

WORKSHOP MANUAL

Model 35

Automatic Transmission

(SECOND EDITION)

ROOTES SERVICE DIVISION

COVENTRY

ENGLAND

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SERVICE TOOLS

Approved service tools for the model 35 Automatic Transmission are obtainable from Messrs. V. L. Churchill & Co. Limited, London Road, Daventry, Northamptonshire. No service tools are manufactured or marketed by the manufacturers of the transmission.

The tools are designed in co-operation with the transmission manufacturers and are essential for the satisfactory dismantling and reassembly of this transmission. Considerable time saving will result from their use when carrying out these operations or when making adjustments. They also ensure the necessary high standards of workmanship with average skilled labour.

Full details of these tools are given in the following list which includes references to all illustrations in which any of these tools are shown.

APPROVED CHURCHILL TOOLS

Operation	Description	Tool No.	Remarks and illustration reference
Support of gearbox during stripping and rebuilding	Bench cradle	CBW. 35A	See Fig. 1, Part 4
Removing and installing snap rings	Circlip pliers	7066	Used on rear clutch, governor and speedometer gear. See Figs. 26, 38 and 39, Part 4
Removing and installing snap rings	Circlip plier points	J Type	Order with 7066 pliers
Removing and installing rear clutch snap ring	Clutch spring compressor	CBW. 37A	See Fig. 26, Part 4
Checking hydraulic pressure and adjusting downshift valve cable	Hydraulic pressure test gauge and hose	CBW. 1A	See Figs. 6 and 8, Part 1
Checking hydraulic pressure and adjusting downshift valve cable	Adaptor	CBW. 38	
Tightening of all nuts and bolts	Tension wrench	RG. 387	$\frac{1}{2}$ in. drive, range 6—40 lb.

Service Tools

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Operation	Description	Tool No.	Remarks and illustration reference
Front band adjustment	Front band spacer gauge .250 in.	CBW. 34	Used in conjunction with 548 torque screwdriver and 548—2 adaptor
Removing/replacing pressure take-off plug	Socket head adaptor M.H.H. $\frac{3}{16}$ in. A/F	CBW. 547A—50—4	Used with Tension wrench. See Fig. 7, Part 1
Rear band adjustment	Rear servo adaptor	CBW. 547A—50—2	Used with Tension wrench
Front band adjustment	Front servo adaptor		Used with torque screwdriver CBW. 548
Tightening of slotted screws	Torque screwdriver	CBW. 548—2	$\frac{1}{4}$ in. sq. drive, range 0—45 lb. ins.
Tightening of all slotted screws	Torque screwdriver adaptor	CBW. 548—1	Britool M.25 screwdriver bit and adaptor D.30
Front band adjustment	Screwdriver bit adaptor	CBW. 547A—50—5	
Rear clutch piston replacer	Inserting sleeve	CBW. 41	See Fig. 64, Part 4
Installing front clutch piston	Front clutch piston assembly tool	CBW. 42	
	Convertor	Tipco B.61	Or any standard $\frac{1}{2}$ in. socket by $\frac{3}{8}$ in. drive

GENERAL DATA

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GENERAL DATA

Transmission unit identification

B.W. No.	Vehicle	Colour of transmission nameplate	Identification on transmission nameplate
ASI—35EP	Minx, Super Minx, Gazelle and Vogue—with 1600 c.c. engine	Post Office Red	EP
AS3—35EP	Alpine—with 1600 c.c. engine only	Jasmine Yellow	3EP
*AS5—35EP	Minx, Super Minx, and Gazelle—with 1725 c.c. engine	Post Office Red and hatched with right hand oblique lines	5EP
*AS15—35EP	Sceptre and Vogue—with 1725 c.c. engine	Crimson	15EP
AS7—35EP	Hawk	Post Office Red hatched with herringbone lines	7EP
AS9—35EP	Super Snipe and Imperial	Jasmine Yellow hatched with herringbone lines	9EP

*The only differences between these units are the downshift cable assemblies and the nameplates.

Fluid Shell Donax T6

Fluid capacity from dry *Minx—S. Minx—Gazelle* ... 11 $\frac{1}{4}$ pts. (13.5 U.S. pts.—6.4 litres)

Vogue—Sceptre—Alpine

” ” ” ” *S. Snipe—Imperial—Hawk* ... 13 $\frac{1}{4}$ pts. (15.9 U.S. pts.—7.5 litres)

Fluid temperature Normal operating range 100°–115° C (212°–240° F).
Beware of scalding

Transmission gear ratios

1st	2.39:1	} Multiplied by ratio from converter, which is infinitely variable between 2:1 to 1:1
2nd	1.45:1	
3rd	1.00:1	
Reverse	2.09:1	

Compression springs—Hydraulic control system

Method of identification

1. Pick out Group A, largest springs, and identify by length.
2. Pick out Group B, all under 1" (25 mm.) in length, and identify by number of coils.
3. Remainder Group C, all over 1" (25 mm.) in length, eliminate first two by number of coils and identify two remaining by measurement.

