www.maskinisten.net
www.classicmachinery.net

FIAT
Trattori

45-66
45-66 DT

WORKSHOP MANUAL

INDEX

	Section
GENERAL	A
SPECIFICATIONS	00
ENGINE	10
POWER TRAIN	20
FRONT AXLE — STEERING	30
FRONT WHEEL DRIVE	40
HYDRAULIC LIFT UNIT	50
ELECTRICAL SYSTEM	60
SERVICE TOOLS	90

SERVIZI TECNICI DI ASSISTENZA

www.maskinisten.net
www.classicmachinery.net

Copyright by
FIAT TRATTORI S.p.A.

●

Reproduction of text and illustrations, in whole or in part, is strictly prohibited. The imperial weights and measures are given for Operator's convenience and though the closest approximation is sought they are normally rounded off for practical reasons. In case of discrepancies, only the metric units should be considered.

PRINTED IN ITALY

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

Servizi Tecnici di Assistenza - Pubblicazioni Tecniche - Print No. **602.54.228.02** - X - 1987 - 2000 - MUCCHI

www.maskinisten.net
www.classicmachinery.net

	Page	Date
A - GENERAL		
General instructions - See Mods. 466/566/666/766	6-7	VII-1984
Safety precautions - See Mods. 466/566/666/766	8-9-10	VII-1984
00 - SPECIFICATIONS		
Identification data - Weights	1	X-1987
Engine	1-2-3	X-1987
Power train - Brakes - Steering - Front axle - Live Front axle - Rear wheels - Power take-off	3	X-1987
Hydraulic lift - Towing attachments - Ballasting - Body - Electrical system - Lighting equipment - Instruments and accessories - Tyre sizes	4	X-1987
Main dimensions	5	X-1987
Power train schematics	5-6	X-1987
Fluid capacities	7	X-1987
10 - ENGINE: Specifications and data		
Engine block - Cylinder head: See Mod. 55-56	1	IX-1985
Crank gear - See Mod. 55-66	2-3-4-5	IX-1985
Valve gear - See Mod. 55-66	5-6-7	IX-1985
Lubrication system - See Mod. 55-66	8	IX-1985
Fuel system - See Mod. 55-66	1-2	X-1987
Torque data - See Mod. 55-66	19-20	IX-1985
Engine section - See Mod. 55-66	21	IX-1985
100 - ENGINE: Description - Performance data - Removal - Installation		
Description - See Mod. 55-66	1	IX-1985
Performance data	1	X-1987
Compression test - See Mods. 456/556/666/766	4	VII-1984
Removal-Installation - See Mods. 456/556/666/766	4-5	VII-1984
101 - ENGINE: Engine block - Cylinder head		
Barrel liners - See Mod. 55-66	1-2	IX-1985
Cylinder head - See Mod. 55-66	2-3-4	IX-1985
102 - ENGINE: Valve gear		
Camshaft - Valves, guides and springs - See Mod. 55-66	1	IX-1985
Tappets, pushrods and rockers - See Mod. 55-66	1	IX-1985
Valve timing gears - See Mods. 466/566/666/766	3	VII-1984
103 - ENGINE: Crank gear		
Crankshaft - See Mod. 55-66	1	IX-1985
Main/Big end bearings and caps - See Mods. 466/566/666/766	2-3	VII-1984
Pistons and rings - See Mod. 55-66	1-2	IX-1985
Connecting rods - See Mod. 55-66	2	IX-1985
Flywheel - See Mods. 466/566/666/766	5	VII-1984
104 - ENGINE: Fuel system		
Removal, installation and timing of injection pump on engine - See Mods. 55-66/60-66/70-66/80-66	1-2-3	X-1987
105 - ENGINE: Lubrication system		
Lubrication system schematics - See Mods. 466 and 566	1	VII-1984
Oil pump - Oil filter - Low oil pressure warning indicator - See Mods. 466/566/666/766	3	VII-1984
106 - ENGINE: Cooling system		
Cooling system schematics - See Mod. 55-66	1	IX-1985
Description - See Mods. 466/566/666/766	2	VII-1984
Water pump - See Mod. 55-66	2	IX-1985
Radiator - See Mods. 466/566/666/766	3	VII-1984
Drive belt tension adjustments - See Mod. 55-66	2	IX-1985
Water temperature gauge - Thermostat - See Mods. 466/566/666/766	4	VII-1984
20 - POWER TRAIN: Specifications and data		
Clutches	1	X-1987
Transmission and splitter	1-2	X-1987
Creeper	2	X-1987
Reverser	2	X-1987
Bevel drive and differential	3	X-1987
Brakes	3	X-1987
Side final drives	3	X-1987
Power Take Off	4	X-1987
Torque data	5-6	X-1987
Power train longitudinal section	7	X-1987
Power train cross-section	8	X-1987
201 - POWER TRAIN: Clutch		
Removal and installation	1	X-1987
VALEO clutch servicing	2-3-4	X-1987
VALEO clutch adjustment	5-6	X-1987
LUK clutch servicing	6-7-8	X-1987
LUK clutch adjustment	8-9	X-1987
Clutch control linkage adjustment	9	X-1987
202 - POWER TRAIN: Transmission and splitter		
Removal and installation	1	X-1987
Disassembly	1-2-3-4	X-1987
Transmission/Splitter longitudinal and cross sections	4	X-1987
Assembly	5-6	X-1987

GENERAL: Contents

www.maskinisten.net
www.classicmachinery.net

	Page	Date
203 - POWER TRAIN - Creeper and mechanical reverser		
Creeper: Description - Servicing	1-2	X-1987
Reverser: Description - Servicing	2-3-4	X-1987
204 - POWER TRAIN - Bevel drive and differential		
Removal - Installation - Disassembly - Assembly of bevel drive and differential	1	X-1987
Bevel pinion shaft removal	1	X-1987
Bevel drive adjustment	1-2-3-4-5	X-1987
Differential pinion/side gear backlash adjustment - See Mods. 466/566	8-9	X-1987
Bevel drive/differential longitudinal and cross sections	3	X-1987
Differential lock installation and adjustment	5	X-1987
205 - POWER TRAIN: Brakes		
Brake unit removal and installation	1	X-1987
Brake pedal adjustment	1	X-1987
Parking brake lever adjustments	2	X-1987
Brake operation - See Mods. 466/566/666/766	5	VII-1984
206 - POWER TRAIN: Side final drives		
Removal	1	X-1987
Disassembly	1	X-1987
Assembly	2	X-1987
207 - POWER TRAIN: Power take-off		
Removal - Installation	1-2	X-1987
PTO longitudinal section	1	X-1987
30 - FRONT AXLE - STEERING: Specifications and data		
Front axle	1	X-1987
Mechanical steering - See Mods. 466/566/666/766	1-2	VII-1984
Hydrostatic power steering	1-2	X-1987
Torque Data	2	X-1987
301 - FRONT AXLE - STEERING: Dead front axle		
Removal - Installation - Steering knuckle servicing - See Mods. 466/566/666/766	1-2	VII-1984
Axle alignment checks - See Mods. 466/566/666/766	2	VII-1984
302 - FRONT AXLE - STEERING: Mechanical steering		
Steering gear servicing - See Mods. 466/566/666/766	1-2	VII-1984
Steering control linkage - See Mods. 466/566/666/766	3	VII-1984
303 - FRONT AXLE - STEERING: Power steering		
Power steering servicing	1	X-1987
Hydraulic pump and reservoir servicing - Hydraulic system bleeding	1	X-1987
Rotary valve wear check - See Mods. 466/566/666/766	5	VII-1984
Return to neutral check - See Mods. 466/566/666/766	5	VII-1984
Seal check - See Mods. 466/566/666/766	5	VII-1984
Relief valve setting	1	X-1987
Cylinder safety valve setting - See Mods. 466/566/666/766	6	VII-1984
Power steering control valve servicing - See Mods. 466/566/666/766	7	VII-1984
Operation schematics and sections	1	X-1987
Trouble shooting chart - See Mods. 466/566/666/766	1	X-1987
40 - FRONT WHEEL DRIVE: Specifications and Data		
Live front axle	1-2	X-1987
Axle drive - Drive shafts - See Mods. 466/566/666/766	2	VII-1984
Torque data	2	X-1987
401 - FRONT WHEEL DRIVE: Live front axle		
Removal - Side final drives, wheel hubs and steering articulation servicing	1	X-1987
Steering knuckle kingpin bearing adjustments	1	X-1987
Wheel hub bearing adjustment	1	X-1987
Bevel drive/Differential unit servicing	1	X-1987
Bevel drive gear adjustments	1-2	X-1987
NO SPIN differential unit	3	X-1987
402 - FRONT WHEEL DRIVE: Drive shafts - Axle drive		
Drive shaft removal and installation - Axle drive removal	1	X-1987
Axle drive installation	1	X-1987
Front wheel drive sections	2	X-1987

www.maskinisten.net
www.classicmachinery.net

	Page	Date
50 - HYDRAULIC LIFT UNIT: Specifications and Data		
Lift	1	X-1987
Hydraulic pump - See Mods. 55-66/60-66/70-66/80-66.	2	IX-1987
Implement attachment	2	X-1987
Remote control valves - See Mods. 466/566/666/766	4-5	VII-1984
Lift trouble shooting chart - See Mods 466/566/666/	6	VII-1984
Torque data	2	X-1987
501 - HYDRAULIC LIFT UNIT - Lift		
Description - See Mods. 466/566/666/766	1	VII-1984
Disassembly	1-2	X-1987
Inspection	2-3	X-1987
Assembly	3-4	X-1987
Position control adjustment	4-5	X-1987
On-bench max lift arm travel adjustment	5-6	X-1987
Draft control adjustment	6-7-8-9	X-1987
LIFT-O-MATIC adjustment (Tractors without cab)	9	X-1987
Position control linkage adjustment (Tractors with cab)	9	X-1987
Draft control linkage adjustment (Tractors with cab)	10	X-1987
Variospeed control linkage adjustment (Tractors with cab)	10	X-1987
LIFT-O-MATIC adjustment (Tractors with cab)	10-11	X-1987
On-tractor max lift arm travel adjustment	11	X-1987
Valve checks - See Mods. 55-66/60-66/70-66/80-66	4	IX-1985
Lift hydraulic system schematics	12	X-1987
Operation - Linkage motions - See Mods. 50-66/60-66/70-66/80-66	6	IX-1985
502 - HYDRAULIC LIFT UNIT: Lift pump		
Servicing - See Mods. 466/566/666/766	1-2	VII-1984
Output test - See Mods. 466/566/666/766	2	VII-1984
503 - HYDRAULIC LIFT UNIT: Implement attachment		
Implement attachment - RH lifting rod	1	X-1987
Draft control device	2	X-1987
504 - HYDRAULIC LIFT UNIT: Remote control valves		
Description and operation - See Mods. 466/566/666/766	1	VII-1984
Hydraulic system schematics - See Mods. 466/566/666/766	1-2-3	VII-1984
Disassembly - See Mods. 466/566/666/766	4-5	VII-1984
Pressure relief valve setting - See Mods. 466/566/666/766	5	VII-1984
Valve spool return test - See Mods. 466/566/666/766	6	VII-1984
Remote control valve leakage test - See Mods. 466/566/666/766	7	IX-1985
Trailer brake valve		
Description - See Mods. 466/566/666/766	8	VII-1984
Hydraulic system schematics - See Mods. 466/566/666/766	8-9-10	VII-1984
Adjustments: trailer brake remote control valve: control rod linkage - See Mods. 466/566/666/766	11	VII-1984
60 - ELECTRICAL SYSTEM: Specifications and Data		
Battery charge system	1	X-1987
Starter motor	1	X-1987
Battery and fuses	1	X-1987
Lighting - Signals - Accessories - See Mods. 466/566/666/766	13	VII-1984
Switches - Turn signal switch.	1	X-1987
Instrument panel	2	X-1987
Fusebox - See Mods. 466/566/666/766	15	VII-1984
Wiring diagram	2-3	X-1987
90 - SERVICE TOOLS	1-2-3-4	X-1987

www.maskinisten.net
www.classicmachinery.net

IDENTIFICATION DATA

	45-66 45-66DT
Marketing code:	
— 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 lb	1810 3982
— 4-wheel drive kg lb	2030 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

www.maskinisten.net
www.classicmachinery.net

Valve Gear		OH valves, pushrod operated
Inlet	Opens: BTDC	3°
	Closes: ABDC	23°
Exhaust	Opens: BBDC	48°30'
	Closes: ATDC	6°
Valve clearance — for timing check		0.45 mm (0.018 in)
— Normal operation - Inlet		0.25 mm (0.010 in)
- 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
	C.A.V.	DPS 8522 A 020A-4806879
Integral all-speed governor — BOSCH		Centrifugal
— C.A.V.		Centrifugal
Integral advance device — BOSCH		Hydraulic
— C.A.V.		Hydraulic
Pump timing, BTDC — BOSCH		6° ± 1°
— 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)

www.maskinisten.net
www.classicmachinery.net

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

www.maskinisten.net
www.classicmachinery.net

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

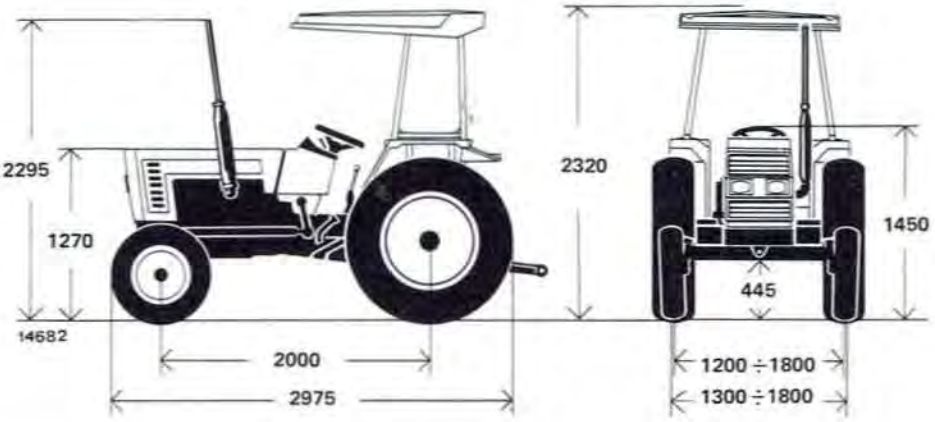
	45-66	45-66DT
Front	5.50-16	7.50-20(1)
	6.00-16	9.50-20(2)
Rear	12.4/11-28	12.4/11-28(1)
	13.6/12-28	13.6/12-28(2)

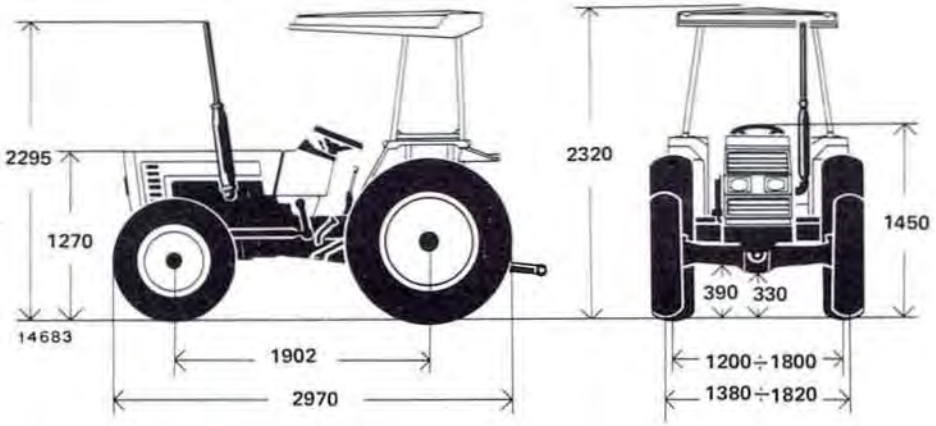
(1) (2) Tire matching references

www.maskinisten.net
www.classicmachinery.net

DIMENSIONS (in mm)

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

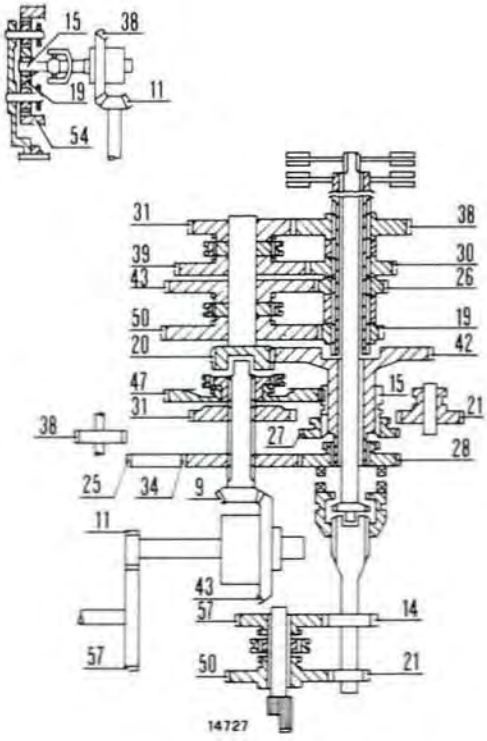




Mod. 45-66 DT
(w/size 7.50-20 front and 12.4/11-28 rear tires)

POWER TRAIN SCHEMATICS
12-Speed Version

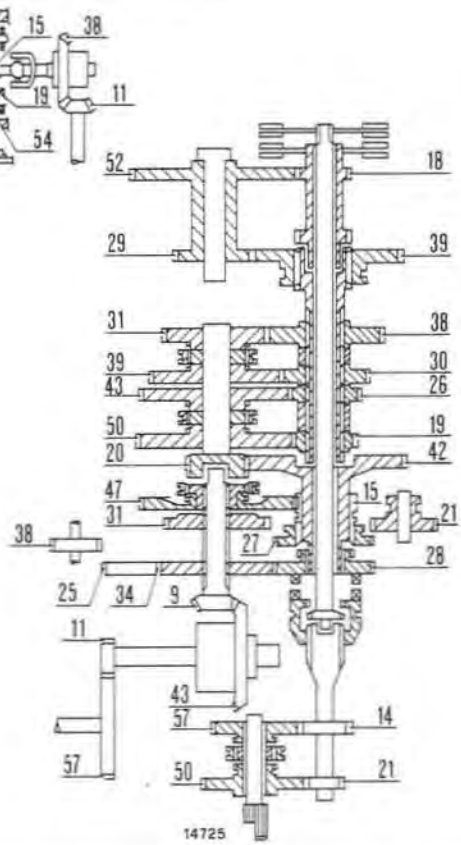
Tractor road speeds with engine at max power speed rate				
GEARS	REAR TIRE SIZES			
	12.4/11-28		13.6/12-28	
	kph	mph	kph	mph
1st Low	1.3	0.8	1.3	0.8
2nd »	2.1	1.3	2.1	1.3
3rd »	2.6	1.6	2.7	1.7
4th »	4.2	2.6	4.4	2.7
1st Normal	3.3	2.0	3.5	2.2
2nd »	5.3	3.3	5.5	3.4
3rd »	6.8	4.2	7.1	4.4
4th »	10.8	6.7	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



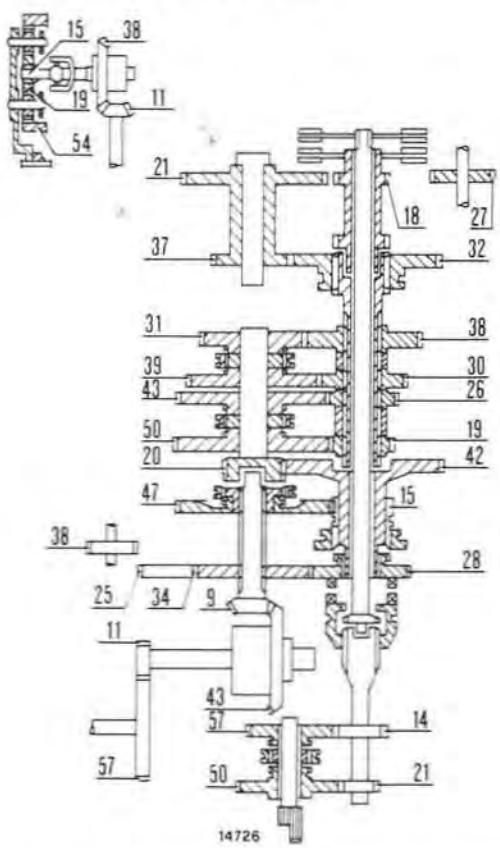
www.maskinisten.net
www.classicmachinery.net

POWER TRAIN SCHEMATICS

Creeper Version



Mechanical Reverser Version



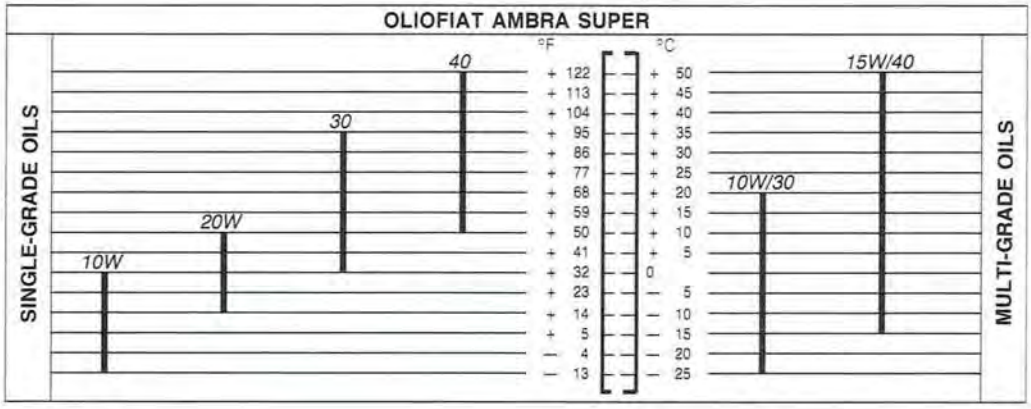
Tractor road speeds with engine at max power speed rate				
GEARS	REAR TIRE SIZES			
	12.4/11-28		13.6/12-28	
	kph	mph	kph	mph
1st Low creeper	0.3	0.18	0.3	0.18
2nd »	0.5	0.31	0.5	0.31
3rd »	0.7	0.43	0.7	0.43
4th »	1.1	0.68	1.1	0.68
1st Normal creeper	0.9	0.56	0.9	0.56
2nd »	1.4	0.87	1.4	0.87
3rd »	1.7	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	26.4	17.6

www.maskinisten.net
www.classicmachinery.net

FLUID CAPACITIES

DESCRIPTION	FLUID				
	FIAT RECOMMENDED PRODUCTS	45-66 and 45-66DT			EQUIVALENT INTERNATIONAL DESIGNATION
		dm^3 (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	Oliofiat **TUTELA MULTI F**	1.7	3 Pt	1.5	Transmission oil bath brakes and lift oil to Massey-Ferguson MF 1135 and Ford M2C 86A
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:					
— 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	—	



www.maskinisten.net
www.classicmachinery.net

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

DELIVERY CHECK

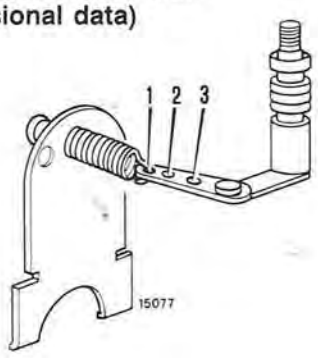
Full throttle stop				Idle speed shut-off			
	rpm	Delivery cm³/1000 shots	Transfer pressure bar (kg/cm²)		rpm	Delivery cm³/1000 shots	Transfer pressure bar (kg/cm²)
	1400 to 1460 1350 1250 800 500 250 150	⩽ 2 39 to 45 50.5 to 53.5 56.5 to 57.5 52.5 to 55.5 ≤ 47 100 to 120	0.2 0.2 0.2 0.2 0.2 0.2 0.2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

www.maskinisten.net
www.classicmachinery.net

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(3)-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).

