

# **MECHlift 150 Bin Lifter**



## **Operating and Maintenance Instruction Manual**



# Table of contents

## 1. GENERAL INFORMATION

General Description .....	4
Introduction and Important Notes.....	5

## 2. OPERATING INSTRUCTIONS

Safety Instructions .....	6
Controls and Components .....	8
Emptying 80 – 240 litre Containers .....	10

## 3. TECHNICAL INFORMATION

Mounting and Dismounting .....	15
Interface Requirements – Mechanical Interface.....	16
Interface Requirements – Hydraulic Interface .....	18
Hydraulic System Specification.....	19
Mechanical Function .....	22
Hydraulic Systems Overview – Systems Breakdown.....	24
Hydraulic Systems Schematic.....	25
Care and Maintenance.....	26
Fault Finding Procedure.....	29

# GENERAL DESCRIPTION



The Model 150 is a low-level lifter capable of handling both hand-loaded plastic bags and European style 240 litre bins. This model has a high ground clearance to decrease the accidental damage. The top of the lifter is level with the hopper's sill making it easy to throw the plastic bags over.

A single rotary actuator drives each lifter, which provides a smooth bin emptying cycle. Stubborn refuse is normally ejected on the first attempt due to the tipping angle of 45°.

This patented rotary lift action is more efficient and uses much less power from the vehicle's engine. Therefore achieving cycle times of 7 to 8 seconds with bins weighing up to 180kg.

The Model 150 is easily removable and transferable. The design is such that it can easily be removed and transferred in under two minutes without the use of any tools.

# INTRODUCTION & IMPORTANT INFORMATION

We are pleased that you decided to acquire a MECHLIFT product. MECHLIFT bin lifters have become popular since 1992 because they are economical, durable and efficient.

Our lifters are continuously being improved therefore; it will be appreciated if you notify us of any problem (or suggestion), irrespective of how big or how small. Our factory and distributors are always at your disposal to provide full after sales service.

## **Please read these notes carefully:**

All users of the lifter or persons carrying out maintenance and repair work should be trained for the appropriate operation of the lifter. Furthermore, they should be made aware of any dangers that might occur when operating the device.

Please study the Operating Instructions closely before using the lifter or carrying out maintenance work or adjustments.

Please read the Operating Manual of the vehicle and vehicle body manufacturer as well.

If any person reading the Operating Instructions does not understand any aspect clearly, or believes that the instructions are inadequate, then do not operate the equipment until clarification has been obtained from MECHLIFT.

The number (1) on the actuator identifies each lifter. The position and style of the number may differ from that shown here.

When making enquiries, please quote the number (1) found on the actuator.



# **OPERATING INSTRUCTIONS:**

## **SAFETY INSTRUCTIONS**

MECHLIFT lifters are designed and tested to work safely when properly used. Anyone working with the lifter, maintaining or repairing it should read and follow these safety instructions.

### **PROPER USE**

- The lifter has been design to only be mounted to a refuse collection vehicle and to empty refuse containers.
- This specific type of lifter may empty only 80-240 litre containers. Emptying any other containers may lead to an accident.
- Lifting or towing of any other load is strictly forbidden.
- Only use the lifter for the purposes shown in the operating instructions. Any other use of the lifter may be dangerous.

### **GENERAL SAFETY**

- Untrained persons may not operate the lifter.
- Read the operating instructions carefully before you use the lifter. Make sure you are familiar with the lifter.
- Only operate the lifter when you know what the controls are for and what they do.
- ALWAYS make sure the bin is properly located on the comb before lifting. If it is not secure on the comb, it may fall and cause an accident.
- DO NOT reach into the bin lifter. Your hands could be crushed.
- DO NOT exceed the cycle speed of 7 sec.

# SAFETY INSTRUCTIONS CONT.

## WORKING AREAS

During the emptying process, the user must move out of the area behind the lifters and stand at the side of the lifter beside the operating lever.

NOBODY is allowed to stand inside the operating area while the machinery is moving or while a bin is lifted.

## MAINTENANCE AND REPAIR

 <b>IMPORTANT!</b>
---

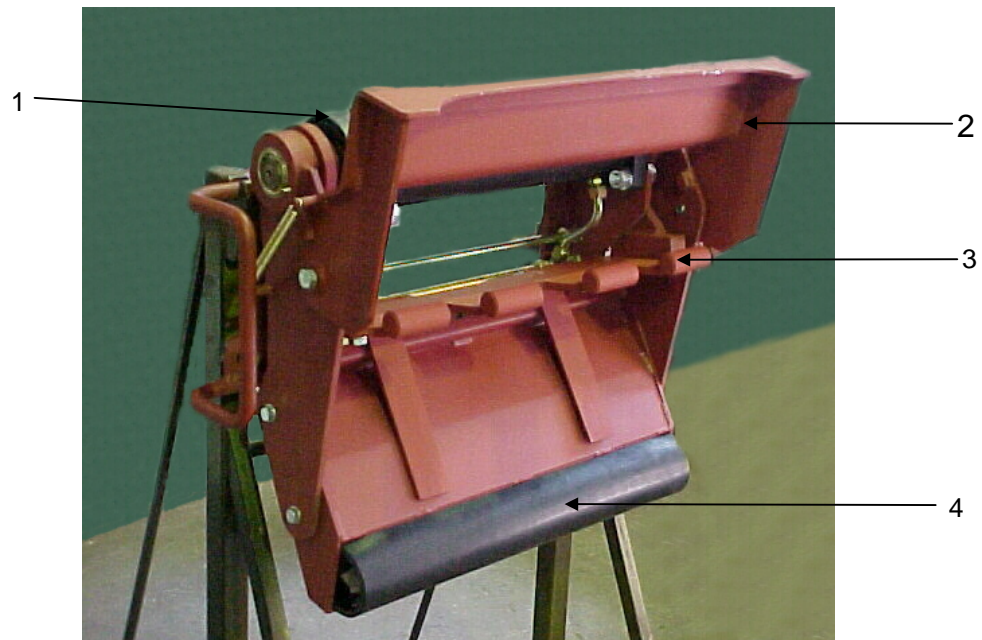
<b>A qualified person must check the lifter at least once a year to see if all safety devices are working properly.</b>
---

