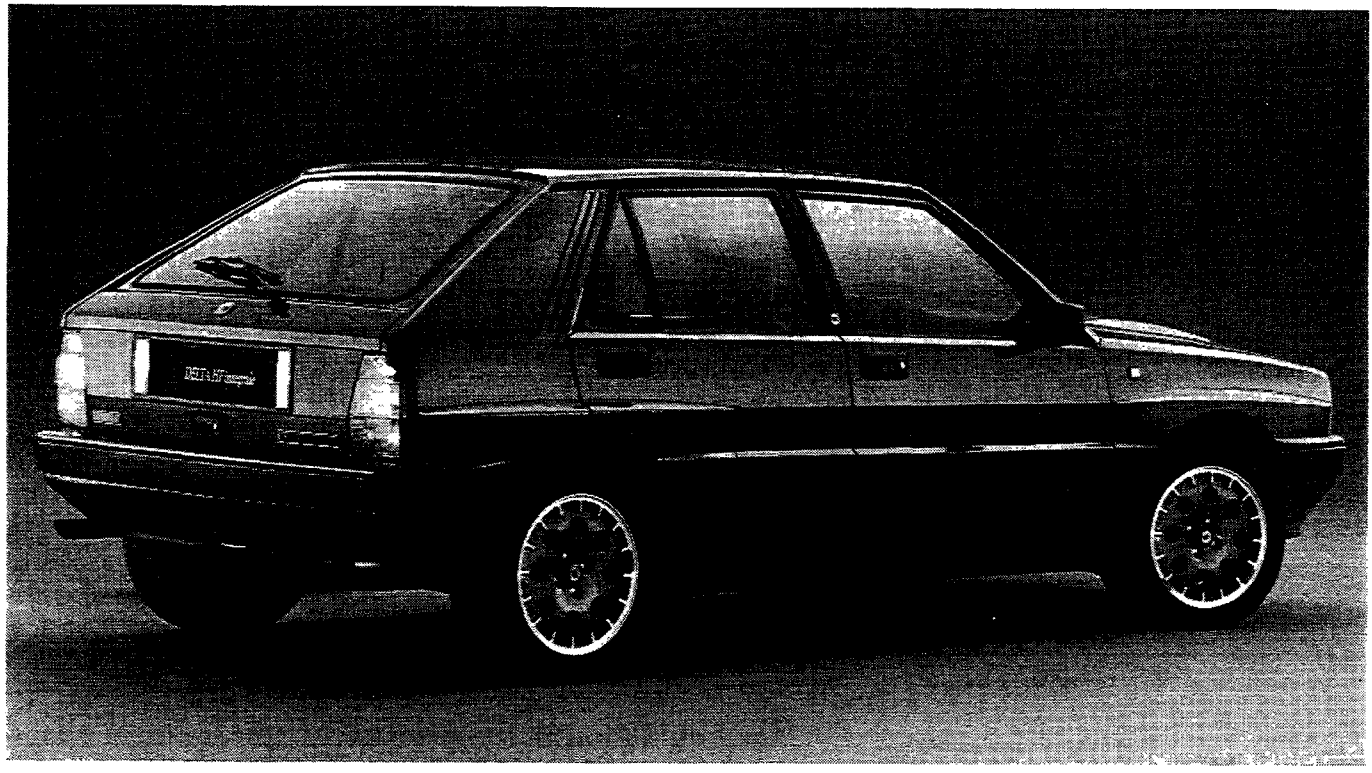
P1L01CA01

3/4 front view



P1L01CA02

3/4 rear view

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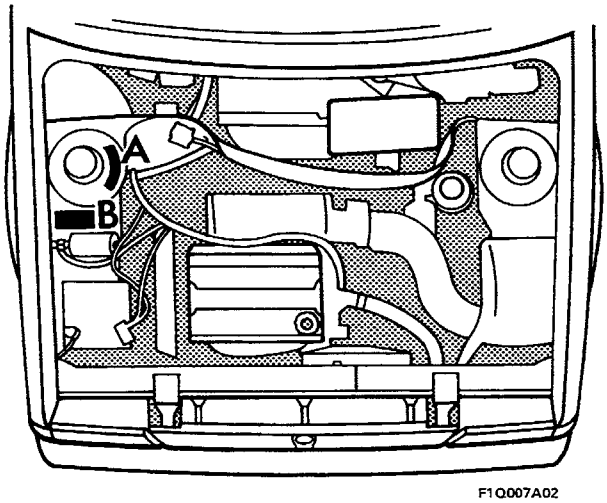
IDENTIFICATION DATA

	CHASSIS	ENGINE	VERSION	5 speed gearbox
1995 *turbo 16v*	ZLA 831 ABO	831 D5.000	831 ABO 26	•

LOCATION OF IDENTIFICATION DATA ON VEHICLE

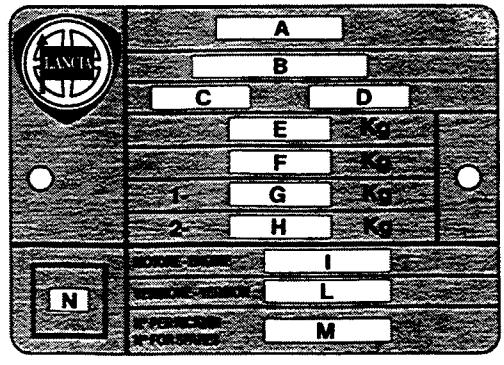


F1Q007A02

A Chassis details

- Vehicle type: (ZLA 831 ABO)
- chassis manufacture number.

NOTE *The engine type and number are stamped on the cylinder block/crankcase behind the engine oil cartridge filter.*



P1X009A02

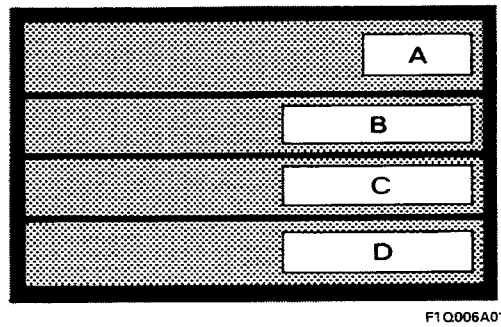
B V.I.N. Plate (EEC regulations)

A. Name of manufacturer.
B. Type approval number.
C. Vehicle type identification code.
D. Chassis manufacture number.
E. Maximum authorized weight of vehicle fully laden.
F. Maximum authorized weight of vehicle fully laden plus tow.
G. Maximum authorized weight on first axle (front).
H. Maximum authorized weight on second axle (rear).
I. Bodywork version code.
L. Engine type.
M. Spares number.
N. Correct value of smoke absorption coefficient (for Diesel engines).

Body paintwork identification plate

It is inside the bonnet lid

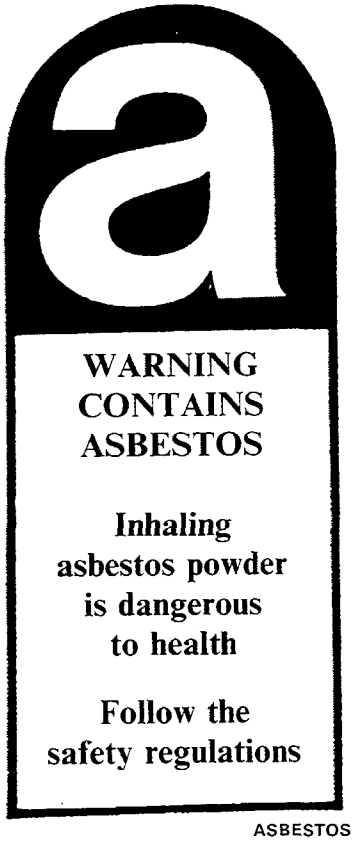
A. Paint manufacturer
B. Description of colour
C. Colour code
D. Colour code for retouches or spraying



F1Q006A01

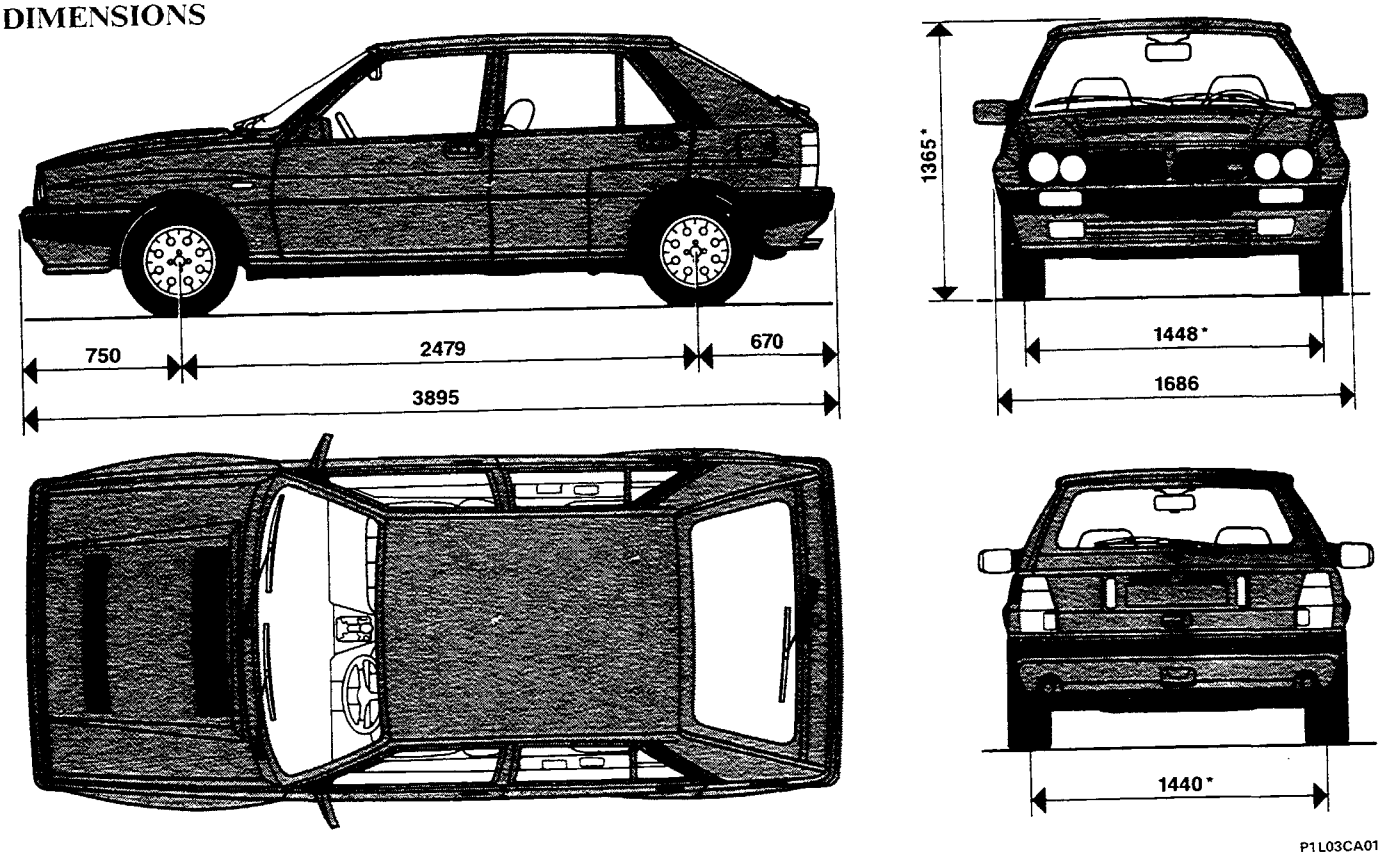
PREFACE ***The gaskets: cylinder head, exhaust manifold and certain cylinder block/crankcase seals contain asbestos.***

Inhaling asbestos powder is dangerous to health; it is therefore necessary to observe the following precautions when working on components containing asbestos:



- Work in the open air on in a well ventilated place.
- Asbestos powder found on the vehicle or produced during operations on the vehicle should be destroyed and not blown with compressed air or brushed away.
- Powder residues should be completely dampened, placed in a sealed container and marked to guarantee safe disposal.
- If any components containing asbestos require cutting, drilling or grinding, the piece must be dampened first and only manual tools should be used or the motor should be running at a slow speed.

DIMENSIONS



P1L03CA01

(*) Unladen car
Luggage compartment capacity with rear seat backrest in normal position: 200 dm^3 (7.06 cu ft).
Luggage compartment capacity with rear seat backrest folded down: 940 dm^3 (33.19 cu ft).

