Thank you for buying a Bunning spreader. For your 3 year 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/MSL180
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 e-mail 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 Mk2 HD & WB

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 (+ or – 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 (UK)

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. **Remember, max gross combination weight is 24390Kg and maximum gross spreader weight is 18290kg. If your spreader is wider then 2.55m and up to 3.5m your maximum speed is 25 mph, above 3.5m is 12 mph.**

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 MSL**

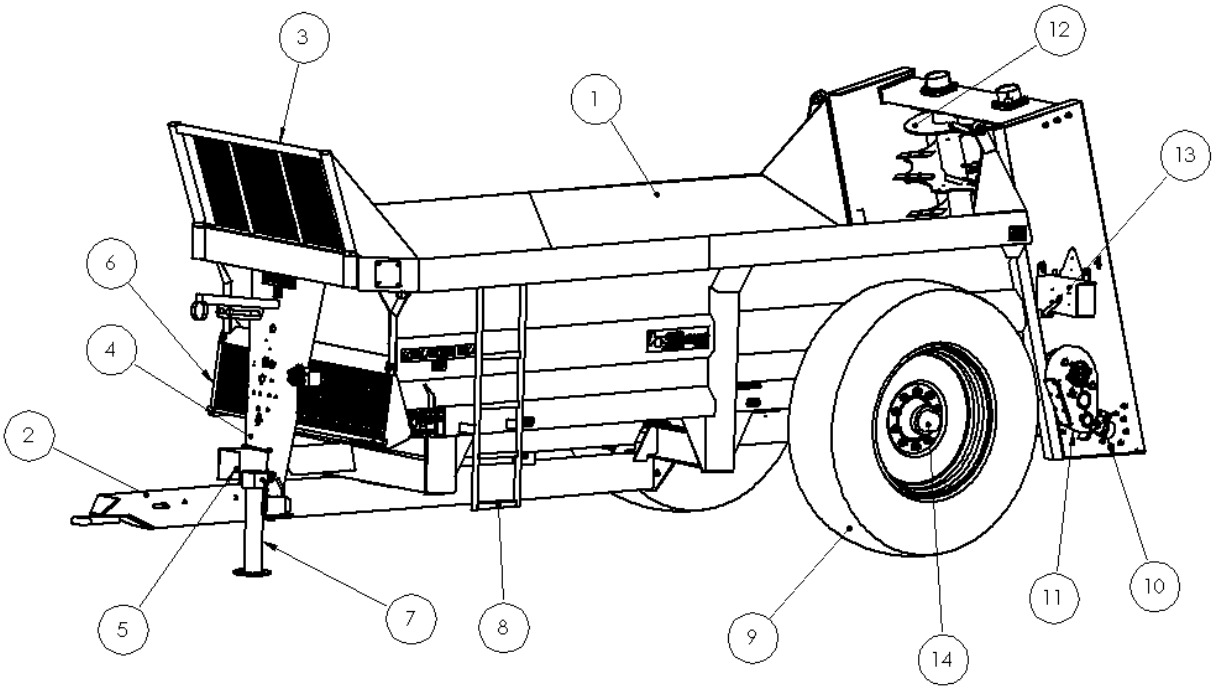
Serial Number: / / /U/MSL

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



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 and remove key before fitting PTO.

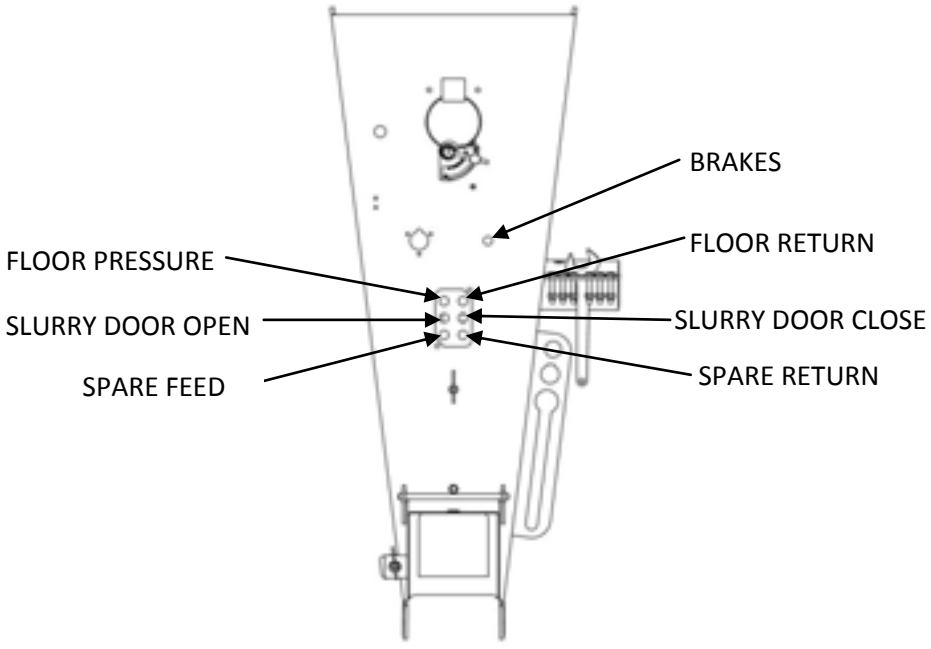
Slide the tractor end of the PTO shaft out and fit to the tractor PTO. Lay the two halves of the PTO shaft alongside one another and mark the required lengths, allowing for turning. Maximum pull out of 300mm (12 inches) of the 2 shafts. Cut to size and clean burrs at each end of shaft **KEEP SHAFT SLIDING 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 the 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 hydrualic 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 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.

1.8 INSTALLATION AND GENERAL USE OF DETACHABLE SPINNER DECK

GENERAL USE

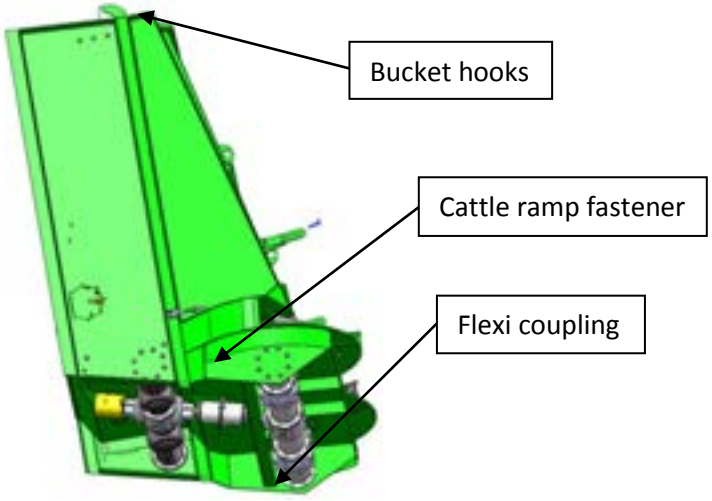
The detachable spinner deck is designed purely for wider spread patterns and low application rates of between 1 and 3 tonnes per acre (2 ½ to 7 ½ tonnes per hectare). It must **NEVER** be used to spread long straw based material or heavy applications beyond 5 tonnes per acre.

INSTALLATION

When fitting or removing the spinner deck assembly great care must be taken not to endanger an assistant in any way, especially when raising or lowering the unit. Persons must not be put at risk.
Before making any adjustments, fitting or removing attachments, the tractor that the spreader is attached to must be switched off and the key removed.

FITTING THE SPINNER DECK

1 Remove guard from output spigots of the auger gearbox.
2 Slide one half of 'flexi coupling' onto the shaft, through shaft of spinner gearbox.
3 Slide other half of the 'flexi coupling' on the input spigot of the spinner gearbox.
4 Using approved lifting apparatus lift the complete spinner deck assembly using lower lifting eye on canopy (ensure bolt & nuts No. 20/20 and 16/18 are securely in place).
5 Offer the assembly to rear of the machine and lower into position. Firstly locate the 'bucket hooks' of deck into clevises at the top rear corners of the spreader.
6 Hinge hook bolt No. 14 into anchors and tighten.
7 Fit and tighten 4 bolts to join the two halves of the flexi coupling.
8 The machine is now ready for use with the spinner deck.



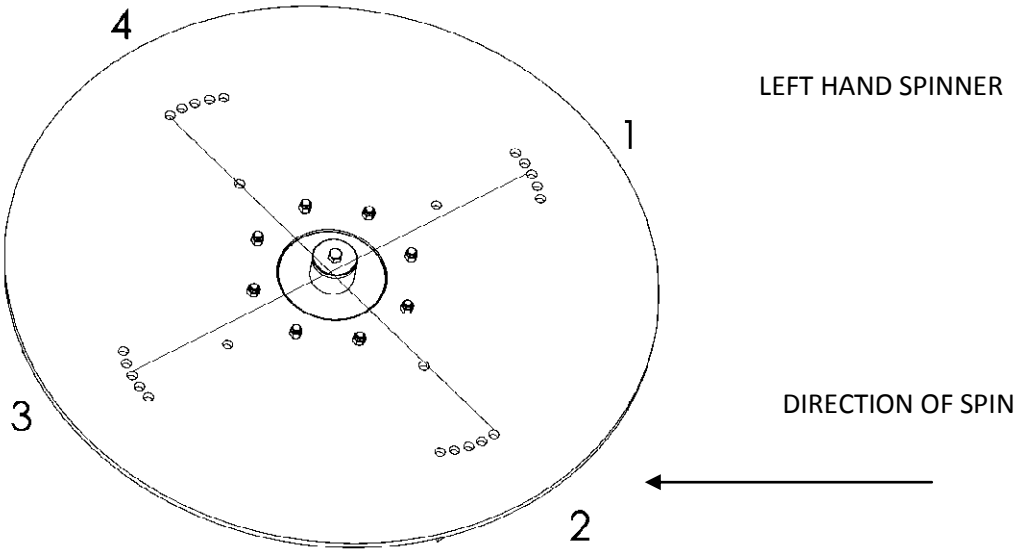
REMOVING THE SPINNER DECK

1 Clean all material from spinners and decks.
2 Remove 4 bolts from the flexi coupling.
3 Loosen hook bolts No. 14 and hinge back to clear anchors.
4 Using approved lifting apparatus lift from lower lifting eye on the canopy firstly pulling the bottom of the deck assembly away from rear of spreader to the clear auger blades.
5 Lift the assembly clear of the spreader and stand on level ground with the front of the assembly close to, or against a wall or stable object.
6 Fit the shaft cover to the output spigot of the spreader beater gearbox.
7 The machine is now ready for use without spinner deck.

ADJUSTMENT OF CANOPY & BLADES

<u>For the best results</u>

1 Fix the canopy on the inner positions for light materials i.e. Poultry manure.
2 For heavy material i.e. slurry or sludge adjust canopy out as far as possible so as not to deposit material beyond the deck into gaps between the discs.
3 To increase the width of the spread pattern adjust the angle of blades forward on the disc.
4 If the spread pattern is light immediately behind the machine adjust the angle of the blades back.
5 It is possible to achieve an even spread by adjusting blades as opposing pairs. i.e Blade 1 and 3 in position 3 and blade 2 and 4 in position 1.



1.9 OPERATING INSTRUCTIONS FOR HORIZONTAL BEATERS

General use

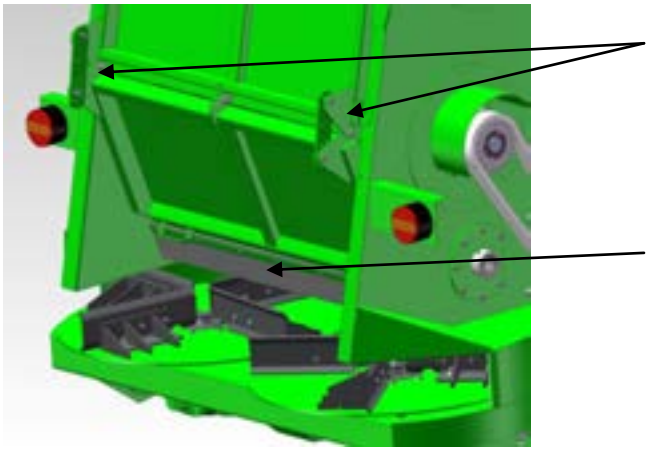
The horizontal beater with spinner discs is designed primarily for wider spread patterns and lower application rates for product such as chicken and turkey manure, however long straw based materials can be spread effectively. It must be expected that application rates maybe slower than a vertical auger spreader.

Adjustments for spread patterns

The position of the lower section of rear canopy and the angle of the blades on the discs will affect the spread pattern and width.

Select a hole position that places the rubber strip over the middle of the discs for a lighter application rates and wider widths. Adjust the hole position to move the rubber strip rearwards for higher application rates e.g. for straw based materials. Excessive rearward adjustment will cause the material to miss the discs and hit the ground without being spread.
Each spinning disc is supplied with 2 blades on and the others loose; it has been proven that many materials are spread more effectively with just 2 blades per disc.

1 To increase the width of the spread pattern adjust the angle of blades forward on the disc.
2 If the spread pattern is light immediately behind the machine adjust the angle of the blades back.
3 It is possible to achieve an even spread by adjusting the blades, as opposing pairs. i.e. Blade 1 and 3 in position 3 and blade 2 and 4 in position 1.
4 When adjusting angle use the 2nd set of holes on the blade to keep the tip of the blade on the edge of the disc



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 manufacturer's 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.

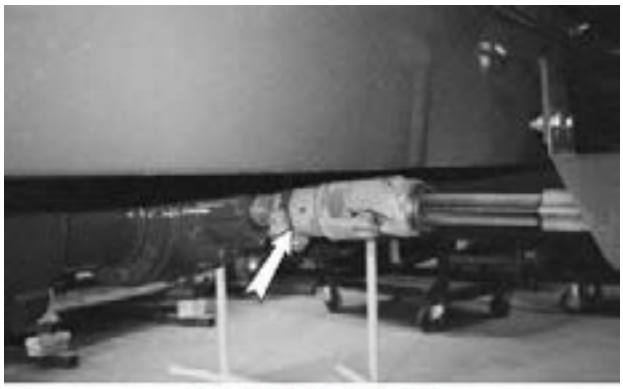
a. Front shaft.
- Remove front Finger Guard to access bearings.

b. Rear Shaft.

- Grease both left and right bearings.

LEFT BUSHING RIGHT BUSHING

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

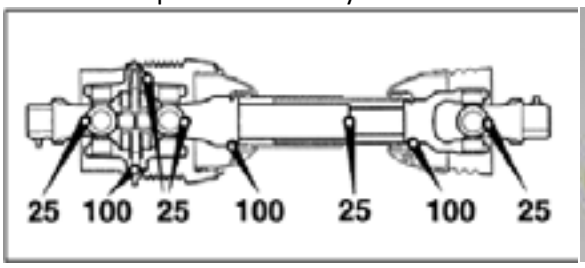


Over-Running Clutch

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.

7. Check bearings in gearboxes.

2.3 Amount of oil required to fill gearbox

Please use EP90 gear oil

RT500/50/25	6.7	Ltrs
RT800/60/32	10.5	Ltrs
SRT 8	7	Ltrs
SRT 12	13.6	Ltrs
SRT 18	13.5	Ltrs
B3183 HDB all in one g/box	16	Ltrs

2.4 SERVICE RECORD

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

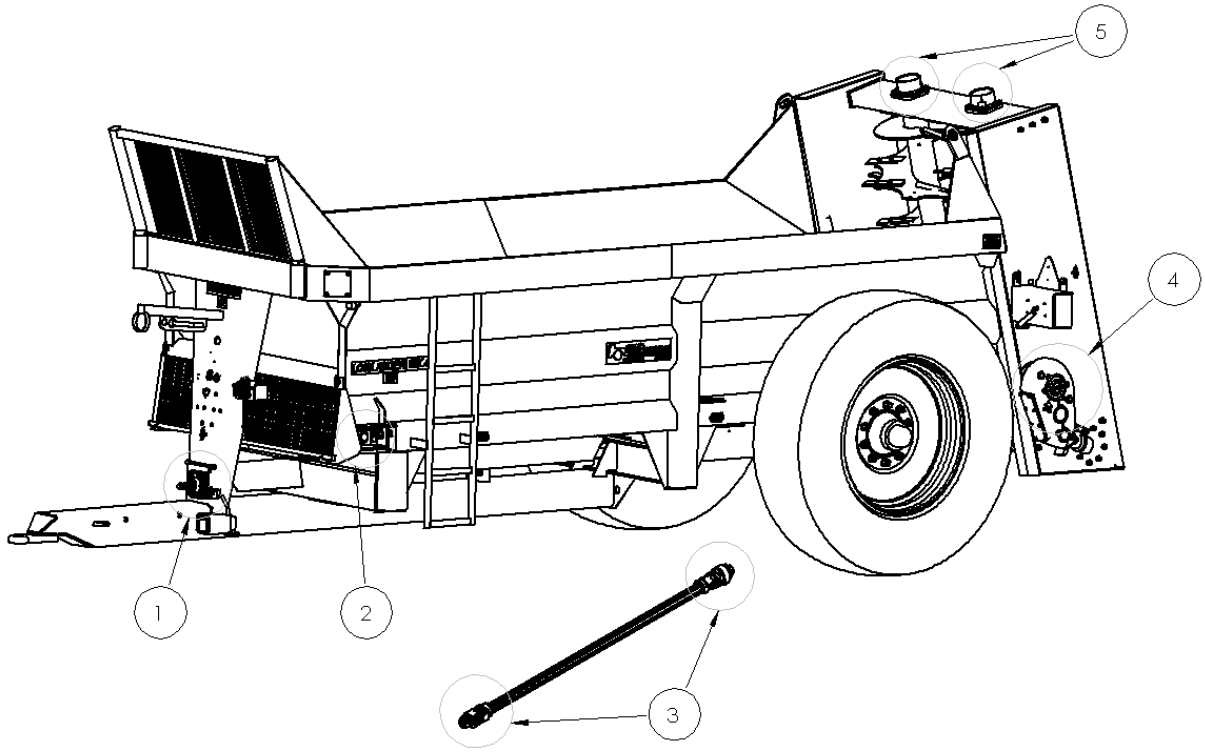
ACTION CODE CK = CHECK CL = CLEAN G = GREASE

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																								

2.5 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.

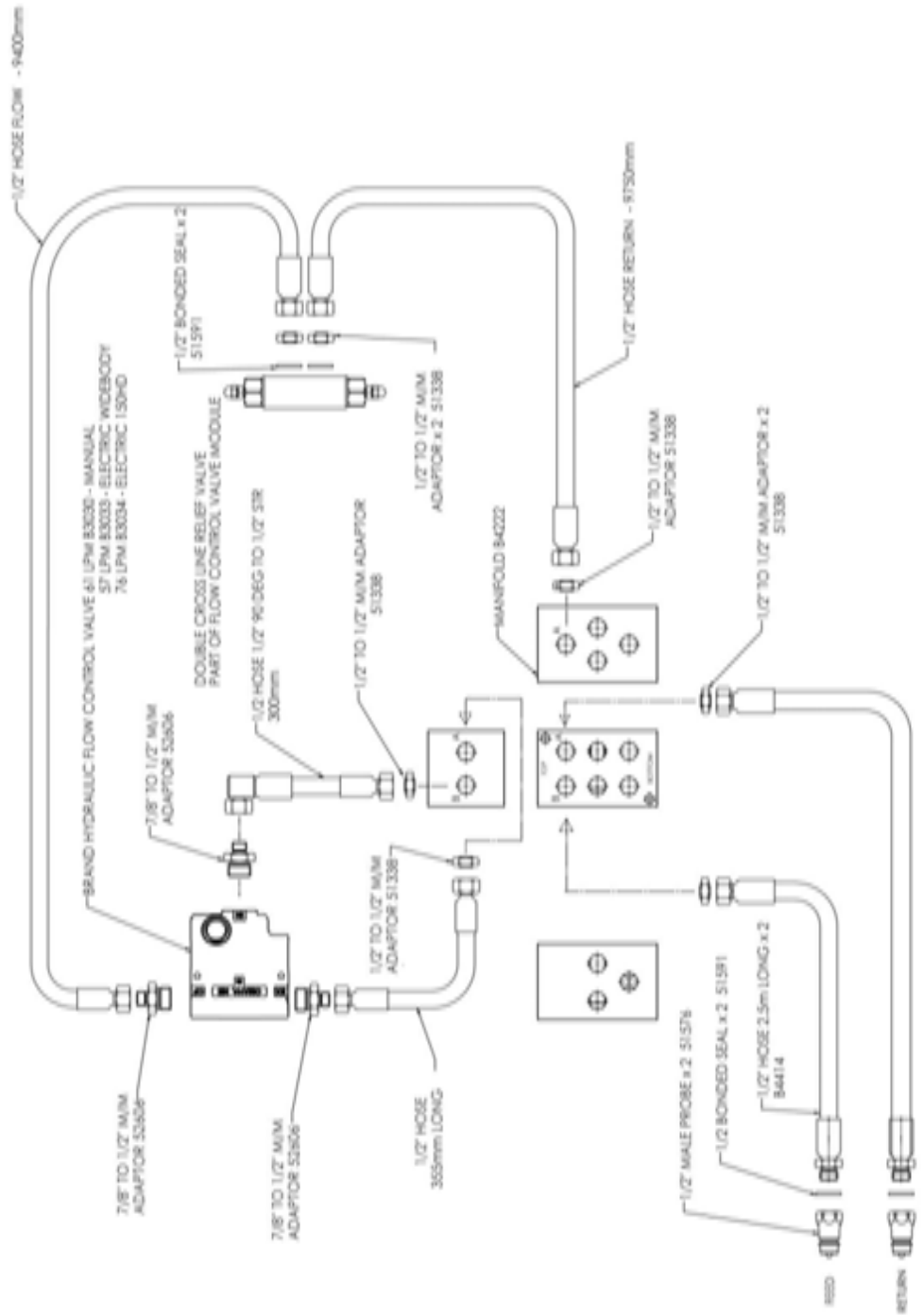
2.6 Greasing points



KEY	GREASE POINT
1	ALL BEARINGS IN DRIVE LINE
2	FRONT SHAFT
3	PTO KNUCKLES
4	REAR SHAFT
5	BEARINGS TOP OF AUGERS

3. FLOOR DRIVE

3.1 HYDRAULIC CIRCUIT FOR FLOOR DRIVE

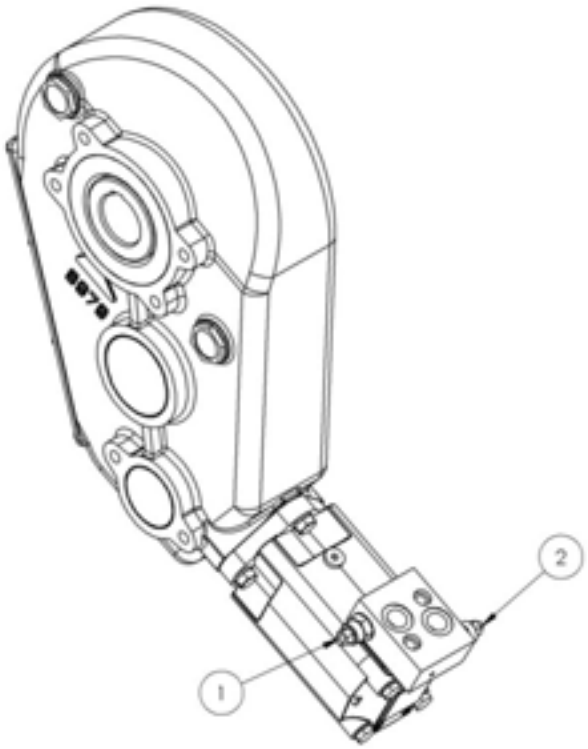


3.2 FLOOR SPEED CONTROL UNIT – 150HD MK2 & WIDEBODY – B3030 61 LPM MANUAL

150HD MK2 - B3033 57 LPM ELECTRIC

WIDEBODY - B3034 76 LPM ELECTRIC

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, insert the Allen key to prevent the screw from rotating whilst slacking off the lock nut. Use the Allen key, turn the screw clockwise to increase pressure until the floor starts to move. Use the Allen key to prevent rotation of the screw and retighten the lock nut.

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

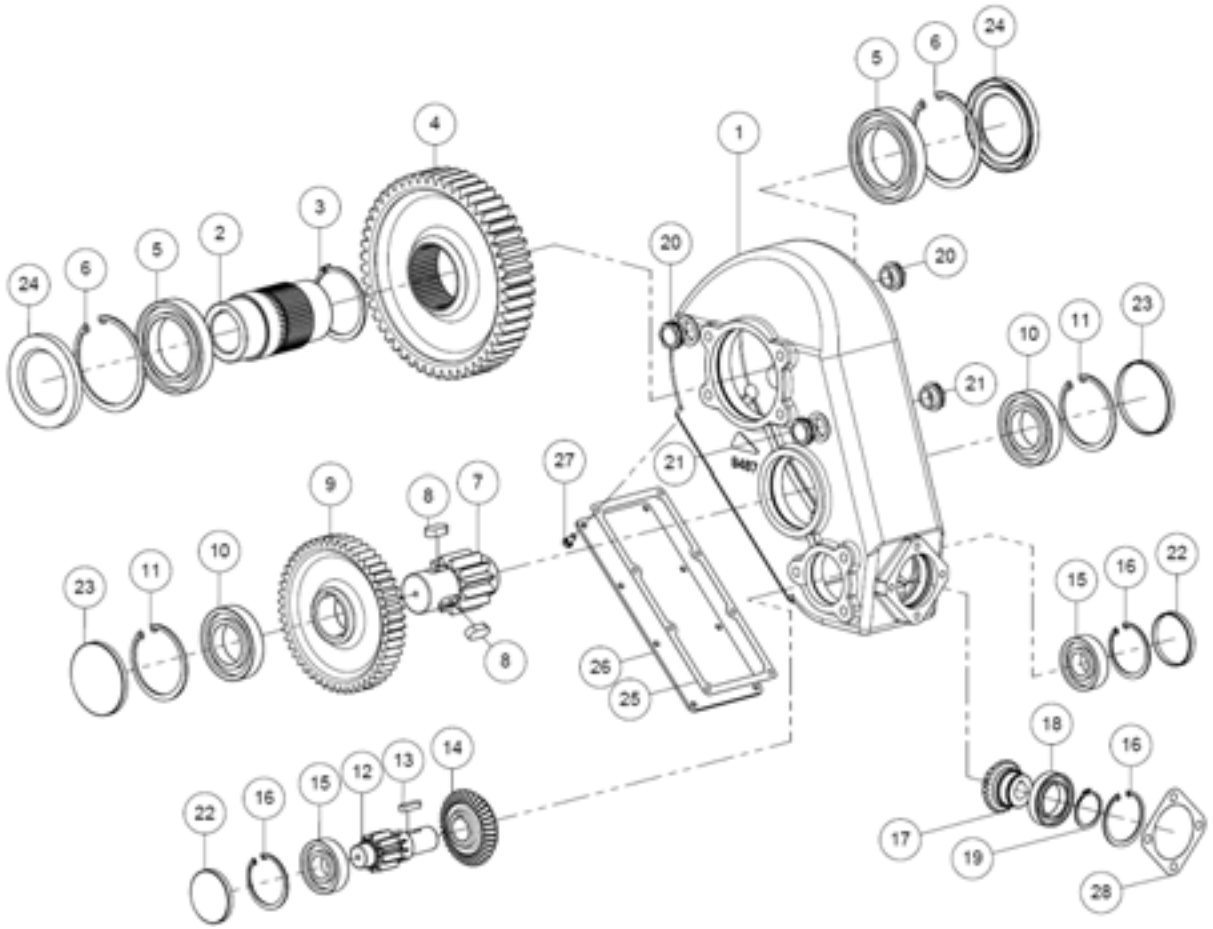
To adjust relief valve pressure

No.1
Cartridge contols 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 retighen 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.

