Fiat X1/9 Speciale

Data and Characteristics

FIAT

Settore Automobili
Gruppo Veicoli Fiat
Assistenza Tecnica

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IMPORTANT - All the dimensions in metric units shown in this publication are the official ones.

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The information contained in this Manual is not binding and provided the basic specification of the model described herein is not affected FIAT reserve the right to introduce any change in their products without obligation immediately to update this publication

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Gruppo Veicoli Fiat - Assistenza Tecnica
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IDENTIFICATION DATA

Engine type	128 AS.000	Chassis type	128 AS

ENGINE

Cycle	4 stroke, petrol
No. of cylinders	4
Bore	3.386″ (86 mm)
Stroke	2.185″ (55.5 mm)
Displacement	1,290 cc
Compression ratio	9,2 to 1
Maximum power (DIN)	53,7 KW (73 HP)
at	6,000 rpm
Maximum torque (DIN)	101 N · m (10,3 kgm)
at	3,400 rpm
Position	central
Arrangement	transversal

Valve Gear:

— Inlet	opens	12° B.T.D.C.
	closes	52° A.B.D.C.
— Exhaust	opens	52° B.B.D.C.
	closes	12° A.T.D.C.

Tappet clearance

— For timing check:	
Inlet	0,60 mm
Exhaust	0,65 mm
— Normal (cold):	
Inlet	0,40 mm
Exhaust	0,50 mm

Fuel System:

— Feeding by mechanical pump.

— Weber 32 DMTR 34/250, downdraft, dual-barrel carburettor. Gradually acting starting device - choke - and accelerating pump, sealed slow running speed adjustment screw.

— EEC device at idle.

— Fuel overflow return line, from carburettor to tank.

Lubrication System: Oil pressure (at 100° C) 3,43 to 4,90 bar (3,5 to 5 kg/cm^2).

Cooling:

— Forced water circulation, using a centrifugal pump.

— Thermostat on head water outlet hose from engine to radiator: begins to open at a temperature of 82° to 84° C.

— Electric cooling fan motor operated by a thermostatic switch on radiator cut-in water temperature 85° to 89° C.

— Auxiliary expansion bottle.

CHASSIS

CLUTCH

Hydraulically controlled dry single-plate type; diaphragm spring release mechanism.

Pedal free play, about . . . . 30 mm

TRANSMISSION

Four forward speeds, synchromesh, and reverse; gearshift lever on floor tunnel.

Gear ratios (to 1):

— first synchromesh	3.583
— second synchromesh	2.235
— third synchromesh	1.454
— top synchromesh	0.959
— reverse	3.714

DIFFERENTIAL

Housed in transmission main case.

Final drive by cylindrical, helical-toothed gears.

Ratio . . . . 4.076 to 1 (13/53)

Rear drive by axle shafts connected to differential with « Tripode » constant-speed joints and to wheels with ball constant-speed joints.

BRAKES

Dual hydraulic system on the four wheels, indipendent at front and rear.

Front and rear brakes: disc type.

Parking hand brake acting mechanically on rear wheel calipers.

STEERING

Rack and pinion type.

Ratio:

— number of steering wheel turns	abt. 3
— corresponding rack travel . .	4.606″ (117 mm)
Turning circle diam., abt. . .	32.808 ft (10 m)

Dual steering column with two universal joints.

Indipendent and symmetrical track rods for each wheel; joints lubricated for life.

FRONT SUSPENSION

Independent wheel type. Lower control arms consisting of a cross rod and a reaction strut; telescopic knuckle pillars incorporated in double-acting hydraulic shock absorbers. Coil springs and co-axial buffers.

Articulation joints are lubricated for life.

Caster	Laden (*)	6° 30′ to 7° 30′
	Unladen (**) . . .	6° 30′ to 7° 30′
Camber	Laden (*)	— 0° 40′ to — 1° 20′
	Unladen (**) . . .	0° to — 1°
Toe-in	Laden (*)	2 to 6 mm
	Unladen (**) . . .	2 to 4 mm

REAR SUSPENSION

Independent wheel type. Lower control arms and telescopic knuckle pillars incorporated in double-acting hydraulic shock absorbers.

Coil springs and co-axial buffers.

Adjustable cross tie rods.

Camber	Laden (*)	— 1° 40′ to — 2° 20′
	Unladen (**) . . .	— 1° 40′ to — 2° 10′
Toe-in	Laden (*)	4 to 6 mm
	Unladen (**) . . .	4 to 8 mm

(*) Car laden: 2 persons + 44 lb. (20 kg) and tyres inflated to specified pressures.
(**) Kerb weight.

ELECTRICAL SYSTEM

Voltage	12 V
Battery capacity (at 20-hour discharge rate)	45 Amp/hr
Alternator FIMM type	A 124 - 14 V - 44 A
Voltage regulator type	RC 2/12 D
Starting motor, FIAT type . . .	E 84-0,8/12 var. 1

Sparking plugs:

Magneti Marelli	type	CW 78 LP
Champion	type	N 7 Y
Bosch	type	W 200 T 30
— Thread		M 14 x 1.25

— Electrodes gap:

Magneti Marelli	0.6 ÷ 0.7 mm
Champion	0.6 ÷ 0.7 mm
Bosch	0.6 ÷ 0.7 mm

WEIGHTS - PERFORMANCES

Kerb **weight** (with water, oil, fuel, spare wheel, tool kit and accessories	1,940 lb. (880 kg)
Carrying capacity . .	2 persons + 132 lb. (60 kg)
Gross weight, fully laden	2,381 lb. (1,080 kg)

Distribution on axles:

— front	1,036 lb. (470 kg)
— rear	1,345 lb. (610 kg)
Maximum towable weight	1,653 lb. (750 kg)

Maximum **speeds** on flat road with good surface (run-in and fully laden):

— first gear	31 mph (50 kph)
— second gear	50 mph (80 kph)
— third gear	75 mph (120 kph)
— top gear, more than	106 mph (170 kph)
— reverse	31 mph (50 kph)

Climbable **gradients** on good surfaces (run-in and fully laden):

— first gear	43 %
— second gear	24 %
— third gear	15 %
— top gear	8 %
— reverse	43 %

CAPACITIES

Description	Quantity dm³	Quantity kg	Recommended Fluid
Fuel tank including a reserve of	49 5 to 7,5	— —	Premium (4-star) Petrol
Radiator, engine, expansion tank, heater and lines	11	—	Water ([2])
Engine sump and filter ([1])	4,25	3,825	**Oliofiat VS+** or **Multigrado**
Transaxle oil	3,15	2,85	**Oliofiat ZC 90**
Steering box	0,140	1,127	**Oliofiat W 90/M**
Constant velocity joint and boot (each)	—	0,095	**Grassofiat MRM 2**
Front brake circuit Rear brake circuit Clutch hydraulic circuit	0,160 0,160 0,180	0,160 0,160 0,180	**Liquido FIAT Etichetta Azzurra DOT 3**
Screen washer bottle	2	—	Water and FIAT **DP1** liquid ([3])

([1]) Total lubricating system capacity is 5 dm³ (4,5 kg). The tabulated value is the requirement for periodic oil changing.

([2]) At the beginning of the cold season use **Paraflu 11** which incorporates oxidation, corrosion and scale control properties, is effective down to —35° C, when mixed half-and-half with water.

([3]) In warm climates use 30 cm³ of FIAT DP1 per dm³; in cold climates (down to —10° C) use a 50-50 mixture of water and FIAT DP1. Below —10° C use exclusively FIAT DP1.

ENGINE OIL GRADE DESIGNATIONS

Atmospheric Temperature	Oliofiat Single-grade	Oliofiat Multi-grade
Below —15° C	**VS+ 10 W** (SAE 10 W)	—
—15° to 0° C	**VS+ 20 W** (SAE 20 W)	**15 W/40**
Up to 35° C	**VS+ 30** (SAE 30)	
Above 35° C	**VS+ 40** (SAE 40)	

Do not mix different brands or grades.

WHEELS AND TYRES

Disc wheels with 4 1/2 J x 13″ rims

Radial tyres, 145-13″

Inflation Pressure	bar	kg/cm²
— Front	1,76	1,8
— Rear	1,96	2

Fiat X1/9

ENGINE
CYLINDER BLOCK - CON-RODS

TABLE II-1

DESCRIPTION	in	mm
Cylinder bore diameter . . . . Cylinder bores are graded into classes with .0004″ (0.01 mm) progression.	3.3858 to 3.3878	86.000 to 86.050
Auxiliary shaft bushing seats, diameters: — drive end . . . . — inside end	 1.5236 to 1.5248 1.3794 to 1.3806	 38.700 to 38.730 35.036 to 35.066
Crankshaft main bearing seat diameter	2.1459 to 2.1465	54.507 to 54.520
Length of rear main bearing seat between thrust ring seats	.8716 to .8740	22.140 to 22.200
Big-end bearing housing diameter	1.9146 to 1.9152	48.630 to 48.646
Thickness of standard big-end bearings	.0603 to .0606	1.531 to 1.538
Range of undersize big-end bearings for service	.010-.020-.030-.040	0.254-0.508-0.762-1.016
Big-end bearings: — fit clearance	 .0014 to .0034	 0.036 to 0.086
Small-end bore diameter	.9425 to .9438	23.939 to 23.972
Small-end bushing O.D.	.9455 to .9465	24.016 to 24.041
Small-end bushing fit: — interference	 .0017 to .004	 0.044 to 0.102
Small-end bushing ream bore, fitted . . . . . Grade 1	.8663 to .8664	22.004 to 22.007
Small-end bushing ream bore, fitted . . . . . Grade 2	.8664 to .8665	22.007 to 22.010
Piston pin — small-end bushing fit: — clearance of new parts	 .0004 to .0006	 0.010 to 0.016
Maximum misalignment between C/Ls of connecting rod small-end and big-end: — measured at 4.92″ (125 mm) from the shank	 ± .0039	 ± 0.10

ENGINE
PISTONS - PIN - RINGS

DESCRIPTION		in	mm
Diameter of standard replacement pistons, measured at right angles to C/L of piston pin:			
— at 1.08″ (27.5 mm) from piston skirt edge	Class A	3.3827 to 3.3831	85.920 to 85.930
	Class C	3.3835 to 3.3839	85.940 to 85.950
	Class E	3.3842 to 3.3846	85.960 to 85.970
Oversize piston range		.0079-.0157-.0236	0.2-0.4-0.6
Piston boss bore diam.	Grade 1	.8660 to .8661	21.996 to 21.999
	Grade 2	.8661 to .8662	21.999 to 22.002
Piston ring groove width	Top groove	.604 to 0.612	1.535 to 1.555
	Centre groove	.0799 to .0807	2.030 to 2.050
	Bottom groove	.1562 to .1570	3.967 to 3.987
Standard piston pin diam.	Grade 1	.8658 to .8659	21.991 to 21.994
	Grade 2	.8659 to .8660	21.994 to 21.997
Oversize piston pin range for service		.0079	0.2
Piston ring thickness:			
— first: compression ring		.0582 to .0587	1.478 to 1.490
— second: oil ring		.0778 to .0783	1.978 to 1.990
— third: scraper ring with oilways and expander		.1544 to .1549	3.925 to 3.937
Piston fit in bore (at right angle to pin, 1.08″ [27.5 mm] apart from piston skirt edge):			
— clearance of new parts		.0021 to .0028	0.050 to 0.070
Piston pin in boss: clearance of new parts		.0001 to .0003	0.002 to 0.008
Piston ring fit (side clearance):			
— first compression ring: clearance of new parts		.0018 to .0030	0.045 to 0.077
— second oil ring: clearance of new parts		.0016 to .0028	0.040 to 0.072
— third scraper ring: clearance of new parts		.0012 to .0024	0.030 to 0.062
Ring gap (fitted):			
— first compression ring		.0118 to .0176	0.30 to 0.45
— second oil ring		.0118 to .0176	0.30 to 0.45
— third scraper ring		.0098 to .0157	0.25 to 0.40
Oversize piston ring range		.0079-.0157-.0236	0.2-0.4-0.6

Fiat X1/9

ENGINE

CRANKSHAFT AND MAIN BEARINGS

TABLE II-3

DESCRIPTION	in	mm
Main journals standard diameter	1.9994 to 2.0002	50.785 to 50.805
Main bearing seat bore	2.1459 to 2.1465	54.507 to 54.520
Standard main bearing thickness	.0718 to .0721	1.825 to 1.831
Main bearing undersize, for service	.01-.02-.03-.04	0.254-0.508-0.762-1.016
Crankpins standard diameter	1.7913 to 1.7920	45.498 to 45.518
Main bearing-to-journal: — assembly clearance	.0020 to .0037	0.00 to 0.05
Length of rear main journal, between shoulders	1.0620 to 1.0639	26.975 to 27.025
Width of rear main bearing seat, between thrust ring seats	.8716 to .8740	22.140 to 22.200
Thickness of rear main bearing seat thrust ring	.0909 to .0929	2.310 to 2.360
Oversize thrust ring thickness	.0959 to .0979	2.437 to 2.487
Crankshaft end-to-rear main bearing seat, thrust rings installed: — assembly clearance	.0021 to .0104	0.055 to 0.265
Maximum misalignment of main journals	.0012 (*)	0.03 (*)
Maximum misalignment of crankpins to main journals . .	± .014	± 0.35
Maximum out-of-round of crankpins and main journals, after grinding	.0002	0.005
Maximum taper of crankpins and main journals, after grinding	.0002	0.005
Squareness of flywheel resting face to crankshaft centreline: — max. out-of-true with dial gauge plunger set laterally some $1^{11}/_{32}''$ (34 mm) apart from crankshaft rotation axis	.0010	0.025
Flywheel: — parallel relationship of driven plate face to crankshaft mounting face: max. out-of-true . . . . — squareness of above faces to rotation axis: max. out-of-true	 .0039 .0039	 0.10 0.10

(*) Total gauge reading.

ENGINE
CYLINDER HEAD

DESCRIPTION	in	mm
Valve guide seat bore	.5491 to .5502	13.950 to 13.977
Outside diameter of valve guide	.5527 to .5534	14.040 to 14.058
Valve guide oversize on O.D., for service	.0079	0.2
Inside diameter of valve guides, press-fitted in head	.3158 to .3165	8.022 to 8.040
Fit between valve guide and seat in head: interference	.0025 to .0043	0.063 to 0.108
Diameter of valve stems	.3139 to .3146	7.974 to 7.992
Fit between valve stem and guide: — clearance of new parts	.0012 to .0026	0.030 to 0.066
Angle of valve seats on cylinder head	45° ± 5′	
Angle of valve faces	45° 30′ ± 5′	
Diameter of valve head: intake exhaust	1.4114 to 1.4231 1.2145 to 1.2263	35.85 to 36.15 30.85 to 31.15
Max. valve runout for a full turn guided by stem, with gauge plunger resting on centre of contact face	.0012	0.03
Width of valve seat in cylinder head (contact face), abt.	.0787	2
Inside diameter of valve seats in cylinder head: intake exhaust	1.1811 to 1.1890 1.0531 to 1.0609	30 to 30.2 26.75 to 26.95
Valve lift: intake exhaust	0.3621 0.3641	9,20 9.25
Diameter of tappet bores in head	1.4566 to 1.4576	37.000 to 37.025
Outside diameter of tappets	1.4557 to 1.4565	36.975 to 36.995
Fit clearance between tappets and bores in head	.0002 to .0020	0.005 to 0.050
Thickness of cap plate: basic dimension	.1575 ± .00047	4 ± 0.012

Tappet cap plates are supplied for service in the following thicknesses: .1279″ (3.25 mm) - .1299″ (3.30 mm) - .1318″ (3.35 mm) - .1339″ (3.40 mm) - .1347″ (3.45 mm) - .1378″ (3.50 mm) - .1397″ (3.55 mm) - .1417″ (3.60 mm) - .1436″ (3.65 mm) - .1457″ (3.70 mm) - .1476″ (3.75 mm) - .1496″ (3.80 mm) - .1516″ (3.85 mm) - .1535″ (3.90 mm) - .1555″ (3.95 mm) - .1575″ (4.00 mm) - .1594″ (4.05 mm) - .1614″ (4.10 mm) - .1634″ (4.15 mm) - .1653″ (4.20 mm) - .1673″ (4.25 mm) - .1693″ (4.30 mm) - .1713″ (4.35 mm) - .1732″ (4.40 mm) - .1752″ (4.45 mm) - .1772″ (4.50 mm) - .1791″ (4.55 mm) - .1811″ (4.60 mm) - .1831″ (4.65 mm) - .1850″ (4.70 mm).

VALVE SPRINGS

		Inner spring	Outer spring
Part number		4145143 4134900	4170469 4170458
Spring length under a load of 75.5 lb. (38.9 kg)	mm in	— —	36 1.417
Spring length under a load of 32.7 lb. (14.9 kg)	mm in	31 1.220	— —
Minimum acceptable load referred to the above lengths	kg lb.	13.5 29.7	36 79.2

ENGINE
VALVE MECHANISM

CAMSHAFT

DESCRIPTION	in	mm
Diameter of camshaft journal seats:		
— drive end	1.1807 to 1.1817	29.989 to 30.014
— intermediate, drive side	1.8890 to 1.8900	47.980 to 48.005
— centre	1.8968 to 1.8978	48.180 to 48.205
— intermediate, flywheel side	1.9047 to 1.9057	48.380 to 48.405
— flywheel end	1.9126 to 1.9136	48.580 to 48.605
Diameter of camshaft journals:		
— drive end	1.1789 to 1.1795	29.944 to 29.960
— intermediate, drive side	1.8872 to 1.8878	47.935 to 47.950
— centre	1.8951 to 1.8957	48.135 to 48.150
— intermediate, flywheel side	1.9030 to 1.9035	48.335 to 48.350
— flywheel end	1.9108 to 1.9114	48.535 to 48.550
Fit between seats and camshaft journals:		
— assembly clearance: drive end	.0011 to .0028	0.029 to 0.070
— assembly clearance: intermediate, drive side	.0012 to .0028	0.030 to 0.070
— assembly clearance: centre	.0012 to .0028	0.030 to 0.070
— assembly clearance: intermediate, flywheel side	.0012 to .0028	0.030 to 0.070
— assembly clearance: flywheel end	.0012 to .0028	0.030 to 0.070

AUXILIARY DRIVE SHAFT

DESCRIPTION	in	mm
Diameter of bushing seats in crankcase:		
— drive end	1.5236 to 1.5248	38.700 to 38.730
— inside end	1.3794 to 1.3805	35.036 to 35.066
Inside diameter of bushings finished in seats:		
— drive end	1.4041 to 1.4049	35.664 to 35.684
— inside end	1.2598 to 1.2606	32.000 to 32.020
Diameter of shaft journals:		
— drive end	1.4013 to 1.4023	35.593 to 35.618
— inside end	1.2575 to 1.2583	31.940 to 31.960
Fit between bushings and seats in crankcase	interference at all times	
Fit between bushings and shaft journals:		
— assembly clearance: drive end	.0018 to .0036	0.046 to 0.091
— assembly clearance: inside end	.0016 to .0031	0.040 to 0.080

ENGINE
FUEL SYSTEM - LUBRICATION

CARBURETTOR

	Primary barrel in	Primary barrel mm	Secondary barrel in	Secondary barrel mm
Type	WEBER 32 DMTR 34/250			
Bore	1.260	32	1.260	32
Main venturi	.866	22	.866	22
Main jet	.043	1.10	.045	1.15
Idle jet	.020	0.50	.028	0.70
Main air corrector	.0865	2.20	.075	1.90
Idle air corrector	.020	0.50	.020	0.50
Accelerator pump jet	0.16	0.40	—	—
Anti-siphon bleed	.039	1.00	—	—
Emulsion tube type	F 30			
Extra fuel device air jet	—	—	—	2.00
Extra fuel device jet	—	—	.039	1.00
Choke type	throttle valve			
Partial opening of primary throttle valve (choke on)	.031″ to .034″ (0.80 to 0.85 mm)		—	—
Needle valve seat	.059″ (1.50 mm)			
Accelerator pump output (10 strokes)	4,7 cm³			
Float level: distance between float and cover with gasket, in vertical position (see TABLE II-d)	7 ± 0.25 mm			

