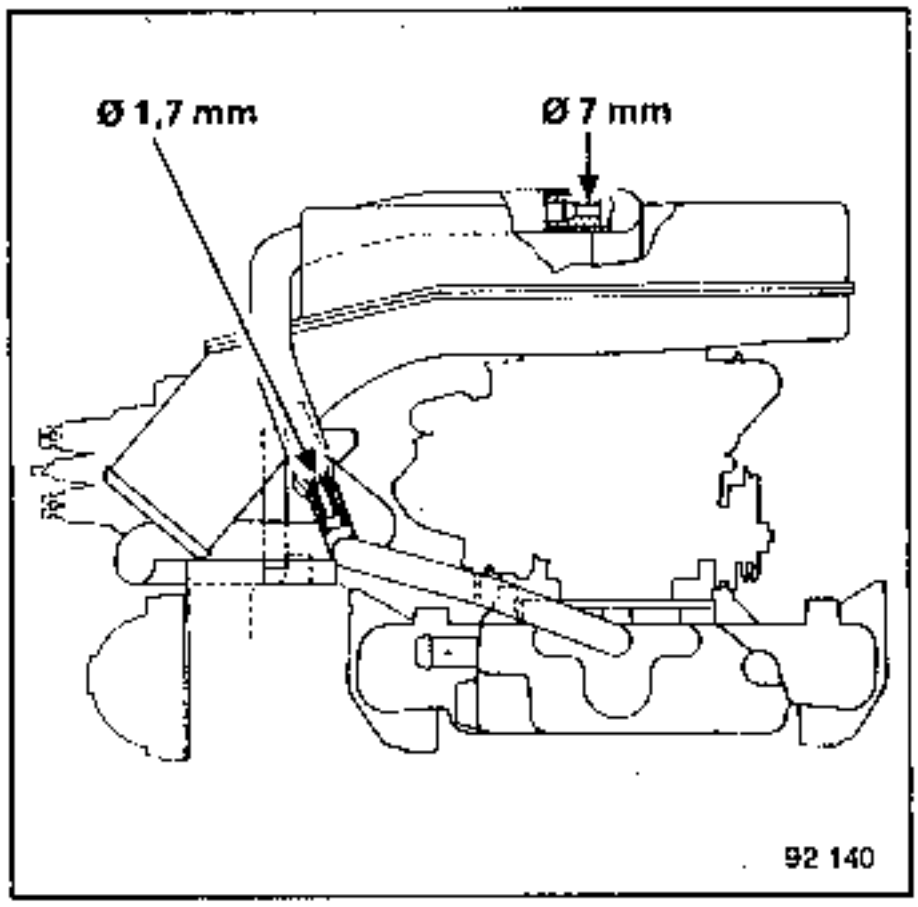


F2N... engine with the filter mounted on top of the carburettor

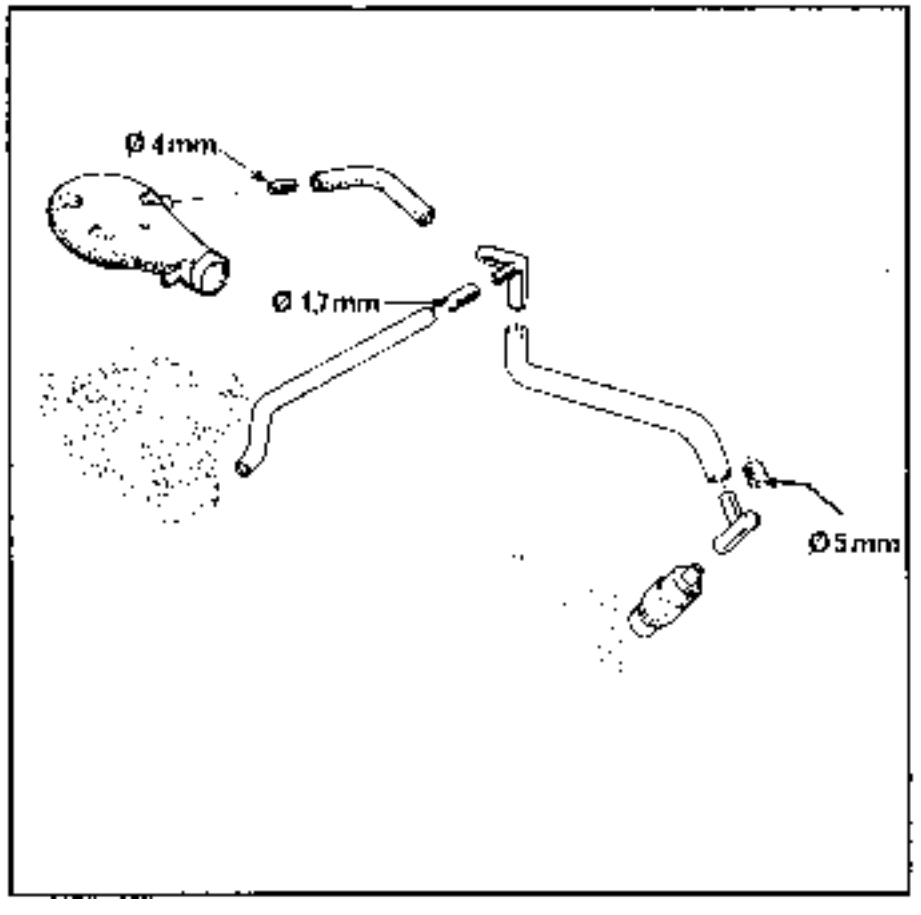


1 - Drain unit
2 - Pipe (drain casing, 3 way union)
3 - Air filter
4 - Pipe (filter, 3 way union)
5 - Pipe (3 way union to carburetter base)
6 - 3 way union
7 - 1.7mm Ø jet
8 - 7mm Ø jet

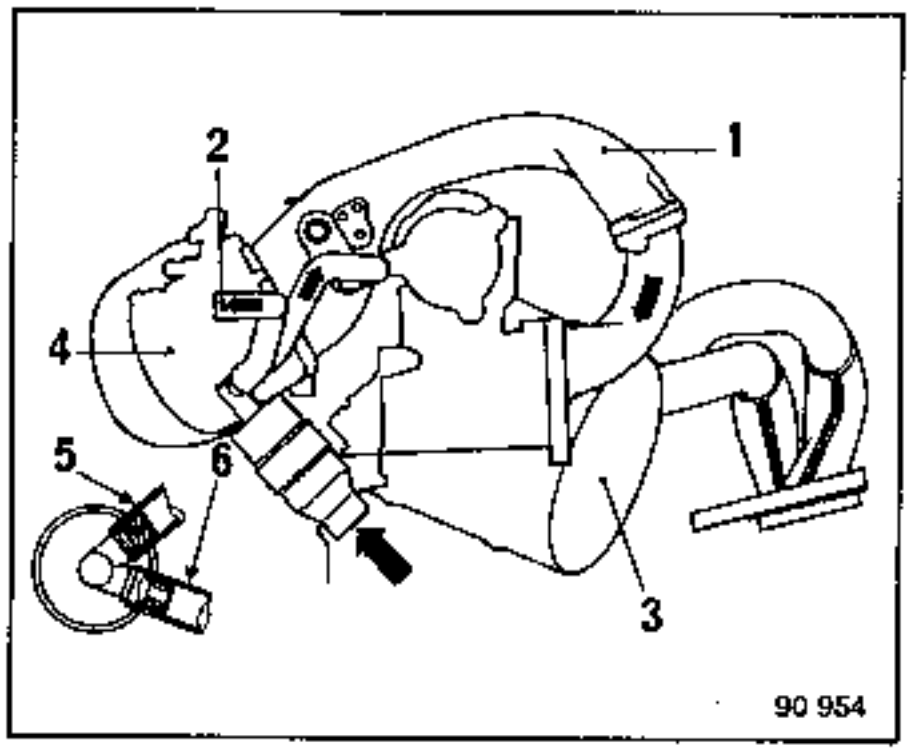
F2N... engine with remotely mounted filter



F2R... Engine

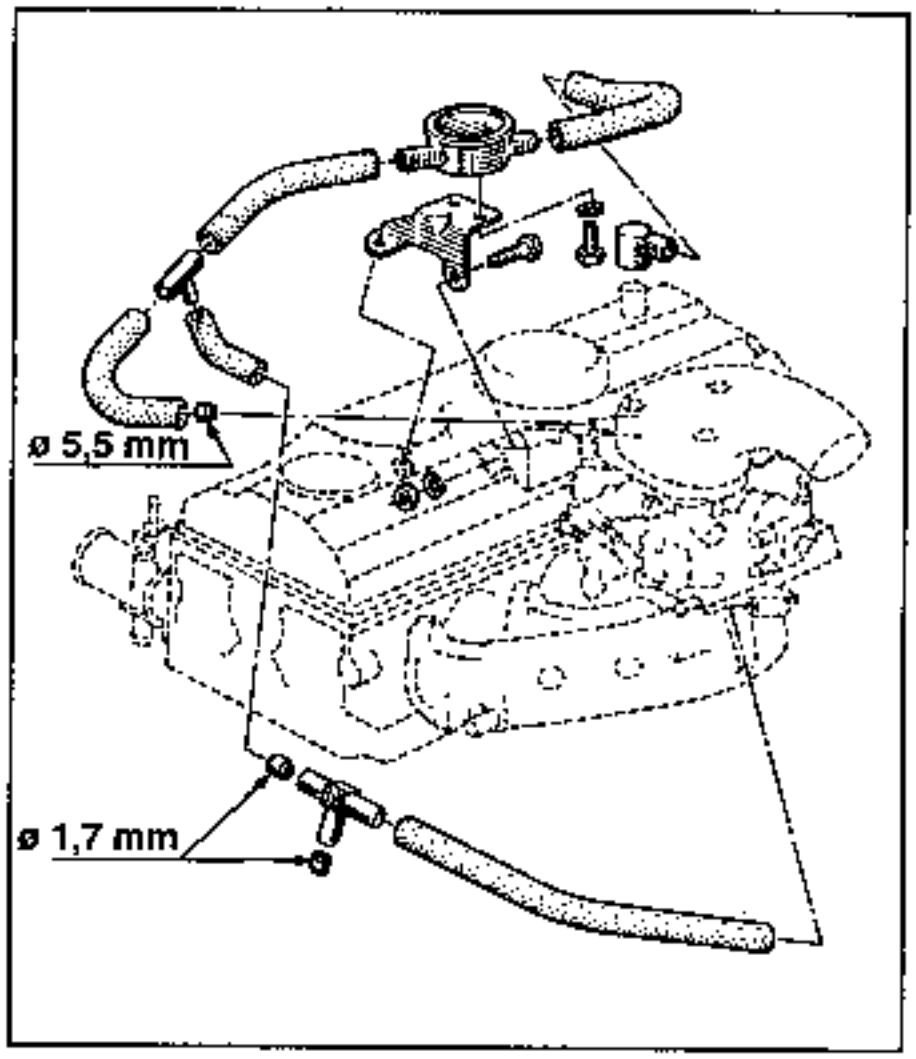


F3N... Engine

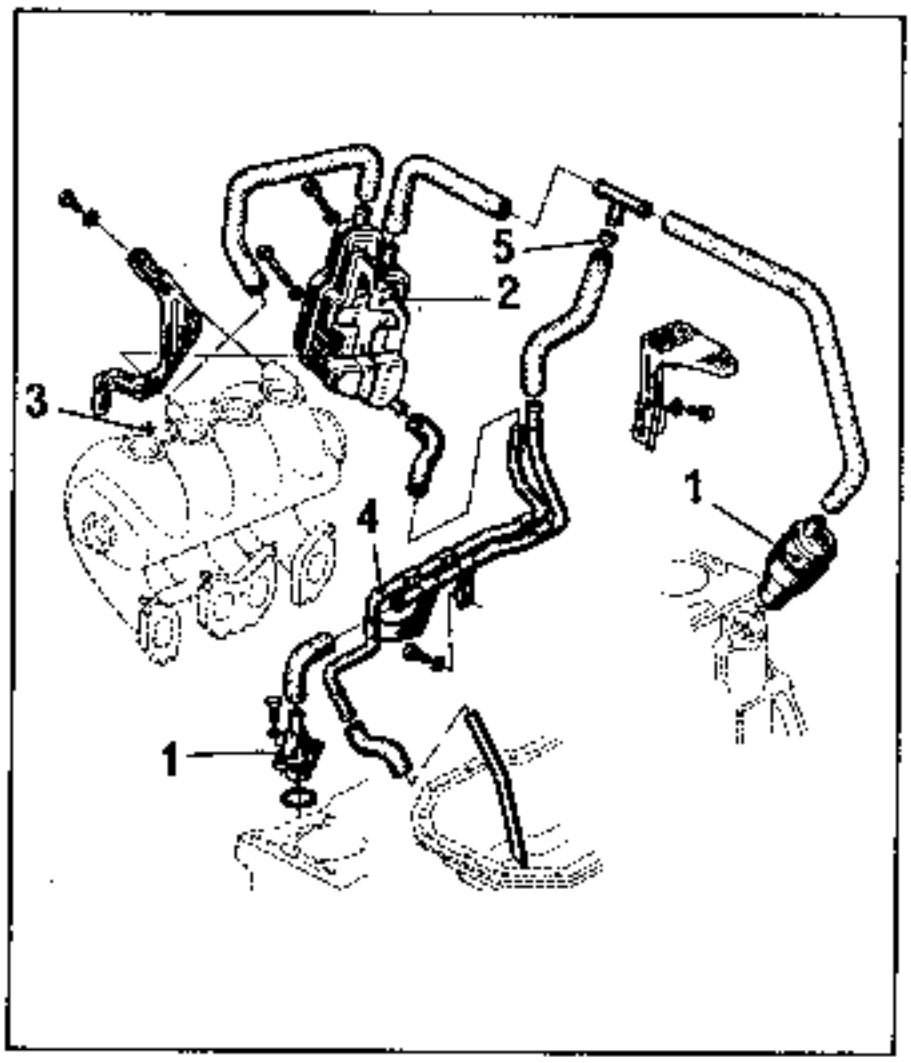


1 - Air intake distributor
2 - Connecting pipe
3 - Air filter
4 - Throttle unit
5 - 1.5mm jet (on distributor side)
6 - 6.5mm jet (on connecting pipe side)

J6R... Engine

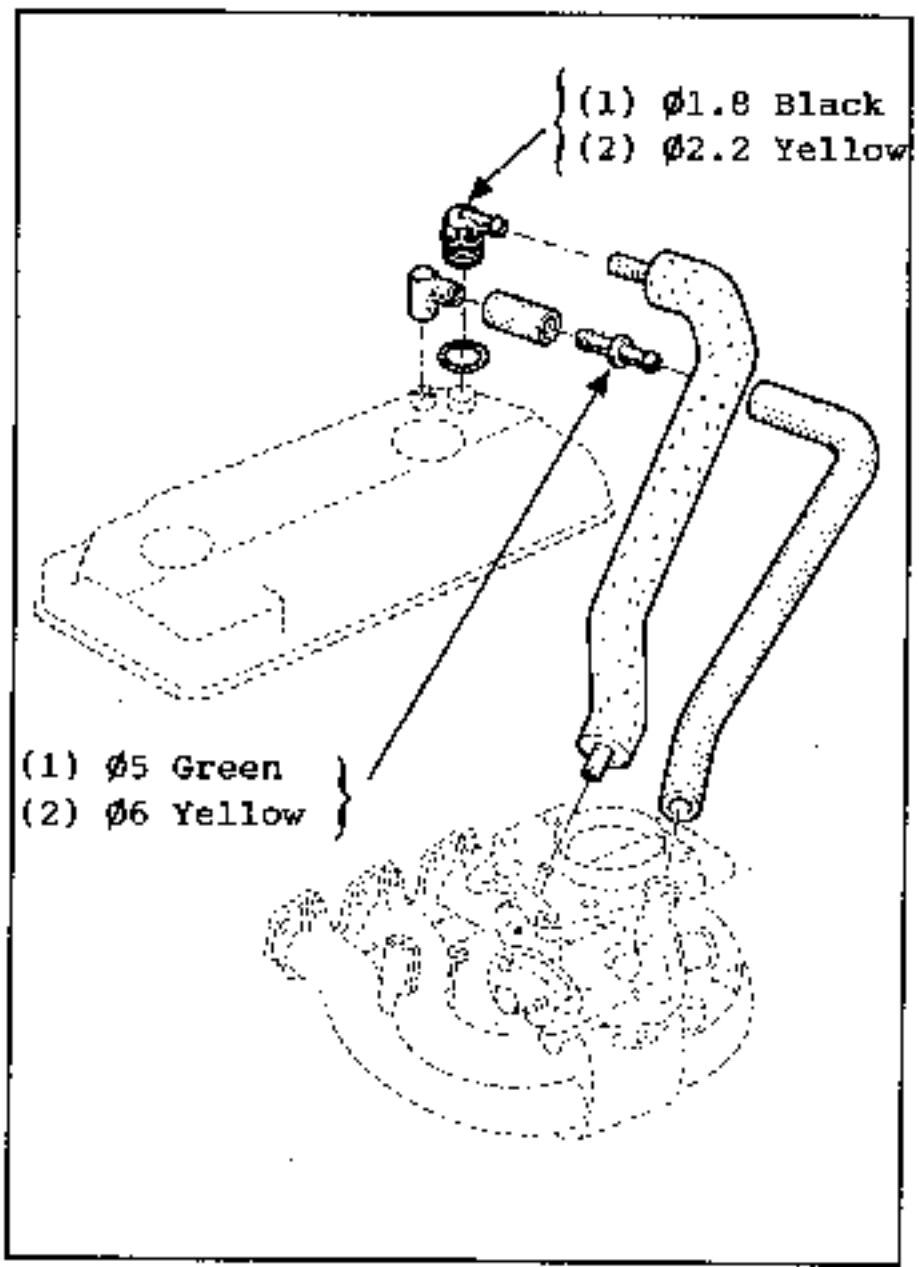


F8Q Engine

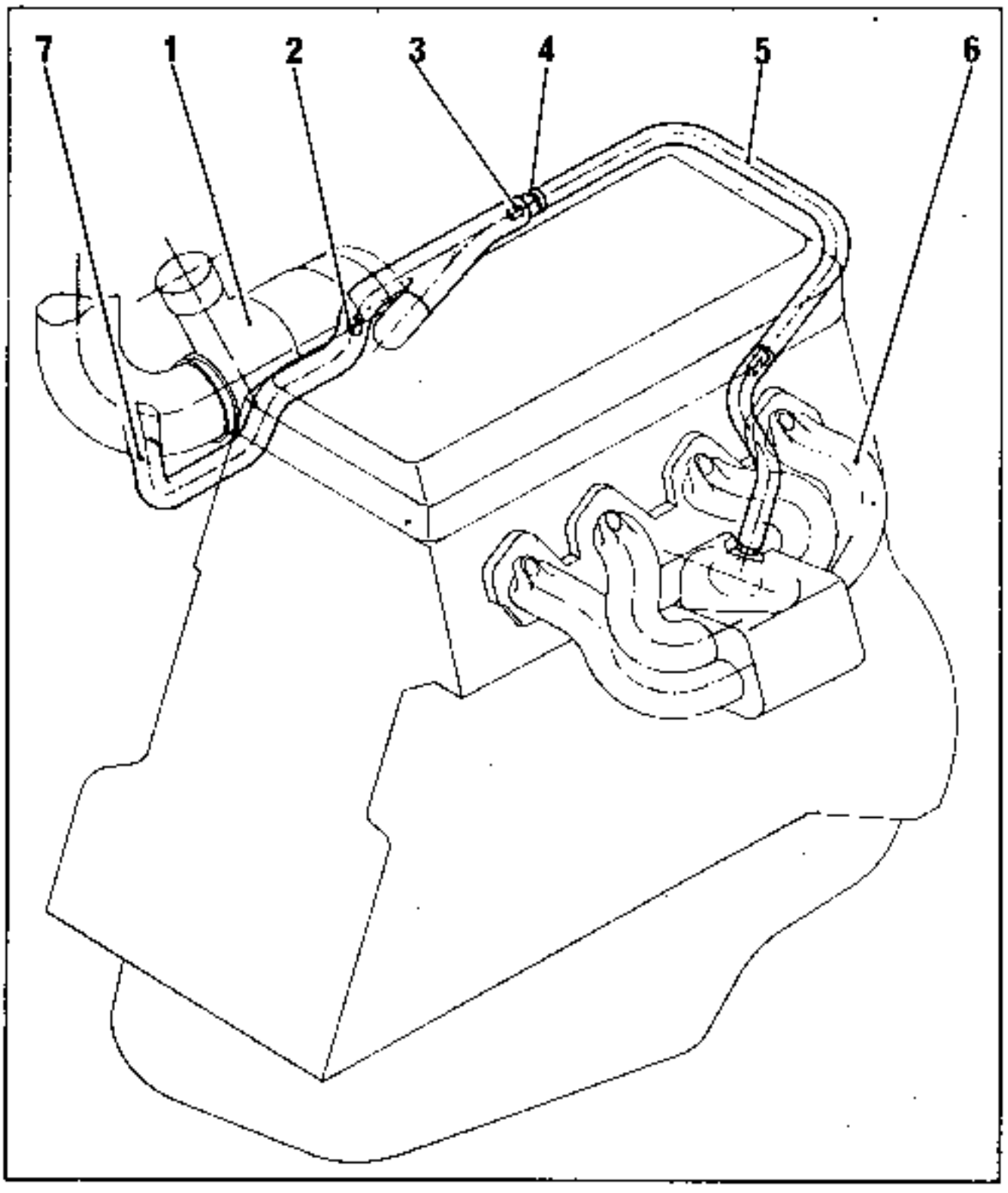


1 - Drain unit
2 - Drain unit
3 - Resonator
4 - Return pipe to crankcase
5 - 8mm Ø jet

J7R... (1) J7T...(2) Engine



RENAULT 21 - 2 l. Turbo X 485



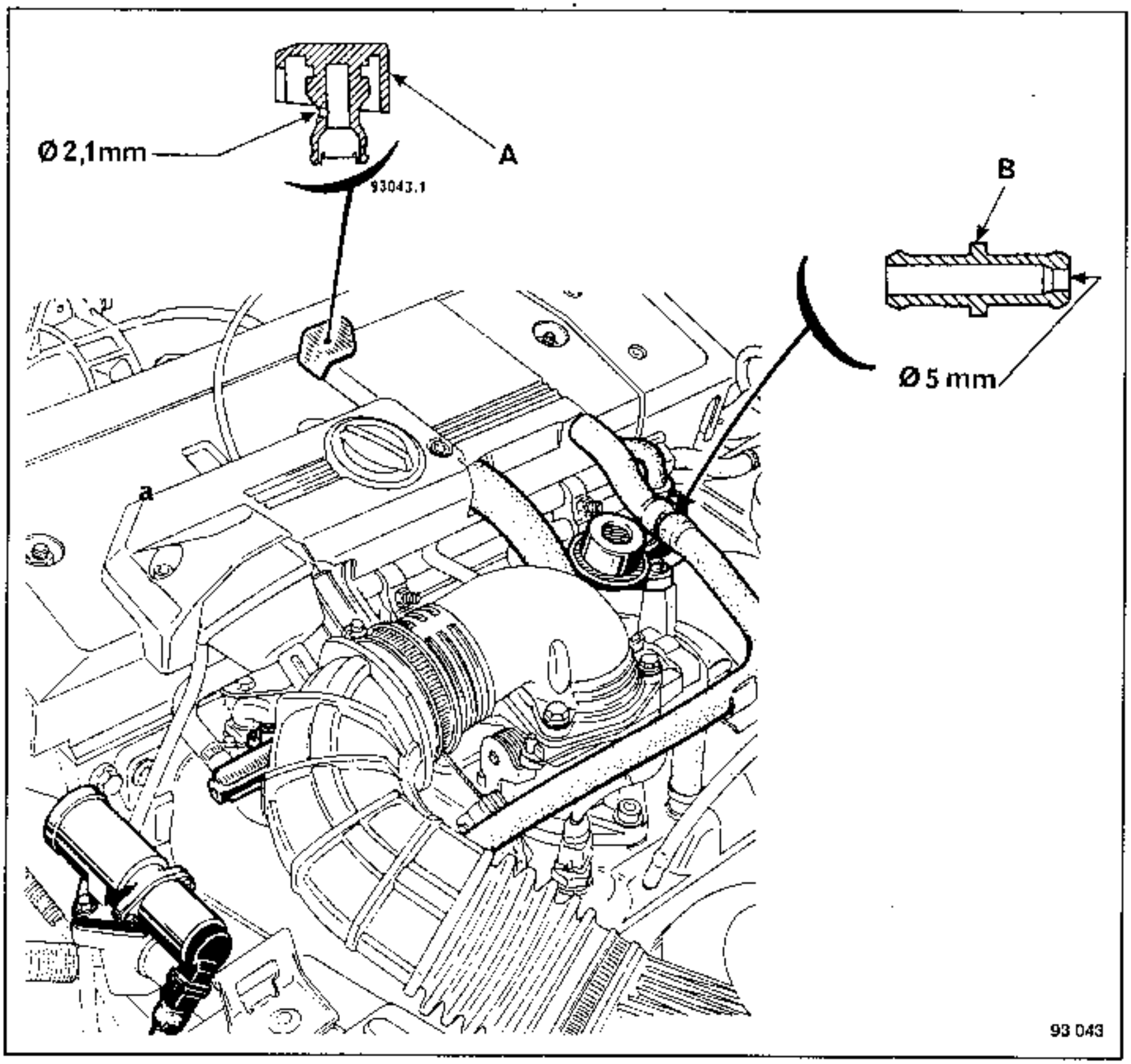
The crankcases gases are recirculated. They are taken from the rocker arm cover to the inlet manifold through a dual circuit (input and output) to be burnt in the combustion chambers. When the turbocharger is operating, valve (4) closes the output circuit.

1 - Turbocharger
2 - 6mm jet
3 - 2.2mm jet
4 - Non return valve
5 - Output circuit
6 - Air intake distributor
7 - Input circuit

CHECKING

For the emission control system to operate correctly, the crankcase oil vapour reintake system must be kept clean and in good condition.

Check that the jets are in position and are the correct sizes.



