

VOLKSWAGEN

ORIGINAL DEALER SPECIFICATIONS



1960 through 1970 Types 1,2,3

TECHNICAL DATA FOR WORKSHOP USE

This booklet contains all major measurements and adjustments for Type 1, 2, and 3 Volkswagens imported into the USA and Canada from 1960 through 1970.

Data for later models are listed in a second volume which will be updated as necessary.

Use this booklet together with the applicable Workshop Manuals.

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All measurements are in mm followed by inches in brackets.

ENGINE

I. Technical Data

Type	Engine Code letter	Output at rpm in 1000		Maximum torque at rpm in 1000		Capacity ccm (cu in.)	Bore mm (in.)	Stroke mm (in.)
		PS (DIN)	bhp (SAE)	mkg (DIN)	lb ft (SAE)			
1/1200	D	34/3.6	41.5/3.9	8.4/2.0	65 /2.4	1192 (72.7)	77 (3.03)	64 (2.52)
1/1300	F	40/4.0	50 /4.6	8.9/2.0	69 /2.6	1285 (78.4)	77 (3.03)	64 (2.52)
1/1500	H')	44/4.0	53 /4.2	10.2/2.0	78 /2.6	1493 (91.1)	83 (3.27)	69 (2.72)
1/1600	B')	47/4.0	57 /4.4	10.6/2.2	81.7/3.0	1584 (96.6)	85.5 (3.36)	69 (2.72)
2/1200	D	34/3.6	41.5/3.9	8.4/2.0	65 /2.4	1192 (72.7)	77 (3.03)	64 (2.52)
	G	42/3.8	51 /4.0	9.7/2.2	74 /2.6			
	H	44/4.0	53 /4.2	10.4/2.0	78 /2.6	1493 (91.1)	83 (3.27)	69 (2.72)
2/1500	H	44/4.0	53 /4.2	10.4/2.0	78 /2.6	1493 (91.1)	83 (3.27)	69 (2.72)
2/1600	B	47/4.0	57 /4.4	10.6/2.2	82 /3.0	1584 (96.6)	85.5 (3.36)	69 (2.72)
3/1500	K	45/3.8	54 /4.2	10.8/2.0	84 /2.8	1493 (91.1)	83 (3.27)	69 (2.72)
3/1500 S	R	54/4.2	66 /4.8	10.8/2.4	84 /3.0	1493 (91.1)	83 (3.27)	69 (2.72)
	T	54/4.0	65 /4.6	11.2/2.2	87 /2.8			
3/1600	T	54/4.0	65 /4.6	11.2/2.2	87 /2.8	1584 (96.6)	85.5 (3.36)	69 (2.72)
	U')	54/4.0	65 /4.6	11.2/2.2	87 /2.8			

Com- pression ratio	Octane requirement	Dry weight kg (lbs)	Installed		Remarks
			from	to	
7.0	87	108 (237)	Aug. 60—July 65		1) Engines with exhaust emission control system for certain countries, engine numbers begin with B/H 5000001
7.3	87	111 (244)	Aug. 65—July 66		
7.5	91	114 (250)	Aug. 66—July 69		2) Starts with engine No. B 6000001
7.5	90	115 (253)	Aug. 69—July 70		3) From engine No. B 5039390:7.5
7.0	87	108 (237)	June 60—Dec. 62		4) Engines with fuel injection
7.8	90	110 (242)	Jan. 63—July 65		
7.5	91	112.5 (248)	Aug. 65—July 67		
7.7 ³⁾	91	115 (253)	Aug. 67—July 70		
7.8	90	122 (268)	—	—July 65	
8.5	95	123 (271)	—	—July 65	
7.7	90	126 (277)	Aug. 65—July 67		
			Aug. 67—		

II. Engine - Diagnosis - Maintenance

Type/Model	Code letter	from Engine No.	Ignition timing			Dwell angle	Spark plug	
			Before or after TDC	rpm	Vacuum hoses		Heat value	Electrode gap
1/1200	D	5000000	10° before	850	off	44-50° (wear limit 42-58°)	145	0.7 mm (.028 inch)
1/1300	F	0000001	7.5° before	850	off		145	
1/1500	H	0204001	7.5°	850	off		145	
1/1500 M 157	H	5000001	0°	850	off		145	
1/1500 M 157 M9	H	5077366	0°	850	off		145	
1/1600 M 157	B	6000001	0°	850	off		145	
1/1600 M 157 M9	B	6000002	0°	850	on		145	
2/1200	D	5000001	10° before	850	off		145	
2/1500	G	0143443	10° before	850	off		145	
2/1500	H	0000001	7.5° before	850	off		145	
2/1600 M 157	B	5000001	0°	850	off		145	
3/1500	K	0000001	10°	850	off		145	
3/1500 S	R	0255001	10°	850	off		145	
3/1600	T	0000001	7.5° before	850	off		145	
3/1600 E	U	0000001	0°	850	on		145	
3/1600 E M 249	U	0000915	0°	850	on	145		

Valve clearance (Engine cold)	Compression				Idling speed rpm	Remarks
	kg/cm ²	psi	Maximum difference kg/cm ²	psi		
0.15 mm (.006 inch) ¹⁾	6.0– 9.0	85–128	2.0	28	manual transmission 800–900 automatic transmission 900–1000	¹⁾ up to Engine No. Type 1: 9205699 Type 2: 0710799 Type 3: 0672697 the valve clearance is: 0.2 mm (.008 inch) for intake 0.3 mm (.012 inch) for exhaust
	6.5– 9.5	92–135	2.0	28		
	7.0–10.0	100–142	2.0	28		
	7.0–10.0	100–142	2.0	28		
	7.0–10.0	100–142	2.0	28		
	7.0–10.0	100–142	2.0	28		
	7.0–10.0	100–142	2.0	28		
	6.0– 9.0	85–128	2.0	28		
	7.0–10.0	100–142	2.0	28		
	7.0–10.0	100–142	2.0	28		
	7.0–10.0	100–142	2.0	28		
	7.0–10.0	100–142	2.0	28		
	8.0–11.0	113–156	2.0	28		
	7.0–10.0	100–142	2.0	28		
	7.0–10.0	100–142	2.0	28		
	7.0–10.0	100–142	2.0	28		

III. Tolerances and wear limits

The term "Wear limit" means that parts which are near, or have reached the dimensions given should not be fitted again when repairing the assembly. When considering the wear limits of pistons and cylinders, the oil consumption of the engine should be taken into account. All measurements are in mm followed by inches in brackets.

Designation	34 PS (DIN) / 41.5 bhp (SAE)	
	New installation mm (inch)	Wear limit mm (inch)
a - Crankcase		
1 - Bores for crankshaft bearings:		
a) Bearings 1-3 diameter	65.00-65.02 (2.5590-2.5598)	65.03 (2.5601)
b) Bearing 4 diameter	50.00-50.03 (1.9685-1.9696)	50.04 (1.9700)
2 - Bore for oil seal/flywheel end diameter	90.00-90.05 (3.5433-3.5453)	
3 - Bore for camshaft bearings diameter	27.50-27.52 (1.082-1.083)	
4 - Bore for oil pump housing diameter	70.00-70.03 (2.7559-2.7570)	
5 - Bore for cam followers diameter	19.00-19.02 (.7480-.7485)	19.05 (.750)
b - Crankshaft		
1 - Crankshaft runout (measured at journal 2 or 4, journals 1 and 3 on V blocks)		0.03 (.0011)
2 - Crankshaft unbalance	max. 12 cmg (10.4 in. lb)	
3 - Main bearing journals out of round		0.03 (.0011)
4 - Connecting rod journals out of round		0.03 (.0011)
5 - Connecting rod bores diameter	55.02-55.06 (2.1660-2.1676)	
6 - Connecting rod journals diameter	54.98-55.00 (2.1644-2.1653)	

all other engines		Remarks
New installation mm (inch)	Wear limit mm (inch)	
65.00–65.02 (2.5590–2.5598)	65.03 (2.5601)	
50.00–50.03 (1.9685–1.9696)	50.04 (1.9700)	
90.00–90.05 (3.5433–3.5453)		
27.50–27.52 (1.082–1.083)		
70.00–70.03 (2.7559–2.7570)		
19.00–19.02 (.7480–.7485)	19.05 (.750)	
	0.02 (.0008)	
max. 12 cmg (10.4 in. lb)	0.03 (.0011)	
	0.03 (.0011)	
55.02–55.05 (2.1660–2.1672)		
54.98–55.00 (2.1644–2.1653)		

Designation	34 PS (DIN) / 41.5 bhp (SAE)				
	New installation mm (inch)		Wear limit mm (inch)		
7 – Connecting rod/crankshaft	radial play	0.02–0.08	(.0008–.0031)	0.15	(.0059)
	end play	0.1–0.4	(.0039–.015)	0.7	(.0027)
8 – Crankshaft bearing bores: Bearings 1 and 3.	diameter	55.03–55.07	(2.1664–2.1680)		
	Bearing 2 . . . diameter	55.02–55.08	(2.1660–2.1684)		
	Bearing 4 . . . diameter	40.05–40.10	(1.5767–1.5787)		
9 – Crankshaft bearing journal:					
	Bearing 1, 2 and 3. diameter	54.97–54.99	(2.1640–2.1648)		
	Bearing 4 . . . diameter	39.98–40.00	(1.5739–1.5748)		
10 – Crankshaft bearing/crankshaft					
	Bearings 1 and 3. radial play	0.04–0.10	(.0015–.0039)	0.18	(.0070)
	Bearing 2 . . . radial play	0.03–0.09	(.0011–.0035)	0.17	(.0066)
	Bearing 4 . . . radial play	0.05–0.10	(.0019–.0039)	0.19	(.0074)
		end play	0.07–0.13	(.0027–.0051)	0.15
11 – Flywheel (measured at center of friction surface)	lateral runout	max. 0.30	(.011)		
	unbalance	max. 20 cmg	(17.4 in. lb)		
	Shoulder for oil seal	outside diameter	69.9–70.1	(2.7519–2.7598)	69.4
Machining of tooth width				max. 2.0	(.08)
12 – Drive plate	unbalance	–			

all other engines				Remarks
New installation mm (inch)		Wear limit mm (inch)		
0.02-0.07	(.0008-.0028)	0.15	(.0059)	
0.1-0.4	(.0039-.015)	0.7	(.0027)	
55.03-55.07	(2.1664-2.1680)			
55.02-55.08	(2.1660-2.1684)			
40.05-40.10	(1.5767-1.5787)			
54.97-54.99	(2.1640-2.1648)			
39.98-40.00	(1.5739-1.5748)			
0.04-0.10	(.0015-.0039)	0.18	(.0070)	
0.03-0.09	(.0011-.0035)	0.17	(.0066)	
0.05-0.10	(.0019-.0039)	0.19	(.0074)	
0.07-0.13	(.0027-.0051)	0.15	(.0059)	
max. 0.30	(.011)			
max. 20 cmg	(17.4 in. lb)			
69.9-70.1	(2.7519-2.7598)	69.4	(2.7322)	
		max. 2.0	(.08)	
max. 5 cmg	(4.5 in. lb)			

Designation	34 PS (DIN) / 41.5 bhp (SAE)		
	New installation mm (inch)	Wear limit mm (inch)	
c – Camshaft			
1 – Camshaft bearing bore: Bearing 1	inside diameter	25.02–25.04 (.9850–.9857)	
	Bearing 2	inside diameter	25.02–25.04 (.9850–.9857)
	Bearing 3	inside diameter	25.02–25.04 (.9850–.9857)
2 – Camshaft	Bearing 1	diameter	24.99–25.00 (.9837–.9842)
	Bearing 2	diameter	24.99–25.00 (.9837–.9842)
	Bearing 3	diameter	24.99–25.00 (.9837–.9842)
3 – Bore/camshaft	radial play	0.02–0.05 (.0008–.0019)	0.12 (.0047)
	end play	0.04–0.13 (.0015–.0051)	0.16 (.0063)
4 – Camshaft	runout	max. 0.02 (.0008)	0.04 (.0015)
(measured at center journal, journals 1 and 3 on V blocks)			
5 – Camshaft gear	backlash	0.00–0.05 (.0019)	
6 – Cam follower	diameter	18.96–18.98 (.7463–.7471)	18.93 (.7452)
7 – Housing bore/follower	radial play	0.02–0.06 (.0008–.0023)	0.12 (.0047)
8 – Push rod	runout	max. 0.3 (.0011)	
d – Cylinders and pistons			
1 – Cylinder bores	out of round	max. 0.01 (.0004)	
2 – Cylinder/piston	clearance	0.04–0.05 (.0015–.0019)	0.20 (.0078)
3 – Piston weight		see page 23	
4 – Weight difference between pistons in one engine	new when repairing	max. 5 grams max. 10 grams	

all other engines		Remarks
New installation mm (inch)	Wear limit mm (inch)	
max. 0.01 (.0004) 0.04—0.06 (.0015—.0023)	0.20 (.0078)	
max. 5 grams max. 10 grams		

Designation	34 PS (DIN) / 41.5 bhp (SAE)	
	New installation mm (inch)	Wear limit mm (inch)
5 – a) Upper piston ring side clearance	0.07–0.09 (.0027–.0035)	0.12 (.0047)
b) Lower piston ring side clearance	0.05–0.07 (.0019–.0027)	0.10 (.004)
6 – Oil scraper ring side clearance	0.03–0.05 (.0011–.0019)	0.10 (.004)
7 – a) Upper piston ring gap	0.30–0.45 (.012–.018)	0.90 (.035)
b) Lower piston ring gap	0.30–0.45 (.012–.018)	0.90 (.035)
8 – Oil scraper ring gap	0.25–0.40 (.010–.016)	0.95 (.037)
e – Connecting rods		
1 – Connecting rod weight		
a) Production	475–525 grams	
b) Replacement parts		
– weight (brown or white)	487–495 grams	
+ weight (gray or black)	507–615 grams	
2 – Weight difference between connecting rods		
in one engine	new	max. 5 grams
	when repairing	max. 10 grams
3 – Piston pin bushing diameter	20.008–20.017 (.7877–.7880)	
4 – Piston pin diameter	19.996–20.000 (.7859–.7874)	
5 – Piston pin/bushing radial play	0.01–0.02 (.0004–.0008)	0.04 (.0016)
f – Cylinder head with valves		
1 – Cylinder seating depth in cylinder head . .	13.7–13.8 (.5393–.5432)	
2 – Combustion chamber capacity	43–45 ccm	
3 – Rocker arm inside diameter	18.00–18.02 (.7086–.7093)	18.04 (.7101)

all other engines				Remarks
New installation mm (inch)		Wear limit mm (inch)		
0.07-0.10	(.0027-.004)	0.12	(.0047)	1) 1/1300:13.7-13.8 mm (.5393-.5432 inch) 2) 1/1300:44-46 ccm
0.05-0.07	(.0019-.0027)	0.10	(.004)	
0.03-0.05	(.0011-.0019)	0.10	(.004)	
0.30-0.45	(.012-.018)	0.90	(.035)	
0.30-0.45	(.012-.018)	0.90	(.035)	
0.25-0.40	(.010-.016)	0.95	(.037)	
500-610 grams				
580-588 grams				
592-600 grams				
max. 5 grams				
max. 10 grams				
22.008-22.017	(.8664-.8665)			
21.996-22.000	(.8659-.8660)			
0.01-0.02	(.0004-.0008)	0.04	(.0016)	
13.45-13.55') (.5295-.5334)''				
48-50 ccm ²)				
18.00-18.02	(.7086-.7093)	18.04	(.7101)	

Designation	34 PS (DIN) / 41.5 bhp (SAE)	
	New installation mm (inch)	Wear limit mm (inch)
4 – Rocker shaft diameter	17.97–17.98 (.7075–.7079)	17.95 (.706)
5 – Rocker shaft/rocker arm radial play	0.02–0.05 (.0008–.0019)	
6 – Valve seats: a) Intake width	1.4–2.5 (.055–.098)	
b) Exhaust width	1.4–2.5 (.055–.098)	
c) Intake seat angle	45°	
d) Exhaust seat angle	45°	
e) Outer correction angle	15°	
f) Inner correction angle	75°	
7 – Valve guides: Intake inside diameter	8.00–8.02 (.3149–.3156)	8.06 (.3172)
Exhaust inside diameter	8.00–8.02 (.3149–.3156)	8.06 (.3172)
8 – Valve stem: Intake diameter	7.94–7.95 (.3126–.3130)	7.90 (.3110)
Exhaust diameter	7.91–7.92 (.3114–.3118)	7.87 (.3098)
	out of round	max. 0.01 (.0004)
9 – Valve guide/valve stem: Intake rock	0.21–0.23 (.0082–.0090)	0.8 (.031)
Exhaust rock	0.28–0.32 (.0110–.0125)	0.8 (.031)
10 – Valve springs length loaded	32.0 (1.259)	
	load	45.6–52.4 kg (98–115 lbs)
11 – Valve clearance	see page 7	
12 – Compression	see page 7	

all other engines				Remarks
New installation mm (inch)		Wear limit mm (inch)		
17.97-17.98	(.7075-.7079)	17.95	(.706)	
0.02-0.05	(.0008-.0019)			
1.4-2.5	(.055-.098)			
1.4-2.5	(.055-.098)			
45°				
45°				
15°				
75°				
8.00-8.02	(.3149-.3156)	8.06	(.3172)	
8.00-8.02	(.3149-.3156)	8.06	(.3172)	
7.94-7.95	(.3126-.3130)	7.90	(.3110)	
7.91-7.92	(.3114-.3118)	7.87	(.3098)	
max. 0.01	(.0004)			
0.21-0.23	(.0082-.0090)	0.8	(.031)	
0.28-0.32	(.0110-.0125)	0.8	(.031)	
31.0	(1.220)			
53.2-61.2 kg	(117-135 lbs)			

Designation	34 PS (DIN) / 41.5 bhp (SAE)	
	New installation mm (inch)	Wear limit mm (inch)
g – Cooling		
1 – Thermostat opening temperature	65–70° C (149–158° F)	
2 – Fan/belt pulley out of balance	–	
3 – Fan out of balance	max. 4 cmg (3.4 in. lb)	
4 – Belt pulley radial runout	0.4 (.015)	
h – Lubrication system		
1 – Oil pressure (only for SAE 30 oil) at an oil temperature of 70° C (158° F): at 2500 rpm pressure	approx. 3 kg/cm ² (42 psi)	2 kg/cm ² (28 psi)
2 – Spring for oil pressure relief valve (up to July 1969) length loaded	43.2 (1.699)	
	load	
	2.5–4.2 kg (5.5–9.2 lbs)	
3 – Spring for oil pressure relief valve (from August 1969) length loaded	44.1 (1.736)	
	load	
	5.6–7.3 kg (12.3–16 lbs)	
4 – Spring for oil pressure control valve length loaded	20.2 (.794)	
	load	
	2.9–3.6 kg (6.3–7.9 lbs)	
5 – Oil pump: Gears/housing without gasket . . end play	–	0.1 (.004)
Gears backlash	0.0–0.2 (0–.008)	
6 – Oil pressure switch opens at pressure	0.15–0.45 kg/cm ² (2.1–6.4 psi)	

all other engines		Remarks
New installation mm (inch)	Wear limit mm (inch)	
65-70° C (149-158° F)		
—		
max. 4 cmg (3.4 in. lb)		
—		
approx. 3 kg/cm ² (42 psi)	2 kg/cm ² (28 psi)	
43.2 (1.699)		
2.5-4.2 kg (5.5-9.2 lbs)		
44.1 (1.736)		
5.6-7.3 kg (12.3-1.6 lbs)		
20.2 (.794)		
2.9-3.6 kg (6.3-7.9 lbs)		
—	0.1 (.004)	
0.0-0.2 (0-.008)		
0.15-0.45 kg/cm ² (2.1-6.4 psi)		