www.maskinisten.net
www.classicmachinery.net

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

www.maskinisten.net
www.classicmachinery.net

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

www.maskinisten.net
www.classicmachinery.net

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

www.maskinisten.net
www.classicmachinery.net

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

www.maskinisten.net
www.classicmachinery.net

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)

www.maskinisten.net
www.classicmachinery.net

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

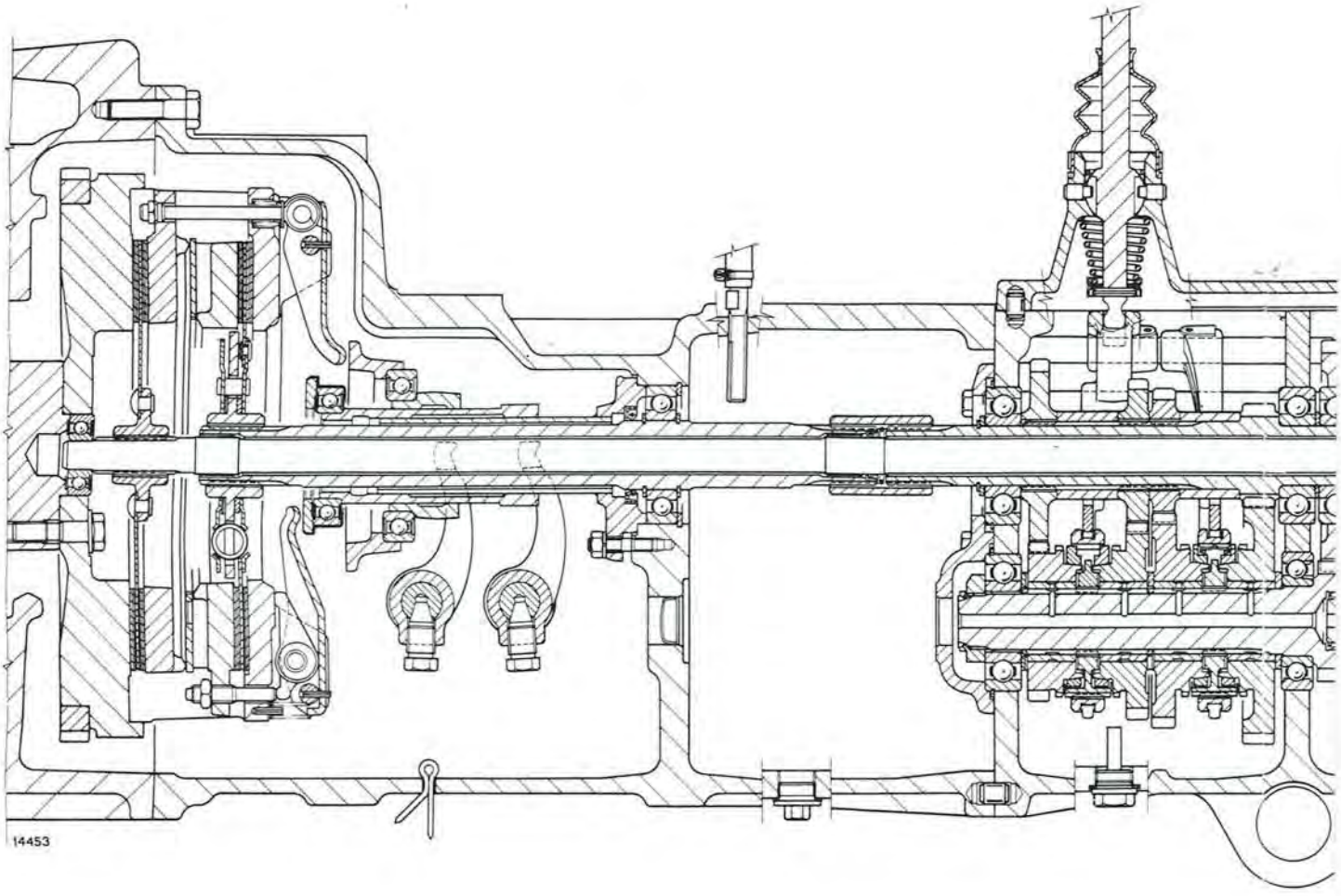
www.maskinisten.net
www.classicmachinery.net

TORQUE DATA

(continued)

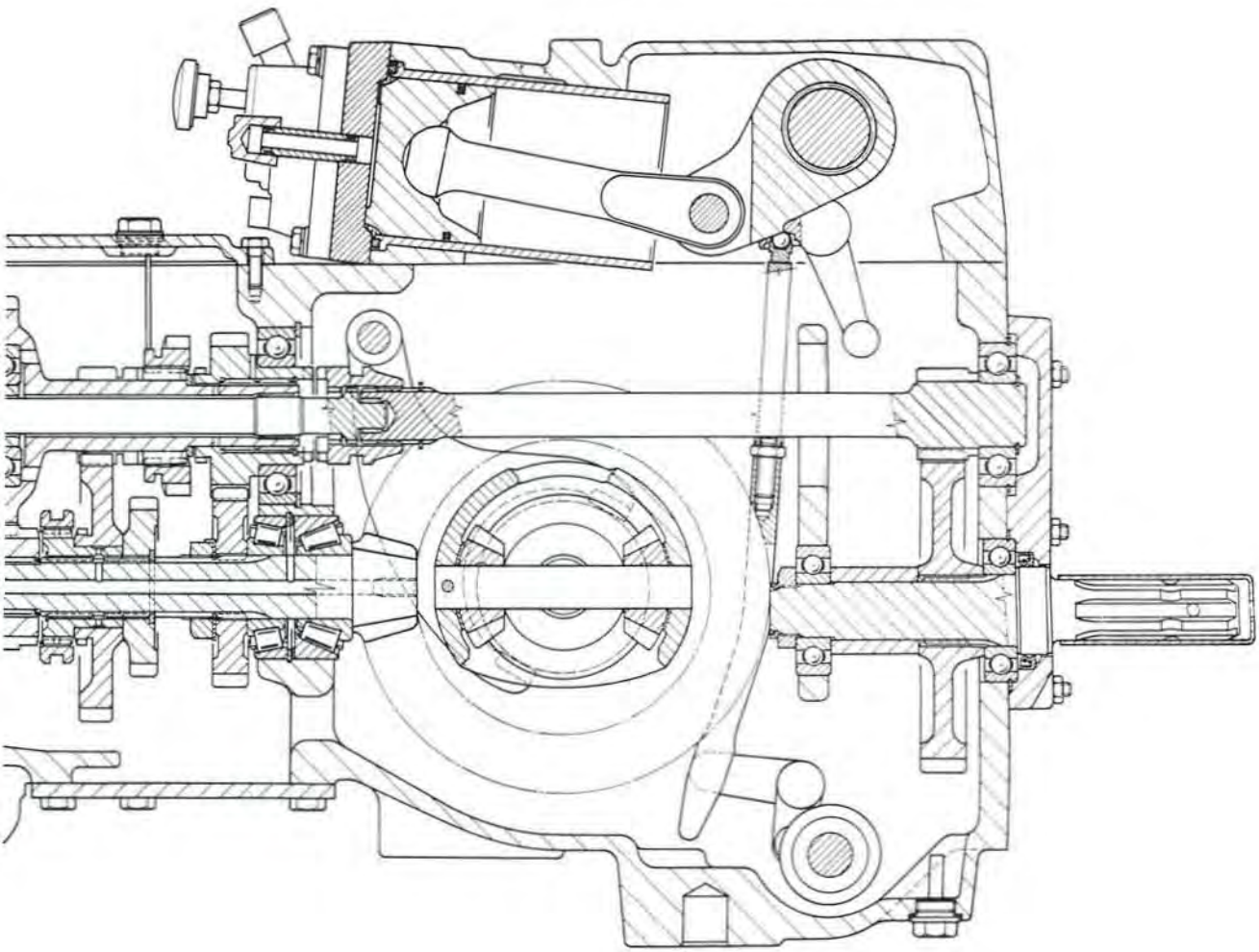
DESCRIPTION	Thread Size	Torque		
		Nm	kgm	ft lb
Power take-off - Sect. 207 Nut, driven gear shaft (C_1, page 1)	M 28x1.5	294	30	217
Nut, self-locking, spline extension (540/1000 rpm PTO) (C_3) .	M 12x1.25	162	16,5	72
Nut, PTO housing cover screw	M 8x1.25	25	2.6	19

www.maskinisten.net
www.classicmachinery.net



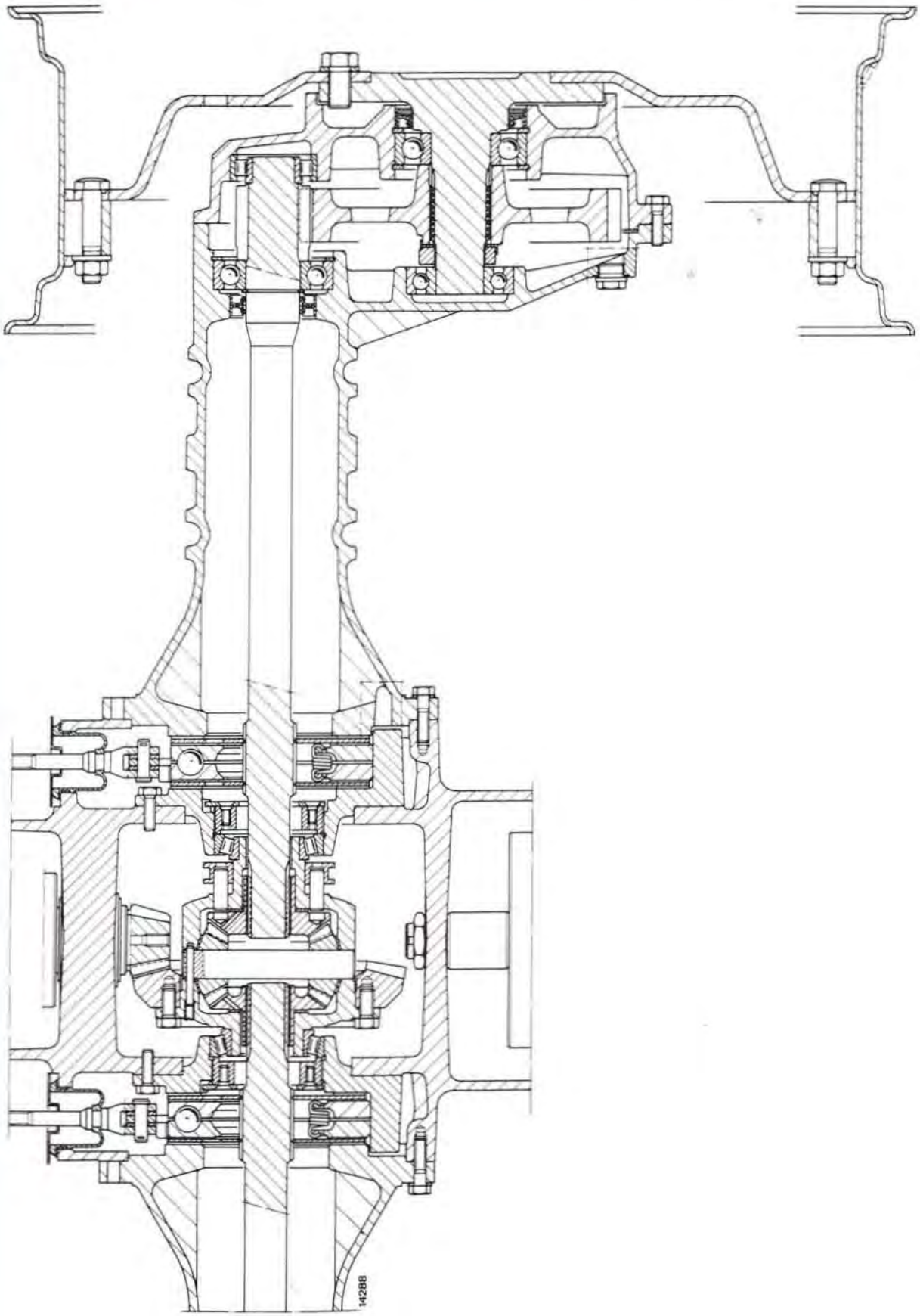
Longitudinal Section through Power Train

www.maskinisten.net
www.classicmachinery.net



www.maskinisten.net
www.classicmachinery.net

POWER TRAIN:
Specifications and Data



Cross Section Through Power Train

www.maskinisten.net
www.classicmachinery.net

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.

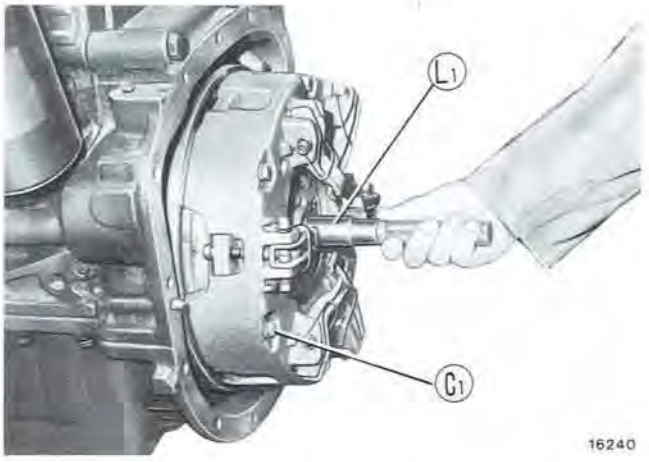
— Apply hand brake and adequately chock the front axle.

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.

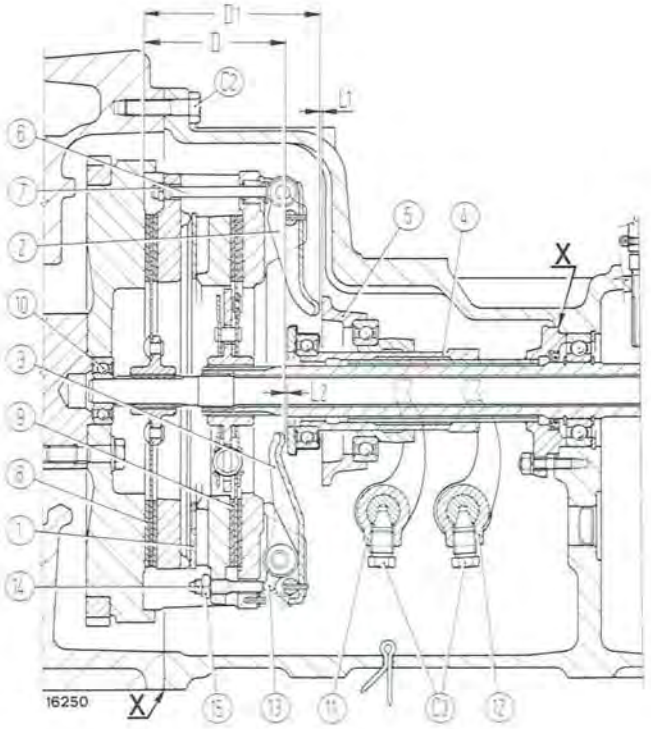
— Tighten screws (C1) to specified torque.

— 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.

www.maskinisten.net
www.classicmachinery.net



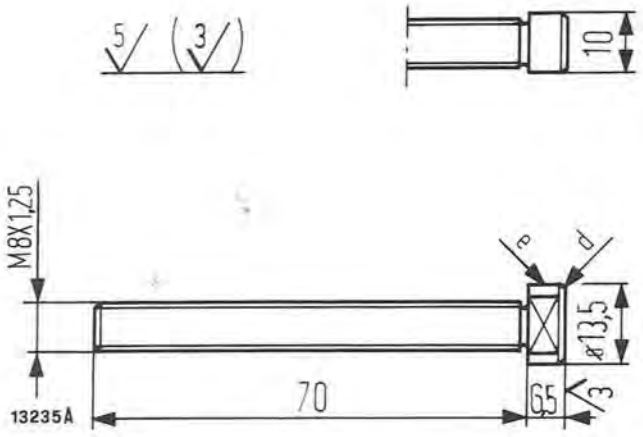
Longitudinal section through 10''/10'' VALEO clutch.

C_2. Clutch housing screws - C_5. 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

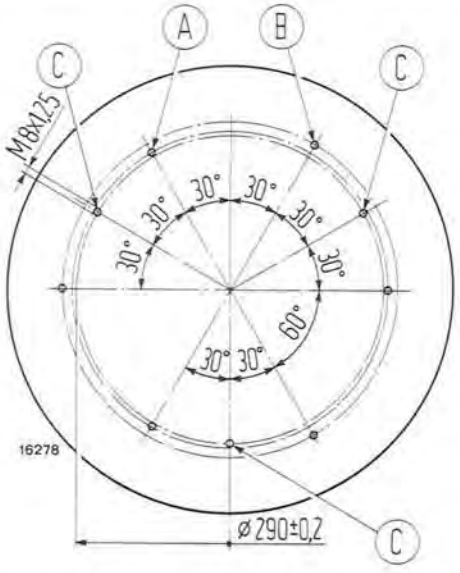
Remove, install and adjust clutch using kit **293650** universal kit **293650** or kit **291291/2** (page 3).
To install clutch on kit **291291/2,** proceed as follows:



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.

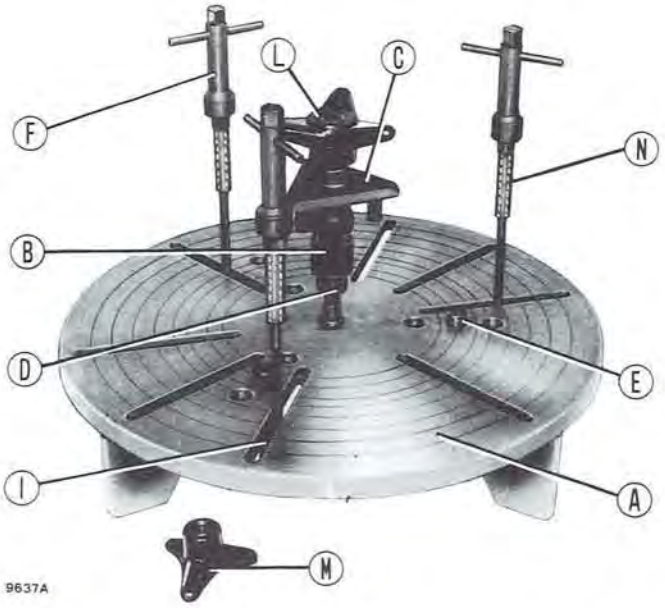
Note - Before fitting the clutch assy, on kit **291291/2** or universal kit **293650** it is recommended to remove from clutch housing the three screws securing the PTO clutch pressure plate flexible drive lugs. For kit **291291/2** only: make in Shop the three locators **50003** following the instructions 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 arount 290 mm (11.4 in) dia circle

www.maskinisten.net
www.classicmachinery.net



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.

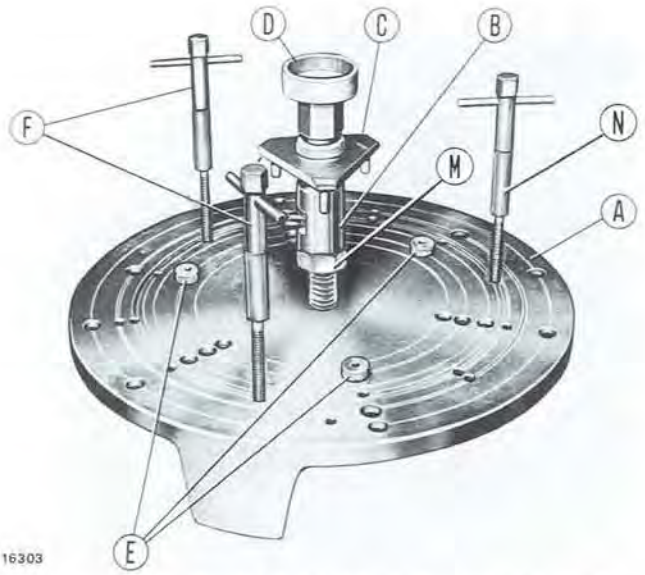
— Place center spacer (B) on base plate (A) and position with register rest face at a height of 126 mm (4.9 in) then lock by jam nut (M).

— 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)

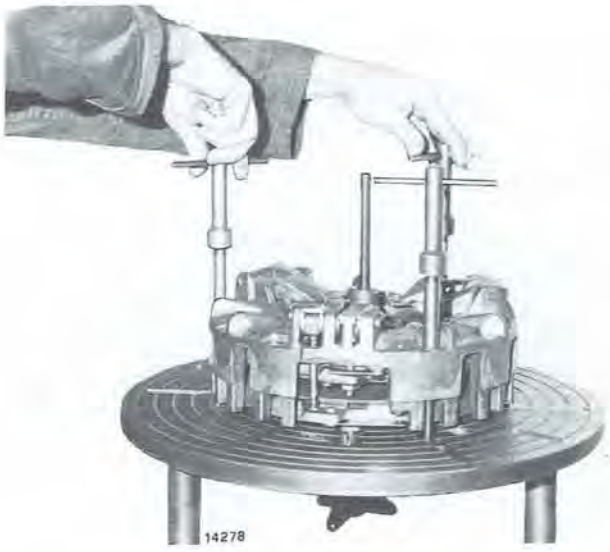
— Rest clutch assy, without master clutch driven plate, on base plate and secure by means of the three fasteners (F) provided with guide bushings (N).

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.

www.maskinisten.net
www.classicmachinery.net



Clutch disassembly on base plate of universal kit 293650.

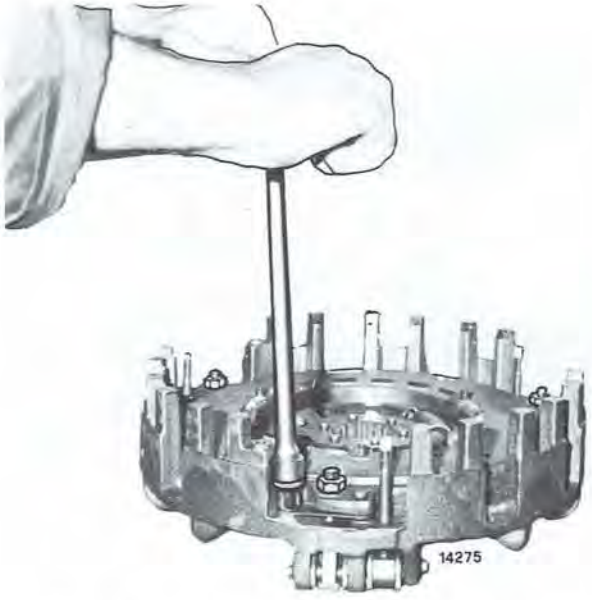
— Measure PTO clutch driven plate thickness (S) and place around the 240 mm (9.4 in) dia. circle the adjustable locators (E) positioning them with top face at a height (h) given by:

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.

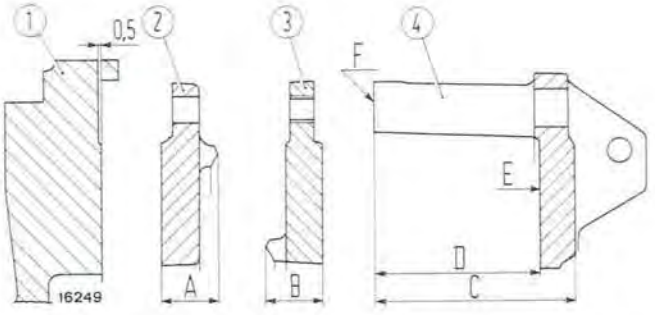
Back off the PTO clutch release lever adjuster rod nuts (7) and progressively unscrew fasteners (F, page 3) thus allowing gradual relief of dished spring and disassembly of clutch.

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.

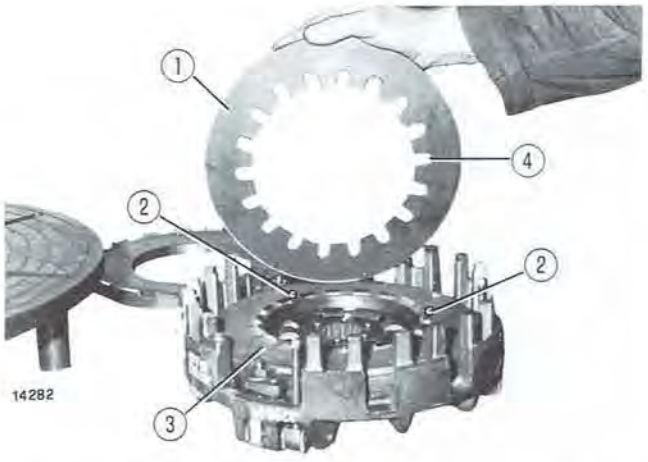
Check clutch housing surfaces and pressure plate facings for good conditions.
In case of need, re-dressing will be possible keeping in mind that dimensions A, B, C and D of reconditioned components should not exceed the limits specified in the figure below; also remember that if clutch housing face (E)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

www.maskinisten.net
www.classicmachinery.net



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.