OIL PUMP

Clearance between gears upper side and pump cover mating face	.0008″ to .0041″ (0.020 to 0.105 mm)
Clearance between gears and pump housing inside wall	.0043″ to .0071″ (0.11 to 0.18 mm)

OIL PRESSURE RELIEF VALVE SPRING

Part number	4153861
Length of seated spring under a load of 11 lb. (5 kg)	.827″ (21 mm)
Minimum permissible load referred to length of seated spring	9 1/2 lb. (4.3 kg)

ENGINE
TORQUE SPECIFICATIONS

ITEM	Part No.	Thread (metric)	Material	Torque ft.lb.	Torque kgm
Self-locking bolt, flywheel to crankshaft	1/43486/70	M 10 x 1.25	R 120	61.5	8.5
Bolt, breather duct to crankcase	1/60454/21	M 8	R 80 Znt	18	2.5
Nut, connecting rod cap bolt	1/25550/20	M 9 x 1	R 80 (bolt R 100)	36	5
Bolt, driven sprocket to camshaft	1/59707/70	M 10 x 1.25	R 120	61.5	8.5
Bolt, cylinder head hold-down	4223901	M 12 x 1.25	R 100	69	9.5
Nut, cylinder head studs	1/61015/21 1/60448/21	M 12 x 1.25	R 80 Znt (Stud R 100)	69	9.5
Cylinder head extension bolt	1/60467/21 1/11011/21	M 8	R 50 Znt	14.5	2
Self-locking bolt, main bearing caps	4263780	M 10 x 1.25	R 100	58	8
Nut, drive pulley on crankshaft	4179194	M 20 x 1,5	R 50 Znt (alb. GH 75-50-03)	101	14
Nut, bearing to belt tensioner support	1/21647/11	M 10 x 1.25	R 50 Znt (Stud R 100)	32.5	4.5
Nut, intake and exhaust manifold	1/61008/11	M 8	R 50 Znt (Stud R 80 Znt)	22	3
Bolt, oil pump and fuel pump shaft driven gear	1/59707/70	M 10 x 1.25	R 120	61.5	8.5
Nut, upper bracket to water pump	1/61008/11	M 8	R 50 Znt (Stud R 80 Znt)	18	2.5
Nut, alternator to lower support	1/21647/11	M 10 x 1.25	R 50 Znt (Bolt R 80 Znt)	36	5
Nut, alternator lower support to crankcase . . .	1/21647/11	M 10 x 1.25	R 50 Znt (Stud R 80 Znt)	36	5
Alternator lower mounting securing nut	1/59708/21	M 10 x 1.25	R 80 Znt	36	5

Fiat X1/9

CHASSIS
CLUTCH - TRANSMISSION - DIFFERENTIAL

TABLE III-1

CLUTCH	
Type	single-plate, dry
Control	hydraulic
Release mechanism	diaphragm spring
Clutch disc	with friction linings
Lining O.D.	7.126″ (181.5 mm)
Lining I.D.	5″ (127 mm)
Max. runout of clutch disk linings	.01″ (.25 mm)
Clutch pedal free travel, corresponding to a clearance of .079″ (2 mm) between diaphragm spring and release sleeve, abt.	1.181″ (30 mm)
Travel of release sleeve, corresponding to a minimum pressure plate displacement of .071″ (1.8 mm)	.334″ (8.5 mm)
Master cylinder bore	3/4″
Operating cylinder bore	3/4″
TRANSMISSION - DIFFERENTIAL	
Speeds	four forward and reverse
Synchronizers: spring ring type slip ring type	1st-2nd 3rd-4th
Gear type: forward reverse	constant mesh, helical-toothed straight toothed, with sliding idler gear
Gear ratios: first second third fourth reverse	3.583 to 1 2.235 to 1 1.454 to 1 0.959 to 1 3.714 to 1
Final drive cylindrical gear set	helical-toothed
Final drive ratio	4.077 to 1 (13/53)

Wheel ratios: Gears	1st	2nd	3rd	4th	rev.
Reduction ratio to 1	14.61	9.11	5.93	3.91	15.14

Differential case bearings	two
Bearing type	taper roller
Bearing pre-load setting	by shims
Side-to-pinion gear backlash adjustment	by thrust washers
Power drive to rear wheels	by axle shafts connected to differential through «Tripode» constant-speed joints and to wheels through ball constant-speed joints

CHASSIS
FRONT SUSPENSION

Type

Independent wheel. Lower control arms with reaction strut; telescopic knuckle pillars incorporated in hydraulic shock absorbers; coil springs and co-axial buffers.

Knuckle Pillars	
Caster — Laden (*)	6° 30′ to 7° 30′
Caster — Unladen (**)	6° 30′ to 7° 30′
— Adjustment: by shims set between reaction struts and supports.	
Wheels	
Camber — Laden (*)	−0° 40′ to −1° 20′
Camber — Unladen (**)	0° to −1°
Toe-in — Laden (*)	2 to 6 mm
Toe-in — Unladen (**)	2 to 4 mm
— Adjustment: by threaded sleeves on track rods.	
Locking suspension: with car at load (*).	
Coil Springs	
Part number	4288938
Length under a load of 474 ± 22 lb. (215 ± 10 kg)	6.693″ (170 mm)
Minimum permissible load referred to above length	441 lb. (200 kg)
Coil springs are divided into two classes color coded as follows:	
— yellow, springs which, under a load of 474 lb. (215 kg), have a length above	6.693″ (170 mm)
— green, springs which, under a load of 474 lb. (215 kg), have a length of	6.693″ (170 mm), or less
Spring pairs belonging to the same class should be fitted.	
Shock Absorbers	
Type: hydraulic, telescopic, double-acting.	
Part number	4290388
Pressure cylinder bore	1.063″ (27 mm)
Length (measured between upper face of dust shield and center of upper screw hole for attachment to knuckle pillar):	
— Extended (buffering begins)	13.720″ ± .079″ (348.5 ± 2 mm)
— Retracted	8.327″ ± .079″ (211.5 ± 2 mm)
Stroke (buffering begins)	5.394″ (137 mm)
Setting (1) — Compression	9.5 to 13 mm
Setting (1) — Rebound	16 to 21 mm

(*) Car laden: two persons plus 44 lb. (20 kg) luggage and tires inflated to specified pressures.
(**) Kerb weight.
(1) Data refer to fixture **Ap. 5023** under the following test conditions: arm 250 mm, travel 100 mm, dial position B-105°.

Type

Independent wheel. Lower control arms; telescopic knuckle pillars incorporated in hydraulic shock absorbers; coil springs and co-axial buffers. Adjustable cross tie rods.

Wheels	
Camber — Laden (*)	—1° 40′ to —2° 20′
Camber — Unladen (**)	—1° 40′ to —2° 10′
Toe-in — Laden I(*)	4 to 6 mm
Toe-in — Unladen (**)	4 to 8 mm
— Adjustment: by threaded sleeves on reaction rods.	
Locking suspension: with car at load (*).	
Coil springs	
Part number	4292214
Length under a load of 562 ± 22 lb. (255 ± 10 kg)	7.874″ (200 mm)
Minimum permissible load referred to the above length	518 lb. (235 kg)
Coil springs are divided into two classes color coded as follows:	
— yellow, springs which, under a load of 562 lb. (255 kg), have a length above	7.874″ (200 mm)
— green, springs which, under a load of 562 lb. (255 kg) have a length of	7.874″ (200 mm) or less
Spring pairs belonging to the same class should be fitted.	
Shock Absorbers	
Type: hydraulic, telescopic, double-acting.	
Part No.	4290389
Pressure cylinder bore	1.063″ (27 mm)
Length (measured between upper face of dust shield and center of upper screw hole for attachment to wheel stub axle):	
— Extended (buffering begins)	16.771″ ± .079″ (426 ± 2 mm)
— Retracted	11.378″ ± .079″ (289 ± 2 mm)
Stroke (buffering begins)	5.393″ (137 mm)
Setting (1) — Compression	9.5 to 13 mm
Setting (1) — Rebound	16 to 21 mm

(*) Car laden: two persons plus 44 lb. (20 kg) luggage, and tires inflated to specified pressures.
(**) Kerb weight.
(1) Data refer to fixture **Ap. 5023** under the following test conditions: arm 250 mm, travel 100 mm, dial position B-105°.

Fiat X1/9	**CHASSIS** **STEERING GEAR**	**TABLE** **III-4**

Steering gear type	rack and pinion
Gear ratio: — steering wheel turns, lock-to-lock, about — corresponding rack travel Ball joint pin articulation angle	 3 4.606″ (117 mm) $60° {}^{+0°}_{+6°}$
Pinion bearings Bearing adjustment Pinion adjustment shims	ball by shims set between pinion cover and upper ball bearing (See Table III-g) 0.12-0.20-0.25-2.5 mm
Adjusting rack-to-pinion lash Rack support adjustment shims	by shims set between cover for rack center pawl and gear housing (See Table III-g) 0.10-0.15 mm
Turning circle diam.	32.80 ft. (10 m) approx.
Track rods	adjustable, with fixed end ball joints
Lock angle: — outer wheel — inner wheel	 28° 32° 40′
Front wheel toe-in { Laden (*) Front wheel toe-in { Unladen	2 to 4 mm 2 to 6 mm
Steering column	dual, with two « U » joints

(*) Car laden: two persons plus 130 lb. (59 kg) of luggage and tires inflated to specified pressures.

Fiat X1/9

CHASSIS
BRAKES

TABLE III-5

Type	disk brakes on all wheels, with independent circuits at front and rear
FRONT	
Brake disks:	
— Diameter	8.937″ (227 mm)
— Thickness: nominal	.392″ to .400″ (9.95 to 10.15 mm)
— Thickness: minimum after refacing	.368″ (9.35 mm)
— Thickness: minimum from wear	.354″ (9 mm)
— Max. runout (total gage reading at .08″ - 2 mm from max. diameter)	.0059″ (.15 mm)
Brake calipers	floating type, single cylinder
Wheel cylinder bore	1.772″ (48 mm)
Brake pad clearance adjustment	automatic
Minimum permissible distance between inner faces of brake pads, not less than	.413″ (10.5 mm)
Minimum permissible thickness of brake pads, about	.079″ (2 mm)
REAR	
Brake disks:	
Diameter	8.937″ (227 mm)
— Thickness: nominal	.392″ to .400″ (9.95 to 10.15 mm)
— Thickness: minimum after refacing	.368″ (9.35 mm)
— Thickness: minimum from wear	.354″ (9 mm)
— Max. runout (total gage reading at .08″ - 2 mm from max. diameter)	.0059″ (.15 mm)
Brake calipers	floating type, single cylinder
Wheel cylinder bore	1.772″ (48 mm)
Lining clearance adjustment	automatic
Minimum permissible distance between inner faces of lining pads	.413″ (10.5 mm) or less
Minimum permissible thickness of lining pads, about	.079″ (2 mm)
Front and rear brakes master cylinder bore	3/4″ (19,05 mm)
Hand parking brake	acting mechanically on rear wheels

Fiat X1/9

CHASSIS
TORQUE SPECIFICATIONS

TABLE III-6

ITEM	Part No.	Thread (metric)	Material	Torque ft.lb.	Torque kgm
CLUTCH					
Bolt, clutch to flywheel	1/09022/31	M 6	R 100 Cdt	10.8	1.5
Bolt, clutch release fork	4200713	M 8	R 80 Znt	18	2.5
Nut, operating cylinder piston shank adjustment	1/61023/11	M 8	R 50 Znt (rod R 50 Ind Znt)	18	2.5
Bolt, operating cylinder	1/60441/21	M 8	R 80 Znt	18	2.5
Bolt, operating cylinder support plate to transmission case	1/61359/21	M 8	R 80 Znt	18	2.5
Nut, operating cylinder support plate to transmission case, stud	1/61008/11	M 8	R 50 Znt (Stud R 80 Znt)	18	2.5
TRANSMISSION AND DIFFERENTIAL					
Bolt, shifter rod detent spring retainer cover .	4212140	M 8	R 80 Znt	18	2.5
Bolt, bell housing to engine	1/55411/21	M 12 x 1.25	R 80 Znt	58	8
Bolt, main case cover	1/09026/21	M 6	5.8 Znt/Ec	7.2	1
Bolt, gearbox to bell housing	1/61008/11	M 8	R 80 Znt	18	2.5
Bolt gearbox cover	1/09026/12	M 6	R 80 Znt	7.2	1
Nut, bell housing to engine	1/61015/11	M 12 x 1.25	R 50 Znt (Stud R 80 Znt)	58	8
Bolt, reverse gear shaft lock plate	1/09023/21	M 6	R 80 Znt	7.2	1
Bolt, shifter forks and lugs	813149	M 6	R 100	14.4	2
Bolt, gearshift rod lever assembly	4170541	M 6	R 100	14.4	2
Bolt, tie rod with flexible coupling to gearshift rod	1/38260/21	M 8	8.8 Znt/Ec	21.7	3
Bolt, gearshift lever support	1/09029/21 1/60505/21	M 6	R 80 Znt	7.2	1
Bolt, final drive ring gear	4250995	M 10 x 1.25	R 100	50.6	7
Bolt, oil boot cover to differential case flange .	1/38240/21	M 6	8.8 Znt/Ec	10.8	1.5
Nut, oil boot cover to differential case flange .	1/58962/11	M 6	R 50 Znt (Stud R 80 Znt)	7.2	1
Nut, main case halves	1/60437/21	M 8	R 80 Znt	18	2.5
Bolt, bell housing and exhaust pipes	4313005	M 8	R 80 Znt	18	2.5

CHASSIS

TORQUE SPECIFICATIONS

ITEM	Part No.	Thread (metric)	Material	Torque ft.lb.	Torque kgm
POWER PLANT MOUNTINGS					
Nut, rubber pad to crossmember bolt, engine end	1/21647/11	M 10 x 1.25	R 50 Znt (Bolt R 100 Cdt)	25.3	3.5
Bolt, crossmember, transmission end	1/60436/31	M 8	R 100 Cdt	14.4	2
Bolt, power unit rubber pad support to gearbox .	1/60427/31	M 8	R 100 Cdt	18	2.5
Bolt, power plant anchor rod	1/61365/21	M 8	R 80 Znt	18	2.5
Bolt, power unit rubber pad	1/38260/11	M 8	5.8 Znt/Ec	10.8	1.5
FRONT SUSPENSION					
Nut, with stacking collar, bearing to wheel hub	4307325	M 20 x 1.5	C 40 Norm-Cdt (mozzo 38 CD 4 Bon)	159.13	22
Nut, self-locking, steering knuckle ball joint .	1/61051/11	M 12 x 1.25	R 50 Znt (Pin 40 NiCrMo 2 R Bon R 90 to 105)	58	8
Nut, self-locking, strut to bracket	1/61050/11	M 12 x 1.25	R 50 Znt (Strut C 30 Bon R ≥ 70)	50.6	7
Nut, strut to control arm	1/61050/11	M 12 x 1.25	R 50 Znt (Bolt R 80 Znt)	50.6	7
Nut, shock absorber-to-body upper mounting pad	1/58962/21	M 6	R 80 Znt (Bolt R 100 Cdt)	7.2	1
Bolt, brake caliper to hub carrier	4369039	M 10 x 1.25	R 80 Phos. black	36.2	5
Bolt, road wheel	4288432	M 12 x 1.25	C 35 R Bon Znt black	65.10	8.8
Nut, self-locking, track control arm	1/61051/11	M 12 x 1.25	R 50 Znt (Pin 40 Ni-Cr-Mo 2 Bon R 90 ÷ 105)	43.4	5.5
Nut, self-locking, shock absorber to steering knuckle bolt	1/25745/21	M 10 x 1.25	R 80 Znt (Bolt R 100 Cdt)	43.4	6
Nut, shock absorber top mounting	1/61050/11	M 12 x 1.25	R 50 Znt	43.4	6
Nut, bolt retaining tie rod bracket to track control arm	1/61008/11	M 8	R 50 Znt (Bolt R 50 Znt)	10.8	1.5

CHASSIS
TORQUE SPECIFICATIONS

ITEM	Part No.	Thread (metric)	Material	Torque ft.lb.	Torque kgm
(cont'd: **FRONT SUSPENSION)**					
Ring nut, front wheel bearing	4354049	M 62 x 1.5	R 50 Znt	43.4	6
Bolt, tie rod support	1/09232/21	M 10 x 1.25	R 80 Znt	29	4
Inlet union, front brake cylinder	4207393	M 10 x 1.25	C 4 MF Tfr Bon Cdt	21.7	3
REAR SUSPENSION					
Nut, with stacking collar, wheel hub	4219934	M 18 x 1.5	C 40 Norm. Cdt (Hub 38 CD 4 Bon)	101	14
Stud bolt, wheel	4288432	M 12 x 1.25	C 35 R Bon Znt black	65.10	8,8
Nut, self-locking, cross rod to control arm bolt	1/25748/21	M 14 x 1.5	R 80 Znt	65.10	8,8
Nut, self-locking, ball joint-to-steering knuckle	1/25748/21	M 14 x 1.5	R 80 Znt	72.3	10
Nut for bolt, clamp on cross ball joint rod sleeve	1/61008/11	M 8	R 50 Znt (Bolt R 80 Znt)	14.4	2
Nut, self-locking, control arm pivot pin	1/25748/21	M 14 x 1.5	R 80 Znt (Pin R 80 Znt)	72.3	10
Nut, self-locking, shock absorber top mounting	1/61050/21	M 12 x 1.25	R 80 Znt	43.4	6
Nut, self-locking, shock absorber-to-steering knuckle bolt	1/25745/21	M 10 x 1.25	R 80 Znt (Bolt R 100 Cdt)	43.4	6
Bolt, brake caliper to steering knuckle	4164496	M 10 x 1.25	R80 Fosf black	36.2	5
Union brake hose	4161631	3/8-24 UNF-3 A	AB 40 PRD Cdt or 00CR Cdt	14.4	2
Ring nut, wheel bearing	4354049	M 62 x 1.5	R 50 Znt	43.4	6
STEERING					
Nut, steering wheel to column	1/07914/11	M 16 x 1.5	R 50 Znt (Shaft C 30 Norm)	36.2	5
Nut, rear wheel bearing	4307325	M 20 x 1.25	C 40 Norm Cdt	159.13	22

CHASSIS
TORQUE SPECIFICATIONS

ITEM	Part No.	Thread (metric)	Material	Torque ft.lb.	Torque kgm
(*cont'd*: **STEERING**)					
Nut, track rod ball joint	4191151	M 14 x 1	R 50 Znt	36	5
Nut, self-locking, steering arm ball joint	1/25756/11	M 10 x 1.25	R 50 Znt (Stud 12 NC 3 Carbon)	25.3	3.5
Nut, steering box to body bolt	1/61008/11	M 8	R 50 Znt (Bolt R 80 Znt)	18	2.5
Nut, steering column universal joint yoke . . .	1/61044/21	M 8	R 80 Znt (Bolt R 100 Znt)	18	2.5
Nut, upper steering column support	1/61008/11	M 8	R 50 Znt (Bolt R50 Sd Stab.)	10.8	1.5
HAND BRAKE MECHANICAL CONTROL					
Bolt, hand brake support	1/38258/11	M 8	5.8 Znt/Ec	10.8	1.5
PEDAL ASSEMBLY					
Nut, pedal assembly and steering column to body	1/61008/11	M 8	R 50 Znt (Bolt R50 Sd Stab)	10.8	1.5
Nut, clutch pedal	1/61008/11	M 8	R 50 Znt (Spindle R 50 Trf Znt)	10.8	1.5
Nut, brake master cylinder to pedal system support	1/61008/11	M 8	R 50 Znt (Bolt R 80 Znt)	18	2.5

HOW TO USE SELF-LOCKING NUTS

Self-locking nuts should never be re-used.

