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giulia super



alfa romeo

***technical characteristics
and
principal
inspection
specifications***

C O N T E N T S

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T E C H N I C A L C H A R A C T E R I S T I C S

PRINCIPAL CHARACTERISTIC DATA

Number of cylinders	4	
Bore	78 mm	(3.072")
Stroke	82 mm	(3.23")
Total cylinder capacity	1570 cc	
Maximum power at 5500 rpm	<div style="display: inline-block; vertical-align: middle; font-size: 2em;">{</div> <div style="display: inline-block; vertical-align: middle;"> DIN 98 CV SAE 112 CV </div>	
Front track	1310 mm	(4'3")
Rear track	1270 mm	(4'2")
Wheel base	2510 mm	(8'2 7/8")
Minimum turning circle	10,900 mm	(35'9")
Overall length	4140 mm	(13'7")
Overall width	1560 mm	(5'1 3/8")
Overall height (unladen)	1430 mm	(4'8")
Dry weight	1000 kg	(2,204 lbs)
Number of seats	5	
Tires 155 x 15	<div style="display: inline-block; vertical-align: middle; font-size: 2em;">{</div> <div style="display: inline-block; vertical-align: middle;"> PIRELLI Cinturato S MICHELIN X </div>	
Fuel consumption per 100 Km (62 miles) (Italian CUNA Standards)	10.4 lt	27.1 mpg GB
		23.5 mpg US
Water pump & generator drive belt	n° 60675	

Performances after running in period:

	Gear	Km/h	mph	
Maximum speeds (with 41 : 9 final drive)	1st	42	26	
	2nd	69	43	
	3rd	102	63	
	4th	138	85	
	5th	over	175	110
	Rev.	46	28	

T i r e s

inflation pressures (with tire cold)

Front wheels - 1.6 to 1.8 kg/cm² (22.7 to 25.6 psi)

Rear wheels - 1.7 to 2.1 kg/cm² (24.1 to 29.8 psi)

- Inflate to the lower pressure for use with low load and short peaks in speed

- Inflate to the higher pressure for use with full load and maximum speeds.

R e f i l l i n g s

		<u>G.B.</u>	<u>U.S.</u>		
Water (engine & radiator)	7.5 lts	1.65 gals	1.98 gals		
Fuel (reserve 6 to 7 lt/1.3-1.5 gals GB/1.6-1.8 gals US)	46 lts	10.1 gals	12.1 gals		
Oil	Engine (pan & filter)	to min. level	3.25 Kgs	3.2 qts	3.8 qts
		to max. level (*)	5.00 Kgs	4.95 qts	5.95 qts
	Gearbox	1.650 Kgs	3.2 pints	3.8 pints	
	Differential	1.250 Kgs	2.5 pints	3.0 pints	
	Steering box . . . . .	.250 Kg	.5 pint	.6 pint

* This quantity is that needed for regular changing; the total amount of oil in the circuit (sump, filter, passages) is 5.75 Kg (5.7 qts G.B.) (6.8 qts U.S.).

P r e s c r i b e d o i l s a n d l u b r i c a n t s

	API - NLGI - SAE number	Recommended commercial equivalents
Engine	SAE 20 W 40 API MS	AGIP F.1 Multigrade SHELL X-100 20 W/40
Gearbox	SAE 90	AGIP F.1 Rotra SAE 90 SHELL Dentax 90
Steering box and differential	SAE 90 API EP	AGIP F.1 Rotra Hypoid SHELL Spirax 90 EP
Propeller shaft universal joints and sliding sleeve	NLGI 1	AGIP F.1 Grease 15 SHELL Retinax G
Front wheel bearings	NLGI 2/3	AGIP F.1 Grease 33 FD SHELL Retinax AX
Brake fluid		Castrol Girling brake fluid amber
Antifreeze		AGIP F.1 Antifreeze SHELL Antifreeze

In countries where the recommended lubricants are not available it is possible to replace them with products of other leading Companies provided that in accordance with the prescribed specifications.

C a r b u r e t i o n

2 Weber 40 DCOE 24 Carburetors

Venturi	27
Main jet (1/8" dia. ball)	110
Main air metering jet	180
Idling jet (150 axial hole)	50
Idling air metering jet	120
Choke jet	65 FS
Choke air metering jet	200
Acceleration pump jet	35
Acceleration pump inlet valve	50
Acceleration pump stroke	14 mm (.55")
Delivery of acceleration pump	4 to 6 cc every 20 pump strokes for each barrel
Needle valve	150 (spring preload 50 grs)
Weight of float	26 grs
Distance of fuel level from float chamber flange	28.5 to 29.5 mm (1.12 to 1.16")
(with a pressure of 2 mts (6"6") H ₂ O upstream the needle valve)	
Idling speed	600 to 700 rpm

2 Solex C 40 PHH/2 Carburetors

Venturi	28
Main jet	125
Main air metering jet	125
Idling jet	55
Idling air metering jet	80
Choke jet	100
Choke air metering jet	300
Acceleration pump jet	35
Delivery of acceleration pump	3.5 to 4.5 cc per 20 pump strokes for each barrel
Needle valve	1.75
Spacer under needle valve	1 mm
Weight of float	12.5 gr
Distance of fuel level	21 mm
(with a pressure of 2 mts (6"6") H ₂ O upstream the needle valve)	

Note - Weber and Solex carburetors are alternative supply.

WARNING - For adjustment data of Solex 40 PHH/2 installed on GIULIA GT and GTC models, refer to "GIULIA GTC Instruction Book" publ. 1037.

