Hydra-Walk® Pipe Handling System Operations Guide

August, 2009

HAZARD WARNINGS

This section contains warnings about possible hazardous situations around the equipment.

Vertical Lift Cylinders

- Ensure that the top platform is free of personnel, tubulars, and debris.
- Do not extend both vertical-lift cylinders at the same time under any circumstances.

Snubbing Cable

- Ensure that all personnel are in a safe position before you activate the casing shoe and tighten the cable.
- Watch the snubbing cable for slack to prevent the following:
  - Falling through the center receiving groove
  - Tangling in the motor components
  - Wrapping around the casing shoe
- Position yourself so that you have a clear view of the operation.
- If there is any issue, stop the process and communicate.
- With larger, heavier casing and drill collars, the snubbing cable helps you pull them from the rig floor to the receiving groove on the Hydra-Walk. Always use the snubbing cable in these situations.

About this Book

Preface

This operations guide contains the following information for the Hydra-Walk® pipe handling system:

- Components
- Operating instructions
- Maintenance instructions
- Troubleshooting information

Intended Audience

This document is intended for the person who is new to the Hydra-Walk.

Document Conventions

As you use this book, the following conventions are used to indicate different types of information:

Text in red indicates information that is crucial to the operation of the Hydra-Walk.

- Choices for an action that you can take next or lists of information are indicated by a bulleted list.

❶ Tasks which consist of a single step are indicated by a single bullet, which denotes this step.

The following conventions are used to display notes and warnings in this book:

Note

A note displays useful information about the operation of the Hydra-Walk. A note does not provide warning information.

WARNING

A warning displays information and procedures that, if not followed, could result in injury to person or damage or destruction to equipment. If you do not follow the instructions in the warning, you will create a hazardous situation.

Table of Contents

CHAPTER

1

INTRODUCTION AND SYSTEM DETAILS

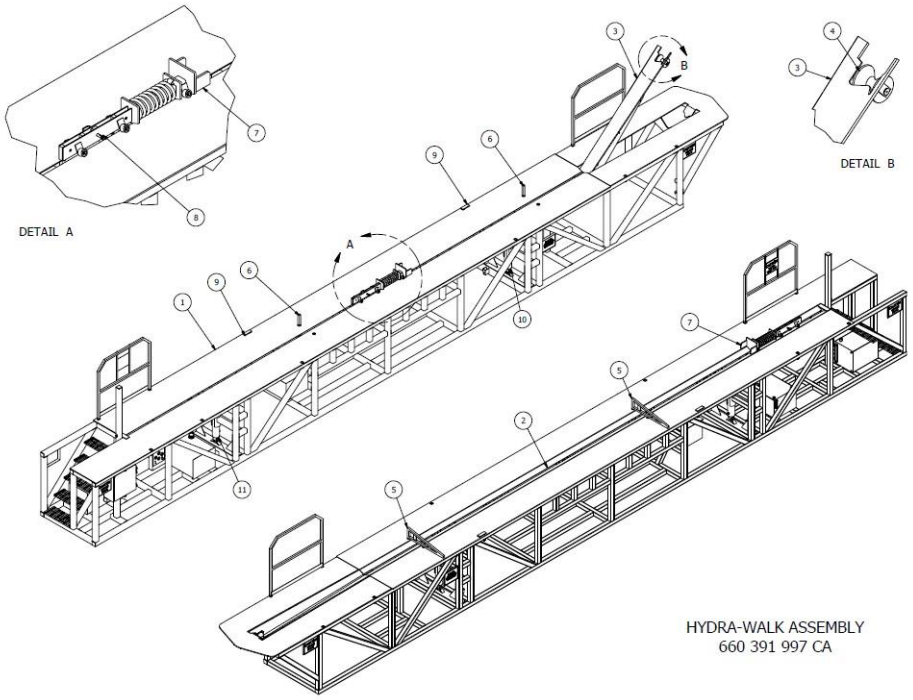
This chapter provides information about the Hydra-Walk® pipe handling system and a list of the components and parts in the Hydra-Walk unit. The tables and diagrams that are included contain part numbers, descriptions, and quantities.

About Hydra-Walk

Hydra-Walk is a patented system that automates the pickup and laydown of tubulars and casing. The automated process increases wellsite safety, job quality, and efficiency. Hydra-Walk was developed because of the inherent risk associated with tubular handling. Safety concerns such as crushed and pinned fingers, slips, falls, and back injuries are reduced by using the Hydra-Walk.

Figure 1.1 on page 2 shows a drawing of the Hydra-Walk.

Figure 1.1 Hydra-Walk



The Hydra-Walk is more safe than manual handling:

- You, the Hydra-Walk operator, can control the system with the remote control. If necessary, you can use the manual controls in the hydraulic valve box.
- The front and rear vertical lifts ensure a safe transition from the racks to the Hydra-Walk, and the bump pins prevent overshot to the center receiving groove.
- The safety steps at the rear of the unit allow easy access when the Hydra-Walk is used as a conventional catwalk.
- The automated and consistent function of the Hydra-Walk decreases the amount of incidents and downtime.

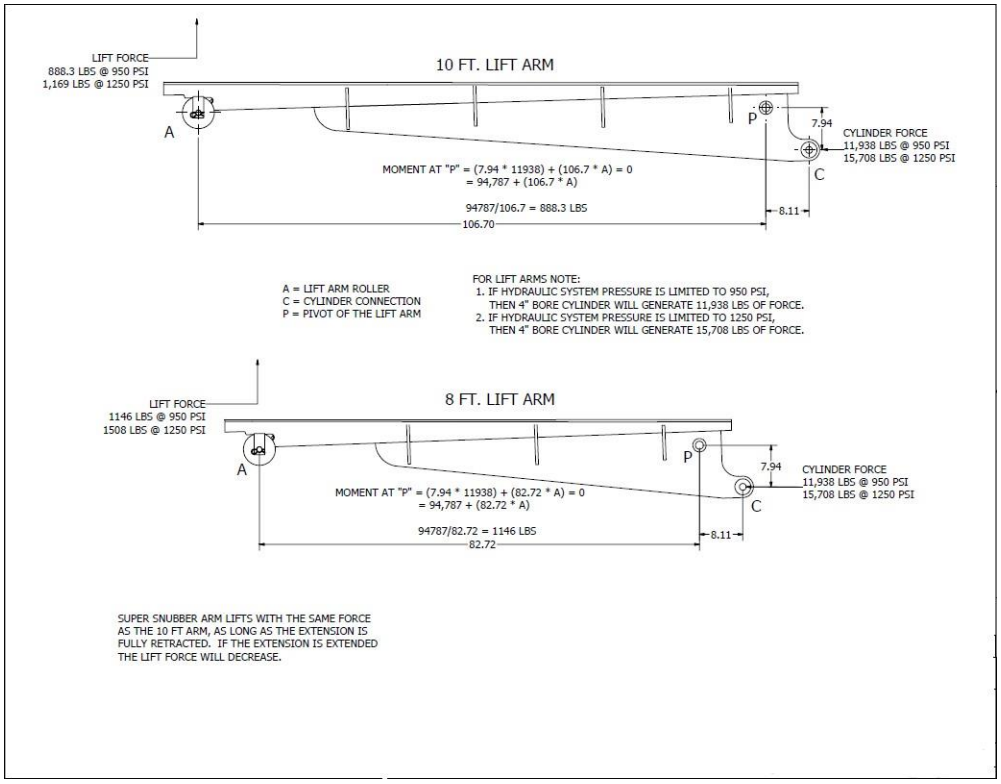
The Hydra-Walk is more efficient than manual handling:

- You can pick up or lay down tubulars with a maximum outside diameter of 7⅝ inches and maximum length of 47 feet meters. The maximum lifting capacity of the Hydra-Walk is 1,500 pounds. Table 1.1 and Figure 1.2 on page 3 show the rating information for the Hydra-Walk.