- Please observe the recommended maintenance intervals (see chapter on “Care and Maintenance”).
- Only trained and experienced persons may carry out maintenance and repair work.
- Only authorized persons are allowed near the lifter during maintenance and repair work.
- ALWAYS switch off the vehicle hydraulics when carrying out maintenance and repair work.
- For safety reasons, only authorized alterations or modifications are allowed.
- DO NOT remove, alter or prevent safety devices from working.
- DO NOT alter the sequence of operation of the lifter.
- Take proper safety precautions when fitting, removing or transporting the lifter.
- Use only original MECHLIFT spares or spares approved by MECHLIFT. These spares will work properly and safely.
- The non-approved spares may change the way the lifter works and can affect safety.
- If you use non-approved spares, you may invalidate the manufacturer’s liability.

# Controls and Components

The main controls and components of the MECHLIFT Model 150 are:

1. Actuator and Carrier Assembly
2. Lip Catch Assembly
3. Comb Frame Assembly
4. Push Frame Assembly





## Lifter Operating Lever

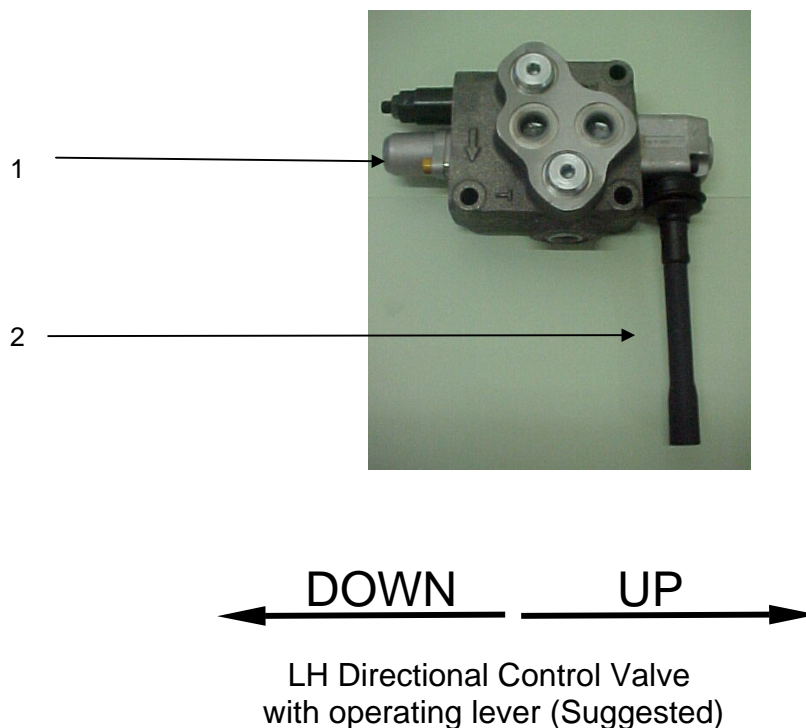
Each lifter needs to be equipped with one directional control valve (1), manipulated by an operating lever (2). It is recommended that a vehicle body builder, supply and mount the directional control valve where convenient on the vehicle.

It is further recommended that the valve be connected so that the lifer can respond as shown by the arrows on the photo.

In order to use the UP function, pull the operating lever (2). The lifting comb will move upward.

In order to use the DOWN function, push against the operating lever (2). The lifting comb will move downward.

When the lever is released, it should automatically return to the neutral position and the lifter must stop immediately.



# Emptying 80-240 litre Containers

## IMPORTANT

- Your lifter has been designed to lift up only the 80-240 litre containers.
- Emptying any other container types may cause accidents and damage to the lifter.

## WARNING

- There is a danger of sustaining injuries within the working area of the lifter.
- Make sure that there is nobody within the working area of the lifter during the emptying process.
- Stay outside the working area of the lifter and step to the side of the lifter throughout the emptying process.
- In case of danger or defect, release the operating lever immediately. The lifter is made inoperative at once.



## Emptying 80-240 litre Containers continued

The procedure below is the preferred method of emptying a container.

- Bring the lifters lip catch plate from the down position to the ready position by pulling the lip catch plate. Beware of injury, as there is a spring action.
- Hold the container handles with both hands and move the container front (1) towards the comb of the lifter.
- Position the containers comb receiver (2) over the comb tips (3) of the lifter.
- Pull the operating lever slowly and evenly **–without jerking–** towards UP until the containers comb receiver (2) has been pushed up against the lip catch frame (4).

### IMPORTANT

- Make sure that the containers are securely located on the lifting comb frames (3).
- The entire comb receiver (2) of each container must be placed correctly on the lifting comb (3).
- If the container is not square, stop the emptying process immediately by releasing the operating lever.
- If this is the case, push the operating lever towards DOWN until the container has been deposited back on the ground.
- Start the new emptying cycle.



DOWN  
POSITION



READY  
POSITION

## Emptying 80-240 litre Containers continued



- Pull the operating lever (1) until the container has reached the fully tipped position.
- Now release the operating lever (1). The lever returns automatically to the neutral position.