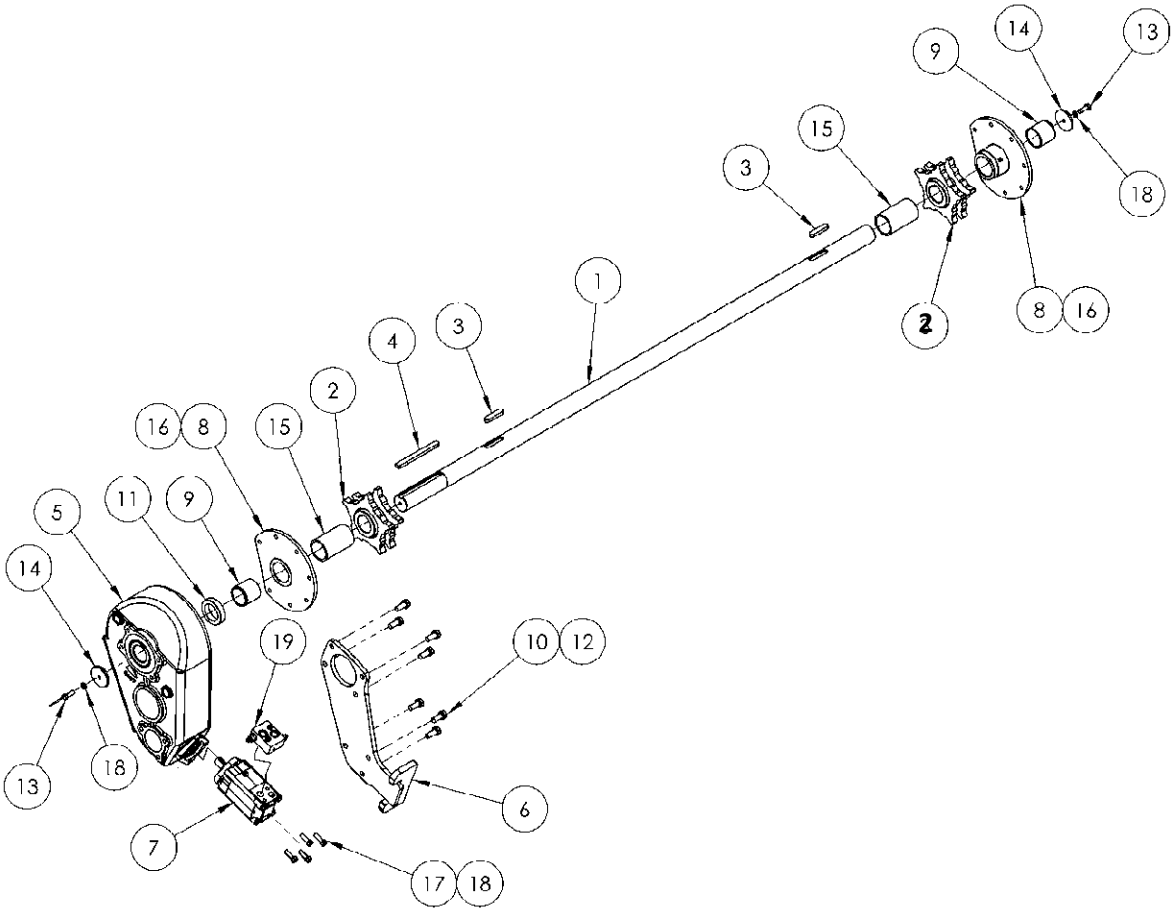
3.4 FLOOR DRIVE GEARBOX B3122

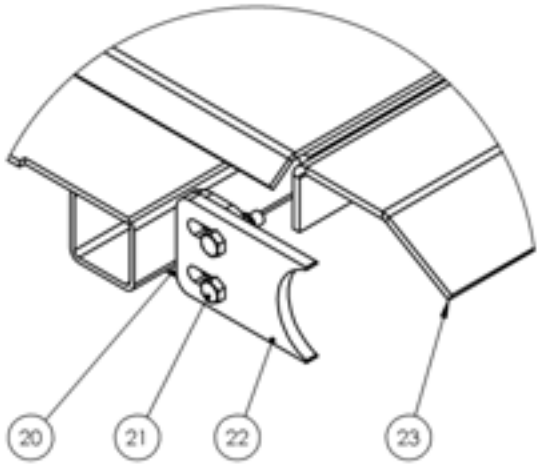


3.4 FLOOR DRIVE GEARBOX B3122 PARTS LIST

KEY	QTY	PART No.	DESCRIPTION
1	1	B3204	CASING
2	1	B3230	SLEEVE
3	1	B4030	CIRCLIP
4	1	B3236	GEAR
5	2	BR325	BEARING
6	2	B4016	CIRCLIP
7	1	B3240	PINION
8	2	B2276	KEY
9	1	B3244	GEAR
10	2	BR365	BEARING
11	2	B4012	CIRCLIP
12	1	B3242	PINION
13	1	B2270L	KEY
14	1	B3248	CROWN GEAR
15	2	BR390	BEARING
16	3	B4006	CIRCLIP
17	1	B3252	PINION
18	1	BR310	BEARING
19	1	B4019	CIRCLIP
20	2	B3997	BREATHER BUNG
21	2	B3995	SIGHT GLASS
22	2	SL265	CAP SEAL
23	2	SL270	CAP SEAL
24	2	SL205	SEAL
25	1	B3224	GASKET
26	1	B3220	COVER PLATE
27	8	73030/1	BOLT
28	1	B3227	GASKET

3.5 REAR FLOOR SHAFT ASSEMBLY HD MK2

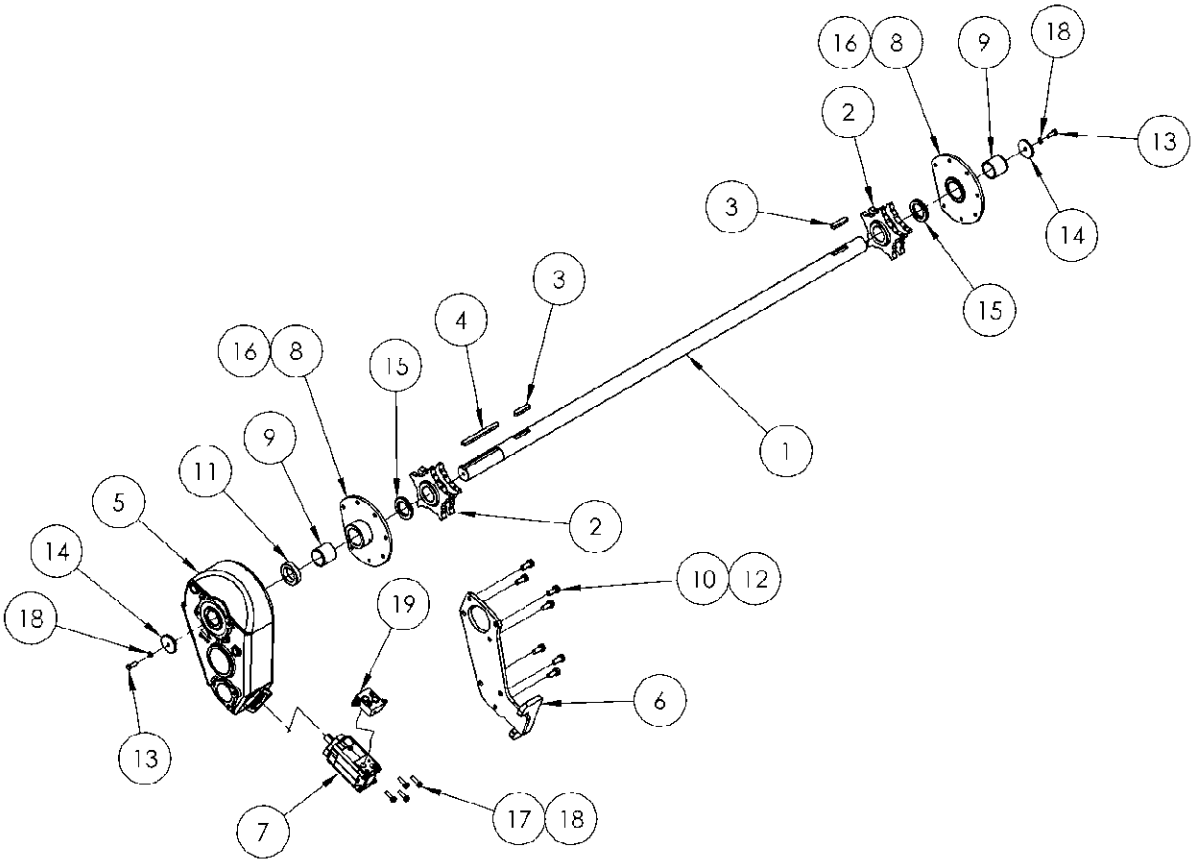


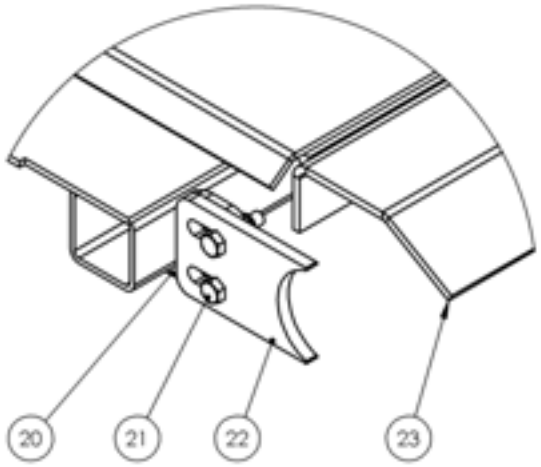


3.5 REAR FLOOR SHAFT ASSEMBLY HD MK2 PARTS LIST

KEY	QTY	PART No.	DESCRIPTION
1	1	B2260	REAR SHAFT
2	2	B2110	GYPSY WHEEL
3	2	B2275	KEY 18x11x80
4	1	B2278	KEY 18x11x190
5	1	B3122	GEARBOX
6	1	B3152	TORQUE PLATE
7	1	B3052	HYDRAULIC MOTOR 200CL
8	2	B2306	BEARING FLANGE
9	2	B2322	ACM BUSH M60
10	7	73153	M16 x 40mm BOLT
11	1	B2348	SPACER
12	7	74704	M16 SPRING WASHER
13	2	73090	BOLT
14	2	B2282	END PLATE
15	2	B2343	SPACER
16	14	73092	BOLT & NUT
17	4	73093	M12 x 40mm BOLT
18	6	74702	M12 SPRING WASHER
19	1	B3078	RELIEF VALVE
20	2	B2124	SCRAPER ATTACHMENT PLATE
21	4	NUT&BOLT	M10x40 BOLT M10 NYLOC
22	2	B2122	PLATE REAR SCRAPER
23	1	B2824	DRIVE SHAFT COVER

3.6 REAR SHAFT ASSEMBLY WIDEBODY

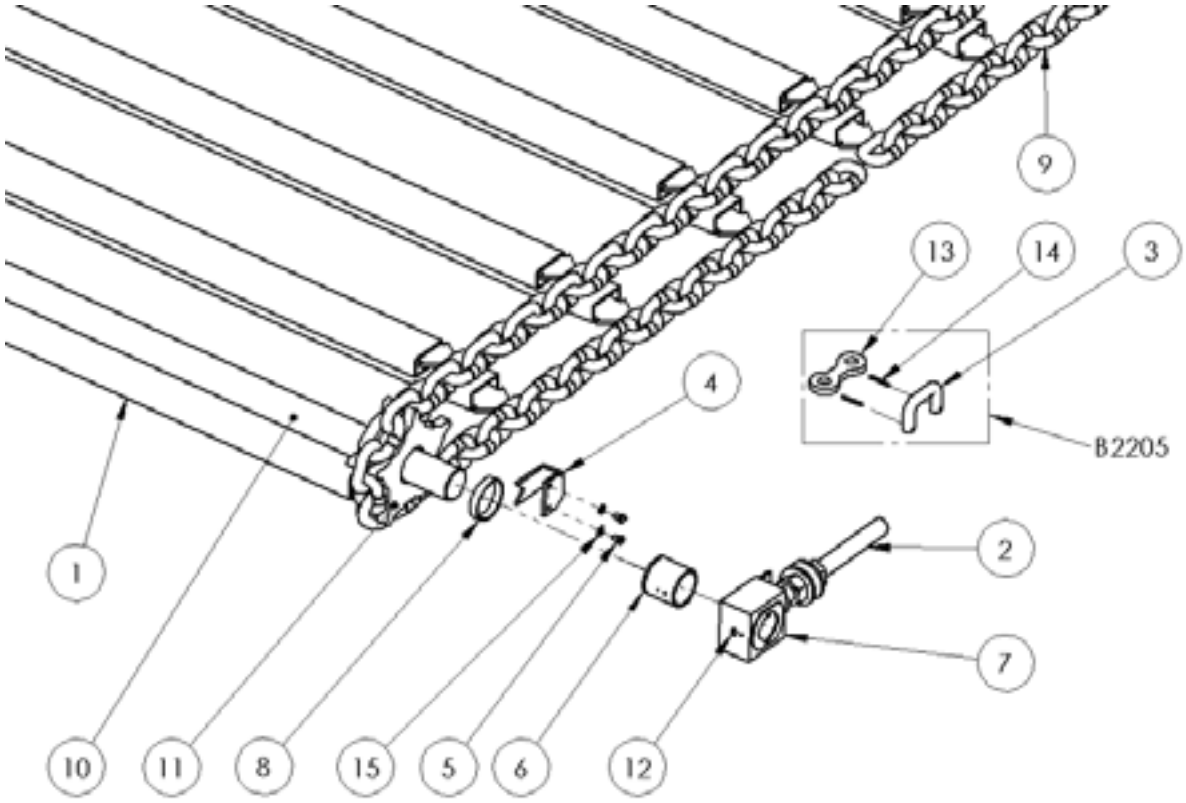




3.6 REAR SHAFT ASSEMBLY WIDEBODY PARTS LIST

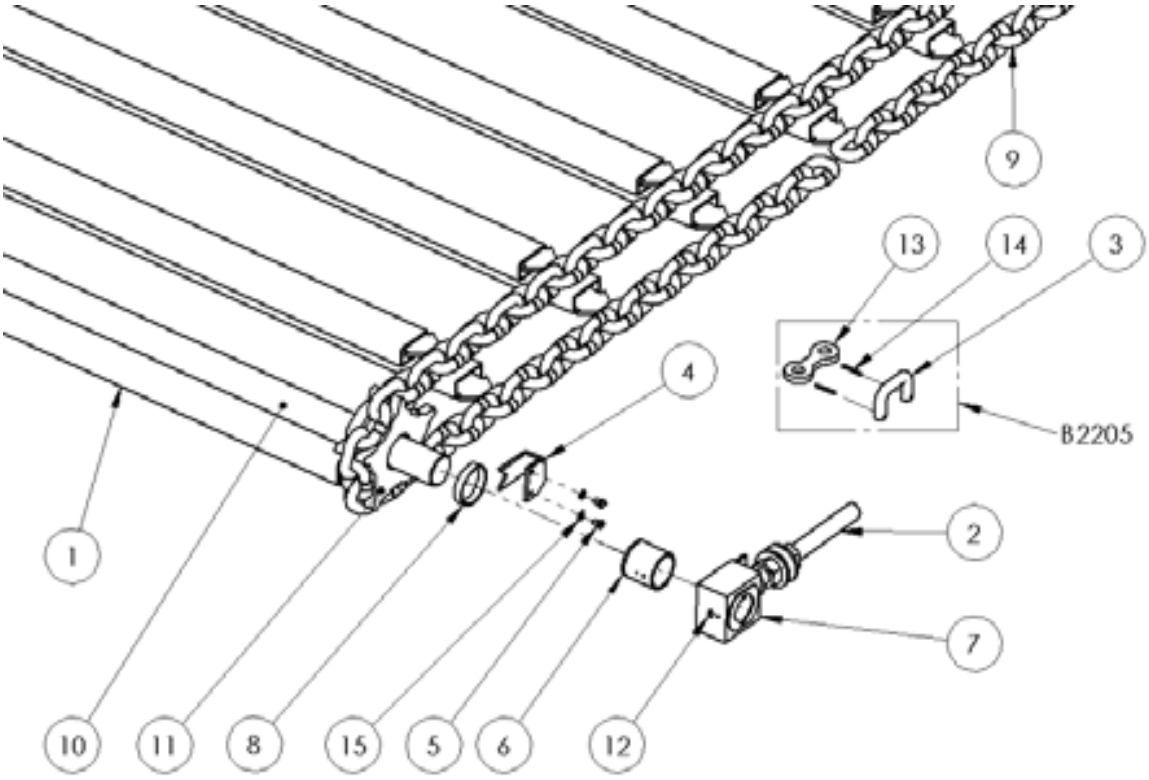
KEY	QTY	PART No.	DESCRIPTION
1	1	B2270	REAR SHAFT
2	2	B2110	GYPSY WHEEL
3	2	B2275	KEY 18x11x80
4	1	B2278	KEY 18x11x190
5	1	B3122	GEARBOX
6	1	B3152	TORQUE PLATE
7	1	B3054	HYDRAULIC MOTOR 250CL
8	2	B2306	BEARING FLANGE
9	2	B2322	ACM BUSH M60
10	7	73153	M16 x 40mm BOLT
11	1	B2348	SPACER
12	7	74704	M16 SPRING WASHER
13	2	73090	BOLT
14	2	B2282	END PLATE
15	2	B2344	SPACER
16	14	73092	BOLT & NUT
17	4	73093	M12 x 40mm BOLT
18	6	74702	M12 SPRING WASHER
19	1	B3078	RELIEF VALVE
20	2	B2124	SCRAPER ATTACHMENT
21	4	NUT&BOLT	M10x40 + M10 NYLOC
22	2	B2122	PLATE REAR SCRAPER
23	1	B2824	DRIVE SHAFT COVER

3.7 FRONT SHAFT AND CHAIN ASSEMBLY HD MK2



KEY	QTY	PART No.	DESCRIPTION
1	35	B2041	FLOOR SLAT BOX TYPE
2	2	B2288	ADJUSTER M30
3	2	B2205	JOINER LINK ASSEMBLY
4	2	B2128	CLEANER FRONT GYPSY
5	4	73031	BOLT M8 x 12
6	2	B2322	ACM BUSH M60
7	2	B2294	BEARING BLOCK
8	2	B2346	SPACER
9	1PR	B2191	CHAIN TABBED 3RD LINK
10	1	B2240	FRONT SHAFT
11	4	B2218	PLATE WHEELS WELD ON
12	2	50726	GREASE NIPPLE
13	2	REF	DOG BONE 20mm CHAINS
14	4	REF	ROLL PIN
15			SPRING WASHER M8

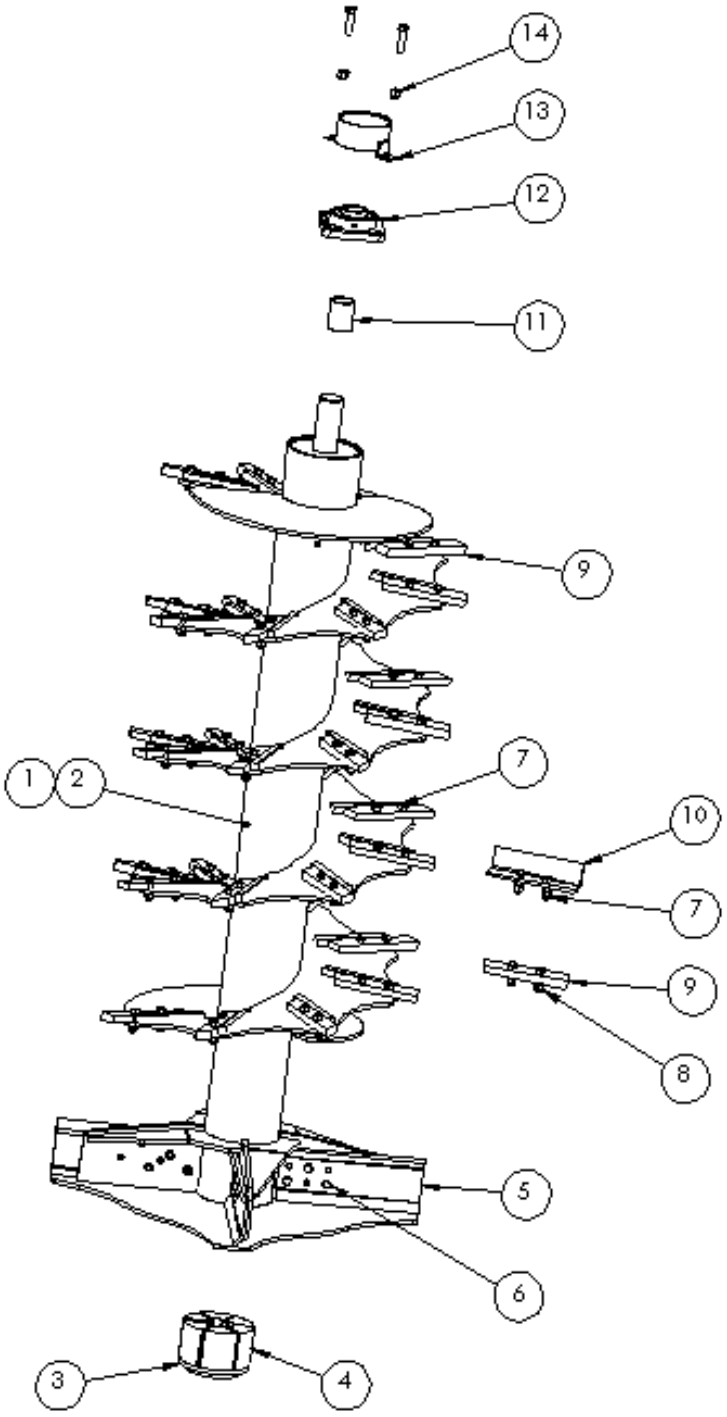
3.8 FRONT SHAFT AND CHAIN ASSEMBLY WIDEBODY



KEY	QTY	PART No.	DESCRIPTION
1	35	B2042	FLOOR SLAT BOX TYPE
2	2	B2288	ADJUSTER M30
3	2	B2205	JOINER LINK ASSEMBLY
4	2	B2128	CLEANER FRONT GYPSY
5	4	73031	BOLT M8 x 12
6	2	B2322	ACM BUSH M60
7	2	B2294	BEARING BLOCK
8	2	B2346	SPACER
9	1PR	B2191	CHAIN TABBED 3RD LINK
10	1	B2240	FRONT SHAFT
11	4	B2218	PLATE WHEELS WELD ON
12	2	50726	GREASE NIPPLE
13	2	REF	DOG BONE 20mm CHAINS
14	4	REF	ROLL PIN
15			SPRING WASHER M8

4 AUGERS AND DRIVE

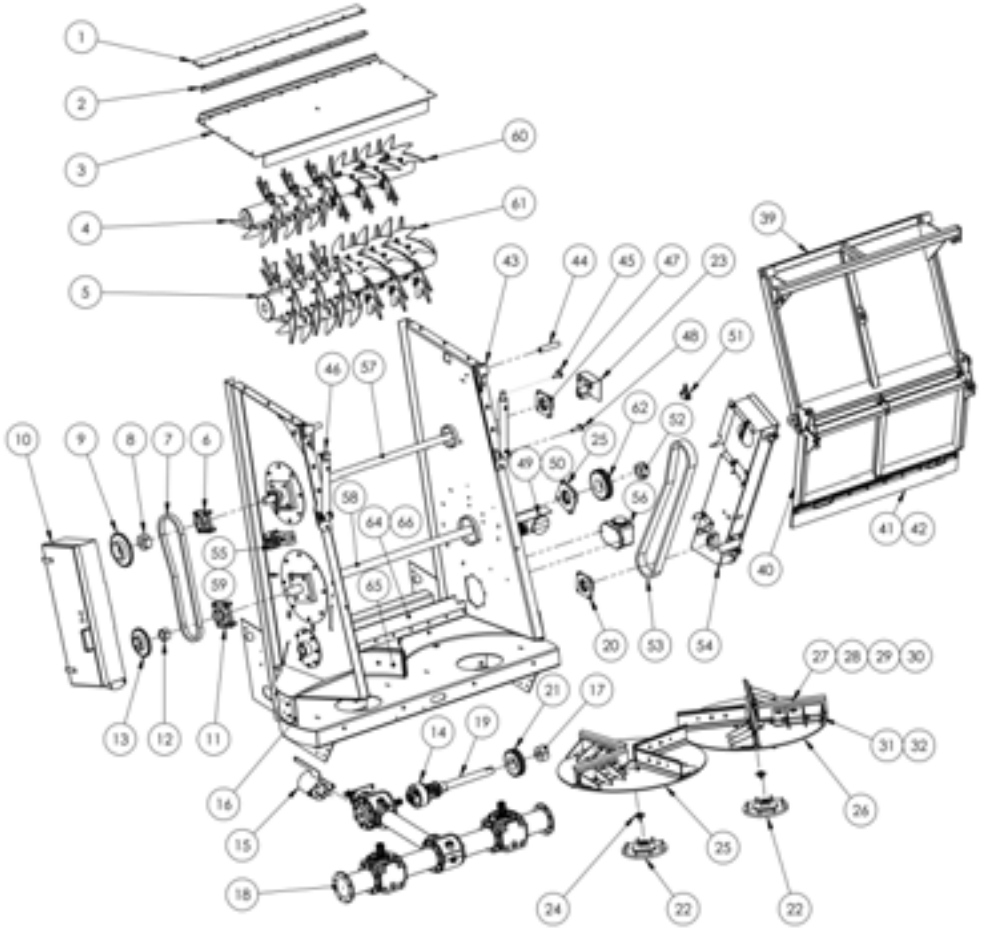
4.1 SHREDDING AUGER MK2 & WIDE BODY



4.1 SHREDDING AUGER MK2 & WIDE BODY PARTS LIST

KEY	QTY	PART No.	DESCRIPTION
1	1	B1044	AUGER L.H
2	1	B1045	AUGER R.H
3	2	B1156	DRIVE FLANGE
4	12	B1146	RUBBER DRIVE BLOCK W.B MK2
5	8	B1123	AUGER BLADE
6		B1103	NUT AND BOLT
7		B1101/1	BOLT & LOCKNUT FOR STD CUTTER & ANGLE THROWER
8		B1101/1	BOLT & NYLOC FOR CUTTER POINT H.D
9		B1102	CUTTER STD POINT BORON
9		B1101	CUTTER POINT H.D BORON
10		B1106	ANGLE THROWER OPTIONAL
11	2	B2352	SPACER
12	2	B1180/1	BEARING M60
13	2	B1162	BEARING COVER
14	8		BOLT M16 X 50 & LOCKNUT