Table 1.1 Lifting Arm Ratings

Arm Length	Pressure	Cylinder Force	Lift Force
8 feet	950 psi	11,938 lbs	1146 lbs
	1250 psi	15,708 lbs	1508 lbs
10 feet	950 psi	11,938 lbs	888.3 lbs
	1250 psi	15,708 lbs	1169 lbs

Figure 1.2 Rating Information



- The rack is 52 inches tall and 30.5 feet long with 2⅞-inch J-55 tubing. Each rack has a certified capacity of 115,000 pounds when placed on an adequate foundation.
- An energy-absorbing trolley running along the center receiving groove provides better tubular control without a cable.
- The Hydra-Walk can handle chrome, stainless steel, and other premium-grade tubulars without damaging the tubulars.
- When the system is not handling tubulars, it can function as a conventional catwalk.
- You can use the Hydra-Walk on well-service rigs and some drilling rigs.
- Hydraulic height adjusters ensure a smooth transition of tubulars from the racks to the Hydra-Walk.
- Easy operation ensures a minimal on-the-job learning curve.
- Portability and size allow easy handling by forklift and positioning in small spaces or wellsites.
- Easy set-up that takes approximately 15 minutes.

The Hydra-Walk is designed with safety in mind first and foremost. It is also designed to be user friendly for the rig crew. With the guidelines set forth in this operations guide, you as an operator can achieve a safe and user-friendly environment. This improves the process of picking up and laying down tubulars and increases the overall productivity for the customer.

Configurations

There are three configurations for the Hydra-Walk that accommodate multiple rig-floor heights:

- The **Standard Hydra-Walk** unit can reach rig floors up to 15 feet.
- The **Long Arm Hydra-Walk** unit can reach rig floors up to 20 feet.
- The **Hydra-Walk System SS** unit can reach rig floors up to 28 feet when utilizing snubbing units or other specialty equipment.

Specifications

This section provides the specifications for the engine.

Table 1.2 Engine Specifications

Feature	Specification
Manufacturer	Kubota
Model	D-722
Horsepower	20 hp
Fuel	Diesel
Oil Type	Mystic 15-50 or compatible oil
Capacity	3¾ quarts

Standard Equipment

The diagrams on the following pages show the Hydra-Walk and point out its components, which are listed in Table 1.3.

Table 1.3 Hydra-Walk Components

Number	Component
1	Hydra-Walk Assembly
2	Center Receiving Groove
3	Front Lifting Arm
4	Lifting Arm Roller
5	Laydown Arms
6	Bump-Stop Pins
7	Energy Absorbing Trolley
8	Trolley Adjusting Pin
9	Floor Extension
10	Front Vertical Lifting Cylinder
11	Rear Vertical Lifting Cylinder

Figure 1.3 shows the Hydra-Walk with its laydown arms installed, and Figure 1.4 shows the Hydra-Walk with the bump pins installed.

Figure 1.3 Hydra-Walk with Laydown Arms Installed

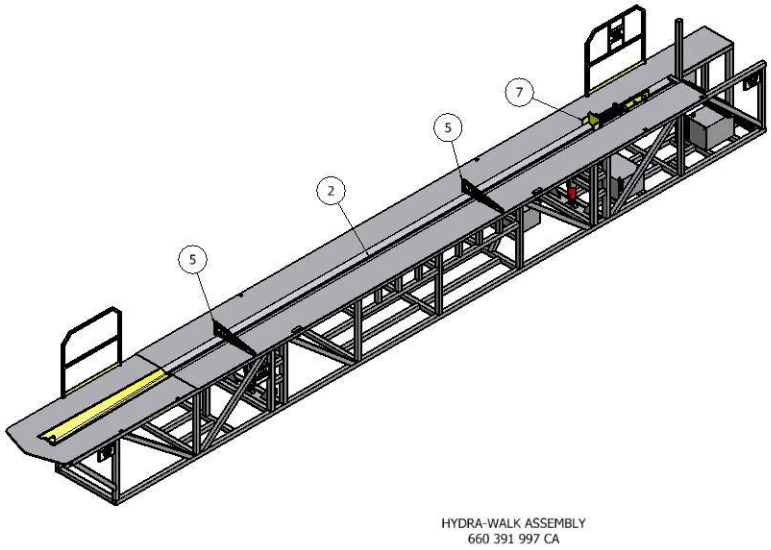
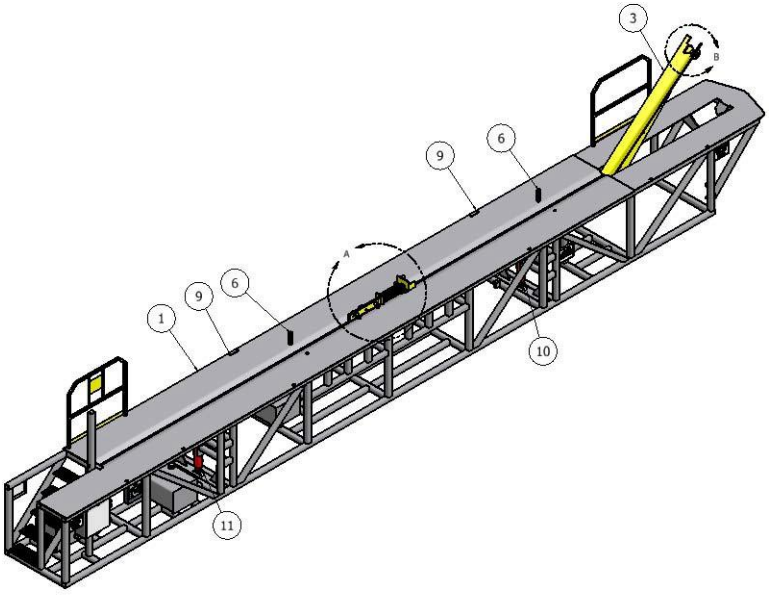


Figure 1.4 Hydra-Walk with Bump Pins Installed



Figures 1.5 and 1.6 show enlarged diagrams of the energy-absorbing trolley and the lifting arm and roller, which are highlighted in Figure 1.4 on page 5.

Figure 1.5 Energy-Absorbing Trolley

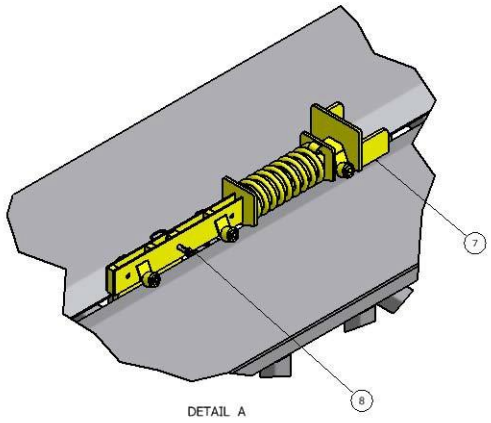
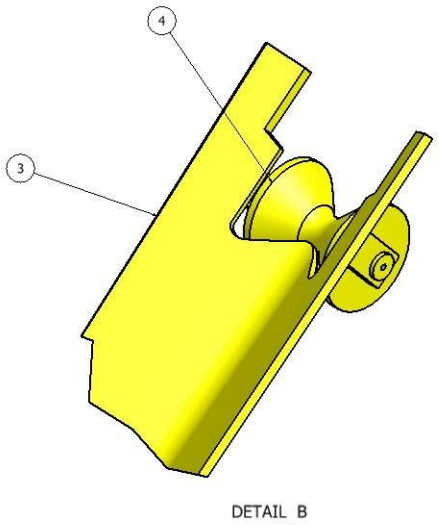


Figure 1.6 Roller Assembly on the Lifting Arm



Engine

The engine, shown in Figure 1.7, is a Kubota D-722. Table 1.4 provides a list of the engine parts called out in Figure 1.7.

