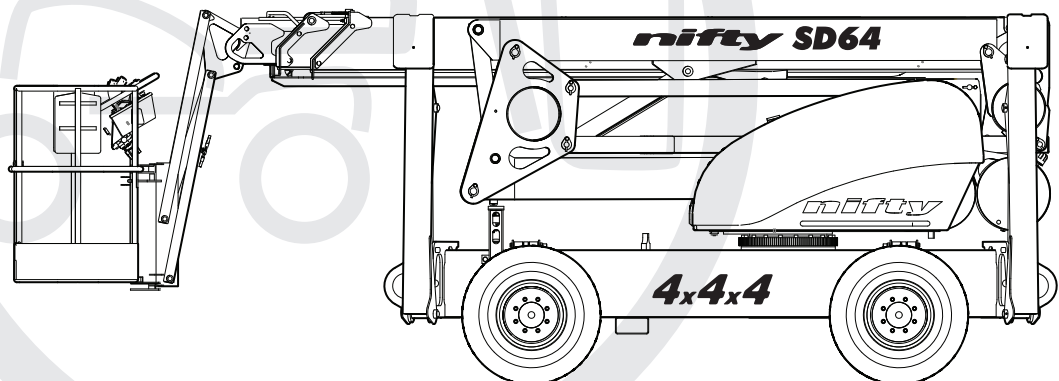


**nifty**

**SD64**

**Service Manual**

**MODEL SD64 SERIES**



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M50810/03



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# 1 Introduction and general information

## 1.1 Foreword

The purpose of this manual is to provide the owner, service engineer or technician with information to service and maintain the Niftylift.

Prior to carrying out any maintenance or operating the Niftylift the operator's manual should be read and fully understood.

The manufacturer has no direct control over the Niftylift's application and use, therefore conformance with good safety practices is the responsibility of the user and his operating personnel.

All information in this manual is based on the use of the Niftylift under proper operating conditions.

**Alteration or modification of the Niftylift are strictly forbidden.**

One of the most important facts to remember is that any equipment is only as safe as those who operate it.

### Warnings and Cautions

Any place these topics may appear, either in this manual or on the Niftylift, are defined as follows:



**THE 'SAFETY ALERT' SYMBOL IS USED TO CALL ATTENTION TO POTENTIAL HAZARDS THAT, IF IGNORED, MAY LEAD TO SERIOUS INJURY OR DEATH.**

#### **⚠ DANGER**

Indicates hazardous situations, which if not avoided, will result in serious injury or death.

#### **⚠ WARNING**

Indicates potentially hazardous situations, which if not avoided, could result in serious injury or death.

#### **⚠ CAUTION**

Indicates potentially hazardous situations, which if not avoided, could result in minor or moderate injury.

#### **NOTICE**

Indicates important information that is not safety related. This includes general safety rules and/or procedures relating to the Niftylift.

**IMPORTANT AND INSTRUCTIONS:** Denotes procedures essential to safe operation and prevention of damage to or destruction of the Niftylift.

### 1.1.1 Defined maintenance terms

Defined maintenance terms used within this manual can be found in the Table 1.1, "Defined Maintenance Terms," on page 2.

**Table 1.1: Defined Maintenance Terms**

<b>Term</b>	<b>Action</b>
Remove	Disconnect and take off component
Install	Place component in position ready for use
Replace	Remove and discard the original component and put a new component in its place
Secure	Install or attach locking device
Reinstall	Install the previously removed component
Tighten	Apply specified torque
Clean	Remove all dirt and deposits
Inspect	Determine general condition conforms to required standards
Check	Determine a particular condition e.g. completeness, security, position
Adjust	Change or move in order to achieve a desired result
Connect	Install, engage component
Lubricate	Apply lubricant
Disconnect	Remove, disengage component

## 1.2 Warranty

During the warranty period, consult Niftylift prior to carrying out any corrective maintenance on your Niftylift. If work is carried out without Niftylift consent your warranty will be invalidated.

Clean assembly practices must be observed when carrying out repairs, as seals and other hydraulic components are sensitive to contamination.

The Niftylift must not have been neglected, misused or modified and must have been regularly maintained.

Failure to comply with these conditions invalidates the warranty.

## 1.3 Scope

Please note at the time of going to press all information, illustrations, details and descriptions contained herein are valid. Niftylift reserves the right to change, alter, modify or improve its products without any obligations to install them on previously manufactured Niftylifts.

If information is found to be either incorrect or missing Niftylift encourage you to send in suggestions which will aid our continuous product improvement.

If after reading this manual you require further information contact us at your nearest office or see the My Nifty section on [www.niftylift.com](http://www.niftylift.com).

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## **1.4 General maintenance information**

Any repair or maintenance work on a Niftylift must be undertaken by a competent person with sufficient training and experience to perform the activity. Basic mechanical, hydraulic, and electrical skills are required to perform routine maintenance and minor repairs to a Niftylift. However, several procedures require specialized skills, tools, lifting equipment and a suitable workshop. In these instances, it is recommended that maintenance and repair be performed by Niftylift or at a Niftylift approved service center.

Niftylift's safety rules and instructions must be obeyed at all times.

Refer to "Frequent inspection" on page 4 where the Niftylift has been out of service for a period longer than 3 months. Different time scales may apply, always comply with local or national regulations.

**⚠ WARNING FAILURE TO PERFORM PREVENTATIVE MAINTENANCE AT THE REQUIRED INTERVALS MAY RESULT IN A NIFTYLIFT THAT IS NOT SAFE TO USE WHICH COULD CAUSE INJURY OR POSSIBLE DEATH.**

Regular inspections and appropriate maintenance will ensure the Niftylift performs efficiently and economically with minimal service or repair down time.

### **1.4.1 Pre-maintenance checks**

Perform the following before maintaining the Niftylift:

- Park the Niftylift on firm and level ground,
- Turn off ignition, remove the key, and relieve hydraulic system pressure,
- Ensure the Niftylift is in transport mode, i.e. all booms lowered and rotated parallel to the base, and basket floor horizontal,
- Ensure wheels are chocked, and, if installed, engage the parking brake,
- Allow the Niftylift to cool down,
- Disconnect power to the Niftylift,
- Disconnect batteries before replacing electrical components.

### **1.4.2 Maintenance information**

Ensure maintenance is carried out in suitable workshop facilities with appropriate tools and suitable lifting equipment.

Components must be replaced with identical or equivalent parts. If unsure contact your nearest Niftylift approved dealer for advice.

Inspect all parts prior to reassembly and replace if necessary. Do not install faulty, used, or worn parts to a Niftylift.

Replace all O-rings, seals and gaskets at reassembly.

Replace any parts with damaged threads; replace all roll pins, self locking fittings and circlips.

If any part resists removal check all fasteners, hydraulic lines, electrical wires and interferences before continuing.

Keep all new parts in their packaging until they are to be installed, carry out inspection before installation.

Mark or tag all hydraulic lines before removal to avoid confusion and errors during reinstallation. Never leave hydraulic lines open or open them in a contaminated area. Always use plugs or caps.

Use only recommended lubricants. See section 2.4.

In general, installation of components can be completed by reversing the removal process and instructions.

Please refer to the following documents for further details.

**Table 1.2: Technical Documents**

Document	Number
Hydraulic Schematic	D81232
Electric Schematic	D81249
Operating and Safety Instructions	M50907
Parts Manual	M50180
Engine Operator's Manual	M50292

For easy access to any of the above documents go to [www.niftylift.com](http://www.niftylift.com), register in the '**My Nifty Registration**' section, then navigate to the '**My Nifty**' section and enter the **Niftylift Serial Number**.

### 1.4.3 Frequent inspection

**The owner of the Niftylift shall make sure that a frequent inspection is carried out in accordance with the manufacturer's instructions, on a Niftylift:**

- (1) That was purchased used. This inspection shall be accomplished unless it is determined that the frequent and annual inspections are current.
- (2) That has been in service for three months or 150 hours, whichever comes first.
- (3) That has been out of service for a period longer than 3 months.

The inspection must be made by a person qualified as a technician on the specific type of Niftylift or one having similar design characteristics. The inspection must be in accordance with items specified by the manufacturer for a frequent Inspection and shall include, but not limited to the following:

- (1) All functions and their controls for speed(s), smoothness, and limits of motion.
- (2) Lower controls including the provisions for overriding of upper controls.
- (3) All chain and cable mechanisms for adjustment and worn or damaged parts.
- (4) All emergency and safety devices.
- (5) Lubrication of all moving parts, inspection of filter element(s), hydraulic oil, engine oil, and coolant as specified by the manufacturer.
- (6) Visual inspection of structural components and other critical components such as fasteners, pins, shafts, and locking devices.
- (7) Placards, warnings and control markings.
- (8) Items specified by the manufacturer.
- (9) Emergency lowering means.

#### 1.4.4 Annual inspection

**The owner of the Niftylift shall make sure that an annual inspection is performed no later than thirteen (13) months from the date of the prior annual inspection.**

The inspection must be made by a person qualified as a technician on the specific type of Niftylift or one having similar design characteristics. The inspection shall include all items included in the frequent inspection (See section 1.4.3) plus items specified by the manufacturer for an annual inspection, to include manufacturer's bulletins.

The inspection shall verify that the MEWP (Mobile Elevated Work Platform) is registered with Niftylift and that any open safety-related bulletins are addressed as part of the inspection. The MEWP shall not be placed back into service until all malfunctions and problems identified in the inspection have been rectified.

The owner shall maintain on the MEWP a means to identify the date the last annual inspection was performed and the interval at which annual inspections are required.

### 1.5 Maintenance safety information

#### 1.5.1 Personal injury prevention

**⚠ WARNING CORRECT PPE (PERSONAL PROTECTION EQUIPMENT) MUST BE WORN FOR ALL MAINTENANCE OPERATIONS CARRIED OUT ON YOUR NIFTYLIFT ACCESS PLATFORM.**

Do not wear jewellery whilst carrying out maintenance. Restrain long hair and do not wear loose clothing. Ensure the work area is well ventilated and well lit.

Never work under an elevated boom. Booms must be restrained from movement by blocking, using overhead slings or fitting a safety prop.

Ensure all stepping surfaces, hand holds and anti-slip surfaces are free from oil, dirt, fuel and ice. Do not step on parts of the Niftylift which are not intended for this.

Use caution when checking hot pressurized systems such as hydraulic and engine coolant.

Use correct tools and equipment, broken or damaged tools and equipment should be replaced/repared.

Where hydraulic or electrical circuits need to be energized e.g. during maintenance or diagnostic procedures, personnel must be aware of moving parts and position themselves accordingly to avoid being crushed or injured.

#### 1.5.2 Machine damage prevention

Never reset a pressure relief valve to a value higher than that stated by the manufacturer.

Ensure no tools, equipment or other objects have been left on the Niftylift.

Please contact your nearest Niftylift approved dealer prior to carrying out any welding.

Never start the engine without the power tray retaining bolt installed.

### 1.5.3 Diesel system safety

Escaping fuel under pressure can penetrate the skin causing serious injury. Do not attempt work on the fuel system without proper training and safety equipment.

Seek immediate medical attention in the event of fuel penetrating the skin.

### 1.5.4 Hydraulic safety

Hydraulic oil escaping under pressure can penetrate the skin and cause serious injury. Do not allow hydraulic oil to squirt or spray.

Seek immediate medical attention in the event of hydraulic oil penetrating the skin.

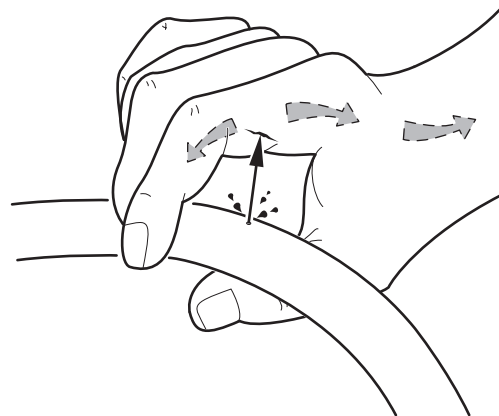
Wear chemical-resistant protective gloves and suitable eye protection when handling hydraulic oil.

Relieve system pressure before removing any hydraulic connections, undo fittings slowly to make sure there is no residual pressure. If pressure is detected, allow it to be released slowly before completely removing the hose.

Fluid leaks may not be visible to the naked eye. Use a piece of cardboard to check for leaks, **not** your hand.

Never install hydraulic lines or components that are damaged.

Ensure all connections are correctly tightened (See section 2.7).



### 1.5.5 Electrical safety

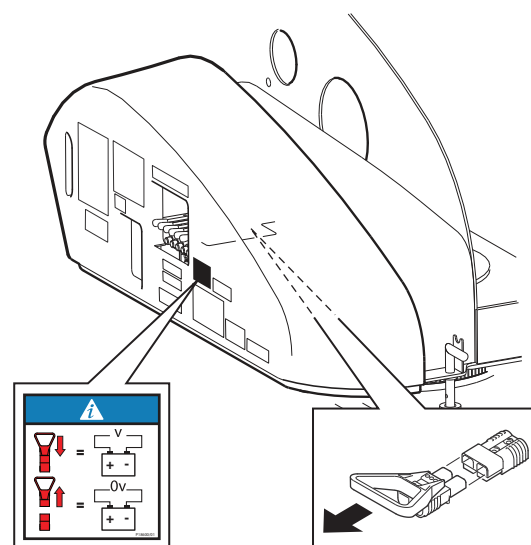
During maintenance of the electrical system, pull the battery-disconnect handle (Anderson).

Ensure sparks, flames or lighted tobacco are kept away from batteries as they emit explosive gases.

Keep metallic objects (tools, etc.) well clear from battery posts.

Ensure battery posts are always protected and caps are installed and in good condition.

Never connect a discharged battery in series with a fully charged battery as this creates a risk of explosion. Always use batteries that have the same level of charge.



### **1.5.6 Environmental awareness**

When draining fluids, ensure they are collected in a suitable container and spillages are avoided.

Used batteries must be disposed of in the correct manner as waste is harmful to the environment.

Consumables such as oils, rags and gloves should also be disposed of correctly in accordance to local regulations as waste is harmful to the environment.

## 2 Specifications

Information correct at time of print, refer to serial number of the Niftylift.

### 2.1 Engine specifications

Feature	Kubota V1505
Type	Water cooled 4-cycle, 4 cylinder diesel engine
Fuel	Diesel fuel grade 2-D
Engine oil	See section 2.4.2
Mass (Dry weight)	110kg (243 lbs)
Displacement	1498cm <sup>3</sup> (91.41 cu.in)
Net power	18.5kW/24.8hp @ 2300rpm
Oil capacity	6.0 L (1.58 US Gal)
Fuel capacity	80.0 L (21.13 US Gal)
Coolant capacity	Approx. 4.5 L (1.19 US Gal)
Valve clearance (cold)	0.145 - 0.185mm (0.0057 - 0.0073in.)

### 2.2 Gearbox specifications

Type	RRWD 270B GEARBOX
Mass (Dry weight)	44.5 kg (98.1 lbs)
Oil capacity	0.5 L (1.05 US Pints)
Oil type	See section 2.4.3

## 2.3 Function times

Function	Up/right/out/down/left/in	
	Time, (Seconds)	
	Min	Max
Rotation (180°) Tele in	56	76
Rotation (180°) Tele out	56	105
Links	18	30
Luffing Tele out	36	70
Luffing Tele in	18	65
Fly boom	10	20
Telescope (luffed up)	18	60
Cage rotate	3	8
<b>Machine Speed</b>		
	High revs	Low revs
Engine speed	2400±50 rpm	1500±50 rpm
Niftylift drive speed FWD/REV	7.5 km/h (4.7 mph)	3.5 km/h (2.2 mph)
FWD/REV drive speed must be measured over a 10 meter (33 feet) distance on flat level ground.		
All measurements carried out with 225kg (496 lbs) in basket (including operator) and operated from basket. Niftylift <b>must</b> be at full working temperature. Hydraulic oil must be between 30-40°C (86-104°F). Function speeds may vary depending on ambient air temperature (e.g. extreme cold).		