Whenever service procedures require nuts to be screwed in and out, the recommended practice is to temporarily use regular nuts, which will be finally replaced with new self-locking nuts upon completion of adjustments.

Conversely, slotted-type self-locking nuts can be safely screwed in and out quite a number of times without affecting their self-locking ability.

ELECTRICAL SYSTEM
GENERATOR

CHARGING SYSTEM

Alternator, type	FIMM, A 124-14 V - 44 A
Voltage	14 V
Maximum output	770 W
Maximum current drawn	53 A
Cut-in speed at 12 C (1)	1 000 ± 50 rev/min
Battery current flow at 7000 rpm with 4 V and balanced thermally	≥ 44 A
Field winding resistance across slip rings (1)	4.1 to 4.5 Ω
Direction of rotation (drive side)	clockwise
Engine/alternator driving ratio	1 to 2
Rectifier Diodes	
Permanent D.C. current at 130° C — rectifier diodes	25 A
Permanent D.C. current at 130° C — exciter diodes	1 A
Reverse current	2 mV
Reverse voltage	≥ 150 V
Voltage Regulator	
Type	RC 2/12 D
Alternator speed for adjustments	5 000 rev/min
Current for thermal balance	7 A
Current for 2nd stage checks	10 to 14 A
Regulating voltage for 2nd stage	14,2 ± 0,3 V
Current for 1st stage checks	25 to 35 A
Voltage difference between 1st and 2nd stage regulation	0 to 0.5 V
Resistance across terminal 15 and earth (at 25° ± 10° C)	22.7 ± 2 Ω
Resistance across terminal 15 and 67 with contacts open	5.6 ± 0.3 Ω
Air gap between core and armature	1.5 ± 0.05 mm
2nd stage contacts air gap	0.45 ± 0.1 mm

(1) At 20° C.

ELECTRICAL SYSTEM

STARTING MOTOR

Type	FIAT E 84-0.8/12 Var. 1
Voltage	12
Nominal output	0.8 kW
Direction of rotation, pinion side	clockwise
No. of poles	4
Field winding	series
Engagement	freewheel
Drive	solenoid
Diameter of inside pole shoes	2.175″ to 2.182″ (55.25 to 55.42 mm)
Diameter of armature	2.140″ to 2.142″ (54.35 to 54.40 mm)
Bench Testing Data.	
— Running test (at 77° F - 25° C):	
Amperage	170
Torque developed	2.89 ± 0.14 ft.lb. (0.40 ± 0.02 kgm)
Speed	1900 r.p.m.
Voltage	9.5
— Stall torque (at 77° F - 25° C):	
Amperage	315
Voltage	7 ± 0.3
Torque developed	6.37 ± 0.22 ft.lb. (0.88 ± 0.03 kgm)
— No-load test (at 77° F - 25° C):	
Amperage, not above	30
Voltage	11.9
Speed	7000 ± 1000 r.p.m
— Inner resistance, on starting (at 77° F - 25° C)	0.022 ± 0.001 Ohms
Check on Mechanical Characteristics.	
— Brush pressure (unworn)	2.5-2.9 lb. (1.15-1.30 kg)
— End clearance, armature shaft	.0039″-.0197″ (0.1-0.5 mm)
— Freewheel efficiency: static torque to rotate pinion slowly	1.5-1.9 in.lb. (1.7-2.2 kgcm)
Solenoid.	
— Coil resistance at 77° F (25° C)	0.39 ± 0.02 Ohms
— Contact stroke	.4240″ to .5642″ (2.87 to 4.03 mm)
— Core stroke	.492″ to .602″ (12.2 to 15.3 mm)
Lubrication.	
— Drive unit splines	FIAT VS+ 10 W oil (SAE 10 W)
— Contact face of middle disc and driving sleeve	FIAT MR 3 grease

IGNITION SYSTEM

Firing order		1-3-4-2	
Ignition Distributor		Magneti Marelli	Ducellier
Code		S 135 F	4526 A
Static advance		5°	5°
Automatic advance		28° ± 2°	28° ± 2°
Contact breaker point pressure		5.39 ± 0.49 N (550 ± 50 g)	4.41 ± 0.49 N (450 ± 50 g)
Contact breaker point gap		0.37 to 0.43 mm	0.35 to 0.50 mm
Condenser capacity (50 to 1000 Hz)		0.20 to 0.22 μF	0.22 to 0.23 μF
Open point period		35° ± 3°	35° ± 3°
Dweel angle		55° ± 3°	55° ± 3°
Spark plugs	BOSCH	MAGNETI MARELLI	CHAMPION
Code	W 200 T 30	CW 78 LP	N 7 Y
Thread and pitch	M 14 x 1.25	M 14 x 1.25	M 14 x 1.25
Electrode gap	0.6 to 0.7 mm	0.6 to 0.7 mm	0.6 to 0.7 mm

INSTRUMENTS

Oil temperature gauge and insufficient oil pressure w/light	red light
No-charge w/light	red light
Fuel gauge and fuel reserve w/light	red light
Main beam tell-tale	blue light
Side and tail lights tell-tale	green light
Direction indicators tell-tale	green light
Hand brake « ON » w/light.	
Water temperature gauge.	
Speedometer with odometer: trip and total.	
Electronic rev. counter.	

ELECTRICAL SYSTEM
LIGHTING EQUIPMENT

Fiat X1/9 — **TABLE IV-4**

Retractable headlamps	two, circular
Round, double-filament bulb:	
— main beam	45 W
— dipped beam	40 W
Front direction and side lamps	two
— direction indicator bulb	21 W
— side light bulb	5 W
Side direction indicator lamps	two
Blinking light bulb	4 W
Rear tail, direction and stop lamps and reflector lens	two
Direction indicators bulb	21 W
Double-filament bulb:	
— tail light	5 W
— stop light	21 W
Reversing light bulb	21 W
Rear licence plate lamps	two
Bulb	5 W
Outer lighting control switch	on instrument panel
Headlamps selector switch	under steering wheel
Courtesy light bulb (one)	5 W
Cigar lighter light bulb	4 W
Ideogram illumination bulb	3 W
Fuel warning light bulb	1.2 W
Oil pressure warning light bulb	1.2 W
Side light warning light bulb	1.2 W
Headlamp warning light bulb	1.2 W
Direction indicator warning light bulb	1.2 W
Handbrake warning light bulb	1.2 W
Heated backlight warning light bulb	1.2 W
Ignition warning light bulb	1.2 W

FUSES Two 3-A fuses Eight 8-A fuses Two 16-A fuses	PROTECTED CIRCUITS
A (*) (8 A)	— Heater fan motor — Tachometer — Windscreen wiper motor — Fuel gauge and warning light — Oil pressure gauge and warning light — Stop lights — Direction indicators and warning light — Engine coolant temperature gauge — Windscreen washer pump
B (8 A)	— Concealed headlamp motors
C (*) (8 A)	— L.H. main beam — Headlamp warning light
D (*) (8 A)	— R.H. main beam
E (*) (8 A)	— L.H. dipped beam
F (*) (8 A)	— R.H. dipped beam
G (*) (8 A)	— L.H. side light — R.H. rear light — L.H. number plate light — Cigar lighter light — Heater ideogram illumination bulb
H (*) (8 A)	— Reversing lights — R.H. side light — L.H. rear light — R.H. number plate light
I (16 A)	— Cigar lighter
L (16 A)	— Radiator fan motor — Horn and horn relay
M (3 A)	— Concealed headlamp lower relay coil
N (*) (3 A)	— Concealed headlamp raise relay coil
In-line fuse (8 A)	— Courtesy light — Carburettor fan motor and relay
In-line fuse (*) (16 A)	— Fog lamps

Unprotected Circuits: Ignition, charging, starting, charging warning light, radiator fan motor relay coil, side light warning light, panel lights, steering column switches relay coil.

(*) With ignition key at MAR.

SPECIAL TOOLS

The following list includes only the special tools.
For information on standard equipment refer to the Catalogues published by G.A. Assistenza Tecnica.

ENGINE

A. 15061	Stand, engine removed
A. 40026	Puller, water pump impeller
A. 50088	Wrench (13 mm) manifold nuts
A. 50095	Spanner for exhaust pipes to engine bolts
A. 50113	Wrench, oil sump drain plug
A. 50121	Wrench, fan pulley to crankshaft nut
A. 50131	Wrenches (19 mm), carburettor end cylinder head nuts (use with torque wrench)
A. 50132	Wrench (13 mm), cylinder head extension nuts (use with torque wrench)
A. 60018	Spark plug seat plug, valve tightness test
A. 60041	Stand, cylinder head during valve seat grinding
A. 60041/2	Fixture, **A. 95868** retainer, valve tightness test
A. 60054	Remover and installer (22 mm), bushing on con-rod small-end
A. 60077	Retainer, con-rod, when boring small-end bushing
A. 60183	Piston rings installer and remover
A. 60251	Remover and installer, pistons pin
A. 60303	Installer, piston pin circlips
A. 60311	Remover and installer, valves
A. 60312	Remover, cartridge oil filter
A. 60313	Installer, valve guides oil seal
A. 60368	Flange and bushing, crankshaft installation on grinding machine
A. 60369	Retainer, flywheel, during installation on crankshaft
A. 60370	Tester, cylinder head leakage (use with **Ap. 5048**)
A. 60372	Remover and installer, fuel pump and oil pump drive shaft
A. 60373	Remover and installer, water pump pulley and impeller
A. 60395	Remover, valve guides
A. 60421	Tool, valve tappet holding and tappet plate removal, during timing check
A. 60442	Board, cylinder head support during valve removal and installation
A. 60455	Tool, holding cylinder head while replacing tappet cap plates and tightening or loosening camshaft pulley - on vice
A. 60459	Cranking tool
A. 60462	Drift for inserting valve guides
A. 60473	Tool, locking camshaft pulley while tightening a loosening retainer nut
A. 60592	Fixture, power plant lifting and moving
A. 60605	Adjustable band, pistons installation in cylinders
A. 61001/145	Brackets, securing engine to service stand **Ar. 22204**
A. 70007	Handle, installers
A. 70576	Transaxle support, use with movable hoisting bridge

(continued)

(Continued: **ENGINE***)*

A. 76036 Jumper - connect to starting motor while timing valves

A. 86010 Installer (10 mm dia.), crankshaft plugs

A. 86040 Installer (40 mm dia.), cylinder block plugs

A. 87001 Plier, tappet plate removal

A. 90308 Reamer (22 mm dia.), con-rod small-end bushings

A. 90310 Reamer (8 mm dia.), valve guide bore

A. 90365 Reamer, fuel pump and oil pump drive shaft bushings

A. 94016 Spindle, plug seat cutter

A. 94016/10 Cutter (10 mm dia.), crankshaft plug seats

A. 95113 Feeler gauge, tappet adjustment

A. 95121 Gauge, Weber carburettor float level check

A. 95751 Tool for checking toothed belt

A. 95868 Valve tightness tester

A. 96148 Ring gauge (86 mm dia.), **A. 95687** zero setting for cylinder bore checking

A. 96219 Gauge, checking height of valve stems after valve seat refacing

A. 96232 Gauge for checking depth of combustion chambers after head grinding

ENGINE TESTER

A. 38124/1 Hose, exhaust fumes

A. 38128/2 Flange, engine-to-tester

A. 38128/3.3 Front support, engine-to-tester

A. 38128/4.2 Brackets, engine-to-tester, flywheel end

CLUTCH

A. 70017 Remover and installer, clutch pedal springs

A. 70210 Pilot, aligning driven plate

TRANSAXLE

A. 40005/003 Three-legged tool, bearing removal from differential case - use with **A. 40005/302**

A. 55035 Wrench, gearbox removal and installation - engine on car

A. 55087 Wrench, gearbox oil filler plug

A. 70100 Installer, transmission synchronizers snap ring (3rd and 4th speed)

A. 70296 Inserter, selector rod seal

A. 70301 Installer, selector rod seal

A. 70375 Tool for fitting seal and bush to differential oil boot

A. 70379 Installer, oil seal to gearbox front cover

A. 70575 Support, transaxle during removal and refitting operations - use with hydraulic jack

A. 71001/14 Support, holding transmission-differential unit during overhaul - clamp to service stand **Ar. 22204**

A. 86014 Installer, gear control rods seat plugs

A. 86016 Installer, gearshift rod seat plug

A. 95655 Fixture with dial gauge, differential bearings shim thickness selection

(Continued)

(Continued)

STEERING

A. 47035 Puller, track rods head pins

A. 57005 Wrench (24 mm), steering wheel nut

A. 74255 Installer, front suspension control arm resilient bushes

A. 74256 Installer, control arm ball head seal

A. 81118 Plier, rear constant-velocity joint boot clamp installation

A. 86511 Wrench, removing and installing wheel nuts

A. 96504 Gauge for checking ball joints on front suspension track control arms

BRAKES

A. 47211/754 Pair of ring grips for front rear wheel brake disc removal - use with **A. 40005/004** and **A. 47210/371**

A. 56126 Wrench, operating brake line connectors

A. 57139 Spanner for track rod lock nut when adjusting front wheel toe-in

A. 74247 Tool, rack rod bush installation

SUSPENSIONS - WHEEL HUBS

A. 47033 Puller, control arm ball joint from steering knuckle

A. 47038 Puller, anchoring rod ball joint from steering knuckle

A. 57020 Wrench, holding damper during lock nut operation

A. 57034 Wrench, damper stem location ring-nut

A. 57123 Wrench, front wheel hub bearing check nut

A. 70526 Bracket for supporting the engine when removing and refitting centre cross-member

A. 74045 Drift, elastic bushes of rear suspension track control arm

A. 74140/1 Pliers, hub and nut staking

A. 74140/9 Pair of heads, wheel hub nuts staking - use with **A. 74140/1**

A. 74216 Installer, bearing and wheel hubs

A. 74268 Installer, hub on rear hub carrier, bearing installed

A. 74277 Front suspension coil spring compressor

A. 74278 Item, front/rear coil spring compression

BODY

A. 78023 Installed, drip channel and dashboard moulding rivets

A. 78031 Pair of suction grips, windscreen and backlight glass handling

A. 78033 Steel wire with end grabs, windscreen and backlight bonding bead removal

ELECTRICAL EQUIPMENT

A. 50095 Wrench, starting motor removal and installation - engine on car

A. 50136 Wrench, sparking plugs

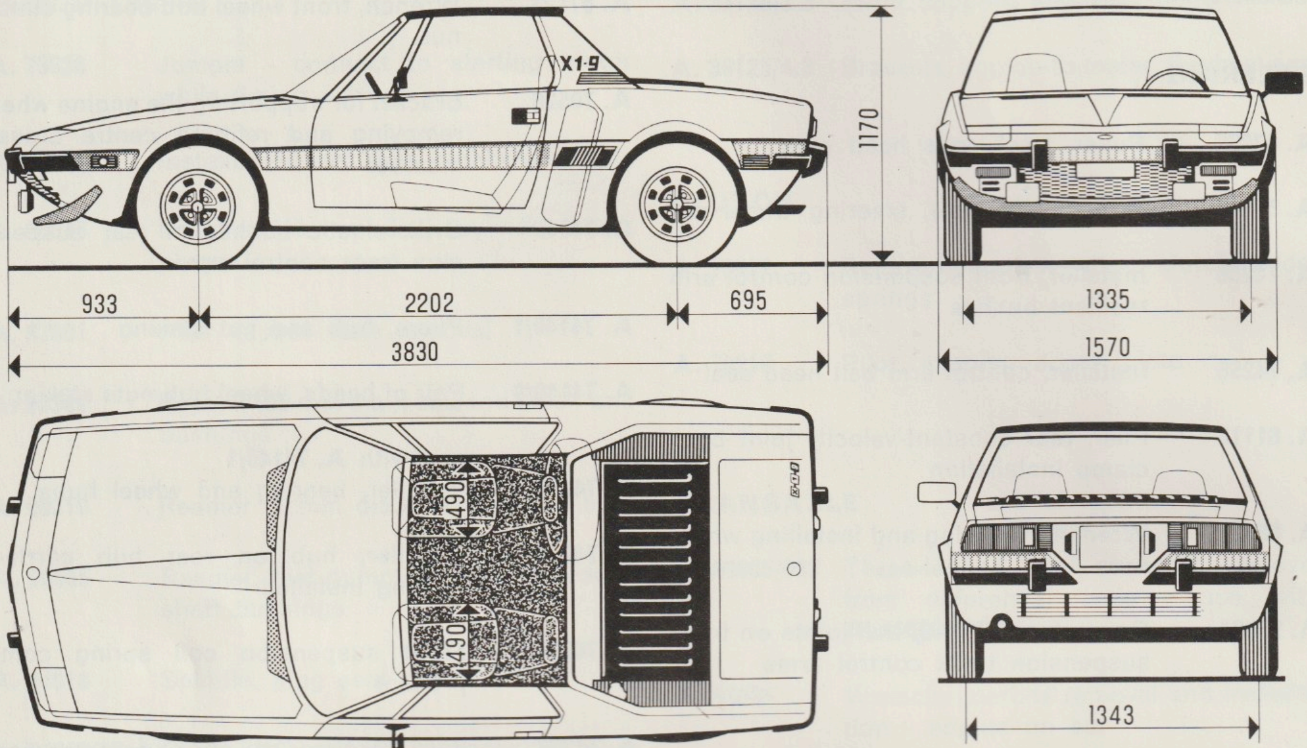
A. 58010 Spanner, ignition distributor securing nut

