

Alcoa
Fastening
Systems



Instruction Manual

Huck Model

911D

Diesel Engine

Hydraulic Powerig

Manufacturer:
Alcoa Fastening Systems Ltd; Telford, United Kingdom



Makers of Huck[®], Marson[®], Recoil[®]
Brand Fasteners, Tools & Accessories



EEC DECLARATION OF CONFORMITY

The machinery below complies with, or is designed and constructed, as far as possible, to comply with the relevant Health and Safety requirements of the Machinery Directive 98/37/EC.

Machinery Description: Diesel Power pack
Make:
Type: 1304 (911D)
Supplier: Lilleker Engineering Co. Ltd
Unit B3 Lincoln Street
Northfield Industrial Estate
Rotherham
South Yorkshire S60 1RP
United Kingdom

This machinery complies with the transposed harmonised standards as follows:

1. BS EN – 982 – Safety of machinery – Fluid power systems
2. BS EN ISO – 12100 – Parts 1 and 2: 2003 Safety of machinery – Basic concepts and general principles for design
3. BS EN – 60204 – Part 1 – 2006 Safety of machinery – Electrical equipment of machines Specification for general requirements

The machinery conforms to British Standard: PD5304: 1988 Safety of Machinery.

The technical construction file for this machinery is lodged at the following address:

Lilleker Engineering Co. Ltd - Rotherham

For and on behalf of the Supplier

Name: Peter Wilson

Signature:

Position: Director

Date: 16 November 2009

Certificate No: 248

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HUCK FASTENING SYSTEMS

Safety Guidelines when using Huck Installation Equipment to install Huck Fasteners.

Before using equipment:

1) **Only** Huck Installation Equipment should be used to install Huck fasteners.

2) **Only** persons that have received training approved by Huck International Ltd should use Huck Installation Equipment.

3) The Manuals and/or Data sheets and warning stickers/labels supplied with the Installation equipment should be studied before connecting the equipment to any primary power supply, in particular the following sections:

- Warnings and Cautions.
- Specifications
- Electrical and/or Air supply.
- Principals of Operation.
- Preparation for use.
- Regular use.
- Regular maintenance.

4) With hydraulic tooling, ensure that it is suitable for use with the Huck Powerig or Huck approved hand pump being used.

5) **Check** that the Powerig or approved hand pump "Pull" and "Return" pressures have been **adjusted to suit the tool being used**. Reference must be made to the instruction manual supplied with the equipment.

6) **Check** that the Nose Assembly is of the **correct** type suitable for installing the fastener being used.

7) Visually check **all** pneumatic and/or hydraulic hoses, electrical cables, Powerigs, hand pumps and hand tools, for any visible signs of damage and leakage. **ALL HYDRAULIC HOSES SHOULD BE RENEWED EVERY FIVE YEARS.**

8) **Do not** connect any equipment to primary power supplies or attempt to use any equipment, that shows signs of damage or leakage.

9) Ensure that **all** air and/or hydraulic hose and/or electrical plugs/connectors are correctly connected **before** switching on supply to equipment.

When operating the equipment:

10) When using fasteners in some types of structure, the fracturing of the Pintail during installation **may** generate noise levels above the first action level of the Noise at Work Regulations and therefore hearing protection must be worn.

11) It is recommended that eye protection, (e.g.. safety glasses), should be worn by the operator.

12) **Never** look **directly** at the front or rear of the installation tool.

13) Never hold the Installation Tool around the Nose Assembly.

14) Keep hands/fingers clear of any moving parts and also apertures in Nose Assemblies.

15) **Warning**
Fasteners should only ever be installed in the actual workpiece to prevent possible high velocity ejection from the Nose Assembly due to tensile forces induced during Pintail fracture.

16) When using two piece fasteners, (i.e.. Pin and Collar type), the conical/chamfered end of the collar **MUST** always be towards the Nose assembly, **NOT** against the work piece.

17) Keep fingers clear from the underside of the head, collars and blind side of fasteners and from within the joint being fastened, during the installation cycle.

18) Do not look directly at the head or blind side of fasteners during the installation cycle.

19) During the installation cycle, the tool will pull and straighten itself to the axis of the fastener, beware of hands being trapped against any nearby structure.

KEEP HANDS CLEAR

20) In the event of any difficulty whilst installing a fastener, releasing the tool trigger at **any time** during the installation cycle will immediately put the tool into reverse.

21) Beware of fastener Pintails which are ejected, (sometimes forcibly), from the tool at the completion, or at Pintail fracture, during the installation cycle.

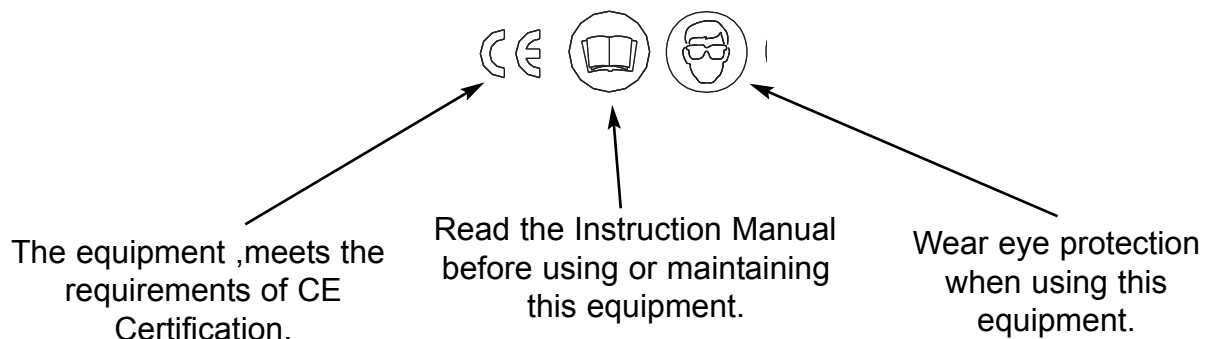
Tools designed to have Pintail Deflectors and or catchers must never be used without them.

22) **Do not** continue to use any equipment which develops a fault whilst being used.

23) Avoid kinking of hoses or dragging of hoses and electrical cables over sharp objects.

Note

The following symbols are attached to the equipment:



CAUTION

BEFORE OPERATING THIS POWERIG,
READ THE SEPARATE DIESEL ENGINE
INSTRUCTION MANUALS PROVIDED.
WITH THIS POWERIG. IN PARTICULAR,
PAY ATTENTION TO ANY SAFETY
INSTRUCTIONS, CAUTIONS AND
WARNINGS.

Description

The 911D diesel engine Powerig is designed to be used with a wide range of Huck hydraulic Installation Tools (including Bobtail Tools -see utilisation), and will operate one Tool. The maximum Pull Pressure is 700 bar (10150 psi) and the maximum Return Pressure is 400 bar (5800 psi). The Powerig is equipped with a 12 vdc Battery and an electric Starter Motor operated by a Key Switch.

The Engine and Pump run continuously and a low hydraulic pressure , (Idle Pressure), ensures that the Tool Piston is kept in the forward position when the Tool is not being used. The Installation Tool is connected to the Powerig by means of Pull and Return pressure Hydraulic Hoses and an electrical Control Cord. The Powerig Hydraulic Directional Valve (HDV), is controlled from the Installation Tool Trigger by a 12 VDC remote control circuit.

When operating ST & DT type Bobtail Tools, or non-Bobtail Tools, the operator presses and holds the Tool Trigger which starts the Tool cycle to install the

Fastener. Once the Fastener is installed, the Trigger is released and the Tool Piston and Nose Assembly return to the fully forward position, the Tool/Nose Assembly are ejected from the installed Fastener.

When operating “IT” type Bobtail Tools, a Limit Switch (sometimes referred to as a Micro-Switch), & a red LED Light on the Tool are activated when the Nose Assembly is correctly located onto the Fastener. The Tool Trigger will only function if the Limit Switch has been activated (indicated by the red LED). The operator now presses and holds the Trigger which starts the Tool cycle to install the Fastener. As long as the Trigger is kept pressed, the Bobtail Collar will be Swaged correctly and the Tool and Nose Assembly will return and eject from the installed Fastener automatically.

“ST” type Bobtail Tools also have a Micro-Switch and LED light but the operator has to release the Trigger when the Bobtail Collar is fully swaged. “DT” Tools also function that way but do not have a Limit Switch or LED.

Specification

Powerig type	911d
Flow L/min (Imp. Gals/min) (at Engine speed of 1800 RPM)	1.22 (0.26)
Pull Pressure max. bar (psi) (See Note 1, page 5)	700 (10150)
Swage Pressure max. bar (psi)	600 (8700)
Return Pressure max. bar (psi) (See Note 2, page 5)	600 (8700)
Diesel Engine, single cylinder (see separate Manual for additional information)	Lombardini 15LD350
Hydraulic Pump	Axial, 4 piston
Control Circuit	12 VDC via Alternator
Starter Motor Circuit	12 VDC via Battery
Battery	12 VDC 55 Amp Hour
Noise	TBA
Hydraulic Oil Reservoir capacity max ltrs (imp. Gals)	14.0 (3.11)
Length mm (inches) (without removable Handles)	850 (33 %)
Width (including wheels) mm (inches)	650 (26)
Height mm (inches)	750 (29.5)
Diameter of min wheels mm (inches)	200 (7.5)
Weight including fluid Kg (lbs)	158 (344)

CAUTION

THE POWERIG SHOULD NOT BE USED AS A STEP. NO PERSON SHOULD CLIMB ON THE POWERIG.

CAUTION

THE POWERIG SHOULD NOT BE USED IN AN EXPLOSIVE AND/OR HIGHLY FLAMMABLE ATMOSPHERE

CAUTION

THE HYDRAULIC OUTPUT PRESSURE VALVES (PULL & RETURN) ON THIS POWERIG MAY HAVE BEEN SET AND SEALED BY THE MANUFACTURER AND SHOULD ONLY BE CHANGED IN ACCORDANCE WITH THE INSTRUCTIONS SHOWN IN THIS MANUAL.

ANY NEW PRESSURES SET MUST ALWAYS BE CHECKED AND TESTED.

Notes:

- 1) If the Powerig is delivered without an Installation Tool, Pull Pressure is factory preset at 510 bar, (7400 psi).
- 2) If the Powerig is delivered without an Installation Tool, Return Pressure is factory preset at 221 bar, (3200 psi).

Intended Use

The 911D Powerig is designed to be used with Huck Installation Tools (refer to Utilisation on Page 5), to install various Huck Bobtail Fasteners, in a factory (where permitted), or outdoor working environment. The unit should be not be placed on a surface with an angle exceeding 15 degrees from the horizontal.

Noise

The sound measurement is in accordance with BS EN ISO 3746: 1996 is less than 70dB(A).

Disposal

Fluids should be disposed of by processing through authorised methods and in accordance with current legislation.

This symbol indicates that this product must be disposed of according to the

The Waste Electrical & Electronic Equipment Regulations 2006



WEEE Directive and our national law. Products of this nature should be

forwarded to a designated collection point e.g. on an authorised one-for-one basis when you buy a similar new product or to an authorised collection site for recycling waste electrical and electronic equipment (WEEE). Improper handling of this type of waste could have a possible negative impact on the environment and human health due to potentially hazardous substances that are generally associated with WEEE. At the same time, your co-operation in the correct disposal of these products will contribute to the effective usage of natural resources.

Special Note

The 911D Series Powerigs include a 12 VDC 55 Amp Hour Lead Acid Battery. Batteries are classed as hazardous waste and should be disposed of in accordance with legal requirements

For more information with respect to the management of waste equipment for recycling please contact our Customer Services desk at Alcoa Fastening Systems Ltd, Telford Shropshire TF3 3BQ. The Producer Identification Number for Alcoa Fastening Systems Ltd, Telford is: WEE/AF0044SY

Utilisation

Non-Bobtail Tools

Huck Tool Series/Model	Pull Pressure Max. bar/psi	Return Pressure Max. bar/psi
2400, 2480 (See Note below)	579/8400	221/3200
2502, 2503 (See Note below)	579/8400	165/2400
2580 Series	393/5700	221/3200
2600 Series	393/5700	193/2800
2620,2624, 2628, 2630 Series	510/7400	221/3200
506, 507, 585, 586, 5901, 516, 520, 524, 528, 532, 536	393/5700	165/2400
6042, 7042, 8042	510/7400	221/3200

Note

Pressures may be reduced for some smaller diameter Fasteners. Refer to appropriate Installation Tool Instruction Manual.

Bobtail Tools

Bobtail Tool Model Series	Fastener Diameter	Pull Pressure Max. bar/psi	Swage Pressure Installation Nose Assy. Max. bar/psi	Swage Pressure Collar Cutter Assy. Max. bar/psi	Return Pressure Max. bar/psi
BTT25	12 mm	389/5640	289/4200	235/3408	289/4200
BTT25	12 mm	389/5640	289/4200	235/3408	289/4200
BTT25	14 mm	389/5640	340/4930	290/4205	289/4200
BTT35	16 mm	380/5510	357/5177	270/3915	350/5075
BTT35	16 mm	380/5510	357/5177	270/3915	350/5075
SFBTT20	16 mm	TBA	TBA	TBA	
BTT57	20 mm	TBA	TBA	TBA	
BTT57	20 mm	TBA	TBA	TBA	

Notes

1) The above Swage Pressures are only a guide and may have to be adjusted to obtain consistent correct Collar swaging. The Pull Pressure should always be a maximum of 60 (870 psi) to 100 bar (1450 psi) higher than the the Swage Pressure to minimise the risk of Bobtail (the part of the Fastener held by the Nose Assembly), fracture.

Pressures - definitions

Pull Pressure:

This is the maximum hydraulic pressure of the Pump which is set and adjusted with the Main Pressure Relief Valve (5). In particular, it controls the *maximum* hydraulic pressure applied to the front of the Tool Piston during the "Pull" stroke (Pulling on the Fastener Pintail), enabling the complete Fastener installation.