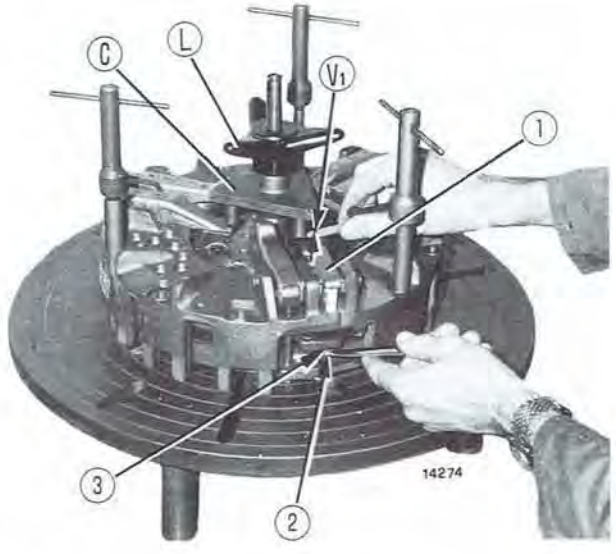
On-bench clutch adjustment

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**.

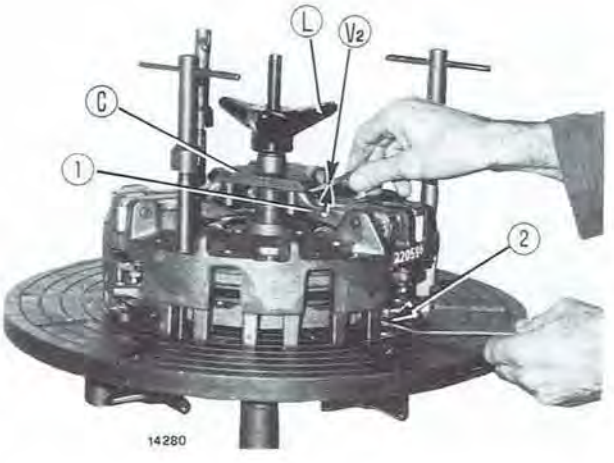
Tighten or back off screws (2) to obtain correct gap (V_1) between master clutch release lever and register pin. Tighten screws through nuts (3).

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.

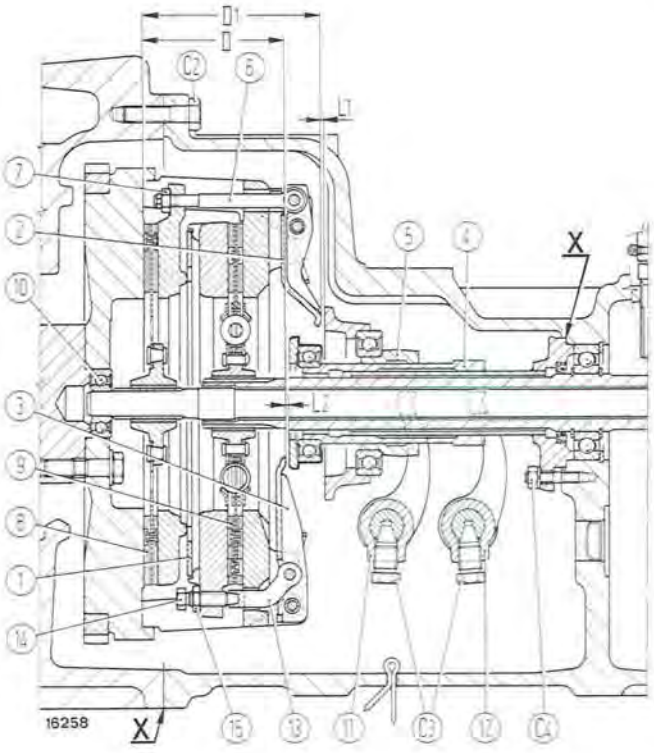


On-bench inspection and adjustment of PTO clutch release lever height using universal kit 293650.

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

www.maskinisten.net
www.classicmachinery.net

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:

www.maskinisten.net
www.classicmachinery.net

— 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

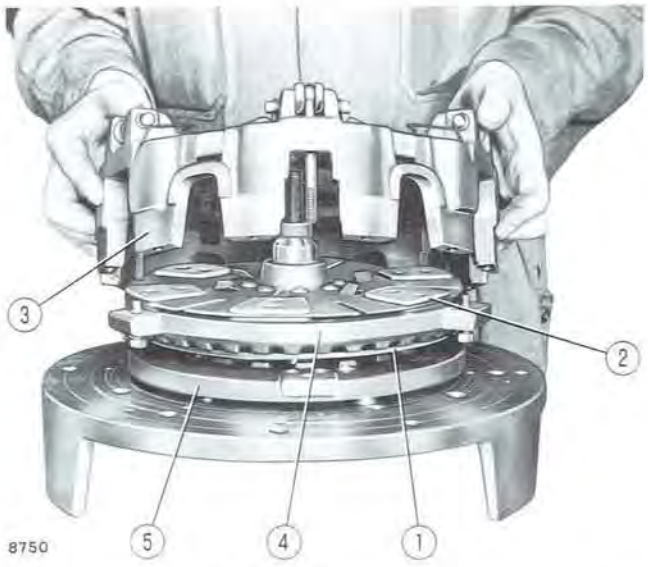
— Lock adjustable locators (E, page 3) by relevant handwheels (M).

— 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.

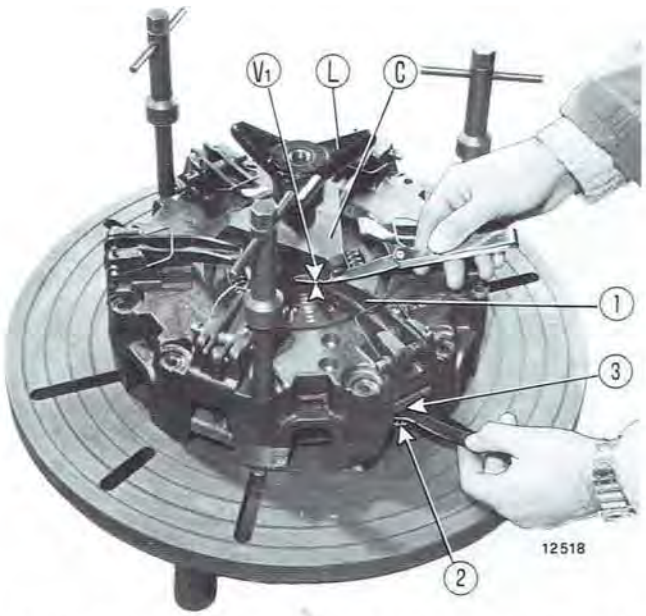
Check clutch driven plates for wear and replace if rivets are near to or flush with top facings. Plates are also to be replaced if the organic facings are found to be soaked with oil.



Removing (installing) housing with levers.

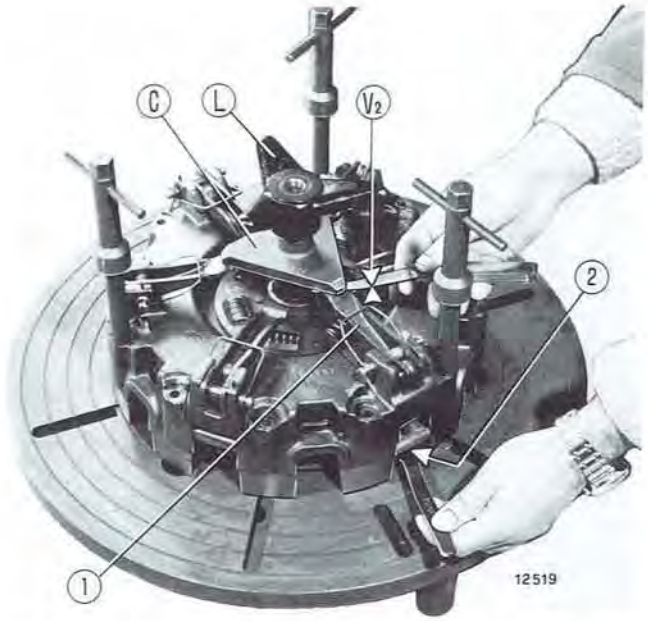
1. Dish spring - 2. Master clutch plate - 3. Clutch housing - 4. Master clutch pressure plate - 5. PTO clutch pressure plate.

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.

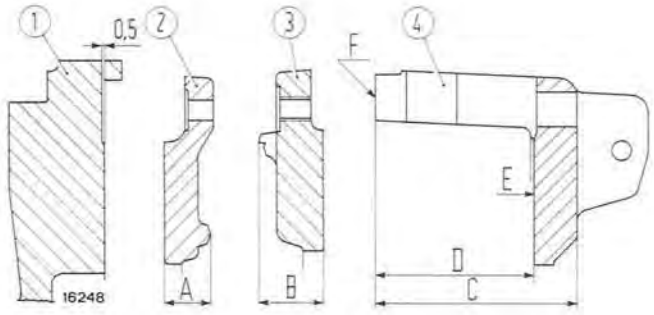
C. Register - L. Handwheel **293739** - V_1 = 0.1 mm (0.004 in). Release lever to register pin gap - 1. Release levers - 2 and 3. Adjusting screw and jam nut.



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.

www.maskinisten.net
www.classicmachinery.net



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.

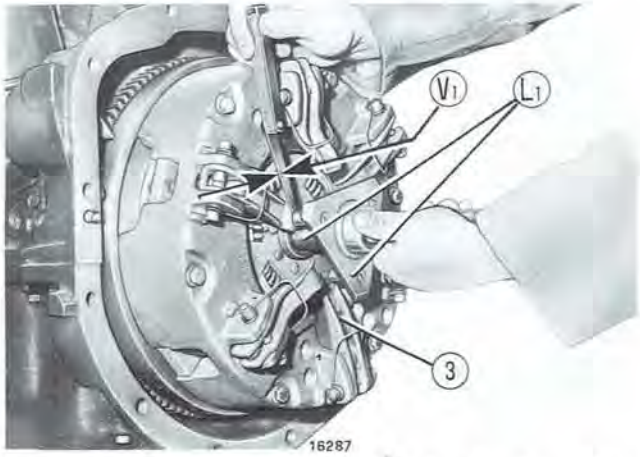
1. On-bench clutch adjustment.

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.**

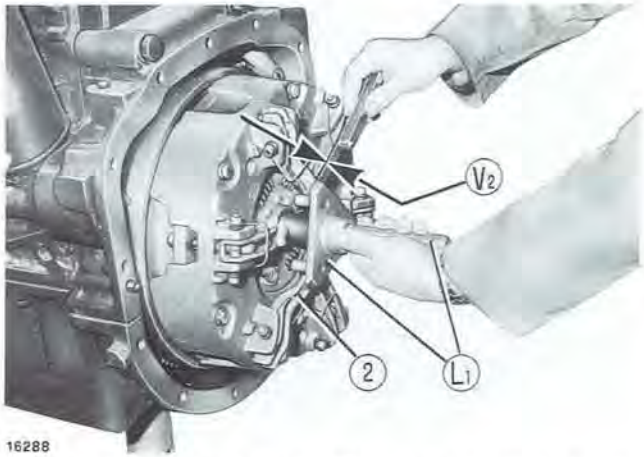
Tighten or back off master clutch release lever (2) adjusting screws (2, page 7) to obtain correct gap (V_1) between register pin ends (C) and master clutch release levers. Secure screws in position through nuts (3).
Tighten or back off PTO clutch release lever (1) adjusting link nuts (2) to obtain correct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

www.maskinisten.net
www.classicmachinery.net

2. On-flywheel clutch adjustment.

Insert pin **292604** (L_1, 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 (V_1 and V_2) 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:

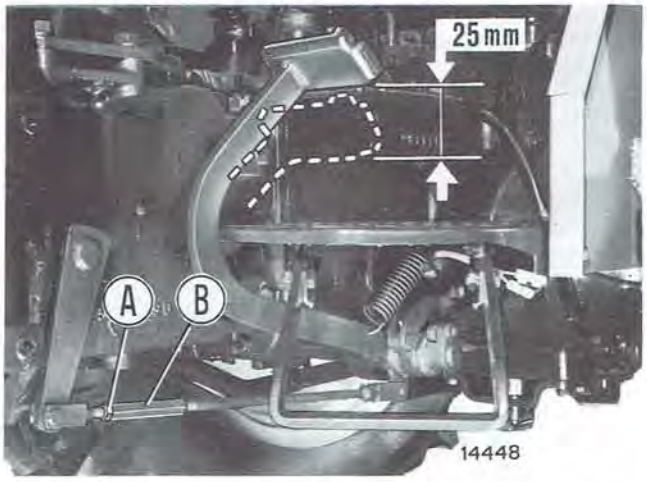
- Back off jam nut (A) and rotate sleeve (B) counter-clockwise (each sleeve turn is equivalent to 12 mm or 0.47 in pedal travel).
- Tighten jam nut (A).
- Ensure that pedal free travel is 25 mm (1 in).

PTO CLUTCH LINKAGE ADJUSTMENT

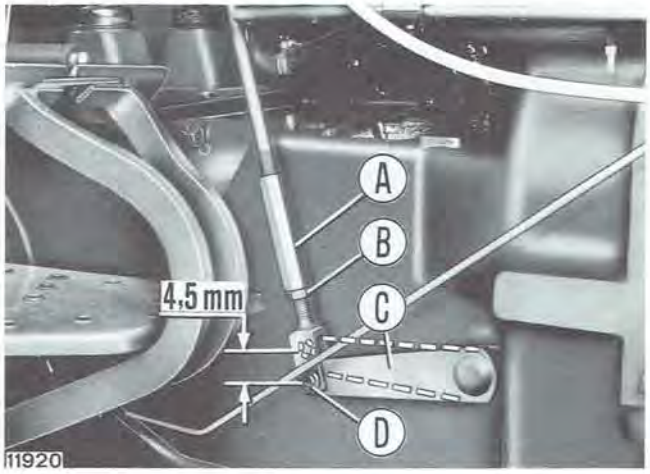
Bring lever (C) to rest position (fully lowered) and check that free travel at pin (D) is 4.5 mm (0.18 in) before clutch release.

Wheen 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.

www.maskinisten.net
www.classicmachinery.net

Transmission - rear drive housing assembly.

REMOVAL - INSTALLATION

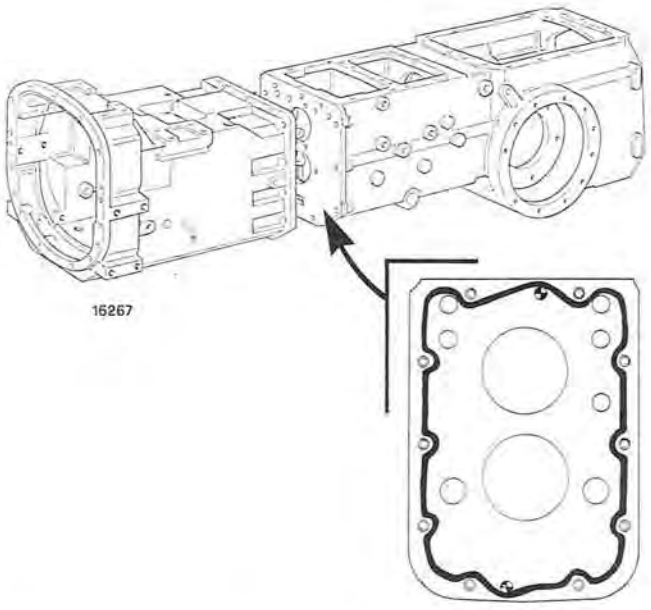
⚠ CAUTION ⚠

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).

www.maskinisten.net
www.classicmachinery.net

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.

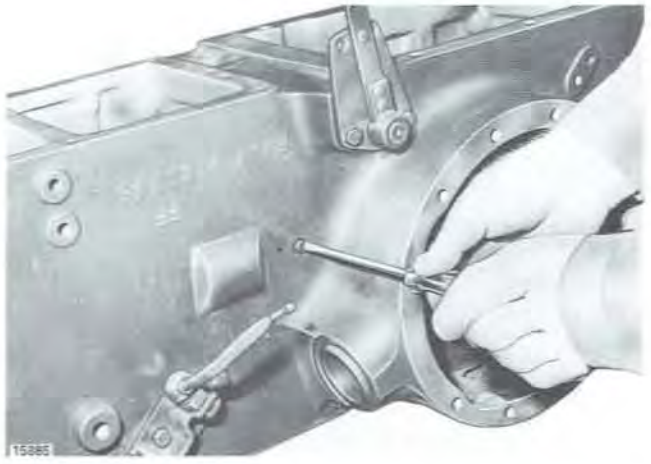
— Pull pinion partially outwards and remove retaining ring (36, page 5). Move gears (33 and 34) towards wall of transmission housing and remove thrust rings (37).

— 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.

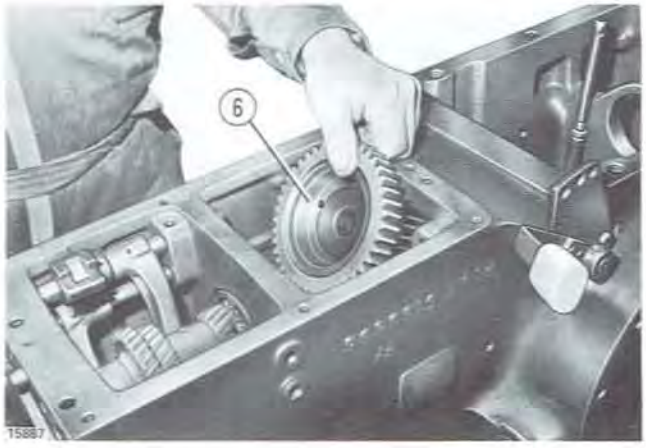
— Remove transmission shifter fork/detent plunger resilient pins and the screws retaining the speed selector check balls and springs.

— 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:

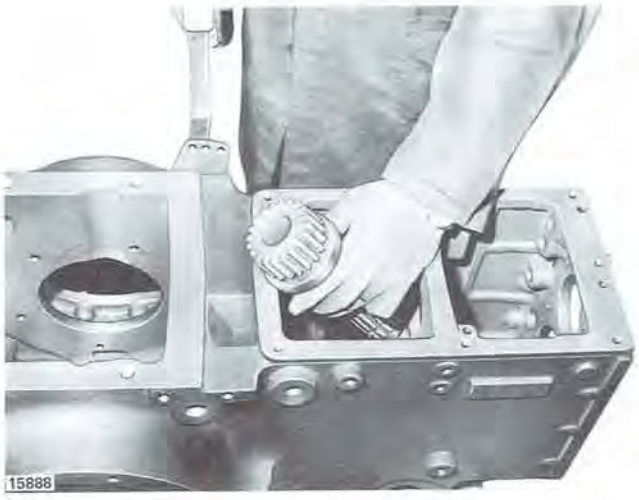
— Make a set of tools as shown in the drawing on page 3.

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



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

www.maskinisten.net
www.classicmachinery.net



Disassembly of transmission driven shaft.

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

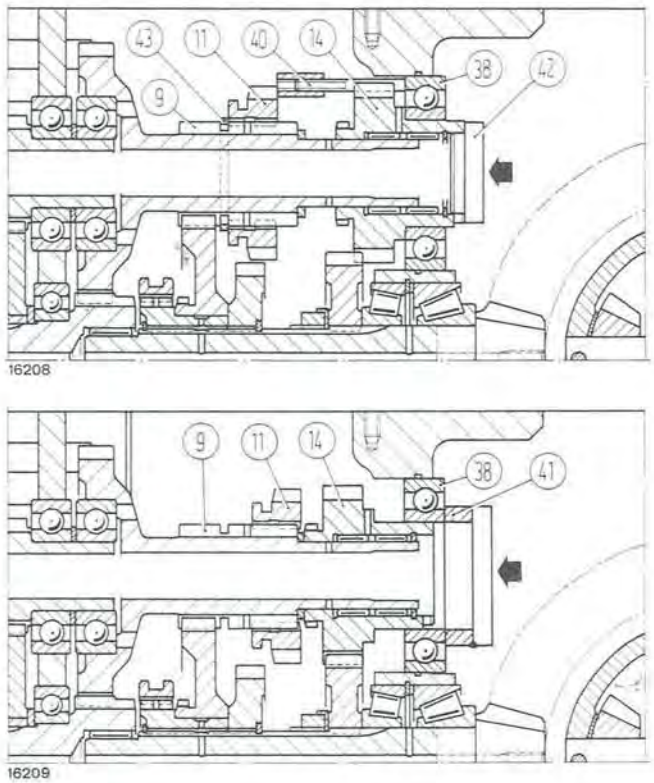
— Push gear (14) with bearing (38) towards rear of drive housing. Install tool (43) on direct drive/low range shaft (9) and force gear (11) into contact with tool as shown in figure alongside.

— 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.

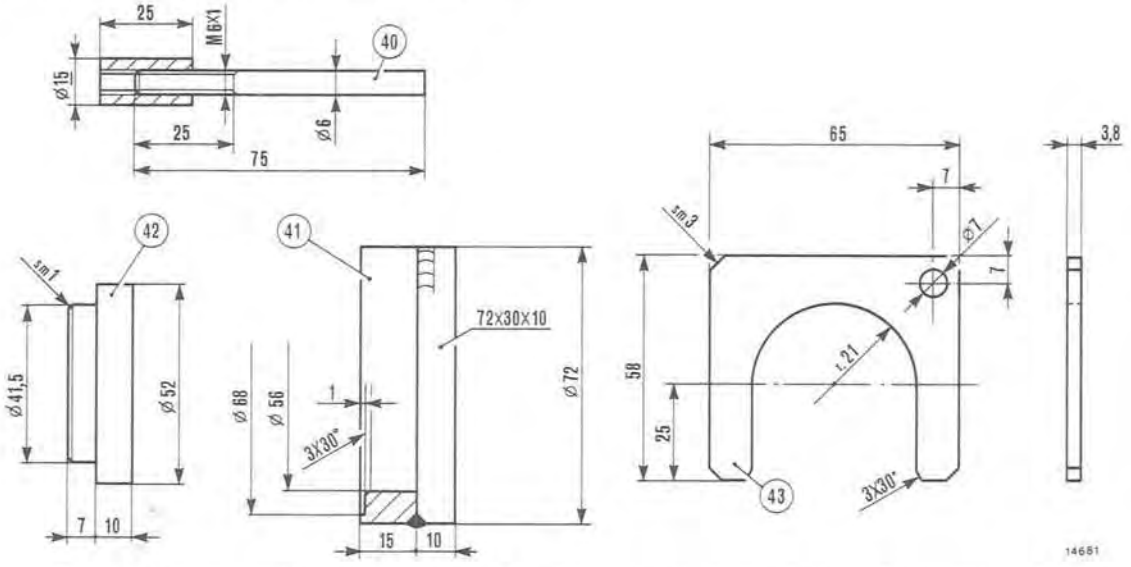
— Install new bearing using tool (41) as shown alongside.



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.

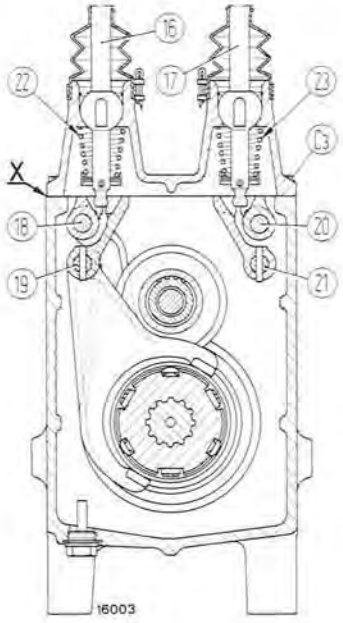
Install the new bearing using Tool (41) as shown aboved.

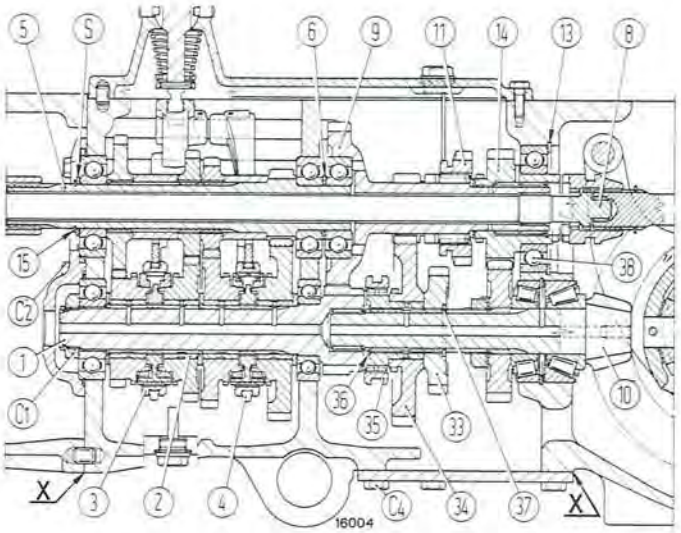


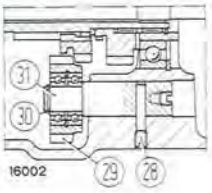
Tools for rear splitter drive shaft bearing and low range drive gear removal (stamp tools with number: 50030) dimensions in mm.

