Agri, LGP, Alpine, Challenger and Tandem Tankers

Operator's Manual and Parts List

WARNING

Read this instruction manual thoroughly before using your machine and follow all safety precautions.

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@MAJOREQUIPMENT

Contents

EEC certificate of conformity for machines

(conforming to Directive 2006/42/EC)

Name of Manufacturer: Major Equipment Ltd
Address: Coolnaha, Ballyhaunis, Co. Mayo, Rep of Ireland

Tel. +353949630572
Fax +353949630788

declares in sole responsibility that the product:

Machine description and function: Vacuum Tanker designed for the use of handling and spreading slurry.

Model: VACUUM TANKER

Type: _____ **Serial number:** _____

Technical file compiled by: Alex Kolchanov (c/o Major Equipment Ltd)

- **THE SUPPLY OF MACHINERY (SAFETY) REGULATIONS 2008.**
- **Construction and Use regulations 1986 (UK).**
- **EN 707: 1999 + A1: 2009.** Agricultural machinery. Slurry tankers.
- **ISO 4254-1: 2008.** AGRICULTURAL MACHINERY - safety part.
- **S.I. No. 299 of 2007**, Safety, Health and Welfare at Work (General Application) Regulations 2007 **(Ireland).**
- **Health & Safety at Work, etc. Act 1974 (c.37) (UK).**
- **Machinery Directive 2006/42**/EC.
- **EN ISO 13857** - Safety of machinery: Safety distances to prevent hazard zones being reached by upper and lower limbs.
- I**SO 12100-2: 2003** SAFETY OF MACHINERY - general principles for design.
- **ISO 14121-1: 2007** SAFETY OF MACHINERY risk assessment.
- **ISO 3767-1: 1998 + A1-2008.** Tractor and machinery for agriculture and forestry. Symbols for operator controls and other displays.

I hereby certify on behalf of Major Equipment Int. Ltd., that this machine when properly installed and operated correctly, complies with all the essential Health & Safety requirements of all legislation referred to above.

Signed: _____ Place: Coolnaha, Ballyhaunis, Co. Mayo, Rep of Ireland
Date: 12/02/2018
Name: John Murphy
Position: Managing Director

Introduction

Thank you

We appreciate having you as a customer and wish you many years of safe and satisfied use of your machine.

Safety Aspects

This manual is an important part of your machine and should remain with the machine when you buy it. Reading your operator's manual will help you and others avoid personal injury or damage to the machine. Information given in this manual will provide the operator with the safest and most effective use of the machine. Only competent and skilled persons who have fully read and understood this operator's manual are allowed to operate this machine.

Sections in your operator's manual are placed in a specific order to help you understand all the safety messages so you can operate this machine safely. You can also use this manual to answer any specific operating or servicing questions.

Your manual contains special messages to bring attention to potential safety concerns, machine damage as well as helpful operating and servicing information. Please read all the information carefully to avoid injury and machine damage. Should any questions arise regarding the information given in this booklet, please contact your local MAJOR dealer or MAJOR.

The operator is solely responsible for the safe use and maintenance of the machine. The machine must only be operated by a competent and skilled person. Setting up and adjustment must only be carried by the operator. Do not let a third party person to adjust or modify the machine in any way.

Intended Use

This machine is a tanker designed for carrying liquid such as slurry and water, it is not designed to carry drinking water. This machine can be filled & emptied by displacing or increasing the atmospheric pressure inside the tanker using a vacuum pump.
A centrifugal pump can also spread the material though a medium pressure outlet.

Product Identification

Machine Serial Numbers

If you need to contact MAJOR or your MAJOR dealer for information on servicing or spare parts, always provide the product model and serial numbers.

We suggest that you record your machine details below:

Model No: _____

Serial No: _____

Date of Purchase: _____

Dealer Name: _____

Dealer Telephone: _____

Register Your Product and Warranty Online

To register your product through the Internet, simply go to the Support section on www.major-equipment.com. Completing the information, either online or with the product warranty card, will ensure the customer that their product receives all post sales service and important product information.

The MAJOR tanker is warranted for 12 months with farmers' use, 6 months with contractors. No warranty is given where the machine is being used as a hire machine. Warranty is against faulty workmanship or parts with the exception of float balls, seals, valve tongues, valve rods and hydra pneumatic ram.

Warranty covers parts only: All parts must be returned to the manufacturer. No warranty can be considered unless parts are returned. All replacement parts will be supplied on a chargeable basis until warranty has been accepted.

Warranty on tyres: Maximum Speed for all tyres supplied on MAJOR tankers is 30kph. Exceeding this speed renders the warranty void.

Product Specification

Model	Tyre options	Capacity		OA Length	OA Width	OA Height	Wheel Arch	Weight (Kg)	
		Gallon	Litres	(Hitch to coupling ball)	(Tyre dependant)	(Add tractor hitch)		(Empty)	(Full)
1150 Slurry Vac	15 x 22.5	1150	5228	4.95m	2.31m	2.9m	N/A	2120	7347
	16.5 x 22.5	1150	5228	4.95m	2.31m	2.9m	N/A	2120	7347
	550/45/22.5	1150	5228	4.95m	2.31m	2.9m	N/A	2120	7347
	550/60/22.5	1150	5228	4.95m	2.31m	2.9m	N/A	2120	7347
	21.3 R24	1150	5228	4.95m	2.31m	2.9m	N/A	2120	7347
1500 Slurry Vac	550/60/22.5	1495	6796	5.82m	2.61m	3.0m	N/A	2400	9195
	21.3 R24	1495	6796	5.82m	2.61m	3.0m	N/A	2400	9195
1700 Slurry Vac	550/60/22.5	1685	7660	6.3m	2.61m	3.1m	N/A	2550	10209
	21.3 R24	1685	7660	6.3m	2.61m	3.1m	N/A	2550	10209
2000 Slurry Vac	560/60/22.5	2040	9274	6.4m	2.48m	3.15m	N/A	3199	12472

Model	Tyre options	Capacity		OA Length	OA Width	OA Height	Wheel Arch	Weight (Kg)	
		Gallon	Litres	(Hitch to coupling ball)	(Tyre dependant)	(Add tractor hitch)		(Empty)	(Full)
1500 LGP	23.1 R26	1485	6750	5.85m	2.65m	3.15m	YES	3520	10270
	28.1 R26	1420	6455	5.85m	2.65m	3.15m	YES	3520	9975
1700 LGP	23.1 R26	1675	6714	6.35m	2.65m	3.15m	YES	3675	11289
	28.1 R26	1610	7319	6.35m	2.65m	3.15m	YES	3675	10993
	30.5 R32	1610	7319	6.35m	2.65m	3.15m	YES	3675	10993
1900 LGP	23.1 R26	1920	8728	6.35m	2.55m	3.18m	YES	3260	12342
	28.1 R26	1920	8728	6.35m	2.65m	3.2m	YES	3486	12213
	30.5 R32	1920	8728	6.35m	2.69m	3.2m	YES	3494	12221

Model	Tyre options	Capacity		OA Length	OA Width	OA Height	Wheel Arch	Weight (Kg)	
		Gallon	Litres	(Hitch to coupling ball)	(Tyre dependant)	Hitch @ 450mm		(Empty)	(Full)
2150 ALPINE	28.1 R26	2144	9747	6.5m	2.6m	3.2m	YES	3856	13603
	29.5/75 R25	2144	9747	6.5m	2.6m	3.2m	YES	3856	13603
	30.5 R32	2144	9747	6.5m	2.6m	3.2m	YES	3856	13603
	800/60/R34	2144	9747	6.5m	2.7m	3.2m	YES	3856	13603
2300 ALPINE	28.1 R26	2340	10640	6.8m	2.6m	3.2m	YES	4130	14770
	29.5/75 R25	2340	10640	6.8m	2.6m	3.2m	YES	4130	14770
	30.5 R32	2340	10640	6.8m	2.6m	3.2m	YES	4130	14770
	800/60/R34	2340	10640	6.8m	2.7m	3.2m	YES	4130	14770
2670 ALPINE	29.5/75 R25	2670	12150	7.4m	2.6m	3.2m	YES	4300	16450
	30.5 R32	2670	12150	7.4m	2.7m	3.2m	YES	4350	16500
	800/60/R34	2670	12150	7.4m	2.7m	3.2m	YES	4350	16500

Model	Tyre options	Capacity		OA Length	OA Width	OA Height	Wheel Arch	Weight (Kg)	
		Gallon	Litres	(Hitch to coupling ball)		Hitch @ 450mm		(Empty)	(Full)
2050 LGP	28.1 R26	2050	9319	6.9m	2.6m	3.3m	YES	3882	13201
	29.5/75 R25	2050	9319	6.9m	2.6m	3.3m	YES	3882	13201
	30.5 R32	2050	9319	6.9m	2.6m	3.3m	YES	3882	13201
	800/60/R34	2050	9319	6.9m	2.6m	3.3m	YES	3882	13201
2200 LGP	550/60/22.5	2208	10036	6.9m	2.4m	3.2m	N/A	4050	14086
2250 LGP	28.1 R26	2250	10228	6.5m	2.6m	3.4m	YES	3920	13630
	29.5/75 R25	2250	10228	6.5m	2.6m	3.4m	YES	3920	13630
	30.5 R32	2250	10228	6.5m	2.6m	3.4m	YES	3920	13630
	800/60/R34	2250	10228	6.5m	2.6m	3.4m	YES	3920	13630
2400 LGP	28.1 R26	2400	10910	6.9m	2.6m	3.4m	YES	4250	15160
	29.5/75 R25	2400	10910	6.9m	2.6m	3.4m	YES	4250	15160
	30.5 R32	2400	10910	6.9m	2.6m	3.4m	YES	4250	15160
	800/60/R34	2400	10910	6.9m	2.6m	3.4m	YES	4250	15160
2600LGP	29.5/75 R25	2600	11819	7.0m	2.6m	3.4m	YES	4350	16169
	30.5 R32	2600	11819	7.0m	2.6m	3.4m	YES	4350	16169
	800/60/R34	2600	11819	7.0m	2.7m	3.4m	YES	4350	16169
2800LGP	29.5/75 R25	2800	12712	7.3m	2.6m	3.4m	YES	4550	16369
	30.5 R32	2800	12712	7.3m	2.6m	3.4m	YES	4550	16369
	800/60/R34	2800	12712	7.3m	2.7m	3.4m	YES	4550	16369
3100 LGP	29.5/75 R25	3100	14092	8.1m	2.6m	3.5m	YES	4650	18742
	800/60/R34	3100	14092	8.1m	2.7m	3.5m	YES	4650	18742

Model	Tyre options	Capacity	OA Length	OA Width	OA Height	Recessed wheel	Weight	
			(Hitch to coupling ball)	(Tyre dependant)	(Add tractor hitch)		(Empty)	(Full)
2000 Gallon Tandem	425/65-22.5	9647	7.0	2.35	3.20	No	4350	13997
	550/60-22.5	9647	7.0	2.45	3.25	No		
	560/60-22.5	9647	7.0	2.46	3.25	No		
2500 Gallon Tandem	425/65-22.5	11296	7.1	2.35	3.35	No	4450	15746
	550/60-22.5	11296	7.1	2.45	3.40	No		
	560/60-22.5	11296	7.1	2.46	3.40	No		
3000 Gallon Tandem	550/60-22.5 (Steering axle)	13658	7.7	2.66	3.40	YES	4700	18358
	560/60-22.5 (Steering axle)	13658	7.7	2.68	3.40	YES		
	750/45-22.5 (Steering axle)	13500	7.7	2.87	3.40	YES		
3500 Gallon Tandem	550/60-22.5 (Steering axle)	16257	8.65	2.66	3.42	YES	5020	21277
	560/60-22.5 (Steering axle)	16257	8.65	2.68	3.44	YES		
	750/45-22.5 (Steering axle)	16130	8.65	2.87	3.44	YES		
4000 Gallon Tandem	550/60-22.5 (Steering axle)	18513	9.35	2.66	3.42	YES	5600	24113
	560/60-22.5 (Steering axle)	18513	9.35	2.68	3.44	YES		
	750/45-22.5 (Steering axle)	18386	9.35	2.87	3.44	YES		

Model	**3500C**
Capacity	3500 Gallons
	15911 Litres
OA Length (Hitch to coupling ball)	8.06m
OA Width (Tyre dependant)	2.64m
OA Height (Add tractor hitch)	3.6m
Weight (Empty)	7600Kg
Weight (Full)	22300Kg

Safety

The operator's manual also explains any potential safety hazards whenever necessary in special safety messages that are identified with the word, CAUTION, and the safety-alert symbol.

Machine Safety Labels

The machine safety labels shown in this section are placed in important areas on your machine to draw attention to potential safety hazards.

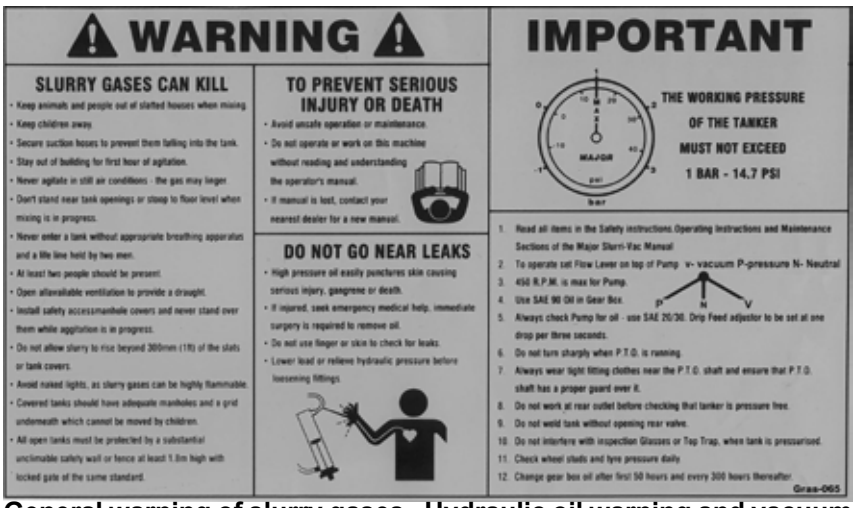
On your machine safety labels, the words DANGER, WARNING, and CAUTION are used with a safety-alert symbol. DANGER identifies the most serious hazards.

To avoid injury, read the manual

Max tractor input PTO speed

Max speed 30 km/h

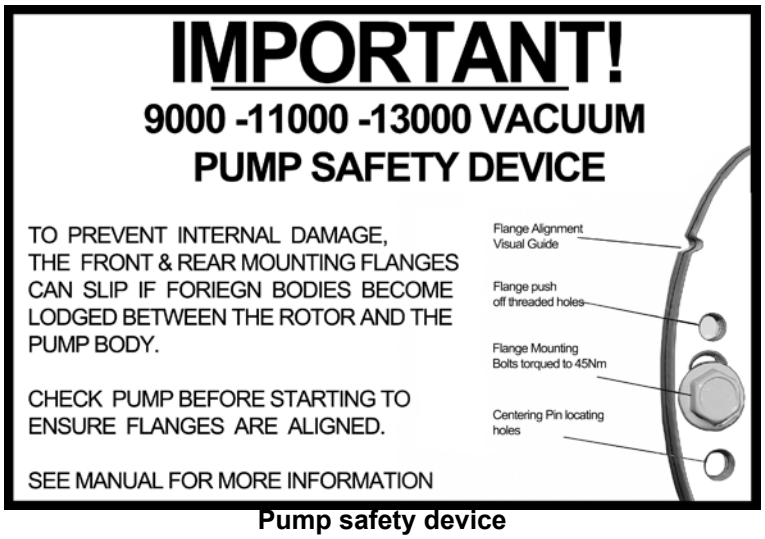
PTO Shaft Warning



General warning of slurry gases. Hydraulic oil warning and vacuum pump operations label

Check wheel nuts daily

Noise hazard



Pump safety device

General precautions while using vacuum tankers

The following rules summarise a practical approach to disposal of slurry from tanks (slurry models):

- When filling/emptying tanker make sure that the area is well ventilated.
- Work in conjunction with a second adult person - preferably keeping a watch from outside the house if you have to enter to move the tanker etc.
- Avoid vigorous agitation in confined spaces and do not allow slurry to rise within 300mm of the slats or covers.
- Drowning is the most common cause of death involving slurry, if slats are removed, cover exposed areas of the tank beside the pump to avoid falling in.
- Keep children safely away from the work site. Animals should be moved out of the shed before starting work.
- Never enter an underground tank without an independent air supply and lifeline attached.
- Avoid smoking and do not use naked flames as slurry gases are highly flammable.
- Beware of the risk of back injury if you need to lift slats in the shed.

The most effective defence against the slurry gas threat is common sense and following the rules above because it is fair to assume that gas is present in all cases.

Danger! Slurry gases can kill

Hazards associated with operating Vacuum Tankers

Gas Hazards (Slurry models)
Filling the tanker and spreading slurry releases gases into the atmosphere. The gases present include methane, carbon dioxide, ammonia and hydrogen sulphide. All these gases are unpleasant, however hydrogen sulphide is extremely poisonous both to people and animals. It affects the nervous system causing symptoms which range from discomfort to sudden death.

Crush Hazard
Bystanders can be injured when machine is towed. Keep clear of machine when moving it.

Pinch Hazard
Pinch points are created when two objects move together, with at least one of them moving in a circle. Ensure all guarding is present.

Wrap Hazard
Any exposed, rotating machine component is a potential wrap point. Injuries usually occur when loose clothing or long hair catch on and wrap around rotating parts such as PTO shafts or Drive shafts on the machine. Ensure all guarding is present.

Thrown objects Hazard
Vacuum Tankers expel liquid at force, note that stones & other items may be in the water and slurry mix. Ensure that output nozzle is not directed at persons.

Hydraulic Hazard
Hydraulic systems store considerable energy,. Careless servicing, adjustment, or replacement of parts can result in serious injury. High pressure blasts of hydraulic oil can injure eyes or other body parts. The following precautions are crucial:
• Make certain the pump is turned off.
• Lower attached equipment to the ground.
• Confirm that load pressure is off the system.
A pinhole leak in an hydraulic hose is a serious hazard. A leak may not be visible, and the only sign may be a few drops of fluid. Never inspect hydraulic hoses with your hands, because a fine jet of hydraulic fluid can pierce the skin.

Noise Hazard
Please note that the machine is normally used outdoors and that the position of the operator is seated in the driving seat of the tractor. It is advisable to consult the prescriptions listed in tractor operator and maintenance manuals.
The acoustic pressure was measured at a distance of 2.6m from the centre of the machine and at a height of 2.0m, with the implement operating in a no load condition - 90 dBA. In a loaded condition & a PTO rate of 540 rpm the obtained value was 97dBA.

Slips trips and falls Hazard
Slips and falls often result from:
1. Slippery footing on the ground
2. Cluttered steps and work platforms.
The potential for slips and falls can be greatly reduced by using good judgement and practicing good housekeeping on and around equipment.

Operating Safely

In the Common Market countries, the installation must comply with directive 2006/42/CE and subsequent modifications, while in the other countries it must comply with the safety regulations of the country.

List of Dangers Associated with Operating the Pump
This Rotary blades vacuum pump has been designed to create a vacuum or pressure inside a tank connected to it.

Under no circumstances must liquids, dust or any kind of solid matter enter the Rotary blades vacuum pump because they could cause it to break. Therefore it is necessary to equip the system with safety valves.

The use of the Rotary blades vacuum pump for any purpose other than that specified above is absolutely forbidden, not provided for by the manufacturer and therefore highly dangerous. Do not use the Rotary blades vacuum pump to handle flammable and/or explosive liquids and materials or for materials that give off flammable gasses. Read This Manual Before Using The Suction Unit/Compressor Do not use the rotary blades vacuum pump in a potentially explosive atmosphere. Never remove the guards fitted on the Rotary blades vacuum pump and always check their efficiency every time the machine is used. Any work on the machine must be carried out while it is not running.

- Failure to comply with the instructions given in this manual may lead to the following dangers:
- Danger of being crushed by the Rotary blades vacuum pump mass during handling and transport;
- Danger of getting entangled in the shaft transmission parts if the necessary guards are removed;
- Heat dangers due to the temperatures that can be reached by the Rotary blades vacuum pump;
- Acoustic danger due to the noise generated and to failure to use personal means of protection;
- Danger to operator's hands during testing with suction and delivery tubes detached from the pump;
- Danger of abrasion from the shaft of the hydraulic pump support if the Rotary blades vacuum pump is operated with the hydraulic pump removed;
- Danger of projection of fluid and solid materials owing to an heavy breakage of the Rotary blades vacuum pump.
- Danger of asphyxiation due to methane gases
- Danger of projection of liquid or gas through partially blocked gate valves
- Danger of projection of hydraulic oil through faulty fittings or damaged hose

Users should become thoroughly familiar with the contents of this manual before using, servicing and mounting the implement to the tractor and all other pertinent operations. Never wear jewellery, loose clothing such as ties, scarves, belts, unbuttoned jackets or dungarees with open zips which could become caught up in moving parts.

Always wear approved garments complying with accident prevention provisions such as non-slip shoes, ear muffs, goggles and gauntlets. Wear a jacket with reflecting stickers if the implement is used near public highways.

Consult your retailer, the Labour Health Service or your nearest equivalent authority for the information about the current safety provisions and specific regulations with in order to ensure personal safety.

ALWAYS DISENGAGE PTO, SWITCH OFF THE TRACTOR ENGINE AND ENGAGE THE PARKING BRAKE BEFORE MAKING ADJUSTMENT TO THE MACHINE.

NEVER PLACE LIMBS NEAR TURNING COMPONENTS OF THE MACHINE. MOVING PARTS CAN REMAIN TURNING FOR UP TO 1 MINUTE AFTER DISENGAGING PTO.

Workstation

The operator must remain seated while working the machine. Always ensure the PTO has been turned off and the parking brake applied before leaving the tractor cab. The operator must always apply the parking brake, and turn off the engine before leaving machine or carrying out maintenance.

NEVER OPERATE THE HYDRAULICS WITH THE TRACTOR SWITCHED OFF

Regulations for use of the transmission

The transmission to the gearboxes is protected throughout the machine by both PTO shafts and bolt down covers. All guarding should be kept efficient and in good condition. If the condition is poor, the guarding should be renewed before the implement is used.

UNLESS IT IS CORRECTLY PROTECTED THE TRANSMISSION COULD CAUSE DEATH SINCE IT CAN CATCH ON PARTS OF THE BODY OR CLOTHING

Ensure retaining chains are correctly anchored on all PTO shafts, preventing them form turning. Ensure drive line can turn easily within the shield. Keep spline grooves clean and greased so that PTO shaft can connect easily. Besides being described in this manual, the method by which the PTO shaft is connected to the tractor must be checked out with the instructions in the tractor manufacturer's manual.

PTO Shaft Safety

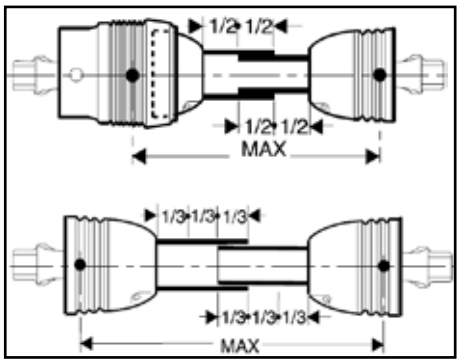
MAX PTO INPUT 540 R.P.M. Contact your nearest dealer or a specialised retail outlet if the PTO must be replaced with a longer one, since this must belong to the same power category and possess the same characteristics. An unsuitable PTO could easily break.

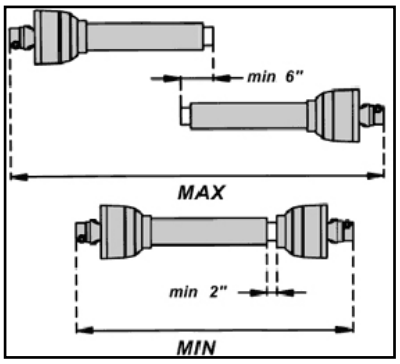
The tractor PTO shaft length may be altered to suit the individual tractor model. When the machine is in operation, the PTO shaft should have a minimum 1/3 engagement as shown in the diagrams. After the machine has been hitched to the tractor, it should be checked in various positions that the drive line is the correct length. If the PTO is too short and tends to slip out of place, it must be replaced with a longer one.

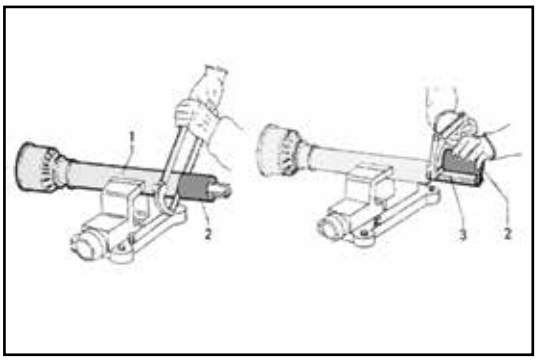
If the PTO shaft is too long, it should be shortened in the following way:

- Set the machine at a minimum distance from the tractor, then brake the tractor and switch off the engine.
- Separate the two halves of the PTO. Insert the female part into the tractor PTO and the male part into the machine PTO, checking that the position is correct by means of the fixing pins.
- Line up the two halves of the PTO together, keeping them parallel.
- Using a felt tip pen, match mark the place where the two halves must be shortened as shown.
- First cut shield "1" and use part "2" as a reference to cut the splined shaft.
- Proceed in the same way for the second half.
- Trim and chamfer the two cut ends of the PTO and clean off all swarf and shavings.
- Grease the two profiles and join the two halves of the PTO together.
- Mount the PTO shaft and check that its length is correct as before.

Do not use the shaft cone as a step







Driving Safely on Public Roads

When driving on public roads, always comply with the Highway Code provisions in force in the country where the machine is being used. Pay particular attention near crossroads, underpasses, level crossings, when meeting other vehicles, overtaking stationary or slower vehicles. Drive near the edge of the road and try not to hold up the traffic.

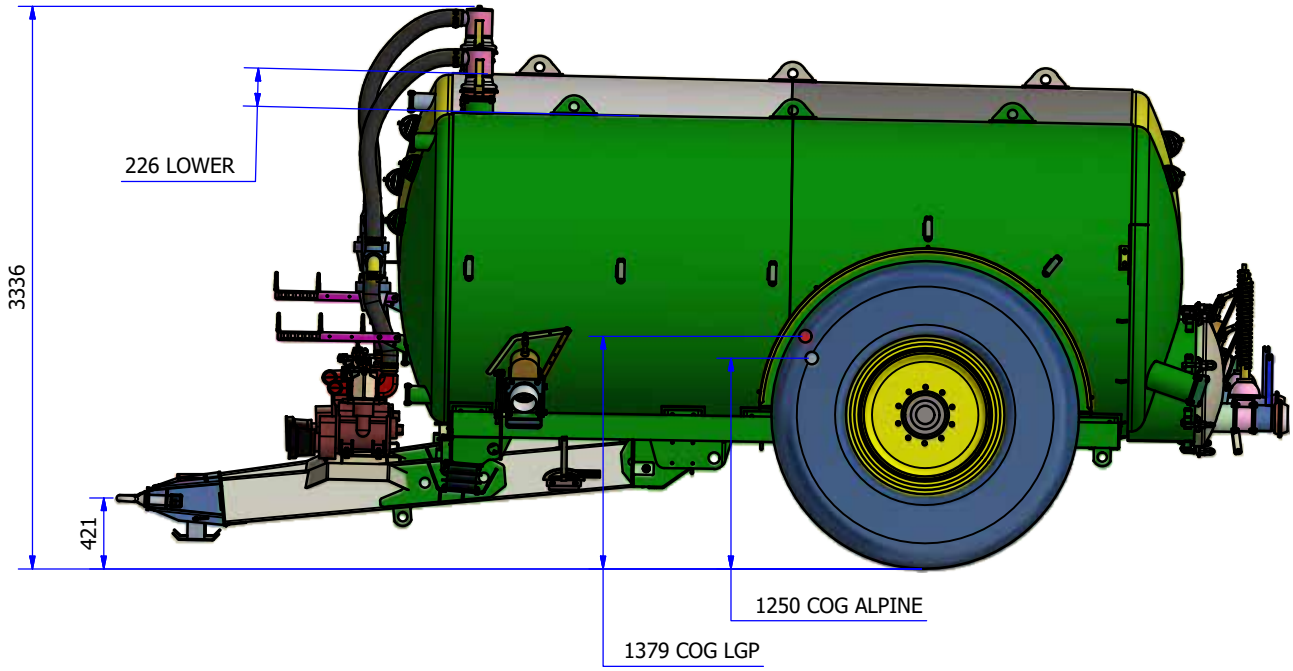
Never park the tractor and/or implement near crossroads, bends, level crossings or where the equipment could be a danger or obstruction to pedestrian traffic. Never drive on public highways when the implement or tractor are particularly dirty since soil, grass and other items could drop on to the road and obstruct the normal road traffic. Disengage the PTO and disconnect the driveline when transporting the implement.

MAXIMUM TRANSPORT SPEED MUST NOT EXCEED 30 km/hr (18 MPH).

Operating conditions

While operating the machine on hilly or sloping ground extra precautions must by taken by the operator as the fluid moves inside the tanker. It is important to remember that the centre of gravity of the machine changes. Wet ground may also affect tanker stability.

It is advisable to drive up and down the slope as oppose to across the slope. Alpine tankers models have a centre of gravity lowered by at least 100mm (depending on the model) compared to a standard LGP tanker. Therefore the Alpine tankers are more suitable to operations on hilly ground.

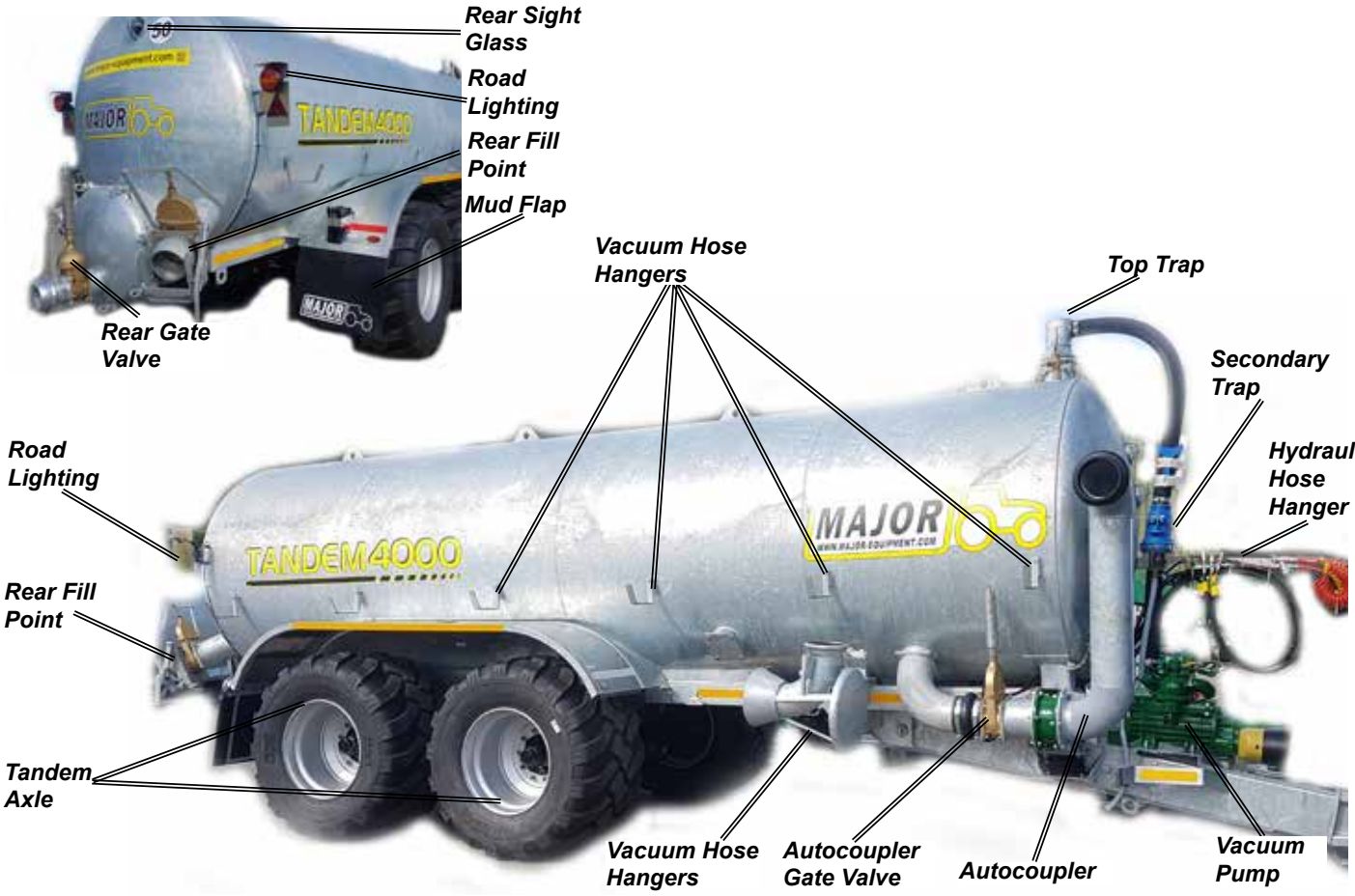


Tanker Balance

All tankers supplied with or without attachments are balanced ex-factory. Adding any attachments after supply e.g. Injector, Trailing shoe, Dribble bar would require a counter balance to be applied to the drawbar.
If not done correctly it can result in premature wear of the hitch on the tanker.

Operating the Machine

Key to Main Parts



Hitching to the Tractor

1. The MAJOR tank chassis hitch point is designed for both pick up hold and drawbar.
2. Attach the tanker hydraulic hose to tractor hydraulic circuit.
3. Attach the hoses (Labelled) to the appropriate circuit.
4. Connect PTO shaft for Vacuum Pump

Operating the Machine

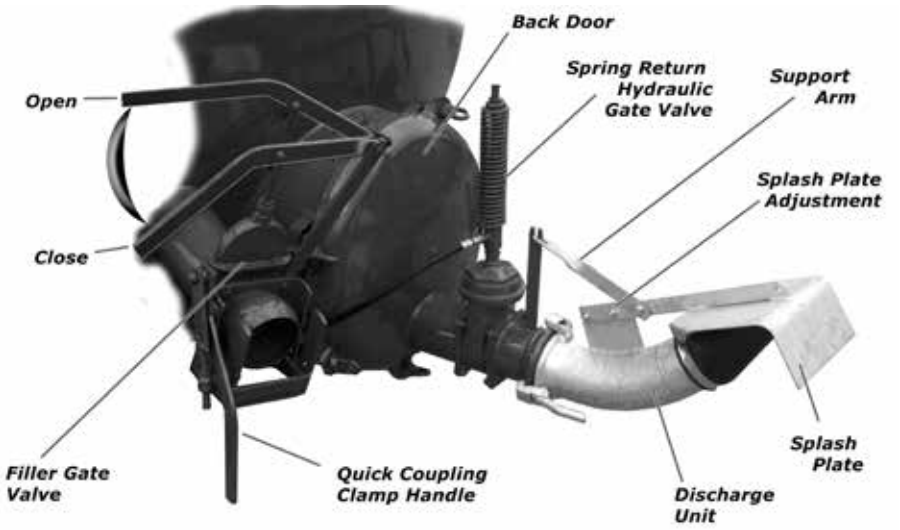
Filling operation
1. Read all items of sections Safety instructions and Maintenance.
2. Attach the filling hose to the quick fill assembly.
3. Ensure the rear valve is open by using the manual operating handle.
4. The suction fill pipe must be completely submersed into the slurry or water (model dependent) before operation.
5. Set the pump oil drip feed to 1 drop every 3 seconds.
6. Place the pump operating lever in the suction position as shown in figure 4.
7. Engage the PTO at low r.p.m and allow to build to 350 r.p.m.
8. Watch for the appearance of the liquid (slurry or water) in the sight glass at the front of the tank when this occurs, shut the inlet valve gate valve.
9. Move the pump operation lever to neutral position.
10. Remove the suction fill pipe.

Emptying operation
1. When arrived at the point of spreading, place the pump to pressure position (opposite the suction position)
2. Open the gate valve on the tanker via the Hydraulic control. Engage the PTO at a low r.p.m., approximately 350 r.p.m., and while at the same time moving forward.

Slurry models:

3. From the manufacturer's extensive filed testing, it has been found that the lightest and heaviest spread of slurry is obtained by:

a) Lightest: Place the distribution plate (see below) in the 90 degree position to the ground surface to obtain the widest throw of slurry possible with fast forward speed.
b) Heaviest: Place the distribution plate in a 150 degree position (sloped back) with a slow forward speed.



Operating the Vacuum Pump

The Rotary blades vacuum pump does not have a start button. Therefore to start it just transmit the motion to the power take-off (P.T.O.). The way this is done depends on the version of Rotary blades vacuum pump. Before starting make sure that the rotary blades vacuum pump is supplied with oil for internal lubrication and lubrication of gearbox.

NOTE: Before starting the rotary blades vacuum pump, make sure that the guards on all the moving parts are in place and efficient. Any damaged or missing components must be replaced and installed correctly before using the transmission. Clean and grease the power take off before to install the cardan transmission.

Do not use the Rotary blades vacuum pump at pressures, temperatures, times higher than those indicated in Table 6. During use do not exceed the speed and power limits set in this manual. Do not overload the machine or suddenly engage the P.T.O.

Parameter	Working Rate	Maximum Rate
Revs M, K PTO	450-500 rpm	600
Revs P, D, H Hydraulic and pulley	1000 rpm	1200
Pressure	0.5 - 1 Bar	1.5 bar
Vacuum	80%	95%
Outside temperature side cylinder compression	80 - 90 Degrees C	130 Degrees C
Time	3 - 5 min	6 - 8 min
Working time with long life blades	6 - 8 min	15 min
Working time ballast version –0.65 bar	continuous	continuous

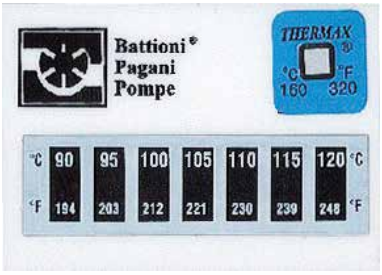
NOTE: Failure to comply with the instructions given in this manual may be dangerous for the user health or may damage the rotary blades vacuum pump. If density of material to suck is high, dilute or mix the material same. The working time should be such that the maximum temperature is never reached. Prolonged operation without interruption may cause damage to the blades as well as overheating.

To stop the rotary blades vacuum pump, stop the engine and disconnect the P.T.O. in order to prevent accidental operation of it.

Controls: A handle, located at the top of the manifold, is provided for the control of intake and compression phases. This can be operated manually. To state in wich direction the handle ha sto be turned to select suction or compression phase, follow the instructions given by the manufacturer of the installation. If the reverse gear locks up, use a lever to lift the handle.

NOTE: Selection of the intake or compression phase with the handle must be made with the Rotary blades vacuum pump not operating.

Temperature Indicator: Thermo Tape is affixed on the compression side of all MEC 9000-11000-13500 versions. This temperature indicator provides two temperature readouts:



- The reversible scale at the bottom changes colour (from black to blue) at a specific temperature (90 ° C to 120 ° C). The scale is provided to help the user prevent the pump from overheating.
- A blue square with a white dot at the centre (a non-reversible indicator) is located at the upper right on the scale. If the dot turns black, the temperature has exceeded 160 ° C, which means the pump has been used for more than 15 minutes at its maximum vacuum level (which is an incorrect use). If this occurs, the pump must be disassembled and all the seals, oil seals and blades must be replaced.

Protective Devices:

NOTE: The Rotary blades vacuum pump, when being installed on a machine, must be equipped with a protective device to isolate the moving parts and prevent access to them by the operators. It is necessary to protect the Rotary blades vacuum pump to avoid the remote danger of material projection in case of heavy breakage. PTO powered vacuum pumps are equipped with a CE plastic protective device. It insulates and protects the operator from the P.T.O. shaft during operation.

Pressure

Pressure under operating conditions should be kept within the range of 0.5-1 bar to avoid overheating the Vacuum pump or breaking the blade (Vanes). However do not exceed a pressure of 1.5 bar.

P
Pressurise Tank for spreading

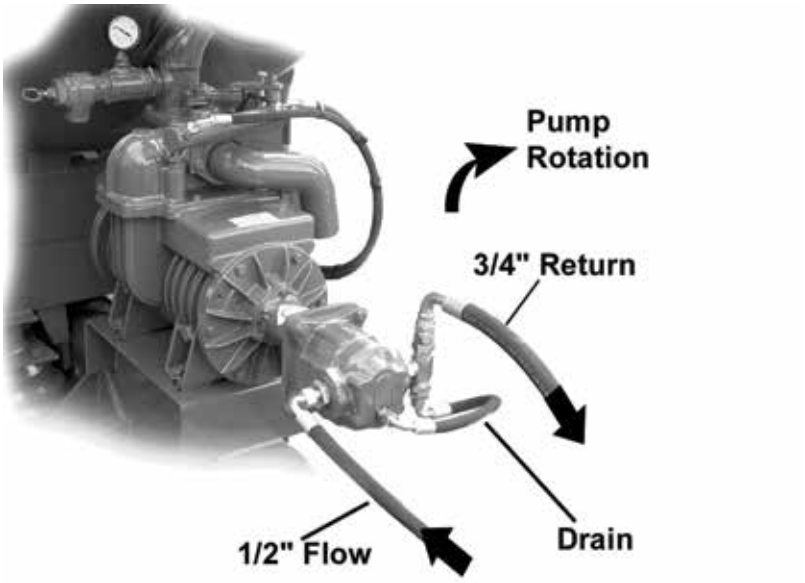
N
Neutral position allows tank to vent. Should be in this position if using Garda Pump

V
Vacuum tank for filling

Hydraulic Powered vacuum pump

The following procedure must be followed before use. Failure to do so will result in oil seal failure in the hydraulic driven pump.

- The main feed to the pump must never exceed ½" bore and enter the hydraulic pump on the smallest port.
- The return flow should have a ¾" minimum bore from the largest port and be allowed a free flow return into the gearbox if the tractor (usually by making an adaptor where the oil plug is) not by going through any valve block system. Contact your tractor dealer or manufacturer for further details if you are uncertain of free flow return line.
- Any backpressure will result in seal failure, such as using small bore tubing or allowing return pipe to foul, restricting oil flow.
- Never alternate hydraulic pipes. The motor will only drive in one direction.
- It is normal for the motor to reduce in speed as the tanker reaches full pressure or full vacuum.
- Change oil in tractor regularly with oil and change filters regularly.
- Always when travelling on public roads place tanker in "vacuum mode".
- Never bring hydraulic pipes into tractor cab or where it could be a danger to the driver.
- In the event of a failure, contact your dealer. Do not attempt to repair oil pump, but first establish whether the fault is the hydraulic pump or the compressor.



Hydraulic Motor

Hydraulic Motor	Rotary blades vacuum pump	Flow Rate	Rpm	Pressure	Max pressure hydraulic system	Transmitted power	Torque
KM 30.51-SO	MEC 8000/H	74.8 l/min	1400	218 bar	230 bar	22.5 kW	158 Nm
	MEC 9000					30 kW	
KM40.87-SO	MEC 11000	125 l/min		186 bar	280 bar	32 kW	211 Nm
	MEC 13500	125 l/min		198 bar		34 kW	240 Nm

Blow Off Valve Adjustment

Check blow off valve is set at 0.7 bar. Below are two types used.

