FIATALLIS®

FL 20
crawler loader

Service manual

UNDERCARRIAGE EQUIPMENT

Form 604.06.109 - English

Reprinted

the master pin and loosen each track chain to facilitate the subsequent removal operation;

- Withdraw cotter (2, fig. 11-1) situated on the outside of each track.
- Take off the master pin from the inside using portable hydraulic press **75295015 (G)** together with: hand pump **75295017 (H)**, hoses **75295018** and the tools illustrated in detail **b**, Fig. 11-1;

NOTE - Internal pin (**5**, Fig. 11-1) must never be extracted from master pin **(4)**. Cotter pin **(2)** must alvays be turned toward track outboard side.

- When installing the track chains, insert coupling thrust rings **(3)** in their seats on the coupling links. Install master pin **(4)** using the guide pin and a hammer.
  Finally, insert cotter **(2)**.

11.1.2 TRACK CHAIN DIASSEMBLY AND ASSEMBLY

For these operations use the double-ram stationary press **75292451** and relevant tool kit shown in Fig. 11-2 which permit the simultaneous disassembly and reassembly of a pin, bushing and link set thus reducing the relevant servicing times.

11.1.3 INSPECTION OF TRACK COMPONENTS

Check track components for wear conditions and compare results with specifications as given under Fig. 11-28.
With track assembled and installed it will be possible to measure the pin to bushing clearance by calculating the average track link pitch (**P**, Fig. 11-28) proceeding as follows:

- Stretch the track chain by placing a pin in one space between two sprocket teeth; shift the machine in reverse
- Measure length (4xP) and divide it by the number of links included in the section of track considered to determine the average length of pitch (**P**).

When tracks are serviced after removal and disassembly the wear conditions should be measured directly on the pins and bushings and the results compared with sprcifications (nominal values).

11.1.4 REPLACEMENT OF A DAMAGED TRACK LINK

Any damaged track link may be replaced without uncoupling and disassembling the complete track chain (except the links adjacent to master pin) by proceeding as follows:

- Remove the track shoe (**1**, Fig. 11-3) fixed to the link (2) requiring replacement and the two adjacent shoes.
- Use the portable press **75295015** provided with the equipment shown (Fig. 11.1 detail b) to extract pins **3** and **4** of the damaged link
- Using the oxyacetylene cutter split up a 20 to 30 mm (3/4 to 1 in) long piece of bushing **(5)** Fig. 11-3.
- Remove the damaged lind **(2)**.
- Remove link **(6)** and extract from same the remaining piece of bushing **(5)**
- Fit a master bushing **(9)** on new link **(11)** and secure to track chain.
- Re-fit the second link **(6)** onto the master bushing
- Insert the two rings **(10)** for the master bushing on links (**7** and **8**) and complete the assembly operation by fitting pins (**3** and **4**).

11.4 TRACK ROLLERS

WARNING

Lift and handle all heavy parts with a lifting device of proper capacity. Be sure parts are supported by proper slings and hooks. Use lifting eyes if provided. Watch out for people in the vicinity.

NOTE - Machines from no. 006065 are fitted with track rollers having bushing carriers as shown in details **(b)** and **(c)** in Fig. 11-19. Given in the following paragraphs are the servicing procedures for both early and late types, bearing in mind that the removal and installation operations are the same in either case and are hence described once only.

11.4.1 REMOVAL

If the need for service is limited to only one or a few rollers, these may be removed with tracks in place by simply:

- Relieving track tension completely
- Raising the machine and supporting it properly on blocks
- Removing frame roller guards and the complete roller with the aid of the sling hook **7529 1667** (A, Fig. 11-16).

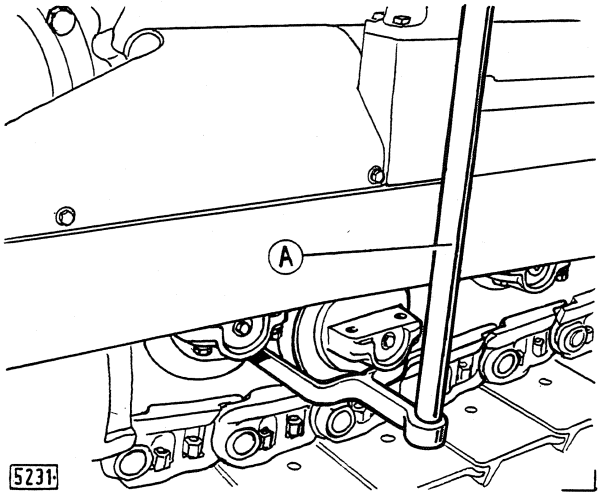


Fig. 11-16 - Removal (installation) of a roller from track frame using tool 75295729 (A).