V a l v e t i m i n g

Checking of valve opening and closing angles

Clearance (with cold engine) between the unlobed profile of cam of camshaft and the cup ceiling:

intake . . . . .	.475 to .500 mm (.0187 to .0197")
exhaust . . . . .	.525 to .550 mm (.0206 to .0216")

Opening of intake valve:

lift of cup . . . . .	.20 mm (.008")
corresponding to an angle before T D C of	18° 30'

Closing of intake valve:

lift of cup . . . . .	.20 mm (.008")
corresponding to an angle after B D C of	42° 30'

Opening of exhaust valve:

lift of cup . . . . .	.15 mm (.006")
corresponding to an angle before B D C of	42° 30'

Closing of exhaust valve:

lift of cup . . . . .	.15 mm (.006")
corresponding to an angle after T D C of	18° 30'

Tolerance on angle values ± 1° 30'

Angle values of the actual diagram of valve timing system with cold engine (clockwise rotation direction of the crankshaft seen from the front side).

opening of intake valve before T D C	36° 50'
closing of intake valve after B D C	60° 50'
opening of exhaust valve before B D C	54° 10'
closing of exhaust valve after T D C	30° 10'
induction stroke	277° 40'
exhaust stroke	264° 20'

I g n i t i o n

Firing order - 1 - 3 - 4 - 2 (No 1 cylinder is that at the fan side)

Opening of contact points of ignition distributor -35 to 40 mm (.014 to .016")

The distributor is correctly fitted when the oiler is toward the engine.

Values of advance of ignition distributor

Fixed advance F Before T D C	Maximum Advance M Before T D C
3° ± 1°	43° + 0° - 3° at 5000 rpm

S p a r k p l u g s

Lodge 2 H L

E l e c t r i c s y s t e m

Voltage 12 V
Battery 60 Ah

Generator
Voltage regulator
Starting motor
Coil
Ignition distributor
Windshfeld wiper

BOSCH	MARELLI
EG (R) 14 V 25 A 29	DN 62 E/P
VA 14 V 25 A	SD 368 A 300/12
EF (R) 12 V .7 PS	MT 54 B
TK 12 A 19	BZR 200 D
VJ 4 BR 35 mk	S 103 A
WS 13/11 S 1 a	T6E 93 A

B u l b ' s w a t t a g e

Inner headlights (high beams)	40/45 watts asymmetric
Outer headlights (low beams)	40/45 watts asymmetric
Front parking lights	5 watts globular
Front lights - direction indicators	20 watts
Side lights - direction indicators	3 watts tubular
Tail lights - parking & stop	5/20 watts
Tail lights - direction indicators	20 watts
Back-up light	20 watts
License plate light	5 watts globular
Cigar lighter lamp	3 watts tubular
Engine compartment light	5 watts globular
Dome light inside the car	5 watts cylindrical
Light in luggage compartment	5 watts cylindrical
Lighting on instrument panel	3 watts tubular
Tell-tale for parking lights	3 watts tubular
Tell-tale for direction indicators	3 watts tubular
Tell-tale for generator	3 watts tubular
Tell-tale for high beams	3 watts tubular
Tell-tale for fuel reserve	3 watts tubular
Tell-tale for blower	3 watts tubular

T i g h t e n i n g t o r q u e s p e c i f i c a t i o n s

Engine/Gearbox unit

	Kgm	lb.ft	Manner of tightening
Nuts of cylinder head	6.2 to 6.4	44.8 to 46.3	Slacken and re-tighten without lubricating
	after repairing, when cold		
	6.6 to 6.7	47.7 to 48.4	Lock without slackening the nut
	when hot		
Spark plugs	2.5 to 3.5	18.1 to 25.3	With graphite grease, when cold
Nuts of the camshaft caps	2 to 2.25	14.5 to 16.3	In oil
Nuts of the connecting rod caps	5 to 5.3	36.2 to 38.3	In oil
Nuts of main bearing caps	4.7 to 5	33.9 to 36.1	In oil
Screws of flywheel on crankshaft	4.2 to 4.5	30.4 to 32.5	In oil
Nut of generator pulley	3 to 3.5	21.7 to 25.3	dry
Nut of gearbox main shaft yoke	12	86.8	dry
Nut of gearbox layshaft	8	57.8	dry
Nut of gearbox half-casings	1.8	13	dry
REAR FRAME			
Screws securing ring gear to differential case . .	4.5 to 5	32.6 to 36.1	dry
Ring nut securing yoke on final drive pinion shaft	8 to 14	58 to 101.2	dry
Nuts securing bearing housings to rear axle banjo .	4.8 to 5.5	34.8 to 39.7	dry
Nuts securing radius rods to body	10 to 11.5	72.4 to 83	dry
Nuts securing radius rods to rear axle banjo . . .	11.5 to 13	83 to 94	dry
Nut securing reaction triangle to body	4.8 to 5.5	34.8 to 39.7	dry
Nut securing reaction triangle to differential housing	11 to 15	79.8 to 108.5	dry
Screws securing brake slave cylinders to axle banjo	.4 to .5	2.9 to 3.6	dry
Screws securing rear brake caliper to support . . .	2.3 to 2.8	16.7 to 20.2	dry
Nuts securing wheels	6 to 8	43.4 to 57.8	dry
Bolts joining differential yoke to prop. shaft yoke	4.5 to 5.5	32.6 to 39.7	dry
FRONT FRAME			
Nut securing steering wheel to column	5 to 5.5	38.1 to 39.7	dry
Screws securing Burman steering box cover	2.3 to 2.5	16.7 to 18	dry
Screws securing steering box & bellcrank bracket to body	4.8 to 5.5	34.8 to 39.7	dry
Nuts of steering linkage ball joints	4.8 to 5.5	34.8 to 39.7	dry
Nut securing steering arm to box	12.5 to 14	90.5 to 101.2	dry
Screws securing upper attachment of shock absorber to body	2.3 to 2.8	16.7 to 20.2	dry
Nut securing shock absorber to suspension arms . .	7.5 to 8.5	54.3 to 61.4	dry
Screws securing upper wishbone front arm to body .	2.3 to 2.8	16.7 to 20.2	dry
Nut securing upper wishbone front arm to rear arm .	4.8 to 5.5	34.8 to 39.7	dry
Nut securing upper wishbone rear arm to body . . .	11.5 to 13	83 to 94	dry
Nuts securing lower wishbone bracket to cross-member	13 to 18	94 to 130	dry
Nuts securing steering arm to steering knuckle . .	4.8 to 5.5	34.8 to 39.7	dry
Nut securing upper wishbone rear arm to steering knuckle	7.5 to 8.5	54.3 to 61.4	dry
Nut securing lower ball joint to wishbone	7.5 to 8.5	54.3 to 61.4	dry
Nut securing lower ball joint to steering knuckle .	7.5 to 8.5	54.3 to 61.4	dry
Nuts securing caliper support to steering knuckle .	4.8 to 5.5	34.8 to 39.7	dry
Screws securing front brake calipers to support . .	7.5 to 8.5	54.3 to 61.4	dry
Screws securing front brake discs	7.5 to 8.5	54.3 to 61.4	dry
Nuts securing wheels	6 to 8	43.4 to 57.8	dry