WEIGHTS (values in kg)

Kerb weight	1250
+ 450	1700
+	910
+	790
	1200

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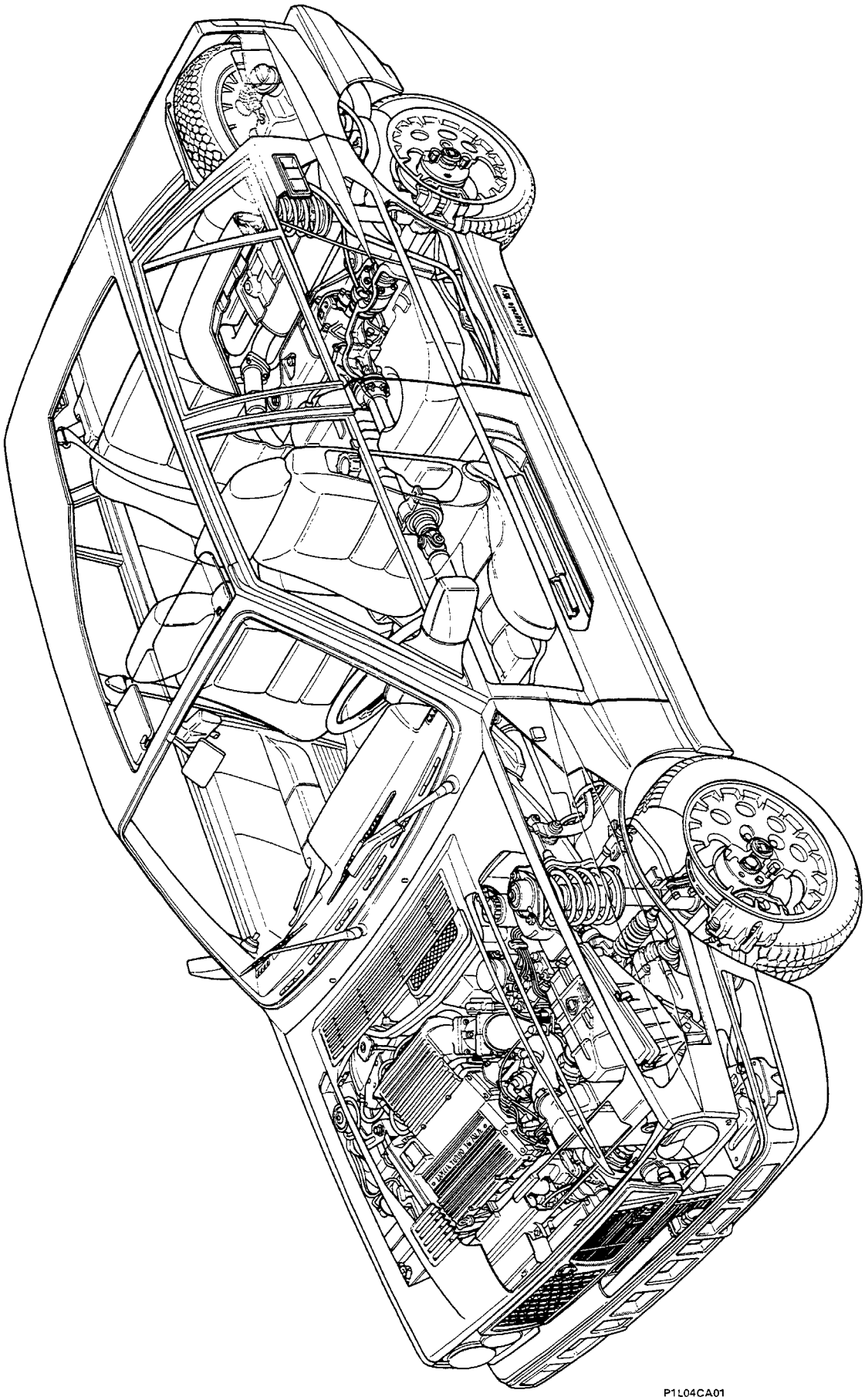
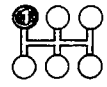
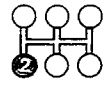
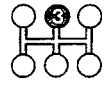
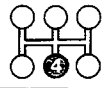
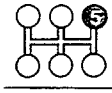
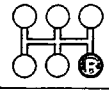
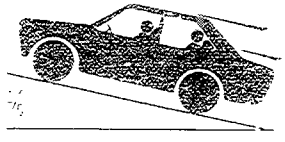
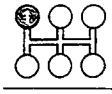
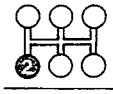
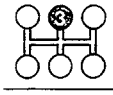
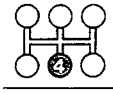
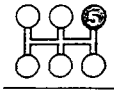
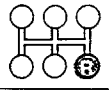
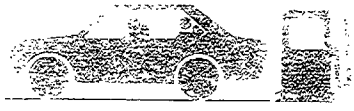
LAYOUT OF MECHANICAL COMPONENTS ON VEHICLE



P1L04CA01

Speed kph 		60
		95
		140
		185
		220
		60
Maximum climable gradient 		58
		41
		25
		17
		12
		68

EEC fuel consumption figures (litres/100 km) 	Urban cycle (A)	11,2
	Constant speed 90 kph (B)	7,9
	Constant speed 120 kph (C)	10,5
	Average consumption (CCMC proposal) $\frac{A+B+C}{3}$	9,8

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Capacities	Unit	Quantity dm³	Quantity (kg)
Petrol O.R. 95		57	-
50% +	Total capacity of cooling system	6,2	-
SELENIA (SAE 15W40	Total capacity	5,9	5,0
	Partial capacity (periodic replacement)	-	4,80
TUTELA DOT 4	Total capacity of hydraulic clutch and braking system — without ABS	0,56	-
	Total capacity of hydraulic clutch and braking system — with ABS		
a = TUTELA ZC 80S	a	3,80	3,40
b = TUTELA GI/A	b	-	-
TUTELA W 90/M DA	a	-	-
	b — Self-locking	1,1	1
a = TUTELA GI/A	a	0,75	-
b = K 854	b	-	-
c = TUTELA MRM2	c	-	0,10
+ Distilled water	3% / ~- 10 °C 50% / ~- 20 °C 100%	2	-

Name of product		Description International designation	Usage
SELENIA	SAE 15 W/40	Multigrade engine oil containing polyalphaolefines and external synthetics. Exceeds API SG and CCMC - G2/G3 specifications. Cuna NC 610 01 G2	Temperature - 15°C ÷ >40°C
VS Supermultigrado	SAE 10 W/30	Low ash content detergent oil for petrol engines. Service API "SF". Exceeds European specification CCMC-G2/G3	Temperature below -15°C ÷ 30°C
	SAE 15 W/40		Temperature - 15°C ÷ >40°C
SELENIA Turbo Diesel	SAE 15 W/40	Multigrade engine oil containing polyalphaolefines and external synthetics. Exceeds standards API CD and CCMC-PD1. Cuna NC 610 01 CL. PD1.	Temperature - 15°C ÷ >40°C
VS Diesel Supermultigrado	SAE 10 W/30	Oil for diesel engines. Service API "CD". Satisfies standards MIL-L-2104 D and CCMC-PD1	Temperature below -15°C ÷ 30°C
	SAE 15 W/40		Temperature - 15°C ÷ >40°C
TUTELA ZC 80S		SAE 80/W oil. Satisfies standards MIL-L-2105 and API GL4	Manual gearboxes and differentials
TUTELA ZC 90		Non EP SAE 80 W/90 oil, for manual gearboxes, containing anti-wear additives.	Gearboxes and non hypoid differentials
TUTELA W 90/M DA		Special EP SAE 80 W/90 oil for normal and self-locking differentials. Satisfies standards MIL-L-2105 C and API GL5	Hypoid differentials Self-locking differentials. Steering boxes
TUTELA GI/A		DEXRON II type oil for automatic transmissions.	Automatic gearboxes. Idroguide
TUTELA CVT		Oil for continuous variation automatic transmissions.	Continuous variation automatic transmissions
TUTELA JOTA 1		Lithium soap based grease, consistency NLGI = 1	Greasing the vehicle except for components particularly exposed to water requiring special greases
TUTELA MRM2		Water-repellant, lithium soap based grease containing molybdenum disulphide, consistency NLGI = 2	Constant velocity joints
TUTELA MR3		Lithium soap based grease, consistency NLGI = 3	Wheel hub bearings, steering rod, various components
TUTELA DOT 3 TUTELA DOT 4		Fluid for hydraulic brakes, meeting USA FMVSS standards no. 116, SAE J 1703, ISO 4925, CUNA NC-956-01	Hydraulic brakes and hydraulically operated clutches
K 854		Lithium soap based grease, consistency NLGI = 000, containing molybdenum disulphide	Rack and pinion steering boxes
SP 349		Special castor oil and sodium soap based grease containing graphite and molybdenum disulphide, compatible with brake fluid and brake circuit rubber seals	Load proportioning valve Load proportioning valve rod bush
Autofà n° 9 DP1		Alcohol based liquid detergent	To be used undiluted or diluted in windscreen washers and headlamp washers
Liquido Paraflu" FIAT		Mono-ethylene glycol based anti-freeze for cooling system	Cooling circuits. Percentage to be used 35% up to - 25°C 50% up to - 35°C
Diesel Mix		Additive for diesel fuel with protective action for diesel engines	To be mixed with diesel fuel (17 cc per 10 litres)

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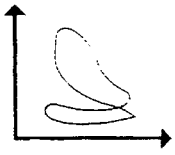
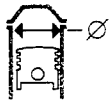
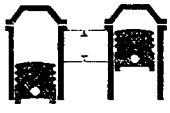
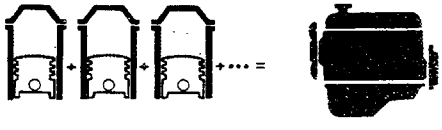
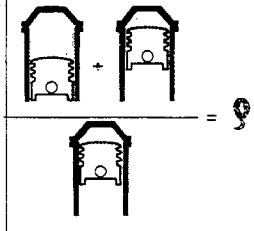
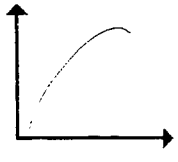
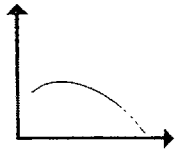
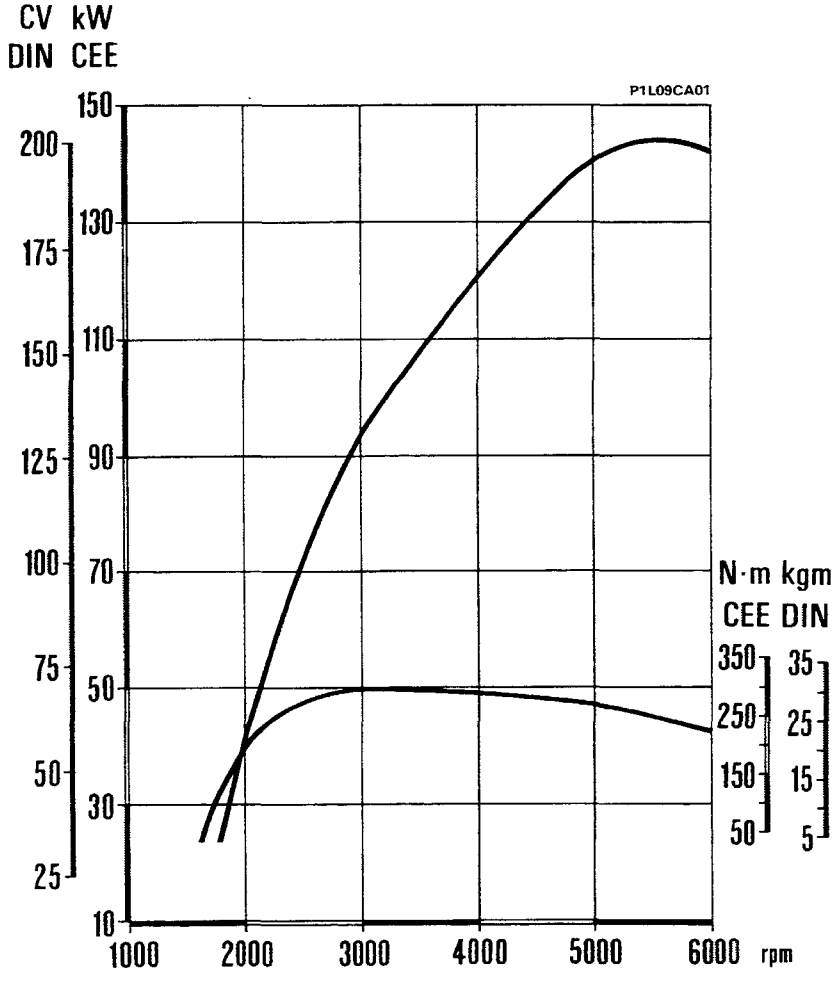
CHARACTERISTICS

			831 D5.000
	Cycle		OTTO 4 stroke
	Number of cylinders		4
	Cylinder liner (bore)	mm	84
	Stroke	mm	90
	Capacity	cc	1995
	Compression ratio		8 ± 0,15
	Max power EEC	kW (CV)	144 (200)
		rpm	5500
	Max torque EEC	daNm (kgm)	29,8 (31)
		rpm	3000