Figure 1.7 Engine Details

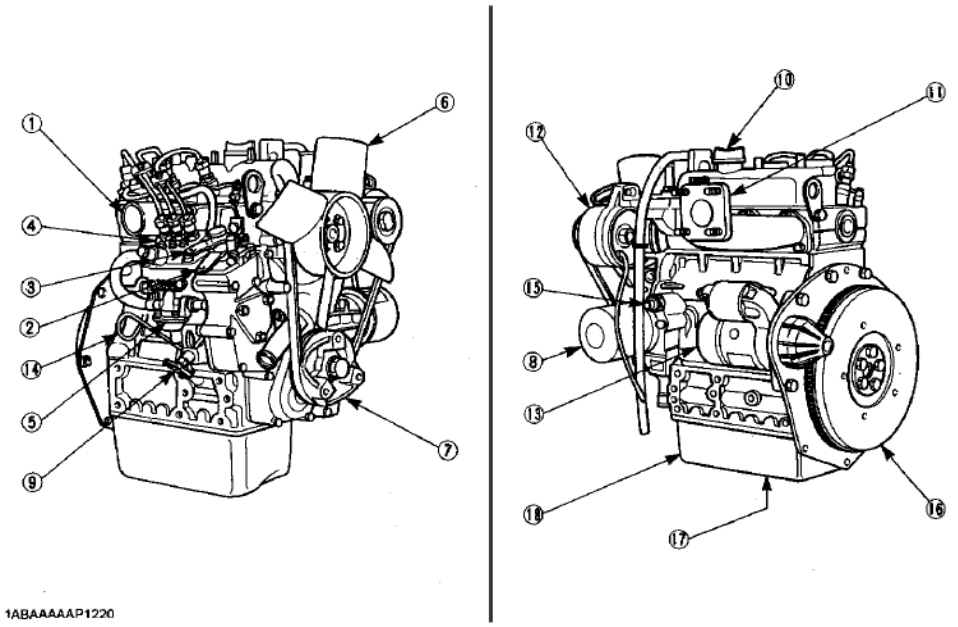


Table 1.4 Engine Parts

Number	Part
1	Intake manifold
2	Speed control lever
3	Engine stop lever
4	Injection pump
5	Fuel feed pump
6	Cooling fan
7	Fan drive pulley
8	Oil filter cartridge
9	Water drain cock
10	Oil filler plug
11	Exhaust manifold
12	Alternator
13	Starter
14	Oil level gauge
15	Oil pressure switch
16	Flywheel
17	Oil drain plug
18	Oil pan

Use the following oil and parts with the engine:

- Engine Oil: Mystic 15-50
- Capacity: 3¾ Quarts
- Oil Filter: WIX 51334
- Fuel Filters: 2 Filters WIX 33389 and 33003
- Air Filter: Kubota 1G659-11222
- Hydraulic Filter: WIX 51759
- Fuel Tank Capacity: 22 Gallons

Hydraulic System

Use the following oil and parts with the hydraulic system:

- Hydraulic Oil: Dextron III / Mercron
- Capacity: 33 gallons
- Pump: Prince

Specialty Equipment

- Front platform for running casing
- Casing shoe
- Snubbing cable
- Snubbing cable snatch blocks
- Padded pickup and laydown arms for specialty tubulars

CHAPTER

2

OPERATIONAL INSTRUCTIONS

This chapter provides the processes, tasks, and steps necessary to set-up and operate the Hydra-Walk.

As the Hydra-Walk operator, you are on location to ensure that the Hydra-Walk is handled properly and positioned correctly.

The sections that follow provide more detail about tubing jobs and casing jobs and the processes and tasks associated with each type of job.

Tubing Jobs

Complete the following process when you arrive at the job site:

1. Find the company representative, rig pusher, or rig operator and discuss the job.
2. Determine if you are picking up or laying down the tubulars.
3. Determine the position of the Hydra-Walk.
4. Set up the Hydra-Walk and the racks (page 10).
5. Check the lubrication points and perform daily maintenance (page 10).
6. Start the Hydra-Walk (page 12).
7. Pick up tubulars (page 14) OR Lay down tubulars (page 15).

Unloading and Setting Up the Hydra-Walk and Racks

After you receive your orders, discuss the orders with the forklift operator and then complete the following steps:

Step 1 Ensure that the area is clear of obstacles, debris, and overhead power lines.

WARNING
Ensure that you have an adequate foundation.

Step 2 With the forklift operator, discuss the proper placement of the forks in the forklift cage, located at the center of the Hydra-Walk.

Step 3 Go to the wellbore and measure 6½ to 7 feet out from the center. Set the leading edge of the Hydra-Walk at this point.

Step 4 Move to the rear of the Hydra-Walk and line up the center receiving groove with the center of the well bore.

Step 5 Square up the Hydra-Walk with the rig floor.

Step 6 Depending on the job situation, install bump pins or laydown arms.

Step 7 Set the racks, keeping them as level as possible by using proper blocking material.

Step 8 If multiple sets of racks are used, overlap the top rail of the tubular racks 2 to 3 inches.

Step 9 Install safety pins on the rear set of racks.

Step 10 Where the front set of racks meets the Hydra-Walk, keep 1 inch of clearance between the racks and the Hydra-Walk.

Step 11 Back your truck up to the rig floor and pick up the v-block using the hydraulic winch on the rig.

Step 12 Position the v-block on the edge of the rig floor lined up with the center of the wellbore and the center receiving groove on the Hydra-Walk.

Step 13 Secure the v-block to the rig floor.

