FIAT

Trattori

55-66 55-66 DT
60-66 60-66 DT
65-66 65-66 DT
70-66 70-66 DT
80-66 80-66 DT

466, 566
666, 756

WORKSHOP MANUAL

QUICK REFERENCE INDEX

SERVIZI TECNICI DI ASSISTENZA

FOREWORD

This edition of the Workshop Manual for models 466, 566, 666 and 766 has been revised to include the new Series 66 models 55-66, 60-66, 65-66, 70-66 and 80-66.

This revised edition covers the new engine assemblies and mechanical and hydraulic units fitted to current Series 66 models, together with revisions made to mechanical, hydraulic and electrical equipment featured on the preceding Series.

For components which have been carried over unchanged to the new Series, consult the basic manual covering models 466, 566, 666 and 766 as directed in the table of contents and the text, noting that:

- ***Model 55-66 supersedes model 466***
- ***Models 60-66 and 65-66 supersede model 566***
- ***Model 70-66 supersedes model 666***
- ***Model 80-66 supersedes model 766***

PRINTED IN ITALY

FIAT TRATTORI S.p.A. - Viale delle Nazioni, 55 - S. Matteo - 41100 MODENA - Italy

Servizi Tecnici di Assistenza - Pubblicazioni Tecniche - Print No. **603.54.228.02** - X - 1987 - 2000 - MUCCHI

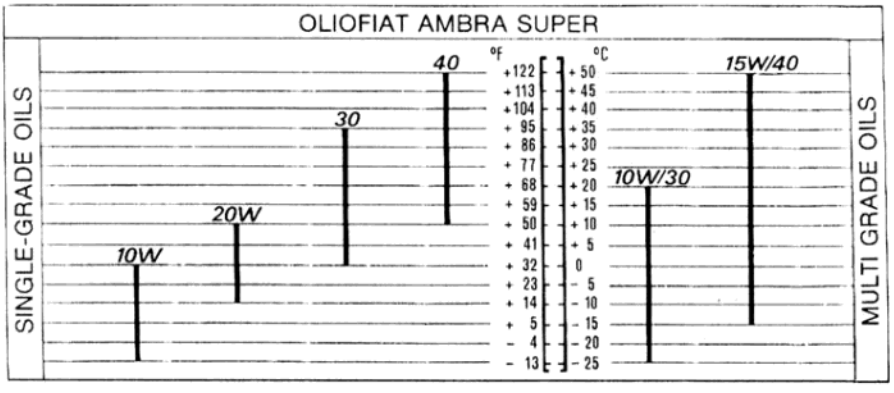
Print No. ***603.54.228.02*** *- X - 1987*

GENERAL: Contents

GENERAL:
Contents

SPECIFICATION

DESCRIPTION	FIAT RECOMMENDED PRODUCTS
Sump and filter oil Sump oil Air cleaner oil	**Oliofiat AMBRA SUPER** (see table below)
Power steering circuit oil Steering unit oil Live front axle oil — Axle casing — Planetary drives (each) Rear transmission (transmission, bevel drive, brakes) and lift oil — 2-wheel drive — 4-wheel drive Final drive oil (each)	**Oliofiat TUTELA MULTI F**
Front wheel hub oil Pressure lubricators	**Grassofiat TUTELA G9**
Coolant { w/o cab with cab	Water and FIAT **"PARAFLU 11"**
Fuel - main tank Fuel - reserve tank	Diesel fuel



CAPACITIES

LIQUIDS AND LUBRICANTS												
CAPACITY												International Designation
55-66/55-66 DT			60-66/60-66 DT			70-66/70-66 DT			80-66/80-66 DT			
dm³ (litres)	gall.	kg	dm³ (litres)	gall.	kg	dm³ (litres)	gall.	kg	dm³ (litres)	gall.	kg	
7.3	1⅓	6.6	7.3	1⅓	6.6	11.7	2½	10.5	11.7	2½	10.5	
6.7	1½	6	6.7	1½	6	10.5	2⅓	9.5	10.5	2⅓	9.5	Diesel engine oil to MIL-L-2104 D and Service API CD
0.55	1⅓ pints	0.5	0.55	1⅓ pints	0.5	0.8	1⅓ pints	0.7	0.8	1⅓ pints	0.7	
1.8	⅓	1.6	1.8	⅓	1.6	1.8	⅓	1.6	1.8	⅓	1.6	
0.9	1¾ pints	0.8	0.9	1¾ pints	0.8	0.9	1¾ pints	0.8	0.9	1¾ pints	0.8	
4.3	¾	3.9	4.3	¾	3.9	6.1	1⅓	5.5	6.1	1⅓	5.5	Transmission, oil bath, brakes and lift oil to Massey Ferguson MF1135 and Ford M2C 86A.
0.8	1⅔ pints	0.7	0.8	1⅔ pints	0.7	1.2	½	1.1	1.2	½	1.1	
46.7	10¼	42	46.7	10¼	42	46.7	10¼	42	10¼	46.7	42	
47,2	10⅓	42.5	47.2	10⅓	42.5	47.2	10⅓	42.5	10⅓	47.2	42.5	
3.9	¾	3.5	3.9	¾	3.5	5.3	1¼	4.8	5.3	1¼	4.8	
—		—	—		—	—		—	—		—	Lithium - calcium grease to NLG1 No. 2
—		—	—		—	—		—	—		—	
12	2½	—	12	2½	—	14	3	—	14	3	—	
14	3		14	3		16			16			
73	16	—	73	16	—	73	16	—	73	16	—	
—	—	—	—	—	—	25			25			

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IMPORTANT - These pages cover the new Mod. 65-66 Tractor: for servicing instructions refer to the earlier 55-66/60-66/70-66 and 80-66 as instructed in the quick-reference list provided below.

TRACTOR 55-66 IDENTIFICATION DATA

	65-66 / **65-66 DT**
Marketing Code:	
— 2-wheel drive	671.600.000
— 4-wheel drive	671.600.000 var. 720.110 671.600.000 var. 720.111
Engineering Code:	
— 12-speed, 2-wheel drive version	671.627.000
— 12-speed, 2-wheel drive version w/mechanical reverser	671.627.000 var. 720.110 671.627.000 var. 720.111
— 20-speed, 2-wheel drive version	
— 12-speed, 4-wheel drive version	
— 12-speed, 4-wheel drive version w/mechanical reverser	
— 20-speed, 4-wheel drive version	
Engine type (common to all versions)	FIAT 8045.06.320 (C.A.V. pump) FIAT 8045.06.220 (BOSCH pump)

ENGINE

Number of cylinders	4
Bore x Stroke	100 x 115 mm (3.94 x 4.53 in)
Total piston displacement	3613 cc (220 cu.in)
Max power rating (DGM/DIN)	47.8 kW (65 HP)

GUIDE LIST: 65-66 COMPONENT UNITS AND ASSOCIATED CROSS-REFERENCES TO SERIES 66 MODELS

Crankcase - Cylinder head	see Mod. 70-66
Crankshaft and bearings - Connecting rods - Pistons - Dynamic balancer	see Mod. 70-66
Valve gears - Camshaft - Valve tappets, guides and rockers - Valves, valve guides and springs	see Mod. 70-66
Oil pump - Oil filter	see Mod. 70-66
Water pump - Thermostat	see Mod. 70-66

The BOSCH and CAV injection pump calibration setting Tables are given on pages 16 and 17, Sect. 00, while engine performance data may be found on page 18, Sect. 00.

Fuel injectors	see Mod. 70-66
Clutch - Transmission - Bevel drive and differential gears - Brakes - Creeper - Reverser - Side final drives - PTO	see Mod. 60-66
Front axle - Mechanical/power steering systems	see Mod. 60-66
Live front axle - Axle drive	see Mod. 60-66
Lift and its hydraulic pump - Implement attachment - Remote control valves	see Mod. 60-66
Electrical system	see Mod. 60-66
Engine servicing equipment	see Mod. 70-66
Chassis/Frame servicing equipment	see Mod. 60-66

MODEL 65-66 - CALIBRATION DATA-BOSCH INJECTION PUMP TYPE VE 4/11F 1250 L 164-2-4804869 - (Provisional data)

ASSEMBLY DATA

Pump rotation (drive end) . . . . . Anti-clockwise
Injection order 1-3-4-2
Plunger lift to spill cut-off
. . . . . 0.2 ± 0.05 mm (0.008 ± 0.0019 in)
Plunger lift from BDC pump timing on engine
. . . . . 1 mm (.039 in)
Pump timing 4° ± 1° B.T.D.C., cylinder No. 1 in compression stroke
Delivery connection of cylinder No. 1:
Marked with letter **A.**

TEST PLAN

Test bench complying with ISO 4008.
Injectors complying with ISO 4010: 1688901020 with pad 1680 103 096.
Release pressure
172 to 175 bar (175 to 178 kg/cm² or 2483 to 2492 psi).
Fuel pressure . . . . . 0.2 bar (kg/cm², 2.8 psi).
Lines (as per ISO 4093.2) . . . . . 6x2x840 mm.
Graduate drain time . . . . . 30''.
Test fluid . . . . . ISO 4113 at 45° ± 1°C.

ADJUSTMENT VALUES

Operation description	rpm	Advance piston stroke mm	Fuel pressure bar (kg/cm²)	Delivery cm³/1000 shots	Transfer pressure bar (kg/cm²)	Spread cm³/1000 shots
Full load delivery	800	2.8 to 3.2	3.9 to 4.5	62.5 to 63.5	0.2	3.5
Idle speed limit	350	—	—	19 to 23	0.2	3
Starting delivery	150	—	—	100 to 120	0.2	—
Full throttle limit	1350	—	—	32 to 38	0.2	—

TEST VALUES

Advance device check			Fuel pressure check			Back leakage		
	rpm	mm		rpm	bar (kg/cm²)		rpm	cm³/100 shots
	600	0.8 to 1.6		600	3.0 to 3.6			
	800	2.0 to 3.2		800	3.9 to 4.5			
	1200	5.4 to 6.2		1200	6.0 to 6.6			

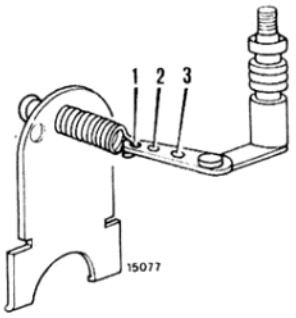
DELIVERY CHECK

Full throttle stop				Idle speed shut-off			
	rpm	Delivery cm³/1000 shots	Transfer pressure bar (kg/cm²)		rpm	Delivery cm³/1000 shots	Transfer pressure bar (kg/cm²)
	1375	11 to 17	0.2		450	≤ 2	0.2
	1400	≤ 2	0.2		400	6 to 12	0.2
	1350	32 to 38	0.2		350	19 to 23	0.2
	1250	54 to 57	0.2				
	800	62.5 to 63.5	0.2				
	600	59.5 to 62.5	0.2				
	250	≤ 47	0.2				
	150	100 to 120	0.2				

MODEL 65-66 - CALIBRATION DATA-C.A.V. INJECTION PUMP TYPE DPS 8520A 140A - 4806880 (Provisional data)

ASSEMBLY DATA

Pump rotation (drive end) . . . . . Anti-clockwise
Injection order 1-3-4-2
Governor control stud to metering valve lever pin . . . . . 41 to 42 mm (1.61 to 1.65 in)
Pump timing: 0° ± 1° B.T.D.C., cylinder No. 1 in compression stroke
Flange guide dia . . . . . 50 mm (1.96 in)
Delivery connection of cylinder No. 1: Marked with letter **U**.



Control spring hole 2.

TEST CONDITIONS

Test bench complying with ISO 4008.
Injectors complying with ISO 4010.
Test fluid: ISO 4113 at 40° ± 2°C
Fuel pressure: 0.1 bar (0,1 kg/cm² or 1.4 psi).
Graduate drain time 30''.
Release pressure: 172 to 175 bar (175 to 178 kg/cm² or 2483 to 2492 psi).
Lines: 6x2x845 mm (ISO 4093.2).
Adjust maximum speed screw to protrude 9.5 mm (0.92 in) from surface of associated nut.

Fully slacken fuel pressure adjusting screw, then tighten through 3 1/2 turns.
Position valve adjusting screw so that it is just beneath the surface of the associated nut.
Fully slacken maximum speed, idle speed and antistall screw.
A 3 mm (0.118 in) shim is installed on the advance device spring side plug no other shims are required.

Test No.	Lever position	Speed	Advance	Transfer pressure	Injector delivery	Spread	Back leakage
		rpm	degrees	bar (kg/cm²)	cm³/200 shots	cm³/200 shots	cm³/100 shots
1 (1)	max	200	—	—	—	—	—
2 (2)		1000	—	—	—	—	—
3		100	—	⩾ 0.4	—	—	—
4 (3) - 5		950	4,5	4,2 to 5,4	—	—	—
6 (4)		1250	6,8 to 7,8	—	—	—	—
7-8		750	—	—	8,4 to 8,6 (●)	⩽ 0,8	40 to 80 (○)
9 (5)		1250	—	—	—	—	—
10 (6)		1420	—	—	1,5 to 2	—	—
11 (7)		1250	—	—	—	—	—
12 (8)		300	1,8 to 2,8	—	—	—	—
13 (9)		250	0	—	⩾ 16	—	—
14 (10)	min	850	—	—	—	—	—
15 (11)		350	—	—	2 to 2,5	—	—
16 (12)		350	—	—	⩽ 0,8	—	—
17 (13)		350	—	—	⩽ 0,5	—	—
18 (14)		—	—	—	—	—	—

1) Delivery to all injectors.
2) Run pump for 3'.
3) Set pressure adjusting screw for specified advance and check that pressure is as specified.
4) Stop test bench, disconnect transfer pressure gauge and install shut-off device. Activate shut-off device and start test bench.
5) Record average delivery.
6) Adjust max. speed screw and block in position.
7) Delivery shall not be less than in test 9 by more than 0.4 cm³/200 shots.
8) Prior to test, bring machine speed to 100 revs and stop machine. Fully tighten valve adjusting screw, start bench and slacken screw until reaching specified values.
9) Prior to test, bring machine speed to 100 revs, stop and restart bench.
10) Adjust anti-stall screw for a delivery of 2 to 3 cm³/2000 shots. Block screw in position.
11) Adjust idling speed screw.
12) Shut-off lever closed.
13) With shut-off device deactivated and shut-off lever open, wait 5'' before performing test.
14) Connect delivery fitting «U» to injector tester and maintain 54 bar (757 psi) pressure. Using timing tool, bring about hydraulic lockup, then position pump timing plate at + 9.5°.

(●) Take reading after 15''.
(○) Flow 300 to 600 cm³ /minute.

MOD. 65-66 - BOSCH INJECTION PUMP

Accelerator position	Braking	Engine speed	Power, w/run-in engine		Fuel consumption kg/h
			2 hrs total kW	50 hrs total kW	
Maximum	Full load	2500	⩾ 46.4 (63 Cv) (°)	⩾ 47.8 (65 Cv)	11 to 11.4
Maximum	Full torque	1500	⩾ 31.6 (43 Cv) (°)	⩾ 32.8 (44.6 Cv)	7.1 to 8.6
Maximum	No load	2750 to 2790	—	—	—
Minimum	No load	625 to 675	—	—	—

MOD. 65-66 - CAV INJECTION PUMP

Accelerator position	Braking	Engine speed	Power, w/run-in engine		Fuel consumption kg/h
			2 hrs total kW	50 hrs total kW	
Maximum	Full load	2500	⩾ 46.4 (63 Cv) (°)	⩾ 47.8 (65 Cv)	11 to 11.4
Maximum	Full torque	1500	⩾ 31.6 (43 Cv) (°)	⩾ 32.8 (44.6 Cv)	7.1 to 7.6
Maximum	No load	2750 to 2790	—	—	—
Minimum	No load	625 to 675	—	—	—

IMPLEMENT ATTACHMENT

Type	3-point linkage
Category	1st/2nd
Max lift capacity - center of gravity at 610 mm (24 in) from lower link swivel bushings, starting with lower links horizontal and top link coupled to top hole	2216 da Nm (2260 kg or 4875 lb)
Max lift capacity - center of gravity at 1130 mm (44.5 in) from lower link swivel bushings, starting with lower links horizontal and top link coupled to top hole	2206 da Nm (2250 hg or 4853 lb)

INJECTION PUMP REMOVAL, INSTALLATION AND TIMING - BOSCH VE TYPE

Remove injection pump as follows:

— Close fuel pump suction cock.

— Remove front cover for access to injection pump timing gear.

— Disconnect fuel suction and leak-back lines, delivery lines accelerator link and engine shut-off connection.

— If necessary, disconnect fuel pump and filters.

— Slacken nuts (C_1) and drive shaft nut. Remove injection pump.

Install injection pump as follows:

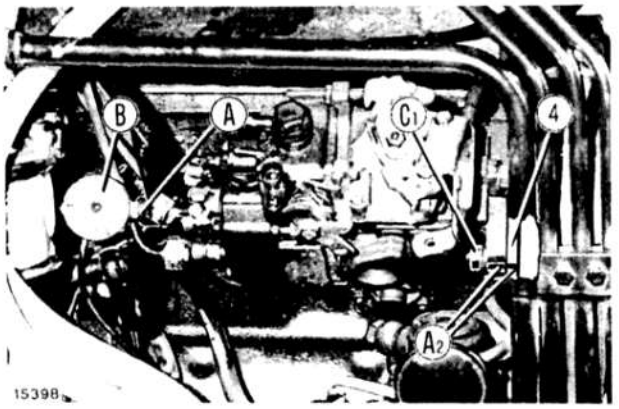
- Position gasket between pump flange and spacer.

- Insert shaft in drive gear and secure through associated nut. Start pump nuts (C·).

- Turn pump body to align timing marks (A· and A_2) on pump and spacer (4).

— Tighten pump nuts or capscrews (C·) and connect fuel and delivery lines. Also connect fuel pump and filters.

— Vent circuit as described in the relevant section.



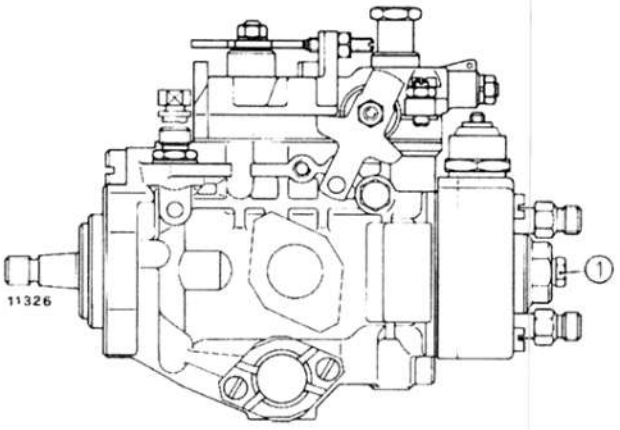
Adjusting BOSCH pump timing on engine

A. Tool **291755** - A_1. Timing marks - B. Gauge **291754** - C·. Pump nut - 4. Spacer.

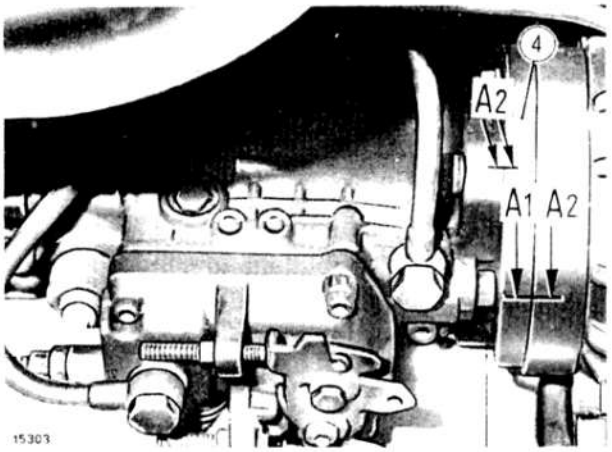
If timing marks (A_2) are missing or are suspected to be incorrect, adjust timing as follows:

— Bring piston No. 1 to T.D.C. in compression stroke (valves closed) and turn flywheel counterclock-wise (as viewed from fan side) until timing pointer is aligned with INIEZ. BOSCH mark.

— With injection pump installed, remove plug (1) and install tool **291755** (A) together with gauge **291754** (B) and apply a 2.5 mm or 0.100 in preload to spindle.

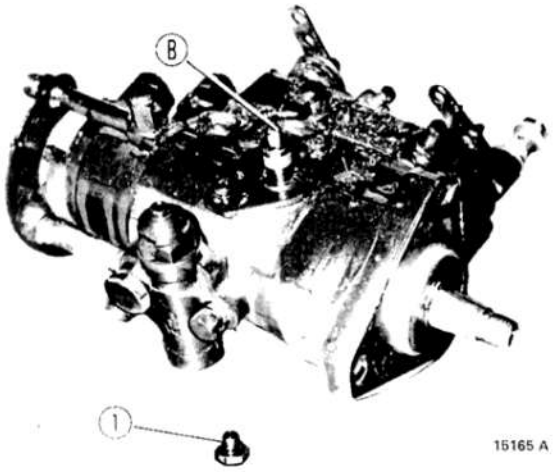


View of injection pump with plug (1)



Applying timing marks (A).

A_1. Existing mark - 4. Spacer.



Installing timing tool 292411 (B) on C.A.V. DPS Injection pump
1. Plug.

- Turn flywheel slowly in the opposite direction until gauge reading stops dropping, indicating that plunger No. 1 is at bottom of stroke at commencent of injection.
- Zero gauge and turn flywheel slowly clockwise until timing pointer is aligned with INIEZ. BOSCH mark.

  Check that plunger stroke as indicated on gauge is 1 mm or 0.039 in. To adjust, slacken pump nuts (C· page 1).
- If plunger stroke is less than specified, turn pump clockwise (as seen from drive side) or counterclockwise if plunger stroke is greater.
- Tighten pump nuts. Apply timing marks to pump flange and spacer.
- Remove gauge (B) and tool (A). Install plug (I) and tighten to 8 to 10 Nm (0.8 to 1 kgm or 5.7 to 7.2 ft. lb).
- Connect fuel and delivery lines with fuel filters.
- Vent circuit as described in the relevant section.

INJECTION PUMP REMOVAL, INSTALLATION AND TIMING - C.A.V. DPS TYPE

Remove injection pump as follows:

- Close fuel pump suction cock.
- Remove front cover for access to injection pump timing gear.
- Disconnect fuel suction and leak-back lines, delivery lines, accelerator link and engine shut-off connection.
- If necessary, disconnect fuel pump.
- Remove nuts (C₁, page 3) and drive shaft nut. Remove injection pump.

Install injection pump as follows:

- Position gasket between pump flange and spacer (4, pag. 3).
- Insert shaft in drive gear and secure through associated nut. Start nuts (C₁).
- Turn pump body to align timing marks (A) on pump and spacer (4).
- Tighten pump nuts (C₁). Install fuel pump, connect fuel lines and vent circuit as described in the relevant section.

If timing marks (A) are missing or are suspected to be incorrect, adjust as follows:

- Bring piston No. 1 to T.D.C. in compression stroke (valves closed); in this position, timing pointer is aligned with INIEZ. C.A.V. mark.
- Remove plug (1) from side cover and install timing tool **292411** (B).
- Install shaft in drive gear, secure through associated nut and start pump nuts (C·).

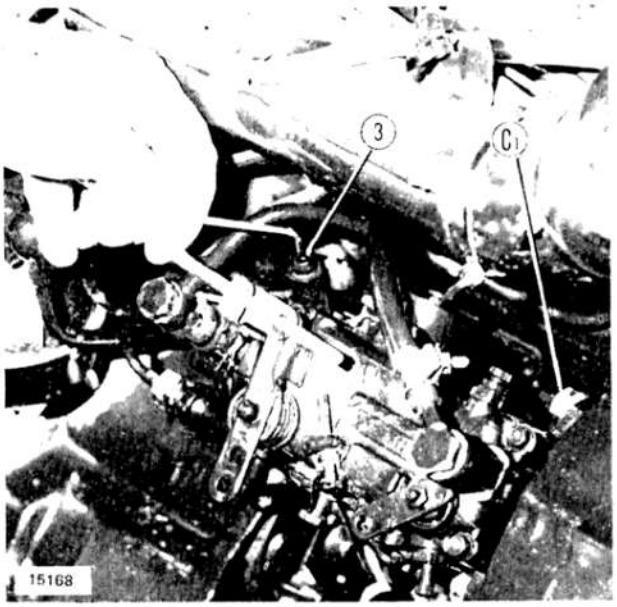
Adjusting C.A.V. DPS injection pump timing

A. Timing marks - B. Tool **292411** - 4. Spacer.

— Turn pump body until spindle of tool **292411** (B) enters notch on pump shaft, i.e., until spindle moves towards pump.

– Tighten pump nuts (C_1), apply timing marks (A) on pump flange and spacer (4), and install fuel pump.

— Remove tool **292411** (B) from cover hole and tighten plug (1) to 4.5 Nm (0.45 kgm or 3.25 ft. lb).



View of injection pump on engine.

C_1. Nuts - 3. Vent screw.

— Connect fuel lines and vent circuit as described in the relevant section.

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— Install bevel pinion bearing cones (7 and 9) with spacer (8) on tool (E, page 8) **293438/2** for models 466DT and 566DT or **293438/2** with centralizer (G) **293439** for models 666DT and 766DT.

— Fully tighten tool nut (M).

— Measure dimension (H_4) between tool pin end and top face.

— Remove bearing cones and spacer from tool, lubricate bearings with engine oil and reinstall on tool, inserting differential carrier (10) with bearing cups.

— Fully tighten tool nut (M) while rotating differential carrier through ten revolutions to set the bearings.

— Measure dimension (H_3) of tool in this condition.

— Thickness of shims (S_1) will be given by:

$$S_1 = H_3 - H_4 + 0.10 \text{ mm } (0.004 \text{ in})$$

If necessary, round off (S_1) to the nearest 0.05 mm (0.002 in) up.

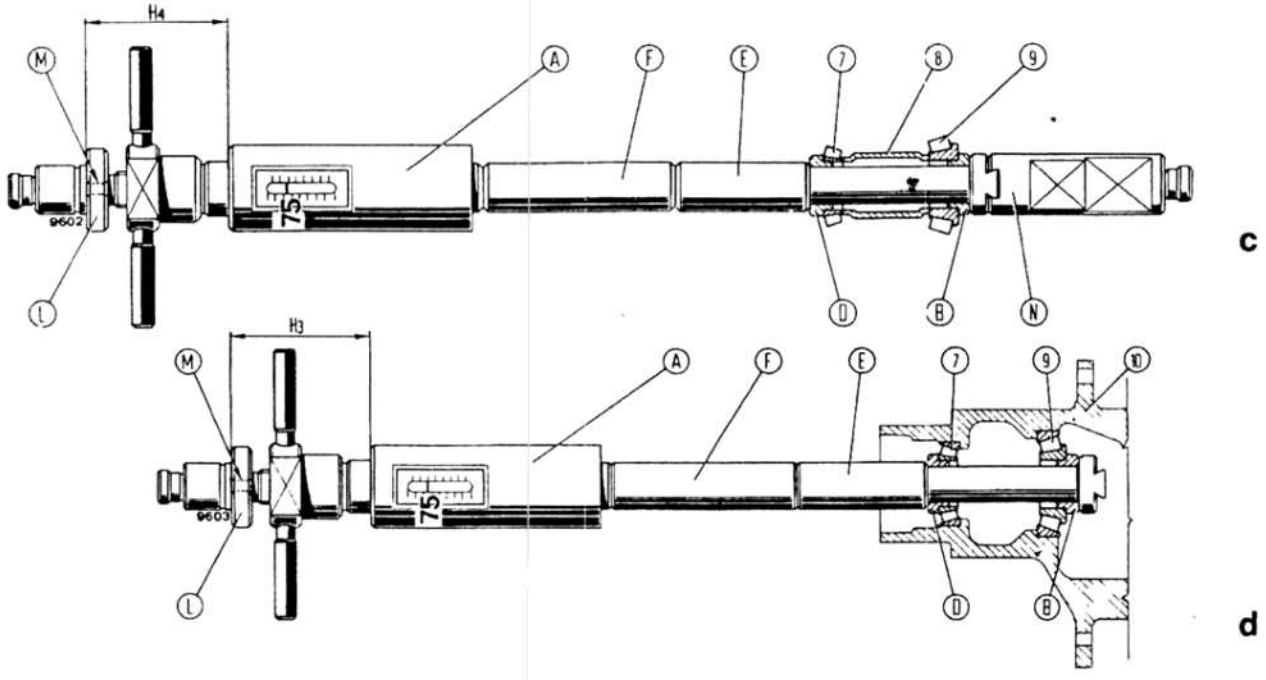
Note: At end of adjustment, do not remove tool from carrier, as it will be used for subsequent bevel pinion position adjustment.

2. Bevel pinion bearing adjustment and shim thickness determination using universal gauge 293510 (Figs. c, d).

Proceed as follows:

— Install spacers **293619** (E) and **293620** (F) and bushings **293632** (B) and **293633** (D) for models 466DT and 566DT, or **293636** (B) and **293632** (D) for models 666DT and 766DT on universal gauge **293510** (A).

— Install part **293617** (N) to secure gauge in vise and insert pinion bearing cones (7 and 9) and spacer (8) positioned as shown in Fig. **c.**



Determining bevel pinion bearing shim thickness (S_1, page 3, section 402) using universal gauge 293510.

c. Measuring dimensions H_4 - d. Measuring dimension H_3 - A. Universal gauge **293510** - B. Bushing **293632** for models 466DT and 566DT, or **293636** for models 666DT and 766DT - D. Bushing **293633** for models 466DT and 566DT, or **293632** for models 666D and 766DT - E. Spacer **293619** - F. Spacer **293620** - H_3 and H_4. Dimensions to be measured using depth gauge. - L. Register **293624** - M. Register holes - N. Vise adapter **293617** - 7 and 9. Bearing cones - 8. Spacer - 10. Differential carrier.

— Turn gauge handwheel to bring pointer gradually to 75 kg (165 lb).

— Install register **293624** (L) on universal gauge (A, page 9), positioning holes (M) in line with flats on handwheel hub.

— Measure dimension (H_4) using a depth gauge.

— Disassemble the unit, lubricate bearings with engine oil and reassemble gauge with bushings (B and D) and spacers (E and F) in differential carrier (10) as shown in Fig. **d**, page 9.

— Gradually bring pointer to 75 kg (165 lb) on graduated scale, rotating tool at the same time to set the bearings. Measure dimension (H_3) as described above.

— Thickness of shims (S_1, page 3, section 402) to be fitted will be given by:

$$S_1 = H_4 - H_3 + 0.10 \text{ mm } (0.004 \text{ in})$$

If necessary, round off (S_1) to the nearest 0.05 mm (0.002 in) up.

Note: At end of adjustment, do not remove tool from carrier, as it will be used for subsequent bevel pinion position adjustment.

3. Bevel pinion position shim thickness determination (Figs. e, f, g).

Proceed as follows:

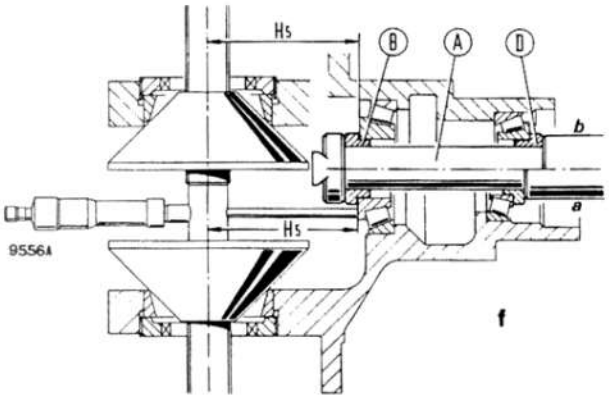
— Position differential bearing cups on shaft (P) of toll **293400/1** with cones (R) and install cups in differential carrier, tightening capscrews (C_{10}) to 113 Nm (11.5 kgm or 83 ft lb).

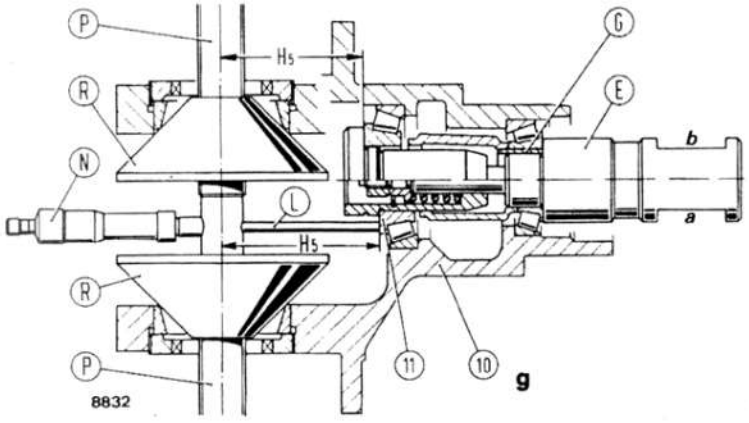
— Tighten or back off tool cones (R) to position 100 mm (3.9 in) spindle (L) in the direction of bearing cone (11) and eliminate clearance between cones (R) and differential bearing cups.

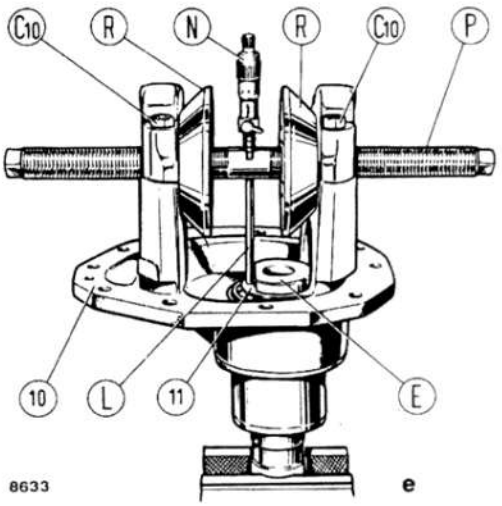
— Turn depth gauge (N) to bring spindle (L) into contact with bearing cone (11) and measure dimension (H_5).

— Establish nominal dimension (H_7) from ring gear centerline to back of pinion:

$$H_7 = H_6 \pm C$$







Determining bevel pinion position shim thickness (S_2, page 3, section 402)

a. Models 466DT and 566DT - b. Models 666DT and 766DT - f. Measuring dimension H_5 using universal gauge **293510** - g. Measuring dimension H_5 using tool **293438/2** - A. Universal gauge **293510** - B. Bushing **293632** for models 466DT and 566DT or **293636** for models 666DT and 766DT - D. Bushing **293633** for models 466DT and 566DT or **293632** for models 666DT and 766DT - E. Tool **293438/2** - G. Centralizer **293439** to be used with tool (E) for models 666DT and 766DT - L, N, P, R. Tool **293400/1** - C_{10}. Differential bearing cap screws - 10. Differential carrier - 11. Front taper roller bearing.

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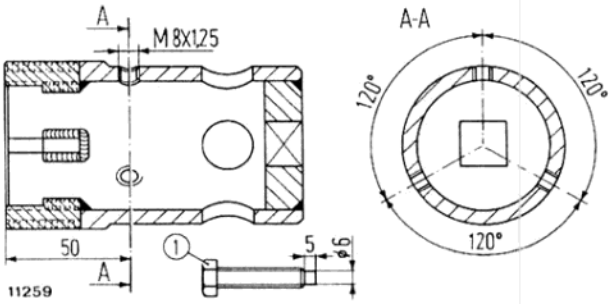


Modyfying lock ring wrench 293520/2 (models 466 DT and 566 DT) or 293524/1 (models 666 DT, 766 DT) for bevel pinion revolving torque-measurement (dimensions in mm).

1. M 8x1.25x40 screw (R 50) to be modified as shown in figure.

where:

H_6 = Nominal distance from ring gear centerline to pinion larger end.
— 100 mm (3.9 in) for models 466DT and 566DT
— 115 mm (4.5 in) for models 666DT and 766DT

C = Correction factor marked on pinion and preceded by + or — if different from 0, to be added to or subtracted from nominal dimension (**H_6**) according to indicated sign. Thickness of shim (**S_2**, page 3, Sect. 402) will be given by:

$$S_2 = H_5 - H_7$$

where:

H_5 = Dimension measured using depth gauge.

H_7 = Corrected nominal dimension from ring gear centerline to back of pinion.

Example (model 566DT)

Dimension measured using depth gauge H_5 = 103.3 mm.

Nominal dimension from ring gear centerline to back of pinion H_6 = 100 mm.

Correction factor C = + 0.2 mm.

Corrected nominal dimension H_7 = 100 + 0.2 = 100.2 mm.

Shim thickness

S_2 = 103.3 — 100.2 = 3.1 mm.

Corrected factor C = — 0.2 mm.

Corrected nominal dimension H_7 = 100 — 0.2 = 99.8 mm.

Shim thickness

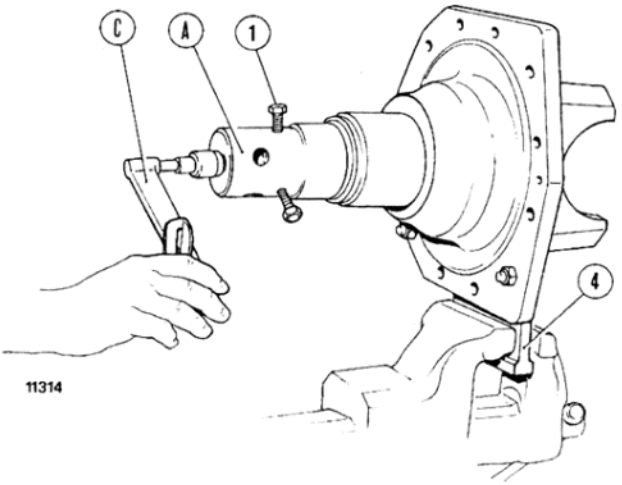
S_2 = 103.3 — 99.8 = 3.5 mm.

Correction factor C = 0 mm.

Corrected nominal dimension H_7 = H_6 = 100 mm.

Shim thickness

S_2 = 103.3 — 100 = 3.3 mm.



Checking bevel pinion revolving torque.

A. Lock ring wrench **293520/2** (models 466 DT and 566 DT) or **293524/1** (models 666 DT, 766 DT) - C. Torque wrench **293512** - 1. Screws retaining wrench **293520/2** or **293524/1** to bevel pinion - 4. Support **293743** for differential carrier.

4. Differential bearing adjustment and bevel drive backlash check.

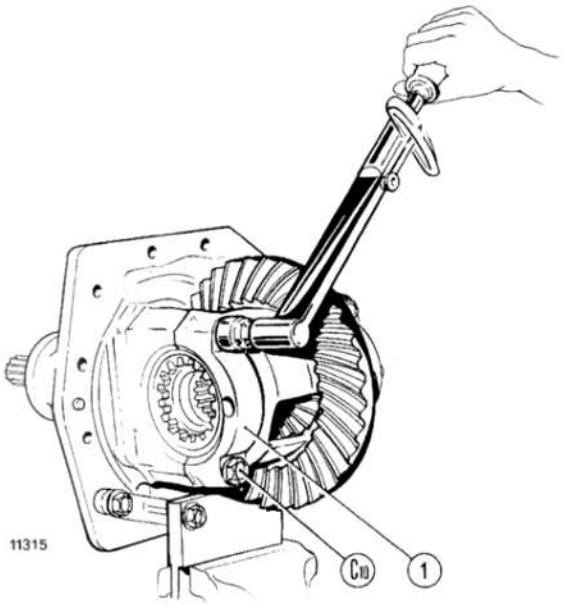
Proceed as follows:

— Install bevel pinion with all parts (less seal 2), including shims (S_1, and S_2, Sect. 402, page 3) as determined above, in differential carrier.

— Lubricate bearings with engine oil and tighten lock ring (C_1, Sect. 402, page 3) to 294 Nm (30 kgm or 217 ft lb) using wrench **293520/2** (models 466 DT and 566 DT) or **293524/1** (models 666 DT and 766 DT).

Modify lock ring wrench **293520/2** (models 466 DT and 566 DT) or **293524/1** (models 666 DT and 766 DT) by drilling and tapping three holes as shown in figure and adding three M 8x1.25x40 (R50) screws (1) as shown in figure.

— Lock wrench **293520/2** (models 466 DT and 566 DT) or **293524/1** (models 666 DT and 766 DT) (altered as described above) on pinion shaft through associated screws (1) and check that torque required to rotate shaft is 0 to 0.2 Nm (0 to 0.02 kgm or 0 to 0.14 ft lb).
Measure torque using torque wrench **293512** (C); do not take starting torque into account.



Installing differential bearing caps.

C_{10}. Self-locking screws - 1. Bearing caps.

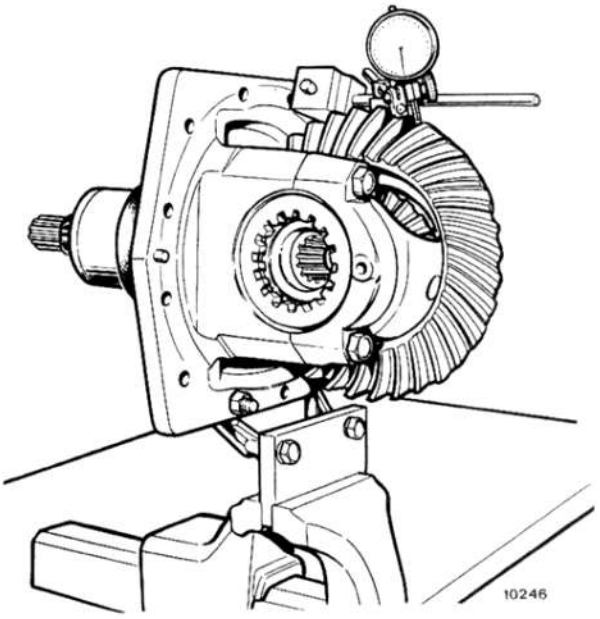
NOTE - This revolving torque is applicable only to pinions installed without seal; when also the seal is fitted, this torque shall be ⩽ 0.5 Nm (0.05 kgm or 0.35 ft lb) for Mods. 466DT and 566 DT and ⩽ 0.75 Nm (0.075 kgm or 0.55 ft lb) for Mods. 666DT and 766DT.
These torques may be measured using a spring balance and string wound on ring nut wrench **293520/2** (Mods. 466DT and 566DT) or **293524/1** (Mods. 666DT and 766DT) and are equivalent to a balance force reading of 0 to 6 N (0 to 0.6 kg or 0 to 1.6 lb) for pinions mounted without seal or 16 N (1.6 kg - 3.5 lb) - 466 DT/566DT - and 22 N (2.2 kg - 4.8 lb) - 666DT/766DT - when pinions are fitted with seals.

— Install differential unit in carrier ensuring that ring gear does not force on pinion, tighten screws (C_{10}) to 59 Nm (6 kgm or 43.4 ft lb) then slacken and re-tighten to 20 Nm (2 kgm or 14.5 ft lb).

— Lubricate ring gear bearings, rotate bevel drive and tighten L.H. lock ring (GS, Sect. 402, page 3) at the same time, using wrench **293544** for models 466DT and 566DT or **293665** for models 666DT and 766DT, to 39 to 59 Nm (4 to 6 kgm or 29 to 43 ft lb) to establish the specified axial pre-load.

— Measure bevel drive backlash using a dial gauge positioned at right angles outside a bevel gear tooth.

