UpRight

POWERED ACCESS

TL37

WORK PLATFORM

SERVICE & PARTS MANUAL

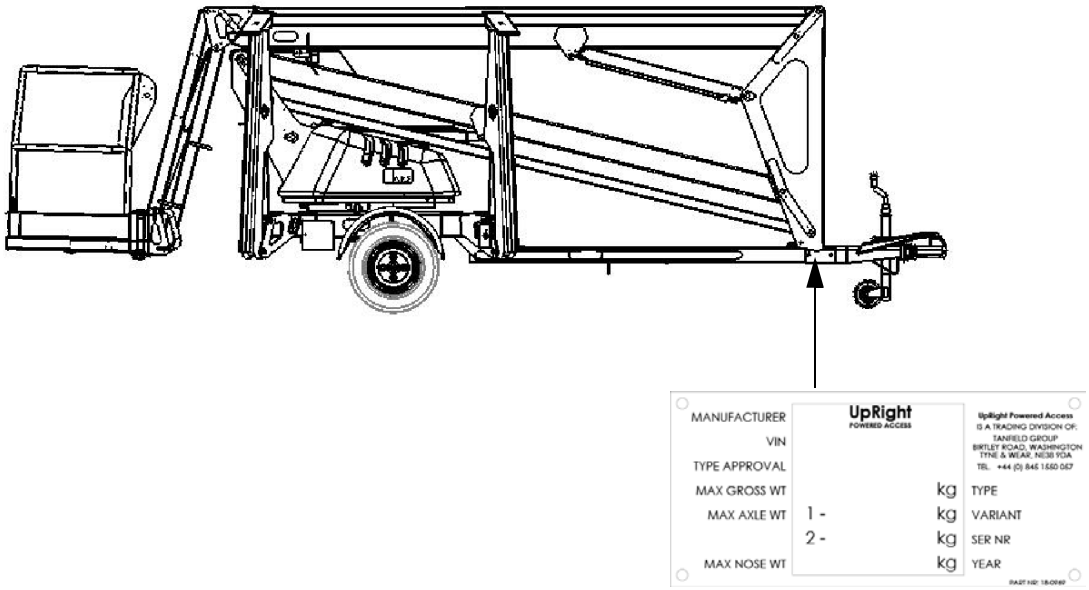
SERVICE & PARTS MANUAL

TL37

This manual covers Serial Numbers 7000 to Current

When contacting UpRight Powered Access for service orparts information, always include the **MODEL** and **SERIAL NUMBER** from the machine namplate.

The serial number is stmped into the
chassis above the machine nameplate.
e.g. 7 # # #



UpRight
POWERED ACCESS
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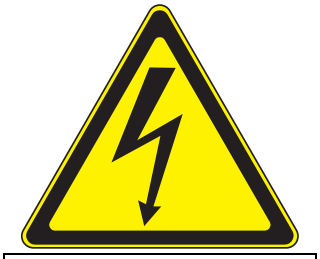
!WARNING!

All personnel shall carefully read, understand and follow all safety rules and operating instructions before operating or performing maintenance on any UpRight aerial work platform.

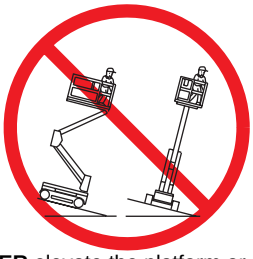
Safety Rules

Electrocution Hazard



THIS MACHINE IS NOT INSULATED!

Tip Over Hazard

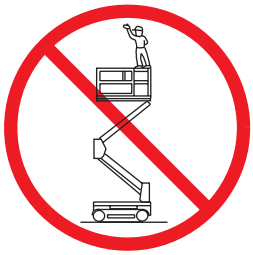


NEVER elevate the platform or drive the machine while elevated unless the machine is on a firm, level surface.

Collision Hazard

NEVER position the platform without first checking for overhead obstructions or other hazards.

Fall Hazard



NEVER climb, stand, or sit on platform guardrails or midrail.

USE OF THE AERIAL WORK PLATFORM:

This aerial work platform is intended to lift persons and his tools as well as the material used for the job. It is designed for repair and assembly jobs and assignments at overhead workplaces (ceilings, cranes, roof structures, buildings etc.). All other uses of the aerial work platform are prohibited!

THIS AERIAL WORK PLATFORM IS NOT INSULATED! For this reason it is imperative to keep a safe distance from live parts of electrical equipment!

Exceeding the specified permissible maximum load **is prohibited!** See “Special Limitations” for details.

The use and operation of the aerial work platform as a lifting tool or a crane (lifting of loads from below upwards or from up high on down) **is prohibited!**

NEVER exceed the manual force allowed for this machine. See “Special Limitations” on for details.

DISTRIBUTE all platform loads evenly on the platform.

NEVER operate the machine without first surveying the work area for surface hazards such as holes, drop-offs, bumps, curbs, or debris; and operate machine to avoid them.

OPERATE machine only on surfaces capable of supporting wheel loads.

NEVER operate the machine when wind speeds exceed this machine’s wind rating. See “Beaufort Scale” for details.

NEVER attach notice boards etc. to the platform, as this will increase the wind loading effect.

IN CASE OF EMERGENCY push EMERGENCY STOP switch to deactivate all powered functions.

IF ALARM SOUNDS while platform is elevated, STOP, carefully lower platform. Move machine to a firm, level surface.

Climbing up the railing of the platform, standing on or stepping from the platform onto buildings, steel or prefab concrete structures, etc., **is prohibited!**

Dismantling the swing gate or other railing components **is prohibited!** Always ensure that the swing gate is closed and securely locked!

It is prohibited to keep the swing gate in an open position (held open with tie-straps) when the platform is raised!

To extend the height or the range by placing of ladders, scaffolds or similar devices on the platform **is prohibited!**

NEVER perform service on machine while platform is elevated without blocking elevating assembly.

INSPECT the machine thoroughly for cracked welds, loose or missing hardware, hydraulic leaks, loose wire connections, and damaged cables or hoses before using.

.**NEVER** use a machine that is damaged, not functioning properly, **VERIFY** that all labels are in place and legible before using.

To bypass any safety equipment **is prohibited** and presents a danger for the persons on the aerial work platform and in its working range.

NEVER charge batteries near sparks or open flame. Charging batteries emit explosive hydrogen gas.

Modifications to the aerial work platform **are prohibited** or permissible only at the approval by **UpRight Powered Access**.

AFTER USE, secure the work platform from unauthorized use by turning both key-switches off and removing key.

The driving or use of MEWP’s on the public highways is subject to Regulations made under the Road Traffic Acts.

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The **UpRight TL37's** unique combination of strength, versatility and simplicity, have made it an instant leader in its class.

Its exceptional working envelope, despite the low towing weight, is achieved thanks to our innovative boom design.

The third flick boom, with 130 DEGREES working arc, guarantees access to the most hard to reach places, while the 90 DEGREES basket rotation provides the precision positioning that is vital for working in tight spaces.

UpRight has a global reputation for innovation and a proud heritage in the design and manufacture of high quality powered equipment.

The company was founded in the UK more than 25 years ago, on the principle of constantly improving service excellence for end users.
Every model in our growing range of versatile, trailer mounted units is a class leader and together they have set new industry benchmarks.

Our commitment to research and design, plus 250,000sq ft of same site fabrication, build and support capacity, mean UpRight can offer complete solutions to meet even the most demanding access applications.

UpRight has third party accreditation to quality standard ISO 9001 and the full range proudly carries the CE mark, complying with or exceeding all relevant standards and EC directives.

UpRight Powered Access is a member of the IPAF
International Powered Access Federation.

To ensure you are fully aware of safety and operational information, the following symbols are used throughout this manual;

This type of box contains, Points of operation to NOTE.

The information contained in this type of box contains, WARNING text. It gives Warnings about the risk of Damage to equipment, and possibly personnel.

The information contained in this type of box contains, DANGER text. It gives Warnings about the risk of PERSONAL INJURY to the operator and or others.

The **UpRight TL37** is of the parallel linkage vertical boom design, mounted on either a road towable trailer, or on industrial bogie chassis . The unique yet very simple boom configuration gives the maximum safety and control ability combined with a robust construction to withstand a heavy working environment.

The **TL37** machine is designed for two man capacity with **215 kg S.W.L.**

The machine incorporates a bottom boom with tie rod, a short vertical boom and a top boom with tie rod. The **TL37** has also an independent hydraulically operated Flick-Out Boom and Rotating Cage for extra manoeuvrability.

The hydraulic system is of a fail-safe design throughout, with built-in hydraulic lock valves on all the rams as a precaution against hose failure. The machine is controlled by means of proportional manual lever operated valves. These valves are located at both the base and in the cage, as standard.

Emergency lower valves are fitted as standard to allow the machine to be lowered from the Base. Additionally, a hand pump is fitted in the cage for emergency operation.

The hydraulically operated outriggers are fitted with load sensing interlocks, to prevent the booms being raised without the outriggers being extended and under load. An interlock prevents the hydraulic outriggers being accidentally retracted while the booms are raised. A simple system of warning lights show the power is on and each of the outriggers is under load.

Performance.

Maximum Working Height	**13.1 m**	
Maximum Working Outreach	**5.9 m**	
Capacity (2-man working)	**215 kg**	
Slewing Arc	**700°**	
Airborne Noise Emissions	**(Battery)**	**70 dB(A)**
	(Engine)	**100 dB(A)**
	(Diesel)	**103 dB(A)**

Construction Standards.

The machine complies fully with the requirements of the following EEC Directives:
Directive 98/37/EC, the 'Machinery Directive'.
Directive 89/336/EEC, as amended – the 'Electromagnetic Compatibility Directive'.
Directive 73/23/EEC, as amended – the 'Low Voltage Directive'.

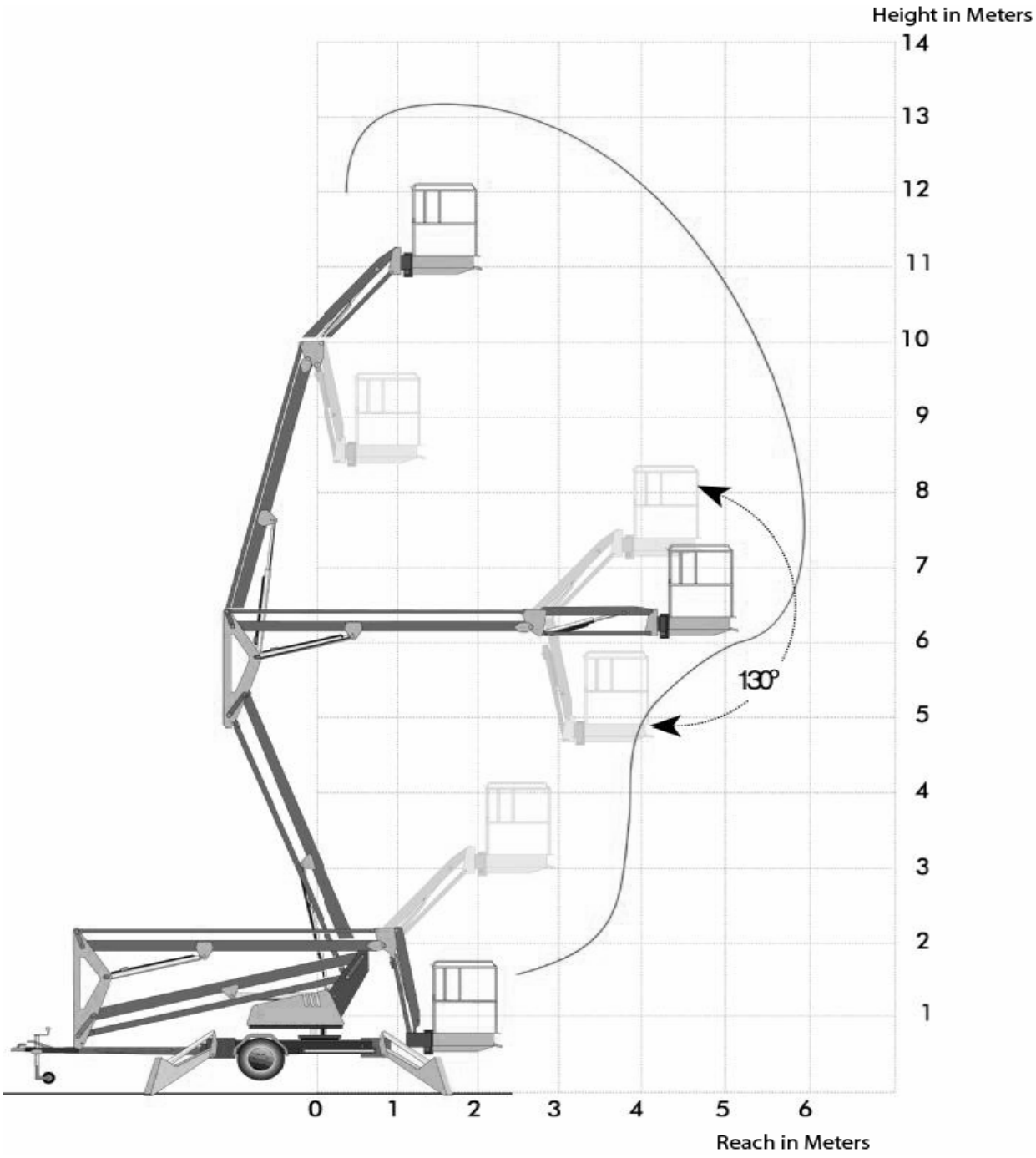
The machine is designed and tested in accordance with all relevant B.S.I. and European Standards including EN280.

TECHNICAL SPECIFICATION

Cage Dimensions	
Length	1.20m
Width	0.80m
Guard-rail Height	1.10m
Toe-board Height	0.15m
Operating Dimensions	
Maximum Working Height	13.10m
Maximum Cage Height	11.10m
Maximum Outreach (From centre of rotation)	5.90m
Travel Dimensions	
Towing Length	6.43m
Closed Width	1.48m
Closed Height	1.95m
Weight (Battery Model)	1450kg (unladen)
Operating Parameters	
Safe Working Load	215 kg
Maximum Horizontal Pull	400 N
Maximum Wind Speed	12.5 ms^{-1}
Rotation	700˚
Cage Slew	90˚

Equipment		
Bottom Ram	Double acting:	Bore Ø 60.0 mm Rod Ø 40.0 mm
Top Ram	Double acting:	Bore Ø 60.0 mm Rod Ø 40.0 mm
Flick Ram	Double acting:	Bore Ø 60.0 mm Rod Ø 40.0 mm
Stabiliser Ram	Double acting:	Bore Ø 70.0 mm Rod Ø 40.0 mm
Bottom & Top Ram Lock Valves	Pilot operated over centre valves	
Control Valve (Cage)	Monoblock unit consisting of five double acting spools	
Control Valve (Ground)	Monoblock unit consisting of four double acting spools	
Control Valve (Stabiliser)	Monoblock unit consisting of four double acting spools	
Bushes	Acetol resin polymer with sintered bronze base (DX)	
Pivot Pins	Stainless Steel Bright Bar To Grade BS970 303 S31 CW	

WORKING ENVELOPE



OPERATOR REQUIREMENTS

1. To operate the machine you must be medically fit and have no problems with eyesight or hearing.

2. You must have a good head for heights.

3. Your primary concern must be the safe operation of the work platform, the safety of the people working with you, and the safety of other persons in your working area.

4. You must be familiar with the contents of this manual, and at no time attempt to operate the machine beyond the recommended limits.

5. The proper care of the work platform is a major factor in ensuring the safety of those who work with it.

6. You must not misuse the machine or ignore or interfere with the devices that have been provided to maintain safety.

7. Operation of the machine should be restricted to personnel who have been authorised to operate the equipment and have received proper training.

1. ***DO NOT*** operate this machine unless you have been fully trained in its safe use.

2. ***DO NOT*** operate the machine on soft, slippery or sloping ground unless adequate precautions have been taken.

   The stabilisers are designed to operate on firm level ground with a minimum bearing strength of 50N/cm^2.

   The maximum load imposed by an outrigger is 10.3kN.

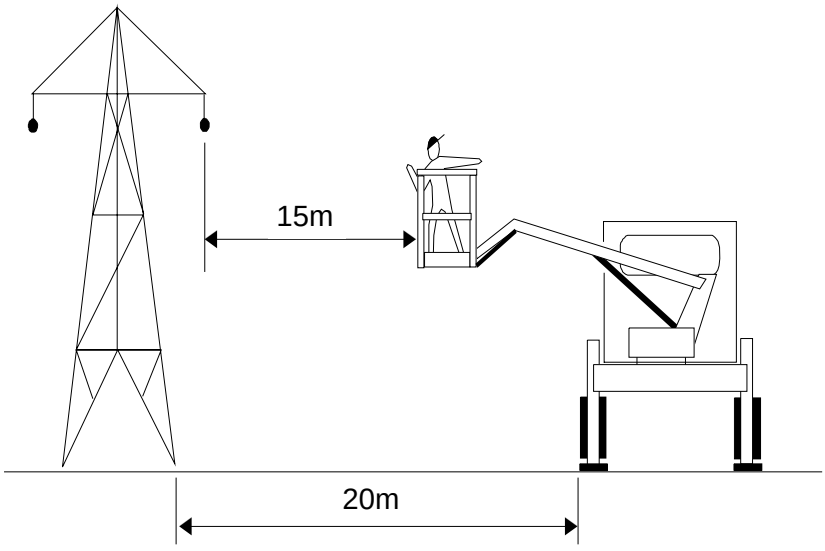
   Advice should be obtained from UpRight as to the type of supports and precautions required before attempting to operate the machine outside these parameters.

3. ***DO NOT*** use any equipment in the basket to increase the reach or working height of the machine, e.g. ladders.

4. ***DO NOT*** fit any additional equipment to the machine that would increase the wind loading, e.g. notice boards.

5. ***DO NOT*** use the machine for any application that may produce special loads or forces: the manufacturer, UpRight, must be consulted for approval of special applications prior to use.

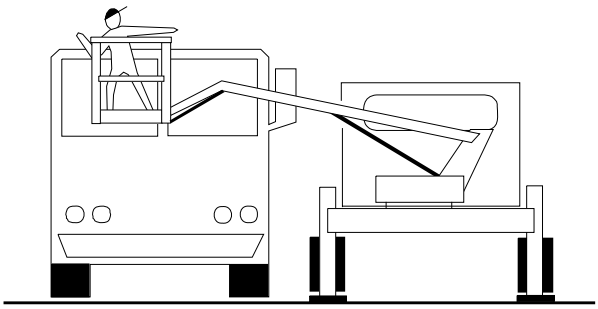
6. ***DO NOT*** use the machine close to live electrical conductors. The minimum safe working distance for a machine working near overhead power cables is the maximum extended length of the booms plus 15 metres, measured with the booms pointing towards the lines, i.e. safe working distance for the TL37 is 20 metres. It is the operator's responsibility to ensure that, when working in the vicinity of live overhead high-voltage lines, the minimum safe working distance is maintained. Erect a simple barrier tape at the safe distance.



7. ***WORKING CLOSE TO POWER CABLES*** – if work has to be carried out at less than the safe working distance, the operator must ***ensure that the electricity supply has been switched off***. Before commencing work, a written permit to work must be obtained from the owners of the power cables or the responsible authority.

8. ***DO NOT*** operate the machine unless all four outriggers are down and in full contact with the ground. The machine must be level and the ***wheels lifted visibly clear of the surface*** before the booms are raised.

9. ***DO NOT*** move the machine with the basket raised and never allow cage or booms to slew into the path of oncoming vehicles.



10. ***DO NOT*** operate the machine if the wind speed exceeds 12.5 m/s. Be aware that, when working near high buildings or structures, shielding and funnelling effects may cause high wind forces on days when the nominal wind speed in the open is low. Wind speed can either be measured from the work platform with a hand held anemometer or estimated using the Beaufort Scale.

BEAUFORT WIND SPEED SCALE

The Beaufort Scale of wind force is accepted internationally and is used in communicating weather conditions. It consists of numbers 0 - 12, each representing a certain strength of velocity of wind at 10m (33ft.) above ground in the open.

Numbers 10-12are not shown in this table.

DESCRIPTION OF WIND		SPECIFICATION FOR USE ON LAND	M/Sec
0	CALM	*Calm – smoke rises vertically*	0-0.5
1	LIGHT AIR	*Direction of wind shown by smoke drift but not by wind vanes.*	0.6-1.5
2	LIGHT BREEZE	*Wind felt on faces; leaves rustle; ordinary vanes moved by wind.*	1.6-3.0
3	GENTLE BREEZE	*Leaves and small twigs in constant motion; wind extends light flag.*	3.5-5
4	MODERATE BREEZE	*Raises dust and loose paper; small branches are moved.*	6-8
5	FRESH BREEZE	*Small trees in leaf begin to sway; crested wavelets form on inland waterways.*	9-10
6	STRONG BREEZE	*Large branches in motion; umbrellas used with difficulty.*	11-13
7	NEAR GALE	*Whole trees in motion; inconvenience felt when walking against wind.*	14-17
8	GALE	*Breaks twigs off trees; generally impedes progress.*	18-21
9	STRONG GALE	*Slight structural damage occurs (chimney pots and slates re-moved)*	22-24

Approximate corrections for wind speeds at other heights are:
2m subtract 30%; 3m subtract 20%; 6m subtract 10%
15m add 10%; 30m add 25%

Trailer mounted machines are fitted with suspension units that may be safely towed behind a car or van at speeds of up 50mph (80km/h) where permitted.

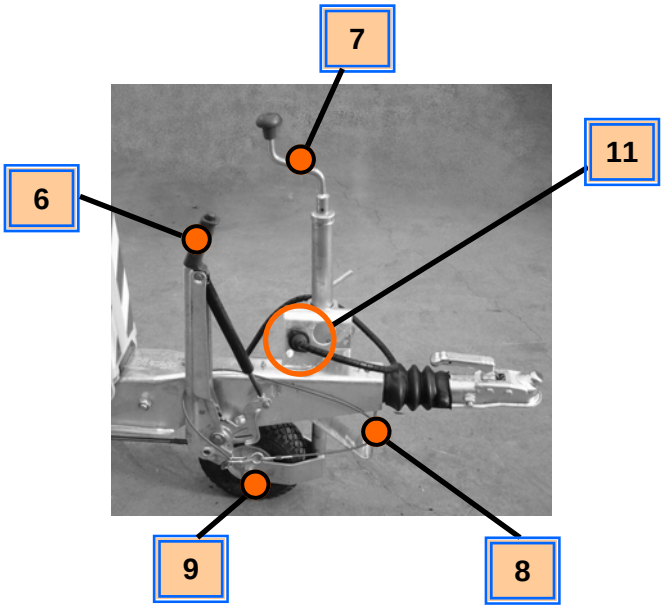
1. Before towing, check the capacity of the vehicle being used.
(Machine weight will increase if optional extras are fitted)

2. Ensure that the road tyres and brakes are in good, serviceable condition.

3. Ensure that all booms are fully lowered and both the transit pins are fitted through the transit pin holes and secured with the "R" clip on the end of the chain. (*see photographs below*)

4. Ensure that all outriggers are fully raised.

5. Use the Jockey Wheel to raise or lower the tow bar coupling to position the machine above the 50mm ball hitch on the towing vehicle.



6. Apply the handbrake.

7. Lower the tow bar coupling down onto the ball hitch using the Jockey Wheel

8. Secure the breakaway cable,
(Ensure correct engagement of 50mm ball).

9. Fully raise the Jockey Wheel and lock in position.

10. Release the Handbrake.

11. Plug in the trailer lights (7 pin plug) and check that both vehicle and trailer lights are working correctly.

The following Pre-Start Checks should be carried out before taking the machine to the place of work.

1. **Damaged or Loose Fittings.**
   Visually Inspect the machine for signs of wear and tear, damage, loose or missing parts.

2. **Wheels. (For towing only)**
   Check tyres are at the correct pressure, **55 psi** (3.8 bar) and that the wheel nuts are tightened using the correct torque setting (100Nm).

3. **Hydraulic fluid.**
   The hydraulic oil tank is located underneath the slew cover on the left hand side of the machine (looking from the cage end).
   With the booms and outriggers in the transport position, the hydraulic oil level should be visible between the upper and lower marks of the dipstick.

Do Not Overfill the Hydraulic Tank

Serious injury or even death may result by not carrying out the following checks of the interlock system before the platform is used!

Top up with ISO Grade 22 hydraulic oil if necessary.

4. **Safety Switches.**

Visually check the cage overload switch is free from damage.

Check all limit switch arms are free from damage and move easily .

With outriggers in transport position, it must not be possible to operate the extending structure.

With outriggers deployed, under load and top or bottom boom raised

The flick boom is not interlocked with the outriggers.

approximately 50mm, it must **NOT** be possible to operate the outrigger controls.

5. **Emergency Stop Switches.**
   Emergency stop switches must operate correctly. Check that each stops the machine's controls and that restarting is prevented until all stop switches are unlatched.

6. Emergency Lower/Slew.

With the top and bottom booms raised approximately 500mm each and the unit switched off, check:
The emergency slew can be operated with the slew handle provided.
The emergency lower valves located on the lift cylinders lower the boom when pushed in a slow and controlled manner and that the boom movement is stopped on releasing the valve

To Reset the hydraulic system after checks;

- *Fully slew the Basket to the right, so that he ram is fully extended.*
- *Fully extend the Outriggers while still maintaining Level. (check the bubble)*
- *Using the ground controls, fully extend both Top and Bottom Booms.*
- *Fully extend the Flick Out Boom.*

All rams must be fully extended at the same time before returning them to their transit position.

7. Emergency Hand Pump.

With the unit set up for working (i.e. outriggers down, under load and the machine level with wheels clear of ground) it is possible to lower the cage using the emergency hand pump.

If the Emergency Lower is used during normal operation, ***DO NOT*** *use the machine,* ***Contact your local UpRight representative****.*

8. Battery Power (*Where applicable)*

Check batteries are fully charged and topped up with distilled water (these.are fitted under the slew cover on both sides of the platform) and that the Battery Isolating Plug is securely connected.

Hydrometer reading should be 1280-1320sg.
With machine level, the distilled water should cover the plates by approximately 6mm.

9. Mains Power (*Where applicable)*

Connect the mains supply, either 110V or 220/240V A.C., depending upon the motor specification. Check the motor is running when the key is turned to the **ON** position.
Check that the voltage and frequency of the power input matches that of the motor. All extensions must be a minimum of 2.5mm², and no longer than 10m due to possible voltage drop.

10. Petrol Power (*Where applicable)*

Check the fuel and oil levels of the engine. Switch on the ignition using the key switch on the slew mounted legend panel. Check the engine runs using the start and stop buttons in the basket. Check that there is sufficient oil and fuel to complete a full working shift.

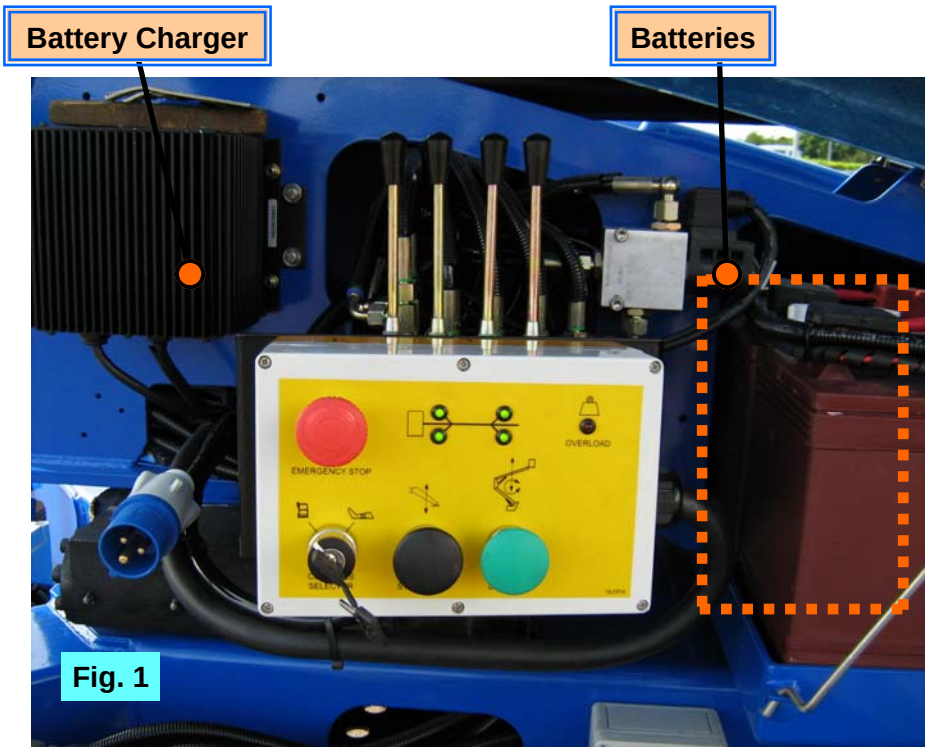


Fig. 1

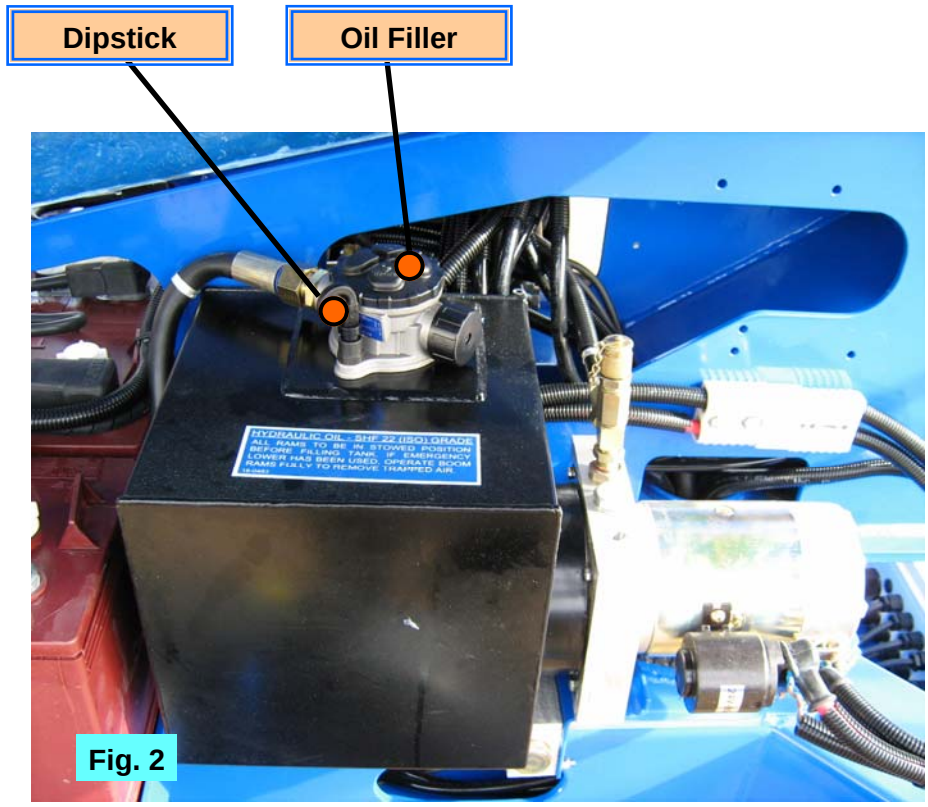


Fig. 2

All extensions must be a minimum of 2.5mm², and no longer than 10m, due to possible voltage drop, which will damage the motor.

SETTING UP

1. Park the unit in an appropriate location at the workplace.

2. Apply the handbrake on the trailer and remove from the towing vehicle.

Do not attempt to set up the machine on steep slopes, ramps or soft ground.

3. With platform key switch set to '**Ground**' ***(Fig 3)***

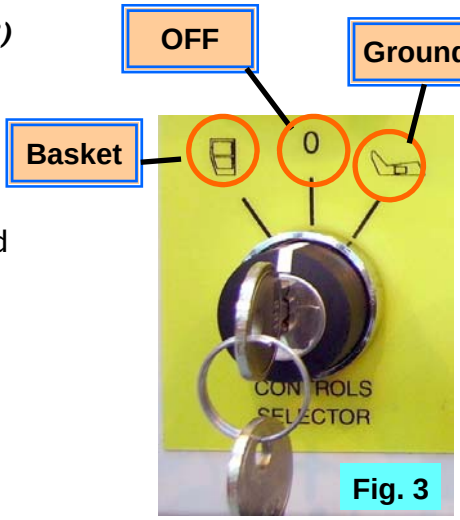


Fig. 3

lower the outriggers by keeping the '**Outrigger Motor Run**' button **(*Fig 5)*** pushed in, operate the appropriate '**Outrigger control lever**' ***(Fig 4),*** until all four are **25mm** to **50mm** from the ground.

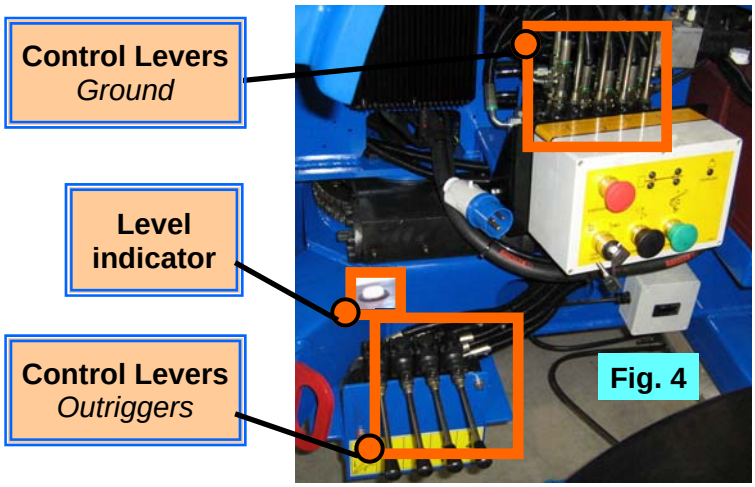


Fig. 4

4. Lower the Outriggers two at a time starting at the tow bar end (No's 3&4) until the jockey wheel just clears the ground.

5. Lower Outriggers 1&2 until the green LED display indicates that they are under load. *(Fig 6)*

6. Repeat this sequence for Outriggers 3&4.

Take EXTREME care NOT to ground either the Basket, or the Jockey Wheel during the next step.

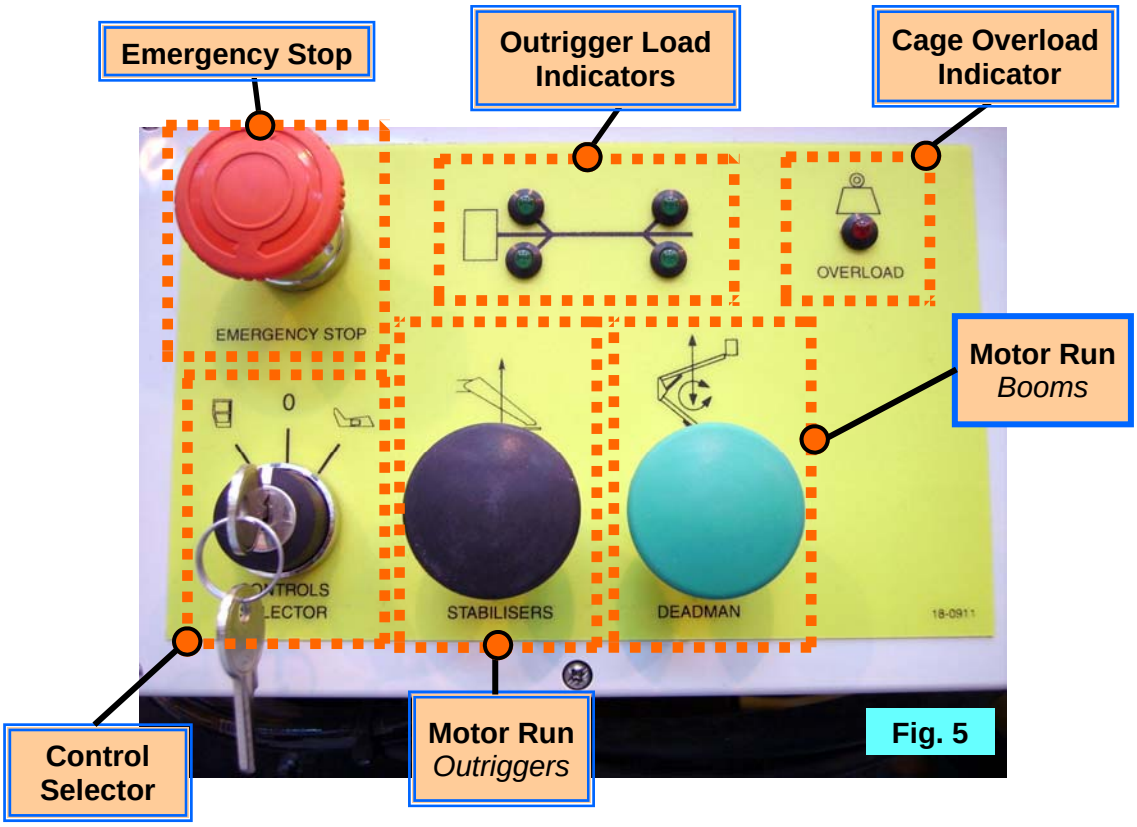


Fig. 5

7. By alternating from 1&2 to 3&4, carefully inch down each pair of Outriggers until all four Outriggers are fully deployed, and the wheels are well clear of the ground.

8. Now, by using the Level indicator *(Fig.4),* raise opposite Outriggers until the bubble and indicator ring are concentric (*i.e.*, the bubble rests in the centre).

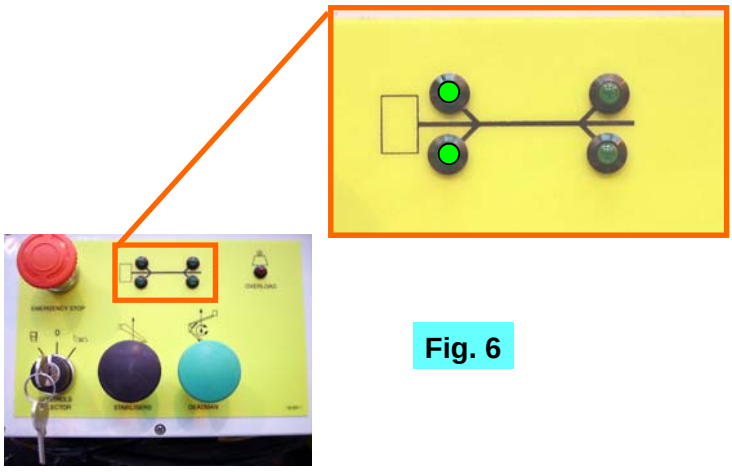


Fig. 6

9. Check that each LED on the Ground Control panel is still illuminated. This indicates that each foot is in firm contact with the supporting surface.

The unit is designed to operate on a supporting surface of minimum bearing strength of 50N/cm².

The maximum outrigger load is 10.3kN.

EXTENDING STRUCTURE

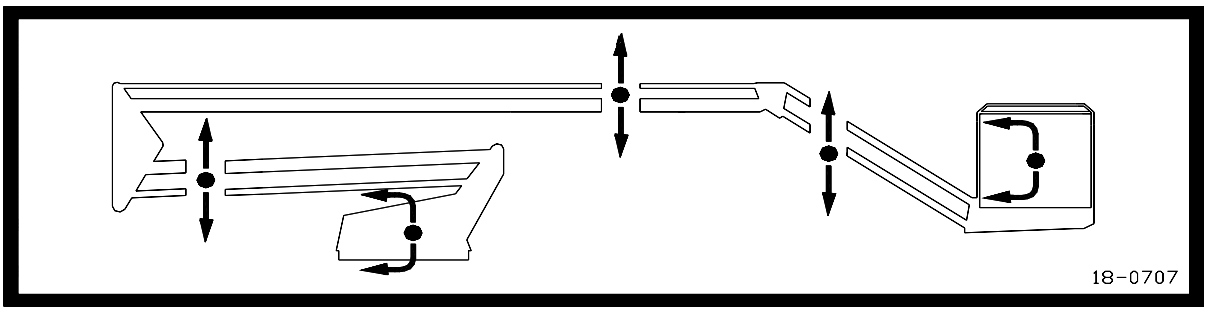
*The **SET-UP** section of this manual **MUST** be completed before extending the structure.*

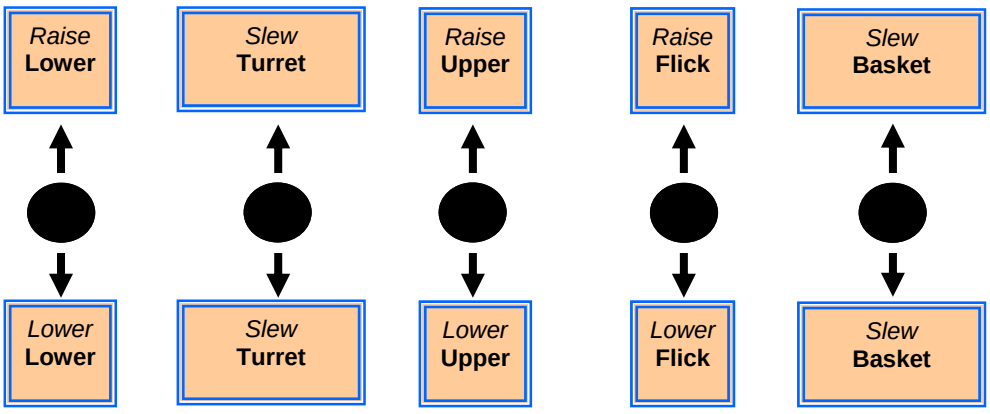
1. Remove and correctly stow the Transit Pins, from both the Upper and Lower Booms.