Checking Lubrication Points, Fluids, and Filters

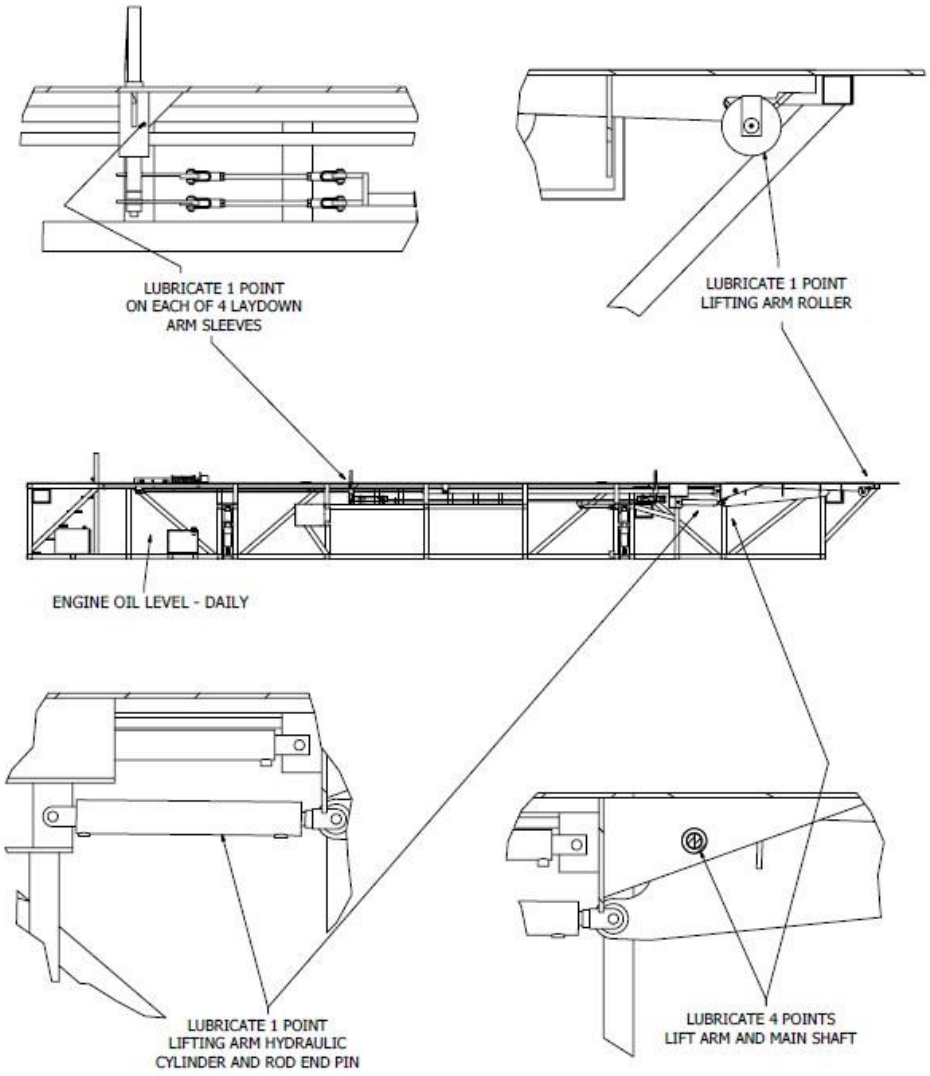
When you use the Hydra-Walk, you must perform the following activities at the time intervals specified:

- Check the engine oil level and coolant level daily.
- Lubricate 4 points on the lifting arm and main shaft every 4 hours.
- Lubricate 1 point on the lifting arm roller every 4 hours.
- Lubricate 1 point on the lifting arm hydraulic cylinder and rod-end pin every 4 hours.

- Lubricate 1 point on each of the 4 laydown arm sleeves every 4 hours when you are laying down.
- Lubricate all linkage pins daily.

Figure 2.1 shows the lubrication points.

Figure 2.1 Lubrication Points

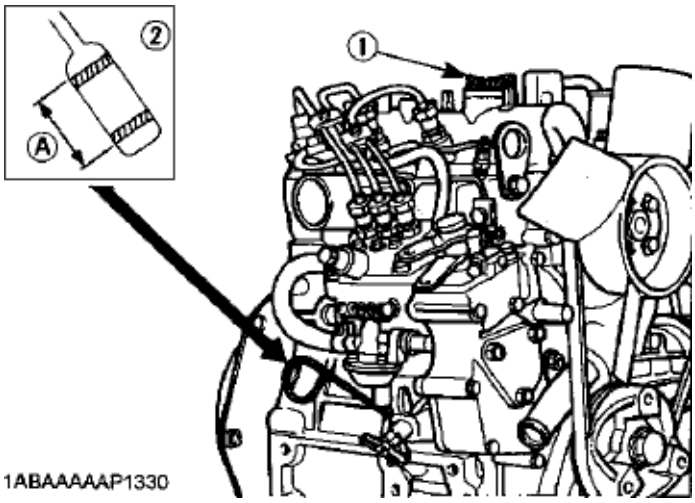


To check the engine oil level

Check the engine oil level before you start the engine and after the engine has been stopped for at least 5 minutes.

Step 1 Remove the oil level gauge, which is shown in Figure 2.2 as **2**.

Figure 2.2 Oil Level Gauge and Range



Step 2 Wipe the oil off of the oil level gauge and replace it in the engine.

Step 3 Remove the oil level gauge and check the oil level. The proper oil level range is shown in Figure 2.2 as **A**.

Starting the Hydra-Walk

To start the Hydra-Walk, complete the following steps:

Step 1 Remove the electrical control cord from your toolbox and lay it out on the ground. Examine the cord for kinks and loops and ensure that it is in a relaxed position.

Step 2 Take one end of the electrical control cord, move it to the main hydraulic valve box, and remove the protective covers from the electrical control cord and the main hydraulic valve box.

Step 3 Ensure that the electrical control cord and the main hydraulic valve box ends are free of all debris.

Note
Use electrical contact cleaner if you need to clean these components. Do not use an oil-based cleaner.

Step 4 Plug the electrical control cord in to the main hydraulic valve box and control box by lining up the receiving groove and tightening the retainer nut.

WARNING

If there is any resistance when performing this task, stop, ensure there is proper alignment, and check for debris.

Step 5 Repeat steps 1 through 4 on the control box with the opposite end of the electrical control cord.

The control box is ready to work when you see the red light come on.

Step 6 Open the hydraulic bypass valve, as shown below.

Step 7 Turn the ignition key counter clockwise to pre-heat the engine, which is complete when the red light on the ignition panel goes out.

Step 8 Press and hold the safety over-ride button.

Step 9 While continuing to hold the safety over-ride button, turn the ignition key clockwise to start the engine.

Step 10 Release the safety over-ride button when the oil pressure builds according to the gauge.

Step 11 While the engine continues to warm up, circulate the hydraulic fluid for approximately 10 minutes.

Step 12 Close the hydraulic bypass valve.

Picking Up Tubing

After the Hydra-Walk and racks are set up as outlined in "Unloading and Setting Up the Hydra-Walk and Racks" on page 10, perform the following steps:

Notes

It is your responsibility as the operator to ensure that the tubulars are placed on the racks properly.

Ensure that the pin end of the tubing is in front of the energy-absorbing-trolley leading edge as the forklift brings the tubing to the racks. This ensures that the tubing will always clear the energy-absorbing trolley safely during the transition from the rack to the center receiving groove.

When working with multiple layers of tubing, place 2 x 4 stripping between each layer. The first 2 x 4 should *not* extend beyond the end of the racks or over the top platform of the Hydra-Walk.

Step 1 Move the energy-absorbing trolley until it is 12 to 18 inches from the end of the center receiving grove.

Step 2 After all of the tubing is unloaded, use the vertical lift control to bring the top platform of the Hydra-Walk to the top layer of the tubing.

WARNING

Do not extend both vertical lift cylinders at the same time under any circumstances.

Notes

Always use the proper blocking material and completely collapse the vertical lift cylinder before moving to the next vertical lift control.

If there is a small gap between the Hydra-Walk and the racks after properly blocking at the desired level, use floor extensions to bridge the gap.

Step 3 Position yourself and the control box at a point where you have an unobstructed view of the rig floor, the rig operator, and the top platform of the Hydra-Walk.

Step 4 The derrick man rolls the first joint on the top layer to the center receiving groove.

Note

The derrick man usually works the racks standing at the collar-end of the tubing, on the ground.

Step 5 Activate the lifting arm control and raise the tubular to the desired height.

Step 6 Activate the energy-absorbing trolley and push the tubular to the wellbore.

Step 7 Lower the lifting arm, letting the tubular rest in the v-block.

Step 8 Extend the energy-absorbing trolley beyond the pin end of the tubing on the rack and continue rolling tubulars until the layer is completed.

Step 9 To accommodate the next layer of tubulars, complete the following steps. Otherwise, skip to step 10.

a One end at a time, raise the Hydra-Walk with the vertical lift control.

b Move the blocking to the desired height of the next layer.