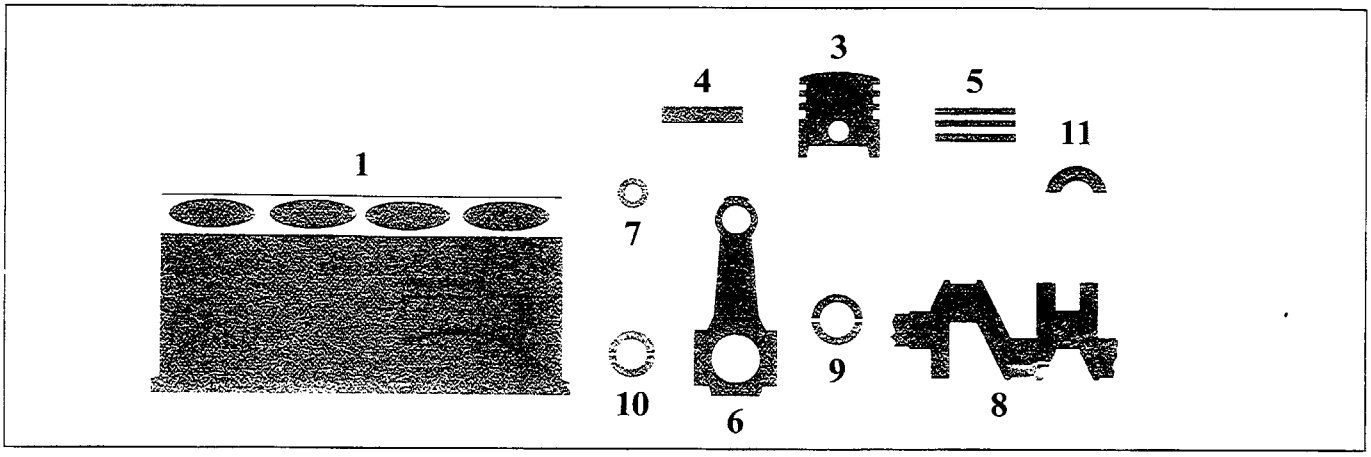
Typical power curves obtained by EEC method

The power curve illustrated can be obtained with the engine overhauled and run in, without a fan, with a silencer and air filter fitted at sea level.

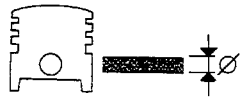
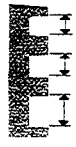
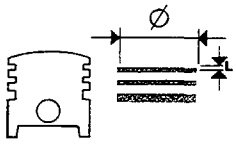
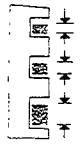
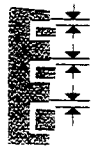
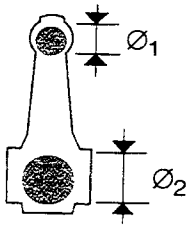
Test bench cycles of overhauled engines

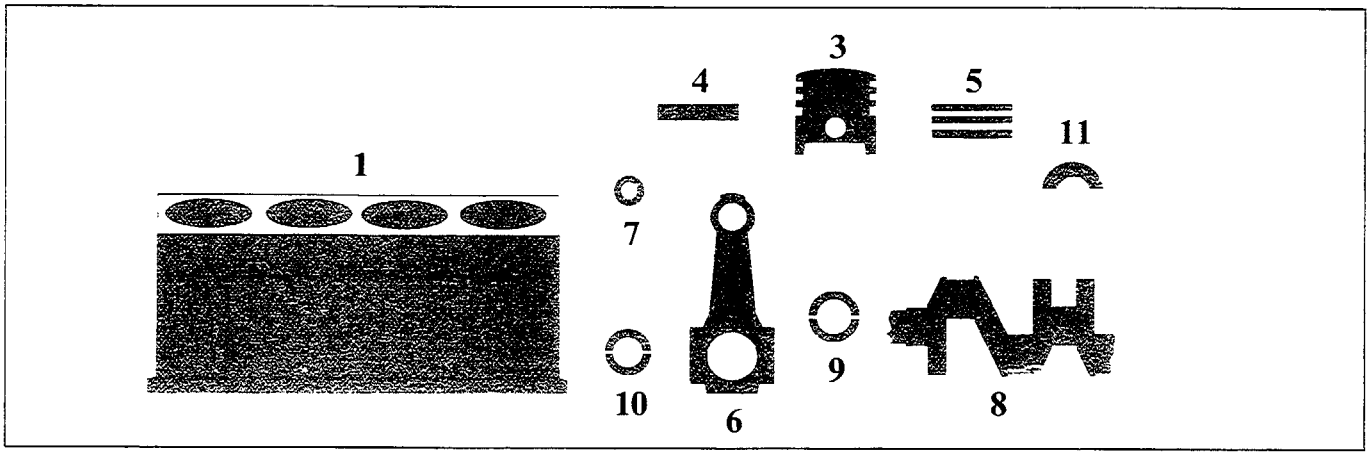
During the bench test of the overhauled engine it is not advisable to run the engine at maximum speed, but to stick to the figures given in the table; complete the running in of the engine in the vehicle.

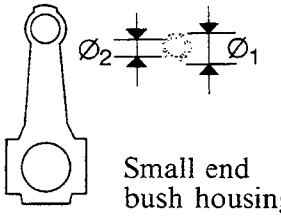
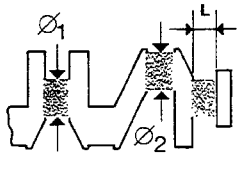
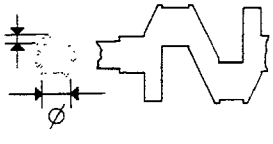
Test speed (rpm)	Time in minutes	Load on the brakes
800 ÷ 1000	10'	no load
1500	10'	no load
2000	10'	no load



	DESCRIPTION		Values in mm
1	Main bearing supports	L	23,100 ÷ 23,200
		A	56,717 ÷ 56,723
		B	56,723 ÷ 56,729
		C	56,729 ÷ 56,735
	Cylinder bore	⌀ 0,010	84,000 ÷ 84,050
3	Piston	Y	15
		A	83,940 ÷ 83,950
		C	83,960 ÷ 83,970
		E	83,980 ÷ 83,990
		⌀ >	0,4
3		Difference in weight between pistons	±5 g
3-1		Piston-Cylinder bore	0,050 ÷ 0,070
3	Gudgeon pin housing	1	21,996 ÷ 21,999
		2	21,999 ÷ 22,002

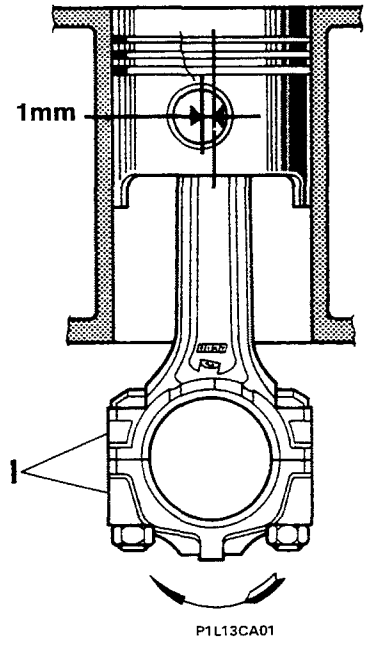
DESCRIPTION		Values in mm
4  Gudgeon pin	Ø 1	21,991 ÷ 21,994
	Ø 2	21,994 ÷ 21,997
	Ø LANCIA >	0,2
4-3 	Gudgeon pin - Housing	0,002 ÷ 0,008
3  Piston ring grooves	 1	1,535 ÷ 1,555
	2	2,020 ÷ 2,040
	3	3,967 ÷ 3,987
5  Piston rings	L 1 	1,478 ÷ 1,490
	L 2	1,987 ÷ 1,990
	L 3	3,925 ÷ 3,937
	Ø LANCIA >	0,4
5-3  Piston rings Piston ring grooves	 1	0,045 ÷ 0,077
	2	0,030 ÷ 0,062
	3	0,030 ÷ 0,062
5-1   Opening at ends in cylinder bore	1	0,30 ÷ 0,50
	2	0,30 ÷ 0,50
	3	0,25 ÷ 0,40
6  Small end bush housing	Ø1	24,988 ÷ 25,021
Big end bearing housing	Ø2 1	53,904 ÷ 53,910
	Ø2 2	53,898 ÷ 53,904
	Ø2 3	53,892 ÷ 53,898



DESCRIPTION			Values in mm
7  Small end bush housing	$\varnothing_1$		25,065 ÷ 25,090
	$\varnothing_2$	1	22,004 ÷ 22,007
		2	22,007 ÷ 22,010
4-7	Gudgeon pin / Small end bush		0,010 ÷ 0,016
7-6	Small end bush / Bush housing		0,044 ÷ 0,102
8  Main journals	$\varnothing_1$	A	52,998 ÷ 53,004
		B	52,992 ÷ 52,998
		C	52,986 ÷ 52,992
Crank pins	$\varnothing_2$	1	50,799 ÷ 50,805
		2	50,793 ÷ 50,799
		3	50,787 ÷ 50,793
	L		27,975 ÷ 28,025
Crankshaft bearings 9 	L	A	1,838 ÷ 1,844
		B	1,844 ÷ 1,850
		C	1,850 ÷ 1,856
	∅		0,254 ÷ 0,508

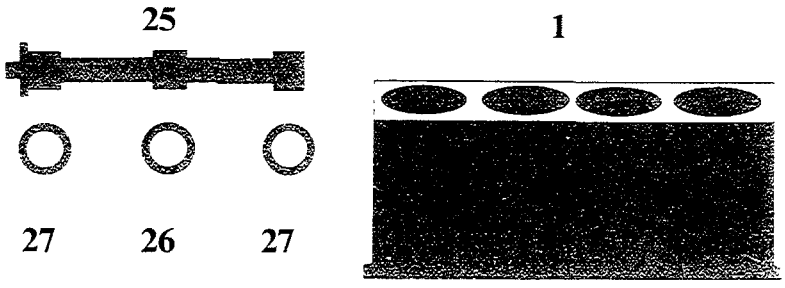
DESCRIPTION		Values in mm
9-8	Crankshaft bearings -Main journals	0,025÷0,049
10	Big end bearings L A	1,527÷1,533
	Big end bearings L B	1,533÷1,539
	Big end bearings L C	1,539÷1,545
	Big end bearings ⌀ LANCIA	0,254÷0,508
10-8	Big end bearings -Main journals	0,033÷0,057
11	Thrust washers S	2,310÷2,360
	Thrust washers S LANCIA	0,127
11-8	Crankshaft end float	0,055÷0,305

Diagram showing fitting of connecting rod-piston assembly and direction of rotation in engine

