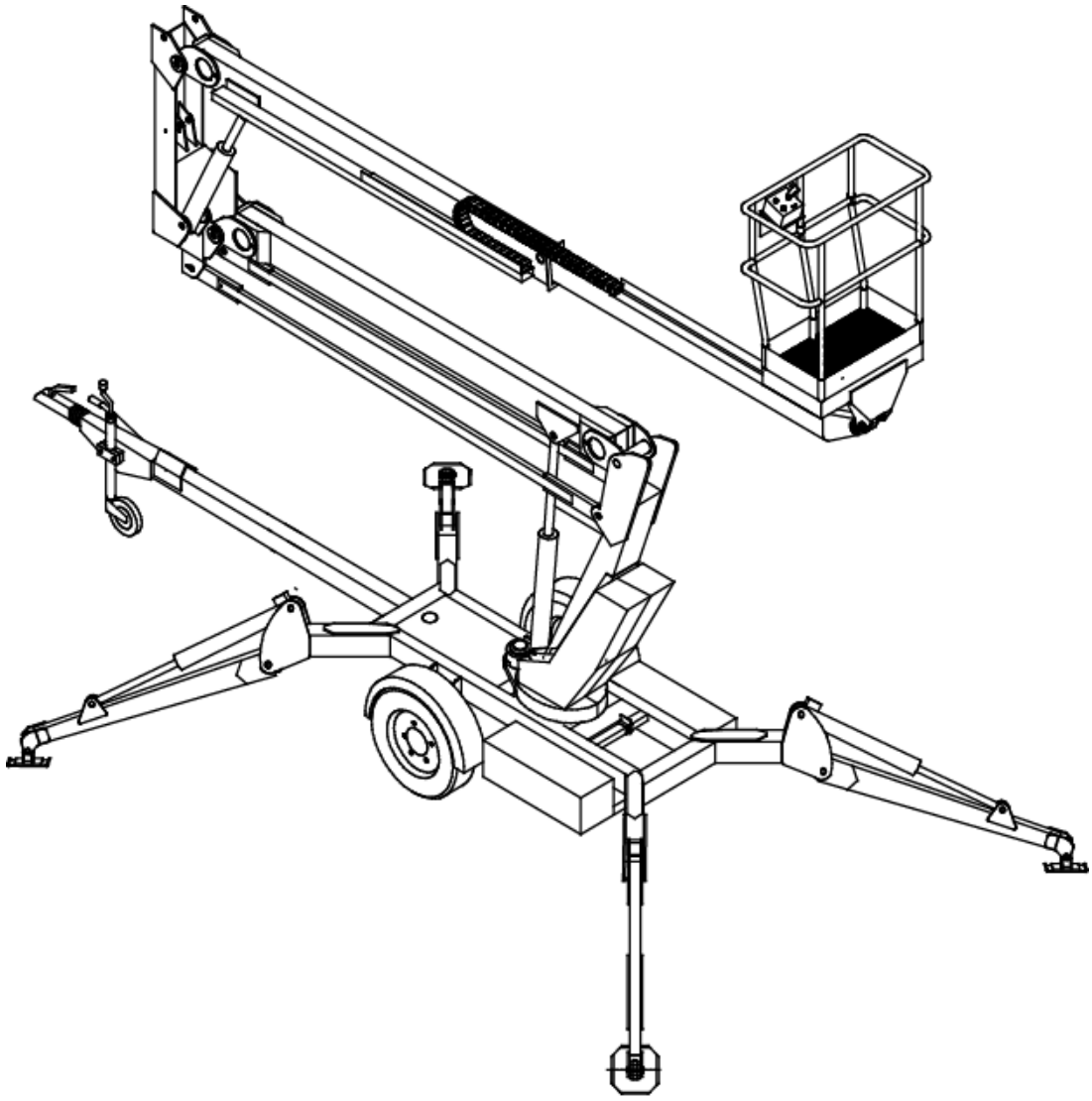
UpRight

POWERED ACCESS



TL49

WORK PLATFORM

SERVICE & PARTS MANUAL

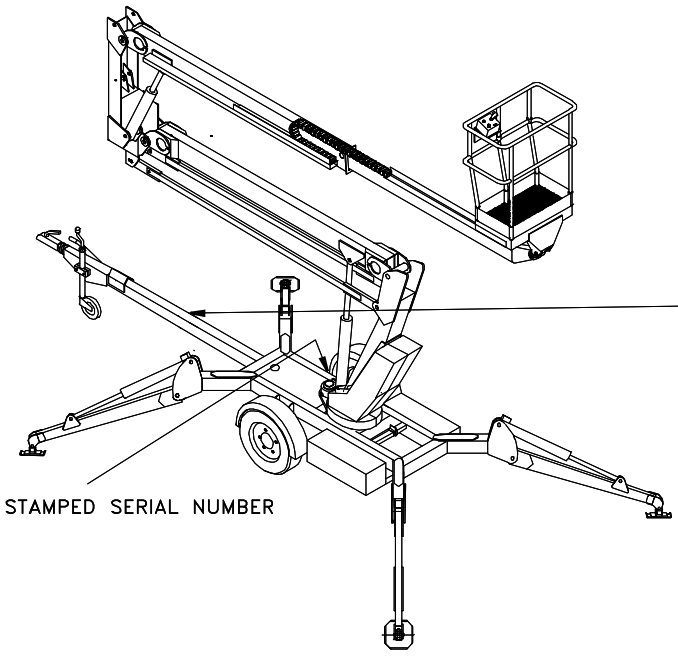
SERVICE & PARTS MANUAL

TL49

Aerial Work Platform

Serial Numbers 1001 to current

When contacting UpRight for service or parts information, be sure to include the MODEL and SERIAL NUMBERS from the equipment nameplate. Should the name plate be missing the SERIAL NUMBER is also stamped on the axle mounting plate on the right hand side of the machine.



UpRight

POTTERY ROAD,
DUN LAOIRE,
IRELAND.

CE

MODEL	TL49	SERIAL No.	199
MAX. PLATFORM HEIGHT	15.0m	UNLADEN WEIGHT MAX.	1900kg
MAX. PLATFORM LOAD	215kg 2 Persons + 55kg. Equipment		
MAX. LATERAL FORCE	400N	MAX. WIND SPEED	12.5m/s
MAX. CHASSIS INCLINATION	0°	BATTERY VOLTAGE	24V
NOMINAL POWER	3kW	CHARGER INPUT VOLTAGE	220/240

CAUTION:ONLY TRAINED & AUTHORISED PERSONNEL MAY USE THIS MACHINE–CONSULT OPERATORS MANUAL BEFORE USE. THIS PLATFORM IS NOT ELECTRICALLY INSULATED

UpRight

UpRight Ireland Ltd.,
Pottery Road,
Dun Laoire,
Ireland.

Foreword

SPECIAL INFORMATION

WARNING

Indicates the hazard or unsafe practice that ***could*** result in severe injury or death.

CAUTION

Indicates the hazard or unsafe practice that could result in minor injury or property damage.

Notes: Give helpful information.

WORKSHOP PROCEDURES

CAUTION: Detailed descriptions of standard workshop procedures, safety principles and service operations are not included. Please note that this manual does contain warnings and cautions against some specific service methods which could cause cause personal injury, or could damage a machine and make it unsafe. Please understand that these warnings cannot cover all conceivable ways in which service, whether or not recommended by UpRight Ireland Ltd., might be done, or of the possible hazardous consequences of each conceivable way, nor could UpRight Ireland Ltd. investigate all such ways. Anyone using service procedures or tools, whether or not recommended by UpRight Ireland Ltd., must satisfy themselves thoroughly that neither personal safety nor machine safety will be jeopardised.

Foreword

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1.0 Introduction

PURPOSE

This manual provides illustrations and instructions for the operation and maintenance of the TL49 Work Platform manufactured by Upright Ireland Ltd, Dun Laoire, Ireland. (See Figure 1-1).

SCOPE

This manual includes both operation and maintenance responsibilities concerning the TL49 Work Platform's readiness. The Maintenance Section covers scheduled maintenance, trouble shooting, repair, adjustment and replacement.

1.1 General Information

DESCRIPTION

The TL49 Work Platform is a trailer mounted work platform designed to be used as a means of elevating personnel and equipment and to provide a mobile work platform. Its articulating and telescopic boom configuration allow the platform to be mavouvered into an extensive range of positions.

PURPOSE AND LIMITATIONS

The objective of the TL49 Work Platform is to provide a quickly deployable, trailer mounted, variable height work platform. The elevating function shall only be used when the work platform is on a firm level work area.

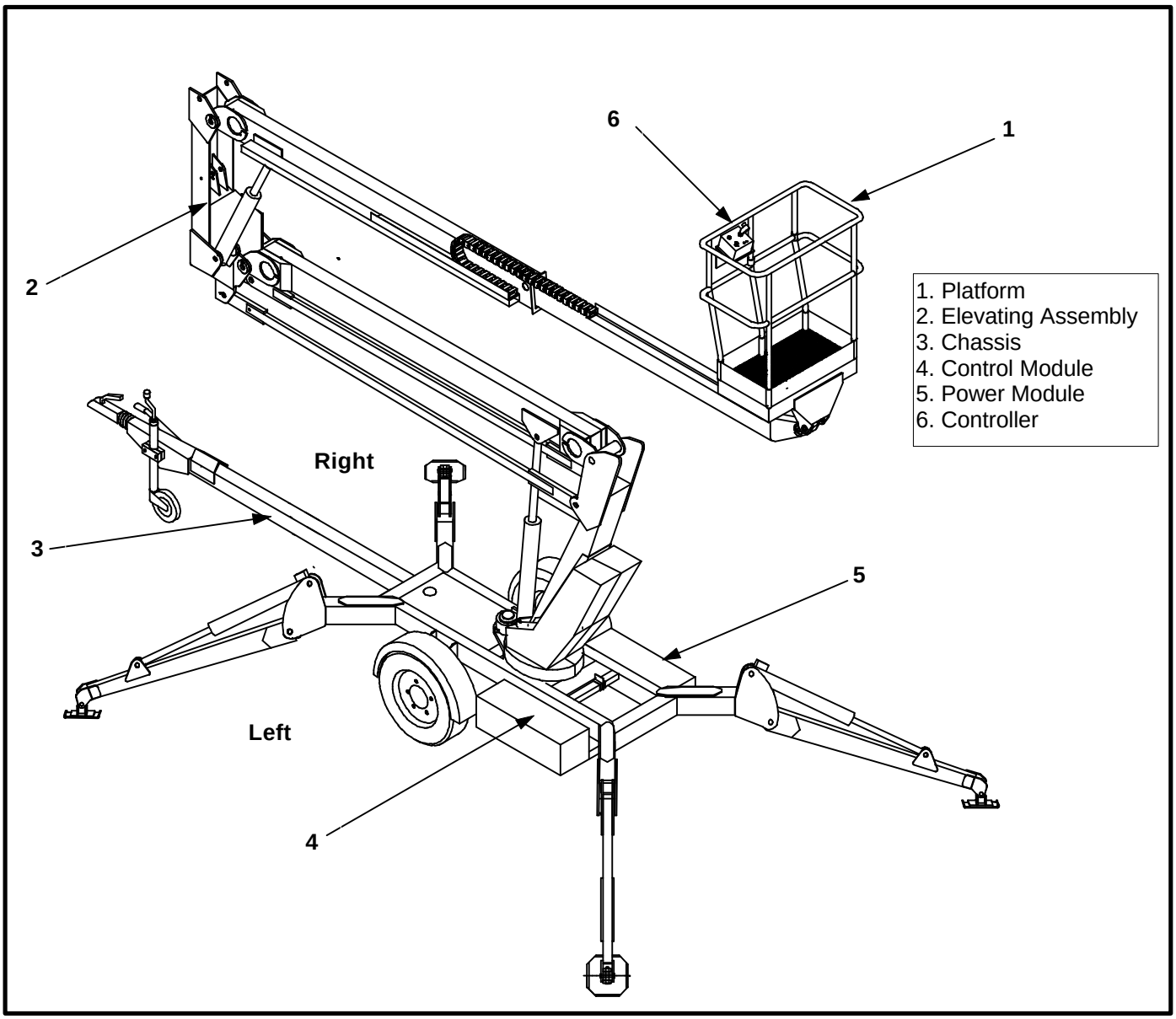


Figure 1-1: TL49 Work Platform

*1.2 Specifications**

Table 1-1: Specifications

ITEM	METRIC	IMPERIAL
Platform Size	0.7m x 1.3m (inside guardrails)	2.3 ft x 4.3 ft
Max. Platform Capacity	215Kg	473 lbs
Max. No. of occupants	2 People	
Max. Working Height	17.0m	55.8 ft
Max. Platform Floor Height	15.0m	49.2 ft
Max. Working Outreach	8.5m	27.9 ft
Travelling Dimensions: **Length** **Width** **Height**	 5.9m 1.6m 1.99m	 19.4 ft 5.3 ft 6.5 ft
Stabiliser spread	3.7m	12.1 ft
Rotation	360° non-continuous	
Gross weight	1900Kg	4189 lbs
Max. Towable speed	100 Km/Hr. **	62.5 mph **
Energy source	24V DC 4HP, 4 x 6V 220 Ah batteries	
System Voltage	24V	
Battery Charger	24V 25A	
Hydraulic Tank Capacity	23.5 Litres	6.1 Gallons
Max. Hydraulic System Pressure	155 Bar	2248 P.S.I
Hydraulic Fluid	ISO # 46	
Lift System	2 x Lift cylinders and 1 x Telescopic cylinder	
Control System	One-hand proportional joystick operating energy-efficient motor control system	
Tyres	195 R14	
Braking	Automatic reverse and overrun brakes plus handbrake.	

***Specifications subject to change without notice**

** Max. speed is subject to traffic regulations in the country in question.

2.1 Preparation for use

Read and familiarise yourself with all operating instructions before attempting to operate machine.

1. Check Hydraulic oil level.
2. Check that batteries are charged.

2.2 Preparation for Shipment

1. Lubricate machine per lubrication instructions in Section 4.4, Maintenance.
2. Fully Lower the platform.
3. Retract all 4 outriggers.
4. Disconnect the negative (-) battery cable from the battery terminal.

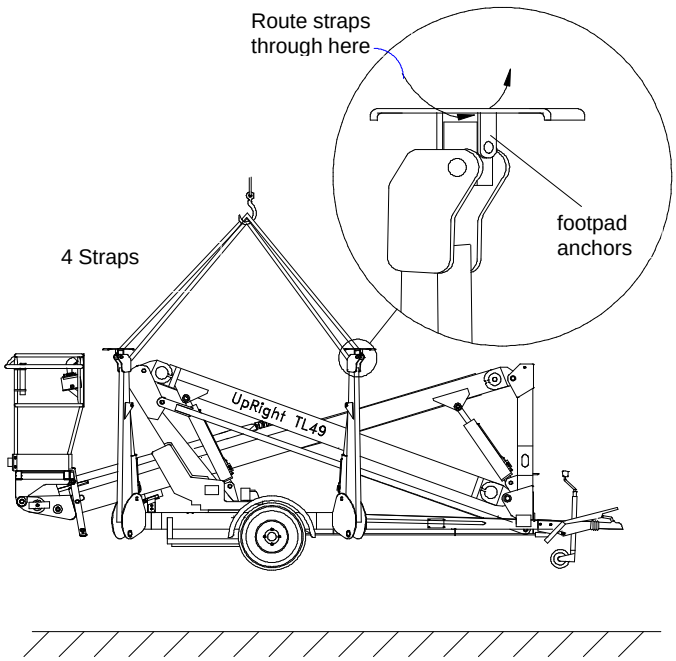
2.3 Lifting of Work Platform

NOTE: Lifting is for loading and unloading only.

CAUTION

See specifications for weight of work platform and be certain that lifting apparatus is of adequate capac ity to lift platform.

Lift the platform at the points shown
Note: Use 4 straps: - 1 per outrigger footpad. (Figure 2-2).



Route straps under the outrigger foot pads and between the footpad anchors.

Figure 2-2: Lifting the TL49

2.5 Transport

The TL49 is a road approved vehicle and therefore may be transported behind a motor vehicle of suitable towing capacity.
If the Tl49 is to be transported by other means then it must be securely tied down to the transporting unit at several points.
Recommended securing points are the four outrigger support members on the chassisand the towbar. Further securing points should be used if the terrain on which the unit is travelling is rough or uneven.
ALWAYS ensure that the handbrake is fully applied and that all the booms are FULLY stowed.

2.6 Storage

No preparation is required for normal storage. Regular maintenance per *Table 4-1* should be performed. If The work platform is to be placed in long term storage (dead storage) use the following preservation procedure.

PRESERVATION

1. Clean painted surfaces. If the painted surface is damaged, repaint.
2. Fill the hydraulic tank to operating level **with the platform fully lowered and the outriggers retracted.** Fluid should be visible on the dip stick.
3. Coat exposed portions of cylinder rods with a preservative such as multipurpose grease and wrap with barrier material.
4. Coat all exposed unpainted metal surfaces with preservative.

BATTERIES

1. Disconnect the battery ground cable and secure to the chassis.
2. Disconnect the remaining battery leads and secure to the chassis.
3. Remove the batteries and place in alternate service.

3.0 Introduction

General functioning

Refer to the Hydraulic and Electrical Schematics, Section 6

The battery powered electric motor directly drives a two section hydraulic pump. The low section of the pump is not used. The high section supplies oil under pressure to the various platform functions. The oil flow is directed to the different functions by electrically activated solenoid valves.

Setting up the machine for use

The TL49 must be set up on firm level ground. The outrigger set-up is critical for sound stability of the unit when elevated. All four outriggers should be lowered until they touch the ground. Then each outrigger should be further lowered in small increments to raise the chassis until the wheels are clear of the ground. Fine adjustment should then using the chassis spirit level as a guide.
Once the four outriggers are taking load the outrigger limit switches should be tripped. The booms cannot be raised until these switches (wired in series) are activated.
As the outriggers are being lowered an alarm sounds in the lower control box. This alarm will stop when the four limit switches are activated.

Operating the booms

Only when the TL49 is set up according to the above procedure can raising and lowering of the booms commence.
The keyswitch at the outrigger control box can be switched to platform or chassis controls.
Platform controls provide variable speeds for the boom functions through the use of a joystick.
This is achieved using a motor control unit which varies the speed of the motor/pump unit and increases or decreases the flow of oil to the different functions. This control unit (located beside the lower controls) receives a control signal from the joystick on the upper controls.
The speed of the motor increases as the control lever is pushed further away from the neutral (stopped) position.

Note: A deadman trigger is an integral part of the joystick. This must be depressed for the functions to operate. (This safety feature prevents unwanted movement of the booms in the case of inadvertent movement of the joystick.)

Chassis controls provide a fixed speed for each of the boom functions.

Design Features

The TL49 Series Work Platform has the following features:

- The interlock system on the outriggers ensure that the machine must be set up safely before use.
- Once the booms have commenced elevating, the boom/outrigger interlock switch is de-activated and outrigger controls are disabled. This prevents use of the outriggers when the machine is elevated.
- The slew cut-out interlock ensures that the boom support structure is clear of the towbar before slewing can commence.
- The energy-efficient motor control units provides long battery life and smooth proportional control of the boom functions.
- The Master/Slave levelling system ensures that the platform remains level throughout the entire working cycle of the machine.
- All cylinders are fitted with hydraulic hose-burst protection interlocks.
- The on-board charger is fully automatic and charges the batteries efficiently and economically.
- If the work platform starts to become unstable and one of the outrigger interlocks becomes de-activated an alarm will sound in the upper control box. In this situation power is cut to the upper controls to prevent boom movement that might increase instability. An emergency override switch is fitted to allow the booms to be descend at a controlled speed to bring the machine back to a stable position.
- In the event of a power loss the two lift cylinders are fitted with emergency lowering valves which allow the booms to be lowered at a controlled speed by an operator on the ground.

3.1 Safety Rules and Precautions

Before using the TL49 Work Platform:
NEVER operate the machine near power lines. **THIS MACHINE IS NOT INSULATED.**

NEVER elevate the platform unless the machine is on firm level ground.

NEVER sit, stand or climb on guard rail or midrail.

NEVER use ladders or scaffolding on the platform.

NEVER attach overhanging loads or increase platform size.

LOOK up, down and around for overhead obstructions and electrical conductors
.
DISTRIBUTE all loads evenly on the platform. See Table 1-1 for maximum platform load.

NEVER use damaged equipment. (Contact UpRight Ireland Ltd. for instructions).

NEVER change or modify operating or safety systems.

INSPECT the machine thoroughly for cracked welds, loose hardware, hydraulic leaks, damaged control cable, loose wire connections and wheel bolts.

NEVER climb down an elevating assembly with platform elevated.

NEVER perform service on or in the elevating assembly while the platform is elevated without first blocking the elevating assembly.

NEVER recharge batteries near sparks or open flame; batteries that are being charged emit highly explosive hydrogen gas.

SECURE the work platform against unauthorised use by turning keyswitch off and removing key from switch.

NEVER replace any component or part with anything other than original replacement parts without manufacturer's consent.

3.2 Controls and Indicators

The controls and indicators for operation of the TL49 Work Platform are shown in Figures 3-1 & 3-2. The name and function of each control and indicator are listed in Tables 3-1 & 3-2. The index numbers in the figure correspond to the index numbers in the table. **The operator should know the location of each control and indicator and have a thorough knowledge of the function and operation of each before attempting to operate the unit.**

Table 3-1: Platform Controls and indicators

INDEX NO.	NAME	FUNCTION
1	CONTROL LEVER	Move joystick forward or backwards to proportionally control lift / slew speeds. NOTE: The interlock trigger on the control lever must be pressed to provide power to the controller. This prevents accidental activation of the controller.
2	FUNCTION SELECTOR	This four position switch selects which function is to be controlled by the control lever. Only one function can be selected at a time.
3	ON / EMERGENCY OVERRIDE SWITCH	This three position switch has 2 functions. (a) On: When turned to this position power is allowed to pass to the control circuitry. (b) Emergency Lowering: This position is momentary i.e. the switch must be held in this position, otherwise it will spring return to the neutral position. This allows power to re-enter the controls when it has been cut due to an outrigger becoming 'light'. Speeds are restricted when this option is used.
4	EMERGENCY STOP SWITCH	Push red button to cut off power to all functions (OFF). Turn clockwise to provide power (ON).

Table 3-1: Platform Controls and indicators (cont'd)

INDEX NO.	NAME	FUNCTION
5	BATTERY CONDITION INDICATOR	This red L.E.D. indicates the condition of the batteries. It is constantly illuminated when the batteries are fully discharged. It flashes repeatedly when the batteries have begun to discharge. It remains off when the batteries are fully charged.

INDEX NO.	NAME	FUNCTION
6	OUTRIGGERS READY INDICATOR	This green L.E.D. indicates that the outriggers have been properly deployed and that power is now available to the upper controls.
7	LEVEL SWTICH	This toggle switch allows the cage to have its level adjusted fowards or backwards.The emergency override switch must be operated also for this switch to function.

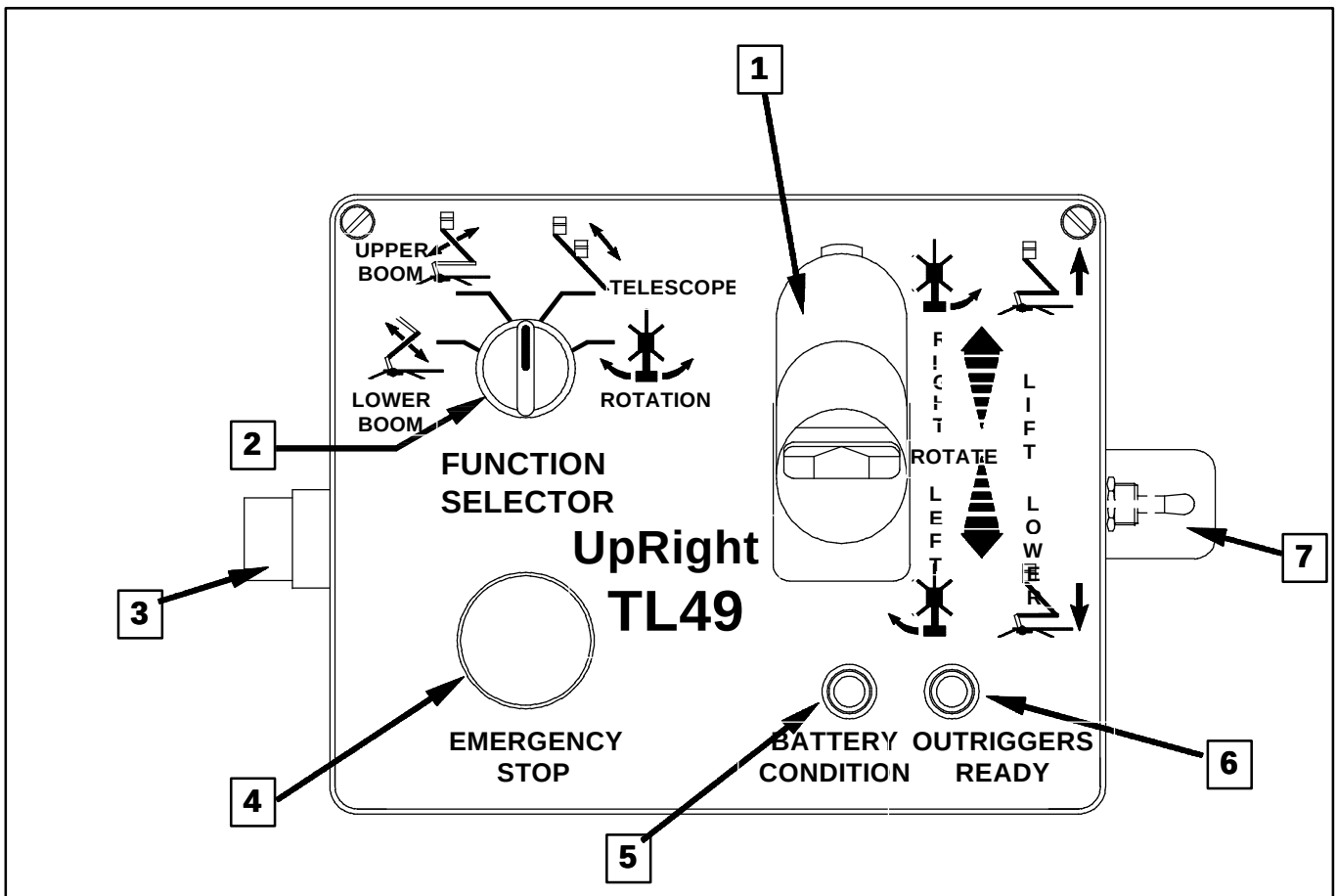
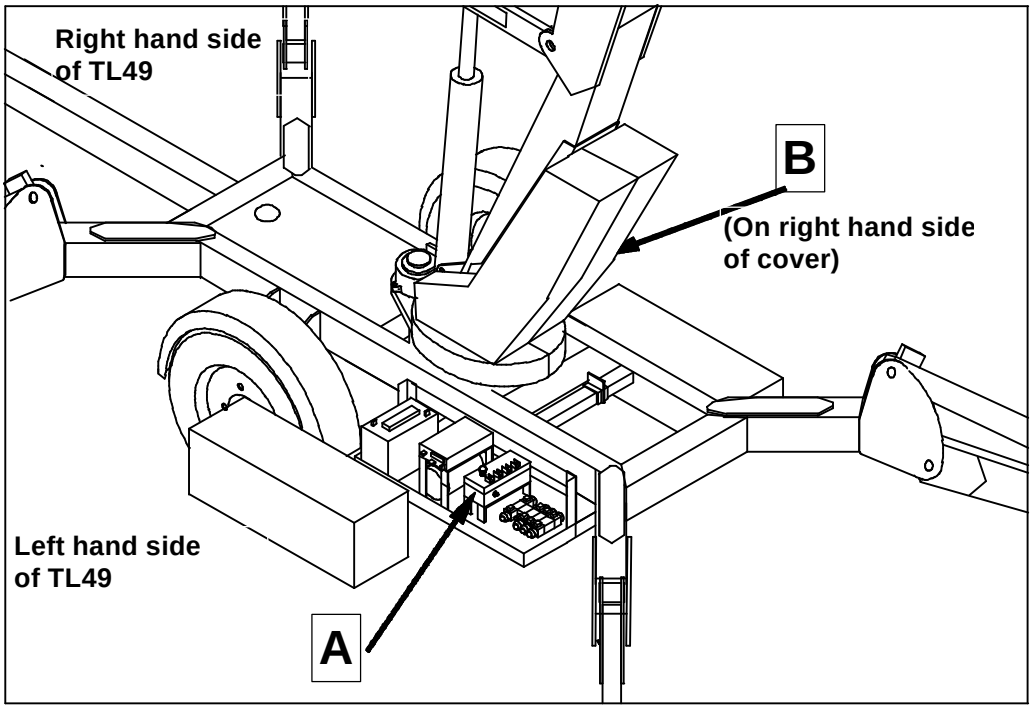


Figure 3-1: Platform Controls



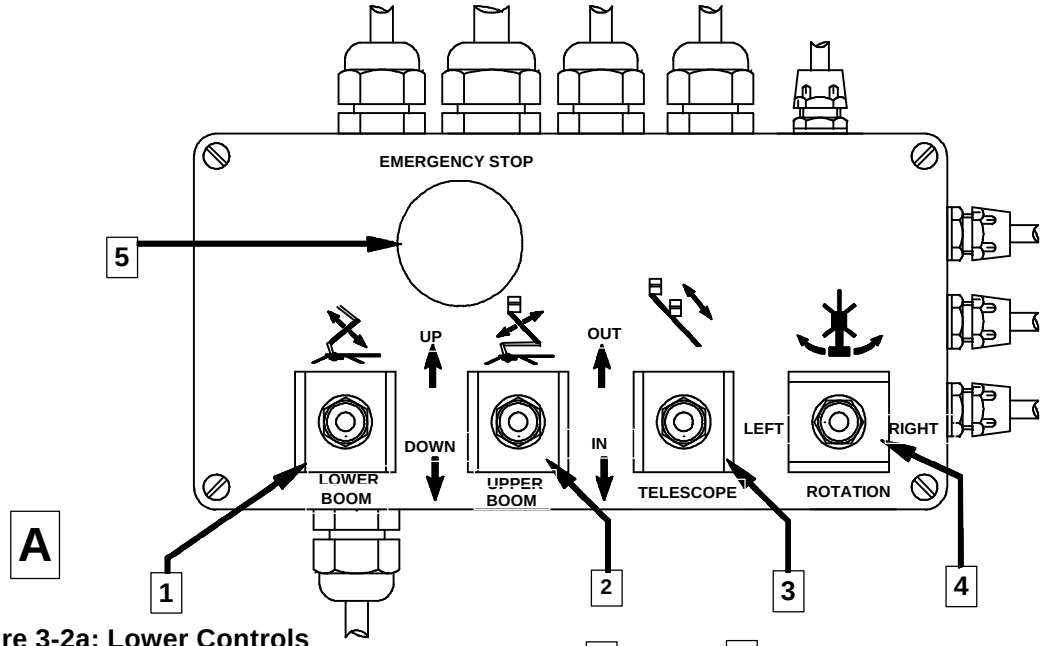


Figure 3-2a: Lower Controls

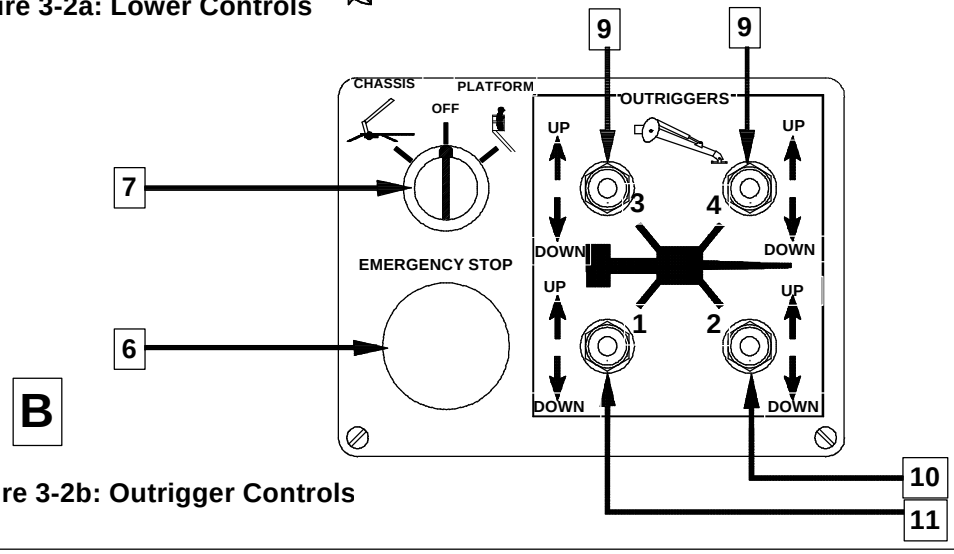


Figure 3-2b: Outrigger Controls

Table 3-2: Outrigger and Lower Controls

INDEX NO.	NAME	FUNCTION
1	LOWER BOOM SWITCH	This two position toggle switch operates the solenoid that feeds oil to the lower lift cylinder. A fixed speed of ascent and descent is only available using this switch.
2	UPPER BOOM SWITCH	This two position toggle switch operates the solenoid that feeds oil to the upper lift cylinder. A fixed speed of ascent and descent is only available using this switch.
3	TELE BOOM SWITCH	This two position toggle switch operates the solenoid that feeds oil to the telescopic cylinder. A fixed speed of extension and retraction is only available using this switch.
4	SLEW SWITCH	This two position toggle switch operates the solenoid that feeds oil to the slew motor. A fixed speed of rotation only available using this switch.
5	EMERGENCY STOP (LOWER CONTROLS)	Push red button to cut off power to all functions (OFF). Turn clockwise to provide power (ON).
6	EMERGENCYSTOP (OUTRIGGER CONTROLS)	Push red button to cut off power to all functions (OFF). Turn clockwise to provide power (ON).
7	KEYSWITCH	This three position keyswitch selects either the lower controls or the upper controls. The key is removable in all three positions to avoid tampering by unauthorised personnel during operation. Power is not available to either the lower control box or the upper control box until the outriggers have been deployed and all 4 limit switches have been activated.
8	REAR LEFT OUTRIGGER SWITCH	This two position toggle switch operates the solenoid that feeds oil to the rear left outrigger cylinder. This allows deployment and retraction of this outrigger
9	FRONT LEFT OUTRIGGER SWITCH	This two position toggle switch operates the solenoid that feeds oil to the front left outrigger cylinder. This allows deployment and retraction of this outrigger
10	FRONT RIGHT OUTRIGGER SWITCH	This two position toggle switch operates the solenoid that feeds oil to the front right outrigger cylinder. This allows deployment and retraction of this outrigger
11	REAR RIGHT OUTRIGGER SWITCH	This two position toggle switch operates the solenoid that feeds oil to the rear right outrigger cylinder. This allows deployment and retraction of this outrigger

3.3 Pre-Operation Inspection

Read, understand and follow all safety rules and operating instructions and then perform the following steps each day before use.

1. Check the level of the hydraulic oil with the platform fully lowered and the outriggers retracted. Remove filler/breather cap from top of hydraulic reservoir.Level should be between min./max. marks on dipstick
   Top up with oil (GRADE: ISO# 46) if necessary.

2. Check that fluid level in the batteries is correct (10mm above the plates).

3. Verify that the batteries are charged.

4. Check that the A.C. extension chord has been disconnected from the charger.

5. Carefully inspect the entire work platform for damage such as cracked welds or structural members, loose or missing parts, oil leaks, damaged cables or hoses, loose connections and tyre damage.

6. Move machine, if necessary, to unobstructed area to allow for full elevation and deployment of outriggers.

7. Pull out both chassis and platform emergency stop buttons to turn ON (Figure 3-1 & 3-2).

8. Turn the chassis keyswitch to CHASSIS (figure 3-2).

9. Operate outrigger toggle switches and deploy outriggers. Adjust outrigger positions until chassis spirit level indicates that the chassis is level.

10. Visually inspect the outrigger assemblies, cylinders, hoses and cables for damage or erattic operation.
    Check that all four limit switches are activated and that heads are undamaged.
    Check for missing or loose parts.

11. Fully elevate platform and slew machine through 180 degrees in both directions.

12. Visually inspect the elevating assembly, lift cylinders, level cylinders and cables and hoses for damage, erattic operation. Check that platform is levelling throughout its cycle. Check for missing or loose parts.

13. Check that the emergency lowering on both lift cylinders is operating correctly as detailed in section 3.4.

14. Push emergency stop button. The controls should not function.

15. Release emergency stop button.

16. Turn keyswitch to platform and climb into platform.

17. Operate lower boom up and press emergency stop button while doing so. Machine should stop and no other functions should be available.

18. Operate manual tele retraction as detailed in section 3.4.

19. Release emergency stop button. Raise lower boom such that 2nd post is less than 1 metre above tow bar. Select slew function. Slew the machine left or right.
    Slew function should not operate. (This is to provide protection to the towbar).

20. Raise lower boom such that the 2nd post is greater than 1 metre above the towbar. Slew machine left or right. Slew function should now operate.

21. Push the emergency stop button. The controls should not function.

22. Release emergency stop button.

3.4 Operation

Before operating work platform ensure that pre-operation and safety inspection has been completed, any deficiencies have been corrected and the operator has been corrected and the operator has been thoroughly trained on this machine. The operator must read, fully understand and follow the Operator Manual.

Deploying the outriggers

Ensure the machine is on solid level ground. Apply handbrake on machine. Ensure the emergency stop buttons at the platform controls and at the lower controls are ON (i.e pulled out). Insert key into keyswitch on the outrigger control box located on the side of the First Post. Turn key to ground controls.

Operate each outrigger by activating its corresponding switch according to the legend on the control box.
Raise the wheels off the ground and ensure the the machine is level by checking the spirit level on the rear of the chassis. If the chassis is not level adjust the extension of the relevant outrigger to make it so.

Raising and lowering the platform

Only when the TL49 is set up according to the above procedure can raising and lowering of the booms commence.
Lower Controls:
With the keyswitch in the ground control position the booms can be operated using the lower controls which are located under the glass fibre cover on the left hand side of the chassis.
Note: The slew function is disabled until the second post is raised approx. 1m above ground level (to prevent damage to tow-bar).
Each function is operated by actuating the relevant control switch according to the legend plate on the lower control box. The speed of each function is fixed when operating from the lower controls. Variable speed is available only from the upper controls.

Upper controls:
To operate the booms from the upper controls, turn the key in the keyswitch of the outrigger control box to upper controls. Climb into the basket and operate the controls according to the upper control legend.
Note: The deadman switch (coloured red) on the control joystick must be depressed for the functions to operate. (This safety feature prevents unwanted movement of the booms in the case of inadvertant movement of the control joystick.)
Proportion control is available from the upper controls. This is achieved using a motor control unit which varies the speed of the motor/pump unit and increases or

decreases the flow of oil to the different functions. This control unit (located beside the lower controls) receives a control signal from the joystick on the upper controls.
The speed of the motor increases as the control lever is pushed further away from the neutral (stopped) position.

Emergency override

In the event of an outrigger limit switch being deactivated, power to the upper controls is cut.
The emergency override switch (fig. 3-1) can be used to bring the machine into a position to re activate the limit switch and restore power. The switch is momentary which means that it must be held in position while operating the necessary function.

Non-Powered descent (Figure 3-3)

In the event of a loss in electrical power the two lift cylinders can be lowered manually. The lower lift cylinder must be lowered first.
At the base of the cylinder there is a red knob that can be turned to allow oil to leave the cylinder at a controlled rate. When the cylinder is retracted it is then possible to lower the upper lift cylinder by the same means.
Be sure to retighten both knobs when this procedure is complete.
If operating the platform from the upper controls, this operation must be carried out by a second person standing at the chassis.

⚠ WARNING ⚠

If the platform should fail to lower, **NEVER** climb down the elevating assembly.

* Manual Tele Retraction (Figure 3-4)

In the event of loss of electrical power the tele cylinder can be retracted as follows:

1. Remove the inspection hatch cover from the first post cover.
2. Turn the shut-off ball valve lever through 90 ^{o} (This lever is located just inside the inspection hatch)
3. Insert hand pump handle through this hatch and couple with the hand pump shaft. (This handle is stored under the cover of the control module on the chassis).
4. Operate handpump to retract the tele cylinder.
5. When the cylinder is retracted remove hand pump handle and turn shut-off ball valve lever back through 90^{o} to its original position.
6. Return inspection hatch cover to first post cover and the handpump handle under the cover of the control module.

