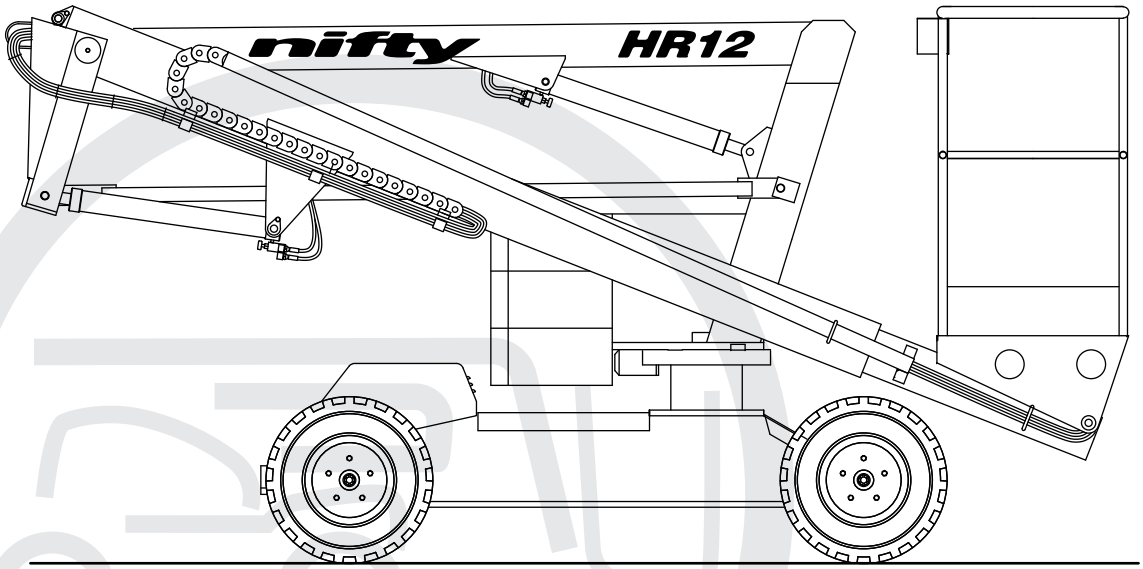
Heightrider

Service Manual

MODEL HR12 SERIES



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Notes

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 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 and/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, “Defined maintenance terms,” on page 2.

Table 1: Defined maintenance terms

Term	Action
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

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 please do not hesitate to contact us at your nearest office.

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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 specialised skills, tools, lifting equipment and a suitable workshop. In these instances, it is recommend that maintenance and repair be performed by Niftylift or at a Niftylift approved service centre.

Manufacturer'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.

⚠WARNING **FAILURE TO PERFORM PREVENTATIVE MAINTENANCE AT THE REQUIRED INTERVALS WILL 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 slewed parallel to the base, and cage 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 being 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 error. Never leave hydraulic lines open or open them in a contaminated area. Always use plugs or caps.

Use only recommended lubricants. See section 2.4.2.

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

Please refer to the following documents for further details.

Document	Number			
	DIESEL	PETROL	BI-ENERGY	DC ELECTRIC
Hydraulic Schematic	D80526			
Electric Schematic	D81632			
Operating and Safety Instructions	M50192			
Parts Manual	M50510			
Engine Operators Manual	M50290	M50295	-	-

For easy access to any of the above documents go to 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 aerial platform 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) and hydraulic oil 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, as provided by Niftylift, 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 pressurised systems such as hydraulic and engine coolant.

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

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.

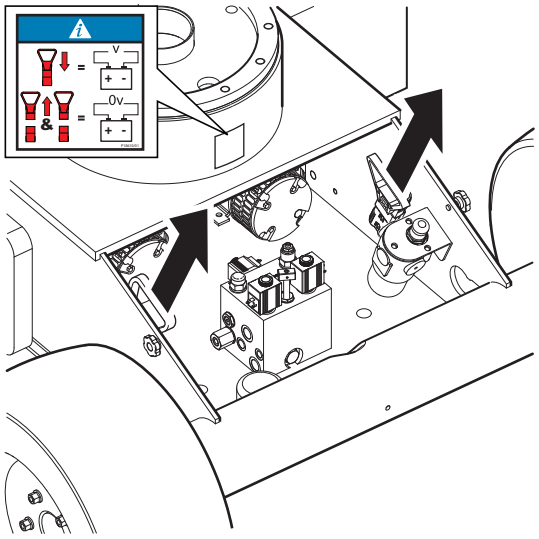
Never start the engine without the power tray retaining bolt installed.

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 Electrical safety



During maintenance of the electrical system, disconnect the start battery negative (-) terminal (Diesel & Bi-energy machines). To isolate the 24V battery system, pull both battery-disconnect handles (Anderson).

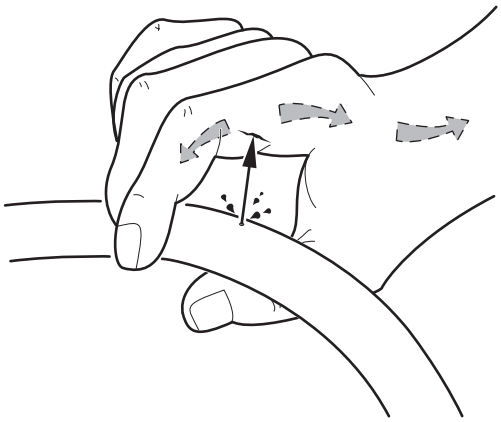
Ensure sparks, flames or lighted tobacco are kept away from batteries as they emit explosive gases.

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 are charged/discharged to the same level.

1.5.5 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 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).

1.5.6 Environmental awareness

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

Diesel

Feature	Kubota OC60	Kubota OC95
Type	Oil-cooled 4-cycle, 1 cylinder diesel engine	
Fuel	Diesel fuel No. 2-D	
Engine oil	See section 2.4.2	
Mass (Dry weight)	38kg (84 lbs)	55kg (121 lbs)
Displacement	276cm^3	416cm^3
Net power	4.2kW/5.6hp @ 3600rpm	7.0kW/9.4hp @ 3600rpm
Oil capacity	1.3 L (0.29 gal)	1.7 L (0.37 gal)
Fuel capacity	3.6 L (0.79 gal)	5.5 L (1.2 gal)
Valve clearance (Cold)	0.14 to 0.18 mm (0.0055 - 0.0071 in.)	

Petrol

Feature	Honda GX270
Type	Air cooled 4-cycle, 1 cylinder OHV petrol engine
Fuel	Premium Petrol (Unleaded)
Engine oil	See section 2.4.2
Mass (Dry weight)	25.8kg (56.9 lbs)
Displacement	270cm^3
Net power	6.6kW/9hp @ 3600rpm
Oil capacity	1.1 L (0.24 gal)
Fuel capacity	5.3 L (1.16 gal)
Spark plug gap	0.70 - 0.80 mm (0.028 - 0.031 in.)
Valve clearance (Cold)	Inlet 0.15 ± 0.02 mm (0.0059 ± 0.0007 in.) Exhaust 0.20 ± 0.02 mm (0.0078 ± 0.0007 in.)

2.2 Gearbox specifications

Type	425GEARBOX PGWF130/5.75/GWS100
Mass (Dry weight)	21kg (46 lbs)
Oil capacity	0.3 L (0.06 gal)
Oil type	See section 2.4.3

2.3 Function times

Function	**Up/right/out**		**Down/left/in**	
	Time, (Seconds)			
	Petrol/Diesel	**Battery**	**Petrol/Diesel**	**Battery**
Slew (180°)	41±5		41±5	
Boom 2 (Ram 1)	29±5		25±5	
Boom 3 (Ram 2)	31±5		30±5	
Boom 4	35±5		23±5	
Niftylift drive speed FWD/REV	**Petrol/Diesel**		**Battery**	
Max hare speed	3.26 km/h - (2.03mph)		2.55 km/h - (1.59 mph)	
Max tortoise speed	1.62 km/h - (1.01 mph)		1.27 km/h - (0.79 mph)	
Elevated drive	0.46 km/h - (0.29 mph)		0.40 km/h - (0.25 mph)	
FWD/REV drive speed must be measured over a 10 metre (33 feet) distance on flat level ground.				
All measurements carried out with 200kg (441 lbs) in cage (including operator) and operated from cage. Niftylift **must** 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	19 L (4.2 gal)
Fuel tank	**OC60** 3.6 L (0.79 gal) **OC95** 5.5 L (1.20 gal) **GX270** 5.3 L (1.16 gal)
Engine oil	**OC60** 1.3 L (0.29 gal) **OC95** 1.7 L (0.37 gal) **GX270** 1.1 L (0.24 gal)

2.4.2 Engine oil specifications

Engine	Ambient temperature	Oil type	
Kubota OC60 / OC95	**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
Honda GX270	**All**	-	SAE 10W/30

2.4.3 Gearbox oil specifications

Ambient temperature	Oil type
-20°C (-4°F) to +45°C (113°F)	ISO VG 22 (Standard fitment)

2.4.4 Hydraulic oil specifications

ISO VG 22 oil is fitted as standard, for other climates or harsh operating conditions please contact your nearest Niftylift approved dealer.

2.4.5 Hydraulic pressure settings

Refer to Hydraulic Schematic as supplied with the machine noting the serial number of the Niftylift.

2.5 Tyre specifications

Standard tyre fitment: Kenda Superturf Tyre 23-10.50-12 6PLY or Grey non-marking, Trelleborg, 23x10.50-12.

⚠WARNING **DO NOT REPLACE TYRES 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 BOLTS	86 Nm (65 lbf·ft)					
SLEW RING BOLTS	285 Nm (210 lbf·ft)					

This torque chart is based on the following assumptions:
Bolts to ISO 898-1 “Mechanical properties of fasteners made of carbon steel and alloy steel”
For “unplated” bolts, all grades:
Hex head bolts
Black oxide steel bolt with a rolled & oiled thread, no finish on steel nut
Prevailing torque includes Nylock (minimum prevailing torque figure assumed)
Medium Clearance holes to ISO 273
Bolt tightening condition = Yield factor of 75%
For “plated” bolts, all grades:
Hex head bolts
Zinc plated oiled (rolled or cut) steel external thread with no finish on steel internal thread
Prevailing torque includes Nylock (minimum prevailing torque figure assumed)
Medium Clearance holes to ISO 273
Bolt tightening condition = Yield factor of 75%
Figures quoted in **Nm** have been calculated in Nm and then rounded to the nearest whole number.
Figures quoted in **lbf·ft** have been calculated in Nm, converted using a factor of 0.737561 and then rounded.

2.6.1 Torque settings - Kubota OC60 and OC95 engines

Screw and bolt material grades are identified by numbers stamped on the screw/bolt head.