11.4.2 SERVICING (EARLY ROLLERS)

To pull out supports (**8**, Fig. 11-19) clamp each roller in a vice by fixture **75291417** (**B**, Fig. 11-17) and operate as follows:

- Drain oil through the plug (**6**, Fig. 11-19)
- Turn supports **(8)** in such a way as to disengage half-rings **(13)** from their grooves.

Should this disassembly prove to be difficult, use screw puller **75295488** (A, Fig. 11-17). Disinsert O-rings (**10**, Fig. 11-19) and face seal halves **(4)** keeping them paired to prevent interchanging at reassembly.

For replacement of bushings **(11)**, withdraw shaft **(12)**, and disassemble bushings using a universal puller or else, an arbor press and suitable drift (split up one of the two bushings).
Mount the bushings on arbor press using a suitable drift. Reassemble rollers as follows:

- Insert shaft **(12)**

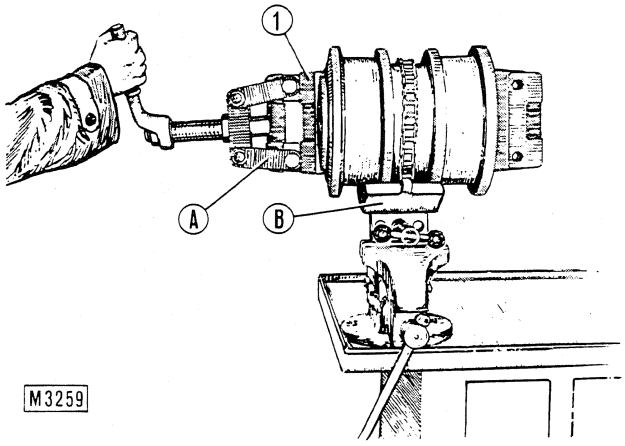


Fig. 11-17 - Dissassembly of a roller support (1) using screw puller 75295488

B. Fixture **75291417** for clamping rollers in a vice.

SPECIFICATIONS (cont'd)

CARRIER ROLLERS (Fig. 11-23)		
Type	Permanent lubrication, equipped with metallic rotary seals (long life)	
No. of rollers per track	2	
	mm	in
Shaft **(3)** O.D. (at bushings)	54.970 to 55.000	2.164 to 2.165
Installed bushing I.D. **(4)** (without reaming)	55.100 to 55.195	2.169 to 2.173
Shaft to bushing clearance	0.100 to 0.225	0.004 to 0.009
— Maximum wear tolerance	1.2	0.05
Bushing O.D.	65.010 to 65.025	2.559 to 2.560
Bushing seat diameter	64.900 to 64.950	2.555 to 2.557
Bushing installation interference	0.060 to 0.125	0.002 to 0.005
Thrust ring **(2)** thickness	9.900 to 10.000	0.390 to 0.394
TRACK ROLLERS (Fig. 11-19)		
Type	Permanent lubrication, equipped with metallic rotary seals (long life)	
No. of track rollers per track:		
— Double flange	Four	
— Single flange	Three	
Roller shaft O.D.	mm	in
— Early type **(12)**	74.970 to 75.000	2.952 to 2.953
— Late type **(17)**	74.970 to 75.000	2.952 to 2.953
Roller bushing I.D. installed (without reaming)		
— Early type **(11)**	75.264 to 75.409	2.963 to 2.968
— Late type **(5)**	75.240 to 75.399	2.962 to 2.968
Shaft to bushing clearance		
— Early type	0.264 to 0.439	0.0104 to 0.0173
— Late type	0.240 to 0.429	0.0094 to 0.0169
— Maximum wear tolerance	1.6	0.063