4.2 HORIZONTAL BEATER x 2 WITH SPINNING DISC



KEY	QTY	PART No.	DESCRIPTION
1	1	B4127	RUBBER SEAL CANOPY
2	1	DMS3669	CLAMP ANGLE
3	1	DMS3670-1	CANOPY LID
4	1	AMS1188	TOP BEATER ASSEMBLY
5	1	AMS1189	BOTTOM BEATER ASSEMBLY
6	1	B1178/1	BEARING UCFX10-50mm
7	1	BC120	1" SINGLE CHAIN
8	1	BC442	TAPERLOCK BUSH 3020/50
9	1	BC258	30T SINGLE SPROCKET 3020
10	1	AMS2144	LHS CHAIN GUARD
11	2	B1180/1	BEARING UCFX13-60mm
12	1	BC436	TAPERLOCK BUSH 2517/60
13	1	BC248	25T SINGLE SPROCKET
14	1	42505	TORQUE LIMITER UNION ASSY 1-3/4" 6 SPLINE
15	1	AMS1524	PTO GEARBOX GUARD

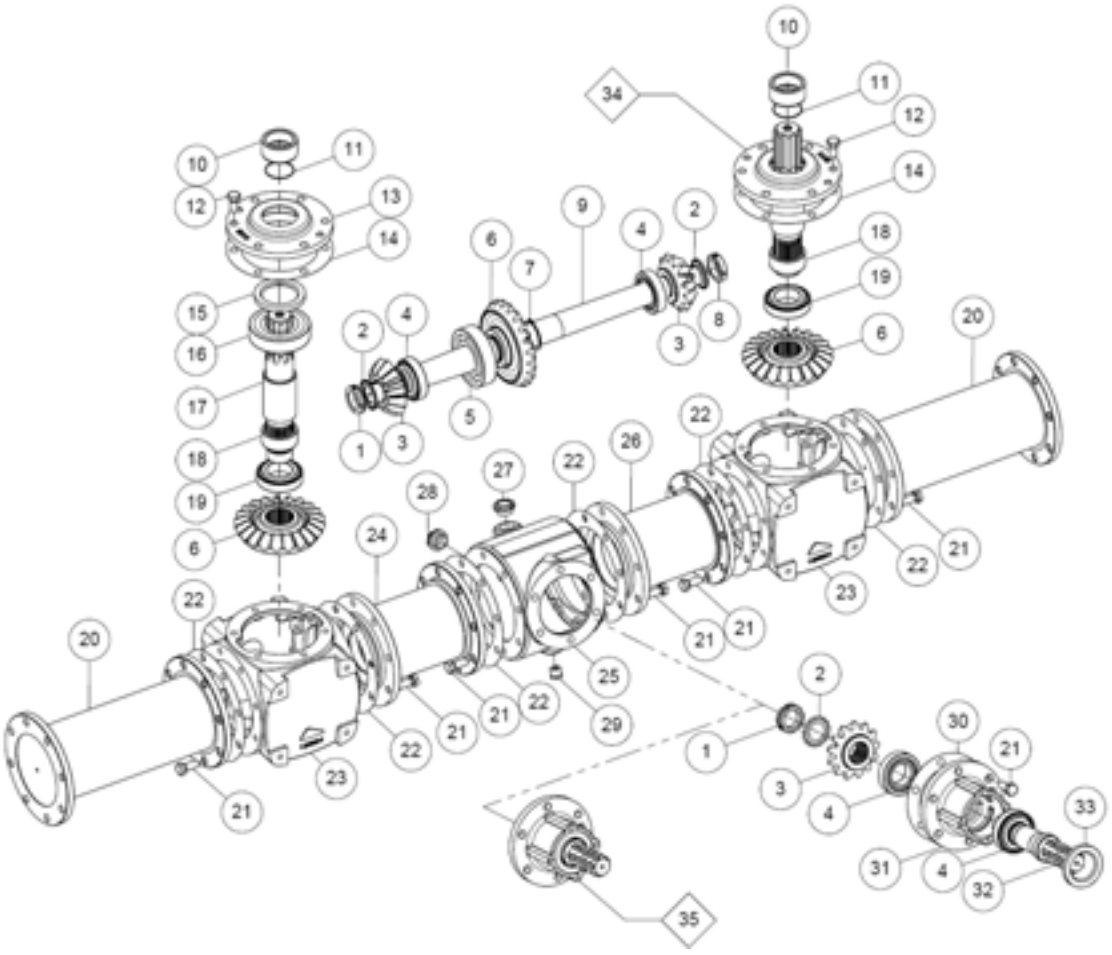
4.2 HORIZONTAL BEATER x 2 WITH SPINNING DISC

KEY	QTY	PART No.	DESCRIPTION
16	2	DMS3781	WEAR END PLATE
17	1	BC442	TAPERLOCK BUSH 3020/50
18	1	B3183	SPINNING DISC GEARBOX
19	1	DMS1328-12	DRIVE SHAFT
20	1	B1178/1	BEARING UCF10-50mm
21	1	BC290/B442	23T SPROCKET & TAPERLOCK
22	1	AMS0069	MOUNTING FLANGE ASSEMBLY
23	1		
24	2	DMS0322	END CAP SPINNER
25	1	DMS3007	LHS SPINNING DISC HARDOX
26	1	DMS3007	RHS SPINNING DISC HARDOX
27	4	B1130	PADDLE
28	4	B1130	PADDLE
29	16		M14x40 BOLT
30	16		M14 NYLOC NUT
31	4	B8356	BLADE HOLDER LHS
32	4	B8357	BLADE HOLDER RHS
33	1	DMS2411	BRACKET OILER
34	1	B8915	OILER PUMP
35	1	10325.2	ACM WEAR PAD
36	2		M6x25 BOLT
37	2		M6 NYLOC NUT
38	1	DMS2410	END CAP OILER
39	1	B8450	TOP DOOR
40	1	B8451	BOTTOM DOOR
41	1	B4126	CANOPY RUBBER
42	1	DMS3004	RUBBER CLAMP STRIP
43	2	AMS1867-1	CANOPY DOOR HINGE ASSEMBLY
44	2	DMS2381	PIVOT PIN
45	2	DMS0940-1	TOP RAM PIN
46	2	65093	RAM CANOPY DOOR
47	1	B1178/1	BEARING UCFX10-50mm
48	1	DMS0940-2	BOTTOM RAM PIN
49	2	70081	TRIANGLE REFLECTOR
50	2	70009/3	LED REAR LAMP
51	2	52106	DIVERTER VALVE
52	1	BC445	TAPERLOCK BUSH 3020/60
53	1	BC140	1" DUPLEX CHAIN
54	1	AMS2867	RHS CHAIN GUARD
55	1	AMS1861	TENSION ASSEMBLY RHS
56	1	B8920	OIL TANK FOR OILER
57	1	DMS0918-2132	TOP BEATER SHAFT
58	1	DMS1934-2192	BOTTOM BEATER SHAFT
59	1	AMS1862	TENSION ASSEMBLY LHS

4.2 HORIZONTAL BEATER x 2 WITH SPINNING DISC

KEY	QTY	PART No.	DESCRIPTION
60	18	B1101/4A	BEATER KNIFE TOP CUTTER
61	18	B1101/7A	BEATER KNIFE BOTTOM CUTTER
62	1	BC294	25T DUPLEX SPROCKET
63	2	B2322	ACM BEARING
64	1	B4176	SPINNER DECK RUBBER
65	2		HARDOX WEAR PAD WRAP
66	1	B3004	RUBBER CLAMP STRIP

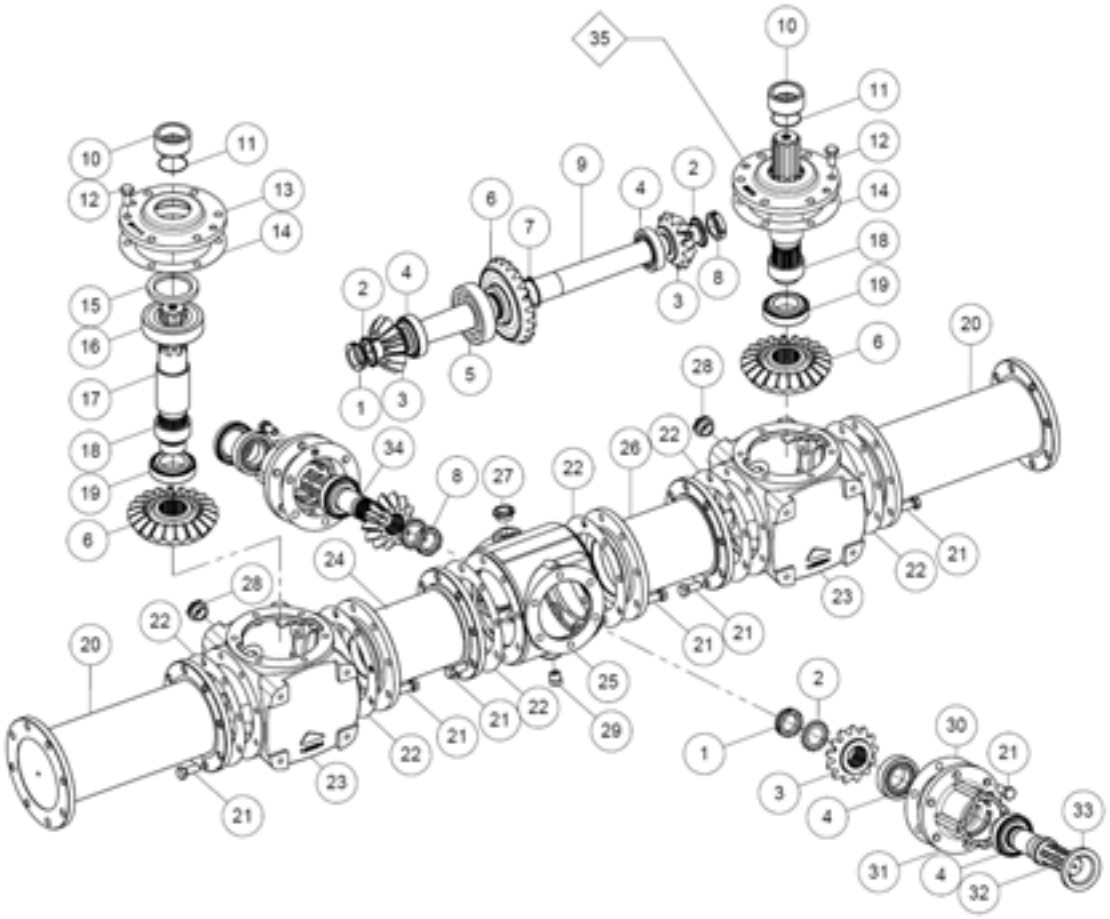
4.3 GEARBOX STD WIDE BODY 1000/350 PART No. B3180



4.3 GEARBOX WIDEBODY 1000/350 PART No. B3180 PARTS LIST

KEY	QTY	PART No.	DESCRIPTION
1	1	B3510	NUT
2	3	B3520	LOCKING WASHER
3	3	B3460	PINION GEAR
4	4	BR175	BEARING
5	1	BR410	BEARING
6	3	B3470	CROWN GEAR
7	1	B4020	CIRCLIP
8	2	B3510	NUT
9	1	B3448	CROSS SHAFT
10	2	B3482	SPACER SLEEVE
11	2	B3939	O RING
12	12	73124	BOLT
13	2	B3420	TOP PLATE
14	2	B3490	GASKET
15	2	SL195	SEAL
16	2	BR405	BEARING
17	2	B3444	OUTPUT SHAFT
18	2	B3480	GEAR SPACER
19	2	BR180	BEARING
20	2	B3412	OUTER CASE SECTION
21	54	73125	BOLT
22	6	B3492	GASKET
23	2	B3418	AUGER GEAR CASE
24	1	B3414	INNER CASE SECTION
25	1	B3404	CENTRE CASE
26	1	B3417	INNER CASE SECTION
27	1	B3998	BREATHER PLUG
28	1	B3996	SIGHT GLASS
29	1	B3990	DRAIN PLUG
30	1	B3494	GASKET EXT
31	1	B3410	EXTENSION
32	1	B3440	INPUT SHAFT
33	1	SL165	SEAL

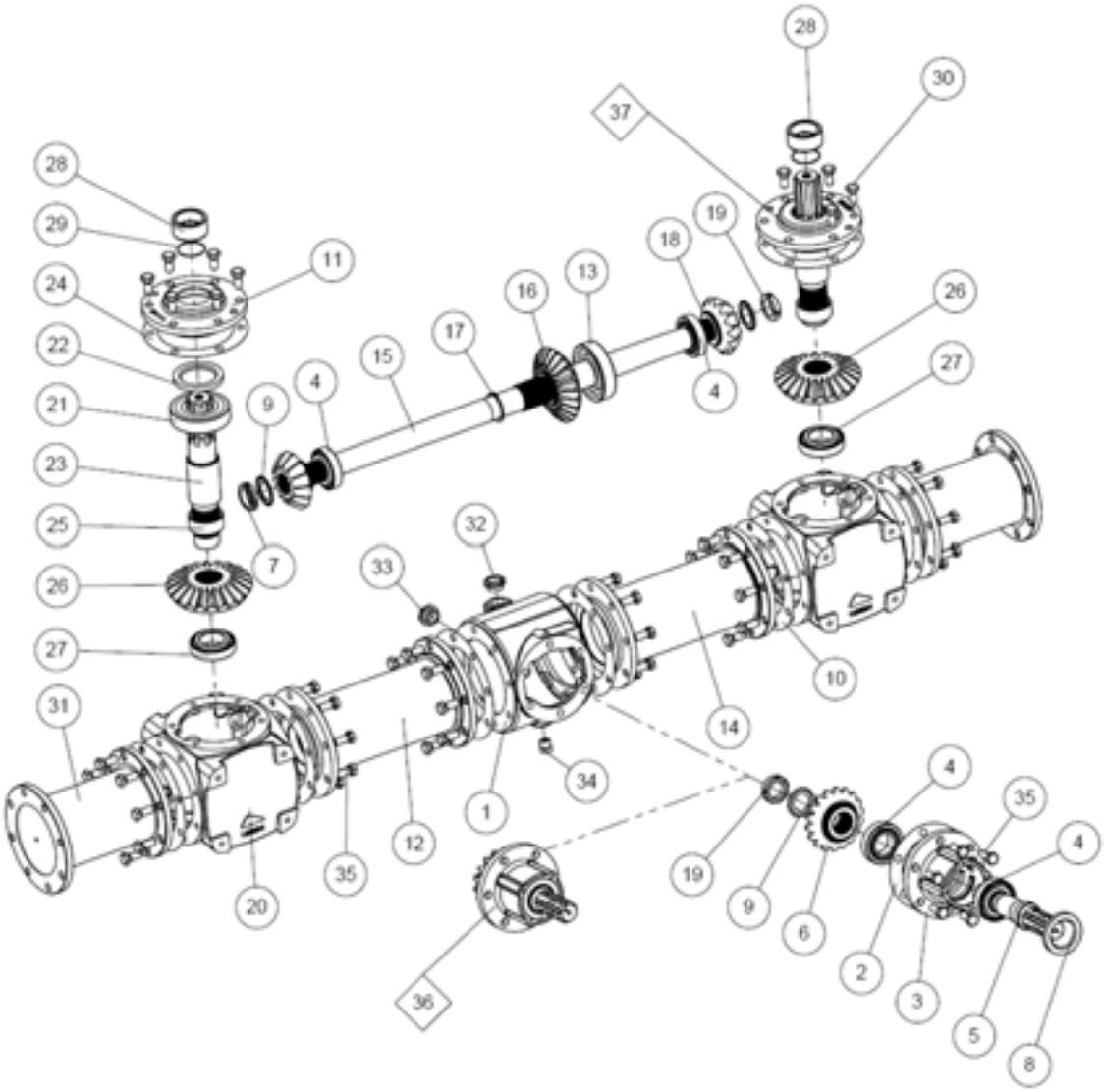
4.4 GEARBOX WIDEBODY SPINNER DECK 1000/350 B3185



4.4 GEARBOX WIDEBODY SPINNER DECK 1000/350 B3185 PART LIST

KEY	QTY	PART No.	DESCRIPTION
1	2	B3510	NUT LH THREAD
2	2	B3520	WASHER
3	4	B3456	PINION GEAR
4	6	BR175	BEARING
5	1	BR410	BEARING
6	3	B3466	CROWN GEAR
7	1	B4020	CIRCLIP
8	2	B3512	NUT RH THREAD
9	1	B3448	CROSS SHAFT
10	2	B3482	SPACER SLEEVE
11	2	B3939	O RING
12	12	73125	BOLT
13	2	B3420	TOP PLATE
14	2	B3490	GASKET
15	2	SL195	SEAL
16	2	BR405	BEARING
17	2	B3444	OUTPUT
18	2	B3480	GEARBOX
19	2	BR180	BEARING
20	2	B3412	OUTER CASE SECTION
21	60	73128	BOLT
22	6	B3492	GASKET
23	2		CASING
24	1		INNER CASING
25	1	B3404	CENTRE CASE
26	1		INNER CASING
27	1	B3990	DRAIN PLUG
28	2	B3996	SIGHT GLASS
29	1	B3998	BREATHER PLUG
30	2	B3494	GASKET EXT
31	2	B3410	EXTENSION
32	1	B3440	INPUT SHAFT
33	2	SL165	SEAL
34	1	B3458	PINION GEAR

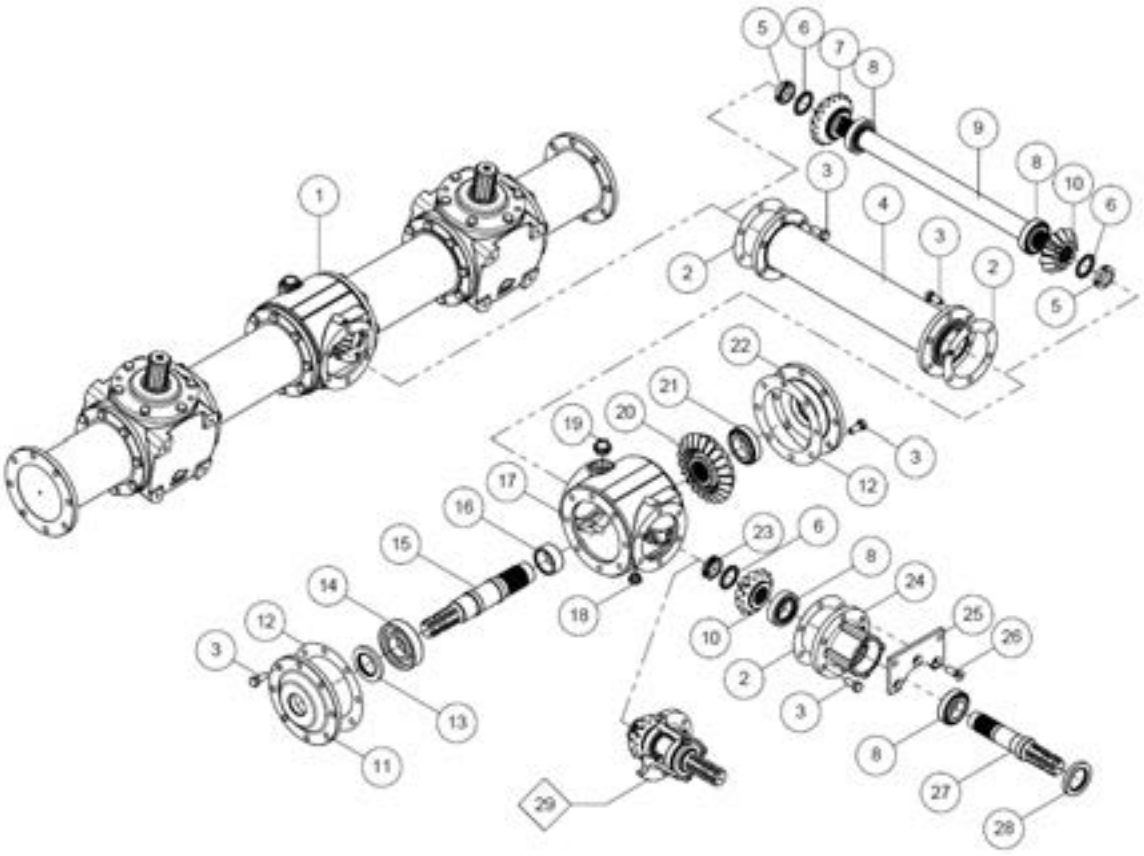
4.5 Gearbox DETACHABLE SPINNER DECK 1000/520 PART No. B3190



4.5 Gearbox DETACHABLE SPINNER DECK 1000/520 PART No. B3190 PARTS LIST

KEY	QTY	PART No.	DESCRIPTION
1	1	B3405	CASING
2	1	B3494	GASKET
3	1	B3410	EXTENSION
4	4	BR175	BEARING
5	1	B3458	SHAFT
6	1	B3454	PINION GEAR
7	2	B3510	NUT
8	1	SL165	SEAL
9	3	B3520	WASHER
10	6	B3492	GASKET
11	2	B3420	TOP PLATE
12	1	B3415R	INNER CASE SECTION
13	1	BR410	BEARING
14	1	B3416R	INNER CASE SECTION
15	1	B3449R	SHAFT
16	1	B3464	CROWN GEAR
17	1	B3430	CIRCLIP
18	2	B3459	PINION GEAR
19	1	B3512	NUT RH THREAD
20	2	B3418	AUGER GEAR CASING
21	2	BR405	BEARING
22	2	SL195	SEAL
23	2	B3444	OUTPUT SHAFT
24	2	B3490	GASKET
25	2	B3480	GASKET
26	2	B3469	CROWN GEAR
27	2	BR180	BEARING
28	2	B3482	SPACER SLEEVE
29	2	B3939	O RING
30	12	73124	BOLT
31	2	B3413	OUTER CASE SECTION
32	1	B3998	DRAIN PLUG
33	1	B3996	SIGHT GLASS
34	1	B3990	BREATHER PLUG
35	54	73125	BOLT

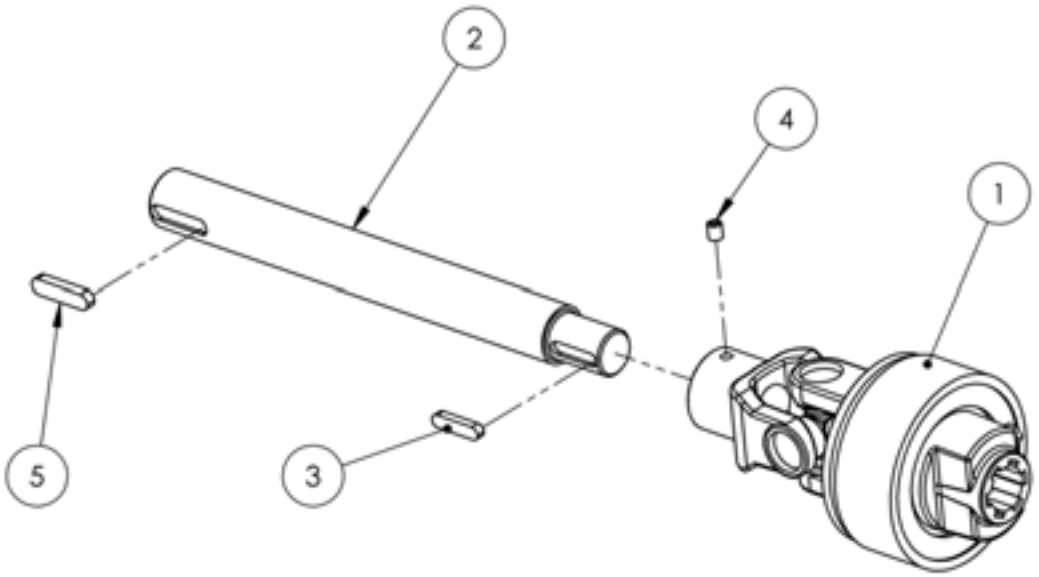
4.6 GEARBOX HORIZONTAL BEATER 1000/590/520-BN MKIV PART No. B3183



4.6 GEARBOX HORIZONTAL BEATER 1000/590/520-BN PART No. B3183 PARTS LIST

KEY	QTY	PART No.	DESCRIPTION
1	1	B3511	BACK GEAR BOX
2	3	B3494	GASKET
3	31	73125	SCREW, HEX-HD M14x35
4	1	B3514	SPACER L = 573.5
5	2	B3512	THREADED RING
6	3	B3520	WASHER
7	1	B3454	BEVEL PINION Z = 18
8	4	BR175	BEARING 32209
9	1	B3515	SHAFT
10	2	B3460	BEVEL PINION Z = 13
11	1	B3516	FLANGE
12	2	B3492	GASKET
13	1	SL178	OIL SEAL 55/90/10 DL
14	1	BR410	BEARING 6311
15	1	B3517	OUTPUT SHAFT
16	1	B3480	SPACER
17	1	B3405	HOUSING
18	1	B3990	OIL PLUG DIA 1/2"
19	1	B3998	OIL BREATHER PLUG DIA 1"
20	1	B3470	GEAR Z = 22
21	1	BR180	BEARING 32210
22	1	B3518	BLIND FLANGE
23	1	B3510	THREADED RING
24	1	B3410	HUB
25	1	B3519	SUPPORT PLATE
26	3	73128	SCREW M14x45
27	1	B3440	SHAFT
28	1	SL165	OIL SEAL 55/85/10-DL
29	1	B3408	COMPLETE HUB

