Bunning Manure Spreader
Operators Handbook Important Safety Information

Intended Purpose

A tractor towed spreader for manure and other materials. 7.5 to 23 tonne carrying capacity

Hazardous Machinery Warning

This machine is hazardous if improperly used and may cause serious injury or death if not used in accordance with these operating instructions and safety warnings. Employers are required to train and supervise all operators and assistants to observe safety precautions described by this handbook, the installation process and by warning decals.

Potential Hazards

PTO Connection and Guarding

Improper PTO connection and operation may cause machine failure and injury to an operator. PTO shaft guards must be used at all times.

Loss of Control

Overloading, excessive speed or use on excessive slopes may result in loss of control. The towing tractor must be suitable for the trailer weight and other operating conditions. Trailer brakes must be used at all times.

Operation Around Bystanders

Do not operate this machine in proximity to bystanders who may be injured by projectiles or other functions including being run over or entangled in the auger.

Hydraulic Fluid Penetration or Burning

Operators must be trained to avoid risks relating to the possibility of hydraulic fluid penetration resulting from high pressure fluid sprays directly contacting an operators skin. Hydraulic components may also be hot and may cause burning if touched.

Electrocution

An operator or a bystander could be electrocuted if the guillotine door was raised here there is a possibility of contact with overhead electrical wires

Bin Entry

A person must not enter the bin while the machine is running. Care must be taken to avoid slip / fall injuries while entering the bin.

Coupling / Decoupling

Care must be taken to avoid crushing an assistant when coupling or decoupling the machine to a tractor.

Machinery Shut Down

This machine must be operated from a tractor drivers seat. The tractor and machine must be shut down, the key removed and hydraulics lowered, if the driver leaves the seat or before any adjustments or repairs are made.

Machinery Start Up

Sound the horn before starting this machine.

Additional Driver Protection

Extra protection can be achieved by lowering the slurry door as the load decreases in height.

OPERATING INSTRUCTIONS

INITIAL HITCHING TO TRACTOR

ATTACH SPREADER TO PICK-UP HOOK OR STATIC HITCH STUB. DO NOT ATTACH TO SWINGING DRAWBAR OR PICK-UP HOOK IN EXTENDED POSITION

Remove screwjack from drawbar (if fitted) and locate in transport position provided at front of spreader.

Slide the tractor end of the PTO shaft out and fit to the tractor PTO. Lay the two halves of the PTO shaft alongside each other and mark the required lengths, allowing for turning. Minimum of 6"engagement of the two halves. Cut to size and clean burrs at each end of shaft **KEEP SHAFT SLIDING SURFACES GREASED.** Attach chains fitted to PTO guard (to prevent rotation of guard) to suitable point on tractor and hole provided on metal cover over PTO shaft on spreader. Ensure that the spring loaded pins in splined yokes are fully locked in position. Always disengage PTO when turning sharply to avoid damage to shaft universal joints. Where a wide angle PTO is fitted attach this end to the tractor.

COUPLING OF HYDRAULIC HOSES

Fit the two hoses for the floor drive hydraulic motor (one to feed and one for return) to double spool valve on tractor. Choose position of spool lever for ease of control to obtain floor movement to rear. Reversing of floor is by selecting the opposite port of rearward floor movement in tractor cab. Universal quick release probes are fitted as standard to hose ends. Mark hose as required to assist in the future coupling for correct position of feed and return. When a slurry door is fitted connect the hydraulic hose to a double spool valve and select the hose positions to suit the operator to open and close the door.

Fit hydraulic brake hose to trailer brake valve on tractor (male fitting). A universal female brake coupling is fitted as standard to the hose ends.

N.B. **CHECK DIRECTION OF FLOOR BEFORE LOADING**. Do not run floor in reverse with full load. Speed of floor in reverse is at **MAXIMUM**

HANDBRAKE The handbrake is a multi-stroke ratchet type. To apply the handbrake give the handle short pumps (a clicking of the ratchet will be heard) until resistance occurs and subsequent tightening of the cable. To release the handbrake give the handle one sharp movement to the left. This releases ratchet mechanism.

CHECK WHEEL NUTS AND TYRE PRESSURES DAILY

BRAKE ADJUSTMENT Brake adjustment is carried out at the Hydraulic brake ram unit fitted to each wheel axle giving independent adjustment to each wheel. To adjust jack up spreader, slacken the locknut on the set screw and turn the set screw clockwise.
BEWARE NOT TO OVER ADJUST. Make sure the wheel can rotate freely.

FLOOR CHAIN ADJUSTMENT. When adjusting floor chains ensure that the adjustment is carried out equally to both sides.

DO NOT ALLOW THE CHAINS TO BECOME TOO SLACK.
ADJUST CHAINS AFTER A FEW LOADS. KEEP CHAINS TIGHT AT ALL TIMES. A guide is to be able to see a whole link below edge of spreader i.e. from centre to front.

An open ended spanner is supplied to adjust the floor chains. It is located behind the shearbolt rack at the front of the machine.

REVERSE FLOOR The floor should only be reversed for very short periods, to clear the augers. **DO NOT** reverse if the floor chain is slack, tighten floor chain first.

LUBRICATION OF SPREADER

DAILY GREASE	Front and rear floor shaft bushes
	Overrun clutch to front of main "T" gearbox
WEEKLY GREASE	All sealed bearings – 2 pumps of grease gun maximum

TAKE CARE NOT TO DAMAGE GREASE SEAL BY OVERGREASING

	Sliding tubes of PTO SHAFT
	PTO universal joints – **Follow instructions as for sealed bearings**
	Screwjack top (When fitted)
	Shearbolt bush
MONTHLY	Check gearbox oil levels
ANNUALLY	Change oil to all gearboxes

TYPE OF LUBRICATION GREASE	Multi purpose
GEARBOXES	EP90

SHEARBOLT PROTECTION Only 1 shearbolt is fitted to the spreader. This is located on the spreader end of the PTO shaft. The bolt is M60 x 60 grade 6.8 mild steel. **ON NO ACCOUNT MUST A BOLT OF HIGHER GRADE THAN 6.8 TENSILE STRENGHT BE FITTED.**

PRESSURE RELIEF VALVE TO FLOOR DRIVE This valve is a cross line type and fitted to the hydraulic motor on the floor drive gearbox. The pressure can be varied to suit the material being spread. To adjust, engage the oil flow via the spool valve on the tractor, slacken the locknut and insert an allen key and turn clockwise to increase pressure until the floor starts to move. Then tighten the locknut. To decrease the pressure, reverse procedure. When making this adjustment, the spreader pressure will be set lower than the tractor PRV. A diagram in the floor drive section of this manual shows which screw relieves forward motion and which screw for reverse motion of the floor.

It is recommended to apply waste oil to the floor chains periodically when spreading dry material and particularly at the end of the spreading season. This assists in the smooth running of the machine and prolongs the working life of the components.

WARNING KEEP ALL LIMBS CLEAR OF THE SPREADING AUGERS WHEN IN MOTION. DO NOT ATTEMPT TO REMOVE OBSTACLES OR CARRY OUT ADJUSTMENTS WITHOUT STOPPING SPREADER OPERATION FIRST. TAKING SHORT CUTS CAN RESULT IN PERMANENT INJURY OR LOSS OF LIFE.

BEFORE ATTEMPTING TO CARRY OUT ANY CHECKS OR ADJUSTMENTS DISENGAGE PTO AND STOP THE TRACTOR ENGINE

GUARDS ARE PROVIDED FOR YOUR SAFETY. NEVER OPERATE SPREADER WITH ANY REMOVED OR OPEN.

Before engaging PTO please make sure that there is no person standing to the rear or side of the spreader. Please observe at all times during spreading operation that no person or persons are present within the working proximity of the spreader. Also remembering any foreign objects hidden in the material i.e. stones, bricks, wood, etc can be thrown further than the actual material, which can result in serious injury.

METHOD OF OPERATION

Engage PTO to power the rear augers – tractor engine revs low.
Select speed of floor required on control valve.
Engage spool valve to power floor to rear .

Note:

When using the spreader in conjunction with a tractor which has a fast and slow response control on the spool valves, check that the control on the spool valve is not in the slow position in respect of the floor drive as this will over ride the variable floor speed.

The spreader always runs very quietly when working. If loud banging noises are heard this will mean that foreign objects are in the material. Obviously the shearbolt may well break. If the shearbolt on the PTO has not sheared and the noise persists **STOP THE SPREADER SWITCH OFF TRACTOR ENGINE** and check the spreader.

IMPORTANT From new, it is strongly recommended that you do not use a high pressure cold washer and definitely not a hot pressure washer to the outside of the spreader for 12 weeks. This will damage the paintwork whilst normal curing of the paint is taking place. Careful low pressure washing is acceptable.

Do not let manure dry and set on fresh paint for the first 3 – 4 weeks. During this period it is advisable to clean the machine after use as instructed.

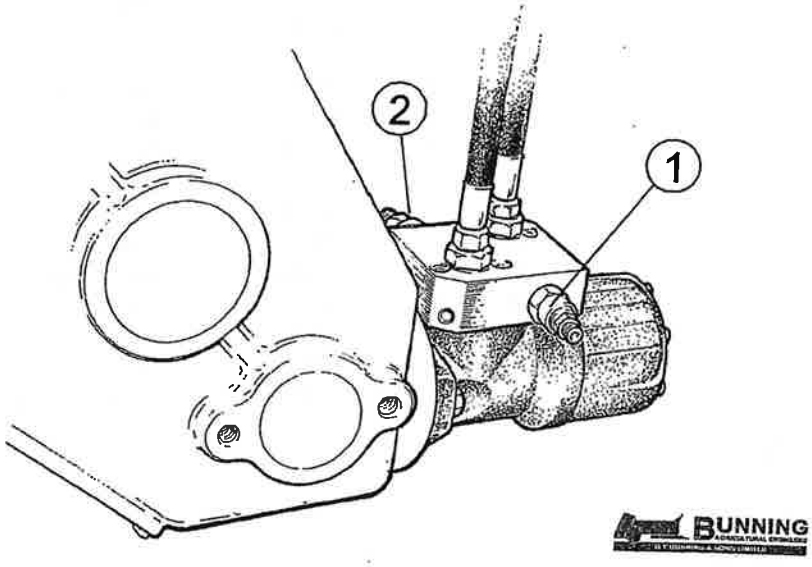
WARRANTY During the 12 month warranty period any failures which occur due to faulty components or workmanship must be reported to G.T. Bunning & Sons Ltd before any repairs or replacement of components is carried out. The warranty period commences on the despatch date from the factory. All parts not guaranteed by G.T.Bunning & Sons Ltd are covered by the component manufacturer and are subject to their own warranty. The warranty terms only apply to machines that have been subject to fair wear and tear operation and where routine maintenance has been carried out.

FLOOR DRIVE RELIEF VALVES

To adjust relief valve pressure

No 1 Cartridge controls movement of floor to rear.
To increase pressure release locknut turn screw clockwise and retighten locknut.
To decrease pressure turn screw anticlockwise.

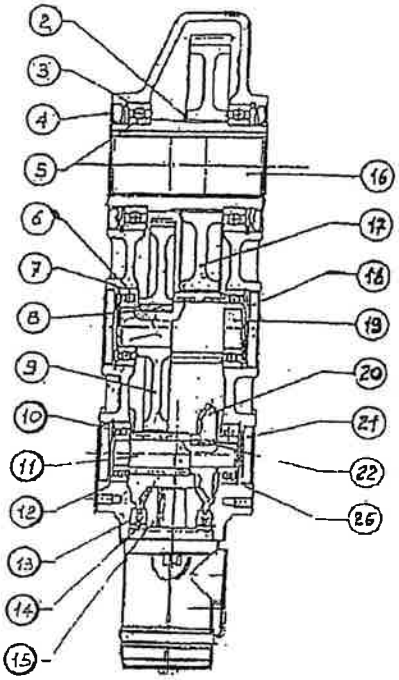
No 2 Cartridge control movement of floor to front.
To increase pressure release locknut turn screw clockwise and retighten locknut.
To decrease pressure turn screw anticlockwise.



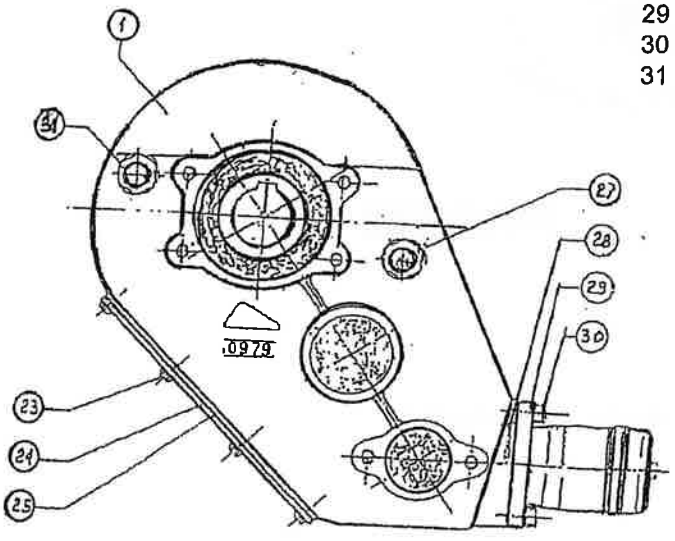
NOTE

Maximum protection can be given to moving parts by keeping relief valve pressure set to a minimum.

FLOOR DRIVE GEARBOX
MK 4 75 / 90 / 105 / 120



KEY.	QTY.	PART NO.	DESCRIPTION
1	1	B3203	Casing
2	1	B4099	Circlip
3	2	B9069	Circlip
4	2	B3946	Seal
5	2	B3869	Bearing
6	2	B3863	Bearing
7	3	B4006	Circlip
8	2	B2271	Key
9	1	B3234	Gear
10	2	B3865	Bearing
11	1	B3232	Pinion Shaft
12	2	B4002	Circlip
13	1	B3862	Bearing
14	1	B4019	Circlip
15	1	B3233	Pinion Bevel
16	1	B3228	Sleeve m50
	1	B3229	Sleeve m60 (W.B. Beaters)
17	1	B3231	Gear
18	2	B3922	Cap Seal
19	1	B3237	Pinion Shaft
20	1	B3238	Crown Bevel
21	2	B3921	Cap Seal
22	1	B2270K	Key
23	8	73030/1	Bolt
24	1	B3218	Cover
25	1	B3222	Gasket
26	1	B3478	Spacer
27	2	B3995	Sight Gage
28	1	B3970	O-Ring
29	1	B3060	Motor
30	2	73092	Bolt
31	2	B3997	Breather Plug



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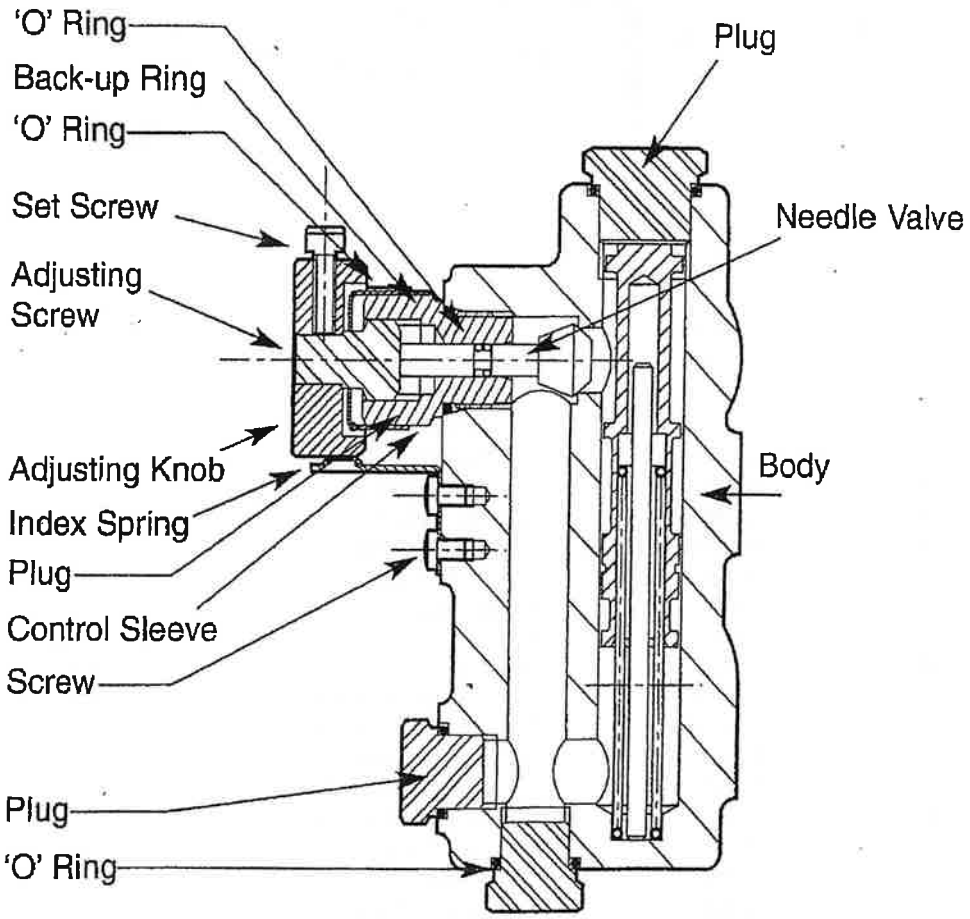
FLOOR CONTROL UNIT
PART NO B3000