- Slacken Locking Collar 'A'
- Adjust threaded part 'B' until a steady 0.7 bar is achieved on the clock pump is pressurising tanker.
- Tighten Locking Collar.

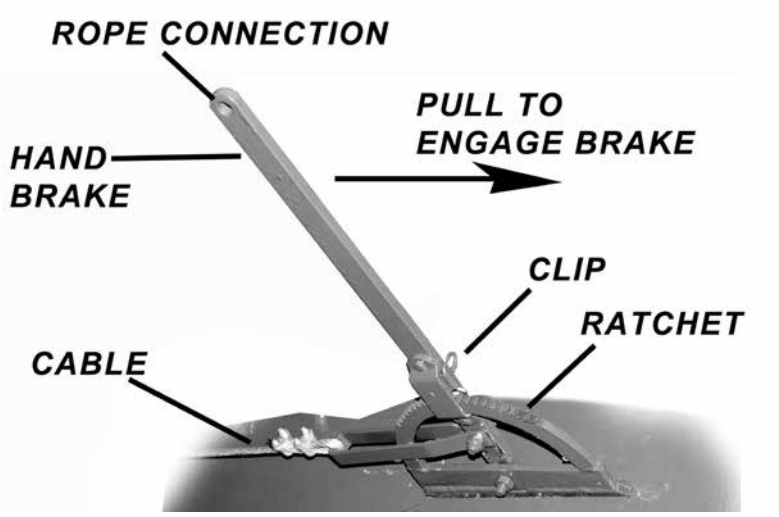
- Slacken Locking screw 'A'
- Adjust threaded stem 'B' until a steady 0.7 bar is achieved on the clock while pump is pressurising tanker
- Tighten Locking screw

Emergency Breakaway Handle

The emergency breakaway handbrake should be connected to the tractor every time the tank is being used. It should be done using the rope provided. The rope should be attached to a solid party of the tractor like the top pin and not to a panel on the tractor. The rope should be tight enough so it will work effectively if the tanker became detached from the tractor but loose enough that the handbrake has not bee applied during normal operation.

Disengaging the emergency breakaway handbrake by following the steps below:

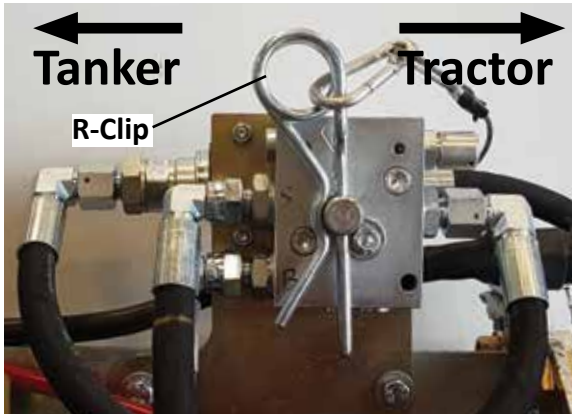
1. Make sure the clip in front of the ratchet is facing forward or turned towards the pump on the tanker. If the clip is turned away from the pump the ratchet mechanism will not release.
2. Push the handle toward the tanker so the ratchet becomes tight against the teeth that hold it in place.
3. Pull the handle away from the tanker so the ratchet will disconnect itself from the teeth.
4. Push the handle back to its original off position.

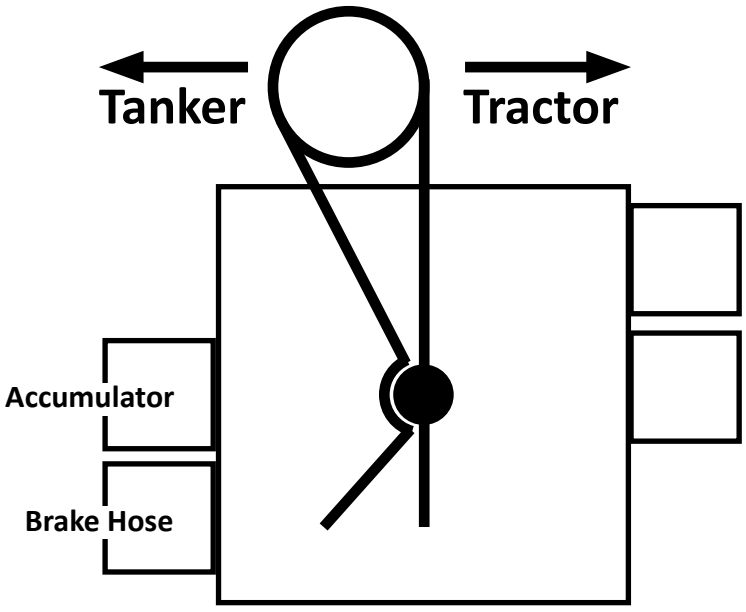


It is important to check that the handbrake is fully released when the tanker is in use. If the brake is left half applied it will cause damage to the brakes on the tanker.

Automatic Emergency Brake

To disconnect the tanker rotate the R-clip forwards and backwards 5-7 times until all oil from the accumulator returns to the tractor.
Before disconnecting the tanker, ensure that R-clip is positioned as shown on the diagram.
When reconnected, depress the brake pedal fully for approximately 20 seconds to recharge the accumulator.

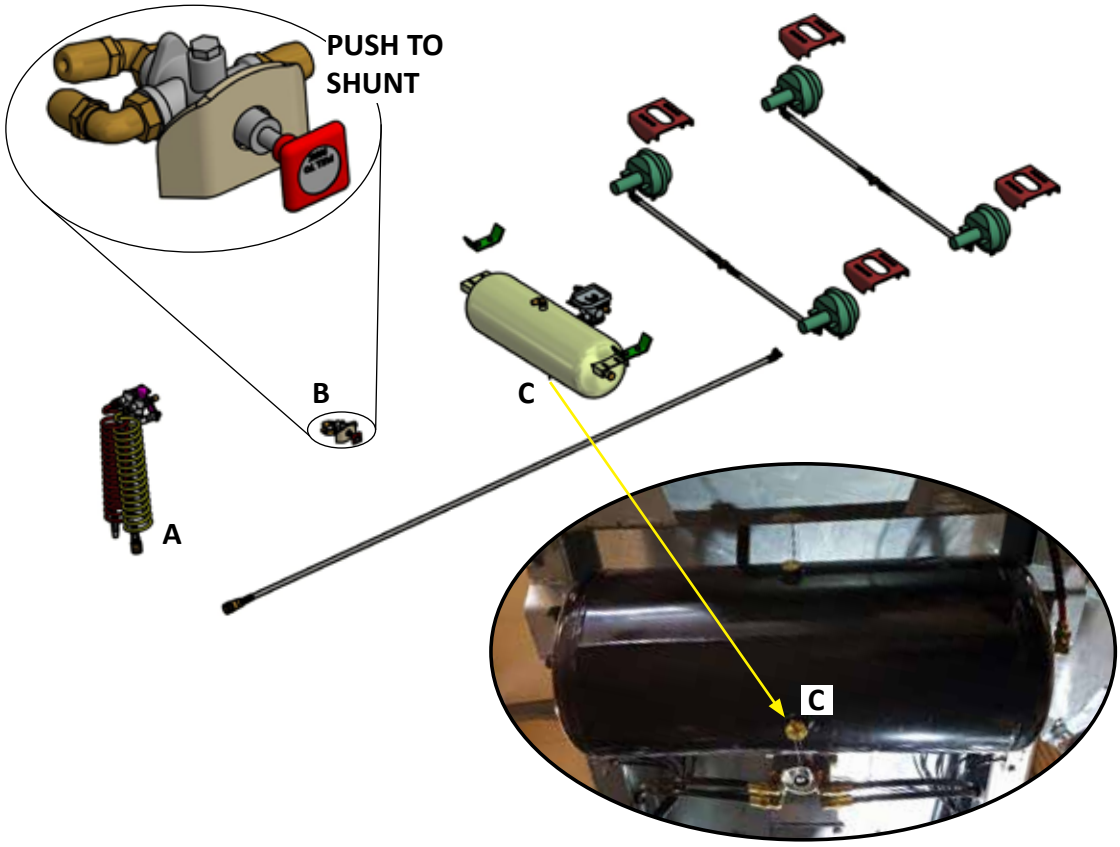




Esure that the wire rope from the R-Clip is connected to the brakes hydraulic hose

Hydraulic/Air brakes setup (if applicable)
If a tanker is equipped with a single line air brakes system and you wish to use hydraulic brakes only the following must be carried out:

1. Disconnect both air hoses **(A)** (yellow and red).
2. Press the Shunt Valve button **(B)**. Repeat push/pull 3-4 times.
3. Pull the cord **(C)** at the bottom of the air tank to release any leftover air.
4. Ensure that air is out of the system.

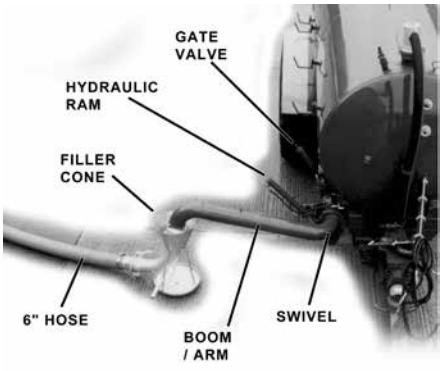


6” Autocoupler

The Auto Coupler hydraulic circuit incorporates a hydraulic pressure valve, which is pre-set, by the manufacturer prior to the tankers dispatch. Altering the valve can increase the sealing pressure. An incorrectly set valve can damage the machine.

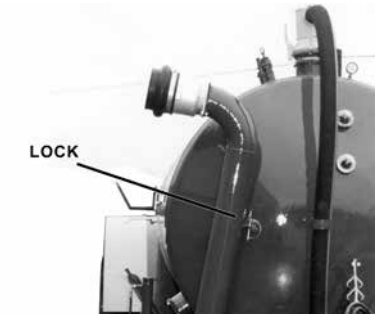
Filling operation (Single spool- Vacuum pump & Coupler on same circuit)

1. Start the vacuum pump.
2. With the funnel in place and the flexible pipe in the liquid storage tank
3. Lower the Autofill boom into the funnel. Keep spool depressed until Vacuum Pump changeover automatically changes to Vacuum.
4. Open the gate valve on the boom using separate Spool control
5. When the tank is full, close the gate valve, stop the PTO and raise the boom into the transport position. Keep spool depressed until Vacuum Pump automatically changes to pressure.



Filling operation (Two spools - Vacuum pump & Coupler on separate circuits)

1. Start the vacuum pump.
2. With the funnel in place and the flexible pipe in the liquid storage tank
3. Lower the Autofill boom into the filler cone.
4. Using separate spool, change vacuum pump controls to Vacuum
5. Open the gate valve on the boom using separate spool.
6. When the tank is full, close the gate valve, stop the PTO and raise the boom into the transport position & change vacuum pump to pressure position.

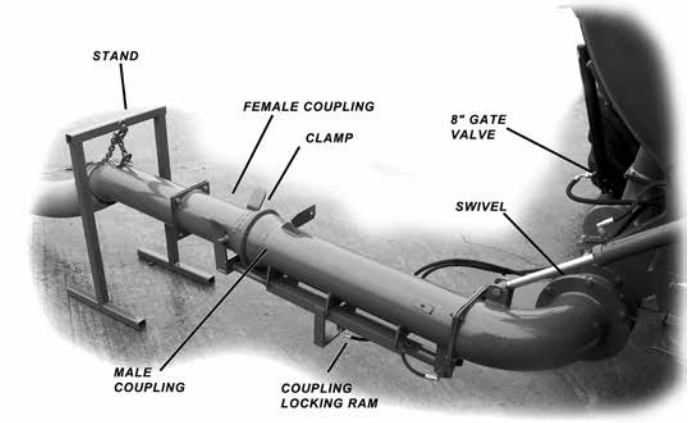


8” Autocoupler

The Auto Coupler hydraulic circuit incorporates a hydraulic pressure valve, which is pre-set, by the manufacturer prior to the tankers dispatch. Altering the valve can increase the sealing pressure.
An incorrectly set valve can damage the machine.

Operation

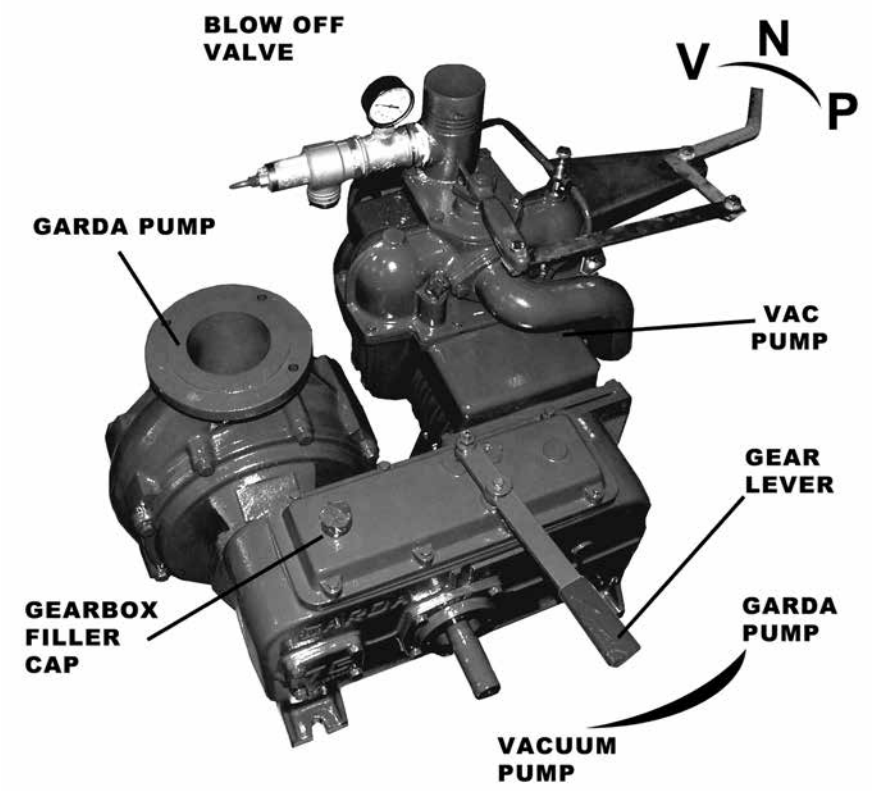
1. Set the female coupling at a suitable height.
2. Lower the male coupler & clamp female in position.
3. Set Vacuum pump at Pressure or Vacuum to empty or fill tanker.
4. Open the 8” gate valve on the boom. & close when operation is complete.
5. Disengage clamp & lift arm into transport position.



Ensure boom is locked in transport position when not in use.

Garda Pump

Do not select gear lever from the vacuum pump to the centrifugal pump while the tractor PTO is rotating or gears could be damaged.



P = Pressurise Tank for spreading
N = Neutral position allows tank to vent. Should be in this position if using Garda Pump
V = Vacuum tank for filling

To fill tank.
1. Turn gear lever towards the left to select the vacuum pump.
2. Turn the handle of the Vacuum pump towards the left to select the Vacuum stage.
3. Activate tractor PTO.

To Empty tank. (i.e. spreading slurry)
1. Turn gear lever towards the left to select the vacuum pump.
2. Turn the gear lever towards the right to select the pressure stage.
3. Activate tractor PTO.

To Operate Jetter / Road Blaster.
1. Turn the gear lever of the) towards the right to select the centrifugal pump.
2. Put the handle of the vacuum pump (A) to the neutral (Centre) position. This ensures that unwanted decompression is not experienced by the tanker.

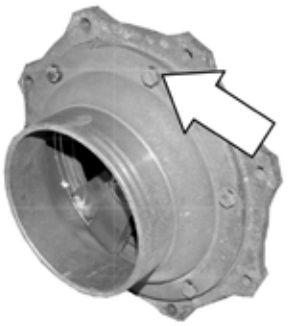
Centrifugal pump

Operating time: Maximum advisable working time should not exceed 30 minutes to avoid overheating the gearbox.

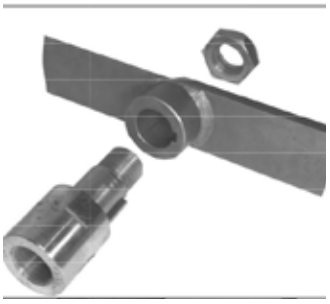
Pressure: Operating pressure should be kept at approx. 5 bar to avoid overheating of the centrifugal pump. However never exceed a pressure of 6 bar.
Absorbed Power: It is necessary to operate the garda pump with a power of approx. 70 kW (94hp). Never apply greater power than 80 kW (107hp) to the PTO to avoid damaging the gearbox.

In frosty weather the centrifugal pump and slurry hoses must be drained of all liquids to avoid damage to the equipment.

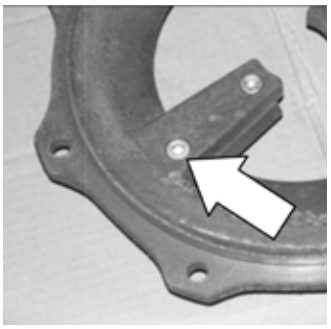
Chopper Blade Detail



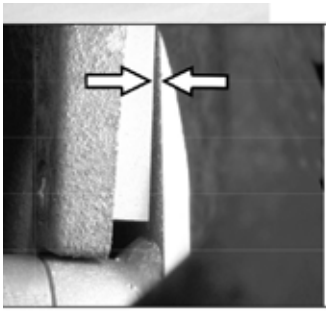
To access the chopper blade, remove inner ring of bolts and remove housing (G88) first



Remove the chopper blade as shown. Remove hex nut (G37). The chopper blade (G89) pulls of the keyed shaft (G92)

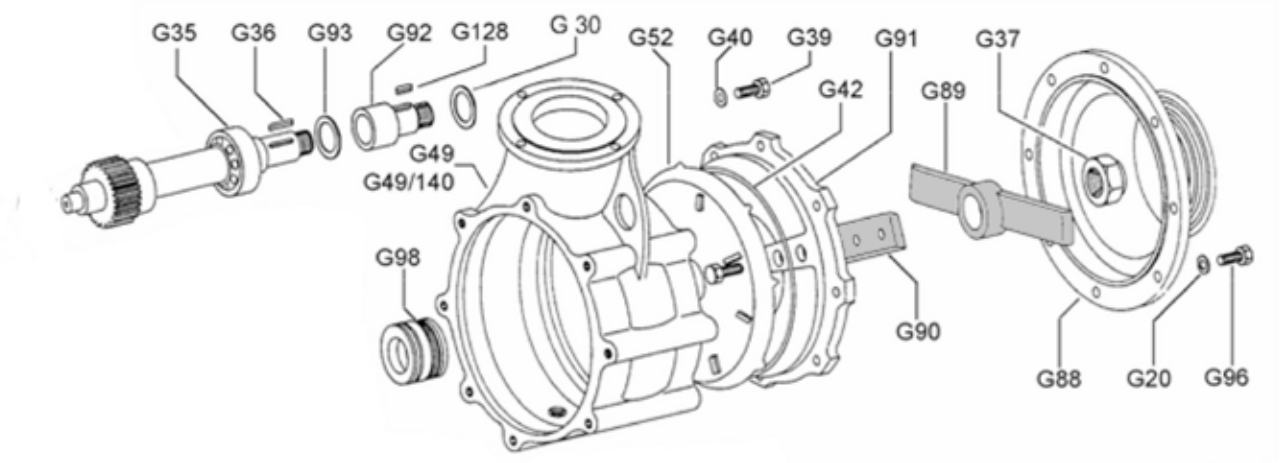


Remove outer housing (G91) to gain access to countersunk bolts to remove couter blades (G90)



Note: The blade gap of 2.5 - 3mm when assembled

CHOPPER DETAIL



Operating the Rain Gun

Follow the following instructions carefully.

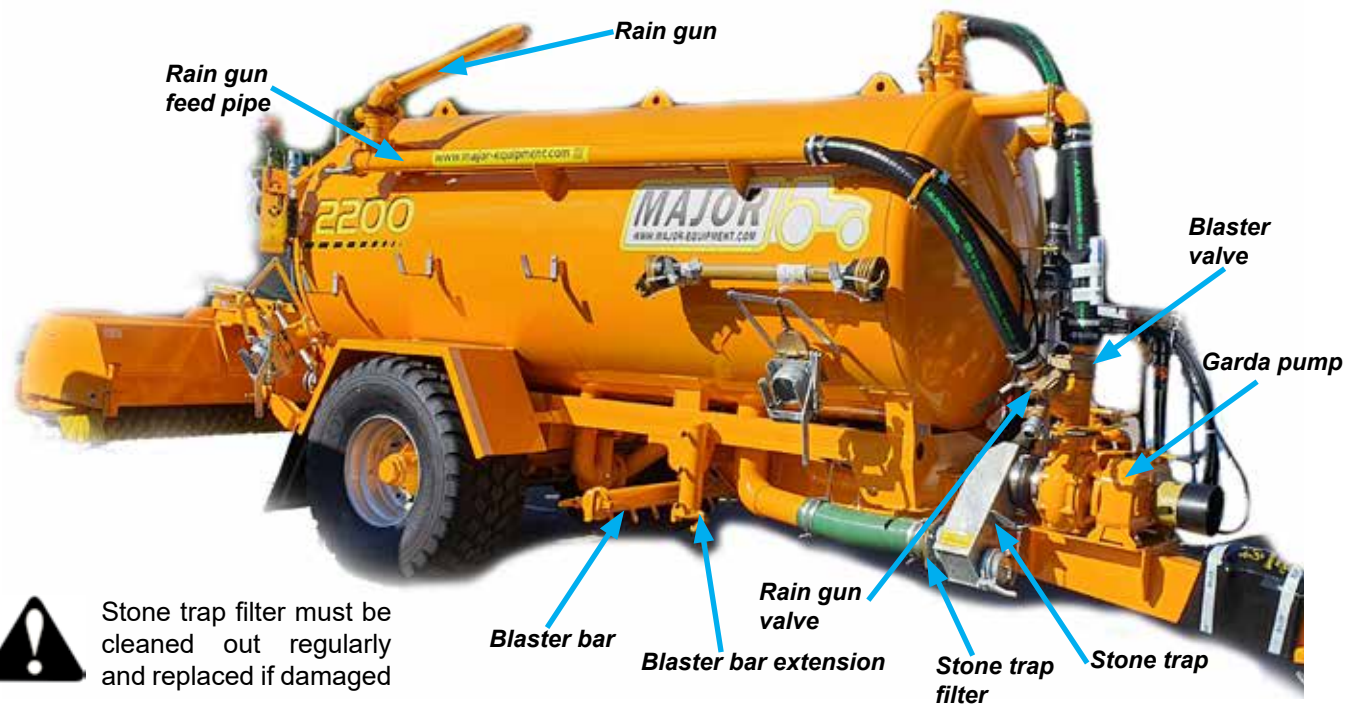
1. Connect the two hydraulic hoses for the rain gun to a double-acting valve on the tractor and check that it rotates through 360 degrees.
2. Engage centrifugal pump and change lever on the vacuum pump to its neutral position (Refer to section “To empty tank” on the previous page).
3. Operate Stone Trap Gate Valve to allow slurry into Garda pump
4. The rain gun spreading direction can be rotated to a desired direction by double acting valve on the tractor.
5. A stone trap is fitted on the bottom of the tank; this is to be cleaned out regularly during the working day.
6. PTO speed maximum is 540 R.P.M.

Operation of the Road Blaster

A clean water source is vital for the Road Blaster to function correctly.

Follow the following instructions carefully.

1. Connect the two hydraulic hoses for the Road Blaster lift ram to a double-acting valve on the tractor and check that it lifts & lowers the blaster bar.
2. Adjust the angle of the Blaster to wash either to the left or right & lock in position.
3. Engage PTO & open stone trap gate valve.
4. For the differing conditions, vary forward speed & tractor RPM to find optimum cleaning ability.
5. Periodically check stone trap filter. Stone trap filter is held in place by a 4” BSP thread.

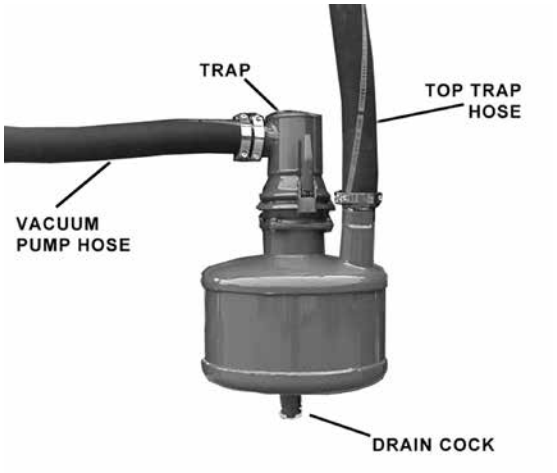


Stone trap filter must be cleaned out regularly and replaced if damaged

Cyclone Trap

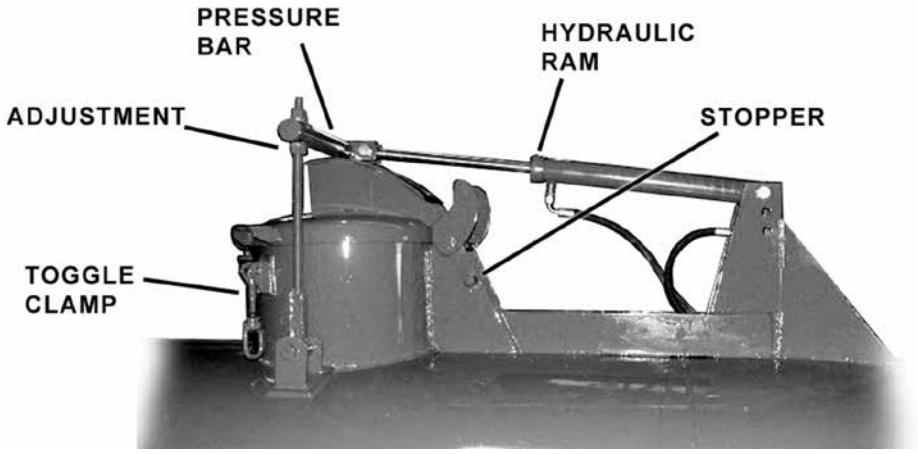
Do not attempt to open cyclone trap when pressurised

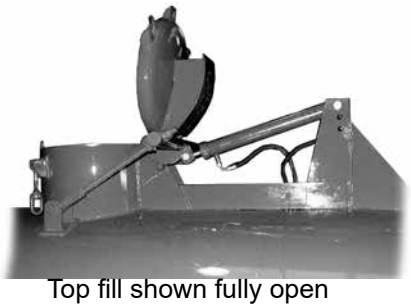
Check for sediment periodically by opening the drainage cock located underneath the Cyclone



Top Fill

Keep bystanders clear when operating top fill as there is a danger of entrapment.





Top fill shown fully open

NOTE: Top fill is pressure tested and adjustment is set before leaving factory.

1. Connect Top Fill hydraulic hoses to the tractor.
2. Ensure top fill is held closed by pressure bar (hydraulics) before undoing the toggle clamps.
3. The lid will now open and close hydraulically.

If air is leaking from around the seal, check seal and ring for damage. If pressure bar requires adjustment then slacken adjuster nuts below bar ¼ turn at a time. Ensure adjustment is equal.

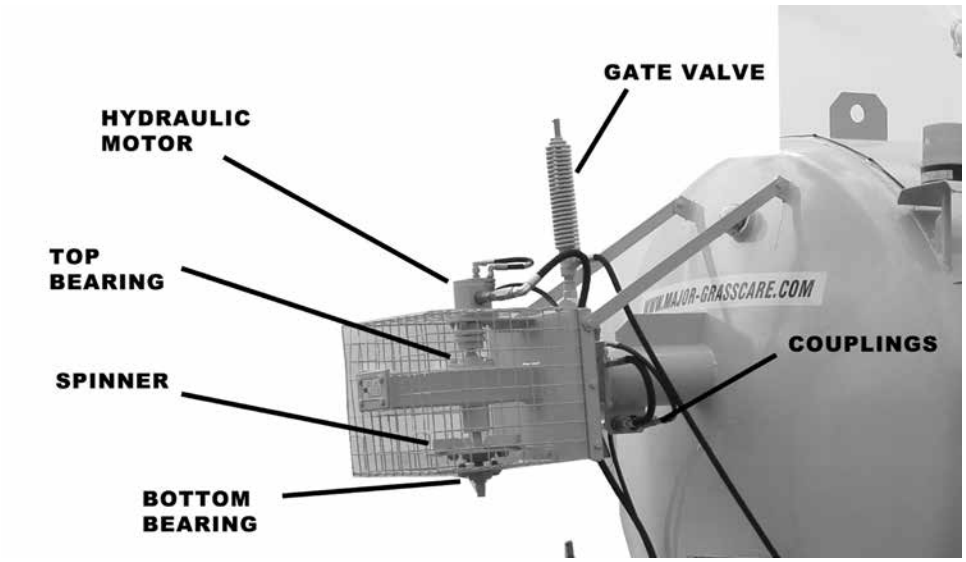
Over adjustment can damage the seal ring and stress the top fill.

Water Spreader

Operation (Do not operate water spreader without guarding.)

1. Pressurise tanker.
2. Start Water Spinner motor
3. Open the 6” gate valve.
4. Water spreader disk speed can be varied by the tap located on the tractor feed coupling.

IMPORTANT
Hydraulic hoses must be correctly connected. The ¼” hose is the feed hose and the ½” hose is the return line. The Return line must return. Damage to the hydraulic motor can occur if hoses are connected incorrectly.



Over Hedge Boom

DANGER DO NOT USE NEAR OVERHEAD CABLES

Operated via 2 double acting spool valves this system allows the operator to fill a “field tanker” using a boom from the roadside. To operate:

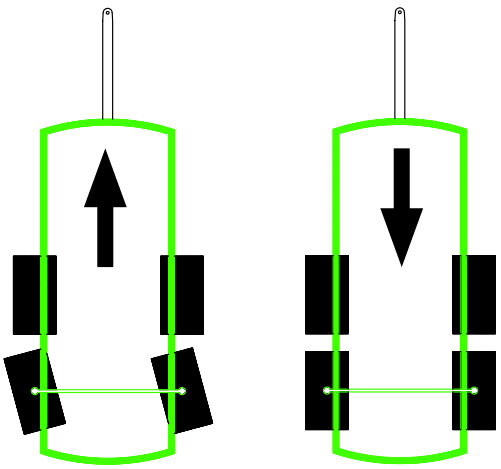
1. Ensure the area of operation is free from obstacles, in particular over-head cables.
2. Lift the boom vertically out of the front support.
3. Rotate the boom until it is above the top-fill hatch on the Spreading tanker.
4. Lower the boom so it is supported by the hatch of the field tanker.
5. Engage the PTO, open Gate Valve to empty tanker.
6. Stop the PTO and close Gate Valve
7. Lift the boom away from the Spreading tanker and return it to the transport position, ensuring it rests on the front support arm.
8. Ensure the Swivel is greased on a regular basis & the chain is oiled regular. Lubricate all other moving parts.

Tandem Steering axle - Free Steering

When driving forward at speeds below 15km/h rear axle will follow the direction determined by the tractor. Wheels of the rear axle will turn up to 15°. This will prevent excessive wear of tyres.

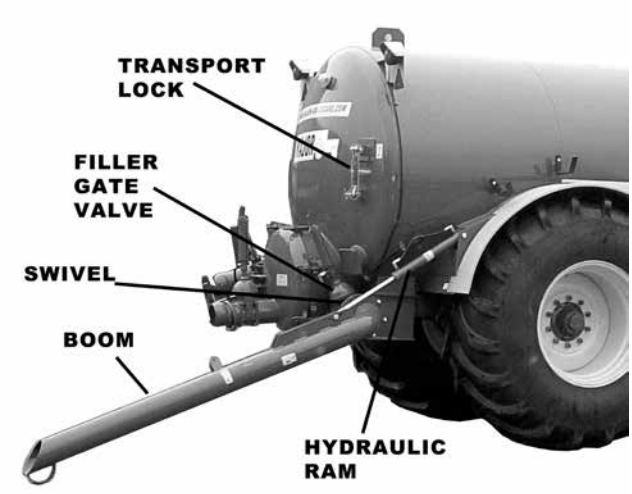
When reversing or driving forward at speeds above 15km/h, rear axle will align with the front one.

Two shock-absorbers stand for the stability of the free steering axle by preventing too significant vibrations.



6” Rear Filler

Ensure boom is locked in transport position when not in use.



Operation:

1. Lower Rear Filler into tank / lagoon.
2. Set Vacuum pump at Vacuum to fill tanker.
3. Open the 6” gate valve on the boom and close when operation is complete.
4. Lift Boom into transport position.
5. Lock in position with transport lock.

Maintenance

A. GENERAL

Good, regular maintenance and correct use are essential if this machine is to remain safe and long lasting.

If any of these areas are neglected, it will affect the life of the tanker:

1. Check the oil level in the gear box at the front of the pump. The level should be seen to be up to the top of the see through plug.
2. Change the oil after the first 50 working hours (running in period) and thereafter every 300 working hours.
3. Check daily that the level of the cooling is always ABOVE the mark of the dip stick.
4. To prolong the life of the vanes in the pump, it is important to flush out the pump with diesel oil after every working day. This is done by sucking 1 litre of diesel in through the air intake while the pump is on the pressure setting, (as for spreading). An extra precaution is also to suck a small amount of reservoir oil into the pump to lubricate it and minimise rusting.
5. If the tanker is to be left unused for a long time, remove the hose that connects the pump to the tank. This avoids the transfer of gases from the tank to the pump, which can cause rusting.
6. Check that the cut out valve protecting the pump are in full working order. Ensure that the cut out balls are not soft and spongy. Replace the small ball every 12 months.
7. Check the wheel nuts and wheel bearings daily for tightness.
8. Check daily that the tongue in the discharge valve will open fully. If it does not, then the top of the valve complete with the ram should be withdrawn by removing the six Allen key screws and the top of the housing cleaned out. Failure to do this will result in breaking of the valve rod or rod tongue. NOTE: Breakages of this type are not covered by warranty.
9. Do not weld tank without opening rear door.

Check the hitch eye for wear weekly. Grease the swivel type hitch every 80 hours of work. Note that exceeding the maximum speed limit will cause the premature wear of the part and possible failure.

DANGER: SLURRY GASES CAN KILL

- Keep animals and people out of slatted houses when mixing is in progress.
- Secure suction hoses to prevent them falling into the tank.
- Don’t stand near tank openings or stoop to floor level when mixing is in progress
- Never enter a below ground level tank unless there is no alternative. If you have to go in wear a lifeline held by two men.

Maintenance Schedule

Grease the following:

	Initially	After 8 Hrs	After 40 Hrs	After 160 Hrs
PTO shaft universal joints	●	●		
PTO shaft Male portion	●		●	
Wheel Hub Bearing	●			●
Brake Cams	●		●	
Rain Gun Gears	●		●	
Road Blaster Swivels	●		●	
Water Spinner Bearings	●	●		
Rear Filler Swivel	●		●	
Auto Coupler Swivel	●		●	
Top Fill Bar	●	●		

Check the following:

	Initially	After 6 Hrs	After 40 Hrs	After 160 Hrs
Oil drip feed	●	●		
Oil reservoir level. Use vacuum pump oil or new mineral oil ISO VG 100 (SAE30)	●	●		
Gearbox Oil level	●	●		
Oil reservoir level	●			
Gate Valves for leaks or blockages	●		●	
Rear inspection cover for leaks	●		●	

Item	**How**	**How often**
Check oil circulation	Inspect the level sight glasses	Once a day
Check oil level in tank	Use the oil level on outside of tank	Once a week
Check wear of blades	Remove threaded plug	Every 300 working hours
Check that the over-pressure and vacuum regulator valves are working correctly	Remove valves	Once a week
Wash oil tank	Remove tank	Once a year
Wash body internally	Put in oil + diesel oil (after washing lubricate with oil only)	Whenever sewage enters or when inactive for a long time
Wash lubrication pump	Use a brush and compressed air	Once a year or for prolonged inactivity
Check that the overflow valves are working correctly	Remove valves	Once a month
Lubricate the power take-off (versions M - MA - K - KA and D)	Oil the P.T.O. with a brush and lubricating oil	Once a month
Wash and clean the valves	Remove valves	Once a month

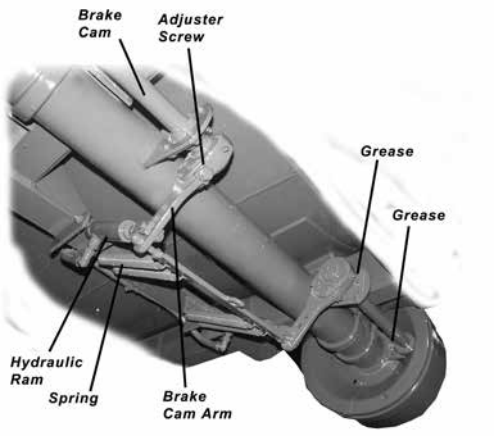
Do the following:

	Initially	After 6 Hrs	After 40 Hrs	After 160 Hrs
Tighten wheel nuts	●	●		
Flush 1 litre of diesel through Pump air intake when in pressure position	●		●	
Drain air brake tank (if fitted)	●		●	

NOTE: Change oil in vacuum pump gearbox & Garda pump gearbox after first 50 hours (running in period) and every 300 working hours following that. ISO VG 460 oil.

B. Running Gear Maintenance - Brake Adjustment

When resetting brakes, brake rams should be 1½“- 2” from end of stroke before brake shoes tighten on hub.



It is important that operators develop a schedule for periodic cleaning, inspection, adjustment and lubrication of brake components.

This will provide the prevention rather than cure of brake problems. Adjustment of brakes should be carried out as frequently as required, in order to maintain the original safety standard.

Slack adjuster travel and uniform lining clearance must be maintained. At regular intervals, brake drums should be removed and linings checked for wear. The linings must not be allowed to wear down beyond the wear line, or to the rivets. After fitting new or re-lined shoes always fit new return springs. Each time the hubs are removed for brake inspection.

Check the following parts for wear:-
1. All hub components.
2. Grease seals. (It is recommended that new seals are fitted)
3. Bearing cups, cones & rollers.
4. Brake anchor pins and location holes.
5. Cam rollers and retaining pins.
6. Wheel studs and nuts.
7. Check brake drum for cracks, scoring or any form of deterioration.

Prior to re-assembly, the following parts should be coated with ‘Copper slip’ or equivalent product:
1. Cam roller location diameters and journals.
2. Anchor pin location holes in brake shoes.
3. Brake Anchor Brackets (spiders) camshaft bores.

NOTE: Brake linings should be replaced as a complete set.
Once the new linings have been fitted, braking performance will be reduced until the new linings have been “bedded in”. This can take up to 1000km, depending on operating conditions. Therefore it is recommeded that linings are replaced well before critical brake inspections such as MOT tests etc.

Check with the manufacturer of your slack adjusters for any adjustment that it requires.

NOTE: Brakes should be adjusted by a competent person. Please consult your dealer or the manufacturer before adjustment.

Tyre Pressure

Tyres should be set at:

1150, 1500, 1700	2 bar
LGP, Alpine	2 bar
Challenger	3 bar Front Axle
	2 bar Rear Axle
Tandem	3.5 bar

Tyre	**BAR**	**P.S.I**
15X22.5	2	29
16X22.5	2	29
550/60X22.5	2	29
21.3R24	2	29
28.1 R26	2	29
30.5 R32	2	29
800/65 R32	2.4	29

Important Tyre Information
1. Tyre pressures are very important and often overlooked. A couple of minutes spent checking them could save you money, correct pressures are related to loads, speeds and vehicle handling and are vital for maximum safety, braking, grip & tyre life.

2. Under Inflation: Causes excessive flexing and deterioration of the casing and also rapid wear of the tread shoulders. Your tanker will have excessive stability problems on undulating ground if one tyre is under nflated on one side.
3. Over Inflation: Results in a reduced area of contact with the road and greater wear on the tread centre which makes your tyres more susceptible to impact damage.

4. A reliable and accurate pressure gauge should be used when the tyres are cold as there is an increase in pressure when the tyres have warmed up.

5. Remember a punctured tyre only needs to travel a very short distance to become worthless and is not covered under guarantee by either the tyre manufacturer or tanker manufacturer.

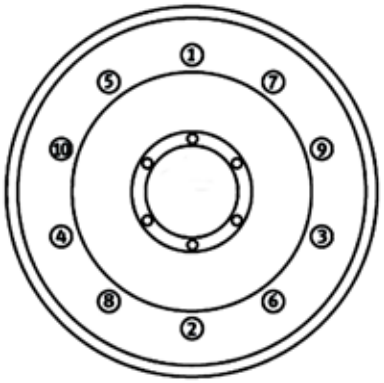
6. Check the side of the tyre for the correct pressure for your tyre.

Wheel Fastening

It is vital that operators and manufacturers ensure that the correct type of wheel cones and nuts are fitted to specified bolts, before torqing to full setting.

Mating surfaces between Hubs and Wheel Rims should be primer painted only. Thick gloss will result in loss of torque.

Wheel tightening sequence: Tighten wheel nuts in this order



TIGHTENING TORQUES	Ft. lb.	N.m
1150, 1500 1700 & 2000 Tanker	200	270
LGP, Alpine, Challenger & Tandem Tanker	550	550-600

Tanker Cleaning

It is advisory that cleaning out works are carried out by experienced and competent person. Consult your local dealer as he would have experience in carrying out such works.

SLURRY GASES CAN KILL INSTANTLY
NEVER WORK ALONE

The Slurry tanker is designed for carrying slurry products. Make sure to use correct PPE if you have to carry out works yourself. If the machine was used for carrying harmful products, the inside environment might be toxic, please check if you require additional protection.

Slurry tanker is a confined space and a person shall not carry out work in Confined Spaces if it is reasonably practical that it could be avoided, as per Health and Safety Authority.

It is advised that the sediments from the tanker are washed off by a power washer without a person entering the tanker. However, if you have to enter the tanker please make sure that:

- You are not working alone and another person is assisting you during this process;
- The tanker is parked up, parking brake applied, engine of a tractor is switched off and PTO is disconnected;
- Children do not enter the tanker under any circumstance;
- The tanker is emptied before opening gate valves, blanking caps, back door and not pressurised;
- You do not spend continuous period of time inside the tanker
- The tanker is fully ventilated with all ports open (including back door) for at least 24 hours. Before ventilating, fill the tanker up with clean water and then discharge it under pressure (repeat at least twice), this will wash off any loose sediments and get rid of most of the slurry fumes inside the tanker.

If your machine is fitted with a front inspection port, it can be used for washing out using a power washer without entering the tanker.

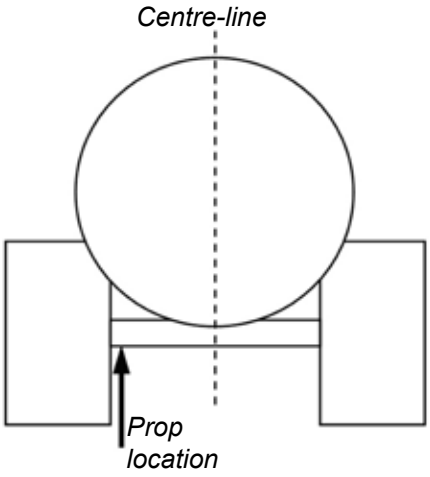
Changing a wheel on a tanker

Never try lifting a tanker when it is full.
Empty the tanker to minimise weight shift.

