PENDPAC *WITTKE RETRO FL™*

OPERATOR MANUAL

labrie
Labrie Enviroquip Group

LABRIE LEACH WITTKE PENDPAC

WITTKE RETRO FL™

OPERATOR MANUAL

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January 2013

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Introduction

The purpose of this manual is to introduce operators to the operational procedures for the WITTKE RETRO FL™. For information regarding maintenance procedures, refer to the maintenance manual of the WITTKE RETRO FL™.

Pre-operating Intructions

It is imperative that you carefully review this manual prior to operating and/or performing any service to your new WITTKE RETRO FL™ front loader.

Upon receipt of your new WITTKE RETRO FL™, perform a complete lubrication following the lubrication guide shown elsewhere in this manual and on the decal applied to the side of the body. Factory lubrication is adequate for production and transport purposes only. In addition, the return filter element must be replaced after 50 hours of use, again, as per instructions shown elsewhere in this manual.

Warning!

WITTKE RETRO FL™ units *must be operated by only one person.*

Mission Statement

Labrie Enviroquip Group is dedicated to providing innovative designs, customized quality equipment and elite customer service.

Vision Statement

The Labrie Enviroquip Group Team will successfully lead the way the world views waste management. We will excel at enhancing our community and protecting the global environment. We are committed to being a profitable company for our customers, shareholders and employees.

To Contact Labrie Plus

In the U.S.

Address:	1981 W. Snell Road Oshkosh, WI 54904
Toll Free:	1-800-231-2771
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General Fax:	1-920-232-2496
Sales Fax:	1-920-232-2498
Parts and warranty:	During business hours, 7:00 AM to 7:00 PM Central Standard Time
Technical Support Service:	Available 24 hours

In Canada

Address:	175 Route du Pont St-Nicolas, QC G7A 2T3
Toll Free:	1-877-831-8250
Telephone:	1-418-831-8250
Service Fax:	1-418-831-1673
Parts Fax:	1-418-831-7561
Parts and warranty:	During business hours, 8:00 AM to 5:00 PM Eastern Standard Time
Technical Support Service:	Available 24 hours
Website:	www.labriegroup.com
E-mail (Sales Dept.):	sales@labriegroup.com
E-mail (Customer Service):	service@labriegroup.com

IMPORTANT: For technical support and parts ordering, the serial number of your vehicle is required. Therefore, Labrie Enviroquip Group recommends to keep record of the information found on the VIN plate, which is located in the cab.

2

Safety

Safety is always of prime importance when operating any type of equipment. All operators working with the WITTKE RETRO FL™ must be aware of the safety practices and features detailed in this section.

Safety Precautions for the Owner

Labrie Enviroquip Group strongly believes that safety is a team effort. Bearing this in mind, we encourage the employer to follow these guidelines:

- Provide all employees – both operators and maintenance personnel – with proper training that includes safe vehicle operation procedures and ensure that those procedures are monitored on a continual basis.
- Ensure that all employees have read this manual.
- Provide operators with the necessary route rules and regulations. Instruct operators on awareness to road hazards such as other people, obstructions and dimensional constraints which includes familiarity with the vehicle width and height, both while at rest and during operation.
- Ensure that all vehicle safety features, such as body and tailgate props are properly used by all personnel when operating or servicing the vehicle.
- Provide necessary safety equipment and apparel.
- Ensure that a daily vehicle inspection is performed. Document the inspections, including all maintenance, repair and malfunction items.

IMPORTANT: Do not allow operation of the WITTKE RETRO FL™ if damaged or malfunctioning. Have all repairs performed immediately.

Safety Precautions for the Employee

As an operator or maintenance employee, it is your responsibility to follow these guidelines:

- Ensure that you have been provided with safe operating and/or maintenance service training and procedures by your employer prior to operating the vehicle or performing maintenance service.
- Carefully read this manual.
- Obey proper operating procedures, safety guidelines and warning decals.
- Use the vehicle only as intended.
- Perform a daily vehicle inspection that includes all operating systems, all vehicle safety equipment and safety decals. Ensure that the inspection is documented and bring any defects to the attention of your supervisor.
- Prior to operating the vehicle, ensure that all mirrors, windows and lights are clean and properly adjusted. Ensure that all cameras and monitors are properly adjusted and function correctly.
- On your daily route, or during your service duties, stay safe; obey all safety decals and safe operating procedures. Watch for other people, obstructions and overhead hazards.
- Always utilize the vehicle's safety features, such as tailgate props and body prop.
- Remember to wear all safety equipment prescribed by your employer.

IMPORTANT: Under no circumstances should you operate damaged or malfunctioning equipment. Report all malfunctions to your supervisor immediately.

WITTKE RETRO FL™ Road Rules

Rule the road with safety. Stay safe and help keep those around you safe. Prior to performing your daily route, know and obey the route rules and regulations provided by your employer and follow these important guidelines. As an operator you should never do the following:

1. Drive with the body raised.
2. Drive without the tailgate latch blocks in place or the tailgate ajar.
3. Exit the cab without engaging the chassis parking brake.
4. Back up the truck while unloading refuse.
5. Hoist the body while on uneven ground.
6. Prop a loaded body with the hoist safety prop.
7. Enter the hopper or main body unless the engine is shut off, the key is removed and there is an out of service tag on the steering wheel. Refer to "Lockout/Tagout Procedure" on page 33.
8. Drive with arms in overheight condition.

Safety Decal Categories

Recognizing and understanding the safety decals affixed to your vehicle can prevent damage and could prevent injury or even death. Decals fall into the following four categories:

Figure 2-1 Safety decal categories

DANGER: White letters on red background. Extreme hazard of severe injury or death

WARNING: Black letters on orange background. Danger of death or severe injury

CAUTION: Black letters on yellow background. Danger of injury or equipment damage

NOTICE: Black letters on purple background. Instructions only.

Safety Decals and Locations

Do not Enter! Stay Clear of Door

English/Spanish Part No. 0401-553

English/French Part No. 0401-467

Location: lower, forward half of hopper access door.

Do not Enter Hopper! Extreme Crush Hazard

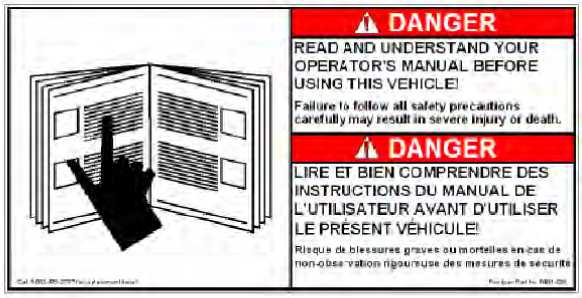
English/Spanish Part No. 0401-554

English/French Part No. 0401-531

Location: curb side hopper wind wing, at the top of the roof access ladder and on leading edge of canopy extension near chassis cab guard.

Read and Understand Your Operating Manual Before Using This Vehicle

English/Spanish Part No. 0401-525



English/French Part No. 0401-526

Location: in chassis cab, attached to inside of driver's (street side) door.

Keep Hands and Body Clear

English/Spanish Part No. 0401-530

English/French Part No. 0401-528

Location: front bulkhead vertical post, just above arm pivot tube

Stand Clear of Tailgate! Extreme Crush Hazard

English/Spanish Part No. 0605-794

English/French Part No. 0401-532

Location: ahead of the tailgate latch box, affixed to the body side wall

Service Hoist Handle

English/Spanish Part No. 0400-978

English/French Part No. 0401-533

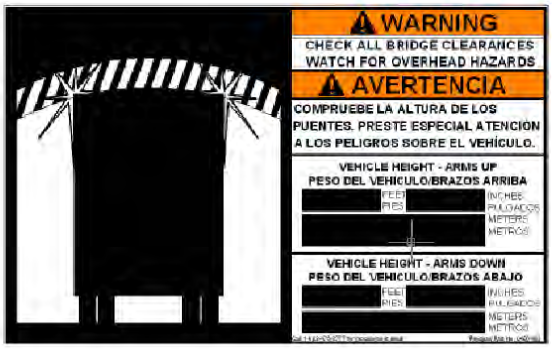
Location: on cover of Service Hoist pump

Do Not Climb on Canopy

English/Spanish Part No. 0400-981

English/French Part No. 0401-466

Check All Bridge Clearances



English/Spanish Part No. 0400-982

English/French Part No. 0401-527

Location: in cab on sun visors, readable when sun visor is stowed.

Do Not Drive When Overheight Warning Lamp is Illuminated

English/Spanish Part No. 0401-555

English/French Part No. 0401-534

Location: in cab on sun visors, readable when sun visor is stowed.

Tailgate Locks Must Be In Place

English/Spanish Part No. 0605-788

English/French Part No. 0401-535

Location: sides of tailgate, just behind the latch.

Crush Hazard. Body May Fall

English/Spanish Part No. 0605-835

English/French Part No. 0401-536

Location: on chassis frame, both sides, near body prop location.

The Top of This Vehicle is High Enough

English/Spanish Part No. 0605-856

English/French Part No. 0401-537

Location: beside the roof access ladder, half-way up, affixed to the body side wall.

Danger of Electrocution/Damage to Vehicle

English/Spanish Part No. 0605-809

English/Spanish Part No. 0401-538

Location: in cab on sun visors, readable when sun visor is stowed.

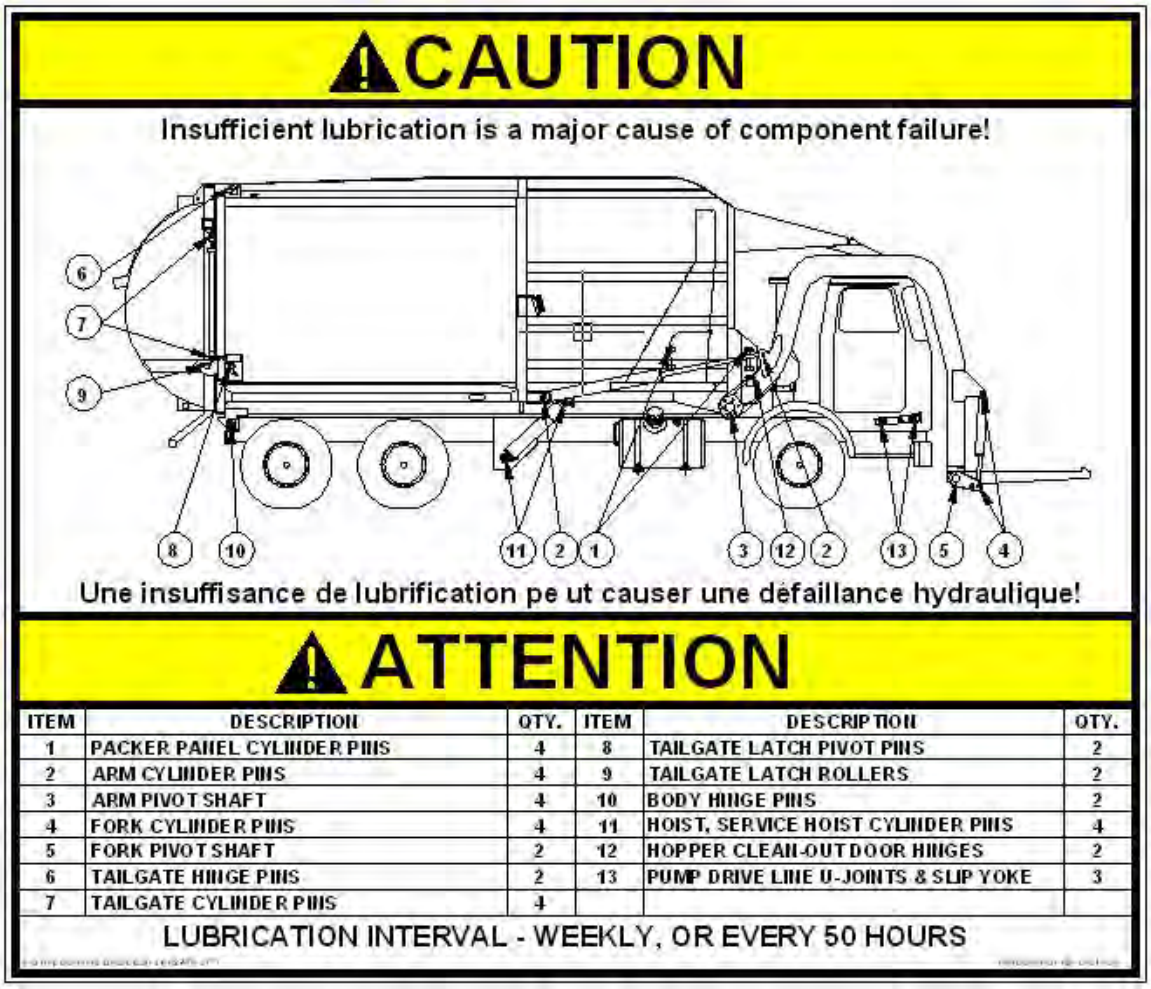
Frame is Heat Treated

English/Spanish Part No. 0401-557

English/French Part No. 0401-540

Location: one each side on chassis frame rail

Lubrication Points



ITEM	DESCRIPTION	QTY.	ITEM	DESCRIPTION	QTY.
1	PACKER PANEL CYLINDER PINS	4	8	TAILGATE LATCH PIVOT PINS	2
2	ARM CYLINDER PINS	4	9	TAILGATE LATCH ROLLERS	2
3	ARM PIVOT SHAFT	4	10	BODY HINGE PINS	2
4	FORK CYLINDER PINS	4	11	HOIST, SERVICE HOIST CYLINDER PINS	4
5	FORK PIVOT SHAFT	2	12	HOPPER CLEAN-OUT DOOR HINGES	2
6	TAILGATE HINGE PINS	2	13	PUMP DRIVE LINE U-JOINTS & SLIP YOKE	3
7	TAILGATE CYLINDER PINS	4			

LUBRICATION INTERVAL - WEEKLY, OR EVERY 50 HOURS

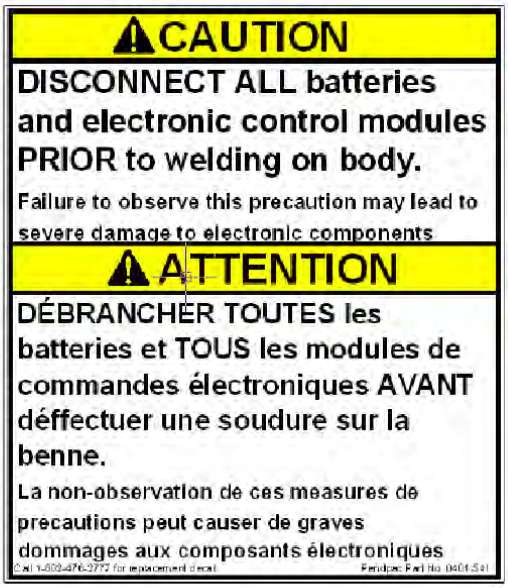
English/Spanish Part No. 0401-556

Also available in English/French (Part No. 0401-539)

Location: Half-way back, at eye level, affixed to the body wall.

Disconnect All Batteries and Electronic Control Modules

English/Spanish Part No. 0605-813

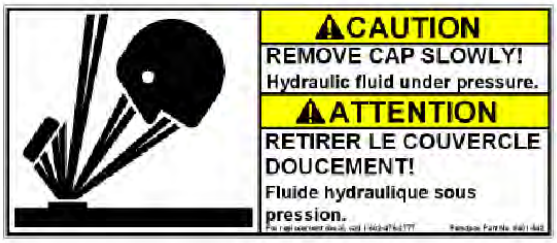


English/French Part No. 0401-541

Location: affixed to battery box cover.