Levelling

The platform can be levelled from the Upper controls using the levelling switch (see Figure 3-1)
This switch is for fine adjustment of the slave levelling cylinder . Care should be taken when performing this operation. The switch should be operated in short bursts to level the cage **slowly.**

* OPTIONAL FEATURE

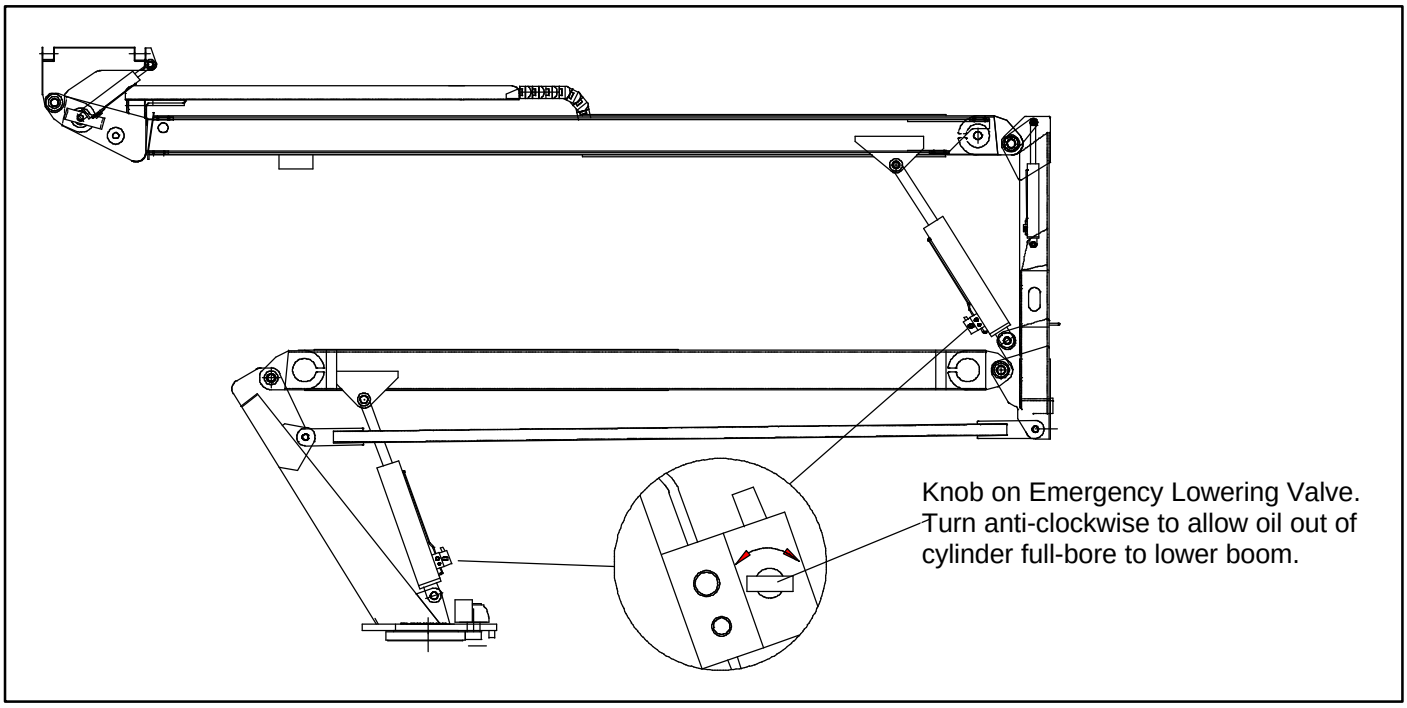


Figure 3-3: Emergency lowering Valve

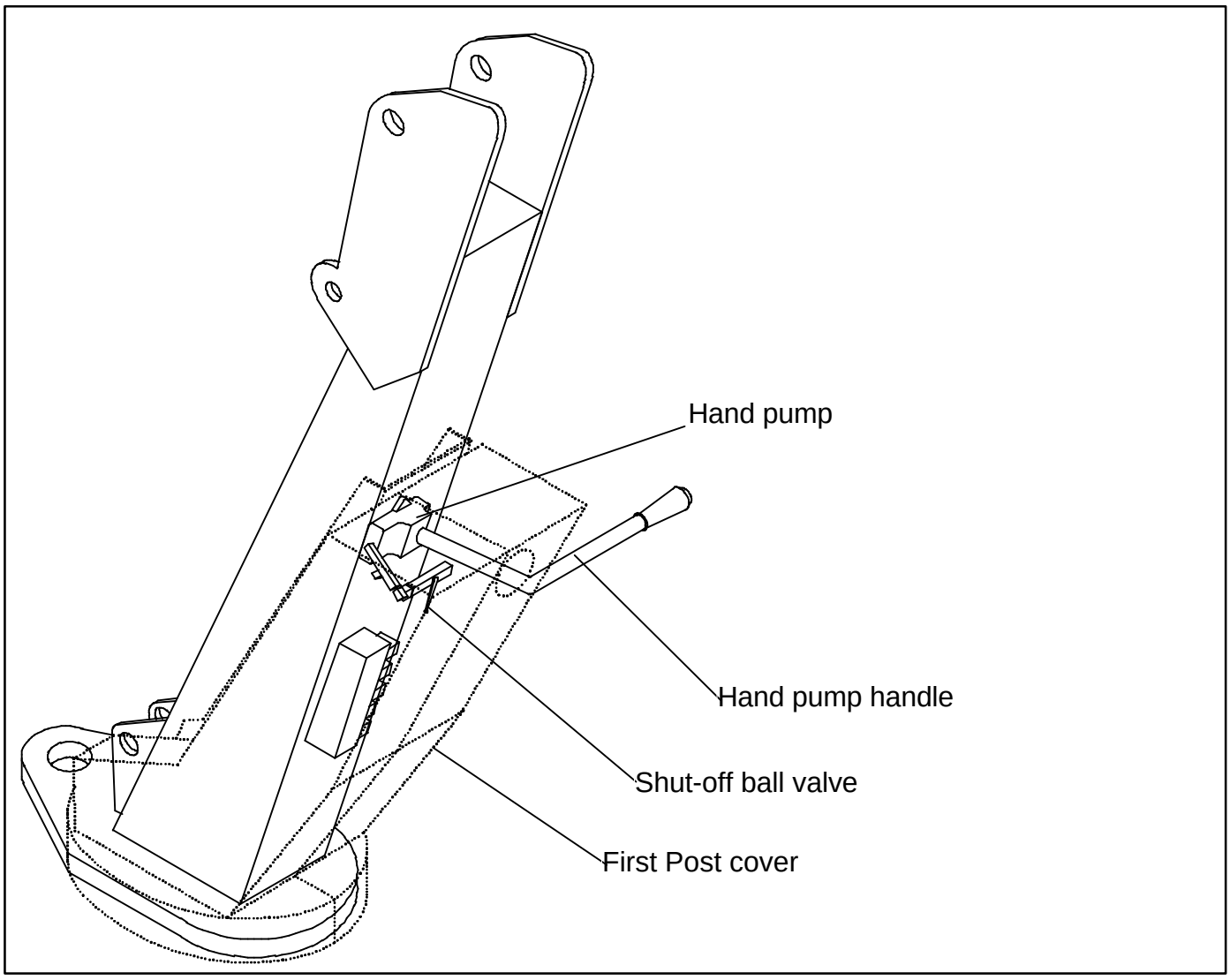


Figure 3-4: Manual Tele Retraction Hand Pump

4.0 Introduction

This section contains instructions for the maintenance of the TL49 Series Work Platform. Procedures for scheduled maintenance and repair/removal are included.

Referring to *Section 3 and Section 6*will aid in understanding the operation and function of the various components and systems of the TL49 Series Work Platform and help in diagnosing and repair of the machine.

TOOLS REQUIRED

The following is a list of items that are required to perform certain maintenance procedures.

1 x Multi-meter capable of reading Voltage, Ohms and Amps.

1 x Pressure Gauge - Range (0 - 1000 P.S.I)

1 x Pressure Gauge - Range (0 - 3000 P.S.I)

We recommend:

1 x 57128-000 Calibrator - A test and analysis instrument for the D.C. motor Control Unit.

4.1 Preventative Maintenance (Table 4-1)

The complete inspection consists of periodic visual and operational checks, together with all necessary minor adjustments to assure proper performance. Daily inspection will prevent abnormal wear and prolong the life of all systems. The inspection and maintenance schedule is to be performed at regular intervals. Inspection and maintenance shall be performed by personnel who are trained and familiar with mechanical and electrical procedures. Complete descriptions of the procedures are in the text following the table.

WARNING

Before performing preventative maintenance familiarise yourself with the operation of the machine.
Never perform maintenance on a machine when it is in the elevated position.

The Preventative Maintenance table has been designed to be used for machine service and maintenance repair. **Please copy the following page and use this table as a checklist when inspecting a machine for service.**

Preventative Maintenance Table Key

Interval

Daily=each shift or every day
50h/30d= every 50 hours or 30 days
250h/6m=every 250 hours or 6 months
500h/1y=every 500 hours or 1 year
1000h/2y=every 1000 hours or 2 years

Y=Yes/Acceptable
N=No/Not Acceptable
R=Repaired/Acceptable

Preventative Maintenance Report

Date: _____
Owner: _____
V.I.N No.: _____ Serial No.: _____
Serviced By: _____
Service Interval: _____

Table 4-1: Preventative Maintenance

COMPONENT	INSPECTION OR SERVICES	INTERVAL	Y	N	R
Battery System	Check electrolyte level	Daily			
	Check battery cable condition	Daily			
	Charge batteries	Daily			
	Check charger condition & operation	Daily			
	Check specific gravity	50h/30d			
	Clean exterior	250h/6m			
	Clean terminals	250h/6m			
Hydraulic Oil	Check oil level	Daily			
	Change filter	250h/6m			
	Drain and replace oil (ISO #46)	500h/1y			
Hydraulic System	Check for leaks	Daily			
	Check hose connections	50h/30d			
	Check for exterior wear	50h/30d			
Emergency Hydraulic System	Open the emergency lowering valves and check for proper operation.	Daily			
Control Joystick	Check condition and operation	Daily			
Electrical Control Cables	Check the exterior of the cables for pinching, binding or wear	Daily			
Platform Cage	Check welds for cracks	Daily			
	Check that securing bolts are tightened				
	Check condition of floor				
	Check drop bar on cage entrance				
Hydraulic Pump	Check for hose fitting leaks	Daily			
	Wipe clean	50h/30d			
	Check for leaks at mating surfaces	50h/30d			
	Check mounting bolts for proper torque	50h/30d			
Elevating Assembly	Inspect for structural cracks	Daily			
	Check hoses for pinch or rubbing points	Daily			
	Check pivot bearings for wear	50h/30d			
	Check all pivot pin retaining plates and clips	50h/30d			
	Check elevating assembly structure for bending	250h/6m			
	Check function of all lights and indicators on the tail board assembly	50h/30d			
Chassis Assembly	Inspect for structural cracks	Daily			
	Check hoses for pinch or rubbing points	Daily			
	Check pivot bearings for wear	50h/30d			
	Check all pivot pin retaining plates and clips	50h/30d			
	Check Tyres for damage	50h/30d			
	Check brake shoes for wear	250h/6m			
	Check security of towhitch bolts	50h/30d			
	Torque wheel nuts to 80Nm (59 lb. ft)	50h/30d			
	Check security of brake rod and cables	50h/30d			
	Ensure tyres are inflated to correct maximum pressure (65 psi)	50h/30d			
Entire Unit	Function check Emergency stop switches at control boxes	Daily			
	Perform pre-operation inspection	Daily			
	Check for and repair collision damage	Daily			
	Lubricate See Section 4.4	50h/30d			
	Check fasteners for proper torque	250h/6m			
	Check for corrosion-remove and repaint	250h/6m			
Labels	Check for peeling, missing, or unreadable labels & replace	Daily			

4.2 Maintenance on Elevated platform

WARNING

BEFORE entering Elevating Assembly while performing maintenance on work platform, while elevated, ensure that Elevating Assembly is properly blocked and/or secured by suitable cranage of adequate capacity.

DO NOT stand in Elevating Assembly area while installing or removing blocking or cranes.

4.3 Battery Maintenance

Electrical energy for the motor is supplied by four 6-volt batteries wired in series for 24 volts DC. Proper care and maintenance of the batteries and the motor will ensure maximum performance from the work platform.

WARNING

Hazard of explosive gas mixture. Keep sparks, flame and smoking materials away from batteries.

Always wear safety glasses when working with batteries.

Battery fluid is highly corrosive. Rinse away any spilled fluid thoroughly with clean water.

Be extra cautious to reduce risk of dropping a metal tool onto battery. It may spark or short circuit battery and may cause explosion.

Always replace batteries with UpRight batteries or manufacturer approved replacements weighing 62lbs (28 Kg) each.

Limit use of new batteries for first five cycles.
New batteries are not capable of their rated output until they have been charged and discharged approximately
10 - 15 times.

BATTERY INSPECTION AND CLEANING

Check battery fluid level daily, especially if work platform is being used in a warm, dry climate. If required add distilled water only. Use of tap water with high mineral content will shorten battery life.

CAUTION

If battery water level is not maintained, batteries will not fully charge, creating a low discharge rate that will damage motor/pump unit and void warranty.

Batteries should be inspected periodically for signs of cracks in the cases, electrolyte leakage and corrosion of the terminals. Inspect cables for worn spots or breaks in the insulation and for broken cable terminals.

Clean batteries that show signs of corrosion of the terminals or onto which electrolyte has overflowed during charging. Use a baking soda solution to clean the batteries, taking care not to get the solution inside the cells. Rinse thoroughly with clear water. Clean battery and cable contact surfaces to a bright metal finish whenever a cable is removed.

BATTERY CHARGING (Figure 4-2)

Charge batteries at end of each work shift or sooner if batteries have been discharged.

⚠ CAUTION ⚠

Charge batteries in a well ventillated area.
Do not charge batteries when the work platform is in an area containing sparks or flames.
Permanent damage to batteries will result if batteries are not immediately recharged after discharging.
Never leave charger operating unattended for more than two days.
Never disconnect cables from batteries when charger is operating.
Keep charger dry.

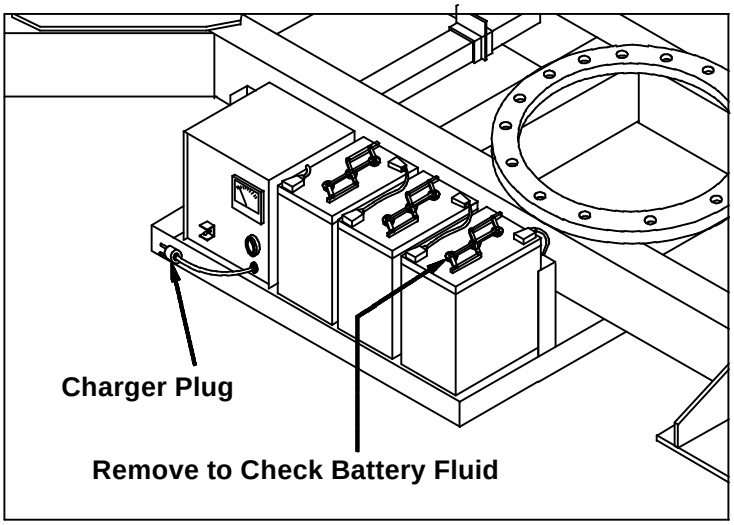


Figure 4-2: Battery Charger

1. Check battery fluid level. If electrolyte level is lower than 10mm above plates add distilled water only.

2. Connect extension cord (1.5mm^2 conductor minimum and 15m in length maximum) to the charger plug. Connect the other end of extension cord to properly grounded outlet of proper voltage and frequency.

3. Charger turns on automatically after a short delay, the ammeter will indicate charging current.

4. Charger turns off automatically when the batteries are fully charged.

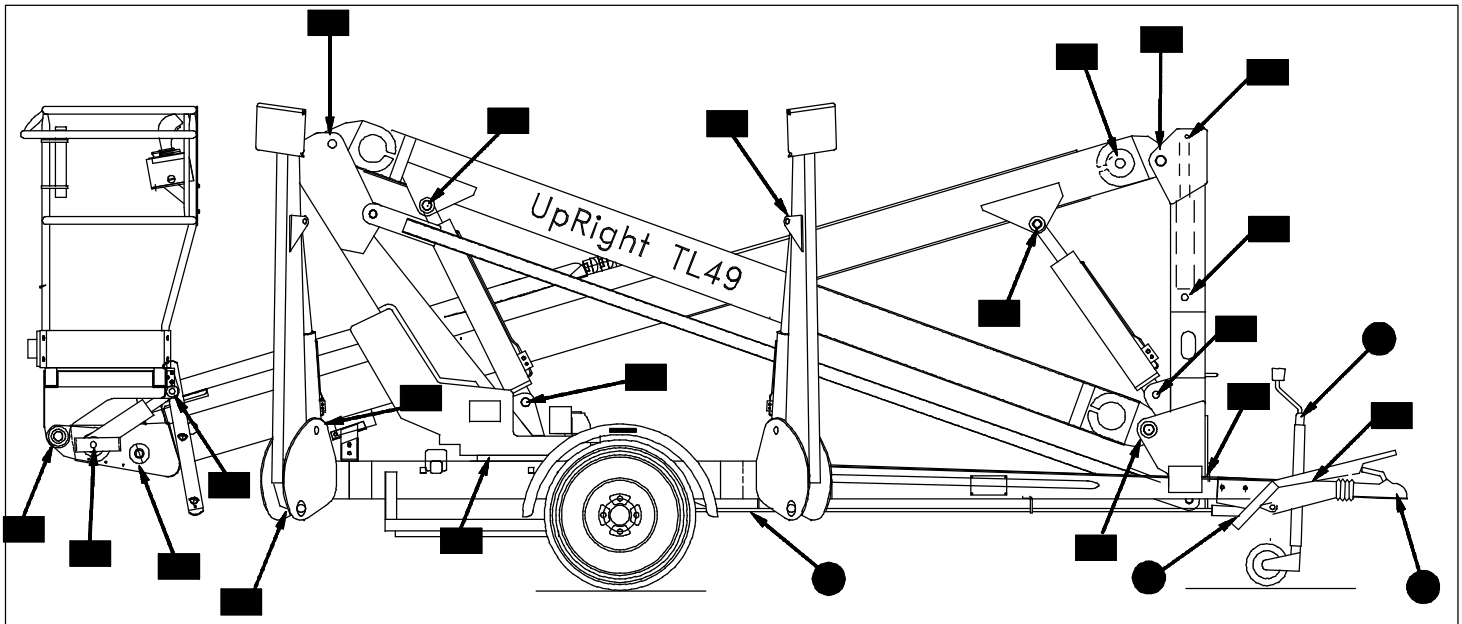
CELL FORMING
The plates in the new battery cells take approximately 10 to 15 cycles (charge and discharge) to 'form' and operate at full capacity.
During this period the batteries should not be discharged excessively.

Excessive discharge can cause polarity reversal of individual cells resulting in complete failure shortly thereafter. Limited use of new batteries will minimise the chance of cell reversal.

Note: Charging time will be longer when the batteries are new.

4.4 Lubrication

Refer to Figure 4-3 for location of items that require lubrication service.



Grease Nipple Locations

2 per Outrigger Cylinder	:8
1 per Outrigger Pivot Boss	:4
2 per Lower Boom Pivot Bosses	:2
1 per Upper Boom Pivot Boss	:1
1 per Inner Boom Pivot Boss	:1
2 per Slew Ring	:2
2 per Tele Cylinder	:2
2 per Master Cylinder	:2
2 per Slave Cylinder	:2
2 per Lower Lift Cylinder	:2
2 per Upper Lift Cylinder	:2
1 per Towhitch coupling	:2
Total	30

OIL

GREASE

Figure: 4-3 Lubrication Points

HYDRAULIC OIL TANK AND FILTER (Figure 4-4)

Fluid Level

With platform fully lowered, oil should be visible on the dipstick, if not fill the tank until oil registers on the dipstick. **DO NOT** fill above the upper line or when the platform is elevated.

Oil and Filter Replacement

1. Operate the platform for 10-15 minutes to bring the hydraulic oil up to normal operating temperature.

⚠ CAUTION ⚠

The hydraulic oil may be of sufficient temperature to cause burns. Wear safety gloves and safety glasses when handling hot oil.

2. Provide a suitable container to catch the drained oil. Hydraulic tank has a capacity of 23 Litres.

3. Remove the drain plug under the tank and allow all oil to drain

4. Clean the magnetic drain plug and reinstall.

5. Disconnect hoses and hose fittings from inlet and outlet port of hydraulic oil filter.
   Loosen and remove filter retaining bolts.
   Reconnect hoses and fittings to the inlet and outlet ports of the replacement oil filter.
   Reconnect retaining bolts.

6. Fill the hydraulic reservoir with hydraulic oil (see Section 1-2) checking level with dipstick.

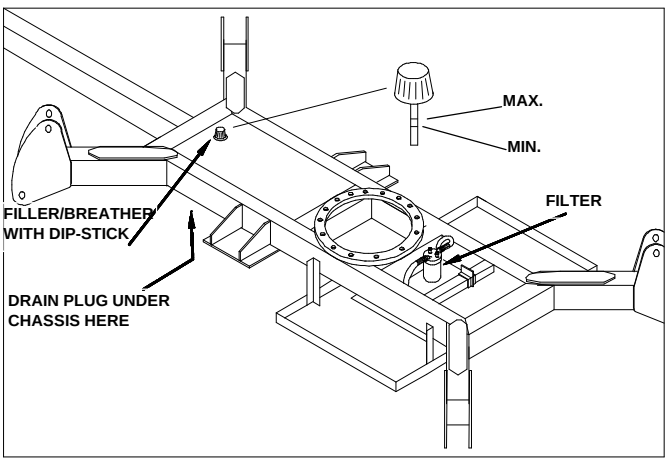


Figure 4-4: Oil & Filter Replacement

4.5 Setting Hydraulic Pressures (Figure 4-5)

Check the hydraulic pressures whenever the pum manifold or relief valve have been serviced or replaced.

⚠ WARNING ⚠

The hydraulic oil may be of sufficient temperature to cause burns. Wear safety gloves and safety glasses when handling hot oil.
The oil in the hydraulic system is under very high pressure which can easily cause severe cuts. Obtain medical assistance immediately if cut by hydraulic oil.

MAIN RELIEF VALVE (Figure 4-5)

1. Operate the hydraulic system for 10-15 minutes to warm the oil.

2. Remove the cover from the 1st post.

3. Insert pressure gauge into high pressure gauge por marked 'PT' on top of front face of main manifold block.

4. Loosen locknut on main relief valve and turn adjusting screw counter clockwise two full turns.

5. Operate telescope-in function switch at lower controls and keep it activated.

6. Slowly turn the main relief valve adjusting screw clockwise until the pressure gauge reads 155 Bar pressure.

7. Release Telescope-in switch.

8. Tighten locknut on main relief valve while holding the adjusting screw in position.

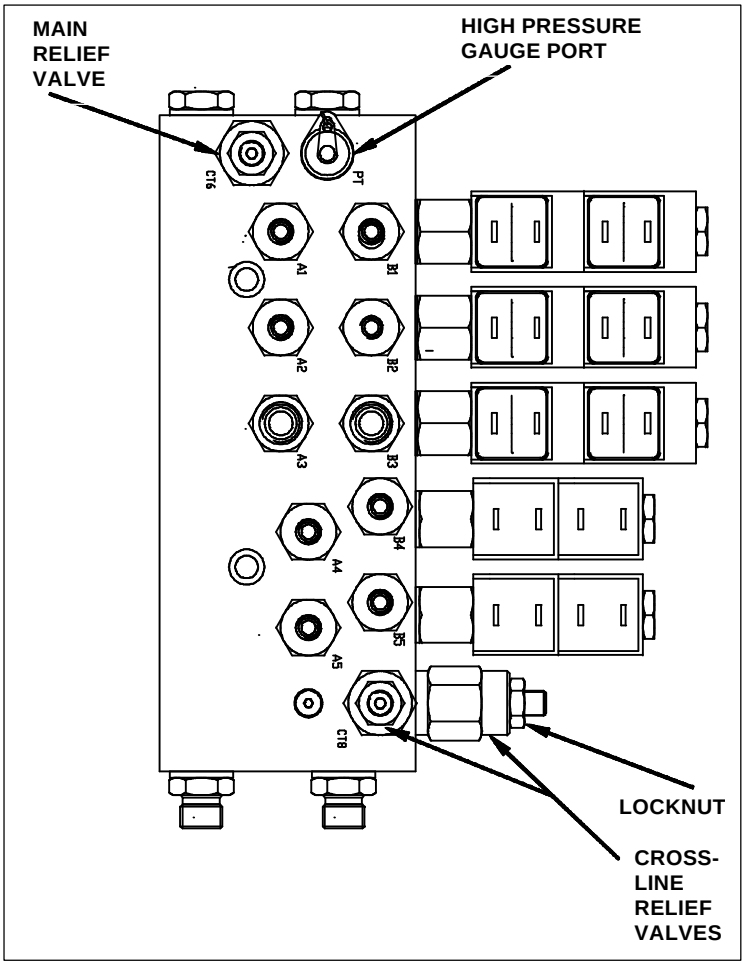


Figure 4-5 Main Manifold Block

SLEW CROSS-LINE RELIEF VALVES (Figure 4-5)

1. Operate the hydraulic system for 10-15 minutes to warm the oil.

2. Remove the cover from the 1st post.

3. Insert pressure gauge into high pressure gauge port marked 'PT' on top of front face of main manifold block.

4. Loosen locknuts on both cross-line relief valves and turn adjusting screws counter clockwise two full turns.

5. Operate slew function from lower controls and rotate elevating assembly through approx. 180° until the slew stop prevents further rotation.

6. Slowly turn the cross-line relief valve adjusting screw clockwise until the pressure gauge reads 50 Bar pressure.

7. Now operate the slew function in the opposite direction through approx. 360° until the slew stop prevents further rotation.

8. Slowly turn the remaining cross-line relief valve adjusting screw clockwise until the pressure gauge reads 50 Bar pressure.

9. Tighten the locknuts on both cross-line reief valves while holding the adjusting screws in position.

4.6 Switch Adjustments

SLEW CUT-OUT LIMIT SWITCH

Function: The purpose of this limit switch is to prevent the operator from slewing while the lower boom and second post are on or near the towbar thus preventing accidental damage to it. It does this by breaking the slew signal from the upper or lower controls while the second post is less than approximately 1 m above the ground.

Location: The switch is located on the first post boom pivot plate.

Adjustment: To adjust the switch loosen the lever clamping nut and rotate the lever. Tighten the lever clamping nut. The lever is actuated by the lower boom as it descends.The Normally Closed contacts of the switch should open when the lower boom is at an angl such that the bottom of the second post is approx. 1 m above the ground.

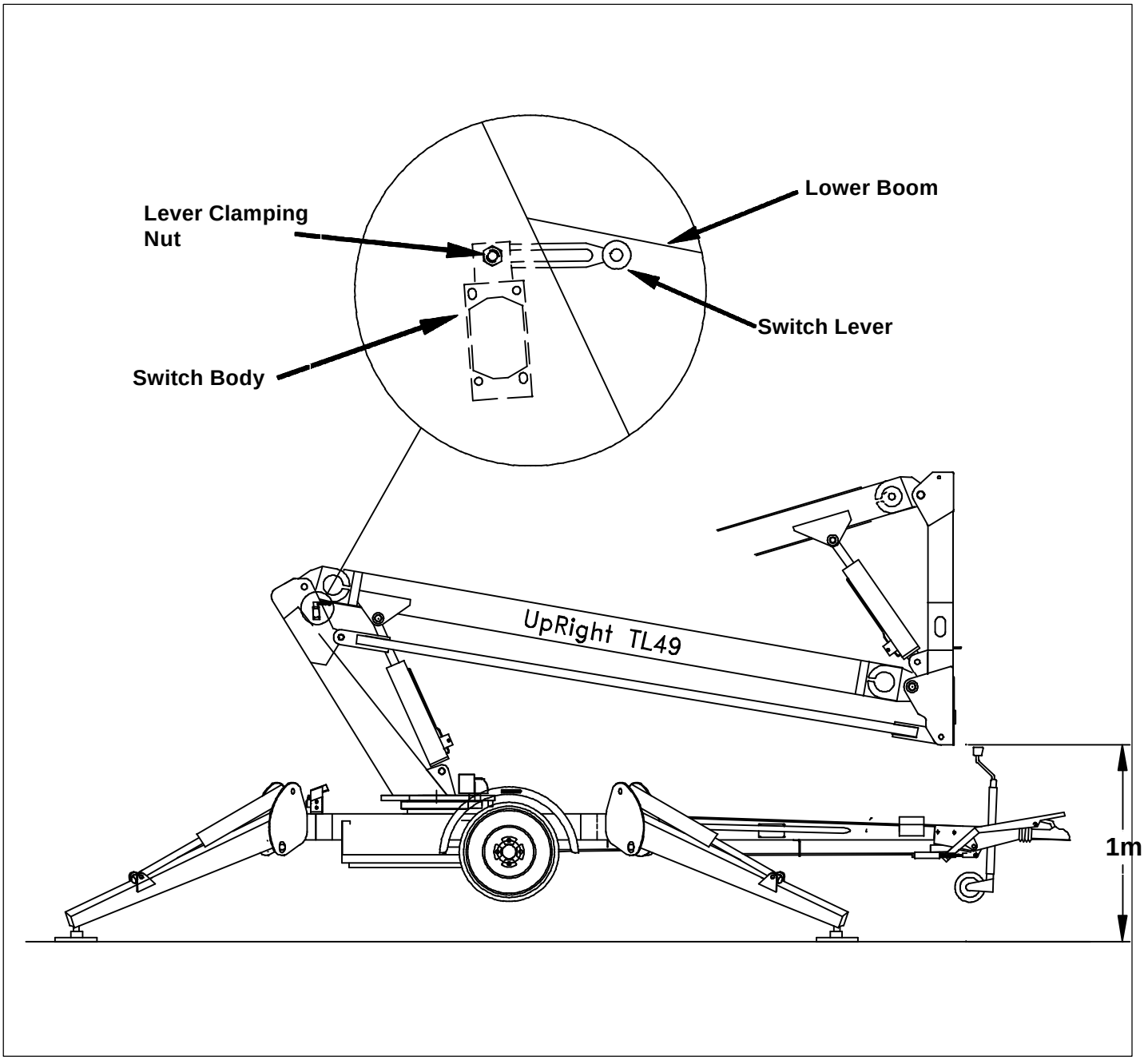


Figure 4-6: Slew Cut-out Limit Switch

4.6 Switch Adjustments (Contd...)

BOOM REST LIMIT SWITCH

Function: This limit switch is activated when the booms are fully stowed and the lower boom is sitting in the boom rest. The outriggers can only be operated when this switch is activated. The limit switch lever (or ball :- pre-serial number 1008) is actuated by the lower boom when is sits into the boom rest. When the boom leaves the boom rest the Normally Open contacts of the limit switch open and power is cut to the outrigger function switches.

Location: The switch is located on the chassis assembly.

Adjustment:

(a) Ball Type: The securing nut that holds the switch may work itself loose after extensive use. adjust height of ball by loosening the locking nut and screwing the switch clockwise or anti-clockwise. The ball should be depressed when the boom sits in the boom rest. Tighten the locking nut.

(b) Lever Type: The switch should be activated when the boom sits in the boom rest. The lever is non-adjustable,but should be checked for freedom of movement and kept clean from dirt and other contaminants that might affect its free movement.

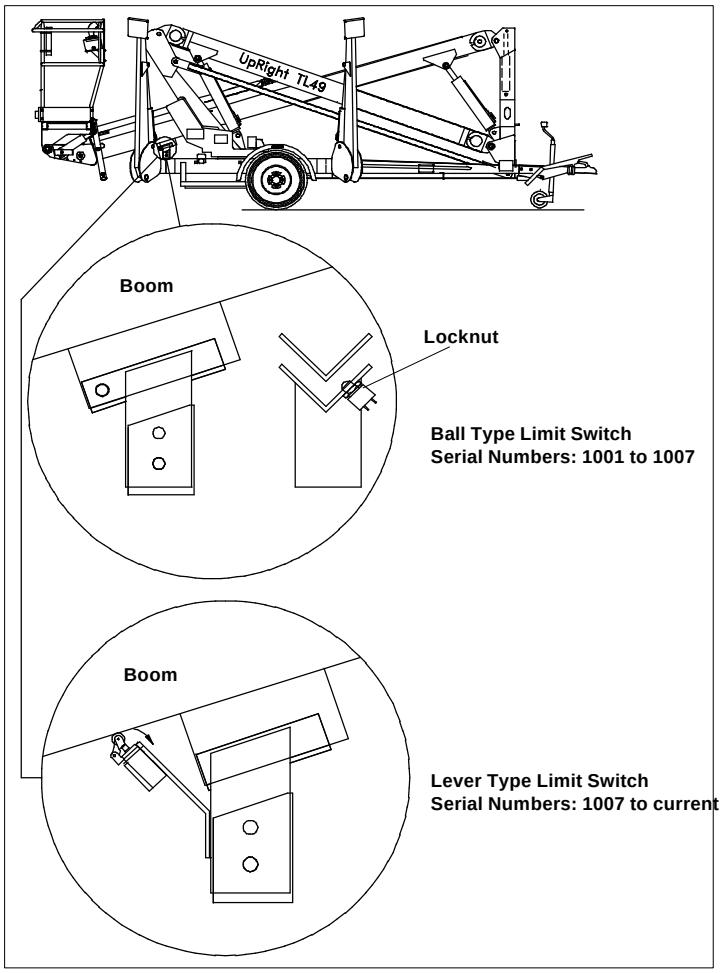


Figure 4-7: Boom Rest Limit Switch

OUTRIGGER LIMIT SWITCHES

Function: These four limit switches are wired in series. When the four outriggers are deployed these switches are activated and allow the booms functions to be operated.

Serial Numbers 1001 to 1059: In addition to the above function the switches also provide warning if one of the outriggers becomes 'light' or lifts off the ground. In this case power is cut to the upper controls and the alarm is acitvated.

Serial Numbers 1060 to current: Once the boom leaves the boom rest the outrigger switch circuit is isolated. The tilt alarm senses that the machine may be becoming unstable and cuts normal functions at the upper controls and activates the alarm**.**

Location: Between the outrigger pivot plates.

Adjustment:

The lever is non-adjustable and should be depressed by the outrigger cylinder head when the outriggers are deployed. It should be checked for freedom of movement and kept clean from dirt or other contaminants.

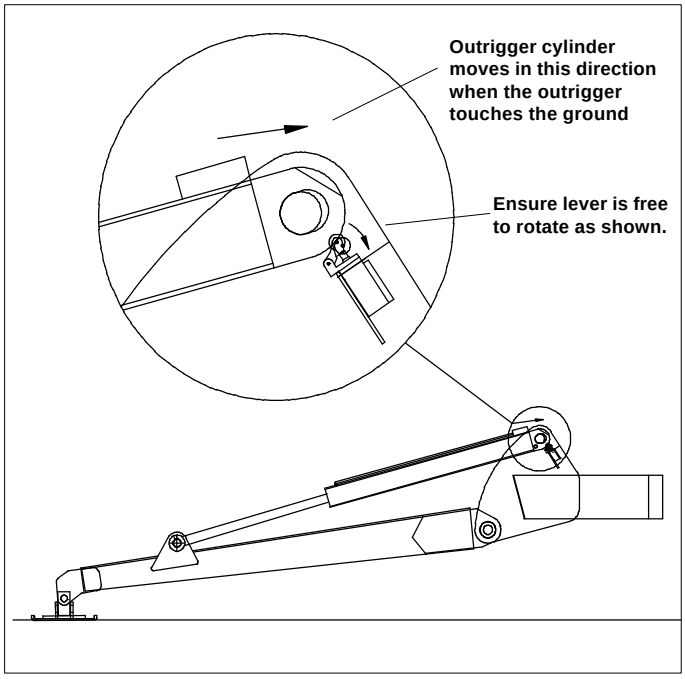


Figure 4-8: Outrigger Limit Switch

4.7 Hydraulic Manifold

Though it is not necessary to remove the manifold to perform all maintenance procedures, a determination should be made as to whether or not the manifold should be removed before maintenance procedures begin.
Figure 4-9 Serial Numbers 1001 to 1037
Figure 4-10 Serial Numbers 1038 to current

REMOVAL

1. Remove battery ground cable.
2. Remove plastic covers from first post.
3. Tag and disconnect the solenoid valve leads from the solenoids.
4. Tag, disconnect and plug hydraulic hoses.
5. Remove securing bolts that hold manifold block to first post.
6. Remove manifold block.

DISASSEMBLY

NOTE: Mark all components as they are removed so as not to confuse their location during assembly. Refer to Figure 4-9 & 4-10 often to aid in disassembly and assembly.

1. Remove coils from solenoid valves.
2. Remove solenoid valves and relief valves.
3. Remove fittings and bonded washers.
4. Remove spool housings and spools.
5. Loosen locking nuts and clamp bars (Serial numbers 1001 to 1037 only)

CLEANING AND INSPECTION

1. Wash the manifold in cleaning solvent to remove built up contaminants and then blow out all passages with **clean** compressed air.

2. Inspect the manifold for cracks, thread damage and scoring where O-rings seal against internal and external surfaces.

3. Wash and dry each component and check for thread damage, torn or cracked O-rings and proper operation.

4. Replace parts and O-rings found unserviceable.

ASSEMBLY

Note: Lubricate all O-rings before installation to prevent damage to O-rings.

1. Install fittings and bonded seals.

2. Install relief valves and solenoid valves.

Note: Torque cartridge relief valves to 45NM.
Torque solenoid spool cartridges to 20NM
Torque coil retaining nuts to 3.4NM

INSTALLATION

1. Attach manifold assembly to first post with bolts and washers.
2. Connect hydraulic hoses to their destinations on the manifold block.
3. Connect soleniod leads to their correct coils.
4. Operate each hydraulic function and check for proper function and leaks.
5. Re-secure plastic cover to first post.

1. Inlet/Outlet section
2. Intermediate sections
3. End section
4. Main Relief Section
5. Cross-Line Relief Section
6. Coil
7., 8., 9., 10. O-ring
11. End Lock Cap
12. Spool Assembly
13. Spool Housing
14. Centre Return Spring
15. Dust Cap
16. Fitting, Straight
17. Bonded Seal
18. Clamp Rod
19. Lock Nut
20. Cross-Line Relief Cartridge (50 Bar)
21. Main Relief Cartridge (155 Bar)

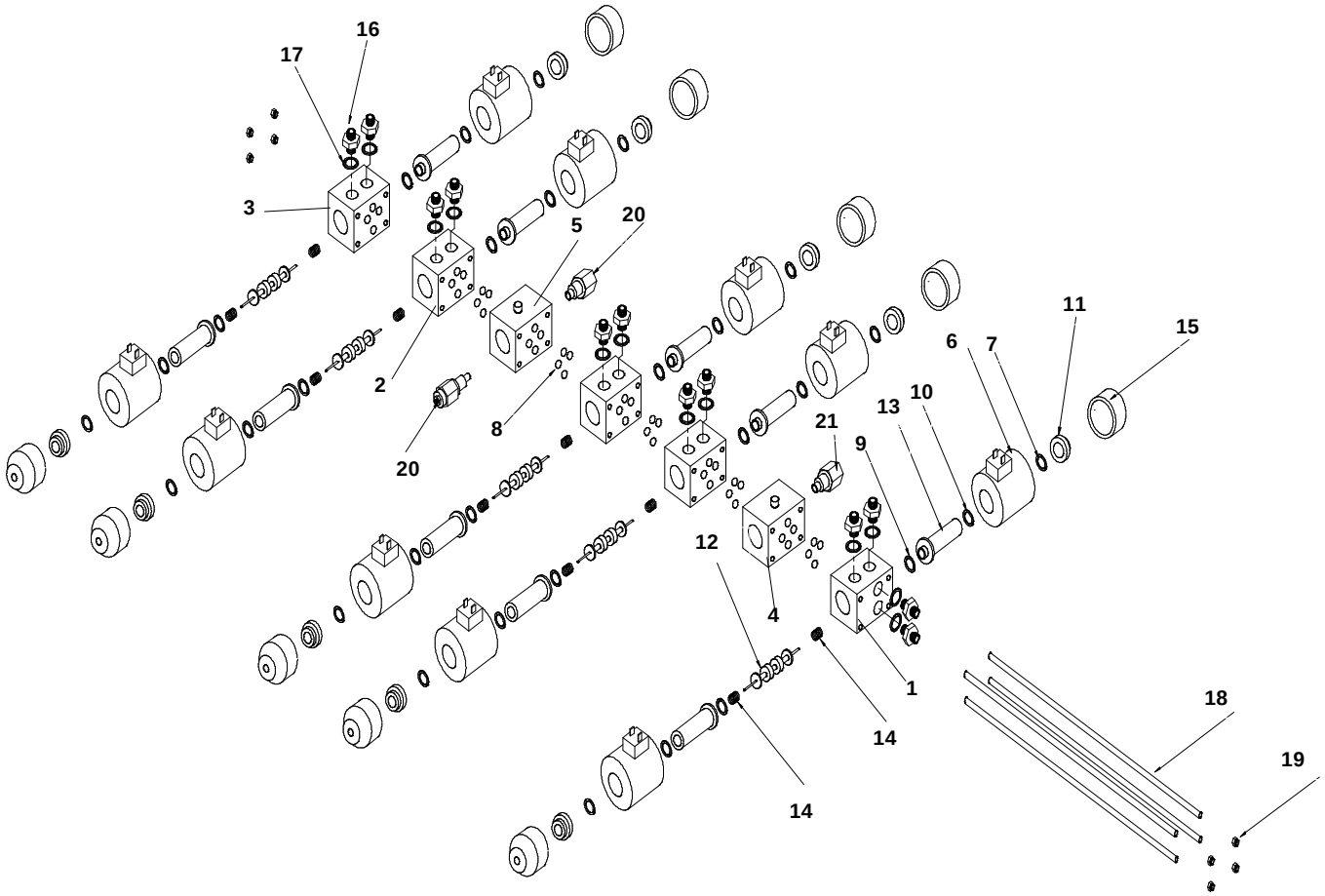


Figure 4-9: Main manifold Block, Serial Numbers 1001 to 1027

1. Valve Block
2. Spool Assembly, Small (including O-Rings)
3. Coil, Small
4. Locking Nut
5. Relief Valve (Slew)
6. Relief Valve (Main)
7. Fitting ,Straight
8. Bonded Washer
9. Fitting, Pressure Test Point
10. Coil, Large
11. Spool Assembly,Large (including O-Rings)
12. Fitting, Plug

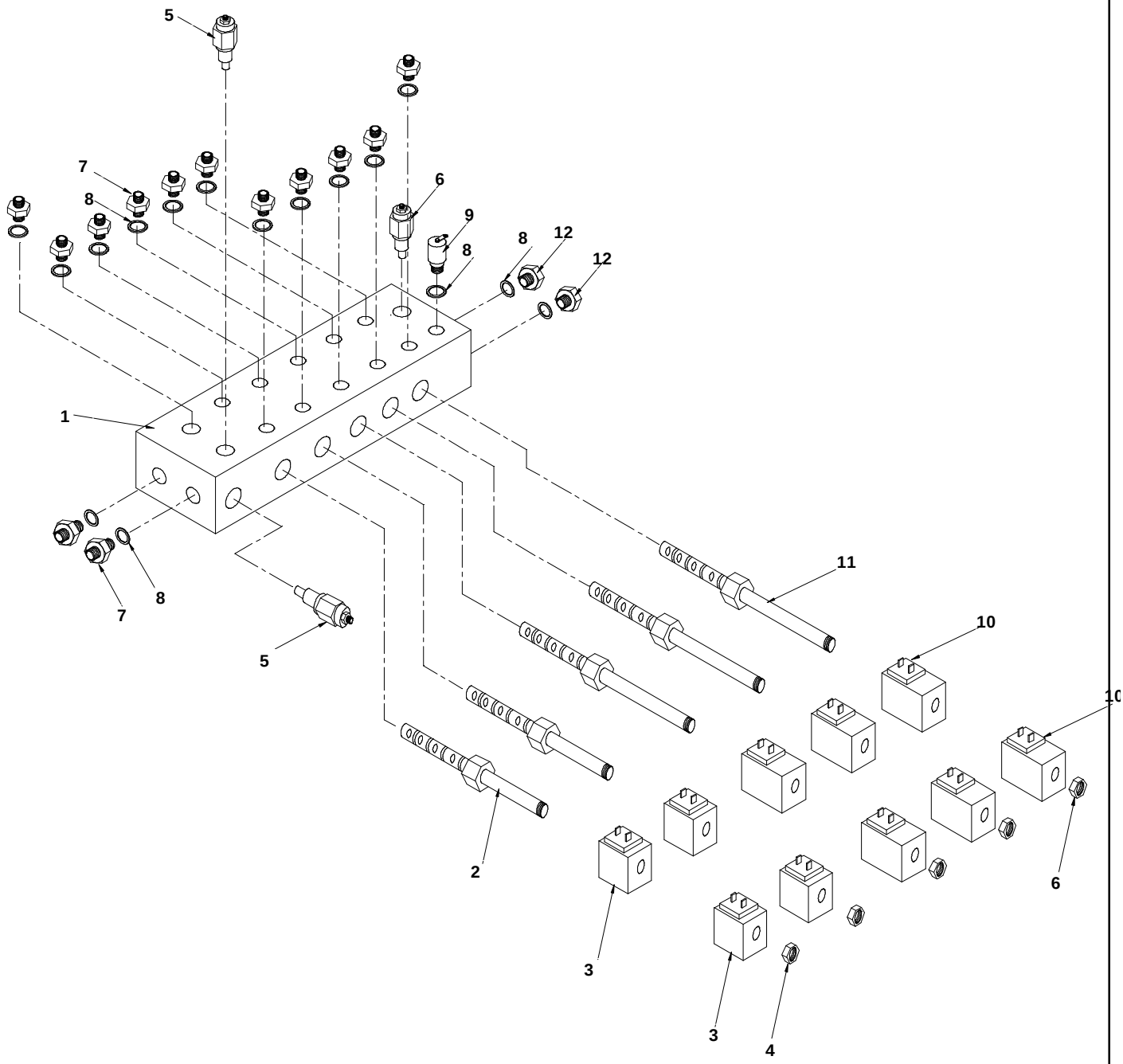


Figure 4-10 Main Manifold Block, Serial Numbers 1028 to current

4.8 Outrigger Manifold

As with the Main manifold it is not necessary to remove the manifold to perform all maintenance procedures, a determination should be made as to whether or not the manifold should be removed before maintenance procedures begin.
Figure 4-11 Serial Numbers 1001 to 1037
Figure 4-12 Serial Numbers 1038 to current

REMOVAL

1. Remove battery ground cable.

2. Remove plastic covers from the control module.

3. Tag and disconnect the solenoid valve leads from the solenoids.

4. Tag, disconnect and plug hydraulic hoses.

5. Remove securing bolts that hold outrigger manifold block to the control module.

6. Remove the outrigger manifold block.

DISASSEMBLY

NOTE: Mark all components as they are removed so as not to confuse their location during assembly. Refer to Figure 4-11 & 4-12 often to aid in disassembly and assembly.