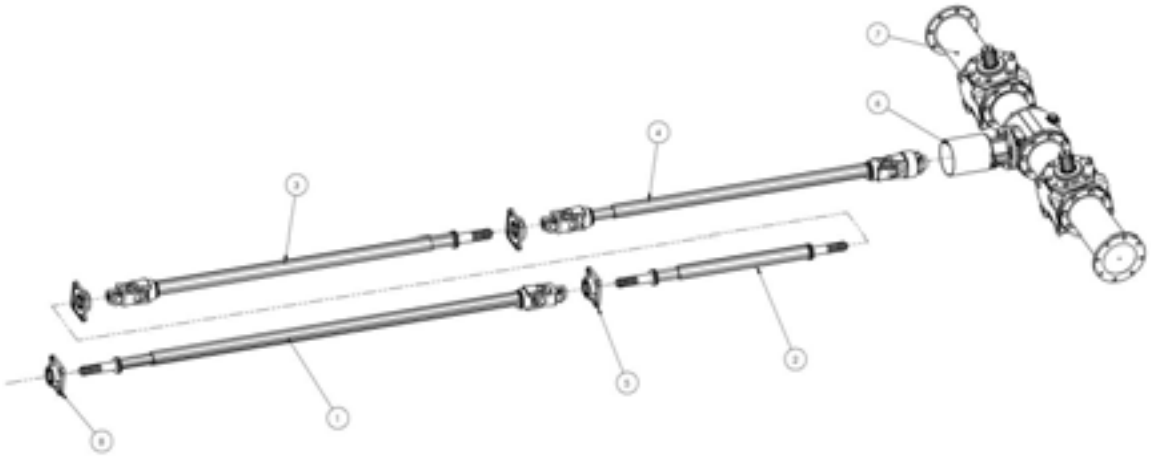
4.7 TRANSVERSE DRIVE ASSEMBLY HORIZONTAL BEATERS CAM CLUTCH



KEY	QTY	PART No.	DESCRIPTION
1	1	42505	TORQUE LIMITER ASSEMBLY 1-3/4" TO 6 SPLINE
2	1	DMS1328-12	DRIVE SAFT WIDEBODY
3	1	DMS0263-03	KEY 12x8
4	1	73898	GRUB SCREW M12 x 16LG
5	1	DMS0326	KEY 14x9

5. P.T.O AND TRANSMISSION

5.1 TRANSMISSION MODEL HD MK2 / WIDEBODY T60 SHAFT



KEY	QTY	PART No.	DESCRIPTION
1	1	42260	PTO SHAFT F/M
2	1	42301	PTO SHAFT M/M
3	1	42255	PTO SHAFT F/M
4	1	42300	PTO SHAFT F/F
5	4	B1170/1	BEARING M35
6	1	AMS1524	GUARD
7	1	B3170	GEARBOX
8	1	B1173	MSF 35 FRONT ONLY

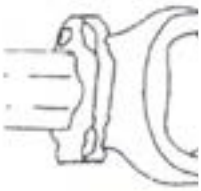
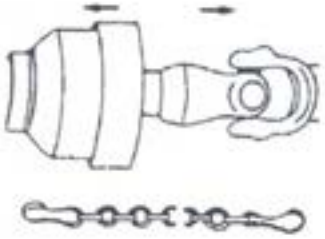
WHEN ADD ON SPINNER DECK T80 SHAFTS

KEY	QTY	PART No.	DESCRIPTION
1	1	42360	PTO SHAFT F/M
2	1	42310	PTO SHAFT M/M
3	1	42311	PTO SHAFT F/M
4	1	42312	PTO SHAFT F/F
5	3	B1176/1	BEARING M45
6	1	AMS1524	GUARD
7	1	B3170	GEARBOX
8	1	B1177	MSF 45 NTN FRONT ONLY

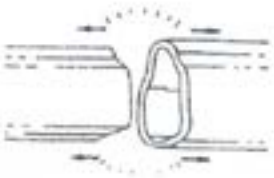
5.2 TRANSMISSION HORIZONTAL BEATERS T80 SHAFTS

MODEL	FRONT	MIDDLE	REAR
150HD	42360	42350 x 2	42380
180/230	42360	42350 x 2	42380

5.3 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

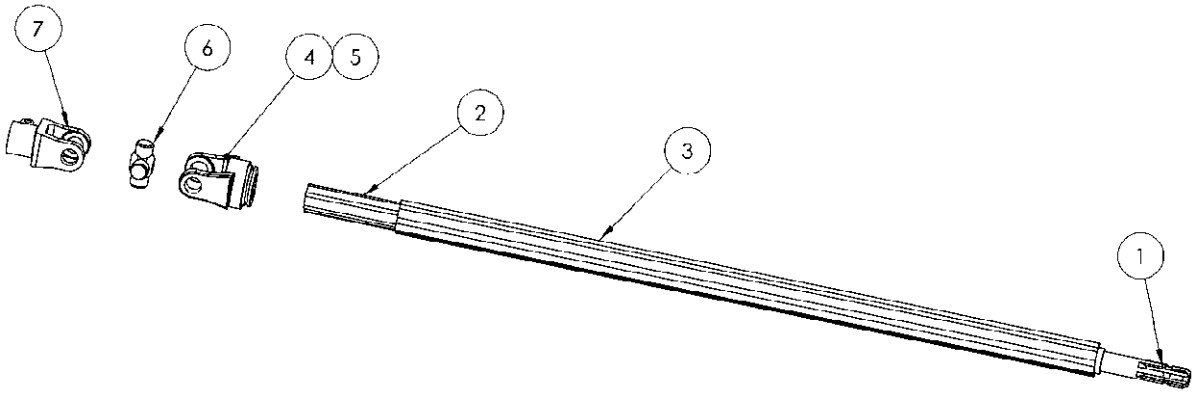
5.3 PROBLEMS AND POSSIBLE SOLUTIONS

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

5.4 WALTERSCHIED WIDE ANGLE PTO
6 SPLINE – 43006
21 SPLINE - 43005

5.5 WALTERSCHEID TORQUE LIMITER COMPLETE 6 SPLINE W/A PART No. 43006TL

5.6 COMER T60 UNDERBODY DRIVESHAFT.

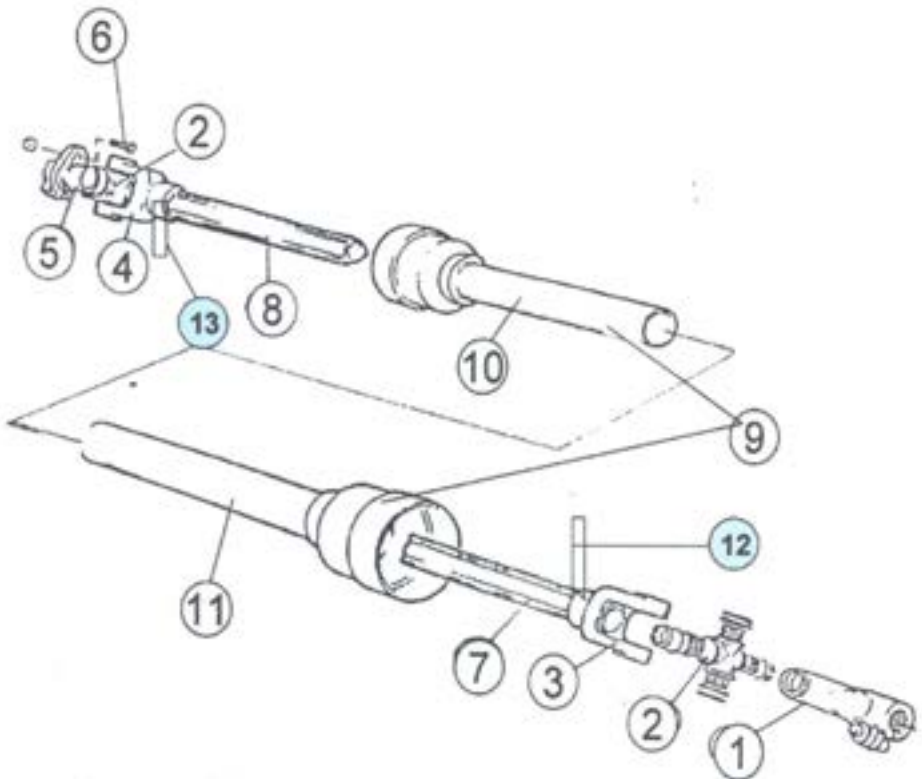


KEY	QTY	DESCRIPTION	PART No.
1	1	SPLINED BAR	42041
2	1	T60 INNER TUBE (PER METER)	42775
3	1	T60 OUTER TUBE(PER METER)	42770
4	1	YOKE TO OUTER	42745
5	1	ROLL PIN	42030
6	1	JOURNAL	42701
7	1	YOKE 6 SPLINE CLAMP BOLT	42715
7	1	1¾ YOKE 6 SPLINE OVERRUN CLAMPBOLT	42766
8	1	1⅜ 6 SPLINE YOKE QUICK RELEASE SHEARBOLT	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

Please note

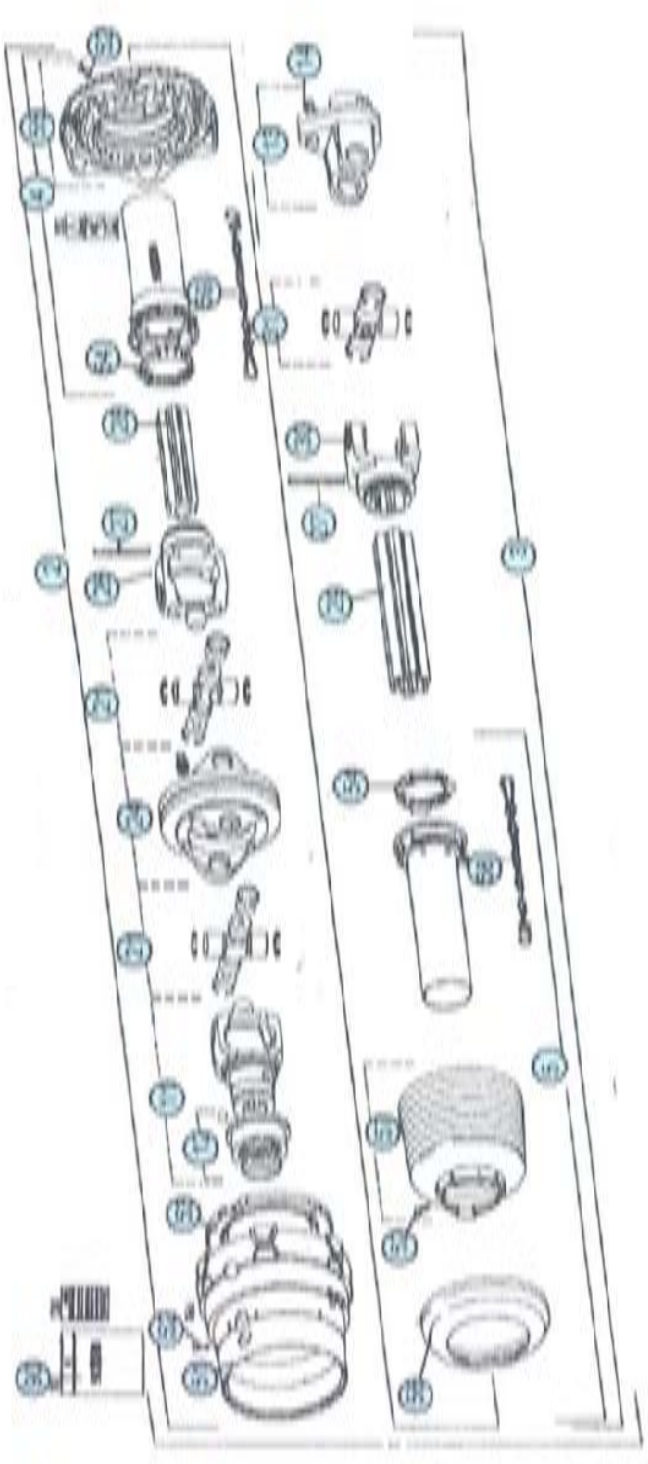
When a horzontal beater build or a detachable spinner deck is fitted T80 shafts are fitted.

5.7 WALTERSCHEID P.T.O SHAFT



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	GAURD INNER
11	1	43444	GUARD OUTER
12	1	42030	ROLL PIN
13	1	42030	ROLL PIN

5.8 WALTERSCHEID WIDE ANGLE P.T.O SHAFT PART No. 43102



5.8 WALTERSCHEID WIDE ANGLE P.T.O SHAFT PART No. 43102 PARTS LIST

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 INNER W/A HALF SHAFT WITH OUTER 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 (AG118)
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

5.9 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.

SEE DVD OR 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 casued 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 then 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 ae 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.

See 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

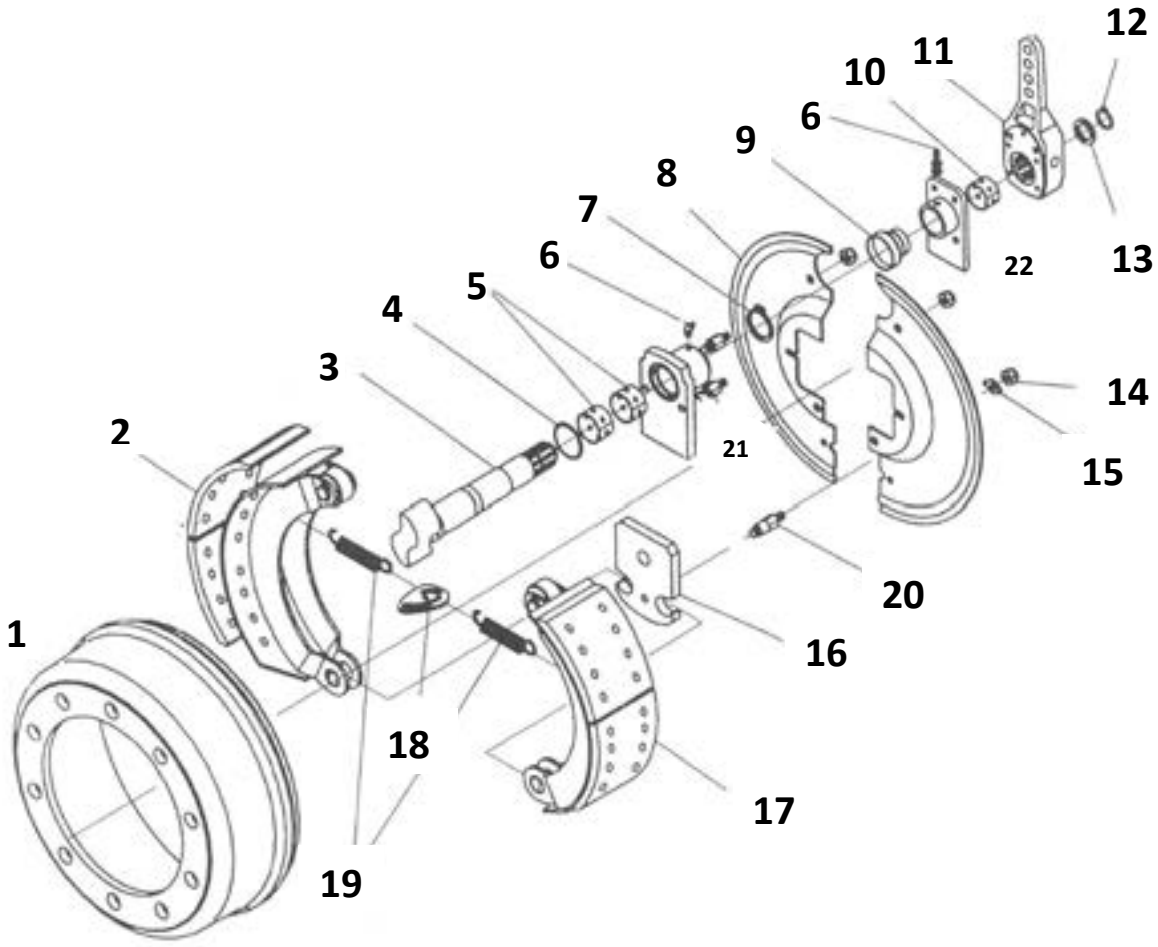
5.10 PTO STOWAGE

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

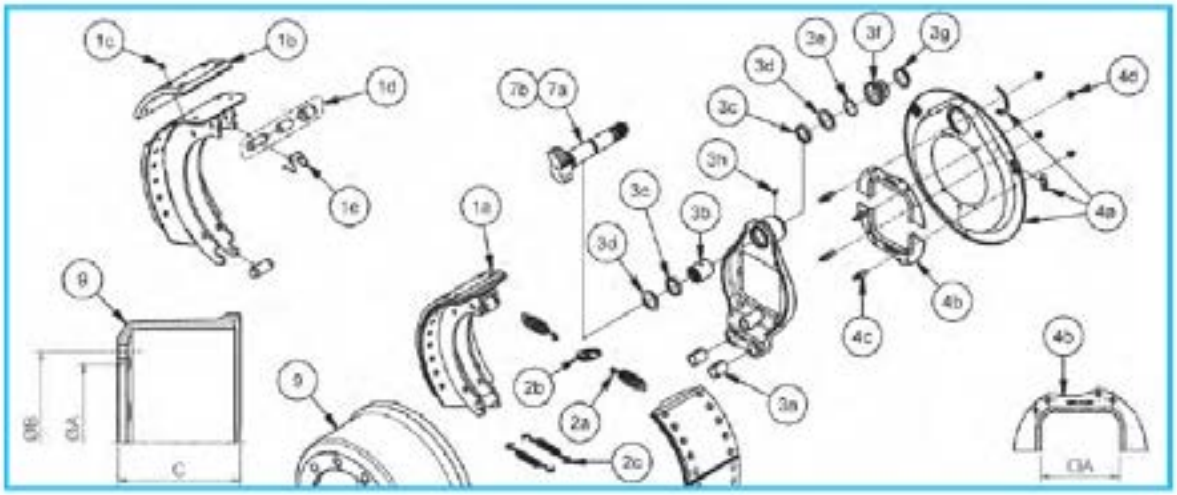
6.1 BRAKE ARRANGMENT EUR 1510 414S - 150HD & 180WB



6.1 BRAKE ARRANGMENT EUR 1510 414S - 150HD & 180WB PARTS LIST

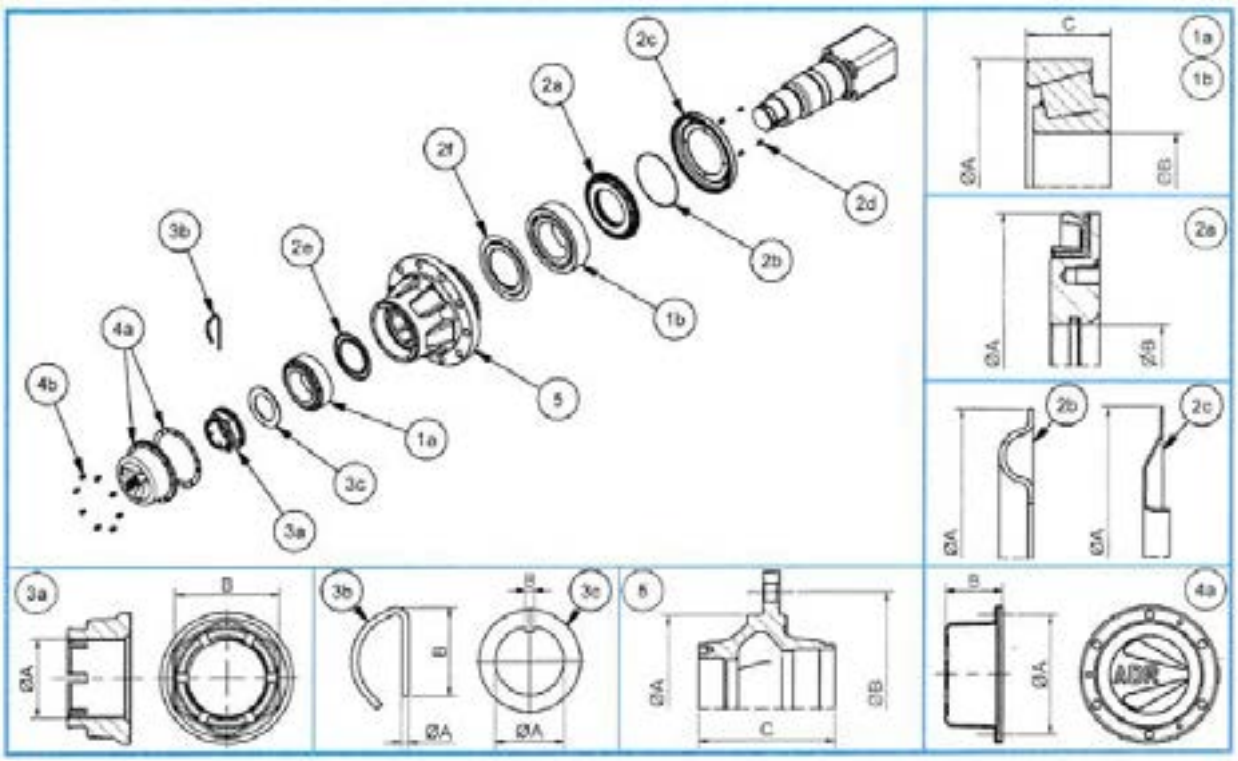
KEY	QTY	DESCRIPTION	PART No.
1	1	DRUM	F10017/7
2	4	LINING	97726013
3	1	S' CAM ROD	97831
4	1	SEAL	97770008
5	2	BUSH	97610568
6	1	GREASER	98608A1
7	1	CIRCLIP	98900042
8	1	BACK COVER	F10123/5
9	1	SEAL	97610575
10	1	BUSH	771382601
11	1	SLACK ADJUSTER	9767
12	1	CIRCLIP	98900025
13	1	WASHER	92630030
14	1	NUT	92411008
15	1	WASHER TABBED	97610579
16	1	MOUNTING	9762
17	2	SHOE	F10108/3
18	1	TENSIONER	97610576
19	2	SPRING	738119
20	1	STUD	97620584
21	1	STUD	97620581
22	1	SUPPORT	74401

6.2 BRAKE ARRANGMENT 4220E – YC - 420x200 – 175HD



Item	Description	Code	A	B	C	Qty.	Kit code
1a	Brake shoe complete	732YC02	-	-	-	2	F10108/7
2a	Spring Ø5,2 L106	738128	-	-	-	2	
2b	Twist lock	736XC02	-	-	-	1	
2c	Spring Ø3,0 L138	738129	-	-	-	2	
3a	Bush Ø28/32 L40	771008	-	-	-	2	
1b	Brake lining	734YA01	-	-	-	4	F10147
2a	Spring Ø5,2 L106	738128	-	-	-	2	
2b	Twist lock	736XC02	-	-	-	1	
2c	Spring Ø3,0 L138	738129	-	-	-	2	
1c	Rivet	96701	-	-	-	42	
2a	Spring Ø5,2 L106	738128	-	-	-	2	N/A
2b	Twist lock	736XC02	-	-	-	1	
2c	Spring Ø3,0 L138	738129	-	-	-	2	
1d	Roll Ø32	738VC01	-	-	-	2	F10136
1e	Spring	738127	-	-	-	2	
3a	Bush Ø28/32 L40	771008	-	-	-	2	F10137
3b	Camshaft bush Ø42	771007	-	-	-	1	
3c	Seal Ø42	5490501	-	-	-	2	
3d	Washer Ø42	73G01	-	-	-	2	
3e	Retaining ring Ø42	58514	-	-	-	1	
3f	Rubber cover	53A09	-	-	-	1	
3g	Clamp	98E01	-	-	-	1	
3h	Grease nipple M8X1,25	98608A1	-	-	-	1	
4a	Protection plate with rubber caps	743XC0002	-	-	-	1	N/A
4b	Square seal	747A112	110	-	-	2	
4c	Spacer L66	57706A7	-	-	-	4	
4d	Nut M8X1,25	97708A1	-	-	-	4	
4a	Protection plate with rubber caps	743XC0002	-	-	-	1	N/A
4b	Square seal	747A242	120	-	-	2	
4c	Spacer L66	57706A7	-	-	-	4	
4d	Nut M8X1,25	97708A1	-	-	-	4	
4a	Protection plate with rubber caps	743XC0002	-	-	-	1	F10148
4b	Square seal	747A542	150	-	-	2	
4c	Spacer L66	57706A7	-	-	-	4	
4d	Nut M8X1,25	97708A1	-	-	-	4	

6.3 AXLE HUB AND BEARING PARTS 175HD

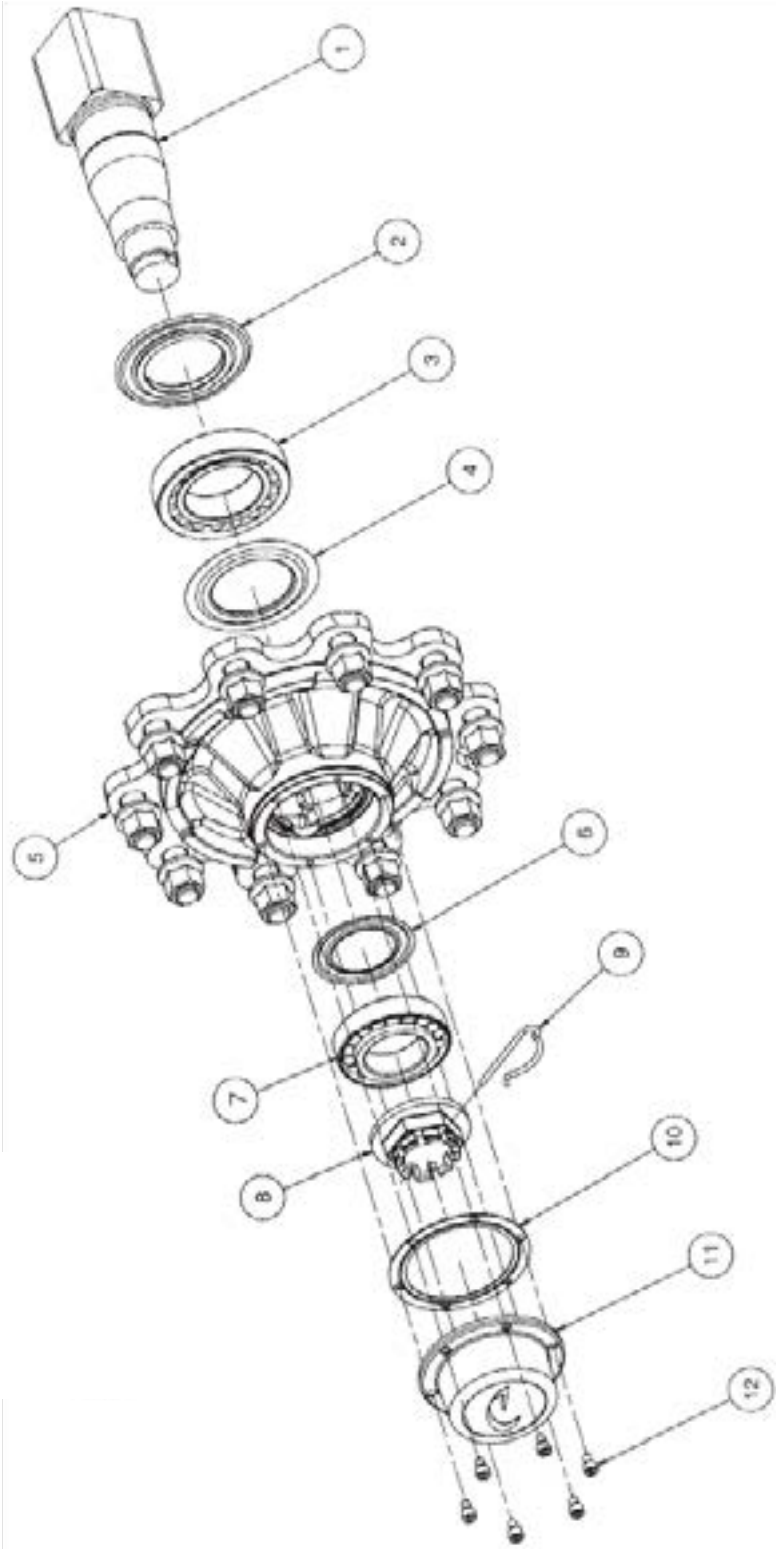


Item	Description	Code	A	B	C	Qty.	Kit code
1a	Bearing 33122	59133122	180	110	56	1	F100496
1b	Bearing 32226	59132226	230	130	67,75	1	
2a	Oil seal with o-ring	5442301	230	132	-	1	F10061/8
2b	O-ring W2,62 Ø183,62	53116301	-	-	-	1	
2c	Dust cover	5551751	-	-	-	1	
2d	Screw M8X1,25	96308A0101	-	-	-	4	
2e	Nilos 33122	5531641	164	-	-	1	
2f	Nilos 32226	5512301	230	-	-	1	
3a	Crown nut	57590D3	M90X2.0	120	-	2	F10066/5
3b	Spring pin	58213	7	96	-	2	
3c	Lock washer	57B9001	90,5	8	-	2	
4a	Cap with gasket	56116001	195	85	-	2	F00609
4b	Screw M8X1,25	96308A0101	-	-	-	16	
5	Hub 10 holes for M24X1,5	61L1WA001	280	335	270	1	**F10016/6**