Swage Pressure:

Sometimes called Cut-Off Pressure, this is the hydraulic pressure which is applied to the front of the Tool Piston, enabling swaging of the Collar during the installation of Bobtail Fasteners when using IT type Bobtail Tools. This pressure

is set using the Digital Pressure Switch (6) and is adjusted to ensure complete swaging of the Collar when the value of the set Swage Pressure is reached. This pressure will always be set lower than the Pull Pressure.

Return Pressure:

This is the hydraulic pressure applied to the rear of the Tool Piston and is set and adjusted with the Pressure Switch (7). In particular, it controls the maximum hydraulic pressure applied to the rear of the Tool Piston during the return stroke, enabling the Tool/Nose Assembly to eject from the installed Fastener.

Servicing Powerig

Only an appropriately qualified and competent person should service any Diesel Engine hydraulic or electrical components.

A SEPARATE Manual is provided for the Diesel Engine.

Alcoa Fastening Systems Account Managers and Systems Engineers are located in your area to offer assistance you require in solving your installation problems.

If you need assistance by telephone, please call Alcoa Fastening Systems Customer Services at Telford UK. tel +44 1952 290011

Principle of Operation with Bobtail Tools

Non Bobtail Tools

When the tool trigger is depressed :-
Relay **R2** is energised which also energises Relay **R1** via contact R2-1 (latched in by the Digital Return Pressure Switch 7).

Normally open Relay contacts R2-3 closes to operate the HDV **3** solenoid, allowing fluid through the HDV via outlet port P. Normally closed Relay contacts R2-2 open, preventing the Return Pressure HDV solenoid from operating while the pull pressure HDV solenoid is energised. The Installation Tool Piston moves rearwards to begin the Fastener installation cycle.

When the Installation Tool trigger is released, Relay **R2** is de-energised, contacts R2-3 open to de-energise the HDV Pull Pressure solenoid. relay contacts R2-2 close to energise the Return Pressure solenoid, allowing fluid through the HDV via outlet port R. The Installation Tool piston moves forward.

When the Piston reaches the fully forward position, pressure in the return line increases and opens the Digital Return Pressure Switch 7 contacts, which de-energises Relay **R1**. This also de-energises the HDV Return Pressure solenoid and the Digital Return Pressure Switch then recloses (re-closes-sets). The installation cycle is now complete.

Bobtail Tools (when connected to the Powerig via the Multi-Pin Lemo Plug)

When the Bobtail Tool Limit Switch is activated (LED Light on), and the Tool trigger is pressed, Relay **R3** is energised (and latched - see Note 1). which also energises relay **R1** via contact R3-1 (latched in by the Digital Return Pressure switch). Normally open Relay contacts R3-

3 close to operate the HDV **3** Pull Pressure solenoid, allowing fluid through the HDV via outlet port P. Normally closed Relay contacts R3-2 open, preventing Return Pressure HDV solenoid from operating while the pull pressure HDV solenoid is energised.

The Installation Tool Piston moves rearwards to begin the Fastener installation cycle

When the Swage Pressure reaches the pressure set on the Digital Swage Pressure Switch 6 Relay **R4** energises and latches in via Relay R1-3 and Relay R4-2 contacts.

Normally closed Relay R4-1 contacts open and de-energises Relay **R3**.

R3-3 contacts open to de-energise the HDV Pull Pressure solenoid.

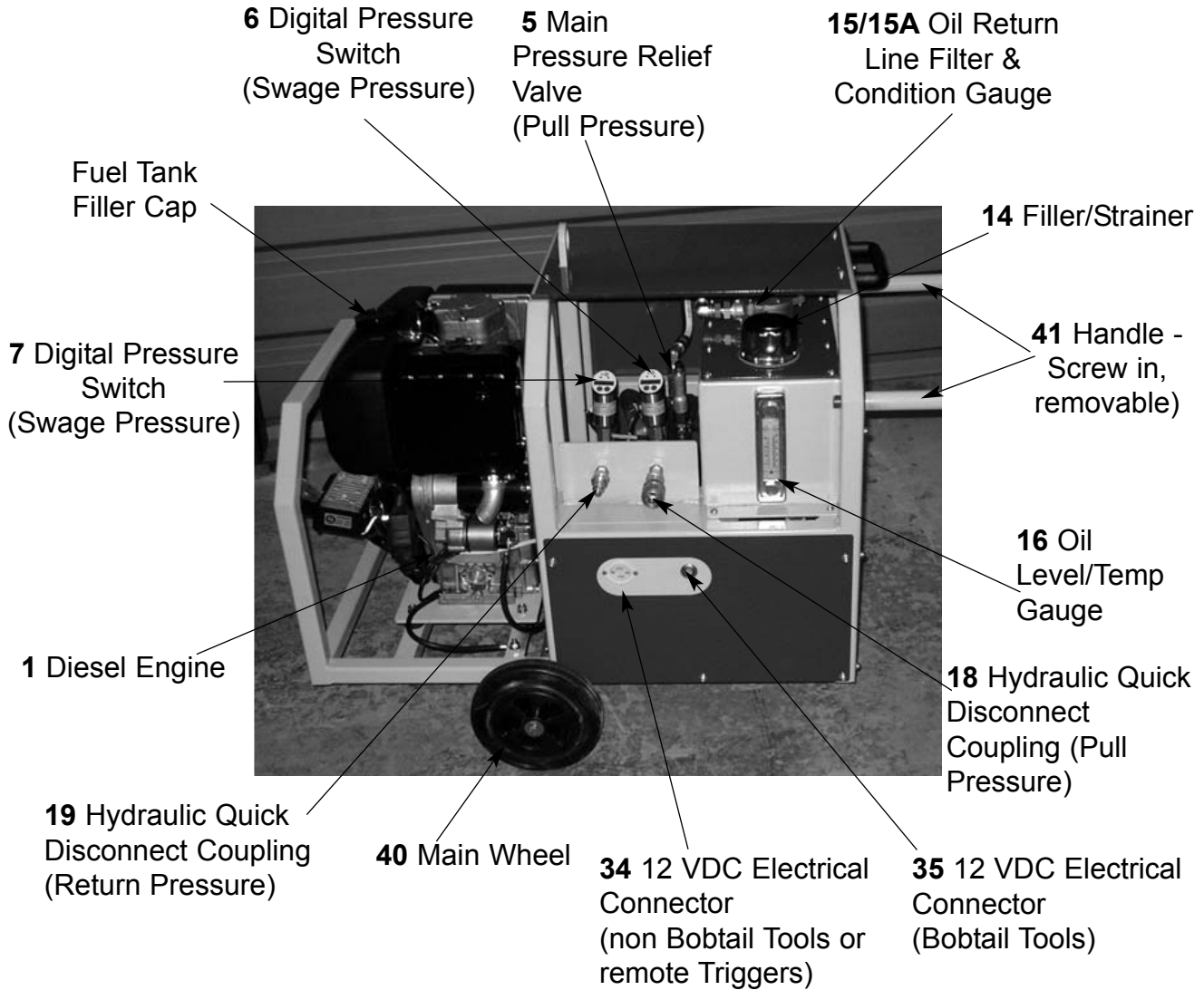
Relay R3-2 contacts close to energise the HDV Return Pressure solenoid allowing fluid through the HDV outlet port R. The Installation Tool Piston moves forward.

When the Piston reaches the fully forward position, pressure in the return line increases and opens the Digital Return Pressure Switch 7 which de-energises Relay **R1**. This also de-energises the HDV Return Pressure solenoid. The Digital Return Pressure Switch then recloses (re-closes-sets).

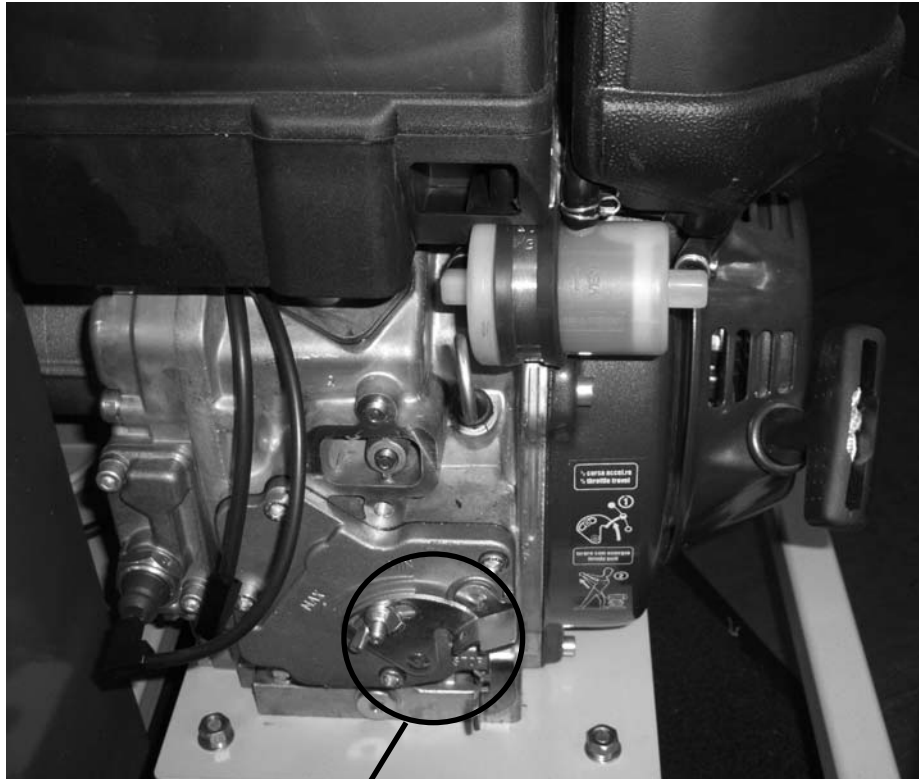
The installation cycle is now complete

Notes:

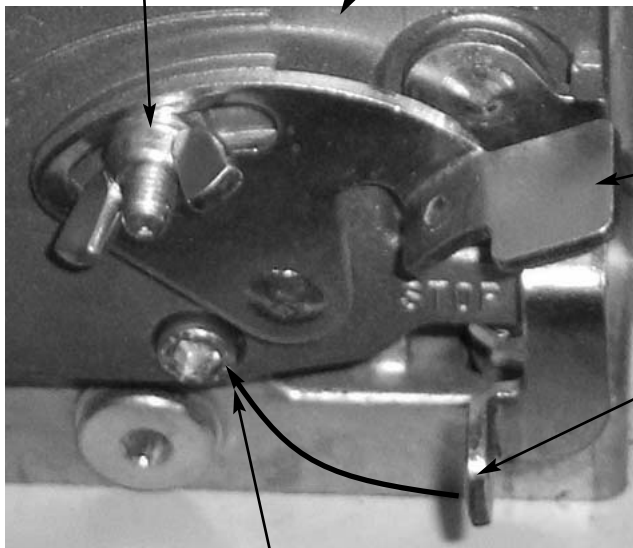
1. The latching of Relay R3, allows the fastener installation to continue even if the Limit Switch contacts in the Tool open after activating the Tool Trigger.



Main Components
FIG. 1



Throttle Control
Lever Lock



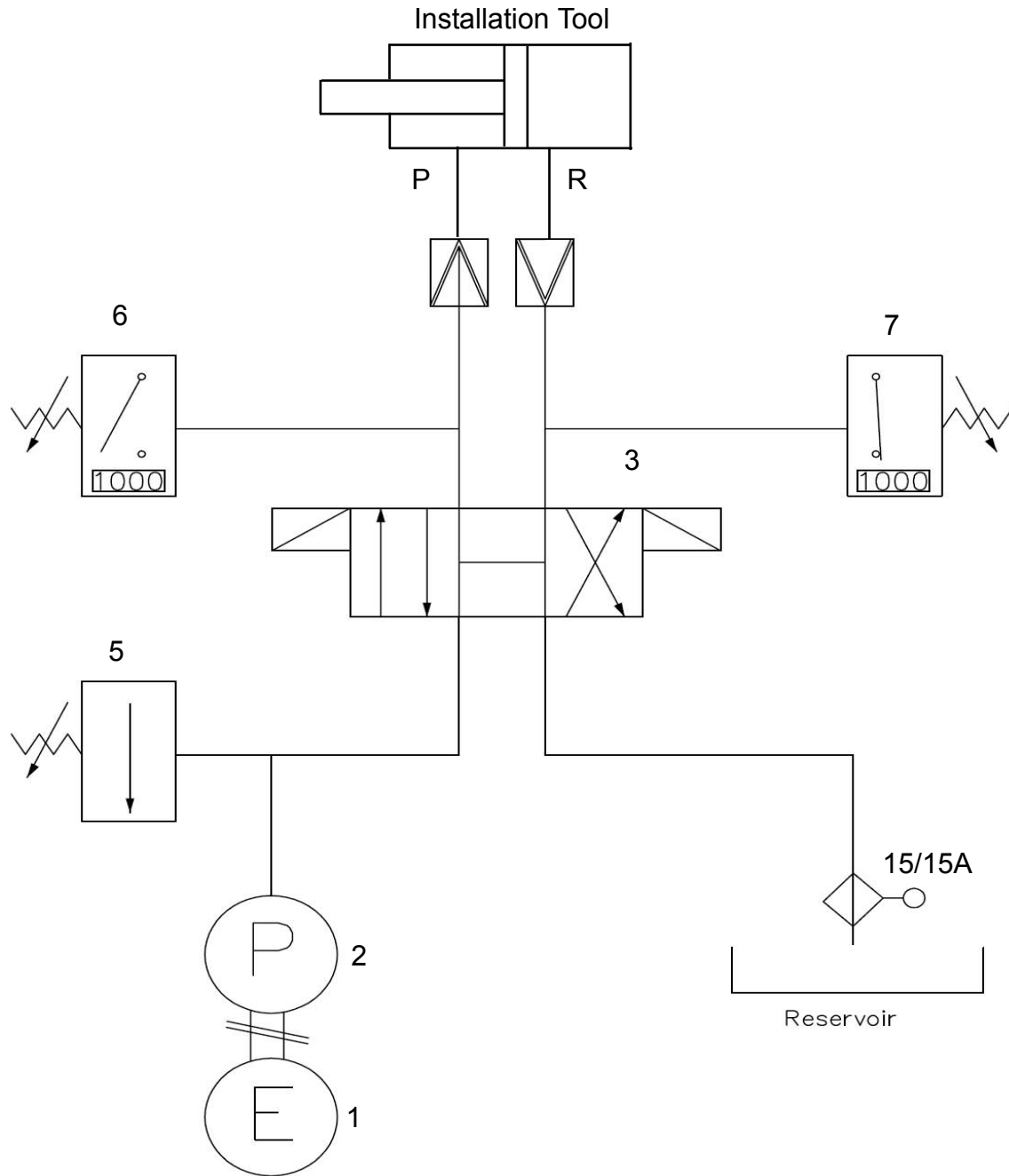
Throttle Control
Lever

Stop Lever
(shown in Engine
run position)