## 2.4 Fluid properties

### 2.4.1 Fluid volumes

Fluid Volumes	
Hydraulic oil tank	80.0 L (21.13 US Gal)
Fuel tank	80.0 L (21.13 US Gal)
Engine oil	6.0 L (1.58 US Gal)
Coolant	Approx. 4.5 L (1.19 US Gal)

### 2.4.2 Engine oil specifications

Engine	Ambient temperature	Oil type	
Kubota V1505	ABOVE 25°C (77°F)	SAE30 OR	SAE 10W/30 SAE 10W/40
	0°C / +25°C (32°F / +77°F)	SAE20 OR	SAE 10W/30 SAE 10W/40
	BELOW 0°C (32°F)	SAE10W OR	SAE 10W/30 SAE 10W/40

### 2.4.3 Gearbox oil specifications

Ambient temperature	Oil type
-10°C (14°F) to +30°C (86°F)	ISO VG 150 (Standard fitment)

### 2.4.4 Hydraulic oil specifications

Oil type
ISO VG 46

Refer to the label on the hydraulic oil tank for the correct oil type. Only use the specified hydraulic oil, do not mix different oil types and viscosities.



### 2.4.5 Engine coolant specifications

Use permanent type (PT) for the Kubota V1505 engine.

When anti-freeze is mixed with water, the ratio must be **less than 50%**, see table below.

Engine	Volume % Anti-freeze	Volume % Water	Freezing Point		Boiling Point	
			°C	°F	°C	°F
Kubota V1505	40	60	-24	-12	106	222
	50	50	-37	-34	108	226

### 2.4.6 Hydraulic pressure settings

Refer to hydraulic schematic as supplied with the machine noting the serial number of the Niftylift.

## 2.5 Tire specifications

**Standard tire fitment:** 33/15.50 - 16.5.

**⚠ WARNING** DO NOT REPLACE TIRES WITH ANYTHING OTHER THAN THE ABOVE SPECIFICATION. CONSULT NIFTYLIFT PRIOR TO REPLACEMENT.

## 2.6 Torque settings

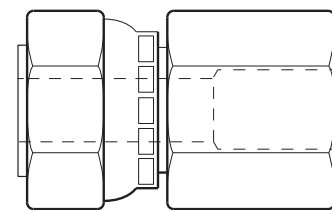
Bolt quality/size	Tightening torque in Nm (lbf-ft)					
	Plated			Unplated		
Grade	8.8	10.9	12.9	8.8	10.9	12.9
M6	7 (5)	10 (8)	12 (9)	8 (6)	11 (8)	13 (10)
M8	17 (13)	25 (18)	29 (22)	19 (14)	27 (20)	32 (23)
M10	34 (25)	49 (36)	58 (43)	37 (27)	54 (40)	63 (46)
M12	58 (43)	85 (63)	99 (73)	63 (47)	93 (69)	108 (80)
M14	93 (68)	135 (100)	158 (117)	101 (74)	148 (109)	172 (127)
M16	143 (106)	209 (154)	245 (180)	156 (115)	228 (168)	267 (197)
M20	288 (212)	408 (301)	477 (352)	304 (224)	445 (328)	521 (384)
M24	491 (362)	698 (515)	816 (602)	519 (383)	760 (561)	889 (656)
WHEEL NUTS	150 Nm (110 lbf-ft)					
ROTATION RING BOLTS	295 Nm (218 lbf-ft)					
<p>This torque chart is based on the following assumptions:</p> <p>Bolts to ISO 898-1 "Mechanical properties of fasteners made of carbon steel and alloy steel"</p> <p>For "unplated" bolts, all grades:</p> <p>Hex head bolts</p> <p>Black oxide steel bolt with a rolled &amp; oiled thread, no finish on steel nut</p> <p>Prevailing torque includes Nylock (minimum prevailing torque figure assumed)</p> <p>Medium Clearance holes to ISO 273</p> <p>Bolt tightening condition = Yield factor of 75%</p> <p>For "plated" bolts, all grades:</p> <p>Hex head bolts</p> <p>Zinc plated oiled (rolled or cut) steel external thread with no finish on steel internal thread</p> <p>Prevailing torque includes Nylock (minimum prevailing torque figure assumed)</p> <p>Medium Clearance holes to ISO 273</p> <p>Bolt tightening condition = Yield factor of 75%</p> <p>Figures quoted in <b>Nm</b> have been calculated in Nm and then rounded to the nearest whole number.</p> <p>Figures quoted in <b>lbf-ft</b> have been calculated in Nm, converted using a factor of 0.737561 and then rounded.</p>						

## 2.7 Hydraulic hose and fitting torque specifications

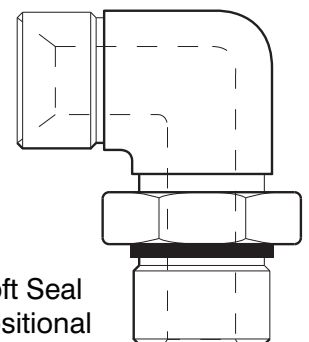
### BSP (Solid Black Nut)

O-Ring Seal Female (ISO 8434)			Soft Seal Positional/Banjo/Block Fittings (ISO 6149 & 1179)		
Size	Thread	Torque Nm (lbf-ft)	Size	Thread	Torque Nm (lbf-ft)
4	1/4" - 19	25 (18)	4	1/4" - 19	40 (30)
6	3/8" - 19	35 (26)	6	3/8" - 19	75 (55)
8	1/2" - 14	55 (41)	8	1/2" - 14	100 (74)
10	5/8 - 14	65 (48)	10	5/8 - 14	130 (96)
12	3/4" - 14	100 (70)	12	3/4" - 14	190 (140)
16	1" - 11	125 (92)	16	1" - 11	300 (221)
20	1"1/4 - 11	190 (140)	20	1"1/4 - 11	330 (243)
24	1"1/2- 11	250 (184)	24	1"1/2- 11	460 (339)
32	2" - 11	400 (295)	32	2" - 11	N/A

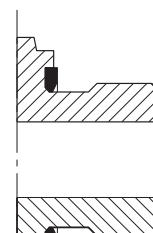
Elastomeric Seal Male (ISO 1179)			
Size	Thread	Torque Nm (lbf-ft)	
		Steel	Aluminium
4	1/4" - 19	60 (44)	30 (22)
6	3/8" - 19	90 (66)	45 (33)
8	1/2" - 14	130 (96)	65 (48)
10	5/8 - 14	N/A	N/A
12	3/4" - 14	200 (148)	100 (74)
16	1" - 11	300 (221)	150 (111)
20	1"1/4 - 11	500 (369)	250 (184)
24	1"1/2- 11	600 (443)	300 (221)
32	2" - 11	N/A	N/A



O-Ring female



Soft Seal Positional



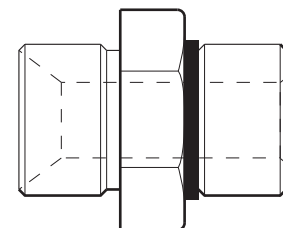
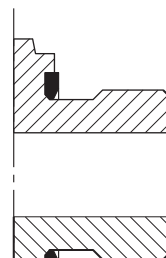
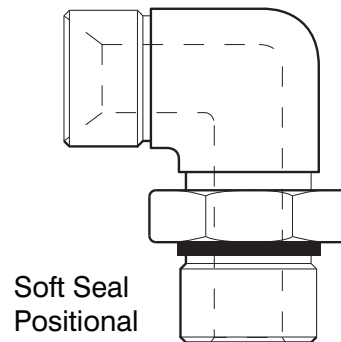
Elastomeric (Integrated Seal)

**Metric (S-Series)**

Soft Seal Positional/Banjo/Block Fittings (ISO 6149 & 1179)		Elastomeric Seal Male (9974/3869)		
Thread	Torque Nm (lbf-ft)	Thread	Torque Nm (lbf-ft)	
			Steel	Aluminium
M12 X 1.5	35 (26)	M12 X 1.5	40 (30)	20 (15)
M14 X 1.5	45 (33)	M14 X 1.5	60 (44)	30 (22)
M16 X 1.5	55 (41)	M16 X 1.5	80 (59)	40 (30)
M18 X 1.5	70 (52)	M18 X 1.5	95 (70)	45 (33)
M20 X 1.5	80 (59)	M20 X 1.5	140 (103)	70 (52)
M22 X 1.5	100 (74)	M22 X 1.5	150 (111)	75 (55)
M27 X 2.0	180 (133)	M27 X 2.0	200 (148)	100 (74)
M30 X 2.0	N/A	M30 X 2.0	380 (280)	190 (140)
M42 X 2.0	330 (243)	M42 X 2.0	480 (354)	240 (177)

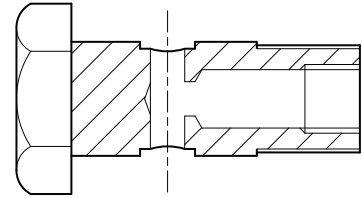
**UNF male with O ring**

Connector Male SAE UNF with O.R ISO 11926 Ports	
Thread	Torque Nm (lbf-ft)
7/16"	21 (16)
1/2"	27 (20)
9/16"	40 (30)
3/4"	78 (58)
7/8"	110 (81)
1"1/16	180 (133)
1"3/16	230 (170)
1"5/16	285 (210)
1"5/8	320 (236)



**UNF bolts**

<b>Dowty Seal Positional / Banjo Bolts</b>		
Size	Thread	Torque Nm (lbf-ft)
4	1/4" - 19	40 (30)
6	3/8" - 19	75 (55)
UNF	9/16" - 18	40 (30)



Dowty Seal  
Positional/Banjo

## 3 Preventative maintenance

### 3.1 Maintenance schedules

#### 3.1.1 Engine maintenance

Maintenance is required at periodic or hourly intervals. The total active, booms active, and drive active hours are displayed in the menu screen on the basket and ground display units.

Operation	Every Day	Every 50 Hours	Every 100 Hours	Every 200 Hours	Every 400 Hours	Every 500 Hours	Every Month	Every Year	Every 2 Years
Engine Oil		● <sup>a)</sup>		•			▲		
Engine Oil Filter		● <sup>a)</sup>		•					
Air Filter @			■ <sup>b)</sup>					● <sup>b)c)</sup>	
Engine Coolant									•
Coolant Hoses & Clamp Bands				▲					•
Fuel Filter				▲	•				
Fuel Hoses & Clamp Bands @		▲							● <sup>d)</sup>
Battery	▲								
Fan Belt			▲			•			
Air Intake Line @				▲					● <sup>e)</sup>
Electrical Wiring / Connections								▲	
▲	Check/Inspect								
■	Clean								
•	Replace								
@	Emission Critical Component								

- a) First time procedure.
- b) In arduous conditions (high levels of dust) the air filter must be cleaned and replaced more frequently.
- c) After six checks with cleaning or annually; whichever occurs sooner.
- d) Contact a Kubota approved dealer.
- e) Replace if necessary.

**3.1.2 Machine maintenance**

Operation	Every Day	Every Week	Every 50 Hours	Every Month	Every 6 Months	Every 500 Hours	Every Year	Every 4 Years
Gearbox Oil			● <sup>a)</sup>				●	
Battery condition	▲							
Hydraulic oil level		▲						
Return filter				▲				
Pressure filter		▲						
Hydraulic oil and filters						● <sup>a)</sup>	●	
Telescopic boom wear pads				▲				
Hose Trunking and Energy Chain		▲						
Boom pivot pin/bushes	▲						**	
Rotation gear engagement				▲				
Rotation ring				**				
Rotation ring bolts							▲	
Boom chains					▲ <sup>**b)</sup>			▲ <sup>c)</sup>
Track rod ends	**							
Tire Pressures		▲						
Tires		▲						
Wheel Nuts				▲				
▲	Check/Inspect							
●	Replace							
**	Lubricate							

- a) First time procedure.
- b) More frequent in hostile environments.
- c) Full inspection required.

## 3.2 Consumables

Consumable items required for maintenance can be found in Table 1.

**Table 1: Consumables**

Type	Detail	Frequency	
Engine oil	10W30 / 15W40	See section 3.1.1	
Engine oil filter	Spin on filter		
Diesel fuel filter	Cartridge or filter element		
Engine coolant	Antifreeze		
Hydraulic oil	ISO VG 46	See section 3.1.2	
Hydraulic oil Pressure filter	10 Micron screen filter		
Hydraulic oil Return filter	3 Micron screen filter		
Hydraulic oil Suction strainer	90 Micron filter element		
White grease	Renolit CZ2		
Black EP grease	Multis MS 2		
Anti Friction Dry PTFE Lubricant	WD 40 Anti Friction Dry PTFE Lubricant		
Petroleum jelly	Vaseline petroleum jelly		
ISO VG 150 Gear oil	EP 150		
Fuse	125A SIBA 80VDC		Replace as required
Fuse	2A ATO 32VDC		
Fuse	3A ATO 32VDC		
Fuse	5A ATO 32VDC		
Fuse	10A ATO 32VDC		
Fuse	15A ATO 32VDC		
Fuse	2A Mini ATO 58VDC		
Fuse	15A Mini ATO 58VDC		
Fuse	25A Mini ATO 58VDC		
Fuse	5A Mini ATO 125VDC		
Fuse	15A Mini ATO 125VDC		
Fuse	40A J Case 32VDC		
Fuse	50A J Case 32VDC		
Fuse	1A Ceramic Fuse 250V		
Fuse	30A Ceramic Fuse 250V		



**3.2.1 Data, safety and specification**

Data, safety and specification details are listed in Table 2.

**Table 2: Data and Specification**

Type	Detail	Number
Hydraulic oil	ISO VG 46	<a href="#">Hogarth 46.pdf</a>
White grease	Renolit CZ2	<a href="#">RENOLIT CZ 2_sds.pdf</a>
Black EP grease	Multis MS 2	<a href="#">msds.pdf</a>
WD 40 W/D44394 aerosol	Anti Friction Dry PTFE Lubricant	<a href="#">WD-40-Specialist-High-Performance-PTFE-Lubricant.pdf</a>
Gear oil	ISO VG 150	<a href="#">Q8 Goya 150.pdf</a>
Engine oil	10W30 / 10W40	<a href="#">16237.pdf</a>
Engine coolant	Antifreeze	<a href="#">11923-1.pdf</a>
Petroleum jelly	Vaseline Petroleum Jelly	<a href="#">petroleum_jelly_sds.pdf</a>
Thread locking adhesive	Loctite 243	<a href="#">243-EN.pdf</a>

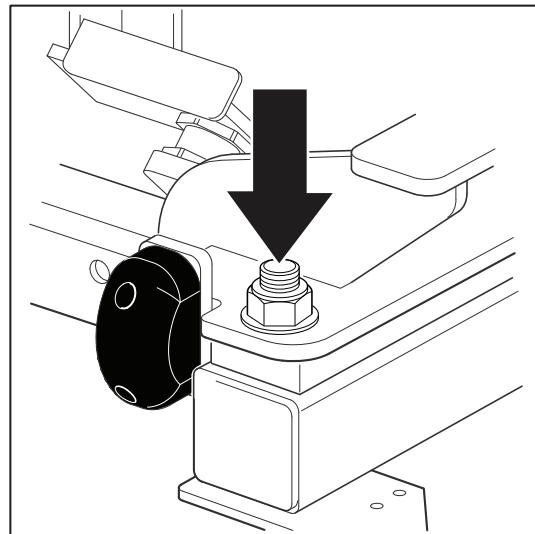
### 3.3 Engine

#### 3.3.1 Power tray

Certain procedures require the engine power tray to be swung away from the superstructure. Never start the engine without the power tray retaining bolt installed.