— Repeat measurement in two other equi-spaced points 120° apart and compare the average of the three readings with specified backlash: 0.15 to 0.20 mm (0.006 to 0.008 in), average 0.18 mm (0.007 in).



Checking normal bevel drive backlash.

If blacklash is out of specified tolerance range, back off one lock ring and tighten the other by the same amount to restore axial pre-load and obtain specified backlash.

In these conditions, pinion and differential bearing revolving torque, measured in the same conditions as pinion torque, must be:

$A_2 = A_1 + 1$ to 1.5 Nm
(0.1 to 0.15 kgm or 0.72 to 1.08 ft lb)

where:

A_2 = Ring gear and pinion revolving torque

A_2 = Pinion revolving torque as previously measured, i.e.:

— 0 to 0.2 Nm (0 to 0.02 kgm or 0.14 ft lb) with pinion installed without seal (all models).

— ⩽ 0.5 Nm (0.05 kgm or 0.36 ft lb) for models 466DT, 566DT with pinion installed with seal.

— ⩽ 0.75 Nm (0.075 kgm or 0.55 ft lb) for models 666DT and 766DT with pinion installed with seal

— 1 to 15 Nm (0.1 to 0.15 kgm or 0.72 to 1.08 ft lb) = Ring gear rotating torque measured at pinion end using wrench **293520/2** (models 466DT and 566DT) or **293524/1** (models 666DT, 766DT) and torque wrench **293512.**

NOTE - Should it be desired to determine the revolving torque of the pinion/ring gear assy using the spring balance/string method on wrench **293520/2** (466DT/566DT) or **293524/1** (666DT/766DT) the balance force reading shall be:

$$F_2 = F_1 + F_3$$

where:

F_2 = Pinion/ring gear assy revolving torque determined by spring balance/string method

F_1 = Revolving torque for pinion alone as measured earlier by balance/string method, namely:

- 0 to 0.6 N (0 to 0.06 kg or 0 to 0.16 lb) pinions not fitted with seal (all models)
- $\leqslant$ 16 N (1.6 kg or 3.5 lb) - 466DT/566DT - pinions fitted with seal
- $\leqslant$ 22 N (2.2 kg or 4.8 lb) - 666DT/766DT - pinions fitted with seal.

F_3 = 29 to 43 N (2.9 to 4.3 kg or 6.4 to 9.5 lb) - 466DT/566DT - or 31 to 47 N (3.1 to 4.7 kg or 6.8 to 10.3 lb) - 666DT/766DT - revolving torque for ring gear alone measured at pinion end using balance/string method.

— Finally, tighten cap retaining screws (C_{10}) to 113 Nm (11.5 kgm or 83 ft lb) and secure lock ring through associated lock plates. If plate does not correspond to notch, tighten lock ring further.

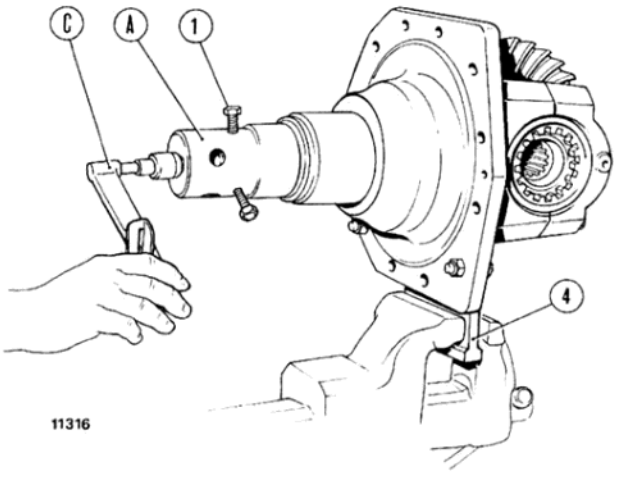
Differential gear backlash adjustment.

Install two side gears (60 and 61, Sect. 402, page 3) on differential cage without shims (6).

Insert differential pinions (62) with washers (7) and journal (63) and tighten screw (8) through a few turns to prevent journal from slipping.

Bring L.H. side gear into contact with differential pinion as shown on page 9, Sect. 204 and, using a depth gauge, measure dimension (H_1) in two diametrally opposite points and average readings.

Push side gear in contact with differential cage as shown on page 9, Sect. 204 and measure dimension (H_2).



Checking ring gear and bevel pinion rotating torque.

A. Lock ring wrench **293520/2** (models 55-90DT and 60-90DT) or **293524/1** (models 70-90DT, 80-90DT, 90-90DT and 100-90DT) - C. Torque wrench **293512** - 1. Screws retaining wrench **293520/2** or **293524/1** to bevel pinion - 4. Support **293743** for differential carrier.

Repeat the same operations on R.H. side gear. Axial displacement of each side gear without shim will be given by:

$$Gs \text{ or } Gd = H_1 - H_2$$

where:

Gs = L.H. side gear axial displacement

Gd = R.H. side gear axial displacement

H_1 and H_2 = Dimensions measured on L.H. or R.H. side gear.

Normal differential pinion and side gear backlash is 0.15 mm (0.006 in).

Note that average ratio of backlash to equivalent side gear displacement is **1 to 1.7.**

Side gear displacement corresponding to normal backlash: **0.15x1.7 = 0.25 mm (0.010 in).**

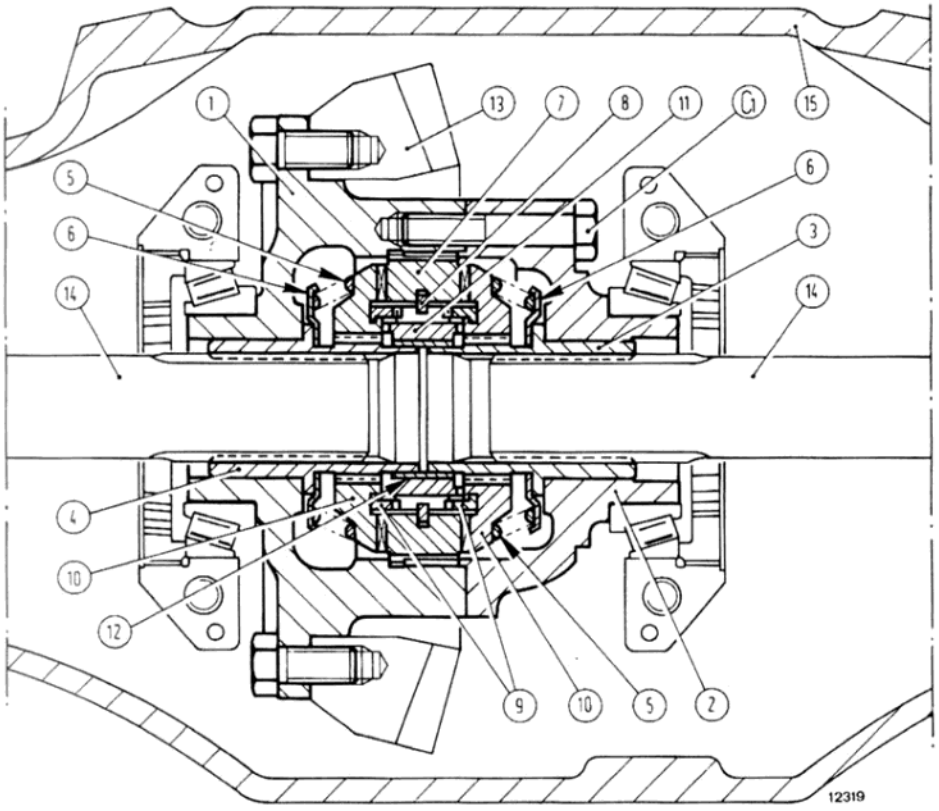
Thickness of shims to install on differential cage will thus be given by:

Ss = Gs — 0.25 (L.H. side gear)

Sd = Gd — 0.25 (R.H. side gear)

Note that shims are available in thickness of 1.5 and 1.6 mm (0.059 in or 0.063 in). Fit the shim which is closer to the calculated value.

NO SPIN DIFFERENTIAL (optional for models 666DT and 766DT)



NOTE

Check NO SPIN differential unit operation as follows:

- With engine off, engage a gear and the front wheel drive, apply parking brake and raise front of tractor.
- Rotate front wheels in a forward direction to eliminate play. Hold L.H. wheel and rotate R.H. wheel rearwards. NO SPIN differential disengages and wheel rotates with an indexing or metallic clicking sound.
- Stop R.H. wheel, then turn forward slightly; NO SPIN differential engages and stops the wheel.
- Rotate both wheels backwards to eliminate play, hold L.H. wheel and rotate R.H. wheel forward. NO SPIN differential disengages and wheel rotates with an indexing or metallic clicking sound.
- Stop R.H. wheel, then turn backwards slightly; NO SPIN differential engages and stops the wheel.
- Repeat the above operations while holding R.H. wheel.

Section through differential with NO SPIN unit (models 666DT and 766DT).

C1. Case screw, tightening torque 56 to 62 Nm (5.7 to 6.3 kgm or 42 to 46 ft lb) - 1. Case, flange half - 2. Case, cap half - 3 and 4. Side gears - 5. Springs - 6. Spring retainer - 7. Central driven assembly - 8. Retaining ring - 9. Cam holdout rings - 10. Driven clutch - 11. Center cam - 12. Stop - 13. Ring gear - 14. Axle shaft - 15. Front axle housing.

OPERATION

The **NO SPIN** differential performs the following key functions:

- Permits full use of tractor pull.
- Permits shorter radins turns than with normal differential.
- Prevents wheel-spin when one wheel loses traction.
- Compensates for differences in wheel travel which occur when turning or traveling over uneven ground.

When the tractor is in a straight-forward or reverse mode of operation the **NO SPIN** allows equal speed to be distributed to both wheels.

When the tractor makes a turn or a front wheel passes over an obstruction, the outer wheel or the wheel riding over the obstruction must travel faster and farther than the other. To do this it automatically disengages, passes over the obstruction or negotiates the curve and reengages, again automatically, when the same rotation speed as that of the opposite wheel is reached.

If one wheel should lose traction momentarily, the opposite wheel which still has traction, continues to pull the vehicle until traction is regained by both wheels.

Turning

In a left turn, for instance, the right wheel increases speed. Axle shaft (14) transmits this speed increase to the left side gear (3), to the left driven clutch (10) and to the associated cam holdout ring (9). When the speed difference between the two wheels reaches a given value, ring (9) and clutch (10) overcome spring load and disengage from center cam (11), remaining in this position until the end of the curve.

Note: For correct **NO SPIN** differential operation, tyres must be equal (within a few millimetres) in rolling radii. Small differences may be corrected by adjusting tyre inflation pressure.

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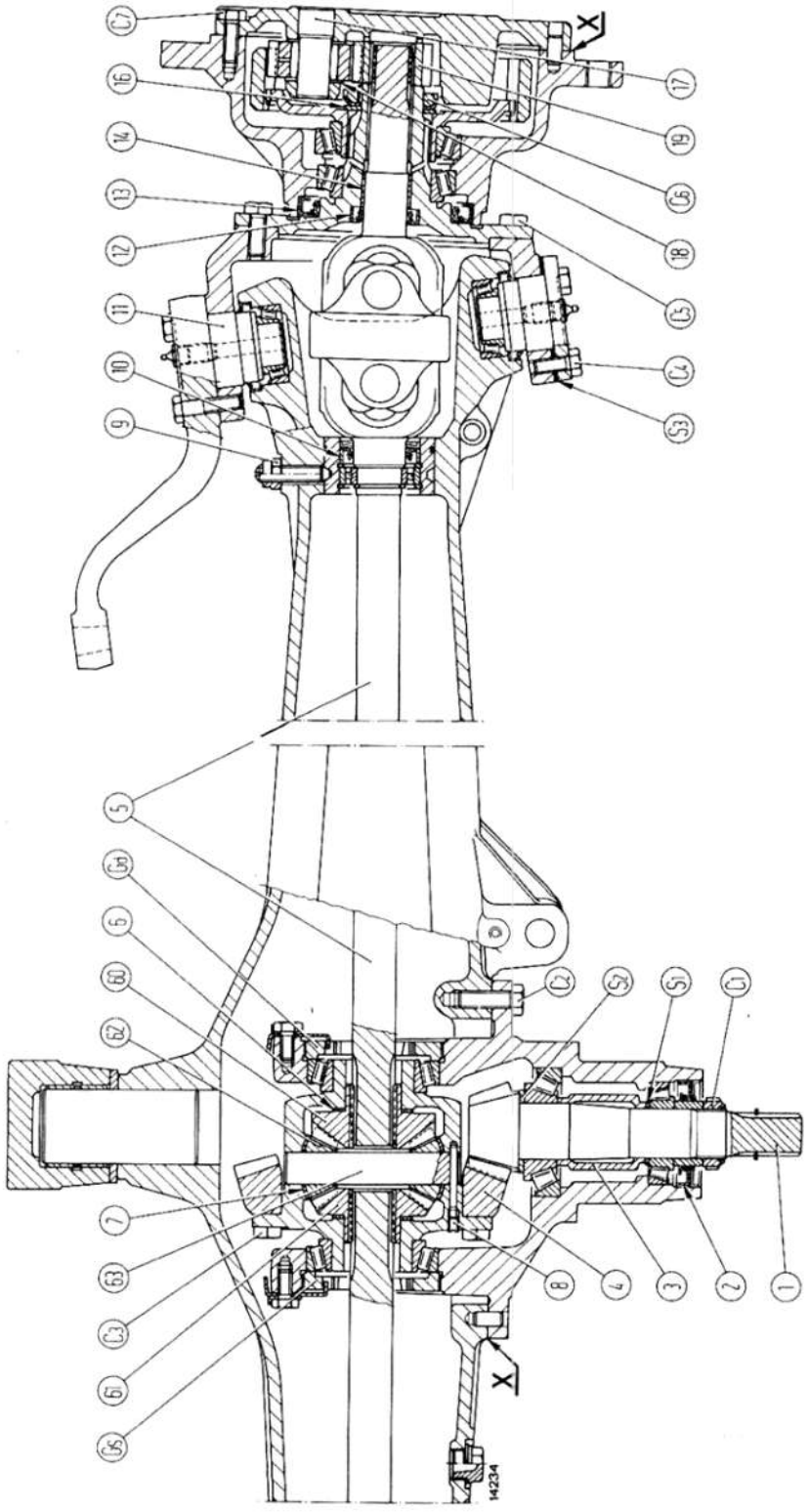

Longitudinal sections through front axle - Late Models 55-66DT and 60-66 DT P.M.

C_1. Bevel pinion bearing lockring - C_2. Differential carrier screw - C_3. Ring gear screw - C_4. King pin bearing screws - C_5. Steering knuckle screw - C_6. Wheel hub bearing lock ring. - C_7. Final drive housing screw. - Gd and Gs. R.H. and L.H. differential bearing lock ring - S_1. Bevel pinion bearing shim - S_2. Bevel pinion position shim - S_3. King pin bearing shims - 1. Bevel pinion - 2. Seal - 3. Bevel pinion bearing spacer - 4. Ring gear - 5. Axle shaft with universal joint - 6. Side gear washers - 7. Differential pinion washers - 8. Differential pinion journal screw - 9. Bearing carrier screw - 10. Seal - 11. King pin bearing - 12. and 13. Seals - 14. Axle shaft bushing - 16. Thrust washer - 17. Planet wheel journals - 18. Planet wheel shims - 19. Sun gear - 60-61. Side gears - 62. Differential pinion - 63. Differential pinion journal.

Note: For front axle swing pivot, axle drive and drive shaft sections, refer to illustrations and legends on page 1, Sect. 402, Mods. 55-66DT/60-66DT/70-66DT/80-66DT.

King pin bearing adjustments (for late 55-66DT/60-66DT models)

Refer to text and illustrations on pages 2 and 3, Sect. 401, Mods. 466DT and 566DT.

Wheel hub bearing adjustments (for late 55-66DT/60-66DT models)

Refer to text and illustrations on pages 4 and 5, Sect. 401, Mods. 466DT and 566DT.

DIFFERENTIAL ADJUSTMENT

Bevel drive/differential servicing

1. Bevel pinion shaft bearing adjustment and shim thickness determination using special purpose tool (for late 55-66DT/60-66DT models).

2. Bevel pinion shaft bearing adjustment and shim thickness determination using universal gauge 293510 (for late 55-66DT 60-66DT models).
3. Bevel pinion positioning shim thickness determination (for late 55-66DT/60-66DT models).
4. Differential bearing adjustment and bevel drive backlash check (for late 55-66DT/60-66DT models).
Planet-to-sun gear backlash adjustment (for late 55-66DT and 60-66DT models).

Refer to text and illustrations on pages 7 thru 13, Sect 401, Mods 466DT and 566DT.

NO-SPIN Differential

Text and illustrations given on page 3, Sect. 401, Mod. 45-66 apply.

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LIFT ADJUSTMENTS

1. Position control adjustment

2. Maximum lift arm travel adjustment on bench

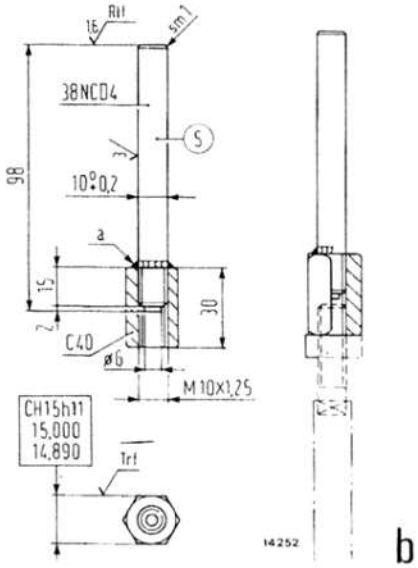
Exclude the Lift-O-Matic device and then proceed as instructed in text and illustrations on pages 7, 8 and 9, Sect. 501, Mods. 466/566/666/766.

Only exception is the final check value which, in this case (Lift-O-Matic excluded) shall be 86.3 to 86.7 mm (3.40 to 3.41 in) (For Mods. 466/566/666/766 this was instead 85 mm - 3.34 in as indicated on page 9, Sect. 501, Mods. 466/566/666/766). Value 86.3 to 86.7 mm may be checked by seeing to it that plunger (P_1) of tool **293846** is retracted by 1.3 to 1.7 mm (0.051 to 0.067 in) with respect to register (R_1, page 9, Sect. 501, Mods. 466/566/666/766).

3. Draft control adjustment (all models)

Note - Draft control adjustment requires use of tool **293846** together with tool **293845/1.**
If early model tool **293845** is available, it may be changed into late model tool **293845/1** by modifying spindle (S) as shown in figure alongside.
Before adjusting draught control, proceed as follows:

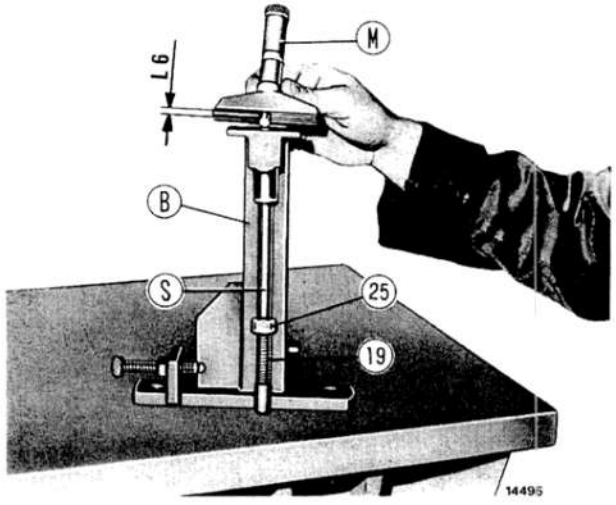
— Remove end of draft control rod (19, page 2) and install on spindle (S) of tool **293845/1,** securing through jam nut (25).



Modification of spindle (S) of early tool 293845 to obtain tool 293845/1 (dimensions in mm).

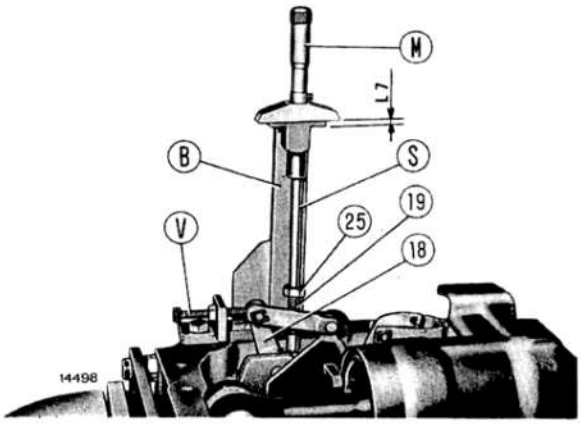
a. Brazing - sm 1 = chanfer 1 mm.

— Place tool **293845/1** (B) together with spindle (S) and end of draft control rod (19) on a surface plate and measure gap (L_6) between top of spindle and depth gauge support face using depth gauge (M). Note that control rod (19) must be installed on spindle (S) in such a way that spindle surface is a few millimeters below the depth gauge support face.



Zeroing tool 293845/1 (B) for draft control adjustment.

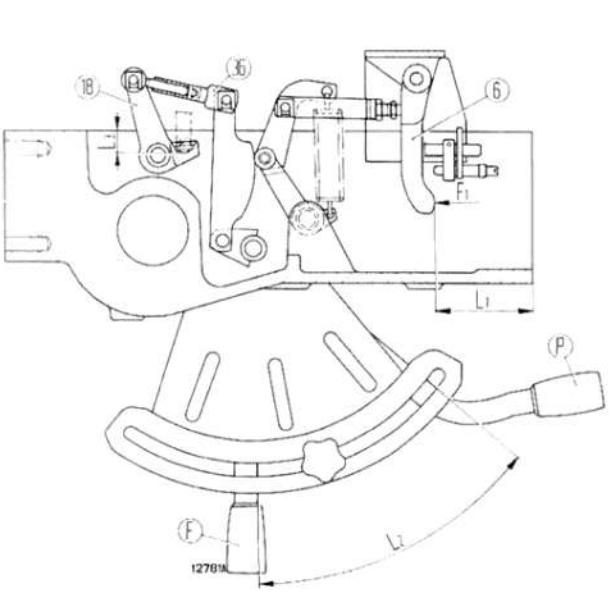
L_6. Gap between top of spindle (S) and depth gauge support face - M. Depth gauge - S. Spindle of tool **293845/1** - 19. Draft control rod - 25. Jam nut.

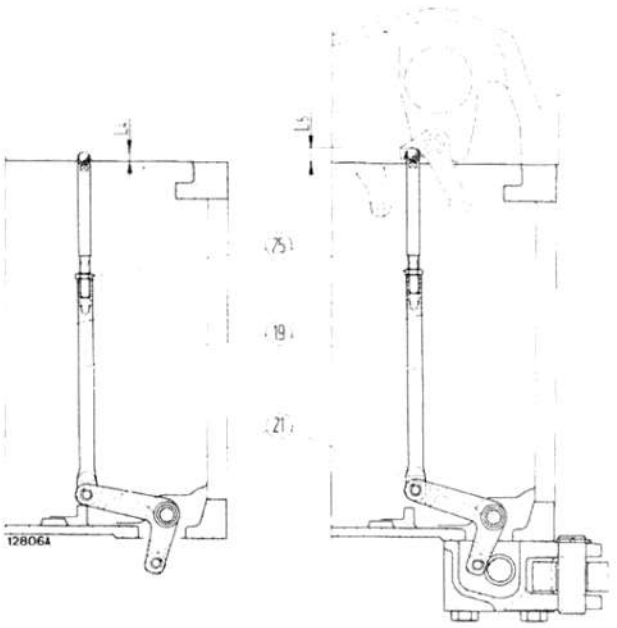


Adjusting draft control.

B. Tool **293845/1 -** L_7. Gap between top of spindle and depth gauge support face - M. Depth gauge - S. Spindle of tool **293845/1** - V. Screw - 18. Draft control inner lever - 19. Draft control rod - 25. Jam nut.

HYDRAULIC LIFT UNIT: Lift





Adjusting draft control.

F. Draft control lever - F_1 4 to 4.5 da N (kg) or 9 to 10 lb. Force applied to lever (6) by tool **293846** - L_1 = 82 to 82.1 mm (3.22 to 3.23 in). Distance between end of lever (6) and lift body front face - L_2 = 184 to 186 mm (7.24 to 7.33 in) Distance between quadrant slot start and lever (F) front edge - L_3 = 17.9 to 18.1 mm or 0.705 to 0.712 in. Distance between lift housing mating face on drive housing and rod contact face (19) on lever (18) - L_4. Proudness of spindle (19) top end over drive housing (w/sensing bar installed) - P. Position control lever - 6. Control valve actuating lever - 18. Draft control inner lever - 19. Draft control rod - 21. Draft control relay lever - 25. Jam nut - 36. Draft control adjustable rod.

Then, with Lift-O-Matic disconnected, proceed as follows:

— With tool **293846** (A, page 9, Sect. 501, Mods. 466/566/666/766) installed on lift body and disconnected from compressed air supply, move position control lever (P) all forward in quadrant and draft control outer lever lever (F) at a distance (L_2) of 184 to 186 mm (7.24 to 7.33 in) between quadrant start and lever front edge.

— Position draft control inner lever cam (32, page 3) horizontally, with lobe facing rear of lift.

— Install tool **293845/1** (B) on lift body and secure to two housing holes as shown in figure on page 1. Turn knurled screw (V) to move draft control inner lever (18) until end of plunger (P_1, page 8, Sect. 501, Mods. 466/566/666/766) is as close as possible to inner register (R_2) of tool **293846** (A).

— Rotate cam (32, page 3) slightly to retract end of plunger of tool **293846** as far as possible.

— Turn screw (V, page 1), again to move lever (18) until end of plunger is aligned with inner register (R_2, page 8, Sect. 501, Mods. 466/566/666/766) of tool **293846.**

— Rotate cam (32, page 3) as necessary to align end of plunger with outer register (R_1, page 8, Sect. 501, Mods. 466/566/666/766).

Then proceed as follows:

— Insert spindle of tool **293845/1** (B, page 1) in draft control inner lever seat (18).

— With end of plunger in line with outer register (R_1), move link (36) and measure distance (L_7) with depth gauge (M, page 1) between top of spindle and depth gauge support face on tool **293845/1**.

— Dimension (L_7, page 1) will be given by:

$$L_7 = L_6 + L_3$$

where:
L_6 = dimension measured with tool **293845/1** on surface plate.
L_3 = 17.9 to 18.1 mm (0.705 to 0.712 in) Distance between lift housing mating face on rear drive housing and rod contact face (19) on lever (18).

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Note - This condition corresponds to a gap (L_1, page 2) of 81.9 to 82.1 mm (3.22 to 3.23 in) between lever end (6) and lift body front face measured applying a force (F_1) of 4 to 4.5 da N or 9 to 10 lb to lever end.

Note - Check that with plunger (P_1, page 8, Sect. 501, Mods. 466/566/666/766), aligned with outer register (R_1) of tool **293846** (A), dimension (L_7, page 1) is as follows:

$$L_7 = L_6 + L_3$$

where:

L_6 = dimension measured with tool **293845/1** on surface plate.

L_3 = 17.9 to 18.1 mm (0.705 to 0.712). Distance between lift housing mating face on rear drive housing and rod contact face (19, page 2) on lever (18). To adjust, turn cam (32) and knurled screw (V, page 1) of tool **293845/1**.

— Install threaded dowel (32) and tighten screw (34) without folding down lockwasher tab (33).

— Disassemble tools **293846** and **293845/1** mount Lift-O-Matic and install hydraulic control valve on lift body.

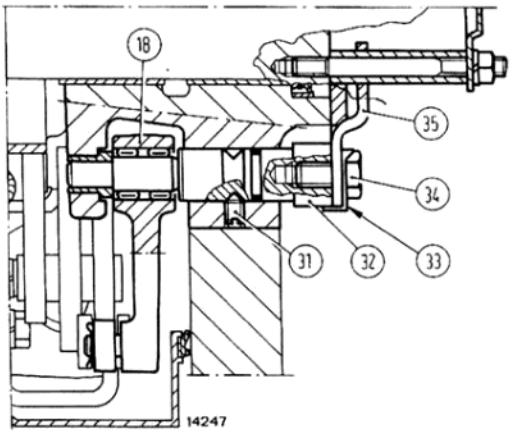
Install lift on tractor as described below:

Warning: First place tool **293845/1** on a surface plate and, using a depth gauge (M) measure distance (L_8) between tool base and depth gauge support face on tool. Stamp measured dimension (L_8) on tool.

— Install draft sensing unit complete with relay lever (21, page 2) and draft control rod (19) but without sensing bar on rear drive housing.

— Rest relay lever (21) on draft sensing unit housing and install tool **293845/1** securing it to two housing holes in such a way that draft control rod (19) fits perfectly into hole on tool as shown in Figure on page 4.

— Using depth gauge (M), measure distance (L_9) between top of rod (19) and depth gauge support face on tool.



Section through draft control inner lever (18) linkage.

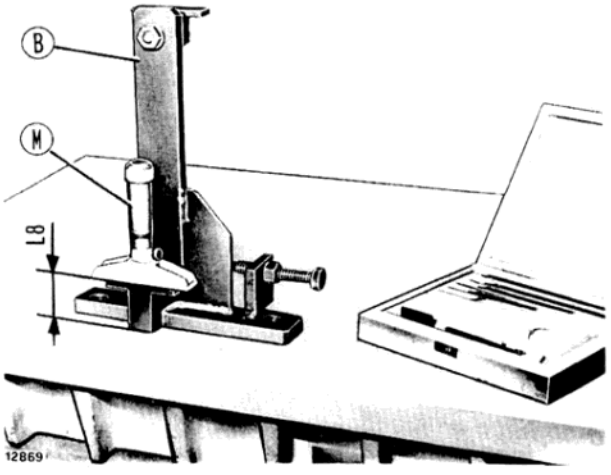
31. Threaded dowel - 32. Lever cam. - 33. Lock washer - 34. Screw - 35. Bracket.

Note - Prondness (L_4, page 2) of top rod end (19) from rear drive housing (with sensing bar removed) will be given by:

$$L_4 = L_8 - L_9$$

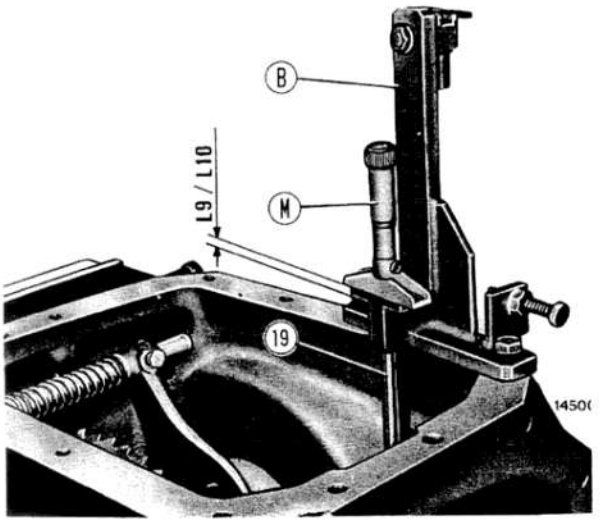
where:

L_8 and L_9 = Dimensions measured with tool **293845/1** resting on surface plate (L_8) or on rear drive housing (L_9, page 4).



Zeroing tool 293845/1 (B) for draft control adjustment.

L_8. Dimension between tool base on surface plate and depth gauge support face (to be stamped on tool) - M. Depth gauge.



Adjusting draft control.

B. Tool **293845/1** - L_6. Distance between top of rod (19) and depth gauge support face on tool (with sensing bar removed). L_{10}. Distance between top of rod (19) and depth gauge support face on tool (with sensing bar installed) - M. Depth gauge - 19. Draft control rod.

— Install sensing bar and measure new distance (L_{10}) between top of rod (19) and depth gauge support face on tool.

Note - Proudness (L_5, page 10) of rod end (19) from housing (with sensing bar installed) will be given by:

$$L_5 = L_8 - L_{10}$$

where:

L_8 and L_{10} = Dimensions measured with tool **293845/1** on surface plate (L_8) or on drive housing (L_{10}).

— Check that dimension (L_5) exceeds dimension (L_4) by at least 5 mm (0.20 in).

— Slacken jam nut (25) and adjust draft control rod length so as to obtain a new poudness (L_5) determined with tool **293845/1** of rod end relative to rear drive housing, as follows:

$$L_5 = L_8 - L_{11}$$

where:

L_8 = Dimension measured with tool **293845/1** on surface plate.

L_{11} = 18.3 to 18.5 mm (0.720 to 0.728 in). Proudness of rod end from drive housing.

— Tighten lock nut (25).

— Install lift on tractor, start engine and check (no load on arms) that in draft control lift begins at a travel (L_2, page 2) of 180 to 190 mm (7 to 7.5 in) measured from start of quadrant slot to front edge of outer lever (F). Otherwise, move cam pin (32, page 3) as required to restore the specified dimension.

— Lock pin (31) and stake lockwasher (33).

4. Maximum lift travel adjustment on tractor

Refer to the text and illustrations on page 11 and 12, Sect. 501, Mods. 466/566/666/766.

VALVE CHECK

Relief and cylinder safety valve setting check

Refer to text and illustrations on pages 12 and 13, Sect. 501, Mods. 466/566/666/766 the only exception being that the cylinder safety valve on Mods. 55-66/60-66/70-66/80-66 shall open at a pressure of 210 to 215 bar (214 to 219 kg/cm² or 2986 to 3058 in) while for the earlier 466/566/666/766 models this setting was 225 to 235 bar (230 to 240 kg/cm² or 3263 to 3408 psi).

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FIAT
Trattori

45-66
45-66 DT

WORKSHOP MANUAL

INDEX

SERVIZI TECNICI DI ASSISTENZA

FIAT TRATTORI S.p.A. - Viale delle Nazioni, 55 - S. Matteo - 41100 MODENA - Italia

Servizi Tecnici di Assistenza - Pubblicazioni Tecniche - Print No. **603.54.228.02** - X - 1987 - 2000 - MUCCHI

Print No. ***603.54.228.02*** *- X - 1987*

GENERAL: Contents

Print No. ***603.54.228.02*** *- X - 1987*

Print No. **603.54.228.02** - X - 1987

IDENTIFICATION DATA

Marketing code:	45-66 45-66DT
— 2-wheel drive	
— 4-wheel drive	
Engineering code:	
— 12-speed, 2-wheel drive	674.100.000
— 12-speed, 2-wheel drive w/mechanical reverser	674.100.000 var. 720.110
— 20-speed, 2-wheel drive	674.100.000 var. 720.111
— 12-speed, 4-wheel drive	674.127.000
— 12-speed, 4-wheel drive w/mechanical reverser	674.127.000 var. 720.110
— 20-speed, 4-wheel drive	674.127.000 var. 720.111
Engine type (all versions)	FIAT 8035.06.320 (C.A.V. Pump) FIAT 8035.06.220 (BOSCH pump)

WEIGHTS

Operating weight (including lift, implement attachment, tow hook, swinging drawbar and ROPS frame:	
— 2-wheel drive kg	1810
lb	3982
— 4-wheel drive kg	2030
lb	4466

ENGINE

Type	4-stroke diesel, naturally aspirated
Injection	Direct
Number of cylinders	3
Liners	Dry, pressed in engine block
Bore and stroke	100 x 115 mm (3.94 x 4.53 in)
Displacement	2710 cm³
Compression ratio	17:1
Max. horsepower DGM/DIN	33.1 kW (45 Hp)
Max. output speed	2500 rpm
Max. torque speed	1500 rpm
Main bearings	4
Oil pan	Iron

SPECIFICATIONS

Valve Gear	OH valves, pushrod operated
Inlet — Opens: BTDC	3°
Inlet — Closes: ABDC	23°
Exhaust — Opens: BBDC	48°30'
Exhaust — Closes: ATDC	6°
Valve clearance — for timing check	0.45 mm (0.018 in)
— Normal operation - Inlet	0.25 mm (0.010 in)
— Normal operation - Exhaust	0.35 mm (0.014 in)
Fuel System Air cleaner	Oil bath or dry, automatic drain centrifugal precleaner
Fuel filters (on feed pump delivery)	Integral cartridge with water separator
Feed pump	Double diaphragm
— Operation	Cam
Injection pump	Distributor, w/incorporated speed governor and automatic advance
— Type BOSCH	VE 3/11F 1250 L163-2-4804867
— Type C.A.V.	DPS 8522 A 020A-4806879
Integral all-speed governor — BOSCH	Centrifugal
Integral all-speed governor — C.A.V.	Centrifugal
Integral advance device — BOSCH	Hydraulic
Integral advance device — C.A.V.	Hydraulic
Pump timing, BTDC — BOSCH	6° ± 1°
Pump timing, BTDC — C.A.V.	0° ± 1°
Injectors	4-orifice
— Type	See page 10, Sect. 10, Mod. 55-66
— Release pressure	230 to 238 bar (235 to 243 kg/cm², 3336 to 3452 psi)
Firing order	1-2-3
Lubrication System	Forced feed, gear pump
Pump drive	Camshaft
Oil filter	Strainer on pump inlet full flow cartridge on outlet
Relief valve	In pump body
— Oil pressure at governed speed	2.9 to 3.9 bar (3 to 4 kg/cm², 42.6 to 56.9 psi)

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Cooling System	Water, centrifugal pump
Radiator	4 deep core vertical tube
Fan, water pump pulley mounted	Suction, steel
Temperature control	Wax thermostat
Tractor Meter	On instrument panel
— Drive	Oil pump gear
Hourmeter activation speed	1800 rpm
Meter drive ratio	1 to 2

POWER TRAIN

Clutch

Type	LUK or VALEO 10"
Construction	Twin, dry single plate
Control	
— Master	Pedal
— PTO	Manual lever
Plate materials	Organic

Transmission

Type	Constant mesh full synchromesh
Gear	Helical
Splitter	Pinion drive, 3 forward and 1 reverse range for 12 forward and 4 reverse speeds
Creeper (when fitted)	20 forward and 8 reverse speeds
Reverser (when fitted)	Mechanical, 12 forward, 12 reverse speeds
Transmission and splitter control	Separate levers to right of operator
Creeper or reverser control	Lever to left of operator

Bevel drive	On differential
Differential	Two pinion
Differential lock	Pedal controlled
Final drives	Planetary, three pinion

BRAKES

Service

Type	Disc, oil-bath, axle shaft mounted
Control	Separate latched pedals

Parking and emergency
Acting on service brake hand lever operated.

STEERING

Mechanical, recirculating ball type or hydrostatic power steering by independent circuits.

Turning radius (no brakes):

— 45-66	3500 mm (11 ft 5 in)
— 45-66DT, FWD in	5000 mm (16 ft 4 in)

FRONT AXLE

Type	Inverted U, telescoping, center pivotting
Track adjustment	Sliding axle ends
Track settings	6 off

FRONT WHEEL DRIVE

Type	Full floating, center pivotting, unjointed drive shaft and articulations on tractor centerline
Differential	Two pinion
	No-Spin unit optional
Final drives	Planetary, in wheel hubs
Track adjustments	Disc/Rim/Hub repositioning
Track settings	8 off

REAR WHEELS

Track adjustments	Disc/Rim/Hub repositioning
Track settings	7 off

POWER TAKE-OFF

Fully independent		(540 rpm or 540-1000 rpm)
Shaft	540 rpm	1 3/8" - 6 spline
	1000 rpm	1 3/8" - 21 spline
Control		Hand lever operated

Standard speed selection:
— Lever on rear drive housing

Engine speed with PTO at standard speeds:

— 540 rpm (all models)	2200 rpm
— 1000 rpm (all models)	2380 rpm

Rotation	Clockwise (tractor viewed from rear)

Ground speed PTO

Control	Same as independent
Rotation	PTO

Shaft drive ratio

— 540 rpm	7.4 revs per rear wheel turn
— 1000 rpm	12.6 revs per rear wheel turn

SPECIFICATIONS

LIFT

Type	Hydraulic, draft, position and combined draft/position control
Draft control	Lower links through sensing bar
Variospeed sensitivity control	4-position lever on control valve
Response control	Knob on control valve
Pump	Gear, engine valve gear driven
LIF-O-MATIC push-button	Lower link raising and lowering with automatic return to selected working depth
Hydraulic fluid	Rear drive housing oil
Implement attachment	Categories 1 and 2

Remote control valves

Number	One or two
Type	— Convertible from single to double-acting — Double-acting, with float position

TOWING ATTACHMENTS

Rear

Drilled crossmember
Swinging drawbar
Tow hook, adjustable for height
Rockinger jaw hook
Lemoine hook
Support with semi-trailer hitch

Front

Fixed pull hook

BALLASTING

Front axle

Three, 30 kg (66 lb) cast iron plates for a total of 90 kg (198 lb)

Rear wheels

Two or four 50 kg (110 lb) rings mounted on wheel discs for a total of 100 kg (220 lb) or 200 kg (440 lb)

BODY

Forward-tiltable hood.
Conventional Operator's compartment.
Partly wrap-around fenders with mounts for ROPS frame.
Fuel tank in front of Operator's compartment.
Padded Operator's seat, with rests. Parallelogram suspension, hydraulic dampers, manual adjustment for height and ride.
Multi function instrument panel (13 indications) plus control board.