2. At the Ground Control Station, turn the key to '**Basket**' (See point #6.)

3. Climb into the basket. Check that all Emergency Stop Switches are released (twisting release). The platform may now be raised, lowered or slewed in any direction by operating the control levers at the basket, whilst depressing the motor run button *(DEADMAN).*

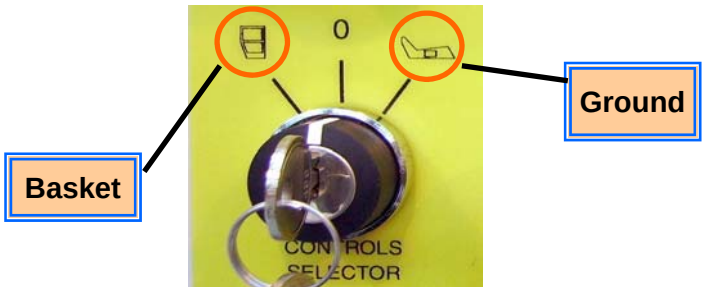
4. Explanation of the Basket Control Station, Directional Control Levers



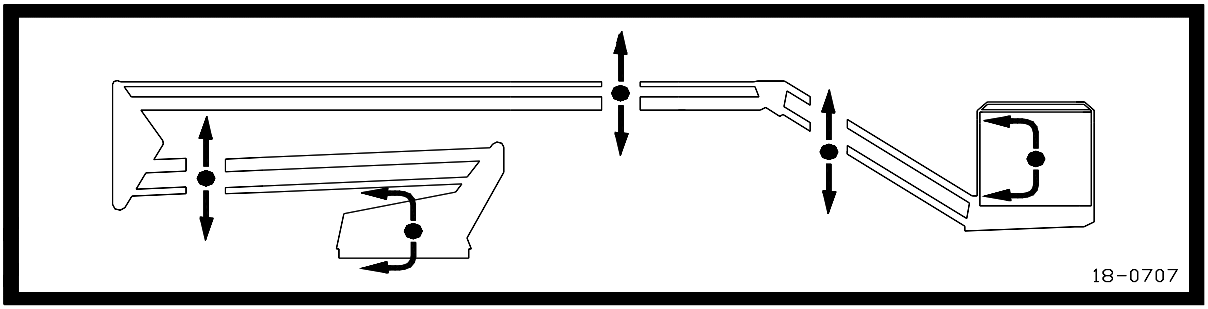


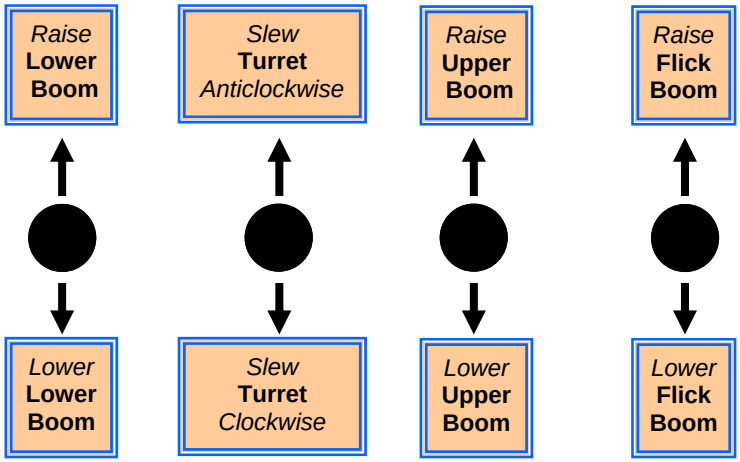
5. A duplicate set of controls (excluding Slew Basket) is mounted on the Slew Turret under the right hand side cover, which allows the platform to be operated from the Ground.

6. At the Ground Control Station, turn the key to '**Ground**'.



7. Explanation of the Ground Control Station, Directional Control Levers





Take EXTREME care when slewing both basket and turret, at low levels.

Before raising, ensure there are no overhead obstructions or power cables and the outriggers are properly extended and secure.

SAFETY HARNESS & EMERGENCY CONTROLS

1. In accordance with IPAF recommendations, UpRight recommend the use of a **Full** Body Harness with an adjustable lanyard is used when operation from the basket.

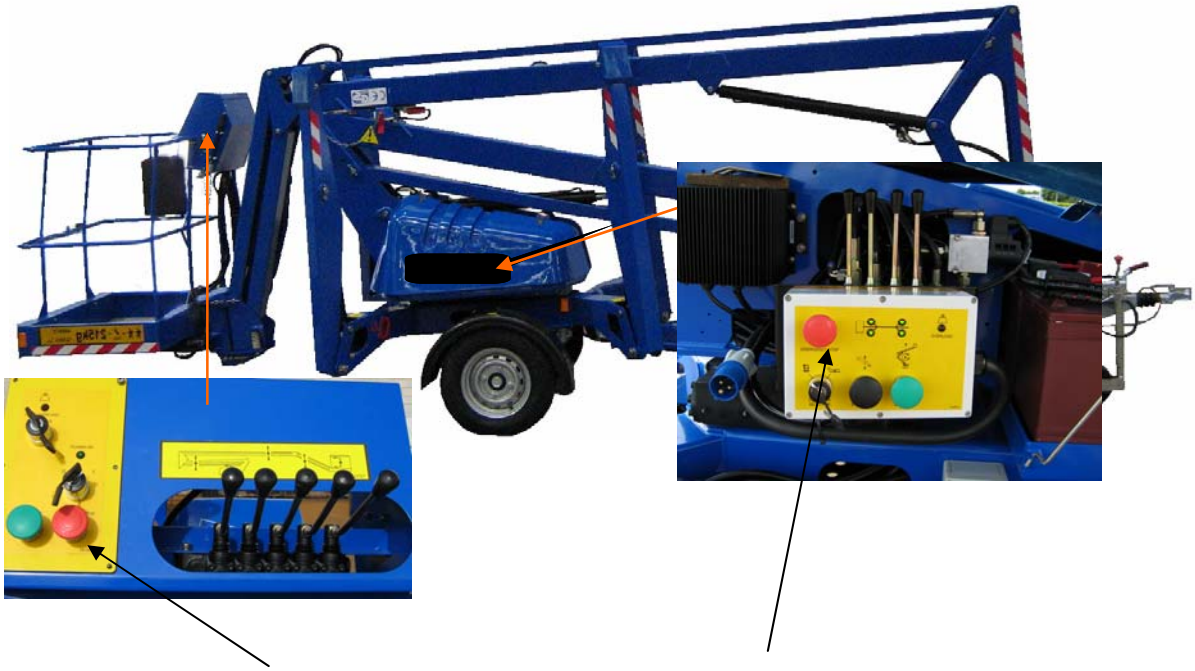
2. The lanyard length should be as short as possible.

3. A permanent anchoring attachment point is provided in the basket for fixing the harness.

EMERGENCY CONTROLS

1. **Emergency Stop**

Emergency Stop buttons are fitted on the machine to stop the motor in an emergency.
There are 2 Emergency Stop Buttons, one in the basket, and one on the ground control panel.



The emergency stops are 'Reset' by twisting.

2. **Emergency Lower.**

In the event of a power failure, There are two ways of Safely lowering the basket.

Emergency Lowering, *method one*

If you are able to get assistance from the ground they can lower both booms by pressing the Emergency Lower Valve on the ram.

Open the Lower Ram valve first to facilitate access to the Top Ram valve.

Each emergency lower valve will automatically close when the handle is released.

*If the Emergency Lower is used due to a machine defect, **DO NOT** use the machine, **Contact your local** **UpRight** **representative**.*

If the Emergency Lower is used, The TOP and BOTTOM BOOMS must be fully extended then fully lowered before work can continue.

After Emergency lowering, any further POWERED lowering could cause an AIRLOCK in the hydraulic system.

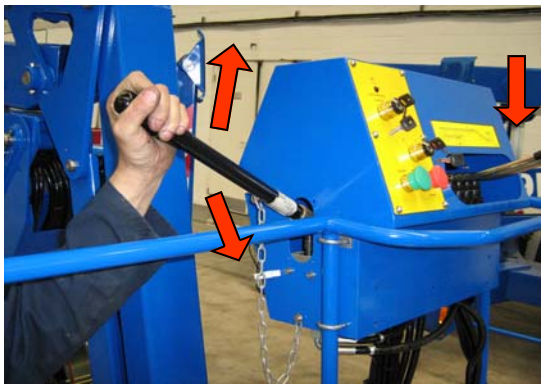
This could cause the Hydraulic operations to Fail.

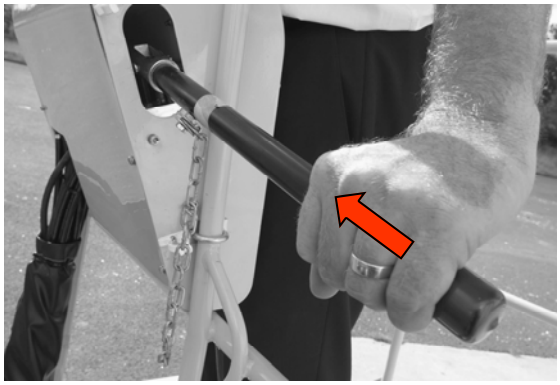
ALL BOOMS MUST BE FULLY EXTENDED/RAISED, THEN LOWERED BEFORE WORK CAN RECOMMENCE.

Emergency Lowering, *method two*.

You can operate the hand pump in the cage and operate the lowering boom functions.

To operate the hand pump, simply insert the lever into the pump shaft, **move a control lever to the required direction of movement**, and operate the hand pump. When the machine starts to lower, continue depressing the control lever.





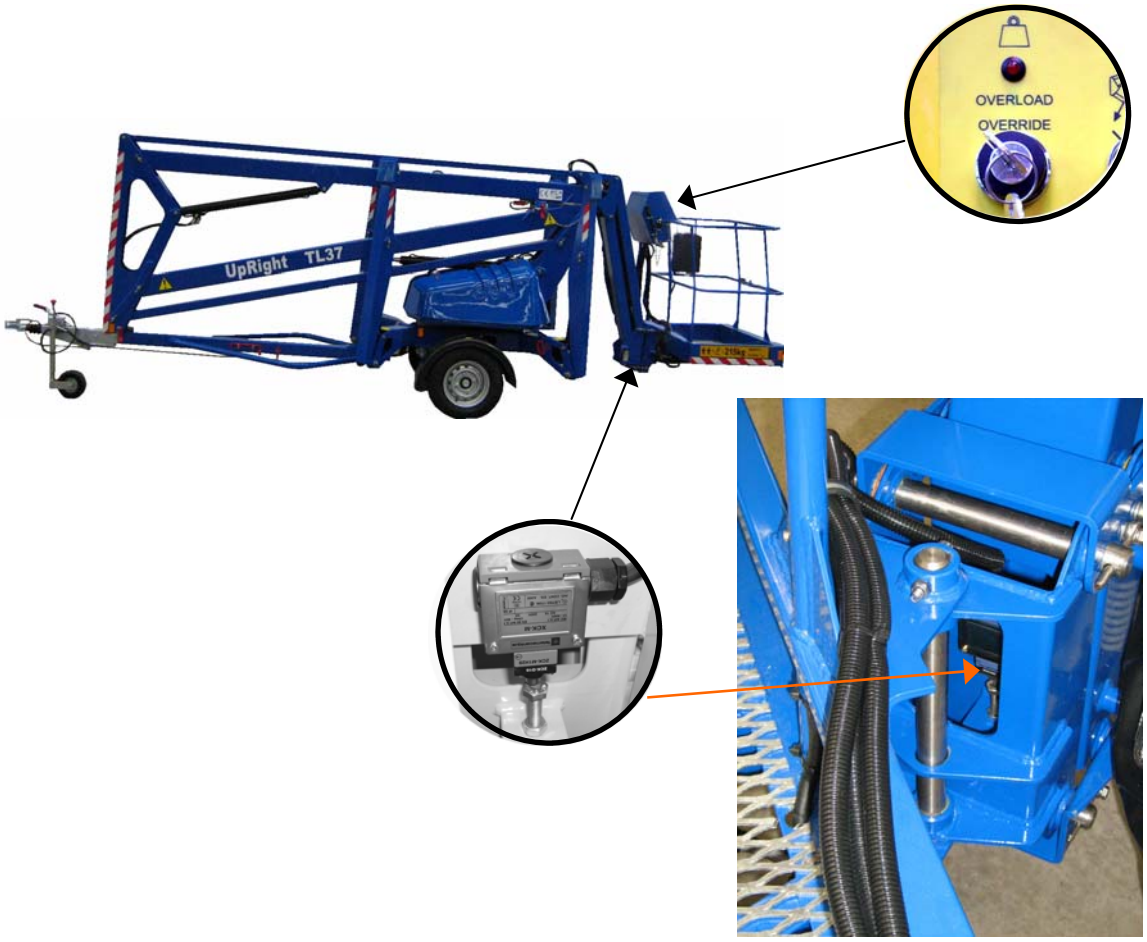
3. EMERGENCY SLEW.

In the event of a power failure, the machine may be manually slewed by moving the base control slew lever in the desired direction and manually indexing the Slew Platform by means of ratchet on the shaft of the Slew Gearbox.

Vigorous pumping is required to lower and operate the slew.

4. CAGE OVERLOAD.

In the event of the cage being overloaded, an audible alarm will sound and the cage controls will cut out.



To **re-start**, enough load must be removed from the cage so that the alarm stops sounding.

In cases where the overload can not be immediatley removed or the cage has fouled, then the overload override selector switch can be used to move the platform to a safe position so that the overload can safely removed.

The Key, Motor Run/Deadman and a Control Lever must be operated at the same time to effect this action

4. EMERGENCY BATTERY ISOLATING PLUG

Disconnecting this plug will isolate the batteries from the powerpack and operating circuits.

Before operating this machine, it is important that both the Operator and another responsible person on site, is aware of the position and function of the following:

A) Emergency Stop Buttons.
B) Emergency Lowering Buttons.
C) Emergency Slew Drive Shaft.
D) Battery Isolating Plug.

1. Fully lower all the booms.

2. Engage the Transit Pins, and lock in place using 'R' clip.

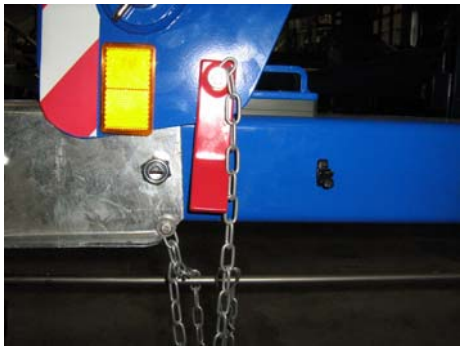
3. With platform keyswitch set to '**Ground**':

   Raise the outriggers by simultaneously depressing the '**MOTOR RUN Outrigger**' button and using the appropriate control levers, two at a time, alternating between the cage and tow bar end until the road wheels are in contact with the ground.

   Only when the road wheels are in contact with the ground should the unit be lowered further until the jockey wheel makes contact with the supporting surface.

   Now fully raise the outriggers until they are in the stowed position.
   Switch off the platform and ensure all loose items/covers are secure before towing the unit.
   The machine is now ready for transportation.

TRANSPORT PIN LOCATIONS – SHOWN READY FOR TRANSPORT



Lower Boom

Upper Boom

The unit must have a thorough inspection carried out every 6 months in accordance with* LOLER *Regulations 1998 and a Certificate of Thorough Inspection produced by a competent person.

Always ensure the machine structure is in good, sound, undamaged condition. Any inspection procedure is always aided by keeping the machine clean.
NB. Do not steam clean the battery charger or electrical components.

Daily Checks.

1. **Damaged or Loose Fittings.**
   Visually Inspect the machine for signs of wear and tear, damage, loose or missing parts.

2. **Wheels.**
   Check tyres are at the correct pressure, 55 psi (3.8 bar) and that the wheel nuts are tightened using the correct torque setting (100Nm).

3. **Hydraulic fluid.**
   The hydraulic oil tank is located underneath the slew cover on the left hand side of the machine (looking from the cage end) .With the booms and outriggers in the transport position, the hydraulic oil level should be visible between the upper and lower marks of the dipstick.
   Top up with ISO Grade 22 hydraulic oil if necessary.

Do Not Overfill the Tank

4. **Safety Switches.**
   Check all limit switch arms are free from damage and move easily.
   With outriggers in transport position, it must not be possible to operate the extending structure.
   With outriggers deployed, under load and top or bottom boom raised approximately 50mm, it must **NOT** be possible to operate the outrigger controls.

***The flick boom is not interlocked with the outriggers*.**

5. **Emergency Stop Switches.**
   Emergency stop switches must operate correctly. Check that each stops the machine's controls and that restarting is prevented until all stop switches are unlatched.

The unit must have a thorough inspection carried out every 6 months in accordance with* LOLER *Regulations 1998 and a Certificate of Thorough Inspection produced by a competent person.

Always ensure the machine structure is in good, sound, undamaged condition. Any inspection procedure is always aided by keeping the machine clean.
NB. Do not steam clean the battery charger or electrical components.

Weekly Checks.

1. Apply grease to the slew gear wheel and all grease nipples.

2. Check battery acid level, top up with distilled water if required (maximum 6mm over plates when battery is standing level), and check mains cable wiring.

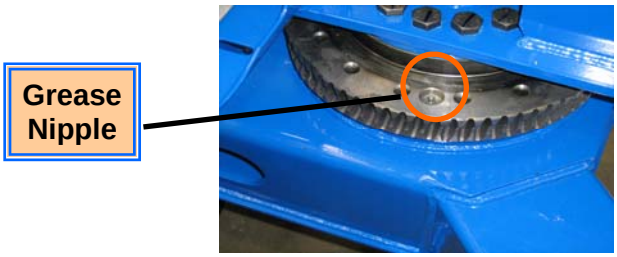
Monthly Checks.

1. Thorough machine inspection to be carried out by a trained and competent person. **(LOLER)**

FOR ENGINE MAINTENANCE REFER TO MANUFACTURES GUIDELINES

Slew Drive Gears.

The slew drive gear is designed to be largely maintenance free. However, we recommend the gear teeth be greased on a monthly basis with a high pressure grease. Additionally, the ring gear and gear box should be greased on a six monthly basis. The grease nipple for the ring gear is on the top face of the slew gear, set between the fixing bolts. It can be accessed by lifting one of the side covers, and slewing the structure appropriately.



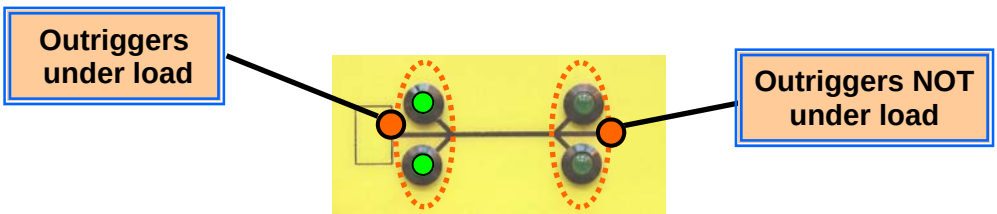
The ring gear should be inspected on a six monthly basis for excessive play. It is unlikely there will be any wear if the machine is maintained correctly.

To check the gear, place a payload of approximately 80Kg in the platform. Elevate the lower boom to approximately half way. Then gently elevate the top boom, whilst observing the ring gear. Excessive wear will be observed by noticing more than 0.5mm movement between the inner and outer bearing rings.

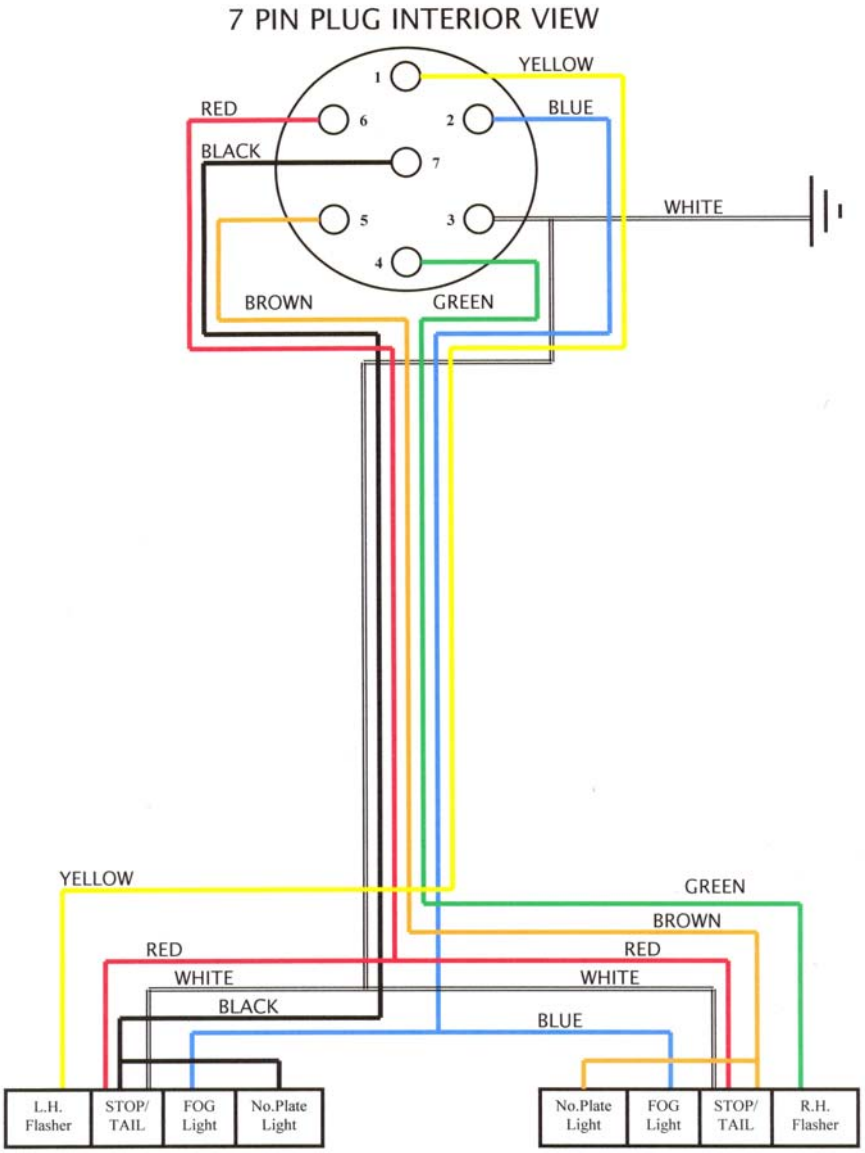
Checking Limit Switch Operation.

The limit switches require no maintenance, other than a visual inspection, on a pre operation basis. This is an important check, to ensure the switch is not mechanically damaged, and the roller is always in contact with the cam, when not under load.

The switch operation can be simply checked, by observing the LED display when deploying the stabilizers. As an outrigger foot touches the ground and becomes loaded, the appropriate light will change to green. This indicates that the switch contact has operated correctly



If the LED displays green at any other time then the machine must not be operated, until the fault is rectified.



Pin No.	*Ref.*	*Colour*	*Function*
1	L	YELLOW	L.H.INDICATOR
2	54G	BLUE	FOG LIGHT(S)
3	31	WHITE	EARTH
4	R	GREEN	R.H. INDICATOR
5	58R	BROWN	R.H. TAIL & No. PLATE
6	54	RED	STOP LIGHT
7	58L	BLACK	L.H. TAIL & No. PLATE

Bi Fuel Option

This machine variant is fitted with a petrol engine, with remote start and stop.

This manual does not cover the maintenance of the engine.

For engine maintenance details refer to the engine manufacturers handbook.

Prior to operating the engine, follow these simple guidelines;

a) ensure there is adequate fuel for the task in hand
b) check the oil level prior to starting the generator
c) Check battery electrolyte level. (Where applicable, Lead Acid batteries Only)

1. To use the engine, simply switch the fuel on, with the lever.

2. With the key, turn the ignition to start, motor on, releasing the starter when the engine fires.

3. Or, if using the basket controls turn the key to engine and push the start button.

4. With the engine running, It will now be possible to operate the machine Hydraulic controls as long as there is power in the main batteries.

Introduction

The UpRight TL37, is a versatile means of gaining access in difficult locations.

The machine is extremely safe in operation providing that basic rules are observed in setting up the machine. This manual focuses on the Maintenance and repair of the machine. Please read the Operators Manual available from UpRight or from your local distributor prior to operating the machine

All operators and service personnel should have read and understood the Operators manual, and received full training in the safe use of the machine before attempting to use it or carrying out repairs.

Always quote your machine serial number and date of manufacturer when ordering spare parts.

Part number for this manual can be found on the inside front cover.

CONSTRUCTION STANDARDS

The machine complies fully with the requirements of

European Standard EN280 : 2001.
The machine has been independently “Type Approved” and
“CE Marked” by RWTUV Essen

Trailer / Superstructure / Outriggers.

This consists of a variety of welded and folded fabrications, which, where necessary, contain bushed stainless steel pivots with grease nipples. The main components are shot blasted and them powder coated, and the cylinders are wet painted. The machine also includes fully automatic running gear with auto reverse and also integrated trailer lighting. At the towing end of the machine there is a heavy duty coupling head as well as a pneumatic jockey wheel. The maximum allowable load on the outriggers is 10.3kN and the allowable sideway inclination is 5 degrees.

Equipment

Bottom Ram	Double acting: Bore Ø 60.0 mm Rod Ø 40.0 mm
Top Ram	Double acting: Bore Ø 60.0 mm Rod Ø 40.0 mm
Dropnose Ram	Double acting: Bore Ø 60.0 mm Rod Ø 40.0 mm
Stabiliser Ram	Double acting: Bore Ø 70.0 mm Rod Ø 40.0 mm
Basket Levelling Ram	Double acting: Bore Ø 40.0 mm Rod Ø 20.0 mm
Bottom & Top Ram Lock Valves	Pilot operated over centre valves
Control Valve (Cage)	Monoblock unit consisting of five double acting spools
Control Valve (Ground)	Monoblock unit consisting of four double acting spools
Control Valve (Stabiliser)	Monoblock unit consisting of four double acting spools
Bushes	Acetol resin polymer with sintered bronze base (DX)
Pivot Pins	Stainless Steel Bright Bar To Grade BS970 303 S31 CW
Tyres	165R13C 8 Ply

Power Pack (Battery Power or Mains Power).

Fully integrated power pack consisting of Motor, Pump, Relief valve, non return Check, Return filter with dip stick for checking oil level. Pump is fitted with internal suction strainer. Return filter is fitted with a breather and is used for topping up if oil is required. The tank is fitted with a drain plug on the bottom face. A quick release coupling for checking oil pressure is fitted on top of the pressure port.

Power Pack (I.C. Engine).

Engine is fitted with a separate pump. Oil is fed from a separate tank which is fitted with a return filter and dip stick. Return filter is fitted with a breather and is used for topping up if oil is required. The tank is fitted with a drain plug on the bottom face. The relief valve is mounted independently in close proximity to the pump together with a quick release coupling for checking hydraulic pressure

The engine is fitted with electric start with its own independent start battery. The engine can be started from the engine's start / stop key switch and from the remote start / stop push button fitted in the cage.

Safety Systems.

Full fail-safe hydraulic and electrics as required by EN280 and the Machinery Directive.

Outriggers are pressure sensitive to prevent operating the booms until the outriggers are in full contact with the ground. Outrigger condition is monitored constantly and full visual indication is given by 4 independent LED's mounted on the Ground control panel.

It is not possible to raise the outriggers when the booms are extended. In case of power failure all booms can be lowered and the slew operated using a manual hand pump fitted in the cage. From the ground the top and bottom booms can be lowered manually by actuating the manual override valves fitted to the Bottom and Top cylinders. The slew can be operated by manually turning the slew motor shaft.

The machine carries full CE approval by RWTUV, Notified body ref. 0044.
Copy available upon request.

Operating Speeds and Noise Level.

Due to oil viscosity and the fluctuating supply of power on a machine fitted with Batteries and / or a I.C. engine as its power source the following nominal operating speeds are indicated. All speeds have been taken with fully charged batteries and at ambient temperature of +10deg. Significant speed differences will be experienced if operating in cold climates and with batteries in a semi discharged state or if the I.C. engine is poorly maintained. All speeds have been taken from the cage with a SWL of 100Kg. Mains power powered machines have different speeds

Drop Nose up	: 18sec	Drop nose down	: 11sec	+/- 1sec
Bottom Boom up	: 40sec	Bottom Boom down	: 22sec	+/- 5sec
Top Boom up	: 24sec	Top Boom down	: 16sec	+/- 5sec
Slew CW 180deg	39 sec (back)	Slew CCW 180deg	: 39sec	+/- 10sec

Basket rotation, From Lock to Lock (90deg) : 6sec +/- 2sec

Noise Level : 70 db(A) Battery or Mains power 85 db(A) I.C. Engine

Duty Cycles.

The mains power pack and the I.C. Engine are both continuously rated. The I.C. Engine speed is fixed and must not be altered.

Battery.

With well maintained batteries you will be able to get the following operations from one full charge :

10 lift and lowers with a 5 min brake (to simulate working) at full elevation and when back at ground level + 1 Outrigger raise and lower…...repeated 4 times !

This will give the operator under normal circumstances a full days work. You can even connect the charger to the mains supply. Something which will boost the batteries and give you an even longer duty cycle. You can not run the machine directly from the charger, as the current draw from the motor is higher than the output from the charger. The 5 min cooling of the motor is important to prevent motor overload.

It is recommended that fault finding is only carried out by technically competent personnel. Whilst every effort has been made to ensure these procedures are as comprehensive as possible, they will not cover all eventualities.

If difficulty is experienced in identifying a fault, contact UpRight or their local representative.

1. I.C. Engine will not start (if fitted):

A) Fuel in tank?
B) Emergency stops are reset (cage & ground controls).
C) Engine Ignition switched on
D) Start Battery correctly charged
E) If engine is cold, has choke been applied (manual) Does the choke pull in (electric).
F) Check engine blade fuse (next to engine)

2. DC motor not turning when trying to lower outriggers:

A) Key selector switch must be on ground.
B) Can you hear contactor on motor clicking ?
C) Check battery level / Should be minimum 2/3 charged
D) Check motor contactor.
E) Check motor brushes.
F) Motor fuse
G) Check that the emergency stop button has not been activated.

3. DC motor turning but not able to operate outriggers:

A) Top boom must be down and boom switch (under top boom, above slew post) activated
B) Limitswitch arm must be secure on switch spindle (boom switch)
C) Check that diverter valve is de-activated (see hydraulic circuit)
D) Check hydraulic pressure / No pressure - Check pump.

4. DC motor not turning - After having lowered all outriggers

A) Check key selector switch
B) Check that no emergency stop button has accidentally been activated.
C) Check outrigger switches - Outriggers must be correctly set.
D) Is audible warning in cage “ON” ? - If yes - Check outrigger switches.
E) Check 2 - . B), C), D), E).

5. Boom will not raise / lower when control lever is operated and DC motor running

A) Correct control station selected, ie ground/platform.
B) Check oil level.
C) Check that diverter valve is activated (see hydraulic diagram)
D) Check that other control valve has all spools in centre position
E) Check hydraulic pressure / No pressure - Check pump
F) Check that emergency lowering valve is not open (on cylinder)
Check for obstructions.

6. Audible alarm activated - No boom movements

A) You have a light leg. Check level and Limit switch on outriggers

7. Slew will not operate in either direction with DC motor turning

A) Check that appropriate control station has been selected,
B) Check that machine is on level ground. Slew will not operate if machine is out of level.
C) Check for obstructions
D) Check that you have not reach the slew stop. 2002 machine specifications will only slew +/-355 deg from the stowed position. Earlier machine would slew +/- 450 deg from the stowed position.

8. Loss of movement on Mains powered machines or I.C. engine powered machines

A) Check dump valve. To enable movement the dump valve must pull in to stop oil going to tank
B) Check oil pressure.
C) Check pump and coupling

9. If Mains motor / I.C. engine stalls when trying to operate machine

A) Check relief valve setting

10. If Mains motor stalls when operating machine

A) Check for voltage drop.
B) Use shorter extension lead
C) DO NOT RUN MACHINE - Motor will fail if voltage reading on motor terminals are below 10% of motor rating when motor is running under load.

11. RCD on mains powered machines keeps tripping

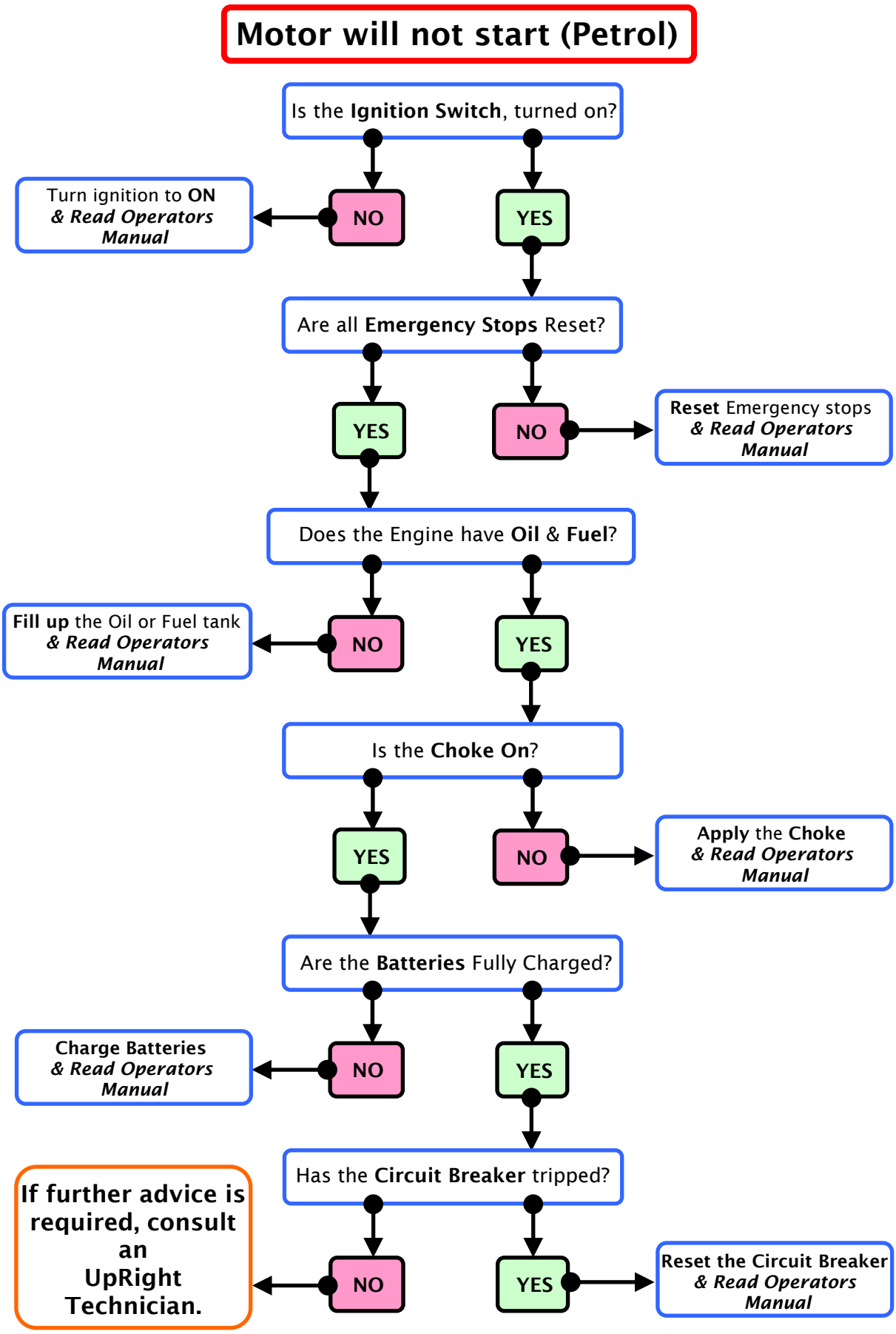
A) Check for water ingress in terminal boxes.
B) Check motor Start & Run capacitors.

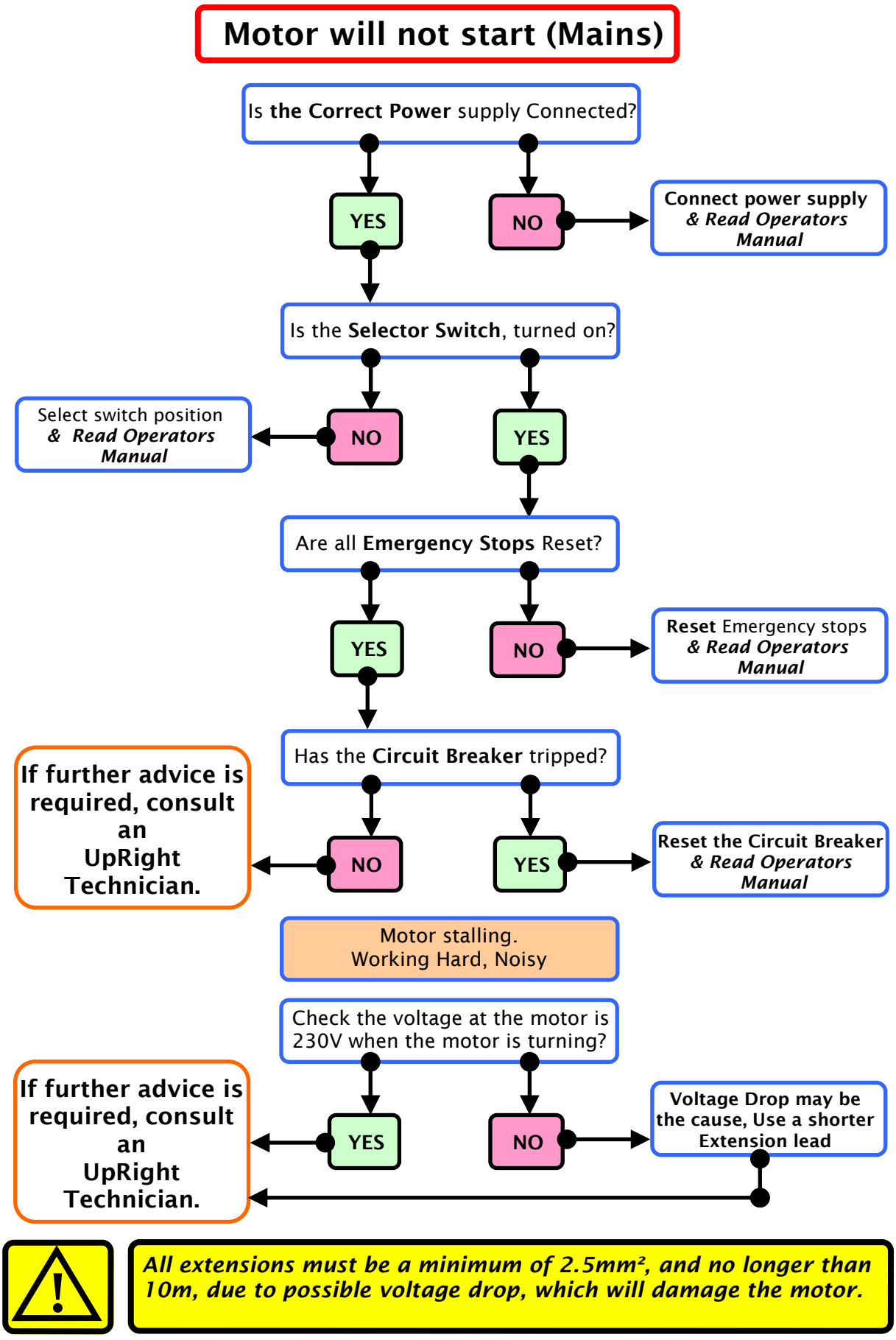
12. 0.5A fuse on control circuit keeps popping (Mains Powered Machines) .

A) Check coil on selector valve and dump valve for cracks/signs of water damage.