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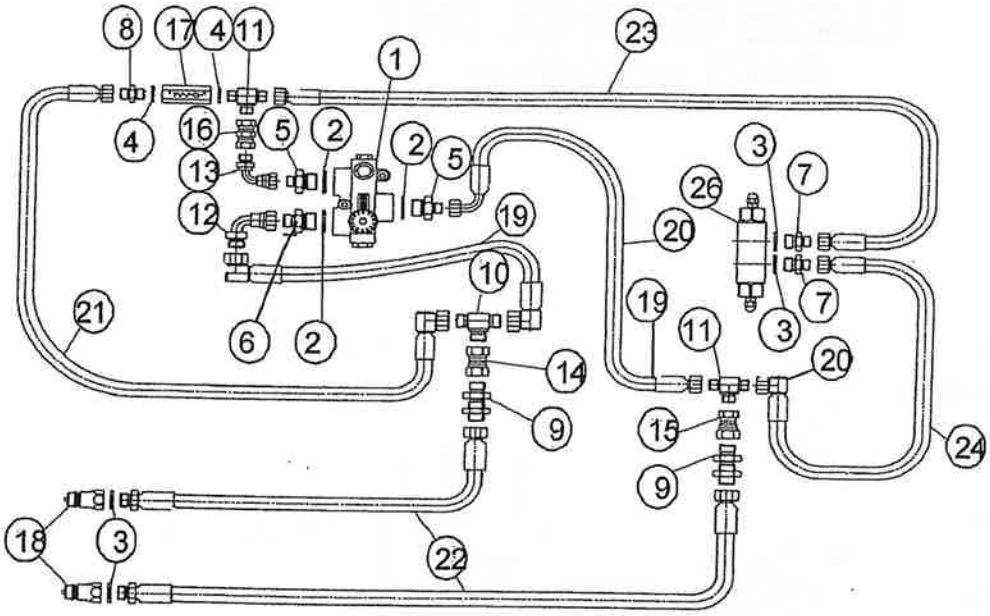
HYDRAULIC CIRCUIT FOR FLOOR DRIVE



Key.	Qty.	PART NO.	DESCRIPTION.
1	1	B3000	Flow Control
2	3	51593	¾" Bonded Seal
3	4	51591	½" Bonded Seal
4	2	51590	3/8" Bonded Seal
5	2	51337	¾" to 3/8" Adapter
6	1	51340	¾" to ½" Adapter
7	2	51336	½" to 3/8" Adapter
8	1	51335	3/8" Male / Male
9	2	51464	½" Bulkhead
10	1	51448	½" Tee
11	2	51447	3/8" Tee
12	1	51412	½" 90* Male / Female
13	1	51414	3/8" 90* Male / Female
14	1	51394	½" Female / Female
15	1	51393	½" to 3/8" Female / Female
16	1	51392	3/8" Female / Female
17	1	52048	3/8" Check Valve
18	2	51576	Male Probe
19	1	B4400	Hyd. Hose 230mm
20	1	B4401	Hyd. Hose 610mm
21	1	B4402	Hyd. Hose 760mm
22	2	B4414	Hyd. Hose 2030
		B4415	Export 2440
23		B4416	Hyd. Hose Flow 75
		B4418	" " " 90
		B4420	" " " 105
		B4422	" " " 120
		B4424	" " " 150
		B4426	" " " WB
24		B4417	Hyd. Hose Return 75
		B4419	" " " 90
		B4421	" " " 105
		B4423	" " " 120
		B4425	" " " 150
		B4427	" " " WB / 230

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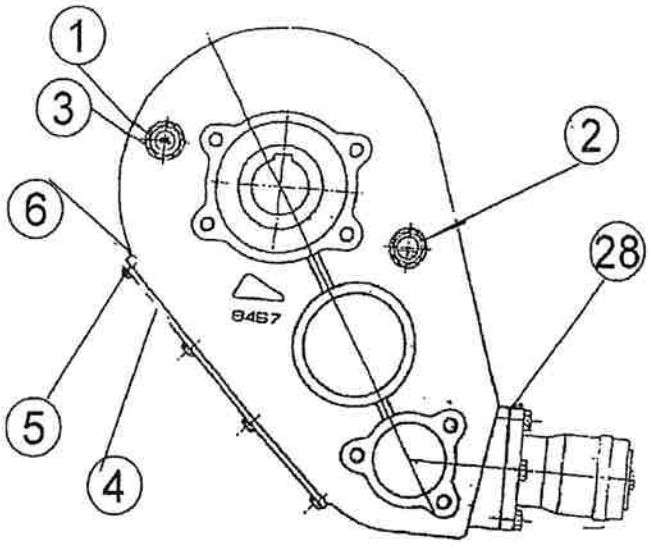
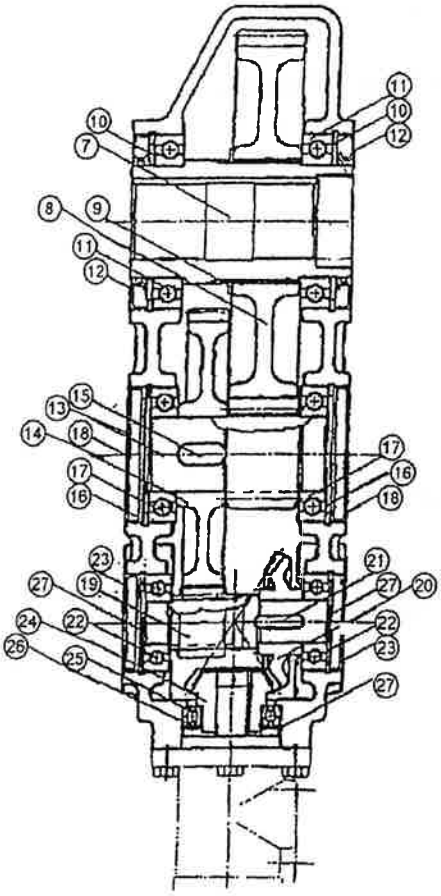


FLOOR DRIVE GEARBOX

RT 800 / 60

MK4 150



Key.	QTY	PART NO	DESCRIPTION
1	1	B3204	Casing
2	2	B3995	Sight Glass
3	2	B3997	Breather Bung
4	1	B3220	Cover Plate
5	8	73030/1	Bolt
6	1	B3224	Gasket
7	1	B3230	Sleeve
8	1	B3236	Gear
9	1	B4030	Circlip
10	2	B4016	Circlip
11	2	B3868	Bearing
12	2	B3948	Seal
13	1	B3240	Pinion
14	1	B3244	Gear
15	2	509560	Key
16	2	B4012	Circlip
17	2	B3867	Bearing
18	2	B3926	Cap Seal
19	1	B3242	Pinion
20	1	B3248	Crown Gear
21	1	509554	Key
22	2	B3864	Bearing
23	2	B3922	Cap Seal
24	1	B3252	Pinion
25	1	B3862	Bearing
26	1	B4019	Circlip
27	3	B4006	Circlip
28	1	B3226	Gasket

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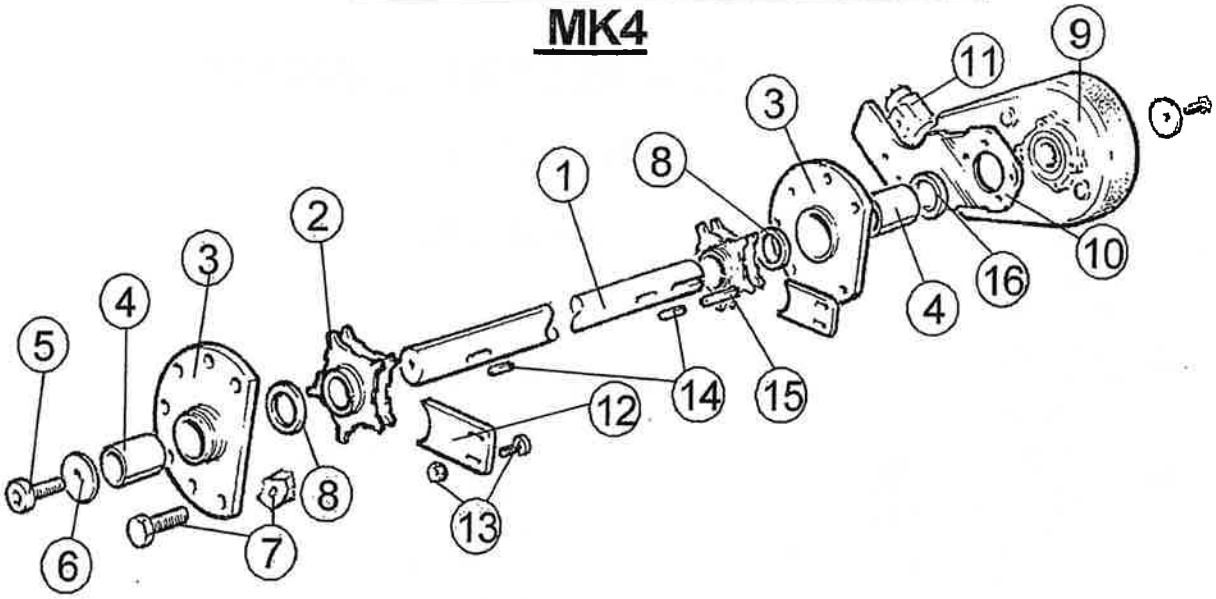
REAR FLOOR SHAFT ASSEMBLY
MK4



Key.	Qty.	Part no.	Description.	
1	1	B2250	Rear Shaft	M50
	1	B2254	Rear Shaft	M60 MK4 150 only
	1	B2256	Rear Shaft	M60 MK4 with W.B. Beaters
2	2	B2100	Gypsy Wheel	M50 MK4 75 —120
	2	B2302	Gypsy Wheel	M60 MK4 150 & W.B. Beaters
3	2	B2300	Bearing Flange	M50
	2	B2302	Bearing Flange	M60
4	2	B2320	ACM Bush	M50
	2	B2322	ACM Bush	M60
5	2	73091	Bolt	
6	2	B2280	End Plate	M60
	2	B2282	End Plate	M70
7	14	73556	Bolt & Nut	
8	2	B2342	Spacer	M50
	2	B2344	Spacer	M60 MK4 150 only
	2	B2341	Spacer	M60 MK4 with WB Beaters
9	1	B3105	Gearbox	RT 500 / 50
	1	B3106	Gearbox	RT 500 / 60 When W.B. Beaters fitted
	1	B3120	Gearbox	RT 800 / 60 MK4 150 only
10	1	B3212	Torque Plate for	RT 500
	1	B3214	Torque Plate for	RT 800
11	1	B3060	Hydraulic Motor	
	1	B3070	Hydraulic Motor	MK4 150 only
12	2	B2122	Cleaner	
13	4	73062	Bolt & Nut	
14	2	B2274	Key for M50 Shaft	
	2	B2275	Key for M60 Shaft	
15	1	B2277	Key for M50 Shaft	
	1	B2278	Key for M60 Shaft	
16	1	B2348	Spacer MK4 150 only	

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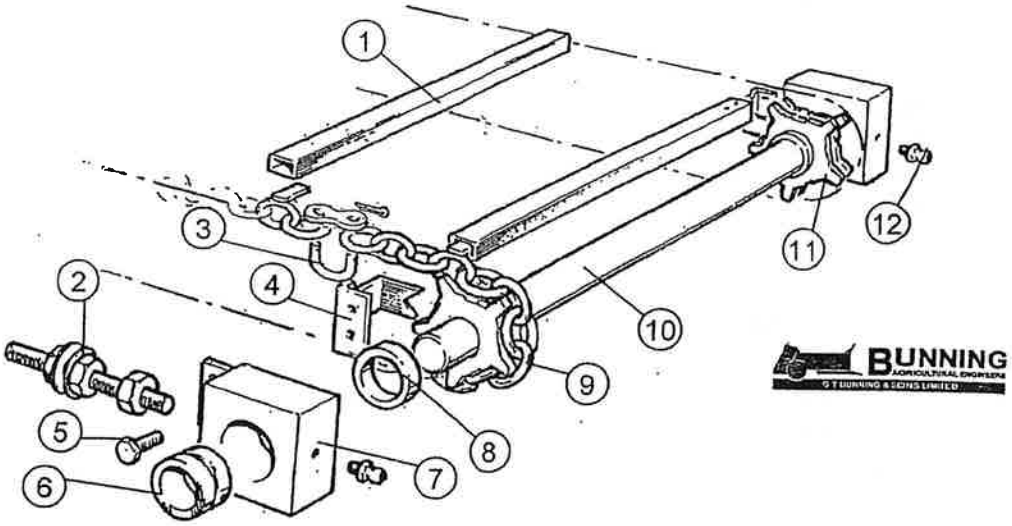
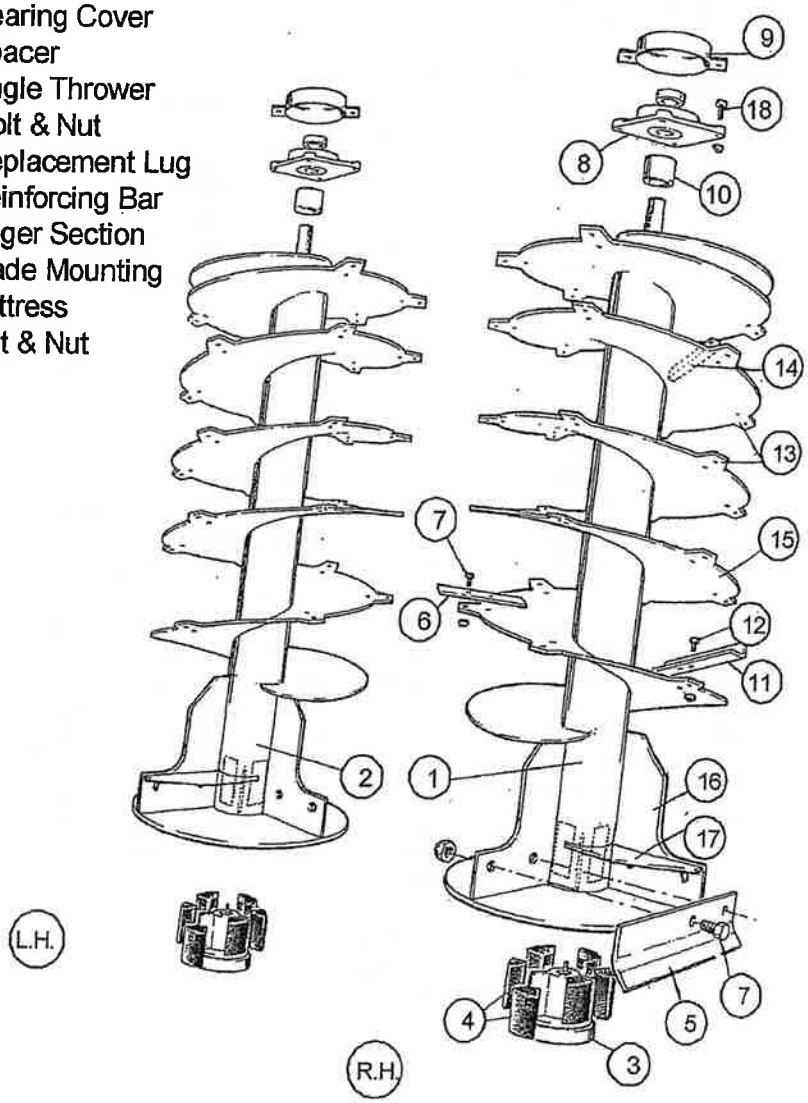
CHAINS & FRONT SHAFT
MK4