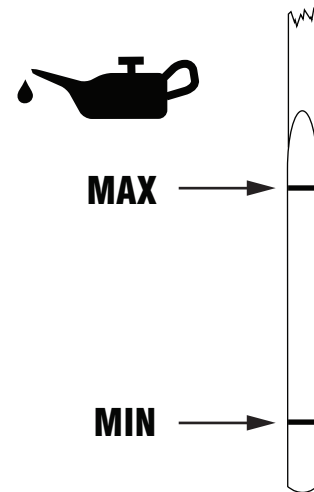
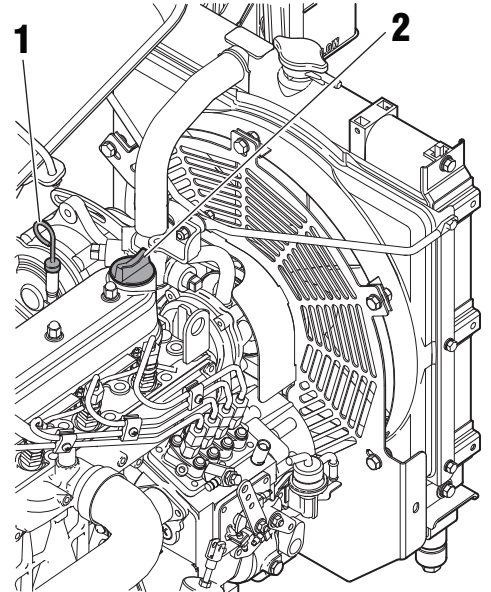
**⚠ WARNING** THE POWER TRAY RETAINING BOLT MUST BE INSTALLED AND TIGHTENED TO THE SPECIFIED TORQUE BEFORE STARTING THE ENGINE.

- 1) Release rubber catch and open the Engine (right hand) canopy.
- 2) Undo nut and remove the power tray retaining bolt and washers.
- 3) Swing the power tray away from the superstructure.
- 4) Swing power tray back into position.
- 5) Reinstall retaining bolt and washers.
- 6) **Replace nut and tighten.** See section 2.6 for torque settings.
- 7) Close the Engine (right hand) canopy and secure rubber strap.



### 3.3.2 Engine oil level check

- 1) Check with the Niftylift on level surface before starting or more than 5 minutes after stopping the engine.
- 2) Remove oil level dipstick (1) and wipe clean.
- 3) Insert dipstick and remove to check oil level.
- 4) If low, add correct specification oil to the oil filling port (2) until the upper limit of the dipstick is reached.
- 5) After adding oil, wait for 5 minutes and re-check oil level. Do not overfill.
- 6) Reinstall the oil filler cap and tighten by hand.



### 3.3.3 Engine oil replace

**⚠ CAUTION** ONLY CARRY OUT THIS PROCEDURE WITH THE ENGINE OFF AND COOLED.

**NOTICE** WHEN DRAINING ENGINE OIL, PLACE A CONTAINER UNDERNEATH THE ENGINE AND DISPOSE ACCORDING TO LOCAL REGULATIONS.

- 1) Remove the drain plug located on the engine oil sump and drain the oil into a suitable container. Note; This will be easier if the oil is warm.
- 2) Replace seal ring and reinstall drain plug.
- 3) Tighten drain plug. See section 2.6 for torque settings.
- 4) Top up engine oil to the upper limit of the dipstick. Oil type and quantities can be found from the oil specification table. See section 2.4.2.
- 5) Re-check oil level at least 5 minutes after filling engine.

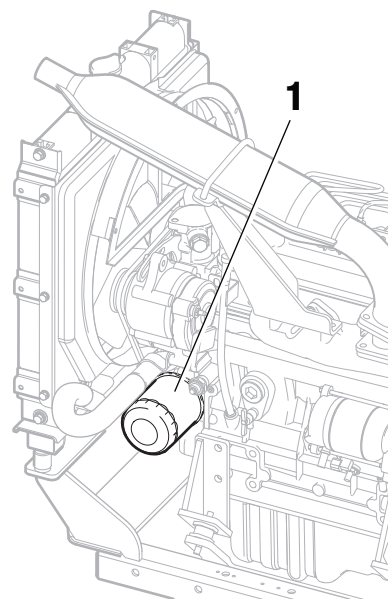
### 3.3.4 Engine oil filter replace

**⚠ CAUTION** ONLY CARRY OUT THIS PROCEDURE WITH THE ENGINE OFF AND COOLED.

**NOTICE** WHEN DRAINING ENGINE OIL, PLACE A CONTAINER UNDERNEATH THE ENGINE AND DISPOSE ACCORDING TO LOCAL REGULATIONS.

**⚠ WARNING** THE POWER TRAY RETAINING BOLT MUST BE INSTALLED AND TIGHTENED TO THE SPECIFIED TORQUE BEFORE STARTING THE ENGINE.

- 1) Remove the power tray retaining bolt and swing the power tray away from the superstructure. See section 3.3.1.
- 2) Using a filter wrench or strap, remove the engine oil filter (1).
- 3) Replace oil filter, apply a film of oil to the seal of the oil filter. Ensure oil filter is marked with the Niftylift's hours and date of filter change.
- 4) Screw oil filter onto engine by hand. When seal contacts the seal surface, tighten oil filter by hand. **Do not tighten with filter wrench.**
- 5) Swing power tray back into position.
- 6) **Reinstall retaining bolt and tighten.** See section 2.6 for torque settings.
- 7) Run engine for a short period and check for leaks.
- 8) Wait 5 minutes and check the oil level.



### 3.3.5 Engine coolant level check

#### **NOTICE**

**DO NOT STOP ENGINE SUDDENLY, IDLE ENGINE FOR 5 MINUTES BEFORE STOPPING.**

**WORK SHOULD BE CARRIED OUT AFTER LETTING THE ENGINE AND RADIATOR COOL OFF COMPLETELY (A MINIMUM OF 30 MINUTES AFTER STOPPING ENGINE).**

#### **⚠ WARNING**

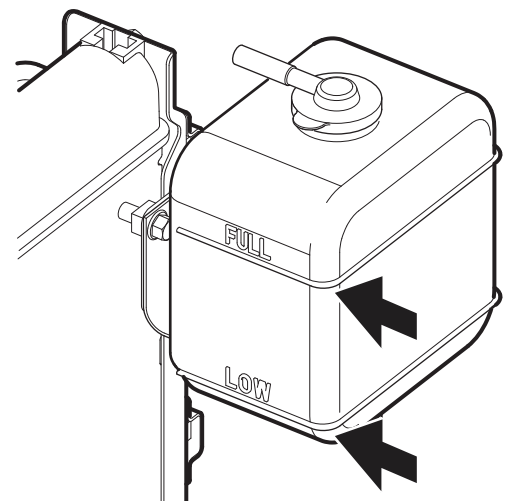
**RISK OF BURNS - DO NOT REMOVE RADIATOR CAP WHILST ENGINE COOLANT IS HOT AND PRESSURIZED. WHEN COOL TO TOUCH, ROTATE CAP TO THE FIRST STOP TO ALLOW EXCESS PRESSURE TO ESCAPE, THEN REMOVE CAP COMPLETELY.**

**IF OVERHEATING SHOULD OCCUR, STEAM MAY GUSH FROM THE RADIATOR OR RESERVE TANK RESULTING IN SEVERE BURNS.**

- 1) Remove the radiator cap after the engine has completely cooled. Ensure the coolant level reaches the supply port.
- 2) Ensure coolant level is sufficient on the reserve tank. The level should be between the full and low marks (arrowed).
- 3) If coolant levels are low, top-up using the correct specification fluid. See section 2.4.5 for coolant specifications and 2.4.1 for fluid volumes.

#### **Important;**

- If the radiator cap has to be removed follow the caution label and securely tighten the cap.
- If coolant should leak, consult your local Kubota dealership.
- Make sure contaminated or sea water does not enter the coolant system.
- Use clean, fresh water with the correct amount of anti-freeze. See section 2.4.5.
- Do not refill reserve tank with coolant higher than the "FULL" level mark.
- Make sure the radiator cap is installed correctly. If the cap is loose or improperly closed, coolant may leak out and quickly decrease the coolant level.



### 3.3.6 Engine coolant replace

#### NOTICE

**DO NOT STOP ENGINE SUDDENLY, IDLE ENGINE FOR 5 MINUTES BEFORE STOPPING.**

**WORK SHOULD BE CARRIED OUT AFTER LETTING THE ENGINE AND RADIATOR COOL OFF COMPLETELY (A MINIMUM OF 30 MINUTES AFTER STOPPING ENGINE).**

#### ⚠ WARNING

**RISK OF BURNS - DO NOT REMOVE RADIATOR CAP WHILST ENGINE COOLANT IS HOT AND PRESSURIZED. WHEN COOL TO TOUCH, ROTATE CAP TO THE FIRST STOP TO ALLOW EXCESS PRESSURE TO ESCAPE, THEN REMOVE CAP COMPLETELY.**

**IF OVERHEATING SHOULD OCCUR, STEAM MAY GUSH FROM THE RADIATOR OR RESERVE TANK RESULTING IN SEVERE BURNS.**

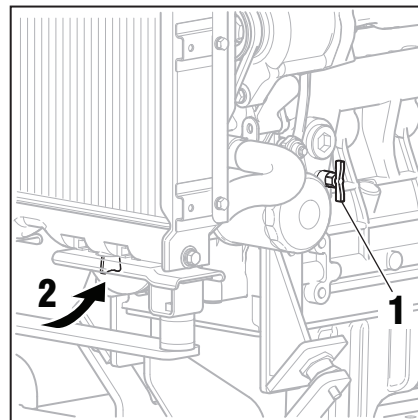
#### NOTICE

**WHEN DRAINING COOLANT, PLACE A CONTAINER UNDERNEATH THE RADIATOR AND DISPOSE ACCORDING TO LOCAL REGULATIONS.**

#### ⚠ WARNING

**THE POWER TRAY RETAINING BOLT MUST BE INSTALLED AND TIGHTENED TO THE SPECIFIED TORQUE BEFORE STARTING THE ENGINE.**

- 1) Remove the power tray retaining bolt and swing the power tray away from the superstructure. See section 3.3.1.
- 2) Open drain plugs (1) and (2) simultaneously open the radiator cap. This must be removed to allow a full coolant drain.
- 3) Undo the clamp band and remove the overflow pipe underneath the reserve tank.
- 4) Drain the reserve tank.
- 5) Reinstall the overflow pipe to the reserve tank and tighten clamp band.
- 6) Ensure both drain plugs are tightened.
- 7) Swing power tray back into position.
- 8) **Reinstall retaining bolt and tighten.** See section 2.6 for torque settings.
- 9) See section 2.4.5 for coolant specifications and 2.4.1 for fluid volumes.



### 3.3.7 Coolant hoses and clamp bands check

**⚠ CAUTION** BE SURE TO CHECK RADIATOR HOSES AND CLAMPS PERIODICALLY. IF RADIATOR HOSE IS DAMAGED OR COOLANT LEAKS, OVERHEATING OR SEVERE BURNS MAY OCCUR.

- 1) Check radiator hoses are securely fixed every 200 hours of operation or 6 months, whichever comes first.
- 2) If hose clamps are loose or water leaks, tighten hose clamps securely.
- 3) If hoses are swollen, hardened or cracked they must be replaced along with clamps. Clamps must be tightened securely.

### 3.3.8 Antifreeze check

**⚠ CAUTION** ONLY CARRY OUT THIS PROCEDURE WITH THE ENGINE SWITCHED OFF AND COOLED DOWN.

**⚠ CAUTION** RISK OF BURNS - DO NOT REMOVE RADIATOR CAP WHILST ENGINE COOLANT IS HOT AND PRESSURIZED. WHEN COOL TO TOUCH, ROTATE CAP TO THE FIRST STOP TO ALLOW EXCESS PRESSURE TO ESCAPE, THEN REMOVE CAP COMPLETELY.

Periodically the antifreeze specific gravity should be checked to ensure suitable freeze protection.

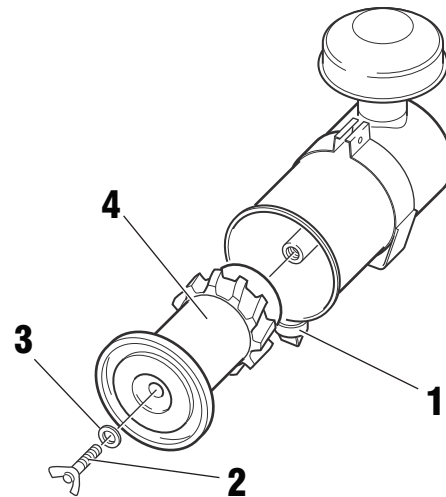
- 1) Allow the engine to cool down and carefully remove the radiator cap.
- 2) Using a suitable antifreeze hydrometer, test the antifreeze specific gravity. See section 2.4.5 for the appropriate protection level.
- 3) Replenish coolant if necessary; use a ratio of 1:1 clean water and antifreeze.
- 4) Reinstall the radiator cap, ensure it is securely fitted.

### 3.3.9 Air filter element maintenance

#### NOTICE

**DO NOT APPLY OIL TO THE AIR FILTER; YOUR NIFTYLIFT IS FITTED WITH A DRY TYPE AIR FILTER. AVOID TOUCHING THE ELEMENT EXCEPT WHEN CLEANING.**

- 1) Open the evacuator valve (1) once a week under ordinary conditions, daily when used in a dust rich environment. This allows dirt and dust to be removed from the air filter.
- 2) Remove bolt (2) and washer (3).
- 3) Slide the filter element (4) out of the air filter body.
- 4) Wipe inside the air cleaner with cloth if found to be dirty or wet.
- 5) When dry dust adheres to the filter element, blow compressed air from the inside out whilst rotating the filter. Air pressure must be no more than 686kPa (7kgf/cm<sup>2</sup> 99 psi).
- 6) When carbon or oil adheres to the filter, soak the filter in detergent for 15 minutes.
- 7) Wash it several times in water, rinse with clean water and allow to dry naturally.
- 8) After filter is fully dried, inspect the inside with a flashlight for damage. Refer to instruction label attached to the filter.
- 9) Reinstall filter element into the air filter body, reinstall washer and tighten bolt.
- 10) Replace filter element every year or after 6 cleanings. This is in standard operating conditions; dust enriched operating environments will require shorter intervals.



### 3.3.10 Fuel pipes check

- 1) Fuel pipes and clamps should be checked every 50 hours of engine operation.
- 2) If clamp bands are found to be loose, apply oil to screw of the band and tighten securely.
- 3) If rubber fuel pipes are found to be worn, replace immediately.

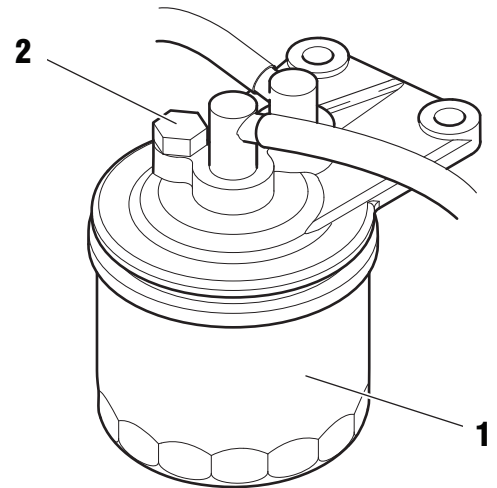
When fuel pipes are not installed, ensure they are capped to prevent dirt entering. This could lead to fuel injection pump malfunction.