Remove Cap Slowly

English/Spanish Part No. 0605-843



English/French Part No.0401-542

Location: on hydraulic tank, near filler cap.

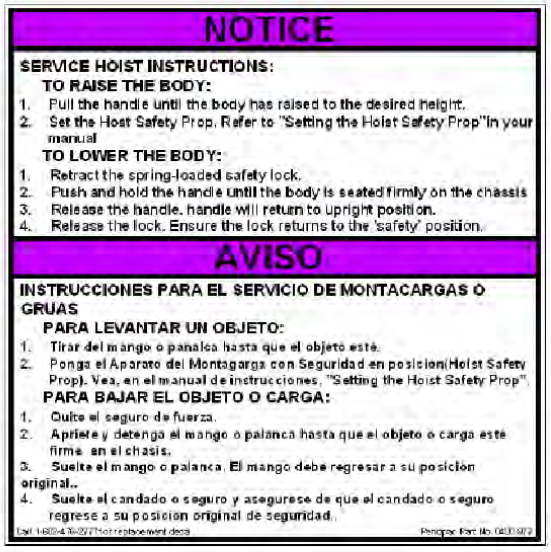
Extension Ladder Must Be Secured

English/Spanish Part No. 0605-815

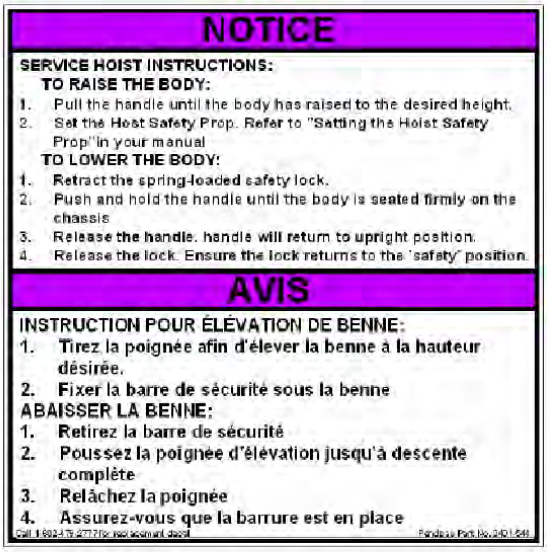
English/French Part No. 0401-543

Location: near stowage latch for roof access ladder.

Service Hoist Instructions



English/Spanish Part No. 0605-815



English/Spanish Part No. 0605-815

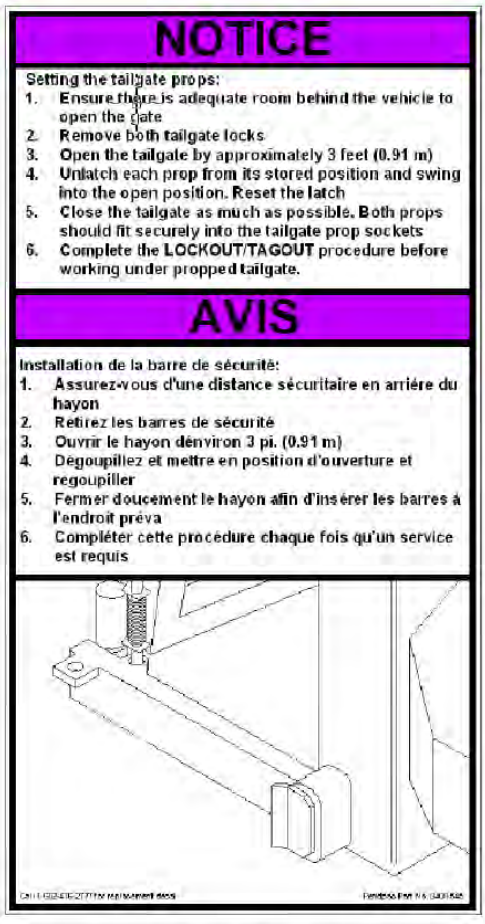
Location: on cover of Service Hoist Pump

Air Tank Drain Notice

English/Spanish Part No. 0401-468 English/French Part No. 0401-547

Location: near lowest air tank drain valve.

Setting the Tailgate Props (Curb Side)



English/Spanish Part No. 0605-798 English/French Part No. 0401-545

Location: above the tailgate latch box, affixed to the body side wall, curb side.

Setting the Tailgate Props (Street Side)

NOTICE

SETTING THE TAILGATE PROPS:

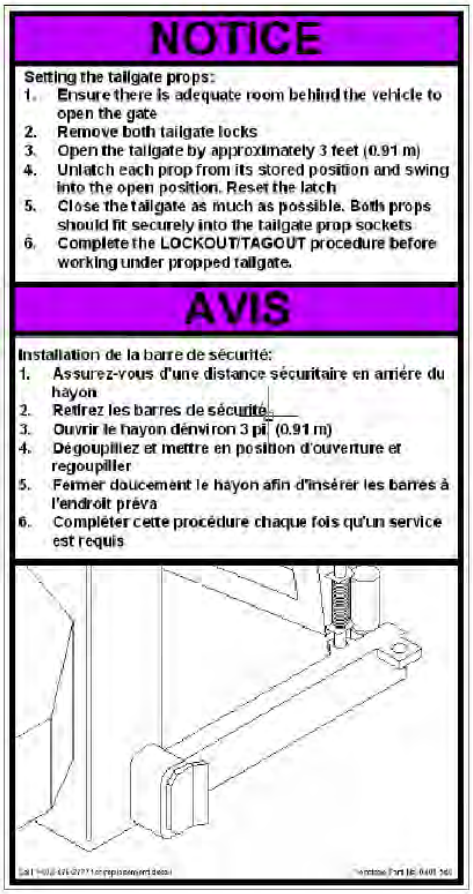
1. Ensure there is adequate room behind the vehicle to open the gate
2. Remove both tailgate locks
3. Open the tailgate by approximately 3 feet (0.91 m)
4. Unlatch each prop from its stored position and swing into the open position. Reset the latch
5. Close the tailgate as much as possible. Both props should fit securely into the tailgate prop sockets
6. Complete the LOCKOUT/TAGOUT procedure before working under propped tailgate.

AVISO

FIJAR LOS APOYOS DE LA PUERTA POSTERIOR:

1. Asegurese alli es sitio adecuado detras del vehiculo de abrir la puerta posterior.
2. Quite ambas cerraduras de la puerta posterior.
3. Abra la puerta posterior por appoximadamenta 3 pies (0.91 M).
4. Abra cada apoyo de su posicion almacenda y haga pivotar en la posicion abierta. Reajuste el cierre
5. Cierrala puerta posterior tanto como sea posible. Ambos apoyos deben fit con seguridad el los zocalos del la puerta posterior.
6. Termine el procedimiento de lockout/tagout antes de tranajar debajo de puerta posterior apoyada.

English/Spanish Part No. 0401-558



NOTICE

Setting the tailgate props:

1. Ensure there is adequate room behind the vehicle to open the gate
2. Remove both tailgate locks
3. Open the tailgate by approximately 3 feet (0.91 m)
4. Unlatch each prop from its stored position and swing into the open position. Reset the latch
5. Close the tailgate as much as possible. Both props should fit securely into the tailgate prop sockets
6. Complete the LOCKOUT/TAGOUT procedure before working under propped tailgate.

AVIS

Installation de la barre de sécurité:

1. Assurez-vous d'une distance sécuritaire en arrière du hayon
2. Retirez les barres de sécurité
3. Ouvrir le hayon dénviron 3 pi (0.91 m)
4. Dégoupillez et mettre en position d'ouverture et regoupiller
5. Fermer doucement le hayon afin d'insérer les barres à l'endroit préva
6. Compléter cette procédure chaque fois qu'un service est requis

English/French Part No. 0401-546

Location: above the tailgate latch box, affixed to the body side wall, street side.

Diesel Fuel Notice

English/Spanish Part No. 0401-560

English/French Part No. 0401-548

Location: on fuel tank, near filler cap.

Programmed PTO Settings

English/Spanish Part No. 0401-561

English/French Part No. 0401-549

Location: inside cab, affixed to the driver's (street side) door.

NOTE: Do not use PTO settings; use MDM for overspeed.

Hydraulic Fluid Notice

English/Spanish Part No. 0605-846

English/French Part No. 0401-551

Location: on hydraulic tank, near filler cap.

Hydraulic Oil Grade Notice

English/Spanish Part No. 0401-562

English/Spanish Part No. 0401-550

Location: on hydraulic tank, near filler cap.

Hydraulic Oil Fill Level

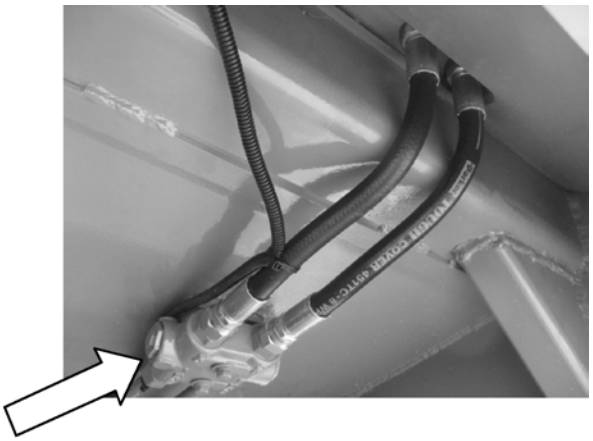
English/Spanish Part No. 0605-967

English/French Part No. 0401-552

Location: on hydraulic tank sight gauge at proper fill height.

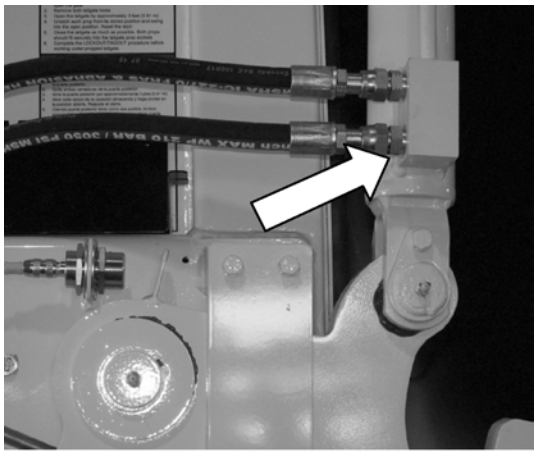
Hydraulic Safety Features

Tailgate Lock Valves



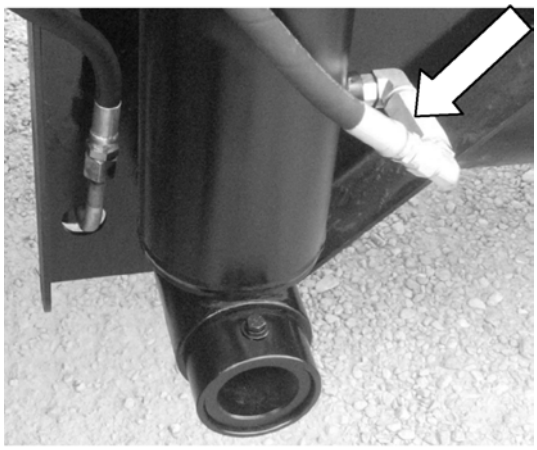
The tailgate lock valves ensure that the tailgate, when open, must be “powered down”. In other words, it cannot close via gravity.

Tailgate Restrictor Fittings



Located in the bottom part of the tailgate cylinders, the restrictor prevents rapid decent of the tailgate in the case of a hose failure.

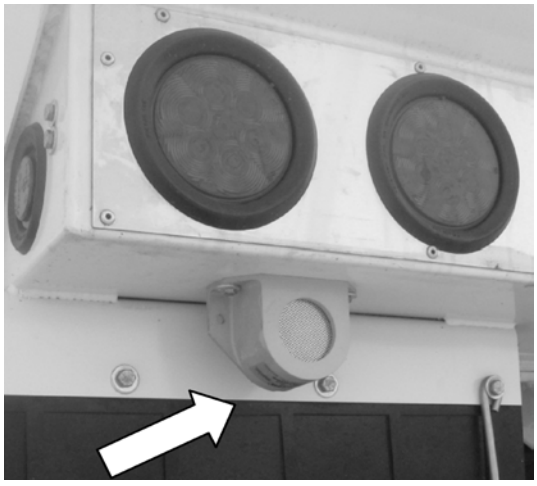
Hoist Restrictor/Check Valve



Located in the port of the hoist or service hoist cylinders, the restrictor prevents rapid descent of the body in the case of a hose failure.

Electrical Safety Features

Backup Alarm



Located at the rear of the chassis, the backup alarm emits an audible warning whenever the transmission is in “reverse” or the tailgate is ajar or opened.

Rear Vision Camera

A camera is mounted to the tailgate, sending a live image of the view behind the truck to the in-cab mounted monitor. The monitor can be set to either come on in reverse only, or to be on continously.

Over Height Warning Lamp

A red indicator lamp with label is mounted to the dash so as to be in the driver's field of view when looking forward. The indicator illuminates whenerver the arms/forks are above 13'-6" in height.

Body Raised Buzzer

An audible warning is transmitted by the MDM control panel whenever the body is raised and not at rest on the chassis frame.

Access Door Open Buzzer

An audible warning is transmitted by the MDM control panel whenever the hopper access door is not completely closed.

Amber Warning Lamp

An amber warning lamp, located in the in-cab control console, illuminates to warn the operator if:

- The packing panel is not home
- The top door is not open
- The tailgate is ajar

Red Warning Lamp

A red warning lamp, located in the in-cab control console, illuminates to warn the operator if:

- The hopper access door is not closed
- The tailgate is fully opened
- The body is raised

Pump “On” Indicator Lamp

A red indicator lamp, located in the pump engage switch, illuminates whenever the hydraulic pump is on.

Auto Pack Indicator Lamp

A green indicator lamp, located in the Auto Pack control button, illuminates whenever Auto Pack is engaged.

Doors Enable Switch

This switch must be depressed simultaneously with the top door or tailgate switches to allow activation.

Mechanical Safety Features

Body Safety Prop

The body safety prop is provided to support the body for maintenance purposes only. The prop ***will only support an empty body***. Never support a loaded body with this prop.

Setting the Body Safety Prop

The body safety prop is designed to stabilize the body in a raised position in order to safely work beneath the body. The body safety prop is standard equipment on full eject units with a service hoist, and on tip to dump units.

NOTE: The body safety prop must be engaged when accessing the underside of a raised body. Do not use the body safety prop to support a loaded body!

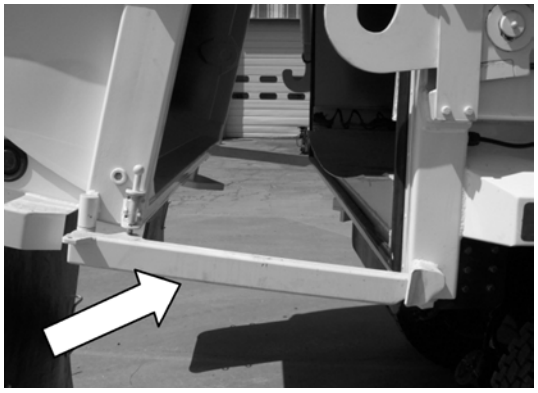
1. Ensure that the vehicle is on solid, level ground and that the body is empty.
2. Set the chassis parking brake.
3. Check for overhead clearance.
4. Chock the front and rear tires.
5. Remove left and right body latch pins.
6. Unlatch the body safety prop spring pin latch.
7. Raise the body far enough to allow the body safety prop to hang vertically.