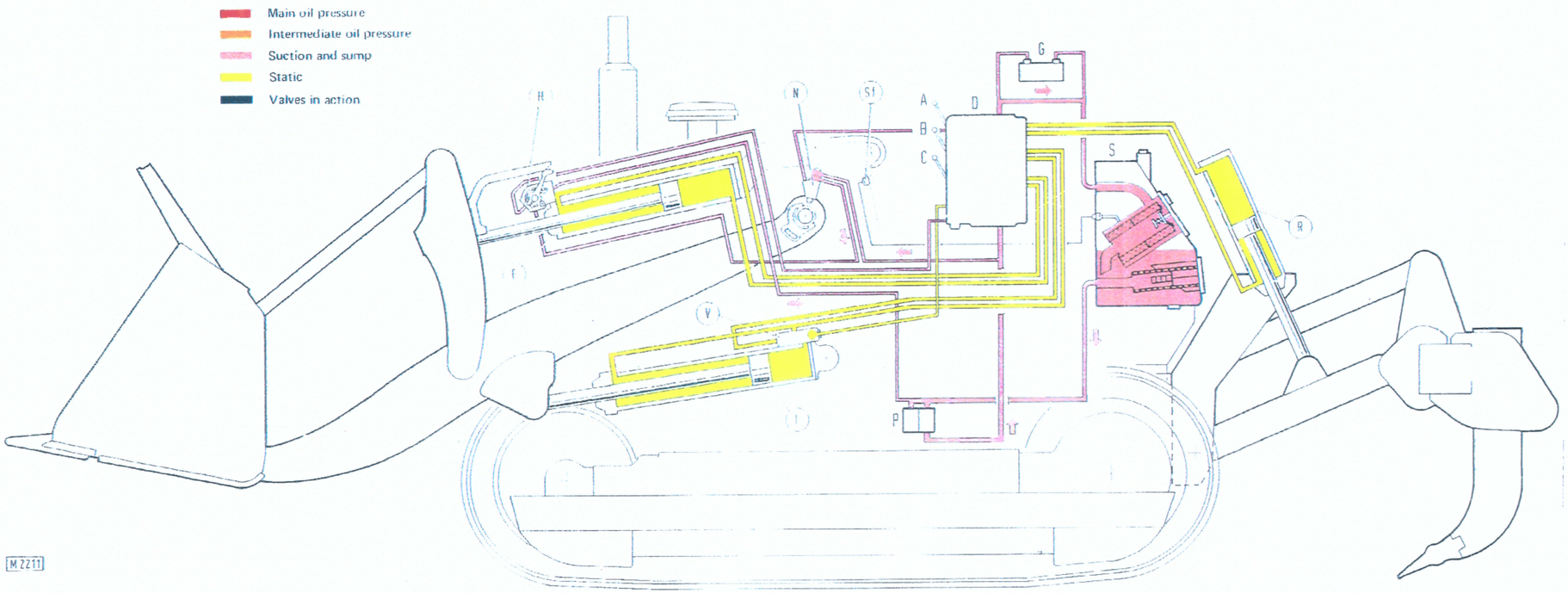
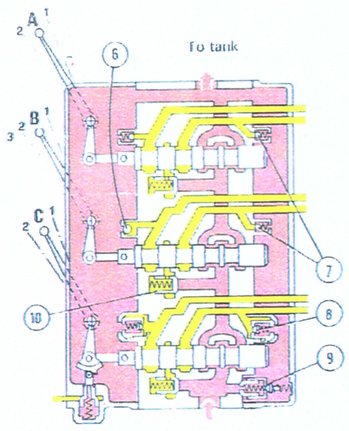


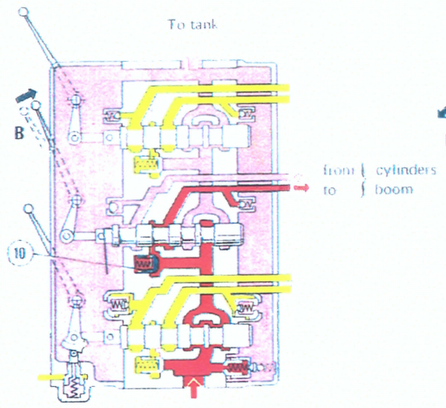
Fig. 12-1 - **FL 20 crawler loader hydraulic system diagram.**

Note - Detail (a) shows control valve with single lever control (E) (optional).