## Emptying 80-240 litre Containers continued

### **i** For your information!

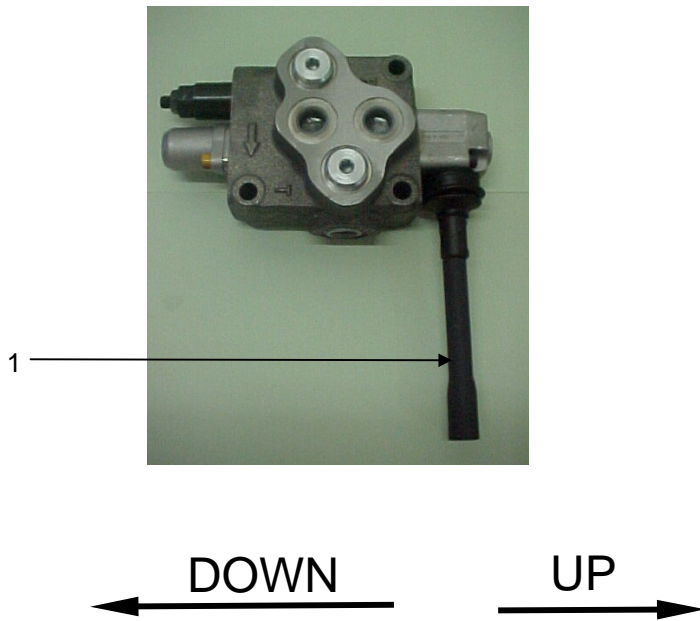
It is acceptable to “shake” the bin to dislodge stuck refuse while in full tipped position by actuating the operating lever. Shaking exerts more strain on the container and lifter so only shake when necessary.

The user must adapt the holding time and shaking amount to suit the type of refuse being handled. There are no particular recommendations or restrictions concerning this.

- Wait until the container has been emptied.
- Push the operating lever (1) towards DOWN until the container has been deposited on the ground.
- Remove the empty container from the lifting comb and move the next full container towards the lifter.



## Emptying 80-240 litre Containers continued



# Technical Information

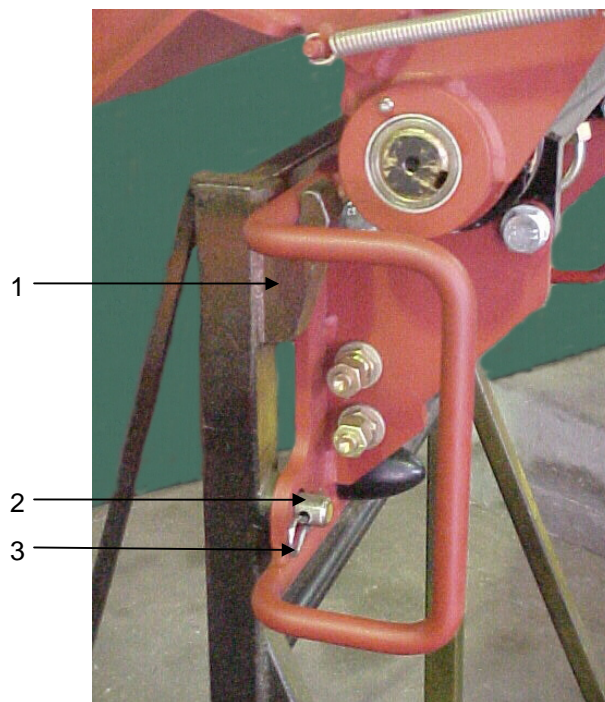
## Mounting and Dismounting

The ML150 is the only lifter, which can be dismantled and mounted without any tools.

The lifter can be removed from one vehicle to be placed in the sill hooks (1) and attachment sub pins (2) of another vehicle.

### **IMPORTANT**

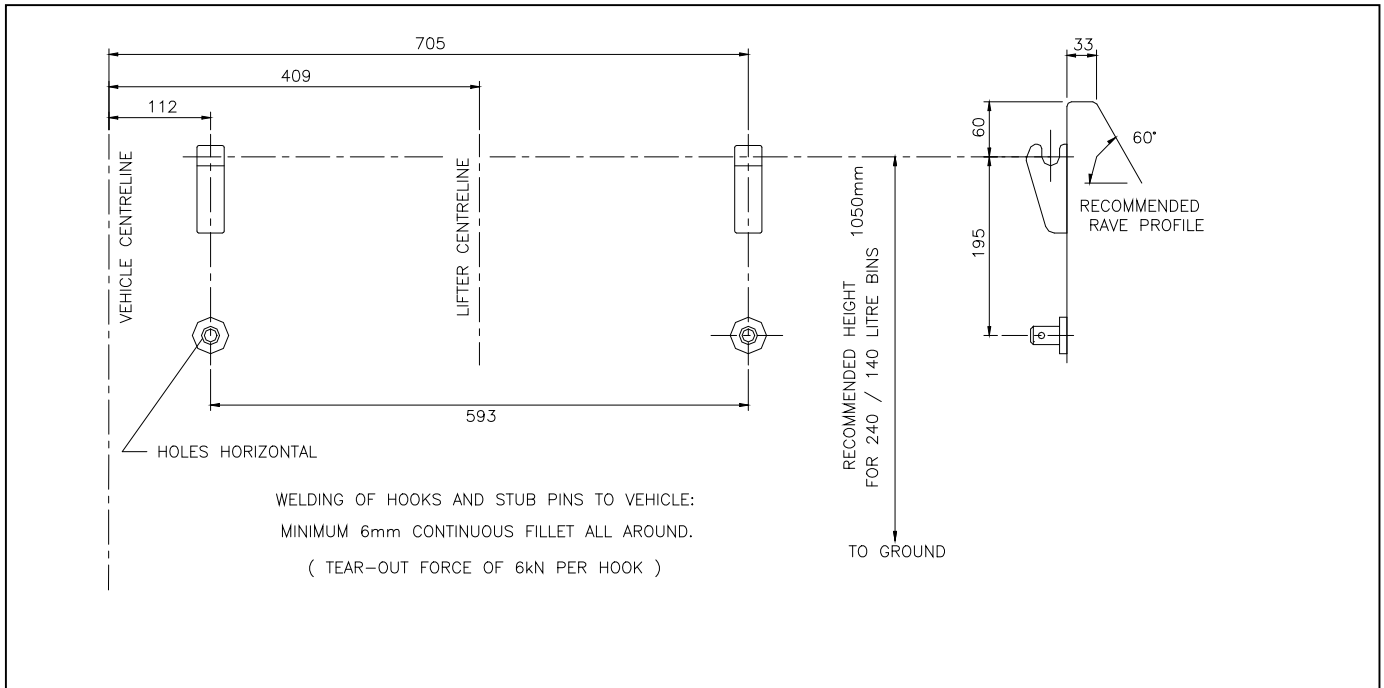
- To avoid damage to the lifter or injury to personnel, more than one person should be used to transfer the lifter.
- When transferring, the relevant safety precautions must be observed.
- Make sure that the grip clips (3) have been placed in the attachment stub pins (2).



