



**A46JRT
ARTICULATED
BOOM LIFT**



Level 2

In this presentation these are the subjects covered.

1. Page 3 :- Safety Features.
2. Page 23 :- Serial number plate.
3. Page 39 :- Engine area.
4. Page 55 :- Chassis components.
5. Page 73 :- Turntable assembly.
6. Page 85 :- Lower controls.
7. Page 99 :- Elevating assembly.
8. Page 121 :- Platform.
9. Page 140:- Maintenance.
10. Page 147 :- Schematics.



SAFETY RULES

Warning

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

SAFETY FEATURES

Safety features covers :-

1. Page 5 :- Safety rules.
2. Page 6 :- E-Stops.
3. Page 7 :- Foot switch interlock.
4. Page 8 :- Emergency lowering system.
5. Page 12 :- Tilt alarm.
6. Page 14 :- Load sensing system.
7. Page 16 :- Platform safety systems
8. Page 17 :- Snorkel guard™.
9. Page 22 :- Emergency brake release.

SAFETY RULES

WARNING

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

Safety Rules

Electrocution Hazard



THIS MACHINE IS NOT INSULATED!

For this reason, it is imperative to keep a safe distance from live parts of electrical equipment.

Tip Over Hazard



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

Collision Hazard



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

Fall Hazard

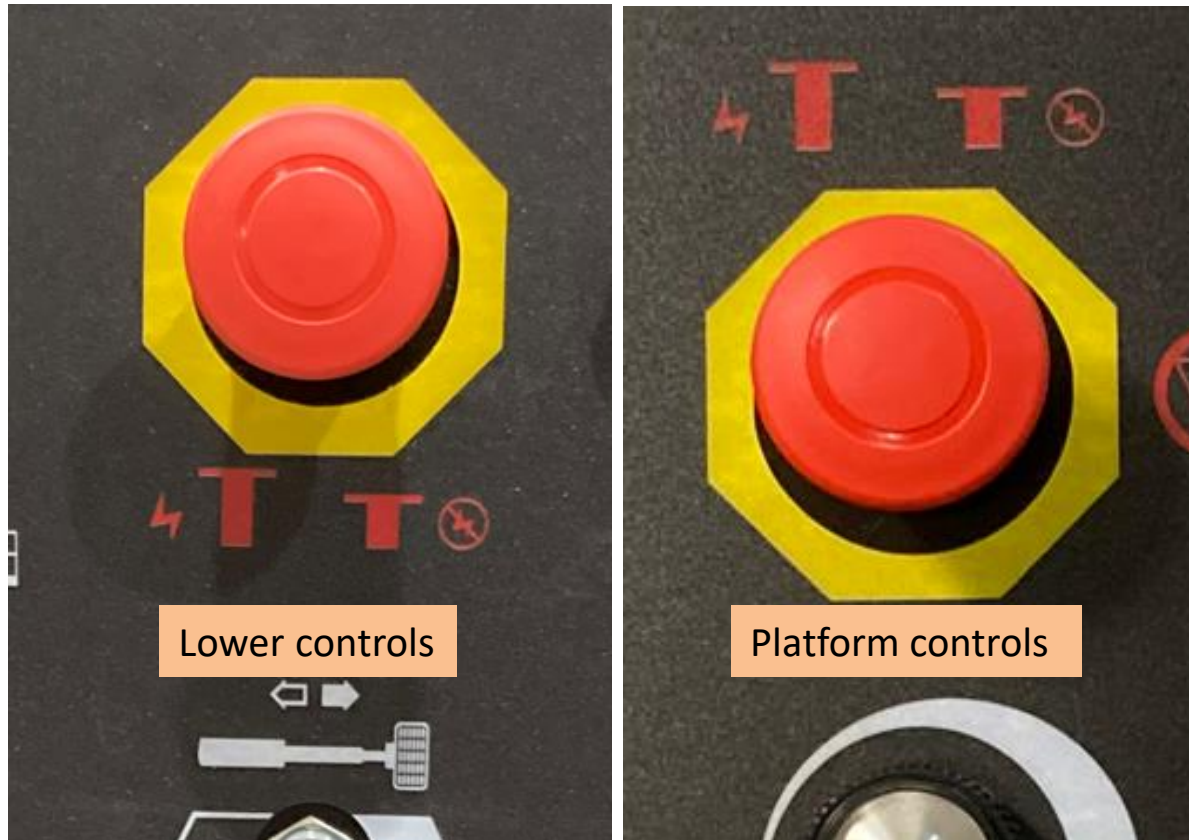


NEVER climb, stand, or sit on platform guardrails or midrail.

SAFETY FEATURES

E-STOPS

There are 2 E-stops on the machine.

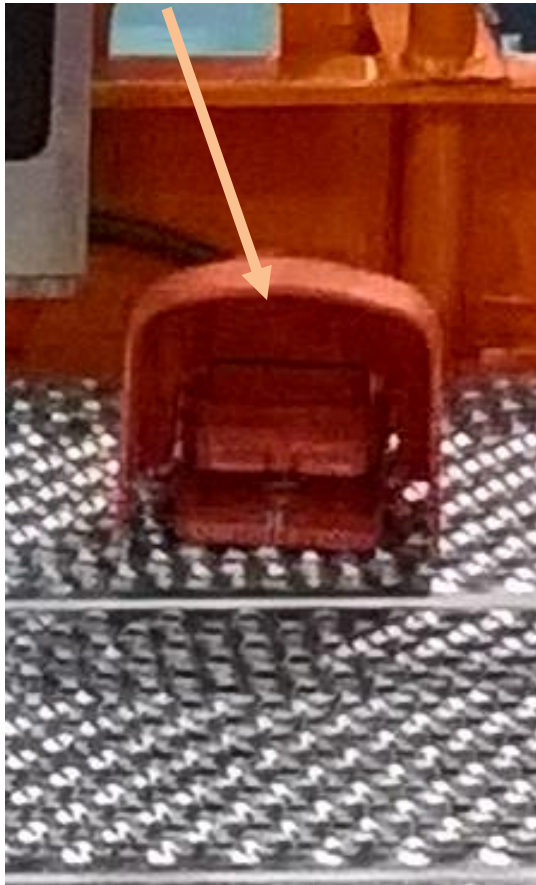


Push the E-Stop in to disconnect power in the case of an emergency.