MAJOR recommends that all wheel changing works are carried out by the dealer, whose workshop is fitted with special equipment (crane/jack, trolley, etc.) for lifting the tanker and removing wheels.
Wheel changing must be carried out by a competent person (fully trained fitter).

The following are some of the hazards which should be taken into consideration:

1. A loaded tanker has a high centre of gravity
   - DO NOT position the jack/supports close to, or on, the centre-line of the slurry tanker;
   - DO NOT use inappropriate jacks and props;
   - DO NOT overload jack/props;
2. Small movements in the liquid load change the centre of gravity of the tanker;
3. Unevenness of the ground or uneven timber/supports used to prop;
4. Soft and unstable ground.



Before lifting up a tanker ensure that:

- The slurry tanker wheels are chocked and it is hitched to a tractor with its parking brake effectively engaged;
- A jacking/lifting/supporting position is chosen to maintain maximum tanker stability;
- The load at the jacking/lifting point is known;
- The jacking/lifting equipment has sufficient lift capacity and is adequately maintained for the task;
- Ground conditions at the jacking point can withstand the loading;
- Ensure the tanker is propped. Do not rely on jack or crane for supporting tanker;
- An adequately rated axle stand or other prop is positioned following the same safety procedure as for choosing the jacking point;
- There is no possibility of slippage between the safety prop (axle stand or other adequate strength support) and the tanker;
- Bystanders or animals must stay clear of the danger zone. Never carry out works with bystanders near the tanker;
- Mechanical aids should be used to lift/position wheels (trolleys, forklifts);
- High visibility clothing is worn where appropriate and where possible the work is carried out away from live traffic.

2050+ gallons Tankers

A suitable location for a jack is at the back of the tanker where the chassis ends.

Standard Tankers

The suitable point for location of a jack is on the axle, as close as possible to the wheel.

Servicing the Axle

Service intervals depend on operating conditions and are best decided by the Operators Fleet Engineer, having considered the following guide lines.

On Initial Receipt
Check all nuts, etc. for recommended torque. It is strongly recommended that wheel nut torque is checked every 7 days or 1000 km, whichever is the sooner.

First 300 miles (500 km)
a) Check all wheel nuts daily for first week, due to seating effects.
b) It is suggested that the hubs are checked for end-float, again due to seating effects.
c) Lubricate all grease points, using Lithium soap-based EP2 grease.

At 3,000 miles (5,000 km)
a) Check same as first 300 miles (500 km).
b) Check wear pattern of brake linings, if not satisfactory, make correct adjustment.
c) Check hubs for end-float. Reset adjustment nut if necessary.

At 10,000 miles (15,000 km) and every 10,000 miles thereafter
a) Lubricate all grease points.
b) Check hubs for bearing end-float. Adjust as necessary.
c) Lubricate slack adjusters.
d) Check brake linings for wear.

At 30,000 miles (50,000 km) and every 30,000 miles thereafter
a) Remove hubs, check brake linings for wear, check anchor pins for sticking (remove and
b) Re-grease if necessary), check camshafts for sticking.
c) Completely clean out grease from hub.
d) Re-pack using fresh grease.
e) Check grease seals for signs of wear, replace if necessary.
f) Re-set bearing adjustment nuts to give bearing end-float.

Bearings

The bearings used in MAJOR axles are of the finest materials, and produced to exacting standards. They are selected to give the user considerable service life. To protect this longevity, the following procedure is recommended when servicing is required:-

a) Immerse cups and cones in a suitable cleaning solution. After soaking, agitate bearings around in fluid to flush out any old residue grease. Never spin a bearing; this could cause the rollers to skid, thus damaging the highly finished internal surfaces of the bearing.
b) When clean, thoroughly drain and dry, preferably in warm air at around 65 - 80°C.
c) The bearing must be now checked for any signs of corrosion, discolouring, pitting or flaking. Should there be any doubts as to the condition of the bearing, replacement is strongly advised.
d) If the bearing is to be refitted immediately, ensure the rollers are fully pre-packed with Lubricant (see recom mended lubricants) before fitment. Alternatively, immerse the bearing in rust-preventative oil, wrap in wax paper, and box for storage.

Note: - If sealed for life bearings (UNIPAC) are fitted, do not tamper with or attempt to service. Any tampering with the bearing may drastically reduce the service life of the bearing and hubs, as well as invalidate the warranty. The only action required for sealed for life bearings is the addition of anti fretting lubricant onto the spindle prior to any reassembly. MAJOR recommend ‘Optimol White T’, or ‘Copper slip’ as an alternative.

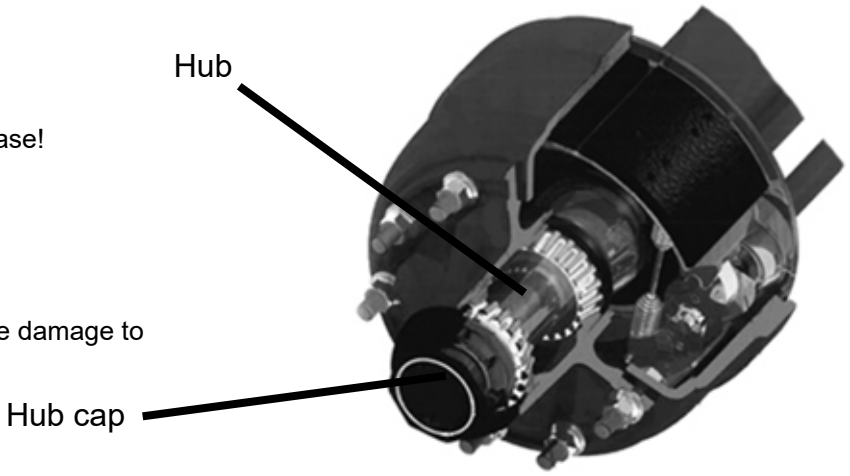
MANUFACTURER	RECOMMENDED	ALTERNATIVE
Shell	Shell Retinax ‘LX2’	Shell Retinax ‘LX’
Mobil	Mobil Grease H. P. 222	Mobil Grease H. P.
Castrol	Castrol LMX	Spheerol A. P. T. Z.
Texaco	Hytex EP2	
Esso	Unirex EP2	
BP	Energrease LC2	

Recommended Lubricants
Greasing the Bearings

Apply grease to these areas indicated.
It is important not to overfill the hub with grease!

I.E.
Hub: - 400 grams
Hub Cap: - 200 grams

NOTE: Greasing at high pressure may cause damage to the seals



End Float

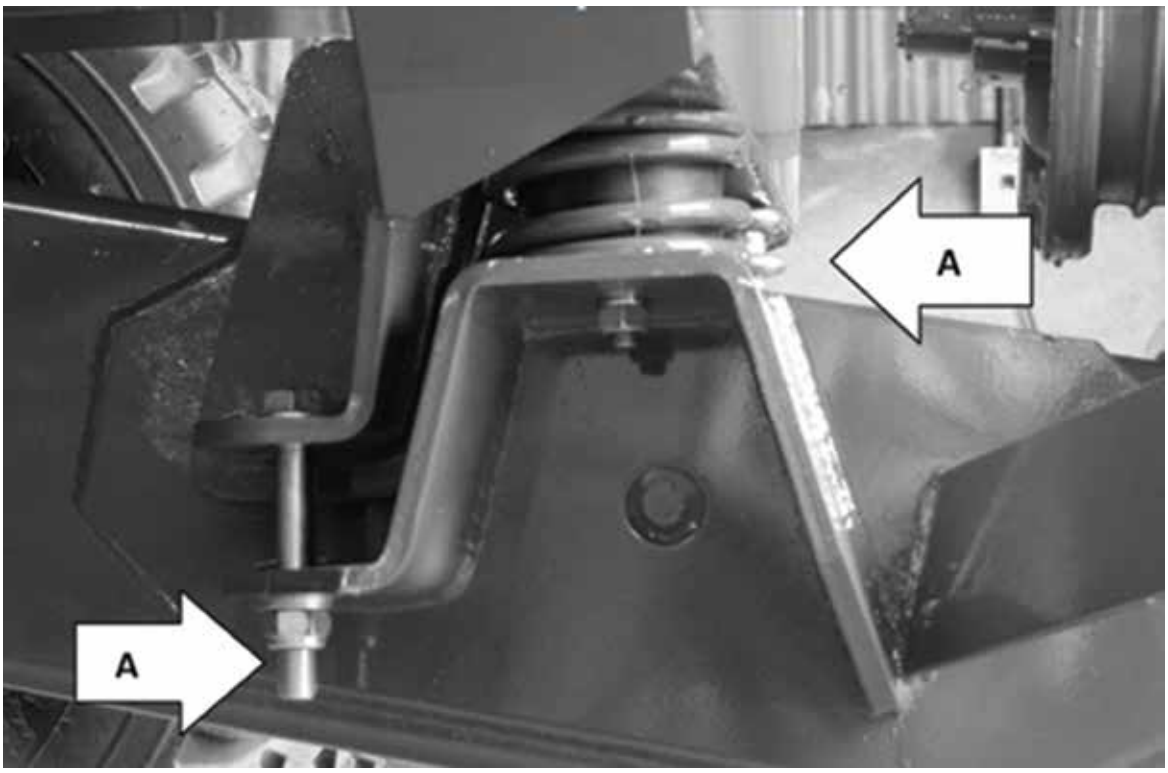
All MAJOR Drum Braked axles are fitted with two rows of tapered roller bearings. To protect normal bearing life, these bearings must not be subjected to preload during assembly and service. End float of between 0.05 and 0.15 mm is therefore recommended. The correct method of setting end float is as follows:

1. Spin wheel and tighten Adjusting Nut until resistance is observed.
2. Back off Adjusting Nut 2½ to 3 flats.
3. Assemble Lock Washer onto spindle, engaging hole over dowel.
4. Assemble Lock Nut and torque to 373 N.m. or 275 lb.Ft.
5. Check free rotation of wheel.

D Standard Tanker Suspension Unit

The standard tanker suspension unit uses a combination of rubber buffers & compression springs as indicated ‘A’. The Tensioning bolts ‘B’ are located either side of the drawbar & should be equally tightened to lightly compress the buffer when the tanker is empty.

An indication of correct compression is when the bolts cannot be turned by hand without compressing the rubber excessively.



E. Vacuum Pump Maintenance

How to uninstall the from the tanker:

PTO:
1. Stop the power take-off of the tractor;
2. Remove the cardan shaft from the power take-off of the rotary blades vacuum pump
3. Remove the connecting pipe that joins the rotary blades vacuum pump to the tank car, by loosening the metal band and sliding the pipe from the adjustable elbow
4. Remove any hydraulic connections
5. Remove the clamping screws and disinstall the rotary blades vacuum pump

Pulley
1. top the power take-off of the tractor
2. Remove the driving belts.
3. Remove the pipe that connects the rotary blades vacuum pump to the tank car. To accomplish this, loosen the metal clamp and pull the pipe out of the elbow
4. Remove any plumbing connections
5. Remove the mounting screws and remove the rotary blades vacuum pump

Hydraulic
1. S top the hydraulic system
2. Remove the hydraulic connections to the motor
3. Remove the pipe that connects the rotary blades vacuum pump to the tank car. To accomplish this, loosen the metal clamp and pull the pipe out of the elbow
4. Remove any plumbing connections;
5. Remove the mounting screws and remove the rotary blades vacuum pump.

How to disassemble the pump - Back Assembly

MEC 1000-1600-2000-3000-4000-5000-6500-8000

1. Remove the back cover or the lubrication pump (together with the connector joint) from the flange;
2. Remove the screws from the back flange;
3. U se two screws for screwing into the threaded extraction holes until the flange is removed;

MEC 9000-11000-13500

1. Remove the rear cover or oil pump (together with the connecting joint) from the flange;
2. Remove the seeger ring from the rear pin;
3. Remove the screws from the rear flange.
4. Screw two screws into the threaded extraction holes just until the flange can be removed;

STAR - AGRI /V (with rear cast iron oil tank)

1. Remove the tank cover and the lubrication pump (together with the connector joint) from the back tank;
2. Remove the screws from the back tank;
3. U se two screws for screwing into the threaded extraction holes until the tank is removed;

STAR - AGRI /F (with rear flange and extractable side sheet oil tank)

1. Close the oil cock placet on the tank
2. Remove the back cover with the lubrication pump (together with the connector joint) from the flange;
3. Remove the screws from the back flange;
4. U se two screws for screwing into the threaded extraction holes until the flange is removed;

How to disassemble the pump - Front Assembly
PTO:
1. Unscrew the screws of the gearbox cover;
2. Use two screws for screwing into the threaded extraction holes until the cover is removed;
3. Remove the gear with splined shaft using an extractor if necessary;

4. For the pinion: unscrew the selflocking nut, use an extractor;
5. Remove the seeger ring placed in front of the bearing
6. S lide the rotor from the body together with the gearbox;
7. Disassemble the rotor from the gearbox through a press;

Pulley 8000
1. Remove the driven pulley and the key;
2. Disassemble the front cover from the flange;
3. Remove the screws from the front flange;
4. S lide the rotor from the body;
5. Remove the seeger ring placed in front of the bearing;
6. Disassemble the rotor from the gearbox through a press;

Pulley
1. Remove the driven pulley and the key
2. Remove the front cover from the flange
3. Remove the seeger ring from the front pin
4. Remove the screws from the front flange
5. Pull the rotor out from the body
6. Use a press to remove the rotor from the flange

Hydraulic
1. Disassemble the hydraulic motor from its support;
2. Remove the hydraulic motor support;
3. Remove the clamping screw located inside the sleeve and then slide the sleeve out;
4. Remove the screws from the front flange;
5. Slide the rotor from the body;
6. Remove the seeger ring placed in front of the bearing;
7. Disassemble the rotor from the gearbox through a press;

Refitting the pump - back

IMPORTANT: Before proceeding with any re-fitting, replace the gaskets of the opened parts.

- Always replace the [flange / pump body] or [gearbox / pump body] fixing screws, when you restore the working conditions, as a result of intervention of the “Crash Protection System.” Recall that this system allows the rotor to slide vertically downward in the case of entry of foreign material into the pump and / or breakage of the vanes, preventing breakage of the main components.
- Always replace flange / pump body or gearbox / pump body fixing screws during each vanes replacement.

SERIES MEC 1000-1600-2000-3000-4000-5000-6500-8000

1. Remove the bearing and the spacer from the back flange;
2. Replace the flange gasket;
3. Bring the back flange up to the pump body, aligning it with the clamping holes;
4. Insert the 6 clamping screws in the holes and tighten them;
5. Fit the bearing on the flange using a drift;
6. Insert the spacer;
7. Re-fit the back cover or the lubrication pump (together with the connector joint) on the flange.

SERIES MEC 9000-11000-13500

1. Remove the bearing from the rear flange;
2. Insert the two centring pins into the pump body (supplied with the manual)
3. Replace the seal on the flange;
4. While lining up the holes with the two pins, bring the rear flange and the pump body together;
5. Insert the 6 mounting screws into the slotted holes and tighten to 45 Nm;
6. Using a mallet, install the bearing on the flange;
7. Install the seeger ring on the rear pin;
8. Install the rear cover or oil pump (together with the connecting joint) back onto the flange;
9. Remove the centring pins.

The MEC 9000/11000/13500 pump is equipped with a system that allows the flange to slide, which prevents breakage if foreign bodies become lodged between the rotor and the pump body. (Except for version G-GA) To benefit from this system, it is important to follow these instructions:
Before starting the pump, make sure the rotor has not dropped down accidentally. This can be accomplished by making sure the cut in the flange lines up with the cut machined into pump body (see picture to the right).

STAR-AGRI /V (with rear cast iron tank)
1. Remove the bearing from the back tank
2. Replace the pump body gasket;
3. Bring the back tank up to the pump body, aligning it with the clamping holes;
4. Insert the clamping screws in the holes and tighten them;
5. Fit the bearing on the tank using a drift;
6. Put back the tank cover and the lubrication pump (together with the connector joint) on the back tank;
7. Fill up the oil tank with oil for lubrification;

STAR-AGRI /F (with later tank)
1. Remove the bearing from the back flange
2. Replace the pump body gasket;
3. Bring the back flange up to the pump body, aligning it with the clamping holes;
4. Insert the clamping screws in the holes and tighten them;
5. Fit the bearing on the flange using a drift;
6. Put back the back cover and the lubrication pump (together with the connector joint) on the back flange (see figure below);
7. Open the cock placed on the side tank

Re-fitting of MEC 1000-1600-2000-3000-4000-5000-6500-8000 /STAR/AGRI manifold

1. Replace the manifold gasket;
2. Position the manifold on the pump body;
3. Tighten the clamping screws of the manifold.
4. Fit the reversing gear
5. Fit the spring onto the reversing gear;
6. Replace the gasket onto the cover with sleeve;
7. Place the cover with sleeve onto the manifold;
8. Tight the fixing screws of the cover;
9. Assemble the handle.

Reinstalling MEC 9000-11000-13500 manifold
1. Replace the gasket on the manifold;
2. Position the manifold on the pump body;
3. Tighten the mounting screws on the manifold;
4. Install the reverse gear;
5. Install the spring on the reverse gear;
6. Install the spacer onto the spring on the reverse gear;
7. Replace the gasket on the manifold cover;
8. Position the manifold cover on the manifold;
9. Tighten the mounting screws on the manifold cover;
10. Install the oil seal into its seat on the manifold cover;
11. Install the handle and tighten it using the screw provided;

Refitting the pump - front

PTO:

1. Mec 5000-6500-8000-9000- 11000-13500: remove the seeger;
2. Star/Agri: disassemble no. 3 screws;
3. Disassemble the bearing;
4. Replace the flange gasket;
5. Mec 9000-11000-13500: install the pins (supplied with the unit) into the pump body;
6. Fix the gearbox to pump body trought screwes
7. Mec 9000-11000-13500: mount the gearbox on the pump ody using screws tightened to 45 Nm;
8. Using a buffer, install the bearing onto the flange and install the seeger;
9. Mec 9000-11000-13500: using a buffer, install the bearing onto the flange, install the compensation ring and install the seeger
10. Mec 9000-11000-13500: install the spacer and mount the pinion on the shaft;
11. Assemble the pinion onto the shaft;
12. Fit the self-locking nut for fixing the pinion;
13. Insert the gear in the bearing housing;
14. Fit the gearbox cover;
15. Fill up the gearbox with oil
16. Mec 9000-11000-13500: remove the centring pins from the pump body.

Pulley:

1. Remove the seeger;
2. Remove the bearing;
3. Disassemble bearing and seeger rign;
4. Mec 9000-11000-13500: insert the pins (supplied with he unit) into the pump body;
5. Replace the flange gasket;
6. Mec 9000-11000-13500: mount the front flange on the pump body using screws tightened to 45 Nm;
7. Using a buffer, install the bearing onto the flange andinstall the seeger;
8. Mec 9000-11000-13500:using a buffer, install thebearing onto the flange, installthe compensation ring and install the seeger;
9. Put the front cover back on the flange.
10. Mec 9000-11000-13500: remove the centring pins from the pump body.

Hydraulic:

1. Remove the seeger;
2. Remove the bearing;
3. Disassemble bearing and seeger rign;
4. Mec 9000-11000-13500: insert the pins (supplied with the unit) into the pump body;
5. Replace the flange gasket;
6. Mec 9000-11000-13500: mount the front flange on the pump body using screws tightened to 45 Nm;
7. Using a buffer, install the bearing onto the flange and install the seeger;
8. Mec 9000-11000-13500: using a buffer, install the bearing onto the flange, install the compensation ring and install the seger;
9. Put the transmission sleeve back on the rotor pin;
10. Re-fit the hydraulic motor support;
11. Mec 9000-11000-13500: remove the centring pins from the pump body.

NOTE: The MEC 9000/11000/13500 pump is equipped with a system that allows the flange to slide, which prevents breakage if foreign bodies become lodged between the rotor and the pump body. (Except for version G-GA) To benefit from this system, it is important to follow these instructions:
Before starting the pump, make sure the rotor has not dropped down accidentally. This can be accomplished by making sure the cut machined into flange lines up with the cut machined into pump body.

Flange slot

Cut for aligning flange with pump body

Garda Pump

Correct Positioning of Reversing Gear

To position the reversing gear correctly, follow the procedure below:
1. Remove the handle (MEC series) or the reversing selector;
2. Remove the manifold cover;
3. Check that the flat part of the reversing gear is positioned at 45° to the power take-off;
4. Re-fit the manifold cover and the handle (MEC series) or the reversing selector.

Direction of Rotation:

NOTE: Before starting the Rotary blades vacuum pump make sure that the P.T.O. shaft turns freely and that the direction of rotation is the same as the one indicated by the arrow.

Never turn the rotary blades vacuum pump in the direction of rotation opposite to the one for which it has been prepared (indicated by the arrow) as this could damage some components as well as prevent the operation of the pump.

Setting up the Lubrication System

Three different types of lubrication have been developed for the Rotary blades vacuum pump (see Figure 3).

a. Normal Lubrication:
Lubrication occurs during the intake phase only. The vacuum created in the Rotary blades vacuum pump sucks oil from the tank. In the compression phase lubrication occurs with the residue of oil from the preceding phase. Normal lubrication is available only for models MEC 1000 and MEC 1600 that are manufactured with only this type of lubrication.

b. Forced Lubrication:
Lubrication occurs in both the intake phase and the compression phase through a gear pump placed at the back and actuated by the rotor shaft. The gear pump sucks oil from the tank and sends it to the manually adjusted metering tap. Excess oil returns to the tank through a tube connecting the tap to the tank. Forced lubrication is available as standard feature on models MEC, STAR, AGRI.

c. Automatic Lubrication
With this system lubrication occurs in both the intake phase and the compression phase by means of a piston metering pump with adjustable flow rate placed at the back and actuated by the rotor. The oil is injected directly into the Rotary blades vacuum pump,eliminating manual adjustment and saving a considerable amount of oil. Automatic lubrication is supplied, on request, on models MEC, STAR, AGRI.

a. b. c.

Oil to Use:
The Rotary blades vacuum pump are supplied without lubritication oil in the oil tank. BPP suggest to use “Battioni Pagani vacuum pump oil” for internal lubrification. It gives:
- Excellent resistance to oxidation
- Strong anti-rust property
- Excellent anti foam power
- Working temperature from -5 °C to 160 °C

IF “VACUUM PUMP OIL” IS NOT AVAILABLE, USE ONLY NEW MINERAL OIL MEETING ISO VG 100 (SAE 30)

Do NOT use the folllowing oils:
Transmission oil - used oil - hydraulic oil - vegetable oil - oil for gears - oil for brakes

You must use only new oil

All M-MA-K-KA versions (with gearbox) are equipped with oil into the gearbox. If you have to change the oil use only ISO VG 460.

Oil Levels:

MEC SERIES	STAR/V, AGRI/V SERIES	STAR/F, AGRI/F SERIES
		
Figure 4	Figure 5	Figure 6

SERIES MEC: For internal lubrication, the minimum oil level is indicated by the notch at the lower end of the level rod (see Figure 4) located on the manifold and consequently the maximum level will be reached when the tank is full.

SERIES STAR/V, AGRI/V: For internal lubrication, the minimum oil level is indicated by the total length of the plug with level rod (see Figure 5) situated in the back tank and the maximum level will be reached with a full tank.

SERIES STAR/F, AGRI/F: For internal lubrication, the minimum oil level is indicated by the lower notch on the indicator placed at the side of the external tank (see Figure 6) and the maximum level will be reached with a full tank.

Oil Tank Capacities:

MEC 1000	MEC 1600	MEC 2000	MEC 3000	MEC 4000	MEC 5000	MEC 6500	MEC 8000
0,6	0,7	1,0	1,2	1,5	2,5	3,1	3,8
MEC 9000	MEC 11000	MEC 13500	STAR/AGRI			STAR-AGRI/F	
2,5	3	3,5	3,7			4,3	

PTO Versions: the gearbox has an oil loading plug at the top of the gearbox and an oil level plug (see Figure 7), placed on the side of the gearbox to allow the level to be checked To ensure correct lubrication, the oil should always be visible in the oil level.

Quantity of Lubrication Oil

When the Rotary blades vacuum pump is running, check that the quantity of oil indicated in Table 4 is dripping from the special regulator tap. These quantities are valid for both Forced and Automatic Lubrication. When necessary, add only unused clean oil to the tank.
PTO Versions: make the first oil change in the gearbox after approx. 100 working hours and subsequent changes approx. every 300 working hours.

MODEL	Drop/min at max vacuum	Drop/min air flow free air	g/h at max vacuum	g/h air flow free air
MEC 1000	20 - 25	10 - 12	50	25
MEC 1600	20 - 25	10 - 12	50	25
MEC 2000	25 - 30	12 - 15	63	32
MEC 3000	25 - 30	12 - 15	63	32
MEC 4000	25 - 30	12 - 15	63	32
MEC 5000	30 - 40	15 - 20	80	40
MEC 6500	40 - 50	20 - 25	100	50
MEC 8000	40 - 50	20 - 25	100	50
MEC 9000	50 - 60	25 - 30	120	60
MEC 11000	50 - 60	25 - 30	120	60
MEC 13500	50 - 60	25 - 30	120	60

MODEL	Drop/min for each drain cock at max vacuum	Drop/min for each drain air flow free air	g/h for each drain cock at max vacuum	g/h for each drain air flow free air
STAR 60	30 - 40	15 - 20	80	40
STAR 72	35 - 45	17 - 22	90	45
STAR 84	40 - 50	20 - 25	100	50
AGRI 60	30 - 40	15 - 20	80	40
AGRI 72	35 - 45	17 - 22	90	45
AGRI 84	40 - 50	20 - 25	100	50

Adjusting the Lubricating Oil

To adjust the dripping of oil in the Rotary blades vacuum pump with forced lubrication, turn the regulator ring nut “A” (see Figure 8) after loosening ring nut “B”. Tighten ring nut “B” again when adjustment has been completed.
The adjustment of oil delivery, in automatic lubrication, is carried out at our factory during final testing of the Rotary blades vacuum pump. If, for any reason, a different setting is required proceed as follows: remove pin cover “B” (see Figure 9), loosen lock nut “C” and then turn regulator pin “A”. By rotating clockwise lower oil delivery is obtained (-), and by rotating anticlockwise higher oil delivery is obtained (+). When adjustment has been completed tighten lock nut “C” and screw cover.

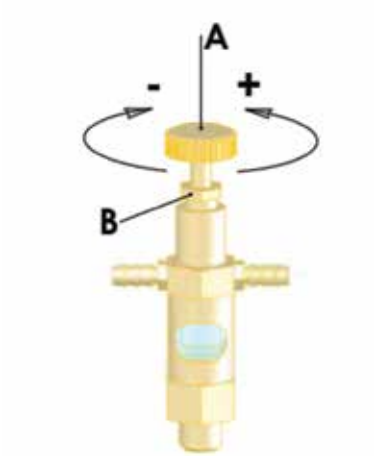


Figure 8

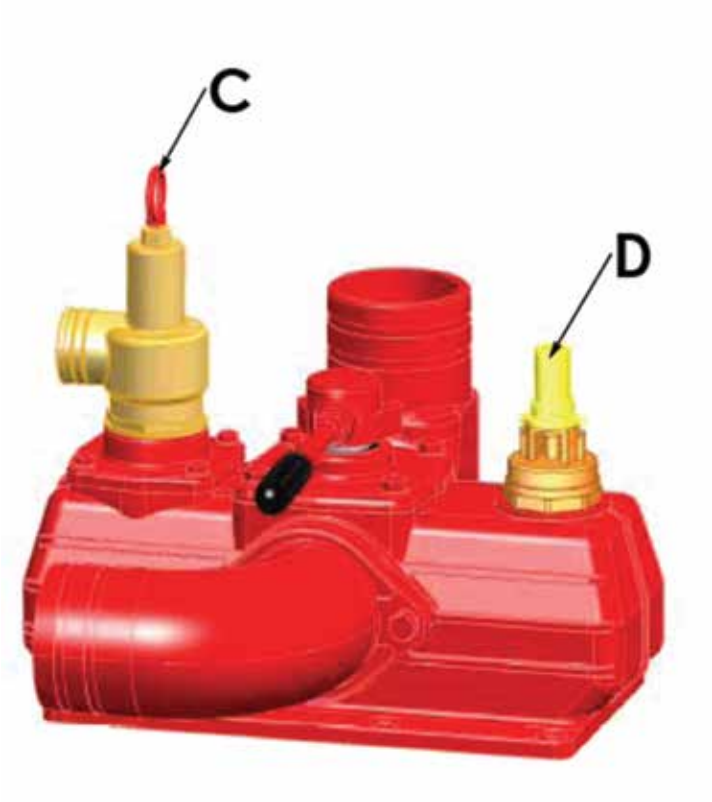
Figure 9

Overpressure and Vacuum Adjustment Valves:

The following diagram describes the valves as series (O), on demand (X) and not available (-) for each model of rotary blades vacuum pump.

	VACUUM ADJUSTMENT VALVE 1" 1/2	OVERPRESSURE VALVE 1" 1/4	OVERPRESSURE VALVE 1" 1/2	OVERPRESSURE VALVE 2"
MEC 1000/1600	-	-	-	-
MEC 2/3/4000	-	X	-	-
MEC 5/6.5/8000	X	-	X	-
MEC 9/11/13500	X	-	-	X
STAR 60/72/84	O	-	-	X
AGRI 60/72/84	O	-	-	X

O = As Series X = on request - = Not available



ATTENTION: the installation must be always equipped with depression valve (set at –0,80 bar) and with overpressure valve (set at 1 bar).

Pressure: the maximum allowed pressure is 2,5 absolute bar (1,5 relative bar). In order to avoid exceeding this value or to obtain a lower max pressure, an overpressure valve, "C", must be applied that is of a size capable of discharging the excess air delivery.

Vacuum: too high a vacuum may cause ovality and waviness of the body or breaking of the blades.
It is therefore advisable to use a vacuum regulator valve, "D". These valves may be fitted on the manifold cover or on manifold of the Rotary blades vacuum pump. Vacuum working degree is of –0,80 bar.

The regulation of the valves is done by acting on the throttle placed on the valve same (overpressure valve) or action on nut and locknut (vacuum adjustment valve).
Testing and Running the Pump

In order to test the Rotary blades vacuum pump check the preceding points, using a workbench if necessary.
Make sure that the P.T.O. shaft turns freely and that the direction of rotation is the same as the one indicated by the arrow.

If operation of the pump is checked without it being connected to the suction/delivery tubes there will be danger to operators' hands due to access to the inside of the discharge elbow. In this situation there is also the danger that foreign bodies will be sucked into the machine.

Check that the position of the handle is correct and test that the Rotary blades vacuum pump exhausts or compresses.

The running in period foreseen for a rotary blades pump is of 30 of effective working. During that period the working parameters must be reduced of 20%.

Maintenance Inspections, Checks, Repairs and Technical Details

Warning:
When carrying out maintenance operations, inspections, checks or repairs it is advisable to wear the individual protective devices listed in this manual.

All maintenance operations, inspections, checks and repairs must be carried out with the greatest care and with the Rotary blades vacuum pump off and the P.T.O. disconnected.

Cleaning the Pump:

If slurry enters the Rotary blades vacuum pump, the inside of the body must be washed immediately, by making it suck in diesel or fuel oil through the discharge elbow with the Rotary blades vacuum pump in compression phase. After this operation make it suck in oil. The same operation should be carried out when the Rotary blades vacuum pump has to remain inactive for a long time. In this case, disconnect the suction and delivery tube connected to the valves and hermetically seal the manifold cover because the gasses that form inside the tank would pass into the Rotary blades vacuum pump and cause the inside of the body to rust and this in turn could cause the blades to break when the system is re-started. In order to avoid rust formation, do not use water. If the body is washed after it is disassembled, it is advisable to carry out a preliminary wash with detergents (e.g. thinners) before carrying out the above operation.

Wash the oil tank at least once a year. Remove the manifold, and then wash it using solvents.

Wash and clean the valves at least once a month. Remove the valves, then wash them with water or, if necessary, non-corrosive detergents.

Checking the Valves: Regularly check that all the valves, for both overflow and pressure/vacuum, are still working efficiently.

Blade Information

Three material type of blades are fitted on Rotary blades vacuum pump. The following Tabella 8 describes what kind of material is fitted for each series.

SERIES	STANDARD Blades	SPECIAL Blades
MEC 1000/8000	O	X
MEC 9/11/13500	-	O
STAR	O	X
AGRI	-	O

O = As series X = On request - = Not available

Standard blades are suitable for no-strong uses, for short and not frequent periods. Special blades are made of a special material suitable for strong uses and for Rotary blades vacuum pump used in agricultural field.

These blades offer an excellent resistance to wear and mechanical and thermical stress. These are suitable for more frequent uses and to suck thick sewages. They are recommended for installation with frequent uses even during the same day.

Apart from normal wear, it may be necessary to replace the blades following incorrect use of the Rotary blades vacuum pump. The most frequent causes come from heat, lack of lubrication, entrance of sewage, high pressure or vacuum, formation of rust inside the body due to prolonged inactivity.

With the heat too high pallets stretch to touch the plate front and rear, this causes the breakdown of the pallets.Lack of lubrication means the blades are completely dry like the inside of the pump. This increases their fragility and causes them to break lengthways. The same type of breakage can be caused by entrance of sewage or by a too high working pressure. A too high vacuum causes the blades to beat against the cylinder with consequent damage to the outside of the blades. Moreover, the lining becomes wavy.

Inspecting the Blades

To check the state of wear of the blades in the Rotary blades vacuum pump proceed as follows:

- Remove the threaded inspection plug;
- Rotate the rotor until a blades lines up with the inspection hole;
- Compare the height of the blades with the reference ring on the rotor;
- Replace the entire set of blades when the height is less than the reference ring on the rotor.

Replacing the Blades

1. Check that there is sufficient space at the back of the Rotary blades vacuum pump to be able to work easily; if there is not, the Rotary blades vacuum pump should be taken off its support beforehand;
2. Remove the back
3. Extract the blades from the rotor;
4. Replace the blades;
5. Clean the Rotary blades vacuum pump.
6. Re-fit the back of the Rotary blades vacuum pump
7. Use original spare parts only

Blade Sizes

MODEL	Blades NUMBER	Blades SIZE
MEC 1000	5	120x38x6,5
MEC 1600	5	190x38x6,5
MEC 2000	7	180x41x6,5
MEC 3000	7	240x41x6,5
MEC 4000	7	300x41x6,5
MEC 5000	7	300x46,5x6,5
MEC 6500	7	370x46,5x6,5
MEC 8000	7	450x46,5x6,5
MEC 5000 S.C.	5	299x46,5x9,7
MEC 6500 S.C.	5	369x46,5x9,7
MEC 8000 S.C.	5	449x46,5x9,7

MODEL	Blades NUMBER	Blades SIZE
MEC 9000	5	300x60x6,5
MEC 11000	5	370x60x6,5
MEC 13500	5	460x60x6,5
MEC 9000 S.C.	5	299x60x9,7
MEC 11000 S.C.	5	369x60x9,7
MEC 13500 S.C.	5	459x60x9,7
MEC 9000 ballast	8	300x60x6,5
MEC 11000 ballast	8	370x60x6,5
MEC 13500 ballast	8	460x60x6,5
STAR 60	6	350x70x7,5
STAR 72	6	400x70x7,5
STAR 84	6	480x70x7,5
AGRI 60	6	350x70x4,7
AGRI 72	6	400x70x4,7
AGRI 84	6	480x70x4,7

Replacement of Rubber Ball

1. Unscrew and raise the valve-holder cover (AGRI and STAR series) or the manifold (MEC series);
2. Replace the rubber ball;
3. Re-fit the valve-holder cover (AGRI and STAR series) or the manifold (MEC series).

Replacement of Gears

1. Unscrew the screws of the gearbox cover;
2. Use two screws for screwing into the threaded extraction holes until the cover is removed;
3. Take out the gear with splined shaft using an extractor if necessary;
4. For the pinion: unscrew the self-locking nut, use an extractor.

Maintenance

Washing the gearbox

1. The gearbox should be washed at least once a year as follows:
2. Drain the oil from the gearbox.
3. Remove the gearbox cover.
4. Wash the gearbox using suitable solvents.
5. Put in the lubricating oil.
6. Put back the gearbox cover.

Replacing the central toothed wheel

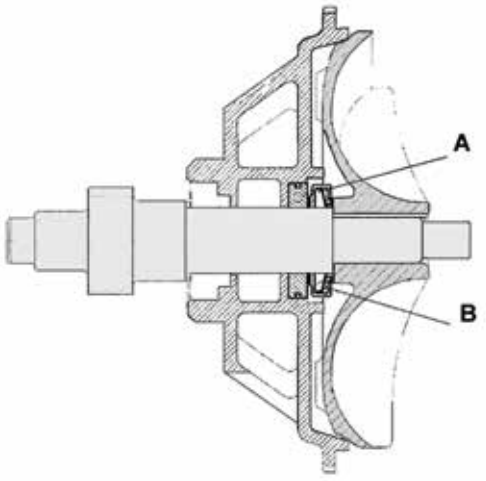
1. Unscrew the screws and remove the gearbox cover.
2. Unscrew the screws and remove the front cover and the back cover;
3. Slip out the central splined shaft by hitting the back with a drift and a hammer until the shaft comes out.
4. Remove the central toothed wheel to be replaced.
5. Slip the central splined shaft into the gearbox by hitting the front with a drift and a hammer and fitting the new toothed wheel to the shaft.
6. Fix on the front cover with the screws.
7. Fit the bearing at the back.
8. Fix on the back cover with the screws.
9. Fix on the gearbox cover with the screws.

Replacing the central splined shaft

1. Unscrew the screws and remove the gearbox cover.
2. Unscrew the screws and remove the front cover and the back cover.
3. Slip out the central splined shaft to be replaced by hitting the back with a drift and a hammer until the shaft comes out.
4. Remove the central toothed wheel on the shaft.
5. Extract the shaft from the front cover and replace it.
6. Put the cover on the new shaft, insert the assembly in the gearbox, and fit the toothed wheel to the shaft.
7. Fix on the front cover with the screws.
8. Fit the bearing at the back;
9. Fix on the back cover with the screws.
10. Fix on the gearbox cover with the screws.

Replacing the mechanical seal

1. Insert item (A) in the seat of the volute support with the wider part facing outwards and push it as far as it will go.
2. Insert item (B) with the wider part facing inwards, so that the two wider parts come into contact.
3. When you fit the impeller be careful to avoid cutting the rubber of item (B) when the spring is being compressed.



Replacing the Centrifugal Pump Shaft (versions with centrifuge)

1. Unscrew the screws of the gearbox cover and remove it.
2. Unscrew the front cover “75” and remove the screws.
3. Unscrew the screws fixing the centrifugal pump support to the gearbox.
4. Use screws to extract the centrifugal pump and position it on the workbench.
5. Remove the volute, together with the external flange, by slipping it off its support.
6. Unscrew the self-locking nut and remove the impeller from the centrifugal pump shaft.
7. Remove the key from the shaft.
8. Slacken the two brass nuts of the packing gland;
9. Remove the front bearing of the centrifugal pump shaft.
10. Slip off the shaft to be replaced by hitting the back with a drift and a hammer until it comes out of the volute support.
11. Remove the back bearing from the shaft and replace it.
12. Fit the back bearing to the support.
13. Insert the new shaft on the support by hitting the front with a drift and a hammer.
14. Tighten the two brass nuts of the packing gland;
15. Attach the key and then the impeller to the shaft.
16. Tighten the self-locking nut.
17. Attach the volute to the support, together with the external flange.
18. Tighten the screws fixing the volute to the support.
19. Attach the centrifugal pump to the gearbox and fix it with screws.
20. Insert the bearing on the shaft in the seat of the gearbox.
21. Fix on the cover “75” with clamping screws.
22. Fix on the gearbox cover with screws.

Replacing the Impeller

1. Unscrew the screws and remove the external volute flange.
2. Unscrew the self-locking nut and remove the impeller.
3. Fit the new impeller to the shaft.
4. Screw on the self-locking nut.
5. Attach the external volute flange.
6. Tighten the clamping screws of the external volute flange.

Replacing the Volute

1. Unscrew the screws and remove the external volute flange.
2. Unscrew the screws fixing the volute to the support.
3. Remove the volute by slipping it off its support.
4. Insert the new volute.
5. Tighten the screws fixing the volute to the support.
6. Attach the external flange to the volute.
7. Tighten the screws of the external volute flange;

Replacing the Volute Support

1. Unscrew the screws and remove the front cover “75”.
2. Unscrew the screws fixing the centrifugal pump support to the gear box.
3. Use two screws to extract the centrifugal pump and put it on the workbench.
4. Unscrew the screws fixing the volute to the support.
5. Remove the volute, together with the external flange, by slipping it off its support.
6. Unscrew the self-locking nut.
7. Remove the impeller from the centrifugal pump shaft.
8. Remove the key.

Troubleshooting

Fault	Possible Cause	Remedy
Insufficient Pump Output	Pump Vanes Sticking	Increase Oil Flow
Insufficient Pressure Build-up	Tank Air leak	Tighten inspection cover or replace seal.
	Pump vanes worn	Replace with complete new set together with gasket and oil seal.
	Pump to tank hose faulty	Tighten clips or renew. Ensure Gate Valves are closed.
Pump Overheating	Lack of oil in Pump reservoir	Fill with SAE 20 oil or in summer use SAE 30.
	Oil drip feed blocked. Incorrect oil drip valve settings.	Clear blockage, set to 1 drop per 3 seconds.
Pump seized	Rotor bent	Replace.
	Broken pump vanes	Replace with complete new set together with gasket and oil seal.
Little vacuum or pressure in tank	Blades are worn	Replace blades
	Some blades are jammed in the rotor	Disassemble Exhauster/Compressor, clean and wash rotor, blades and body
	Air filtration or leakage in system	Eliminate infiltrations
	Undulated cylinder	Smooth or replace body
	Reversing gear badly positioned	Disassemble and position correctly
Overheating of exhauster/compressor	Flange assembly too light	Add a gasket to the back of the flange
	Excessive pressure	Reduce pressure
	Excessive revs	Reduce revs
	Excessive working time	Reduce working time
	Blades too long	Trim blades to correct size
	Lack of lubrication	Check oil level in tank. Functioning of oil pump, regulation of oil tap
Beat against external surface of exhauster/compressor	Revs too low	Increase revs
	Vacuum too high	Reduce vacuum
Sewage comes out of exhaust elbow of exhauster /compressor	Top trap valves working incorrectly	Check top trap valves
Fumes come out of exhaust elbow of exhauster/compressor	Excessive lubrication	Adjust lubrication
Lack of circulating lubricating oil in Exhauster / compressor	Air intake ay pipe fitting	Replace pipe fittings
	Lubrication tube badly inserted in pipe fittings	Insert correctly
	Air in oil pump chamber	Fill pump chamber with oil
Tank does not fill NOTE: For vacuum pumps, a fill factor of ca. 90% is normal. A 6” hose has a capacity of ca 3500 litres/min.	The upper cut-off valve closes too early.	Allow the pump to rotate at a lower RPM. (a pressure of 0.7 bar is ideal) OR install under pressure valve on the tank.
	Blades of the pump are worn out.	Replace the blades.
	Slurry is extremely thick.	Dilute or mix the slurry
	Slurry drain is too deep.	Move the drawing-in hose.
		Mount a piece of 8” hose at the end of the hose, with a reducer of 6-8”.
Hydraulic gate valve doesn’t respond	Hydraulic pressure hose is connected incorrectly	Reconnect correctly
	Gas-spring cylinder defect	Replace cylinder
	Fastening eye of the cut-off valve is broken (as a result of frost or dirt)	Remove dirt in the cut-off valve box. OR Replace the cut-off valve.