NOTE: Do not raise the body higher than is required to engage the body safety prop. If the unlatched prop does not swing into a vertical plane when the body is raised, the prop has been damaged and must be repaired prior to use.

8. Lower the body until the body safety prop landing pads fit into the retainer cutouts and seat securely onto the chassis frame.

9. Complete the lockout/tagout procedure described elsewhere in this manual.

Tailgate Props



The tailgate props, one each side, when engaged, ensure that the tailgate cannot close.

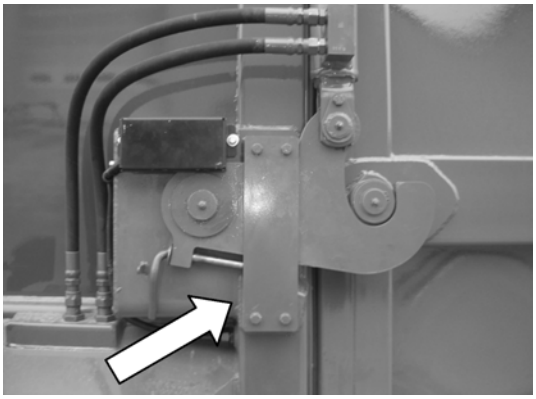
Setting the Tailgate Props

NOTE: Never walk or work under the tailgate without first positioning the tailgate props!

To set the tailgate props:

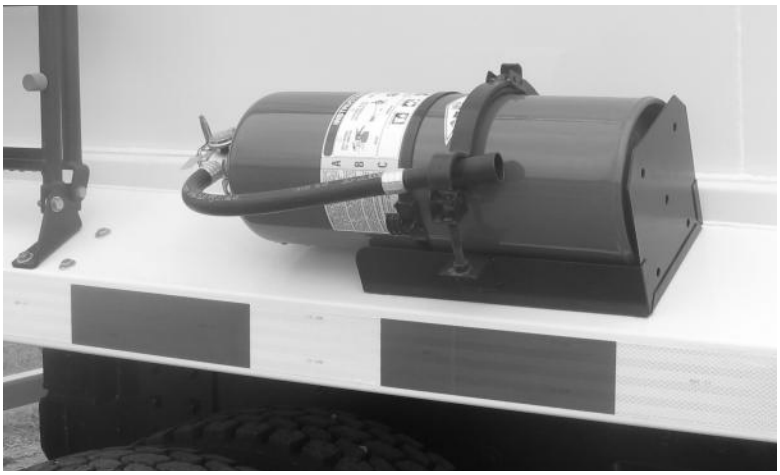
1. Ensure that there is adequate clearance behind the vehicle to allow for tailgate.
2. Remove both tailgate lock blocks.
3. Open the tailgate so that the bottom portion is about 36” away from the body.
4. Unlatch each prop from its stored position and allow it to swing out 90 degrees, or perpendicular to the tailgate frame.
5. Lock the props in place by releasing the spring latch rods so they engage in the holes provided.
6. Close the tailgate as far as required so that the props engage into the receptacles attached to the body frame.
7. Complete the Lockout/Tagout procedure as explained elsewhere in this manual.

Tailgate Lock Blocks



The tailgate lock blocks are an integral part of the tailgate latch. The blocks must be engaged to prevent unintentional opening of the tailgate, which could cause serious damage to the tailgate and latch.

Fire Extinguisher



The fire extinguisher (optional) is mounted near the rear of the vehicle on the rubrail.

First Aid Kit

The first aid kit (optional) is located in the cab of the vehicle for quick access.

Environmental Spill Kit

The environmental spill kit is mounted in a rack on the body rubrail.

Safety Interlock Tests

Your WITTKE RETRO FL™ is equipped with a number of safety interlock functions that are programmed into the electronic control unit (ECU). Testing of all interlock functions should become an integral part of your daily inspection as an operator.

IMPORTANT: If any of these test fail, do not operate your vehicle until it has been repaired.

Test: Pump Lockout by Access Door Not Closed

The hopper access door triggers a proximity switch whenever the door is closed. The hydraulic pump bypasses to the reservoir whenever the proximity switch is not triggered (when the door is open), preventing operation of any of the hydraulic controls.

NOTE: Do not enter the body while the vehicle is running; injury or death may occur. Refer to "Lockout/Tagout Procedure" on page 33.

For this test, proceed as follows:

1. With the hydraulic pump 'on', open the hopper access door.
2. The red illuminated 'danger' warning lamp, along with the audible buzzer, should be activated on the control console.
3. The MDM control screen should read "ACCESS DOOR OPEN".
4. Verify that all hydraulic function has been rendered inoperative by activating one of the functions, such as the forks.
5. If hydraulic functions are still active, refer to the *Proximity Switches* section in the *Maintenance Manual*.

Test: Auto Pack and Eject Functions Locked Out by Top Door Not Fully Open

The top door triggers a proximity switch whenever it is fully open. This proximity switch, when triggered, allows the 'Auto Pack' and 'Eject' functions. This feature is included to prevent packing or ejecting against the top door, which may cause damage to the top door.

For this test, proceed as follows:

1. With the packing panel fully forward to its home position, activate the top door function to partially close it.
2. Activate 'Auto Pack'. The packing panel should not move.
3. Open the tailgate completely.
4. Activate Pack Panel 'Eject'. Again, the packing panel should not move.
5. If the packing panel moves in either instance, refer to the *Proximity Switches* section in the *Maintenance Manual*.

Test: Auto Pack Function Locked Out by Tailgate Ajar

Each tailgate latch hook triggers a proximity switch when fully closed. These proximity switches, when triggered, allow the 'Auto Pack' function. This feature is included to prevent the operator from activating Auto Pack at the landfill with the tailgate open, leaving the cab and being struck with ejecting refuse from the body.

For this test, proceed as follows:

1. With the packing panel fully forward to its home position, remove the tailgate lock blocks and activate the Tailgate 'Open' function so that the tailgate is at least partially open.
2. Activate 'Auto Pack'. The packing panel should not move.
3. If the packing panel moves when depressing 'Auto Pack', refer to the *Proximity Switches* section in the *Maintenance Manual*.

Test: Eject Function Locked Out by Tailgate Not Fully Open

Each tailgate latch hook triggers a proximity switch when fully closed. In addition, the tailgate triggers a tilt switch that senses when the tailgate is fully open. This combination of switches, allow the 'Eject' function only when the tailgate is fully open.

For this test, proceed as follows:

1. With the packing panel fully forward to its home position, remove the tailgate lock blocks and activate the Tailgate 'Open' function so that the tailgate is at least partially open.
2. Activate the 'Eject' Button. The packing panel should not move.
3. If the packing panel moves when depressing 'Eject', refer to the *Proximity Switches* section in the *Maintenance Manual*.

Test: Auto Pack and Eject Locked Out by Arms Elevated

The lift arms trigger a proximity switch when being raised to a height that would place the forks over the legal height of 13'-6". This arm position roughly corresponds to the fork pivot tube being just above the cab windshield. The proximity switch, triggered in this position, prevents 'Auto Pack' and 'Eject' from functioning, and also illuminates the 'Arms Overheight' warning lamp. This prevents the operator from being able to pack with a container in the hopper.

For this test, proceed as follows:

1. With the packing panel fully forward to its home position, raise the lift arms so that the 'Arms Overheight' warning lamp is triggered 'on'.
2. Activate 'Auto Pack'. The packing panel should not move.
3. Next, leaving the arms in their current position, open the tailgate completely.
4. Activate 'Eject'. The packing panel should not move.
5. If the packing panel moves when depressing 'Eject', refer to the *Proximity Switches* section in the *Maintenance Manual*.

Test: Arms 'Up' Locked Out by Packer Panel Not Home

The packer panel triggers a proximity switch in the fully forward or 'home' position. This proximity switch, when triggered, allows the operator to raise the arms. If the proximity switch is not triggered, the operator can only raise the arms until they trigger overheight proximity switch #1, which roughly corresponds to the arms being at a height that puts the fork pivot tube above the cab windshield. This lockout prevents the operator from dumping a container behind the packing panel.

For this test, proceed as follows:

1. With the arms down, activate the 'Auto Pack' function and then depress the 'Pump Shutoff' switch. The packing panel will stop.
2. Pull out the 'Pump Shutoff' switch to engage the pump, and raise the arms as far as they will go.
3. The arms should stop when the fork pivot tube is approximately at the level of the top of the cab windshield.
4. If the arms travel all the way to the dump position, refer to the *Proximity Switches* section in the *Maintenance Manual*.

Test: Arms 'Up' Locked Out by Top Door Not Open

The top door triggers a proximity switch when it is fully open. When this proximity switch is triggered, it allows the arms to lift and dump a container. If the proximity switch is not triggered, the operator can only raise the arms until they trigger overheight proximity switch #1, which roughly corresponds to the arms being at a height that puts the fork pivot tube above the cab windshield. This lockout prevents the operator from dumping a container with a closed or partially closed top door, which would cause serious damage.

For this test, proceed as follows:

1. With the arms down, activate the top door 'Close' function so that the door is partially closed.
2. Raise the arms as far as they will go.
3. The arms should stop when the fork pivot tube is approximately at the level of the top of the cab windshield.
4. If the arms travel all the way to the dump position, refer to the *Proximity Switches* section in the *Maintenance Manual*.

Test: Joystick Locked Out by Body Raised

On full eject units with service hoist, the body triggers a proximity switch when at rest on the chassis frame. This proximity switch, when triggered, allows movement of the lift arms only when the body is down on the chassis frame. This lockout prevents the lift arms from damaging the chassis cab.

For this test, proceed as follows:

1. With the arms raised completely and the forks stowed in the hopper, raise the hoist or service hoist so that the body raised proximity switch is not triggered.
2. Activate arms 'down'. The arms should not move.
3. If the arms move, refer to the *Proximity Switches* section in the *Maintenance Manual*.

Test: Tailgate Function Locked Out by Body Raised

On full eject units with service hoist, the body triggers a proximity switch when it is down and at rest on the chassis frame. When this proximity switch is not activated, it locks out the tailgate 'open' and 'close' functions. This lockout prevents the operator from having the tailgate contact refuse and other debris on the ground or during ejection.

For this test, proceed as follows:

1. Raise the body off the chassis frame.
2. Activate the tailgate 'open' function. The tailgate should not move.
3. Activate the tailgate 'close' function. Again, the tailgate should not move.
4. If the tailgate does move, refer to the *Proximity Switches* section in the *Maintenance Manual.*

Test: Hoist Locked Out by Arms Not Stowed

On full eject units with service hoist, the arms trigger a proximity switch when they are raised fully and contact the body bumper pads. The forks also trigger a proximity switch when they are raised fully. When both of these proximity switches are activated (as in when the forks are stowed in the hopper), the body hoist will function. If, however, both proximity switches are not triggered (as in when the forks are down), the body hoist will not work. This lockout prevents damage to the chassis cab.

For this test, proceed as follows:

1. With the arms down, activate the hoist 'up' function.
2. The hoist should not function.
3. If the hoist does move, refer to the *Proximity Switches* section in the *Maintenance Manual.*

NOTE: Backwards arms must be stowed to raise body.

Lockout Summary

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Table 1 Lockout summary

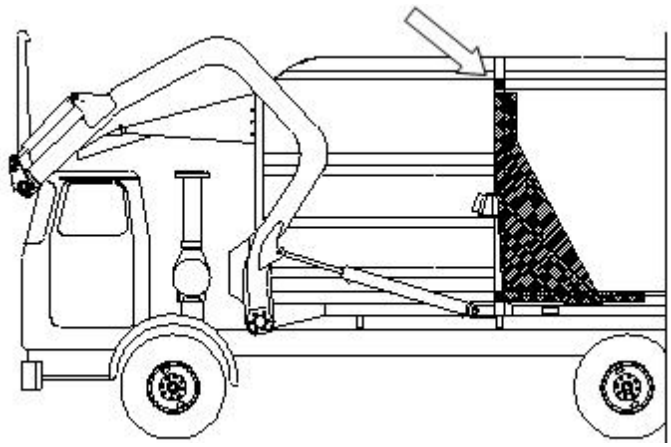
Function Locked Out	Locked Out By
Auto Pack and/or Packer “Full Eject”	Top Door Prox. Switch
Auto Pack	Tailgate Prox. Switches
Packer “Full Eject”	Tailgate Prox. Switches
Auto Pack and/or Packer “Full Eject”	Arm Overheight Prox. Switch #1
Packer “Full Eject”	Top Door Prox. Switch
Arms “Up”	Packer Home Prox. Switch
Arms “Up”	Top Door Prox. Switch
Joystick	Body Raised Prox. Switch
Pump	Access Door Prox. Switch
Tailgate	Body Raised Prox. Switch
Hoist	Arms Overheight Prox. Switch #2

Test: Auto Pack Travel Limit

During an auto pack cycle, a cam attached to the curb side pack cylinder triggers a proximity switch so that the packing panel travels rearward a predefined distance to sweep the hopper of refuse, and then returns to the forward or home position.

For this test, proceed as follows:

1. Activate ‘auto pack’. The packing panel should travel rearward until the top portion of the packing panel aligns with the roof mounted breaker bar at the top rear of the hopper.
2. If the packing panel does not stop at this point, or stops too soon, please refer to the guide in this manual on how to adjust the pack limit switch.



Warning Lamp/Buzzer Tests

Distinct positions of moving body parts, such as the packer panel, top door, rear door, arms and forks will trigger either the amber warning lamp, the red danger lamp, the in-cab buzzer or the chassis backup alarm. These warnings, in conjunction with the readout screen on the MDM electronic control unit, serve to alert the operator that a dangerous condition exists, forcing him to pay close attention to how the unit is operated in order to prevent damage or serious injury. The warning indicators are:

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Table 2 Warning buzzers

Action	Buzzer	Chassis Backup Alarm
Tailgate Ajar	Yes	Yes
Body Raised	Yes	No
Access Door Open	Yes	No

.

Table 3 Warning lamps

Action	Amber Caution	Red Danger	Red Overheight	Green Autopack	Red Pump On
Pump On					Yes
Auto Pack Engaged				Yes	
Access Door Open		Yes			
Arms Over Height		Yes	Yes		
Packer Not Home	Yes				

Table 3 Warning lamps (Cont'd)

Action	Amber Caution	Red Danger	Red Overheight	Green Autopack	Red Pump On
Top Door Not Open	Yes				
Tailgate Ajar	Yes				
Tailgate Fully Open		Yes	Yes		
Body Raised		Yes	Yes		

Lockout/Tagout Procedure

The lockout/tagout procedure should be followed whenever you are inspecting, cleaning or repairing your WITTKE RETRO FL™.

Figure 2-2 Lockout/tagout tags

NOTE: Failure to follow the lockout/tagout procedure may result in serious injury or death. Prior to performing under body work it is necessary to set the body prop as explained later in this manual.

The following is the lockout/tagout procedure:

1. Set the chassis parking brake.
2. Turn off the hydraulic pump.
3. Activate one of the hydraulic controls to relieve any residual pressure in the system.
4. Turn off engine, remove keys from the ignition and store the keys in a safe, controlled area. It is recommended that you keep the keys on your person.

5. Place an Out-of-Service tag (see Figure 2-2) on the steering wheel using a non-reusable fastener and place an Out-of-Service sign in the front window.
6. Turn off and lock the battery kill switch.
7. Chock the wheels.

3

In-Cab Control Console

The WITTKE RETRO FL™ has a series of controls that allow easier operation of the different functions that come with the vehicle. These controls are located on the in-cab control console.