1. Remove coils from solenoid valves.

2. Remove solenoid valves.

3. Remove relief valve (Serial numbers 1001 to 1037 only).

3. Remove fittings and bonded washers.

4. Remove spool housings and spools (Serial numbers 1001 to 1037 only)

5. Loosen locking nuts and clamp bars (Serial numbers 1001 to 1037 only)

CLEANING AND INSPECTION

1. Wash the manifold in cleaning solvent to remove built up contaminants and then blow out all passages with **clean** compressed air.

2. Inspect the manifold for cracks, thread damage and scoring where O-rings seal against internal and external surfaces.

3. Wash and dry each component and check for thread damage, torn or cracked O-rings and proper operation.

4. Replace parts and O-rings found unserviceable.

ASSEMBLY

Note: Lubricate all O-rings before installation to prevent damage to O-rings.

1. Install fittings and bonded seals.

2. Install relief valve (Serial numbers 1001 to 1037 only)
and solenoid valves.

Note: Torque cartridge relief valves to 45NM.
Torque solenoid spool cartridges to 20NM
Torque coil retaining nuts to 3.4NM

INSTALLATION

1. Attach manifold assembly to control module with bolts and washers.

2. Connect hydraulic hoses to their destinations on the manifold block.

3. Connect soleniod leads to their correct coils.

4. Operate each hydraulic outrigger cylinder and check for proper function and leaks.

5. Re-secure plastic cover to module.

1. Inlet/Outlet section
2. Intermediate sections
3. End section
4. Relief Section (Set at Max. Not Used)
5. Relief Cartridge (Not used in circuit)
6. Coil
7., 8., 9., 10. O-ring
11. End Lock Cap
12. Spool Assembly
13. Spool Housing
14. Centre Return Spring
15. Dust Cap
16. Fitting, Straight
17. Bonded Seal
18. Clamp Rod
19. Locking Nut

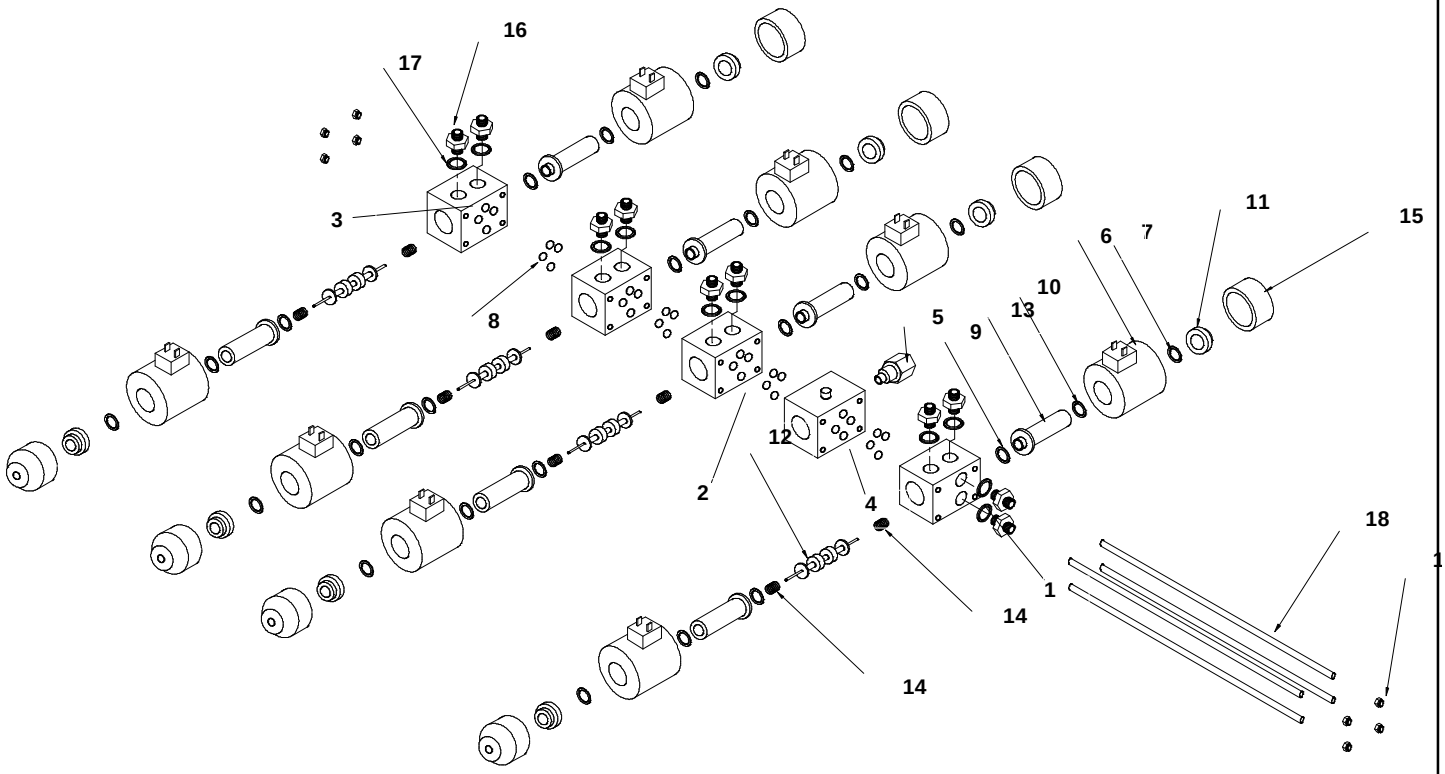


Figure 4-11: Outrigger manifold Block, Serial Numbers 1001 to 1027

1. Valve Block
2. Spool Assembly (including O-Rings)
3. Coil
4. Locking Nut
5. Fitting ,Straight
6. Bonded Washer
7. Plug

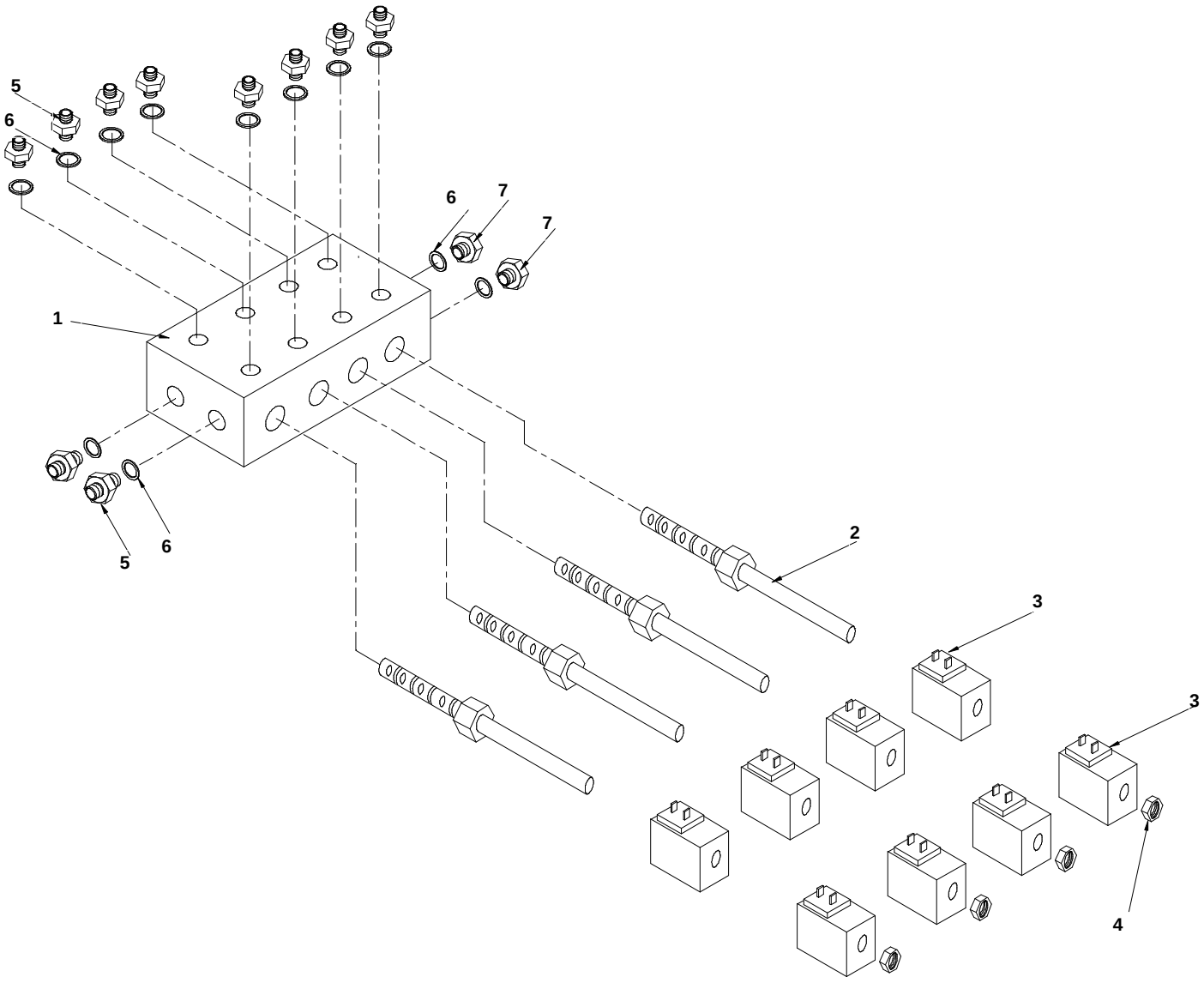


Figure 4-12: Outrigger manifold Block, Serial Numbers 1028 to current

4.9 Hydraulic Pump (Figure 4-13)

REMOVAL

NOTE: If the hydraulic reservoir has not been drained, suitable means for plugging the hoses should be provided to prevent excessive fluid loss.

1. Mark, disconnect and plug hose assemblies.

2. Loosen the capscrews and remove the pump assembly from the motor.

INSTALLATION

1. Lubricate the pump shaft with general purpose grease and attach the pump to the motor with the capscrews.

2. Using a criss-cross pattern torque each capscrew a little at a time until all the capscrews are torqued to 20 ft.lbs. (27 N-m).

3. Unplug and reconnect the hydraulic hoses.

4. Check the oil level in the hydraulic tank before operating the work platform.

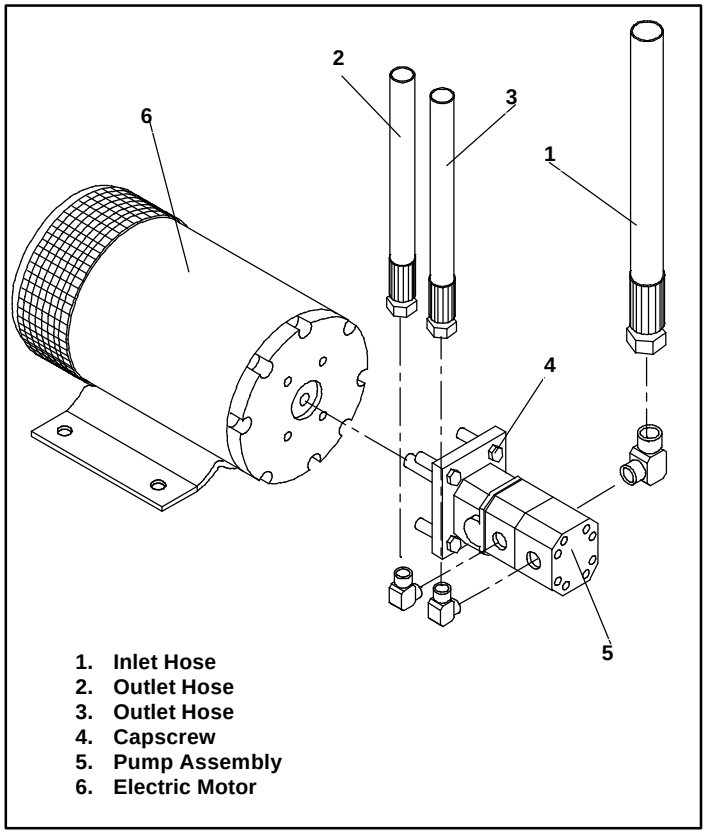


Figure 4-13: Hydraulic Pump

4.10 Hydraulic Cylinders

REMOVAL

A: Slave Levelling Cylinder

NOTE: Removal of the slave cylinder requires the cage to be held in position by suitable suppo slings or by another person.

1. Disconnect both hoses and plug ends to avoid excessive oil spillage. Note which hose goes to which port.
2. Remove lock plate securing bolt and spring washe from both the rod end pin and body end pin.
3. Remove lock plates.
4. Hold cage assembly in position and knock out rod end pin and body end pin.
5. Remove cylinder.

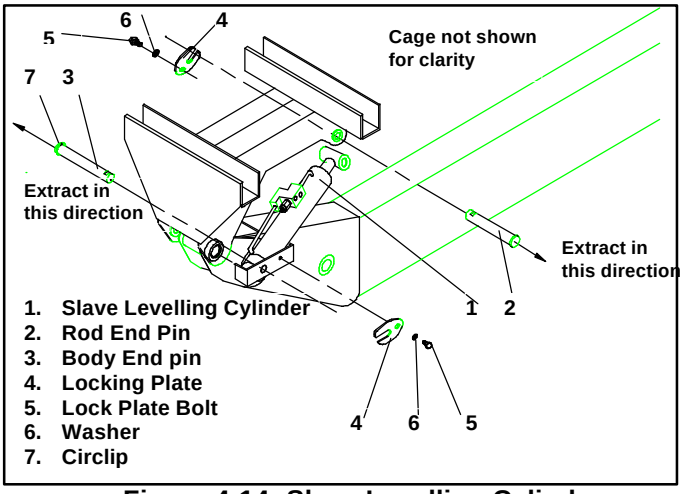


Figure 4-14: Slave Levelling Cylinder

DISASSEMBLY, CLEANING AND INSPECTION, REASSEMBLY

All the cylinders are similar in their construction and the disassembly, cleaning and inspection and reassembly is dealt with in Section 4-11.

INSTALLATION

Note: before installing Slave Cylinder check cylinde pins and bearings for wear and replace if necessary

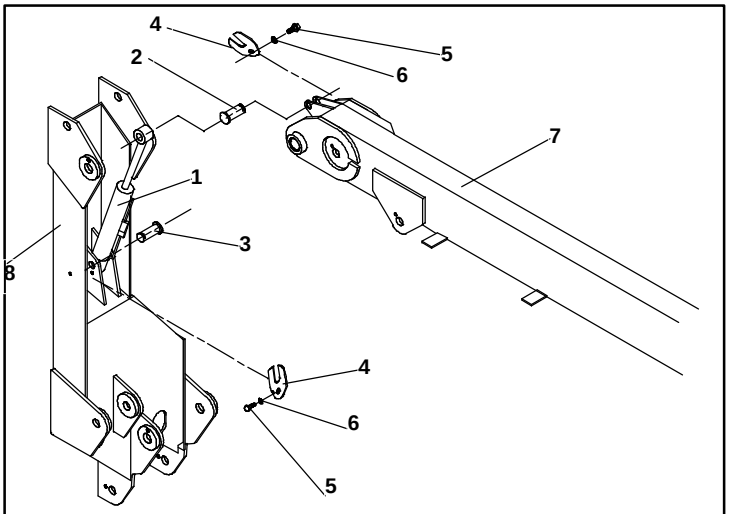
1. Lift the cylinder into place and insert the body end pin in through the cylinder and boom.

Note: take care in aligning the pin in the holes so th the pin can be pushed in by hand. If the pin and hol are not properly aligned and the pin is forced in, the bushings will be damaged.

2. Line the cage cradle holes up with the cylinder rod hole and insert the rod end pin.
3. Slide both locking plates into the groves on the pins and secure with the bolts and washers.
4. **Test with weight at rated platform load to che system operation.**

B: Master Levelling Cylinder

1. Disconnect the 4 hoses and plug ends to avoid excessive oil spillage. Note which hose goes to which port.
2. Remove lock plate securing bolt and spring washer from both the rod end pin and body end pin.
3. Remove lock plates.
4. Holding the cylinder securely. Knock out both the rod end and body end pins.
5. Remove the cylinder.



1. Master Levelling Cylinder
2. Rod End Pin
3. Body End Pin
4. Locking Plate
5. Lock Plate Bolt
6. Washer
7. Upper Boom
8. Second Post

Figure 4-15: Master Levelling Cylinder

DISASSEMBLY, CLEANING AND INSPECTION, REASSEMBLY

See Section 4-11.

INSTALLATION

Note: before installing Master Cylinder check cylinder pins and bearings for wear and replace if necessary.

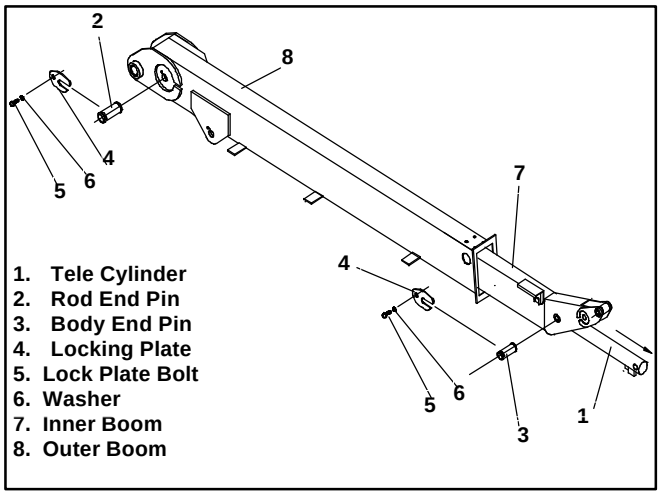
1. Lift the cylinder into place and insert the body end pin in through the cylinder and Second Post Anchors.

Note: take care in aligning the pin in the holes so that the pin can be pushed in by hand. If the pin and holes are not properly aligned and the pin is forced in, the bushings will be damaged.

2. Line the Upper Boom Anchor holes up with the cylinder rod hole and insert the rod end pin. (Note: To move the cylinder rod for aligning the holes the overcentre cartridges must be removed from the block on the cylinder body or alternatively the Upper Lift Cylinder can be used to raise and lower the Upper Boom)
3. Slide both locking plates into the groves on the pins and secure with the bolts and washers.
4. Reconnect the hoses to their correct ports.
5. **Test with weight at rated platform load to check system operation.**

C: Telescopic Cylinder

1. Set the machine up on level ground with all 4 outriggers deployed.
2. Raise the upper boom to just below horizontal.
3. Disconnect the two hoses from the cylinder body and plug. Note which hose goes to which port.
4. Remove the lock plate securing bolt and spring washer from both the inner and outer upper boom.
5. Remove both lock plates.
6. The tele cylinder can now be pulled out of both booms. Note: the cylinder will require two people to lift it out due to its length and weight.



1. Tele Cylinder
2. Rod End Pin
3. Body End Pin
4. Locking Plate
5. Lock Plate Bolt
6. Washer
7. Inner Boom
8. Outer Boom

Figure 4-16: Tele Cylinder

DISASSEMBLY, CLEANING AND INSPECTION, REASSEMBLY

See Section 4-11.

INSTALLATION

Note: before installing Tele Cylinder check cylinder pins and bearings for wear and replace if necessary

1. Lift the cylinder into place and slide it into the front end of the Inner Boom.
2. Insert a metal bar (e.g. a screw driver) into one of the pin holes in the Outer Boom and into the rod-end pivot.
3. Lift the rod end up to align the holes on the cylinder and the Outer boom.

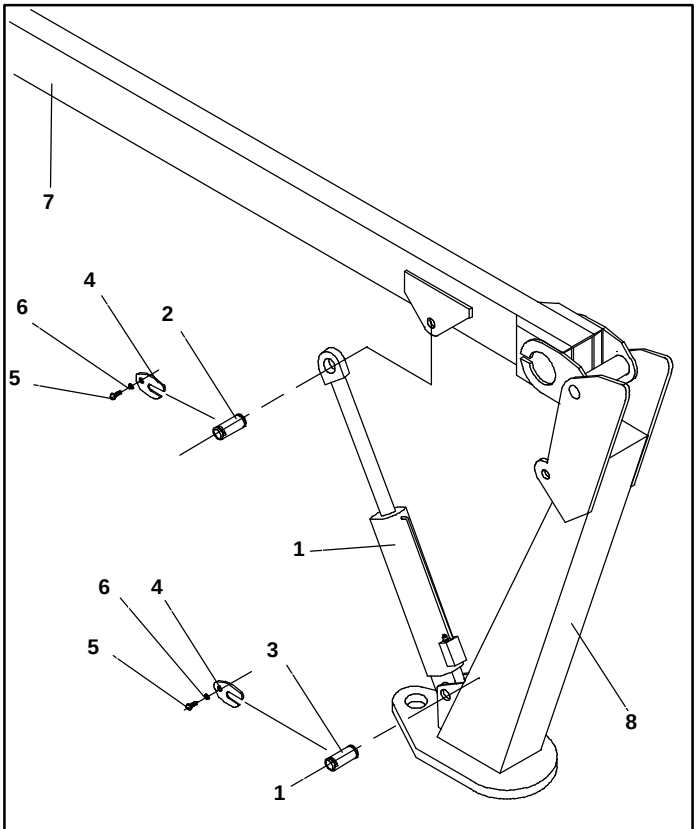
Note: take care in aligning the pin in the holes so that the pin can be pushed in by hand. If the pin and holes are not properly aligned and the pin is forced in, the bushings will be damaged.

4. Insert the rod end pin through the boom and cylinder and secure the locking plate to the pin end with the bolt and washer.
5. Repeat steps 2 to 4 at the body end.
6. Reconnect the hoses to their correct ports.
7. **Test with weight at rated platform load to check system operation.**

D: Lower Lift Cylinder

NOTE: Due to the force on the pins caused by the weight of the booms, it is generally necessary to use a sling and overhead crane of suitable capacity to assist in the removal of the cylinder pins.

1. Set the machine up on level ground with all 4 outriggers deployed.
2. Securely attach a sling to the second post and to an overhead crane.
3. Disconnect the two hoses from the cylinder body and plug. Note which hose goes to which port.
4. Remove lock plate securing bolt and spring washer from both the rod end pin and body end pin.
5. Remove the lock plates.
6. Take up the slack on the sling to remove the weight of the booms on the rod end pin.
7. Knock the rod end pin out pin out.
8. Knock the body end pin out.
9. Remove cylinder.



1. Lower Lift Cylinder
2. Rod End Pin
3. Body End Pin
4. Locking Plate
5. Lock Plate Bolt
6. Washer
7. Lower Boom
8. First Post

Figure 4-17: Lower Lift Cylinder

DISASSEMBLY, CLEANING AND INSPECTION, REASSEMBLY

See Section 4-11.

INSTALLATION

Note: before installing Lower Lift Cylinder check cylinder pins and bearings for wear and replace if necessary.

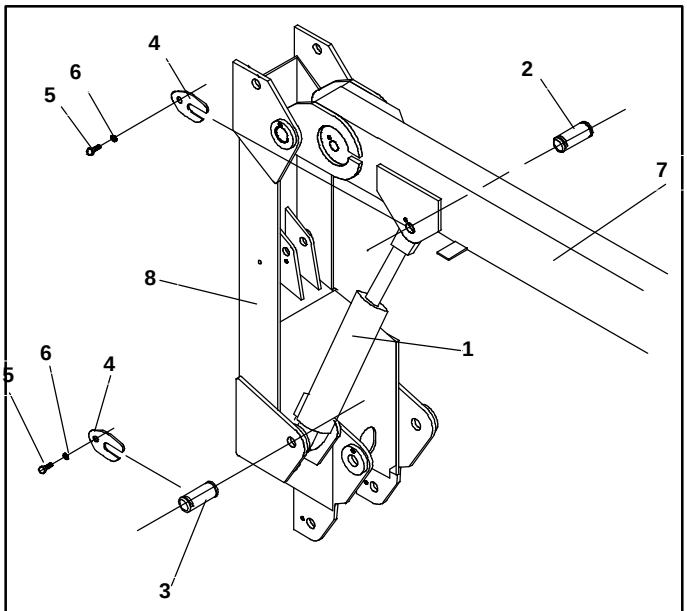
1. Lift the cylinder into place and insert the body end pin in through the cylinder and First Post Anchors.

Note: take care in aligning the pin in the holes so that the pin can be pushed in by hand. If the pin and holes are not properly aligned and the pin is forced in, the bushings will be damaged.

2. Line the Lower Boom Anchor holes up with the cylinder rod hole and insert the rod end pin. (Note: To align the holes use an overhead crane and sling of suitable capacity firmly secured to the second post. This should be used to raise and lower the Lower Boom)
3. Slide both locking plates into the groves on the pins and secure with the bolts and washers.
4. Reconnect the hoses to their correct ports.
5. **Test with weight at rated platform load to chec system operation.**

E: Upper Lift Cylinder

Follow the same procedure as with the lower lift cylinder but use the sling on the upper boom at the cage end.



1. Upper Lift Cylinder
2. Rod End Pin
3. Body End Pin
4. Locking Plate
5. Lock Plate Bolt
6. Washer
7. Upper Boom
8. Second Post

Figure 4-18: Upper Lift Cylinder

DISASSEMBLY, CLEANING AND INSPECTION, REASSEMBLY

See Section 4-11.

INSTALLATION

Note: before installing Upper Lift Cylinder check cylinder pins and bearings for wear and replace if necessary.

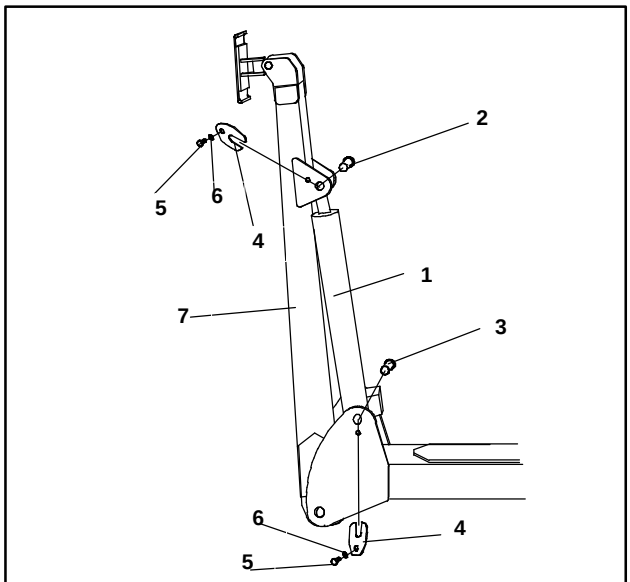
1. Lift the cylinder into place and insert the body end pin in through the cylinder and Second Post Anchors.

Note: take care in aligning the pin in the holes so that the pin can be pushed in by hand. If the pin and holes are not properly aligned and the pin is forced in, the bushings will be damaged.

2. Line the Upper Boom Anchor holes up with the cylinder rod hole and insert the rod end pin. (Note: To align the holes use an overhead crane and sling of suitable capacity firmly secured to the Upper Boom at the cage end. This should be used to raise and lower the Upper Boom).
3. Slide both locking plates into the groves on the pins and secure with the bolts and washers.
4. Reconnect the hoses to their correct ports.
5. **Test with weight at rated platform load to check system operation.**

F: Outrigger Cylinder

1. With the booms in the stowed position, raise all 4 outriggers.
2. Disconnect the hoses from the cylinder and plug to avoid excessive oil spillage. Note which hoses go to which port.
3. Remove the securing bolts and washers from the cylinder lock plates.
4. Remove the lock plates.
5. Holding the outrigger in position, knock out the body end pin.
6. Lower the outrigger and cylinder to the ground and knock out the rod end pin.
7. Remove the cylinder.



1. Outrigger Cylinder
2. Rod End Pin
3. Body End Pin
4. Locking Plate
5. Lock Plate Bolt
6. Washer
7. Outrigger

Figure 4-19: Outrigger Cylinder

DISASSEMBLY, CLEANING AND INSPECTION, REASSEMBLY

See Section 4-11.

INSTALLATION

Note: before installing outrigger Cylinder check cylinder pins and bearings for wear and replace if necessary.

1. Installation is the reverse of removal (above)

Note: take care in aligning the pin in the holes so that the pin can be pushed in by hand. If the pin and holes are not properly aligned and the pin is forced in, the bushings will be damaged.

2. **Test with weight at rated platform load to check system operation**

4.11 Disassembly, Cleaning and Inspection and Assembly of Hydraulic cylinders

Note: The disassembly, cleaning and inspection and assembly for all the cylinders is basically the same.

DISSASSEMBLY OF HYDRAULIC CYLINDERS

Note: Prepare a clean work area on which to service the internal parts.

1. Remove fittings, Pilot operated check valve cartridges and overcentre valve cartridges from the cylinder blocks.
2. Bend up tab on tab washer (if applicable).
3. Unscrew end cap and remove from cylinder body with rod and piston.
4. Unscrew the piston locknut from the rod and remove the piston head and the end cap.
   Note: Some piston locknuts are fitted with a roll pin and grub screw which must be removed before unscrewing the locknut
5. Remove all seals from the end cap (i.e. wiper, shaft seal, O-ring, rod seal, end cap gland and PTFE seal) and disregard.
6. Remove all seals from piston head (i.e. piston O-ring and piston seal) and disregard.

CLEANING AND INSPECTION

1. Clean all metal parts in solvent and blow dry with filtered compressed air.
2. Check all threaded parts for stripped or damaged threads.
3. Check the bearing surfaces inside of the end cap, outer edge surface of the piston, inside the cylinder body and the rod for signs of scoring or excessive wear.
4. Replace any parts found unserviceable.
5. Discard all seals.
6. Examine all cartridge valves for wear on threads and damage to O-rings.

ASSEMBLY

1. Lubricate and install a new complete set of seals on both the end cap and piston.
2. Slide the end cap onto the rod (with the tab washer where applicable) and then the piston head.
3. Screw on the piston locknut (fitting roll pin and grub screw where applicable).
4. Lubricate the entire assembly's seals and slide the piston into the cylinder body.
5. Screw end cap onto end of cylinder body.
6. Bend down tab on tab washer.
7. Insert all cartridge valves and fittings into the cylinder valve block.

1	CYLINDER BODY
2	VALVE BODY
3	CARTRIDGE
4	END CAP
5	ROD AND END PIVOT
6	ROD SEAL
7	O-RING
8	WIPER
9	PISTON O-RING
10	GREASE NIPPLE
11	PISTON HEAD
12	PISTON SEAL
13	PISTON LOCKNUT
14	ROLL PIN
15	GRUB SCREW
16	END CAP GLAND
17	TAB WASHER
18	CARTRIDGE
19	PTFE SEAL
20	ROD SEAL

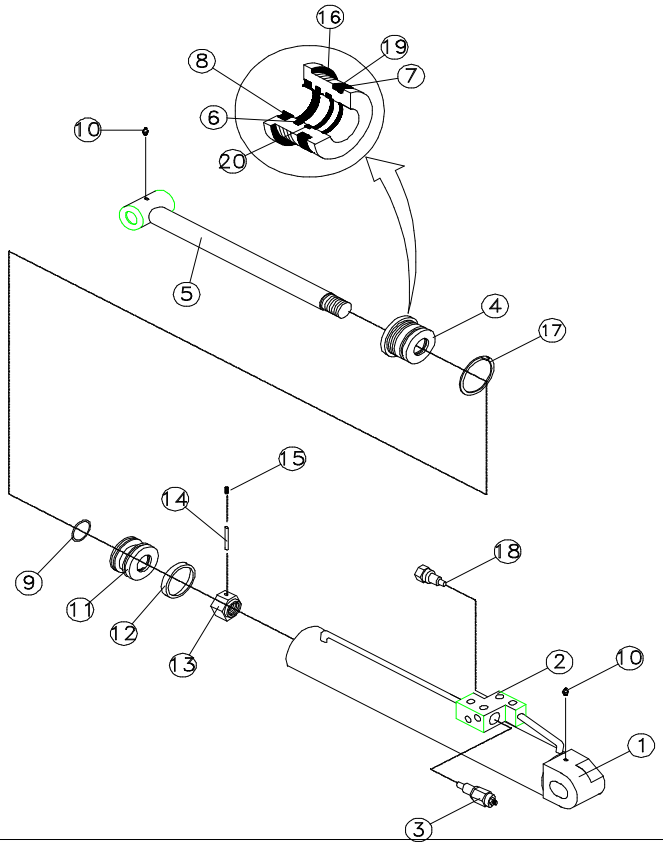


Figure 4-20: Hydraulic Cylinder Components

4.12 Adjustment of Overcentre Valves on lift cylinders.

The valve supplier delivers the overcentre valve pre-set to specification and **should not** be adjusted by the user. In the event of the valve having been tampered with the advisable course of action is to fit a replacement cartridge.

A **short term** solution is to temporarily adjust the valve as follows :-

a) Place 215 kg. evenly distributed in the cage.
b) Raise the boom to about 50mm stroke on the cylinder.
c) Disconnect the two hoses to the inlet of the o/c valve.
d) Using a screw driver adjust the spring setting screw on the valve cartridge.
Turning the screw clockwise increases the pressure setting. Turning the screw anticlockwise reduces the setting and allows the boom to creep downwards. Adjust the spring setting until the boom just begins to creep downwards.
e) Screw the adjuster **1 (one)** further turn **clockwise** and secure locknut.
f) Reconnect the hoses and remove the load.

This operation should only be carried out by suitably qualified and/or experienced personnel.

⚠ CAUTION ⚠

An incorrectly adjusted valve may cause one of the following problems:-

Cylinder creeps down under load less than the SWL.
Jerky motion in cylinder & boom when lowering.
Pump under high load when lowering.
Valve does not hold load if hose connections are loosened or broken.
Seals damaged in cylinders due to high ambient temperature rise.

5.0 Introduction

Table 5-1 provides a logical sequence of tests that are designed to isolate problems with TL49 machines. This table includes a list of probable causes and remedies.

⚠ WARNING ⚠

When troubleshooting, ensure that the work platform is resting on a form, level surface.
When performing any service on or in the elevating assembly area, which requires the platform to be raised, the elevating assembly
must be securely supported by overhead cranes of suitable capacity.
Disconnect the batteries ground cable when replacing or testing the continuity of any electrical component

GENERAL PROCEDURE

Trouble shooting should be carried out in two steps. First, thoroughly study both the hydraulic and electric schematics to determine possible causes. Loose terminal connections and short circuits are always a potential cause when trouble shooting. Second, check suspect component electrically, hydraulically and mechanically to determine if they are at fault. Refer to Tables 6-1 and 6-2 for Reference used in Table 5-1

Troubleshooting

Table 5-1: Trouble shooting

TROUBLE	PROBABLE CAUSE	REMEDY
All functions inoperable, electric motor does not start.	1. Blown electric motor fuse FU2.	Check 160 amp electric motor fuse. Replace if blown.
	2. Faulty battery charger.	Check the voltage output of the battery charger. If less than 24 VDC, repair or replace.
	3. Faulty battery(ies).	After completely charging batteries, test each battery. Replace as required.
	4. Loose or broken battery lead.	Check continuity of all battery and motor leads. Replace if necessary.
	5. Emergency Stop switch(es) (SW9, SW12, SW15) failed open.	With emergency stop switch in the ON position, check continuity across contacts. If none, replace.
	6. Blown control fuse FU1.	Check 7A circuit control fuse. Replace if blown.
All functions inoperable. Electric motor starts when control is actuated.	1. Oil level in hydraulic reservoir is low.	Check hydraulic fluid level, top off as required.
	2. Faulty hydraulic pump.	Check pressure and delivery of the hydraulic pump. Replace if required.
Electric motor continues to run after controls are returned to the neutral (OFF) position.	Line contactor (LC1) contacts fused together.	With o voltage at the coil terminals of the line contactor check continuity across the contact terminals. If there is continuity replace the Line Contactor.
Platform will not elevate or elevates slowly.	1. Emergency Lowering valve V4 open.	Close emergency down valve.
	2. Platform overloaded.	Observe maximum load rating. (See Table 1-1)
	3. Faulty controller at upper controls.	Check functionality of controller. Replace if faulty.
	4. Blown control fuse FU1.	Check 7A circuit contrrol fuse. Replace if blown.
	5. Battery level low. Check LED on motor control unit for 7 flash fault (LED will flash 7 times) due to battery voltage <13V.	Check Battery Voltage. Charge if necessary.

Table 5-1: Trouble shooting (cont.)

TROUBLE	PROBABLE CAUSE	REMEDY
Platform will not elevate or elevates slowly.	6. Check LED on motor control unit for 8 flash fault (LED will flash 8 times) due to thermal cutback.	Allow unit to cool down, to clear flashing.
	7. Check LED on motor control unit for 5 flash fault (LED will flash 5 times) due to Line contactor not closing on selection of a function.	Check Line contactor for mechanical operation and coil O.K. Repair or replace if necessary.
	8. Outrigger limit switches LS1, LS2, LS3, LS4 not activated.	Ensure all four outriggers are deployed and the limit switch contacts are closed. Replace switch.
Booms drift down after being elevated	1. Emergency lowering valve open.	Ensure that emergency lowering valve is completely closed. Replace the valve.
	2. Leaking piston seals in lift cylinders (CYL1, CYL2)	Check for leakage at cylinder return line, replace seals if necessary.
Outrigger cylinders will not retract.	Boom rest limit switch, LS5, is not activated or is faulty.	Ensure booms are stowed. Check that Normally Open contacts of limit switch are closed when boom is on boom rest.
Machine will not slew when booms are elevated	Faulty slew cut-out limit switch, LS6.	Check that Normally Closed contacts of limit switch are closed when second post is approximately 1m above ground. Adjust switch lever arm or Replace switch.
Tele cylinder will not retract or extend.	Shutoff ball valve SBV is open.	Close Shutoff ball valve.

6.0 Introduction

This section contains electrical and hydraulic power schematics and associated information for maintenance purposes.
The diagrams are to be used in conjunction with Table 5-1: Troubleshooting Guide. They allow understanding of the makeup and functions of the systems for checking, tracing, and faultfinding during troubleshooting analysis.

The components that comprise the electrical and hydraulic systems are given a reference designation and are explained as to function and location in the following tables.

