Thank you for buying a Bunning spreader.
For your Bunning guarantee please fill in the form below and return it to G.T. Bunning Ltd.

LOWLANDER WARRANTY REGISTRATION FORM	
Customer Name	
Company Name	
Address	
Post Code	
Telephone	
Fax	
Email	
Machine ID Number	
ID No. Example	01/01/9999/U/MSL60
Date of delivery	
Dealer	

Important Data Protection Information.
We or our business partners may contract you by mail, telephone, e-mail or other electronic messaging services with offers of goods and services or information that may be of interest to you.
By providing us with your telephone number or email address you consent to being contacted by these methods.
If you do not wish to receive marketing information by these methods from GT Bunning or our business partners please tick this box. ☐

GT Bunning & Sons Ltd
The Green
Gressenhall, Dereham
Norfolk
NR20 4DT ENGLAND

Bunning Lowlander Mk4 60

Pre-Delivery Inspection sheet

The purpose of this document is to ensure that the operator, hirer or owner is fully appraised of all safey guidelines and operating and maintenance methods before taking possession of the machine.

GENERAL		
1	Ensure the operator receives a copy of the instruction & spares manual.	
2	Draw attention to the safety decals located on the machine.	
3	Explain the functions of the machine.	
4	Locate, identify & explain spreader to towing vehicle air ,hydraulic and electric connectors.	
5	Check oil level of floor drive gearbox and auger drive gearbox.	
6	Explain how to cut the PTO guard to size and where to fit the safety chains.	

LIGHTING		
12	Check operation of lights	
13	Check condition of cabling & 7 pin connector.	

BRAKING		
7	Check operation of parking brake.	
8	Check operation of service brake.	

HYDRAULICS & PNUEMATICS		
14	Check hydraulic hose condition especially brake hoses & connectors.	
15	Check hydraulic cylinder for leaks and damage.	
16	Check air system hose condition and connectors. (Option).	

STRUCTURE		
9	Check condition of body, drawbar & augers	
10	Check condition of all cylinders & pins.	
11	Grease all points if necessary.(see manual).	

WHEELS & TYRES		
17	Check condition of tyres.	
18	Ensure tyre pressures are correct for speed & load.	
19	Check wheel nut torque. (Check daily for first week of use)	

DATE:	SIGNATURE	
I have received a copy of the instruction & spares manual and understand the method of operation, the safety requirements and the maintenance methods.		OPERATOR
I have given basic instruction in the method of operation, the position of safety stickers and methods of maintenance, and ensured that the owner/operator is in possession of the Manual.		DEALER

CHASSIS SERIAL NUMBER……

PREFACE

The instructions in the manual must be read carefully and followed by all persons concerned with the operation, maintenance, repair or inspection of this machine in order to prevent accidents.

Read especially sections relating to safety, operating instructions and maintenance.

The use of spare parts, accessories and additional equipment which is not originally manufactured checked and release by GT Bunning Ltd can have a negative effect on specific design features of the machine and on its operability. This may impair its operating safety, as well as safety at work for the operator and could invalidate warranty.

GT Bunning will in no way be liable for damage or personal injury caused by the use of other than original GT Bunning parts, accessories and additional equipment.

Technical specifications, dimensions and weights are given with the usual tolerances (+/-2%).

GT Bunning Ltd operates a policy of continual improvement; as such some items in this manual may differ slightly from that of your machine. GT Bunning reserves the right to make changes to the machine or manual without notice. If in any doubt regarding any aspect of the design or operation of this machine contact GT Bunning Ltd or your GT Bunning Ltd agent for clarification.

HOW TO USE THIS MANUAL

The manual contains sections that cover all of the following, Safety, Operating instructions, Maintenance, Specifications and Technical data. Refer to the contents pages for the relevant page number.

Before use of the machine familiarise yourself with the manual and its contents

The machine should only be operated, serviced and repaired by persons who are familiar with the machine and who have read and understood this manual, and are informed of the risks.

This manual should stay with the machine/operator at all times.

OPERATING ON PUBLIC ROADS

Before operating on public roads the spreader must be correctly connected to the towing vehicle, the lights must be connected and function of the lighting equipment must be checked. The braking system of the spreader must be correctly connected to the towing vehicle, check for correct operation.

INTRODUCTION

This manual provides information on the use, adjustment and servicing of the GT Bunning range of Lowlander spreader.

Following the advice on the correct maintenance and servicing procedures will ensure maximum performance and a long service life of your machine.

Failure to carry out maintenance work correctly or incorrect operation will result in poor machine efficiency and loss of valuable time.

By ensuring the correct operation, and by carrying out maintenance and service work with care, you will be able to make full use of the technical knowledge and the experience with which your Lowlander spreader was originally designed.

DISPOSAL

Upon completion of the useful life of the machine, all parts can be disposed of at a suitable waste disposal facility.

Care must be taken if oxy-acetylene cutting equipment is to be used.

The wheels and tyres, hydraulic cylinders, valves and hoses must be removed before using cutting equipment.

Oil must be drained collected and disposed of in accordance with current legislation.

Electrical components must be disposed of in accordance with the relevant legislation.

G.T.BUNNING & SONS LIMITED

SPREADERS, TRAILERS & TANKS

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Registered Office:
Smithy House,
TheGreen
Gressenhall, Dereham
Norfolk, NR20 4DT

EC MACHINERY DIRECTIVE
2006/42/EC
DECLARATION OF CONFORMITY

We hereby ceritify that the machinery stipulated below complies with all the relevant provisions of the EC Machinery Directive 2000/42/EC & regulations adopting the Directive.

Modifications to this machine without prior written approval from the undersigned will render the declaration null & void.

Machine Description: Unbalanced trailer for the carriage & application of manure

Machine Type: Agricultural manure spreader

Model: **Lowlander MSL60**

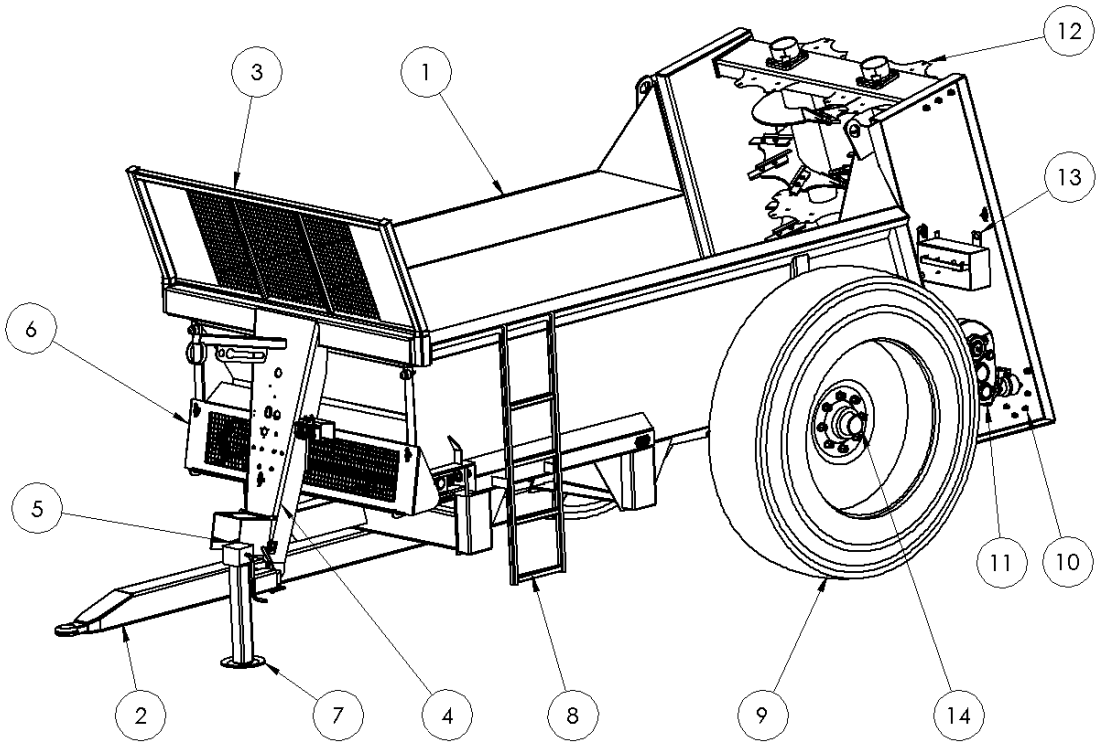
Serial Number: / / /U/MSL

Standards used.
BS ISO 4251-1:2005+A1:2012, BS EN ISO 12100-1:2010, BS EN ISO 4254-1:2009, BS EN 690: 1994+A1:2009, BS EN 15811: 2009, BS EN ISO 13857:2008, BS EN 349:1993+A1:2008, BS EN 12965:2003+A2:2009, BS EN 953:1997+A1:2009, BS EN ISO 5674:2009, BS ISO 4413:2010.

Signed Greg Shepherd
Name: Greg Shepherd

Date :
Position: Joint Managing Director

MACHINE OVER VIEW



MACHINE OVER VIEW PARTS LIST

KEY	QTY	DESCRIPTION
1	1	BODY
2	1	DRAWBAR
3	1	STONE GUARD
4	1	FRONT PILLAR
5	1	PTO DRIVE LINE
6	1	FINGER GUARD
7	1	SUPPORT LEG
8	1	LADDER
9	2	WHEEL & TYRE ASSEMBLY
10	1	AUGER GEARBOX
11	1	FLOOR DRIVE GEARBOX, MOTOR AND VALVE
12	2	AUGER
13	2	LAMP ASSEMBLY
14	1	AXLE

1. OPERATING INSTRUCTIONS

The intended purpose of the vehicle is to tow and spread manure and other materials.

1.1 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 the front of spreader.

Turn off the tractor engine and remove the key.

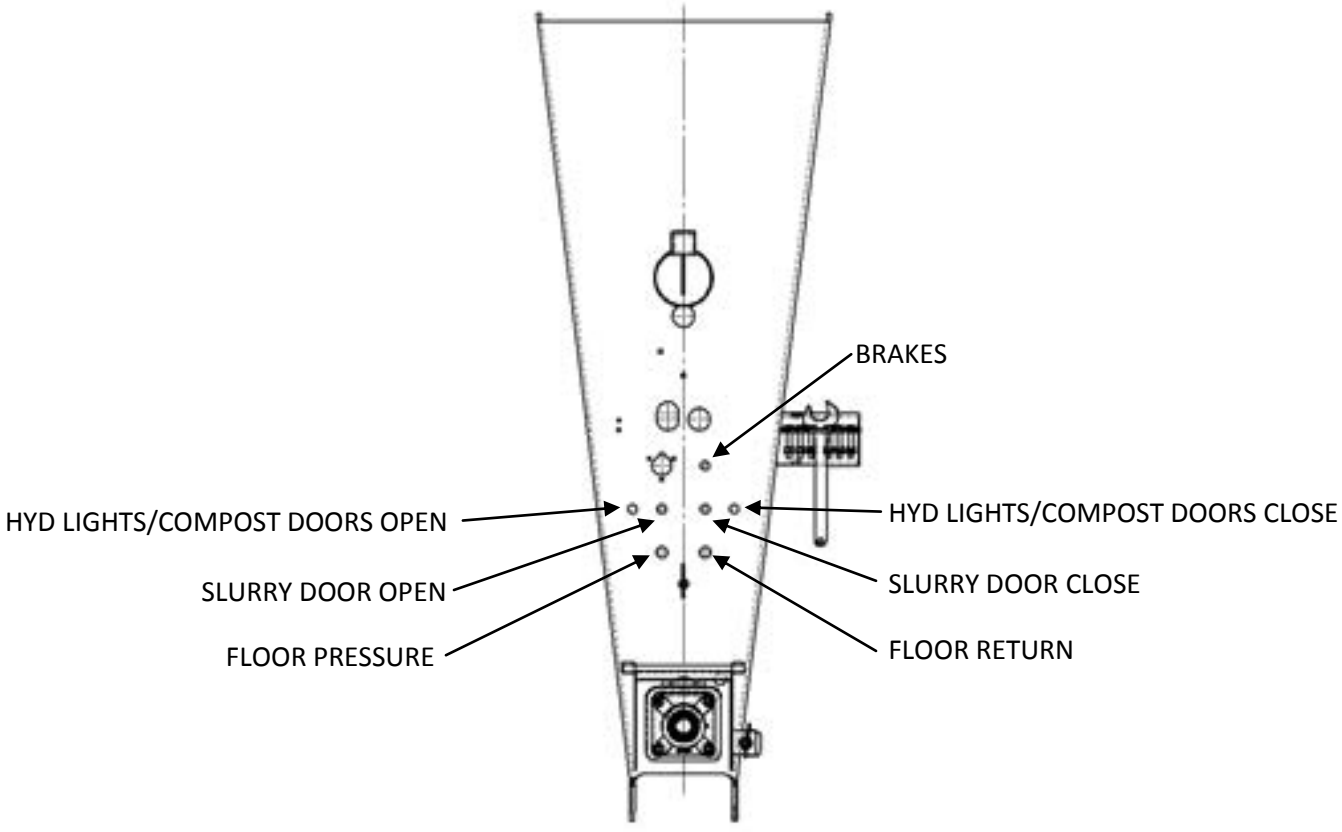
Slide the tractor end of the PTO shaft out and fit to the tractor PTO. Lay the two halves of the PTO shaft alongside one another and mark the required lengths, allowing for turning. Maximum pull out of 300mm (12 inches) of the 2 shafts. Cut to size and clean burrs at each end of shaft **KEEP SHAFT SLIDING SURFACES GREASED.** Attach chains fitted to PTO guard (to prevent rotation of guard) to suitable point on the 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 the PTO when turning sharply to avoid damage to shafts universal joints. Where a wide angle PTO is fitted attach this end to the tractor. Please refer to the DVD for more information.

1.2 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 done by selecting the opposite position of hydraulic control lever. 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 hoses 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**.
Only reverse floor for a few seconds.

Ensure the braking system is connected and that it functions correctly before moving.



1.3 Hand brake.

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 in the opposite direction. This releases the ratchet mechanism.

1.4 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 the spreader, slacken the locknut in the set screw and turn the set screw clockwise. (See section 7)
BEWARE NOT TO OVER ADJUST. Make sure the wheel can rotate freely.

1.5 Floor 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 ADJUSTED CORRECTLY AT ALL TIMES, A GUIDE IS TO BE ABLE TO SEE A WHOLE LINK BELOW FRONT BOTTOM EDGE OF SPREADER i.e. FROM CENTRE TO FRONT.

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.

1.6 Method of operation.

1) Select speed of floor required on control valve.
2) Engage PTO to power the rear augers – tractor engine revs low.
3) Raise slurry door to required height if fitted.
4) Engage spool valve to power floor to rear.

1.7 Slurry Door

As the load height reduces lower the slurry door to cover the augers. This will help prevent foreign objects being thrown forward.

2. MAINTENANCE

2.1 Lubrication of spreader.

DAILY GREASE	Front and rear floor shaft
	Overrun clutch to front of main 'T' gearbox
	Hitch eye
WEEKLY GREASE	All sealed bearing – 1/2 pump of grease gun maximum.

TAKE CARE NOT TO DAMAGE GREASE SEAL BY OVERGREASING

Sliding tube of PTO shaft.
PTO universal joints – **Follow manufacturers instructions.**
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

2.2 Servicing intervals

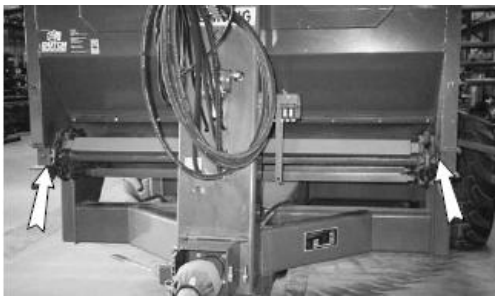
The period recommended is based on normal operating conditions. Severe or unusual conditions may require more frequent lubrication or oil changes.

IMPORTANT: *ENSURE CV JOINT IS GREASED BEFORE FIRST USE!*
TAKE CARE NOT TO DAMAGE SEALS BY OVERGREASING.

DAILY (8 HRS)

1. Check for hydraulic fluid leaks and damaged hoses.
2. Grease Front and Rear floor chain shaft bearings.

a. Front shaft.
- Remove front Finger Guard to access bearings.



b. Rear Shaft.

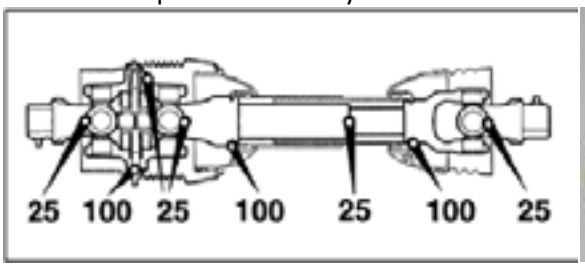
- Grease both left and right bearings.

3. Grease the Overrun Clutch to front of the auger gearbox.

WEEKLY (40 HRS)

1. Check wheel nuts. Re-torque as needed.
2. Grease all sealed bearings
   a. Driveline hanger bearings (2 or 3 depending on model).
   b. Top auger bearings (Grease nipples access provided on right turret).
3. Grease the telescoping section of the PTO shaft.

4. Grease PTO input drive system.
    a. Input shaft.
    b. Cross joint fittings.
    c. Guard bearings.
    d. Shear bolt housing.
    e. Over-running clutch (5 pumps).
5. Grease the implement jack top.
6. Check gearbox oil level
    a. Floor Chain Drive Gearbox
        - Oil should be level with the middle of the sight glass.
        - Add oil as required through the top plug.
    b. Auger Gearbox
        - Spreader must be unhooked from tractor and set on level ground to check oil. Oil should be level with the middle of the sight glass.
        - Add oil as required through the top plug.
        - Oil may take a while to distribute in casing, recheck level after 30 – 40 minutes and repeat if necessary.



MONTHLY

1. Apply grease or heavy oil to apron chain.
2. Grease telescoping section of PTO shaft.

3. Grease the CV Joint of PTO shaft (15 pumps)
4. Grease suspension system spring bushings on each side.
5. Grease brake pivot bushings (Tandem Suspension machines).
6. Grease parking brake leaver joint.
7. Check and adjust the apron chain tension. Refer to section 5.2.2 - page 50.

ANNUALLY

1. Change oil to all gearboxes.
2. Check the condition of the frame sealing flaps. Replace if not sealing the sides or bottom.
   a. Front.
   b. Rear Slurry Door Auger Deck.
3. Check brake setting.

   Brakes can be checked by depressing the brake petal with the engine running and the tractor in gear; release clutch to determine brake adjustment.
4. Check condition of rotor blades and paddles. Repair when there are loose bolts, cracked welds, chipped, bent or broken blades or paddles. Replace when any components are worn within 1 inch (25 mm) of flighting.
5. Clean machine.
6. Check general hardware/bolt tightness. Retighten if necessary.

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.

2.3 SERVICE RECORD

See Lubrication and Mainteneance sections for details of service. Copy this page to continue record.