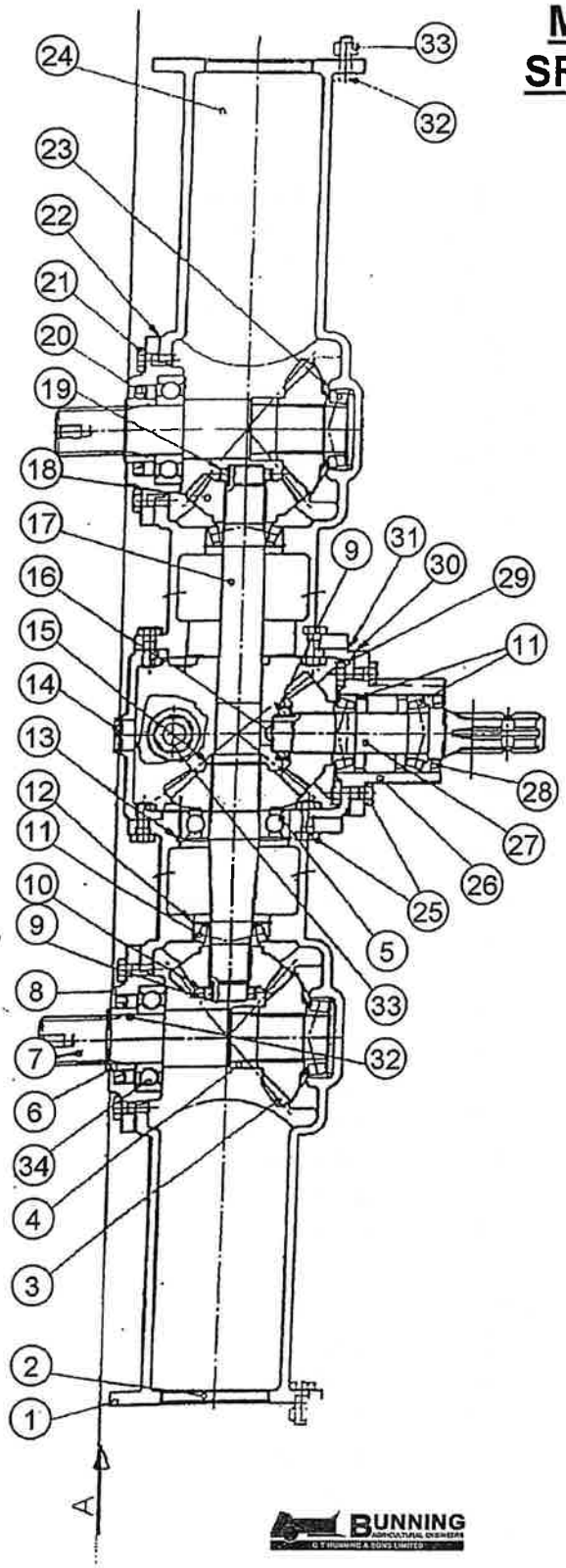
Key.	Qty.	Part No.	Description.
1	22	B2010	Channel Floor Slat MK4 75
	28	B2010	Channel Floor Slat MK4 90 / 105
	30	B2010	Channel Floor Slat MK4 120
	33	B2010	Channel Floor Slat MK4 150
	43	B2015	Box Floor Slat MK4 75
	55	B2015	Box Floor Slat MK4 90 / 105
	59	B2015	Box Floor Slat MK4 120
	65	B2015	Box Floor Slat MK4 150
2	2	B2286	Adjusters M24 MK4
	2	B2288	Adjusters M30 MK4 150 Only
3	2	B2202	Joiner Link
4	2	B2126	Front Cleaner
5	4	73031	Bolt
6	2	B2320	Bush M50
	2	B2322	Bush M60 MK4 150 Only
7	2	B2290	Bearing Housing M50
	2	B2294	Bearing Housing M60 150 Only
8	2	B2345	Spacer M50
	2	B2346	Spacer M60 MK4 150 Only
9	1pr	B2152	Floor Chain 28ft for Channel Slats MK4 75
	1pr	B2162	Floor Chain 35ft for Channel Slats MK4 90 / 105
	1pr	B2172	Floor Chain 37ft for Channel Slats MK4 120
	1pr	B2182	Floor Chain 40ft for Channel Slats MK4 150
	1pr	B2154	Floor Chain 28ft for Box Slats MK4 75
	1pr	B2164	Floor Chain 35ft for Box Slats Mk4 90 / 105
	1pr	B2174	Floor Chain 37ft for Box Slats MK4 120
	1pr	B2184	Floor Chain 40ft for Box Slats MK4 150
10	1	B2220	Shaft M50
	1	B2222	Shaft M60 Mk4 150 Only
11	1	B2214	Plate Wheel Set of 4
	1	B2218	Plate Wheel Set of 4 MK4 150 Only
12	2	50726	Grease Nipple

SHREDDING AUGERS
MK4

Key.	Qty	Part No.	Description
1	1	B1021	Auger R.H. 75 / 90
	1	B1031	Auger R.H. 120 / 150
2	1	B1020	Auger L.H. 75 / 90
	1	B1030	Auger L.H. 120 / 150
3	2	B1152	Drive Flange
4	12	B1142	Rubber Drive Block
5	3	B1111	Blade R.H.
	3	B1110	Blade L.H.
6	44	B1100	Cutter 75 / 90
	56		Cutter 120 / 150
7	100	73556	Bolt & Nut 75 / 90
	124		Bolt & Nut 120 / 150
8	2	B1178	Bearing
9	2	B1160	Bearing Cover
10	2	B2350	Spacer
11		B1106	Angle Thrower
12		73558	Bolt & Nut
13		B1096	Replacement Lug
14	44	B1098	Reinforcing Bar
15		B1066	Auger Section
16	6	B1080	Blade Mounting
17	6	B1088	Buttress
18	8	73155	Bolt & Nut



MK 4 GEARBOX
SRT 12 – 540 / 360



Key.	Qty.	Part No.	Description.
1	1	B3400	Casing
2	2	B3928	Cap Seal
3	3	B3464	Gear
4	2	B3480	Spacer
5	1	B3866	Bearing
6	2	B3482	Sleeve
7	2	B3442	Shaft
8	2	B3420	Top Plate
9	2	B3510	Nut L.H. Thread
10	3	B3520	Washer
11	4	B3822	Bearing
12	2	B4007	Circlip
13	1	B4014	Circlip
14	1	B3996	Sight Glass
15	1	B4020	Circlip
16	1	B3990	Drain Bung
17	1	B3446	Shaft
18	3	B3456	Pinion Gear
19	1	B3512	Nut R.H. Thread
20	2	B3942	Seal
21	12	73124	Bolt
22	2	B3490	Gasket
23	2	B3824	Bearing
24	1	B3402	Casing L.H.
25	22	73125	Bolt
26	1	B3410	Extension
27	1	B3440	Shaft
28	1	B3940	Seal
29	1	B3404	Casing
30	1	B3494	Gasket
31	2	B492	Gasket
32	2	B3939	O – Ring
33	1	B3998	Plug
34	2	B3870	Bearing

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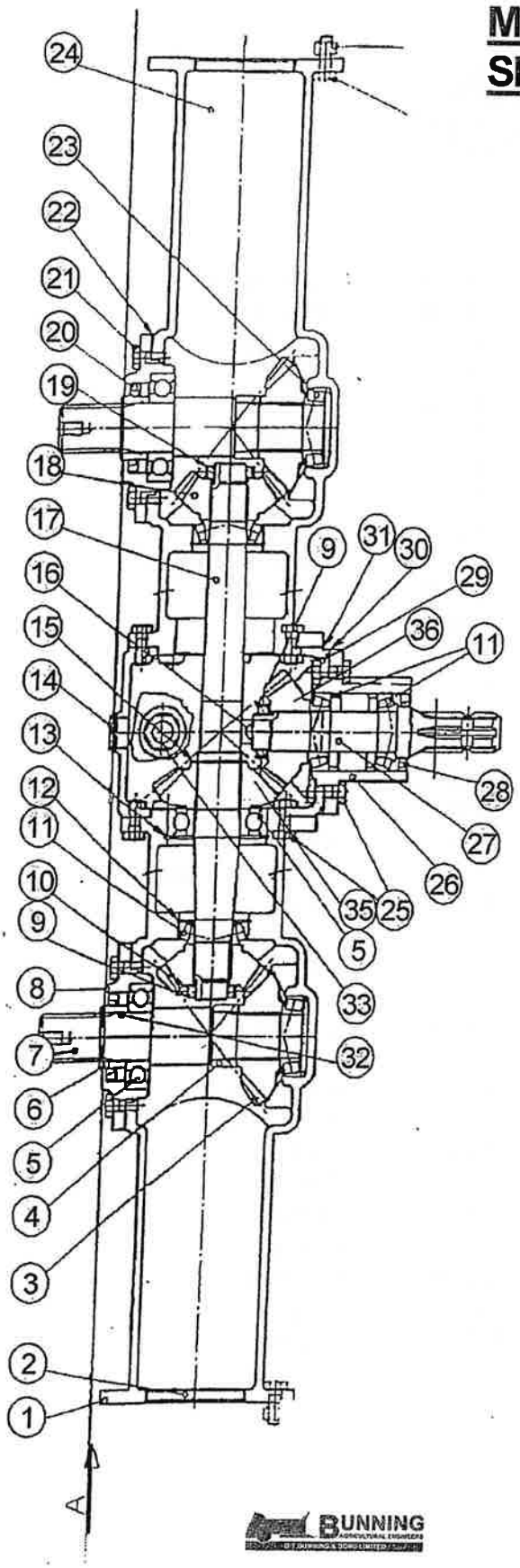
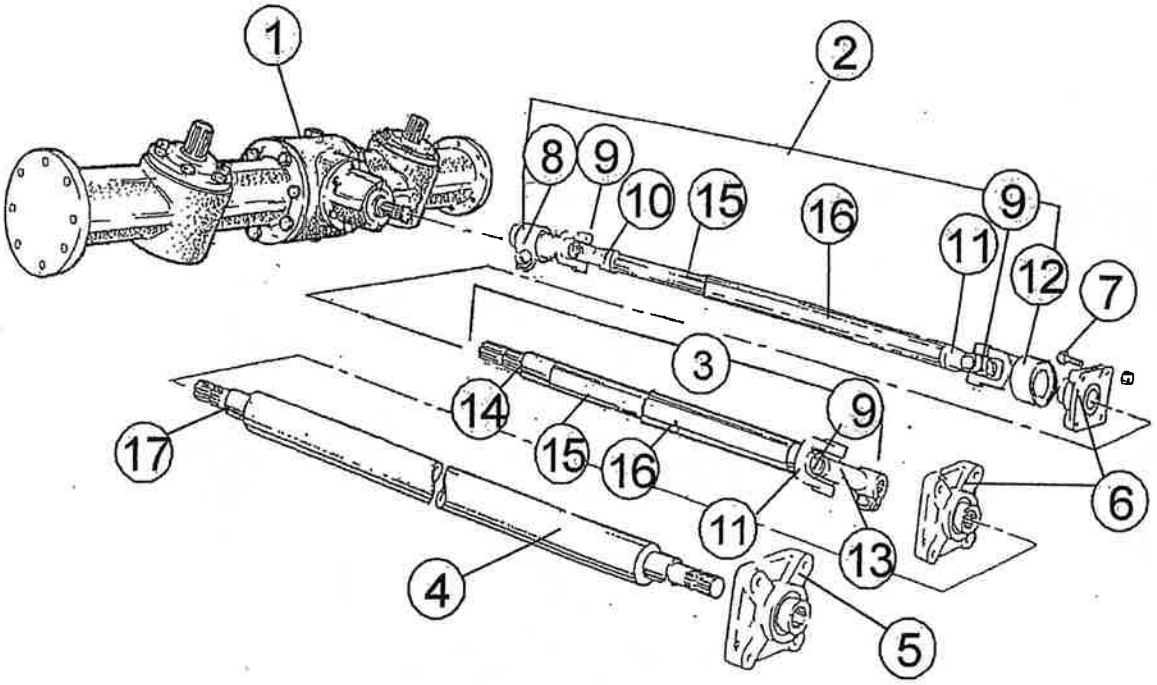
MK4 GEARBOX
SRT12 1000/420



Key.	Qty.	Part No.	Description.
1	1	B3400	Casing R.H.
2	2	B3928	Cap Seal
3	2	B3466	Crown Gear
4	2	B3480	Spacer
5	1	B3866	Bearing
6	2	B3482	Sleeve
7	2	B3442	Shaft
8	2	B3420	Top Plate
9	2	B3510	Nut L.H. Thread
10	3	B3520	Washer
11	4	B3822	Bearing
12	2	B4007	Circlip
13	1	B4014	Circlip
14	1	B3996	Sight Glass
15	1	B4020	Circlip
16	1	B3990	Drain Bung
17	1	B3446	Shaft
18	2	B3456	Pinion Gear
19	1	B3512	Nut R.H. Thread
20	2	B3942	Seal
21	12	73124	Bolt
22	2	B3490	Gasket
23	2	B3824	Bearing
24	1	B3402	Casing
25	22	73125	Bolt
26	1	B3410	Extension
27	1	B3440	Shaft
28	1	B3940	Seal
29	1	B3404	Casing
30	1	B3494	Gasket
31	2	B492	Gasket
32	2	B3939	O – Ring
33	1	B3998	Plug
34	2	B3870	Bearing
35	1	B3468	Gear
36	1	B3458	Pinion

MK4 TRANSMISSION
WITH WB AUGERS ONLY



KEY.	QTY.	PART NO.	DESCRIPTION
1	1	B3180	Gearbox SRT 1830
1	1	43204	Shaft F/F
3	1	43203	Shaft M/F
4	1	B1200	Shaft
5	1	B1172	Lock Bearing
6	2	B1170	Bearing M35
7	12	73092	Bolt
8	1	43331	Yoke – 1 3/4
9	3	43340	Journal
10	1	43334	Yoke – S4
11	2	43335	Yoke -- S5
12	1	43333	Yoke – Overrun
13	1	43330	Yoke – 6 Spline
14	1	B1205	6 Spline Spiggot
15		43301	S4 Tube
16		43302	S5 Tube
17	2	B1202	Replacement Stub

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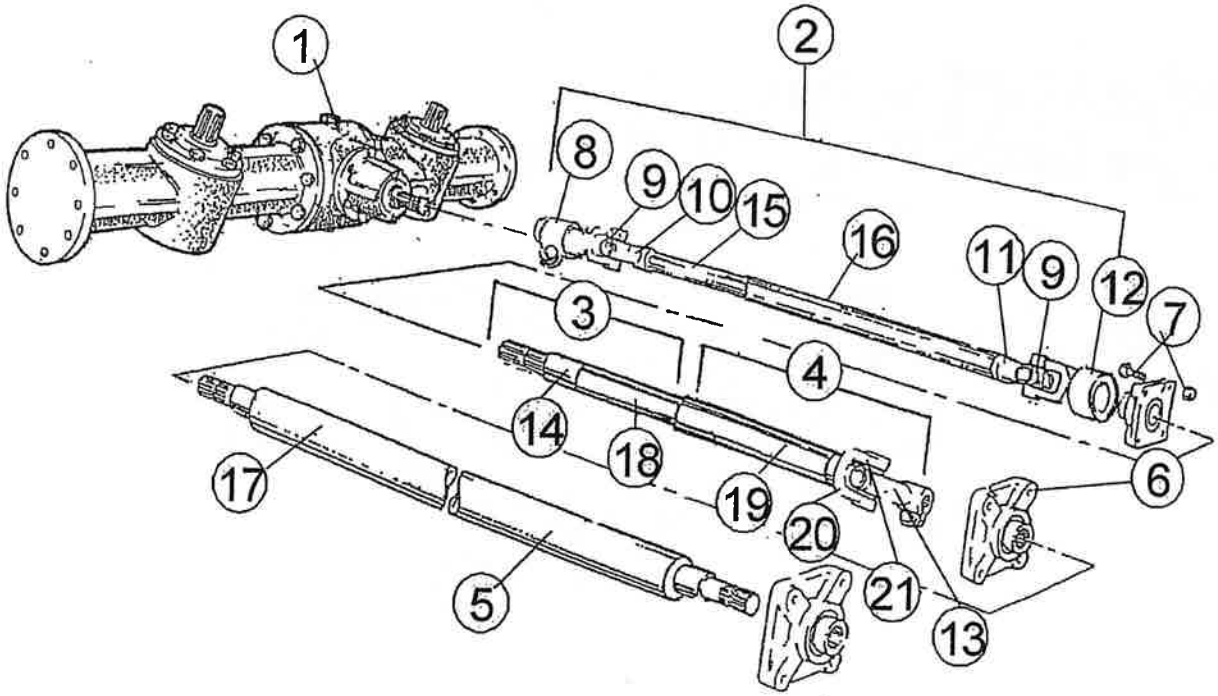
DRIVE TRAIN
MK4
Position of shafts may vary with different models