### 3.3.11 Fuel filter replace

**⚠ WARNING FUEL ESCAPE - PLACE A SUITABLE CONTAINER UNDERNEATH THE WORK AREA AND DISPOSE FUEL ACCORDING TO LOCAL REGULATIONS.**

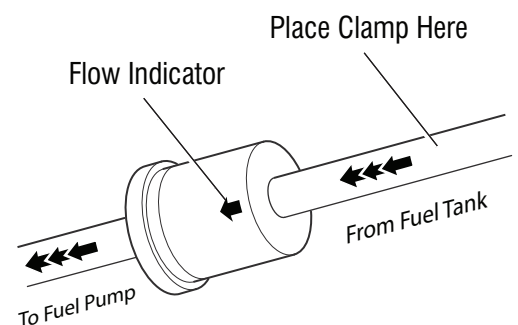
- 1) Locate the fuel filter on the side of the engine and clamp both the fuel pipes on the filter housing.
- 2) Using a filter wrench or strap, remove the fuel filter (1).
- 3) Replace fuel filter with clean diesel.
- 4) Screw filter onto filter housing by hand. When seal contacts the housing surface, tighten by hand. **Do not tighten with filter wrench.**
- 5) Release the pipe clamp from the tank feed pipe first followed by the outlet pipe.
- 6) Start the engine and inspect for leaks.
- 7) If the engine does not start, loosen the air vent plug on the filter housing (2) by a few turns.
- 8) Tighten air vent plug when fuel flows and air bubbles are no longer present.



### 3.3.12 In-line fuel filter replace

**⚠ WARNING FUEL ESCAPE - PLACE A SUITABLE CONTAINER UNDERNEATH THE WORK AREA AND DISPOSE FUEL ACCORDING TO LOCAL REGULATIONS.**

- 1) Remove the power tray retaining bolt and swing the power tray away from the superstructure. See section 3.3.1.
- 2) Locate fuel filter on the superstructure and clamp the feed pipe from tank.
- 3) Loosen jubilee clips and remove fuel pipes.
- 4) Cut the cable tie securing the fuel filter.
- 5) Replace the fuel filter
- 6) Replace fuel filter ensuring the arrow on the filter points in the direction of fuel flow (tank to engine).
- 7) Tighten Jubilee clips.
- 8) Remove clamp from feed hose ensuring filter refills with fuel.
- 9) Start the engine and inspect for leaks.



### 3.3.13 Exhaust system inspect

**⚠ CAUTION** ONLY CARRY OUT THIS PROCEDURE WITH THE ENGINE SWITCHED OFF AND COOLED DOWN. BEWARE OF HOT ENGINE COMPONENTS.

**⚠ WARNING** THE POWER TRAY RETAINING BOLT MUST BE INSTALLED AND TIGHTENED TO THE SPECIFIED TORQUE BEFORE STARTING THE ENGINE.

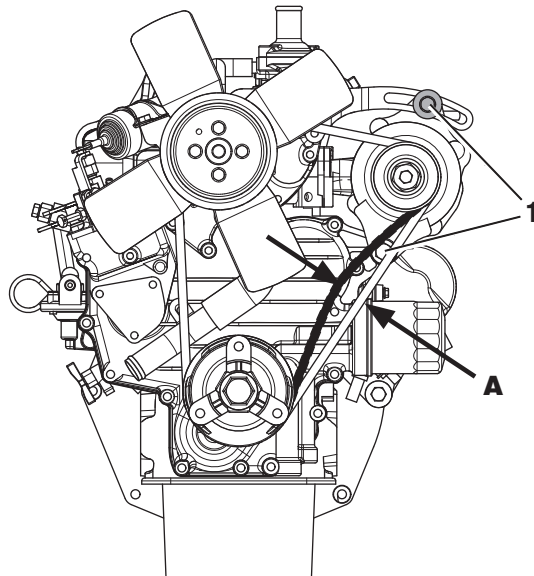
- 1) Open the Engine (right hand) canopy.
- 2) Remove the power tray retaining bolt and swing the power tray away from the superstructure. See section 3.3.1.
- 3) Inspect the exhaust components for signs of cracks and leaks; e.g. carbon build up around joints and seams.
- 4) Swing power tray back in to position.
- 5) Reinstall retaining bolt and tighten. See section 2.6 for torque settings.

### 3.3.14 Fan belt check

**⚠ CAUTION** ONLY CARRY OUT THIS PROCEDURE WITH THE ENGINE SWITCHED OFF AND COOLED DOWN. BEWARE OF HOT ENGINE COMPONENTS.

#### Every 100 hours

- 1) Ensure engine is switched OFF.
- 2) Open the Engine (right hand) canopy.
- 3) Apply moderate pressure to belt using your thumb in area shown on diagram. If dimension A does not fall in the range 7 to 9mm (0.28 to 0.35in.), loosen the alternator mounting bolts (1) and adjust accordingly until the belt deflection falls within these limits.
- 4) Tighten alternator mounting bolts. See section 2.6 for torque settings.
- 5) If belt is damaged, replace immediately. (See section 4.4.2).



### 3.4 Base assembly

#### 3.4.1 Tire condition check

Tires should be checked every week. Worn or defective tires can impair safety and machine handling. Check the tires have sufficient tread and there are no cuts, bulges, abrasions or damage to the tire tread and sidewall. Tires must be inflated to the correct pressure.

Worn or defective tires should be replaced before placing the Niftylift into service. See section 2.5 for tire specifications.

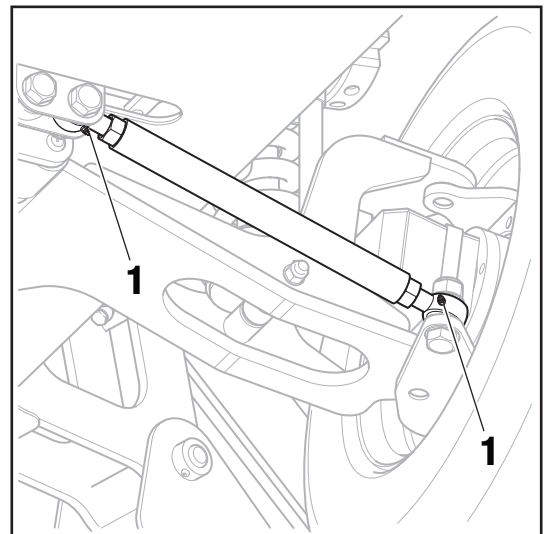
#### 3.4.2 Tire pressure check

Tire pressures should be checked every week. Incorrect tire pressures impair safety, machine handling and may increase tire wear.

Tire pressures should be checked and adjusted when cold to 2.1 bar (30 psi).

#### 3.4.3 Track rod end lubrication (daily)

- 1) Grease nipples (1) are located on either end of each track rod.
- 2) Check that each track rod is adequately lubricated.
- 3) Lubricate if necessary.
- 4) Pump the grease gun two to three times as required. Use black EP grease (See section 3.2.1).



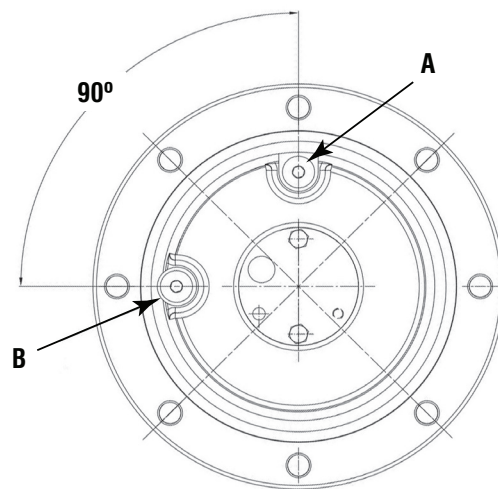
## 3.5 Drive hub gearbox

### 3.5.1 Oil replace

#### NOTICE

**WHEN DRAINING OIL, PLACE A SUITABLE CONTAINER UNDERNEATH THE GEARBOX AND DISPOSE ACCORDING TO LOCAL REGULATIONS.**

- 1) Manufacturer's specifications require this procedure to be carried out after the first 50 hours, then every 2500 hours or once a year. Depending on the operating cycle this frequency may vary.
- 2) Select the drive hub to be serviced. Manoeuvre the Niftylift until either plug is at its lowest possible position.
- 3) Remove both plugs and drain the oil into a suitable container. Dispose of waste oil in accordance with local environmental policies.
- 4) Manoeuvre the Niftylift until one plug (A) is at the highest point (see diagram). Fill gearbox until oil level is even with bottom of plug hole (B). See section 2.4.3 for oil specifications.
- 5) Reinstall plugs and tighten.
- 6) Repeat for remaining gearboxes.



### 3.5.2 Bleeding air from the braking circuit

#### ⚠ WARNING

**MAKE SURE SUITABLE EYE PROTECTION AND CLOTHING ARE WORN WHEN OPENING THE HYDRAULIC CIRCUIT.**

#### NOTICE

**PLACE A SUITABLE CONTAINER UNDERNEATH THE WORK AREA AND DISPOSE OIL ACCORDING TO LOCAL REGULATIONS.**

- 1) Connect the hydraulic couplings to the brake ports on the gearbox.
- 2) Pressurize the hydraulic circuit, then carefully loosen the hose union on the inlet port.
- 3) Tighten the hose union once oil flows and air bubbles are no longer present. See section 2.7 for hydraulic hose torque settings.
- 4) Clean any excess oil and inspect for leaks.

## 3.6 Batteries

**⚠ WARNING** MAKE SURE SUITABLE EYE PROTECTION AND CLOTHING ARE WORN WHEN MAINTAINING THE BATTERIES.

MAKE SURE THERE IS ADEQUATE VENTILATION WHEN CARRYING OUT MAINTENANCE ON THE BATTERIES.

**⚠ WARNING** CONTACT WITH CONCENTRATED SULFURIC ACID RESULTS IN RAPID DESTRUCTION OF BODY TISSUE VIA BURNS. IF INHALED, SEEK FRESH AIR AND IMMEDIATE MEDICAL ATTENTION. IN THE EVENT OF SKIN OR EYE CONTACT, FLUSH WITH LARGE VOLUMES OF WATER AND SEEK IMMEDIATE MEDICAL ATTENTION. IN THE EVENT OF INGESTION, DO NOT INDUCE VOMITING AND SEEK IMMEDIATE MEDICAL ATTENTION.

### 3.6.1 Condition check (daily)

- 1) Check batteries for evidence of leaks or spilt battery acid. If material is released or spilled, lime or soda ash may be used to neutralize, or flush with large volumes of water. Dispose of waste in accordance with local regulations for acid and lead scrap. Use approved respiratory protection, rubber gloves, and splash-proof safety goggles. Use rubber boots and acid-proof clothing for major spills. Replace any defective batteries.
- 2) Check the condition of battery cables and link wires. Ensure that the insulation is intact along the length of each cable. Replace any defective battery cables or link wires. Use insulated spanners on battery terminals. Do not lay tools or other metal objects on the batteries.
- 3) Check that all battery cables and link wires are securely fastened to the battery terminals and lubricated. Remove any corrosion from battery terminals and clamps. Ensure all surfaces are clean and free of lubrication. Secure battery terminals using an insulated spanner. Once tightened and secure, lubricate battery clamps with petroleum jelly to prevent corrosion.

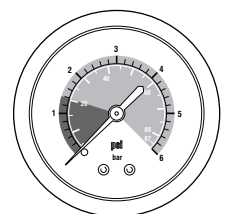
## 3.7 Hydraulic oil

### 3.7.1 Level check (weekly)

Ensure the Niftylift is on level ground with the platform stowed. Check that the oil level is between the minimum and maximum marks on the gauge. Top-up the tank with oil if the level is below the minimum mark. Use the same oil grade as indicated on the label attached to the hydraulic tank. If the oil level is above the MAX mark, drain as required. See section 3.7.4.

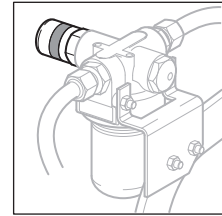
### 3.7.2 Suction & return filter check (monthly)

With the Niftylift running and the oil temperature at 40°C (104°F), operate the telescope out function and observe the suction & return filter condition indicators located under the engine (right hand) canopy. If visual indicator is red, the respective pressure filter element should be replaced once the oil has cooled sufficiently.



### 3.7.3 Pressure filter check (weekly)

With the Niftylift running and the oil temperature at 40°C (104°F), observe the pressure filter condition indicator (located on the rear of the power tray). If visual indicator is red, the respective pressure filter element should be replaced once the oil has cooled sufficiently.



### 3.7.4 Hydraulic oil and filters replace

**⚠ CAUTION** ONLY CARRY OUT THIS PROCEDURE WITH THE ENGINE SWITCHED OFF AND COOLED DOWN. BEWARE OF HOT ENGINE COMPONENTS.

**⚠ CAUTION** RISK OF BURNS - ALLOW THE HYDRAULIC OIL SUFFICIENT TIME TO COOL BEFORE DRAINING.

**NOTICE** PLACE A SUITABLE CONTAINER UNDERNEATH THE WORK AREA AND DISPOSE OIL ACCORDING TO LOCAL REGULATIONS.

Replace the Hydraulic oil and filters after the first 500 hours of operation, then every year thereafter.

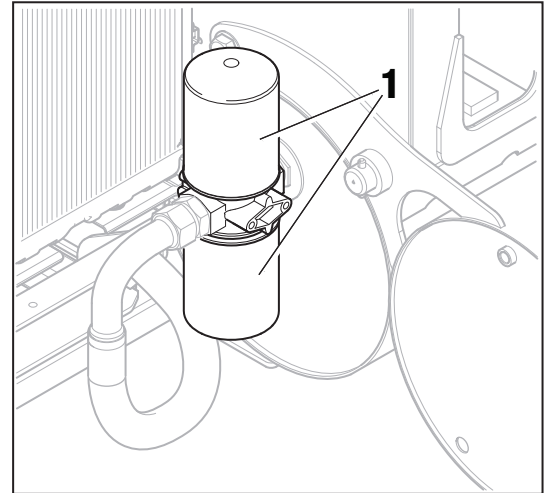
**Replacement or testing of the hydraulic oil is essential for optimum machine performance. Contaminated oil and filters may cause poor performance and continued use may cause component damage. Depending upon the operating environment, more regular oil changes may be required.**

**Observe clean working practices when servicing the hydraulic system.**

- 1) Ensure that the Niftylift is on level ground with the platform stowed and the oil temperature is not above 40°C (104°F).
- 2) Loosen the filler cap to relieve pressure. Caution must be taken when removing the tank cap as the hydraulic tank is pressurized.
- 3) Place a suitable container under the hydraulic tank.
- 4) Remove the drain plug located on the underside of the tank.
- 5) Dispose of waste oil in accordance with local environmental policies.
- 6) Reinstall drain plug in tank and tighten.