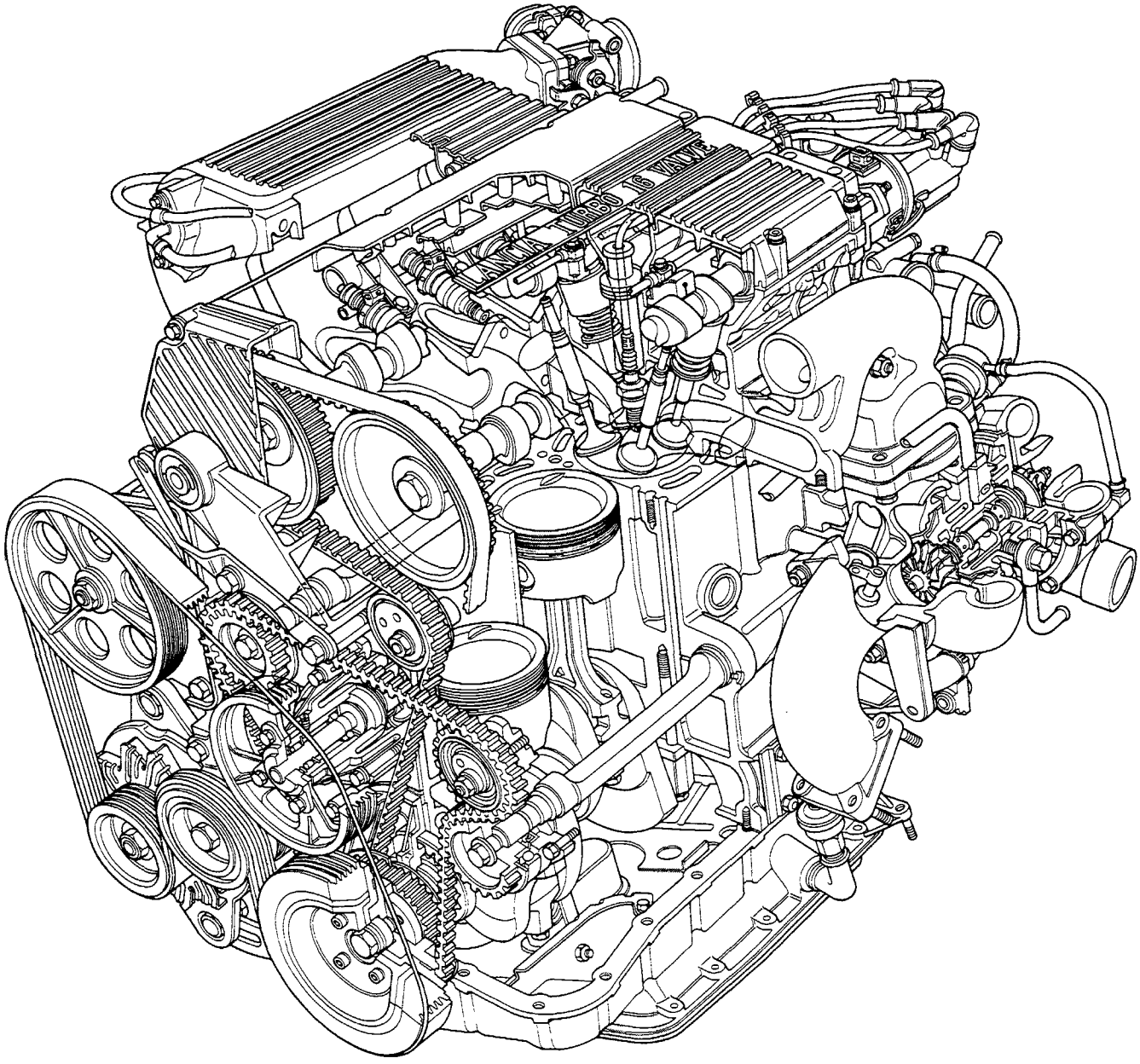


1 = Area where matching number of cylinder bore to which connecting rod belongs is stamped.
The arrow shows the direction of rotation of the engine as seen from the timing side.

1 mm = Gudgeon pin offset on the piston.



DESCRIPTION		Values in mm
25	Counter balance shafts	n° 2
	Shaft control	by toothed belt
26	Ø Centre bush for counter balance shafts in housing	37,020 ÷ 37,040
27	Ø Ball bearings for counter balance shafts	19,990 ÷ 20,000
25	Ø Counter balance shaft centre bearing	36,945 ÷ 36,960
25	Ø Counter balance shaft beairngs	19,980 ÷ 19,993
26-1	Bush for shaft Cylinder block/crankcase housing	0,080 ÷ 0,150
25-26	Shaft bearing - Bush	0,060 ÷ 0,095
27-1	Ball bearings Cylinder block seats	+0,011 ÷ – 0,025
25-27	Shaft bearings Ball bearings	+0.020 ÷ – 0,003



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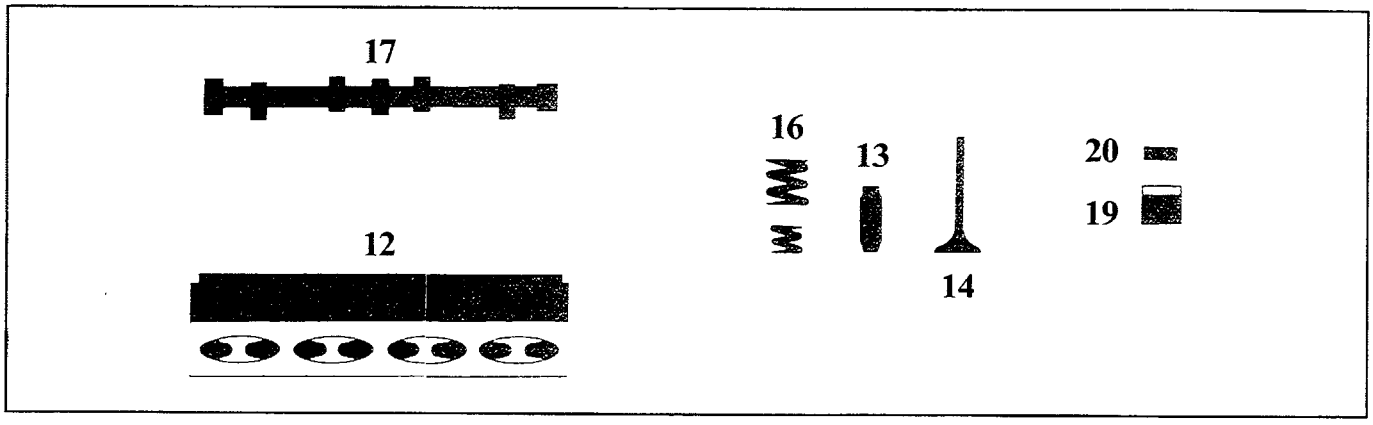
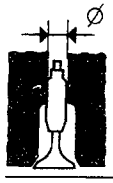
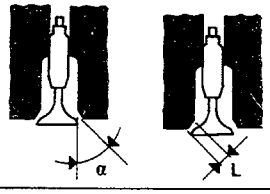
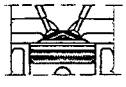
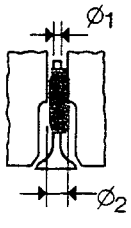
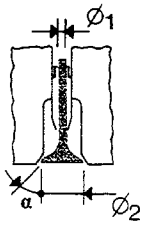
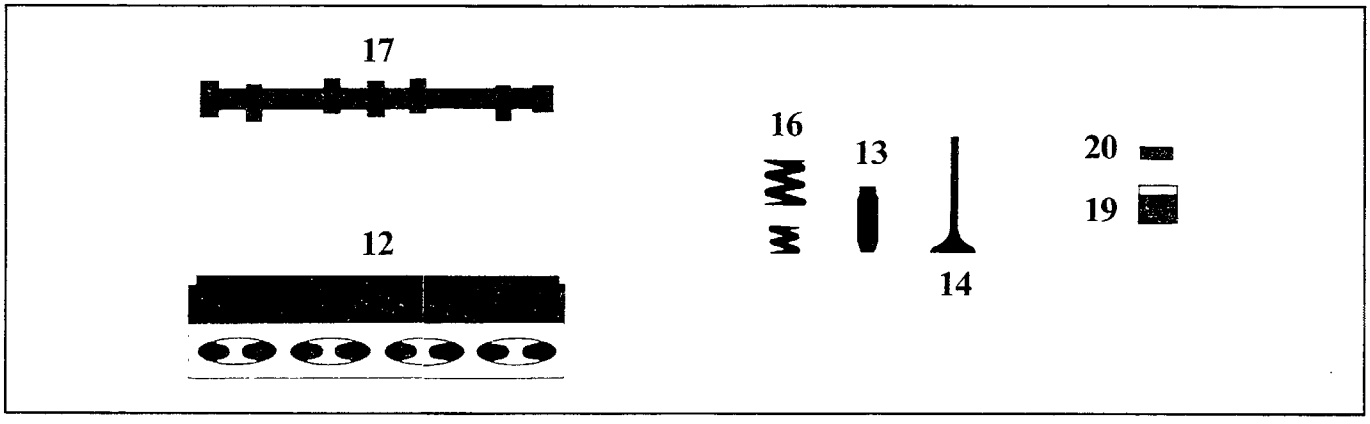
Engine, partial cross section



DESCRIPTION			Values in mm
	 Valve guide bore in cylinder head	Ø	13,950 ÷ 13,977
12	 Valve seats	α	45° ± 5'
		α	45° ± 5'
		L	circa 2
	 Volume of combustion chamber in cylinder head	cc	–
13	 Valve guide	$Ø_1$	7,022 ÷ 7,040
		$Ø_2$	14,010 ÷ 14,030
		$Ø_2$ LANCIA >	0,05-0,10-0,25
13-12	Valve guide Bore in cylinder head		0,033 ÷ 0,080
14	 Valves	$Ø_1$	6,974 ÷ 6,992
		$Ø_2$	34,300 ÷ 34,500
		α	45° 30 ± 5'
		$Ø_1$	6,974 ÷ 6,992
		$Ø_2$	28,300 ÷ 28,500
		α	45° 30' ± 5'

DESCRIPTION		Values in mm
14-13 Valve - Valve guide		0,030 ÷ 0,066
15 Internal valve spring	P_1	14,12 ÷ 15,10 daN
	H_1	31
	P_2	26,39 ÷ 28,74 daN
	H_2	21,5
16 External valve spring	P_1	36,68 ÷ 39,6 daN
	H_1	36
	P_2	55,91 ÷ 60,82 daN
	H_2	26,5
17 Camshaft bearings	Ø	28,480 ÷ 28,495
	L	19,670 ÷ 19,750
Cam lift		8,6
		7,5
Camshaft bearings in cylinder head **12**	Ø	28,545 ÷ 28,570
	L*	19,450 ÷ 19,520
Tappet housings	Ø	37,000 ÷ 37,025
17-12 Camshaft bearings Camshaft housing	radial	0,050 ÷ 0,090
	axial	0,150 ÷ 0,300
19 Tappet	Ø	36,975 ÷ 36,995

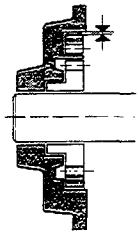
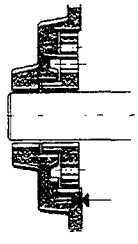
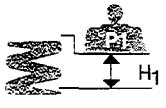
* Rear cap measurement



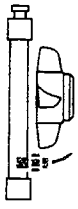
DESCRIPTION		Values in mm
19-18	Tappet Housing in cylinder head	0,005 ÷ 0,050
20	Shim S (0,05)	3,25 ÷ 4,70
17-20	clearance for timing check — inlet	0,80
	clearance for timing check — exhaust	0,80
	operational clearance — inlet	0,35 ± 0,04
	operational clearance — exhaust	0,40 ± 0,03

TIMING ANGLES

inlet	opens B.T.D.C.	8°
	closes A.B.D.C.	35°
exhaust	opens B.T.D.C.	30°
	closes A.B.D.C.	0°

	Values in mm
Engine lubrication system	forced feed by means of lobe gear pump with cartridge oil filter in series
Oil pump	lobe gears
Pump operated	through crankshaft
Oil pressure relief valve	incorporated in crankshaft front cover
 between pump casing housing and driven gear	0,080 ÷ 0,186
 between the upper side of the gears and the pump cover	0,025 ÷ 0,056
Full flow	cartidge filter
Insufficient oil pressure sender unit	electrical
 Operating pressure at a temperature of 100°C	3,4 ÷ 4,9 bar
 P_1	11,1 ÷ 12,1 daN
Oil pressure relief valve spring H_1	35,3

COOLING SYSTEM

Cooling circuit		coolant circulation via centrifugal pump, radiator and two speed electrical fan operated by thermostatic switch
Water pump operated		through belt
 Thermal switch to engage fan		86° ÷ 94°C
		81° ÷ 89°C
Engine cooling water thermostat	opening	81° ÷ 85°C
	max opening	91° ÷ 93°C
	valve travel	⩾ 7,5 mm
Clearance between impeller blades and pump casing 		0,6 ÷ 1 mm
Pressure for checking system water tightness		0,98 bar
Pressure for checking exhaust valve on expansion tank		0,98 bar

FUEL SYSTEM - Description

Type	I.A.W. (MPI) injection/ignition
Fuel regulation pressure	2,5 bar
Pump (type)	electrical
Pump capacity (14 V supply with engine idling)	⩾ 120 litres/h