Bolt size	Tightening torque in Nm (lbf·ft)	
Grade	**Standard screw/bolt (4)**	**Special screw/bolt (7)**
M6	7.9 - 9.3 (5.8 - 6.9)	9.8 - 11.3 (7.2 - 8.3)
M8	17.7 - 20.6 (13.0 - 15.2)	23.5 - 27.5 (17.4 - 20.3)
M10	39.2 - 45.1 (28.9 - 33.3)	48.1 - 55.9 (35.4 - 41.2)
M12	62.8 - 72.6 (46.3 - 53.5)	77.5 - 90.2 (57.1 - 66.5)

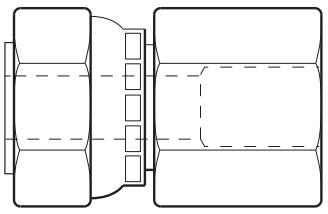
Stamped number	Screw / bolt material grade
Blank or 4	Standard screw / bolt SS41, S20C
7	Special screw / bolt S34C, S48C (Refined)

2.7 Hydraulic hose and fitting torque specifications

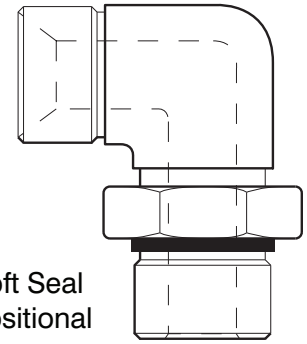
BSP (solid black nut)

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

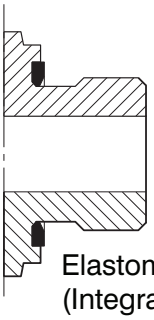
Elastomeric seal male (ISO 1179)			
Size	Thread	Torque Nm (lbf·ft)	
		Steel	Aluminium
4	1/4" - 19	60 (44)	30 (22)
6	3/8" - 19	90 (66)	45 (33)
8	1/2" - 14	130 (96)	65 (48)
10	5/8 - 14	N/A	N/A
12	3/4" - 14	200 (148)	100 (74)
16	1" - 11	300 (221)	150 (111)
20	1"1/4 - 11	500 (369)	250 (184)
24	1"1/2- 11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



O-Ring female



Soft Seal
Positional



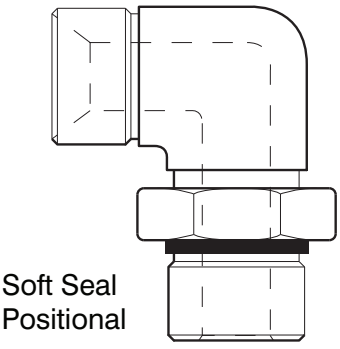
Elastomeric
(Integrated Seal)

Metric (S-Series)

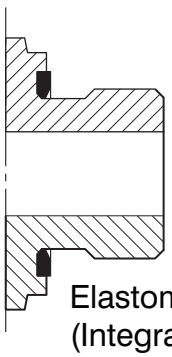
Soft seal positional/banjo/block fittings (ISO 6149 & 1179)		Elastomeric seal male (9974/3869)		
			Torque Nm (lbf·ft)	
Thread	Torque Nm (lbf·ft)	Thread	Steel	Aluminium
M12 X 1.5	35 (26)	M12 X 1.5	40 (30)	20 (15)
M14 X 1.5	45 (33)	M14 X 1.5	60 (44)	30 (22)
M16 X 1.5	55 (41)	M16 X 1.5	80 (59)	40 (30)
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

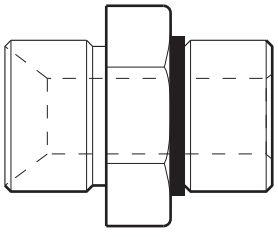
Connector male SAE UNF with O.R ISO 11926 Ports	
Thread	Torque Nm (lbf·ft)
7/16”	21 (16)
1/2”	27 (20)
9/16”	40 (30)
3/4”	78 (58)
7/8”	110 (81)
1”1/16	180 (133)
1”3/16	230 (170)
1”5/16	285 (210)
1”5/8	320 (236)



Soft Seal
Positional



Elastomeric
(Integrated Seal)



UNF with O-Ring

3 Preventative maintenance

3.1 Maintenance schedules

3.1.1 Engine maintenance

Diesel - Kubota OC60 and OC95

Operation	Every Day	Every 25 Hours	Every 100 Hours	Every 500 Hours	Every 800 Hours	Every 1500 Hours	Every Year	Every 2 Years
Engine oil	▲	●[a)]	●					
Oil strainer		■[a)]	■					
Air filter @	▲		■[b)]				●[b)]	
Fuel filter			■	●				
Fuel pipes and clamps	▲							●
Valve clearance					▲[c)]			
Nozzle injection pressure and spraying condition @						▲■[c)]		
Battery			▲					

▲	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) Consult a Kubota approved dealer.

Petrol - Honda GX270

Operation	Every Day	Every Week	First Month or 20 Hours	Every 3 Months or 50 Hours	Every 6 Months or 100 Hours	Every Year or 300 Hours	Every 1000 Hours	Every 2 Years
Engine oil	▲		•		•			
Air filter		▲		■a)b)		•b)		
Sediment cup					■b)			
Spark plug					▲	•		
Spark arrester (where fitted)					■b)			
Valve clearance						▲b)		
Combustion chamber							■b)	
Fuel tank & filter					■b)			
Fuel pipe								▲

▲	Check/Inspect
■	Clean
•	Replace

a) In arduous conditions (high levels of dust) the air filter must be cleaned and replaced more frequently.
b) Consult a Honda approved dealer.

3.1.2 Machine maintenance

Operation	Every Day	Every Week	Every 100 Hours	Every Month	Every 6 Months	Every Year
Gearbox oil			●a)			●b)
Battery condition	▲					
Battery fluid levels		▲				
Hydraulic oil level		▲				
Pressure filter		▲				
Hydraulic oil and filters						●c)
Telescopic boom wear pads				▲		
Hose trunking and energy chain		▲				
Boom pivot pin/bushes	▲					**
Slew gear engagement				▲		
Slew ring				**		
Slew ring bolts	**			▲		
Wheel bolts				▲		
Inverter / generator[d)]	▲				▲e)	
Cage power supply[d)]	▲				▲e)	
Earth strap	▲					

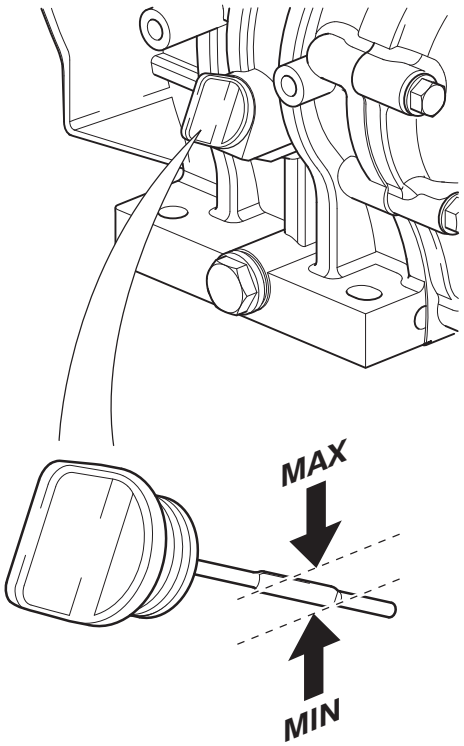
▲	Check/Inspect
■	Clean
●	Replace
**	Lubricate

a) First time procedure.
b) Every 1000 hours or yearly whichever occurs first.
c) In arduous conditions (high levels of dust) the hydraulic oil and filters must be replaced more frequently.
d) Optional equipment.
e) PAT Test (or equivalent) inspection to be carried out.

3.1.3 Engine oil level check

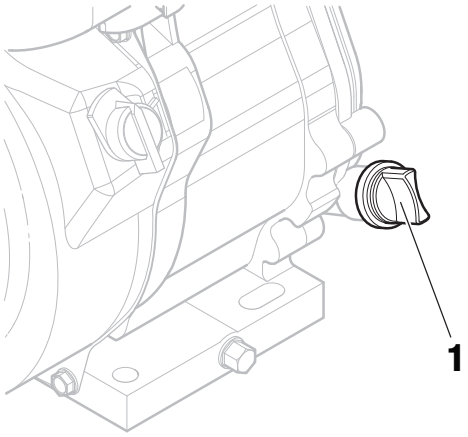
Diesel

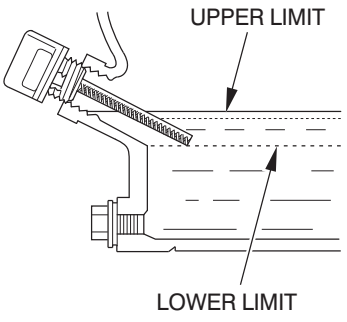
1) Check with the Niftylift on level surface before starting or more than 5 minutes after stopping the engine.
2) Remove the oil dipstick (1) and wipe clean.
3) Insert the oil dipstick into the filler neck.
4) Remove the filler cap/dipstick and check the oil level.
5) If low, add correct specification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



Petrol

1) Check with the Niftylift on level surface before starting or more than 5 minutes after stopping the engine.
2) Remove the oil filler cap/dipstick (1) and wipe clean.
3) Oil level should be to the upper limit mark (bottom edge of the oil fill hole).
4) Insert the filler cap/dipstick into the filler neck, but do not screw it in (see diagram).
5) Remove the filler cap/dipstick and check the oil level.
6) If low, add correct specification oil to the oil filling port.
7) After adding oil, wait for 5 minutes and re-check oil level. Do not overfill.
8) Reinstall the filler cap/dipstick and tighten by hand.





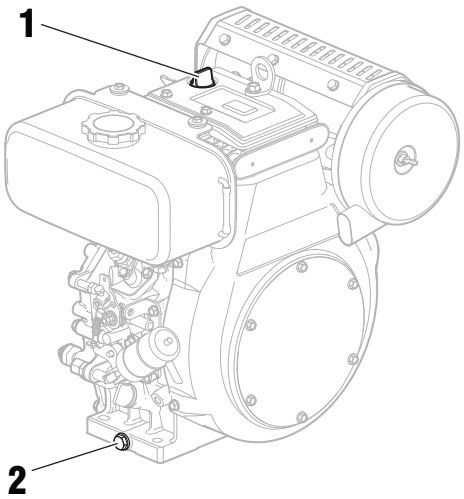
3.1.4 Engine oil replace

⚠ 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.**

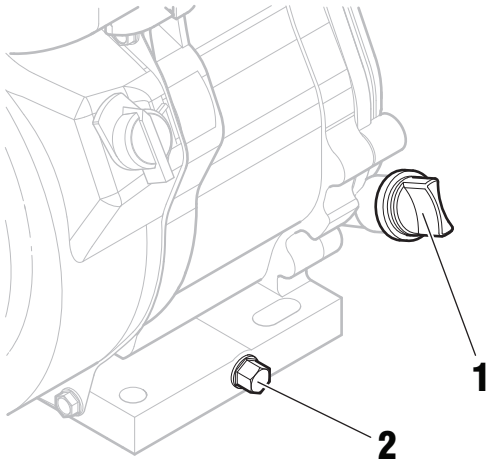
Diesel

1) Remove the oil filler cap (1).
2) Remove the drain plug (2) and drain the oil into a suitable container. Note; This will be easier if the oil is warm.
3) Replace seal ring and reinstall drain plug.
4) Tighten drain plug. See section 2.6 for torque settings.
5) Top up engine oil to the upper limit of the dipstick. See section 2.4 for oil type and capacity.
6) Reinstall the oil filler cap.
7) Re-check oil level at least 5 minutes after filling engine.



Petrol

1) Remove the filler cap/dipstick (1).
2) Remove the drain plug (2) and drain the oil into a suitable container. Note; This will be easier if the oil is warm.
3) Replace seal ring and reinstall drain plug.
4) Tighten drain plug. See section 2.6 for torque settings.
5) Top up engine oil to the upper limit mark (bottom edge of the oil fill hole). See section 2.4 for oil type and capacity.
6) Re-check oil level at least 5 minutes after filling engine.
7) Reinstall the filler cap/dipstick and tighten by hand.



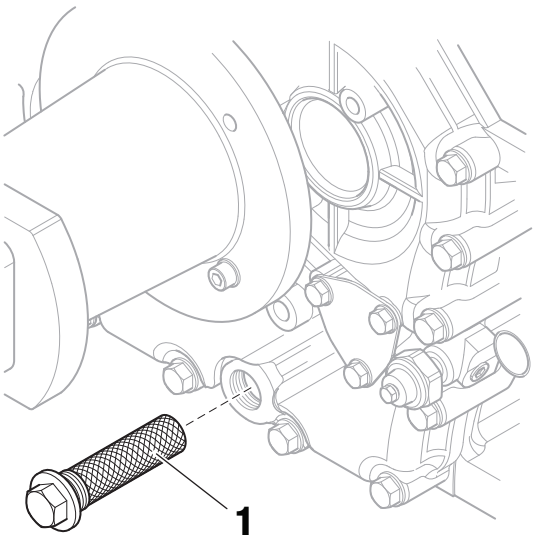
3.1.5 Engine oil strainer clean - Diesel

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

NOTICE **DISPOSE ANY WASTE ACCORDING TO LOCAL REGULATIONS.**

The engine oil strainer should be cleaned each time the engine oil is changed.

1) With the engine oil drained, remove the engine oil strainer (1).
2) Clean with mild solvent or replace if necessary.
3) Reinstall engine oil strainer and tighten. See section 2.6 for torque settings.
4) Replenish engine oil. See section 3.1.4.