In-Cab Control Console

NOTE: It is imperative that the operator familiarize himself with the layout and function of all the controls required to operate the WITTKE RETRO FL™.

Figure 3-1 In-cab console

Auto-Pack Switch

This switch controls the automatic pack cycle. Depress the switch and release to initiate the automatic pack cycle.

NOTE: The switch will illuminate when in auto-pack cycle.

Figure 3-2 Auto-pack switch

Hydraulic Pump Shutoff Switch

This switch controls the hydraulic pump. To engage the pump, the switch must be pulled out. The switch knob will illuminate in the 'on' position. To turn the pump off, push the switch in.

Figure 3-3 Hydraulic pump shutoff switch

Danger Warning Lamp

This lamp will illuminate whenever the following occurs:

- The hopper access door is open
- The arms are over height
- The tailgate is ajar
- The body is raised

Figure 3-4 Danger warning lamp

Caution Warning Lamp

This lamp will illuminate whenever the following occurs:

- The packing panel is not home
- The top door is not open
- The tailgate is ajar

Figure 3-5 Caution warning lamp

MDM Control Module

This module displays many warnings as well as other information. It will be covered elsewhere in this manual.

Figure 3-6 MDM control module

Eject/Reverse Switch

This rocker switch is used to either eject the load at the landfill, or to reverse the packer panel during auto pack. Press top of the switch and hold to eject; press bottom of the switch and hold to reverse the packer panel.

Figure 3-7 Eject/reverse switch

Fork Width Control

This is an optional control to set the spacing of the forks. Pressing top of the switch and holding it down moves the forks apart; pressing bottom of the switch and holding it down brings them closer together.

Figure 3-8 Fork width control

Hopper Cover Switch

This rocker switch is used to control the hopper cover (top door). It must be used in conjunction with the 'Door Enable' switch beside it. Pressing top of the switch and holding it down opens the top door; pressing bottom of the switch and holding it down closes the top door. Top of the 'Door Enable' switch must be pressed and held at the same time the hopper cover switch is activated in either direction.

Figure 3-9 Hopper cover switch

Door Enable Control

The top of this rocker switch must be pressed and held whenever the hopper cover or rear door controls are used in order for them to function.

Figure 3-10 Door enable control

Rear Door Control

This control is used to open or close the rear door. It must be used in conjunction with the 'Door Enable' switch beside it. Pressing top of the switch and holding it down opens the rear door; pressing bottom of the switch and holding it down closes the rear door. Top of the 'Door Enable' switch must be pressed and held at the same time the rear door switch is activated in either direction.

Figure 3-11 Rear door control

Remote Joystick Control

This is an optional control used to supply or cut power to a remote joystick mounted inside or outside the cab. Pressing the toggle up provides power to the remote joystick. In the center position power to the remote joystick is cut off.

Figure 3-12 Remote joystick control

Hopper Lamp Switch

This is an optional switch used to control the lamp mounted to the street side rear view mirror, illuminating the hopper area. Pressing the toggle upward will turn on the lamp. Pressing it back down to the center position turns the lamp off.

Figure 3-13 Hopper lamp switch

Pack Lamp Switch

This is an optional switch used to control the lamp mounted behind the cab, illuminating the packer area. Pressing the toggle upward will turn on the lamp. Pressing it back down to the center position turns the lamp off.

Figure 3-14 Pack lamp switch

Backup Lamp Switch

This is an optional switch used to control the backup lamps located on the tailgate near the center brake light. It will also control the fender mounted backup lamps if your vehicle is so equipped. Pressing the toggle up will illuminate the lamps. With the switch in the center position, the lamps are off. Pressing the toggle to the lower position puts the lamps in 'auto' mode, whereby they only illuminate when the transmission is in reverse.

Figure 3-15 Backup lamp switch

Strobe Lamp Switch

This is an optional switch used to control the strobe lamp, usually located on the tailgate near the center brake light. It will also control a front body mounted strobe lamp if your vehicle is so equipped. Pressing the toggle up will illuminate the lamps. With the switch in the center position, the lamps are off. Pressing the toggle to the lower position puts the lamps in 'auto' mode, whereby they only illuminate when the hydraulic pump is on.

Figure 3-16 Strobe lamp switch

Lift Arm Auto-Pack Switch

This is an optional switch used to control the arms activated auto-pack function. If the toggle switch is in the ON position, the auto-pack cycle will be activated when the arms drop below the windshield. Press the toggle to the OFF position when this function is no longer needed.

Figure 3-17 Lift arm auto-pack switch

Arms Over Height Indicator Lamp

This lamp, which is dash mounted for easy viewing by the operator, indicates that the arms/forks are over height (13'-6"). This condition will occur every time a container is dumped. The lamp will go off if the forks are stowed in the hopper, if the arms/forks are below 13'-6" or if the tailgate is fully open.

Figure 3-18 Arms over height indicator lamp

Joystick Control

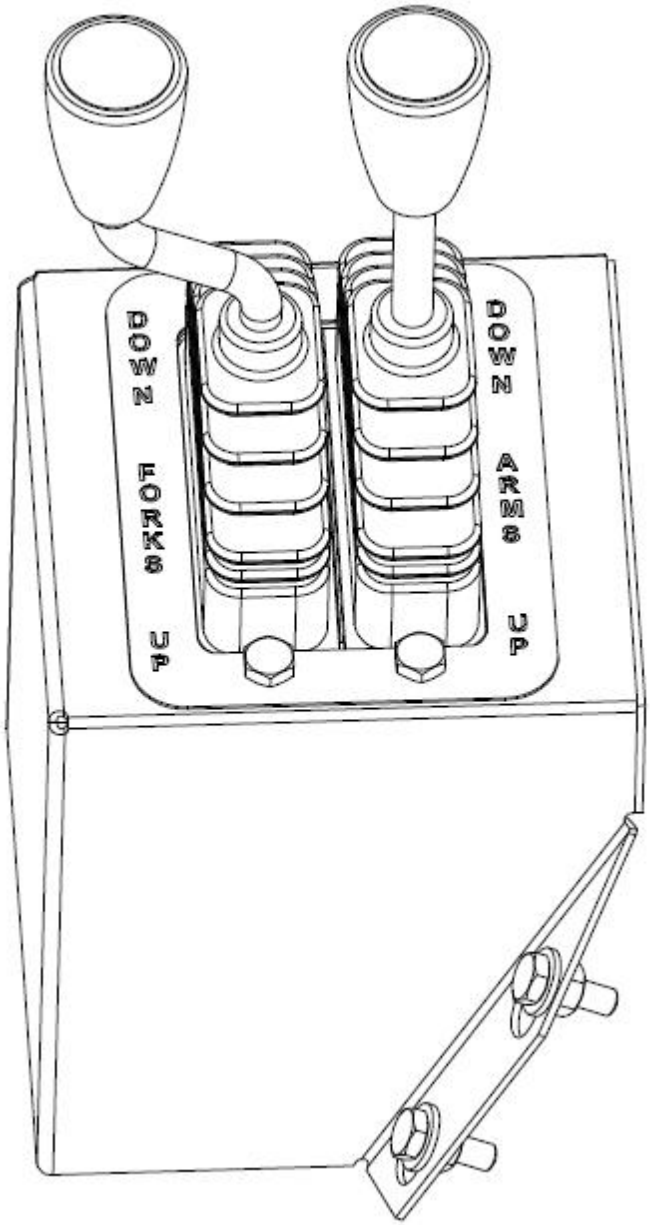
The WITTKE RETRO FL™ is equipped with a joystick to control operation of the arms and forks for dumping containers. The joystick is modulated and offers fine control over the speed of actuation of either the arms or the forks. Your WITTKE RETRO FL™ may be equipped with a single handle, dual axis joystick, or a dual handle, single axis joystick.

Dual Handle Joystick

This joystick is equipped with dedicated handles for each of fork control and arm control. The left handle is for the forks whereas the right handle is for the arms. As the label plate indicates, pushing the corresponding handle away from you towards the front will lower the arms or forks, whereas pulling the corresponding handle toward you will lower the arms or forks.

Each handle operates independently, so it is possible to activate both controls simultaneously if desired. This will take some practice, but it does speed up the time required to dump a container.

Figure 3-19 Dual handle joystick

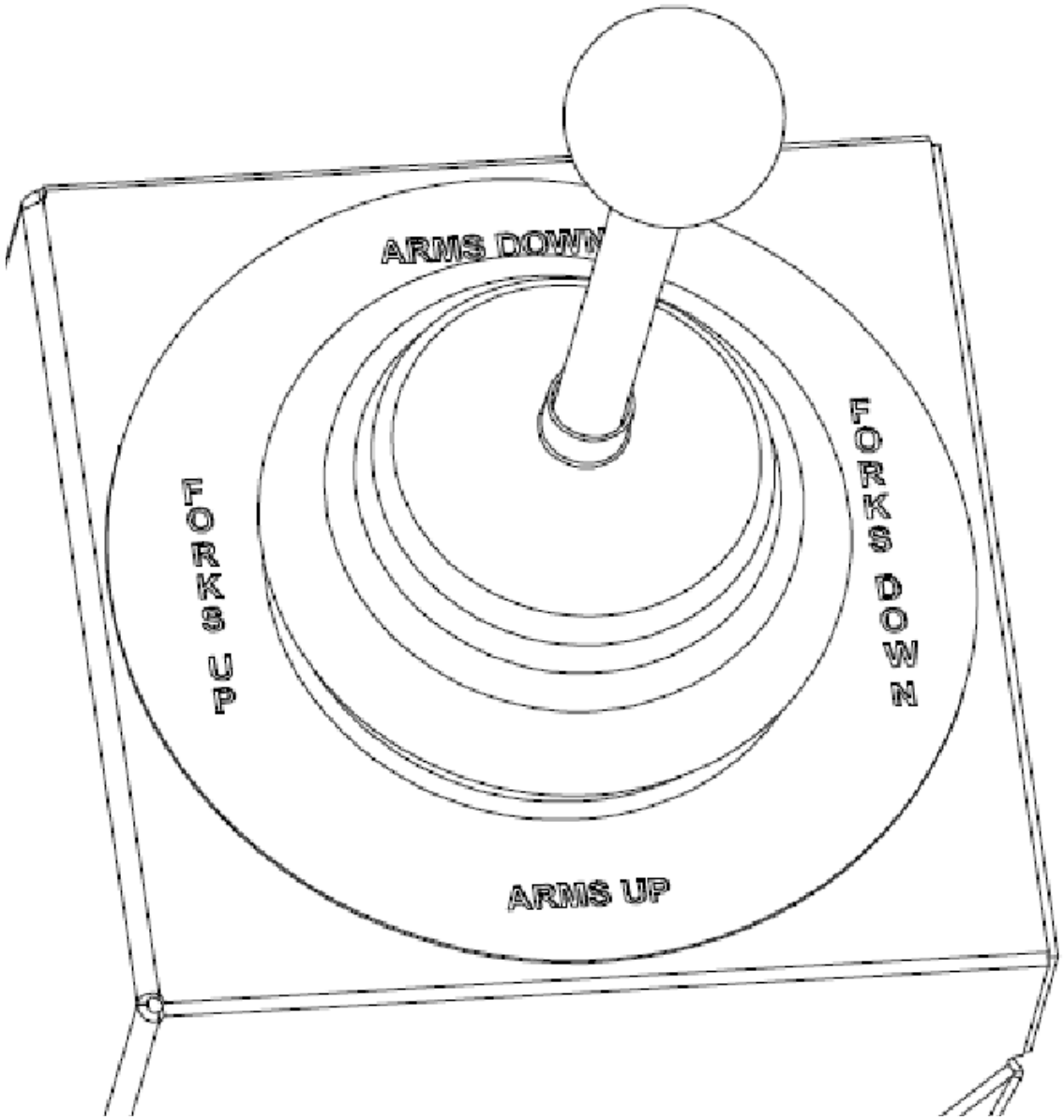


Dual Axis Joystick

This joystick is equipped with only one handle, but has two axes. The forward/backward axis controls the lift arms, whereas the left/right axis controls the forks. Pushing the handle forward will raise the lift arms, whereas pulling the handle backward will lower them. Pushing the handle to the right will lower the forks, whereas pulling the handle to the left will raise the forks.

It is possible to control both arm and fork functions with this joystick. For example, if the handle is pushed at a 45 degree angle between arms down and forks down, both functions will operate. This takes practice, but it will reduce time taken to dump a container once perfected.

Figure 3-20 Dual axis joystick



Service Hoist Pump Lever

The service hoist is an optional feature on full eject units. It consists of an electric pump, battery operated, attached to an oil tank. The control unit is located on the chassis frame and has a handle to control both body raising and lowering functions. Pulling the lever toward you raises the service hoist, whereas pushing the lever away from you (toward the chassis frame) will lower the service hoist.

Figure 3-21 Service hoist pump lever

IMPORTANT: Always use the body prop to support the body when using the service hoist. Never use the service hoist and body prop to lift and support a loaded body. Failure to heed these warnings could result in serious injury or death. Also, remove latch pins prior to operation.

4

Operating the Wittke Retro FL™

Prior to Vehicle Operation

Prior to operating your Wittke Retro FL™ front loader, ensure that you have been provided with the proper training related to the safe operation of the vehicle. As an operator, you must be familiar with the location, operation and function of all controls and warning indicators provided and adhere to all safety rules and procedures.

Note: Some controls are considered optional equipment and therefore may not be installed on your vehicle.

Prior to using the Wittke Retro FL™, operators are required to perform a daily pre-trip inspection.

Review the Operator Pre-Trip Inspection document commencing on Page 80 herein.

Ensure that all malfunctions or concerns are reported to your supervisor and/or maintenance department.

Prior to starting your route, consult with your supervisor for specific driving rules.

Remember to obey all speed restrictions and road regulations.

Qualified Operators Only

All persons operating the Wittke Retro FL™ must have the correct state/province issued license to drive the chassis that the Wittke Retro FL™ is mounted to, which includes certification to operate vehicles equipped with air brakes.

Operator Pre-Trip Inspection: Prior to Starting the Vehicle

The following inspection should be completed prior to starting the engine. Ensure the parking brake is set before your inspection.

- Check cleanliness of the vehicle, paying close attention to decals, mirrors, windows and lights.
- Check that safety equipment is present (fire extinguisher, first aid kit, flare kit, etc.)
- Ensure that body is seated flat to the chassis, not leaning to one side or the other, and that body pins are installed.
- Ensure that all body attachment points are tight and free of cracks.
- Check the entire body for unusual wear, distortion, cracking or leaking.
- Ensure that the hydraulic oil is at the proper level in the reservoir.
- Ensure all hydraulic reservoir valves such as the suction line ball valve, are open.
- Check all the hydraulic cylinders for leaks.
- Check all hydraulic cylinder mounting pins to ensure they are secure.
- Ensure that the tailgate is closed and the lock blocks are positioned.

Operator Pre-Trip Inspection: After Starting the Vehicle

After starting the vehicle, the following inspection should be completed prior to leaving the yard. Ensure the parking brake is set prior to your inspection.

- Engage the hydraulic pump.
- Operate all body controls to ensure they function properly.
- Ensure that all interlocks are functioning properly (see pages 31 through 35)
- Check all lights to ensure they are functioning properly, including signal lamps, head lamps, marker lamps, brake lamps and work lamps.
- Park the arms against the body stops and park the forks in the hopper (see next paragraph on arm travel positions).

Arm/Fork Travel Positions

Depending on the distance being travelled, the arms and forks should be placed in either the ready travel position, or the parked travel position.