Note - For the installation of bearings on stub axle and the tightening of the nut refer to page 15.

M A J O R I N S P E C T I O N S P E C I F I C A T I O N S

C a m s h a f t s

Diameter of journals	=	26.959 to 26.980 mm (1.0614 to 1.0622")
Diameter of journal bearings	=	27.000 to 27.033 mm (1.0630 to 1.0642")
Radial clearance between Journals and bearings	=	.020 to .074 mm (.0008 to .0029")
End play of camshaft in thrust bearing	=	.065 to .182 mm (.0026 to .0071")

V a l v e s a n d v a l v e g u i d e s

	Intake	E x h a u s t		
	LIVIA H	LIVIA C	A T E	
Valves {	Diameter of valve poppet	41.00 to 41.15 mm (1.614 to 1.620")	37.00 to 37.15 mm (1.4567 to 1.4625")	37.0 to 37.2 mm (1.4567 to 1.4645")
	Diameter of valve stem	8.962 to 8.987 mm (.3528 to .3538")	8.935 to 8.960 mm (.3518 to .3527")	8.935 to 8.960 mm (.3518 to .3527")
	Total length	106.903 to 107.157 mm (4.2088 to 4.2187")	106.173 to 106.427 mm (4.1801 to 4.1900")	106.05 to 106.15 mm (4.1753 to 4.1791")
Valve guide {	Outside diameter with guide removed	14.033 to 14.044 mm (.5528 to .5529")		
	Inside diameter with guide assembled in cylinder head	9.000 to 9.015 mm (.3544 to .3549")		

Clearance between guide assembled in cylinder head and valve stem	{	Intake	=	.013 to .053 mm (.0005 to .0020")
		Exhaust	=	.040 to .080 mm (.0016 to .0031")

Diameter of valve guide seat on cylinder head = 13.990 to 14.018 mm (.5508 to .5518")

Interference between seat and valve guide = .015 to .054 mm (.0006 to .0021")

Projection of valve guides from their recesses in the cylinder head = 16.800 to 17.000 mm (.662 to .669")

V a l v e s e a t s

	Intake	Exhaust	
Outer diameter of the valve seat {	standard	42.597 to 42.632 mm (1.6771 to 1.6784")	38.597 to 38.632 mm (1.5196 to 1.5209")
	oversized	42.897 to 42.932 mm (1.6889 to 1.6902")	38.897 to 38.932 mm (1.5314 to 1.5327")
Diameter of recess in the cylinder head for valve seat {	standard	42.532 to 42.557 mm (1.6744 to 1.6754")	38.532 to 38.557 mm (1.5169 to 1.5179")
	oversized	42.832 to 42.857 mm (1.6862 to 1.6872")	38.832 to 38.857 mm (1.5288 to 1.5298")

Interference between valve seat and recess in cylinder head = .100 to .040 mm (.0039 to .0016")

Seat angle = 120°

V a l v e c u p s

Diameter of cup	{ standard - 34.973 to 34.989 mm (1.3773 to 1.3775") oversized - 35.173 to 35.189 mm (1.3848 to 1.3853")
Diameter of cup seat in cylinder head	
Clearance between seat and cup	- .011 to .052 mm (.0005 to .0020")

V a l v e s p r i n g s

	Free length	Length under test load	Test load
Inner spring	red mark 47.3 mm (1.87")	26 mm (1.02")	22.2 to 23.1 Kg 48.9 to 51.1 lbs
	green mark 46.5 mm (1.83")		
Outer spring	red mark 52.8 mm (2.08")	27.5 mm (1.08")	35.7 to 37.1 Kg 78.6 to 81.8 lbs
	green mark 51.3 mm (2.03")		

Note - The valve springs should be fitted with the color-marked coil downward.