Designation	34 PS (DIN) / 41.5 bhp (SAE)	
	New installation mm (inch)	Wear limit mm (inch)
i - Clutch		
1 - Complete clutch	out of balance	max. 15 cmg (13 in. lb)
2 - Pressure plate	lateral runout	-
3 - Release ring	lateral runout	max. 0.3 (.011)
4 - Flywheel/release ring	distance	26.7-27.3 (1.05-1.073)
5 - Clutch springs		light blue dark blue
	length loaded	29.2 (1.148) 29.2 (1.148)
Load	new	60-64 kg 62-66 kg (132-141 lbs) (136-145 lbs)
Load	settled	52-56 kg 54-58 kg (114-123 lbs) (119-128 lbs)
Load	new	} 1/1300 only
Load	settled	
Load	new	} all other vehicles
Load	settled	
6 - Clutch plate	lateral runout	max. 0.4 (.016) (at 175 mm/7.677 inch diameter)
7 - Free play at pedal		10-20 (.4-.8)

all other engines		Remarks
New installation mm (inch)	Wear limit mm (inch)	
max. 15 cmg (13 in. lb)		1) only for 1/1500, 1600 2) 1/1300: light blue, dark blue 3) 1/1300: max. 0.4 (.016 in) at 175 mm/6.889 inch diameter
—	0.10 (.004)	
max. 0.3 (.011)	0.4 (.015)	
26.7–27.3 (1.05–1.073)		
white ¹⁾ red ²⁾		
29.2 (1.148) 29.2 (1.148)		
60–64 kg (132–141 lbs)		
62–66 kg (136–145 lbs)		
52–56 kg (114–123 lbs)		
54–58 kg (119–128 lbs)		
44.5–49.5 kg (99–110 lbs)		
34–37 kg (75–81 lbs)		
39–44 kg (86–97 lbs)		
29.5–32.5 kg (66–72 lbs)		
max. 0.5 ³⁾ (.02) ³⁾		
(at 195 mm/7.677 inch diameter)		
10–20 (.4–.8)		

IV. Dimensions and markings of pistons and cylinders

Type	Size class (\varnothing = diameter)	Color	Cylinder mm \varnothing	Matching piston mm \varnothing
1/1200 1/1300	Standard size Nominal size 77.0 mm \varnothing	blue	76.990–76.999	76.95
		pink	77.000–77.009	76.96
		green	77.010–77.020	76.97
	1st oversize Nominal size 77.5 mm \varnothing	blue	77.490–77.499	77.45
		pink	77.500–77.509	77.46
		green	77.510–77.520	77.47
	2nd oversize Nominal size 78.0 mm \varnothing	blue	77.990–77.999	77.95
		pink	78.000–78.009	77.96
		green	78.010–78.020	77.97
1/1500 3/1500	Standard size Nominal size 83.0 mm \varnothing	blue	82.990–83.001	82.95
		pink	83.002–83.013	82.96
		green	83.014–83.025	82.97
	1st oversize Nominal size 83.5 mm \varnothing	blue	83.490–83.501	83.45
		pink	83.502–83.513	83.46
		green	83.514–83.525	83.47
	2nd oversize Nominal size 84.0 mm \varnothing	blue	83.990–84.001	83.95
		pink	84.002–84.013	83.96
		green	84.014–84.025	83.97
1/1600 2/1600 3/1600	Standard size Nominal size 85.5 mm \varnothing	blue	85.490–85.501	85.45
		pink	85.502–85.513	85.46
		green	85.514–85.525	85.47
	1st oversize Nominal size 86.0 mm \varnothing	blue	85.990–86.001	85.95
		pink	86.002–86.013	85.96
		green	86.014–86.025	85.97
	2nd oversize Nominal size 86.5 mm \varnothing	blue	86.490–86.501	86.45
		pink	86.502–86.513	86.46
		green	86.514–86.525	86.47

V. Piston weights

Type	- Weight (brown) grams	+ Weight (gray) grams
1/1200	277-302	285-310
1/1300 up to July 1966	298-310	306-318
1/1500 from August 1966	370-380	378-388
1/1600 up to July 1970	402-412	410-420
2/1600 up to April 1968	398-410	406-418
2/1600 from April 1968 to July 1970	402-412	410-420
3/1600	398-410	406-418

VI. Tightening torques

Location	Designation	Thread	mkg
Connecting rod 1/1200	connecting rod bolt	M 9×1	3.0–3.5 ¹⁾
Connecting rod, all other engines	nut	M 9×1	3.5–3.5 ¹⁾
Crankcase halves	nut	M 12×1.5	3.5 ²⁾
Crankcase halves	nut	M 8	2.0
Flywheel or drive plate to crankshaft	gland nut	M 28×1.5	30.0
Belt pulley to crankshaft Type 1 and 2	bolt	M 20×1.5	4.0–5.0
Belt pulley to crankshaft Type 3	bolt	M 20×1.5	13.0–15.0
Oil pump to crankcase	nut	M 8	2.0
Oil cooler or bracket to crankcase	nut	M 6	0.8
Oil strainer cover to crankcase	cap nut	M 6	0.8
Oil drain plug in cover	plug	M 14×1.5	3.5
Gland nut in oil breather	gland nut	M 32×1.5	5.5
Oil filter to crankcase Type 3	nut	M 8	2.0
Oil pressure switch to crankcase Type 1 and 2	—	M 10×1	1.0
Engine carrier to crankcase Type 2/1600	bolt	BM 8	2.5
Engine carrier to crankcase Type 2/1600	bolt	BM 10	4.0
Engine carrier to crankcase Type 3	self-locking bolt	M 8	4.5
Engine carrier to crankcase Type 3	self-locking bolt	M 10	7.0

lb ft	Remarks
22-25')	1) Renew, oil contact surfaces.
22-25')	2) For cap nuts: 2.5 mkg (18 lb ft)
25')	
14	
217	
29-36	
94-108	
14	
6	
6	
25	
40	
14	
7	
18	
29	
32	
50	<p>Caution Quality Grade or Tensile Class of listed threaded fasteners are not included. Always check with Parts List to make sure they are for the intended purpose.</p>

Location	Designation	Thread	mgk	lb ft	
Generator support to crankcase Type 1 and 2	nut	M 8	2.0	14	
Breather to crankcase Type 3	nut	M 8	2.0	14	
Fuel pump to crankcase	nut	M 8	1.5	11	
Cylinder head to crankcase	nut	M 10	3.2 ⁴⁾	23 ⁴⁾	
Rocker shaft to cylinder head	nut	M 8	2.5	18	
Intake pipe to cylinder head Type 1 and 2	nut	M 6	0.8	6	
Intake pipe to cylinder head Type 3	nut	M 8	2.0	14	
Spark plug in cylinder head	—	M 14×15	3.5	25	
Heat exchanger and muffler to cylinder head	nut	M 8	2.2	16	
Clutch to flywheel	bolt	M 8	3.0	22	
Converter to drive plate Type 1	bolt	M 8	3.0	22	
Converter to drive plate Type 3	bolt	M 8	2.0	14	
Fan to generator Type 1 and 2	nut	M 12×1.5	6.0	43	
Pulley to generator	nut	M 12×1.5	6.0	43	
Engine carrier to body Type 3	self-locking nut	M 8	2.5 ³⁾	18 ³⁾	
Engine to transmission	nut	M 10	3.0	22	
Engine to transmission (Automatic Stick Shift)	bolt	M 10	4.0	29	

Remarks

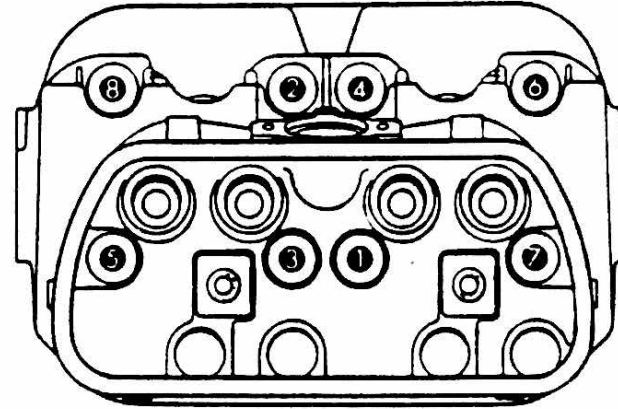
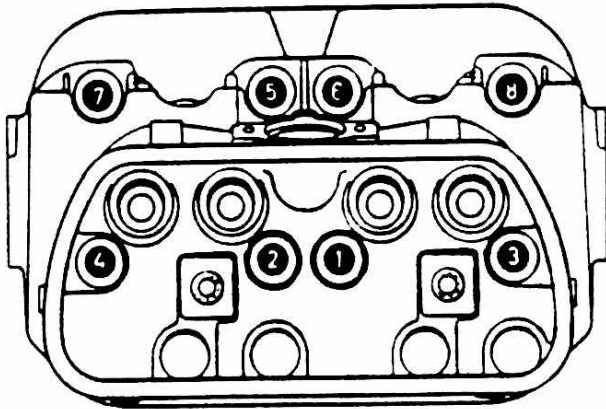
3) Use new nuts and lock washers.

4) **Tightening cylinder head nuts**

a – Tighten nuts lightly first

b – Tighten to 1 mgk (7 lb ft) in the order shown

c – Fully tighten to specified torque in the order shown.



Caution

Quality Grade or Tensile Class of listed threaded fasteners are not included. Always check with Parts List to make sure they are for the intended purpose.

FUEL SYSTEM

1. Carburetor jets and settings Type 1 and 2

Vehicle	Type 1 and 2	Type 2	Type 1	Type 2
Transmission	Manual transmission			
Engine, Capacity and output.	1200/34 bhp	1500/42 bhp	1300/40 bhp	1500/44 bhp
from Engine No.	5000001	0143543	F0000001	H0204001 H 0000001
Solex carburetor type	28 PICT-2')	28 PICT & 28 PICT-1	30 PICT-1	30 PICT-1
Part No.	113129023 J 141 129023 K	211 129023 K/L	113129023 P 141 129023 M	113129025 B 211 129029 N/I
Modification No.	VW12-1	VW22-1	VW132-2	VW104-1 VW45-1/ VW77-1
Venturi mm diameter	22.5	22.5	24.0	24.0 24.0
Main jet	122.5	115	125	120 115
Air correction jet	130y ^a)	145y or 150z	125z ^a)	125z ^a) 135z
Pilot jet	g55	g45	g55	55 60
Idling air jet drilling	2.0	1.55	150	150 150
Idling cut-off valve			electro-magnetic with fuel jet	
Float needle valve mm diameter	1.5	1.5	1.5	1.5 1.5
Fuel level	18±1	18±1	—	— —
Float needle valve washer mm	1.0	1.0	—	— 1.0
Float weight grams	5.7	5.7	5.7	5.7 5.7
Injection quantity cc/stroke	1.1–1.4 ^a)	1.1–1.4 ^a)	1.3–1.6	1.05–1.35 1.05–1.35
Cotter pin position / washer	1/1.0	1/1.0	—	— —
Power fuel jet	75	85	— ^b)	50 75
Distance from accelerator pump tube to housing joint. mm	0.2–0.6	0.2–0.6	—	— —
Emulsion tube			integral part of air correction jet	

Type 1		Type 2	Remarks
Manual transmission	Automatic Stick Shift	Manual transmission	
1500/44 bhp		1600/47 bhp	1) For engines with progressive accelerator linkage. 2) Type 2 and 14: 145y 3) Type 14: 170z 4) Type 14: 135z 5) Up to Engine No. 7350400 (Type1) and 7777337 (Type2): 0.8-1.0 6) Up to June 1963: 1.2-1.3 7) Type 14: 75
H 5000001	H 5077368	B 5000001	
30 PICT-2	30 PICT-2	30 PICT-2	
113129027 H	113129027 J	113129027 H	
VW 126-1/2	VW 167-2	VW 126-1/126-2	
24.0	24.0	24.0	
× 116	× 116	× 116	
125z ⁶⁾	125z	125z	
55	55	55	
135	140 (14)	140 (14)	
electro-magnetic with fuel jet			
1.5	1.5	1.5	
19.5±1	19.5±1	—	
1.0	1.0	1.0	
8.5	8.5	8.5	
1.05-1.35	1.05-1.35	1.3-1.6	
—	—	—	
60	60	60	
—	—	—	
Integral part of air correction jet			

Vehicle	Type 1		Type 2
	Manual	Automatic Stick Shift	Manual
Transmission			
Engine Capacity and output	1600/47 bhp	1600/47 bhp	1600/47 bhp
from Engine No.	B 6000001	B 6000002	B 5116437
Solex carburetor type	30 PICT-3	30 PICT-3	30 PICT-3
Part No.	113129029 D	113129029 E	211 129029 Q
Modification No.	VW 226-1	VW 327-1	VW 236-1/2
Venturi mm diameter	24.0		24.0
Main jet	×112.5		112.5
Air correction jet with emulsion tube	125 z		140 z
Pilot jet	65		65
Idling air jet drilling	135		135
Auxiliary fuel jet	45		45
Auxiliary fuel jet drilling	130		130
Bypass air cut-off valve	1.8		1.8
Float needle valve mm diameter	1.5		1.5
Fuel level	19.5±1		19.5±1
Float needle valve washer mm	1.5		1.5
Float weight grams	8.5		8.5
Injection quantity cc/stroke	1.2-1.35		1.2-1.35
Cotter pin position / washer	2.0/1.0		2.0/1.0
Power fuel jet	100		100
Distance from accelerator pump tube to housing joint . mm	0.4±0.2		0.4±0.2
Emulsion tube	Integral part of air correction jet		

Remarks

II. Carburetor jets and settings for Type 3

Engine		Type 3 / Single-carburetor Engine / 1500 cc		
Carburetor Type		32 PHN-1		
Part No.		311 129 025 A ¹⁾	311 129 025 D / 027 A ³⁾	
Identification marks for	6 volt	—	VW 1-1	VW 1-3
	12 volt	—	VW 2-1 ²⁾	VW 2-3/4
From Engine No.		0084752	0220137	0319841
Venturi	mm diameter	23.5	23.5	23.5
Main jet		132.5	127.5	130.0
Air correction jet		115	115	115
Pilot jet		g 45 ³⁾	g 45 ³⁾	g 50 ³⁾
Idling air drilling		—	—	—
Injector tube for pump	mm diameter	0.8	0.8	0.7
Power fuel jet	mm diameter	0.7	0.7	0.7
Emulsion tube	No.	48	48	48
Float needle valve	mm diameter	1.5	1.5	1.5
Float weight	grams	12.5	12.5	12.5
Accelerator pump capacity	cc/stroke	0.9-1.2	0.9-1.2	0.8-1.0 ⁴⁾
Throttle valve gap	mm	0.8-0.9	0.8-0.9	0.8-0.9

Remarks

-) As replacement: 311 129 025 D (VW 1-3)
-) From Carburetor No. 238 255, identification marks as follows due to re-routing of vacuum drilling:
 - VW 1-2 (6 volt)
 - VW 2-2 (12 volt)
-) With electro-magnetic cut-off valve
-) Adjustable
-) Introduction of 12 volt system

Engine	Type 3 / Twin-carburetor/1500 cc		
Carburetor Type	32 PDSIT-2/-3')		
Part No.	341 129 025 / 026')	341 129 025 A / 026 A')	
Identification marks for	6 volt	VW 5-1 / VW 6-2 or-2 / or-3	VW 26-1 / VW 27-1
	12 volt	VW 24-1 / VW 25-1 or-2 / or-2	VW 35-1 / VW 36-1
From Engine No.	0255001	0633331	
Venturi mm diameter	21.5	23	
Main jet	× 125	× 135	
Air correction jet	180	180	
Pilot jet	g 45	g 45	
Injector tube for pump mm diameter	0.5')	0.5')	
Power fuel jet mm diameter	0.9')	0.8')	
Float needle valve mm diameter	1.2')	1.2') '*)	
Float weight grams	7.3	7.3	
Accelerator pump capacity cc/stroke	0.35-0.55	0.35-0.55	
Throttle valve gap mm	0.60-0.65	0.60-0.65	

Remarks

- 1) Left/right (left carburetor with vacuum connection for distributor)
- 2) Carburetor for 6 volt system not supplied as replacement part.
When necessary, convert 12 volt type to 6 volt.
- 3) With electro-magnetic cut-off valve.
Distance from center of tube to carburetor body.
- 4) 12.0 mm 5) 15.0 mm 6) 9 mm 7) 9.5 mm 8) 10.5 mm
- 9) With damping ball
- 10) Gasket 1.5 mm thick
- 11) Gasket 0.5 mm thick
- 12) Cotter pin in center position

Engine	Type 3 / Twin-carburetor / 1600 cc		Remarks	
Carburetor Type	32 PDSIT-2/-3')			
Part No.	341 129 025 B / 026 B')	341 129 027 C / 028 C')	For remarks, see page 35	
Identification marks for.	6 volt	VW 40-1 / VW 41-1		²⁾ ²⁾
	12 volt	VW 42-1 / VW 43-1		VW 98-1 VW 99-1
From Engine No.	T 0000001	T 0244544		
		left carb. right carb.		
Venturi mm diameter	23	24		
Main jet	× 130	× 132.5 × 130		
Air correction jet	240	150 120		
Pilot jet.	g 45 ³⁾	g 50 ³⁾		
Injector tube for pump . . . mm diameter	0.5 ⁴⁾	0.5 ⁴⁾		
Power fuel jet mm diameter	0.8 ⁵⁾	—		
Float needle valve mm diameter	1.2 ⁶⁾ ¹⁰⁾	1.2 ⁶⁾ ¹¹⁾		
Float weight grams	7.3	7.3		
Accelerator pump capacity cc/stroke	0.35-0.55 ¹²⁾	0.35-0.55 ¹²⁾		
Throttle valve gap. mm	0.60-0.65	0.60-0.65		

III. Fuel pump

Type	from Engine No.	Part No.	Identification mark	Minimum delivery capacity ¹⁾		Maximum delivery pressure in kg/cm ² – psi	
				cc/min	rpm		
1	5000001–7777338 D/F 0000001 ²⁾	211 127 025 113 127 025 A	VW 3 VW 7	300 400	3400 3400	0.25 0.25	3.5 3.5
2 (1500/1600)	3403348–7777338 from start of production	211 127 025	VW 3	300 400	3400 3800	0.25 0.25	3.5 3.5
3	T 0000001	311 127 025 A	VW 6	400	3800	0.35	5.0

¹⁾ Via 1.5 mm (.059 in.) diameter float needle valve (1.2 mm (.047 in.) diameter on Type 3/twin carburetor)

²⁾ and Type 1/1500 from Engine No. H 0204001

FRONT AXLE

I. Tolerances, wear limits and settings

a - Torsion bars						
Type	from Chassis No.	Number of leaves	Position	Bar diameter mm (inch)	Length mm (inch)	Setting angle
1	1-0517305	8	top	—	941.5 (37.167)	49°±1°
		8	bottom	—		53°30'±1°
	116000001	10	top	—	954 (37.558)	44°±30'
		10	bottom	—		35°30'±30'
2	20-117902	9	top	—	980 (38.582)	37°±30'
		9	bottom	—		
	218000001	9	top	—	980 (38.582)	56°±30'
9		bottom	—			
	2102000001	9	top	—	980 (38.582)	60°+1°)
		9	bottom	—		
3	0000001	—	—	14.9 (.586)	859 (33.818)	39°10'+50'

1) Bars are prestressed, white spot on end must be on left, in direction of motion.

b - Stabilizer (Type 3)

Model	Chassis No.	Bar diameter mm (inch)	Remarks
31, 34	from 311 000 001	11.0 (.433)	
36	from 311 000 002	13.7 (.539)	
36	from 317 000 002	11.0 (.433)	Introduction of equalizer spring
36 Automatic	up to 368 149 833	11.0 (.433)	replacement from Chassis No. 368 000 002, 13.7 mm (.539 inch) diameter bar
36 Automatic	from 368 149 834	13.7 (.539)	
31, 34, 36	from 319 000 001	13.7 (.539)	Introduction of double-joint axle