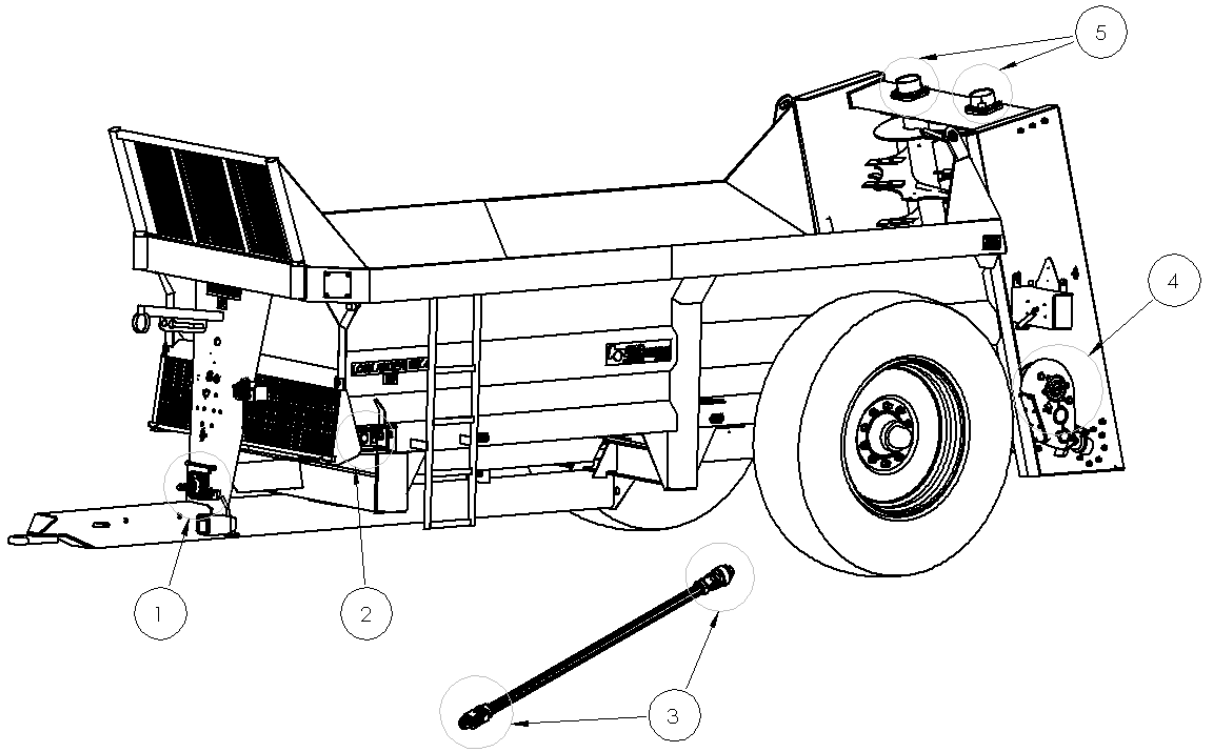
ACTION CODE CK = CHECK CL = CLEAN G = GREASE

MAINTENANCE \ HOURS / SERVICED BY																								
25 Hours or Monthly																								
G PTO Driveline																								
G Telescoping Section PTO																								
G PTO Input Drive System																								
G Hub Ratcheting Mech.																								
G Apron Chain Shaft Bearings																								
G Roller Bearings																								
CK Oil Levels in Gearboxes																								
G Apron Chain																								
100 Hours or 4 Months																								
G Telescoping Section PTO																								
G Spring Bushings																								
G Brake Pivot Bushings																								
G Tandem Pivot																								
CK Apron Chain Tension																								
Annually																								
CK Sealing Flaps																								
CK Brake Settings																								
CK Rotor Blades & Paddles																								
CL Machine																								

2.4 Shearbolt Protection.

Only one shearbolt is fitted to the spreader. This is located on the spreader end of the PTO shaft. The bolt is M10 x 60 grade 6.8 mild steel.
ON NO ACCOUNT MUST A BOLT OF HIGHER GRADE THAN 6.8 TENSILE STRENGTH BE FITTED.

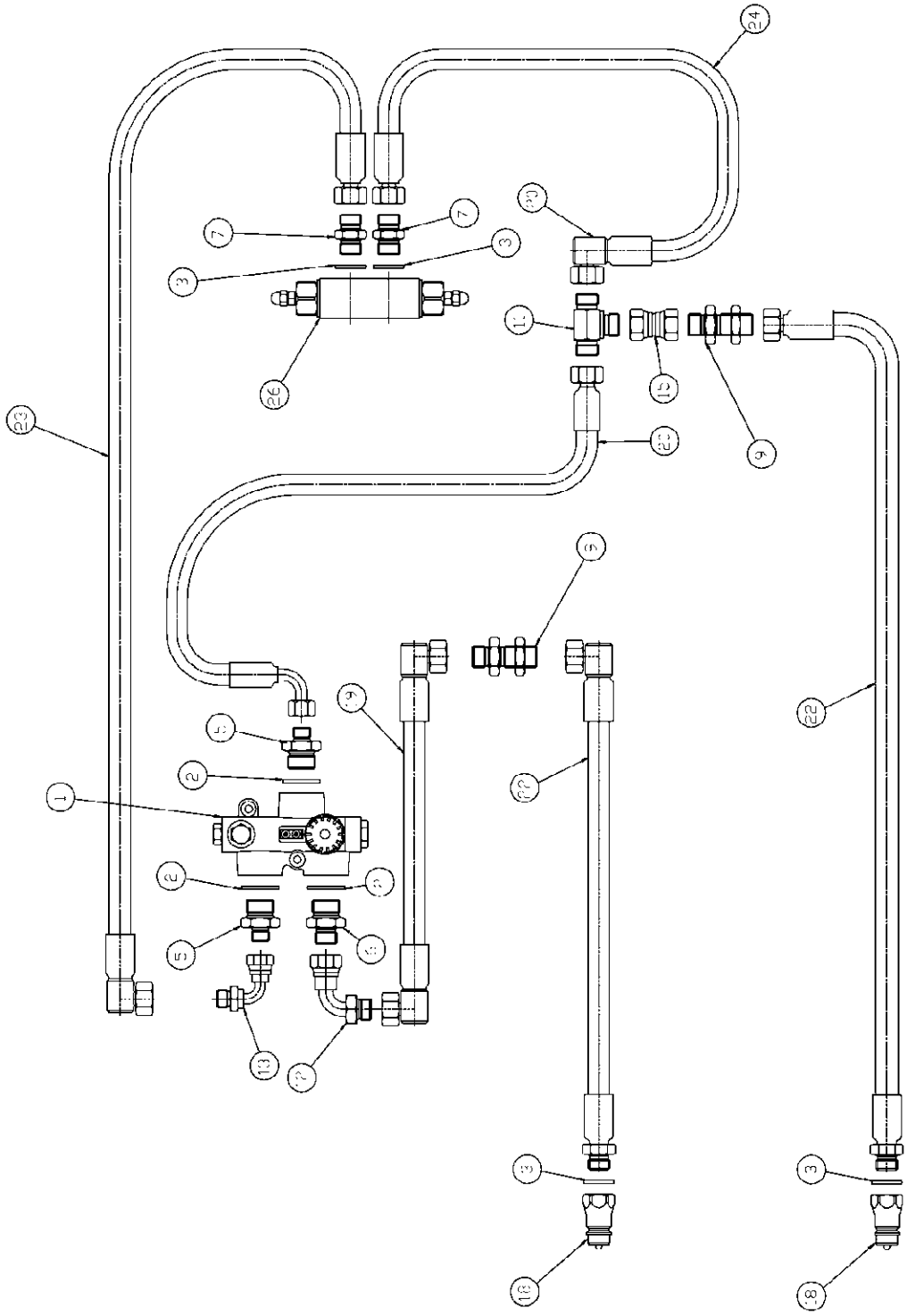
2.5 Greasing points



KEY	GREASE POINT
1	ALL BEARINGS IN DRIVE LINE
2	FRONT SHAFT
3	PTO KNUCKLES
4	REAR SHAFT
5	BEARINGS TOP OF AUGERS (GREASE POINT O/S ON TURRET)

3. FLOOR DRIVE

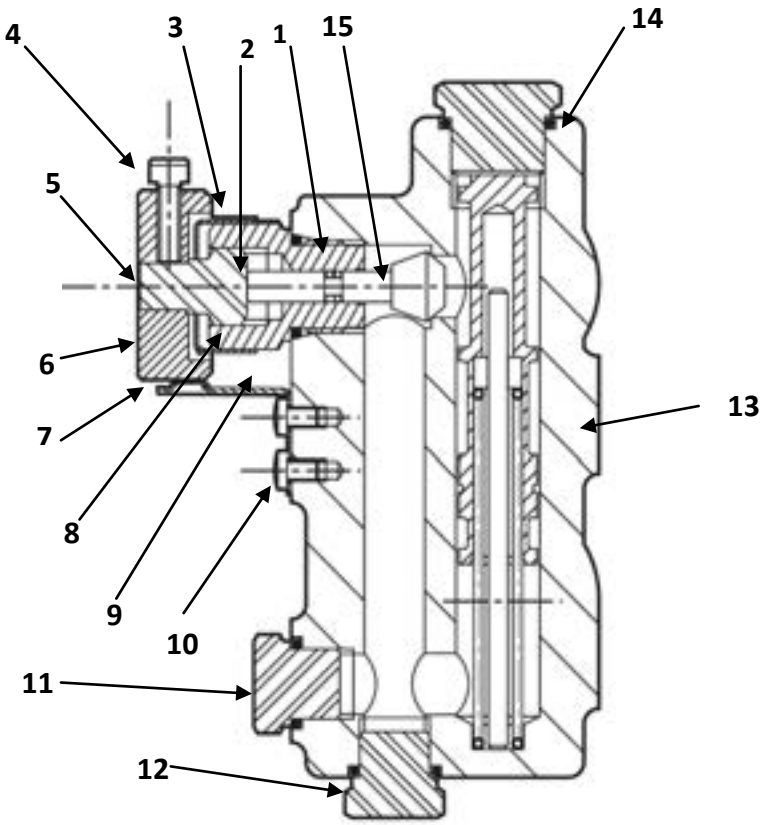
3.1 HYDRAULIC CIRCUIT FOR FLOOR DRIVE



3.1 HYDRAULIC CIRCUIT FOR FLOOR DRIVE PARTS LIST

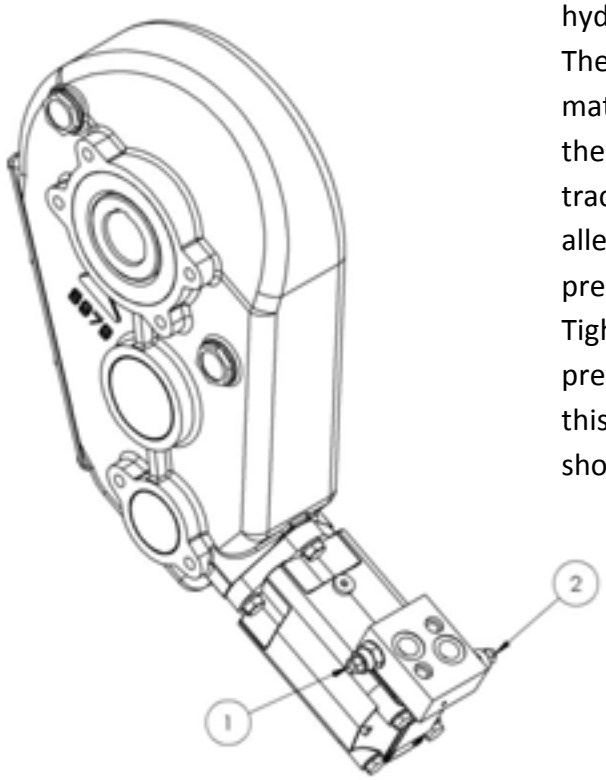
KEY	QTY	PART No.	DESCRIPTION
1	1	B3000	FLOW CONTROL
2	3	51593	3/4" BONDED SEAL
3	4	51591	1/2" BONDED SEAL
4	1	51590	3/8" BONDED SEAL
5	2	51337	3/4" TO 3/8"ADAPTOR
6	1	51340	3/4" / 1/2" ADAPTOR
7	2	51336	1/2" TO 3/8" ADAPTOR
8			
9	2	51464	1/2" BULKHEAD
10			
11	1	51447	3/8" MALE TEE
12	1	51412	1/2" MALE/FEMALE 90 DEG
13	1	51414	3/8" MALE/FEMALE 90 DEG
14			
15	1	51393	1/2" TO 3/8" FEMALE/FEMALE
16			
17			
18	1	51576	1/2" MALE PROBE
19	2	B4400	HYD HOSE 230mm
20	1	B4401	HYD HOSE 610mm
21			
22	2	B4414	HYD HOSE 2500mm
23		B4416	HYD HOSE FLOW
24		B4417	HYD HOSE RETURN
26	1	B3068	DOUBLE CROSS LINE RELIEF VALVE

3.2 FLOOR SPEED CONTROL UNIT – PART No. B3000



KEY	QTY	DESCRIPTION
1	1	O RING
2	1	BACK-UP RING
3	1	O RING
4	1	SET SCREW
5	1	ADJUSTER SCREW
6	1	ADJUSTING KNOB
7	1	INDEX SPRING
8	1	PLUG
9	1	CONTROL SLEEVE
10	1	SCREW
11	1	PLUG
12	1	O RING
13	1	BODY
14	1	PLUG
15	1	NEEDLE VALVE

3.3 FLOOR DRIVE RELIEF VALVES



This valve is 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. Tighten the locknut. To decrease the pressure, reverse procedure. When making this adjustment, the spreader pressure should be set lower than the tractor PRV.

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.

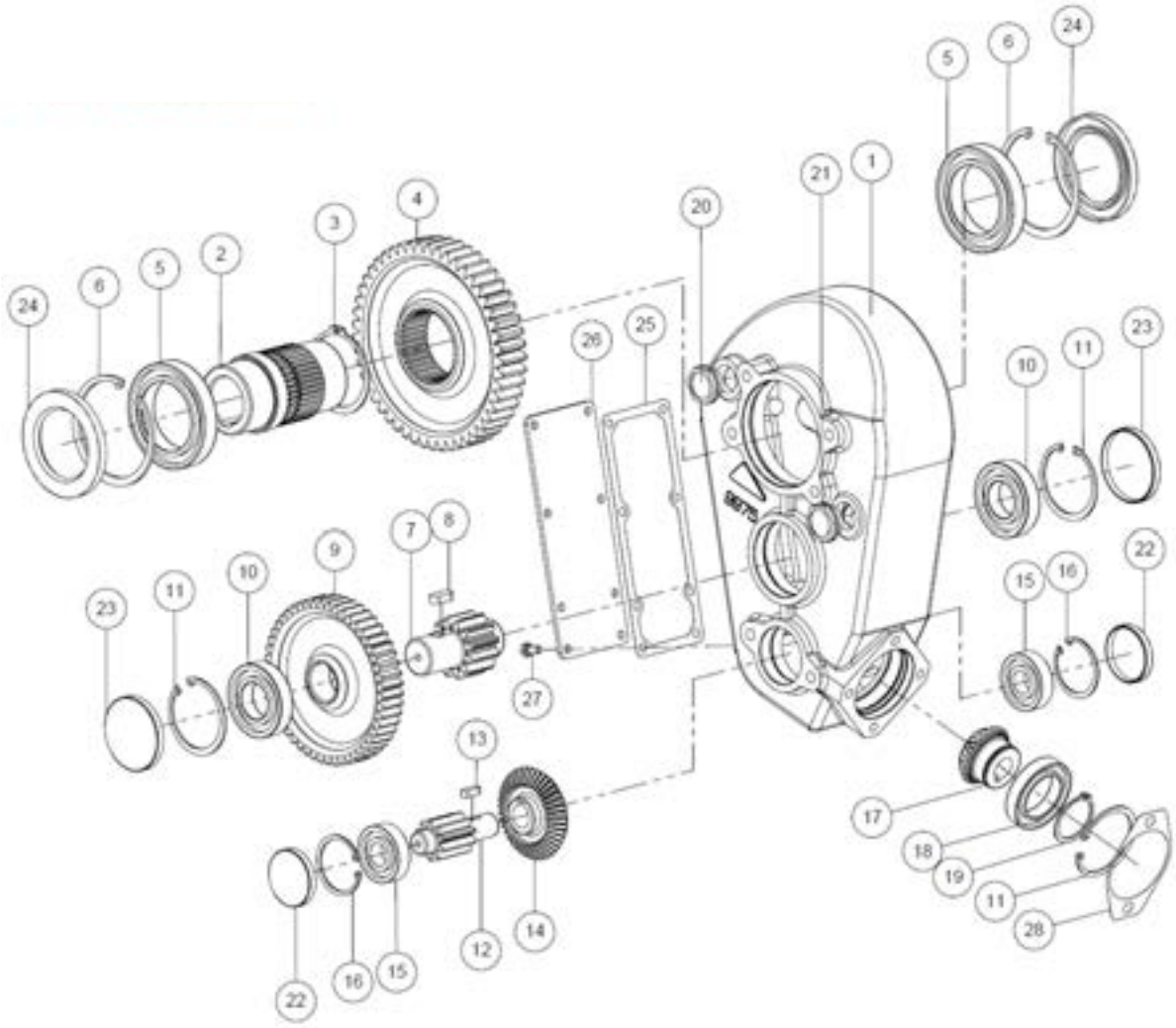
No.2

Cartridge controls 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.

3.4 FLOOR DRIVE GEARBOX 350/50 PART No. B3100

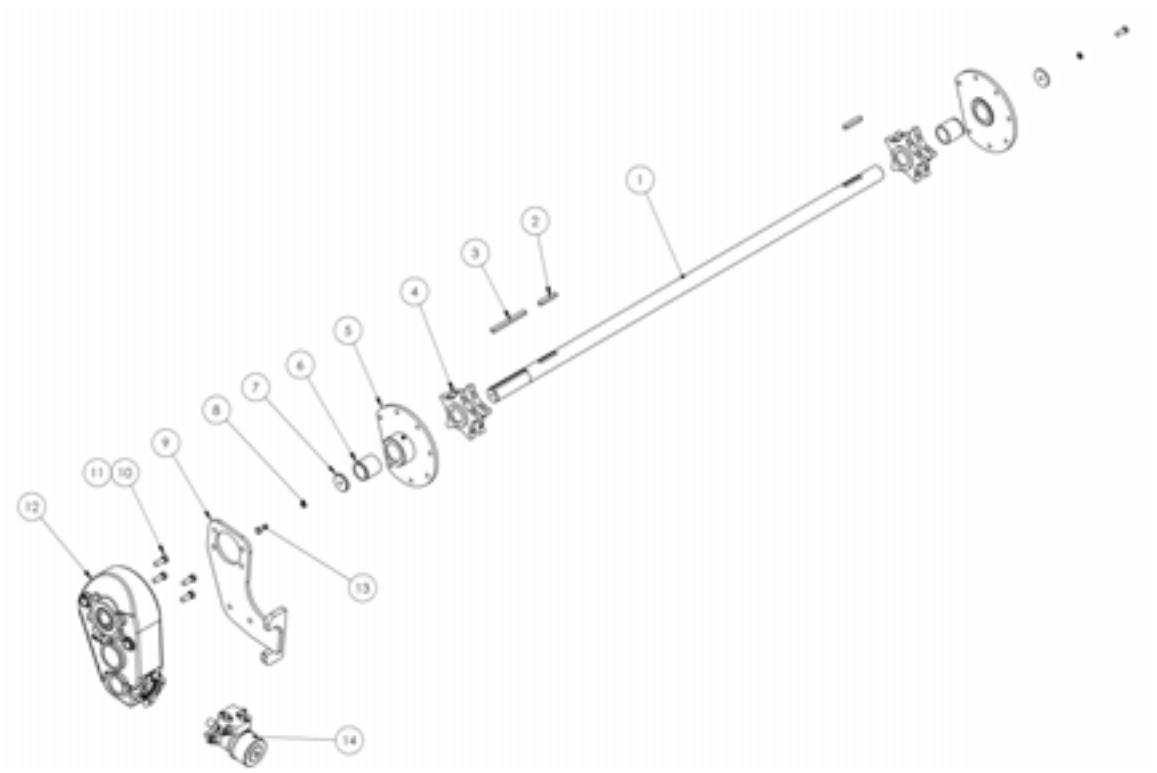


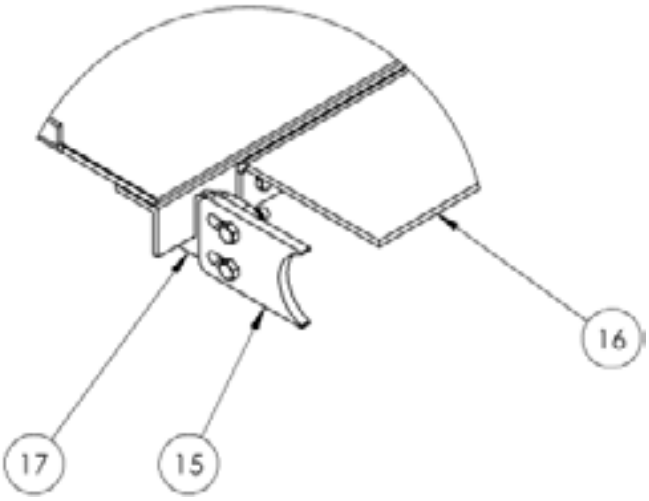
Note:
Motor not shown Part No. **B3040**