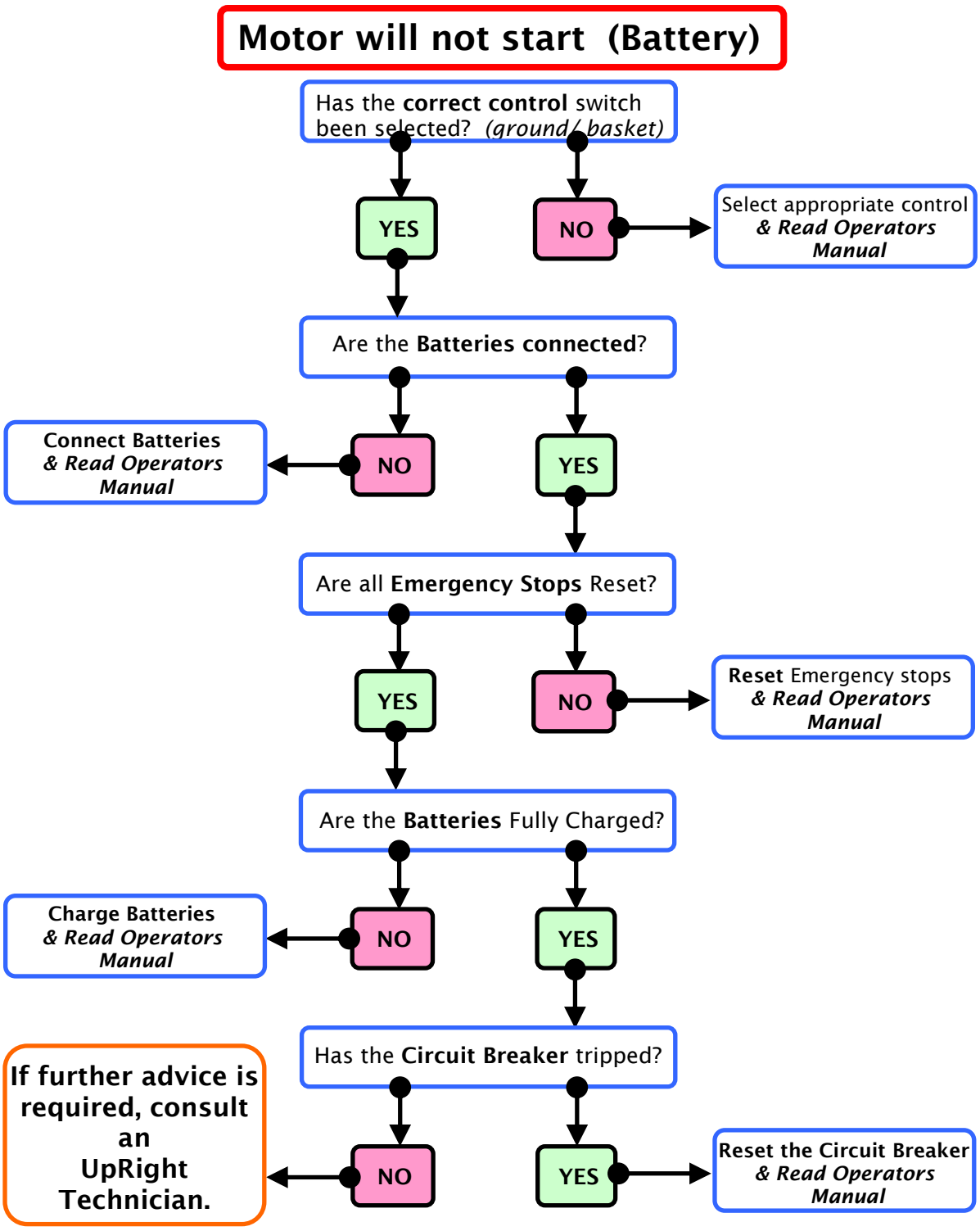
13. Burnt out mains isolating transformer (Mains Powered Machines)

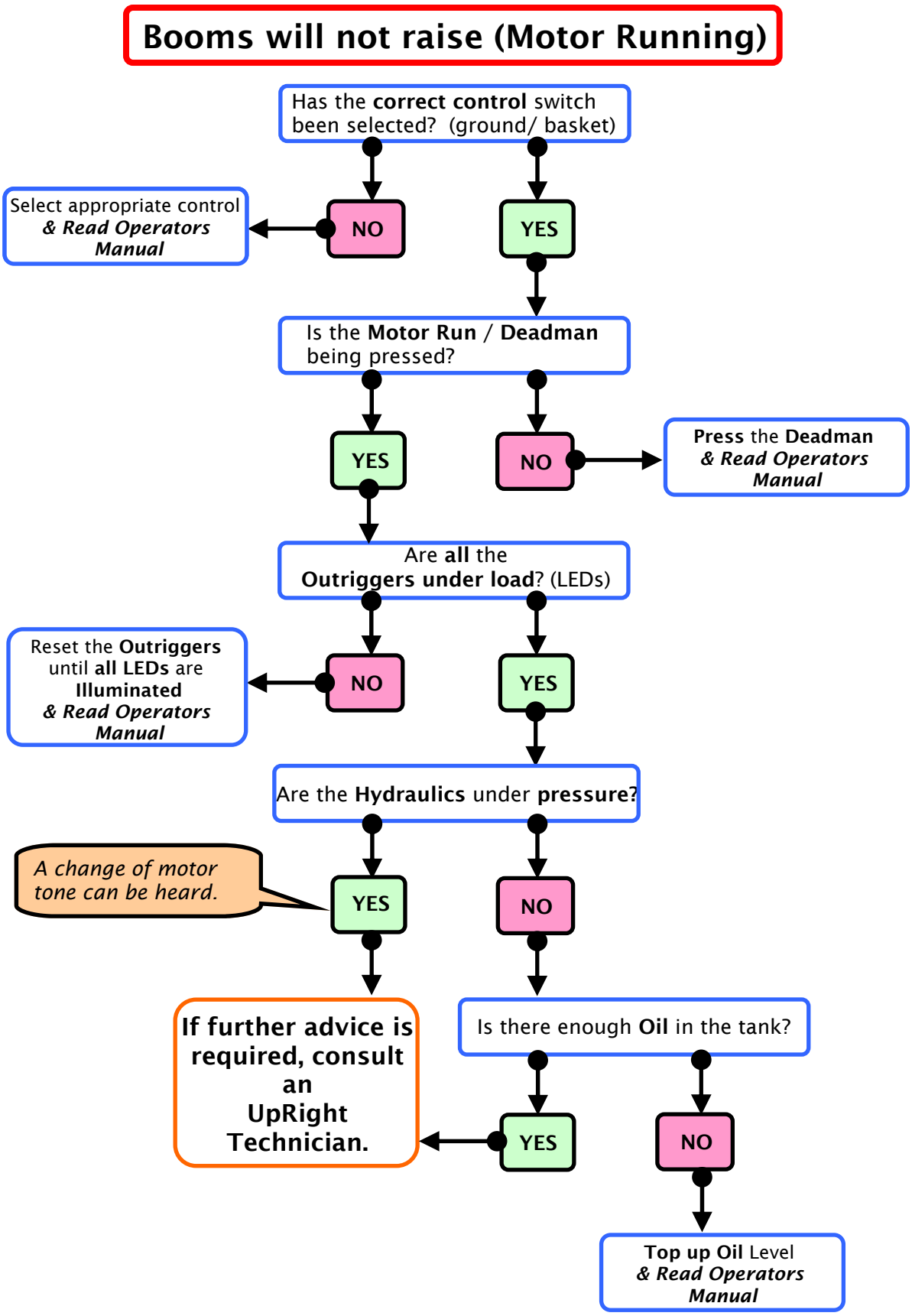
A) Check fuse.
B) Check coil on selector valve and dump valve for cracks/signs of water damage.


Motor will not start (Petrol)
Is the Ignition Switch, turned on?
NO
Turn ignition to ON & Read Operators Manual
YES
Are all Emergency Stops Reset?
YES
NO
Reset Emergency stops & Read Operators Manual
Does the Engine have Oil & Fuel?
NO
Fill up the Oil or Fuel tank & Read Operators Manual
YES
Is the Choke On?
YES
NO
Apply the Choke & Read Operators Manual
Are the Batteries Fully Charged?
NO
Charge Batteries & Read Operators Manual
YES
Has the Circuit Breaker tripped?
If further advice is required, consult an UpRight Technician.
NO
YES
Reset the Circuit Breaker & Read Operators Manual

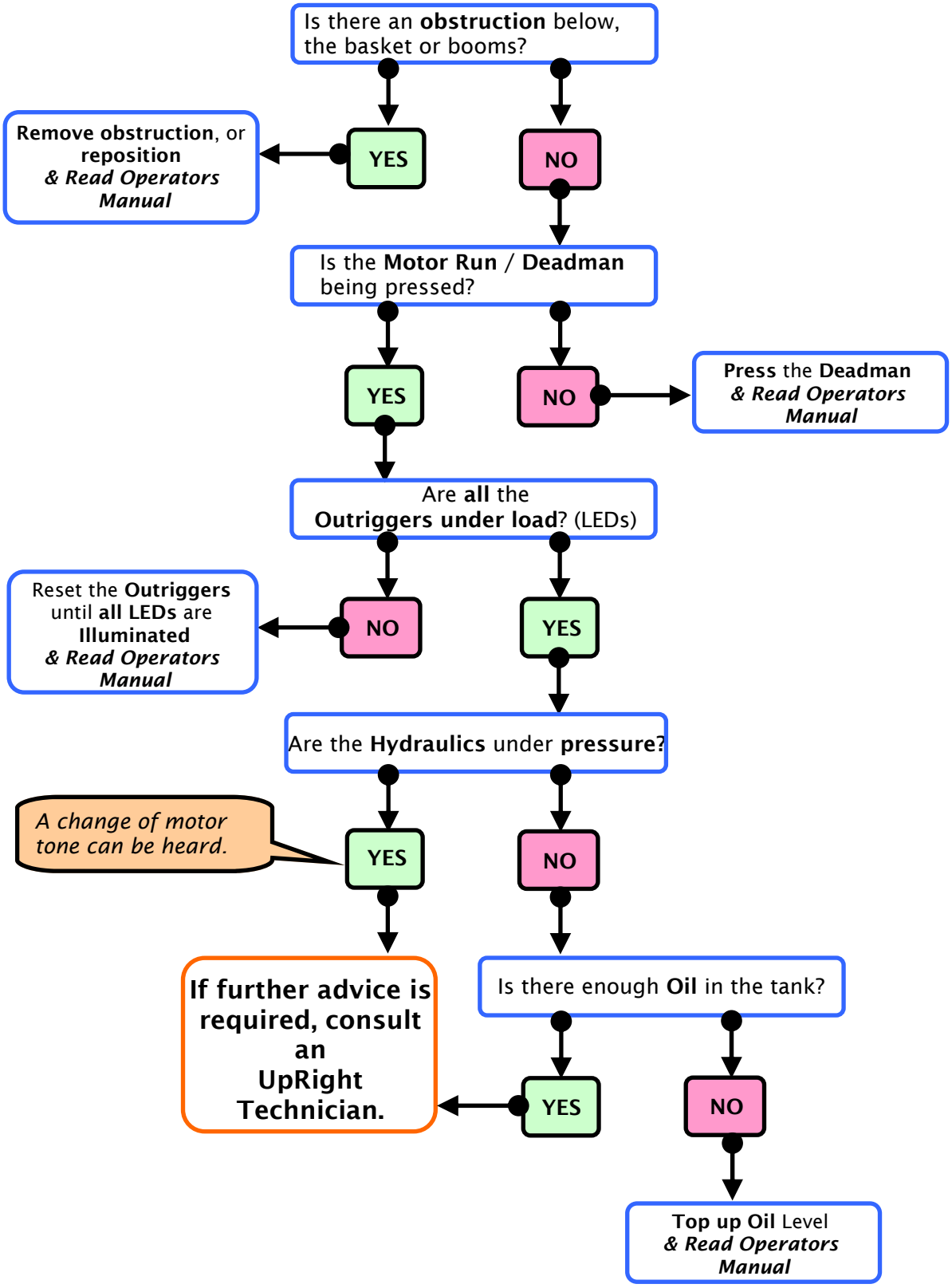


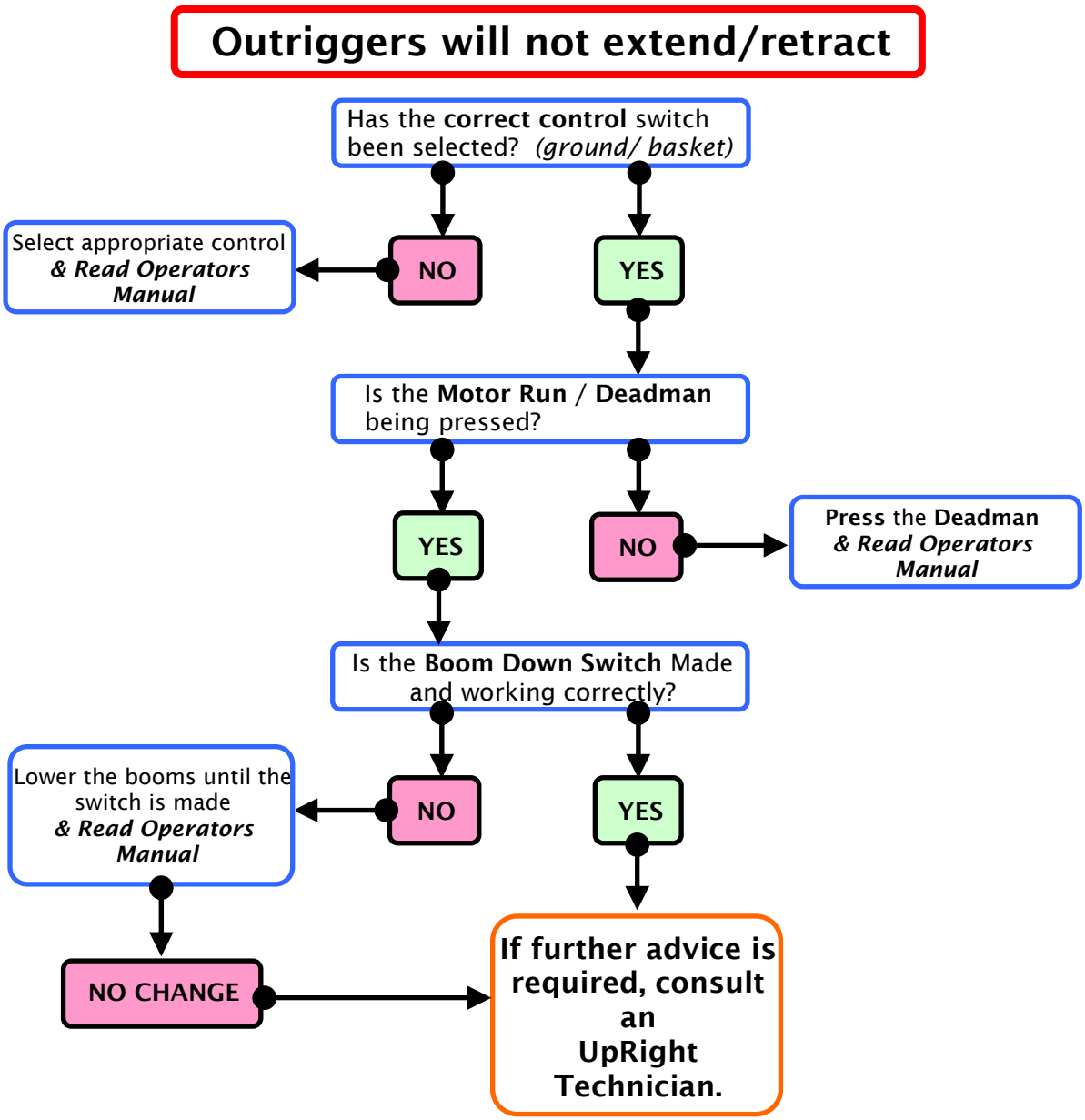
All extensions must be a minimum of 2.5mm², and no longer than 10m, due to possible voltage drop, which will damage the motor.


Motor will not start (Battery)
Has the correct control switch been selected? (ground/ basket)
YES
NO
Select appropriate control & Read Operators Manual
Are the Batteries connected?
Connect Batteries & Read Operators Manual
NO
YES
Are all Emergency Stops Reset?
YES
NO
Reset Emergency stops & Read Operators Manual
Are the Batteries Fully Charged?
Charge Batteries & Read Operators Manual
NO
YES
Has the Circuit Breaker tripped?
If further advice is required, consult an UpRight Technician.
NO
YES
Reset the Circuit Breaker & Read Operators Manual

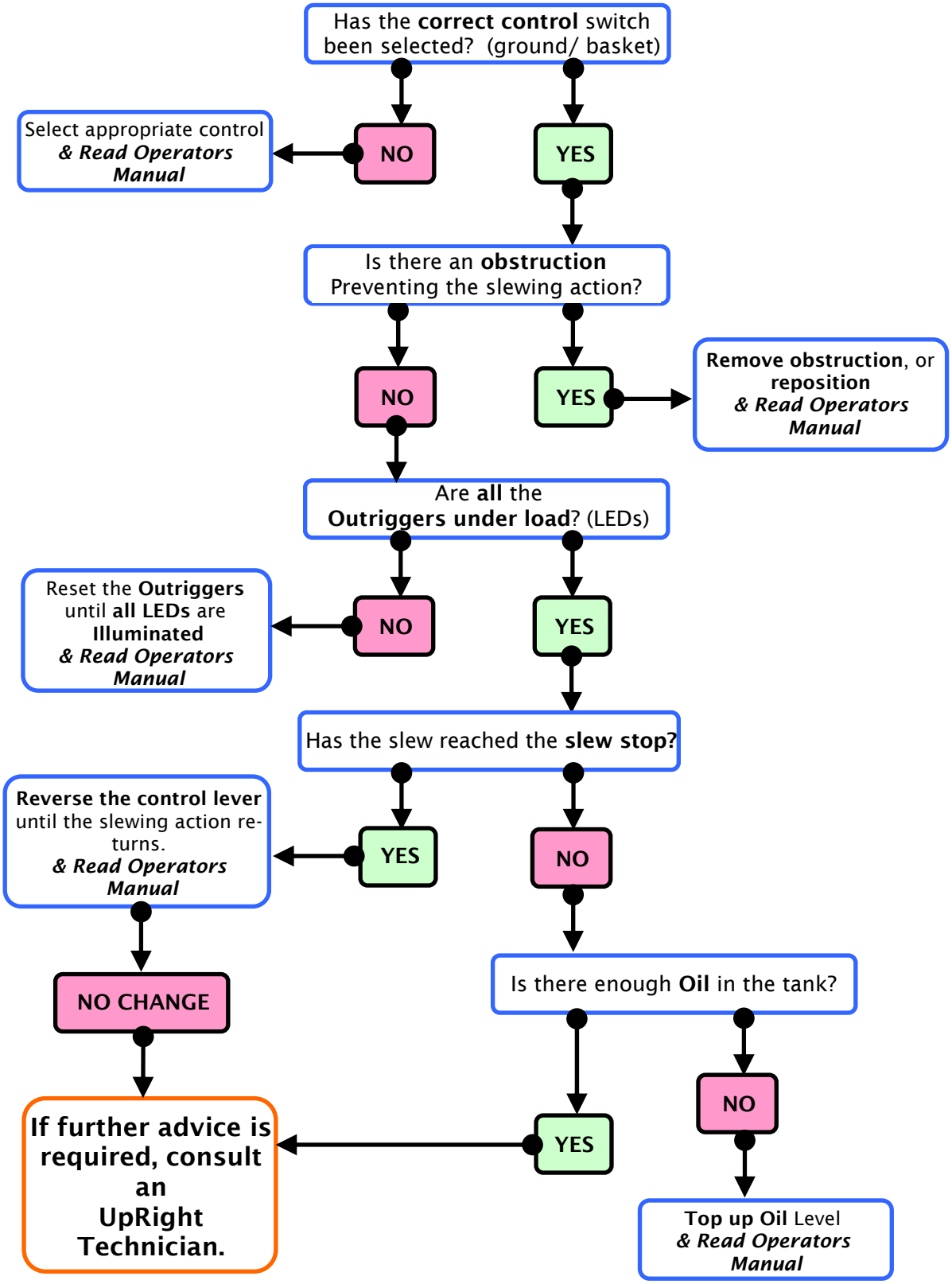

Booms will not raise (Motor Running)
Has the correct control switch been selected? (ground/ basket)
NO
YES
Select appropriate control & Read Operators Manual
Is the Motor Run / Deadman being pressed?
YES
NO
Press the Deadman & Read Operators Manual
Are all the Outriggers under load? (LEDs)
NO
YES
Reset the Outriggers until all LEDs are Illuminated & Read Operators Manual
Are the Hydraulics under pressure?
A change of motor tone can be heard.
YES
NO
If further advice is required, consult an UpRight Technician.
Is there enough Oil in the tank?
YES
NO
Top up Oil Level & Read Operators Manual

Booms will not lower (Motor Running)




Outriggers will not extend/retract
Has the **correct control** switch been selected? *(ground/ basket)*
NO
YES
Select appropriate control *& Read Operators Manual*
Is the **Motor Run** / **Deadman** being pressed?
YES
NO
Press the **Deadman** *& Read Operators Manual*
Is the **Boom Down Switch** Made and working correctly?
NO
YES
Lower the booms until the switch is made *& Read Operators Manual*
NO CHANGE
If further advice is required, consult an UpRight Technician.

Slew will not operate (Motor Running)



MAINTENANCE SCHEDULE

Maintenance.

General - A well maintained machine will give years of trouble free operation. The machine requires very little maintenance. The biggest problem is operators not looking after the machine and physically damaging the structure or its individual components during use or when being towed on the road.

Note - All machines being operated in the UK must have a thorough inspection carried out every 6 months in accordance with LOLER Regulations 1998 and a Certificate of Thorough Inspection produced by a competent person. Contact UpRight Group for further details.

Operators Responsibility - It is the operator's responsibility to ensure that the machine is safe to use. To do so, he must carry out all the Daily checks prior to using the machine. From a pure maintenance point of view only the Weekly & 6 monthly maintenance requirement is required. Obviously when the engineer is working on the machine he now becomes the operator and must carry out the Daily checks.

Maintenance Schedule—What is shown here is very much worst case scenario covering most eventualities. If further advice is needed contact UpRight or its local representative.

The reference number shown on the far left hand side of the table refers to the relevant Maintenance Procedure Sheet in this manual. If this manual was not issued with the machine, check for updates and revisions from UpRight or its local representative.

- IMPORTANT -

Always ensure the machine is in good, sound, undamaged condition. When carrying out maintenance and repairs always clean the machine thoroughly. Take care not to steam clean the batteries or the electrical components.

Failure to maintain the machine as specified will invalidate your warranty.

SECTION	DAILY CHECKS	ACTION	NOTES
1	Hydraulic System	Top up with machine standing on level ground in the travelling position. Fill oil using the return line filter on top of the tank. Oil must be at the bottom mark on the dipstick. Look for oil leaks.	Use SHF22 oil or equivalent. Change oil and filter every 6 months
2	I.C. Engine	Check oil, filter and fuel. Check for leaks. Check battery. Top up with distilled water only. 6 mm above plates.	See OEM manual for more information
3	Level Gauge	Check that level gauge is present and secure	
4	Physical damage	Check for physical damage to the booms, tie bars, basket, slew and the chassis. Check all warning labels are in place	Do not use damaged machine
5	Nuts, Bolts, Fittings	Check for missing and loose nut and bolts.	Replace immediately
6	Locking pegs	Check that all locking pegs are present. Check that no shafts are seized.	Broken peg = seized shaft
7	Transport locks & Lifting points	Check that all transport lock pins are present. Check for damaged lifting points	Do not transport machine without locking pin.
8	Battery & Charging	If fitted. Check operation of charger. Record specific gravity of each cell. Clean top of battery. Clean and check terminal	
9	Emergency stop	Check that all emergency stop switches are working	Turn to release
10	Electrical system	Check for correct operation of the complete electrical system	
11	Electrical Safety system	Check that you can not operate the booms until outriggers are down and in contact with ground. Check that you can not raise the outriggers with top or bottom boom elevated.	
1	Hydraulic Safety system	Check that all emergency lowering valves work. Check emergency slew. Check emergency handpump	
12	Wheels	Check tyres for damage. Wheel nuts and tyre pressure	55PSI 3.8 Bar
13	Running gear	Check parking brake. Check overrun device. Check for damage	
14	Trailer lights	Check for correct operation if towing	
	WEEKLY CHECKS	Depending on use and operating condition different intervals may be acceptable	
15	Lubrication	All grease nipples. Depending on machine use and operating condition different intervals may be acceptable.	
16	Slew Gear	Check slew gear for excessive wear. Grease	
	MONTHLY CHECKS	Can be done 6 monthly depending on operating conditions	
1	DC motor	Check and replace motor brushes if machine is used heavily	2/3 worn = Replace
13	Wheel bearings	Check for wear - Do checks at every 3000 miles	
	6 MONTHLY CHECKS		
16	Thorough Inspection	Contact UpRight or its local representative.	Change oil and filter !

Power Pack.

The hydraulic system is fully self contained. Oil tank capacity is 15 Litres. When operating above 0C we recommend using ISO22 Grade Hydraulic Mineral Oil (See Health & Safety guidelines supplied with the oil prior to handling).

Replace oil and filter every 6 months. The biggest cause of hydraulic problem, sticking valves, leaking cylinders etc.. are due to contaminated oil. There is no need to replace the oil in the hoses. Just replace the oil in the tank.

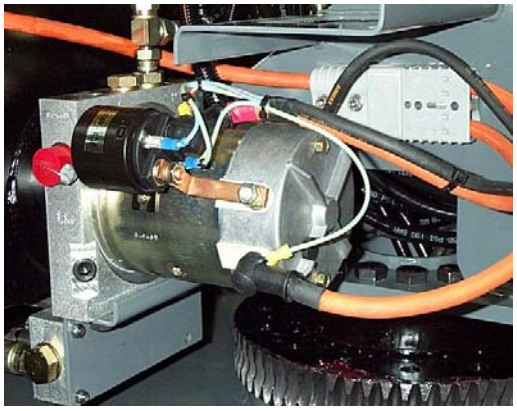
The return line filter doubles as the oil filler cap. No oil is used by the system so if oil is required this would indicate an oil leak which must be investigated prior to using the machine.

Correct Oil Level.

It is critical that the correct oil level is maintained. Too little oil will cause cavitation and failure of the pump. Too much oil will lead to oil leak through the return filter breather or a massive oil leak when using the emergency lower valves on the top and bottom boom. The rams are double acting. When using the emergency lower valves you require free space in the tank to accommodate oil which normally would be pumped into the annular side of the cylinder. If this should happen, just clean up the oil spillage. Fully extend ALL rams. Then close up all rams and check the free space in the tank using the dip stick. Oil must be at the bottom mark on the dipstick to ensure correct level.

DC Motor & Pump.

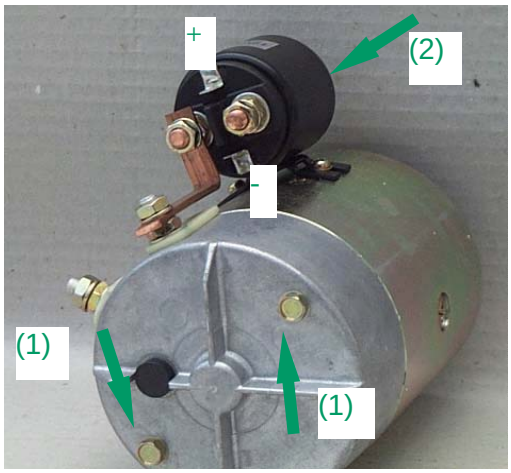
The hydraulic pump is submerged in the tank. Oil is drawn in through a suction strainer protecting the pump. The DC motor (shown) is directly coupled to the pump shaft. On AC motor a small adapter coupling is used between the motor and pump shaft. To replace the pump the tank must be removed. Remove the power pack from the machine. The tank is secured with 4 bolt. Remove the tank. The pump is bolted to the aluminium block containing the relief valve (Hidden under the red cap shown here - Relief valve is factory set to 210Bar). Remove the 4 fixing bolts securing the pump.



When the pump has been removed it can be split and the gears can be inspected for wear. If the gears are worn (or broken) we recommend replacing the complete pump. The replacement pump is complete with gears, front and back plate all ready to bolt on in place of the old unit (strainer is not included). Before fitting the pump, apply a liberal amount of clean hydraulic oil to the gears. Take great care to torque the 4 - 5/16 Hex fixing bolts evenly to 13 ft/lbs to ensure correct operation of the pump. **DO NOT OVERTIGHTEN**. Before fitting the tank. Thoroughly clean the tank and the magnet you will find inside the tank. De-grease, replace the large "O" ring and apply a small amount of silicone around the circumference of the de-greased tank neck. Push the tank back on and secure with the 4 bolts removed earlier .

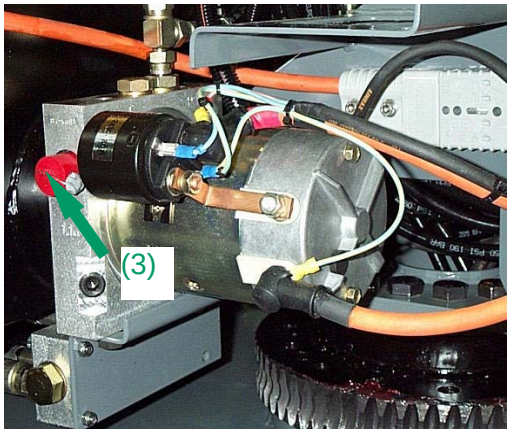
DC Motor.

DC motor - The DC motor can be removed without worrying about oil spillage. Just remove the 2 long bolts (1) at the end of the motor. You can now withdraw the motor. Take care not to strain the wires.



To ensure optimum performance from the DC motor we recommend replacing the motor brushes when they are 2/3 worn. If the machine is used extensively (quite normal in a hire environment) this can be required at least every 6 months. To replace the brushes, fully remove the motor from the power pack. Blow out all the brush dust using compressed air before reassembling the motor.

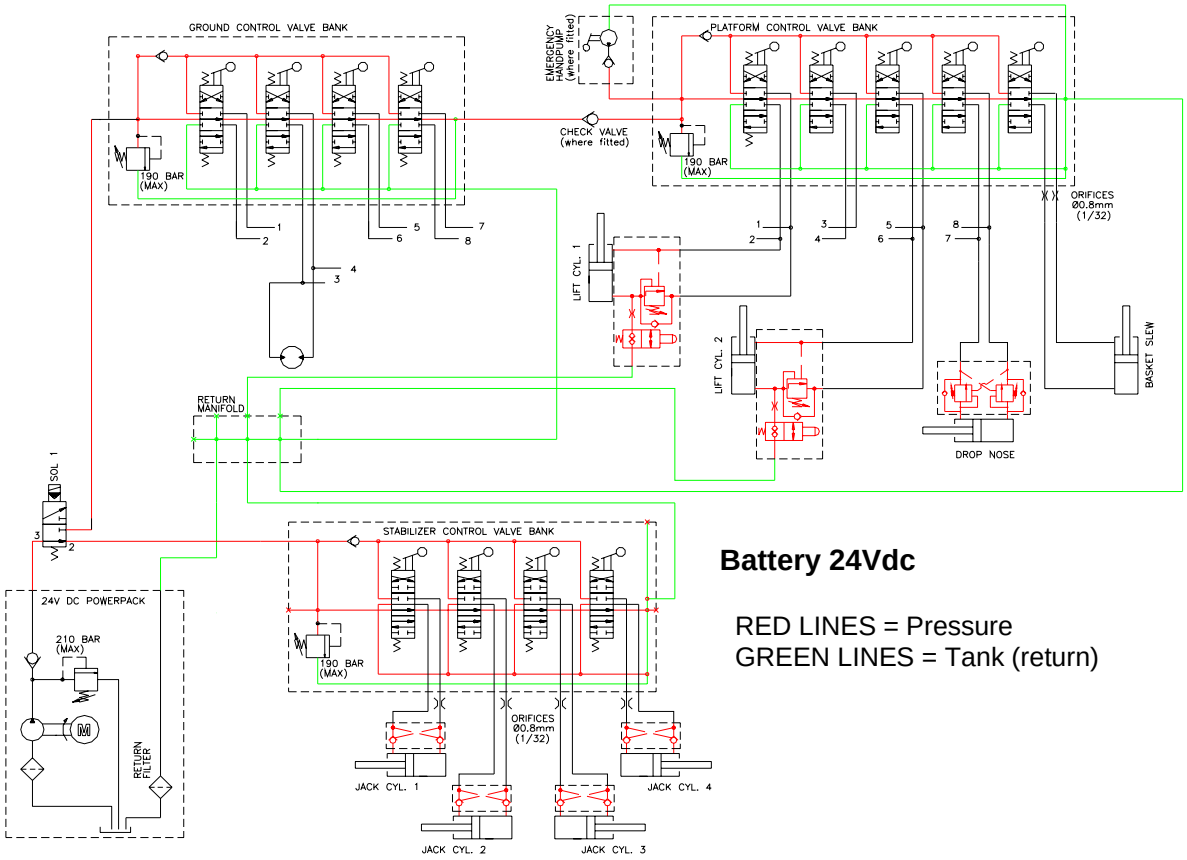
Check the motor shaft bearing and replace if worn. We also recommend replacing the contactor at the same time as replacing the brushes. The unit is fully sealed (to prevent sparks igniting battery gases) and contain no serviceable parts.



If the motor is not stopping when the green motor run button is released and no power is at the contactor coil. Replace contactor immediately. To stop the motor in this case. Use the battery disconnect plug or lightly tap the contactor on its end (2) with the handle of a large screw driver to free the internal contact points

IMPORTANT

The main relief valve is factory set at 210 bar and should normally not need adjusting. Breaking the seal (3) during the warranty period, for whatever reason, will invalidate the warranty.



Power Pack

Fully integrated pump, tank, preset relief valve and return filter. The biggest cause of hydraulic problems is down to contaminated oil. Change oil and filter at least every 6 months, even though the hydraulic system is a closed system. The only access for external dirt is through the filter breather. You will have contamination due to seal kit wear (black sludge in the bottom of the tank, mechanical wear from the gear pump, valve block and cartridges in addition to water contamination due to tank condensation. See power pack section for more details.

SOL1

This valve diverts oil from the outrigger control valve first to the ground control valve and then to the basket control valve. Never operate the coil unless it is on the valve cartridge. You risk burning out the coil.

Ground Control Valve

This gives you full control over all functions apart from the basket slew. The adjustable relief valve is set at the factory to approximately 190 bar. It should be set so that when you lift the bottom boom from rest you can just lift the full safe working load (SWL). The centre position is closed to prevent oil back feeding and running back to tank when operating the basket controls.

Slew Motor

The slew motor is bolted directly on the slew gear. Apart from greasing and checking for oil leaks it requires no maintenance.

Platform Controls
Is identical to the ground control apart from the extra valve bank needed to control the slewing basket ram. The orifice in the Basket slew fitting is there to prevent the basket turning too quickly.

Hand Pump
Enables you to lower and operate the slew in case of emergency. The pump is fed from the general return line. It is theoretically possible to extend the cylinder with the hand pump but the force required is excessive and the fixing bracket for the hand pump is not designed to take such a load. If no resistance is felt when operating the hand pump try to operate the basket slew or the drop nose to prime the pump.

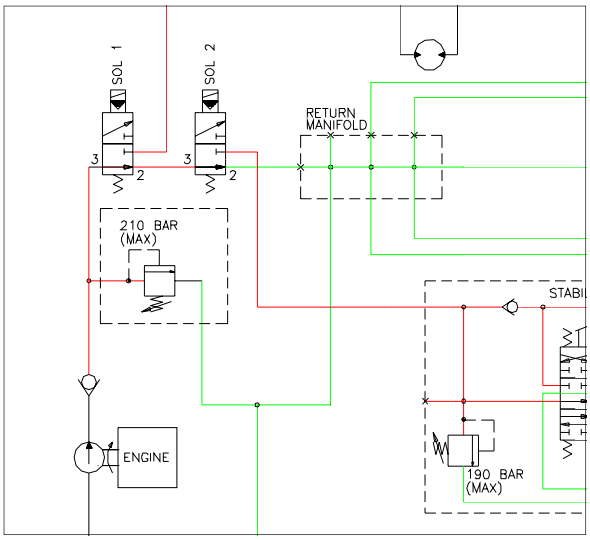
Basket Slew
Cylinder has no lock valve. It relies on the closed centre of the spool to prevent it moving.

All Other Boom Cylinders
Have lock valves fitted to prevent uncontrolled movement in case of hose failure.

Stabiliser Control Valve
In the centre position, this block has the B port connected to the tank. This is to ensure that the outrigger cylinder check valve closes quickly when setting up the machine. The 4 restrictors shown are there to prevent cylinder juddering caused by the check valves fitted to the outrigger cylinders.

Read this in conjunction with the description of the hydraulic circuit (31HC20A) for the Battery 24VDC powered machine.

The TL37 can be fitted with a variety of power options. The battery powered machine has only one solenoid valve fitted (SOL1). Both the I.C. engine and the mains powered version have a separate dump valve fitted (SOL2). This is because oil is in circulation all the time, not only just when a cylinder movement is required as on the battery version. Having oil circulating through the different valve blocks may lead to uncontrolled movements should the controls accidentally be operated. By fitting a dump valve the oil will always go to tank unless the dump valve is activated.



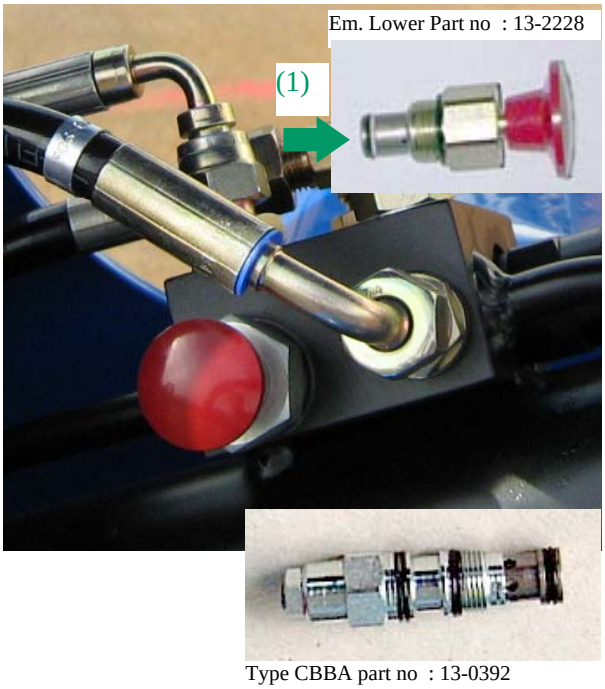
See the relevant circuit diagram for your machine at the end of this handbook or contact UpRight or its local representative for further information if required

TOP & BOTTOM RAM

Each ram is fitted with a manual release to enable lowering of the boom in case of emergency. Depress the red button and hold. When released, the red button will spring out and the movement should stop.

If the cylinder is operating erratically - Jamming at odd intervals with the motor running. - Check that the little restrictor disc (1) fitted at the nose of the cartridge has not come loose. The disc is held in pace with a small circlip. Replace cartridge.

The O/C valve enables the oil to flow freely into the cylinder but will not let any oil flow out until a pilot signal is received when pumping oil into the annular side of the ram. The O/C valve will then open up and let oil flow out, in a controlled manner, to prevent boom juddering.



Type CBBA part no : 13-0392

The O/C valve is also fitted with an adjustable relief valve which must be set to 1.25 times the maximum pressure inside the cylinder. If the cartridge is marked with CBBA you screw the adjusting screw CCW to increase pressure. If screwed fully CW the cartridge is now fully open and does not hold any load. The O/C valve must be set correctly to ensure safe operation.

TOP & BOTTOM RAM continued

Ram not holding under load.

When you let go of the controls the cylinder movement must stop.

We do not advise that a machine is left extended unattended for any great length of time (over night etc.) It is normal to expect some slight creep over time, but during normal operating conditions the ram should hold the load and not move once the lock valve cartridge has closed. (This may take up to 1-2 sec after the directional valve has been returned to the centre position. The pilot pressure holding the valve open must be allowed to drain back to tank to allow the lock valve to seat fully).

When a cylinder is not holding you must decide which part has failed.

- Cylinder Piston Seal
- O/C valve (or check valve)
- Emergency Lowering cartridge (if fitted)

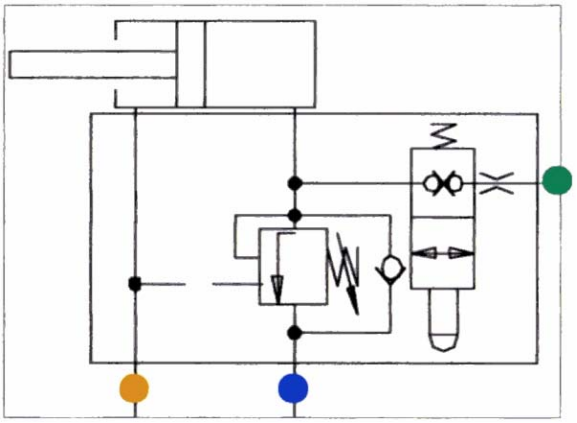
The best and quickest way of establishing this are by removing all hoses (carefully) to see where oil is leaking out.