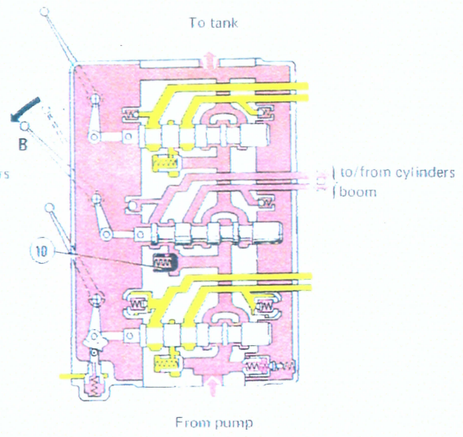
A. Ripper control valve
B. Boom control lever
C. Bucket control lever
D. Control valve
E. Combined control lever
F. Dump cylinder
G. Hydraulic system heat exchanger (partial oil flow)
H. Hydraulic bucket positioner
L. Lift cylinder
N. Hydraulic boom lift kick-out
P. Ripper cylinder
S. Tank
Sf. Return filter restriction indicator light
V. LH lift cylinder valve block
Z. Ripper control lever



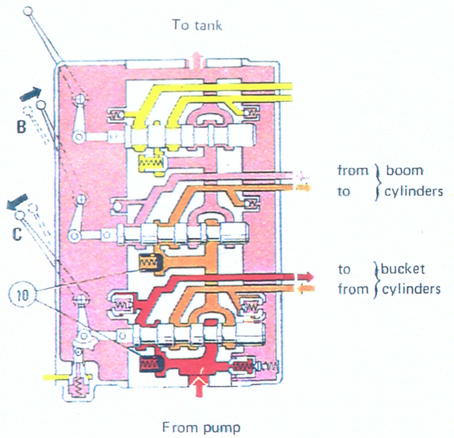
a. Control valve in neutral



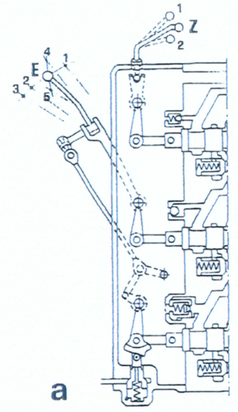
b. Control valve in lift position



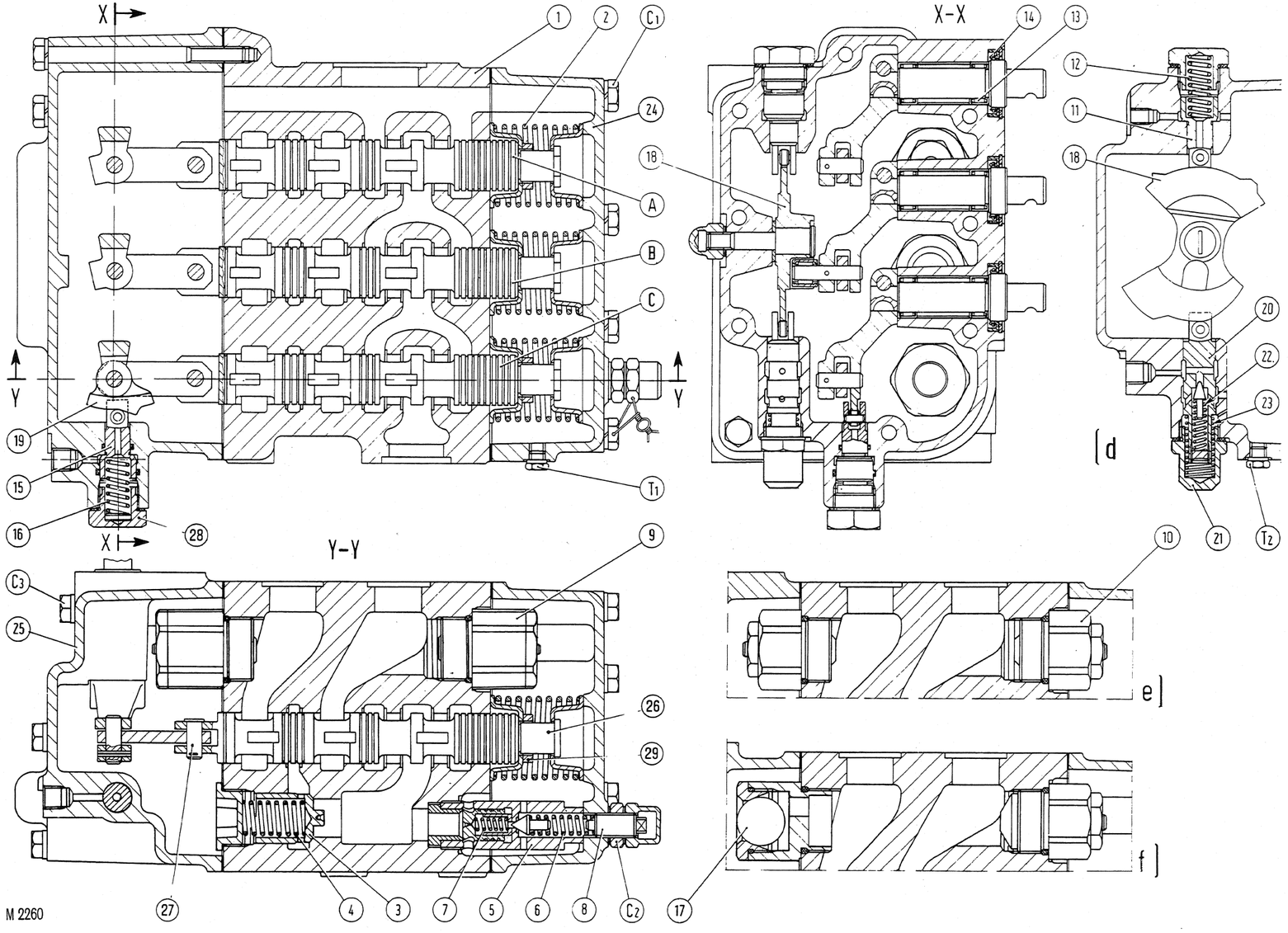
c. Control valve in float position



d. Control valve in lift and bucket dump position



e. Control valve with single lever control (optional)



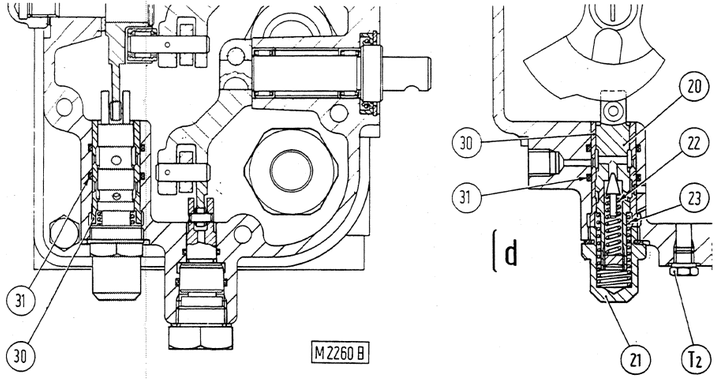


Fig. 12-11 - Loader hydraulic system control valve components and sections.

A. Ripper control spool - **B.** Boom control spool - **C.** Bucket control spool - C_1. Capscrews securing rear cover to control valve body - C_2. Adjustment screw locknut - C_3. Capscrews securing cover **(25)** to control valve body **(1)** - **d.** Section through detent plunger and spring **(11)** and boom control spool cushion valve - **e, f.** Control valve sections through overload valve **(10)** and make-up valve **(17)** - **M.** From pump delivery - T_1 and T_2. Oil drain plugs - **1.** Control valve body - **2.** Spool return spring - **3.** Check valve - **4.** Check valve spring - **5.** Pressure relief valve - **6.** Pressure relief valve pilot spring - **7.** Pressure relief valve main spring - **8.** Pressure relief valve adjustment screw - **9.** Make-up and overload valve - **10.** Overload valve - **11** and **12.** Detent plunger and spring - **13.** Needle roller bearings - **14.** Seals - **15.** Bucket positioner detent plunger - **16.** Plunger spring - **17.** Make-up valve - **18.** Boom control cam, lift and float positions - **19.** Bucket positioner control cam - **20.** Cushion valve - **21.** Cushion valve adjuster plug - **22.** Cushion valve spring - **23.** Spring - **24.** Rear cover - **25.** Lever support cover - **26.** Spring cup capscrews - **27.** Spool to control lever connecting pins - **28.** Spring retainer - **29.** Spacer - **30.** Valve guide bushing (late type) - **31.** O-ring.