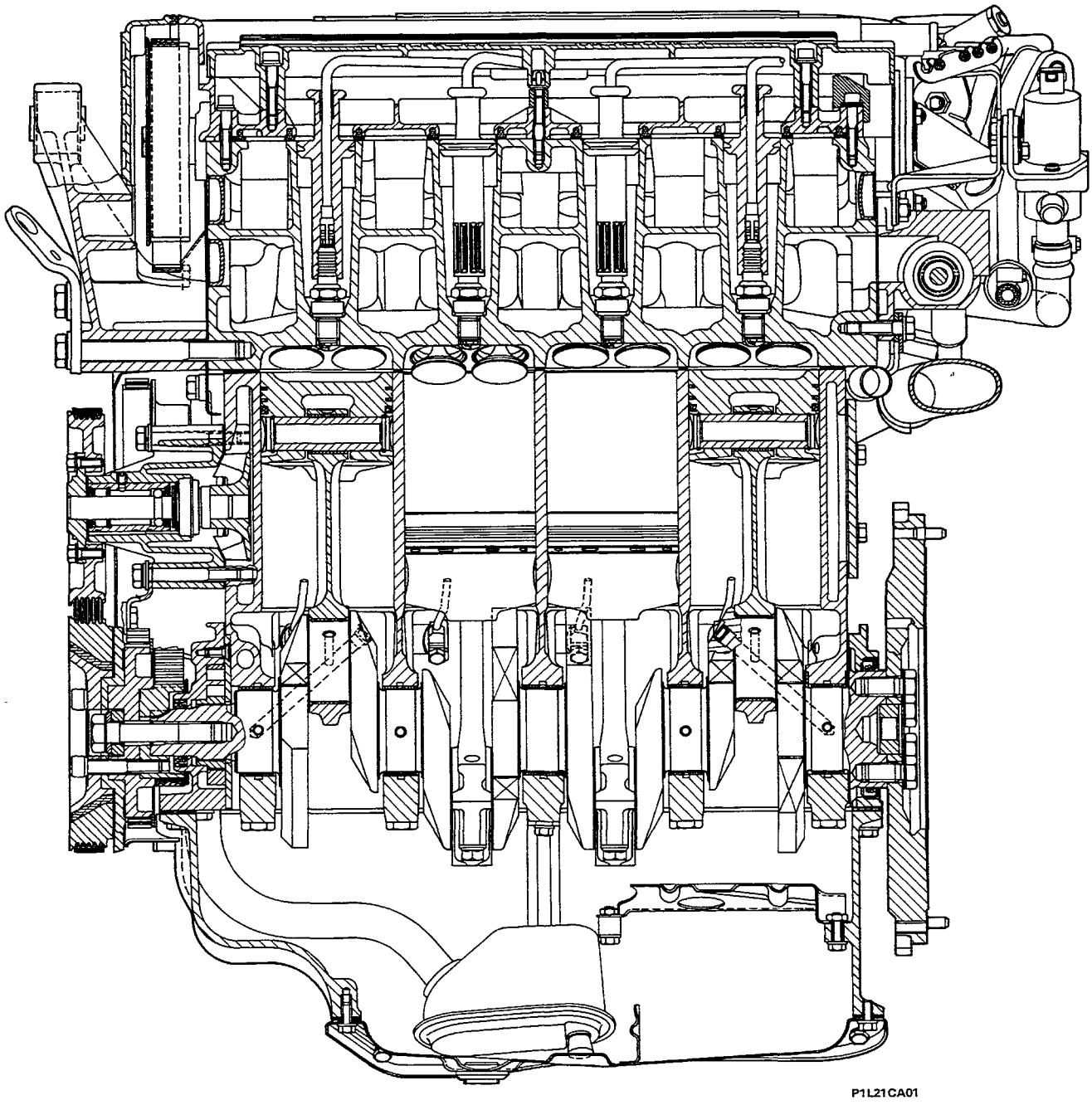
SUPERCHARGING (with turbocharger operated by exhaust gases with "Waste-gate" valve)

Turbocharger type:	Garrett T3
Maximum supercharging pressure	1 bar

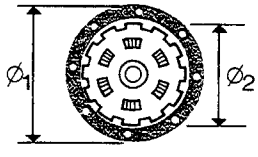
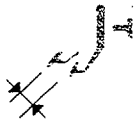
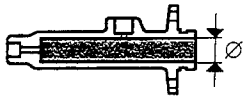
Checking engine idle speed and carbon monoxide emissions

Engine idle speed	rpm	850 ÷ 950	(750 ÷ 850) (*)
Co idle emissions	(%)	1,5 ± 0,5	

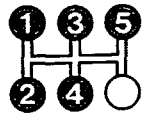
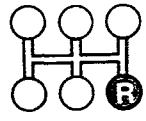
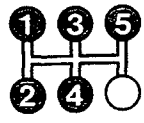
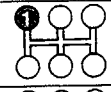
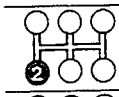
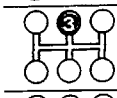
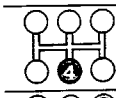
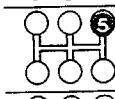
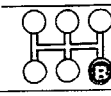
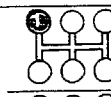
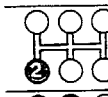
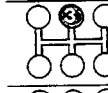
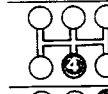
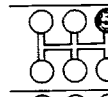
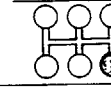
(*) With VAE valve disconnected



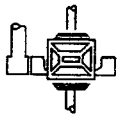
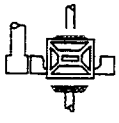
Longitudinal section of engine

		Values in mm
Type		 dry, single plate
 Operating mechanism		 diaphragm spring
Spring loading	daN	650
 Lining	Ø1	236
	Ø2	154
	Distance between pedal in end of travel position and rest position	142
Clutch release		hydraulic
	Clutch pump Ø	18,75 (3/4")
	Operating cylinder Ø	25,4 (1")

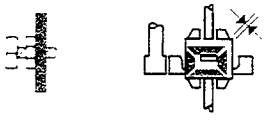
GEARBOX

Synchronizers	spring ring (Porsche type) 	-
	baulk ring type 	
Gears	straight toothed 	
	helical toothed 	
Gear ratios		3,500
		2,176
		1,524
		1,156
		0,917
		3,545
Crown wheel and pinion reduction		56/18 (3,11)
Ratio at the wheels		10,888
		6,767
		4,739
		3,595
		2,851
		11,025

CENTRE DIFFERENTIAL: Epicyclic, with torque shared between front and rear axles with a ratio of 47/53

 Differential internal casing bearing	 conical roller bearings
 Adjustment of bearing pre-loading	 by shims
 LANCIA (0,05) mm Thickness of shims	1,00 ÷ 1,60
 Interference to obtain exact bearing pre-loading mm	bearings not pre-loaded = 0,12 bearings pre-loaded (350 daN) = 0,08

FRONT DIFFERENTIAL

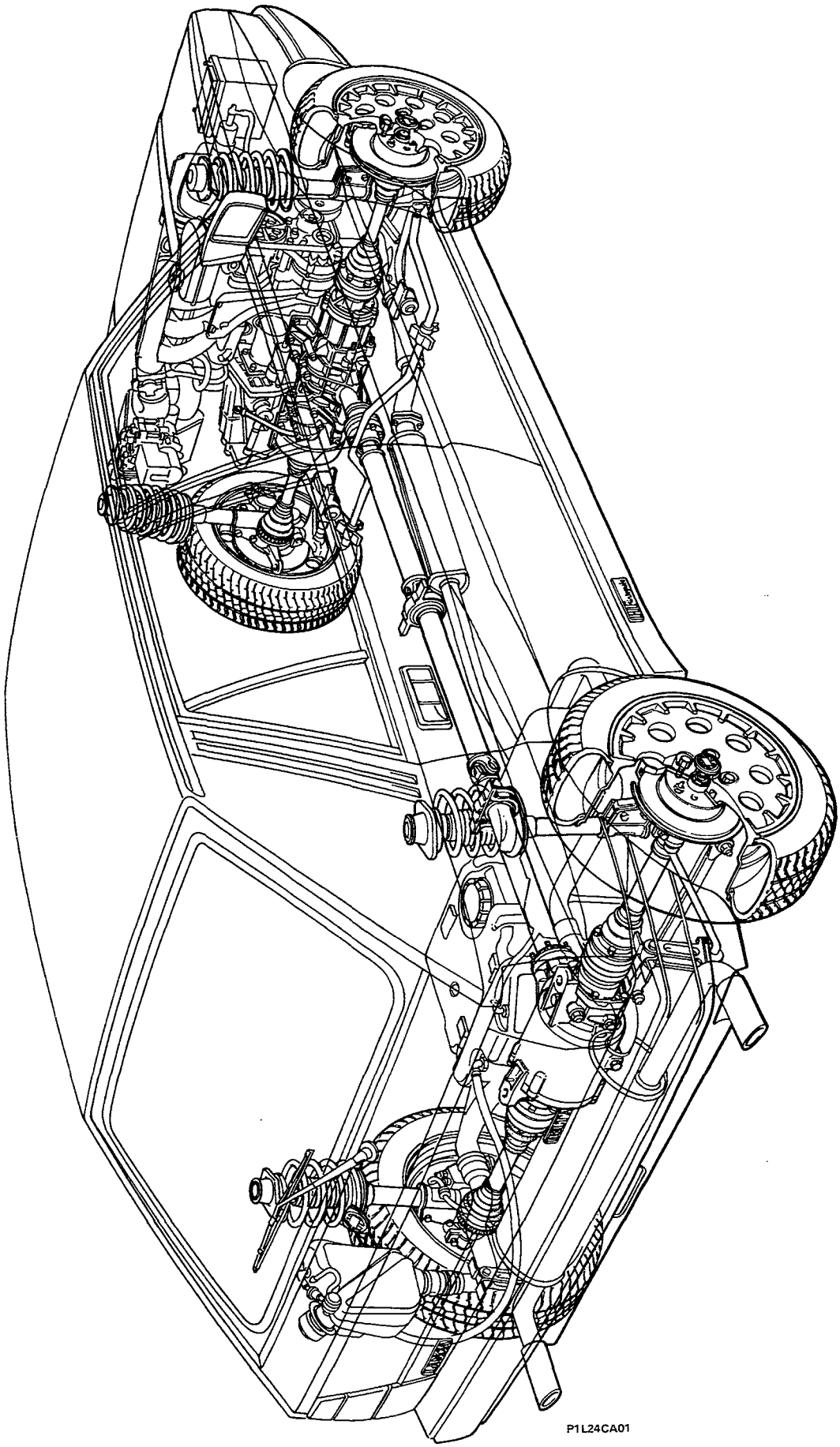
 Clearance between satellite and planet gears mm	⩽0,10
 Adjustment of clearance between planet and satellite gears	cannot be adjusted

IDLER GEAR

 Final drive ratio	43/19 (2,263)
 daNm Crown wheel bearing rolling torque	0,18 ÷ 0,20
 Adjustment of crown wheel bearing	 by shims
 LANCIA 0,025 mm Thickness of shims	1,475 ÷ 2,90
 Adjustment of bevel pinion position	 by shims
 LANCIA 0,02 mm Thickness of shims	2,55 ÷ 3,35
 daNm Bevel pinion bearing rolling torque	0,08 ÷ 0,12
 mm Clearance between pinion and crown wheel	0,08 ÷ 0,15
 Adjustment of clearance between pinion and crown wheel	 by shims
 LANCIA 0,025 mm Thickness of shims	1,475 ÷ 2,90

Type		in three sections
Supports		2 { 1 on the centre section with a ball bearing on the support 1 on the rear section with a ball bearing inside the support fixed dust cover
Sliding constant velocity joints		1, on the front section
Universal joints		2, on the centre section
Splined joint		1, on the rear section
Spider radial clearance	mm	0,01 ÷ 0,04
Thickness of shims for adjusting spider radial clearance	mm	1,50-1,53-1,56-1,59-1,62
Clearance between joint splines	mm	0,175 ÷ 0,350