ELECTRICAL SYSTEM

Voltage	12 V
Alternator	MARELLI or BOSCH
Starter	BOSCH or MARELLI or LUCAS
Capacity	88 or 90 Ah

Lighting

Headlamps	Twin, high and asymmetric low beams, 45/40 W

Front lights

— Parking	5 W
— Turn signal	21 W

Tail lights

— Parking	5 W
— Turn signal	21 W
— Stop	21 W
— License plate	

Instruments and accessories

Instrument panel	multi-function with check control
Control board	
Worklight	35 W
Rear power point	DIN, 7-pole
Dash power point	Single-pole, control board-mounted
Horn	push
Cold starting	thermostarter or start-pilot
Cigar lighter	dash-mounted
Fuses	up to 8 (see Section 60, page 12, Mods. 466/566/666/766)
Hazard warning lights	tractor and trailers

TIRE SIZES

	45-66	45-66DT
Front	5.50-16	7.50-20(1)
	6.00-16	9.50-20(2)
Rear	12.4/11-28	12.4/11-28(1)
	13.6/12-28	13.6/12-28(2)

(1) (2) Tire matching references

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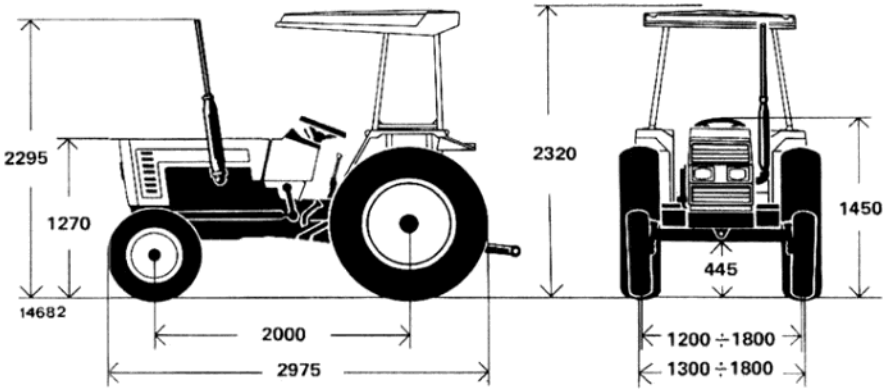
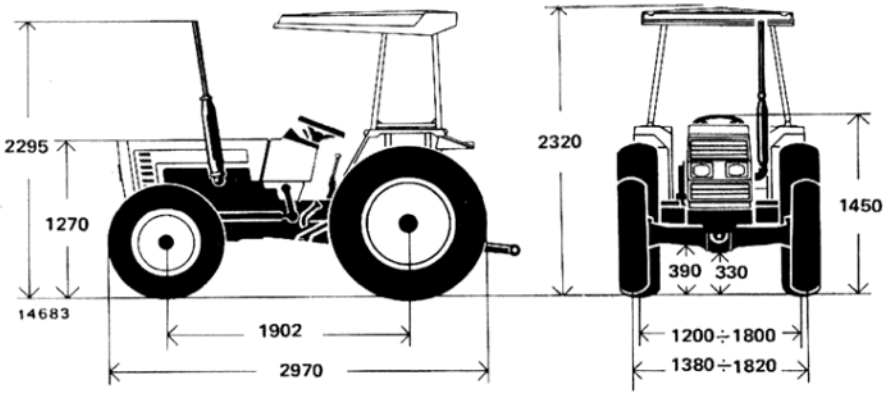
DIMENSIONS (in mm)

Mod. 45-66
(w/size 5.50-16 front and 12.4/11-28 rear tires)

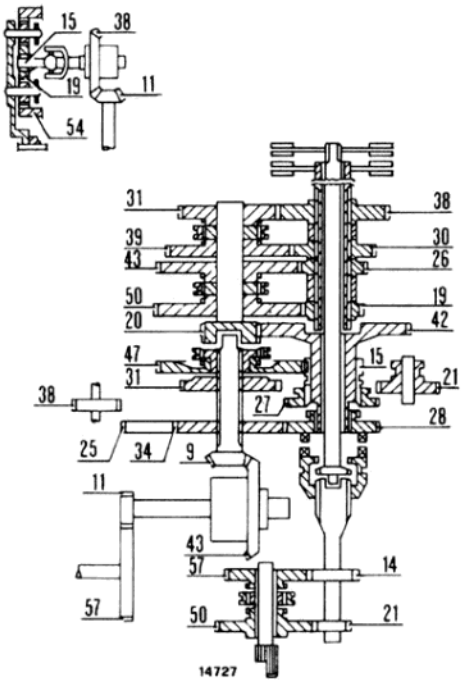




Mod. 45-66 DT
(w/size 7.50-20 front and 12.4/11-28 rear tires)

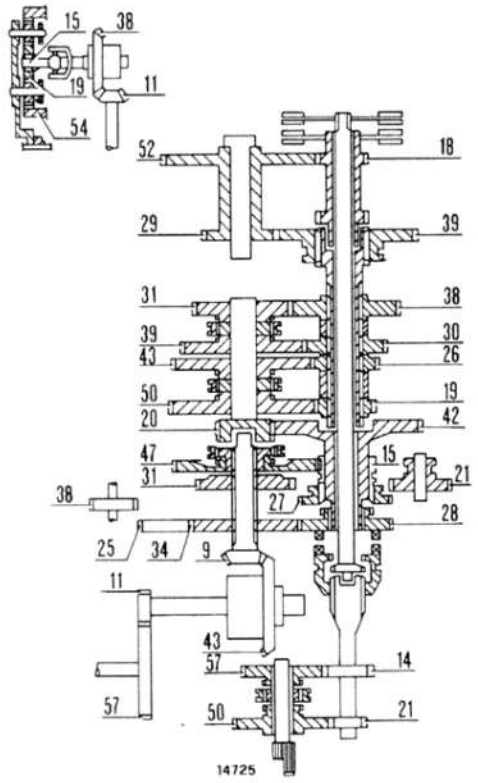
POWER TRAIN SCHEMATICS
12-Speed Version

Tractor road speeds with engine at max power speed rate				
GEARS	REAR TIRE SIZES			
	12.4/11-28		13.6/12-28	
	kph	mph	kph	mph
1st Low	1.3	0.8	1.3	0.8
2nd »	2.1	1.3	2.1	1.3
3rd »	2.6	1.6	2.7	1.7
4th »	4.2	2.6	4.4	2.7
1st Normal	3.3	2.0	3.5	2.2
2nd »	5.3	3.3	5.5	3.4
3rd »	6.8	4.2	7.1	4.4
4th »	10.8	6.7	11.2	6.9
1st High	8.5	5.3	8.9	5.5
2nd »	13.6	8.4	14.2	8.8
3rd »	17.3	10.7	18.0	11.2
4th »	27.5	17.0	28.7	17.8
1st Reverse	3.5	2.2	3.7	2.3
2nd »	5.6	3.5	5.9	3.6
3rd »	7.2	4.5	7.5	4.6
4th »	11.4	7.0	11.9	7.4

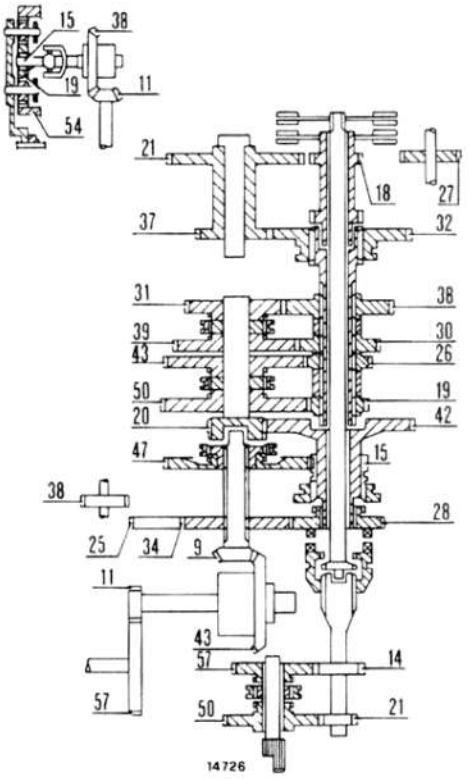


POWER TRAIN SCHEMATICS

Creeper Version



Mechanical Reverser Version



Tractor road speeds with engine at max power speed rate				
GEARS	REAR TIRE SIZES			
	12.4/11-28		13.6/12-28	
	kph	mph	kph	mph
1st Low creeper	0.3	0.18	0.3	0.18
2nd »	0.5	0.31	0.5	0.31
3rd »	0.7	0.43	0.7	0.43
4th »	1.1	0.68	1.1	0.68
1st Normal creeper	0.9	0.56	0.9	0.56
2nd »	1.4	0.87	1.4	0.87
3rd »	1.7	1.05	1.8	1.12
4th »	2.8	1.74	2.9	1.80
1st Low	1.3	0.8	1.3	0.8
2nd »	2.1	1.3	2.1	1.3
3rd »	2.6	1.6	2.7	1.7
4th »	4.2	2.6	4.4	2.7
1st Normal	3.3	2.0	3.5	2.2
2nd »	5.3	3.3	5.5	3.4
3rd »	6.8	4.2	7.1	4.4
4th »	10.8	6.7	11.2	6.9
1st High	8.5	5.3	8.9	5.5
2nd »	13.6	8.4	14.2	8.8
3rd »	17.3	10.7	18.0	11.2
4th »	27.5	17.0	28.7	17.8
1st Low Reverse	0.9	0.56	0.9	0.56
2nd »	1.4	0.87	1.5	0.93
3rd »	1.8	1.12	1.9	1.18
4th »	2.9	1.80	3.1	1.92
1st High Reverse	3.5	2.2	3.7	2.3
2nd »	5.6	3.5	5.9	3.6
3rd »	7.2	4.5	7.5	4.6
4th »	11.4	7.0	11.2	6.9

Tractor road speeds with engine at max power speed rate								
GEARS	FORWARD DRIVE				REVERSE DRIVE			
	Tire sizes				Tire sizes			
	12.4/11-28		13.6/12-28		12.4/11-28		13.6/12-28	
	kph	mph	kph	mph	kph	mph	kph	mph
1st Low	1.3	0.8	1.3	0.8	1.3	0.8	1.3	0.8
2nd »	2.1	1.3	2.1	1.3	2.0	1.2	2.1	1.3
3rd »	2.6	1.6	2.7	1.7	2.6	1.6	2.7	1.7
4th »	4.2	2.6	4.4	2.7	4.1	2.5	4.3	2.7
1st Normal	3.3	2.0	3.5	2.5	3.3	2.0	3.5	2.5
2nd »	5.3	3.3	5.5	3.4	5.3	3.3	5.5	3.4
3rd »	6.8	4.2	7.1	4.4	6.7	4.1	7.0	4.3
4th »	10.8	6.7	11.2	6.9	10.7	6.6	11.1	6.9
1st High	8.5	5.3	8.9	5.5	8.5	5.3	8.8	5.4
2nd »	13.6	8.4	14.2	8.8	13.5	8.3	14.0	8.7
3rd »	17.3	10.7	18.0	11.2	17.1	10.6	17.8	11.0
4th »	27.5	17.0	28.7	17.8	27.3	16.9	28.4	17.6

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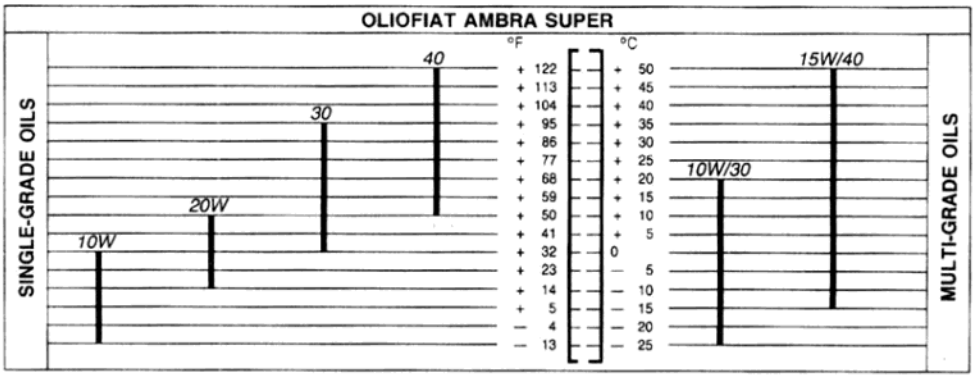
FLUID CAPACITIES

DESCRIPTION	FLUID				
	FIAT RECOMMENDED PRODUCTS	45-66 and 45-66DT			EQUIVALENT INTERNATIONAL DESIGNATION
		dm³ (liters)	Imp units	kg	
Sump and filter oil	Oliofiat **AMBRA SUPER**	7.3	1 2/3 Gal	6.6	Diesel engirie oil to MIL-L-2104 D and Service API CD
Sump oil		6.7	1 1/2 Gal	6	
Air cleaner oil		0.55	1 Pt	0.5	
Power steering circuit oil		1.7	3 Pt	1.5	
Steering gear box oil		0.9	1 2/3 Pt	0.8	
Live front axle oil:					
— Axle casing		4.8	8 2/5 Pt	4.3	
— Planetary drives (each)		0.55	1 Pt	0.5	
Rear drive housing (transmission, bevel drive, brakes) and lift oil:	Oliofiat **TUTELA MULTI F**				Transmission oil bath brakes and lift oil to Massey-Ferguson MF 1135 and Ford M2C 86A
— 2-wheel drive		22	3 4/5 Gal	20	
— 4-wheel drive		23	5 Gal	20	
Final drives (each)		2.3	4 Pt	2.1	
Front wheel hub oil	**Grassofiat TUTELA G9**	—	—	—	Lithium-calcium base grease to NLGI No.2 consistency
Pressure lubricators					
Coolant	Water and FIAT **«PARAFLU 11»**	12	2 2/3 Gal	—	
Fuel tank	Diesel oil	42	9 1/3 Gal	—	



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Refer to data given on pages 9-10, Sect. 10, Models 55-66 which apply. Provided on this page and the next are the calibration data specific of Mod. 45-66.

MODEL 45-66 - CALIBRATION DATA-BOSCH INJECTION PUMP TYPE VE 3/11 F 1250 L 163 2-4804867 (Provisional data)

ASSEMBLY DATA

Pump rotation (drive end) . . . . . Anti-clockwise
Injection order 1-2-3
Plunger lift to spill cut-off
. . . . . 0.2 ± 0.05 mm (0.008 ± 0.0019 in)
Plunger lift, pump timing on engine . . .1 mm (.039 in)
Pump timing 6° ± 1° B.T.D.C., cylinder No. 1 in compression stroke
Delivery connection of cylinder No. 1: Marked with letter A.

TEST PLAN

Test bench complying with ISO 4008.
Injectors complying with ISO 4010: 1688901020 with pad 1 680 103 096.
Release pressure . . . . . 172 to 175 bar (175 to 178 kg/cm² or 2483 to 2492 psi).
Fuel pressure . . . . . 0.2 bar (0.2 kg/cm², 2.8 psi)
Lines (as per ISO 4093.2) . . . . . 6x2x840 mm.
Graduate drain time 30''.
Test fluid . . . . . ISO 4113 at 40° ± 2°C.

ADJUSTMENT VALUES

Operation description	rpm	Advance piston stroke mm	Fuel pressure bar (kg/cm²)	Delivery cm³/1000 shots	Transfer pressure bar (kg/cm²)	Spread cm³/1000 shots
Full load delivery	800	2.8 to 3.2	4.2 to 4.8	56.5 to 57.5	0.2	3.5
Idle speed limit	350	—	—	10 to 14	0.2	3
Starting delivery	150	—	—	100 to 120	0.2	—
Full throttle limit	1350	—	—	39 to 45	0.2	—

TEST VALUES

Advance device check rpm	mm	Fuel pressure check rpm	bar (kg/cm²)	Leak off rpm	cm³/100 shots
600	0.6 to 1.4	600	3.2 to 3.8		
800	2.8 to 3.2	800	4.2 to 4.8		
1200	4.6 to 5.4	1200	6.4 to 7.0		

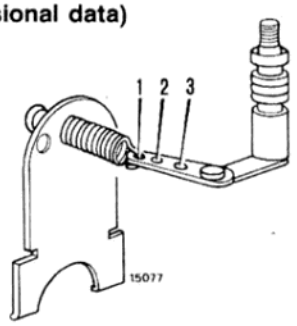
DELIVERY CHECK

Full throttle stop rpm	Delivery cm³/1000 shots	Transfer pressure bar (kg/cm²)	Idle speed shut-off rpm	Delivery cm³/1000 shots	Transfer pressure bar (kg/cm²)
1400 to 1460	⩽ 2	0.2	350	10 to 14	0.2
1350	39 to 45	0.2	400	⩽ 2	0.2
1250	50.5 to 53.5	0.2			
800	56.5 to 57.5	0.2			
500	52.5 to 55.5	0.2			
250	≤ 47	0.2			
150	100 to 120	0.2			

MODEL 45-66 - CALIBRATION DATA-C.A.V. INJECTION PUMP TYPE DPS 8522A 020A - 4806879 (Provisional data)

ASSEMBLY DATA

Pump rotation (drive end) . . . . . Anti-clockwise
Injection order 1-2-3
Governor control stud to metering valve lever pin . . . . . 41 to 42 mm (1.61 to 1.65 in)
Pump timing : 0° ± 1° B.T.D.C., cylinder No. 1 in compression stroke
Flange guide dia . . . . . 50 mm (1.96 in)
Delivery connection of cylinder No. 1: Marked with letter **U**.



Control spring hole 2.

TEST CONDITIONS

Test bench complying with ISO 4008.
Injectors complying with ISO 4010.
Test fluid: ISO 4113 at 40° ± 2°C
Fuel pressure: 0.1 bar (0,1 kg/cm² or 1.4 psi).
Graduate drain time 30''.
Release pressure: 172 to 175 bar (175 to 178 kg/cm² or 2483 to 2492 psi).
Lines: 6x2x845 mm (ISO 4093.2).
Adjust maximum speed screw to protrude 9 mm (0.354 in) from surface of associated nut.

Fully slacken fuel pressure adjusting screw, then tighten through 3 1/2 turns.
Position valve adjusting screw so that it is just beneath the surface of the associated nut.
Fully slacken maximum speed, idle speed and antistall screw.
A 3.5 mm (0.138 in) shim is installed on the advance device spring side plug; no other shims are required.

Test No.	Lever position	Speed rpm	Advance degrees	Transfer pressure bar (kg/cm²)	Injector delivery cm³/200 shots	Spread cm³/200 shots	Leak off cm³/100 shots
1 (1)	max	200	—	—	—	—	—
2 (2)		1000	—	—	—	—	—
3		100	—	⩾ 0.4	—	—	—
4 (+)		850	—	—	—	—	—
5(7)-6		900	3,8	4,2 to 5,2	—	—	—
7 (4)		1250	5,8 to 6,3	—	—	—	—
8 - 9		750	—	—	—	—	50 to 90 (○)
10 (5)		1250	—	—	8,7 to 8,9 (●)	⩽ 0,8	—
11 (6)		1420	—	—	1,5 to 2	—	—
12 (7)		1250	—	—	—	—	—
13 (8)		350	—	—	⩽ 12	—	—
14 (9)		250	0	—	⩾ 14	—	—
15 (10)	min	850	—	—	—	—	—
16 (11)		325	—	—	2,0 to 2,5	—	—
17 (12)		325	—	—	⩽ 0,8	—	—
18 (13)		325	—	—	⩽ 0,5	—	—
19 (14)		—	—	—	—	—	—

1) Delivery to all injectors.
2) Run pump for 3'.
3) Set pressure adjusting screw for specified advance and check that pressure is as specified.
4) Stop test bench, disconnect transfer pressure gauge and install shut-off device. Activate shut-off device and start test bench.
5) Record average delivery.
6) Adjust max. speed screw and block in position.
7) Delivery shall not be less than in test 10 by more than 0.4 cm³/200 shots.
8) Prior to test, bring bench speed to 100 revs and slacken screw until reaching specified values
9) Prior to test, bring bench speed to 100 revs, stop and restart machine.
10) Adjust anti-stall screw for a delivery of 2 to 3 cm³/2000 shots. Block screw in position.
11) Adjust idling speed screw.
12) Shut-off lever closed.
13) With shut-off deactivated and shut-off lever open, wait 5'' before performing test.
14) Connect delivery fitting «U» to injector tester and maintain 54 bar (757 psi) pressure. Using timing tool, bring about hydraulic lockup, then position pump timing plate at + 15.5°.
(●) Take reading after 15''. (○) Flow 375 to 675 cm³ /minute.
(+) Pump body pressure as measured with gauge connected at vent screw hole shall be 0.1 to 0.3 bar (0.1 to 0.3 kg/cm³ or 1.4 to 4.2 psi).

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ON-BENCH BRAKE TEST PERFORMANCE DATA

Test Plan

Engine deprived of fan, air cleaner and exhaust silencer.

Barometric pressure:	740 ± 5 mm Hg at a.s.l.
Ambient temperature:	20 ± 3°C
Relative humidity:	70 ± 5%
Fuel density:	830 ± 10 g/liter

Injection pump static advance timing BTDC cylinder No. 1 on compression stroke:

— Mod. 45-66 BOSCH Injection pump	6° ± 1°
— Mod. 45-66 CAV Injection pump	0° ± 1°

MOD. 45-66 - BOSCH INJECTION PUMP

Accelerator position	Braking	Engine speed	Power, w/run-in engine		Fuel consumption kg/h
			2 hrs total kW	50 hrs total kW	
Maximum	Full load	2500	⩾ 32.4 (44 HP) (°)	⩾ 33.1 (45 HP)	7.8 to 8.2
Maximum	Full torque	1500	⩾ 22.8 (31 HP) (°)	⩾ 23.5 (32 HP)	5.1 to 5.6
Maximum	No load	2750 to 2790	—	—	—
Minimum	No load	625 to 675	—	—	—

MOD. 45-66 - CAV INJECTION PUMP

Accelerator position	Braking	Engine speed	Power, w/run-in engine		Fuel consumption kg/h
			2 hrs total kW	50 hrs total kW	
Maximum	Full load	2500	⩾ 32.4 (44 HP) (°)	⩾ 33.1 (45 HP)	7.8 to 8.2
Maximum	Full torque	1500	⩾ 22.8 (31 HP) (°)	⩾ 23.5 (32 HP)	5.1 to 5.6
Maximum	No load	2750 to 2790	—	—	—
Minimum	No load	625 to 675	—	—	—

(°) Design values

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CLUTCH - LUK 10''/10''

Type	Twin, single dry plate
Control	
— Master	Pedal
— PTO	Manual
Release mechanism	Dished spring
Plate material:	
— Master	Organic compound
Plate thickness:	
— Master	10.1 to 10.5 mm (0.397 to 0.413 in)
— PTO (all models)	8.5 to 8.9 mm (0.3346 to 0.350 in)
— Wear limit	See page 8 section 201
Master clutch control sleeve working clearance	0.050 to 0.151 mm (0.0020 to 0.0060 in)
PTO clutch control sleeve working clearance	0.060 to 0.180 mm (0.0024 to 0.0071 in)
Release lever alignment	See pages 5 & 7 Sect. 201
Clutch linkage adjustment	See page 9 Sect. 201

CLUTCH - VALEO 10''/10''

Type	Twin, single dry plate
Control	
— Master	Pedal
— PTO	Manual
Release mechanism	Dished spring
Plate material	Organic compound
Plate thickness:	
— Master	8.2 to 8.8 mm (0.32 to 0.34 in)
— PTO	8.5 to 8.8 mm (0.33 to 0.35 in)
— Wear limit	See page 4, Sect. 201
Master clutch control sleeve working clearance	0.050 to 0.151 mm (0.0020 to 0.0060 in)
PTO clutch control sleeve working clearance	0.060 to 0.180 mm (0.0024 to 0.0071 in)
Release lever alignment	See pages 5 & 7, Sect. 201
Clutch linkage adjustment	See page 9, Sect. 201

TRANSMISSION AND SPLITTER

Transmission type	4-speed, constant mesh helical gears with speed range synchromesh shift

Splitter	Pinion drive. 3 forward ranges and 1 reverse range, for a total of 12 forward 4 reverse speeds.
— Gears	Spur
— Reduction ratios	
● Low	15 to 47 = 1 to 3.133
● Normal	28 to 34 = 1 to 1.214
● High	1
Transmission and splitter controls	Separate manual levers
Transmission shaft thrust ring thickness (S, page 4, Sect. 202)	2.80 - 3.00 - 3.20 - 3.40 - 3.60 mm (0.1102-0.1181-0.1260-0.1338-0.1417 in)
PTO clutch shaft dia.	21.979 to 22.000 mm (0.865 to 0.867 in)
Bushing fitted I.D.	22.040 to 22.092 mm(1) (0.867 to 0.869 in)(1)
Shaft clearance in bushing	0.040 to 0.113 mm (0.002 to 0.004 in)
Bushing interference fit with drive shaft	0.037 to 0.091 mm (0.0014 to 0.0035 in)
Selector shaft detent ball spring length:	
— Free	18.8 mm (0.7401 in)
— Under 73 to 81 N (7.5 to 8.3 kg. or 16 to 18 lb)	15.8 mm (0.6219 in)
Lever spring length:	
— Free	76 mm (2.992 in)
— Under 238 to 240 N (24.3 to 24.5 kg, or 53 to 54 lb)	40 mm (1.575 in)

(1) Not reamed.

CREEPER

Type	Pinion drive, spur gear, between clutch and transmission. 20 forward and 2 reverse speeds.
Reduction ratio	$\frac{18 \times 29}{52 \times 39}$ = 1 to 3.885
Control	Lever on operator's left

REVERSER

Type	Manual, spur gear, between clutch and transmission. 1 driven gear, 1 intermediate gear, 1 relay gear.
Reduction ratio	$\frac{18 \times 27 \times 37}{27 \times 21 \times 32}$ = 1 to 1.009
Control	Lever on operators' left

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BEVEL DRIVE AND DIFFERENTIAL

Bevel drive ratio	9/43 = 1 to 4.8
Bevel drive backlash	0.15 to 0.20 mm (0.0059 to 0.0078 in)
Differential	2-pinion
Differential lock	Pedal controlled
Bevel pinion adjustment	See pages 1 and 2, section 204
Bevel pinion bearing adjustment	See page 3, section 204
Bevel pinion bearing shim thickness range	1.00-1.05-1.10-1.15-1.20-1.25-1.30-1.35-1.40-1.45-1.50-1.55-1.60-1.65-1.70-1.75-1.80-1.85-1.90-1.95-2.00-2.05-2.10-2.15-2.20 mm (0.039-0.041-0.043-0.045-0.047-0.049-0.051-0.053-0.055-0.057-0.059-0.061-0.063-0.065-0.067-0.069-0.071-0.073-0.075-0.077-0.079-0.081-0.083-0.085-0.087 in)
Differential bearing and bevel drive backlash adjustment	See pages 3, 4 and 5, section 204
Side gear and differential pinion backlash	0.15 mm (0.006 in)
Side gear thrust washer thickness	1.5-1.6 mm (0.059-0.063 in)
Differential pinion thrust washer thickness	15 mm (0.059 in)
Differential lock adjustment	See page 5, Sect. 204
Differential lock fork shim thickness	0.5 mm (0.020 in)
Differential lock fork spring length:	
— Free	156 mm (6:14 in)
— Under 329 to 363 N (33.6 to 37 kg. or 74 to 81 lb)	102 mm (4.01 in)

BRAKES

Type:	
— Service	Disc, oil bath, axle shaft mounted
— Parking	Same discs as service brake
Control:	
— Service	Mechanical, latched pedals
— Parking	Mechanical, manual lever
Number of discs (each brake)	2
Disc material	organic compound

FINAL DRIVES

Type	Pinion drive, spur
Reduction ratio	11 to 57 = 1 to 5.2

POWER TAKE-OFF

540 rpm PTO	
Type	Independent or Ground speed
Control	Manual by lever
Rotation (as viewed from rear)	Clockwise
Engine speed with PTO at 540 rpm (all models):	2200 rpm
PTO speed with engine at full load rpm:	614 rpm
Output shaft diameter	1 3/8 in (6 spline)
540/1000 rpm PTO	
Type Control Rotation (as vieweol from rear)	As 540 rpm PTO
Speed selection	Through PTO housing-mounted lever
Engine speed with PTO at 540 rpm (all models):	2200 rpm
Engine speed with PTO at 1000 rpm (all models):	2380 rpm
PTO speed at full engine rpm: — 540 rpm — 1000 rpm	 614 rpm 1050 rpm
Ground speed PTO speed: — 540 rpm — 1050 rpm	 7.4 revs/wheel turn 12.6 revs/wheel turn
Output shaft dia. — 540 rpm — 1000	 1 3/8 in (6-spline) 1 3/8 in (21-spline)
Driven gear bushing O.D. (14, page 2, Sect. 207)	45.925 to 45.950 mm (1.8080 to 1.8090)
Driven gear I.D. (10 and 11)	46.050 to 46.075 mm (1.8130 to 1.8140 in)
Gear clearance in bushings	0.100 to 0.150 mm (0.0039 to 0.0059 in)
Driven shaft diameter	37.966 to 37.991 mm (1.4947 to 1.4957 in)
Bushing I.D. (14)	38.000 to 38.039 mm (1.4960 to 1.4976 in)
Shaft clearance in bushings	0.009 to 0.073 mm (0.0003 to 0.0029 in)

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TORQUE DATA

DESCRIPTION	Thread Size	Torque		
		Nm	kgm	ft lb
Clutch-Sect. 201				
Screw, clutch to flywheel (C_1, page 1)	M 8x1.25	25	2.6	19
Screw, withdrawal fork (C_3, pages 2 and 6)	M 16x1.5	157	16	116
Screw, clutch housing to rear drive housing	M 12x1.25	98	10	72
Screw, clutch housing to engine (C_2, pages 2 and 6)	M 12x1.25	98	10	72
Nut, sleeve cover (C_4, pages 2 and 6)	M 8x1.25	17	1.7	12
Transmission and splitter - Sect. 202				
Nut driven gear shaft (C_1, page 4)	M 32x1.5	294	30	217
Screw, transmission shaft bearing cup (C_2)	M 8x1.25	28	2.9	21
Screw, upper transmission housing cover (C_3	M 8x1.25	25	2.6	19
Screw, lower transmission housing cover (C_4)	M 10x1.25	59	6	43
Creeper - Reverser - Sect. 203				
Screw, creeper driven shaft retaining plate or reverser intermediate gear pin and driven shaft (C_1, pages 1 and 3)	M 12x1.25	67	6.8	49
Bevel drive and differential - Sect. 204				
Screw, ring gear (C_1, page 3)	M 12x1.25	123	12.5	90
Screws, self-locking, support, ring gear and differential (C_2)	M 10x1.25	59	6	43
Screw, support, differential lock pedal (C_3, page 5)	M 10x1.25	49	5	36
Brakes - Sect. 205				
Screw, quadrant and lever	M 16x1.5	147	15	108
Final drives - Sect. 206				
Nut, wheel shaft (C_5, page 1)	M 42x1.5	490	50	362
Screw, final drive cover (C_1)	M 10x1.25	59	6	43
Screw, final drive housing (C_2)	M 10x1.25	73	7.5	54
Screw, disc to wheel hub (C_4)	M 18x1.5	255	26	188
Nut, disc to wheel rim (C_3)	M 16x1.5	245	25	181
Nut, wheel ballast ring	M 14x1.5	221	22.5	163

TORQUE DATA

(continued)

DESCRIPTION	Thread Size	Torque		
		Nm	kgm	ft lb
Power take-off - Sect. 207 Nut, driven gear shaft (C_1, page 1)	M 28x1.5	294	30	217
Nut, self-locking, spline extension (540/1000 rpm PTO) (C_3) .	M 12x1.25	162	16,5	72
Nut, PTO housing cover screw	M 8x1.25	25	2.6	19

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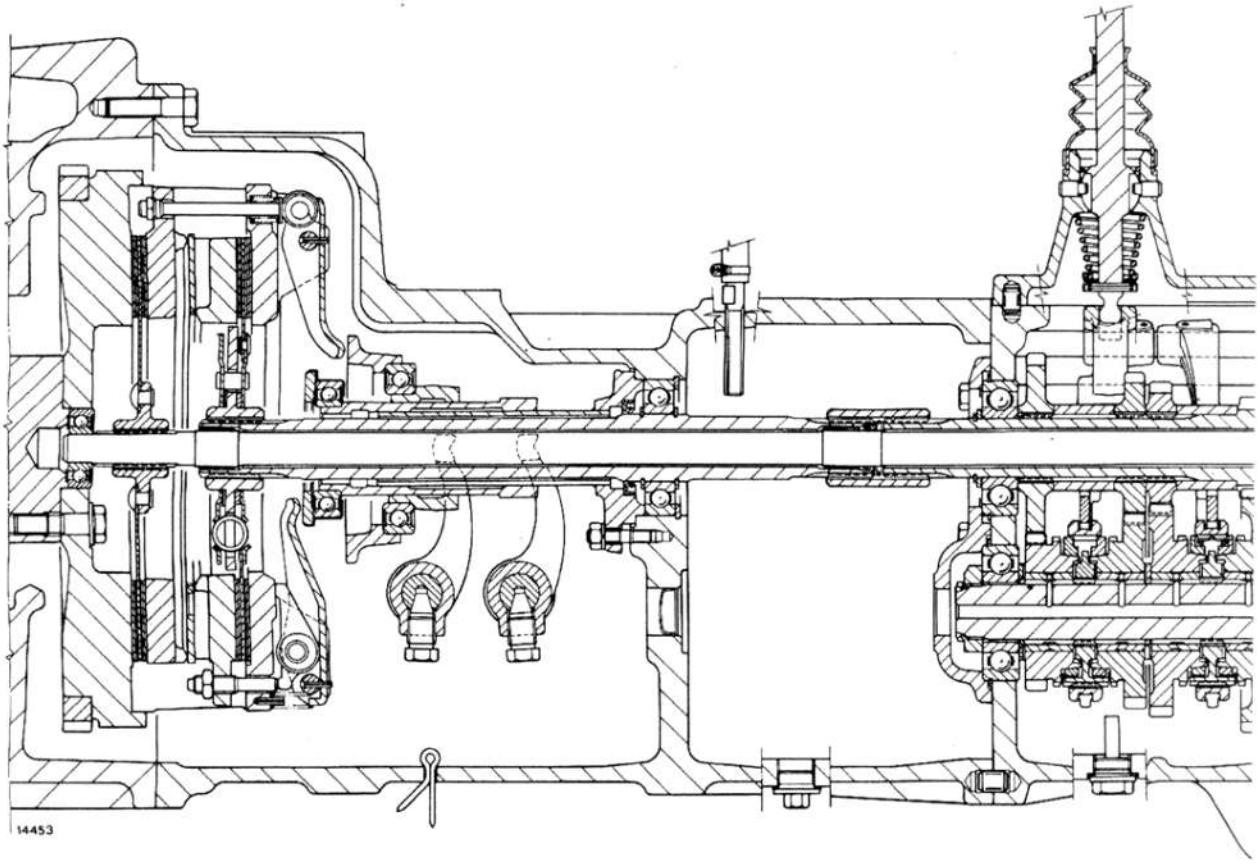
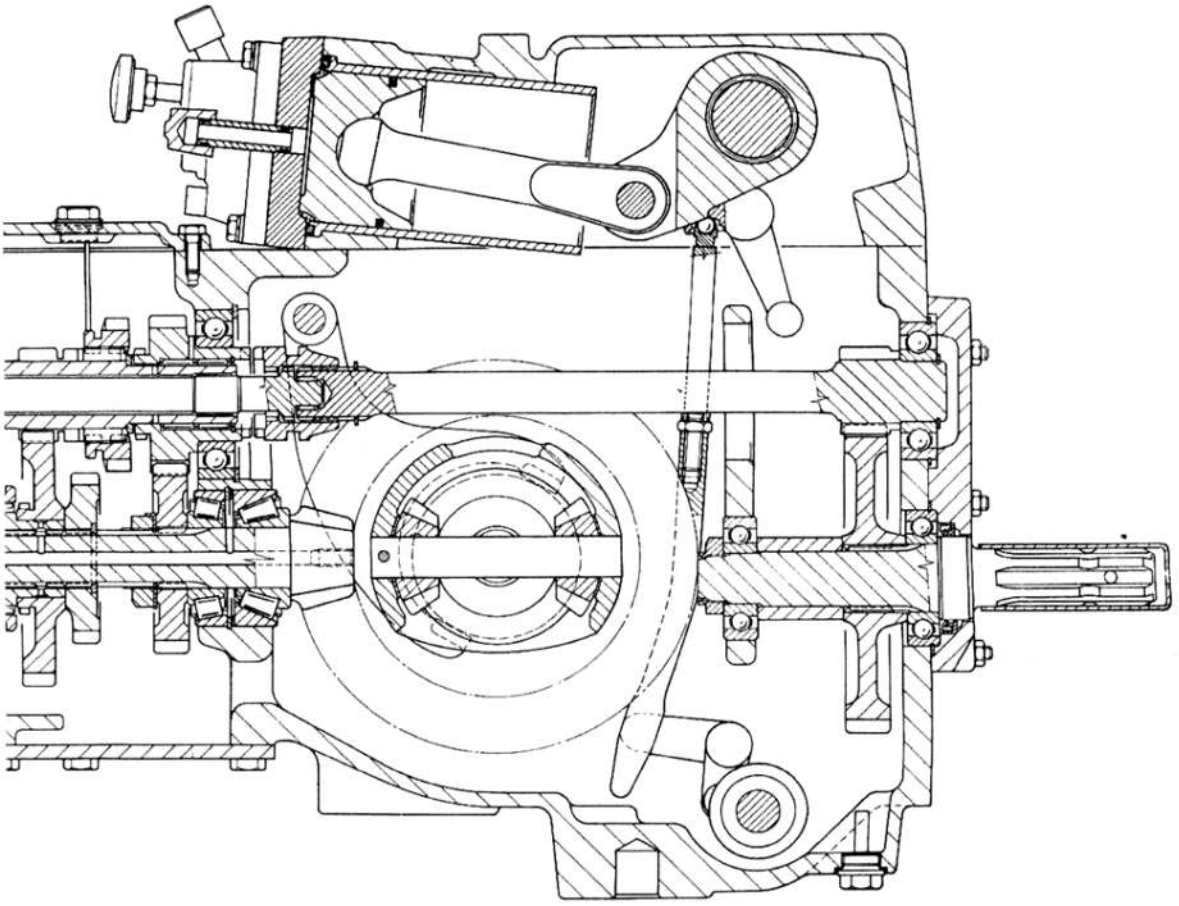
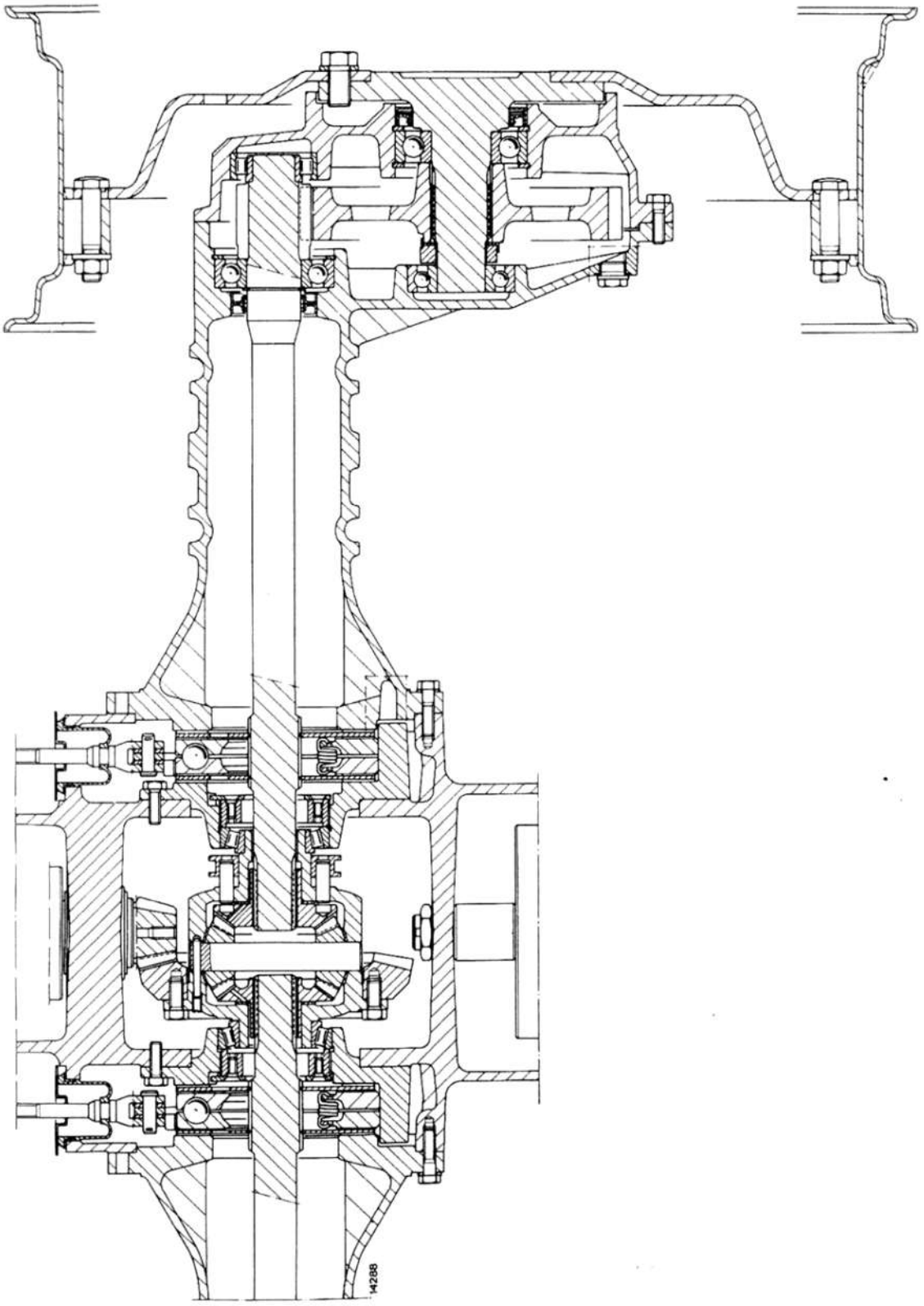


Longitudinal Section through Power Train





Cross Section Through Power Train

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VALEO OR LUK 10''/10'' CLUTCH REMOVAL AND INSTALLATION

Separate engine with front axle from drive housing to gain access to clutch. Proceed as follows:

⚠ CAUTION ⚠

Lift and handle all heavy components using a suitable lift. Ensure that units or parts are supported by suitable slings or hooks.
Ensure that no one is in the vicinity of the load to be lifted.

— Disconnect and insulate battery negative lead. Disconnect accelerator and engine shut-off linkage from injection pump, starter leads, dashboard cables, tractor meter shaft and hood bowden.

— Drain drive housing oil; for DT remove also front axle drive shaft and associated guard.

— Disconnect master /PTO clutch control linkage rods from outside levers on clutch housing.

— Drain power steering reservoir oil, disconnect the three power steering pipes and disconnect associated hoses.

— Disconnect hydraulic lift oil suction and delivery lines from pump.

— Shut the cock and disconnect fuel lines at tank, at injection pump and at lift pump.

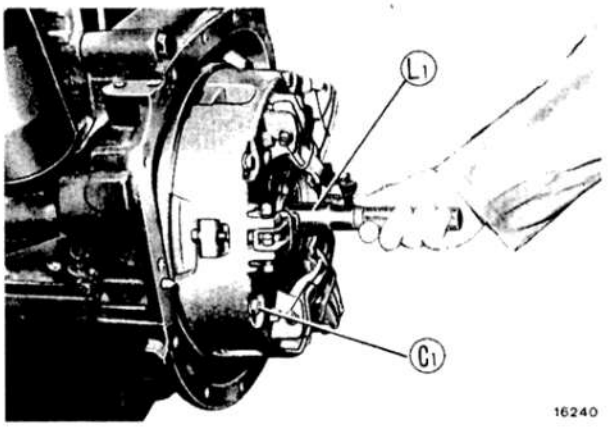
— Apply hand brake and adequately chock the front axle.

If tractor is equipped with ballast weights which cannot be removed, connect weights to a hoist to prevent engine from pitching forwards.

— Position a hydraulic stand w/guides **292320** and telescopic fixed stand under drive housing rear end, two rail-mounted telescopic stand, one under the front end and another under engine oil sump rear end.
Backoff the screws securing clutch housing to engine and separate the engine complete with front axle assy from the tractor.

— Remove capscrews securing clutch housing to engine and separate engine with front axle from the rest of the tractor.

Remove clutch assy from flywheel proceeding as follows:



Removing (installing) clutch.
C1. Clutch retaining screws - L1. Centralizing pin **292604**

— Remove the four screws (C1) securing clutch and slacken the two remaining screws.

— Insert centering pin (L1) in clutch plate shaft seats, back off the two remaining screws and remove assy with PTO driven disc.

On reassembly bear the following points in mind:

— Check condition of ball bearings (10, pages 2 & 6) pressed in flywheel; replace in the event of excessive noise or binding. To install a new bearing, pack seat with **grassofiat TUTELA MRM2** grease.

— Pack with **grassofiat TUTELA MRM2** the release sleeve spline spaces.