Garda Pump - Troubleshooting

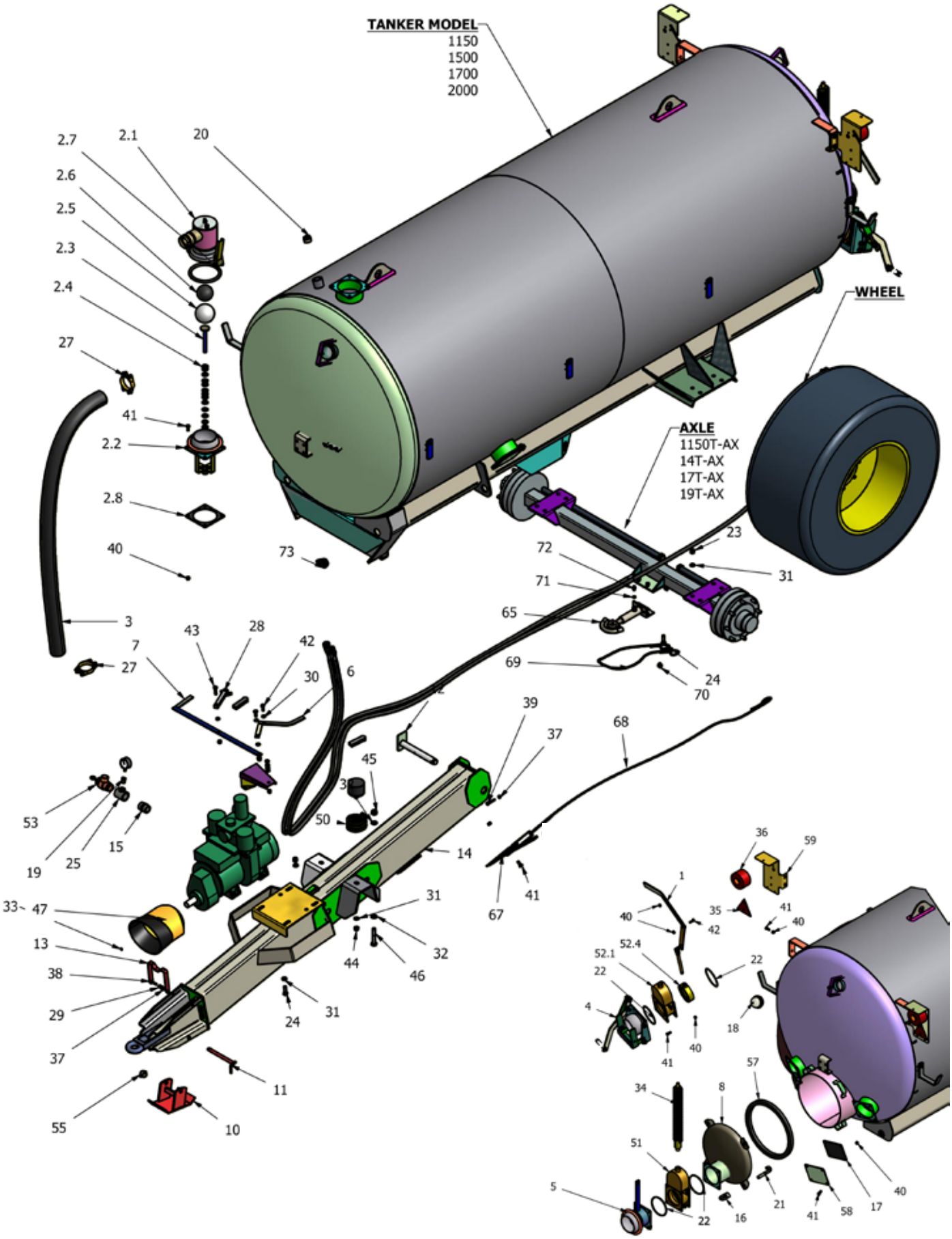
FAULT	POSSIBLE CAUSE	REMEDY
Irregular exit of sewage from delivery of centrifugal pump	Sewage too dense	Dilute sewage
	Air filtration	Eliminate infiltration
Sewage does not exit from delivery tube of centrifugal pump	Delivery tube obstructed	Eliminate obstruction
	Lever gate valve found above the centrifugal pump is shut	Open gate valve
	Handle of exhauster/compressor not placed towards the left	Position handle
Excessive sewage exits from packing seal of centrifugal pump	Graphitized cord is worn	Replace graphitized cord without excessive tightening
	Graphitized cord is burnt	Replace graphitized cord without excessive tightening
Mechanical seal of centrifugal pump whistles (for version with mechanical seal)	Mechanical seal is burnt through lack of sewage	Replace mechanical seal
Delivery pressure of centrifugal pump does not reach working values	Impeller lugs worn or broken	Replace impeller
	RPM too low	Increase RPM (max. 600 RPM)
	Tractor PTO does not have sufficient power to reach max. pressure	Increase power
	Diameter of outlet hole of nozzle of rotating jet too wide	Decrease diameter of outlet hole.
Group PTO does not rotate	Broken blade on exhauster/compressor	Replace blades (check rotor pin if bent)
	Foreign body in exhauster/compressor	Remove foreign body
Cracked gearbox	Excessive power used	Reduce power of tractor
	Turning executed without removing cardan shaft	Remove cardan shaft before executing any manoeuvre
Exhauster/compressor does not rotate	Too sudden start has broken key connecting rotor shaft to pinion of exhauster/compressor	Replace key and if necessary, rotor and pinion
No exhaust/compression in exhauster/compressor	Handle incorrectly positioned	Position handle correctly
	Reversing gear badly positioned	Position reversing gear correctly
	All blades jammed	Disassemble exhauster/compressor, clean and wash rotor blades and body.
	Rubber ball close overflow valve	Increase air passage inside valve.

Axle Troubleshooting

Fault	Possible Cause
Excessive brake drum wear	Overheating through excessive braking.
	Contaminated brake linings.
Grease or oil leaks	Incorrect assembly or damaged seal.
	Seal lips distorted (low loader).
	Damaged / worn hub cap gasket.
	Hubometer stem leaks.
Loose wheels	Incorrect torque.
	Worn cones/bolts.
	Mismatched wheels and fasteners.
	Damaged wheels.
	Excessive paint on hub.
Hubs overheating	Bearing adjustment too tight.
	Insufficient lubrication.
	Low loader on heavy duty operation.
Brakes binding or dragging	Failed brake shoe return spring.
	Badly worn bearings
	Incorrectly adjusted brakes
	Brakes not releasing properly
	Faulty valve in brake system
	Faulty trailer air coupling
Bearing failure	Abrasive contamination.
	Overheating due to lack of end float.
	Forcible assembly.
	Incorrect end float
Corrosion	Water, acid and corrosive materials formed by deterioration of lubricant, will produce a reddish-brown coating and small etched holes over outer and exposed surfaces of race. Corrosive oxides also act as a lapping agent.
	Brinelling is caused by improper assembly or removal, usually hammering with off-centre blows. Use tubes, preferably under a press or extractor.
Fatigue	All bearings are subject to fatigue and must be replaced eventually. Your own operating experience will dictate mileage replacement of bearings showing only normal wear.
Shaft fits	Excessive looseness under load is very objectionable because it produces a creeping or slipping of the inner ring on the rotating shaft. This causes the surface metal of the shafts to scrub or wear off.
	When play or looseness even 0.0025 mm exists between the bearing and shaft, there is a very powerful force tending to rotate the inner race on the shaft.
The brakes don’t function or make noise	Brake lining has worn out. Replace the brake lining.
	Wheel bearing is adjusted incorrectly Adjust the wheel bearing.

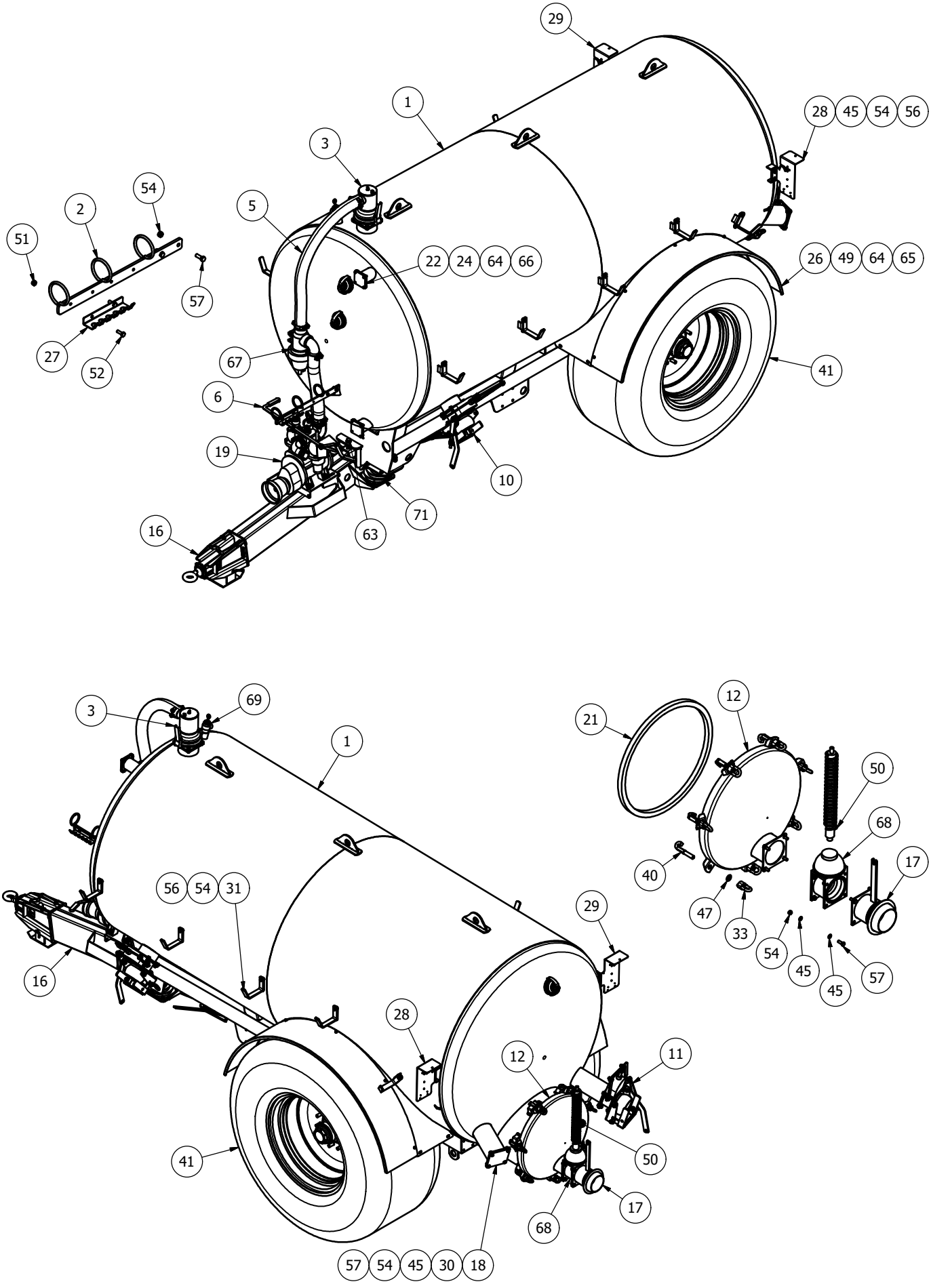
Spare Parts - Tankers

1150, 1500, 1700 and 2000 Standard Slurry Tanker

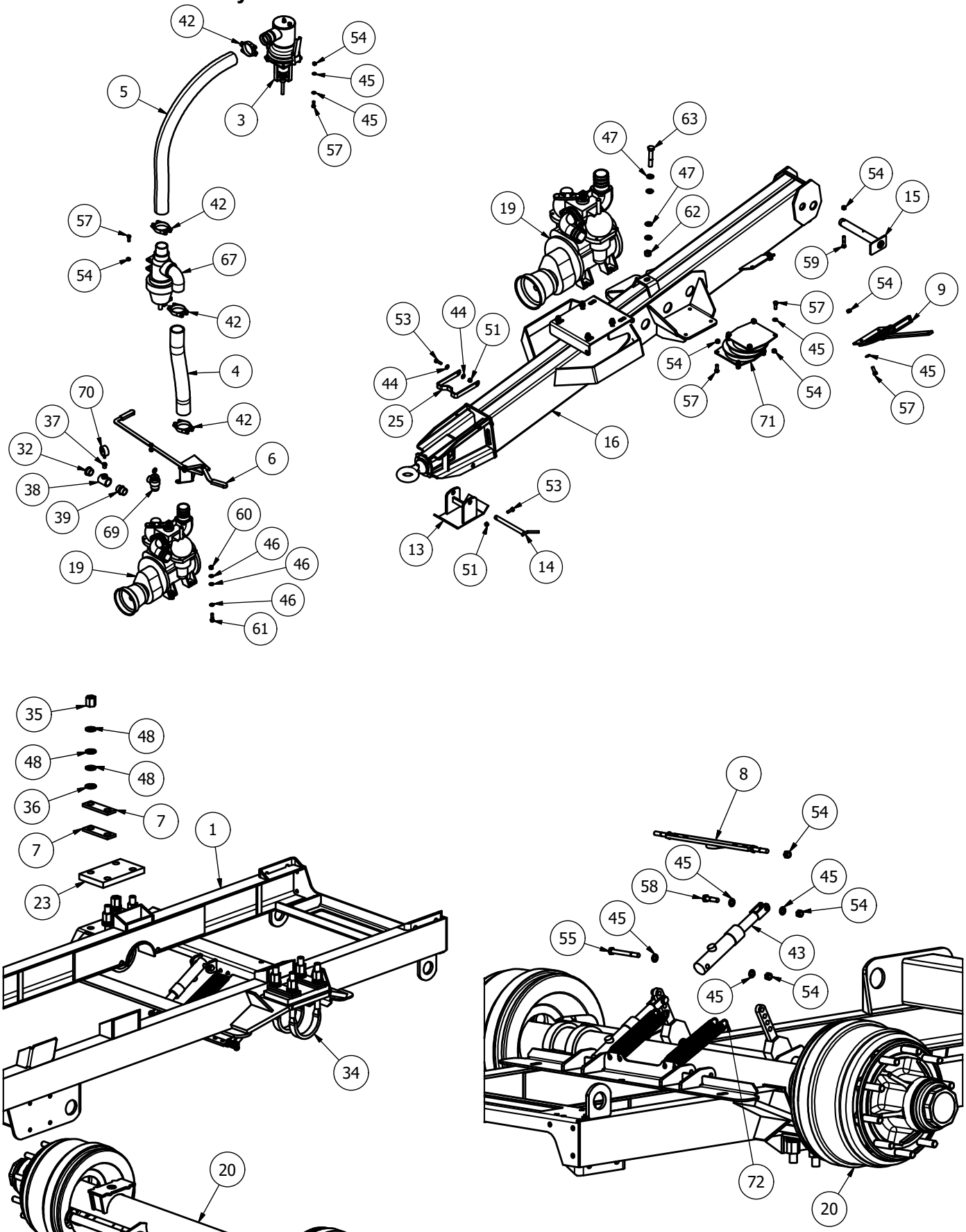


Item	Part No	Description	Qty
1	260900	VALVE HANDLE ASSEMBLY	1
2.1	5000444A	TOP TRAP CAP	1
2.2	5000444B	TOP TRAP CAGE	1
2.3	5000441	Mushroom	1
2.4	FWM20	M20 Flat Washer	13
2.5	3746120	FLOAT BALL (DIA 120mm)	1
2.6	3745100	SEAL BALL (DIA 100mm)	1
2.7	OM022/6	“O” RING	1
2.8	3722161	6” PIPE FLANGE SEAL	1
3	5000801	80mm HOSE (BLACK)	1
4	6PQC-001	6” PIVOT COUPLING	1
5	OM028/6	6” MALE CONNECTION	1
6	SH6	PUMP HANDLE REMOTE LINK	1
7	SH7	PUMP HANDLE LINKAGE	1
8	SV13	20” BACK DOOR	1
9	SV2	6” HOSE BRACKET	8
10	TK-DSA	STANDARD TANK STAND	1
11	TK-DSB	DRAWBAR STAND PIVOT PIN	1
12	TK-PIN	DRAWBAR PIVOT PIN	1
13	TK-PTS001	PTO STAND 11/13/16/20 TANKER	1
14	TK-SDBR	SUSPENSION DRAWBAR FAB	1
15	3772246	1 1/2” HEX NIPPLE	1
16	130020A	M20 Eye Nut	4
17	3722160	6” FLANGE BLANK SEAL	3
18	3770030	Dia 3” Sight Glass	2
19	3772002	1/2”-1/4” REDUCER NIPPLE	1
20	3772022	1 1/4” BUNG	1
21	4000047	M20 Hook Bolt	4
22	4716601	“O” RING	4
23	5/8F	5/8” FINE NYLOC NUT	12
24	58x2FBZP	5/8”x2” FINE BOLT	12
25	7772201	1 1/2”-1/2” BSP TEE	1
27	AD86-95	TWO BOLT HOSE CLAMP	2
28	AM60	MEC 8000 HANDLE	1
29	FWM10	M10 FLAT WASHER	4
30	FWM12	M12 FLAT WASHER	9
31	FWM16	M16 FLAT WASHER	18
32	FWM20	M20 Flat Washer	12
33	FWM6	M6 FLAT WASHER	4
34	HA1	6” SPRING RETURN RAM	1
35	LC2700	TRIANGLE REFLECTOR	2
36	LC360	LAMP	2
37	M10	M10 NYLOC NUT	3
38	M10x40BZP	M10x40 BOLT	2
39	M10x60BZP	M10x60 BOLT	1
40	M12	M12 NYLOC NUT	46
41	M12x30SZP	M12x30 SET BOLT	35
42	M12x35BZP	M12x35 BOLT	11
43	M12x50BZP	M12x50 BOLT	1
44	M16	M16 NYLOC NUT	2
45	M20	M20 NYLOC NUT	2
46	M20x110BZP	M20x110 BOLT	2
47	M6x20SZP	M6x20 SET BOLT	4
48	MEC8000	PTO POWERED VAC PUMP	1
49	MOT75	DIA 105x75 BUFFER	2
50	MOT75-SPRG-01	TANK BUFFRE SPRING	2
51	R1716/6	6” GATE VALVE	1
52.1	R1716/6	6” GATE VALVE	1
52.2	4719600	BRASS ROD (6”)	1
52.3	4716607	GATE VALVE FORK	1
52.4	4716604	6” DOME VALVE TONGUE	1
53	R1727	SAFETY VALVE	1
54	R1765	1/4” PRESS” GAUGE 3 BAR MAX	1
55	37	LINCH PIN DIA 6	1
56	SH4	PUMP HANDLE MOUNT	1
57	SV13A	20” DOOR SEAL	1
58	3722170	6” PIPE FLANGE BLANK	3
59	TA LGPLITL (2TK5-L)	LGP LIGHT BRACKET (LH)	1
60	TA LGPLITR (2TK5-R)	LGP LIGHT BRACKET (RH)	1
65	QV70	STD TANKER BRAKE RAM	1
66	20090B-01	HANDBRAKE PLATE	1
67	MG165F1	STD TANKER HANDBRAKE	1
68	STW10-HB	HANDBRAKE CABLE	1
69	STW10-BR	BRAKE CABLE	1
70	STW10G	DIA 8mm WIRE ROPE GRIP	8
71	EDOW14	1/4” DOWTY WASHER	1
72	EMM14	1/4” M/M CONNECTOR	1
73	111070	DIA 50.5-54mm INSERT	4
74	190.000.545	PTO GUARD (EXTENDED OVAL)	1

LGP Tanker - Assembly



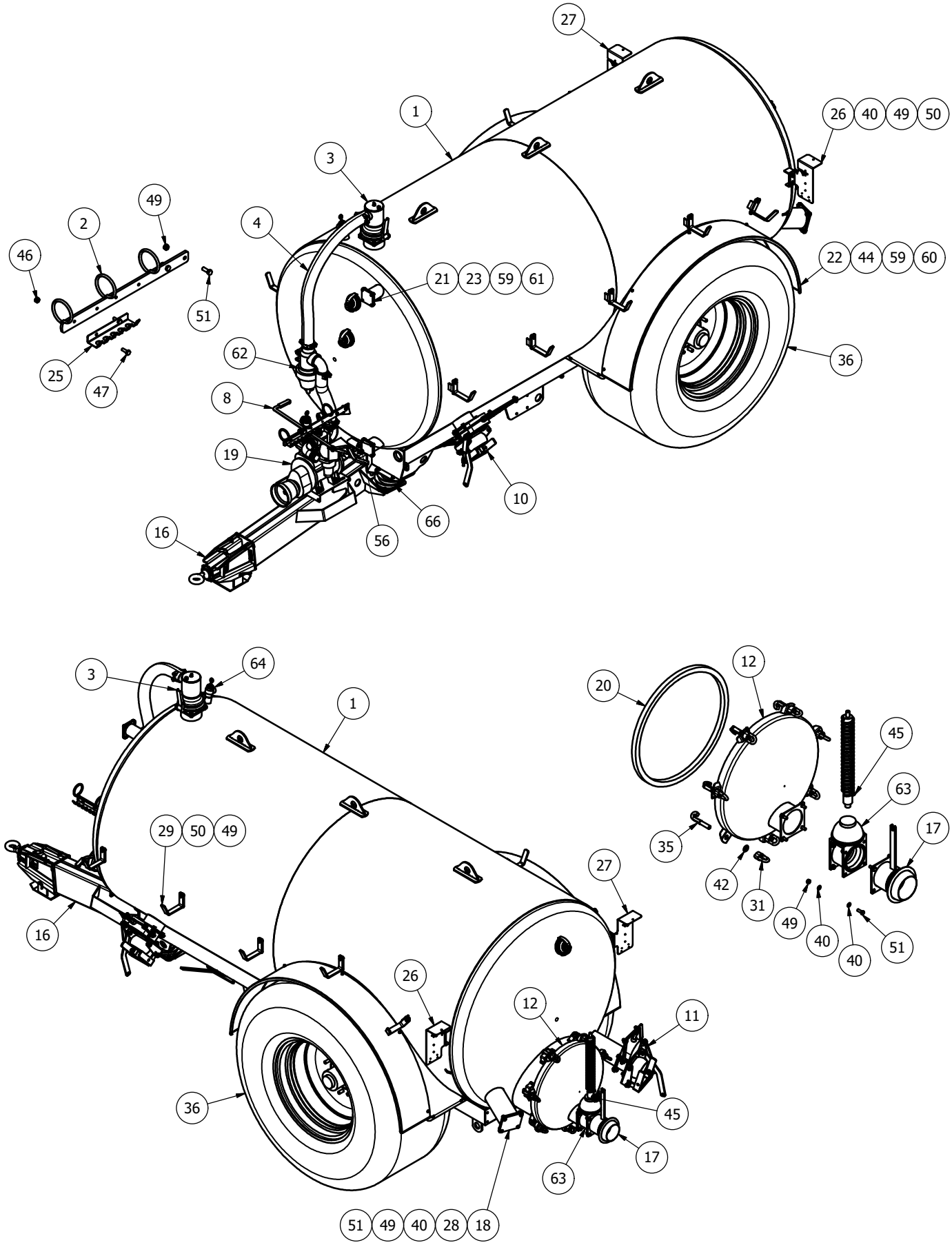
LGP Tanker - Assembly



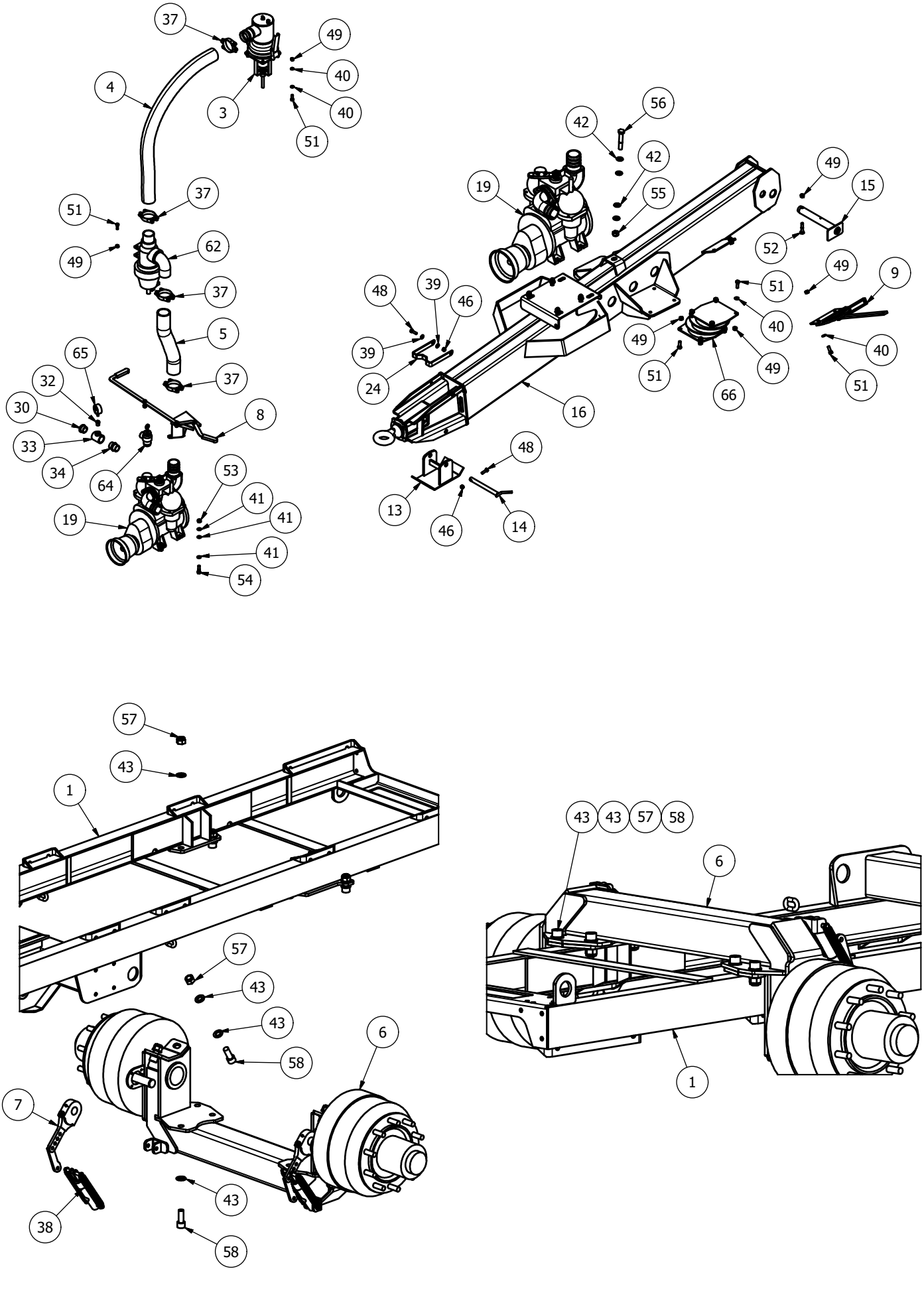
LGP Tanker - Parts List

Item	Part No	Description	Qty
1	2400LGP-TK	2400 LGP TANK	1
2	2TKBC-2	CABLE LOCATION BAR	1
3	5000444/80	TOP TRAP 80mm	1
4	5000801-1	80mm HOSE (BLACK)	1
5	5000801-2	80mm HOSE (BLACK)	1
6	AM50-9000	CHANGE-OVER HANDLE (9000)	1
7	LGP-A10	AXLE WASHER	8
8	LGP-ABB	BRAKE BAR	1
9	MG165F1-A	TANKER HANDBRAKE	1
10	R1716-6S	SIDE FILL COMPLETE (LH)	1
11	R1716-6SH	SIDE FILL COMPLETE (RH)	1
12	SV305-S	30.5" Back Door for 29" Tube	1
13	TK-DSA	STANDARD TANK STAND	1
14	TK-DSB	DBAR STAND PIVOT PIN	1
15	TK-PIN	DRAWBAR PIVOT PIN	1
16	TK-SDBR-SE	SWIVEL EYE DRAWBAR	1
17	OM028-6N	6" MALE CONNECTION	1
18	3722160	6" FLANGE BLANK SEAL	2
19		PUMP	1
20	S-MAJOR-007	LGP AXLE	1
21	SV16A	29" DOOR SEAL	1
22	TA-ST100-03	100mm PIPE FLANGE SEAL	2
23	AXL2-PL	AXLE PLATE	2
24	TA-ST100-02	100mm PIPE FLANGE BLANK	2
25	TK-PTS001	PTO STAND (TANKER)	1
26	TK-SMU28-66-G	28" MUDGUARD	2
27	TA-HCM04	CABLE MOUNT	1
28	TA-LGPLITL	LGP LIGHT BRACKET (LH)	1
29	TA-LGPLITR	LGP LIGHT BRACKET (RH)	1
30	3722170	6" PIPE FLANGE BLANK	2
31	SV2	6" HOSE BRACKET	10
32	112_PLUG	1 1/2" BSP PLUG	1
33	130020A	M20 EYE NUT	7
34	13033-B	M24 'U' BOLT	4
35	13033-N	M24 NUT (THICK)	8
36	13033-W	M24 FLAT WASHER (AXLE)	8
37	3772002	1/2"-1/4" REDUCER NIPPLE	1
38	3772201	1 1/2"-1/2" BSP TEE	1
39	3772246	1 1/2" NIPPLE	1
40	4000047	M20 HOOK BOLT	7
41		WHEEL	2
42	AD86-95	TWO BOLT HOSE CLAMP	4
43	DIS30110	BRAKE DISPLACEMENT RAM	2
44	FWM10	M10 FLAT WASHER	4
45	FWM12	M12 FLAT WASHER	62
46	FWM14	M14 FLAT WASHER	12
47	FWM20	M20 FLAT WASHER	11
48	FWM24	M24 FLAT WASHER	24
49	FWM8	M8 FLAT WASHER	20
50	HA1	6" SPRING RETURN RAM	1
51	M10	M10 NYLOC NUT	5
52	M10x30SZP	M10x30 SET BOLT	2
53	M10x35SZP	M10x35 SET BOLT	3
54	M12	M12 NYLOC NUT	63
55	M12x120BZP	M12x120 BOLT	2
56	M12x30SZP	M12x30 SET BOLT	14
57	M12x35BZP	M12x35 BOLT	42
58	M12x50BZP	M12x50 BOLT	2
59	M12x60BZP	M12x60 BOLT	1
60	M14	M14 NYLOC NUT	4
61	M14x50BZP	M14x50 BOLT	4
62	M20	M20 NYLOC NUT	1
63	M20x110BZP	M20x110 BOLT	1
64	M8	M8 NYLOC NUT	18
65	M8x25SZP	M8x25 SET BOLT	10
66	M8x30BZP	M8x30 BOLT	8
67	R1336-80	OVERFLOW TRAP	1
68	R1706-6	6" DOME GATE VALVE	1
69	R1727	SAFETY VALVE1 1/2" BSP	2
70	R1765	1/4" PRESS' GAUGE 3 BAR MAX	1
71	SO700	RUBBER BUFFER	2
72	SPR3-5-180	BRAKE RAM SPRING	4

Alpine Tanker - Assembly



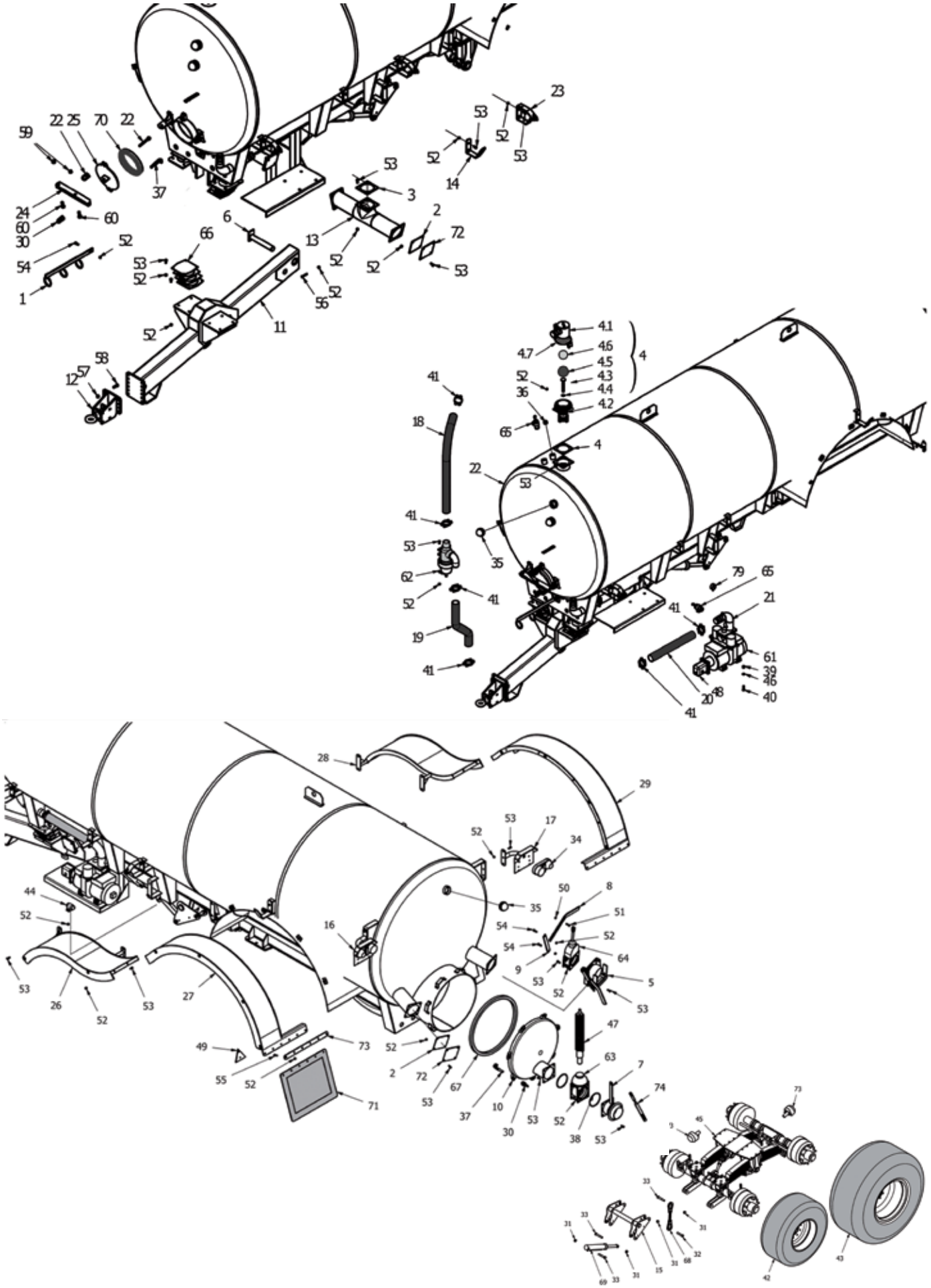
Alpine Tanker - Assembly



Alpine Tanker - Parts list

Item	Part No	Description	Qty
1	2300ALP-TK	2300 ALP TANK	1
2	2TKBC-2	CABLE LOCATION BAR	1
3	5000444/80	TOP TRAP 80mm	1
4	5000801-2	80mm HOSE (BLACK)	1
5	5000801-3	80mm HOSE (BLACK)	1
6	ALP-AX-01	ALPINE AXLE	1
7	ALP-AX-20	SLACK ADJUSTER	2
8	AM50-9000	CHANGE-OVER HANDLE (9000)	1
9	MG165F1-A	TANKER HANDBRAKE	1
10	R1716-6S	SIDE FILL COMPLETE (LH)	1
11	R1716-6SH	SIDE FILL COMPLETE (RH)	1
12	SV305-S	30.5" Back Door for 29" Tube	1
13	TK-DSA	STANDARD TANK STAND	1
14	TK-DSB	DBAR STAND PIVOT PIN	1
15	TK-PIN	DRAWBAR PIVOT PIN	1
16	TK-SDBR-SE	SWIVEL EYE DRAWBAR	1
17	OM028-6N	6" MALE CONNECTION	1
18	3722160	6" FLANGE BLANK SEAL	2
19	MEC-9000-M	9000 PUMP PTO 540rpm	1
20	SV16A	29" DOOR SEAL	1
21	TA-ST100-03	100mm PIPE FLANGE SEAL	2
22	ALP-MUD01G	ALPINE GALV MUDGUARD	2
23	TA-ST100-02	100mm PIPE FLANGE BLANK	2
24	TK-PTS001	PTO STAND (TANKER)	1
25	TA-HCM04	CABLE MOUNT	1
26	TA-LGPLITL	LGP LIGHT BRACKET (LH)	1
27	TA-LGPLITR	LGP LIGHT BRACKET (RH)	1
28	3722170	6" PIPE FLANGE BLANK	2
29	SV2	6" HOSE BRACKET	10
30	112_PLUG	1 1/2" BSP PLUG	1
31	130020A	M20 EYE NUT	7
32	3772002	1/2"-1/4" REDUCER NIPPLE	1
33	3772201	1 1/2"-1/2" BSP TEE	1
34	3772246	1 1/2" NIPPLE	1
35	4000047	M20 HOOK BOLT	7
36	800-60R34	DIA 1824x800mm	2
37	AD86-95	TWO BOLT HOSE CLAMP	4
38	DIS30110-C1	DIA 30x110x DIA 14	2
39	FWM10	M10 FLAT WASHER	4
40	FWM12	M12 FLAT WASHER	54
41	FWM14	M14 FLAT WASHER	12
42	FWM20	M20 FLAT WASHER	11
43	FWM24	M24 FLAT WASHER	20
44	FWM8	M8 FLAT WASHER	20
45	HA1	6" SPRING RETURN RAM	1
46	M10	M10 NYLOC NUT	5
47	M10x30SZP	M10x30 SET BOLT	2
48	M10x35SZP	M10x35 SET BOLT	3
49	M12	M12 NYLOC NUT	57
50	M12x30SZP	M12x30 SET BOLT	14
51	M12x35BZP	M12x35 BOLT	42
52	M12x60BZP	M12x60 BOLT	1
53	M14	M14 NYLOC NUT	4
54	M14x50BZP	M14x50 BOLT	4
55	M20	M20 NYLOC NUT	1
56	M20x110BZP	M20x110 BOLT	1
57	M24	M24 NYLOC NUT	10
58	M24x60SKS	M24x60 SOCKET HEAD SCREW 12.9	10
59	M8	M8 NYLOC NUT	18
60	M8x25SZP	M8x25 SET BOLT	10
61	M8x30BZP	M8x30 BOLT	8
62	R1336-80	OVERFLOW TRAP	1
63	R1706-6	6" DOME GATE VALVE	1
64	R1727	SAFETY VALVE1 1/2" BSP	2
65	R1765	1/4" PRESS' GAUGE 3 BAR MAX	1
66	SO700	RUBBER BUFFER	2

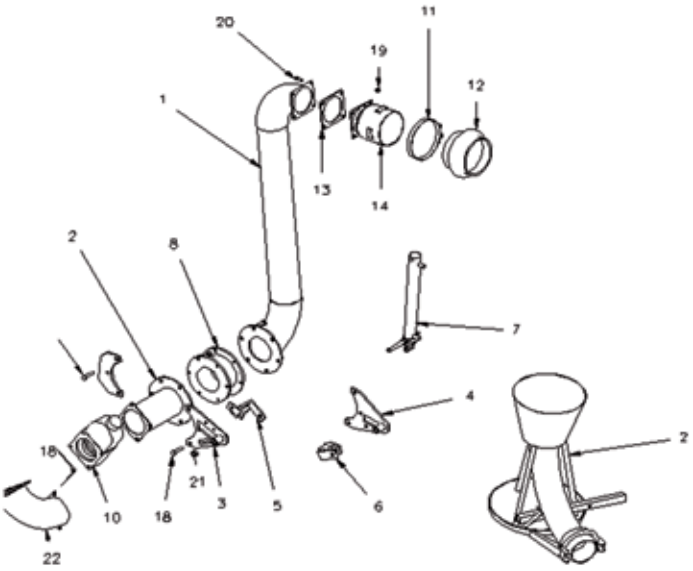
3500 Challenger - Assembly



3500 Challenger Tanker - Parts list

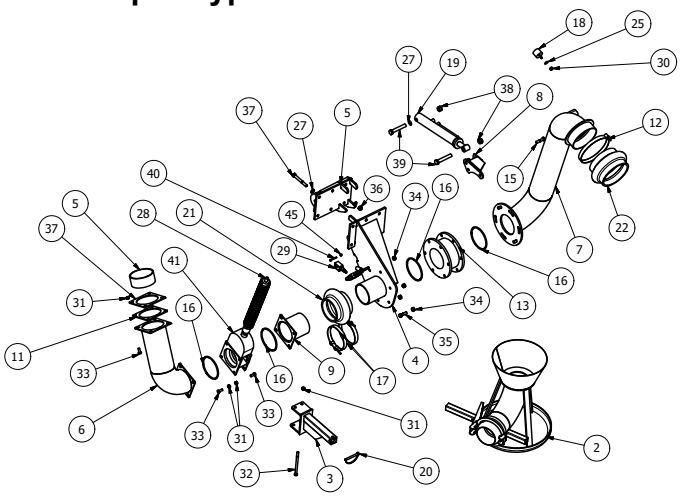
Item	Part No	Description
1	2TKBC-2	Cable Location Bar
2	3722160	6” Flange Blank Seal
3	3722161	6” Pipe Flange Seal
4	50004446	TOP TRAP 80mm
4.1	5000444A	Top Trap Cap
4.2	5000444B	Top Trap Cage
4.3	5000441	Mushroom
4.4	FWM20	M20 Flat Washer
4.5	3746120	Float Ball
4.6	3745100	Seal Ball
4.7	OM022/6	‘O’ Ring
4.8	3722161	6” Pipe Flange Seal
5	6PQC-001	6” Pivot Coupling
6	DTKP-1A	Drawbar Pivot Pin
7	OM028/6	6” Male Connection
8	R1716-6HDL	Valve Handle (260900 Complete unit)
9	R1716-6L	Valve Linkage
10	SV16/6	29 1/2” Rear Door
11	T31-D	Drawbar
12	T31-DH	Adjustable Swivel Hitch
13	T31-F001	Front Filler Tube
14	T31-HH01	Vacuum Hose Mount
15	T31-L	Axle Lift Arm
16	T31-LTE-L	Light Bracket Left-Hand
17	T31-LTE-R	Light Bracket Right-Hand
18	T31-P002	80mm HOSE (BLACK)
19	T31-P003	80mm HOSE (BLACK)
20	T31-P004	80mm HOSE (BLACK)
21	T31-PU01	8000 Vac Pump Outlet
22	T35-SFAB	Tanker (ref)
23	TA-HHL	Lockable Hose Hanger
24	TA-IHARM	Hinge Arm
25	TA-IHL	Inspection Hatch Lid
26	TA-MU-LF	Front L-Hand Mudguard
27	TA-MU-LR	Left Rear Mudguard
28	TA-MU-RF	Front R-Hand Mudguard
29	TA-MU-RR	Rear R/Hand Mudguard
30	130020A	M20 Eye Nut
31	1/CHEX	1” Fine Plain Nut
32	1x5FBZP	1”X5” FINE BOLT
33	1x6FBZP	1”X6” FINE BOLT
34	380100	Rubber Backed Lighting
35	3770030	Dia 3” Sight Glass
36	3772022	1 1/4” Bung
37	4000047	M20 Hook Bolt
38	4716601	‘O’ Ring
39	5/8F	5/8” Fine Nyloc Nut
40	58x2FBZP	5/8”X2” FINE BOLT
41	AD86-95	Two Bolt Hose Clamp
42	BN3	DIA 1280x520mm
43	BN7	DIA 1800x790mm
44	CA9710	Side Marker- Red / Clear Lights
45	CHAL-AX-V3	Challenger Tanker Bogey
46	FWM16	M16 Flat Washer
47	HA1	Spring Return Ram
48	KM73 (CML74)	Hydraulic Motor
49	LC2700	Triangle Reflector
50	M10	M10 Nyloc Nut
51	M10x40BZP	M10x40 Bolt
52	M12	M12 Nyloc Nut
53	M12x30SZP	M12x30 Set Bolt
54	M12x35BZP	M12x35 Bolt
55	M12x40BZP	M12x40 Bolt
56	M12x70BZP	M12x70 Bolt
57	M16	M16 Nyloc Nut
58	M16x50BZP	M16x50 Bolt
59	M20	M20 Nyloc Nut
60	M20x60BZP	M20x60 Bolt
61	MEC8HYD	Hyd Vac Pump
62	R1336/80	Overflow Trap
63	R1706/6	6” Dome Gate Valve
64	R1716/6H	6” GATE VALVE C/W ROD
65	R1727	Safety Valve
66	SO700	Rubber Buffer
67	SV16A	29” Door Seal
68	T35CHAIN	Lifting Chain
69	T35-LR_B	Axle Lift Ram
70	TA-IH-S	12” Inspection Cover Seal
71	T35-LR_R	Lift Axle Ram Rod
71	TA-MU-14	Rubber Mudguard
72	3722170	6” Pipe Flange Blank
73	T24-30	Air/Hyd. Brake Ram
73	TA-MU-09	Rubber Mudguard Clamp
74	TA-SP021	Support Arm
79	R1765	1/4” Press’ Gauge