If oil is coming out from :

- The Emergency lowering cartridge is faulty. Clean or replace

- The O/C (or check valve) is faulty. Clean, adjust relief valve or replace (Note that check valves are non adjustable and can only be cleaned or replaced)

- Replace the Piston seal kit. Oil is passing the piston and escaping out of the annular port which have no lock valve fitted



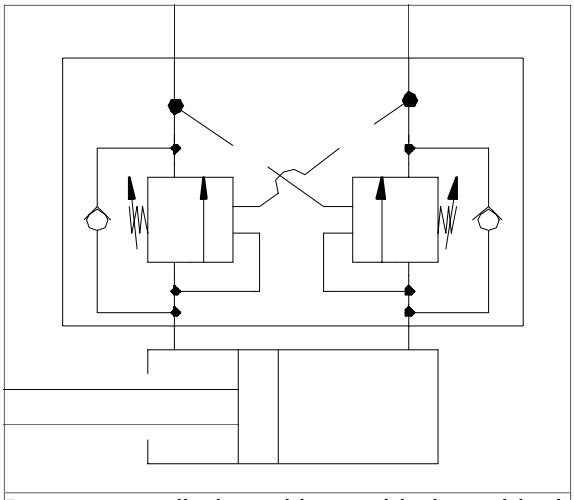
For clarity the drawing shows only one hose to each service. In reality you have two hoses, one for the Cage controls and one for the ground controls. It is only the emergency lower which has one hose.

DROPNOSE RAM

Is fitted with two O/C valves. You have two things you can try to help you to decide which component has failed :

First remove all hoses (take care) so you can see where oil is escaping

- If the oil is escaping from the full bore side the full bore O/C valve is the problem.
- Slowly open the adjusting screw for the O/C relief valve on the annular side. The piston seals have failed if oil starts to come out from the annular side and the cylinder is starting to close up at an increased speed, replace the piston seals



Dropnose cylinder with welded on block containing two adjustable O/C valves

OUTRIGGER RAM

Is fitted with two check valves. They have no adjustment.

If the outrigger is not holding under load it is most likely that the check valve for the full bore side is leaking.

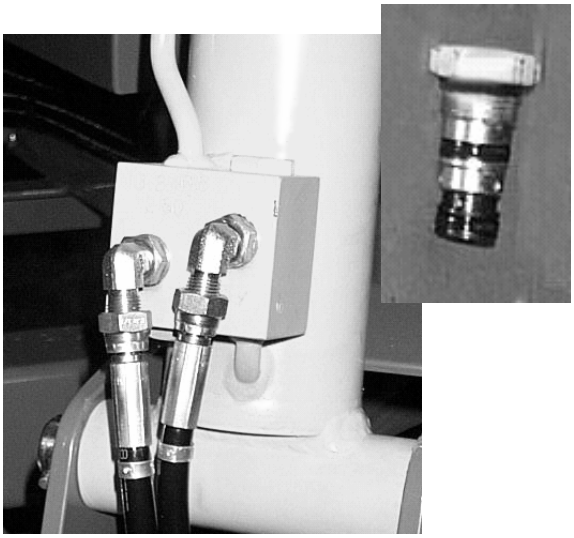
The check valves are difficult to get to as the block is well protected from falling objects by being tucked well away on the underside of the ram. You have to remove the rod pin from the outrigger when the outrigger is retracted.

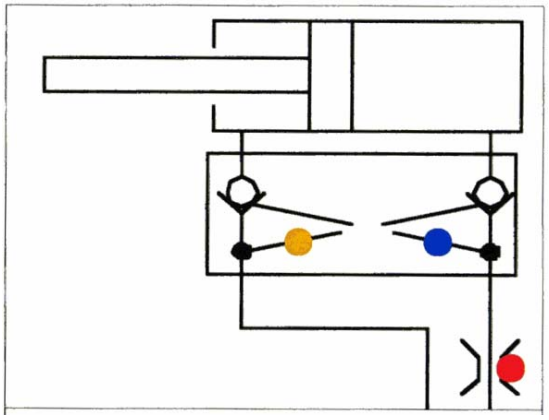
You can now swing down the outrigger to free the cylinder.

Both check valves are identical. You can swap them over to see if the cylinder stop moving.

Remember the • full bore check ensures that the outrigger stays down when you are up in the air working. The annular • side check ensures that the outrigger remains vertical when you are towing the machine down the road.

The • restrictor is critical to prevent the outrigger juddering when raising the outrigger to the transport position. Do not replace with a non restricted hose adapter.





Outrigger cylinder with welded on block containing the two check valves. The restrictor shown is the hose adapter fitted in the outrigger control valve

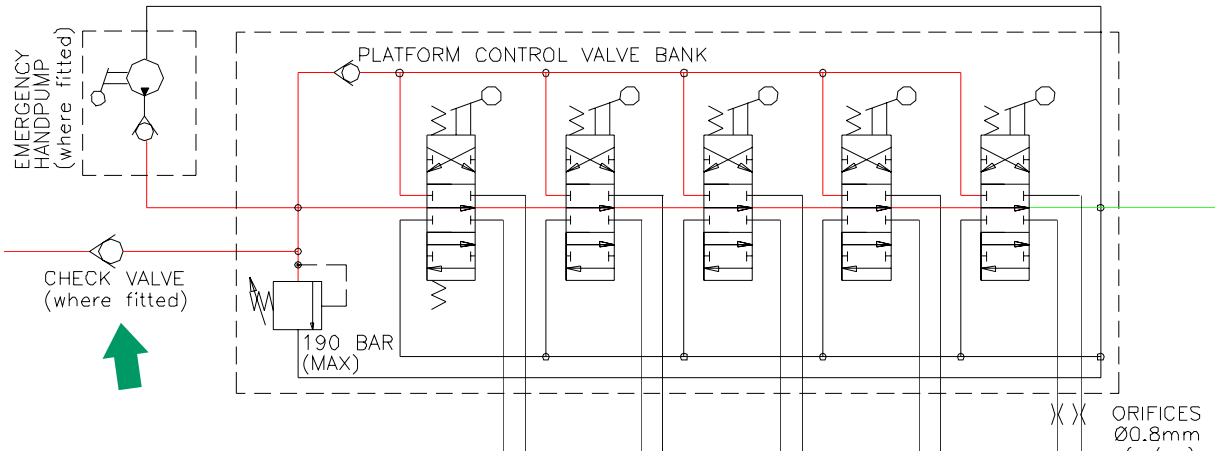
CONTROL VALVE - CAGE

Is shown on the diagram below with the manual hand pump on the left hand side.

Below the handpump is the inline check valve which prevents the oil going back down the pressure line when operating the hand pump.

The relief valve shown here is set at 190 Bar and should be adjusted in accordance with the setting up procedure. Shown elsewhere, see section :

The relief valve can be seen on the picture insert in the bottom right hand corner. Remove cap and screw adjusting screw in to increase pressure and out to decrease pressure. Put cap back after adjusting



The spools are all the same. They are all closed centre in the neutral position. It is critical that the valve block does not leak internally when in the neutral position. Remember you have two valve blocks. Each is connected together at the lift cylinders. If the Ground valve is not leak free, with the spool in the neutral position, when operating the Cage valve, the oil will not go into the cylinder but leak out (internally) through the Ground valve. This can also happen if the spool is not properly centralised by the spring at the end of the spool.

The same thing is true if you operate the Ground controls and the Cage valve is leaking internally.

The normal symptom for this problem is when the operator reports that *"everything works fine from the ground controls but when operating from the cage, boom x does not move. Motor runs but nothing happens."* In this case the valve which makes the boom work correctly is in fact the valve which is at fault!

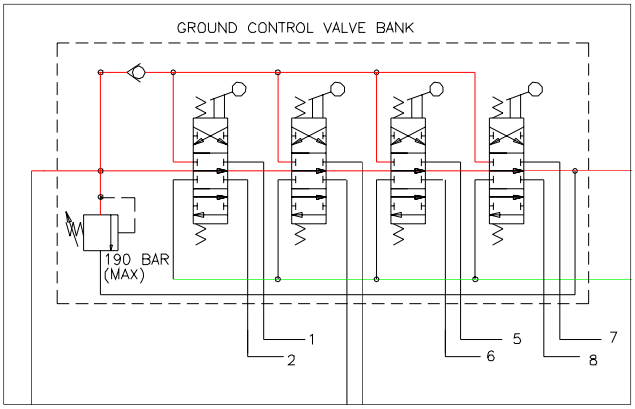
CONTROL VALVE - GROUND

Is identical to the cage control valve apart from the following:

- Only 4 sections. You are not able to operate the slewing basket from the ground. The slewing basket is the last spool shown on the cage valve drawing with the two restrictors.

- A high pressure carry over plug has been fitted to the ground control valve to allow oil under full system pressure to pass through it. Without the internal plug you will not be able to operate the basket valve as all oil would go directly back to tank.

If you have to replace the ground control valve make sure the carry over plug is fitted. The plug is inside the valve, under the fitting for the return line. Shine a light down the port and you will see the Allen head grub screw. If it is not there, use the grub screw fitted to the valve you are replacing.



If you ever experience an oil leak from the valve block it is most likely to be from the end cap.

Either the end where the lever is or at the opposite end where the return spring is. Never fully withdraw the spool just push it out opposite to where the leak is coming from sufficient to clear the “O” ring which you now can pry out with a small screw driver. Put plenty of grease and keep well lubricated when pushing the spool back in.

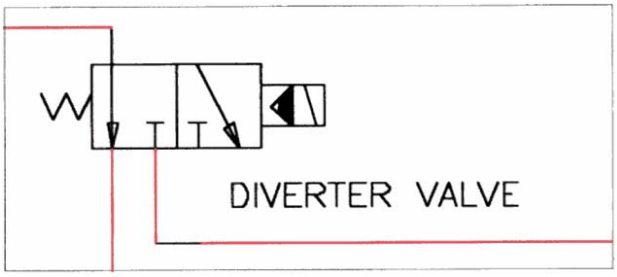
If the spool is not centring check that the return spring and the end cap is well secured.

DIVERTER VALVE

When not activated (no power on the coil) The oil will flow as indicated by the symbols left hand side.

When activated the oil will flow as shown on the right hand side.

When you look at the complete circuit you will see that with no power on the coil., oil will flow to the outrigger control valve. Activate the valve and oil flows to the ground control valve. If you do not get full flow, or you get a high pressure drop over the valve, you may have a sticking valve . Remove the cartridge form the aluminium body and clean. Also look for contamination in the valve or the valve cavity.



To check that power is reaching the coil you can hold a screwdriver against the end of the coil. When the coil is activated you will feel a strong magnetic force pulling the screwdriver towards the nut securing the coil to the cartridge.

Do not use great force when securing the coil to the cartridge as the casing can easily crack due to thermal expansion when it is heated up during use.

The coil will fail if water gets in through the crack.

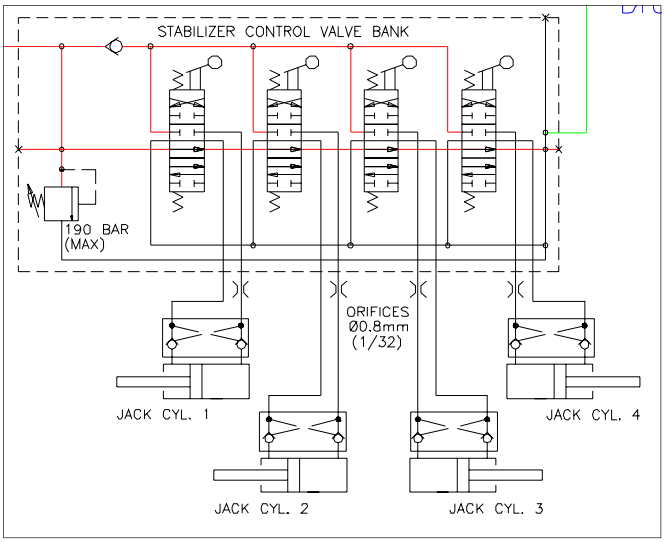
OUTRIGGER CONTROL VALVE

This valve is not interchangeable with the ground control valve even though it is a 4 bank valve block with a relief valve and looks identical to the ground controls.

When the spool is in the neutral position the annular side of the ram is attached to the tank line. This is done to ensure that the pilot pressure holding the check valve on the full bore open, is drained off quickly to tank so that the check valve close quickly

If the valve block is replaced make sure that the piping is done exactly as shown. You rely on the closed port as your back up for the check on the full bore side.

Some early version did not have this type of spool. This type can easily be identified as it has Din-Oil stamped on the end cap. This type used a standard closed centre valve block. The leakage rate across the closed centre spool was high enough to ensure that the check would close



Each A port has a restrictive hose adapter fitted in the valve block. If the restrictor gets blocked you will not be able to operate the cylinder correctly.

When looking for a fault relating to cylinders and valve blocks - swapping hose connection can easily give a good pointer to where the fault is. If the fault stays put, you know that the fault is in the valve block. If the fault moves you know it is the cylinder. Do not over tighten the hose fitting. You are more likely to cause a leak by deforming the adapter cone than leaving the fitting to loose.

RESTRICTORS

You have seen that all valve blocks have restrictors fitted at different locations. The most common version on the current versions (2002) of the TL37 uses a hose adapter with a drilled hole. Other types which have been in use (and still are on other machines) is a simple copper washer with a sized hole. The copper washer is squashed between the hose fitting and the adapter screwed into the valve block.

It is easy to see when a copper washer type restrictor have been used as it looks like the hose fitting is not screwed fully down onto the adapter when comparing to the hose fitting next to it. You also need more force when tightening the hose fitting to prevent leaks

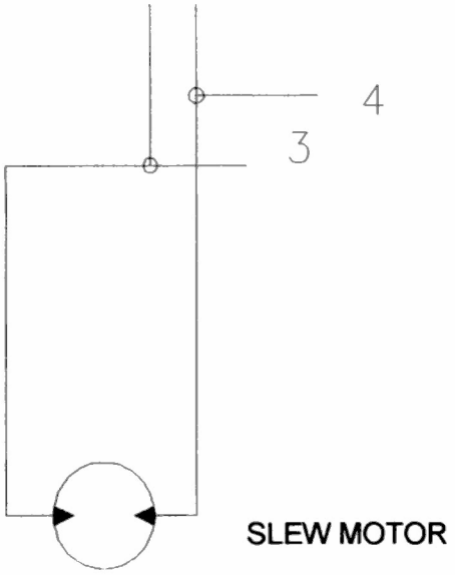
Hose adapter shown here with drilled hole. If cylinder movement is erratic check for contamination

Copper restrictor fitted loose in the hose adapter. Hose end require more torque to prevent oil leak when securing hose.

SLEW MOTOR

The motor is a high torque low speed hydraulic motor. The motor can be unbolted from the slew drive to check for leakage. Full seal kit is available with overhaul instructions.

3 and 4 indicate the hoses going to the cage controls.



GENERAL TESTS OF LOAD HOLDING VALVES

You have seen that all critical movements rely on 2 components for safety

- The lock valve on the cylinder
- The closed centre on the valve block

The valve blocks used have very low leakage rate (that is why we can rely on it for the slewing cage ram which have no lock valve).

How do you know if you are holding on the valve block and not on the cylinder lock valve ?

Simple - With the pump not running. operate the valve block as if you were going to close the ram up. If you get cylinder movement you know you have a leaking load holding valve on the cylinder.

Do not use a machine where the load holding valve has failed.

SLEWING CAGE RAM

Do not operate the slewing basket ram valve lever without the pump turning. If you operate the valve lever you can push the basket from side to side. You have now entered air into the system and the basket will not stay put during transport.

If this should happen, just move the valve lever with the pump running, moving the basket from side to side will fill the cylinder with oil and the basket will lock in place, when you release the lever

BLEEDING

The hydraulic system needs no special bleeding. If you have stripped a cylinder down or removed hoses for repair, just operate the cylinder fully in and fully out and the system is operational.

REMEMBER

Keep it clean - Replace filter and oil regularly - Make sure the oil you put in the tank is clean - Never fill oil using dirty cans - Remember you use no oil - If you have to replace oil you have a leak - If you work regularly below 0 deg C and use low viscosity oil, do not forget to replace the oil for regular grade in the summer to prevent oil leaks from cylinders and hose ends - Keep a log of relief valve settings to monitor pump performance - If you have a problem the first thing to do when you arrive is to fit a pressure gauge to see what is going on. Do not rely on the sound of the pump !

HYDRAULIC PUMP

The engine is driving a hydraulic pump via a spider type coupling.

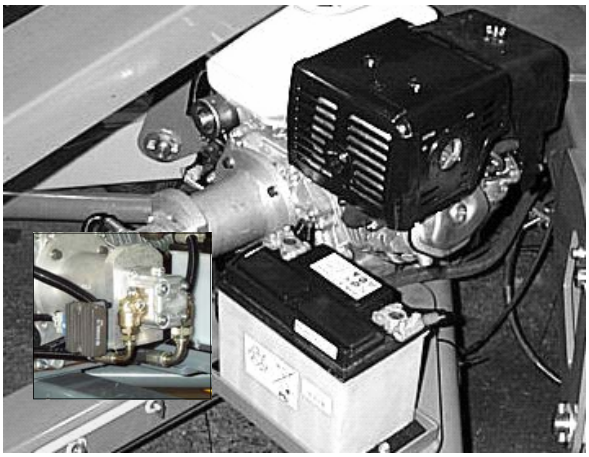
What to do if loss of oil pressure is experienced and the motor is running correctly?

First check that the hydraulic system is working correctly by checking that the dump valve is activated. If the dump valve is working and you still have no oil flow, it is most likely to be a failed pump or that the coupling is spinning on the motor or pump shaft. Remove the bell housing to check that each coupling half is secured on the shaft. Then remove the pump and check the internal gears. The Stop/Run/Start key switch is located on the right hand side of the engine. You also have a separate push button Start/Stop in the cage. Some engines are equipped with an automatic electrical choke to facilitate remote cold start. For the engine to start remotely, the key switch on the engine must be in the run position. If not, the engine will turn over on the starter, but will fail to ignite. The platform's control circuit is powered by the engines start battery. The built in heavy duty 10A alternator will recharge the battery during use. If the engine is not turning over when trying to start the most likely cause is a discharged battery. Jump start using another 12 volt battery or use the manual recoil fitted on all engines. Always switch the key switch on the engine to the "Off" position when not in use to isolate the circuit. Should the engine turn over without starting check the fuel level first ! Then look at the electrical circuit for faults.

Always let the engine reach operating temperature before loading the hydraulic circuit.

Some engines are fitted with a low oil level safety cut out which will stop the engine and prevents starting if the oil level is low.

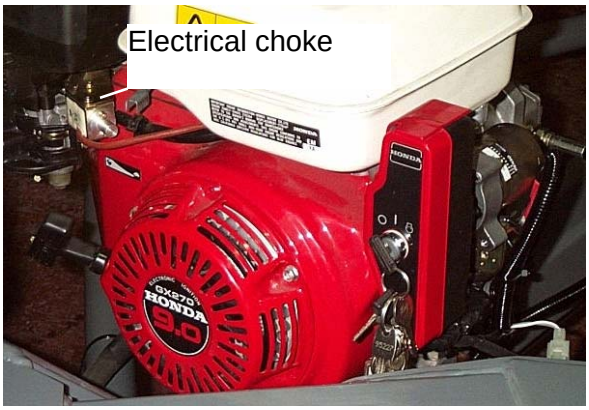
The engine Stop/Run/Start key switch must be in the run position even when starting the engine manually.



Shown here is the Honda G270 petrol engine and 12V start battery (without protective cover)

<u>Check battery weekly and top up with distilled water if required</u>

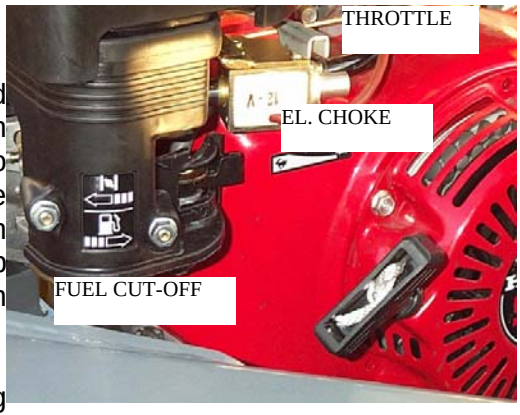
The yellow handle is the emergency slew handle and has nothing to do with the engine. See elsewhere in this manual for information on using the emergency slew handle.



HP: 9HP / 3600RPM Max torque 2600RPM
Fuel Capacity : 6 Litres
Pump Capacity : 1.19 cc
Operating RPM : Set to boom speeds !
Noise level : 75db (A)
Max Charging current : 10A
Battery required for manual start : NO
Battery required for platform electrics : YES
Max running time (approximately) : 8 hours
Low oil level cut out fitted : YES
Engine oil spec: SAE 10-40

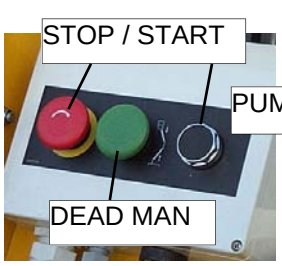
See OEM manual for more information.

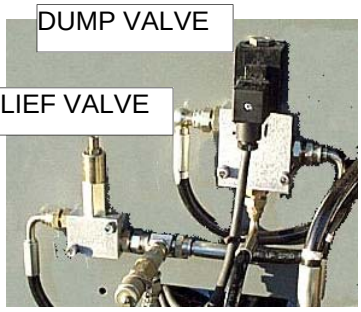
ENGINE SETTINGS



The throttle is locked and must not be tampered with. If the boom speeds are not in accordance with the time test sheet the engine speed may have to be adjusted. Set engine speed by adjusting the throttle to give required pump flow which in turn governs boom speed. Then set throttle end stop and secure throttle from turning using lock nut on throttle spindle (not shown)

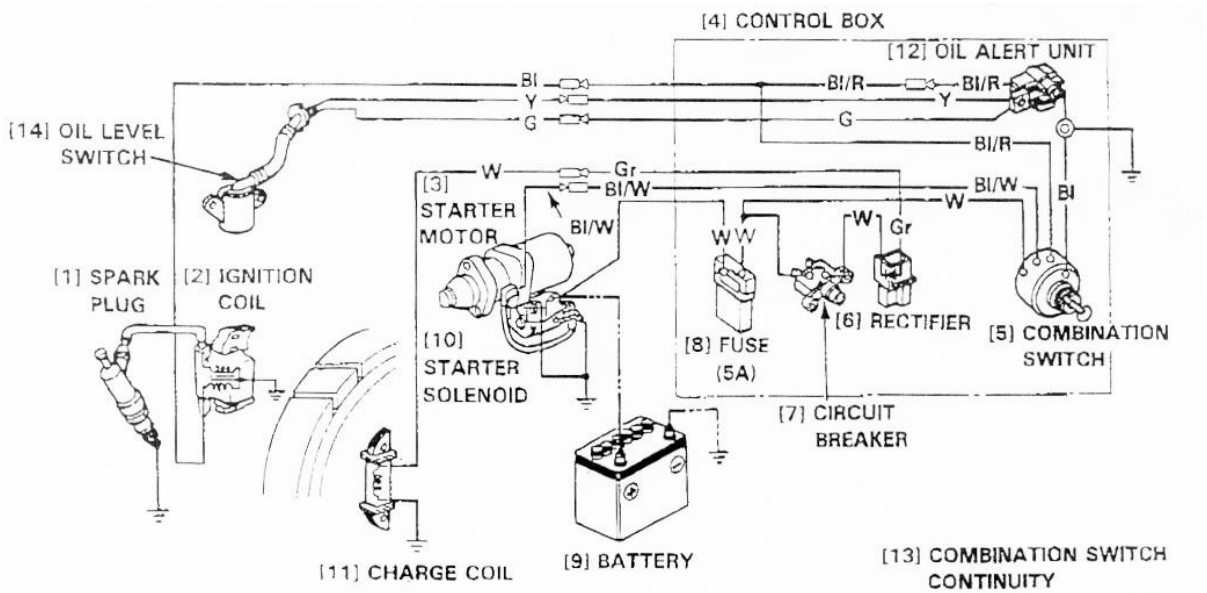
Use fuel cut-off when moving machine over long





ELECTRICAL START / STOP

The full engine electrical diagram shown below is not integrated in the main electrical diagram for the machine. The engine is stopped by letting the signal to the ignition coil go to earth.



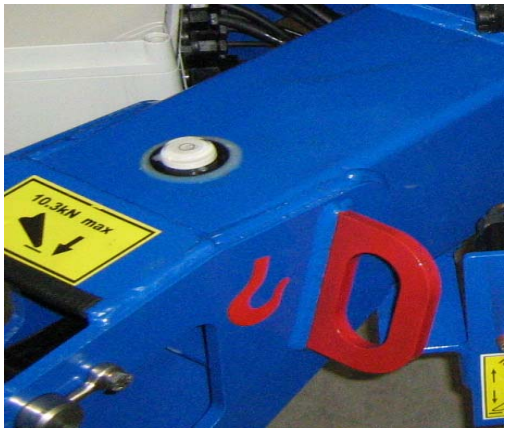
[13] COMBINATION SWITCH CONTINUITY

	IG	E	BAT	ST
COLO	B/R	Bl	W	Bl/W
OFF	○—○			
ON				
START			○—○	

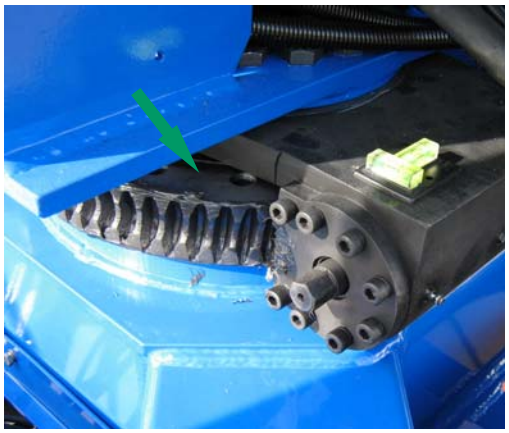
Bl	BLACK	Br	BROWN
Y	YELLOW	O	ORANGE
Bu	BLUE	Lb	LIGHT BLUE
G	GREEN	Lg	LIGHT GREEN
R	RED	P	PINK
W	WHITE	Gr	GRAY

LEVEL GAUGE

The level gauge used for setting up the machine is located next to the outrigger control valve block. If the level is damaged or has been removed do not use the machine until a new level has been fitted.



The reference point (datum) for the level is the top face of the slew ring. Photograph shows an engineer's level set on the machine so that the slew ring can be set absolutely level.



PHYSICAL DAMAGE

When looking for physical damage it is important that the machine is clean. Large dents in the boom from operators hitting obstacles are generally easy to see. Crack in welds or corrosion damage can be harder to spot. The biggest wear and tear is not the load in the basket but the constant vibration from towing. Curbs and Speed Bumps passed at high speed can cause severe damage to the tow bar or the axle.

On machines fitted with the optional sliding axle inspect the underside of the axle carrier and the sliding box suspension. On machine fitted with the fixed axle check the fixing bolts and the main chassis member. Also check the area just behind the coupling where the vertical boom is secured to the towbar. If someone has forgotten to secure the vertical boom to the towbar and towed the machine over a long distance on poor roads damage may have occurred due to the constant banging of the vertical boom against the towbar. Also check the top boom rest. The top boom must also be locked in place during transport.

IMPORTANT

The top boom lock is strictly speaking not needed if the operator always fully lowers the top boom and powers it down in the rest position. Unfortunately experience on earlier machines has shown that the operator would forget to fully lower the boom and damage would occur to the underside of the top boom when it bounced about in its rest during transport. Fitting the top boom lock greatly reduces the need for top boom repair or possible replacement.

Another area prone to damage is the drop nose. When reversing, the basket may hit a low wall or a post. The impact may not be easy to spot on an already battered basket but the impact may bend the bottom of the dropnose.

Check the straightness of the top tie bar. A slight dip is acceptable but a pronounced kink or sideways bend is unacceptable. Check both booms for creases in the steel next to the main bosses next to the slew post and the vertical boom.

Hoses and cables are prone to damage and wear and tear. If the outer sheathing on the hydraulic hose is slightly frayed fitting a temporary outer sleeve may be adequate depending on the size of the damage.

IMPORTANT

Always err on the side of caution -
If in doubt replace, or ask **UpRight** or its local representative for advice**.**

NUTS & BOLTS

Replace any missing bolts immediately. The main pivot shafts and pivot pins are secured with one or two locking pegs. The locking peg not only secures the shafts from falling out but also stops them turning.

Most nuts used are Nyloc nuts which are superior to the normal full nut and spring washer. Never use plain nuts and spring washers unless originally fitted . Always torque fixings.

THREAD SIZE	MAXIMUM TIGHTENING TORQUES			
	UNPLATED		PLATED	
	Nm	Lbf.in.	Nm	Lbf.in.
M4	4.6	40.7	3.5	31
M5	9.5	84.1	7.1	62.8
M6	16.0	142.0	12.0	106.0
M8	39.0	345.0	29.0	257.0
M10	77.0	682.0	58.0	513.0
M12	135.0	1200.0	101.0	894.0
M14	215.0	1900.0	161.0	1420.0
M16	330.0	2920.0	248.0	2190.0
M20	650.0	5750.0	488.0	4320.0

LOCKING PEG

Each shaft is secured with a locking peg as mentioned above. If you find that a peg is broken or that the bolt and peg is missing then this can be a sign that the shaft is seized due to lack of lubrication. If a seized shaft is suspected, check that the x-drilling for the locking peg lines up with the bolt hole for the locking peg securing bolt. Fit a new peg. Carefully operate the boom to see if the shaft is trying to turn.

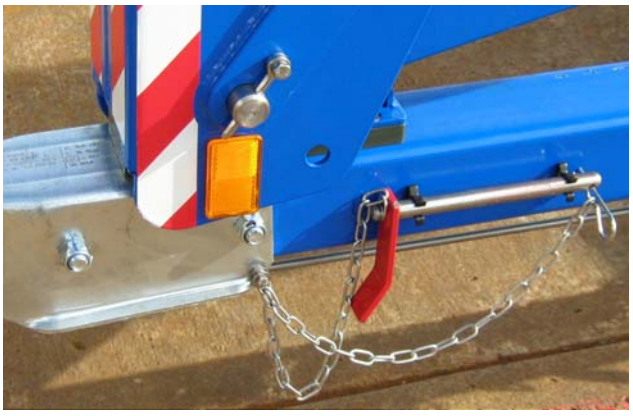
If a grease nipple is fitted, apply grease. If you suspect that the shaft is seized it is recommended to drive the shaft 1/2 way out. Clean and apply new grease. If the shaft is badly worn or scored, replace both shaft and the bush.

Depending on which shaft is causing the problem, you may have to support the structure to prevent jamming when extracting the shaft.

LOCKING PINS

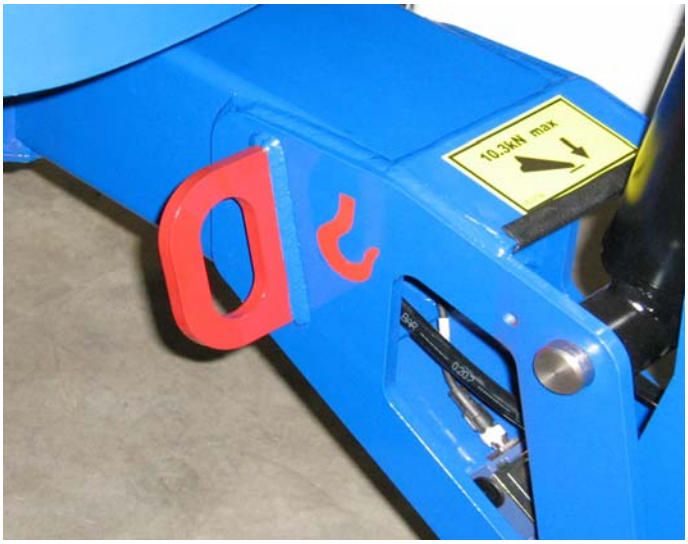
It is important that the boom locking pins are used when the machine is transported. Never transport a machine if the pin is missing. The fixing clips fitted on current (2002) machines have been provided to prevent paint damage by the pin hitting the structure during use.

When towing, insert pin and lock in place with the “R” clip provided. During inspection look for indication of the machine being moved without the pin. Good tell tale signs are dents in the top boom and crack lines below the vertical boom. Contact UpRight or its local agent on advice for repairs.



LIFTING LUGS

Check for wear and tear. Check for damage. You have two lugs attached together on the towbar and two lugs on each side of the rear outriggers. Current machines have a single box towbar. Earlier models had “A” frame towbar with one individual lug welded to each side of the towbar.



BATTERY & CHARGING

If your machine is fitted with the fully automatic charger, please read on. If your machine is fitted with a different type, see documentation which should have been included with the unit.

The Charger has the following advantages:

- Waterproof
- Capable of charging batteries when motor is running.
- Dual voltage with auto select and indicator light to show voltage selected.
- Short circuit protection
- Designed to withstand heavy vibration
- Modular design. The black box will control 12V, 24V, and 48V all at 30A outputs with the appropriate transformer.
- Auto-boost to enable batteries to be kept in optimum condition when machine is in storage with charger connected.

OPERATION

When connected to the mains supply the output current will be shown in the display window. With a 2/3 discharged battery the current will be in the region of 25A / 30A. (Bulk Phase Light On)

When the battery voltage has reached gassing level (2.45V per cell) the timing phase will start (Gas Phase Light On). This timing period is calculated as follows: 1/2 the time it took to reach gassing level + 1 hour.

After the timing phase is completed the charger will switch itself into stand-by mode (Charge Complete Light On)

The Charger (Black Box) shown here with 110V plug. To operate on 240V just replace plug

The appropriate transformer (12V, 24 or 48V transformer is wired in to the black box. Take care to properly secure the wires. If not you will end up as shown above. Burnt terminals due to loose wires

FUSES :
12Vdc system = 7A
24V & 48V systems = 15A

Type Bussman Ceramic MDA - (7 or 15) 250Volt, time Delay 1.25” x 0.25”

ERROR CODES

If the display panel on the black box is flickering between –1 and 2 you have a fault in the transformer or the black box.

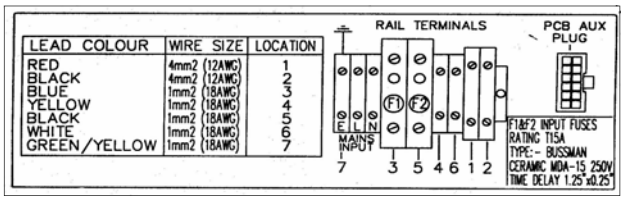
Check the two output fuses under the terminal cover. The black box or the transformer contains no user replaceable parts. Opening the black box apart from the terminal cover shown will invalidate the warranty. If the Time Out Light comes on you have possibly a faulty battery. Check each cell with a hydrometer. The Time Out light will come on and the charger will switch off if gassing level has not been reached in 24hours.

Reverse Polarity Light will light if the output cables to the battery are reversed. Red Cable Must go to + battery terminal, Black Cable must go to - battery terminal.

CHARGING TIMES

The charger will recharge 2/3 discharged batteries in 8 to 10 hours. In reality batteries are often discharged more than 2/3 when used on a access platform. The operator tend to use the machine until the motor stops (This causes arcing of the motor contactor, and severe heat rise in the motor. Both of which shortens the components life considerably.) Then he forgets to put the machine back on charge until after the weekend. The result is that the battery can be as much as 95% discharge before the charger is connected (this causes severe reduction in battery life). If the battery cell voltage is below 1 volt the charger may not start. In that case, hold down the low voltage start button for several seconds. This will bypass the charger safety system and cause it to start irrespective of battery voltage. After the voltage has increased sufficiently for the controller to take over, you can let go of the button.

If gassing level is not reached in 24hours the charger will switch off and the Time Out Light will come on.



Disconnecting the input lead will automatically re-set the timer. Take care not to disconnect the charger during a charging cycle. Always let the charger reach “Charge Complete” or “Time Out” to prevent overcharging.

PRACTICAL APPLICATIONS

The operator will run the batteries all the way down. Then he will try to connect the charger and continue working the machine. This will not work. The electric motor requires as much as 3 times the charger output. The charger will float on max 30A and the motor will not turn (This results in damage to the motor and contactor)

If the user has a very hectic work schedule he may run out of battery power before he has finished his work. In that case he can connect the charger to a mains supply before the batteries are 50% discharged. This will then give enough time for the charger to keep topping up the batteries and extend the duty cycle of the machine considerably.

The battery life may be slightly reduced as the optimum charging cycle for any battery is “fully charged - 2/3 discharged and then fully charged”

MAINTENANCE

- Check that the fuses are secured in the fuse holder.
- Check that all wires are secure on the terminal block and on the battery terminal.
- Check that the multipin plug is secure on the pcb.
- Check for damage to cables and wiring.

BATTERY

When charging the battery will give off explosive hydrogen gas. Keep away from open flames. Always wear appropriate personal safety equipments such as eye protection and rubber gloves to prevent injury in case of spillage.

Keep the top of the batteries clean and free from dirt. It is very easy for the battery to be contaminated when topping up with distilled water. The batteries are working very hard and regular topping up with distilled water will be required.

PRACTICAL APPLICATIONS

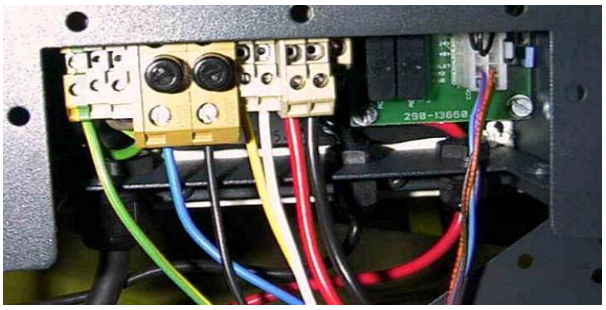
The most common problem is the operator who rings up and complains that

"The machine has just gone out on hire and did only 2 lifts - and yes we did have it on charge all last night before it went out"

You need to establish:

- Was the charger working ?
- Are the batteries in good condition ?

The most useful tool you can have is the Hydrometer ,to check the specific gravity, and a simple volt meter. Check each cell and see how they all compare. If one or more cell is significantly lower than the rest, replace all batteries. It is false economy to replace individual batteries.



To check if the charger works you can connect your voltmeter to the same battery terminals as the charger. Take a note of the reading. Now connect the charger to mains voltage.

You should see a marked increase in voltage. Also check the display on the charger. You can also connect an inline ammeter (or use a clamp on type) to check that the charger output display matches the current going into the batteries

BATTERY CHARGING USING GENERATOR

The charger can only be connected to a generator fitted with a full AVR (Automatic Voltage Regulator) and spike filtering system.

Large voltage fluctuations and spikes will damage the electronic components in the charger

We have found that the Honda Generator sets offer the best and most reliable voltage supply. This applies only to the fully integrated Honda generator sets and not the cheaper verity using a Honda Engine fitted with a non Honda generator unit.

EMERGENCY STOP

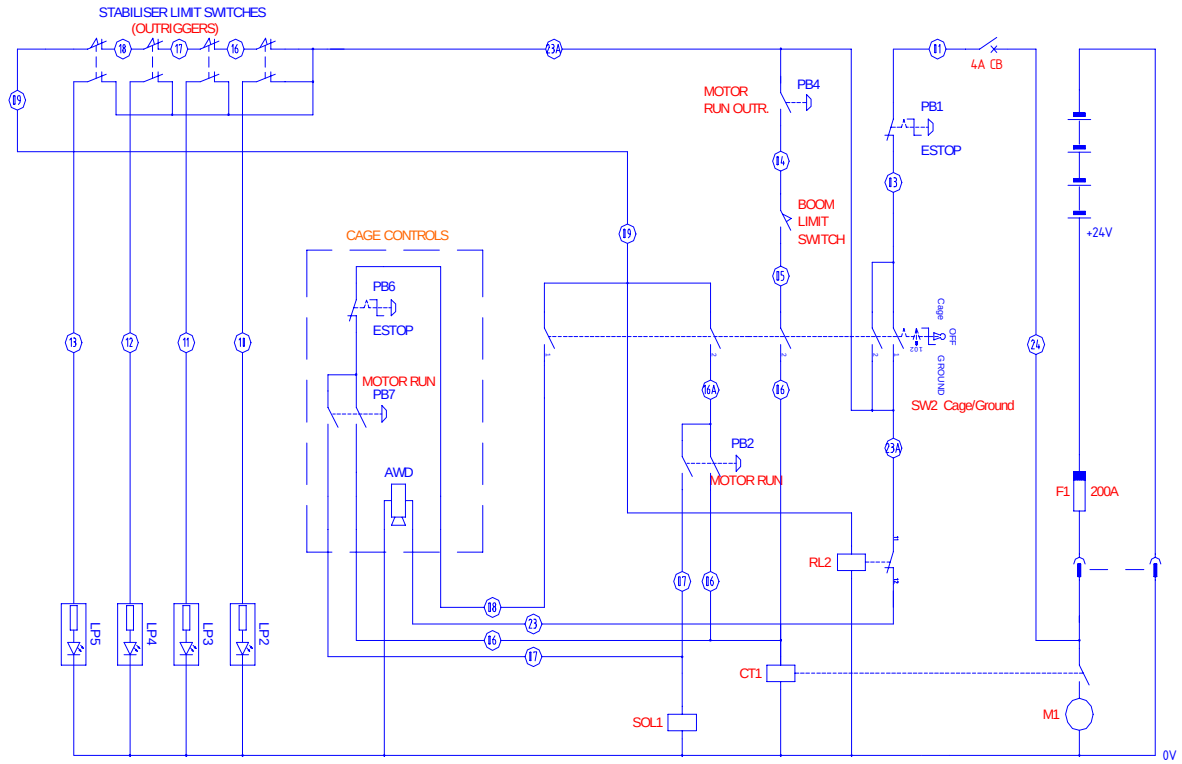
Two emergency Stops are fitted. One at each control post. When depressed they must stop all movements within a few seconds maximum. When activated it must not be possible to operate the machine. To release, turn 1/4 turn and the Emergency stop head will pop back out. The switch head is not physically attached to the switch mechanism behind the head. If the head is released and the machine will not start check that the switch has not seized in the open position.