FOOTSWITCH INTERLOCK

There is an interlock on the upper control box operation which prevents platform operation if a switch or joystick is accidentally moved.

The foot switch must be engaged, then a control switch/ joystick operated to get the machine to work.

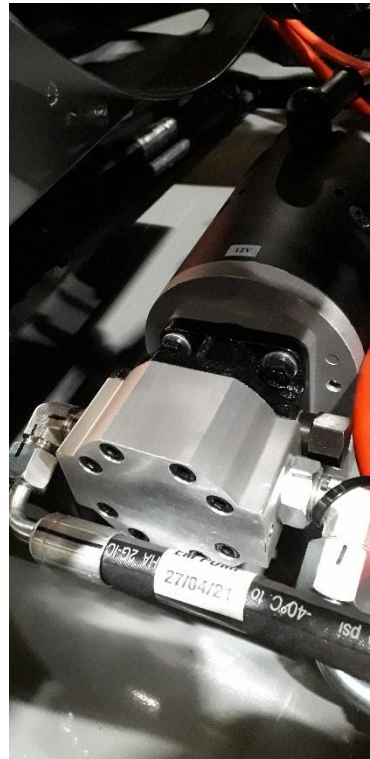


EMERGENCY LOWERING OPERATION



The emergency power system is for emergency lowering and stowing only. The length of time the pump can be operated depends on the capacity of the battery. Do not use this system for normal operation.

Only use if the main power system fails.

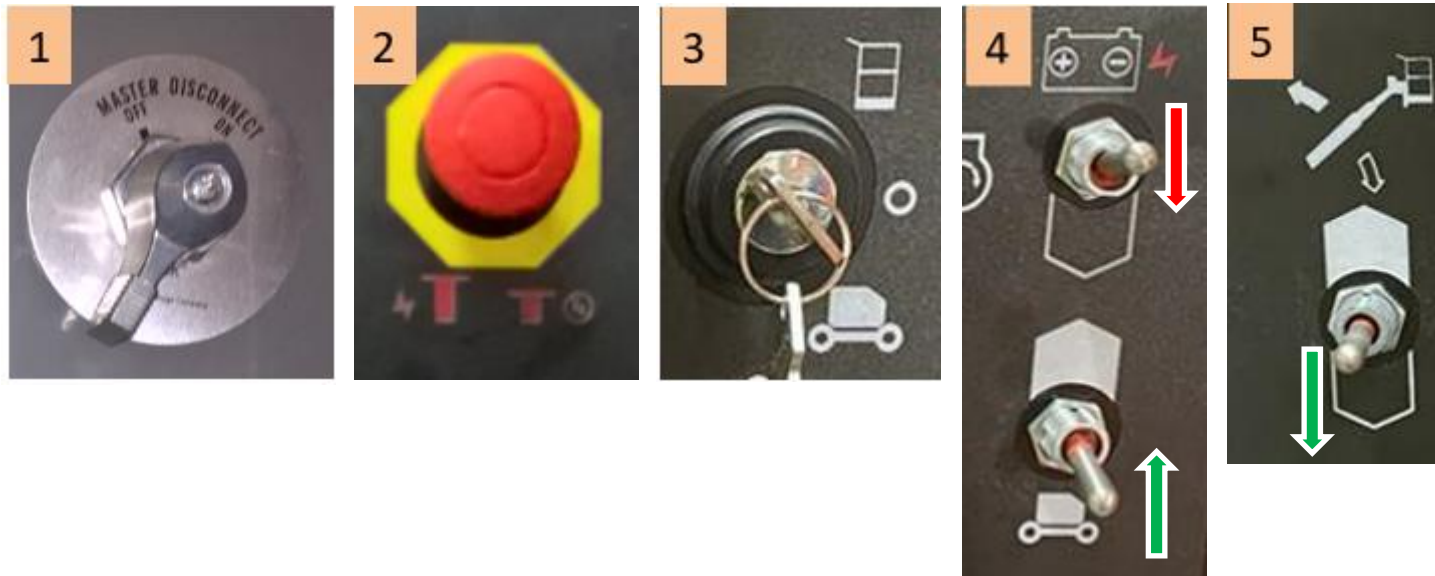


The emergency pump/motor assembly is located behind the radiator in the engine bay.

EMERGENCY LOWERING OPERATION

Lower controls

1. The battery disconnect switch must be in the “on” position.
2. The emergency stop button at the Lower controls must be in the “on” position.
3. The control selector switch at the lower controls must be in the “Lower or Ground” position.
4. Push upwards and hold the **Ground operation switch** in the “on” position.
5. Then push downwards and hold the **emergency power switch** in the “on” position.
6. Push and hold the appropriate function toggle switch, e.g. boom lower, in the desired direction.



All 3 switches must be held in position to get the operation to work.