A. 89514 Wrench, side direction indicators removal and installation

Fiat X1/9

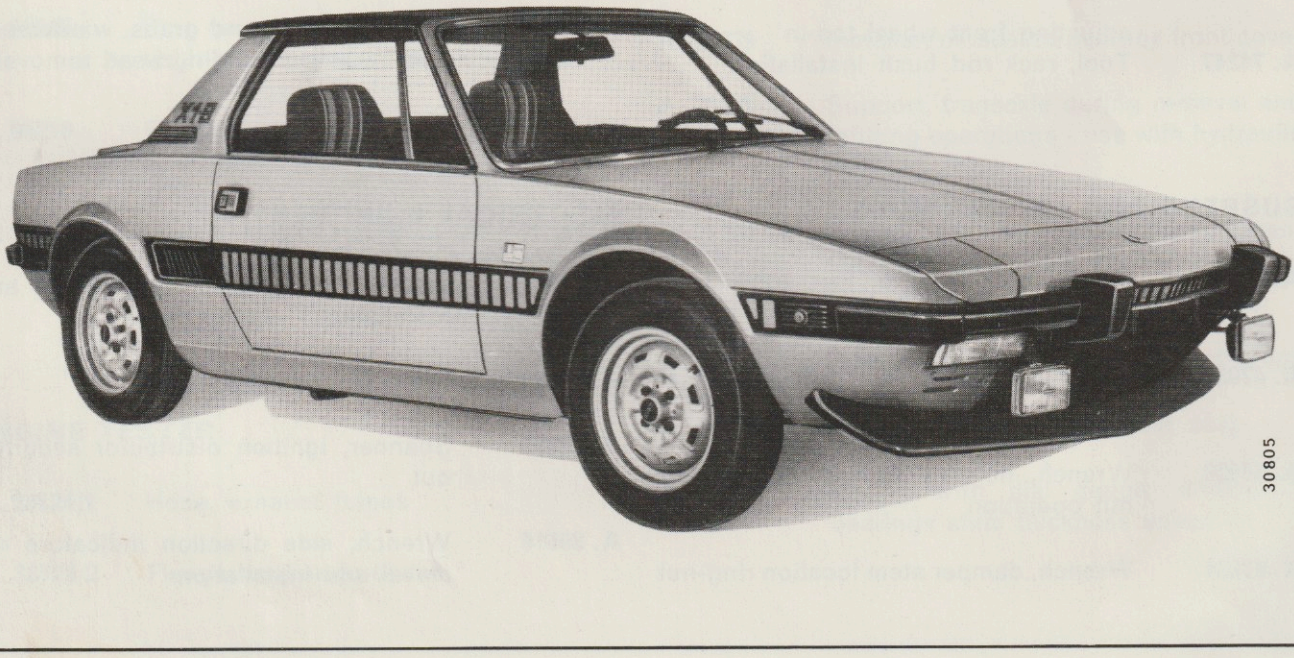
MAIN DATA
DIMENSIONS

TABLE I-a



30003

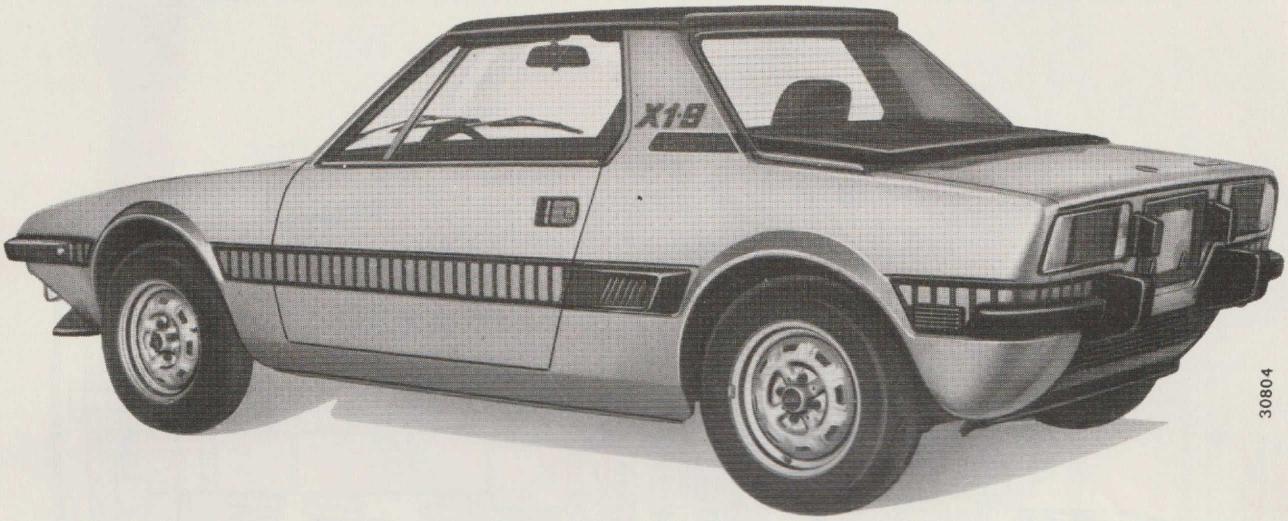
Max. Height Refers to an Unladen Car

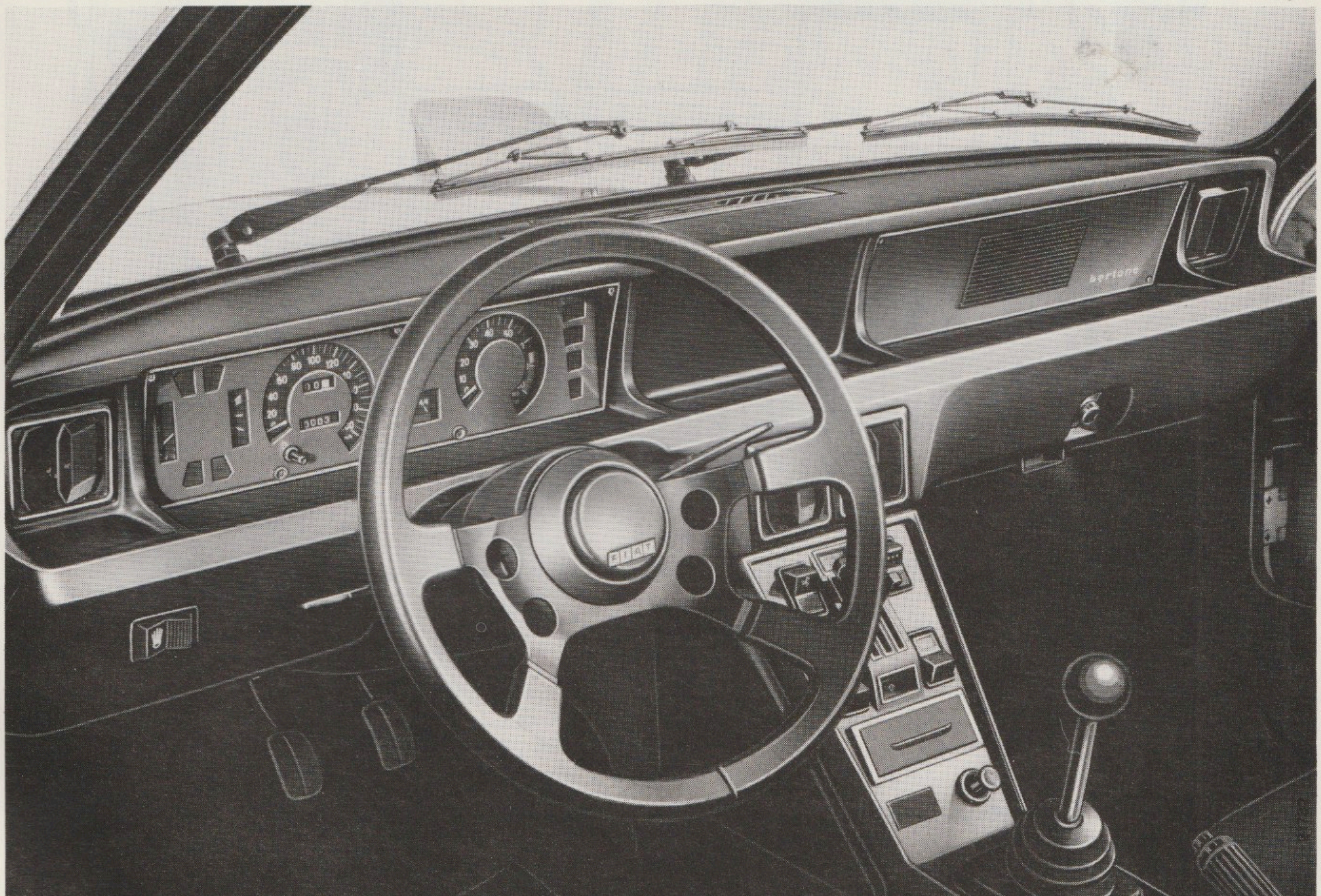


30805

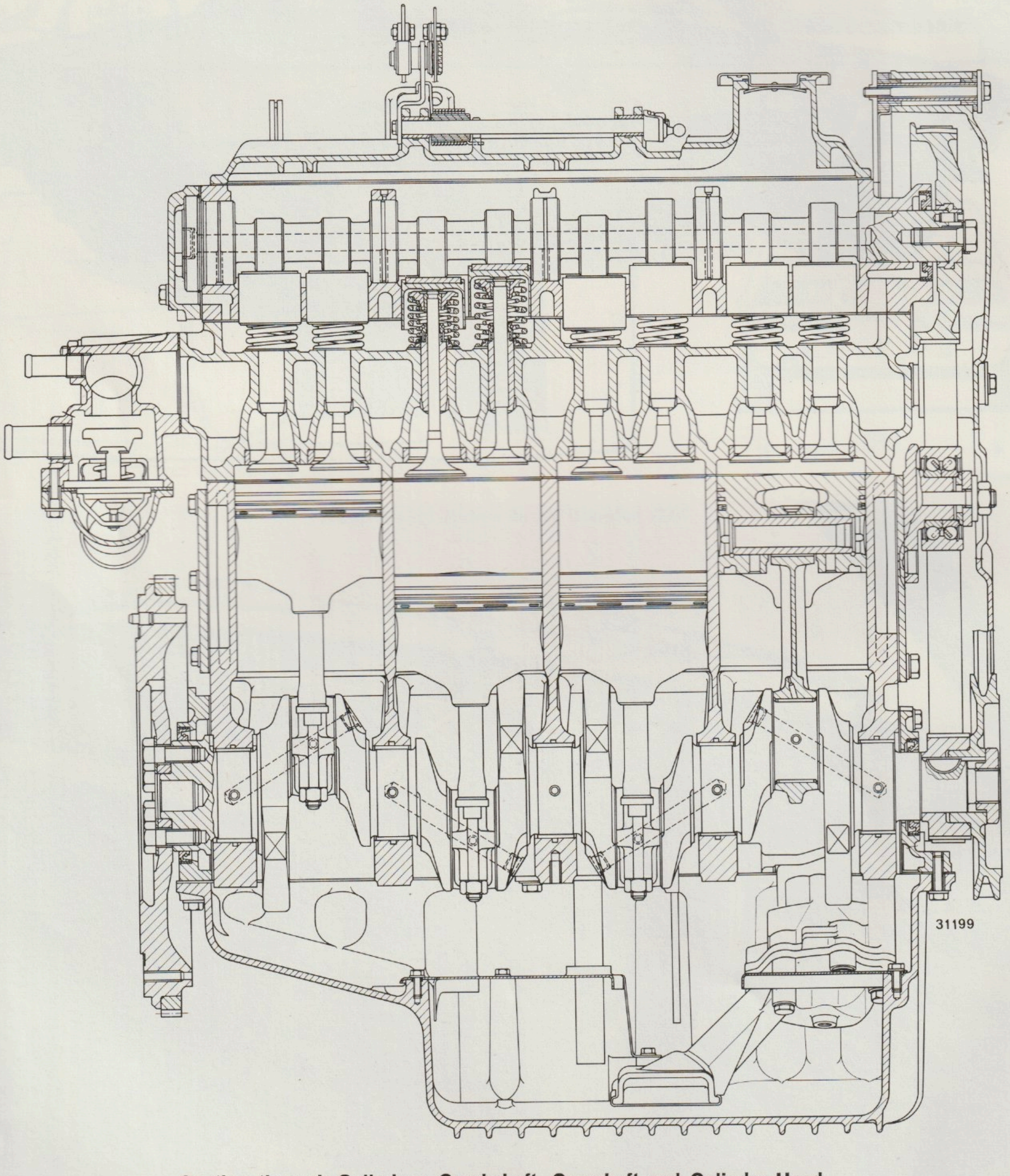
GENERAL INFORMATION

INSTRUMENTS AND CONTROLS



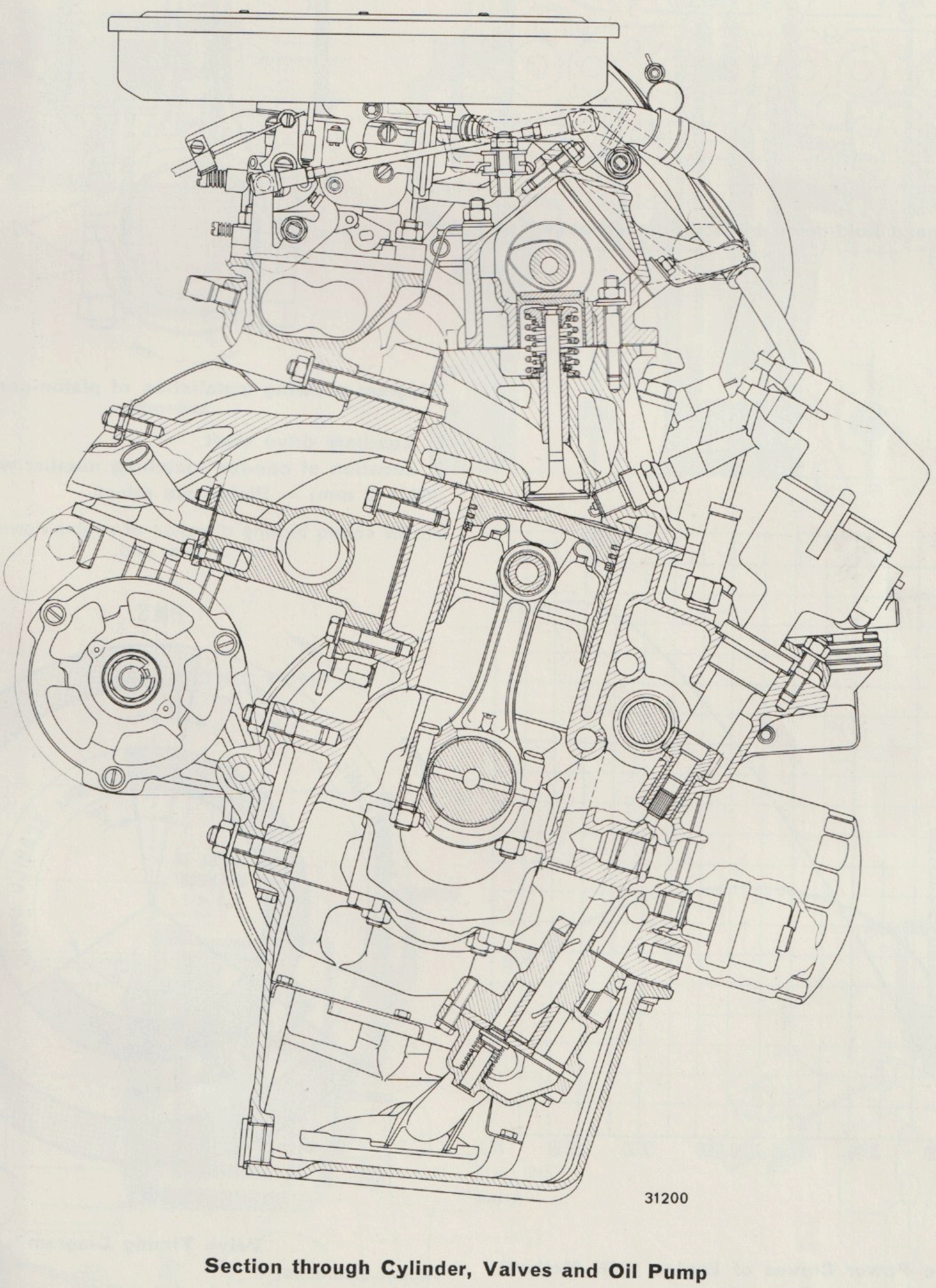


ENGINE LONGITUDINAL SECTION - ENGINE TYPE 128 AS.000



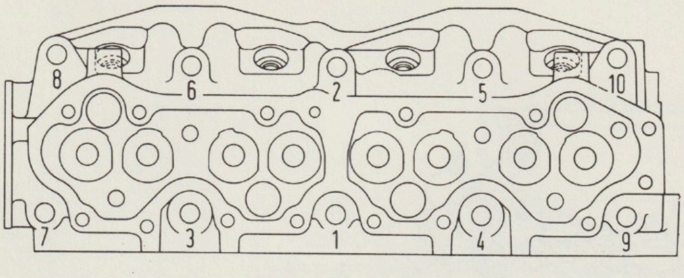
Section through Cylinders, Crankshaft, Camshaft and Cylinder Head

ENGINE CROSS SECTION - ENGINE TYPE 128 AS.000



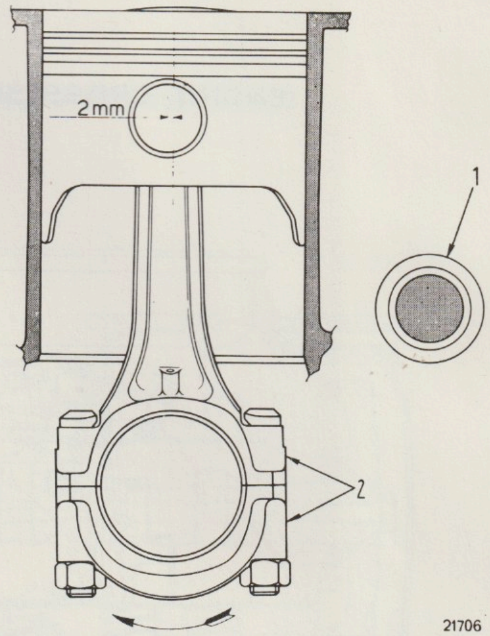
Section through Cylinder, Valves and Oil Pump

The engine is inclined 11° forward.



15017

Cylinder head hold-down bolts tightening sequence.



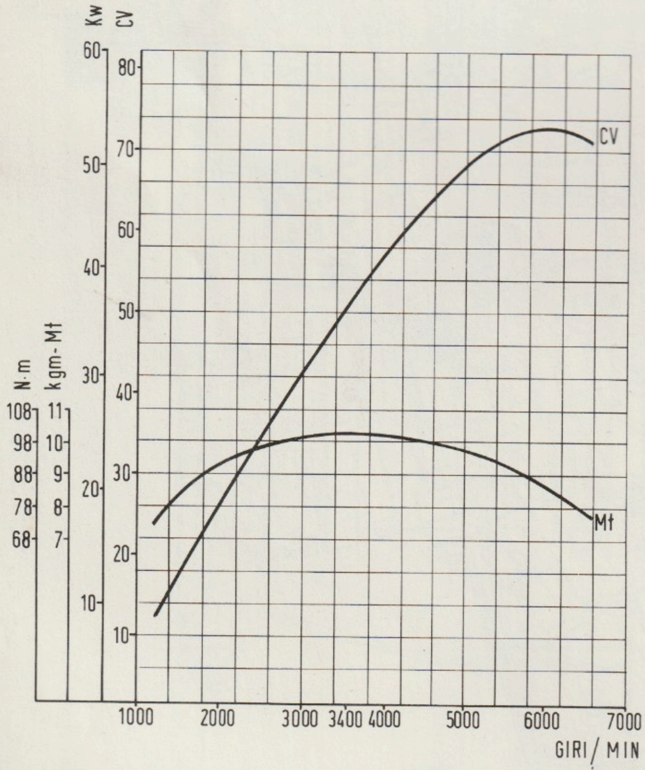
21706

Diagram showing installation of piston-connecting rod assembly.

1. **Auxiliary drive shaft.**
2. **Location of con-rod matching number with cylinder.**

.0787″ (2 mm) = Piston pin offset.

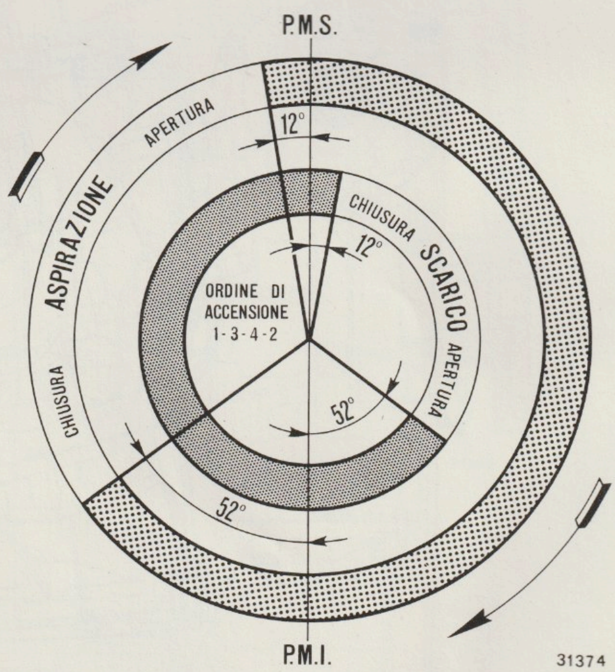
Arrow shows turning direction of engine viewed from timing gear end.