3.4 FLOOR DRIVE GEARBOX 350/50 PART No. B3100 PARTS LIST

KEY	QTY	PART No.	DESCRIPTION
1	1	B3202	CASING
2	1	B3227/1	SLEEVE M50
3	1	B4008	CIRCLIP
4	1	B3245	GEAR
5	2	BR317	BEARING
6	2	B4013	CIRCLIP
7	1	B3249	PINION SHAFT
8	1	B2271	KEY
9	1	B3246	GEAR
10	2	BR350	BEARING
11	3	B4006	CIRCLIP
12	1	B3250	PINION SHAFT
13	1	B2270K	KEY
14	1	B3238	CROWN BEVEL
15	2	BR375	BEARING
16	2	B4002	CIRCLIP
17	1	B3233	PINION SHAFT
18	1	BR310	BEARING
19	1	B4019	CIRCLIP
20	2	B3997	BREATHER PLUG
21	2	B3995	SIGHT GUAGE
22	2	SL255	CAP SEAL
23	2	SL265	CAP SEAL
24	2	SL197	SEAL
25	1	B3221	GASKET
26	1	B3217	COVER PLATE
27	8	73030/1	M8 BOLT
28	1	B3226	GASKET

3.5 REAR FLOOR SHAFT ASSEMBLY

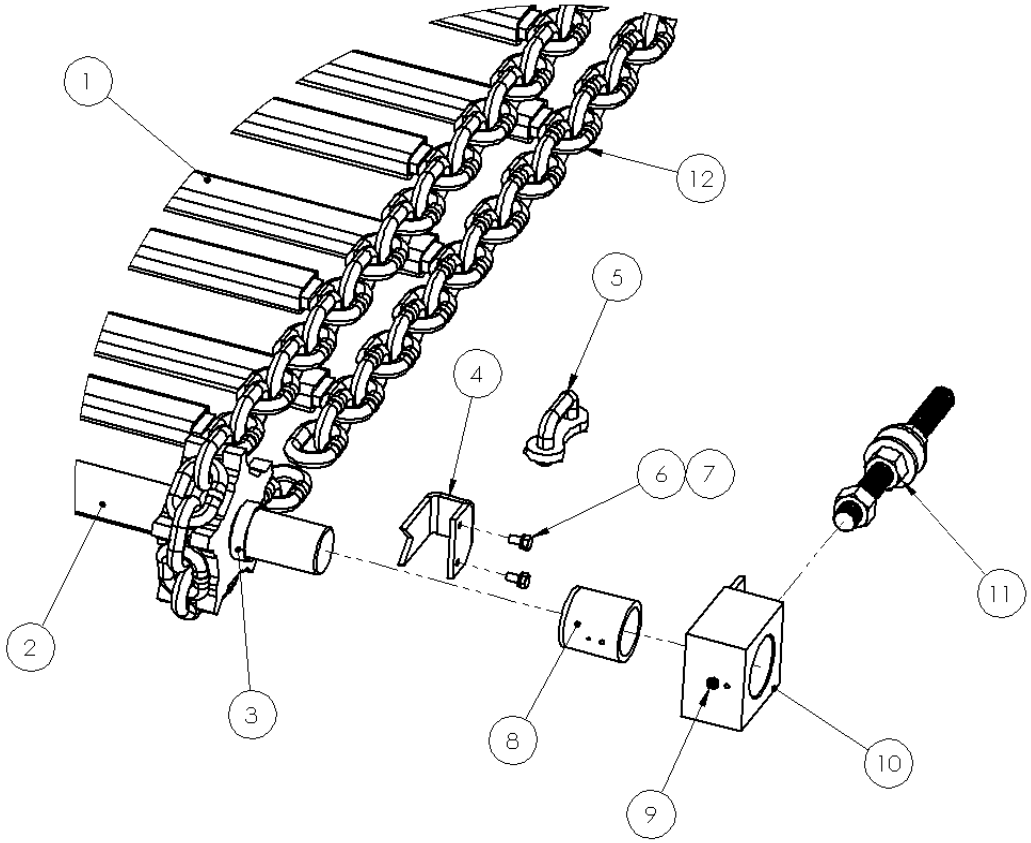




3.5 REAR FLOOR SHAFT ASSEMBLY PARTS LIST

KEY	QTY	PART No.	DESCRIPTION
1	1		REAR SHAFT
2	2	B2274	KEY
3	1	B2277	KEY
4	2	B2100	GYPSY WHEEL ASSEMBLY
5	2	B2300	BEARING FLANGE ASSEMBLY
6	2	B2320	ACM BUSH M50
7	2	B2280	END PLATE
8	2		M12 WASHER
9	2	B3212	TORQUE PLATE
10	4	73556	NUT
11	4	73556	WASHER
12	1	B3100	GEARBOX
13	2		M12 x 35 BOLT & SPRING WASHER
14	1	B3040	MOTOR
15	2	B2122	REAR GYPSY SCRAPER
16	1	B2822	DRIVE SHAFT COVER
17	2	B2124	MOUNT PLATE FOR SCRAPER

3.6 FRONT SHAFT AND CHAIN ASSEMBLY

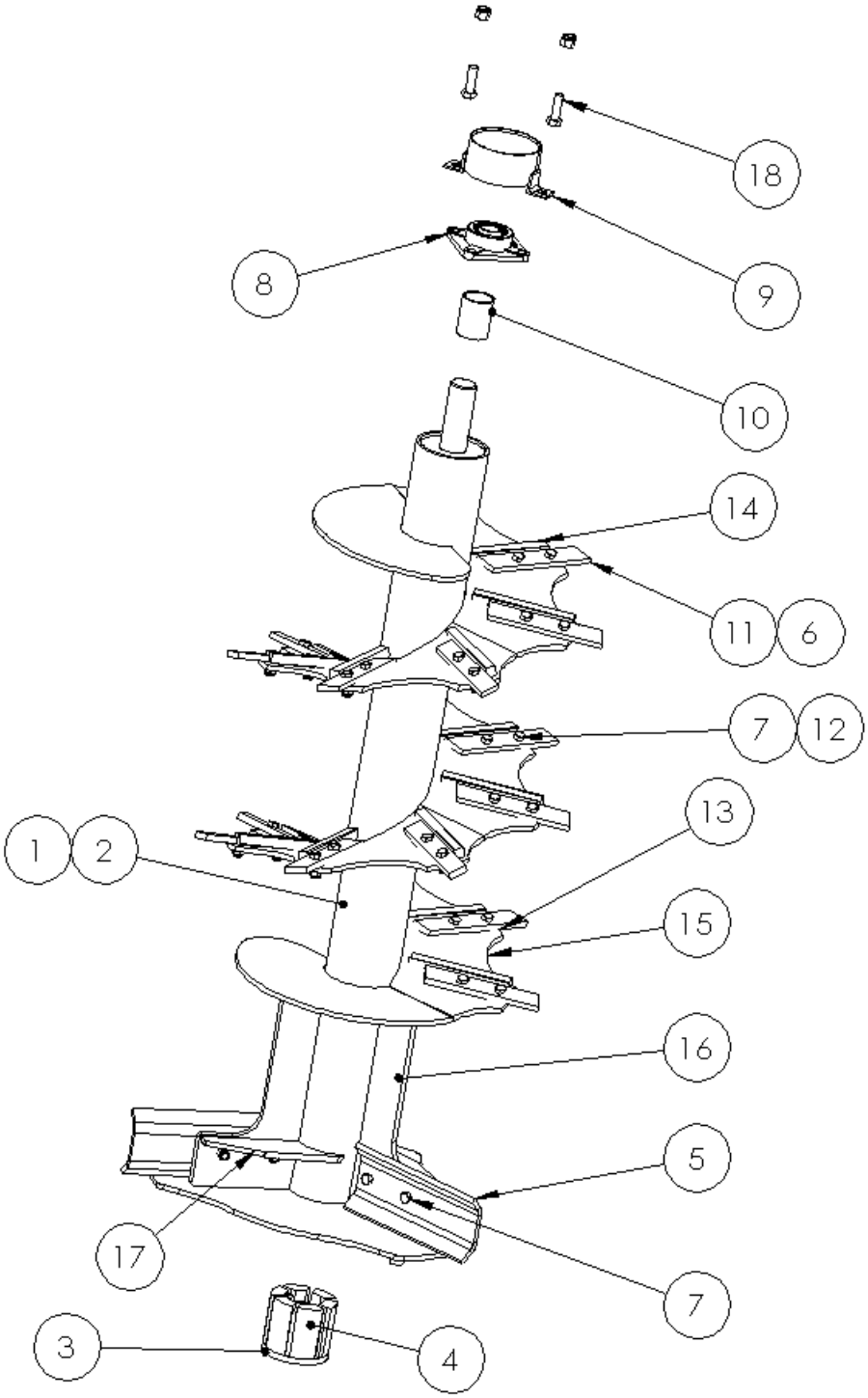


3.6 FRONT SHAFT AND CHAIN ASSEMBLY PARTS LIST

KEY	QTY	PART No.	DESCRIPTION
1	26	B2015	BOX FLOOR SLAT FOR 60
2	1	B2220	FRONT SHAFT ASSEMBLY
3	2	B2345	SPACER M50
4	2	B2126	FRONT CLEANER
5	2	B2202	JOINER LINK
6	4	73031	M8 BOLT
7	4		M8 LOCK WASHER
8	2	B2320	BUSH M50
9	2	50726	GREASE NIPPLE
10	2	B2290	BEARING HOUSING M50
11	2	B2286	AJDUSTER M24
12	1PR	B2142	FLOOR CHAIN 24FT FOR BOX SLAT

4 AUGERS AND DRIVES

4.1 SHREDDING AUGER

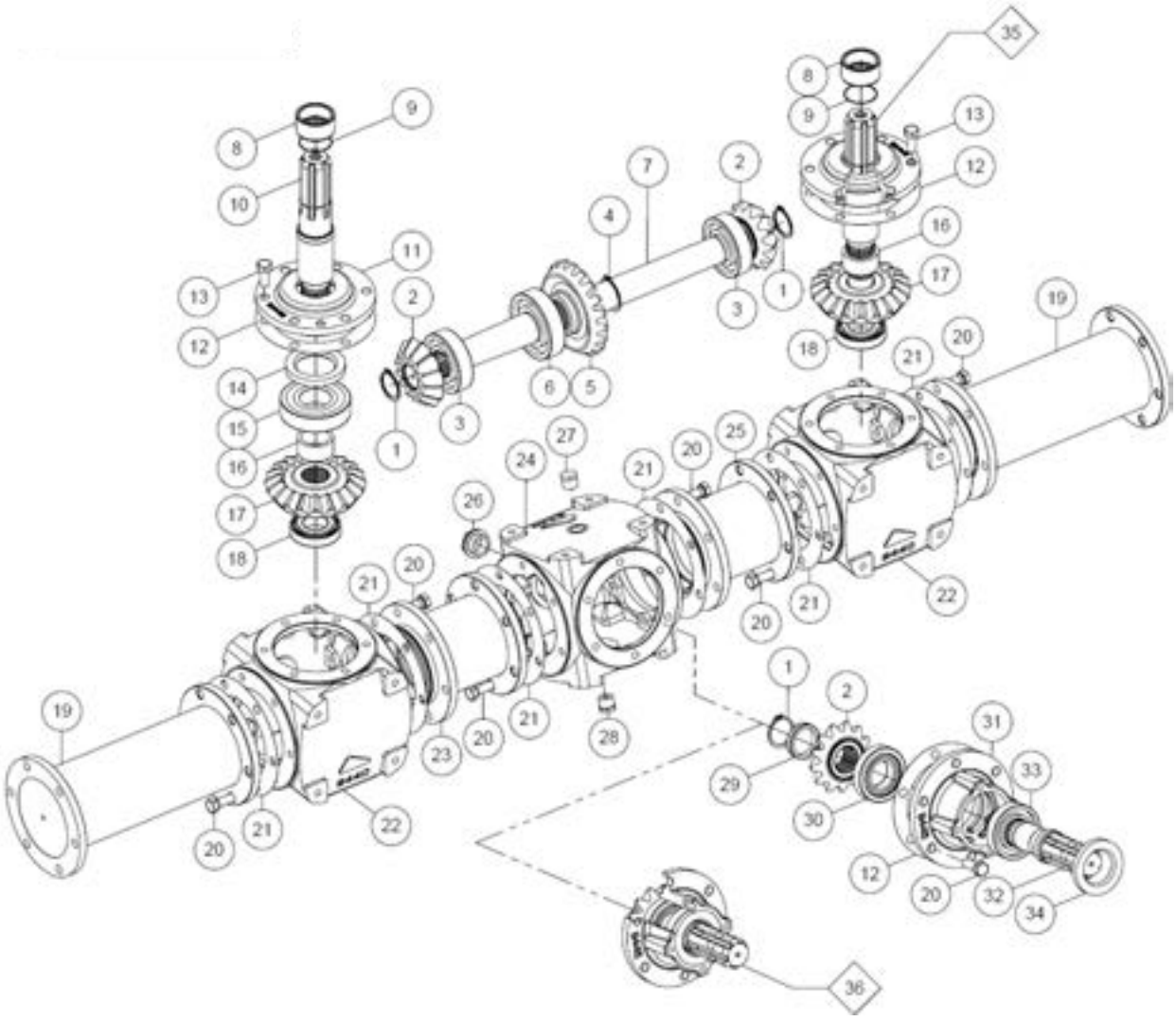


4.1 SHREDDING AUGERS PARTS LIST

KEY	QTY	PART No.	DESCRIPTION
1	1	B1017	AUGER R.H
2	1	B1016	AUGER L.H
3	2	B1152	DRIVE FLANGE
4	12	B1142	RUBBER DRIVE BLOCK
5	3	B1122	AUGER BLADE NON HANDED
6	44	B1100/1	CUTTER BORON *
7	100	B1103	BOLT & NUT
8	2	B1178/1	BEARING
9	2	B1160	BEARING COVER
10	2	B2350	SPACER
11		B1106	ANGLE THROWER
12		B1105	BOLT & NUT
13		B1096	REPLACEMENT LUG
14	44	B1098	REINFORCING BAR
15	3	B1066	AUGER SECTION
16	6	B1080	BLADE MOUNTING
17	6	B1088	BUTTRUSS
18	8	73155	BOLT & NUT

*** B1100 STANDARD CUTTER STEEL EN8**

4.2 GEARBOX PART No. B3194

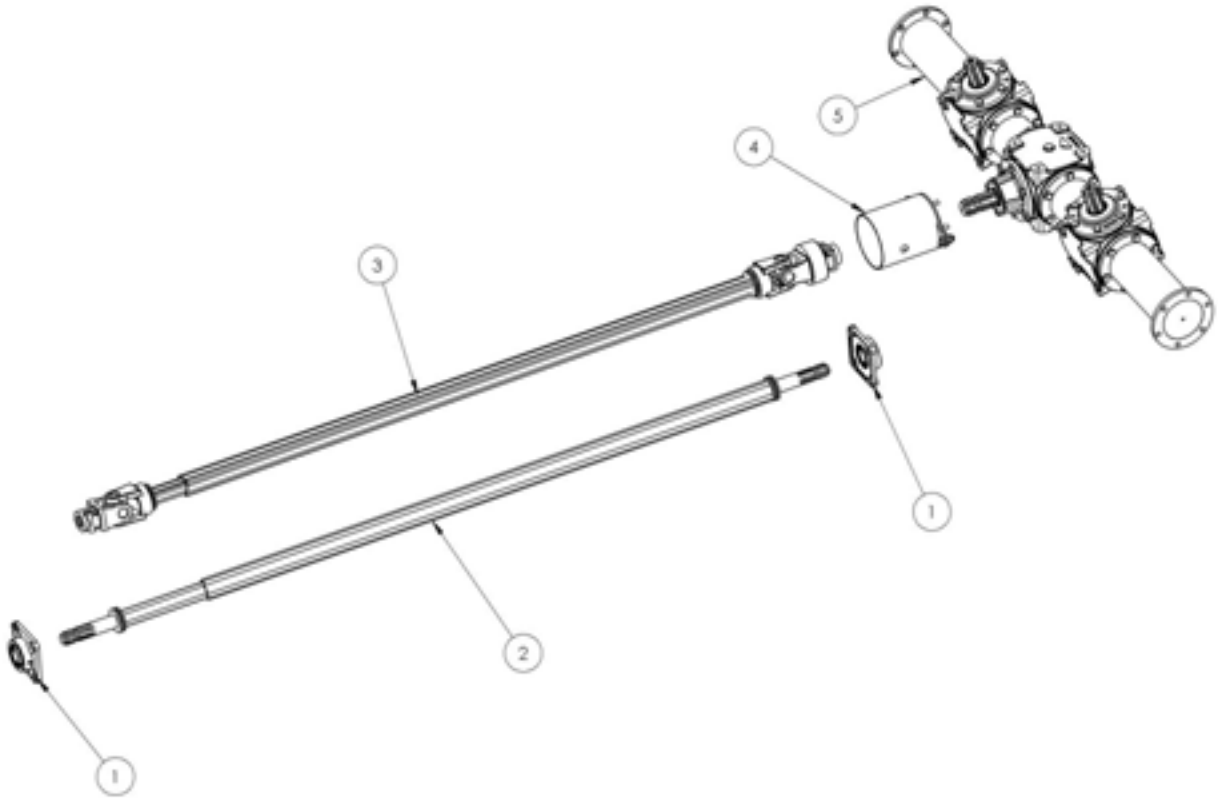


4.2 GEARBOX PART No. B3194 PARTS LIST

KEY	QTY	PART No.	DESCRIPTION
1	3	B4017	CIRCLIP
2	3	B3452	PINION
3	2	BR395	BEARING
4	1	B4018	CIRCLIP
5	1	B3461	GEAR
6	1	BR400	BEARING
7	1	B3445	SHAFT
8	2	B3484	SLEEVE
9	2	B3938	O-RING
10	2	B3441	SHAFT
11	2	B3423	TOP PLATE
12	3	B3495	GASKET
13	12	70391	M12
14	2	SL165	SEAL
15	2	BR401	BEARING
16	2	B3485	SPACER
17	2	B3462	GEAR
18	2	BR100	BEARING
19	2	B3411	CASING
20	42	70392	M12 BOLT
21	6	B3496	GASKET
22	2	B3419	CASING
23	1	B3411/2	CASING
24	1	B3403	CASING
25	1	B3411/1	CASING
26	1	B3996	SIGHT GLASS
27	1	B3991	PLUG
28	1	B3990	DRAIN
29	1	B3481	SPACER
30	1	BR105	BEARING
31	1	B3407	EXTENSION
32	1	B3439	SHAFT
33	1	BR350	BEARING
34	1	SL157	SEAL

5. P.T.O AND TRANSMISSION

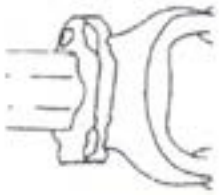
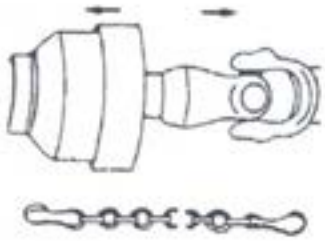
5.1 TRANSMISSION



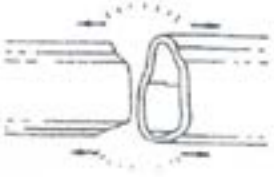
5.1 TRANSMISSION PARTS LIST

KEY	QTY	PART No.	DESCRIPTION
1	2	B1170	FLANGED BEARING
2	1	42302	FRONT PTO DRIVE SHAFT
3	1	42290	REAR PTO DRIVE SHAFT
4	1	AMS1524	PTO GUARD GEARBOX
5	1		MODEL 60 GEARBOX