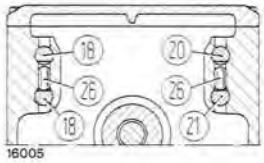
Note - Make two pieces of tool No. 40.

www.maskinisten.net
www.classicmachinery.net







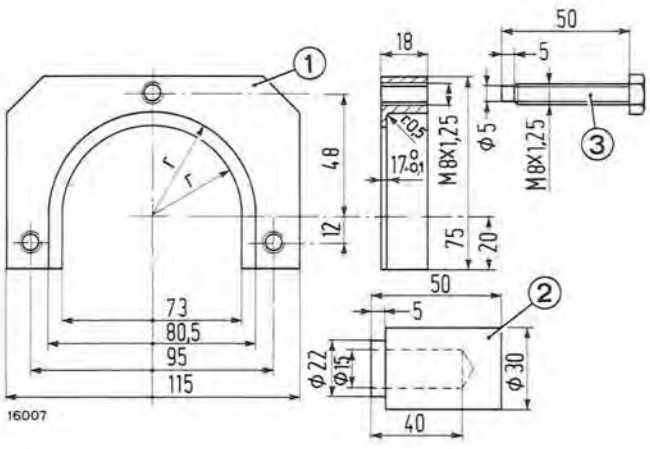


Longitudinal and cross sections through transmission and splitter.

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.

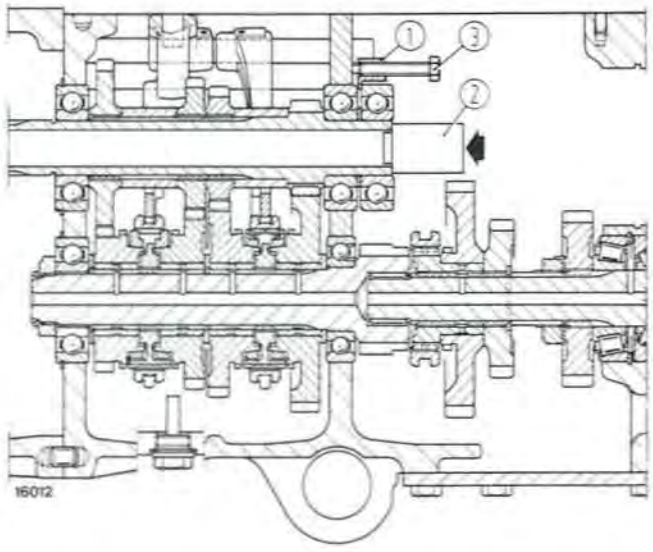
— Then, using a suitable presser, apply force on tool (2, page 5) to push transmission drive shaft forward as far as it will go.

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

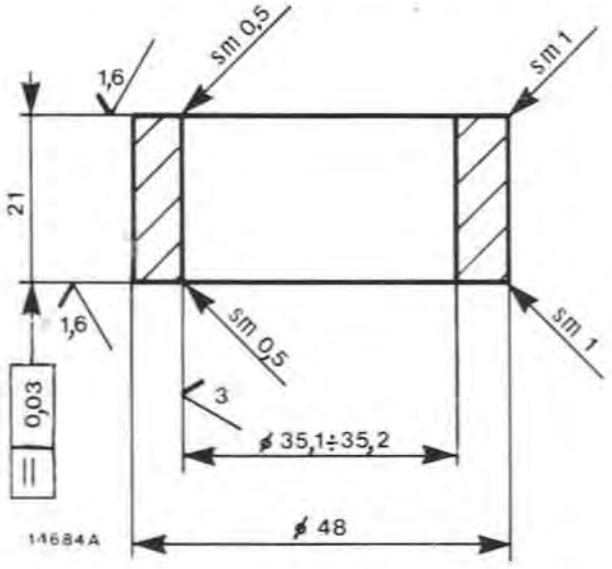
— Forcing again on tool (2) cause the rear bearing to slide off the shaft.

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

www.maskinisten.net
www.classicmachinery.net



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

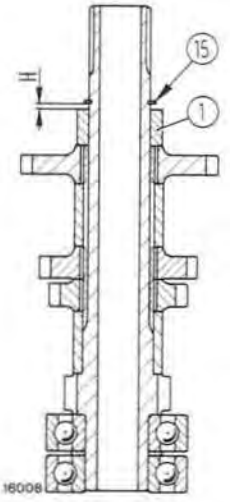
Refer to figures on page 4 for correct part positioning and note the points below.

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 (C, page 4) to the specified torque.

Insert two shifter forks without connecting to associated shifter rods.

Install drive shaft and associated gears.



Adjusting transmission drive shaft bearings.

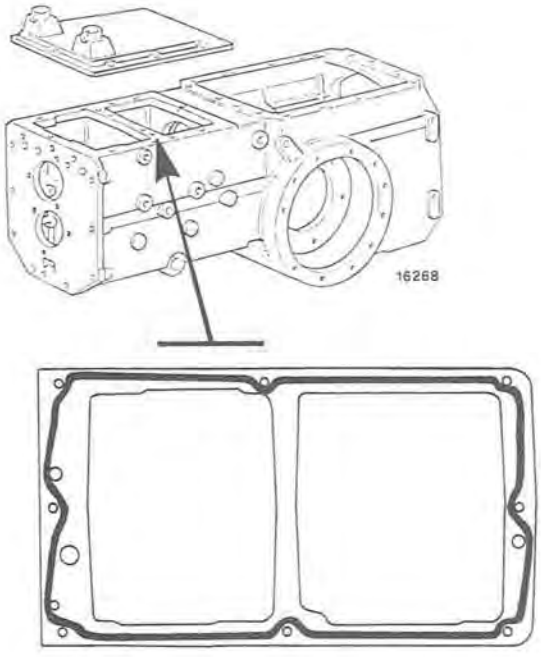
H. Clearance (measured with feeler gauge) - 1. Fixture **50037** ring (made in workshop) - 15. Retaining.

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.

— 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).

www.maskinisten.net
www.classicmachinery.net



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.**

www.maskinisten.net
www.classicmachinery.net

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.

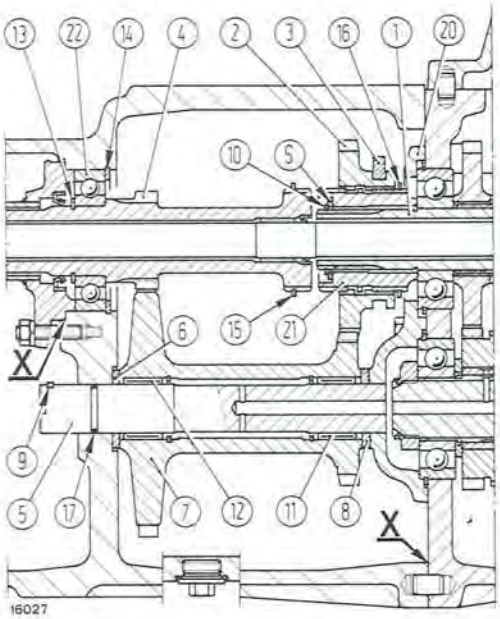
If tractor is equipped with ballast weights which cannot be removed, connect weights to a hoist to prevent engine from pitching forwards.

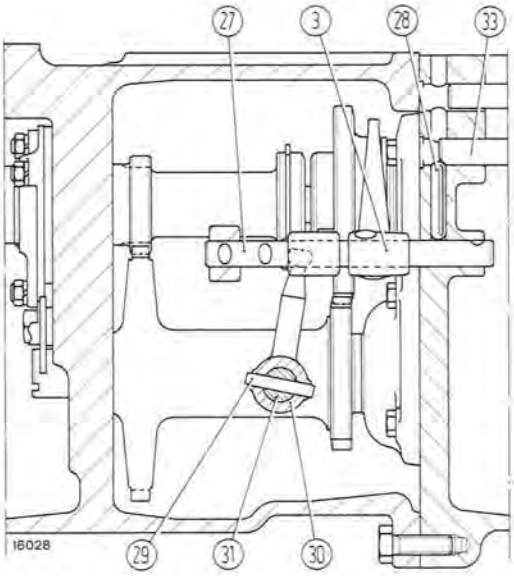
— Position trolley stend **292320** with fixed end under transmission-rear drive housing and adjustable ends one under sump and one under clutch housing.

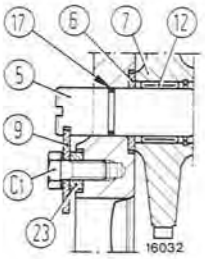
— Position a telescoping stand under drawbar support, to prevent possible tipping over of transmission/drive housing assembly.

— 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.





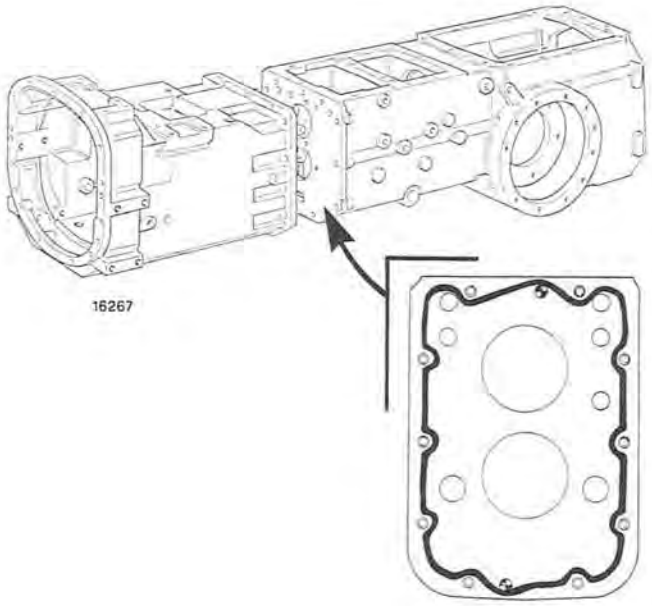


Sections through creeper.

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.

www.maskinisten.net
www.classicmachinery.net



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 (C1, 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.

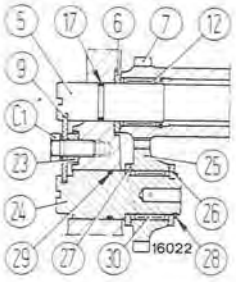
Note - Upon assembly of sleeve (21, page 1) interpose a shim (S) thick enough to provide a final end float (G) of 0 to 0.2 mm (0 to 0.0078 in).

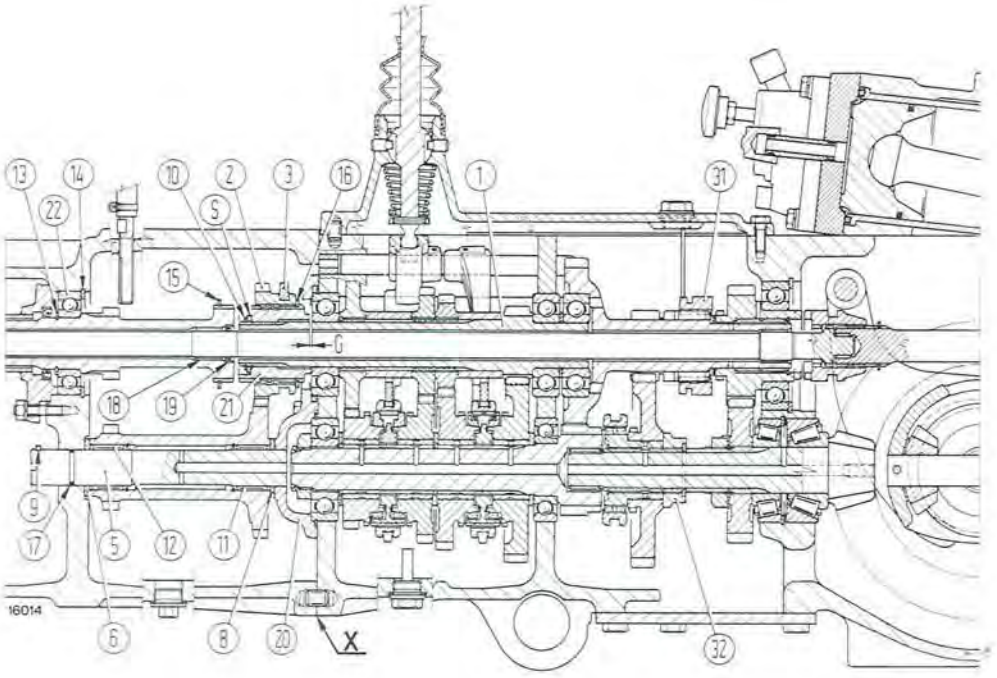
MECHANICAL REVERSER DESCRIPTION

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.

www.maskinisten.net
www.classicmachinery.net

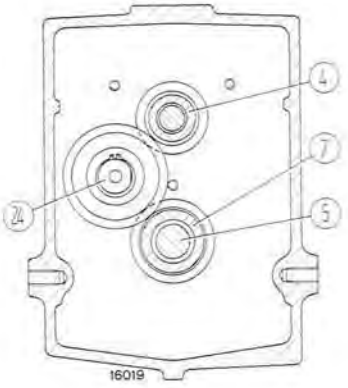




Sections through mechanical reverser.

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.

www.maskinisten.net
www.classicmachinery.net

— 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).

www.maskinisten.net
www.classicmachinery.net

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.

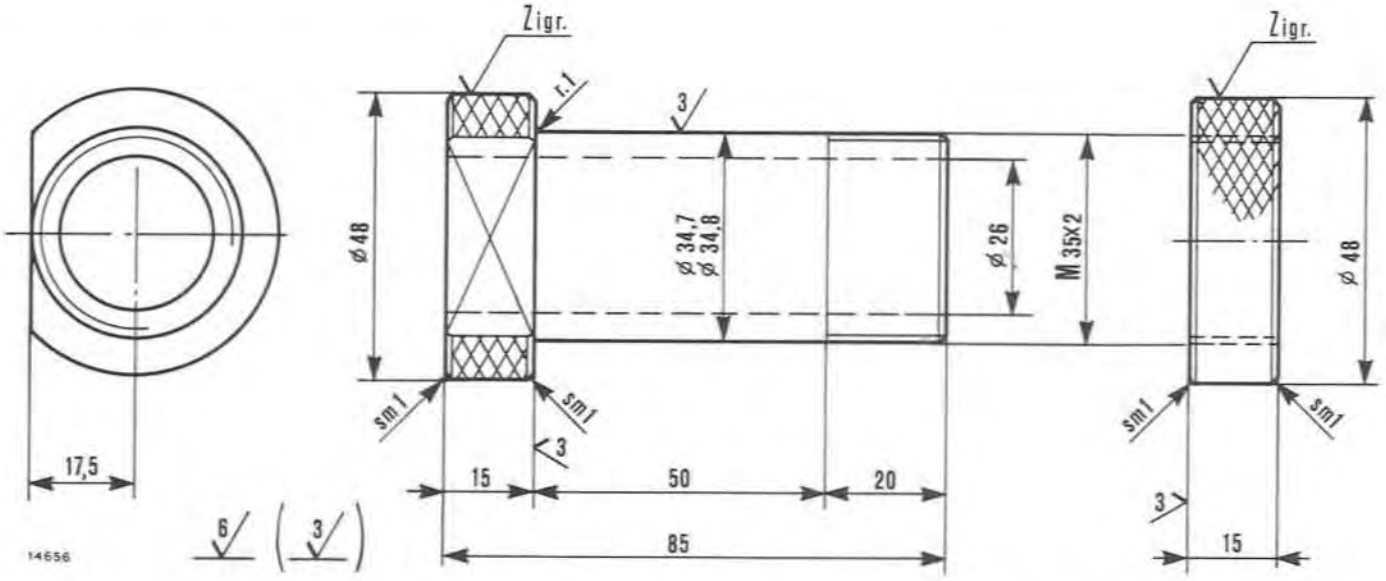
Note - To adjust bevel pinion shaft position, make a tool as shown in the drawing on page 2.

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).

www.maskinisten.net
www.classicmachinery.net

POWER TRAIN:
Bevel Drive and Differential



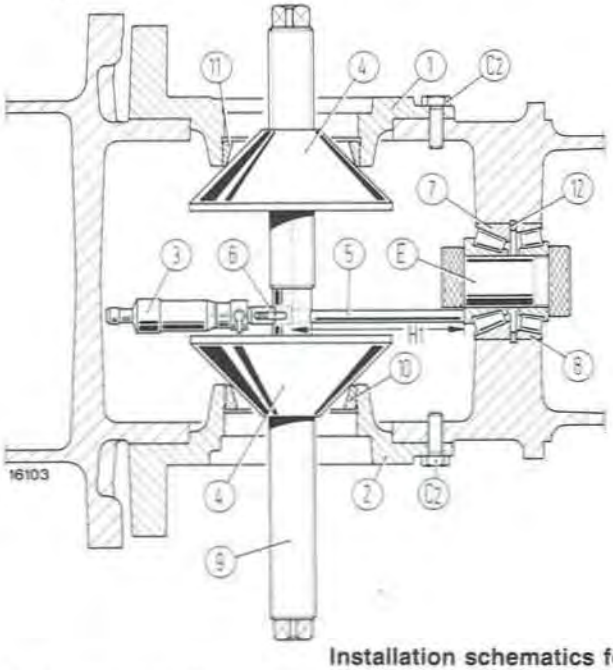
Tool for bevel pinion shaft assembly position adjustment. (Dimensions in mm) - (Punch mark No. 50029).

— 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.

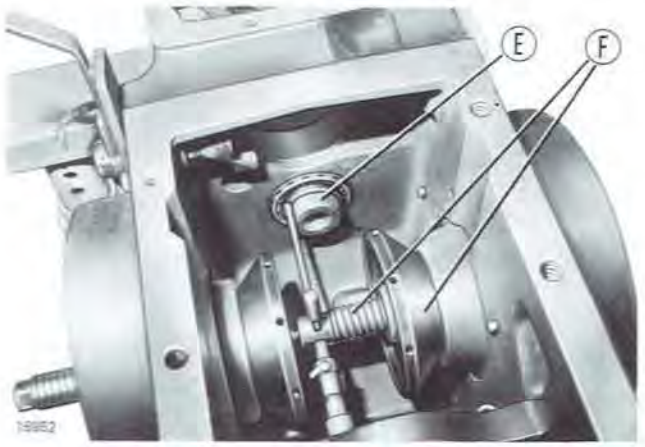
C = Correction factor stamped on pinion, expressed in mm and preceeded by + or —, if other than 0, to be added to or subtracted from nominal dimension (H_2) according to sign.

— Shim thickness (S) will be given by:

$$S = H_1 - H_3$$

where:

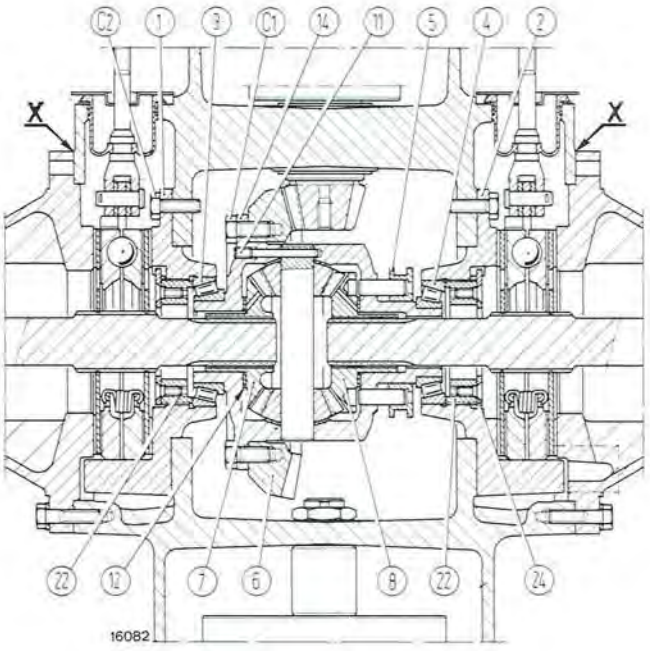
H_1 = Dimension measured with micrometer gauge
H_3 = Corrected nominal dimension between ring gear centerline and back of pinion.

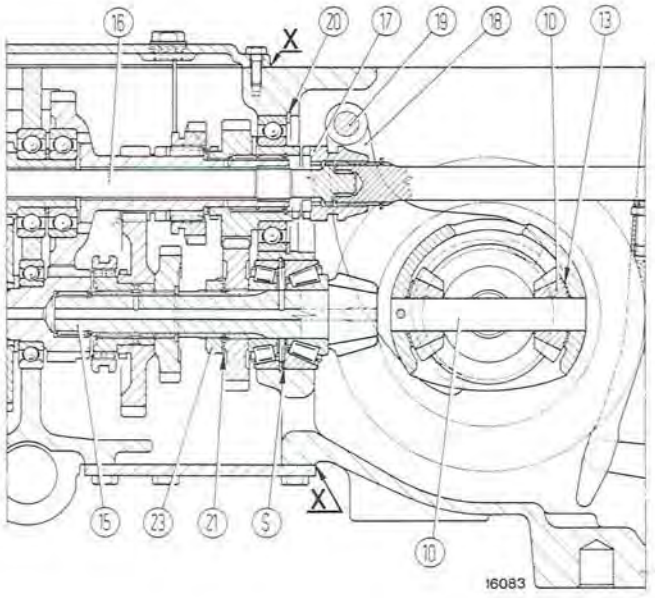


Installation schematics for bevel pinion position check tool.

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.

www.maskinisten.net
www.classicmachinery.net





Longitudinal and cross sections through bevel drive and differential.

C_1. Bevel ring gear retaining screws - C_2. 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).

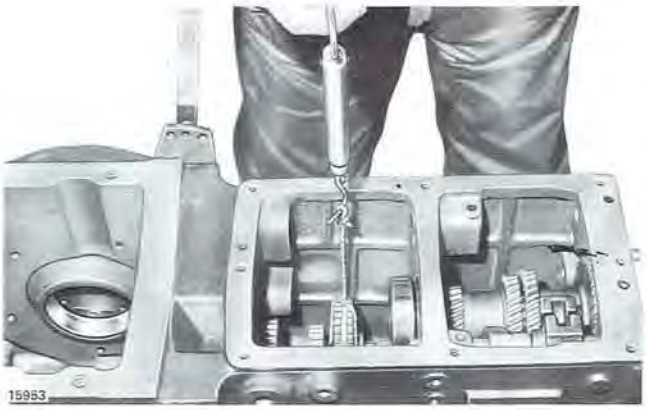
Note - After adjustment, bend lockwasher tab (21), over bearing adjusting nut to prevent work-out.

Differential bearing adjustment and bevel drive backlash check

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

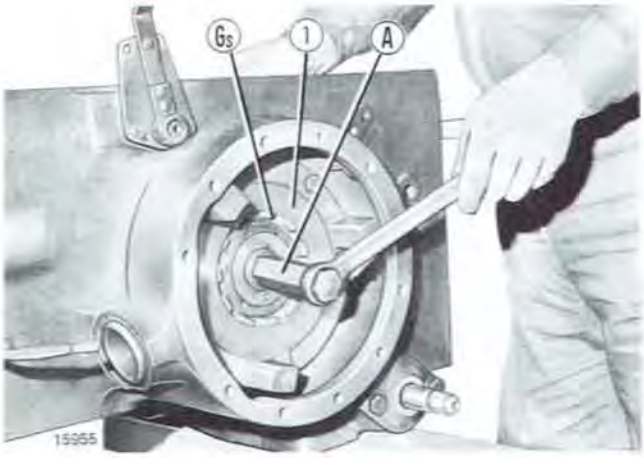
Note - For adjusterring installation, make a tool as shown in drawing page 7, Sect. 204, Mods. 466/566/666/766.