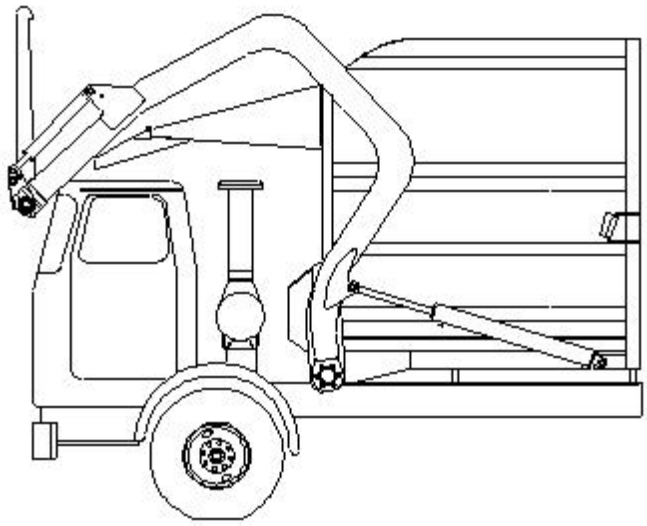
Caution!

During operation of the arms and forks, pay close attention to overhead clearance with power lines, etc. Failure to do so could cause injury or death.

Ready Travel Position

When several containers are located within a short distance of one another, it is beneficial to place the arms and forks in the short distance travel position. Place the arms so that the fork pivot tube is positioned at the top of the cab windshield and place the forks vertical. Make certain that the arms over height warning lamp is not illuminated to ensure that the vehicle height does not exceed 13'-6".

Figure 4-1 Ready travel position

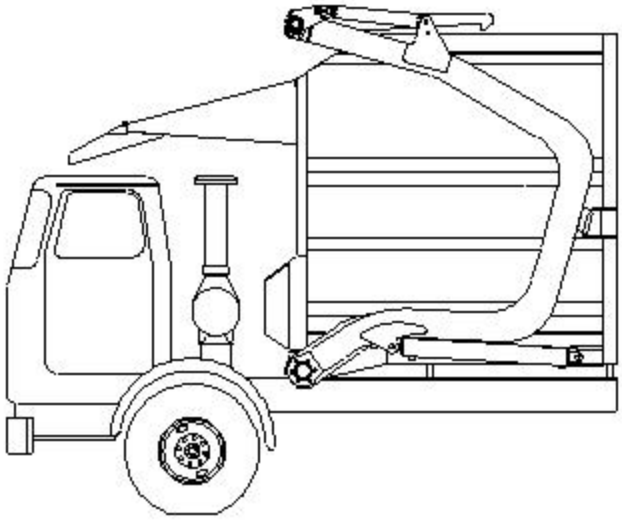


NOTE: Local regulations may stipulate a vehicle height limit of less than 13'-6" (4.11 meters). In those cases, parking the arms and forks will not bring the overall height below the legal limit.

Parked Travel Position

During transport requiring long traveling distances between container pickups, park the lift arms against the body bumper pads and tuck the forks into the hopper. This practice ensures that the vehicle is less than 13'-6" in height and provides support for the lift arms and arm cylinders. When the arms and forks are parked, the top door can be closed to eliminate the possibility of refuse blowing out of the hopper.

Figure 4-2 Parked travel position



Engaging & Dumping Container

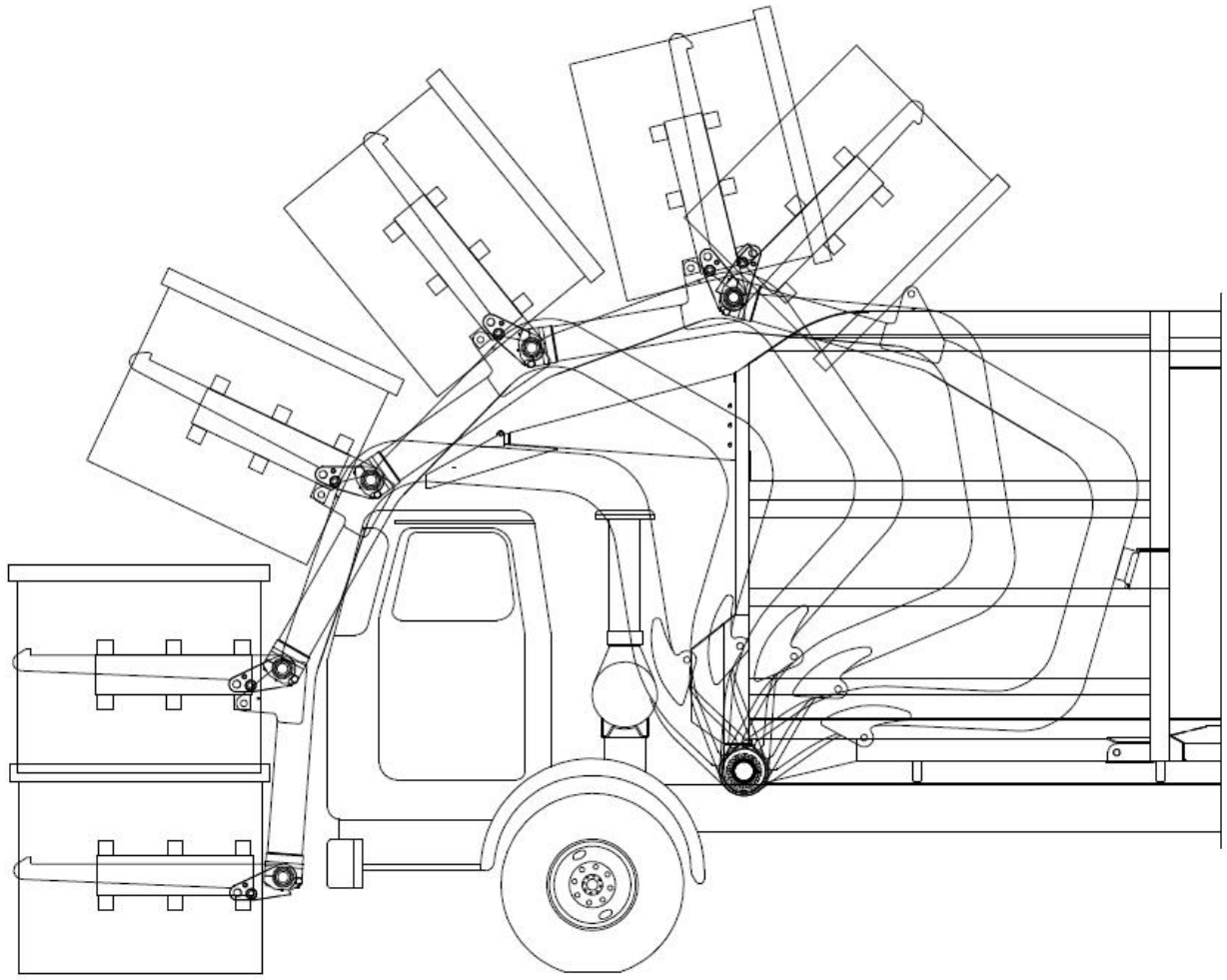
The following steps are required to engage and dump a front load container into the hopper:

1. While inching toward the front of the container, lower the arms and level the forks so that they are the same height as the pockets of the container.
2. Drive forward so that the forks enter the container pockets and the front of the container touches the fork bumper pads.
3. Set the parking brake.
4. Ensure that the top door is open all the way, and the packer blade is forward (home).
5. Raise the lift arms and ensure the container does not contact the cab or the canopy by utilizing the fork control.
6. Once the arms are up all the way (they contact the body bumper pads), rotate the forks back to dump the refuse into the hopper.
7. It is not necessary to tip the container past about 45 degrees.

NOTE: Do not tip the container until the fork cylinders bottom out, as the container could fall into the hopper.

8. If required, the forks can be jogged forward and back slightly to rock the container and dislodge sticking refuse.
9. Once the container is empty, roll the forks out.
10. Lower the arms until the container touches the ground and the forks are free in the container pockets.
11. Release the parking brake and slowly back up without turning steering wheel until the forks are free of the container.

Figure 4-3 Dumping container



Compacting Refuse

There are two control buttons required to compact refuse, namely the 'Auto Pack' button and the 'Eject/Reverse' toggle switch.

To initiate the pack cycle, depress the Auto Pack push button and release it. It is not necessary to hold this button down to keep the pack cycle going. The packer panel will travel rearward, sweeping the hopper of refuse. It will stop automatically at the rear of the hopper, remain stationary for a brief moment, and then automatically return to the front of the hopper.

When the body starts to fill up, it will become necessary to reverse the packer panel before it has traveled to the rear of the hopper in order to avoid refuse from spilling over the packer panel. To reverse the packer panel while it is Auto Packing, use the reverse toggle switch to bring the packer panel forward. This will allow the piled refuse in the hopper to fall down. Then the Auto Pack button can be depressed again to initiate the pack cycle. This process can be repeated for as many times as it takes to ensure the refuse is compacted into the body and does not spill over the packer panel.

You will know that the body is full when one of two conditions occurs: either the packer panel will no longer complete a pack cycle before returning, or it is impossible to cycle the packer without having refuse spill over top.

Unloading Refuse

Once you have arrived at the landfill, do the following:

1. Choose a spot to unload that will allow for the tailgate to be opened without contacting anything.
2. Ensure that your parking brake is set and turn on the hydraulic pump.
3. Activate the tailgate 'close' toggle switch momentarily. This action will free up the tailgate latch lock blocks.
4. Walk to the rear of the body and remove the tailgate lock blocks.
5. Get back into the cab and open the tailgate completely.
6. Release the parking brake.
7. Activate the 'Eject' toggle switch, which will push the load out.
8. Allow the ejecting refuse to push the vehicle forward if required.

After Unloading

Once the unloading process is completed, do the following:

1. Return the packer panel by activating the 'Reverse' toggle switch. Stop the packer panel approximately 60" from the front of the hopper.
2. Activate the Tailgate 'Close' rocker switch, but do not close the tailgate completely. Allow enough clearance (about 36") between the tailgate and the body to engage the tailgate safety props.
3. Engage the tailgate safety props as described earlier in this manual.
4. Complete the Lockout/Tagout procedure as described earlier in this manual.
5. Clean all refuse from the tailgate seal and the tailgate frame in order to ensure a leak free seal once the tailgate is again closed.
6. Clean out the hopper as described later in this manual.
7. Start up the vehicle and from the cab activate the tailgate 'open' momentarily to free the tailgate safety props.
8. Walk to the rear of the body and stow the tailgate safety props.
9. From the cab, activate the tailgate 'closed' rocker switch until the tailgate is completely closed.
10. Walk to the rear of the body and re-insert the tailgate lock blocks.
11. Retract the packer panel to its home position at the front of the hopper.

Cleaning the Hopper

The hopper area forward of the packer panel must be cleaned daily, or more often, depending on the amount and type of refuse that spills over top of the packer panel. The best time to clean the hopper is at the landfill after unloading.

To clean the hopper, do the following:

1. Set the chassis parking brake.
2. Raise the lift arms completely.
3. Activate the packer panel by depressing the Auto Pack push button.
4. Once the packer panel has moved rearward about 48 inches, depress the red pump shut-off button.
5. Complete the Lockout/Tagout procedure (see *Lockout/Tagout Procedure* on page 33).
6. Open the hopper access door and enter the hopper.
7. Remove all refuse trapped in front of the packer panel, paying close attention to refuse trapped in the front bulkhead and slide rail channels.

NOTE: Failure to clean the hopper of refuse can cause damage to the pack cylinders and pack cylinder hoses.

Figure 4-4 Hopper

8. While in the hopper, inspect the pack cylinders, hoses and pack cylinder pins for any abnormalities and report these to your supervisor.
9. Exit the hopper area and close the hopper access door.

Cautionary Notes for Maintenance Personnel

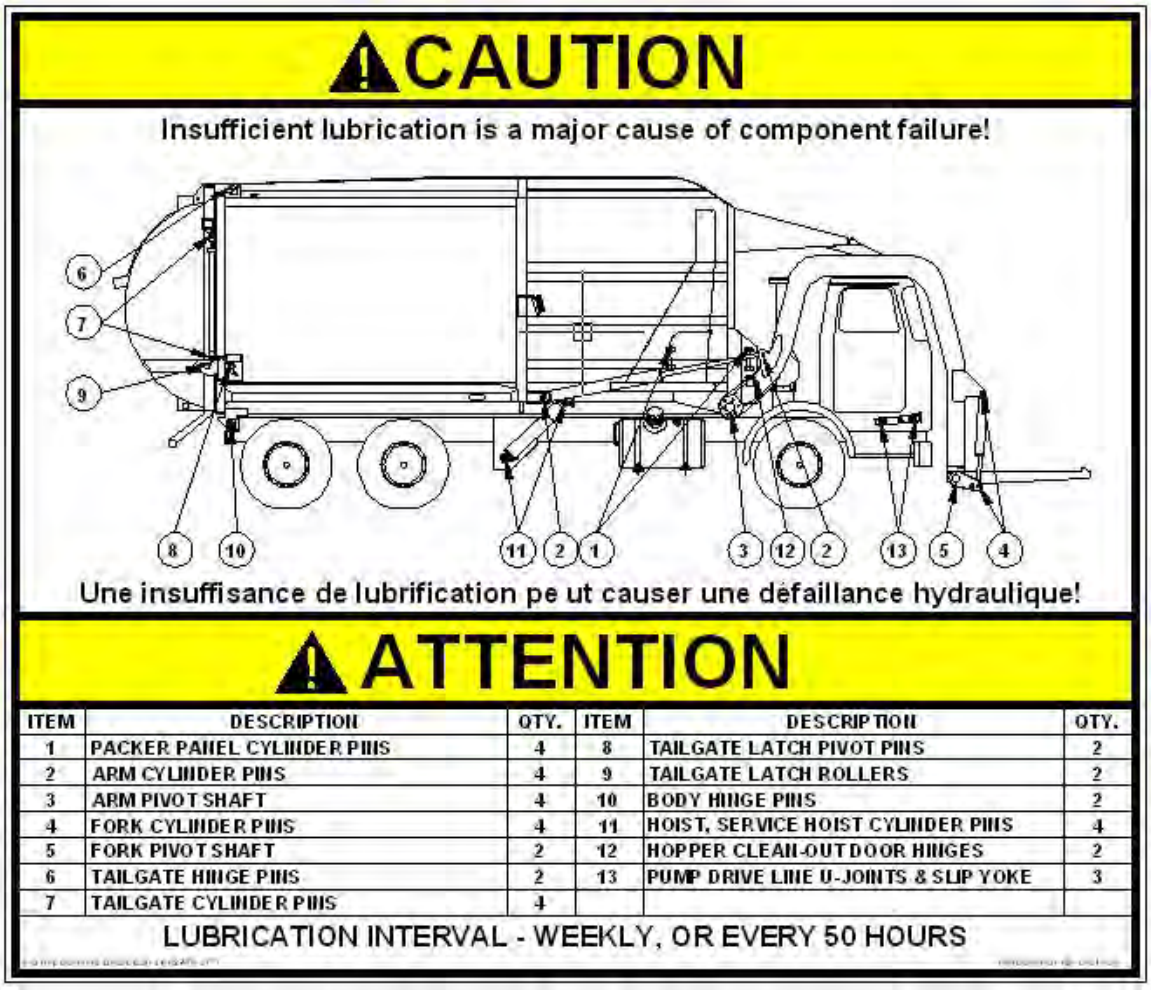
With your safety in mind, please note that it is imperative that ONLY QUALIFIED PERSONNEL (who are knowledgeable with the operations of this vehicle) perform service to the hydraulic, electrical and pneumatic systems.