31168

Characteristic Power Curves of Engine (DIN Method)

GIRI/MIN = Rev/min



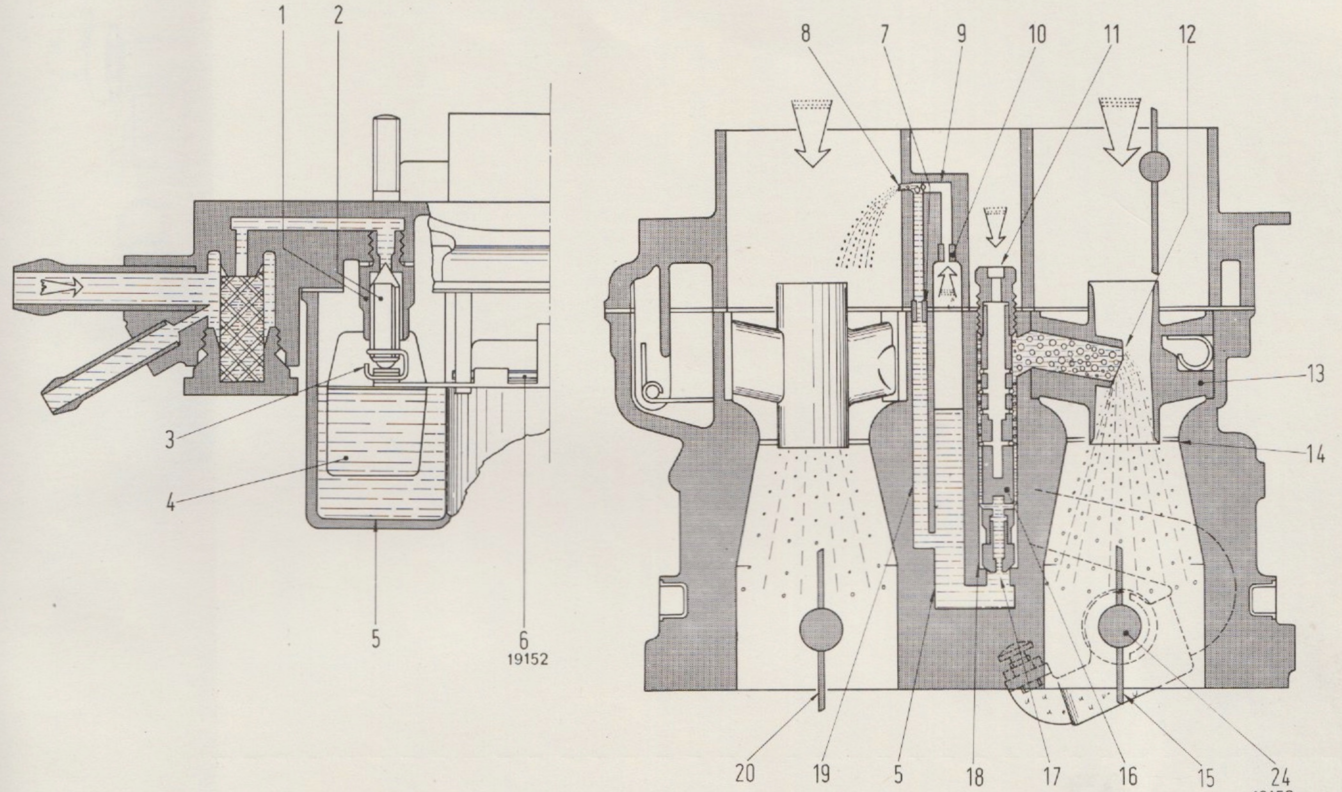
31374

Valve Timing Diagram

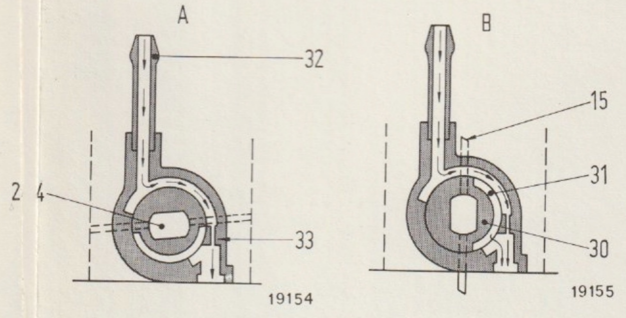
Tappet clearance:

— for timing check	
Inlet	0,60 mm
Exhaust	0,65 mm
— for normal operation (cold)	
Inlet	0,40 mm
Exhaust	0,50 mm

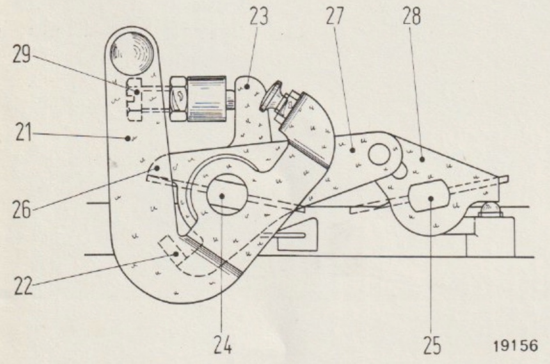
CRUISE



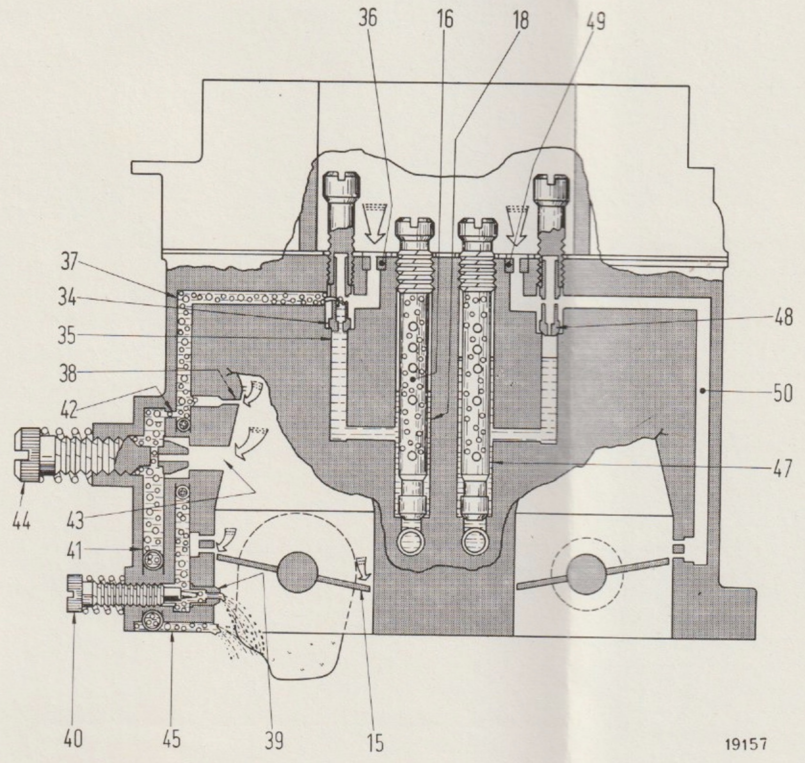
BLOW-BY GASES RECIRCULATION DEVICE



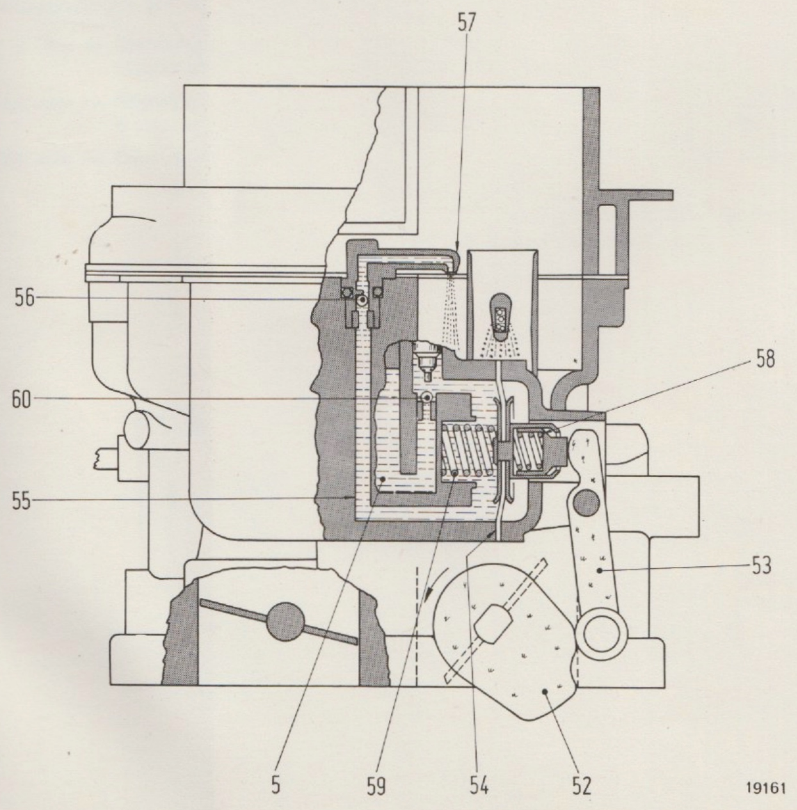
THROTTLE VALVES DIFFERENTIAL OPENING DEVICE



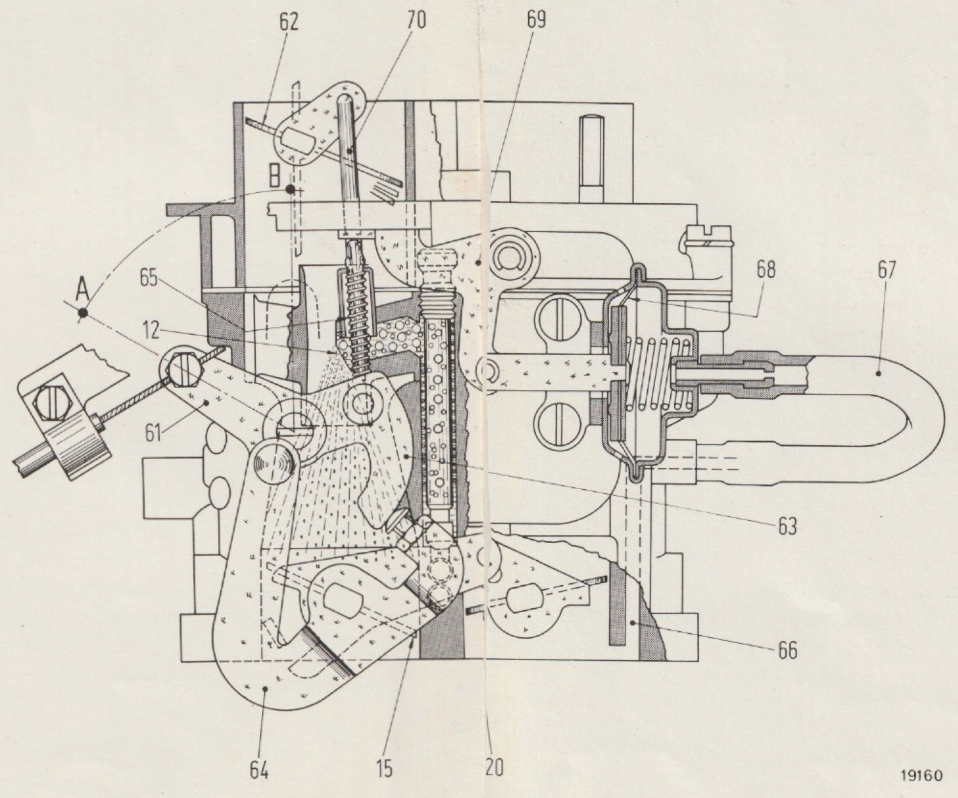
IDLE AND TRANSFER

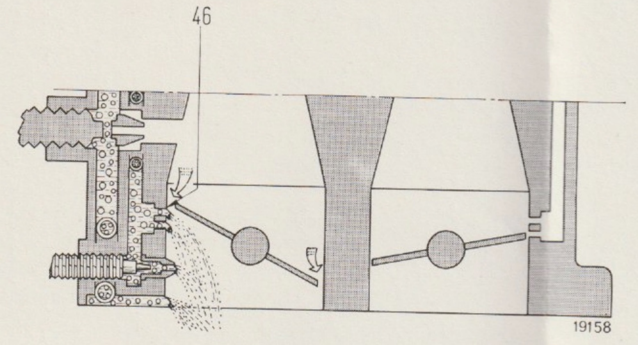


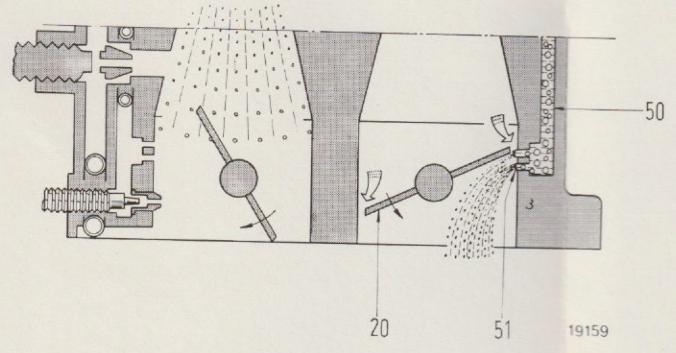
ACCELERATING PUMP



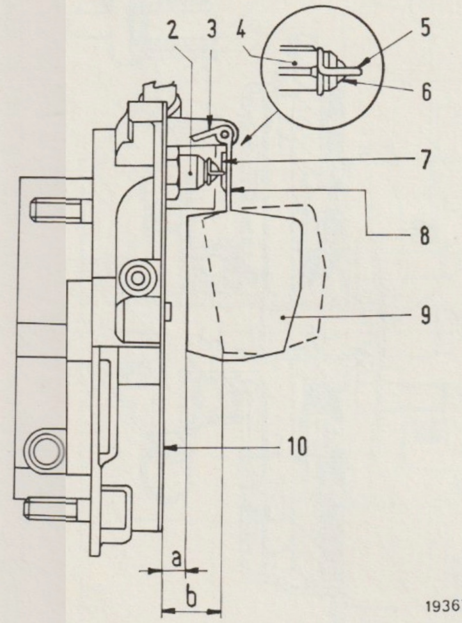
CHOKE







1. Needle valve.
2. Valve needle.
3. Needle return hook.
4. Float.
5. Fuel bowl.
6. Float hinge pin.
7. Calibrated bushing for power fuel passage at high speed.
8. Power fuel calibrated orifice.
9. Power air passage.
10. Air passage calibrated bushing.
11. Main air corrector jet.
12. Spray nozzle.
13. Auxiliary venturi.
14. Primary venturi.
15. Primary throttle.
16. Emulsion tube.
17. Main jet.
18. Main jet well.
19. Power fuel passage at high speed.
20. Secondary throttle.
21. Throttle operating lever.
22. Lug.
23. Primary shaft sector.
24. Primary shaft.
25. Secondary shaft.
26. Idler lever butt.
27. Idler lever.
28. Secondary shaft actuating lever.
29. Screw and lock nut, positioning primary throttle.
30. Rotary valve.
31. Blow-by gas passage slot.
32. Blow-by gas duct.
33. Calibrated orifice for blow-by gas suction at idle.
34. Main idling jet.
35. Idling fuel passage.
36. Idling air calibrated bushing.
37. Main idling fuel passage.
38. Idling air calibrated orifice.
39. Idling mixture calibrated bushing.
40. Idling mixture adjusting screw.
41. By-pass idling passage.
42. By-pass idling calibrated orifice.
43. By-pass idling air orifice.
44. By-pass idle adjusting screw.
45. By-pass idling mixture passage.
46. Primary throat transfer orifices.
47. Secondary well.
48. Secondary idling jet.
49. Secondary air passage calibrated bushing.
50. Fuel passage.
51. Secondary throat transfer orifices.
52. Accelerating pump actuating lobe.
53. Accelerating pump actuating lever.
54. Accelerating pump diaphragm.
55. Accelerating pump fuel passage.
56. Accelerating pump delivery valve.
57. Accelerating pump spray nozzle.
58. Accelerating pump delivery extension spring.
59. Diaphragm spring.
60. Ball valve.
61. Choke actuating lever.
62. Choke throttle valve.
63. Fast idle primary throttle opening cam.
64. Fast idle throttle opening lever.
65. Calibrated spring.
66. Vacuum passage.
67. Vacuum line.
68. Vacuum diaphragm device, part opening throttle 62.
69. Choke mixture leaning throttle lever.
70. Throttle valve rod.



FLOAT LEVEL

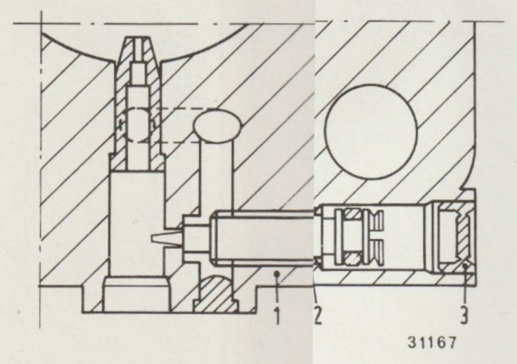
Float level setting diagram.

1. Carburettor cover.
2. Needle valve.
3. Lug.
4. Valve needle.
5. Return hook.
6. Movable ball.
7. Tang.
8. Float arm.
9. Float.
10. Gasket.

a = .275″ ± .0098″ (7 ± 0.25 mm) = distance between float and cover with gasket, in vertical position.
b = .590″ (15 mm) = maximum distance of float from cover face, with gasket.
b — a = .354″ (9 mm) = float travel.

Slow Running Speed

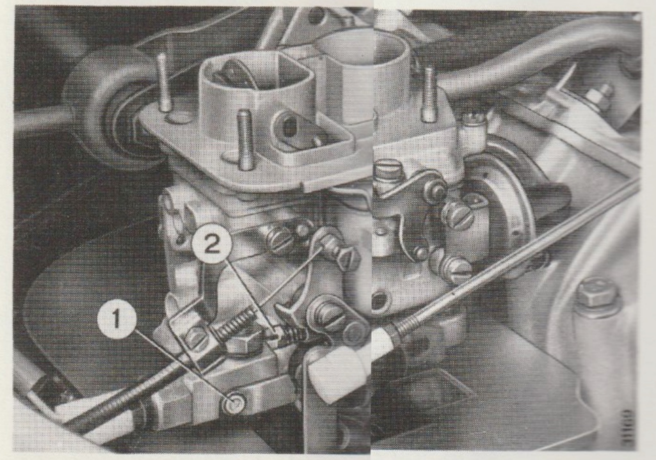
To meet European anti-pollution regulations, the slow running volume adjusting screw is now factory sealed by means of a plastic plug.



Showing the Carburettor.

1. Screw housing.
2. Slow running volume adjusting screw.
3. Plug.

Should it become necessary to adjust the slow running volume remove the plug, act on the screw as necessary and replace the plug.



Adjusting the Slow Running Speed.

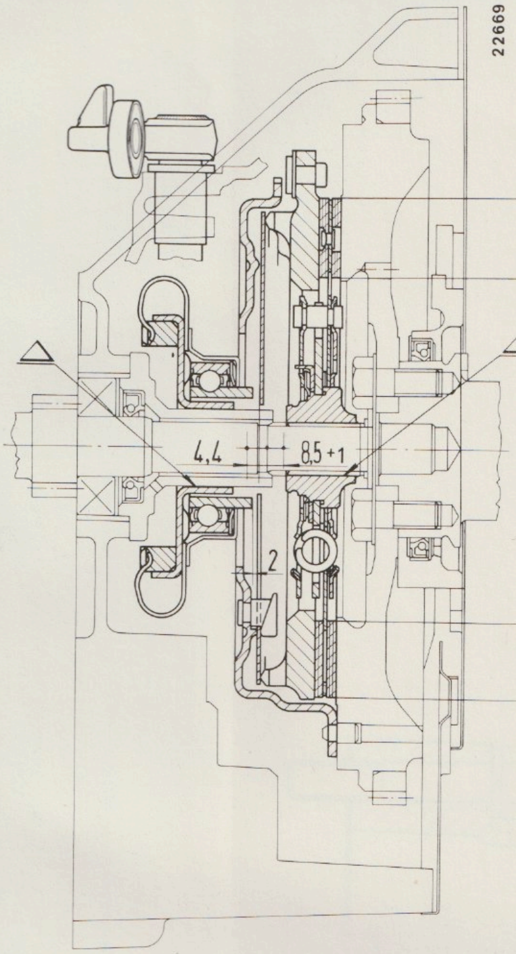
1. Plastic plug.
2. Slow running volume adjusting screw.