Key.	Qty.	Part No.	Description.
1	1	B3170	Gearbox 1000 / 420
	1	B3172	Gearbox 540 / 360
2	1	43105	Driveshaft F/F
3	1	B1230	Driveshaft Inner 90 / 105 / 120
	1	B1232	Driveshaft Inner 150
4	1	B1220	Driveshaft Outer 90 / 105
	1	B1222	Driveshaft Outer 120 only
	1	B1224	Driveshaft Outer 150 only
5	1	B1200	Driveshaft M / M
6	2	B1170	Bearing
7	12	73092	Bolt & Nut
8	1	43311	Yoke to 1 ¾
9	2	43325	Journal W.S
10	1	43314	Yoke to S4
11	1	43315	Yoke to S5
12	1	43316	Overrun Clutch
13	1	42034	Yoke to 6 Spline T60
14	1	B1206	6 Spline Spiggot Weld in
15	1	43301	Inner Tube S4
16	1	43302	Outer Tube S5
17	2	B1202	6 Spline Plug
18	1	42027	Inner Tube T60
19	1	42028	Outer Tube T60
20	1	42033	Yoke to T60
21	1	42031	Journal T60
22	1	B1172	Lock Ring Bearing

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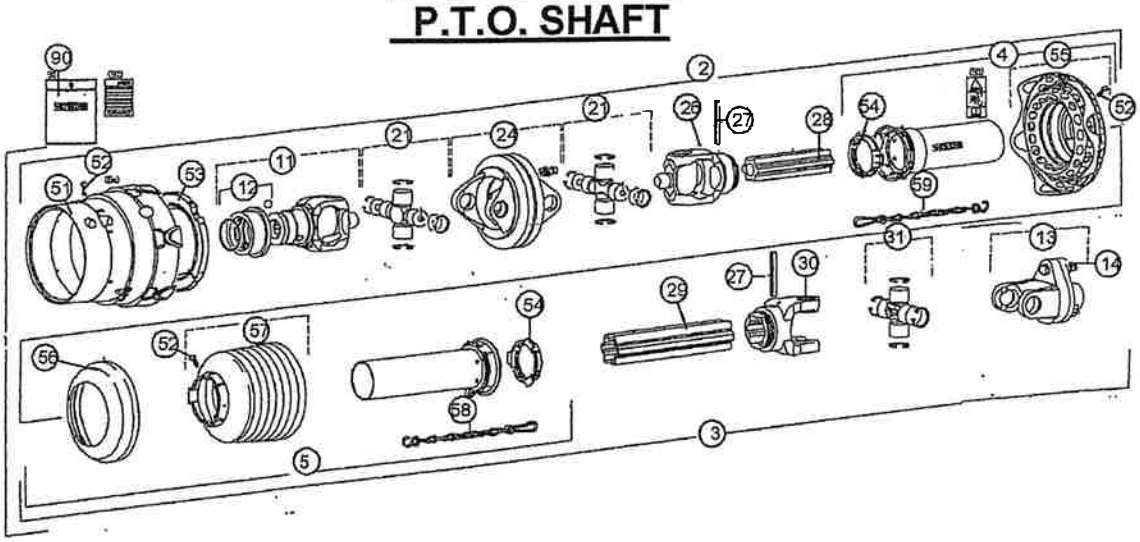
WALTERSCHEID
WIDE ANGLE
P.T.O. SHAFT



Key	Qty	Part No	Description
1	1	43005	W/A P.T.O. Shaft complete 21 Spline
	1	43006	W/A P.T.O. Shaft complete 6 Spline
	1	43007	W/A P.T.O. Shaft complete 20 Spline
2	1	43390	21 Spline inner W/A half shaft with outer guard
	1	43391	6 Spline inner W/A half shaft with outer guard
	2	43389	20 Spline inner W/A half shaft with outer guard
3	1	43392	6 Spline outer W/A half shaft with inner guard
4	1	43472	W/A Half guard outer
5	1	43470	W/A Half guard inner
11	1	43360	W/A Yoke to 21 Spline
	1	43361	W/A Yoke to 6 Spline
	11	43362	W/A Yoke to 20 Spline
12	1	43322	AS – Lock Size C
13	1	43374	Shear bolts clutch to yoke
14	1	B1310	Shear bolt 6.8 Hardness
21	2	43367	W/A Journal kit complete
24	1	43365	W/A Centre body
26	1	43366	W/A Yoke to S4 inner tube
27	2	42030	Roll pin
28		43301/1	Inner tube star profile coated S4GA
29		43302	outer tube star profile
30	1	43315	Yoke outer tube
31	1	43340	Journal Kit
51	1	43474	w/a Guard cone
52	10	43490	Screw
53	1	43475	W/A Bearing Ring
54	1	43450	Inner tube bearing ring
55	1	43476	W/A Flexible guard
56	1	43452	Reinforcing collar
57	1	43451	Cone for inner tube
58	1	43448	Safety chain 400
59	1	43449	Safety chain 600
90	1	43002	W/S Instruction manual

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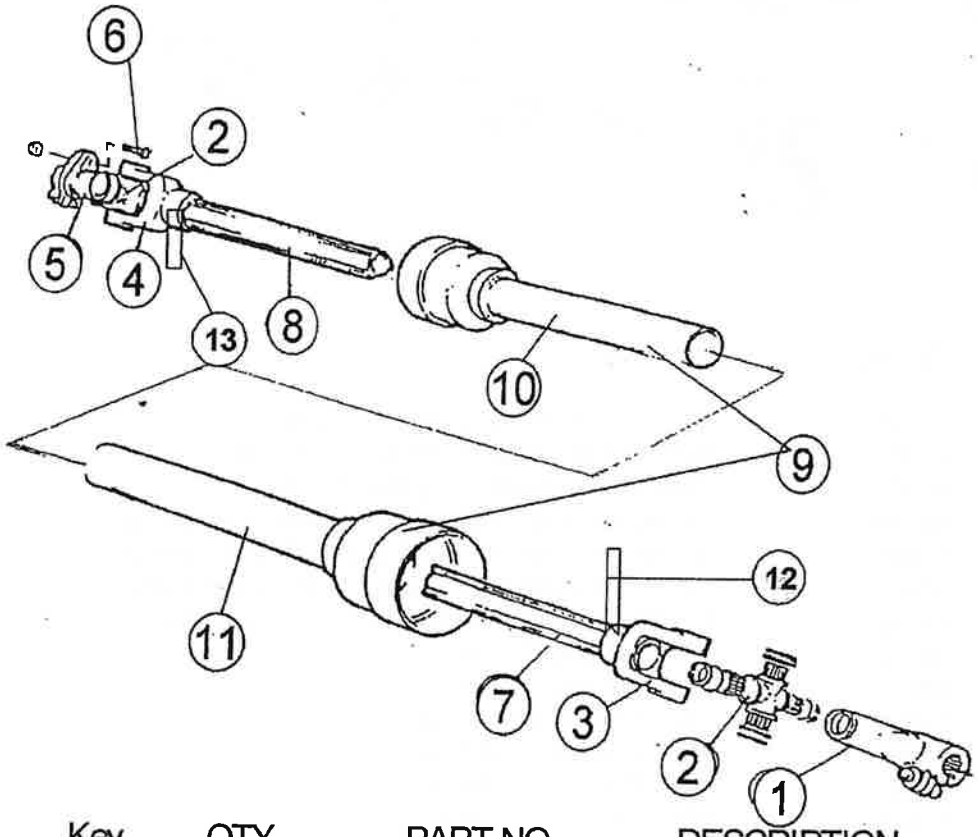
WALTERSCHEID
P.T.O. SHAFT
PART NO. 43102



Key.	QTY.	PART NO.	DESCRIPTION.
1	1	43312	Yoke to 6 Spline
	1	43313	Yoke to 21 Spline
2	2	43325	Journal
3	1	43314	Yoke to S4 Tube
4	1	43315	Yoke to S5 Tube
5	1	43317	Yoke to shear bolt clutch
6	1	B1310	Shear bolt 6.8 Hardness
7		43301	S4 Tube Inner
8		43302	S5 Tube Outer
9	1	43441	Guard Complete
10	1	43443	Guard Inner
11	1	43444	Guard Outer
12	1	42030	Roll pin
13	1	42030/1	Roll pin

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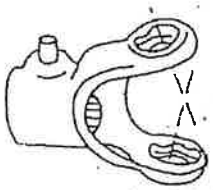
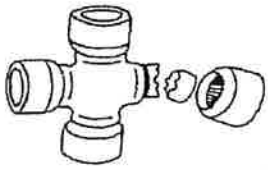
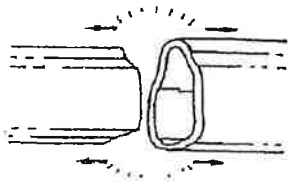
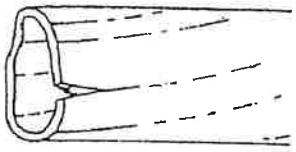
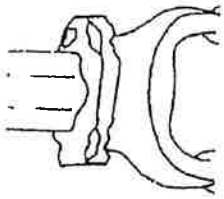
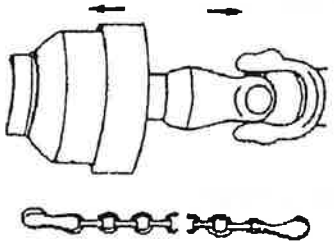
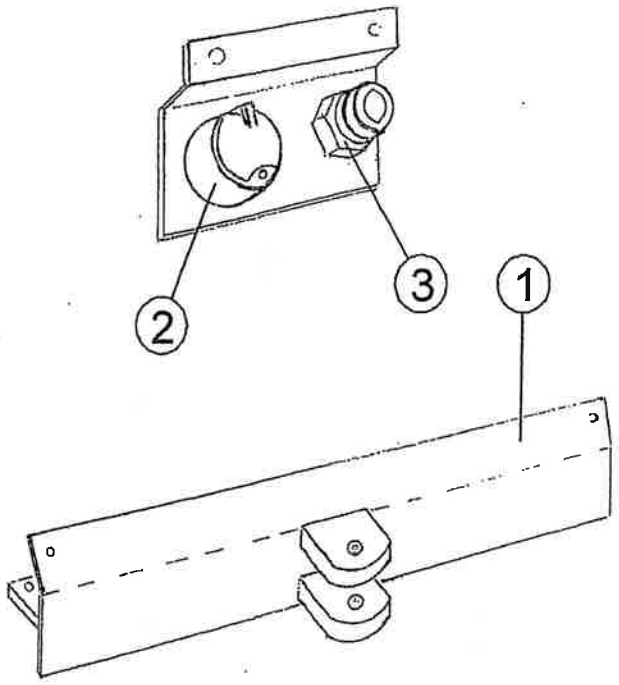
Problems and possible solutions

Problems	Probable causes	Possible solutions
 Yoke eyes opening / deforming	Excessive twisting of shafts	Fit an appropriate safety device onto the drive
	Drive too long	Upgrade the drive
 Wear on yoke arms	Excessive working angle of worn joint	Use a constant velocity joint or disengage the P.T.O. on tight bends
 Cross pins break	Excessive twisting movement	Fit an appropriate safety device onto the drive Upgrade the drive
 Rapid wear on cross pins	Excessive continuous load or excessive working angle	Check that the choice of working conditions and type are appropriate
	Lubrication intervals not respected	Respect the prescribed lubrication intervals
 Telescopic tubes disengaging during work or manoeuvring	Drive too short	Replace drive with a longer one

PROBLEMS AND POSSIBLE SOLUTIONS

Problems	Probable causes	Possible solutions
 Torsion of telescopic tubes	Excessive twisting of shafts	Fit an appropriate safety device onto the drive
		Upgrade the drive
 Rapid wear on tubes	Excessive slipping under load of drive	Use drive polyamide coated tubes. (Rilsan coated)
	Drive too short so tubes are not coupled well	Replace drive with one of an adequate length
	Poor lubrication	Lubricate as prescribed
 Rapid wear on shielding ring nuts	Poor lubrication	Lubricate as prescribed
 Shielding coming out of its seat and chain giving way	Bad chain connection	Position chain properly so that even at the maximum drive angle the chain is not under tension

REAR CLEVIS DRAWBAR
Optional



Key	Part No	Description
1	B5310	Rear Clevis Drawbar Cross Member MK4
	B5314	Rear Clevis Drawbar Cross Member HD MK2 & WB
2	70107	7 Pin Light Socket
3	51569	Hydraulic Break Connection

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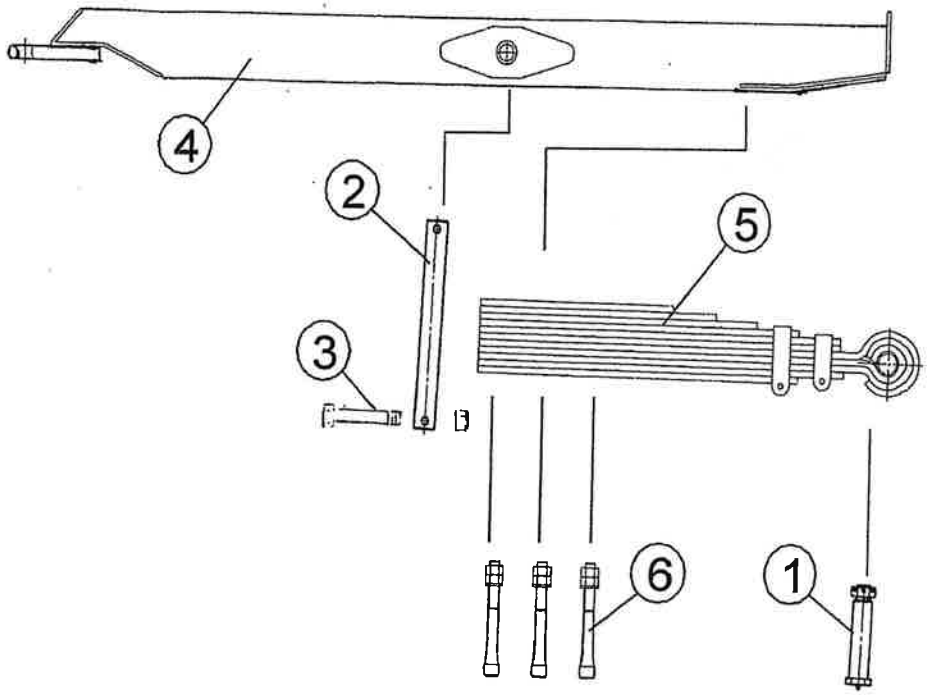
SPRUNG DRAW BAR
Optional



Key	Qty	Part No	Description
1	1	70440	Gudgeon Pin
2	1	70442/2	Pivot Pin
3	1	73102	Nut & Bolt
4	1	N / A	Drawbar To Suit Model
5	1	70438	Spring 11 Leaf up to 15 Tonne
		70438/1	Spring 13 Leaf up to 18 Tonne & Over
6	3	70439	U – Bolt 24mm for 11 Leaf Spring
		70439/2	U – Bolt 30mm for 13 Leaf Spring