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



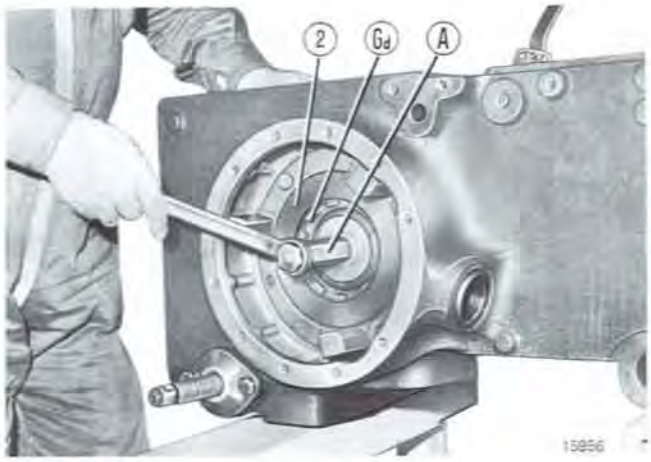
Bevel pinion taper roller bearing adjustment.

www.maskinisten.net
www.classicmachinery.net



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

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



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

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

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

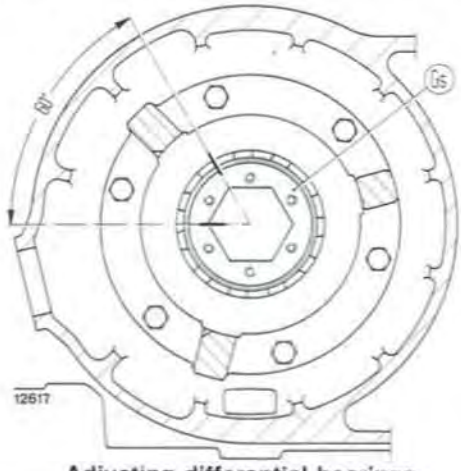
5 + 1 to 2.5 Nm (0.5 + 0.1 to 0.25 kgm or 0.72 to 1.8 ft lb) if torque found on pinion was **1 Nm (0.1 kgm or 0.72 ft lb)**

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).

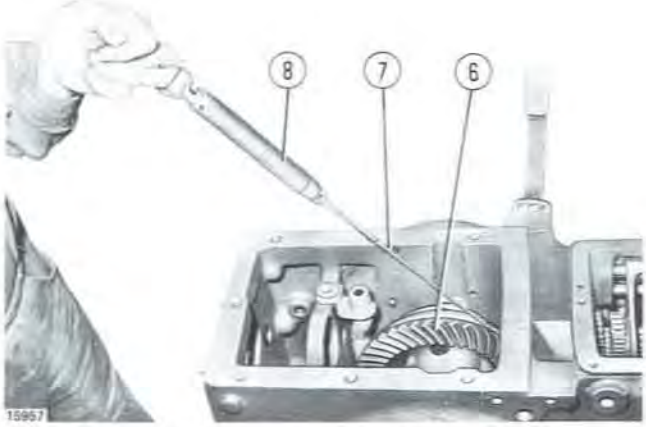
— Using a dial gauge, check bevel drive backlash (G). Take measurements at three equi-spaced points 120° apart and average readings. Normal backlash is 0.15 to 0.20 mm (0.006 to 0.008 in), or an average of 0.18 mm (0.007 in). To compensate for excessive backlash, note that the average ratio of normal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

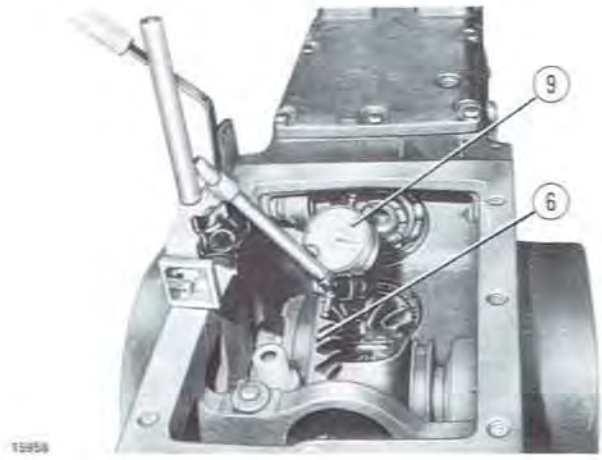
G = Bevel drive backlash as previously measured.



Bevel gear set support bearing rolling torque.

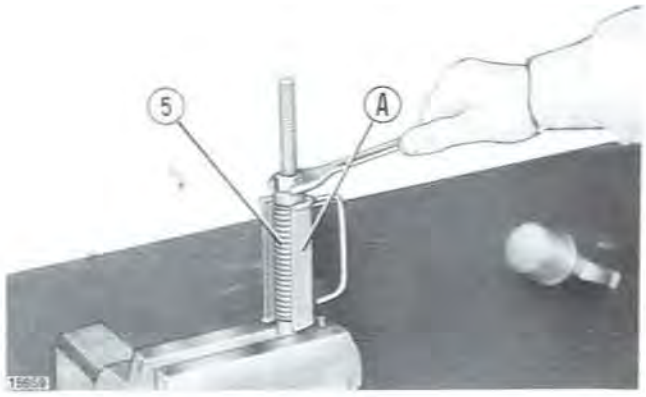
6. Ring gear - 7. String - 8. Spring balance.

www.maskinisten.net
www.classicmachinery.net



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.

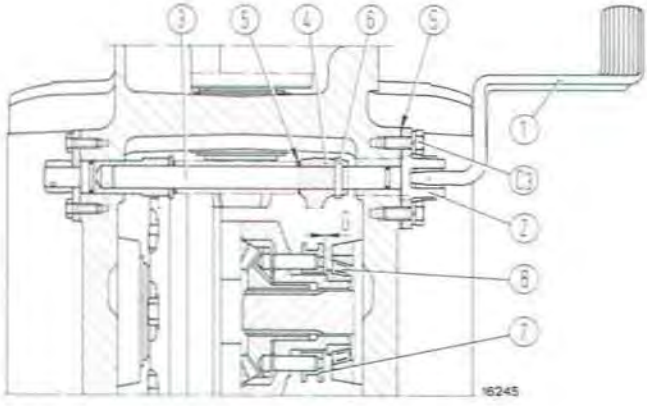
DIFFERENTIAL LOCK INSTALLATION AND ADJUSTMENT

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).

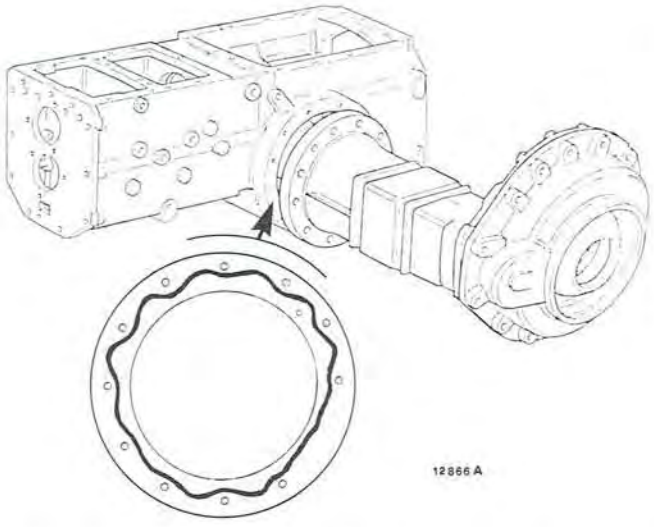
Adjust clearance by changing shims (S) between support (2) and drive housing.



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.

www.maskinisten.net
www.classicmachinery.net



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

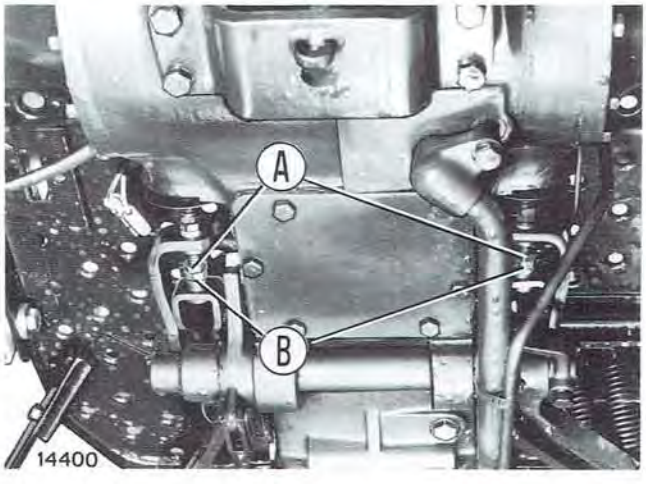
After adjusting brake pedal, check parking brake which must apply fully when hand lever is pulled to third notch on quadrant.

If not adjust as follows:

— Back off jam nuts (A).

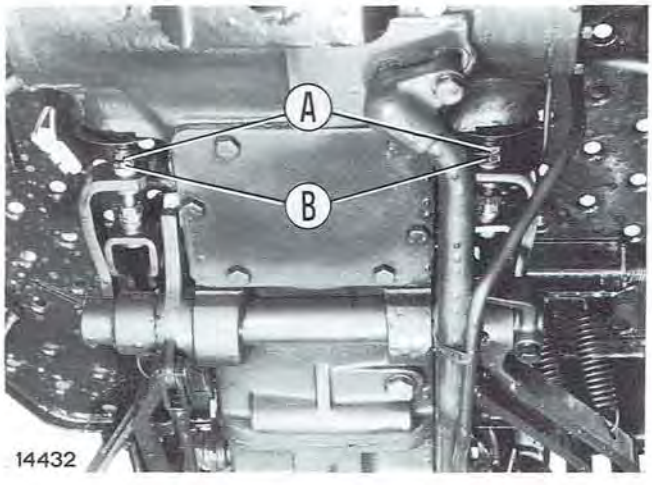
— Turn sleeves (B) until lever reaches third notch.

— Tighten jam nuts (A).



Adjusting brake pedals.

A. Locknuts - B. Sleeves.



Adjusting parking brake lever.

A. Jam nuts - B. Sleeves.

www.maskinisten.net
www.classicmachinery.net

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.

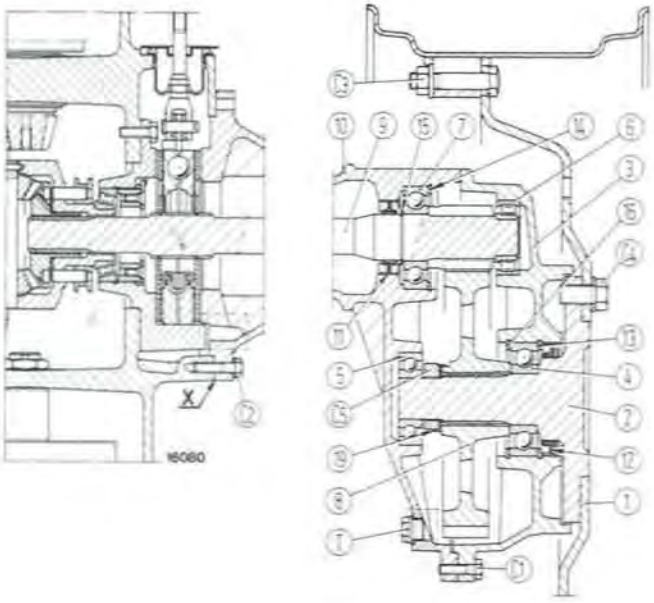
Disassemble final drives as follows:

— 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.

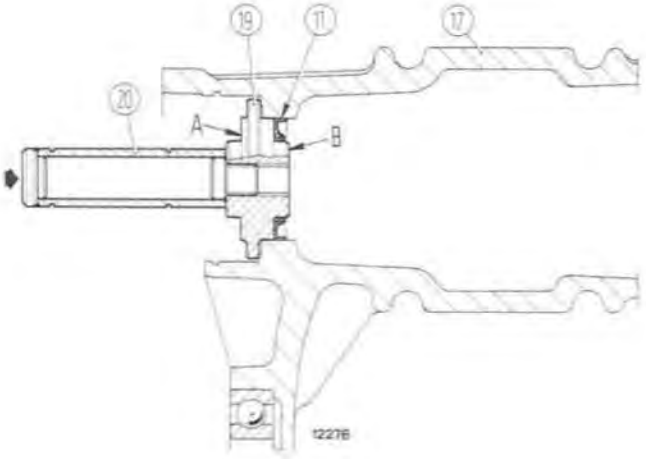
— Remove retaining ring (14) and withdraw axle shaft (1) with b earing (7).

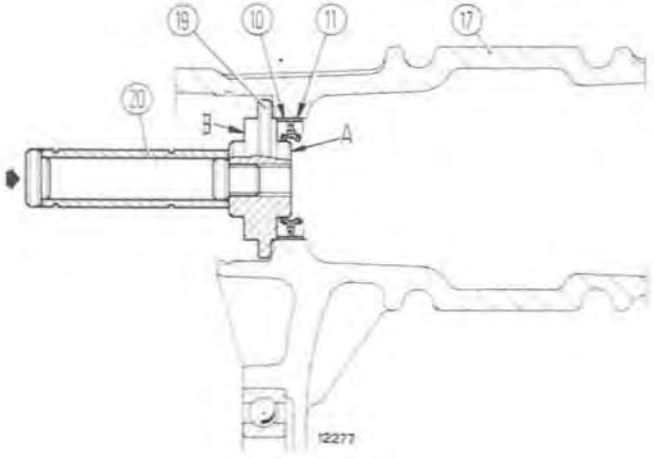


Longitudinal section through R.H. final drive.

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**.

www.maskinisten.net
www.classicmachinery.net

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.

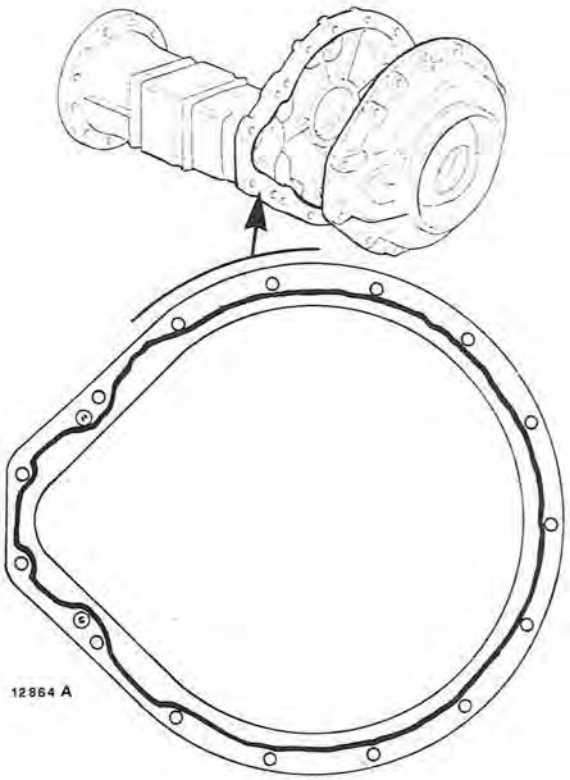
— Tighten mut (C_5, page 1) to the torque specified in table.

— 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.

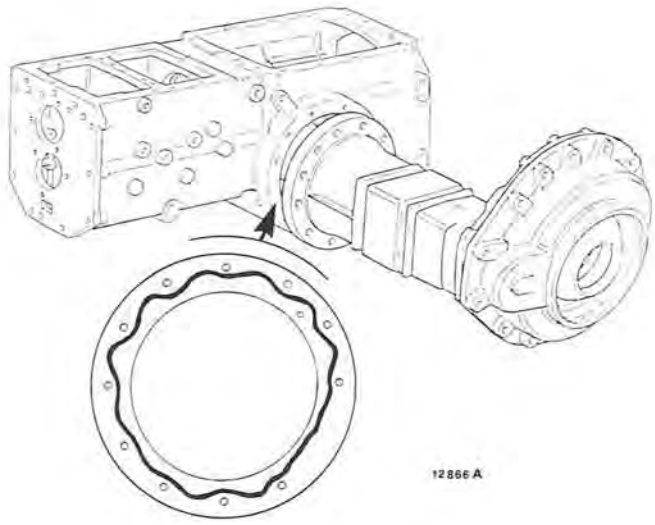
Before installing final drive housing on rear drive housing, and cover on final drive housing, thoroughly clean and degrease mating surfaces and apply a 2 mm (0.08 in) bead of jointing compound as shown in figures below.

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



Applying jointing compound for final drive housing cover installation.

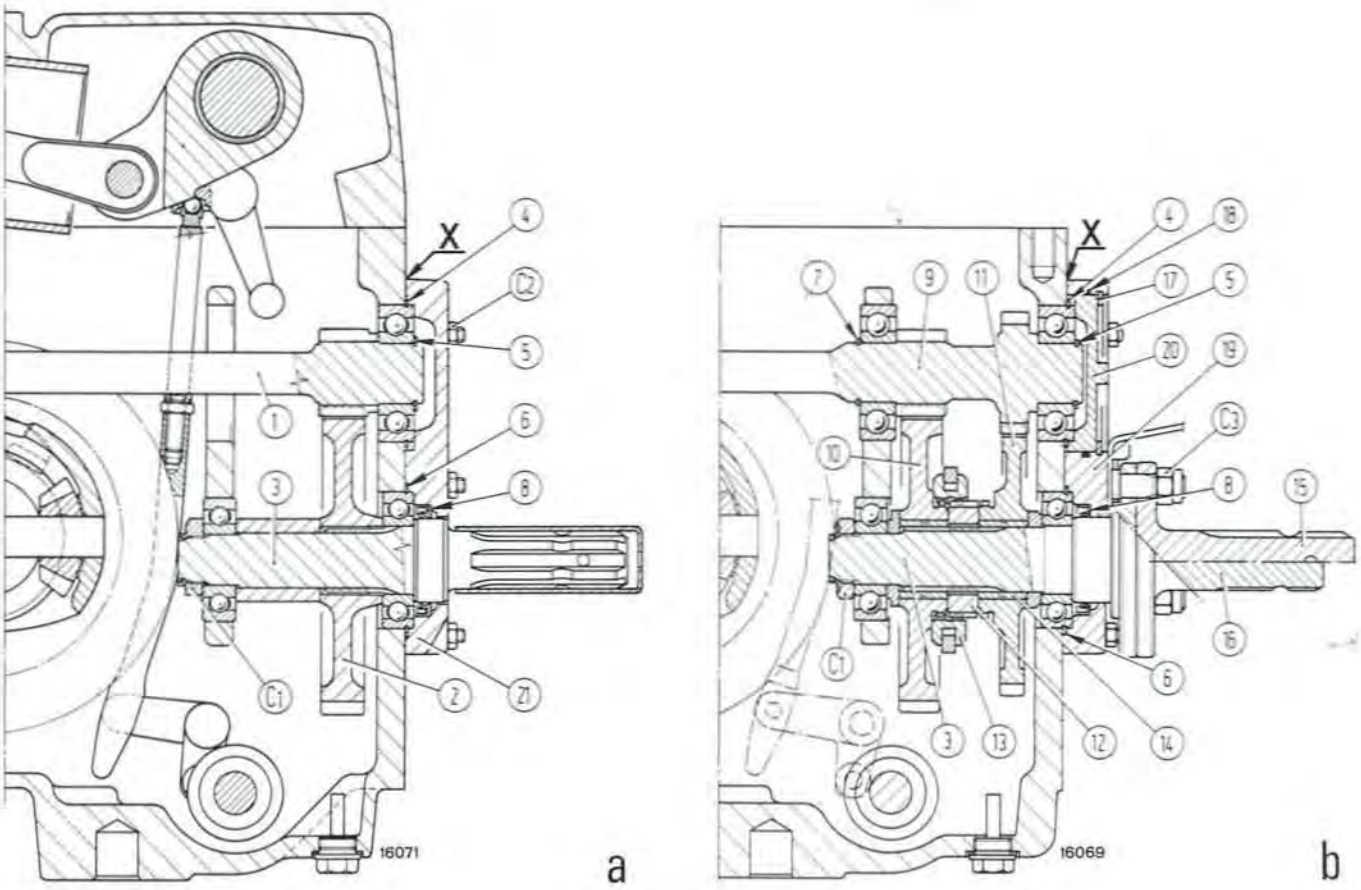
Jointing compound types are indicated on page 6, Sect. A, Mods. 466/566/666/766.



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.

www.maskinisten.net
www.classicmachinery.net



Longitudinal section through PTO.

a. Section through 540 rpm PTO - b. Section through 540/1000 rpm PTO - C_1. Driven shaft nut - C_2. PTO housing cover screw nuts - C_3. 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:

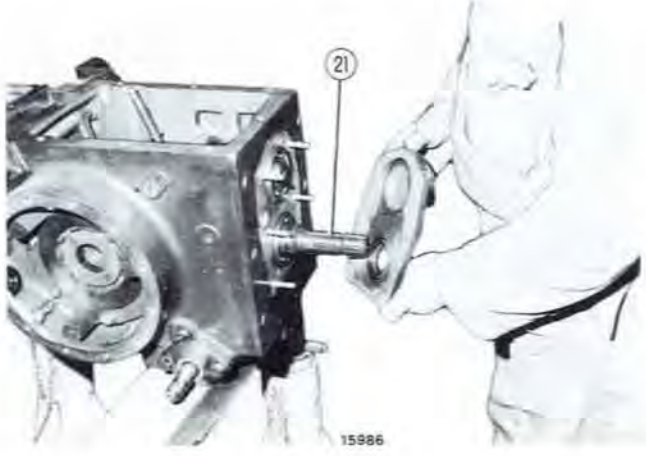
— Drain oil from rear drive housing.

— Remove drawbar, support and tow hook (when fitted).

Next, for the 540 rpm PTO:

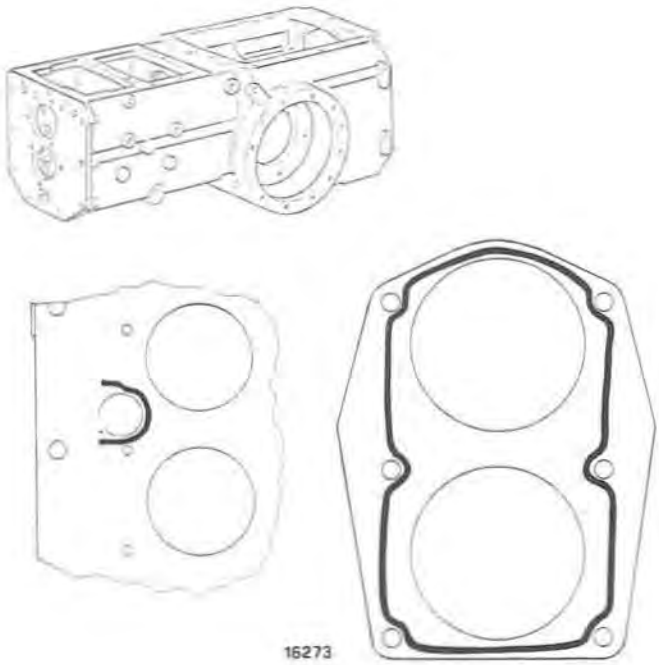
— Remove rear cover (21).

— 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).

www.maskinisten.net
www.classicmachinery.net



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.

www.maskinisten.net
www.classicmachinery.net

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

www.maskinisten.net
www.classicmachinery.net

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

www.maskinisten.net
www.classicmachinery.net

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.

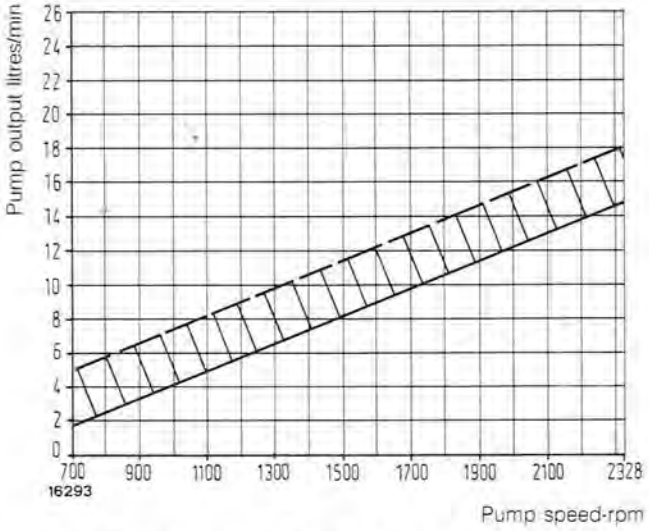
On-Tractor relief valve adjustment

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.

www.maskinisten.net
www.classicmachinery.net

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

www.maskinisten.net
www.classicmachinery.net

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

www.maskinisten.net
www.classicmachinery.net

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.