Fiat X1/9

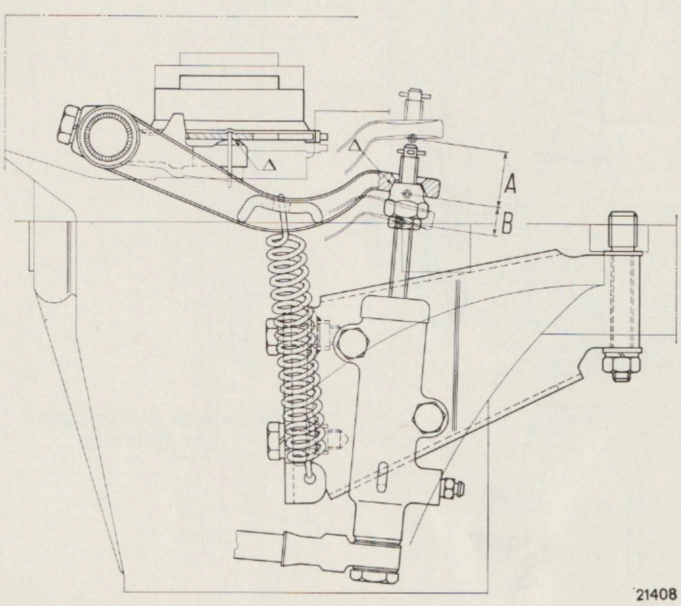
CHASSIS
CLUTCH

TABLE III-a

Δ = Lubrication points: **grassofiat MR3**



22669



21408

Longitudinal Section of Clutch Unit

2 mm = Measurement to be obtained by adjustment of flexible clutch release cable

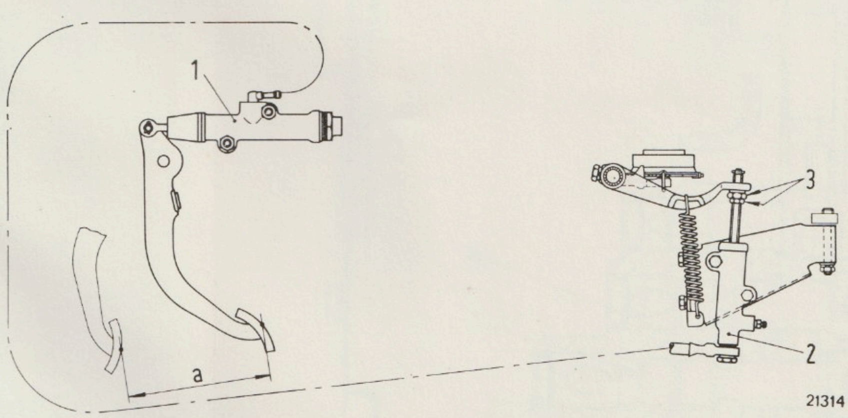
4,4 mm = Maximum permissible displacement following disc facing wear

8,5 mm = Declutching travel

Section of Clutch Release Mechanism through the Forked Lever and Release Bearing

A = 28,5 mm declutching travel corresponding to a minimum clutch disc separation of 1,8 mm

B = 11 mm displacement of clutch release lever following disc lining wear



21314

Diagram Showing Clutch Hydraulic Circuit

1 Master cylinder

2 Slave cylinder

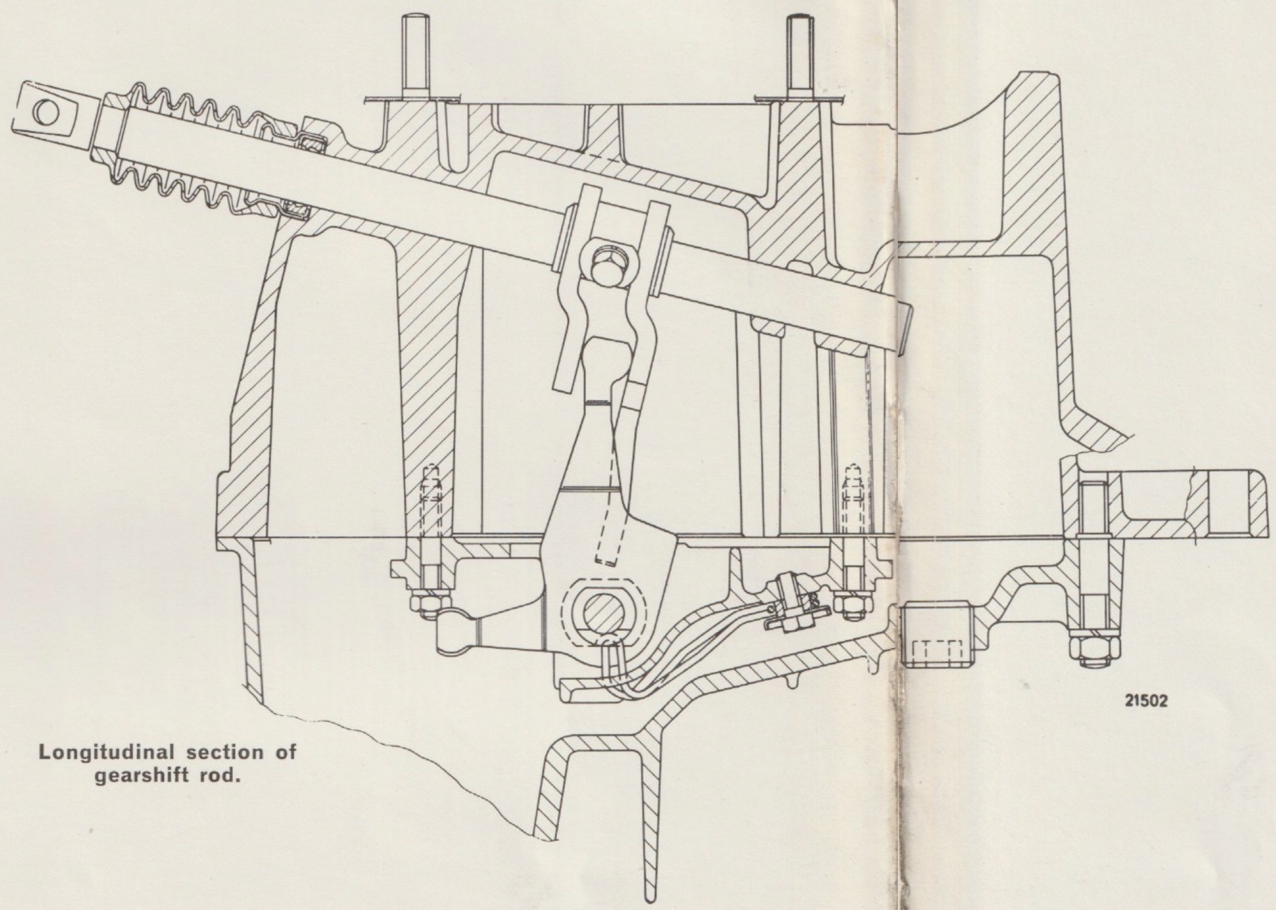
3 Nut and locknut

a = 160 mm. Clutch pedal travel

Fiat X1/9

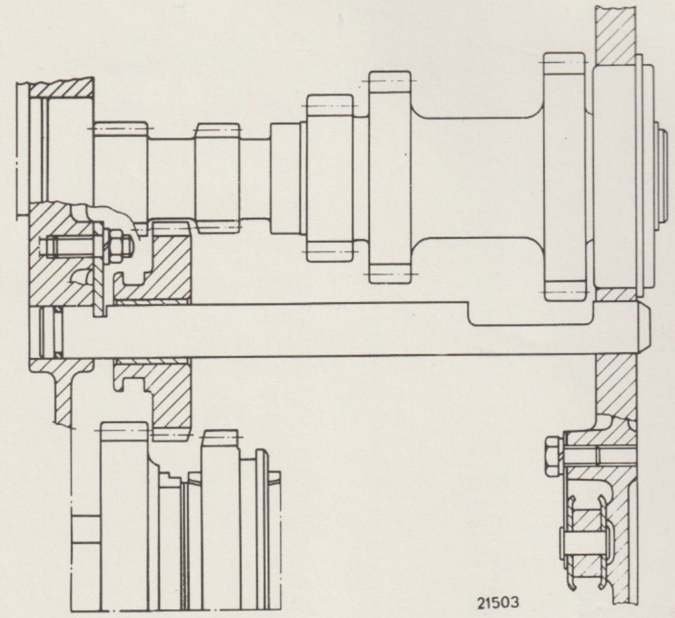
CHASSIS
TRANSMISSION ASSEMBLY SECTIONS

TABLE III-c



21502

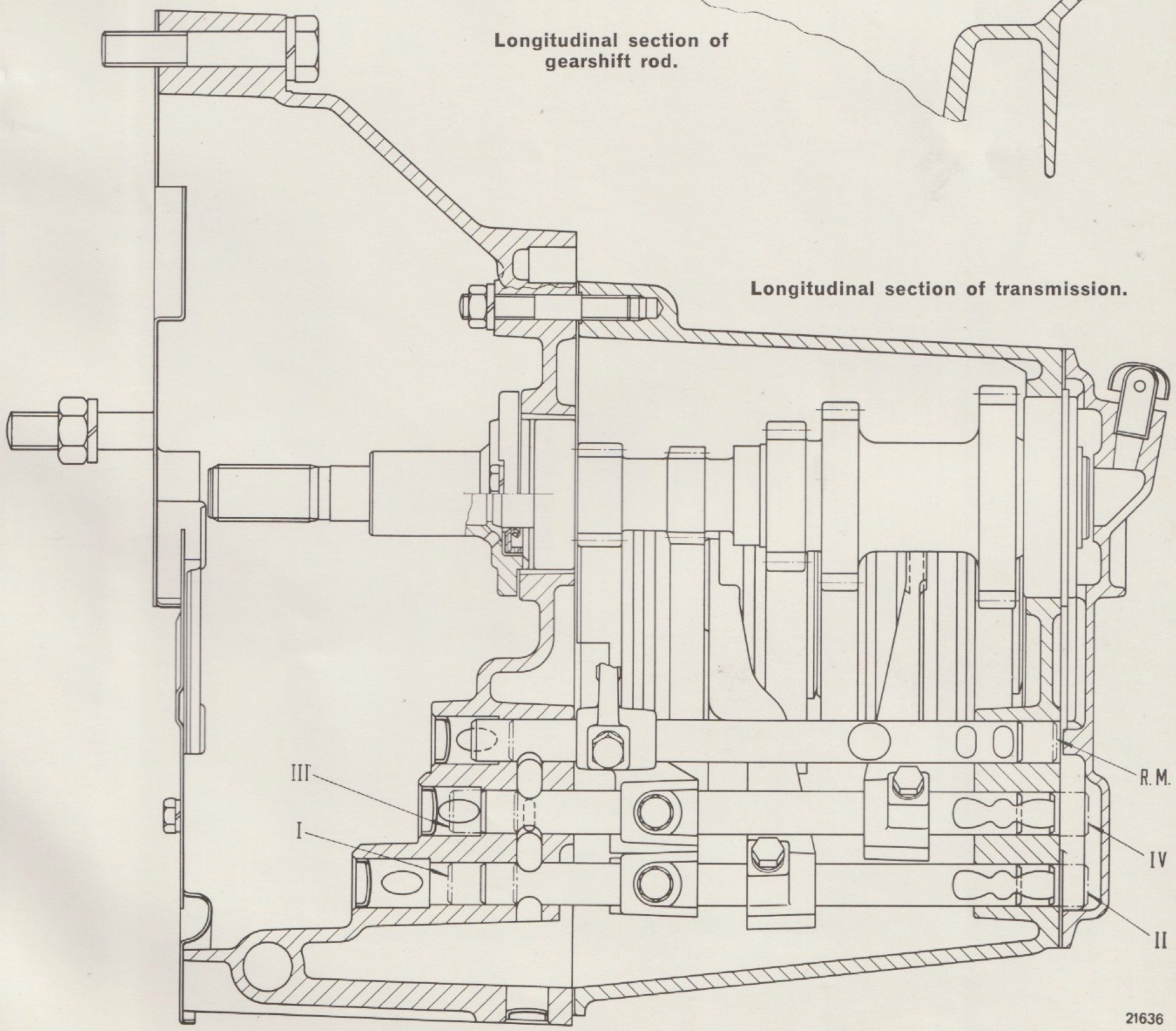
Longitudinal section of gearshift rod.



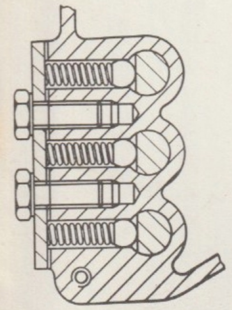
21503

Section through reverse idler gear.

Longitudinal section of transmission.

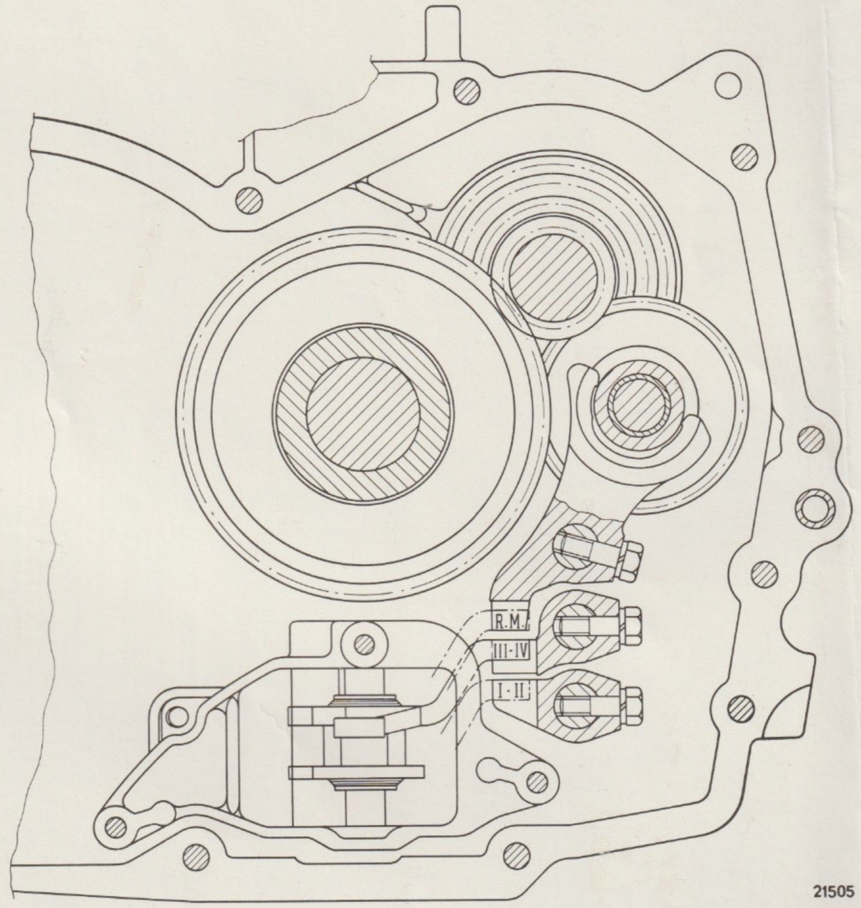


21636



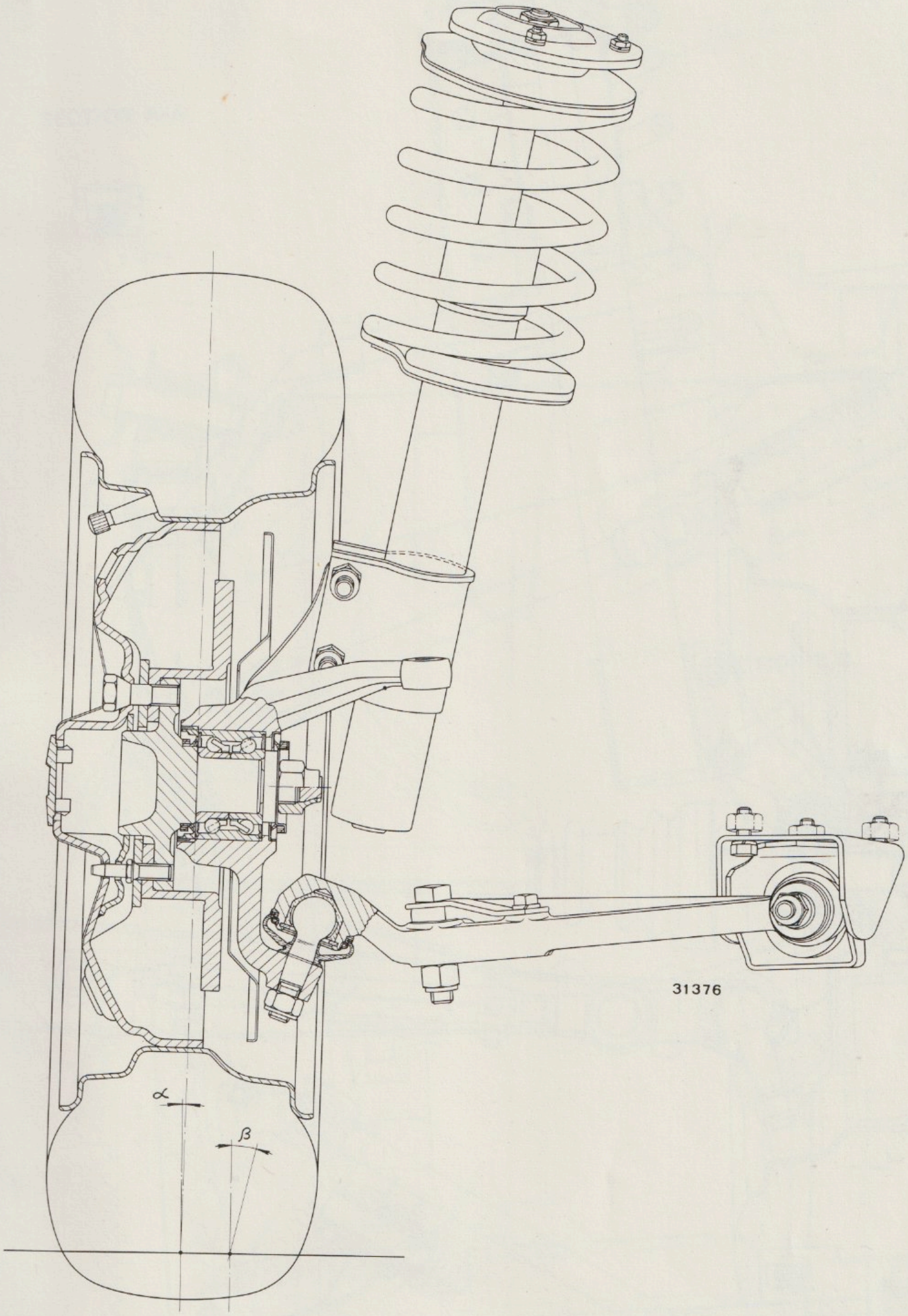
21638

Section through detent springs for gear control rods.



21505

Section through gear control lugs.