ELECTRICAL SYSTEM

The electrical system is quite simple and requires minimal maintenance. The biggest problem is loose connections, again caused by vibration during towing, and the second is moisture or condensation caused by high humidity and temperature fluctuations.

Erratic running of the motor when depressing the green run button and moving the booms can be caused by an intermittent internal cable failure. The failure can be hard to locate. The best way is to lower the relevant boom. If the motor has stopped permanently, use the emergency lower system. Try to raise the boom again and see it the fault occurs roughly in the same place. If it does, it is highly likely you have an internal cable failure and the complete cable should be replaced.

On mains powered machine the control circuit is almost identical apart from voltage variants and the use of a isolation transformer on the control circuit. The bolt on motor contactor used on the DC pack is replaced by a combined thermal overload and motor contactor mounted inside its own junction box. On I.C. machines the boom circuit is the same as for the DC powered machines apart from the electrical start stop circuit needed for the engine.



CT1 is mounted on top of the DC motor and switches the motor on/off

CB is a 4A Re-settable circuit breaker to protect the wiring loom from damage in case of a short circuit.

PB1 is the first emergency stop. Mounted on the ground controls.

SW2 is the key switch for selecting Cage or Ground controls and operating the outriggers. Turn to cage and switch set 1 closes. Turn to ground and switch set 2 closes

RL2 remains closed until the outriggers are under pressure.

AWD is the audible alarm fitted in the cage control box. The alarm is controlled by RL2.

PB4 is the black motor run switch on the ground control only used to start the motor when operating the outriggers.

Boom Limit Switch must be closed and the booms down to enable the motor to start and operate the outriggers.

Outrigger limit switch contain 2 N.C. contactor. One set controls the 4 LED's LP2-LP5. The other set is wired in series. When all the switches are closed, RL2 is activated. AWD stops

PB2 is the green motor run button on the ground controls. This switch becomes active after the SW2 is turned to ground and the 4 outrigger limit switches are closed.

SOL1 is the coil on the hydraulic diverter valve. When activated it prevents oil going to the outrigger control valve. It must be activated for the boom functions to work.

PB6 is the emergency stop button in the cage.

PB7 is the Green motor run button in the cage. After the key switch is turned to cage and the 4 outriggers are under pressure (PB6 not activated) pressing PB7 starts the motor. SOL1 is pulled in and the oil will flow to the cage control valve.

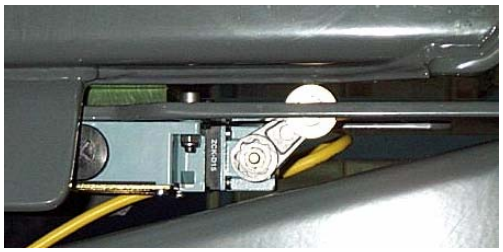
All wires are numbered as shown. Each wire terminal has the same number as the cable attached to it.

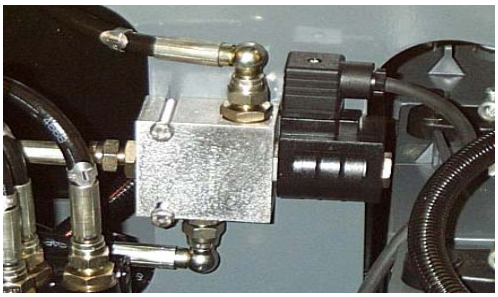
You will not be able to raise the outriggers unless the boom limit switches are activated as it is only PB4 which starts the electric motor without activating SOL1.

F1 protects the power side to the electric motor.

The battery can be isolated by pulling the Anderson plug next to the power pack

- You must not be able to raise the outriggers with the booms up in the air. If you are, you must check the boom limit switch and the diverter valve. If you are not able to lift up the outriggers after lowering the booms. Check the same components





- If you have used the emergency lowering valve on the top or bottom ram you must fully extend the cylinder to fill the ram up with oil. You will have a delay for several seconds the first time you try to power the cylinder down as it has to fill up with oil**.** If the oil tank is overflowing., just clean up the oil spillage - the tank was overfilled !

- If you use the emergency slew handle you must operate the slew valve handle at the same time to allow oil to circulate. When you turn a hydraulic motor it becomes a pump and the oil must go somewhere !

- Check that the audible alarm is working. It should come on when you have a light leg.

- You should not be able to lift the booms up in the air unless the outriggers are all down and in full contact with the ground. If you are you must adjust the outrigger limit switch immediately. If you do go up without having the outrigger correctly set you **will** fall over! If you get a light leg during use, the machine will stop and you will hear the audible alarm mounted on the underside of the cage control box. Now you must use the hand pump to come down and re-set the outriggers. Check that the LED on the ground control panel is working correctly. Each LED should only come on when the outrigger is in contact with the ground

WHEELS

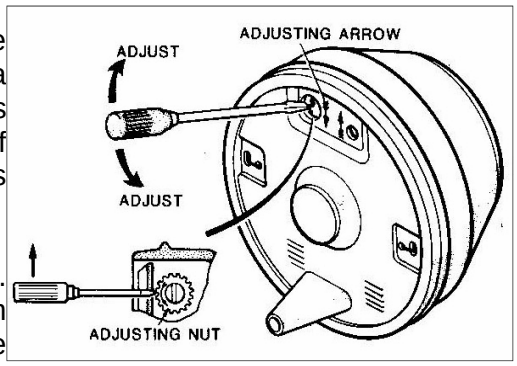
Check for damage to the tyre. Replace if tread pattern is worn below 3mm. On machines with sliding axle you will see increased wear on the inside part of the tyre compared to the outside part. It is important that correct tyre pressure is maintained at all times. The correct pressure is 3.8bar (55PSI) and not what may be indicated on the tyre. See separate tyre pressure sticker fitted to the top of the mudguard. Tyre size is : 165 R13C 8Ply

IMPORTANT

For fully service and maintenance information on the running gear contact UpRight and request a copy of the running gear OEM service handbook. Below are a few important extracts which covers the some of the basic checks to carry out when servicing the machine. If the handbrake is not fully applied there is a risk that the trailer could run backwards. The brake rod must not be under tension or bowed when the handbrake is disengaged.

BRAKES

Check Bowden cable for damage - Replace if inner steel core is visible. Sticking brakes can be down to seized cables. The inner steel wire must run freely inside the cable.



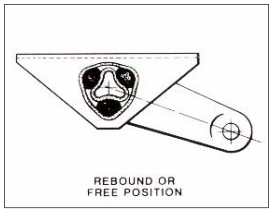
Adjust the brakes with the wheels removed. Remove the plastic bung in the back of the brake plate. Use a screw driver to adjust the star wheel until resistance is felt when turning the brake drum in the direction of travel. Then slack back until the brake drum turns freely.

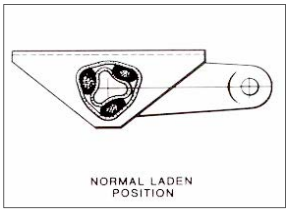
Check for correct movement of the Bowden cable. The cable should move 5 to 8 mm. Check for uniform response when braking. All adjustment must be done at the wheel brake and not on the brake linkage.

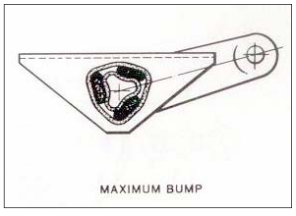
When removing the drum for cleaning the brake shoes. Always ensure that a new flanged nut is used. Tighten the flange nut to 280Nm - 300Nm. When refitting the wheel, tighten wheel nuts in the N.S.W.E sequence and to a torque of 88Nm.

AXLE

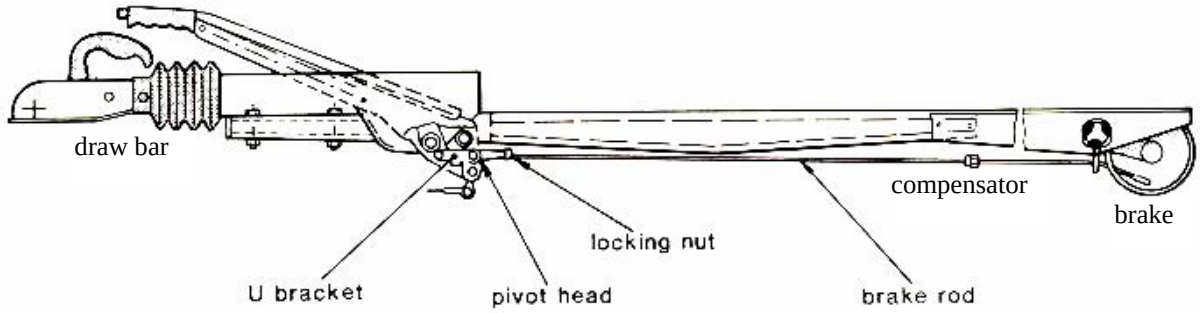
The axle is fully maintenance free. Check fixing bolts. If ordering replacement axle quote all ref. numbers on the oval serial number plate riveted to the axle beam.







COUPLING / OVERUN DEVICE



Ensure that the draw bar is fully extended. Screw the brake rod into the pivot head and secure with a M10 nut. Using the M10 ball nut, connect the brake rod to the Bowden cable via the compensating bracket. Fit and hand tighten the hex securing nut. Now tighten the M10 ball nut on the brake rod until there is no further play on the pivot head against the draw bar (the draw bar must be fully extended).

The compensating bracket must be square on the brake rod. The current type of Bowden cables are non adjustable. Hook the cable on to the compensator bracket . Adjust to ensure even braking on the brake, not on the compensator.

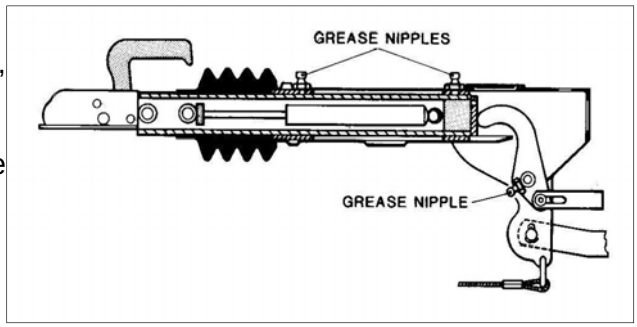
Check that both wheels run freely in the forward direction. Apply handbrake, the brakes should start to come on at the second click. The gas strut will ensure that the handbrake is fully applied. If the trailer is moving backwards the handbrake will move further up. This is normal. It is imperative that the gas strut is working correctly. Without the gas strut the brakes will not hold the trailer on a slope.

Adjust brakes if required.

Check that all nuts are secure (M10, 49Nm, 36ft.lb)

Grease the coupling head (Multipurpose grease to DIN 51825 KTA 3K

Clean and oil all other moving parts.

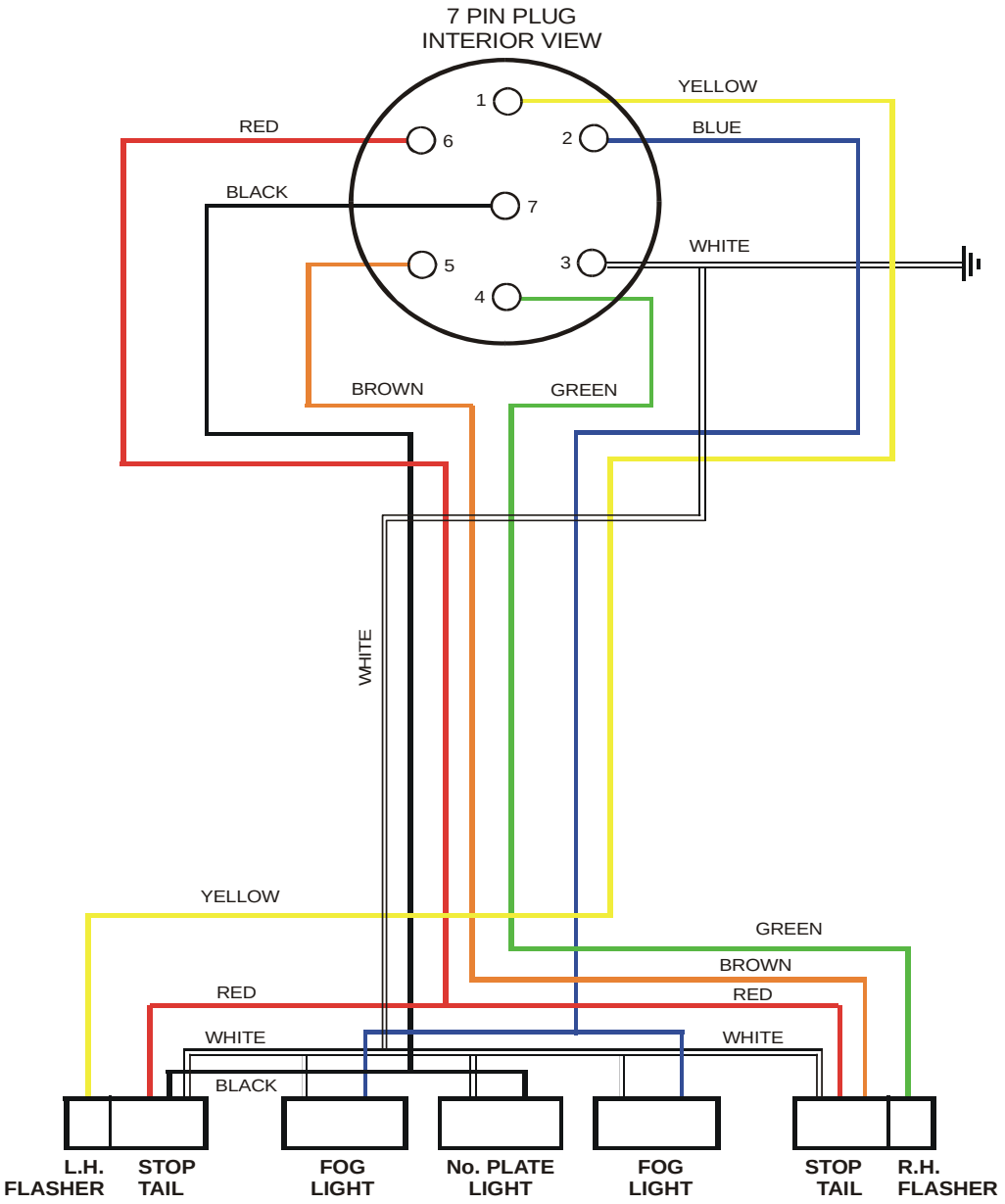


WHEEL BEARINGS

The wheel bearings are sealed for life and require no maintenance or grease. The service life for a set of bearings is in the region of 20 000 to 30 000 miles, depending on running conditions. It is vital that the brakes have not been overheated as this will cause the grease in the sealed ball bearings to evaporate and the bearings will fail.

Never re-use the flanged nut when refitting the brake drum as the wheel may come off when towing

When purchasing a brake drum the bearings are normally included, fitted to the brake drum. If replacing bearings only, contact UpRight or its local representative for further information. Always use a new flanged nut and torque to 280—300Nm when refitting the drum.

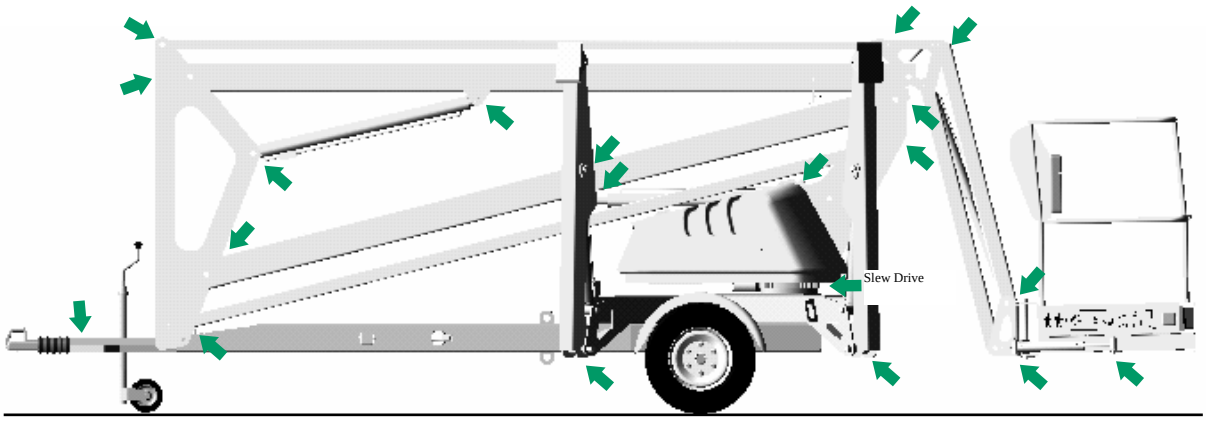


No.	Ref.	Colour	Function
1	L	YELLOW	L.H. Indicator
2	54G	BLUE	Rear Fog Lamp(s)
3	31	WHITE	Earth
4	R	GREEN	R.H. Indicator
5	58R	BROWN	R.H. Tail
6	54	RED	Stop Lights
7	58L	BLACK	L.H. Tail & Number Plate

Photo show the TL37 fitted with 2 fog lights. Depending on local regulations and specifications, your machine may be different

GENERAL GREASE POINTS

Regular greasing not only greatly improves the service life of the bushes, it also will remove any moisture which may cause internal corrosion on the wall of the bosses making it difficult to remove the pivot shafts for inspection.



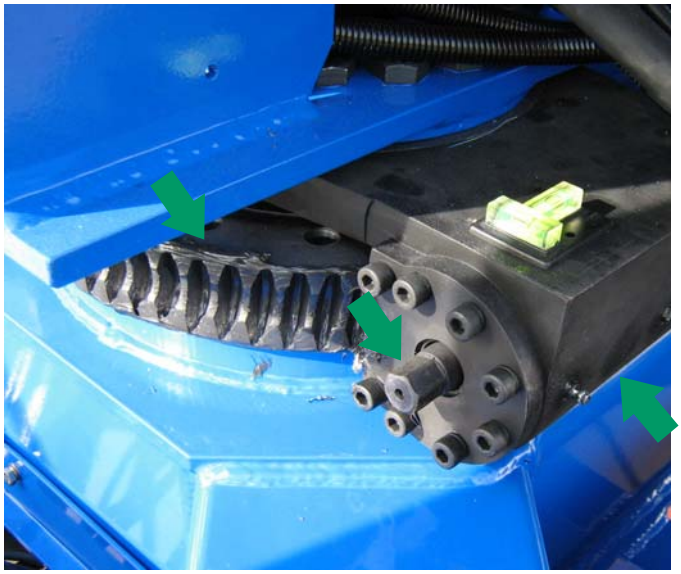
LUBRICATION SPECIFICATIONS

We recommend only using premium quality grease. Experience has shown that a Lithium based grease offers very good performance. For the slew ring the RENOLIT ARMNA G4789 from Fuchs offers extremely good lubrication and anti corrosion properties. Especially at very low temperatures (-30DegC)

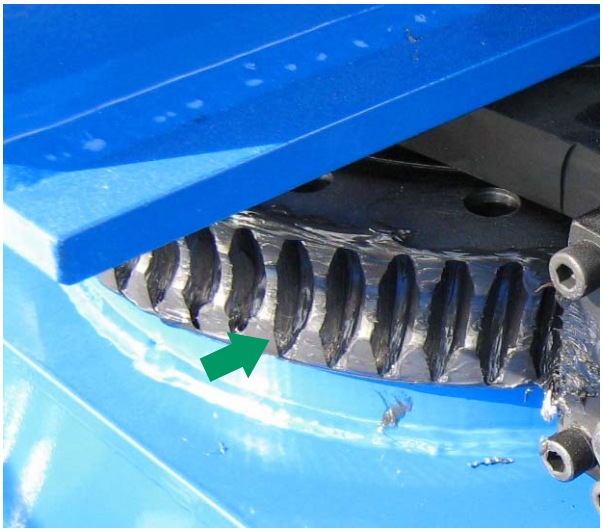
SLEW DRIVE

To grease the slew ring you must set the machine up and slew around so you can gain access to the reas-sessed grease nipple fitted to the top face of the slew ring.

When greasing the worm housing take care not to push out the oil seal on the end face. If you do, remove excess grease from the end and drive the seal back in.. See Slew Drive Gear section for more details.



SLEW DRIVE GEARS



The slew drive gear is designed to be largely maintenance free. However, we recommend the gear teeth be greased on a weekly / monthly basis with a high pressure grease depending on operating conditions. Always clean the gear first to remove any road dirt and grime. In very dusty or sandy conditions take care to prevent a build-up of grit / sand mixed with grease which may cause premature wear on the gear.

Additionally, the ring gear and gear box should be greased on a six monthly basis. The grease nipple for the ring gear is on the top face of the slew gear, set between the fixing bolts. It can be accessed by lifting one of the side covers, and slewing the structure appropriately.

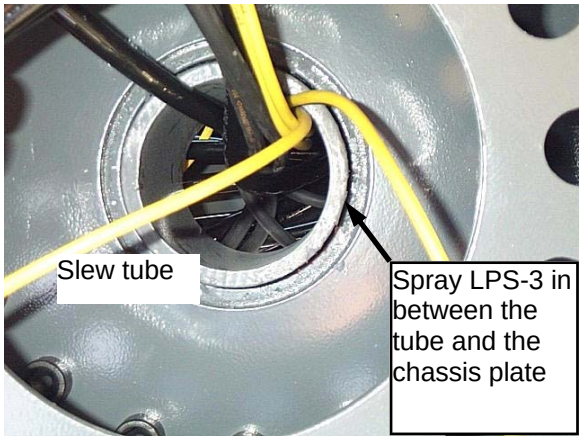
The ring gear should be inspected on a six monthly basis for excessive play. It is unlikely there will be any wear if the machine is maintained correctly.

To check the gear, place a payload of approximately 80Kg in the platform. Elevate the lower boom to approximately half way. Then gently elevate the top boom, whilst observing the ring gear. Excessive wear will be observed by noticing more than 0.5mm movement between the inner and outer bearing rings. If excessive wear is present the gear ring should be replaced

MAINTENANCE PROCEDURE

The slew stop mechanism is fully lubricated and should normally not require any further lubrication. Should more lubrication be needed this can be done in two ways.

1) When greasing the slew bearing some grease will drop in to the centre part of the slew. Keep on greasing the slew bearing until you can see grease escaping from the outside sealing lip on the slew gear. Keep on greasing, The grease will now be pushed out through the outer and inner sealing ring of the slew bearing. Grease escaping from the inner seal will drop onto the slew stop ring
2) You can also spray LPS-3 lubrication up between the Slew tube and the chassis plate.



How does the slew stop work ?

The slew stop mechanism is very simple and prevent the cables and hoses getting tangled up by continuous rotation. The Slew stop ring will allow the operator to turn almost 360 deg in each direction from the stowed position.

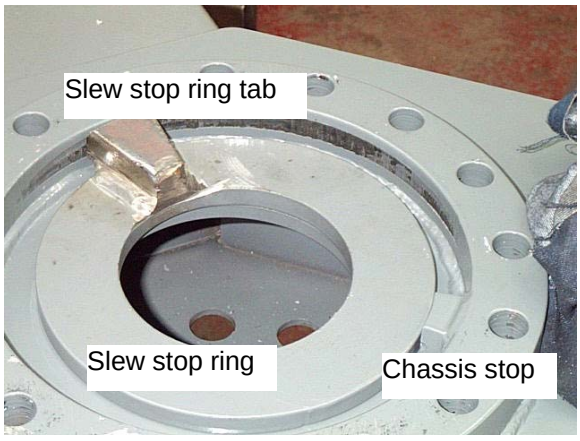
The critical parts of the slew stop are as follows :

Chassis stop

Slew stop ring

Slew stop ring tab

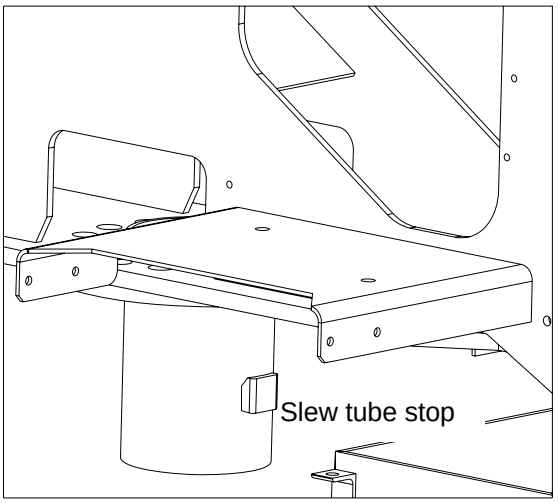
Slew tube stop



When slewing (rotating) the Slew tube stop will pick up on the Slew stop ring tab and drag it around until Slew stop ring tab hits the Chassis stop. Now you will not be able to slew any further - You can now slew almost two turns in the opposite direction until the Slew stop ring tab hits the Chassis stop again. This gives you almost two turns “lock to lock”. From the parking position this equates to “one turn left or one turn right” measured from the parking position

What can go wrong ?

Very little in short ! The mechanism is very simple and have proven itself very reliable in the field. If the fault is not relating to the slew gear or the hydraulic motor the only thing that can go wrong is that one of the 3 steel blocks welded on break loose and the slew does not stop. You will now be able to slew continually and eventually rip of the hoses and cables. The only way to solve this problem is to split the machine and weld the slew stop back on. If the slew is jamming up Check hydraulic pressure. Apply plenty of lubrication to ensure that the slew stop ring has not got jammed. Again if the problem does not disappear you have to split the machine to investigate further.



THOROUGH INSPECTION

All machines being operated in the UK must have a thorough inspection carried out every 6 months in accordance with LOLER Regulations 1998 and a Certificate of Thorough Inspection produced by a competent person. Enclosed here is a sample of the Inspection Procedure followed by an approved UpRight Engineer and the Certificate of Thorough Examination (CTE) which will be issued .

When the machine has passed its test the machine will be issued with a sticker showing the Certificate number and the date of next Examination. A copy of the Certificate is available upon request.

Contact UpRight Group for further details.

ILLUSTRATED PARTS BREAKDOWN

This section lists and illustrates the replaceable assemblies and parts for the various versions of the TL37 Work Platform manufactured by UpRight Powered Access UK.

When using the following pages to order replacement parts, please quote:

1. The full serial number and model of the machine
2. The part numbers and quantities of the items you require.

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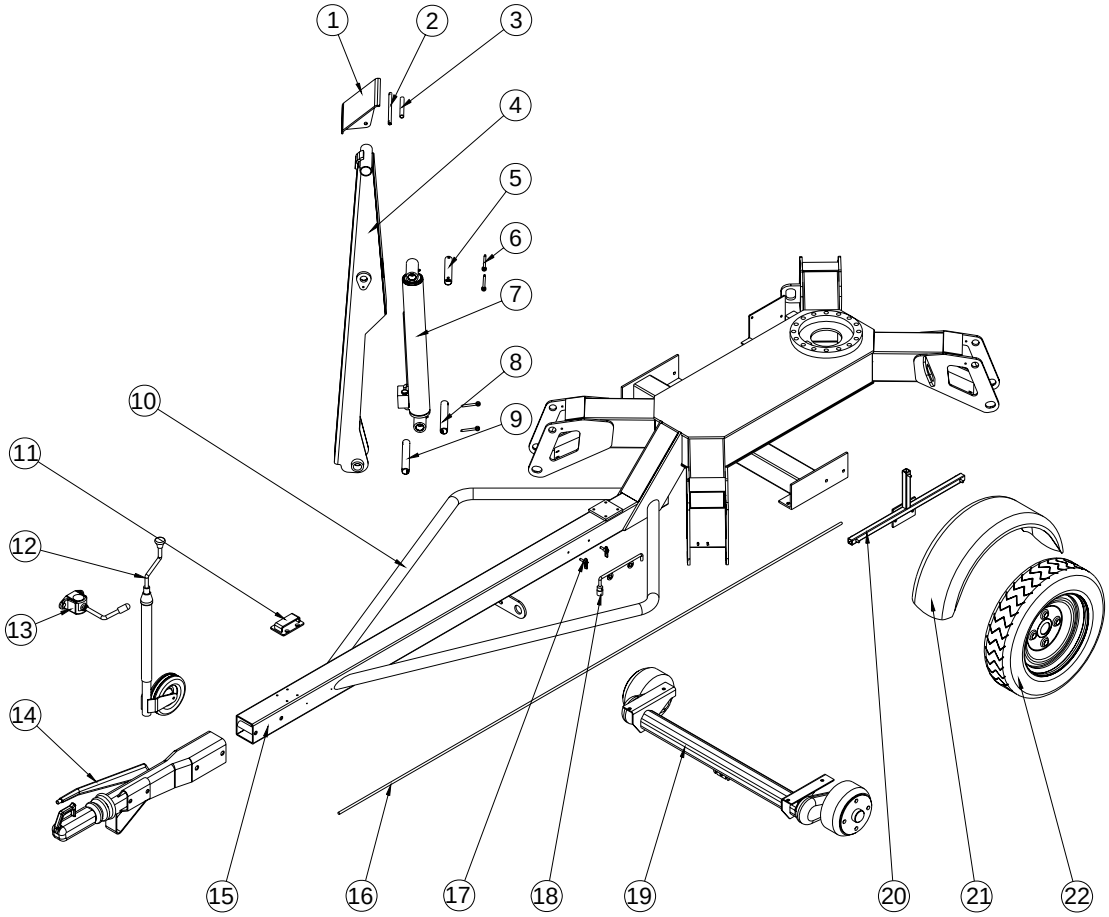
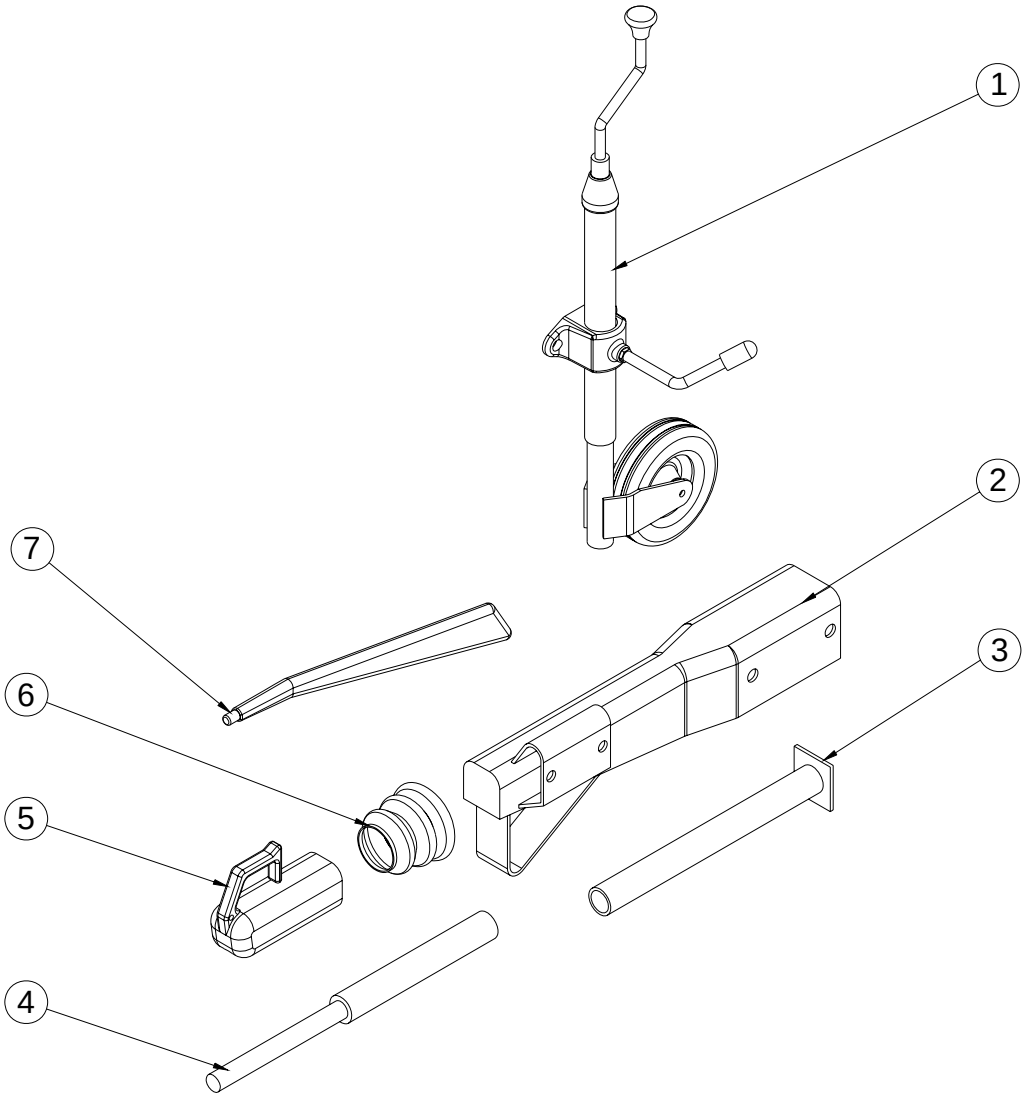
CHASSIS & OUTRIGGER ASSEMBLY



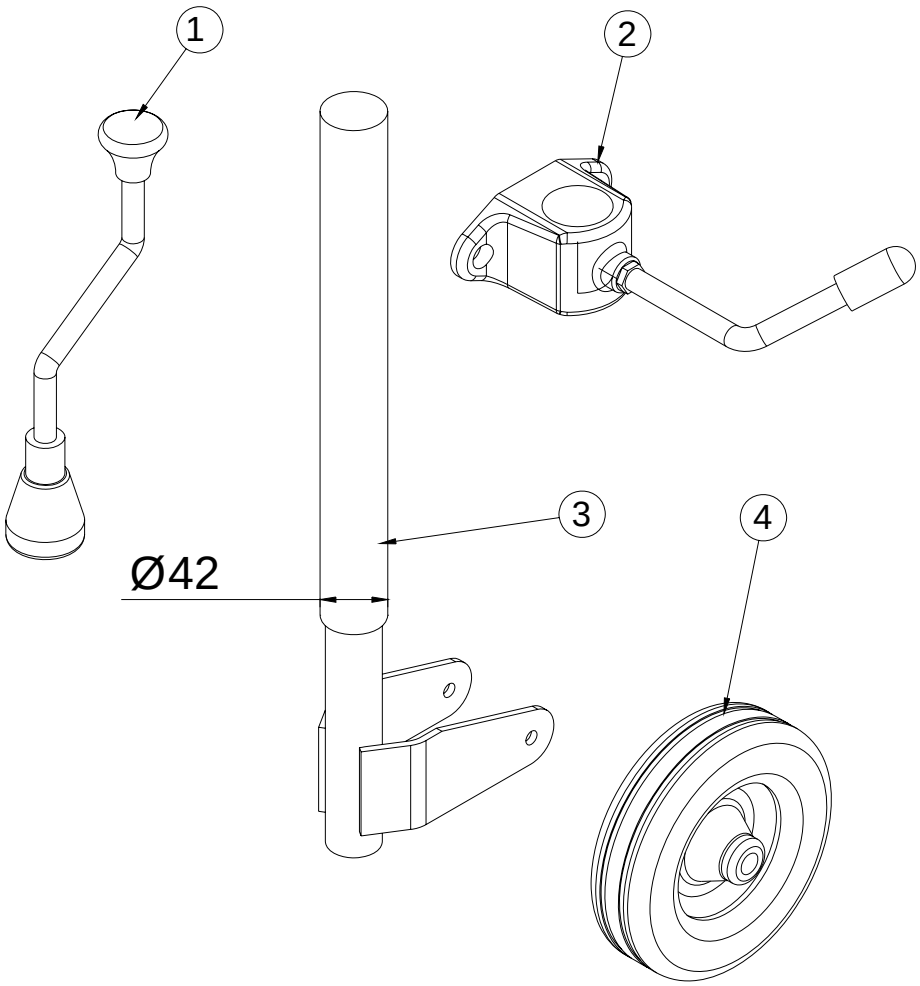
No.	Part No.	Description	Qty.
1	22-5828	OUTRIGGER FOOT	4
2	SP-012E218	OUTRIGGER FOOT PIN	4
3	12-3116	HOSE	4
4	10-4540	OUTRIGGER LEG	4
5	SP-030D167	OUTRIGGER RAM/OUTRIGGER PIVOT PIN	4
6	10-2672	RETAINING PEG	16
7	508180-000	OUTRIGGER RAM	4
8	SP-030D201	OUTRIGGER AM/CHASSIS PIVOT PIN	4
9	SP-030K211	OUTRIGGER LEG PIVOT PIN	4
10	10-5227	BOLT-ON CYCLE GUARDS (OPTIONAL)	2
11	10-4974	BOOM HOLDING BRACKET	1
12	-	JOCKEY WHEEL	1
13	-	JOCKEY WHEEL CLAMP	1
14	25-0317	COUPLING ASSEMBLY	1
15	10-4960	CHASSIS ASSEMBLY	1
16	22-4922	BRAKE ROD	1
17	11-3313	ANTI-LUCE FASTENER	2
18	10-4957	EMERGENCY SLEW HANDLE	1
19	25-0316	AXLE	1
20	10-4675	MUDGUARD MOUNTING BRACKET	2
21	25-0310	MUDGUARD	2
22	03-0272	WHEEL ASSEMBLY	2

TOW HITCH ASSEMBLY



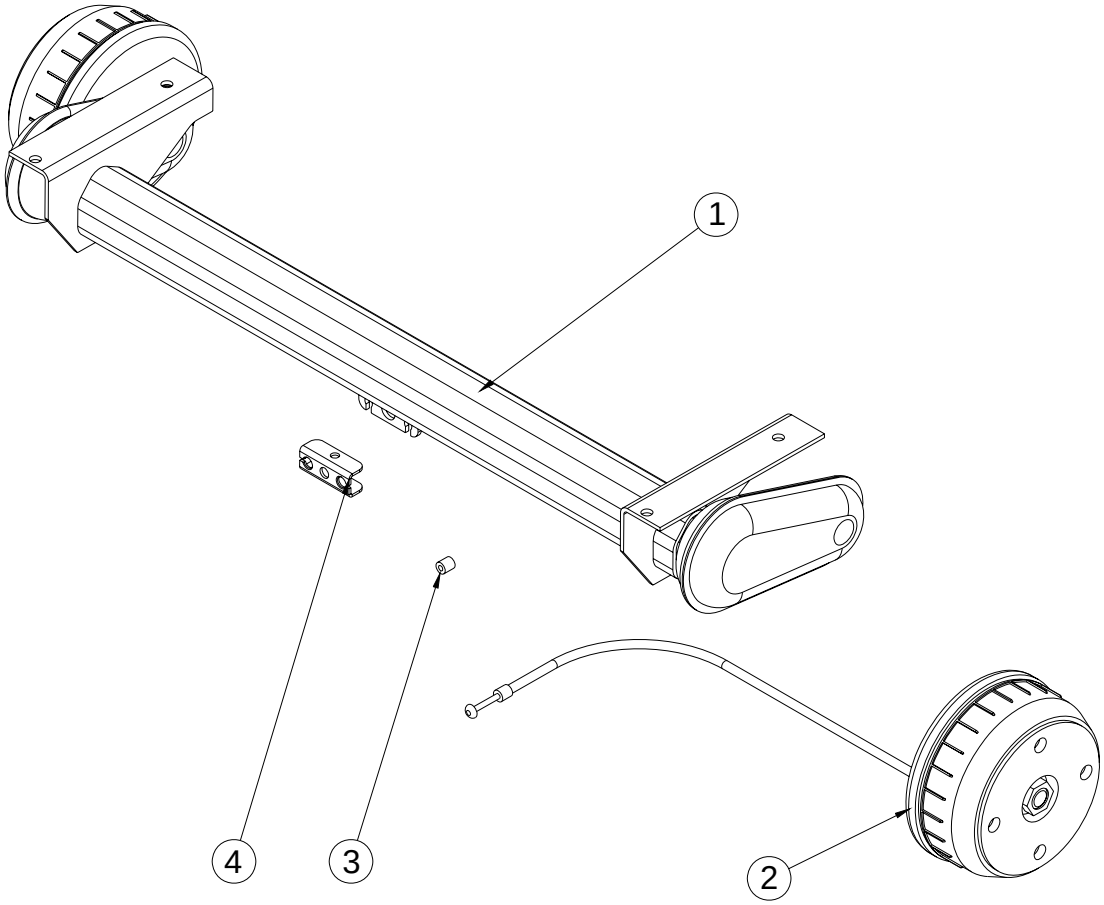
No.	Part No.	Description	Qty.
1	25-0323	JOCKEY WHEEL WITH CLAMP	1
2	25-0317-1	HOUSING (WITH BEARINGS)	1
3	25-0317-5	OVERUN SHAFT	1
4	25-0317-6	DAMPER	1
5	25-0317-3	COUPLING HEAD	1
6	25-0317-2	GAITER	1
7	25-0317-4	HAND BRAKE ASSEMBLY	1

JOCKEY WHEEL & CLAMP



42 mm DIAMETER SPINDLE

No.	Part No.	Description	Qty.
1	25-0323-1	HANDLE	1
2	25-0323-2	CLAMP	1
3	N/A AS SPARE	SPINDLE	1
4	25-0323-3	WHEEL	1



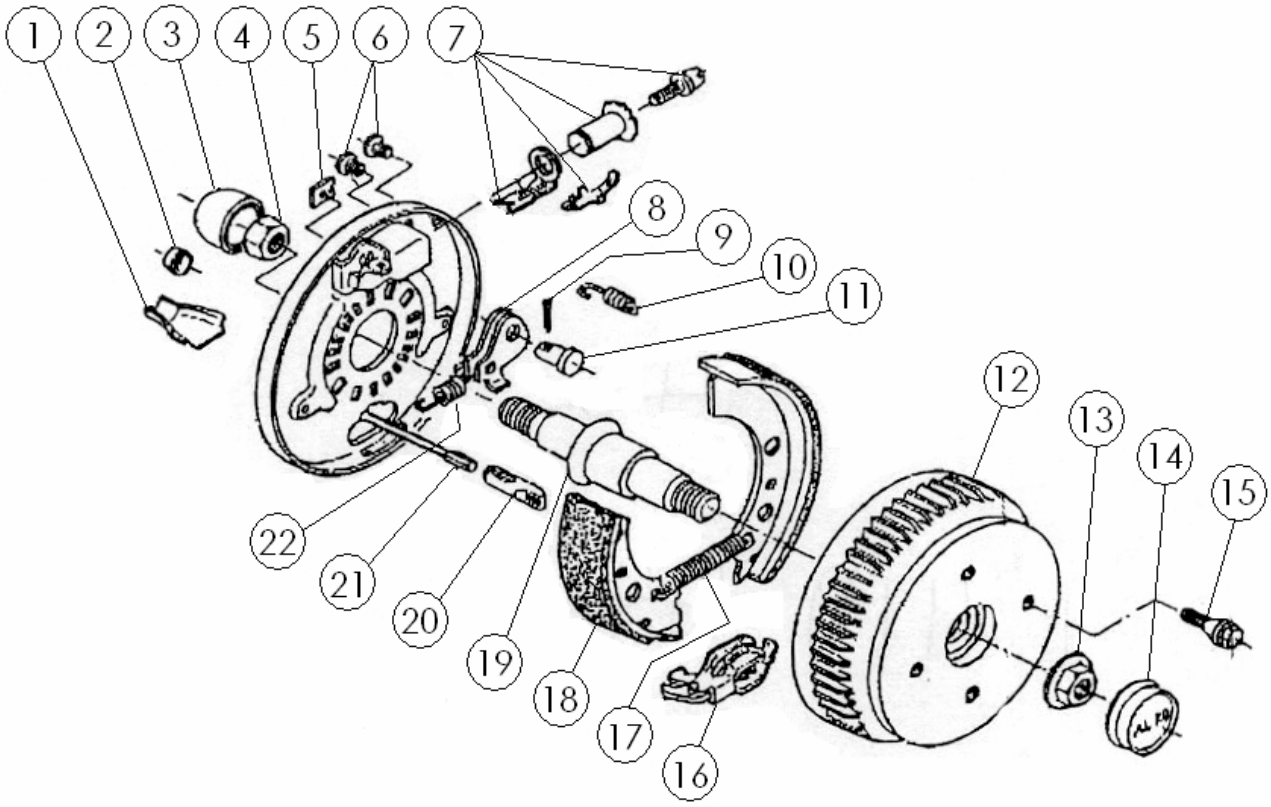
No.	Part No.	Description	Qty.
1	25-0316	MAIN AXLE COMPLETE WITH BRAKE	1
2	SEE PAGES 1.6 & 1.7	BRAKE ASSEMBLY	2
3	25-0322	COMPENSATOR FERRULE	1
4	25-0316-9	COMPENSATOR	1

There are two kinds of brake assembly fitted to the TL37 axle.

