

Advanced Drilling Equipment Supply Company

DBA

ADESCO.LLC

www.adescoteam.com

1-505-918-5595

Injection Pump Unit
(25-190 bbls/hr)

For

SubSea Solutions

Operator's Manual
General Information

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Section 1 Safety

1.1 General

Advanced Drilling Equipment Supply Company hereinafter referred to as 'ADESCO' designs and provides this entire product so that it can be operated safely and in responsible manner. However, the responsibility for safe operation rests with those who use and maintain these products. The following safety precautions are offered as a guide which, if conscientiously followed, will minimize the possibility of accidents throughout the useful life of this equipment.

The Injection pump unit should be operated only by those who have been trained and delegated to do so, and have read and understand the Operator's Manual. Failure to follow the instructions, procedures and safety precautions in this manual can result in accidents and injuries.

Never start the Injection pump unit unless it is safe to do so. DO NOT attempt to operate the Injection pump unit with a known unsafe condition. Tag the pump or render it inoperative by disconnecting the battery so others who may not know of the unsafe condition will not attempt to operate it until the condition is corrected.

Use and operate the Injection pump only in full compliance with all pertinent OSHA requirements and/or pertinent Federal, State and Local codes or requirements.

DO NOT modify the Injection pump unit except with written approval from ADESCO (Serious injury or Death May Occur)!

Each day walk around the injection pump and inspect for leaks, loose or missing parts, damaged parts or parts out of alignment. Perform all recommended daily maintenance.

Inspect for torn, frayed, blistered or otherwise deteriorated and degraded hoses or piping (ALL HOSES OR PIPING INSTALLED BEYOND THE FINAL DISCHARGE OF THE INJECTION PUMP ARE THE CUSTOMER/USER RESPONSIBILITY). Replace as required.

1.2 Loading and Unloading

It is extremely important that the customer/user understands that this Injection pump unit is a heavy piece of equipments. Although considered a 'mobile' unit, it is a dangerous operation to lift such a piece of equipment. Great care should be taken to select an appropriate trucking/moving company when it is required to transport or reposition this unit.

THEY MUST be informed of the following:

- Unit weight is approximately 7,500 lbs.
- Unit width is approximately 7'6" wide.
- Unit length is approximately 9'6"
- Oilfield style lifting/hitch pins are installed for loading via cable bridle.
- The trucking/moving company is responsible for all damage incurred during transportation.
- **DO NOT** set unit on grades exceeding 10 degrees (18%) of level.

It is extremely important that you position yourself in a safe area when the unit is being lifted. Never be in a direct line with the bridle or cables. If a cable snaps, it will immediately whip as far as its length allows, thus if you are within the distance of its length you are in danger of being struck.

1.3 Pressure Release

This Injection pump unit is capable of a tremendous amount of pressure. Before operating, rigging down, or other related activities, care should be taken to insure that all pressure has been 'released' from the system.

1.4 Moving Parts

Keep hands, arms, and other parts of the body and also clothing away from belts, pulleys and other moving parts.

DO NOT attempt to operate the pump with any guards removed. Wear snug-fitting clothing and confine long hair when working around this pump, especially when exposed to moving parts within the parameter of the skid. Make sure personnel are out of the immediate area prior to starting or operating this Injection pump unit.

ALWAYS shut off engine before adding fuel, lubricant, fluid, coolant, etc.

Disconnect the battery to prevent accidental engine operation prior to attempting repairs or adjustments. Tag the battery connection so others will not accidentally/unexpectedly reconnect it.

Keep area around unit free of trip hazards and clutter.

1.5 Hot Surfaces, Sharp Edges, and Sharp Corners

Avoid bodily contact with hot fluid, hot coolant, hot surfaces and sharp edges and corners

Wear personal protective equipment including gloves and head covering when working in, around, or on the Injection pump unit.

Keep a first aid kit handy. Seek medical assistance promptly in case of injury. **DO NOT** ignore small cuts and burns as they may lead to infection.