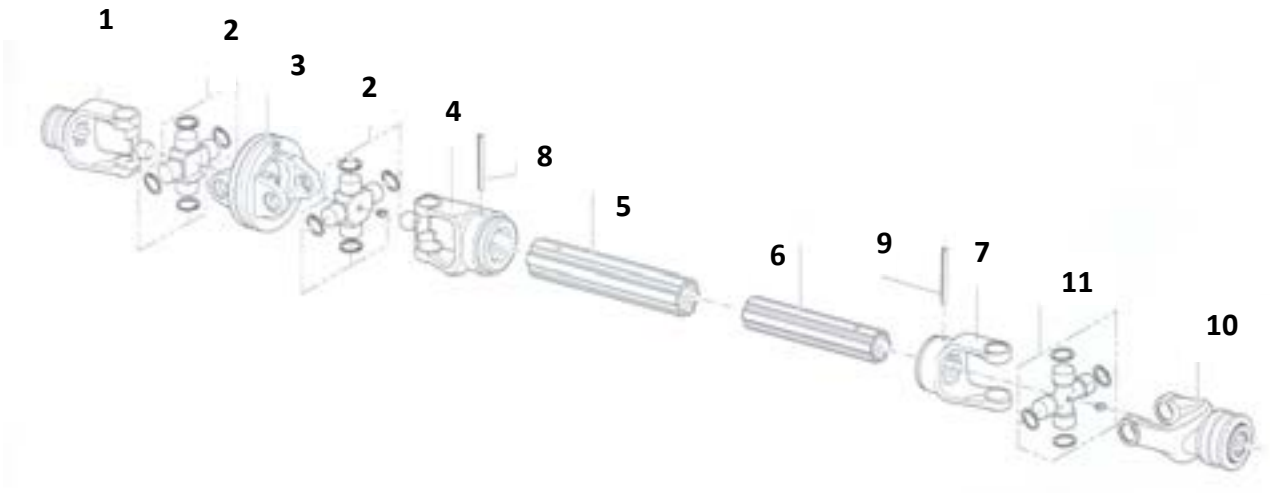
5.2 PROBLEMS AND POSSIBLE SOLUTIONS

PROBLEM	PROBABLE CAUSE	POSSIBLE SOLUTION
 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

5.2 PROBLEMS AND POSSIBLE SOLUTIONS

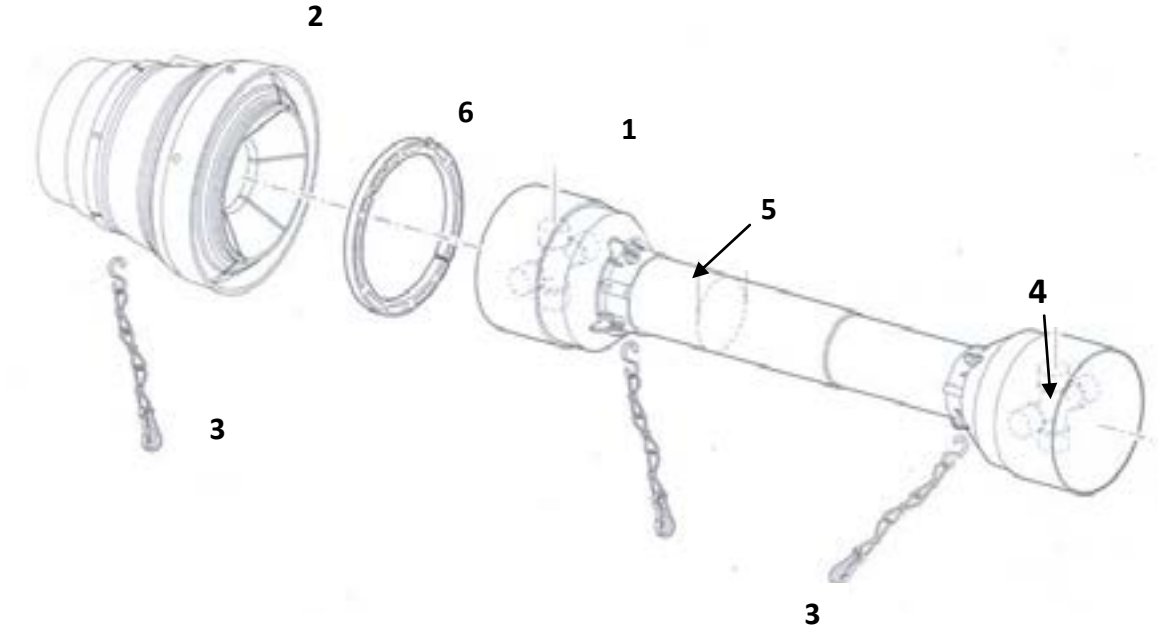
PROBLEM	PROBABLE CAUSE	POSSIBLE SOLUTION
 Yoke eyes opening / deforming	Excessive twisting of shafts	Fit an appropriate safety device onto the drive
	Drive too long	Upgrade the drive
 Wear on yoke arms	Excessive working angle of worn joint	Use a constant velocity joint or disengage the P.T.O. on tight 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

5.3 COMER SERIES V PTO SHAFT ASSEMBLY.



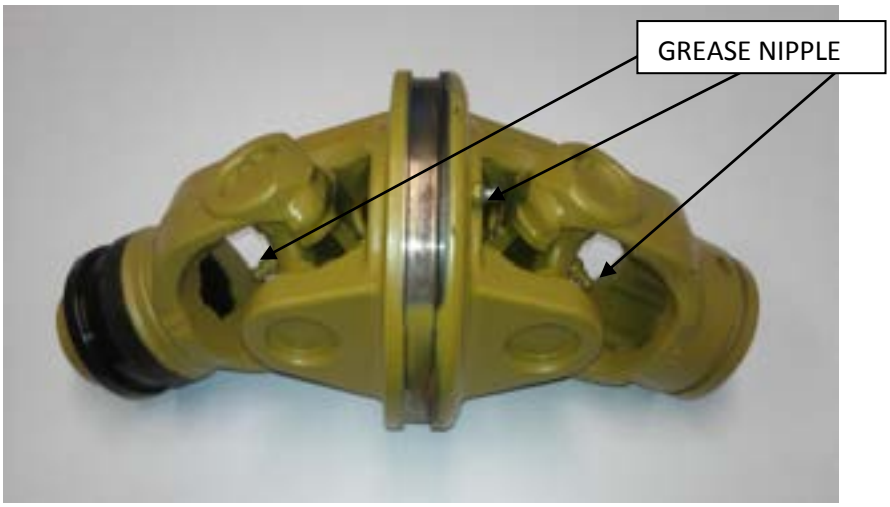
KEY	QTY	DESCRIPTION	PART No.
1	1	W/A YOKE 6 SPLINE 1⅜	42810
1	1	W/A YOKE 21 SPLINE 1⅜	42815
1	1	W/A YOKE 20 SPLINE 1¾	42825
2	2	W/A JOURNAL	42848
3	1	W/A CENTRAL BODY	42845
4	1	W/A YOKE TO OUTER	42830
5	1	MULTI LOBE OUTER TUBE	42780
6	1	MULTI LOBE INNER TUBE	42785
7	1	YOKE TO INNER MULTI LOBE	42835
8	1	ROLL PIN	42792
9	1	ROLL PIN	42790
10	1	T60 YOKE TO SHEARBOLT	42760
11	1	T60 JOURNAL	42701
12	1	SHEARBOLT 4.6	B1310
12	1	SHEARBOLT 6.8	B1311
12	1	SHEARBOLT 8.8	B1312
12	1	SHEARBOLT 10.9	B1313

5.4 COMER WIDE ANGLE GUARD COMPLETE PART No. 42088.

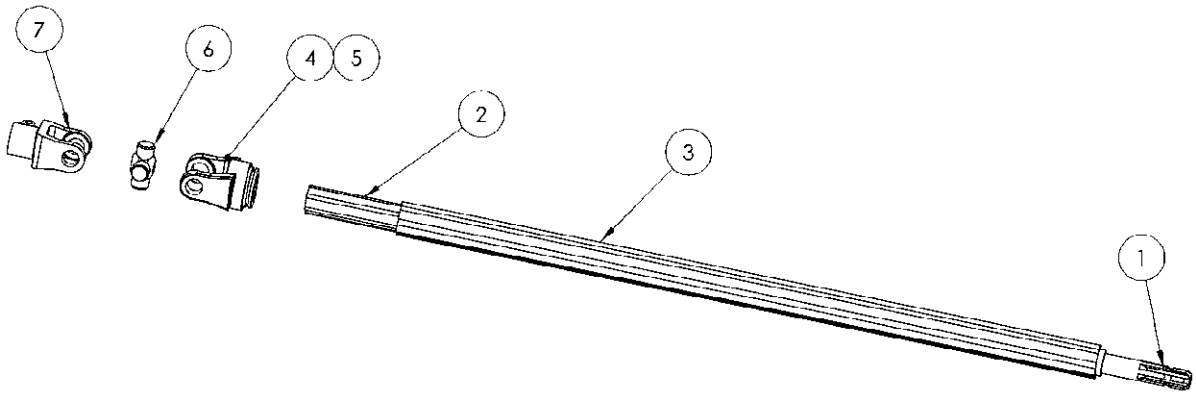


KEY	QTY	DESCRIPTION	PART No.
1	1	LONG SECTIONS	42910
2	1	W/A CONE	42920
3	1	SAFETY CHAINS	42945
4	1	BEARING RING INNER	42935
5	1	BEARING RING OUTER	42930
6	1	GUARD RETAINING COLLAR	42940
7	1	W/A GUARD COMPLETE	42088

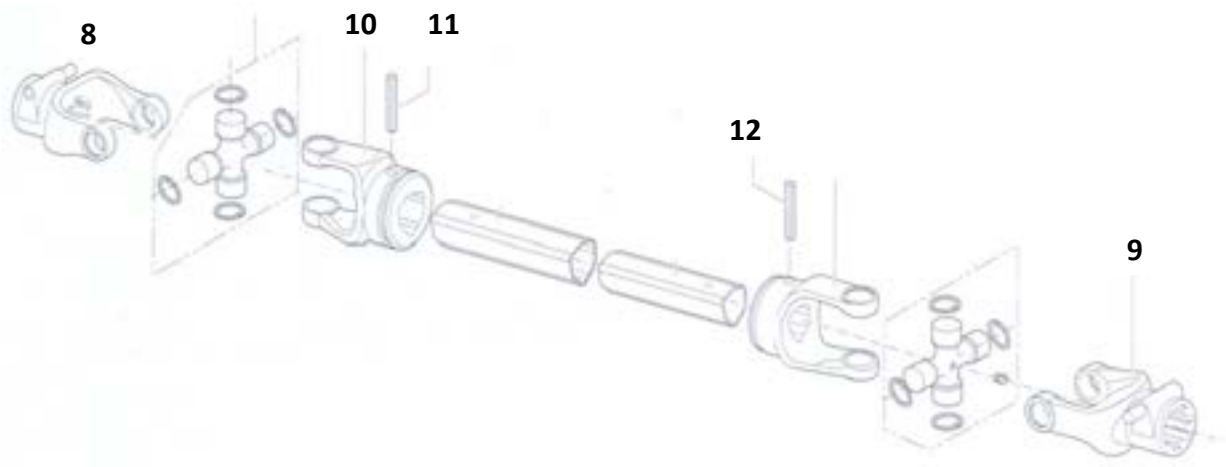
5.5 COMER WIDE ANGLE GREASE POINTS



5.6 COMER T60 UNDERBODY DRIVESHAFT.

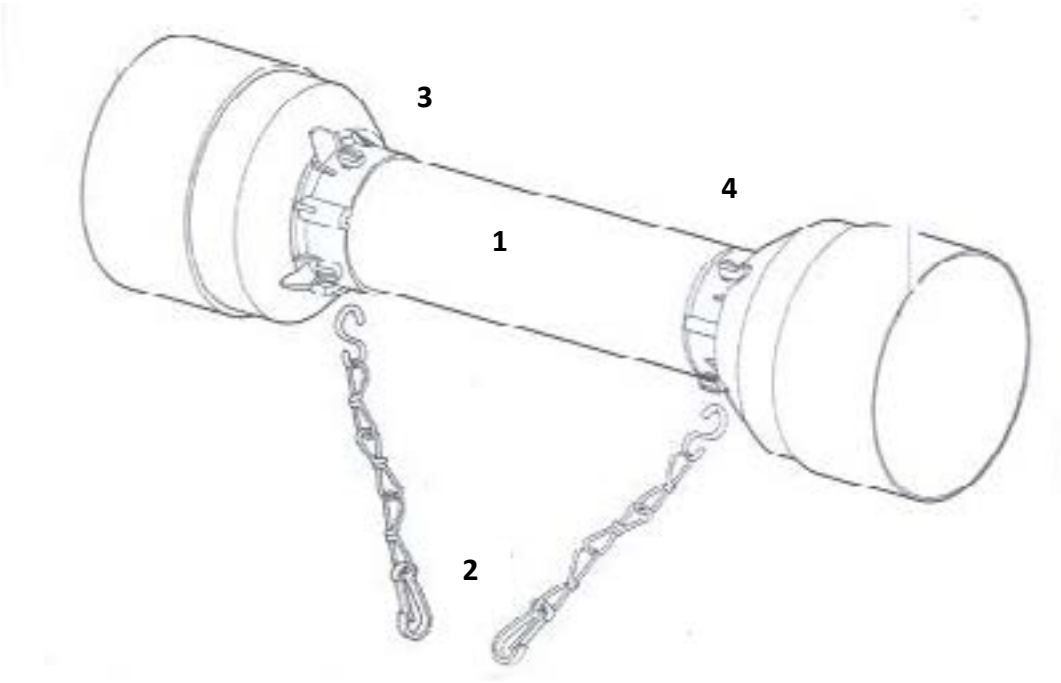


INTERCONNECTING PTO SHAFT



KEY	QTY	DESCRIPTION	PART No.
1	1	SPLINED BAR	42041
2	1	T60 INNER TUBE (PER METER)	42775
3	1	T60 OUTER TUBE(PER METER)	42770
4	1	YOKE TO OUTER	42745
5	1	ROLL PIN	42030
6	1	JOURNAL	42701
7	1	YOKE 6 SPLINE CLAMP BOLT	42715
7	1	1¾ YOKE 6 SPLINE OVERRUN CLAMPBOLT	42766
8	1	1⅜ 6 SPLINE YOKE QUICK RELEASE SHEARBOLT	42760
9	1	1⅜ 6 SPLINE YOKE QUICK RELEASE SHEARBOLT	42705
9	1	1 ⅜ 21 SPLINE YOKE QUICK RELEASE SHEARBOLT	42725
9	1	1 ¾ 21 SPLINE YOKE QUICK RELEASE SHEARBOLT	42740
10	1	YOKE TO INNER	42750
11	1	ROLL PIN	42790
12	1	ROLL PIN	42792

5.7 COMER PLASTIC GUARD ASSEMBLY.



KEY	QTY	DESCRIPTION	PART No.
1	1	PLASTIC GUARD COMPLETE	42910
2	1	SAFETY CHAIN	42058
3	1	BEARING RING INNER	42056
4	1	BEARING RING OUTER	42057

5.8 COMER PTO GUARD SAFETY CHAIN FIXING

Care should be taken when fixing the PTO safety chains, by following the guidelines below you can help avoid unnecessary and possibly expensive damage to the PTO guard and its component parts. Please see DVD supplied or contact your local dealer.

The purpose of the safety chain is to stop the guarding from rotating during its normal operation thus preventing foreign objects becoming entangled in it including you!, the safety chains must be fixed in a position that limits the risk of damage to both operator and shaft guarding.

Because each application varies there is no one perfect way of fitting, as we are all aware tractors vary as do machines, some come with ideal fixing points others don't. The chains are supplied at a set length; this is not the length they have to be used at, more so the length exists to ensure attachment can be achieved should a suitable anchor point be some distance from the guard.

In the case where a chain can be shortened it should be, not so much as to then cause damage by pulling on the guard but enough to stop the whole chain wrapping around the guard cuffs as the shaft starts to work. This is especially true when fixing wide angle constant velocity joints, by its nature the shaft will be moving to the left and right as the tractor turns, in this case we have to leave enough slack on the chain to allow this movement but at the same time ensuring that the chain does not wrap around the wide angle cover or pull across its surface causing damage, in an ideal world the chain would be fixed at 90 degrees to the guard, in effect the only point of contact between guard and chain would be where the chain is fixed to the guard, getting the anchor point as close to 90 degrees to the shaft will certainly help prevent damage.

Sometimes with the wide angle shafts it is possible to fix one chain to the other, at the same time shortening the length of chain as it is done, this can be achieved by taking the main tube guard chain that is at the wide angle end of the drive shaft and clipping it to the chain running from the wide angle guard which in turn is anchored as close to 90 degrees from the shaft as is possible, again providing there is some slack left in the chain, the length of chain can be reduced thus avoiding damage caused by excess chain wrap around and crossover.

The following pointers should help keep your guard serviceable for many hours.

1. Don't leave the chains too long allowing them to wrap around the guard it will damage the guard.
2. Don't leave the chains so short they pull on the guard.
3. Always try and avoid contact between chain and guard, keep contact to a minimum.
4. Anchor the chains as close to 90 degrees from the shaft as possible.
5. If needed attach one chain to the other, to avoid cross over and chain wrap around.
6. Always ensure there is enough slack to allow for exaggerated movement especially when using a wide angle shaft.
7. Always maintain the shaft as instructed by the manual supplied with it.
8. Grease your shaft and guard bearings regularly.
9. Always replace worn chains and guarding, damaged guards are potentially lethal.
10. Always stop the tractor engine, wait for the machine to stop turning and remove the ignition key before attempting to work on or around your driveshaft.
11. If in doubt, refer to PTO manual or DVD.

Safety chain fixing positions

Grease points tractor end

Grease points machine end

For more information on fitting and maintaining your Comer PTO see:-

www.youtube.com/watch?v=dDxK0e9rA9E

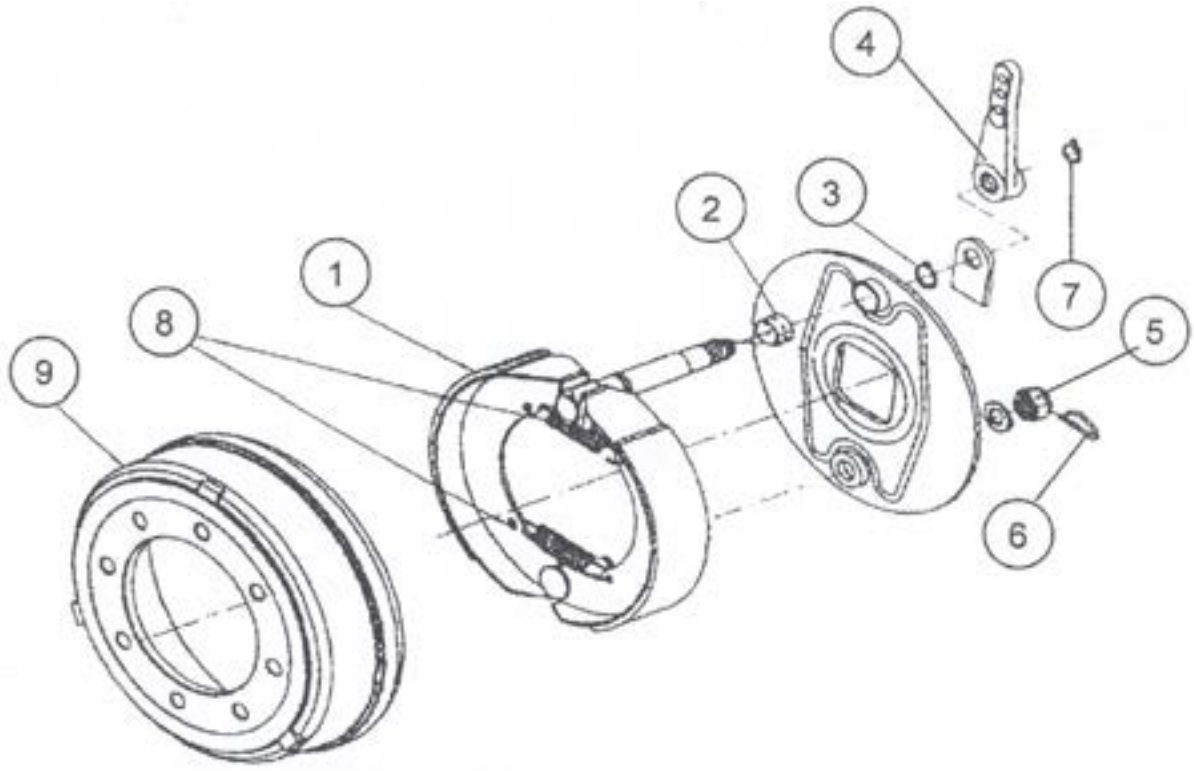
5.9 PTO STOWAGE

When the spreader is not in use stow PTO as shown to prevent damage.