Designation	Type 1	
	New installation mm (inch)	Wear limit mm (inch)
c – Axle beam and torsion arms		
1 – Torsion arm bearings in axle beam		
a) Seat for upper needle bearing diameter	45.97–45.99 (1.809–1.810)	—
Needle bearing diameter	46.0 (1.811)	—
Thrust rings diameter	—	—
Oversize diameter	46.17–46.19 (1.817–1.818)	—
Needle bearing diameter	46.2 (1.819)	—
Thrust rings diameter	—	—
b) Seat for lower needle bearing diameter	49.97–49.99 (1.967–1.968)	—
Needle bearing diameter	50.0 (1.968)	—
Oversize diameter	50.17–50.19 (1.975–1.976)	—
Needle bearing diameter	50.2 (1.976)	—
2 – Bushing for		
a) Torsion arm, upper ream out to	37.20–37.25 (1.463–1.465)	37.38 (1.471)
b) Torsion arm, lower ream out to	37.20–37.25 (1.463–1.465)	
} ³⁾		
3 – Torsion arm twist		
	max. 0.5 (.02)	—
	} ⁵⁾	

Type 2		Type 3		Remarks
New installation mm (inch)	Wear limit mm (inch)	New installation mm (inch)	Wear limit mm (inch)	
56.97-56.99 ¹⁾ (2.242-2.243) ¹⁾	—	43.97-43.99 (1.730-1.731)	—	1) Up to Chassis No. 217148459 54.97-54.99 (2.163-2.164) 55 (2.165)
56.96-56.99 (2.242-2.243)	—	44.0 (1.732)	—	
57.17-57.19 (2.250-2.251)	—	44.15 (1.738)	—	2) Up to Chassis No. 0127587 46.97-46.99 (1.849-1.850) 47.0 (1.850) 47.17-47.19 (1.856-1.857) 47.2 (1.858)
57.17-57.19 (2.250-2.251)	—	44.17-44.19 (1.738-1.739)	—	
—	—	44.2- (1.740)	—	3) From Chassis No. Type 1: 116000001 Type 2: 218000001 Type 3: 315000001 Metal bushings. Do not ream out.
—	—	44.35 (1.746)	—	
56.97-56.99 ¹⁾ (2.242-2.243) ¹⁾	—	49.97-49.99 (1.967-1.968)	—	
56.96-56.99 (2.242-2.243)	—	50.0 (1.968)	—	4) Only valid for metal bushings
57.17-57.19 (2.250-2.251)	—	50.17-50.19 ²⁾ (1.975-1.976) ²⁾	—	
57.17-57.19 (2.250-2.251)	—	50.2 (1.966)	—	5) From Chassis No. Type 1: 116000001 Type 2: 213000001 Type 3: 0000001 when testing with VW 282 d the mandrel must contact the measuring surface.
43.2-43.27 (1.700-1.702) } ³⁾	43.40 (1.786) } ⁴⁾	35.15-35.20 (1.383-1.385) } ³⁾	32.38 (1.273) } ⁴⁾	
43.2-43.27 (1.700-1.702) } ³⁾	43.40 (1.786) } ⁴⁾	33.17-33.22 (1.305-1.307) } ³⁾	33.38 (1.313) } ⁴⁾	
max. 0.3 ⁴⁾ (.012) ⁴⁾	—	— ³⁾	—	

Designation	Type 1	
	New installation mm (inch)	Wear limit mm (inch)
d – Steering ball joints, steering knuckles, link pins		
1 – Steering ball joints	—	—
Ball joints, upper ²⁾ play	max. 0.5 (.02)	2.0 ¹⁾ (.08)
Ball joints, lower ²⁾ play	max. 0.5 (.02)	1.0 (.04)
2 – Steering knuckle/stub axle		
Steering knuckle/caliper mounting surface distortion	0.15 ³⁾ (.006)	—
Steering knuckle/stub axle measured with vernier caliper and square distortion	±0.05 ³⁾ (.002)	—
Steering knuckle/backing plate or splash plate mounting surface to outer edge of tie rod hole	—	—
3 – King pin/bushing		
Steering knuckle/torsion arm link radial play	92.7–93.3 ⁴⁾ (3.625–3.663)	—
Steering knuckle/torsion arm link preload	0.02–0.05 (.0008–.002)	0.08 (.003)
4 – King pin		
King pin/bushing up to Chassis No. 999 304: diameter	0.00–0.04 (.0–.0016)	—
King pin/brass bushing radial play	—	—
King pin/brass bushing radial play	—	—

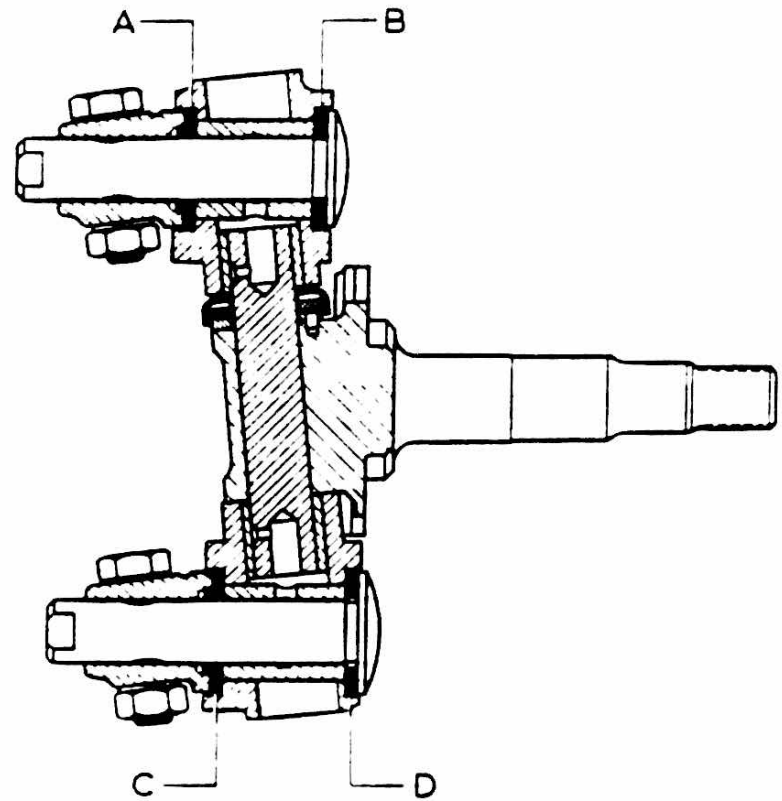
Type 2		Type 3		Remarks
New installation mm (inch)	Wear limit mm (inch)	New installation mm (inch)	Wear limit mm (inch)	
—	—	—	—	1) When checking with VW 281 a 2) Type 2 only: After fitting new joints, peen to 6–9 tons with VW 471 three times 3) Measured with VW 258 K/P 4) Measured at minimum of three points 5) from Chassis No. 118857240
max. 0.3 (.012)	2.0 ¹⁾ (.08)	1.0 (.04)	2.5 ¹⁾ (.098)	
max. 0.3 (.012)	2.0 (.08)	max. 0.5 (.02)	2.0 (.08)	
—	—	0.3 ²⁾ (.012)	—	
—	—	±0.05 ²⁾ (.002)	—	
0.4 ⁴⁾ (.076)	—	—	—	
—	—	—	—	
—	—	—	—	
—	—	—	—	
23.97–23.95 (.943–.942)	0.10 (.004)	—	—	
—	—	—	—	
0.02–0.05 (.0008–.002)	0.10 (.004)	—	—	

Designation	Type 1		Type 2	
	New installation mm (inch)	Wear limit mm (inch)	New installation mm (inch)	Wear limit mm (inch)
5 – King pin/spacer without rubber seal end play	—	—	max. 0.15 (.006)	—
6 – Link pin diameter	17.94–17.91 (.706–.705)	17.80 (.700)	19.92–19.91 (.784–.783)	19.78 (.778)
from Chassis No. 1 144303 diameter	—	—	21.92–21.91 (.862–.861)	21.78 (.856)
7 – Wheel bearing inside diameter	29.00–29.01 ^{a)} (1.141–1.142)	—	31.75–31.77 (1.250–1.251)	—
. outside diameter	50.29–50.32 ^{a)} (1.980–1.981)	—	59.13–59.16 (2.328–2.329)	—
8 – Wheel bearing inside diameter	17.46–17.48 ^{a)} (.687–.688)	—	19.02–19.04 (.749–.750)	—
. outside diameter	39.88–39.90 ^{a)} (1.570–1.571)	—	45.24–45.26 (1.781–1.782)	—
9 – Seat for bearing – on stub axle diameter	29.98–29.00 ^{b)} (1.180–1.181)	—	31.73–31.75 (1.249–1.250)	—
– in drum or disc diameter	50.25–50.28 ^{b)} (1.978–1.979)	—	59.09–59.12 (2.326–2.328)	—
10 – Seat for bearing – on stub axle diameter	17.45–17.46 ^{a)} (.687–.688)	—	19.03–19.05 (.749–.750)	—
– in drum or disc diameter	39.84–39.87 ^{a)} (1.568–1.570)	—	45.20–45.22 (1.779–1.780)	—
11 – Wheel bearing play	0.03–0.12 ^{a)} (.001–.005)	—	0.03–0.12 ^{a)} (.001–.005)	—

Type 3		Remarks
New installation mm (inch)	Wear limit mm (inch)	
—	—	4) Up to Chassis No. 115 999 000: 25.0 –25.01 mm (.984– .985 inch) diameter Up to Chassis No. 118 857 239: 26.99–27.0 mm (1.061–1.062 inch) diameter
—	—	7) Up to Chassis No. 318 189 212: 26.99–27.0 mm (1.061–1.062 inch) diameter
—	—	8) Up to Chassis No. 115 999 000: 61.99–62.0 mm (2.439–2.440 inch) diameter
	—	9) Up to Chassis No. 115 999 000: 20.0 –20.1 mm (.787– .786 inch) diameter
	—	10) Up to Chassis No. 115 999 000: 51.99–52.0 mm (2.046–2.047 inch) diameter
29.00–29.01 ⁷⁾ (1.141–1.142)	—	11) Up to Chassis No. 115 999 000: 24.99–25.01 mm (.984– .985 inch) diameter Up to Chassis No. 118 857 239: 26.97–26.98 mm (1.060–1.061 inch) diameter
50.29–50.32 (1.980–1.981)	—	12) Up to Chassis No. 318 189 212: 26.97–26.98 mm (1.060–1.061 inch) diameter
17.46–17.48 (.687–.688)	—	13) Up to Chassis No. 115 999 000: 61.97–61.99 mm (2.438–2.440 inch) diameter
39.88–39.90 (1.570–1.571)	—	14) Up to Chassis No. 115 999 000: 19.98–19.99 mm (.786– .787 inch) diameter 15) Up to Chassis No. 115 999 000: 51.97–51.99 mm (2.044–2.046 inch) diameter
	—	16) If axle is noisy, keep to lower tolerance 0.03–0.06 mm (.001–.002 inch)
29.98–29.00 ¹²⁾ (1.180–1.181)	—	
50.25–50.28 (1.978–1.979)	—	
17.45–17.46 (.687–.688)	—	
39.84–39.87 (1.568–1.570)	—	
0.03–0.12 ¹⁶⁾ (.001–.005)	—	

e - Arrangement of shims Type 1 without link pin dust seals (up to Chassis No. 2921 551)

Offset in mm	Number of Shims for ¹⁾			
	Upper Torsion Arm		Lower Torsion Arm	
	Inner (A)	Outer (B)	Inner (C)	Outer (D)
5	3	7	7	3
5.5	4	6	7	3
6	4	6	6	4
6.5	5	5	6	4
7	5	5	5	5
7.5	6	4	5	5
8	6	4	4	6
8.5	7	3	4	6
9	7	3	3	7



¹⁾ There must always be a total of 10 shims on each link pin.

**Type 1 with link pin dust seals (from Chassis No. 2921 552 to Chassis No. 115979202) and
Type 2 up to Chassis No. 217148459**

Offset in mm	Number of Shims for ²⁾			
	Upper Torsion Arm		Lower Torsion Arm	
	Inner (A)	Outer (B)	Inner (C)	Outer (D)
5.5	2	6	5	3
6	2	6	4	4
6.5	3	5	4	4
7	3	5	3	5
7.5	4	4	3	5
8	4	4	2	6
8.5	5	3	2	6

²⁾ Each link pin must always be fitted with 8 shims and a protective washer.

II. Steering – Tolerances, wear limits and settings

Designation	Type 1	Type 2 up to Ch. No. 218 000 000	
	New installation mm (inch)	New installation mm (inch)	Wear limit mm (inch)
a – Roller steering			
1 – Roller shaft/seat for bushing . . . diameter	23.98–23.99 (.943–.944)	—	—
Bushing for roller shaft inside diameter	24.00–24.02 (.944–.945)	—	—
b – Worm and peg steering			
1 – Bushing for swing lever shaft . . . ream out to	—	24.00–24.03 (.944–.945)	24.04 (.946)
2 – Swing lever shaft diameter	—	23.97–23.98 (.942–.943)	23.95 (.940)
3 – Drop arm shaft ream out to	—	25.38–25.40 (.999–1.0)	—
Drop arm shaft in bushing . . . radial play	—	0.03–0.06 (.001–.0024)	0.10 (.004)
4 – Worm spindle, installed run-out (measured at column end)	—	max. 0.35 (.001)	—
5 – Column in steering box press-in depth	—	45–46*) (1.771–1.811)	—
Worm spindle preload (end play) without oil seal	1.5–2.5 cmkg (1.3–2.2 in. lb)	2–5 cmkg (1.7–4.4 in. lb)	—
with oil seal	2.0–3.0 cmkg (1.7–2.6 in. lb)	—	—
6 – Preload for peg	—	2–3 cmkg (1.7–2.6 in. lb)	—
7 – Peg nut tightening torque	—	25 cmkg (22.0 in. lb)	—
8 – Steering gear turning torque (mea- sure on steering wheel, tie rods and draglink off)	9–12 cmkg (7.8–10.6 in. lb)	24*) cmkg (22.0 in. lb)	—
9 – Steering wheel turns (from lock to lock) approx.	2½	2¾	—
10 – Steering gear ratio	19.4	15.0	—
12 – Overall ratio	14.34*)	15.7	—

Type 2 from Ch. No. 218000001 New installation mm (inch)	Type 3 New installation mm (inch)	Remarks
—	23.98–23.99 (.943–.944)	1) From Chassis No. 218000001. Metal bushings. Do not ream out. 2) Up to Chassis No. 219127054: 25 mm (1.0 inch) 3) On ATE steering: 43±0.5 mm (1.693±.02 inch) 4) Valid for new steering gears; over 3000 miles: 8–10 cmkg (7.0–8.7 in. lb) 5) Karmann Ghia: 14.14
—	24.00–24.02 (.944–.945)	
1)	—	
27.5 ²⁾ (1.083)	—	
—	—	
—	—	
—	—	
—	—	
2–5 cmkg (1.7–4.4 in. lb)	1.5–2.5 cmkg (1.3–2.2 in. lb)	
—	2.0–3.0 cmkg (1.7–2.6 in. lb)	
2–3 cmkg (1.7–2.6 in. lb)	—	
25 cmkg (22.8 in. lb)	—	
24 cmkg ⁵⁾ (22.0 in. lb)	9–12 cmkg (7.8–10.6 in. lb)	
2%	2%	
15.0	19.4	
15.7	14.8	

III. Wheel alignment data

An angle of 10' equals a toe measurement of 1.1 mm (.043 inch) with 14" wheels
 or 1.2 mm (.047 inch) with 15" wheels

The sign + means toe-in, — means toe-out

Test conditions:

- Instrument and wheel mirrors properly adjusted
- Vehicle empty
- Tire pressures correct (for permissible total weight)
- Suspension free of tension
- Vehicle aligned properly

Designation	Value
Type 1	
1 – Total toe with wheels not pressed	+ 30' ± 15' or + 1.8 to 5.4 mm (+.070 to +.212 inch)
2 – Total toe with wheels pressed	+ 5 ± 15' or – 1.2 to + 2.4 mm (+.047 to +.094 inch)
3 – Pressure applied to wheels	10 ± 2 kg (22 ± 4 lbs.)
4 – Maximum permissible difference in toe with wheels pressed and not pressed	max. 25'

Designation	Value
5 – Camber in straight-ahead position	
from Chassis No. 116000001	0° 30' ± 20'
up to Chassis No. 115979202	0° 40' ± 30'
Maximum permissible difference between sides	30'
5 – Toe out at 20° lock to left and right (wheels not pressed)	
from Chassis No. 116000001 to left	– 1° 20' ± 30'
. to right	– 2° 10' ± 30'
up to Chassis No. 115979202	– 2° ± 30'
Maximum permissible difference between sides	1°
Karmann Ghia models up to Chassis No. 1644421	– 2° ± 1°
7 – Offset between stub axles	max. 8 mm (.314)
3 – Caster angle of a wheel	3° 20' – 1°
equals the camber difference of a wheel on a lock from 20° left to 20° right	2° 15' ± 40'

Designation	Value
9 – Rear wheel camber with spring plates properly set (after at least 300 miles)	
a) Vehicles with double-joint axle all models	– 1° 20' ± 40'
b) Vehicles with swing axle	
Modell 11 from Chassis No. 117000001 permissible minimum camber	1° ± 1° – 1°
Model 14 from Chassis No. 147000003	15' ± 1° – 1° 30'
Model 15 from Chassis No. 157000002 permissible minimum camber	15' ± 1° – 1° 30'
all models up to Chassis No. 116021298 permissible minimum camber	+ 2° 30' ± 1° 0°
Maximum permissible difference between sides	
all models with double-joint axle	45'
all models with swing axle	20'
10 – Total rear wheel toe with correct camber	
all models with double-joint axle	0° ± 15'
all models with swing axle	– 5 ± 10'
11 – Maximum permissible deviation in wheel alignment	10'

Designation	Value
Type 2	
1 – Total toe with wheels not pressed from Chassis No. 218000001 up to Chassis No. 217148459	+ 15' ± 15' or 0 to + 3.3 mm (0.0 to + .130 inch) + 5' ± 10' or – 1.1 to + 2.2 mm (–.0432 to +.087 inch)
2 – Total toe with wheels pressed from Chassis No. 218000001 up to Chassis No. 217148459	+ 5' ± 15' – 5' ± 10'
3 – Pressure applied to wheels	15 ± 3 kg (33 ± 6 lbs.)
4 – Maximum permissible difference between toe with wheels pressed and not pressed	25'
5 – Front wheel camber in straight-ahead position from Chassis No. 218000001 up to Chassis No. 217148459	+ 40' ± 20' + 40' ± 30'
Maximum permissible difference between sides	30'
6 – Toe-out at a 20° lock to left and right (wheels not pressed)	– 2° 30' ± 30'
7 – Offset between stub axles	max. 8 mm (.314 inch)
8 – Caster angle of a wheel from Chassis No. 218000001 up to Chassis No. 217148459	3° ± 40' max. 1°
equals the camber difference of a wheel on a lock from 20° left to 20° right from Chassis No. 218000001 up to Chassis No. 217148459	2° ± 25' max. 40'

Designation	Value
9 – Rear wheel camber with spring plates properly set	
(after at least 300 miles)	
a) Vehicles with double joint rear axle	
all models	- 50' ± 30'
b) Vehicles with swing axle	
Model 21, 261–264	+ 4° ± 30'
Model 23, 265–268	+ 3° 30' ± 30'
Model 22, 24, 25	+ 3° ± 30'
Maximum permissible difference between sides	20'
10 – Rear wheel toe with correct camber	
a) Vehicles with double joint rear axle all models	+ 10' ± 20'
b) Vehicles with swing axle	- 25' ± 25'
11 – Maximum permissible deviation in wheel alignment	
all models with double joint rear axle	10'
all models with swing axle	13'