Autocoupler type 1



Item	Part No	Description
1	TA-FB	Auto-Coupler Boom
2	TA-FBP	Auto Coupler Short Pipe
3	TA-FBIRM	Ram Pivot Mount
4	TA-FBORM	Ram Mount
5	TA-FBRML	Long Ram Mount
6	TA-FBRMS	Short Ram Mount
7	TA-FBRAM	Auto Coupler Ram
8	BP2001/G	6” Swivel
10	R1716/6	6” Gate Valve
11	5101170	Hose Clip For Rubber Cone
12	BP1101/H	8” Connector
13	3722161	Flange Gasket
14	TA-FBE	Auto Coupler Boom End
15	TA-FB2	Swivel Tank Mount
16	5/8F	5/8” Fine Nyloc Nut
17	58X2FBZP	5/8” X 2” Fine Bolt
18	58X212FBZP	5/8” X 2 1/2” Fine Bolt
19	M12	M12 Nyloc Nut
20	M12X30BZP	M12 X 30 Set Bolt
21	M20	M20 Nyloc Nut
22	TA-FB90	Autocoupler 90 Bend
23	TA-FBC	Filler Cone

Autocoupler type 2



Item	Part No	Description	Qty
1	PC3	9, 11, 13500 HYD CHANGE OVER	1
2	TA-6GHC	6" AUTOCOUPLER HOPPER	1
3	TA-6GHCM	HOPPER TANK MOUNT	1
4	TA-6HC-AR	STD HOPPER COUPLER BASE (RH)	1
5	TA-6HC-BR	RAM MOUNT (RH)	1
6	TA-6HC-CR	INLET PIPE	1
7	TA-6HC-DR	SHORT HOPPPER COUPLER BOOM	1
8	TA-6HC-ER	RAM SWIVEL MOUNT (RH)	1
9	TA-6HC-F	HOSE ADAPTOR	1
10	TA-8GHC-081	COUPLER BRACE TUBE	1
11	3722161	6" PIPE FLANGE SEAL	1
12	5101180	HOSE CLIP (214-226)	1
13	BP2001-G	6" SWIVEL	1
14	MOT38D	3/8" HYDRAULIC BALL VALVE	1
15	M14x60BZP	M14x60 BOLT	2
16	4716601	O' RING	4
17	5101150	HOSE CLIP 162-174	2
18	53005802	DIA 50x40xM10 BUFFER	1
19	8AC-RAM	AUTO COUPLER RAM BODY	1
20	AG272	SHAFT LOCK PIN DIA 11	1
21	BP1101-G	6" FLEXIBLE CONNECTOR	1
22	BP1101-H	8" CONNECTOR	1
23	CRP3890	3/8" CRIMP SWEPT (90 Deg)	1
24	EMM38	3/8" M/M CONNECTOR	2
25	FWM10	M10 FLAT WASHER	1
26	FWM14	M14 FLAT WASHER	4
27	FWM16	M16 FLAT WASHER	14
28	HA1	6" SPRING RETURN RAM	1
29	HDV14	PRESSURE RELIEF VALVE	1
30	M10	M10 NYLOC NUT	1
31	M12	M12 NYLOC NUT	14
32	M12x200BZP	M12x200 BOLT	2
33	M12x30SZP	M12x30 SET BOLT	12
34	M14	M14 NYLOC NUT	12
35	M14x50BZP	M14x50 BOLT	10
36	M16	M16 NYLOC NUT	6
37	M16x130BZP	M16x130 BOLT	6
38	M20	M20 NYLOC NUT	2
39	M20x120SZP	M20x120 SET BOLT	2
40	M6x50SZP	M6x50 SET BOLT	2
41	R1716/6	6" GATE VALVE	1

Tanker Lights Wiring

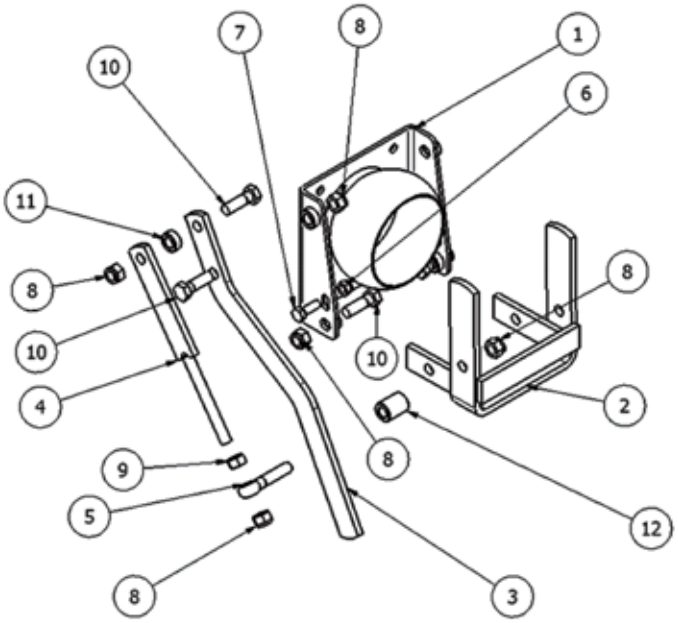
Italian wiring code

1	GREEN	LH indicator
2	SPARE	
3	BLACK	EARTH
4	WHITE	RH indicator
5	SPARE	
6	RED	STOP lights
7	YELLOW	PARKING lights

European wiring code

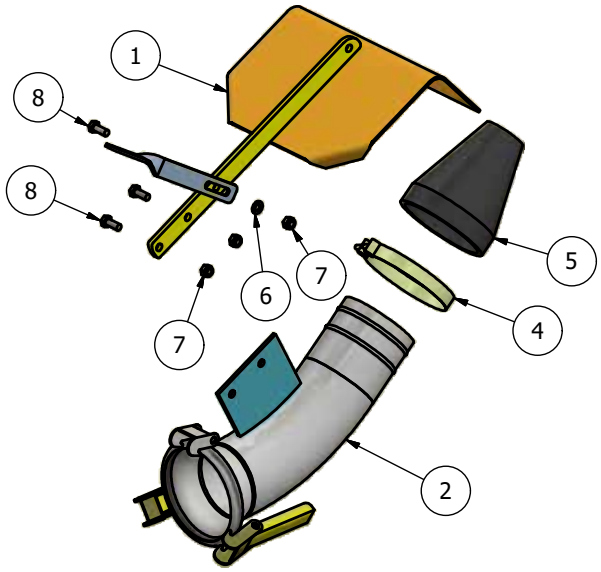
1	YELLOW	LH indicator
2	BLUE	SPARE
3	WHITE	EARTH
4	GREEN	RH indicator
5	BROWN	PARKING lights
6	RED	STOP lights
7	BLACK	PARKING lights

Quick Coupling



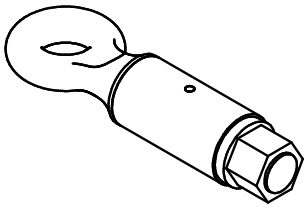
Item	Part No	Description
1	6PQC-010	Quick Coupling Bal
2	6PQC-020	Coupling Clamp
3	6PQC-040	Handle
4	OM052/4	Adjuster Rod
5	EB-1680	Eye Bolt M16x80
6	M12	M12 Nyloc Nut
7	M12x35BZP	M12x35 Bolt
8	M16	M16 Nyloc Nut
9	M16HEX	M16 Plain Nut
10	M16x50BZP	M16x50 Bolt
11	6PQC-012P	Quick Coupling Bush
12	6PQC-014	Coupling Bush (Long)

Splash Plate



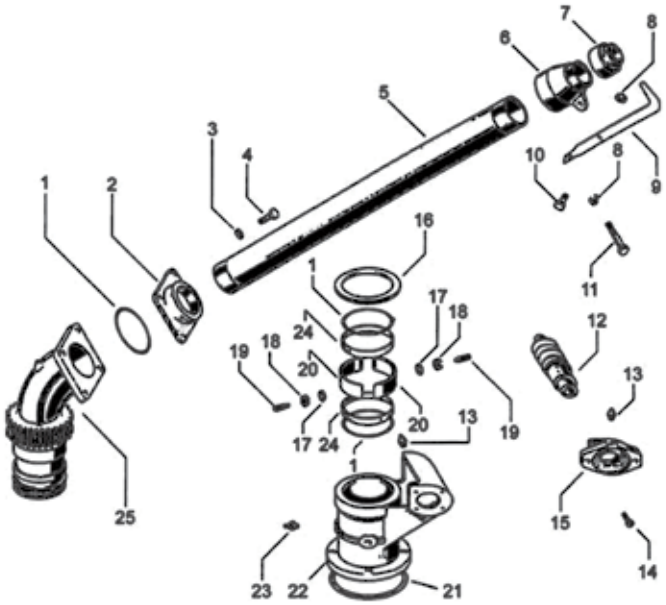
Item	Part No	Description	Qty
1	OM051A	LOW ANGLE SPLASH PLT	1
2	OM051-1	6" FEMALE DISGHARGE PIPE	1
3	TA-SP021	SUPPORT ARM	1
4	5101150	HOSE CLIP 162-174	1
5	5103306	DISCHARGE CONE	1
6	FWM12	M12 FLAT WASHER	1
7	M12	M12 NYLOC NUT	3
8	M12x30SZP	M12x30 SET BOLT	3
9	OM022-6	6" O' RING FOR COUPLING	1

Swivel towing eye



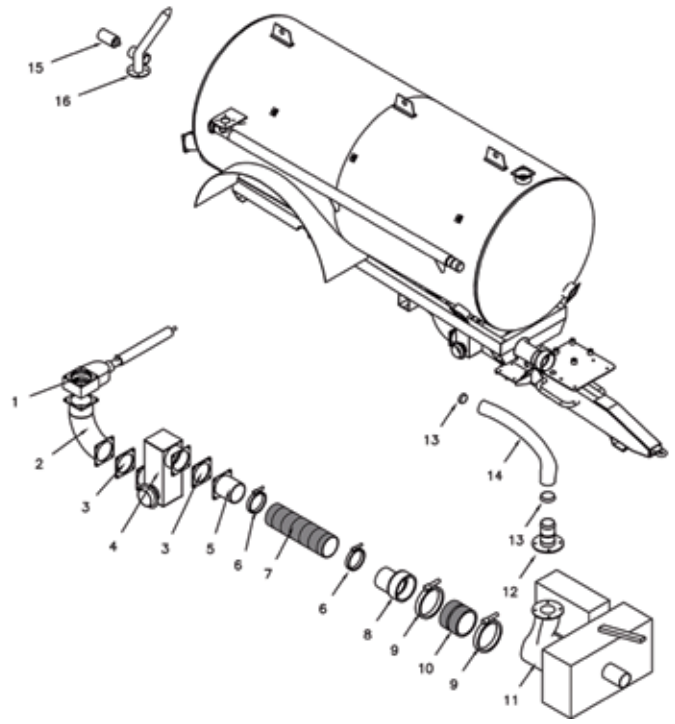
Item	Part No	Description	Qty
1	10396	Swivel towing eye dia 50	1

Jetter (Raingun) Nozzle



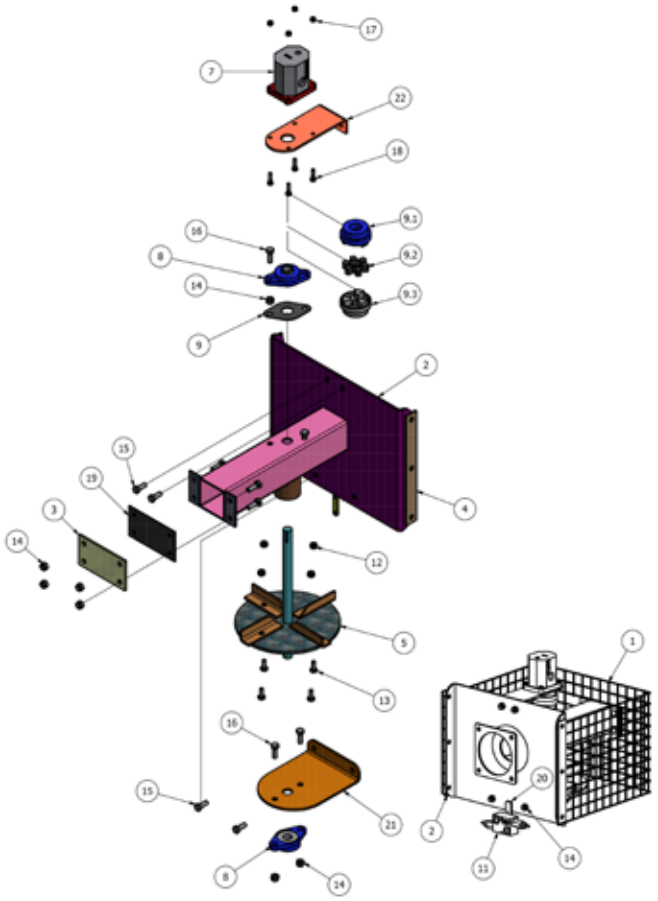
Item	Part No	Description
1	5030210008BP	O RING
2	4010601079BP	FLANGE PLATE
3	FWM10	Washer
4	M10X25BPZ	Bolt
5	4011806004BP	Tube 3” x750
6	4010001003BP	Large Nozzle
7	4010001004BP	Small Nozzle
8	M8	Nut
9	4010006004BP	Nozzle Needle
10	M8X30BZP	Bolt
11	M8X50BZP	Bolt
12	4020006003BP	Hydraulic Fitting
13		Grease Nipple
14	M6X16SZP	Bolt
15	4010406006BP	Flange
16	5060205004BP	Top Seal
17	5050202002BP	Washer
18	M10	M10 Nyloc Nut
19	5051007003BP	Stud
20	4011806002BP	Wear Ring
21	69911470OR	O Ring
22	4011001020BP	Flange Housing
23		Grease Nipple M10
24	5060205002BP	Guide Ring
25	4010101033BP	Swivel Flange Body

Jetter (Raingun)



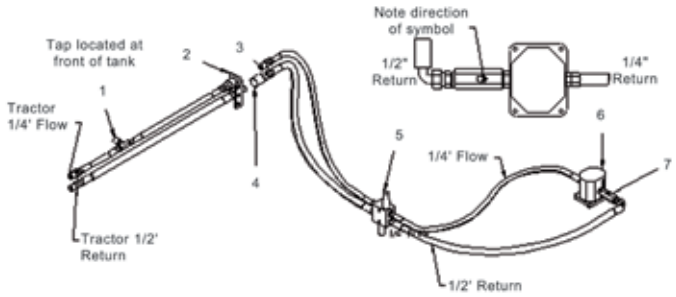
Item	Part No	Description
1	R1716/6	6” Gate Valve & Spring Return Ram
2	JET7	Stone Trap Bend (LGP)
3	GARDA-1A	Garda Mount Plate
4	JST-P101	Jetter Stone Trap (Paint)
5	JET9	Pipe Outlet
6	5101150	Circlip
7	TVTE150	6” Hose
8	JET20	8” To 6” Pipe Reducer
9	5101200	Circlip
10	BP1101/H	8” Connector
11	GARDA75	Garda Pump
12	GARDA5	Pump Outlet
13	510100	Circlip
14	TGRE100	100mm HOSE
15	GMP320	Hydraulic Motor
16	BP210/E	Hydraulic jetter with flange

Water Spreader



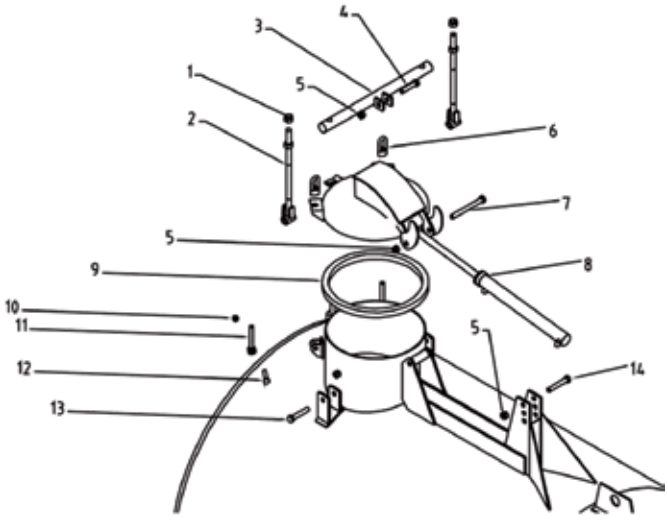
Item	Part No	Description	Qty
1	TA-GRD	WATER SPINNER MESH	1
2	TA-WSA	WATER SPINNER BODY	1
3	TA-WSA5	WATER SPRDER BX END CAP	1
4	TA-WSA8	MESH CLAMP	2
5	TA-WSDSK	WATER SPREADER DISK	1
6	TA-WSM2	MOTOR MOUNT SUPPORT	1
7	02ZMAG14E034R	WATER SPINNER MOTOR	1
8	BR01	FLANGE BEARING	2
9	BR01-G	SEAL FOR WATER SPINNER	1
10	HRC-90	COUPLING	1
9.1	HRC-090F 1108-15	15mm BORE	1
9.3	HRC-090F 1108-25	1" BORE	1
9.2	HRC-090	COUPLING INSERT	1
11	LU002284000	CROSS FLOW RELIEF VALVE	1
12	M10	M10 NYLOC NUT	4
13	M10x25SZP	M10x25 SET BOLT	4
14	M12	M12 NYLOC NUT	11
15	M12x30SZP	M12x30 SET BOLT	4
16	M12x35BZP	M12x35 BOLT	8
17	M8	M8 NYLOC NUT	4
18	M8x30BZP	M8x30 BOLT	4
19	TA-WSA6	BOX END GASKET	1
20	TA-WSA7	SPINNER VALVE MOUNT	1
21	TA-WSB1	SPREADER BEARING MOUNT	1
22	TA-WSMO	WATER SPREAD MOTR MNT	1

Hydraulic Circuit



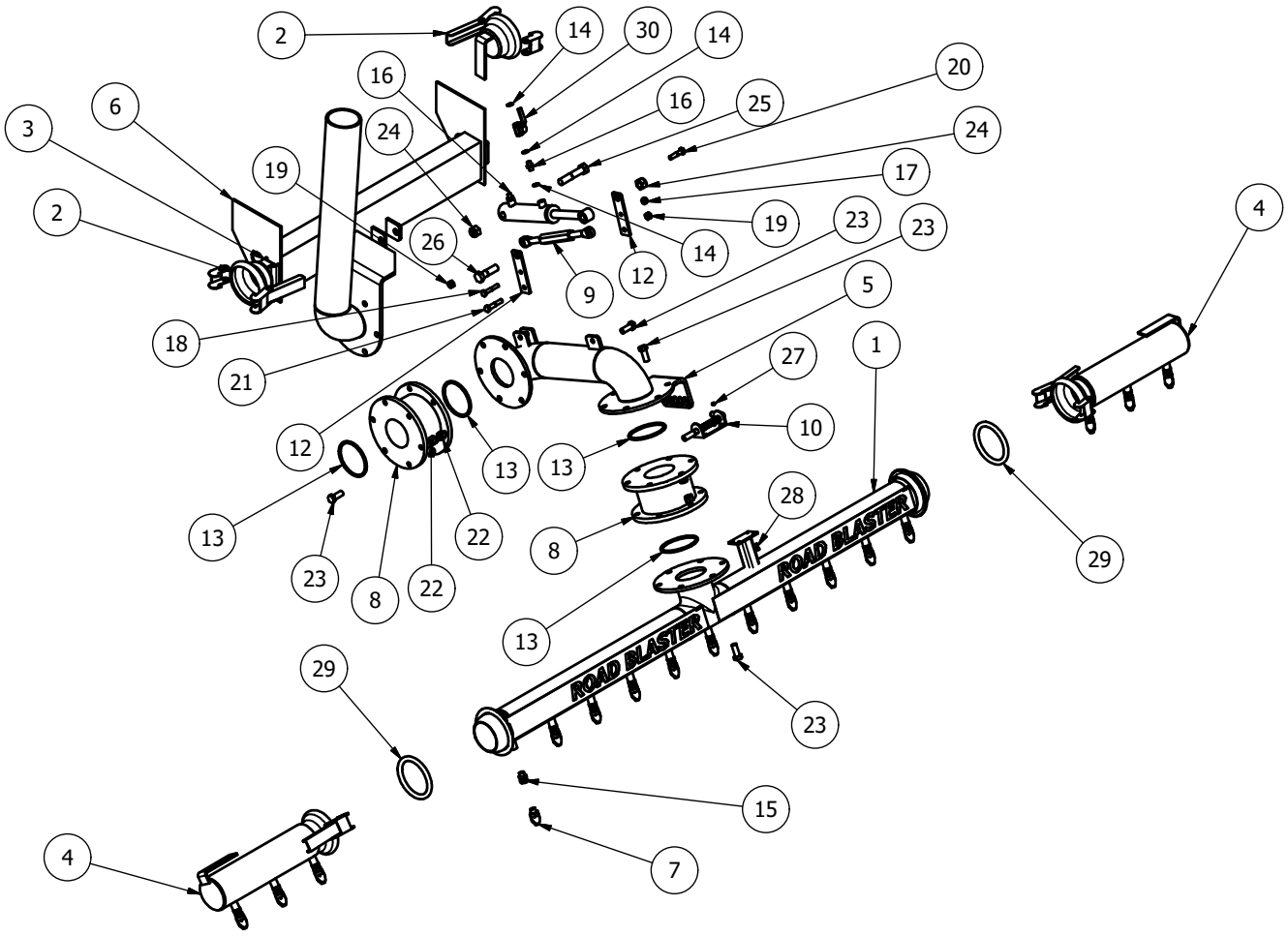
Item	Part No	Description
1	201011	Tap Speed Control
2	4411	Mounting Bracket
3	12QRM	Male Flow connector
4	12QRF	Female Return connector
5	1RLD03R2D-D	Cross flow relief valve
6	1ML22DR10	Hydraulic Motor
7	VR13	Non-Return Valve

Top Fill



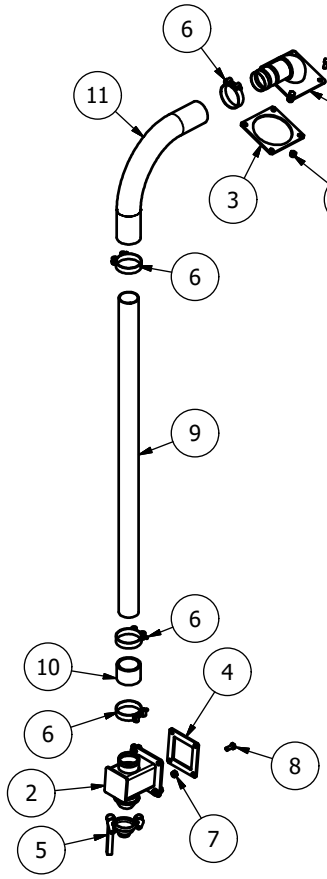
Item	Part No	Description
1	M24	Nyloc Nut
2	TTF-TIE	Top Fill Tie Bar
3	TTF-BAR	Top Fill Bar
4	M20X90BZP	Bolt
5	M20	Nyloc Nut
6	MG16910A	Clamp Nut
7	M20X200BZP	Bolt
8	TTFRM	Hydraulic Ram
9	SV13A	Seal
10	M16	Nyloc Nut
11	MG16910B	Clamp Bolt
12	M16X75BZP	Bolt
13	M20X110BZP	Bolt
14	M20X120BZP	Bolt

Road Blaster



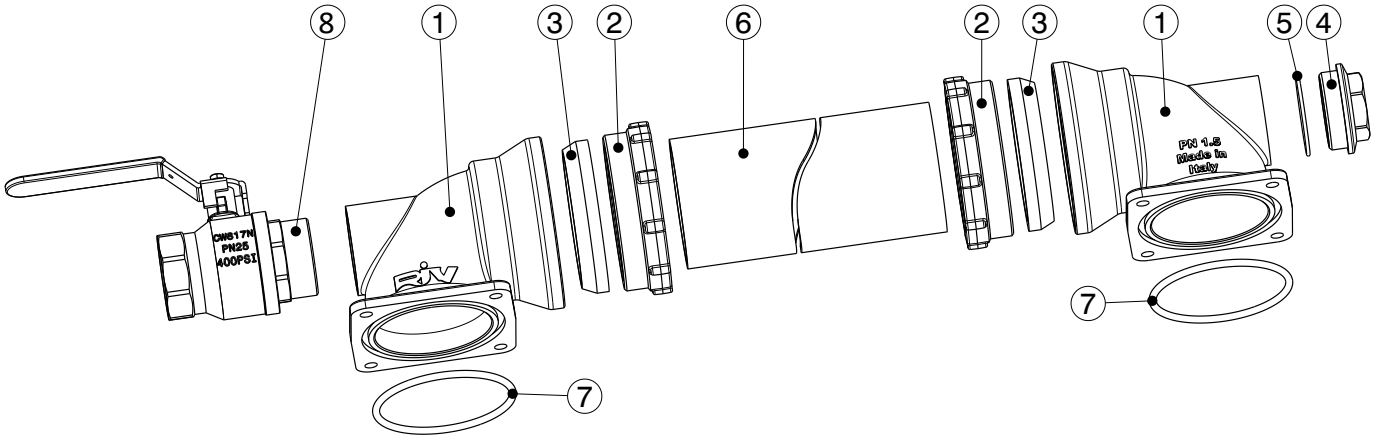
Item	Part No	Description	Qty
1	TA-BLSTR-BR	ROAD BLASTER OUTLET	1
2	TA-BLSTR-C	BLASTER END CAP	2
3	TA-BLSTR-EXM01	EXT PIPE HOOK	2
4	TA-BLSTR-EXT2	BLASTER 2 PORT EXT'	2
5	TA-BLSTR-L	BLASTER LIFT	1
6	TA-BLSTR-MNT	BLASTER MOUNT	1
7	B3-8P-5060	NOZZLE FOR BLASTER	17
8	BP2001-D	4" SWIVEL	2
9	E5338-BLASTER	1/2"x3/4" TURNBUCKLE	1
10	G3011	5/8" SPRING LOADED BOLT	1
11	SC75-RAM	SWEEPER RAM	1
12	BLAST_L-24	RAM LINKAGE	2
13	4716000	4" 'O' RING	4
14	EDOW14	1/4" DOWTY WASHER	4
15	EMF38	3/8" M/F CONNECTOR	17
16	EMM14RV	1/4" M/M RESTRICTOR (DIA 1mm)	2
17	M10	M10 NYLOC NUT	1
18	M10x60BZP	M10x60 BOLT	1
19	M12	M12 NYLOC NUT	2
20	M12x50BZP	M12x50 BOLT	1
21	M12x60BZP	M12x60 BOLT	1
22	M16	M16 NYLOC NUT	24
23	M16x40SZP	M16x40 SET BOLT	24
24	M20	M20 NYLOC NUT	2
25	M20x100BZP	M20x100 BOLT	1
26	M20x70BZP	M20x70 BOLT	1
27	M5	M5 NYLOC NUT	4
28	M5x16SZP	M5x16 SET BOLT	4
29	OM022-4	4" COUPLING 'O' RING	2
30	R1362-14	1/4" BALL VALVE	1

Full length sight glass (3”)



Item	Part No	Description	Qty
1	3-HOSE-6-90	3" Hose Tail 6" Flange 90 Deg	1
2	TA-RST-60-BO	SIGHT TUBE BASE BOLT-ON	1
3	3722161	6" PIPE FLANGE SEAL	1
4	TA-RST-102-BO	SIGHT TUBE SEAL	1
5	TA-RST-55	2" BLANK CAP	1
6	5101080	HOSE CLIP 86-91 (3"HOSE)	4
7	M12	M12 NYLOC NUT	8
8	M12x30SZP	M12x30 SET BOLT	8
9	TA-RST-35	POLYCARBONATE SIGHT TUBE	1
10	TA-RST-74	75mm GREEN SUCTION HOSE	1
11	TA-RST-75	75mm GREEN SUCTION HOSE	1

Full length sight glass (4”)



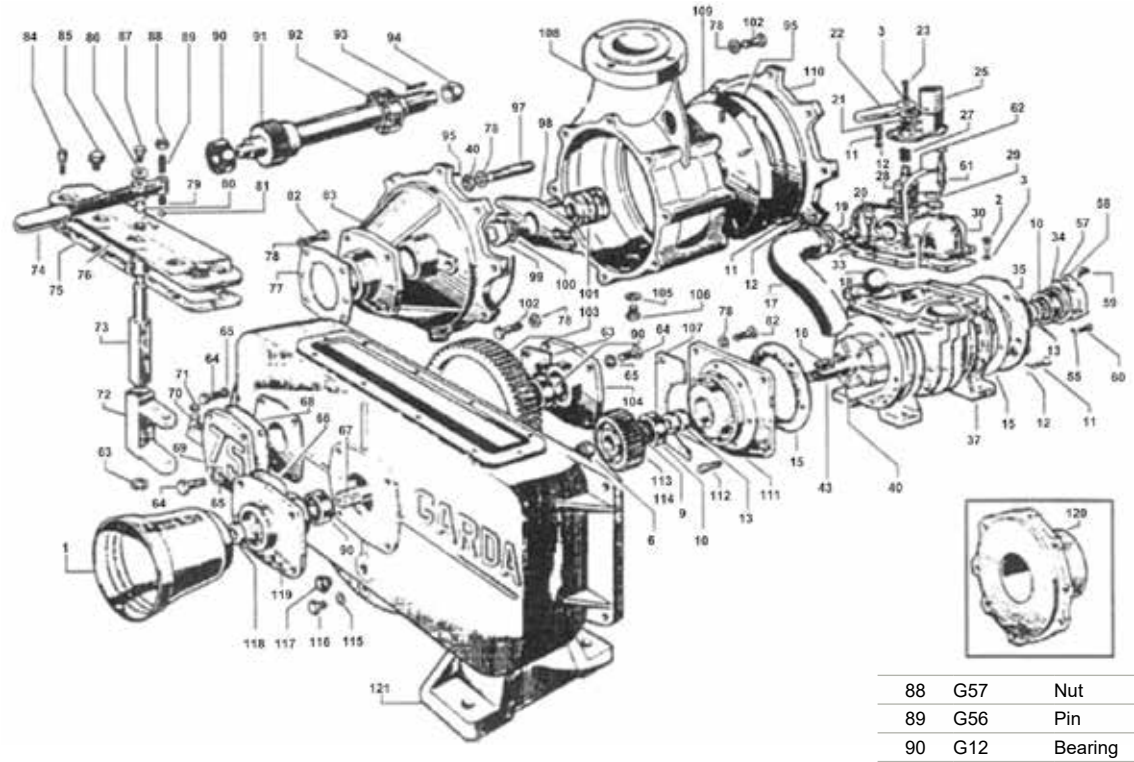
Item	Part No	Description	Qty
1		SIght glass housing	2
2		Threaded ring	2
3		Gasket	2
4		Plug	1
5		O-Ring	1
6		Tube	1
7		O-Ring	2
8		Ball Valve	1

Vacuum Pumps

Vacuum Pump Vanes

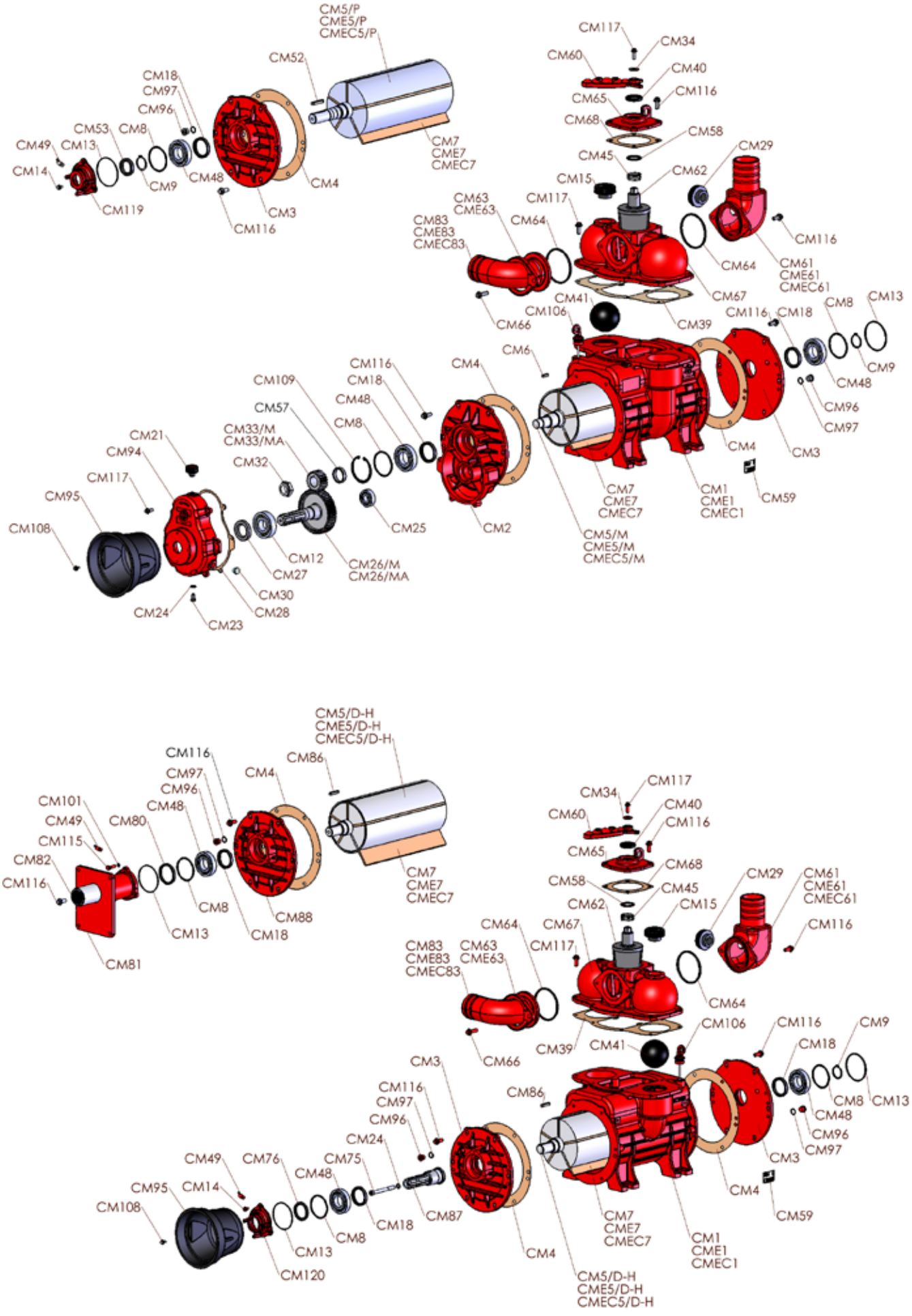
Pump	Part No	Dimensions
MEC 5000 Vanes	AM7	300L x 46.5W x 6.3Dmm
MEC 6500 Vanes	AMEC7	370L x 46.5W x 6.3Dmm
MEC 8000 Vanes	AME7	450L x 46.5W x 6.3Dmm
SEM 10000 Vanes	AM56	350L x 70w x 7.3D mm
SEM 12000 Vanes	PS1266	400L x 70w x 7.5D mm
12000 Litre Agri Pump Vane	4007047BP	400L x 70w x 4.5D mm

Battioni Garda 75 Vacuum Pump

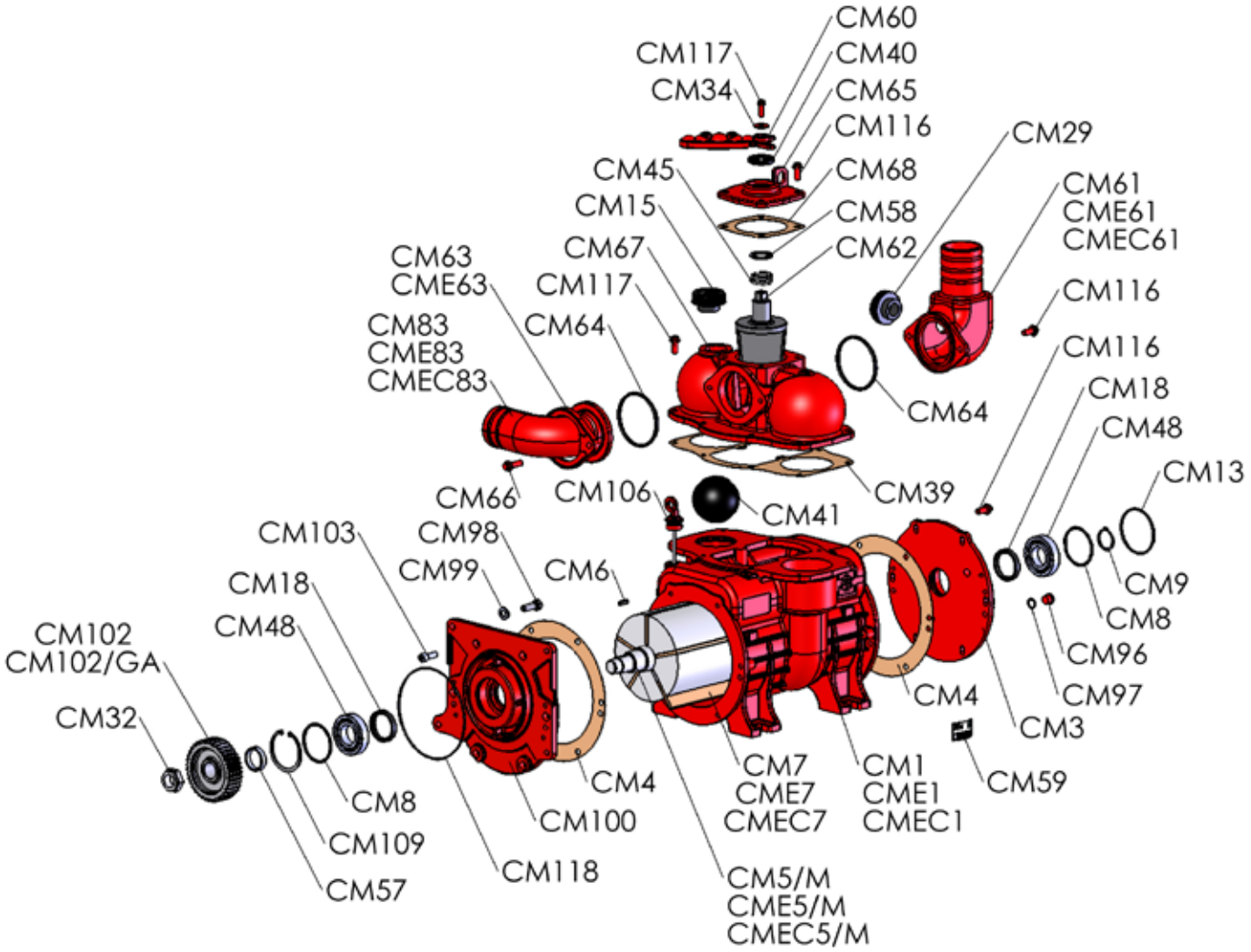


Item	Part No	Description
1	AM43	Cone
2	AM34	Bolt
3	AM35	Smooth Washer
6	AM32	Lock Nut
9	AM58	Spacer
10	AM48	Bearing
11	AM16	Bolt
12	AM17	Washer
13	AM18	Seal
15	AM4	Gasket
16	AM6	Key
17	AM36	Exhaust
18	AM41	Ball
19	AM37	Gasket
20	AM10	Dipstick
21	AM40	Seal
22	AM60	Handle
23	AM11	Bolt
25	AME61	Housing
27	AM45	Spring
28	AM28	Valve
29	AM29	Gasket
30	AM38	Housing
33	AM39	Housing Gasket
34	AM57	Spacer
35	AM3	Back Cover
37	AM4	Body
40	AM7	Vane
43	AM5	Rotor
55	AM20	Washer
57	AM13	Gasket
58	AM14	End Cap
59	AM15	Grease Nipple
60	AM19	Bolt
61	AM44	Oil dropper
62	AM46	Oil pipe
63	G10	Circlip
64	G11	Bolt
65	G20	Washer
66	G22	Gasket
67	G26	Keyed central shaft
68	G7	Gasket Cover
69	G6	Housing
70	G8	Gear Selector
71	G9	Circlip
72	G16	Linkage Selector
73	G17	Selector Link. Arm
74	G27	Gear Lever
75	G29	Gasket
76	G13	Pump Head
77	G41	Gasket
78	G40	Washer
79	G31	Spring
80	G32	Oil Seal
81	G33	Ball
82	G14	Bolt
83	G38	Housing
84	G18	Bolt
85	G21	Stud
86	G15	Washer
87	G19	Bolt
88	G57	Nut
89	G56	Pin
90	G12	Bearing
91	G34	Rotor Drive
92	G35	Bearing
93	G36	Key
94	G37	Nut
95	G42	Gasket
96	G43	Nut
97	G44	Threaded Pin
98	G48	Seal Holder
99	G45	Seal
100	G46	Sealing Ring
102	G39	Bolt
103	G5	Large Gear
104	G58	Housing
105	G51	Plug Washer
106	G50	Plug Stud
107	G4	Housing plate gasket
108	G49	Pump Housing/Scroll
109	G52	Impeller rotor
110	G53	Flange
111	GR3	Housing Plate
112	G54	Bolt
113	G55	Gear
114	G55	Gear
115	G24	Washer
116	G23	Plug
117	G28	Oil
118	G25	Seal
119	G2	Shaft Housing
120	G59	External scroll flange
121	G1	Gearbox Housing