INDEX

Schematics

NOTES

6.1 Electrical Schematic **SERIAL NUMBERS: 1001 TO 1016**

Table 6-1: Electrical Schematic Legend

REFERENCE	NAME	FUNCTION	LOCATION
ALM1	Alarm, Tilt	Provides warning sound until outriggers are deployed and the contacts on LS1, LS2, LS3 and LS4 are closed. If one of the switches opens during the operation of the machine then the alarm sounds and power is cut to the upper controls.	In Upper Control Box
BAT	Batteries (4) 6 Volts each.	To store energy	Equipment subframe on chassis
D1	Diode	Feeds a signal to pin 11 on the controller when the levelling up function is selected and prevents backfeed to the level up solenoid when level down is selected.	On lower control box P.C.B.
D2	Diode	Feeds a signal to pin 11 on the controller when the levelling down function is selected and prevents backfeed to the level down solenoid when level up is selected.	On lower control box P.C.B.
D3	Diode	Feeds power to tele-out solenoid from upper controls and prevents feed-back to upper controls from lower controls.	On lower control box P.C.B.
D4	Diode	Feeds power to tele-out solenoid from Lower controls and prevents feed-back to Lower controls from upper controls.	On lower control box P.C.B.
D5	Diode	Feeds power to tele-in solenoid from upper controls and prevents feed-back to Lower controls from upper controls.	On lower control box P.C.B.
D6	Diode	Feeds power to tele-in solenoid from lower controls and prevents feed-back to Lower controls from upper controls.	On lower control box P.C.B.
D7	Diode	Feeds a signal from lower lift cylinder (up) solenoid to pin 12 on the controller and prevents backfeed to the solenoid when other functions are selected.	On lower control box P.C.B.
D8	Diode	Feeds a signal from tele cylinder (out) solenoid to pin 12 on the controller and prevents backfeed to the tele-out solenoid when other functions are selected.	On lower control box P.C.B.
D9	Diode	Feeds a signal from upper lift cylinder (up) solenoid to pin 12 on controller and prevents backfeed to the lift solenoid when other functions are selected.	On lower control box P.C.B.
D10	Diode	Feeds +24V to pin 6 on the controller from upper controls.	On lower control box P.C.B.
D11	Diode	Feeds +24V to pin 6 on the controller when keyswitch is switched to lower controls	On lower control box P.C.B.
D12	Diode	Feeds a signal from tele cylinder (in) solenoid to pin 12 on the controller and prevents backfeed to the tele-in solenoid when other functions are selected.	On lower control box P.C.B.
D13	Diode	Feeds a signal from lower lift cylinder (down) solenoid to pin 12 on the controller and prevents backfeed to the lower lift solenoid when other functions are selected.	On lower control box P.C.B.
D14	Diode	Feeds a signal from upper lift cylinder (down) solenoid to pin 12 on the controller and prevents backfeed to the upper lift solenoid when other functions are selected.	On lower control box P.C.B.
D15	Diode	Feeds power to slew right solenoid from upper controls and prevents feed-back to upper controls from the lower controls.	On lower control box P.C.B.
D16	Diode	Feeds power to slew left solenoid from lower controls and prevents feed-back to lower controls from upper controls.	On lower control box P.C.B.
D17	Diode	Feeds power to lower cylinder (up) solenoid from upper controls and prevents feed-back to upper controls from lower controls.	On lower control box P.C.B.
D18	Diode	Feeds power to lower cylinder (up) solenoid from lower controls and prevents feed-back to lower controls from upper controls.	On lower control box P.C.B.
D19	Diode	Feeds power to upper cylinder (up) solenoid from upper controls and prevents feed-back to upper controls from lower controls.	On lower control box P.C.B.
D20	Diode	Feeds power to upper cylinder (up) solenoid from lower controls and prevents feed-back to lower controls from upper controls.	On lower control box P.C.B.
D21	Diode	Feeds power to slew left solenoid from upper controls and prevents feed-back to upper controls from lower controls.	On lower control box P.C.B.
D22	Diode	Feeds power to slew left solenoid from lower controls and prevents feed-back to lower controls from upper controls.	On lower control box P.C.B.
D23	Diode	Feeds power to lower cylinder (down) solenoid from upper controls and prevents feed-back to upper controls from lower controls.	On lower control box P.C.B.
D24	Diode	Feeds power to lower cylinder (down) solenoid from lower controls and prevents feed-back to lower controls from upper controls.	On lower control box P.C.B.
D25	Diode	Feeds power to upper cylinder (down) solenoid from upper controls and prevents feed-back to upper controls from lower controls.	On lower control box P.C.B.
D26	Diode	Feeds power to upper cylinder (down) solenoid from lower controls and prevents feed-back to lower controls from upper controls.	On lower control box P.C.B.
D27	Diode	Feeds power signal from joystick trigger when emergency override is activated to pin 4 on controller. It prevents backfeed from lower slew signal to upper controls.	On lower control box P.C.B.
D28	Diode	Feed to alarm. Prevents back feed to coil of RL4.	On lower control box P.C.B.
D29	Diode	Feeds a signal to the tilt alarm when the keyswitch is at lower controls and all four outrigger limit switches are activated. It prevents backfeed to the coil of RL3 through the keyswitch.	On lower control box P.C.B.
D30,D31	Diode	Feed the signal which comes from the keyswitch (set at upper controls) to one of the alarm relay contact and prevents power getting to upper controls when the alarm is activated from the lower controls.	On lower control box P.C.B.
D32	Diode	Feeds the signal from the outrigger diodes to the line contactor and prevents backfeed from other signals to pin 16 on the controller.	On lower control box P.C.B.
D33	Diode	Prevents backfeed to lower control contact of the keyswitch when the line contactor is energised.	On lower control box P.C.B.
D34,35	Diode	Feed a signal to pin 7 on the controller when slew is energised by lower controls. They prevent backfeed to the slew solenoids when a signal is fed through D27 to pin7 on the controller.	On lower control box P.C.B.
D36	Diode	It prevents backfeed to the outrigger control switches when the alarm is activated from upper controls.	On lower control box P.C.B.
D37	Diode	Feeds a signal to the line contactor when the joystick trigger is depressed. It prevents backfeed to the upper controls when the line contactor is energised by lower controls.	On lower control box P.C.B.
D38	Diode	Feeds a signal to tilt alarm when keyswitch is at upper controls and all four outrigger limit switches are activated.It prevents backfeed to the coil of K1 through the keyswitch.	On lower control box P.C.B.
D39, D41, D43, D45, D47, D49, D51, D53	Diode	Feeds a signal to the line contactor each time and outrigger function switch is operated. They also prevent the outrigger solenoids from being energised by a backfeed from the line contactor signal line when it is energised by other functions.	On lower control box P.C.B.
D40, D42, D44, D46, D48, D50, D52, D54	Diode	Feeds +24V supply to the outrigger solenoids (up & down) when the outrigger function switches are activated.	On lower control box P.C.B.
D56	Diode	Suppression diode for coil of line contactor.	LC1
D57	Diode	Suppression diode for the coil of direction relay 1 (RL1)	UCB
D58	Diode	Suppression diode for the coil of direction relay 2 (RL2)	UCB
D59	Diode	Feeds power to Emergency stop contact at upper controls. It also prevents a backfeed to normal upper controls when the emergency override is being operated.	UCB
D61 - D70	Diode	Suppression diodes for the coils of function control solenoids 1 to 10.	LCB
D71 - D78	Diode	Suppression diodes for the coils of outrigger control solenoids 11 to 18	LCB
D79,D82	Diode	Feeds a signal to pin 13 on the controller via the slew cut-out limit switch (LS5) when the slew function is selected at the upper controls	UCB
D80, D83	Diode	Feeds a signal to pin 8 on the controller when the lower cylinder lift function is selected at the upper controls. It prevents backfeed to the lower lift solenoid when the upper lift cylinder solenoid is energised.	UCB
D81, D84	Diode	Feeds a signal to pin 8 on the controller when the upper cylinder lift function is selected at the upper controls. It prevents backfeed to the upper lift cylinder solenoid when the lower lift cylinder solenoid is energised.	UCB
D85	Diode	Feeds a signal to pin 8 on the controller when the tele cylinder (out) function is selected at the upper controls. It prevents backfeed to the tele in solenoid when the tele out solenoid is energised.	U.C.B.
D86	Diode	Feeds a signal to pin 8 on the controller when the tele cylinder (in) function is selected at the upper controls. It prevents backfeed to the tele out solenoid when the tele in solenoid is energised.	U.C.B.
D87	Diode	Suppression diode for the coil of SOL19	L.C.B
D88	Diode	Feeds SOL 19 and prevents backfeed to pin 7 on controller if a fault developes in SOL 19	L.C.B.
FU1	Fuse 7 Amps	Overload protection for circuit	On MCU
FU2	Fuse 160 Amps	Overload protection for Electric motor	On MCU
KSW	Keyswitch 3-Position	Diverts power to upper or lower control boxes	Outrigger control box
LS1, LS2, LS3, LS4	Limit Switch, Outrigger	Activated when outriggers are deployed. +24V supply from batteries is routed through these four limit switches in series to the keyswitch and provides power to the upper and lower control boxes for operation of the boom functions.	
LS5	Boom rest limit switch	Activated when booms are in stowed position. When boom leaves boom rest the Normally Open contact of the switch opens and cuts power to the outrigger function switches. This prevents the outriggers from being operated whilst the booms are elevated.	On chassis
LS6	Slew cut-out limit switch	Prevents slewing until the 2nd post is clear of the tow bar. The Normally closed contact is open and the slew signal to pin 13 on the controller is broken until the 2nd post is clear of the tow bar.	On first post under lower boom.
LC1	Line Contactor	In the unenergised state the Normally Closed contacts allow the charger +Ve feed to the batteries. In the energised state the Normally Open contacts close and route the battery +Ve to the pump motor	On motor control unit on the chassis equipment subframe

6.1 Electrical Schematic **SERIAL NUMBERS: 1017 TO 1059**

Table 6-1: Electrical Schematic Legend

REFERENCE DESIGNATION	NAME	FUNCTION	LOCATION
ALM1	Alarm, Tilt	Provides warning sound until outriggers are deployed and the contacts on LS1, LS2, LS3 and LS4 are closed. If one of the switches opens during the operation of the machine then the alarm sounds and power is cut to the upper controls.	In Upper Control Box
BAT	Batteries (4) 6 Volts each.	To store energy	Equipment subframe on chassis
D1	Diode	Feeds a signal to pin 11 on the controller when the levelling up function is selected and prevents backfeed to the level solenoid when other functions are selected.	On lower control box P.C.B.
D2	Diode	Feeds a signal to pin 11 on the controller when the levelling down function is selected and prevents backfeed to the level solenoid when other functions are selected.	On lower control box P.C.B.
D3	Diode	Feeds power to tele-out solenoid from upper controls and prevents feed-back to upper controls from lower controls.	On lower control box P.C.B.
D4	Diode	Feeds power to tele-out solenoid from lower controls and prevents feed-back to lower controls from upper controls.	On lower control box P.C.B.
D5	Diode	Feeds power to tele-in solenoid from upper controls and prevents feed-back to lower controls from upper controls.	On lower control box P.C.B.
D6	Diode	Feeds power to tele-in solenoid from lower controls and prevents feed-back to lower controls from upper controls.	On lower control box P.C.B.
D7	Diode	Feeds a signal from lower lift cylinder (up) solenoid to pin 4 on the controller and prevents backfeed to the solenoid when other functions are selected.	On lower control box P.C.B.
D8	Diode	Feeds a signal from tele cylinder (out) solenoid to pin 4 on the controller and prevents backfeed to the tele-out solenoid when other functions are selected.	On lower control box P.C.B.
D9	Diode	Feeds a signal from upper lift cylinder (up) solenoid to pin 4 on controller and prevents backfeed to the lift solenoid when other functions are selected.	On lower control box P.C.B.
D10	Diode	Feeds +24V to pin 6 on the controller from upper controls.	On lower control box P.C.B.
D11	Diode	Feeds +24V to pin 6 on the controller when keyswitch is switched to lower controls	On lower control box P.C.B.
D12	Diode	Feeds a signal from tele cylinder (in) solenoid to pin 4 on the controller and prevents backfeed to the tele-in solenoid when other functions are selected.	On lower control box P.C.B.
D13	Diode	Feeds a signal from lower lift cylinder (down) solenoid to pin 4 on the controller and prevents backfeed to the lower lift solenoid when other functions are selected.	On lower control box P.C.B.
D14	Diode	Feeds a signal from upper lift cylinder (down) solenoid to pin 4 on the controller and prevents backfeed to the upper lift solenoid when other functions are selected.	On lower control box P.C.B.
D15	Diode	Feeds power to slew right solenoid from upper controls and prevents feed-back to upper controls from the lower controls.	On lower control box P.C.B.
D16	Diode	Feeds power to slew left solenoid from lower controls and prevents feed-back to lower controls from upper controls.	On lower control box P.C.B.
D17	Diode	Feeds power to lower cylinder (up) solenoid from upper controls and prevents feed-back to upper controls from lower controls.	On lower control box P.C.B.
D18	Diode	Feeds power to lower cylinder (up) solenoid from lower controls and prevents feed-back to lower controls from upper controls.	On lower control box P.C.B.
D19	Diode	Feeds power to upper cylinder (up) solenoid from upper controls and prevents feed-back to upper controls from lower controls.	On lower control box P.C.B.
D20	Diode	Feeds power to upper cylinder (up) solenoid from lower controls and prevents feed-back to lower controls from upper controls.	On lower control box P.C.B.
D21	Diode	Feeds power to slew left solenoid from upper controls and prevents feed-back to upper controls from lower controls.	On lower control box P.C.B.
D22	Diode	Feeds power to slew left solenoid from lower controls and prevents feed-back to lower controls from upper controls.	On lower control box P.C.B.
D23	Diode	Feeds power to lower cylinder (down) solenoid from upper controls and prevents feed-back to upper controls from lower controls.	On lower control box P.C.B.
D24	Diode	Feeds power to lower cylinder (down) solenoid from lower controls and prevents feed-back to lower controls from upper controls.	On lower control box P.C.B.
D25	Diode	Feeds power to upper cylinder (down) solenoid from upper controls and prevents feed-back to upper controls from lower controls.	On lower control box P.C.B.
D26	Diode	Feeds power to upper cylinder (down) solenoid from lower controls and prevents feed-back to lower controls from upper controls.	On lower control box P.C.B.
D27	Diode	Feeds power signal from joystick trigger when emergency override is activated to pin 7 on controller.	On lower control box P.C.B.
D28,D29	Diode	Feed the signal which comes from the keyswitch (set at upper controls) to one of the alarm relay contact and prevents power getting to upper controls when the alarm is activated from the lower controls.	On lower control box P.C.B.
D30	Diode	Feeds the signal from the outrigger diodes to the line contactor and prevents backfeed from other signals to pin 16 on the controller.	On lower control box P.C.B.
D31	Diode	Prevents backfeed to lower control contact of the keyswitch when the line contactor is energised.	On lower control box P.C.B.
D32	Diode	It prevents backfeed to the outrigger control switches when the alarm is activated from upper controls.	On lower control box P.C.B.
D33	Diode	Feeds a signal to the line contactor when the joystick trigger is depressed. It prevents backfeed to the upper controls when the line contactor is energised by lower controls.	On lower control box P.C.B.
D34,35	Diode	Feed a signal to pin 7 on the controller when slew is energised by lower controls. They prevent backfeed to the slew solenoids when a signal is fed through D27 to pin7 on the controller.	On lower control box P.C.B.
D36	Diode	Feed to alarm. Prevents back feed to coil of K2.	On lower control box P.C.B.
D37	Diode	Feeds a signal to tilt alarm when keyswitch is at lower controls and all four outrigger limit switches are activated. It prevents backfeed to the coil of K1 through the keyswitch.	On lower control box P.C.B.
D38	Diode	Feeds a signal to tilt alarm when keyswitch is at upper controls and all four outrigger limit switches are activated.It prevents backfeed to the coil of K1 through the keyswitch.	On lower control box P.C.B.
D39,D41,D43, D45,D47,D49, D51, D53	Diode	Feeds a signal to the line contactor each time and outrigger function switch is operated. They also prevent the outrigger solenoids from being energised by a backfeed from the line contactor signal line when it is energised by other functions.	On lower control box P.C.B.
D40, D42, D44, D46, D48, D50, D52, D54	Diode	Feeds +24V supply to the outrigger solenoids (up & down) when the outrigger function switches are activated.	On lower control box P.C.B.
D55,56	Diode	Feeds a signal to pin 12 on the controller when the tele function is selected at the upper controls.	UCB
D57,D58	Diode	Suppression diode for the coil of direction relay 1 (RL1) & relay 2 (RL2)	UCB
D59	Diode	Feeds power to Emergency stop contact at upper controls. It also prevents a backfeed to normal upper controls when the emergency override is being operated.	UCB
D61 - D70	Diode	Suppression diodes for the coils of function control solenoids 1 to 10.	LCB
D71 - D78	Diode	Suppression diodes for the coils of outrigger control solenoids 11 to 18	LCB
D79,D82	Diode	Feeds a signal to pin 13 on the controller via the slew cut-out limit switch (LS5) when the slew function is selected at the upper controls	UCB
D80, D83	Diode	Feeds a signal to pin 8 on the controller when the lower cylinder lift function is selected at the upper controls. It prevents backfeed to the lower lift solenoid when the upper lift cylinder solenoid is energised.	UCB
D81, D84	Diode	Feeds a signal to pin 8 on the controller when the upper cylinder lift function is selected at the upper controls. It prevents backfeed to the upper lift cylinder solenoid when the lower lift cylinder solenoid is energised.	UCB
D85	Diode	Suppression diode for coil of line contactor.	LC1
D86	Diode	Suppression diode for coil of SOL 19	L.C.B.
D87	Diode	Feeds SOL19 and prevents backfeed to pin 13 on controller if a fault developes in SOL 19	L.C.B.
FU1	Fuse 7 Amps	Overload protection for circuit	On MCU
FU2	Fuse 160 Amps	Overload protection for Electric motor	On MCU
LS1, LS2, LS3, LS4	Limit Switch, Outrigger	Activated when outriggers are deployed. +24V supply from batteries is routed through these four limit switches in series to the keyswitch and provides power to the upper and lower control boxes for operation of the boom functions.	
LS5	Boom rest limit switch	Activated when booms are in stowed position. When boom leaves boom rest the Normally Open contact of the switch opens and cuts power to the outrigger function switches. This prevents the outriggers from being operated whilst the booms are elevated.	On chassis
LS6	Slew cut-out limit switch	Prevents slewing until the 2nd post is clear of the tow bar. The Normally closed contact is open and the slew signal to pin 4 on the controller is broken until the 2nd post is clear of the tow bar.	On first post under lower boom.
K1	Alarm Relay	This relay is energised when the four outrigger limit switches are activated. The Normally Closed contacts which feed power to the alarm are opened and the alarm switches off. If an outrigger limit switch opens during operation of the booms the relay de-energises and the alarm sounds.	In Lower Control Box
K2	Relay	This relay is constantly energised through the tilt alarm. The normally open contacts remain closed in this state and feed the upper controls with power when the keyswitch is turned to upper controls.	In Lower Control Box

6.1 Electrical Schematic **SERIAL NUMBERS: 1060 TO CURRENT**

Table 6-1: Electrical Schematic Legend

REFERENCE DESIGNATION	NAME	FUNCTION	LOCATION
ALM1	Alarm, Tilt	Provides warning sound until outriggers are deployed and the contacts on LS1, LS2, LS3 and LS4 are closed. If one of the switches opens during the operation of the machine then the alarm sounds and power is cut to the upper controls.	In Upper Control Box
BAT	Batteries (4) 6 Volts each.	To store energy	Equipment subframe on chassis
D1	Diode	Feeds a signal to pin 11 on the controller when the levelling up function is selected and prevents backfeed to the level solenoid when level down is selected.	On lower control box P.C.B.
D2	Diode	Feeds a signal to pin 11 on the controller when the levelling down function is selected and prevents backfeed to the level solenoid when level up is selected.	On lower control box P.C.B.
D3	Diode	Feeds power to tele-out solenoid from upper controls and prevents feed-back to upper controls from lower controls.	On lower control box P.C.B.
D4	Diode	Feeds power to tele-out solenoid from lower controls and prevents feed-back to lower controls from upper controls.	On lower control box P.C.B.
D5	Diode	Feeds power to tele-in solenoid from upper controls and prevents feed-back to lower controls from upper controls.	On lower control box P.C.B.
D6	Diode	Feeds power to tele-in solenoid from lower controls and prevents feed-back to lower controls from upper controls.	On lower control box P.C.B.
D7	Diode	Feeds a signal from lower lift cylinder (up) solenoid to pin 4 on the controller and prevents backfeed to the solenoid when other functions are selected.	On lower control box P.C.B.
D8	Diode	Feeds a signal from tele cylinder (out) solenoid to pin 4 on the controller and prevents backfeed to the tele-out solenoid when other functions are selected.	On lower control box P.C.B.
D9	Diode	Feeds a signal from upper lift cylinder (up) solenoid to pin 4 on controller and prevents backfeed to the lift solenoid when other functions are selected.	On lower control box P.C.B.
D10	Diode	Feeds +24V to pin 6 on the controller from upper controls.	On lower control box P.C.B.
D11	Diode	Feeds +24V to pin 6 on the controller when keyswitch is switched to lower controls	On lower control box P.C.B.
D12	Diode	Feeds a signal from tele cylinder (in) solenoid to pin 4 on the controller and prevents backfeed to the tele-in solenoid when other functions are selected.	On lower control box P.C.B.
D13	Diode	Feeds a signal from lower lift cylinder (down) solenoid to pin 4 on the controller and prevents backfeed to the lower lift solenoid when other functions are selected.	On lower control box P.C.B.
D14	Diode	Feeds a signal from upper lift cylinder (down) solenoid to pin 4 on the controller and prevents backfeed to the upper lift solenoid when other functions are selected.	On lower control box P.C.B.
D15, D16	Diode	Feeds a signal to pin 13 on the controller via the slew cut-out limit switch (LS5) when the slew function is selected at the upper controls	On lower control box P.C.B.
D17	Diode	Feeds power to slew left solenoid from upper controls and prevents feed-back to upper controls from the lower controls.	On lower control box P.C.B.
D18	Diode	Feeds power to slew left solenoid from lower controls and prevents feed-back to lower controls from upper controls.	On lower control box P.C.B.
D19	Diode	Feeds power to lower cylinder (up) solenoid from upper controls and prevents feed-back to upper controls from lower controls.	On lower control box P.C.B.
D20	Diode	Feeds power to lower cylinder (up) solenoid from lower controls and prevents feed-back to lower controls from upper controls.	On lower control box P.C.B.
D21	Diode	Feeds power to upper cylinder (up) solenoid from upper controls and prevents feed-back to upper controls from lower controls.	On lower control box P.C.B.
D22	Diode	Feeds power to upper cylinder (up) solenoid from lower controls and prevents feed-back to lower controls from upper controls.	On lower control box P.C.B.
D23	Diode	Feeds power to slew right solenoid from upper controls and prevents feed-back to upper controls from lower controls.	On lower control box P.C.B.
D24	Diode	Feeds power to slew right solenoid from lower controls and prevents feed-back to lower controls from upper controls.	On lower control box P.C.B.
D25	Diode	Feeds power to lower cylinder (down) solenoid from upper controls and prevents feed-back to upper controls from lower controls.	On lower control box P.C.B.
D26	Diode	Feeds power to lower cylinder (down) solenoid from lower controls and prevents feed-back to lower controls from upper controls.	On lower control box P.C.B.
D27	Diode	Feeds power to upper cylinder (down) solenoid from upper controls and prevents feed-back to upper controls from lower controls.	On lower control box P.C.B.
D28	Diode	Feeds power to upper cylinder (down) solenoid from lower controls and prevents feed-back to lower controls from upper controls.	On lower control box P.C.B.
D29	Diode	Feeds power signal from joystick trigger when emergency override is activated to pin 7 on controller.	On lower control box P.C.B.
D30, D31	Diode	Feed the signal which comes from the keyswitch (set at upper controls) to one of the alarm relay contact and prevents power getting to upper controls when the alarm is activated from the lower controls.	On lower control box P.C.B.
D32	Diode	Feeds the signal from the outrigger diodes to the line contactor and prevents backfeed from other signals to pin 16 on the controller.	On lower control box P.C.B.
D33	Diode	Prevents backfeed to lower control contact of the keyswitch when the line contactor is energised.	On lower control box P.C.B.
D34	Diode	It prevents backfeed to the outrigger control switches when the alarm is activated from upper controls.	On lower control box P.C.B.
D35	Diode	Feeds a signal to the line contactor when the joystick trigger is depressed. It prevents backfeed to the upper controls when the line contactor is energised by lower controls.	On lower control box P.C.B.
D36	Diode	Feed to alarm. Prevents back feed to coil of K2.	On lower control box P.C.B.
D37	Diode	Feeds a signal to tilt alarm when keyswitch is at lower controls and all four outrigger limit switches are activated. It prevents backfeed to the coil of K1 through the keyswitch.	On lower control box P.C.B.
D38	Diode	Feeds a signal to tilt alarm when keyswitch is at upper controls and all four outrigger limit switches are activated.It prevents backfeed to the coil of K1 through the keyswitch.	On lower control box P.C.B.
D39,D41,D43, D45,D47,D49, D51, D53	Diode	Feeds a signal to the line contactor each time and outrigger function switch is operated. They also prevent the outrigger solenoids from being energised by a backfeed from the line contactor signal line when it is energised by other functions.	On lower control box P.C.B.
D40, D42, D44, D46, D48, D50, D52, D54	Diode	Feeds +24V supply to the outrigger solenoids (up & down) when the outrigger function switches are activated.	On lower control box P.C.B.
D55,56	Diode	Feeds a signal to pin 12 on the controller when the tele function is selected at the upper controls.	UCB
D57,D58	Diode	Suppression diode for the coil of direction relay 1 (RL1) & relay 2 (RL2)	UCB
D59	Diode	Feeds power to joystick at upper controls. It also prevents a backfeed to normal upper controls when the emergency override is being operated.	UCB
D61 - D70	Diode	Suppression diodes for the coils of function control solenoids 1 to 10.	LCB
D71 - D78	Diode	Suppression diodes for the coils of outrigger control solenoids 11 to 18	LCB
D79,D81	Diode	Feeds a signal to pin 8 on the controller when the lower cylinder lift function is selected at the upper controls. It prevents backfeed to the lower lift solenoid when the upper lift cylinder solenoid is energised.	UCB
D80 D82	Diode	Feeds a signal to pin 8 on the controller when the upper cylinder lift function is selected at the upper controls. It prevents backfeed to the upper lift cylinder solenoid when the lower lift cylinder solenoid is energised.	UCB
D83	Diode	Suppression diode for coil of line contactor.	LC1
D84, D85	Diode	Feed a signal to pin 7 on the controller when slew is energised by lower controls. They prevent backfeed to the slew solenoids when a signal is fed through D29 to pin7 on the controller.	On lower control box P.C.B.
D86	Diode	Suppression diode for coil of SOL 19	LCB
D87	Diode	Feeds SOL 19 and prevents backfeed to pin 13 on controller if a fault developes in SOL 19	L.C.B.
FU1	Fuse 7 Amps	Overload protection for circuit	On MCU
FU2	Fuse 160 Amps	Overload protection for Electric motor	On MCU
FU3	Fuse 7 Amps	Overload protection for supply to motor control unit.	On MCU
LS1, LS2, LS3, LS4	Limit Switch, Outrigger	Activated when outriggers are deployed. +24V supply from batteries is routed through these four limit switches in series to the keyswitch and provides power to the upper and lower control boxes for operation of the boom functions. This power is isolated from the outriggers when the boom leaves the boom rest.	On Outrigger support.
LS5	Boom rest limit switch	Activated when booms are in stowed position. When boom leaves boom rest the Normally Open contact of the switch opens and cuts power to the outrigger function switches. This prevents the outriggers from being operated whilst the booms are elevated. The power from the outrigger switches is now diverted through the Normally closed contact of the boom rest limit switch.	On chassis
LS6	Slew cut-out limit switch	Prevents slewing until the 2nd post is clear of the tow bar. The Normally closed contact is open and the slew signal to pin 4 on the controller is broken until the 2nd post is clear of the tow bar.	On first post under lower boom.
K1	Alarm Relay	This relay is energised when the four outrigger limit switches are activated. The Normally Closed contacts which feed power to the alarm are opened and the alarm switches off. If an outrigger limit switch opens during operation of the booms the relay de-energises and the alarm sounds.	In Lower Control Box

6.1 Electrical Schematic **SERIAL NUMBERS: 1001 TO 1016**

Table 6-1: Electrical Schematic Legend (Contd...)

REFERENCE	NAME	FUNCTION	LOCATION
LED1	Battery Indicator	The LED remains off when the batteries are fully charged. The LED flashes when the batteries begin to discharge. The LED will remain on when the batteries are fully discharged.	Upper Control Panel
LED2	Outrigger Light Emitting Diode	This LED is illuminated when the outriggers are deployed and taking load. If an outrigger becomes 'light' and comes off the ground the light will go off and the alarm will sound	Upper Control Panel
MCU	Motor Control Unit	Controls the speed of the electric motor .Using upper controls the motor speed varies with the position of the control joystick. Using the lower controls the motor has different fixed speeds for the various functions which are programmed into the MCU using a special calibrator.	On chassis equipment subframe
MOT	24V D.C. Electric Motor	This motor is close coupled to the hydraulic pump which provides the oil flow and pressure to operate the various machine functions.	On chassis equipment subframe.
RL1	Joystick direction relay	This relay is energised when the joystick is pushed forward. The contacts close allowing +24V to be fed into only one half of the contacts on the selector switch. This then allows only one of the two solenoids on each function spool to be energised thus allowing only one direction of motion when the joystick is pushed forward.	UCB
RL2	Joystick direction relay	This relay is energised when the joystick is pulled backwards. The contacts close and feed +24V to the opposite set of contacts in the selector switch as RL1 does. This then energises the opposite solenoid for each function and provides motion in the opposite direction when the joystick is pulled back.	UCB
RL3	Alarm Relay	This relay is energised when the four outrigger limit switches are activated. The Normally Closed contacts which feed power to the alarm are opened and the alarm switches off. If an outrigger limit switch opens during operation of the booms the relay de-energises and the alarm sounds.	In Lower Control Box

REFERENCE	NAME	FUNCTION	LOCATION
RL4	Relay	This relay is constantly energised through the tilt alarm. The normally open contacts remain closed in this state and feed the upper controls with power when the keyswitch is turned to upper controls.	In Lower Control Box
SW1	Function switch Lower Boom	Sends power to lower lift cylinder control solenoid which diverts oil to full bore or annular side of lower lift cylinder.	LCB
SW2	Function switch Upper Boom	Sends power to lower lift cylinder control solenoid which diverts oil to full bore or annular side of upper lift cylinder.	LCB
SW3	Function switch Tele Boom	Sends power to tele cylinder control solenoid which diverts oil to full bore or annular side of tele lift cylinder.	LCB
SW4	Function switch Tele Boom	Sends power to slew motor control solenoid which diverts oil to the left or right side of the slew motor.	LCB
SW5, SW6, SW7, SW8	Function switch Outriggers	Sends power to outrigger control solenoids which diverts oil to the annular or full bore side of the outrigger cylinders.	Outrigger Control Box
SW9	Emergency stop button	Control circuit shut off.	Outrigger Control Box
SW10	Function switch Levelling	Sends power to Levelling control solenoid which diverts oil to the annular or full bore side of the slave levelling cylinder.	UCB
SW11	Switch - 4-Position selector	Sends power to selected solenoid valve (lower lift, upper lift, tele & slew). Only one function can be selected at one time.	UCB
SW12	Emergency stop button	Control circuit shut off.	UCB
SW13	Switch, Emergency Override	Provides emergency power when power is cut to the upper controls due to an outrigger limit switch de-activating.	UCB
SW14	Switch, On/Off	Allows +24V supply to feed upper controls. Allows signals from tele and lift functions to pass down to the controller. Allows Joystick trigger signal to pass down to the controller (This switch is combined in the same housing as SW13)	UCB
SW15	Emergency stop button	Control circuit shut off.	Lower Control Box

MOTOR CONTROL UNIT (PIN LEGEND)

PIN No.	DESCRIPTION
1	Battery Discharge Indicator (B.D.I.) output
2	Not used - **sw8** - Switch 8
3	Not used - 10v Supply
4	**sw4 -** Switch 4 (Speed 4: Lower control slew speed - Factory set at 17%)
5	Not used - Not connected
6	24V supply (must be greater than 14 Volts)
7	**sw5** - Switch 5 (Outrigger speed from lower controls - Factory set at 40%)
8	**sw1** - Switch 1 (Speed 1: Max. variable speed for Tele, Upper and Lower lift cylinders from upper controls - Factory set at 60%)
9	Not used - Accel. supply
10	Not used - Not connected
11	**sw7** - Switch 7 (Speed 7: Levelling speed from upper controls - Factory set at 20%)
12	**sw3** - Switch 3 (Speed 3: Boom speeds from lower controls - Factory set at 40%)
13	**sw2** - Switch 2 (Speed 2: Max variable speed for slew from upper controls - Factory set at 38%)
14	Accelerator (3.5v-0v) - Input from joystick to vary motor speed from upper controls.
15	Not used - Not connected
16	Not used - **sw6** - Switch 6
17	Not used - Not connected

6.1 Electrical Schematic **SERIAL NUMBERS: 1017 TO 1059**

Table 6-1: Electrical Schematic Legend (Contd...)

REFERENCE DESIGNATION	NAME	FUNCTION	LOCATION
KSW	Keyswitch 3-Position	Diverts power to upper or lower control boxes	Outrigger control box
LC1	Line Contactor	In the unenergised state the Normally Closed contacts allow the charger +Ve feed to the batteries. In the energised state the Normally Open contacts close and route the battery +Ve to the pump motor	On motor control unit on the chassis equipment subframe
LED1	Battery Indicator	The LED remains off when the batteries are fully charged. The LED flashes when the batteries begin to discharge. The LED will remain on when the batteries are fully discharged.	Upper Control Panel
LED2	Outrigger Light Emitting Diode	This LED is illuminated when the outriggers are deployed and taking load. If an outrigger becomes 'light' and comes off the ground the light will go off and the alarm will sound	Upper Control Panel
MCU	Motor Control Unit	Controls the speed of the electric motor .Using upper controls the motor speed varies with the position of the control joystick. Using the lower controls the motor has different fixed speeds for the various functions which are programmed into the MCU using a special calibrator.	On chassis equipment subframe
MOT	24V D.C. Electric Motor	This motor is close coupled to the hydraulic pump which provides the oil flow and pressure to operate the various machine functions.	On chassis equipment subframe.
RL1	Joystick direction relay	This relay is energised when the joystick is pushed forward. The contacts close allowing +24V to be fed into only one half of the contacts on the selector switch. This then allows only one of the two solenoids on each function spool to be energised thus allowing only one direction of motion when the joystick is pushed forward.	UCB
RL2	Joystick direction relay	This relay is energised when the joystick is pulled backwards. The contacts close and feed +24V to the opposite set of contacts in the selector switch as RL1 does. This then energises the opposite solenoid for each function and provides motion in the opposite direction when the joystick is pulled back.	UCB
SW1	Function switch Lower Boom	Sends power to lower lift cylinder control solenoid which diverts oil to full bore or annular side of lower lift cylinder.	LCB
SW2	Function switch Upper Boom	Sends power to lower lift cylinder control solenoid which diverts oil to full bore or annular side of upper lift cylinder.	LCB
SW3	Function switch Tele Boom	Sends power to tele cylinder control solenoid which diverts oil to full bore or annular side of tele lift cylinder.	LCB
SW4	Function switch Tele Boom	Sends power to slew motor control solenoid which diverts oil to the left or right side of the slew motor.	LCB
SW5, SW6, SW7, SW8	Function switch Outriggers	Sends power to outrigger control solenoids which diverts oil to the annular or full bore side of the outrigger cylinders.	Outrigger Control Box
SW9	Emergency stop button	Control circuit shut off.	Outrigger Control Box
SW10	Function switch Levelling	Sends power to Levelling control solenoid which diverts oil to the annular or full bore side of the slave levelling cylinder.	UCB
SW11	Switch - 4-Position selector	Sends power to selected solenoid valve (lower lift, upper lift, tele & slew). Only one function can be selected at one time.	UCB
SW12	Emergency stop button	Control circuit shut off.	UCB
SW13	Switch, Emergency Override	Provides emergency power when power is cut to the upper controls due to an outrigger limit switch de-activating.	UCB
S14	Switch, On/Off	Allows +24V supply to feed upper controls. Allows signals from tele and lift functions to pass down to the controller. Allows Joystick trigger signal to pass down to the controller (This switch is combined in the same housing as SW13)	UCB
SW15	Emergency stop button	Control circuit shut off.	Lower Control Box

MOTOR CONTROL UNIT (PIN LEGEND)

PIN No.	DESCRIPTION
1	Battery Discharge Indicator (B.D.I.) output
2	Not used - **sw8** - Switch 8
3	Not used - 10v Supply
4	**sw4** - Switch 4 (Speed 4: Boom speeds from lower controls - Factory set at 40%)
5	Not used - Not connected
6	24V supply (Must be greater than 14 Volts)
7	**sw5 -** Switch 5 (Speed 5: Lower control slew speed - Factory set at 17%)
8	**sw1** - Switch 1 (Speed 1: Max. Variable speed for Upper and Lower lift cylinders from upper controls - Factory set at 60 %)
9	Not used - Accel. supply
10	Not used - Not connected
11	**sw7** - Switch 7 (Speed 7: Levelling speed from upper controls - Factory set at 20%)
12	**sw3** - Switch 3 (Speed 3: Max. Variable speed for Tele cylinder from upper controls - Factory set at 100%)
13	**sw2** - Switch 2 (Speed 2 : Max. Variable slewing speed from upper controls - Factory set at 38%)
14	Accelerator (3.5v-0v) - Input from joystick to vary motor speed from upper controls.
15	Not used - Not connected
16	**sw6** - Switch 6 (Speed 6: Outrigger speed from lower controls - Factory set at 40%)
17	Not used - Not connected

6.1 Electrical Schematic **SERIAL NUMBERS: 1060 TO CURRENT**

Table 6-1: Electrical Schematic Legend (Contd...)