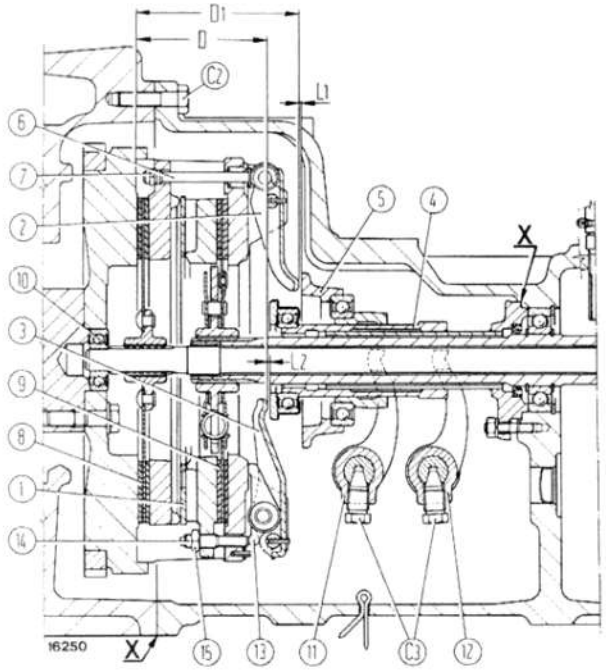
— Use centralizing pin to install clutch assy with clutch PTO driven disc on flywheel.

— Tighten screws (C1) to specified torque.

— Connect transmission to engine-front axle unit after smearing **grassofiat TUTELA MRM2** grease in clutch driven disc slots and jointing compound as per Sect. A, page 6 - Mods. 466/566/666/766 on clean mating surfaces.

⚠ CAUTION ⚠

Use suitable tools to align holes. DO NOT USE FINGERS OR HANDS.



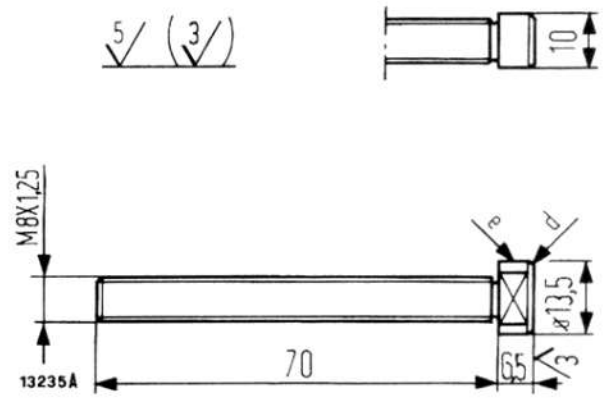
Longitudinal section through 10''/10'' VALEO clutch.

C_2. Clutch housing screws - C_3. Fork lever screws - C_4. Sleeve cover retaining nuts - D = 101 mm (3.976 in). Nominal distance of transmission clutch levers from flywheel face - D_1 = 125 mm (4.927 in). Nominal distance of P.T.O. clutch release levers (2) from flywheel face - L_1 = 2.5 mm (0.0098 in). Nominal P.T.O. clutch release lever clearance - L_2 = 2 mm (0.0790 in). Nominal transmission clutch release lever clearance - 1. Dished springs - 2. PTO clutch release levers - 3. Transmission clutch release levers - 4. and 5. Release control sleeves with thrust bearings - 6. and 7. PTO clutch release lever locknut and adjusting link - 9. PTO clutch plate - 10. Flywheel bearing - 11. and 12. Sleeve control forks - 13., 14. and 15. Transmission clutch release lever adjusting screw and locknut.

Warning - On clutch assembly, ensure that clutch plates are positioned as shown in figure.
Note - On assembly, thoroughly clean and degrease mating surfaces **X** and apply jointing compound as per Sect. A, page 6, Mods. 466/566/666/766.

VALEO 10''/10'' CLUTCH OVERHAUL

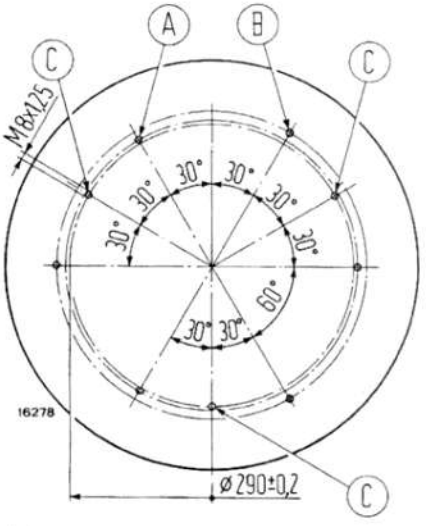
Remove, install and adjust clutch using kit **293650** universal kit **293650** or kit **291291/2** (page 3).
To install clutch on kit **291291/2,** proceed as follows:



Construction drawing for locators 50003 of kit 291291/2 for adjustment of LUK 10''/10'' and VALEO 10''/10'' clutches (dimensions in mm)

d = 1 mm (0.3937 in) radius chamfer - e = mark **50003** Use R80 material.

Note - Before fitting the clutch assy, on kit **291291/2** or universal kit **293650** it is recommended to remove from clutch housing the three screws securing the PTO clutch pressure plate flexible drive lugs. For kit **291291/2** only: make in Shop the three locators **50003** following the instructions shown in above illustration (the three locators are also used for servicing the LUK 12''/12'' clutch of the 160-90 Turbo and 180-90 Turbo models). Also modify base plate **292598** of kit **291291/2** by drilling three holes threaded to M 8x1.25 around plate on the 290 mm (11.4 in) circle following the indications given in Figure below.



Modifications to be made in base plate 292598 of kit 291291/2

A and B. Existing holes on 295 mm dia (11.6 in) and 314 mm (12.4 in) diameter circles - C. Holes to be drilled arounf 290 mm (11.4 in) dia circle

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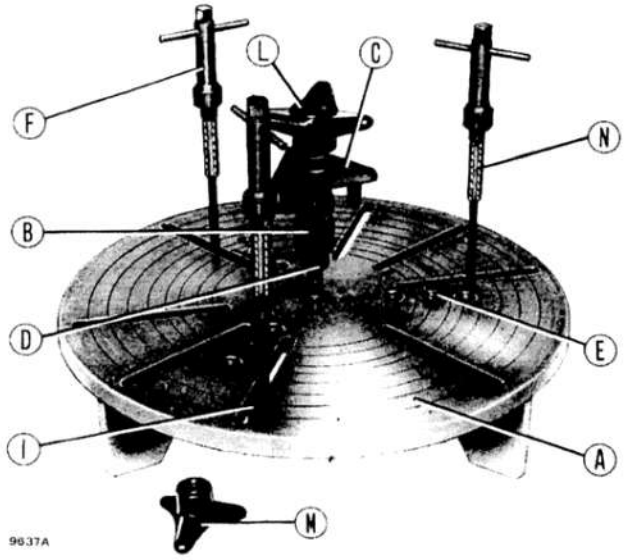


Component parts of universal kit 293650 for VALEO or LUK 10''/10'' clutch adjustment

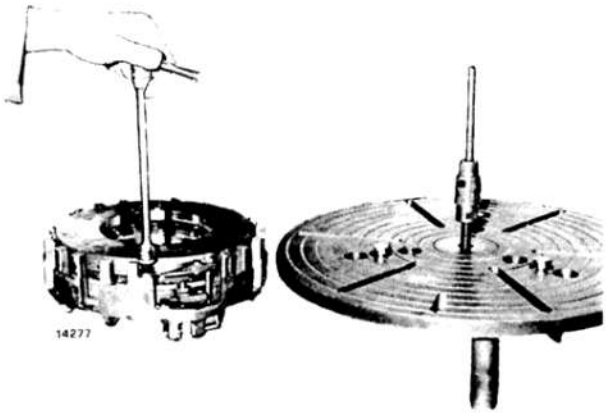
A. Base plate **293332/1** - B. Central spacer **292450** - C. Register **293731** - D. Central spacer locknut **293730** - E. Locators **293726** - F. Fasteners **293725** - I. Pads **293755** - L. Register retaining handwheel **293739** - M. Locator handwheels **293740** - N. Spacers **293737** for VALEO clutch or spacers **293345** for LUK clutch.

— Place center spacer (B) on base plate (A) and position with register rest face at a height of 126 mm (4.9 in) then lock by jam nut (M).

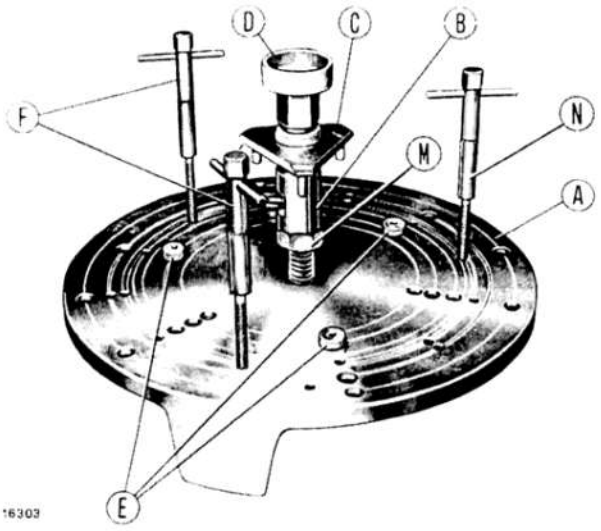
— Place the three locators (E) around the 209 mm (8.2 in) dia. circle with top face at a height (h) given by:

h = 0.25 mm (0.0098 in) + S

where **S** = measured thickness of PTO clutch driven plate.



Removal of screws retaining the PTO pressure plate flexible drive lugs.



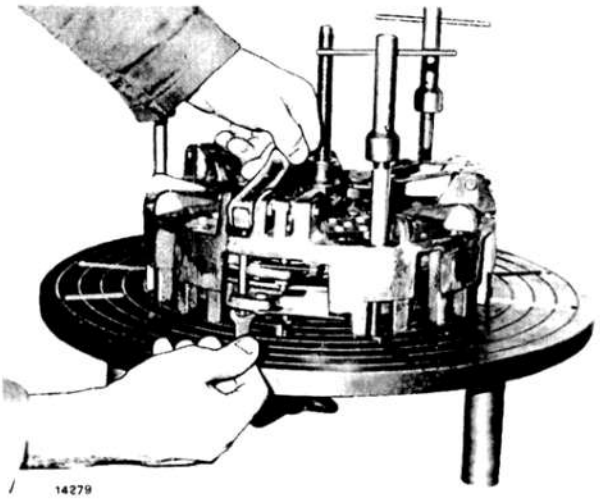
Component parts of kit 291291/2 for VALEO or LUK 10''/10'' clutch adjustment.

A. Base plate **292598** - B. Central spacer **292450** - C. Register **293731** - D. Spacer and register retaining nut **292344** - E. Locators **50003** (to be built in strop) - F. Fasteners **291292/1** - M. Nut, size M 16x1.5 - N. Guide bushings **293737** (VALEO clutches only)

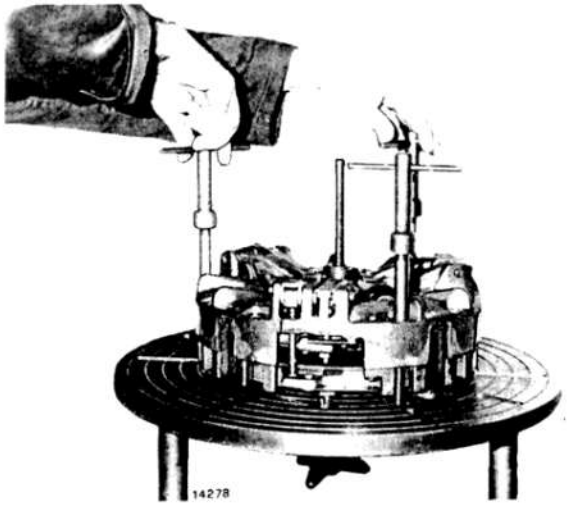
— Rest clutch assy, without master clutch driven plate, on base plate and secure by means of the three fasteners (F) provided with guide bushings (N).

To install clutch on universal tool kit **293650** proceed as follows:

— Place spacer (B) on base plate (A), position register rest face at a height of 126 mm (4.9 in) and lock in position by jam nut (D).



Removal of PTO clutch release lever adjuster rod nuts.



Clutch disassembly on base plate of universal kit 293650.

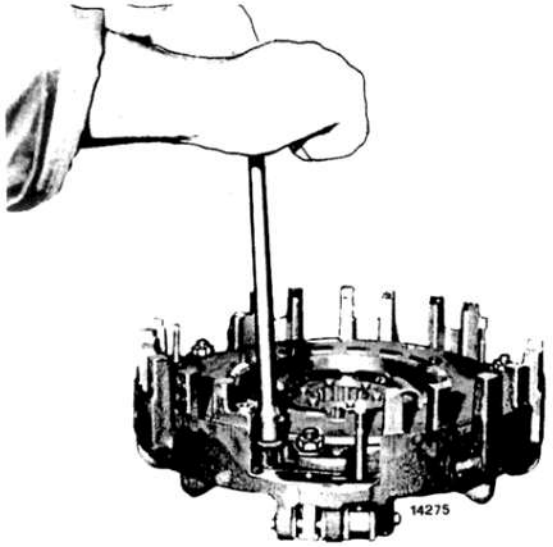
— Measure PTO clutch driven plate thickness (S) and place around the 240 mm (9.4 in) dia. circle the adjustable locators (E) positioning them with top face at a height (h) given by:

h = 0.25 mm (0.0098 in) + S

where **S** is the measured thickness of PTO driven plate.

— Next, lock locators (E) in position by hand-wheels (M).

On base plate, rest the clutch assy, without PTO driven plate, and secure by the three fasteners (F, page 3) provided with pads (I) and guide bushings (N).



Removal of screws retaining the master clutch flexible drive lugs.

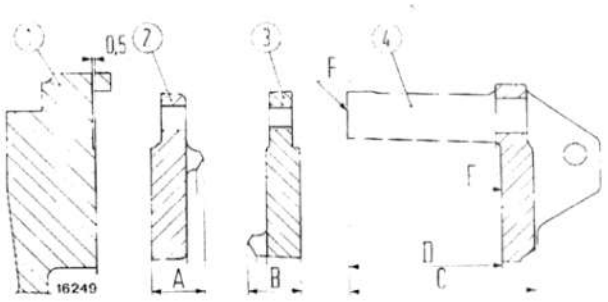
Back off the PTO clutch release lever adjuster rod nuts (7) and progressively unscrew fasteners (F, page 3) thus allowing gradual relief of dished spring and disassembly of clutch.

From clutch housing remove the three screws securing the master clutch pressure plate flexible drive lugs and pickup the pressure plate.

Important - During disassembly, servicing and reassembly of the clutch, be careful not to shift or exchange the master and PTO clutch pressure plate drive lugs as originally fitted on respective plates.

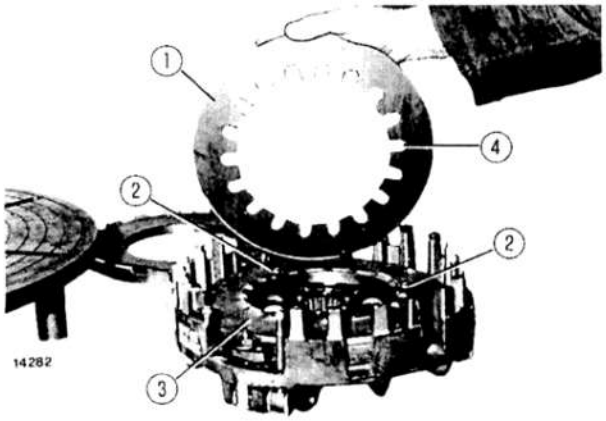
Check clutch driven plates for wear and replace if facings are worn down flush with the rivets. Should the organic agglomerate facings be wet with oil change plates without hesitation.

Check clutch housing surfaces and pressure plate facings for good conditions.
In case of need, re-dressing will be possible keeping in mind that dimensions A, B, C and D of reconditioned components should not exceed the limits specified in the figure below; also remember that if clutch housing face (E) is reconditioned specified dimension (D) can be restored only if also housing surface (F) is subsequently reconditioned.



VALEO 10"/10" Clutch: minimum dimensions allowed after conditioning of parts subject to wear.

A. ⩾ 23.2 mm (0.9134 in) - B. ⩾ 25.1 mm (0.9882 in)
C. ⩾ 86.3 mm (3.340 in) - D. = 69 mm (2.72 in)
1. Engine flywheel - 2. PTO clutch pressure plate - 3. Master clutch pressure plate - 4. Support housing.



Correct mating of dished spring (1) and master clutch pressure plate (3).

2. Spring assembly locating dowels - 4. Slots

Reassemble clutch using suitable tools of kit **291291/2** or universal kit **293650** noting the following points:

- Correctly position dished spring (1) on master clutch pressure plate (3) ensuring that locator dowels (2) are in register with slots (4).
- Adjust clutch as directed below.

Note - At assembly, tighten the screws securing the master/PTO clutch pressure plate flexible drive lugs to 1.5 da Nm (kgm) (3.3 ft lb) after having coated the threads with a thin film of strong LOCTITE thread locking compound.
Tighten nuts (15, page 2) locking the master clutch release levers to 4.9 da Nm (kgm) (10.8 ft lb).

VALEO 10''/10'' CLUTCH ADJUSTMENT

For proper clutch adjustment, release levers must be correctly aligned at the dimensions given (D and D_1, page 2) relative to flywheel face.
Clutch adjustment may be carried out with clutch on bench or fitted to flywheel.

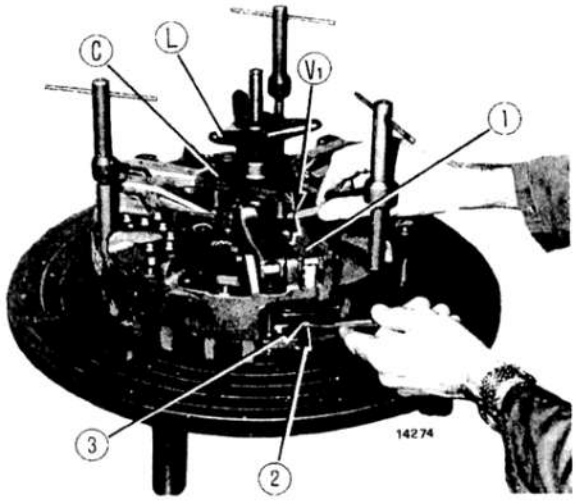
On-bench clutch adjustment

Place clutch on base plate of kit **293650** or kit **291291/2** and lock as described earlier for disassembly.

Install register (C) and secure through handwheel (L) of universal kit **293650** or nut (D, page 3) of kit **291291/2**.

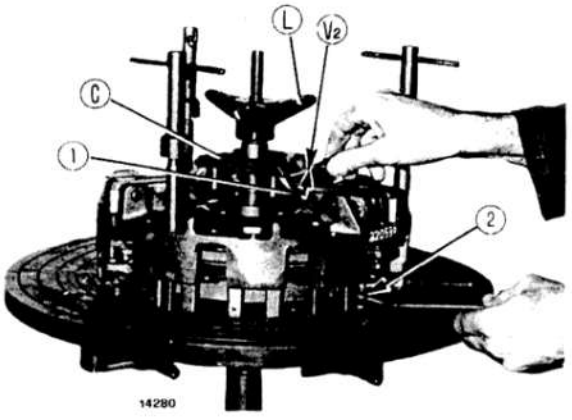
Tighten or back off screws (2) to obtain correct gap (V_1) between master clutch release lever and register pin. Tighten screws through nuts (3).

Tighten or back off PTO clutch release lever adjusting link nuts (1) to obtain correct gap (V_2) between register face and release lever.



On-bench inspection and adjustment of master clutch release lever height using universal kit 293650.

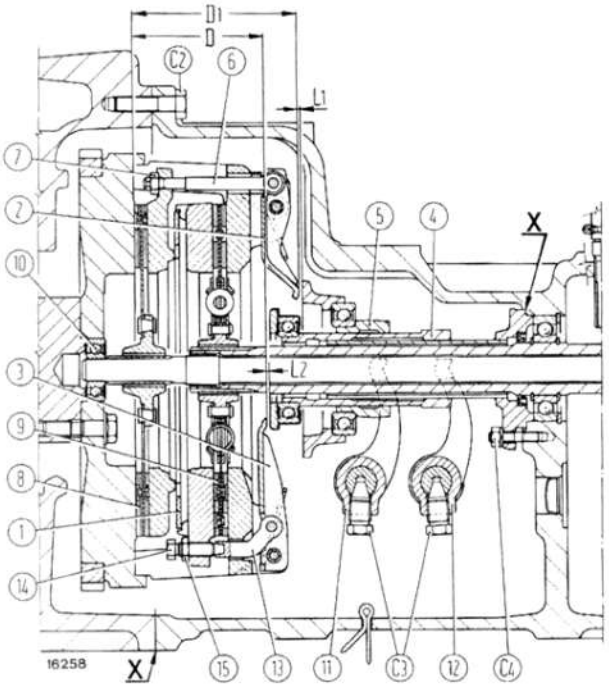
C. Register - L. Handwheel **293739** - V_1 = 0.1 mm (0.004 in). Release lever to register pin gap - 1. Release levers - 2 and 3. Adjusting screw and jam nut.



On-bench inspection and adjustment of PTO clutch release lever height using universal kit 293650.

C. Register - L. Handwheel **293739** - V_2 = 0.1 mm (0.004 in). Register to release lever gap - 1. Release levers - 2. Adjusting nut.

Note - After clutch lever adjustment, remove, handwheel (L, page 4) for universal kit **293650** or nut (D) for kit **291291/2** register (C). Install presser **292176** on kit base plate and check release of both the master and PTO clutches as instructed on pag. 6, Sect. 201, mods. 466/566/666/766.



Longitudinal section through LUK 10''/10'' clutch.

C_2. Clutch housing screws - C_3. Fork lever screws - C_4. Sleeve cover retaining nuts - D = 101 mm (3.976 in). Nominal distance of master clutch release levers from flywheel face - D_1 = 125 mm (4.927 in) Nominal distance of PTO clutch release levers from flywheel face - L_1 = 2.5 mm (0.098 in) Nominal clearance between PTO clutch release levers and thrust bearing - L_2 = 2 mm (0.079 in). Nominal clearance between master clutch release levers and thrust bearing - 1. Dished spring - 2. PTO clutch release levers - 3. Master clutch release levers - 4 and 5. Release control sleeves with thrust bearings - 6 and 7. PTO clutch release lever jam nut and adjusting link - 8. PTO clutch plate - 9. Master clutch plate - 10. Flywheel bearing - 11 and 12. Sleeve control forks - 13, 14 and 15. Master clutch release lever locknut, adjusting screw and lever.

Warning - On clutch reassembly, ensure that clutch plates are positioned as shown in figure.

Note - On assembly, thoroughly clean and degrease mating surfaces **X** and apply jointing compound as per section A, page 6, models 466/566/666/766.

2. On-flywheel clutch adjustment

Insert pin **292604** in clutch driven plate shaft seats, ensuring that end is in contact with bearing (10, page 2) and push register **292605.**
Adjust gaps (V_1 and V_2) as indicated in preceding paragraph.

Note - Universal kit **293650** or kit **291291/2** and on flywheel clutch adjustment may result in quite considerable differences in terms of positioning, a fact which does not affect clutch efficiency, being due to varying PTO clutch plate thickness owing to machining tolerance build-up or wear, plus the magnification inherent in the high leverage ratio.

LUK 10''/10'' CLUTCH OVERHAUL

To disassemble, reassemble and adjust the clutch use universal kit **293650** or kit **291291/2** (page 3).
To apply clutch to kit **291291/2** proceed as follows:

Note - Only for kit **291291/2:** make in shop three locators **50003** following the instructions shown in the illustration on page 2 (the three locations are also used for servicing the LUK 12''/12'' clutch of the 160-90 Turbo and 180-90 Turbo models).
Also modify base plate **292598** of kit **291291/2** by drilling three holes threaded to M 8x1.25 around plate on the 290 mm dia (11.4 in) circle following the indications given in the figure on page 2.

— Install central spacer (A, page 3) on baseplate (B) position spacer at a height of 126 mm (4.9 in) using register and secure at this height through jam nut (M).

— Place adjustable locators (E, page 3) over 209 mm (8.2 in) dia circle with top face at a height (h) given by:

$$h = 0.25 \text{ mm } (0.0098 \text{ in}) + S$$

where:

S = measured PTO clutch driven plate thickness.

— Install clutch unit without PTO driven plate on base plate and secure through three fasteners (F).

To apply clutch on universal kit **293650**, proceed as follows:

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— Install central spacer (B) on base plate (A, page 3); position spacer at a height of 126 mm (4.9 in) using register and secure at this height by jam nut (M).

— Measure PTO clutch driven plate thickness and place adjustable locators (E) over the 240 mm (9.4 in) dia. circle with top face at a height (h) given by:

h = 0.25 mm (0.0098 in) + S

where
S = measured PTO clutch driven plate thickness

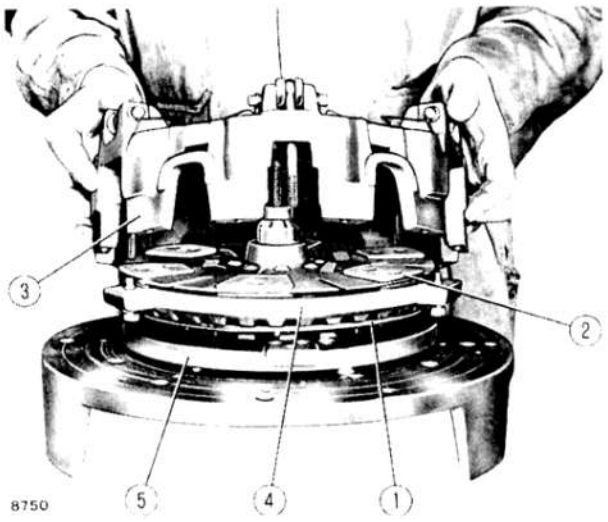
Lock adjustable locators (E, page 3) by relevant handwheels (M).

— Install clutch unit, without PTO driven plate on base plate and secure through three fasteners (F) and spacers (N).

— Install clutch assy without PTO driven plate on base plate and secure through three fasteners (F) provided with pads (I) and spacers (N).

Remove PTO clutch release lever adjusting link nuts (7, page 6) and slowly back off fasteners (F, page 3) to release load on dish spring. Disassemble clutch as shown alongside.

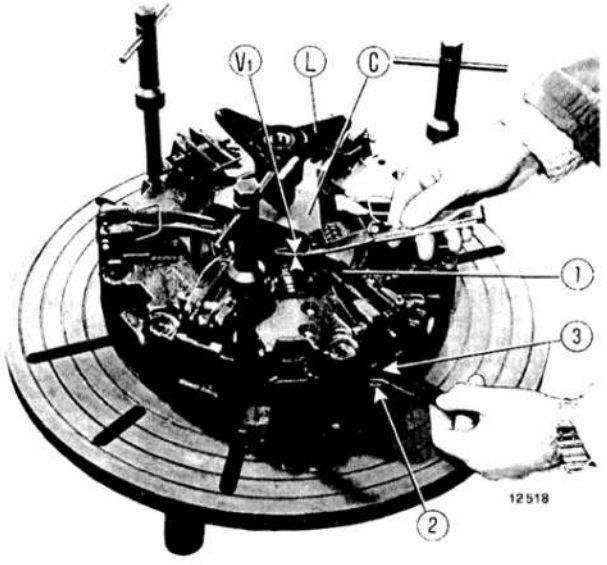
Check clutch driven plates for wear and replace if rivets are near to or flush with top facings. Plates are also to be replaced if the organic facings are found to be soaked with oil.



Removing (installing) housing with levers.

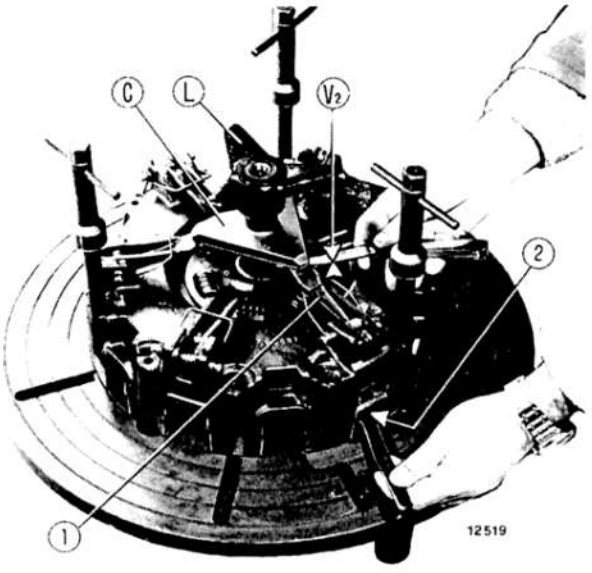
1. Dish spring - 2. Master clutch plate - 3. Clutch housing - 4. Master clutch pressure plate - 5. PTO clutch pressure plate.

Check clutch housing surfaces and pressure plate facings for good condition.
In case of need, re-dressing will be possible keeping in mind that dimensions A, B, C and D of reconditioned components should not exceed the limits specified in the



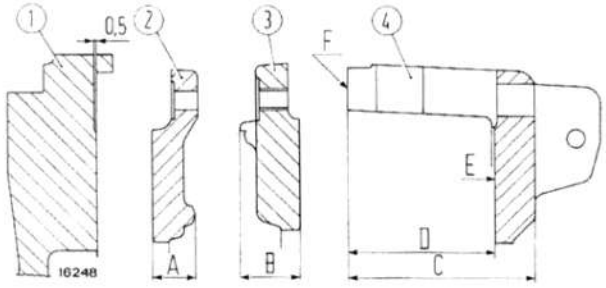
On-bench inspection and adjustment of master clutch release lever height using universal kit 293650.

C. Register - L. Handwheel **293739** - V_1 = 0.1 mm (0.004 in). Release lever to register pin gap - 1. Release levers - 2 and 3. Adjusting screw and jam nut.



On-bench inspection and adjustment of PTO clutch release lever height using universal kit 293650.

C. Register - L. Handwheel **293739** - V_2 = 0.1 mm (0.004 in). Register to release lever gap - 1. Release levers - 2. Adjusting nut.



Minimum dimensions after dressing LUK clutch.

A. ⩾ 19.4 mm (0.764 in); B ⩾ 24.4 mm (0.960 in); C ⩾ 85 mm (3.35 in); D = 68.5 ± 0.15 mm (2.69 ± 0.0006 in) - 1. Flywheel - 2. PTO clutch pressure plate - 3. Master clutch pressure plate - 4. Housing.

figure above; also remember that if clutch housing face (E) is reconditioned, specified dimension (D) can be restored only if also housing surface (F) is subsequently reconditioned.

Reassemble clutch, using suitable tools of kit **291291/2** or of kit **293650,** noting the following points:

— Correctly position dished spring (1, page 6) on PTO clutch pressure plate (2).

— Adjust clutch as directed below.

LUK 10''/10'' CLUTCH ADJUSTMENT

For correct clutch adjustment, release levers must be aligned at the dimensions given (D and D_1, page 6) relative to flywheel face. Clutch adjustment may be carried out with clutch on bench or fitted to the flywheel.

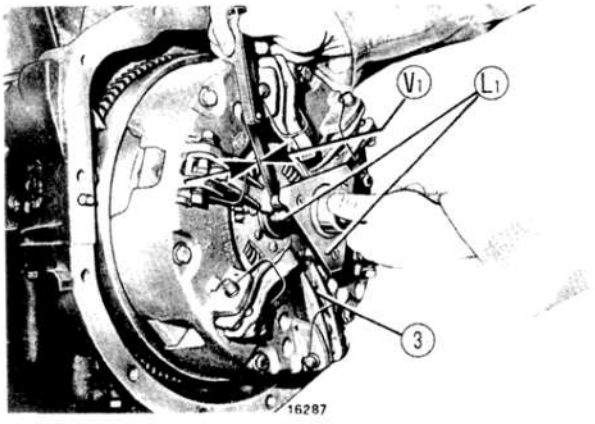
1. On-bench clutch adjustment.

Install clutch on base plate of universal kit **293650** or kit **291291/2** and secure using parts as described for disassembly (pages 6 and 7).

Install register (C) and secure through handwheel (L) for universal kit **293650** or nut (D) for kit **291291/2.**

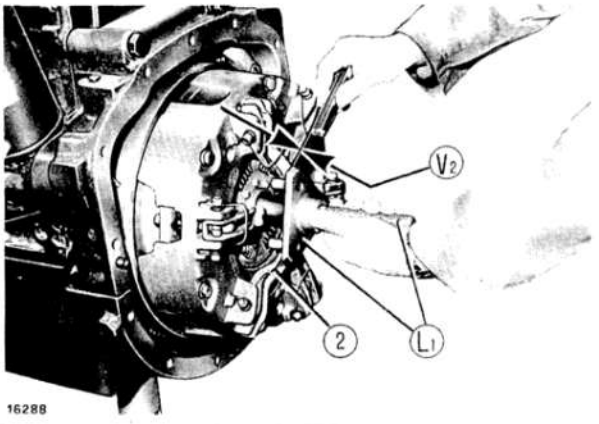
Tighten or back off master clutch release lever (2) adjusting screws (2, page 7) to obtain correct gap (V_1) between register pin ends (C) and master clutch release levers. Secure screws in position through nuts (3).
Tighten or back off PTO clutch release lever (1) adjusting link nuts (2) to obtain correct gap (V_2) between release lever ends and register face (C).

Note - After clutch lever adjustment, remove handwheel (L, page 3) for universal kit **293650** or nut (D) for kit **291291/2** and register (C). Install presser **292176** on kit base plate and check PTO and transmission clutch release as indicated on page 6, mods. 466/566/666/766.



On-flywheel inspection of master clutch release lever height.

L_1. Pin **292604** and register **292605** - V_1 = 0.1 mm (0.004 in). Release lever (3) to register pin gap - 3. Master clutch release levers.



On-flywheel inspection of PTO clutch release lever height.

L_1. Pin **292604** and register **292605** - V_2 = 0.1 mm (0.004 in). Register face to release lever (2) gap - 2. PTO clutch release levers.

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2. On-flywheel clutch adjustment.

Insert pin **292604** (L1, page 8) in clutch driven plate shaft seats, ensuring that end is in contact with bearing (10, page 6) and press associated register **292605** against pin. Adjust gaps (V1 and V2) as indicated in earlier section.

Note - Universal kit **293650** or kit **291291/2** and on flywheel clutch adjustment may result in quite considerable differences in terms of positioning, a fact which does not affect clutch efficiency, being due to varying PTO clutch plate thickness owing to machining tolerance build-up or wear, plus the magnification inherent in the high average ratio.

MASTER CLUTCH LINKAGE ADJUSTMENT

Check that pedal free travel before clutch release is approximately 25 mm (1 in). When free travel is down to 15 mm (0.59 in), adjust clutch as follows:

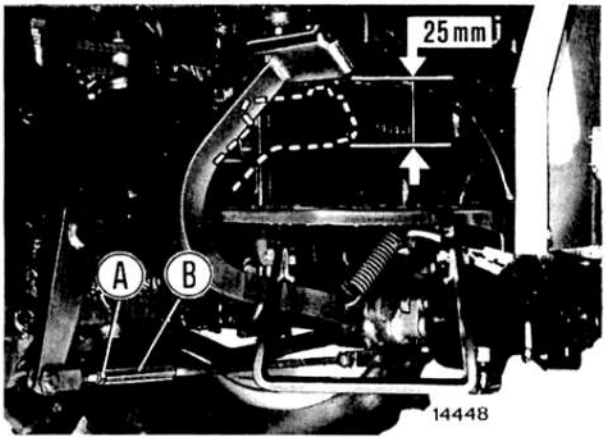
- Back off jam nut (A) and rotate sleeve (B) counter-clockwise (each sleeve turn is equivalent to 12 mm or 0.47 in pedal travel).
- Tighten jam nut (A).
- Ensure that pedal free travel is 25 mm (1 in).

PTO CLUTCH LINKAGE ADJUSTMENT

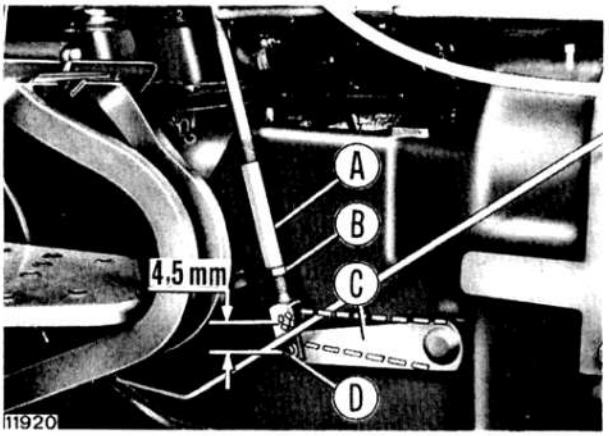
Bring lever (C) to rest position (fully lowered) and check that free travel at pin (D) is 4.5 mm (0.18 in) before clutch release.

When free travel is down to 2.5 mm (0.10 in), adjust clutch as follows:

- Back off jam nut (B) and rotate sleeve (A) clockwise through 3/4 turn (1 turn = 3 mm (0.12 in) displacement at pin D).
- Lock jam nut (B)
- Ensure that pedal free travel is 4.5 mm (0.18 in).



Adjusting master clutch control pedal free travel.
A. Jam nut - B. Adjusting sleeve.



Adjusting PTO clutch control lever free travel.
A. Adjusting sleeve - B. Jam nut - C. Outer relay lever - D. Pin.

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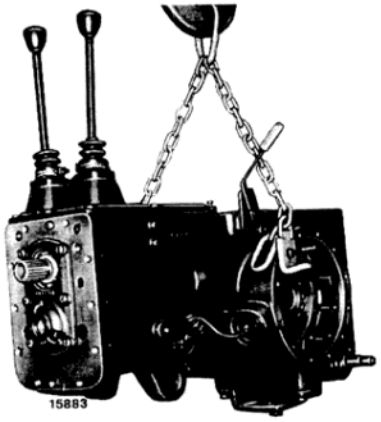


Transmission - rear drive housing assembly.

REMOVAL - INSTALLATION

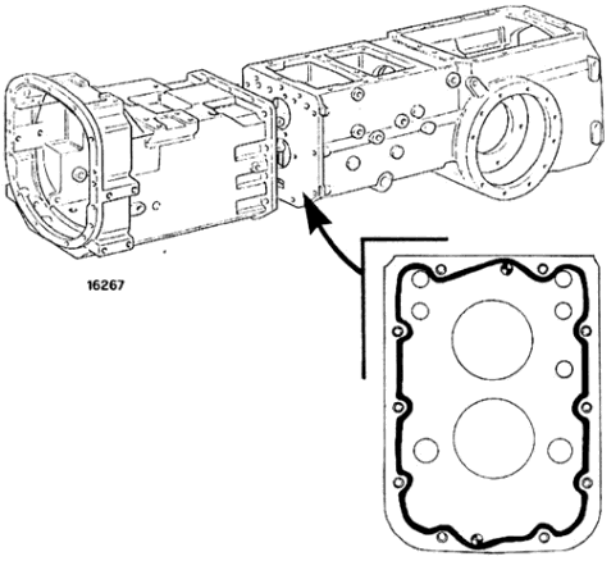
⚠ CAUTION ⚠

Lift and handle all heavy parts using a suitable lift. Ensure that units or parts are supported by suitable slings or hooks. Ensure that no one is in the vicinity of load to be lifted.

Drain transmission-rear drive housing oil proceed as follows:

- Disconnect battery negative lead and electrical leads of power point and fender-mounted signal lights from their connections.
- Disconnect lift lines, transmission clutch control link from outer control lever and accelerator control link from pedal.
- For DT models: remove front axle drive shaft and associated guard.
- Remove lift with outer control levers.
- Install a mechanical stand under rear end of drive housing and remove wheels, final drives and brake units.
- Connect drive housing to hoist through lift hook **291517.**
- Install mechanical stand under clutch housing, remove screws securing transmission-rear drive housing to clutch housing and remove transmission - rear drive assy.

Before installing transmission housing on clutch housing after overhaul, thoroughly clean and degrease mating surfaces and apply 2 mm (0.08 in) jointing compound as indicated in figure.
Jointing compound types to be used are indicated on page 6, Sect. A, Mods. 466/566/666/766.



Applying jointing compound on assembly of transmission-rear drive housing to clutch housing.

Jointing compound types to be used are indicated on page 6, Sect. A, Mods. 466/566/666/766.

DISASSEMBLY

⚠ CAUTION ⚠

Handle all parts with great care. Do not put hands or fingers between parts. Wear safety equipment such as goggles, gloves and safety shoes.

To facilitate subsequent operations, install transmission-rear drive housing on rotary stand **290086,** resting rear of housing on mechanical stand to keep it in balance.

Proceed as follows:

- Remove PTO as described in applicable Section, the differential lock/PTO control devices the differential bearing cages by pulling up from top the bevel gear set and transmission top cover with outer control levers.
- Remove transmission front bearing cover splitter shifter fork pins and detent plungers, range shifter springs/check ball screws, subsequently pulling out the horizontal striker rods: pickup all forks, springs, balls and detent plungers.
- Remove retaining ring (13, page 4) of splitter drive shaft rear bearing, take out the normal speed drive gear (14) complete with ball and needle roller bearings, using a proper punch; pull out direct drive shaft and low range gears (9) complete with normal/reverse sliding gear (11).

Removal of resilient pins securing transmission/splitter shifter fork and detent plungers.

— Remove the reverse gear.

— Partially slacken bevel pinion shaft bearing adjusting nut, install adapter constructed as directed on page 3, Sect. 202 for models 466, 566, 666 and 766 tractors, and secure to slide hammer puller.

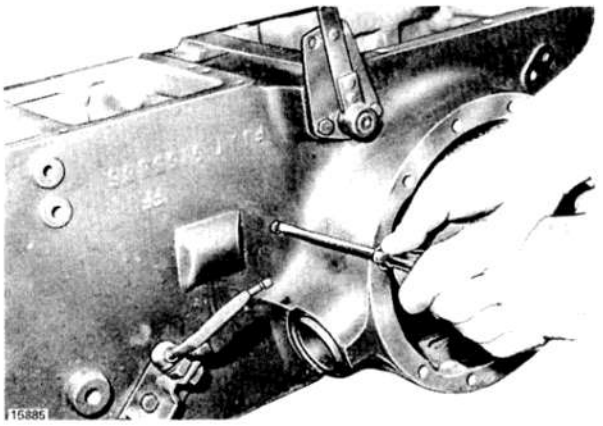
— Pull pinion partially outwards and remove retaining ring (36, page 5). Move gears (33 and 34) towards wall of transmission housing and remove thrust rings (37).

— Fully slacken bevel pinion shaft bearing adjusting nut and remove pinion, retrieving gears from inside housing. To retrieve pinion shims, first remove pinion end bearing cup from transmission housing.

— Engage two speeds and back out the nut securing the drive shaft bearings.

— Take out retaining ring (15, page 4) and grabbing the front end of transmission drive shaft (5) pull out through housing rear end, picking up all the loose gears from housing interior.

Reverse speed idle gear removal.



Removal of screw retaining the reverse gear jackshaft.

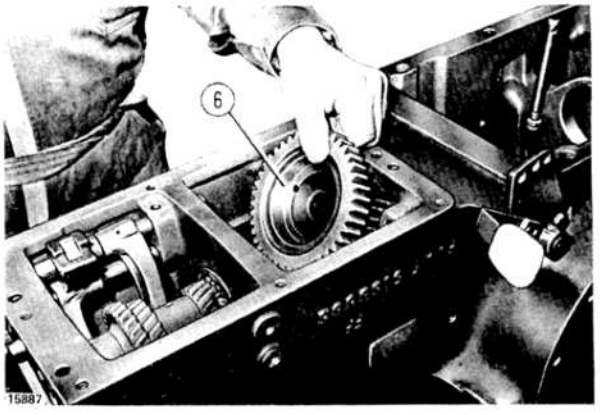
— Remove transmission shifter fork/detent plunger resilient pins and the screws retaining the speed selector check balls and springs.