Please read carefully the Safety Information, Controls and Operation sections within this manual prior to attempting any maintenance to your WITTKE RETRO FL™.

Initial Lubrication

Prior to first using your new WITTKE RETRO FL™ front loader, it is necessary to complete a full lube job. All grease points are shown on the decal affixed to the body side wall. Do not assume that your new unit has been lubricated to a sufficient level that it is ready for work.

Please read the Safety, Controls and Operation sections of this manual prior to performing any service work on your new WITTKE RETRO FL™.



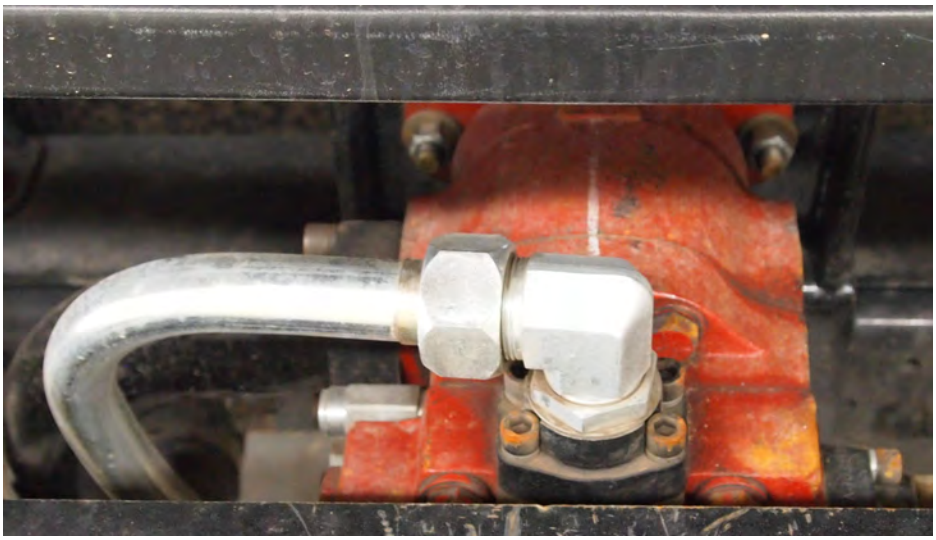
ITEM	DESCRIPTION	QTY.	ITEM	DESCRIPTION	QTY.
1	PACKER PANEL CYLINDER PINS	4	8	TAILGATE LATCH PIVOT PINS	2
2	ARM CYLINDER PINS	4	9	TAILGATE LATCH ROLLERS	2
3	ARM PIVOT SHAFT	4	10	BODY HINGE PINS	2
4	FORK CYLINDER PINS	4	11	HOIST, SERVICE HOIST CYLINDER PINS	4
5	FORK PIVOT SHAFT	2	12	HOPPER CLEAN-OUT DOOR HINGES	2
6	TAILGATE HINGE PINS	2	13	PUMP DRIVE LINE U-JOINTS & SLIP YOKE	3
7	TAILGATE CYLINDER PINS	4			

LUBRICATION INTERVAL - WEEKLY, OR EVERY 50 HOURS

Hydraulic Pump Mode

Your WITTKE RETRO FL™ hydraulic system is equipped with a Muncie Live Pak pump. This pump provides a 'live' hydraulic system at all engine speeds when engaged. This allows for "pack on the run" compaction of refuse, as well as positioning of arms and forks when pulling up to a container for engagement. While this pump offers minimal horsepower consumption when pump output is not required, it is recommended that the pump be turned 'off' when the hydraulic system is not needed, such as when driving between container pickups, especially at highway speeds.

Figure 4-5 Hydraulic pump

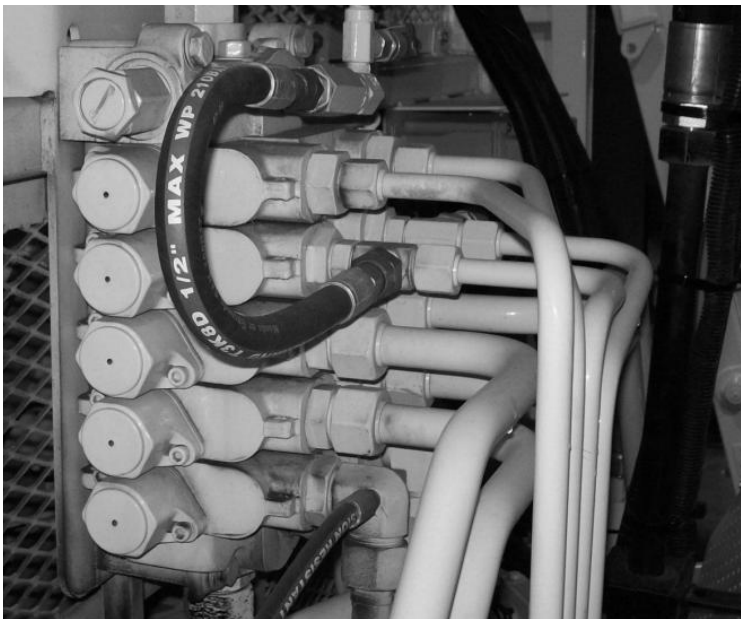


The Muncie Live Pak hydraulic Pump is used to feed a maximum of 55 gallons per minute of oil to the hydraulic system at 1,500 rpm. The pump uses a dual modulating element designed to establish a low unload condition of 20 psi when returning oil back to the reservoir in the 'off' mode. An electric solenoid valve is used to place the pump in the 'on' or 'off' mode. When placed in the 'on' mode, the unload condition shuts down and the modulating element varies the flow up to the preset flow limit of 55 gpm. Any pump flow produced in excess of 55 gpm is diverted back to the reservoir.

There are three ports on the pump: a suction port, pressure port and bypass port. The suction port supplies oil to the pump inlet through a 2-1/2" diameter hose from the reservoir. The pressure port provides oil flow to the main directional valve through a 1-1/4" diameter hose. The bypass port routes oil back to the reservoir through a 1-1/4" hose.

There are normally no adjustments required to the cartridges on the hydraulic pump.

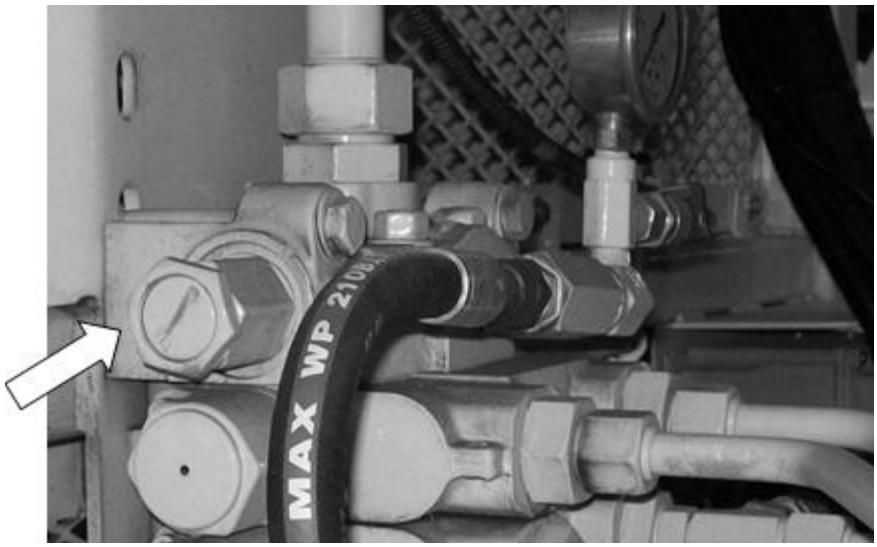
Main Directional Valve



The main directional valve is located behind the cab on the body front bulkhead. It receives hydraulic oil flow from the pump into its inlet section. The inlet section houses a relief valve that controls the maximum pressure available to the hydraulic circuit. The main directional valve has a number of work sections. Each work section controls one of the functioning hydraulic circuits. Work sections are of the 'parallel' variety, meaning that more than one circuit can be operating simultaneously. However, the hydraulic flow will go to the circuit that takes the least amount of operating pressure. Following the work sections is an outlet section. Its port is connected to the reservoir and is the path whereby all oil returning from the hydraulic circuits is channeled back to the reservoir.

The main directional valve sections are secured together with 4 tie rods torqued to 35 lb-ft. Between all sections are a series of o-rings that seal the hydraulic flow path and prevent leaking to the atmosphere. The o-rings are replaceable if leakage occurs. Consult Labrie*Plus* for replacement parts.

Pressure Relief Valve



The pressure relief valve is located in the main directional valve inlet section. It is adjustable and controls the maximum hydraulic pressure available to the work circuits. The relief valve should be set to 2,300 psi maximum. When the WITTKE RETRO FL™ leaves the factory, the relief valve is covered with a rubber seal to prevent anybody from changing the valve setting. That valve does not need any adjustment once out of the factory.

Work Circuits

On a full eject commercial WITTKE RETRO FL™, five work circuits are provided to control all the functions of the packer body. In order of their placement in the main directional valve, from top to bottom they are:

1. Top Door Circuit – this circuit controls the extension and retraction of the top door cylinder. The top door cylinder has a restrictor fitting in each port to limit hydraulic flow, and thus speed, in both directions.

2. Tailgate Circuit – this circuit controls the extension and retraction of the two tailgate cylinders which open and close the tailgate latch and the tailgate. The tailgate cylinders have a restrictor fitting to limit the speed that the tailgate closes at. In addition, the tailgate cylinders are each controlled by a double pilot check valve that a) ensures tailgate descent is controlled and b) the latch hook does not drop due to gravity.

3. Arm Circuit – this circuit controls the extension and retraction of the arm cylinders. In addition, a deceleration valve is employed in the arm raise circuit to decelerate the arms before they contact the rubber bumpers on the body. To control the arm 'up' speed, the deceleration valve uses a cam operated plunger to limit the oil flow out of the arm cylinders.

4. Fork Circuit – this circuit controls the extension and retraction of the fork cylinders. There are no other auxiliary valves in the fork circuit.

5. Pack Circuit – this circuit controls the extension and retraction of the pack cylinders. Since the pack cylinders are telescopic, a very large amount of oil flows out of the cylinders when they retract. To help divert this large flow of oil around the main directional valve directly back to the reservoir, a pilot check valve is incorporated in the pack circuit.

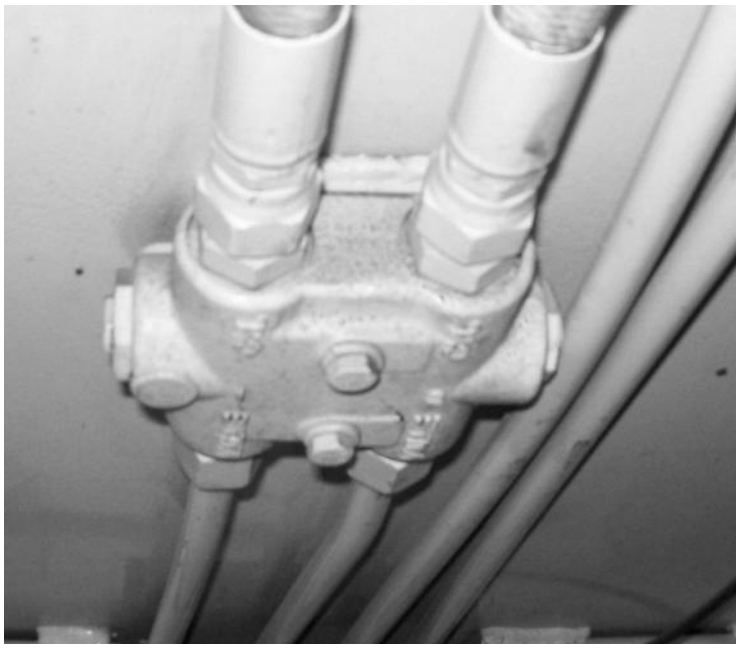
Tailgate Safety Circuit

The tailgate circuit controls the tailgate latch as well as opening and closing of the tailgate. To prevent inadvertent opening of the tailgate latch from inside the cab, or due to gravity acting on the latch hooks, mechanical safety blocks are used to prevent the latch hooks from dropping. In the event that the operator fails to replace the safety blocks when the tailgate is closed, a ***tailgate safety circuit*** has been incorporated to prevent the latch from opening.

This circuit consists of a velocity fuse and a bleed valve tied into the tailgate circuit. Hydraulic pressure from the main directional valve inlet section is fed through the bleed valve to the tailgate cylinders, providing positive pressure to close the tailgate latch hooks. Simultanously, hydraulic pressure output from the tailgate cylinders is fed through the velocity fuse, preventing any hydraulic pressure build-up that could open the tailgate latch hooks.

Even though this circuit is present, ***never operate the WITTKE RETRO FL™ without engaging the mechanical safety blocks!***

Double Pilot Check Valves



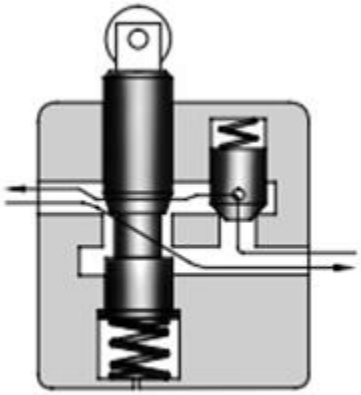
There are two double pilot check valves located at the rear of the body in the tailgate circuit, one on each branch leading to the tailgate cylinders. These valves are situated so that hydraulic pressure is required to close the tailgate, ensuring that it cannot free-fall due to gravity. In addition, the valve ensures that the tailgate latch hook cannot drop due to gravity or bleed off of pressure from the shaft end of the tailgate cylinders. See *Hydraulic Schematic* on page 77 for clarification on how this valve is located.

Pilot Check Valve

A pilot check valve is incorporated into the pack circuit to divert oil flow directly from the retracting pack cylinders to the reservoir. The pilot check valve is located behind the cab on the body front bulkhead. As stated earlier, the pack circuit incorporates telescopic cylinders. When oil flow of 25 gallons per minute is fed to the pack cylinders to retract them, oil flow at a rate of 156 gallons per minute is exiting the pack cylinders. The main directional valve cannot handle this amount of flow, so a parallel path through the pilot check valve is made available. When the pack cylinders are extending, the pilot check valve is not open. It must be 'piloted' open using pressure from the retract ports of the pack cylinders, so it is open only during retraction of the packer panel.

Incorporating the pilot check valve into the pack circuit not only speeds up the pack cycle time, but also reduces heat buildup in the hydraulic system by reducing pressure drop when retracting the packer.

Deceleration Valve



The deceleration valve is located at the front of the body, under the front bulkhead. The valve's plunger contacts a cam bolted to the arm pivot tube. As the pivot tube rotates and the plunger is pushed in by the cam, hydraulic flow through the valve is reduced. The deceleration valve is located in the arm circuit, and controls the flow of hydraulic oil out of the arm cylinders when the arms are being raised, thus reducing the arm travel speed.

It is imperative that the arms slow down before making contact with the rubber bumpers on the body. If the arms were to contact the bumpers at full speed, serious damage to the bumpers, the arms or the body would result.

IMPORTANT: Never operate the WITTKE RETRO FL™ with a non-functioning deceleration valve.