REFERENCE DESIGNATION	NAME	FUNCTION	LOCATION
K2	Relay	This relay is constantly energised through the tilt alarm. The normally open contacts remain closed in this state and feed the upper controls with power when the keyswitch is turned to upper controls.	In Lower Control Box
KSW	Keyswitch 3-Position	Diverts power to upper or lower control boxes	Outrigger control box
LC1	Line Contactor	In the unenergised state the Normally Closed contacts allow the charger +Ve feed to the batteries. In the energised state the Normally Open contacts close and route the battery +Ve to the pump motor	On motor control unit on the chassis equipment subframe
LED1	Battery Indicator	The LED remains off when the batteries are fully charged. The LED flashes when the batteries begin to discharge. The LED will remain on when the batteries are fully discharged.	Upper Control Panel
LED2	Outrigger Light Emitting Diode	This LED is illuminated when the outriggers are deployed and taking load. If an outrigger becomes 'light' and comes off the ground the light will go off and the alarm will sound	Upper Control Panel
MCU	Motor Control Unit	Controls the speed of the electric motor .Using upper controls the motor speed varies with the position of the control joystick. Using the lower controls the motor has different fixed speeds for the various functions which are programmed into the MCU using a special calibrator.	On chassis equipment subframe
MOT	24V D.C. Electric Motor	This motor is close coupled to the hydraulic pump which provides the oil flow and pressure to operate the various machine functions.	On chassis equipment subframe.
RL1	Joystick direction relay	This relay is energised when the joystick is pushed forward. The contacts close allowing +24V to be fed into only one half of the contacts on the selector switch. This then allows only one of the two solenoids on each function spool to be energised thus allowing only one direction of motion when the joystick is pushed forward.	UCB
RL2	Joystick direction relay	This relay is energised when the joystick is pulled backwards. The contacts close and feed +24V to the opposite set of contacts in the selector switch as RL1 does. This then energises the opposite solenoid for each function and provides motion in the opposite direction when the joystick is pulled back.	UCB
SW1	Function switch Lower Boom	Sends power to lower lift cylinder control solenoid which diverts oil to full bore or annular side of lower lift cylinder.	LCB
SW2	Function switch Upper Boom	Sends power to lower lift cylinder control solenoid which diverts oil to full bore or annular side of upper lift cylinder.	LCB
SW3	Function switch Tele Boom	Sends power to tele cylinder control solenoid which diverts oil to full bore or annular side of tele lift cylinder.	LCB
SW4	Function switch Tele Boom	Sends power to slew motor control solenoid which diverts oil to the left or right side of the slew motor.	LCB
SW5, SW6, SW7, SW8	Function switch Outriggers	Sends power to outrigger control solenoids which diverts oil to the annular or full bore side of the outrigger cylinders.	Outrigger Control Box
SW9	Emergency stop button	Control circuit shut off. In series with SW12 and SW15	Outrigger Control Box
SW10	Function switch Levelling	Sends power to Levelling control solenoid which diverts oil to the annular or full bore side of the slave levelling cylinder.	UCB
SW11	Switch - 4-Position selector	Sends power to selected solenoid valve (lower lift, upper lift, tele & slew). Only one function can be selected at one time.	UCB
SW12	Emergency stop button	Control circuit shut off. In series with SW9 and SW15	UCB
SW13	Switch, Emergency Override	Provides emergency power when power is cut to the upper controls due to an outrigger limit switch de-activating.	UCB
S14	Switch, On/Off	Allows +24V supply to feed upper controls. Allows signals from tele and lift functions to pass down to the controller. Allows Joystick trigger signal to pass down to the controller. (This switch is combined in the same housing as SW13)	UCB
SW15	Emergency stop button	Control circuit shut off. In series with SW12 and SW15	LCB

MOTOR CONTROL UNIT (PIN LEGEND)

PIN No.	DESCRIPTION
1	Battery Discharge Indicator (B.D.I.) output
2	Not used - **sw8** - Switch 8
3	Not used - 10v Supply
4	**sw4** - Switch 4 (Speed 4: Boom speeds from lower controls - Factory set at 40%)
5	Not used - Not connected
6	24V supply (Must be greater than 14 Volts)
7	**sw5 -** Switch 5 (Speed 5: Lower control slew speed - Factory set at 17%)
8	**sw1** - Switch 1 (Speed 1: Max. Variable speed for Upper and Lower lift cylinders from upper controls - Factory set at 60 %)
9	Not used - Accel. supply
10	Not used - Not connected
11	**sw7** - Switch 7 (Speed 7: Levelling speed from upper controls - Factory set at 20%)
12	**sw3** - Switch 3 (Speed 3: Max. Variable speed for Tele cylinder from upper controls - Factory set at 100%)
13	**sw2** - Switch 2 (Speed 2 : Max. Variable slewing speed from upper controls - Factory set at 38%)
14	Accelerator (3.5v-0v) - Input from joystick to vary motor speed from upper controls.
15	Not used - Not connected
16	**sw6** - Switch 6 (Speed 6: Outrigger speed from lower controls - Factory set at 40%)
17	Not used - Not connected

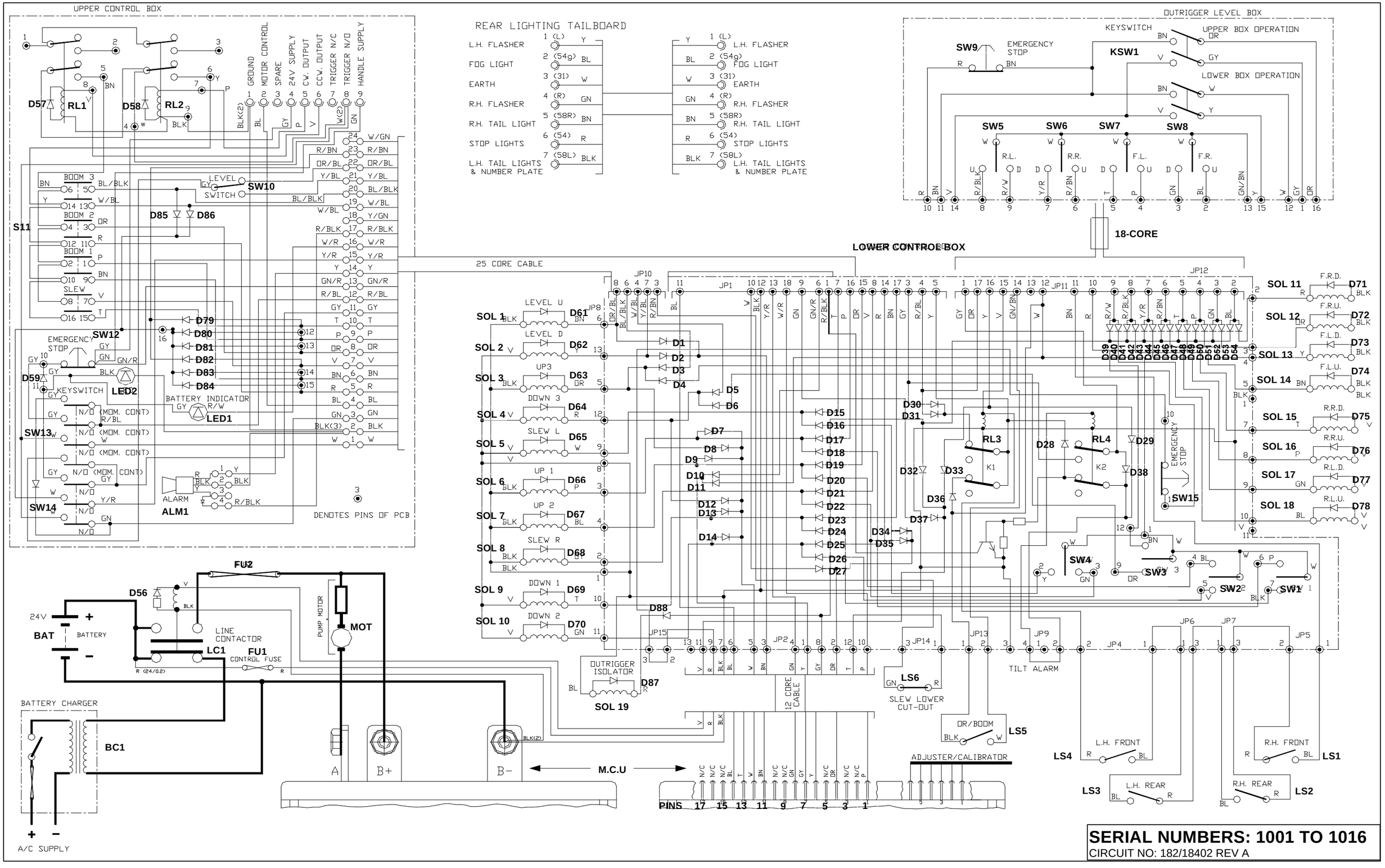


Figure 6-1: Electric Schematic

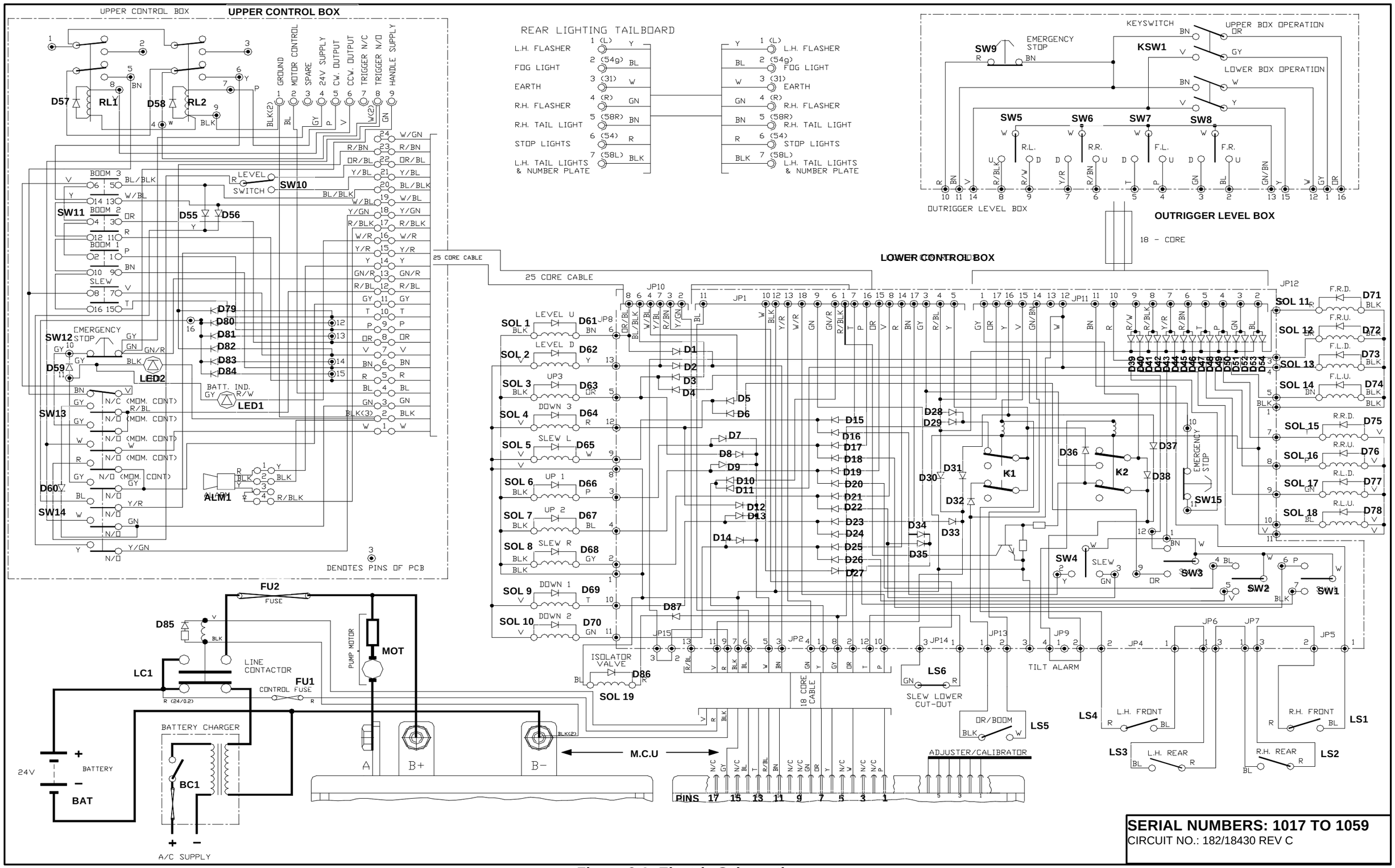


Figure 6-1: Electric Schematic

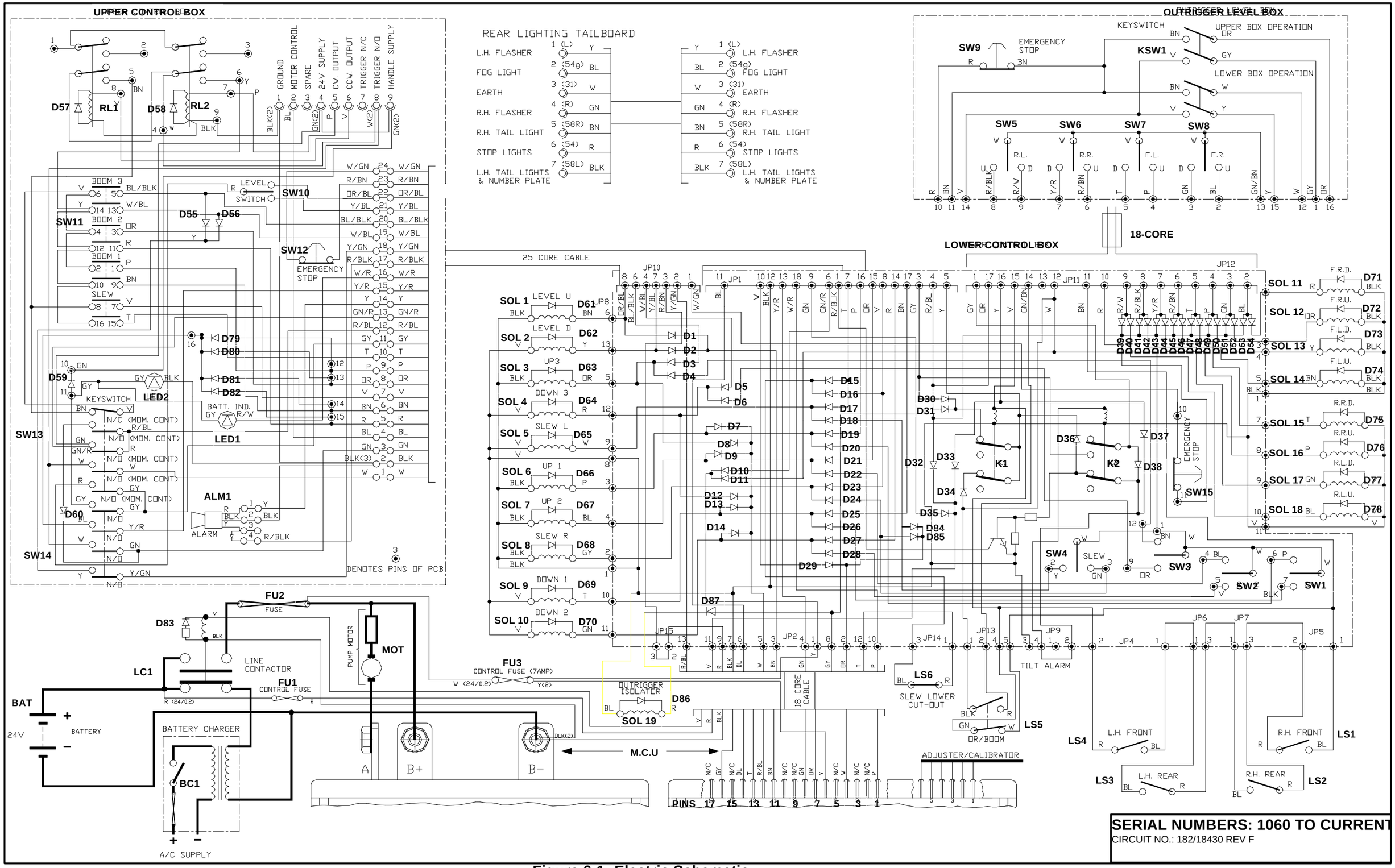


Figure 6-1: Electric Schematic

6.2 Hydraulic Schematic

Serial Numbers 1001 to 1027

Table 6-2: Hydraulic Schematic Legend

REFERENCE DESIGNATION	NAME	FUNCTION	LOCATION
CYL1	Lower boom lift cylinder	Provides the force to lift lower boom	Foward of first post
CYL2	Upper boom lift cylinder	Provide the force to lift upper boom	Behind second post
CYL3	Telescopic cylinder	Provides the force to push/pull the tele-boom	Inside upper outer & inner boom
CYL4	Master levelling cylinder	Provides the pressure tothe slave cylinder for cage levelling	Behind second post
CYL5	Slave levelling cylinder	Provides the force to level cage up/down	Close to cage pivot at inner boom
CYL6-9	Outrigger cylinder	Provides the force to extend and retract the outriggers	On outrigger /chassis
FL1	Return line filter (10 Micron)	Continuously filters hydraulic return oil. Contains integral bypass which operates when return line oil pressure exceeds 1.7 Bar.	Between chassis runners behind slew bearing.
HP	Handpump	Used for retraction of tele boom in the case of power failure. Delivers 15cc / stroke.	Above main manifold block on first post.
MMB	Main manifold block	Contains the directional control valves and relief valves that distribute oil to the various functions and control the operating pressures,	On rear of first post under glass reinforced plastic cover.
MOT1	Slew Motor	Coupled to a gearbox it drives the slew bearing via a pinion gear.	Forward of first post on base plate
MP	Motor/Pump set	Gear pump close coupled to D.C electric motor. Provides pressurised oil flow for all hydraulic functions. One section of pump not used and pumps oil straight back to tank. The other section delivers approx. 13 L/min at 100% motor speed.	On chassis under motor control unit.
OMB	Outrigger Manifold Block	Contains the directional control valves that distribute oil to the outrigger cylinders,	On chassis beside lower contril box.
RV1, RV2	Cross-line relief valve	To limit the max. operating pressure of the slew motor. (Set at 50 Bar).	On main manifold block.
RV3	Main relief valve	Sets max system pressure to 155 Bar.	On main manifold block
SBV	Shutoff Ball Valve	Must be open for normal tele retraction. Must be closed for non powered (Handpump) tele retraction.	Coupled to handpump.
V1	Dual overcentre valve (Comprises of 2 single overcentre cartridges)	Holds pressure in slave cylinder and provides host burst protection. (Set 120 Bar)	On base of slave cylinder
V2	DoublePilot operated check valve (Comprises of 2 single Pilot operated check valves)	Holds tele cylinder and outrigger cylinders in position after controls are released	On base of telecylinder and outrigger cylinders
V3	Single overcentre valve	Prevents back flow and provides hydraulic lock on cylinder	On base of upper, lower & tele cylinders
V4	Emergency lowering valve	Allows upper and lower boom to be manually lowered	On base of upper and lower cylinders
V5	Dual overcentre valve (Comprises of 2 single overcentre cartridges)	Holds pressure in master/slave closed circuit and provides host burst protection. (Set 160 Bar)	On base of master cylinder
V6,V7,V8,V9,V10	Direction control valves	Sends oil to annular or full bore sides of the levelling, tele and lift cylinders and to the left or right side of the slew motor.	On main manifold block.
V11, V12, V13, V14	Direction control valves	Sends oil to annular or full bore sides of the outrigger cylinders.	On outrigger manifold block.
V15	Isolator Valve	Isolates outrigger manifold block from main circuit when not in use. Prevents unwanted pressure entering the outrigger spools.	On chassis.

6.2 Hydraulic Schematic Serial Numbers 1028 to Present

Table 6-2: Hydraulic Schematic Legend

REFERENCE DESIGNATION	NAME	FUNCTION	LOCATION
CYL1	Lower boom lift cylinder	Provides the force to lift lower boom	Foward of first post
CYL2	Upper boom lift cylinder	Provide the force to lift upper boom	Behind second post
CYL3	Telescopic cylinder	Provides the force to push/pull the tele-boom	Inside upper outer & inner boom
CYL4	Master levelling cylinder	Provides the pressure tothe slave cylinder for cage levelling	Behind second post
CYL5	Slave levelling cylinder	Provides the force to level cage up/down	Close to cage pivot at inner boom
CYL6-9	Outrigger cylinder	Provides the force to extend and retract the outriggers	On outrigger /chassis
FL1	Return line filter (10 Micron)	Continuously filters hydraulic return oil. Contains integral bypass which operates when return line oil pressure exceeds 1.7 Bar.	Between chassis runners behind slew bearing.
HP	Handpump	Used for retraction of tele boom in the case of power failure. Delivers 15cc / stroke.	Above main manifold block on first post.
MMB	Main manifold block	Contains the directional control valves and relief valves that distribute oil to the various functions and control the operating pressures,	On rear of first post under glass reinforced plastic cover.
MOT1	Slew Motor	Coupled to a gearbox it drives the slew bearing via a pinion gear.	Forward of first post on base plate
MP	Motor/Pump set	Gear pump close coupled to D.C electric motor. Provides pressurised oil flow for all hydraulic functions. One section of pump not used and pumps oil straight back to tank. The other section delivers approx. 13 L/min at 100% motor speed.	On chassis under motor control unit.
OMB	Outrigger Manifold Block	Contains the directional control valves that distribute oil to the outrigger cylinders,	On chassis beside lower contril box.
SBV	Shutoff Ball Valve	Must be open for normal tele retraction. Must be closed for non powered (Handpump) tele retraction.	Coupled to handpump.
V1	Dual overcentre valve (Comprises of 2 single overcentre cartridges)	Holds pressure in slave cylinder and provides host burst protection. (Set 120 Bar)	On base of slave cylinder
V2	Pilot operated check valve	Provides hydraulic lock on annular sides of tele cylinder and outrigger cylinders .	On base of telecylinder and outrigger cylinders
V3	Single overcentre valve	Prevents back flow and provides hydraulic lock on cylinder	On base of upper, lower ,tele & outrigger cylinders
V4	Emergency lowering valve	Allows upper and lower boom to be manually lowered	On base of upper and lower cylinders
V5	Dual overcentre valve (Comprises of 2 single overcentre cartridges)	Holds pressure in master/slave closed circuit and provides host burst protection. (Set 160 Bar)	On base of master cylinder
V6	Isolator Valve	Isolates outrigger manifold block from main circuit when not in use. Prevents unwanted pressure entering the outrigger spools.	On chassis .
V7,V8,V9,V10, V11	Directional Control Valves	Sends oil to annular or full bore sides of the levelling, tele and lift cylinders and to the left or right side of the slew motor.	On Main Manifold Block
V12,V13,V14, V15	Directional Control Valves	Sends oil to annular or full bore sides of the outrigger cylinders.	On Outrigger Manifold Block.
RV1, RV2	Cross-line relief valve	To limit the max. operating pressure of the slew motor. (Set at 50 Bar).	On main manifold block.
RV3	Main relief valve	Sets max system pressure to 155 Bar.	On main manifold block

SERIAL NUMBERS: 1001 TO 1027

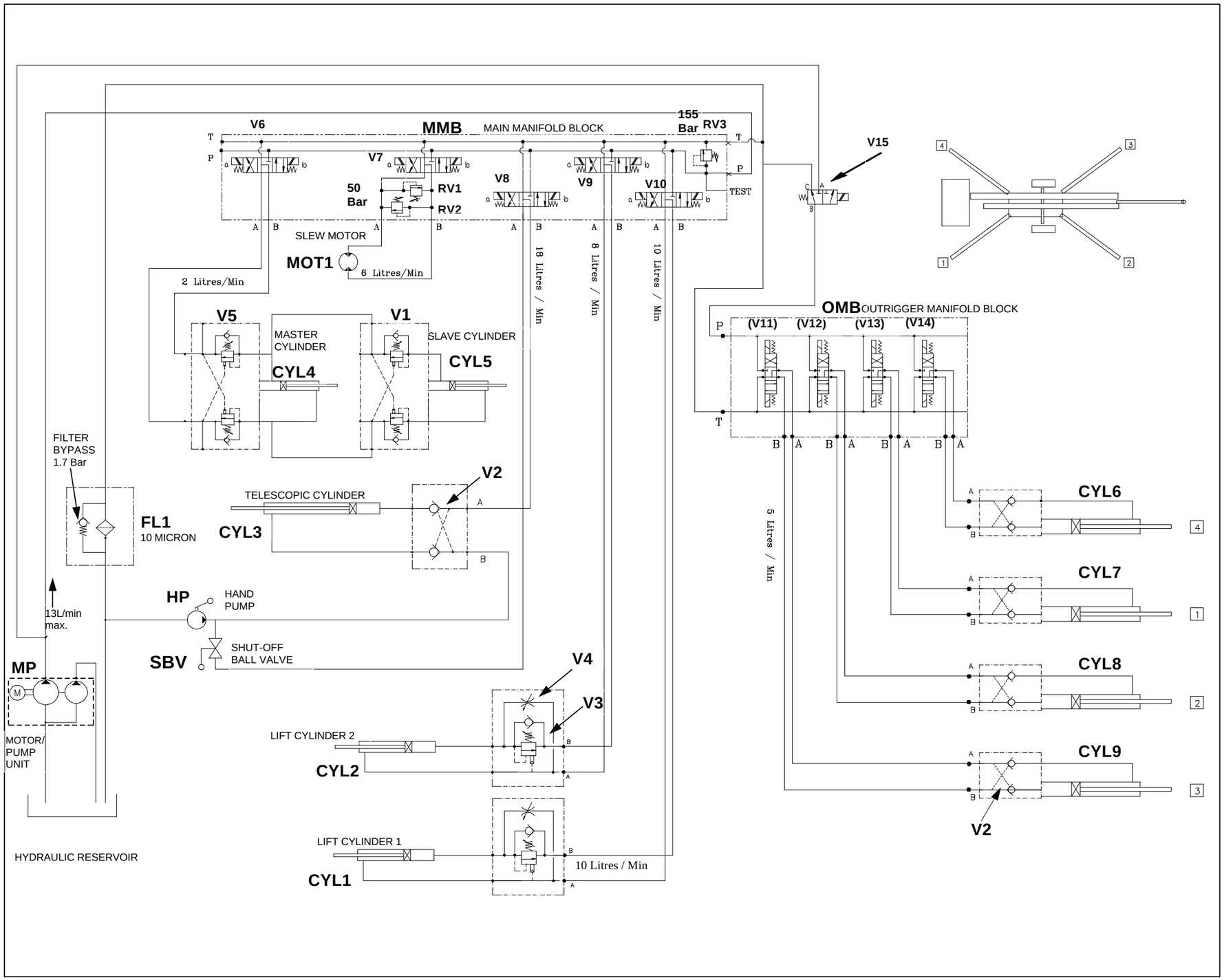


Figure 6-2: Hydraulic Schematic

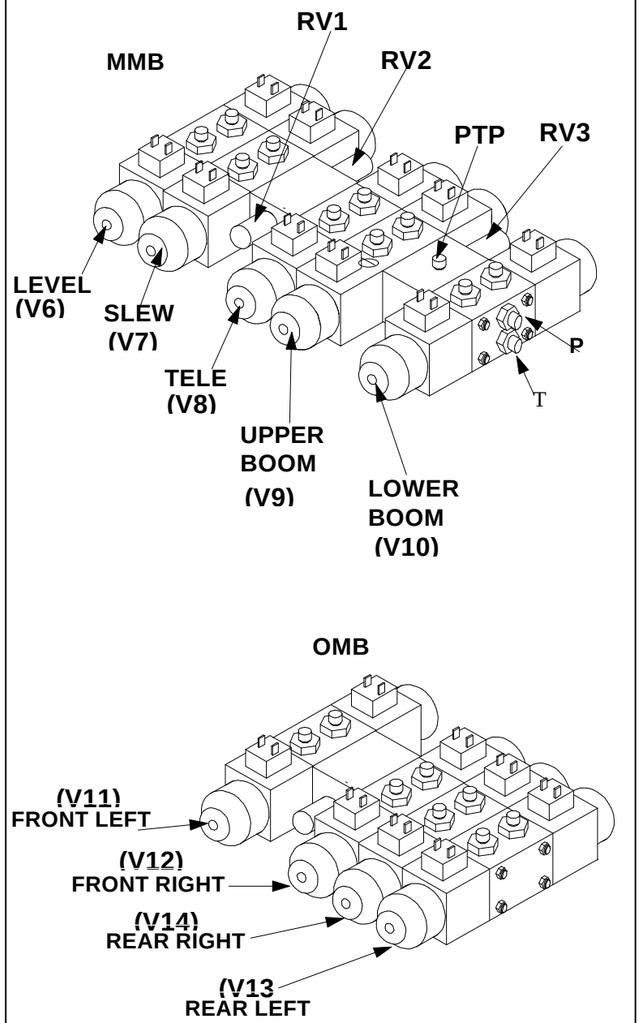


Figure 6-3: Hydraulic Manifolds

SERIAL NUMBERS: 1027 TO CURRENT

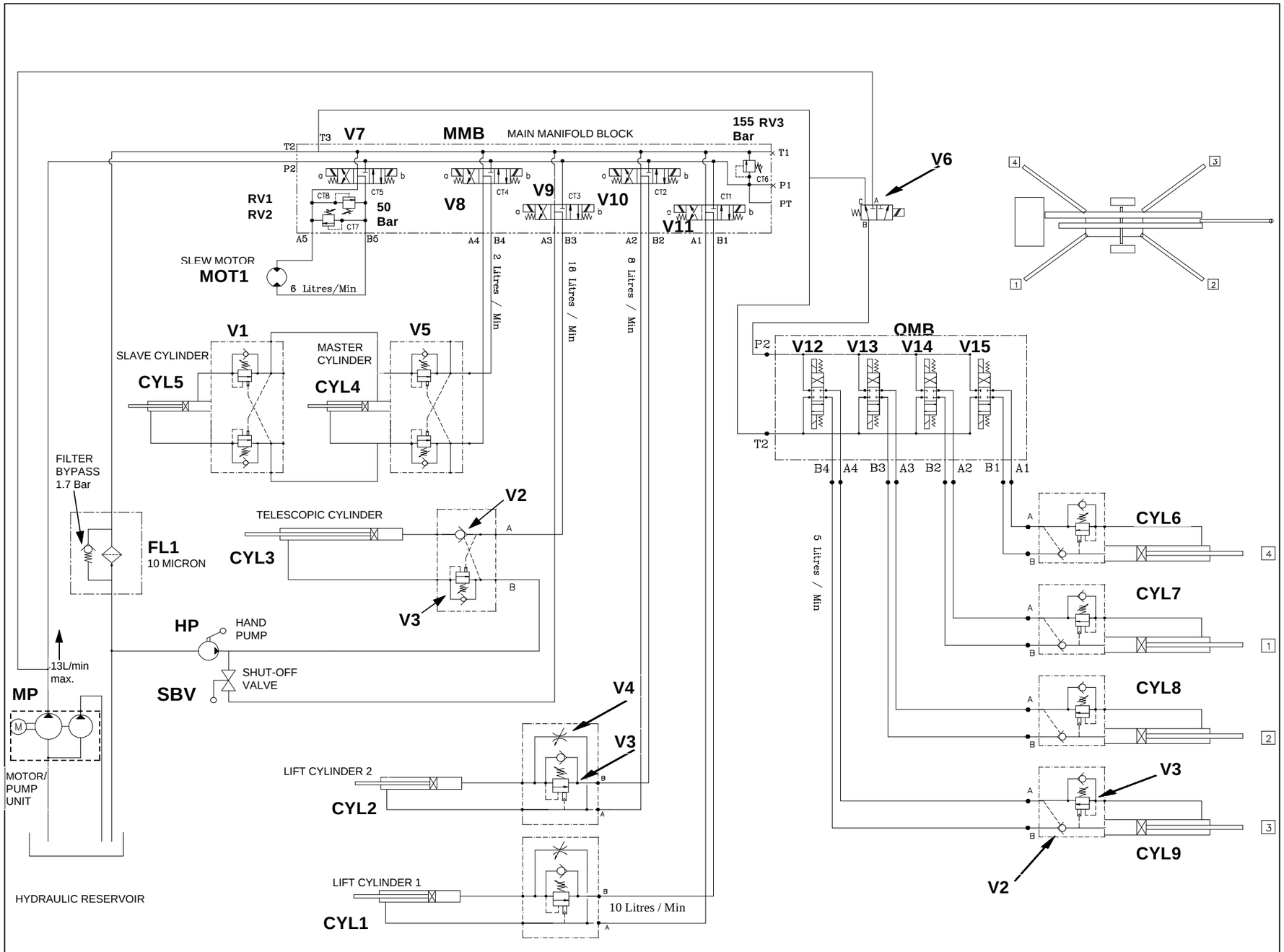


Figure 6-2: Hydraulic Schematic

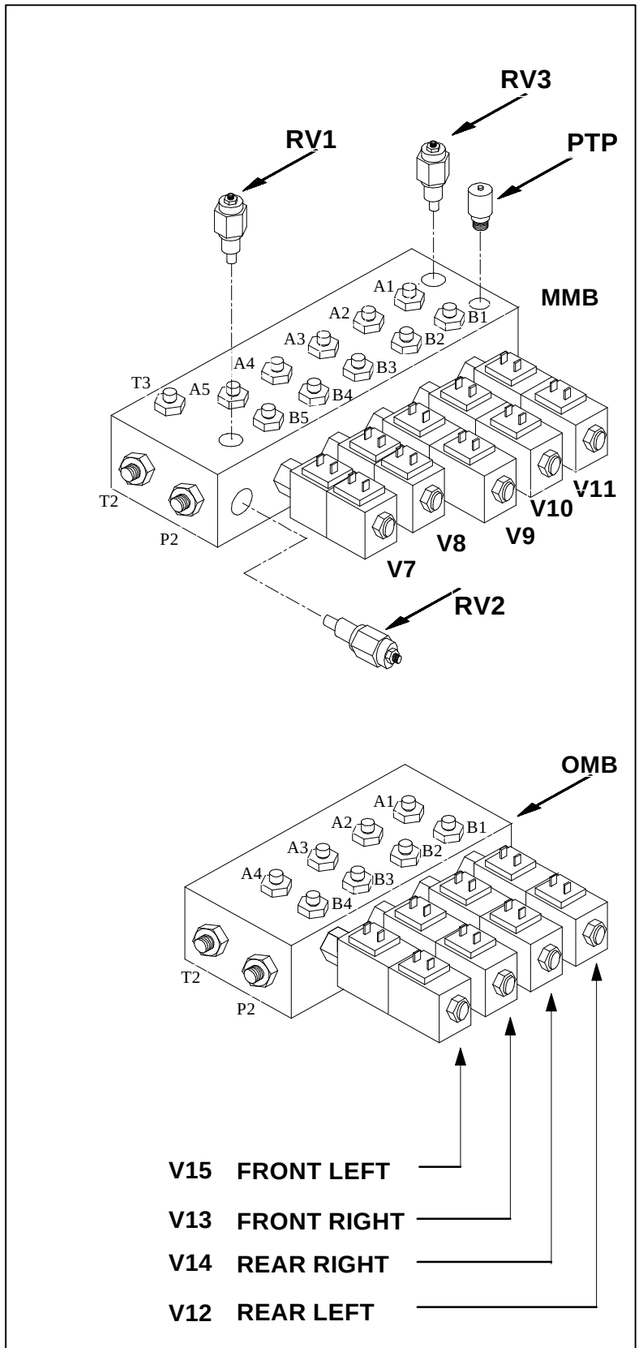


Figure 6-3: Hydraulic Manifolds

7.0 Introduction

This section lists and illustrates the replaceable assemblies and parts of the TL49 Work Platform as manufactured by UpRight Ireland Ltd.

Each parts list contains the conponent parts for that assembly indented to show relationship where applicable.

NOTE: Part Numbers and descriptions in bold text have more detailed descriptions further on in this manual.

7.1 Index

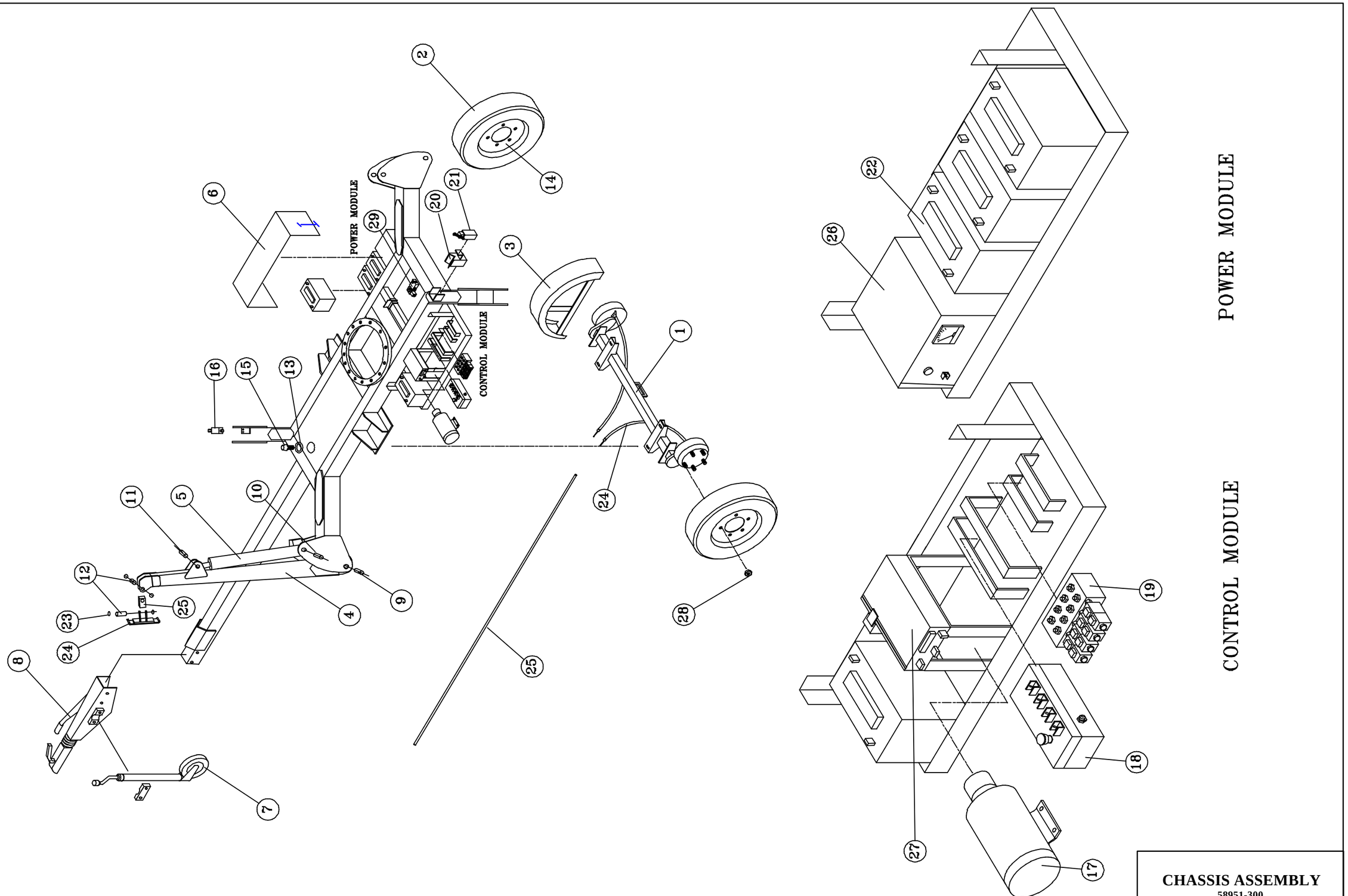
CHASSIS ASSEMBLY

58951-300

ITEM	PART-NUMBER	DESCRIPTION	QTY.
1	**58048-300**	**AXLE & BRAKE HUB ASSEMBLY**	1
2	58071-300	TYRE , 8 PLY	2
3	57099-300	MUDGUARD ASSEMBLY	2
4	57807-300	OUTRIGGER ASSEMBLY	4
5	**57978-300** **58733-300**	**OUTRIGGER CYLINDER ASSEMBLY SERIAL NUMBERS 1001 TO 1026** **OUTRIGGER CYLINDER ASSEMBLY SERIAL NUMBERS 1027 TO CURRENT**	4
6 *	58110-300 57510-000	COVER RUBBER LATCH	2 4
7 * * * *	57080-000 57461-000 58797-000 58972-000 58973-000	JOCKEY WHEEL ASSEMBLY **SERIAL NUMBERS 1001 TO 1037** CLAMP SLEEVE ASSEMBLY **SERIAL NUMBERS 1001 TO 1037** JOCKEY WHEEL ASSEMBLY **SERIAL NUMBERS 1038 TO CURRENT** CLAMP SLEEVE ASSEMBLY **SERIAL NUMBERS 1038 TO CURRENT** WHEEL ASSEMBLY **SERIAL NUMBERS 1001 TO CURRENT**	1 1 1 1 1
8	**58111-300** **58112-300**	**COUPLING - SERIAL NUMBERS 1001 TO 1036** **COUPLING - SERIAL NUMBERS 1037 TO CURRENT**	1
9	58055-401	OUTRIGGER PIVOT PIN	4
10	58055-401	OUTRIGGER CYLINDER PIN (BLOCK END)	4
11	58055-402	OUTRIGGER CYLINDER PIN (ROD END)	4
12	58052-400	FOOT PAD PIVOT PIN	8
13	57379-000	GASKET FOR FILLER/BREATHER	1
14	58070-300	WHEEL RIM	2
15	57109-300	FILLER/BREATHER ASSEMBLY	1
16	57850-400	OUTRIGGER LIMIT SWITCH	4
17 * * *	**15797-000** 15797-010 15979-011 10145-001	**MOTOR PUMP SET ASSEMBLY** PUMP ELECTRIC MOTOR BRUSH SET	1
18	**58121-300** **58830-000**	**LOWER CONTROL BOX ASSEMBLY , SERIAL NO'S 1001 TO 1059** **LOWER CONTROL BOX ASSEMBLY , SERIAL NO'S 1060 TO CURRENT**	1 1
19	**58711-300**	**OUTRIGGER CONTROL VALVE BLOCK ASSEMBLY**	1
20	58060-300	BOOM REST	1
21 *	62881-000 57850-000	BOOM REST LIMIT SWITCH BALL TYPE **SERIAL NUMBERS 1001 TO 1007** BOOM REST LIMIT SWITCH LEVER TYPE **SERIAL NUMBERS 1008 TO CURRENT**	1
22	15796-001	BATTERY 6V 220 Ah, DRY	4
23	57045-300	SPIRIT LEVEL - 2 PLANES	1
24	58073-300	BRAKE CABLE ASSEMBLY	2
25	58116-300	BRAKE ROD	1
26 * *	63948-011 63944-011 63983-002	BATTERY CHARGER - E.U. BATTERY CHARGER - U.S.A. BATTERY CHARGER - JAPAN	1
27 *	58118-000 58119-000	PUMP MOTOR CONTROLLER - 2 INDEPENDANT VARIABLE SPEEDS **SERIAL NUMBERS 1001 TO 1016** PUMP MOTOR CONTROLLER - 3 INDEPENDANT VARIABLE SPEEDS **SERIAL NUMBERS 1017 TO CURRENT**	1
28	58074-000	WHEEL NUTS	10
29	**58772-300**	**OUTRIGGER ISOLATOR VALVE ASSEMBLY**	1