Stop Lever
(stop Engine
position)

Engine Controls

Main Components
FIG. 1A

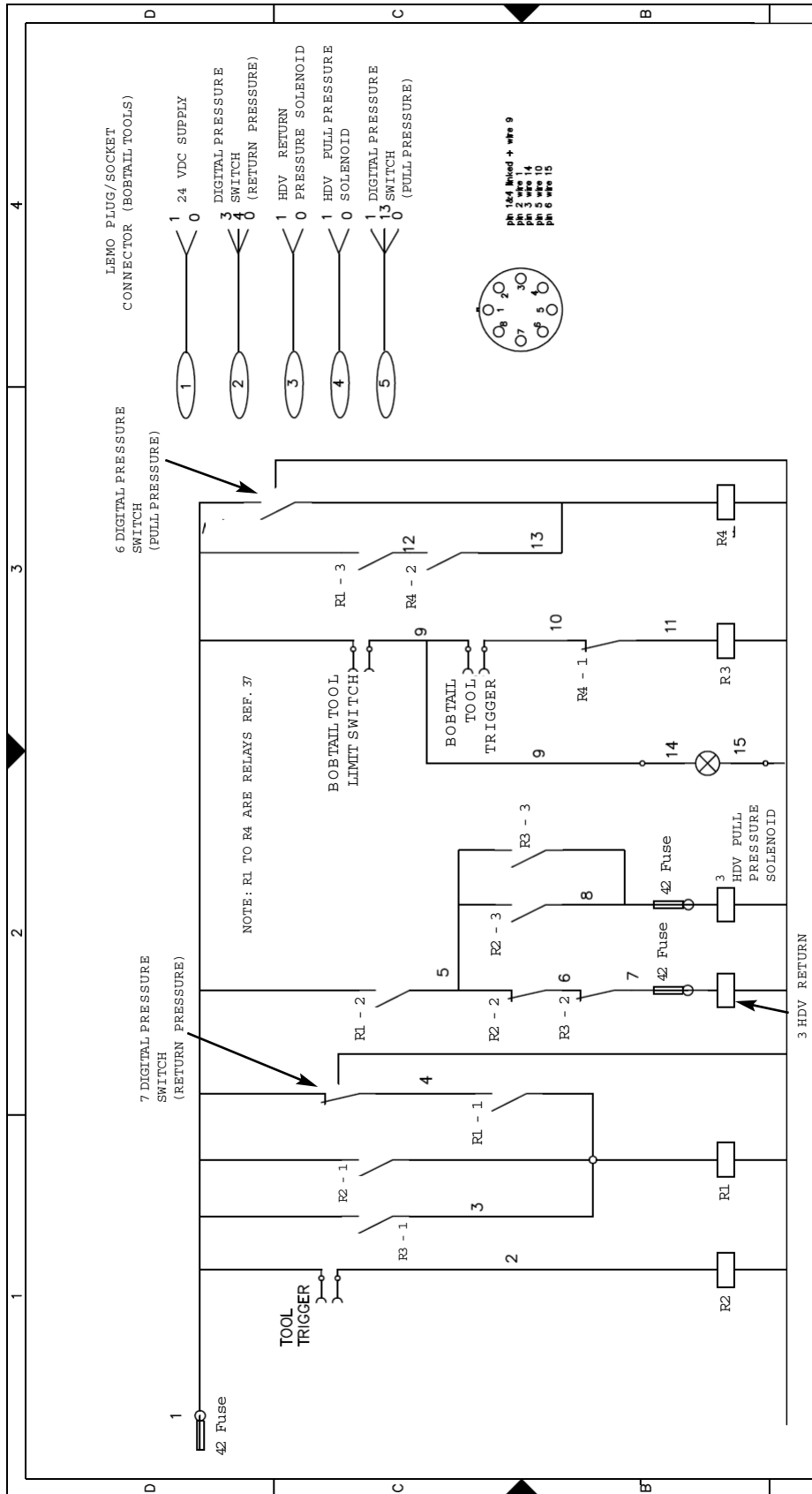


LEGEND

Ref. N0.	Part Number	Item
1	911D/1	Lombardini 15LD-350 Diesel Engine
2	911D/2	Pump
3	911D/3	Hydraulic Directional Valve
5	911D/5	Main Pressure Relief Valve (Pull Pressure)
6	911D/6	Digital Pressure Switch (Swage Pressure)
7	911D/7	Digital Pressure Switch (Return Pressure)
15	911D/15	Hydraulic Oil Return Line Filter
15A	911D/15A	Oil Filter Condition Gauge

911D Hydraulic Schematic

FIG. 2



911D Electrical Schematic

FIG 3

Preparation for First Time Use (Refer to FIG. 1)

1. Check the diesel engine oil level by using the dipstick. The oil level should be near the maximum.



If necessary add clean oil via the filler cap.



Note:

Refer to the Diesel Engine maintenance Manual for correct grade of oil.



2. Open air cleaner and remove element.



3. Fill with engine oil up to the level mark.



4. Reassemble air cleaner. Ensure that the air filter is mounted the correct way otherwise dust and other impurities could enter the intake ducts.

CAUTION

To avoid explosions or fire outbreaks, do not smoke or use naked flames during operations. Fuel vapours are highly toxic.

Only carry out operations outdoors or in a well ventilated area.

Keep face well away from the filler cap and fuel tank to prevent inhalation of harmful vapours.

Dispose of fuel in accordance with applicable laws and regulations as it is highly polluting.

Use the same type of fuel as used in cars as use of other types could damage the engine. The cetane rating of the fuel must be higher than 45 to prevent difficult starting.

Do not use dirty fuel or mixtures of diesel fuel and water, since this would cause serious engine damage

5. Check that there is sufficient engine diesel fuel for the time intended to operate the Powerig. A full tank of fuel will run the engine for approx. 4 hours at 2400 r.p.m. Do not fill the fuel tank completely but just up to 1 cm (0.39") from the top of the fuel tank. This allows space for fuel movement. Only use clean fuel and wipe any fuel spillage from the engine before starting.

6. Using the Oil Level/Temp Gauge **16**, check that the hydraulic fluid (oil) level is at the top of the glass. To avoid overheating of the fluid, the level should not be allowed to fall lower than half way down the glass. .

7. If necessary, remove Filler Cap **14** and fill Powerig Oil Reservoir with recommended hydraulic fluid, (refer to page 28) to the top of the glass.

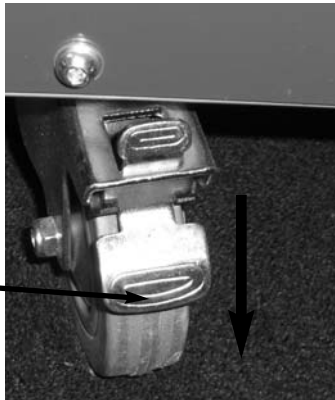
CAUTION

For filling the reservoir, only use *clean* fluid and a *clean* funnel with a maximum of a 60 micron filter. Failure to do this will cause malfunction and component damage.

8. Reinstall Filler Cap.

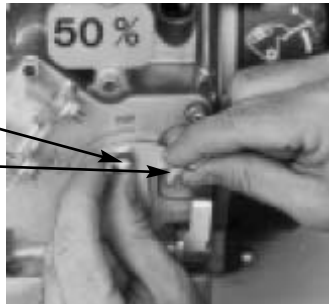
Starting & stopping the engine...

9. Apply the brake on the Castor Wheel to avoid unexpected movement of the Powerig during operation. Push down with foot to operate brake.



Throttle Lever Lock

Throttle Lever



Starting...

10. Set the throttle at 50% maximum speed.

11. Turn the key clockwise to position 1 as shown below. The warning light should illuminate.



12. Continue to turn the key clockwise to position 2 to operate the electric starter motor. Release the key once the engine has started. The key will now return to position 1 and should be left in this position whilst the engine is running.



Note:

If there is not enough battery power to operate the electric starter motor, the engine maybe started with the recoil starter. Refer to page 53 of the Diesel Engine Maintenance Manual for instructions.

13. Move throttle lever to the idle position and allow engine to run at idle for a few minutes before increasing speed and putting under load.

Note:

During the first 50 hours of running the engine, do not exceed 70% of maximum load.

Stopping...

14. Move throttle lever to the idle position and allow engine to run at idle for a few minutes.

15. Move the stop lever fully to the left until the engine stops.



16. Rotate the key anti-clockwise to the stop position.



CAUTION

Do not operate the starter for more than 20 seconds at a time. If the engine does not start, wait 1 minute before trying again.

If the engine does not start after two attempts, trace the cause according to the Diagnosis Chart (page 75 - 77) of the Diesel Engine Maintenance Manual. All warning lights should stay off when the engine is running.

Checking & Adjusting Pull, Return & Swage Pressures...

Pull Pressure (FIG.4)

(refer to **Utilisation** (page 6) for correct setting)

1. With the engine running at operating speed, observe the display on the Digital Pressure Switch (Swage Pressure). This will show the unit of measurement set and will periodically show “bAr” or “PSI”.

Note:

When facing the hydraulic connectors, the Digital Pressure Switch (Swage Pressure), is on the right hand side.

2. Connect a remote electrical trigger (or the plug/cable from a non-Bobtail Installation Tool), to the Powerig electrical connector 34.

3. Operate the remote Trigger momentarily and note pressure reading displayed on the Digital Pressure Switch.



CAUTION

Complete this test as quickly as possible to prevent overload of hydraulic components.

4. Refer to FIG. 4 and adjust the Pull Pressure to suit the Installation Tool being used. Refer to **Utilisation** (Page 6) and/or the Installation Tool Instruction Manual for correct Pull Pressure setting. Only make small adjustments (1/4 turn) at one time. **Do not** remove any pre-installed washers or locknut from the adjusting screw.

5. Check the Pull Pressure again as described above. Repeat adjustment if necessary until correct value is obtained.

6. Once the Pull Pressure has been set, tighten the Lock Nut on the Adjustment Screw to ensure setting is retained. Check the pressure one more time to ensure it had not changed whilst tightening the Lock Nut.

Return Pressure (FIG 4)

(refer to **Utilisation** (page 6) for correct setting)

Notes:

a) The diesel engine does not have to be running during checking or adjustment of the return pressure but the key must be in position 1.

b) When facing the hydraulic connectors, the Digital Pressure Switch (Return Pressure), is on the left hand side.

c) The Digital Pressure Switches are able to measure two SEPARATE pressure switch points; S1 & S2. Only the S1 is used and for the Return Pressure, the normally closed (N/C) switch contacts are utilised. If the left hand indicator light is on, then the N/C contacts are closed.

d) The reset pressures r1 & r2 should left at the factory setting of 50 bar (725 psi).

e) The S1 button is used to change to the different menu items. The S2 button is used to access the menu items and the S1 button used again to change the settings of those menu items.

1. Press both the S1 & S2 buttons at the same time and the display will show the first menu item.



2. Press the S2 button and the current unit setting will be displayed.

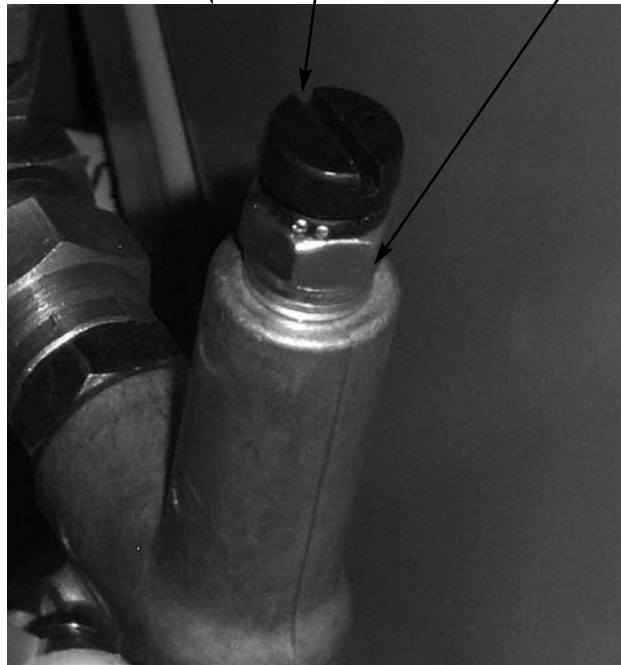




7 Digital Pressure Switch
(Swage Pressure)

6 Digital Pressure Switch
(Swage Pressure)

Adjustment Screw
Clockwise to increase Pull Pressure
Anti-clockwise to decrease Pull Pressure



Lock Nut

5 Main Pressure Relief Valve
(Pull Pressure)

FIG. 4

3. To keep this setting, press S2 again and the display will return to "Unit". Pressing S1 *now* will change the display to the next menu item (S1); continue from step 5. To *change* the measurement units, press S1. Consecutive pressing of S1 will change the units between bAr and PSI.



When the required unit is shown, press S2 again and the display will return to "Unit"



4. Press S1 to continue to the next menu item. The display will show "S1". This is switch point 1, the value of this is the Return Pressure.