Section 2 Description

2.1 Introduction

Your new Injection pump unit will offer superior performance and reliability along with a minimal amount of maintenance requirements.

The Injection pump is equipped with a **KA3500** triplex pump. With proper maintenance and care it will last for years under normal operating conditions. As you continue reading this manual and come to learn how the pump operated and is cared for, you will see how easy it is to keep this unit in top operating condition.

The unit includes a driver (engine), triplex pump assembly, mix tanks, fluid control, control system, and various interconnecting parts, all working together to perform the operation of a Injection pump unit.

All components are critical to the performance of this unit and should be considered as such. No components or parts should be added to, taken away, altered or etc. without the written permission of the packager.

As required, replacement parts or components should only be the same as originally installed by the **OEM (ADESCO)**. No substitution of replacement part/component should be made unless written authorization as given by ADESCO.

2.2 Injection Pump Unit

The pump utilized in this package is a standard triplex, positive displacement plunger pump. The plungers reciprocate within the bores of the fluid-end. As the plungers move toward the crank, the fluid is drawn through the suction valves and into the bore. As the plunger moves away from the crank, the suction valve closes and the discharge valve opens to allow fluid into the discharge port. If there is restriction, the pump will create pressure to force the fluid into the discharge system.

2.3 Injection Pump Frame Lubrication System, Functional Description

The pump frame has a splash lubrication system. Oil is introduced into the required areas to the crank 'dipping' into the oil on each revolution. It is imperative that a proper oil level is maintained within the power frame for this process to work. **DO NOT** mix different types of lubricants within the power frame. Combinations of different fluids may lead to operational problems such as foaming.

2.4 Injection Pump Packing Lubrication System, Functional Description

The plunger packing is housed within the packing cases directly attached to the backside of the fluid end. The packaging serves to seal the area/surface between the plunger and the fluid end. It is imperative that these packing assemblies receive proper lubrication. Grease zerts have been provided to allow grease to be directly injected into the packing cases. It is also beneficial to apply a small amount of 'rock-drill' or 'SAE 40 motor oil' directly onto the plungers immediately before starting the pump.

2.5 Lubrication Guide

The reliability of the unit is dependent upon the selection and maintenance of the lubricant. The ambient temperature, relative humidity, discharge pressure, and contamination levels must be considered in the lubrication selection. The manufacturers recommended lubrication should always be used.

2.6 Capacity Control

This Injection pump unit was designed for use in a variety of applications. Due to this, it is possible to utilize this unit for pumping many different fluids at varying volumes and pressures as long as the design parameters are not breached.

ALWAYS contact ADESCO when there is a question about the viability of this unit for any project that is being considered.

2.7 Engine Instrument Group and Protective System

The control/shutdown system for the power unit is incorporated into one simple control panel. All necessary engine controls such as: start, accessory, throttle can be manually operated at this location. **(For more information, refer to the owner's manual provided with this power unit).**

If you have questions regarding the operation of this control/shutdown system, you should contact your supervisor.

2.8 Transmission

A 4-speed manual transmission is installed on your Injection pump.

Section 3 Operation

3.1 General

While ADESCO has built into this pump package a comprehensive array of controls and indicators to assure you that it is operating properly, you will want to recognize and interpret the readings which will call for service or indicates the beginning of a malfunction. Before starting this Injection pump unit, read this section thoroughly and familiarize yourself with the controls and indicators, their purposes, location, and use.

3.2 Purpose of Control/Gauges/Valving

Control or Indicator

Purpose

Power frame oil/sump level

Visually indicates the level within the power frame assembly.

The proper level is $\frac{1}{2}$ of the **sight-glass**. DO NOT OVERFILL.

Check level when the pump is shut down.

Relief valve

Protects the discharge piping/system from over pressurization by mechanically releasing excess fluid when set pressure is breached.

Four (4) Speed, do not operate in 1st or 4th gear

Allows the operator to control volume delivery.

3.3 Initial Start-Up Procedure

The following procedure should be used to make the initial start-up of this Injection pump unit.