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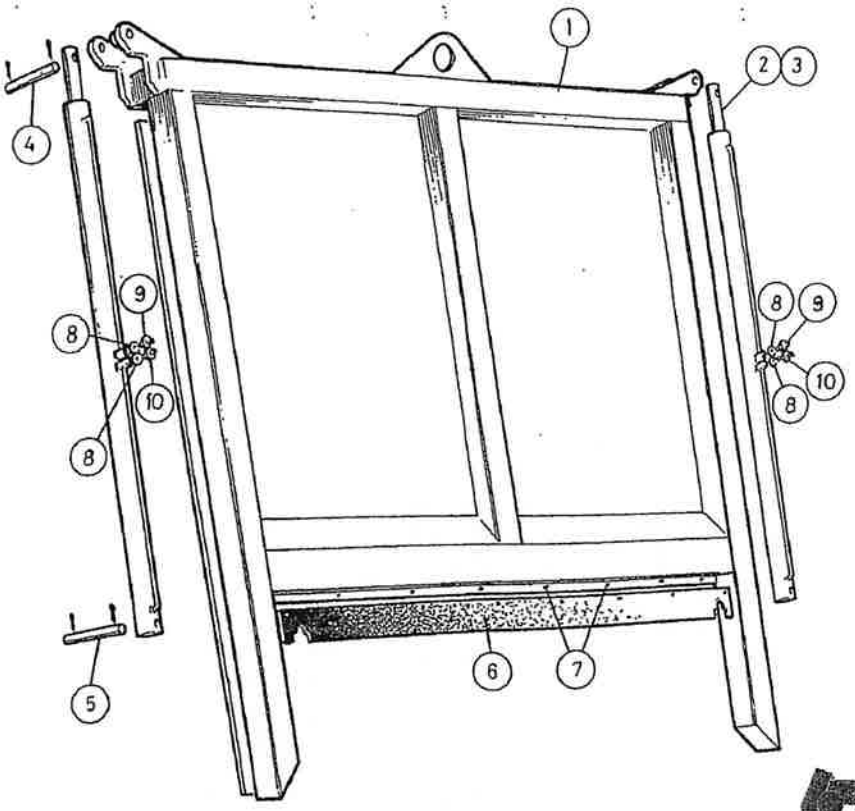
LOWLANDER MK4
GUILLOTINE SLURRY DOOR

Key.	Qty.	Part No.	Description
1	1	B4110	Door – 75/90
	1	B4112	Door 105/120/150
	1	B4115	Door with WB Augers
2	2	70879	2" Bore x 52" Stroke Ram – 75/90
	2	70880	2" Bore x 64" Stroke Ram – 105/120/150
3		70931	Seal Kit 2" Bore
4	2	B4130	Top Ram Pin Dia 5/8"
5	2	B4132	Bottom Ram Pin Dia ¾"
6	1	B4158	Rubber Seal
	1	B4166	Rubber Seal with WB Augers
7	1	B4184	Clamping Strip & M8 x 35 Bolt c/w S.L. Nuts
8	4	51590	3/8" Bonded Seal
9	2	51335	3/8" M/M Adaptor
10	2	10522	3/8" x 1/8" Restrictor



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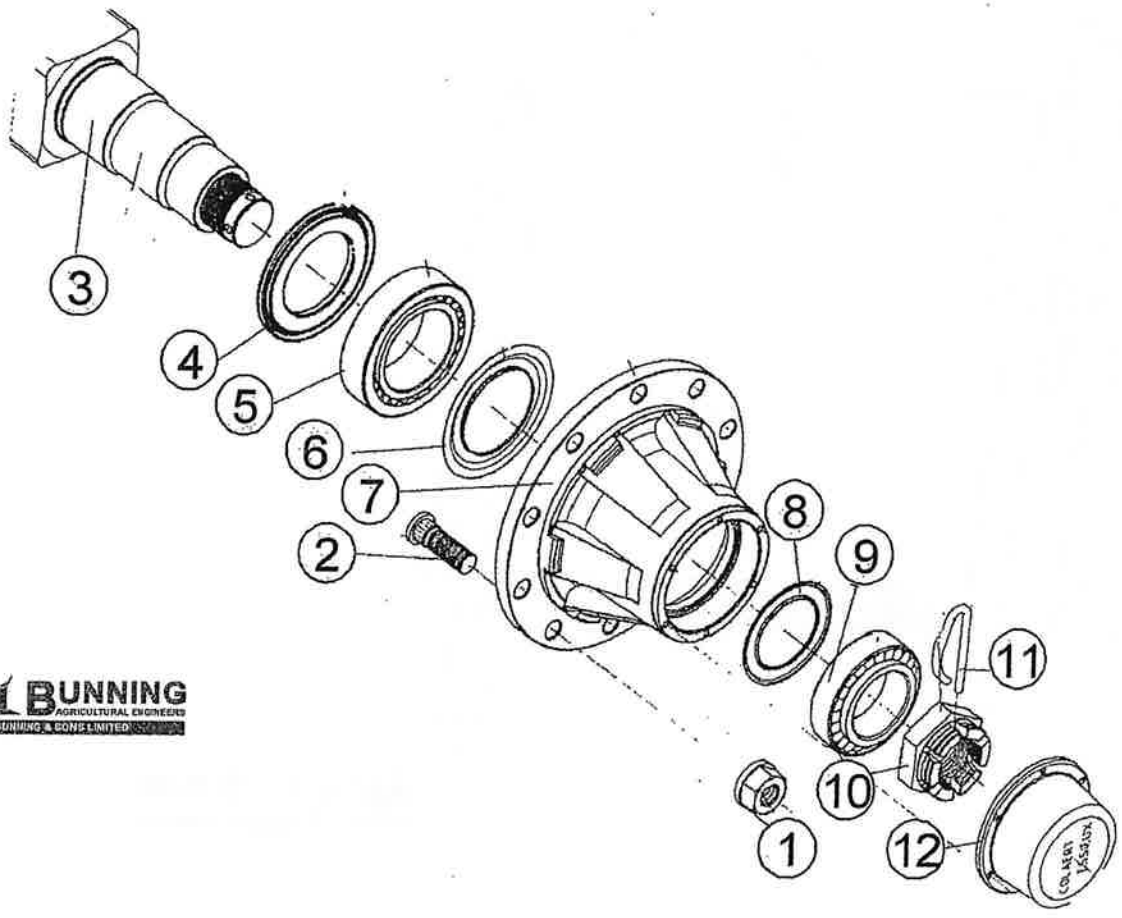
AXLE HUB & BEARING PARTS
MK 4

Model	75	90 & 105	120	150
Axle Type	EF 938	EUR 1010 – EUR 1110	EUR 1410	EUR 1510
Axle Size	90mm	100mm -- 110mm	140mm	150mm

Key	Description.	Part No.	Part No.	Part No.	Part No.
1	Wheel Nut	F00550	F00547	F00547	F00547
2	Wheel Stub	F00545/1	F00546	F00546	F00546
3	Axle	J1020	J1030/40	J1050	J1060
4/6/8	Seal Kit	F10061/3	F10061/4	F10061/5	F10061/6
5	Bearing	F10044	F10049/1	F10047	F10049
7	Hub	F10016/1	F10016/2	F10016/2	F10016/3
9	Bearing Outer	F10036	F10045/1	F10045/1	F10049/1
10	Castle Nut	F10066/1	F10066/2	F10066/2	F10066/2
11	Pin	J1060F1	J1060F1	J1060F1	J1060F1
12	Hub Cap	F10073	F10073/1	F10073/1	F10073/2



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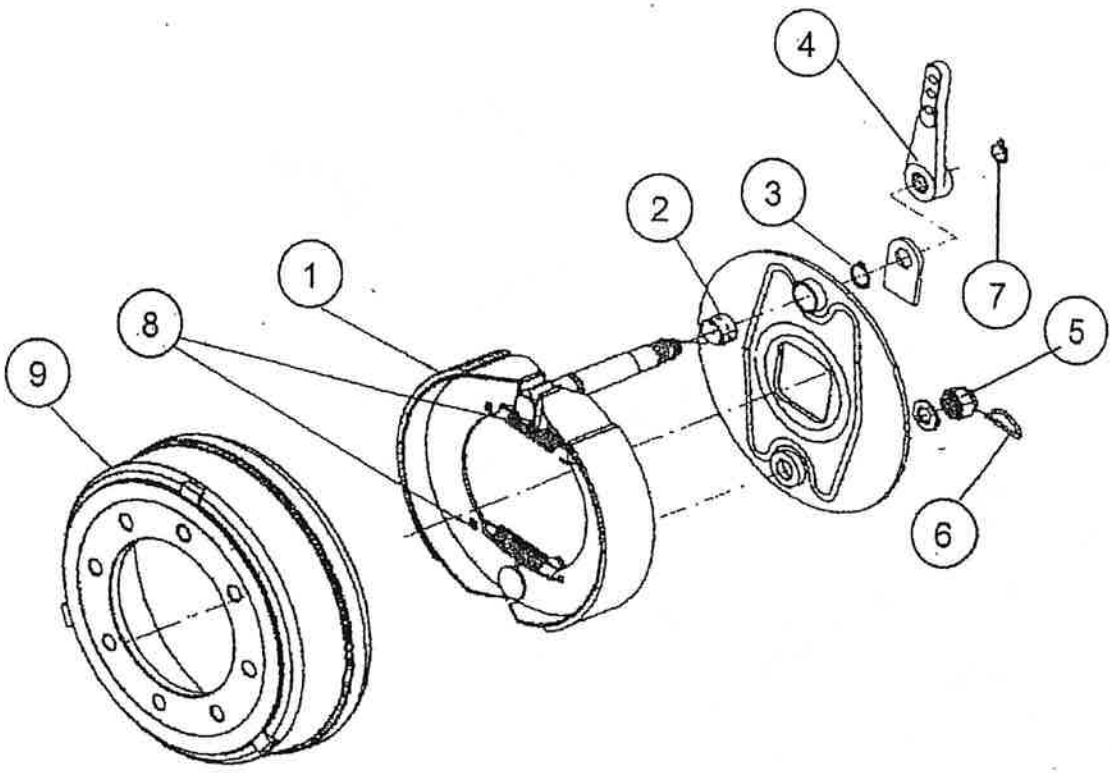
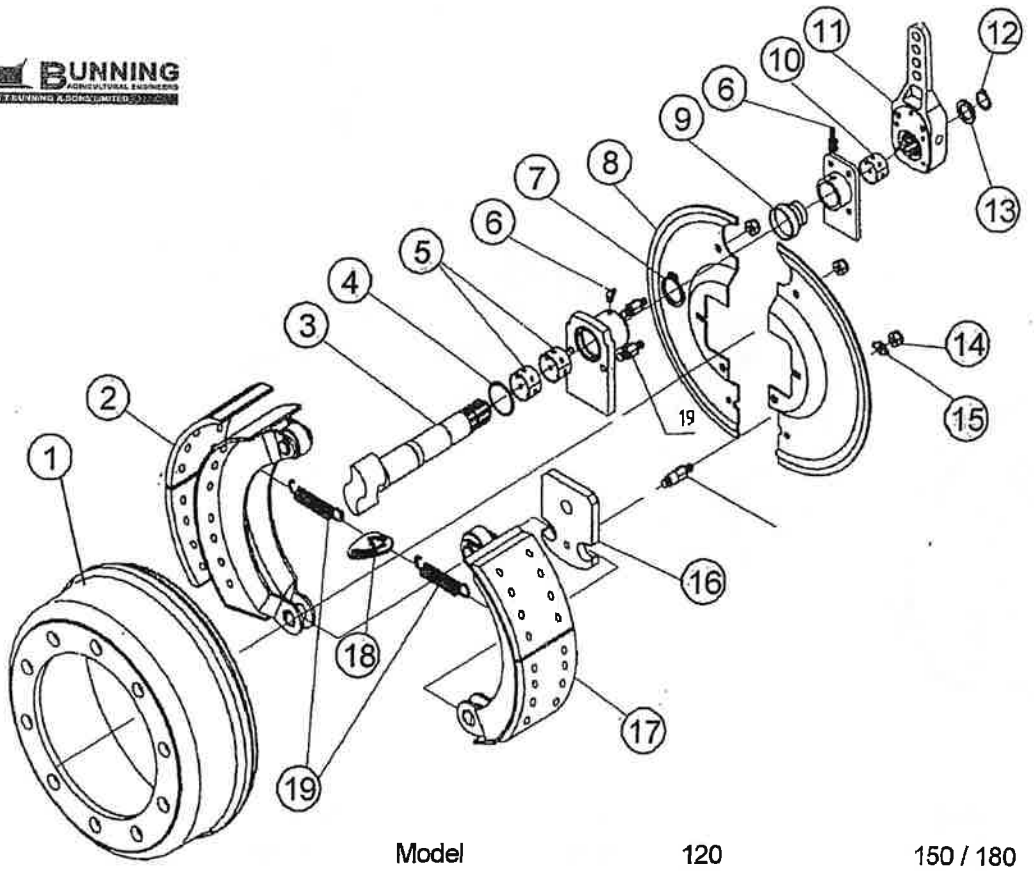
BRAKE PARTS
MK4 75/90/105



Model.	75.	90/105
Axle Type	EF938	EUR 1010/1110
Brake Type	A 410	A610
Brake Size	355 x 80	400 X 80

Key.	Description.	Part No.	Part No.
1	Brake Shoes	F10107	F10108/1
2	Brake Rod Bush	97610514	97610514
3	Circlip 38E	98900038	98900038
4	Brake Lever	F00620	F00620
5	Nut	57524B2	57524B2
6	Pin 4 x 32	98850432	98850432
7	Circlip	98900025	98900025
8	Return Spring	738123	738117
9	Drum	F0017/4	F0017/5

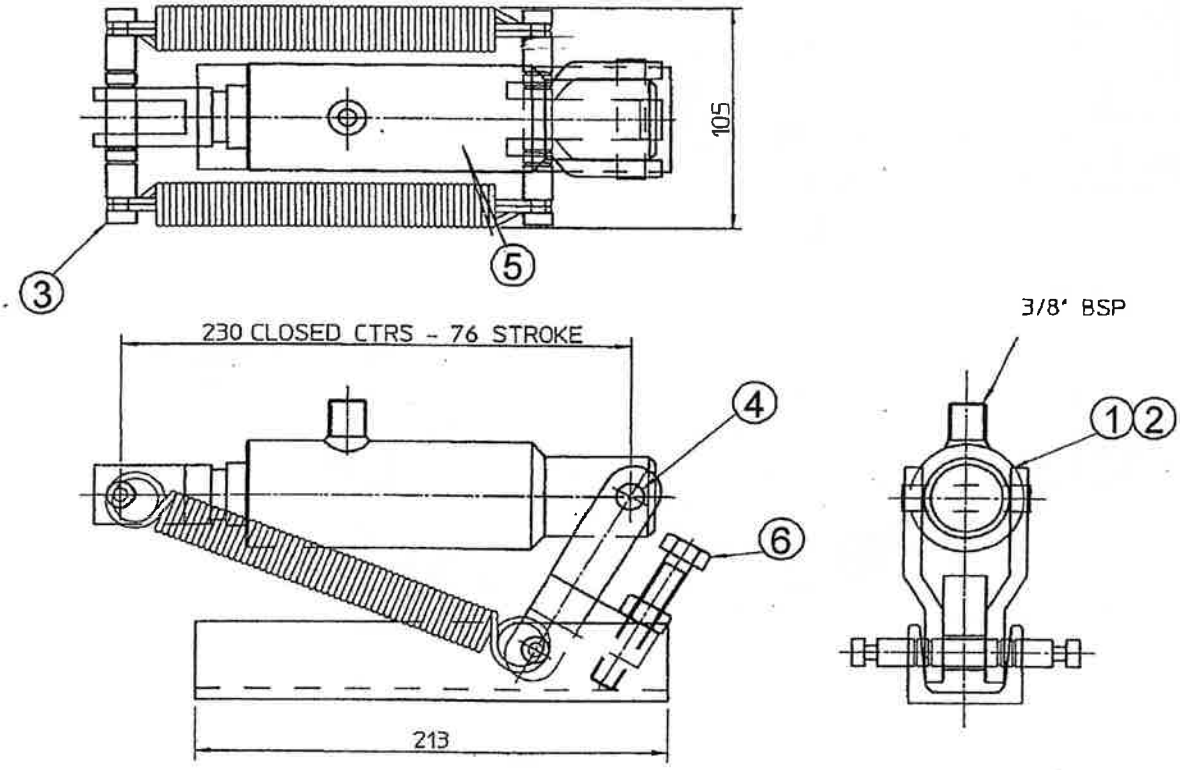
MK 4 BRAKE ARRANGEMENT
120 / 150 WB



Model	120	150 / 180
Axle Size	140mm sq	150mm sq
Brake Type	412S	414S

Key.	Qty.	Description.	Part No.	Part No.
1	2	Drum	F10017/6	F10017/7
2	4	Lining	97726D08	97726013
3	2	'S' Cam Rod	97831	97831
4	2	Washer	97770008	97770008
5	4	Bush	97610568	97610568
6	4	Greaser	50731/3	50731/3
7	2	Circlip 42E	98900042	98900042
8	2	Back Cover per pair	F10123/4	F10123/5
9	2	Rubber Boot	97610575	97610575
10	2	Bush	771382601	771382601
11	2	Brake Lever	F1030	F1030
12	2	Circlip	98900025	98900025
13	2	Washer	92630030	92630030
14	10	Nut	92411008	92411008
15	2	Tab Washer	97610579	97610579
16	2	Stud	97620583	97620583
17	2pr	Brake Shoe	F10108/2	F10108/3
18	2	Spring Tensioner	97610576	97610576
19	4	Return Spring	738119	738119