MEC 9000-11000-13500/M-P



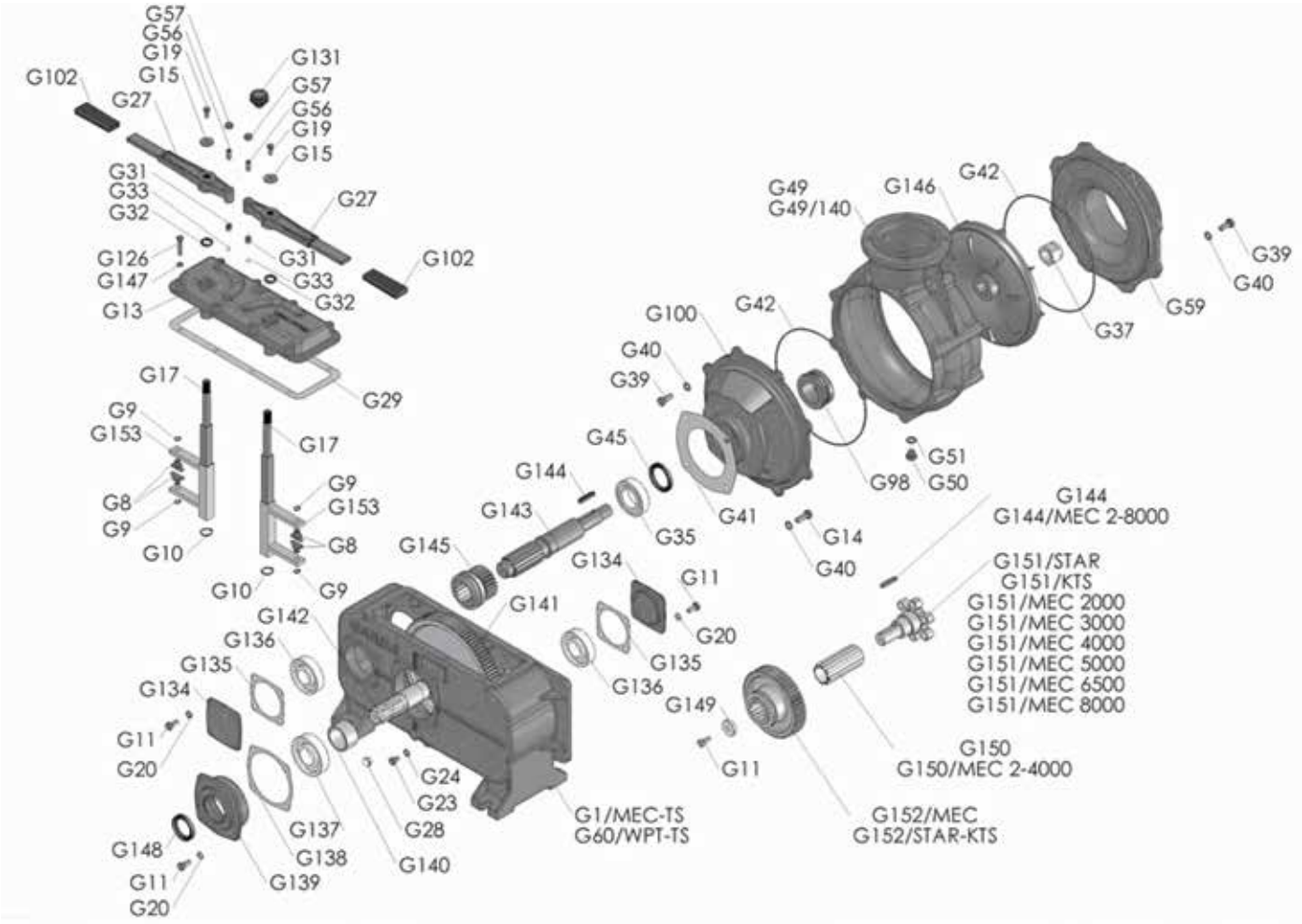
MEC 9000-11000-13500/G



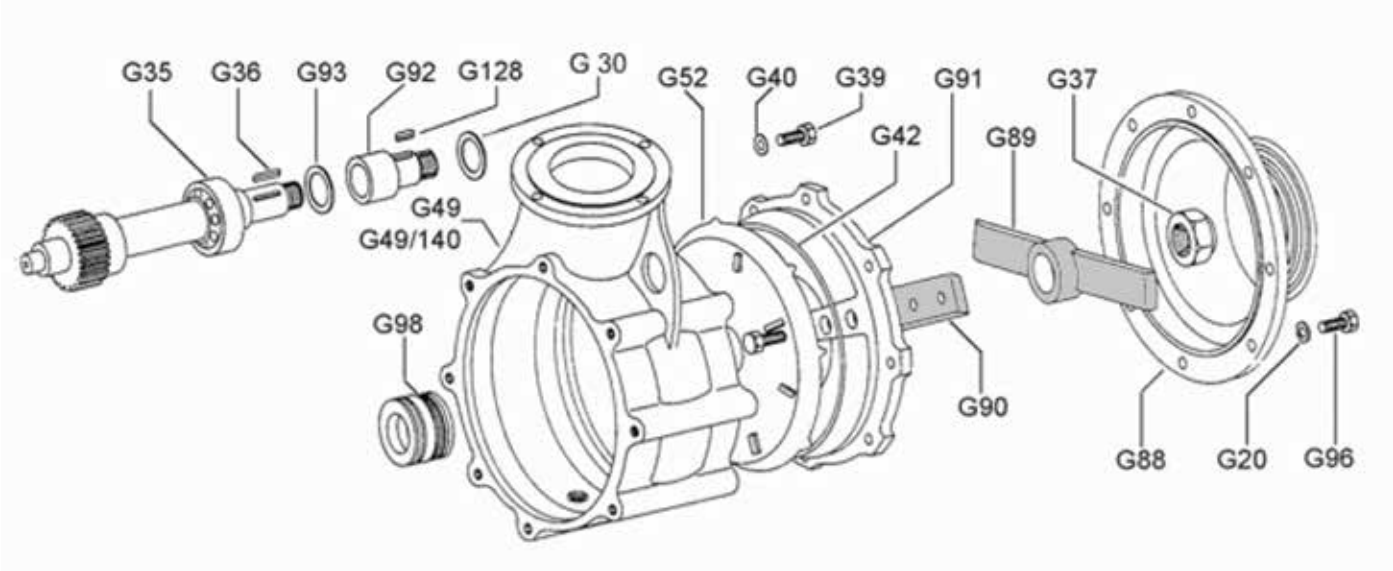
Item	Part No	Description	Machine	Qty
CM1	4010101085	Pump body	MEC 9000	1
CME 1	4010101086	Pump body	MEC 11000	1
CMEC	4010101087	Pump body	MEC 13500	1
CM 2	4010301028	Gearbox	MEC / M	1
CM 3	4010401061	Front flange and back flange	MEC P / D	2
CM 4	4030108048	Flange gasket	MEC M / P / D / H /g	1
CM 5/d-h	4010220150	Rotor	MEC 9000/D-H	1
CME 5/d-h	4010220151	Rotor	MEC 11000/D-H	1
CMEC 5/d-h	4010220152	Rotor	MEC 13500/D-H	1
CM 5/db-hb	4010220162	Rotor	MEC 9000/D-H BALLAST	1
CME 5/db-hb	4010220163	Rotor	MEC 11000/D-H BALLAST	1
CMEC 5/dbhb	4010220164	Rotor	MEC 13500/D-H BALLAST	1
CM 5/M	4010220144	Rotor	MEC 9000/M	1
CME 5/M	4010220145	Rotor	MEC 11000/M	1
CMEC 5/M	4010220146	Rotor	MEC 13500/M	1
CM 5/Mb	4010220159	Rotor	MEC 9000/M BALLAST	1
CME 5/Mb	4010220160	Rotor	MEC 11000/M BALLAST	1
CMEC 5/Mb	4010220161	Rotor	MEC 13500/M BALLAST	1
CM 5/MSC	4010220153	Rotor	MEC 9000/M Senza Colletore	1
CME S/MSC	4010220154	Rotor	MEC 11000/M Senza Colletore	1
CMEC 5/MSC	4010220155	Rotor	MEC 13500/M Senza Colletore	1
CM 5/p	4010220147	Rotor	MEC 9000/P	1
CME 5/p	4010220148	Rotor	MEC 11000/P	1
CMEC 5/p	4010220149	Rotor	MEC 13500/P	1
CM 5/pb	4010220156	Rotor	MEC 9000/P BALLAST	1
CME 5/pb	4010220157	Rotor	MEC 11000/P BALLAST	1
CMEC 5/pb	4010220158	Rotor	MEC 13500/P BALLAST	1
CM 6	5050707002	Key	MEC M/g 6x6x25	1
CM 7	4070113192	Long life blade	MEC 9000	5
CME 7	4070113193	Long life blade	MEC 11000	5
CMEC 7	4070113194	Long life blade	MEC 13500	5
CM 7	4070113192	Long life blade	MEC 9000 BALLAST	8
CME 7	4070113193	Long life blade	MEC 11000 BALLAST	8
CMEC 7	4070113194	Long life blade	MEC 13500 BALLAST	8

CM 7/SC	4070113198	Blade	MEC 9000	5
CME 7/SC	4070113199	Blade	MEC 11000	5
CMEC 7/SC	4070113200	Blade	MEC 13500	5
CM 8	5012207001	Undulated ring		2
CM 9	5050507017	Seeger ring		1
CM 12	5012107010	Ball bearing		1
CM 13	5030210028	Seal ring		1
CM 14	5050107005	Screw		3
CM 15	5060605006	Black Plug		1
CM 18	5030300041	Oil seal		2
CME 18	5030300042	Oil seal Vers. Ballast		2
CM 21	5060605001	Oil Plug		1
CM 23	5050107018	Screw		1
CM 24	5050202002	Aluminium washer		1
CM 25	5012107006	Ball bearing		1
CM 26/M	4020507003	Gear with shaft 540 rpm	MEC / M	1
CM 26/Ma	4020507012	Gear with shaft 1000 rpm	MEC / Ma	1
CM 27	5030300005	Oil seal		1
CM 28	4030108049	Gearbox cover gasket	MEC / M	1
CM 29	5060605005	Black plug		1
CM 30	5060105004	Oil level plug		1
CM 32	5050300002	Self-locking nut		1
CM 33/M	4020607003	Pinion 540 rpm	MEC / M	1
CM 33/Ma	4020607057	Pinion 1000 rpm	MEC / Ma	1
CM 34	5050207022	Washer		1
CM 39	4030109035	Manifold gasket	MEC 9000-11000-1350	1
CM 40	5030300015	Oil seal		1
CM 41	5060410007	Heavy rubber ball		1
CM 45	4012007011	Spring		1
CM 48	5012107004	Ball bearing		2
CM 49	5050812001	Lubricator		1
CM 52	5050707007	Key		1
CM 53	5030300002	Oil seal		1
CM 57	4011707067	Rotor Spacer		1
CM 58	5050207031	Smooth washer		1
CM 59	5101800000	Sticker thermo label		1
CM 60	4010801024	Handle		1
CM 61	4011501031	Suction elbow		1
CME 61	4011501032	Suction elbow		1
CMEC 61	4011501033	Suction elbow		1
CM 62	4010701018	Reversing gear		1
CM 63	4010406017	Support flange		1
CME 63	4010406015	Support flange		1
CM 64	5030210008	Seal ring		2
CM 65	4010601056	Manifold cover		1
CM 66	5050107054	Screw		2
CM 67	4010501026	Manifold		1
CM 68	4030109025	Manifold cover gasket		1
CM 73/2”	4010606020	Tank Oil cover		1
CM 73/2”1/2	4010606021	Tank Oil cover		1
CM 75	5050107050	Screw		1
CM 76	5030300032	Oil seal		1
CM 80	5030300013	Oil seal		1
CM 81	4011001059	Hydraulic motor support g.4		1
CM 82	4020107024	Hydraulic motor transmission coupling g. 4		1
CM 83	4010901018	Revolving elbow		1
CME 83	4010901019	Revolving elbow		1
CMEC 83	4010901020	Revolving elbow		1
CM 86	5050707015	Key		1
CM 87	5020107002	Splined hub hole Ø 32		1
CM 88	4010401063	Front flange / h	MEC / H	1
CM 93	5051206001	Eyebolt		1
CM 94	4010601154	Gearbox cover gasket	MEC / M	1
CM 95	4060505000	Shaft guard ce	MEC / M	1
CM 96	5050906006	Iron plug		1
CM 97	5050202007	Aluminium washer		1
CM 98	5050107028	Screw		4
CM 99	5050207005	Smooth washer		4
CM 100	4010401062	Decompressor support flange	MEC / g	1
CM 101	5050207003	Washer	MEC / H	3
CM 102	4020607005	GARDA pinion 540 rpm	MEC / g	1
CM 102/ga	4020607017	GARDA pinion 1000 rpm	MEC / ga	1
CM 103	5050107026	Screw		6
CM 106	5060100001	Oil level rod		1
CM 108	5050107107	Screw		4
CM 109	5050507011	Seeger ring		1
CM 110	4010007038	Hose	BALLAST	2
CM 111	5040407005	Curved connector		2
CM 112	4010007021	Hose for filter	BALLAST	2
CM 113	6100200029	Completed unidirectional valve		2
CM 114	4010007037	Hose Support	BALLAST	1
CM 115	5050107123	Screw		3
CM 116	5050107109	Screw		13
CM 117	5050107108	Screw		15
CM 118	5030210063	Seal ring		1
CM 119	4010601153	Front cover / p	MEC / P	1
CM 120	4010601101	Front cover / d	MEC / D	1

Chopper Pump Parts



Chopper Detail

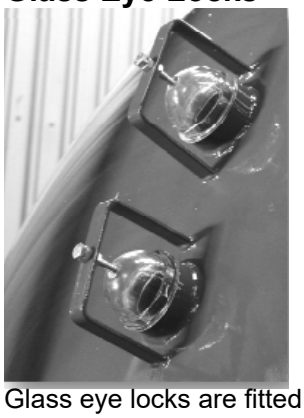


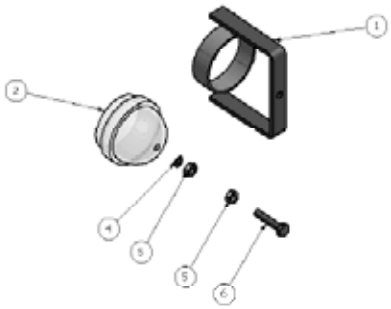
Item	Part No	Description	Qty
G1/MEC	4010301004	Gearbox GARDA / MEC	1
G 1/MEC-TS	4010301024	Gearbox GARDA / MEC TURBO SYSTEM	1
G 1/MEC-TS	4010301024	Gearbox WPT - GARDA / MEC TURBO SYSTEM	
G 5/540	4020807001	Central gear wheel 540 RPM Z 97 - M 3	1
G 6	4010601020	Front cover (75)	1
G 7	4030108008	Front and back cover gasket	2
G 8	4010007001	Shoe for gear	2
G 9	5050507002	Circlip Ø 12 E	1
G10	5050507003	Circlip Ø 25 E	1
G11	5050107020	Screw M 10x25 TE	12
G12	5012107010	Ball bearing 6307	3
G13	4010601021	Gearbox cover	1
G 14	5050107028	Screw M 12x35 TE	4

G 15	5050207009	Blank washer Ø 8x32	1
G 16	4010006001	Gearshift fork GARDA	1
G 17	4011907001	Gear pin	1
G 19	5050107009	Screw M 8x20 TE	7
G 20	5050207004	Smooth washer Ø 10	20
G 21	5060605001	Oil plug Ø 3/8" Gas	1
G 22	4030108009	Front cover gasket	1
G 23	5050107018	Screw M 10x16 TE	1
G 24	5050202002	Aluminium washer Ø 10x16	1
G 25	5030300005	Oil seal 35x62x10	1
G 26	4020907001	Splined central shaft	2
G 27	4010801003	Gear lever	1
G 28	5060105004	Oil level plug Ø 3/8" Gas 1	
G 29	4030109007	Gearbox cover gasket	1
G 30	5050207010	Blank washer Ø 30x56 1	
G 31	4012007003	Spring	1
G 32	5030300008	Oil seal 19x27x6 1	
G 33	5010007002	Steel ball Ø 8.73 1	
G 34	4020907002	Centrifugal shaft for preshaped ring GARDA 6500	1
G 35	5012107014	Ball bearing	
G 36	5050707007	Key 8x7x50 1	
G 37	5050300003	Self-locking nut M 30x2 1	
G 38	4011001001	Scroll and impeller support for preshaped ring GARDA 6500	1
G 39	5050107027	Screw M 12x30 TE	16
G 40	5050207005	Smooth washer Ø 12	24
G 41	4030108010	Scroll support gasket	1
G 42	5030210001	Seal ring Ø 298x3.53	2
G 43	5050303002	Brass nut M 12	2
G 44	4050412001	Stud bolt M 12x107	2
G 45	5030300009	Oil seal 50x70x10	1
G 46	5030210015	Rubber ring HL 187	1
G 47	4030111001	Preshaped ring Ø 50x70x10	6
G 48	4011301001	Cordholder	1
G 49	4011101001	Scroll GARDA 6500	1
G49 / 140	4011101004	Scroll GARDA 6500 - Ø 140	1
G 50	5050906001	Iron plug Ø 1/4" Gas	1
G 51	5050202003	Aluminium washer Ø 1/4" Gas	1
G 52	4011219001	Impeller GARDA 6500	1
G 53	4010401009	Scroll external flange GARDA z GARDA 6500	1
G 54	5050107026	Screw M 10x25 TCEI	6
G 56	5051007005	Stop dowel M 10x25 P.P	. 1
G 57	5050307003	Nut M 10	1
G 58	4010601066	Back cover	1
G 59	4010401010	External scroll flange with rubber hose GARDA 6500	1
G 60 / WPT 1000	4010301006	Gearbox WPT - STAR 1000 RPM	1
G 60 / WPT 1000 - TS	4010301026	Gearbox WPT-STAR 1000RPM TURBO SYSTEM	1
G 61 / 1000	Central gear wheel	GARDA 1000 RPM Z 86 - M 3	1
G 62 / 1000	4020907003	Centrifugal shaft for preshaped ring GARDA 1000 RPM	1
G 66	4020807003	Central gear wheel with idle gear	1
G 67	4020907008	Centrifuge shaft for preshaped ring + idle gear GARDA 6500	1
G 68	4011703001	Bushing Ø 30x40x60	1
G 71	4011101002	Scroll GARDA 3500	1
G 72	5030210006	Ring seal OR 4950	1
G 73	4011219002	Impeller GARDA 3500	1
G 74	4011001007	Scroll and impeller support for preshaped ring GARDA 3500	1
G 75	5030210017	Rubber ring HL 150	1
G 77	5050107045	Screw M 12x30 TSEI	4
G 78	4030111002	Preshaped ring Ø 40x56x8	4
G 79	4011301002	Cordholder	1
G 80	5050303001	Brass nut M 10	2
G 81	4050412002	Stud bolt M 10x64	2
G 82	4030108025	Scroll support gasket	1
G 84	4010401028	Connection flange GARDA 3500	1
G 85	4020907004	Centrifugal shaft for preshaped ring GARDA 3500	1
G 86	5050707006	Key 8x7x35	1
G 87	4020907005	Centrifuge shaft for preshaped ring + idle gear GARDA 3500	1
G 88	4010401029	Closing flange	1
G 89	4010006005	Blade	1
G 90	4010006006	Counter-blade	1
G 91	4010401027	Blade-holder flange	1
G 92	4010007002	Extension	1
G 93	4011707011	Spacer	1
G 96	5050107021	Screw M 10x30 TE	6
G 98	5030000003	Centrifugal frontal mechanical seal GARDA 6500	1
G 99 / 540	4020907010	Centrifugal shaft for mechanical seal GARDA 6500	1
G 100	4011001033	Scroll support with mechanical seal GARDA 6500	1
G 101 / 1000	4020907013	Centrifugal shaft for mechanical seal GARDA 6500 1000 RPM	1
G 102	5060010003	Handle knob	1
G 103	4010601122	Gearbox front cover CE	1
G 104	5050107005	Screw M 6x16 TE	4
G 105	5050207002	Smooth washer Ø 6	4
G 107	4020907055	Centrifugal shaft for mechanical seal GARDA 3500 1	1
G 108	5030000006	Centrifugal frontal mechanical seal GARDA 3500	1
G 109	4011001037	Impeller and scroll support with mechanical seal GARDA 3500	1
G 110	4020907056	Transmission shaft for high pressure pump GARDA/JET	1
G 111	5012107029	Ball bearing 16013	2
G 112	5050107054	Screw M 10x35 TE	1
G 113	4020807013	Central gear wheel for high pressure pump GARDA/JET Z 84 M 3	1
G 114	4020807008	Back central gear wheel GARDA/ JET-GK Z 97 - M 3	1
G 115	4010407005	High pressure pump coupling flange GARDA/JET	1

G 118/ 540-1000	4020807011	Gear wheel for 1000 RPM shaft GARDA/GK 540-1000Z 41 - M 3	1
G 119	4011707032	Spacer GARDA/GK 52x42x55	1
G 120	4010601111	Back cover GARDA/GK	1
G 121	4010606005	Gearbox side cover GARDA/GK	1
G 122	4030110022	Gearbox side cover gasket GARDA/GK	1
G 123	5050107015	Screw M 8x16 TCEI	6
G 124 / 540-540	4020807009	Gear wheel GARDA/GK 540-540 Z 61 - M3	1
G 125	4020807010	Central gear wheel GARDA/GK 540-1000Z 81 - M 3	1
G 126	5050107093	Screw M 8x45 TE	8
G 128	5050707004	Key 8x7x25	1
G 129	4011001014	High pressure pump support GARDA/JET	1
G 130	4060505018	Guard shaft GARDA - CE	2
G 131	5060605011	Charge oil plug Ø 3/8" Gas	1
G 132	5050107084	Screw M 6x16 TEF	4
G 133	4010601148	Front cover (75) GARDA 3500	1
G 134	4010601081	Front and rear covers TURBO SYSTEM	2
G 135	4030108031	Front and rear covers' gaskets TURBO SYSTEM	2
G 136	5012107011	Ball bearing TURBO SYSTEM 6308	1
G 137	5012107012	Ball bearing TURBO SYSTEM 6309	1
G 138	4030108032	Front and rear cover gasket TURBO SYSTEM	1
G 139	4010601123	Gearbox front cover TURBO SYSTEM CE	1
G 140	4011707051	Spacer TURBO SYSTEM	1
G 141	4020807015	Central gear wheel TURBO SYSTEM	1
G 142	4020907066	Central shaft	1
G 143	4020907067	Centrifugal shaft for mechanical seal TURBO SYSTEM GARDA/6500	1
G 144	5050707009	Key 10x8x50	1
G 144 / MEC 2-8000	4011806020	Reduction key TURBO SYSTEM Ø8-Ø10 - 40 mm	1
G 145	4020607047	Centrifugal shaft pinion TURBO SYSTEM	1
G 146	4011219006	Centrifugal pump impeller TURBO SYSTEM GARDA/6500	1
G 147	5050207003	Smooth washer Ø 8	8
G 148	5030300022	Oil seal TURBO SYSTEM 45x65x8	1
G 149	4011707055	Splined smooth washer TURBO SYSTEM	1
G 150	4020907069	Splined sleeve TURBO SYSTEM MEC 5-8000/STAR/KTS	1
G 150 / MEC 2-4000	4020907071	Splined sleeve TURBO SYSTEM MEC 2-3-4000	1
G 151 / STAR	4011907076	Front pin TURBO SYSTEM STAR	1
G 151 / KTS	4011907077	Front pin TURBO SYSTEM KTS	1
G 151 / 2000 TS	4010220068	Rotor TURBO SYSTEM MEC 2000/D	1
G 151 / 3000 TS	4010220069	Rotor TURBO SYSTEM MEC 3000/D	1
G 151 / 4000 TS	4010220070	Rotor TURBO SYSTEM MEC 4000/D	1
G 151 / 5000 TS	4010220071	Rotor TURBO SYSTEM MEC 5000/D	1
G 151 / 6500 TS	4010220072	Rotor TURBO SYSTEM MEC 6500/ D	1
G 151 / 8000 TS	4010220073	Rotor TURBO SYSTEM MEC 8000/D	1
G 152 / MEC TS	4020607051	Compressor pinion TURBO SYSTEM MEC 1000 RPM	1
G 152 / STAR-KTS	4020607049	Compressor pinion TURBO SYSTEM STAR-KTS 1000 RPM	1
G 153	4010006007	Gearshift fork TURBO SYSTEM	1

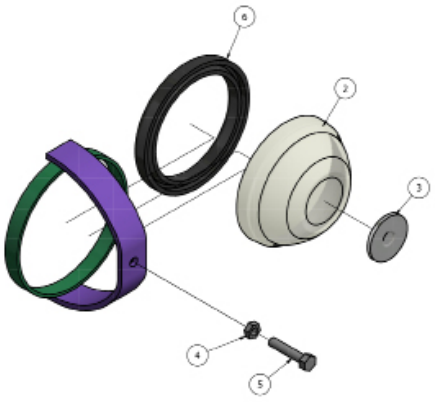
Glass Eye Locks





Glass eye locks are fitted to the front and rear dished ends on all tanker.

Item	Part No	Description	Qty
1	TA-GEL-01	Eye lock flat	1
2	3770030	3" Sight Glass	1
3	3772030	3" Bsp Socket	1
4	FWM8	M8 Flat Washer	1
5	M10HEX	M10 Hex Nut	2
6	M10x50BZP	M10x50 Bolt	1



Item	Part No	Description	Qty
2	CPSL00000018	GLASS EYE	1
1	TA-GEA	GLASS EYE MOUNTING	1
1.2	TA-GE006	EYE LOCK FLAT	1
1.1	TA-GE008	GLASS EYE RING	1
4	M8HEX	M8 PLAIN NUT	2
6	TA-GE004	GLASS EYE RUBBER	1
5	M8x40SZP	M8x40 SET	1
3	DIPC450DG018	PRESSURE DISC	1

MANUAL SUPPLEMENT - WIRED CETOP 3 CONTROLLER

Wired controllers are fitted to tankers with multiple hydraulic requirements. Each tanker will have individual items connected to the cetop 3 valve bank, e.g. raingun or autocoupler.

This supplement refers to the Cetop 3 controller & parts listing

DANGER

Hydraulic systems store considerable energy. Careless servicing, adjustment, or replacement of parts can result in serious injury. High pressure blasts of hydraulic oil can injure eyes or other body parts. The following precautions are crucial:

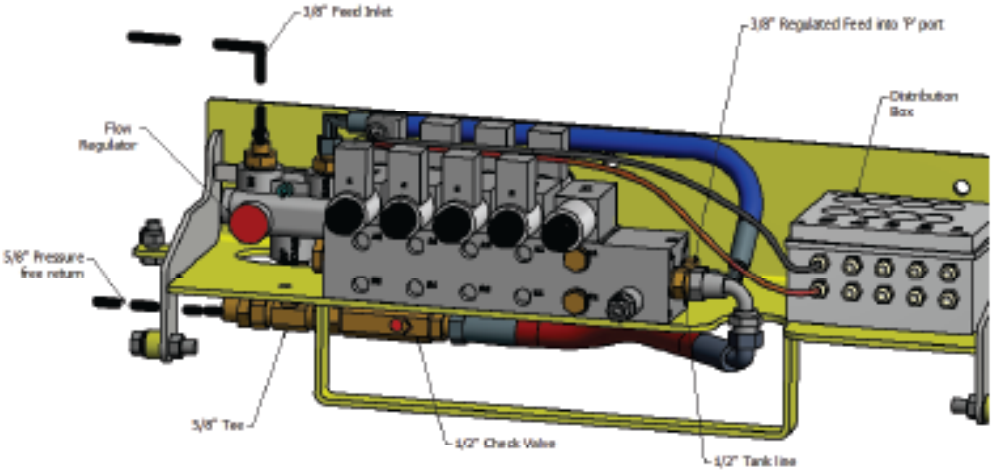
- Make certain the hydraulic pump is turned off.
- Lower attached equipment to the ground.
- Confirm that load pressure is off the system.

A pinhole leak in an hydraulic hose is a serious hazard. A leak may not be visible, and the only sign may be a few drops of fluid. Never inspect hydraulic hoses with your hands, because a fine jet of hydraulic fluid can pierce the skin

HYDRAULICS

IMPORTANT: Ensure tractor filters & quick release couplings are clean. Oil flow requirement 30-45 litres per minute.

NOTE:
A flow regulator is fitted to protect the valve bank, the excess oil is bypassed back to the tractor.
To reduce heat & excessive work of the oil pump, reduce tractor oil flow at the tractor spool controller.



CONNECTION SEQUENCE

- **OIL SUPPLY[Feed] via 3/8" hose [red cable tie]**
- **OIL RETURN [Tank Line] via 5/8" hose [3 yellow ties]**

Oil return fitted to pressure free return port on tractor.

Connect Return line first, then Feed line
Disconnect Feed line first, then Return [tank] line

ELECTRICAL CONNECTION TO TRACTOR

Control box	9 pin plug
Road lights	7 pin plug

CONTROL BOX
Control box is fitted with an intergral power switch, c/w LED power indicator.

NOTE:
Switches are 'bang bang' type with instant action from the solenoid.
Coils on Valve bank are fitted with LED's as part of the troubleshooting guide.

MANUAL SUPPLEMENT - WIRED CETOP 3 CONTROLLER

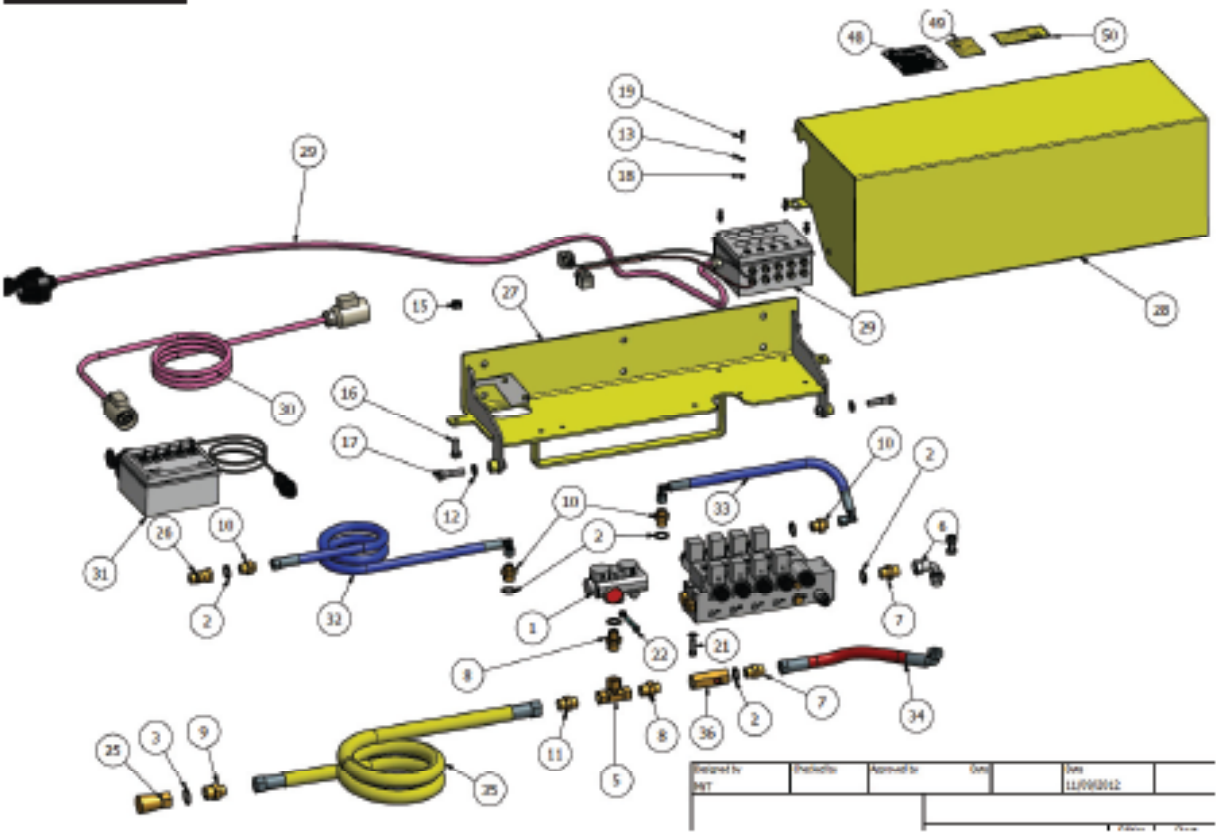
Troubleshooting

Important! ***All tests and repairs to be carried out by experienced personnel.***

Step	Procedure	Remedy
1	Check all 12V connections. Make sure control box supply is connected to tractor, and that control box is connected to machine with 19-pin plug. Inspect 19-pin socket and plug, ensure they connect properly. Make sure all pins are the same length.	Replace any damaged plugs or sockets as pins can sometimes be shoved back and not make a connection..
2	Check power supply. Make sure there is power (+), (-) in the tractor supply socket. Check fuses and wiring in the tractor and all of the wiring on the machine.	Replace any blown fuses or any broken wires. Clean or replace any corroded connections
3	Check hydraulic supply. Make sure there is a supply through the 3/8" Hose and a return through a check valve in the 1/2" hose. Free flow return is preferred.	Fit hoses in correct order, a supply and a return through a check valve. Ensure the correct supply of oil. Cetop 3 45 litres /minute Max Cetop 5, 70 litres /minute Max Ensure both hoses are connected to the same double acting spool valve, where a free flow return is not available. If oil supply isn't at correct rate, the valve bank may overpressure & and possibly lock up and damage the machine.
4	Check hydraulic system for leaks in both pipes and rams.	Replace any damaged pipes or seals. If any double acting rams do not retract, and are receiving a supply of oil it may be that the seals inside the barrel are damaged.
5	Check solenoid lights. Make sure the solenoids light up and that there is power at the connections. Check electrical connections on solenoids.	Replace any damaged connections on the solenoids / wiring.
6	If solenoids do not light up, check switches in the control box.	Open the control box and look for any loose wires or switches. Check switches by doing a continuity test using a multimeter. Replace any broken connections or defective switches.

MANUAL SUPPLEMENT - WIRED CETOP 3 CONTROLLER

PARTS LISTING

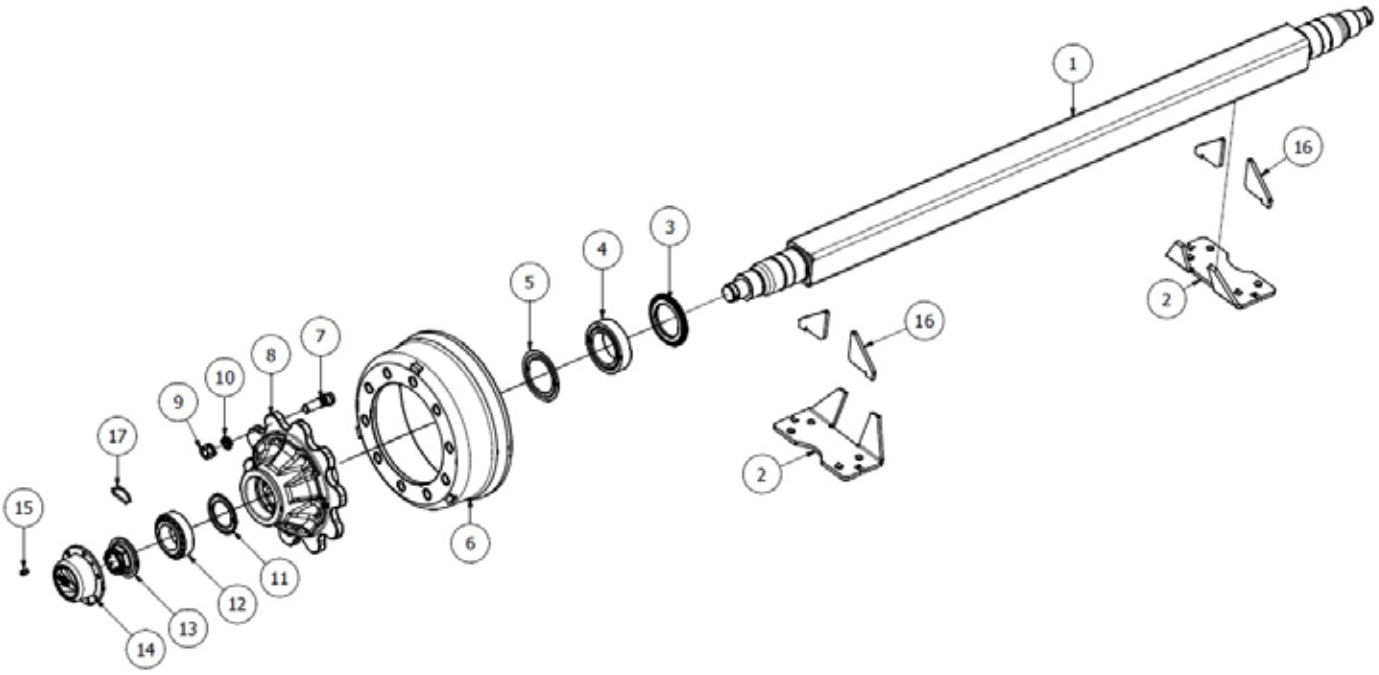


ITEM	PART NUMBER	DESCRIPTION	QTY
1	ZPV2V12SH	Priority Flow Controller	1
2	EDOW12	1/2" Dowty Washer	10
3	EDOW34	3/4" Dowty Washer	1
4	EDOW38	3/8" Dowty Washer	2
5	ERFFT38	3/8" Female Tee	1
6	EMF90-12	1/2-1/2" M/F 90 Block Adapter	1
7	EMM12	1/2" M/M Connector	2
8	EMM12S8	1/2-5/8" M/M Connector	2
9	EMM34S8	5/8-3/4" M/M Connector	1
10	EMM8M12	1/2-3/8" M/M Connector	4
11	EMM58	5/8" M/M Connector	1
12	FWM12	M12 Flat Washer	2
13	FWM5	M5 Flat Washer	4
14	FWM8	M8 Flat Washer	2
15	M12	M12 Nyloc Nut	2
16	M12x80SZP	M12x80 Set Bolt	2
17	M12x50BZP	M12x50 Bolt	2
18	M5	M5 Nyloc Nut	4
19	M5x20SZP	M5x20 Set Bolt	4
20	M8	M8 Nyloc Nut	2
21	M8x80SZP	M8x80 Bolt	2
22	M8x50SK	M8x50mm SOCKET HEAD	2
23	PLUG12H	1/2" Plug (Hex)	2
24	PLUG38H	3/8" Plug (Hex)	2
25	QRF34	3/4" Quick Release Female	1
26	QRM12	1/2" Quick Release Male	1
27	TA-ESMH-A	Valve Mounting	1
28	TA-ESMH-B	Valve Mounting Cover	1
29	TA-ESMH-C	Distrib. Box -	1
30	TA-ESMH-D	Controller Cable	1
31	TA-ESMH-E	Control Box	1
32	TA-ESMH-H1	3/8" Pressure Feed	1
33	TA-ESMH-H2	3/8" Regulated Hose	1
34	TA-ESMH-H3	1/2" Return Line	1
35	TA-ESMH-H4	5/8" Tank Line	1
36	VUR03C	1/2" Check Valve	1
48	Gma-209	Hydraulic Label	1
49	Gma-049	Don't Go Near Leaks	1
50	Gma-044	Read The Manual	1

REFER TO HYDRAULIC SCHEMATIC SUPPLIED WITH MANUAL FOR HYDRAULICALLY DRIVEN ITEMS CONNECTED TO THE CETOP 3 VALVE.