EMERGENCY LOWERING OPERATION

Upper controls

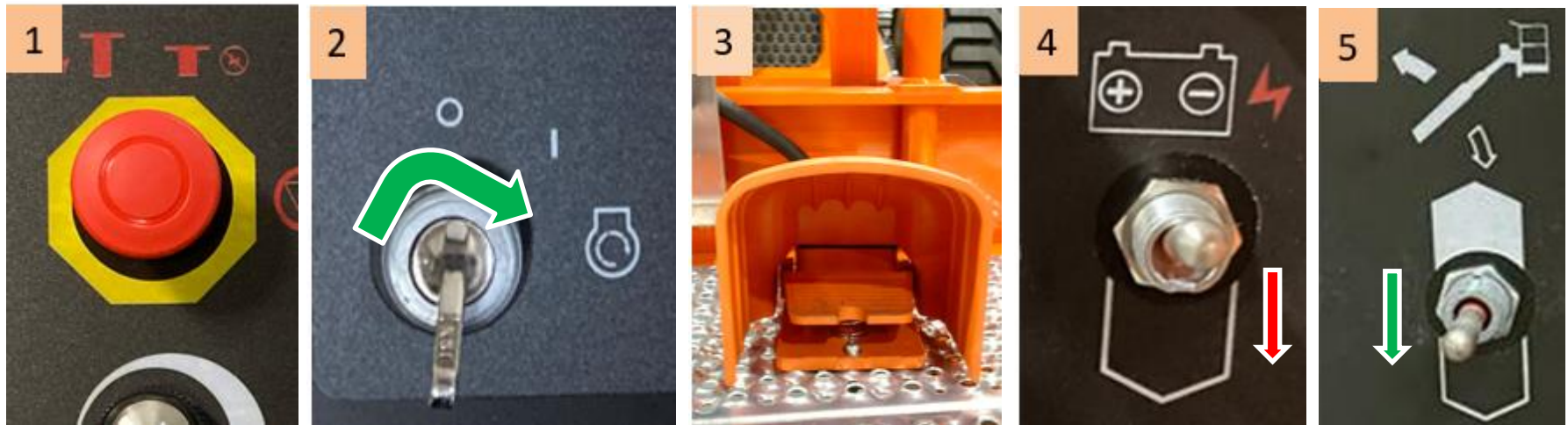
For the Upper controls to be operational follow steps 1 to 3 on Lower controls operations.
The control selector switch at the lower controls must be in the “Upper or basket” position.



EMERGENCY LOWERING OPERATION

Upper controls

1. The emergency stop button at the Upper controls must be in the “on” position.
2. Turn the ignition key to “On”.
3. Step down on the platform foot switch.
4. Then push downwards and hold the **emergency power switch** in the “on” position.
5. Push and hold the appropriate function toggle switch, e.g. **boom lower**, in the desired direction.



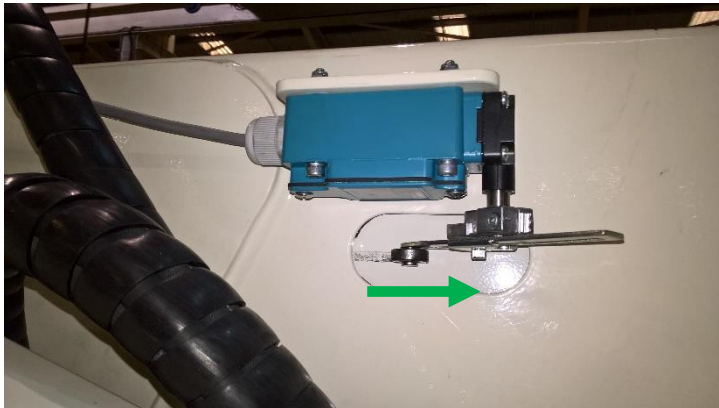
All 3 switches must be held in position to get the operation to work.

TILT ALARM

If the chassis of the machine goes beyond the recommended tilt angles, 3.5° front to back and 3.5° side to side, and the platform is lifted off the top boom microswitch



or the boom extension extended off the microswitch



TILT ALARM

The overload/tilt warning RED light and alarm will come on

at the Lower control box



and Upper control box.



To recover the machine the booms must either be fully lowered or retracted onto the microswitches then the machine should be driven to a level surface.

LOAD SENSING SYSTEM

If **100%** of the rated capacity is reached in the platform the overload light will continue to be illuminated and an alarm will sound.

This is a **WARNING** to the operator that the rated capacity has been reached and the platform load must be reduced. Normal function will remain to allow the platform to be positioned to remove some of the load.

Note

The machine should not be operated continuously with the overload alarm sounding.

If **110%** of the rated capacity is reached in the platform the overload light will continue to be illuminated and an alarm will continue to sound, and all functions will be disabled.

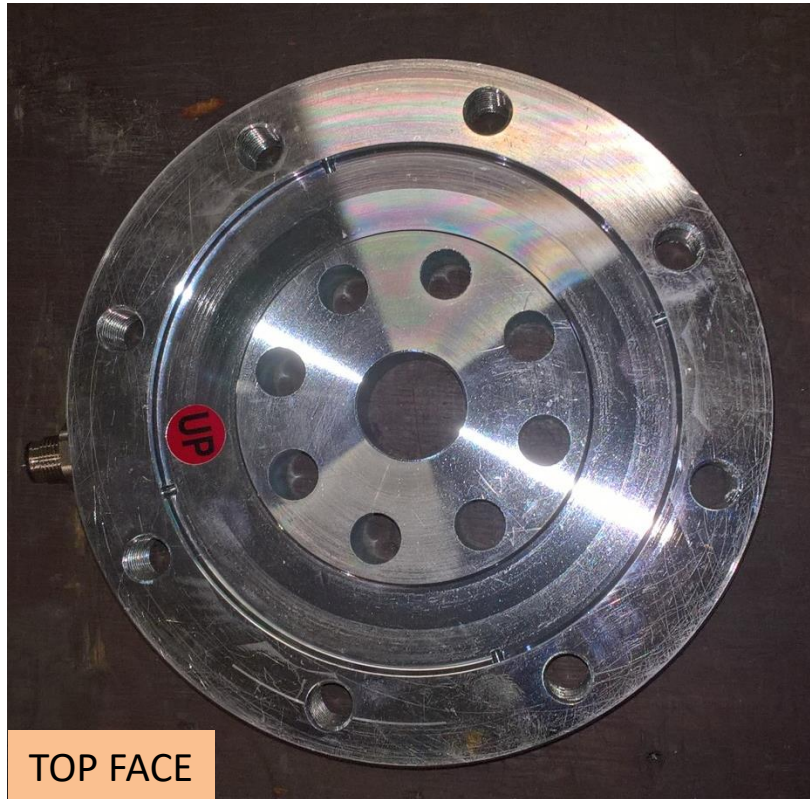
Note

The operator must remove the excess load from the platform.