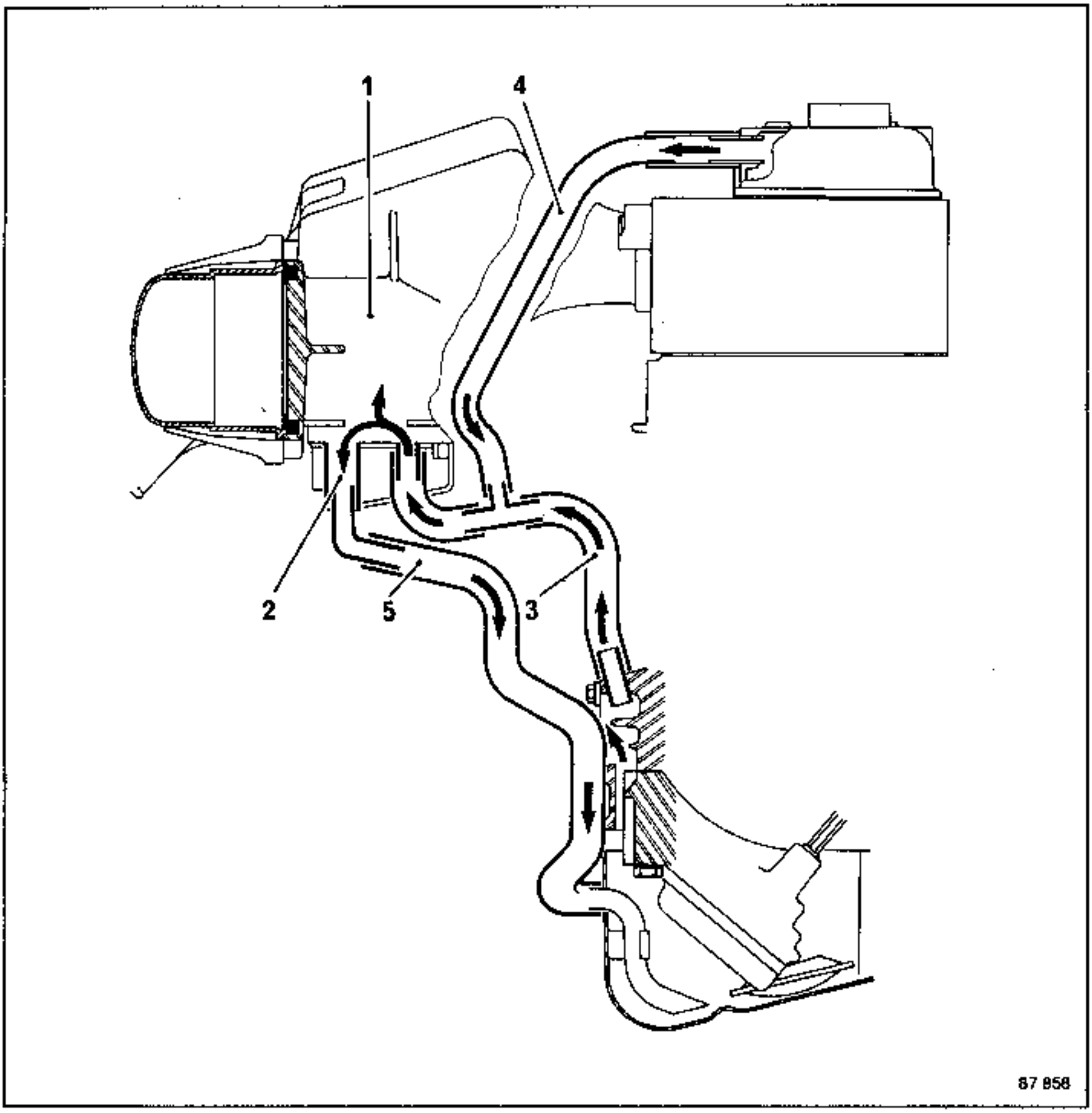
A - Output side reintake (jet Ø 2.1mm, colour yellow)
B - Input side reintake (jet Ø 5mm, colour yellow).

CHECKING

For the emission control system to operate efficiently, the crankcase oil reintake system must be kept clean and in good condition.

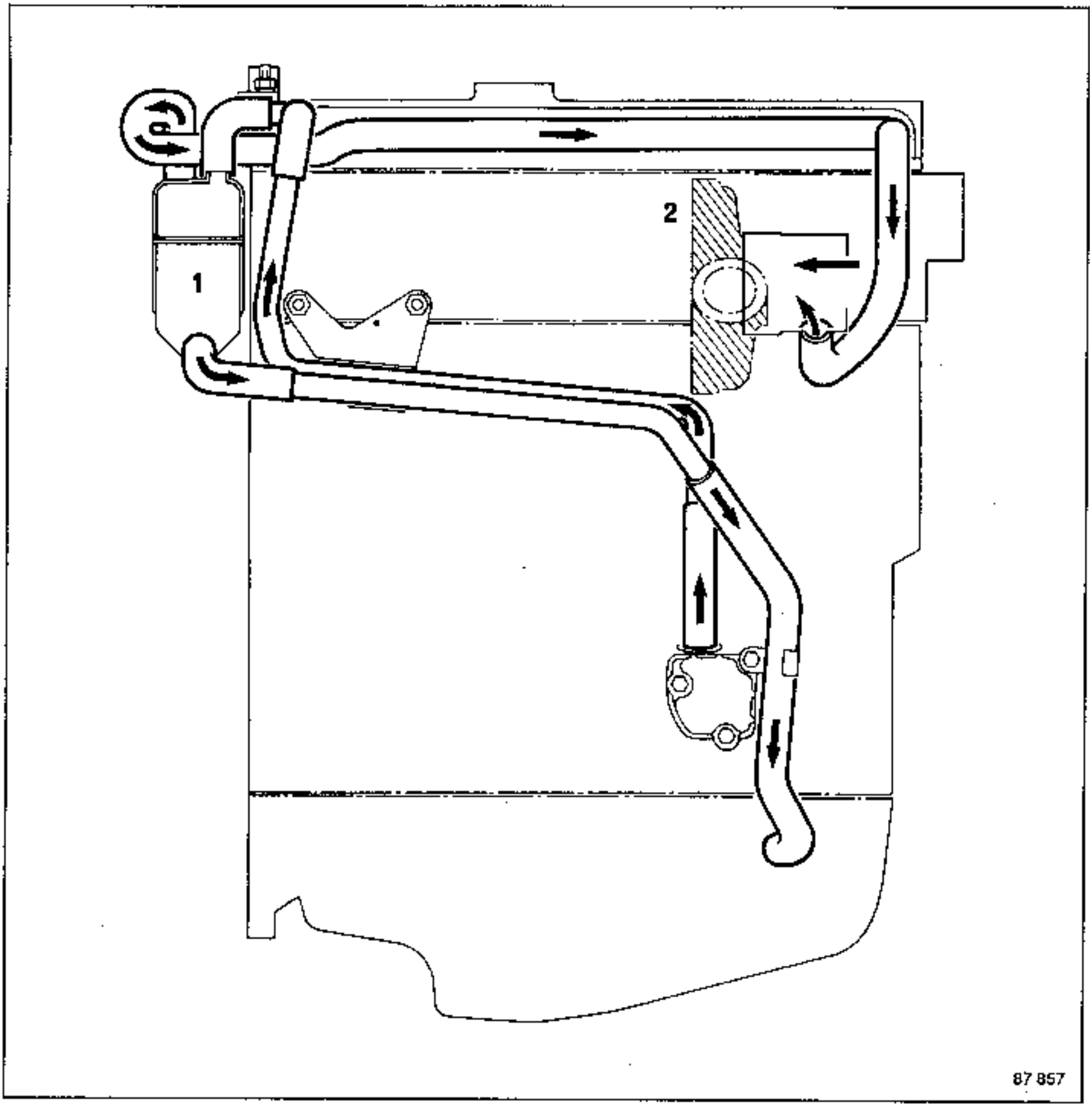
Check that the jets are in position and of the correct sizes.

J8S Naturally Aspirated Engine



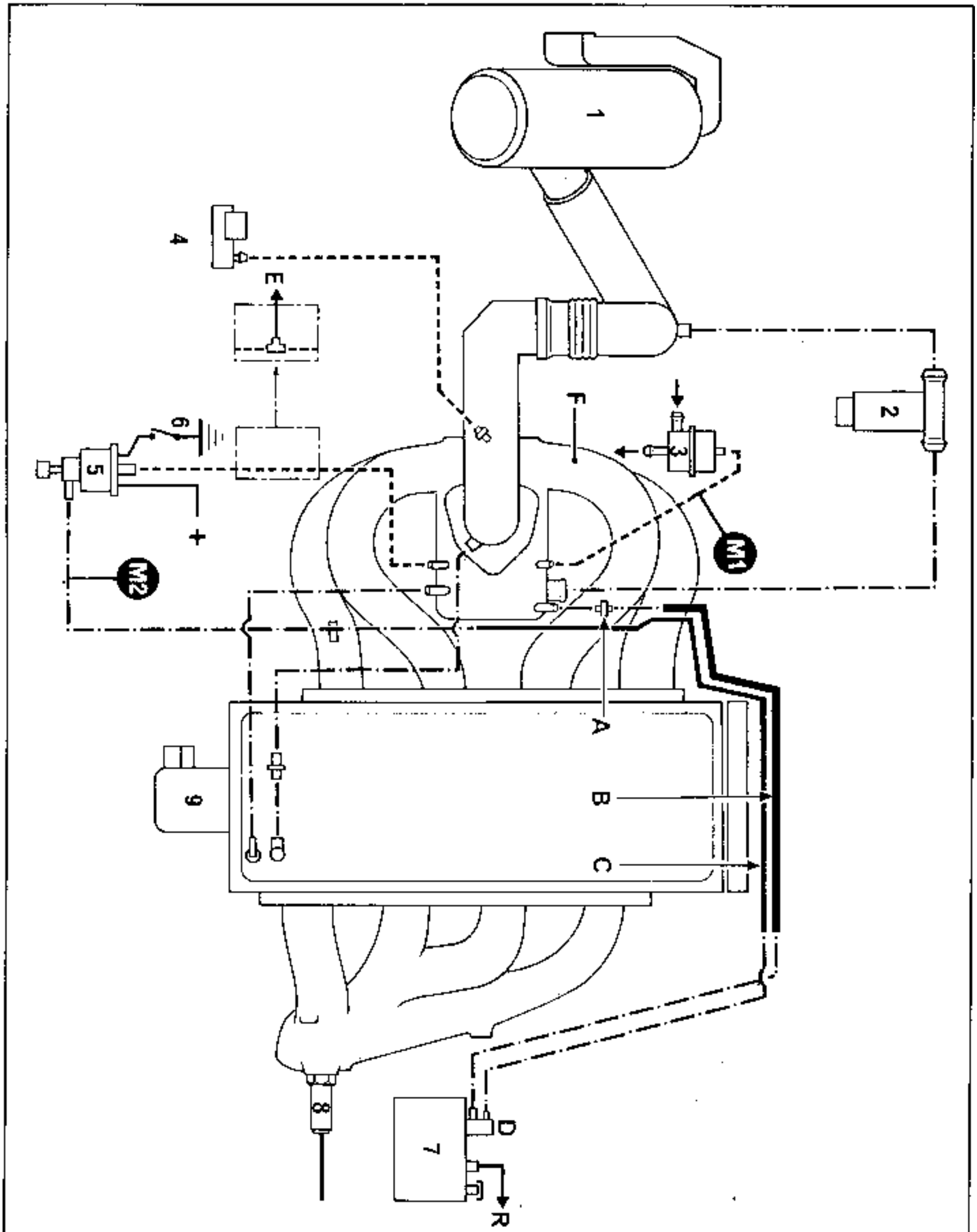
1 - Air casing
2 - Drain unit
3 - Oil vapour reintake pipe (lower engine)
4 - Oil vapour reintake pipe (upper engine)
5 - Return to sump pipe

J8S Turbo Engine



1 - Drain unit
2 - Turbocharger

X 48 Vehicles (for certain markets)



1 - Air filter
2 - Idling speed regulator valve
3 - Fuel pressure regulator
4 - Pressure sensor
5 - Solenoid valve controlling fuel vapour absorption canister
6 - Electronic computer
7 - Fuel vapour absorption canister
8 - Oxygen sensor or Lambda sensor
9 - Ignition distributor

A - 1.8mm Ø jet: colour white
B - Fuel vapour canister bleed pipe (intake distributor - canister)
C - Fuel vapour canister bleed control pipe (canister - solenoid valve)
D - Fuel vapour canister valve
E - To automatic transmission
F - Air intake distributor
R - To fuel tank

For certain markets, X 48K vehicles are fitted with a system for absorbing the vapours emanating from the fuel tank:

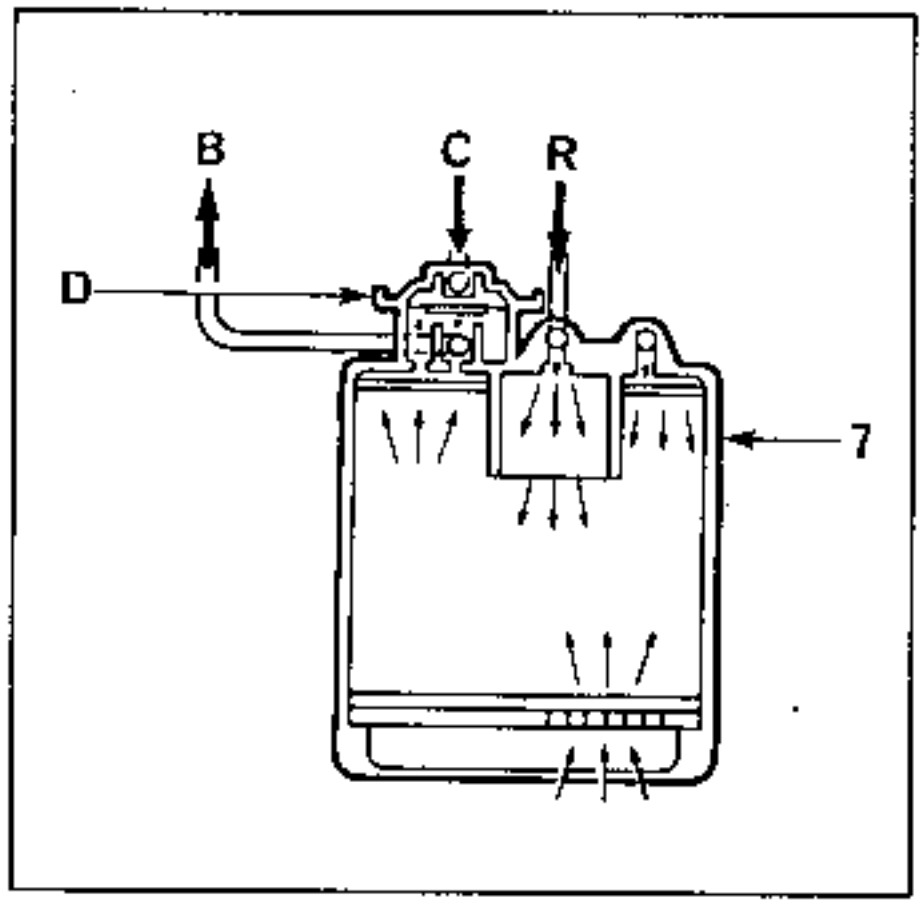
- The circuit consists of a fuel vapour absorption canister connected to the tank by a pipe (R).

- The fuel vapour absorption canister contains active carbon. It carries a valve (D) connected to the air intake distributor and controlled by the injection computer (6) through solenoid valve (5) and pipe (C). The fuel vapour canister is bled via pipe (B) calibrated by a jet (A) 1.8mm in diameter and colour white.

PRINCIPLE OF OPERATION:

- When the engine is stopped:
  The fuel vapour is collected in the fuel vapour absorption canister.

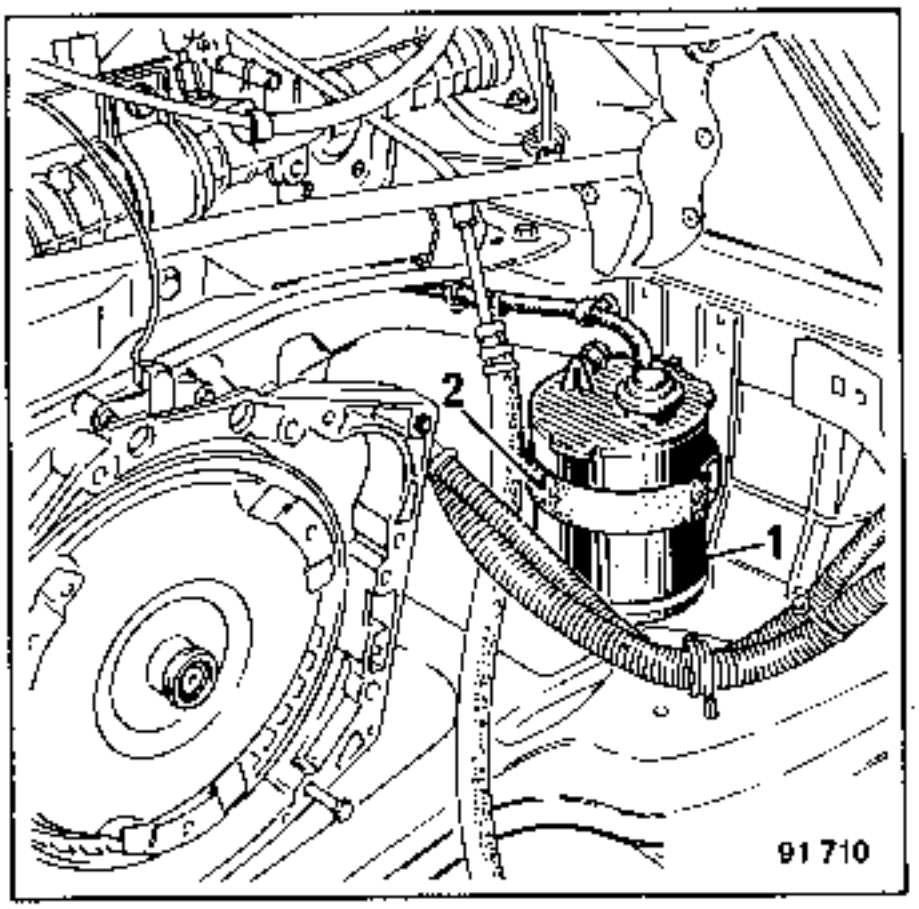
- When the engine is running at idling speed:
  There is no bleed signal to the solenoid valve (5) (no control signal from the injection computer (6)).



- When the engine is running at speeds other than idling:
  Under certain conditions, when the system is warm, the injection computer (6) sends an electrical signal to the solenoid valve (5) to open the pneumatic circuit (C) between the air intake distributor (F) and the fuel vapour canister (7). The fuel vapour contained in it is then bled off.

POSITIONS OF THE ANTI-EVAPORATION SYSTEM COMPONENTS

The fuel vapour absorption canister (1) is secured to the left hand side member (on the same side as the air intake distributor and below the injection and ignition computer).

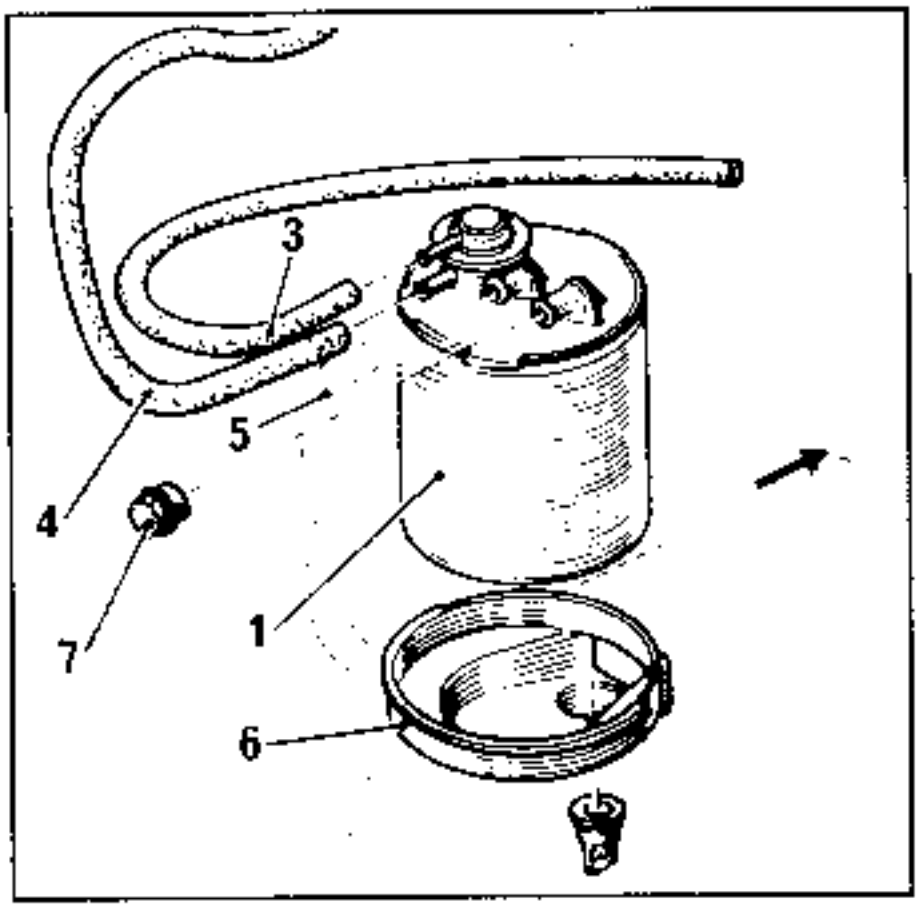


The canister bleed solenoid valve is mounted, together with the pressure sensor, on the injection computer protective casing.

REPLACING THE FUEL VAPOUR ABSORPTION CANISTER

Disconnect the pipes from the top of the canister.

Remove the securing strap (2) and take out the canister from under the vehicle.

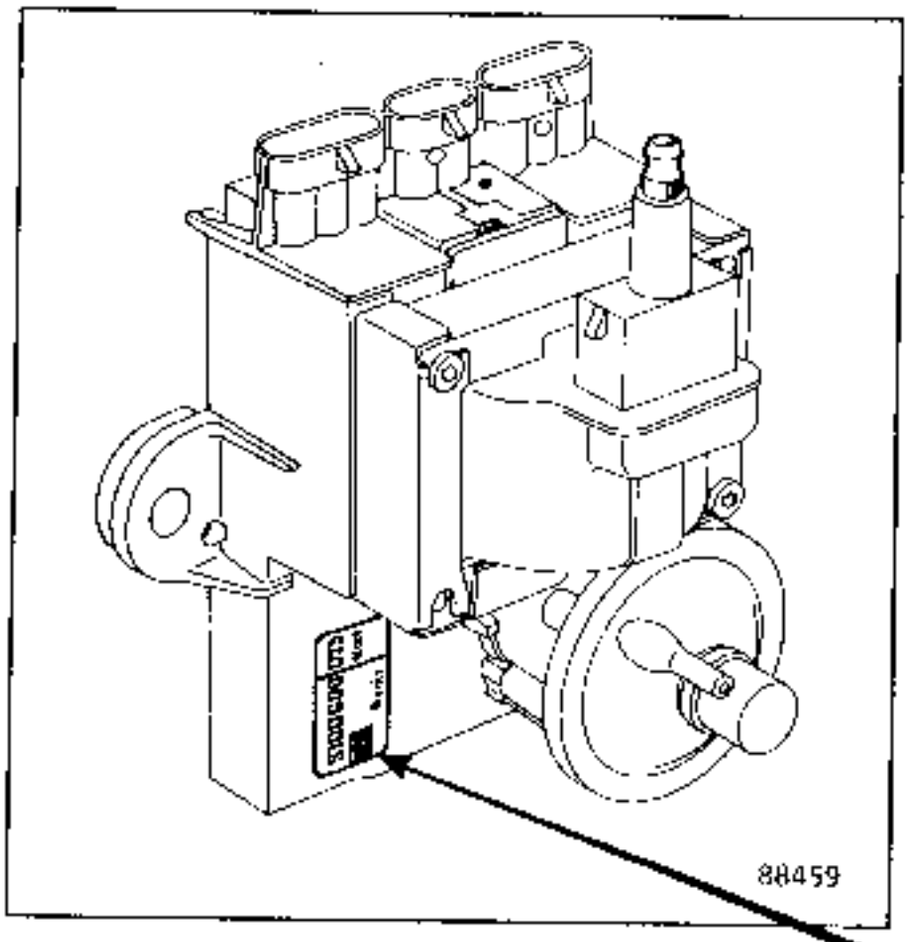


1 - Fuel vapour absorption canister
2 - Securing strap (left hand drawing)
3 - To solenoid valve
4 - To air intake distributor
5 - To fuel tank
6 - Support
7 - Plug

When refitting the canister, ensure that the pipes are correctly connected.

Vehicle	Engine	Curves
X 481	F2N 712 F2N 716	RE 234
X 482	F2N 710	RE 232
X 482	F2N 754	RE 282
L 489	J6R 758 J6R 759	RE 001
L 48 D B 48 D	C2J 770	RE 278
X 48 J	F2R 702	RE 232
L 48 M K 48 M	F2N 750	RE 258
L 48 N K 48 N	F2N 752	RE 259

TYPE F IGNITION UNIT

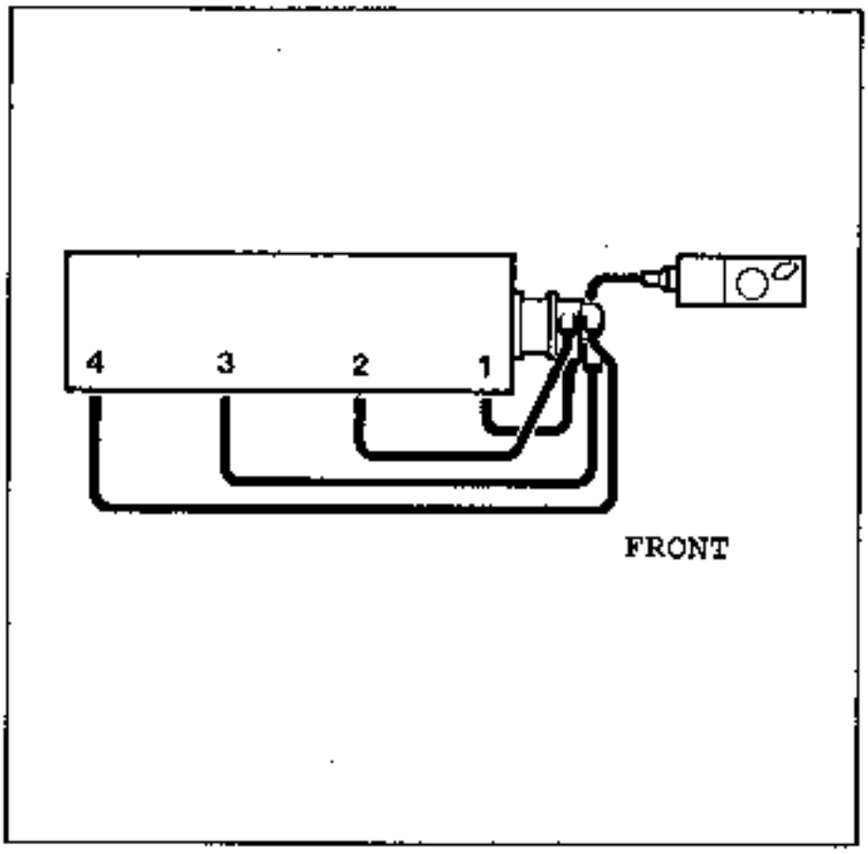


CURVE IDENTIFICATION

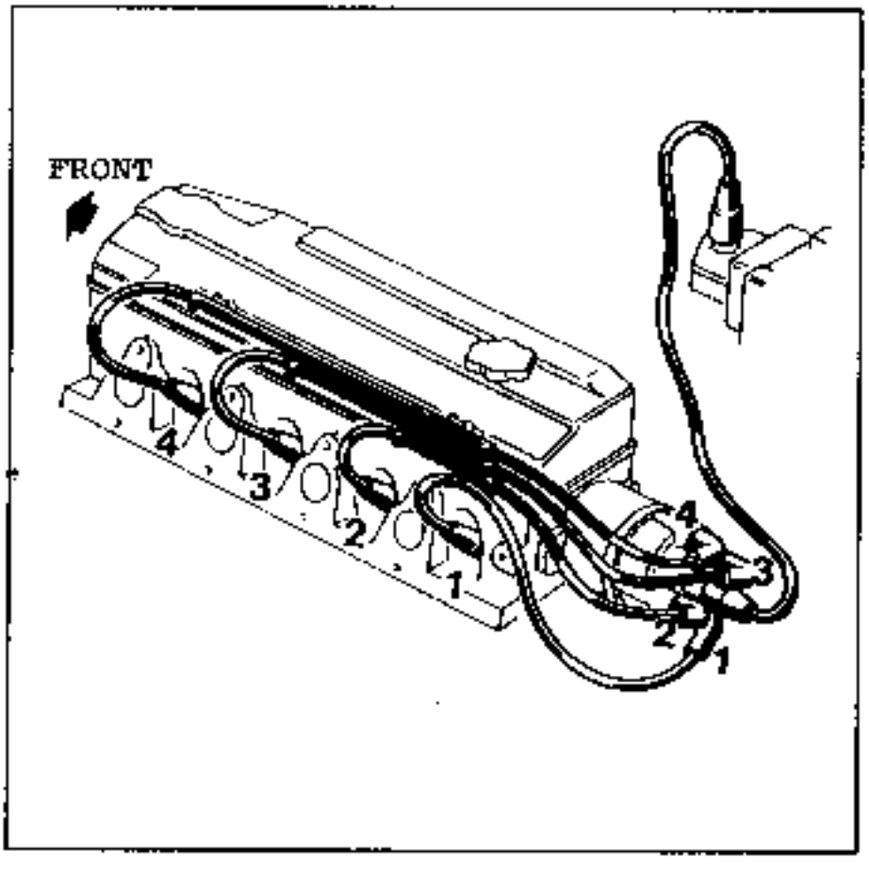
The curves are identified by a label stuck to the body of the electronic computer.