Wheel Studs = F00561

Wheel Nuts = F00562

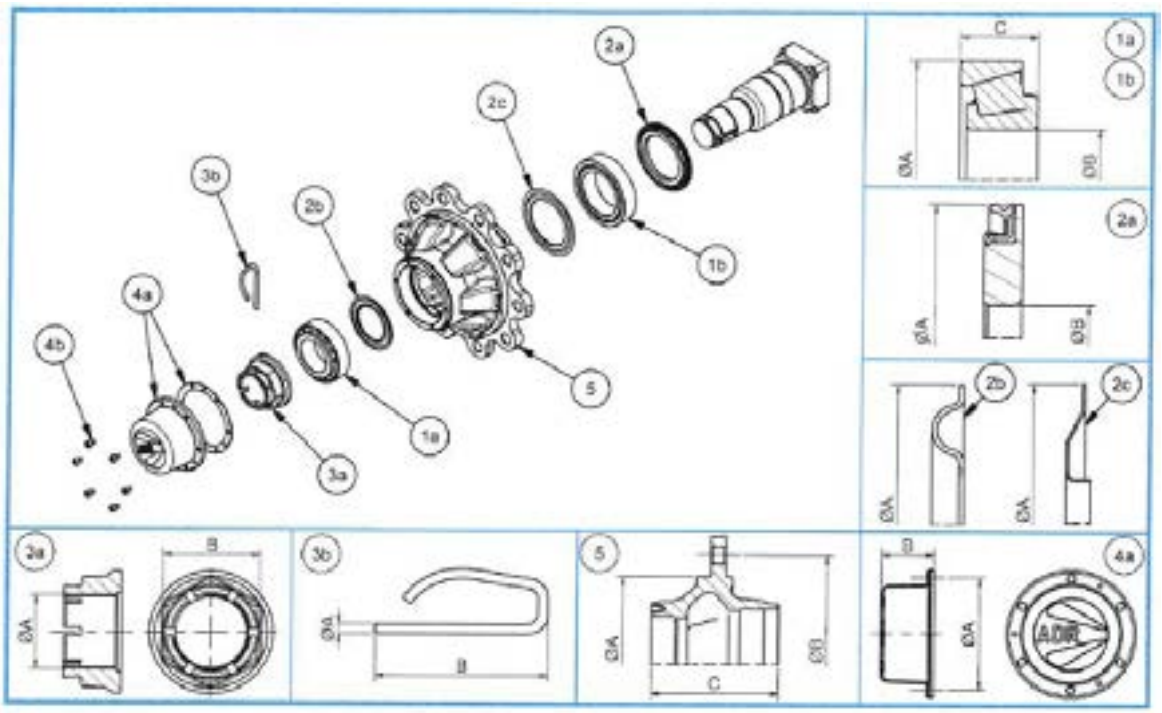
6.4 AXLE HUB AND BEARING PARTS 150HD & 180WB



6.4 AXLE HUB AND BEARING PARTS150HD & 180WB PARTS LIST

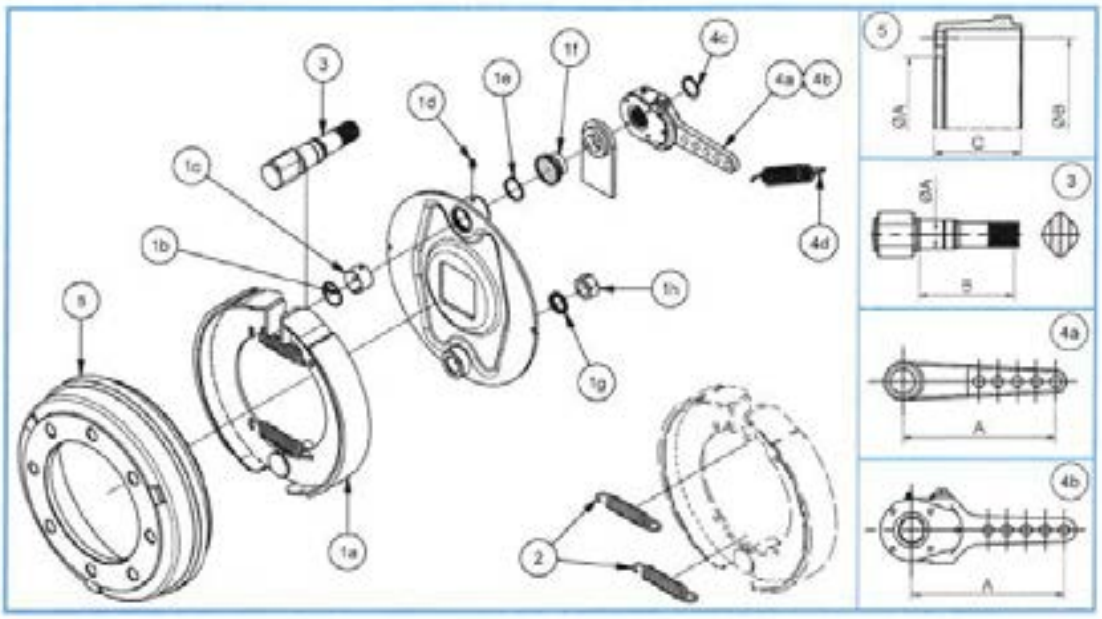
	MODEL	150HD/180
	AXLE TYPE	EUR 1520
	AXLE SIZE	150mm
KEY	**DESCRIPTION**	**PART No.**
1	AXLE	
2 4 6	SEAL KIT	F10061/6
3	BEARING	BR245
5	HUB	F10016/3
7	BEARING OUTER	BR240
8	CASTLE NUT	F10066/2
9	PIN	J1060F1
10	HUB CAP GASKET	
11	HUB CAP	F10073/2
12	HUB CAP SCREW	
	WHEEL NUT	F00547
	WHEEL STUD	F00546

6.5 TANDEM AXLE HUB PARTS EUR 1130 AXLE 230



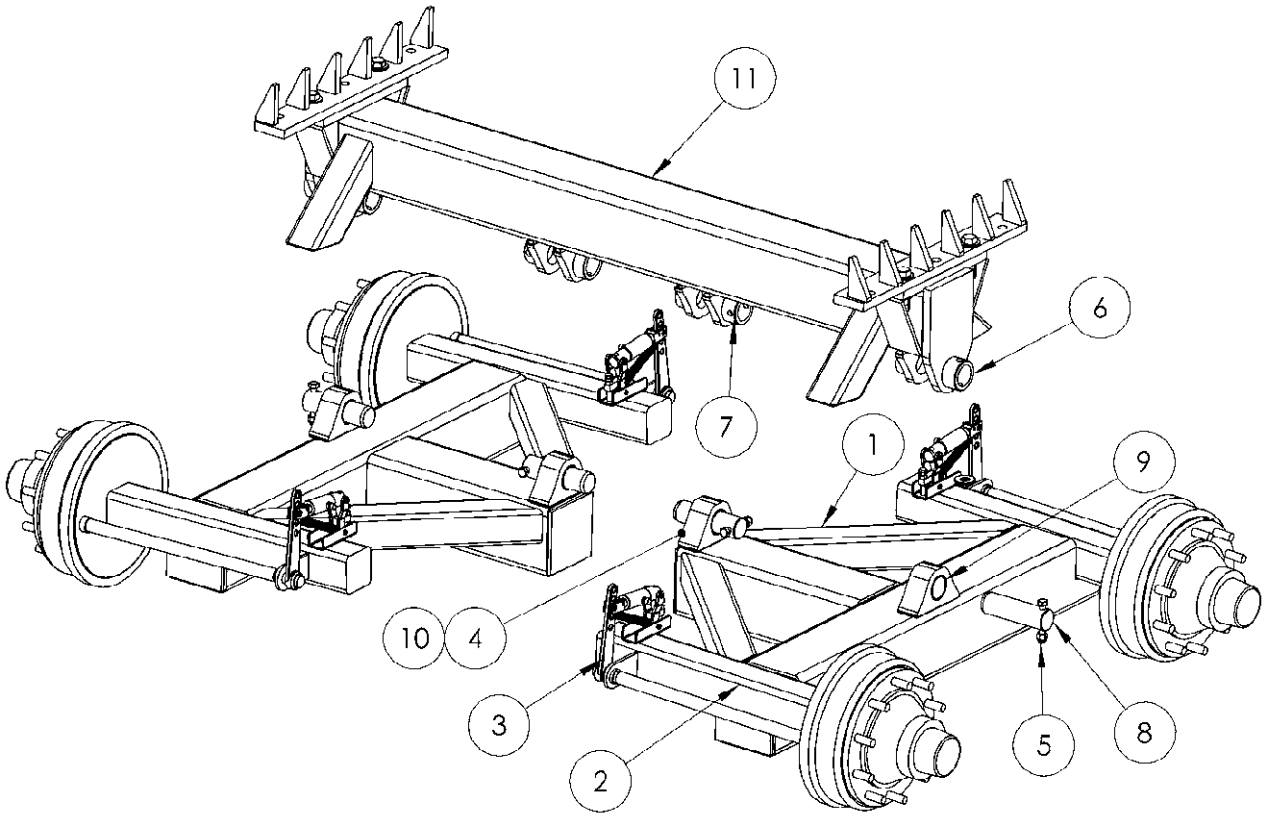
Item	Description	Code	A	B	C	Qty	Kit code
1a	Bearing 33215	59133215	130	75	41	1	F100490
1b	Bearing 33020	59133020	150	100	39	1	
2a	Oil seal	5441503	150	102	-	1	F10061/3
2b	Nilos 33215	5531191	119	-	-	1	
2c	Nilos 33020	5511501	150	-	-	1	
3a	Crown nut	57570D1	M70X2,0	90	-	2	F10066/2
3b	Spring pin	58207	7	105	-	2	
4a	Cap with gasket	56113001	144	80	-	2	F00606
4b	Screw M8X1,25	96308A0101	-	-	-	12	
5	Hub 10 holes for M22X1,5	61L1V001	280	335	204	1	F10016/2

6.6 TANDEM AXLE BRAKE PARTS EUR 1130 AXLE 230



Item	Description	Code	A	B	C	Qty.	Kit code
1a	Brake assembly	731TG01	-	-	-	1	
1b	Camshaft bush Ø38	771382601	-	-	-	1	
1c	O-ring W2,62 Ø37,77	53103801	-	-	-	1	
1d	Grease nipple M6X1,25	98608A1	-	-	-	1	F10108/1
1e	Retaining ring Ø38	58513	-	-	-	1	
1f	Rubber cover	53A08	-	-	-	1	
1g	Washer Ø24	9800241	-	-	-	1	
1h	Nut M24X1,5	9712481	-	-	-	1	
2	Spring Ø4,5 L162	738117	-	-	-	4	N/A
3	Camshaft	75A3552...	38	(2) <=300	-	1	N/A
	Camshaft	75A3553...	38	(2) >300	-	1	
4a	Lever	7611503	200	-	-	2	F10316
4c	Retaining ring Ø32	58511	-	-	-	2	
4b	Slack adjuster	7021501	200	-	-	1	F10317
4c	Retaining ring Ø32	58511	-	-	-	1	
4d	Spring Ø3,5 L173	738201	-	-	-	1	
5	Drum 6 holes for M18X1,5	66LTG0602	160	205	118	1	N/A
	Drum 8 holes for M20X1,5	66LTG0801	220	275	118	1	
	Drum 10 holes for M22X1,5	66LTG1001	280	335	118	1	F10119/4

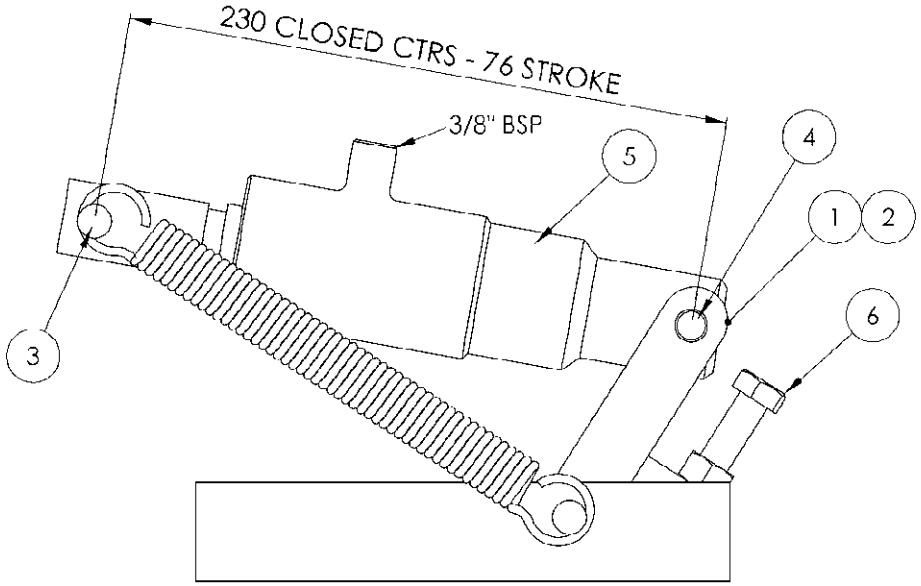
6.7 26 TONNE TANDEM AXLE 230 WIDEBODY



KEY	QTY	PART No.	DESCRIPTION
1	1 PR	B5026	ROCKING BEAM ASSEMBLY
2	4		STUB AXLE 130 BEAM
3	4	F00620	BRAKE LEVER
4	4	B5130	PIVOT BLOCK M60
5	4	73164	BOLT & NUT
6	4	B5115	RETAINING COLLAR
7	4	B5117	COLLAR
8	4	B5110	PIVOT PIN BUSH M60
9	4	B2322	BUSH M60
10	4	50726	GREASE NIPPLE
11	1	B5050	CROSS BEAM

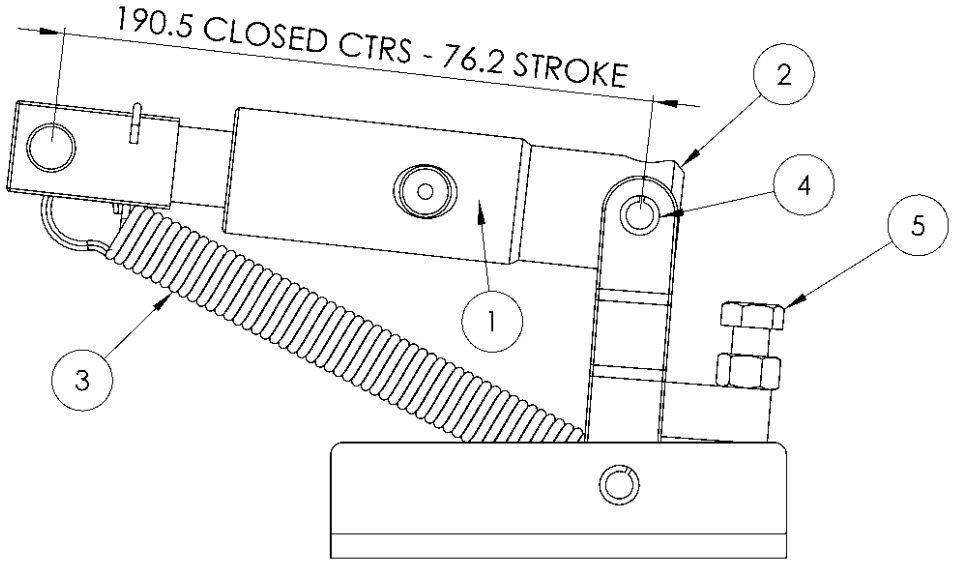
6.8 HYDRAULIC BRAKE RAM ASSEMBLY – Widebody 180

35mm BORE – 70830.3



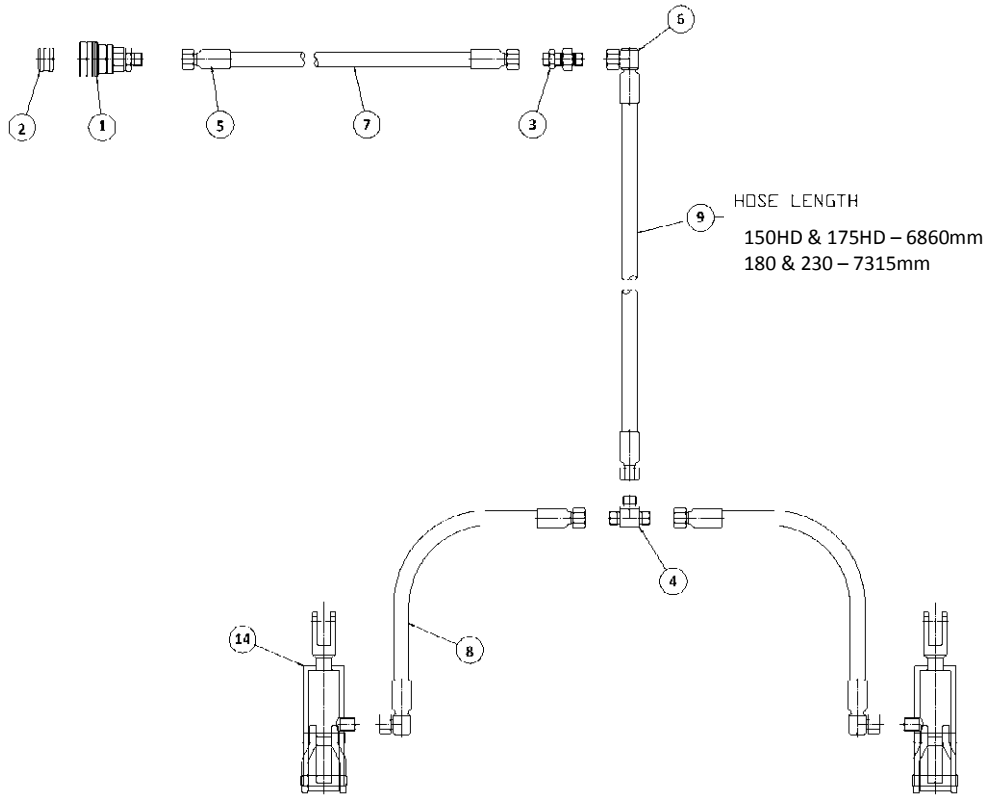
KEY	QTY	PART No.	DESCRIPTION
1	2	70830/3	RAM ASSEMBLY
2	2	70831/3	SEAL KIT
3	2	70830/4	SPRING & PIN KIT
4	2	70836	SELLOCK PIN
5	2	70835/3	CYLINDER
6	2	70834	ADJUSTER

6.9 HYDRAULIC BRAKE RAM ASSEMBLY – Widebody 230 25mm PART No. 70830/1



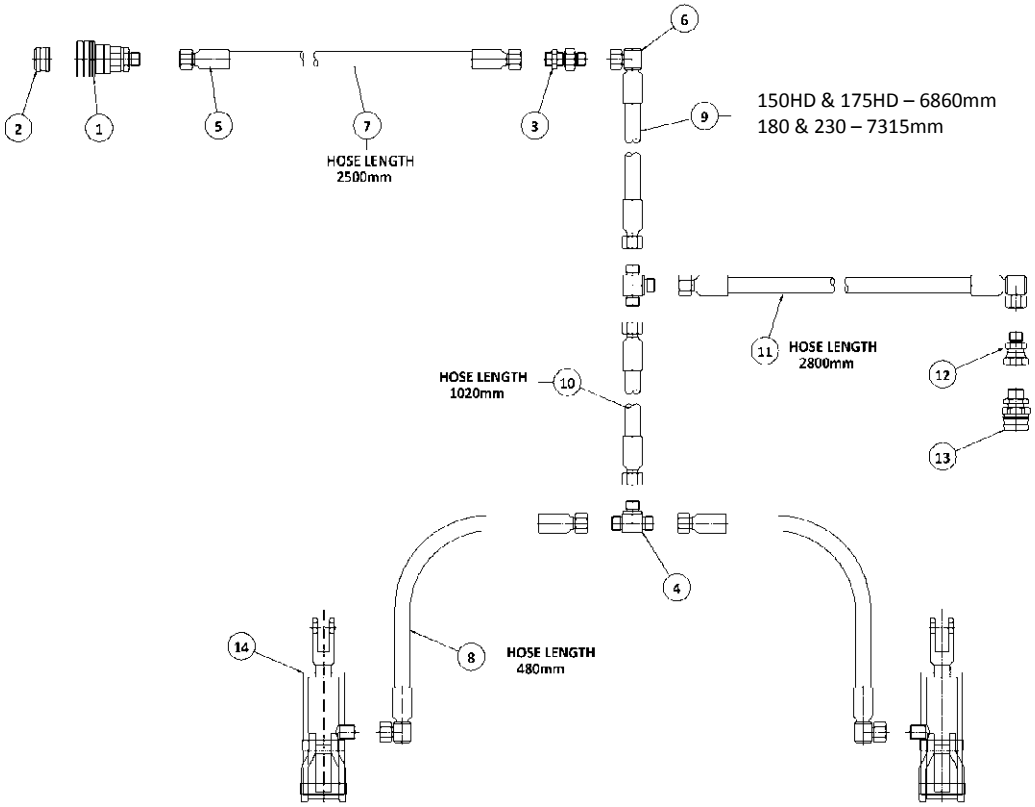
KEY	QTY	PART No.	DESCRIPTION
1	1	70835/1	RAM ASSEMBLY
2	1	70831	SEAL KIT
3	1	70832	SPRING & PIN KIT
4	2	70836	SELLOCK PIN
5	1	70834	ADJUSTER

6.10 HYDRAULIC BRAKE CIRCUIT SINGLE AXLE



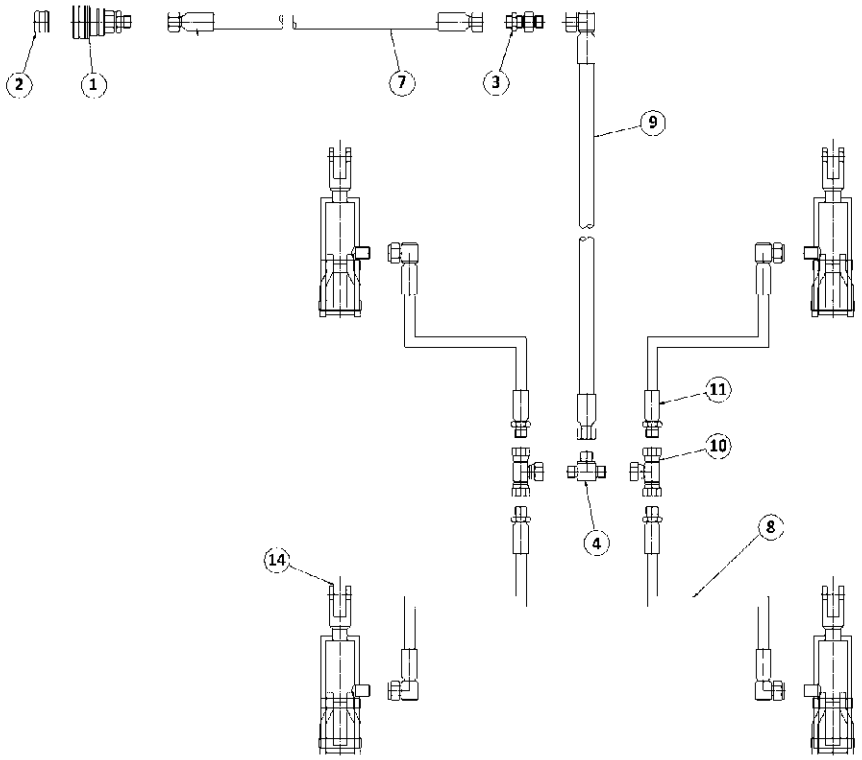
KEY	QTY	PART No.	DESCRIPTION
1	1	51568	COUPLING 3/8 FEMALE SELF SEAL
2	1	51583-1	DUMMY 3/8 MALE
3	1	51463	3/8"-3/8" NPT BULKHEAD
4	2	51447	3/8"-3/8"-3/8" NPT MALE TEE
7	1	B4462	INTER-CONNECTING HOSE
8	2	B4454	AXLE HOSE
9	1	B4458	LONG HOSE
14	REF		BRAKE ACTUATOR HYDRAULIC

6.11 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
5	8	51037	HOSE END DIA3/8"-3/8" BSP FEMALE
6	4	51111	HOSE END DIA3/8"-3/8" NPT 90 DEG FEM
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

6.12 HYDRAULIC BRAKE CIRCUIT TANDEM 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 BULHKHEAD
4	2	51447	3/8"-3/8"-3/8" NPT MALE TEE
7	1	B4462	INTER-CONNECTING HOSE
8	4	B4454	AXLE HOSE
9	1	B4458	LONG HOSE
10	2	51457	TEE 3/8 NPT FEMALE
11	4	52310	HOSE END DIA3/8-3/8 NTP MALE
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.