Normal function will resume once the platform load is reduced below 110% continuously for at least two seconds.

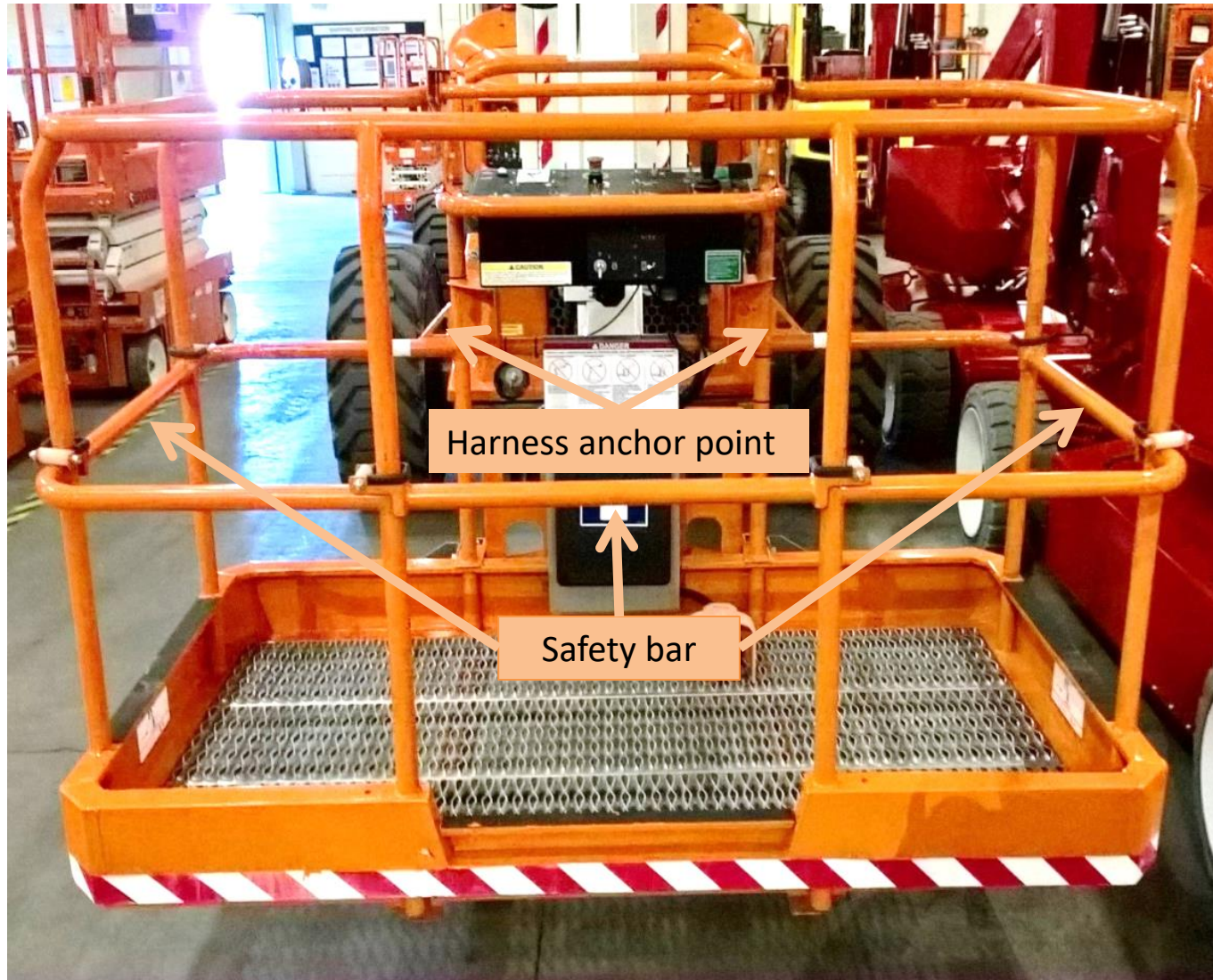
LOAD CELL

The Load Cell is located on top of the rotator unit. This assembly is located in the mounting bracket on the platform base. As the platform is loaded the increase in weight is registered at the Load cell.