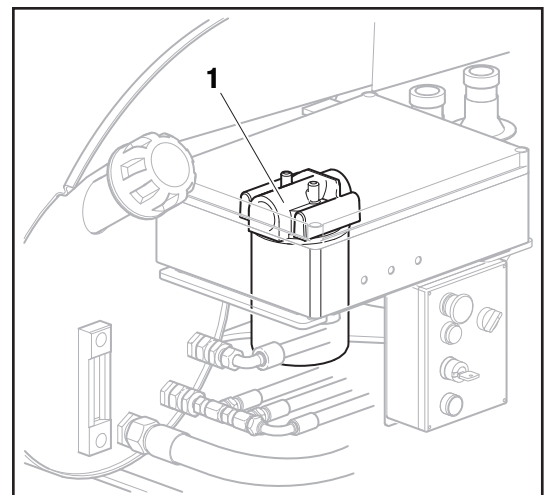
**Suction filter**

- 7) Open the engine (right hand) canopy and place a suitable container underneath the suction filter.
- 8) Using a filter wrench or strap, remove suction filter (1).
- 9) Replace suction filter, apply a film of oil to the seal of the filter.
- 10) Screw filter on by hand. When seal contacts the seal surface, tighten filter by hand. **Do not tighten with filter wrench.**



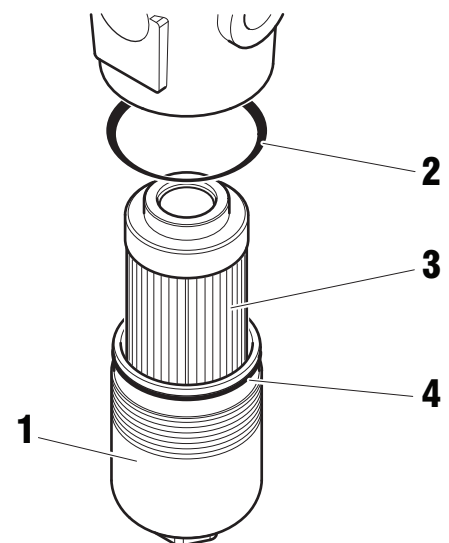
**Return filter**

- 11) Open the control (left hand) canopy and place a suitable container underneath the return filter.
- 12) Using a filter wrench or strap, remove the return filter (1).
- 13) Replace return filter, apply a film of oil to the seal of the filter.
- 14) Screw filter on by hand. When seal contacts the seal surface, tighten filter by hand. **Do not tighten with filter wrench.**



**Pressure filter**

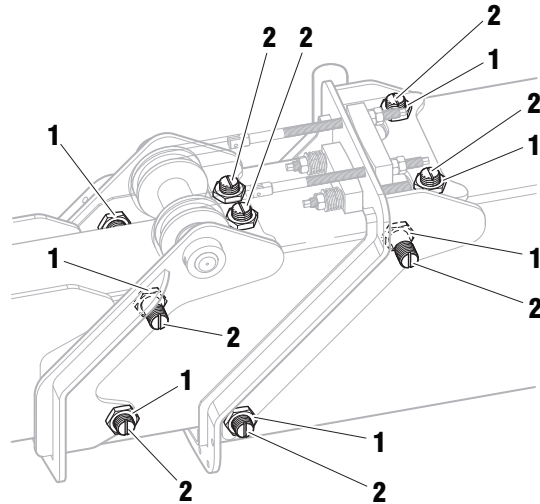
- 15) Open the engine (right hand) canopy and place a suitable container underneath the pressure filter.
- 16) Remove the filter bowl (1) and seal ring (2).
- 17) Remove filter element (3) and seal ring (4).
- 18) Replace seal rings on filter bowl, lubricate with clean hydraulic oil.
- 19) Replace filter element.
- 20) Reinstall filter bowl and tighten. **DO NOT APPLY EXCESSIVE TIGHTENING TORQUE.**
- 21) Refill tank with oil until level is between MIN and MAX on gauge. See section 2.4.1 for capacity and 2.4.4 for oil specification.
- 22) Operate the hydraulic system until oil temperature reaches 40°C (104°F). Check operation and inspect for leaks.



## 3.8 Telescopic boom

### 3.8.1 Wear pad check (monthly)

- 1) With the links down and the telescope boom fully retracted, check that there are no loose, missing, or defective components in the superstructure end of the telescope boom. This includes wear pads, shims, spacers and fasteners.
- 2) Fully extend the telescope booms.
- 3) It may be necessary to raise the telescope boom slightly to avoid the platform hitting the floor.
- 4) Check that there are no loose, missing, or defective components in the platform end of the telescope boom. This includes wear pads, shims, spacers, fasteners, wear screws and locking nuts.
- 5) Check the clearance between each of the 6 wear screws and the inner telescope boom sections.
- 6) If adjustment is required, release the locking nut (1) and tighten each wear screw (2) until it makes contact at the tightest point with the inner telescope boom section.
- 7) Back-off each wear screw before tightening the locking nuts.
- 8) Check that the underside of the inner telescope boom section is adequately lubricated and free from scoring or rubbing marks.
- 9) Lubricate if necessary using white grease. (See section 3.2.1).



### 3.8.2 Hose trunking and energy chain check (weekly)

- 1) Examine the hose trunking and check that there are no loose, missing, or defective components.
- 2) Check that the hose trunking does not make contact with or “snag” on the boom structure at any point over its range of travel.
- 3) With the telescope section fully extended, check that the trunking system adequately supports the weight of the hose bundle. The upper section of aluminium trunking should be approximately parallel with the top surface of the boom.
- 4) Check the condition of the energy chain, paying particular attention to the condition of the links at both ends, as this is where the highest loads and wear rates occur. See section 4.3.1 if any links require replacement.
- 5) Check that the energy chain is free from debris or any abrasive material that could cause damage to the hydraulic hoses. Remove & dispose of any debris in accordance with local environmental policies.

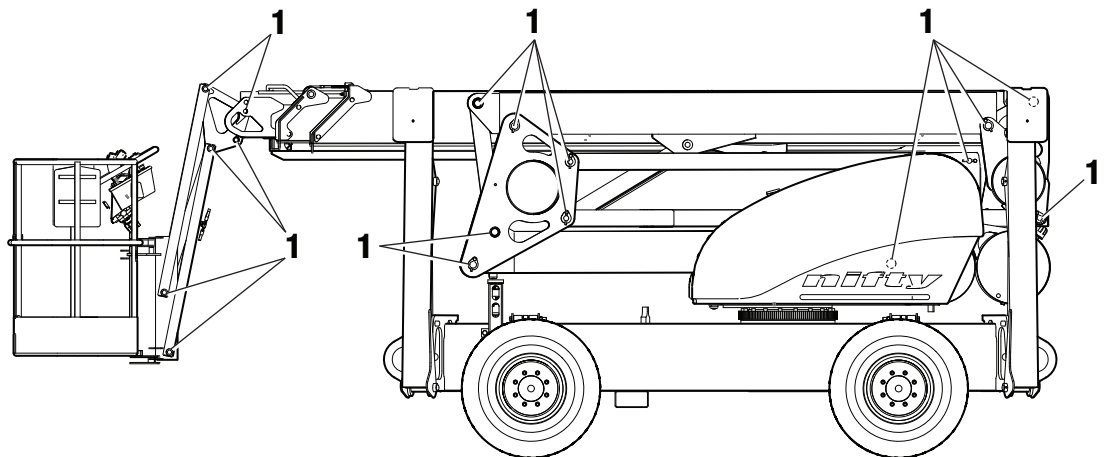


### 3.8.3 Boom pivot pin check (daily)

Check the respective locking device on each boom pivot pin is installed and secure.

### 3.8.4 Boom pivot bushes lubricate (yearly)

At yearly intervals lubricate all DU pivot bushes (1) on the Fly boom, Links and Telescope assemblies.



Use a dry PTFE aerosol lubricant spray. (See section 3.2.1). Apply lubricant spray and allow to penetrate at each of the pivot bush joints identified in the diagram above. Note; there are no grease or lubrication nipples on the pivot bushes.

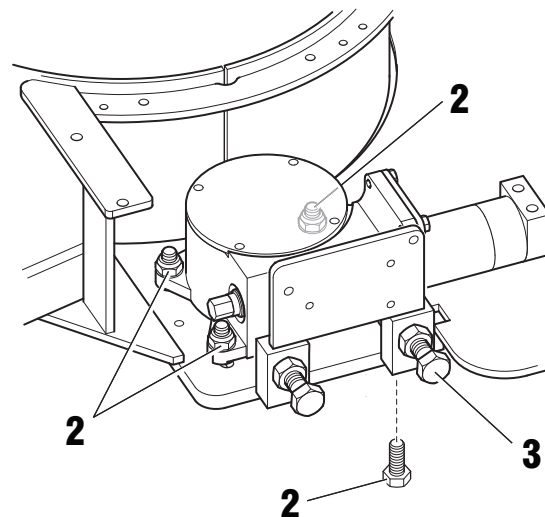
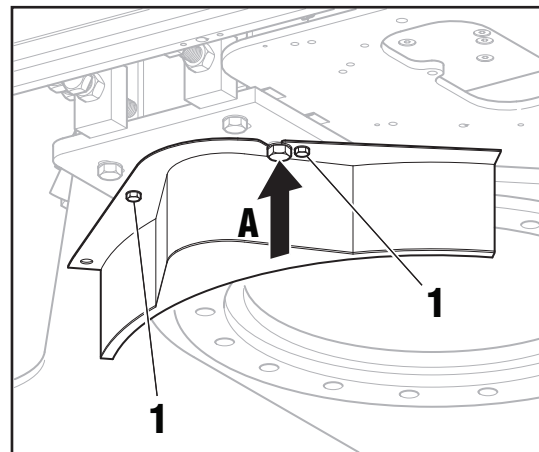
### 3.8.5 Chain inspection

Every 6 months of operation (more frequent in hostile environments), the leaf chains should be inspected and lubricated. Every 4 years a full chain inspection must be carried out. Please refer to Chain Inspection Manual (**M50280**) for further information.

### 3.9 Boom rotation gear

#### 3.9.1 Rotation gear engagement check (monthly)

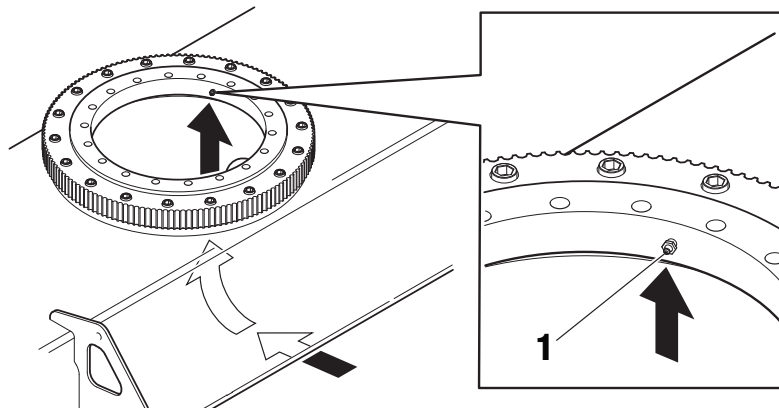
- 1) Check the play between the rotation ring and pinion.
- 2) With the telescope boom fully extended, manually push the booms from side-to-side. A small amount of play is permissible.
- 3) Inspect the rotation ring for signs of uneven wear, damage or missing teeth.
- 4) Rotate the machine through a full revolution and check that there are no tight spots where the superstructure struggles to rotate.
- 5) If adjustment is required, remove bolt (arrowed A) and 2 bolts (1) from the rotation ring guard.
- 6) Remove the rotation guard.
- 7) loosen 4 securing bolts (2) on the rotation ring gearbox.
- 8) Slacken off the locking nuts on both adjustment bolts (3).
- 9) Screw in adjustment bolts to increase pinion engagement or screw out the adjustment bolts to reduce pinion engagement.
- 10) Tighten both locking nuts on the adjustment bolts.
- 11) Tighten the 4 nuts / bolts securing the rotation ring gearbox in stages to 100Nm (74 lbf-ft).
- 12) Rotate the machine through a full revolution and check that there are no tight spots where the superstructure struggles to rotate.
- 13) If necessary reduce pinion engagement.
- 14) Reinstall the rotation guard and tighten 2 bolts. See section 2.6 for torque settings.
- 15) Apply Loctite 243 or equivalent thread locker to bolt A and tighten to 100Nm (74 lbf-ft).



### 3.9.2 Rotation ring lubrication (monthly)

**⚠ CAUTION** DO NOT CARRY OUT THIS PROCEDURE WHILST THE ENGINE IS RUNNING.

- 1) Two grease nipples (1) are located 180° apart on the inner rotation ring.
- 2) Connect a flexi-end grease gun up through the base to the grease nipple.

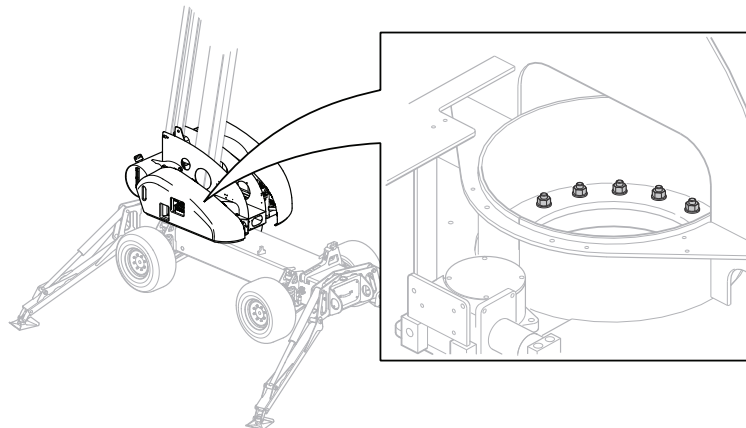


- 3) Pump the grease gun two to three times as required. Use black EP grease (See section 3.2.1).
- 4) Apply grease to the teeth of the rotation gear as required.

### 3.9.3 Rotation ring bolts check (yearly)

**⚠ CAUTION** DO NOT CARRY OUT THIS PROCEDURE WHILST THE ENGINE IS RUNNING.

Access the rotation ring bolts via the aperture in the superstructure. See section 2.6 for torque settings.



## 4 Repair procedures

### 4.1 General

#### 4.1.1 Fuses

The main replaceable fuses on the Niftylift are as follows:

- 125A - Battery Power Circuit,
- 125A - Diesel Engine Starter Motor and Alternator.

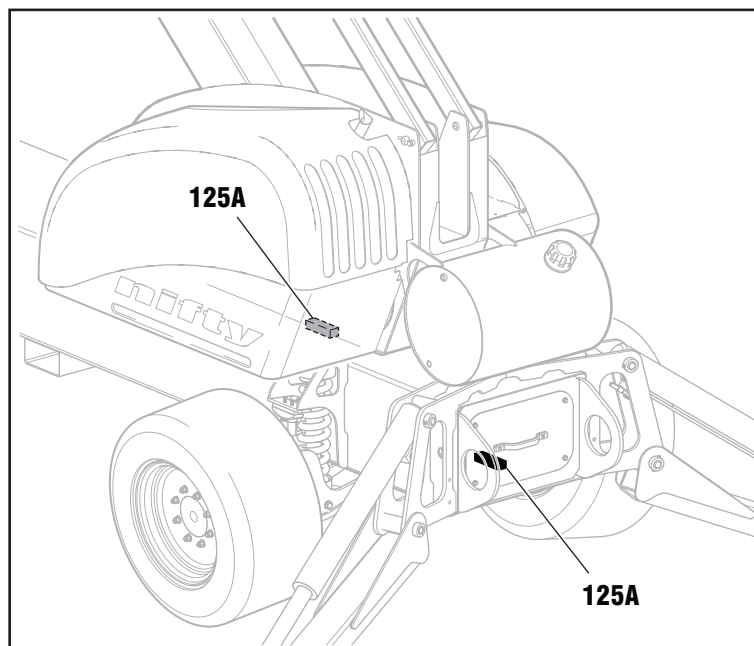
Prior to the replacement of any fuse, determine the cause of the fault. Do not replace the fuse until the cause of the fault has been remedied.

Isolate Niftylift from power supply during maintenance of the electrical system. (See section 1.5.4).

The replacement fuse must always be the same rating as the defective one.

See location diagram.

#### Main fuse location



## 4.2 Platform/basket

### 4.2.1 Footswitch - contact switch replace

The footswitch is used to provide power to the Niftylift controls.