Designation	Value
Type 3	
1 – Total toe with wheels not pressed	+ 40' ± 15' or + 3 to + 6.6 mm (+.118 to +.260 inch)
2 – Total toe with wheels pressed	+ 30' ± 15' or + 1.8 to + 5.4 mm (+.070 to +.212 inch)
3 – Pressure applied to wheels	10 ± 2 kg (22 ± 4 lbs.)
4 – Maximum permissible difference between toe with wheels pressed and not pressed . .	20'
5 – Front wheel camber in straight-ahead position Maximum permissible difference between sides	1° 20' ± 20' 20'
6 – Toe-out at a 20° lock to left and right (wheels not pressed) all models to left to right	– 40' ± 30' – 10' ± 30'
7 – Offset between stub axles	max. 8 mm (.314 inch)
8 – Caster angle of a wheel equals the camber difference of a wheel on a lock from 20° left to 20° right	4° ± 40' 2° 40' ± 25'

Designation	Value
9 – Rear wheel camber with spring plates properly set (after at least 300 miles)	
a) Vehicles with double-joint rear axle all models	$- 1^{\circ} 20' \pm 40'$
b) Vehicles with swing axle	
Model 31 from Chassis No. 317000001 } and Model 34 from Chassis No. 347000003 }	$1^{\circ} 45' \pm 1^{\circ}$
permissible minimum camber	$- 30'$
Model 36 from Chassis No. 367000002	$2^{\circ} 30' \pm 1^{\circ}$
permissible minimum camber	$+ 30'$
All models up to Chassis No. 316316238	$2^{\circ} 30' \pm 1^{\circ}$
permissible minimum camber	0°
Model 31 and 34	$+ 1^{\circ}$
Model 36	
Maximum permissible difference between sides	
all models with double-joint axle	$45'$
all models with swing axle	$30'$
10 – Rear wheel toe with correct camber	
a) Vehicles with double-joint rear axle	$+ 5' \pm 15'$
Model 31 and 34	$0^{\circ} \pm 15'$
Model 36	$- 5' \pm 10'$
b) Vehicles with swing axle	$- 5' \pm 10'$
11 – Maximum permissible deviation in wheel alignment	$\text{max. } 10'$

Remarks

IV. Tightening torques

Designation	Thread	mkg	lb ft
a – Front axle – Type 1			
Front axle to frame	M 12×1.5	5.0	36
Shock absorber bolt on side plate	M 12×1.5	3.0–3.5	22–25
Shock absorber nut on side plate	M 10	2.0	14
Shock absorber nut on lower torsion arm	M 10	3.0–3.5	22–25
Nuts for steering ball joints ¹⁾	M 12×1.5 or M 10×1	5.0–7.0 4.0–5.0	36–50 29–36
Inner wheel bearing nut	M 18×1.5	4.0 ²⁾	29 ²⁾
Locknut for wheel bearing	M 18×1.5	7.0 ²⁾	50 ²⁾
Socket head screw in clamp nut	M 7	1.0–max. 1.3 ²⁾	7–max. 9 ²⁾
Slotted nut on tie rod	M 12×1.5 or M 10×1	3.0 ⁴⁾ 2.5 ⁴⁾	22 ⁴⁾ 18 ⁴⁾
Steering damper nut on tie rod ¹⁾	M 10×1	2.5	18
Steering damper bolt on axle tube	M 10	4.0–4.5	29–32
Setscrew for torsion bars	M 14×1.5	4.0–5.0	29–36
Locknut for setscrew	M 14×1.5	4.0–5.0	29–36
Caliper to steering knuckle	M 10	4.0	29
Clamping bolt-link pln to torsion arm	M 10	4.5	32

Remarks

- 1) Always use new self-locking nuts after removal.
- 2) Tighten inner nut to 4.0 mkg (29 lb ft) first, fit new lock plate and back off nut 72° (distance from one wheel bolt hole in drum to next). Then tighten outer nut to 7.0 mkg (50 lb ft).
- 3) Tighten nut while turning wheel. Then back off nut until the specified axial play of 0.03–0.12 mm (.001–.005 inch) is obtained (Bracket VW 769 with dial gauge). If front axle tends to be noisy, keep play to lower limit 0.03–0.06 mm (.001–.002 in.). When play is correct, tighten socket head screw to the correct torque.
- 4) Turn on to cotter pin hole.

Caution

Quality Grade or Tensile Class of listed threaded fasteners are not included. Always check with Parts List to make sure they are for the intended purpose.

Designation	Thread	mkg	lb ft
b – Front axle – Type 2			
Front axle / frame bolts (side member)	M 12×1.5	9.0–12.5	65–90
Shock absorber nut and bolt, upper (from Chassis No. 971 550) . .	M 12×1.5	5.0	36
Shock absorber securing bolt, upper (up to Chassis No. 971 549) .	M 10 or M 12×1.5	4.0–4.5 3.5–4.5	29–32 25–32
Shock absorber securing nut, lower	M 10 or M 12×1.5	2.5–3.5 4.0–6.0	18–22 29–43
Socket head screw in clamp nut	M 7	1.5–max. 2.0 ¹⁾	11–max. 14 ¹⁾
Inner wheel bearing nut	M 18×1 or M 22×1.5	3.5 } ²⁾	25
Wheel bearing locknut	M 18×1 or M 22×1.5	7.0 } ²⁾	50
Tie rod and draglink nuts	M 12×1.5 or M 10×1	3.0 } ³⁾ 2.5 } ³⁾	22 } ³⁾ 18 } ³⁾
Steering damper / frame bolt and nut (up to Chassis No. 851 389) .	M 10×45	4.5	32
Steering damper / axle tube bolt (from Chassis No. 851 390) . . .	M 10×40	4.0–4.5	29–32
Steering damper / swing lever bolt	M 10×72	4.0–4.5	29–32
Setscrew for torsion bars	M 14×1.5	4.0	29
Locknut for setscrew	M 14×1.5	4.0	29
Stabilizer to torsion arm	M 10 or M 8	3.5–5.0 2.5	25–36 18
Bolt for brake backing plate to steering knuckle	M 10	5.0–6.0	36–43
Clamping bolt for link pins to torsion arm	M 10	4.0–5.0	29–36
Ball joints to steering knuckle ⁴⁾	M 18×1.5	10.0	72
Swing lever to shaft	M 12×1.5	5.0–7.0	36–50

Remarks

- 1) Tighten nut while turning wheel. Then back off nut until the specified axial play of 0.03–0.12 mm (.001–.005 in.) is obtained (Bracket VW 769 with dial gauge). If front axle tends to be noisy, keep play to lower limit 0.03–0.06 mm (.001–.002 in.). When play is correct, tighten socket head screw to the correct torque.
- 2) Tighten inner nut to 3.5 mgk (25 lb ft) first while turning wheel. Then fit new lock plate and back off nut until specified axial play of 0.03–0.12 mm (.001–.005 in.) (Bracket VW 769 with dial gauge) is obtained. If front axle tends to be noisy, keep play to lower limit 0.03–0.06 mm (.001–.002 in.). When play is correct, tighten outer locknut to 7.0 mgk (50 lb ft).
- 3) Turn on to cotter pin hole.
- 4) Always use new self-locking nuts after removal.

Caution

Quality Grade or Tensile Class of listed threaded fasteners are not included. Always check with Parts List to make sure they are for the intended purpose.

Designation	Thread	mkg	lb ft
c – Front axle – Type 3			
Front axle securing bolts			
a – upper and lower	M 10	3.0	22
b – center	M 10	4.0	29
Set screw securing torsion bars	M 14×1.5	3.0	22
Set screw securing stabilizer	M 14×1.5	4.5–5.5	32–40
Locknut for set screw	M 14×1.5	4.0	29
Torsion bar to axle beam bolts	M 10	4.0	29
Clamp bolt for stabilizer	M 10	4.0 } ¹⁾	29 } ¹⁾
Adjusting bolt for stabilizer	M 8	1.0 } ¹⁾	7 } ¹⁾
Shock absorber to axle beam bolts	M 12×1.5	3.0–3.5	22–25
Shock absorber nut on torsion arm	M 10	3.0–3.5	22–25
Caliper to steering knuckle	M 10	5.0	36
Steering arm on steering knuckle	M 10×1	5.5	40
Nuts for upper and lower ball joints	M 20×1.5 } or M 18×1.5 }	11.0	80
Clamp bolts for upper and lower ball joints	M 10×40	5.5	40
Up to Chassis No. 0273513 (October 1963)	M 8×40	3.5	25
Inner wheel bearing nut up to Chassis No. 315220883	M 16×1.5	1.5 } ³⁾	11
Wheel bearing locknut	M 16×1.5	7.0 } ³⁾	50
Socket head screw in clamp nut	M 7	1.0–max.1.3 ²⁾	7–max.9 ²⁾
Steering damper bolt on axle	M 10	4.0–4.5	29–32
Steering damper nut on drop arm	M 10	2.5	18

Remarks

- 1) Tighten clamp bolt to 4 mkg (29 lb ft) first, then tighten adjusting bolt to 1 mkg (7 lb ft) and lock it.
- 2) Tighten nut while turning wheel. Then back off nut until the specified axial play of 0.03–0.12 mm (.001–.005 in.) is obtained (Bracket VW 769 with dial gauge). If front axle tends to be noisy, keep play to lower limit 0.03–0.06 mm (.001–.002 in.). When play is correct, tighten socket head screw to the correct torque.
- 3) Tighten inner nut first while turning wheel. Then fit new lock plate and back off nut until specified play of 0.03–0.12 mm (.001–.005 in.) (Bracket VW 769 with dial gauge) is obtained. If front axle tends to be noisy, keep play to lower limit. When play is correct, tighten outer locknut to 7.0 mkg (50 lb ft).

Caution

Quality Grade or Tensile Class of listed threaded fasteners are not included. Always check with Parts List to make sure they are for the intended purpose.

Designation	Thread	mkg	lb ft
e – Steering gear – Type 1 and 3			
Steering gear to axle – Type 1	M 10	2.5–3.0	18–22
Steering gear to axle – Type 3	M 10	2.5–3.0	18–22
Locknut for roller shaft adjusting screw	M 10+1	2.5	18
Steering gear cover bolts	M 8×1.25	2.0–2.5	14–18
Locknut for steering worm adjustment screw	M 35×1.5	5.0–6.0	36–43
Screw for self-cancelling ring on steering wheel	AM 3.5	0.5	3.6
Screw securing drop arm to roller shaft	M 12×1.5	7.0	50
Steering wheel nut	M 18×1.5	5.0	36
Bolt for steering coupling to steering worm	M 8	2.0–2.5	14–18
Nut flange to coupling disc	M 8	1.5	11
Column to flange/steering coupling (Type 1)	M 8	1.5	11
Column to flange/steering coupling (Type 3)	M 8	3.0	22
Slotted nut on tie rod	M 12×1.5	3.0	22
	or M 10×1	2.5	18
Locknut for tapered ring to tie rod	M 14×1.5	2.5	18
Bolt for tie rod retaining clamp	M 8×1	1.5	11
Bolt for steering column mounting plate to instrumental panel	M 8	1.5	11
Bolt for steering column eccentric ring bracket – Type 3	M 8	1.5	11

Remarks

1) Turn on to next cotter pin hole.

Caution

**Quality Grade or Tensile Class of listed threaded fasteners are not included.
Always check with Parts List to make sure they are for the intended purpose.**

Designation	Thread	mkg	lb ft
f – Steering gear – Type 2			
Bracket to frame bolts	M 10×22	4.0–4.5	29–32
Steering box to bracket	M 10×40	3.5–5.0	25–36
Drop arm nut	M 20×1.5	8.0–11.0	58–80
Swing lever pinch bolt	M 12×1.5	6.0	43
Clamp on tie rod	M 8×1	1.5–2.0	11–14
Drag link to swing lever and drop arm	M 12×1.5	2.0–3.0')	14–22')
Clamp on drag link	M 8×1	1.5–2.0	11–14
Steering wheel nut	M 16×1.5	2.5–3.0	18–22
Nut for flange to steering worm	M 8	2.0	14
Castellated nut for coupling disc to flange	M 8	1.5	11
Screw for steering column cap to floor plate	M 6	0.5	3.6
Steering gear case cover bolt	M 8	2.5	18
Steering gear end cover bolt	M 6	1.5	11

Remarks

1) Turn on to next cotter pin hole.

Caution

**Quality Grade or Tensile Class of listed threaded fasteners are not included.
Always check with Parts List to make sure they are for the intended purpose.**

TRANSMISSION AND REAR AXLE

I. Transmission data

Type/ Model	Transmission Type	Code letter	Final drive ratio	Engine capacity	Valve body Code letter
113, 14, 15	1	AA	8:35	1200	—
113, 14, 15	1	AB	8:35	1300	—
113, 14, 15	1	AC	8:33	1500	—
113, 14, 15	1	AH	8:33	1500	—
113, 14, 15	1	AH	8:33	1600	—
113, 14, 15	2	BA	8:35	1500	—
113, 14, 15	2	BE	8:33	1600	—
2	1	—	8:33	1200/1500	—
2	1	CA	8:43	1600	—
3	1	DA	8:33	1600	—
3	1	DC	8:33	1600	—
3	3	EB	9:33	1600	B

Remarks	Manufactured		
	from	to	
Swing axle	Aug. 60	July 65	Type of transmission: 1 = Four speed manual transmission 2 = Automatic Stick Shift 3 = Automatic transmission
Swing axle	Aug. 65	July 66	
Swing axle	Aug. 66	July 68	
Double-joint axle	Aug. 68	July 69	
Double-joint axle	Aug. 69		
M 9 Automatic Stick Shift	Aug. 68	July 69	
M 9 Automatic Stick Shift	Aug. 69		
Swing axle	Aug. 60	July 67	
Double-joint axle	Aug. 67		
Swing axle	Apr. 61	July 68	
Double-joint axle	Aug. 68		
M 249 (Automatic transmission) and M 236 (Fuel injection)	Aug. 68		

II. Tolerances, wear limits and settings

Designation	
a – Manual transmission	
1 – 1st gear	end play
2 – 3rd gear	end play
3 – 4th gear	end play
4 – Synchronesh units	
clearance "a" between coupling teeth and synchronizer ring	
1./2. gears	clearance
3./4. gears	clearance
5 – Shift fork/operating sleeves for 1./2. and 3./4. gears	end play
6 – Preload of pinion taper roller bearing	
Turning torque	new
	used more than 30 miles

Fully synchronized transmission		Automatic Stick Shift		Remarks
New installation mm (inch)	Wear limit mm (inch)	New installation mm (inch)	Wear limit mm (inch)	
0.10–0.25 ¹⁾ (.004–.010)	—	—	—	¹⁾ Try to keep to lower limit (0.10 mm/.004 inch) ²⁾ Valid for all transmissions with double-joint axle
0.10–0.25 ¹⁾ (.004–.010)	—	0.10–0.25 ¹⁾ (.004–.010)	—	
0.10–0.25 (.004–.010)	—	0.10–0.25 (.004–.010)	—	
1.1–1.8 (.043–.070)	0.60 (.024)	1.1–1.8 (.043–.070)	0.60 (.024)	
1.0–1.8 (.039–.070)	0.60 (.024)	1.1–1.8 (.043–.070)	0.60 (.024)	
0.10–0.30 (.004–.012)	—	0.10–0.30 (.004–.012)	—	
6–21 cmkg ²⁾ (5.3–19.5 in. lb)		6–21 cmkg (5.3–19.5 in. lb)		
3– 7 cmkg ²⁾ (2.6–6.1 in. lb)		3– 7 cmkg (2.6–6.1 in. lb)		

Designation

b – Drive shaft

Drive shaft, front (surface for 3rd gear needle bearing) run-out

c – Gearbox and gearshift housing

1 – Preload of transmission case halves or final drive covers on the differential ball bearings . .

2 – Preload of final drive covers on taper roller bearings

Turning torque new

more than 30 miles used

3 – Plastic packing/transmission case/axle tube/tube retainer clearance

4 – Reduction gear shaft (Type 2) run out

Fully synchronized transmission		Automatic Stick Shift		Remarks
New installation mm (inch)	Wear limit mm (inch)	New installation mm (inch)	Wear limit mm (inch)	
max. 0.02 (.0007)	—	—	—	
0.14 (.005)	—	—	—	
18–22 cmkg (16.5–20.4 in. lb)	—	18–22 cmkg (16.5–20.4 in. lb)	—	
3– 7 cmkg (2.6–6.1 in. lb)	—	3– 7 cmkg (2.6–6.1 in. lb)	—	
0.00–0.20 (.000–.008)	—	—	—	
max. 0.01 (.0004)	—	—	—	

Designation

5 – Shift rod shifting pressure

6 – Gearshift housing bushings inside diameter

7 – Inner shift lever diameter

8 – Preload of gearshift housing

9 – Starter bushing inside diameter

10 – Starter shaft/bushing radial clearance

Fully synchronized transmission		Automatic Stick Shift		Remarks
New installation mm (inch)	Wear limit mm (inch)	New installation mm (inch)	Wear limit mm (inch)	
15-20 kg (30-44 lbs.)	—	6.5 kg (14 lbs.)	—	
15.05-15.03 (.592-.591)	15.25 (.600)	15.05-15.03 (.592-.591)	15.25 (.600)	
15.00-14.96 (.590-.588)	14.75 (.580)	15.00-14.96 (.590-.588)	14.75 (.580)	
0.02-0.11 (.0008-.0043)	—	—	—	
12.55-12.57 (.493-.494)	12.65 (.497)	12.55-12.57 (.493-.494)	12.65 (.497)	
0.09-0.14 (.003-.005)	0.25 (.010)	0.09-0.14 (.003-.005)	0.25 (.010)	

Designation	New installation mm (inch)	Wear limit mm (inch)
d – Planetary gears		
1 – Adjusting planetary gear end play	0.45–1.05 (.018–.042)	—
2 – Adjusting brake bands		
a – 2nd gear		
Tighten screw to 0.5 mkg (3.5 lb ft) then back off 1 ¼ to 2 turns¹)	—	—
b – 1st gear		
Tighten screw to 0.5 mkg (3.5 lb ft) then back off 3 ¼–3 ½ turns¹)	—	—
3 – Clutches		
a – Forward clutch²)		
end play “a”	0.8–1.2 (.032–.048)	—
b – Direct and reverse clutch with 2 plates²)		
Circlip thickness	1.7 (.067)	—
Axial play for direct and reverse clutch with 3 plates²)	1.7–2.2 (.067–.086)	—

Remarks

- 1) **Adjust bands with transmission horizontal and tighten adjusting screws to 1 mkg (7 lb ft) first to settle the bands.**
- 2) **Use only lined plates with annular groove and 6.1–0.25 mm (.240–.010 in.) thick pressure plate. Note thickness of circlip.**
- 3) **Use only lined plates with waffle surface and 6.3–0.15 mm (.248–.006 inch) thick pressure plate.**

Designation

e – Final drive

- 1 – Play at differential gears with diff. housing bolted together axial
- 2 – Play between diff. housing and cover/gear shaft radial { old
new
- 3 – Double taper roller pinion bearing
Preload (turning torque) new bearings
used bearings
(used more than 30 miles)
- 4 – Taper roller bearings for differential
Preload new bearings
used bearings
(used more than 30 miles)
- 5 – Backlash (measured at pitch circle diameter)
- 6 – Rear axle shafts:
 - a – Flange/fulcrum plates/differential gears (4 parts) clearance
 - b – Flange/differential gears (measured across the convex faces) clearance
 - c – Measured at bearing seat shaft between centers run-out