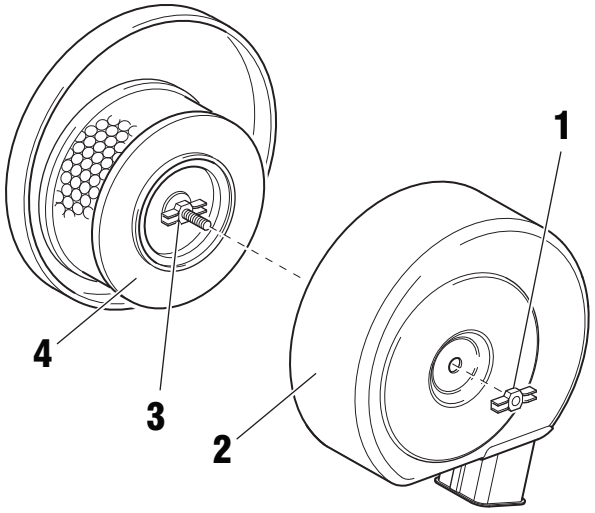


3.1.6 Air filter element maintenance

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.**

Diesel

1) Undo nut (1) and remove the cover (2).
2) Undo nut (3) and remove the filter element (4).
3) When dry dust adheres to the element, blow compressed air from the inside out whilst rotating the element. Air pressure must be no more than 205kPa (2.1kgf/cm^2 30psi).
4) Reinstall the filter element and tighten nut.
5) Reinstall the cover and tighten nut.
6) Replace the filter element every year or after 6 cleanings. This is in standard operating conditions; dust enriched operating environments will require shorter intervals.



Petrol

The air filter should be checked weekly, cleaned every 6 months or 100 hours and replaced every year or 300 hours. This is in standard operating conditions; dust enriched operating environments will require shorter intervals.

Consult a Honda approved dealer.

3.1.7 Fuel pipes check

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

⚠WARNING **PETROL IS HIGHLY FLAMMABLE AND EXPLOSIVE. KEEP FLAMES, SPARKS AND HEAT SOURCES AWAY FROM PETROL. CLEAN UP ANY SPILLAGES IMMEDIATELY.**

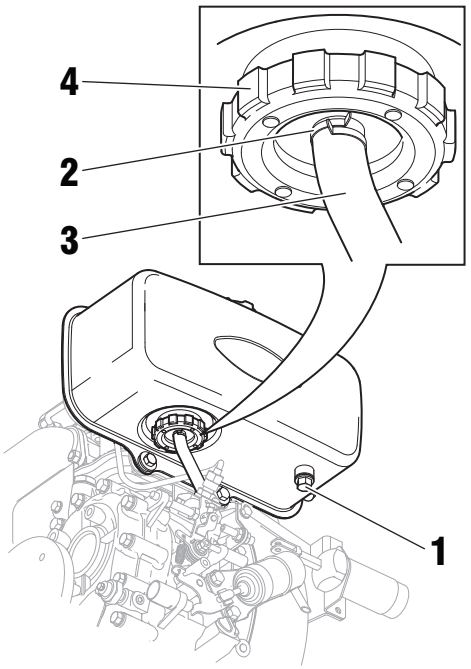
1) Fuel pipes and clamp bands should be checked every day.
2) If clamp bands are found to be loose, replace immediately.
3) If rubber fuel pipes are found to be worn or perished, replace immediately.
4) When fuel pipes are not installed, ensure they are capped to prevent dirt entering.
5) Fuel pipes should be replaced after 2 years.

3.1.8 Fuel filter clean / replace

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

⚠WARNING **ENSURE ENGINE IS OFF BEFORE REPLACING THE FUEL FILTER. ALLOW ENGINE TO COOL DOWN SUFFICIENTLY.**

Diesel



6) Undo the fuel tank drain plug (1) and drain the fuel.
7) Replace the seal ring and reinstall the drain plug.
8) Tighten the drain plug. See section 2.6.1 for torque settings.
9) Loosen the clamp band (2) on the fuel pipe (3) and disconnect from the fuel filter (4).
10) Undo the fuel filter and remove.
11) Wash the fuel filter with clean diesel or replace if necessary.
12) Observe clean assembly practices to avoid contamination by dust or dirt.
13) Tighten the filter by hand.
14) Reconnect the fuel pipe and reinstall clamp band.
15) Replenish fuel and inspect for leaks.

Petrol

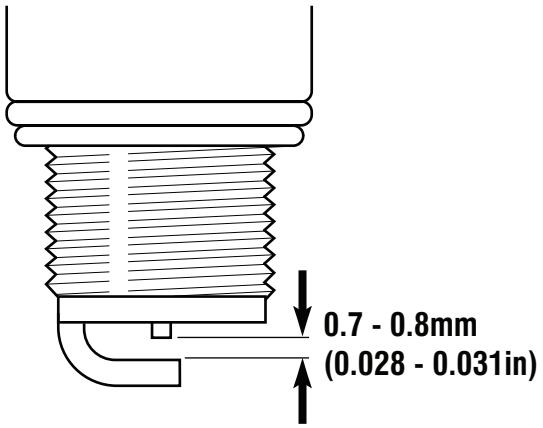
The fuel filter should be checked every 6 months or 100 hours. Consult a Honda approved dealer.

3.1.9 Spark plug check

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

NOTICE **TO AVOID POTENTIAL DAMAGE TO THE ENGINE, MAKE SURE THE SPARK PLUG IS INSTALLED AND TIGHTENED TO THE SPECIFIED TORQUE.**

1) Open the Engine canopy.
2) Disconnect the ignition coil lead and remove the spark plug.
3) Remove any carbon deposits from the spark plug using a wire brush.
4) Visually inspect the spark plug.
5) Replace if damaged, badly fouled or if the electrode is worn.
6) Check and adjust the electrode gap to 0.7-0.8 mm (0.028-0.031 in) using a suitable feeler gauge.



7) Reinstall spark plug and tighten by hand, then tighten a further 1/8 to 1/4 of a turn. Note; where the spark plug is replaced, the new spark plug should be tightened by hand and then a further 1/2 turn.
8) Connect the ignition coil lead.

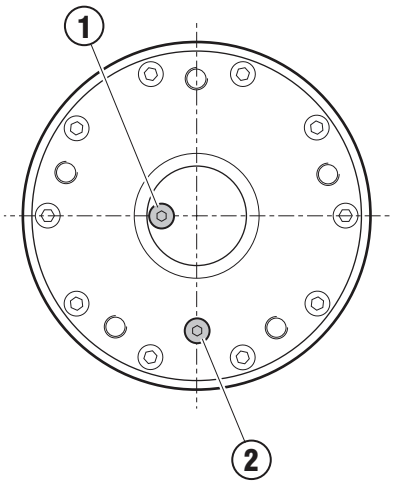
3.1.10 Exhaust system inspect

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

1) Open the Engine canopy.
2) Inspect the exhaust components for signs of cracks and leaks; e.g. carbon build up around joints and seams.

3.2 Drive hub gearbox

3.2.1 Oil replace



1) Manufacturer's specifications require this procedure to be carried out after the first 100 hours, then every 1000 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 the drive hub is in position (see diagram).
3) Chock the front wheels.
4) Remove the yellow wheel bolt indicators from the wheel.
5) Loosen each wheel bolt by half a turn.
6) Using a suitable jack raise the rear of the Niftylift until the wheels are clear of the ground.
7) Ensure the Niftylift is supported on suitable blocks or stands, **not** the jack.
8) Support the wheel using a suitable wheel jack.
9) Undo the wheel bolts and remove the wheel.
10) Remove level/filler plug (1) and drain plug (2).
11) Drain oil into a suitable container. Dispose of waste oil in accordance with local environmental policies.
12) Reinstall drain plug and tighten. See section 2.6 for torque settings.
13) Fill gearbox through the level/filler plug hole until oil level reaches bottom of plug hole. See section 2.4.3 and 2.2 for oil specification and capacity.
14) Reinstall level/filler plug and tighten. See section 2.6 for torque settings.
15) Reinstall wheel and partially tighten bolts.
16) Remove supports and lower Niftylift.
17) Tighten wheel bolts and reinstall yellow wheel bolt indicators. See section 3.10.1.
18) Repeat process for remaining gearbox.

3.2.2 Bleeding air from the braking circuit

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

⚠CAUTION **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) Pressurise 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.

3.3 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.**

NOTICE **BATTERIES ARE MAINTENANCE FREE AND DO NOT REQUIRE TOPPING UP. IF IGNORED, IRREPARABLE DAMAGE TO THE BATTERY WILL OCCUR.**

NOTICE **UNDER NO CIRCUMSTANCES SHOULD A MACHINE BE LEFT FULLY DISCHARGED AS SEVERE BATTERY DAMAGE CAN OCCUR IN A RELATIVELY SHORT TIME.**

3.3.1 Condition check (daily)

1) Check that the batteries are fully charged. Batteries should be recharged at the end of each working day or shift. See manufacturer's Operating Manual for correct battery charging procedure.
2) Check batteries for evidence of leaks or spilt battery acid. If material is released or spilled, lime or soda ash may be used to neutralise, 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.
3) 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.
4) 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.

3.3.2 Condition check (weekly) - excludes AGM batteries

1) Carry out all procedures listed above in Daily checks.
2) Remove all battery cell caps and check the fluid level in each cell in each battery. The level should be sufficient to cover the plates. Top-up each battery cell as necessary using distilled (deionised) water, do not overfill. Replace and tighten battery cell caps and put batteries on charge. Leave batteries to stabilise for one hour before proceeding with further checks.

3) Using a hydrometer, check the specific gravity of the battery fluid in each cell in each battery (Target 1.26-1.27 for DYNO Batteries when fully charged). If the specific gravity is not within the serviceable range, battery de-sulphate fluid may be used to restore batteries.

4) Replace all battery cell caps and clean any liquid from the top surface of the batteries.

3.3.3 Storage

Should the Niftylift be unused for a period of time, it will be necessary to fully charge the batteries to prevent irreversible damage.

NOTICE **IF A BATTERY IS DISCHARGED, ENSURE THAT IT IS CHARGED UP BEFORE BEING LEFT IDLE FOR AN EXTENDED PERIOD OR PUT INTO STORAGE.**

NOTICE **REGULAR MONITORING AND MAINTENANCE OF BATTERIES IS ESSENTIAL DURING STORAGE OR IDLE PERIODS. IF BATTERIES DISCHARGE BELOW A CERTAIN VOLTAGE THEY BECOME UNUSABLE AND MUST NOT BE RECHARGED. BATTERY FAILURE CAUSED BY NEGLECT WILL NOT BE COVERED UNDER WARRANTY. IT IS THEREFORE IMPERATIVE THAT THE FOLLOWING INSTRUCTIONS ARE ADHERED TO.**

Lead-acid flooded (wet) batteries

Before placing the Niftylift into storage, ensure batteries are fully charged to 6.37V open circuit voltage (100% state of charge). Isolate the batteries (See section 1.5.4) and monitor open circuit voltage every 4 - 6 weeks (2 - 4 weeks if stored in temperatures greater than 32°C (90°F)). Batteries in storage should be charged when they decline to the following state of charge:

- 6.19V (70% state of charge).

Where possible always keep batteries in cool, dry environments. Storage in hot environments can negatively impact batteries. Avoid direct exposure to heat sources during storage. Batteries self-discharge faster at high temperatures.

Avoid storing in freezing temperatures, batteries can freeze in cold temperatures (less than 0°C (32°F)) if they are not fully charged. If batteries are stored in cold environments, it is critical that they be kept at a high state of charge.

Due to the potential for self-discharge during storage, batteries should be given a full charge prior to placing back into service.

Absorbent Glass Mat (AGM) batteries

Before placing the Niftylift into storage, ensure batteries are fully charged to 6.42V open circuit voltage (100% state of charge).

Isolate the batteries (See section 1.5.4) and monitor open circuit voltage every 2 - 3 months (1 - 2 months if stored in temperatures greater than 32°C (90°F)). Batteries in storage should be charged when they decline to the following state of charge:

- 6.27V (75% state of charge).

Where possible always keep batteries in cool, dry environments. Storage in hot environments can negatively impact batteries. Avoid direct exposure to heat sources during storage. Batteries self-discharge faster at high temperatures.