C o n n e c t i n g r o d s

Length between center line of big end and center line of small end of connecting rod	- 147.955 to 148.045 mm (5.8250 to 5.8285")
Inner diameter of the big end of connecting rod	- 53.695 to 53.708 mm (2.1140 to 2.1144")
Inner diameter of bushing in the small end of rod	- 22.005 to 22.015 mm (.8664 to .8667")
End play of the connecting rods on the crankpins	- .200 to .300 mm (.0079 to .0118")
Thickness of connecting rod bearings	{ standard - 1.829 to 1.835 mm (.0720 to .0722")
	{ 1st oversize - 1.956 to 1.962 mm (.0770 to .0772")
	{ 2nd oversize - 2.083 to 2.089 mm (.0820 to .0824")
Radial clearance between crankpins and bearings for big end of connecting rod	- .025 to .063 mm (.0010 to .0024")
Maximum out of parallelism between center line of big end hole and center line of small end hole	- .074 mm (.0029")

P i s t o n p i n

O.D. of pin	{ Black color - 21.994 to 21.997 mm (.86590 to .86602")
	{ White color - 21.997 to 22.000 mm (.86606 to .86614")

P i s t o n p i n h o l e

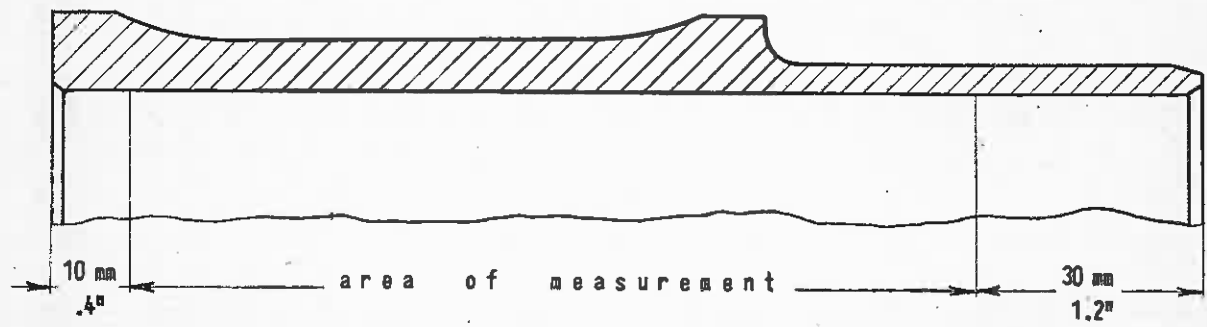
	Black color	White color
Borgo piston	22.000 to 22.002 mm (.86614 to .86621")	22.003 to 22.005 mm (.86626 to .86633")

P i s t o n s a n d c y l i n d e r b a r r e l s

Diameter of pistons to be measured to square with the hole for piston pin and at a distance of 10-12 mm (.394 - .472") from the lower border of skirt.

For cylinder classification purpose, use the minimum diameter recorded.

	CLASS A (BLUE)	CLASS B (PINK)	CLASS C (GREEN)
BORG0 piston	77.920 to 77.930 mm (3.0677 to 3.0681")	77.931 to 77.940 mm (3.0682 to 3.0685")	77.941 to 77.950 mm (3.0686 to 3.0688")
Cylinder barrel	77.965 to 77.994 mm (3.0703 to 3.0706")	77.995 to 78.004 mm (3.0707 to 3.0710")	78.005 to 78.014 mm (3.0711 to 3.0714")



Clearance between cylinder barrel and piston . . . . .		.055 to .074 mm (.0022 to .0029")
Wear limit		120 mm (.0047")
Elongation and taper of barrels	{	new 010 mm (.0004")
		wear limit 050 mm (.0019")
Projection of barrels from cylinder block . . . . .		.000 to .060 mm (.0000 to .0024)
Surface roughness of barrel bore		20 to 40 microinches RMS

C o m p r e s s i o n a n d o i l s c r a p e r r i n g s

Height of grooves in piston for compression rings	{	normal	-	1.775 to 1.790 mm (.0699 to .0704")		
		chromium-plated	-	1.785 to 1.800 mm (.0703 to .0708")		
Height of groove in piston for oil scraper ring			-	4.015 to 4.030 mm (.1581 to .1586")		
Thickness of compression rings			-	1.728 to 1.740 mm (.0681 to .0685")		
Thickness of oil scraper ring			-	3.978 to 3.990 mm (.1567 to .1571")		
End play of rings in grooves	{	compression rings	{	normal	-	.035 to .062 mm (.0014 to .0024")
				chromium-plated	-	.045 to .072 mm (.0018 to .0028")
		oil scraper rings			-	.025 to .052 mm (.0010 to .0020")
Gap of rings to be inspected in ring gauge or in cylinder barrels			-	.300 to .450 mm (.0012 to .0017")		

C r a n k s h a f t

Diameter of main journals	{	standard	-	59.960 to 59.973 mm (2.3606 to 2.3611")
		1st undersize	-	59.706 to 59.719 mm (2.3506 to 2.3511")
		2nd undersize	-	59.452 to 59.465 mm (2.3407 to 2.3411")
Diameter of crankpins	{	standard	-	49.987 to 50.000 mm (1.9680 to 1.9685")
		1st undersize	-	49.733 to 49.746 mm (1.9581 to 1.9585")
		2nd undersize	-	49.479 to 49.492 mm (1.9480 to 1.9485")
Thickness of main bearings	{	standard	-	1.829 to 1.835 mm (.0720 to .0722")
		1st oversize	-	1.956 to 1.962 mm (.0770 to .0772")
		2nd oversize	-	2.083 to 2.089 mm (.0820 to .0822")
Diameter of seat for main bearings in crankcase	-			63.657 to 63.676 mm (2.5062 to 2.5069")
Length of central journal	{	standard	-	30.000 to 30.035 mm (1.1811 to 1.1824")
		1st oversize	-	30.127 to 30.162 mm (1.1861 to 1.1874")
		2nd oversize	-	30.254 to 30.289 mm (1.1911 to 1.1924")
Thickness of thrust rings for central journal	{	standard	-	2.311 to 2.362 mm (.0910 to .0929")
		1st oversize	-	2.374 to 2.425 mm (.0935 to .0954")
		2nd oversize	-	2.438 to 2.489 mm (.0960 to .0980")
End play of crankshaft	-			.111 to .228 mm (.0044 to .0089")
Radial clearance between journals and main bearings	-			.014 to .058 mm (.0005 to .0022")
Fillet radii	{	main journals & crankpins	-	1.7 to 2.1 mm (.07 to .08")
		pin on flywheel side	-	3.7 to 4.1 mm (.15 to .16")
Main journals & crankpins surface roughness	-			63 microinches RMS
Maximum elongation of main journals and crankpins	-			.007 mm (.00027")
Maximum taper of main journals and crankpins measured on their full length	-			.01 mm (.00039")
Maximum error of parallelism of main journals and crankpins measured on their full length	-			.015 mm (.00059")
Maximum misalignment allowed between main journals	-			.01 mm (.00039")
Maximum misalignment allowed between ϵ of the two pairs of crankpins and ϵ of main journals	-			.300 mm (.0118")