Note

You must use the appropriate thickness of blocking material to ensure a smooth transition from the racks to the Hydra-Walk.

Step 10 Repeat steps 6 through 9 until all layers are complete.

Finishing the Job

Perform the following steps when you comlete the job or leave the site for the day.

Step 1 Idle the engine down.

Step 2 Pick up and store all 2 x 4 stripping in the end of the racks.

Step 3 Remove the v-block from the rig floor.

Step 4 Remove the support blocking from underneath the Hydra-Walk and collapse all of the cylinders.

Step 5 Open the bypass valve for the cool-off period of 5 to 10 minutes.

Step 6 Unscrew the retainer nut on both ends of the electrical control cord.

Step 7 Replace the protective cover caps on the electrical control cord, control box, and the main hydraulic valve box.

Step 8 Roll up the electrical control cord and place it in your toolbox with the control box.

Step 9 Turn the ignition key to the *Off* position.

Laying Down Tubing

Complete the steps in “Unloading and Setting Up the Hydra-Walk and Racks” on page 10 and then perform the following steps.

Step 1 Remove the bump pins and place them back in the toolbox.

Step 2 If necessary, collapse the small cylinder beneath the Hydra-Walk and install the laydown arms so that they are pointing to the lifting arm end of the Hydra-Walk.

Step 3 Using the vertical lift control, raise the Hydra-Walk above the racks 3 to 4 inches and block properly.

WARNING
Do not extend both vertical lift cylinders at the same time under any circumstances.

The rig pulls the first joint of tubing, engages the tongs, and unscrews the tubing.

Step 4 Install the thread protector, push the pin end of the tubing off the edge of the rig floor, and lower it to the center receiving groove.

Step 5 As the rig blocks are lowered and the tubular is over the v-block, unlatch the elevators.

The elevators move back to the tubular, and the rig pulls the next joint of tubing.

Step 6 When personnel and equipment are clear, activate the lifting arm.

The tubing slides down the center receiving groove and stops at the energy absorbing trolley.

Step 7 Raise the lifting arm high enough so that the lay-down arms can be activated underneath the tubing.

Step 8 Lower the lifting arm.

The tubing rolls off of the lay-down arms onto the tubular rack.

Step 9 Activate the laydown arms to the open position for the next joint of tubing.

Note
When you have a full layer of tubing, place 2 x 4 stripping over the tubing. Always place the stripping directly over the tubular racks to ensure proper support for each layer without damaging the tubing.

Step 10 Raise the Hydra-Walk 3 to 4 inches above the layer of tubulars and block properly.

WARNING
Do not extend both vertical lift cylinders at the same time under any circumstances.

Finishing the Job

Step 1 Idle the engine down.

Step 2 Remove the laydown arms when the job is complete, and put them in the storage position.

Step 3 Pick up and store all 2 x 4 stripping in the end of the tubular racks.

Step 4 Remove the v-block from the rig floor.

Step 5 Remove the support blocking from underneath the Hydra-Walk.

Step 6 Collapse all of the cylinders.

Step 7 Open the bypass valve for the cool-off period of 5 to 10 minutes.

Step 8 Unscrew the retainer nut on both ends of the electrical control cord.

Step 9 Replace the protective cover caps on the electrical control cord, control box, and the main hydraulic valve box.

Step 10 Roll up the electrical control cord and place it in your toolbox with the control box.

Step 11 Turn the ignition key to the *Off* position. Check with the company representative to ensure that your job is complete.

Casing Jobs

Complete the following process for a casing job:

1. Prepare the Hydra-Walk for the casing job (page 17).
2. At the job, find the company representative, rig pusher, or rig operator and discuss the job.
3. Determine if you are picking up or laying down the casing.
4. Determine in which direction the racks and the Hydra-Walk should be set up.
5. Unload and set up the Hydra-Walk and the racks for picking up (page 19) OR Unload and set up for laying down (page 21).
6. Check the lubrication points and perform daily maintenance (page 10).
7. Start the Hydra-Walk (page 12).
8. Place the casing on the racks.

Job Preparation

Before the Hydra-Walk leaves the yard, complete the following steps for casing between 4½ and 7⅝ inches.

Step 1 Collapse the long cylinder and then extend it again 18 to 20 inches.

Step 2 Turn the ignition key to the *Off* position.

Step 3 Open the hydraulic bypass valve, releasing any stored energy.

Step 4 Underneath the top platform and in the middle (directly beneath the center receiving groove), remove the two 1-inch pins from the clevis on the rod end of the long cylinder.

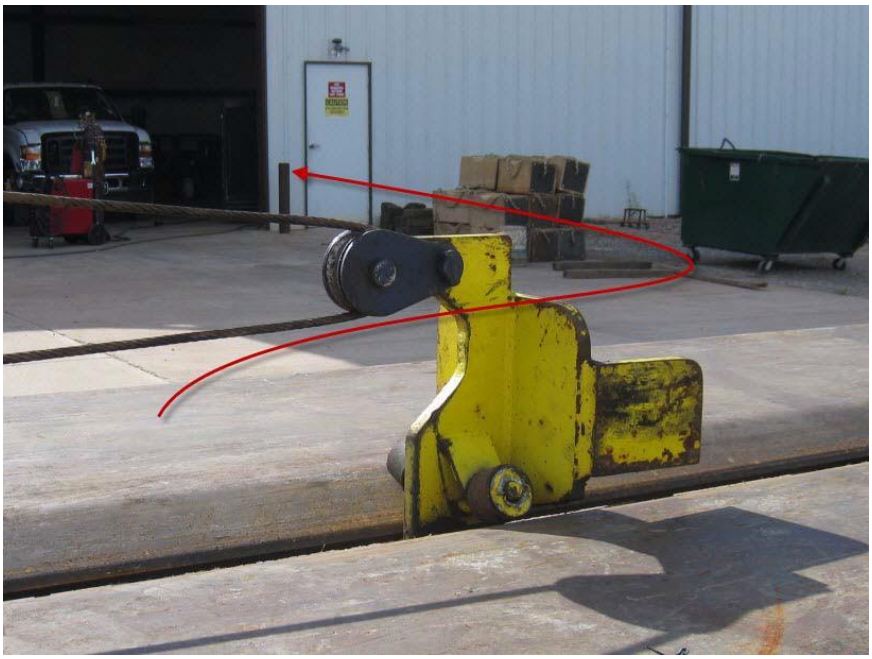
Step 5 Move to the top platform and lift and remove the energy-absorbing trolley.

Step 6 Lower and position the casing shoe on the clevis end of the long cylinder and re-install the two 1-inch pins.

Step 7 Stretch the snubbing cable out until it is in a relaxed position.

Step 8 Lower the end of the cable with the factory loop over the snubbing post (at the top of the steps) and position it in the clevis and re-install the clevis pin, as shown below.

Step 9 Take the live end of the snubbing cable forward to the rear of the casing shoe and feed the snubbing cable up through the bottom of the snatch block, as shown below.



Step 10 Take the live end of the snubbing cable back to the snubbing post and feed the snubbing cable up through the snatch block located on the snubbing post

When the snubbing cable is properly installed, it forms a "Z" shape starting at the snubbing post, as shown below. The Hydra-Walk is now ready to be loaded and taken to the job site.

Unloading and Setting Up for Picking Up Casing

After you receive your orders, discuss the orders with the forklift operator and then complete the following steps:

Step 1 Ensure that the area is clear of obstacles, debris, and overhead power lines.

WARNING
Ensure that you have an adequate foundation.

Step 2 With the forklift operator, discuss the proper placement of the forks in the forklift cage, located at the center of the Hydra-Walk.