PLUG LEAD CONNECTIONS:

1-3-4-2



TYPE F ENGINE



TYPE J ENGINE

Special Features of the Electronic Units used on type F Engines

Certain integral electronic ignition system units have an additional ignition advance correction take-off, which is connected to socket (Z) by a "packard" 3 way connector.

Two wires are connected to channels A and C of this connector or only one wire to channel A (depending on the type of system).

Each wire has its own correction function

ELECTRONIC IGNITION SYSTEMS RE232 and RE234.

Two temperature switches are used. They are earthed to bring them into operation.

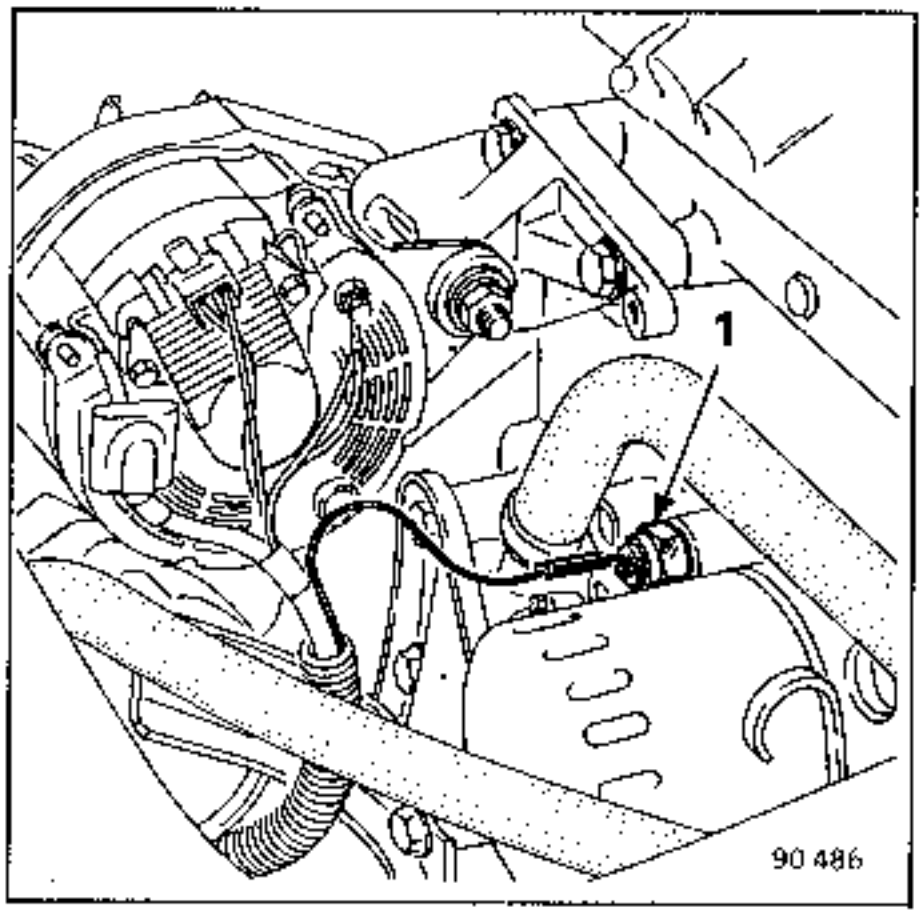
On channel (A) the wire is connected to the electric fan coolant temperature switch mounted on the radiator. It operates as follows:

	Temperature (°C)	
	Below 90	Above 90
Advance correction between 1200 rpm and 4700 rpm at a vacuum of 0 to 270 mb.	0	-4 ± 2

This correction prevents pinking.

On channel (C), the wire is connected to the oil temperature switch (1) on the cylinder block. This operates as follows:

	Temperature (°C)		
	Below 15	From 15 to 70	Above 70
Advance correction between 1200 & 2500 rpm at a vacuum of 380 to 920 mb.	+10° ± 2	0	+10° ± 2



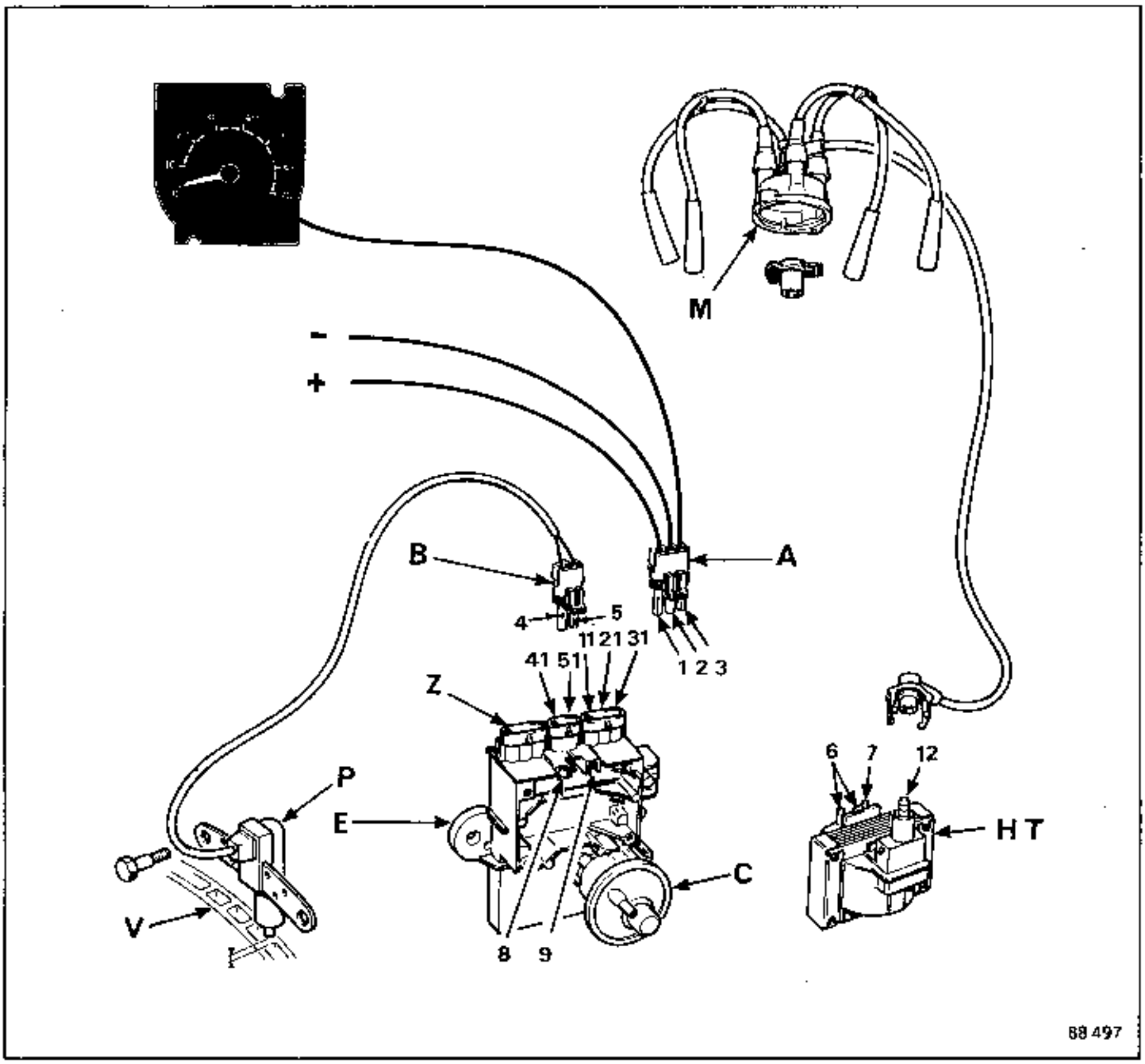
AEI RE282

Only the coolant temperature switch is used.

The oil temperature switch is replaced by the oil pressure warning light pressure switch, which was formerly at the back of the cylinder block near the engine intermediate shaft.

	Temperature (°C)	
	Below 90	Above 90
Advance correction between 1200 rpm and 4700 rpm at a vacuum of 0 to 270 mb.	0	-3 ± 2

This correction prevent pinking.



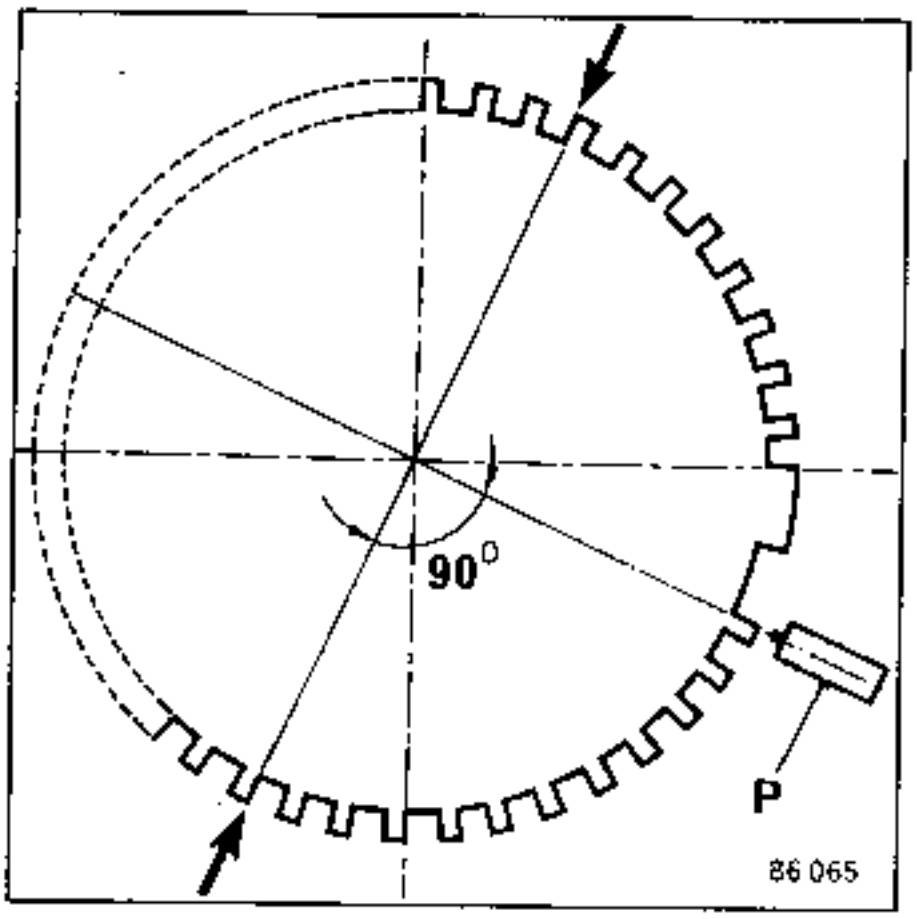
Item	Description
1	+ supply
2	Earth
3	Tachometer
4	Sensor coil
5	Sensor coil
6	Coil + terminal and interference suppression capacitor terminal
7	Coil - terminal
8	Coil + contact
9	Coil - contact
11	Module + "input"
12	Secondary contact stud
21	Module earth
31	Tachometer "output"

Item	Description
41	Sensor signal
51	Sensor signal
M	Distributor cap
HT	Ignition coil
C	Vacuum capsule
E	Electronic computer
P	Magnetic position sensor
V	Flywheel
A	Supply connector
B	Position sensor connector
Z	See special features on page 4

NOTE: Terminals 8 and 11 are directly interconnected inside the housing.

1 - FLYWHEEL

This has 44 evenly spaced teeth on it, of which two are removed each half turn to form an absolute precision index 90° before top and bottom dead centres. In reality, therefore, there are only 40 teeth.



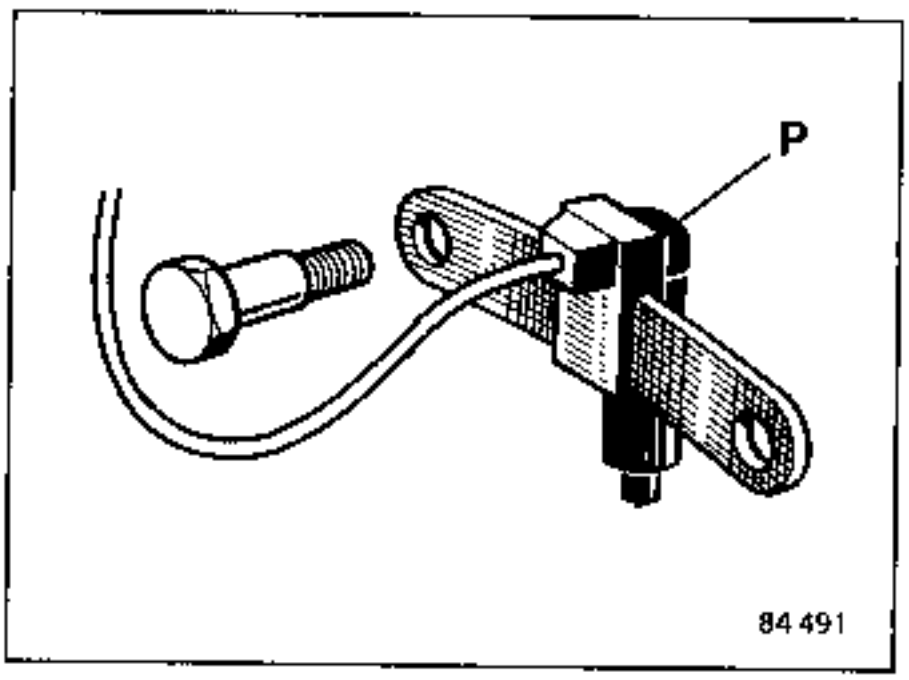
2 - POSITION SENSOR (P)

This detects:

- the positions of top and bottom dead centre,
- the engine speed.

It cannot be adjusted (it is pre-adjusted on its securing bar).

It must be secured to the clutch housing with shouldered bolts.

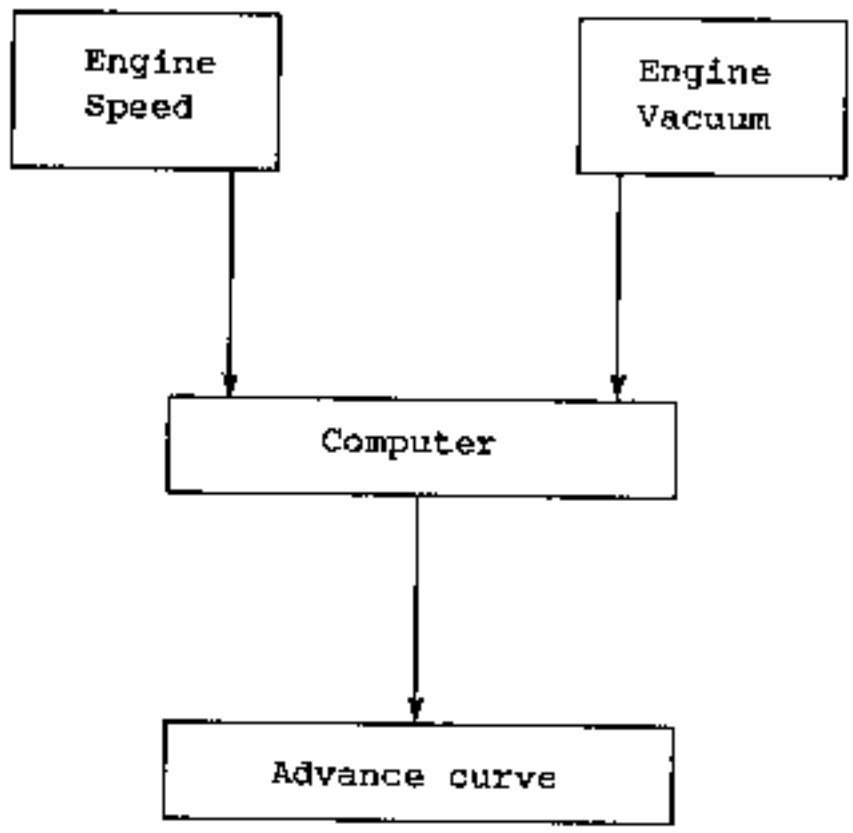


3 - VACUUM SENSOR

The external appearance of this vacuum capsule is identical to that on a conventional ignition system, but internally it is different.

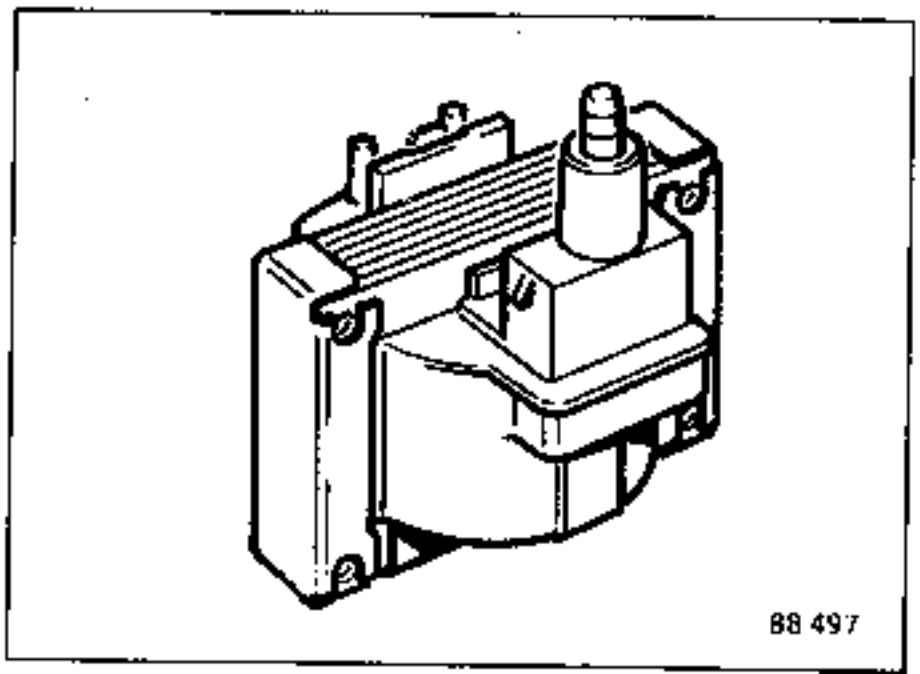
4 - THE COMPUTER

This is an electronic system which defines the timing curve to suit the engine speed and vacuum.

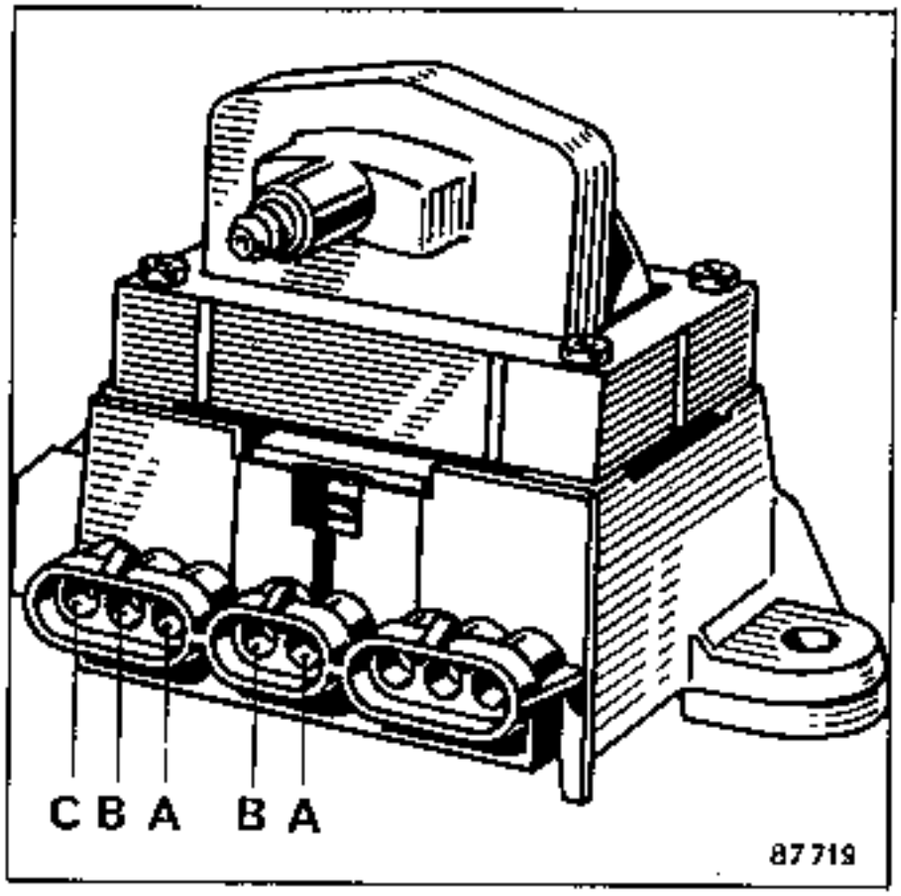


5 - THE COIL

This is separate from the computer and can therefore be replaced separately.



The RENAULT injection unit is programmed with the ignition advance curves and sends a control signal (5 volts) to the ignition power module.



3 way connector

A Battery +
B Earth
C Tachometer

2 way connector

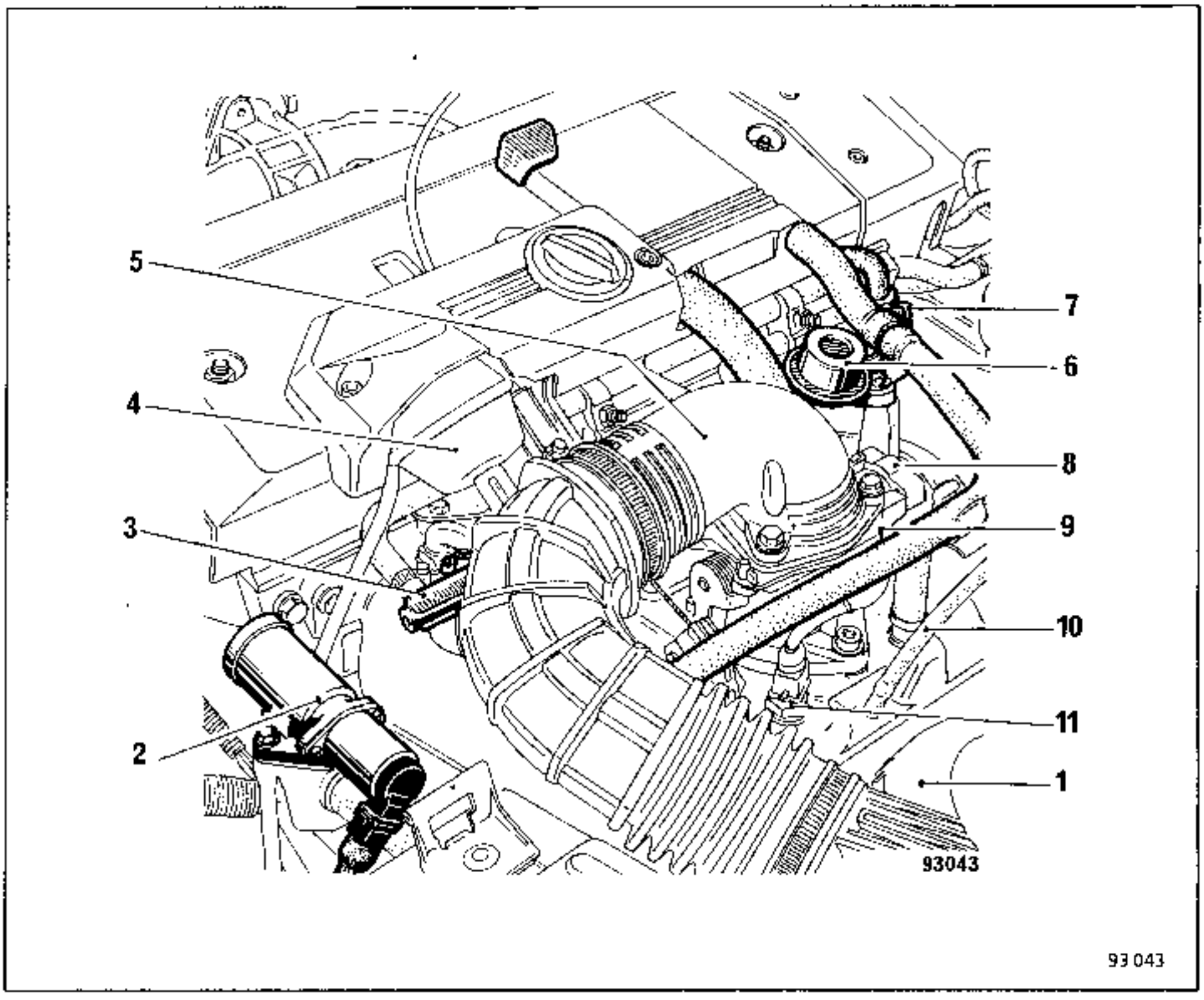
A Control signal earth
B Control signal

SPARK PLUGS

Type	ENGINE	AC	CHAMPION	EYQUEM RENAULT	SPARK GAP ± 0.5(mm)
L481 K481 S481 B481	F2N	C41CXLS	N279YC	C82LS	0,8
L482 K482 S482	F2N 710	C41CXLS	N279YC	C82LS	0,8
B482 L482 S482 K482	F2N 754	-	-	C82LS	0,8
L483 K483 B483	J7R		S6YC	C82LJS	0,9
L485	J7R 752			803LJSP	0,6
L489	J6R	C42CLTS	S279YC		0,8
L48D B48D	C2J		N281YC		0,8
L48E K48E B48E	F3N 722	C41CXLS	N6YC	C82LS	0,8
L48F K48F B48F	F3N 726		RN9YC		0,8
L48J K48J B48J	F2R 702	C41CXLS	N279YC	C82LS	0,8
L48K K48K B48K	J7T 754 J7T 755	C41CLTS	S7YC		0,8
L48M K48M	F2N 750	C41CXLS	N279YC	C82LS	0,8
L48N K48N	F2N 752	C41CXLS	N279YC	C82LS	0,8
L48Q/L48Y B48Q/B48Y	J7R 754	-	-	FC62LS3	1,2

WARNING: Fit only the make and type of spark plugs epecified. The thermal index is not the only factor in the selection of spark plugs.