Spring

	Valve block identification	No Active Coils	Wire dia. ins.	Approx. Free Length ins.
<i>Group A</i>				
Primary regulator valve	9EP	14	.056	2.94* (74.7 mm.)
	3EG	11 $\frac{1}{2}$	.062	2.12* (53.8 mm.)
	EP	15	.056	2.85* (72.4 mm.)
Secondary regulator valve	ALL	16 $\frac{1}{2}$	.056	2.59* (65.8 mm.)
2—3 shift valve	ALL	19 $\frac{1}{2}$.036	1.59* (40.4 mm.)

* Use these figures for final identification

General Data

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Spring					Valve block identification	No. of active coils	Wire dia. ins.	Approx. free length ins.
<i>Group B</i>								
Rear pump check valve	...	...	...	...	ALL	3*	.019	.62 (15.7 mm.)
" " " "	...	...	...	...	ALL	5*	.024	.62 (15.7 mm.)
Converter check valve	...	...	...	...	ALL	12*	.018	.70 (17.8 mm.)
Throttle valve return	...	...	...	...	ALL	28*	.018	.81 (20.6 mm.)
<i>Group C</i>								
1—2 shift valve	...	...	...	...	ALL	13½*	.024	1.09 (27.7 mm.)
Servo orifice control box	...	...	...	...	EP only	23*	.025	1.13 (28.7 mm.)
" " " "	...	...	...	...	EP only	24*	.025	1.09 (27.7 mm.)
Modulator valve	...	...	...	...	ALL	19	.028	1.07* (27.2 mm.)
Throttle Spring between downshaft valve and throttle valve	...	...	...	...	ALL	19½ 18	.032 .032	1.175* (29.8 mm.) to 1.85* (30.1 mm.)

* Use these figures for final identification

TORQUE CHART—MODEL 35 TRANSMISSION

Application	Description	No. used	Torque lb. ft.	kg.m.
Converter to drive disc	$\frac{3}{8}$ —24 UNF $\times \frac{5}{8}$ "	4	30	4.1
Drive disc to crankshaft	$\frac{3}{8}$ —24 UNF $\times \frac{3}{4}$ "	4	30	4.1
Transmission case to converter housing	$\frac{5}{16}$ —18 UNC $\times \frac{7}{8}$ "	6	9	1.2
Extension housing to transmission case	$\frac{5}{16}$ —18 UNC $\times 1$ "	4	9	1.2
Oil pan to transmission case	$\frac{5}{16}$ —18 UNC $\times \frac{5}{8}$ "	15	9	1.2
Front servo to transmission case	$\frac{5}{16}$ —18 UNC $\times 1$ "	1	9	1.2
	$\frac{5}{16}$ —18 UNC $\times 1\frac{3}{8}$ "	1	9	1.2
Rear servo to transmission case	$\frac{3}{8}$ —16 UNC $\times 1\frac{1}{4}$ "	1	12	1.6
	Screw—rear servo	1	12	1.6
Pump adaptor to front pump body	No. 10—24 UNC $\times \frac{5}{8}$ "	1	2	0.3
	$\frac{5}{16}$ —18 UNC $\times \frac{7}{8}$ "	5	20	2.7
Pump adaptor to transmission case	$\frac{5}{16}$ —18 UNC $\times \frac{7}{8}$ "	6	12	1.6
Rear pump to transmission case	$\frac{1}{4}$ —20 UNC $\times 1\frac{1}{8}$ "	5	5	0.6
	No. 10—24 UNC $\times 1\frac{1}{8}$ "	1	2	0.3
Centre support to transmission case	Screw—centre support	2	12	1.6
Outer lever to manual valve shaft	$\frac{5}{16}$ —24 UNF	1	6	0.8
Pressure point	$\frac{1}{8}$ —27 Dryseal N.P.T.F. headless pipe plug	1	5	0.6
Oil pan drain plug	$\frac{1}{4}$ —18 Dryseal N.P.T.F. headless pipe plug	1	12	1.6
Oil tube collector to lower body	No. 10—24 UNC $\times \frac{11}{16}$ "	6	2	0.3
	No. 10—24 UNC $\times \frac{7}{8}$ "	2	2	0.3
Governor line plate to lower body	No. 10—24 UNC $\times 1$ "	2	2	0.3
	No. 10—24 UNC $\times 2$ "	2	2	0.3
Lower body end plate to lower body	No. 10—24 UNC $\times \frac{9}{16}$ "	3	2	0.3
Upper body end plate front or rear to upper body	No. 10—24 UNC $\times \frac{7}{16}$ "	6	2	0.3