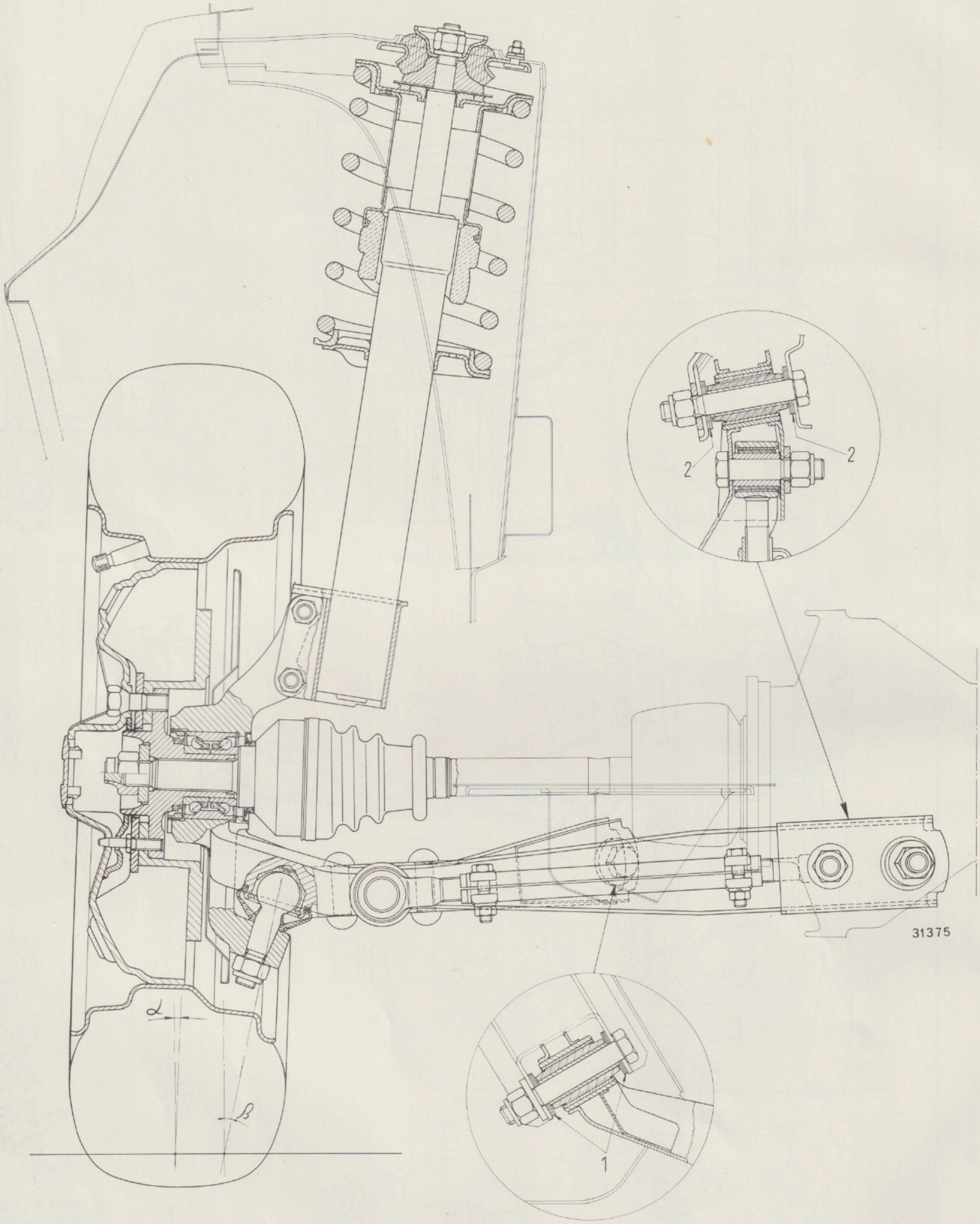


Section through Front L.H. Suspension and Wheel

α = —0° 40′ to —1° 20′: camber (*)

β = ~ 13°: K.P.I. (*)

(*) Car laden to the equivalent of 2 adults plus 20 kg with tyres correctly inflated.



Section through Rear L.H. Suspension and Wheel

$\alpha = -1°\,40'$ to $-2°\,20'$: camber (*)

$\beta = 12°$: K.P.I (*)

(*) Car laden to the equivalent of 2 adults plus 20 kg with tyres correctly inflated.

1 Washers, front mounting of track control arm

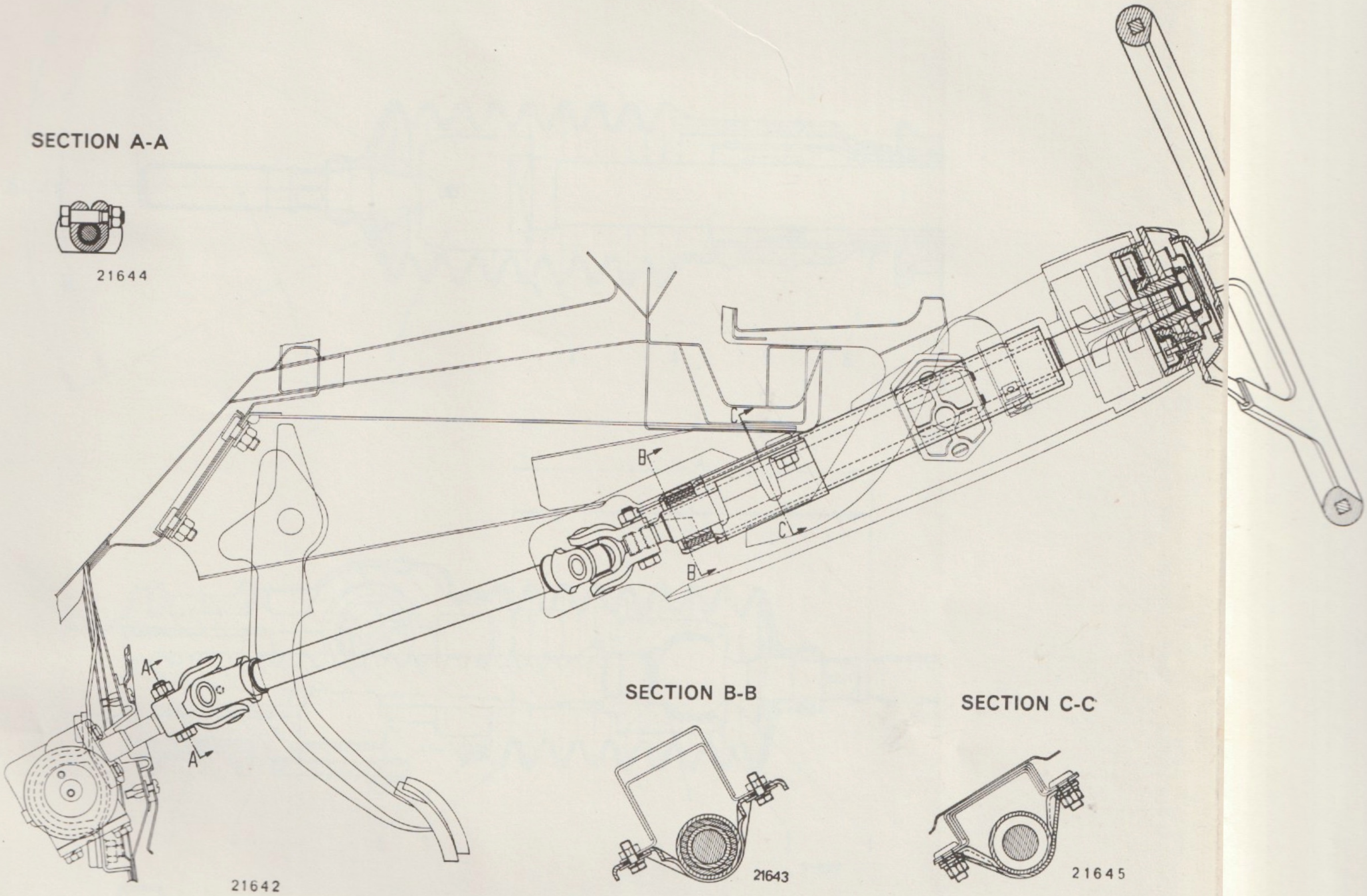
2 Washers, rear mounting of track control arm

Fiat X1/9

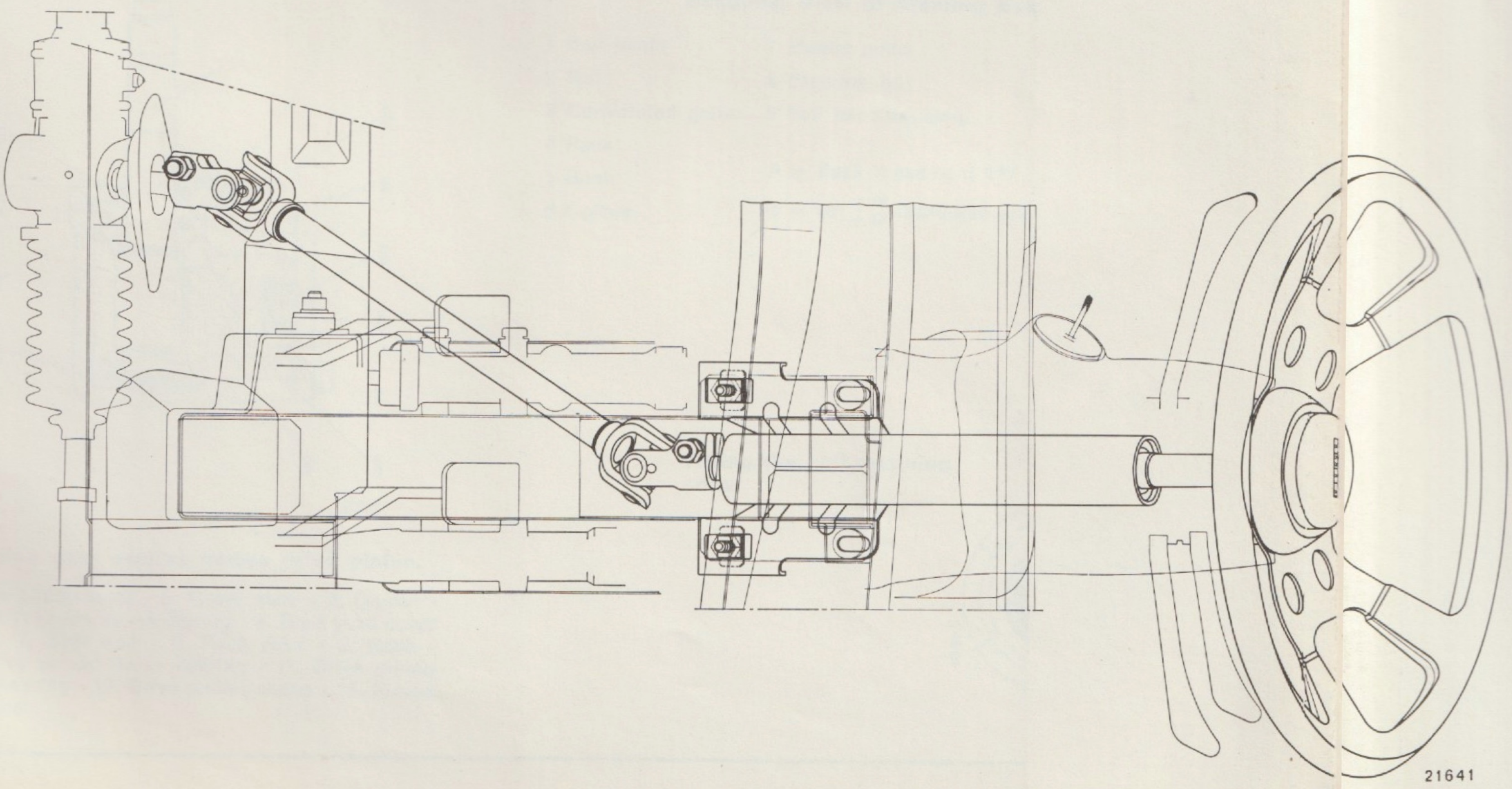
CHASSIS

STEERING CONTROL

TABLE
III-f



21642

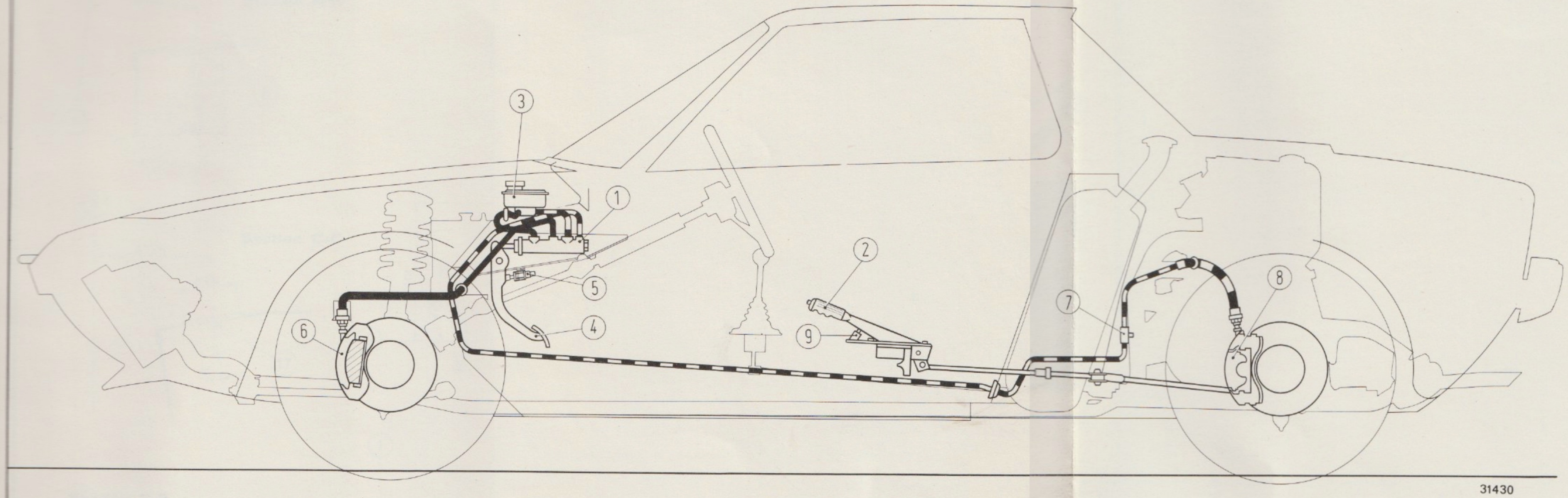


21641

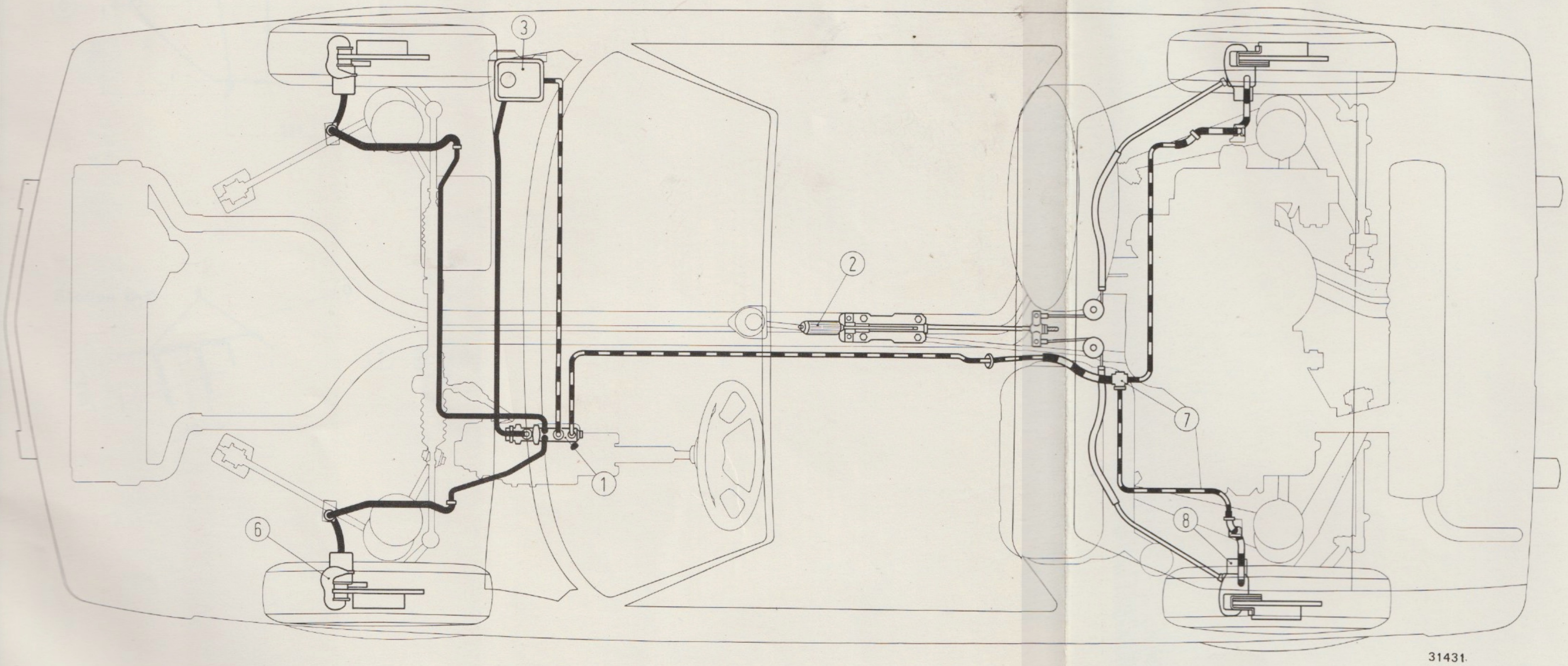
Fiat X1/9

CHASSIS
BRAKE SYSTEM DIAGRAM

TABLE III-h



31430



31431

Diagram Showing Hydraulic System and Handbrake Mechanism

1 Brake master cylinder
2 Handbrake lever
3 Brake fluid reservoir
4 Brake pedal
5 Stop light switch
6 Front brake calipers
7 Three way union for rear brake pipes
8 Rear brake calipers
9 Handbrake warning light switch