HYDRAULIC BRAKE RAM ASSEMBLY
MK4 75/90
30mm BORE



Key.	Qty.	Part No.	Description
1	2	70830/2	Ram Assembly
2	2	70831/2	Seal Kit
3	2	70830/4	Spring & Pin Kit
4	2	70836	Sellock Pin
5	2	70835/3	Cylinder
6	2	70834	Adjuster

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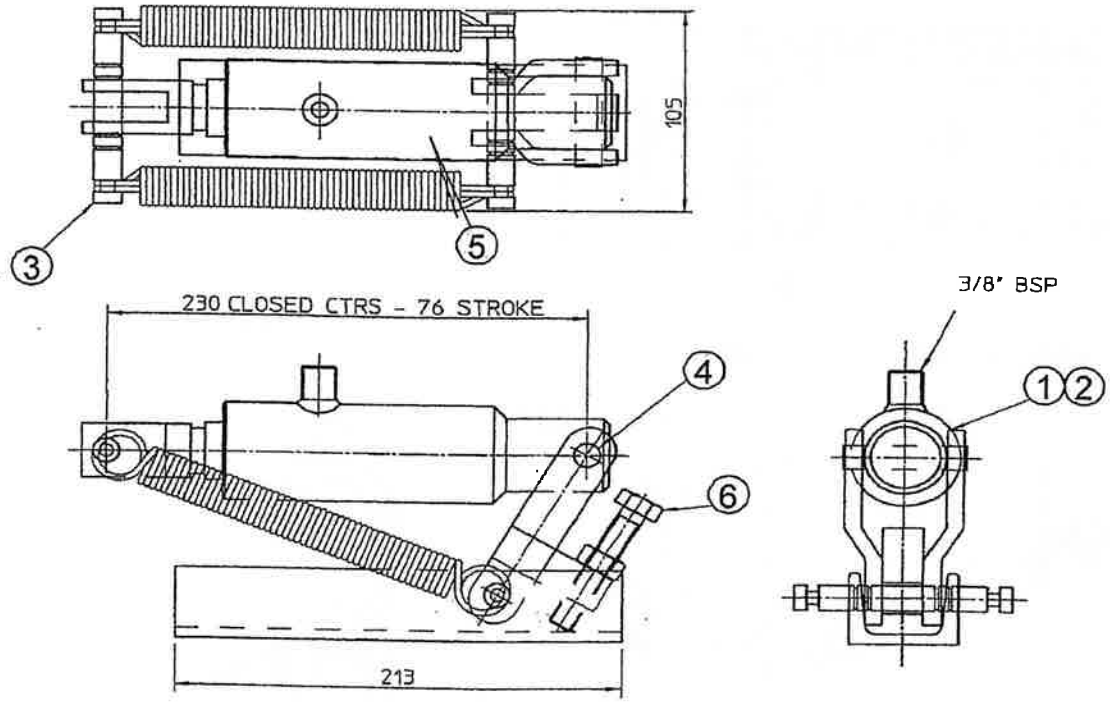
HYDRAULIC BRAKE RAM ASSEMBLY
MK4 105 / 120 / 150 & WB
35mm BORE



Key.	Qty.	Part No.	Description
1	2	70830/3	Ram Assembly
2	2	70831/3	Seal Kit
3	2	70830/4	Spring & Pin Kit
4	2	70836	Sellock Pin
5	2	70835/3	Cylinder
6	2	70834	Adjuster

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1. SAFETY NOTICE

The authors and publisher are not liable for any physical damage or personal injury resulting from errors or omissions in this manual.

Maintenance must be carried out by suitably qualified personnel using appropriate tools.

This manual describes everyday maintenance operations and does not cover major repairs.

We recommend that maintenance should be carried out by a specialised workshop.

Carrying out repairs and maintenance work may be dangerous. This safety notice describes only some of the potential hazards and is intended to make users aware of the risks and encourage them to take care.

Personal protection :
Wear appropriate personal protection equipment: goggles, mask, gloves, helmet, safety shoes, overalls, etc.
Work in the presence of another person.

Unstable vehicles :
Never work underneath or near a vehicle that has been raised using only a jack.
When working underneath or near a vehicle that has been jacked up, always make sure that the jack is used in conjunction with stands or other effective supports and that the jack and stands used can bear the weight.
Check that the vehicle is perfectly stable and that the forces applied to the vehicle while carrying out maintenance will not cause it to shift. Also check that the ground is firm.

Hot parts :
Some parts, such as brake drums, for example, may become extremely hot in use.

Pressurised hydraulic or pneumatic systems :
NB: Before carrying out maintenance on hydraulic or pneumatic systems, which may be pressurised, take all necessary precautions to avoid accidental pressure release.

Risk of fire, risks from fumes, toxic gases and irritant substances :
All fuel is highly flammable and petroleum vapour is explosive.
For cleaning and degreasing parts, use only appropriate, recognised cleaning fluids and follow the instructions on the packaging.
Avoid contact with the skin and avoid inhaling vapour, fumes or toxic gases.
Do not smoke, use a naked flame or create sparks, etc if there is a risk of explosion or fire owing to the presence of flammable vapours, fuel, oil, paint, solvents, dust, straw, etc.
A fire extinguisher appropriate for the type of risk should always be to hand.

Asbestos :
The brake linings of our axles no longer contain asbestos. We used asbestos-free linings well before EU regulations prohibited its use.
If there is any doubt about the presence of asbestos (for example, when carrying out maintenance on old axles), the brakes and linings should be handled as if they contained asbestos, as asbestos dust is a major health hazard.

Environment :
We have carefully studied the harmful effects of our products on the environment.
Respect the environment and do not dump oil, grease and used chemical products. They should be disposed of in accordance with the regulations at a waste collection point, waste disposal centre or recycling centre.

2. AXLES

2.1 General

The specifications of our axles and suspensions can be found in the general COLAERT ESSIEUX catalogue.
The catalogue provides the following information.

Axles
- The axle cross-section.
- The axle type.
- The axle loads and maximum admissible offset at speeds of 25, 40 and 60 km/h with zero offset wheels, with single, tandem or tridem axles.
- The number and size of studs and the bolt circle.
- The centre hole diameter.
- The brake dimensions (drum internal diameter and lining width).
- The braking characteristics certified by CEMAGREF and TUV.

The general catalogue also gives the admissible load on the axle assembly for different load offsets.
Exceeding these values may cause excessive bending of the axle and possibly permanent damage.

Stabiliser jacks bearing on the axles, weight transfer devices or lifting axles do not increase the maximum load on the axles or suspensions.

Suspension
- The maximum load for the suspension.
- The wheel-base.
- The type of spring, the number of leaves and the number of fixed leaves.
- The height of the axle assembly unladen and laden, for different axle cross-sections.

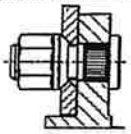
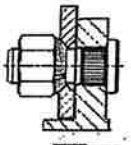
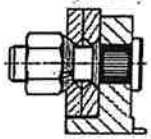
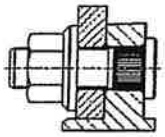
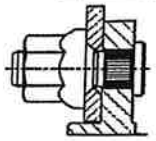
2. AXLES

2.2 Axle, maintenance and adjustment

2.2.1 Assembly and fixing of the wheels

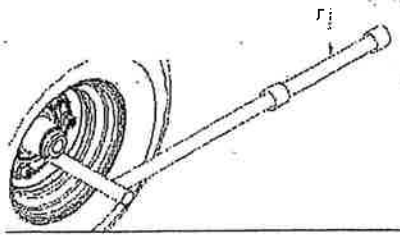
Above all to check that the type of wheel used is compatible with the nut of the wheel stud, for all the cases of fixing of the wheel with centering on the wheel stud, i.e. all those of table below except the nuts of the type M, to check that the holes of the rim have a conical part in order to receive the spherical part as of nuts DIN, the spherical washer of the plain nuts or the conical part of the nuts with "Bec ".

In the case of twim tyres, in order to ensure a good centering, it is necessary to insert a spherical washer between the flask of the hub and the rim except assembly nuts M .

NUT TYP	Spanner	Wheel stud	Tightening torque	Leverage (*L)	Force (*F)
	mm	mm	Nm	mm	Kg
DIN 	17	M12x1.5	90	300	30
	19	M14x1,5	130	300	40
	24	M18x1,5	270	450	60
Plain nut + washer 	24	M18x1,5	270	450	60
	27	M20x1,5	380	600	60
	30	M22x1,5	510	800	60
"Twin" 	24	M18x1,5	270	450	60
	27	M20x1,5	380	600	60
	30	M22x1,5	510	800	60
"M" 	-	-	-	-	-
	27	M20x1,5	450	800	55
	32	M22x1,5	650	1000	65
"Bec" 	28	M18x1,5	270	450	60
	30	M20x1,5	380	600	60
	32	M22x1,5	510	800	60

Tightening of the nuts of wheel

On lately assembled wheels, the nuts can, at the beginning, to loosen itself in consequence of a compressing. It is thus necessary to check the tightening of the nuts after the first course in load. One will proceed in the same way later on after each disassembling of wheels. To tighten the nuts, to use the adapted special spanner. If one uses the machines bolt ones for the nuts of wheel, to regulate the tightening torque well, if not the threading and the metal of the stud and nuts of wheel undergo an overload.



(*) The 2 last columns of the table are useful as reference for those which do not have a torque spanner or of pneumatic screw driver (see the figure at side).

It is allowed to use an impact spanner for disassembling, but it is absolutely necessary to avoid the tightening of the nuts with this type of spanner, because the exerted couple is unverifiable.

2.2.2 Tightening and retightening wheel nuts (Summary) :

Never use impact wrenches to tighten the wheel nuts as the impact torque may be excessive.

Wheel nuts should be tightened diagonally using a torque wrench.

If power tools are used (for example, pneumatic torque wrench) they must be carefully set to the required torque for tightening.

Otherwise, the studs and wheel nuts may be overtightened which may damage or break them.

Retighten the wheel nuts after:
- The first time of use.
- The first laden journey.
- The first 1,000 km.
- Every 6 months or 25,000 km.

Repeat every time the wheels are changed or removed.

2.2.3 Checking the hubcaps

Missing or damaged hubcaps must be replaced immediately to avoid dirt penetrating into the hub which might result in damage to the bearings.

Check that the hub caps are in place and in perfect condition.

For press fit hubcaps, check visually that they are fully home.

For hubcaps attached using screws, fit a new gasket if necessary when the hubcap is removed and retighten the screws regularly (every 6 months).

2.2.4 Checking the wheel bearing play

- After the first 1,000 km.
- Before intensive use, every 6 months or 25,000 km.

Wheel bearings are subject to wear: their lifetime depends on the operating conditions, the load, the speed, the adjustment and lubrication, etc.

To check the wheel bearings:
- Lift the wheel off the ground.
- Turn in both directions slowly to check for any rough points or friction.
- Turn it at high speed to check for unusual noises, such as grating or knocking.

If the bearing is damaged or worn, the bearing and seals should all be replaced (see paragraph 2.2.7 Replacing the wheel bearings).

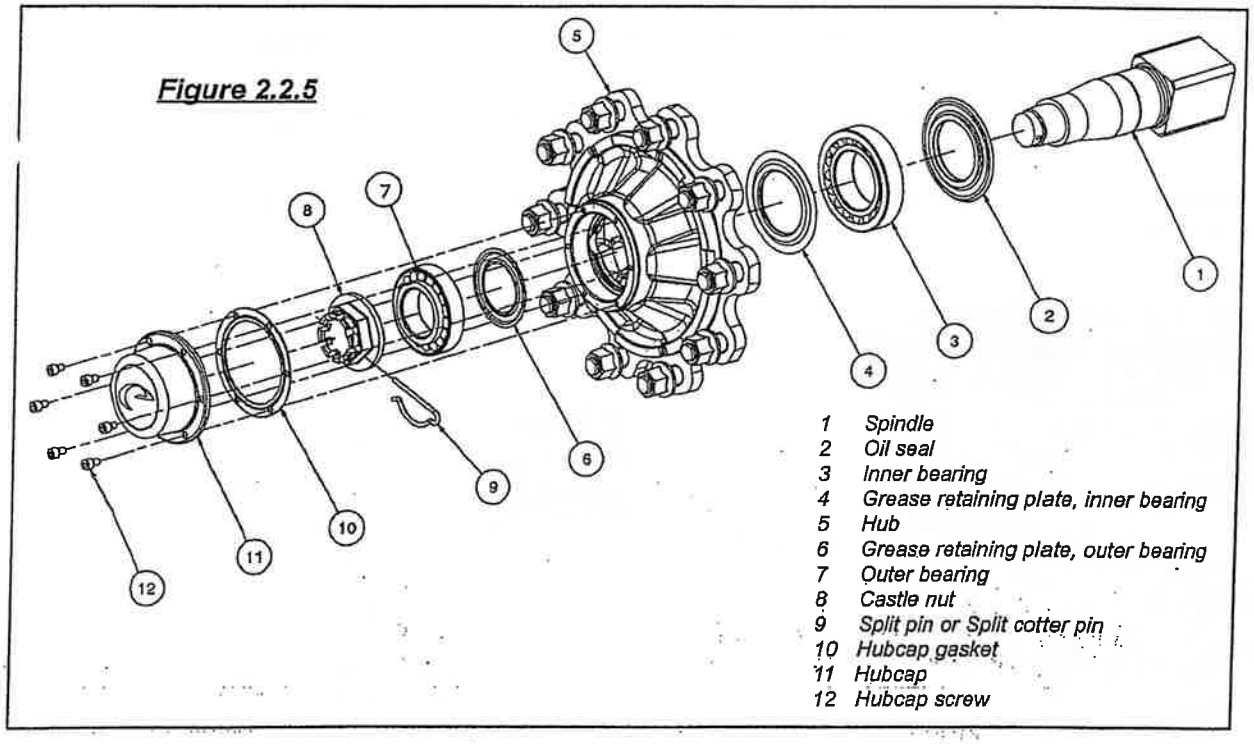
To check the wheel bearing play, raise the axle until the wheel is no longer resting on the ground ***(ensure that the vehicle cannot move)***.
Release the brake, grip the wheel at the top and the bottom and check the play by trying to tilt it. The play can also be detected by using a lever between the wheel and the ground.
If you can feel any play, adjust the wheel bearing (see paragraph 2.2.5 Adjusting the wheel bearings).

Make sure that the play does not come from the suspension or a steering axle kingpin.

2.2.5 Adjusting the wheel bearings

Lift the axle until the wheel is no longer resting on the ground.
Large wheels should be removed so that the play is easier to feel and to make it easier to adjust the bearings.

Figure 2.2.5



1 *Spindle*
2 *Oil seal*
3 *Inner bearing*
4 *Grease retaining plate, inner bearing*
5 *Hub*
6 *Grease retaining plate, outer bearing*
7 *Outer bearing*
8 *Castle nut*
9 *Split pin or Split cotter pin*
10 *Hubcap gasket*
11 *Hubcap*
12 *Hubcap screw*

- Remove the hubcap.
- Remove the cotter pin or hair-pin clip from the spindle.
- Tighten the castle nut (right-hand thread) to take up the internal play (the conical roller bearings should then be firmly held between the hub seatings, the pressure ring, spindle and castle nut).
The rotation of the hub or wheel feels to be slightly stiff.
- Slacken the castle nut until there is no longer any friction between the castle nut and the outer bearing and the hole for the pin is aligned with a notch in the castle nut.
Tap the hub gently using a mallet to shake down the assembly.
- Check that the hub rotates more freely.