5. Press the S2 button and the current Return Pressure setting will be displayed. To keep this setting, press S2 several times until "S1" is displayed again.

Pressing S1 *now* will change the display to the next menu item (r1); continue from step 9.

To *change* the settings, note the flashing/blinking cursor under the space for the first digit of Return Pressure setting.

Note:

The display is able to show 4 digit numbers. In this example a value of 350 bar is shown and therefore the space for the first digit is blank. 4 digit numbers are only used if the measurement units are set to PSI. **The Return Pressure must always be lower than the Pull Pressure by at least 6.9 bar (100 psi), to ensure correct Powerig function.**

6. Consecutive pressing of S1 will change the value of the digit over the cursor from 1 to 9 and then 0.

7. When the required value shown, press S2 and the cursor will move to the right under the next digit.

8. Continue adjusting each digit in turn. Pressing S2 after adjusting the last digit will change the display back to "S1".

9. Pressing the S1 button will change the display to the next menu item. r1 is the value at which the Return Pressure (S1), resets to zero and should be set at 50 bar (725 psi). Press S2 to check the setting. If it is necessary to change the setting then follow the procedure as in steps 6 & 7.



10 Press S1 to continue to the next menu item which is S2. The S2 & r2 switch points are not used.



The next steps will save the settings...

11. Press the S2 button several times until the display shows "Stor".



12. Press the S2 button and the display will show "no". Press the S1 button to change the display to "yes".



13. Press the S2 button to save the settings. The display will return to zero.



Swage Pressure (FIG 4
(only applicable when using IT type tools.
Refer to **Utilisation** (page 6) for correct
setting)

Note:

When using IT type Bobtail Installation Tools, fitted to the Powerig connector **35** with the electrical 8 pin Lemo Plug, the Digital Pressure Switch (Swage Pressure) **6**, controls the hydraulic pressure to the tool during the pull cycle. This in turn controls the amount (length) of Bobtail fastener Collar swage. The higher the pressure, the more the Collar is swaged.

This Digital Pressure Switch is checked and adjusted using the same procedure as that for the Digital Pressure Switch for the Return Pressure as previously explained. The indicator will light not be illuminated as the normally open contacts should be in the open condition.

Set a Swage Pressure just above the minimum required for the Nose Assembly Anvil to just lightly contact the Collar Flange. A circular witness mark around the Collar flange will indicate the Anvil contact. On most large diameter (12 mm (1/2") and above), Bobtail Collars have a series of raised nodules around the flange which will be crushed by contact with the Anvil.

Do not adjust the Swage Pressure too high as this increases the risk of Bobtail grooves being stripped/damaged or the Bobtail being broken away from the Pin. In either event, this will prevent a Bobtail Collar Cutter from being used to remove the installed fastener.

14. Inspect hoses, electrical cords and connections frequently for signs of damage or ageing. If necessary replace.

15. Connect both hoses of the Installation Tool, (or if being used with a Hose Set, connect the Hose Set), to the Powerig. Activate the Tool Trigger to fully cycle the Tool, or if using an "IT" type Bobtail Tool, then use a remote trigger attached to the Powerig connector **34**.

Note:

It is not possible to cycle IT type Bobtail Tools using it's own trigger unless the tool Limit Switch is activated (contacts close). Therefore a remote Trigger as described above must be used.

CAUTION

BTT series tools do not have a Dump Valve to relieve hydraulic pressure from the front of the Piston.

Therefore, release the trigger immediately when the tool Piston has stopped moving.

CAUTION

Some types of Installation Tool (e.g. BTT and SFBTT series, extend in length during operation.

16. When using tools other than BTT Bobtail Tools, continue to press the trigger for approx. 4 seconds when the Tool Piston has stopped moving. Release the Trigger and allow the Tool Piston to return to the starting position. Repeat three times. This will ensure that any air in the hydraulic system is removed.

Note:

New Hose Sets or individual hoses may not contain any hydraulic fluid and the air must be removed. To do this, connect one pair of couplings at one end of the Hose set, to the Powerig. Connect the other pair of Hose set couplings to each other. With the Powerig running, activate the remote trigger/tool trigger and then release. Wait approx. 45 seconds, then stop the Powerig. Check the Powerig hydraulic oil level before continuing.

17. Check the Pull Pressure again and re-closes-adjust if necessary. Tighten the Lock Nut to ensure settings to not change.

Connecting and testing a Bobtail Tool (after completing previous steps 1 to 17).

IT type Bobtail Tools...

1. Inspect hoses, electrical cords and connections frequently for signs of damage or ageing. If necessary replace.

2. Remove the remote trigger from the Powerig.

3. Connect the Hydraulic Couplings of the Tool or Hose Set to the hydraulic couplings 18 & 19 of the Powerig.

4. Connect the plug of the Bobtail Tool or Hose Set to the Powerig Electrical Connector **35**.

WARNING

TO AVOID THE RISK OF PERSONAL INJURY, TEMPORARILY DISCONNECT THE TOOL ELECTRICAL PLUG FROM THE POWERIG WHILST FITTING THE NOSE ASSEMBLY TO THE TOOL.

5. Attach the Nose Assembly to the tool in accordance with instructions contained in the Instruction Manual for the tool or as shown.

6. Check operation of the tool Limit Switches by locating the Bobtail part of the fastener as far as possible into the Nose Assembly Puller. The Limit Switch light on the Tool should illuminate.

Note:

The Powerig will not allow Fastener installation unless the tool Limit Switch is activated. If it fails to activate, then check that the Nose Assembly has been assembled onto the Tool correctly. Also, check for correct Limit Switch adjustment, (refer to the Instruction Manual for the tool).

7. Prepare a sample joint with the Bobtail Fastener. Place the Collar (see note below), onto the Pin.

Note:

Only Bobtail Fasteners of 12 mm (1/2") diameter or larger, have thread form locking grooves into which a tab on the Collar locates. Rotating the Collar will enable it to be screwed hand tight to the joint face.

8. Locate the Nose Assembly Puller onto the Bobtail grooves of the fastener Pin. The Nose Assembly should be in line with the axis of the fastener Pin.

9. Press and hold the tool Trigger. The Nose Assembly Puller will retract into the Anvil, closing around the end of Pin. The Anvil will be forced forward toward the Collar Flange to complete the Collar swaging/forming. When the Swage Pressure is reached, the Tool/Nose Assembly will eject automatically from the installed fastener, even if the Trigger is kept depressed. When the Nose Assembly Anvil is free from the Collar, the Puller will release from the end of the Pin and enable the Tool/Nose Assembly to be removed from the installed fastener.

10. Release the tool Trigger.

11. The installed fastener should be checked with the correct Bobtail Fastener inspection Gauge to ensure correct Collar swage. Adjust the Swage Pressure if necessary.

Note:

Set a Swage Pressure just above the minimum pressure required for the Nose Assembly Anvil to just lightly contact the Collar Flange. A circular witness mark around the Collar flange will indicate the Anvil contact. On most large diameter (12 mm (1/2") and above), Bobtail Collars have a series of raised nodules around the flange

which will be crushed by contact with the Anvil.

Do not adjust the Swage Pressure too high as this increases the risk of Bobtail grooves being stripped/damaged or the Bobtail being broken away from the pin. In either event, this will prevent a Bobtail Collar Cutter from being used.

ST type Bobtail tools...

These tools have a Limit Switch and operate in a similar way to the IT type tools except that the operator must release the tool Trigger to eject the Tool/Nose Assembly from the installed fastener. Follow steps 1 to 11 as for the IT type tools but in step 4. connect the plug of the Bobtail tool to the Powerig Electrical Connector **34**

DT type Bobtail tools and non-Bobtail tools fitted with Bobtail Nose Assemblies...

Note:

When using DT type tools, the hydraulic Pull Pressure (as set with the Main Pressure Relief Valve **5**), controls the Collar swaging. Ensure this has been adjusted to the correct value before attempting to install a fastener. The Digital Pressure Switch **6** is not utilised.

1. Inspect hoses, electrical cords and connections frequently for signs of damage or ageing. If necessary replace.

2. Remove the remote trigger from the Powerig.

3. Connect the Hydraulic Couplings of the Tool or Hose Set to the hydraulic couplings 18 & 19 of the Powerig.

4. Connect the plug of the Bobtail Tool or Hose Set to the Powerig Electrical Connector **34**.

WARNING

TO AVOID THE RISK OF PERSONAL INJURY, TEMPORARILY DISCONNECT THE TOOL ELECTRICAL PLUG FROM THE POWERIG WHILST FITTING THE NOSE ASSEMBLY TO THE TOOL.

5. Attach the Nose Assembly to the tool in accordance with instructions contained in the Instruction Manual for the tool or as shown.

6. Prepare a sample joint with the Bobtail Fastener. Place the Collar (see note below), onto the Pin.

Note:

Only Bobtail Fasteners of 12 mm (1/2") diameter or larger, have thread form locking grooves into which a tab on the Collar locates. Rotating the Collar will enable it to be screwed hand tight to the joint face.

8. Locate the Nose Assembly Puller onto the Bobtail grooves of the fastener Pin. The Nose Assembly should be in line with the axis of the fastener Pin.

Note:

DT type tools do not have a Limit Switch which means the tool Trigger is always enabled. Therefore, the operator must ensure that the Nose Assembly Puller is correctly located onto the Bobtail part of the fastener Pin before pressing the tool Trigger to start the installation cycle. Failure to do this may result in damage to the Puller and increases the risk of Bobtail grooves being stripped/damaged or the Bobtail being broken away from the pin. In either event, this may prevent the Collar from swaging correctly and will prevent a Bobtail Collar Cutter from being used to remove the installed fastener.

9. Press and hold the tool Trigger. The Nose Assembly Puller will retract into the

Anvil, closing around the end of Pin. The Anvil will be forced forward toward the Collar Flange to complete the Collar swaging/forming.

10. Release the tool Trigger when the Collar is fully swaged or the Nose Assembly stops moving. When the Nose Assembly Anvil is free from the Collar, the Puller will release from the end of the Pin and enable the Tool/Nose Assembly to be removed from the installed fastener.

11. The installed fastener should be checked with a Bobtail Fastener inspection Gauge to ensure correct Collar swage. Adjust the Main Pressure Relief Valve if necessary.

Note:

Set a Pull Pressure just above the minimum

pressure required for the Nose Assembly Anvil to just lightly contact the Collar Flange. A circular witness mark around the Collar flange will indicate the Anvil contact. On most large diameter (12 mm (1/2") and above), Bobtail Collars have a series of raised nodules around the flange which will be crushed by contact with the Anvil.

Do not adjust the Pull Pressure too high as this increases the risk of Bobtail grooves being stripped/damaged or the Bobtail portion of the pin being broken away from the pin. In either event, this will prevent a Bobtail Collar Cutter from being used to remove the installed fastener

Other tools used to install Pintail type fasteners...

The Powerig Pull and Return Pressures should be set in accordance with the information in the Instruction Manual for

Preparation for Regular Use

Before each Powerig operation, perform the following:

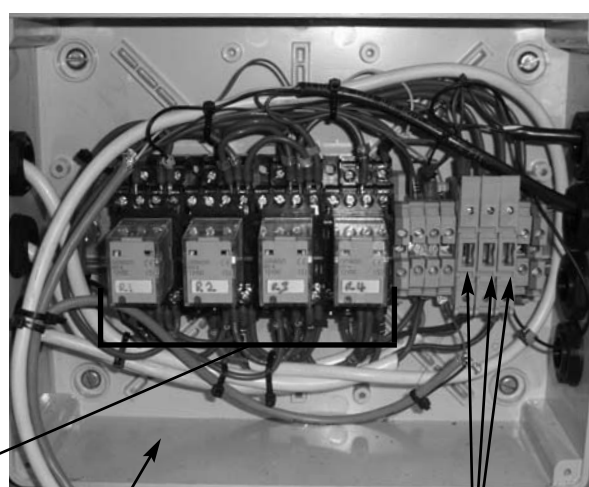
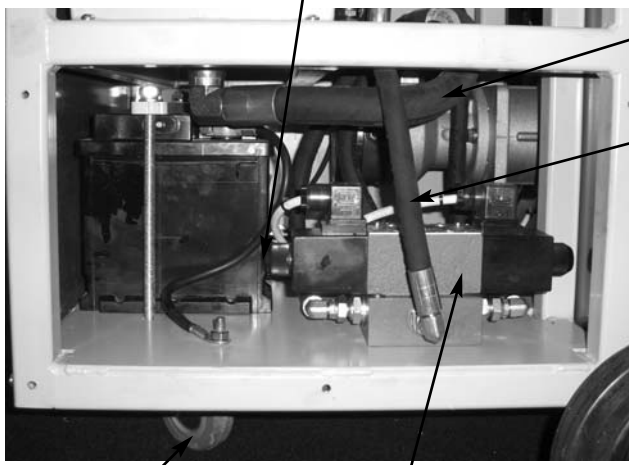
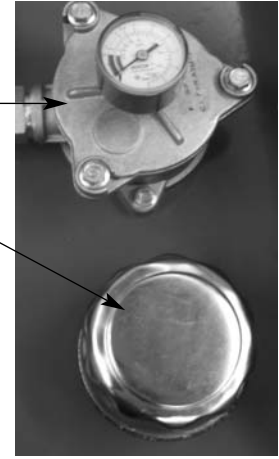
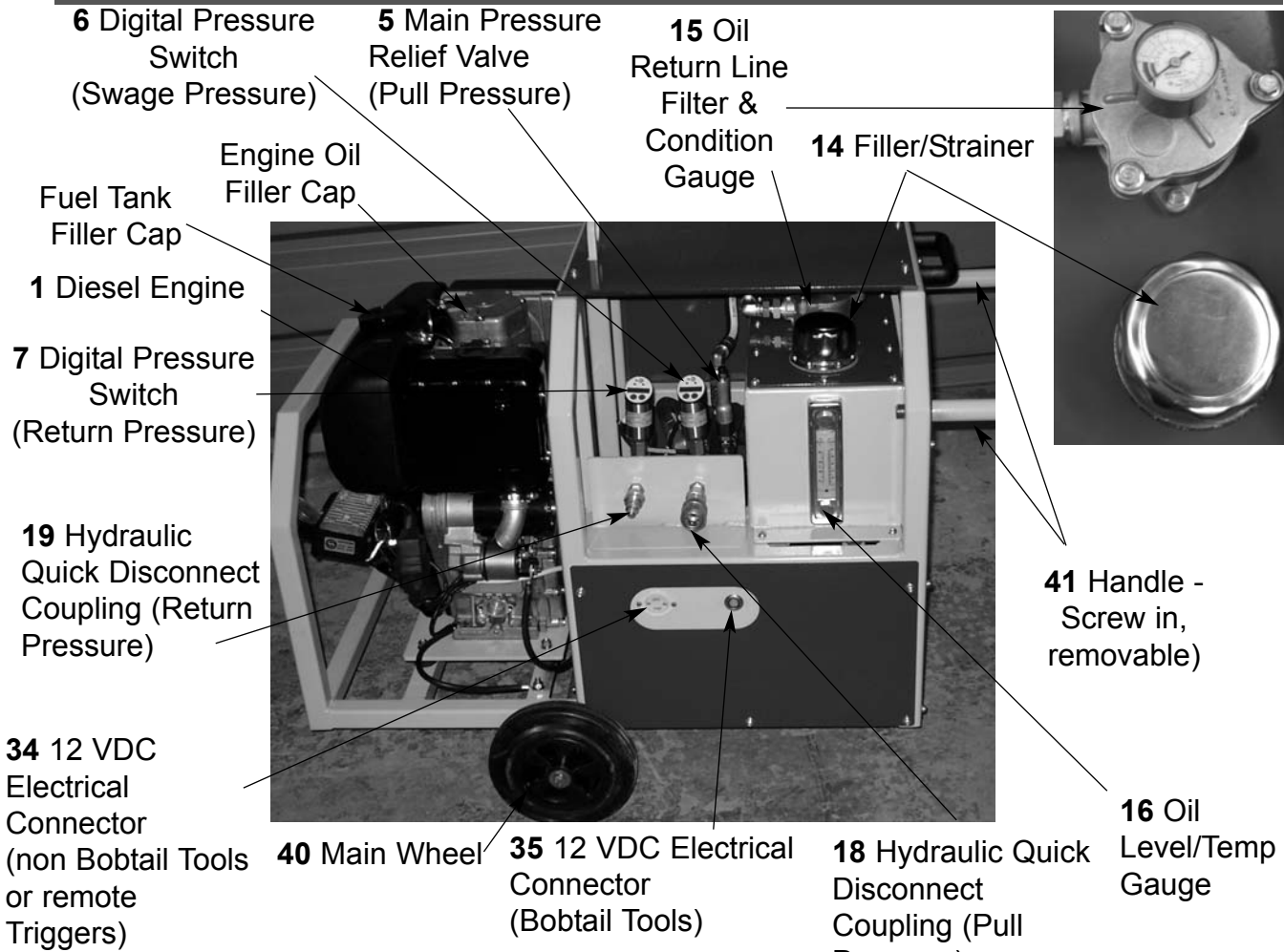
1. Inspect hoses, electrical cords and connections frequently for signs of damage or ageing. If necessary replace.
2. Regularly check engine oil level and hydraulic fluid level.
3. Connect the Pull and Return Hydraulic Connectors of the Tool or Hose Set to the Powerig Hydraulic Connectors **18 & 19**. Connect the Electrical Plug of the Tool or Hose Set to the Powerig connection **34** or **35** according to the tool being used.
4. Check that all electrical and hydraulic connectors of the Tool and Hose Sets are properly attached.

5. Cycle the Tool several times to circulate the oil through the Powerig valves, hoses and Tool.

CAUTION

Do not attempt to operate the Tool without the Tool hoses attached to the Powerig. When using HPT tools, release trigger immediately at the end of the pull stroke.

8. Powerig is ready for use.



**Parts List
911D Powerig**

911D Parts List continued

Ref. No.	Qty.	Description	Supplier Part No.	Supplier	Huck Part No.
1	1	Lombardini 15LD-350 Diesel Engine	15LD-350	Lombardini	911D/1
2	1	Pump PF504H.XVB.1	-	-	911D/2
3	1	HDV (Hydraulic Directional Valve)	-	-	911D/3
4	1	Subplate	-	-	911D/4
5	1	Main Pressure Relief Valve (Pull Pressure)	MVC41A	Voith	911D/5
6	1	Digital Pressure Switch (Swage Pressure)	TECSIS S2400B087403		911D/6
7	1	Digital Pressure Switch (Return Pressure)	TECSIS S2400B087403		911D/7
8	2	Digital Pressure Switch Power Cable	804000E030M020		911D/8
9	1	3/8 Hydraulic Hose Assy.310 mm (Filter to Tee)			911D/9
10	1	3/8 Hydraulic Hose Assy.300 mm (Manifold Tee to Male Tee on Relief Tank Port)	-	-	911D/10
11	2	1/4 Hydraulic Hose Assy.460 mm (Manifold Ports A & B to Pressure Switch Outlet)	-		911D/11
12	1	1/4 Hydraulic Hose Assy.400 mm (Manifold Port P to under Relief valve)	-	-	911D/12
13	1	3/4 Hydraulic Hose Assy. 440 mm (Oil Reservoir to Pump)	-	-	911D/13

911D Parts List continued

Ref.	Qty. No.	Description	Supplier Part No.	Supplier	Huck Part No.
14	1	Hydraulic Oil Filler ST34B	45/F1315M90		911D/14
15	1	Hydraulic Oil Return Line Filter RTF3/10	301/2 SIF-10A 10	-	911D/15
15A	1	Oil Filter Condition Gauge	-	-	911D/15A
16	1	Hydraulic Oil Level/Temp.Gauge (127 mm)	CRS L05127TE	-	911D/16
17	1	Hydraulic Oil Filter/Breather (73 mm)	CRS TP 102601	-	911D/17
18	1	Hydraulic Quick Disconnect Coupling (Pull Pressure)		AFS	only available as a pair 10440 911D/18
19	1	Hydraulic Quick Disconnect Coupling (Return Pressure)			
20	1	Adaptor - 1/2 x 3/8 BSP Male	-	-	911D/18
21	3	Adaptor - 3/8 x 1/4 BSP Male	-	-	911D/19
22	2	Bulkhead Adaptor - BSP 1/4	-	-	911D/20
23	2	Bush - 1/4 BSP Female x 3/8 NPT	-	-	911D/21
24	4	Adaptor - 1/4 BSP Male Male	-	-	911D/22
25	2	Adaptor - 1/4 BSP Male x 1/4 fixed Female	-	-	911D/23
26	3	Swivel Tee - 1/4 BSP Female	-	-	911D/24
27	4	Dowty Washer 3/8	-	-	911D/25
28	5	Dowty Washer 1/4	-	-	911D/26
29	1	Adaptor - 3/4 BSP 12 SAE	-	-	911D/27

911D Parts List continued

No.	Ref.	Qty.	Description	Supplier Part No.	Supplier	Huck Part No.
30	1	1	Adaptor - 1/4 Male x 3/8 Female	-	-	911D/28
31	1	1	Adaptor - 1/4" Male x 3/8" Female Swivel	-	-	911D/29
32	1	1	Tee - 3/8" Male	-	-	911D/30
33	1	1	Dowty Washer 1/2"	-	-	911D/31
34	1	1	12 VDC Electrical Connector (for 2 pin Bayonet Plug)	-	AFS	110685
35	1	1	12 VDC Multi-Pin Lemo Electrical Connector	-	AFS	HKE-9076
36	1	1	Battery - 12 VDC 55 Amp Hour	-	-	911D/32
37	4	4	Relay & Base - 14 pin 12 VDC (R1, R2, R3, R4)	-	-	911D/33
38	1	1	Electrical Enclosure	-	-	911D/34
39	1	1	Castor Wheel 100 x 27	Flexello	-	911D/35
40	2	2	Main Wheel 200 mm x 20 mm bore	-	-	911D/36
41	2	2	Handle - screw in, removable	-	-	911D/37
42	3	3	Fuse - 5 Amp (5 mm x 20 mm)	-	-	911D/38

Preventive Maintenance

1. Before carrying out any maintenance, remove the key from the engine Key Switch to avoid accidental starting and electrical damage.

2. Regularly inspect the hydraulic fluid. If contamination particles larger than 20 μm are present, then replace fluid. Good practice is to replace the hydraulic fluid every 12 Months to avoid ageing effects.

Note:

The introduction of foreign material into the hydraulic system can result in poor performance and repair downtime. Observe the following practices:

3. When filling or adding oil, always use a clean funnel with a maximum 60 micron filter. Ensure that correct fluid is used.

4. Always ensure that hose couplings are free from dirt before attachment of Tools.

5. All hydraulic hoses should be renewed every five years.

Notes:

A) Mixing different manufacturers/kinds of hydraulic oil can cause a chemical reaction relating to resin or sludge. Contact the manufacturer for advise to avoid any problems. In any case, all traces of the original oil must be removed by rinsing (washing out) all hydraulic components.

If filling/draining the Powerig, ensure that hydraulic fluids are not accidentally switched.

B) Hydraulic fluids should be disposed of according to the environmental guidelines/legislation applicable in the country where the unit is being maintained and/or used. Please also consult the guidelines of your individual oil

manufacturer.

6. Refer to the engine manuals supplied with this Powerig for preventative maintenance details.

Adding Hydraulic Fluid

1. Ensure that equipment is readily available to deal with any spillage of hydraulic fluid.

2. Remove the screws from the top cover and remove cover. This will provide better access to the Filler.

Alternatively, use a short length of flexible tubing between the funnel and the filler.

3. *Before* removing the filler cap, use a clean wipe to remove any accumulated dirt from the filler cap and surrounding area. Remove the filler cap.

5. Locate a clean funnel into the filling port and place an absorbent wipe around the funnel spout to soak up any excess fluid.

6. *Before* adding any hydraulic fluid, check that it is the correct type and grade. (Refer to page 28).

7. Slowly add the new hydraulic fluid, pausing regularly to allow fluid in the funnel to flow into the pump reservoir and also preventing accidental spillage.

8. Continue to add fluid until it rises to the top of the Oil Level/Temperature Gauge glass.

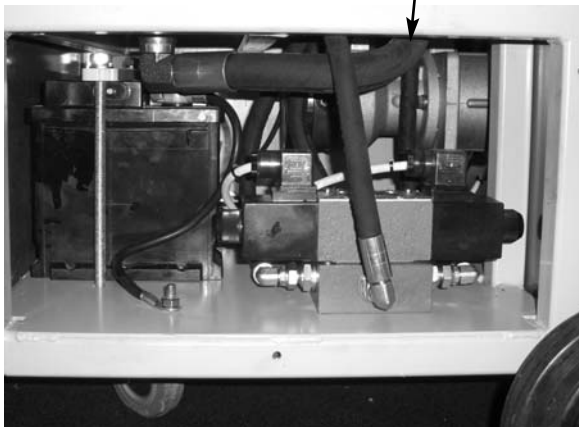
9. Remove the funnel and replace the filler cap. Ensure filler cap is hand tightened.

10. Clean any fluid spillage with absorbent wipes. Replace cover and secure in place using the screws.

Draining Hydraulic Fluid.....

1. Ensure that equipment is readily available to deal with any spillage of hydraulic fluid.
2. If possible, place the Powerig onto an oil tray or draining sink sufficient to retain 14 ltrs (3.11 Gals.) of fluid.
3. Remove the screws from the rear cover and remove cover.

13 Hose



4. Use a clean wipe to remove any accumulated dirt from around the area where Hydraulic Hose **13** is connected to the Pump.
5. Disconnect Hydraulic Hose **13** from the Pump and drain the oil into a suitable container which has a minimum capacity of 14 ltrs (3.11 Gals.).
6. After the oil has completely drained from the reservoir, re-connect the hose to the pump and tighten.
7. Clean any fluid spillage with absorbent wipes.

Note:

Do not replace the rear cover until the reservoir has been re-filled with new oil and the Powerig has been running for a few minutes. This will allow checks

to be made for any leakage from the hose connection. re-connect-tighten the hose connection if any leakage is observed.

8. Clean any remaining fluid spillage with absorbent wipes before replacing the rear cover and tightening the screws.

Maintenance

1. Before carrying out any maintenance, remove the key from the engine to avoid accidental starting and electrical damage.
2. Electrical components are only allowed to be repaired and/or replaced by a qualified electrician.
3. Hydraulic components are only allowed to be repaired and/or replaced by a qualified mechanic.
4. Refer to the engine manuals supplied with this Powerig for further maintenance details.