Fully synchronized transmission		Automatic Stick Shift		Remarks
New installation mm (inch)	Wear limit mm (inch)	New installation mm (inch)	Wear limit mm (inch)	
0.25–0.45 ¹⁾ (.010–.017)	—	0.25–0.45 ¹⁾ (.010–.017)	—	¹⁾ Differentials with spacer sleeve: 0–0.14 (0–.005 in.) wear limit: 0.20 (.008 in.) ²⁾ For all transmissions used together with double-joint rear axle
0.03–0.08 (.001–.003)	0.12 (.005)	—	—	
0.025–0.06 (.001–.002)	0.12 (.005)	—	—	
6–21 cmkg (5.2–18.2 in. lb)	—	6–21 cmkg (5.2–18.2 in. lb)	—	
3–7 cmkg (2.6–6.1 in. lb)	—	3–7 cmkg (2.6–6.1 in. lb)	—	
18–22 cmkg (15.8–19.3 in. lb)	—	18–22 cmkg (15.8–19.3 in. lb)	—	
3–7 cmkg (2.6–6.1 in. lb)	—	3–7 cmkg (2.6–6.1 in. lb)	—	
0.15–0.25 (.006–.010)	—	0.15–0.25 (.006–.010)	—	
0.04–0.24 (.0015–.009)	0.25 (.010)	—	—	
0.03–0.10 (.001–.004)	0.20 (.008)	—	—	
max. 0.05 (.0019)	—	—	—	

Designation	Automatic transmission		
	New installation mm (inch)	Wear limit mm (inch)	
f – Final drive			
1 – Preload for drive pinion bearings	new	14–20 cmkg (12.2–17.4 in. lb)	—
	more than 30 miles used	2 cmkg' (1.7 in. lb)	—
2 – Total preload for drive pinion with differential	new	22–24 cmkg (19.3–20.9 in. lb)	—
	more than 30 miles used	3–5 cmkg' (2.7–4.4 in. lb)	—

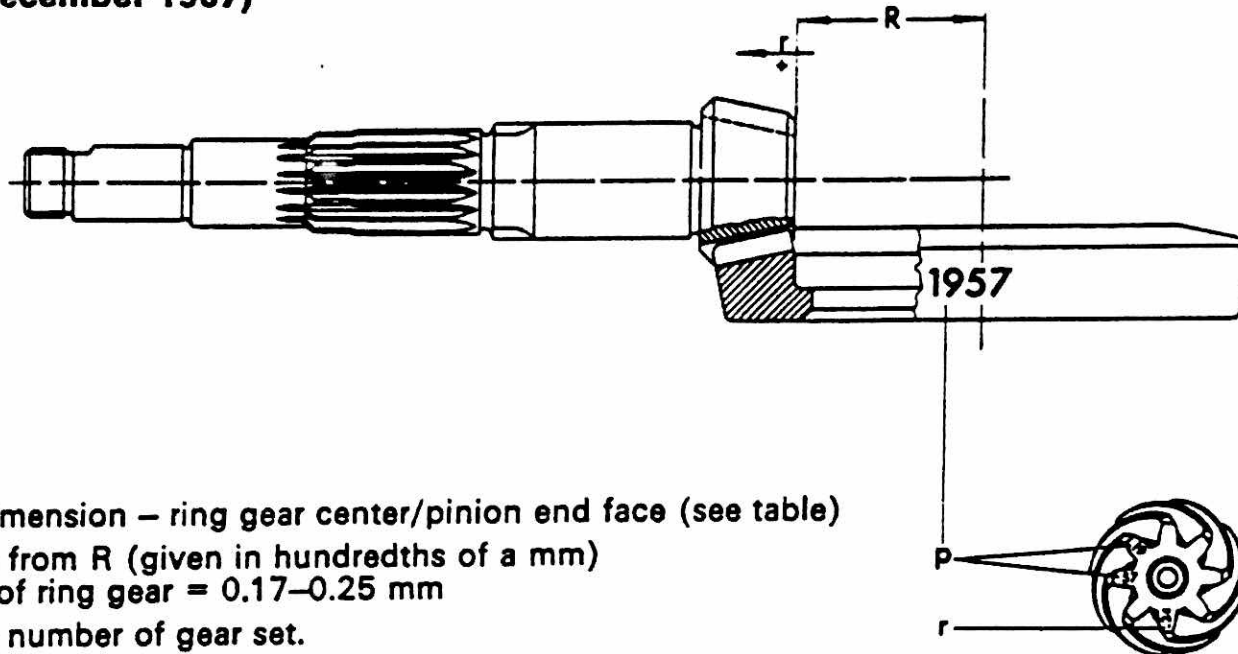
Remarks

- 1) Before disassembling a bearing carrier, measure backlash and turning torque. If the **total torque is at least 3 cmgk** (2.7 in. lb) and the pinion torque at least 2 cmkg (1.7 in. lb), the position of the adjusting rings should be marked and the marks aligned when assembling again. If the pinion torque is less than 2 cmkg (1.7 in. lb), it should be set to 2 cmkg (1.7 in. lb) on assembly. If there is play, the bearings must be replaced.

III. Transmission adjustment

a - Marking of gear sets

1 - Fully synchronized transmission (up to December 1967)



R - Design dimension - ring gear center/pinion end face (see table)

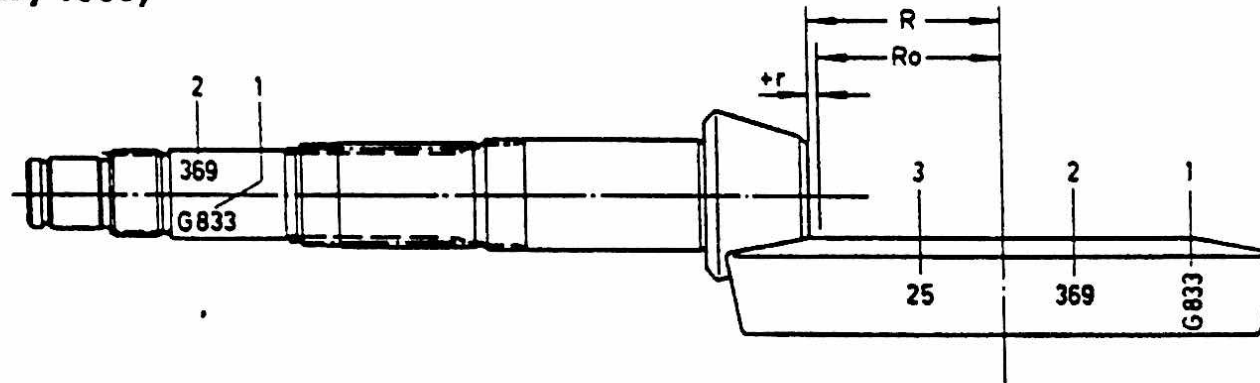
r - Deviation from R (given in hundredths of a mm)
backlash of ring gear = 0.17-0.25 mm

p - Matching number of gear set.

	Type 1	Type 2		Type 3		
Type of teeth	8 : 35 Gleason	8 : 33 Klingelberg	Gleason	8 : 35 Klingelberg	8 : 33 Klingelberg	Gleason
"R" mm	58.70	59.70	58.70 ¹⁾	58.70		
Distinguishing features	The Gleason toothing becomes deeper towards the outside of the gear.					

¹⁾ Marking: From Chassis No. 572083: "P" on left of lettering.
From Chassis No. 584927: "K" on end face of pinion.

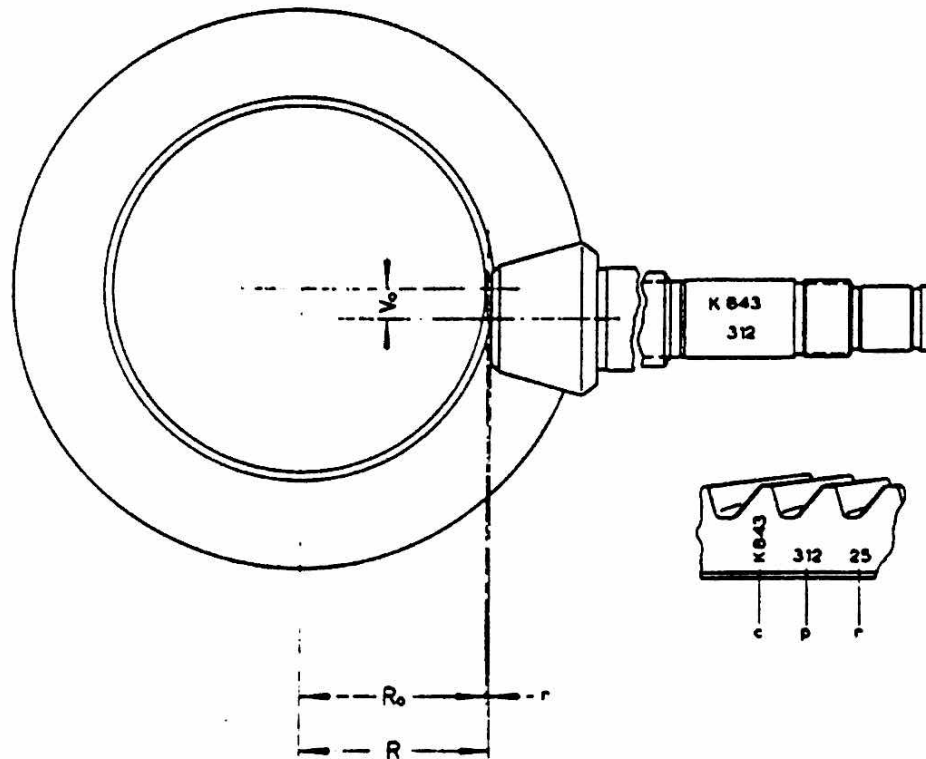
**1a – Fully synchronized transmission and Automatic Stick Shift
(from January 1968)**



(Example: Fully synchronized transmission with double-joint axle)

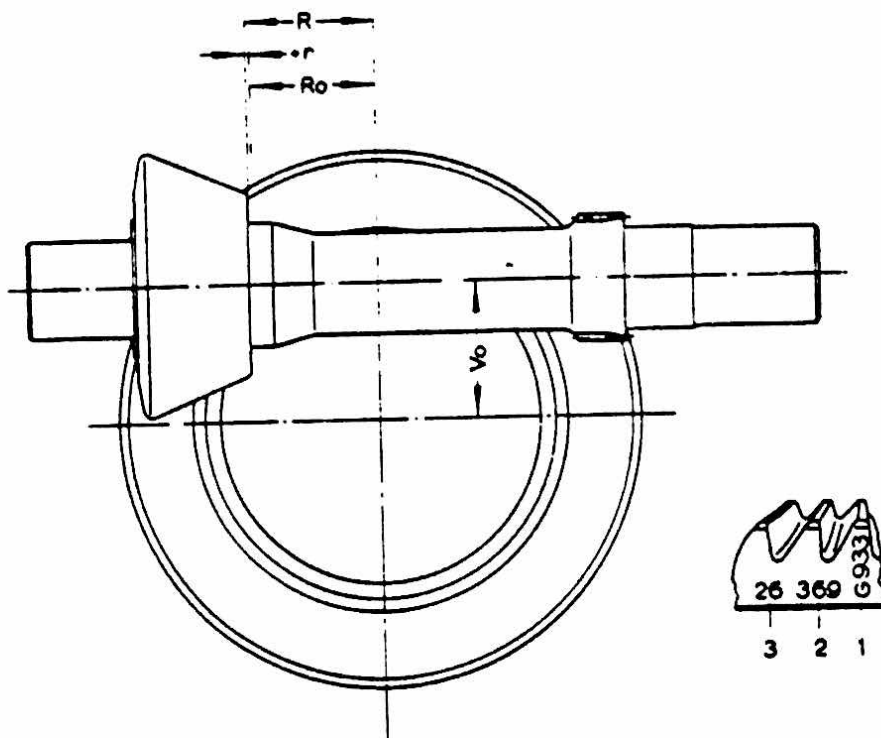
- 1 – "G 833" means Gleason gear set with a ratio of 8 : 33.
- 2 – Matching number of gear set.
- 3 – Deviation "r" based on the master gauge of the special machine used in production.
The deviation is given in $\frac{1}{100}$ mm with the same sign. For example: "25" means that $r = +0.25$ mm.
- Ro – Length of master gauge used in special machine, "Ro = 58.70 mm".
- R – Actual measurement between ring gear centerline and end of pinion at point of quietest running.

**2 – Fully synchronized transmission
(Type 2, from Chassis No. 218000001)**



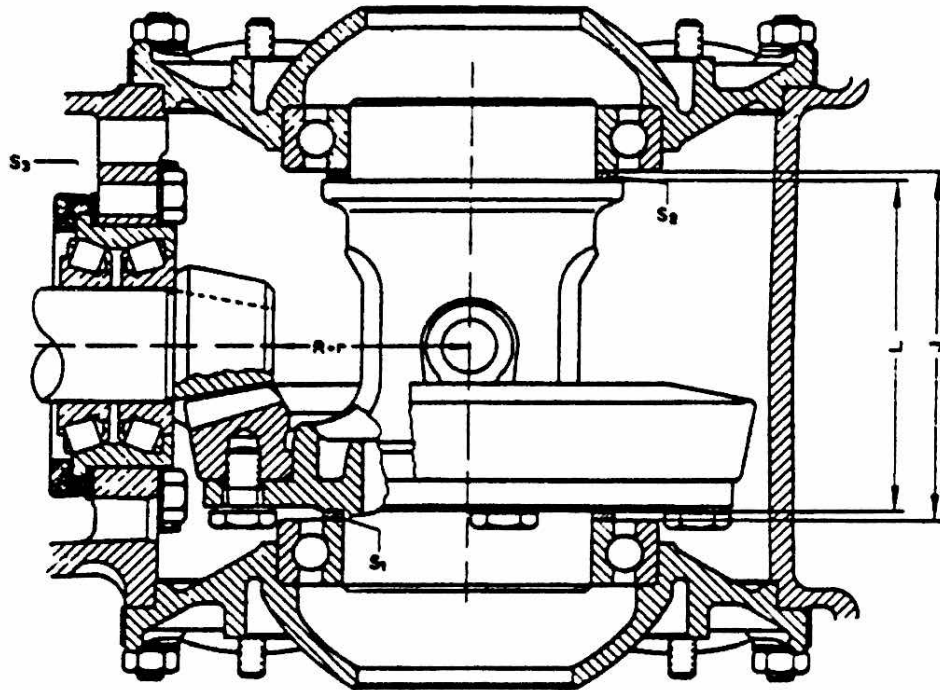
- 1 – "K 843" means Klingelberg gear set with a ratio of 8 : 43.
- 2 – Matching number (312) of gear set.
- 3 – Deviation "r" based on the master gauge of the special machine used in production.
- Ro – Length of master gauge used in special machine "Ro = 63 mm".
- R – Actual measurement between ring gear centerline and end of pinion at point of quietest running.
- Vo – Hypoid offset = 10 mm.

3 - Automatic transmission



- 1 - "G 933" means Gleason gear set with a ratio of 9 : 33
- 2 - Matching number of gear set (369).
- 3 - Deviation "r" based on the master gauge of the special machine used in production.
The deviation is given in $1/100$ mm with the same sign. For example: "26" means that $r = +0.26$ mm.
- R_o - Length of master gauge used in special machine. " R_o " = 40.55 mm.
- R - Actual measurement between ring gear centerline and end of pinion at quietest running point.
- V_o - Hypoid offset = 42.5 mm.

- b - Adjusting drive pinion and ring gear**
- 1 - Fully synchronized transmission**



"S₃" shims for drive pinion
 "S₁" shims at ring gear end
 "S₂" shims at opposite end
 J depth of housing between ball bearings
 L length of differential housing

Explanation of signs

Sign	Designation	Dimension
Svo	Mean backlash	0.20
MR	Measuring ring	measure thickness
$\downarrow S_1$	Axial movement of ring gear to give specified mean backlash	1/100 mm
S ₁	Shim at ring gear end	find thickness
S ₂	Shim at opposite end	find thickness
e	Difference between zero setting of mandrel/pinion actual dimension without shims	0.10–0.50 mm
p ₁	Preload on bearing at ring gear end	0.07 mm
p ₂	Preload on bearing at opposite end	0.07 mm
r	Deviation in gear set G 358 / K 835 / G 338 / K 833	0.05–0.65 mm

Finding shim thickness

"S₁" shim

$$S_1 \text{ nominal} = e + r$$

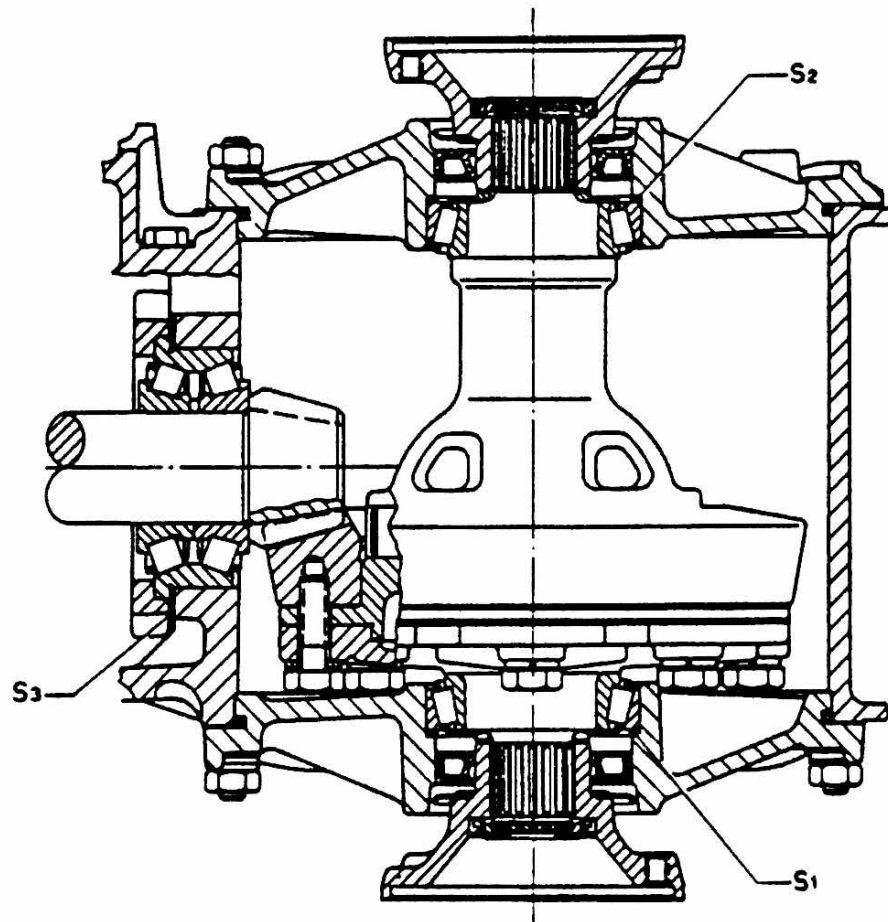
"S₂" shim

$$S_2 = I - L - S_1$$

"S₁" shim

$$S_1 = MR + \downarrow S_1 + p$$

2 - Manual transmission with double joint axle



"S₁" shims at ring gear end
"S₂" shims at opposite end
"S₃" shims for drive pinion

Explanation of signs

Sign	Designation	Dimension
Svo mean	Average of several (4 ×) backlash readings	1/100 mm
Δ S _r	Axial movement of ring gear to give specified mean backlash	1/100 mm
S _r	Shim at ring gear end	find thickness
S _o	Shim at opposite end	find thickness
e	Difference between zero setting of measuring mandrel and actual pinion dimension without shims	0.10–0.50 mm
r	Deviation for gear set G 338 / K 833	0.05–0.65 mm
w	Correction factor for gear set G 338	1.00
	Correction factor for gear set K 833	1.10
h	Ring gear lift from full mesh position for G 338 gear set	0.20 mm
	Ring gear lift from full mesh position for K 833 gear set	0.20 mm
E _o	Length of setting pin	58.70 mm