Avoid storing in freezing temperatures, batteries can freeze in cold temperatures (less than 0°C (32°F)) if they are not fully charged. If batteries are stored in cold environments, it is critical that they be kept at a high state of charge.

Due to the potential for self-discharge during storage, batteries should be given a full charge prior to placing back into service.

3.4 Inverter / generator and power to cage options

3.4.1 Condition check (daily)

⚠WARNING **EXPLOSION HAZARD. DO NOT USE THE INVERTER / GENERATOR IN THE VICINITY OF FLAMMABLE FUMES OR GASES. AVOID COVERING THE VENTILATION OPENINGS. ALWAYS OPERATE UNIT IN AN OPEN AREA.**

NOTICE **EXPLOSION HAZARD. DO NOT USE THE INVERTER / GENERATOR IN THE VICINITY OF FLAMMABLE FUMES OR GASES. AVOID COVERING THE VENTILATION OPENINGS. ALWAYS OPERATE UNIT IN AN OPEN AREA.**

Information regarding the operation of the inverter / generator can be found in the Operating and Safety Instructions Manual supplied with the Niftylift.

If the inverter detects a malfunction, an error code will be displayed on the unit's digital display.

Checks before and after use

(1) Ensure operation of the inverter / generator is prevented when the E-stop is pressed.
(2) With the E-stop pressed, check that the socket / plug at cage and base are correctly wired (only if competent to do so) and visually check the terminals for burn marks or staining that may suggest overheating, to ensure they are not damaged.
(3) Check electrical cable (where visible) is not damaged and has not been repaired with insulating tape or an unsuitable connector. Damaged cable should be replaced with a new cable of the correct type and wire gauges, by a competent person.
(4) Check the RCD box is not damaged in any way that will give rise to electrical or mechanical hazards and visually check the terminals for burn marks or staining that may suggest overheating.
(5) Ensure a PAT test label (or equivalent) is fitted on the RCD box and is up to date and within its next approval check.
(6) With the E-stop released and the inverter / generator switched on, ensure the RCD works correctly by pressing the test switch, then reset.
(7) PAT testing (or equivalent) should be completed every 6 months.

PAT Testing (or equivalent)

Due to the high usage of the machine with the power cable running through the booms, a PAT test (or equivalent) must be carried out on the cable every 6 months by a competent person.

This must be done by disconnecting the inline connector from the inverter / generator to the RCD unit (If fitted).

A competent person is an individual who can demonstrate they have the necessary knowledge, skills and experience to carry out a task, that has been trained in PAT testing and holds a certificate of competence in PAT testing.

If the test fails, report immediately and attach a “not be used / out of action” warning label to the cage socket and to the RCD box. Leave the RCD in the **OFF** position, until the issue has been rectified.

Rectify any defects before placing the Niftylift back into service.

3.5 Hydraulic oil

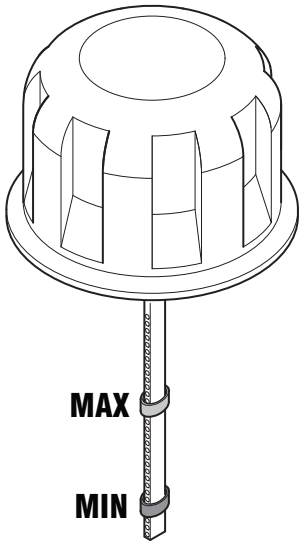
3.5.1 Level check (weekly)

NOTICE **ALWAYS USE THE SAME OIL GRADE AS INDICATED ON THE LABEL ATTACHED TO THE HYDRAULIC TANK.**

Ensure the Niftylift is on level ground with the platform stowed. Locate the hydraulic tank filler cap underneath the middle bonnet. Loosen the filler cap to relieve pressure. Caution must be taken when removing the tank cap as the hydraulic tank is pressurised.

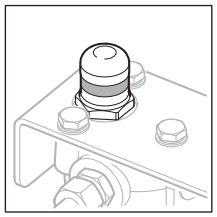
Check that the oil level is between the minimum and maximum marks on the dipstick. Top-up the tank with oil if the level is below the MIN mark. Use the same oil grade as indicated on the label attached to the hydraulic tank.

If the oil level is above the MAX mark, drain as required. See section 3.5.3.



3.5.2 Pressure filter check (weekly)

With the Niftylift running and the oil temperature at 40°C (104°F), observe the pressure filter condition indicator (located under the rear bonnet). If the visual indicator is red, the pressure filter cartridge should be replaced once the oil has cooled sufficiently.



3.5.3 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 **DISPOSE ANY WASTE ACCORDING TO LOCAL REGULATIONS.**

Replace the Hydraulic oil and filters every year.

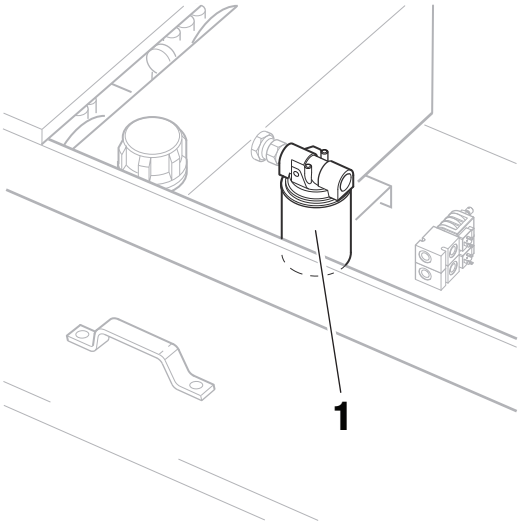
Replacement or testing of the hydraulic oil is essential for optimum machine performance. Contaminated oil and filters may cause poor performance and continued use may cause component damage. Depending upon the operating environment, more regular oil changes may be required.

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 pressurised.
3) Locate the hydraulic tank drain plug underneath the Niftylift.
4) Place a suitable container under the hydraulic tank and undo the drain plug.
5) Dispose of waste oil in accordance with local environmental policies.
6) Replace drain plug and tighten to 130Nm (96 lbf·ft).

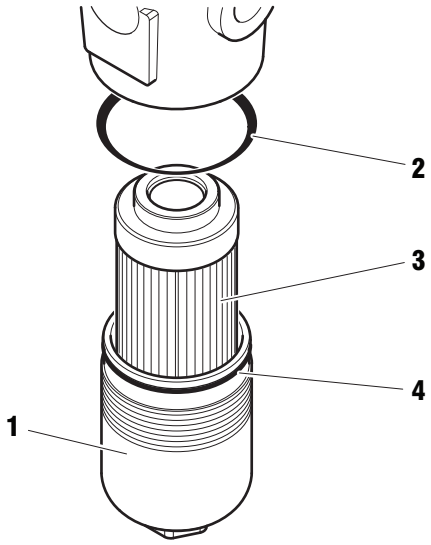
Return filter

7) Locate the return filter underneath the middle bonnet.
8) Using a filter wrench or strap, remove the filter (1).
9) Replace the filter, apply a film of clean hydraulic oil to the filter seal.
10) Screw filter onto housing by hand. When seal contacts the housing surface, tighten by hand. **Do not tighten with filter wrench**.



Pressure filter

11) Remove the rear bonnet and locate the pressure filter.
12) Place a suitable container underneath filter housing.
13) Remove the filter bowl (1) and seal ring (2).
14) Remove filter element (3) and seal ring (4).
15) Replace seal rings on filter bowl, lubricate with clean hydraulic oil.
16) Replace filter element.
17) Reinstall filter bowl and tighten. **DO NOT APPLY EXCESSIVE TIGHTENING TORQUE.**
18) Refill tank with oil until level is between MIN and MAX on the dipstick. See section 2.4.1 for capacity and 2.4.3 for oil specification.

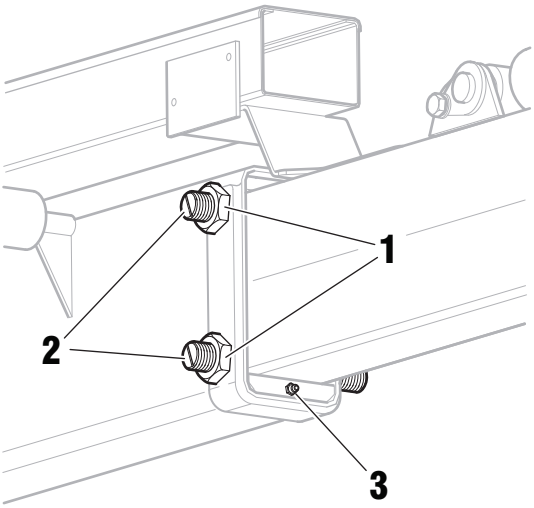


19) Operate the hydraulic system until oil temperature reaches 40°C (104°F). Check operation and inspect for leaks.

3.6 Telescopic boom

3.6.1 Wear pad check (monthly)

1) With the links and luffing boom 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 boom.
3) It may be necessary to raise boom 3 slightly to avoid the cage 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.



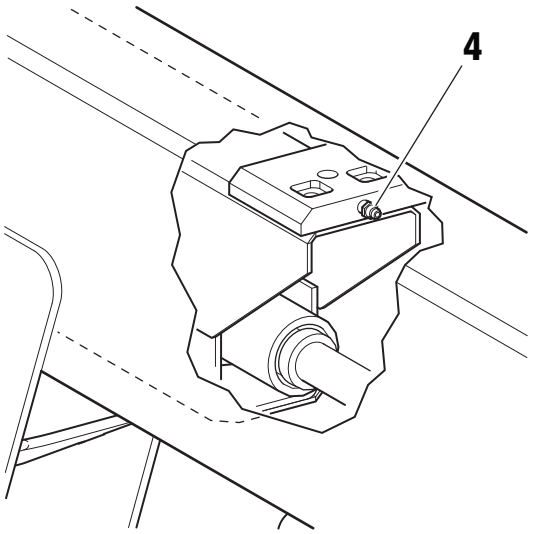
5) Check the clearance between each wear screw and the inner telescope boom section.

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.

7) Back-off each wear screw until it no longer touches the inner telescope boom, then tighten the locking nuts.

8) Check that the underside of the inner telescope boom is adequately lubricated and free from scoring or rubbing marks.

9) Connect a grease gun to the grease nipple (3) and pump the grease gun two to three times as required.



10) Locate the second grease nipple (4) at the knuckle end of telescope boom and pump the grease gun two to three times as required.

11) Use Hycote white grease or equivalent.

3.6.2 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.

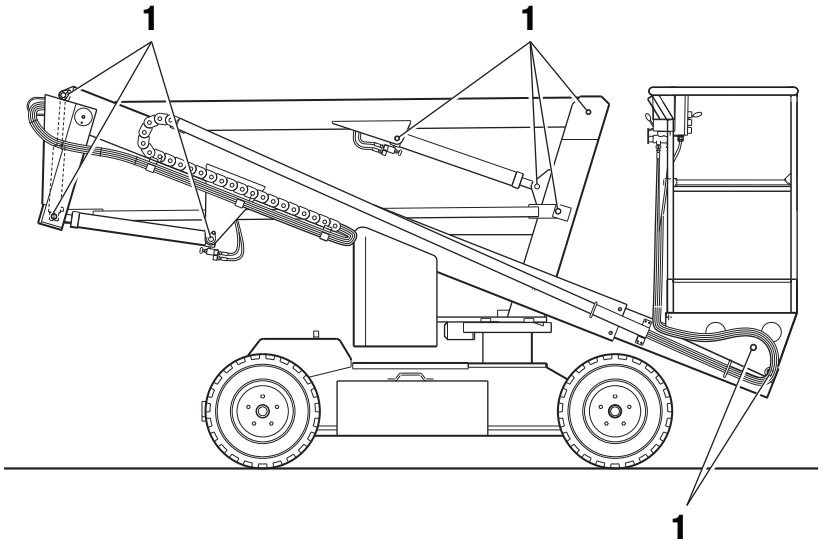
3) With the telescope section fully extended, check that the trunking system adequately supports the weight of the hose bundle. The upper section of aluminium trunking should be approximately parallel with the top surface of the boom.

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.