#### Remove

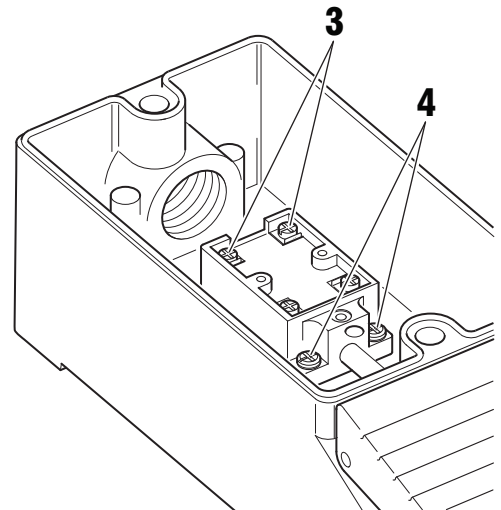
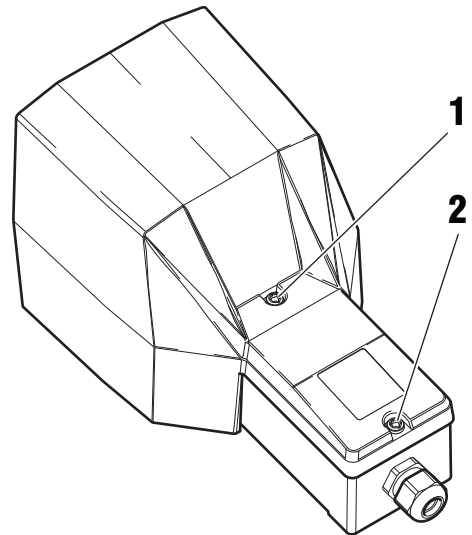
- 1) Isolate Niftylift from power supply. (See section 1.5.4).
- 2) Remove bolts (1) and (2) and remove the footswitch cover and rubber gasket.

Note; the longer length of bolt (1).

- 3) Record wiring locations.
- 4) Disconnect wiring from switch terminals (3).
- 5) Remove 2 screws (4) from contact switch and remove.

#### Install

- 6) Replace contact switch and tighten 2 screws.
- 7) Connect wiring to contact switch terminals as observed in step 3.
- 8) Reinstall footswitch cover and rubber gasket making sure bolts are in the same position as step 2.
- 9) Tighten bolt (1) to 3.0 Nm (2.2 lbf-ft) and bolt (2) to 2.5 Nm (1.8 lbf-ft).
- 10) Connect the power supply (See section 1.5.4).



## 4.3 Booms

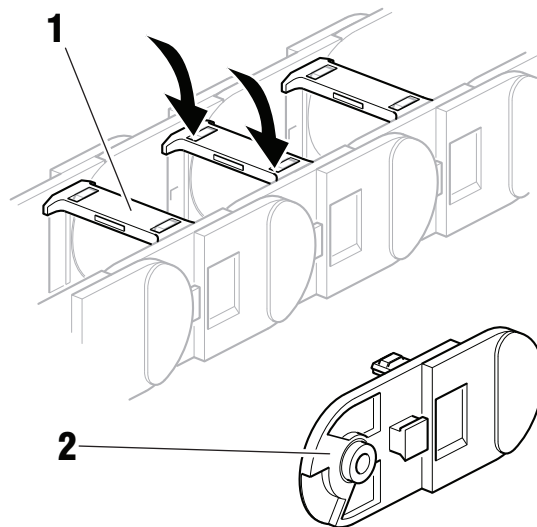
Booms are safety critical components, please contact your nearest Niftylift approved dealer for further information.

### 4.3.1 Energy chain link

One of two types of energy chain may be installed, please follow the respective instructions below.

#### Remove

- 1) Operate telescopic boom to access the worn or damaged link.
- 2) Insert a small flat screwdriver into the slots arrowed on the chain bridge section (1).
- 3) Carefully prize the bridge section out of the chain.
- 4) Repeat steps 2 and 3 on the opposite side of the chain.
- 5) Remove link (2) from the chain.

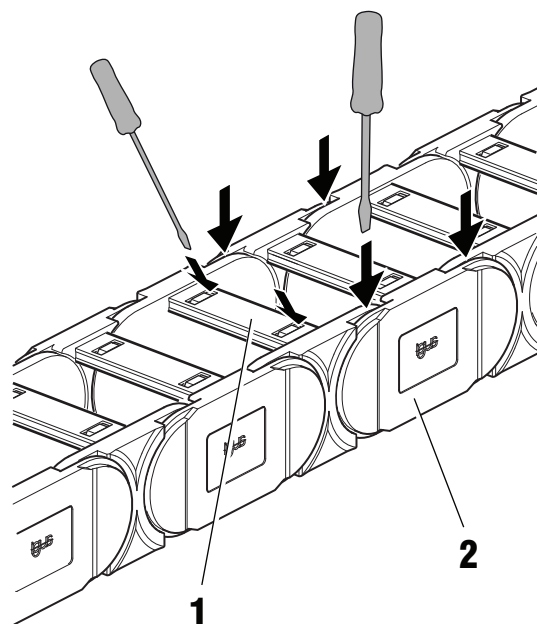


#### Install

- 6) Replace the link and click in place.
- 7) Reinstall both bridges and click into position.

#### Remove

- 1) Operate telescopic boom to access the worn or damaged link.
- 2) Insert a small flat screwdriver into chain bridge (1) and lever upwards.
- 3) Lift out the chain bridges.
- 4) Repeat step 2 and step 3 and remove lower chain bridges.
- 5) Carefully prize apart link (2) at the four points arrowed.
- 6) Remove link from chain.



#### Install

- 7) Replace link to chain and click into position.
- 8) Reinstall upper and lower chain bridges and click into position.

## 4.4 Power tray

### 4.4.1 Exhaust

**▲ CAUTION**

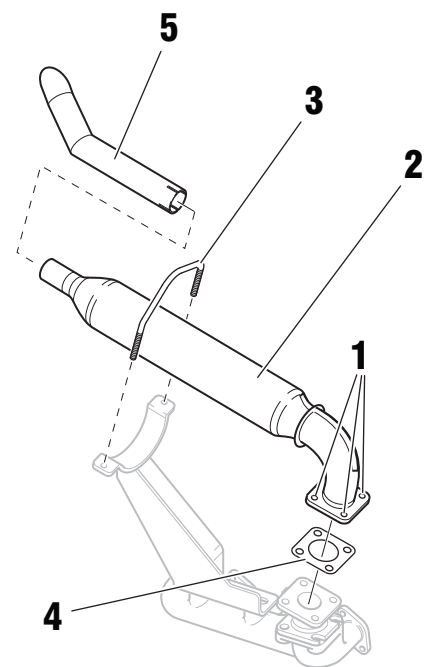
**ONLY CARRY OUT THIS PROCEDURE WITH THE ENGINE OFF AND COOLED.**

**▲ WARNING**

**THE POWER TRAY RETAINING BOLT MUST BE INSTALLED AND TIGHTENED TO THE SPECIFIED TORQUE BEFORE STARTING THE ENGINE.**

#### Remove

- 1) Open the Engine (right hand) canopy.
- 2) Remove the power tray retaining bolt. See section 3.3.1.
- 3) Swing the power tray away from the superstructure.
- 4) Remove 4 retaining bolts (1) from the exhaust assembly (2).
- 5) Remove 2 nuts from the exhaust clamp (3).
- 6) Remove exhaust assembly from the manifold.
- 7) Remove gasket (4).
- 8) Remove exhaust pipe (5) from the exhaust silencer.



#### Install

- 9) Reinstall exhaust pipe onto the exhaust silencer.
- 10) Replace gasket and reinstall the exhaust assembly to the manifold.
- 11) Reinstall 4 retaining bolts and tighten. See section 2.6 for torque settings.
- 12) Reinstall exhaust clamp and tighten nuts. See section 2.6 for torque settings.
- 13) Swing power tray back into position.
- 14) **Reinstall power tray retaining bolt and tighten.** See section 2.6 for torque settings.
- 15) Start engine, check for leaks around joints and seals.
- 16) Close the Engine (right hand) canopy.

#### 4.4.2 Fan belt

### ⚠ CAUTION

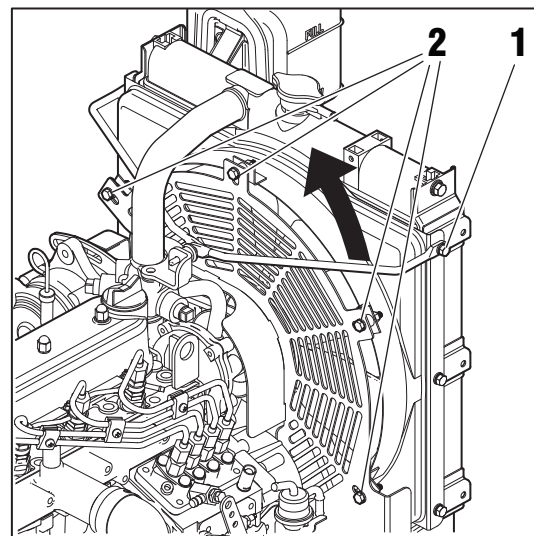
**ONLY CARRY OUT THIS PROCEDURE WITH THE ENGINE OFF AND COOLED.**

### ⚠ WARNING

**THE POWER TRAY RETAINING BOLT MUST BE INSTALLED AND TIGHTENED TO THE SPECIFIED TORQUE BEFORE STARTING THE ENGINE.**

#### Remove

- 1) Open the Engine (right hand) canopy.
- 2) Remove the power tray retaining bolt. See section 3.3.1.
- 3) Swing the power tray away from the superstructure.
- 4) Remove bolt (1) from the radiator support and raise upwards.
- 5) Remove 4 bolts (2) and remove the fan guard.
- 6) Loosen the alternator mounting bolts and remove the fan belt.



#### Install

- 7) Replace fan belt.
- 8) Reinstall fan guard and tighten 4 bolts. See section 2.6 for torque settings.
- 9) Lower the radiator support, reinstall bolt and tighten. See section 2.6 for torque settings.
- 10) See section 3.3.14 for fan belt adjustment.
- 11) Swing power tray back into position.
- 12) **Reinstall power tray retaining bolt and tighten.** See section 2.6 for torque settings.
- 13) Close the Engine (right hand) canopy.

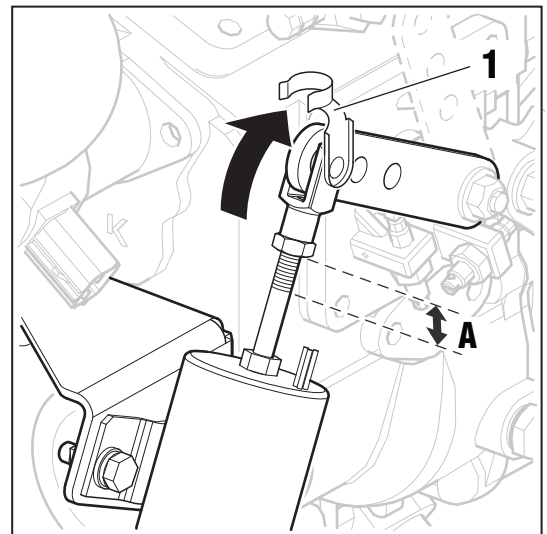


### 4.4.3 Throttle solenoid

**CAUTION** ONLY CARRY OUT THIS PROCEDURE WITH THE ENGINE OFF AND COOLED. BEWARE HOT ENGINE COMPONENTS.

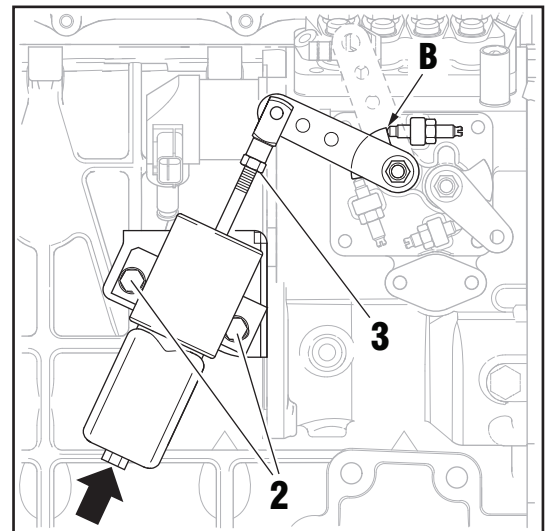
#### Remove

- 1) Open the Engine (right hand) canopy.
- 2) Isolate Niftylift from power supply. (See section 1.5.4).
- 3) Record measurement A.
- 4) Record the position of the throttle solenoid wiring connections.
- 5) Disconnect the throttle solenoid connectors.
- 6) Lift clip (1) and remove.
- 7) Undo 2 bolts (2) and remove the throttle solenoid.
- 8) Undo lock nut (3), then remove clevis pin and lock nut.



#### Install

- 9) Make new connections on the throttle solenoid wiring.
- 10) Reinstall lock nut and clevis pin observe measurement A recorded in step 3. (Do not tighten lock nut fully at this stage).
- 11) Replace the throttle solenoid, ensure 2 bolts are tight.
- 12) Reconnect clevis pin to the throttle linkage and secure with clip.
- 13) Manually push the throttle solenoid (arrowed), ensure the throttle solenoid is at full travel when it contacts the throttle stop (position B).
- 14) Readjust measurement A if necessary.
- 15) Ensure lock nut is tight.
- 16) Reconnect wiring and secure cable ties as necessary.
- 17) Connect the power supply (See section 1.5.4).
- 18) Start the engine and check machine operation.
- 19) Close the Engine (right hand) canopy.



## 4.5 Base assembly

### 4.5.1 Steer cylinders

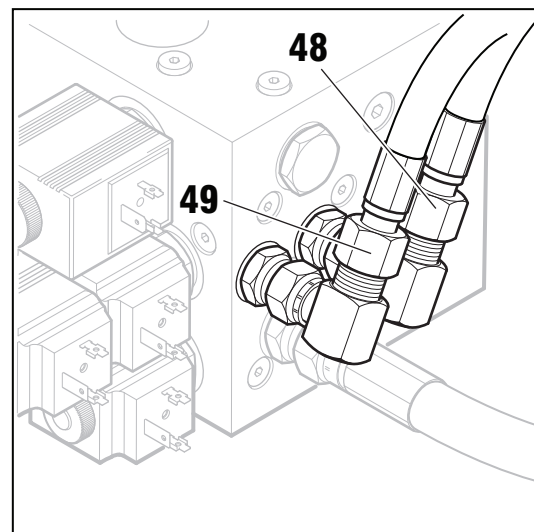
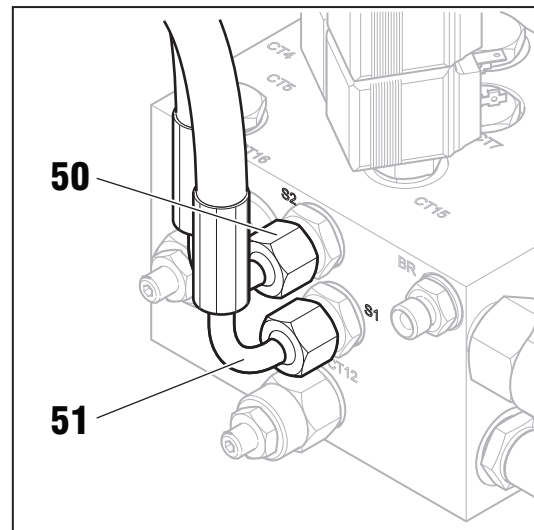
**⚠ WARNING** MAKE SURE SUITABLE EYE PROTECTION AND CLOTHING ARE WORN WHEN OPENING THE HYDRAULIC CIRCUIT.

**⚠ CAUTION** RISK OF BURNS - ALLOW THE HYDRAULIC OIL SUFFICIENT TIME TO COOL BEFORE DRAINING.

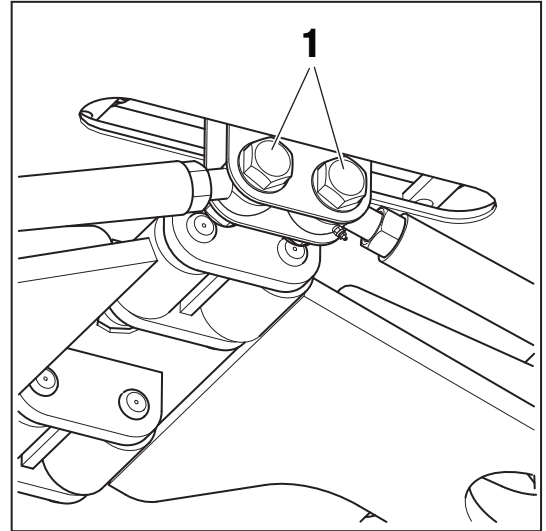
**NOTICE** PLACE A SUITABLE CONTAINER UNDERNEATH THE WORK AREA AND DISPOSE OIL ACCORDING TO LOCAL REGULATIONS.