Step 3 Determine the appropriate stand-off measurement for the casing:

Note
Most casing is 40 to 47 feet long.

a Extend the casing shoe to the rear of the Hydra-Walk and then retract it approximately 10 inches.

b Have the forklift operator put one joint of casing in the center receiving groove and slide the casing back against the casing shoe.

You can see how much casing is sticking out in front of the lifting arm.

c Have the forklift operator pick up the Hydra-Walk, with the one joint of casing, and position it to the center of the wellbore.

d Ensure that the collar of the casing is back from the rig floor 6 to 10 inches.

Step 4 Square the Hydra-Walk with the rig and set it.

Step 5 Set the first rack back from the leading edge of the Hydra-Walk 24 inches. Set the second rack 4 to 5 feet forward of the snubbing post. If multiple sets of racks are used, overlap the top rails of the racks 2 to 3 inches. Install safety pins on the rear set of racks.

Step 6 Unload all of the casing following the instructions for stripping and unloading casing.

Note
When working with multiple layers of casing, place 2 x 4 stripping between each layer. The first 2 x 4 should *not* extend beyond the end of the racks or over the top platform of the Hydra-Walk.

Step 7 Have the forklift operator pick up the front platform for running casing and set it in the gap between the leading edge of the Hydra-Walk and the rig floor.

Step 8 Install the bump pins.

Step 9 Where the front set of racks meets the Hydra-Walk, allow 1 inch of clearance between the racks and the Hydra-Walk.

Step 10 Back your truck up to the rig floor and pick up the v-block using the hydraulic winch on the rig.

Step 11 Position the v-block on the edge of the rig floor, lined up with the center of the wellbore and the center receiving groove on the Hydra-Walk.

Step 12 Secure the v-block to the rig floor.

Check the lubrication points. See “Checking Lubrication Points, Fluids, and Filters” on page 10.

Start the Hydra-Walk. See “Starting the Hydra-Walk” on page 12.

Unloading and Setting Up for Laying Down Casing

When laying down casing, you might not have a joint of casing for a measuring tool. The Hydra-Walk, with the casing shoe installed, has 41 feet of surface from the leading edge of the Hydra-Walk to the leading edge of the fully-extended casing shoe. Most casing is no longer than 47 feet. You should be able to judge at what point the collar would be away from the edge of the rig floor 6 to 12 inches.

Step 1 Ensure that the area is free of obstacles, debris, and overhead power lines.

Step 2 Determine at what point the collar is away from the edge of the rig floor 6 to 12 inches. Measure from this point 47 feet back and mark the ground.

Step 3 Extend the casing shoe on the Hydra-Walk and run it back to the snubbing post.

Step 4 When you have the forklift operator set the Hydra-Walk, align the leading edge of the casing shoe with the mark you made on the ground.

Step 5 Align the center receiving groove with the center of the wellbore and square with the rig. Set down the Hydra-Walk.

Step 6 Move back from the leading edge of the Hydra-Walk 24 inches and set the first rack, keeping 1 inch of clearance between the racks and the Hydra-Walk.

Step 7 For the next rack move forward from the snubbing post 4 to 5 feet and set the rack, keeping 1 inch of clearance between the racks and the Hydra-Walk.

Step 8 Install safety pins on the rear set of racks.

Step 9 Have the forklift operator pick up the front platform for laying down casing and set it in the gap between the leading edge of the Hydra-Walk and the rig floor.

Step 10 Install the laydown arms.

Step 11 Back your truck up to the rig floor and pick up the v-block using the hydraulic winch on the rig.

Step 12 Position the v-block on the edge of the rig floor lined up with the center of the wellbore and the center receiving groove on the Hydra-Walk.

Step 13 Secure the v-block to the rig floor.

Check the lubrication points. See “Checking Lubrication Points, Fluids, and Filters” on page 10.

Start the Hydra-Walk. See “Starting the Hydra-Walk” on page 12.

Snubbing Cable

Using the Snubbing Cable to Pick Up Casing

When using the snubbing cable to pick up casing, the casing is rolled to the center receiving groove and lays flat. You must activate the lifting arm to get clearance under the casing.

WARNING

Because you are using a mechanical means to support the casing, you are creating a pinch/crush point. At no time should your hands or any body part be placed underneath the casing.

Step 1 From the pin-end of the casing, wrap the snubbing cable around the casing 5 to 6 feet up from the pin end.

Step 2 Activate the casing shoe and push the joint to the rig floor and then set it on the v-block.

The casing is ready to be latched on to by the elevators.

Step 3 As the operator of the rig picks up casing, continue to move the casing shoe forward to take up the slack in the snubbing cable.

WARNINGS

Ensure that all personnel are in a safe position.

The Hydra-Walk operator must be observant as the cable gets tight. Watch for the following:

- Snubbing cable falling through the center receiving groove
- Snubbing cable tangled in the motor components
- Snubbing cable wrapped around the casing shoe

Step 4 Activate the casing shoe to the rear.

The snubbing cable lets the joint ease forward to the wellbore as you run the casing shoe back.

Step 5 Remove the cable and repeat steps 1 through 4.

Using the Snubbing Cable to Lay Down Casing

When laying down casing, the previous task is reversed. The casing shoe is in a fully extended position, giving the snubbing cable the most reach to the rig floor.

After the casing has been unscrewed:

Step 1 Wrap the snubbing cable 5 to 6 feetabove the pin end.

Step 2 Install the thread protector.

Step 3 Activate the casing shoe.

As the shoe runs forward it will pull the casing from the rig floor back to the Hydra-Walk, and the rig operator will let the casing down to the center receiving groove.

Step 4 Continue moving casing back on to the Hydra-Walk until it begins to move without assistance from the snubbing cable.

Step 5 Remove the cable when the casing is unlatched on the v-block.

Step 6 Activate the lifting arm.

Note
Always have the casing shoe run up against the casing to ensure total control of the casing.

Step 7 Extend the casing shoe.

Step 8 Raise the lifting arm to ensure clearance for the laydown arms under the casing.

Step 9 Lower the lifting arms so that the casing rolls on to the racks.

Step 10 Move the joystick control to the **Open** position.

You are ready for the next joint of casing.

Step 11 Repeat steps 1 through 10 until all of the casing is laid down.

Handling Chrome or Premium Tubing

When you use chrome or premium tubing (for example, stainless steel), some steps will change; however, unloading and set up remain the same.

Complete the following steps before you handle any tubulars.

Step 1 When you set the racks, attach 2 x 4 stripping to the top rail of the racks, securing it with duct tape for the *total* length of the racks.

Step 2 Replace the lifting-arm roller with the hard plastic roller.

Step 3 Pad the top edge of the laydown arms with padding material secured with duct tape.

CHAPTER

3

MAINTENANCE AND SERVICE INSTRUCTIONS

This chapter provides a list of the routine maintenance that must be performed on the Hydra-Walk and the tasks that explain how the maintenance is performed.

Perform the following activities on a regularly-scheduled basis:

Interval	Activity	Page
100 hours	Change engine oil	page 26
100 hours	Change oil filter cartridge	page 27
100 hours	Change fuel filters	page 28
300 hours	Change air filters	page 29
500 hours	Change hydraulic filter	page 30

When you perform maintenance, always turn off the engine and remove the key from the ignition.

Changing the Engine Oil

Use the following steps to replace the engine oil, which should be changed after the initial 50 hours and then every 100 hours after.