HYDRAULIC FLUIDS

	* - <-- 0° C	* 0° - 30° C	* 30° C --> +
	HLP 32	HLP 46	HLP 68
AGIP	AGIP OSO 35	AGIP OSO 45	
ARAL	ARAL Vitam GF 32 ARAL Vitam DE 32 ARAL Vitam HF 32	ARAL Vitam GF 46 ARAL Vitam DE 46 ARAL Vitam HF 46	
AVIA	AVILUB Hydr.-Oil RSL 32 AVILUB Hydr.-Oil HVI 32	AVILUB Hydr.-Oil RSL 46 AVILUB Hydr.-Oil HVI 46	
BLASER	BLASOL 157	BLASOL 158	
BP	BP ENERGOL HLP 32 BP ENERGOL HLP-D 32 BP ENERGOL SHF 32	BP ENERGOL HLP 46 BP ENERGOL HLP-D 46 BP ENERGOL SHF 46	
CASTROL	CASTROL HYSPIN AWS 32	CASTROL HYSPIN AWS 46	
CHEVRON	EP Hydr.-Oil 32 EP Hydr.-Oil 32 HV	EP Hydr.-Oil 46 EP Hydr.-Oil 46 HV	
ELF	ELF Acantis 32	ELF Acantis 46 Hydrelf 46	
ESSO	NUTO H 32 HLPD-OIL 32	NUTO H 46 HLPD-OIL 46	
FINA	HIDRAN 32 Hydr.-Oil D 3011-32	HIDRAN 46 Hydr.-Oil D 3011-46	
FUCHS	RENOLIN MR 10 RENOLIN B 10	RENOLIN MR 25 RENOLIN B 15	
GULF	HARMONY 32 AW	HARMONY 46 AW	
HOUGHTON	HYDROLUBRIC VG 32	HYDROLUBRIC VG 46	
MOBIL	MOBIL D.T.E. 24 MOBIL D.T.E. 13	MOBIL D.T.E. 25	
OEST	Hydr.-Oil H-LP 32 Hydr.-Oil 32 DD	Hydr.-Oil H-LP 46 Hydr.-Oil 46 DD	
SHELL	SHELL Tellus Oil 32	SHELL Tellus Oil 46	
SUNOCO	SUNVIS 816-WR	SUNVIS 821-WR	
TEXACO	Rando Oil HD A-32 Rando Oil HD AZ-32 Alcor Oil DD 32	Rando Oil HD B-46 Alcor Oil DD 46	
VALVOLINE	VALVOLINE ETC-25	VALVOLINE ETC-30	

* Environment Temperature

Important Note:

The following pages contain the Material Safety Data Sheets (MSDS) for the Shell Tellus 46 Hydraulic Oil & the Esso Diesel Fuel which were both supplied with this Powerig when new.

The MSDS for the engine oil is contained in the SEPARATE Diesel Engine manuals supplied with the Powerig.

Shell Tellus Oil 46

Version 1.0

Effective Date 10.09.2009

Regulation 1907/2006/EC

Material Safety Data Sheet**1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND COMPANY/UNDERTAKING**

Material Name : Shell Tellus Oil 46
Uses : Hydraulic oil.
Product Code : 001D1368

Manufacturer/Supplier : Shell UK Oil Products Limited
 PO BOX 3
 Ellesmere Port
 CH65 4HB
 United Kingdom

Telephone : +44 (0) 151-350-4000
Fax : +44 (0) 151-350-4000
Email Contact for MSDS : If you have any enquiries about the content of this MSDS please email lubricantSDS@shell.com

Emergency Telephone Number : +44-(0) 151-350-4595

2. HAZARDS IDENTIFICATION

EC Classification : Not classified as dangerous under EC criteria.

Health Hazards : Not expected to be a health hazard when used under normal conditions. Prolonged or repeated skin contact without proper cleaning can clog the pores of the skin resulting in disorders such as oil acne/folliculitis. High-pressure injection under the skin may cause serious damage including local necrosis. Used oil may contain harmful impurities.

Signs and Symptoms : Oil acne/folliculitis signs and symptoms may include formation of black pustules and spots on the skin of exposed areas. Local necrosis is evidenced by delayed onset of pain and tissue damage a few hours following injection. Ingestion may result in nausea, vomiting and/or diarrhoea.

Safety Hazards : Not classified as flammable but will burn.
Environmental Hazards : Not classified as dangerous for the environment.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Preparation description : Highly refined mineral oils and additives.

Additional Information : The highly refined mineral oil contains <3% (w/w) DMSO-extract, according to IP346.

4. FIRST AID MEASURES

General Information : Not expected to be a health hazard when used under normal conditions.

Inhalation : No treatment necessary under normal conditions of use. If

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- symptoms persist, obtain medical advice.
- Skin Contact** : Remove contaminated clothing. Flush exposed area with water and follow by washing with soap if available. If persistent irritation occurs, obtain medical attention. When using high pressure equipment, injection of product under the skin can occur. If high pressure injuries occur, the casualty should be sent immediately to a hospital. Do not wait for symptoms to develop. Obtain medical attention even in the absence of apparent wounds.
- Eye Contact** : Flush eye with copious quantities of water. If persistent irritation occurs, obtain medical attention.
- Ingestion** : In general no treatment is necessary unless large quantities are swallowed, however, get medical advice.
- Advice to Physician** : Treat symptomatically. High pressure injection injuries require prompt surgical intervention and possibly steroid therapy, to minimise tissue damage and loss of function. Because entry wounds are small and do not reflect the seriousness of the underlying damage, surgical exploration to determine the extent of involvement may be necessary. Local anaesthetics or hot soaks should be avoided because they can contribute to swelling, vasospasm and ischaemia. Prompt surgical decompression, debridement and evacuation of foreign material should be performed under general anaesthetics, and wide exploration is essential.

5. FIRE FIGHTING MEASURES

Clear fire area of all non-emergency personnel.

- Specific Hazards** : Hazardous combustion products may include: A complex mixture of airborne solid and liquid particulates and gases (smoke). Carbon monoxide. Unidentified organic and inorganic compounds.
- Suitable Extinguishing Media** : Foam, water spray or fog. Dry chemical powder, carbon dioxide, sand or earth may be used for small fires only.
- Unsuitable Extinguishing Media** : Do not use water in a jet.
- Protective Equipment for Firefighters** : Proper protective equipment including breathing apparatus must be worn when approaching a fire in a confined space.

6. ACCIDENTAL RELEASE MEASURES

Avoid contact with spilled or released material. For guidance on selection of personal protective equipment see Chapter 8 of this Material Safety Data Sheet. See Chapter 13 for information on disposal. Observe all relevant local and international regulations.

- Protective measures** : Avoid contact with skin and eyes. Use appropriate containment to avoid environmental contamination. Prevent from spreading or entering drains, ditches or rivers by using sand, earth, or other appropriate barriers.
- Clean Up Methods** : Slippery when spilt. Avoid accidents, clean up immediately. Prevent from spreading by making a barrier with sand, earth or other containment material. Reclaim liquid directly or in an

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- Additional Advice** : absorbent. Soak up residue with an absorbent such as clay, sand or other suitable material and dispose of properly.
: Local authorities should be advised if significant spillages cannot be contained.

7. HANDLING AND STORAGE

- General Precautions** : Use local exhaust ventilation if there is risk of inhalation of vapours, mists or aerosols. Properly dispose of any contaminated rags or cleaning materials in order to prevent fires. Use the information in this data sheet as input to a risk assessment of local circumstances to help determine appropriate controls for safe handling, storage and disposal of this material.
- Handling** : Avoid prolonged or repeated contact with skin. Avoid inhaling vapour and/or mists. When handling product in drums, safety footwear should be worn and proper handling equipment should be used.
- Storage** : Keep container tightly closed and in a cool, well-ventilated place. Use properly labelled and closeable containers. Storage Temperature: 0 - 50°C / 32 - 122°F
The storage of this product may be subject to the Control of Pollution (Oil Storage) (England) Regulations. Further guidance maybe obtained from the local environmental agency office.
- Recommended Materials** : For containers or container linings, use mild steel or high density polyethylene.
- Unsuitable Materials** : PVC.
- Additional Information** : Polyethylene containers should not be exposed to high temperatures because of possible risk of distortion. Exposure to this product should be reduced as low as reasonably practicable. Reference should be made to the Health and Safety Executive's publication "COSHH Essentials".

8. EXPOSURE CONTROLS/PERSONAL PROTECTION**Occupational Exposure Limits**

- Exposure Controls** : The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Select controls based on a risk assessment of local circumstances.
Appropriate measures include: Adequate ventilation to control airborne concentrations. Where material is heated, sprayed or mist formed, there is greater potential for airborne concentrations to be generated.
- Personal Protective Equipment** : Personal protective equipment (PPE) should meet recommended national standards. Check with PPE suppliers.
- Respiratory Protection** : No respiratory protection is ordinarily required under normal conditions of use. In accordance with good industrial hygiene practices, precautions should be taken to avoid breathing of material. If engineering controls do not maintain airborne concentrations to a level which is adequate to protect worker

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- health, select respiratory protection equipment suitable for the specific conditions of use and meeting relevant legislation. Check with respiratory protective equipment suppliers. Where air-filtering respirators are suitable, select an appropriate combination of mask and filter. Select a filter suitable for combined particulate/organic gases and vapours [boiling point >65 °C (149 °F)] meeting EN141.
- Hand Protection** : Where hand contact with the product may occur the use of gloves approved to relevant standards (e.g. Europe: EN374, US: F739) made from the following materials may provide suitable chemical protection: PVC, neoprene or nitrile rubber gloves. Suitability and durability of a glove is dependent on usage, e.g. frequency and duration of contact, chemical resistance of glove material, glove thickness, dexterity. Always seek advice from glove suppliers. Contaminated gloves should be replaced. Personal hygiene is a key element of effective hand care. Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturizer is recommended.
- Eye Protection** : Wear safety glasses or full face shield if splashes are likely to occur. Approved to EU Standard EN166.
- Protective Clothing** : Skin protection not ordinarily required beyond standard issue work clothes.
- Monitoring Methods** : Monitoring of the concentration of substances in the breathing zone of workers or in the general workplace may be required to confirm compliance with an OEL and adequacy of exposure controls. For some substances biological monitoring may also be appropriate.
- Environmental Exposure Controls** : Minimise release to the environment. An environmental assessment must be made to ensure compliance with local environmental legislation.

9. PHYSICAL AND CHEMICAL PROPERTIES

- Appearance : Light brown. Liquid at room temperature.
- Odour : Slight hydrocarbon.
- pH : Not applicable.
- Initial Boiling Point and Boiling Range : > 280 °C / 536 °F estimated value(s)
- Pour point : Typical -30 °C / -22 °F
- Flash point : Typical 230 °C / 446 °F (COC)
- Upper / lower Flammability or Explosion limits : Typical 1 - 10 % (V) (based on mineral oil)
- Auto-ignition temperature : > 320 °C / 608 °F
- Vapour pressure : < 0.5 Pa at 20 °C / 68 °F (estimated value(s))
- Density : Typical 879 kg/m³ at 15 °C / 59 °F
- Water solubility : Negligible.
- n-octanol/water partition coefficient (log Pow) : > 6 (based on information on similar products)
- Kinematic viscosity : Typical 46 mm²/s at 40 °C / 104 °F
- Vapour density (air=1) : > 1 (estimated value(s))
- Evaporation rate (nBuAc=1) : Data not available

Shell Tellus Oil 46

Version 1.0

Effective Date 10.09.2009

Regulation 1907/2006/EC

Material Safety Data Sheet**10. STABILITY AND REACTIVITY**

Stability	: Stable.
Conditions to Avoid	: Extremes of temperature and direct sunlight.
Materials to Avoid	: Strong oxidising agents.
Hazardous	: Hazardous decomposition products are not expected to form during normal storage.
Decomposition Products	

11. TOXICOLOGICAL INFORMATION

Basis for Assessment	: Information given is based on data on the components and the toxicology of similar products.
Acute Oral Toxicity	: Expected to be of low toxicity: LD50 > 5000 mg/kg , Rat
Acute Dermal Toxicity	: Expected to be of low toxicity: LD50 > 5000 mg/kg , Rabbit
Acute Inhalation Toxicity	: Not considered to be an inhalation hazard under normal conditions of use.
Skin Irritation	: Expected to be slightly irritating. Prolonged or repeated skin contact without proper cleaning can clog the pores of the skin resulting in disorders such as oil acne/folliculitis.
Eye Irritation	: Expected to be slightly irritating.
Respiratory Irritation	: Inhalation of vapours or mists may cause irritation.
Sensitisation	: Not expected to be a skin sensitiser.
Repeated Dose Toxicity	: Not expected to be a hazard.
Mutagenicity	: Not considered a mutagenic hazard.
Carcinogenicity	: Product contains mineral oils of types shown to be non-carcinogenic in animal skin-painting studies. Highly refined mineral oils are not classified as carcinogenic by the International Agency for Research on Cancer (IARC). Other components are not known to be associated with carcinogenic effects.
Reproductive and Developmental Toxicity	: Not expected to be a hazard.
Additional Information	: Used oils may contain harmful impurities that have accumulated during use. The concentration of such impurities will depend on use and they may present risks to health and the environment on disposal. ALL used oil should be handled with caution and skin contact avoided as far as possible. High pressure injection of product into the skin may lead to local necrosis if the product is not surgically removed.

12. ECOLOGICAL INFORMATION

Ecotoxicological data have not been determined specifically for this product. Information given is based on a knowledge of the components and the ecotoxicology of similar products.

Acute Toxicity	: Poorly soluble mixture. May cause physical fouling of aquatic organisms. Expected to be practically non toxic: LL/EL/IL50 > 100 mg/l (to aquatic organisms) (LL/EL50 expressed as the nominal amount of product required to prepare aqueous test extract). Mineral oil is not expected to cause any chronic effects to aquatic organisms at concentrations less than 1 mg/l.
Mobility	: Liquid under most environmental conditions. Floats on water. If

Shell Tellus Oil 46

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Regulation 1907/2006/EC

Material Safety Data Sheet

- it enters soil, it will adsorb to soil particles and will not be mobile.
- Persistence/degradability** : Expected to be not readily biodegradable. Major constituents are expected to be inherently biodegradable, but the product contains components that may persist in the environment.
- Bioaccumulation** : Contains components with the potential to bioaccumulate.
- Other Adverse Effects** : Product is a mixture of non-volatile components, which are not expected to be released to air in any significant quantities. Not expected to have ozone depletion potential, photochemical ozone creation potential or global warming potential.

13. DISPOSAL CONSIDERATIONS

- Material Disposal** : Recover or recycle if possible. It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste classification and disposal methods in compliance with applicable regulations. Do not dispose into the environment, in drains or in water courses.
- Container Disposal** : Dispose in accordance with prevailing regulations, preferably to a recognised collector or contractor. The competence of the collector or contractor should be established beforehand.
- Local Legislation** : Disposal should be in accordance with applicable regional, national, and local laws and regulations.
EU Waste Disposal Code (EWC): 13 01 10 mineral based non-chlorinated hydraulic oils. Classification of waste is always the responsibility of the end user.