#### Remove

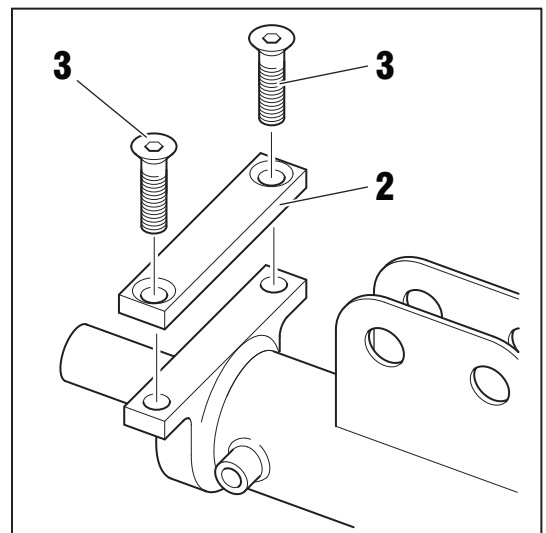
- 1) Ensure the Niftylift is in its stowed position.
- 2) Center the steering so wheels point straight ahead.
- 3) Undo 4 bolts and remove the base end cover to allow access to the steer cylinder.
- 4) Observe clean assembly practices to avoid contamination by dust or dirt.
- 5) Open the control (left hand) canopy and place a suitable container underneath the Drive Control Valve (front steer cylinder) or SD Valve (rear steer cylinder).
- 6) Mark the hydraulic hoses for identification purposes.
- 7) For the front steer cylinder, carefully remove 2 hydraulic hoses labelled 50 and 51 from the Drive Control Valve (DCV).
- 8) For the rear steer cylinder, carefully remove 2 hydraulic hoses labelled 48 and 49 from the SD Valve.
- 9) Slowly loosen fittings to allow pressure to dissipate.
- 10) Insert plugs and cap to prevent oil loss.
- 11) Cut cable ties to release the hoses.
- 12) Feed hoses back down through the base.
- 13) Locate the access holes on either side of the base and remove 2 bolts and washers securing steer cylinder.



- 14) From underneath the base, remove 2 bolts (1), 2 washers and 2 nuts from the track rods.
- 15) Remove steer cylinder and connected hoses.
- 16) Observe the position of the hydraulic hoses and disconnect from the steer cylinder.

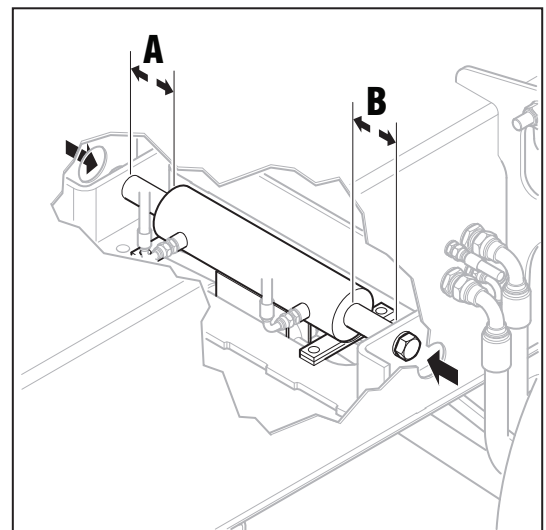


- 17) Remove the wear pads (2) from the steer cylinder. Retain 4 bolts and washers (3), discard Nyloc nuts.



**Install**

- 18) Check the wear pads and reinstall or replace if necessary.
- 19) Use new Nyloc nuts and tighten four bolts. See section 2.6 for torque settings.
- 20) Connect hydraulic hoses as recorded in step 16 and tighten connectors. See section 2.7 for torque settings.
- 21) Feed hydraulic hoses back up through the base.
- 22) Position steer cylinder in the base, ensure measurement A and B is equal.
- 23) Apply thread locking adhesive to bolt threads (See section 3.2.1).
- 24) Reinstall 2 bolts (arrowed) through access holes in the base and tighten to 250 Nm (184 lbf-ft).
- 25) Reconnect track rods replacing 2 Nyloc nuts and tighten. See section 2.6 for torque settings.
- 26) Remove caps or plugs from the respective valve block ports and hydraulic hoses.
- 27) Connect hydraulic hoses as recorded in step 6. Tighten connectors. See section 2.7 for torque settings.



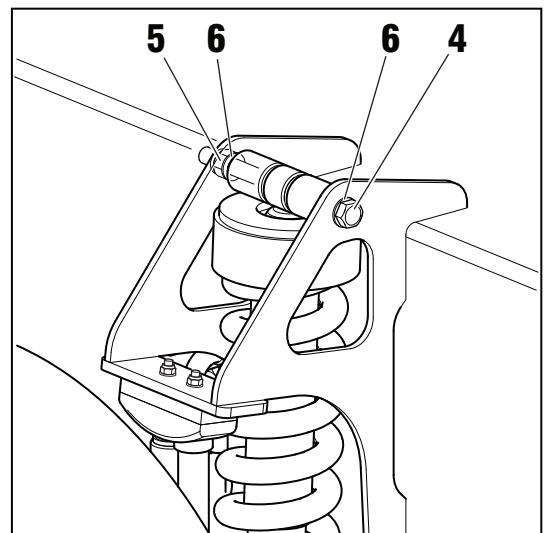
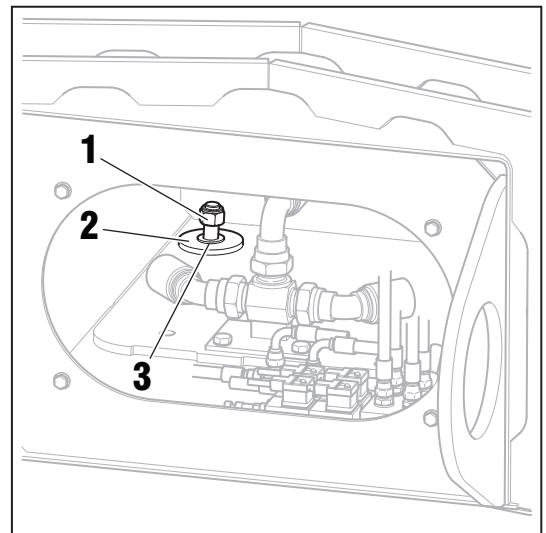
- 28) Remove container from underneath the respective valve block and dispose of any oil in accordance with local regulations.
- 29) Close the control (left hand) canopy.
- 30) Operate the machine and check hydraulic system until oil temperature reaches 40°C (104°F). Check operation and inspect for leaks.
- 31) Check hydraulic oil level and top up with appropriate grade of oil if necessary (See section 2.4.4).
- 32) Reinstall end cover to base and tighten 4 bolts. See section 2.6 for torque settings.

### 4.5.2 Shock absorber

Shock absorbers should be checked for damage, leaks and correct damping operation. Replace as necessary.

#### Remove

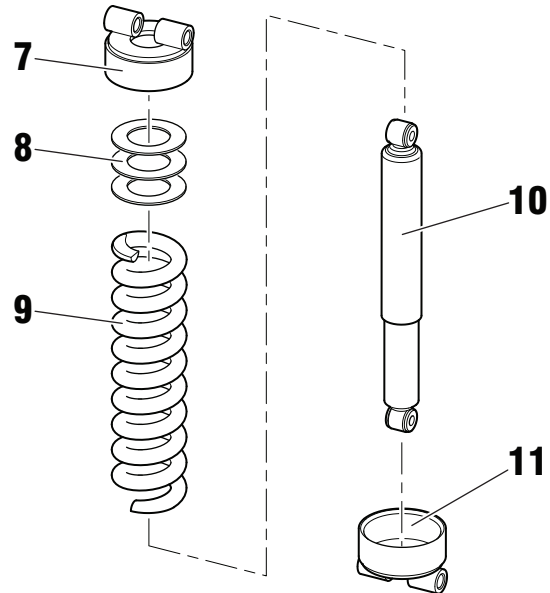
- 1) Ensure the Niftylift is in its stowed position.
- 2) Center the steering so wheels point straight ahead.
- 3) Refer to the Operating & Safety Instructions supplied with the Niftylift and lower the stabilizers.
- 4) Ensure the Niftylift is level.
- 5) Support the swing axle using a suitable jack.
- 6) Undo 4 bolts and remove the base end cover to allow access to the swing axle stud.
- 7) Remove and discard the Nyloc nut (1) from the Swing axle stud.
- 8) Retain washer (2) and spacer (3).
- 9) Ensure coil spring is fully relaxed (lower the hydraulic jack if necessary), then remove the upper bolt (4), nut (5) and 2 washers (6).
- 10) Observe orientation of the bolt (facing into the Niftylift).
- 11) Discard the Nyloc nut.



- 12) Remove the upper suspension cup (7) and retain shim (8) x1 on front suspension or x3 on rear suspension.
- 13) Remove the coil spring (9).
- 14) Remove lower bolt and 2 washers; discard the Nyloc nut.
- 15) Remove the shock absorber (10).

### Install

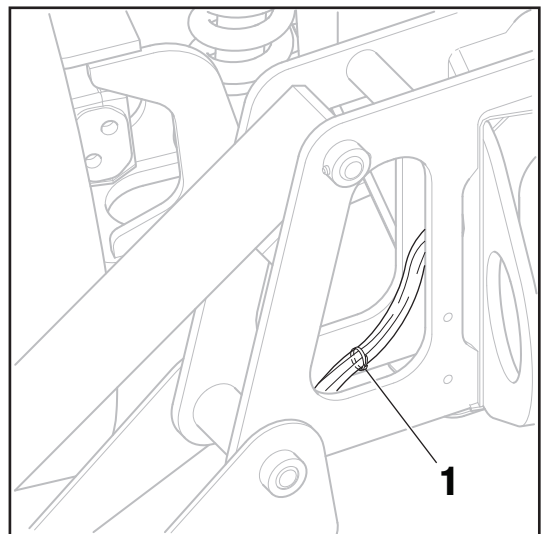
- 16) Lower the shock absorber into position on the lower suspension cup (11).
- 17) Reinstall lower bolt and washers through swing axle.
- 18) Install Nyloc nut and tighten. See section 2.6 for torque settings.
- 19) Reinstall coil spring.
- 20) Extend the shock absorber and position the spacer(s) on top of the coil spring.
- 21) Reinstall the upper suspension cup.
- 22) Observe orientation of the bolt as in step 10 and reinstall the upper bolt and washers. Raise the hydraulic jack if necessary to align bolt holes.
- 23) Install Nyloc nut and tighten. See section 2.6 for torque settings.
- 24) Remove the hydraulic jack.
- 25) Raise the stabilizers.
- 26) Reinstall the washer and spacer to the swing axle stud.
- 27) Replace Nyloc nut and tighten. See section 2.6 for torque settings.
- 28) Reinstall end cover to base and tighten 4 bolts. See section 2.6 for torque settings.



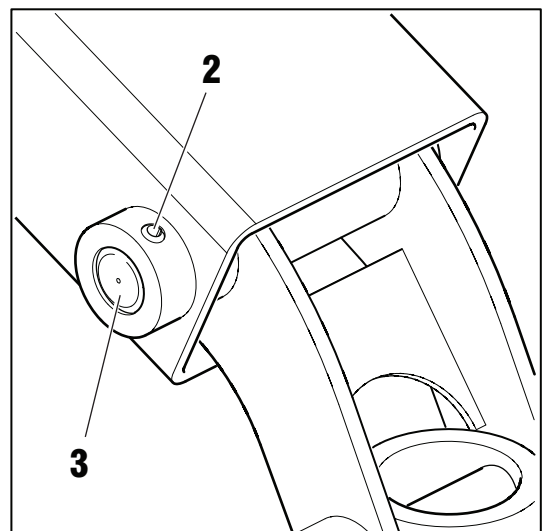
### 4.5.3 Stabilizer microswitch

#### Remove

- 1) Ensure the Niftylift is in its stowed position.
- 2) Lower the stabilizer to mid position.
- 3) Place a suitable support underneath the stabilizer foot.
- 4) Isolate Niftylift from power supply. (See section 1.5.4).
- 5) Cut the cable tie (1) to release the wiring harness.



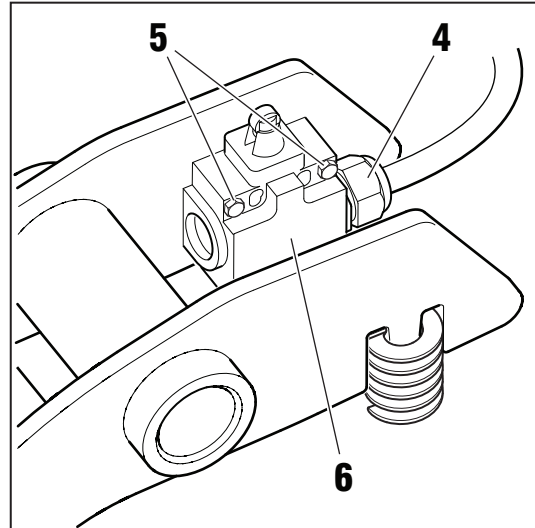
- 6) Using a suitable punch, knock out the roll pin (2).
- 7) Using a suitable drift, knock out the pin (3).
- 8) Withdraw the stabilizer foot assembly and rest it upon the work bench.
- 9) Retain spring.



- 10) Loosen gland (4).
- 11) Undo bolts (5) and remove switch.
- 12) Remove front cover (6).
- 13) Record the position and disconnect four wires.
- 14) Withdraw wiring from switch.

**Install**

- 15) Insert wiring into switch.
- 16) Connect wiring to switch terminals as observed in step 13.
- 17) Reinstall front cover.
- 18) Install switch and tighten bolts.
- 19) Tighten gland.
- 20) Ensure spring is fitted and reinstall stabilizer foot assembly.
- 21) Replace pin and secure with roll pin.
- 22) Remove support.
- 23) Secure wiring harness with a cable tie.
- 24) Connect the power supply. (See section 1.5.4).
- 25) Operate the stabilizer and check for correct operation.



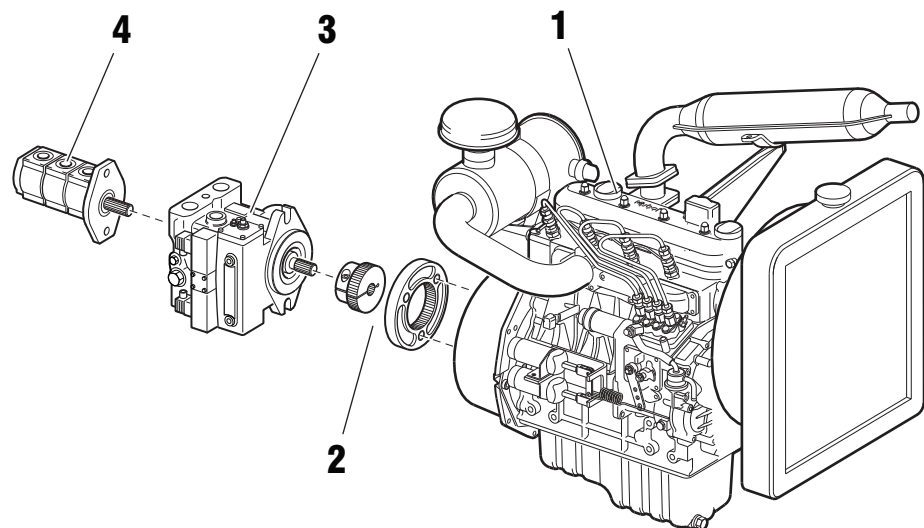


## 5 System Overview

### 5.1 Power system

The main hardware for this system consists of the following:

- (1) 25kW Kubota V1505 Diesel engine
- (2) Drive Hub and Flange
- (3) 250 bar (3626 psi) 45cc Swash Pump
- (4) 16cc Engine Gear Pump.