Please check the condition of the PTO guard regularly, if damaged replace as soon as possible.

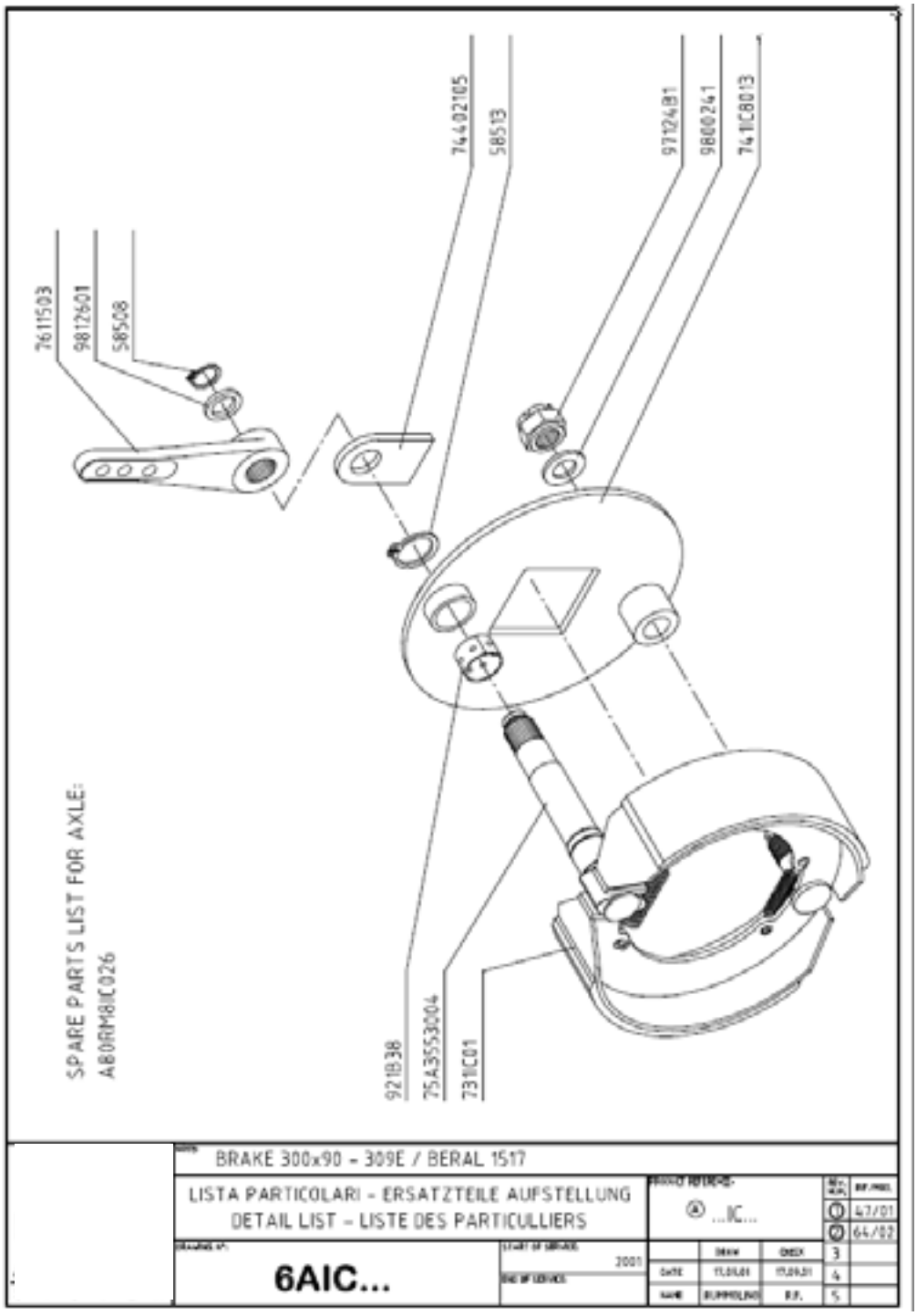
6. BRAKE & AXLE ARRANGEMENTS

6.1 BRAKE PARTS 355x80

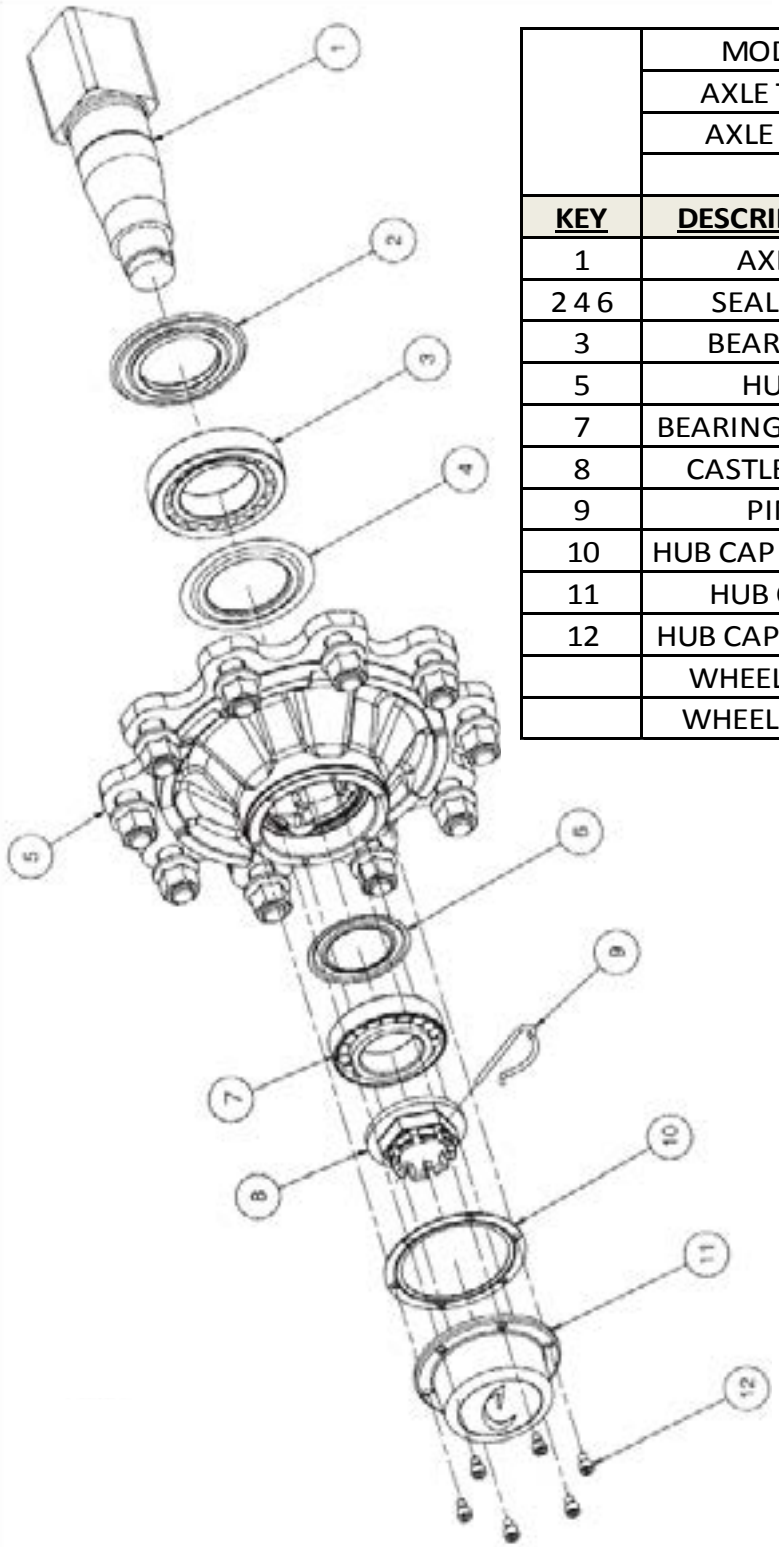


	MODEL	60
	AXLE SIZE	EF938
	BRAKE TYPE	A 410
	BRAKE SIZE	355 x 80
KEY	**DESCRIPTION**	**PART No.**
1	BRAKE SHOES	F10107
2	BRAKE ROD BUSH	97610514
3	CIRCLIP 38E	98900038
4	BRAKE LEVER	F00620
5	NUT	57524B2
6	PIN 4 x 32	98850432
7	CIRCLIP	98900025
8	RETURN SPRING	738123
9	DRUM	F10007/4

6.2 BRAKE PARTS 300x90



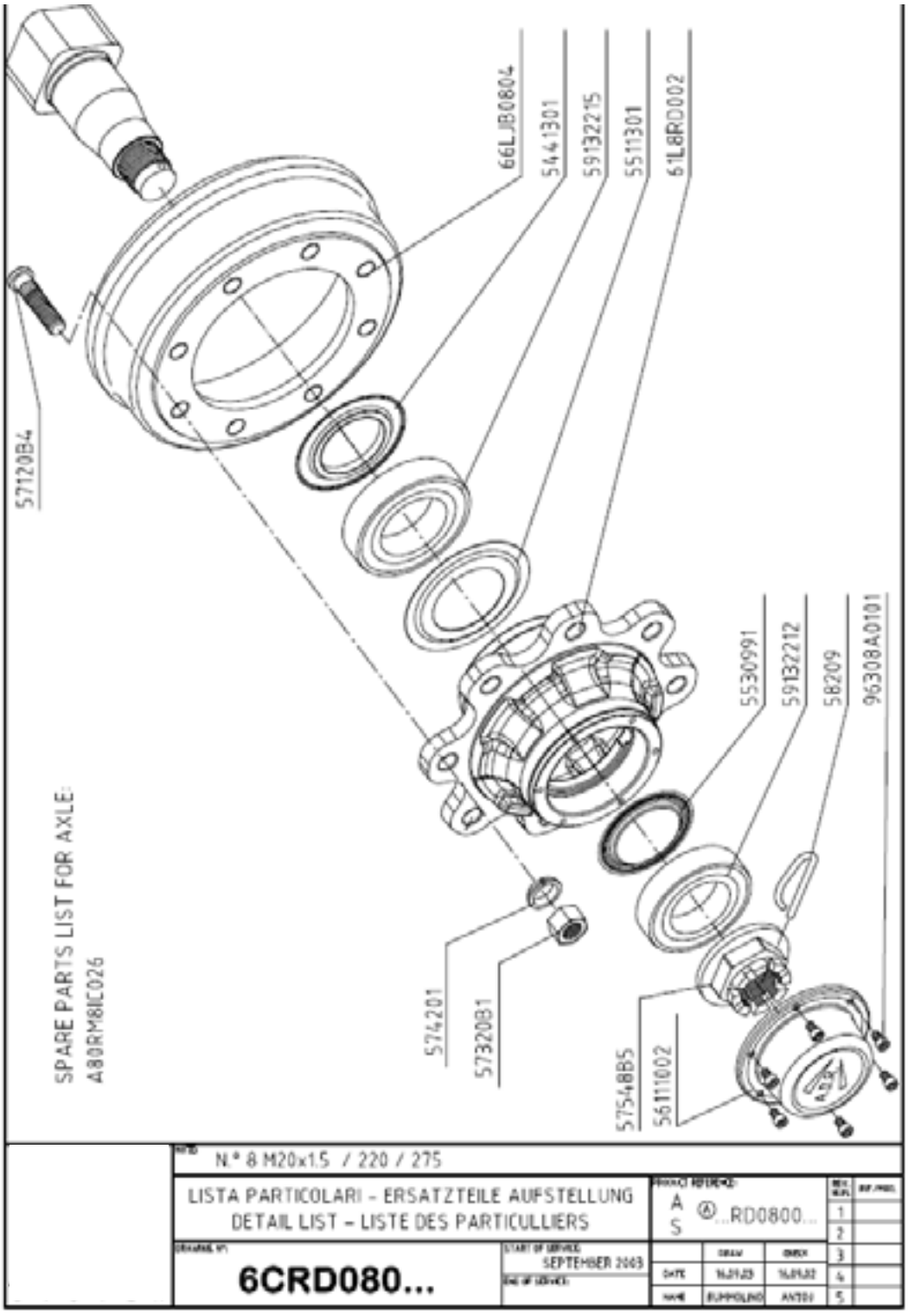
6.3 AXLE HUB AND BEARING PARTS EF938



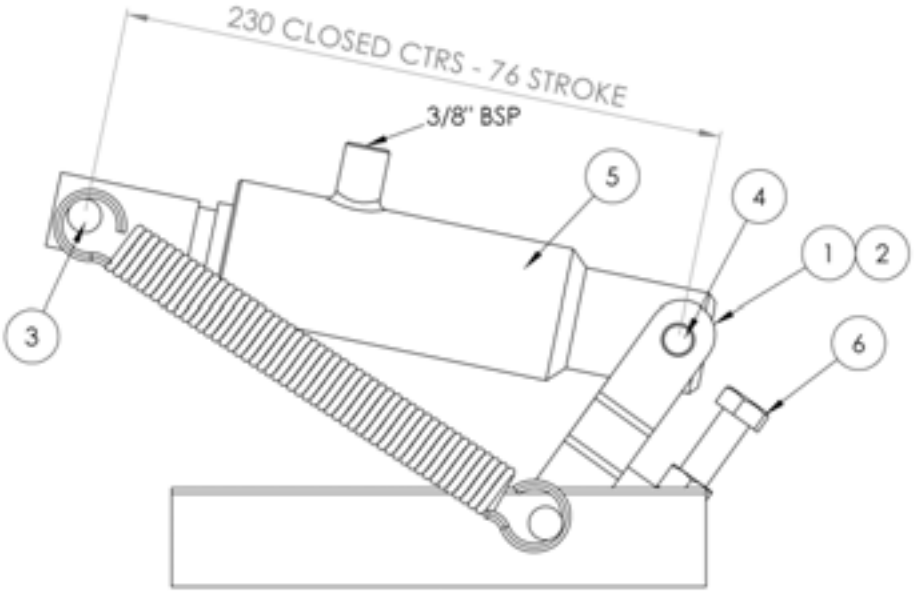
	MODEL	60
	AXLE TYPE	EF 938
	AXLE SIZE	90mm

KEY	DESCRIPTION	PART No.
1	AXLE	J1020
2 4 6	SEAL KIT	F10061/3
3	BEARING	BR210
5	HUB	F10016/1
7	BEARING OUTER	BR195
8	CASTLE NUT	F10066/1
9	PIN	J1060F1
10	HUB CAP GASKET	
11	HUB CAP	F10073
12	HUB CAP SCREW	
	WHEEL NUT	F00550
	WHEEL STUD	F00545/1

6.4 AXLE HUB AND BEARING PARTS 309E

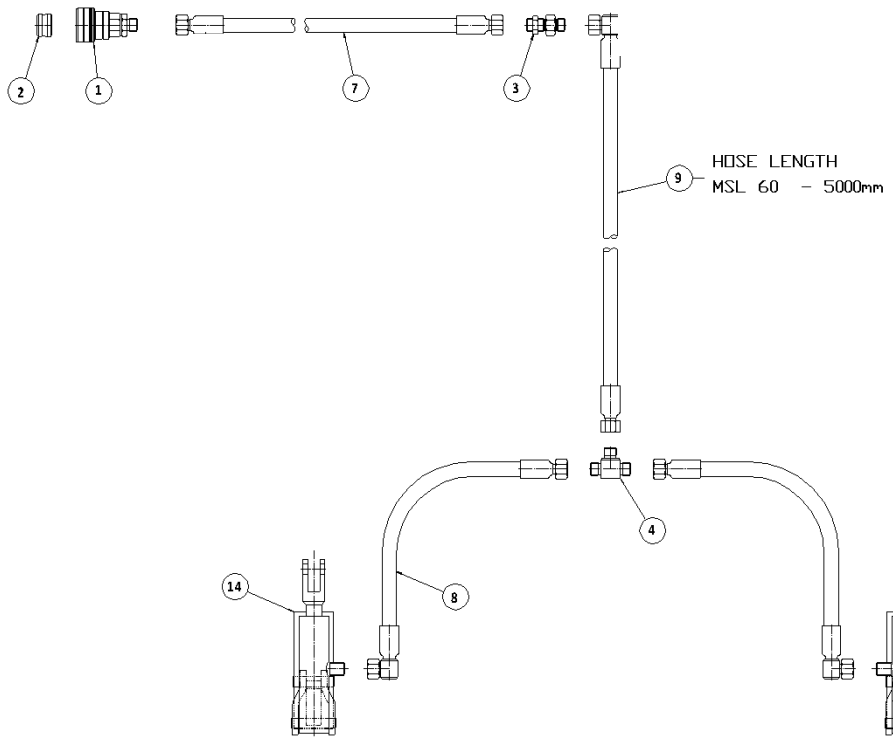


6.5 HYDRAULIC BRAKE RAM ASSEMBLY – 30mm BORE – 70830.2



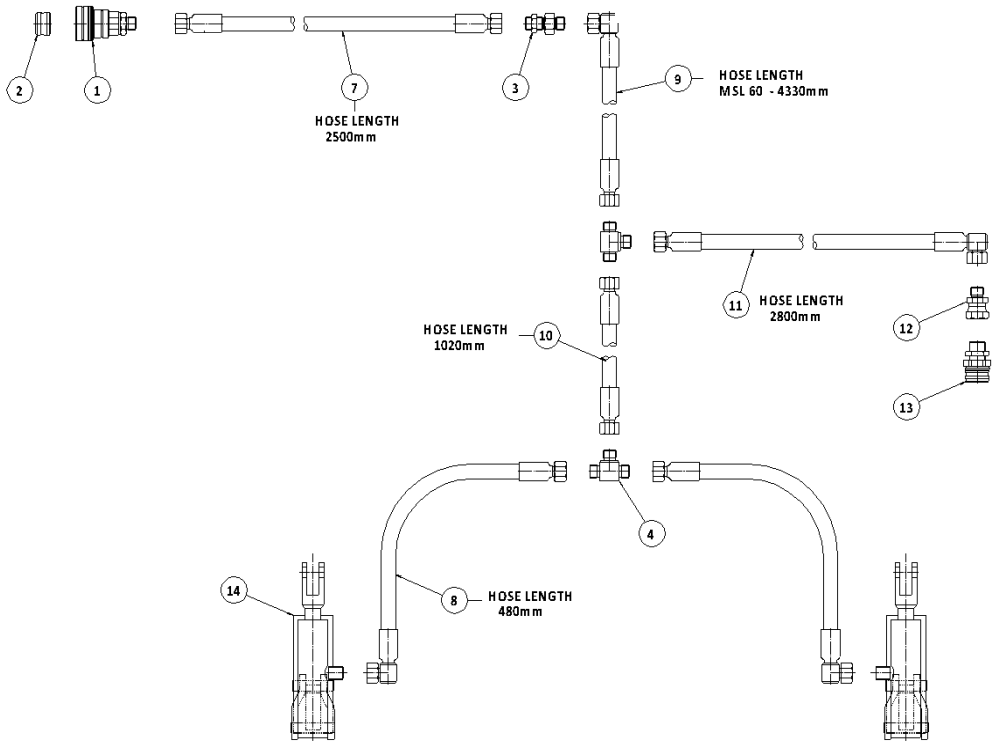
KEY	QTY	PART No.	DESCRIPTION
1	2	70830/2	RAM ASSEMBLY
2	2	70831/2	SEAL KIT
3	2	70830/4	SPRING & PIN KIT
4	2	70836	SELLOCK PIN
5	2	70835/3	CYLINDER
6	2	70834	ADJUSTER

6.6 HYDRAULIC BRAKE CIRCUIT SINGLE AXLE



KEY	QTY	PART No.	DESCRIPTION
1	1	51568	COUPLING 3/8 FEMALE SELF SEAL
2	1	51583-1	DUMMY 3/8 MALE
3	1	51463	3/8"-3/8" NPT BULKHEAD
4	2	51447	3/8"-3/8"-3/8" NPT MALE TEE
7	1	B4462	INTER-CONNECTING HOSE
8	2	B4454	AXLE HOSE
9	1	B4458	LONG HOSE
14	REF		BRAKE ACTUATOR HYDRAULIC

6.7 HYDRAULIC BRAKE CIRCUIT & CLEVIS DRAWBAR



KEY	QTY	PART No.	DESCRIPTION
1	1	51568	COUPLING 3/8 FEMALE SELF SEAL
2	1	51583-1	DUMMY 3/8 MALE
3	1	51463	3/8"-3/8" NPT BULHKHEAD
4	2	51447	3/8"-3/8"-3/8" NPT MALE TEE
7	1	B4462	INTER-CONNECTING HOSE
8	2	B4454	AXLE HOSE
9	1	B4458	LONG HOSE
10	1		HOSE DIA3/8" BORE 2 WIRE x 1020
11	1		HOSE DIA3/8" BORE 2 WIRE x 2800
12	1	51644	ADAPTOR 3/8" MALE-M20x1.5 FEM
13	1	51569	COUPLING 3/8 MALE SELF SEAL
14	REF		BRAKE ACTUATOR HYDRAULIC

7. AXLES

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.