Special Features of the J7R 754 Engine



1. Air filter
2. Regulator valve (HITACHI)
3. Fuel injection gallery
4. Speed regulator capsule
5. Air intake ducting
6. Pulse damper
7. Fuel pressure regulator
8. Load potentiometer
9. Throttle unit
10. Pressure sensor pipe with 1.5mm jet
11. Air temperature sensor

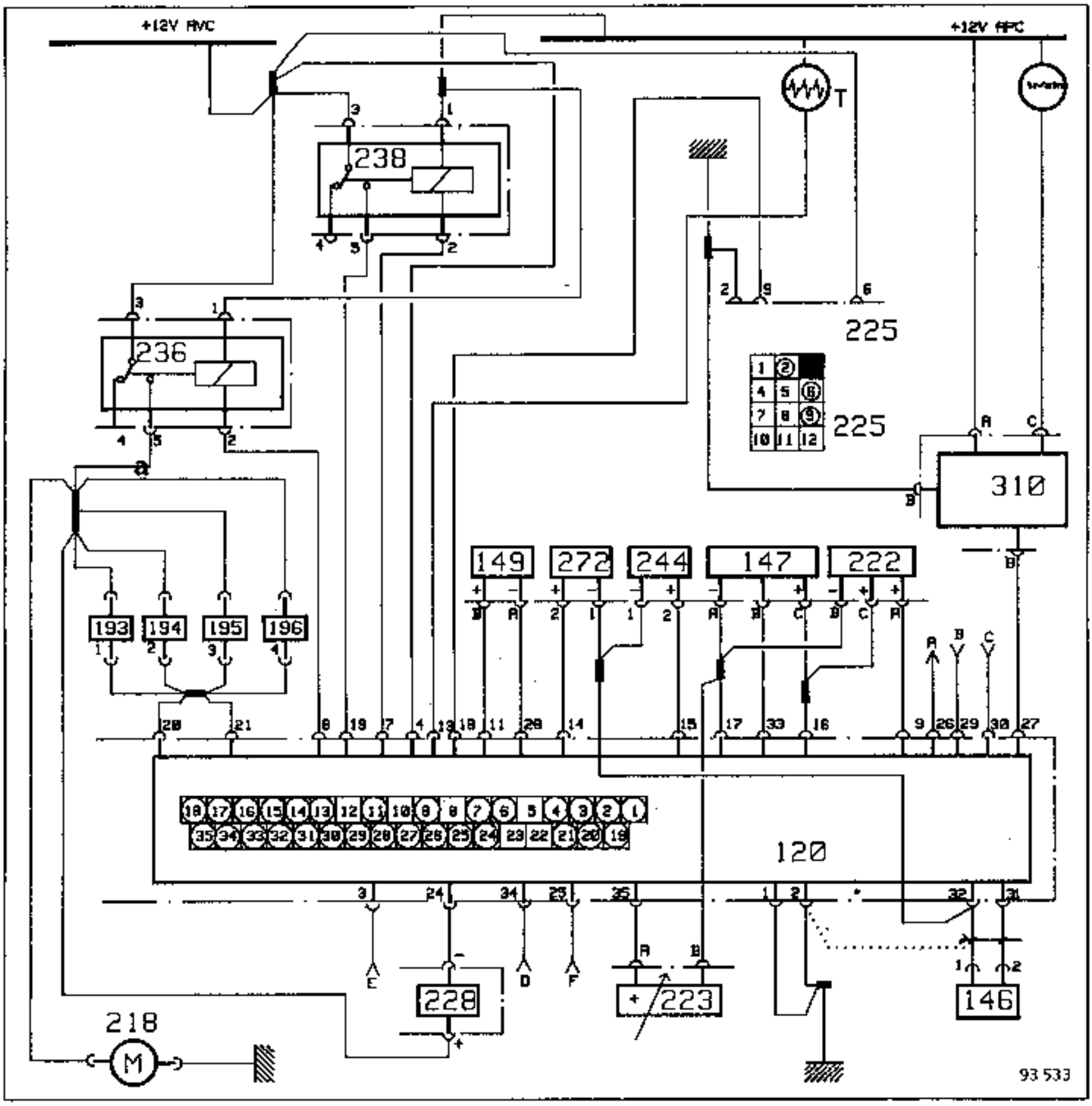
The J7R-754 engine differs from the others at its cylinder head (12 valves):

- the spark plugs are on the exhaust side,

- the inlet manifold is special, as is the fuel injection gallery, which is fitted with a pulse damper and a pressure regulator which is integral with the gallery.

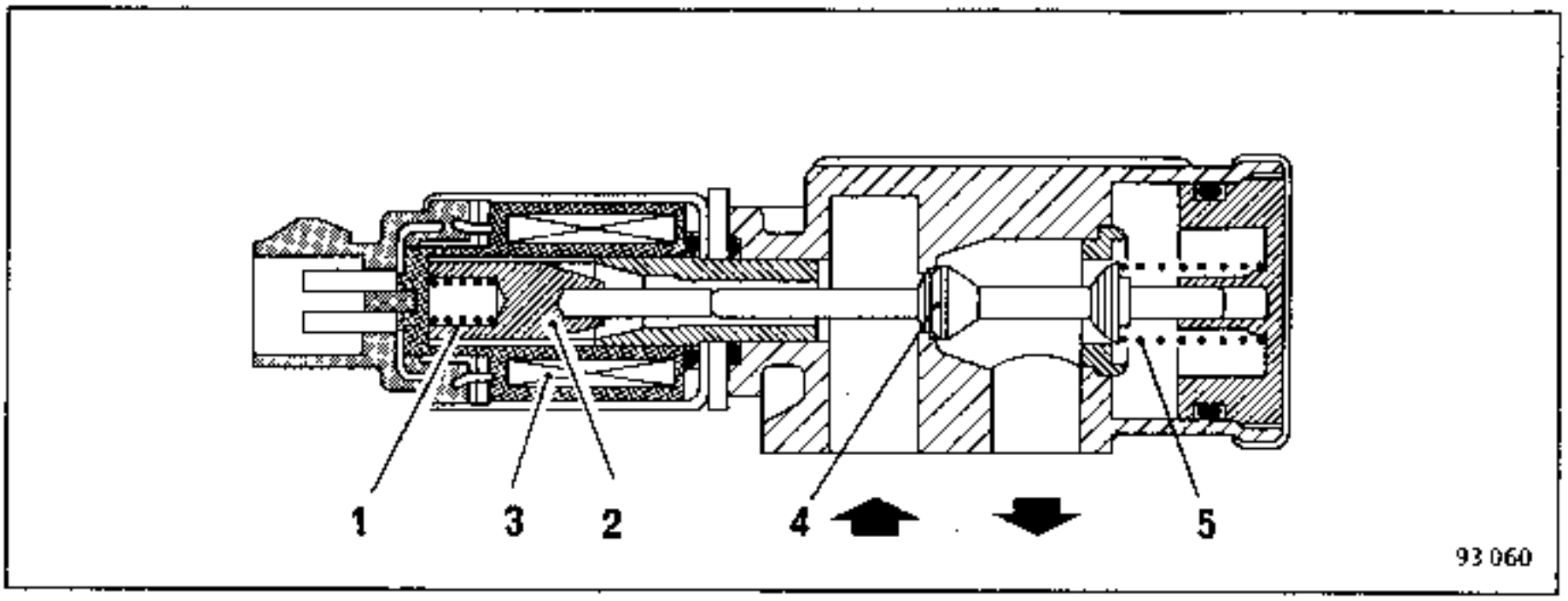
- the idling speed regulator valve (HITACHI) is mounted directly on the inlet manifold. It is fitted with a 2 wire connector (one + after the ignition switch and one - leading to computer terminal 24).

INJECTION CIRCUIT DIAGRAM



120	Computer
146	Pinking sensor
147	Pressure sensor
149	Flywheel sensor
193 - 196	Injectors
218	Fuel pump (engine)
222	Throttle unit potentiometer
223	Adjusting potentiometer
225	Diagnostic socket (plan view)
228	Idling regulator solenoid valve
236	Pump relay
238	Supply relay
244	Coolant temperature sensor
272	Air temperature sensor
310	Ignition power module (M.P.A.)
	Connectors
T	Diagnostic warning light
A	To flow sensor
B	Starter signal
C	Air conditioning - on/off signal
D	Air conditioning thermostat signal
E	Vehicle speed signal
F	Power steering pressure switch signal

"HITACHI" REGULATOR VALVE



PRINCIPLE OF OPERATION

The HITACHI regulator valve has a single winding (2 wires on the connector).

In the "off" position

The air circuit is closed, the spool (4) is pushed back towards the coil (3) by the spring (5). The core (2) is held against the spool by the small spring (1).

With the ignition switched on and the engine stopped

(period during which the fuel pump is running). The coil is supplied with current. The magnetic field pushes over the core (2), the spool (4) moves and opens the valve:

R.C.O. 0% = valve closed
R.C.O. 100% = valve open

With the ignition on and the engine running at idling speed

The computer maintains a cycling rate (R.C.O.) which will maintain the air delivery that keeps the idling speed at the figure programmed on the computer (for example, 850 rpm when the engine is warm).

TESTING BY MEANS OF THE XR 25

Special features:

The total sequence time for the HITACHI valve is approximately 6 m.s.

Example of XR 25 readings

	Diag. output 12	Voltmeter output connector G.O.
Valve closed	0 %	6 m.s
Valve open	100 %	0.3 m.s
Engine warm Idling regulation	37 %	3.9 m.s

FAULT FINDING

If there is something wrong with the idling regulation system, the engine will stall when the foot is removed from the accelerator.

Check:

The coil resistance (9 to 30 ohms).

That the + supply, after the ignition switch, is present at the connector supply wire (current present, with the engine stopped, for approximately 1 second after the ignition is switched on)

Check the continuity of the circuit between:

- channel 24 on computer connector (computer disconnected and replaced by junction block M.S.1048) and channel 5 on the pump relay connector (236). See circuit diagram.

ANTI-FREEZE QUANTITIES AND GRADES

Cooling System Engine Types	Capacities, in litres for the various versions				Specific Requirements
	Phase I	Phase II	C.A.	Aut. Trans.	
C2J	5,5	5,5	-	-	
F2N	5,2	6,4	6,4	6,4	
F2R	7	7	7	-	Glaceol AL (type C)
F3N single point	4,7	6	-	-	
F3N multipoint	4,7	6	6	6,4	Add only demineralized
F8Q	-	7	-	-	water
J6R	6,8	6,8	6,8	7,2	
J7R	6,8	6,8	7	7,2	Protection down to -23°C
J7R Turbo	6,2	6,2	6,2	-	for temperate, hot and cold
J7R 12 valve	-	7,1	7,1	-	climates
J7T	5,7	5,7	7	7,2	Protection down to -40°C
J8S	7,1	-	-	-	for very cold climates.
J8S Turbo	7,2	7,2	7,2	-	
J8S +	7	7	-	-	

THERMOSTAT

Engine Type	Starts to open (in °C)	Fully open (in °C)	Travel (in mm)
C2J	89	101	7,5
F2N F3N	89	101	8
F2R	78	90	7,5
F8Q	82	94	7,5
J6R J7R J7T	89	101	7,5
J8S	81	93	7,5

ALUMINIUM MATRIX RADIATORS

Certain vehicles are equipped with radiators, the cooling matrix of which is made from aluminium.

Flushing Out

Never flush out these radiators, or the cooling system, with caustic soda or alkaline products (they can corrode light alloy components and cause leakage)

Storage

A radiator can be stored, after removal, for a maximum of 48 hours without taking any particular precautions.

For longer than this, however, particles of the brazing flux used in the radiator during manufacture and the dichlorides in the coolant that the radiator contained, cause, when they make contact with the air, oxydization of the aluminium components of the radiator, resulting in leakage.

One must therefore carry out the following on a radiator which is to remain off the vehicle for more than 48 hours:

- Either THOROUGHLY FLUSH IT OUT with water, BLOW THROUGH IT with compressed air, then PLUG all the orifices.

- Or keep it filled with coolant, if possible.

Anti-Freeze

The correct type of anti-freeze must be used in an aluminium radiator.

The AL type C anti-freeze marketed by the RENAULT network fulfils the specifications laid down by our Design Office, in particular in that:

- it does not attack the various aluminium and cast iron components,

- it has an alkaline content which is specifically adapted to the special requirements of light alloy systems,

- it contains special additives providing effective protection against the acid products of combustion found in both high speed diesel and petrol engines,

- the premixed coolant solutions provide for correct frost protection and efficient running at all temperatures.

EXPANSION BOTTLES THAT ARE NOT AN INTEGRAL PART OF THE RADIATOR

There is no heater hot water valve. There is a continuous flow of water through the heater which contributes towards engine cooling.

FILLING

Check that the drain plug or plugs are fully tightened.

Open the bleed screw or screws.

Fill the system through the expansion bottle.

Close the bleed screws as soon as coolant runs from them in a continuous jet.

Start the engine (run it at 1500 rpm).

Top up the level to overflowing, for approximately 4 minutes.

Close the bottle.

BLEEDING THE SYSTEM

Leave the engine running for approximately 10 minutes at 1500 rpm until the electric fan or fans cut in (time required for the automatic degassing of the system.)

Check that the coolant level is near the "Max" mark.

DO NOT OPEN THE BLEED SCREW OR SCREWS WITH THE ENGINE RUNNING.

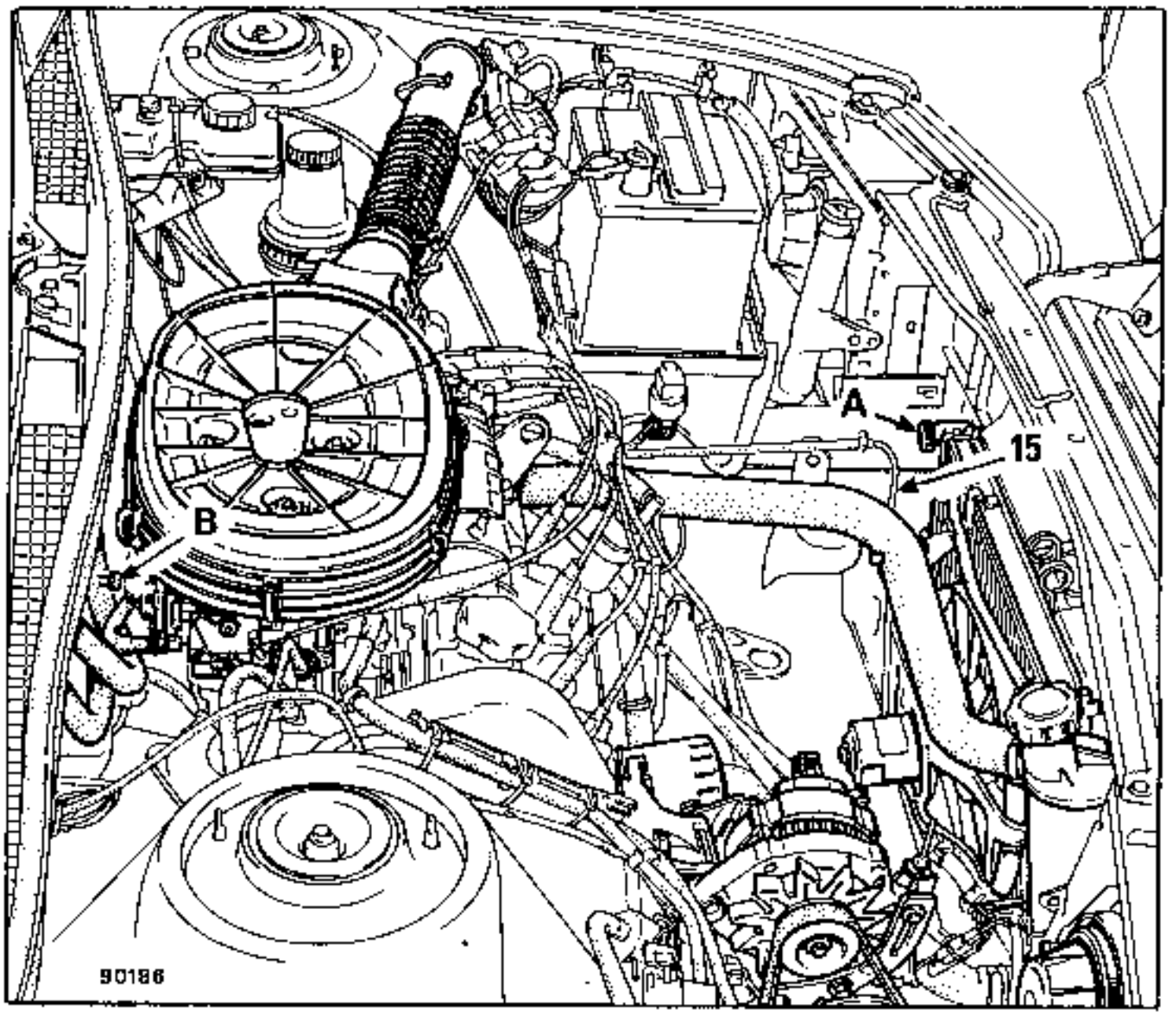
TIGHTEN THE EXPANSION BOTTLE CAP WHEN THE ENGINE IS WARM.

EXPANSION CHAMBER WHICH FORMS PART OF THE RADIATOR

There is no heater hot water valve.

The coolant flow through the heater is continuous and contributes to cooling the engine.

FILLING



Open the bleed screw (A) on the radiator.

Open the bleed screw (B) on the heater hose.

Disconnect the syphon pipe from the radiator and lay it flat (15).

Gradually fill the system through the expansion chamber.

Close the bleed screws (A) and (B) as soon as there is a continuous flow of coolant from them.

Start the engine (1500 rpm).

Depress the accelerator 3 or 4 times (3 to 4000 rpm), then top up the level until it overflows the expansion chamber for approximately 4 minutes.

Close the expansion chamber. Return the syphon pipe to its original position.

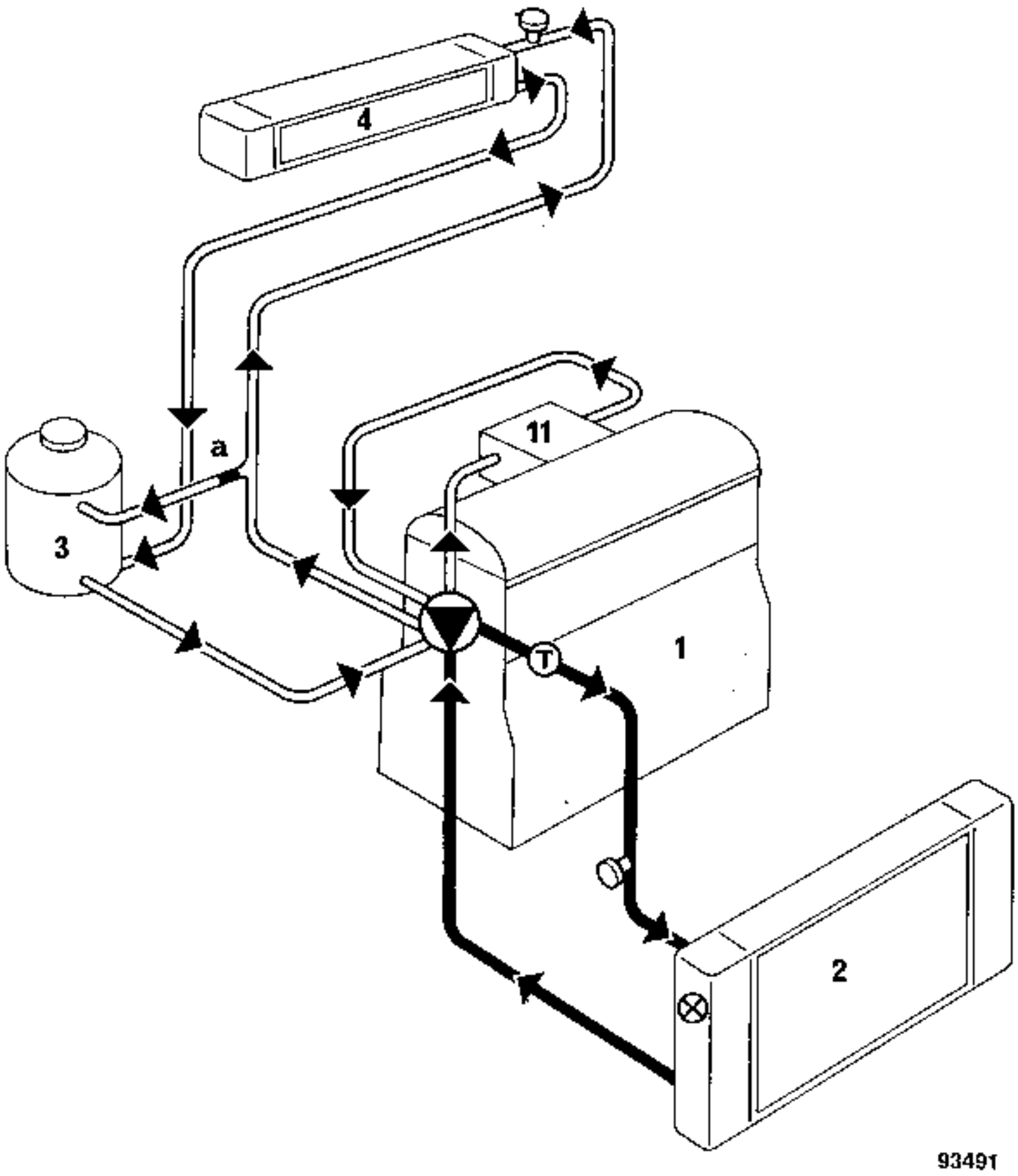
Allow the engine to run for 10 minutes at 1500 rpm until the electric fan cuts in at least three times:
(this is necessary to degas the system automatically).

Check that the coolant level is around the "max" mark (it is acceptable for it to be higher than this).

DO NOT OPEN THE BLEED SCREW OR SCREWS WHILST THE ENGINE IS RUNNING.

RETIGHTEN THE EXPANSION CHAMBER CAP WHEN THE ENGINE IS WARM.

Phases I and II



1. Engine
2. Radiator
3. Expansion bottle
4. Heater
11. Carburettor base heater
a. 3mm Ø jet

Coolant pump

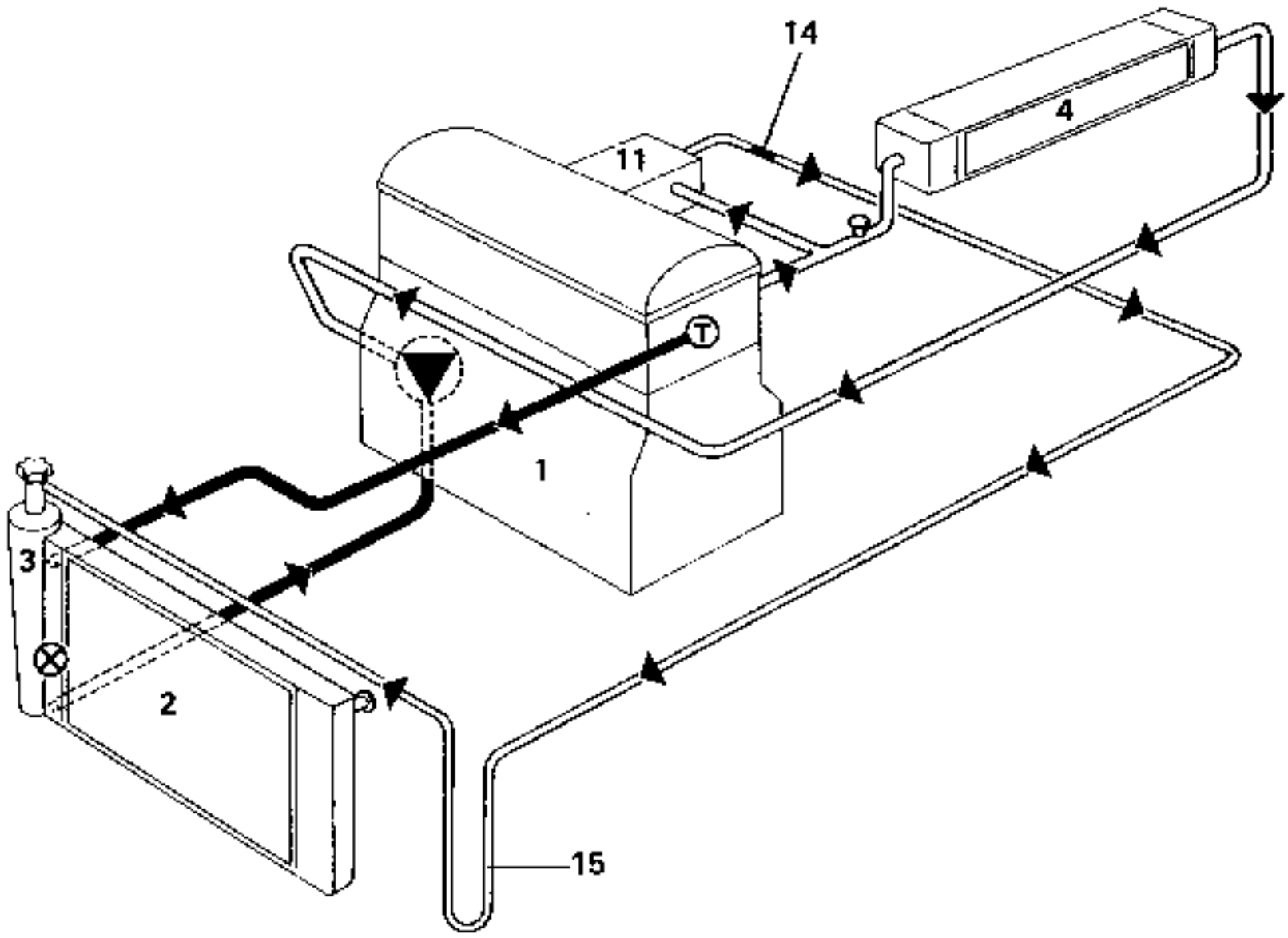
T Thermostat

Bleed screw

Temperature switch

The valve on the expansion bottle is set at 1.2 bars

Phase I



90162

1. Engine
2. Radiator
3. Hot bottle with permanent degassing
4. Heater
11. Carburettor base heater
14. 3.5mm Ø jet
15. Siphon