— To remove transmission drive shaft, proceed from its front end: pickup all the gears from housing interior.

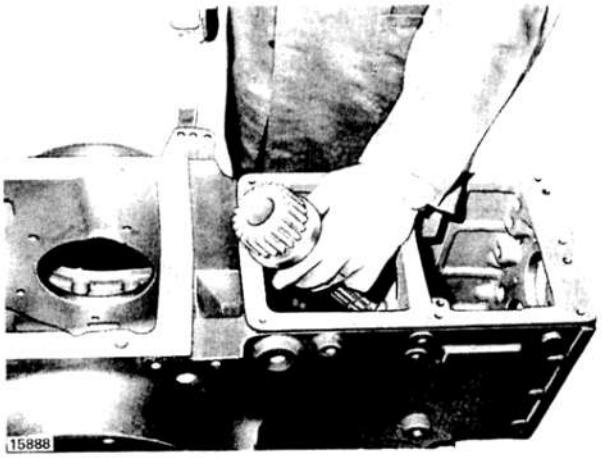
Note - Splitter drive shaft bearing (38, page 4) and normal range drive gear (14) may be removed and installed without disassembling bevel drive/differential unit, should it be necessary to replace only these parts. Proceed as follows:

— Make a set of tools as shown in the drawing on page 3.

— Remove top transmission housing cover, PTO housing and PTO shaft. If necessary, also remove hydraulic lift.



Disassembly of DD/Low range drive shaft (9).



Disassembly of transmission driven shaft.

— Remove bearing retaining ring (13, page 4).

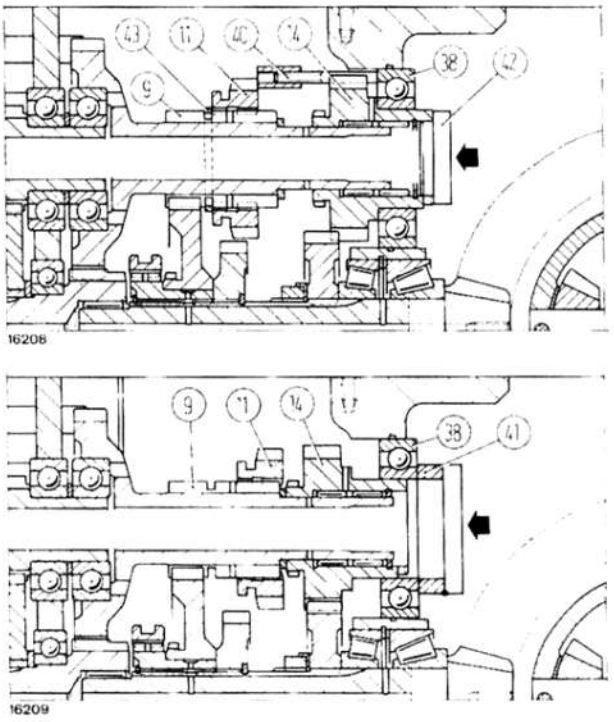
— Push gear (14) with bearing (38) towards rear of drive housing. Install tool (43) on direct drive/low range shaft (9) and force gear (11) into contact with tool as shown in figure alongside.

— Install two tools (40), in diametrically opposed positions and adjust length so that they press against both gear (11) and outer race of bearing (38).

— Install tool (42) and, using a hammer, strike tool to remove gear (14) from bearing (38).

— Retrieve bearing (38) and, if necessary, gear (14) from rear of housing.

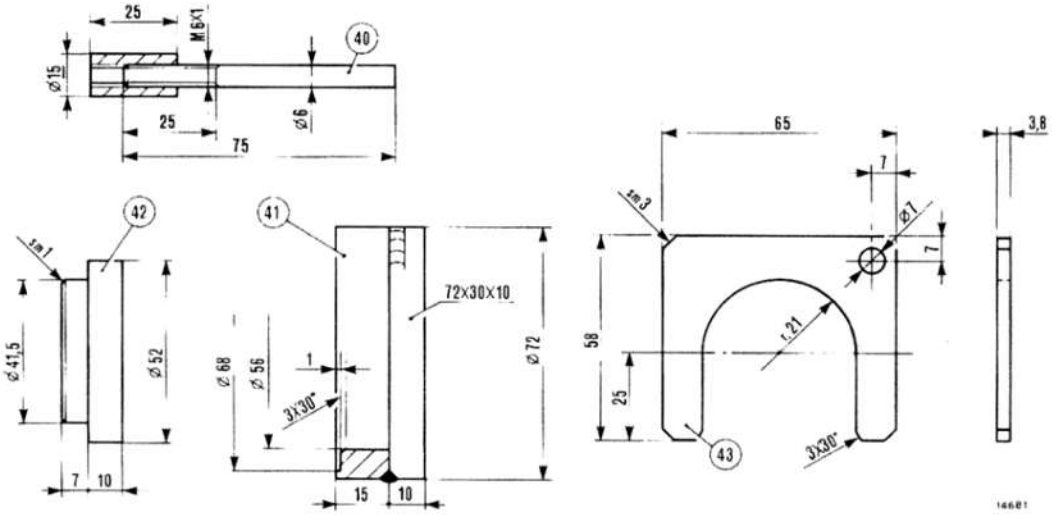
— Install new bearing using tool (41) as shown alongside.



Removing (Fig. a) and installing (Fig. b) rear splitter drive shaft bearing (38) and normal range drive gear (14) with bevel drive/differential unit on tractor.

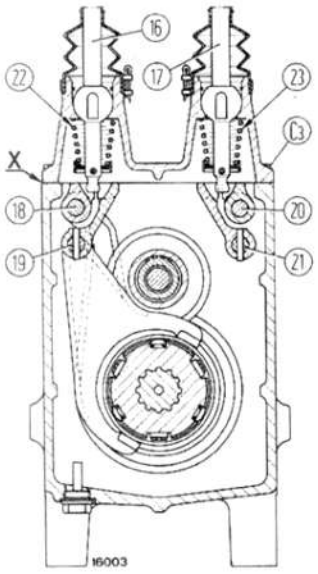
9. Direct drive/Low range shaft - 11. Reverse/normal range sliding gear - 40, 41, 42 and 43. Tools to be made in workshop.

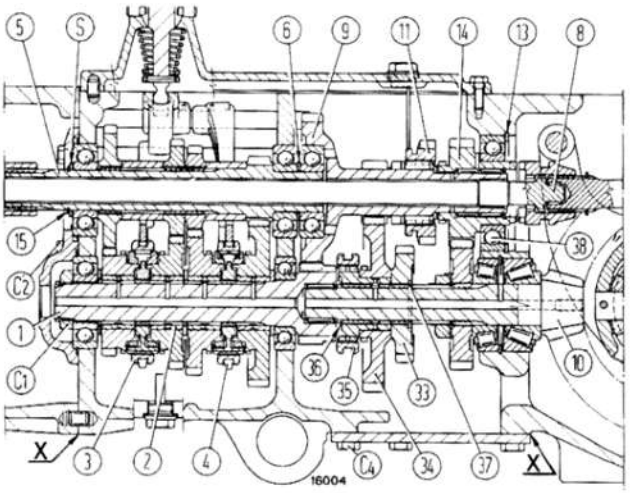
Install the new bearing using Tool (41) as shown aboved.

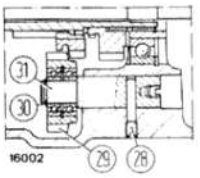


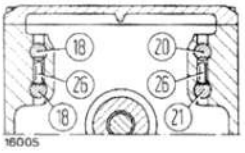
Tools for rear splitter drive shaft bearing and low range drive gear removal (stamp tools with number: 50030) dimensions in mm.

Note - Make two pieces of tool No. 40.







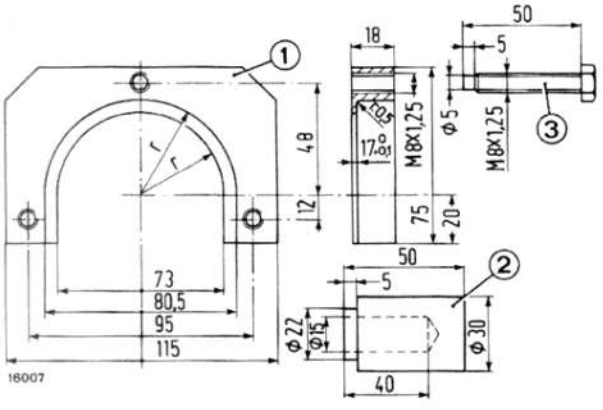


Longitudinal and cross sections through transmission and splitter.

C_1. Driven gear shaft lockring - C_2. Bearing cover retaining screws - C_3. Top cover retaining screws - C_4. Bottom cover retaining screws - S_1. Drive shaft bearing shim - 1. Transmission driven shaft - 2. Transmission driven gear support bushings - 3. 3rd and 4th sliding sleeve - 4. 1st and 2nd sliding sleeve - 5. Transmission drive shaft - 6. Washer - 8. PTO shaft - 9. Direct drive and low range shaft - 10. Bevel pinion shaft - 11. Rev. and normal range sliding gear - 13, 15, 30 and 36. Retaining rings - 14. Normal range drive gear - 16. Transmission shift lever - 17. Splitter shift lever - 18. 1st/2nd speed shifter rod - 19. 3rd/4th shifter rod - 20. Low/high range shifter rod - 21. Normal/rev. range shifter rod - 22 and 23. Transmission and splitter shift lever springs - 26. Detent plunger - 28. Screw - 29. Rev. relay gear - 31. Jackshaft - 33 Reverse gear - 34. Low range drive gear - 35. Shifter sleeve - 37. Thrust washers - 38. Bearing

Note - Tighten screw (28) using one of the jointing compounds indicated on page 6, Sect. A, Mods. 466/566/666/766. After installation, check for oil leakage.

Note - On installation, apply jointing compound to surfaces **X** as directed on page 6, Sect. A, Mods. 466/566/666/766



Workshop built tools for disassembly of transmission drive shaft with bevel pinion shaft installed (punch mark No. 50038). Dimensions in mm.

Build 3 pieces of item (3).

Important - Should it be necessary to disassemble the transmission drive shaft when bevel drive pinion shaft is installed, a special set of tools must be built in the shop as shown in the Figure alongside.

Then, proceed as follows:

— Take out retaining ring (15).

— Fit tools **50038** as shown on page 5.

— Then, using a suitable presser, apply force on tool (2, page 5) to push transmission drive shaft forward as far as it will go.

— At this point, turn in the screws (3) to pull back again the drive shaft.

— Forcing again on tool (2) cause the rear bearing to slide off the shaft.

Once this bearing is removed, the shaft may be withdrawn without having to disturb the bevel pinion shaft.

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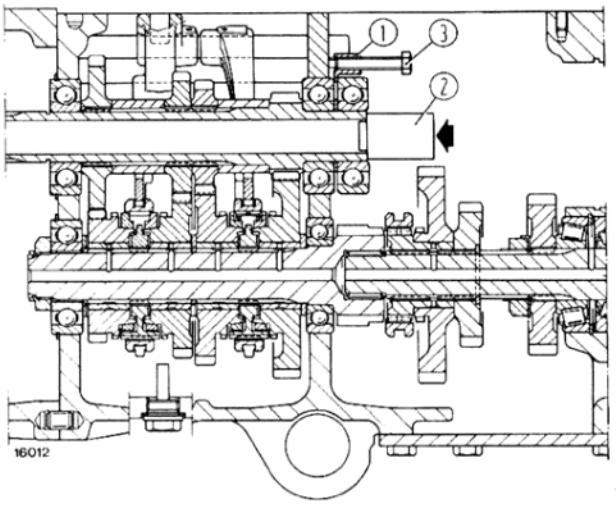
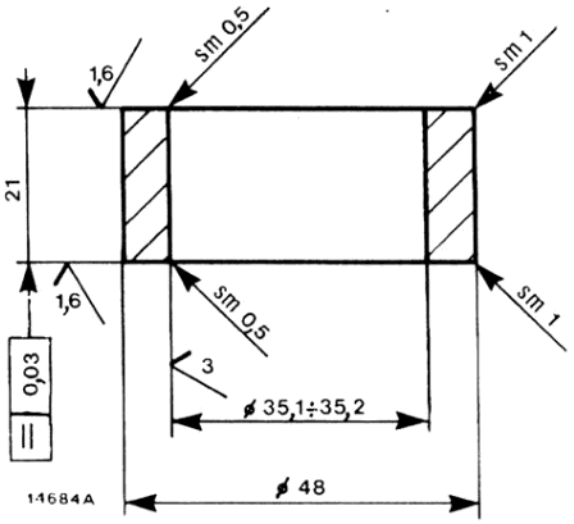


Transmission drive shaft rear bearing disassembly.



Tool built in shop for transmission drive shaft bearing adjustment (Dimensions in mm - Punch mark No. 50037).

sm 0.5 = 0.5 mm (0.0197 in) chamfer
sm 1 = 1 mm (0.0394 in) chamfer

Important - The removal/installation operations described on these pages refer to the servicing of transmission and splitter.
When only the splitter need be overhauled, it will no longer be necessary to disconnect the transmission/drive housing from the clutch housing as the splitter gears are accessible directly from machine rear end. For removal/installation only of the parts needed to permit servicing of splitter alone, see the description provided for the differential bevel gear set under Section 204.

ASSEMBLY

Refer to figures on page 4 for correct part positioning and note the points below.

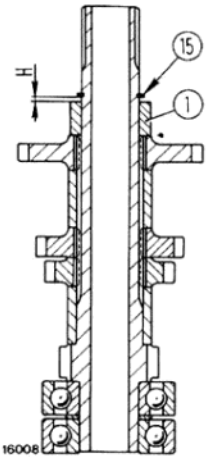
Install transmission drive shaft with rear bearing; slide gears, associated bushings and synchromesh assemblies over shaft from inside the housing and lubricate contact surfaces with engine oil.

Position front bearing on housing and press in using a suitable driver. Tighten lockring (C1 page 4) to the specified torque.

Insert two shifter forks without connecting to associated shifter rods.

Install drive shaft and associated gears.

Note - Drive shaft gear end float must be 0 to 0.20 mm (0 to 0.0079 in). Consequently, adjust bearings so that they are installed without preload. To facilitate bearing adjustment, make a tool as shown in drawing above.

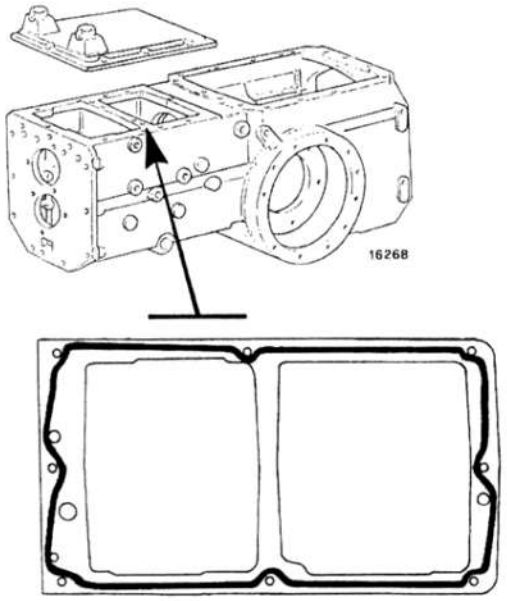


Adjusting transmission drive shaft bearings.

H. Clearance (measured with feeler gauge) - 1. Fixture **50037** ring (made in workshop) - 15. Retaining.

— Assemble transmission drive shaft on bench with front bearing and gears but without shims (S, page 4) and front bearing.

— Install tool. Insert one or two screwdrivers between a gear and associated bushing to maintain tool in contact with rear retaining ring (15).



Applying jointing compound for top and bottom cover installation on transmission housing.

Types of jointing compound to be applied are indicated on page 6, Sect. A, Mods. 466/566/666/766.

— Using a feeler gauge measure the gap (H) between ring (15) and tool (1).

— Measure tool thickness (Hs) and thickness of front bearing cone.

— Shim to be installed will be given by:

$$S = H + Hs - Hc$$

where:
H = Measured clearance
Hs = Tool thickness
Hc = **Measured** bearing thickness.

Note - Fit a shim pack having the thickness needed to ensure - at assembly completion - an end float of 0 to 0.20 mm (0 to 0.0079 in) between drive shaft gears.

— Install shaft, relevant gears and shim pack as calculated above.

— Install transmission shifter rods together with detent balls, springs and plunger.

— Install bevel pinion shaft with gears after position and bearing preload adjustments as described in the relevant sections.

— Install reverse gear and fork on pinion.

— Install splitter drive shaft assy.

— Install shifter fork and range change shifter rods together with detent balls, springs and plunger.

— Install bevel ring gear after bearing adjustment as described in the relevant Section.

Install top cover drive on transmission-rear housing, after cleaning and degreasing mating surfaces and applying a 2 mm (0.08 in) bead of jointing compound as shown.

Assemble P.T.O. housing cover to transmission housing as directed on page 2, Sect. 207.

Assemble lift to drive housing as directed on page 4, Sect. 501.

Install final drives on drive housing as directed on page 2, Sect. 206.

Jointing compound types are indicated on page 6, Sect. A, **Mods. 466/566/666/766.**

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DESCRIPTION

Spur, pinion drive creeper is installed between clutch unit and transmission and provides 20 forward and 8 reverse speeds. Creeper is operated through a hand lever on L.H. footboard.

CREEPER REMOVAL, INSTALLATION AND DISASSEMBLY

⚠ CAUTION ⚠

Lift and handle all heavy components using a suitable hoist.
Ensure that units or parts are supported by suitable slings or hooks.
Ensure that no one is in the vicinity of the load to be lifted.

Separate clutch housing from transmission-rear drive, housing to gain access to creeper. To this end, proceed as follows:

— Disconnect battery negative lead and electrical connections of power point and fender-mounted signal lights.

— Drain oil from transmission-rear drive housing and disconnect lift lines. Disconnect transmission clutch control link from outer control lever, creeper control link, and accelerator control link.

— For DT models, remove front axle drive shaft and associated guard.

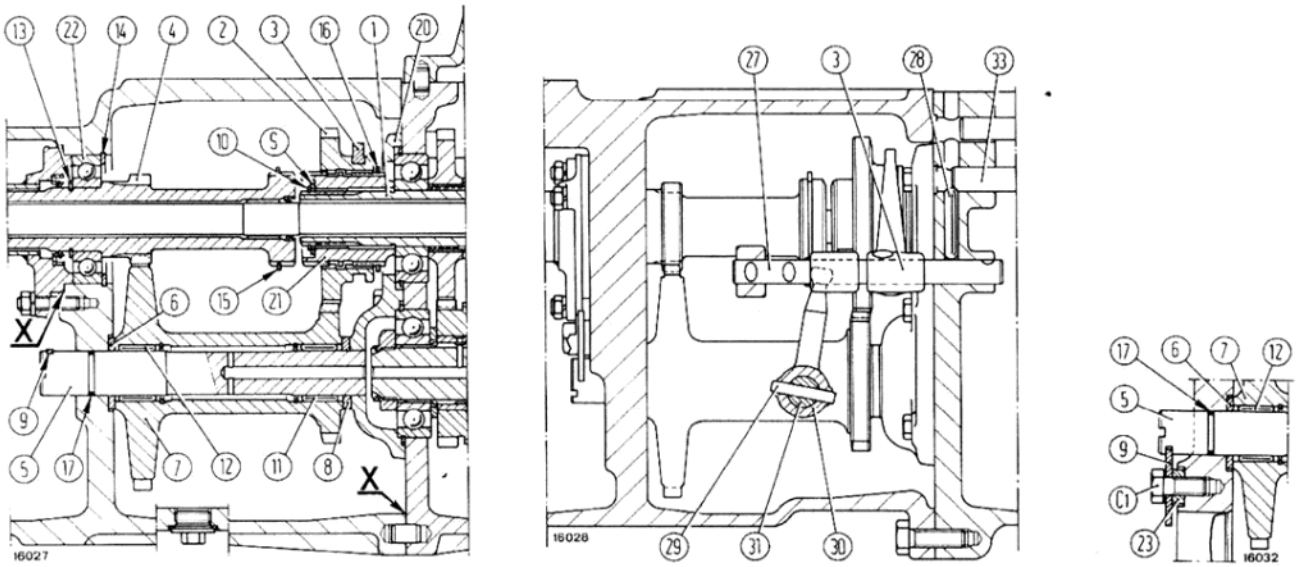
If tractor is equipped with ballast weights which cannot be removed, connect weights to a hoist to prevent engine from pitching forwards.

— Position trolley stend **292320** with fixed end under transmission-rear drive housing and adjustable ends one under sump and one under clutch housing.

— Position a telescoping stand under drawbar support, to prevent possible tipping over of transmission/ drive housing assembly.

— Remove screws retaining transmission-rear drive housing to clutch housing and separate engine with front axle and clutch housing from tractor.

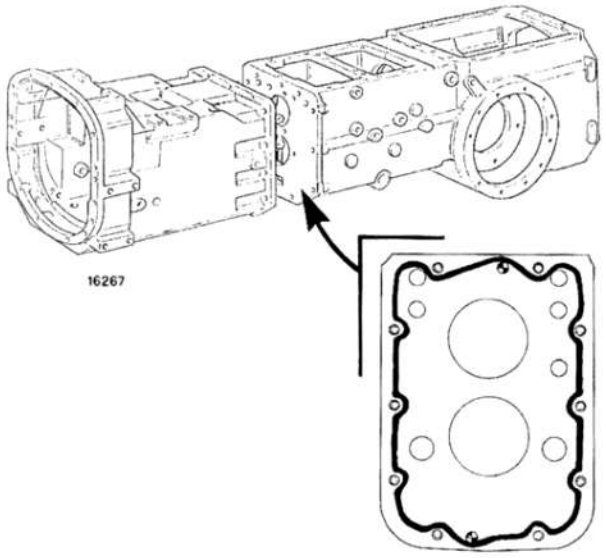
Note - To facilitate the removal/installation of clutch housing from/on the transmission/drive housing the transmission and creeper must be in neutral and the splitter shifted into low range.



Sections through creeper.

C1. Sto plate (9) retaining screw - G = 0 to 0.2 mm (0 to 0.0078 in) end float of fitted sleeve (21) - Sh. Shim - 1. Transmission-creeper shaft - 2. Creeper drive gear - 3. Creeper shifter fork - 4. Clutch-creeper shaft - 5. Driven gear jackshaft - 6. Driven gear front thrust washer - 7. Creeper driven gear - 8. Driven gear rear thrust washer - 9. Jackshaft stop plate - 11 and 12. Needle roller bearings - 10, 13, 14, 15 and 16. - Retaining rings - 17. O-ring - 18. P.T.O. shaft support bushing - 19. Seal - 20. Transmission bearing cover - 21. Creeper gear engagement sleeve - 22. Ball bearing - 23. Stop plate spacer - 27. Creeper shifter rod - 28. High range detent plunger - 29. Roll pin - 30. Fork control lever - 31. Creeper control shaft assy - 33. Splitter high and low range shifter rod.

Note - On assembly, thoroughly clean and degrease mating surfaces **X** and apply one of the jointing compounds listed on page 6, Sect. A, Mods. 466/566/666/766.



Applying jointing compound for transmission housing installation on clutch housing.

Jointing compound types are indicated on page 6, Sect. A, Mods. 466/566/666/766.

— Remove creeper drive gear (2, page 1) along with fork (3) after taking off the screw retaining rod (27) and pickup spring and check ball.

— Remove retaining ring (15) pull out roll pin (29) and fork lever (30), then withdraw shaft (31) partially outwards.

— Remove retaining ring (14) and withdraw clutch-creeper shaft (4), together with bearing and retaining ring (13, page 1). Retrieve driven gear (7). If clutch-creeper shaft (4) removal is difficult, separate clutch housing from engine as described hereunder.

Note - The operations detailed above concern overhaul of creeper only.

If driven gear jackshaft (5, page 1) replacement is necessary or if it is not possible to remove clutch-creeper shaft (4) or driven gear (7) as described above, separate engine from clutch housing. To this end, proceed as follows:

— Disconnect accelerator and engine shut-off links from injection pump, starter leads, dashboard cables and tractor meter drive shaft.

— Disconnect fuel lines from fuel pump, filters, and injector leak-off, drain power steering tank and disconnect power steering lines.

— Disconnect P.T.O. clutch link from control lever and separate fuel tank assy with hood and power steering control valve or steering unit from clutch housing.

— Remove screws retaining clutch housing to engine and separate engine together with front axle from clutch housing.

— Remove screws (C_1, page 1) and take out jackshaft (5).

— Remove clutch release sleeves together with thrust bearings.

— Remove ball bearing thrust cover retaining nuts and, working from the opposite side, remove shaft together with retaining ring (13) and bearing (22).

On assembly, ensure that high range detent plunger (28, page 1) is correctly seated.

⚠ CAUTION ⚠

Use suitable tools to align holes. DO NOT USE FINGERS OR HANDS.

Before assembling transmission housing to clutch housing, thoroughly clean and degrease mating surfaces and apply a 2 mm (0.08 in) bead of jointing compound as shown in figure.

Jointing compound types are indicated on page 6, Sect. A, Mods. 466/566/666/766.

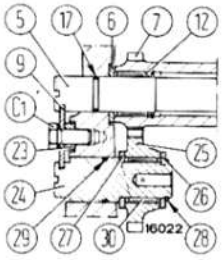
If units have been disassembled, install clutch housing on engine-front axle assy after smearing **grassofiat TUTELA MRM2** in clutch drive disc slots. Clean and degrease mating surface and apply one of the jointing compounds indicated on page 6, Sect. A, Mods. 466/566/666/766.

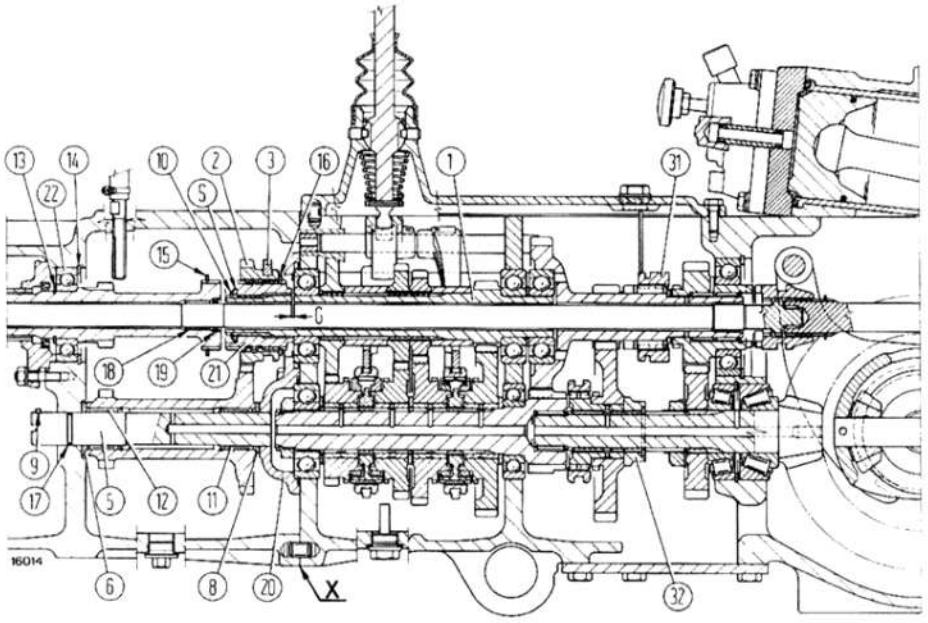
Note - Upon assembly of sleeve (21, page 1) interpose a shim (S) thick enough to provide a final end float (G) of 0 to 0.2 mm (0 to 0.0078 in).

MECHANICAL REVERSER DESCRIPTION

Mechanical reverser is installed between clutch unit and transmission (on tractors equipped with reverser, transmission does not feature reverse gears) and provides 12 forward and 12 reverse ratios.

Reverser is controlled through a hand lever on L.H. footboard.

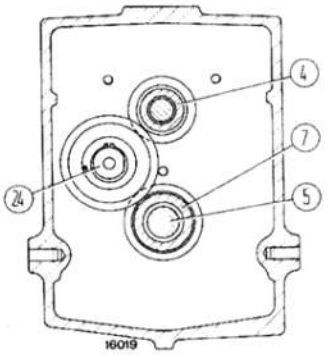




Sections through mechanical reverser.

C_1. Stop plate retaining screw - G = 0 to 0.2 mm (0 to 0.0078 in) = End float of sleeve (21) after assembly - S = Shim - 1. Transmission/reverser shaft - 2. Reverser drive gear - 3. Reverse fork - 4. Clutch/reverser shaft - 5. Relay gear jackshaft - 6. Relay gear front thrust washer - 7. Reverser relay gear - 8. Relay gear rear thrust washer - 9. Jackshaft stop plate - 11 and 12. Needle roller bearings - 10, 13, 14, 15 and 16. Retaining rings - 17. O-ring - 18. P.T.O. shaft support bushing - 19. Seals - 20. Transmission bearing cover - 21. Reverser gear engagement sleeve - 22. Ball bearing - 23. Stop plate spacer - 24. Intermediate gear jackshaft - 25. Reverser intermediate gear - 26 and 27. Intermediate gear thrust washers - 28. Retaining ring - 29. O-ring - 30. Needle roller bearing - 31. Normal range engagement gear - 32. Spacer.

Note - On assembly, thoroughly clean and degrease mating surfaces **X** and apply one of the jointing compounds listed on page 6, Sect. A, Mod. 466/566/666/766.



REMOVAL-INSTALLATION AND DISASSEMBLY

⚠ CAUTION ⚠

Lift and handle all heavy components using a suitable hoist.
Ensure that units or parts are supported by suitable slings or hooks. Ensure that no one is in the vicinity of the load to be lifted.

Separate clutch housing from transmission-rear drive housing to gain access to reverser. To this end, proceed as follows:

— Disconnect battery negative lead and electrical connections of power point and fender-mounted signal lights.

— Drain oil from transmission-rear drive housing and disconnect lift lines. Disconnect transmission clutch link from control lever, reserver link and accelerator link.

— For DT models, remove front axle drive shaft and associated guard.

If tractor is equipped with ballast weights which cannot be removed, connect weights to a hoist to prevent engine from pitchng forwards.

— Position trolley stand **292320** with fixed end under transmission/rear drive housing and adjustable ends one under sump and one under clutch housing.

— Position a telescoping stand under drawbar support to prevent possible tipping over of transmission/drive housing essy.

— Remove screws securing transmission-rear drive housing to clutch housing and separate engine with front axle and clutch housing from the tractor.

Note - To facilitate the removal/installation of clutch housing from/on the transmission/drive housing, the transmission and reverser must both be in neutral and the splitter shifted into low range.

Remove reverser drive gear (2, page 3) and relay gear (7).

If necessary, remove retaining ring (14) and withdraw clutch/reverser shaft (4) together with bearing (22) and retaining ring (13). If clutch/reverser shaft removal is difficult, separate clutch housing from engine as described below.

Note - The operations detailed above concern overhaul of reverser unit only.

If jackshafts (5 and 24, page 3) must be replaced, or if it has not been possible to remove clutch/reverser shaft (4) as described above, separate engine from clutch housing. To this end, proceed as described on page 2 for the creeper.

⚠ CAUTION ⚠

Use suitable tools to align holes. DO NOT USE FINGERS OR HANDS.

Before assembling transmission housing to clutch housing, thoroughly clean and degrease mating surfaces and apply a 2 mm (0.08 in) bead of jointing compound as shown in figure on page 2.

Jointing compound types to be applied are indicated on page 6, Sect. A, Mods. 466/566/666/766.

If units have been disassembled, install clutch housing on engine-front axle assy after smearing **grassofiat TUTELA MRM2** in clutch driven disc slots. Clean and degrease mating surfaces and apply one of the jointing compounds indicated on page 6, Sect. A, Mods. 466/566/666/766.

Note - Upon assembly of seeve (21, page 3) interpose a shim (S) thick enough to provide a final end float (G) of 0 to 0.2 mm (0 to 0.0078 in).

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BEVEL DRIVE - DIFFERENTIAL REMOVAL - INSTALLATION

Proceed as follows:

⚠ CAUTION ⚠

Lift and handle all heavy components using a suitable hoist.
Ensure that units or parts are supported by suitable slings or hooks. Ensure that no one is in the vicinity of the load to be lifted.

— Drain rear drive housing oil.

— Disconnect battery negative lead, multi-pole power point connections and lift lines.

— Remove ROPS frame, fenders and remote control valves, if any.

— Remove lift with control levers and transmission housing top cover with levers.

— Position a support stand under drive housing and remove wheels, final drives, brake units and P.T.O. housing.

— Take off bearing supports and remove bevel drive-differential unit from rear end of housing.

Disassemble unit as follows:

— Remove screws (C_1, page 3) and separate ring gear from differential carrier.

— Remove screw (11) and journal (10), retrieving differential pinions and side gears.

On reassembly, proceed as follows:

— Smear **grassofiat TUTELA G9** grease on differential pinion washers.

— Tighten screws (C_1, page 3) to the specified torque.

— Adjust taper roller bearings as indicated in relevant Sections.

— Adjust differential lock as indicated in relevant Section.

⚠ CAUTION ⚠

Handle all parts carefully. Do not put hands and fingers between parts. Wear safety equipment such as goggles, gloves and safety shoes.

BEVEL PINION SHAFT REMOVAL - INSTALLATION

Proceed as follows:

— Remove P.T.O. control lever and differential lock.

— Remove splitter drive shaft rear bearing retaining ring (20, page 3). Take out normal range gear together with ball bearing and needle roller bearing and remove splitter drive shaft with reverse sleeve.

Note - For bevel pinion shaft removal use adapter as shown in drawing on page 3, Sect. 202, Mods. 466/566/666/766.

— Fully slacken bevel pinion shaft bearing adjusting nut, install adapter (page 3, Sect. 202, Mods. 466/566/666/766) and secure to slide hammer puller. Pull out pinion, and retrieve gears from inside housing.

Note - To retrieve pinion positioning shims (S, page 3), first remove pinion end bearing cup from drive housing.

On assembly, adjust bevel pinion position and taper roller bearing preload as indicated in relevant Sections.

⚠ CAUTION ⚠

Use suitable tools to align holes. DO NOT USE HANDS OR FINGERS.

Install top cover with transmission control levers and bottom cover (if previously removed) on housing, after cleaning and degreasing mating surfaces and applying a 2 mm (0.08 in) bead of jointing compound as shown in figures on page 6, Sect. 202.

Install P.T.O. housing on drive housing as directed on page 2, Sect. 207.

Install lift on transmission housing as directed on page 4, Sect. 501.

Install final drives on drive housing as directed on page 2, Sect. 206.

Jointing compound types are indicated on page 6, Sect. A, Mods. 466/566/666/766.

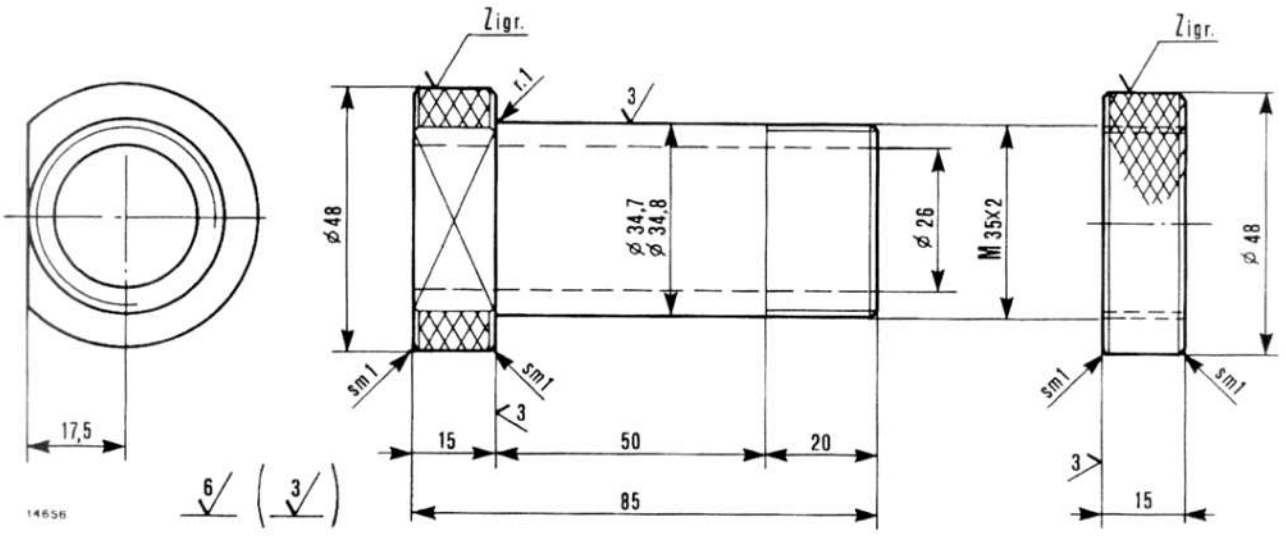
BEVEL DRIVE ADJUSTMENT

Bevel pinion position adjustment and shim thickness measurement.

Note - To adjust bevel pinion shaft position, make a tool as shown in the drawing on page 2.

Proceed as follows:

— Install tool (E, page 2) together with bevel pinion bearing cones on rear drive housing with bearing cups (7 and 8) and retaining ring (12), but without shims (S, page 3).



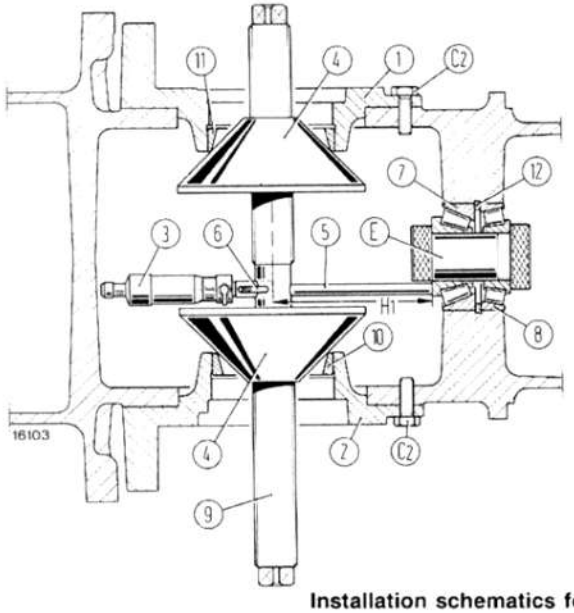
Tool for bevel pinion shaft assembly position adjustment. (Dimensions in mm) - (Punch mark No. 50029).

— Install tool **293400/1**, (F) on differential supports (1 and 2) with bearing cups (10 and 11).

— Tighten or back off two cones (4) to bring micrometer (3) spindle (5) to bevel pinion shaft bearing (7).

— Turn cones (4) by hand or using lockring wrench **293446** to bring tool firmly up against bearing cups (10 and 11), thus eliminating tool end play.

— Lock micrometer gauge with spindle through screw (6).



— Bring micrometer spindle (5) in contact with bearing (7) and measure dimension (H_1).

— Establish correct nominal dimension (H_3) between ring gear centerline and back of pinion:

$$H_3 = H_2 \pm C$$

where:

H_2 = 118.5 mm (4.6653 in). Nominal dimension between ring gear centerline and back of pinion.

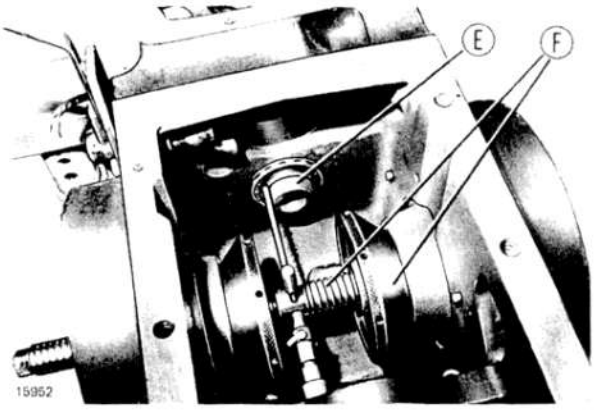
C = Correction factor stamped on pinion, expressed in mm and preceeded by + or —, if other than 0, to be added to or subtracted from nominal dimension (H_2) according to sign.

— Shim thickness (S) will be given by:

$$S = H_1 - H_3$$

where:

H_1 = Dimension measured with micrometer gauge
H_3 = Corrected nominal dimension between ring gear centerline and back of pinion.



Installation schematics for bevel pinion position check tool.

C_2. Support retaining screws (1 and 2) - E. Tool (make in workshop) - F. Universal tool **293400/1** - H_1. Dimension measured with tool - 1 and 2. Differential supports - 3. Micrometer gauge - 4. Centralizing cones - 5. Micrometer spindle - 6. Micrometer screw - 7 and 8. Bevel pinion bearings - 9. Threaded shaft - 10 and 11. Taper roller bearing cups - 12. Retaining ring.

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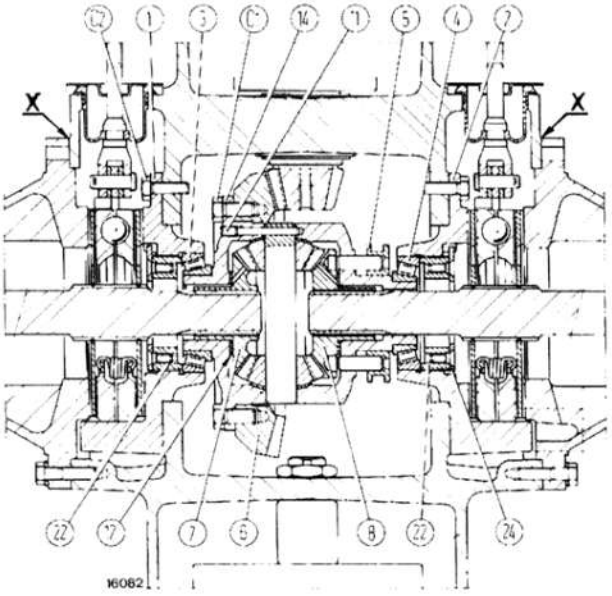
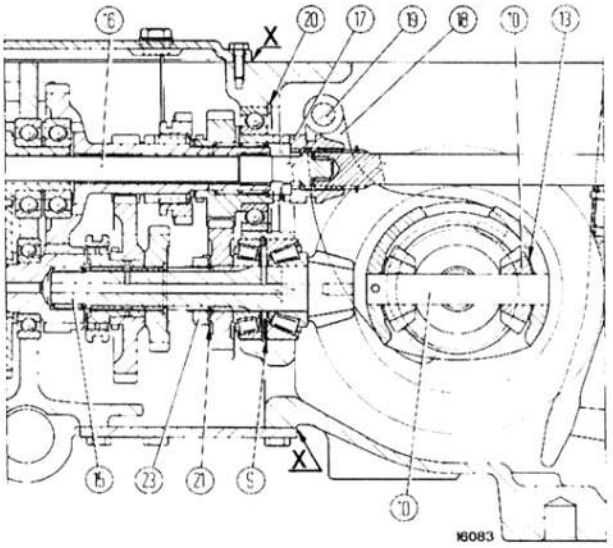




Longitudinal and cross sections through bevel drive and differential.