# Interface Requirements

## Mechanical Interface

If only a single lifter is to be fitted, it is recommended that it be placed to one side of the centreline to allow a second lifter to be fitted later.



*Mountings Position on the Refuse Collection Vehicle*

The mounting space on the vehicle body must provide the following dimensions:

Width = 593 mm

Distance between sill hooks and the sill attachment sub pins = 195mm

Height from the sill hook to the top of the rave profile = 60mm

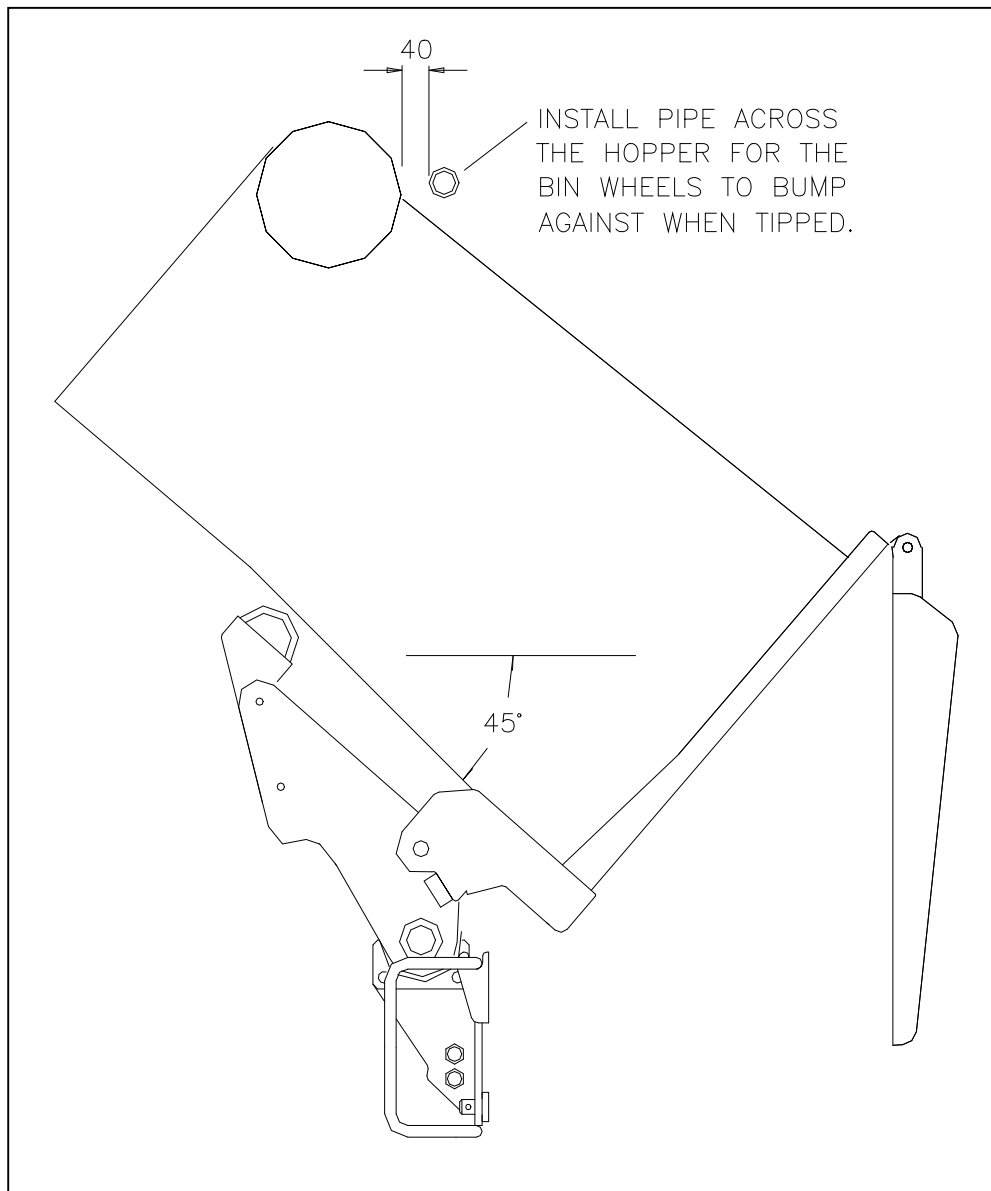
In some cases, it is necessary to extend the rave profile to the rear and upward so that the compactor blade does not foul on any part of the bin lifter. Contact Mechlift for more information in this regard. We will recommend a rave extension if the particulars of the compactor are known.

It will also be necessary to install a pipe across the hopper for the containers wheels to bump against when tipped.



 **IMPORTANT**

- Make sure that the container cannot be trapped by the packing system during the tipping process.
- If there is any interference between the container and the packing system, it will be necessary to extend the rave rail to the rear and upward.
- In such a situation, please contact Mechlift for more information.



# Hydraulic Interface (Suggested)

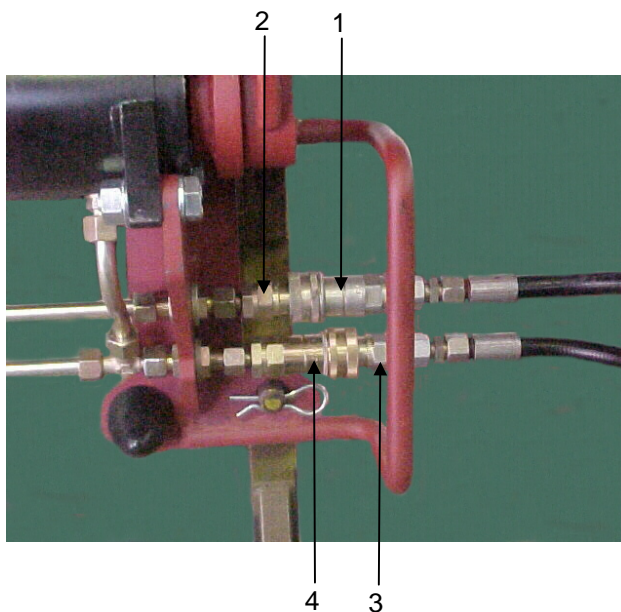
For vehicles where the lifters are to be a permanent installation, the pipes must all be steel and suitably protected against corrosion. These pipes should comply with the DIN2391 and be 12x1.5mm pipes.