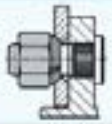
2. AXLES

2.2 Axle, maintenance and adjustment

2.2.1 Assembly and fixing of the wheels

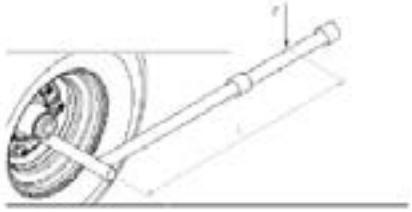
Above all to check that the type of wheel used is compatible with the nut of the wheel stud, for all the cases of fixing of the wheel with centering on the wheel stud, i.e. all those of table below except the nuts of the type M, to check that the holes of the rim have a conical part in order to receive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

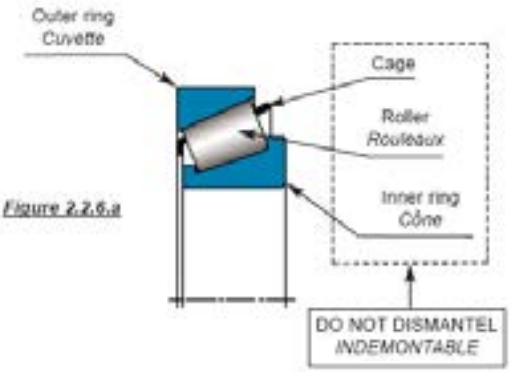


Figure 2.2.6.a

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

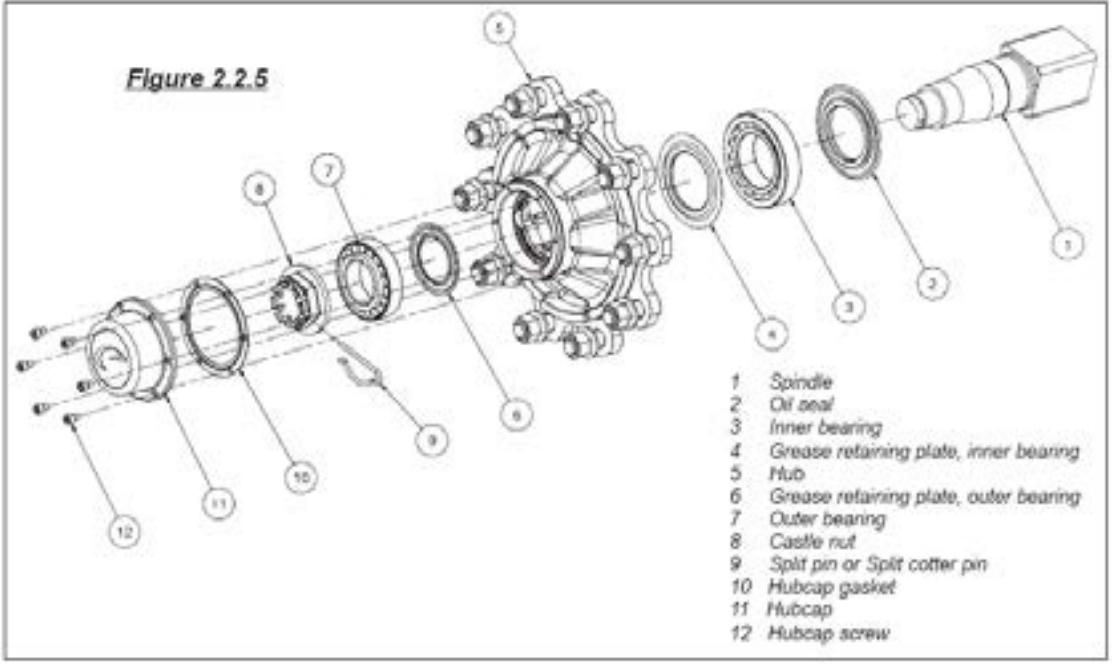
To check the wheel bearing play, raise the axle until the wheel is no longer resting on the ground ***(ensure that the vehicle cannot move)***.
Release the brake, grip the wheel at the top and the bottom and check the play by trying to tilt it. The play can also be detected by using a lever between the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

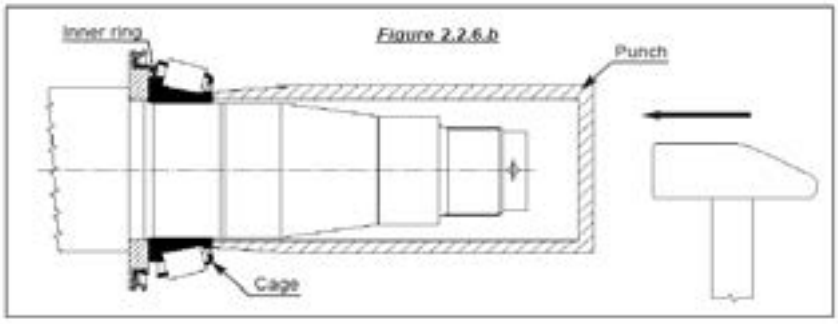


Figure 2.2.6.b

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.

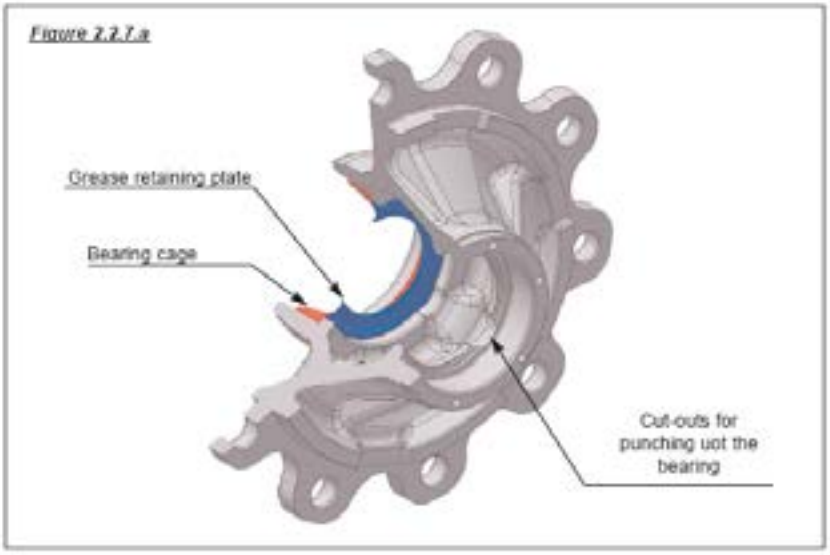
To replace the wheel bearings, follow the instructions for removing the hub (see paragraph 2.2.6 Lubricating the wheel bearings) and remove the bearing cups from the hub as follows.

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 :

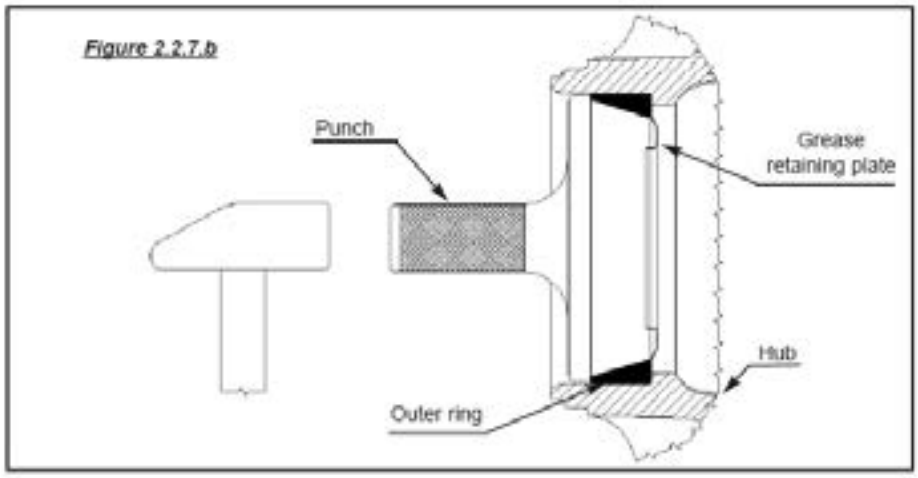
Make sure that the bearing cups and grease retaining plates are the right way round.

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



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

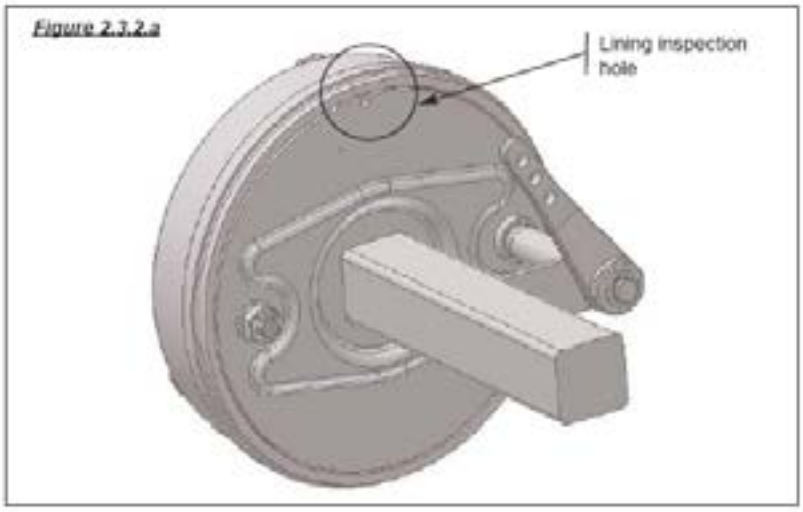
Check and test the brakes before intensive use and every 3 months:

- 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



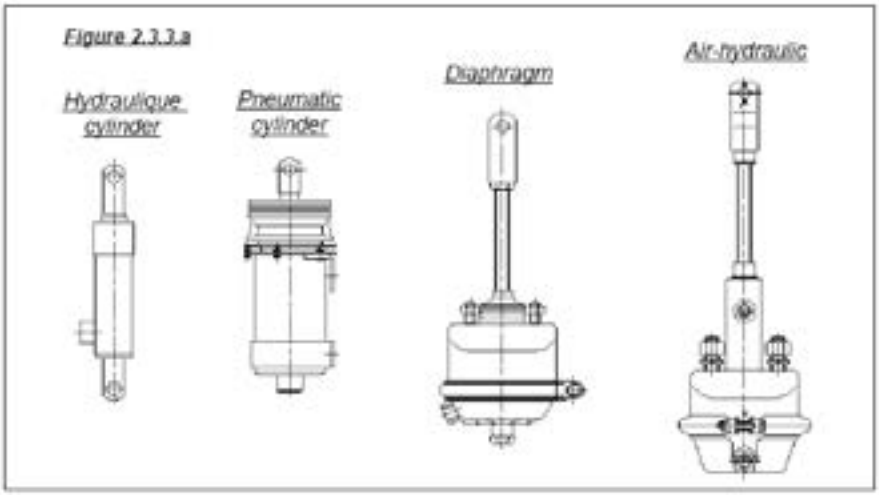
2.3.3 Adjusting brakes with fixed levers

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).

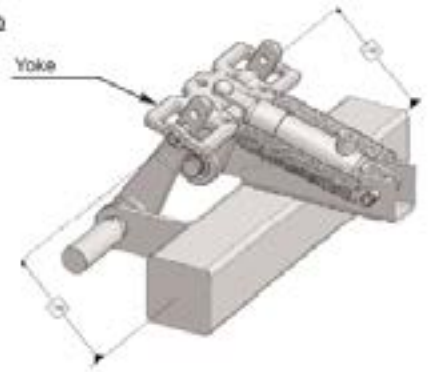
Never change the linkage position for the actuator on the lever without authorisation from the vehicle manufacturer as the vehicle will have been tested with the actuator at this position (the brake operating levers have several holes, always use the original hole).

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.



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**).

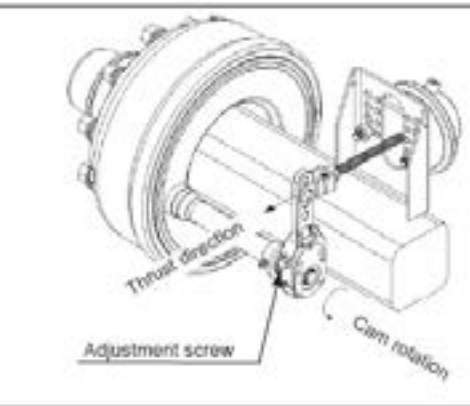
NB. The actuator brakes by pushing the lever to turn it in a particular direction. The screw must be adjusted so that the cam moves in this direction to take up the slack. The direction in which the screw must be turned depends on the configuration.

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.

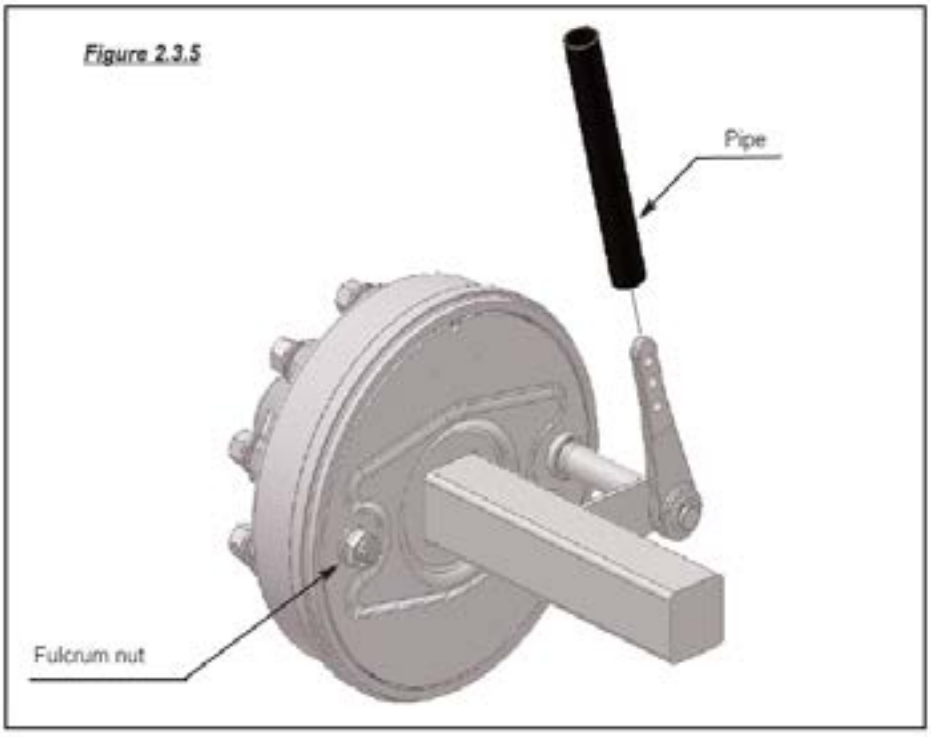
When replacing the brake linings, check all the brake components.
- Condition of the drums.
- Condition of the cam shafts and levers, in particular check the play in the splines.
- Wear on the bushings.
- Condition of the bellows (depending on the model).
- Condition of the shoe return springs.
- Condition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



SPRING DRAWBAR

After the first laden journey, before intensive use or every 6 months ***(See figure 8)***

- Retighten all the mounting U-bolt nuts to the recommended torque *Item 2*.
- Lubricate the attachment shaft *Item 3*.

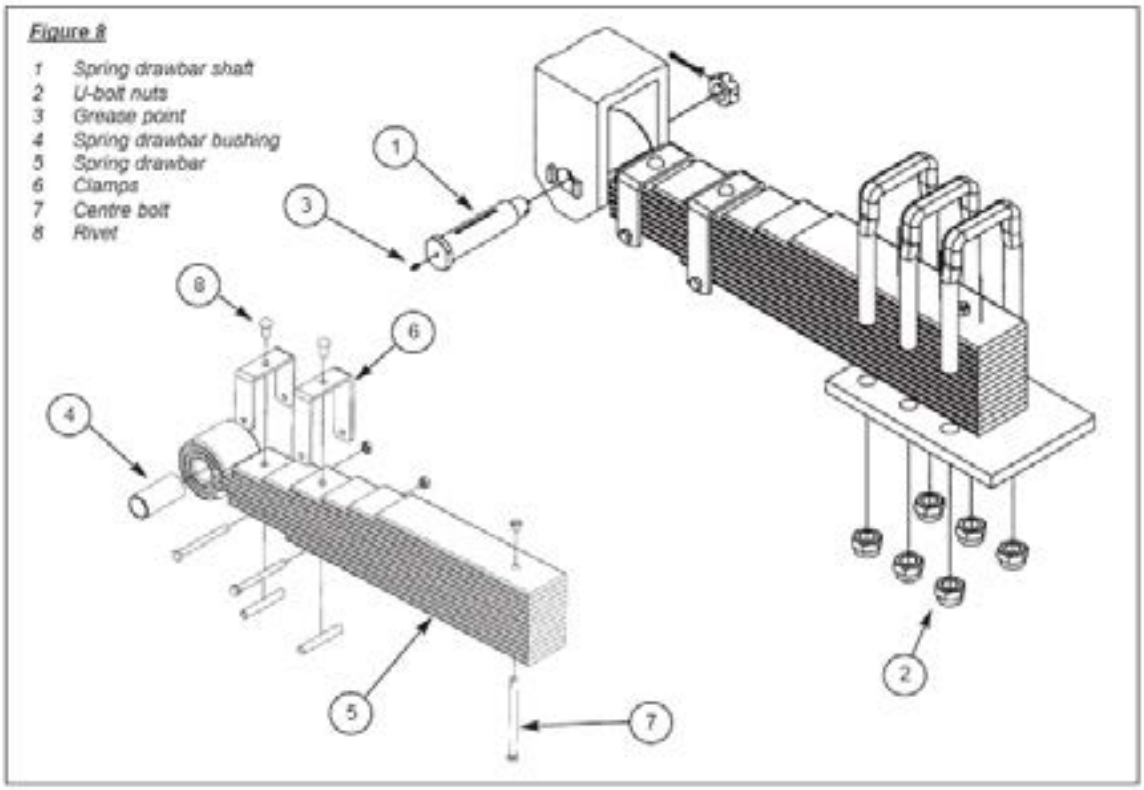
Under harsh or intensive operating conditions, maintenance should be carried out more frequently.

Every year:

- Check the play between the bushing *Item 4* and the spring drawbar shaft *Item 1*, and, if there is excessive play, replace the worn parts.
- Check the general condition of the spring *Item 5*, clean it thoroughly and brush the sides of the springs to check for cracks. Check the condition of the clamps *Item 6*.

Figure 8

1 *Spring drawbar shaft*
2 *U-bolt nuts*
3 *Grease point*
4 *Spring drawbar bushing*
5 *Spring drawbar*
6 *Clamps*
7 *Centre bolt*
8 *Rivet*



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 similary undesirable.

Underinflation results in excessive deflection which increases the heat generated by the tyre, this in turn leads to its eventual disintigration. 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 flexibilty 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 estabish a suitable mean pressure that mimimises both under inflation when loaded and excessive over inflation when running light.

Road Usage.

Max gross combination weight is 24390Kg and maximum gross spreader weight is 18290Kg.

If your machine is wider then 2.55m and up to 3.5m your maximum speed is 25 mph, above 3.5m it is mph.

8.2 TYRE PRESSURE SETTINGS - GENERAL

TYRE TYPE	6 MPH/10 KPH - Bar/PSI						20 MPH/30 KPH - Bar/PSI			
	10000 kg	13000 kg	15000 kg	17000 kg	18000 kg	20000 kg	10000 kg	10170 kg	15000 kg	20000 kg
16.9-14 x 34 P14	3.0/44						2.5/36			
18.4 x 34 PR14		2.5/36						2.5/36		
580/70 R38			2.0/29	2.5/36	2.8/41	3.0/44		2.0/29		
710/70 R38			2.0/29	2.0/29	2.3/33	2.5/36		1.7/25		
800/45 R26.5 PR16		1.9/28						1.9/28		
750/60 R30.5 *	SEE BELOW									
600/55 R22.5 **		2.3/33					4.0/58	2.0/29		

750/60R 30.5 181D/178E TRELLEBORG TWIN 404

To establish correct tyre pressures it is ESSENTIAL to determine the ACTUAL load imposed on each axle in normal service and the speeds at which the tyres are actually being used. The pressures shown in the attached chart are based on the vehicle's plated loads. If the actual loads are appreciably different the pressures must be adjusted to prevent over or underinflation.

AXLE LOAD	SPEED		PRESSURES			
			SHORT HAUL		LONG HAUL	
KG	KPH	MPH	BAR	PSI	BAR	PSI
7000 HIGHWAY	50	31	0.8	11.6	1.0	15
7000 HIGHWAY	40	25	0.8	11.6	1.0	15
20000 HIGHWAY	50	31	4.0	58	5.2	75
20000 HIGHWAY	40	25	3.5	50	4.6	66
20000 HIGHWAY	30	19	3.0	44	3.9	57

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 roliing application: Load capacity to be increased by 15%, after increasing the inflation pressure by 20%.

580/70 R38

STANDARD 170/A8 HIGH LOAD 180/A8

KPH MPH

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	25 16	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									
580/70R 38	W18A	577 22.7	1817 71.5	816 32.1	5343 210.4	155A8	1	6760	4410	3260	3150	2940	2680	4120	3530	3150
						152 B	15	14890	9710	7180	6940	6480	5900	9070	7780	6940
							1.3	7890	5150	3810	3670	3430	3120	4800	4120	3670
							19	17380	11340	8390	8080	7560	6870	10570	9070	8080
						155A8	1.6	8910	5810	4300	4150	3875	3530	5430	4650	4150
						152 B	23	19630	12800	9470	9140	8540	7780	11960	10240	9140
							2	11340	7400	5470	5280	4930	4490	6900	5920	5280
							29	24980	16300	12050	11630	10860	9890	15200	13040	11630
						Reinforced	2.4	12600	8220	6080	5860	5480	4990	7670	6580	5860
						rim	35	27750	18110	13390	12910	12070	10990	16890	14490	12910
						170A8	2.8	13800	9000	6660	6420	6000	5460	8400	7200	6420
						167 B	41	30400	19820	14670	14140	13220	12030	18500	15860	14140
							3.2	14880	9710	7180	6920	6470	5890	9060	7760	6920
							46	32780	21390	15810	15240	14250	12970	19960	17090	15240
							3.6	15940	10400	7690	7420	6930	6310	9700	8320	7420
							52	35110	22910	16940	16340	15260	13900	21370	18330	16340
							4	16950	11060	8180	7890	7370	6710	10320	8840	7890
							58	37330	24360	18020	17380	16230	14780	22730	19470	17380
						Reinforced	4.4	17920	11690	8650	8340	7790	7090	10910	9350	8340
						rim	64	39470	25750	19050	18370	17160	15620	24030	20590	18370
						180A8	4.6	18400	12000	8880	8560	8000	7280	11200	9600	8560
						175B	67	40530	26430	19560	18850	17620	16040	24670	21150	18850

Bar

PSI

KG

lbs

710/70 R38

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	25 16	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									
710/70R 38	DW23A	716 28.2	1948 76.7	877 34.5	5739 225.9		1.3	10790	7040	5210	5020	4690	4270	6570	5630	5020
							19	23770	15510	11480	11060	10330	9410	14470	12400	11060
							1.5	11730	7650	5660	5460	5100	4640	7140	6120	5460
							22	25840	16850	12470	12030	11230	10220	15730	13480	12030
						166A8	1.6	12190	7950	5880	5670	5300	4820	7420	360	5670
						163B	23	26850	17510	12950	12490	11670	10620	16340	14010	12490
							1.7	12810	360	6180	5960	5570	5070	7800	6680	5960
							25	28220	18410	13610	13130	12270	11170	17180	14710	13130
							1.9	13660	8910	6590	360	5940	5410	8320	7130	360
							28	30090	19630	14520	14010	13080	11920	18330	15700	14010
						172A8	2.1	14490	9450	6990	6740	6300	5730	8820	7560	6740
						169B	30	31920	20810	15400	14850	13880	12620	19430	16650	14850
							2.2	14970	9770	7230	6970	6510	5920	9110	7810	6970
							32	32970	21520	15930	15350	14340	13040	20070	17200	15350
							2.5	16150	10530	7790	7510	7020	6390	9830	8420	7510
							36	35570	23190	17160	16540	15460	14070	21650	18550	16540
						178A8	2.8	17250	11250	8330	8030	7500	6830	10500	9000	8030
						175B	41	38000	24780	18350	17690	16520	15040	23130	19820	17690

560/60 R22.5

Size	Rim	Unloaded dimension SW mm in	Unloaded dimension OD mm in	Loaded Static Radius mm in	Rolling Circum mm in	PR,Stars Load Index Speed Symbol	Infi press Bar psi	Recommend load, kg (lbs) Speed, km/h (mph) Mixed application Static	10 6	25 16	30 19	40 25	50 31	60 37	65 40	70 44
560/60R 22.5	16.00DC	554 21.8	1245 49	559 22	3660 144.1		**0.8**	**4160**	**3420**	**3110**	**2900**	**2620**	**2350**	**2120**	**1970**	**1810**
							12	*9160*	*7530*	*6850*	*6390*	*5770*	*5180*	*4670*	*4340*	*3990*
							1.5	**6000**	**4930**	**4490**	**4180**	**3780**	**3390**	**3050**	**2840**	**2610**
							22	*13220*	*10860*	*9890*	*9210*	*8330*	*7470*	*6720*	*6260*	*5750*
							1.7	**6460**	**5310**	**4830**	**4500**	**4070**	**3650**	**3280**	**3060**	**2810**
							25	*14230*	*11700*	*10640*	*9910*	*8960*	*8040*	*7220*	*6740*	*6190*
							2	**7110**	**5840**	**5320**	**4940**	**4480**	**4020**	**3610**	**3370**	**3090**
							29	*15660*	*12860*	*11720*	*10880*	*9870*	*8850*	*7950*	*7420*	*6810*
							2.5	**8100**	**6650**	**6070**	**5630**	**5100**	**4580**	**4110**	**3840**	**3520**
							36	*17840*	*14650*	*13370*	*12400*	*11230*	*10090*	*9050*	*8460*	*7750*
							3.5	**9840**	**8090**	**7380**	**6850**	**6210**	**5560**	**5000**	**4670**	**4280**
							51	*21670*	*17820*	*16260*	*15090*	*13680*	*12250*	*11010*	*10290*	*9430*
						161 E	**4**	**10640**	**8740**	**7960**	**7400**	**6710**	**6010**	**5410**	**5040**	**4625**
							58	*23440*	*19250*	*17530*	*16300*	*14780*	*13240*	*11920*	*11100*	*10190*