1. Position the pump unit on a level surface so that proper amounts of liquid can be added if necessary. Always check the fluid levels when pump is shutdown.
2. Service engine, refer to Engine Operator's manual for specifications and other information on preparing the engine for start-up.

3. Fill power frame/sump with fluid as recommended in Section 3.2.
4. Start engine with clutch disengaged.
5. After warm-up ensure all valves are in proper position and engage transmission and speed up engine to desired RPM.
6. Keep unit at idle until warm-up has occurred.
7. Ensure that all control/shutdown systems are set and working properly.
8. Monitor unit very closely until you have achieved your operating pressure for a reasonable time.
9. NOTE: This unit is not intended to be operated in an unmanned situation. You must accompany the unit at all times during operation.

3.4 Cold Weather Start-Up

Any Injection pump unit operated at ambient temperature below 32 degrees F should be subject to the recommendations listed below.

Recommendations

1. Minimum recommendation starting temperature should be -10 degrees F (-24 degrees C) with proper cold weather lubricants.
2. Engines should be started at low idle position and maintained during warm-up period at that RPM.
3. Ensure that there is flow of fluid through the unit to rule out the possibility of ice plugs within the system.

3.5 Shut Down Procedure

1. Idle down pump to 700-900 RPM.
2. Disengage transmission.
3. Run engine at idle until engine water temperature falls below 180 degrees F.
4. Shut engine down and blow out lines with compressed air if unit is in a cold weather situation.

3.6 General Operating Instructions

This pump was never intended to be operated by an inexperienced individual! Injection pump units are dangerous and will quantify the danger level as the pressure increases. There is no way for a manufacturer of pumps such as this to plan for or prepare for every conceivable operation that this unit will be subjected to. It is your responsibility as the customer/user to ensure that it is operated safe, productive, and within its designated parameters. If there is ever a question you should contact ADESCO. You, as a customer/user, take full responsibility for the operation of this unit!

Section 4 Maintenance

4.1 General

As you proceed in reading this section, it will be easy to see that the maintenance program for the Injection pump unit is quite minimal. By following the maintenance schedule provided, you will be able to keep your pump in proper running condition.

The recommended schedule is set for average conditions. When operating in severe temperatures or a contaminated atmosphere, the periods between maintenance operations should be shortened.

4.2 Daily Operation Pump

Prior to starting the pump, inspect it for general cleanliness and to see that nothing is obstructing the flow of cooling air through the radiator. Check the fluid level in the power frame. Should the level be low, simply add the necessary amount.

After a routine start has been made, observe the instrument panel gauges to be sure they monitor the correct readings for that particular phase of operation. After pump has been put on line, it is recommended that a general check of the pump and instruments be made every 15 minutes.

4.3 Maintenance after Initial 100 Hours of Operation

After the initial 100 hours of operation, a few maintenance requirements are needed to ensure the Injection pump unit is working properly. Perform the following maintenance operations to prevent unnecessary problems.

1. Drain power frame oil.
2. Visually inspect all belts.
3. Visually inspect pump drive sheaves for misalignment and wear.
4. Visually inspect shaft seals on power frame for leaking/seeping oil.
5. Remove stuffing box cap and visually inspect plungers for heavy scarring or wear.
6. Refill power frame with approved oil.
7. Inject a small amount of grease into packing case zerts.

4.4 Maintenance Every 1500 to 2500 Hours

1. Drain power frame oil.
2. Visually inspect all belts.
3. Visually inspect pump drive sheaves for misalignment and wear.
4. Visually inspect shaft seals on frame for leaking/seeping oil.
5. Inject a small amount of grease into pillow block bearings.
6. Remove stuffing box cap and visually inspect plungers for heavy scarring or wear.
7. Refill power frame with approved oil.
8. Inject a small amount of grease into packing case zerts.

NOTE: Replace pump valves as needed!

4.5 Procedure for Ordering Parts

Call ADESCO at 505-918-5595 with model and serial number of pump and required part numbers.