Adjusting the Deceleration Valve

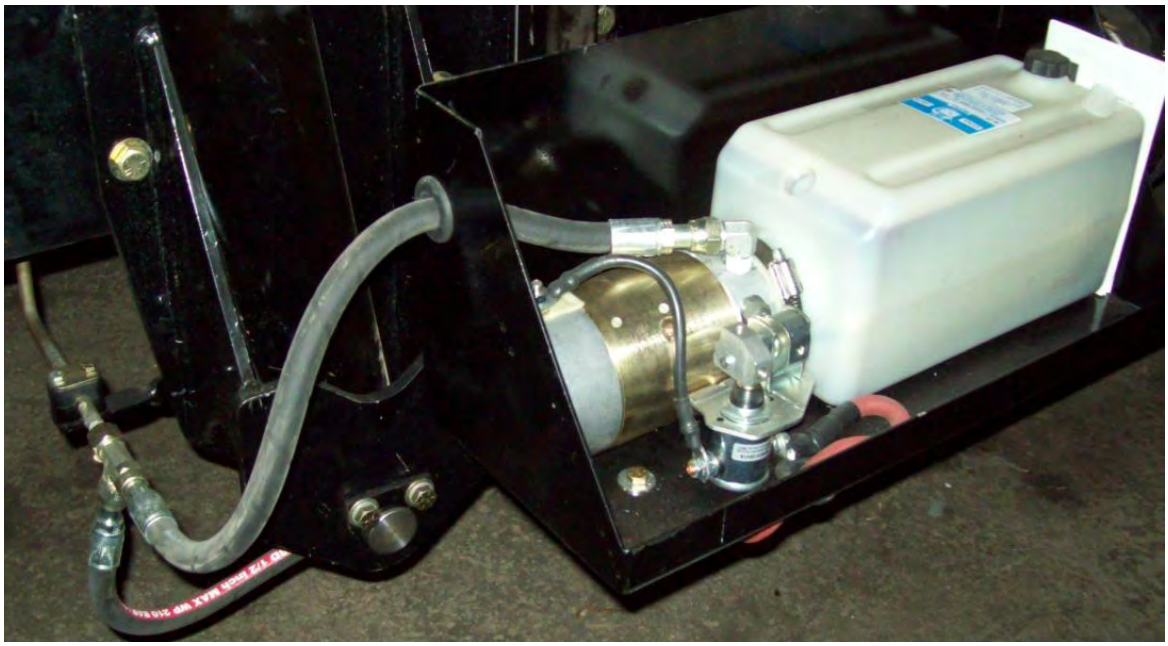
The following procedure should be followed if it becomes necessary to adjust the deceleration valve. A properly adjusted valve should come very close to stopping the travel of the arms just as they contact the rubber bumpers so that no jarring impact is created.

To adjust the deceleration valve:

1. Perform the arms full upward cycle up to the rubber bumpers on the body.
2. Mechanically depress the plunger on the deceleration valve all the way to determine the total plunger travel.
3. Loosen the actuating cam on the arm pivot tube and rotate it so that it depresses the valve plunger to within 1/8" of total inward travel.
4. Tighten the actuating cam.
5. Run the arms initially at engine idle and then at 1500 engine rpm and note the arm deceleration. Normal motion for the arms when the deceleration valve is properly adjusted would have them starting to slow down when they are about 18" from contacting the rubber bumpers.

6. If the arms stop before contacting the rubber bumpers, the cam must be adjusted. Loosen the cam attachment bolts and the set screw slightly and rotate the cam in order to make the plunger depressed for a shorter time.
7. If the arms do not slow down enough before contacting the rubber bumpers, the cam must be adjusted the opposite direction.
8. Once the setting appears correct, lift a container with the arms and note if the arm action changes. Slight modification of the cam setting may be required to ensure the arms operate properly with the weight of a container.

Service Hoist



The body service hoist is provided as a means to raise the body in the air approximately 5 degrees from horizontal to allow access to the transmission area of the chassis. The service hoist is actuated through a stand-alone 12 volt DC operated pump providing hydraulic power to two small diameter single acting hydraulic cylinders. The pump incorporates an integral reservoir and manual, lever operated 2 way, 2 position normally closed directional valve. The service hoist pump also incorporates an adjustable, factory set relief valve. The relief valve is located on the inboard side of the pump body and is adjusted by loosening the lock nut and turning the adjustment screw clockwise with an allen key to increase pressure. Adjusted pressure should not exceed 2,500 psi.

IMPORTANT: The service hoist is only capable of lifting an empty body. Never lift a loaded body with the service hoist.

IMPORTANT: Always engage the body safety prop when the body is raised in the air.

NOTE: Always remove latch pins prior to operation.

Hydraulic Hose

The WITTKE RETRO FL™ employs hydraulic hoses that meet or exceed the minimum required specifications listed below:

HYDRAULIC	HOSE SPECIFICATIONS						
INSIDE DIAMETER	1/4"	3/8"	5/8"	1/2"	3/4"	1"	1-1/4"
MIN. BEND RADIUS	2.00"	2.50"	4.1"	3.50"	4.90"	12"	16.50"
MAX. WORKING PRESSURE, PSI	3,050	3,050	3,050	3,050	3,050	3,250	2,540
BURST PRESSURE, PSI	12,200	12,200	12,200	12,200	12,200	13,040	10,160
SAE SPEC, MEETS OR EXCEEDS	100R17	100R17	100R17	100R17	100R17	100R2AT	100R2AT
COVER	EXTRA ABRASION RESISTANT						

Hydraulic Tubing

The WITTKE RETRO FL™ employs seamless carbon steel hydraulic tubing for all circuits. Welded tubing may be substituted, provided it meets the specifications listed below:

HYDRAULIC TUBE SPECIFICATIONS							
INSIDE DIAMETER	1/4"	3/8"	1/2"	5/8"	3/4"	1"	1-1/4"
WALL THICKNESS	.035"	.035"	.049"	.065"	.083"	.095"	.120"
SAE SPECIFICATION	J524B	J524B	J524B	J524B	J524B	J524B	J524B
COATING	ZINC DICHROMATE PLATED						
WORKING PRESS., PSI	3,950	2,567	2,695	2,860	3,043	2,613	2,640
BURST PRESSURE, PSI	15,800	10,267	10,780	11,440	12,173	10,450	10,560

Hydraulic Cylinders

All WITTKE RETRO FL™ hydraulic cylinders have been stamped with the body serial number. Since Labrie employs a number of cylinder suppliers, if replacement cylinders or seal kits are required, please quote the body serial number when ordering.

Hydraulic Oil

The most crucial component of the hydraulic system is the hydraulic oil. It transports damaging contaminants to filtering systems, lubricates and provides anti-wear additives to protect against component corrosion.

Regular oil changes are vital to the longevity of hydraulic system components. Operational performance, load and environmental conditions are variables that determine the frequency of hydraulic oil changes.

NOTE: We recommend that the hydraulic oil be replaced every 1000 hours. Following the failure of any major hydraulic component, the oil should be filtered through an external filtration system capable of cleaning the oil to a contamination level equivalent to ISO 4406 18/15/13.

Oil Identification

An identification decal, located on the hydraulic tank, specifies the manufacturer's brand and viscosity of hydraulic oil provided with your WITTKE RETRO FL™. When oil replacement becomes necessary, other equivalent oil types can be substituted, provided they meet the existing oil's specifications. These specifications are listed below:

- Viscosity, cSt @ 40°C 32
- Viscosity, cSt @ 100°C 5.5
- Viscosity, SUS @ 100°F 171
- Viscosity, SUS @ 210°F 45
- Viscosity Index 100
- Pour Point, °F -33

Hydraulic Reservoir

Your WITTKE RETRO FL™ is equipped with an aluminum hydraulic reservoir with a capacity of 55 gallons. It is baffled internally to separate the inlet from the outlet in order to allow entrained air to escape. The aluminum construction helps for heat dissipation. The reservoir oil volume changes as hydraulic functions are operated. To compensate for the volume change, air either enters or is expelled through the breather cap. On full eject units, the breather cap is located on the front bulkhead and is attached to the reservoir via a hydraulic line. The breather maintains 5 psi of air pressure in the reservoir at all times once the oil heats up. Air pressure above 5 psi is expelled into the atmosphere. The positive tank pressure helps push oil into the hydraulic pump inlet to prevent cavitation.

Caution!

Always remove the breather cap and filler cap slowly to let the internal air pressure dissipate in order to avoid serious injury.

A ball valve is provided on the 2-1/2" diameter reservoir inlet line for maintenance purposes.

NOTE: It is imperative that the ball valve be open whenever the engine is running. Even though the hydraulic pump is 'off', it is still pumping oil through the bypass line back to the reservoir. Severe damage to the hydraulic pump will occur if it is operated with the ball valve closed.

Oil Filtration

The hydraulic system in your WITTKE RETRO FL™ front loader requires filtration for performance and longevity. Excessive particle contaminants, over a period of time, will result in poor hydraulic performance and component failure. The hydraulic system in your WITTKE RETRO FL™ is protected with one 5 micron return line filter, one 10 micron air filter, one 40 micron breather cap, one 100 mesh suction strainer and one magnetic drain plug.

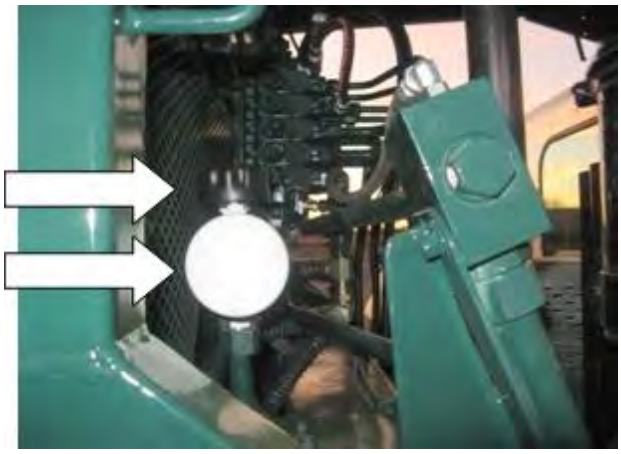
Return Filter

The reservoir mounted return filter houses two (2) elements of 5 microns. These elements must be changed after the first 50 hours of use. Thereafter, they must be replaced:

1. Whenever the filter gauge needle is in the red zone of the gauge, or
2. Whenever there is a major hydraulic component failure, or
3. Every 1000 hours.

Air Filter and Breather Cap

The 25 micron air filter and 40 micron breather cap, located on the body front bulkhead, protect the reservoir from airborne contamination whenever the tank 'breathes', such as when extending or retracting any of the body hydraulic cylinders. They should be changed every 1000 hours.



Suction Strainer

The suction strainer is located in the hydraulic reservoir, screwed into the large diameter port that the ball valve attaches to. The 100 mesh screen from which the strainer is constructed serves to trap macro contaminants only, and should be cleaned or replaced every 1000 hours.

Magnetic Drain Plug

This plug, located at the bottom of the hydraulic reservoir, catches macro particles that may settle to the bottom. It should be cleaned every 1000 hours.

Return Filter Replacement

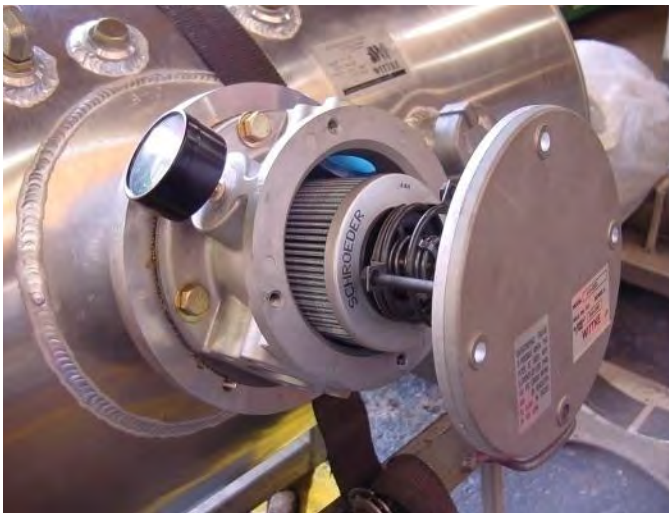
NOTE: While every effort is made at the Labrie factory to ensure clean hydraulic systems, it should be noted that most hydraulic system experts recommend the return filter be replaced after a break-in period. Labrie's recommendation is to replace this filter element after a break-in period of 50 hours of operation.

The procedure to replace the return filter element(s) is as follows:

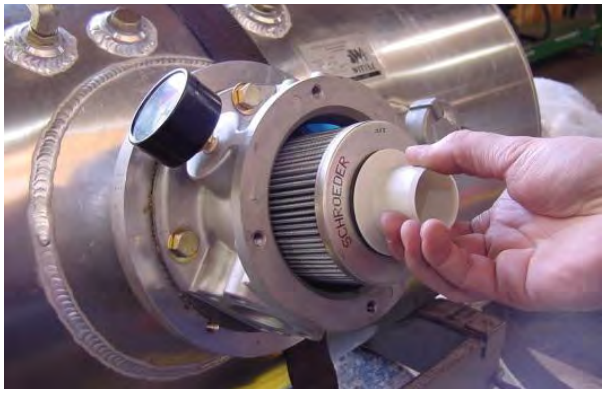
1. Turn off the vehicle. Refer to "Lockout/Tagout Procedure" on page 33.

NOTE: Keep tools, working area and equipment clean. A pan will be required to collect a small amount of oil lost as the elements are removed.

2. Slowly remove the hydraulic tank filler cap. By slowly turning the threaded cap, air pressure will be released gradually.
3. Remove the four (4) cover plate bolts and lift off the plate. Inspect the bypass valve.



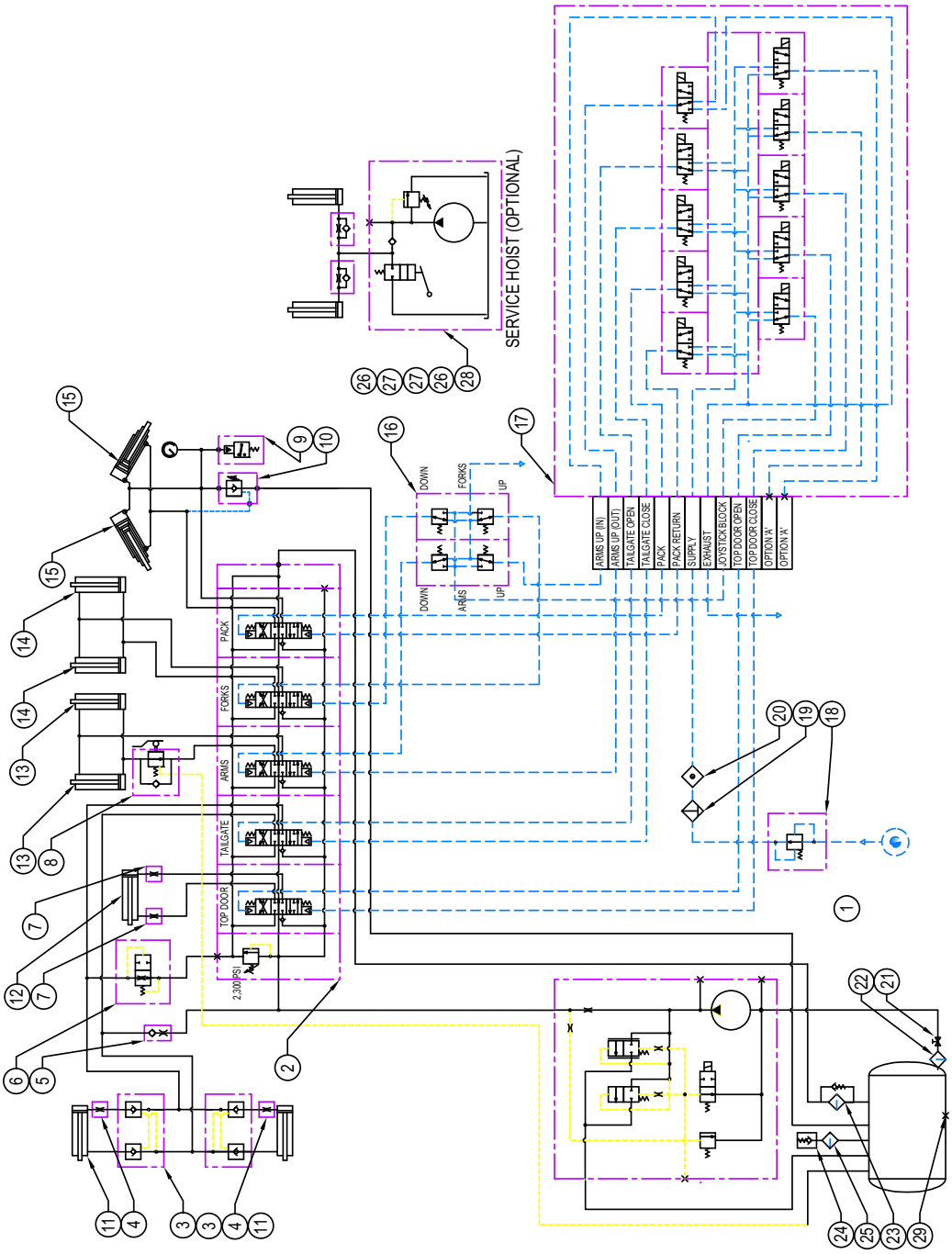
4. Reach inside and remove the two elements.