WARNINGS

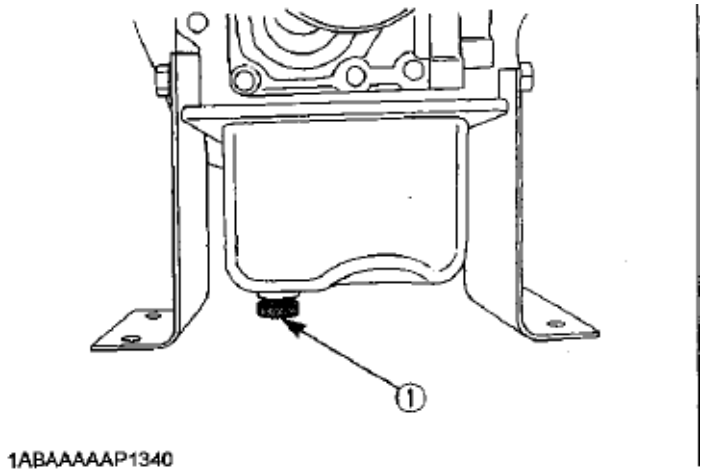
Turn off the engine and remove the key from the ignition before changing the engine oil.

Allow the engine to cool. The engine oil may be hot and cause burns.

Place a container under the engine when you drain the oil. Dispose of the waste oil properly per your state regulations.

Step 1 Remove the drain plug, shown in Figure 3.1 as **1**.

Figure 3.1 Engine Oil Drain Plug



Step 2 Drain the old oil while the engine is still warm so that the oil drains easily.

Step 3 Replace the drain plug when the old oil finishes draining.

Step 4 Remove the oil filler plug and add new engine oil. Fill the reservoir to the maximum amount indicated on the oil level gauge. For more information about checking the oil, see “To check the engine oil level” on page 12.

Replacing the Oil Filter Cartridge

Use the following steps to replace the oil filter, which should be replaced after the initial 50 hours of use and then every 100 hours after.

WARNINGS

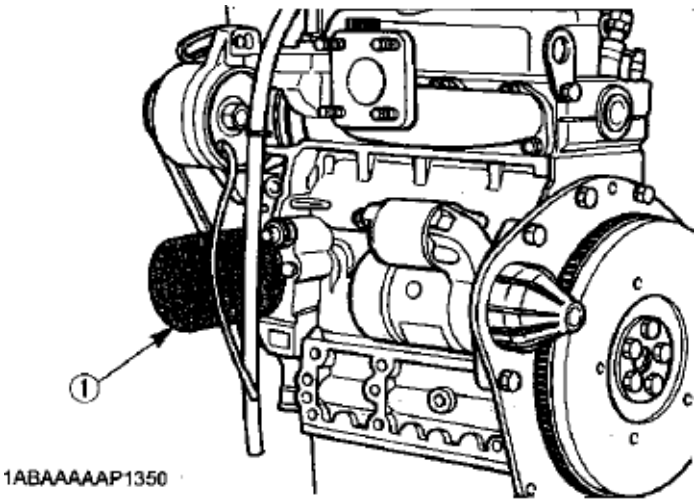
Turn off the engine and remove the key from the ignition before changing the oil filter cartridge.

Allow the engine to cool. The engine oil may be hot and cause burns.

Dispose of the spent oil filter cartridge properly per your state regulations.

Step 1 Using a filter wrench, remove the oil filter cartridge, which is shown in Figure 3.2 as **1**.

Figure 3.2 Oil Filter Cartridge



Step 2 Apply a film of oil to the gasket on the new filter cartridge.

Step 3 Insert the new filter cartridge and tighten it *by hand*. Do not use a wrench to tighten the new filter cartridge.

Step 4 Start the engine and allow it to run for several minutes. Check for oil leaks around the seal.

Note

Wipe off the surface of the engine and filter cartridge completely before starting the engine.

Step 5 Turn off the engine and let it rest for 30 seconds. Check the engine oil level. Add more oil if necessary.

Changing the Fuel Filters

Use the following steps to replace the primary (shown in Figure 3.3) and inline (secondary) fuel filters, which should be replaced every 100 hours.

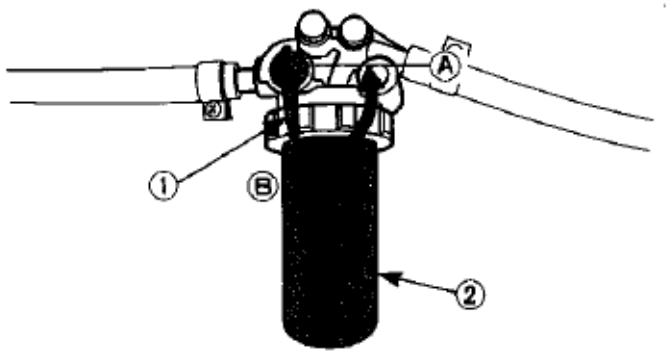
WARNINGS

Entrance of dust and dirt can cause the fuel injection pump and injection nozzle to malfunction.

Turn off the engine and remove the key from the ignition before changing the fuel filters.

Dispose of the spent fuel filters and any captured waste fuel properly per your state regulations.

Figure 3.3 Primary Fuel Filter



1ABAAAAAP1310

To Change the Primary Fuel Filter

Step 1 Close the fuel filter lever, which is shown in Figure 3.3 as **1**.

Step 2 Remove the top cap.

Step 3 Clean any deposits out of the bowl, which is shown in Figure 3.3 as **2**.

Step 4 Place the new filter in the bowl.

Step 5 Fill the bowl with diesel fuel.

Step 6 Install the bowl and tighten the retainer nut by hand.

To Change the Inline Fuel Filter

The inline fuel filter is located on the supply line between the fuel tank and the primary filter. There is no fuel shut-off valve, so you must take precautions to minimize the amount of fuel that spills as you change the inline fuel filter.

Step 1 Place a container underneath the filter and hoses.

Step 2 Loosen the two hose clamps and remove the filter.

Step 3 Place a ⅜-inch bolt in the fuel line coming from the fuel tank.

Step 4 Insert the new filter.

Step 5 There is a flow arrow on the filter that points to the engine. The arrow on the filter must point toward the primary filter on the engine. Install and tighten clamps.

Inspecting, Cleaning, and Changing the Air Filter

Use the steps in this section to replace the air filter, which is shown in Figure 3.4. Complete the steps once per week unless you are working in dusty conditions, in which case you should perform the steps daily. Replace the element every 300 hours.

WARNING

Do not apply oil to the air filter.

Turn off the engine and remove the key from the ignition before changing the air filter.

Figure 3.4 Air Filter Detail

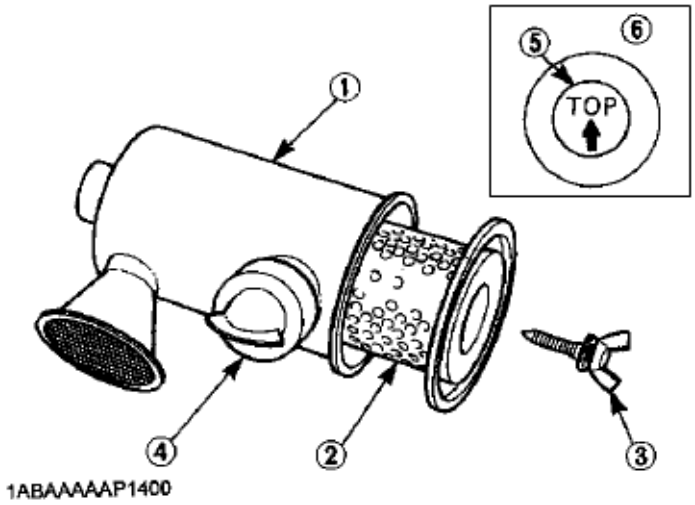


Table 3.5 Air Filter Parts

Number	Part
1	Air cleaner body
2	Element
3	Wing bolt
4	Evacuator valve
5	“TOP” mark
6	Dust cap

Step 1 Open the evacuator valve, which is shown in Figure 3.4 as **4**.