600/55 R22.5

Size	Rim	Unloaded dimension SW mm in	Unloaded dimension OD mm in	Loaded Static Radius mm in	Rolling Circum mm in	PR,Stars Load Index Speed Symbol	Infi press Bar psi	Recommend load, kg (lbs) Speed, km/h (mph) Mixed application Static	10 6	25 16	30 19	40 25	50 31	60 37	65 40	70 44
600/55R 22.5	20.00DC	600 23.6	1245 49	562 22.1	3670 144.5		**0.8**	**4280**	**3520**	**3210**	**2980**	**2700**	**2420**	**2160**	**2030**	**1860**
							12	*9430*	*7750*	*7070*	*6560*	*5950*	*5330*	*4760*	*4470*	*4100*
							1.5	**6160**	**5070**	**4610**	**4290**	**3890**	**3480**	**3110**	**2920**	**2680**
							22	*13570*	*11170*	*10150*	*9450*	*8570*	*7670*	*6850*	*6430*	*5900*
							1.7	**6620**	**5440**	**4960**	**4610**	**4180**	**3740**	**3340**	**3140**	**2880**
							25	*14580*	*11980*	*10930*	*10150*	*9210*	*8240*	*7360*	*6920*	*6340*
							2	**7290**	**5990**	**5470**	**5070**	**4600**	**4120**	**3680**	**3460**	**3170**
							29	*16060*	*13190*	*12050*	*11170*	*10130*	*9070*	*8110*	*7620*	*6980*
							2.5	**8300**	**6820**	**6210**	**5780**	**5230**	**4690**	**4190**	**3930**	**3610**
							36	*18280*	*15020*	*13680*	*12730*	*11520*	*10330*	*9230*	*8660*	*7950*
							3.5	**10100**	**8300**	**7570**	**7020**	**6370**	**5710**	**5090**	**4790**	**4390**
							51	*22250*	*18280*	*16670*	*15460*	*14030*	*12580*	*11210*	*10550*	*9670*
						162 E	**4**	**10930**	**8980**	**8180**	**7600**	**6890**	**6180**	**5510**	**5180**	**4750**
							58	*24070*	*19780*	*18020*	*16740*	*15180*	*13610*	*12140*	*11410*	*10460*

710/70 R42

Size	Rim	Unloaded dimension SW mm in	Unloaded dimension OD mm in	Loaded Static Radius mm in	Rolling Circum mm in	PR,Stars Load Index Speed Symbol	Infl. press Bar psi	Recommend load, kg (lbs) Speed, km/h (mph) Not high and sustained torque; Road transport Static	10 6	25 16	30 19	40 25	50 31	Field operation Low Torque 10 6	20 12	High Tor 10 6
710/70R42 (Dens.365)	DW23B	740 29.1	2055 80.9	936 36.9	6178 243.2	173A8 173 B	0.8 12	7870 17330	5130 11300	3800 8370	3660 8060	3420 7530	3420 7530	4790 10550	4100 9030	3660 8060
							1 15	8950 19710	5840 12860	4320 9520	4160 9160	3890 8570	3890 8570	5450 12000	4670 10290	4160 9160
							1.2 17	9960 21940	6500 14320	4810 10590	4630 10200	4330 9540	4330 9540	6060 13350	5200 11450	4630 10200
							1.4 20	10900 24010	7110 15660	5260 11590	5070 11170	4740 10440	4740 10440	6640 14630	5690 12530	5070 11170
							1.6 23	11800 25990	7700 16960	5690 12530	5490 12090	5130 11300	5130 11300	7180 15810	6160 13570	5490 12090
							2 29	13430 29580	8760 19300	6480 14270	6250 13770	5840 12860	5840 12860	8180 18020	7010 15440	6250 13770
							2.2 32	14210 31300	9270 20420	6860 15110	6610 14560	6180 13610	6180 13610	8650 19050	7420 16340	6610 14560
							2.4 35	14950 32930	9750 21480	7220 15900	6960 15330	6500 14320	6500 14320	9100 20040	7800 17180	6960 15330
						188A8 188B	2.6 38	16200 35860	10620 23390	7860 17310	7580 16700	7080 15590	7080 15590	9910 21830	8500 18720	7580 16700
							2.8 41	17020 37490	11100 24450	8210 18080	7920 17440	7400 16300	7400 16300	10360 22820	8880 19560	7920 17440
							3 44	17710 39010	11550 25440	8550 18830	8240 18150	7700 16960	7700 16960	10780 23740	9240 20350	8240 18150
							3.2 46	18400 40530	12000 26430	8880 19560	8560 18850	8000 17620	8000 17620	11200 24670	9600 21150	8560 18850

8.3 WHEEL TYPE & TORQUE SETTINGS

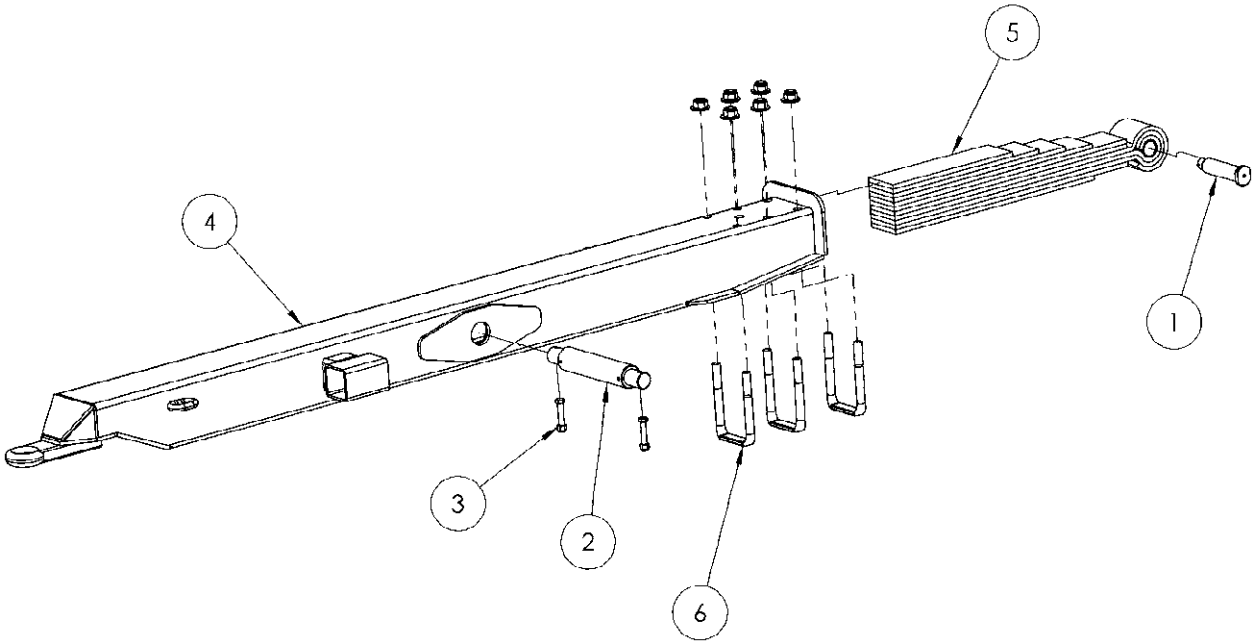
TYRE TYPE	WHEEL TYPE	WHEEL STUD TYPE & SIZE	TORQUE SETTINGS
580/70 R38	W18A x 38 - 45 offset 280 bore	10 x M22 - 1.5 335 PCD	510 Nm/375 lb/ft
710/70 R38	DW 23a x 38 - 50 offset 280 bore	10 x M22 - 1.5 335 PCD	510 Nm/375 lb/ft
800/45 R26.5 PR16	28.0DCx26.5 centre nave 280 bore	10 x M22 - 1.5 335 PCD	510 Nm/375 lb/ft
600/55 R22.5	20-00 DC x 22.5 centre nave 281 bore	10 x M22 - 1.5 335 PCD	510 Nm/375 lb/ft
750/60 R30.5	AG24.00 x 30.5 centre nave 281 bore	10 x M22 - 1.5 335 PCD	510 Nm/375 lb/ft

IMPORTANT

CHECK WHEEL NUT TORQUE AFTER EACH LOAD FOR THE 1ST 10 LOADS AND THEN DAILY FOR THE FIRST WEEK AND ONCE A WEEK THEREAFTER.

9. OPTIONS

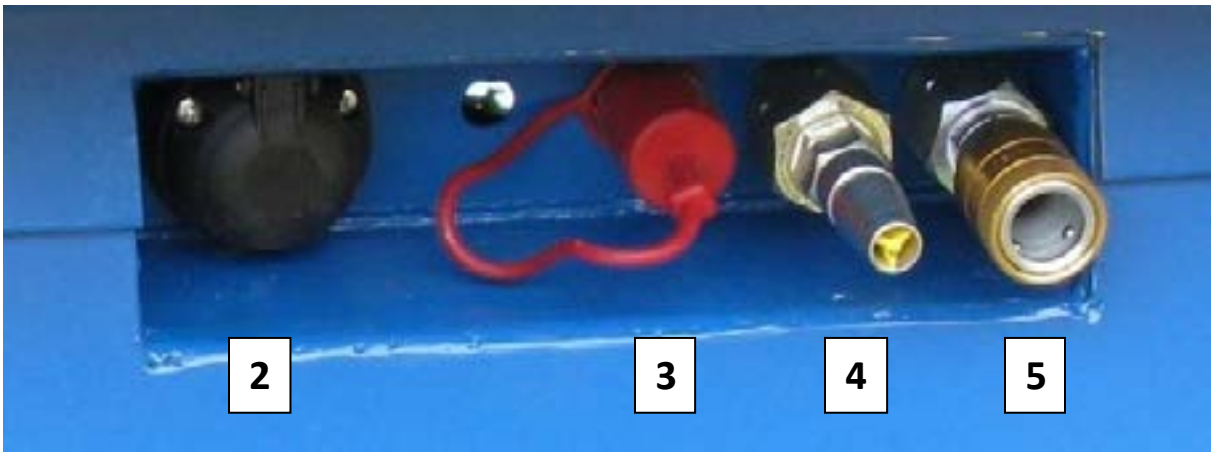
9.1 SPRUNG DRAWBAR

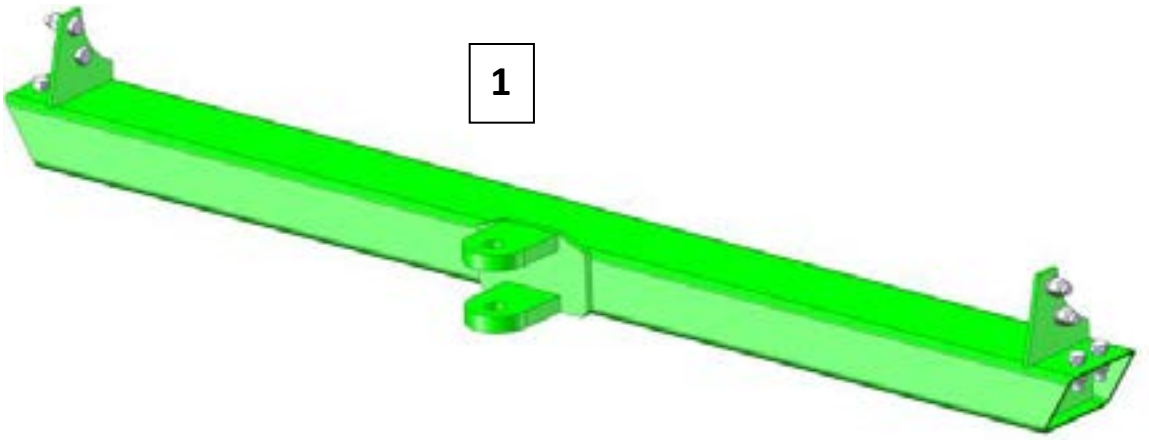


KEY	QTY	PART No.	DESCRIPTION
1	1	70440	GUDGEON PIN & NUT
2	2	70442/2	PIVOT PIN
3	1	73102	NUT & BOLT M16
4	1	N/A	DRAWBAR TO SUIT MODEL
5	2	70438/1	SPRING 13 LEAF UP TO 18 TONNE & OVER
6	3	70439/2	U-BOLT 30mm FOR 13 LEAF SPRING

SWIVEL EYE TO 9000Kg VERTICAL LOAD RATED .
DRAW PIN SIZE 1-1/2" OR 2"
PLEASE CONTACT YOUR BUNNING DEALER FOR DETAILS.

9.2 REAR CLEVIS DRAWBAR

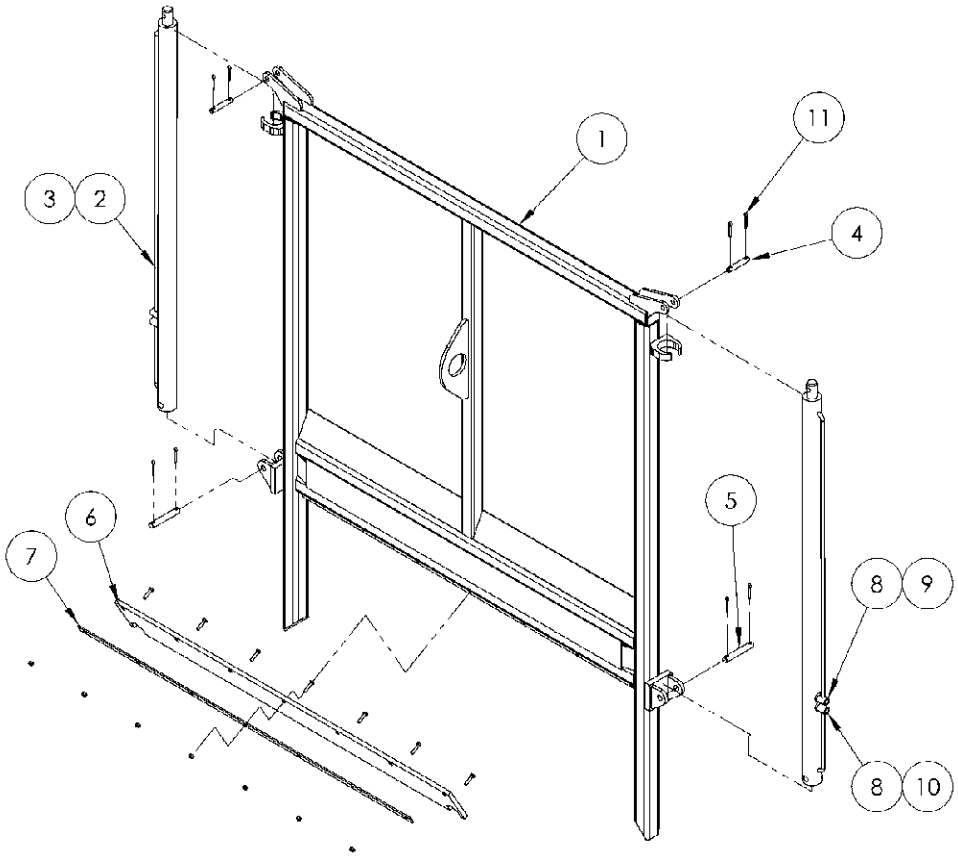




KEY	QTY	PART No.	DESCRIPTION
1	1	B5310	REAR CLEVIS DRAWBAR CROSS MEMBER
2	1	70107	7 PIN LIGHT SOCKET
3	1	51569	HYDRAULIC BRAKE CONNECTION
4	1	CF350932	AIR COUPLING MALE
5	1	CF351543	AIR COUPLING FEMALE

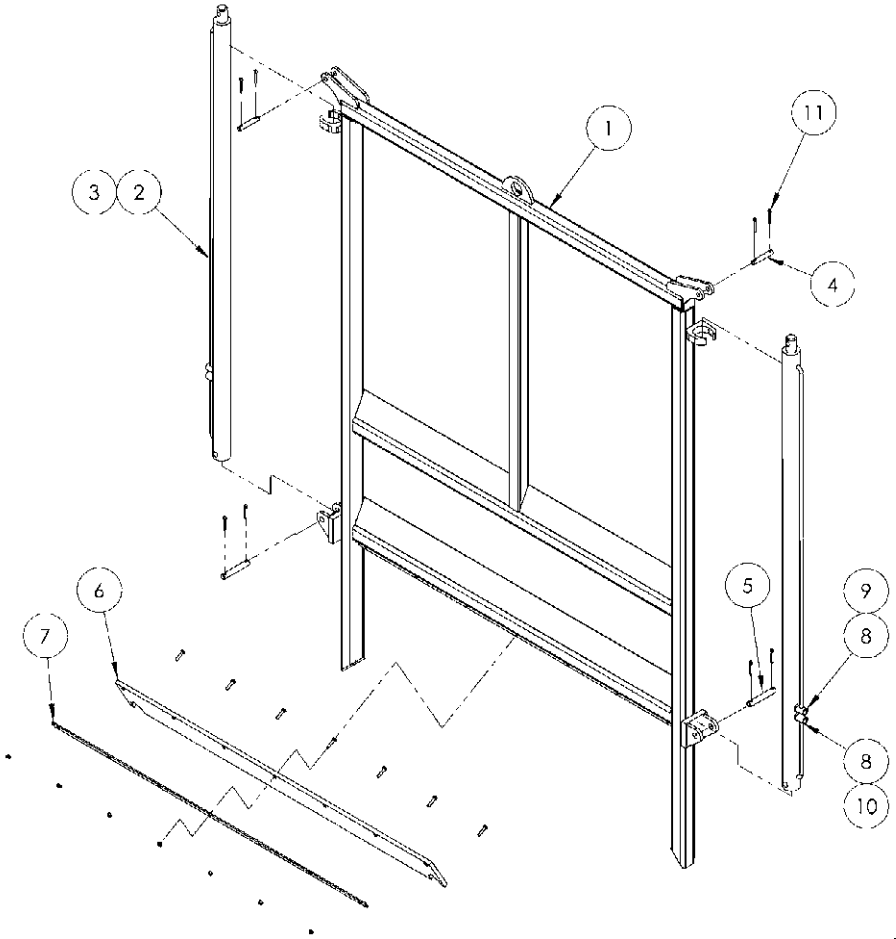
NOTE: The drawbar is designed for highway use **only** towing an unladen spreader.

9.3 GUILLOTINE SLURRY DOOR MK2 & WIDEBODY



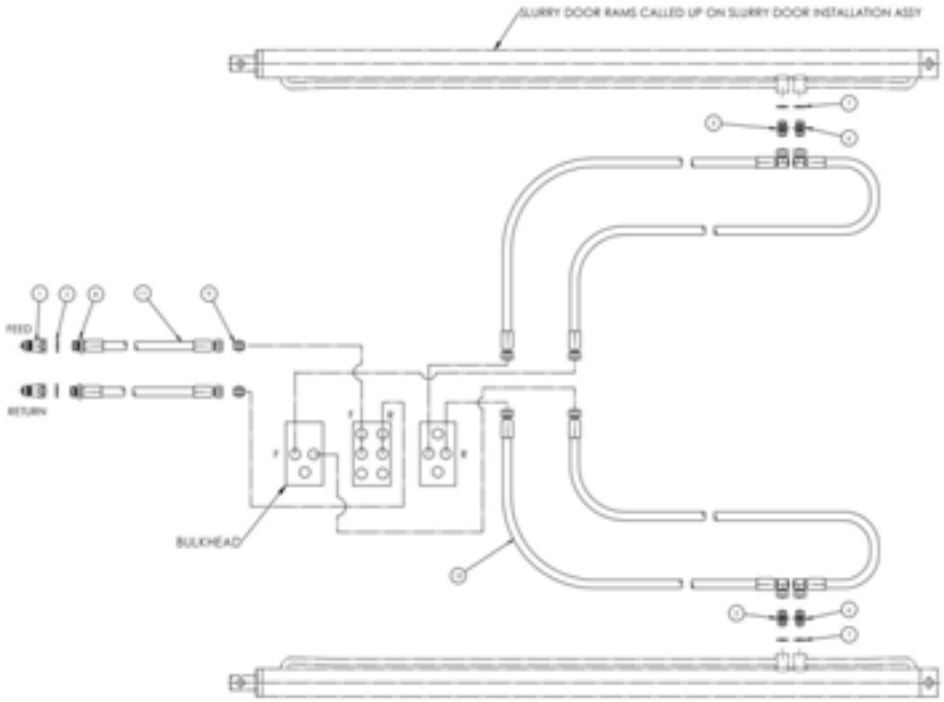
KEY	QTY	PART No.	DESCRIPTION
1	1	B4115	GUILLOTINE DOOR
2	2	B4138	HYDRAULIC RAM
3		65520	RAM SEAL KIT
4	2	B4130	TOP RAM PIN DIA 5/8"
5	2	B4132	BOTTOM RAM PIN DIA 3/4"
6	1	B4166	RUBBER SKIRT W.B
	1	B4162	RUBBER SKIRT HD MK2
7	1	B4188	CLAMP STRIP
8	4	51590	3/8" BONDED SEAL
9	2	51335	3/8" M/M ADAPTOR
10	2	10522	3/8" x 1/8" RESTRICTOR
11	8	50988	SPLIT PIN

9.4 GUILLOTINE SLURRY DOOR HORIZONTAL BEATERS



KEY	QTY	PART No.	DESCRIPTION
1	1	B4115	DOOR
	2	B4138	HYDRAULIC 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	B4166/1	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
11	8	50988	SPLIT PIN

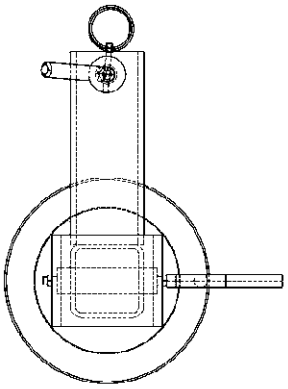
9.5 GUILLOTINE SLURRY DOOR HYDRAULIC CIRCUIT.

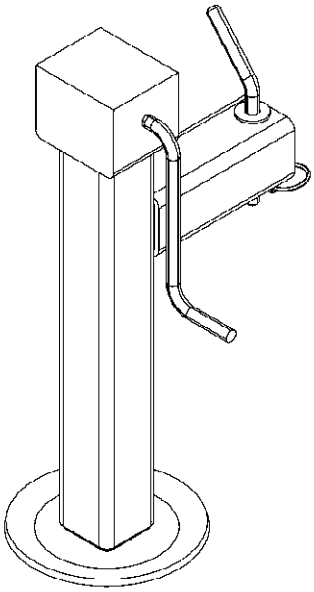


KEY	QTY	PART No.	DESCRIPTION
1	2	51576	1/2" PROBE MALE SELF SEALER
2	2	51583	DUMMY 1/2" FEMALE
3	2	51463	3/8"-3/8"- BPT BULKHEAD
4	2	51447	3/8"-3/8"-3/8" MALE TEE
5	2	51335	3/8"-3/8" BPT NIPPLE
6	2	10522	3/8"-3/8" BPT NIPPLE 1/8" REDUCED
7	4	51590	DIA 3/8" DOWTY WASHER
8	2	51591	DIA 1/2" DOWTY WASHER
9	6	51338	3/8-1/2" M/M ADAPTOR
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		HOSE 3/8" BORE 2 WIRE x 2500mm
13	2		HOSE 3/8" BORE 2 WIRE x 8620mm
14	4		HOSE 3/8" BORE 2 WIRE x LENGTH
16	REF	SEE NOTE	HYD RAM 50mm BORE DOUBLE ACTING

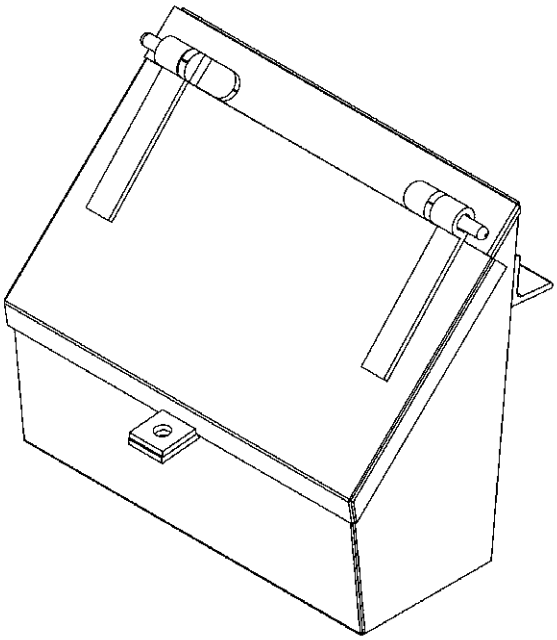
Note: This slurry door has longer legs then the standard.