C l u t c h

Pedal free travel	-	23 mm (.9")
Distance between thrust ring and the reference sleeve of tool C.6.0104	-	.75 to 1.25 mm (.029 to .053")
Squareness of the clutch driven plate assembled on gearbox direct drive shaft	-	.50 mm (.019")
Wear limit of driven plate thickness	-	6 mm (.236")
Spring rating		
free length	-	43.5 to 45.5 mm (1.71 to 1.79")
length under test load	-	29 mm (1.14")
test load	-	45 to 49 Kg (99 to 108 lbs)

G e a r b o x

Transmission ratios		<table border="0"> <tr> <td>1st gear</td> <td>3.304 : 1</td> </tr> <tr> <td>2nd gear</td> <td>1.988 : 1</td> </tr> <tr> <td>3rd gear</td> <td>1.355 : 1</td> </tr> <tr> <td>4th gear</td> <td>1.000 : 1</td> </tr> <tr> <td>5th gear</td> <td>.791 : 1</td> </tr> <tr> <td>Reverse gear</td> <td>3.010 : 1</td> </tr> </table>	1st gear	3.304 : 1	2nd gear	1.988 : 1	3rd gear	1.355 : 1	4th gear	1.000 : 1	5th gear791 : 1	Reverse gear	3.010 : 1
1st gear	3.304 : 1													
2nd gear	1.988 : 1													
3rd gear	1.355 : 1													
4th gear	1.000 : 1													
5th gear791 : 1													
Reverse gear	3.010 : 1													
Maximum eccentricity of main shaft	-	.05 mm (.020")												
End play between forks and sleeves	<table border="0"> <tr> <td>assembly</td> <td>-</td> <td>.15 to .34 mm (.006 to .013")</td> </tr> <tr> <td>wear limit</td> <td>-</td> <td>.85 mm (.033")</td> </tr> </table>	assembly	-	.15 to .34 mm (.006 to .013")	wear limit	-	.85 mm (.033")							
assembly	-	.15 to .34 mm (.006 to .013")												
wear limit	-	.85 mm (.033")												

Calibration of springs for striking rod balls	<table border="0"> <tr> <td>free length</td> <td>15.2 mm (.600")</td> <td>30.5 mm (1.2")</td> </tr> <tr> <td>length under test load</td> <td>10 mm (.390")</td> <td>20 mm (.78")</td> </tr> <tr> <td>test load</td> <td>2.88 to 3.12 Kg (6.4 to 6.8 lbs)</td> <td>4.32 to 4.68 Kg (9.5 to 10.3 lbs)</td> </tr> </table>	free length	15.2 mm (.600")	30.5 mm (1.2")	length under test load	10 mm (.390")	20 mm (.78")	test load	2.88 to 3.12 Kg (6.4 to 6.8 lbs)	4.32 to 4.68 Kg (9.5 to 10.3 lbs)	Gear	1st - 2nd - 3rd	5th - Rev.
		free length	15.2 mm (.600")	30.5 mm (1.2")									
		length under test load	10 mm (.390")	20 mm (.78")									
		test load	2.88 to 3.12 Kg (6.4 to 6.8 lbs)	4.32 to 4.68 Kg (9.5 to 10.3 lbs)									

Maximum end play of the main shaft gears	<table border="0"> <tr> <td>1st speed gear</td> <td>-</td> <td>.170 to .245 mm (.0067 to .0096")</td> </tr> <tr> <td>2nd & 3rd speed gear</td> <td>-</td> <td>.130 to .205 mm (.0052 to .0081")</td> </tr> <tr> <td>5th speed gear & Rev.</td> <td>-</td> <td>.160 to .220 mm (.0063 to .0087")</td> </tr> </table>	1st speed gear	-	.170 to .245 mm (.0067 to .0096")	2nd & 3rd speed gear	-	.130 to .205 mm (.0052 to .0081")	5th speed gear & Rev.	-	.160 to .220 mm (.0063 to .0087")
1st speed gear	-	.170 to .245 mm (.0067 to .0096")								
2nd & 3rd speed gear	-	.130 to .205 mm (.0052 to .0081")								
5th speed gear & Rev.	-	.160 to .220 mm (.0063 to .0087")								
Distance between outer planes of the engaging teeth of 3rd and 4th gears	-	42 to 42.2 mm (1.65 to 1.66")								
Distance, in neutral, of the rear band (propeller shaft side) of 5th speed sleeve from the rear edge of gear engaging teeth	-	12.9 mm (.508")								