This manual does not replace the manual provided by the vehicle manufacturer.

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.

General information.

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.

Axle, maintenance and adjustment.

2. AXLES

2.2 Axle, maintenance and adjustment

2.2.1 Assembly and fixing of the wheels

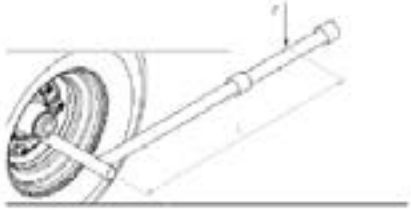
Above all to check that the type of wheel used is compatible with the nut of the wheel stud, for all the cases of fixing of the wheel with centering on the wheel stud, i.e. all those of table below except the nuts of the type M, to check that the holes of the rim have a conical part in order to receive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

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)

2. AXLES

- 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.

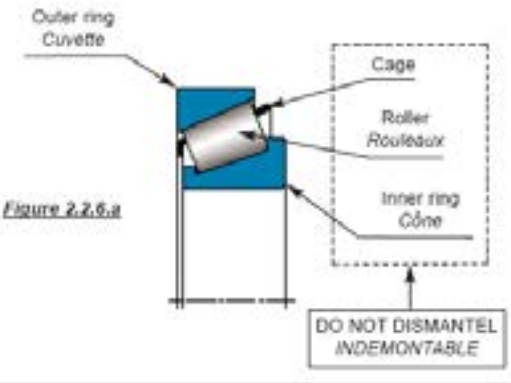


Figure 2.2.6.a

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.

2. AXLES

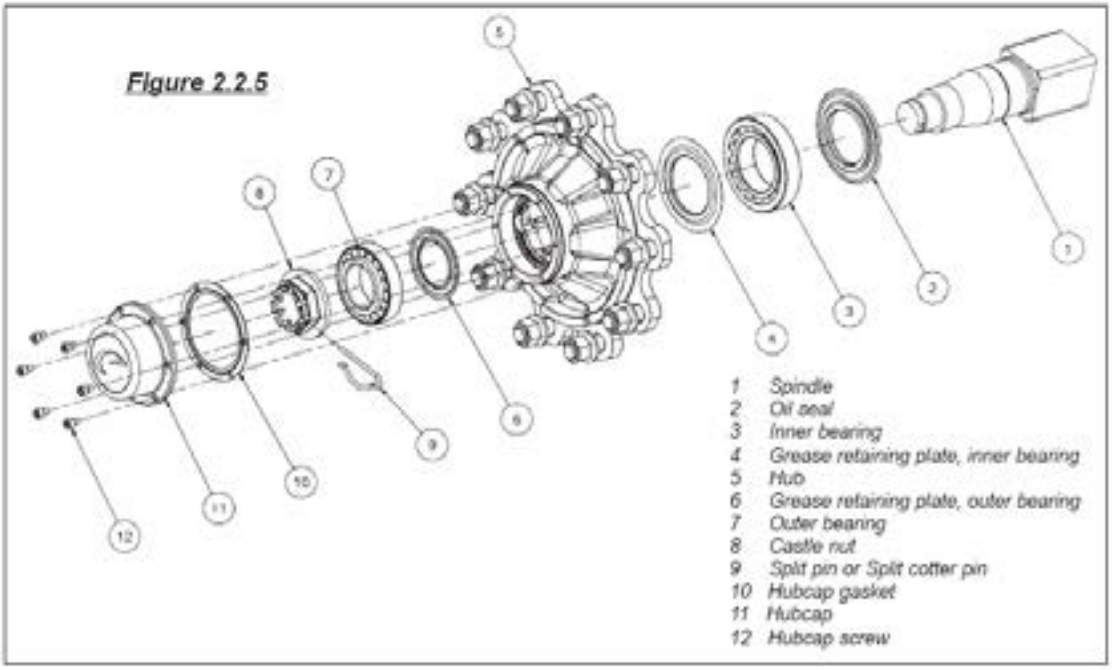
To check the wheel bearing play, raise the axle until the wheel is no longer resting on the ground ***(ensure that the vehicle cannot move)***
Release the brake, grip the wheel at the top and the bottom and check the play by trying to tilt it. The play can also be detected by using a lever between the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



- 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.

2. AXLES

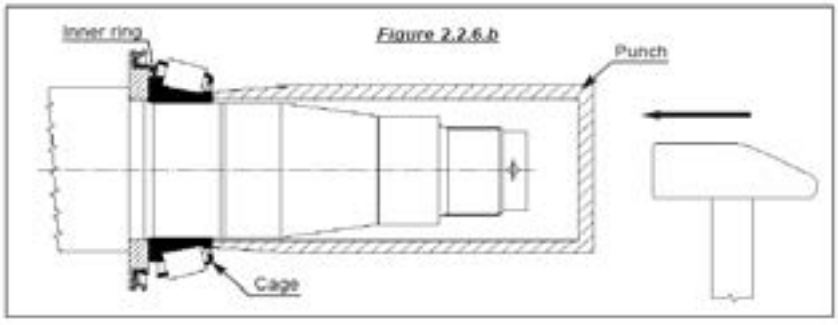
- Remove the drum/hub assembly, using a hub puller if necessary: the outer ring, the grease retaining plates inside the hub (depending on the model), the small bearing cone and cage come with the hub. Check these parts.
  The bearing cups and grease retaining plates can be left inside the hub for cleaning.
- 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. AXLES

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.

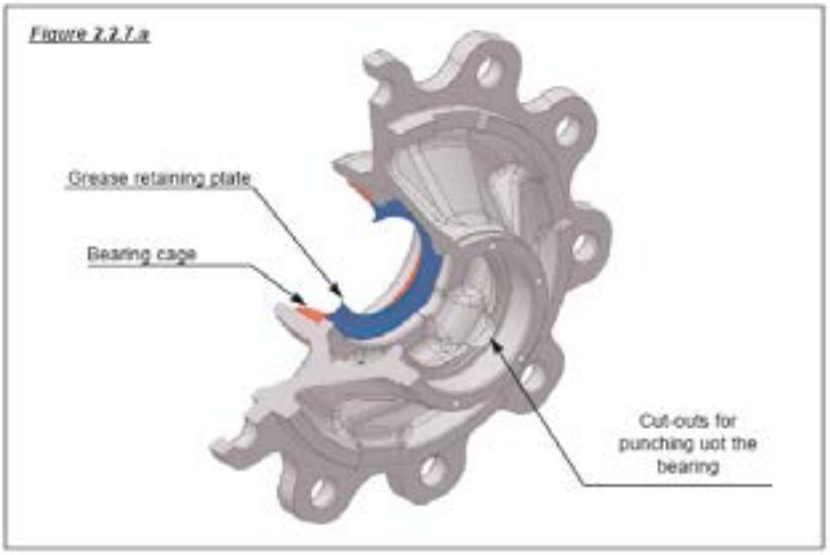
To replace the wheel bearings, follow the instructions for removing the hub (see paragraph 2.2.6 Lubricating the wheel bearings) and remove the bearing cups from the hub as follows.

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. AXLES

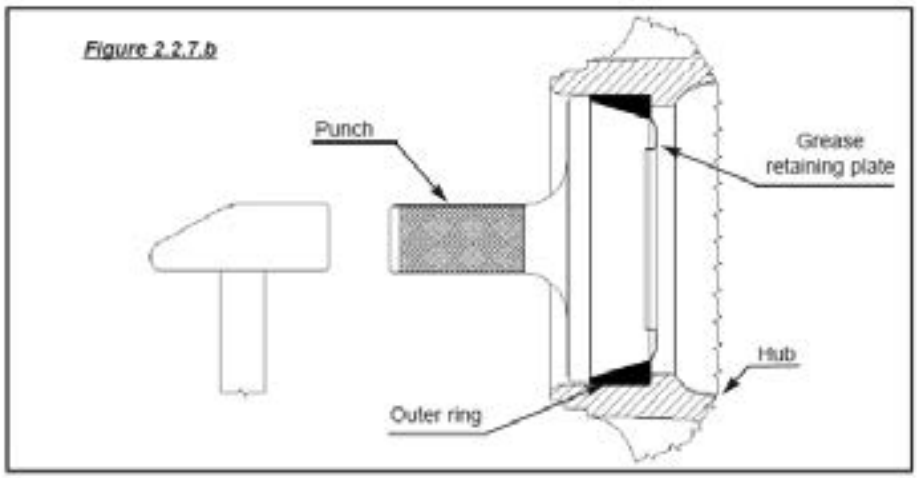


Figure 2.2.7.b

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:

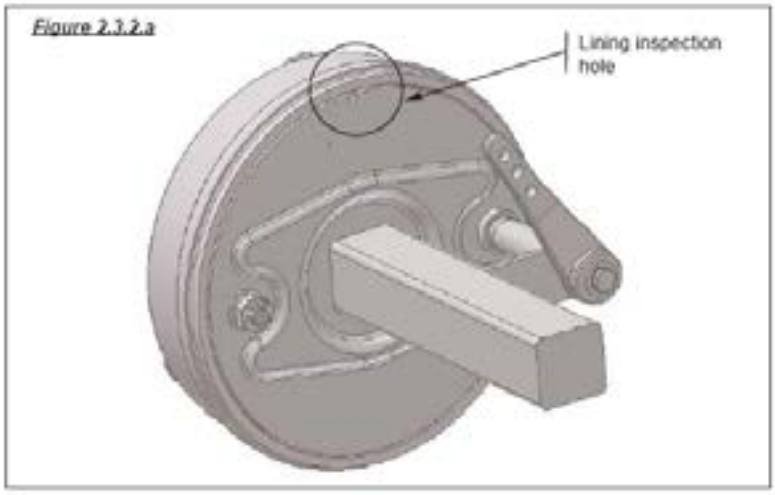
- Check the brake wear and the clearance between the brake linings and the drum visually (See figure **2.3.2.a**). It is probable that the linings are worn when the actuator travel has increased significantly.
- Check the thickness of the brake linings (See table paragraph 2.3.5 Replacing the brake shoes 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

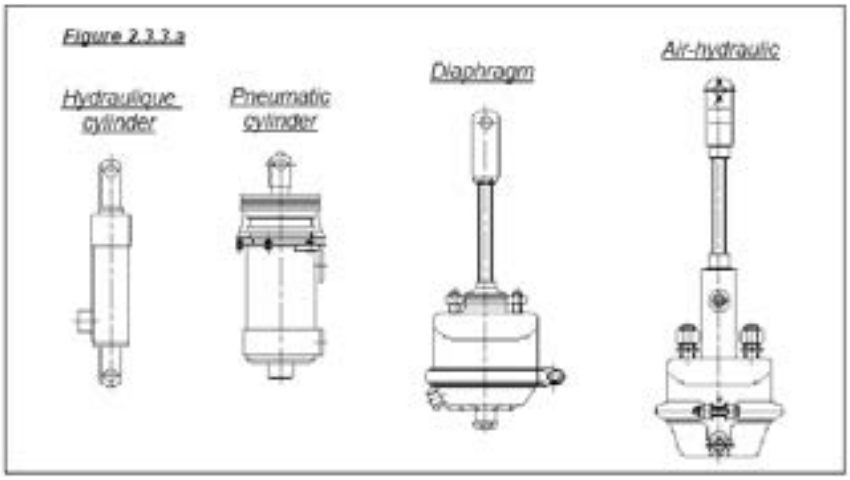
Take up the slack when the actuator stroke reaches about two thirds of the maximum travel (See figure **2.3.3.a**).

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).

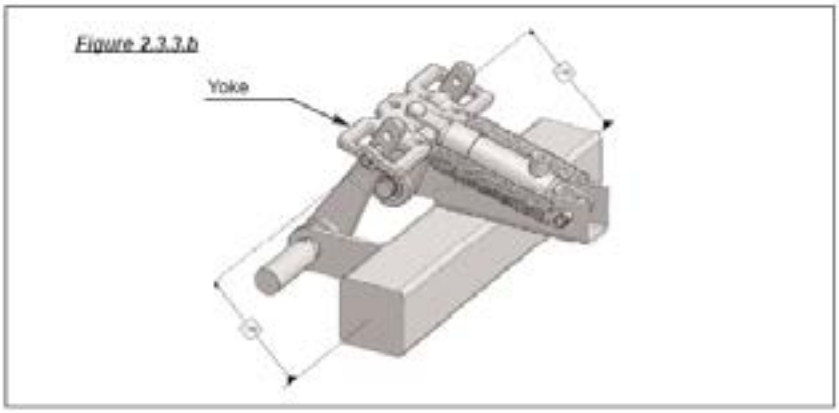
For braking systems with a yoke, the yoke must remain parallel with the axle especially when the brakes are fully applied (See figure 2.3.3.b). This means that the stroke of the levers on the brakes at each side must be identical. Otherwise, the brake slack must be adjusted.

Figure 2.3.3.a



2. AXLES

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**).

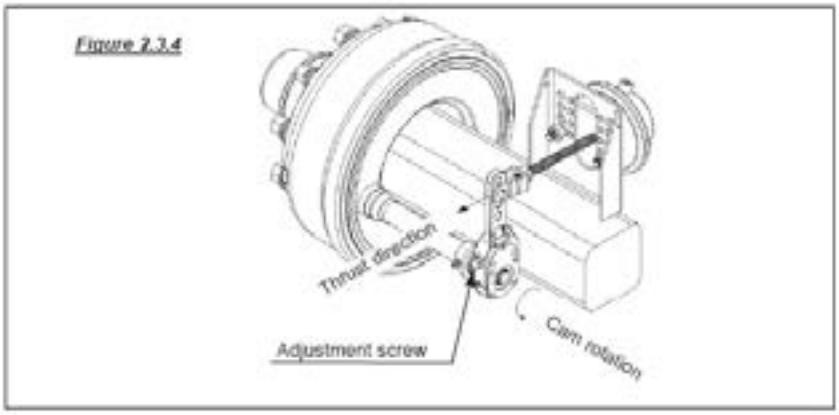
NB. The actuator brakes by pushing the lever to turn it in a particular direction. The screw must be adjusted so that the cam moves in this direction to take up the slack. The direction in which the screw must be turned depends on the configuration.

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. AXLES

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.

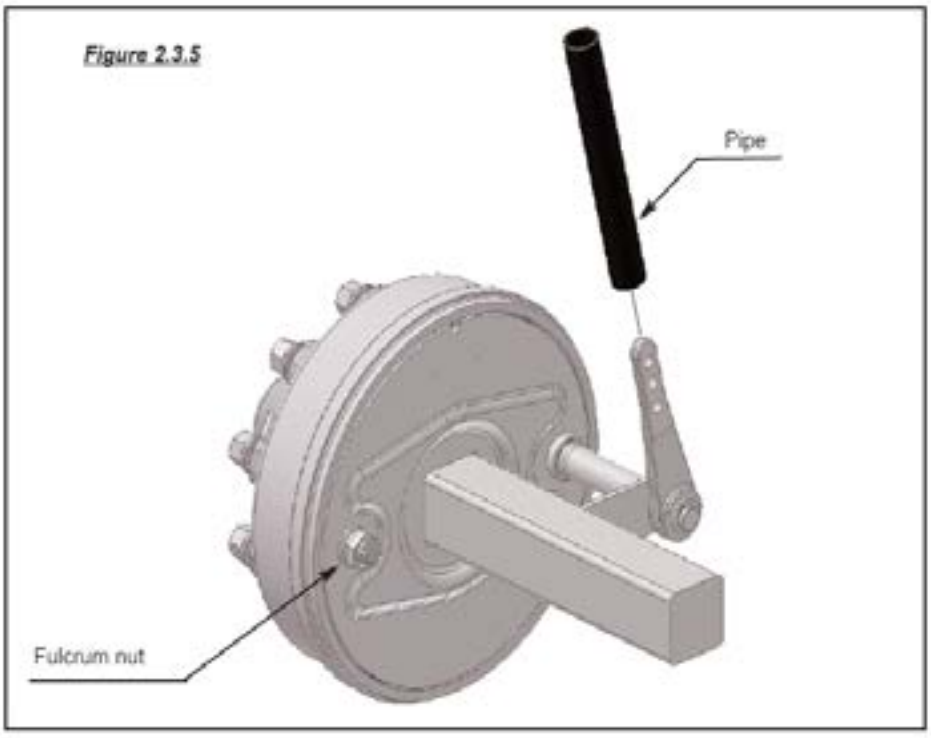
When replacing the brake linings, check all the brake components.
- Condition of the drums.
- Condition of the cam shafts and levers, in particular check the play in the splines.
- Wear on the bushings.
- Condition of the bellows (depending on the model).
- Condition of the shoe return springs.
- Condition 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.



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	

8 TYRES AND WHEELS

8.1 Tyre and wheel maintenance.

Maintenance of correct inflation pressure is the basic essential factor in obtaining the best performance and life from a pneumatic tyre. 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, this in turn leads to its eventual disintegration. In addition the distortion of the casing will result in the lifting of the centre of the tread, 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 brakes locking.

Unlike cars on which tyre loads do not vary greatly it is not practicable to provide standard recommendations. This is because tyre loading 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 mimimises both under inflation when loaded and excessive over inflation when running light.

8.2 TYRE PRESSURE SETTINGS

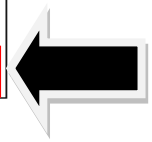
Recommended rims in red

For stationary service (0 km/h) and speed up to 10 km/h inflation pressure must increase by 20%. Field dual: 88% of field load, field triple: of field load.

Allianze allows for free rolling application: Load capacity to be increase by 15%, after increasing the inflation pressure by 20%.