Step 2 If dirt or moisture is present, wipe the inside of the air cleaner body (shown in Figure 3.4 as **1**) with a cloth.

Step 3 If dust is adhered to the element, which is shown in Figure 3.4 as **2**, spray compressed air from the inside to turn the element.

Note
The pressure of the compressed air must be under 205kPa or 2.1kgf/cm^2, 30psi.

Step 4 Inspect the inside of the element to check for damage and dirt. If any of the following conditions are present, change the element:

- damage
- carbon or oil
- heavy dirt or dust

Changing the Hydraulic Filter

Use the following steps to replace the hydraulic filter (shown in Figure 3.6), which should be replaced every 500 hours.

WARNING
Turn off the engine and remove the key from the ignition before changing the hydraulic filter.

Figure 3.6 Hydraulic Filter

You must use the correct gasket, which is provided with the filter.

Step 1 Remove the old filter by turning it to the left.

Step 2 Remove the gasket.

Step 3 Clean the mounting base and groove so that they are free of debris. Also verify that the mounting base and groove are undamaged.

Step 4 Use one of the following options to select the correct sealing gasket:

- For mounting bases with a groove, apply a thin layer of engine oil or grease to the gasket and place the gasket in the groove.
- For mounting bases with no groove, place the L-shaped gasket on the top edge of the filter.

Step 5 Install the new filter by turning it to the right to tighten it. See the installation instructions printed on the filter can for additional information.

CHAPTER

4

TROUBLESHOOTING

This chapter contains troubleshooting information for the Hydra-Walk.

Movement

Slow Movement

Problem

The battery is low or the systems are not charged.

Resolution

Wait for the battery to finish charging. Check charging system and battery integrity.

No Movement

Problem

The system is not moving.

Resolution

Check for these possible causes:

- Check the hydraulic bypass valve to ensure that it is fully closed.
- Open the main hydraulic valve control box and check for motion using the manual controls.

- Check the electrical control cord ends to ensure that they are free of all debris and are connected properly.
  - — If the RED light on the Control Box is not ON, the malfunction is in the electrical control cord. Reverse the electrical control cord and reconnect. Try the function again.
  - — If problems persist, replace the cord.

Engine

Engine Will Not Start or Runs Rough

Problem

The engine does not start or, when started, runs roughly.

Resolution

Check for these possible causes:

- low fuel level
- dirty or clogged fuel filters
- corroded battery cable ends
- low battery fluid
- blown circuit breaker on ignition control panel; reset circuit breaker on control panel
- dirty or clogged air filter

Engine Is Not Receiving Power

Problem

The battery is dead.

Resolution

Change the battery.

If changing the battery is not possible, perform the following steps:

Step 1 Turn the ignition key to the *Off* position.

Step 2 Remove the electrical control cord from the hydraulic valve box.

Step 3 Attach the booster cables to the Hydra-Walk battery. (BLACK=negative RED=positive)

Step 4 Turn the operator vehicle off and remove all of the electrical devices (for example, cell phone or laptop) from the charging system in the pick-up truck.

Step 5 Attach the booster cable to the truck battery (BLACK=negative RED=positive).

Step 6 Start the vehicle and engage the ignition switch on the control panel.

Engine Will Not Start

Problem

- The engine is trying to start, but will not.
- The emergency kill button on the control box is activated.

Resolution

Ensure that the throttle cable is pulled out to a high idle position.

Engine Is Not Functioning Properly

Problem

The fuel shut-off solenoid is not positioned correctly.

Resolution

The electrical fuel shut-off solenoid is positioned on the opposite side of the ignition control panel. It is usually brightly colored and is the only electrical component on that side of the engine. *When functioning properly*, the electrical fuel solenoid retracts when the ignition is engaged. If the electrical fuel solenoid does NOT retract, contact your immediate supervisor or maintenance advisor.

Other Electrical Issues

Problem

The electrical components are not operating properly.

Resolution

Check for these possible causes:

- Generator and water pump fan belt malfunction
- Proper tension on the fan belt

If you have exhausted these possibilities, and your machine is still not functioning properly, call your immediate supervisor or maintenance advisor.

APPENDIX

B

HYDRA-WALK MACHINE CHECKLIST

The following information is recorded when you inspect a Hydra-Walk system. Each inspection item is marked “Yes,” “No,” or “N/A.”

a Are all hydraulic hoses in good condition and free of leaks?

b Are steps and handrails installed and in good condition?

c Are all controls labeled and gauges in proper working order?

d Are the kill switches on the machine labeled and painted a contrasting color and working properly?

e Is the kill switch on the remote labeled and painted a contrasting color and working properly?

f Is the fire extinguisher inspection tag current and fire extiniguisher in good condition?

g Is the battery cover in place?

h Is the spark arrestor in place behind the muffler and maintained and the exhaust system in good condition?

i Are all moving parts guarded including pulleys, shafts, and belts?

j Is the hose reel in good conidtion and without leaks?

k Are all fluids at proper working levels?

l Are all grease points checked and properly greased?

m No damaged wiring or broken wiring visible

n Hydraulic cylinders show no signs of damage or leaks

o Lay down linkage in proper working condition (check for bent linkage)

p Is the spring-loaded pushfoot in good working condition? (wheels turning freely)

q Are the laydown arms in good working condition and free from damage?

r Is the lifting arm in proper working condition and free of damage?

s Is the frame structure free of damage?

t Are the warning signs in place and in good condition?

u Are the pipe racks free from bent tubing, cracks, or broken welds?

v Are the safety roll-off pins installed/attached at the end of each rack?

All items that receive an unsatisfactory check require a clarifying comment at the bottom of the inspection form.

Skills Checklist and Certification Level

- ❑ Operator Evaluation
- ❑ Trainer Evaluation

Name: _____ EIN: _

District: _____ Marketplace

- ❑ Understands and can identify the Hydra-Walk components
- ❑ Understands the procedures for unloading and setting up for a tubing job
- ❑ Identifies engine, oil levels, fuel levels, lubrication points, hydraulic oil, diesel, and filters
- ❑ Understands Hydra-Walk engine start-up procedure
- ❑ Understands hazards associated with the vertical lift cylinders
- ❑ Understands and can identify standard and specialty equipment
- ❑ Understands the procedure for picking up and laying down tubing
- ❑ Understands the procedure for unloading and setting up for a casing job
- ❑ Understands the procedure for picking up and laying down casing
- ❑ Understands the procedure for using snubbing cable
- ❑ Understands the hazards associated with the use of the snubbing cable
- ❑ Understands troubleshooting the Hydra-Walk and its engine

I certify that the individual named above has completed Hydra-Walk training and has demonstrated proficiency on the above checked items.

_____

Instructor Signature Date

Level of Operator Certification

- ❑ Hydra-Walk System - Standard (8' or 10' lift-arm with tubulars 3 ½" or smaller in size)
- ❑ Hydra-Walk System - Severe Duty (8' or 10' lift-arm with tubulars greater than 3 ½" in size
- ❑ Hydra-Walk System - Premium Grade (8' or 10' lift-arm with premium grade tubulars 3 ½" or smaller in size)
- ❑ Hydra-Walk System - Super Snubber (all job types/sizes requiring a SS unit)

_____

Area Manager Signature Date