C1. Bevel ring gear retaining screws - C2. Differential support retaining screws - S. Bevel pinion positioning shims - 1 and 2. Differential support - 3 and 4. Taper roller bearings - 5. Differential lock sleeve - 6. Bevel ring gear - 7 and 8. Side gears - 9. Differential pinion - 10. Journal - 11. Differential pinion journal retaining screw - 12 and 13. Shims - 14. Differential carrier - 15. Bevel pinion shaft - 16. P.T.O. shaft - 17. P.T.O. control sleeve - 18. Fork - 19. Differential lock shaft - 20. Retaining ring - 21. Lockwasher - 22. Differential bearing adjuster ring - 23. Bevel pinion shaft bearing adjuster nut - 24. Lockwashers.

Note - On assembly, thoroughly clean and degrease mating surfaces **X** and apply one of the jointing compounds indicated on page 6, Sect. A, Mods. 466/566/666/766.

Pinion shaft bearing adjustment.

- Install pinion shaft on housing together with bearing shim (S) (as determined earlier) gears and bearing adjuster nut (23).

- Rotate pinion shaft to set bearings and simultaneously tighten adjusting nut (C) until revolving torque is 1 to 1,5 Nm (0.1 to 0.15 kgm, 0.72 to 1 ft lb). Measure torque with spring balance and string wrapped round LR gear and ensure that transmission shaft are not dragged into motion.

Specified revolving torque is equivalent to a spring balance pull of 13.3 to 20.3 N (7.36 to 20.4 kg, 26.2 to 45 lb).

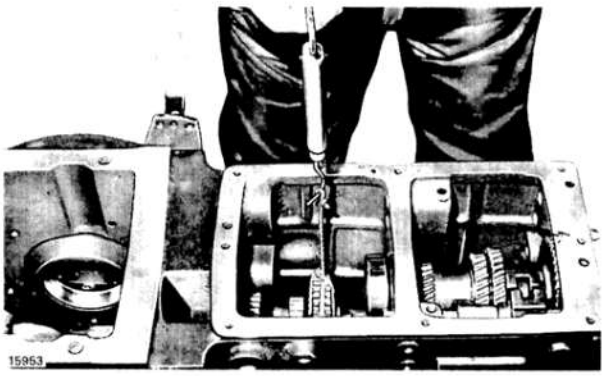
Note - After adjustment, bend lockwasher tab (21), over bearing adjusting nut to prevent work-out.

Differential bearing adjustment and bevel drive backlash check

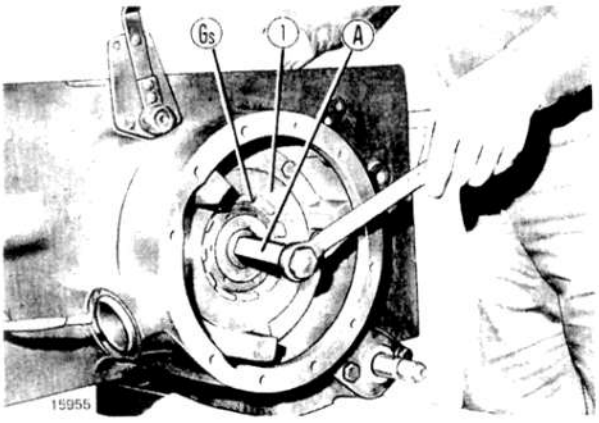
- With bevel pinion installed, install differential unit with bevel ring gear.

Note - For adjusterring installation, make a tool as shown in drawing page 7, Sect. 204, Mods. 466/566/666/766.

- Install L.H. adjusterring (Gs, page 4) and tighten to ensure minimum bevel drive backlash of 1 mm (0.04 in) approx.



Bevel pinion taper roller bearing adjustment.



Installing L.H. bearing adjuster ring (Gs).

A. Tool (make in workshop) - 1. L.H. differential support.

— Install RH bearing adjuster ring (Gd) and tighten until bevel ring/pinion gear set rolling torque is as follows:

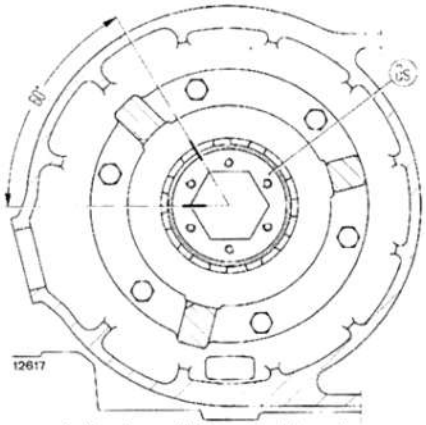
5 + 1 to 2.5 Nm (0.5 + 0.1 to 0.25 kgm or 0.72 to 1.8 ft lb) if torque found on pinion was **1 Nm (0.1 kgm or 0.72 ft lb)**

or

7.1 + 1 to 2.5 Nm (0.5 + 0.1 to 0.25 kgm or 0.72 to 1.8 ft lb) if torque found on pinion was **1.5 Nm (0.15 kgm or 1 ft lb)**.

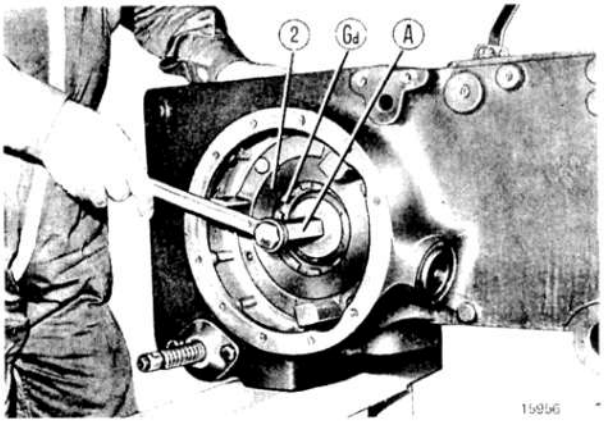
Measure this torque using spring balance and a string wrapped round differential carrier flange (make sure differential lock yoke does not interfere with its set and pinion does not drag the shaft). Specified rolling torque is equivalent to a spring balance pull of:

— 61.8 to 77.5 N (6.3 to 7.9 kg or 14 to 17 lb) or
— 83.3 to 99 N (8.5 to 10.1 kg or 19 to 22 lb)



Adjusting differential bearings.

60° = Lockring rotation (Gs or Gd), equivalent to one side of lockring hexagon and corresponding to ring gear axial displacement of 0.33 mm (0.013 in).



Installing R.H. bearing adjuster ring (GD).

A. Tool (make in workshop) - 2. R.H. differential support.

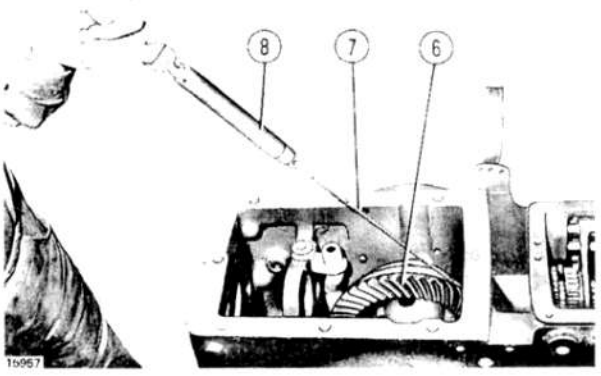
— Using a dial gauge, check bevel drive backlash (G). Take measurements at three equi-spaced points 120° apart and average readings. Normal backlash is 0.15 to 0.20 mm (0.006 to 0.008 in), or an average of 0.18 mm (0.007 in). To compensate for excessive backlash, note that the average ratio of normal backlash to equivalent ring gear axial displacement is 1 to 1.4

Consequently ring gear axial displacement (Z) will be:

$$Z = (G - 0.18) \times 1.4$$

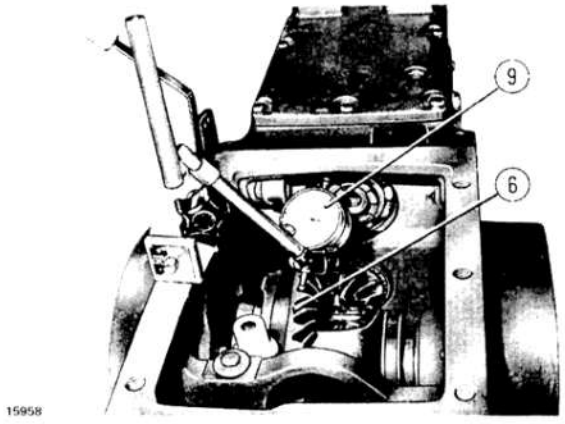
where:

G = Bevel drive backlash as previously measured.



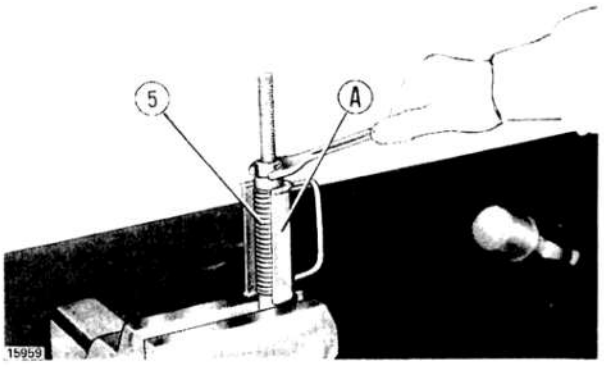
Bevel gear set support bearing rolling torque.

6. Ring gear - 7. String - 8. Spring balance.



Bevel ring gear to pinion backlash checks (specified: 0.15 to 0.20 mm or 0.006 to 0.008 in).

6. Ring gear - 9. Centesimal dial gauge.



Differential mechanical lock installation.

A. Tool **293452** - 5. Spring.

— Back off R.H. adjuster ring and tighten L.H. adjuster ring by the same amount until the specified backlash is achieved.

Note - Note that one complete turn of ring corresponds to 2 mm (0.08 in) ring gear axial displacement (Z). Consequently, a 60° turn of ring, equivalent to one side of ring hexagon, corresponds to a ring gear axial displacement of 0.33 mm (0.013 in).

— Install lockwashers (24, page 3) on adjuster rings in such a way that washer tab is aligned with notch on differential support.

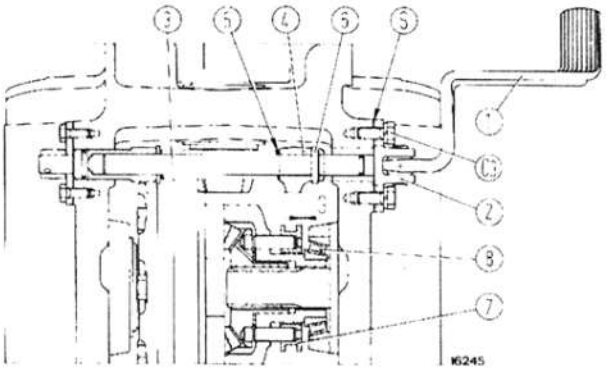
DIFFERENTIAL LOCK INSTALLATION AND ADJUSTMENT

Assemble differential lock using tool **293452** (A) to compress return spring (5) and to insert roll pin (6) which secures fork (4) in its seat on shaft.

Install bevel ring gear-differential unit on supports.

Using feeler gauge, check that clearance (G) between sleeve (7) and R.H. differential bearing is 2 mm (0.08 in).

Adjust clearance by changing shims (S) between support (2) and drive housing.



Installing and adjusting differential lock.

C3. Screws - G = 2 mm (0.08 in). Clearance between sleeve (7) and bearing (8) - S. Sleeve positioning shims - 1. Differential lock lever - 2. Lever support - 3. Yoke shaft - 4. Yoke - 5. Spring - 6. Roll pin - 7. differential lock sleeve - 8. Differential bearing.

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BRAKE UNIT REMOVAL AND INSTALLATION

⚠ CAUTION ⚠

Lift and handle all heavy components using a suitable hoist. Ensure that units or parts are supported by suitable slings or hooks. Ensure that no one is in the vicinity of the load to be lifted.

Disassamble brake unit as follows:

— Drain rear drive housing oil.

— Position a support stand under drive housing and remove ROPS frame, fenders and remote control valves, if any.

— Back off capscrews (C_2, page 1, Sect. 206) and remove final drive assy.

— Remove cotter pin and pin (2), securing brake pedal to link (1).

— Back off link (1) from spring side and remove complete brake unit.

— Check actuator (4) and brake discs (5) for wear. Replace discs when sintered material is almost worn out.

On brake unit installation, use driver **293847** (A) as shown to position boot (11) correctly on brake link (1).

Before installing final drive housing on rear drive housing, thoroughly clean and degrease mating surfaces and apply a 2 mm (0.08 in) bead of jointing compound as shown in figure on page 2.

Jointing compound types are indicated on page 6, Sect. A, Mods. 466/566/666/766.

BRAKE PEDAL ADJUSTMENT

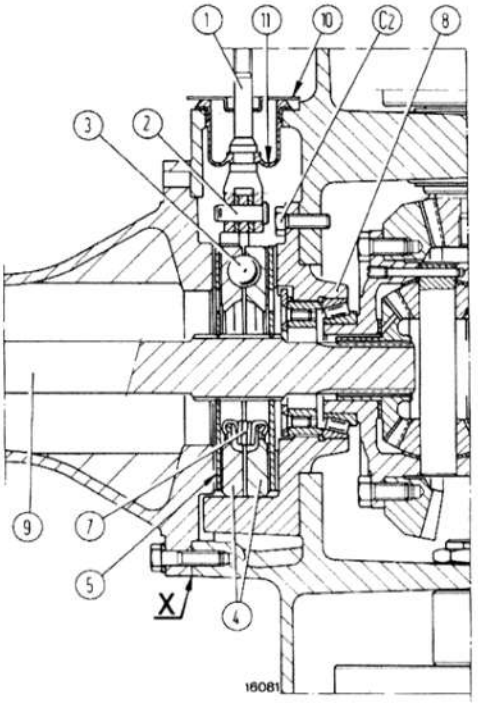
Check that pedal free travel is the same for both pedals and does not exceed 70 mm (3.15 in).

To adjust, proceed as follows:

— Move brake hand lever downwards.

— Back of jam nuts (A, page 2) and turn sleeves (B) until free travel is 35 mm (1.77 in).

— Tighten jam nuts (A).

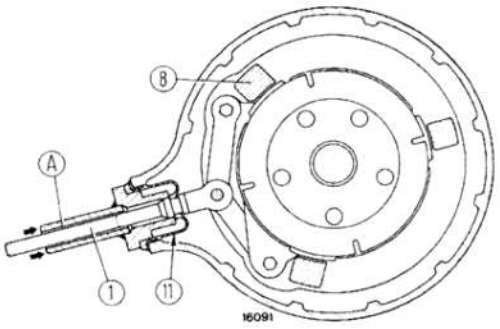


Section through brake unit.

C_2. Differential support screws - 1. Brake link - 2. Pin - 3. Ball - 4. Brake actuator - 5. Brake discs - 7. Actuator pull-off spring - 8. Differential support - 9. Axle shaft - 10. Boot cover plate - 11. Boot.

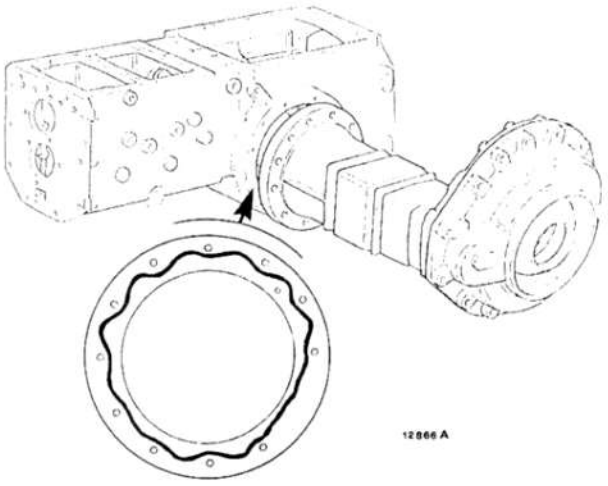
Note - On assembly apply jointing compound to surfaces **X** as directed in notes and in diagram on page 2.

Important - New brake discs **must be** soaked for at least 2 hours, and preferably for 5 to 6 hours, in TUTELA MULTI F oil before installation.



Correct brake position for installation of boot (11).

A. Driver **293847** - 1. Brake link - 8. Differential support.



Applying jointing compound to final drive and rear drive housing.

Jointing compound types are indicated on page 6, Sect. A, Mods. 466/566/666/766.

PARKING BRAKE LEVER ADJUSTMENT

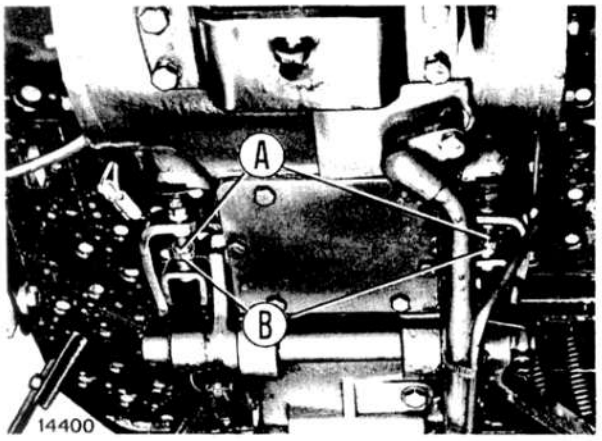
After adjusting brake pedal, check parking brake which must apply fully when hand lever is pulled to third notch on quadrant.

If not adjust as follows:

— Back off jam nuts (A).

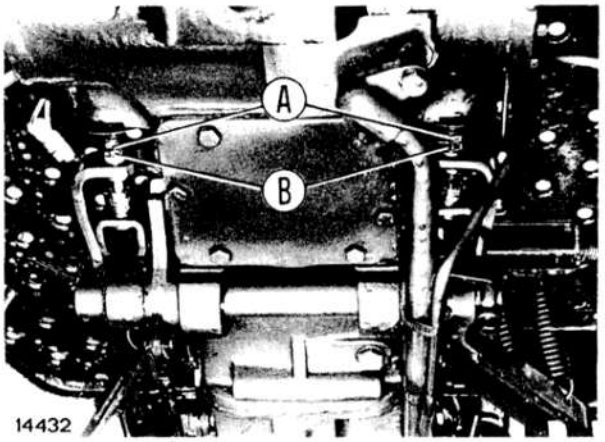
— Turn sleeves (B) until lever reaches third notch.

— Tighten jam nuts (A).



Adjusting brake pedals.

A. Locknuts - B. Sleeves.



Adjusting parking brake lever.

A. Jam nuts - B. Sleeves.

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REMOVAL

⚠ CAUTION ⚠

Raise and handle all heavy components using a suitable hoist. Ensure that units or parts are supported by suitable slings or hooks. Ensure that no one is in the vicinity of the load to be lifted.

Remove final drives as follows:

— Drain oil from rear (drive) and final drive housings.

— Position a support stand under rear drive housing and remove ROPS frame, wheels, fenders and auxiliary control valves, if any.

— Take out screws (C_2) and remove final drive housing assy.

DISASSEMBLY

⚠ CAUTION ⚠

Handle all parts with care. Do not put hands and fingers between parts. Wear safety items such as goggles, gloves and safety shoes.

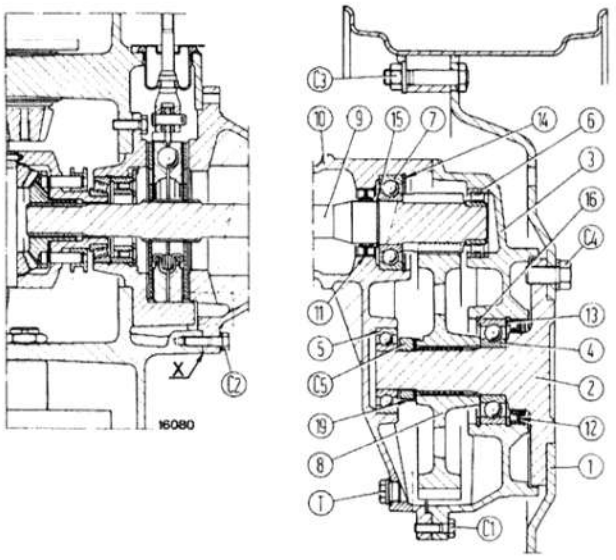
Disassemble final drives as follows:

— Back off screws (C_1) and remove final drive cover together with driven gear (8).

— Tighten two M18x1.5 screws into two of the wheel disc holes on hub and clamp wheel shaft in vise.

— Back off nut (C_5), remove driven gear (8) and force out stub axle (2), tapping on end.

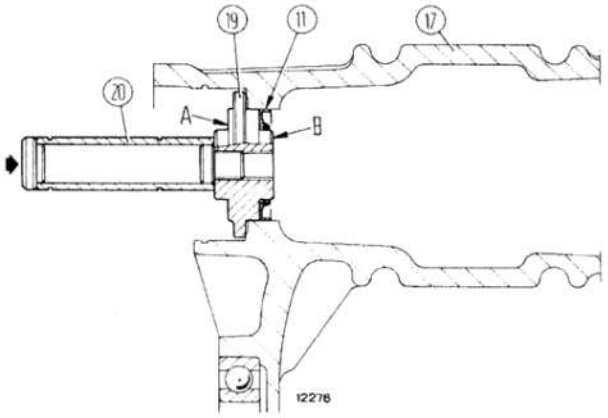
— Remove retaining ring (14) and withdraw axle shaft (1) with b earing (7).

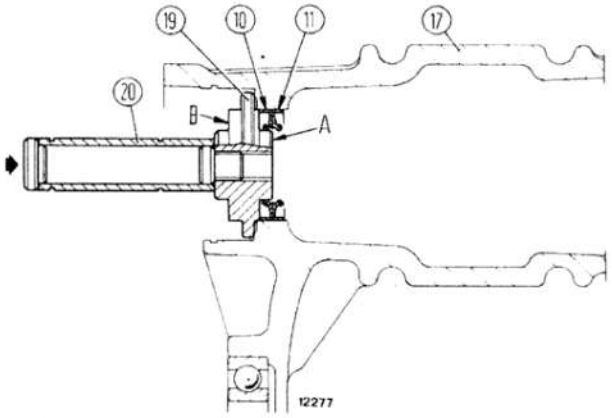


Longitudinal section through R.H. final drive.

C_1. Final drive housing cover screws - C_2. Screws securing final drive housing to drive housing - C_3. Nuts securing disc to wheel rim - C_4. Screws securing disc to wheel hub - C_5. Nut, shaft (2) - T. Drain plug - 1. Wheel disc - 2. Wheel shaft - 3. Final drive housing cover - 4, 5 and 7. Ball bearings - 6. Roller bearing - 8. Final drive driven gear - 9. Axle shaft - 10. Final drive housing - 11 and 12. Seals - 13, 14, 15 and 16. Retaining rings - 19. Lockwasher.

Note - On assembly, apply jointing compound to surfaces **X** as directed in notes in diagrams on page 2.





Installing axle shaft seals.

A, B. Surfaces of driver **293850** with reference marks 1 and 2 - 10 and 11. Seals - 17. Final drive housing - 19. Driver **293850** - 20. Handle **293800**.

ASSEMBLY AND INSTALLATION

If replacement is necessary, install axle shaft seals (10 and 11, page 1) as shown in figures and proceeding as follows:

— Install seal (11) on final drive housing and position in seat using driver (19) **293850** with handle **293800** (20).

Note - On assembly of seal (11, page 1), surface (A) of punch **293850** facing ourwards, must show reference mark 1. As a consequence, surface (B), facing the seal, must show reference mark 2.

— Install seal (10) on final drive housing as shown in figure and position in seat using driver (19) with handle **293800** (20).

Note - On assembly of seal (10), surface (B) of punch **293850** facing outwards, must show reference mark 2. As a consequence, surface (A), facing the seal, must show reference mark 1.

Proceed as follows:

⚠ CAUTION ⚠

Use suitable tools to align holes. NEVER USE HANDS OR FINGERS.

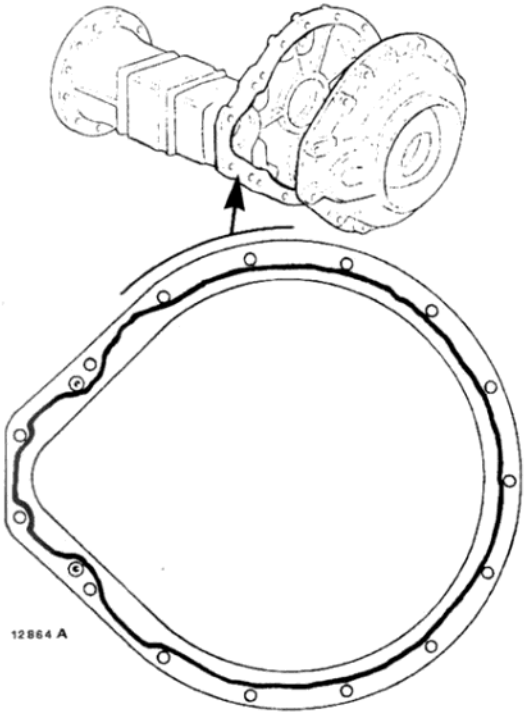
— Tighten mut (C_5, page 1) to the torque specified in table.

— Smear **grassofiat TUTELA G9** on roller of bearing (6) so that they stick to the bearing cup, and install cover (3).

Note - To ensure that bearing (6) is **installed correctly,** position final drive housing (10) vertically and install cover (3) from the top.

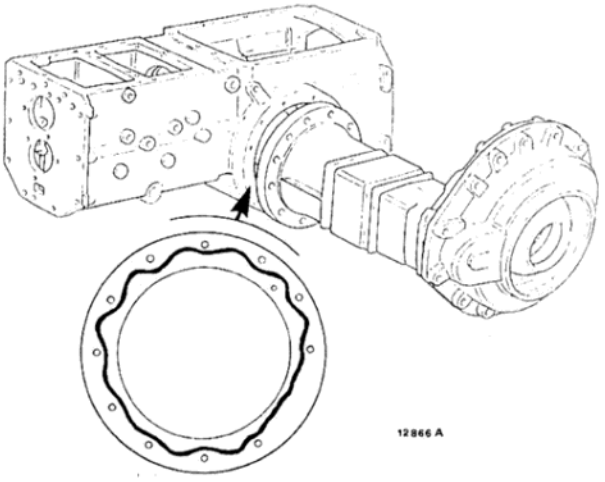
Before installing final drive housing on rear drive housing, and cover on final drive housing, thoroughly clean and degrease mating surfaces and apply a 2 mm (0.08 in) bead of jointing compound as shown in figures below.

Jointing compound types are indicated on page 6, Sect. A, Mods. 466/566/666/766.



Applying jointing compound for final drive housing cover installation.

Jointing compound types are indicated on page 6, Sect. A, Mods. 466/566/666/766.



Applying jointing compound for final drive housing installation on rear drive housing.

Jointing compound types are indicated on page 6, Sect. A, Mods. 466/566/666/766.

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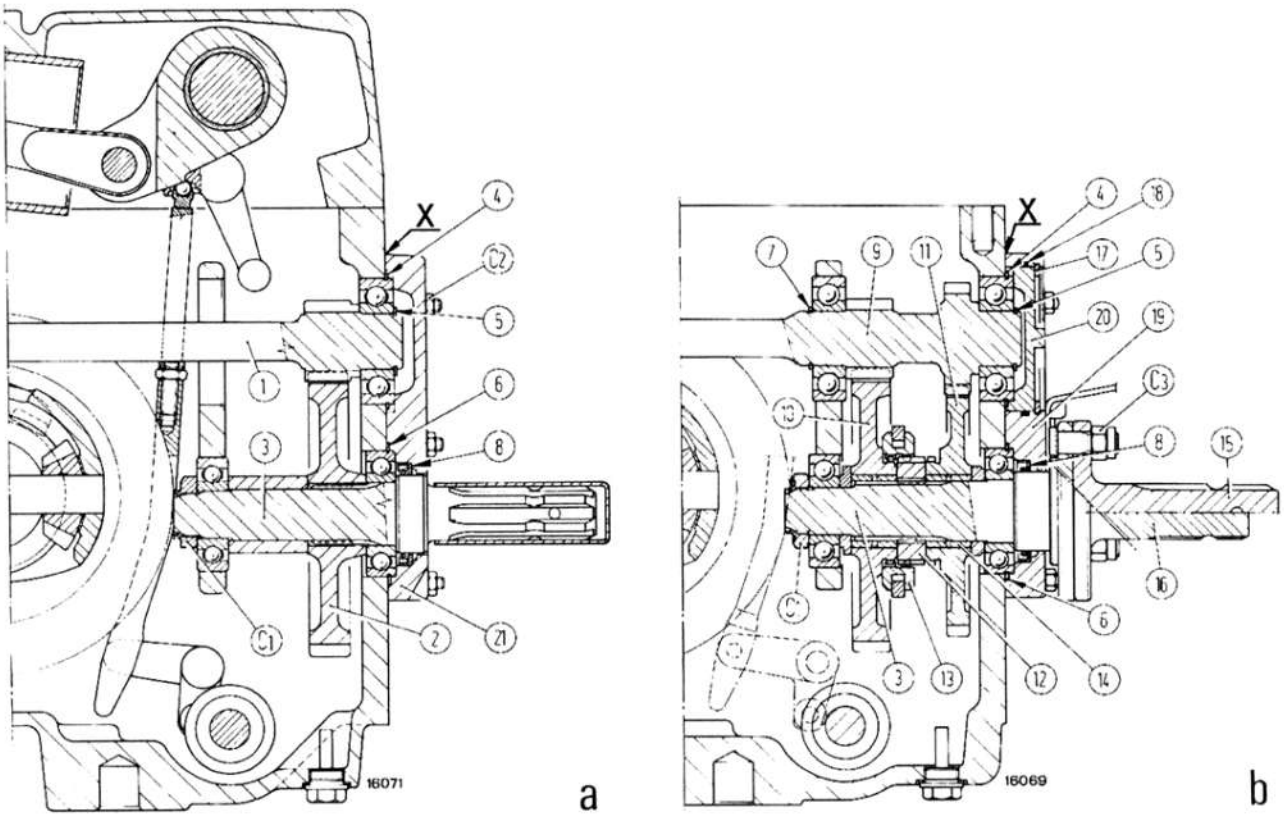


Longitudinal section through PTO.

a. Section through 540 rpm PTO - b. Section through 540/1000 rpm PTO - C1. Driven shaft nut - C2. PTO housing cover screw nuts - C3. Housing end self-locking nut - 1. Drive gear - 2. Driven gear - 3. Driven shaft - 4, 5, 6 and 7. Retaining rings - 8. Seal - 9. Double drive gear - 10. 540 rpm driven gear - 11. 1000 rpm driven gear - 12. Fixed gear - 13. Engagement sleeve - 14. Driven gear support bushings - 15. 540 rpm splined extension - 16. 1000 rpm splined extension - 17. Retaining ring - 18. O-ring - 19. PTO cover (540/1000 rpm) - 20. Drive gear rear bearing cover (540/1000 rpm) - 21. PTO cover (540 rpm).

REMOVAL

⚠ CAUTION ⚠

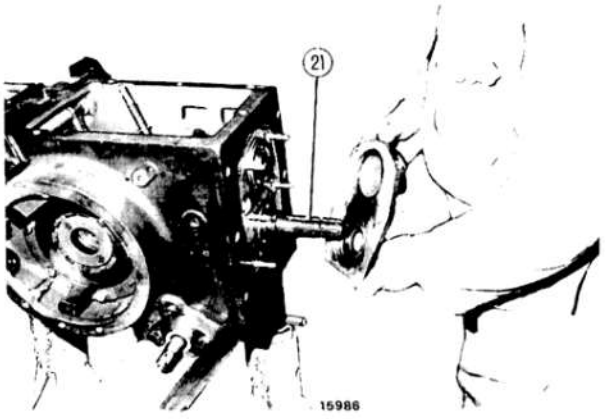
Handle all parts with care. Do not put hands or fingers between parts. Wear safety items such as goglles, gloves and shoes.

Proceed as follows:

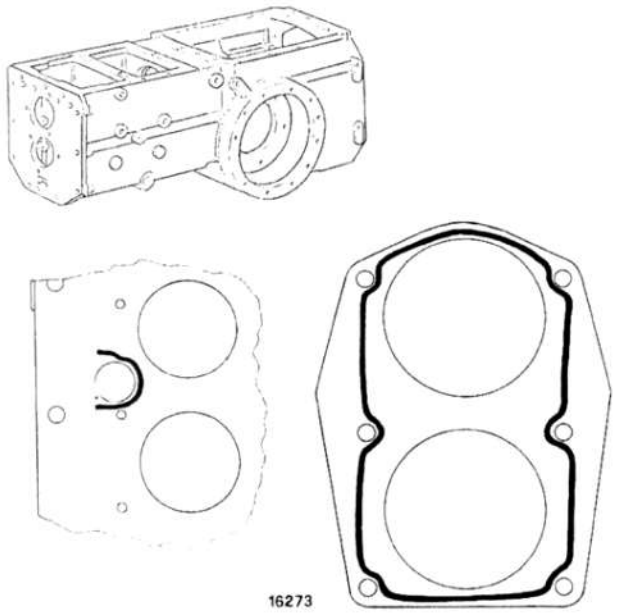
- Drain oil from rear drive housing.
- Remove drawbar, support and tow hook (when fitted).

Next, for the 540 rpm PTO:

- Remove rear cover (21).
- Engage PTO in ground speed mode: this will prevent dropping of the engagement sleeve during outward removal of drive shaft (1).



Removal of 540 rpm PTO rear cover (21).



Applying jointing compound for PTO housing installation on rear drive housing.

a. Application area on rear drive housing - b. Application area on PTO housing cover.

Jointing compound types are indicated on page 6, Sect. A, Mods. 466/566/666/766.

— Remove drive shaft (1, page 1).

— Back off nut (C_1) and take out driven shaft (3) retrieving gear (2), the spacer and bearing from housing.

Instead, for the 540/1000 rpm PTO proceed as follows:

— Remove retaining ring (17, page 1) and cover (20).

— Remove retaining ring (7) and the retaining ring on drive shaft (9) near PTO engagement sleeve.

— Engage PTO in ground speed mode: this will prevent dropping of the engagement sleeve during outward removal of drive shaft (9).

— Take out drive shaft (9, page 1).

— Back off nut (C_1) and take out driven shaft (3), retrieving from housing the driven gears (10 and 11) fixed gear (12) engagement sleeve (13) two support bushings (14) and thrust washers.

— Finally, take off PTO cover (19).

⚠ CAUTION ⚠

Use suitable tools to align holes. NEVER USE HANDS OR FINGERS.

ASSEMBLY

Change any bearings found to be damaged; check 540/1000 rpm PTO driven gear bushings (14, page 1) for wear. Check all fit clearances comparing them with specified values tabulated in Sect. 20

Replace any seals (8, page 1) and/or O-ring (18) found to be no longer efficient.

Note - To replace seals:

— 540 rpm PTO (8, Fig. a): take off rear cover (21).

— 540/1000 rpm PTO (8, Fig. b): remove complete PTO unit as described earlier.

Upon reassembly of PTO components, refer to the figures on page 1 and apply the tightening torques as specified - see Table in Sect. 20.

Install PTO rear cover on drive housing after having accurately cleaned and degreased all the surfaces involved and applied a 2 mm (0.08 in) thick bead of jointing compound in the locations shown above.
For types of jointing compound, refer to page 6, Sect. A, Mods. 466/566/666/766.

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FRONT AXLE

Type	Inverted U, telescoping, centre pivoting
Tracks (six)	1300-1400-1500-1600-1700-1800-1900 mm (51-55-59-63-67-71-75 in)
Steering Knuckle Articulation	
King pin journal dia.	29.967 to 30.000 mm (1.1798 to 1.1811 in)
Bushing fitted I.D.	30.050 to 30.140 mm (1.1830 to 1.1866 in)
King pin clearance in bushings	0.050 to 0.173 mm (0.0020 to 0.0070 in)
Bronze thrust washer thickness	3.925 to 4.000 mm (0.1545 to 0.1575 in)
Steel washer thickness	3.925 to 4.000 mm (0.1545 to 0.1575 in)
Axle Pivot	
Pivot dia.	29.967 to 30.000 mm (1.1798 to 1.1811 in)
Bushing fitted I.D.	30.050 to 30.140(1) mm (1.1830 to 1.1866 in)
Pivot clearance in bushing	0.050 to 0.173 mm (0.0020 to 0.0070 in)

(1) Not reamed

POWER STEERING

Type	Hydrostatic
Make	DANFOSS or ORSTA
Hydraulic circuit	Independent, separate pump
Oil reservoir	Transparent plastic on R.H. side of engine
Oil filter	In oil reservoir, metal cartridge
Hydraulic Pump	
Type	gear
Model	C 18
Make	FIAT
Drive	from engine valve gear
Rotation (seen from drive side)	Clockwise
Drive ratio	0.931 to 1
Rated speed (at engine governed speed)	2328 rpm
Rated output (all models)	19.1 L/min (4.18 GPM)
Onbench output at 1450 rpm and 68.5 bar (70 kg/cm² or 996 psi):	
— New or reconditioned pump	11.1 L/min (2.4 GPM)
— Used pump	7.7 L/min (1.7 GPM)
— Test oil temperature	55° to 65°C
— Test oil viscosity	SAE 20

FRONT AXLE - STEERING: Specifications and Data

POWER STEERING

Drive/driven gear journal diameter	17.400 to 17.418 mm (0.6850 to 0.6857 in)
Bearing bore diameter	17.450 to 17.470 mm (0.6870 to 0.6878 in)
Gear journal clearance in bearing	0.032 to 0.070 mm (0.0012 to 0.0027 in)
Maximum wear clearance	0.1 mm (0.004 in)
Gear clearance in pump body	0.020 to 0.064 mm (0.0008 to 0.0025 in)
Maximum pump body wear, suction side opposite gears	0.1 mm (0.004 in)
Gear width	13.190 to 13.215 mm (0.5193 to 0.5203 in)
Bearing width	16.863 to 16.878 mm (0.6639 to 0.6645 in)
Pump body width	47.070 to 47.120 mm (1.853 to 1.855 in)
Gear and bearing end play in pump body (fitted, after servicing)	0.1 to 0.2 mm (0.004 to 0.008 in)
Control Valve	DANFOSS or ORSTA
Type	with steering column operated rotary valve (permitting steering also in case of pump failure)
Outfit code:	
— DANFOSS (w/valves in control valve body)	OSPC 100
— ORSTA (w/valves block)	LAG-B-100-2-LVP16-2
Relief valve crack-off setting (both control valves)	
— 2 WD	80 bar (82 kg/cm², 1166 psi)
— 4 WD	100 bar (102 kg/cm², 1450 psi)
Power cylinder overload valve crack-off setting	200 bar (204 kg/cm², 2900 psi)
Power Cylinder	
— Type	Double acting, located behind front axle
Cylinder bore diameter	48 mm (1.88 in)
Piston rod diameter	22 mm (0.866 in)
Maximum piston stroke	200 mm (7.87 in)

TIGHTENING TORQUE DATA

Refer to table on page 5, Sect. 30, Mods. 466/566/666/766 which applies with the following exceptions.

DESCRIPTION	Thread Size	Torque		
		Nm	kgm	ft lb
Front Axle, Section 301 Screw, front axle carrier to engine	N 18x1.5	314	32	231.5
Nut, axle end	M 14x1.5	147	15	108.5
Nut, R.H. and L.H. levers on knuckles	M 12x1.25	93	9.5	68.7
Screw, wheel to hub	M 14x1.5	147	15	108.5

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POWER STEERING OVERHAUL

Proceed as described on page 1, Sect. 303, Mods. 466/566/666/766 except that the DANFOSS OSPB100 ON control valve is no longer fitted on the 45-66 Model.

Steering pump and reservoir overhaul

For steering pump overhaul and testing, proceed as described on page 1, Sect. 502, Mods 466/566/666/766 in regard of the hydraulic lift pump.

In addition, mind the following:

— Pump components are shown on page 3, Sect. 303, Mods. 466/566/666/766.

— Pump assembly and performance data are given in Table on page 1, Sect. 30, while shown alongside is the specific pump output/speed curve chart.

When removing hydraulic fluid reservoir (T, page 10, Sect. 303, Mods. 466/566/666/766) clean thoroughly and check for:

— Oil leaks, replacing reservoir if required, as no repair is possible.

— Efficiency of metal strainer filter, container and spring.

After assembly, refill the system in several steps each time operating the steering control to help in filling all parts of the circuit properly.

Hydraulic system bleeding

To eliminate any air in the hydraulic system, simply steer lock-to-lock a number of times and top up fluid as required.

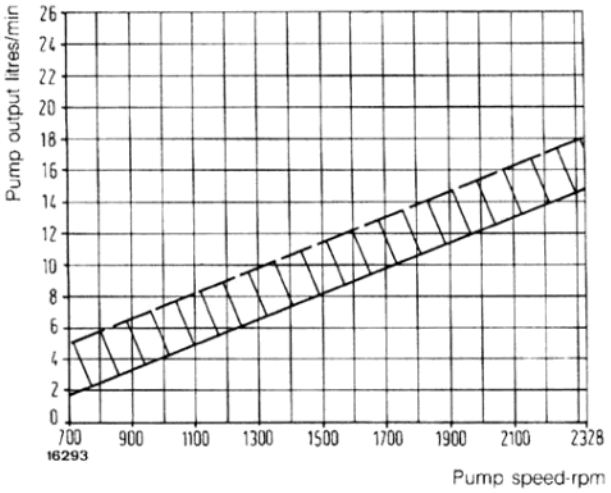
On-Tractor relief valve adjustment

Proceed as instructed on pages 4 and 5, Sect. 303, Mods. 466/566/666/766.

Only exception is the valve setting value which is unchanged at 100 bar (102 kg/cm² or 1452 psi) for the 45-66DT model but changes to 80 bar (82 kg/cm² or 1166 psi) for the 2-wheel drive 45-66: both values shall be measured with engine running at about 1600 rpm.

ON-BENCH RELIEF VALVE SETTING ADJUSTMENT

Prepare the set-up shown in Fig. a on page 4, Sect. 303, Mods. 466/566/666/766 and complete the circuit as shown in Fig. b, on page 5.



C18 power steering pump output-speed curve.

Test pressure 80 bar (82 kg/cm² or 1166 psi) - Fluid temperature: 55 to 65°C.

Next, proceed as instructed on page 5, Sect. 303, Mods. 466/566/666/766.

Only exception is the valve setting value which is unchanged at 100 bar (102 kg/cm² or 1452 psi) for the 45-66DT model but changes to 80 bar (82 kg/cm² or 1166 psi) for the 2-wheel drive 45-66.

TROUBLE SHOOTING

Refer to the text on pages 8 and 9, Sect. 303, Mods. 466/566/666/766: remember that the 45-66 and 45-66DT tractors are no longer fitted with the DANFOSS OSPB 100 ON control valve but only DANFOSS OSPC 100 or ORSTA LAG-B100.

Power steering operation schematics and illustrative sections

Refer to the illustrations and texts on pages 10 and 11, Sect. 303, Mods. 466/566/666/766 and remember that the 45-66 and 45-66DT Tractors are no longer fitted with the DANFOSS OSPB 100 ON control valve but only the DANFOSS OSPC 100 or ORSTA LAG-B100 units.

Also remember that fot the 2-wheel drive 45-66 tractor the relief valve setting is adjusted to 80 bar (82 kg/cm² or 1166 psi) and to 100 bar (102 kg/cm² or 1452 psi) for the four-wheel drive tractors.