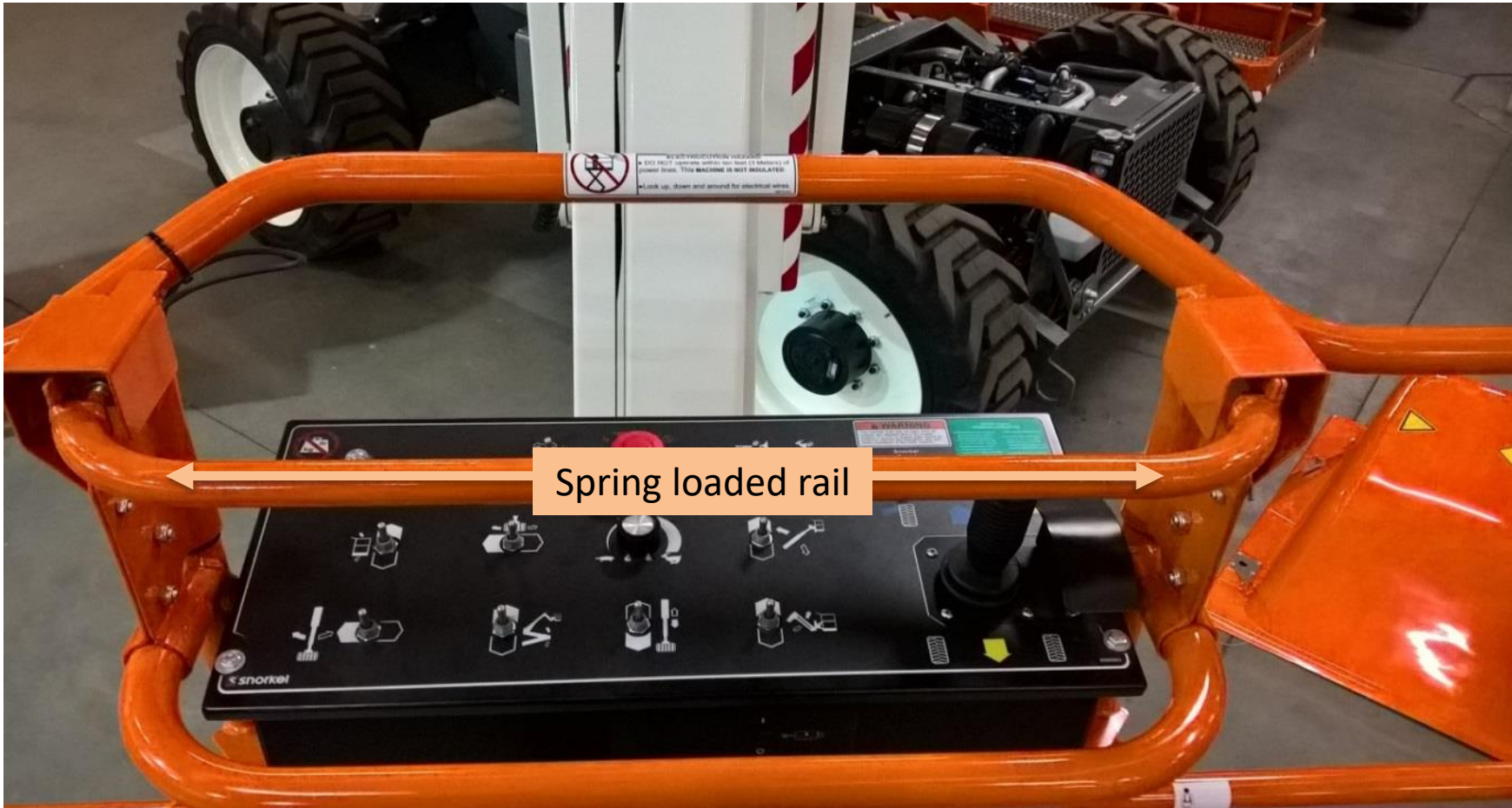
SAFETY FEATURES

PLATFORM SAFETY FEATURES



DO NOT begin to operate the machine until the platform entrance safety bars are in the fully lowered position.

SNORKEL GUARD™



The simple mechanical system features a spring-loaded rail that sits above the upper control panel which cuts out machine operations when compressed, e.g. in the case of the operator being involuntary pushed against the controls.

SNORKEL GUARD™

When closed or no gap the Spring-loaded rail is “seen” by a proximity switch located on the platform rail. Machine operates normally.

When the operator moves the rail away or opens the gap from the proximity switch the proximity switch “loses sight” of the rail and stops machine operation.