14. TRANSPORT INFORMATION**ADR**

This material is not classified as dangerous under ADR regulations.

RID

This material is not classified as dangerous under RID regulations.

ADNR

This material is not classified as dangerous under ADNR regulations.

IMDG

This material is not classified as dangerous under IMDG regulations.

IATA (Country variations may apply)

This material is not classified as dangerous under IATA regulations.

15. REGULATORY INFORMATION

The regulatory information is not intended to be comprehensive. Other regulations may apply to this material.

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Version 1.0

Effective Date 10.09.2009

Regulation 1907/2006/EC

Material Safety Data Sheet

EC Classification	: Not classified as dangerous under EC criteria.
EC Symbols	: No Hazard Symbol required
EC Risk Phrases	: Not classified.
EC Safety Phrases	: Not classified.
EINECS	: All components listed or polymer exempt.
TSCA	: All components listed.
Other Information	: Environmental Protection Act 1990 (as amended). Health and Safety at Work Act 1974. Consumers Protection Act 1987. Control of Pollution Act 1974. Environmental Act 1995. Factories Act 1961. Carriage of Dangerous Goods by Road and Rail (Classification, Packaging and Labelling) Regulations. Chemicals (Hazard Information and Packaging for Supply) Regulations 2002. Control of Substances Hazardous to Health Regulations 1994 (as amended). Road Traffic (Carriage of Dangerous Substances in Packages) Regulations. Merchant Shipping (Dangerous Goods and Marine Pollutants) Regulations. Road Traffic (Carriage of Dangerous Substances in Road Tankers in Tank Containers) Regulations. Road Traffic (Training of Drivers of Vehicles Carrying Dangerous Goods) Regulations. Reporting of Injuries, Diseases and Dangerous Occurrences Regulations. Health and Safety (First Aid) Regulations 1981. Personal Protective Equipment (EC Directive) Regulations 1992. Personal Protective Equipment at Work Regulations 1992.

16. OTHER INFORMATION

R-phrases)

Not classified.

MSDS Version Number	: 1.0
MSDS Effective Date	: 10.09.2009
MSDS Revisions	: A vertical bar () in the left margin indicates an amendment from the previous version.
MSDS Regulation	: Regulation 1907/2006/EC
MSDS Distribution	: The information in this document should be made available to all who may handle the product.
Disclaimer	: This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.



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SAFETY DATA SHEET

SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

As of the revision date above, this (M)SDS meets the regulations in the United Kingdom & Ireland.

PRODUCT

Product Name: ESSO DIESEL
Product Description: Hydrocarbons and Additives
Product Code: 708110-60
Intended Use: Diesel engine fuel

COMPANY IDENTIFICATION

Supplier: Esso Petroleum Company, Limited
 ExxonMobil House
 Emyn Way
 KT22 8UX Leatherhead, Surrey
 United Kingdom

24 Hour Environmental / Health Emergency Telephone e-mail 01372 222 000 (UK) / +44 1372 222 000 (Ireland)
 SDS-UK@EXXONMOBIL.COM

SECTION 2 HAZARDS IDENTIFICATION

This material is dangerous according to regulatory guidelines (see (M)SDS Section 15).

CLASSIFICATION: | Carc. Cat. 3; R40 | Xn; R65 | R66 | N; R51/53 |

PHYSICAL / CHEMICAL HAZARDS

Material can release vapours that readily form flammable mixtures. Vapour accumulation could flash and/or explode if ignited. Material can accumulate static charges which may cause an incendiary electrical discharge.

HEALTH HAZARDS

Limited evidence of a carcinogenic effect. Harmful: may cause lung damage if swallowed. Repeated exposure may cause skin dryness or cracking. Under conditions of poor personal hygiene and prolonged repeated contact, some polycyclic aromatic compounds (PACs) have been suspected as a cause of skin cancer in humans. May be irritating to the eyes, nose, throat, and lungs. May cause central nervous system depression. High-pressure injection under skin may cause serious damage.

ENVIRONMENTAL HAZARDS

Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Note: This material should not be used for any other purpose than the intended use in Section 1 without expert advice. Health studies have shown that chemical exposure may cause potential human health risks which may vary from person to person.

SECTION 3 COMPOSITION / INFORMATION ON INGREDIENTS

This material is regulated as a preparation.



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Reportable Hazardous Substance(s) or Complex Substance(s)

Name	CAS#	EINECS / ELINCS	Concentration *	Symbols/Risk Phrases
Fuels, diesel, no. 2	68476-34-6	270-676-1	> 94%	Xn;Carc. Cat. 3;R40, Xn;R65, R66, N;R51/53

* All concentrations are percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

Note: Composition may contain up to 0.5% performance additives and / or dyes. FAME (fatty acid methyl ester) may be present up to 5% - the maximum permitted by European Standard EN 590

SECTION 4	FIRST AID MEASURES
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INHALATION

Remove from further exposure. For those providing assistance, avoid exposure to yourself or others. Use adequate respiratory protection. If respiratory irritation, dizziness, nausea, or unconsciousness occurs, seek immediate medical assistance. If breathing has stopped, assist ventilation with a mechanical device or use mouth-to-mouth resuscitation.

SKIN CONTACT

Remove contaminated clothing. Dry wipe exposed skin and cleanse with waterless hand cleaner and follow by washing thoroughly with soap and water. For those providing assistance, avoid further skin contact to yourself or others. Wear impervious gloves. Launder contaminated clothing separately before reuse. Discard contaminated articles that cannot be laundered. If product is injected into or under the skin, or into any part of the body, regardless of the appearance of the wound or its size, the individual should be evaluated immediately by a physician as a surgical emergency. Even though initial symptoms from high pressure injection may be minimal or absent, early surgical treatment within the first few hours may significantly reduce the ultimate extent of injury.

EYE CONTACT

Flush thoroughly with water. If irritation occurs, get medical assistance.

INGESTION

Seek immediate medical attention. Do not induce vomiting.

NOTE TO PHYSICIAN

If ingested, material may be aspirated into the lungs and cause chemical pneumonitis. Treat appropriately.

PRE-EXISTING MEDICAL CONDITIONS WHICH MAY BE AGGRAVATED BY EXPOSURE

Hydrocarbon Solvents/Petroleum Hydrocarbons- Skin contact may aggravate an existing dermatitis.

SECTION 5	FIRE FIGHTING MEASURES
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EXTINGUISHING MEDIA

Appropriate Extinguishing Media: Use water fog, foam, dry chemical or carbon dioxide (CO₂) to extinguish flames.

Inappropriate Extinguishing Media: Straight streams of water



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FIRE FIGHTING

Fire Fighting Instructions: Evacuate area. Prevent run-off from fire control or dilution from entering streams, sewers or drinking water supply. Fire-fighters should use standard protective equipment and in enclosed spaces, self-contained breathing apparatus (SCBA). Use water spray to cool fire exposed surfaces and to protect personnel.

Hazardous Combustion Products: Aldehydes, Sulphur Oxides, Smoke, Fume, Incomplete combustion products, Oxides of carbon

FLAMMABILITY PROPERTIES

Flash Point [Method]: >56C (133F) [ASTM D-93]
Flammable Limits (Approximate volume % in air): LEL: 0.6 UEL: 7.0
Autoignition Temperature: >250°C (482F)

SECTION 6

ACCIDENTAL RELEASE MEASURES

NOTIFICATION PROCEDURES

In the event of a spill or accidental release, notify relevant authorities in accordance with all applicable regulations.

PROTECTIVE MEASURES

Avoid contact with spilled material. Warn or evacuate occupants in surrounding and downwind areas if required, due to toxicity or flammability of the material. See Section 5 for fire fighting information. See the Hazard Identification Section for Significant Hazards. See Section 4 for First Aid Advice. See Section 8 for Personal Protective Equipment.

SPILL MANAGEMENT

Land Spill: Eliminate all ignition sources (no smoking, flares, sparks or flames in immediate area). Stop leak if you can do so without risk. All equipment used when handling the product must be grounded. Do not touch or walk through spilled material. Prevent entry into waterways, sewer, basements or confined areas. A vapour-suppressing foam may be used to reduce vapour. Use clean non-sparking tools to collect absorbed material. Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers. Large Spills: Water spray may reduce vapour, but may not prevent ignition in enclosed spaces.

Water Spill: Stop leak if you can do so without risk. Eliminate sources of ignition. If the Flash Point exceeds the Ambient Temperature by 10 deg C or more, use containment booms and remove from the surface by skimming or with suitable absorbents when conditions permit. If the Flash Point does not exceed the Ambient Air Temperature by at least 10C, use booms as a barrier to protect shorelines and allow material to evaporate. Seek the advice of a specialist before using dispersants.

Water spill and land spill recommendations are based on the most likely spill scenario for this material; however, geographic conditions, wind, temperature, (and in the case of a water spill) wave and current direction and speed may greatly influence the appropriate action to be taken. For this reason, local experts should be consulted. Note: Local regulations may prescribe or limit action to be taken.

ENVIRONMENTAL PRECAUTIONS

Large Spills: Dyke far ahead of liquid spill for later recovery and disposal. Prevent entry into waterways, sewers, basements or confined areas.

SECTION 7

HANDLING AND STORAGE



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HANDLING

Avoid all personal contact. Use proper bonding and/or earthing procedures. Do not use as a cleaning solvent or other non-motor fuel uses. For use as a motor fuel only. Do not use electronic devices (including but not limited to cellular phones, computers, calculators, pagers or other electronic devices etc) in or around any fuelling operation or storage area unless the devices are certified intrinsically safe by an approved national testing agency and to the safety standards required by national and/or local laws and regulations. Prevent small spills and leakage to avoid slip hazard. Do not siphon by mouth. Material can accumulate static charges which may cause an electrical spark (ignition source).

Static Accumulator: This material is a static accumulator.

STORAGE

Keep container closed. Handle containers with care. Open slowly in order to control possible pressure release. Store in a cool, well-ventilated area. Storage containers should be earthed and bonded. Drums must be earthed and bonded and equipped with self-closing valves, pressure vacuum bungs and flame arresters.

SECTION 8	EXPOSURE CONTROLS / PERSONAL PROTECTION
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EXPOSURE LIMIT VALUES

Exposure limits/standards (Note: Exposure limits are not additive)

Substance Name	Form	Limit/Standard		Note	Source	Year
Fuels, diesel, no. 2	Stable Aerosol.	TWA	5 mg/m ³		ExxonMobil	2007
Fuels, diesel, no. 2	Vapour.	TWA	200 mg/m ³		ExxonMobil	2007

Note: Information about recommended monitoring procedures can be obtained from the relevant agency(ies)/institute(s):

ENGINEERING CONTROLS

The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Control measures to consider:
 Use explosion-proof ventilation equipment to stay below exposure limits.

PERSONAL PROTECTION

Personal protective equipment selections vary based on potential exposure conditions such as applications, handling practices, concentration and ventilation. Information on the selection of protective equipment for use with this material, as provided below, is based upon intended, normal usage.

Respiratory Protection: If engineering controls do not maintain airborne contaminant concentrations at a level which is adequate to protect worker health, an approved respirator may be appropriate. Respirator selection, use, and maintenance must be in accordance with regulatory requirements, if applicable. Types of respirators to be considered for this material include:

No special requirements under ordinary conditions of use and with adequate ventilation.

For high airborne concentrations, use an approved supplied-air respirator, operated in positive pressure mode.



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Supplied air respirators with an escape bottle may be appropriate when oxygen levels are inadequate, gas/vapour warning properties are poor, or if air purifying filter capacity/rating may be exceeded.

Hand Protection: Any specific glove information provided is based on published literature and glove manufacturer data. Work conditions can greatly affect glove durability; inspect and replace worn or damaged gloves. The types of gloves to be considered for this material include:

Chemical resistant gloves are recommended. If contact with forearms is likely wear gauntlet style gloves. CEN standards EN 420 and EN 374 provide general requirements and lists of glove types.

Eye Protection: If contact with material is likely, chemical goggles are recommended.

Skin and Body Protection: Any specific clothing information provided is based on published literature or manufacturer data. The types of clothing to be considered for this material include:

Chemical/oil resistant clothing is recommended.

Specific Hygiene Measures: Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Discard contaminated clothing and footwear that cannot be cleaned. Practice good housekeeping.

ENVIRONMENTAL CONTROLS

See Sections 6, 7, 12, 13.

SECTION 9	PHYSICAL AND CHEMICAL PROPERTIES
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Typical physical and chemical properties are given below. Consult the Supplier in Section 1 for additional data.

GENERAL INFORMATION

Physical State: Liquid
Colour: Light Colored
Odour: Petroleum/solvent
Odour Threshold: N/D

IMPORTANT HEALTH, SAFETY, AND ENVIRONMENTAL INFORMATION

Relative Density (at 15 C): 0.85
Flash Point [Method]: >56C (133F) [ASTM D-93]
Flammable Limits (Approximate volume % in air): LEL: 0.6 UEL: 7.0
Autoignition Temperature: >250°C (482F)
Boiling Point / Range: > 180C (356F)
Vapour Density (Air = 1): > 2 at 101 kPa
Vapour Pressure: < 0.04 kPa (0.3 mm Hg) at 20°C
Evaporation Rate (N-Butyl Acetate = 1): N/D
pH: N/D
Log Pow (n-Octanol/Water Partition Coefficient): > 3.5
Solubility in Water: Negligible
Viscosity: 2 cSt (2 mm²/sec) at 40°C - 4 cSt (4 mm²/sec) at 40°C
Oxidising properties: See Sections 3, 15, 16.

OTHER INFORMATION

Freezing Point: N/D



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Melting Point: N/A

SECTION 10	STABILITY AND REACTIVITY
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STABILITY: Material is stable under normal conditions.

CONDITIONS TO AVOID: Open flames and high energy ignition sources.