- Always err on the side of too free rather than too tight.
- When the hub has been adjusted, fit a new split cotter pin or re-fit the hair-pin clip.
- Refit the hubcap.
- Refit the wheel following the instructions in paragraphs 2.2.1 (Fitting wheels) and 2.2.2 (Tightening and retightening wheel nuts).

When the wheel has been refitted, turn it slightly. It should come to rest with a slow rocking movement due to the imbalance.

2.2.6 Lubricating the wheel bearings

In normal operating conditions, lubricate the bearings every 2 years or every 50,000 km and when the brake shoes are replaced.
In harsh conditions the bearings should be lubricated more frequently.

Use a general purpose EP grease formulated for lubricating plain, ball and roller bearings, subject to heavy loads and impacts typical of HGV, agricultural vehicle hubs, etc.

All parts (hub, spindle, bearings, seals, castle nuts, hubcap, cotter pin) should be degreased and perfectly clean before reassembly.

The work should be carried out in a clean environment with appropriate tools as the slightest bit of dirt can damage the bearings or even the spindle.

When carrying out maintenance on the bearings, check the brake linings, drum and return springs, clean the brakes, clean and lubricate the brake cam shaft.

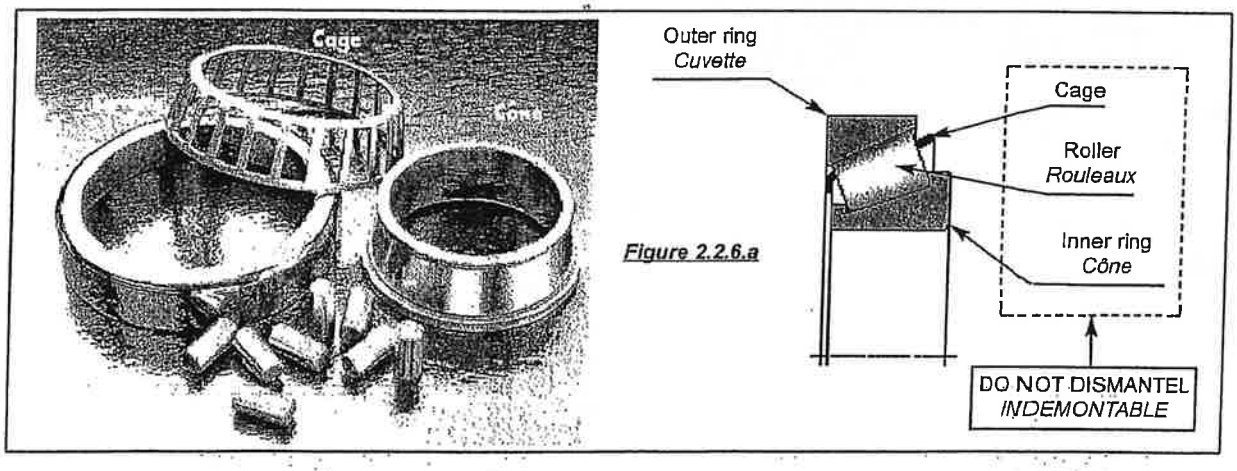


Figure 2.2.6.a

Disassembly : (See figures 2.2.5 and 2.2.6.a)

- Slacken the wheel nuts.
- Lift the axle until the wheel is off the ground.
- Remove the wheel.
- Release the brakes (make sure that the vehicle cannot move).
- Remove the hubcap.
- Remove the split pin or pin from the spindle.
- Remove the castle nut.

- Remove the drum/hub assembly. using a hub puller if necessary: the outer ring, the grease retaining plates inside the hub (depending on the model), the small bearing cone and cage come with the hub. Check these parts.
  The bearing cups and grease retaining plates can be left inside the hub for cleaning.
- Remove the large bearing cage and cone from the spindle using a bearing puller if necessary.
- Check the oil seal between the spindle and the large bearing (or the wheel bearing seal depending on the model), and replace these parts if necessary. A puller may be required to remove the wheel bearing seal. Note the orientation of the oil seal for reassembly.
- Check the contact surfaces on the spindle for the bearing and seal and the threaded end of the spindle and remove any bumps or asperities.
- Check the hub surfaces in the same way.
- Check the bearing face of the castle nut.

Clean and degrease all parts with a suitable cleaning fluid.

Reassembly :

- Grease the spindle lightly.
- Refit the oil seal or wheel bearing seal (ensure that the seal is the right way round), a punch makes it easier to fit the wheel bearing seal and avoids damaging the seal.
- Apply a generous coating of grease to the large bearing cage and rollers, making sure that the grease penetrates all round the rollers and under the cage.
- Fit at bottom the interior ring (cone) of the large bearing on the rocket, it is important to take care not to damage the cage of the bearing, to go up the cone unit, rollers and cage (figure **2.2.6.a**) on fized to use if necessary tools as shown in the figure **2.2.6.b**, the effort to push must apply only to the cone, in no case on the cage or the rollers what involves a deterioration of the bearing.
- Apply a 15 mm (small axles) or 20 mm (large axles) layer of grease all around and right across the large and small bearing cups that are still in the hub.
- If the hub does not have grease retaining plates, put a large amount of grease in the centre of the hub to act as a reservoir.
- Slide the hub/drum assembly over the spindle and the brake shoes keeping the hub perfectly straight and aligned until it is in contact with the oil seal at the back of the spindle.
- Apply a generous layer of grease to the small bearing cage and rollers and fit the assembly to the spindle.
- Fit the castle nut and adjust it as described above (See paragraph 2.2.5 Adjusting the wheel bearings).
- Lock the castle nut with a hair-pin clip or new split cotter pin as appropriate.
- For hubs without grease retaining plates, fill the hubcap with grease.
- Refit the hubcap.

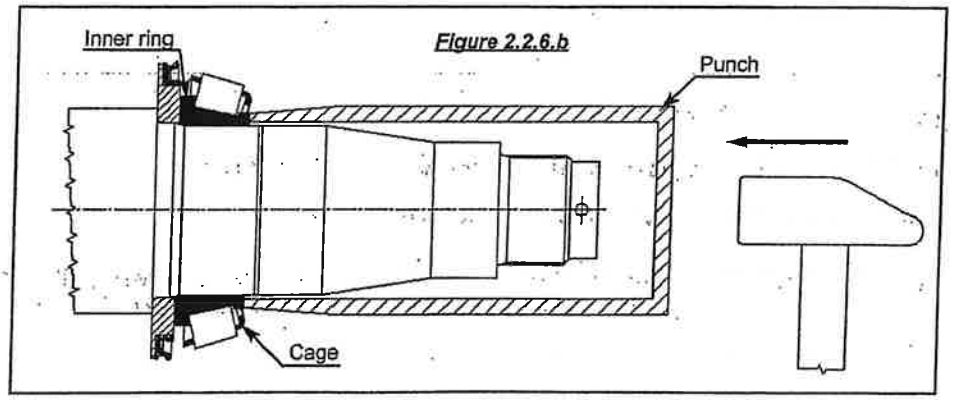


Figure 2.2.6.b

2.2.7 Replacing the wheel bearing

New grease retaining plates should be fitted to hubs with grease retaining plates (See figure 2.2.5), as the plates will be damaged while removing the bearing cups.

Unpack the bearings at the last moment and never mix them up.

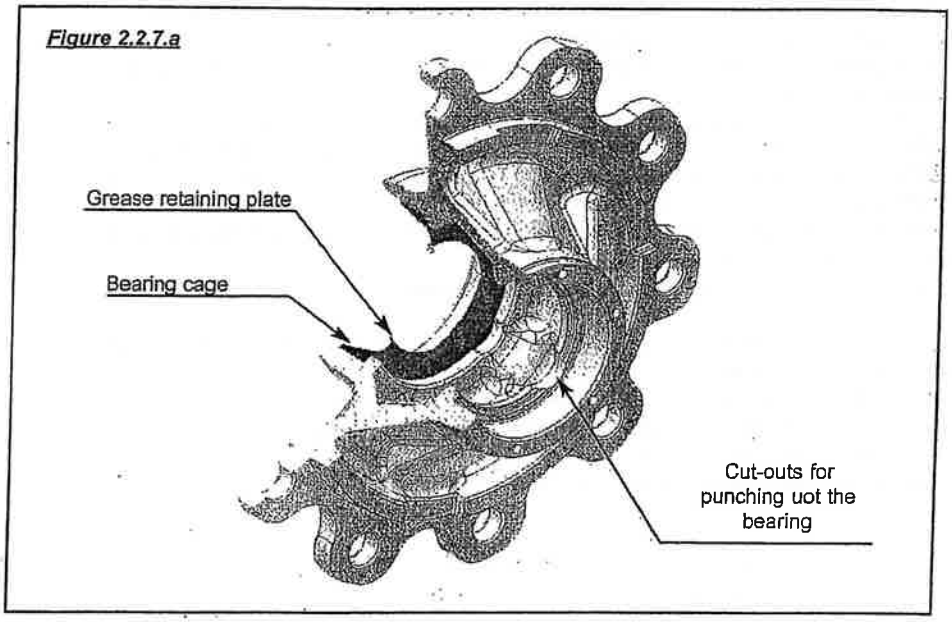
To replace the wheel bearings, follow the instructions for removing the hub (see paragraph 2.2.6 Lubricating the wheel bearings) and remove the bearing cups from the hub as follows.

Removing the bearing cups from the hub

Note the orientation of the bearing cups and grease retaining plates for reassembly.

- The bearing cups are an interference fit and must be punched out using a hammer and a mild steel punch (See figure **2.2.7.a**).
- If the hub has grease retaining plates, these will be punched out at the same time as the bearing cups and will, therefore, be damaged.

Figure 2.2.7.a



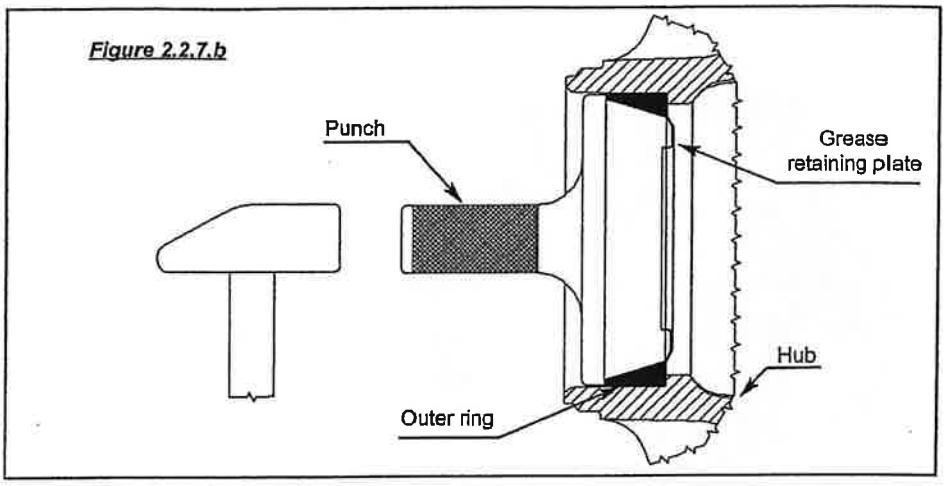
Fitting new bearing cups into the hub :

Make sure that the bearing cups and grease retaining plates are the right way round.

NB: Never fit the bearing cup with the bearing cone and rollers in place

- If the hub has grease retaining plates, first put the grease retaining plate in its seating (the right way round) and ensure that it remains well centred and in place while the bearing cup is being fitted. Re-check when the operation is complete.
- Fit the bearing cups and punch into place using a mild steel punch as shown in figure 2.2.7.b.

Take care that the bearing cups are straight and that they are firmly against the seating in the hub.



2.3 Brake maintenance and adjustment

2.3.1 Initial checks

The brakes should be tested before using for the first time and after the first laden journey:
- Check the actuator and return spring mountings, check the actuator stroke and return travel and check that the road and parking brakes operate and release correctly.
- Tighten the screws and nuts (covers, fulcrum, etc), check the cotter pins, pins, circlips, etc.
- Check for hydraulic fluid and air leaks.

2.3.2 Checking brake clearance and wear

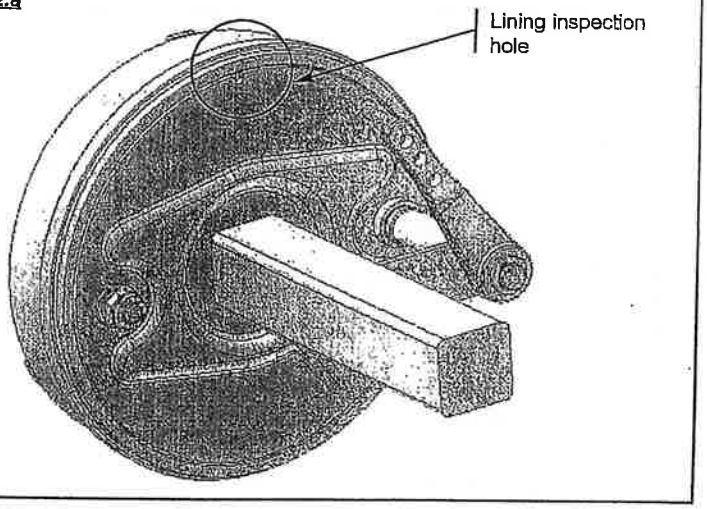
Check and test the brakes before intensive use and every 3 months:
- Check the brake wear and the clearance between the brake linings and the drum visually (See figure **2.3.2.a**). It is probable that the linings are worn when the actuator travel has increased significantly.
- Check the thickness of the brake linings (See table paragraph 2.3.5 Replacing the brake shoes for the minimum thickness).

The brake shoes should be replaced as soon as the minimum lining thickness is reached.

- Check that the brakes are clean and clean them if necessary.
- Lubricate brake cam shaft bearings with grease nipples lightly to avoid grease deposits on the brake linings and drums.
- Carry out the initial checks described above (See paragraph 2.3.1 Initial checks).

2. AXLES

Figure 2.3.2.a



2.3.3 Adjusting brakes with fixed levers

Take up the slack when the actuator stroke reaches about two thirds of the maximum travel (See figure **2.3.3.a**).

To take up the slack, turn the lever by one or more splines, ensuring that the brakes are not touching when released (to prevent overheating the brakes).

Never change the linkage position for the actuator on the lever without authorisation from the vehicle manufacturer as the vehicle will have been tested with the actuator at this position (the brake operating levers have several holes, always use the original hole).

For braking systems with a yoke, the yoke must remain parallel with the axle especially when the brakes are fully applied (See figure 2.3.3.b). This means that the stroke of the levers on the brakes at each side must be identical. Otherwise, the brake slack must be adjusted.