R e a r a x l e a n d s u s p e n s i o n

Transmission-axle overall ratios-with final drive 41 : 9	}	1st gear	15.049 : 1
		2nd gear	9.055 : 1
		3rd gear	6.172 : 1
		4th gear	4.555 : 1
		5th gear	3.603 : 1
		Reverse	13.710 : 1
Maximum eccentricity of axle shafts . . . . .			.10 mm (.004")
Clearance between teeth of planetary gears . . . . .			.05 mm (.002")
Play between teeth of final drive . . . . .			.05 to .10 mm (.002 to .004")
Max factory end play between reaction trunnion and attachment to body			1 mm (.04")
Reference dimension on tool C.6.0101 for pinion-to-ring gear fitting			70 ± .0025 mm (2.7559 ± .0001")
Pre-load on pinion bearing		11.5 to 15.5 KgcM (10 to 13.5 in. lbs)	
Total pre-load on final drive bearings		16.5 to 24.5 KgcM (14.4 to 21.3 in. lbs)	

C h e c k i n g o f s u s p e n s i o n s p r i n g s

Colored marks: sky blue - sky blue

Free length	449 mm (17.7")
Length under test load	252 mm (10")
Test load	321 - 341 Kgs (710 - 740 lbs)

C h e c k i n g o f s h o c k a b s o r b e r s o n t e s t b e n c h

Calibration data (when cold)

	G I R L I N G		B I A N C H I A L L I N Q U A N T	
	Extension	Compression	Extension	Compression
High speed	121 - 190 Kgs (267-418 lbs)	27 - 42 Kgs (60-92 lbs)	135 - 190 Kgs (298-418 lbs)	50 - 80 Kgs (111-176 lbs)
Low speed	13 - 32 Kgs (29 - 70 lbs)	9 - 18 Kgs (20-40 lbs)	19 - 55 Kgs (42-121 lbs)	9 - 22 Kgs (20 - 48 lbs)

F r o n t s u s p e n s i o n

Adjustment of clearance in wheel bearings

When performing regular servicing or whenever the removal of wheel hubs is required, adjust the bearing clearance as follows:

- 1) Screw in the castellated nut and lock it to a torque of 2.5 Kgm (18 ft.lbs) while at the same time revolving the wheel hub to set the bearings properly in their seats;
- 2) Unscrew the nut half a turn or more;
- 3) Lightly tap on the stub axle end with a mallet in order to return the outboard bearing in its proper position even in the case a slight interference between bearing cone and stub axle exists;
- 4) Lock the nut in place to 1.5 Kgm (10.8 ft-lbs);
- 5) Unscrew the nut of a quarter turn;
- 6) If the hole in the axle is aligned with a slot in the castellated nut insert the cotter pin; if not, screw in the nut by the minimum angle needed to line up the hole and the next slot;
- 7) Again tap lightly on stub axle end to restore the same condition as under step 3;
- 8) The end play so obtained on stub axle should fall between .02 - .12 mm (.0008 - .0047").

Wheel bearing lubricating instructions

The quantity of lubricating grease should be about 65 grammes (2½ ozs) for each hub; do not exceed such a quantity to avoid bearing overheating, grease leakage, etc.

The grease should be well distributed inside the bearings and into side recesses.

Subsequently, at the regular schedule, remove the hub cover and pack the outboard bearing.

Ball joints

- End play of lower ball joint in its socket .5 to 1 mm (.02 to .04").

Note - Ball joints require no regular lubrication being provided with special grease seals which retain the grease packed in by factory on assembly. Only if strictly needed (joints squeaking) grease with Shell Retinax A.

Checking of suspension springs

Colored marks: sky blue - sky blue

Free length		312.5 mm (12.31")
Length under test load		200 mm (7.8")
Test load		911.8-968.2 Kgs (2100-2650 lbs)

Checking of shock absorbers on test bench

Calibration data (when cold)

	G I R L I N G		BIANCHI - ALLINQUANT	
	Extension	Compression	Extension	Compression
High speed	210 to 310 Kgs (470 to 680 lbs)	27 to 52 Kgs (60 to 115 lbs)	150 to 190 Kgs (330 to 420 lbs)	55 to 80 Kgs (121 to 175 lbs)
Low speed	30 to 52 Kgs (66 to 115 lbs)	9 to 22 Kgs (20 to 48 lbs)	25 to 55 Kgs (55 to 121 lbs)	9 to 22 Kgs (20 to 48 lbs)

B r a k e s

D i s c

Whenever a brake unit is overhauled or replaced check the disc for true rotation with the disc fitted to the car. Use a dial gauge and check that runout does not exceed .15 mm (.006"). Should the reading exceed this value, then the installation of disc on stub axle must be carefully examined; if the run out persists, replace the disc. If the disc is scored, the grinding of the surfaces is allowed providing not to exceed an undersize of 1 mm (.0394"), equalized on both faces, i.e. .5 mm (.0197") each face.

F r i o t i o n p a d s

	<u>F r o n t</u>	<u>R e a r</u>
Thickness when new	16 mm (.630")	17.5 mm (.689")
Wear limit	8 mm (.315")	10.0 mm (.394")

C a l i p e r s

On replacement of disc or caliper measure the running clearance between caliper and disc on each side; the difference should not exceed .5 mm (.0197").

To centralize the caliper about the disc, insert shims between caliper and mounting flange as required.

H a n d b r a k e

It is mechanically-operated and acts on the rear service brake pads.

The adjustment is performed by acting on the nut of control cable located between intermediate levers and calipers. After the adjustment, make sure that levers of rear calipers to which the cable is connected are all the way outward. In such a position the cable must not be tight but slightly slackened. Furthermore the brake pads must not contact the disc.

N.B. - For repair and maintenance instructions refer to: "Disc Brake System for GIULIA T.I. model" publication no. 930.