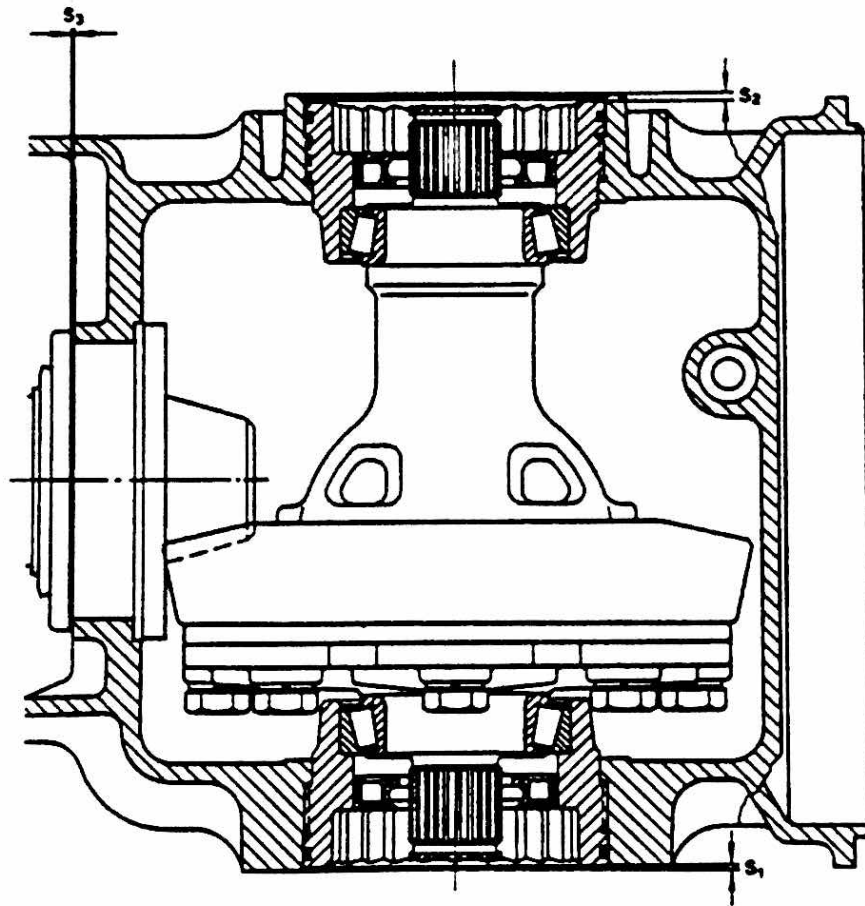
Finding shim thickness "S_r" shim

$$S_{r, \text{ nominal}} = e + r$$

Finding "Δ S_r"

$$\Delta S_r = (S_{\text{vo mean}} \times w) - h$$

3 - Automatic Stick Shift



S_1 - Screw-in depth of adjusting ring at ring gear end
 S_2 - Screw-in depth of adjusting ring at opposite end
 S_3 - Shim for drive pinion

Explanation of signs

Sign	Designation	Dimension
Svo mean	Average of several (4 ×) backlash readings	1/100 mm
ΔS_1	Axial movement of ring gear to give specified mean backlash	1/100 mm
S_1	Screw-in depth of adjusting ring at ring gear end	—
S_2	Screw-in depth of adjusting ring at opposite end	—
e	Difference between measuring mandrel and setting pin	0.10–0.50 mm
r	Deviation for gear set G 358 / K 835	0.05–0.65 mm
w	Correction factor for gear set G 358 Correction factor for gear set K 835	1.00 1.10
h	Ring gear lift from full mesh position for G 358 gear set Ring gear lift from full mesh position for K 835 gear set	0.20 mm 0.22 mm
Eo	Length of setting pin	58.70 mm

Finding shim thickness "S," shim

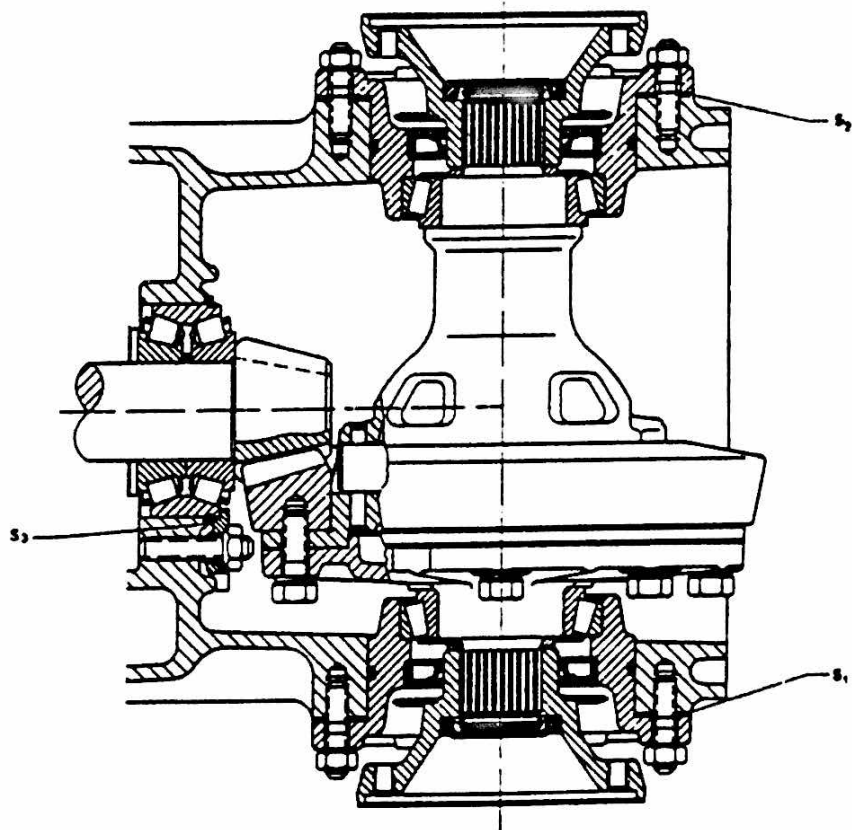
$$S_1 \text{ nominal} = e + r$$

Finding " ΔS_1 ,"

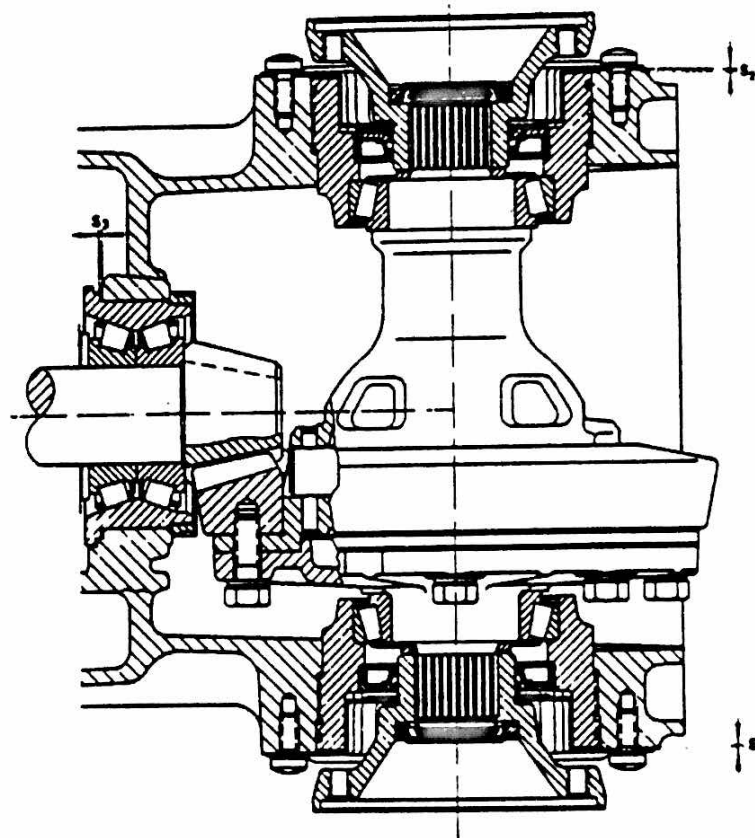
$$\Delta S_1 = (S_{\text{vomean}} \times w) - h$$

4 - Type 2

**up to Chassis No. 218202251
(July 1968)**



**from Chassis No. 219000001
(August 1968)**



Explanation of signs

Sign	Designation	Dimension
Svo mean	Average of several (4 ×) backlash measurements	1/100
∠ S ₁	Axial movement of ring gear to give average backlash	1/100
M. S.	Measuring shim VW 381/10 (two pieces)	1.30 mm
S	Movement of taper roller bearing outer ring	1/100 mm
w	Correction factor for individual gear set	—
h	Ring gear lift from no-play mesh position with pinion of individual gear set	1/100 mm
r	Deviation from "Ro", marked on gear set in hundredths of a millimeter	r = 25 = 0.25 mm
e	Difference between setting pin and mandrel	Measured in mm (0.85–1.30 mm possible)

Finding shim thickness "S₁" shims¹⁾

$$S_{1, \text{ nominal}} = e - r$$

$$S_{1, \text{ nominal}} = e + r$$

Shim thickness S₂, nominal and S₃, nominal

$$S_{2, \text{ nominal}} = \text{M. S.} - \angle S_{1, \text{ nominal}}$$

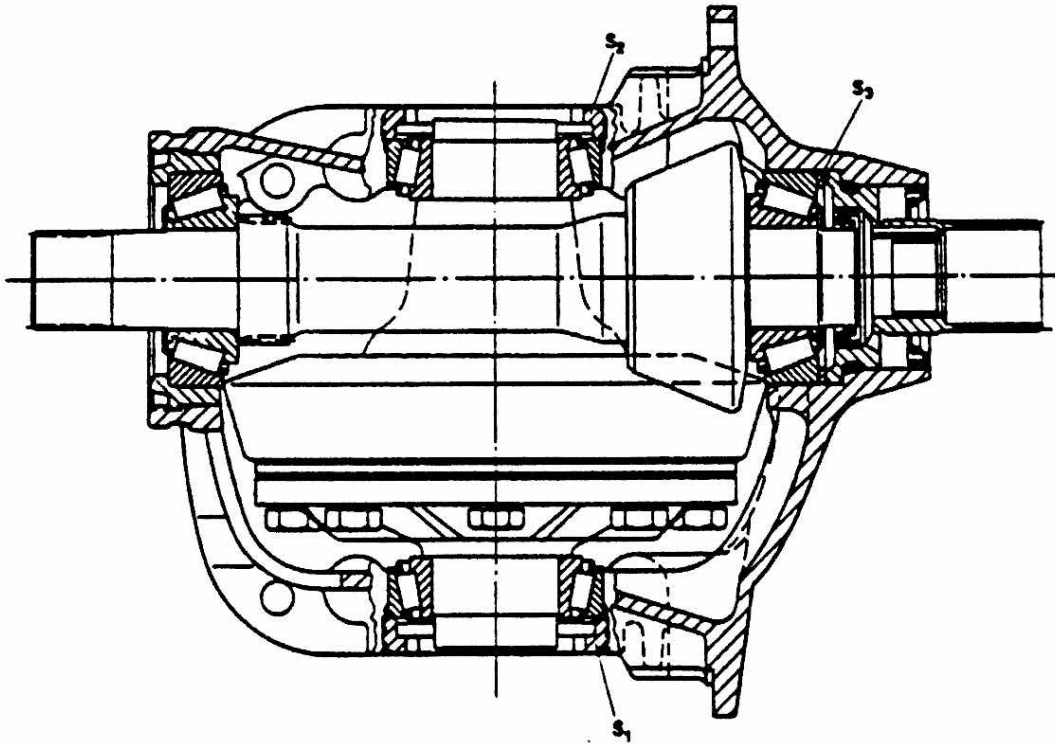
Determining "∠ S₁"

$$\angle S_{1, \text{ nominal}} = (S_{\text{vo mean}} \times w) - h$$

$$S_{3, \text{ nominal}} = \text{M. S.} + \angle S_{1, \text{ nominal}} - S$$

- ¹⁾ From Chassis No. 218000001 to Chassis No. 218202251 the shim is on the ring gear side.
²⁾ From Chassis No. 219000001 the shim is on the transmission side.
 The final drive is adjusted with adjusting rings as on Automatic Stick Shift.

5 - Automatic Transmission



- S₁ - Screw-in depth of adjusting ring at ring gear end
- S₂ - Screw-in depth of adjusting ring at opposite end
- S₃ - Shim between taper roller bearing and pinion

Explanation of signs

Sign	Designation	Dimension
S_1	Screw-in depth of adjusting ring at ring gear end	—
S_2	Screw-in depth of adjusting ring at opposite end	—
S_3	Shim between taper roller bearing and pinion	find thickness
R_0	Length of master gauge used in special test machine	40.55 mm
R	Location of pinion in relation to centerline of ring gear at quietest running point (nominal dimension)	$R = R_0 + r$
r	Deviation from "R ₀ ", marked on gearset	
S_{vo}	Backlash	0.15–0.25 mm
V_0	Hypoid offset	42.5 mm
G 933	Gear set G = Gleason: 933. No. of teeth 33/9	ratio = 3.67
$D/2$	Half diameter of mandrel	$D/2 = 10.00$ mm
E_0	Length of setting pin VW 380/3 $E_0 = R_0 + D/2$ mm	$E_0 = 60.55$ mm
e	Difference between mandrel and setting pin	measured in mm

Finding shim thickness

$$S_3 = e - r$$

IV. Ratios

Gears	Fully synchronized transmission Type 1, 2 and 3	Automatic Stick Shift	Automatic transmission	¹⁾ Up to Chassis No. Type 1 1161021298 } 1.32 Type 3 316316238 } Type 2 2162179668 1.22 ²⁾ Type 2 ³⁾ Up to Chassis No. 217148459 : 4.375	
	No. of teeth	No. of teeth	No. of teeth		
1st gear	38/10	35/17	—		
2nd gear	35/17	29/23	—		
3rd gear	30/23	24/27	—		
4th gear	24/27; 23/28 ³⁾	—	—		
Reverse	21/14 × 44/17	43/14	—		
Reverse from August 1967	20/14 × 43/17				
Ratios					
1st gear	3.80	2.06	2.65		
2nd gear	2.06	1.26	1.59		
3rd gear	1.26 ¹⁾	0.89	1.0		
4th gear	0.89; 0.82 ³⁾	—	—		
Reverse	3.88	3.07	1.8		
Reverse from August 1967	3.62				
Torque increase max.	—	2.1	2.5		
Final drive	Type 1/1200 /1300	Type 1/1500 /1600 Type 2/1200 /1500 Type 3	Type 2/1600	Automatic Stick Shift	Automatic transmission
Klingelberg	—	4.125	5.375 ³⁾	4.375	—
Gleason	4.375		—	4.375	3.67

Reduction gears	No. of teeth		Ratio	Remarks
	Driven gear	Axle shaft gear		
Type 2/1200	25	18	1.39	
Type 2/1500	24	19	1.26	

V. Automatic transmission test data
Stall torque speed 1900–2000 rpm

Pressure table			
Selector lever position	Pressure	kg/cm² (psi)	Remarks
N	Primary throttle pressure	3.0 ± 0.02 (42 ± .28)	Increase idling speed to 1000 rpm Vacuum hose off
	Main pressure	8.2–8.5 (116–120)	
R	Primary throttle pressure	0.35–0.45 (5–6)	Increase idling speed to 1000 rpm Vacuum hose on
	Main pressure	3.3–3.5 (47–50)	
R	Main pressure	6.7–7.7 (95–110)	
D	Primary throttle pressure	2.8–3.0 (40–42)	at stall torque speed (full throttle) Vacuum hose on
	Main pressure	8.0–8.4 (114–120)	
R	Main pressure	15.0–20.0 (213–284)	
D	Main pressure	6.1–6.3 (87–90)	at full throttle and a road speed of over 18 mph
Gear shift speeds mph			
Gear	Part throttle	Full throttle	Kickdown
1–2	10–13	17–19	30–39
2–3	15–17	45–49	55–59
3–2	15–12	34–29	56–53
2–1	10–8	15–13	34–26

Remarks

VI. Torsion Bar Adjustment (Spring plates unloaded)

Type	Model	Transmission Type	Installed		Torsion bar		Setting
			from Chassis No.	to Chassis No.	Length mm (in.)	diameter mm (in.)	
without equalizer spring							
1	all	1	2528668	1161021297	552 (22.440)	22 (.866)	17° 30' ± 50'
	111-115' with wider track	1	117483306		552 (22.440)	22 (.866)	18° 30' + 50'
3	311-345	1	0000001	315220883	626 (24.645)	23 (.905)	19° + 50'
	311-317	1	316000001	316316236	626 (24.645)	23 (.905)	20° + 50'
	343-345		346000003	346316237	626 (24.645)	23 (.905)	19° + 50'
	361-363	1	0006827	366316238	626 (24.645)	24 (.944)	18° 30' + 50'
2	all	1	20-117902	217148456	590 (23.228)	29 (1.141)	20° ± 30'

Remarks

') Canada only

Transmission types: 1 = Four speed manual
2 = Automatic Stick Shift
3 = Automatic

Type	Model	Transmission Type	Installed		Torsion bar		Setting
			from Chassis No.	to Chassis No.	Length mm (in.)	diameter mm (in.)	
with equalizer spring							
1	all	1	117000001	1181016098	552 (21.732)	21 (.826)	20°+50'
3	311-317	1	317000001	318235386	626 (24.646)	22 (.866)	22° 30'+50'
	361-363	1	367000004		626 (24.646)	23 (.905)	21° 39'+50'

Remarks

Transmission types: 1 = Four speed manual
2 = Automatic Stick Shift
3 = Automatic

Type	Model	Trans- mission Type	Installed		Torsion bar		Setting
			from Chassis No.	to Chassis No.	Length mm (in.)	diameter mm (in.)	
with double joint axle							
1	113-117 141-143 151	1+2	118000001 ¹⁾		676 (26.614)	22 (.866)	20° 30'+50'
3	311-313 311-313 315-317 315-317	1 3 1 3	318000001 ¹⁾ 318000002 ²⁾		676 (26.614)	22 (.866)	23°+50' 24°+50' 23°+50'
	361-363	1+3	368000003 ³⁾		676 (26.614)	23.5 (.925)	21° 30'+50'
2	22, 24, 28	1	218000001		610 (24.015)	26.2 (1.02)	23°+50'
	21, 23, 26	1	218000002		610 (24.015)	28.1 (1.106)	21° 10'+50'

Remarks

- 1) **Vehicles with manual transmission from Chassis No. 119000001**
- 2) **Vehicles with manual transmission from Chassis No. 319000001**

Transmission types:

- 1 = **Four speed manual**
- 2 = **Automatic Stick Shift**
- 3 = **Automatic**

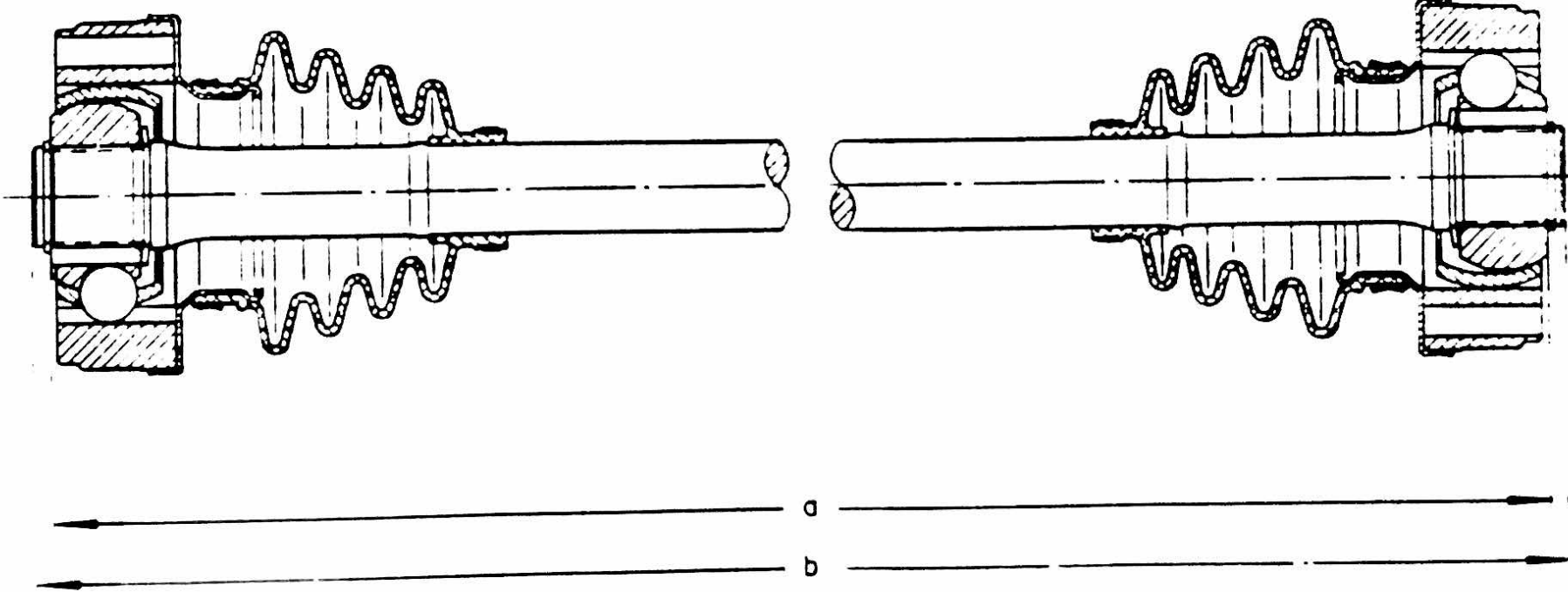
VII. Double joint shafts

a - Drive shafts

Type	Trans- mission Type	Code number		Length, mm (inch)		Part No. Shaft (without joints)
		On end of shaft	Shaft assembly	Shaft Dimension "b"	Shaft assembly Dimension "a"	
1	1	1	1	415.5 (16.357)	405.3 (15.955)	113 501 211
	2	1	1	415.5 (16.357)	405.3 (15.955)	113 501 211
2	1	2	—	476 (18.739)	—	211 501 211
3	1	1	1	415.5 (16.357)	405.3 (15.955)	113 501 211
	3	2 left	2 left	389.5 (15.333)	379.3 (14.931)	311 501 211 left
	3	3 right	3 right	439.5 (17.302)	427.3 (16.821)	311 501 212 right

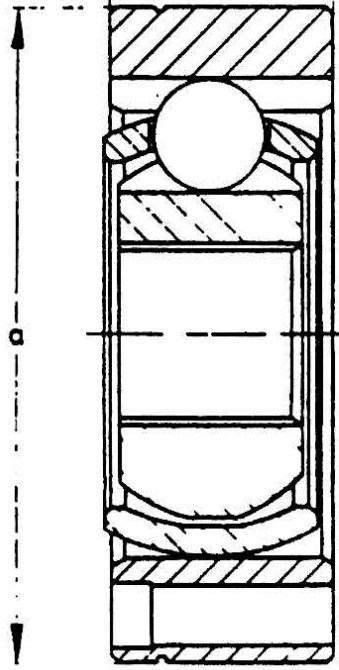
Remarks

Transmission types: 1 = Four speed manual
2 = Automatic Stick Shift
3 = Automatic



b - Constant velocity joints

Type	Part No.	Diameter "a" mm (inch)	Width "b" mm (inch)	Ball diameter mm (inch)	Grease per joint	
1	113501331	91-0.1 (3.582-.003)	32 ± 0.3 (1.259-.011)	15.88 (.624)	60 grams of multi purpose grease with MoS ₂ additive	
2	up to Chassis No. 2102300000	211 501 331 A ¹)	100-0.2 (3.937-.007)	32 ± 0.3 (1.259-.011)		17.46 (.687)
	from Chassis No. 2112000001	211 501 331 B ²)	100-0.2 (3.937-.007)	32 ± 0.3 (1.259-.011)		19.05 (.749)
3	113501331	91-0.1 (3.582-.007)	32 ± 0.3 (1.259-.011)	15.88 (.624)		

Designation	New installation mm (inch)	Wear limit	Remarks
<p>1 – Shaft, run-out</p> <p>2 – Turning torque in taper roller bearings (rear wheel bearings)</p>	<p>0.5 mm (.019)</p> <p>max. 20 cmkg (17.4 in. lb)</p>	<p>—</p> <p>—</p>	<p>1) Groove for metal cap on flange end</p> <p>2) Annular groove on outside diameter must be towards flange.</p> 

VIII. Tightening torques

Designation	Thread
a – Transmission and Rear Axle (fully synchronized) all Types	
Drive pinion round nut:	
1 – for double ball bearing	M 35×1.5
2 – for double taper roller bearing	M 35×1.5
Pinion bearing retainer bolt	M 10×1.5
Pinion nut	M 22×1.5
Drive shaft nut	M 22×1.5
Retaining nut for taper roller bearing	M 80×1
Reverse lever guide bolt	M 7×1
Selector fork bolt	M 8×1.25
Nuts for gearshift housing	M 7×1
Ring gear bolt	M 10×1.5
Final drive cover nuts	M 8×1.25
Axle tube retainer nuts	M 8×1.25
Rear wheel bearing retainer bolt	M 10×1.5
Oil drain plug	M 24×1.5
Oil filler plug	M 24×1.5
Rear axle shaft nut (Type 1 and 3)	M 24×1.5
Nut on driven shaft (Type 2 from August 1963)	M 30×1.5
Nut on rear axle driven shaft (Type 2)	
up to Chassis No. 1 144 302	M 24×1.5
from Chassis No. 1 144 303	M 30×1.5
Transmission carrier on frame	M 18×1.5
Spring plate/reduction gear housing bolt (Type 2)	M 12×1.5

mkg	lb ft	Remarks
12.0 20.0 5.0 6.0 ¹⁾ 6.0 ¹⁾ 22.0 ²⁾ 2.0 2.5 1.5 6.0 3.0 2.0 6.0 2.0 2.0 30.0 15.0 30.0 30.0 ³⁾ 23.0 10.0-12.0	87 144 36 43 ¹⁾ 43 ¹⁾ 160 ²⁾ 14 18 11 43 22 14 43 14 14 217 108 217 217 ³⁾ 166 72-87	<p> ¹⁾ Tighten first to 12 mkg (87 lb ft) then back off and finally tighten to 6 mkg (43 lb ft). ²⁾ Tighten to 22 mkg (160 lb ft) first, back off and tighten to 22 mkg (160 lb ft) again. ³⁾ If cotter pin holes are not in line, tighten to a maximum of 35 mkg (250 lb ft). If hole is still not in line, use a different nut. </p> <p> Caution Quality Grade or Tensile Class of listed threaded fasteners are not included. Always check with Parts List to make sure they are for the intended purpose. </p>

Designation	Thread
b – Additional torques for transmission and rear axle (Automatic Stick Shift)	
Temperature switch/Selector switch/Starter safety switch	M 14×1.5
Converter to drive plate screws	M 8×1.25
Retaining nut for taper roller bearing	M 80×1
Nut for converter housing	M 8×1.25
Screw for one-way clutch support	M 6×1
Screw for clutch carrier plate	M 6×1
Bearing lock bolt	M 8×1.25
Clamp bolt for clutch lever	M 8×1.25
Screw for transmission oil pan and lock plate	M 7×1.25
Union for oil pressure line	M 12×1.5
Union for oil return line	M 14×1.5
Screw for drive shaft	M 8×1.25
Bolt in diagonal arm	M 14×1.5
c – Additional torques for transmission and rear axle (Type 3 Automatic)	
Bolt for oil pump on transmission case	M 6×1
Screw for valve body on transmission case	M 6×1
Screw for transfer plate on valve body	M 5×0.8
Screw for oil strainer on valve body	M 6×1
Screw for oil pan on transmission case	M 8×1.25

mkg	lb ft	Remarks
2.5	18	1) Tighten to 22 mkg (160 lb ft) first, back off and tighten to 22 mkg (160 lb ft) again. 2) Use new screws. 3) After installing a new gasket, tighten as described in Workshop Manual – H –.
2.5	18	
22.0 ¹⁾	160 ¹⁾	
2.0	14	
1.5 ²⁾	11 ²⁾	
1.5	11	
1	7	
2.5	18	
1.0	7	
3.5	25	
3.5	25	
3.5	25	
12.0	87	
0.4	3	
0.4	3	
0.35	2	
0.35	2	
1.0 ³⁾	7 ³⁾	

Designation	Thread
Threaded pin for operating lever on transmission case	M 10×1.5
Plug for pressure connections/transmission case	M 10×1
Vacuum unit/transmission case	M 14×1.5
Bolt for bearing cap/differential carrier	M 10×1.5
Bolt for ring gear/differential housing	M 9×1
Bolt for converter on drive plate	M 8×1.25
Bolt for drive shaft on flange	M 8×1.25
Adjusting screw for front band	M 12×1.75
Adjusting screw for rear band	M 12×1.75
Locknut for band adjusting screw	M 10×1.75
Nut for differential carrier on rear axle housing	M 6×1
Nut for side cover on rear axle housing	M 6×1
Nut for transmission/final drive housing	M 8×1.25
Nut and bolt for spring plate	M 12×1.75
Bolt for bearing cover	M 10×1.5
Bolt for diagonal arm	M 10×1.5

mkg	lb ft	Remarks
0.6	4	1) Tighten to 1 mkg (7 lb ft) first, loosen and tighten again. Turn out 1¼–2 turns from this position.
1.0	7	
2.5	18	2) Tighten to 1 mkg (7 lb ft) first, loosen and tighten again. Turn out 3¼–3½ turns from this position.
5.5	40	
4.5	32	
2.0	14	
3.5	25	
0.5 ¹⁾	3.5 ¹⁾	
0.5 ²⁾	3.5 ²⁾	
2.0	14	
0.8	6	
0.8	6	
2.0	14	
11.0	80	
6.0	43	
12.0	87	
		<p>Caution</p> <p>Quality Grade or Tensile Class of listed threaded fasteners are not included. Always check with Parts List to make sure they are for the intended purpose.</p>

Designation	Thread
d – Transmission and Rear Axle (fully synchronized) Type 2 – from Chassis No. 218000001	
Retaining ring for double taper roller bearing/transmission case	M 80×1
Round nut/pinion	M 35×1.5
Union nut/clamp sleeve	M 14×1.5
Bracket/reverse shifter shaft on gear carrier	M 8×1.5
Support/rocker lever on gear carrier	M 8×1.5
Shift fork on selector shaft	M 8×1.25
Locking screw with dog point	M 8×1.25
Clamp sleeve on gear carrier	M 14×1.5
Shift housing on gear carrier	M 7×1
Nuts on gear carrier, transmission and clutch housing	M 8×1.25
Ring gear to differential housing	M 9×1
Double taper roller bearing retainer (up to Chassis No. 219020134)	M 9×1.25
Final drive side covers (up to Chassis No. 219020134)	M 8×1.25
Brake backing plate to housing	M 8
Brake backing plate to housing	M 10
Slotted nut on rear wheel shaft	M 30×1.5
Joint to flange (socket head screw)	M 8
Diagonal arm to frame	M 12×1.5
Cover/spring plate mounting	M 10
Diagonal arm to bearing housing	M 14×1.5
Shock absorber to frame and bearing housing	M 12×1.5

mkg	lb ft	Remarks
22.0 ¹⁾ 20.0 2.5-3.0 2.5 2.5 2.5 1.5 4.5 1.5 2.0 4.5 3.0 ²⁾ 2.0 2.5 3.5 32-35 ³⁾ 3.5 8.0 4.5 13.0 6.0	160 ¹⁾ 144 18-22 18 18 18 11 32 11 68 32 22 ²⁾ 14 18 25 230-253 ³⁾ 25 58 32 94 43	<p> ¹⁾ Tighten to 22 mkg (160 lb ft) first, back off and tighten to 22 mkg (160 lb ft) again. ²⁾ Tighten to 4.5 mkg (32 lb ft) first, back off and tighten to 3.0 mkg (22 lb ft). ³⁾ With reinforced spacer sleeve, at least 35 mkg (253 lb ft): then turn on to cotter pin hole. </p> <p> Caution Quality Grade or Tensile Class of listed threaded fasteners are not included. Always check with Parts List to make sure they are for the intended purpose. </p>

BRAKES AND WHEELS

I. Tolerances, wear limits and settings

Designation	Type 1			Type 2	
	From Chassis No.	Up to Chassis No.	New installation mm (inch)	From Chassis No.	Up to Chassis No.
a - Master cylinder					
stroke	115000001	—	33.0 (1.299)	1144303	—
stroke		6502399	30.0 (1.181)	—	1144302
diameter	115000001	—	17.46 (.687)	117902	—
diameter		6502399	19.05 (.749)	—	
b - Tandem master cylinder					
Front wheel circuit stroke	117000001		15.5 (.609) ¹⁾	218000001	
Rear wheel circuit stroke			12.5 (.491)		
Front wheel circuit stroke	147000001		14.0 (.551) ²⁾	217019488	
Rear wheel circuit stroke			14.0 (.551)		
diameter	117000001		19.05 (.749)	217019488	
c - Wheel cylinders					
front diameter	1673351	—	22.20 (.873)	117902	2102248837
rear diameter	1673351	—	19.05 (.749)	117902	—
	118000001		17.46 (.687)	—	
d - Caliper					
Cylinder diameter	147000001	—	40.0 (1.574)	—	—

New installation mm (inch)	Type 3		New installation mm (inch)	Remarks
	From Chassis No.	Up to Chassis No.		
36.0 (1.417) 30.0 (1.181) 22.20 (.873)	0024846 — 0 221 975	— — 0221 974 ²⁾	36.0 (1.417) 19.05 (.749) 20.64 (.812)	¹⁾ Valid for drum brakes only ²⁾ Valid for disc brakes only ³⁾ Canada only
24.0 (.944) 14.0 (.551) 19.0 (.748) 13.0 (.511) 22.20 (.873)	317 000 001 317 000 001		15.0 (.590) 15.0 (.590) — — 19.05 (.749)	
25.40 (1.0) 22.20 (.873)	0027850 — —	— — —	22.20 (.873) — 22.20 (.873)	
— —	316 000 001	—	42.0 (1.653)	

Designation	Type 1		Wear limit mm (inch)	From Chassis No.	Up to Chassis No.	
	From Chassis No.	Up to Chassis No.				New installation mm (inch)
● - Brake drums						
front and rear inside diameter')	—	—	—	—	1 144 303	
front inside diameter')	—	—	230,1 : 0.2 (9.058 : .008)	—	231.5 (9.113)	1 144 302
rear inside diameter')	—	—	230.0 : 0.2 (9.055 : .008)	—	231.5 (9.113)	1 144 302
front and rear wall thickness out of round taper	—	—	— max. 0.1 (.004)	—	4.0 (.16)	—
lateral run-out	—	—	max. 0.1 (.004)	—	—	—
measured at friction surface radial run-out	—	—	max. 0.25 (.016)	—	—	—
radial run-out	—	—	max. 0.15 (.006)	—	—	1 144 302
	—	—	—	—	—	—
f - Brake disc						
thickness	—	—	9.50-9.45 (.373-.372)	—	8.0 (.315)	—
Disc after turning thickness	—	—	min. 8.5 (.333)	—	8.0 (.315)	—
Machining dimension per side	—	—	max. 0.5 (.019)	—	—	—
thickness tolerance	—	—	max. 0.02 (.0007)	—	—	—
run-out	—	—	max. 0.2 (.007)	—	—	—

Type 2		Type 3				Remarks
New installation	Wear limit	From Chassis No.	Up to Chassis No.	New installation	Wear limit	
mm (inch)	mm (inch)			mm (inch)	mm (inch)	
250.0±0.2 9.842±.008 230.2±0.3 9.058±.012 230.0±0.2 9.055±.008	251.5 (9.900) 231.5 (9.113) 231.5 (9.113)	0221 975	0221 974 ¹⁾ 0221 974 ¹⁾	248.1±0.2 (9.765) 231.1±0.2 (9.097±.008) 231.0±0.2 (9.096±0.08)	249.5 (9.821) 232.5 (9.055) 232.5 (9.055)	¹⁾ The drum turning dimension for 0.5 mm (.020 in.) oversize linings is 1.0 mm (.040 in.) above the given dimension for all drums. ²⁾ Canada only
— max. 0.1 (.004) max. 0.1 (.004) max. 0.25 (.016) max. 0.1 (.004) max. 0.20 (.008)	4.0 (.16) — — — — —	— — — —	— — — —	— max. 0.1 (.004) max. 0.1 (.004) max. 0.25 (0.16) max. 0.20 (.008) —	4.0 (.16) — — — — —	
— — — —	— — — —	— — — —	— — — —	9.50–9.45 (.373–.372) min. 8.5 (.333) max. 0.5 (.019) max. 0.02 (.0007) max. 0.2 (.007)	8.0 (.315) 8.0 (.315) — — —	

Designation	Type 1		New installation mm (inch)	Wear limit mm (inch)	From Chassis No.	Up to Chassis No.
	From Chassis No.	Up to Chassis No.				
g - Brake linings						
Linings for brake shoes						
front width	— ¹⁾	—	40.0 (1.574)	—	1144303	—
width	—	— ²⁾	30.0 (1.181)	—		1144302
rear width	118000001		40.0 (1.574)	—	1144303	—
width	—	—	30.0 (1.181)	—		1144302
front and rear thickness	—	—	4.0-3.8 (.157-.149)	2.5 (.098)	117902	—
Friction pad for disc brake thickness	—	—	10.0 (.393) ³⁾	2.0 (.078)	—	—

Type 2				Type 3		Remarks
New installation mm (inch)	Wear limit mm (inch)	From Chassis No.	Up to Chassis No.	New installation mm (inch)	Wear limit mm (inch)	
55.0 (2.165)	—	—	—	50.0 (1.968)	—	'1) De Luxe Sedan from Chassis No. 1 673 351 Model 14 from Chassis No. 1 665 213 Model 15 from Chassis No. 1 665 425 '2) Standard (111) Sedan up to Chassis No. 4 630 937, Canada only '3) Without pad carrier plate
50.0 (1.968)	—	—	—	—	—	
45.0 (1.771)	—	0076300	—	45.0 (1.771)	—	
40.0 (1.574)	—	—	—	—	—	
0-4.8 (.196-0.188)	2.5 (.098)	0076300	—	4.0-3.8 (.157-.149)	2.5 (.098)	
—	—	—	—	10.0 (.393) ³⁾	2.0 (.078)	

II. Tire data

Type	1				3			
Model	VW 1200/1300 and Karmann Ghia		VW 1500/1600		31 and 34 ¹⁾		36	
Tire (tubeless)	5.60-15 4 PR ²⁾		5.60-15 4 PR		6.00-15 L 4 PR ²⁾		6.00-15 L 6 PR	
Rim x wheel size Radial runout } Lateral runout }	4 J x 15 ⁴⁾				4½ J x 15			
	max. 1.5 mm (.060 inch)							
Inflation pressures in kg/cm ² and (psi)	front	rear	front	rear	front	rear	front	rear
a - up to 2 occupants	1.1 (16)	1.7 (24)	1.3 (18)	1.9 (27)	1.2 (17)	1.8 (26)	—	—
b - fully loaded	1.2 (17)	1.8 (26)	1.3 (18)	1.9 (27)	1.3 (18)	2.0 (28)	—	—
c - with half payload	—	—	—	—	—	—	1.2 (17)	1.8 (26)
d - with full payload	—	—	—	—	—	—	1.3 (18)	2.5 (35)
¹⁾ Canada only ²⁾ Model 14 from Chassis No. 117000001: 6.00 S-15 L 4 PR ³⁾ Model 34 from August 1963: 6.00 S-15 L 4 PR				⁴⁾ Model 14 from Chassis No. 148469038: 4½ J x 15 ⁵⁾ Station Wagon up to July 1969 ⁶⁾ Station Wagon from August 1969				

Type	2 (up to August 1967)		2 (from August 1967)			
Model	up to Chassis No. 1145426	from Chassis No. 1145427 ^a)	all ^a)			
Tire (tubeless)	6.40-15 6 PR (with tube)	7.00-14 6 PR	7.00-14 8 PR			
Rim × wheel size Radial runout } Lateral runout }	4½ K × 15	5 JK × 14 max. 1.5 mm (.060 inch)				
Inflation pressures in kg/cm ² and (psi)	front rear	front rear	front rear			
a – up to ¾ payload	2.0 (28)	2.3 (33)	2.0 (28)	2.3 (33)	2.0 (28)	2.5 (35)
b – with full payload	2.0 (28)	2.5 (35)	2.0 (28)	2.5 (35)	2.0 (28)	2.8 (40)

For prolonged high speed travel the tire pressures on vehicles with bias ply tires should be increased by 0.2 kg/cm² (3 psi).