To identify the brake assembly that you have you must look at the back of the drop arm. If you see a large plastic cap (item 3 page 1.6) covering the fixing nut (item 4 page 1.6) then you have a Euro style brake assembly. If these afore mentioned items are not present then you have a Compact style brake assembly. This compact type uses an allen head bolt to secure the stub axle to the drop arm. See pages 1.6 &1.7 for further parts information.

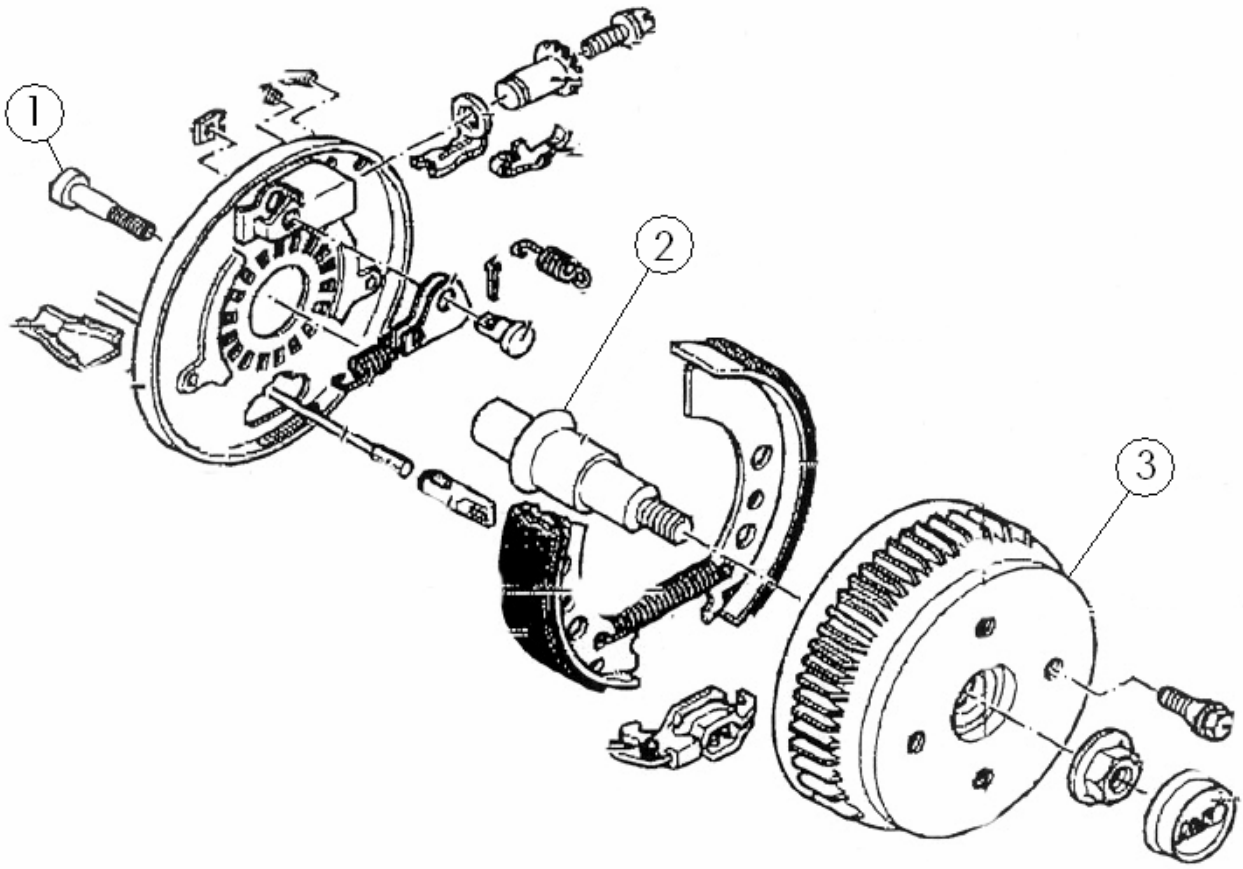
If there is any damage to the brake back plate or stub axle, the complete axle must be then returned for servicing. These two parts are not supplied loose.

EURO BRAKE ASSEMBLY



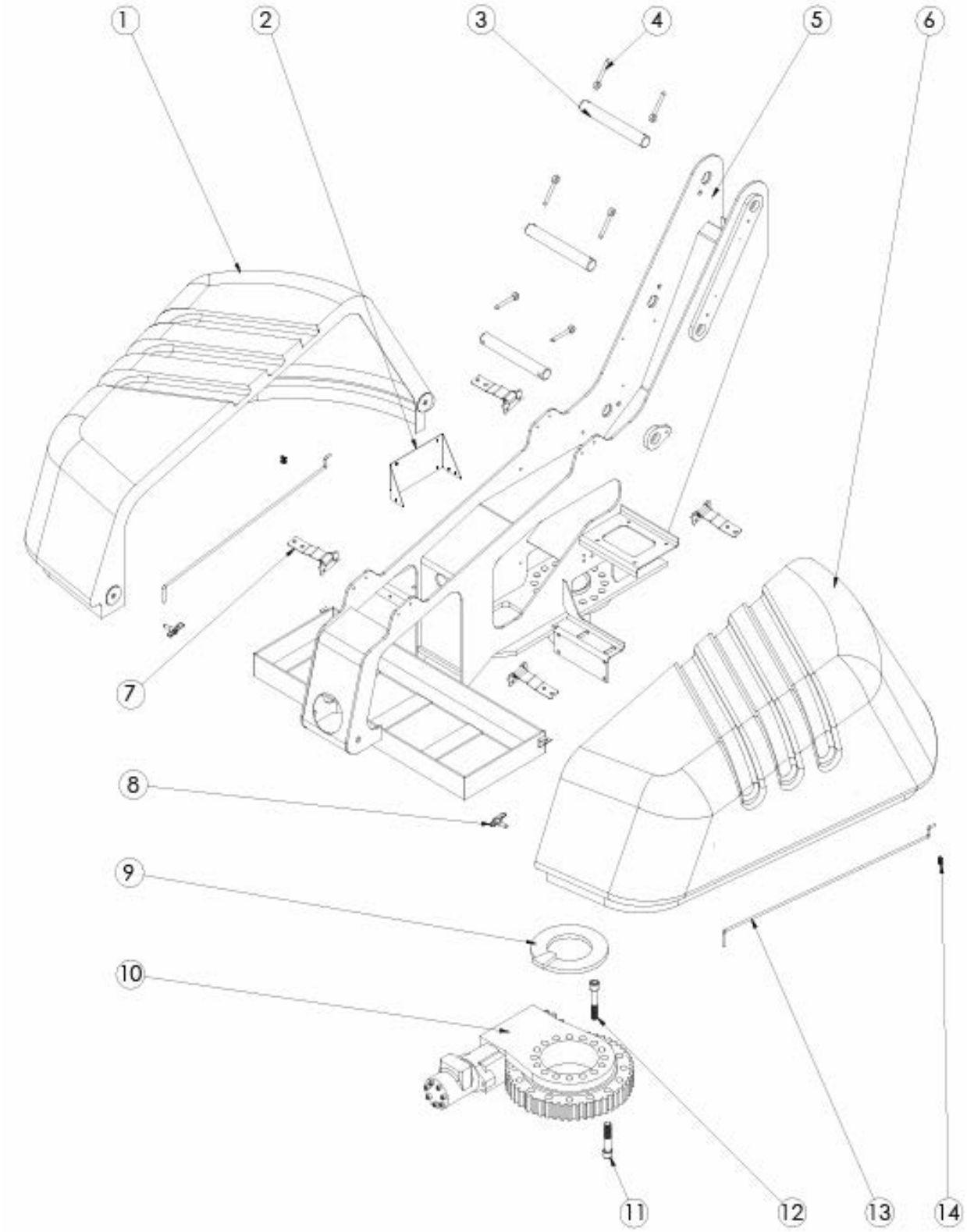
No.	Part No.	Description	Qty.
1	25-0316-2	AXLE CABLE SHELL	2
2	25-0316-11	BACK PLATE CAP	2
3	25-0316-12	COVER	2
4	25-0316-13	LOCKING NUT	2
5	25-0316-14	COVER PLATE	2
6	25-0316-15	PLASTIC LUG	4
7	25-0316-10	ADJUSTER ASSEMBLY COMPLETE	2
8	25-0316-16	REVERSE LEVER LH SIDE	1
	25-0316-17	REVERSE LEVER RH SIDE	1
9	25-0316-18	SPLIT PIN	2
10	25-0316-19	SHOE RETAINING SPRING	2
11	25-0316-20	BEARING BOLT	2
12	25-0316-6	COMPLETE DRUM	2
13	25-0316-4	AXLE FLANGE NUT - DO NOT RE-USE	2
14	25-0316-21	DUST CAP	2
15	25-0316-22	WHEEL BOLT	8
16	25-0316-26	EXPANDING CLUTCH	2
17	25-0316-7	AXLE PULL OFF SPRING	2
18	25-0316-5	BRAKE SHOES	2
19	25-0316-25	STUB AXLE - NOT SUPPLIED LOOSE	2
20	25-0316-24	CABLE EYE	2
21	25-0316-8	AXLE BOWDEN CABLE	2
22	25-0316-23	REVERSE LEVER SPRING	2

All parts are identical to the Euro style brake assembly with exception of the parts listed below



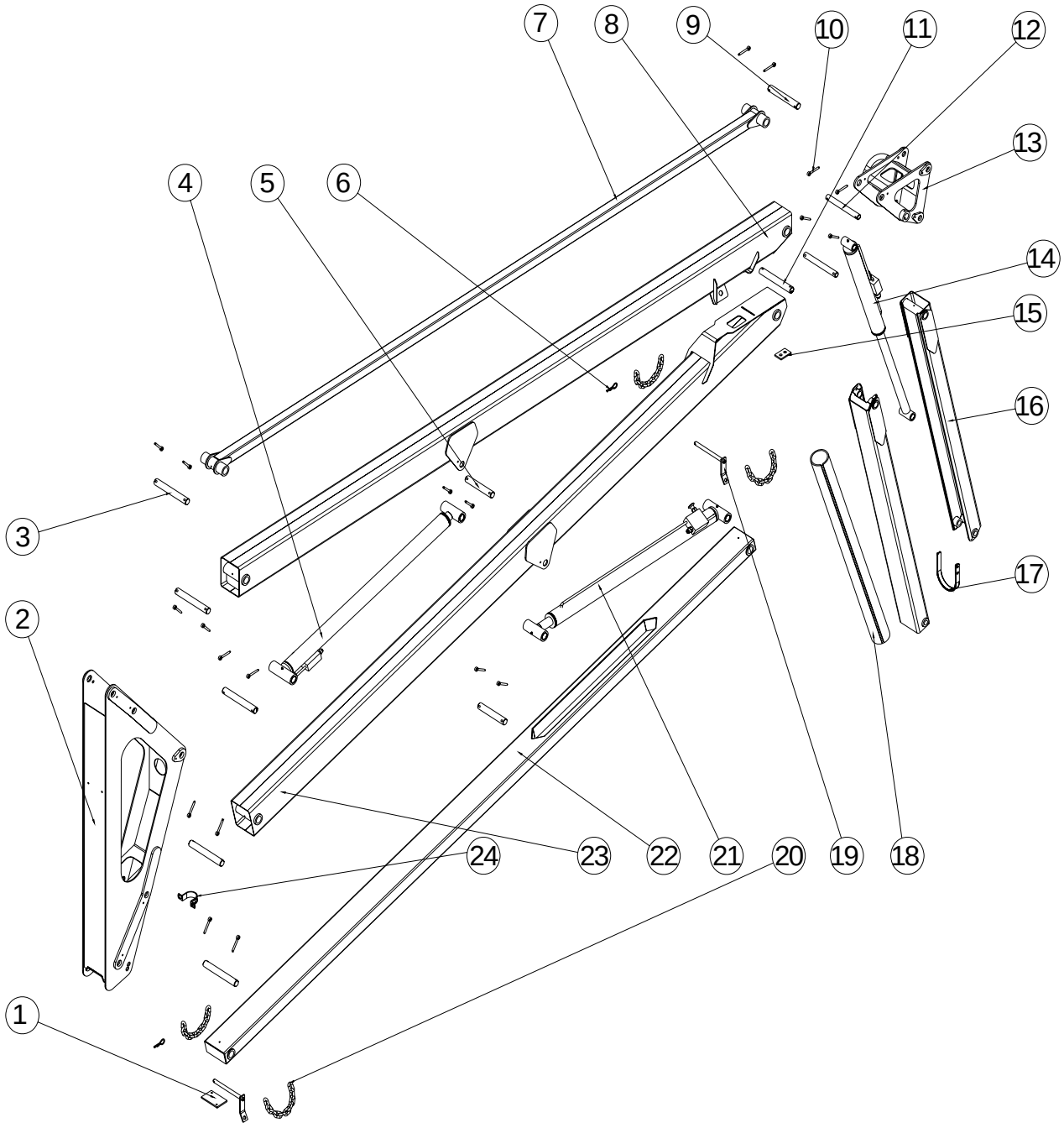
No.	Part No.	Description	Qty.
1	25-0316-29	STUB AXLE FIXING BOLT	
2	25-0316-28	STUB AXLE	
3	25-0316-27	COMPLETE DRUM	

SLEW ASSEMBLY



No.	Part No.	Description	Qty.
1	16-0135	SLEW COVER - RH	1
2	22-4945	ELECTRICAL BOX MOUNTING BRACKET	1
3	SP-030D221	PIN	3
4	10-2672	RETAINING PEG	6
5	10-4973	SLEW (BATTERY)	1
6	16-0134	SLEW COVER - LH	1
7	15-0878	HINGE	4
8	11-3313	ANTI-LUCE FASTENER	2
9	10-4449	SLEW RESTRICTOR	1
10	08-0158	SLEW DRIVE	1
11	-	M16 CAPHEAD x 80 LONG	
12	-	M16 CAPHEAD x 90 LONG	
13	22-4920	CABINET STAY	2
14	15-0861	STAY CLIP	2

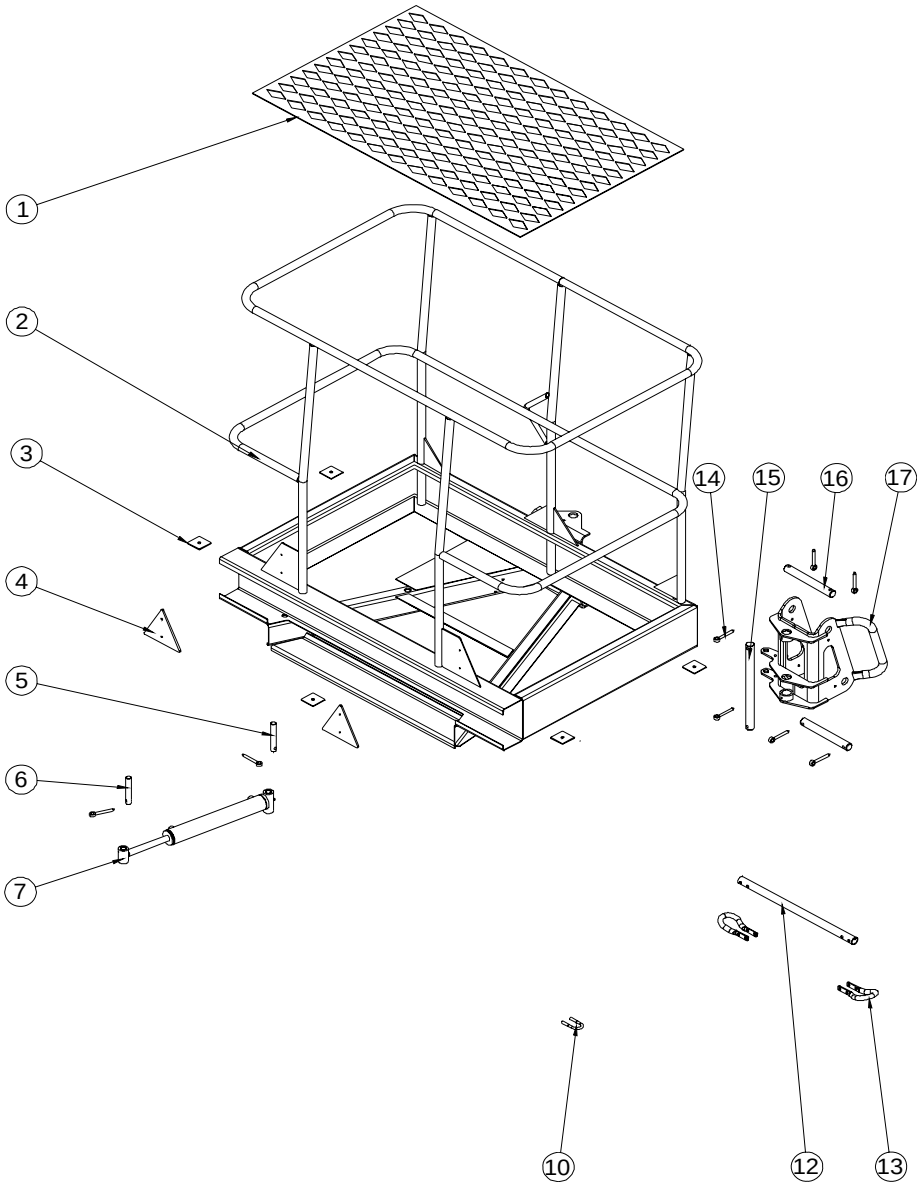
BOOM ASSEMBLY PARTS



No.	Part No.	Description	Qty.
1	15-0432	VERTICAL BOOM WEAR PAD (6mm)	-
	15-0875/5	VERTICAL BOOM WEAR PAD (5mm)	-
	15-0875/10	VERTICAL BOOM WEAR PAD (10mm)	-
	15-0875/20	VERTICAL BOOM WEAR PAD (20mm)	-
2	10-4408	VERTICAL BOOM	1
3	SP-030D221	MAIN BOOM PIN	5
4	508177-000	TOP RAM	1
5	SP-030D179	BOTTOM & TOP RAM PIVOT PIN	2
6	15-0025	R CLIP	2
7	10-4419	TOP TIE BAR	1
8	10-4415	TOP BOOM	1
9	SP-030D208	TOP TIE BAR/QUADRANT PIVOT PIN	1
10	10-2672	RETAINING PEG	20
11	SP-030K224	QUADRANT PIVOT PIN	1
12	SP-025D208	DROPNOSE/QUADRANT PIVOT PIN	2
13	10-4707	QUADRANT	1
14	508181-000	DROPNOSE RAM	1
15	15-0489	TOP BOOM WEAR PAD	1
16	10-4706	DROPNOSE BOOM	2
17	22-4927	HOSE GUIDE	2
18	15-0859	GAITER	1
19	10-3473	BOOM RETAINING PIN	2
20	15-0459	RETAINING CHAIN	4
21	508176-000	BOTTOM RAM	1
22	10-4420	BOTTOM TIE BAR	1
23	10-4416	BOTTOM BOOM	1
24	15-0867	P-CLIP	1

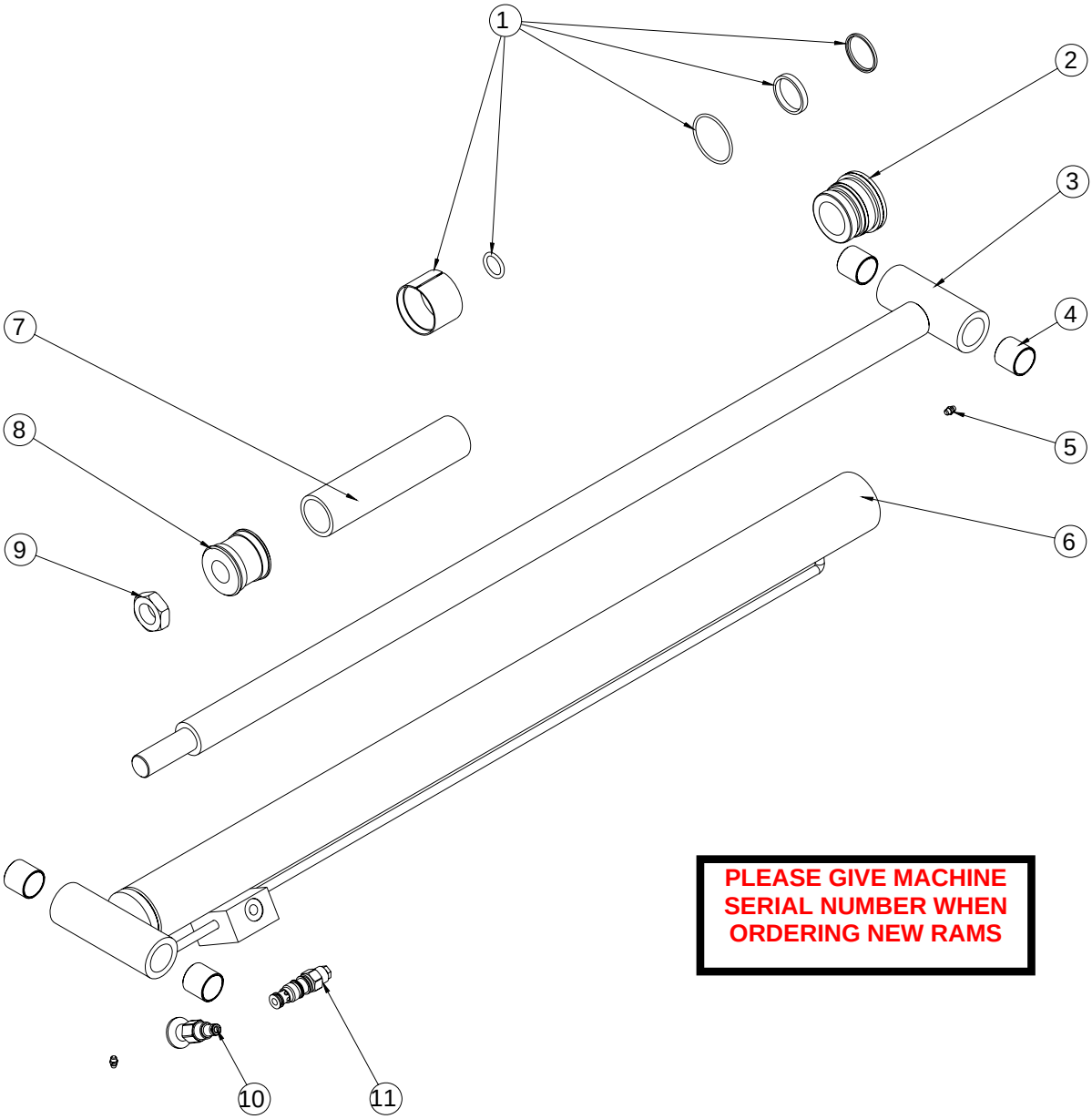
FOR ITEM 1, VERTICAL BOOM WEAR PAD, A VARIETY OF COMBINATIONS OF PADS ARE USED DEPENDING ON THE MACHINE. THE PART NUMBER IS DETERMINED BY THE THICKNESS OF THE PAD OR PADS.

CAGE ASSEMBLY



No.	Part No.	Description	Qty.
1	24-3757	STEEL MESH FLOOR	1
2	10-4701	CAGE	1
3	11-3438	WASHER	5
4	25-0311	WARNING TRIANGLE	2
5	SP016B108	PIN	1
6	SP016B102	PIN	1
7	508179-000	SLEWING BASKET RAM	1
8			
9			
10	11-3433	U-BOLT	4
11			
12	24-3772	ACCESS BAR	1
13	24-3773	ACCESS BAR CLAMP	2
14	10-2672	RETAINING PEG	8
15	SP-025D330	PIN	1
16	SP-025D201	PIN	2
17	10-4704	CAGE SUPPORT	1

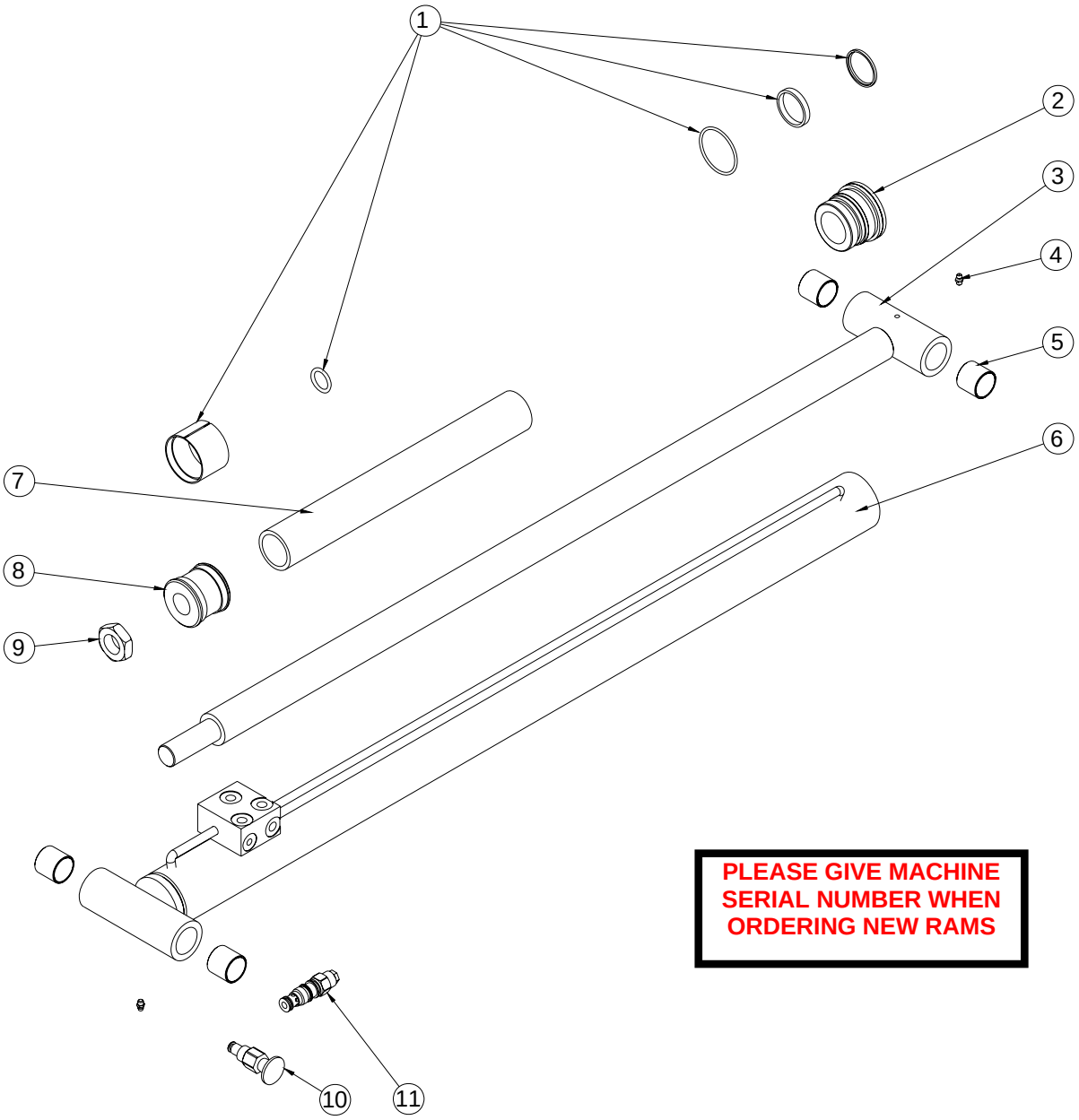
BOTTOM RAM - 508176-000



PLEASE GIVE MACHINE SERIAL NUMBER WHEN ORDERING NEW RAMS

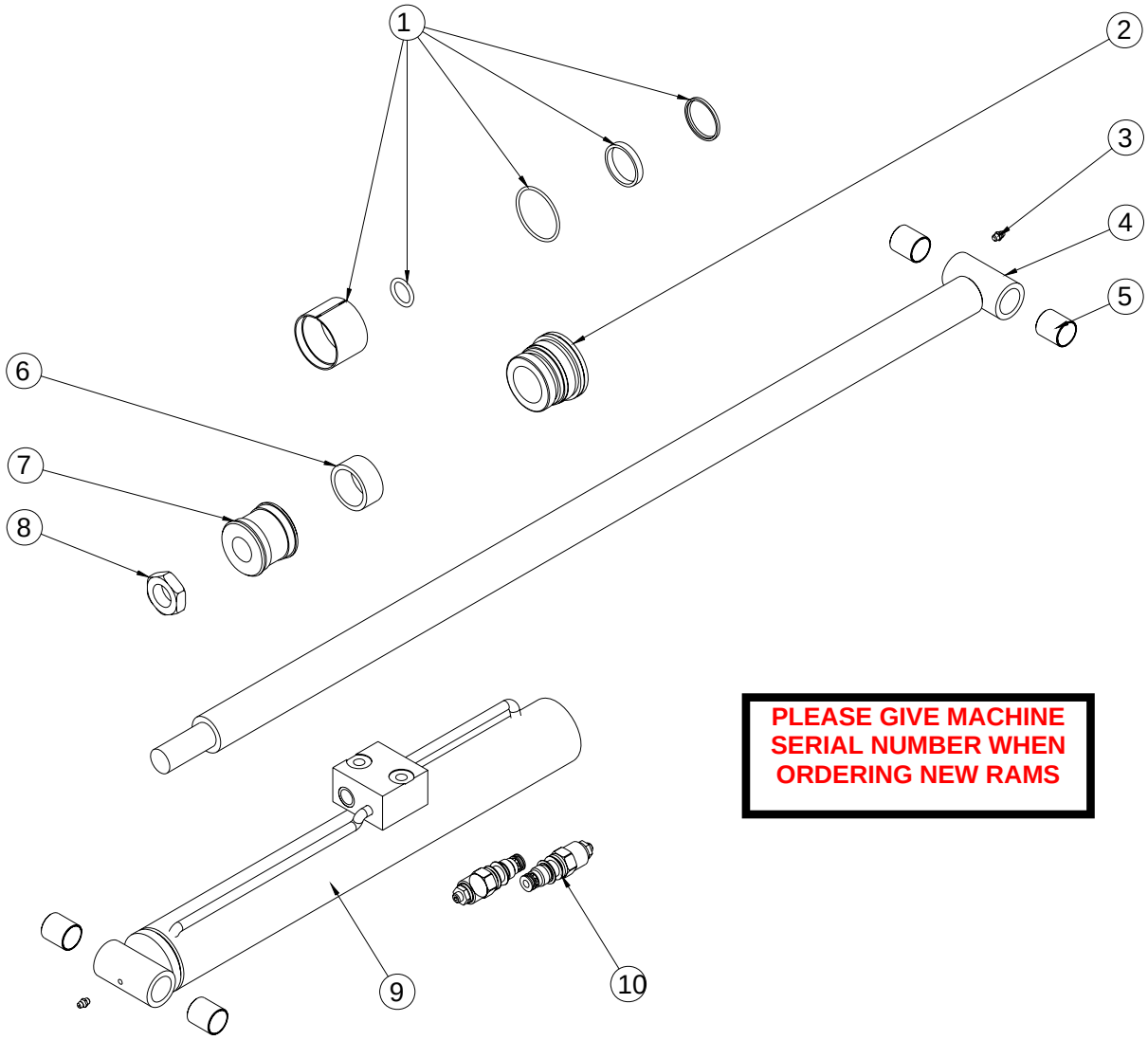
No.	Part No.	Description	Qty.
1		SEAL KIT	1
2	13-1061	HEAD BUSH	1
3	13-2400-1	ROD ASSEMBLY	1
4	SB-030030	BUSH	4
5	14-0001	GREASE NIPPLE	2
6	13-2400-2	TUBE ASSEMBLY	1
7	SS-0400214	RAM SPACER	1
8	13-1064	PISTON	1
9	13-1049	LOCKNUT	1
10		EMERGENCY LOWER CARTRIDGE	1
11		OVER CENTRE VALVE CARTRIDGE	1

TOP RAM - 508177-000



PLEASE GIVE MACHINE SERIAL NUMBER WHEN ORDERING NEW RAMS

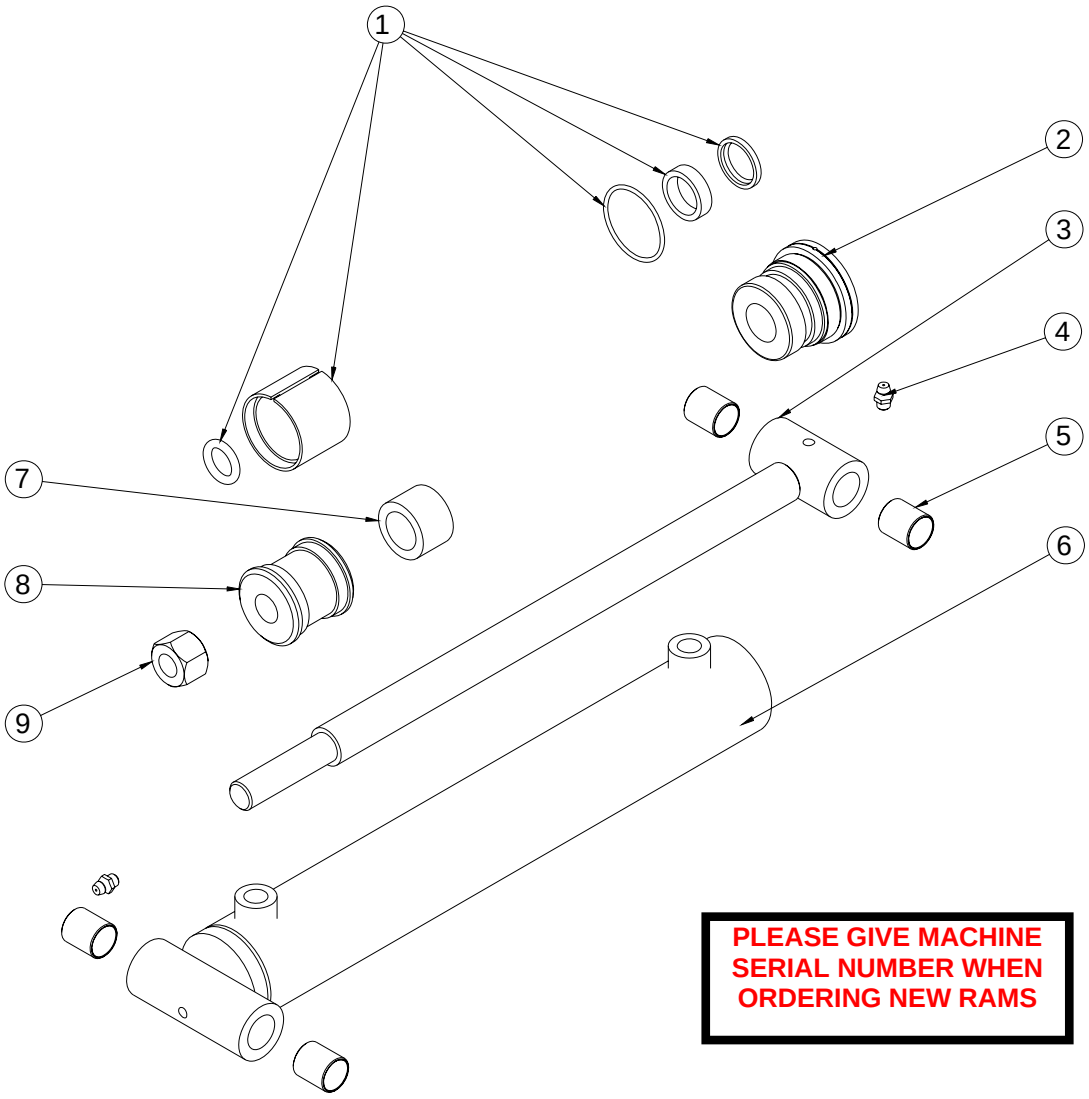
No.	Part No.	Description	Qty.
1		SEAL KIT	1
2	13-1061	HEAD BUSH	1
3	13-2401-1	ROD ASSEMBLY	1
4	14-0001	GREASE NIPPLE	2
5	SB-030030	BUSH	4
6	13-2401-2	TUBE ASSEMBLY	1
7	SS-0400390	RAM SPACER	1
8	13-1064	PISTON	1
9	13-0973	LOCKNUT	1
10		EMERGENCY LOWER CARTRIDGE	1
11		OVER CENTRE VALVE CARTRIDGE	1