Coolant pump

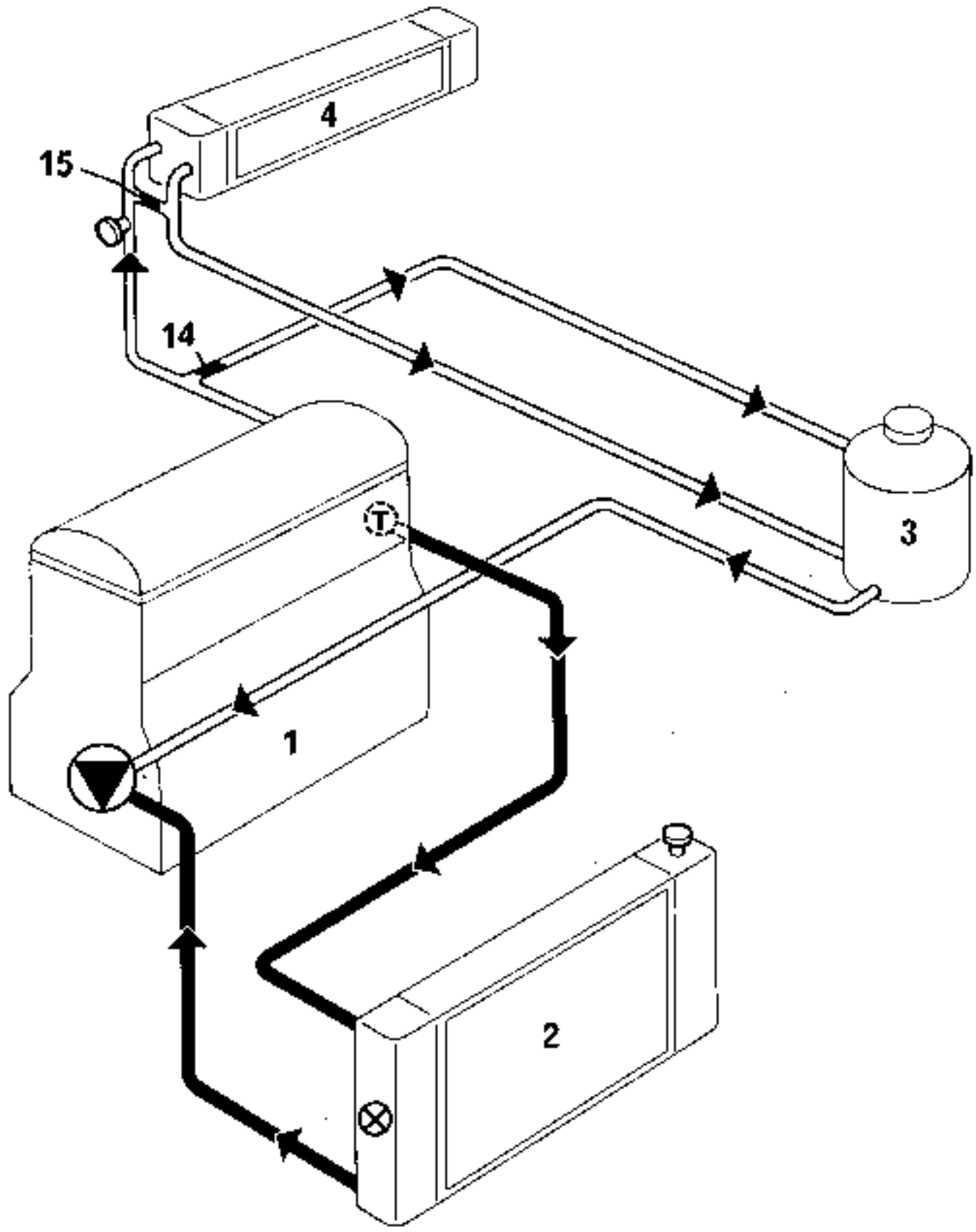
Thermostat

Bleed screw

Temperature switch

The valve on the expansion bottle is set at 1.2 bars

Phase II
- temperate climate 76HP
- emission control 75HP



93485

1. Engine
2. Radiator
3. Hot bottle with permanent degassing
4. Heater
14. 3mm Ø jet
15. 8mm Ø bypass jet

Coolant pump

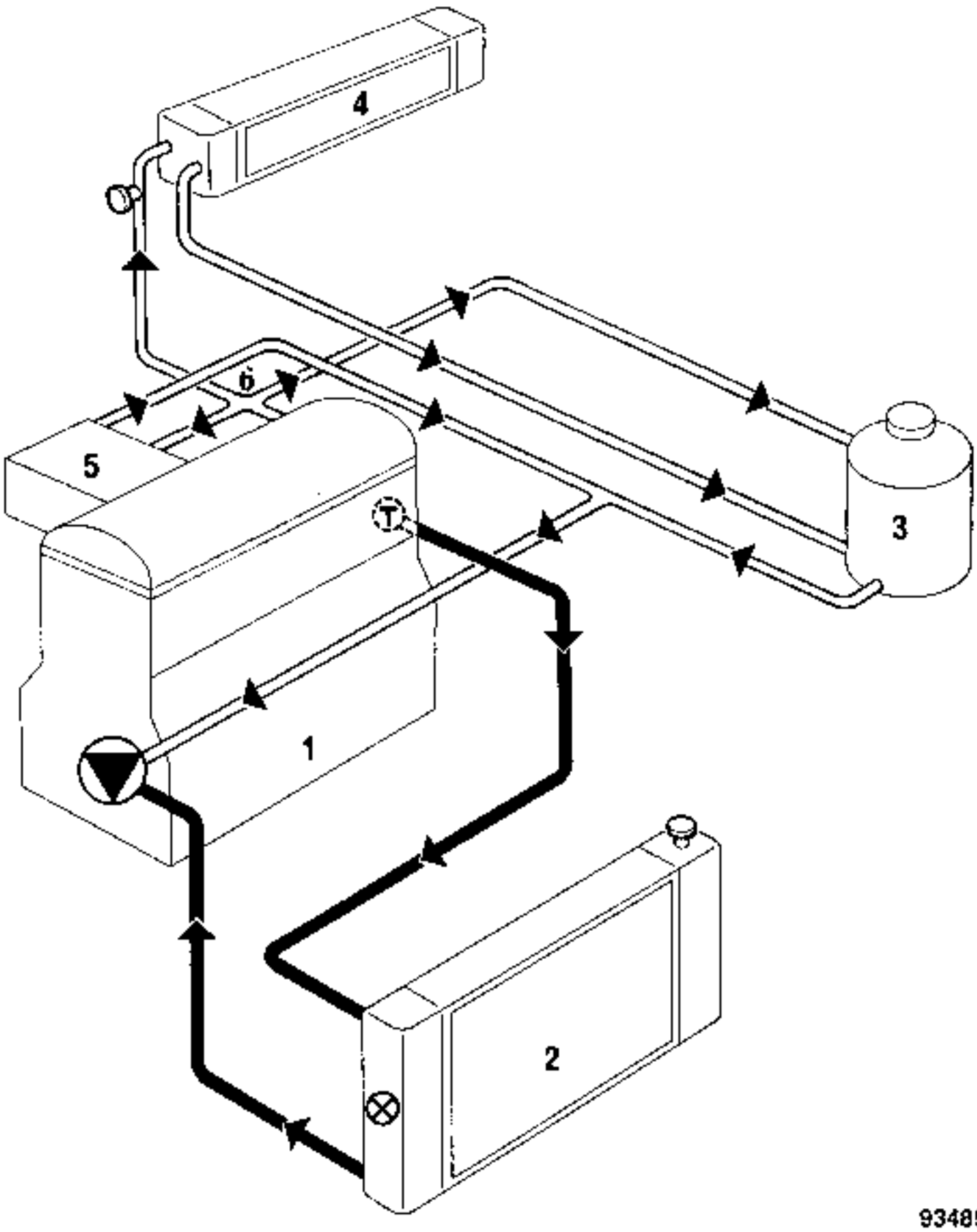
Thermostat

Bleed screw

Temperature switch

The valve on the expansion bottle is set at 1.2 bars

Phase II
- emission control 90HP



93485. 1

1. Engine
2. Radiator
3. Hot bottle with permanent degassing
4. Heater
5. Manifold
6. 4 way union
   Jets Ø 16/10/10/3mm

Coolant pump

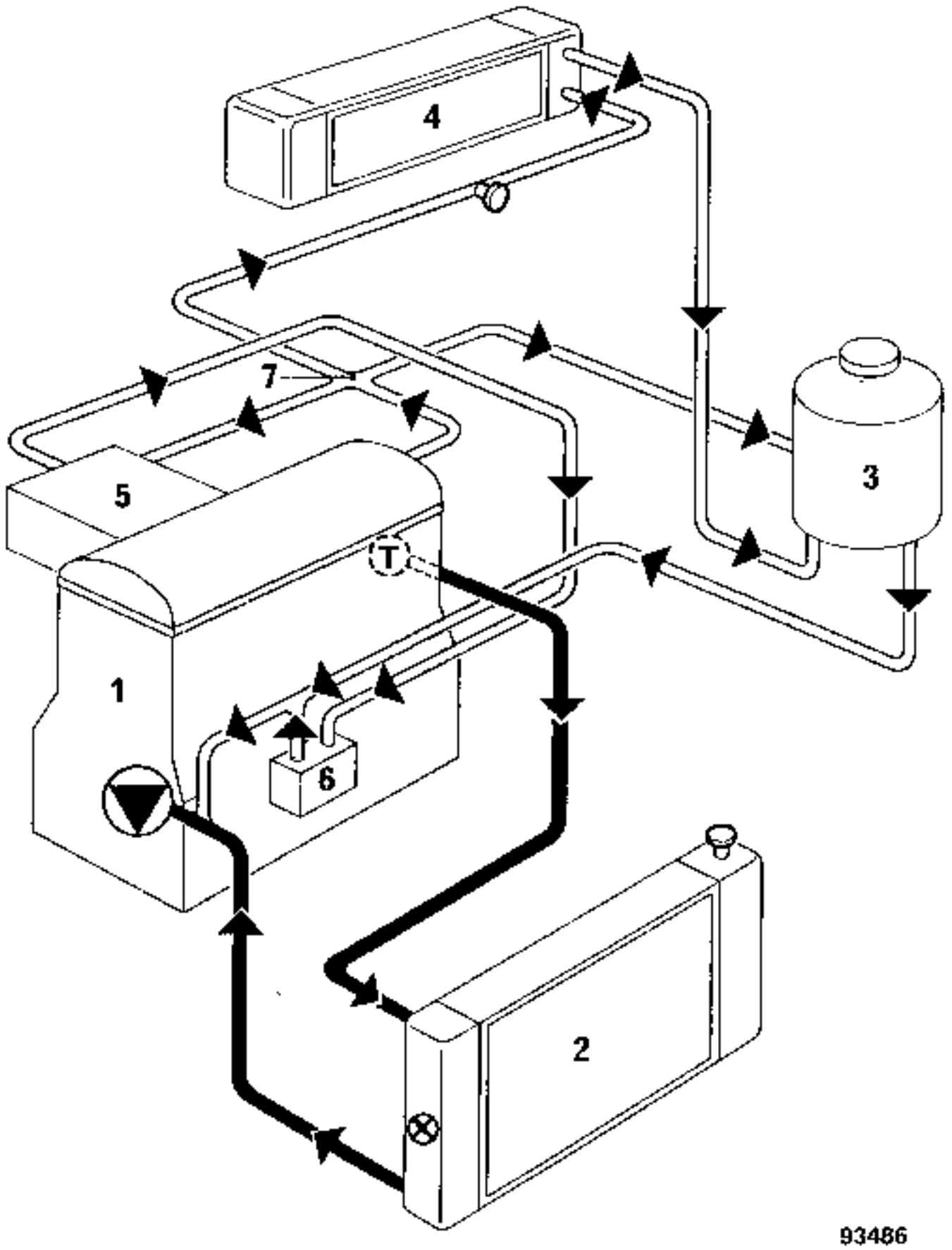
Thermostat

Bleed screw

Temperature switch

The valve on the expansion bottle is set at 1.6 bars

Phase II
- hot climates, without air conditioning



93486

1. Engine
2. Radiator
3. "Hot" bottle
4. Heater
5. Manifold
6. Modine (oil cooler)
7. 4 way union
   Jets Ø 16/10/10/3mm

Coolant pump

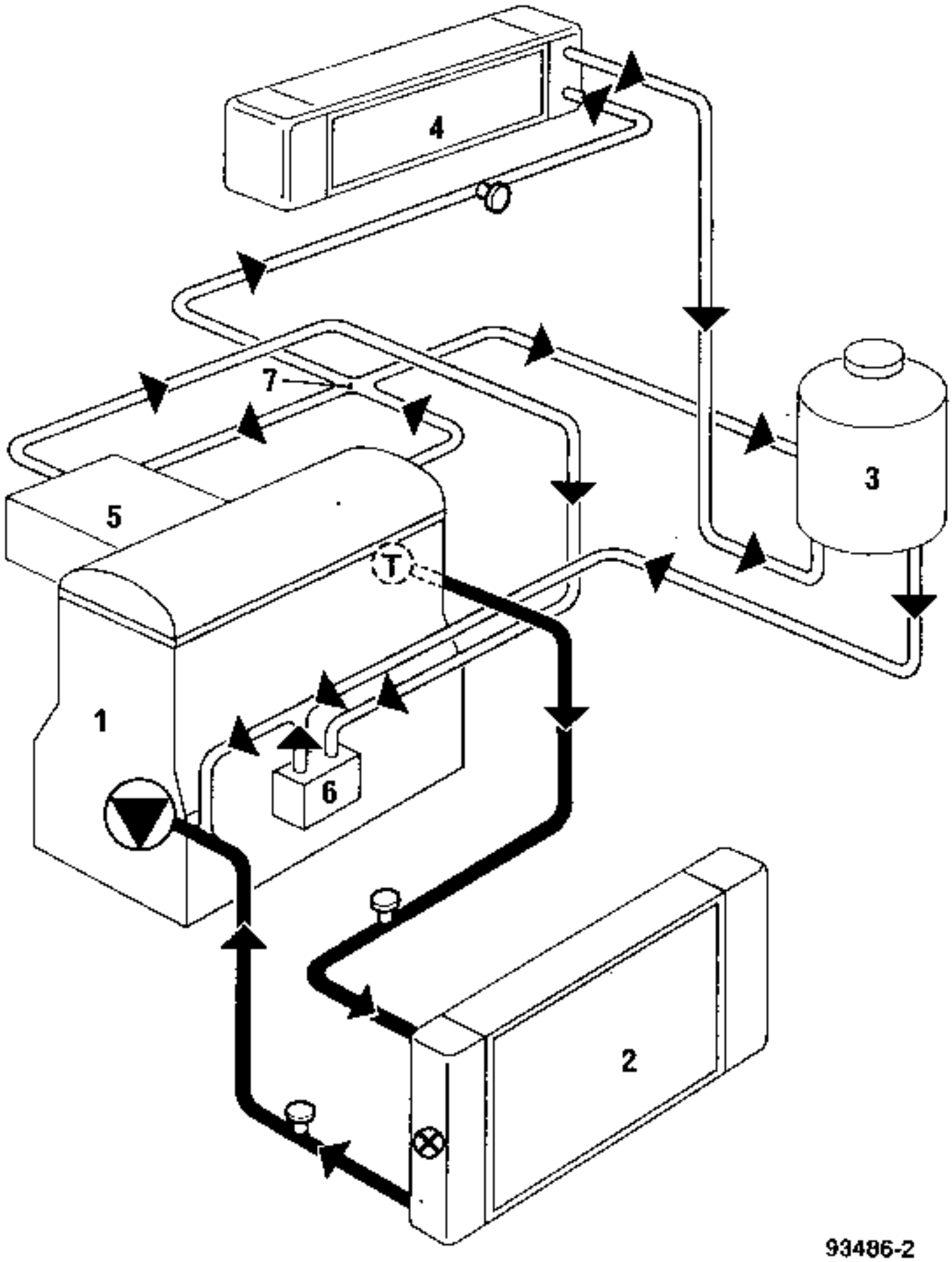
Thermostat

Bleed screw

Temperature switch

The valve on the expansion bottle is set at 1,6 bars

Phase II
- hot climates, with air conditioning



93486-2

1. Engine
2. Radiator
3. "Hot" bottle
4. Heater
5. Manifold
6. Modine (oil cooler)
7. 4 way union
   Jets Ø 16/10/10/3mm

Coolant pump

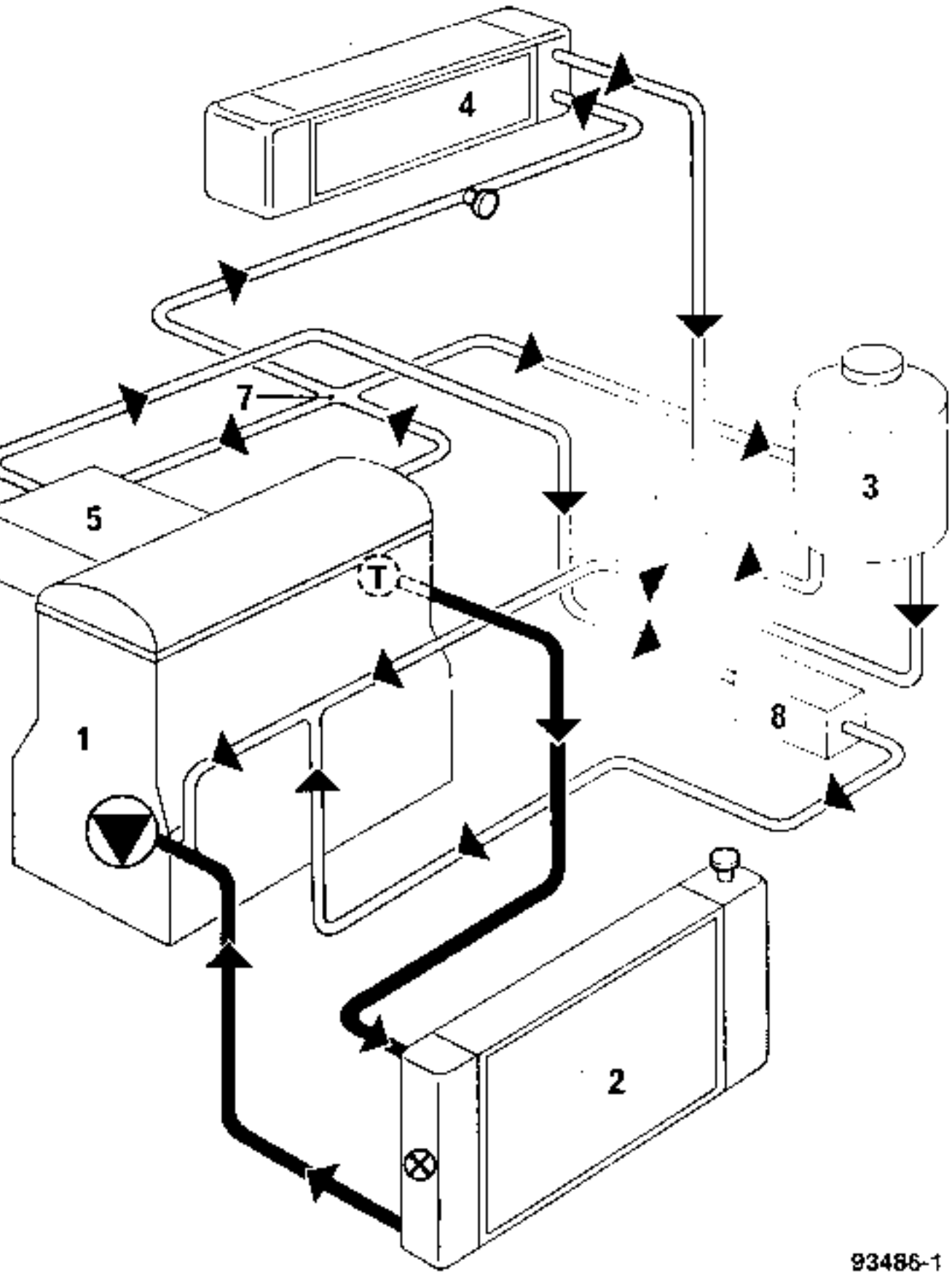
T Thermostat

Bleed screw

Temperature switch

The valve on the expansion bottle is set at 1.6 bars

Phase II
- Automatic transmission, temperate climates



1. Engine
2. Radiator
3. "Hot" bottle
4. Heater
5. Manifold
7. 4 way union
   Jets Ø 16/10/10/3mm
8. Aut. trans. oil cooler

Coolant pump

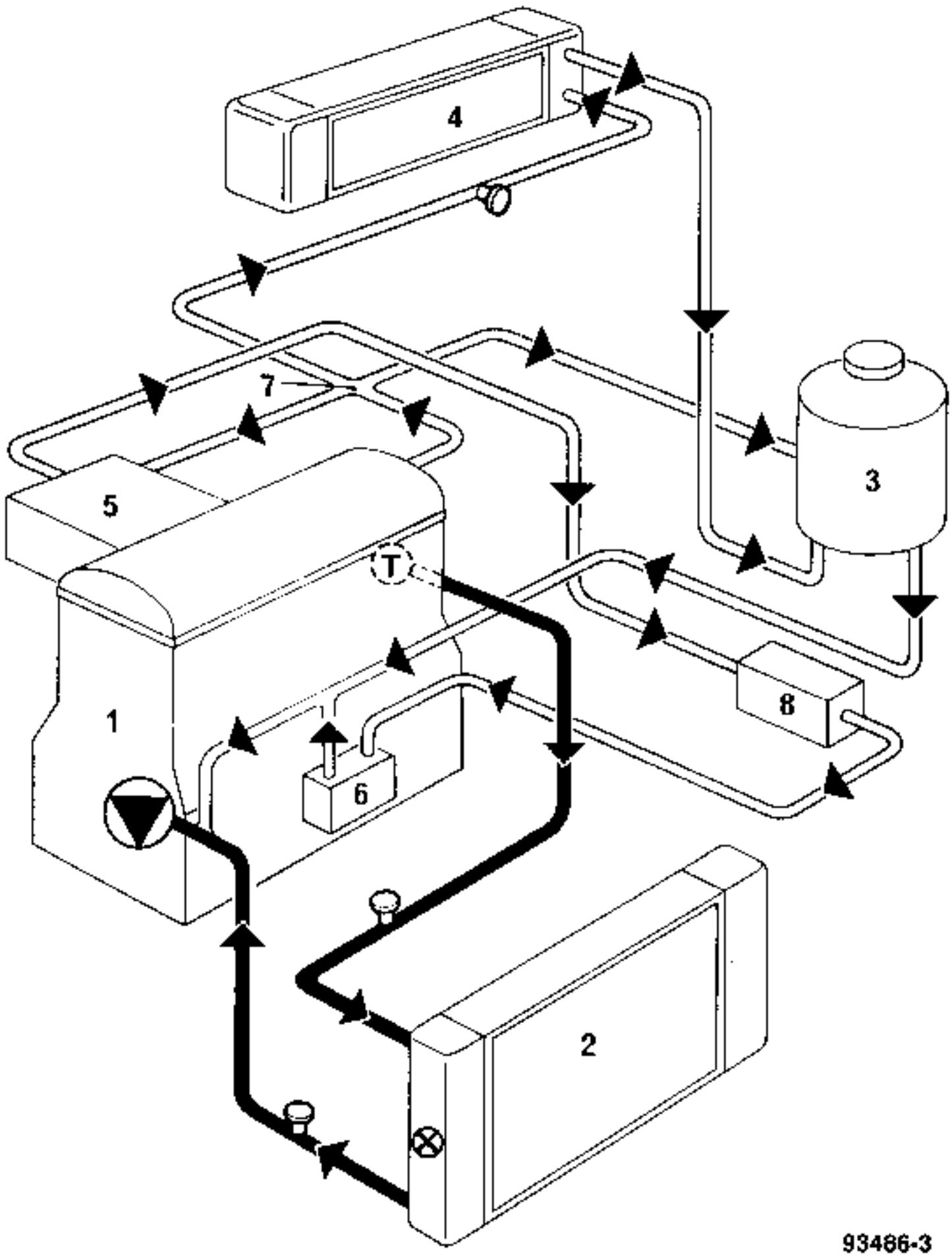
T Thermostat

Bleed screw

Temperature switch

The valve on the expansion bottle is set at 1.2 bars

Phase II
- automatic transmission, hot climates



1. Engine
2. Radiator
3. "Hot" bottle
4. Heater
5. Manifold
6. Modine (oil cooler)
7. 4 way union
   Jets Ø 16/10/10/3mm
8. Aut. trans. oil cooler

Coolant pump

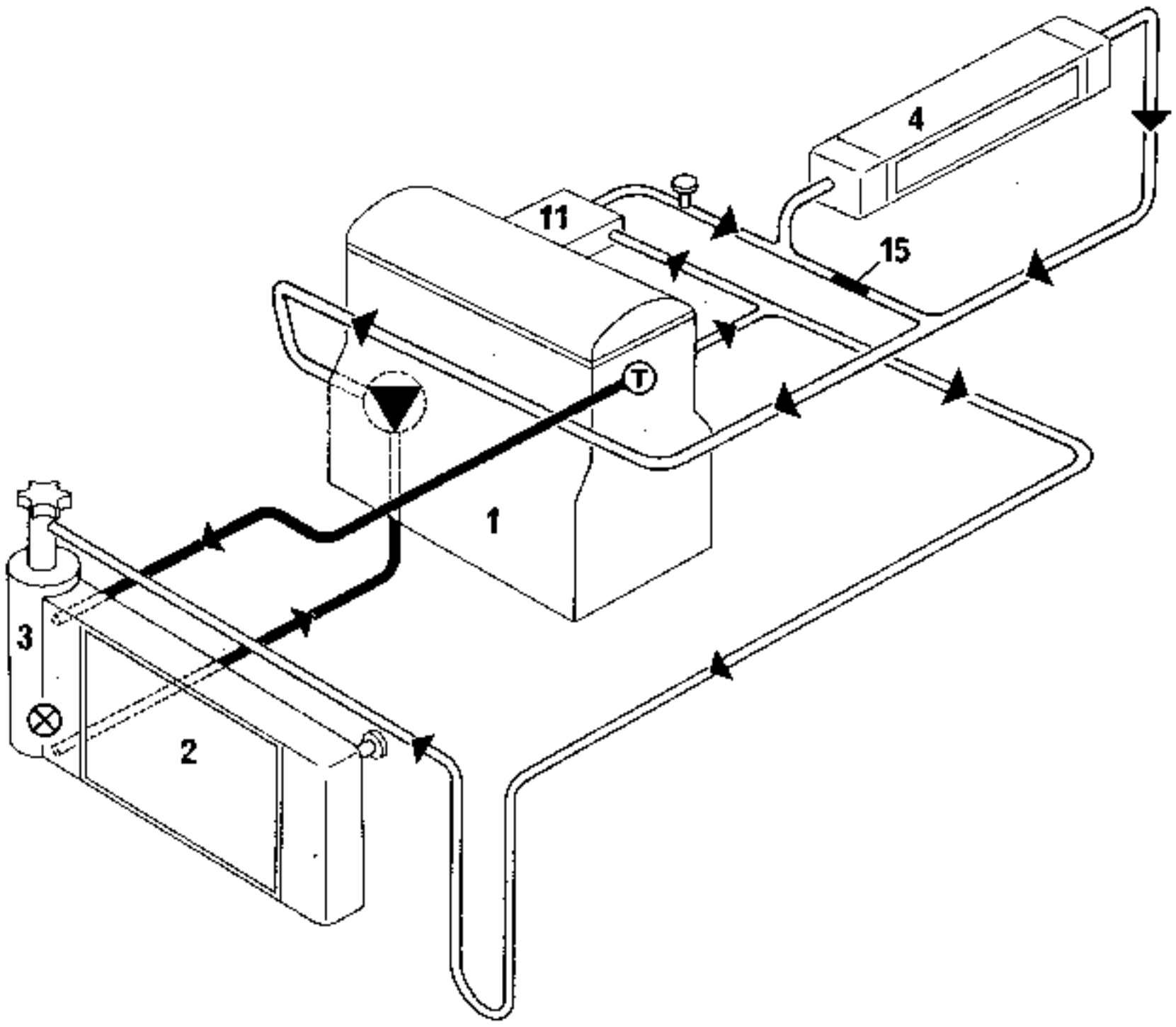
Thermostat

Bleed screw

Temperature switch

The valve on the expansion bottle is set at 1.6 bars

Phases I and II
- without air conditioning



93559

1. Engine
2. Radiator
3. "Hot" bottle with permanent degassing
4. Heater
11. Carburettor base heater
15. Bypass

Coolant pump

Thermostat

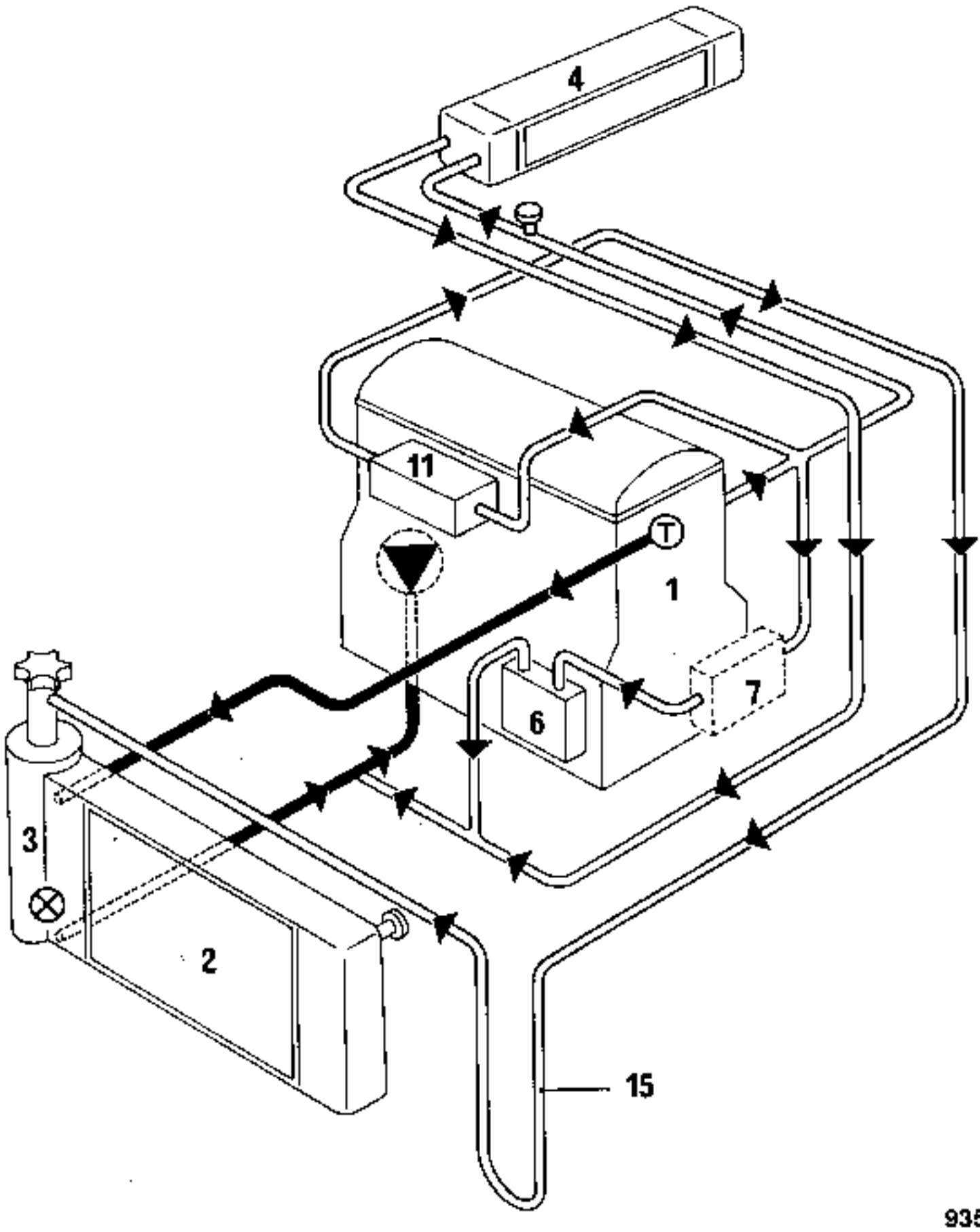
Bleed screw

Temperature switch

The valve on the expansion bottle is set at 1.2 bars

Phases I and II
- with and without air conditioning

Phase II
- automatic transmission without air conditioning, in dotted lines



1. Engine
2. Radiator
3. "Hot" bottle with permanent degassing
4. Heater
6. Modine (oil cooler)
7. Aut. trans. oil cooler
11. Throttle unit
15. Siphon