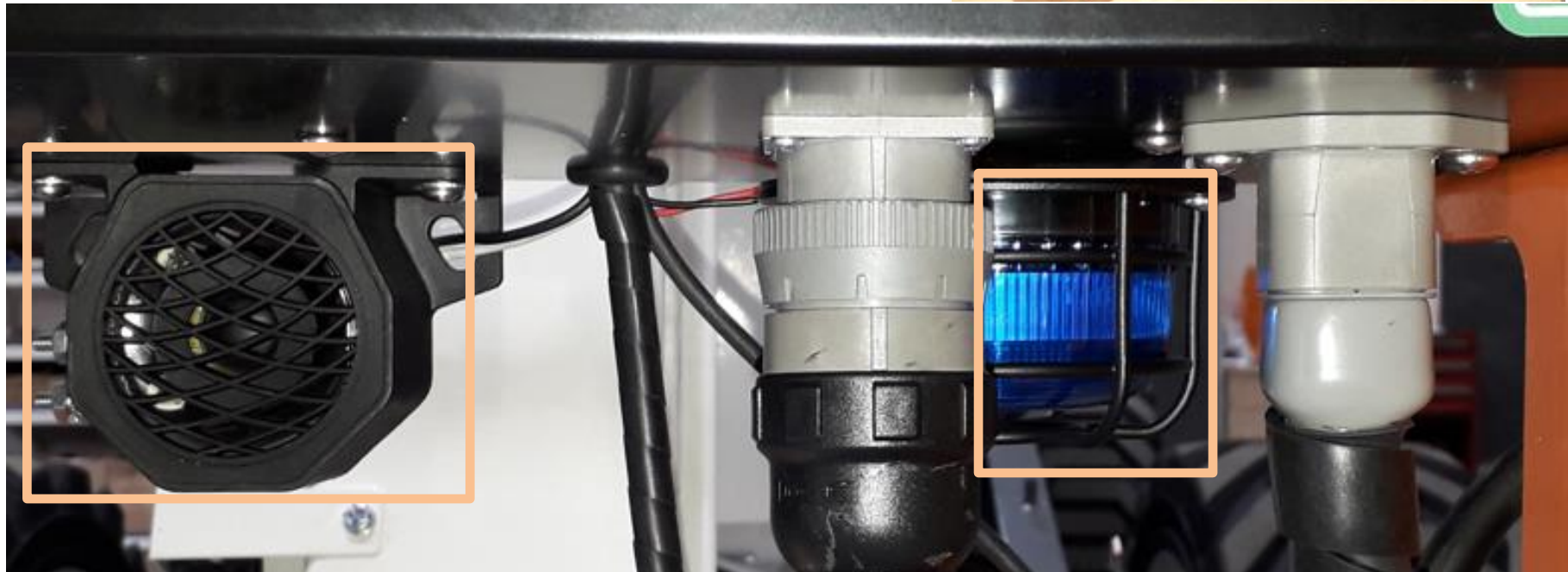


SNORKEL GUARD™

If an operator is involuntarily pushed against the spring-loaded rail that sits above the upper control panel the machine functions are disabled.

When the Snorkel Guard™ is activated, the following occurs :-

- The horn sounds.
- The blue light under the upper control panel flashes.
- All functions are interrupted.



SNORKEL GUARD™

When the Snorkel Guard™ system is activated, the Snorkel Guard™ override switch is pressed Upwards to override the system to operate MAIN BOOM DOWN, RISER BOOM DOWN or JIB DOWN functions.



The switch is spring returned to the normal operation position.

The Snorkel Guard override switch must only be used when all controls are released and in the neutral position. If a zero or neutral state cannot be achieved depress the emergency stop and obtain assistance at the lower controls.

EMERGENCY WHEEL BRAKE RELEASE

If the machine needs to be moved when it has no power, the brakes of the rear wheels can be released as follows :-

1. Loosen and remove the 2 small bolts (circled in fig. 1) in the cover of the drive hub.
2. Remove the cover and turn it around so that the dimple is facing inwards.
3. Refit the cover as in fig. 2 and refit and tighten the 2 bolts.
4. This will release the brake. Do this to both drive hubs.
5. Once the machine has been moved to a safe location reverse the procedure to reapply the brakes.



Fig. 1



Fig. 2

		Snorkel, Vigo Centre, Birtley Road, Washington, Tyne & Wear, NE38 9DA, U.K.					
TYPE MEWP		SERIAL NUMBER _____					
MODEL NUMBER A46JRT		SLOPE SENSOR ALARM SETTING					
MONTH / YEAR OF MANUFACTURE _____		FRONT TO BACK 3.5 deg		SIDE TO SIDE 3.5 deg			
NON-LOADED MACHINE WEIGHT 7550 lbs kg		MAXIMUM WHEEL LOAD 4470 lbs kg		BATTERY POWERED MODELS 30 hp kW		DRIVE MOTORS N/A V	
ENGINE POWERED MODELS _____		MAXIMUM OUTRIGGER LOAD N/A lbs kg		BATTERIES 12 V		86 Ah	
MAXIMUM GRADEABILITY 40 %		MAXIMUM ALLOWABLE WIND SPEED 12.5 mph m/s		CHARGER INPUT N/A V			
MAXIMUM ALLOWABLE MANUAL FORCE (SIDE PULL)		Indoors 400 lbs N		Outdoors 400 lbs N		MAXIMUM PLATFORM REACH 7.5 ft m	
MAXIMUM PLATFORM HEIGHT 14.1 ft m		MAXIMUM PLATFORM HEIGHT 14.1 ft m					
RATED NUMBER OF OCCUPANTS		Indoors 2		Outdoors 2		MAXIMUM PLATFORM LOAD 227kg = 2 Persons + 67kg Tools	
⚠ CAUTION ⚠							
<small>ONLY trained and authorised personnel may operate this machine. Consult the Operators Manual before using this machine. DO NOT make any changes to this machine, any changes made will invalidate the manufacturer's warranty and may contravene legislation.</small>							
Axle weights with machine in the stowed position.							
STEER AXLE _____ lbs kg		3448 lbs kg					
DRIVE AXLE _____ lbs kg		3421 lbs kg					
<small>511025-000</small>							

SERIAL NUMBER PLATE

Serial number plate covers :-

1. Page 25 :- Serial number plate.
2. Page 27 :- Manual force.
3. Page 32 :- Slope sensor alarm settings.
4. Page 34 :- Wind speeds.
5. Page 36 :- Working range.
6. Page 38 :- Maximum platform loading.

SERIAL NUMBER PLATE



		Snorkel, Vigo Centre, Birtley Road, Washington, Tyne & Wear, NE38 9DA, U.K.					
TYPE MEWP		SERIAL NUMBER		A46JRT-01-230900403			
MODEL NUMBER		A46JRT		SLOPE SENSOR ALARM SETTING			
MONTH / YEAR OF MANUFACTURE		09/2023		FRONT TO BACK		3.5 deg	
NON-LOADED MACHINE WEIGHT		7550		SIDE TO SIDE		3.5 deg	
ENGINE POWERED MODELS		30		MAXIMUM WHEEL LOAD		4470	
MAXIMUM OUTRIGGER LOAD		N/A		BATTERY POWERED MODELS		N/A	
MAXIMUM GRADEABILITY		40 %		DRIVE MOTORS		N/A	
MAXIMUM ALLOWABLE MANUAL FORCE (SIDE PULL)		Indoors 400		BATTERIES		12 V 86 Ah	
MAXIMUM PLATFORM HEIGHT		14.1		CHARGER INPUT		N/A	
RATED NUMBER OF OCCUPANTS		Indoors 2		MAXIMUM ALLOWABLE WIND SPEED		12.5	
		Outdoors 2		MAXIMUM PLATFORM REACH		7.5	
				MAXIMUM DRIVE HEIGHT		14.1	
				MAXIMUM PLATFORM LOAD			
				227kg = 2 Persons + 67kg Tools			
CAUTION							
ONLY trained and authorised personnel may operate this machine. Consult the Operators Manual before using this machine. DO NOT make any changes to this machine, any changes made will invalidate the manufacturer's warranty and may contravene legislation.							
Axle weights with machine in the stowed position.							
STEER AXLE		3448		3448 kg			
DRIVE AXLE		3421		3421 kg			
511025-000							

Located on the serial number plate is various information regarding the serial number, year of manufacture, tilt settings, battery capacities, gradeability among other things.