PLEASE GIVE MACHINE SERIAL NUMBER WHEN ORDERING NEW RAMS

No.	Part No.	Description	Qty.
1		SEAL KIT	1
2	13-1061	HEAD BUSH	1
3	14-0001	GREASE NIPPLE	2
4	13-2402-1	ROD ASSEMBLY	1
5	SB-025030	BUSH	4
6	SS-0400023	RAM SPACER	1
7	13-1064	PISTON	1
8	13-0973	LOCKNUT	1
9	13-2402-2	TUBE ASSEMBLY	1
10		OVER CENTRE VALVE CARTRIDGE	2

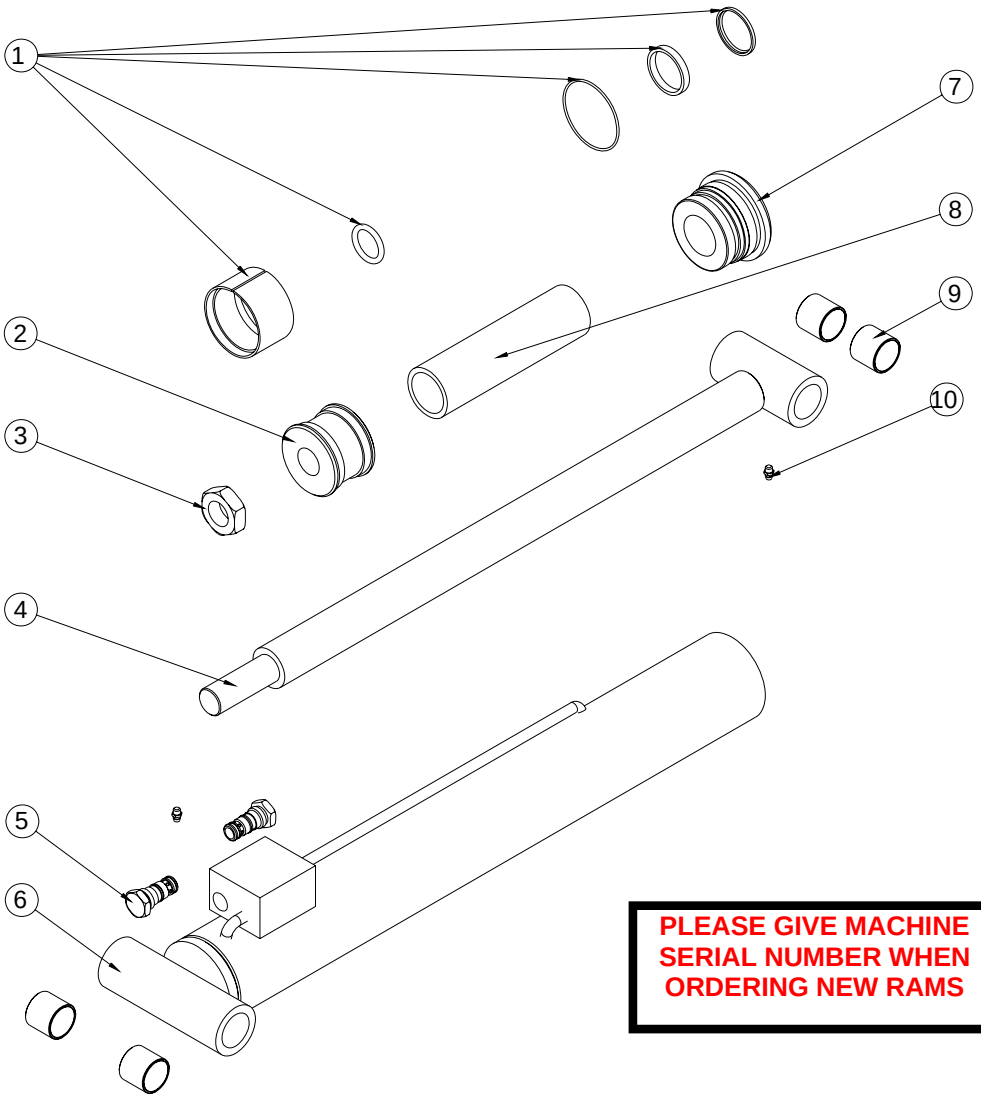
SLEWING BASKET RAM - 508179-000



PLEASE GIVE MACHINE SERIAL NUMBER WHEN ORDERING NEW RAMS

No.	Part No.	Description	Qty.
1		SEAL KIT	1
2	13-0988	HEAD BUSH	1
3	13-2403-1	ROD ASSEMBLY	1
4	14-0001	GREASE NIPPLE	2
5	SB-016020	BUSH	4
6	13-2403-2	TUBE ASSEMBLY	1
7	SS-0200020	RAM SPACER	1
8	13-0992	PISTON	1
9	13-0994	LOCKNUT	1

OUTRIGGER RAM - 508180-000

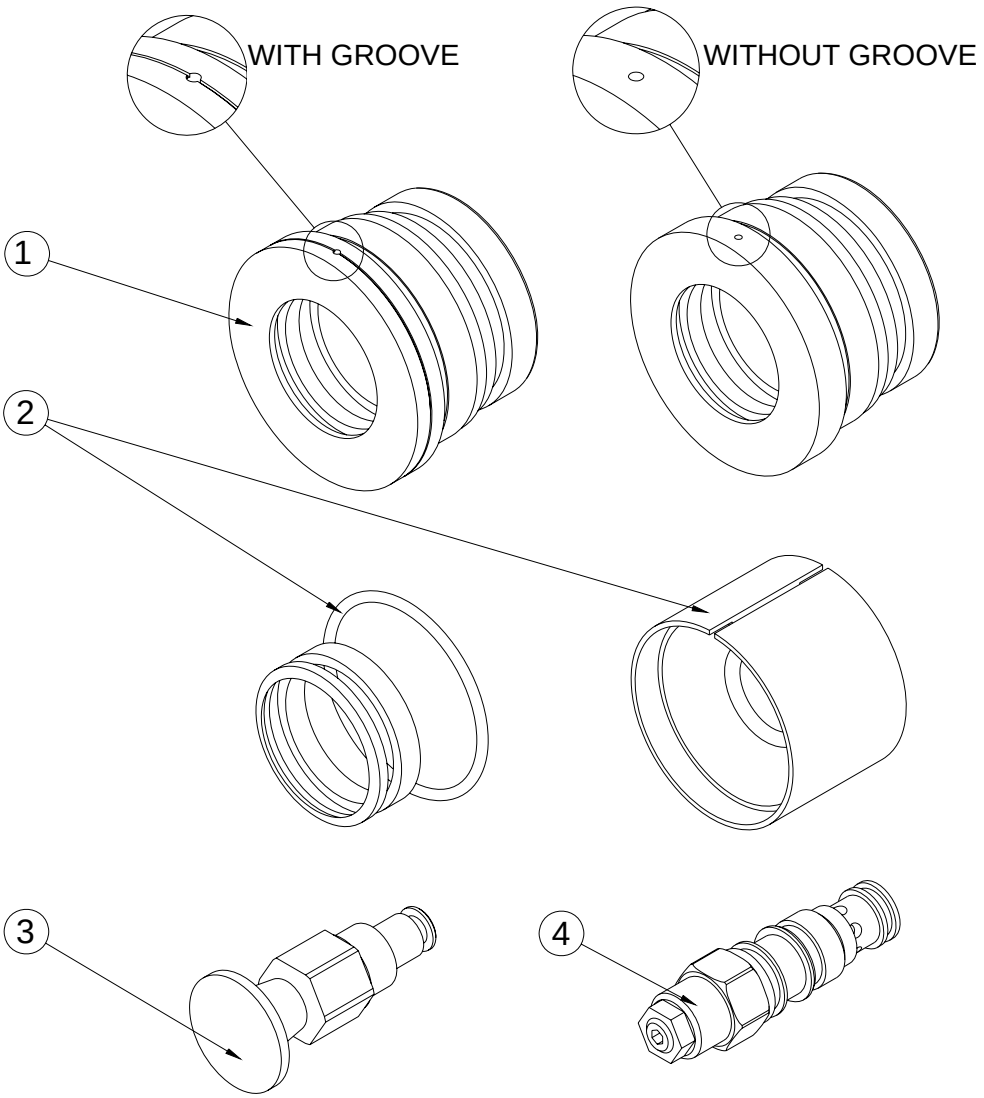


PLEASE GIVE MACHINE SERIAL NUMBER WHEN ORDERING NEW RAMS

No.	Part No.	Description	Qty.
1	13-2351	SEAL KIT	1
2	13-1007	PISTON	1
3	13-1049	LOCKNUT	1
4	13-2408/2	ROD ASSEMBLY	1
5	13-2483	CHECK VALVE	2
6	13-2408/1	TUBE ASSEMBLY	1
7	13-2437	HEAD BUSH	1
8	SS-0400180	RAM SPACER	1
9	SB-030030	BUSH	4
10	14-0001	GREASE NIPPLE	2

SEAL KIT & CARTRIDGE INFORMATION

To identify correct Seal Kit & Cartridges, check end cap for circular groove.



To identify correct Seal Kit & Cartridges, check end cap for circular groove.

TOP & BOTTOM RAMS - WITH GROOVE

No.	Part No.	Description	Qty.
1	13-1061	END CAP	1
2	13-1065/1	SEAL KIT	1
3	13-3561	EMERGENCY LOWER CARTRIDGE	1
4	13-2489	OVERCENTRE VALVE CARTRIDGE	1

TOP & BOTTOM RAMS - WITHOUT GROOVE

No.	Part No.	Description	Qty.
1	13-1061	END CAP	1
2	13-1065	SEAL KIT	1
3	13-2228	EMERGENCY LOWER CARTRIDGE	1
4	13-0392	OVERCENTRE VALVE CARTRIDGE	1

DROPNOSE RAM - WITH GROOVE

No.	Part No.	Description	Qty.
1	13-1061	END CAP	1
2	13-1065/1	SEAL KIT	1
3	N/A		
4	13-2489	OVERCENTRE VALVE CARTRIDGE	2

DROPNOSE RAM - WITHOUT GROOVE

No.	Part No.	Description	Qty.
1	13-1061	END CAP	1
2	13-1065	SEAL KIT	1
3	N/A		
4	13-0392	OVERCENTRE VALVE CARTRIDGE	2

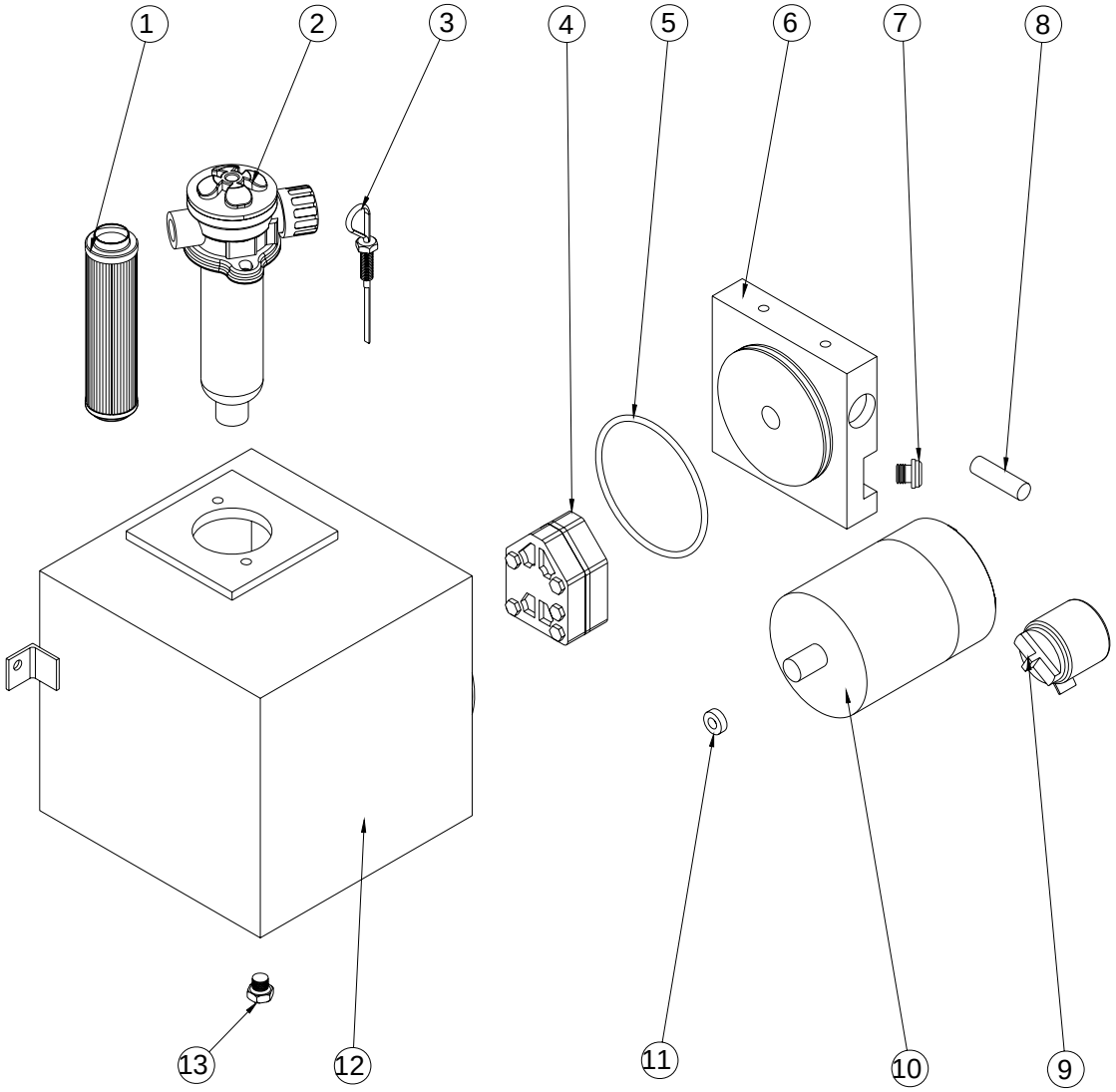
SLEWING BASKET RAM - WITH GROOVE

No.	Part No.	Description	Qty.
1	13-0988	END CAP	1
2	13-2522	SEAL KIT	1
3	N/A		
4	N/A		

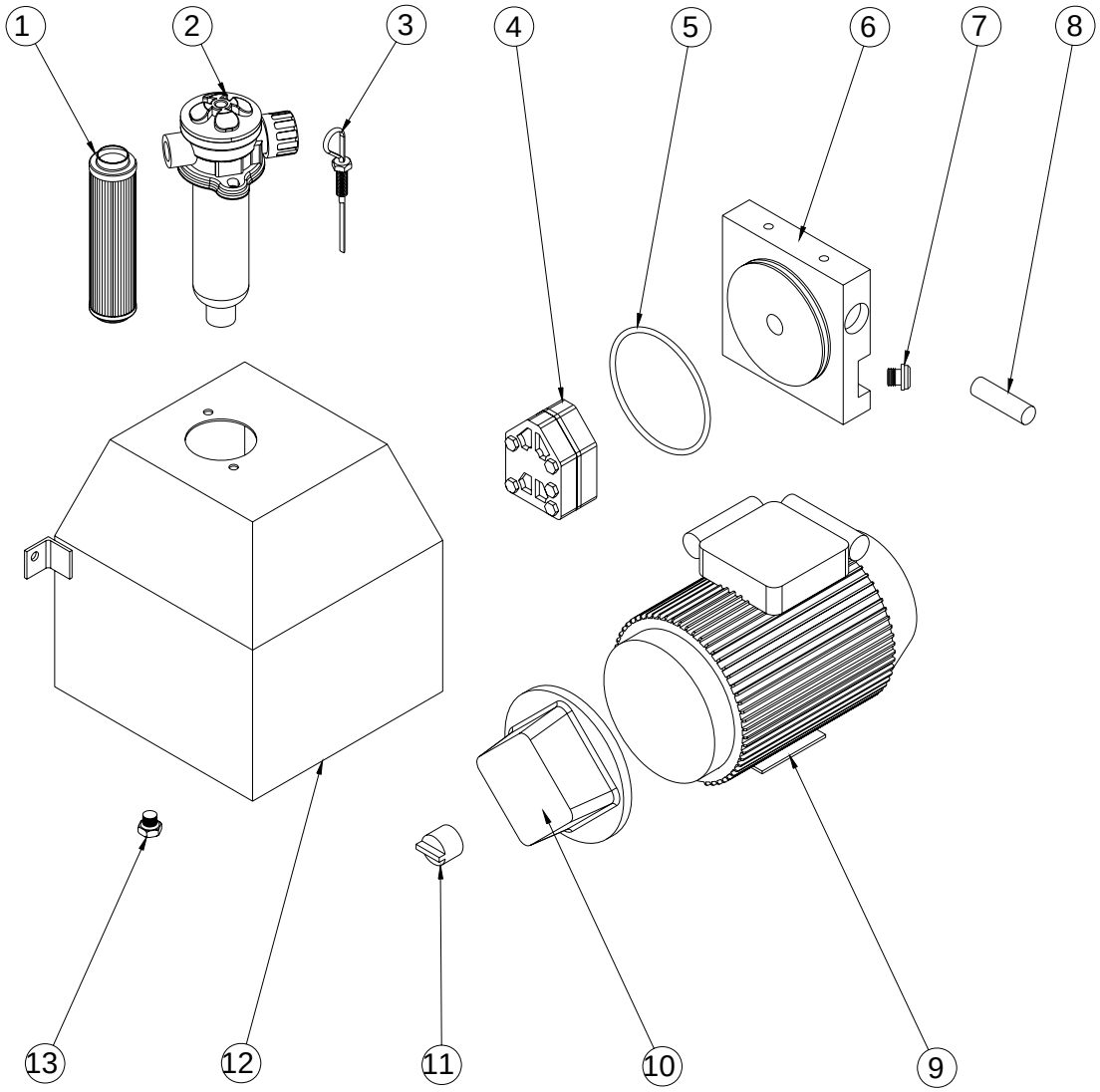
SLEWING BASKET RAM - WITHOUT GROOVE

No.	Part No.	Description	Qty.
1	13-0988	END CAP	1
2	13-0993	SEAL KIT	1
3	N/A		
4	N/A		

BATTERY POWER PACK - 19-0158

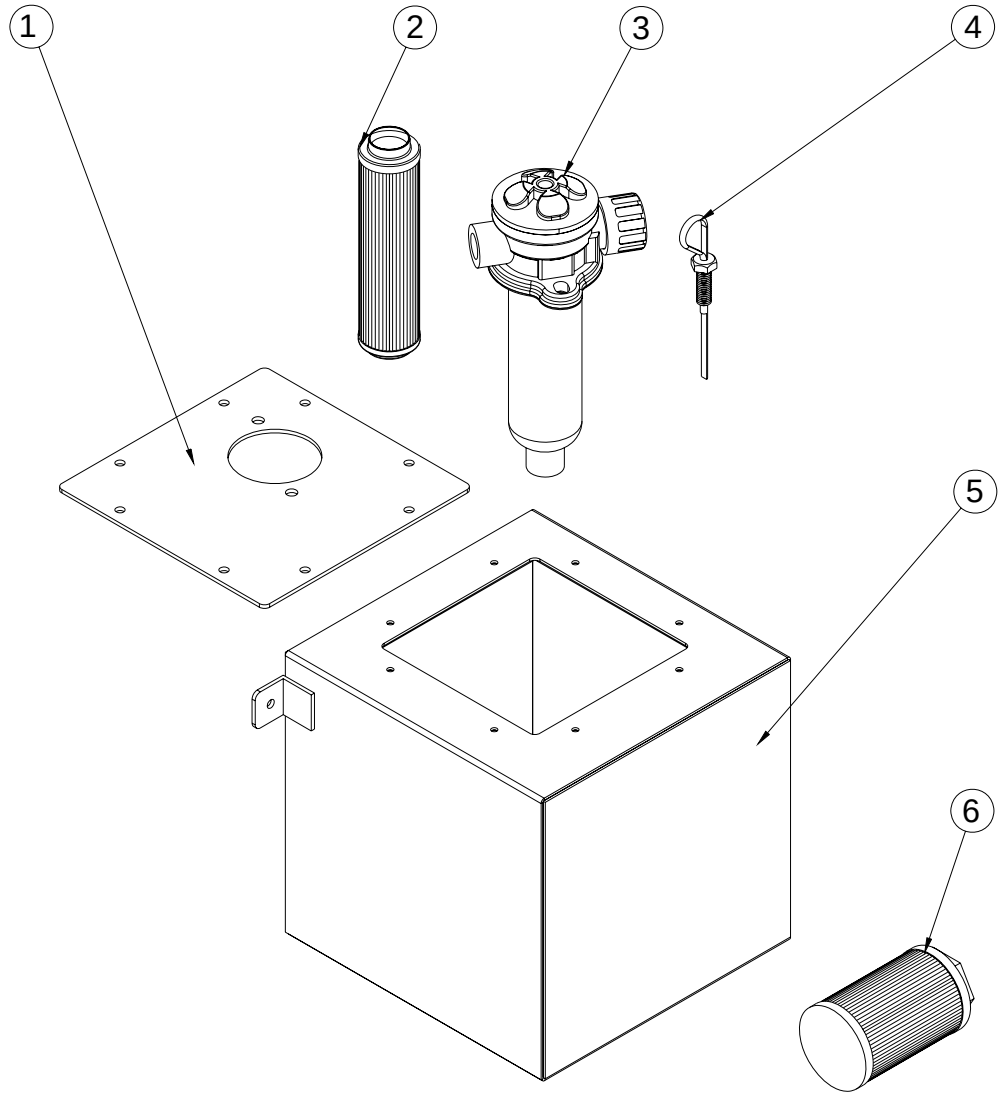


No.	Part No.	Description	Qty.
1	13-2543-1	RETURN LINE FILTER ELEMENT	1
2	13-2543	RETURN LINE FILTER	1
3	13-1695-8	DIPSTICK & BOLT	1
4	13-2482	PUMP (1.1 cc/rev)	1
5	13-3582	PORT PLATE O-RING	1
6	13-3581	PUMP HOUSING	1
7	12-2018	PLUG	1
8	13-3550	RELIEF VALVE CARTRIDGE	1
9	13-3551	24V CONTACTOR	1
10	19-0158-2	24V MOTOR WITH CONTACTOR	1
11	13-3583	OIL SEAL	1
12	19-0147-1	TANK	1
13	12-2004	PLUG	1

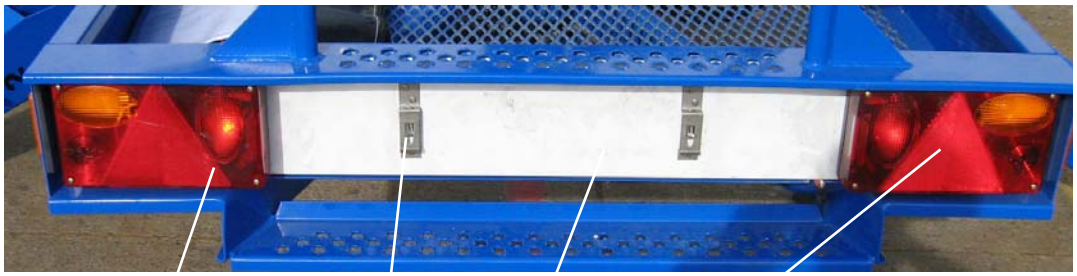


No.	Part No.	Description	Qty.
1	13-2543-1	RETURN LINE FILTER ELEMENT	1
2	13-2543	RETURN LINE FILTER	1
3	13-1695-8	DIPSTICK & BOLT	1
4	13-2482	PUMP (1.1 cc/rev)	1
5	13-3582	PORT PLATE O-RING	1
6	13-3581	PUMP HOUSING	1
7	12-2018	PLUG	1
8	13-3550	RELIEF VALVE CARTRIDGE	1
9	19-0135-2	MOTOR	1
10	19-0135-3	MOTOR FLANGE	1
11	19-0135-4	OLDHAM COUPLING	1
12	19-0135-1	TANK	1
13	12-2004	PLUG	1

PETROL POWER PACK TANK

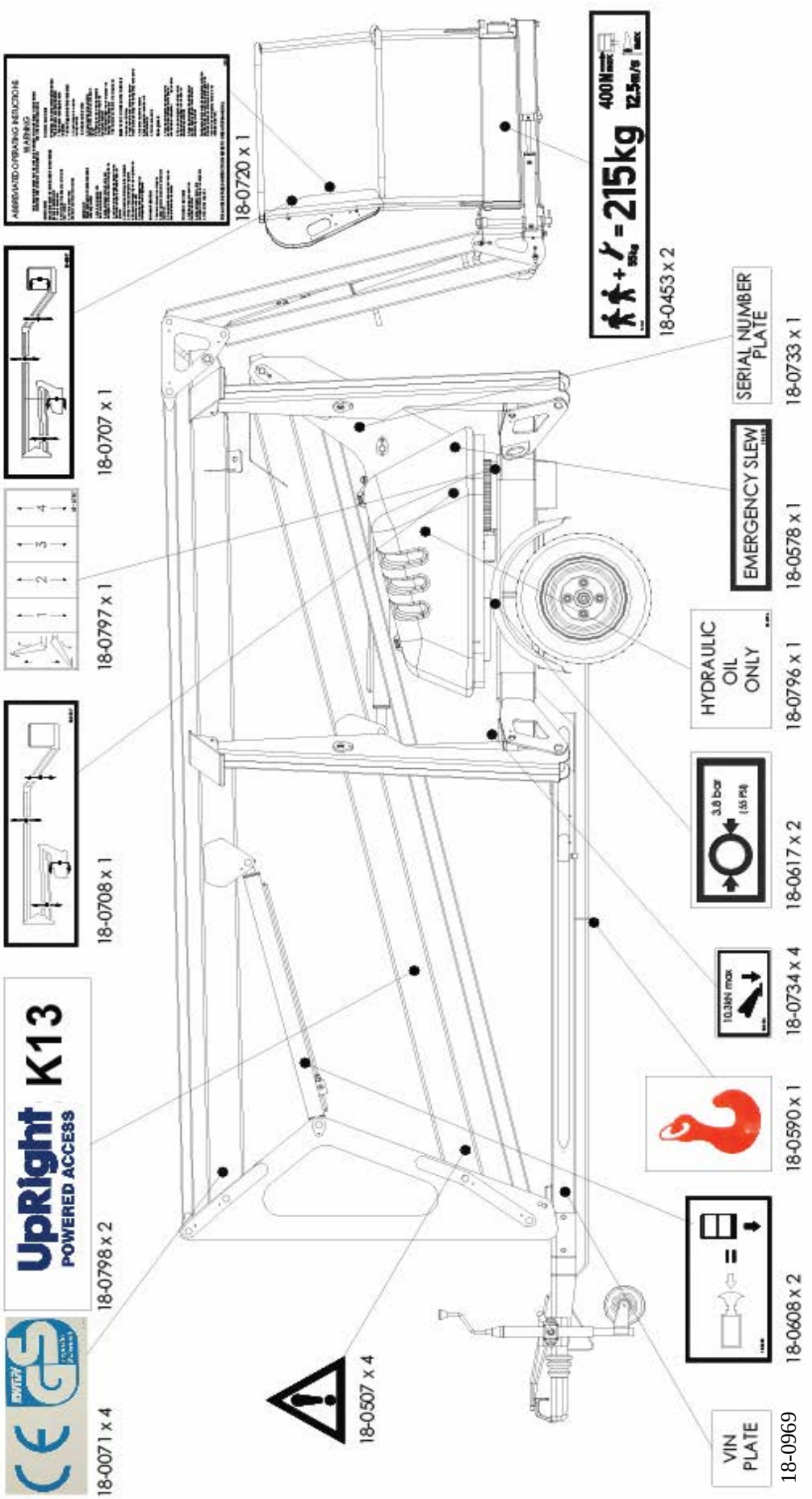


No.	Part No.	Description	Qty.
1	22-4994	HYDRAULIC TANK LID	1
2	13-2543-1	RETURN LINE FILTER ELEMENT	1
3	13-2543	RETURN LINE FILTER	1
4	13-1695-8	DIPSTICK & BOLT	1
5	10-4996	HYDRAULIC TANK	1
6	13-0339	SUCTION STRAINER	1

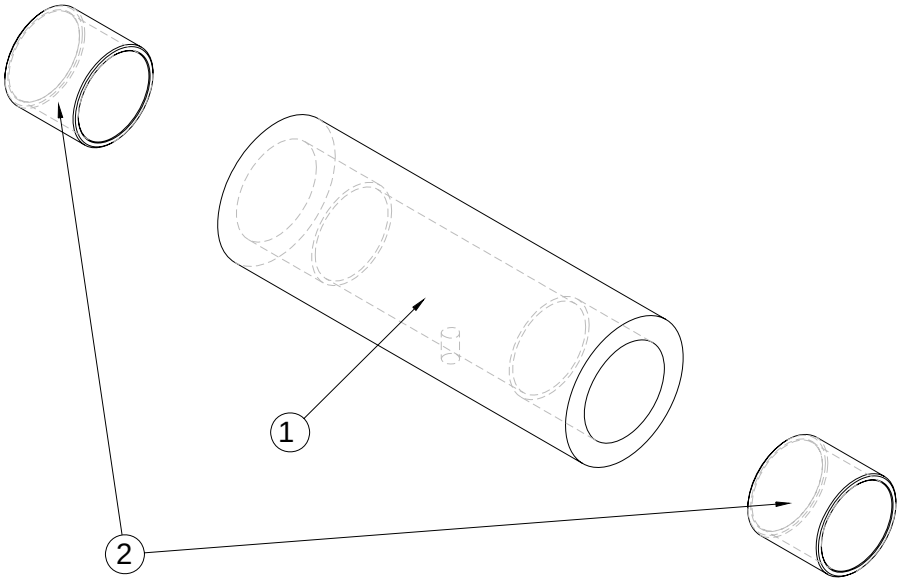


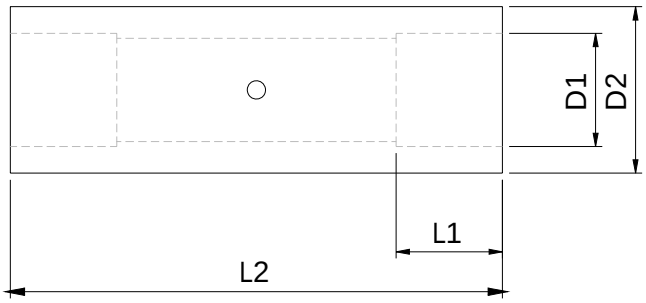
No.	Part No.	Description	Qty.
	25-0334	LIGHTING BOARD	1
1	25-0334/1	LIGHT CLUSTER LH	1
2	25-0334/2	NUMBER PLATE HOLDER	2
3	25-0334/3	PLANK	1
4	25-0334/4	LIGHT CLUSTER RH	1

DECALS


UpRight
POWERED ACCESS
K13
215kg
400N
18-0071 x 4
18-0798 x 2
18-0708 x 1
18-0797 x 1
18-0707 x 1
18-0720 x 1
18-0453 x 2
18-0507 x 4
18-0608 x 2
18-0590 x 1
18-0734 x 4
18-0617 x 2
18-0796 x 1
18-0578 x 1
18-0733 x 1
18-0969
VIN PLATE
HYDRAULIC OIL ONLY
EMERGENCY SLEW
SERIAL NUMBER PLATE

BOSSES & BUSHES





STANDARD BUSH CODE: SB-XXX XXX
e.g. SB-030040

L1 (MM)

D1 (MM)

THE BUSH MUST FILL THE COMPLETE LENGTH OF L1.
HOWEVER, IT IS ACCEPTABLE TO MAKE UP THR TOTAL LENGTH L1 BY USING MORE THAN ONE BUSH

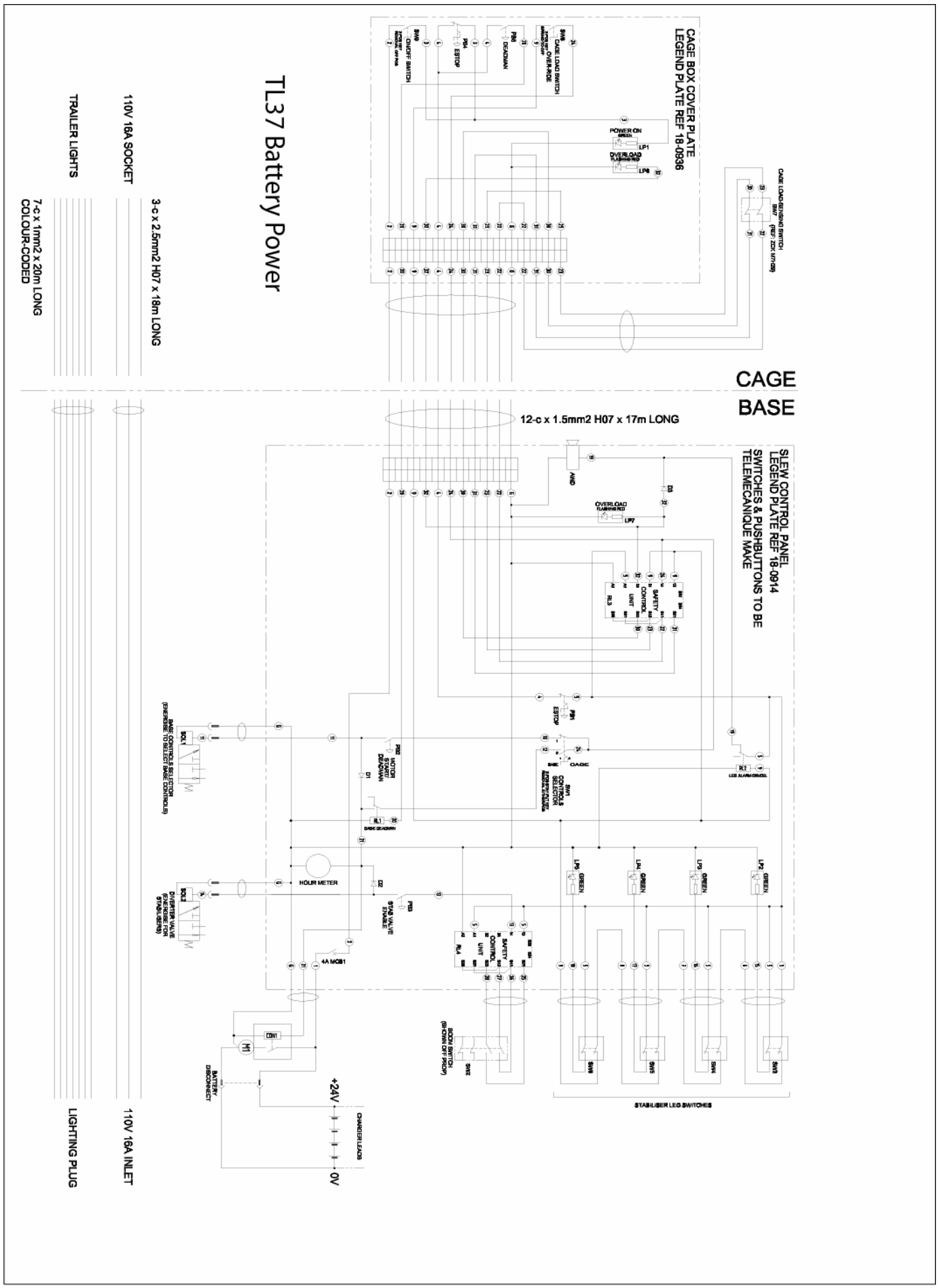
ALWAYS USE GENERAL PURPOSE GREASE ON YELLOW SURFACE OF THE BUSH .

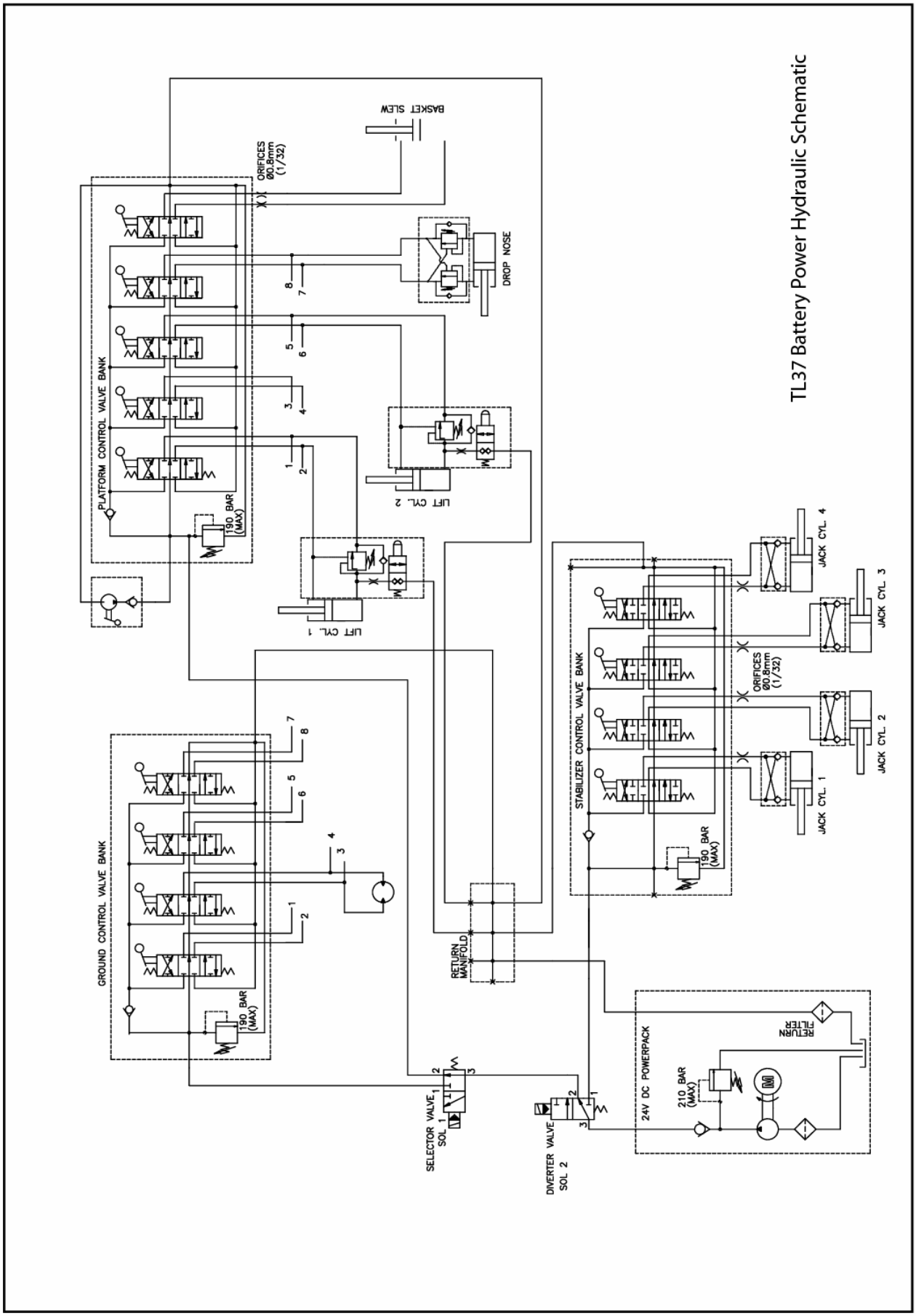
THE PIN MUST BE FREE FROM SCORES—IF IN DOUBT, REPLACE THE PIN

Bush Locations.