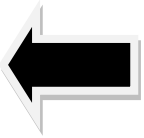
16.9-14 x 34 P14

Size	Rim	Unloaded dimension		Loaded Static Radius	Rolling Circum	PR,Stars Load Index	Infl. press	Recommend load, kg (lbs)								
								Speed, km/h (mph)								
								Not high and sustained torque; Road transport						Field operation		
														Low Torque		High Tor
		SW	OD													
		mm in	mm in	mm in	mm in	Speed Symbol	Bar psi	Static	10 6	20 12	30 19	40 25	50 31	10 6	20 12	10 6
16.9 - 34	W15 DW14	429 16.9	1585 62.4	725 28.5	4716 185.7		**1**	**4070**	**2660**	**2180**	**1890**	**1770**	**1610**	**2480**	**2120**	**1890**
							15	*8960*	*5860*	*4800*	*4160*	*3900*	*3550*	*5460*	*4670*	*4160*
							1.2	**4530**	**2960**	**2420**	**2110**	**1970**	**1790**	**2760**	**2360**	**2110**
							17	*9980*	*6520*	*5330*	*4650*	*4340*	*3940*	*6080*	*5200*	*4650*
						6PR	**1.3**	**4740**	**3090**	**2530**	**2200**	**2060**	**1870**	**2880**	**2470**	**2200**
						133A8	*19*	*10440*	*6810*	*5570*	*4850*	*4540*	*4120*	*6340*	*5440*	*4850*
							1.5	**5200**	**3390**	**2780**	**2420**	**2260**	**2060**	**3160**	**2710**	**2420**
							22	*11450*	*7470*	*6120*	*5330*	*4980*	*4540*	*6960*	*5970*	*5330*
							1.6	**5410**	**3530**	**2890**	**2510**	**2350**	**2140**	**3290**	**2820**	**2510**
							23	*11920*	*7780*	*6370*	*5530*	*5180*	*4710*	*7250*	*6210*	*5530*
						8PR	**1.7**	**5590**	**3650**	**2990**	**2600**	**2430**	**2210**	**3400**	**2920**	**2600**
						139A8	*25*	*12310*	*8040*	*6590*	*5730*	*5350*	*4870*	*7490*	*6430*	*5730*
							1.8	**5730**	**3740**	**3060**	**2660**	**2490**	**2270**	**3490**	**2990**	**2660**
							26	*12620*	*8240*	*6740*	*5860*	*5480*	*5000*	*7690*	*6590*	*5860*
							1.9	**5910**	**3860**	**3160**	**2750**	**2570**	**2340**	**3600**	**3080**	**2750**
							28	*13020*	*8500*	*6960*	*6060*	*5660*	*5150*	*7930*	*6780*	*6060*
						10PR	**2**	**6100**	**3980**	**3260**	**2840**	**2650**	**2410**	**3710**	**3180**	**2840**
						142A8	*29*	*13440*	*8770*	*7180*	*6260*	*5840*	*5310*	*8170*	*7000*	*6260*
							2.2	**6490**	**4230**	**3470**	**3020**	**2820**	**2570**	**3950**	**3380**	**3020**
							32	*14300*	*9320*	*7640*	*6650*	*6210*	*5660*	*8700*	*7440*	*6650*
							2.5	**6990**	**4560**	**3740**	**3250**	**3040**	**2770**	**4260**	**3650**	**3250**
							36	*15400*	*10040*	*8240*	*7160*	*6700*	*6100*	*9380*	*8040*	*7160*
						14PR	**2.8**	**7480**	**4880**	**4000**	**3480**	**3250**	**2960**	**4550**	**3900**	**3480**
						149A8	*41*	*16480*	*10750*	*8810*	*7670*	*7160*	*6520*	*10020*	*8590*	*7670*



18.4 x34 PR14

Size	Rim	Unloaded dimension SW	Unloaded dimension OD	Loaded Static Radius	Rolling Circum	PR,Stars Load Index	Infl. press	Recommend load, kg (lbs) Speed, km/h (mph) Not high and sustained torque; Road transport Static	10 6	20 12	30 19	40 25	50 31	Field operation Low Torque 10 6	20 12	High Tor 10 6
		mm in	mm in	mm in	mm in	Speed Symbol	Bar psi									
18.4 - 34	W16L DW16 W15L	467 18.4	1650 65	748 29.4	4882 192.2		0.9	4720	3080	2520	2190	2050	1870	2870	2460	2190
							13	10400	6780	5550	4820	4520	4120	6320	5420	4820
							1	5010	3270	2680	2330	2180	1980	3050	2620	2330
							15	11040	7200	5900	5130	4800	4360	6720	5770	5130
						6PR	1.1	5290	3450	2830	2460	2300	2090	3220	2760	2460
						137A8	16	11650	7600	6230	5420	5070	4600	7090	6080	5420
							1.2	5570	3630	2980	2590	2420	2200	3390	2900	2590
							17	12270	8000	6560	5700	5330	4850	7470	6390	5700
							1.3	5840	3810	3120	2720	2540	2310	3560	3050	2720
							19	12860	8390	6870	5990	5590	5090	7840	6720	5990
						8PR	1.4	6100	3980	3260	2840	2650	2410	3710	3180	2840
						142A8	20	13440	8770	7180	6260	5840	5310	8170	7000	6260
							1.5	6210	4050	3320	2890	2700	2460	3780	3240	2890
							22	13680	8920	7310	6370	5950	5420	8330	7140	6370
							1.7	6670	4350	3570	3100	2900	2640	4060	3480	3100
							25	14690	9580	7860	6830	6390	5810	8940	7670	6830
						10PR	1.8	6900	4500	3690	3210	3000	2730	4200	3600	3210
						146A8	26	15200	9910	8130	7070	6610	6010	9250	7930	7070
							2	7380	4820	3950	3430	3210	2920	4490	3850	3430
							29	16260	10620	8700	7560	7070	6430	9890	8480	7560
							2.3	8000	5220	4280	3720	3480	3170	4870	4180	3720
							33	17620	11500	9430	8190	7670	6980	10730	9210	8190
						14PR	2.5	8400	5480	4490	3910	3650	3320	5110	4380	3910
						153A8	36	18500	12070	9890	8610	8040	7310	11260	9650	8610



420/85R34

Size	Rim	Unloaded dimension SW	Unloaded dimension OD	Loaded Static Radius	Rolling Circum	PR,Stars Load Index	Infl. press	Recommend load, kg (lbs) Speed, km/h (mph) Not high and sustained torque; Road transport Static	10 6	20 12	30 19	40 25	50 31	65 40	Field operation Low Torque 10 6	20 12	High Tor 10 6
		mm in	mm in	mm in	mm in	Speed Symbol	Bar psi										
420/85R34	W15L W14L W13	450 17.7	1580 62.2	713 28.1	4696 184.9		0.8	3730	2430	1990	1860	1770	1770	1620	2480	2120	1890
							12	8220	5350	4380	4100	3900	3900	3570	5460	4670	4160
							1	4260	2780	2260	2130	2030	2030	1850	2840	2440	2170
						139D	15	9380	6120	5020	4690	4470	4470	4070	6260	5370	4780
						142A8	1.3	4950	3230	2640	2470	2350	2350	2150	3290	2820	2510
							19	10900	7110	5810	5440	5180	5180	4740	7250	6210	5530
							1.6	5590	3650	2990	2790	2650	2650	2430	3710	3180	2840
							23	12310	8040	6590	6150	5840	5840	5350	8170	7000	6260
							1.8	5890	3840	3150	2940	2800	2800	2560	3920	3360	3000
						144D	26	12970	8460	6940	6480	6170	6170	5640	8630	7400	6610
						147A8	2.1	6440	4200	3440	3220	3075	3075	2800	4310	3690	3290
							30	14190	9250	7580	7090	6770	6770	6170	9490	8130	7250

13.0/65x18

Size	Rim	Unloaded dimension SW mm in	Unloaded dimension OD mm in	Loaded Static Radius mm in	Rolling Circum mm in	PR	Free/Drive Wheel Load index speed Sym		Init. press bar psi	Recommend load, kg (lbs) Speed, km/h (mph) Free rolling 10 6	25 16	40 25	50 31	Drive Wheel 10 6	25 16	40 25	50 31
13.0/65-18	11	336 13.2	890 35	398 15.7	2611 102.8	12PR	138A8 134 B		1.5 22	1570 4340	1680 3700	1410 3110	1270 2800	1390 3060	1180 2600	990 2180	890 1960
									3 44	2970 6540	2520 5550	2120 4670	1910 4210	2070 4560	1760 3880	1480 3260	1330 2930
							125A8 121 B		3.6 52	3300 7270	2810 6190	2360 5200	2120 4670	2310 5090	1960 4320	1650 3630	1490 3280
									4.9 71	3960 8720	3370 7420	2830 6230	2540 5590	3300 7270	2800 6170	2360 5200	2130 4690
						14PR	141A8 137 B		3.9 57	3400 7490	2890 6370	2430 5350	2190 4820	2380 5240	2020 4450	1700 3740	1530 3370
									4.1 59	3500 7710	2980 6560	2500 5510	2250 4960	2450 5400	2080 4580	1750 3850	1580 3480
							128A8 124 B		4.3 62	3610 7950	3060 6740	2575 5670	2320 5110	2520 5550	2140 4710	1800 3960	1620 3570
									5.9 86	4330 9540	3670 8080	3090 6810	2780 6120	3600 7930	3060 6740	2570 5660	2320 5110
						16PR	144A8 140B		4.6 67	3780 8330	3210 7070	2700 5950	2430 5350	2630 5790	2240 4930	1880 4140	1690 3720
									4.8 70	3880 8550	3300 7270	2770 6100	2490 5480	2700 5950	2300 5070	1930 4250	1740 3830
							131A8 127B		4.9 71	3920 8630	3330 7330	2800 6170	2520 5550	2730 6010	2320 5110	1950 4300	1760 3880
									6.2 91	4760 10350	4000 8810	3360 7400	3020 6650	3900 8590	3320 7310	2790 6150	2520 5550

16.9-14 x 34 PR14

Size	Rim	Unloaded dimension SW	Unloaded dimension OD	Loaded Static Radius	Rolling Circum	PR Stars Load Index	Infl. press	Recommend load, kg (lbs)								
								Speed, km/h (mph)								
								Not high and sustained torque; Road transport						Field operation		
														Low Torque		High Tor
		mm in	mm in	mm in	mm in	Speed Symbol	Bar psi	Static	10 6	20 12	30 19	40 25	50 31	10 6	20 12	10 6
16.9-34	W15 DW14	429 16.9	1585 62.4	725 28.5	4716 185.7	6PR 133A8	1 15	4070 8960	2660 5860	2180 4800	1890 4160	1770 3900	1610 3550	2480 5460	2120 4670	1890 4160
							1.2 17	4530 9980	2960 6520	2420 5330	2110 4650	1970 4340	1790 3940	2760 6080	2360 5200	2110 4650
							1.3 19	4740 10440	3090 6810	2530 5570	2200 4850	2060 4540	1870 4120	2880 6340	2470 5440	2200 4850
						8PR 139A8	1.5 22	5200 11450	3390 7470	2780 6120	2420 5330	2260 4980	2060 4540	3160 6960	2710 5970	2420 5330
							1.6 23	5410 11920	3530 7780	2890 6370	2510 5530	2360 5180	2140 4710	3290 7250	2820 6210	2510 5530
							1.7 25	5590 12310	3650 8040	2990 6590	2600 5730	2430 5350	2210 4870	3400 7490	2920 6430	2600 5730
						10PR 142A8	1.8 26	5730 12620	3740 8240	3060 6740	2660 5860	2490 5480	2270 5000	3490 7690	2990 6590	2660 5860
							1.9 28	5910 13020	3860 8500	3160 6960	2750 6060	2570 5660	2340 5150	3600 7930	3080 6780	2750 6060
							2 29	6100 13440	3980 8770	3260 7180	2840 6260	2650 5840	2410 5310	3710 8170	3180 7000	2840 6260
						12PR 149A8	2.2 32	6490 14300	4230 9320	3470 7640	3020 6650	2820 6210	2570 5660	3950 8700	3380 7440	3020 6650
							2.5 36	6990 15400	4560 10040	3740 8240	3250 7160	3040 6700	2770 6100	4260 9380	3650 8040	3250 7160
							2.8 41	7480 16480	4880 10750	4000 8810	3480 7670	3260 7160	2960 6520	4550 10020	3900 8590	3480 7670

8.3 WHEEL TYPE & TORQUE SETTINGS

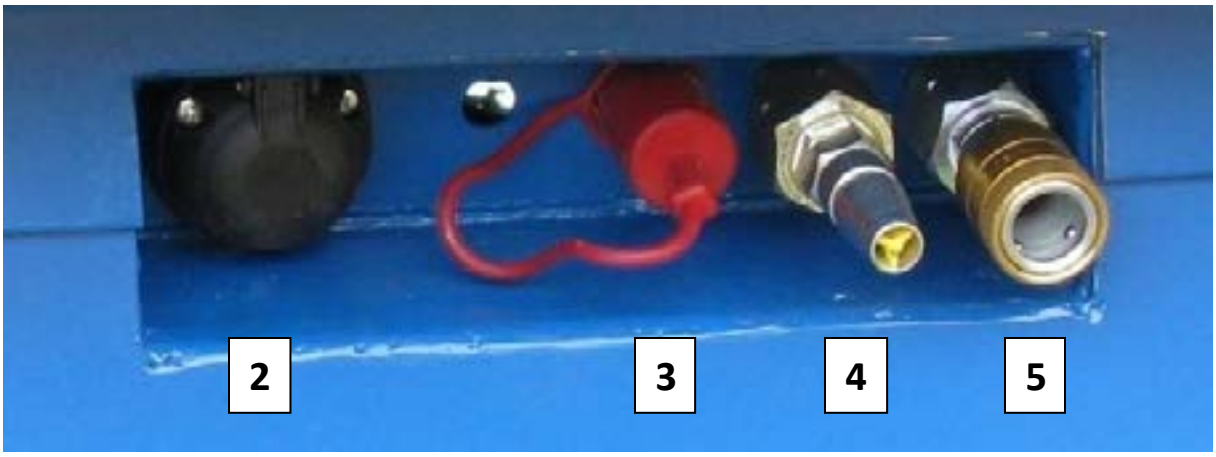
TYRE TYPE	WHEEL TYPE	WHEEL STUD TYPE & SIZE	TORQUE SETTINGS
16.9-14 x 34 P14	DW 16x34 centre nave 220 bore	8 x M18 - 1.5 275 PCD	270 Nm/200 lb/ft
18.4 x 34 PR14	16 x 34 centre nave 280 bore	8 x M18 - 1.5 275 PCD	270 Nm/200 lb/ft

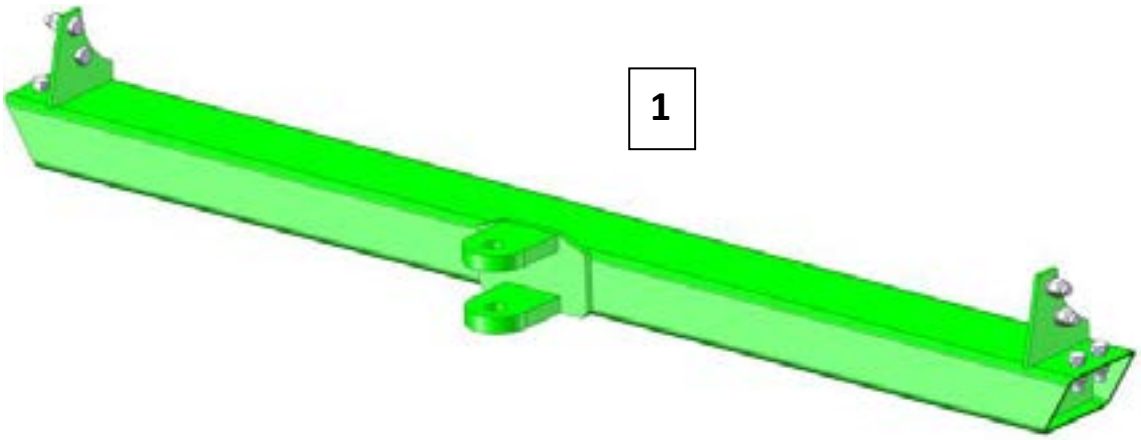
IMPORTANT

CHECK WHEEL NUT TORQUE DAILY FOR THE FIRST WEEK AND ONCE A WEEK THEREAFTER.

9. OPTIONS

9.1 REAR CLEVIS DRAWBAR - OPTIONAL

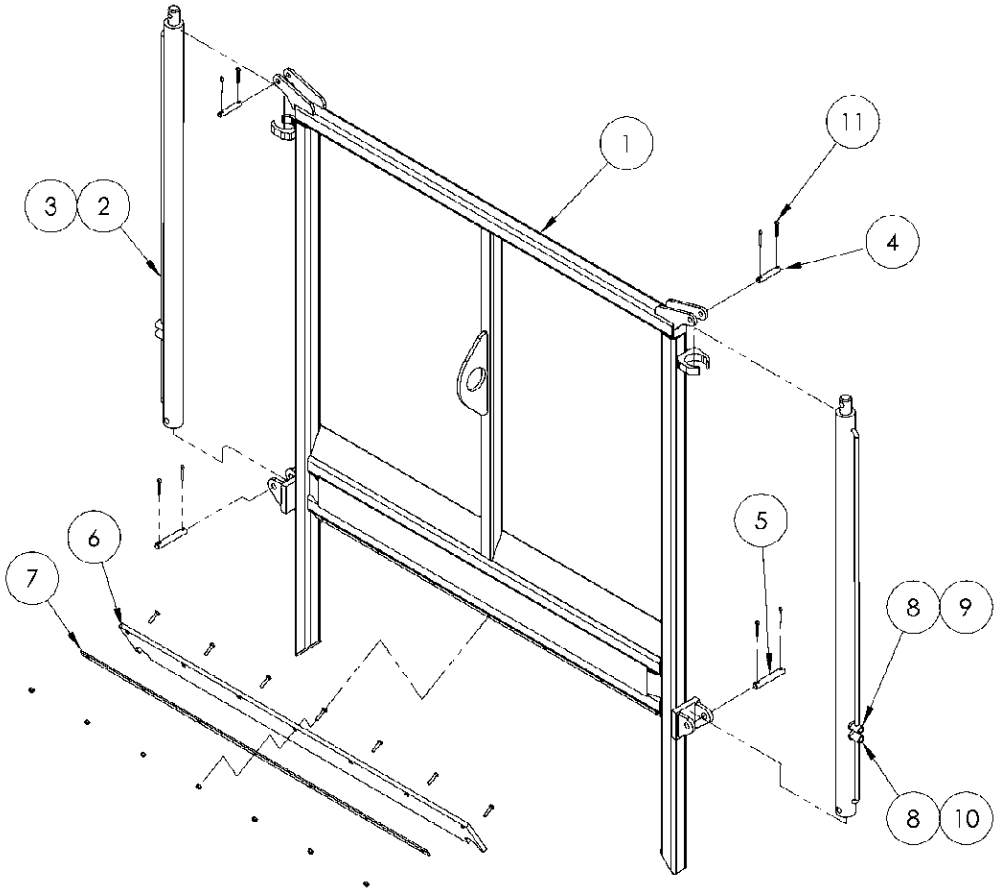




KEY	QTY	PART No.	DESCRIPTION
1	1	B5310	REAR CLEVIS DRAWBAR CROSS MEMBER
2	1	70107	7 PIN LIGHT SOCKET
3	1	51569	HYDRAULIC BRAKE CONNECTION
4	1	CF350932	AIR COUPLING MALE
5	1	CF351543	AIR COUPLING FEMALE

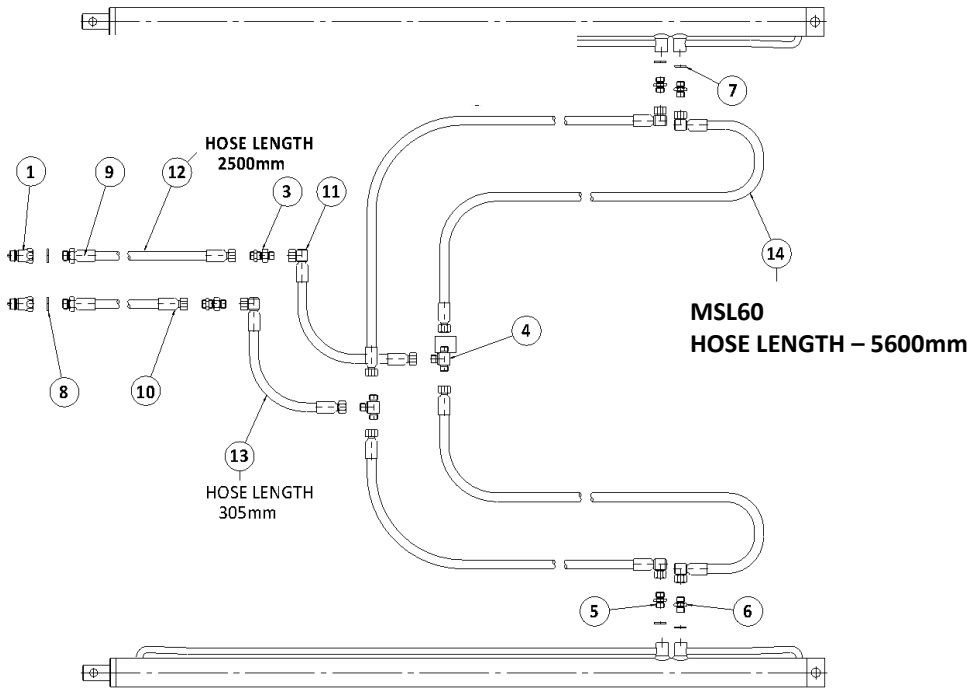
NOTE:
The drawbar is designed for highway use **only** towing an unladen spreader.