Note - When removing spools from control valve seats, mark both spools and seats to ensure proper assembly.

Proceed as follows:

– Fully lower boom.

– Remove bucket and dump cylinders (2, Fig. 12-25).

– Take off retaining plates and remove lift cylinder front pivot pins (a) using suitable punch.

– Apply sling **75291601** to lift-arms and take up slack.

– Remove boom pivot pin capscrews (C_2) and withdraw boom rear pivot pins using a slide hammer puller.

– Using the hoist, raise lift arms clear of loader and lower to ground.

On assembly, bear in mind the following points:

– Install spacer (8) between lift cylinder rear link pivot pin (c) bushings and boom and cross link pivot pin (9) bushings.

– Shim pivot pins to obtain specified side play (see p. 52).

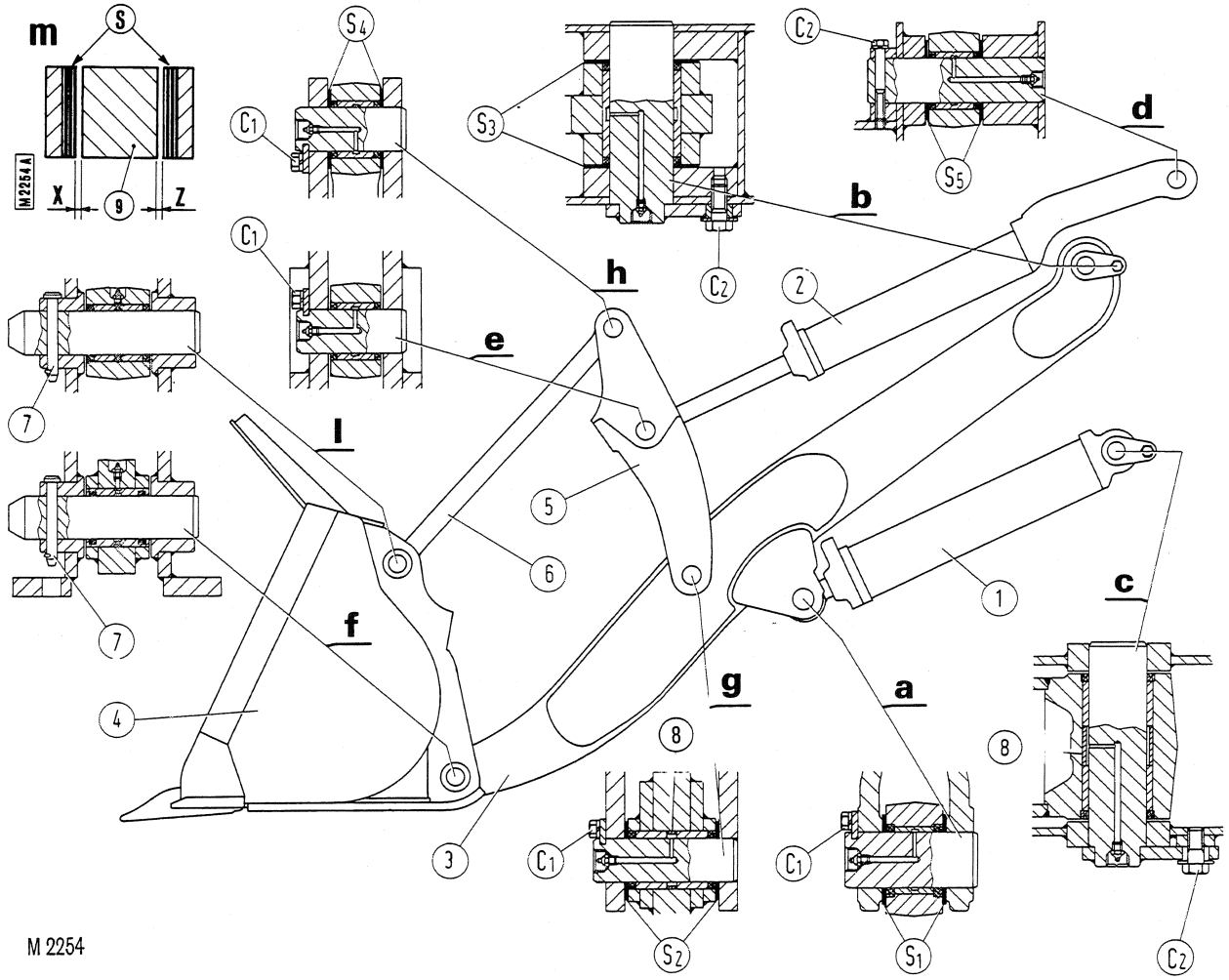


Fig. 12-25 - Bucket and linkage.

a, b, c, d, e, f, g, h, l. Pivot pins - C_1. Pivot pin retaining plate capscrews - C_2. Boom pivot pin capscrews - **M.** Pivot pin shim (S) installation - **S**, S_1, S_2, S_3, S_4, S_5. Shims - X_2. Side play - **1.** Lift cylinder - **2.** Dump cylinder - **3.** Lift-arms - **4.** Bucket - **5.** Cross link - **6.** Dump link - **7.** Pin - **8.** Spacer - **9.** Linkage component.

SPECIFICATION AND DATA cont'd

HYDRAULIC BUCKET POSITIONER (Fig. 12-23)	
Positioner control spool seat diameter	25.020 to 25.041 mm (0.906 to 0.907 in)
Positioner control spool diameter	24.987 to 25.000 mm (0.983 to 0.984 in)
Spool clearance in seat	0.020 to 0.054 mm (0.0007 to 0.0021 in)

BOOM LIFT CYLINDER VALVE BLOCK (Fig. 12-19)	Installed on left lift cylinder
Safety valve lock plunger **(9)** O.D.	33.961 to 34.000 mm (1.337 to 1.338 in)