OPTIONS

# 1	**58976-000**	**SPARE WHEEL OPTION**	1
*	58070-300	WHEEL RIM	
*	58071-300	TYRE	
*	58975-300	MOUNTING BRACKET	

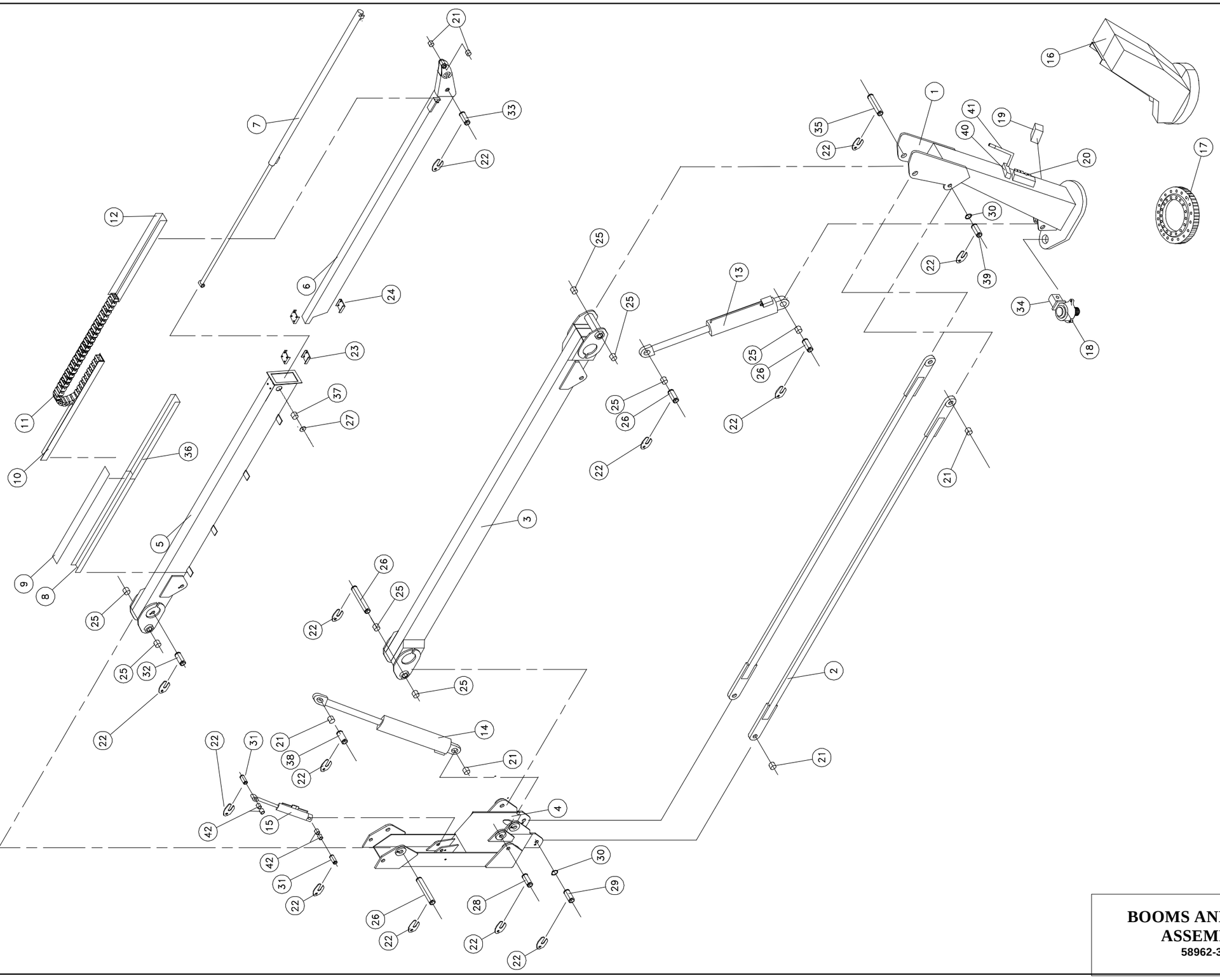


CHASSIS ASSEMBLY
58951-300

BOOMS AND POSTS ASSEMBLY

58962-300

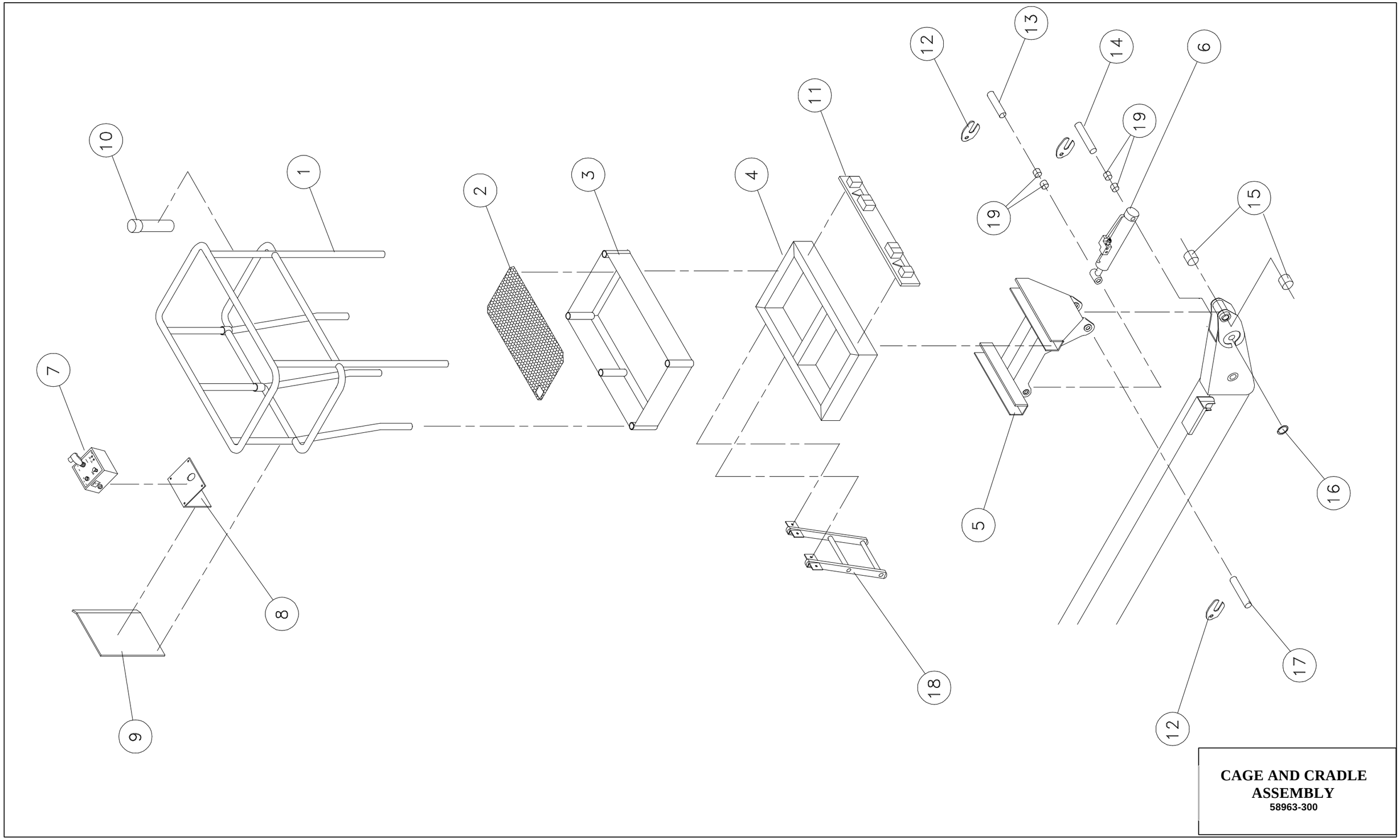
ITEM	PART-NUMBER	DESCRIPTION	QTY.
1	57812-300	FIRST POST WELDMENT	1
2	57818-300	TENSION BAR WELDMENT	2
3	57814-300	LOWER BOOM WELDMENT	1
4	57813-300	SECOND POST WELDMENT	1
5	57815-300	UPPER BOOM WELDMENT	1
6	57816-300	INNER BOOM WELDMENT	1
7	**57979-000** **58732-000**	**TELE CYLINDER ASSEMBLY SERIAL NO. 1001 TO 1026** **TELE CYLINDER ASSEMBLY SERIAL NO. 1027 TO CURRENT**	1
8	57892-300	TRUNKING (LONG)	1
9	57897-300	TRUNKING COVER	1
10	57891-300	ENERGY CHAIN GUIDE	1
11 * *	58061-000 58062-000 58063-000	ENERGY CHAIN LINK ASSY (SIDES AND CROSSBARS) MOUNTING ELEMENTS (SET OF 4)	1 1 1
12	58058-300	CHAIN SUPPORT CHANNEL	1
13	**57982-000** **58730-000**	**1ST POST CYLINDER ASSY SERIAL NO. 1001 TO 1026** **1ST POST CYLINDER ASSY SERIAL NO. 1027 TO CURRENT**	1
14	**57983-000** **58731-000**	**2ND POST CYLINDER ASSY SERIAL NO. 1001 TO 1026** **2ND POST CYLINDER ASSY SERIAL NO. 1001 TO CURRENT**	1
15	**57980-000** **58734-000**	**MASTER CYLINDER ASSY SERIAL NO. 1001 TO 1026** **MASTER CYLINDER ASSY SERIAL NO. 1001 TO CURRENT**	1
16 *	58113-300 58795-000	1ST POST COVER INSPECTION HATCH COVER	1 1
17	57043-300	SLEWRING BEARING	1
18	**57041-300**	**SLEW GEARBOX AND PINION ASSEMBLY**	1
19	**58124-300**	**OUTRIGGER CONTROL BOX ASSEMBLY**	1
20	**58710-300**	**MAIN VALVE BLOCK ASSEMBLY**	1
21	57054-000	30MM I.D. FLANGED BUSH	4
22	58056-400	PIN LOCK PLATE	16
23	57976-300	OUTER BOOM WEAR PAD	2
24	57975-300	INNER BOOM WEAR PAD	2
25	57046-000	35MM I.D. BUSHING	8
26	58055-404	PIVOT PIN 35MM	1
27	57885-300	WEAR PAD COVER PLATE	2
28	58066-403	PIVOT PIN 30MM	1
29	58054-402	PIN 30MM	2
30	57033-000	CIRCLIP	4
31	58065-402	PIN 25MM	1
32	58065-404	PIN 25MM	1
33	58065-403	PIN 25MM	1
34	57350-300	SLEW MOTOR	1
35	58055-403	PIVOT PIN 35MM	1
36	57884-300	TRUNKING (SHORT)	1
37	57977-300	WEAR PAD (SIDE)	2
38	58066-402	PIN 30MM	1
39	58054-401	PIN 30MM	2
40	57944-300	HANDPUMP	1
41 42	58196-300 57047-000	HANDPUMP HANDLE 25MM I.D. BUSHING	1 4



BOOMS AND POSTS ASSEMBLY
58962-300

CAGE AND CRADLE ASSEMBLY
58963-300

ITEM	PART-NUMBER	DESCRIPTION	QTY.
1	57954-300	CAGE RAIL WELDMENT	1
2	57994-300	CAGE FLOOR WELDMENT	1
3	57993-300	KICKER PLATE WELDMENT	1
4	57992-300	CAGE BASE WELDMENT	1
5	57821-300	CRADLE WELDMENT	1
6	**57981-300** **58735-300**	**SLAVE CYLINDER ASSEMBLY SERIAL NUMBERS 1001 TO 1026** **SLAVE CYLINDER ASSEMBLY SERIAL NUMBERS 1027 TO CURRENT**	1
7	**58122-300**	**UPPER CONTROL BOX ASSEMBLY**	1
8	58038-400	UPPER CONTROL BOX MOUNTING BRACKET	1
9	57966-300	MOUNTING PANEL	1
10	03613-000	INSTRUCTION HOLDER	1
11	**57190-400**	**TAILBOARD ASSEMBLY**	**1**
12	58056-400	PIN LOCK PLATE	3
13	58065-401	PIN	1
14	58053-400	PIN	1
15	57054-000	BUSHING	2
16	57032-000	25MM EXTERNAL CIRCLIP	1
17	58066-401	PIN	1
18	57998-300	STEP ASSEMBLY	1
19	57047-000	25MM I.D. BUSHING	4



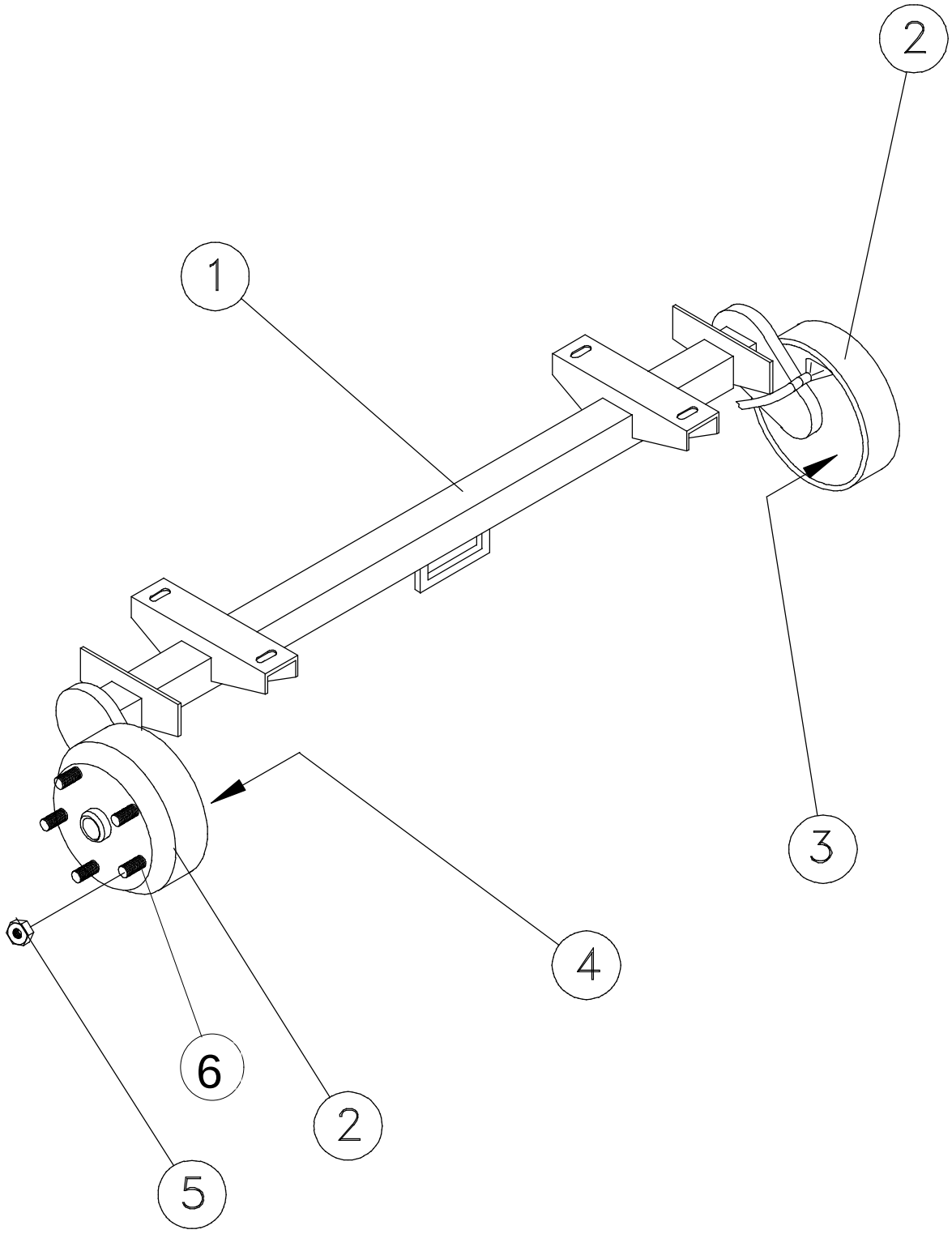
CAGE AND CRADLE ASSEMBLY
58963-300

AXLE AND BRAKE HUB ASSEMBLY

58048-000

ITEM	PART-NUMBER	DESCRIPTION	QTY.
1	58068-000	AXLE	1
2	58069-000	WHEEL HUB ASSEMBLY	2
3	58072-000	BRAKE ASSEMBLY (LEFT HAND)	1
4	58075-000	BRAKE ASSEMBLY (RIGHT HAND)	1
5	57474-000	WHEEL NUTS M12	10
6	57471-000	WHEEL STUD M12 (SERRATED)	10

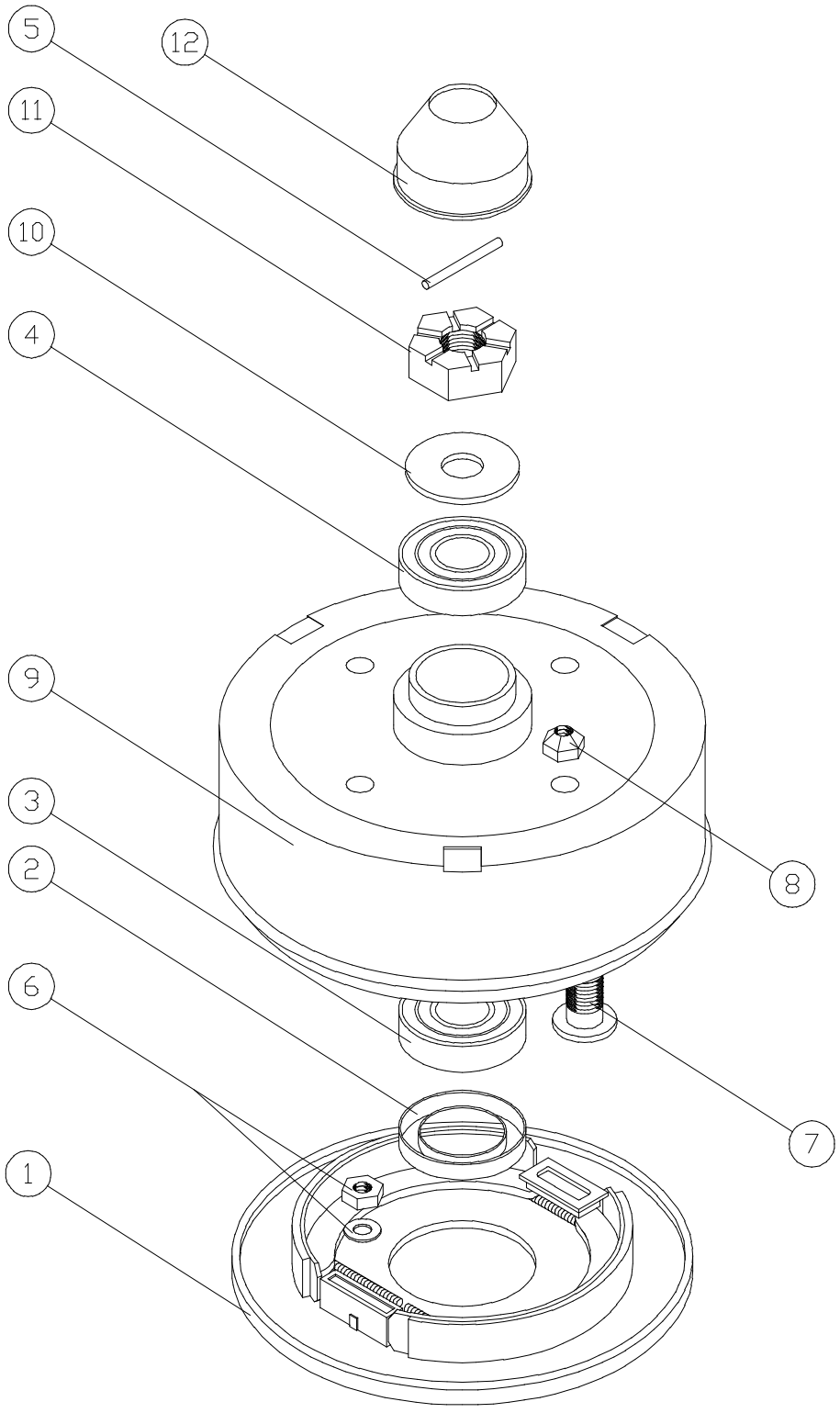
AXLE AND BRAKE HUB ASSEMBLY



HUB ASSEMBLY
58069-000

ITEM	PART-NUMBER	DESCRIPTION	QTY.
1	**58072-000** **58075-00**	**LEFT HAND BRAKE ASSEMBLY** **RIGHT HAND BRAKE ASSEMBLY**	1
2	58871-000	OIL SEAL	1
3	58895-000	INNER BEARING	1
4	58896-000	OUTER BEARING	1
5	-	SPLIT PIN	1
6	-	RETAINING NUT & WASHER	4
7	57471-000	WHEEL STUD	5
8	57474-000	WHEEL NUT	5
9	58897-000	DRUM	1
10	-	WASHER	1
11	-	AXLE NUT	1
12	58898-000	HUB CAP	1

HUB ASSEMBLY

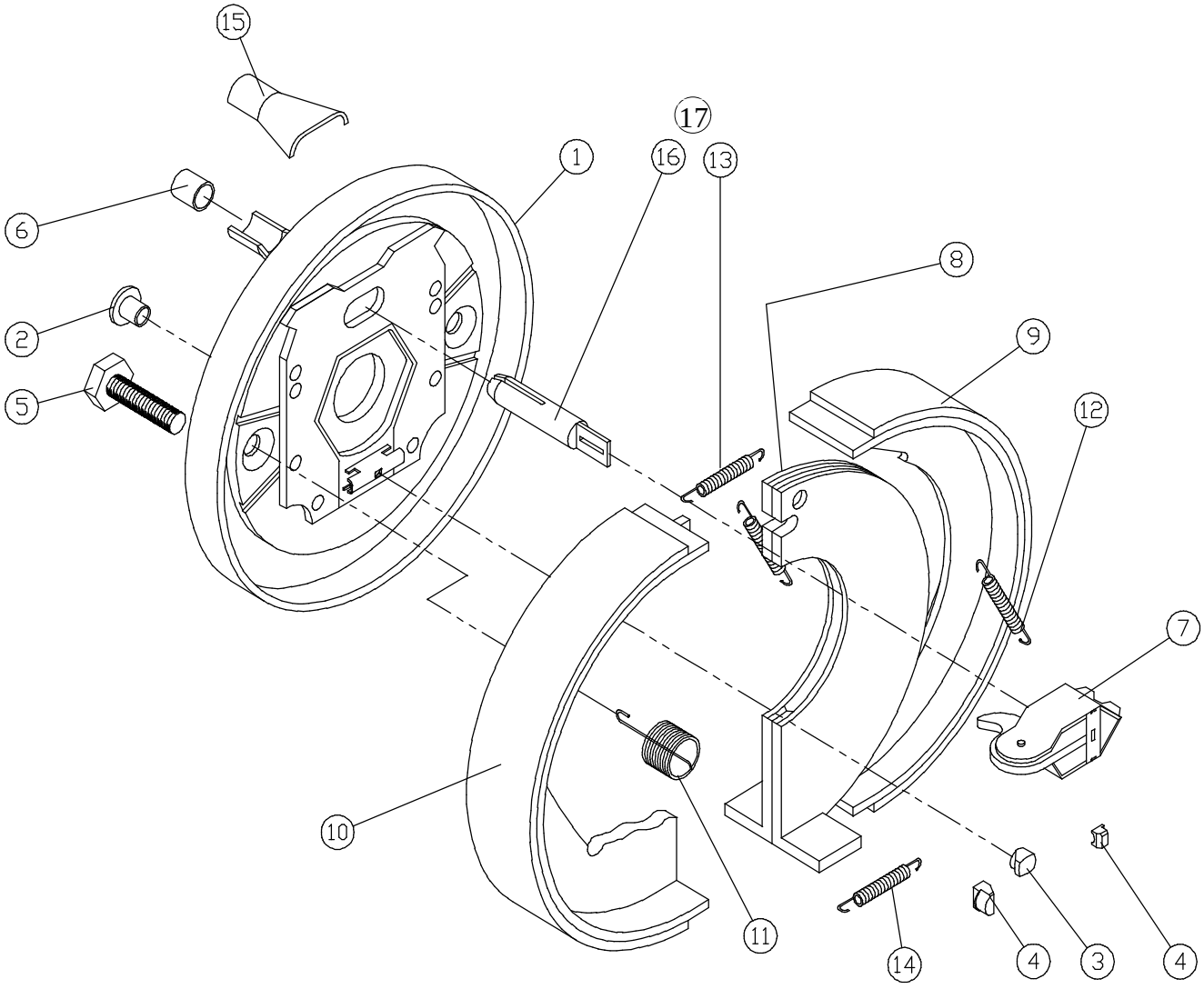


BRAKE ASSEMBLY

58072-000 (L.H.) / 58075-000 (R.H.)

ITEM	PART-NUMBER	DESCRIPTION	QTY.
1		BACK PLATE L.H.	1
2		BLANKING PLUG	2
3		ADJUSTING WEDGE NUT	1
4		SIDE WEDGE	2
5		BOLT	1
6		RETAINING CAP	1
7		EXPANDER ASSEMBLY	1
8		SHOE CARRIER	1
9	58893-000	REVERSING SHOE	1
10	58894-000	STANDARD SHOE	1
11		RETAINING SPRING	1
12		REVERSING SHOE SPRING	2
13		TOP SPRING	1
14		BOTTOM SPRING	1
15		CABLE BRACKET TOP HALF	1
16		EYELET	1
17		BACKPLATE RIGHT HAND	1

BRAKE ASSEMBLY



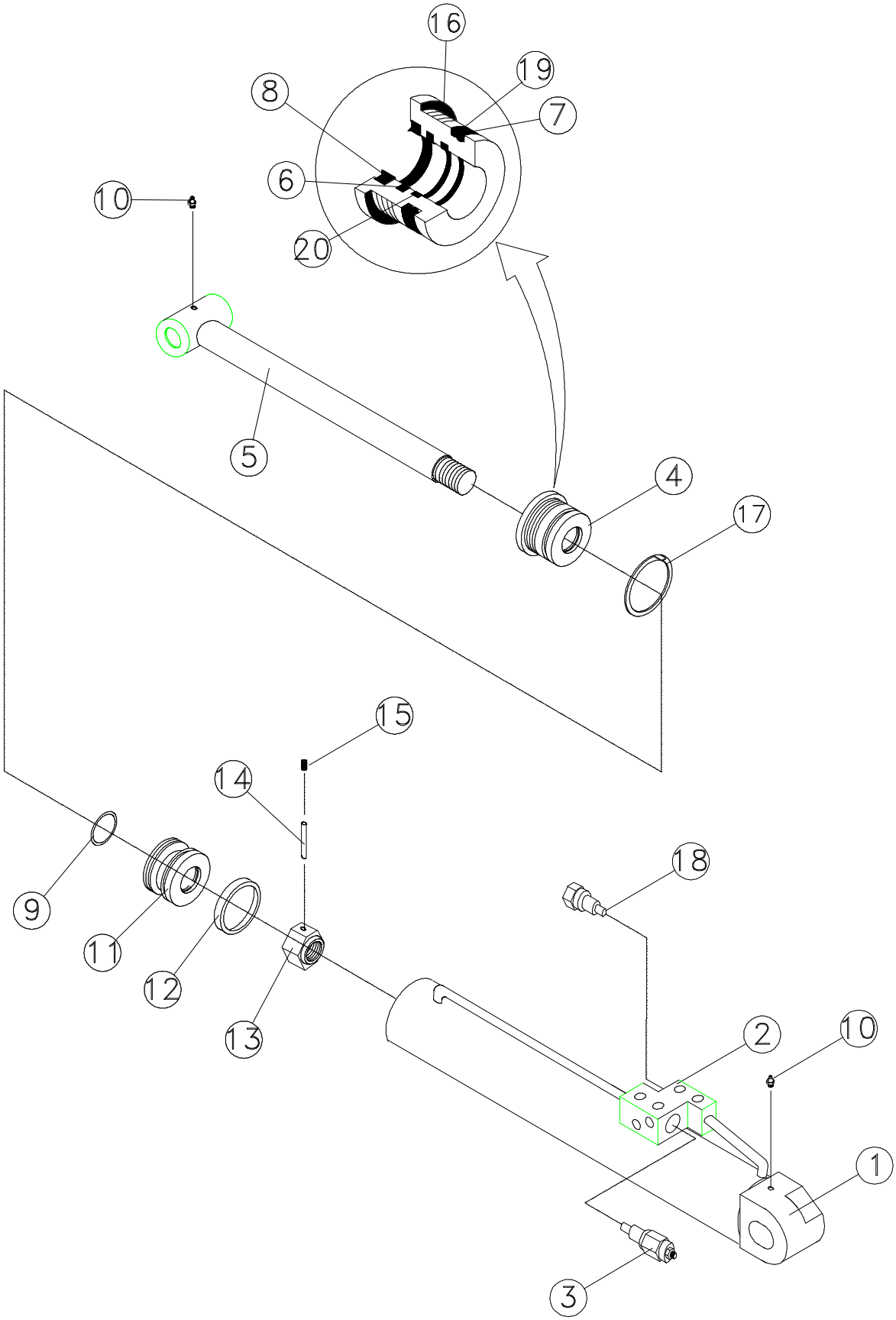
OUTRIGGER CYLINDER ASSEMBLY

(A) 58798-300 SERIAL NUMBERS 1001 TO 1026
(B) 58733-300 SERIAL NUMBERS 1027 TO CURRENT

ITEM	PART-NUMBER	DESCRIPTION	QTY.
1	-	OUTRIGGER CYLINDER BODY	1
2	-	VALVE BODY	1
3	(A) 58103-000 (B) 58728-000	SINGLE P.O. CHECK CARTRIDGE SINGLE OVERCENTRE CARTRIDGE - 200 BAR	1 1
4	-	END CAP	1
5	-	ROD AND END PIVOT	1
6	SEE NOTE	ROD SEAL	1
7	SEE NOTE	O-RING	1
8	SEE NOTE	WIPER	1
9	SEE NOTE	PISTON O-RING	1
10	58819-000	GREASE NIPPLE	2
11	-	PISTON HEAD	1
12	SEE NOTE	PISTON SEAL	1
13	-	PISTON LOCKNUT	1
14	SEE NOTE	ROLL PIN	1
15	SEE NOTE	GRUB SCREW	1
16	SEE NOTE	END CAP GLAND	1
17	-	TAB WASHER	1
18	(A) 58103-000 (B) 58925-000	SINGLE P.O. CHECK CARTRIDGE SINGLE P.O. CHECK CARTRIDGE	1 1
19	SEE NOTE	PTFE SEAL	1
20	SEE NOTE	ROD SEAL	1

NOTE: ITEMS 6,7,8,9,12,13,14,15,16, 19 & 20 ALL FORM THE SEAL KIT FOR THE CYLINDER.
THE SEAL KIT IS (A) PART NUMBER 58740-000 SERIAL NUMBERS 1001 - 1026
(B) PART NUMBER 58749-000 SERIAL NUMBERS 1027 - CURRENT

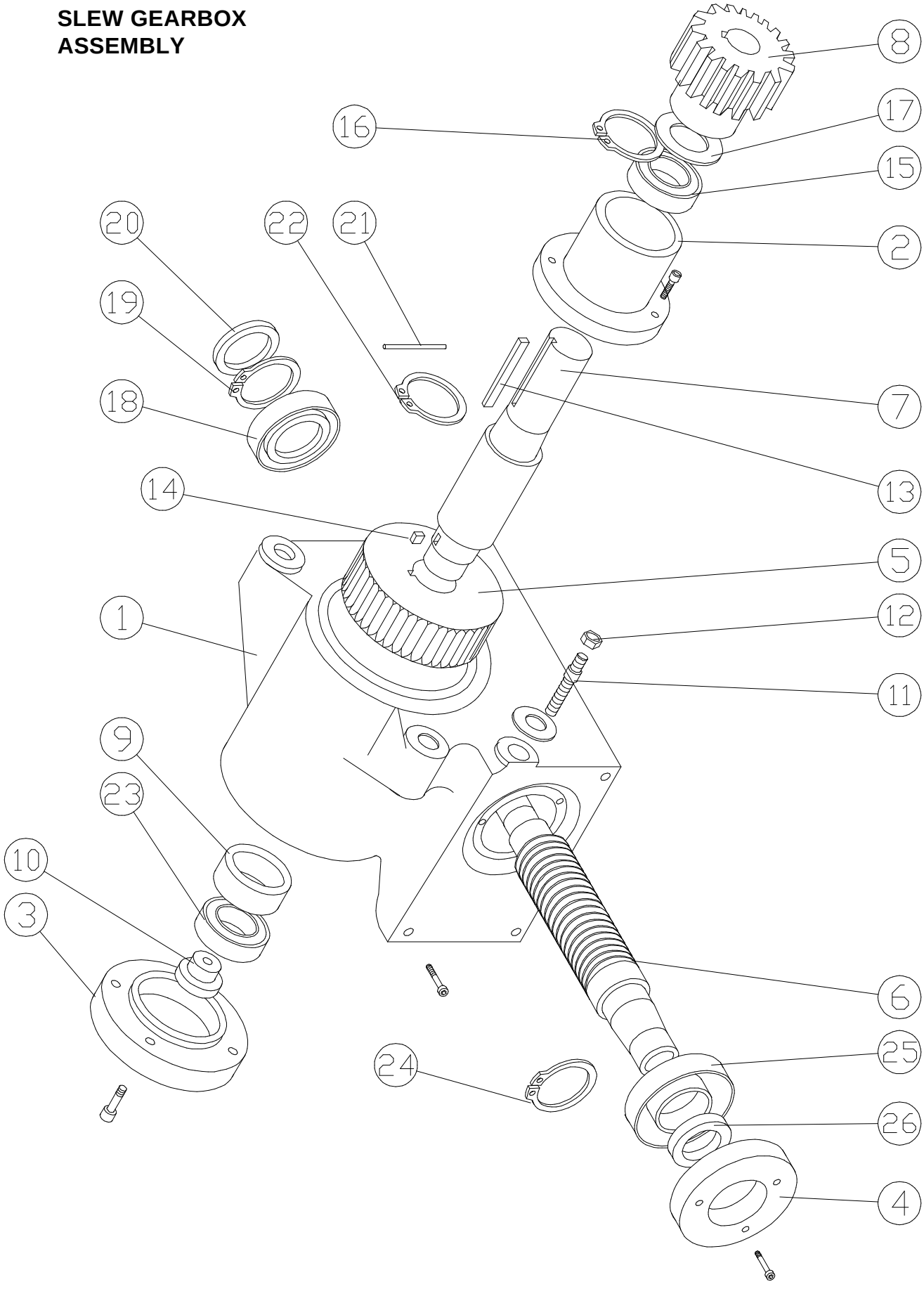
Outrigger
Cylinder Assembly



SLEW GEARBOX ASSEMBLY
57041-300

ITEM	PART-NUMBER	DESCRIPTION	QTY.
1	-	GEARBOX HOUSING	1
2	-	BEARING HOUSING	1
3	-	TOP CAP	1
4	-	WORM CAP	1
5	-	GEAR WHEEL	1
6	-	WORM	1
7	-	MAIN SHAFT	1
8	-	SLEW PINION	1
9	-	BUSH	1
10	-	LOCKING CAP	1
11	-	STUD	1
12	-	SELF-LOCKING NUT	1
13	-	KEY	1
14	-	KEY	1
15	-	BEARING	1
16	-	CIRCLIP	1
17	-	SEAL	1
18	-	BEARING	1
19	-	CIRCLIP	1
20	-	SEAL	1
21	-	SEALOCK PIN	1
22	-	CIRCLIP	1
23	-	BEARING	1
24	-	CIRCLIP	1
25	-	BEARING	1
26	-	SEAL	1
27	-	CIRCLIP	1

SLEW GEARBOX ASSEMBLY



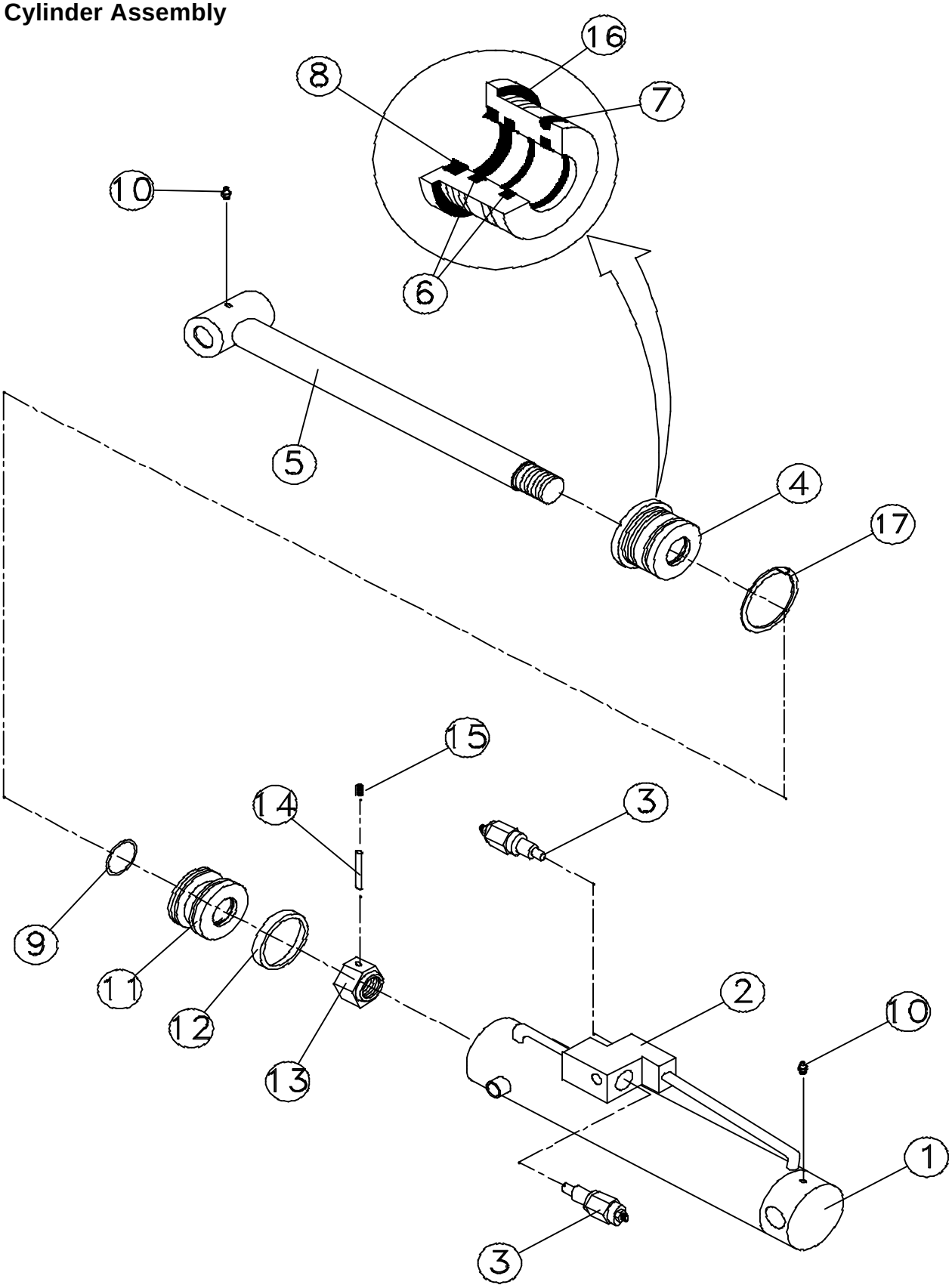
MASTER/SLAVE CYLINDER ASSEMBLY

(A) 57980-300/57981-300 SERIAL NUMBERS 1001 TO 1026
(B) 58734-300/58735-300 SERIAL NUMBERS 1027 TO CURRENT

ITEM	PART-NUMBER	DESCRIPTION	QTY.
1	-	MASTER/SLAVE CYLINDER BODY	1
2	-	VALVE BODY	1
3	(A) 58079-000	SINGLE OVERCENTRE CARTRIDGE - SLAVE - 120 BAR	1
	(A) 58078-000	SINGLE OVERCENTRE CARTRIDGE - MASTER - 160 BAR	1
	(B) 58715-000	SINGLE OVERCENTRE CARTRIDGE - SLAVE - 120 BAR	1
	(B) 58719-000	SINGLE OVERCENTRE CARTRIDGE - MASTER - 160 BAR	1
4	-	END CAP	1
5	-	ROD AND END PIVOT	1
6	SEE NOTE	ROD SEAL	2
7	SEE NOTE	O-RING	1
8	SEE NOTE	WIPER	1
9	SEE NOTE	PISTON O-RING	1
10	58819-000	GREASE NIPPLE	2
11	-	PISTON HEAD	1
12	SEE NOTE	PISTON SEAL	1
13	-	PISTON LOCKNUT	1
14	SEE NOTE	ROLL PIN	1
15	SEE NOTE	GRUB SCREW	1
16	SEE NOTE	END CAP GLAND	1
17	-	TAB WASHER	1

NOTE: ITEMS 6,7,8,9,12,13,14,15 & 16 ALL FORM THE SEAL KIT FOR THE CYLINDER.
THE SEAL KIT IS (A) PART NUMBER 58743-000 SERIAL NUMBERS 1001 - 1026
(B) PART NUMBER 58750-000 SERIAL NUMBERS 1027 - CURRENT

Master and Slave Cylinder Assembly

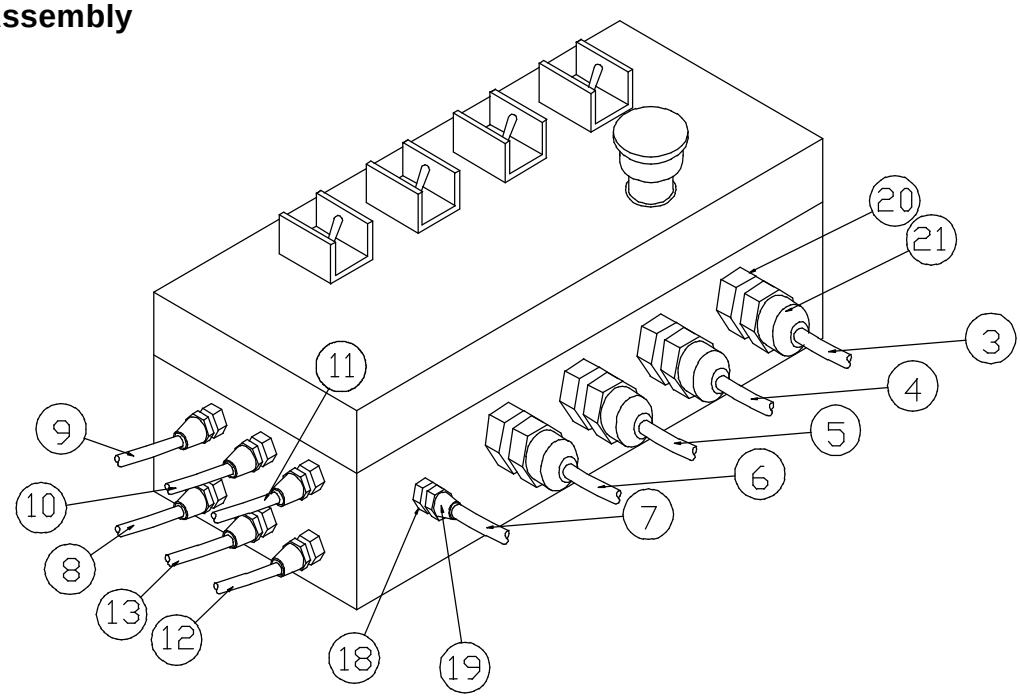


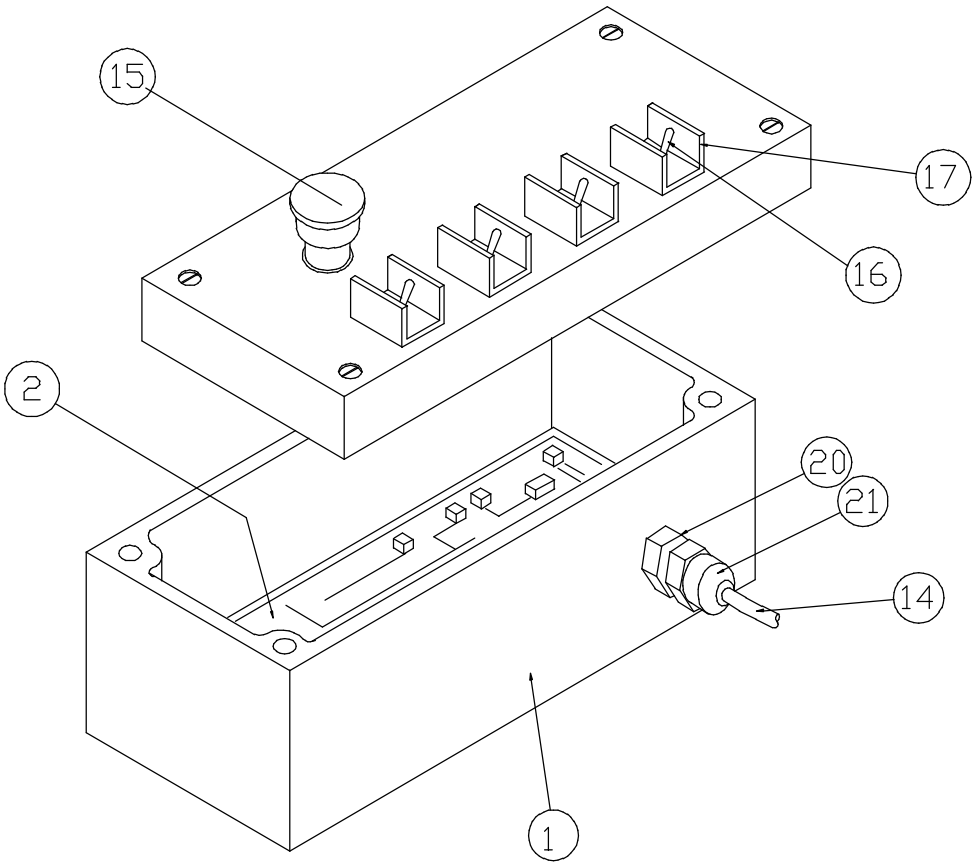
LOWER CONTROL BOX (L.C.B.) ASSEMBLY

58121-300 SERIAL NUMBERS 1001 TO 1059
58830-300 SERIAL NUMBERS 1060 TO CURRENT

ITEM	PART-NUMBER	DESCRIPTION	QTY.
1	58133-300	ENCLOSURE	1
2	58134-300	P.C.B. ASSEMBLY - SERIAL NUMBERS 1001 TO 1059	1
	58831-300	P.C.B ASSEMBLY - SERIAL NUMBERS 1060 TO CURRENT	1
3	58141-300	CABLE ASSEMBLY (L.C.B. - MAIN SOLENOIDS)	1
4	58139-300	CABLE ASSEMBLY (L.C.B. - UPPER CONTROL BOX)	1
5	58138-300	CABLE ASSEMBLY (L.C.B. - OUTRIGGER CONTROL BOX)	1
6	58137-300	CABLE ASSEMBLY (L.C.B. - MOS 90)	1
7	58140-300	CABLE ASSEMBLY (L.C.B. - TILT ALARM)	1
8	58145-300	CABLE ASSEMBLY (REAR LEFT OUTRIGGER LIMIT SWITCH)	1
9	58146-300	CABLE ASSEMBLY (REAR RIGHT OUTRIGGER LIMIT SWITCH)	1
10	58144-300	CABLE ASSEMBLY (FRONT RIGHT OUTRIGGER LIMIT SWITCH)	1
11	58143-300	CABLE ASSEMBLY (FRONT LEFT OUTRIGGER LIMIT SWITCH)	1
12	58147-300	CABLE ASSEMBLY (SLEW INHIBIT LIMIT SWITCH)	1
13	58148-300	CABLE ASSEMBLY (BOOM REST LIMIT SWITCH)	1
14	58142-300	CABLE ASSEMBLY (L.C.B. - OUTRIGGER SOLENOIDS)	1
15	57309-300	EMERGENCY STOP BUTTON	1
16	57311-400	TOGGLE SWITCH	4
17	57312-400	SWITCH GUARD	4
18	57308-300	GLAND (SMALL)	7
19	*	LOCKNUT (SMALL)	
20	*	LOCKNUT (LARGE)	5
21	57308-400	GLAND (LARGE)	