For vehicles where the lifters are to be transferable, two hydraulic hoses are required to operate the lifter. These hoses must be run to the respective side of the lifter be it a left hand or right hand lifter. It is recommended that 12mm flexible hydraulic hose with a working pressure of 20MPa be used.

Should you be using QR couplings, it is suggested you fit the pressure line on the vehicle with a female unit (1) and the lifter with a male unit (2).

For the return line, it is suggested you fit the vehicle with a male unit (3) and the lifter with a female unit (4).

Using a different size coupling on the return line than that fitted to the supply line will further eliminate the possibility of error when the connection is made.



# Hydraulic System Specifications

The hydraulic control system provided by the body builder must be able to control the oil volume at 9 litre/min to each lifter at a pressure of 16MPa maximum.

**EACH** lifter must be provided with its **own** dedicated relief valve. The relief valve must have a fast response time (25ms) and be able to drop the whole vehicle supply flow (often as high as 160l/min) down to 10MPa in the event of malfunctions.

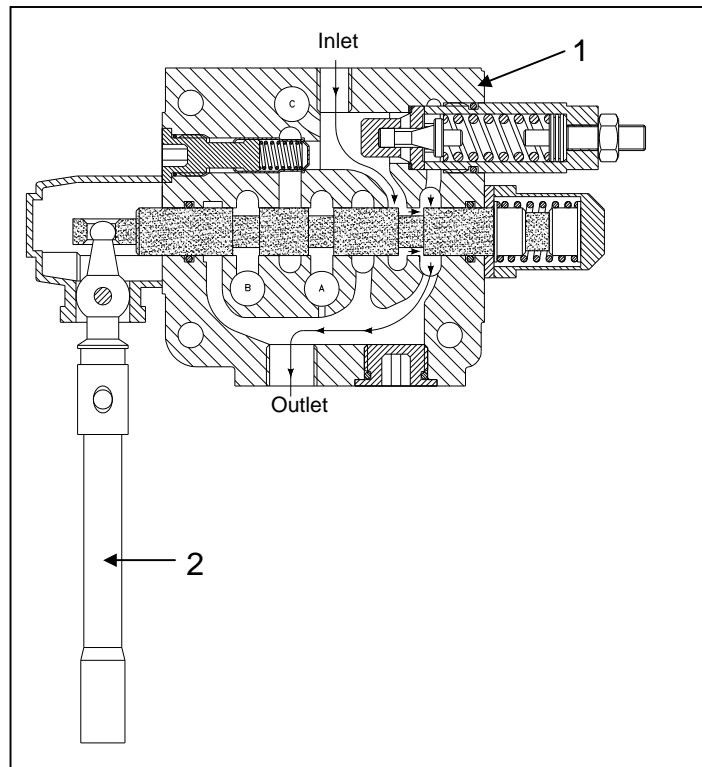
From the relief valve the flow must go through a flow regulator if the vehicles hydraulic supply does not provide a constant flow rate (for example if it depends on engine speed). This valves function is to limit the volume of oil to the lifter viz. 10 litre/minute

The flow regulator must be able to admit the maximum flow provided by the vehicle's supply system (for example the engine mounted pump). The pressure rating of the regulator valve must be in excess of the highest pressure possible during a malfunction of the vehicle's supply system.

Each lifter also requires a directional control valve (1). The control valve must be hand lever (2) operated with an automatic (spring) return to the close position when the lever is released. In the closed position, the flow to and from the vehicle supply must be positively blocked (ports A & B closed). Due to the general availability of these valves, the minimum requirement is 20MPa even though the relief valves are set at 10MPa on the directional control valve.

The directional control valve (1) must be mounted more than 300mm away from any hazardous moving machinery (including the lifter) but the person operating the valve must still be able to keep the lifter in view at the same time.

## Hydraulic System Specifications continued



Schematic Diagram a Directional Control Valve

### Summary of the Hydraulic System Requirements:

- **Flow rate:**  
Minimum of 9 litres per minute to achieve 8 second cycle times.
- **Supply pressure at coupling:**  
 $p = 10\text{MPa}$  minimum
  - **Oil requirements:**  
DIN51524 – HL32/ISO VG32  
Working temperature should not be greater than  $80^{\circ}\text{C}$ .  
The viscosity should range from 10 to 380mm /s.

The cleanliness should be NAS 1638 Class 9 (filter retention better than beta  $\geq 75$ ). Use a filter with a  $25\mu\text{m}$  element.