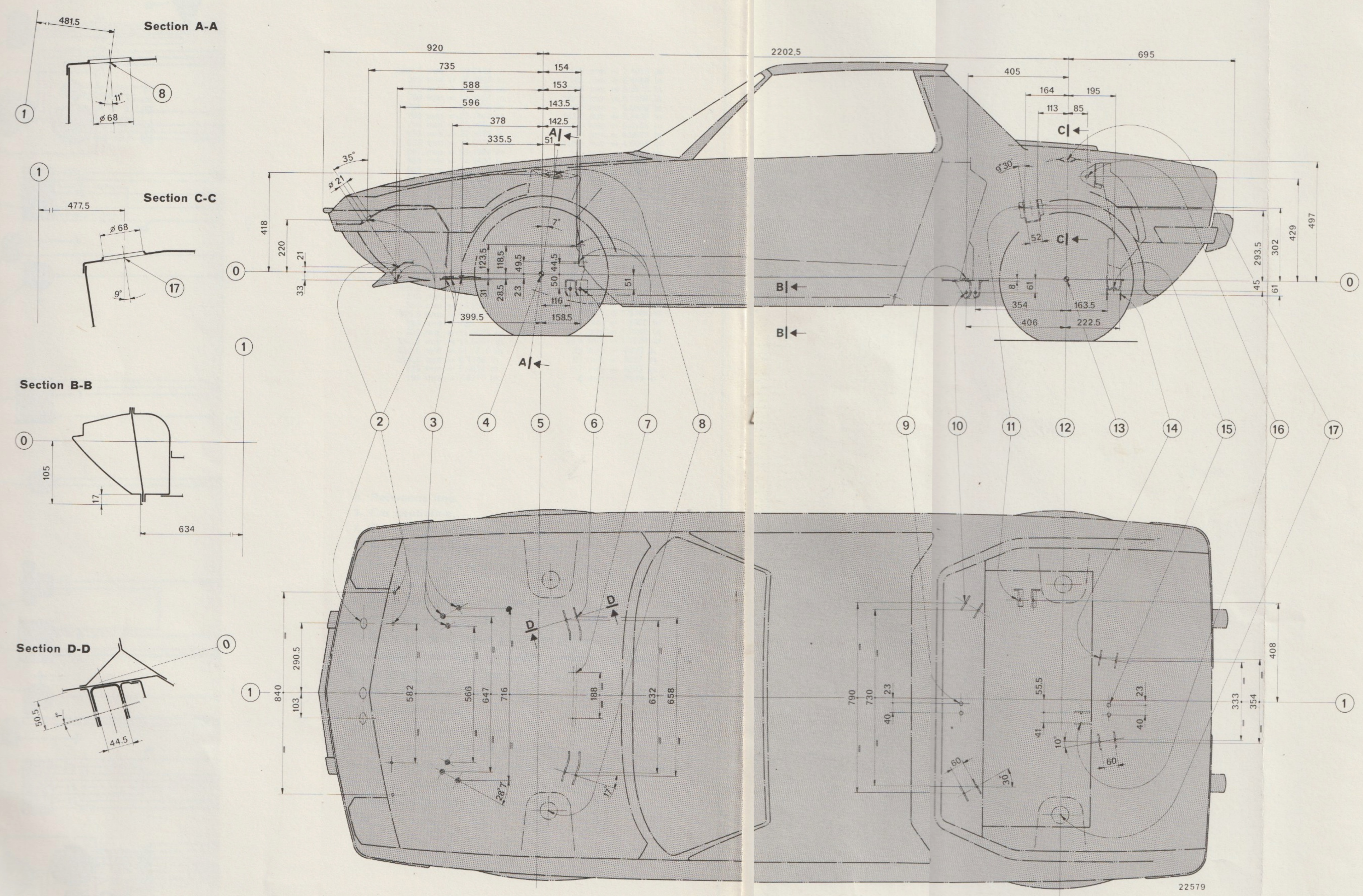
Front brake hydraulic circuit

Rear brake hydraulic circuit

Fiat X1/9

CHASSIS
RUNNING GEAR UNITS MOUNTING DIAGRAM

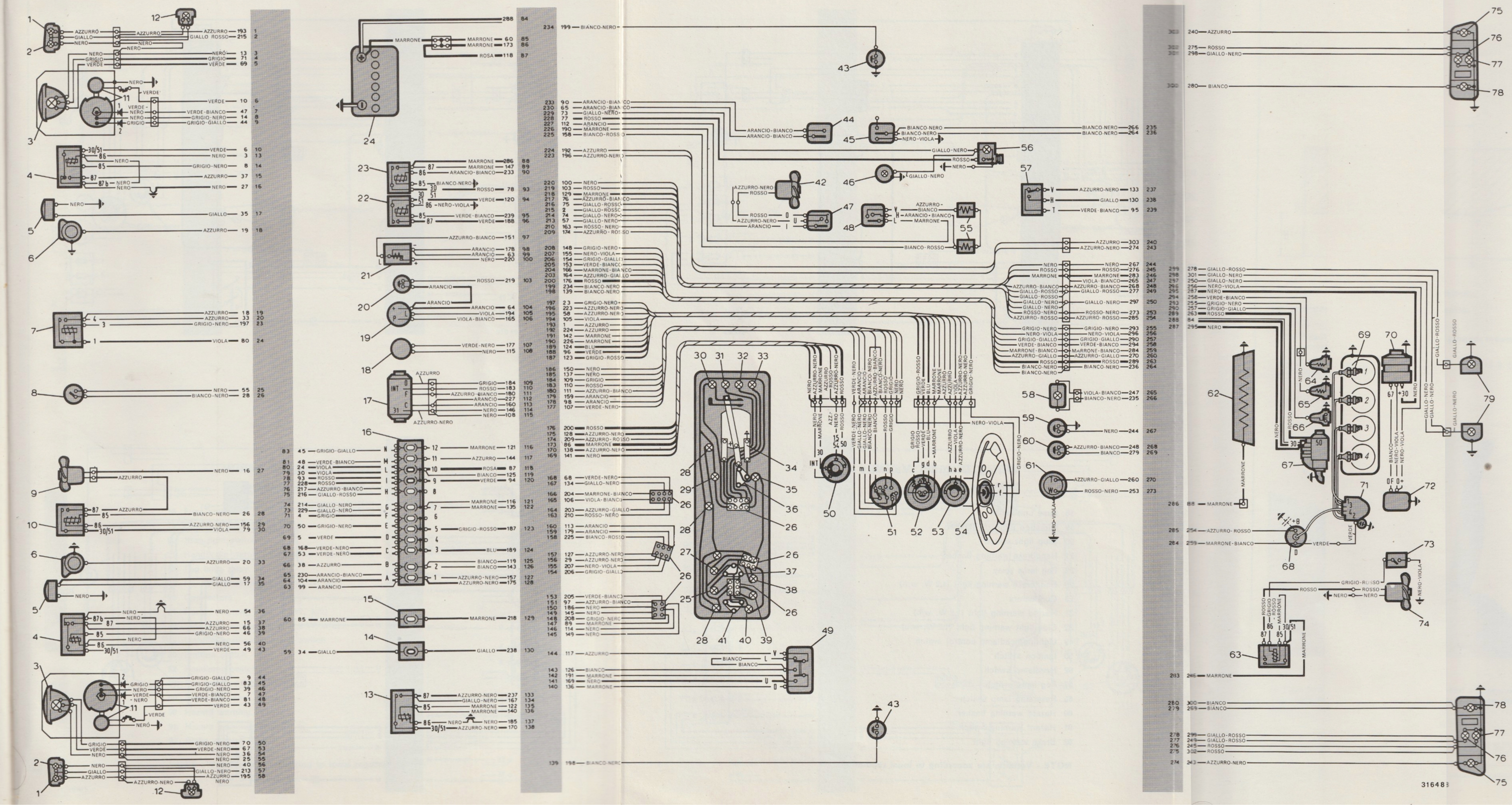
TABLE III-i



2202.5 mm	= 86.7124 in	188 mm	= 7.4015 in
920 mm	= 36.2205 in	164 mm	= 6.4566 in
840 mm	= 33.0708 in	163.5 mm	= 6.4173 in
790 mm	= 31.1024 in	158.5 mm	= 6.2204 in
735 mm	= 28.9370 in	154 mm	= 6.0629 in
730 mm	= 28.7402 in	143.5 mm	= 5.6496 in
716 mm	= 28.1890 in	142.5 mm	= 5.6105 in
695 mm	= 27.3622 in	123.5 mm	= 4.8622 in
658 mm	= 25.9055 in	118.5 mm	= 4.6653 in
647 mm	= 25.4724 in	116 mm	= 4.6569 in
634 mm	= 24.9606 in	113 mm	= 4.4488 in
632 mm	= 24.8819 in	105 mm	= 4.1338 in
596 mm	= 23.4646 in	103 mm	= 4.0551 in
588 mm	= 23.1496 in	85 mm	= 3.3464 in
582 mm	= 22.9134 in	68 mm	= 2.6771 in
566 mm	= 22.2835 in	61 mm	= 2.4016 in
497 mm	= 19.5669 in	60 mm	= 2.3622 in
481.5 mm	= 18.9567 in	55.5 mm	= 2.1850 in
477.5 mm	= 18.7992 in	52 mm	= 2.0472 in
429 mm	= 16.8898 in	51 mm	= 2.0078 in
418 mm	= 16.4567 in	50.5 mm	= 1.9882 in
408 mm	= 16.0630 in	50 mm	= 1.9685 in
406 mm	= 15.9843 in	49.5 mm	= 1.9488 in
405 mm	= 15.9449 in	45 mm	= 1.7717 in
399.5 mm	= 15.7283 in	44.5 mm	= 1.7520 in
378 mm	= 14.8819 in	41 mm	= 1.6339 in
354 mm	= 13.9370 in	40 mm	= 1.5748 in
335.5 mm	= 13.2087 in	33 mm	= 1.2992 in
333 mm	= 13.1102 in	31 mm	= 1.2205 in
302 mm	= 11.8898 in	28.5 mm	= 1.1220 in
293.5 mm	= 11.5551 in	23 mm	= .9055 in
290.5 mm	= 11.4370 in	21 mm	= .8268 in
222.5 mm	= 8.7598 in	17 mm	= .6693 in
220 mm	= 8.6614 in	8 mm	= .3150 in
195 mm	= 7.6771 in		

0. Reference line.
1. Car centreline.
2. Radiator suspension mounting.
3. Front suspension front mounting.
4. Front wheel static centre.
5. Front wheel axis.
6. Front control arm rear mounting.
7. Steering box mounting.
8. Front shock absorber upper mounting.
9. Crossmember front mounting, power plant suspension.
10. Rear control arm front mounting.
11. Power plant side mounting.
12. Rear wheel axis.
13. Rear wheel static centre.
14. Rear control arm rear mounting.
15. Crossmember rear mounting, power plant suspension.
16. Power plant suspension rear mounting.
17. Rear shock absorber upper mounting.

Fiat X1/9 | **ELECTRICAL SYSTEM** **WIRING DIAGRAM** | **TABLE IV-a**



Wiring Diagram (12 V)

(Middle-european Version)

1 Front direction indicators (21 W, Spherical)
2 Side lights (5 W, Spherical)
3 Concealed headlamps (45/40 W, Spherical, double filament)
4 Headlamp motor relays
5 Fog lamps
6 Horn
7 Horn relay
8 Radiator fan thermostatic switch
9 Radiator fan motor
10 Radiator fan motor relay
11 Headlamp drive motors
12 Repeater lights (4 W, Tubular)
13 Headlamp switch relay
14 Fog lamp fuse
15 Interior light/carburettor cooling fan fuse
16 Fuse unit
17 Windscreen wiper motor
18 Windscreen washer pump
19 Direction indicator flasher
20 Stop light switch
21 Handbrake warning flasher
22 Fog lamp relay
23 Heated backlight relay
24 Battery
25 Handbrake w/l (1,2 W, w/b)
26 Connectors
27 Spare w/l socket
28 Panel lights (3 W, w/b)
29 Direction indicator w/l (1,2 W, w/b)
30 Spare w/l socket
31 Hazard w/l (where mandatory)
32 Side light w/l (1,2 W, w/b)
33 Headlamp w/l (1,2 W, w/b)
34 Electronic tachometer
35 Fuel w/l (1,2 W, w/b)
36 Fuel gauge
37 Water temperature gauge
38 Ignition w/l (1,2 W, w/b)
39 Heated backlight w/l (1,2 W, w/b)
40 Oil pressure w/l (1,2 W, w/b)
41 Oil pressure gauge
42 Heater fan motor
43 Door switches
44 Heated backlight switch
45 Courtesy light switch
46 Ideogram illumination lamp
47 Heater fan motor switch
48 Panel light switch
49 Lighting/headlamp control switch
50 Ignition switch
51 Wiper/washer switch
52 Headlamp switch
53 Direction indicator switch
54 Horn control
55 Panel light ballast resistors
56 Cigar lighter/light (4 W, Tubular)
57 Fog lamp switch
58 Courtesy light (5 W, Festoon)
59 Handbrake warning switch
60 Reversing light switch
61 Fuel transmitter
62 Heated backlight
63 Carburettor cooling fan motor relay
64 Water temperature gauge transmitter
65 Oil pressure warning transmitter
66 Oil pressure warning switch
67 Starter motor
68 Ignition coil
69 Spark plugs
70 Alternator
71 Ignition distributor
72 Voltage regulator
73 Carburettor cooling fan motor thermal switch
74 Carburettor cooling fan motor
75 Rear direction indicators (21 W, Spherical)
76 Rear lights (51 W, Spherical)
77 Stop lights (21 W, Spherical)
78 Reversing lights (21 W, Spherical)
79 Number plate lights (5 W, Spherical)

w/l = warning light
w/b = wedge base

EXPLANATORY NOTE

Each wire section ends in an identification number. Actual wiring can be traced by looking for the wire number in the adjacent coloured strip, where wire path is resumed.

Cable Colour Code

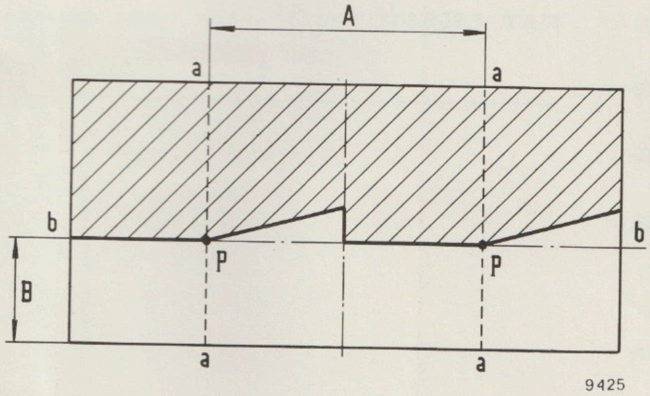
Arancio = **Amber**	Giallo = **Yellow**	Rosa = **Pink**
Azzurro = **Light blue**	Grigio = **Grey**	Rosso = **Red**
Bianco = **White**	Marrone = **Brown**	Verde = **Green**
Blu = **Dark blue**	Nero = **Black**	Viola = **Mauve**

Fiat X1/9

ELECTRICAL SYSTEM

HEADLAMPS ALIGNMENT

TABLE IV-b



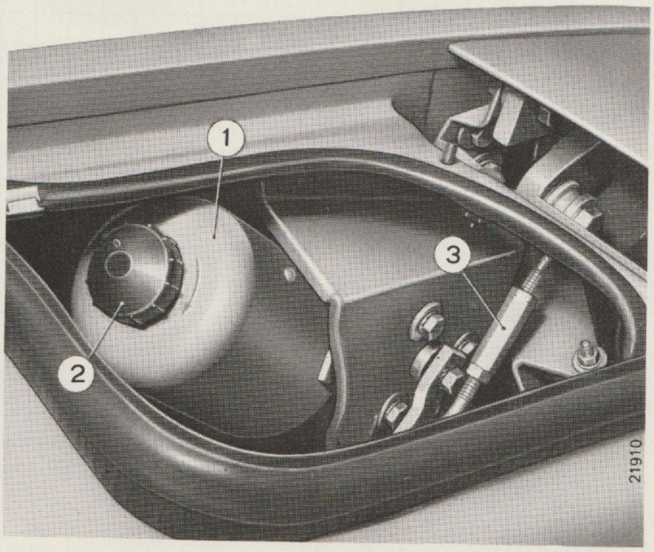
Headlamps alignment diagram.

A = distance between headlamps centre.

B = C — 1.378″ (3.5 cm).

C = headlamps centre height above ground, measured when aligning.

The above data apply to an unladen car, placed 16 ft. (5 m) away from the screen.



Retractable headlamp controls housing.

1. Actuator.

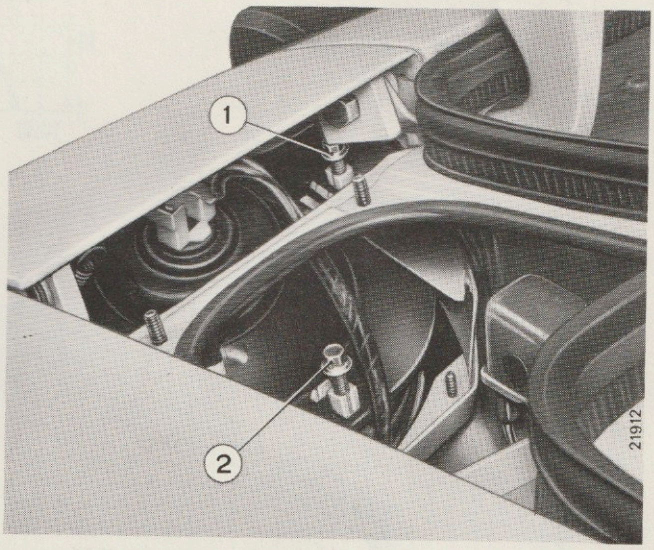
2. Headlamp tilting manual control.

3. Headlamp travel adjustment rod.

The arrow on actuator casing, shows the only turning direction of headlamp tilting manual control knob.

Headlamp open.

Access to screw 1 (dipped beam horizontal adjustment), is gained through the slot on headlamp housing inner side.



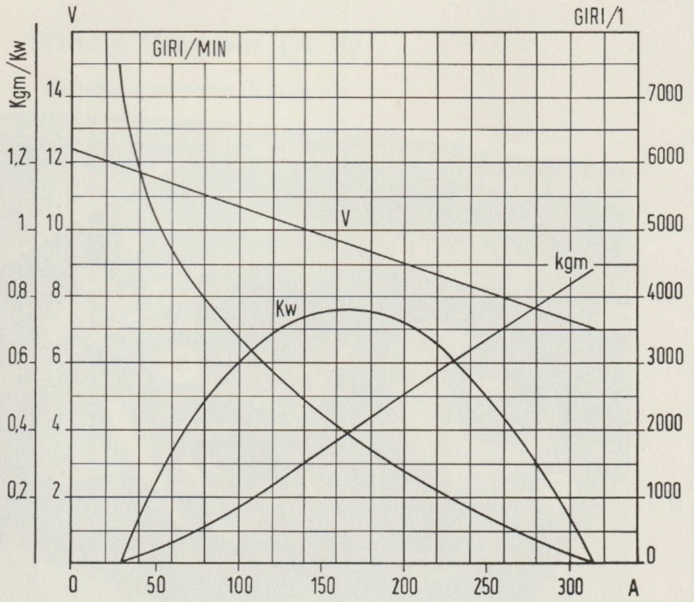
Beam adjustment screws.

1. Dipped beam horizontal adjustment screw.

2. Main beam horizontal adjustment screw.

ELECTRICAL SYSTEM

TYPICAL CURVES

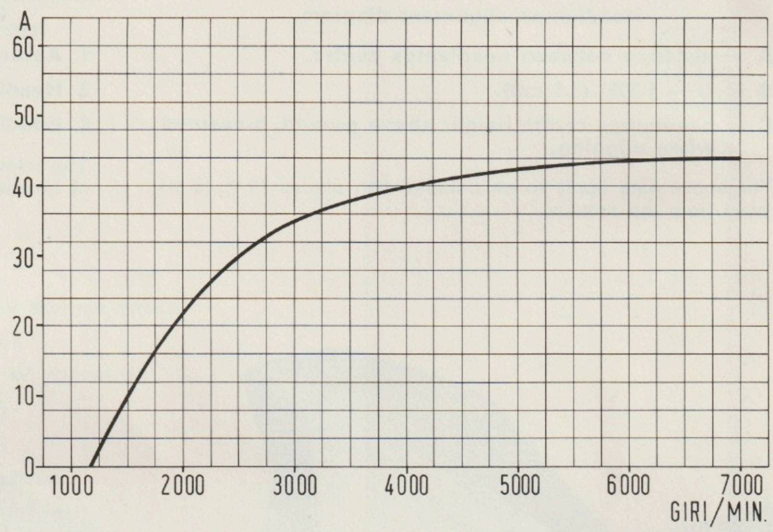


19328

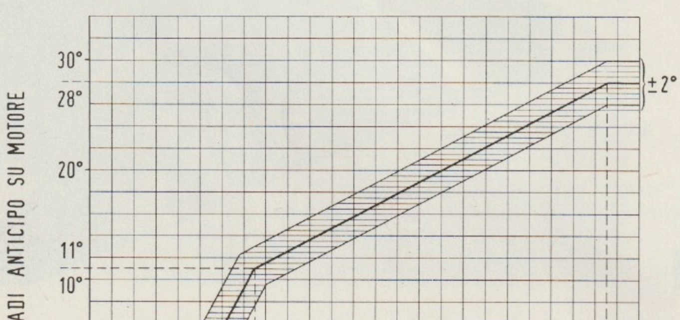
FIAT E 84-0.8/12 Var. 1 starter motor curves.

Alternator Output Curve
FIMM A 124 - 14 V - 44 A

GIRI/MIN = Rev/min



29759



17402

Automatic advance of distributor S 135 F installed on engine.

Giri/min = R.P.M. Giri/min motore = Engine R.P.M.

Gradi anticipo su motore = Advance degress versus engine