LAYOUT OF POWER TRANSMISSION COMPONENTS



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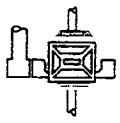
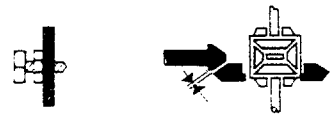
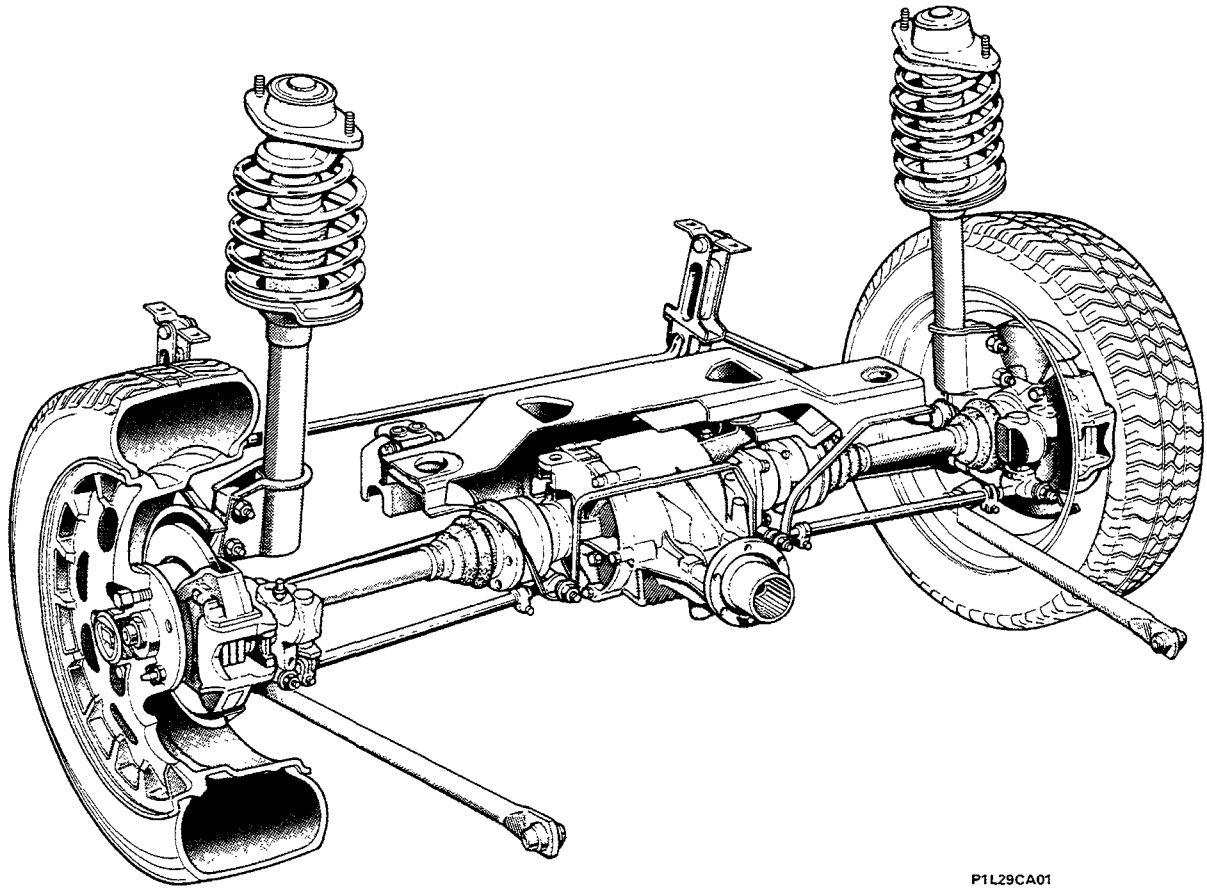
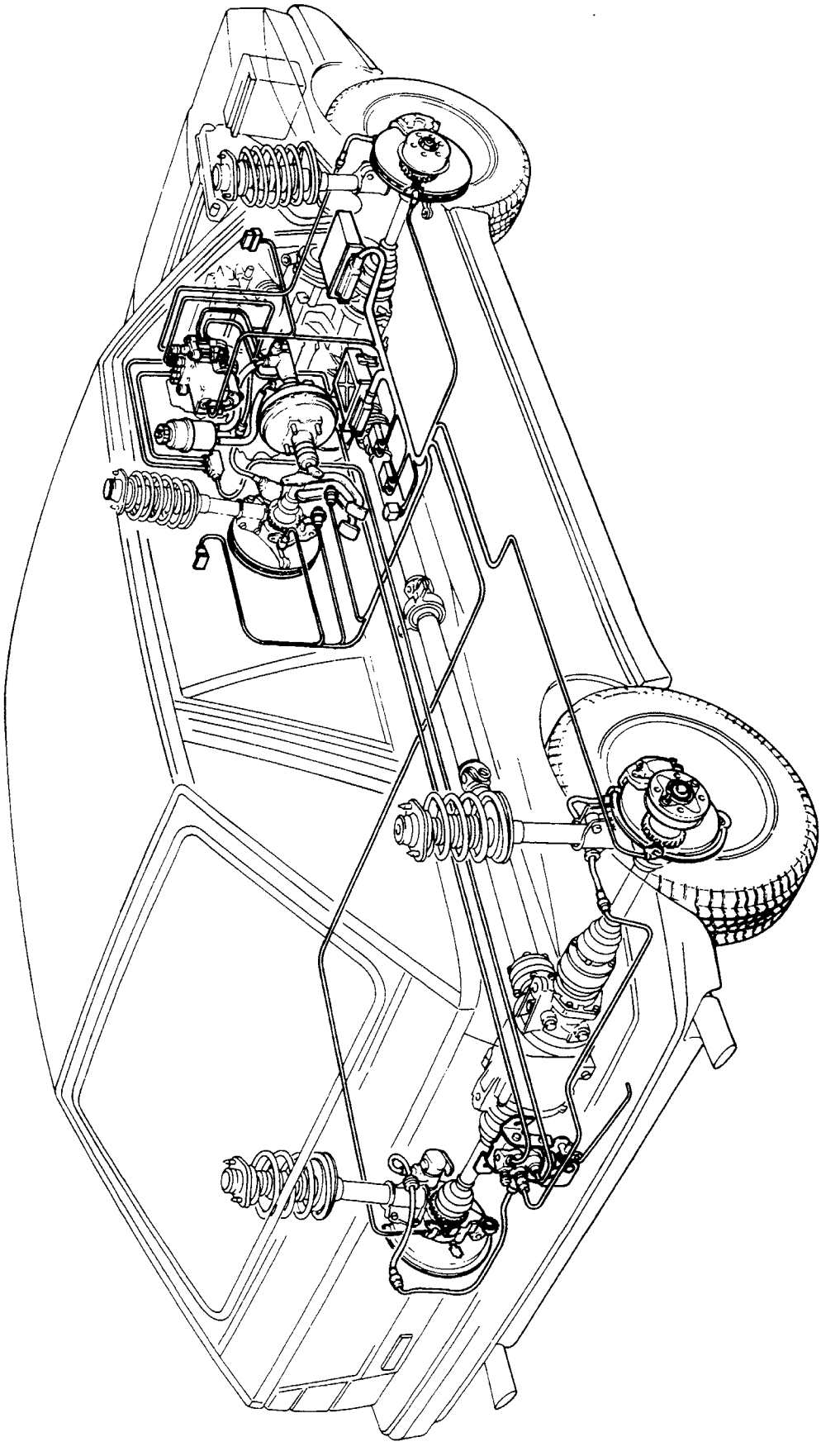
 Final drive ratio	19/43 (2,263)
 Ratio at the wheels 	10,888
	6,767
	4,739
	3,595
	2,851
	11,025
 daNm Bevel pinion bearing rolling torque	0,08 ÷ 0,12
 Adjustment of bevel pinion position	 by shims
 Thickness of shims	2,55 ÷ 3,35
 Differential internal casing bearing	 conical roller bearings
 daNm Crown wheel bearings rolling torque	0,18 ÷ 0,20
 mm Clearance between pinion and crown wheel	0,08 ÷ 0,15

 Adjustment of clearance between pinion and crown wheel	 by shims
 Adjustment of bearing pre-loading	
 Thickness of differential internal casing bearing pre-loading adjustment shims	0,18 ÷ 0,20



Parital diagrammatic cross section of rear axle

DIAGRAM SHOWING BRAKING SYSTEM



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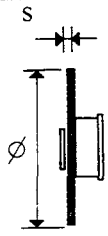
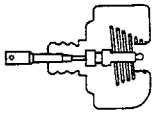
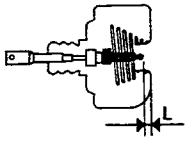
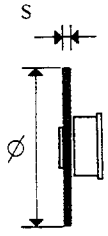
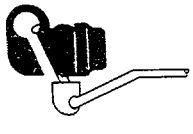
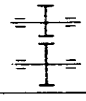
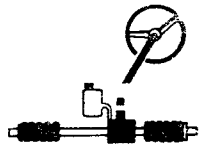
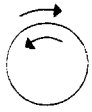
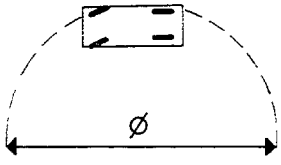
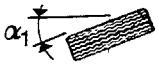
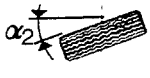
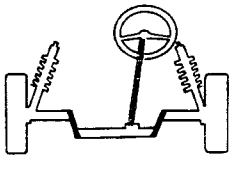
FRONT BRAKES

		Values in mm
 Disc	∅	284
	s	21,90 ÷ 22,10
	s	20,9
	s < allowed	20,2
 Brake pads	s < allowed	1,5
Caliper	∅	54
 Master cylinder (pump)	∅	22,225 (7/8")
 Servo brake		ISOVAC 7"
 Distance of hydraulic piston push rod from master cylinder support plate	L	0 ÷ 0,3

REAR BRAKES

		Values in mm
 Disc	∅	227
	s	10,70 ÷ 10,90
	s	9,70
	s < allowed	9
 Brake pads	s < allowed	1,5
Caliper	∅	34
 Load proportioning valve		acting on rear wheels
Ratio (reduction) 		0,36

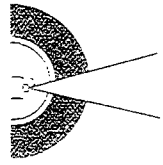
Type	 rack and pinion power assisted
 Ratio —   no. of turns lock to lock	2,835
 rack travel	134 mm
 Minimum turning circle	10,4 m
   Steering angle — outer wheel α_1	30°46'
inner wheel α_2	35°4'
 Steering column	 with 2 universal joints

WHEELS

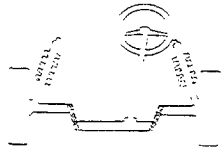
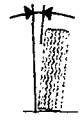
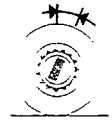
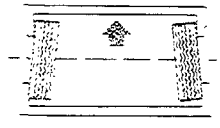
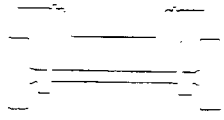
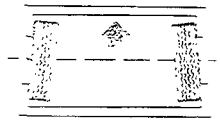
 Tyre	type		205/50 - VR 15
	front	average load	2 bar
		heavy load	2,2 bar
	rear	average load	2 bar
		heavy load	2,2 bar
 Rim	type		light alloy 7Jx15"

NOTE Spare wheel with 4J x 15" AH2 rim and 115/70 R15" XTL tyre
Speed limit: 80 km/h. Inflation pressure: 4,2 bar

WHEEL GEOMETRY




unladen car (*)

 Front suspension	camber (**)		- 1' ± 30'
	caster (**)		3°10' ± 30'
	toe in		- 2 ± 1 mm (●)
 Rear suspension	camber (**)		- 1°30' ± 30'
	toe in		3 ÷ 5 mm (●)

(*) With tyres inflated to the correct pressure and vehicle in running order
(**) Angles cannot be adjusted (●) Measured on a 360 mm diameter

Front suspension independent, Mac Pherson type with lower track control arm and damper comprising double acting telescopic shock absorber and offset coil spring.
Stabilizer bar

Coil spring

Diameter of wire	mm	13 ± 0,05
Number of turns		5,39
Direction of coil		clockwise
Height of spring released	mm	405,95
Height of spring under a load of 415,8 daN	mm	180,5
The springs are subdivided into two categories, identifiable by a mark: yellow (1) for those under a load of: 415,8 daN		> 180,5
green (1) for those under a load of: 415,8 daN		⩽ 180,5

(1) Springs of the same category must be fitted.

Shock absorbers

Type: telescopic, hydraulic, gas double acting		Way-Assauto
Travel (start)	mm	151
Maximum extension (start)	mm	514,5

Rear suspension independent, Mac Pherson type with lower longitudinal track control arm and damper comprising double acting hydraulic telescopic shock absorber and offset coil spring.
Stabilizer bar