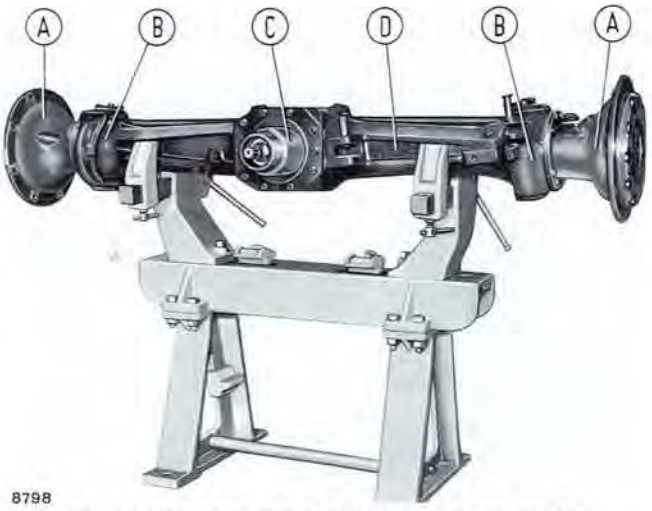
Proceed as follows:

— 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.

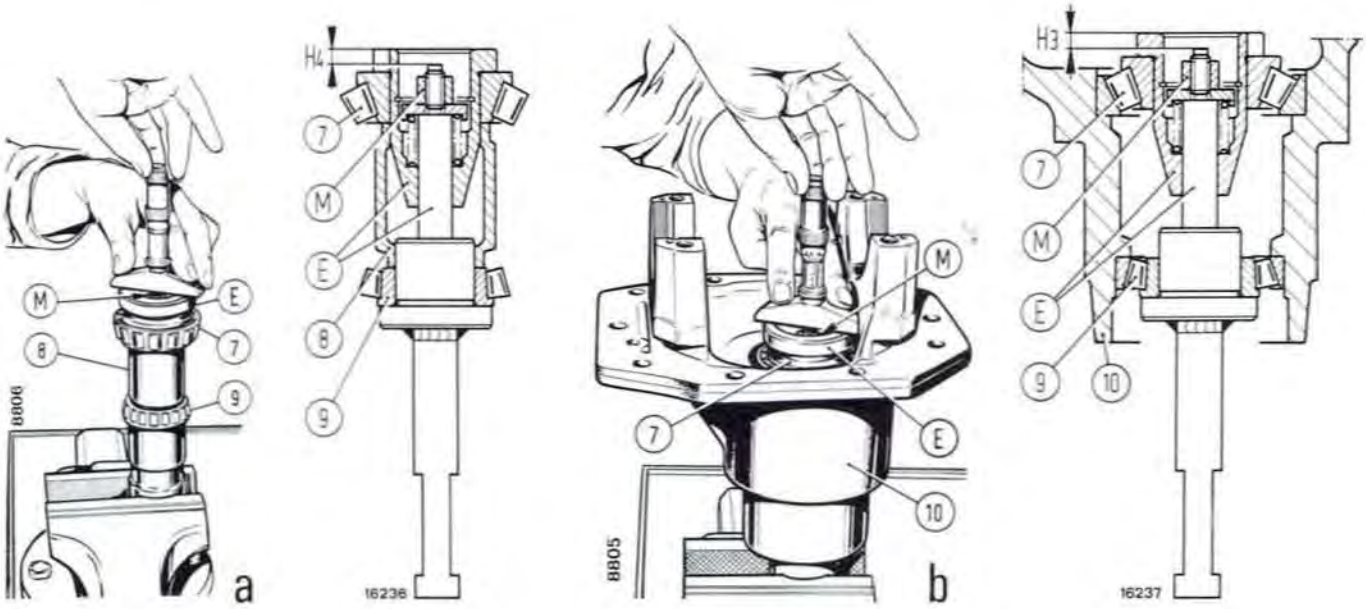
— Thickness of shim pack (S_1) to be fitted is given by:

$$S_1 = H_3 - H_4$$

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.

www.maskinisten.net
www.classicmachinery.net



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

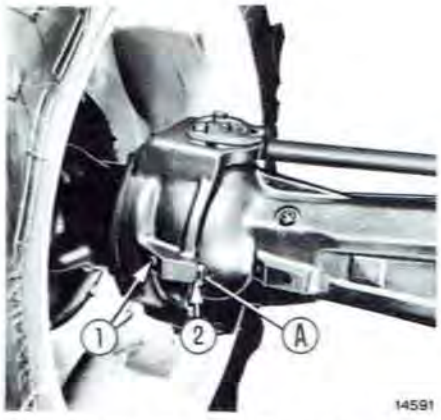
a. Measuring dimension (H_4) - b. Measuring dimension (H_3) - E. Tool **293752** - H_3, H_4. Dimensions to be measured between tool pin end and top face - M. Tool nut - 7 and 9. Bearing cones - 8. Spacer - 10. Differential carrier.

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:

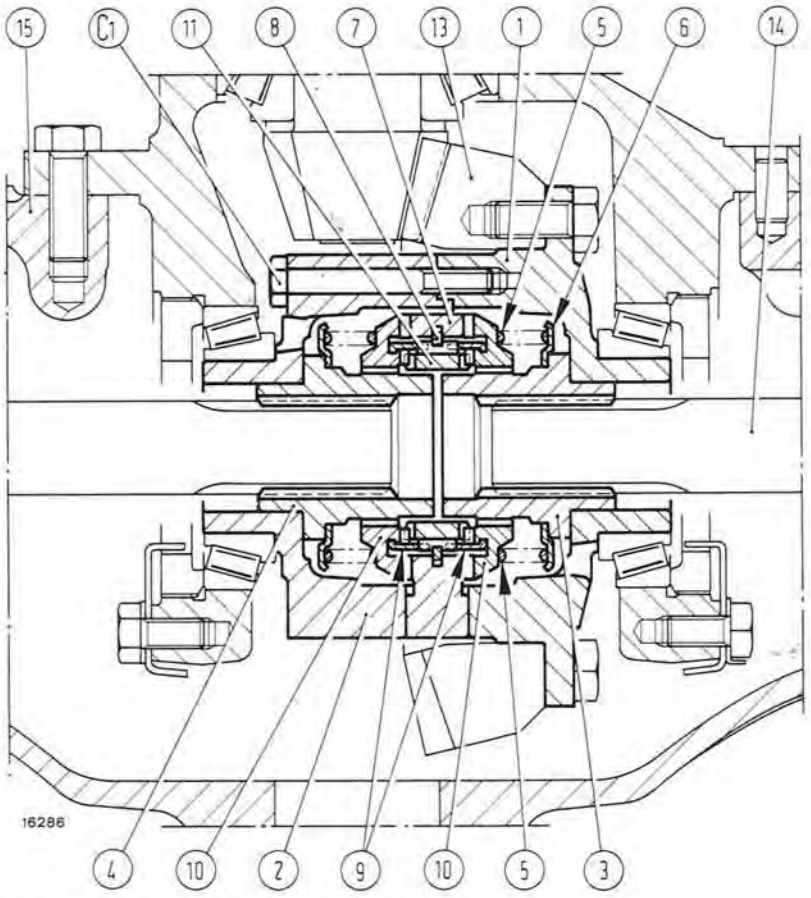
position 1 for power steered tractors
position 2 for mechanical steered tractors.

www.maskinisten.net
www.classicmachinery.net

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.

www.maskinisten.net
www.classicmachinery.net

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.

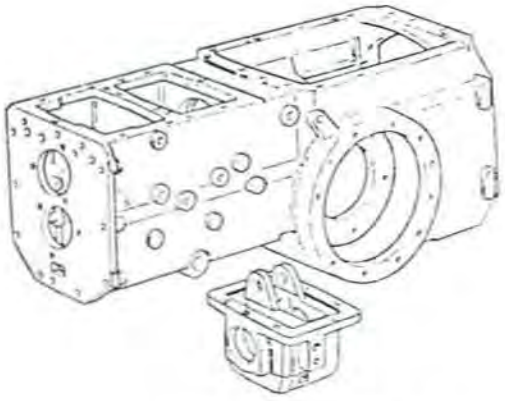
Disassemble unit on bench as follows:

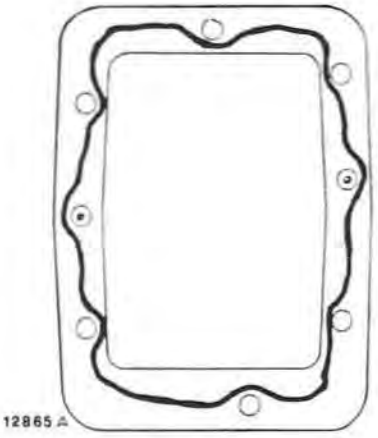
— Remove roll pin (45, page 2) using a suitable punch, withdraw intermediate shaft (46) and remove associated gear (48) together with needle roller bearing (47) and thrust washers and spacer (56).

— 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.

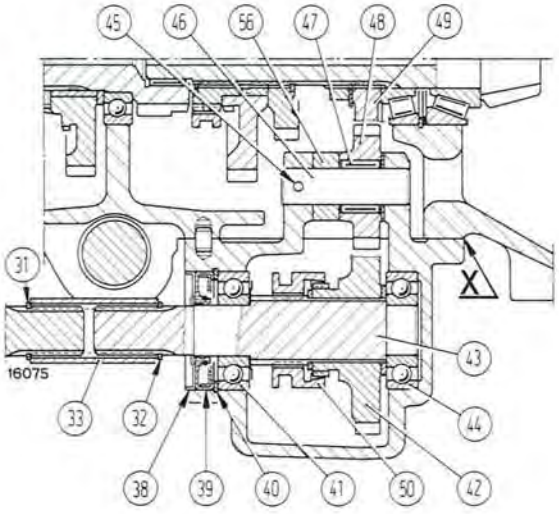
Preferably replace dust excluder (38) taking care to prevent distortion on assembly.

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

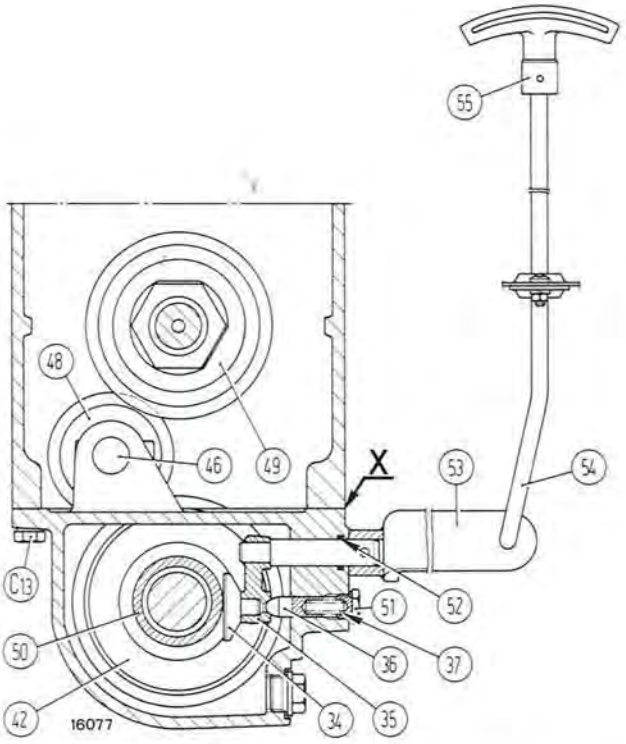
www.maskinisten.net
www.classicmachinery.net



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.

www.maskinisten.net
www.classicmachinery.net

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 in³)
Relief valve crack-off setting	186 to 191 bar (190 to 195 kg/cm², 2.702 to 2.773 psi)
Safety valve crack-off setting	210 to 215 bar (214 to 219 kg/cm², 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.

www.maskinisten.net
www.classicmachinery.net

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

www.maskinisten.net
www.classicmachinery.net

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:

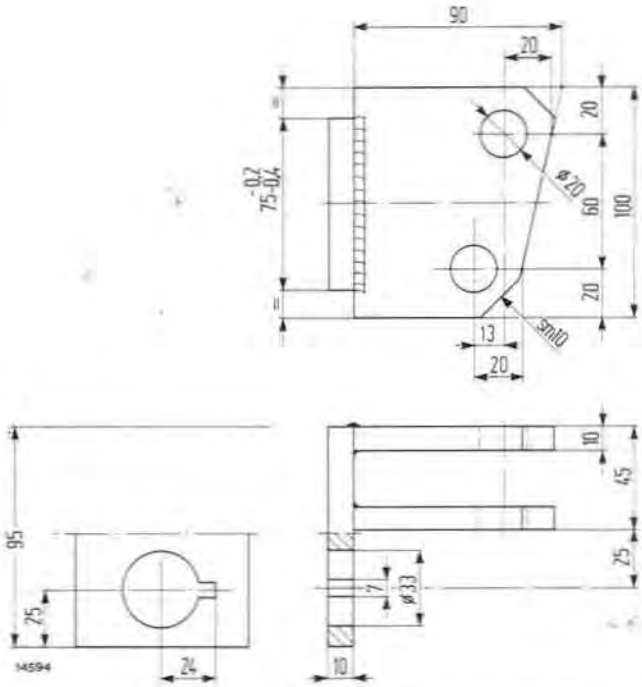
Note - To install lift on stand, make a bracket **50032** in the shop as shown in the above drawing.

— 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).

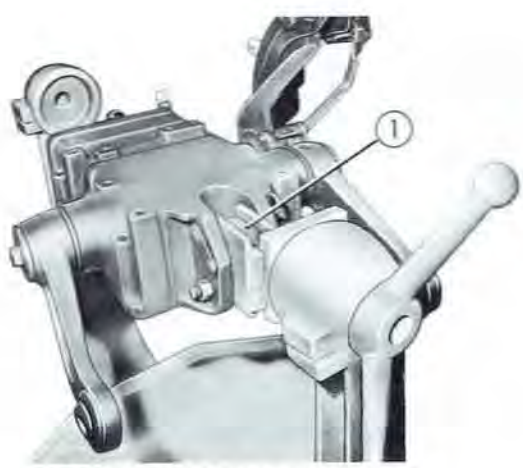


Bracket to be made in workshop for mounting of lift on rotary stend 290086 (Punch mark No. 50032). Dimensions in mm.

— 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.

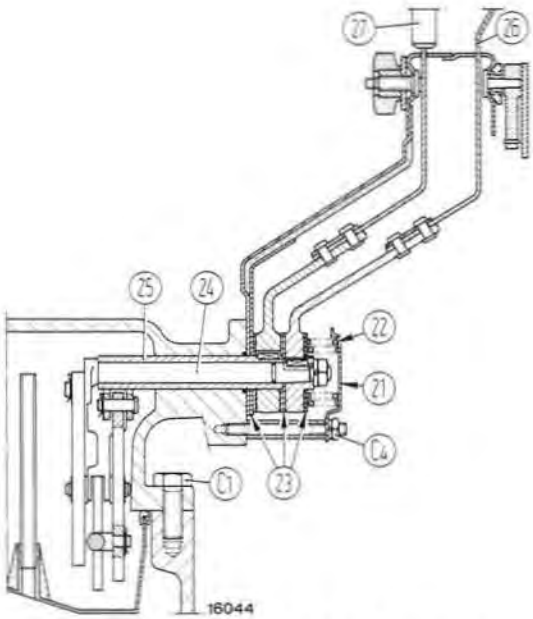


Installation of lift on rotary stand.

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

www.maskinisten.net
www.classicmachinery.net

HYDRAULIC LIFT UNIT: Lift



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).

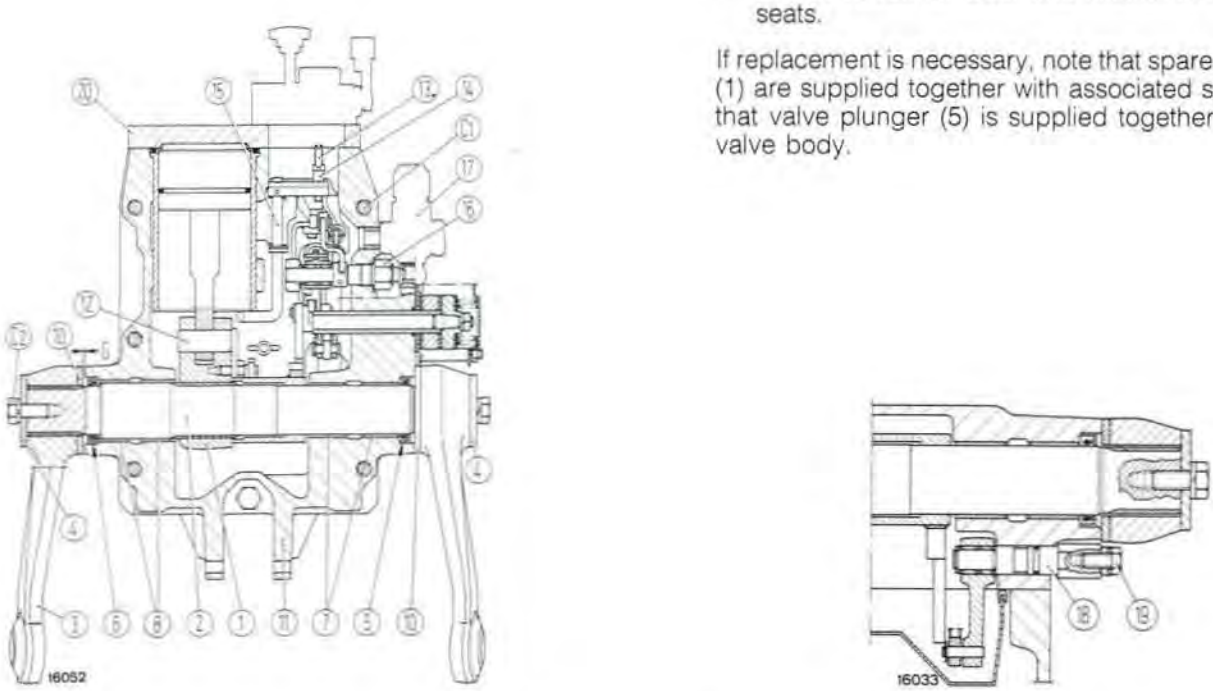
INSPECTION

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.

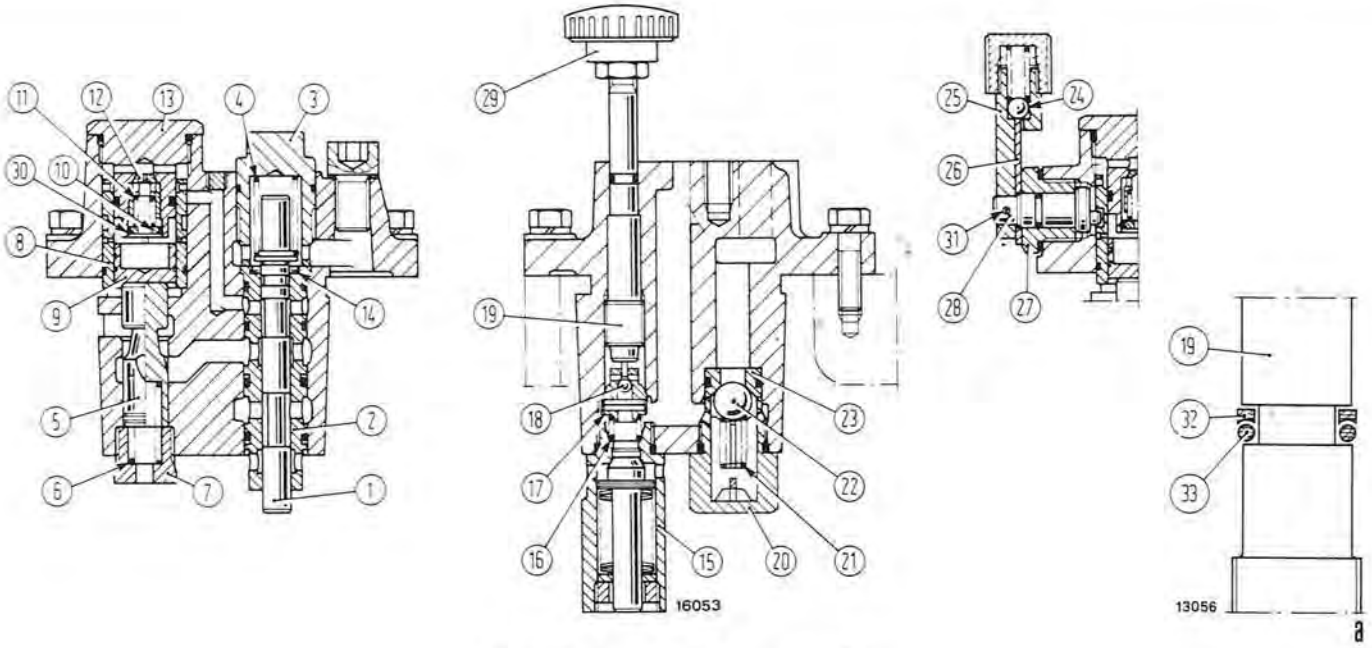
If replacement is necessary, note that spare valve spools (1) are supplied together with associated seats (2), and that valve plunger (5) is supplied together with control valve body.



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.

www.maskinisten.net
www.classicmachinery.net



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.

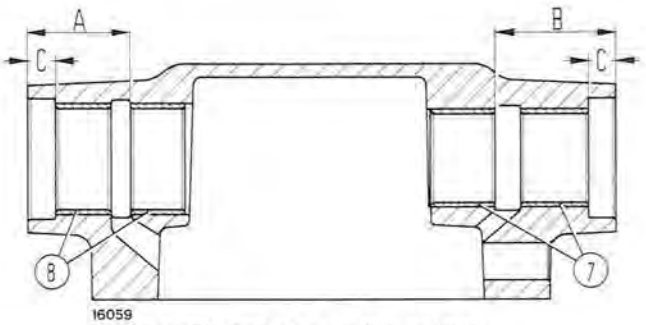
— Remove L.H. seal (6). If replacement is necessary, also remove R.H. seal (5).

— 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**.

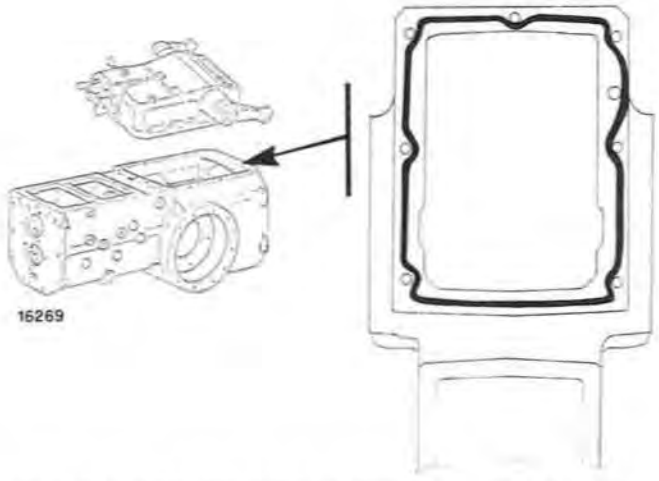
— Reassemble control linkage using driver **293839** to install needle roller bearing on spool lever and driver **293838** to install needle roller bearings on draft control inner lever and link.



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.

www.maskinisten.net
www.classicmachinery.net



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.

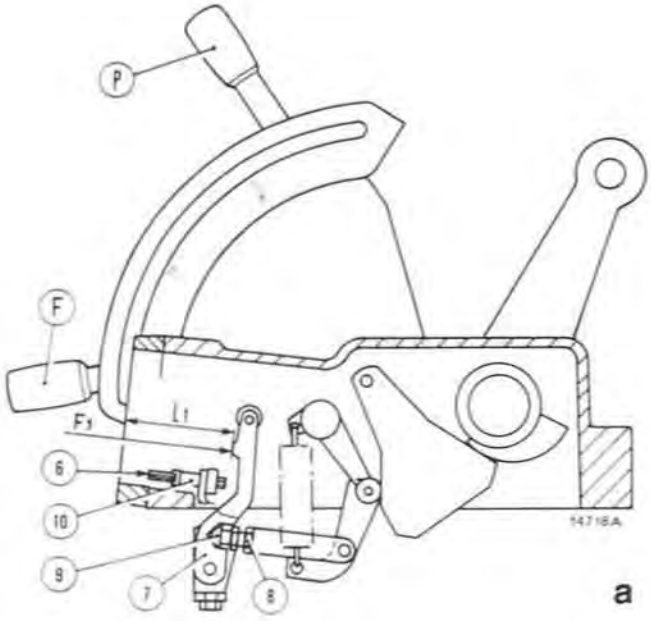
⚠ CAUTION ⚠

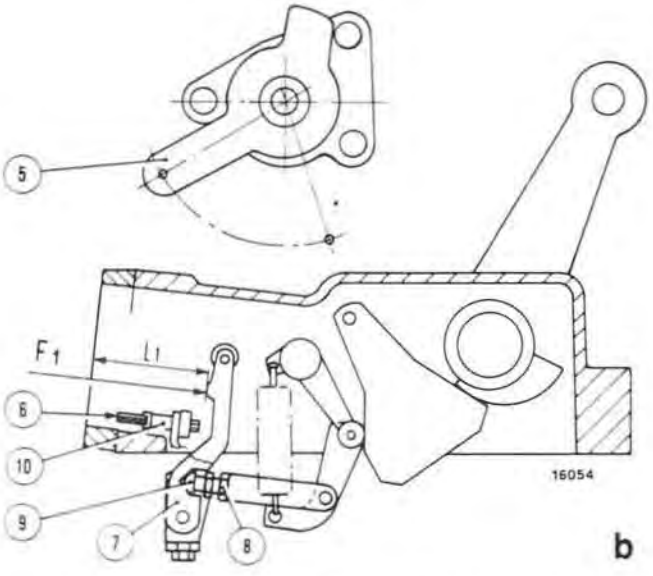
Use suitable tools to align holes. DO NOT USE HANDS OR FINGERS.