FRONT AXLE - STEERING:

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LIVE FRONT AXLE

Type	Steering, full-floating, center pivotting
Bevel Drive and Differential	
Bevel drive ratio	11/38 = 3.45 to 1
Bevel drive backlash	0.15 to 0.20 mm (0.006 to 0.008 in)
Bevel pinion bearing shim thickness (S_1, page 3, Sect. 402)	2.50 - 2.55 - 2.60 - 2.65 - 2.70 - 2.75 - 2.80 2.85 - 2.90 - 2.95 - 3.00 - 3.05 - 3.10 - 3.15 3.20 - 3.25 - 3.30 - 3.35 - 3.40 - 3.45 - 3.50 3.55 - 3.60 - 3.65 - 3.70 mm (0.098 - 0.100 - 0.102 - 0.104 - 0.106 - 0.108 0.110 - 0.112 - 0.114 - 0.116 - 0.118 - 0.120 0.122 - 0.124 - 0.126 - 0.128 - 0.130 - 0.132 0.134 - 0.136 - 0.138 - 0.140 - 0.142 - 0.144 0.146 in)
Bevel pinion shim thickness (S_2)	2.5 - 2.6 - 2.7 - 2.8 - 2.9 - 3.0 - 3.1 - 3.2 3.3 - 3.4 - 3.5 - 3.6 - 3.7 mm (0.098 - 0.102 - 0.106 - 0.110 - 0.114 0.118 - 0.122 - 0.126 - 0.130 - 0.134 0.138 - 0.142 - 0.146 in)
Differential pinion and side gear backlash	0.15 mm (0.006 in)
Side gear thrust washer thickness (7, page 2, Sect. 402)	1.470 to 1.530 mm (0.0579 to 0.0602 in)
Differential pinion thrust washer thickness (6)	1.50-1.60 mm (0.0590-0.0630 in)
Differential pinion journal dia.	21.939 to 21.960 mm (0.864 to 0.865 in)
Differential pinion bore dia.	22.040 to 22.061 mm (0.868 to 0.869 in)
Differential pinion journal clearance in pinion bore	0.080 to 0.122 mm (0.003 to 0.004 in)
Side gear spigot diameter	37.961 to 38.000 mm (1.494 to 1.496 in)
Side gear spigot bore diameter in differential case	38.080 to 38.119 mm (1.499 to 1.501 in)
Side gear spigot clearance in differential case	0.080 to 0.158 mm (0.003 to 0.006 in)
Axle Shafts and Joints	
Axle shaft journal diameter (5, page 2, Sect. 402) at bushings (14)	29.914 to 29.935 mm (1.178 to 1.179 in)
Axle bushing fitted I.D. (14)	30.050 to 30.150 mm (1.183 to 1.185 in) (1)
Axle shaft running clearance in bushing	0.115 to 0.191 mm (0.004 to 0.007 in)
Bushing interference fit in housing	0.064 to 0.129 mm (0.002 to 0.005 in)
King pin bearing shim thickness (S_3, page 3, Sect. 402)	0.10 - 0.15 - 0.20 - 0.25 - 0.30 mm (0.004 - 0.006 - 0.008 - 0.010 - 0.012 in)
Planetary Final Drives	
Reduction ratio	15 : (15 + 54) = 1 : 4.6
Driven gear thrust washer thickness (18, page 2, Sect. 402)	0.77 to 0.83 mm (0.030 to 0.033 in)
Axle Pivot	
Centre pivot diameter	52.652 to 52.671 mm (2.0729 to 2.0737 in)
Centre pivot front bushing fitted I.D. (21)	52.720 to 52.790 (1) mm (2.0756 to 2.0783 in)
Centre pivot working clearance in bushing	0.049 to 0.138 mm (0.0019 to 0.0054 in)
Rear bevel pinion carrier spigot O.D.	99.040 to 99.072 mm (3.8992 to 3.9005 in)
Rear bushing fitted I.D. (24)	99.146 to 99.221 (1) mm (3.9033 to 3.9063 in)
Spigot fitted clearance in bushing	0.074 to 0.181 mm (0.0029 to 0.0071 in)
Axle front and rear thrust washer thickness (22, page 2, Sect. 402)	4.95 to 5.00 mm (0.1949 to 0.1968 in)

(1) Not reamed

LIVE FRONT AXLE: Specifications and Data

LIVE FRONT AXLE

Turning radius:	
— FWD IN - Brakes off	5000 mm (16 ft 5 in)
— FWD OUT - Brakes off	4600 mm (15 ft 1 in)

TIGHTENING TORQUE DATA

DESCRIPTION	Thread Size	Torque		
		Nm	kgm	ft lb
Front Axle, Section 402				
Lock ring, bevel pinion	M 35x1.5	294	30	217
Screw, differential case to axle casing (C_2)	M 12x1.25	113	11.5	83
Screw, ring gear to differential case (C_3)	M 12x1.25	113	11.5	83
Screw, king pin (C_4)	M 10x1.25	64	6.5	47
Screw, steering kunckle (C_5)	M 12x1.25	113	11.5	83
Lock ring, wheel bearing (C_6)	M 45x1.5	59	6	43
Screw, planetary final drive housing (C_7)	M 10x1.25	64	6.5	47
Screw, wheel disc to hub	M 16x1.5	255	26	188
Nut, rim to wheel disc screw	M 16x1.5	245	25	181
Screw, front and rear axle case support (C_9)	M 18x1.5	392	40	289
Screw, differential cap (C_{10})	M 12x1.25	113	11.5	83
Screw, front axle carrier to engine (C_{11})	M 18x1.5	314	32	231
Drive Shafts - Axle Section 402				
Screw, axle drive housing to tractor (C_{13}, page 2)	M 10x1.25	59	6	43

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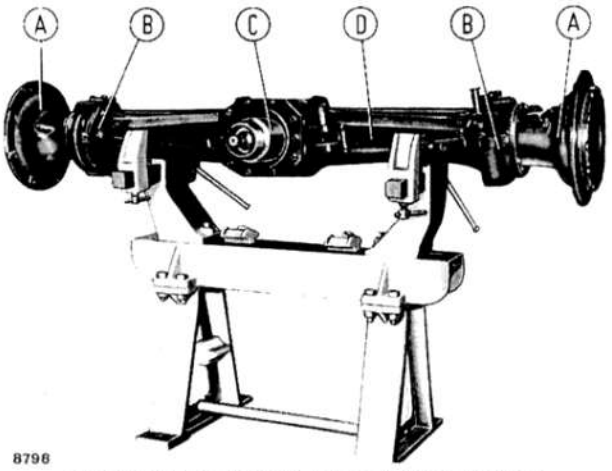
REMOVAL

⚠ CAUTION ⚠

Lift and handle all heavy parts using a suitable hoist. Ensure that units or parts are supported by suitable slings or hooks. Ensure that no one is in the vicinity of the lifted load.

Proceed as follows:

- Remove drive shaft guard, remove retaining rings (28 and 31) (page 1, Sect. 402, Mods. 55-66/60-66/70-66/80-66) from seats and withdraw drive shaft (30), moving splined sleeves (27 and 33) inwards.
- Remove power steering cylinder and hinge pins; place a hydraulic jack centrally under housing and remove wheels.
- Place a stand under engine sump at front, remove front and rear axle pivots and, lowering jack, separate assy from tractor.
- Secure axle assy to universal stand, remove and drain oil axle housing and final drives.



Front axle assy installed on universal stand.

A. Wheel hubs with planetary final drives - B. Steering knuckle - C. Differential carrier - D. Axle housing.

DISASSEMBLY

⚠ CAUTION ⚠

Handle all parts carefully. Do not put hands and fingers between parts. Wear safety goggles, shoes and gloves.

Final drive, hub and steering knuckle overhaul.
Refer to text and illustrations on pages 1 and 2, Sect. 401, Mods. 466DT and 566DT.

King pin bearing adjustments
Refer to text and illustrations on pages 2 and 3, Sect. 401, Mods. 466DT and 566DT.

Wheel hub bearing adjustments
Refer to text and illustrations on pages 4 and 5, Sect. 401, Mods. 466DT and 566DT.

Bevel drive-Different unit overhaul
Refer to text and illustrations on pages 7 and 8, Sect. 401, Mods. 466DT and 566DT.

Differential bevel gear set adjustments

1. Bevel pinion bearing adjustment and shim thickness determination using special purpose tool.

Proceed as follows:

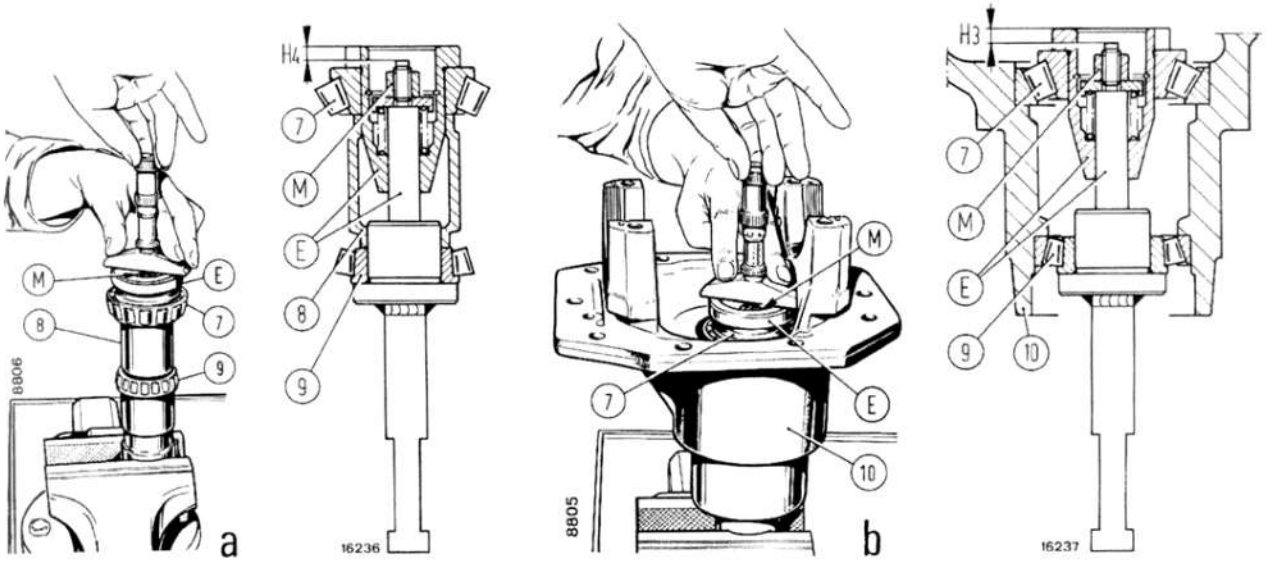
- Install tool (E, page 2) **293752** the pinion bearing inner cones (7 and 9) and associated spacer (8).
- Fully tighten nut (M) of tool.
- Measure dimension (H_4) between top face and tool pin end.
- Disassemble. Lubricate bearings with engine oil and reassemble parts on tool, interposing the differential carrier (10) complete with bearing outer spring.
- Fully tighten tool nut (M) at the same time turning the carrier about ten times to seat bearings properly.
- Measure dimension (H_3) of tool under this condition.

Thickness of shim pack (S_1) to be fitted is given by:

$$S_1 = H_3 - H_4$$

If necessary, round off the values (S_1) obtained to the nearest plus 0.05 mm.

Note - At end of adjustment, do not remove the tool from the carrier as this same setup is needed for bevel pinion position adjustments.



Determining bevel pinion bearing shim thickness (S_1, page 3, Sect. 402, Mods. 55-66DT/60-66DT).

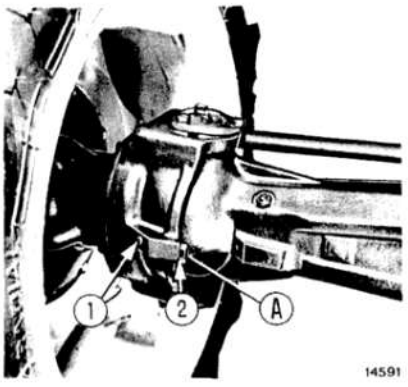
a. Measuring dimension (H_4) - b. Measuring dimension (H_3) - E. Tool **293752** - H_3, H_4. Dimensions to be measured between tool pin end and top face - M. Tool nut - 7 and 9. Bearing cones - 8. Spacer - 10. Differential carrier.

2. Bevel pinion bearing adjustment and shim thickness determination using universal tool 293510.

Refer to text and illustration on pages 9 and 10, Sect. 401, Mods. 466DT and 566DT.

3. Bevel pinion position shim thickness determination

Refer to text and illustrations on pages 10 and 11, Sect. 401, Mods. 466DT and 566DT.



Fitting steer limiter screw (A)

1 and 2. Alternative screw mounting positions.

4. Differential bearing adjustment and bevel drive backlash check

Refer to text and illustrations on pages 11, 12 and 13, Sect. 401, Mods. 466DT and 566DT.

Differential planet/side gear backlash adjustment

Refer to text and illustrations on page 13, Sect. 401, Mods. 466DT/566DT/666DT and 766DT models.

Installation of steering limiter screw

To prevent any interference of tires with steering control linkages under all-steered wheels and max axle swing conditions, fit limiter screw (A) in:

position 1, for power steered tractors
position 2, for mechanical steered tractors.

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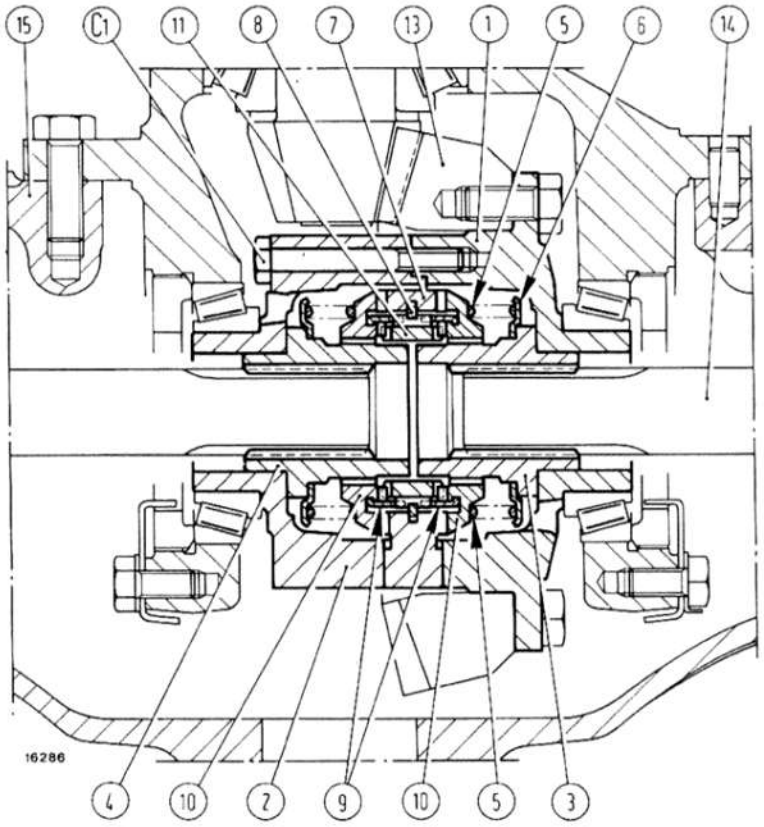
NOTE

Check NO SPIN differential unit operation as follows:

- With engine off, engage a gear and the front wheel drive, apply parking brake and raise front of tractor.
- Rotate front wheels in a forward direction to eliminate play. Hold L.H. wheel and rotate R.H. wheel rearwards. NO SPIN differential disengages and wheel rotates with an indexing or metallic clicking sound.
- Stop R.H. wheel, then turn forward slightly; NO SPIN differential engages and stops the wheel.
- Rotate both wheels backward to eliminate play, hold L.H. wheel and rotate R.H. wheel forward. NO SPIN differential disengages and wheel rotates with an indexing or metallic clicking sound.
- Stop R.H. wheel, then turn backward slightly; NO SPIN differential engages and stops the wheel.
- Repeat the above operations while holding R.H. wheel.



Section through differential with NO SPIN unit (model 45-66DT).

C_1. Case screw, tightening torque 39 Nm (4 kgm or 29 ft lb) - 1. Case, flange half - 2. Case, cap half - 3 and 4. Side gears - 5. Springs - 6. Spring retainer - 7. Central driven assembly - 8. Retaining ring - 9. Cam holdout rings - 10. Driven clutch - 11. Center cam - 12. Stop - 13. Ring gear - 14. Axle shafts - 15. Front axle housing.

OPERATION

The **NO SPIN** differential performs the following key functions:

- Permits full use of available traction.
- Permits shorter radius turns than with normal differentials.
- Prevents wheel-spin when one wheel loses traction.
- Compensates for differences in wheel travel which occur when turning or traveling over uneven ground.

When the tractor is in a straight-forward or reverse mode of operation the **NO SPIN** allows equal speed to be distributed to both wheels.

When one wheel «holds back» (e.g. outer turning circle wheel on curves or the wheel that must go sver en obstacle) the associated wheel drive shaft in disengaged and will continue to turn freely.

If one wheel should lose traction momentarily, the opposite wheel which still has traction, continues to pull the vehicle until traction is regained by both wheels.

Turning

In a left turn, for instance, the right wheel increases speed. Axle shaft (14) transmits this speed increase to the left side gear (3), to the left driven clutch (10) and to the associated cam holdout ring (9). When the speed difference between the two wheels reaches a given value, ring (9) and clutch (10) overcome spring load and disengage from center cam (11), remaining in this position until the end of the curve.

Note - For correct **NO SPIN** differential operation, tires must be equal (within a few millimetres) in rolling radii. Small differences may be corrected by adjusting tire inflation pressure.

Note - The **NO SPIN** unit shown above is the same as fitted on early Mods. 55-66DT/60-66DT and on vineyard and orchard versions.

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DRIVE SHAFT

Removal

To remove drive shaft, proceed as follows:

— Remove shaft guard and retaining rings (28 and 31, page 1, Sect. 402, Mods. 55-66DT/60-66DT/70-66DT/80-66DT) from seats and withdraw drive shaft (30), moving splined sleeves (27 and 33) inwards.

Installation

Reinstall shaft in seats and adjust as follows:

— Bring axle housing into contact with rear axle pivot support (25, page 2, Sect. 402, Mods. 55-66DT/60-66DT/70-66DT/80-66DT) to eliminate support end play (L_1) and position front splined sleeve (27) against retaining ring (28). Using a feeler gauge, measure gap between sleeve and retaining ring (26) and install shim (S_5) to obtain sleeve end play (L) of 1 to 1.5 mm (0.04 to 0.06 in).

AXLE DRIVE

Removal

To remove axle drive from tractor, proceed as follows:

— Remove drive shaft as directed above.

— Drain oil from rear drive housing and axle drive housing.

— Disconnect vertical link from outer lever, back off screws (C_{13}) and remove axle drive housing.

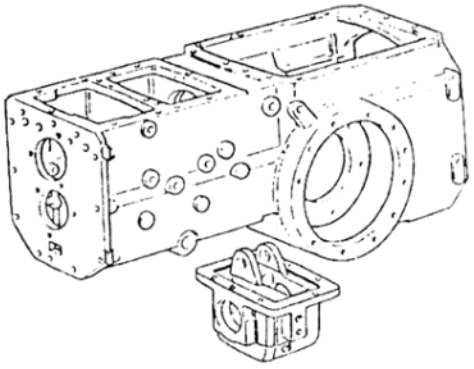
Disassemble unit on bench as follows:

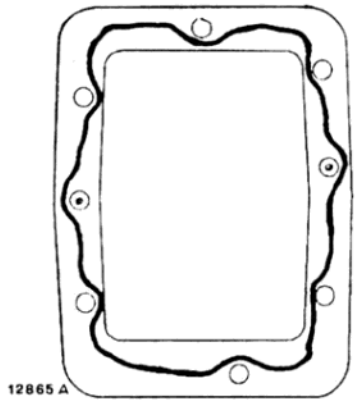
— Remove roll pin (45, page 2) using a suitable punch, withdraw intermediate shaft (46) and remove associated gear (48) together with needle roller bearing (47) and thrust washers and spacer (56).

— From outside of axle drive housing, remove dust excluder (38), seal (39), retaining ring (40) and driven shaft (43) with attached ball bearing and oil seal.

— Remove front wheel drive control sleeve (50) and driven gear (42) with thrust washers from axle drive housing.

— Using a slide hammer puller, remove ball bearing (44).





Applying jointing compound for axle drive housing installation on rear drive housing.

Jointing compound types are indicated on page 6, Sect. A, Mods. 466/566/666/766.

Check thrust washers for wear and ball bearing efficiency.

If necessary, scrap and replace seal (39), using protector **293836** during installation.

Installation

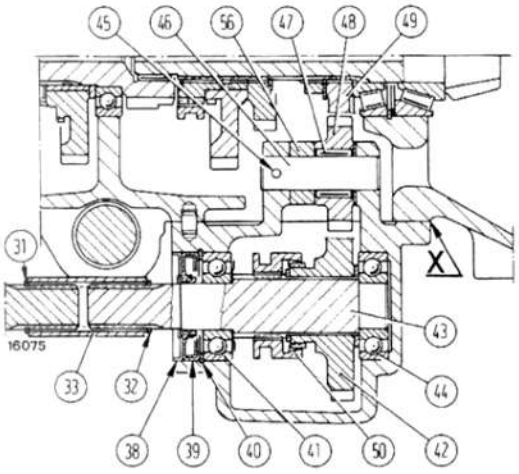
To install, reverse the removal procedure and refer to Figure on page 2.

Preferably replace dust excluder (38) taking care to prevent distortion on assembly.

Before axle drive housing reinstallation on rear drive housing, thoroughly clean and degrease mating surfaces and apply a 2 mm (0.08 in) dia. bead of jointing compound as shown in Figure above.

Jointing compound types are indicated on page 6, Sect. A, Mods. 466/566/666/766.

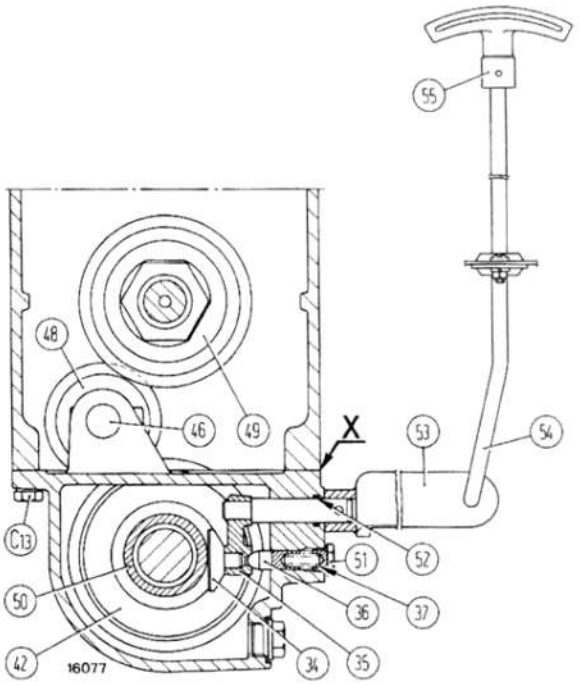
FRONT WHEEL DRIVE: Sections



Axle drive sections.

For live front axle section, see illustration on page 3, Sect. 402, late models 55-66DT and 60-66DT. For live front axle swing pivot section and for correct assembly of bushings in front and rear supports see relevant illustrations on page 1, Sect. 402, Mods. 55-66DT/60-66DT/70-66DT and 80-66DT.

Note - On assembly, thoroughly clean and degrease mating surfaces **X** and apply one of the jointing compounds listed on page 6, Sect. A, Mods. 466/566/666/766.



C_{13}. Axle drive housing to tractor screw - 31. and 32. Retaining rings - 33. Rear splined sleeve - 34. Shoe - 35. Inner relay lever - 36. Plunger - 37. Plunger spring - 38. Dust excluder - 39. Seal - 40. Retaining ring - 41. Ball bearing - 42. Driven gear - 43. Splined driven shaft - 44. Ball bearing - 45. Roll pin - 46. Intermediate shaft - 47. Needle roller bearing - 48. Intermediate gear - 49. Drive gear keyed on bevel pinion shaft - 50. Axle drive engagement sleeve - 51. Plug - 52. O-ring - 53. Axle drive outer control lever - 54. Vertical link - 55. Hand lever - 56. Intermediate gear thrust spacer.

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LIFT

Type	Position draft and mixed control
Control	Two independent levers
Variospeed sensitivity control	Control valve-mounted four-position lever
LIFT-O-MATIC	Fast lunk raising/lowering by buttons: no need to use position/draft control levers
Link lowering speed adjustment	by knob on control valve
Single-acting cylinder:	
— Bore x stroke	90x110 mm (3.5 to 4.3 in)
— Displacement	700 cc (42.7 in^3)
Relief valve crack-off setting	186 to 191 bar (190 to 195 kg/cm^2, 2.702 to 2.773 psi)
Safety valve crack-off setting	210 to 215 bar (214 to 219 kg/cm^2, 3.053 to 3.126 psi)
Lift piston dia.	89.980 to 90.000 mm (3.5425 to 3.5433 in)
Lift cylinder bore dia.	90.036 to 90.071 mm (3.5447 to 3.5460 in)
Piston working clearance in bore	0.036 to 0.091 mm (0.0014 to 0.0036 in)

Note - For lift construction and design data see pages 1 and 2, Sect. 50, Mods. 466/566/666/766 except as indicated below:

Cross shaft journal dia.:	
— R.H.	47.970 to 48.000 mm (1.8886 to 1.8897 in)
— L.H.	54.970 to 55.000 mm (2.1642 to 2.1653 in)
Bushing fitted I.D. in lift body:	
— R.H.	48.100 to 48.184 mm(1) (1.8937 to 1.8970 in)
— L.H.	55.100 to 55.184 mm(1) (2.169 to 2.173 in)
Cross shaft working clearance in bushings	0.100 to 0.214 mm (0.004 to 0.008 in)
R.H. bushing interference fit in housing	0.065 to 0.161 mm (0.003 to 0.006 in)
L.H. bushing interference fit in housing	0.065 to 0.161 mm (0.003 to 0.006 in)
Cross shaft end float with lift arms in position	0.200 to 1.400 mm (0.008 to 0.0551 in)
Check valve return spring length:	
— Free	23.5 mm (0.9252 in)
— Under 35.3 to 39.2 N (3.6 to 4 kg or 7.9 to 8.8 lb)	18 mm (0.70 in)

(1) To be obtained after press fitting and without any reconditioning.

HYDRAULIC LIFT UNIT: Specifications and Data

IMPLEMENT ATTACHMENT

Type Category Draft control	3-point linkage One and two Through lower links and sensing bar
Max, lift capacity, center of gravity 610 mm (24 in) from lower link bushings and starting with links horizontal (top link coupled to centre hole):	1598 daN (1630 kg or 3586 lb)
Max. lift capacity, starting with lower links horizontal (Top link coupled to center hole) and center of gravity 970 mm or 38.2 in from lower links	1393 daN (1420 kg or 3124 lb)
Max lower link end travel: — Lifting rods out and coupled to front mounting holes — Lifting rods out and coupled to rear mounting holes	 ~ 720 mm (28.3 in) ~ 620 mm (24.4 in)
Sensing bar diameter Sensing bar end float	24.867 to 24.900 mm (0.9790 to 0.9803 in) 1.5 to 5.4 mm (0.0590 to 0.2126 in)

TIGHTENING TORQUE DATA

DESCRIPTION	Thread Size	Torque		
		Nm	kgm	ft lb
Lift - Section 501				
Screw, lift to rear drive housing (C_1, page 2)	M 14x1.5	147	15	108.5
Screw, control valve body to lift	M 8x1.25	26	2.7	19.5
Screw, lift arm plates (C_2, page 2)	M 14x1.5	147	15	108.5
Plug, max arm lift adjustment (23, page 11)	M 12x1.25	103	10.5	75.9
Nut, position control shaft	M 10x1.25	15	1.5	10.8
Nut, lever bracket studs (C_4, page 2)	M 8x1.25	25	2.6	18.8
Screw, lift housing cover	M 14x1.5	147	15	108.5
Screw, top link support	M 16x1.5	221	22.5	162.7
Screw, suction connection	M 12x1.25	98	10	72.3
Screw, delivery connection on lift control valve	M 10x1.25	59	6	43.4
Implement attachment and towing device - Sect. 503				
Screw, tow hook and drawbar support	M 16x1.5	221	22.5	162.7
Nut, drawbar screw	M 18x1.5	343	35	253

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REMOVAL

⚠ CAUTION ⚠

Lift and handle all heavy components using a suitable hoist.
Ensure that units or parts are supported by suitable slings or hooks. Ensure that no one is in the vicinity of the lifted load.

Remove lift as follows:

— Separate lifting arms from hitch.

— Remove remote control valve half-coupling support plate.

— Disconnect oil delivery lines to lift. Where fitted, remove remote control valve oil drain lines from lift body.

— Preferably, remove operator's seat and apply a lift hook to two symmetrical seat mounting holes.

— Remove the 7 screws retaining lift to rear drive housing and remove lift assy. Take care to prevent draft control rod (12, page 6) from fouling lift linkage.

DISASSEMBLY

⚠ CAUTION ⚠

Handle all components with care. Do not put hands and fingers between parts.
Wear safety goggles, shoes and gloves.

Place lift on a service stand, then proceed with the disassembly operations as follows:

Note - To install lift on stand, make a bracket **50032** in the shop as shown in the above drawing.

— Take off the retaining screws and remove the control valve unit.

— Remove screw (C_2, page 2) and take off thrust plate (4).

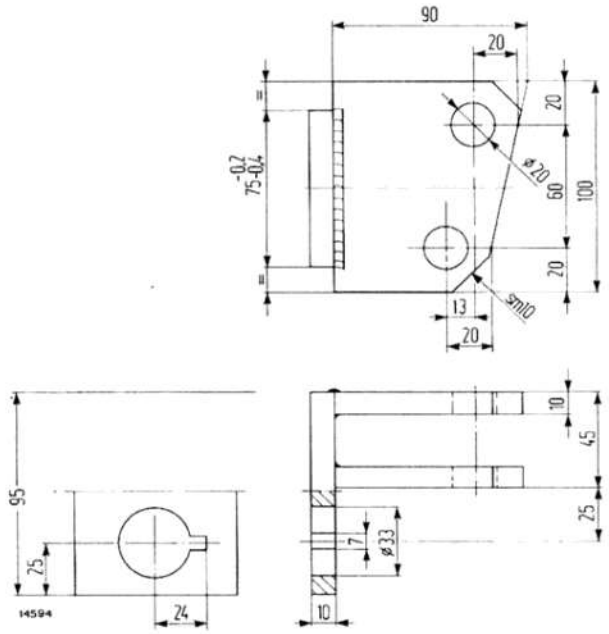
— Install the tool made in workshop (see page 3, Sect. 501, Mods. 466/566/666/766) and secure to arm shaft with interposed thrust plate (4, page 2). Tighten screws (C_2) to compress springs (22, page 2).

— Remove nuts (C_4) and retrieve springs (21) and quadrant bracket (21). Remove position control shaft nut and retrieve control levers (26 and 27) and clutch plates (23).

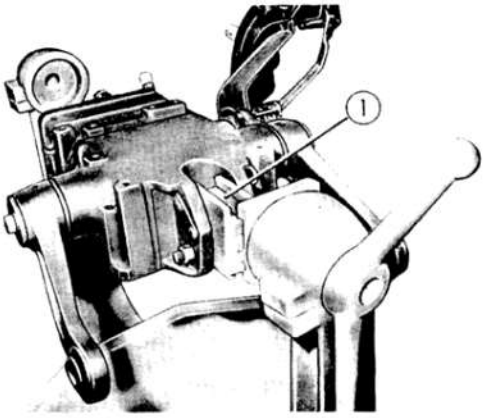
— Remove lift front cover (20, page 2) then the cylinder barrel complete with piston.

— Take piston out of barrel.

— Remove inner arm screw, and remove cross shaft by striking its right end.

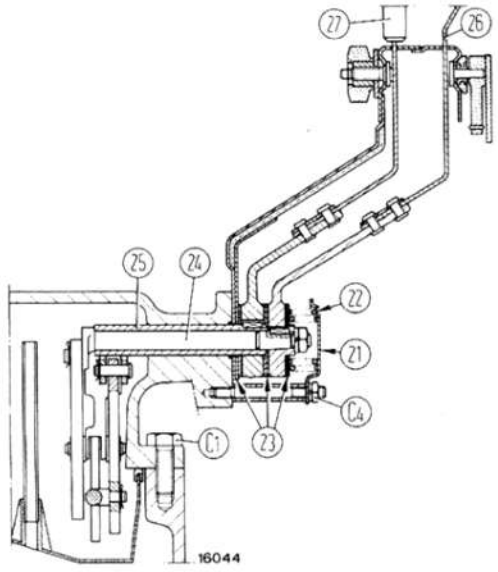


Bracket to be made in workshop for mounting of lift on rotary stend 290086 (Punch mark No. 50032). Dimensions in mm.



Installation of lift on rotary stand.

1. Bracket **50032** to be made in workshop.



Section through lift levers and controls.

C1. Lift screws - C4. Lever quadrant bracket nuts - 21. Lever quadrant bracket - 22. Springs - 23. Clutch plates - 24. Position control lever pin - 25. Draft control lever inner shaft - 26. Position control lever - 27. Draft control lever.

— Remove pin (16) screws (19) and pivot (18), and take out inner levers.

— For tractors not equipped with remote control valves remove relief valve (17) from lift body.

To disassemble control valve, proceed as follows:

— Remove cylinder safety valve (15, page 3), knob (29), arm lowering speed control valve (17) and pin (19).

— Remove connection (20), retrieving check valve (22) and associated seat (23).

— Remove plug (3), retrieving valve spool (1), associated seat (2), spring (4) and ring (14).

— Remove draft sensitivity valve plug (13) and plug (7), retrieving plunger (5), spring (6), piston (9) and associated seat (8).

Remove retaining ring (30) and retrieve spring cup (10), spring (11) and draft sensitivity valve.

Back off plug (27), remove roll pin (31) and retrieve response control valve pin (28).

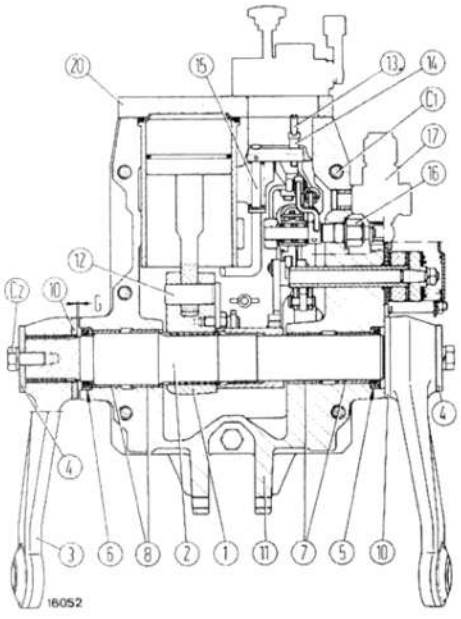
INSPECTION

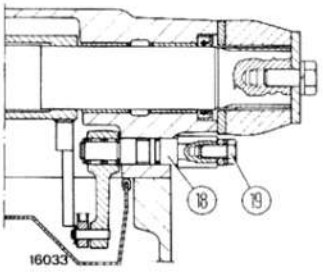
Refer to table on page 1, Sect. 50 and inspect as follows:

— Carefully check seals, replacing if necessary.

— Check valves for wear and clearance in associated seats.

If replacement is necessary, note that spare valve spools (1) are supplied together with associated seats (2), and that valve plunger (5) is supplied together with control valve body.





Sections through lift.

C1. Lift screws - C2. Thrust plate screws - G = 0.2 to 1.4 mm (0.008 to 0.055 in). Shaft end float - 1. Inner arm - 2. Cross shaft - 3. Lift arms - 4. Arm thrust plates - 5. R.H. seal - 6. L.H. seal - 7. R.H. bushings - 8. L.H. bushings - 10. Thrust washers - 11. Top link support - 12. Piston rod pin - 13. Limit travel adjusting screw - 14. Limit travel adjusting screw jam nut - 15. Limit travel control rod - 16. Control valve link pin - 17. Lift relief valve (for tractors without remote control valves) - 18. Draft control inner lever pivot - 19. Set screw - 20. Front cover.

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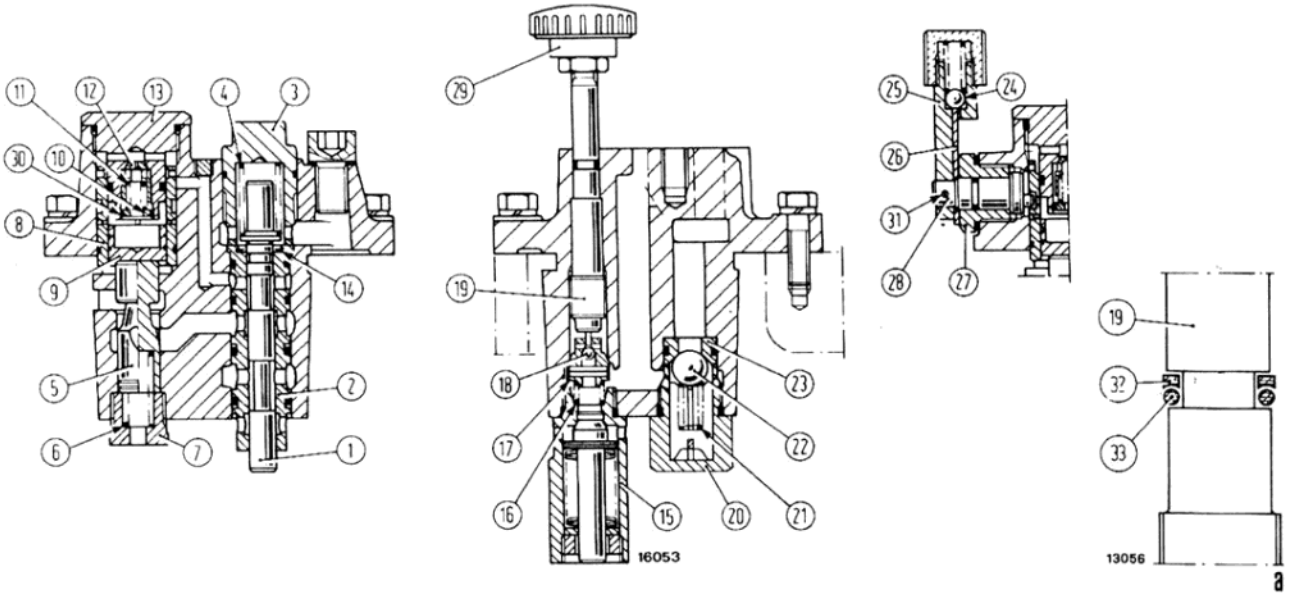


Sections through lift control valve.

a. Detail of O-ring (33) and back-up ring (32) installation - 1. Valve spool - 2. Spool seat - 3. Plug - 4. Spool return spring - 5. Valve plunger - 6. Plunger spring - 7. Plug - 8. Piston seat - 9. Piston - 10. Spring cup - 11. Draft sensitivity adjusting valve spring - 12. Sensitivity adjusting valve - 13. Plug - 14. Ring - 15. Cylinder overload valve - 16. Response control valve spring - 17. Arm lowering speed control valve - 18. Ball - 19. Response control valve adjusting pin - 20. Plug - 21. Check valve spring - 22. Check valve - 23. Check valve seat - 24. Detent ball - 25. Adjusting pin lever - 26. Sector - 27. Plug - 28. Adjusting pin - 29. Arm lowering speed control knob - 30. Retaining ring - 31. Roll pin - 32. Back-up ring - 33. O-ring.

Note - Install O-ring (33) and back-up ring (32) as shown in detail (a), using protector **293858** and heating ring (32) in oil at 50°C. Take care to install ring (32) with flat surface facing upwards and concave surface facing O-ring (33).

Check cylinder overload and relief valve setting as described in the appropriate paragraphs. Valve may be integral with remote control valves or installed on lift body.

ASSEMBLY

Reverse disassembly procedure and note the points below:

— Should replacement become necessary, press-fit cross shaft bushings from outside to inside of lift body ensuring that dimensions (A, B, C) are as shown in Figure. Bushings need no reaming after installation.

— Couple shaft (2, page 2) to inner arm (1) and lift arms (3), lining up reference marks on parts.

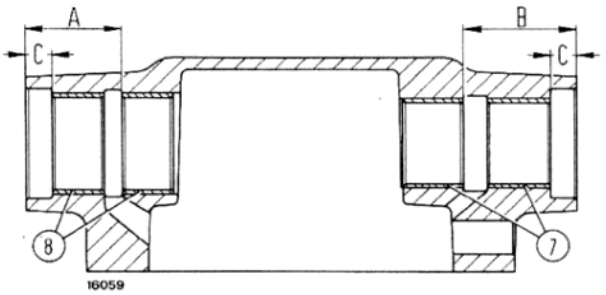
— Remove L.H. seal (6). If replacement is necessary, also remove R.H. seal (5).

— With cross shaft (2) installed, fit seals using driver **292535** to insert seals correctly in seats.

— At end of assembly, check that cross shaft end float is 0.2 to 1.4 mm (0.008 to 0.055 in) (G, page 2).

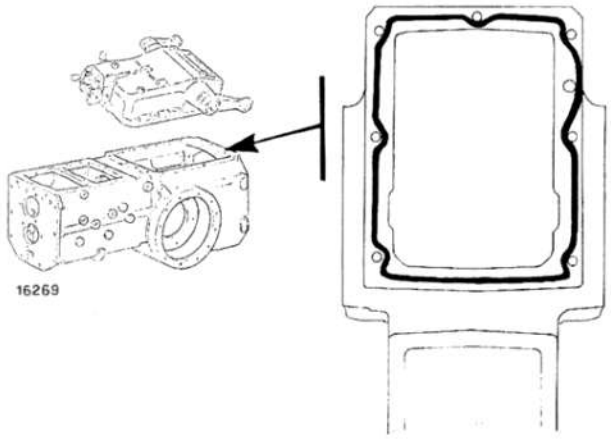
— To prevent seal damage, install piston in cylinder using guide ring **297547**.

— Reassemble control linkage using driver **293839** to install needle roller bearing on spool lever and driver **293838** to install needle roller bearings on draft control inner lever and link.



Cross shaft bushing fitting details.

A = 55 mm (2.16 in) - B = 67 mm (2.64 in) - C = 15 mm (0.59 in) - 7. R.H. bushings - 8. L.H. bushings.



Applying jointing compound to rear drive housing prior to installation.

Jointing compound types are indicated on page 6, Sect. A, Mods. 466/566/666/766.

— Reassemble control valve as shown in figures and install on lift body after thoroughly cleaning and degreasing mating surfaces and applying one of jointing compounds listed on page 6, Sect. A, Mods. 466/566/666/766.

Note - At control valve reassembly, check spool (1, page 3) for proper efficiency as described on page 7, Sect. 501, Mods. 466/566/666/766.

— Before installing lift, thoroughly clean and degrease mating parts and apply a 2 mm (0.04 in) dia. bead of jointing compound on rear driving housing as shown in Figure. Jointing compound types are indicated on page 6, Sect. A, Mods. 466/566/666/766.