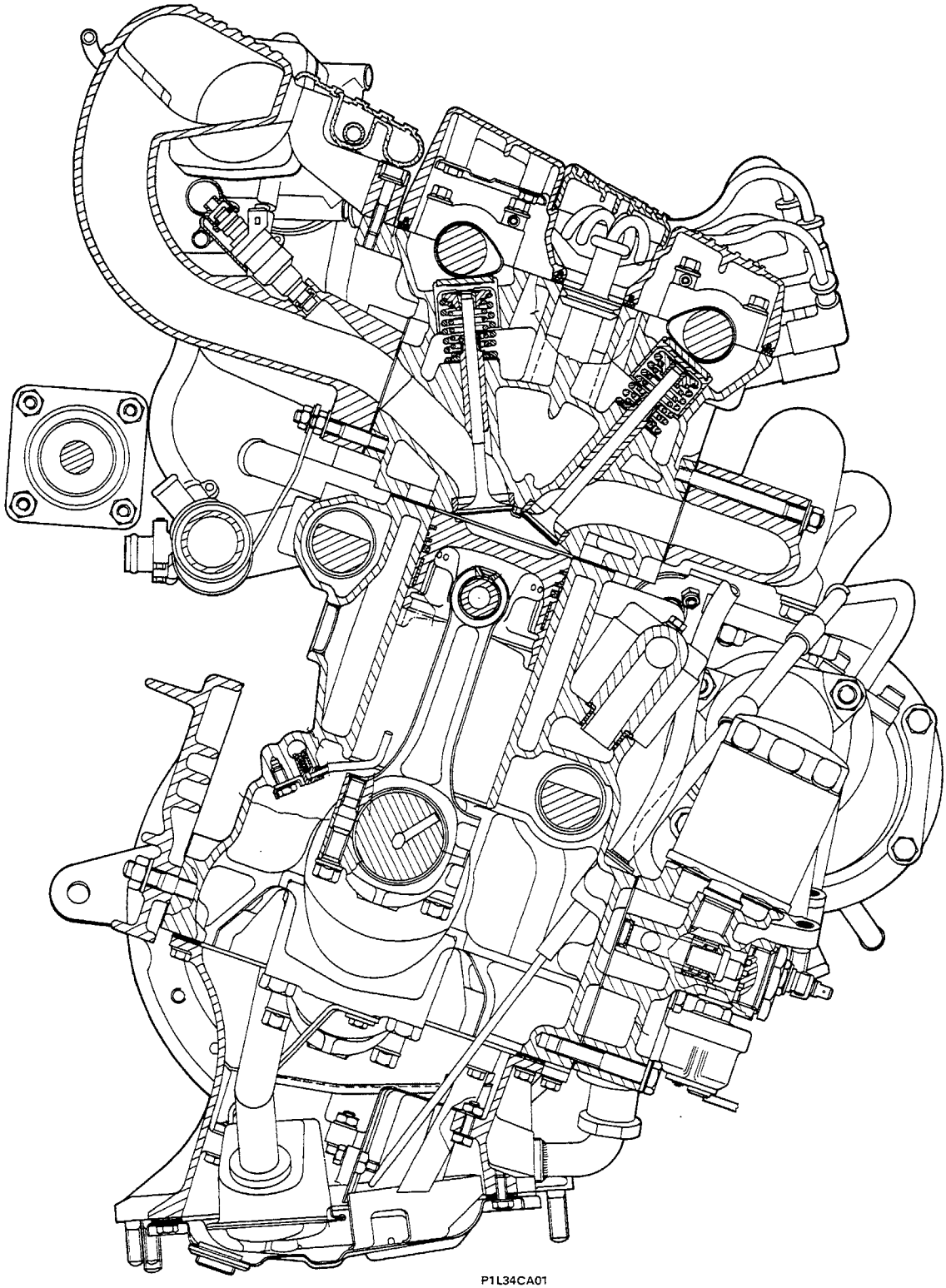
Coil spring

Diameter of wire		mm	12,1 ± 0,05
Number of turns			3,86
Direction of coil			clockwise
Height of spring released		mm	291
Height of spring under a load of 263 daN		mm	156,5
The springs are subdivided into two categories, identifiable by a mark:			
yellow (1) for those under a load of: 263 daN	having a height of mm		> 156,5
green (1) for those under a load of: 263 daN	having a height of mm		⩽ 156,5

(1) Springs of the same category must be fitted.

Shock absorbers

Type: telescopic, hydraulic double acting		Way-Assauto
Travel (start)	mm	175
Maximum extension (start)	mm	575



Cross section of engine

SUMMARY

STARTER MOTOR	M. Marelli E70R - 1,4 kW - 12 V M. Marelli E95 - 1,1 kW - 12 V Bosch ∅94 - 0,95 kW - 12 V
ALTERNATOR	M. Marelli AA125R - 14 V - 65 A
VOLTAGE REGULATOR	M. Marelli RTT 119 AC
BATTERY	12 V - 45 Ah - 225 A
IGNITION SYSTEM	Weber (MPI) electronic injection/ignition
IGNITION DISTRIBUTOR	DT 543 D
IGNITION COIL	M. Marelli BAE 504 DK
IGNITION COIL WITH CONTROL MODULE	M. Marelli AEI 600 C
SPARK PLUGS	Fiat V45 LSR M. MARELLI F8 LCR Bosch WR6 DC Champion RN7 YC

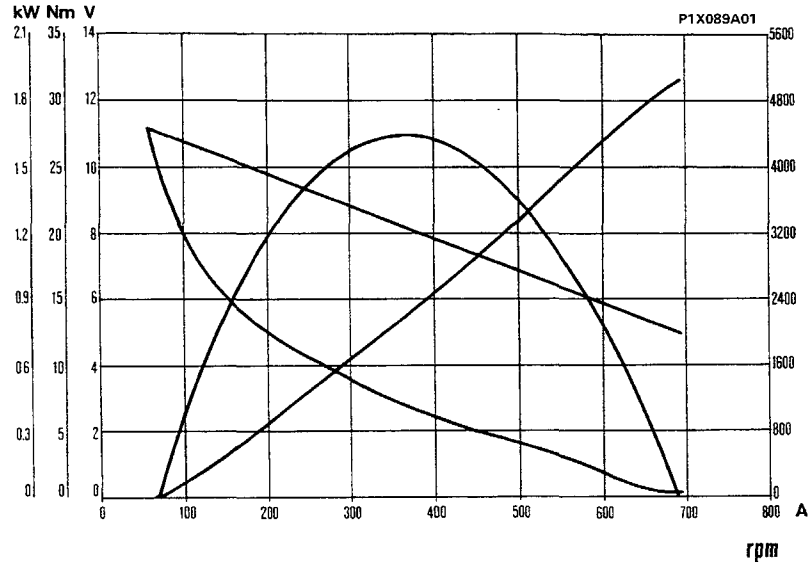
STARTER MOTOR

Type		M.MARELLI E70R-12V-1,4kW (with reduction gear)	M.MARELLI E95-12 V-1,1 kW	BOSCH ∅94-12 V-0,95 kW
Voltage	V	12		
Nominal power	kW	1,4	1,1	0,95
Rotation, pinion side		clockwise		
No. of poles		4		
Field coil		series winding	in series-parallel	series winding
Engagement		free wheel		
Operation		solenoid		
End float of armature shaft	mm	0,15 ÷ 0,45		
Data for bench test				
Operating test (*):				
current	A	360 ÷ 380	270	260
speed	rpm	1150	1750	1600
voltage	V	8,15	9,2	9,5
torque developed	daNm	1,30	0,65	0,70
Engagement test (*):				
current	A	680 ÷ 700	530 ÷ 570	460 ÷ 500
voltage	V	4,9	6,6	7,4
torque developed	daNm	3,11	⩾1,60	⩾1,50
Free running test (*):				
current	A	60 ÷ 80	35 ÷ 45	35 ÷ 45
voltage	V	11,1	11,6 ÷ 11,7	11,5
speed	rpm	4040	8500 ÷ 9500	9100 ÷ 10100
Relay				
Winding resistance (*) pull in	Ω	0,33 ÷ 0,37	0,33 ÷ 0,37	0,36 ÷ 0,38
Winding resistance (*) hold in	Ω	1,13 ÷ 1,27	1,13 ÷ 1,27	1,6 ÷ 1,7
Lubrication				
Internal splines and shaft bushes		VS' SAE 10 W		
Engagement sleeve and intermediate disc		TUTELA MR3		

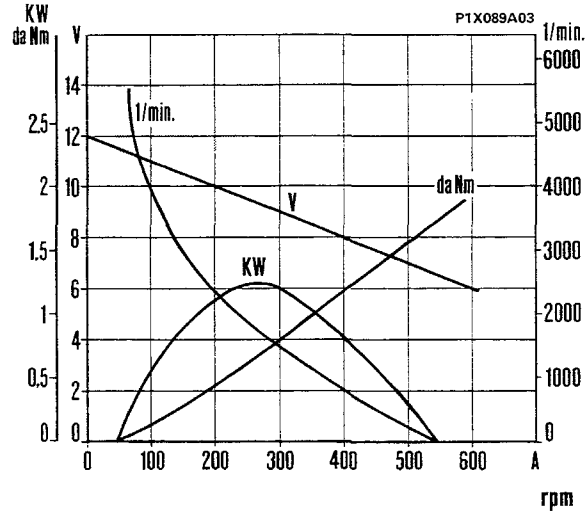
(*) Data obtained at an ambient temperature of 20°C.

NOTE *When overhauling it is not advisable to undercut the insulator between the commutator bars*

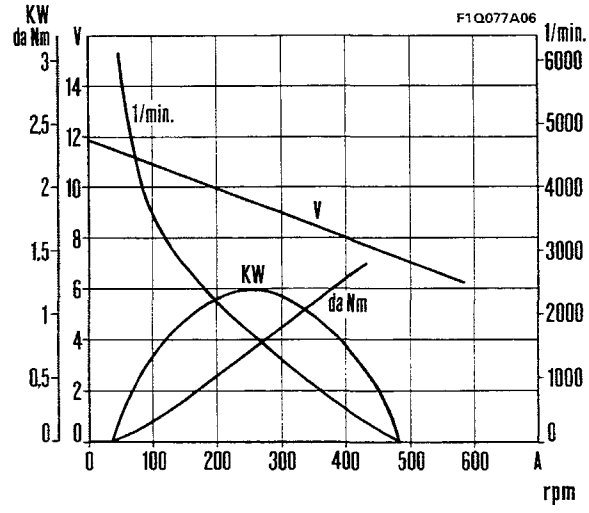
STARTER MOTOR – TYPICAL CURVES



M. Marelli E 70R - 12 V - 1,4 kW



M. Marelli E 95 - 1,1 kW - 12 V



Bosch ∅94 - 12 V - 0,95 kW

ALTERNATOR

Make and type		M. Marelli AA 125R - 14 V - 65 A
Nominal voltage	V	12
Maximum current	A	65
Cut in speed when warm	rpm	1050 ÷ 1150
Current delivery at the battery at 7000 rpm at operating temperature	A	⩾63
Field winding resistance, between the slip rings (*)	Ω	2,6 ÷ 2,8
Direction of rotation (seen from control side)		clockwise
Engine/alternator transmission ratio		1 : 2
Diode rectifiers		bridge

(*) Data obtained at an ambient temperature of 25 °C.

VOLTAGE REGULATOR

Type		Built in electronic RTT 119 AC
Alternator speed for test	rpm	7000
Thermal stabilization current	A	30 ÷ 35
Test current	A	32 ÷ 33
Regulation voltage (*)	V	14 ÷ 14,3

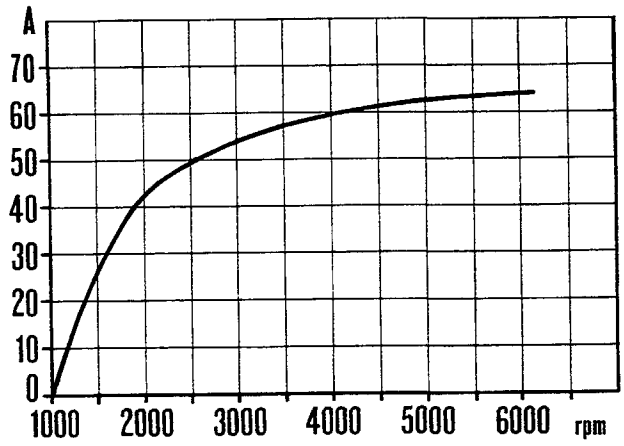
(*) Data obtained at an ambient temperature of 20 °C.

BATTERY

Nominal voltage	V	12
Capacity (20 hour discharge)	Ah	45

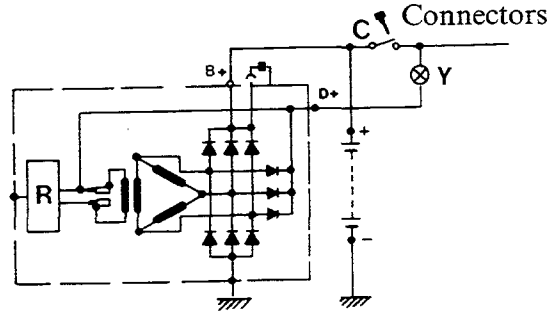
ALTERNATOR - TYPICAL OUTPUT CURVES

(at operating temperature, at a constant voltage of 13.5 V with bedded in brushes)



P2A067A02

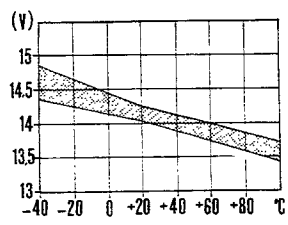
M. Marelli AA 125 R - 14 V - 65 A



P2A067A01

Wiring diagram for Marelli alternator

C = Ignition switch with key
Y = Battery recharging warning light (12V - 3/5W)
R = Electronic voltage regulator



P2A065A07

Typical regulator voltage curve
FIMM RTT 119 AC

ELECTRONIC IGNITION POWER MODULE

Make and type	M. Marelli AEI 600C
Firing order	1 - 3 - 4 - 2

DISTRIBUTOR

Make		M. Marelli
Type		DT 453 D
Built in rotor arm resistance	Ω	1000
Electro-magnetic impulse generator coil winding resistance at 20 °C	Ω	758 ÷ 872

IGNITION COIL

Make		M. Marelli
Type		BAE 504 DK
Ohmic resistance of primary winding at 20 °C	Ω	0,415 ÷ 0,495
Ohmic resistance of secondary winding at 20 °C	Ω	4320 ÷ 5280

TDC AND RPM SENSOR

Make and type		M. Marelli SEN 8 D
Sensor winding resistance	Ω	612 ÷ 748
Distance (gap) between sensor and crankshaft pulley teeth	mm	0,4 ÷ 1