## 5.2 Boom system

### 5.2.1 Booms valve

The boom control valve contains the ON/OFF solenoid and Pressure Reduction Valve (PRV) for the boom controls.

### 5.2.2 Boom switches

Mounted on the tele-knuckle and the booms down/centralising post located on the top of the base, and operated by any of the booms raising and/or the telescopic boom extending, these switches control both the operation of the Tilt Alarm Sensor, and the drive speed control function.

With the booms in the stowed position, the operator is allowed to drive the machine and negotiate slopes up to 10° without activating the tilt alarm.

Because of the restricted visibility over the engine canopy, an electric luffing switch has been provided. Using this switch on the basket console permits the operator to elevate the luffing boom to a restricted safe height for driving.

## 5.3 Drive system

### 5.3.1 Overview

A Kubota V1505 diesel engine coupled to two hydraulic pumps provide hydraulic pressure of 250 bar (3626 psi) in the drive system. Hydraulically driven motors provide drive through a gearbox to each wheel to give the machine four wheel drive capability. The table below describes the available driving modes and machine speeds.

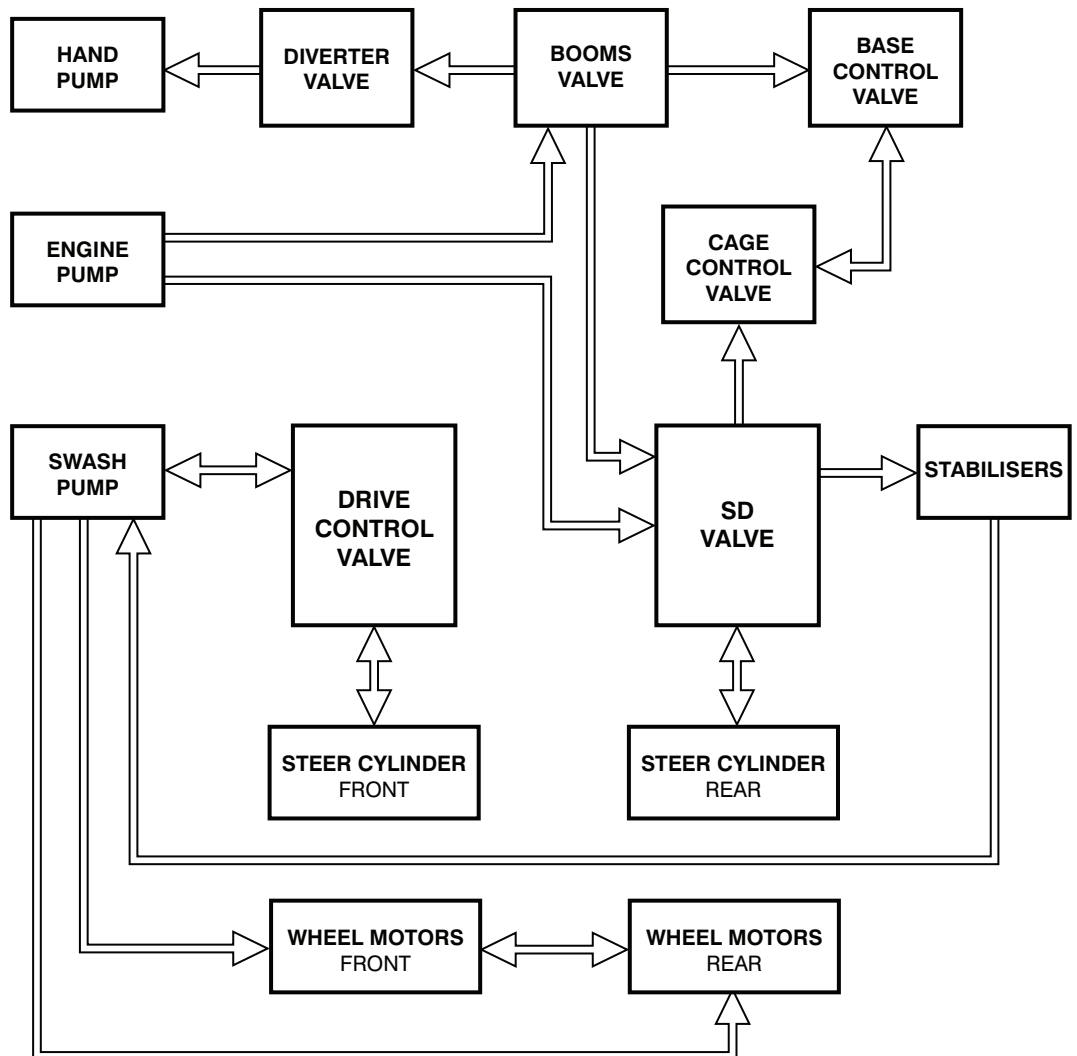
Driving Mode	Speed
Hare	7.5 km/h (4.7 mph)
Tortoise	3.5 km/h (2.2 mph)

### 5.3.2 Charging system

The engine alternator charges the start battery when the engine is running which keeps the battery at 14.4V.

### 5.4 Hydraulic system overview

A simplified version of the hydraulic system is shown below in block diagram format. Brief descriptions of the operation of individual blocks are given below. Component details, valve arrangement and connections are shown in the hydraulic schematics. Please refer to the hydraulic schematics in conjunction with the electric schematics listed in "Technical Documents" on page 4 for in-depth understanding of the complete system.



## 5.5 Hydraulic pumps

The Niftylift is equipped with two hydraulic pumps. The first, a variable displacement (swash) pump and the second a fixed displacement engine (gear) pump. See Pump Specifications table for information.

Pump Specifications	
Swash Pump	Engine Pump
45cc Variable Displacement Pump Closed Loop Circuit	16cc Triple body, aluminum, external gear
Maximum pressure 350 bar (5076 psi)	Maximum pressure 230 bar (3335 psi)

## 5.6 Hydraulic valve blocks

The following valve blocks are fitted to the Niftylift:

- Drive Control Valve (DCV)
- SD Valve
- Booms Valve

The table below describes the main functions. Refer to Hydraulic Schematic D81955 for more details.

Function	Description
Drive Control Valve	Controls brake release to the front and rear brakes. Controls front steering.
SD Valve	Controls rear steering. Controls the stabilizers drive forward and backward.
Booms Valve	Regulates pressure to the SD valve.

## 5.7 Brake release

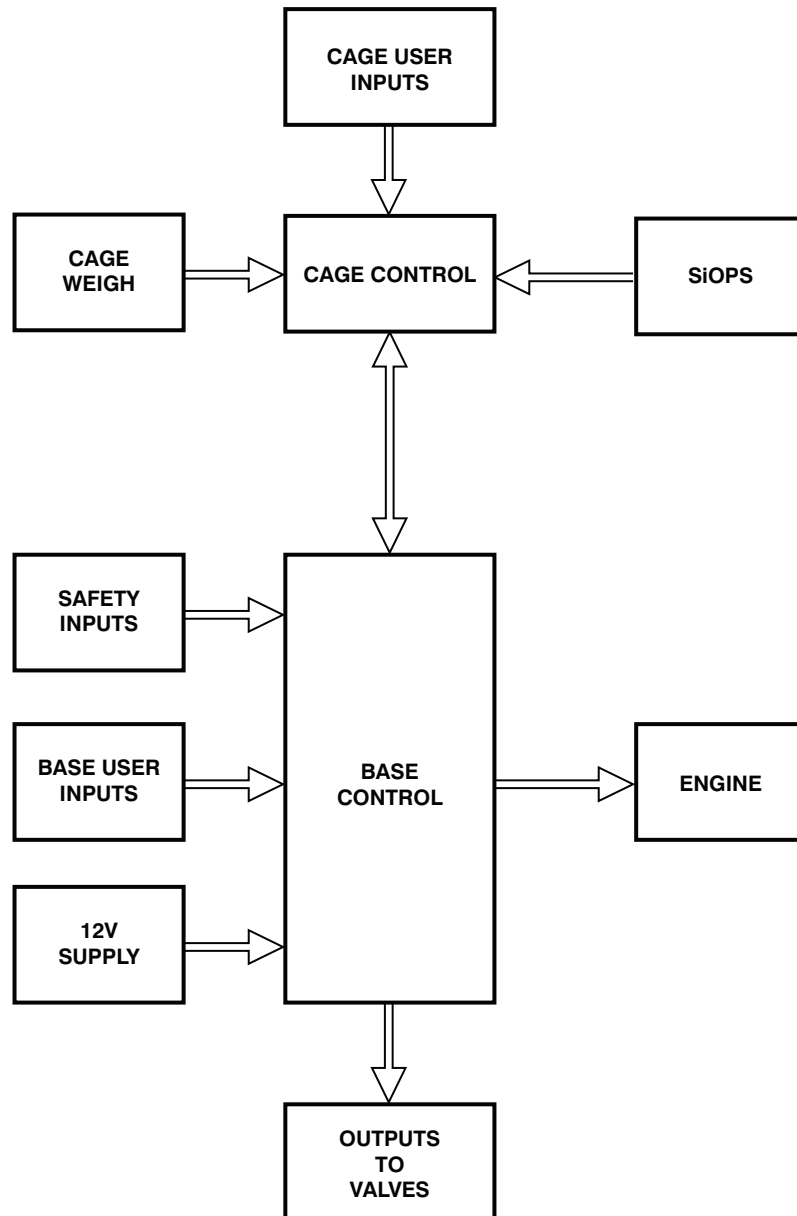
The front and rear brakes are controlled via the brake release valve in the DCV. When driving, the system is energized and the brakes are released on all four gearboxes.

## 5.8 Steering

### Four wheel steer

To improve manoeuvrability, both the front and rear wheels are steered. When steer is activated, steer flow is supplied from the DCV to the front steer cylinder and via the SD valve to the rear steer cylinder.

### 5.9 Electrical control system overview



### 5.10 Control logic

Component level details and connections are provided in the Electric Schematics listed in Table 1.2, "Technical Documents," on page 4.

## 6 Troubleshooting guide

### 6.1 Troubleshooting information

This guide is designed to help identify and rectify faults more easily. Known faults are listed below. Your specific Niftylift fault may not be listed here, if not please contact your local Niftylift approved dealer in order for the guide to be continually improved and updated.

### 6.2 Platform function fault finding

Problem	Cause / Test	Solution
<b>Niftylift will not drive</b>	Check that power is reaching the solenoids on the DCV and SD valve blocks	Main PCB may need replacement
	Check main PCB for signal in from joystick and out to drive block	Loose connector
	Check joystick	Replace joystick if faulty
<b>No functions, but engine operates correctly</b>	Drive hub failure	Drive hub failure. Replace any damaged parts
	Footswitch fault	Contact switch may need replacement (See section 4.2.1)
<b>Niftylift inactive, engine will not start</b>	Battery-disconnect handle (Anderson)	Reconnect battery-disconnect handle (See section 1.5.4)
	Check main fuse	If fuse blown, replace with direct replacement (See section 4.1.1)
	Battery discharged	Recharge battery
	E-stops activated	Ensure e-stops are pulled out, at base controls and basket controls
	Basket weigh activated	Remove weight from basket
<b>Niftylift will not select hare speed</b>	Check that power is reaching the throttle solenoid	PCB / wiring may need replacement
	Check free movement on throttle linkage	Adjust or repair linkage
	Check Solenoid	Replace solenoid if faulty

### 6.3 Engine fault finding

Problem	Cause / Test	Solution
Engine difficult to start	Fuel is thick and doesn't flow	Check the fuel tank and fuel filter. Remove water, dirt and other impurities
		As all fuel will be filtered by the filter, if there should be water or other foreign matters on the filter, clean the filter with diesel
	Air or water mixed in fuel system	If air is in the fuel filter or injection lines, the fuel pump will not work properly. To attain proper fuel injection pressure, check carefully for loosened fuel line couplings, loose cap nuts etc.
		Loosen joint bolt at top of fuel filter and air vent screws of fuel injection pump to eliminate all the air in the fuel system
	Thick carbon deposits on orifice of injection nozzle	This is caused when water or dirt is mixed in the fuel. Clean the nozzle injection piece, being careful not to damage the orifice
		Check to see if nozzle is working properly. If not, install a new nozzle
	Valve clearance is incorrect	Adjust valve clearance to 0.145 to 0.185mm (0.0057 to 0.0072in.) when the engine is cold
	leaking valves	Grind valves
	Fuel injection timing is wrong	Adjust injection timing
		The injection timing 0.3 rad (18°) before top dead center (TDC)
	Engine oil becomes thick in cold weather and engine cranks slow	Change grade of oil appropriate to the ambient temperature
Low compression	Bad valve or excessive wear of rings, pistons and liners cause insufficient compression. Replace with new parts	
Battery is discharged and the engine will not crank	Charge start battery	
	In winter, always remove battery from the Niftylift, charge fully and keep indoors. Install on the Niftylift when required	

<b>Problem</b>	<b>Cause / Test</b>	<b>Solution</b>
<b>Engine output insufficient</b>	Carbon stuck around orifice of injection nozzle piece	Clean orifice and needle valve, being careful not to damage the nozzle orifice
		Check nozzle for condition. Replace if necessary
	Inadequate compression. Leaking valves	Bad valve or excessive wear of rings, pistons and liners cause insufficient compression. Replace with new parts
		Grind valves
	Fuel supply is deficient	Check fuel system
	Moving parts overheating	Check lubricating oil system
		Check lubricating oil filter is functioning correctly
		Filter element deposited with impurities will cause poor lubrication. Replace element
		Check clearance of bearings are within factory specifications
		Check ignition timing
	Valve clearance is wrong	Adjust valve clearance to 0.145 to 0.185mm (0.0057 to 0.0072in.) when the engine is cold
Air cleaner is dirty	Clean the air filter every 100 hours of operation	
Fuel injection pressure is incorrect	Adjust to correct pressure. 13.7 Mpa (140kgf/cm <sup>2</sup> , 1991 psi)	
Injection pump wear	Do not use poor quality fuel as it will cause excessive pump wear. Use only grade 2-D Diesel	
	Check the fuel injection pump element and delivery valve assembly and replace if necessary	
<b>Engine cutting out due to low fuel level</b>	Fuel level too low	Re-fill fuel tank if problem persists see above for 'Air or water mixed in fuel system'
	Fuel line crushed	Release fuel line and replace if damaged
	Lift pump not functioning correctly	Replace lift pump



## 6.4 Gearbox fault finding

<b>Problem</b>	<b>Cause / Test</b>	<b>Solution</b>
<b>Oil leakage from seals</b>	Hardening of the seals due to prolonged storage	Clean area and check for leakage after a few days
	Seals damaged or worn	Contact a Niftylift approved service center
	Too much lubricant	Check oil level (See section 3.5.1)
<b>Vibrations and/or excessive noise</b>	Wheel gear is not correctly installed	Check the fixing
	Internal anomaly	Contact a Niftylift approved service center
	Bearings badly lubricated or faulty	Contact a Niftylift approved service center
	Dented or chipped teeth	Contact a Niftylift approved service center
	Low oil level	Check oil level, top-up if necessary (See section 3.5.1)
<b>Brakes fail to disengage</b>	Low pressure in the braking circuit	Check the brake connection and hydraulic circuit
	Brake stuck due to prolonged storage	Contact a Niftylift approved service center
<b>Brakes do not engage</b>	Residual pressure in the circuit	Check hydraulic circuit
<b>Over-heating</b>	Either too much or too little oil	Check the oil level
	Unsuitable lubricant	Check the lubricant type and condition
	Bearings badly lubricated or faulty	Contact a Niftylift approved service center
	Multiple-disc brake not opening completely	Check brake opening pressure
	High thermal power	Contact a Niftylift approved service center

***niftylift***