9.2 GUILLOTINE SLURRY DOOR



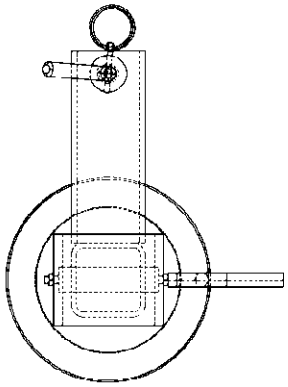
KEY	QTY	PART No.	DESCRIPTION
1	1	B4108	DOOR
2	2	B4135	50mm BORE x 1067mm STROKE RAM
3		65520	SEAL KIT 50mm BORE
4	2	B4130	TOP RAM PIN DIA 5/8"
5	2	B4132	BOTTOM RAM PIN DIA 3/4"
6	1	B4158	RUBBER SEAL
7	1	B4184	CLAMPING STRIP & M8 x 35 BOLT C/W S.L NUTS
8	4	51590	3/8" BONDED SEAL
9	2	51335	3/8" M/M ADAPTOR
10	2	10522	3/8" x 1/8" RESTRICTOR
11	8	50988	SPLIT PIN

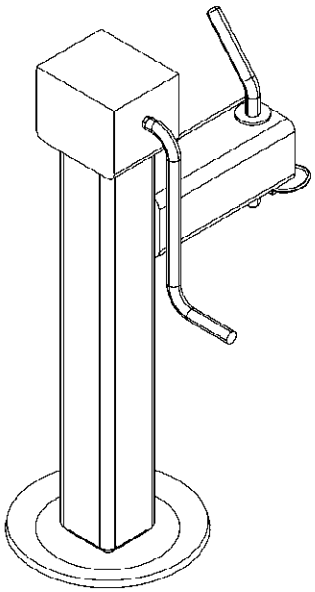
9.3 GUILLOTINE SLURRY DOOR HYDRAULIC CIRCUIT.



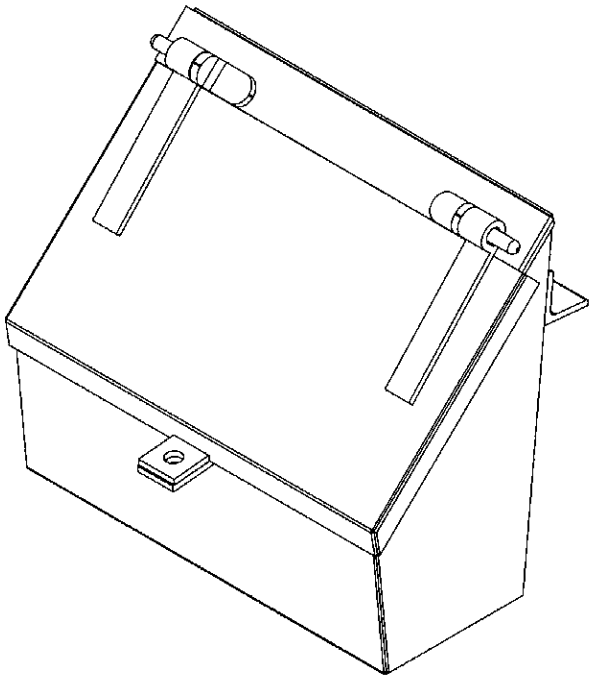
KEY	QTY	PART No.	DESCRIPTION
1	2	51576	1/2" PROBE MALE SELF SEALER
2			
3	2	51463	3/8"-3/8"- BPT BULKHEAD
4	2	51447	3/8"-3/8"-3/8" MALE TEE
5	2	51335	3/8"-3/8" BPT NIPPLE
6	2	10522	3/8"-3/8" BPT NIPPLE 1/8" REDUCED
7	4	51590	DIA 3/8" DOWTY WASHER
8	2	51591	DIA 1/2" DOWTY WASHER
9	2	52316	HOSE END DIA 3/8-1/2" BPT MALE
10	8	52311	HOSE END DIA 3/8"-3/8" BPT FEMALE
11	6	52313	HOSE END DIA 3/8"-3/8" BPT 90 DEG FEM
12	2	52793	HOSE 3/8" BORE 2 WIRE x 2500
13	2	52793	HOSE 3/8" BORE 2 WIRE x 305
14	4	52793	HOSE 3/8" BORE 2 WIRE x LENGTH
15	2	B4135	HYDRAULIC RAM
16	REF	SEE NOTE	HYD RAM 50mm BORE DOUBLE ACTING

9.4 SUPPORT LEG PART No. 70307

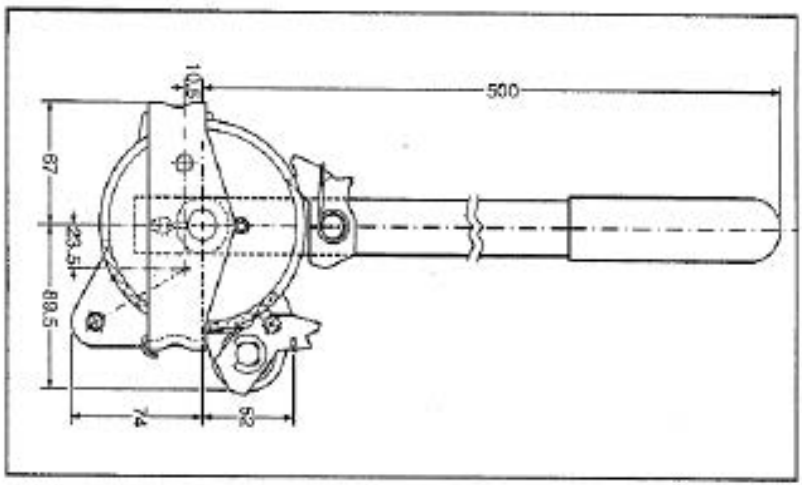




9.5 TOOLBOX PART No. 80136



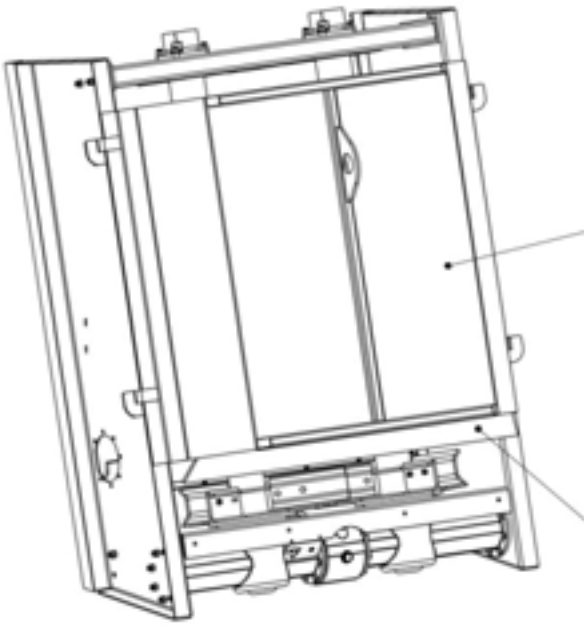
9.6 HANDBRAKE CONTROL MULTI-STROKE MS45 PART No. 70321



9.7 BODY SEAL RUBBER

KEY	QTY	PART No.	DESCRIPTION
1	1	B4158	SLURRY DOOR & FRONTWALL
2	1	B4160	AUGER DECK
3	1	B4173	DOUBLE WIPE

9.8 SIMPLE CANOPY

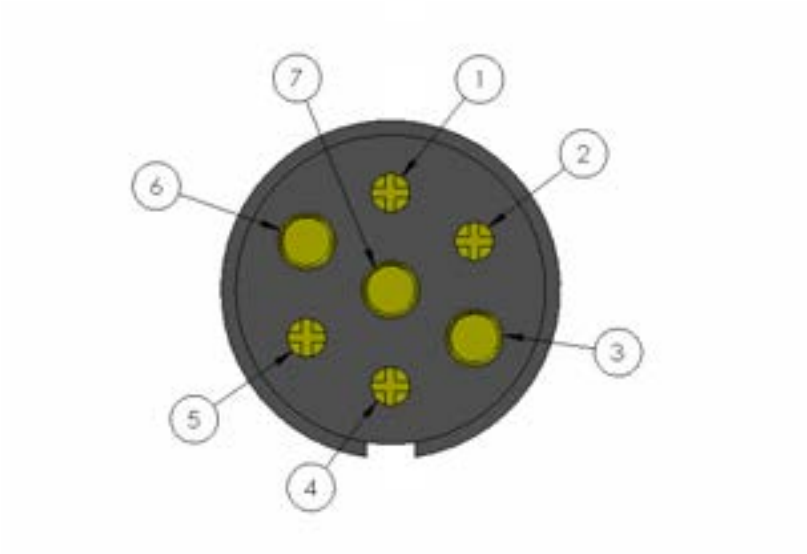


9.9 HYDRAULIC BORDER CONTROL

KEY	QTY	PART No.	DESCRIPTION
1	1	65078	RAM DA30 20 255
2	1	B4191	MOUNT BRACKET LH
2	1	B4191/1	MOUNT BRACKET RH
3	1	B4190	DEFLECTOR PLATE LH
3	1	B4190/1	DEFLECTOR PLATE RH
		65505	30/20 SEAL KIT

10. ELECTRICS

10.1 WIRING FOR 12v 7 PIN PLUG



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.

For North American units.

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

Pins 3 & 5 may be linked.

10.2 REAR LAMPS – 70152

10.3 FRONT MARKER LAMP – 70154

11. HEALTH AND SAFETY

11.1 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.

11.2 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.

11.3 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.

11.4 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 operator's skin. Hydraulic components may also be hot and may cause burning if touched.

11.5 Electrocution

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

11.6 Body entry

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

11.7 Coupling / Decoupling

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

11.8 Machinery start up

Sound the horn before starting this machine.

11.9 Machinery shut down

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

11.10 Additional driver protection

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

11.11 PTO Connection and guarding

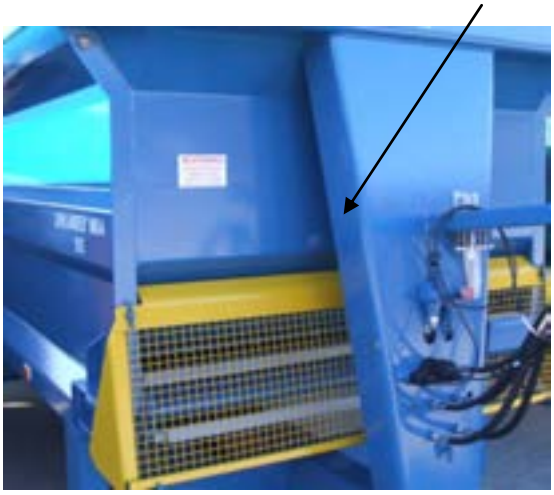
Improper PTO connection and operation may cause machine failure and injury to an operator. PTO shaft guards must be used at all time.

11.12 Personal protective equipment (PPE)

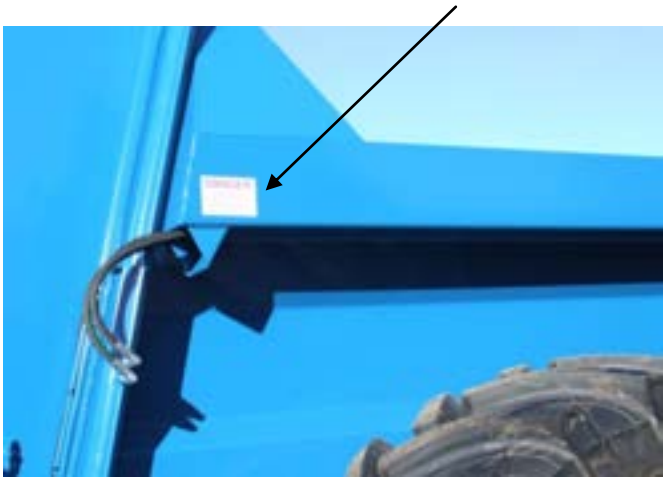
When maintaining and operating this machine make sure appropriate PPE is worn.
i.e. Overalls, gloves, safety shoes, eye and ear protection.

11.13 Safety decal location

i) Warning – When spreading , lower slurry door to cover exposed augers.

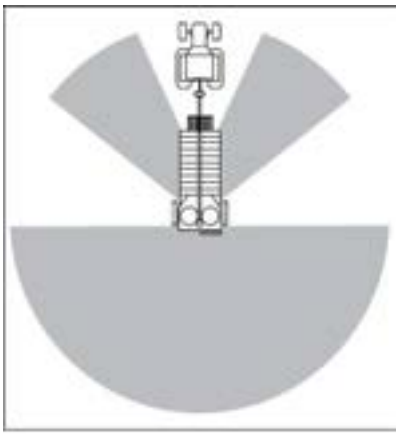


ii) Danger – Keep hands clear of taildoor and mechanism during operation.



11.14 Operating hazard area

- Objects can be thrown out from the rotors with sufficient force to severely injure people. Stay away from machine when it is running. Keep others away.
- Stay out of shaded hazard area.
- Always know where all additional personnel are located when operating the spreader. Never allow anyone within the hazard area.
- Stay away from the sides and rear of the spreader when it is running to prevent being hit by flying debris. Rotors can expel solid objects with sufficient force to cause severe injury. Stay out of hazard area.



NOTE: *Remember any foreign objects hidden in the material i.e. stones, bricks, wood etc. can be thrown further than the actual material, which could result in serious injury or loss of life.*

11.15 Warnings

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 the PTO and stop the tractor engine and remove key.

Guards are provided for your safety. **Never** operate the spreader with any removed or open.

Before engaging the PTO 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 present within the working proximity. Remember any foreign objects hidden in the material i.e. stones, bricks, wood etc can be thrown further than the actual material, which could result in serious injury or loss of life.

HEALTH AND SAFETY EXCUTIVE

NEVER try to clear blockages from a PTO-driven machine while it is moving. Always:

- Disengage the power drive;
- Stop the tractor engine;
- Ensure controls are in neutral and the hand brake is applied;
- Remove the engine key;
- Wait for all movement to cease before attempting to clear any blockage and use a tool to clear the blockage.

12. WARRANTY

During the 3 year 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 replacements 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.

13. IMPORTANT INFORMATION

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 drives, 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 shearbolts on the PTO has not sheared and the noises persists **STOP THE SPREADER SWITCH OFF TRACTOR ENGINE** and check the spreader.

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 takes place.
Careful low pressure washing is acceptable.

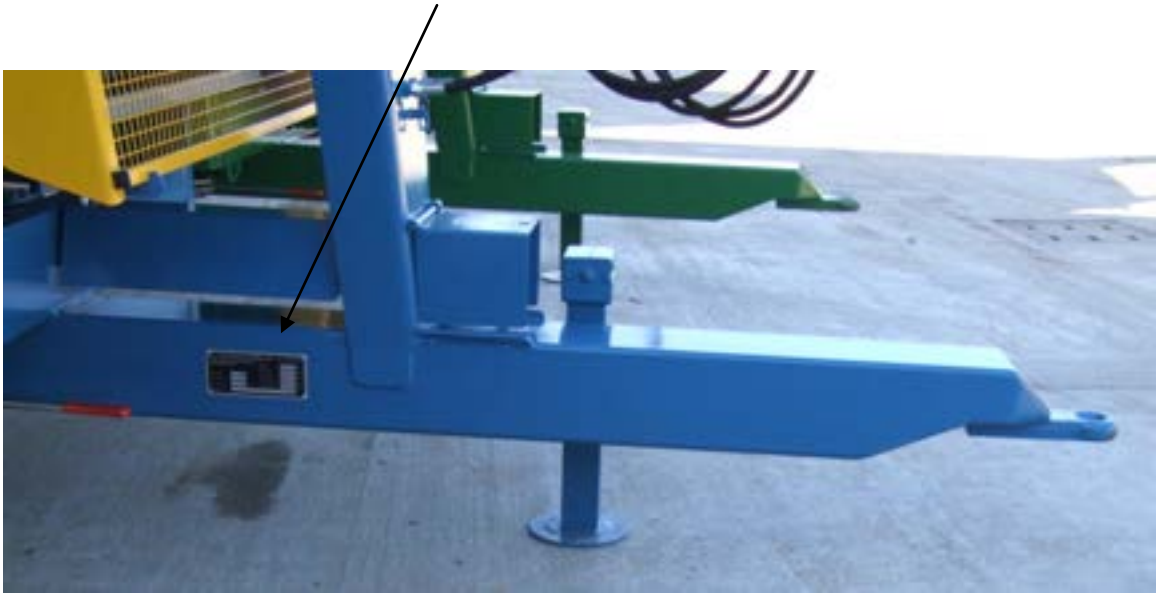
Do not let manure dry and set on fresh paint for the first 3-4 weeks. During this period it is advisable to clean the machine after use as instructed.

14. NOTES

15. IDENTIFICATION PLATE

The machine number (VIN), the model is required with all orders for spare parts and technical enquires. The is necessary in order to ensure correct delivery of spare parts.

The identification plate with the machine Number is attached to the middle right side of the machine drawbar.



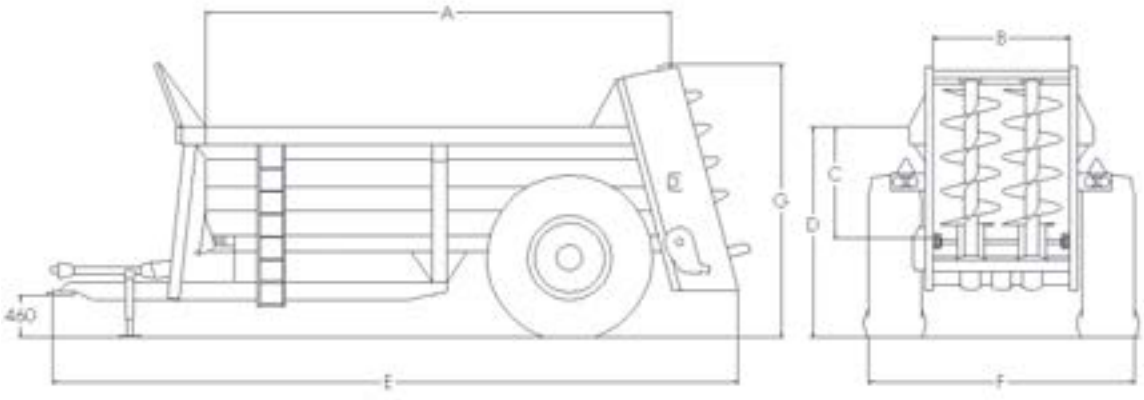
16. TECHNICAL DATA & SPECIFICATIONS

GROSS DESIGN Kg	11000
GROSS GB Kg	11000
AXLE DESIGN Kg	9000
AXLE GB Kg	9000
EYE Kg	2000
PAYLOAD Kg	6000
UNLADEN WEIGHT Kg	3200

Bunning tolerance +/-2%

Axle	Single
Axle beam size	90mm
Carrying capacity	6000 Kg
Cubic meters level	4.0m
Cubic meters heaped	6.0m
Body size (int.mm)	3550X1500X795
Floor drive	Hydraulic
Floor chain size	16mm
Brake size mm	355x80
Tyre size	16.9x34 PR14
Spread Mech	TWIN VERTICAL AUGERS
Spread width	UP TO 16m
PTO speed	1000 rpm
Floor plate	5mm
Side plate	4mm

17. MACHINE DIMENSIONS



MODEL	A	B	C	D	E	F	G
60	3775	1500	790	1780	6000	2520	2400

FOR PROMPT IDENTIFICATION AND SUPPLY OF SPARES, ALWAYS QUOTE THE CHASSIS SERIAL NUMBER. (FOUND ON THE CHASSIS IDENTIFICATION PLATE)

This manual should stay with the machine/operator at all times.

This manual is an original English language copy