9.6 SUPPORT LEG PART No. 70306

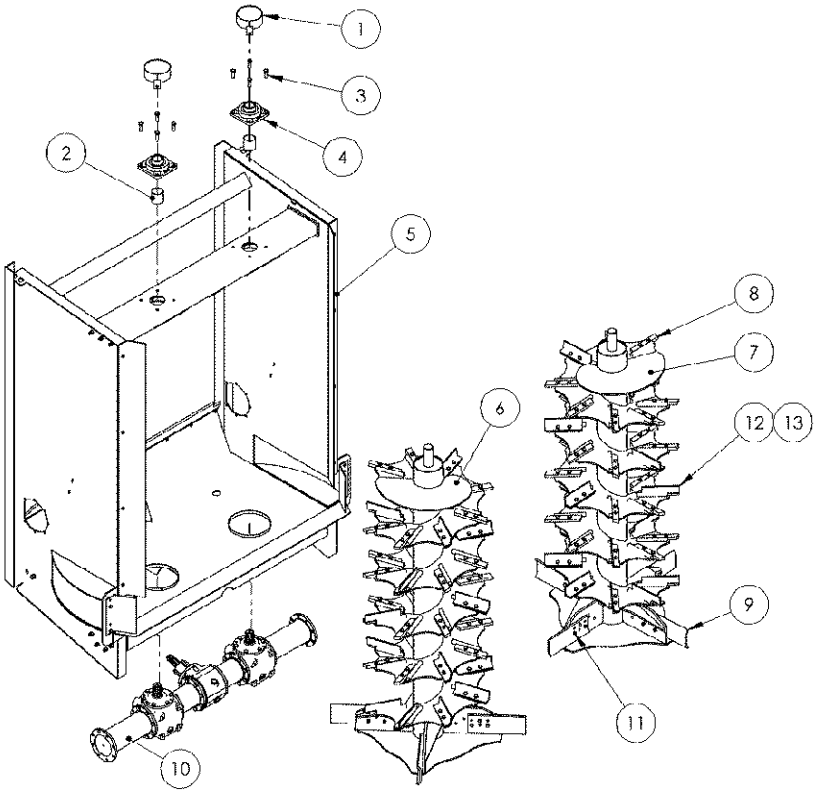




9.7 TOOLBOX PART No. 80136

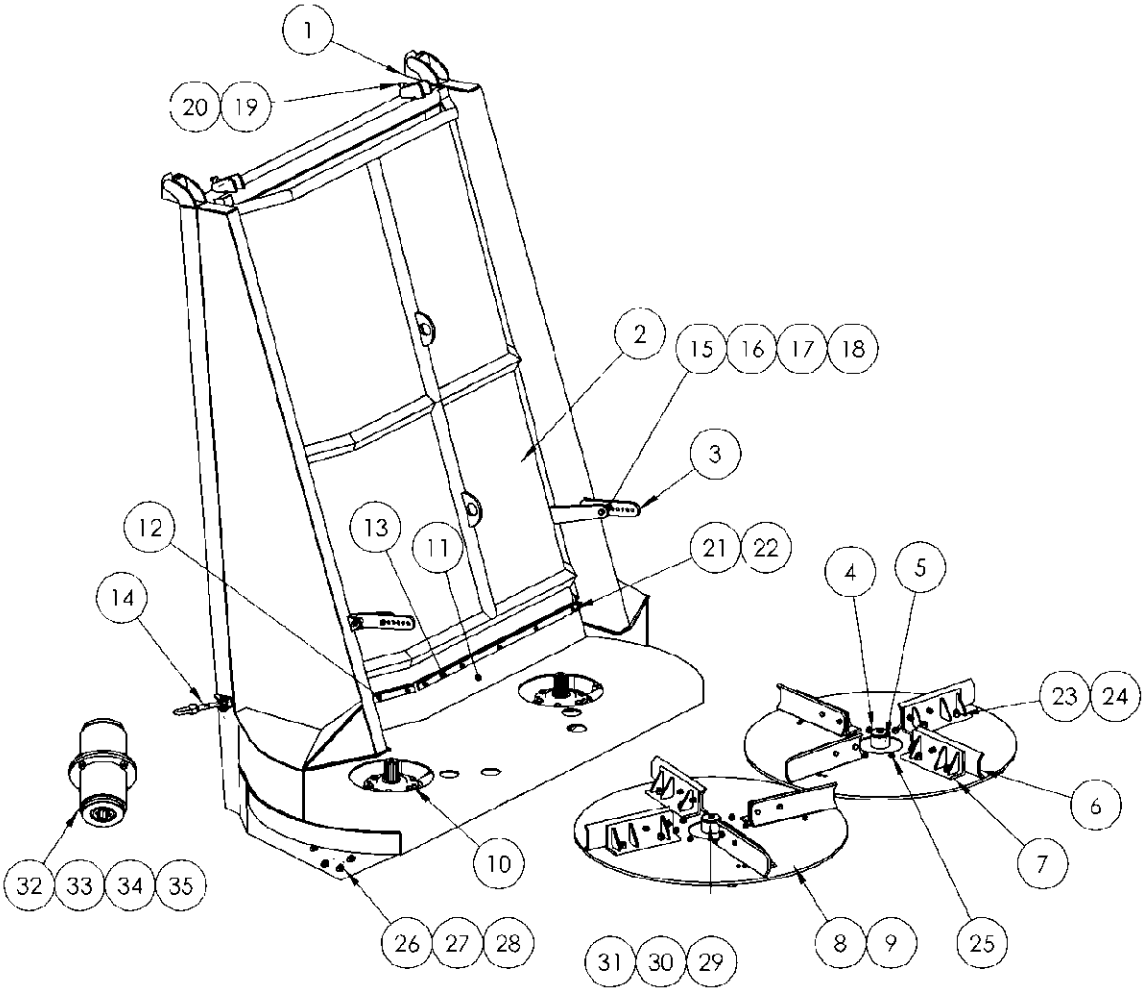


9.8 SLUDGE CAKE BUILD



KEY	QTY	PART No.	DESCRIPTION
1	2	B1162	BEARING CAP
2	2	B2352	SPACER
3	8	73155/73375	BOLT AND LOCKNUT
4	2	B1180/1	BEARING M60
5	1		SLUDGE CAKE BODY
6	1	B1048	AUGER ASSEMBLY LH
7	1	B1049	AUGER ASSEMBLY RH
8	44	B1101	CUTTER POINT H.D
9	8	B1123	AUGER BLADE
10	1	B3180	AUGER GEARBOX
	160	B1101/1	BOLT & NYLOC (BOLT FOR CUTTERS)
11	16	B1104	BOLT FOR BLADES
12	36	B1106	ANGLE THROWER
13	18	B1102	CUTTER POINT STD

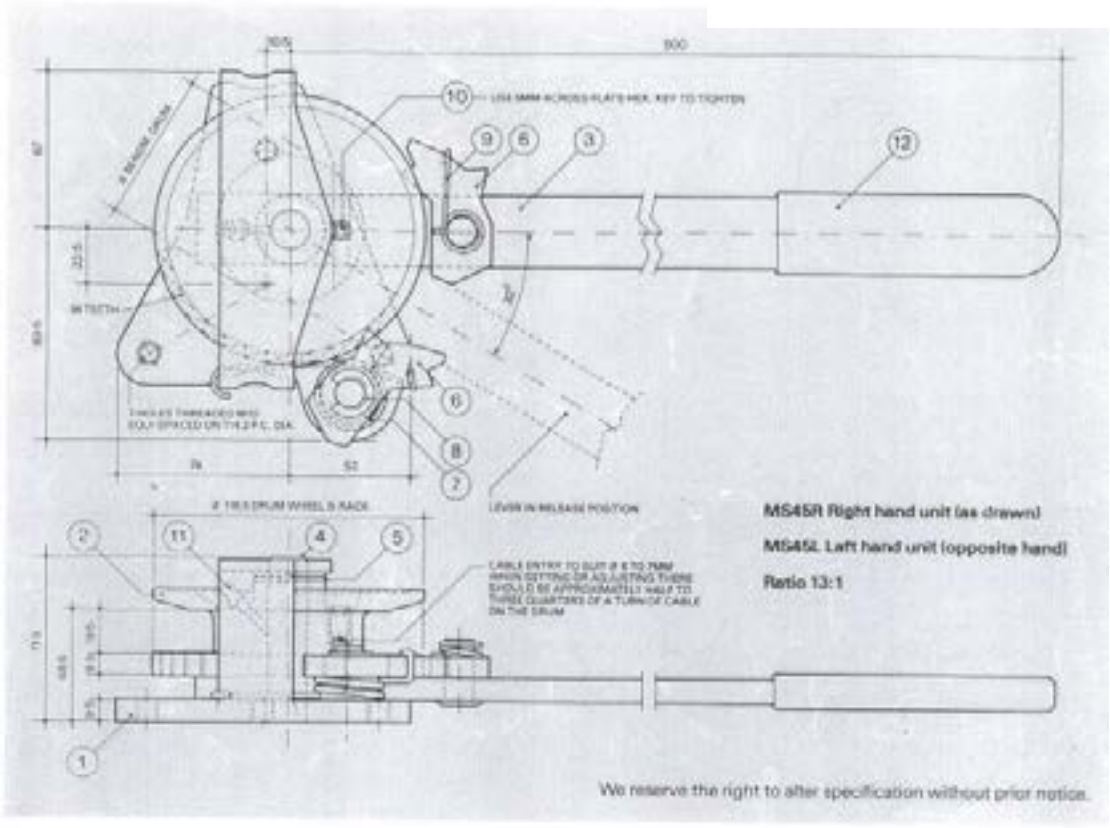
9.9 DETACHABLE SPINNER DECK – ADD ON OPTION



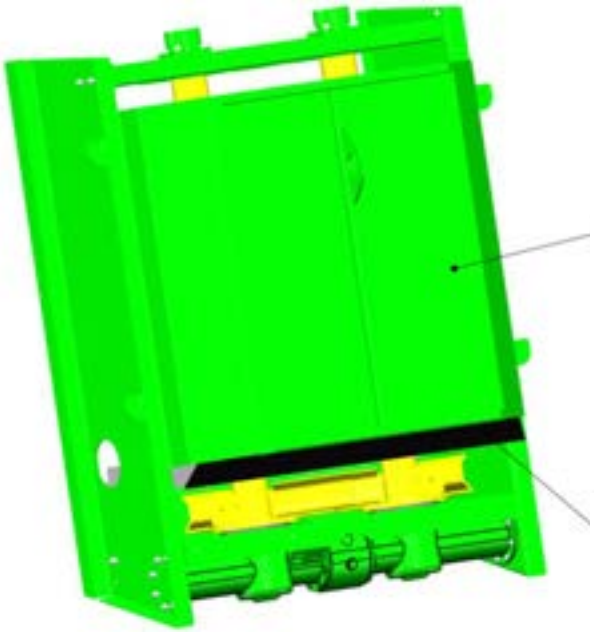
9.9 DETACHABLE SPINNER DECK – ADD ON OPTION PARTS LIST

KEY	QTY	PART No.	DESCRIPTION
1	2	B8810	BUCKET HOOK
2	1	AMS0524	REAR CANOPY ASSEMBLY
3	3	DMS0889	LINK CANOPY
4	2	DMS0322	END CAP
5	2	AMS0141	MOUNTING FLANGE ASSEMBLY
6	8	DMS2986	AUGER/SPINNER BLADE
7	8	AMS2109	BLADE HOLDER ASSEMBLY
8	1	B8340	SPINNER DISC LH
9	1	B8342	SPINNER DISC RH
10	1	B3190	BERMA SRT 18/1830 1000/520 3IN1
11	1	DMS0513	RUBBER SKIRT
12	2	DMS0512	CLAMPING STRIP
13	1	DMS0511	CLAMPING STRIP
14	2	A2134	HOOK BOLT
15	4	DMS0072	HINGE TUBE
16	20		M12 LOCK NUT
17	4		M12 WASHER
18	4		M12 BOLT x 70mm
19	2		M10 BOLT x 70mm
20	2		M10 LOCK NUT
21	8		M8 LOCK NUT
22	8		M8 LOCK NUT
23	8		M16 LOCK NUT
24	8		M16 BOLT x 45mm
25	16		M12 BOLTx 50mm
26	16		M14 LOCK NUT
27	16		M14 BOLT x 50
28	16		M14 WASHER
29	2	B8336	DISC DRIVE FLANGE
30	2	B8339	FLANGE CAP
31	2	73698	CAP SCREW
32	1	B8484	FLEXIDRIVE BODY
33	1	B8486	FLEXIDRIVE
34	6	B1142	RUBBER DRIVE BLOCK
35	6	B1142	RUBBER DRIVE BLOCK

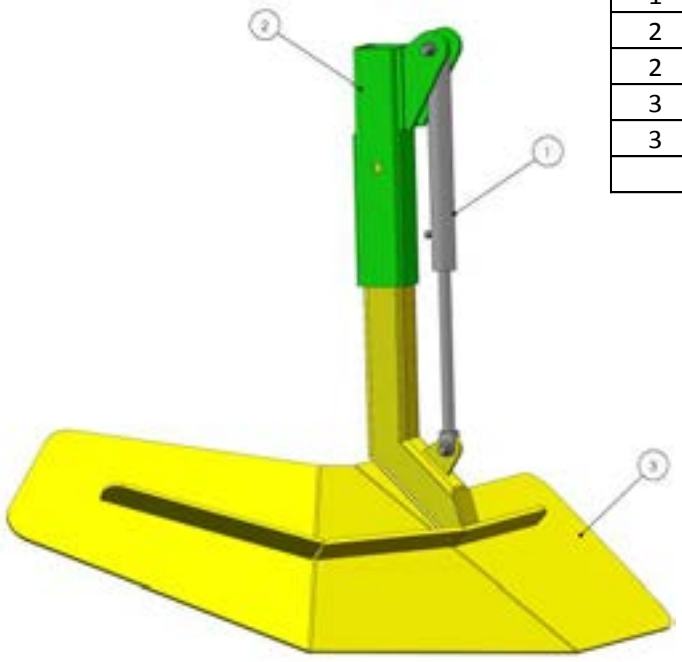
9.10 HANDBRAKE CONTROL MULTI-STORKE MS45 PART No. 70321



9.11 SIMPLE CANOPY

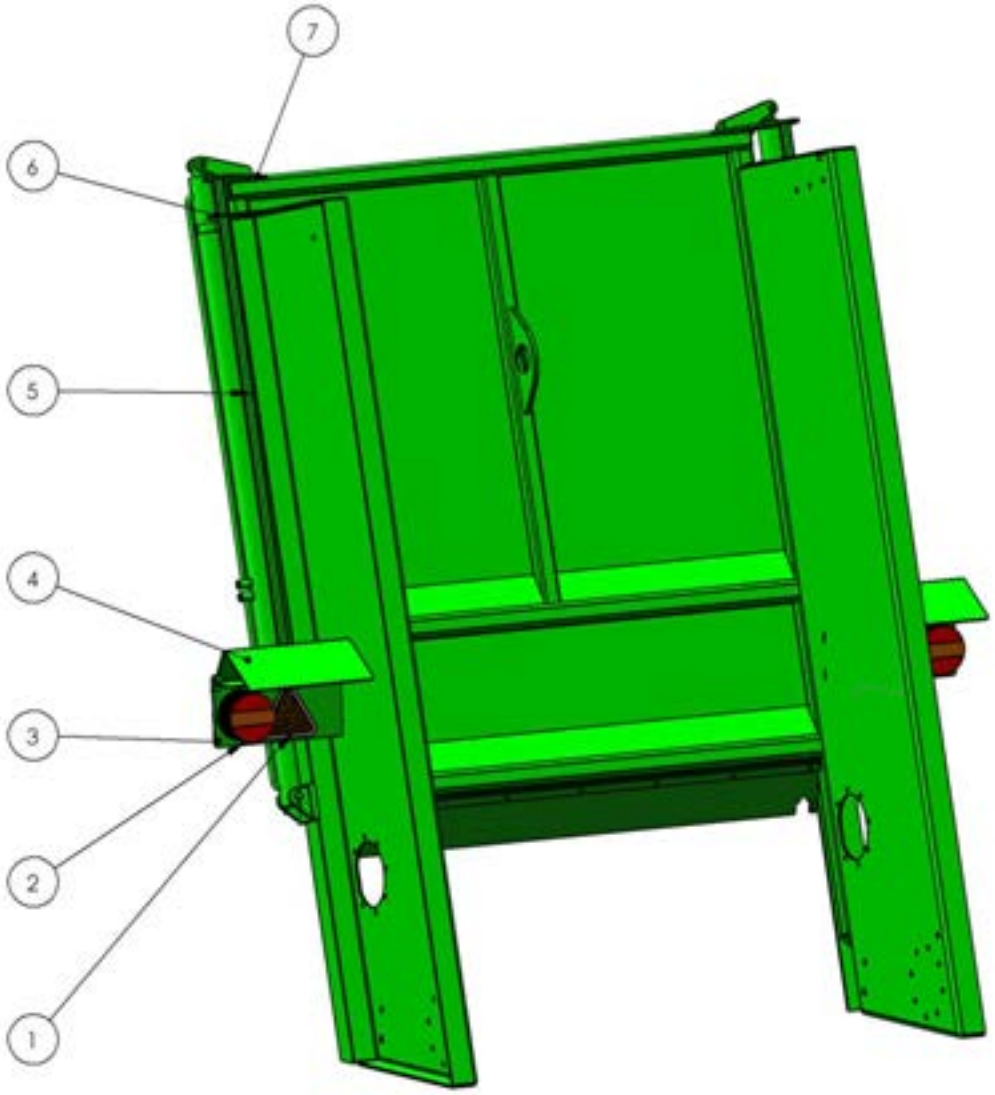


9.12 HYDRAULIC BORDER CONTROL



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

9.13 AUTO REAR LAMPS



KEY	QTY	PART No.	DESCRIPTION
	1	B5232	AUTO LAMP COVER COMPLETE ASSEMBLY
1	2	70081	TRIANGLE
2	2	70009/3	REAR LAMP
3	2	DMS2256-1/-2	LAMP BRACKET LH / RH
4	2	AMS1336-1/-2	LAMP COVER LH / RH
5	2	DMS2254	POST GUIDE
6	2	DMS225	STRIKER PLATE

9.14 BODY SEAL RUBBERS

KEY	QTY	PART No.	DESCRIPTION
1	1	B4166	SLURRY DOOR RUBBER
2	1	B4167	FRONTWALL RUBBER
3	1	B4175	DOUBLE WIPER RUBBER STRIP
4	1	B4168	DECK RUBBER
5	1	B4171/1	HORIZONTAL BEATER CANOPY LOWER
6	1	B4172/1	HORIZONTAL BEATER TOP WIPER

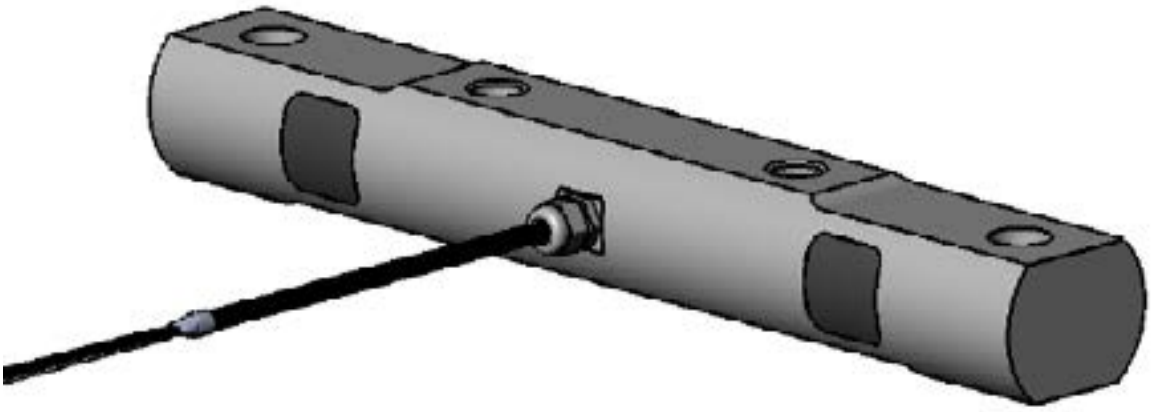
9.15 WEIGH CELL SPARES – RDS

Load cell 6.4 meter lead B9071

Load cell 12.2 meter lead B9072

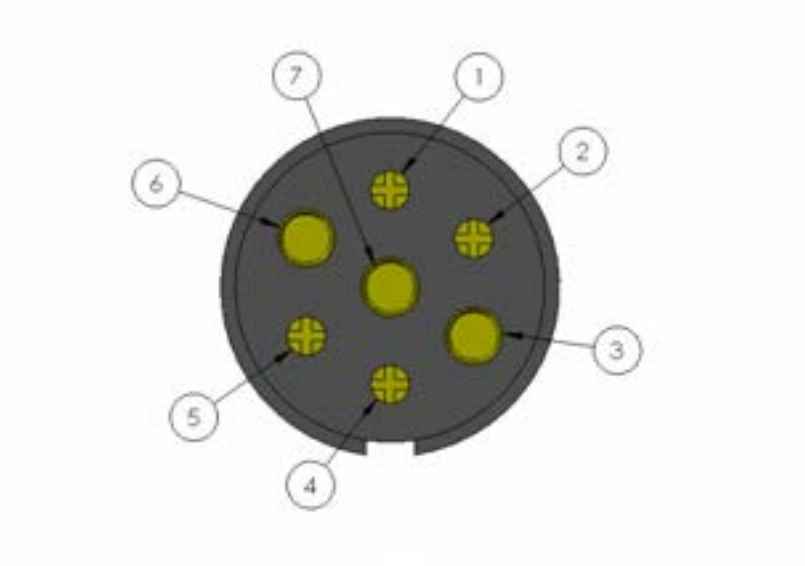
Printer unit B9073

Weigh cell kit B9070



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 / COMMERICAL PLUG

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

10.2 REAR LAMPS – 70009/3

10.3 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 operators 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 lowing the slurry door as the load decreases in height.

11.11 PTO Connection and gaurding

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)

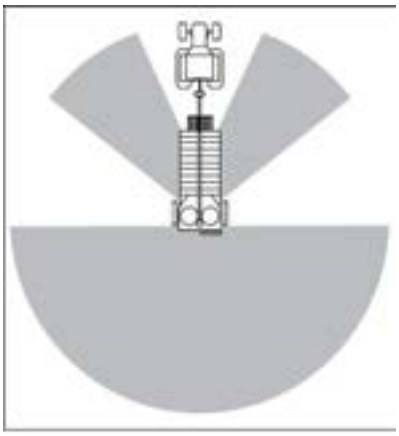
When maintaining and operating this machine make sure appropriate PPE is worn.
i.e. Overalls, gloves, safety shoes, eye and ear protection.

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 check 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 are 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 speader 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 definatley 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.

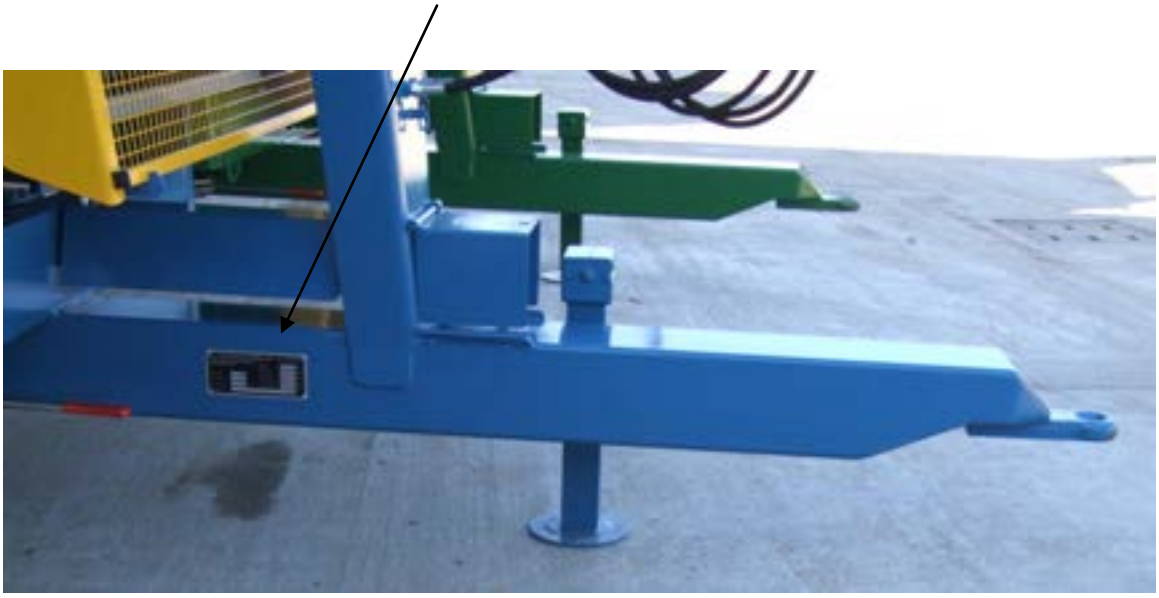
Do not let manure dry and set on fresh paint for the first 3-4 weeks. During this period it is advisable to clean the machine after use as instructed.

14. NOTES

15. IDENTIFICATION PLATE

The machine number (VIN) is required with all orders for spare parts and technical enquires. This 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

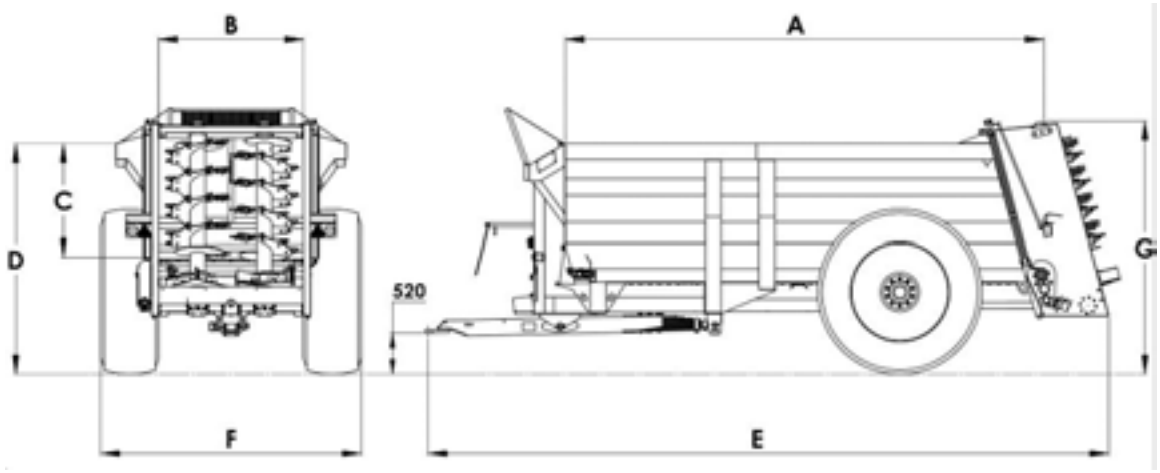
MODEL				
	150HD	**175HD**	**180**	**230**
GROSS DESIGN Kg	21750	25750	25000	31000
AXLE DESIGN Kg	18000	22000	20000	13000x2
AXLE GB Kg	10170	10170	10170	9000x2
EYE Kg	3570	3750	5000	5000
TARE WEIGHT Kg	6540	7350	7000	8000
PAYLOAD Kg	15000	17500	18000	23000
PAYLOAD + TARE Kg	21540	24850	23000	31000
AXLE SIZE	150 SQ	150SQ	150 SQ	130 SQ

Bunning tolerance +/- 2%

MODEL				
	150HD	**175HD**	**180**	**230**
Axle	SINGLE	SINGLE	SINGLE	TANDEM
Axle beam size	150mm	150mm	150mm	110mm
Carrying capcacity	15000 Kg	17500 Kg	18000 Kg	23000 Kg
Cubic meters	12 level/15 heaped	18 level/22 heaped	10 level/14 heaped	10 level/14 heaped
Extended sides	18.9m V/24.5m F	N/A	17 up to 26 heaped	17 up to 26 heaped
Body size (int.mm)	5950x1600x1295mm	5950x1600x1580mm	6050x1830x950	6050x1830x950
Floor drive	Hydraulic	Hydraulic	Hydraulic	Hydraulic
Floor speed control	Hydraulic variable speed c/w reverse			
Floor chain size	20mm	20mm	20mm	20mm
Brake size mm	406x140	420x200	406x140	400x80
Tyre size	580/70 R38	710/70 R42	580/70 R38	600/55 R22.5
Spread Mech	Twin vertical augers	Twin vertical augers	Twin vertical augers	Twin vertical augers
Spread width	Up to 20 meters	Up to 20 meters	Up to 20 meters	Up to 20 meters
PTO speed	1000 RPM	1000 RPM	1000 RPM	1000 RPM
Floor plate	5mm	5mm	5mm	5mm
Side plate	4mm	4mm	4mm	4mm

NB – Machines with extension sides or build in flares are designed for use with light materials. DO NOT EXCEED THE PLATED WEIGHTS.

17. MACHINE DIMENSIONS



MODEL	A	B	C	D	E	F	G
150HD	6000	1830	1250	2450	8560	3020	3080
175HD	6000	1830	1580	2890	8560	3280	3135
180	6000	1830	960	2150	8560	3270	3080
230	6000	1830	960	2150	8560	3350*	3080

- * 2900mm with wheels under body
- Bunning tolerance +/- 2%

FOR PROMPT 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.