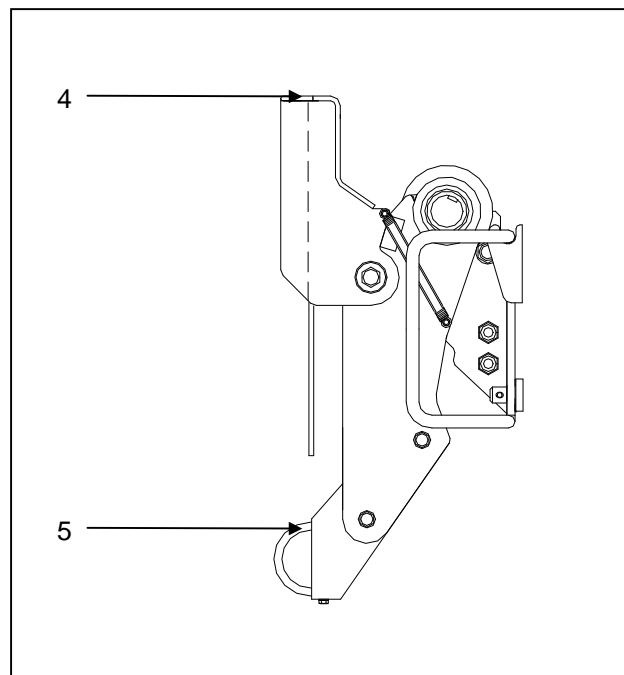
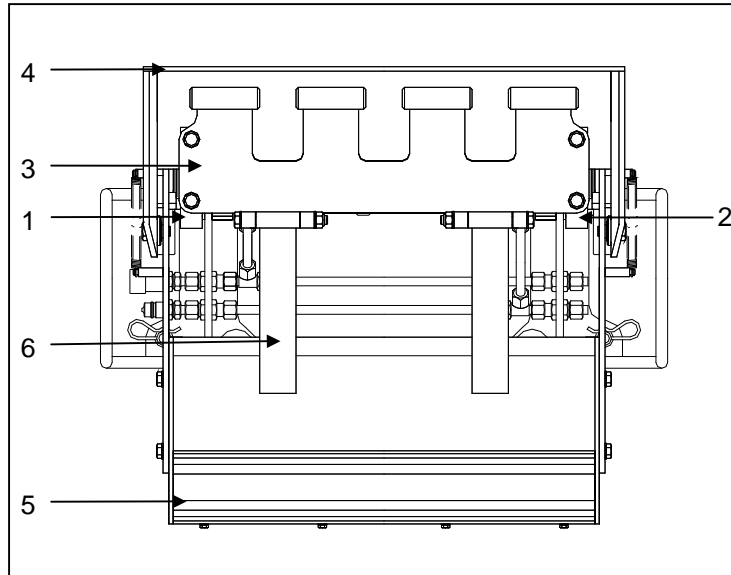
This page has intentionally been left blank

# Mechanical Function

The emptying cycle consists of a *lifting and tipping* movement.

- The refuse container is positioned over the comb tips.
- The lifting movement starts when the fulcrum arms (1 & 2) rotate, lifting the comb frame (3).
- At this point, the container edge is locked by means of the lip catch plate (4).
- The rotational movement now continues lifting the pushing frame (5), the over tip lock plates (6) fall into place and when the lifter is fully tipped the actuator stops internally.
- On completion of the emptying process, the lifter movement is carried out in reverse order.
- The pushing frame (5) swings back and the comb lowers, assisted by gravity.
- The comb frame (3) opens and deposits the container on the ground.
- Now the lifter is in the starting position again and can be loaded with a new refuse container.

# Mechanical Function cont.



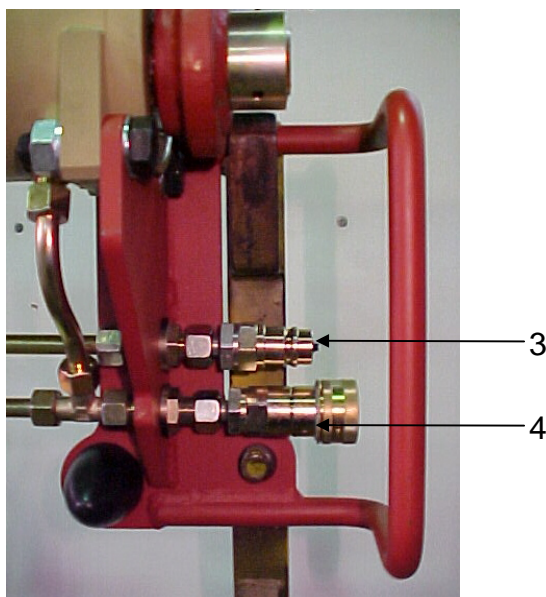
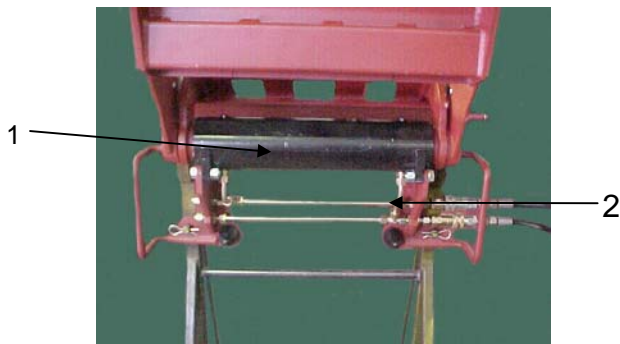
# Hydraulic Systems Overview

## Systems Breakdown

The lifting and tipping movements of the lifter is performed and controlled a hydraulic actuator.

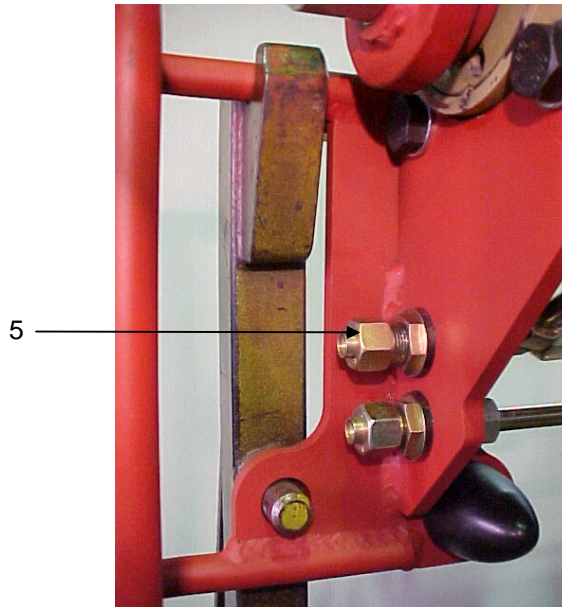
The lifters hydraulic system consists of the following components:

1. Actuator
2. Pipes
3. Male QR Coupling
4. Female QR Coupling
5. Blanking Plugs

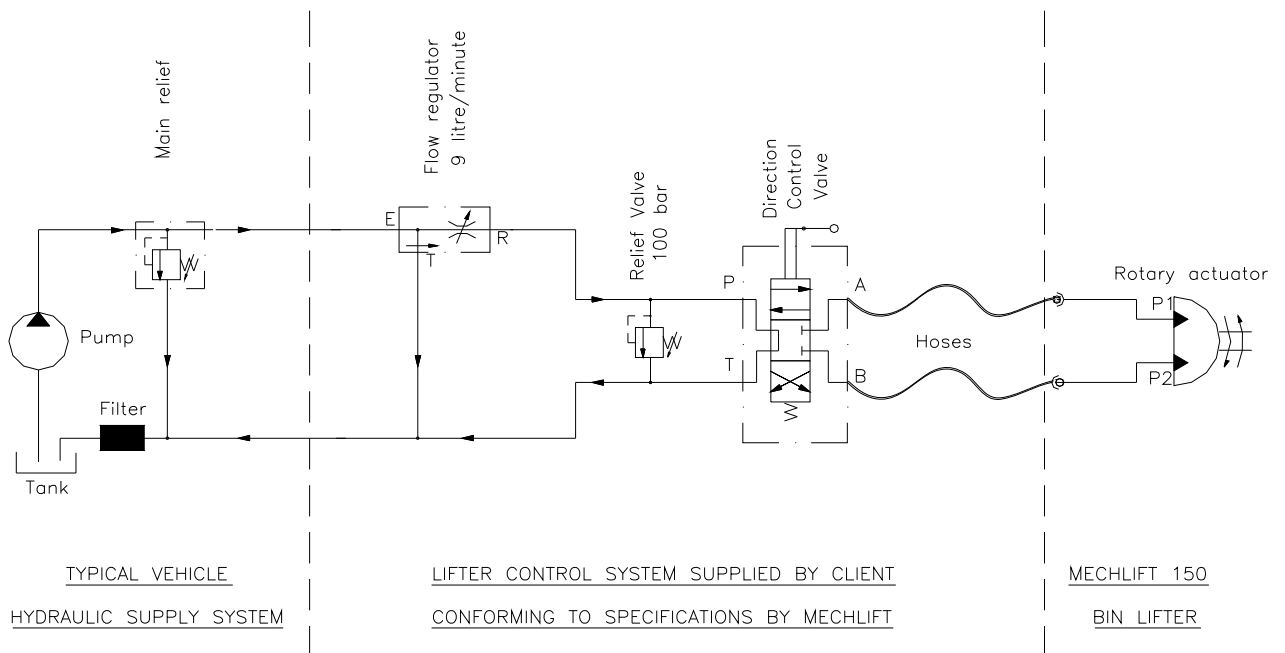




## Hydraulic Systems Overview cont.



### HYDRAULIC SYSTEMS SCHEMATIC (SUGGESTED)



# Care and Maintenance

Proper lifter maintenance ensures reliability and extends the life of vital components. Please observe the maintenance instructions and thus avoiding failures and damage to components.

## **IMPORTANT**

- When carrying out maintenance work ensure that the relevant safety precautions as well as the safety specifications as detailed in the chapter “Safety Instructions” are observed.
- Only trained and experienced persons are allowed to do maintenance and repair work.

Switch off all hydraulic systems before carrying out any maintenance work.

## **Daily Maintenance**

- Visually inspect machinery for leaks, damage, missing guard frames, missing labels or missing bump rubbers etc.
- Clear away accumulated refuse such as plastic bags etc.
- Check for correct operation before leaving the depot.

## **Weekly Maintenance**

- Start by performing Daily Maintenance.
- Clean the lifter with high pressure washing equipment.
- Grease all nipples.

## **IMPORTANT**

- Observe a minimum distance of 50cm when spraying the synthetic parts with the high pressure washing equipment.
- To prevent damage to the components of the high pressure washing device the temperature and pressure should not exceed 80 °C and 80bar respectively.

A weekly wash protects the moving parts from “cementing” due to contamination, which could cause malfunctions.

## Care and Maintenance cont.

### Monthly Maintenance

- Start by performing Weekly Maintenance.
- Check that the grip clips are still in place.
- Check potential wear of bearings by pushing the push frame from side to side.
- Lift an empty bin for a number of cycles and check that the bin engages easily, is held securely, and that no part of the machinery can cause any damage to the bin.



### **IMPORTANT**

- The lifter can be operated with new dry bearing bushes, without lubrication. However, if you choose to grease the bearings, the grease must be refreshed every week, or else it will become an abrasive paste.

The “dry” bearing points use PTFE type material running on special stainless steel bushes. Only fit the exact equivalents or replacements obtained from MECHLIFT.

### **Maintenance Of Hydraulic Components**

Cleanliness is of utmost importance when carrying out maintenance work on any hydraulic equipment. Even small dirt particles can damage valves or block oil ways.

- Ensure that no dirt or other contaminating substances can penetrate the system. Hydraulic fluids should be topped up only through a sieve.
- Check that the hydraulic fluid level in the vehicle tank is in accordance with the manufacturer’s instructions.
- If the level has dropped carry out a full hydraulics system check for leaks.
- Leaks that are found must be rectified immediately either by replacing the damaged seal or installing a new part. If necessary, direct any queries to the MECHLIFT Service Department.

Observe the intervals for oil filter changes indicated in the vehicle manufacturer’s operating instructions.

## **Care and Maintenance cont.**

### **Operating Fluids**

In the case of refilling or changing the hydraulic system, the fluid should conform to DIN51524. The working temperature should not be greater than 80 °C and the viscosity range must be from 10mm<sup>2</sup>/s to 380mm<sup>2</sup>/s. The cleanliness should be NAS 1638 Class 9 (filter retention better than beta<sub>10</sub> > = 75). The supply filtration should be 25µm.

**Normal good hydraulic maintenance practice applies equally to the bin lifter supply as it does to the rest of the vehicle's hydraulic systems.**

### **Recommendation**

- All wearing parts must be replaced annually
- The lifter must be checked annually by a maintenance workshop.