SERIAL NUMBER PLATE

PLATE INFORMATION

Mobile elevating work platform

Model number

Y.O.M.

Total m/c weight empty

Engine rated kW

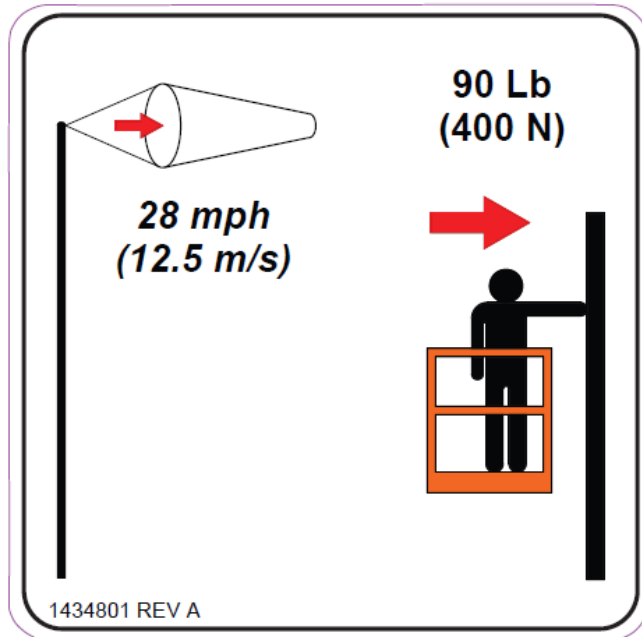
Slope gradeability (40% = 22°)

Maximum allowable manual force (Side pull)

snorkel		Snorkel, Vigo Center Washington NE38 90A	
TYPE	MEWP	S N	
MODEL NUMBER	A46JRT		
MONTH / YEAR OF MANUFACTURE	09/2023		
NON-LOADED MACHINE WEIGHT	7550	lbs kg	
ENGINE POWERED MODELS	30	hp kW	
MAXIMUM OUTRIGGER LOAD	N/A	lbs kg	
MAXIMUM GRADEABILITY	40	%	
MAXIMUM ALLOWABLE MANUAL FORCE (SIDE PULL)	Indoors	400	lbs N
	Outdoors	400	
MAXIMUM PLATFORM HEIGHT	14.1	ft m	
RATED NUMBER OF OCCUPANTS	Indoors	2	M P L
	Outdoors	2	

SERIAL NUMBER PLATE

MANUAL FORCE



Manual force is the force applied by the occupants to objects such as walls or other structures outside the work platform.



DANGER

- **The aerial platform can tip over if it becomes unstable.**
- **Do not exceed the maximum allowable manual force indicated on the machine decals, placards, and in the machine specifications in the operator manual.**
- **Death or serious injury can result from a tip-over accident.**

SERIAL NUMBER PLATE

PLATE INFORMATION

Mobile elevating work platform

Model number

Y.O.M.

Total m/c weight empty

Engine rated kW

Slope gradeability (40% = 22°)

Maximum allowable manual force (Side pull)

Maximum platform height

Rated number of occupants

snorkel		Snorkel, Vigo Center Washington NE38 90A	
TYPE	MEWP	S N	
MODEL NUMBER	A46JRT		
MONTH / YEAR OF MANUFACTURE	09/2023		
NON-LOADED MACHINE WEIGHT	7550	lbs	kg
ENGINE POWERED MODELS	30	hp	kW
MAXIMUM OUTRIGGER LOAD	N/A	lbs	kg
MAXIMUM GRADEABILITY	40	%	
MAXIMUM ALLOWABLE MANUAL FORCE (SIDE PULL)	Indoors	400	lbs N
	Outdoors	400	
MAXIMUM PLATFORM HEIGHT	14.1	ft	m
RATED NUMBER OF OCCUPANTS	Indoors	2	M P L
	Outdoors	2	

SERIAL NUMBER PLATE

PLATE INFORMATION

el,
Centre, Birtley Road,
ington, Tyne & Wear,
9DA, U.K.

CE **UK**
CA

SERIAL NUMBER **A46JRT-01-230900403**

SLOPE SENSOR ALARM SETTING
FRONT TO BACK **3.5** deg SIDE TO SIDE **3.5** deg

MAXIMUM WHEEL LOAD **4470** lbs kg

BATTERY POWERED MODELS **DRIVE MOTORS** **N/A** V

BATTERIES **12** V
86 Ah

CHARGER INPUT **N/A** V

MAXIMUM ALLOWABLE WIND SPEED **12.5** mph m/s

MAXIMUM PLATFORM REACH **7.5** ft m

MAXIMUM DRIVE HEIGHT **14.1** ft m

MAXIMUM PLATFORM LOAD **227kg = 2 Persons + 67kg Tools**

Machine serial number

SERIAL NUMBER PLATE

PLATE INFORMATION



Machine serial number

The serial number format gives the following information:-


A46JRT :- Model type


-01 :- Manufacturing plant

-2309 :- Year and month of manufacture


-00403 :- Machine build number

Manufacturing plant codes

01 = Vigo, UK. 

04 = Elwood, Kansas. 