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Application	Description	No. used	Torque	
			lb. ft.	kg.m.
Upper body to lower body	No. 10—24 UNC $\times 1''$	5	2	0.3
	No. 10—24 UNC $\times 1\frac{3}{8}''$	1	2	0.3
	No. 10—24 UNC $\times \frac{5}{8}''$	2	2	0.3
Valve bodies assembly to transmission case	$\frac{1}{4}$ —20 UNC $\times 1\frac{1}{4}''$	1	5	0.6
	$\frac{1}{4}$ —20 UNC $\times 2''$	2	5	0.6
Front pump strainer to lower body	No. 10—24 UNC $\times \frac{3}{8}''$	4	2	0.3
Downshift valve cam bracket to valve body	No. 10—32 UNF $\times 1\frac{7}{16}''$	2	2	0.3

Governor

Body to governor sleeve	$\frac{1}{4}$ —20 UNC $\times 1\frac{3}{8}''$	2	Tighten fully with large screwdriver	
Cover plate to governor body	No. 10—24 UNC $\times \frac{3}{8}''$	2	2	0.3

Band Adjustment

Adjusting screw nut to front servo lever	$\frac{3}{8}$ —16 UNC	1	17	2.3
Adjusting screw locking nut rear servo to case	$\frac{7}{16}$ —14 UNC	1	27	3.7

Special thread parts

Starter inhibitor switch lock nut*	$\frac{7}{16}$ —14 UNC	1	5	0.6
Downshift valve cable adaptor to transmission case	$\frac{1}{2}$ —13 UNC	1	8	1.1
Filler tube connector adaptor to transmission case	$\frac{1}{2}$ —BSP	1	25	3.4
Filler tube to connector sleeve nut	1 $\frac{1}{16}$ —16 UN	1	17	2.3
Stone guards to converter	No. 8 Thd. speed screw	4	1.5	0.21

* Sealer used on switch body threads.

STALL TEST DATA

Engine RPM			Condition
A	B	C	
1850 approx.	1800 approx.	1550 approx.	Normal
Under 1500 approx.	Under 1000—1500 approx.	Under 800—1300 approx.	Engine not developing its full power and in need of tune up
Under 1000 approx.	Under 1000 approx.	Under 800 approx.	Stator one way clutch slipping
Over 2000 approx.	Over 1800 approx.	Over 1550 approx.	Transmission or converter slips
A ... Minx, S/Minx, Gazelle, Vogue, Sceptre and Alpine. B ... Super Snipe and Imperial. C ... Hawk.			

General Data

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APPROXIMATE GEAR SHIFT SPEEDS

Minx and Gazelle —1600 and 1725 Engines
 Super Minx and Vogue — " " " "
 (Saloon and Estate)
 Sceptre —1725 Engine

THROTTLE POSITION				GEAR CHANGE D. SELECTED				M.P.H.				K.P.H.
Light	...	...	...	1—2	...	...	...	3—7	...	...	...	4.8—11.2
"	...	...	...	2—3	...	...	...	5—10	...	...	...	8.0—16.0
Full	...	...	...	1—2	...	...	...	22—27	...	...	...	35.4—43.4
"	...	...	...	2—3	...	...	...	34—44	...	...	...	54.7—70.8
*Forced	...	...	...	1—2	...	...	...	33—40	...	...	...	53.0—64.3
"	...	...	...	2—3	...	...	...	50—60	...	...	...	80.4—96.5
*Kickdown	...	...	...	3—2	...	...	...	47—56	...	...	...	75.6—90.1
"	...	...	...	3—1	...	...	...	26—33	...	...	...	41.8—53.1

Alpine

Light	...	...	...	1—2	...	...	...	5—9	...	...	...	8.0—14.5
"	...	...	...	2—3	...	...	...	9—13	...	...	...	14.5—20.9
Full	...	...	...	1—2	...	...	...	27—31	...	...	...	43.4—49.9
"	...	...	...	2—3	...	...	...	45—50	...	...	...	72.4—80.5
*Forced	...	...	...	1—2	...	...	...	36—41	...	...	...	57.9—66.0
"	...	...	...	2—3	...	...	...	57—63	...	...	...	91.7—101.4
*Kickdown	...	...	...	3—2	...	...	...	47—54	...	...	...	75.6—86.9
"	...	...	...	3—1	...	...	...	25—30	...	...	...	40.2—48.3

Super Snipe—Imperial—Hawk

Light	...	...	...	1—2	...	...	...	4—7	...	...	...	6.4—11.2
"	...	...	...	2—3	...	...	...	6—10	...	...	...	9.6—16.0
Full	...	...	...	1—2	...	...	...	22—27	...	...	...	35.4—43.4
"	...	...	...	2—3	...	...	...	37—45	...	...	...	59.5—72.4
*Forced	...	...	...	1—2	...	...	...	32—40	...	...	...	51.4—64.3
"	...	...	...	2—3	...	...	...	55—63	...	...	...	88.5—101.3
*Kickdown	...	...	...	3—2	...	...	...	50—58	...	...	...	80.4—93.3
"	...	...	...	3—1	...	...	...	29—34	...	...	...	46.6—54.7

*For explanation of forced throttle and
kickdown see Page 4 Part 1.