3.6.3 Boom pivot bushes lubricate (annually)

At yearly intervals lubricate all DU pivot bushes on the booms and telescope assemblies.

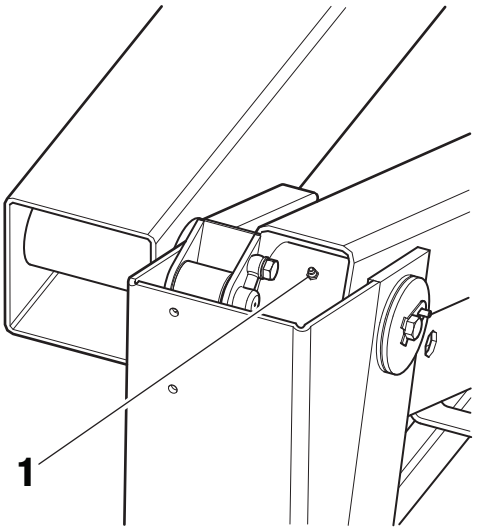


Use a dry PTFE aerosol lubricant spray such as WD40 W/D44394 or equivalent. Apply lubricant spray and allow to penetrate at each of the pivot bush joints (1) in the diagram above. Note; with the exception of the boom knuckle, there are no grease or lubrication nipples on the pivot bushes.

Boom knuckle

Ensure that the Niftylift is on level ground with the platform stowed.

1) Locate the boom knuckle grease nipple (1).
2) Connect a grease gun to the grease nipple and pump the grease gun two to three times as required.
3) Use EP 2 Grease meeting specification DIN 51825: (2004-06) 2K-30 or equivalent.



3.6.4 Boom pivot pin check (daily)

Check the respective locking device is installed and secure on all boom pivot pins.

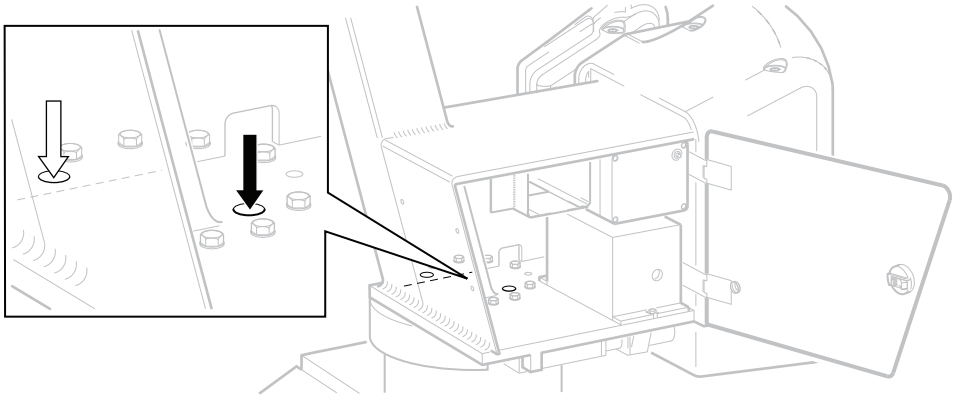
3.7 Boom rotation gear

3.7.1 Slew gear engagement check (monthly)

1) Check the play between the slew 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 slew gear 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.

3.7.2 Slew ring lubrication (monthly)

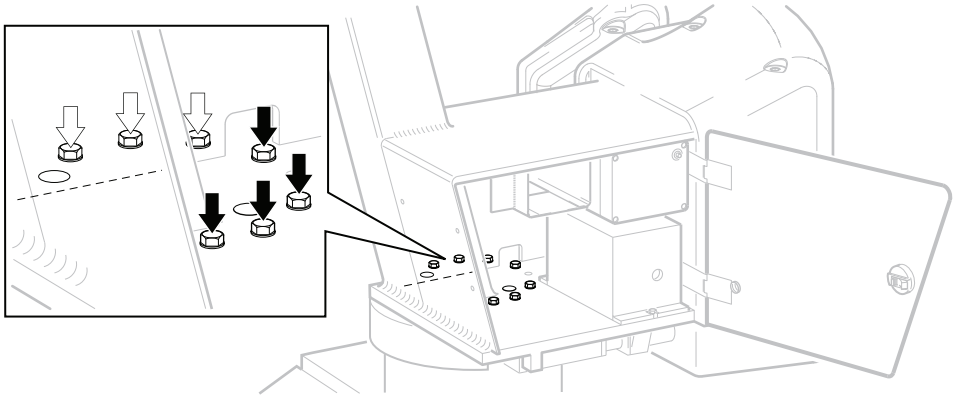
1) Open the base control station access cover.
2) Grease nipples are located 180° apart on the inner slew ring.



3) Connect a flexi-end grease gun through the access hole to the grease nipple.
4) Pump the grease gun two to three times as required. Use lithium based (Ep) grease corresponding to DIN 51825 K2K - 20 and ISO L-X-BCHA2. It is also permissible to use equivalent grease with a working temperature between -20°C (68°F) and +120°C (248°F).
5) Using a suitable paint brush, apply grease liberally to the outer slew ring teeth.
6) Close the base control station access cover.

3.7.3 Slew ring bolts check (yearly)

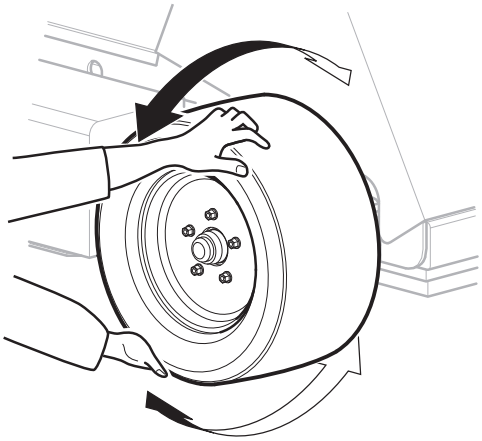
Tighten the slew ring bolts located on the superstructure. See section 2.6 for torque settings.

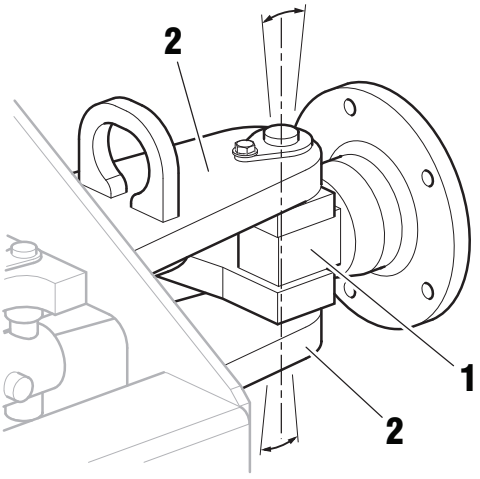


3.8 Front axle

3.8.1 Front wheel hub bushes (yearly)

1) Ensure that the Niftylift is on level ground and the platform stowed.
2) Chock the rear wheels.
3) Using a suitable jack raise the front of the Niftylift until the wheels are clear of the ground.
4) Ensure the Niftylift is supported on suitable blocks or stands, **not** the jack.
5) Rock the wheel by hand and check for excessive vertical movement between the hub assembly (1) and axle beams (2). A small amount of movement is permissible.
6) Where movement is excessive, the hub assembly will need to be removed for further inspection.





3.9 Chassis

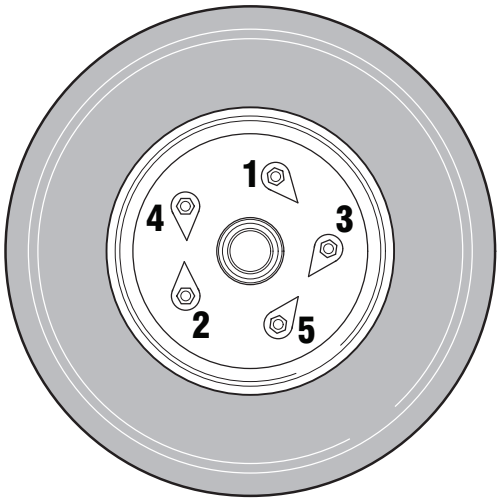
3.9.1 Earth strap check (daily)

Check that the earth strap is secure and in contact with the ground.

3.10 Wheels and tyres

3.10.1 Wheel bolt torque (monthly)

1) Ensure that the Niftylift is on level ground and the wheels are chocked.
2) Remove the yellow wheel bolt indicators.
3) Slacken each wheel bolt and tighten to the specified torque as per the sequence shown in the diagram. See section 2.6 for torque settings.
4) Reinstall the wheel bolt indicators as shown in the diagram.
5) Repeat process for each wheel.



4 Repair procedures

4.1 General

4.1.1 Fuses

There are 3 main replaceable fuses on the Niftylift:

- 225A (x2) - Power Pack,
- 125A - Engine Starter Motor,
- 30A - (Diesel Engine).

In addition to the 3 main fuses, 2 fuses can be found in the Terminal box:

- 5A Blade fuse,
- 3.15A Slow blow glass fuse.

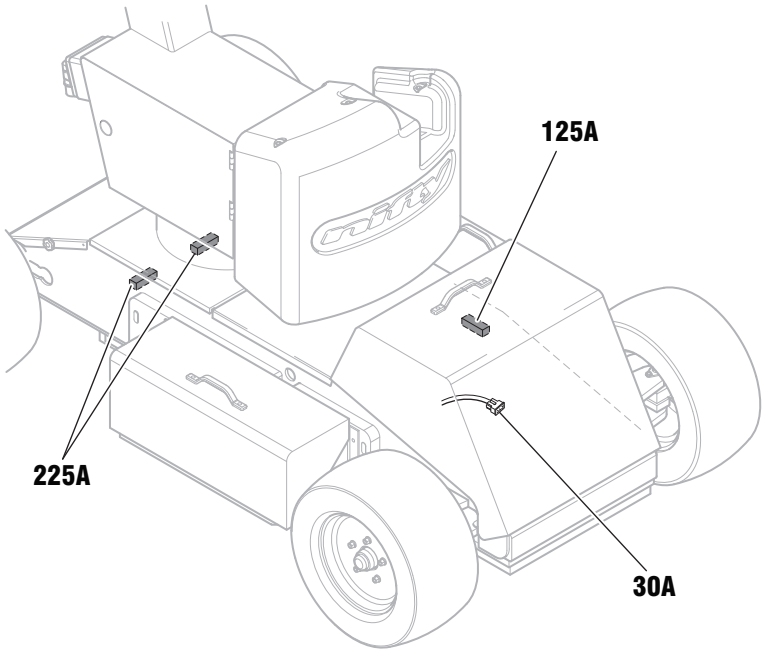
Prior to the replacement of any fuse, determine the cause of the fault. Do not replace the fuse until the cause of the fault has been remedied.

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

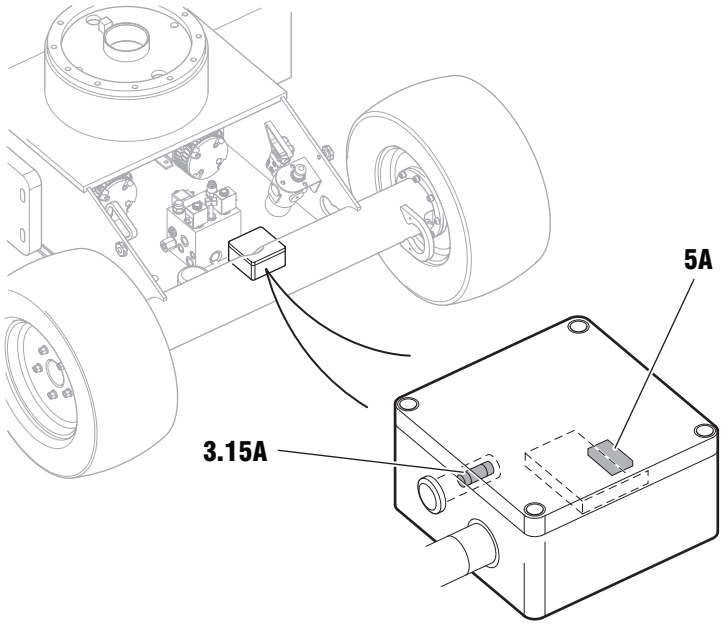
The replacement fuse must always be the same rating as the defective one.