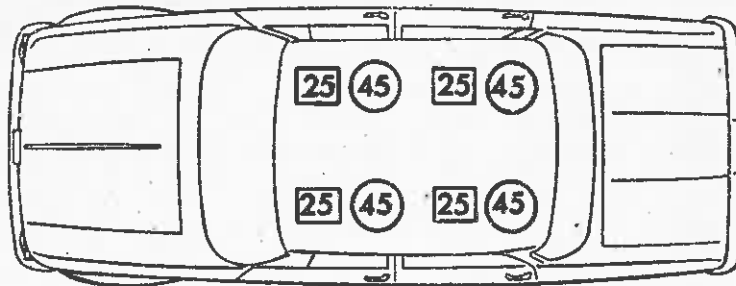
W H E E L A L I G N M E N T

CHECKING OF WHEEL ANGLES AND CAR "TRIM"

UNDER STATIC LOAD

Put the car under static load, with shock absorbers and stabilizer rod connected, with full tank or equivalent, with spare wheel, tool kit and the tires inflated to the prescribed pressures.

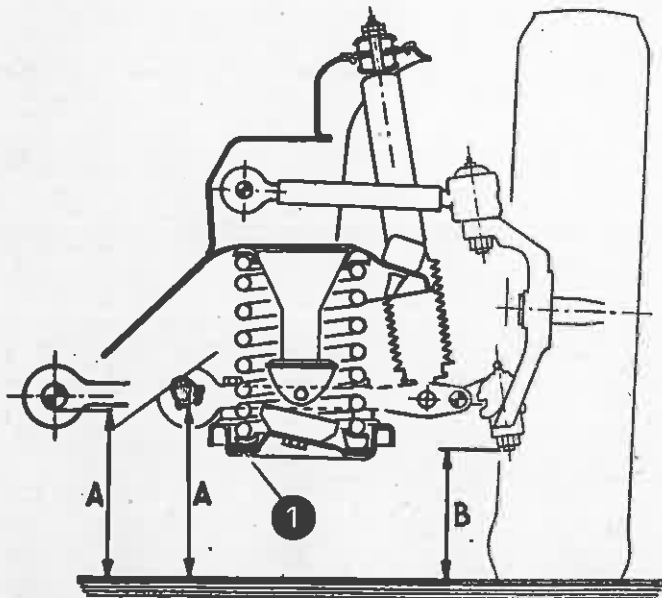
- | | | |
|---------------|---|---|
| - Front seats | } | 1 weight of 45 Kgs on each seat |
| | | 2 weights of 25 Kgs on flooring where feet rest |
| - Rear seats | } | 2 weights of 45 Kgs on seat |
| | | 2 weights of 25 Kgs on flooring where feet rest |



Front wheels

- Raise the front end by hand 40 to 50 mm ($1\frac{1}{2}$ to 2"); then allow it to return to its normal position gently. Measure the distance A of lower shaft and distance B of lower king pin from a lower reference plane; make the subtraction (A1-B1).
- Lower the front end of body slowly by hand (40 to 50 mm) and let it free to return. Measure the distance A and B and make the subtraction (A2-B2).
- Compute the average $\frac{(A1-B1) + (A2-B2)}{2}$ and compare it with the reference dimension shown below.

- | | | | |
|-------|---|-----------------------------------|---------------------------------------|
| A - B | } | for elongated-cross-section shaft | $34 \pm 3 \text{ mm} (1.34 \pm .12")$ |
| | | for round-cross-section shaft | $38 \pm 3 \text{ mm} (1.49 \pm .12")$ |



NOTE - To adjust, add shims in position 1.
 Shims are available in the following thicknesses:

3.5 mm	(.14")
7.0 mm	(.28")
10.5 mm	(.42")

Dimension A must be measured in correspondence of the lower line of wishbone shaft as shown.

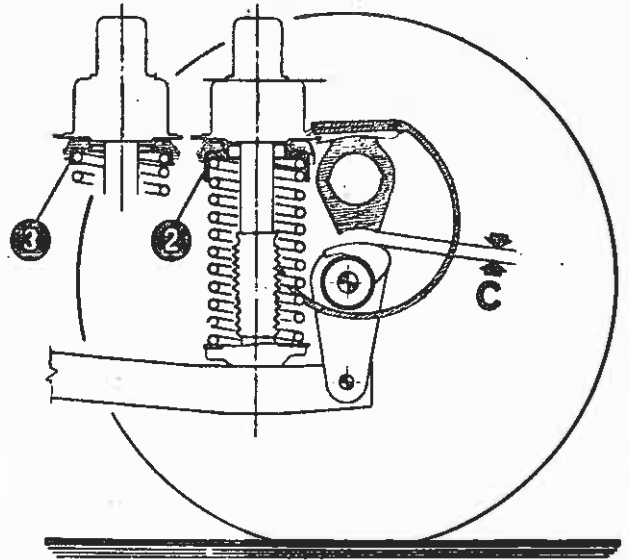
Rear wheels

- Raise the rear end, let it return as previously said and measure the distance C:
dimension recorded C1
- Lower the body and let it free to return, then
measure the distance C:
dimension recorded C2
- Compute the average $\frac{C1 + C2}{2}$ and compare it with:
 $C = 10 \pm 5 \text{ mm } (.4 \pm .2")$

NOTE - To adjust, remove the seat 3 and add shims
in position 2 as shown.