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.

www.maskinisten.net
www.classicmachinery.net

— 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.

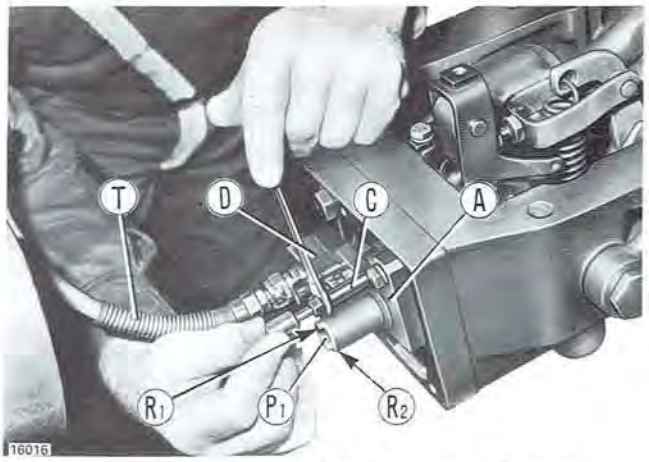
Note - This condition corresponds to a gap (L_1, page 4) of 82 to 82.1 mm (3.228 to 3.232 in) between lever end (7) and lift body front face measured applying a force (F_1) of 4 to 4.5 daN (kg) or 9 to 10 lb to lever end.

— 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.

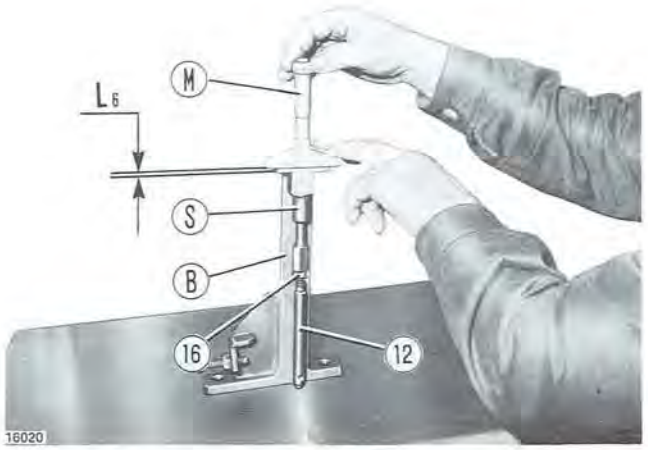
A. Tool **293846** - C. Wrench **293844/1** - D. Compressed air connection **293872** - P_1. Plunger - R_1. Outer register - R_2. Inner register - T. Compressed air line.

2. Maximum lift arm travel adjustment on bench

Proceed as follows:

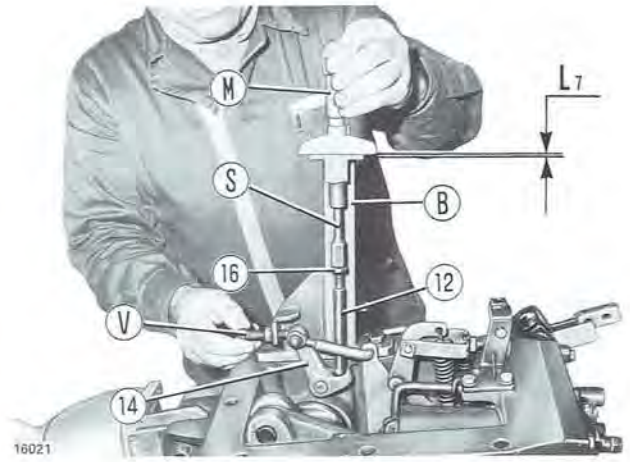
— With tool **293846** (A) installed on lift body fit connector **293872** (D).

— 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.

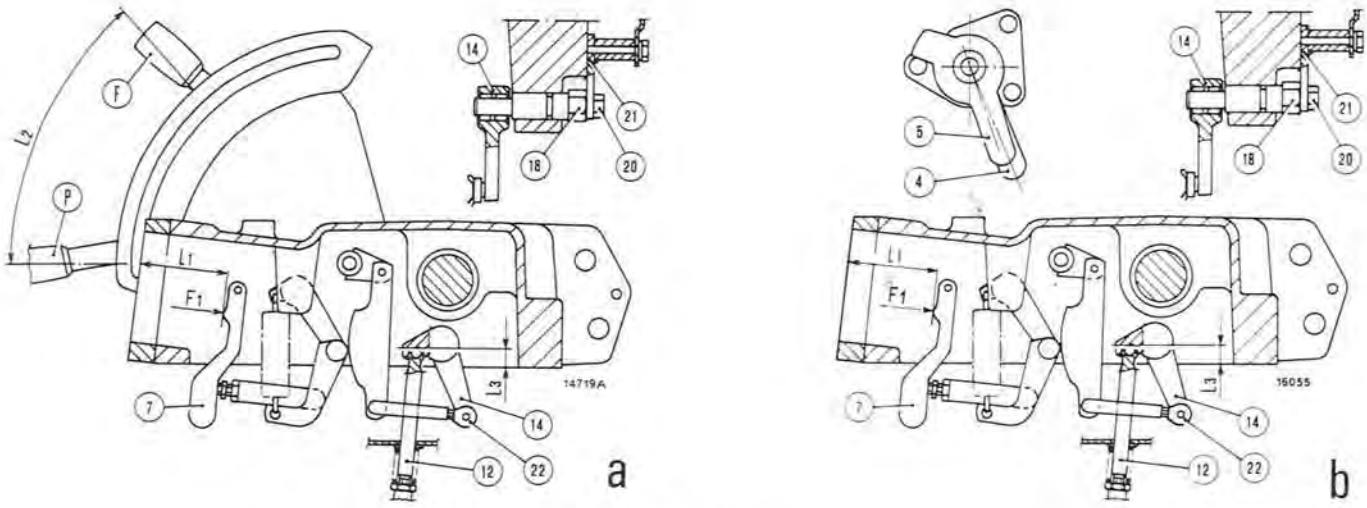
L_6. Gap between top of spindle (S) and depth gauge support face - M. Depth gauge - S. Spindle - 12. Draft control rod - 16. Jam nut.



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.

www.maskinisten.net
www.classicmachinery.net



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_5) 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.

www.maskinisten.net
www.classicmachinery.net

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:

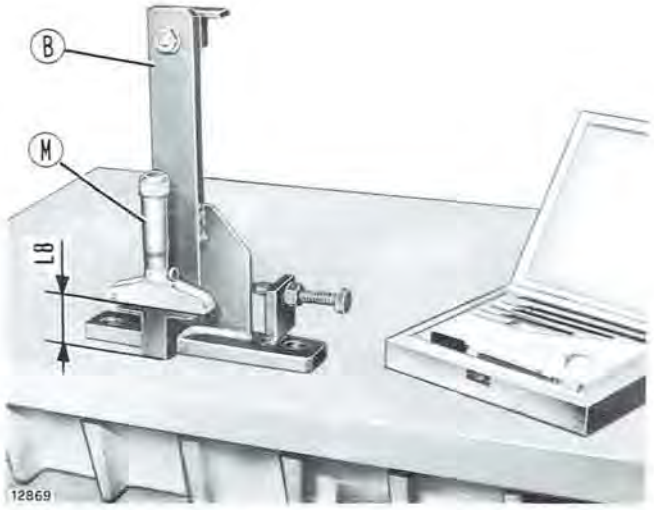
L_6 = Dimension measured with tool **292541** placed on a surface plate.

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.

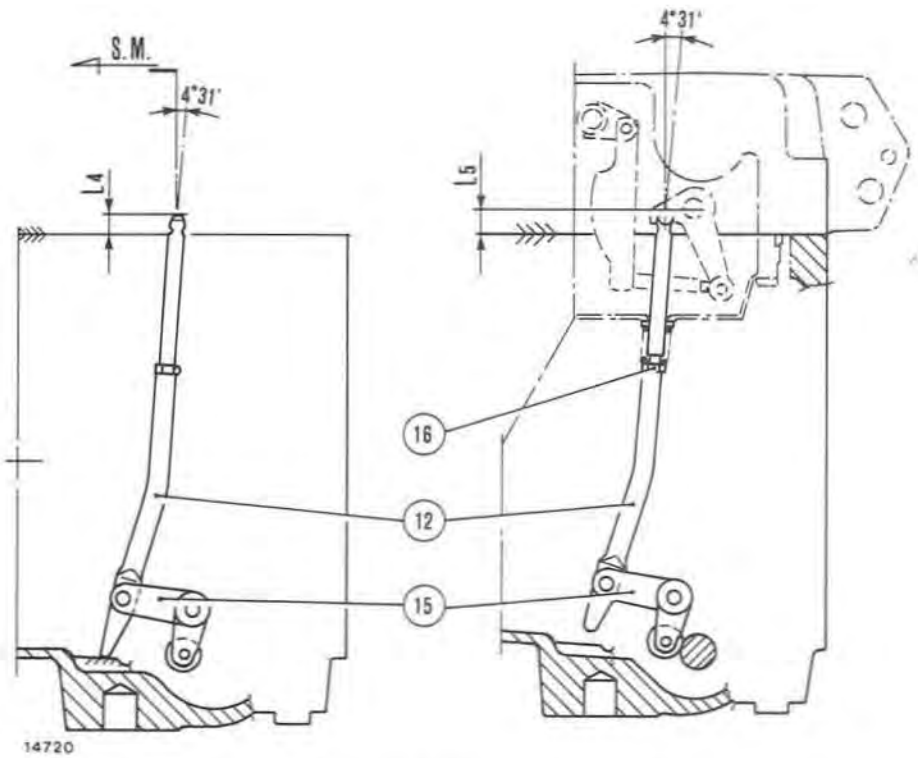
Next, proceed with the lift installation on tractors as described below:

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

www.maskinisten.net
www.classicmachinery.net



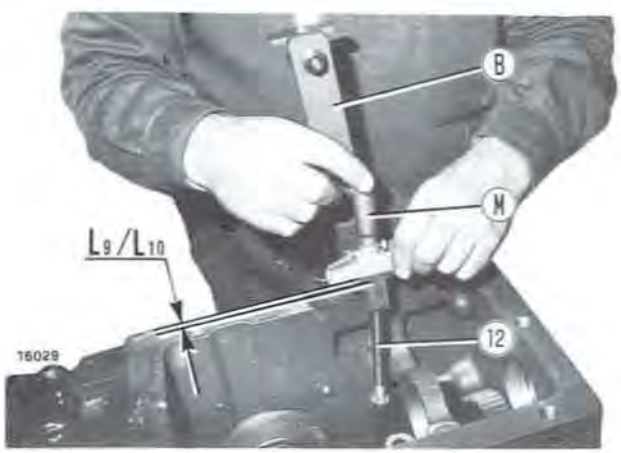
Draft control adjustment.

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.

www.maskinisten.net
www.classicmachinery.net

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).

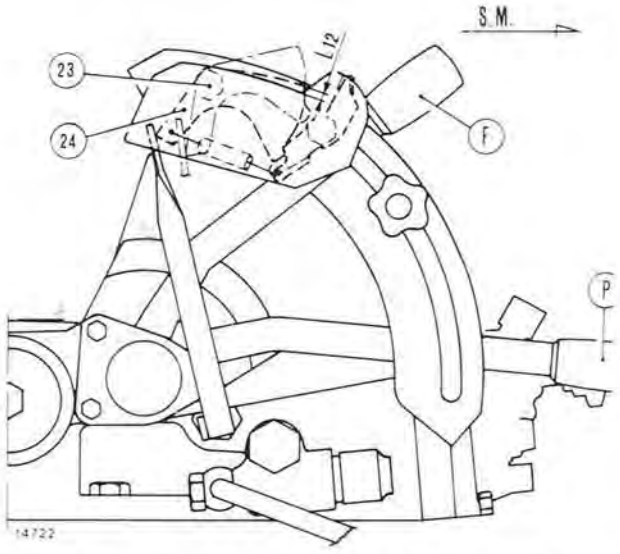
Install lift unit on Tractors. Only Tractors without FIAT Cab: start engine and check that with no load on lower arms the draft control lifting action begins at a distance (L_2, page 6) of 180 to 190 mm (7 to 7 1/2 in) from start of quadrant slot to front edge of draft control hand lever (F, Fig. A, 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.

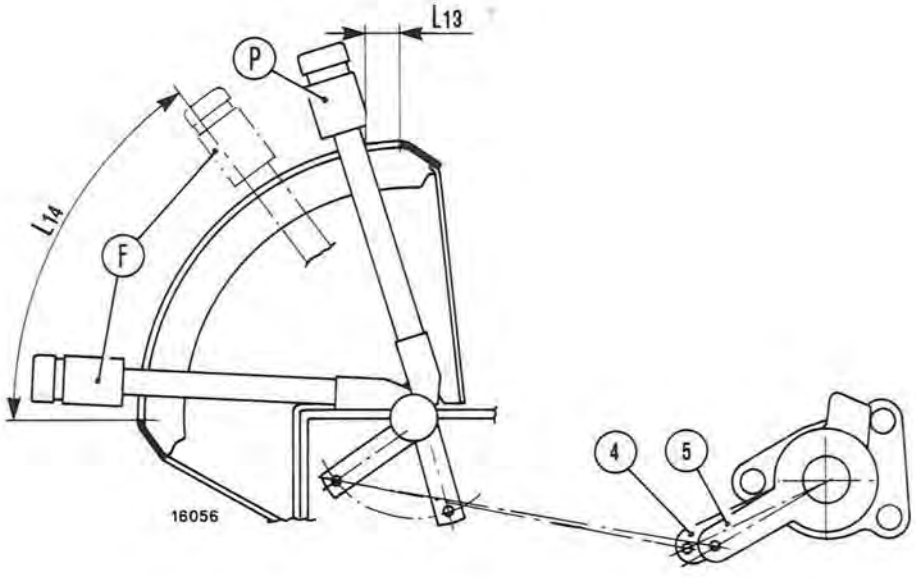
Position control link adjustment - Tractors with FIAT Cab

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.

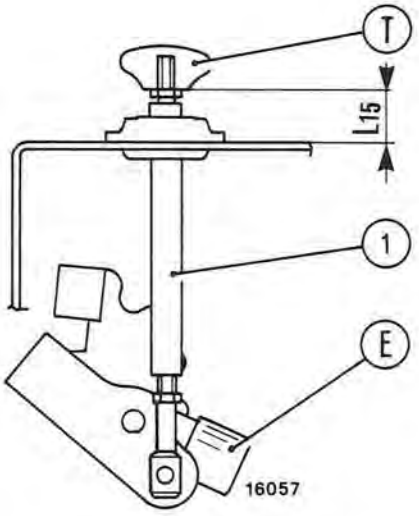
— Lock all jam nuts.



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.

www.maskinisten.net
www.classicmachinery.net



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.

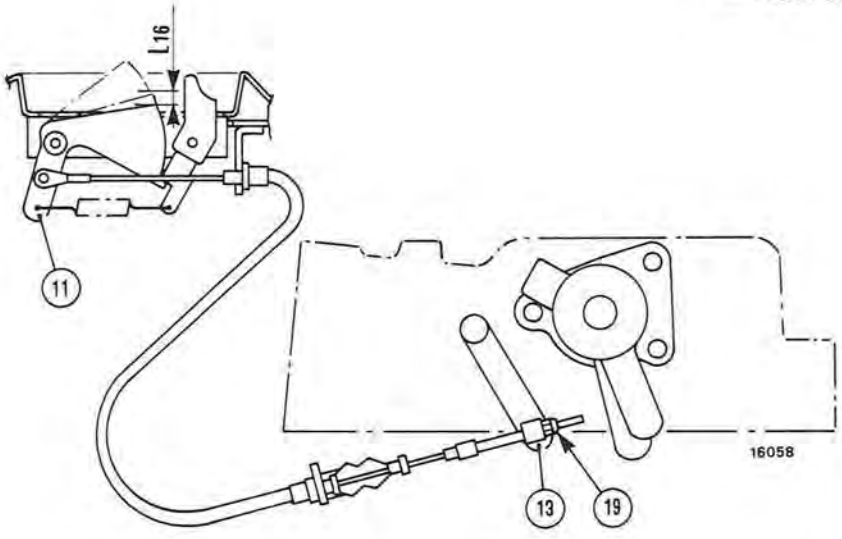
LIFT-O-MATIC adjustment - Tractors with FIAT Cab.

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.



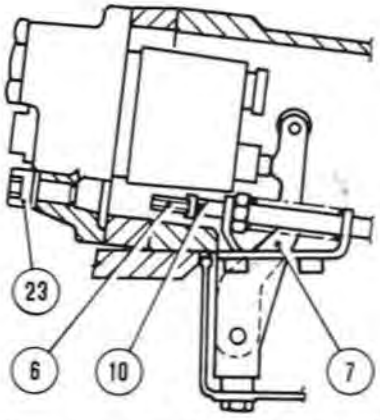
LIFT-O-MATIC adjustment (Tractors with FIAT Cab.).

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.

www.maskinisten.net
www.classicmachinery.net

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).

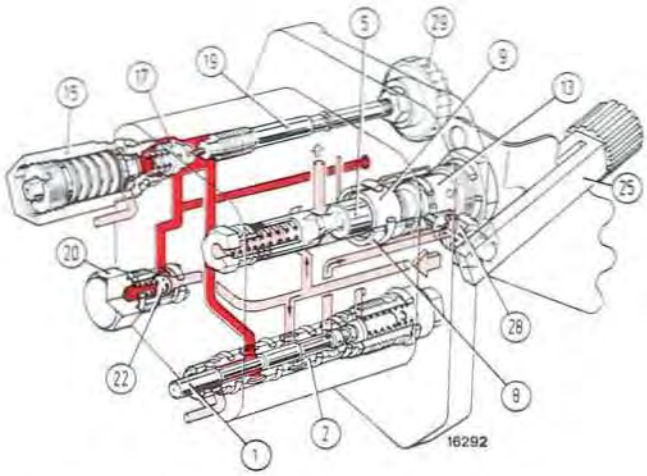
— Tighten jam nut (10).

— 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

www.maskinisten.net
www.classicmachinery.net



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.

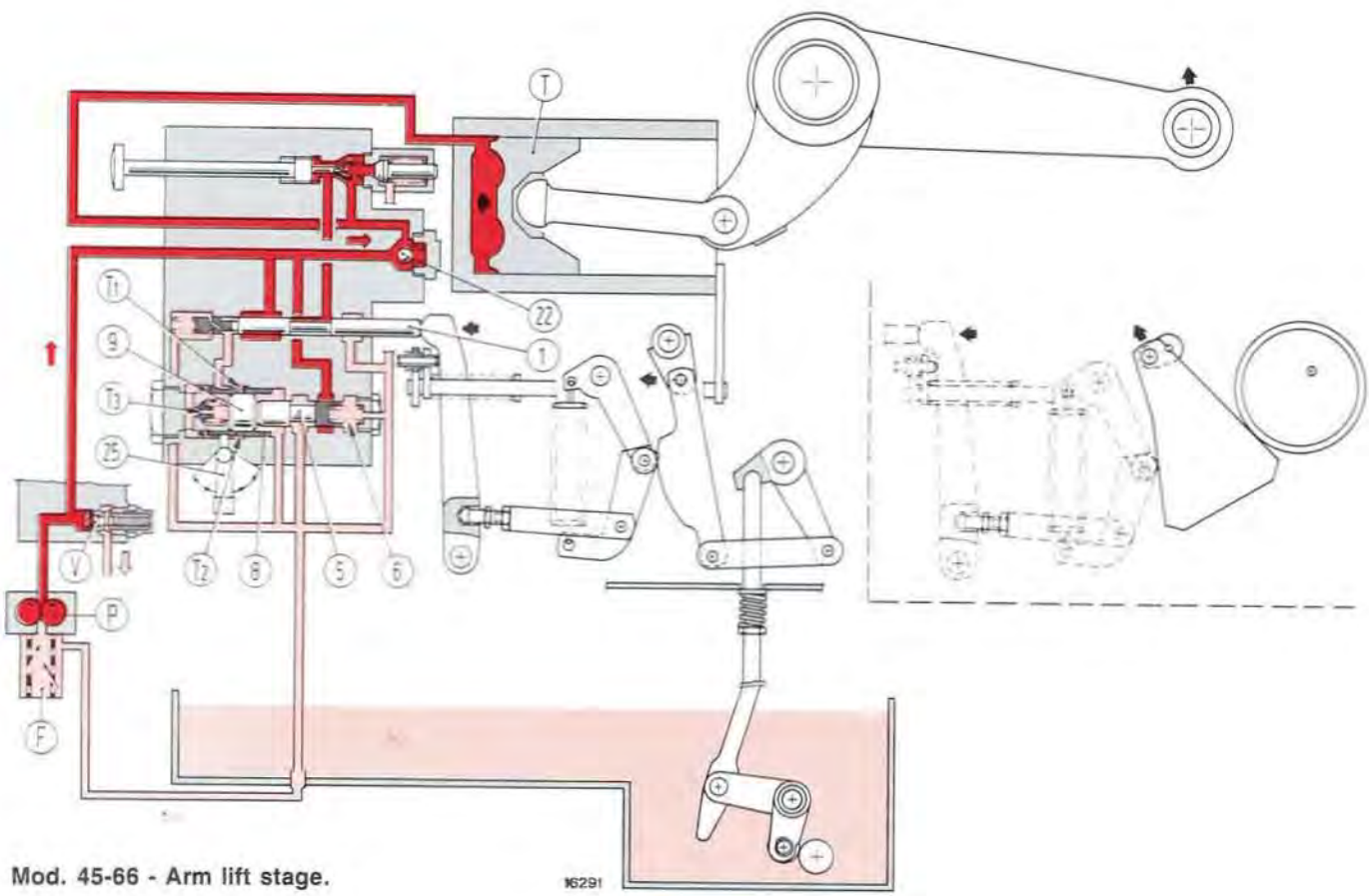
The control valve perspective section shown alongside (which replaces its counterpart on page 14, Sect. 501, mods. 466/566/666/766) shows this replacement of delivery connection (20) with a plug.

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.

www.maskinisten.net
www.classicmachinery.net

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).

Right-hand lifting rod

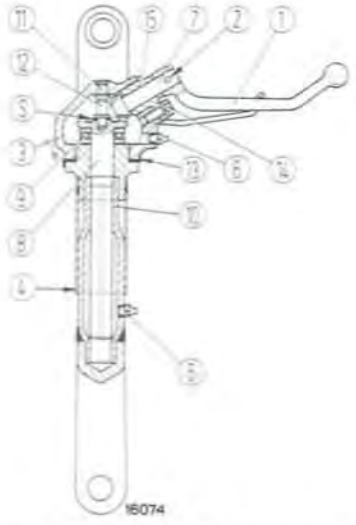
To remove the right-hand lifting rod proceed as follows:
— Bend back tab of lockwasher (13) and back off cover (4) with attached driven gear (8).

— 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).