See location diagrams.

Main fuse location



Terminal box fuse location

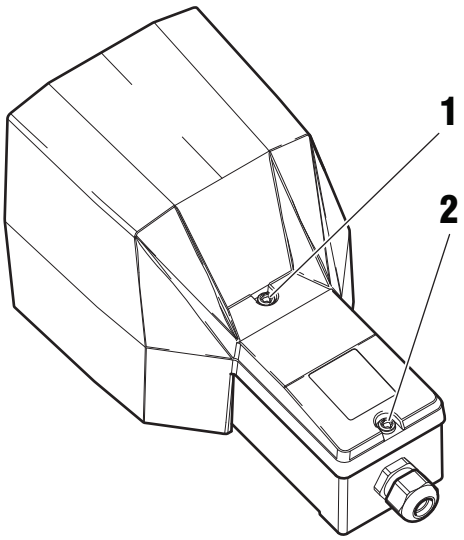


4.2 Platform/Cage

4.2.1 Footswitch - contact switch replace

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

Remove

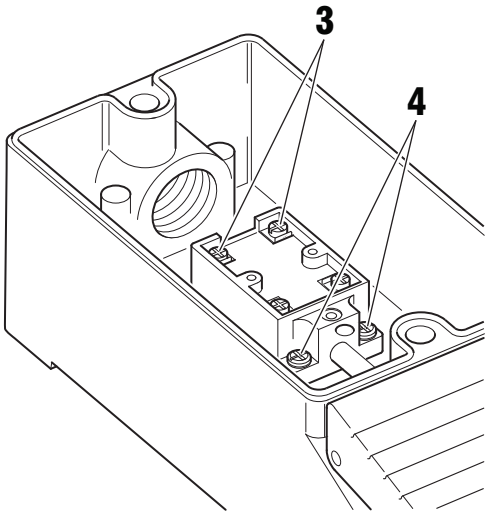


1) Isolate the power supply (See section 1.5.4).
2) Remove bolts (1) and (2) and remove the footswitch cover and rubber gasket.

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 3.0Nm (2.2 lbf·ft) and bolt (2) to 2.5Nm (1.8 lbf·ft).
10) Connect the power supply (See section 1.5.4).

4.3 Booms

Booms are safety critical components, contact a Niftylift approved dealer for further information.

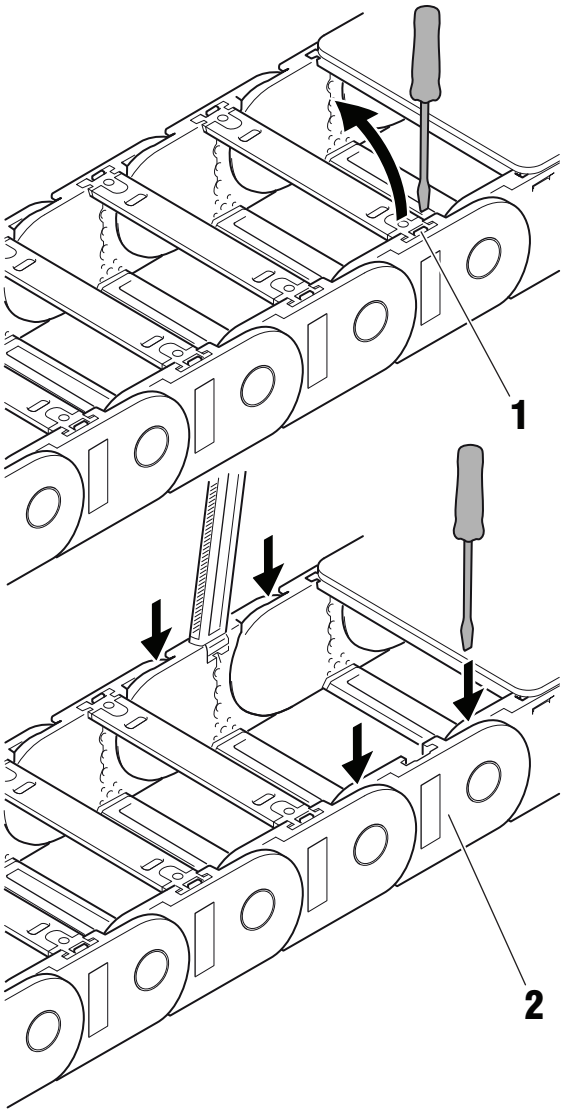
4.3.1 Energy chain link

Remove

1) Operate telescopic boom to access the worn or damaged link.
2) Insert a small flat screwdriver into chain bridge (1) and prise upwards.
3) Raise the chain bridge until vertical.
4) Carefully prise apart link (2) at the four points arrowed.
5) Remove link from the chain.

Install

6) Replace the link section and click into position.
7) Lower each chain bridge and click into position.



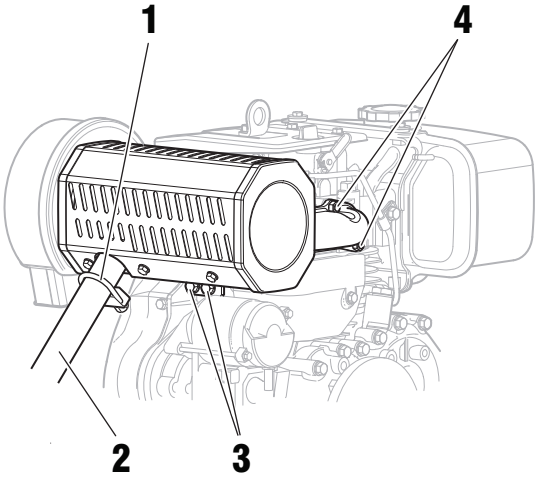
4.4 Base Assembly

4.4.1 Engine exhaust

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

Exhaust assembly - Diesel

Remove



1) Open the front bonnet.
2) Remove the 2 nuts from the exhaust clamp (1) and remove the exhaust pipe (2).
3) Remove 2 retaining bolts (3) securing the exhaust assembly to the engine.
4) Remove 2 nuts (4) from the exhaust manifold and remove the exhaust assembly.
5) Remove the exhaust gasket.

Install

6) Replace exhaust gasket.
7) Replace exhaust assembly and tighten 2 nuts and 2 bolts. See section 2.6.1 for torque settings.
8) Reinstall the exhaust pipe and clamp.
9) Tighten 2 clamp nuts. See section 2.6 for torque settings.
10) Start the engine and check the exhaust.
11) Close the engine canopy.

Exhaust assembly - Petrol

Consult a Honda approved dealer.

4.4.2 Steer cylinder

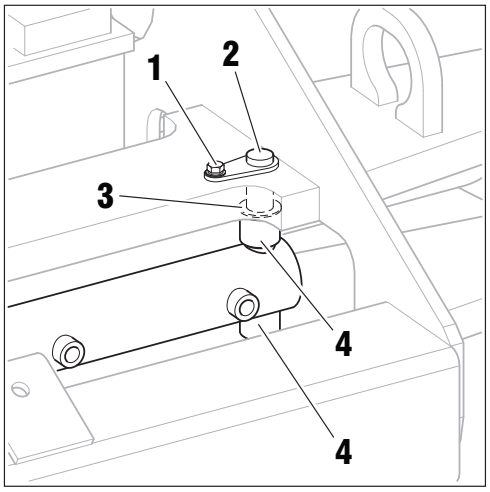
⚠WARNING **PRESSURISED HYDRAULIC OIL CAN PENETRATE AND BURN SKIN. SLOWLY LOOSEN HYDRAULIC CONNECTIONS TO ALLOW PRESSURE TO DISSIPATE. DO NOT ALLOW OIL TO SQUIRT OR SPRAY.**

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

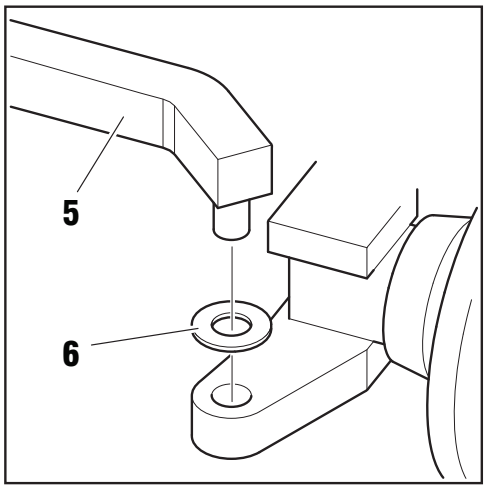
⚠WARNING **ENSURE SUITABLE EYE PROTECTION AND CLOTHING ARE WORN WHEN OPENING THE HYDRAULIC CIRCUIT.**

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

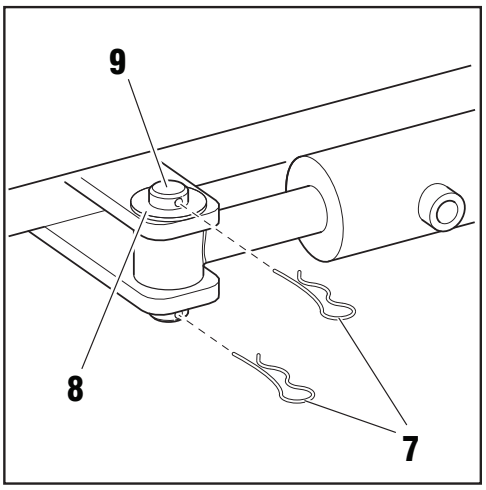
Remove



1) Ensure the Niftylift is in its stowed position.
2) Centre the steering so wheels point straight ahead.
3) Observe clean assembly practices to avoid contamination by dust or dirt.
4) Open or remove the front bonnet (model specific).
5) Carefully remove 2 hydraulic hoses from the steer cylinder. Slowly loosen fittings to allow pressure to dissipate.
6) Insert plugs and cap to prevent oil loss.
7) Remove bolt and spring washer (1).
8) Remove steer pin (2), washer (3) and 2 spacers (4).
9) Chock the rear wheels.
10) Remove the yellow wheel bolt indicators from one of the front wheels.
11) loosen each wheel bolt by half a turn.
12) Using a suitable jack raise the front of the Niftylift until the front wheels are clear of the ground.
13) Ensure the Niftylift is supported on suitable blocks or stands, **not** the jack.
14) Undo the wheel bolts and remove the front wheel.
15) Using a suitable hammer, tap the track rod (5) upwards to release from the front hubs.
16) Remove and retain the washer (6) on each track rod pin.



17) Pull the track rod assembly from the Niftylift.
18) Remove one R-clip (7) and washer (8) then remove pin (9).
19) Remove steer cylinder from track rod.



Install

20) Replace steer cylinder.
21) Reinstall pin and washer to track rod.
22) Secure pin with R-clip.
23) Reinstall track rod assembly to Niftylift.
24) Reinstall washer to track rod pin and tap track rod downwards into front hub.
25) Reinstall steer pin, spacers and washer.
26) Reinstall spring washer and tighten bolt to steer pin. See section 2.6 for torque settings.
27) Reinstall front wheel.
28) Remove supports and lower Niftylift.
29) Tighten wheel bolts and reinstall yellow wheel bolt indicators. See section 3.10.1.
30) Connect hydraulic hoses and tighten connectors. See section 2.7 for torque settings.
31) Operate the hydraulic system until oil temperature reaches 40°C (104°F). Check operation and inspect for leaks.
32) Check hydraulic oil level and top up with appropriate grade of oil if necessary. See section 2.4.4.
33) Close or reinstall the front bonnet.

5 System overview

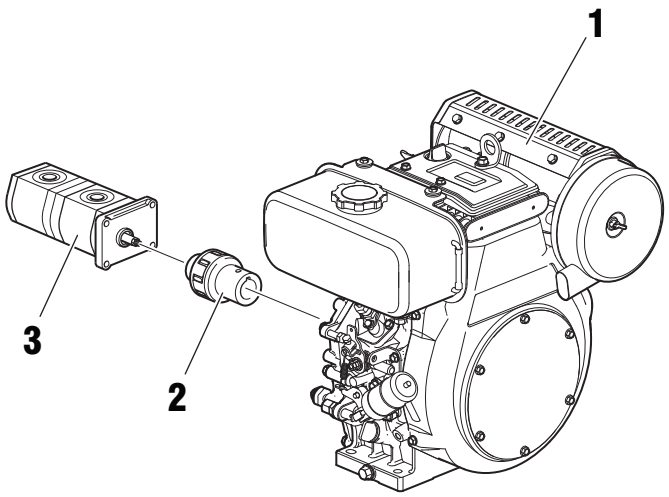
5.1 Introduction

Power options consist of DC Battery only, petrol or Diesel only, Bi-energy (Engine & Battery).