Coolant pump

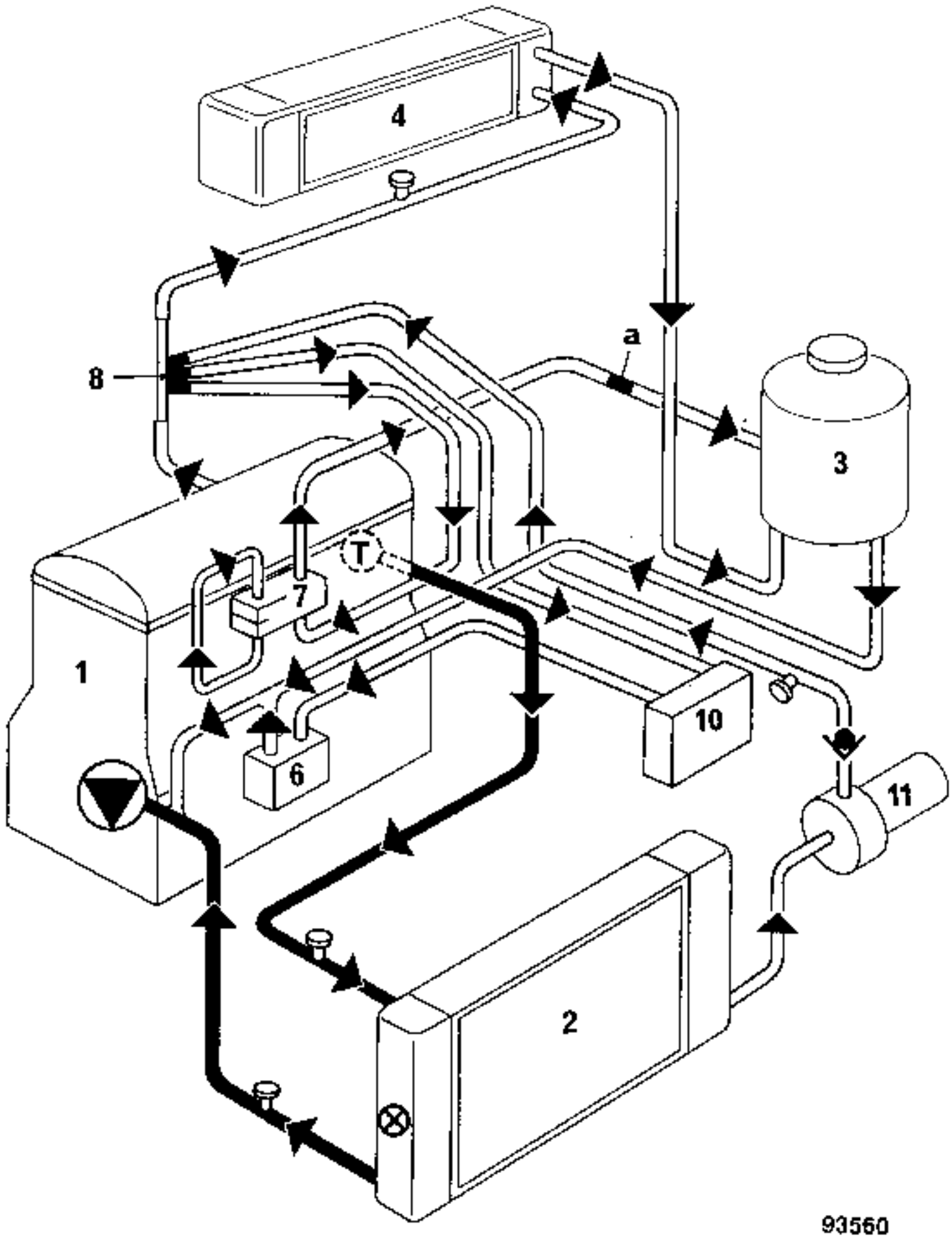
T Thermostat

Bleed screw

Temperature switch

The valve on the expansion bottle is set at 1.2 bars

Phase II
- automatic transmission, without air conditioning



1. Engine
2. Radiator
3. "Hot" bottle
4. Heater
6. Modine (oil cooler)
7. Throttle unit
8. 5 way union
   Jets Ø 16/10/10/6/5.5mm
10. Aut. trans. oil cooler
11. Electric pump
a. 5.5mm Ø jet

Coolant pump

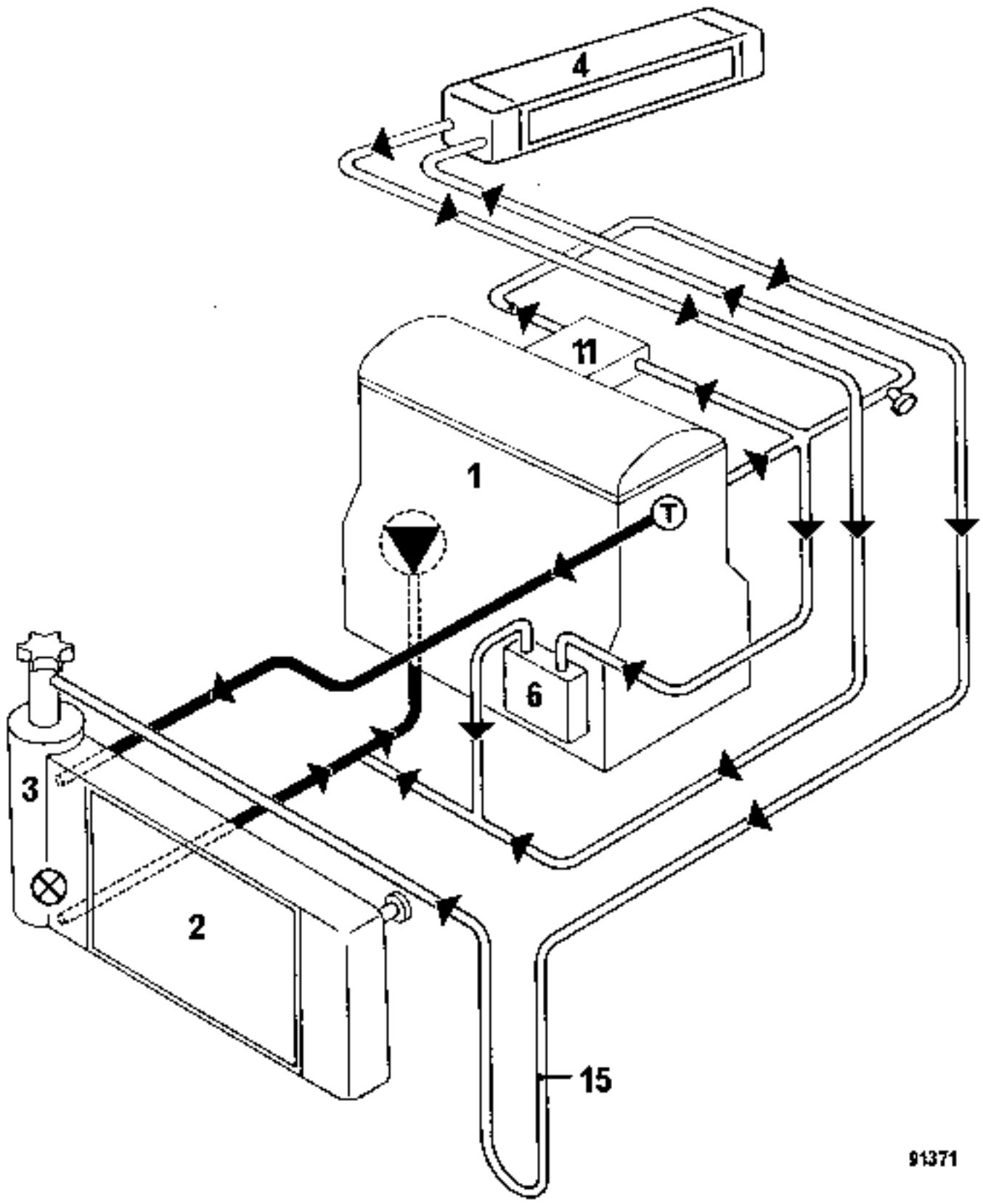
T Thermostat

Bleed screw (4)

Temperature switch

The valve on the expansion bottle is set at 1.2 bars

Phase I
- without air conditioning



1. Engine
2. Radiator
3. "Hot" bottle with permanent degassing
4. Heater
6. Modine (oil cooler)
11. Carburettor base heater
15. Siphon

Coolant pump

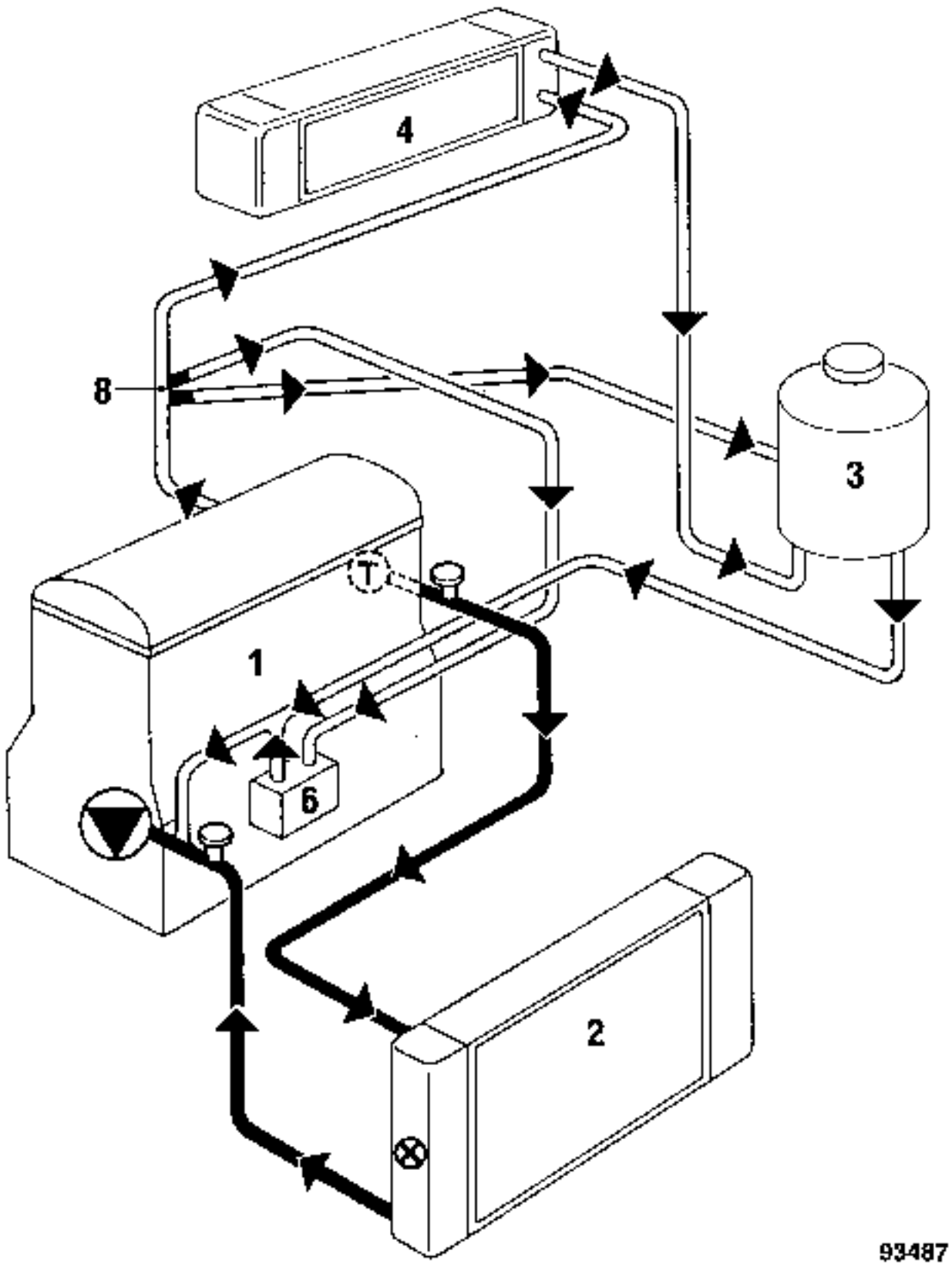
T Thermostat

Bleed screw

Temperature switch

The valve on the expansion bottle is set at 1.2 bars

Phase I
- with air conditioning



1. Engine
2. Radiator
3. "Hot" bottle
4. Heater
5. Modine (oil cooler)
8. 4 way union
   Jets Ø 16/10/10/3mm

Coolant pump

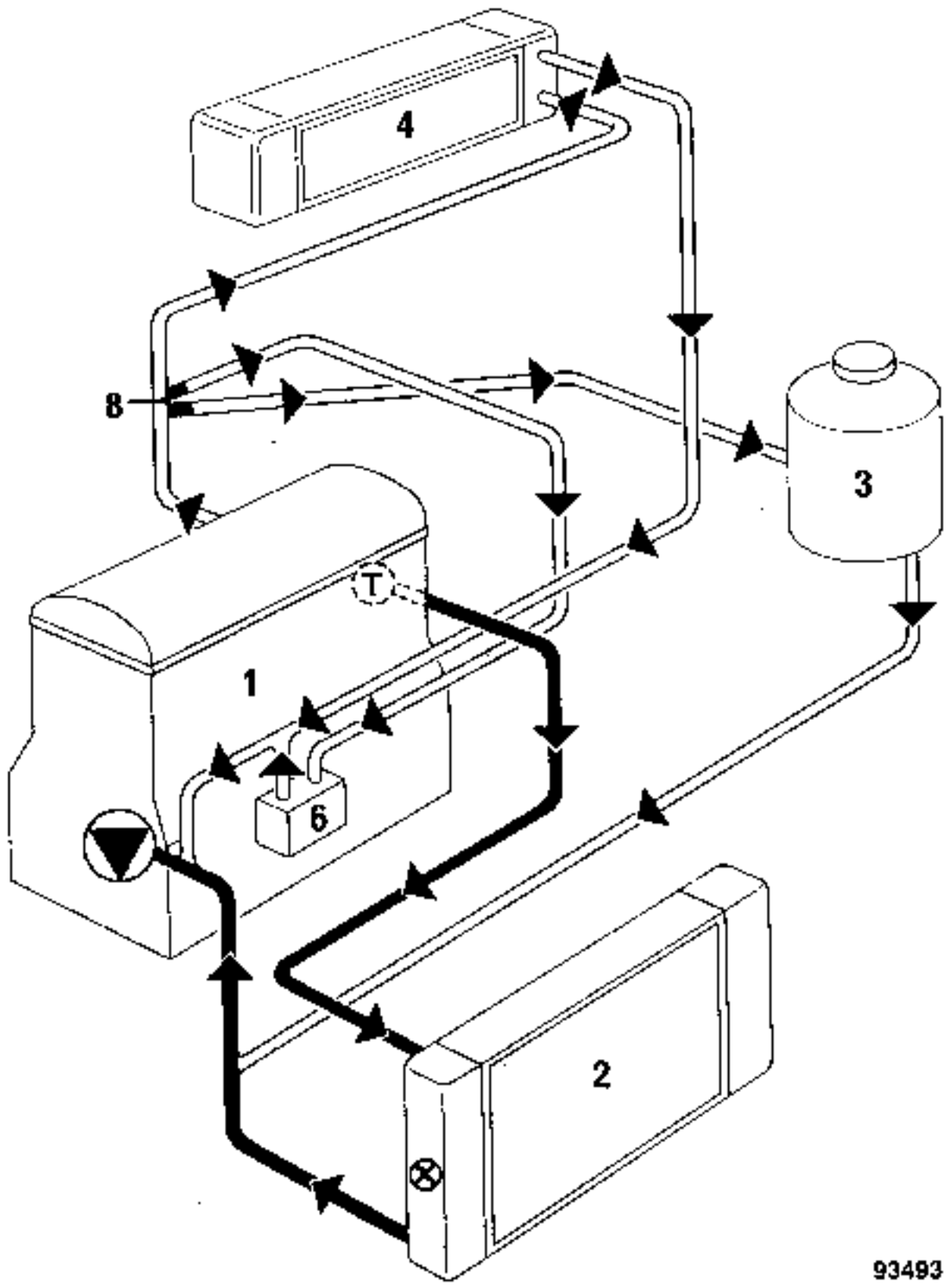
Thermostat

Bleed screw

Temperature switch

The valve on the expansion bottle is set at 1.2 bars

Phase II



1. Engine
2. Radiator
3. "Hot" bottle
4. Heater
6. Modine (oil cooler)
8. 4 way union
   Jets Ø 16/10/10/3mm

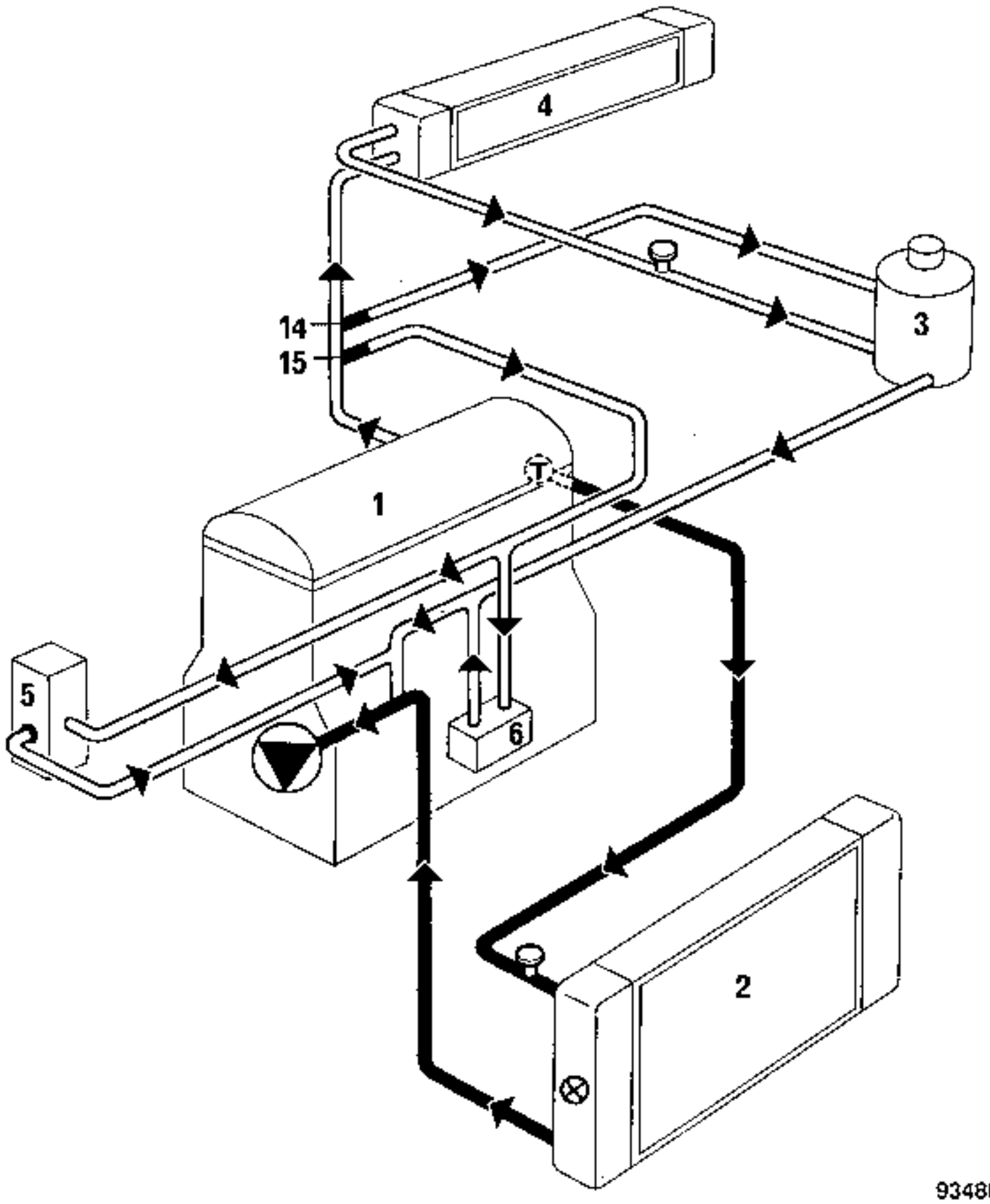
Coolant pump

Thermostat

Bleed screw

Temperature switch

The valve on the expansion bottle is set at 1.2 bars



1. Engine
2. Radiator
3. "Hot" bottle with permanent degassing
4. Heater
5. Fuel heater
6. Modine (oil cooler)
14. 3mm Ø jet
15. 8mm Ø jet

Coolant pump

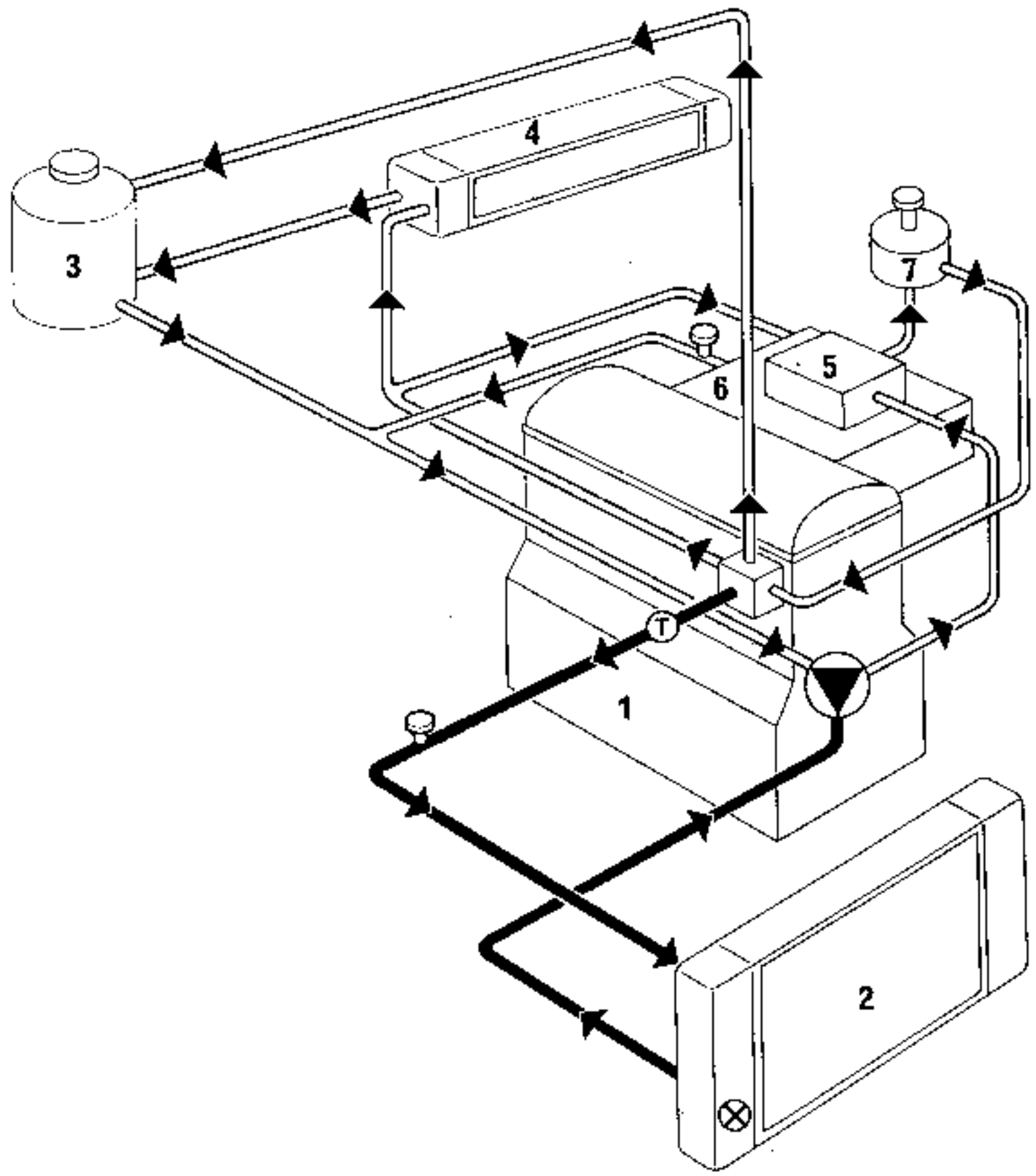
Thermostat

Bleed screw

Temperature switch

The valve on the expansion bottle is set at 1.2 bars

Phases I and II
- with and without air conditioning



93492

1. Engine
2. Radiator
3. "Hot" bottle with permanent degassing
4. Heater
5. Carburettor base heater
6. Manifold heater
7. Choke