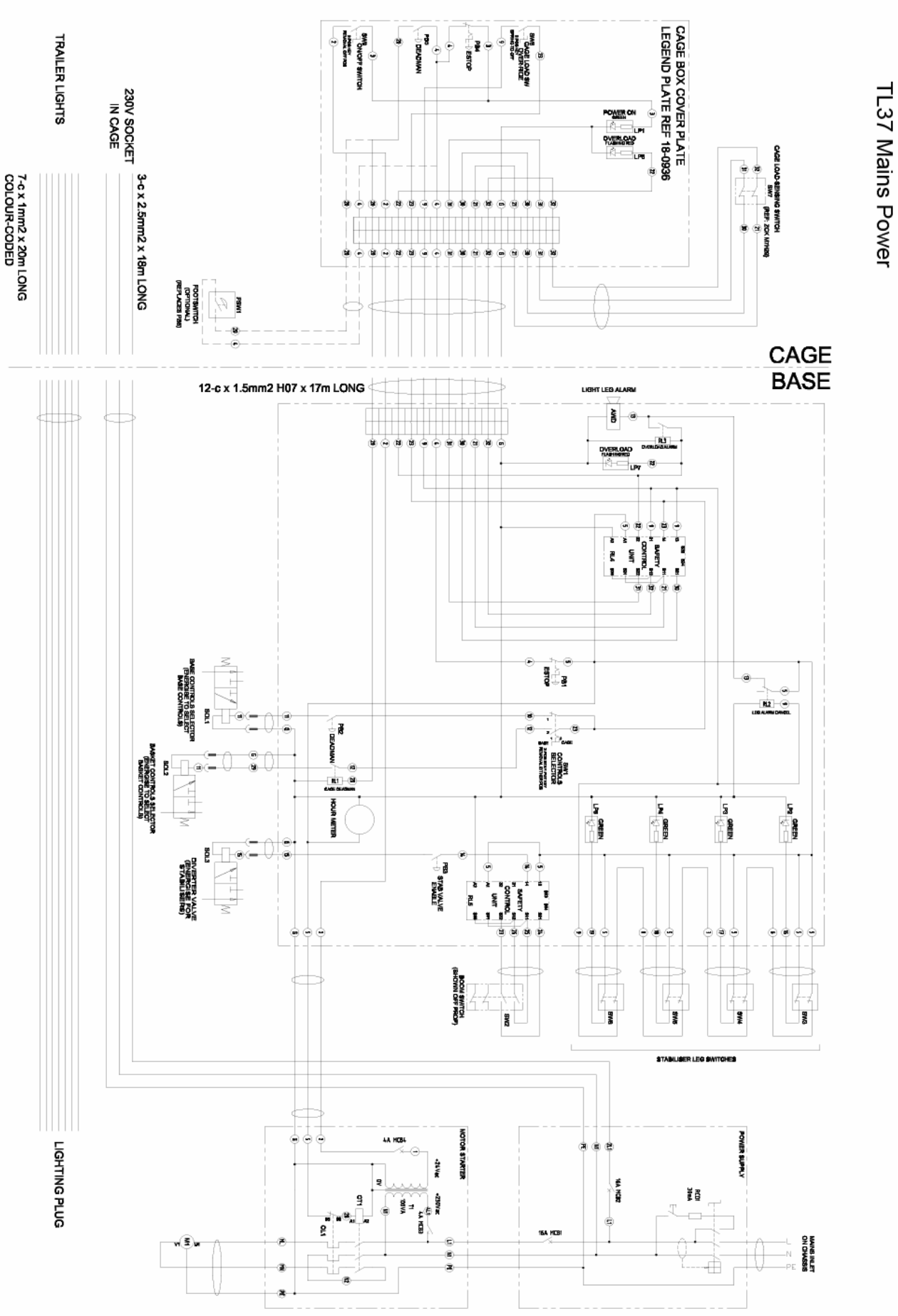
Outrigger	SB-030030 (2 off)
Bottom Tie Bar	SB-030030 (4 off)
Bottom Boom	SB-030030 (4 off)
Top Tie Bar	SB-030030 (4 off)
Top Boom	SB-030030 (4 off)
Dropnose Boom	SB-025025 (2 off, full boss), SB-025015 (4 off, short boss)
Cage Pivot	SB-025015 (2 off)
Bottom Ram	SB-030030 (4 off)
Top Ram	SB-030030 (4 off)
Dropnose Ram	SB-025025 (4 off)
Outrigger Ram	SB-030030 (4 off)
Slewing Basket Ram	SB-016025 (2 off, cylinder end), SB-016015 (2 off, rod end)

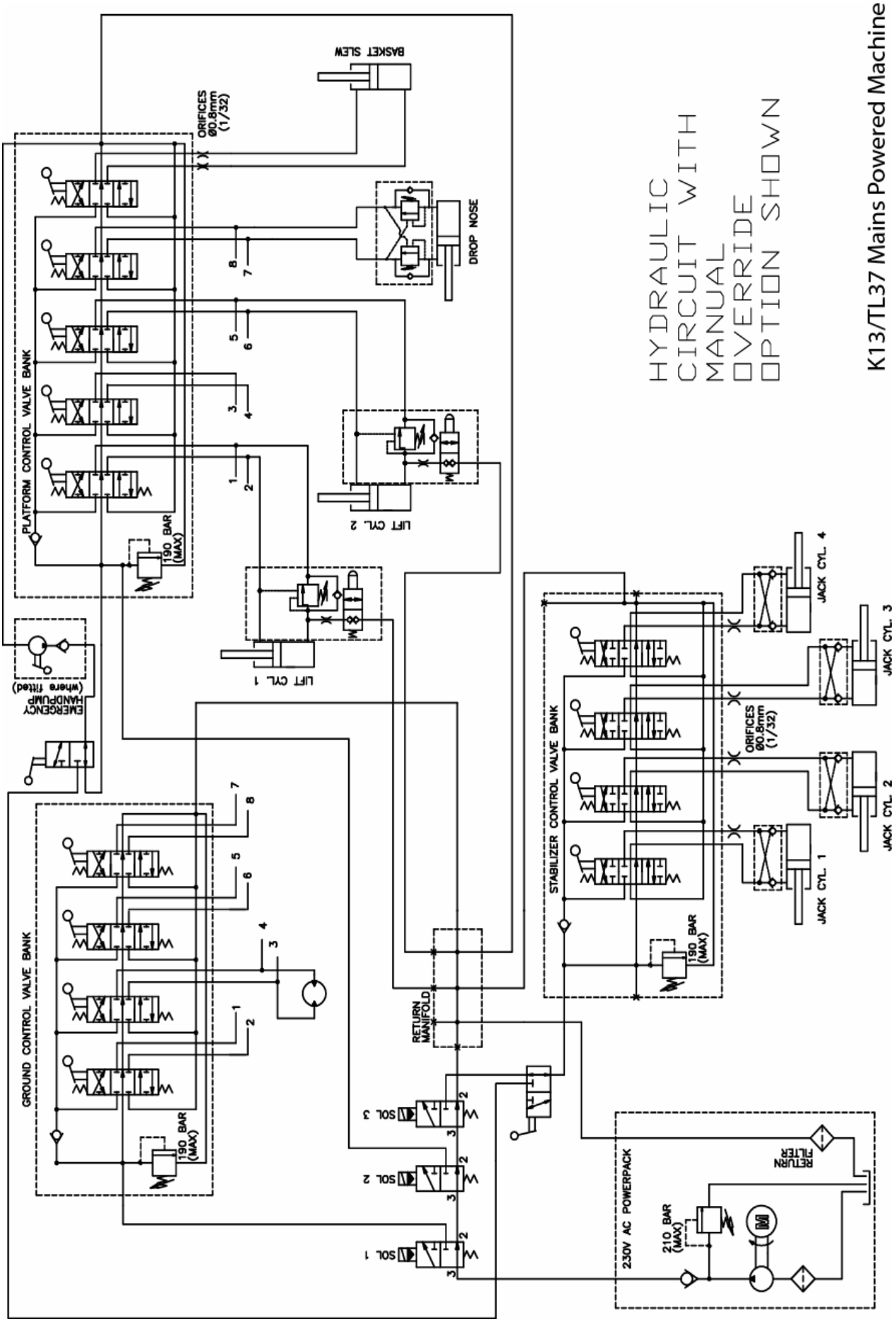
BATTERY - CIRCUIT SCHEMATIC



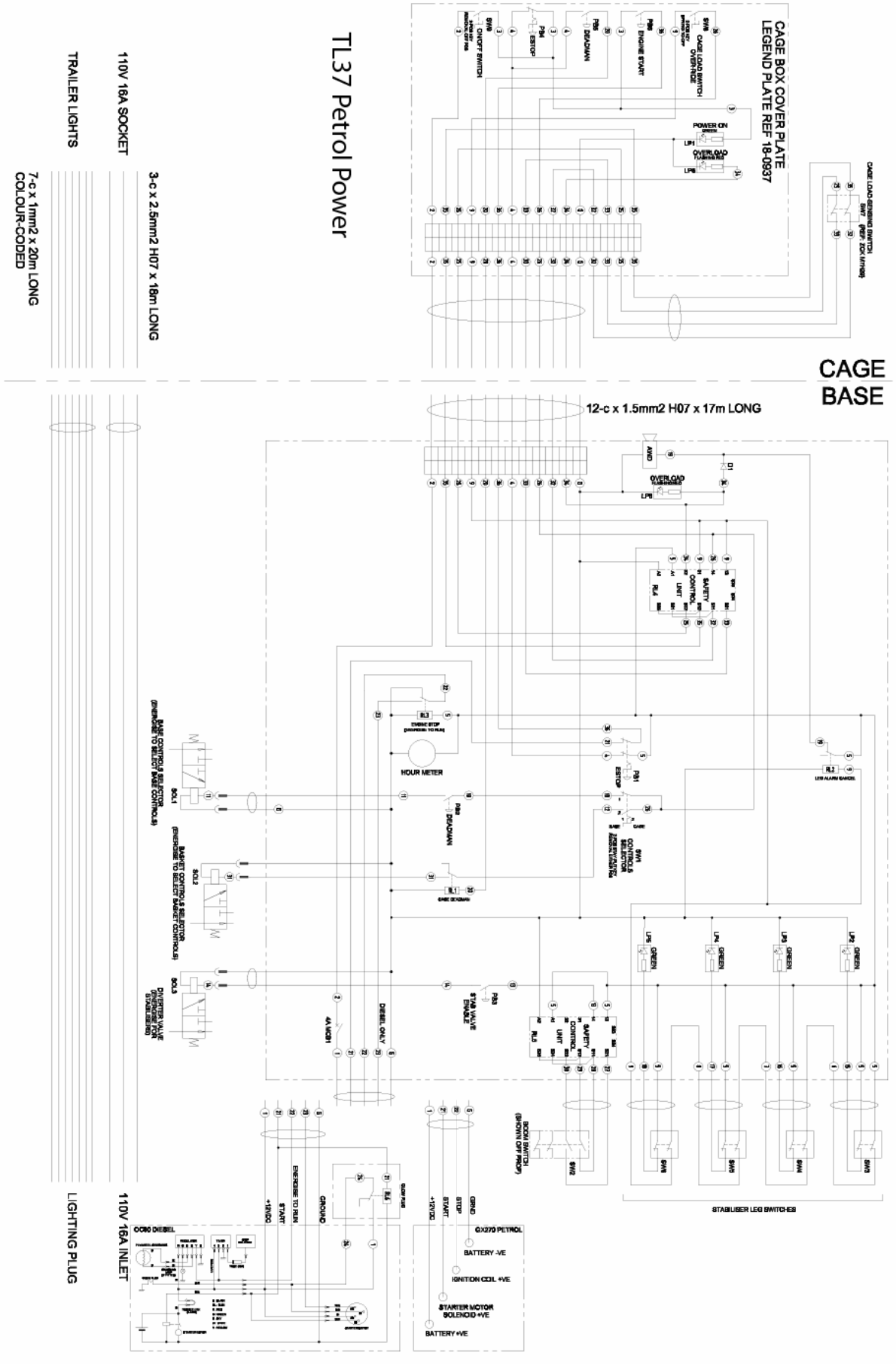

TL37 Battery Power Hydraulic Schematic
BASKET SLEW
ORIFICES Ø0.8mm (1/32)
DROP NOSE
PLATFORM CONTROL VALVE BANK
190 BAR (MAX)
LIFT CYL. 2
LIFT CYL. 1
GROUND CONTROL VALVE BANK
190 BAR (MAX)
STABILIZER CONTROL VALVE BANK
190 BAR (MAX)
ORIFICES Ø0.8mm (1/32)
JACK CYL. 4
JACK CYL. 3
JACK CYL. 2
JACK CYL. 1
RETURN MANIFOLD
SELECTOR VALVE SOL 1
DIVERTER VALVE SOL 2
24V DC POWERPACK
210 BAR (MAX)
RETURN FILTER

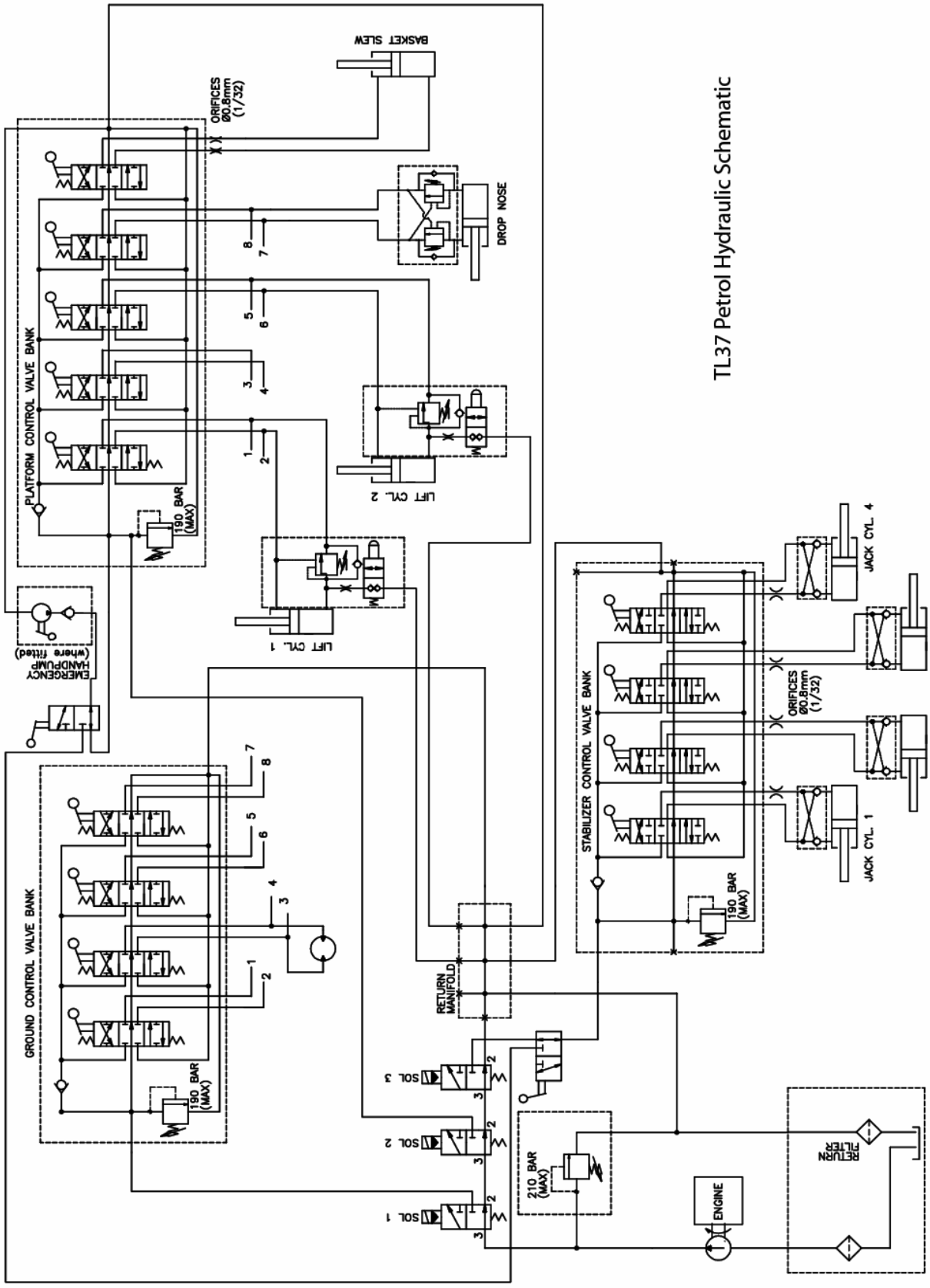
MAINS - CIRCUIT SCHEMATIC



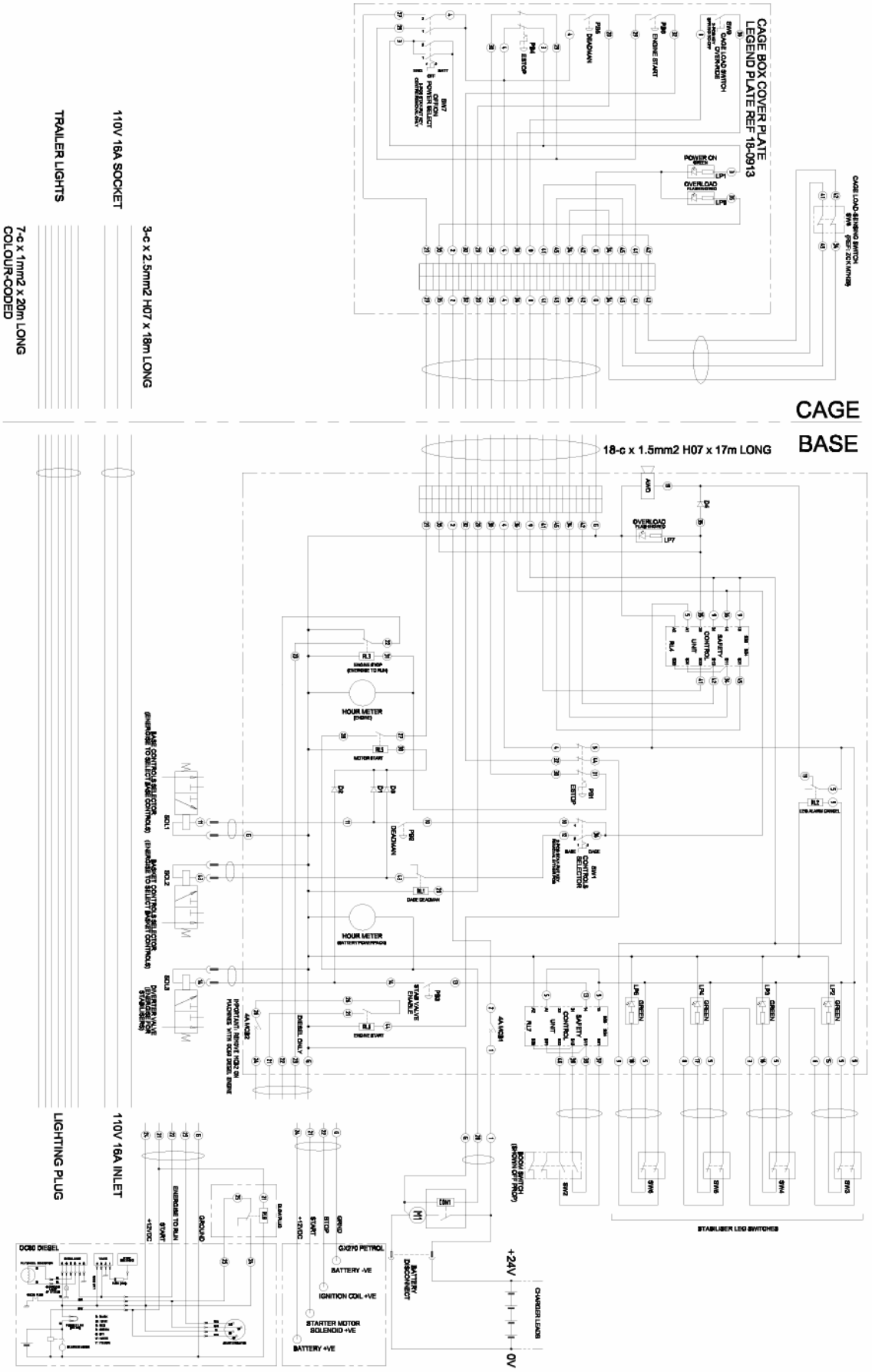

K13/TL37 Mains Powered Machine
HYDRAULIC CIRCUIT WITH MANUAL OVERRIDE OPTION SHOWN
BASKET SLEW
ORIFICES Ø0.8mm (1/32)
DROP NOSE
PLATFORM CONTROL VALVE BANK
190 BAR (MAX)
LIFT CYL. 2
LIFT CYL. 1
EMERGENCY HANDPUMP (where fitted)
GROUND CONTROL VALVE BANK
190 BAR (MAX)
RETURN MANIFOLD
STABILIZER CONTROL VALVE BANK
ORIFICES Ø0.8mm (1/32)
190 BAR (MAX)
JACK CYL. 4
JACK CYL. 3
JACK CYL. 2
JACK CYL. 1
SOL 3
SOL 2
SOL 1
230V AC POWERPACK
210 BAR (MAX)
RETURN FILTER

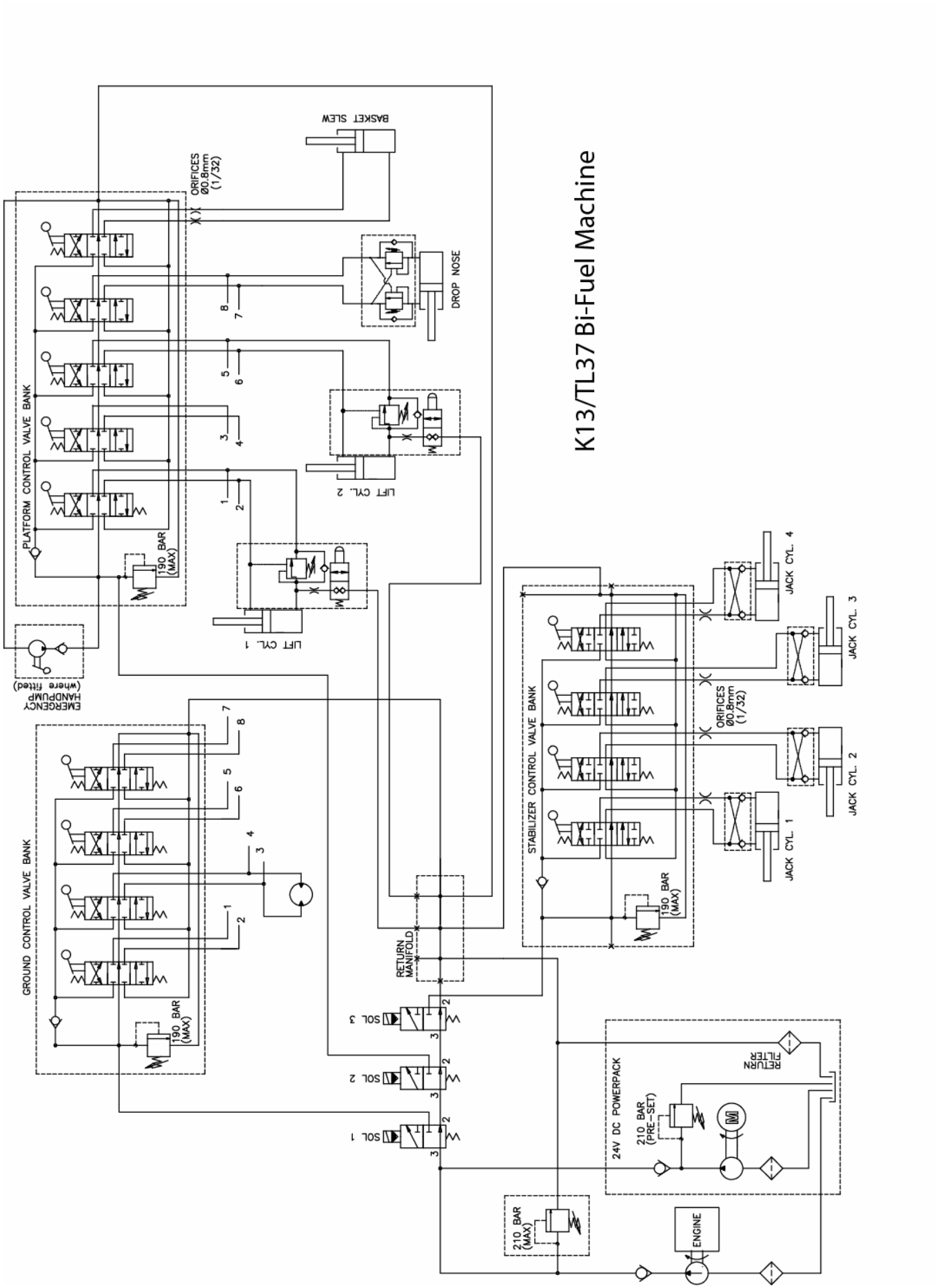
PETROL - CIRCUIT SCHEMATIC




TL37 Petrol Hydraulic Schematic
BASKET SLEW
ORIFICES Ø0.8mm (1/32)
DROP NOSE
PLATFORM CONTROL VALVE BANK
190 BAR (MAX)
LIFT CYL. 2
LIFT CYL. 1
EMERGENCY HANDPUMP (where fitted)
GROUND CONTROL VALVE BANK
190 BAR (MAX)
RETURN MANIFOLD
SOL 3
SOL 2
SOL 1
210 BAR (MAX)
ENGINE
RETURN FILTER
STABILIZER CONTROL VALVE BANK
ORIFICES Ø0.8mm (1/32)
190 BAR (MAX)
JACK CYL. 4
JACK CYL. 3
JACK CYL. 2
JACK CYL. 1

BI-FUEL - CIRCUIT SCHEMATIC




K13/TL37 Bi-Fuel Machine
BASKET SLEW
ORIFICES Ø0.8mm (1/32)
DROP NOSE
PLATFORM CONTROL VALVE BANK
190 BAR (MAX)
LIFT CYL. 2
LIFT CYL. 1
EMERGENCY HANDPUMP (where fitted)
GROUND CONTROL VALVE BANK
190 BAR (MAX)
RETURN MANIFOLD
STABILIZER CONTROL VALVE BANK
ORIFICES Ø0.8mm (1/32)
190 BAR (MAX)
JACK CYL. 4
JACK CYL. 3
JACK CYL. 2
JACK CYL. 1
SOL 3
SOL 2
SOL 1
24V DC POWERPACK
210 BAR (PRE-SET)
RETURN FILTER
210 BAR (MAX)
ENGINE

HYDRAULIC PARTS LISTS

BATTERY HYDRAULICS PARTS LIST (CIRCUIT 31-hc-20-b)

Part No.	Description	Qty.	Comments
13-2329	SOLENOID VALVE	1	SOL1
13-2329-1	SOLENOID VALVE REPLACEMENT COIL	-	FOR SOL1
13-2367	RETURN MANIFOLD	1	-
13-2536	GROUND CONTROL VALVE BANK	1	-
13-2537	STABILISER CONTROL VALVE BANK	1	-
13-2539	CONTROL VALVE HANDLE	5	ON 13-2541
13-2540	CONTROL VALVE HANDLE	8	ON 13-2536 & 13-2537
13-2541	PLATFROM CONTROL VALVE BANK	1	-
13-3547	EMERGENCEY HAND PUMP (17cc)	1	-
13-3548	PUMP HANDLE	1	ON 13-3547
13-3549	CHECK VALVE	1	-

MAINS HYDRAULIC PARTS LIST (CIRCUIT 31-hc-24-a)

Part No.	Description	Qty.	Comments
13-2367	RETURN MANIFOLD	1	-
13-2536	GROUND CONTROL VALVE BANK	1	-
13-2537	STABILISER CONTROL VALVE BANK	1	-
13-2539	CONTROL VALVE HANDLE	5	ON 13-2541
13-2540	CONTROL VALVE HANDLE	8	ON 13-2536 & 13-2537
13-2541	PLATFROM CONTROL VALVE BANK	1	-
13-3547	EMERGENCEY HAND PUMP (17cc)	1	-
13-3548	PUMP HANDLE	1	ON 13-3547
13-3549	CHECK VALVE	1	-
13-3576	SOLENOID VALVE	2	SOL1 & SOL2
13-3576-1	SOLENOID VALVE REPLACEMENT COIL	-	FOR SOL1 & SOL2

PETROL HYDRAULICS PARTS LIST (CIRCUIT 31-hc-28-a)

Part No.	Description	Qty.	Comments
13-0959	RELIEF VALVE	1	
13-2367	RETURN MANIFOLD	1	-
13-2536	GROUND CONTROL VALVE BANK	1	-
13-2537	STABILISER CONTROL VALVE BANK	1	-
13-2539	CONTROL VALVE HANDLE	5	ON 13-2541
13-2540	CONTROL VALVE HANDLE	8	ON 13-2536 & 13-2537
13-2541	PLATFROM CONTROL VALVE BANK	1	-
13-3547	EMERGENCEY HAND PUMP (17cc)	1	-
13-3548	PUMP HANDLE	1	ON 13-3547
13-3549	CHECK VALVE	1	-
13-3573	SOLENOID VALVE	2	SOL1 & SOL2
13-3573-1	SOLENOID VALVE REPLACEMENT COIL	-	FOR SOL1 & SOL2

REPLACEMENT CARTRIDGE FOR ALL SOLENOID VALES IS 13-1294-1

BI-FUEL HYDRAULICS PARTS LIST (CIRCUIT 31hc-26-a)			
	(Petrol and Battery)		
Part No.	**Description**	**Qty**	**Comments**
13-0959	RELIEF VALVE	1	
13-1949	BELL HOUSING	1	
13-1950	COUPLING	1	
13-2329	SOLENOID VALVE	2	
13-2367	RETURN MANIFOLD	1	
13-2536	GROUND CONTROL VALVE BANK	1	
13-2537	STABILISER CONTROL VALVE BANK	1	
13-2539	CONTROL VALVE HANDLE	5	ON 13-2541
13-2540	CONTROL VALVE HANDLE	8	ON 13-2536 & 13-2537
13-2541	PLATFORM CONTROL VALVE BANK	1	
13-3547	EMERGENCY HAND PUMP (17cc)	1	
13-3548	PUMP HANDLE	1	ON 13-3537
13-3549	CHECK VALVE	1	
13-3649	PUMP	1	
13-3650	PUMP ELBOW 3/8"	1	
13-3651	PUMP ELBOW 1/2"	1	

HYDRAULIC HOSE LIST

No.	Part No.	Description	Qty.
-	13-3552	HYDRAULIC HOSE LIST (BATTERY POWER)	1
-	13-3555	HYDRAULIC HOSE LIST (MAINS POWER)	1
-	13-3559	HYDRAULIC HOSE LIST (PETROL POWER)	1
-	13-3597	HYDRAULIC HOSE LIST (BI FUEL)	1
1	C1	CAGE – TANK	1
2	C2	BASE V/V CARRY OVER – CAGE	1
3	C3	CAGE – BOTTOM RAM	1
4	C4	CAGE – BOTTOM RAM	1
5	C5	CAGE V/V – TOP RAM	1
6	C6	CAGE V/V – TOP RAM	1
7	C7	CAGE V/V – SLEW MOTOR TEES	2
8	C8	CAGE V/V TEE – DROPNOSE RAM	2
9	C9	EMER. H/PUMP – PRESSURE CAGE V/V	1
10	C10	EMER. H/PUMP – TANK CAGE V/V	1
11	C11	CAGE V/V – SLEWING CAGE RAM	1
12	C12	CAGE V/V – SLEWING CAGE RAM	1
13	C13	PRESSURE – O/R VALVE (NOT PETROL OR BI-FUEL)	1
14	C14	TANK MAN. – O/R VALVE TANK	1
15	C15	O/R VALVE – O/R RAM '1'	2
16	C16	O/R VALVE – O/R RAM '2'	2
17	C17	O/R VALVE – O/R RAM '3'	2
18	C18	O/R VALVE – O/R RAM '4'	2
19	C19	PUMP – SOLENOID VALVE (NOT PETROL)	1
20	C20	SOLENOID VALVE – BASE VALVE PRESS.	1
21	C21	BASE VALVE – BOTTOM RAM	1
22	C22	BASE VALVE – BOTTOM RAM	1
23	C23	TANK MAN – BOTTOM RAM E. LOWER	1
24	C24	BASE VALVE – TOP RAM	1
25	C25	BASE VALVE – TOP RAM	1
26	C26	TANK MAN. – TOP RAM E. LOWER	1
27	C27	BASE V/V – TEE P. CAGE V/V (D/NOSE)	2
28	C28	BASE VALVE – TANK MANIFOLD	1
29	C29	BASE VALVE - SLEW	2
30	C30	DIVERTER V/V – TANK MANIFOLD (MAINS ONLY)	1
31	C31	TANK – RETURN LINE MANIFOLD	1
32	C32	SOL. 1, PORT 1 – BASE V/V PRESS (PETROL & BI-FUEL ONLY)	1
33	C33	ENGINE PRESS. – MAIN RELIEF TEE (PETROL & BI-FUEL ONLY)	1
34	C34	MAIN RELIEF – TANK MANIFOLD (PETROL & BI-FUEL ONLY)	1
35	C35	PRESS. POINT TEE – SOL. 1, PORT 3 (PETROL & BI-FUEL ONLY)	1
36	C36	SOL. 1, PORT 2 – SOL. 2, PORT 3 (PETROL & BI-FUEL ONLY)	1
37	C37	SOL. 2, PORT 2 – TANK MANIFOLD (PETROL & BI-FUEL ONLY)	1
38	C38	SOL. 2, PORT 1 – PRESS. O/R VALVE (PETROL & BI-FUEL ONLY)	1
39	C39	SUCTION FROM TANK - ENGINE (PETROL & BI-FUEL ONLY)	1

Part No.	Description	Qty.
13-3546	HYDRAULIC FITTING LIST (BATTERY & MAINS POWER)	1
12-0901	¼" BSP Male x ¼" BSP Male Straight Adaptor	10
12-0902	3/8" BSP Male x 3/8" BSP Male Straight Adaptor	6
12-0903	½" BSP Male x ½" BSP Male Straight Adaptor	1
12-1001	¼" BSP Male x 3/8" BSP Male Straight Adaptor	31
12-1004	½" BSP Male x 3/8" BSP Male Straight Adaptor	1
12-1005	¼" BSP Male x ½" BSP Male Straight Adaptor	2
12-1011	¼" BSP Female Swivel x 3/8" BSP Male Straight Adaptor	1
12-1105	¼" BSP Male Equal Tee	1
12-1107	¼" BSP Equal Tee F.O.R	4
12-1118	¼" BSP Equal Tee F.O.B	2
12-1119	3/8" BSP Equal Tee F.O.R	1
12-1210	¼" BSP Male on the Branch x 3/8" BSP Male x 3/8" BSP	1
12-1501	½" Dowty Washer	5
12-1502	3/8" Dowty Washer	49
12-1507	¼" Dowty Washer	12
12-1887	¼" BSP Male x ¼" BSP Male Pos. Elbow	11
12-2001	½" BSP Male Plug	2
12-2003	3/8" BSP Male Plug	3
12-2004	¼" BSP Male Plug	2
12-3017	¼" BSP Ferrule	1
12-3149	¼" BSP Pressure Test Point	1
12-3150	¼" BSP Male x 3/8" BSP Male 1/32" Orifice Straight Adaptor	6

HYDRAULIC FITTING LIST

Part No.	Description	Qty.
13-3560	HYDRAULIC FITTING LIST (PETROL POWER)	1
13-3598	HYDRAULIC FITTING LIST (BI-FUEL)	1
12-0901	¼" BSP Male x ¼" BSP Male Straight Adaptor	12
12-0902	$^{3}/_{8}$" BSP Male x $^{3}/_{8}$" BSP Male Straight Adaptor	6
12-0903	½" BSP Male x ½" BSP Male Straight Adaptor	1
12-1001	¼" BSP Male x $^{3}/_{8}$" BSP Male Straight Adaptor	36
12-1004	½" BSP Male x $^{3}/_{8}$" BSP Male Straight Adaptor	2
12-1005	¼" BSP Male x ½" BSP Male Straight Adaptor	2
12-1011	¼" BSP Female Swivel x $^{3}/_{8}$" BSP Male Straight Adaptor	1
12-1105	¼" BSP Male Equal Tee	1
12-1107	¼" BSP Equal Tee F.O.R	6
12-1118	¼" BSP Equal Tee F.O.B	2
12-1119	$^{3}/_{8}$" BSP Equal Tee F.O.R	1
12-1210	¼" BSP Male on the Branch x $^{3}/_{8}$" BSP Male x $^{3}/_{8}$" BSP Female Unequal Tee	1
12-1501	½" Dowty Washer	6
12-1502	$^{3}/_{8}$" Dowty Washer	51
12-1507	¼" Dowty Washer	20
12-1887	¼" BSP Male x ¼" BSP Male Pos. Elbow	11
12-2001	½" BSP Male Plug	2
12-2003	$^{3}/_{8}$" BSP Male Plug	1
12-2004	¼" BSP Male Plug	4
12-2010	½" BSP Female Plug	1
12-3017	¼" BSP Ferrule	1
12-3149	¼" BSP Pressure Test Point	1
12-3150	¼" BSP Male x $^{3}/_{8}$" BSP Male $^{1}/_{32}$" Orifice Straight Adaptor	6
12-9000	¼" BSP Male x $^{3}/_{8}$" BSP Male 1.4mm Orifice Straight Adaptor (BI-FUEL ONLY)	4

TYPE 1

TYPE 2

TYPE 3

Switch Variations.

There are three different variations of switches that may be fitted to the machine which can be identified by looking at the back of the switch.

The three variations are shown in the diagram above.

Type 1. These are the switches which are listed on the previous page with there corresponding part numbers. The type 1 switch is not interchangeable with the other types of switch.

Type 2 & Type 3 These two types of switches are interchangeable as they use the same size cut out in the electrical box. However if you do change from type 2 to type 3 switch heads or vice versa, then you must change the bodies and contacts as these are not interchangeable between the two types of switches.

Details of all the part numbers of switch heads, bodies and contact are listed in the tables on the next page.

ELECTRICAL SWITCH VARIATIONS

SWITCH HEADS

	REFERENCE	TYPE 1 P/N	TYPE 2 P/N	TYPE 3 P/N
EMERGENCY STOP	PB1 & PB6	09-2004	09-0208	09-1916
BLACK PUSH BUTTON	PB2 & PB7	09-2015	09-0255	09-1917
GREEN PUSH BUTTON	PB4	09-2005	09-0499	09-1918
3 POSITION KEY	SW1	09-2014	09-0235	09-1925
SPARE KEY	FOR SW1	09-2014/1	09-1008	09-1008

TYPE 2 CONTACTS

Part No.	Description	Reference	Qty.
09-0209	SWITCH BODY - 1 N.C. CONTACT	PB1 & PB6	2
09-0121	SWITCH BODY - 1 N.O. CONTACT	1 ON PB2	4
		1 ON PB4	
		1 ON PB7	
		1 ON SW1	
09-0122	1 N.O. CONTACT BLOCK - ADD ON	1 ON PB2	6
		1 ON PB7	
		4 ON SW1	

TYPE 3 CONTACTS

Part No.	Description	Reference	Qty.
09-1931	SWITCH BODY - 1 N.C. CONTACT	PB1 & PB6	2
09-1930	SWITCH BODY - 1 N.O. CONTACT	1 ON PB4	1
09-1915	SWITCH BODY - 2 N.O. CONTACT	1 ON PB2	3
		1 ON PB7	
		1 ON SW1	
09-1932	1 N.O. CONTACT BLOCK - ADD ON	3 ON SW1	3

ELECTRICAL PARTS

Part No.	Description	Reference	Qty.
09-0168	BATTERY	-	4
09-2280	PLATFORM CHARGE MODULE	-	1
09-2004	EMERGENCY STOP	PB1 & PB6	1
09-2005	BOOMS SWITCH	PB2	1
09-2005	DEAD MAN SWITCH	PB7	1
09-2006	NORMALLY CLOSED CONTACT BLOCK	ON PB1 & PB6	2
09-2007	NORMALLY OPEN CONTACT BLOCK	5 ON SW1	10
		1 ON PB4	
		2 ON PB2	
		2 ON PB7	
09-2014	GROUND/BASKET SELECTOR SWITCH	SW1	2
09-2015	STABILISER SWITCH	PB4	1
09-2017	RELAY	RL1	1
09-2018	RELAY BASE	ON RL1	
09-2025	LED	LP2-LP5 INC	4
09-2033	AUDIBLE WARNING DEVICE	AWD	1
09-2046	FUSE	F1	1
09-2047	FUSE HOLDER	ON F1	
EF24	FOOT SWITCH (OPTIONAL)	-	1

LIMIT SWITCHES

Part No.	Description	Reference	Qty.
09-0778	OUTRIGGER LIMIT SWITCH HEAD	FOR 09-2030	4
09-2030	OUTRIGGER LIMIT SWITCH	-	4
09-2320	CAGE LOAD LIMIT SWITCH		1
09-2367	CAGE LOAD LIMIT SWITCH PLUNGER HEAD	FOR 09-2320	1
09-1961	BOOM LIMIT SWITCH	-	1

STICKERS

Part No.	Description	Reference	Qty.
18-0802	CAGE CONTROL STICKER	-	1
18-0803	GROUND CONTROL STICKER	-	1

WIRES

Part No.	Description	Reference	Qty.
09-2042	LIMIT SWITCH CABLE 90° (BOOM)	-	1
09-2043	LIMIT SWITCH CABLE (OUTRIGGERS)	-	4

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