Lower Control Box Assembly

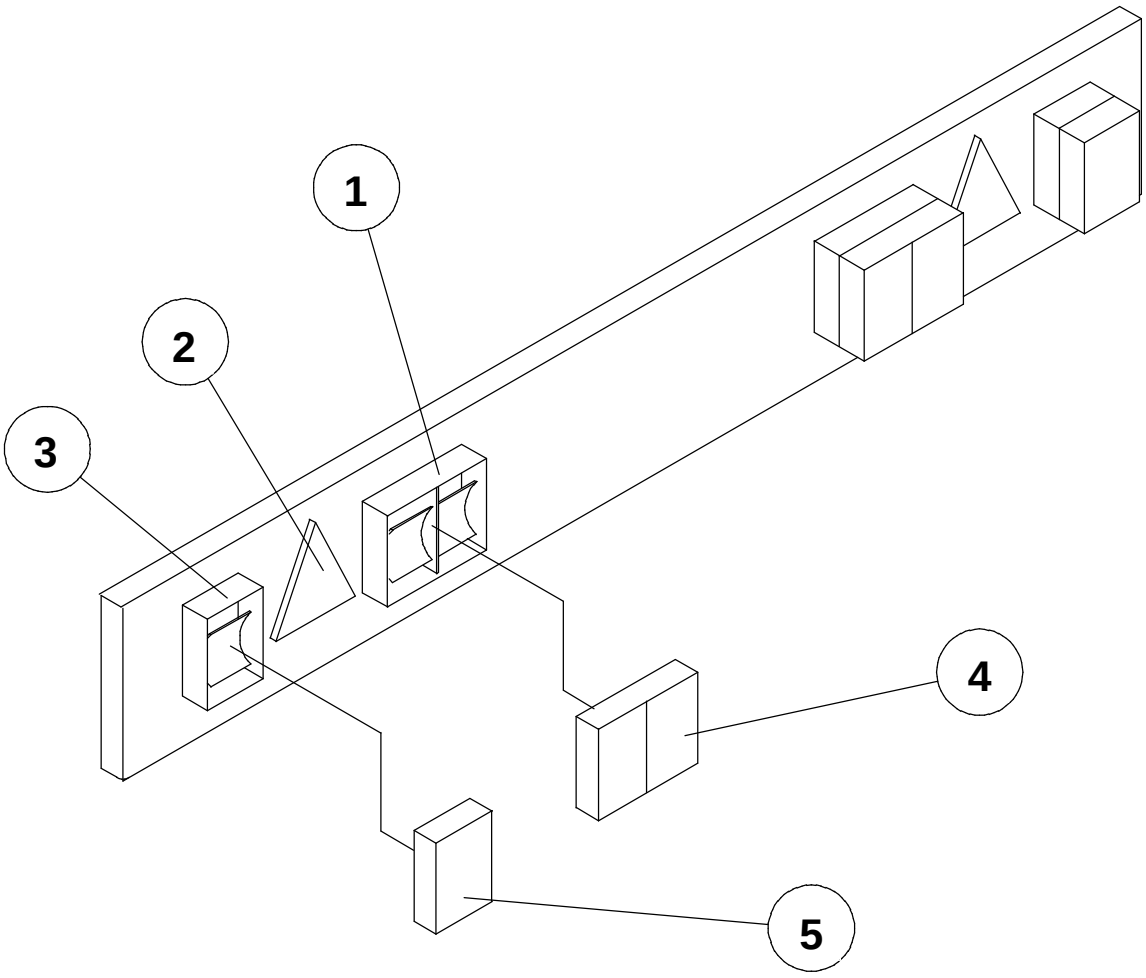




TAILBOARD ASSEMBLY
57190-300

ITEM	PART-NUMBER	DESCRIPTION	QTY.
1	58736-000	BRAKE/INDICATOR ASSEMBLY COMPLETE	2
2	58739-000	REFLECTOR	2
3	58738-000	FOG LIGHT ASSEMBLY COMPLETE	2
4	57280-000	BRAKE/INDICATOR LENS	2
5	57237-000	FOG LIGHT LENS	2

Tail Board Assembly



COUPLING ASSEMBLY

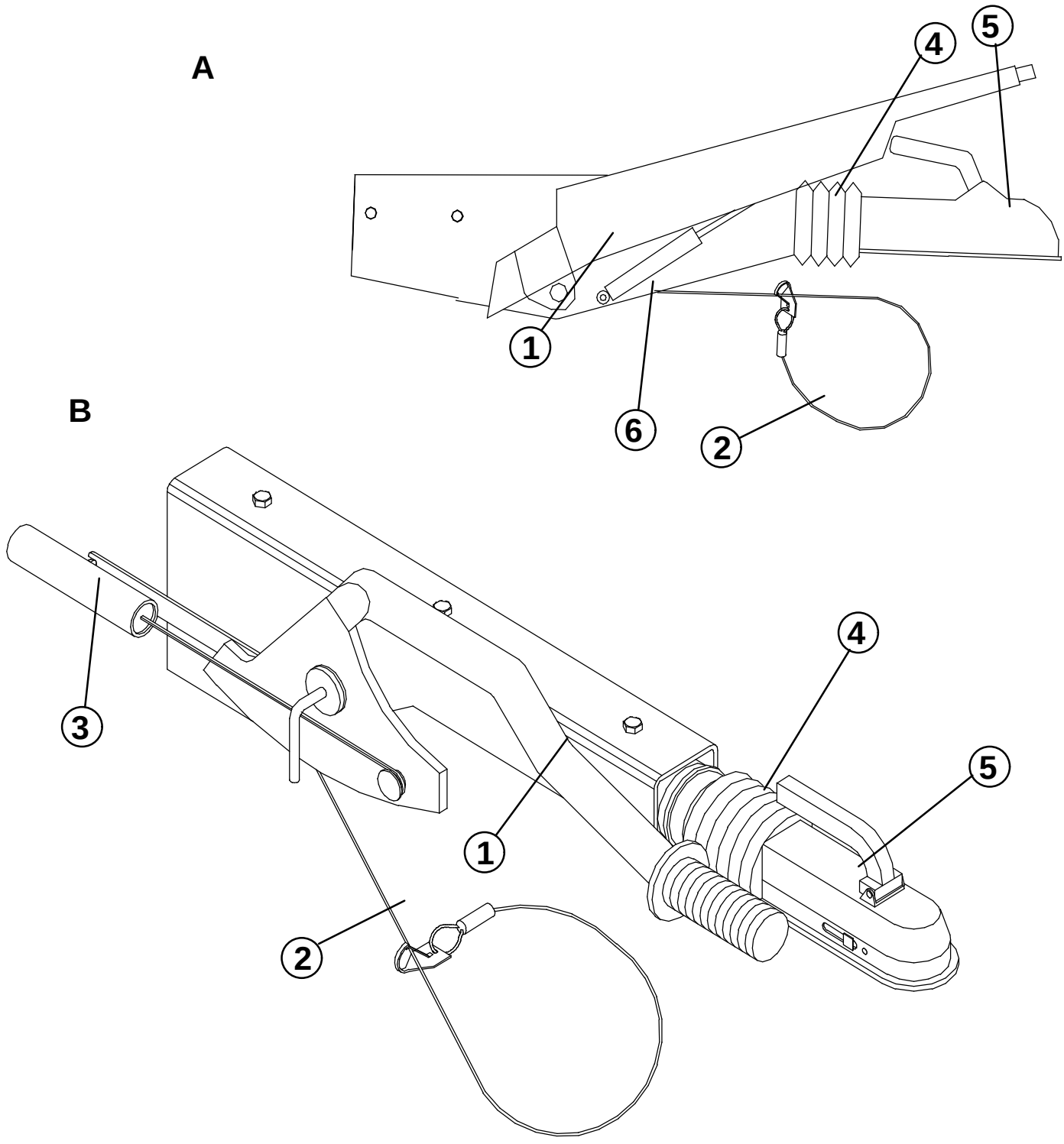
(a) 58111-300 SERIAL NUMBERS 1001 TO 1037

ITEM	PART-NUMBER	DESCRIPTION	QTY.
1(a)	58786-000	LEVER ASSEMBLY	1
2(a)	57486-000	BREAKAWAY SAFETY CABLE	1
4(a)	58789-000	GAITER	
5(a)	58791-000 58792-000	COUPLING HEAD (EUROPE) COUPLING HEAD (USA)	
6(a)	58785-000	GAS SPRING	1

(b) 58112-300 SERIAL NUMBERS 1038 TO CURRENT (EXCLUDING GERMAN MACHINES (TYPE (a) USED))

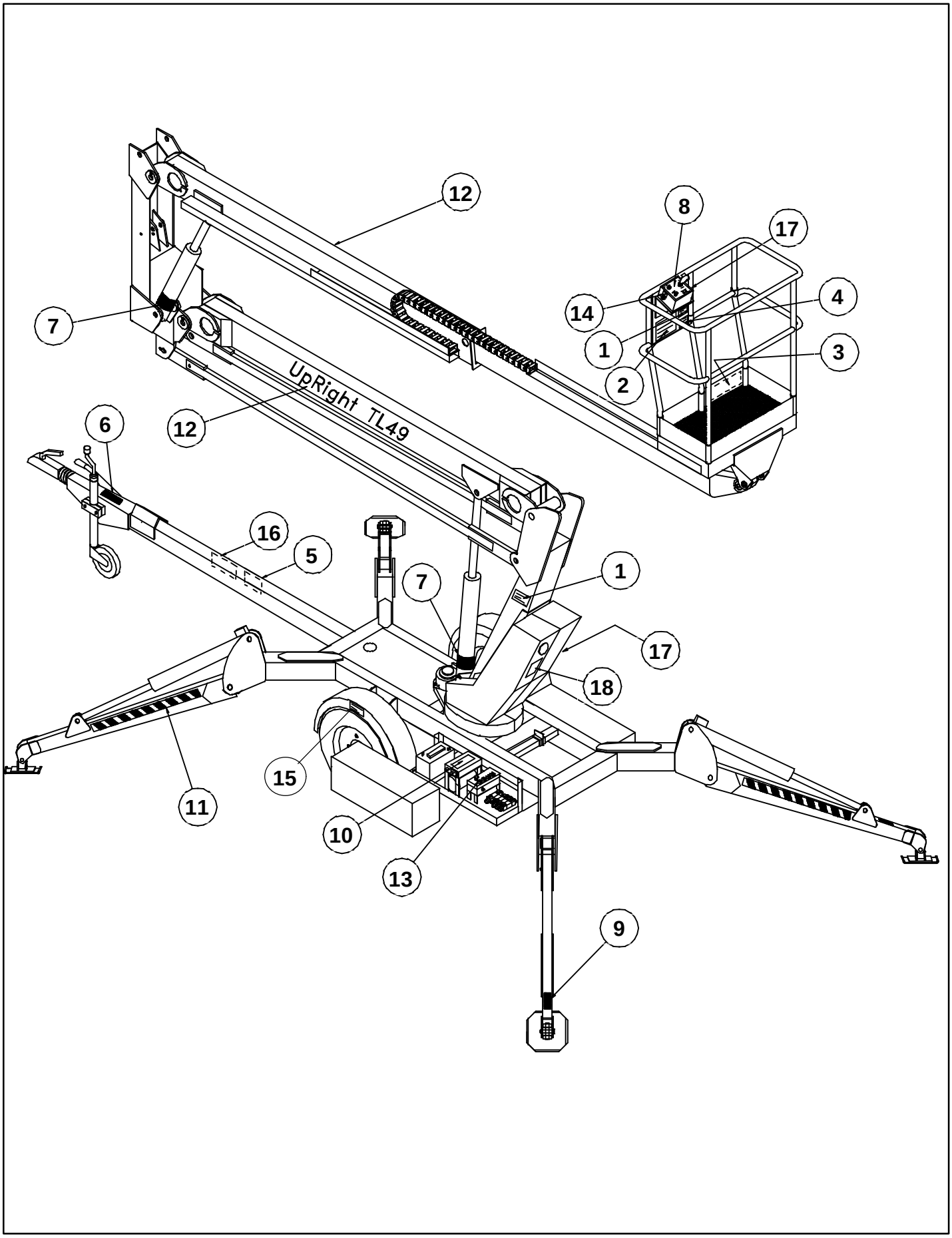
ITEM	PART-NUMBER	DESCRIPTION	QTY.
1(b)	58787-000	LEVER ASSEMBLY	1
2(b)	57486-000	BREAKAWAY SAFETY CABLE	1
3(b)	58794-000	SPRING PACK ASSEMBLY	1
4(b)	58790-000	GAITER	1
5(b)	58791-000 58792-000	COUPLING HEAD (EUROPE) COUPLING HEAD (USA)	1

Coupling Assembly



LABEL KIT
57806-100

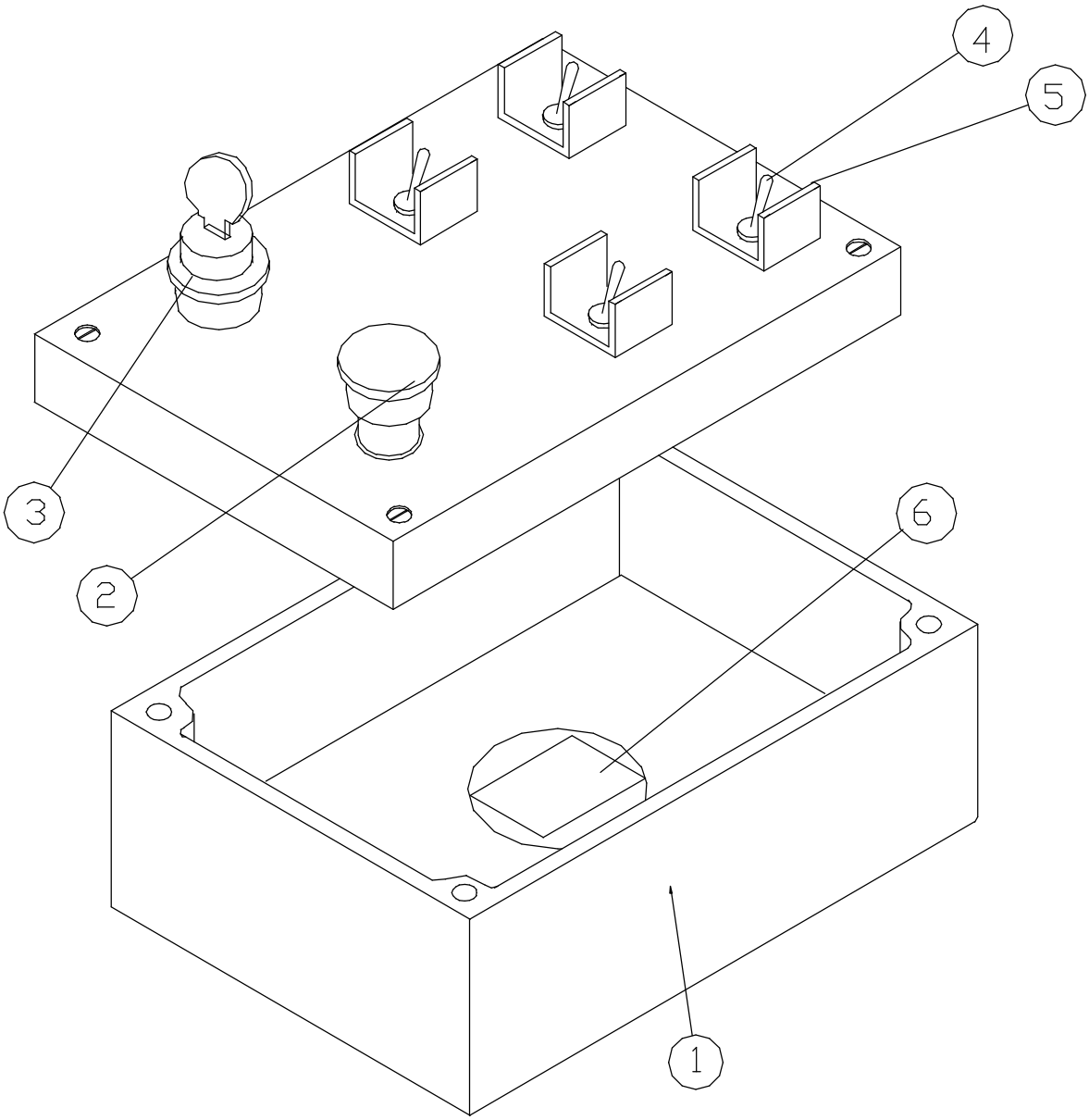
ITEM	PART-NUMBER	DESCRIPTION	QTY.
1	57388-400	DECAL - WARNING (NOT INSULATED)	2
2	57395-400	DECAL - ALARM ACTION	1
3	57392-400	DECAL - 215 Kgs S.W.L.	1
4	57394-400	DECAL - IMPORTANT INSTRUCTIONS	1
5	58800-400	DECAL - NAMEPLATE	1
6	57381-400	DECAL - BEFORE TOWING	1
7	57382-400	DECAL - EMERGENCY LOWERING	2
8	58012-400	DECAL - UPPER CONTROLS	1
9	57384-400	DECAL - LOWERING OUTRIGGERS	4
10	57387-400	DECAL - QUADRAPOWER	1
11	57385-000	HAZARD TAPE - BLACK/AMBER (50 X 900)	8
12	58013-300	DECAL - ‘UpRight TL49’ LOGO	2
13	58011-300	DECAL - LOWER CONTROL BOX	1
14	57396-400	DECAL - ON/OFF UPPER CONTROLS	1
15	57386-400	DECAL - TYPE PRESSURE	2
16	58801-300	V.I.N. PLATE	1
17	58010-300	DECAL - OUTRIGGER CONTROLS	1
18	58700-300	DECAL - HANDPUMP OPERATION	1


12
8
17
4
14
1
3
2
7
12
UpRight TL49
6
16
5
7
1
17
18
15
11
10
13
9

OUTRIGGER CONTROL BOX ASSEMBLY
58124-300

ITEM	PART-NUMBER	DESCRIPTION	QTY.
1	58160-300	ENCLOSURE BOX	1
2	57309-300	EMERGENCY STOP BUTTON	1
3	57310-300	KEYSWITCH	1
4	57311-400	TOGGLE SWITCH	1
5	57312-400	SWITCH GUARD	1
6	58138-300	HARNESS ASSEMBLY	1

Outigger Control Box Assembly



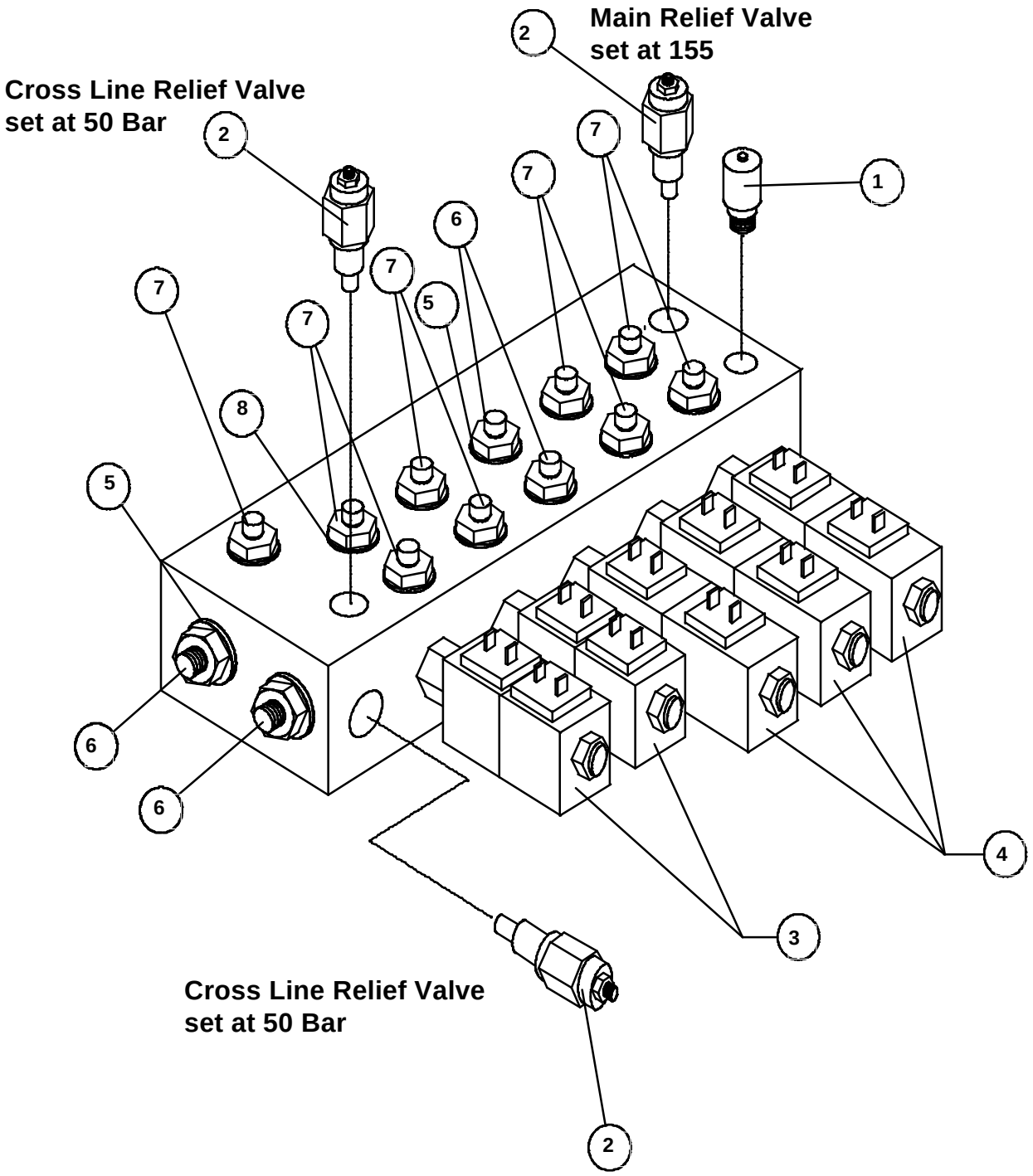
MAIN MANIFOLD BLOCK ASSEMBLY

58710-300
SERIAL NUMBER: 1028 TO CURRENT

ITEM	PART-NUMBER	DESCRIPTION	QTY.
1	57106-000	PRESSURE TEST POINT FITTING	1
2	58722-000	ADJUSTABLE RELIEF VALVE - MAIN RELIEF SET AT 155 BAR - SLEW CROSS LINE RELIEF VALVE SET AT 50 BAR	3
3	58726-000	4 WAY 3 POSITION VALVE AND COILS (SLEW + LEVELLING)	2
4	58724-000	4 WAY 3 POSITION VALVE AND COILS (LIFTS + TELE)	3
5	57125-000	3/8” BONDED SEAL	6
6	57122-000	3/8” MALE - MALE STRAIGHT B.S.P. ADAPTOR	4
7	57358-000	1/4” MALE - MALE STRAIGHT B.S.P. ADAPTOR	9
8	57124-000	1/4” BONDED SEAL	9

*** SEAL KIT FOR COMPLETE MANIFOLD BLOCK AND COMPONENTS - 58725-000**

Main Manifold Block Assembly



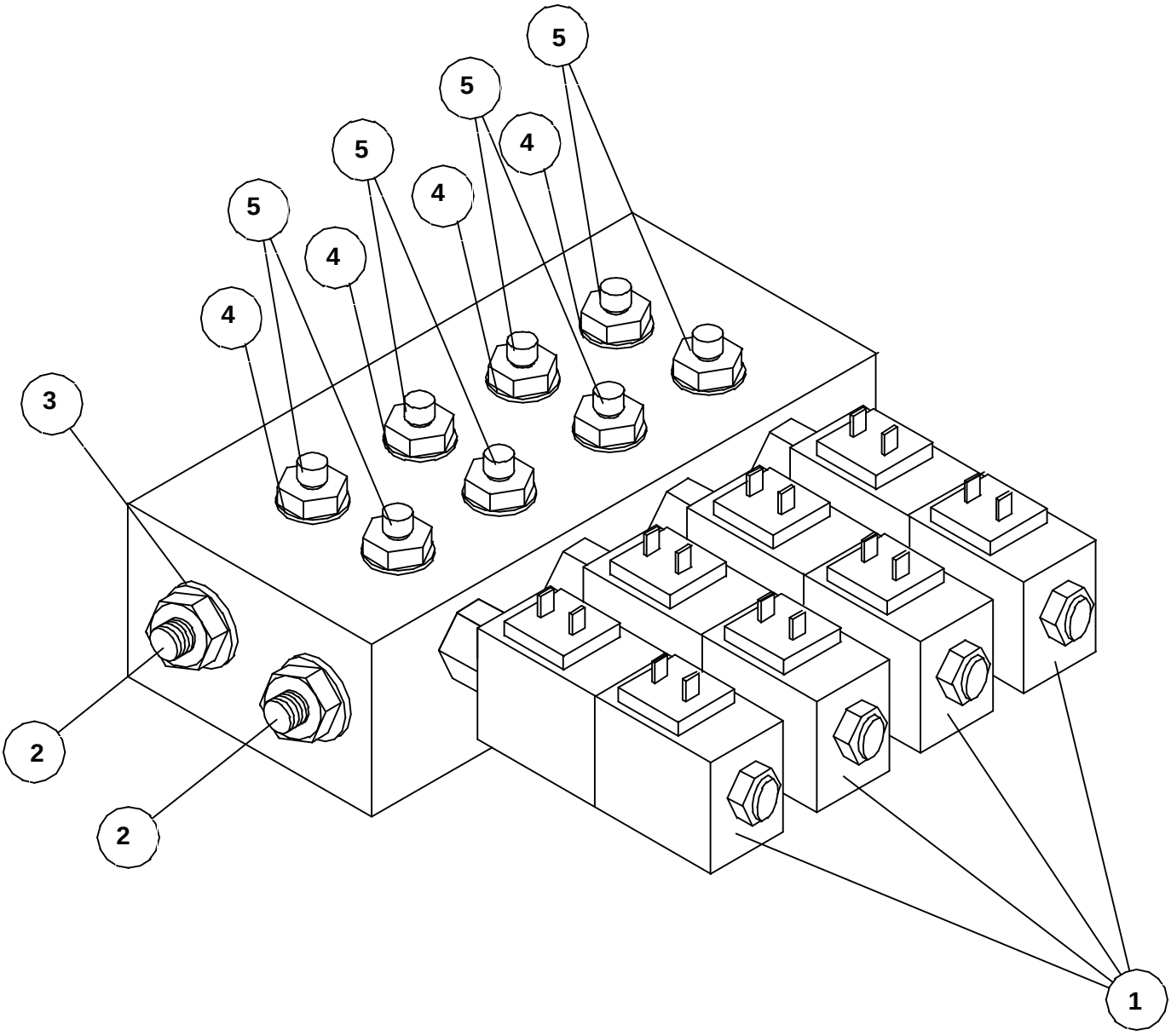
OUTRIGGER MANIFOLD BLOCK ASSEMBLY

58710-300
SERIAL NUMBERS: 1028 TO CURRENT

ITEM	PART-NUMBER	DESCRIPTION	QTY.
1	58723-000	4 WAY 3 POSITION VALVE AND COILS	4
2	57122-000	3/8” MALE - MALE STRAIGHT B.S.P. ADAPTOR	2
3	57125-000	3/8” BONDED SEAL	2
4	57124-000	1/4” BONDED SEAL	8
5	57358-000	1/4” MALE - MALE STRAIGHT B.S.P. ADAPTOR	8

*** SEAL KIT FOR COMPLETE MANIFOLD BLOCK AND COMPONENTS - 58727-000**

Outrigger Manifold Block Assembly



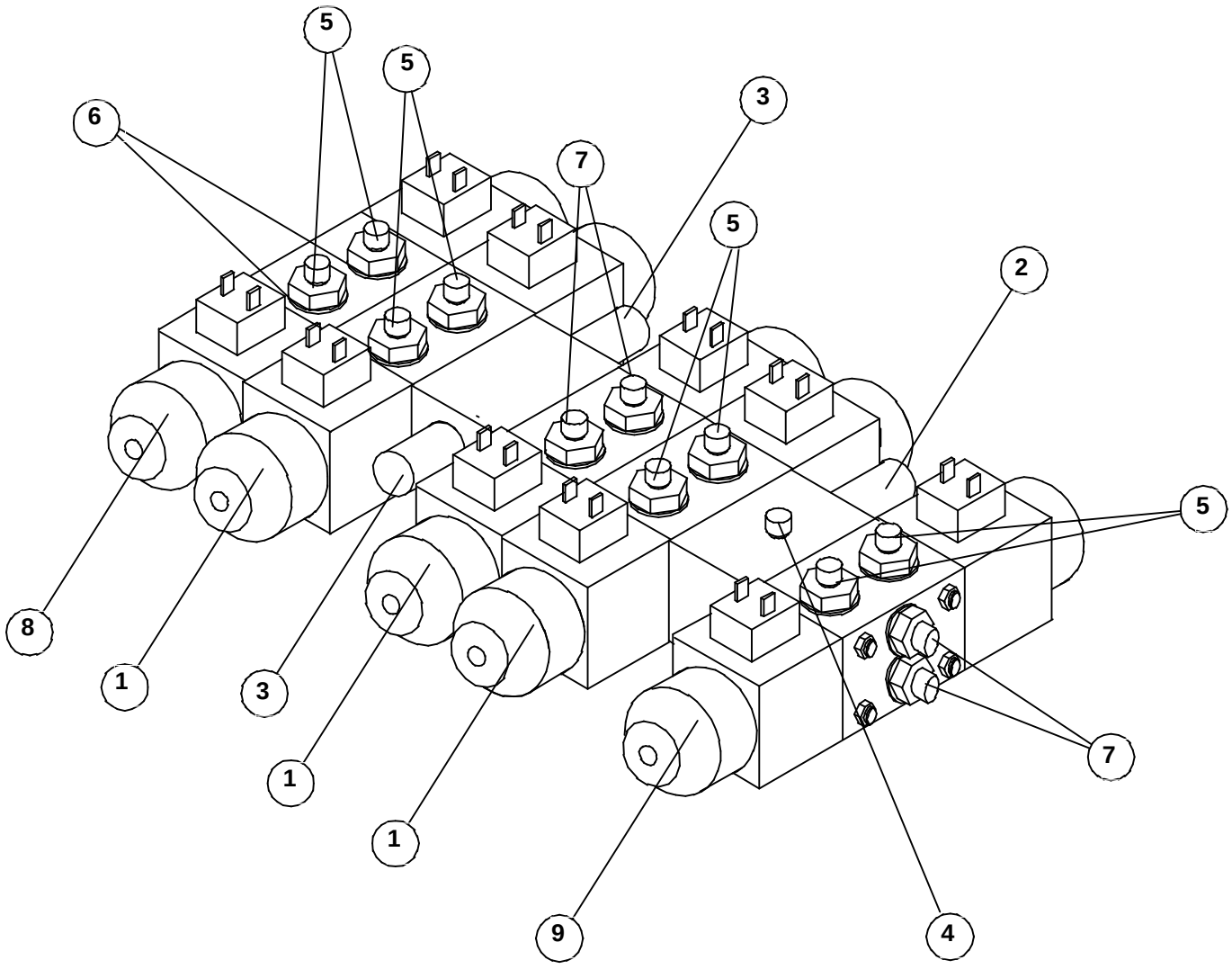
MAIN MANIFOLD BLOCK ASSEMBLY

58076-300
SERIAL NUMBERS: 1001 TO 1027

ITEM	PART-NUMBER	DESCRIPTION	QTY.
1	58754-000	4 WAY 3 POSITION INTERMEDIATE VALVE AND COILS	3
2	58756-000	MAIN RELIEF VALVE CARTRIDGE - SET TO155 BAR	1
3	58755-000	CROSSLINE RELIEF VALVE CARTRIDGE - SET TO 50 BAR	2
4	57106-000	PRESSURE TEST POINT FITTING	1
5	57358-000	1/4” - 1/4” MALE - MALE STRAIGHT B.S.P. ADAPTOR	8
6	57124-000	1/4” BONDED SEAL	14
7	57121-000	1/4” - 3/8” MALE - MALE STRAIGHT B.S.P. ADAPTOR	2
8	58773-000	4 WAY 3 POSITION END VALVE AND COILS	1
9	58774-000	4 WAY 3 POSITION INLET/OUTLET VALVE AND COILS	1

*** SEAL KIT FOR COMPLETE MANIFOLD BLOCK AND COMPONENTS - 58757-000**

Main Manifold Block Assembly



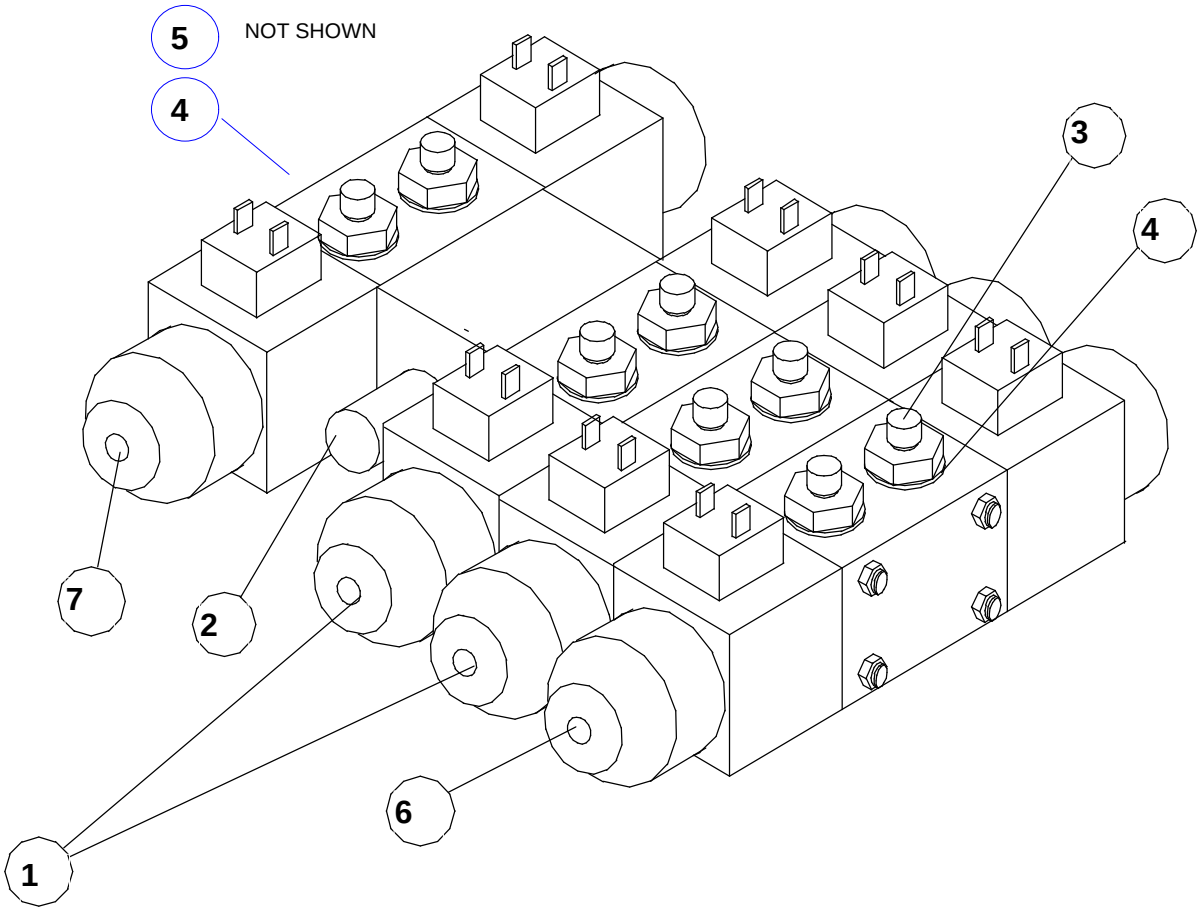
OUTRIGGER MANIFOLD BLOCK ASSEMBLY

58077-300
SERIAL NUMBER 1001 TO 1027

ITEM	PART-NUMBER	DESCRIPTION	QTY.
1	58754-000	4 WAY 3 POSITION INTERMEDIATE VALVE AND COILS	2
2	58756-000	RELIEF VALVE CARTRIDGE - SET TO MAX.	1
3	57358-000	1/4” MALE - MALE STRIAGHT B.S.P. ADAPTOR	8
4	57124-000	1/4” BONDED SEAL	8
5	57512-000	3/8” MALE - 1/4” MALE STRIAGHT B.S.P. ADAPTOR	2
6	58773-000	4 WAY 3 POSITION END VALVE AND COILS	1
7	58774-000	4 WAY 3 POSITION INLET/OUTLET VALVE AND COILS	1

*** SEAL KIT FOR COMPLETE MANIFOLD BLOCK AND COMPONENTS - 58758-000**

Outrigger Manifold Block Assembly



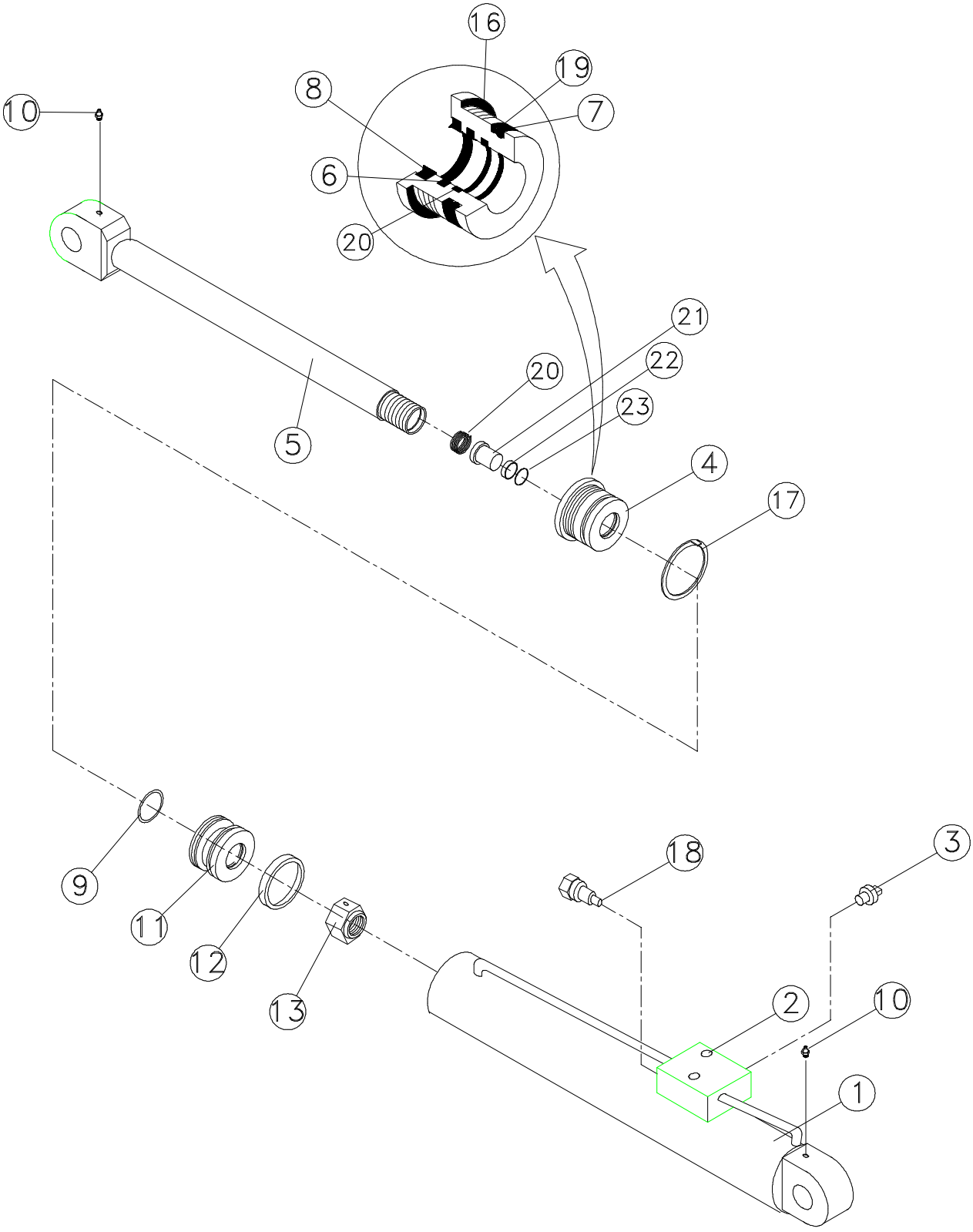
LOWER LIFT CYLINDER ASSEMBLY

(A) 57982-300 SERIAL NUMBERS 1001 TO 1026
(B) 58730-300 SERIAL NUMBERS 1027 TO CURRENT

ITEM	PART-NUMBER	DESCRIPTION	QTY.
1	-	CYLINDER BODY	1
2(A) 2(B)	57368-000 -	VALVE BLOCK BOLTED TO MANIFOLD (NOT SHOWN) VALVE BODY WELDED TO CYLINDER	1
3(A) 3(B)	57472-000 58718-000	EMERGENCY LOWERING CARTRIDGE VALVE EMERGENCY LOWERING CARTRIDGE VALVE	1
4	-	END CAP	1
5	-	ROD AND END PIVOT	1
6	SEE NOTE	ROD SEAL	2
7	SEE NOTE	O-RING	1
8	SEE NOTE	WIPER	1
9	SEE NOTE	PISTON O-RING	1
10	58819-000	GREASE NIPPLE	2
11	-	PISTON HEAD	1
12	SEE NOTE	PISTON SEAL	1
13	SEE NOTE	PISTON LOCKNUT	1
16	SEE NOTE	END CAP GLAND	1
17	-	TAB WASHER	1
18(A) 18(B)	57378-000 58728-000	SINGLE OVERCENTRE CARTRIDGE - 175 BAR SINGLE OVERCENTRE CARTRIDGE - 175 BAR	1
19	SEE NOTE	END CAP SEAL	1
20	-	CUSHIONING SPRING	1
21	-	CUSHIONING SHAFT	1
22	-	SLEEVE	1
23	-	RETAINING CLIP	1