MATERIALS TO AVOID: Halogens, Strong Acids, Strong Bases, Strong oxidisers

HAZARDOUS DECOMPOSITION PRODUCTS: Material does not decompose at ambient temperatures.

HAZARDOUS POLYMERIZATION: Will not occur.

SECTION 11	TOXICOLOGICAL INFORMATION
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Acute Toxicity

Route of Exposure	Conclusion / Remarks
INHALATION	
Toxicity: LC50 > 5000 mg/m3	Minimally Toxic. Based on test data for structurally similar materials.
Irritation: Data available.	Elevated temperatures or mechanical action may form vapours, mist, or fumes which may be irritating to the eyes, nose, throat, or lungs. Based on test data for structurally similar materials.
INGESTION	
Toxicity: LD50 > 2000 mg/kg	Minimally Toxic. Based on test data for structurally similar materials.
Skin	
Toxicity: LD50 > 2000 mg/kg	Minimally Toxic. Based on test data for structurally similar materials.
Irritation: Data available.	May dry the skin leading to discomfort and dermatitis. Based on test data for structurally similar materials.
Eye	
Irritation: Data available.	May cause mild, short-lasting discomfort to eyes. Based on test data for structurally similar materials.

CHRONIC/OTHER EFFECTS

For the product itself:

Vapour concentrations above recommended exposure levels are irritating to the eyes and the respiratory tract, may cause headaches and dizziness, are anaesthetic and may have other central nervous system effects. Small amounts of liquid aspirated into the lungs during ingestion or from vomiting may cause chemical pneumonitis or pulmonary edema.

Diesel fuel: Carcinogenic in animal tests. Caused mutations in-vitro. Repeated dermal exposures to high concentrations in test animals resulted in reduced litter size and litter weight, and increased fetal resorptions at maternally toxic doses. Dermal exposure to high concentrations resulted in severe skin irritation with weight loss and some mortality. Inhalation exposure to high concentrations resulted in respiratory tract irritation, lung changes/infiltration/accumulation, and reduction in lung function. Diesel exhaust fumes: Carcinogenic in animal tests. Inhalation exposures to exhaust for 2 years in test animals resulted in lung tumours and lymphoma. Extract of particulate produced skin tumours in test animals. Caused mutations in-vitro.



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Additional information is available by request.

SECTION 12	ECOLOGICAL INFORMATION
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The information given is based on data available for the material, the components of the material, and similar materials.

ECOTOXICITY

Material -- Expected to be toxic to aquatic organisms. May cause long-term adverse effects in the aquatic environment.

MOBILITY

More volatile component -- Highly volatile, will partition rapidly to air. Not expected to partition to sediment and wastewater solids.

High molecular wt. component -- Low solubility and floats and is expected to migrate from water to the land. Expected to partition to sediment and wastewater solids.

PERSISTENCE AND DEGRADABILITY**Biodegradation:**

Material -- Expected to be inherently biodegradable

Atmospheric Oxidation:

More volatile component -- Expected to degrade rapidly in air

SECTION 13	DISPOSAL CONSIDERATIONS
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Disposal recommendations based on material as supplied. Disposal must be in accordance with current applicable laws and regulations, and material characteristics at time of disposal.

DISPOSAL RECOMMENDATIONS

Product is suitable for burning in an enclosed controlled burner for fuel value or disposal by supervised incineration at very high temperatures to prevent formation of undesirable combustion products.

REGULATORY DISPOSAL INFORMATION

European Waste Code: 13 07 01

NOTE: These codes are assigned based upon the most common uses for this material and may not reflect contaminants resulting from actual use. Waste producers need to assess the actual process used when generating the waste and its contaminants in order to assign the proper waste disposal code(s).

This material is considered as hazardous waste pursuant to Directive 91/689/EEC on hazardous waste, and subject to the provisions of that Directive unless Article 1(5) of that Directive applies.

Empty Container Warning Empty Container Warning (where applicable): Empty containers may contain residue and can be dangerous. Do not attempt to refill or clean containers without proper instructions. Empty drums should be completely drained and safely stored until appropriately reconditioned or disposed. Empty containers should be taken



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for recycling, recovery, or disposal through suitably qualified or licensed contractor and in accordance with governmental regulations. DO NOT PRESSURISE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND, OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS, STATIC ELECTRICITY, OR OTHER SOURCES OF IGNITION. THEY MAY EXPLODE AND CAUSE INJURY OR DEATH.

SECTION 14	TRANSPORT INFORMATION
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LAND (ADR/RID)

Proper Shipping Name: GAS OIL
 Proper Shipping Name Suffix: Special Provision 640L
 Hazard Class: 3
 Classification Code: F1
 UN Number: 1202
 Packing Group: III
 Label(s) / Mark(s): 3
 Hazard ID Number: 30
 CEFIC Tremcard: 30S1202
 Hazchem EAC: 3Y
 Transport Document Name: UN1202, GAS OIL, 3, PG III

INLAND WATERWAYS (ADNR)

Proper Shipping Name: GAS OIL
 Hazard Class: 3
 Hazard ID Number: 30
 UN or ID Number: 1202
 Packing Group: III
 Label(s) / Mark(s): 3
 Transport Document Name: UN1202, GAS OIL, 3, PG III

SEA (IMDG)

Proper Shipping Name: GAS OIL
 Hazard Class & Division: 3
 UN Number: 1202
 Packing Group: III
 Label(s): 3
 EMS Number: F-E, S-E
 Transport Document Name: UN1202, GAS OIL, 3, PG III, (56°C c.c.)

AIR (IATA)

Proper Shipping Name: GAS OIL
 Hazard Class & Division: 3
 UN Number: 1202
 Packing Group: III
 Label(s): 3
 Transport Document Name: UN1202, GAS OIL, 3, PG III

SECTION 15	REGULATORY INFORMATION
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Material is dangerous as defined by the EU Dangerous Substances/Preparations Directives.

CLASSIFICATION: Category 3 Carcinogen. Harmful. Dangerous for the environment.



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EU LABELING:

Symbol: Xn, N



Harmful.



Dangerous for
the environment.

Nature of Special Risk: R40; Limited evidence of a carcinogenic effect. R65; Harmful: may cause lung damage if swallowed. R66; Repeated exposure may cause skin dryness or cracking. R51/53; Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Safety Advice: S2; Keep out of the reach of children. S36/37; Wear suitable protective clothing and gloves. S61; Avoid release to the environment. Refer to special instructions/safety data sheets. S62; If swallowed, do not induce vomiting: seek medical advice immediately and show this container or label.

Contains: Fuels, diesel, no. 2

REGULATORY STATUS AND APPLICABLE LAWS AND REGULATIONS

Complies with the following national/regional chemical inventory requirements: EINECS, TSCA, ENCS

Applicable EU Directives and Regulations:

EU Directive:

92/85/EEC [...pregnant workers...recently given birth or...breastfeeding directive]
 94/33/EC [...on the protection of young people at work]

SECTION 16	OTHER INFORMATION
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N/D = Not determined, N/A = Not applicable

KEY TO THE RISK CODES CONTAINED IN SECTION 2 AND 3 OF THIS DOCUMENT (for information only):

R40; Limited evidence of a carcinogenic effect.

R51/53; Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

R65; Harmful: may cause lung damage if swallowed.

R66; Repeated exposure may cause skin dryness or cracking.

THIS SAFETY DATA SHEET CONTAINS THE FOLLOWING REVISIONS:

No revision information is available.

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Internal Use Only

MHC: 1A, 0, 0, 0, 1, 1

PPEC: C

DGN: 7081439XGB (1012120)

LIMITED WARRANTIES

Tooling Warranty: Huck warrants that tooling and other items (excluding fasteners, and hereinafter referred as "other items") manufactured by Huck shall be free from defects in workmanship and materials for a period of ninety (90) days from the date of original purchase.

Warranty on "non standard or custom manufactured products": With regard to non-standard products or custom manufactured products to customer's specifications, Huck warrants for a period of ninety (90) days from the date of purchase that such products shall meet Buyer's specifications, be free of defects in workmanship and materials. Such warranty shall not be effective with respect to non-standard or custom products manufactured using buyer-supplied molds, material, tooling and fixtures that are not in good condition or repair and suitable for their intended purpose.

THERE ARE NO WARRANTIES WHICH EXTEND BEYOND THE DESCRIPTION ON THE FACE HEREOF. HUCK MAKES NO OTHER WARRANTIES AND EXPRESSLY DISCLAIMS ANY OTHER WARRANTIES, INCLUDING IMPLIED WARRANTIES AS TO MERCHANTABILITY OR AS TO THE FITNESS OF THE TOOLING, OTHER ITEMS, NONSTANDARD OR CUSTOM MANUFACTURED PRODUCTS FOR ANY PARTICULAR PURPOSE AND HUCK SHALL NOT BE LIABLE FOR ANY LOSS OR DAMAGE, DIRECTLY OR INDIRECTLY, ARISING FROM THE USE OF SUCH TOOLING, OTHER ITEMS, NONSTANDARD OR CUSTOM MANUFACTURED PRODUCTS OR BREACH OF WARRANTY OR FOR ANY CLAIM FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES.

Huck's sole liability and Buyer's exclusive remedy for any breach of warranty shall be limited, at Huck's option, to replacement or repair, at FOB Huck's plant, of Huck manufactured tooling, other items, nonstandard or custom products found to be defective in specifications, workmanship and materials not otherwise the direct or indirect cause of Buyer supplied molds, material, tooling or fixtures. Buyer shall give Huck written notice of claims for defects within the ninety (90) day warranty period for tooling, other items, nonstandard or custom products described above and Huck shall inspect products for which such claim is made.

Tooling, Part(s) and Other Items not manufactured by Huck.

HUCK MAKES NO WARRANTY WITH RESPECT TO THE TOOLING, PART(S) OR OTHER ITEMS MANUFACTURED BY THIRD PARTIES. HUCK EXPRESSLY DISCLAIMS ANY WARRANTY EXPRESSED OR IMPLIED, AS TO THE CONDITION, DESIGN, OPERATION,

MERCHANTABILITY OR FITNESS FOR USE OF ANY TOOL, PART(S), OR OTHER ITEMS THEREOF NOT MANUFACTURED BY HUCK. HUCK SHALL NOT BE LIABLE FOR ANY LOSS OR DAMAGE, DIRECTLY OR INDIRECTLY, ARISING FROM THE USE OF SUCH TOOLING, PART(S) OR OTHER ITEMS OR BREACH OF WARRANTY OR FOR ANY CLAIM FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES.

The only warranties made with respect to such tool, part(s) or other items thereof are those made by the manufacturer thereof and Huck agrees to cooperate with Buyer in enforcing such warranties when such action is necessary.

Huck shall not be liable for any loss or damage resulting from delays or nonfulfillment of orders owing to strikes, fires, accidents, transportation companies or for any reason or reasons beyond the control of the Huck or its suppliers.

Huck Installation Equipment

Huck International, Inc. reserves the right to make changes in specifications and design and to discontinue models without notice.

Huck Installation Equipment should be serviced by trained service technicians only.

Always give the Serial Number of the equipment when corresponding or ordering service parts.

Complete repair facilities are maintained by Huck International, Inc. Please contact one of the offices listed below.

Eastern

One Corporate Drive Kingston, New York 12401-0250 Telephone (845) 331-7300 FAX (845) 334-7333

Canada

6150 Kennedy Road Unit 10, Mississauga, Ontario, L5T 2J4, Canada.

Telephone (905) 564-1825 FAX (905) 564-1963

Outside USA and Canada

Contact your nearest Huck International Office, see back cover.

In addition to the above repair facilities, there are Authorized Tool Service Centers (ATSC's) -located throughout the 'United States. These service centers offer repair services, spare parts, Service Parts Kits, Service Tools Kits and Nose Assemblies. Please contact your Huck Representative or the nearest Huck office listed on the back cover for the ATSC in your area.



For the Long Haul™

A Global Organization

Alcoa Fastening Systems (AFS) maintains company offices throughout the United States and Canada, with subsidiary offices in many other countries. Authorized AFS distributors are also located in many of the world's

industrial and Aerospace centers, where they provide a ready source of AFS fasteners, installation tools, tool parts, and application assistance.

Alcoa Fastening Systems world-wide locations:

Americas

Alcoa Fastening Systems

Aerospace Products Tucson Operations

3724 East Columbia
Tucson, AZ 85714
800-234-4825
520-747-9898
FAX: 520-748-2142

Alcoa Fastening Systems

Aerospace Products Carson Operations

PO Box 5268
900 Watson Center Rd.
Carson, CA 90749
800-421-1459
310-830-8200
FAX: 310-830-1436

Alcoa Fastening Systems

Commercial Products Waco Operations

PO Box 8117
8001 Imperial Drive
Waco, TX 76714-8117
800-388-4825
254-776-2000
FAX: 254-751-5259

Alcoa Fastening Systems

Commercial Products Kingston Operations

1 Corporate Drive
Kingston, NY 12401
800-431-3091
845-331-7300
FAX: 845-334-7333
www.hucktools.com

Alcoa Fastening Systems

Commercial Products Canada Operations

6150 Kennedy Road, Unit 10
Mississauga, Ontario L5T2J4
Canada
905-564-4825
FAX: 905-564-1963

Alcoa Fastening Systems

Commercial Products Latin America Operations

Avenida Parque Lira. 79-402
Tacubaya Mexico, D.F.
C.P. 11850
FAX: 525-515-1776
TELEX: 1173530 LUKSME

Far East

Alcoa Fastening Systems

Commercial Products Australia Operations

14 Viewtech Place
Rowville, Victoria
Australia 3178
03-764-5500
Toll Free: 008-335-030
FAX: 03-764-5510

Europe

Alcoa Fastening Systems

Commercial Products United Kingdom Operations

Unit C, Stafford Park 7
Telford, Shropshire
England TF3 3BQ
01952-290011
FAX: 0952-290459

Alcoa Fastening Systems

Aerospace Products France Operations

Clos D'Asseville
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33-1-30-27-9500
FAX: 33-1-34-66-0600

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