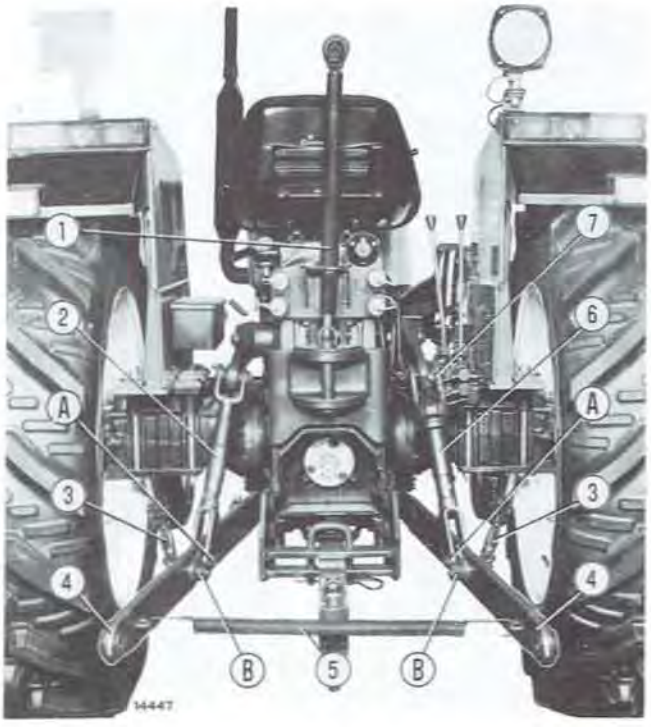
— Take off roll pin (2) and remove handle (1) and drive pinion.

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).



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.

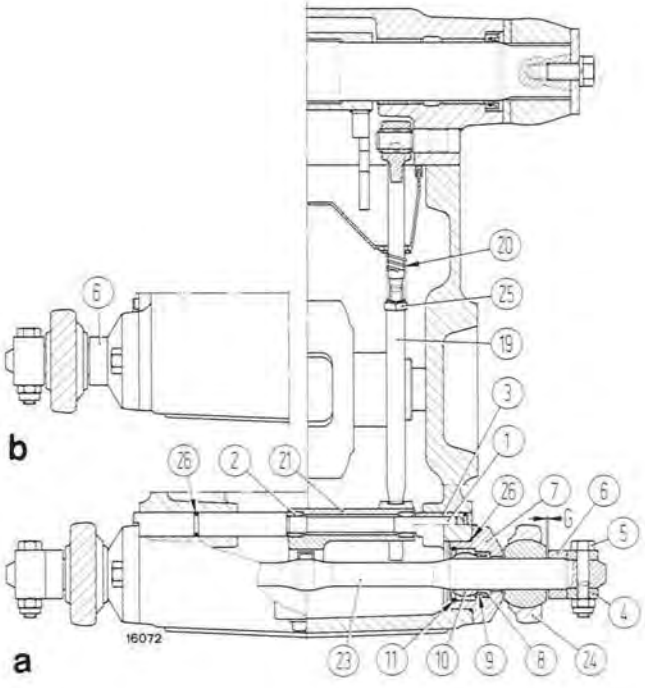


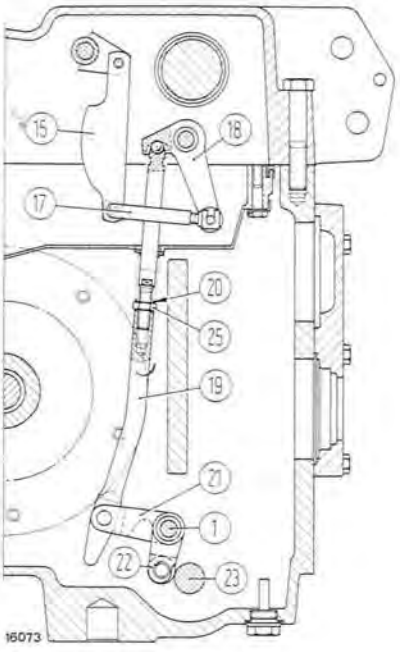
Lift and implement attachment.

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.

www.maskinisten.net
www.classicmachinery.net

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.

www.maskinisten.net
www.classicmachinery.net

BATTERY CHARGE SYSTEM

Refer to text on page 1, Sect. 60, Mods. 55-66/60-66/70-66/80-66

MARELLI OR BOSCH STARTER MOTORS

See page 2, Sect. 60, Mods. 55-66/60-66

BATTERY

Voltage	12 V
Nominal capacity (20 h discharge rate)	88 Ah standard or dry charge. Alternatively 90 Ah, permanent sealed.

FUSES

Six 8 Amp and two 16 Amp fuses, housed in box.

Fuses	PROTECTED CIRCUITS	Amp
1	Engine shut-off solenoid.	8
2	Turn signal and stop lights (tractor and trailer) with indicators, water temperature gauge, fuel gauge, air cleaner restriction indicator, battery charge indicator, low engine oil pressure indicator, parking brake indicator and sending unit, horn.	8
3	Front R.H. parking light, rear L.H. parking light, license plate light, trailer L.H. parking light, parking light indicator, cab work lights.	8
4	Front L.H. parking light, rear R.H. parking light, trailer R.H. parking light, rear work light, instrument panel light.	8
5	Low beams.	8
6	High beams and indicator.	8
7	Hazard warning indicator and flasher single-pole power point.	16
8	Thermostarter or Start-Pilot.	16

STARTER SWITCH - Refer to Table on page 2, Sect. 60, Mods. 55-66/60-66/70-66/80-66 which applies.

LIGHTING SWITCH - Refer to Table on page 14, Sect. 60, Mods. 466/566/666/766.

TRACTOR/TRAILER TURN SIGNAL SWITCH - Refer to Table on page 3, Sect. 60, Mods. 55-66/60-66/70-66/80-66.

INSTRUMENT PANEL - Refer to illustration and text on page 3, Sect. 60, Mods. 55-66/60-66/70-66/80-66.

ELECTRICAL SYSTEM: Specifications and Data

www.maskinisten.net
www.classicmachinery.net

Control Board.

A. Hazard warning light switch with visual indicator - B. Turn signal lights switch - C. Fuse box - D. Single-pole power point - E. Starter switch - F. Lighting switch and horn button.

Neutral

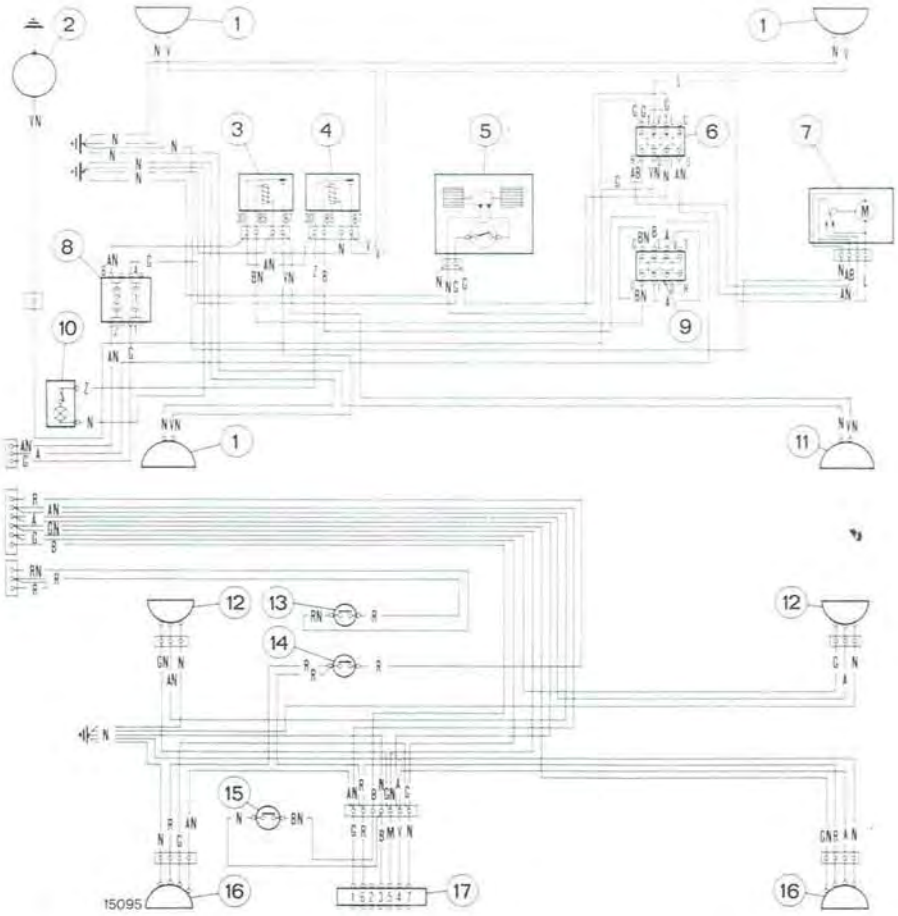
Parking lights

Headlamp low beams

Headlamp high beams

Horn: press in

G. Thermostarter or Start-Pilot button.



WIRING DIAGRAM FOR TRACTORS WITH CAB

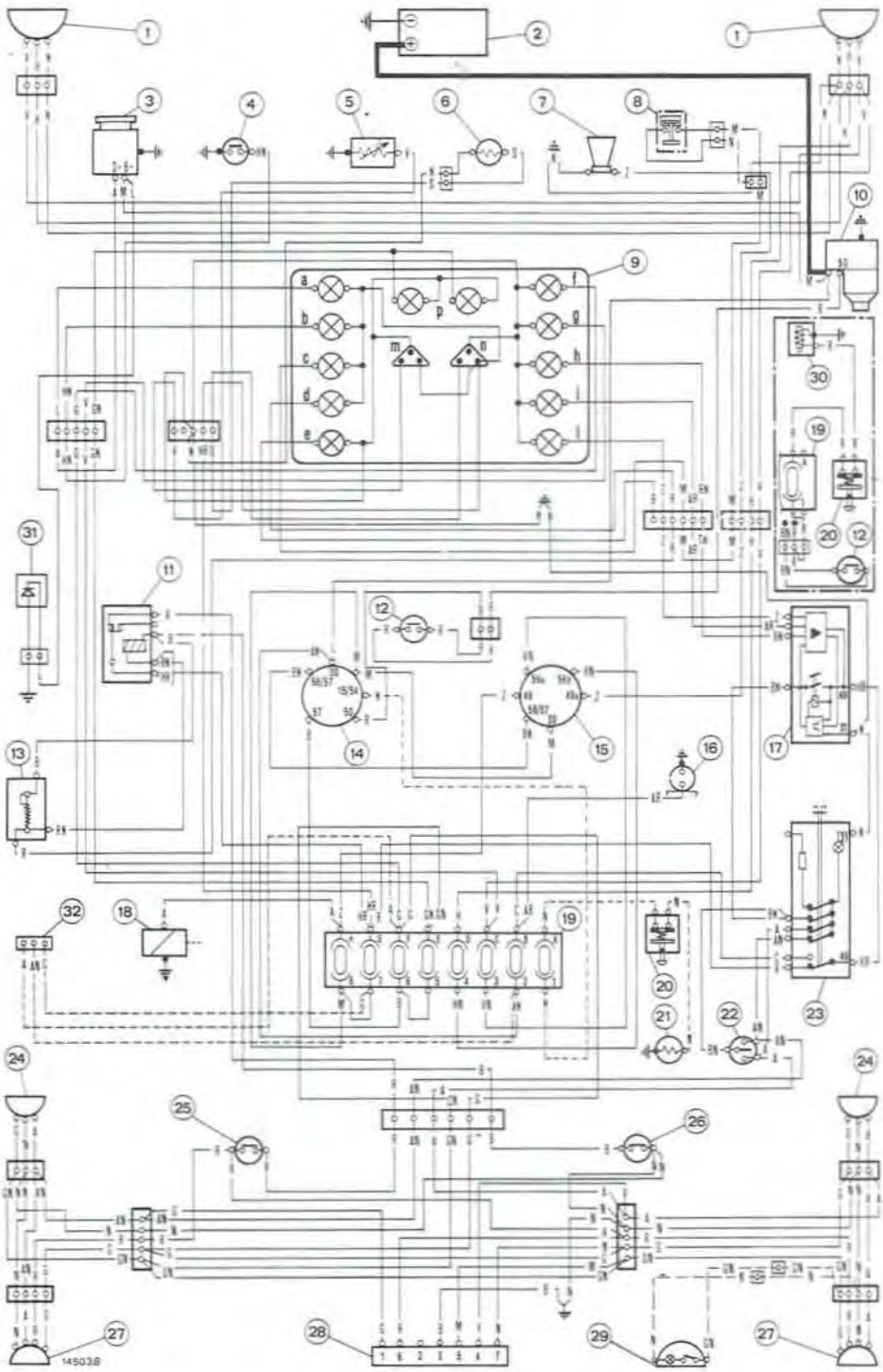
1. Auxiliary work lights.
2. Washer electro-pump.
3. Rear work lights relay switch.
4. Headlamps relay switch.
5. Fan-heater unit.
6. Wiper/washer switch.
7. Wiper motor.
8. Fuse box.
9. Auxiliary work lights switch.
10. Cab light.
11. Rear work light.
12. Front parking and turn signal switch.
13. Starter inhibition switch.
14. Stop lights switch.
15. Hand (parking) brake indicator.
16. Rear parking, turn signal and stop lights.
17. Seven-pole power point.

www.maskinisten.net
www.classicmachinery.net

WIRING DIAGRAM
TRACTOR WITH ACCESSORIES

Note - *Detail shows installation of start-pilot device which cannot be fitted together with thermostarter.*

★ *To starter connection 50.*
● *To starter switch connection 50.*



1. Headlamps: high/asymmetric low beams.
2. Battery.
3. Alternator.
4. Low engine oil pressure sending unit.
5. Water temperature gauge sending unit.
6. Fuel gauge sending unit.
7. Horn.
8. Air cleaner restriction sending unit.
9. 13-function instrument cluster:
   - **a.** Battery charge indicator.
   - **b.** Low engine oil pressure indicator.
   - **c.** Air cleaner restriction indicator.
   - **d.** Parking brake indicator.
   - **e.** Spare.
   - **f.** Parking lights indicator.
   - **g.** High beam indicator.
   - **h.** Tractor turn signal indicator.
   - **i.** 1st trailer turn signal indicator.
   - **l.** 2nd trailer turn signal indicator.
   - **m.** Water temperature gauge.
   - **n.** Fuel gauge.
   - **p.** Instrument panel light.
10. Starter.
11. Hand brake/stop lights indicator relay switch.
12. Starter inhibitor switch.
13. Parking brake flasher with indicator.
14. Starter switch.
15. Lighting switch and horn button.
16. Single-pole power point.
17. Hazard warning/turn signal flasher.
18. Engine shut-off solenoid.
19. Fuse box.
20. Thermostarter/button start-pilot.
21. Thermostarter.
22. Turn signal switch.
23. Hazard warning switch with indicator.
24. Front parking and turn signal lights.
25. Stop light switch.
26. Parking brake indicator switch.
27. Rear parking, turn signal and stop lights.
28. Seven-conductor power point.
29. Work light and switch.
30. Start Pilot.
31. Overvoltage protection device.
32. Cab connector (optional).

CABLE COLOUR CODE

A	= Light blue	**M**	= Brown
B	= White	**N**	= Black
C	= Orange	**R**	= Red
G	= Yellow	**S**	= Pink
H	= Grey	**V**	= Green
L	= Dark blue	**Z**	= Mauve

www.maskinisten.net
www.classicmachinery.net

10 - ENGINE

100 - Removal - Installation - Bench test.

290740/1	Hook, lift.
290090	Stand, rotary.
293860	Bracket set, use with rotary stand **290090.**
291309/1	Tester, compression (kit **292631**).

101 - Engine block - Cylinder head.

292507	Plate, liner removal.
291501	Plate, liner installation.
292240 (390425)	Tap (M12x1.75), injector sleeve.
292243 (390771)	Clean-up tool, injector sleeve.
293784 (342137)	Puller, injector sleeve.
293742/2	Reamer set, injector sleeve.
293861	Burnisher, injector sleeve.
291113	Support fixture, cylinder head.
292248	Quadrant, cylinder head hold-down bolt angle tightening.

102 - Valve gear.

293269 (390363)	Reamer, camshaft bushings.
292103 (360383)	Remover-replacer set, camshaft bushings - use with **292208 (370008).**
292208 (370008)	Handle.
291046/1 (360409/1)	Puller, engine valve guide.
291177 (390310)	Reamer, engine valve guide.
292913	Lathe, universal, valve seats.
291780 (360409/3)	Installer, exhaust and inlet valve guide (use with **291046/1).**
291978	Reamer set, valve seats (instead of **292913).**
290064	Grinder, valve.
291050	Remover/replacer, valve spring.
291112	Support, valve.
291883 (350108)	Wrench, valve clearance.

103 - Crank gear.

291504	Puller, crankshaft pulley hub.
291160	Pliers, piston ring.
291048	Installer, piston ring.

104 - Fuel system

293780	Hand pump, injector calibration check.
293671	Cleaners, injectors.
290898	Support, injector removal/installation (FIAT-OMAP).
293760	Support, injector removal/installation (BOSCH-CAV-OMAP).
293761	Wrenches, injectors.
293786	Wrench, injection pump pressure connections.

On-bench injection pump test equipment.

290239	Support, adjustable.
290756	Drive coupling.
292147	Spacer, injection pump test.
290765	Delivery lines (test A, 6x2x850 mm).
290752	Plate, pump support.
293149	Test stand, injection pump.
292197	Dial gauge (1/100 mm, stroke 30 mm dia 60 mm).
291754	Dial gauge (1/100 mm, stroke 5 mm, dia. 40 mm).
291755	Gauge, injection pump assembly.
293401	Kit, on-tractor injection pump check.

BOSCH injection pump.

290664 (365149)	Remover-replacer pump rotor.
290774	Gauge, distributing piston stroke.
290779	Installer, O-ring.
290780	Remover, O-ring.
292548	Protector, O-ring.
291750	Extension, M8x1 (for use with **290774).**
292553 (342141)	Remover, pressure regulating valve roll pin.
292554	Protector, cam ring.
292555/1	Remover/replacer, pump shaft.
292557/1	Compressor, pressure regulating valve.
291747 (352142)	Wrench, governer shaft.
291748 (352140)	Wrench, plug.

www.maskinisten.net
www.classicmachinery.net

291752 Gauge, excess fuel stroke.
291912 (352141) Wrench, governor support screw.
291751 Tester, automatic advance.
292197 Dial gauge (1/100 mm - stroke 30 mm - dia. 60 mm).
292239 Installer, O-ring.
291749 (352139) Wrench, pressure regulating valve.

CAV injection pump.

290741 Guide, throttle lever spindle removal.
290744 Remover/replacer, transfer pump rotor (use with torque wrench).
290745 Guide, start-retard O-ring replacer.
290746 Guide, advance plug O-ring replacer.
290757 Gauge, timing, pump flange.
290758 Remover/replacer, cam ring pin.
292249 Tester, advance.
292251 Wrench (TORX 15).
292252 Wrench (TORX 20).
292253 Wrench (TORX 25).
292254 Guide, drive shaft seal installation.
292397 Connector, transfer pressure.
292401 Gauge, timing (use with **290757**).
292405 Insert (use with **290757**).
292411 Pin, timing.
292412 Adapter set (use with **292249**).
292414 Tester, feed pressure.
292415 Connector, drain.
292430 Connector, inlet.
292439 Connector, pump leakage test.
292400 Plug, pump leakage test.

106 - Cooling system.

291182/1 Puller, water pump impeller.
291968 Tester set, coolant temperature.

20 - POWER TRAIN

201 - Clutch.

292320 Stand
291291/2 Kit, universal overhaul (early model).
293650 Kit, universal, overhaul (late model).
292604 Centralizer/adjuster, clutch on tractor.
292605 Register, clutch adjustments (w/**292604**)
292176 Compressor, release lever test.

202 - Transmission and splitter.

291517 Hook, lift, transmission housing.
292888 Guide pins, clutch housing removal/installation.

204 - Bevel drive and differential.

291517 Hook, lift, rear drive housing.

293400/1 Gauge, bevel pinion position.

292576 Compressor, differential lock fork spring.

291525 Installer, differential supports.

205 - Brakes.

293847 Installer, brake link bellows.

206 - Final drives.

292400 Hook, lift, rear wheels.

291517 Hook, lift.

293850 Installer, final drive seals (use with **293800**).

293800 Handgrip.

291525 Installer, final drive cover.

207 - Power take-off.

293838 Installer, PTO shaft needle roller bearings.

30 - FRONT AXLE - STEERING

303 - Power steering

293388 Installer, O-ring, steering box.
293389 Installer, rotary valve spring.
292390 Retainer, rotor shaft.
293300 Kit, pressure gauge (use with **293160**) steering gear on tractor.

www.maskinisten.net
www.classicmachinery.net

Steering hydraulic test equipment.

291231	Tester, pump output.
293005	Tank.
291235 or	Electric motor (6-10 HP).
292150	Electric motor (9-15 HP).
290385	Union.
293165	Hydraulic pump.
293723	Support.
292256 / **292257**	Brackets (use with **292723**).
292724	Screw (2 off).
293192/1	Wrench, rotary valve.
290445	Pipe, suction.
290448 / **290540**	Adapter, suction pipe.
293316	Adapter (2 off), suction and delivery pipes.
290544	Pipe, delivery.
290475	Connector, 3-way.
290541	Adapter, return pipe.
290447	Pipe, return.
293315	Plug (2 off).
293721	Connection, oil drain.
292775	Pipe, oil drain.

40 - FRONT WHEEL DRIVE

401 - Front axle.

292116	Hook, lift, ballast support.
293782	Wrench, front axle bevel pinion (use with **293785**).
293785	Wrench, front bevel pinion lock ring (use with **293782**).
291525	Pins, planetary final drive cover installation.
293812	Pins, front wheel installation.
293460 (**322215**)	Stand, front axle overhaul.
293836	Guard, axle drive shaft seal installation.
293743	Support, differential bevel pinion housing.
293520/2	Wrench, bevel pinion bearing lockring and rolling torque check.
293400/1	Gauge, bevel pinion position (use with **293752** or **293510**).
293510	Adjuster, universal, bevel pinion bearings.
293752	Adjuster specific bevel pinion bearing.
293544	Wrench, differential bearing lockring.
293837	Wrench, wheel bearing lockring.
292220/3	Tester, bearing rolling torque.
293857	Puller, live front axle articulation pivot.

50 - LIFT UNIT

501 - Lift.

290284	Pump, hand, valve adjustment.
293300	Tester, pressure, universal (pressure gauges and connectors).
292547	Installer, piston with lift seal.
292535	Protector/installer, lift cross shaft seal.
290828	Adapter, cylinder safety valve adjustment (use with **290284**).
290824	Adapter, relief valve adjustment (use with **290284**).
293849	Adapter, control valve spool leakage check (use with **290284**).
291862	Wrench, cylinder safety valve adjustment.
291863	Wrench, relief valve adjustment.
291215	Hook, link - control valve lever retaining spring.
293839	Installer, needle roller bearing, control valve spool lever
293838	Installer, needle roller bearing, draft upper/lower levers.
293846	Adjuster, lift draft and position control.
293872	Connector (w/ **293846**).
293845/1	Adjuster, lift draft control (with **293846**).
293844/1	Adjuster, arm max lift.
293858	Protection, link lowering valve, spool seal installation.
293463	Wrench, remote control valve overpressure valve sleeve
292650	Bench, lift test.
293851	Tank.
293852	Union.
293853	Pipe.
293854	Pins and bushings.

www.maskinisten.net
www.classicmachinery.net

502 - Lift pump A31 and C18.

293600	Stand, rotary, pump overhaul (to clamp in vise),
291231	Tester, output, large, complete with:
290417	- Union, inlet
290418	- Union, outlet
290448	- Adapter, inlet
290445	- Pipe, inlet
290447	- Pipe, delivery
290434	- Screen, inlet/outlet unions.
291235	Motor, electric, pump drive, complete with:
290385	- Coupling, drive.

504 - Remote control valves.

291231	Tester, output, large, complete with:
291235(0)	- Electric motor
293005	- Tank
293165	- Hydraulic pump
290385	- Union
293548/1	- Valve support
292256	- Bracket
292257	- Bracket
290469/1	- Support
293539	- Burette
290448	- Reduction
290445	- Pipe
290419	- Inlet pipe
293556	- Screw
293316	- Reduction
293544	- Pipe
293532	- Connection
290503	- Reduction
290378	- Drain pipe
290541	- Reduction
290447	- Return pipe
293552	- Plug
290383	- Plug
293553	- Connection
290424	- Pipe
293459	- Ball union
292146 or **290475**	- Connection, 3-way
293547	- Reduction
292152	- Reduction
293550	- Connection.

(0) **Electric motor 291235** is indicated as an alternative to 15 HP electric motor **292150.**

60 - ELECTRICAL SYSTEM.

293599	Support, alternator bench test.