5. Place the new elements into the housing

6. Moisten the filter housing and cover plate sealing surfaces with oil.
7. Replace the cover plate.
8. Operate the hydraulic system and check for leaks.

Hydraulic Schematic



Commercial Full Eject Front Loader

ITEM NO.	QTY	DESCRIPTION
1	1	GEAR PUMP
2	1	DIRECTIONAL CONTROL VALVE
3	2	DOUBLE PILOT CHECK VALVE
4	2	RESTRICTOR FITTING, 070” ORIFICE
5	1	RESTRICTOR CHECK VALVE
6	1	VELOCITY FUSE
6	2	RESTRICTOR FITTING. XXX ORIFICE
8	1	DECELERATION VALVE
9	1	PRESSURE TRANSDUCER
10	1	PILOT CHECK VALVE
11	2	HYDRAULIC CYLINDER, TAILGATE
12	1	HYDRAULIC CYLINDER, TOP DOOR
13	2	HYDRAULIC CYLINDER, ARM, 4.0” DIA.
	2	HYDRAULIC CYLINDER, ARM, 4.5” DIA.
14	2	HYDRAULIC CYLINDER, FORK
15	2	HYDRAULIC CYLINDER, PACK, MH
	2	HYDRAULIC CYLINDER, PACK, CH
16	1	JOYSTICK, DUAL AXIS, SINGLE HANDLE
	1	JOYSTICK, SINGLE AXIS, DUAL HANDLE
17	1	PNEUMATIC CONTROL VALVE
18	1	PRESSURE PROTECTION VALVE
19	1	PARTICULATE FILTER
20	1	COALESCING FILTER
21	1	INLET STRAINER
22	1	SHUT OFF VALVE
23	1	FILTER, RETURN LINE
24	1	FILTER, BREATHER

ITEM NO.	QTY	DESCRIPTION
25	1	CAP, BREATHER
26	2	HYDRAULIC CYLINDER, SERVICE HOIST
27	2	RESTRICTOR CHECK VALVE
28	1	ELECTRIC PUMP
29	1	DRAIN PLUG, MAGNETIC

Recommended Maintenance Schedule

LUBRICATION						
DESCRIPTION	**PRE-TRIP**	**10 HRS**	**50 HRS**	**100 HRS**	**500 HRS**	**1000 HRS**
LEFT FORK CYLINDER PINS (2)			*			
LEFT ARM PIVOT TUBE (3)			*			
LEFT ARM CYLINDER PINS (2)			*			
LEFT SERVICE HOIST CYLINDER (2) (if equipped)			*			
LEFT TAILGATE LATCH (1)			*			
LEFT TAILGATE ROLLER (1)			*			
LEFT TAILGATE HINGE PINS (1)			*			
LEFT TAILGATE CYLINDER PINS (2)			*			
LEFT BODY HINGE PIN (1)			*			
RIGHT BODY HINGE PIN (1)			*			
RIGHT TAILGATE CYLINDER PINS (2)			*			
RIGHT TAILGATE HINGE PINS (1)			*			
RIGHT TAILGATE ROLLER (1)			*			
RIGHT TAILGATE LATCH (1)			*			
RIGHT SERVICE HOIST CYLINDER PINS (2)			*			
RIGHT ARM CYLINDER PINS (2)			*			
PACK CYLINDER PINS (4)			*			

LUBRICATION						
DESCRIPTION	**PRE-TRIP**	**10 HRS**	**50 HRS**	**100 HRS**	**500 HRS**	**1000 HRS**
RIGHT ARM PIVOT TUBE (3)			*			
RIGHT FORK CYLINDER PINS (2)			*			
SLIDING FORK SLIDE TUBE (if equipped)			*			

MECHANICAL INSPECTION						
DESCRIPTION	**PRE-TRIP**	**10 HRS**	**50 HRS**	**100 HRS**	**500 HRS**	**1000 HRS**
HYDRAULIC TANK GATE VALVE TIED "OPEN"	*	*	*			
HYDRAULIC TANK FLUID LEVEL	*	*	*			
VERIFY SUCTION HOSE IS SECURE AND LEAK FREE	*	*	*			
DRIVELINE SHAFT BOLTS ARE TIGHT			*			
ENSURE PUMP MOUNT BOLTS TIGHT & LOCK WIRE IN PLACE			*			
ENSURE FORK CYLINDER PIN KEEPERS ARE SECURE			*			
INSPECT FORKS FOR CRACKS AND/OR BROKEN WELDS			*			
INSPECT FORK HOSES FOR ABRASIONS		*	*			
INSPECT FORK TUBE "D-RUBBERS" FOR MAJOR WEAR			*			
INSPECT P.S. ARM FOR CRACKS AND/OR BROKEN WELDS			*			
INSPECT P.S. ARM HOSES FOR ABRASIONS		*	*			
ENSURE P.S. ARM CYL. PIN KEEPERS ARE SECURE	*	*	*			
INSPECT P.S. "D-RUBBERS" FOR MAJOR WEAR			*			
INSPECT ACCESS DOOR LADDER FOR SERVICEABILITY			*			

MECHANICAL INSPECTION						
DESCRIPTION	**PRE-TRIP**	**10 HRS**	**50 HRS**	**100 HRS**	**500 HRS**	**1000 HRS**
INSPECT ACCESS DOOR FOR SERVICEABILITY			*			
INSPECT PACKER BLADE CYL, PINS AND PIN KEEPERS			*			
INSPECT PACKER HOSES FOR ABRASIONS		*	*			
INSPECT PACKER CYLINDERS FOR DAMAGE			*			
INSPECT INSIDE HOPPER WALLS AND BLADE FOR CRACKS AND/OR BROKEN WELDS			*			
INSPECT HEADER MESH			*			
INSPECT OUTER P.S. SIDEWALLS AND FENDER FOR CRACKS AND/OR BROKEN WELDS			*			
ENSURE BODY LADDER HARDWARE IN TACT AND TIGHT			*			
INSPECT TOP DOOR CYLINDER PINS	*	*	*			
INSPECT TOP DOOR CYLINDER FOR DAMAGE			*			
INSPECT ROOF/TOP DOOR FOR CRACKS AND/OR BROKEN WELDS			*			
ENSURE PROPER OPERATION OF P.S. TAILGATE LOCKS	*	*	*			
ENSURE P.S. TAILGATE CYL PIN KEEPERS ARE SECURE	*	*	*			
INSPECT P.S. TAILGATE LATCH PIVOT AND ROLLER FOR LUBRICATION, CRACKED AND/OR BROKEN WELD			*			
INSPECT P.S. TAILGATE CYLINDER FOR DAMAGE	*					
INSPECT OVERALL TAILGATE WELDS FOR CRACKS			*			
INSPECT D.S. TAILGATE CYLINDER FOR DAMAGE			*			

MECHANICAL INSPECTION						
DESCRIPTION	**PRE-TRIP**	**10 HRS**	**50 HRS**	**100 HRS**	**500 HRS**	**1000 HRS**
INSPECT D.S. TAILGATE LATCH PIVOT AND ROLLER FOR LUBRICATION, CRACKED AND/OR BROKEN WELD			*			
ENSURE D.S. TAILGATE CYL PIN KEEPERS ARE SECURE	*	*	*			
ENSURE PROPER OPERATION OF D.S. TAILGATE LOCKS	*	*	*			
INSPECT OUTER P.S. SIDWALLS AND FENDER FOR CRACKS AND/OR BROKEN WELDS			*			
INSPECT D.S. "D-RUBBERS" FOR MAJOR WEAR			*			
ENSURE D.S. ARM CYL. PIN KEEPERS ARE SECURE	*	*	*			
INSPECT D.S. ARM HOSES FOR ABRASIONS		*	*			
INSPECT D.S. ARM FOR CRACKS AND/OR BROKEN WELDS			*			
INSPECT ALL WIRING FOR ABRASIONS AND/OR PINCHING EFFECT			*			
IF EQUIPPED WITH SERVICE HOIST AND/OR TIP TO DUMP UNITS MECHANICAL INSPECTION						
DESCRIPTION	**PRE-TRIP**	**10 HRS**	**50 HRS**	**100 HRS**	**500 HRS**	**1000 HRS**
CHECK HYDRAULIC OIL LEVEL OF SERVICE HOIST TANK			*			
CHECK OPERATION OF HOIST			*			
INSPECT HOIST CYL. PIN KEEPERS			*			
INSPECT HOIST CYL. FOR DAMAGE			*			
INSPECT HOIST SAFETY PROPS FOR SERVICEABILITY			*			
ENSURE BODY GUIDE AND SPACER PLATES ARE SECURE AND FREE FROM DEBRIS			*			

IF EQUIPPED WITH SERVICE HOIST AND/OR TIP TO DUMP UNITS MECHANICAL INSPECTION						
DESCRIPTION	**PRE-TRIP**	**10 HRS**	**50 HRS**	**100 HRS**	**500 HRS**	**1000 HRS**
ENSURE ALL IN-CAB COMPONENTS SECURE	*	*	*			
COMPLETE UNIT FUNCTION AND LOCKOUT CHECKS			*			
LEAK CHECKS						
DESCRIPTION	**PRE-TRIP**	**10 HRS**	**50 HRS**	**100 HRS**	**500 HRS**	**1000 HRS**
INSPECT PUMP AND PUMP HOSES				*		
INSPECT FORK CYLINDER, FITTINGS AND HOSES				*		
INSPECT VALVE BANK AND VALVE BANK ATTACHMENTS				*		
INSPECT PACKER CYLINDER FITTINGS AND HOSES				*		
INSPECT HYDRAULIC TANK, RETRUN/ PRESSURE LINES, FILTER HOUSING AND GATE VALVE				*		
INSPECT ARM CYLINDERS, TUBES AND HOSES				*		
INSPECT TAILGATE CYLINDERS, FITTINGS AND HOSES				*		
INSPECT TOP DOOR CYLINDERS, FITTINGS AND HOSES				*		
INSPECT DECK TUBING AND FITTINGS UNDER BODY				*		
LEAK CHECKS - OPTIONAL EQUIPMENT						
DESCRIPTION	**PRE-TRIP**	**10 HRS**	**50 HRS**	**100 HRS**	**500 HRS**	**1000 HRS**
INSPECT SERVICE HOIST TANK				*		
INSPECT SERVICE HOIST CYLS, FITTINGS AND HOSES				*		
INSPECT SLIDING FORK CYLINDER				*		

LEAK CHECKS - OPTIONAL EQUIPMENT						
DESCRIPTION	**PRE-TRIP**	**10 HRS**	**50 HRS**	**100 HRS**	**500 HRS**	**1000 HRS**
INSPECT SLIDING FORK FITTINGS AND HOSES				*		
SAFETY EQUIPMENT INSPECTION						
DESCRIPTION	**PRE-TRIP**	**10 HRS**	**50 HRS**	**100 HRS**	**500 HRS**	**1000 HRS**
INSPECT TAILGATE SAFETY PROPS						*
INSPECT BODY SAFETY PROPS						*
ENSURE BACK-UP ALARM OPERATES WHEN UNIT IN REVERSE, TAILGATE NOT HOME POSITION, AND/OR BODY UP (if equipped with service hoist)	*					
INSPECT FIRE EXTINGUISHER FOR SERVICEABILITY	*					
INSPECT FLARE KIT FOR SERVICEABILITY	*					
INSPECT FIRST AID KIT FOR SERVICEABILITY	*					
CLEANING						
DESCRIPTION	**PRE-TRIP**	**10 HRS**	**50 HRS**	**100 HRS**	**500 HRS**	**1000 HRS**
CLEAN MIRRORS	*					
CLEAN ALL LIGHTS	*					
CLEAN CAMERA AND MONITOR (if equipped)	*					
CLEAN DEBRIS AT TAILGATE SEAL	*					
WASH COMPLETE BODY			*			
CLEAN DEBRIS FROM BEHIND PACKER BLADE			*			
CLEAN VALVE BANK AND HEADER AREA	*	*				
INSPECT SAFETY DECALS	*	*				
CHECK FOR NOTICEABLE HYDRAULIC LEAKS	*	*				

CONSUMABLE ITEMS						
DESCRIPTION	**PRE-TRIP**	**10 HRS**	**50 HRS**	**100 HRS**	**500 HRS**	**1000 HRS**
CLEAN OR REPLACE BREATHER CAP						*
CLEAN OR REPLACE HYDRAULIC OIL						*
CLEAN OR REPLACE SUCTION STRAINER						*
REPLACE RETURN FILTER (AFTER FIRST 50 HOUR CHANGE)						*
CLEAN OR REPLACE MAGNETIC PLUG IN TANK						*

Welding Information

If factory authorized welding repairs are required on your Wittke Retro front loader, please keep in mind that in most cases the material being welded is either high strength, low alloy steel or abrasion resistant steel. Welding materials of this type requires the use of low hydrogen electrodes (EXX18).

Remove all paint at the weld area, and be cautious of hydraulic lines and electrical wiring harnesses.

Caution!

Disconnect all batteries and electronic control modules before attempting any welding repairs to the packer body.

Caution!

The chassis frame rails are heat treated. In no instance is it acceptable to weld on the chassis frame!

Electrical System

The electrical system consists of numerous components connected by generic harnesses. Proximity switches provide safety lockouts and work in conjunction with the operational controls located in the control panel. The electrical control system activates air solenoid valves that in turn provide controlled air pressure to the main hydraulic directional valve. In other words, the system may be described as 'electric over air over hydraulic'.

Major Electrical Components

IQAN MDM Master Control Module

The MDM is the main unit of the central control system. It contains the system's application software. In addition, the MDM contains a visual interface screen that displays text, parameters and other settings. All communication with the control system takes place from the MDM via the CAN-bus network.

labrieplus

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