Figure 2.3.3.a

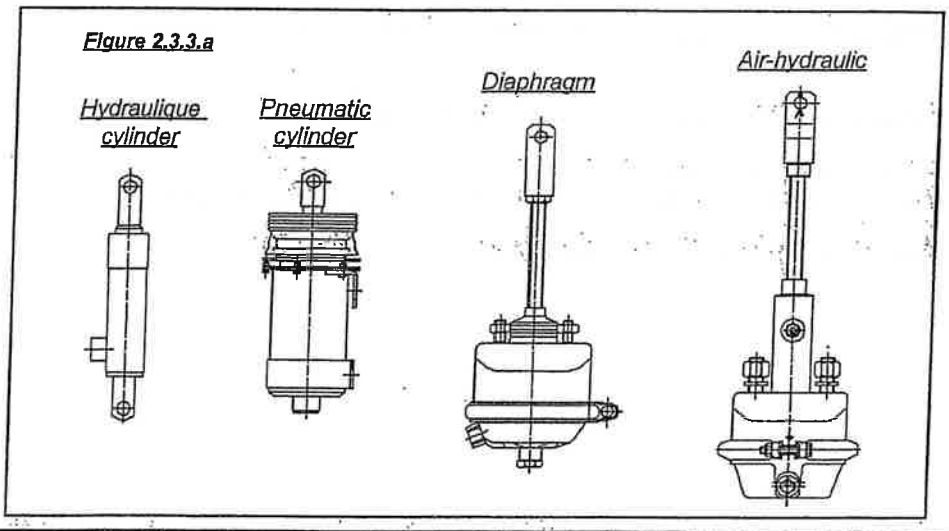
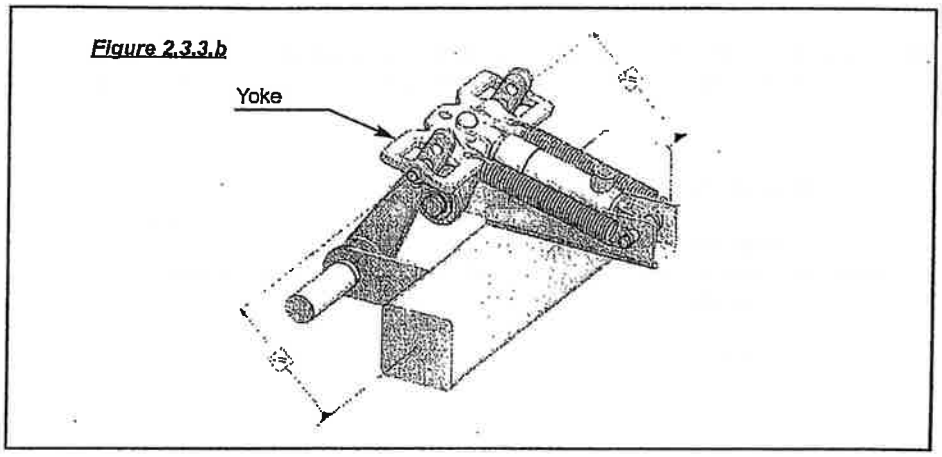


Figure 2.3.3.b



2.3.4 Adjusting brakes with adjustable levers

Take up the slack when the actuator stroke reaches about two thirds of the maximum stroke (See also paragraph 2.3.3 Adjusting brakes with fixed levers).

To take up the slack, turn the adjustment screw on the lever to adjust the relative position of the cam and the lever (See figure **2.3.4**).

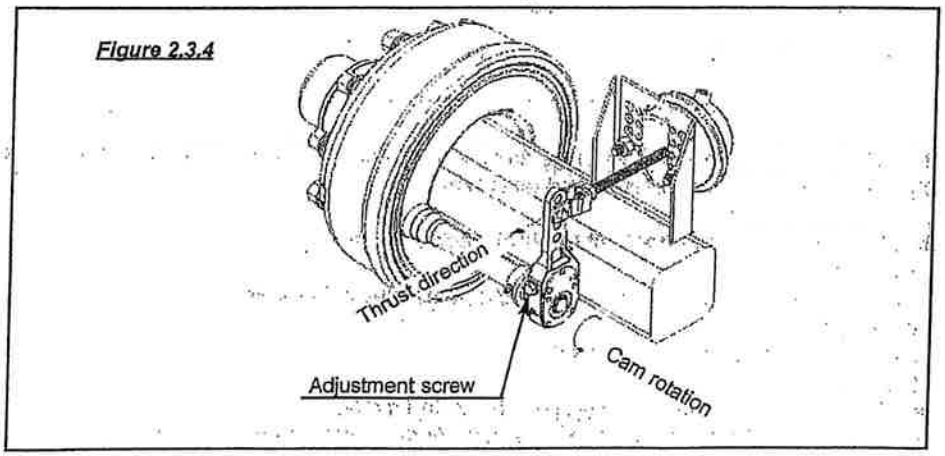
NB. The actuator brakes by pushing the lever to turn it in a particular direction. The screw must be adjusted so that the cam moves in this direction to take up the slack. The direction in which the screw must be turned depends on the configuration.

Ensure that the brakes are not touching when released (to prevent overheating the brakes).

Never change the linkage position for the actuator on the lever without authorisation from the vehicle manufacturer as the vehicle will have been tested with the actuator at this position (the brake operating levers have several holes, always use the original hole)

For braking systems with a tandem yoke, the yoke must remain parallel with the axle especially when the brakes are fully applied (See figure **2.3.3.b**). This means that the stroke of the levers on the brakes at each side must be identical. Otherwise, the brake slack must be adjusted.

Figure 2.3.4



2.3.5 Replacing the brake shoes

The brake shoes should be replaced as soon as the minimum lining thickness is reached.
When replacing the brake shoes, repack the wheel bearings with grease (See paragraph 2.2.6 Lubricating the wheel bearings).

MINIMUM LINING THICKNESS		
BRAKE TYPE	DIMENSIONS (Drum internal diameter and lining width)	Minimum lining THICKNESS
A25	250 x 60	2
A30	300 x 60	2
309E	300 x 90	2
310E	300 x 100	5
314E	300 x 135	5
316	300 x 160	5
A320	350 x 60	2
A410	355 x 80	2
A61	400 x 80	2
408E	400 x 80	2
314S	300 x 135	5
A910	406 x 120	5
A940	406 x 140	5
412S	406 x 120	5
414S	406 x 140	5

See paragraphs 2.2.5 Adjusting the wheel bearings and 2.2.6 Lubricating the wheel bearings for hub disassembly and reassembly and wheel bearing lubrication and adjustment.

When replacing the brake linings, check all the brake components.
- Condition of the drums.
- Condition of the cam shafts and levers, in particular check the play in the splines.
- Wear on the bushings.
- Condition of the bellows (depending on the model).
- Condition of the shoe return springs.
- Condition the fulcrums and their mountings (depending on the model).
- Check the rotation of the brake shoe rollers (if fitted) and lightly lubricate before reassembly.

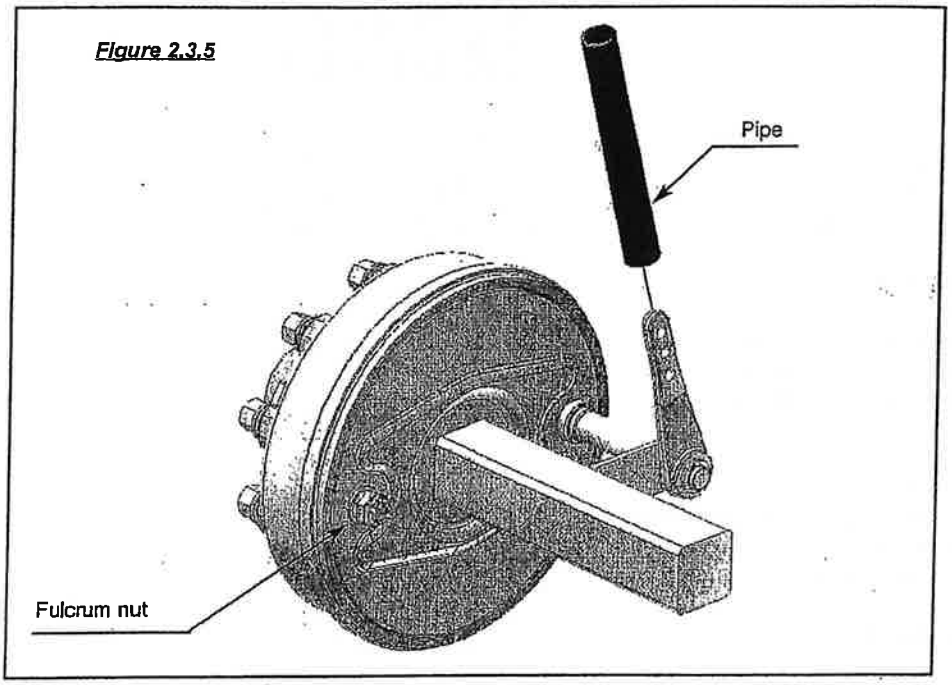
2. AXLES

Always replace any worn or damaged parts.

When reassembling, apply a thin coat of grease to all contact surfaces (cams, fulcrums, bushings, etc) being careful to avoid getting any grease on the drums and shoe linings.

For brakes with an adjustable fulcrum, centre the brake shoes before clamping the fulcrum:
When the hub/brake assembly has been reassembled, slacken the fulcrum nut slightly, operate the brake lever in the correct direction (direction of the actuator thrust) by pulling on the lever by hand. (it is easier if a pipe is placed over the lever as shown in figure 2.3.5) to press the shoes against the drum.
Clamp the fulcrum while pressing on the lever.
If the nut is locked using a split cotter pin, always use a new cotter pin.

Figure 2.3.5



11. MINIMUM PROGRAM OF MAINTENANCE

This maintenance plan is intended for normal operating conditions. More frequent maintenance may de required for harsh operating conditions (construction sites, mountains, intensive use, etc).

See the following paragraphs for detailed maintenance instructions.

	on commissioning	after the firt laden journey	after the first 1,000 km	every 3 months	every 6 months or 25,000 km	before intensive service	every 2 years or 50,000 km
2.2 Axle maintenance and adjustment							
2.2.2 Tightening and retightening wheel nuts	X	X	X		X		
2.2.3 Checking the hubcaps	X				X		
2.2.4 Checking the wheel bearing play			X		X	X	
2.2.6 Lubricating the wheel bearings							X
2.3 Brake maintenance and adjustment							
2.3.1 Initial checks	X	X		X		X	
2.3.2 Checking brake clearance and wear				X		X	
2.3.3 Adjusting brakes with fixed levers				X		X	
2.3.4 Adjusting brakes with adjustable levers				X		X	
3. Steering axles							
3.2.1 Normal maintenance				X		X	
3.2.2 Checking and adjusting the wheel alignment					X		
3.2.3 Locking cylinder maintenance and adjustment					X		
3.2.4 Adjusting the clearance, steering axles with tapered pins only						X	
3.2.5 Adjusting the steering angle						X	
4. Bogies suspension		X			X	X	
5. Basic tandem suspension and basic half-tandem suspension		X			X	X	
6. Rod half-tandem suspension, tandem and tridem		X			X	X	
7. Pneumatic suspension		X			X	X	
8. Springs drawbar		X			X	X	

TYRES AND WHEELS -1-

Maintenance of correct inflation pressure is the basic essential factor in obtaining the best performance and life from a pneumatic tyre as the air inside the tyre enables it to carry a load. It is only when the inflation pressure is correctly matched that the tyre adopts its optimum cross-sectional shape and the tread rests correctly on the road surface with the correct pressure distribution across its whole width thus allowing the sidewalls to provide the required degree of flexibility. Both performance and life of the tyres will suffer if pressures are unsuitable so both over or under inflation (or overload which has the same effect) are similarly undesirable.

UNDERINFLATION results in excessive deflection which increases the heat generated by the tyre which can lead to its eventual disinfigration. In addition the distortion of the casing will result in the lifting of the centre of the tread and thus overloading the outer edges of the tread, producing rapid wear at those points..

OVERINFLATION distorts the tyre's casing but in this case it tends to lift the outer edges of the tread off the road surface and imposes extra load and more rapid wear on the centre of the tread. Owing to reduced flexibility the tyre will be more vulnerable to impact damage, ride quality will be impaired and the wheels will be more liable to bounce which can result in skidding due to brake locking.

Unlike cars on which tyre loads do not vary greatly it is not practicable to provide standard recommendations. This is because tyre loadings and operating conditions vary widely.

Remember that spreaders travel laden one way and unladen in the opposite direction, it is therefore desirable to establish a suitable mean pressure that minimises both under inflation when loaded and excessive over inflation when running light.

WHEELS AND TYRE EQUIPMENT

Tyre size 16.9 – 14 x 34 PR14 ALLIANCE T-324 – 153A8

Wheel size DW 16 x 34 central nave 220 bore

CHECK TYRE PRESSURES REGUARLY

Tyre pressure @ 20 mph 10000 kg axle 2.5 bar 36 psi
Tyre pressure @ 6 mph 10000 kg axle 3.0 bar 44 psi

WHEEL STUD TYPE & SIZE

8 X m18 – 1.5 275 PCD

CHECK WHEEL NUTS DAILY

Wheel nut torque 270nm 200lb / ft

WHEELS AND TYRE EQUIPMENT

Tyre size 18.4 x 34 PR14 ALLIACE T – 324 153A8

Wheel size DW 16 x 34 central nave 280 bore

CHECK TYRE PRESSURES REGULARLY

Tyre pressure @ 20 mph 10170 kg axle 2.5 bar 36 psi
Tyre pressure @ 6 mph 13000 kg axle 2.5 bar 36 psi

WHEEL STUD TYRE & SIZE

10 X m22 – 1.5 335 pcd

CHEEK WHEEL NUTS DAILY

Wheel nut torque 510nm 375lb / ft

WHEEL AND TYRE EQUIPMENT

Tyre size 580 / 70 R38 ALLIANCE A-370 170A8

WHEEL SIZE W18A X 38 – 45 offset 280 bore

CHECK TYRE PRESSURES REGULARLY

Tyre pressure @ 20 mph 10170 kg axle 2.0 bar 29 psi
Tyre pressure @ 6 mph 15000 kg axle 2.0 bar 29 psi
Tyre pressure @ 6 mph 17000 kg axle 2.5 bar 36 psi
Tyre pressure @ 6 mph 18000 kg axle 2.8 bar 41 psi
Tyre pressure @ 6 mph 20000 kg axle 3.0 bar 44 psi

WHEEL STUD TYRE & SIZE

10 X M22 – 1.5 335 PCD

CHECK WHEEL NUTS DAILY

Wheel nut torque 510nm 375 lb / ft

WHEEL AND TYRE EQUIPMENT

Tyre size 710 / 70 R38 ALLIANCE A – 360 170 A8

Wheel size DW 23a x 38 – 50 offset 280 bore

CHECK TYRE PRESSURES REGULARLY

Tyre pressure @ 20 mph 10170 kg axle 1.7 bar 25 psi
Tyre pressure @ 6 mph 15000 kg axle 2.0 bar 29 psi
Tyre pressure @ 6 mph 17000 kg axle 2.0 bar 29 psi
Tyre pressure @ 6 mph 18000 kg axle 2.3 bar 33 psi
Tyre pressure @ 6 mph 20000 kg axle 2.5 bar 36 psi

WHEEL STUD TYRE & SIZE

10 X M22 – 1.5 3335 pcd

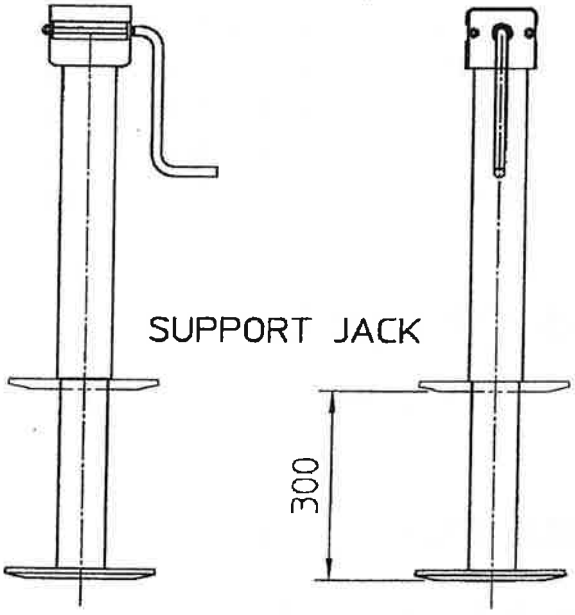
CHECK WHEEL NUTS DAILY

Wheel nut torque 510 nm 375 lb / ft

Support Jack

Type J10403-S

Part No. 70306

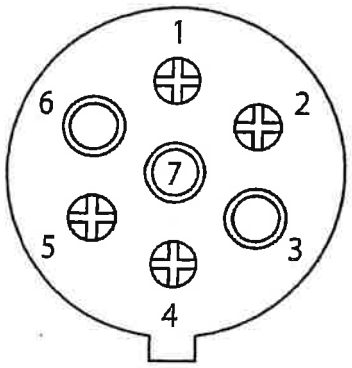


WIRING FOR 12v 7 PIN PLUG

N TYPE (NORMAL) I.S.O.1724

SPREADERS-SLURRY TANKERS
TIPPERS-FUEL & WATER BOWSERS

AGRICULTURAL SPEED



1 - YELLOW - Y - L.H.INDICATOR
2 - BLUE - B - FOG
3 - WHITE - W - EARTH
4 - GREEN - G - R.H.INDICATOR
5 - BROWN - BR - TAIL
6 - RED - R - STOP
7 - BLACK - BL - SIDE MARKERS

PINS 5 & 7 MAY BE LINKED

COLAERT ESSIEUX

NOTES