# Fault Finding Procedure

## Troubleshooting

For the lifter to operate correctly it needs two things from the truck mounted oil supply:

- 1) A sufficient volume of oil of 9 litres/minute for the lifter to achieve a cycle time of 8 seconds.
- 2) A sufficient pressure available from the vehicles pump. This is to be in the range 140 - 160bar.

**IF THIS IS NOT AVAILABLE, THE LIFTER WILL NOT PERFORM AS DESIGNED**

**TOOLS:** To diagnose any lifter problem the serviceman needs to rely on a flow meter able to read more than 30 litre/minute and a screw on pressure gauge (200bar or 20 MPa) to attach to the test points fitted to the direction control valves (Servicemen remember 1bar = 100kPa = 0.1MPa so 120bar = 12MPa).

**THE FIRST STEP** to diagnosing any problem is to make a quick **visual inspection** of the lifter looking for major oil leaks, whether the pump is running, oil level, dented pipes, overheating hydraulics, accident damage, misalignment of moving parts, etc. and correct these.

**IMPORTANT: Ensure the lifter is receiving filtered oil. A build up of dirt in valves will affect ANY hydraulic system**

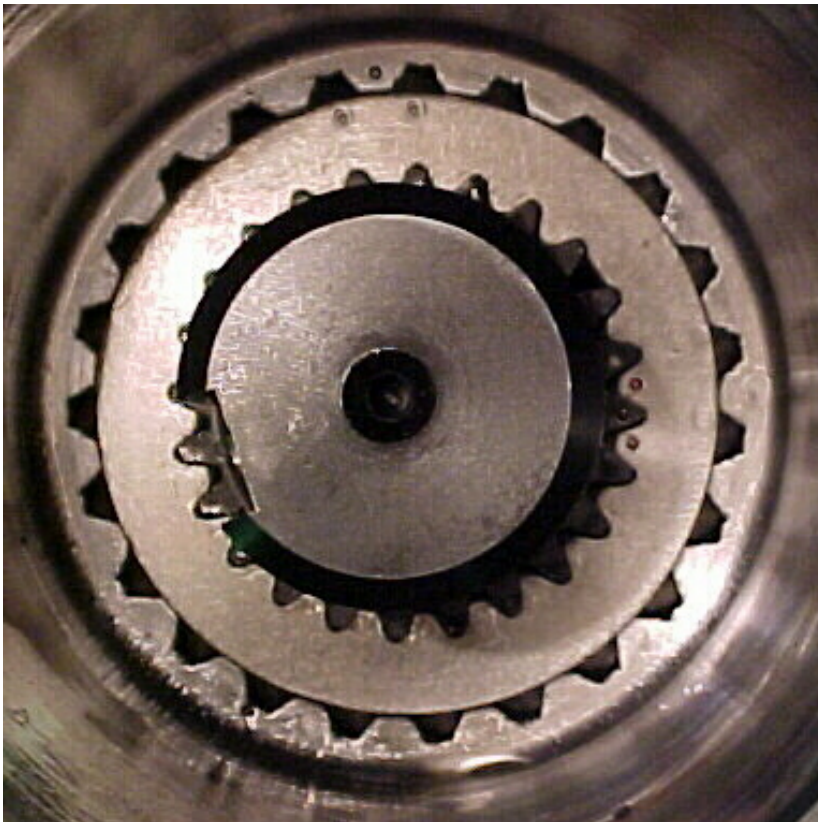
Task	Problem	Possible Cause	Remedy
1.	One or both lifters are very weak OR do not tip fully .... ignoring their speed, they are <b>unable</b> to lift a fair load ....	Hydraulic pressures are too low  <b>OR</b> the fulcrum arms are slipping on the actuator shafts  <b>OR</b> actuators are partially seized. (Experience has shown this to be the least likely cause of complaint)  <b>OR</b> there is a very high leakage across the piston seals.	Ensure 120bar minimum pressure is available on the control valves. If lifter/s remain weak their actuators may have stripped keys (between shaft and fulcrum arm). Check and correct this. If all appears OK check for seized actuators. Do this by removing the two plugs on top of each actuator and you must be able to rotate the fulcrum arm by hand <b>without</b> using levers (action to be smooth NOT coarse). Where seizing or internal leakage is indicated, remove the actuators and have overhauled by MECHLIFT or other competent persons.

<b>Troubleshooting (Continued)</b>			
Task	Problem	Possible Cause	Remedy
2.	Any ONE lifter is slow up and down .... but is able to lift full bins.	Oil volume in the circuit is too low.	Check flow with a flow meter.
3.	Part way through lift cycle actuator appears to 'seize'. More when system is hot and a number of lifts have been completed successfully without seizing.	The right hand side port may be blocked by a swollen plastic buffer block. Hydraulic oil when contaminated with water causes this plastic buffer to swell.	The nose of this fitting must have two grooves cut across its face to reduce the possibility of blockage. With the actuator in the full up position, this plastic buffer can be observed through the top RH port. If it appears damaged, renew the buffer. Ensure oil is not contaminated with water.
4.	Signs of overheating.	Invariably the lifter is being supplied too much oil exceeding the lifters valve ratings resulting in the OIL OVERHEATING  OR the oil being supplied to the lifter has been heated by OTHER USERS of the oil e.g. the compactor system. The lifter cannot overheat unless there are EXTERNAL causes as outlined.	Refer problem to installer of equipment.

## Fault Finding Procedure cont.

### **IMPORTANT**

BE CAREFUL WHEN STRIPPING ACTUATORS. THEIR INTERNAL GEARING IS TIMED WITH PUNCH MARKS. ENSURE YOU LOCATE THESE BEFORE STRIPPING OUT THE PISTON OR SHAFT. FAILURE TO OBSERVE THIS RULE MAY RESULT IN THE ACTUATOR HAVING TO BE RETURNED TO MECHLIFT FOR CORRECT ASSEMBLY.



If it is impossible to solve the problem, please contact Mechlift (Pty) Ltd.