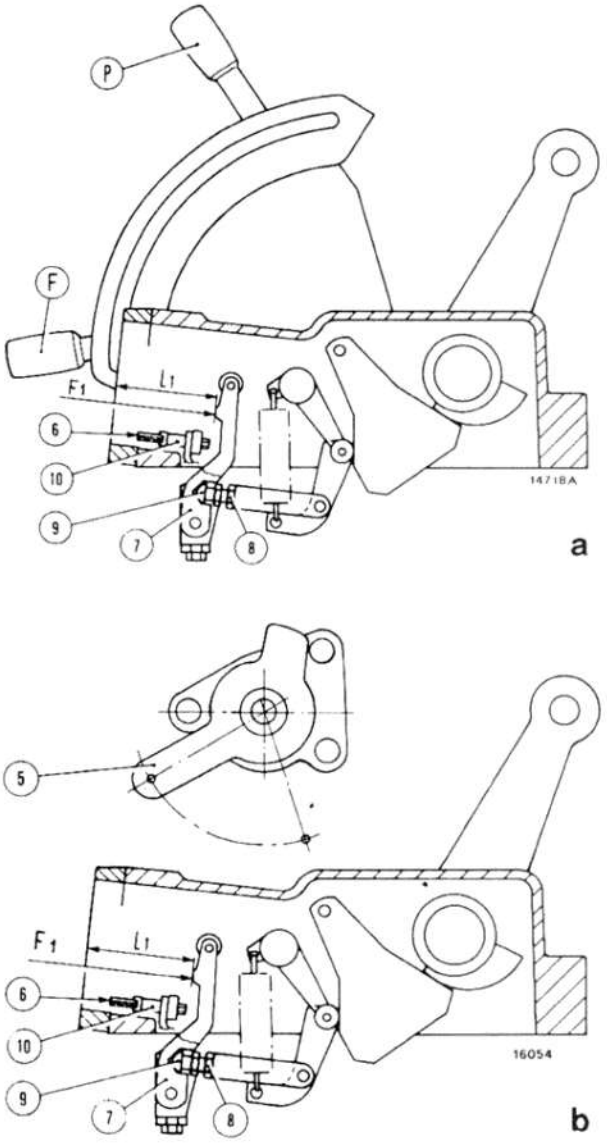
⚠ CAUTION ⚠

Use suitable tools to align holes. DO NOT USE HANDS OR FINGERS.

LIFT ADJUSTMENT

The following adjustments refer to a lift without hydraulic control valve and placed on work bench or secured to a rotary stand through a suitable bracket.
Adjust in the order given.
With lift installed on tractor, only arm upward travel adjustment and slight variations in draft control lever setting are possible.

1. Position control adjustment
Proceed as follows:



Adjusting position control.

a. Tractors w/o FIAT Cab - b. Tractors w/ FIAT Cab - F. Draft control lever - F_1 = 4 to 4.5 daN (kg) or 9 to 10 lb. Force applied by tool **293846** on lever (7) - L_1. Distance between lever end (7) and lift body front end - P. Position control lever - 5. Position control relay lever - 6. Limit travel adjusting screw - 7. Control valve lever - 8. Jam nut - 9. Control valve lever rod end - 10. Screw (6) jam nut.

— Set position control lever (P, Fig. a) fully back on quadrant (tractors without Cab) or its relay lever (5, Fig. b) fully forward on quadrant (tractors with Cab).

— Rotate cross shaft to bring inner arm in contact with lift body.

– Using wrench **293844/1** (C), slacken jam nut (10, page 4) and travel adjusting screw (8) until screw no longer touches lever (7).

— Install tool **293846** (A) on lift body.

– Using two wrenches back off nut (8, page 4) and tighten or slacken adjustable link rod (9) so that plunger (P_1) is aligned with outer register (R_1) of tool (A) as shown.

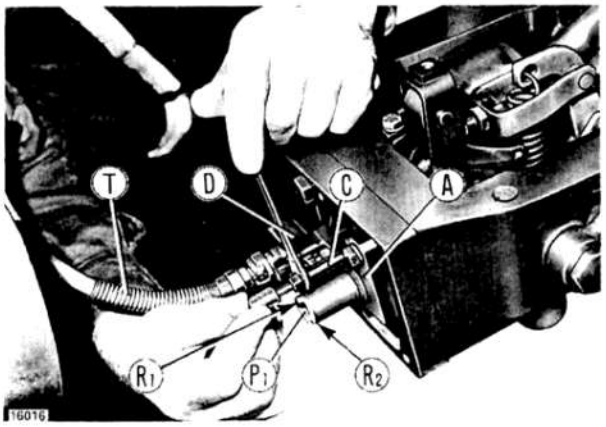
Note - This condition corresponds to a gap (L_1, page 4) of 82 to 82.1 mm (3.228 to 3.232 in) between lever end (7) and lift body front face measured applying a force (F_1) of 4 to 4.5 daN (kg) or 9 to 10 lb to lever end.

— Tighten nut (8).

— Move position control lever (P, Fig. a, page 4) fully forward on quadrant (Tractors w/o Cab) or position control relay lever (5, Fig. b, page 4) fully back against spacer (Tractors w/Cab).

— Rotate arm shaft to bring piston fully forward and check that moving rod (P_1) of tool **293846** is retracted 1.3 to 1.7 mm (0.051 to 0.067 in) with respect to register (R_2) of same tool.

Note - This condition corresponds to a gap (L_1) between lever end (7, page 4), and lift body front end of 86.3 to 86.7 mm (3.397 to 3.413 in) when measured applying a force (F_1) of 4 to 4.5 daN (kg) or 9 to 10 lb on lever end.



Adjusting maximum lift arm travel on bench.

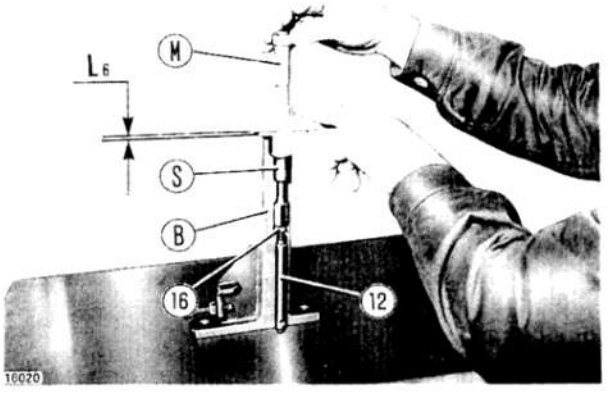
A. Tool **293846** - C. Wrench **293844/1** - D. Compressed air connection **293872** - P_1. Plunger - R_1. Outer register - R_2. Inner register - T. Compressed air line.

2. Maximum lift arm travel adjustment on bench

Proceed as follows:

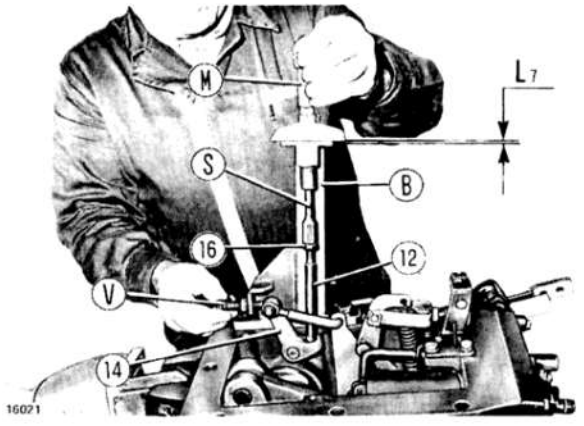
— With tool **293846** (A) installed on lift body fit connector **293872** (D).

— Set position control lever (P, Fig. a, page 4) fully back on quadrant (Tractors w/o Cab) or position control outer relay lever (5, Fig. b, page 4) fully forward against spacer (Tractors w/Cab).



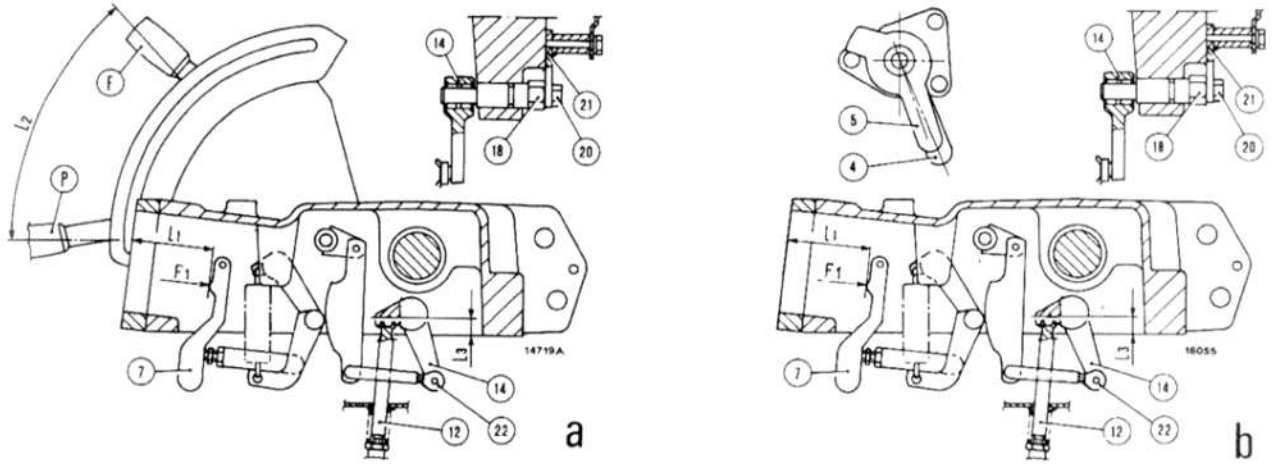
Zeroing tool 292541 (B) for draft control adjustment.

L_6. Gap between top of spindle (S) and depth gauge support face - M. Depth gauge - S. Spindle - 12. Draft control rod - 16. Jam nut.



Adjusting draft control.

B. Tool **292541** - L_7. Gap between top of spindle (S) and depth gauge support face - M. Depth gauge - S. Spindle (tool **292541**) - V. Screw (tool **292541**) - 12. Draft control rod - 14. Draft control inner lever - 16. Jam nut.



Adjusting draft control.

a. Tractors w/o FIAT Cab - b. Tractors w/ Fiat Cab - F. Draft control lever - F_1 = 4 to 4.5 da N (kg) or 9 to 10 lb. Force applied to lever (7) by tool **293846** - L_1 = **81.9** to **82.1** mm. (3.224 to 3.232 in). Distance between end of lever (7) and lift body front face - L_2 = **184** to **186** mm (7.224 to 7.323 in). Distance between end of slot and front edge of lever (F) - L_3 = **17.9** to **18.1** mm (0.7047 to 0.7126 in) (Tractors w/o Cab) or **22.9** to **23.1** mm (0.9016 to 0.9094 in) (Tractors with Cab). Distance between lift housing to rear drive housing mating face and rod (12) contact face on lever (14) - P. Position control lever - 4. Draft control outer relay lever - 5. Position control outer relay lever - 7. Position control lever - 12. Draft control rod - 14. Draft control inner relay lever - 18. Cam pin - 20. Screw - 21. Bracket - 22. Draft control adjustable link rod.

— Rotate arm shaft to bring inner arm into contact with lift body.

— Couple connection **293872** (D, page 5) to a compressed air source (T) and introduce air to cylinder so that piston moves through full lift stroke. Maintain air pressure to keep piston in this position.

— Using wrench **293844/1** (C), tighten screw (6, page 4) until end of plunger (P_1) is retracted by 1.3 to 1.7 mm (0.0512 to 0.0670 in) relative to inner register (R_2, page 5) of tool **293846** (A).

Note - This condition corresponds to a gap (L_1, page 4) of 86.3 to 86.7 mm (3.397 to 3.413 in) between lever end (7) and lift body front end.

— Tighten jam nut (10).

3. Draft control adjustment

Proceed as follows:

— Remove end of draft control rod (12) and install on spindle (S, page 5) of tool **292541** securing through nut (16).

— Place tool **292541** (B) together with spindle (S) and end of draft control rod (12) on a surface plate and measure gap (L_6) between top of spindle and depth gauge (M, page 5) support face.
Remember that rod (12) must be screwed in onto spindle (S) so that this is a few mm lower than gauge rest face on tool.

— With tool **293846** (A, page 5) installed on lift body and disconnected from compressed air supply:

- **Tractors w/o Cab,** move position control lever (P, Fig. a) fully forward on quadrant and place draft control lever (F) so that there is a distance (L_2) of 184 to 186 mm (7.24 to 7.32 in) between end of slot and front edge of lever.

- **Tractors w/Cab,** position the draft control outer levers (4, Fig. b) and position control lever (5) all fully back against spacer.

Next, proceeds follows:

— Set draft control inner lever cam pin (18, page 6) horizontal with cam facing the rear end of lift.

— Install tool **292541** (B, page 5) on lift body and secure to two housing holes as shown in Figure on page 5. Turn knurled screw (V) to move draft control inner lever (14) until end of plunger (P_1) is set as near as possible to inner register (R_1) on tool **293846** (A).

— Turn slightly cam pin (18, page 6) to backup as far as possible the end of the plunger of tool **293846**.

— By screw (V, page 5) act again on draft control inner lever (14) until the plunger end is brought in line with register (R_2) of tool **293846**.

— Finally, turn cam pin (18, page 6) until the end of plunger is in line with outer register (R_1, page 5).

— Introduce the spindle of tool **292541** (B, page 5) into the seat on draft control inner lever (14).

— With plunger of tool **293846** in line with register (R_1) operate on adjustable link rod (22); next, using depth gauge (M, page 5) measure distance (L_7) from spindle top face to gauge rest face on tool **292541**.

— Dimension (L_7, page 5) shall be:

$$L_7 = L_6 + L_3$$

where:

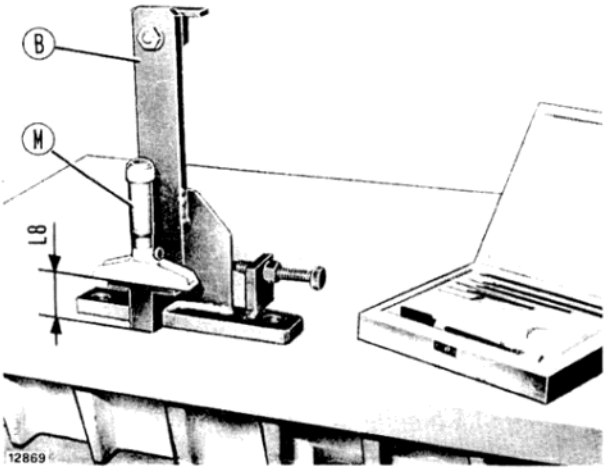
L_6 = Dimension measured with tool **292541** placed on a surface plate.

L_3 = **17.9 to 18.1 mm (0.7047 to 0.7126 in)** for tractors w/o Cab or **22.9 to 23.1 mm (0.9016 to 0.9094 in)** for tractors w/ Cab. This is a running clearance between lift housing to drive housing mating face and spindle rest face (12, page 6) on lever (14).

Note - This condition corresponds to a dimension (L_1) of 81.9 to 82.1 mm or 3.224 to 3.232 in) between lever end and lift body front support as measured applying a force (F_1) of 4 to 4.5 daN (kg) or 9 to 10 lb on lever end.

IMPORTANT - Check that with plunger (P_1, page 5) aligned with outer register (R_1) of tool **243846** (A), dimension (L_7) is as follows:

$$L_7 = L_6 + L_3$$



Zeroing the draft control adjustment tool 292541 (B).

L_6 = Distance between tool base resting on surface plate and depth gauge support face (to be punch marked on tool) - M. Depth gauge.

where:

L_6 = Distance measured with tool **292541** resting on surface plate.

L_3 = **17.9 to 18.1 mm (0.7047 to 0.7126 in)** for tractors w/o Cab or **22.9 to 23.1 mm (0.9016 to 0.9094 in)** for tractors w/Cab. This is the distance between lift housing to rear drive housing mating face and the contact face of rod (12, page 5) on lever (14).

If these conditions do not check, operate as required on cam pin (18, page 6) and knurled screw (V, page 5) of tool **292541** to obtain the specified values.

Tighten screw (20, page 6) so that cam pin (18) is locked with bracket (21).

— Take off tools **293846** and **292541** and fit control valve on lift housing.

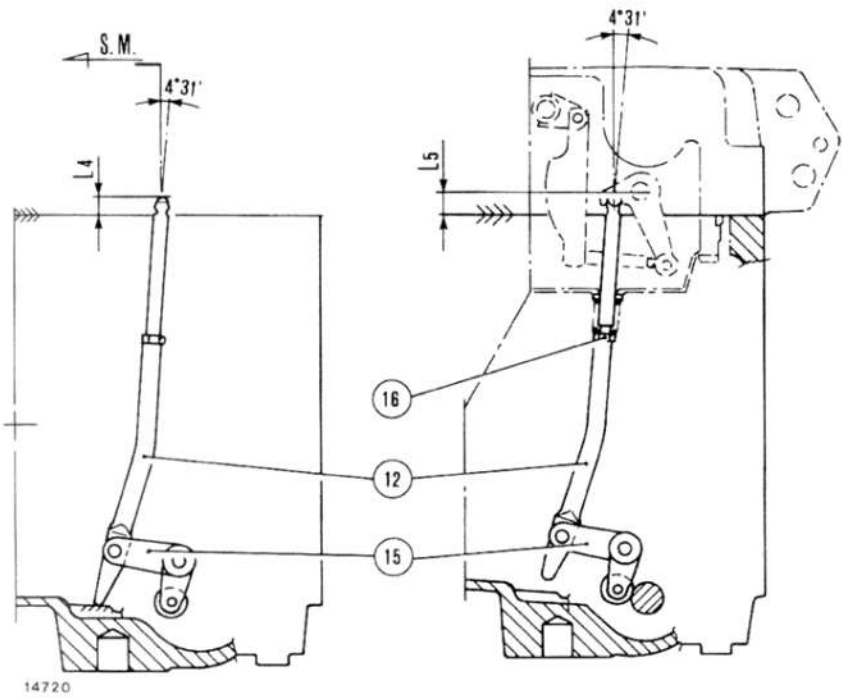
Next, proceed with the lift installation on tractors as described below:

Warning - First place tool **292541** on a surface plate and, using depth gauge (M), measure distance (L_8) between tool base and depth gauge support face on tool. Puch mark the value found for (L_8) on tool.

— Install relay lever (15, page 8) complete with draft control rod (12) on rear drive housing.

— Rest relay lever (15) against the associated stop on drive housing and install tool **292541** securing it

HYDRAULIC LIFT UNIT: Lift



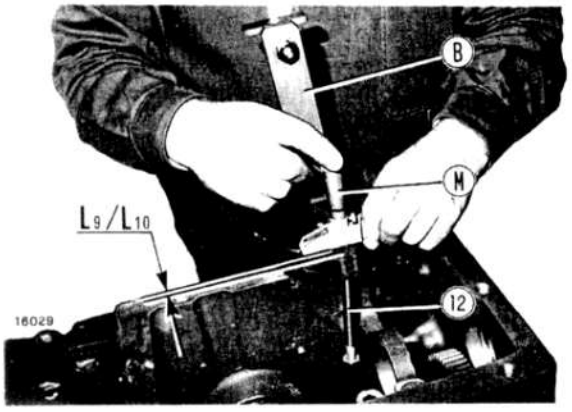
Draft control adjustment.

L_4 = Proudness of rod (12) over rear drive housing (sensing bar removed) - L_5 = Proudness of rod (12) over rear drive housing (sensing bar installed) - SM = Travel direction - 12. Draft control rod - 15. Draft control relay lever - 16. Jam nut.

to two housing holes in such a way that rod (12) fits exactly into the hole in tool as shown below.

— Using depth gauge (M) measure distance (L_9) between top face of rod (12) and gauge rest face on tool.

Note - Top end proudness of rod (12) relative to drive housing (sensing bar removed) shall be given by:



Draft control adjustment.

B. Tool **292541** - L_9 = Distance between top face of rod (12) and gauge rest face on tool (sensing bar removed) - L_{10} = Distance between top face of rod (12) and gauge rest face on tool (sensing bar installed) - M. Depth gauge - 12. Draft control rod.

$$L_5 = L_8 - L_{10}$$

where:
L_8 and L_{10} = Distances measured with tool **292541** installed on surface plate (L_8, page 7) or in drive housing (L_9).

— Install the sensing bar and measure the new distance (L_{10}) between top face of rod (12) and gauge rest face on tool.

Note - Proudness (L_4) of rod top end (12) from drive housing (sensing bar installed) will be given by:

$$L_4 = L_8 - L_9$$

where:
L_8/L_9 = Distances measured with tool **292541** resting on surface plate (L_8, page 7) or on drive housing (L_9).

— Check that dimension (L_5) exceeds dimension (L_4) by at least 5 mm (0.20 in).

— To adjust, slacken jam nut (16) and turn draft rod in or out as required to provide a new proudness (L_5) of rod top face relative to drive housing, as measured on tool **292541,** as follows:

$$L_5 = L_8 - L_{11}$$

where:
L_8 = dimension measured with tool **292541** installed on surface plate.

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L_{11} = 18.3 to 18.5 mm (0.7205 to 0.7283 in). Proudness of rod end (12, page 8) from drive housing, for normal operation.

— Tighten and lock jam nut (16).

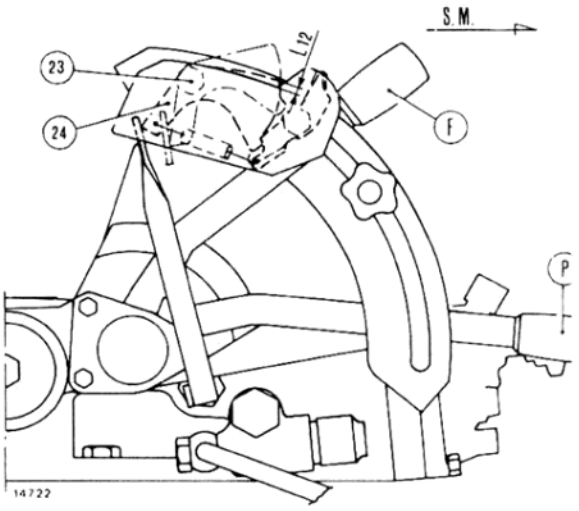
Install lift unit on Tractors. Only Tractors without FIAT Cab: start engine and check that with no load on lower arms the draft control lifting action begins at a distance (L_2, page 6) of 180 to 190 mm (7 to 7 1/2 in) from start of quadrant slot to front edge of draft control hand lever (F, Fig. A, page 6).
If not, operate on cam pin (18, page 6) as required to restore this value.
Finally, tighten screw (20, page 6).

LIFT-O-MATIC adjustment - Tractor without FIAT Cab.

Proceed as follows:
— Start engine and keep at medium speed.

— Set the position and draft control levers (P and F, respectively) to full stroke forward on quadrant.

— Adjust the positioning of LIFT-O-MATIC support and levers assy on lift unit controls support, securing by screws (23) in such a way that upon pressing button (24) lift arms start to more when button is still short of the full stroke by a distance (L_{12}) of 7 to 10 mm (0.2756 to 0.3937 in).



LIFT-O-MATIC adjustment (Tractors without FIAT Cab).

F. Draft control lever - L_{12} = 7 to 10 mm (0.2756 to 0.3937 in) Button (24) residual travel - P. Position control lever - S.M. = Travel direction - 23. Screws - 24. LIFT-O-MATIC control button.

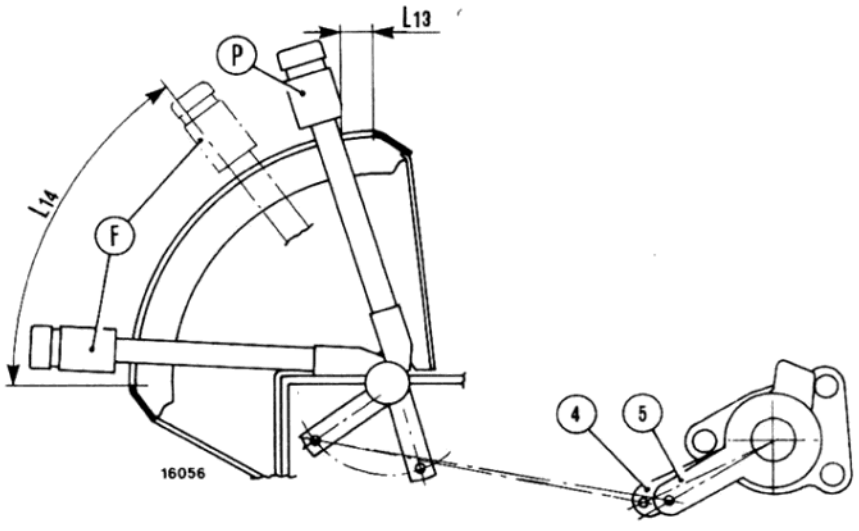
Position control link adjustment - Tractors with FIAT Cab

Proceed as follows:
— Set position control lever (P) at a distance (L_{13}) of 15 mm (0.59 in) between end of quadrant slot and rear edge of hand lever.

— Set position control outer relay lever (5) all the way forward against its spacer stop.

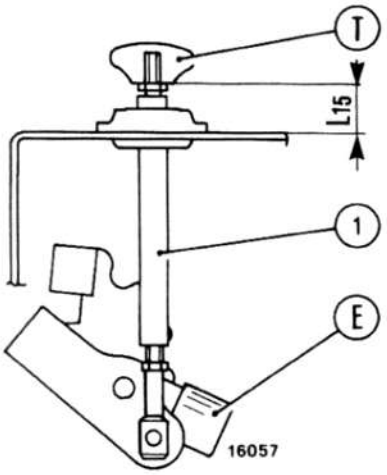
— Connect the link rod and adjust its length by screwing in or out its ends as required.

— Lock all jam nuts.



Position/Draft control link adjustments (Tractors with FIAT Cab).

F. Draft control lever - L_{13} = 15 mm (0.59 in). Distance between end of quadrant slot and hand lever rear edges (F and P) - L_{14} = 245 to 255 mm (9.64 to 10 in). Distance between start of slot and front edge of hand lever (F) - P. Position control lever - 4. Draft control outer lever - 5. Position control outer lever.



Variospeed control link rod adjustment (Tractors with FIAT Cab).

E. Sensitivity control valve lever - L_{15} = 20 mm (0.78 in). Distance between rest face of knob (T) and platform - T. Sensitivity knob - 1. Link rod.

Draft control link adjustment - Tractors with FIAT Cab.

Proceed as follows:

— Set position control lever (P, page 9) to full stroke forward on quadrant, under fully lowered condition.

— Set draft control outer relay lever (4, page 9) full stroke forward against its spacer stop.

— Set draft control lever (F, page 9) at a distance (L_{13}) of 15 mm (0.59 in) between the end of quadrant slot and the rear edge of both levers.

— Connect the draft control link rod.

— Start engine and keep at medium speed.

— Without applying any load on arms, check that draft control lifting begins at a travel (L_{14}, page 9) of 235 to 245 mm (9.25 to 9.64 in) between beginning of quadrant slot and front edge of draft lever (F). If not, operate on cam pin (18, page 6) as required to restore this value.

Variospeed sensitivity link adjustment (Lift sensitivity response settings on Tractors with FIAT Cab).

Proceed as follows:

— Position knob (T) with its rest face at a distance (L_{15}) of 20 mm (0.78 in) from platform.

— Position lever (E) on control valve as shown in the Figure (setting —).

— Connect rod (1) adjusting its length by screwing in or out its end as required.

— Lock the jam nut.

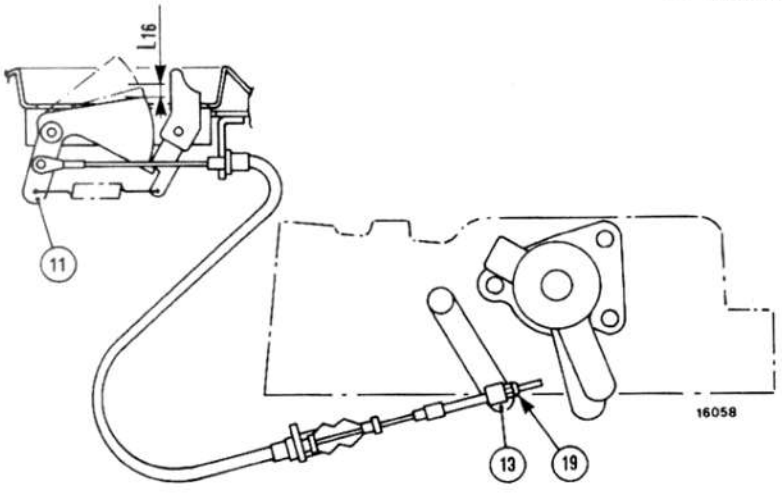
LIFT-O-MATIC adjustment - Tractors with FIAT Cab.

Proceed as follows:

— Set the draft and position control levers (F and P, page 9) to full stroke forward on quadrant.

— Connect cable to button (11) and secure the LIFT-O-MATIC device on fender.

— Start engine and keep at medium speed.



LIFT-O-MATIC adjustment (Tractors with FIAT Cab.).

L_{16} = 9 to 12 mm (0.35 to 0.47 in). Residual travel of button (11) - 11. LIFT-O-MATIC control button - 13. LIFT-O-MATIC actuating lever - 19. Cable end fitting.

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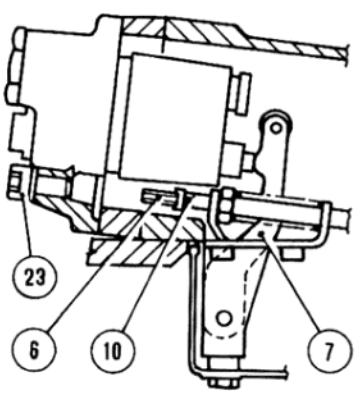
Arm max lift travel adjustment.

d = 2 to 3 mm (0.0787 to 0.1181 in). Difference between references S_1 and S_2 - S_1 = Reference on lift unit housing - S_2 = Reference on lift arms - 6. End of travel adjusing screw - 7. Control valve actuating lever - 10. Jam nut - 23. Plug.



— Connect cable to actuating lever (13, page 10) and adjust its length so that upon pressing button (11) lift arms begin to lower when button is still short of its full stroke by a distance L_{16} = 9 to 12 mm or 0.35 to 0.47 in.

4. Maximum lift arm travel adjustment with unit installed on tractor

Test conditions:

— Apply a 50 kg (110 lb) weight on lower link socket joints.

— Build up system oil temperature to 50-60°C.

Next, proceed as follows:

— Turn off engine, wait about 5 minutes to allow drainage of oil from lift into drive housing; remove plug (23) and introduce in its place wrench **293844/1** (C, page 5).

— Re-start engine and accelerate to abt. 1200-1500 rpm.

— On all Tractors (w/ and w/o cab) keep the position and draft control levers in full stroke forward setting on quadrant then proceed to lift arms using the LIFT-O-MATIC.

— Using wrench **293844/1** (C, page 5) slacken jam nut (10) and backoff end of travel adjusting screw (6) until pressure relief valve releases.

— Mark two corresponding references on lift housing (S_1) and on lift arms (S_2).

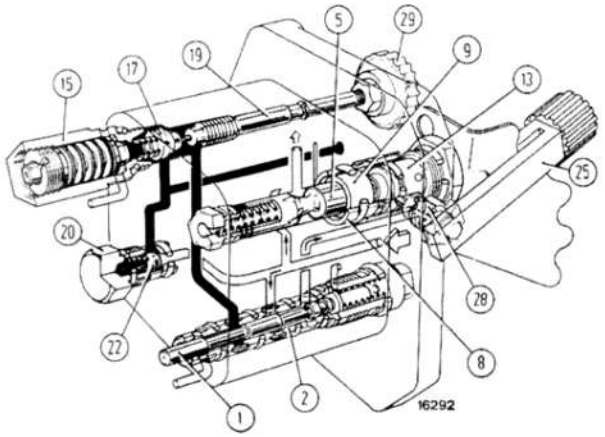
— Using wrench **293844/1** (C, page 5) turn in adjusting screw (3) until distance (d) between the two marks is set at 2 to 3 mm (0.0787 to 7.1181 in).

— Tighten jam nut (10).

— Turn off engine, again wait about 5 minutes, remove wrench **293844/1** (C, page 5) and re-fit plug (10).

— Activate a few lift strokes to check adjustment was done correctly.

HYDRAULIC LIFT UNIT: Lift



Mod. 45-66 - Control valve perspective view.

The only substantial difference between the 45-66 and above referenced model hydralic system schematics is the oil admission into the power cylinder: it no longer takes place through delivery connection (20, page 14, mods. 466/566/666/766) which was replaced by a plug but through a specific connection outside of the control valve.

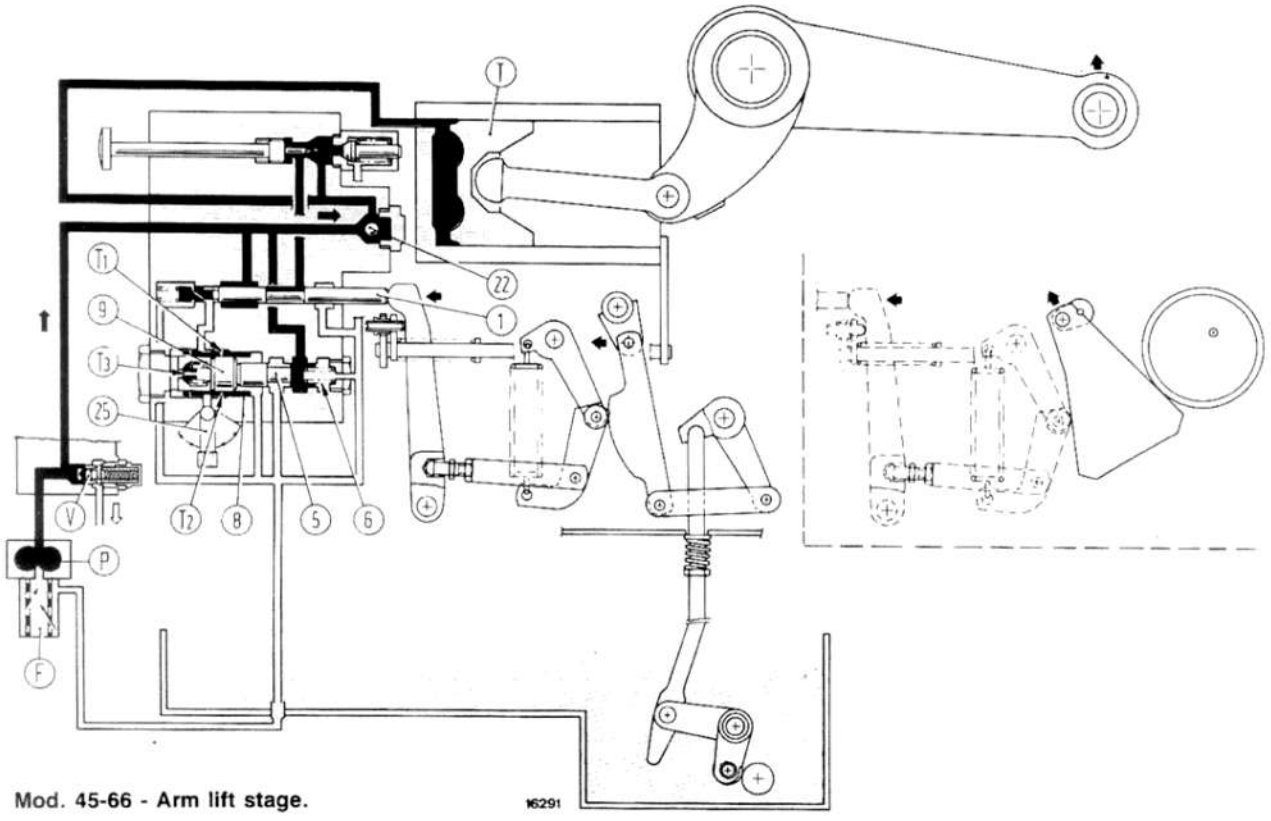
The control valve perspective section shown alongside (which replaces its counterpart on page 14, Sect. 501, mods. 466/566/666/766) shows this replacement of delivery connection (20) with a plug.

The hydraulic schematics below shows the arm lift stage and indicates the different oil entry into power cylinder: it replaces the schematics given on page 15, Sect. 501, mods. 466/566/666/766.

Mod. 45-66 - Hydraulic lift control valve operation stages.

Refer to the text and illustrations on pages 14 and 15, Sect. 501, Mods. 466/566/666/766 which apply.

No new schematics are shown here for the arm neutral (Hold) and lower stages as they are practically the same as those found on page 15, Sect. 501, mods. 466/566/666/766, the only difference being the admission of oil into the power cylinder.



Mod. 45-66 - Arm lift stage.

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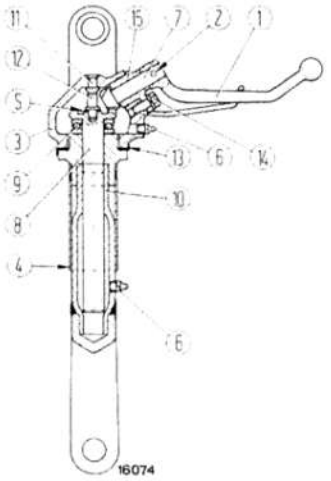
THREE-POINT LINKAGE

The implement attachment is a three-point linkage with adjustable lifting rods and top link, provided with lower link side sway check chains.

The lower links, pivotted to the sensing bar, are equipped with spacers to change pivot position and allow variations in draft sensitivity (see note on page 2).



Section through R.H. lifting rod.

S. End float shims - 1. Levelling box handle - 2. Roll pin - 3. Upper housing - 4. Cover - 5. Cover screws - 6. Lubricator - 7. Drive pinion - 8. Driven gear - 9. Thrust bearings - 10. Lower housing - 11. Fixed pin - 12. Driven gear pin - 13. Lockwasher - 14. Drive pinion support screws - 15. Drive pinion support.

Right-hand lifting rod

To remove the right-hand lifting rod proceed as follows:

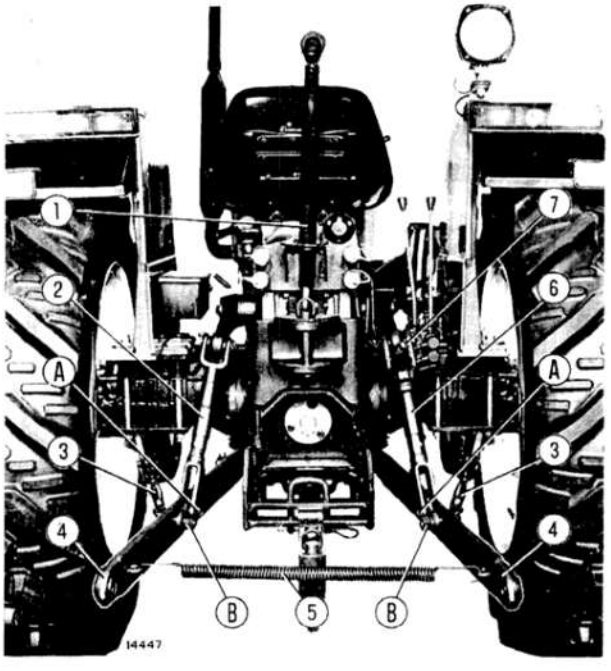
— Bend back tab of lockwasher (13) and back off cover (4) with attached driven gear (8).

— Back off screw (14) and remove support (15) with drive pinion (7).

— Back off lower housing (10) and remove driven gear and thrust bearing (9).

— Take off roll pin (2) and remove handle (1) and drive pinion.

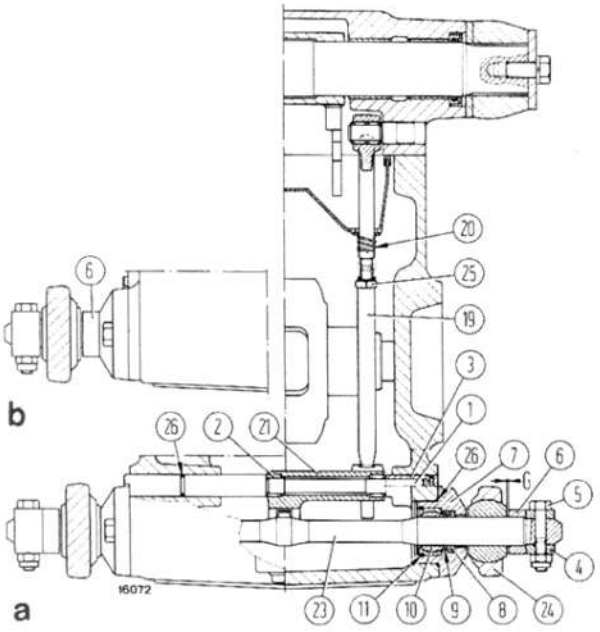
On assembly, pack the top and bottom recesses with **grassofiat TUTELA G9** or other approved grease and insert shims between pin (12) and driven gear (8), to obtain 0.1 to 0.3 mm (0.004 to 0.012 in) end float. Determine end float by inserting a feeler gauge between pins (11) and (12).

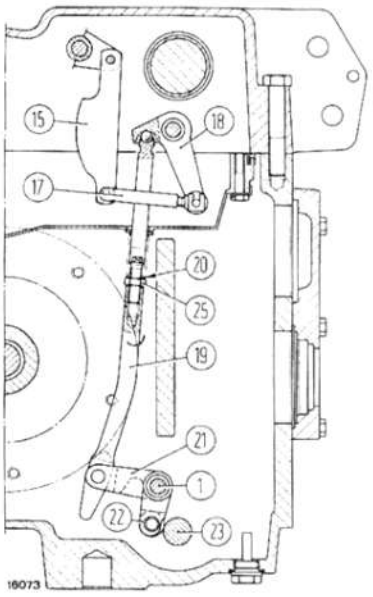


Lift and implement attachment.

A. Front lift rod mounting holes - B. Rear lifting rod mounting holes - 1. Adjustable top link - 2. L.H. lifting rod - 3. Lower link check chains for use with implements attached - 4. Lower links - 5. Lower link check spring (for on-road transfers without implement) - 6. R.H. Lifting rod - 7. Levelling box handle and spring.

HYDRAULIC LIFT UNIT: Implement Attachment





Section through draft control device.

a. Spacer (6) location for standard and heavy-duty applications - b. Spacer (6) location for light applications - G = 1.5 to 5.4 mm (0.006 to 0.21 in). Sensing bar end play - 1. Draft control relay lever pin - 2. Needle roller bearings - 3. Draft control relay lever spacer - 4. Thrust bushing - 5. Link screw - 6. Outer spacer - 7. Inner spacer - 8. Seal - 9. Thrust ring - 10. Sensing bar support bushing - 11. Retaining ring - 15. Draft control inner lever - 17. Draft control link - 18. Lever - 19. Draft control rod - 20. Spring - 21. Draft control relay lever - 22. Relay lever roller - 23. Sensing bar - 24. Lower links - 25. Jam nut - 26. O-ring.

DRAFT CONTROL DEVICE

To remove the draft sensing bar, which constitutes the means for monitoring and controlling draft on three-point links, proceed as follows:

— Drain drive housing oil.

— Remove lifting rods and lower links.

— Remove screws and sensing bar support (7) assembly.

— Retrieve bar.

Note - To remove draft control rod (19) back off pin (1) and withdraw rod together with relay lever (21).

On assembly, install needle roller bearings (2) on relay lever (21) using driver **293838.**

Check that sensing bar end float (G) is 1.5 to 5.4 mm (0.06 to 0.21 in).

Note - To increase lift sensitivity when working with light implements in draft or combined draft and position control, assemble lower links (24) with spacers (6) on inboard side of links.

For normal or heavy duty applications, install spacers (6) on outboard side of links.

This position reduces draft sensitivity, thus enabling the operator to make more use of tractor power.

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