Under no circumstance is the cold tire pressure to exceed the maximum inflated pressure marked on the tire.

III. Tightening torques

Location	Designation	Thread
a – Master cylinder		
Stop screw in housing	bolt	M 6
Residual pressure valve to housing	—	M 12×1
Brake light switch to housing	—	M 10×1
Master cylinder to frame	bolt	M 8
Brake line to master cylinder ¹⁾	union nut	M 10×1
Push rod to clevis	nut	M 9×1
b – Front wheel brakes		
Backing plate to steering knuckle	bolt	M 10
Cylinder and backing plate to steering knuckle	bolt	M 10
Splash shield to steering knuckle	bolt	M 7
Cylinder to backing plate	bolt	M 8
Caliper housing	socket head screw	M 7
Caliper to steering knuckle	bolt	M 10
Bleeder valve in cylinder/caliper	—	M 6/M 7
Bleeder valve in cylinder Type 2 front	—	M 10×1
Hose to cylinder/caliper	—	M 10
Screw for clamp nut	socket head screw	M 7
	socket head screw	M 7

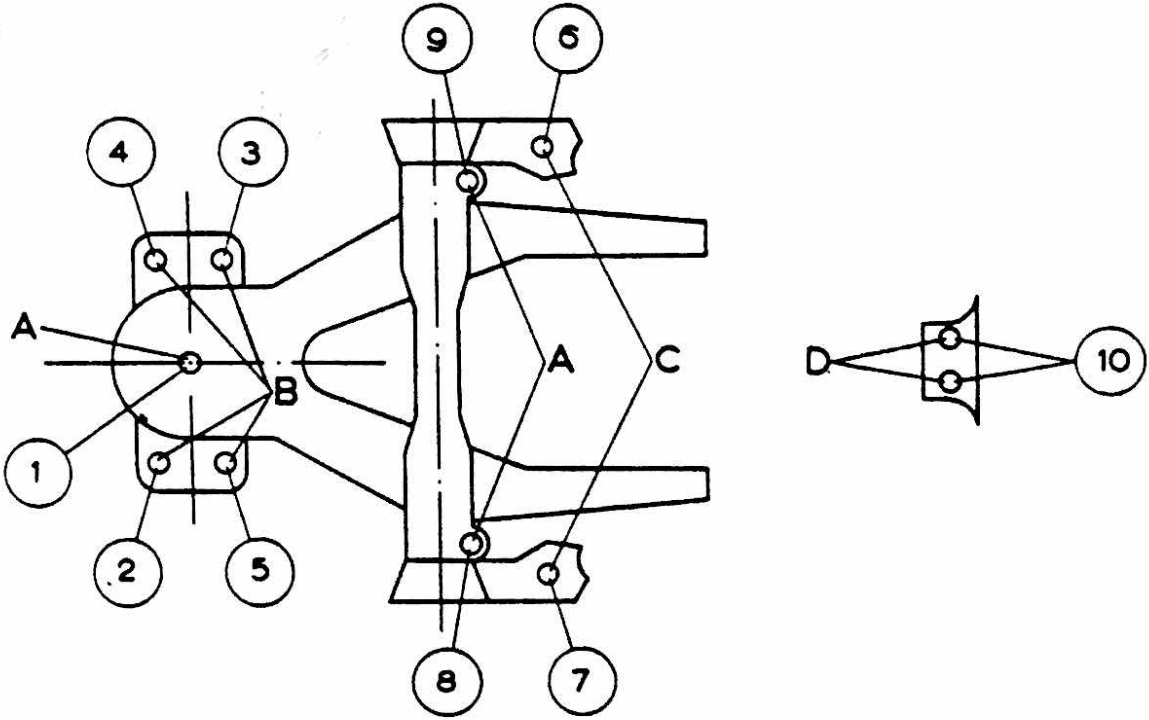
Location	Designation	Thread
c – Rear wheel brakes		
Cylinder to backing plate	bolt	M 8
Cover to bearing housing	bolt	M 10
Backing plate to bearing housing	bolt	M 8
Backing plate to bearing housing	bolt	M 10
Brake drum to shaft	slotted nut	M 24/M 30
d – Wheels		
Wheel to drum/disc	bolt	M 14×1.5
Wheel to drum/disc	bolt	M 14×1.5
Wheel to drum/disc	bolt	M 12×1.5
e – Pedals		
Pedal bracket to frame	bolt	M 10
Pedal stop plate to frame	bolt	M 8
Brake pedal/pin	bolt	M 10×1.5
Brake pedal/push rod	bolt	M 8
Clutch pedal/pin	nut	M 10
Bracket/clutch pedal/frame	bolt	M 8

mkg	lb ft	Type			Remarks
		1	2	3	
2.0-3.0	14-22	x		x	<p>Caution Quality Grade or Tensile Class of listed threaded fasteners are not included. Always check with Parts List to make sure they are for the intended purpose.</p>
6.0	43	x		x	
2.0-3.0	14-22		x		
3.0-4.0	22-28		x		
35.0	253	x	x	x	
12.0-13.0	87-94	x		.	
13.0	94		x		
10.0	72	x		x	
4.0-4.5	28-32	x		x	
2.0-2.5	14-18	x		x	
3.0-4.0	22-28		x		
2.0	14		x		
2.5	18		x		
2.0	14		x		

BODY

I. Tightening torques

Designation	Thread
a - Body (Type 1 and 3)	
a - When installing body:	
body bolts	M 8
body bolts	M 10
b - When checking:	
body bolts	M 8
body bolts	M 10
b - Body (additional for Type 3 only)	
Sub-frame to frame, bolts (A)	M 10
Sub-frame to frame, bolts (B)	M 8
Body to sub-frame (tightened from luggage compartment), bolts (C)	M 10
Rear engine support, bolts (D)	M 8
Body to front axle support, bolts.	M 10

mkg	lb ft	Remarks
1.5-2.0	11-14	<p data-bbox="751 431 1906 467">1) The sub-frame securing bolts must be tightened in the order shown here.</p>  <p data-bbox="766 1247 1806 1393">Caution Quality Grade or Tensile Class of listed threaded fasteners are not included. Always check with Parts List to make sure they are for the intended purpose.</p>
1.5-2.0	11-14	
1.0-1.5	7-11	
1.0-1.5	7-11	
4.0-4.5	29-33	
2.0	14	
4.0	29	
1.0-1.5	7-11	
4.0	29	
4.0	29	

ELECTRICAL SYSTEM

I. General data

Generator	}	Technical data and test figures are given in Workshop Manual, Volume E
Starter		
Distributor		Details of distributor interchangeability are given in the Workshop Manual, Volume K
Dwell angle		44–50°
Firing order		1 – 4 – 3 – 2

Spark plugs

Type ¹⁾	Heat value	Thread	Electrode gap
Bosch W 145 T 1 Beru 145 / 14 Champion L 88 A	} 145	14 mm	0.7 (.028 in.)

¹⁾ Champion L 88 A or plugs with the same heat value and thread from other manufacturers.

II. Batteries

a - Standard equipment

Type	1	2	3
up to Chassis No.	1161021298 6 V / 66 Ah	216179668 6 V / 77 Ah	316316238
from Chassis No.	117000001 ²⁾ 12 V / 36 Ah	217000001 12 V / 45 Ah	317000001

State of charge	Normal		Tropical Specific gravity
	Specific gravity	Acid freezes at	
Discharged	1.12	-11°C / 12.2°F	1.08
Half charged	1.20	-27°C / -16.6°F	1.16
Fully charged	1.285	-68°C / -90.0°F	1.23

²⁾ From Chassis No. 118000001, 12 V / 45 Ah battery

b - Checking battery

Level of acid over the plates and separators 5 mm (7/32 in.).

If acid level indicators are fitted, top acid up to level shown.

Cell voltage (measured with a cell tester):

Charged: 2.0 volts

Discharged: 1.6 volts

or total voltage measured under load:

Cell voltage × number of cells.

The difference in voltage between the cells must not exceed 0.2 volts.

GENERAL DATA

I. Performance data

Type Model	1			
	11/1200	11/1300	11/1500	11/1500 Autom. Stick Shift
Maximum and cruising speed mph	71	74	77	74
at an engine speed of rpm	2870	4010	3950	4150
Road speeds				
at an engine speed of rpm	3600	4000	4000	4000
1st gear mph	15	17	18	31
2nd gear mph	28	32	34	50
3rd gear mph	47	52	56	71
4th gear mph	66	74	78	—
Hill climbing ability on good roads with two occupants				
1st gear %	41.0	44.0	46.0	39.0
2nd gear %	21.0	23.0	24.0	31.0
3rd gear %	12.0	12.5	13.0	22.9
4th gear %	7.0	8.0	8.0	—
Acceleration times (through the gears)				
0-31 mph seconds	7	6	6	—
0-50 mph seconds	18	14	13	15
0-62 mph seconds	37	26	23	—
Fuel consumption (DIN 70030)				
miles per Imp. gallon	37.6	33.2	32.1	30.4
miles per US gallon	30.3	27.5	26.7	25.3
Oil consumption				
Imp. pints per 1000 miles8-2.8	.8-2.8	1.4-2.8	1.4-2.8
US pints per 1000 miles	1.0-3.4	1.0-3.4	1.7-3.4	1.7-3.4

11/1600	11/1600 Autom. Stick Shift	14/1500	14/1500 Autom. Stick Shift	14/1600	14/1600 Autom. Stick Shift	15/1500	15/1500 Autom. Stick Shift	15/1600	15/1600 Autom. Stick Shift	Remarks
81 4080	77 4250	83 4150	80 4350	84 4250	81 4450	77 3950	74 4150	81 4080	77 4250	
4000 18 34 56 78	4000 31.5 51 72 —	4000 18 34 56 78	4000 31 51 72 —	4000 18 34 56 78	4000 31.5 51 72 —	4000 18 34 56 78	4000 31 51 72 —	4000 18 34 56 78	4000 31.5 51 72 —	
48.0 25.0 14.0 8.0	38.0 31.0 22.0 —	45.0 23.0 13.0 8.0	37.4 29.6 21.8 —	45.5 24.0 13.5 8.0	37.0 30.0 21.0 —	45.0 23.0 13.0 8.0	37.4 29.6 21.8 —	45.5 24.0 13.5 8.0	37.0 30.0 21.0 —	
— 13 21	— 15 23	6 13 22	— 15 —	— 13 20	— 15 23	6 13 23	— 15 —	— — —	— — —	
31.4 26.1	29.6 24.7	33.2 27.5	31.4 25.3	32.1 26.7	30.4 25.3	32.1 26.7	30.4 25.3	31.4 26.1	29.6 24.7	
1.4-2.8 1.7-3.4	1.4-2.8 1.7-3.4	1.4-2.8 1.7-3.4	1.4-2.8 1.7-3.4	1.4-2.8 1.7-3.4	1.4-2.8 1.7-3.4	1.4-2.8 1.7-3.4	1.4-2.8 1.7-3.4	1.4-2.8 1.7-3.4	1.4-2.8 1.7-3.4	

Type Model	2			
	2/1200 34 bhp	2/1500 42 bhp	2/1500 44 bhp	2/1600 47 bhp
Maximum and cruising speed	59	65	59	65
at an engine speed of	3620	4040	3660	3900
Road speeds				
at an engine speed of	3600	3800	4000	4000
1st gear	12	13	14	14
2nd gear	24	24	25	27
3rd gear	40	42	43	43
4th gear	58	61	64	66
Hill climbing on good roads				
with two occupants				
1st gear	26	26	28	27
2nd gear	13.5	13.5	14.5	14
3rd gear	7.0	7.0	8.0	7.0
4th gear	4.0	4.0	4.5	4.0
Acceleration times (through the gears)				
0-31 mph				
0-50 mph				
0-62 mph				
Fuel consumption (DIN 70030)				
miles per Imp. gallon	29.6	28.5	29.1	27.1
miles per US gallon	24.7	23.7	24.2	22.6
Oil consumption				
Imp. pints per 1000 miles	1.4-3.9	1.4-3.9	1.4-3.9	1.4-3.9
US pints per 1000 miles	1.7-4.7	1.7-4.7	1.7-4.7	1.7-4.7

3								Remarks
31/1500	36/1500	31, 34, 36 1500 S	31/1600	31/1600 Auto- matic	34/1600	36/1600	36/1600 Auto- matic	
77 3950	77 3950	84 4250	84 4250	81 4250	90 4360	84 4250	81 4250	
3800 17 32 53 74	3800 17 32 53 74	4200 13 36 56 83	4000 18 34 56 78	4000 28 47 75 —	4000 18 34 56 78	4000 18 34 56 78	4000 28 47 74 —	
42.5 22 12.5 7.5	40 20 11.5 6.5	45.5 23.5 13/14 7.5/8.0	44 23 13 8.0	40 — — —	44 23 13.0 8.5	41.5 21.5 12.0 7.5	36 — — —	
6 15 25	6 15 25	— 12 20	5 12.5 20	— 14 —	5 11.5 19	5 12.5 20	— 14 —	
33.6 28.0	33.6 28.0	35.3 29.4	31.7 26.4	29.1 23.7	31.7 26.4	31.7 26.4	29.1 23.7	
1.4-2.8 1.7-3.4	1.4-2.8 1.7-3.4	1.4-2.8 1.7-3.4	1.4-2.8 1.7-3.4	1.4-2.8 1.7-3.4	1.4-2.8 1.7-3.4	1.4-2.8 1.7-3.4	1.4-2.8 1.7-3.4	

II. Capacities

Designation	Type 1	Type 2	Type 3
Fuel tank		10.5 US gal. (8.6 Imp. gal.) ¹⁾	
Crankcase		5.3 US pints (4.4 Imp. pints)	
Transmission and final drive		6.3 US pints (5.5 Imp. pints) Refill quantity 5.3 US pints (4.4 Imp. pints)	
Reduction gears		0.5 US pint (0.4 Imp. pint)	
Transmission and final drive Type 2, from Chassis No. 218 000 001		7.4 US pints (6.1 Imp. pints) Refill quantity 7.4 US pints (6.1 Imp. pints)	
Automatic Stick Shift Converter circuit	7.6 US pints (6.3 Imp. pints) ATF ²⁾ Refill quantity 7.6 US pints (6.3 Imp. pints)		
Transmission / final drive	6.3 US pints (5.5 Imp. pints) Refill quantity 6.3 US pints (5.5 Imp. pints)		
Automatic Transmission Converter and planetary gears		12.6 US pints (11.0 Imp. pints) ATF ²⁾ Refill 6.3–8.4 US pints (5.5–7.0 Imp. pints)	
Final drive		2.1 US pints (1.75 Imp. pints) Refill 2.1 US pints (1.75 Imp. pints)	

Designation	Type 1	Type 2	Type 3
Steering - Roller steering - Ross steering Brake system Oil bath air cleaner (fill up to mark) . . .	0.4 US pints (0.35 Imp. pint) 0.5 US pint (0.4 Imp. pint) 0.5 US pint ³⁾ (0.4 Imp. pint)	0.5 US pint ⁴⁾ (0.4 Imp. pint) 0.6 US pint (0.5 Imp. pint) 0.6 US pint ⁴⁾ (0.5 Imp. pint)	0.34 US pint ³⁾ (0.28 Imp. pint) 0.5 US pint (0.4 Imp. pint) 0.8 US pint ⁷⁾ (0.7 Imp. pint)

- ¹⁾ Type 2, from Chassis No. 218000001, 15.8 US gal. (13.2 Imp. gal.)
- ²⁾ ATF = Automatic Transmission Fluid
- ³⁾ Only up to November 1964. Since then, filled with liquid grease.
- ⁴⁾ From August 1966 until November 1968 filled in production with 250 g liquid grease.
- ⁵⁾ Type 14/1300: 0.63 US pint (0.55 Imp. pint), Type 11/1500: 0.84 US pint (0.7 Imp. pint)
- ⁶⁾ Type 2/1200: 0.5 US pint (0.4 Imp. pint).
- ⁷⁾ Single carburetor engine: 0.5 US pint (0.4 Imp. pint). Canada only.

III. Dimensions

Type 1 and 3

Designation	11 and 15	14
Wheelbase mm (in.)	2400 (94.48)	2400 (94.48)
Track, front mm (in.)	1305/1310' (51.38)/(51.58)	1305/1316')/1304' (51.38)/(51.80)/(51.34)
rear mm (in.)	1288/1300 ²)/1358 ⁴) (50.70)/(51.18)/(53.46)	1288/1300 ²)/1350 ²)/1338 ²) (50.70)/(51.18)/(53.14)/(52.67)
Length mm (in.)	4080 (160.62)	4140 (163.0)
Width mm (in.)	1550 (61.01)	1634 (64.32)
Height, empty mm (in.)	1500 (59.05)	1320 (51.9)
Ground clearance, loaded. . mm (in.)	152/150 ⁶) (5.98/5.90)	152 (5.98)
Angle of approach	27° 40'/25 ⁶)	24° 10'/23 ⁶)
departure	12° 30'/15 ⁶)	12° 30'/12 ⁶)

Type 2

Designation	up to July 1963		
	21, 22, 23, 28	24, 25	26
Wheelbase mm (in.)	2400 (94.48)	2400 (94.48)	2400 (94.48)
Track, front mm (in.)	1370' (53.90)	1370' (53.90)	1370' (53.90)
rear mm (in.)	1360 (53.5)	1360 (53.5)	1360 (53.5)
Length, without bumper guards mm (in.)	4280 (168.5)	4300 (169.3)	4290 (163.7)
Width mm (in.)	1750 (68.9)	1800 (70.9)	1750 (68.9)
Ground clearance, loaded. . mm (in.)	—	—	—

31	34	36	Remarks
2400 (94.48)	2400 (94.48)	2400 (94.48)	1) From Chassis No. 118000001 2) From Chassis No. 148469038 3) From Chassis No. 116000001 4) From Chassis No. 117000001: From Chassis No. 118000001: 1350 mm (53.14 in.) 5) From Chassis No. 147000001 6) From Chassis No. 318000001 7) From Chassis No. 3102000001 8) From Chassis No. 118000001
1310 (51.58)	1310 (51.58)	1310 (51.58)	
1346/1350*) (52.99)/(53.14)	1346/1350*) (52.99)/(53.14)	1346/1350*) (52.99)/(53.14)	
4225/4340') (166.3)/(170.9)	4280 (168.49)	4225/4340') (166.3)/(170.9)	
1640 (64.56)	1620 (63.77)	1640 (64.56)	
1470 (57.86)	1330 (52.36)	1470 (57.86)	
150 (5.90)	138/150*) (5.43)/(5.90)	150 (5.90)	
24°/23'')	23°	25°/23'')	
15°	13°	15°	

from August 1963 to July 1967			from August 1967		Remarks
21, 22, 23, 28	24	26	21, 22, 23, 26	24	
2400 (94.48)	2400 (94.48)	2400 (94.48)	2400 (94.48)	2400 (94.48)	1) From start of production: 1375 mm (54.1 in.) Type 2/1500
1375 (54.1)	1375 (54.1)	1375 (54.1)	1385 (54.5)	1385 (54.5)	
1360 (53.5)	1360 (53.5)	1360 (53.5)	1426 (56.2)	1426 (56.2)	
4280 (168.5)	4290 (168.9)	4290 (168.9)	4420 (174.8)	4445 (175.0)	
1750 (68.9)	1800 (70.9)	1750 (68.9)	1765 (69.5)	1815 (71.5)	
—	—	—	185 (7.3)	185 (7.3)	

Remarks

Remarks