5.1.1 Power system

The main hardware for this system consists of the following:

(1) Diesel or petrol engine
(2) Coupling
(3) Pump Assembly



Diesel engine

A Kubota OC60 or OC95 engine, driving a twin bodied pump with direct mounted pump dump valves (one per section), and integral relief valve on the rear pump. The arrangement allows two speed operation, fast throttle and automatic relief for ramp climbing.

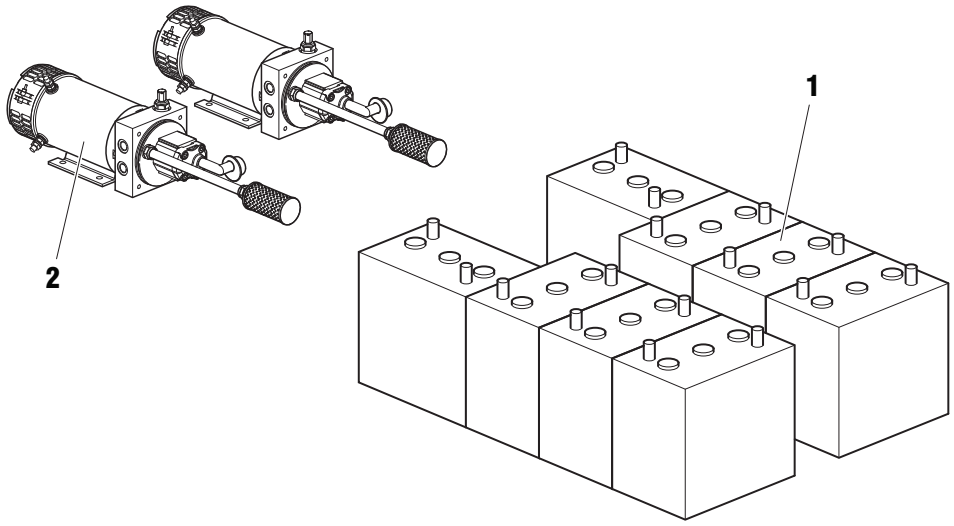
Petrol engine

A Honda GX 270 engine, driving a single body pump with direct mounted pump dump valve. The engine is also equipped with a throttle solenoid for two-speed operation.

5.1.2 DC electric system

The main hardware for this system consists of the following:

(1) 245Ah 6V batteries x8
(2) Power Packs x2 (3kW 24V)



Battery pack

Eight 245Ah 6V batteries wired in parallel supply 24V to both power packs. The on-board battery charger requires connection to either a 230V or 110V AC power supply. Recharge batteries at the end of every working day or shift. A step down voltage converter reduces the output voltage from 24V to 12V to supply the control circuit.

Power packs

The 24V battery system powers x2 3kW 24V power packs. Each has an integral hydraulic pump 1.2CC (RH power pack) and 2.2CC (LH power pack) providing power to the hydraulic circuit. A step down regulator reduces the output voltage from 24V to 12V to supply the control circuit and separate battery.

Battery management

Battery condition is permanently monitored by the control circuit, such that when available power has decreased to 20% of full charge, the battery status circuit begins to restrict the power to the hydraulic power packs. This function causes the drive system to alternately stop and start, signalling to the operator that re-charging is necessary. At the same time the Klaxon will begin to sound intermittently re-enforcing the charge warning. At this point, sufficient power remains to drive to the nearest power point. Should the operator ignore the on-set of the discharge warning, the "chopping" will continue until the machine is rendered inoperative. Immediate charging will then be required.

NOTICE **UNDER NO CIRCUMSTANCES SHOULD A MACHINE BE LEFT FULLY DISCHARGED AS SEVERE BATTERY DAMAGE CAN OCCUR IN A RELATIVELY SHORT TIME.**

NOTICE **UNDER NO CIRCUMSTANCES SHOULD BATTERIES BE LEFT ON CHARGE FOR PERIODS IN EXCESS OF 24 HOURS.**

Battery isolation

The battery-disconnect handles (Anderson) are located beneath the rear bonnet and allow the machine control and power circuits to be isolated from the batteries. In order to isolate the batteries it is necessary to pull both handles. The left side release handle also incorporates a control circuit connector. Pulling this handle also disconnects the supply to the PCB control box. Under normal operation, the machine key switch should be used to isolate the machine, with the battery-disconnect handles only being required for emergencies, in the event of a short circuit, or during routine maintenance. See section 1.5.4.

Batteries

245 AH DYNO Batteries are fitted as standard. If alternative batteries are used the charger must be reconfigured to suit the replacement batteries. Contact Niftylift for further information.

As an alternative to the standard 245 Ah DYNO batteries, the Niftylift may be fitted with 245 Ah Absorbent Glass Mat (AGM) batteries.

These batteries are maintenance free, therefore **DO NOT REFILL** with distilled (deionised) water. Irreparable damage will occur.

5.2 Battery charging

Recharge batteries at the end of every working day or shift. Refer to the Operating & Safety Instructions manual as supplied with the machine for information on battery charging.

5.2.1 Battery charging - extension leads

Excessive cable lengths from the supply point to the battery charger will result in significant voltage drop, leading to a reduction in the chargers efficiency. In addition, inadequate sized cable cores will have a limiting effect on its current carrying capacity, which will again lead to a reduction in the chargers efficiency. Both of these can result in over-heating of the cable with an increased risk of fire, short circuits, or damage to the components themselves.

When connecting the on-board battery charger to an earthed AC power supply, use the shortest length lead possible. Where this is not practicable, observe the following information to ensure effective battery charging.

⚠ CAUTION **EXTENSION LEADS MUST HAVE APPROPRIATE SAFETY APPROVALS FOR THE COUNTRY IN WHICH THEY ARE USED.**

Extension leads 230v

NOTICE **EXTENSION LEADS ARE TO BE UNCOILED TO PREVENT OVERHEATING AND MUST BE VISUALLY INSPECTED FOR ANY DEFECTS BEFORE USE.**

NOTICE **ONLY USE APPROVED EXTENSION LEADS WITH A PASSED PAT LABEL FITTED.**

NOTICE **DO NOT EXCEED THE MAXIMUM LENGTHS WHEN JOINING MULTIPLE LEADS.**

NOTICE **ENSURE THE MACHINE IS CONNECTED DIRECTLY TO THE POWER SUPPLY SOURCE AND AVOID THE USE OF SPLITTERS.**

230V (UK Only) standard Type G 13A plug maximum extension lead length		
Cable core size	**Connector maximum current**	**Maximum length**
1.5mm	13A	15m (49.2ft)
1.5mm	13A RCD protected	25m (82ft)
2.5mm	13A	25m (82ft)
2.5mm	13A RCD protected	45m (147.6ft)

230V 16A rated plug maximum extension lead length		
Cable core size	**Connector maximum current**	**Maximum length**
1.5mm	16A	15m (49.2ft)
1.5mm	16A RCD protected	22m (72.2ft)
2.5mm	16A	25m (82ft)
2.5mm	16A RCD protected	35m (114.8ft)
4mm	16A	40m (131.2ft)
4mm	16A RCD protected	55m (180.4ft)

230V 15A rated plug maximum extension lead length		
Cable core size	**Connector maximum current**	**Maximum length**
1.5mm	15A	15m (49.2ft)
1.5mm	15A RCD protected	22m (72.2ft)
2.5mm	15A	25m (82ft)
2.5mm	15A RCD protected	40m (131.2ft)
4mm	15A	40m (131.2ft)
4mm	15A RCD protected	60m (196.9ft)

Extension leads 110v (UK only)

Ensure the supply from the transformer is suitable for the application. It must allow continuous supply based on the current required in order to allow a complete charge cycle and avoid nuisance tripping.

NOTICE **IF CHARGING A MACHINE WITH A 16A SUPPLY, THE 110V TRANSFORMER MUST HAVE A CONTINUOUS RATING OF 2.25KVA OR ABOVE.**

NOTICE **IF CHARGING A MACHINE WITH A 32A SUPPLY, THE 110V TRANSFORMER MUST HAVE A CONTINUOUS RATING OF 3.5KVA OR ABOVE.**

NOTICE **EXTENSION LEADS ARE TO BE UNCOILED TO PREVENT OVERHEATING AND MUST BE VISUALLY INSPECTED FOR ANY DEFECTS BEFORE USE.**

NOTICE **ONLY USE APPROVED EXTENSION LEADS WITH A PASSED PAT LABEL FITTED.**

NOTICE **DO NOT EXCEED THE MAXIMUM LENGTHS WHEN JOINING MULTIPLE LEADS.**

NOTICE **ENSURE THE MACHINE IS CONNECTED DIRECTLY TO THE POWER SUPPLY SOURCE AND AVOID THE USE OF SPLITTERS.**

110V maximum extension lead length		
Cable core size	**Connector maximum current**	**Maximum length**
1.5mm	16A	10m (32.8ft)
2.5mm	16A	18m (59.1ft)
4mm	16A	28m (91.9ft)
4mm	32A	14m (45.9ft)
6mm	32A	23m (75.5ft)

5.3 Bi-energy system

5.3.1 Duty selector

On multiple power option machines, (Bi-Energy) one of the functions on the platform control station will be a duty selector. This key switch allows the selection of either power option, i.e. from Diesel to Battery or Petrol to battery, or vice-versa. On other machines this same key switch serves as an "On-Off" control.

5.4 Boom system

5.4.1 Boom switch

The boom switch is located adjacent to the Knuckle, and works from a cam attached to boom 3. This permits the operator to slightly raise the booms whilst still permitting high-speed drive. This switch controls both the operation of the tilt alarm sensor, and the speed control function.

With the booms in the stowed position, the tilt alarm sensor is by-passed, allowing the machine to negotiate slopes in excess of the permissible working angle, without isolating the drive function. At the same time, "Hi" drive is possible, as is fast throttle on those machines so equipped. When the booms are raised, the tilt alarm sensor becomes activated, only slow speed operation is possible and only "Lo" drive is permitted. These control functions are of primary importance to safety of the machine and operator. Under no circumstances should this control function be isolated or by-passed.

5.5 Drive system

5.5.1 Drive Control Valve (DCV)

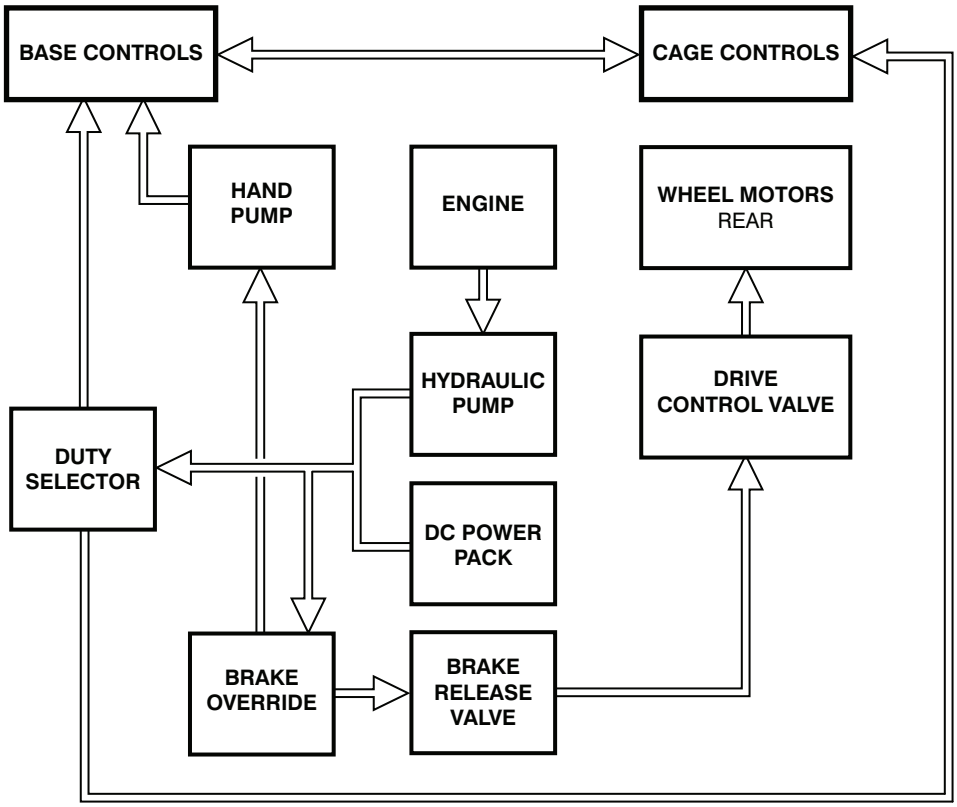
The motion control valve comprises several individual components all directly involved in the hydraulic supply to the wheel drive motors. Principal amongst these are the drive control valves, which electrically change the drive motor hydraulics supply from series flow to parallel, or vice versa. This control function is only available when the booms are lowered, and allows the operator to select "Hi" or "Lo" drive. "Hi" drive gives fast speed of travel, but low gradeability, "Lo" drive gives best gradeability, but slow speed. "Lo" drive is used for climbing inclines and delicate positioning of the machine.