Coolant pump

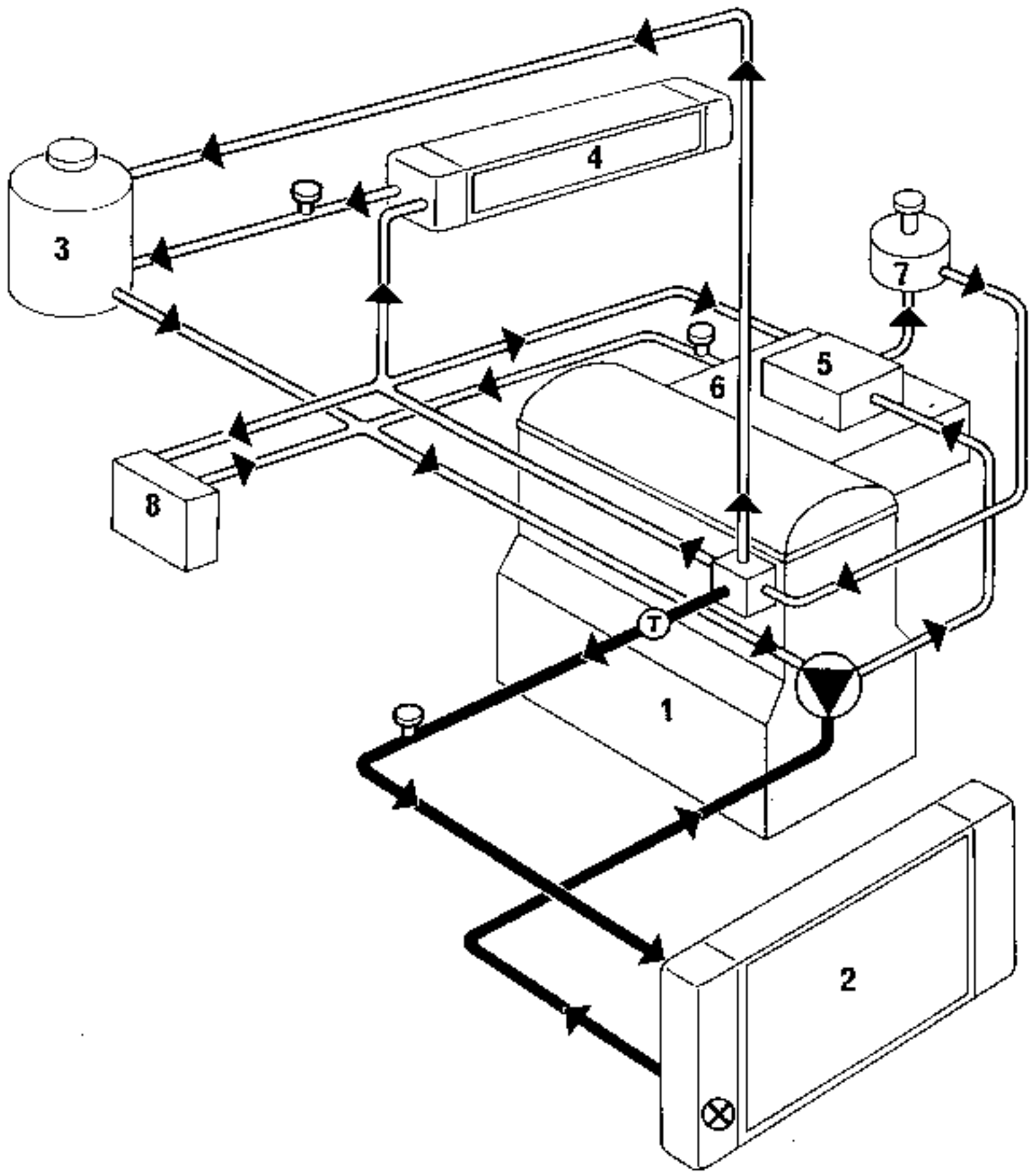
Thermostat

Bleed screw

Temperature switch

The valve on the expansion bottle is set at 1.2 bars

Phases I and II
- automatic transmission



93525

1. Engine
2. Radiator
3. "Hot" bottle with permanent degassing
4. Heater
5. Carburettor base heater
6. Manifold heater
7. Choke
8. Aut. trans. oil cooler

Coolant pump

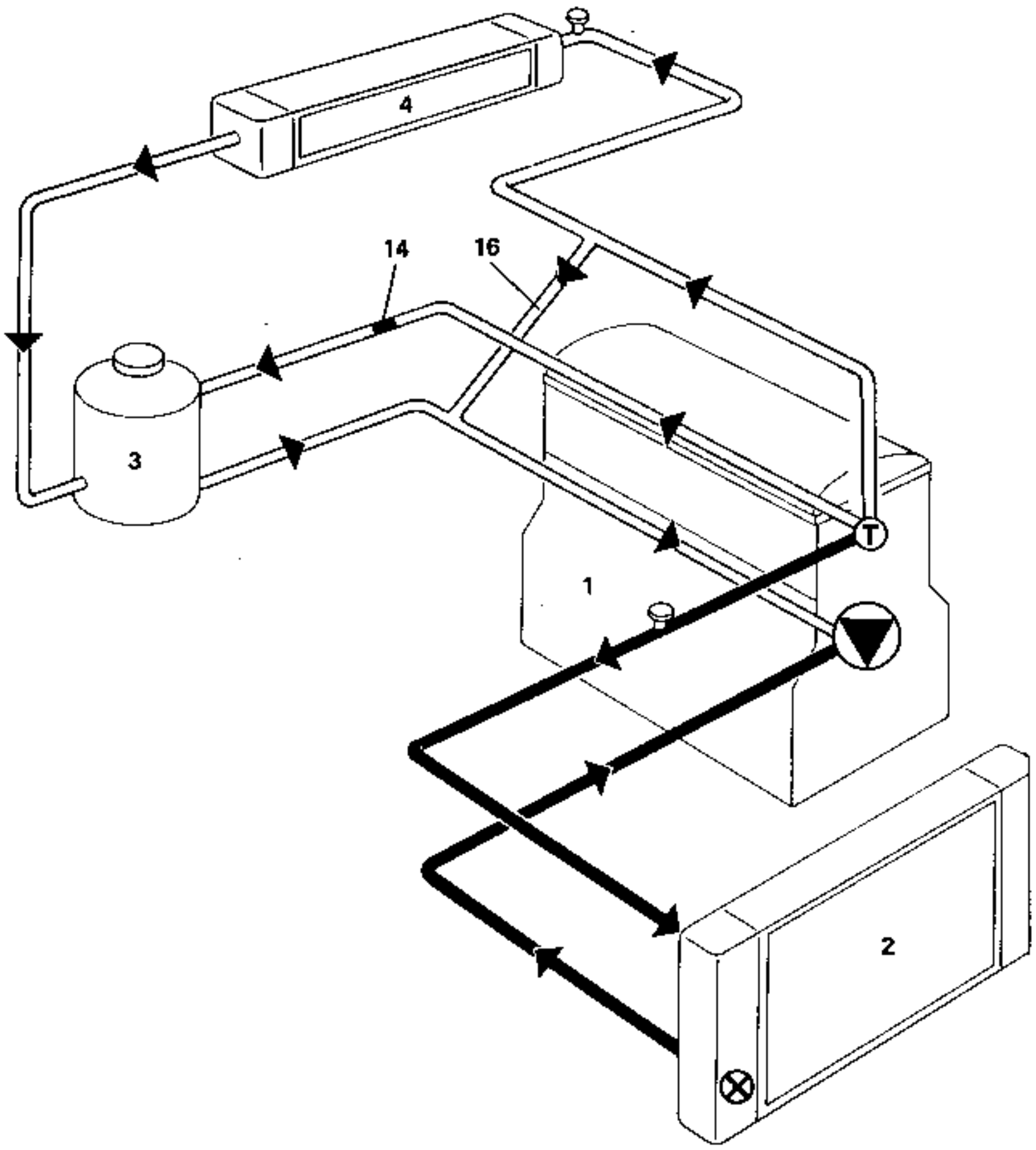
Thermostat

Bleed screw

Temperature switch

The valve on the expansion bottle is set at 1.2 bars

Phases I and **II**
- J7R engine with air conditioning
- J7T engine without air conditioning



1. Engine
2. Radiator
3. "Hot" bottle with permanent degassing
4. Heater
14. 3mm Ø jet
16. Bypass

Coolant pump

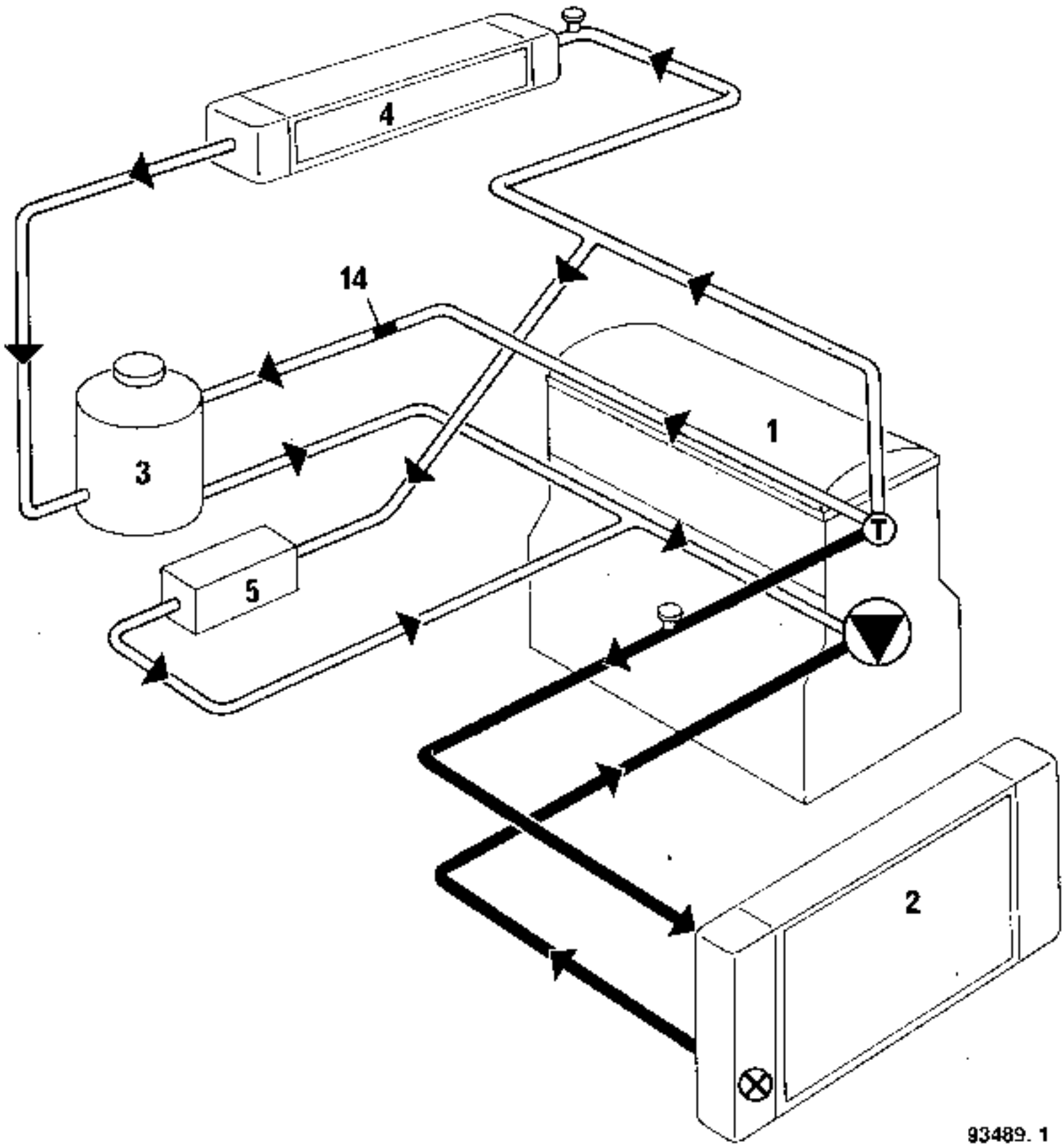
Thermostat

Bleed screw

Temperature switch

The valve on the expansion bottle is set at 1.2 bars

Phase II
- J7R engine, aut. trans. with air conditioning
- J7T engine, aut. trans. without air conditioning



1. Engine
2. Radiator
3. "Hot" bottle with permanent degassing
4. Heater
5. Aut. trans. oil cooler
14. 3mm Ø jet

Coolant pump

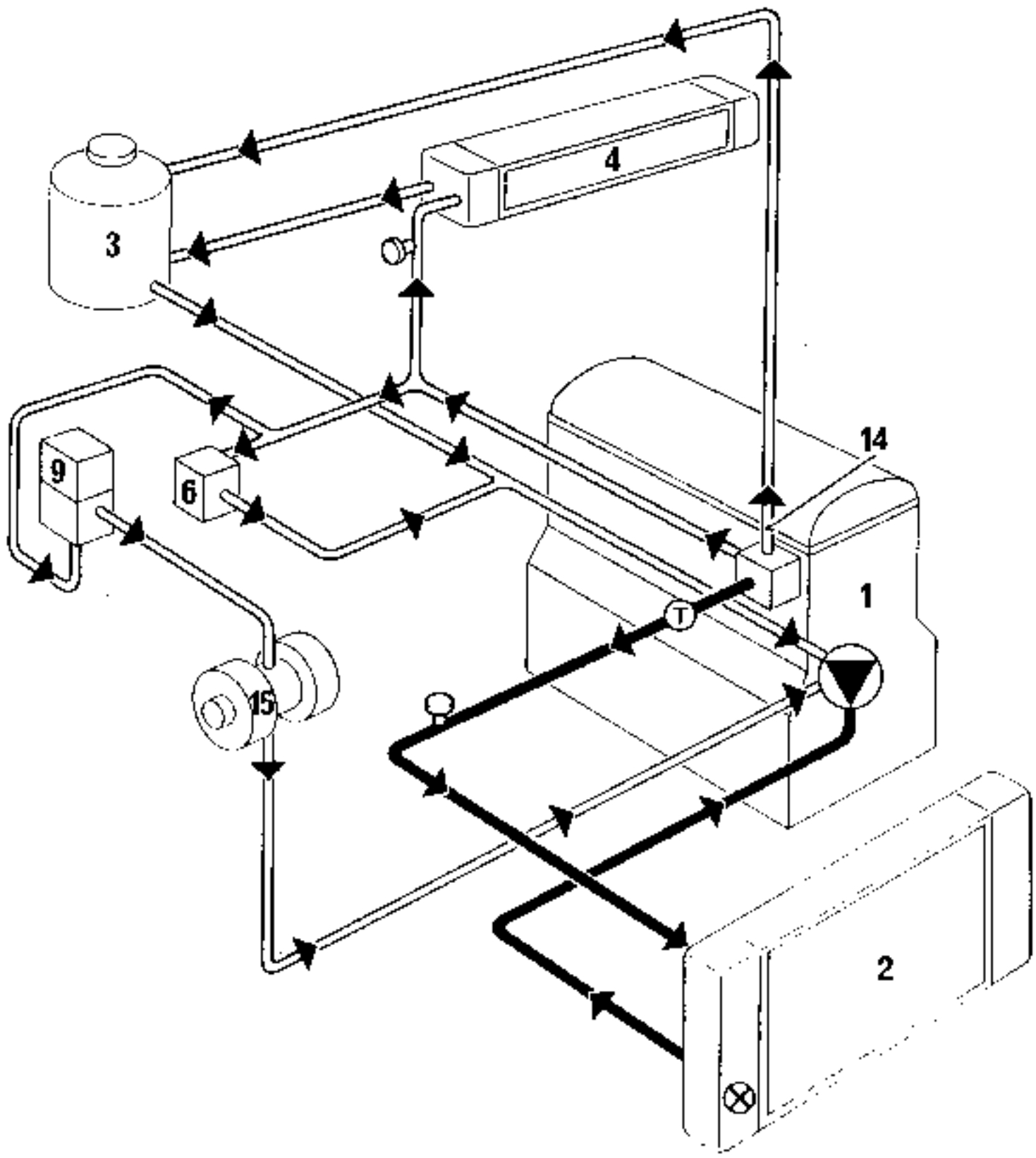
T Thermostat

Bleed screw

Temperature switch

The valve on the expansion bottle is set at 1.2 bars

Phases I and II



1. Engine
2. Radiator
3. "Hot" bottle with permanent degassing
4. Heater
6. Modine (oil cooler)
9. Electric coolant pump
14. 3mm Ø jet
15. Turbocharger

Coolant pump

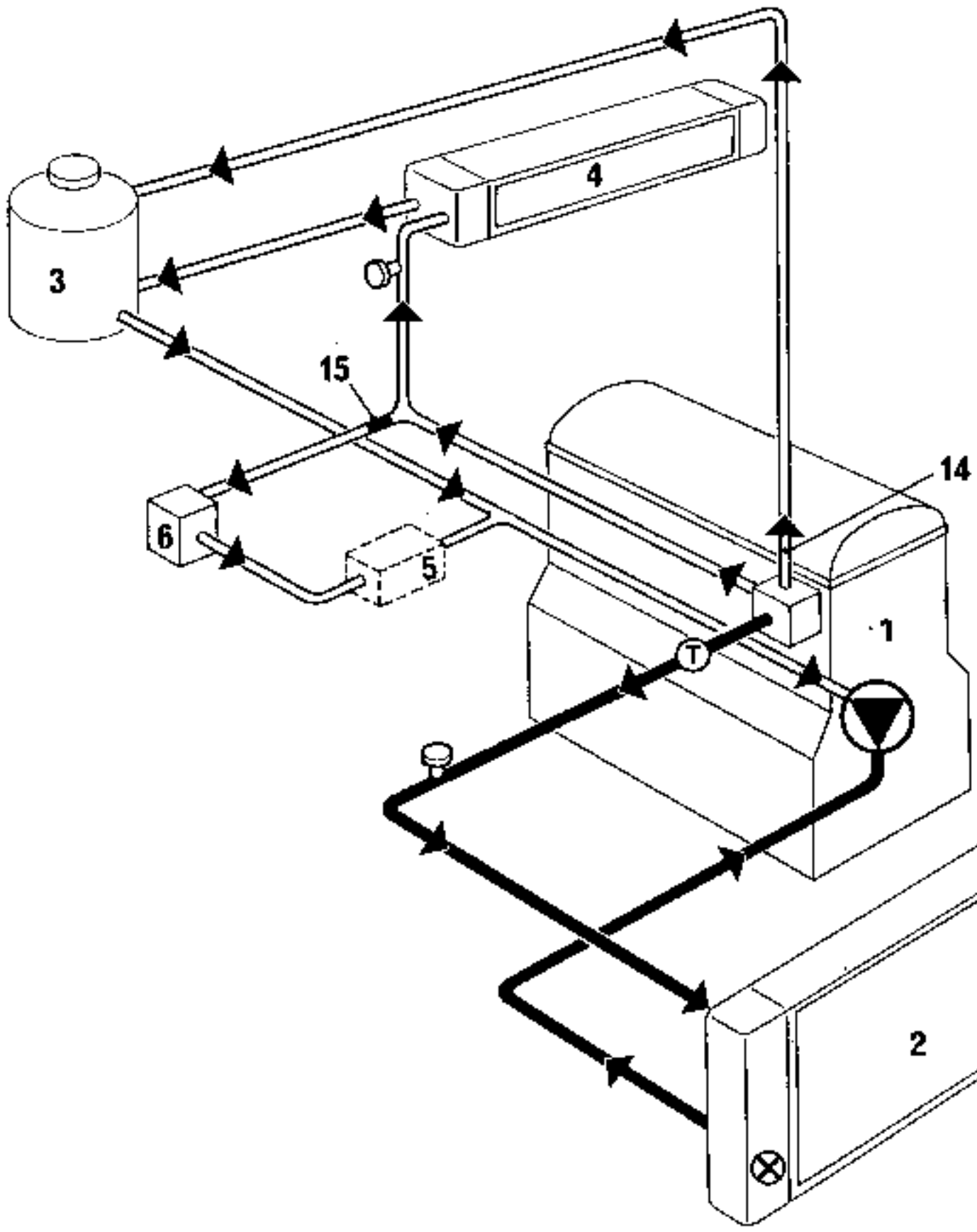
T Thermostat

Bleed screw

Temperature switch

The valve on the expansion bottle is set at 1.6 bars

Without air conditioning
Automatic transmission shown in dotted lines



1. Engine
2. Radiator
3. "Hot" bottle with permanent degassing
4. Heater
5. Aut. trans. oil cooler
6. Modine (oil cooler)
14. 3mm Ø jet
15. 8mm Ø jet

Coolant pump

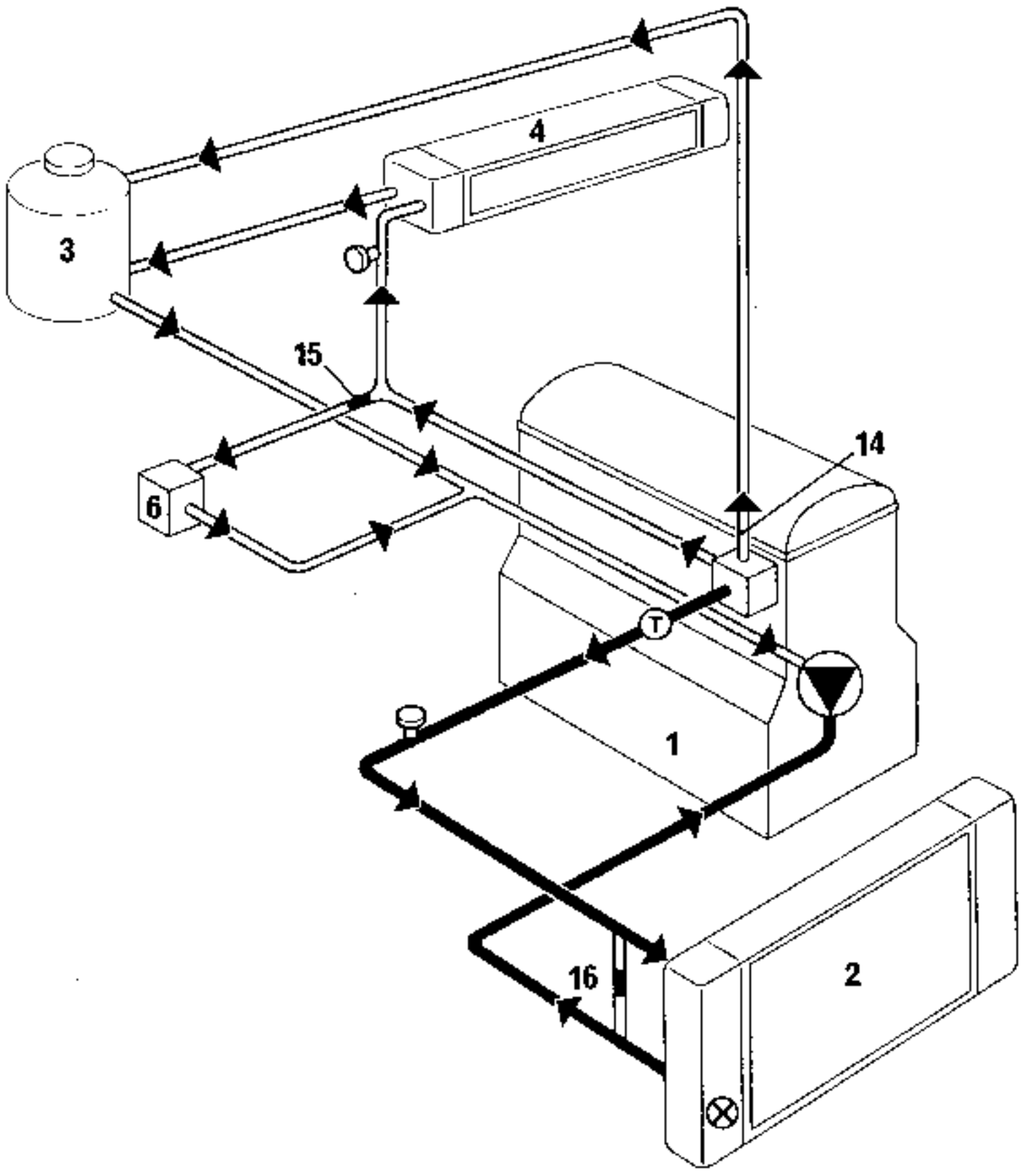
T Thermostat

Bleed screw

Temperature switch

The valve on the expansion bottle is set at 1.6 bars

With air conditioning



93490. 1

1. Engine
2. Radiator
3. "Hot" bottle with permanent degassing
4. Heater
6. Modine (oil cooler)
14. 3mm Ø jet
15. 8mm Ø jet
16. 10mm Ø bypass