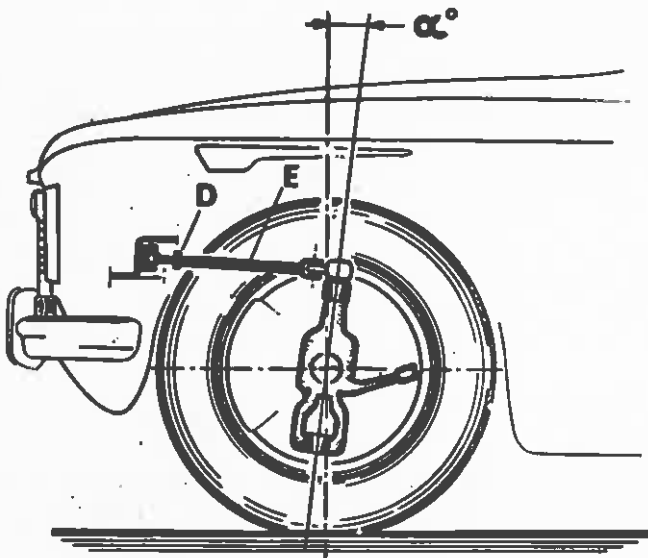
Shims are available in the following thick-
nesses:

- 6.5 mm (.26")
- 11.5 mm (.45")
- 16.5 mm (.65")
- 21.5 mm (.85")



In the conditions as specified $\left\{ \begin{array}{l} A - B = 38 \pm 3 \text{ mm} \\ C = 10 \pm 5 \text{ mm} \end{array} \right.$ check the wheel angles.

Caster angle



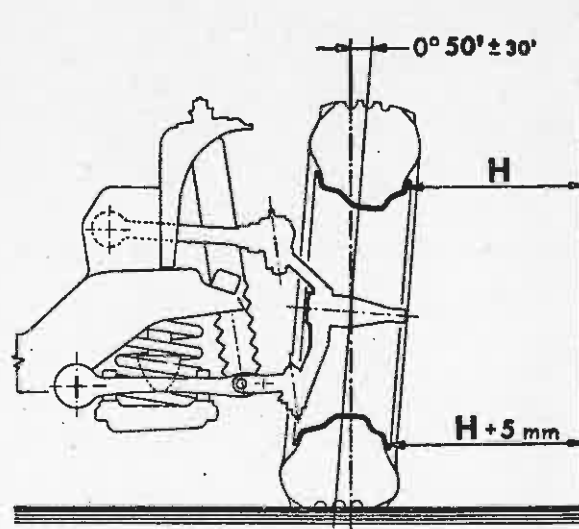
$$\alpha = 1^\circ \pm 30'$$

- The difference in caster angle between
R.H. and L.H. wheel must not exceed $0^\circ 20'$.

To adjust, loosen jam nut D and rotate rod E.

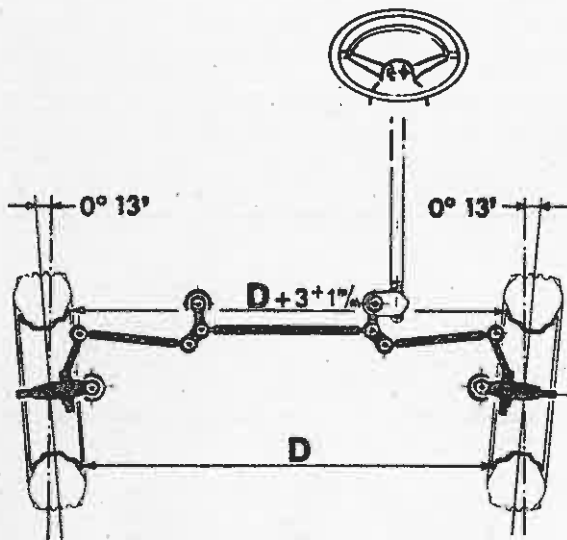
NOTE - Small adjustments of the caster angle allow to correct slight drift tendency of the car.

Front wheel camber



Not adjustable.
Make a check of the chassis, if necessary.

Front wheel toe-in



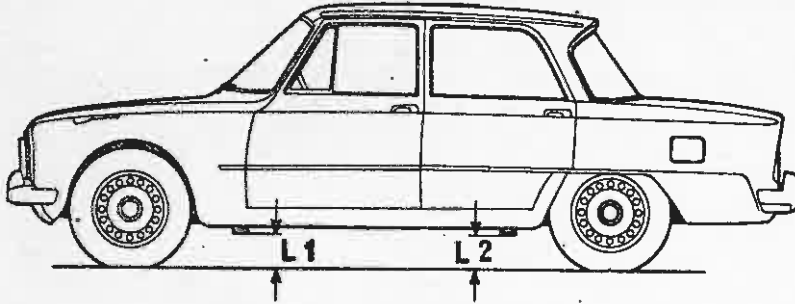
Rod length:

- side 283 to 293 mm (11.2 to 11.5")
- track 530 to 550 mm (20.9 to 21.6")

With the toe-in as specified, the length of rods as measured between ball joint centers should fall within the limits shown. If these values cannot be restored, the cause will probably be found in distortion resulting from a collision.

CHECKING OF FRONT WHEEL ANGLES (unladen car)

- Place the car on level ground with tires inflated as specified.
Insert the suitable tools under the car in correspondence of the jack sockets so as to obtain the ground clearance shown.



L 1 = 230 mm (9.06") (tool Arr. 4.0117)

L 2 = 246 mm (9.68") (tool Arr. 4.0119)

Jack sockets must just contact the tools; if necessary load the car evenly until this condition occurs.

- In such a condition check that wheel angles are as specified below:

Caster	$0^{\circ} 10' \pm 20'$
Camber	$\left\{ \begin{array}{l} 0^{\circ} 25' \pm 30' \\ H + 3 \text{ mm} \pm 3 \text{ (.12} \pm \text{.12") } \end{array} \right.$
Toe-in	$\left\{ \begin{array}{l} 0^{\circ} 26' \pm 4' \\ D + 6 \text{ mm} \pm 1 \text{ (.24} \pm \text{.04") } \end{array} \right.$

- To adjust the wheel angles follow the procedure "Checking under static load" except that values for unladen car above apply.