5.5.2 Brake Release Valve

The motion control valve also incorporates a solenoid operated dump valve, which controls the brake function on the machine. This valve must be energised to allow the machine to move. If no voltage is present, the wheel motors will not be able to develop drive torque, whilst at the same time, the parking brakes will remain engaged. Only when a green "Power Control" push-button is being used (or the Platform Foot-switch is depressed) will the BRV operate. If the tilt alarm sensor detects an excessive inclination whilst the booms are raised it is the BRV which is de-energised to isolate the machine. (At the same time the klaxon tone changes to a continuous tone to indicate this condition).

5.6 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 Schematic D80526. Please refer to D80526 in conjunction with the Electric Schematics D81632 and D81867 for in-depth understanding of the complete system.

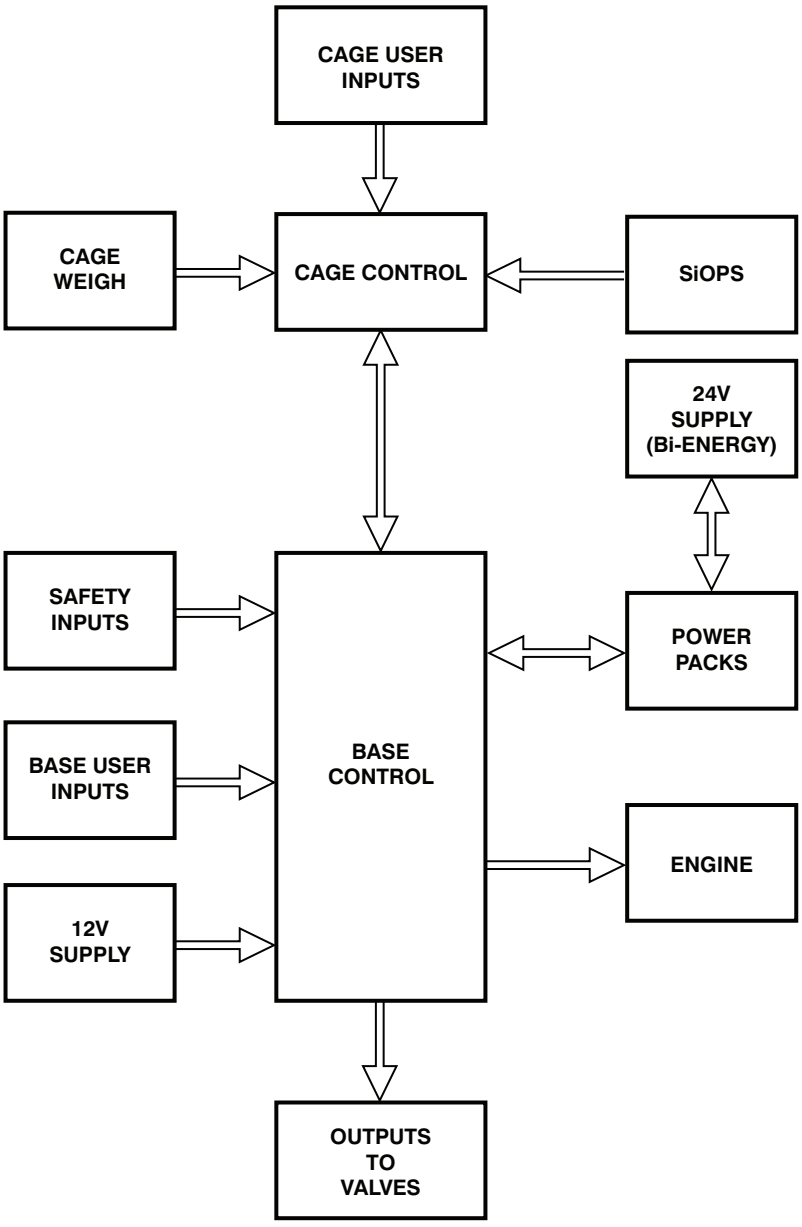


5.7 Steering

Steer system

Steer is activated using the drive joystick on the platform control box. Steer flow is supplied to the steer cylinder via the cage control valve. Maximum pressure on the steer line is set to 200 Bar (2900 psi).

5.8 Electrical control system overview



5.9 Control logic

Component level details and connections are provided in the Electric Schematics D81632 and D81867.

6 Troubleshooting guide

6.1 Trouble shooting 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 dealer in order for the guide to be continually improved and updated.

6.2 Platform function fault finding

Problem	Cause / Test	Solution
Niftylift will not drive	Check that power is reaching the solenoids on the Drive Control Valve (DCV)	Check fuse and reset on Terminal box
	Tilt alarm activated	Return booms to stowed position and drive Niftylift onto level ground
No functions, but engine operates correctly	Coupling failure	Connect coupling. Replace any damaged parts
	Footswitch fault	Contact switch may need replacement (See section 4.2.1)
Niftylift inactive, engine will not start	Battery disconnect handles (Anderson) Disconnected	Reconnect Battery disconnect handles (Anderson) (See section 1.5.4)
	Check main fuses	If fuse blown, replace with direct replacement (See section 4.1.1)
	Batteries discharged	Recharge batteries
	E-stops activated	Ensure e-stops are pulled out, at base controls and cage controls
	Cage weigh activated?	Remove weight from cage

6.3 Engine fault finding

6.3.1 Diesel engine

Problem	Cause / Test	Solution
Engine does not start	No fuel	Replenish fuel
	Air in the fuel system	Vent air
	Water in the fuel system	Replace fuel and repair or replace fuel system
	Fuel pipe clogged	Clean
	Fuel filter clogged	Clean or replace
	Excessively high viscosity of fuel or engine oil at low temperature	Use the specified fuel / oil
	Fuel with low cetane number	Use the specified fuel
	Fuel leak due to loose injection pipe retaining nut	Tighten nut
	Incorrect injection timing	Adjust injection timing
		OC60 - 0.26 - 0.30 rad (15° - 17°) before top dead centre (TDC)
		OC95 - 0.23 - 0.26 rad (13° - 15°) before top dead centre (TDC)
	Fuel camshaft worn	Replace
	Injection nozzle clogged	Clean
	Injection pump malfunctioning	Replace
	Seizure of crankshaft, camshaft, piston, cylinder lining or bearing	Replace
	Compression leak from cylinder head	Replace cylinder head gasket, Tighten cylinder head bolt and nozzle holder
	Deficient compression	Check and correct valve
	Improper valve seat alignment, valve spring broken, valve seized	Replace
	Incorrect valve timing	Adjust
	Piston ring and liner worn	Replace
	Excessive valve clearance	Adjust

Problem	Cause / Test	Solution
Engine runs erratically	Fuel filter clogged or dirty	Clean
	Air cleaner clogged	Clean or replace
	Fuel leak due to loose injection pipe retaining nut	Tighten nut
	Injection pump malfunctioning	Replace
	Incorrect nozzle injection pressure	Repair or adjust
	Injection nozzle stuck or clogged	Replace
	Fuel overflow pipe clogged	Clean
	Governor malfunctioning	Repair
Either white or blue exhaust smoke is observed	Excessive engine oil	Reduce to the specified level
	Piston ring and liner worn or stuck	Replace
	Incorrect injector timing	Adjust
	Deficient compression	Check top clearance and correct valve recessing
Either black or dark grey exhaust smoke is observed	Overload	Reduce load
	Low grade fuel used	Use the specified fuel
	Fuel filter clogged	Clean or replace
	Air cleaner clogged	Clean or replace
Deficient output	Incorrect injection timing	Adjust
	moving parts show signs of seizing	Repair or replace
	Deficient nozzle injection	Repair or replace nozzle
	Compression leak	Repair
Excessive oil consumption	Piston ring gaps aligned	Space gaps 120° apart
	Oil ring worn or stuck	Replace
	Piston ring groove worn	Replace piston
	Valve stem and guide worn	Replace
	Oil leak	Repair
Fuel mixed into lubricant	Injection pump broken	Replace pump element or pump

Problem	Cause / Test	Solution
Low oil pressure	Engine oil insufficient	Replenish
	Oil strainer clogged	Clean
	Relief valve stuck	Replace
	Relief valve spring weakened or broken	Replace
	Excessive oil clearance of crankshaft bearing	Replace
	Excessive oil clearance of crank pin bearing	Replace
	Oil gallery clogged	Clean
	Incorrect oil	Use specified oil
	Oil pump defective	Repair or replace
High oil pressure	Incorrect oil	Use specified oil
	Relief valve defective	Replace
Engine overheating	Engine oil insufficient	Replenish
	Overload running	Reduce load
	Head gasket defective	Replace
	Incorrect injection timing	Adjust
	Incorrect fuel	Use specified fuel

6.3.2 Petrol engine

Problem	Cause / Test	Solution
Engine does not start	Battery discharged	Recharge battery
	Fuse blown	Replace fuse
	Fuel valve OFF	Move lever to ON position
	Choke OPEN	Move lever to CLOSE position unless engine is warm
	Engine switch OFF	Turn engine switch to ON position
	Engine oil level low (Oil Alert models)	Replenish with specified oil
	Insufficient fuel	Replenish with specified fuel
	Bad fuel; engine stored without treating or draining petrol, or refuelled with bad petrol	Drain fuel tank and carburettor, replenish with fresh petrol
	Spark plug faulty, fouled or improperly gapped	Gap or replace spark plug
	Spark plug wet with fuel (flooded engine)	Dry and reinstall spark plug. Start engine with throttle lever in MAX position
	Fuel filter restricted, carburettor malfunction, ignition malfunction, valves stuck etc.	Repair or replace faulty components as necessary. Consult a Honda approved dealer
Engine lacks power	Air filter elements restricted	Clean or replace filter elements
	Bad fuel; engine stored without treating or draining petrol, or refuelled with bad petrol	Drain fuel tank and carburettor, replenish with fresh petrol
	Fuel filter restricted, carburettor malfunction, ignition malfunction, valves stuck etc.	Repair or replace faulty components as necessary. Consult a Honda approved dealer

6.4 Gearbox fault finding

Problem	Cause / Test	Solution
Oil leakage from seals	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 centre
	Too much lubricant	Check oil level (See section 3.2.1)
Vibrations and/or excessive noise	Wheel gear is not correctly installed	Check the fixing
	Internal anomaly	Contact a Niftylift approved service centre
	Bearings badly lubricated or faulty	Contact a Niftylift approved service centre
	Dented or chipped teeth	Contact a Niftylift approved service centre
	Low oil level	Check oil level, top-up if necessary (See section 3.2.1)
The brakes fails to disengage	Low pressure in the braking circuit	Check the brake connection
	Brake stuck due to prolonged storage	Apply pressure to the brake and turn the wheel by turning the motor on
Brakes do not engage	Residual pressure in the circuit	Check hydraulic circuit
Over-heating	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 centre
	High thermal power	Contact a Niftylift approved service centre

niftylift