Plunger **(9)** seat diameter	35.025 to 34.064 mm (1.339 to 1.34 in)
Plunger - seat clearance	0.025 to 0.103 mm (0.0009 to 0.004 in)
Quick lower valve plunger **(2)** O.D.	30.975 to 31.000 mm (1.219 to 1.22 in)

	mm	in
Plunger **(2)** seat **(1)** diameter	31,050 – 31,115	1.222 to 1.224
Valve seat clearance	0,050 – 0,14	0.0019 to 0.0055
Flow control valve plunger **(3)** O.D.	39.984 – 40,000	1,574 to 1.578
Plunger **(3)** seat diameter	40,009 – 40,034	1.575 to 1.576
Valve seat clearance	0,009 – 0,05	0,00036 to 0,002
Restrictor valve **(5)** O.D.	31,9 – 32,01	1.255 to 1.271
Valve **(5)** seat diameter	32,2 – 32,3	1.267 to 1.271
Valve seat clearance	0,19 – 0,40	0.008 to 0.016

	Length				Test load	
	Free		Under load			
Spring data for:	mm	in	mm	in	daN	lb
– Flow control valve spring **(6)**	56.5	2.224	32	1.259	22.5 to 24.9	50.58 to 55.97
– Quick lower valve spring **(7)**	100	3.937	38	1.496	2.35 to 2.55	5.28 to 5.73
– Safety valve lock spring **(8)**	100	3.937	38	1.496	2.35 to 2.55	5.28 to 5.73

SAFETY VALVE LOCK (late type only)	Installed on RH boom lift cylinder
NOTE - Data are same as parts (1,8 and 9 Fig. 12-19) under heading BOOM LIFT CYLINDER VALVE BLOCK	

BOOM LIFT KICK-OUT (Fig. 12-21)	mm	in
Plunger guide bushing **(4)** seat diameter	19,070 – 19,122	4.286 to 4.296
Bushing O.D.	19,017 – 19,050	4.275 to 4.282
Bushing interference fit	0,020 – 0,105	0.0044 to 0.0236
Plunger guide bushing I.D.	12,716 – 12,759	2.858 to 2.868
Plunger **(3)** O.D.	12,673 – 12,700	2.848 to 2.854
Bushing - plunger clearance	0,016 – 0,086	0.0035 to 0.0193
Check valve ball **(7)** seat diameter	23,020 – 23,072	5.174 to 5.186