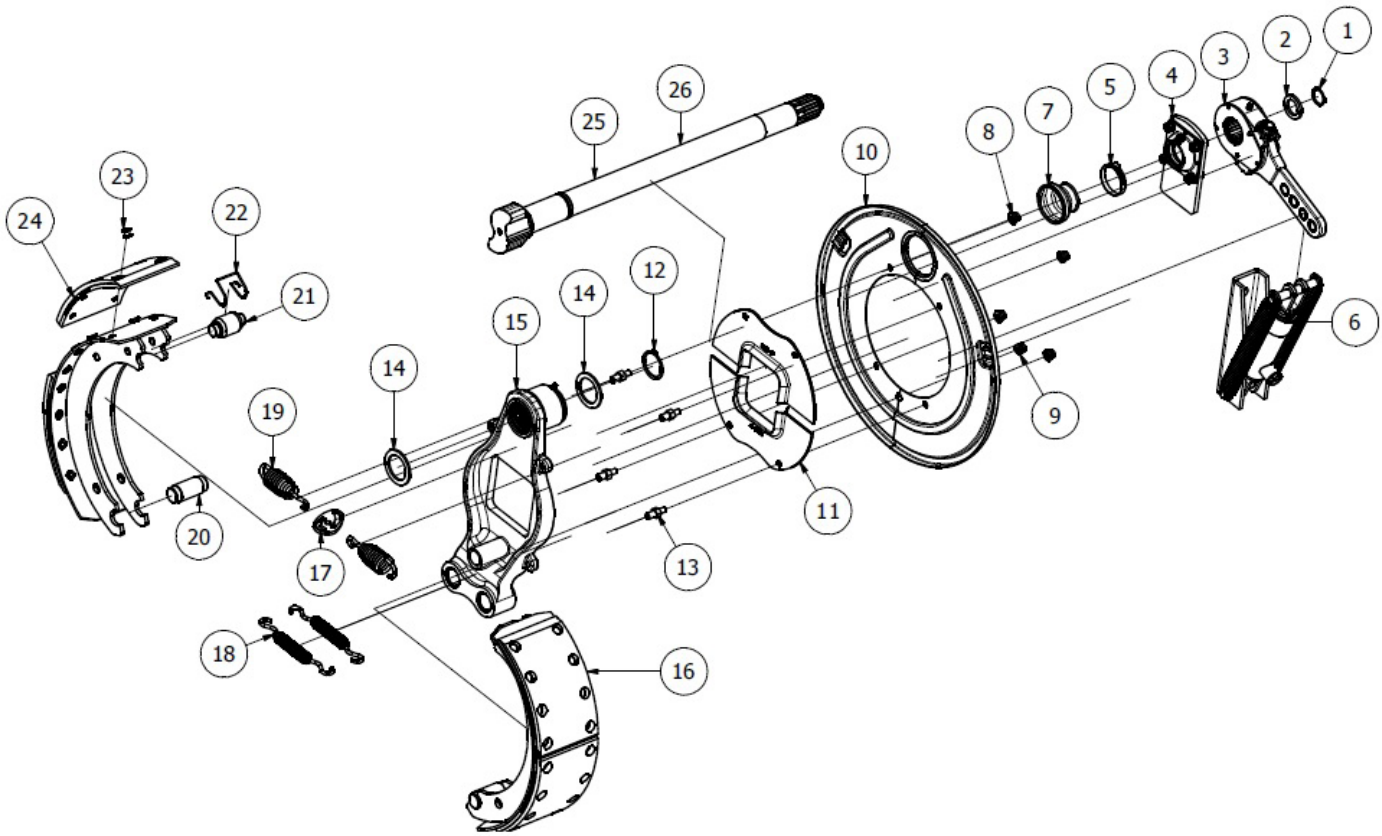
Axles

Axle - 100mm sq twin ram (AA0UA1VC007)



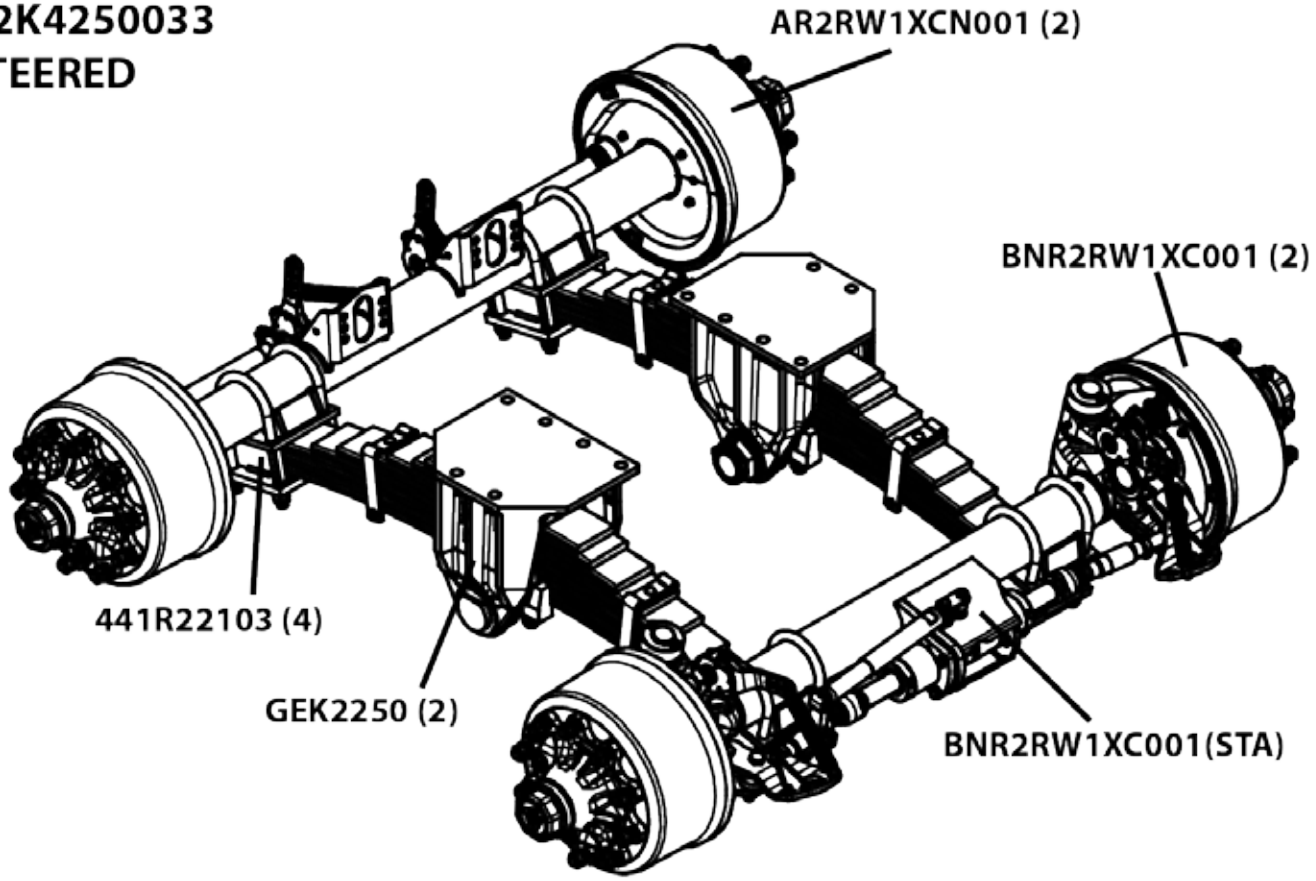
Item	Part No	Description	Qty
1	68UAA00003	AXLE BODY S100 LAM TRACK 1900	1
2	462103108	PLATE	2
3	5441402	GREASE SEAL INDUSTRIAL 092/140	2
4	59133018	33018 090 140 39	2
5	5511402	NILOS FOR BEARING 33018	2
6	66LVA1001	DRUM	2
7	57122B15	STUD M22X1.50 L089	20
8	61L1UA003	HUB	2
9	57322B1	STUD NUT M22X1.50 WR30	20
10	574221	LIMES WASHER ø22.5	20
11	5531092	NILOS GREASE SEAL 109/072	2
12	59133114	33114 070 120 37	2
13	57548B6	CROWN NUT M48X1,50 WR65 H44 7 NOTCH	2
14	56112518	CAP 125 BOLT ON ADR WITH GASKET	2
15	96308A0101	SOCKET HEAD SCREW	12
16	466103078	STIFFENING PLATE FOR AXLE SPECIAL TYPE	4
17	58209	SPRING PIN FOR NUT M48 7 NOTCH	2

Axle - 100mm sq twin ram (AA0UA1VC007)



Item	Part No	Description	Qty
1	58508	SEEGER D025 DIN471 FOR SHAFT	2
2	9812601	WASHER	2
3	7621603	SLACK ADJUSTER SAE 1.5"" Z=10	2
4	74417102	SUPPORT	2
5	98E01	HOSE CLAMP FOR RUBBER CAPS	2
6	813105	ASSEMBLY CYLIND D037/030 S110	2
7	53A09	RUBBER CAP FOR CAM SHAFT Ø40	2
8	97708A1	SELF LOCKING NUT M08X1,25	8
9	73A01	RUBBER FAIRLEAD D15	2
10	743WC0002	PROTECTION PLATE 412E 414E	2
11	747A012	PROTECTION WITH GAKSET S100	4
12	58514	SEEGER D042 DIN471 FOR SHAFT	2
13	57708A2	SPACER SPYDER 412E	8
14	73G01	WASHER BRAKE 412E 4218E	4
15	742YCA011	SPYDER 42-40 S100 ALIGNED	2
16	732VC03	BRAKE SHOE 406X120 412E	4
17	736XC02	SPRING EXTENDER 412E 414E	2
18	738129	SPRING BRAKE 412E 4218E	4
19	738128	SPRING BRAKE 412E 4218E	4
20	83502801	PIN FOR BRAKE SHOE 412E 4218E	4
21	73BVC01	ROLL ASSEMBLY FOR 412E 4218E	4
22	738127	SPRING FOR ROLL BRAKE 412E	4
23	96701	RIVET 8X15 FOR LINING	64
24	734VC02	LINING 406X120 BRAKE 412E	8
25	466103078	STIFFENING PLATE FOR AXLE SPECIAL TYPE	4
26	75Q4063006	CAM SHAFT D40 B0600 S LEFT	1
27	75P4063006	CAM SHAFT D40 B0600 S RIGHT	1

G2K4250033
STEERED



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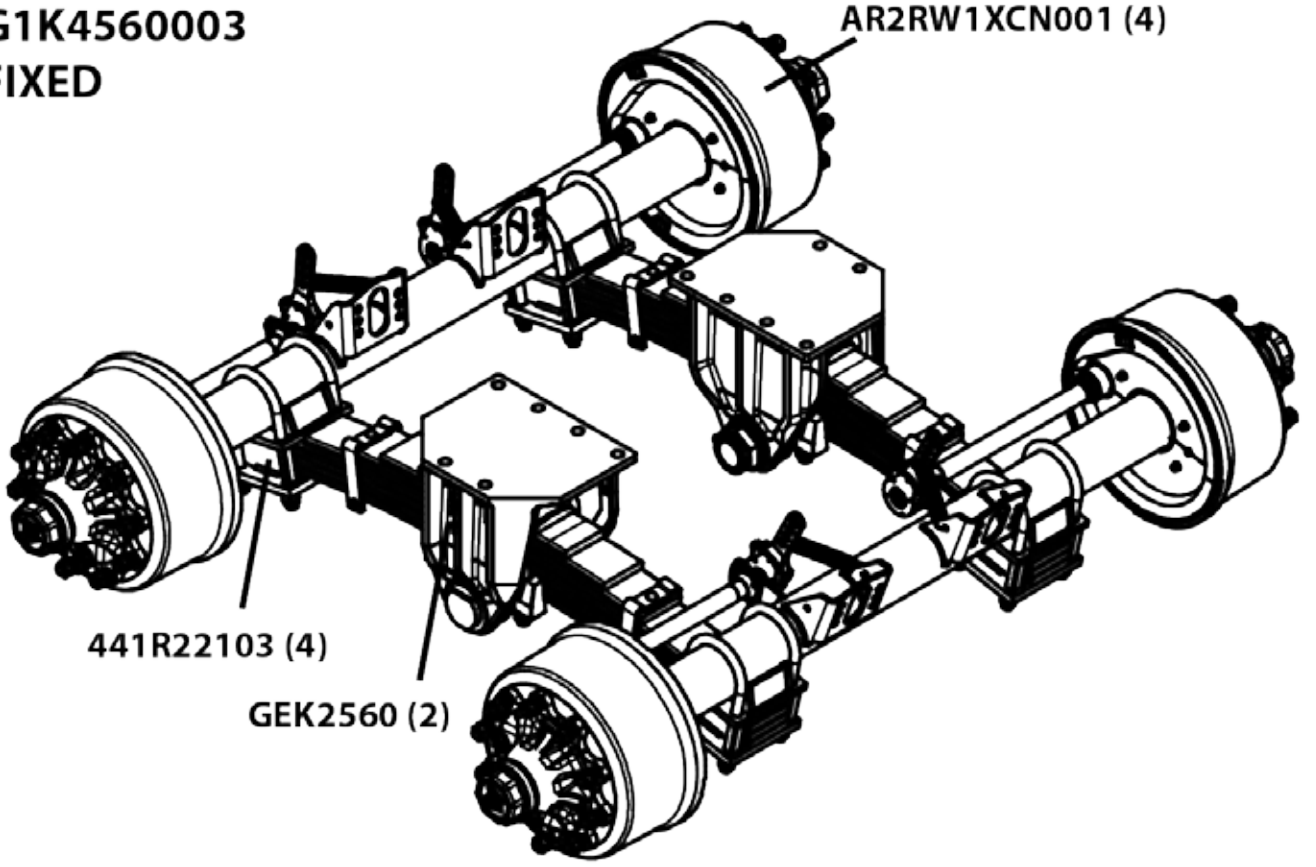
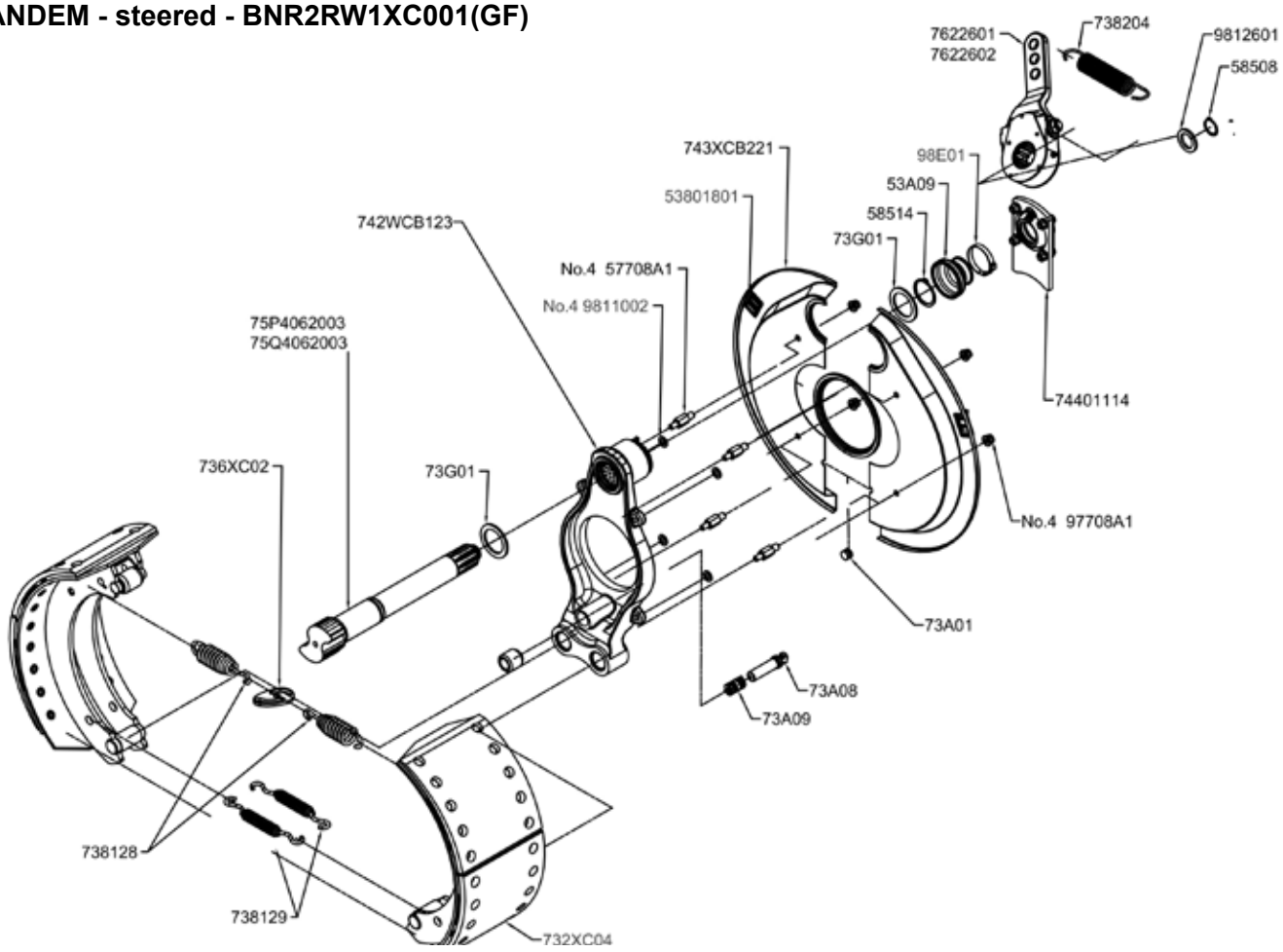
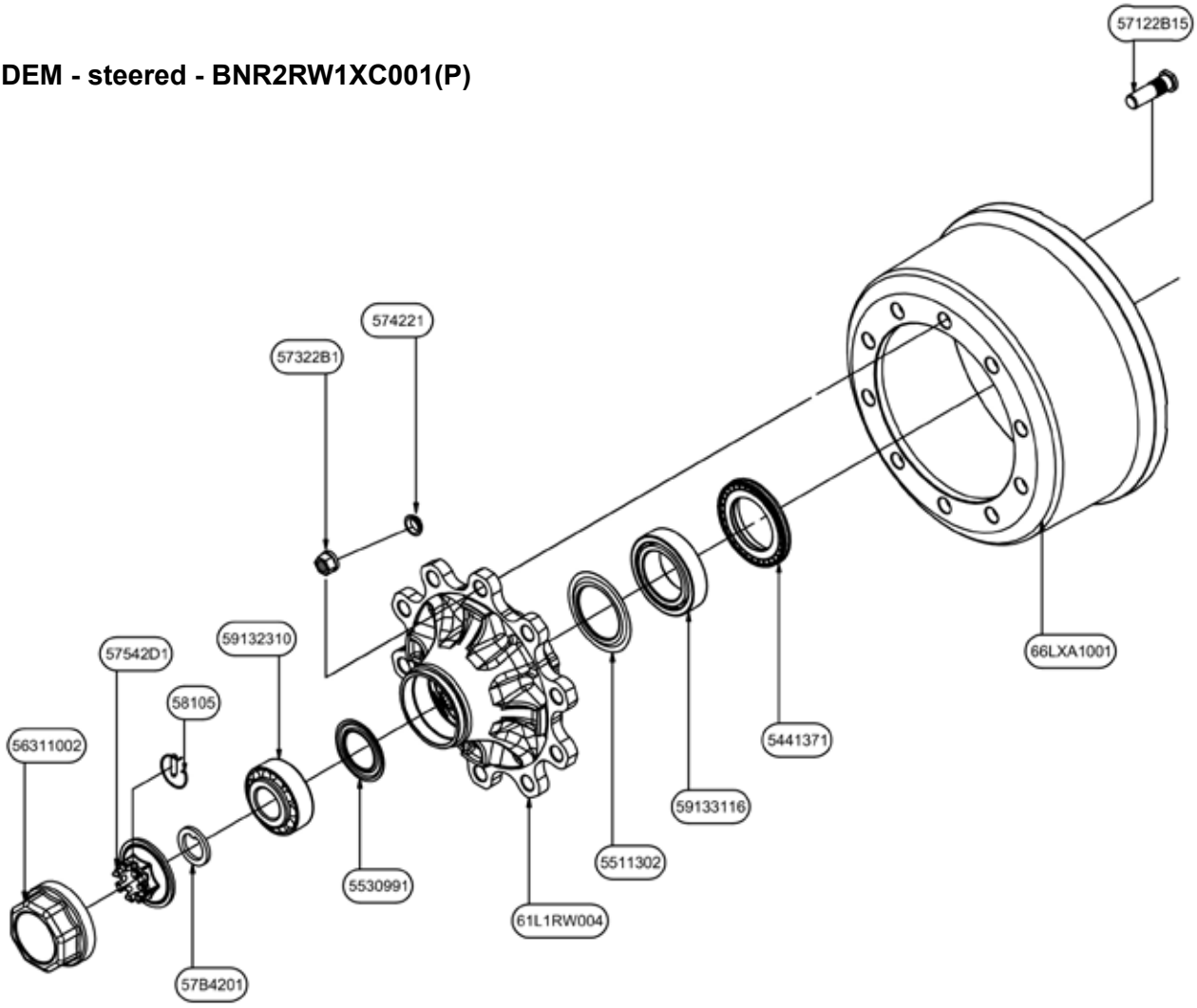


TANDEM - steered - BNR2RW1XC001(GF)



TANDEM - steered - BNR2RW1XC001(P)



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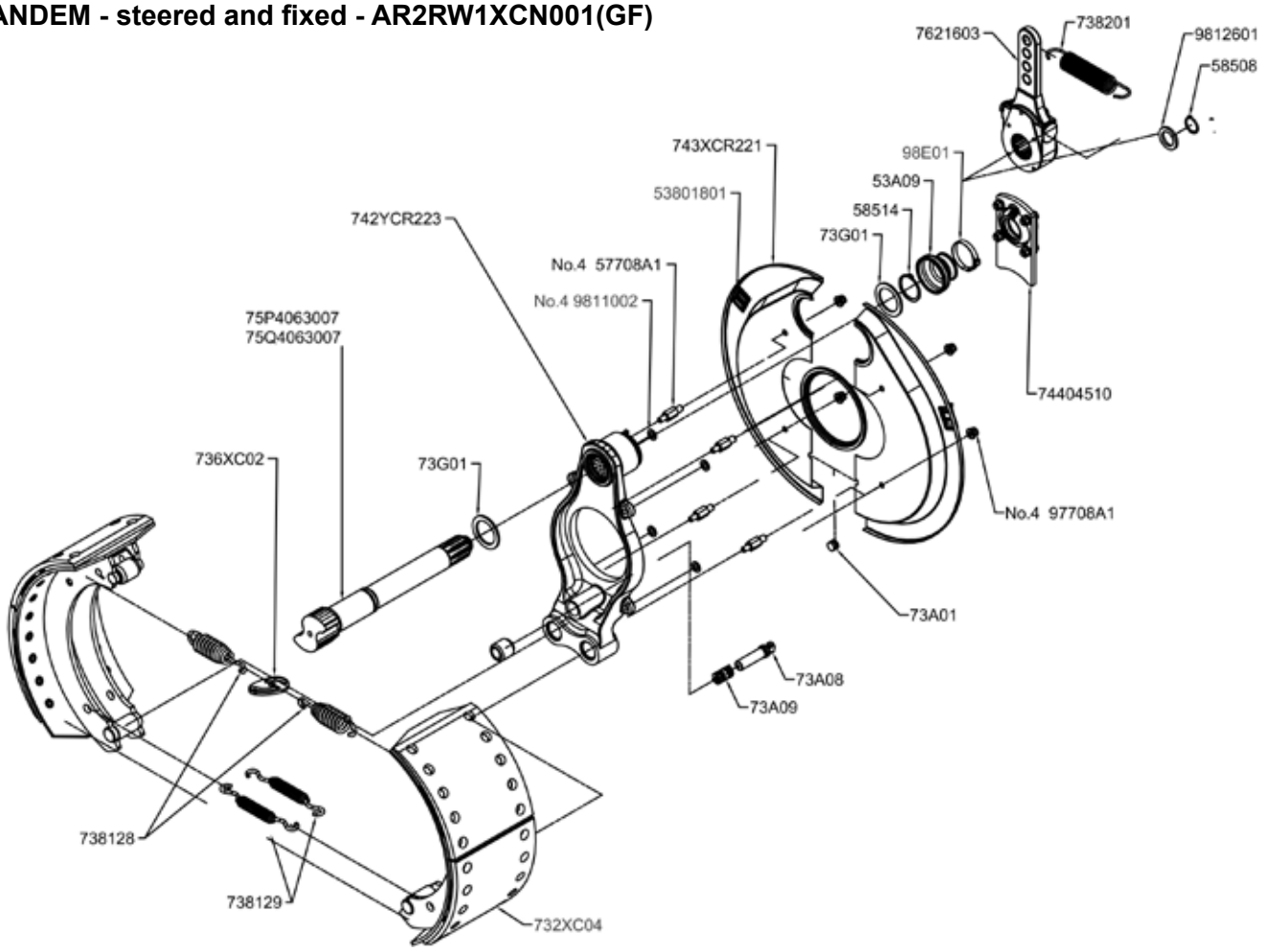

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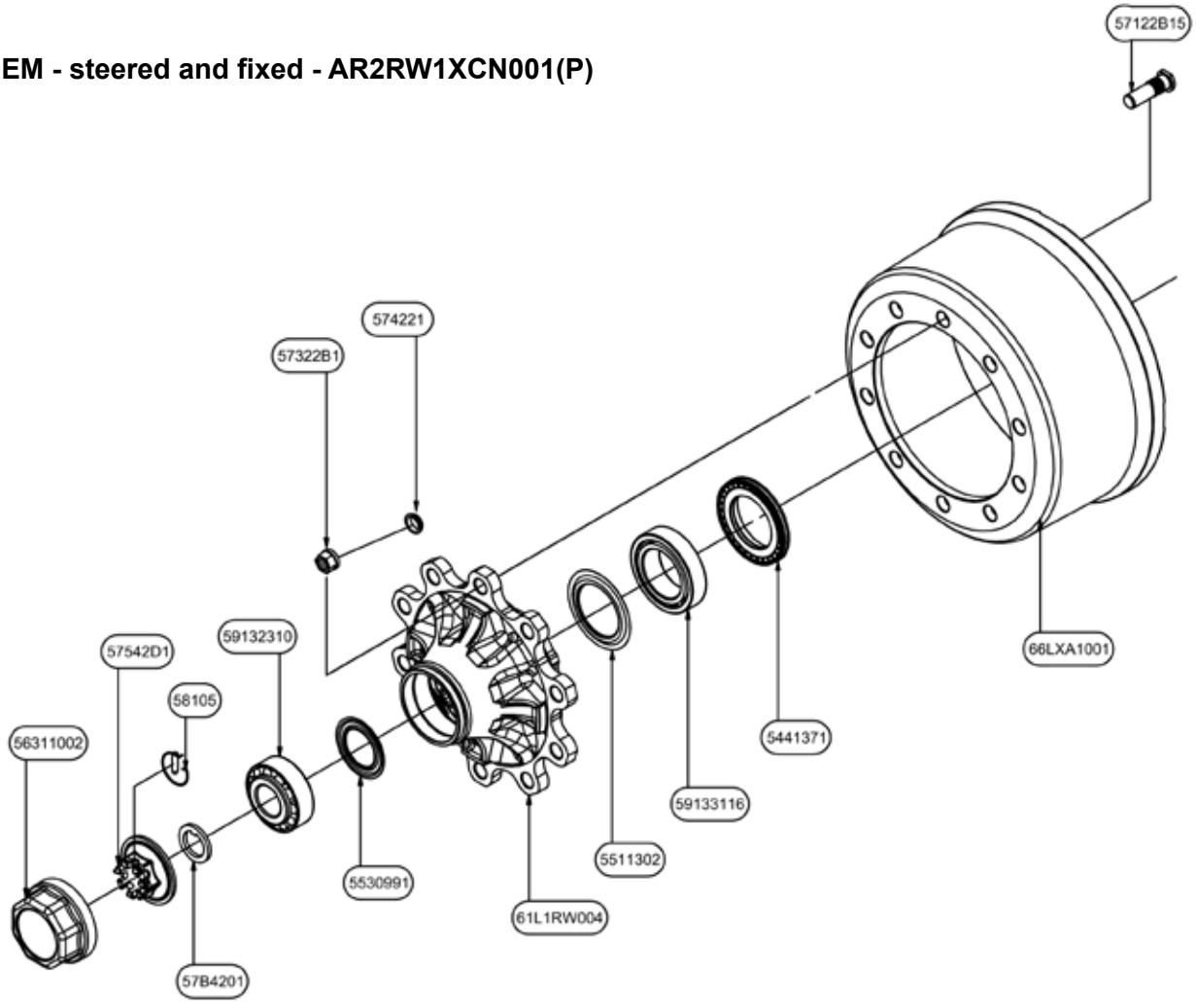
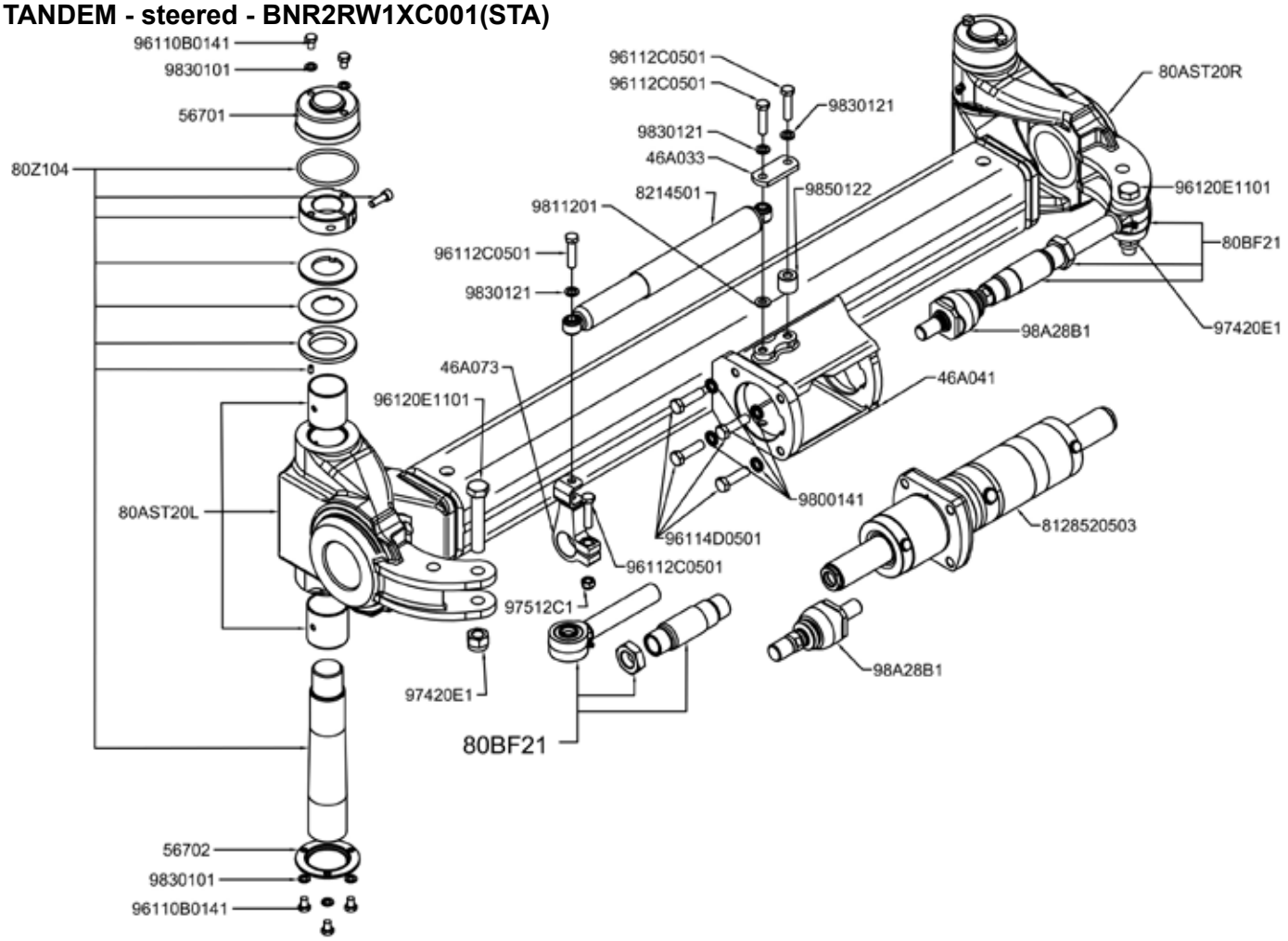
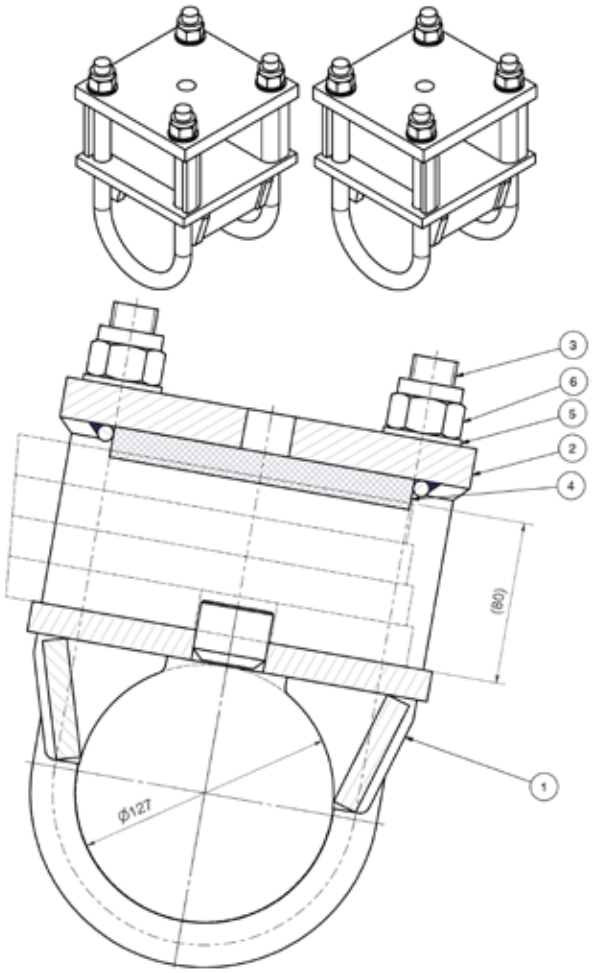


TANDEM - steered - BNR2RW1XC001(STA)

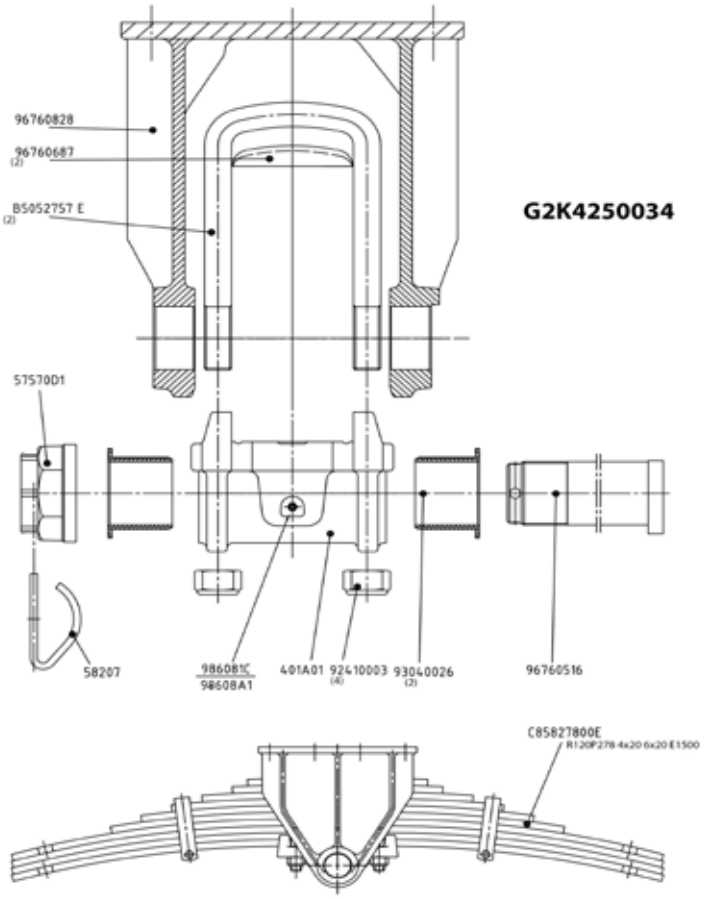


TANDEM - steered and fixed - 441R22103

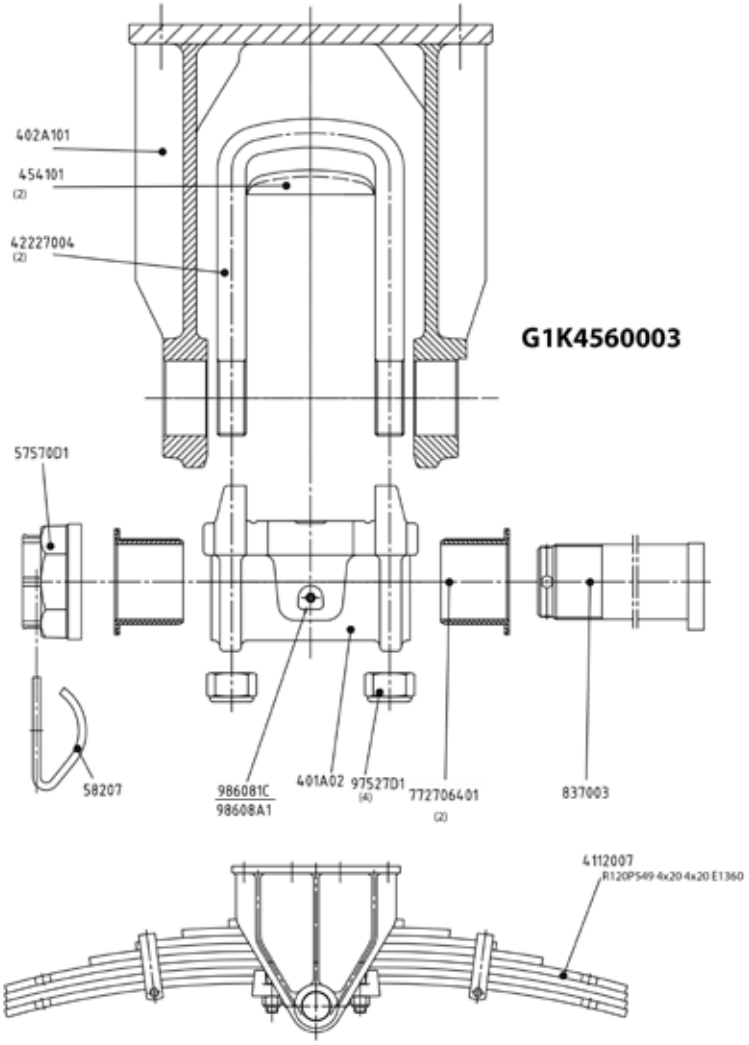


Item	Part No	Description	Qty
1	96760960	PLATE R127 B120	2
2	4352010	BOX CLAMPING LS120 4X20 R127	2
3	42122011	U-BOLT E M22X2.50 H295 W128	4
4	45306	RUBBER PLATE 150X120 TK15	2
5	9812201	WASHER M22 D023 D039 SP3.0 ISO 7089	8
6	97422F1	SELF LOCKING NUT M22X2,50 CA10 DIN 982	8

TANDEM - steered - GEK2250

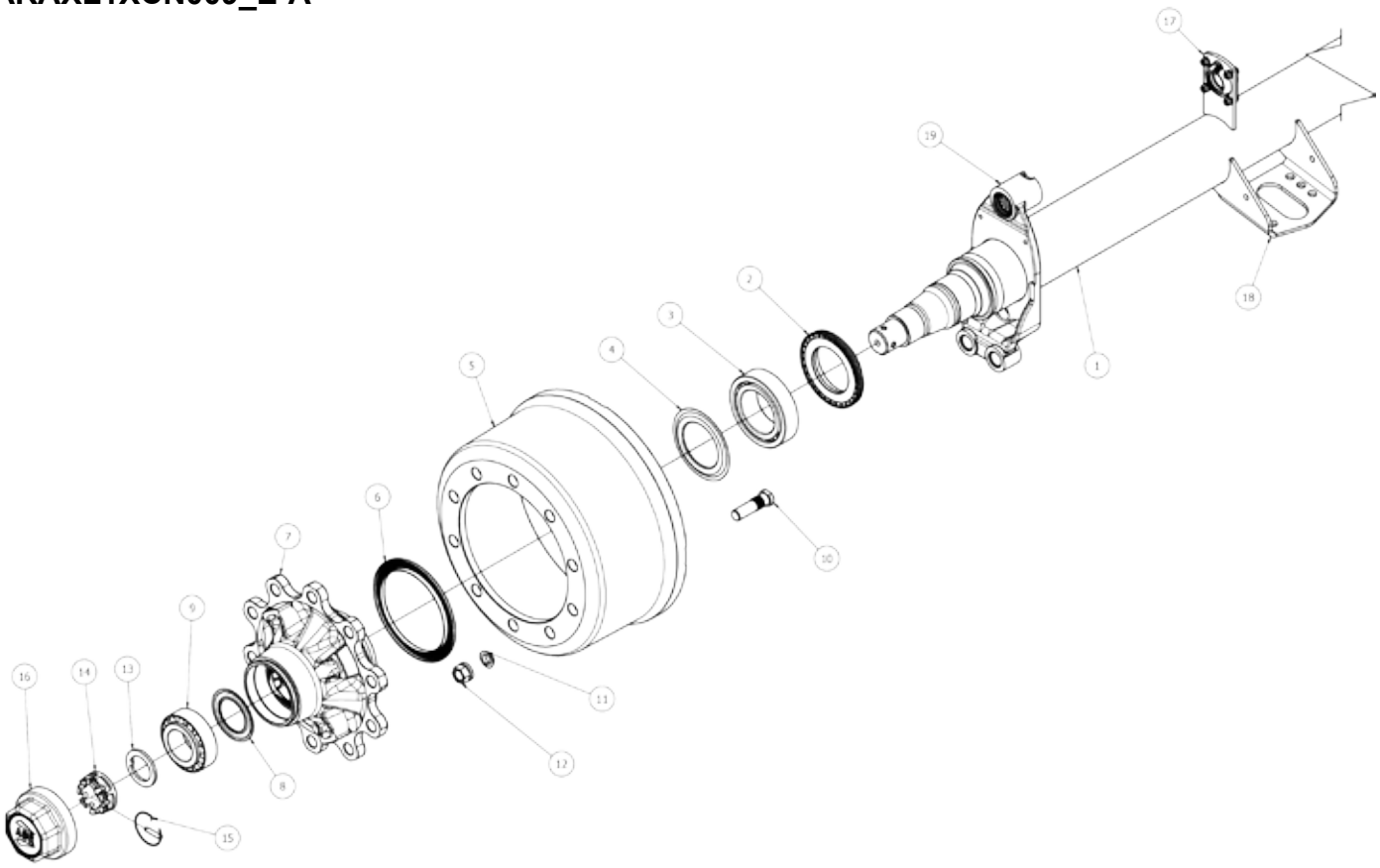


TANDEM - fixed - GEK2560



STEERED TANDEM AXLE - HEAVY DUTY

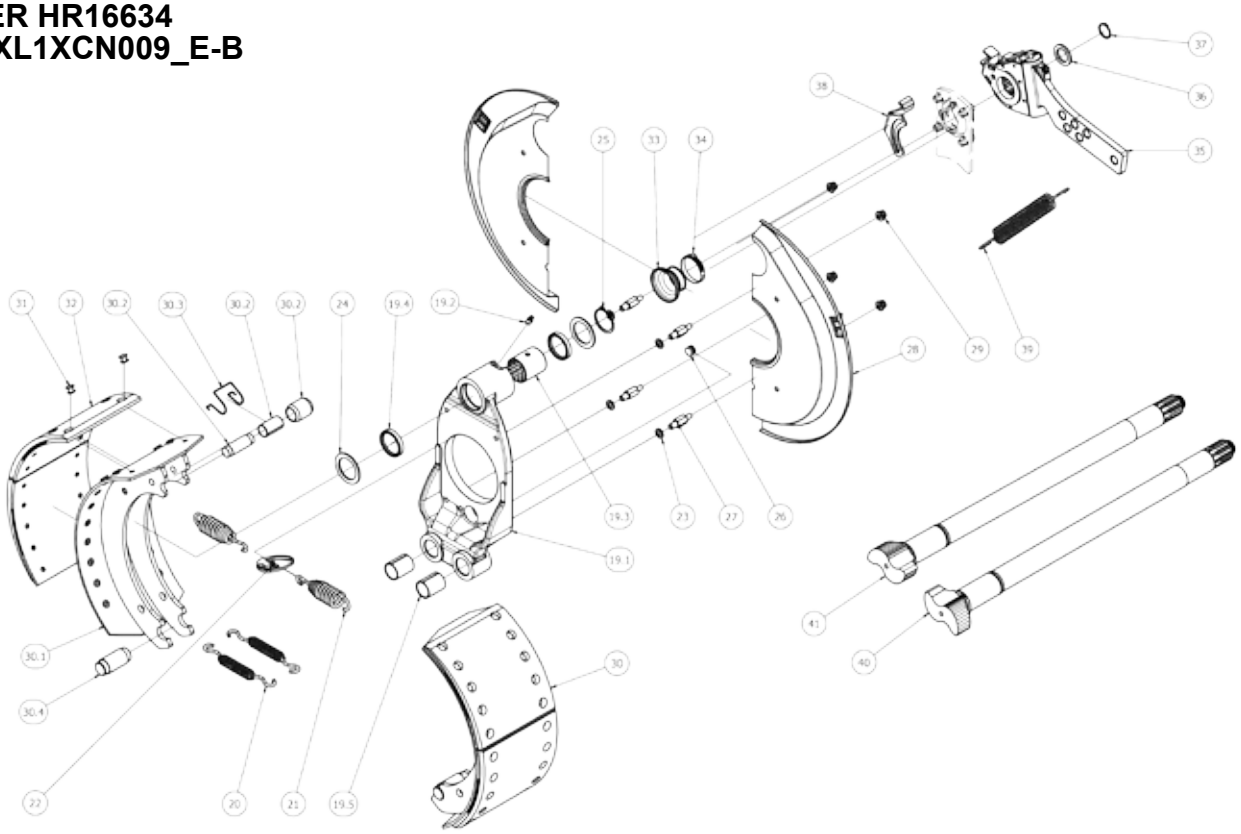
AFTER HR16634
ARAXL1XCN009_E-A



Item	Part No	Description	Qty
1	68XLRA0016	CORPO ASSE T127X20 CAR 2050	1
2	5441561	GREASE SEAL INDUSTRIAL 096/156	2
3	59133118	33118 090 150 45	2
4	5511503	NILOS 33118	2
5	66LXA1001	DRUM 420X180 H10 22 335-290	2
6	739119	EXCITER D170-214 100 TEETH BRAKE	2
7	61L1XL004	HUB H10 22 120-150 280-335	2
8	5531091	NILOS GREASE SEAL 109/067 FOR 32213	2
9	59133213	33213 065 120 41	2
10	57122B15	STUD M22X1,50 L089 HUB AND DRUM	20
11	574221	LIMES WASHER ø22.5	20
12	57322B1	STUD NUT M22x1,50 CH30 GERMAN TYPE	20
13	57B5301	LOCK WASHER FOR M53	2
14	57552D1	CROWN NUT M52X2.00 WR70 H36	2
15	58108	SPLIT PIN 8X36 WITH SAFETY RING D66	2
16	56312002	CAP 120 M135X2.00 ADR	2
17	74417501	CAMSHAFT SUPP R127 ROUND 40-42 D40 L068	2
18	46108306	BRACKET FOR BOOSTER FOR AXLE ROUND 127	2
19	742WCR223	SPYDER 42-40 R127 ROUND	2