NOTE: ITEMS 6,7,8,9,12,13 & 16 ALL FORM THE SEAL KIT FOR THE CYLINDER.
THE SEAL KIT IS:
(A) PART NUMBER 58741-000 SERIAL NUMBERS 1001 TO 1026
(B) PART NUMBER 58746-000 SERIAL NUMBERS 1027 TO CURRENT

Lower Lift
Cylinder Assembly



UPPER LIFT CYLINDER ASSEMBLY

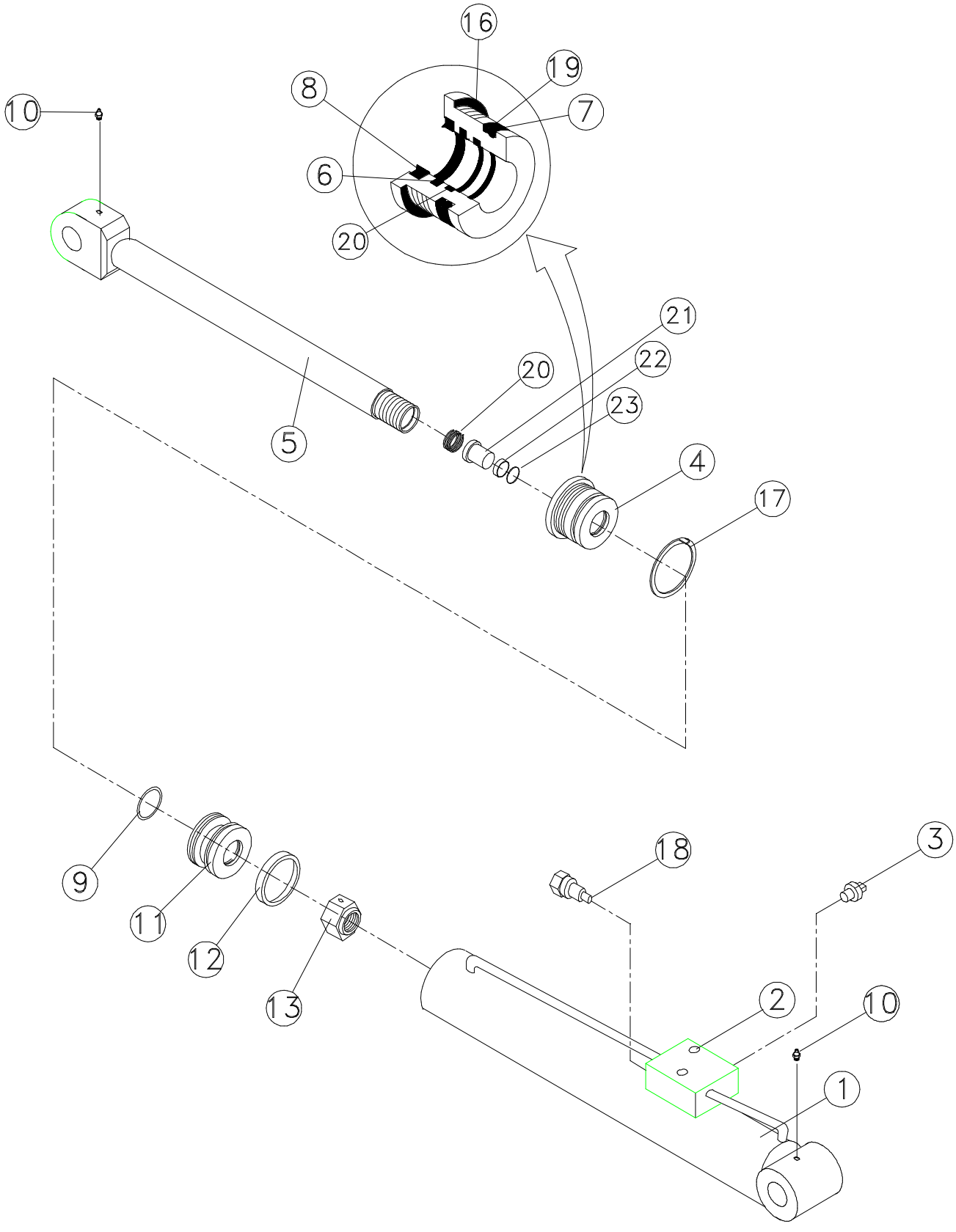
(A) 57983-300 SERIAL NUMBERS 1001 TO 1026
(B) 58731-300 SERIAL NUMBERS 1027 TO CURRENT

ITEM	PART-NUMBER	DESCRIPTION	QTY.
1	-	CYLINDER BODY	1
2(A) 2(B)	57368-000 -	VALVE BLOCK BOLTED TO MANIFOLD (NOT SHOWN) VALVE BODY WELDED TO CYLINDER	1
3(A) 3(B)	57372-000 58718-000	EMERGENCY LOWERING CARTRIDGE VALVE EMERGENCY LOWERING CARTRIDGE VALVE	1
4	-	END CAP	1
5	-	ROD AND END PIVOT	1
6	SEE NOTE	ROD SEAL	2
7	SEE NOTE	O-RING	1
8	SEE NOTE	WIPER	1
9	SEE NOTE	PISTON O-RING	1
10	58819-000	GREASE NIPPLE	2
11	-	PISTON HEAD	1
12	SEE NOTE	PISTON SEAL	1
13	SEE NOTE	PISTON LOCKNUT	1
16	SEE NOTE	END CAP GLAND	1
17	-	TAB WASHER	1
18(A) 18(B)	57378-000 58728-000	SINGLE OVERCENTRE CARTRIDGE - 175 BAR SINGLE OVERCENTRE CARTRIDGE - 175 BAR	1
19	SEE NOTE	END CAP SEAL	1
20	-	CUSHIONING SPRING	1
21	-	CUSHIONING SHAFT	1
22	-	SLEEVE	1
23	-	RETAINING CLIP	1

NOTE: ITEMS 6,7,8,9,12,13 & 16 ALL FORM THE SEAL KIT FOR THE CYLINDER.
THE SEAL KIT IS

(A) PART NUMBER 57360-000 SERIAL NUMBERS 1001 TO 1026
(B) PART NUMBER 58747-000 SERIAL NUMBERS 1027 TO CURRENT

Upper Lift
Cylinder Assembly



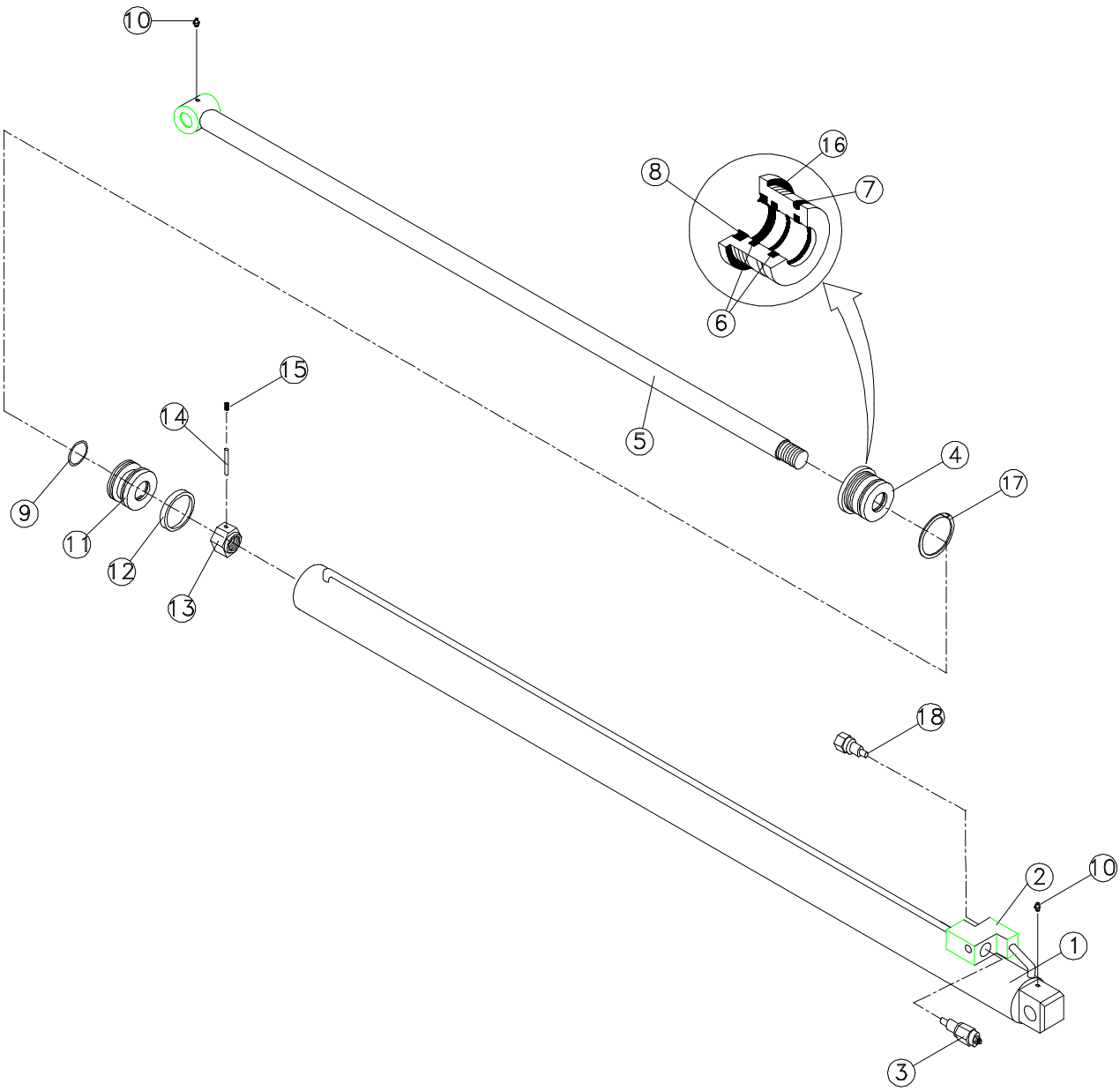
TELE CYLINDER ASSEMBLY

(A) 57979-300 SERIAL NUMBERS: 1001 TO 1026
(B) 58732-300 SERIAL NUMBERS: 1027 TO CURRENT

ITEM	PART-NUMBER	DESCRIPTION	QTY.
1	-	TELE CYLINDER BODY	1
2	-	VALVE BODY	1
3(A)	58103-000	SINGLE P.O. CHECK CARTRIDGE - 200 BAR	1
3(B)	58728-000	SINGLE OVERCENTRE CARTRIDGE - 200 BAR	1
4	-	END CAP	1
5	-	ROD AND END PIVOT	1
6	SEE NOTE	ROD SEAL	2
7	SEE NOTE	O-RING	1
8	SEE NOTE	WIPER	1
9	SEE NOTE	PISTON O-RING	1
10	58819-000	GREASE NIPPLE	2
11	-	PISTON HEAD	1
12	SEE NOTE	PISTON SEAL	1
13	SEE NOTE	PISTON LOCKNUT	1
14	SEE NOTE	ROLL PIN	1
15	SEE NOTE	GRUB SCREW	1
16	SEE NOTE	END CAP GLAND	1
17	-	TAB WASHER	1
18(A)	58103-000	SINGLE P.O. CHECK CARTRIDGE	1
18(B)	58714-000	SINGLE P.O. CHECK CARTRIDGE	1

NOTE: ITEMS 6,7,8,9,12,13,14,15 & 16 ALL FORM THE SEAL KIT FOR THE CYLINDER.
THE SEAL KIT IS (A) PART NUMBER 58742-000
(B) PART NUMBER 58748-000

Telescopic Cylinder Assembly

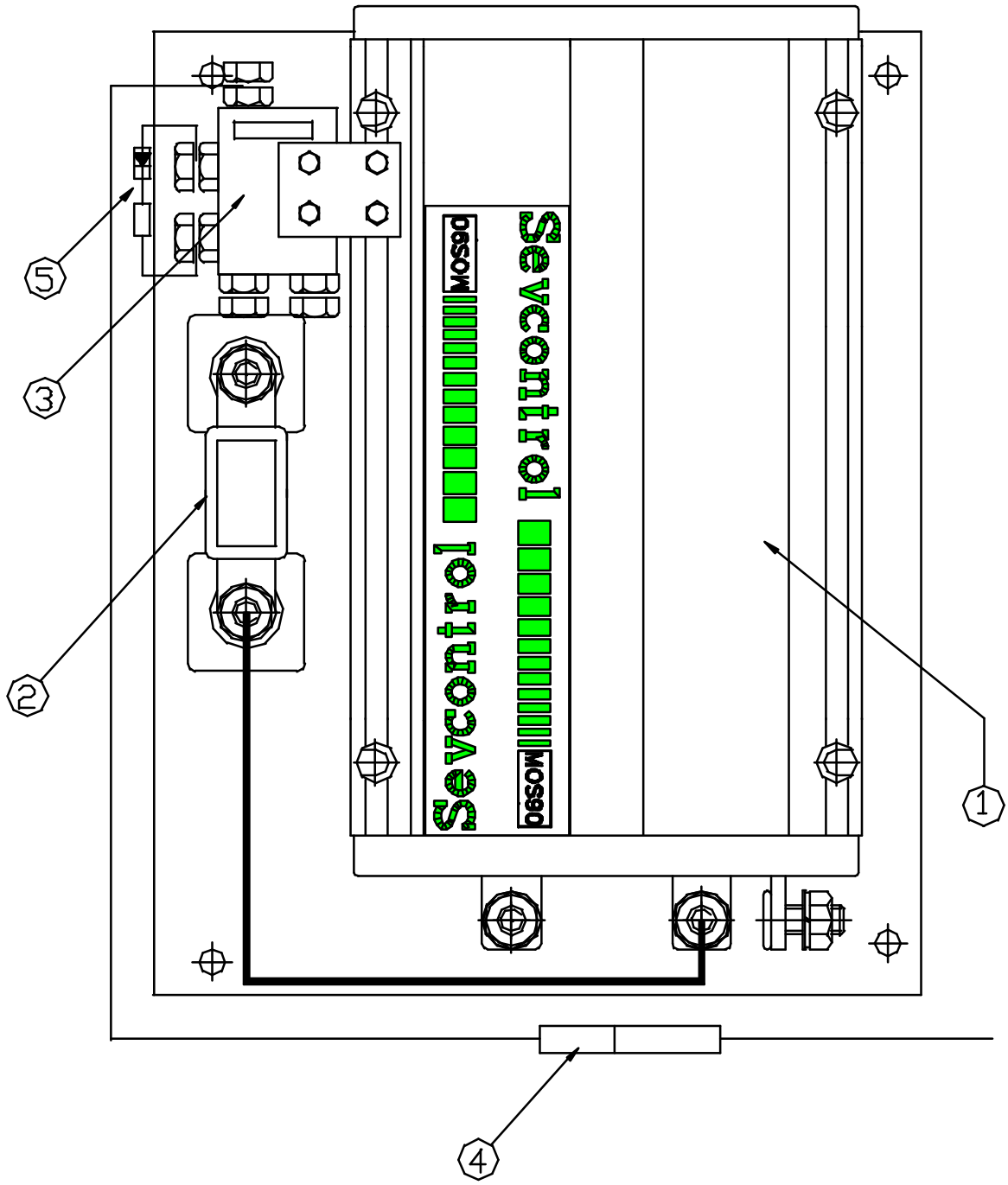


PUMP MOTOR CONTROL UNIT ASSEMBLY

58943-000 = COMPLETE ASSEMBLY AS PER PAGE 7-45

ITEM	PART-NUMBER	DESCRIPTION	QTY.
1 *	**58118-000** **58119-000**	CONTROLLER UNIT **SERIAL NUMBERS 1001 TO 1016** CONTROLLER UNIT **SERIAL NUMBERS 1017 TO CURRENT**	1
2	57304-000	FUSE 160A	1
3	57485-000	LINE CONTACTOR	1
4	57470-000	FUSE 7A	1
5	58932-000	SUPRESSION DIODE ASSY.	1
6 * NOT SHOWN	57128-000	MOS 90 CALIBRATOR - TEST/PROGRAMMING INSTRUMENT	1

Pump Motor Control Unit Assembly

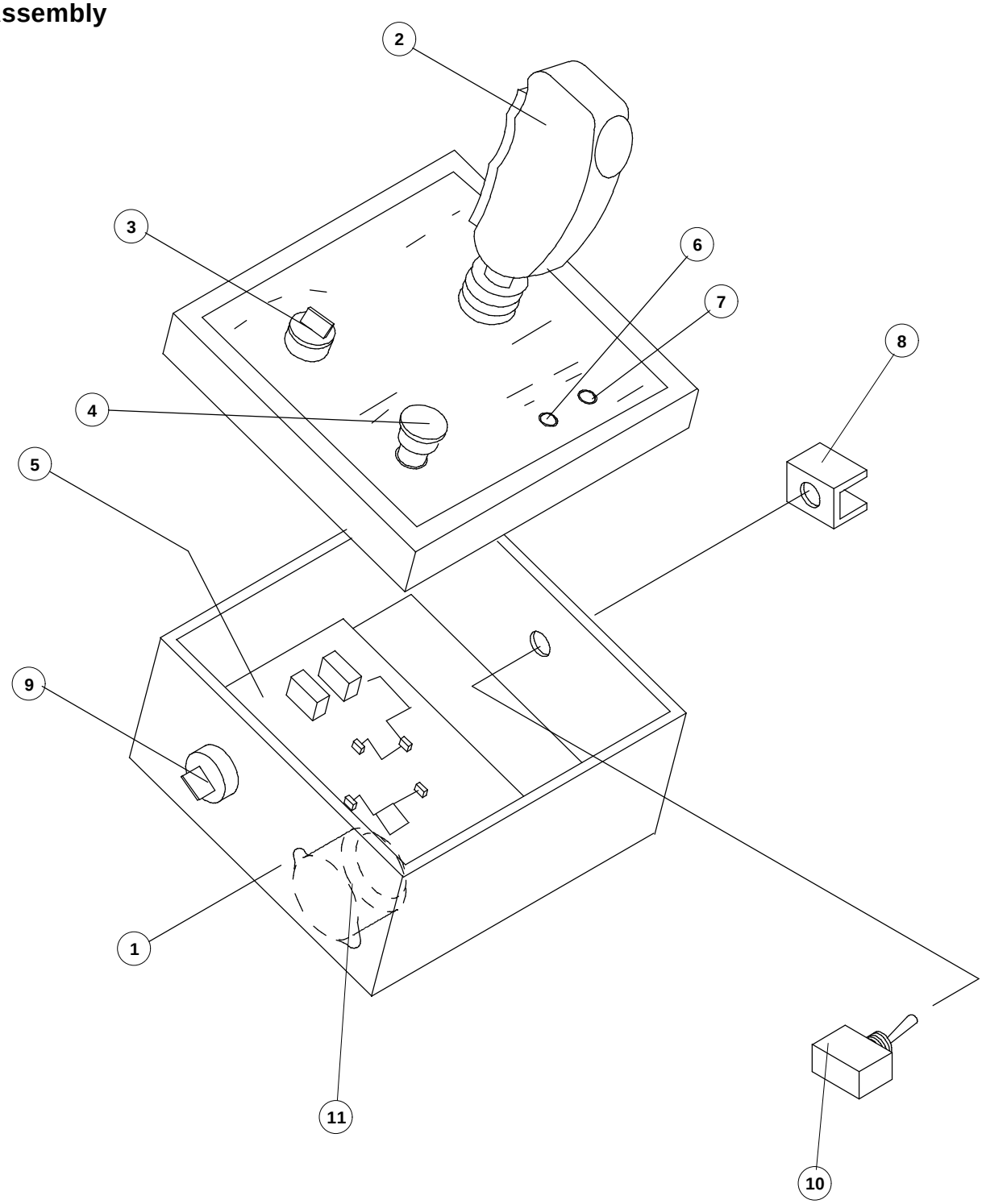


UPPER CONTROL BOX (U.C.B.) ASSEMBLY

58122-300

ITEM	PART-NUMBER	DESCRIPTION	QTY.
1	58150-000	ENCLOSURE	1
2	57325-000	JOYSTICK	1
*	63975-004	POT ASSY	1
*	58984-000	RUBBER BOOT	1
*	58985-000	INTERNAL MICRO SWITCH	1
3	58152-000	4-POSITION SELECTOR SWITCH	1
4	57309-000	EMERGENCY STOP BUTTON	1
5	57236-000	P.C.B.	1
6	57330-000	RED LED	1
7	57329-000	GREEN LED	1
8	57312-400	SWITCH GUARD	1
9	57327-400	ROTARY SWITCH	1
*	58947-000	CONTACT BLOCK N/C	1
*	58946-000	CONTACT BLOCK N/O	1
10	57311-400	TOGGLE SWITCH	1
11	57328-400	BUZZER	1

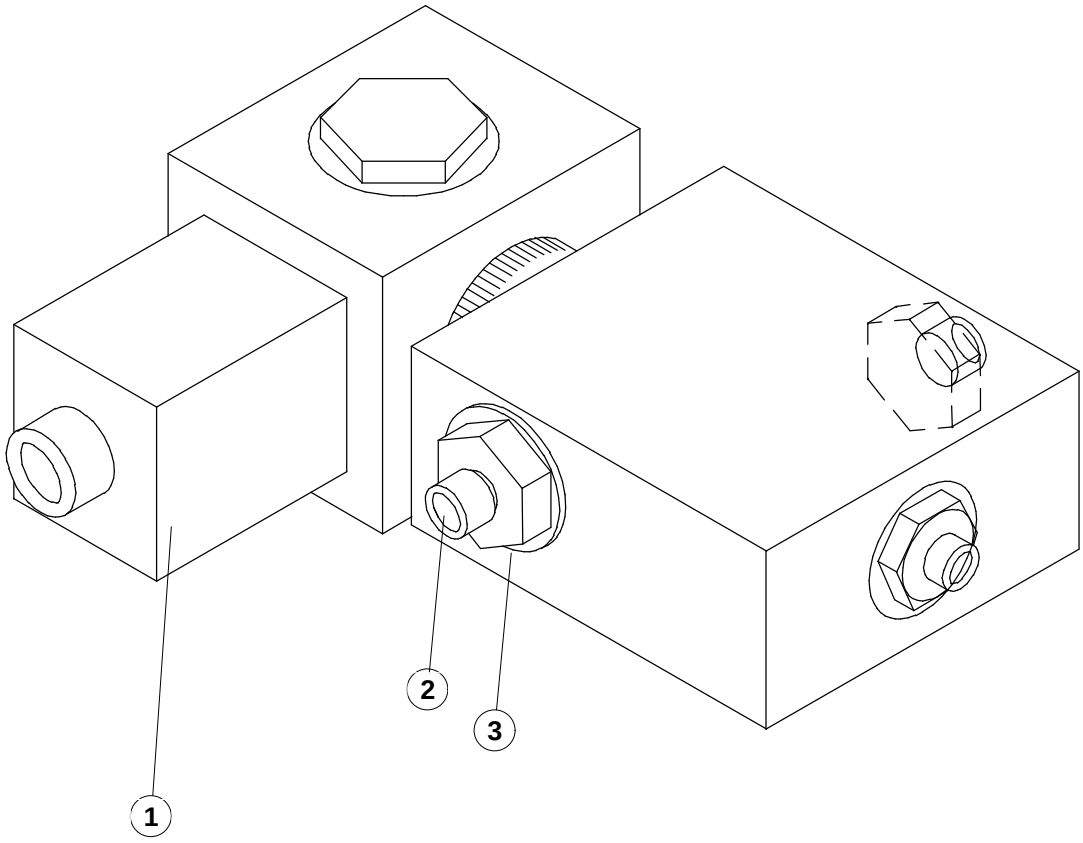
Upper Control Box Assembly



OUTRIGGER ISOLATOR VALVE ASSEMBLY
58772-300

ITEM	PART-NUMBER	DESCRIPTION	QTY.
1	58764-000	CARTRIDGE VALVE AND COIL	1
2	57122-000	3/8” MALE - MALE STRAIGHT B.S.P. ADAPTOR	3
3	57125-000	3/8” BONDED SEAL	3

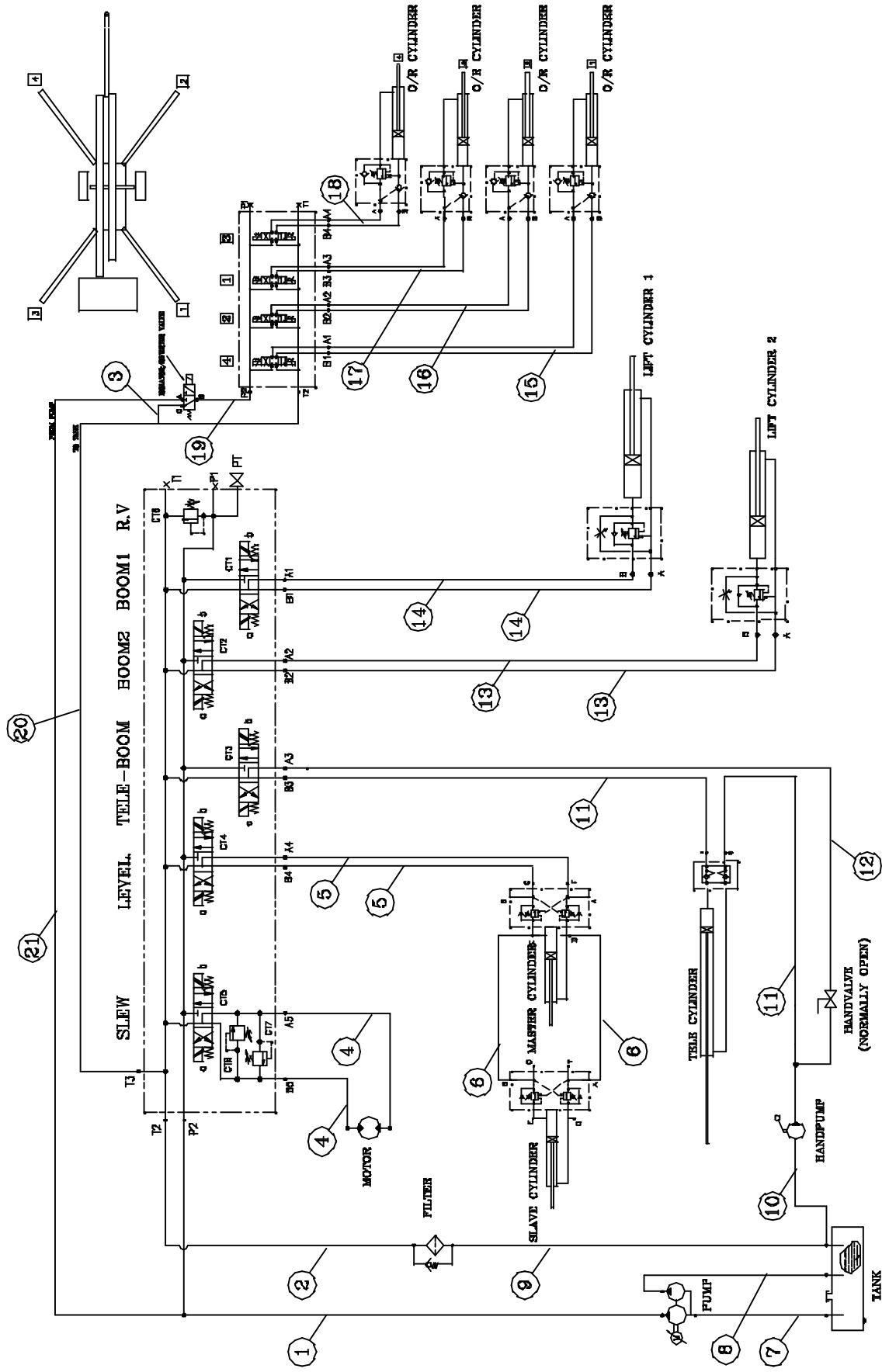
Outrigger Isolator Valve Assembly



HOSE ASSEMBLY

ITEM	PART-NUMBER	DESCRIPTION	QTY.
1	58098-300	HOSE ASSY - PUMP TO MAIN VALVE	1
2	58083-300	HOSE ASSY - RETURN FROM MAIN VALVE BLOCK TO FILTER	1
3	58767-300	HOSE ASSY - PORT ' C' ON ISOLATOR VALVE TO PORT T ON OUTRIGGER VALVE BLOCK	1
4	58095-300	HOSE ASSY - MAIN VALVE BLOCK TO SLEW MOTOR	2
5	58093-300	HOSE ASSY - MAIN VALVE BLOCK TO MASTER CYLINDER	2
6	58094-300	HOSE ASSY - MASTER CYLINDER TO SLAVE CYLINDER	2
7	58082-300	HOSE ASSY - SUCTION LINE FROM TANK TO PUMP	1
8	58085-300	HOSE ASSY - RETURN FROM PUMP TO TANK	1
9	58084-300	HOSE ASSY - RETURN FROM FILTER TO TANK	1
10	58199-300	HOSE ASSY - SUCTION LINE FROM HANDPUMP TO TANK	1
11	58096-300	HOSE ASSY - HANDPUMP TO TELE CYLINDER - MAIN VALVE BLOCK TO TELE CYLINDER	1 1
12	58198-300	HOSE ASSY - HANDPUMP SHUT-OFF VALVE TO MAIN VALVE BLOCK	1
13	58097-300	HOSE ASSY - MAIN VALVE BLOCK TO UPPER LIFT CYLINDER	2
14	58088-300	HOSE ASSY - MAIN VALVE BLOCK TO LOWER LIFT CYLINDER	2
15	58092-300	HOSE ASSY - OUTRIGGER BLOCK TO OUTRIGGER CYLINDER NO. 1	1
16	58091-300	HOSE ASSY - OUTRIGGER BLOCK TO OUTRIGGER CYLINDER NO. 2	1
17	58090-300	HOSE ASSY - OUTRIGGER BLOCK TO OUTRIGGER CYLINDER NO. 3	1
18	58089-300	HOSE ASSY - OUTRIGGER BLOCK TO OUTRIGGER CYLINDER NO. 4	1
19	58766-300	HOSE ASSY - PORT 'P' ON OUTRIGGER BLOCK TO PORT 'B' ON ISOLATOR VALVE	1
20	58086-300	HOSE ASSY - RETURN LINE FROM OUTRIGGER BLOCK TO MAIN VALVE BLOCK	1
21	58765-300	HOSE ASSY - PUMP TO PORT 'A' ON ISOLATOR VALVE	1

Hose Assembly



Local Distributor:

Lokaler Vertiebshändler:

Distributeur local:

El Distribuidor local:

Il Distributore locale:

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TEL: +1 (559) 443 6600
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PN-

MOS 90 Settings

TL49 Drive Assist MOS90

Serial # various

Part Number:

058119-000

Cal. Label	Enables/Drives Function	Unit	Setting	Signal	Comments
Speed 1	Upper controls, Boom 1 & 2	%	60	Input/Prop.	
Speed 2	Upper controls, Slew	%	38	Input/Prop.	
Speed 3	Upper Controls, Telescopic	%	100	Input/Prop.	
Speed 4	Lower controls, Boom 1, 2, Tele & outriggers	%	45	Input/Fixed	
Speed 5	Lower controls, Slew	%	17	Input/Fixed	
Speed 6	Lower controls, Drive assist speed	%	100	Input/Fixed	
Speed 7	Upper controls, Cage Levelling	%	20	Input/Fixed	
Speed 8	Not Used	-	-------	-------	
Creep	Not Used	-	-------	-------	
Ramp	Activation delay ("Soft Start")	seconds	1.00	-------	
Extra	Not Used	-	-------	-------	
I Max	MOS 90 max. amp. capacity	Amp	270	-------	
X 3	Not Used	-	-------	-------	
X 4	Battery discharge value	Volt	2.07	-------	Upper Box Red L.E.D: Flashes at 70% Discharge
X 5	Battery discharge value	Volt	1.90		Upper Box Red L.E.D: Lit at 80% Discharge
Batt.	Battery voltage at pin # 6	Volt	Real Time		
Motor	Voltage across motor contacts	Volt	Real Time		
Motor	Amperage across motor contacts	Amp	Real Time		
Temp	Internal temperature	Celsius	Real Time		
Test	Switch activation and status	OP/CL	Real Time		OP=Open, CL=Closed

To activate the test: Red indicator at TEST, then press "+" or "-" to select which switch to test

Switch No.	Activates...	Un-Act.	Activated	Input, Pin#	Comments
Switch 1	Upper controls, Boom 1 and 2	Open	Closed	8	Green
Switch 2	Upper controls, Slew	Open	Closed	13	Turqoise
Switch 3	Upper controls, Telescopic	Open	Closed	12	Red/Blue
Switch 4	Lower controls, Boom 1, 2 & Tele, outriggers	Open	Closed	4	White/grey
Switch 5	Lower controls, Slew	Open	Closed	7	Orange
Switch 6	Lower controls, Drive Assist	Open	Closed	16	
Switch 7	Upper controls, Cage levelling	Open	Closed	11	Brown
Switch 8	Not Used	Open	-------	-------	
Switch 9	Not Used	Open	-------	-------	
Switch 10	Not Used	Open	-------	-------	

Calibrator Part Number: 57128-000

siw/lt:MOS90settings

MOS 90 Settings

TL49 Drive Assist MOS90

Serial # various

Part Number:
058119-000

Cal. Label	Enables/Drives Function	Unit	Setting	Signal	Comments
Speed 1	Upper controls, Boom 1 & 2	%	60	Input/Prop.	
Speed 2	Upper controls, Slew	%	38	Input/Prop.	
Speed 3	Upper Controls, Telescopic	%	100	Input/Prop.	
Speed 4	Lower controls, Boom 1, 2, Tele & outriggers	%	45	Input/Fixed	
Speed 5	Lower controls, Slew	%	17	Input/Fixed	
Speed 6	Lower controls, Drive assist speed	%	100	Input/Fixed	
Speed 7	Upper controls, Cage Levelling	%	20	Input/Fixed	
Speed 8	Not Used	-	-------	-------	
Creep	Not Used	-	-------	-------	
Ramp	Activation delay ("Soft Start")	seconds	1.00	-------	
Extra	Not Used	-	-------	-------	
I Max	MOS 90 max. amp. capacity	Amp	270	-------	
X 3	Not Used	-	-------	-------	
X 4	Battery discharge value	Volt	2.07	-------	Upper Box Red L.E.D: Flashes at 70% Discharge
X 5	Battery discharge value	Volt	1.90		Upper Box Red L.E.D: Lit at 80% Discharge
Batt.	Battery voltage at pin # 6	Volt	Real Time		
Motor	Voltage across motor contacts	Volt	Real Time		
Motor	Amperage across motor contacts	Amp	Real Time		
Temp	Internal temperature	Celsius	Real Time		
Test	Switch activation and status	OP/CL	Real Time		OP=Open, CL=Closed

To activate the test: Red indicator at TEST, then press "+" or "-" to select which switch to test

Switch No.	Activates...	Un-Act.	Activated	Input, Pin#	Comments
Switch 1	Upper controls, Boom 1 and 2	Open	Closed	8	Green
Switch 2	Upper controls, Slew	Open	Closed	13	Turqoise
Switch 3	Upper controls, Telescopic	Open	Closed	12	Red/Blue
Switch 4	Lower controls, Boom 1, 2 & Tele, outriggers	Open	Closed	4	White/grey
Switch 5	Lower controls, Slew	Open	Closed	7	Orange
Switch 6	Lower controls, Drive Assist	Open	Closed	16	
Switch 7	Upper controls, Cage levelling	Open	Closed	11	Brown
Switch 8	Not Used	Open	-------	-------	
Switch 9	Not Used	Open	-------	-------	
Switch 10	Not Used	Open	-------	-------	

Calibrator Part Number: 57128-000

MOS 90 Settings **TL-49 Pump Controller** **Part Number:**

Serial # 1001 - 1016 58118-000 (40056)

Cal. Label	Enables/Drives Function	Unit	Setting	Signal	Comments
Speed 1	Upper controls, Boom 1, 2 & Telescopic	%	60	Input/Prop.	
Speed 2	Upper controls, Slew	%	38	Input/Prop.	
Speed 3	Lower controls, Boom 1, 2 & Telescopic	%	40	Input/Fixed	
Speed 4	Lower controls, Slew	%	19	Input/Fixed	
Speed 5	Lower controls, Outriggers	%	40	Input/Fixed	
Speed 6	Not Used	-	-------	-------	
Speed 7	Upper controls, Cage Levelling	%	20	Input/Fixed	
Speed 8	Not Used	-	-------	-------	
Creep	Not Used	-	-------	-------	
Ramp	Activation delay ("Soft Start")	seconds	1.00	-------	
Extra	Not Used	-	-------	-------	
I Max	MOS 90 max. amp. capacity	Amp	270	-------	
X 3	Not Used	-	-------	-------	
X 4	Battery discharge value	Volt	2.07	-------	Upper Box Red L.E.D: Flashes at 70% Discharge
X 5	Battery discharge value	Volt	1.90		Upper Box Red L.E.D: Lit at 80% Discharge
Batt.	Battery voltage at pin # 6	Volt	Real Time		
Motor	Voltage across motor contacts	Volt	Real Time		
Motor	Amperage across motor contacts	Amp	Real Time		
Temp	Internal temperature	Celsius	Real Time		
Test	Switch activation and status	OP/CL	Real Time		OP=Open, CL=Closed

To activate the test: Red indicator at TEST, then press "+" or "-" to select which switch to test

Switch No.	Activates...	Un-Act.	Activated	Input, Pin#	Comments
Switch 1	Upper controls, Boom 1, 2 & Telescopic	Open	Closed	8	Green
Switch 2	Upper controls, Slew	Open	Closed	13	Turqoise
Switch 3	Lower controls, 1, 2 & Telescopic boom	Open	Closed	12	White
Switch 4	Lower controls, Slew	Open	Closed	4	Orange
Switch 5	Lower controls, Outriggers	Open	Closed	7	Grey
Switch 6	Not Used	Open	-------	-------	
Switch 7	Upper controls, Cage levelling	Open	Closed	11	Brown
Switch 8	Not Used	Open	-------	-------	
Switch 9	Not Used	Open	-------	-------	
Switch 10	Not Used	Open	-------	-------	

Calibrator Part Number: 57128-000

MOS 90 Settings **TL-49 Pump Controller** **Part Number:**

Serial # 1017 - current 58119-000 (40057)

Cal. Label	Enables/Drives Function	Unit	Setting	Signal	Comments
Speed 1	Upper controls, Boom 1 & 2	%	60	Input/Prop.	
Speed 2	Upper controls, Slew	%	38	Input/Prop.	
Speed 3	Upper Controls, Telescopic	%	100	Input/Prop.	
Speed 4	Lower controls, Boom 1, 2 & Tele	%	45	Input/Fixed	
Speed 5	Lower controls, Slew	%	17	Input/Fixed	
Speed 6	Lower controls, Outriggers	%	40	Input/Fixed	
Speed 7	Upper controls, Cage Levelling	%	20	Input/Fixed	
Speed 8	Not Used	-	-------	-------	
Creep	Not Used	-	-------	-------	
Ramp	Activation delay ("Soft Start")	seconds	1.00	-------	
Extra	Not Used	-	-------	-------	
I Max	MOS 90 max. amp. capacity	Amp	270	-------	
X 3	Not Used	-	-------	-------	
X 4	Battery discharge value	Volt	2.07	-------	Upper Box Red L.E.D: Flashes at 70% Discharge
X 5	Battery discharge value	Volt	1.90		Upper Box Red L.E.D: Lit at 80% Discharge
Batt.	Battery voltage at pin # 6	Volt	Real Time		
Motor	Voltage across motor contacts	Volt	Real Time		
Motor	Amperage across motor contacts	Amp	Real Time		
Temp	Internal temperature	Celsius	Real Time		
Test	Switch activation and status	OP/CL	Real Time		OP=Open, CL=Closed

To activate the test: Red indicator at TEST, then press "+" or "-" to select which switch to test

Switch No.	Activates...	Un-Act.	Activated	Input, Pin#	Comments
Switch 1	Upper controls, Boom 1 and 2	Open	Closed	8	Green
Switch 2	Upper controls, Slew	Open	Closed	13	Turqoise
Switch 3	Upper controls, Telescopic	Open	Closed	12	Red/Blue
Switch 4	Lower controls, Boom 1, 2 & Tele	Open	Closed	4	White
Switch 5	Lower controls, Slew	Open	Closed	7	Orange
Switch 6	Lower controls, Outriggers	Open	Closed	16	Grey
Switch 7	Upper controls, Cage levelling	Open	Closed	11	Brown
Switch 8	Not Used	Open	-------	-------	
Switch 9	Not Used	Open	-------	-------	
Switch 10	Not Used	Open	-------	-------	

Calibrator Part Number: 57128-000

Last Update January 2002.