ADVANCE ON ENGINE

Idling from 850 to 950 rpm	15° ± 2°

SPARK PLUGS

Make and type	Fiat V 45 LSR	Bosch WR 6 DC	Champion RN7YC	M. Marelli F8LCR
Thread	M 14 × 1,25			
Electrode gap	0.6 ÷ 0.7 mm			

I.A.W. ELECTRONIC INJECTION SYSTEM COMPONENTS

DESCRIPTION	QUANTITY	TYPE
ELECTRONIC CONTROL UNIT	1	WH4W.08/90E-95
BUTTERFLY CASING	1	56 CFL 54
INJECTOR	4	IW 058
AUTOMATIC IDLE ADJUSTMENT SOLENOID VALVE	1	VAE 01/02
PRESSURE REGULATOR	1	RP7/2.5 bar
AIR TEMPERATURE SENSOR	1	ATS 04
WATER TEMPERATURE SENSOR	1	WTS 05
ABSOLUTE PRESSURE SENSOR	1	APS 02/03
	1	APS 05/01
BUTTERFLY VALVE POSITION SENSOR	1	PF 09/02
FUEL FILTER	1	FI 02/2
ELECTRIC FUEL PUMP	1	PI 022/12

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ENGINE

1840207814	Tool (Ø 18-22 mm) for removing counter balance shaft front bearings from crankcase (to be used with 1840206000)
1850088000	Spanner (13 mm) for adjusting manifold fixing nuts
1850113000	Wrench (12 mm) for engine oil draining plug
1852137000	Spanner, 1/2" socket, for cylinder head fixing bolts
1852150000	Spanner for bolts fixing tappet covers
1853003000	Spanner (19 mm) for bolt fixing camshaft gear, on vehicle
1854033000	Spanner for electric pump or fuel filter ring nut on tank
1854038000	Spanner for fuel level sender ring nut on tank
1860054000	Installer (22 mm dia), piston pin bush
1860162000	Pressure gauge with unions for checking engine oil pressure (scale 0-9,81 bar)
1860183000	Pliers (Ø 75-110 mm) for removing and refitting piston rings
1860303000	Installer, piston pin snap rings
1860395000	Drift, valve guides removal
1860443000	Lever to insert tappet retainer during valve clearance adjustment
1860454000	Installer, oil seal on valve guide
1860456000	Cylinder head rest for use when replacing tappet plates (on bench vice)
1860470000	Tool to rest cylinder head during overhauling
1860486000	Drift, valve guides inserting
1860490000	Fixture to retain valve tightness test device 1895868000 (to be used with 1860470000)
1860592000	Universal hook for lifting and moving engine-gearbox unit
1860592010	Tool for removing and refitting engine-gearbox unit (to be used with 1860592000)
1860605000	Band (Ø 60-125 mm) for fitting normal and oversize pistons in cylinders
1860644000	Tool, valve removal and refitting
1860699000	Installer to fit crankshaft rear oil seal (to be used with 1870007000)
1860745100	Tool for toothed belts tensioning (to be used with specific parts)
1860745200	Tool for timing system toothed belt tensioning (to be used with 1860745100)
1860745400	Tool to stretch timing system counterrotating shaft toothed belt (use with 1860745100)
1860747000	Tool to hold tappets for replacing plates while adjusting valve clearance (to be used with 1860443000)
1860758000	Tool to remove oil filter
1860765000	Tool for retaining camshaft toothed pulley.
1860768000	Tool for rotating crankshaft on vehicle
1860769000	Board to rest cylinder head during valve removal and refitting
1860770000	Drift for fitting camshaft gaskets and crankshaft front gasket
1861001011	Pair of brackets to secure engine on rotating stand 1861000000

1867028000	Pair of threaded pegs for crankshaft rotation (on bench)
1867029000	Flywheel lock
1876036000	Jumper for rotating engine when adjusting valve clearance
1890385000	Reamer (7 mm dia) for valve guide bores
1895362000	Cooling system leakage test equipment
1895683000	Device for checking engine cylinder compression (scale 4.05 - 18.2 bar)
1895683002	Cards for tool 1895683000
1895762000	Dynamometer to check V and poly-V belt tension
1895868000	Valve leakage test equipment
1895890000	Fuel pump delivery pressure gauge with unions
1896248000	Gauge for checking valve stem height after refacing bores in cylinder head

CLUTCH

1875029000	Clutch disk centering pin
1875084000	Tool for removing thrust bearing from clutch release mechanism

GEARBOX

1846001000	Half rings to withdraw gearbox main shaft bearing (engine side) (to be used with 1846017000)
1850113000	Wrench (12 mm), oil sump draining plug
1855035000	Spanner (19 mm) for removing and refitting gearbox
1870595000	Cross member for supporting engine whilst removing-refitting gearbox-differential unit
1870600000	Support to hold gearbox-differential assy during removal and installation
1871001014	Support for gearbox-differential unit whilst overhauling (to be fitted to 1861000000 or to **1871000000**)

FRONT AND REAR DIFFERENTIAL

1845062000	Tool to remove front axle shaft constant velocity joint (to be used with 1847017001)
1847017004	Plate to remove shaft from crown wheel (to be used with 1847017001)
1870100002	Drift for fitting front differential cover seal and bearing and front and rear differential pinion seal
1870152000	Drift to fit differential bevel pinion bearings inner race (1) rear bearing only
1870430000	Tool to gauge adjusting shim of front and rear differential bevel pinion (to be used with 1870404000, 1895884000 and 1895113000)
1870432000	Tool to retain front differential bevel pinion when handling lock nut
1870433000	Tool to check clearance between front differential pinion and ring gear (to be used with 1895684000)
1870434000	Tool to fit rear differential right flanged shaft seal (to be used with 1870007000)
1870435000	Tool to fit outer rings of front and rear differentials pinion bearings (to be used with 1870007000 and 1840005002)
1870436000	Support for front and rear differentials (operation at the bench)

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1870437000 Tool to remove inner ring of front and rear differential bevel pinion shaft rear bearing (to be used with 1846017000)

1870438000 Tool to remove inner rings of front and rear differential case bearings (to beused with 1840005001, 1840005302 and 1840005400)

1870439000 Tool to check rolling torque of front differential case bearings and of rear differential bevel pinion bearings (to be used with 1895697000)

1870440000 Tool for checking contact of front and rear differential pinion/crown wheel teeth (to be used with 1870433000, 1870439000, 1870442000 and 1870443000)

1870441000 Tool to retain bevel pinion when handling lock nut and when checking rear differential pinion/ring gear clearance (to be used with 1895684000)

1870443000 Tool to check rolling torque of front differential case bearings and of rear differential bevel pinion bearings (to be used with 1895697000)

1870597000 Installer for differential cover oil seal (to be used with 1870007000)

1875017000 Tool to remove and refit differential bearing rings (to be used with 1840005003)

1875019000 Tool to remove and refit differential bearing rings (to be used with 1840005003)

1895655000 Tool to select differential bearing adjusting shims (to be used with 1895884000)

BRAKING SYSTEM

1856132000 Spanner (10-11 mm) for adjusting brake fluid pipe unions

STEERING

1847035000 Puller for steering rod ball pins

SUSPENSION AND WHEELS

1847017004 Plate for pulling wheel hub (to be used with 1847017001)

1854015000 Spanner (19 mm) for removing and refitting shock absorber fixing nut

1870152000 Drift for fitting bearing and hub on rear stub axle

1874555000 Pneumatic tool for compressing suspension springs when removing shock absorbers

ELECTRICAL EQUIPMENT

1850087000 Spark plug wrench

1857504000 Spanner (29 mm) for adjusting air conditioning system compressor pipe unions

1876046000 Lever to disconnect tag terminals from block

1895879000 Tool for checking cylinder no. 1 piston T.D.C. for positioning sensor carrier plate (static advance electronic ignition) (to be used with 1895881000)

1895895000 Tool for positioning sensor carrier plate, timing side (static advance electronic ignition)

IODYWORK

1859008000 Spanner for outer rear view mirror ring nut

1878017000 Pliers to clamp seat spring hooks

1878031000 Set of suction pads (4) for raising windscreen and rearscreen glass

1878076000 Tool to cut internal trimming plastic protection

1878077000 Tool to remove door trim panels or plastic buttons

ORDINARY TOOLS

1840005000	Puller, universal
1840206000	Percussion extractor (to be used with special tools)
1846017000	Base for puller half-rings
1847017001	Percussion extractor (to be used with special tools)
1861000000	Rotating stand for overhauling engine (also for gearboxes and differentials)
1861000001	Pair of sections for brackets supporting the engine on rotating stand 1861000000
1870007000	Universal handle
1870404000	Support for measuring depth and projection (to be used with 1895881000)
1871000000	Rotating column for overhauling gearboxes and differentials
1874549000	Support for vehicle rear and lifting (to be used with hydraulic jack)
1895113000	Gauge (0,05-0,10 ... 0,80 mm) for checking various clearances
1895684000	Dial gauge with magnetic base
1895697000	Dynamometer (0-4,90 Nm) for measuring bearing rolling torque
1895881000	Dial gauge to be used with special tools (measuring capacity 10 mm; shank length 16.7 mm)
1895884000	Dial gauge to be used with special tools (measuring capacity 5 mm; shank length 16.5 mm)

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DESCRIPTION	Thread size	Tightening torque
		daNm
ENGINE		
Centre bearing cap to crankcase fixing, bolt	M 12 x 1,25	2 + 130°
Bearing caps to crankcase fixing, bolt	M 12 x 1,25	2 + 90°
Rod to aluminium guard and torque converter fixing, nut	M 10 x 1,25	5
One-way oil drain valve	3/8" 14 NPTF	5
Bracket to Ferguson joint aluminium guard, differential and bell housing fixing, nut	M8	2,5
Aluminimum guard and bell housing rear brackets fixing, nut	M 10 x 1,25	5
Reaction mounting to torque converter fixing, bolt	M 12 x 1,25	9,5
Cylinder head to crankcas fixing, bolt	M 10 x 1,25	5 + 90° + 90°
Camshaft cap fixing, bolt	M 8	2,5
Inlet manifold to cylinder head fixing, nut	M 8	2,5
Exhaust manifold to cylinder head fixing, nut	M 8	2,5
Inlet manifold mounting to cylinder head fixing, bolt	M 8	2,5
Big end fixing, bolt	M 10 x 1	2,5 + 50°
Flywheel to crankshaft fixing, bolt	M 12 x 1,25	14,2
Poly-V belt and power assisted steering pump drive pulley fixing, bolt	M 8	2,5
Timing gear to crankshaft fixing, bolt*	M 14 x 1,5 Left hand	19
Belt tensioner bearing to mounting fixing, bolt	M 10 x 1,25	4,4
Belt tensioner mounting to alternator and power assisted steering mounting fixing, bolt	M 8	2,3
Poly-V belt tension adjustment screw stop, nut	M 10 x 1	4,4
Timing gear fixing, bolt	M 12 x 1,25	11,8
Camshaft belt tensioner bearing fixing, nut	M 10 x 1,25	4,4

* The bolt should not be lubricated

DESCRIPTION	Thread size	Tightening torques
		daNm
Counter balance shaft gear fixing, bolt	M 12 x 1,25	11,8
Counter balance shaft cover fixing, bolt	M 8	2,3
Counter balance shaft belt tensioner fixing, nut	M 8	2,3
Turbocharger to exhaust manifold fixing, nut	M 10 x 1,5	5,9
Union to turbocharger fixing, nut	M 10 x 1,5	5,9
Turbocharger mounting bracket to crankcase fixing, bolt	M 8	2,9
Turbocharger mounting bracket and exhaust pipe mounting bracket to crankcase fixing, nut	8	2,9
Oil supply pipe to turbocharger fixing, bolt	M 8	2,3
Filler for adjustable union fixing oil supply pipe to oil filter mounting	M 14 x 1,5	5
Oil supply pipe support bracket to exhaust manifold fixing, bolt	M 10 x 1,25	4,3
Oil return pipe from turbocharger to sump fixing, bolt	M 8	2,3
Filler for adjusting union fixing coolant supply and return pipes to the turbocharger	M 16 x 1,5	3,2
Oil filter mounting and engine mounting to crankcase fixing, bolt	M 10 x 1,25	4,3
Plug for thermostatic valve on oil filter mounting	M 35 x 1,5	11,8
Oil level dip stick fixing, bolt	M 8	2,5
Water pump to crankcase fixing, bolt	M 8 x 1	2,5
Water pump union to casing fixing, bolt	M 8	2,3
Accelerator outer cable reaction bracket to inlet manifold fixing, bolt	M 8	2,5
Coolant return pipe to inlet manifold fixing, nut	M 8	2,3
Thermostat to cylinder head fixing, nut	M 8	2
Complete coolant return pipe to cylinder head fixing, bolt	M 8	2,3