STEERED TANDEM AXLE - HEAVY DUTY

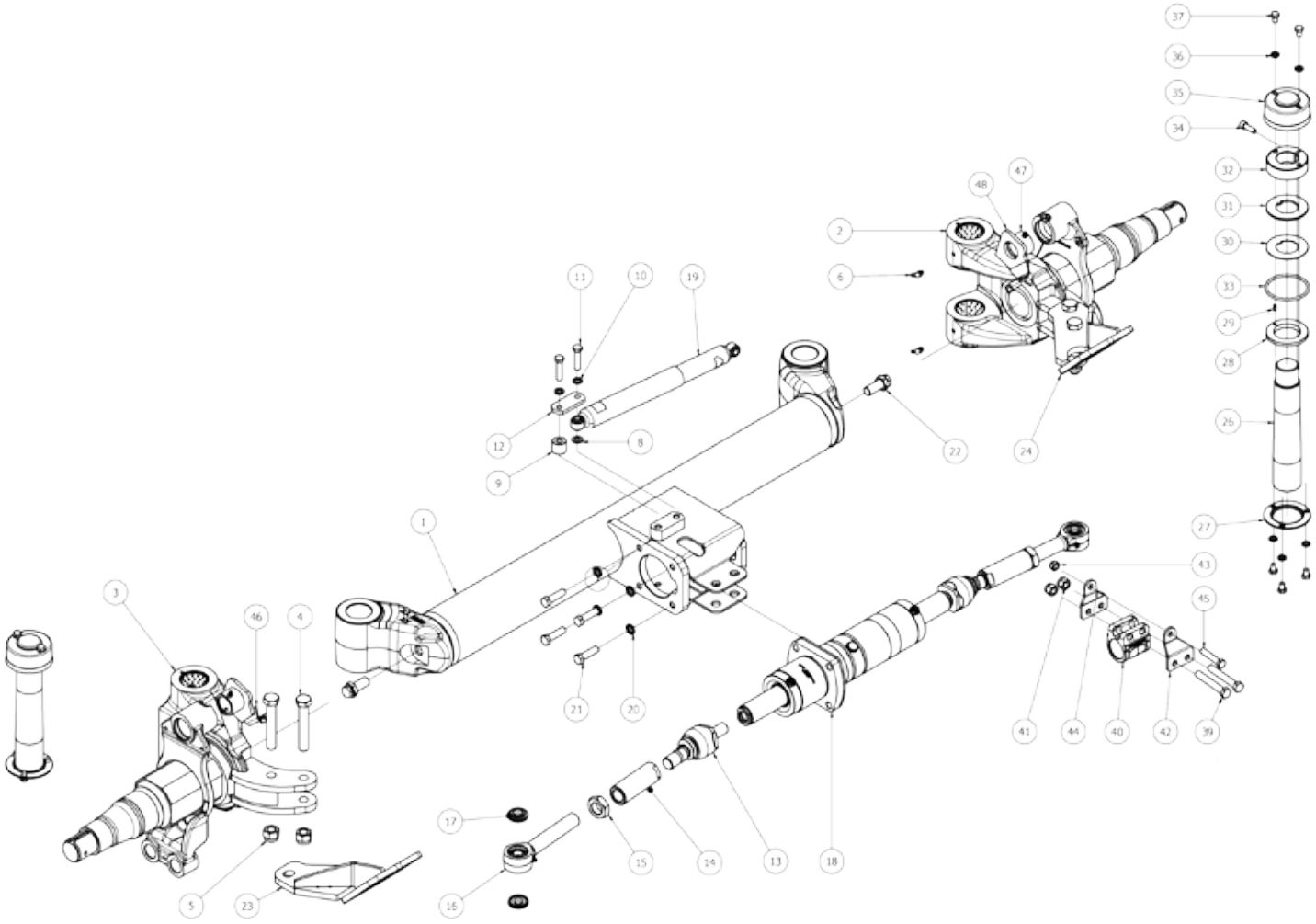
AFTER HR16634
ARAXL1XCN009_E-B



Item	Part No	Description	Qty
19.1	742WCR222	SPYDER 42-40 R127 MACHINED	2
19.2	98608A1	GREASE NIPPLE STRAIGHT M08X1,25	2
19.3	771007	BUSH BMT-3 P424650 WITH TYPE 2 LOZANGE AND	2
19.4	5490501	SPECIAL GREASE SEAL 041/050 CAM SHAFT 412E 4218E	4
19.5	771008	BUSH MU-B P2832 L 40	4
20	738129	SPRING BRAKE 412E 4218E	4
21	738128	SPRING BRAKE 412E 4218E	4
22	736XC02	SPRING EXTENDER 412E 414E 4218E 5218S	2
23	9811002	WASHER M10 D010.5 D018 TK1.6 ISO 7092 ZINC PLATED	8
24	73G01	WASHER BRAKE 412E 4218E	4
25	58514	SEEGER D042 DIN471 FOR SHAFT	2
26	73A01	RUBBER FAIRLEAD D15	2
27	57708A1	SPACER SPYDER 4218E	8
28	743XCR221	PROTECTION PLATE 4218E 4220E ALL PURPOSE BARE	2
29	97708A1	SELF LOCKING NUT M08X1,25 THIN WITH FLANGE	8
30	732XC04	BRAKE SHOE 420X180 4218E	4
30.1	733XC05	SHOE BARE MACHIN 420X180 4218E	1
30.2	73BVC01	ROLL ASSEMBLY FOR 412E 4218E 414E 4220E 5218E	1
30.3	738127	SPRING FOR ROLL BRAKE 412E 4218E	1
30.4	83502801	PIN FOR BRAKE SHOE 412E 4218E	1
31	96701	RIVET 8X15 FOR LINING DIN7338-3 B SHAPE	20
32	734XA01	LINING 420X180 BRAKE 4218S	2
33	53A11	RUBBER CAP FOR CAM SHAFT Ø40	2
34	98E01	HOSE CLAMP FOR RUBBER CAPS BRAKE	2
35	7631600	SLACK ADJUST AUTO SAE 1.5" Z10	2
36	9812601	WASHER M26 D026 D039 TK 4.0 UNI 1749 ZINC PLATED	2
37	58508	SEEGER D025 DIN471 FOR SHAFT	2
38	76A02	ANCHOR BRACKET 60° FOR AUTOMATIC SLACK ADJUSTER	2
39	738201	RETURNING ACTION SPRING D30 AGRICULTURAL BRAKE	2
40	75Q4063007	CAM SHAFT D40 B=650 S LEFT SAE 1,5" Z=10	1
41	75P4063007	CAM SHAFT D40 B=650 S RIGHT SAE 1,5" Z=10	1

STEERED TANDEM AXLE - HEAVY DUTY

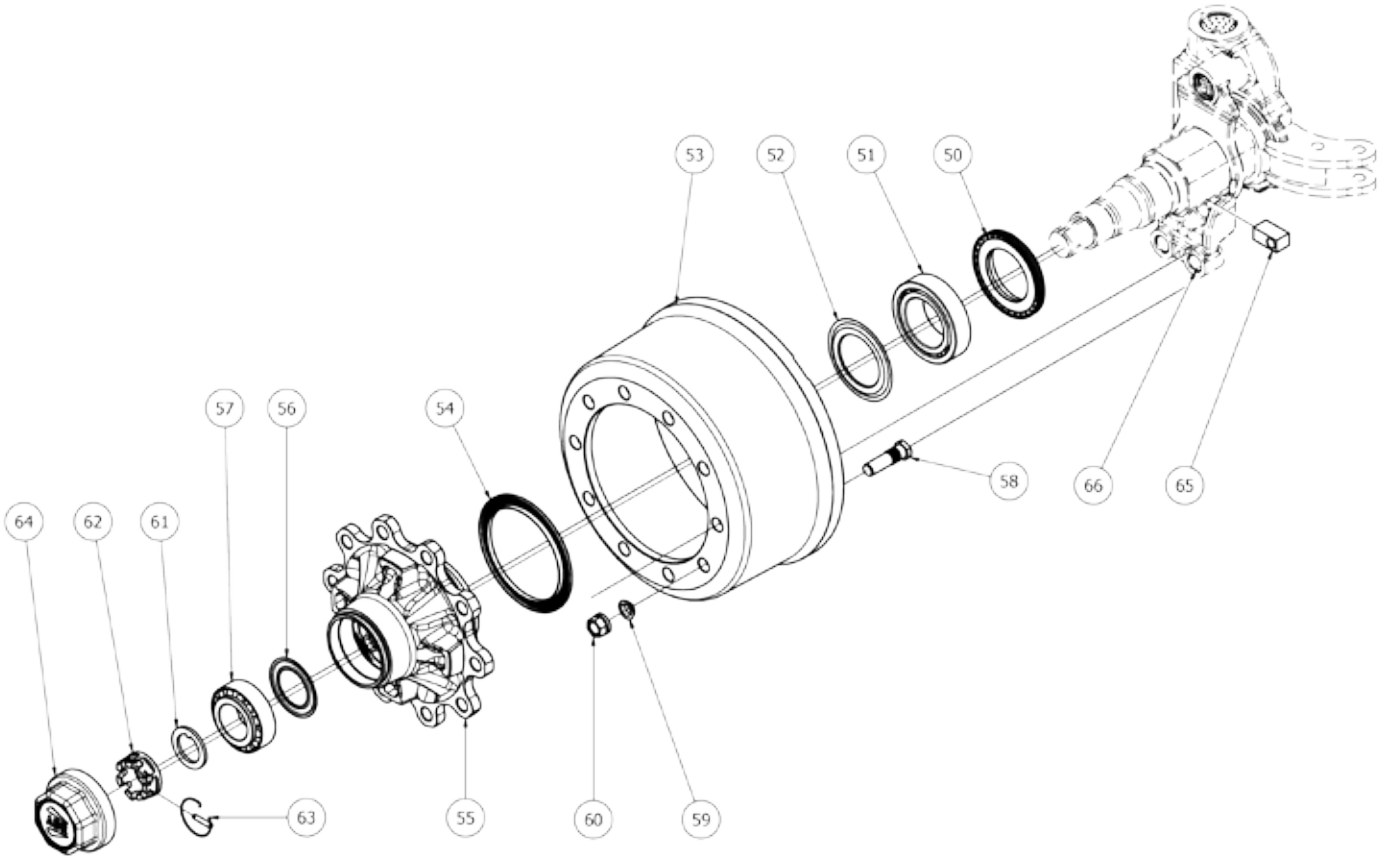
AFTER HR16634
BNRAXL1XCN001_E-A



Item	Part No	Description	Qty
1	8020ST20N089	FUSTO STA-STB T127X20 LAM	1
2	8001ST20R009	GRUPPO STAFFONE STA-STB XL RIGHT	1
3	8001ST20L009	GRUPPO STAFFONE STA-STB XL LEFT	1
4	96120E1201	SCREW EH M20X2,50 L120 CA8,8 ISO 4014 ZINC PLATED	4
5	97420E1	SELF LOCKING NUT M20X2.50 CA8 DIN 982 ZINC PLATED	4
6	98608A2	GREASE NIPPLE 45° M08X1,25	4
7	46A160	FIXING PLATE FOR NO.2 8214501 SUPPORT 46A098-46A123	1
8	9811201	WASHER M12 D013 D024 TK2.5 ISO 7089 ZINC PLATED	1
9	9850122	SPACER FOR SHOCK ABSORBER STEERING SWA SWB	1
10	9830121	GROWER WASHER M012 DIN127	2
11	96112C0501	SCREW EH M12X1,75 L050 CS08,8 ISO 4014 ZINC PLATED	2
12	46A033	FIXING PLATE FOR NO2 SHOCK ABSORBER STA SWA	1
13	98A28B1	SNODO ASSIALE M24X1,5 M28X1,5	2
14	80BG48	MAIN BODY L0120 LIGHT FOR COUPLING BAR	2
15	97230F1	THIN NUT M30X3,00 RIGHT ISO 4035 CA 8 ZINC PLATED	2
16	98930F7	BALL JOINT END M30X3,00 RIGHT COUPLING BAR STA STB STJ	2
17	9850212	SPACER D021/028 L008,5	4
18	8128520503	CYLINDER HYDR D085/045 S205 DA SELF STEERING AXLE	1
19	8214501	AMMORTIZZATORE D045 C220	1
20	9800141	TWIN WASHER M14 D15.2 D23 SP3.4 DELTA PROTEKT	4
21	96114D0501	SCREW EH M14X2,00 L050 CS08.8 ISO 4014 ZINC PLATED	4
22	96820B0531	BOLT SPECIAL M20x1.50 L053.5 SELF STEERING AXLE ADJUSTMENT	2
23	468690	ASSEMBLY OF LEFT BOOSTER SPECIAL TYPE FOR STP 406E	1
24	468689	ASSEMBLY OF RIGHT BOOSTER SPECIAL TYPE FOR STP 406E	1
26	83206002	PIN SELF STEERING AXLE STN STR STC STK SRC STS STA STB STJ	2
27	56702	CAP LOWER WITH GASKET	2
28	57D13	WASHER WITH COLLAR FOR RING NUT STN STR STC STK SRC	2
29	58406	PIN	2
30	57D12	WASHER FOR RING NUT STN STR STC STK SRC STS STA STB STJ	2
31	57D07	SPACER FOR RING NUT STN STR STC STK SRC STS STA STB STJ	2
32	57648D2	RING NUT M48X2,00 FOR STN STR STC STK SRC STS STA STB STJ	2
33	53108501	OR6337 D085,09 WIRE 5,34	2
34	96310B0301	SCREW SH M10x1,50 L030 CS10.9 ISO4762 ZINC PLATED	2
35	56701	UPPER CUP Ø84 FOR STEERING AXLE TYPE SM	2
36	9830101	GROWER WASHER M010 DIN127	10
37	96110B0141	SCREW EH M10X1,50 L014 CA8,8 ISO 4017 ZINC PLATED	10
39	96114D0901	SCREW EH M14X2,00 L090 CS08.8 ISO 4014 ZINC PLATED	2
40	46A182	SUPPORT D045 SHOCK ABSORBER ALL PURPOSE	1
41	97414D1	SELF LOCKING NUT M14X2.00 CA8 DIN 982 ZINC PLATED	2
42	46A188	PLATE SHOCK ABSORBER SUPPORT LEFT FOR 8214501	1
43	97512C1	SELF LOCKING NUT M12X1,75 CL8 DIN985 ZINC PLATED	1
44	46A187	PLATE SHOCK ABSORBER SUPPORT RIGHT FOR 8214501	1
45	96112C0601	SCREW EH M12X1,75 L060 CS08,8 ISO 4014 ZINC PLATED	1
46	76A04	ANCHOR BRACKET ALIGNED	2
47	74401113	SUPPORT D=38 L=005 FOR CAM SHAFT	2
48	462083089	SUPPORT PLATE SPECIAL TYPE FOR CAMSHAFT	2

STEERED TANDEM AXLE - HEAVY DUTY

AFTER HR16634
BNRAXL1XCN001_E-B



Item	Part No	Description	Qty
50	5441561	GREASE SEAL INDUSTRIAL 096/156	2
51	59133118	33118 090 150 45	2
52	5511503	NILOS 33118	2
53	66LXA1001	DRUM 420X180 H10 22 335-290	2
54	739119	EXCITER D170-214 100 TEETH BRAKE 412E 414E 4218E 4220E	2
55	61L1XL004	HUB H10 22 120-150 280-335	2
56	5531091	NILOS GREASE SEAL 109/067 FOR 32213	2
57	59133213	33213 065 120 41	2
58	57122B15	STUD M22X1,50 L089 HUB AND DRUM	20
59	574221	LIMES WASHER ø22.5	20
60	57322B1	STUD NUT M22x1,50 CH30 GERMAN TYPE	20
61	57B5301	LOCK WASHER FOR M53	2
62	57552D1	CROWN NUT M52X2.00 WR70 H36	2
63	58108	SPLIT PIN 8X36 WITH SAFETY RING D66	2
64	56312002	CAP 120 M135X2.00 ADR	2
65	73A65	SUPPORT FOR ABS SENSOR PERIFERIA ZA S150	2
66	742WCB223	SPYDER 42-40 R120 ROUND	2

STEERED TANDEM AXLE - HEAVY DUTY

AFTER HR16634
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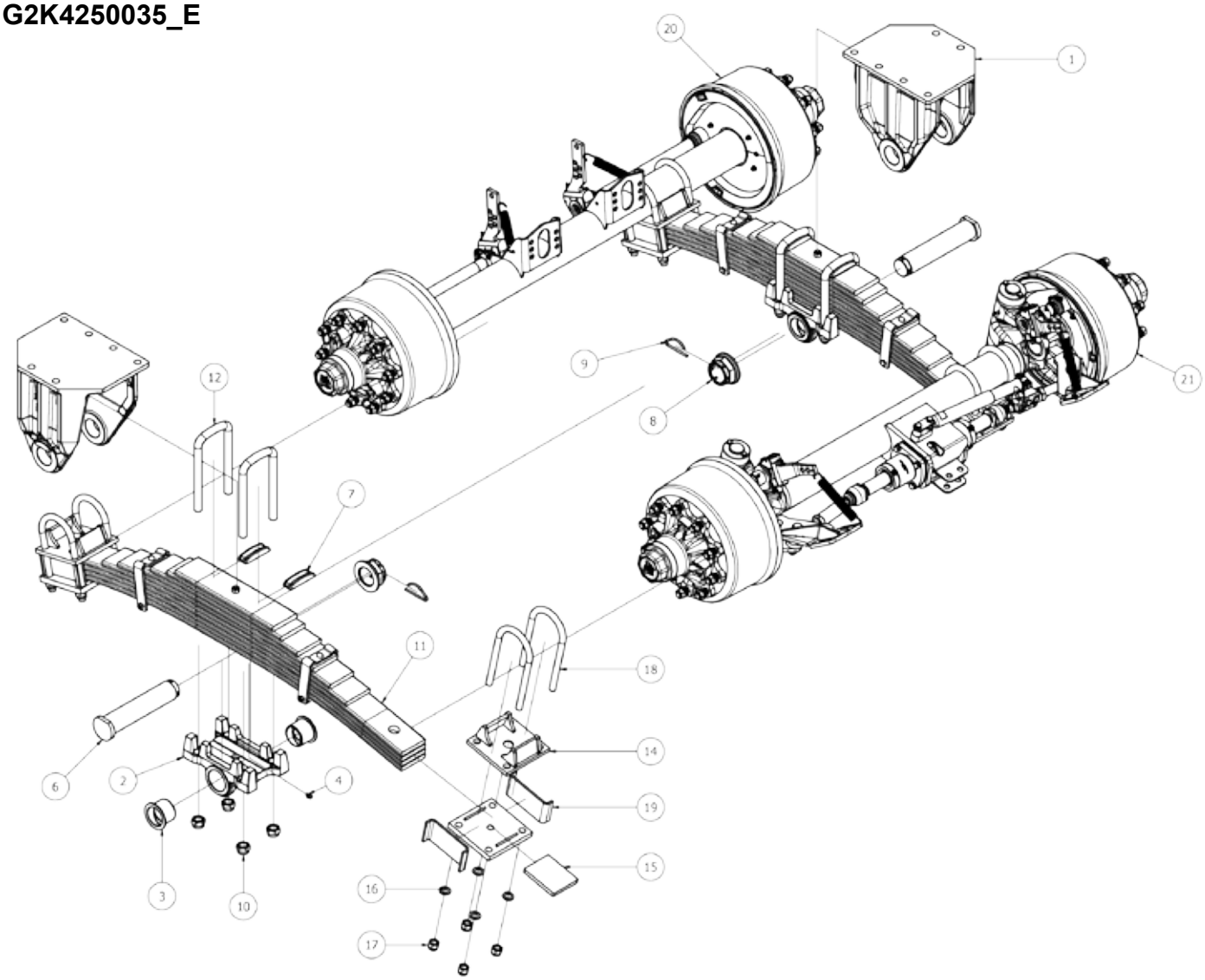
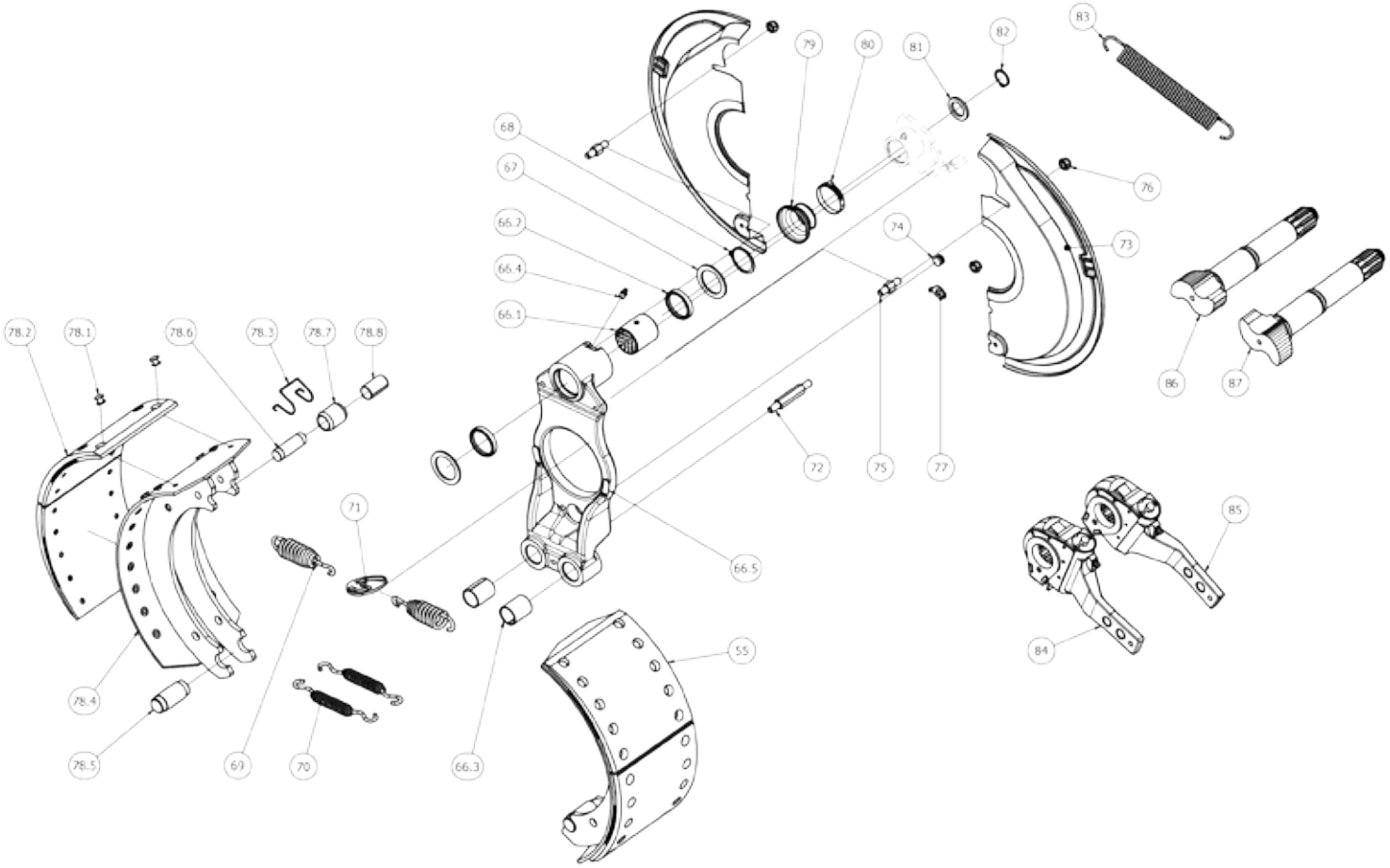


Item	Part No	Description	Qty
1	402A101	SUPPORT BOGIE J-K H350 DRILLED	2
2	401A02	PALIER BOGIE I-K MACHINED	2
3	772706401	Bague ERTALON D070/100 L064	4
4	98608A1	GREASE NIPPLE STRAIGHT M08X1,25	2
5	986081C	CAP FOR GREASE NIPPLE	2
6	837003	PIN BOGIE TYPE G-I-J-K	2
7	454201	CLAMPING WEDGE LEAF SPRING 120	4
8	57570D1	CROWN NUT M70X2.00 WR90 H55	2
9	58207	SPRING PIN FOR NUT M70	2
10	97527D1	SELF LOCKING NUT DIN985 H,M27X200	8
11	4112009	LEAF SPRING R120P278 E1543 4X20 6X20	2
12	42227014	U-BOLT M M27X2,00	4
13	441R22103	CLAMPING R127 4X20 LS120	4
14	96760960	PLAQUE INTERMEDIAIRE D127 R120	1
15	45306	RUBBER PLATE 150X120 TK15	1
16	9812201	WASHER M22 D023 D039 SP3.0 ISO 7089 ZINC PLATED	4
17	97422F1	SELF LOCKING NUT M22X2,50 CA10 DIN 982 ZINC PLATED	4
18	42122011	U-BOLT E M22X2,50 H295 W128	2
19	4352010	BOX CLAMPING LS120 4X20 R127	1
20	ARAXL1XCN009	BRAKED AXLE HUB AND DRUM PERIFERIA XL FRENO 4218E	1
21	BNRAXL1XCN001	SELF STEERING AXLE STA 0° PERIFERIA XL BRAKE 420X180 4218E	1

STEERED TANDEM AXLE - HEAVY DUTY

AFTER HR16634
BNRAXL1XCN001_E-C

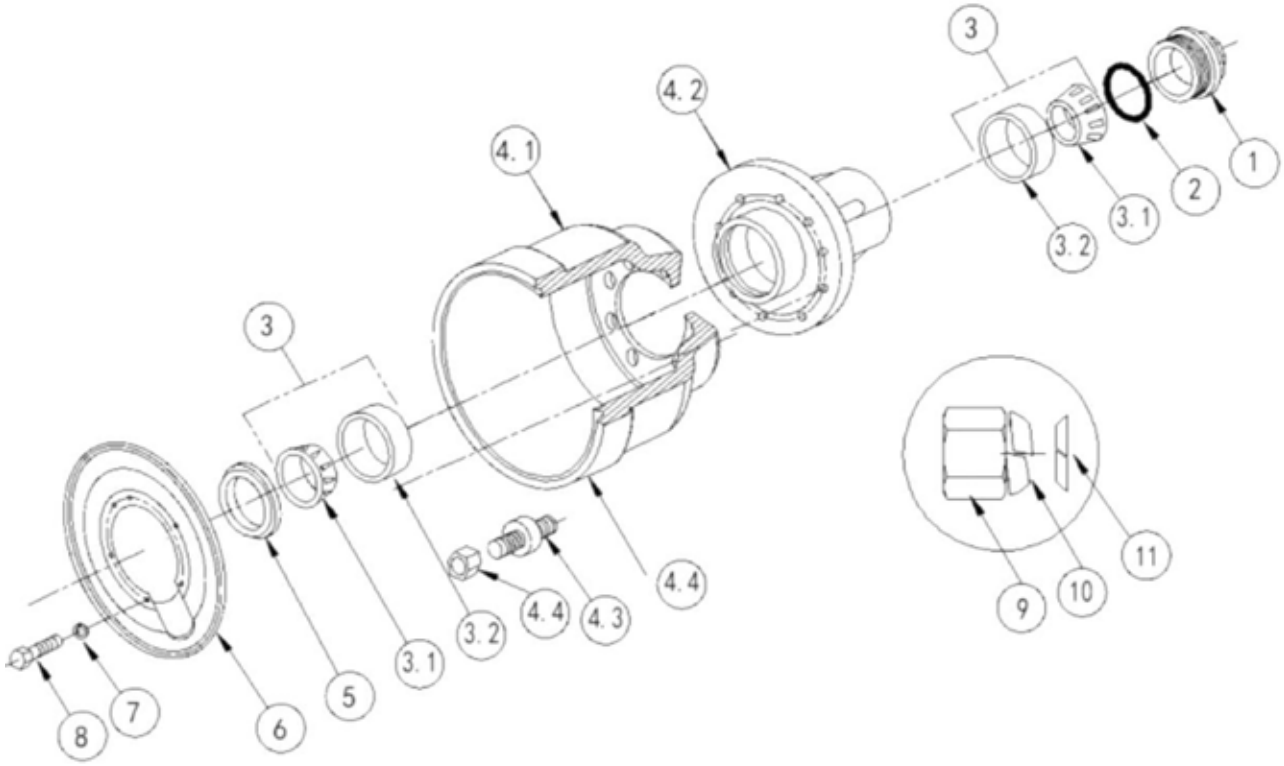


Item	Part No	Description	Qty
66.1	771007	BUSH BMT-3 P424650 WITH TYPE 2 LOZANGE	2
66.2	5490501	SPECIAL GREASE SEAL 041/050 CAM SHAFT	4
66.3	771008	BUSH MU-B P2832 L 40	4
66.4	98608A1	GREASE NIPPLE STRAIGHT M08X1,25	2
66.5	742WCB222	SPYDER 42-40 R120 ROUND BARE	2
67	73G01	WASHER BRAKE 412E 4218E	4
68	58514	SEEGER D042 DIN471 FOR SHAFT	2
69	738128	SPRING BRAKE 412E 4218E	4
70	738129	SPRING BRAKE 412E 4218E	4
71	736XC02	SPRING EXTENDER 412E 414E 4218E 5218S	2
72	57710B12	SPACER SPYDER 4218E LOWER	2
73	743XCB223	PROTECTION PLATE 4218E 4220E R120 ROUND	2
74	73A01	RUBBER FAIRLEAD D15	2
75	57710B13	SPACER SPYDER 4218E UPPER	4
76	97510B1	NUT M10X1,50 DIN 985	6
77	57B1001	LOCK WASHER Ø10 FOR PROTECTION PLATE	2
78	732XC04	BRAKE SHOE 420X180 4218E	4
78.1	96701	RIVET 8X15 FOR LINING DIN7338-3 B SHAPE	20
78.2	734XA01	LINING 420X180 BRAKE 4218S	2
78.3	738127	SPRING FOR ROLL BRAKE 412E 4218E	1
78.4	733XC05	SHOE BARE MACHIN 420X180 4218E	1
78.5	83502801	PIN FOR BRAKE SHOE 412E 4218E	1
78.6	83302003	PIN FOR ROLL BRAKE	1
78.7	737VC01	ROLL FOR BRAKE SHOE 412E 4218E	1
78.8	771006	BUSH MU-B P2023 L40	1
79	53A11	RUBBER CAP FOR CAM SHAFT Ø40	2
80	98E01	HOSE CLAMP FOR RUBBER CAPS BRAKE	2
81	9812601	WASHER M26 D026 D039 TK 4.0 UNI 1749	2
82	58508	SEEGER D025 DIN471 FOR SHAFT	2
83	738204	RETURNING ACTION SPRING D30	2
84	7632601	SLACK ADJ AUTO SAE Z10 SHIFT30	1
85	7632602	SLACK ADJ AUTO SAE Z10 SHIFT30	1
86	75P4062003	CAM SHAFT D40 B=225 S RIGHT SAE 1,5" Z=10	1
87	75Q4062003	CAM SHAFT D40 B=225 S LEFT SAE 1,5" Z=10	1

Single axle - GRANNING type (including ALPINE tankers)

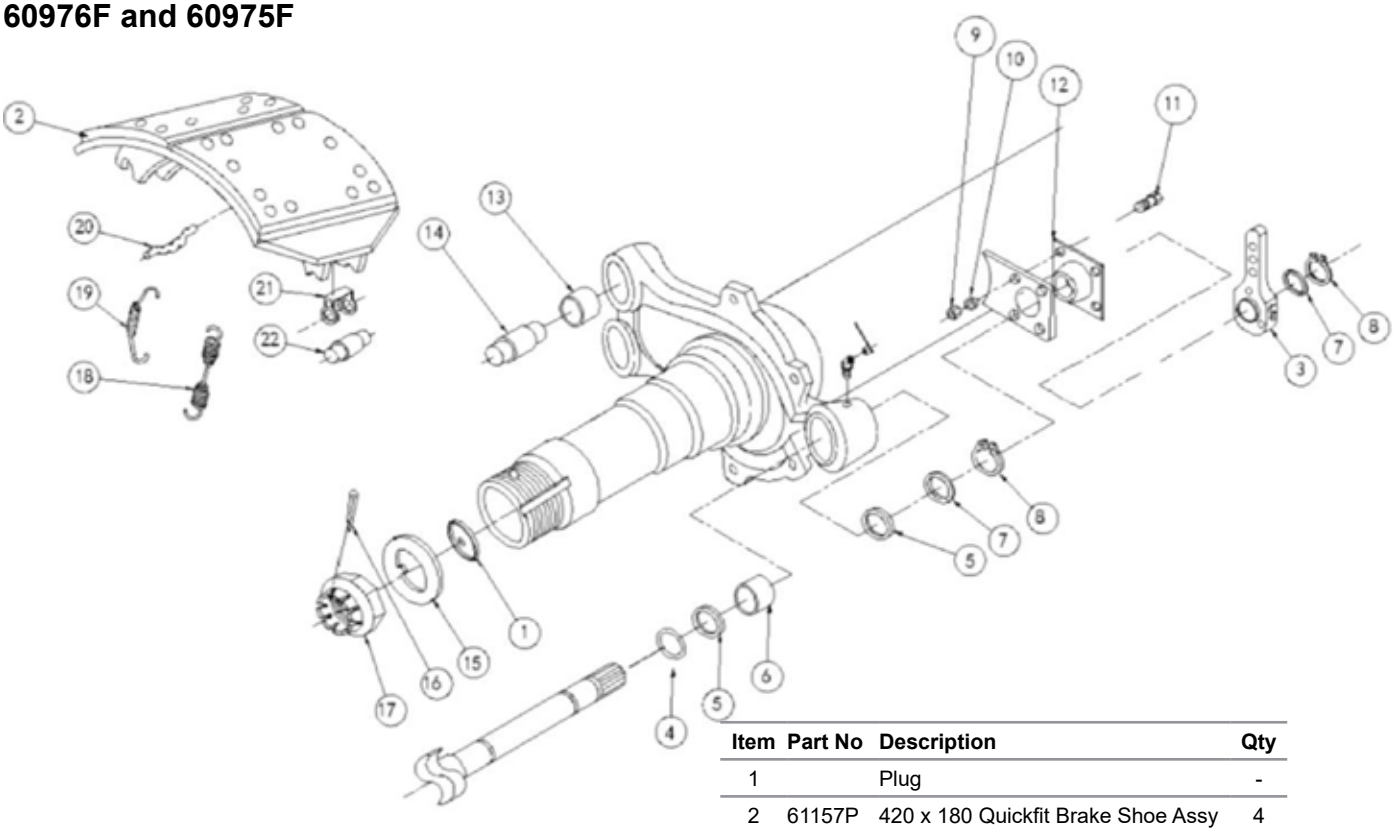
NOTE:
The axle breakdown provided below covers all Alpine (2150-2670) and all LGP (2050-3100) tankers.

60976F and 60975F



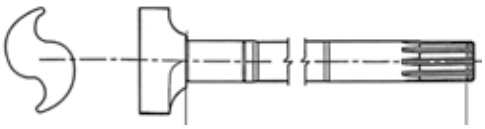
Item	Part No	Description	Qty
1	20000	Hub Cap Steel	2
2	20001	O-Ring (Hub-Cap Gasket)	2
3	20002	Bearing	4
4.1	20102	10 Stud Internal Drum	2
4.2	20101	10 Stud External Hub	2
4.3	20011	M22 x 1.5 Wheel Bolt L=66	20
4.4	20100	Internal Wheel Bolt Nut	20
5	20013	Seal Oil 108	2
6	20105	Dust Cover	2
7	20016	Lock Washer 12mm	12
8	20017	Hex Bolt M8 x 16mm	12
9	61383	M22 Din Wheel Nut	20
10	61371	M22 Din Inner Washer	20
11	61372	M22 Din Outer Washer	20

60976F and 60975F



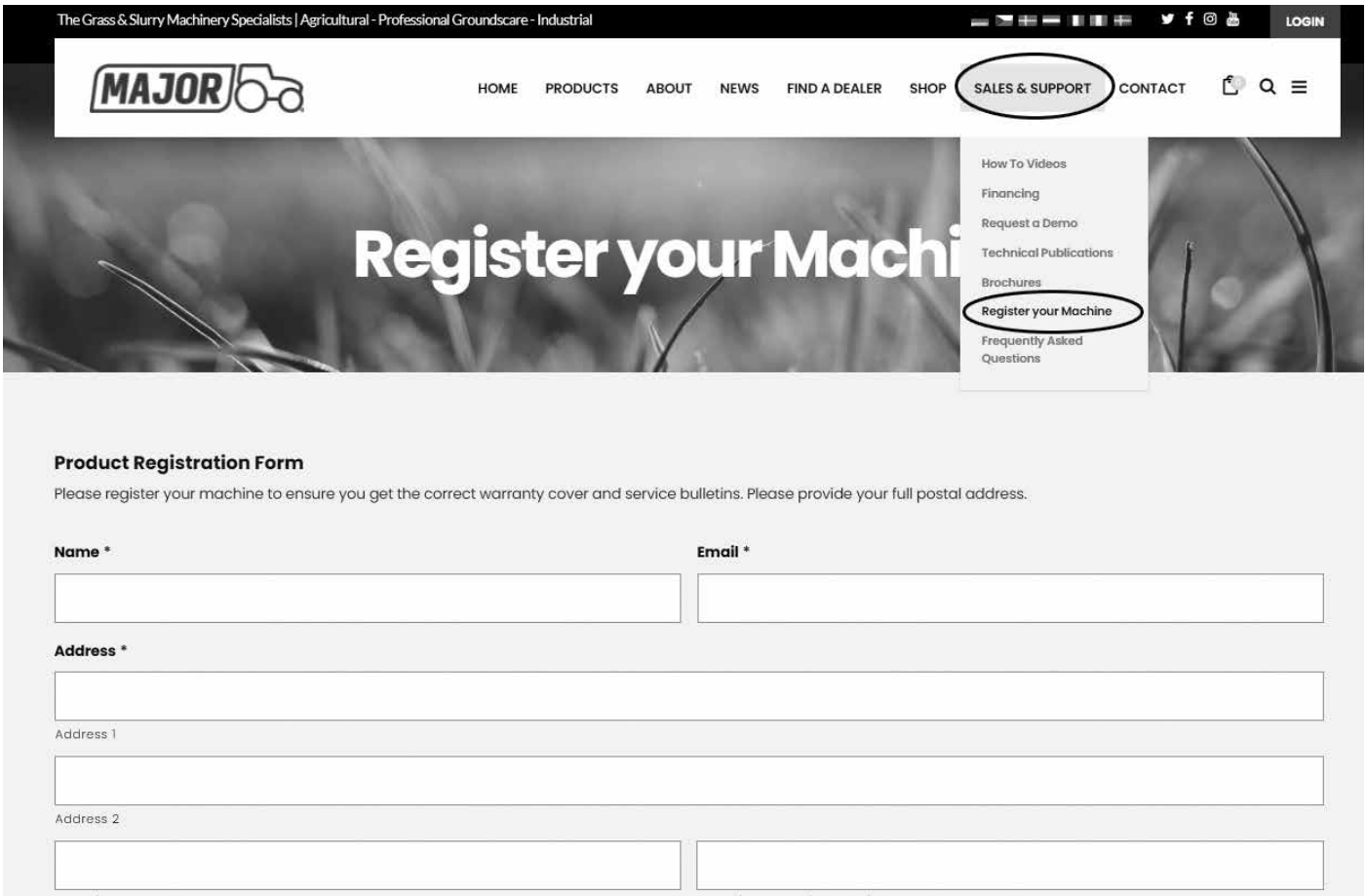
Item	Part No	Description	Qty
1		Plug	-
2	61157P	420 x 180 Quickfit Brake Shoe Assy	4
3	30015	Manual Slack Adjuster 10 Spline	2
4	61057	Camshaft Beveled Washer	2
5	61056	Camshaft Grease Seal	4
6	61055	Camshaft Bush	2
7	61058	Support Washer Camshaft	4
8	61120	Circlip	4
9	20052	Hex Nut M10	8
10	20051	Plain Washer Ø10	8
11	20048	Hex Bolt M10 x 32	8
12	61080	Spherical Bearing Camshaft	2
13	20067	Anchor Pin Bush	4
14	61171	Anchor Pin	4
15	20058	Axle Washer	2
16	20059	Cotter Pin Ø8 x 40	2
17	20060	Heavy Duty Axle Nut	2
18	61140	Return Spring	2
19	61141	Anchor Spring Pin	4
20	61150	Return Spring Pin	2
21	61220	Cam Roller Retainer	4
22	61235	Cam Roller	4

LGP and ALPINE axle cam shaft



Item	Part No	Description	Qty
1	61061	L=212mm Large Head Left **(ALPINE)**	1
2	61071	L=212mm Large Head Right **(ALPINE)**	1
3	61065	L=519mm Large Head Left **(LGP)**	1
4	61075	L=519mm Large Head Right **(LGP)**	1

All MAJOR machines must be registered when sold, to ensure that you receive the correct warranty cover and service bulletins. To register your machine for warranty, please go to the SALES & SUPPORT section of our website www.major-equipment.com and enter your details.



Product Registration Form

Please register your machine to ensure you get the correct warranty cover and service bulletins. Please provide your full postal address.

Name *

Email *

Address *

Address 1

Address 2

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