Coolant pump

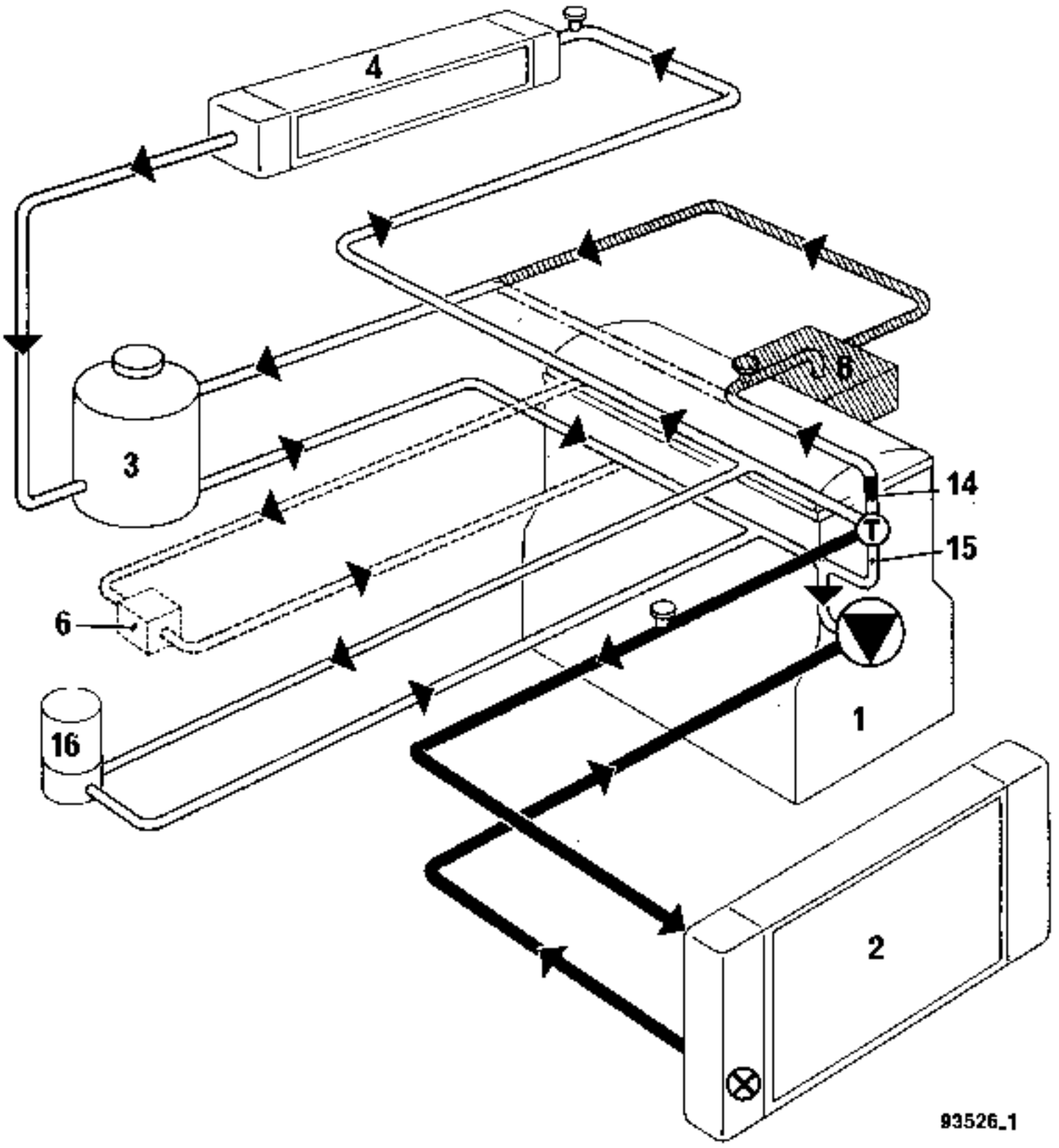
Thermostat

Bleed screw

Temperature switch

The valve on the expansion bottle is set at 1.6 bars

Phase I
- with and without air conditioning



Flow through oil cooler, coolant pump (AC)

Flow through Bosch cold starting system

Flow with Roto-Diesel pump

1. Engine
2. Radiator
3. "Hot" bottle with permanent degassing
4. Heater
6. Oil cooler for diesel turbo engines
8. Bosch cold starting system
14. 3.5mm Ø jet
15. Circuit P (see operation of thermostat)
16. Fuel heater

Coolant pump

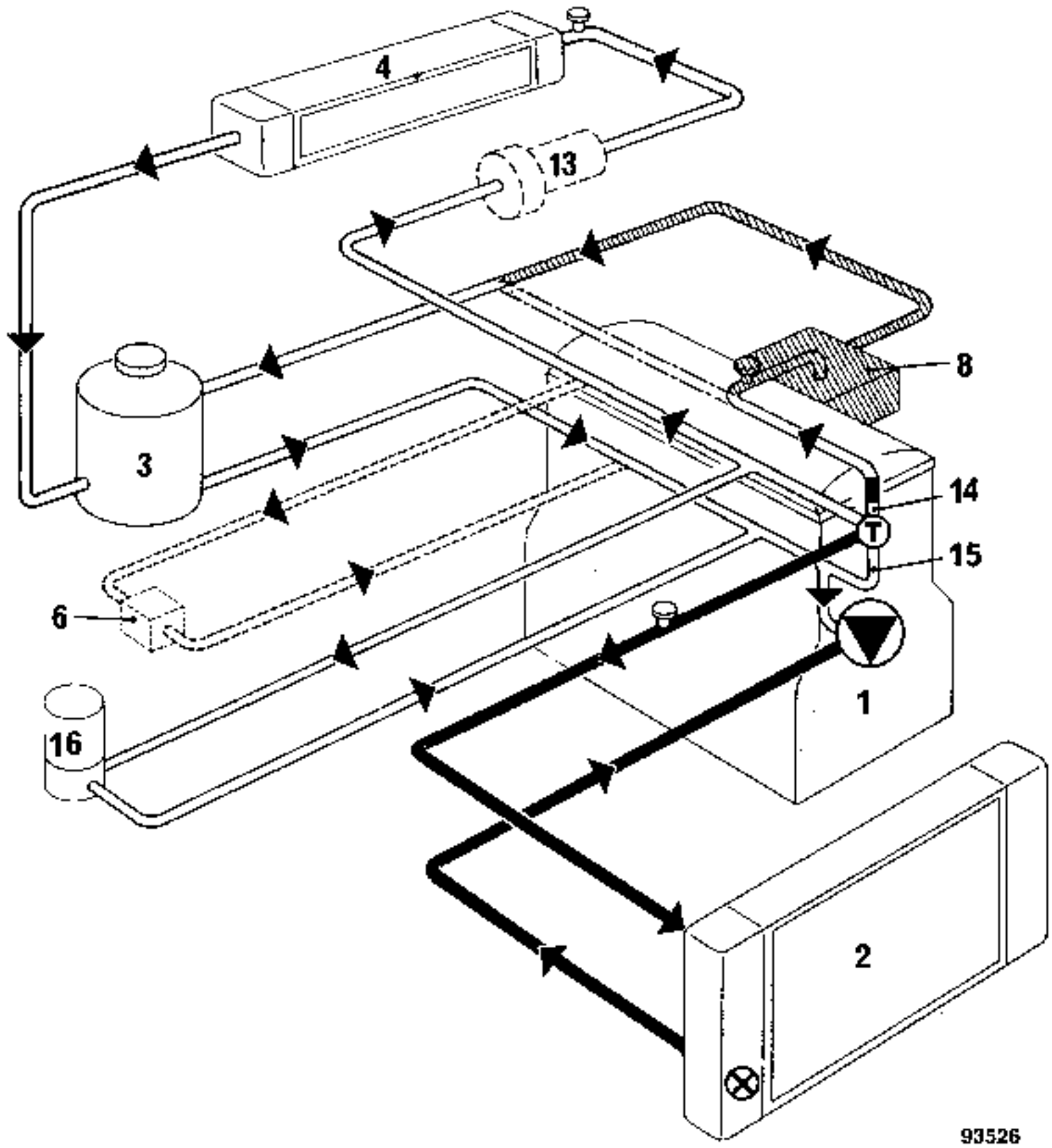
Double acting thermostat

Bleed screws of which there are: 2 (Roto diesel pump)
3 (Bosch pump)

Temperature switch

The valve on the expansion bottle is set at 1.2 bars

Phase II
- without air conditioning



Flow through oil cooler

Flow through Bosch cold starting system

Flow with Roto-diesel pump

1. Engine
2. Radiator
3. "Hot" bottle with permanent degassing
4. Heater
5. Aut. trans. oil cooler
6. Oil cooler for diesel turbo engines
13. Electric pump (air conditioned versions)
14. 3.5mm Ø jet
15. Circuit P (see operation of thermostat)
16. Fuel heater

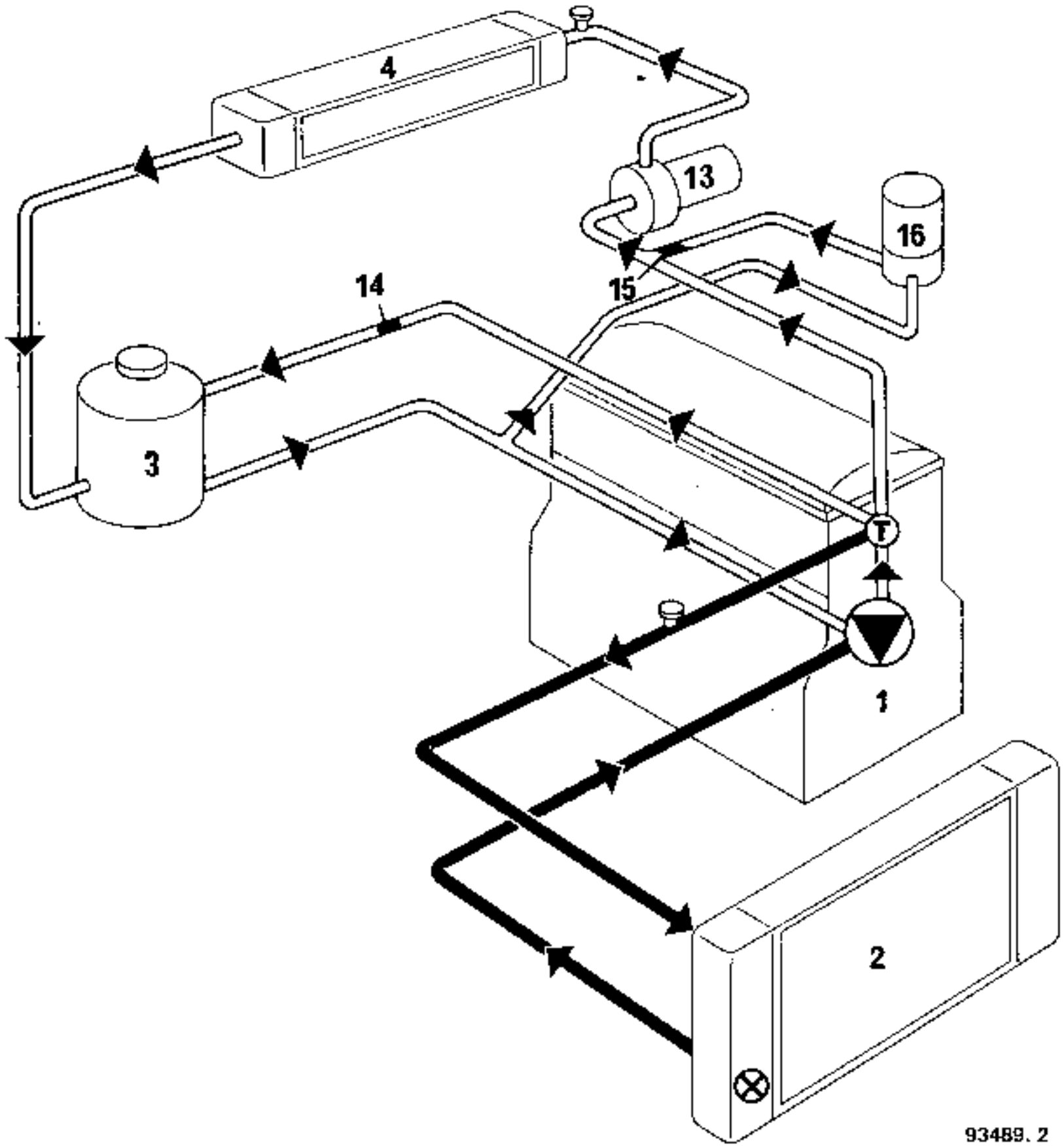
Coolant pump

Double acting thermostat

Bleed screws of which there are: 2 (Roto diesel pump)
2 (Bosch pump)

Temperature switch

The valve on the expansion bottle is set at 1.2 bars



1. Engine
2. Radiator
3. "Hot" bottle with permanent degassing
4. Heater
13. Electric coolant pump
14. 3mm Ø jet
15. 8mm Ø jet
16. Fuel heater

Coolant pump

T Thermostat

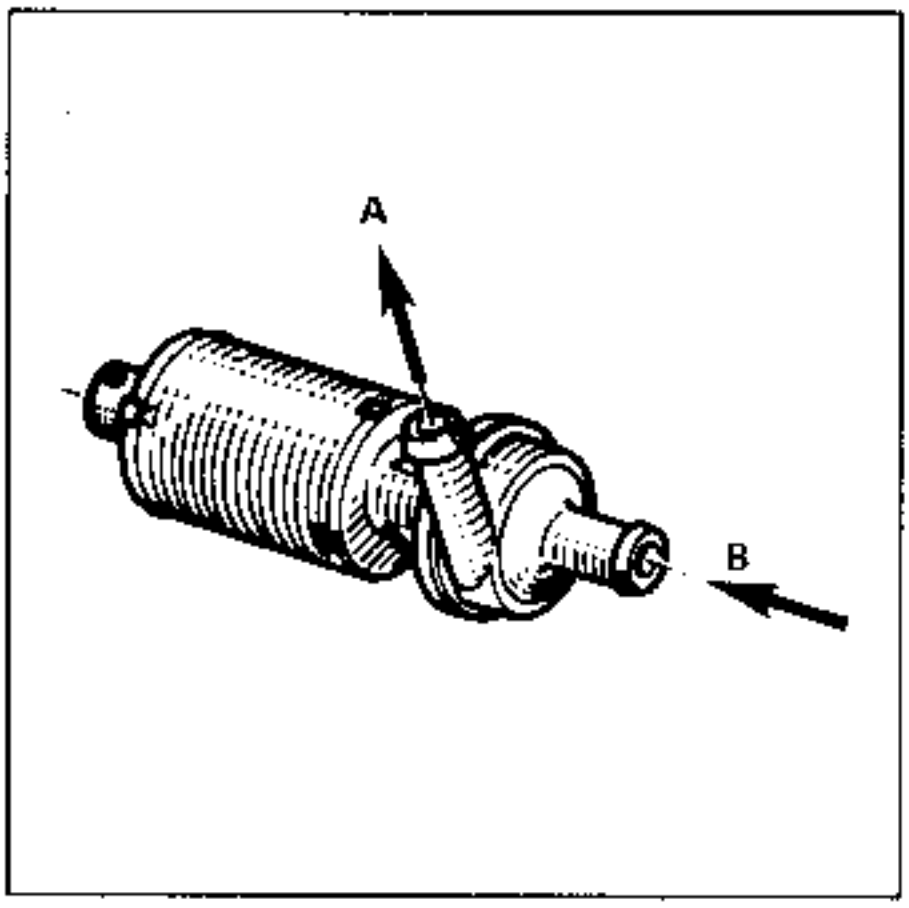
Bleed screw

Temperature switch

The valve on the expansion bottle is set at 1.2 bars

The electric coolant pump is mounted on the side of the front right hand shock absorber turret (centrifugal type).

The pump suction connection is the hole on the centre line of the pump-motor assembly and the pressure output is perpendicular to this centre line.

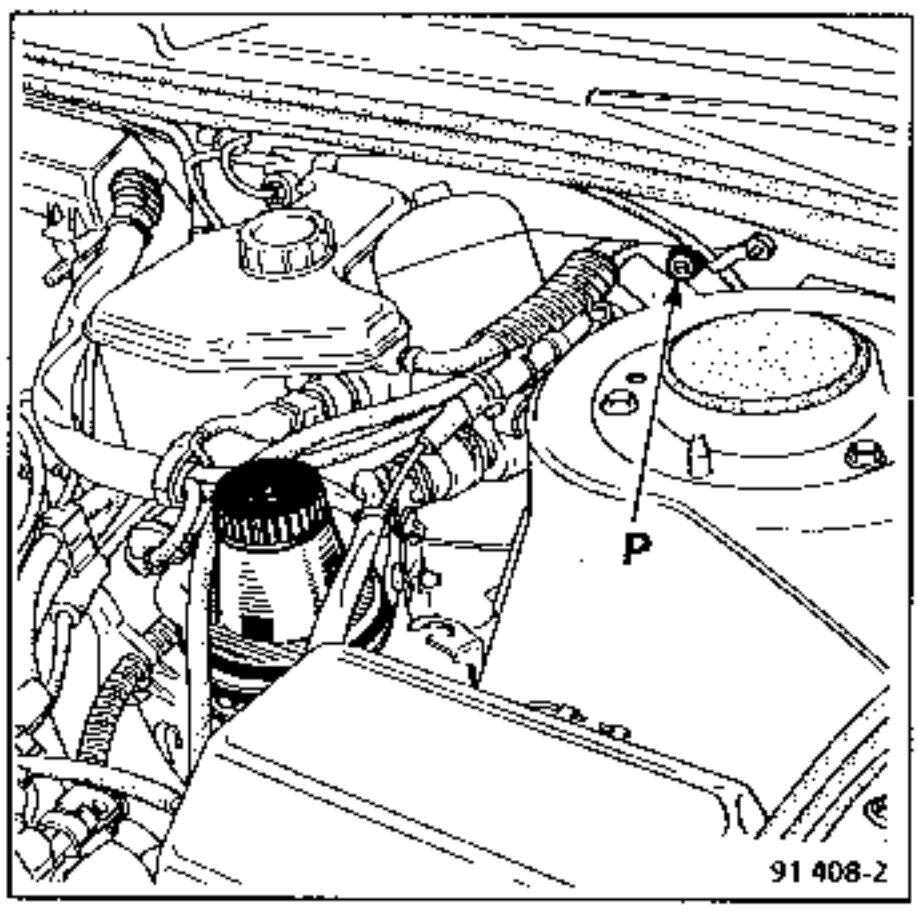


A Pressure output

B Suction input

WARNING:

Bleed screw (P) is not part of the coolant system. It is used to bleed the clutch hydraulic control system.

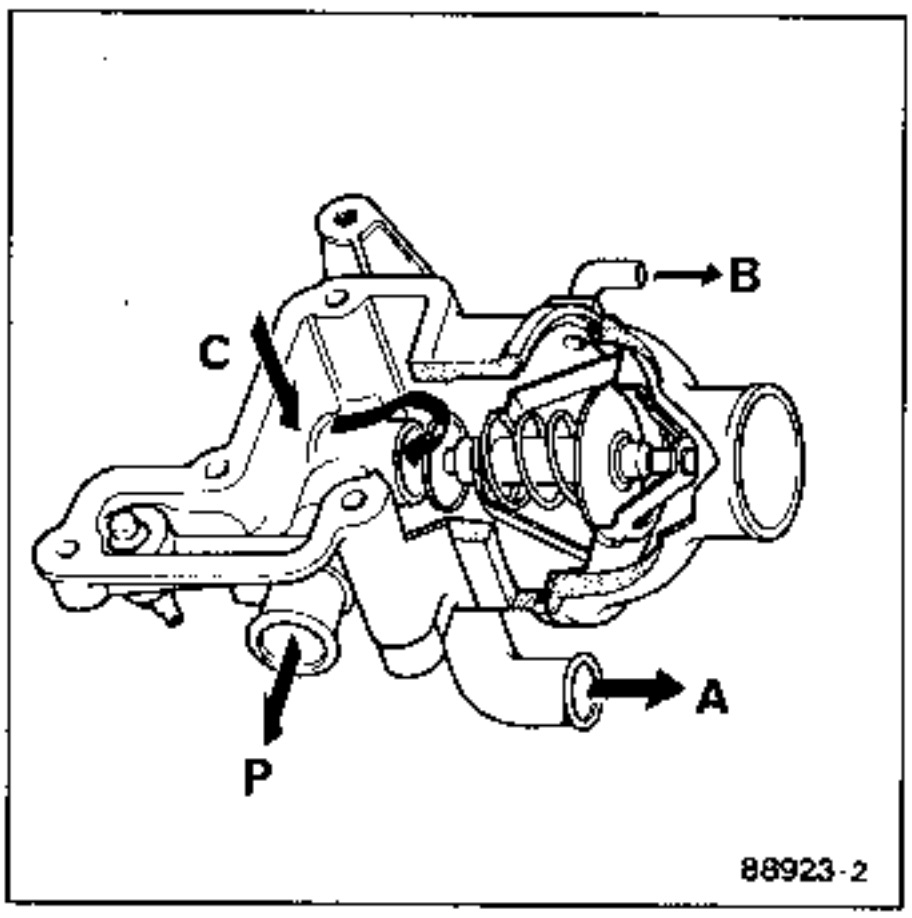


The coolant pump passes coolant into the cylinder block.

WHEN THE ENGINE IS COLD

The coolant flows through the cylinder block, the cylinder head, the cold starting system (Bosch pump only), the heater and the "hot" expansion bottle.

Figure 1

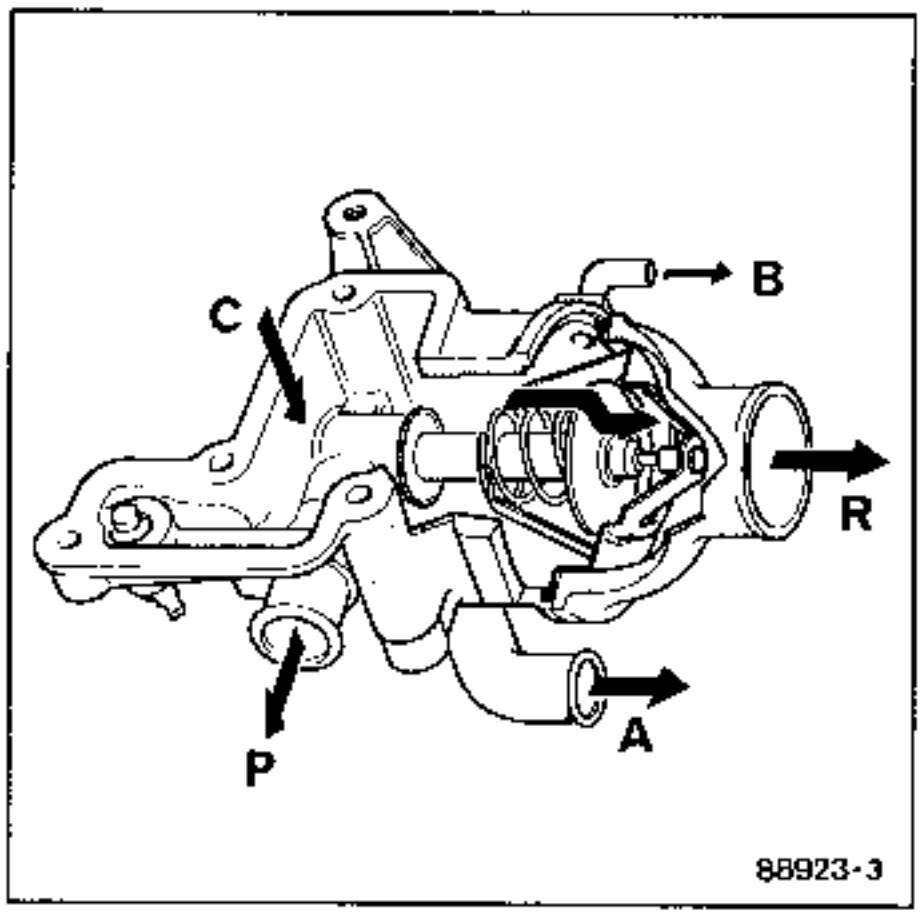


The thermostat (Figure 1) is closed and the coolant from the cylinder head (circuit C) is passed back to the coolant pump through circuit P, the heater through circuit A and the cold starting system (Bosch pump) followed by the "hot" expansion bottle through circuit (B).

WHEN THE ENGINE IS HOT

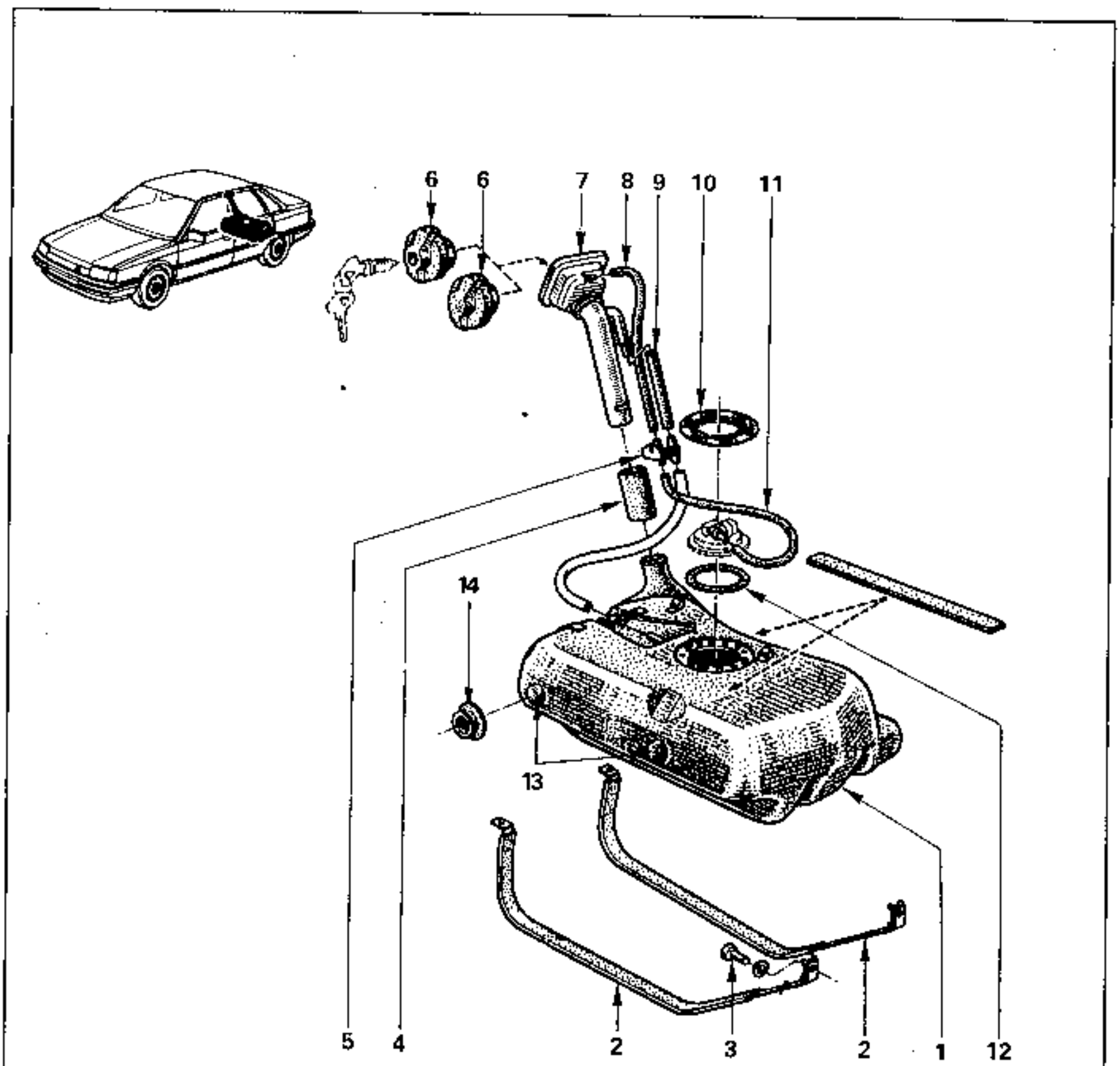
The coolant flows through the cylinder block, the cylinder head, the radiator, the cold starting system (Bosch pump only), the heater and the "hot" expansion chamber.

Figure 2



The thermostat (figure 2) is "open". It allows the coolant from the cylinder head (circuit C) to pass to the radiator (circuit R) and closes off circuit P, which formerly connected the cylinder head (circuit C) to the coolant pump.

Coolant still flows through connections (A) and (B).



1. Fuel tank
2. Securing straps
3. Securing bolts
4. Sleeve
5. Double connector
6. Filler cap (non ventilated type)
7. Filler pipe
8. Tank vent pipe
9. Tank vent pipe
10. Locking ring
11. Tank vent pipe
12. Tank unit gasket
13. Dowel locating the tank on the vehicle body
14. Spacer

NOTE: on vehicles for certain markets, the tank vent passes through a "CANISTER"