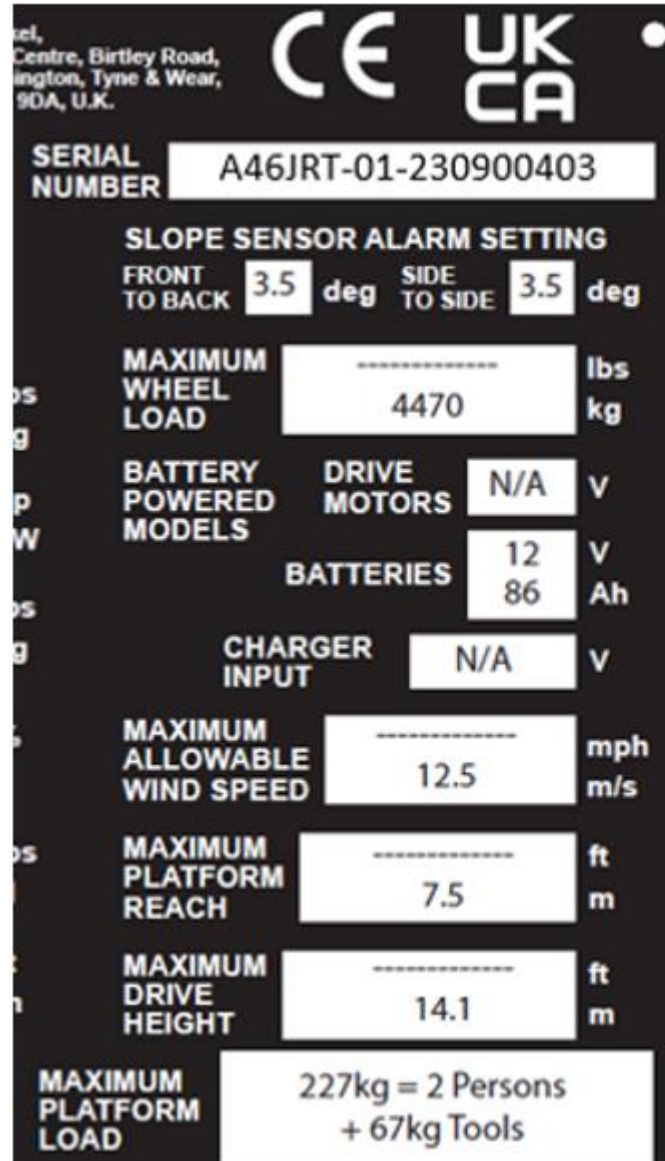
07 = New Zealand. 

11 = Henderson, Nevada. 

12 = China. 

SERIAL NUMBER PLATE

PLATE INFORMATION



Machine serial number

Maximum tilt angle

SLOPE SENSOR ALARM SETTING

If the aerial platform chassis is out of level more than the machine specified slope sensor alarm setting when the main boom is raised or extended, an alarm will sound and the tilt warning light on the lower and upper control panels will illuminate.

Note

While the alarm is sounding it is not possible to drive or raise the platform.

When you hear this alarm immediately lower the platform completely. When the platform is completely down, determine and correct the cause of the tilt before raising the platform again.

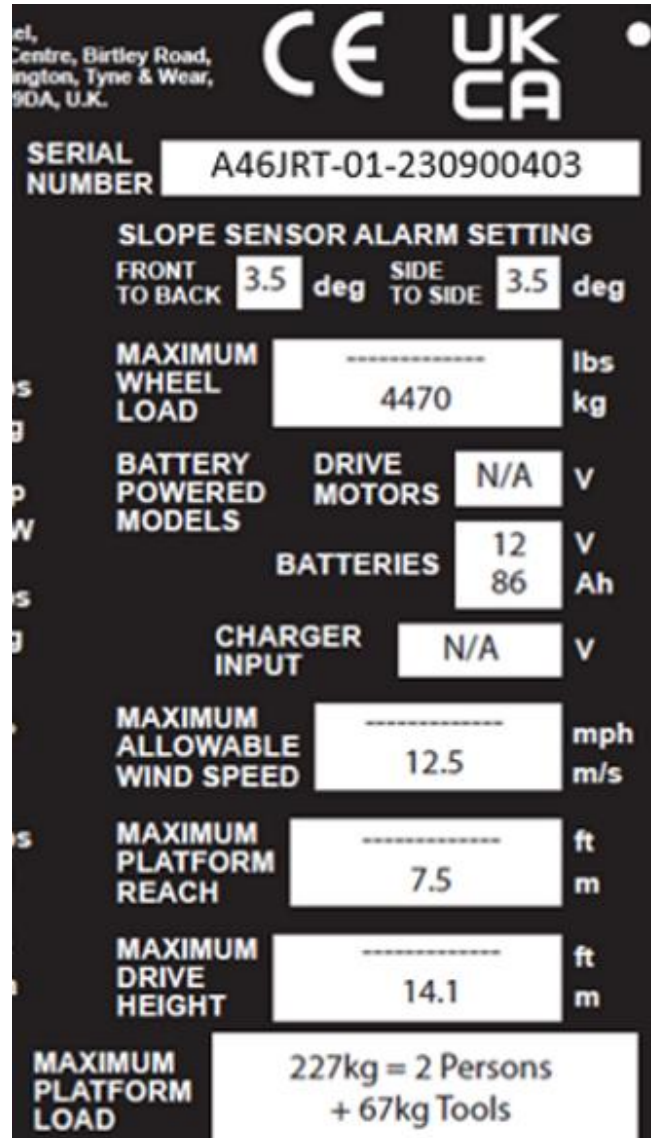
Slope sensor figures as shown on the serial number plate.



The side-to-side figure shown is the worst case for the machine as the platform is raised.

SERIAL NUMBER PLATE

PLATE INFORMATION



Machine serial number

Maximum tilt angle

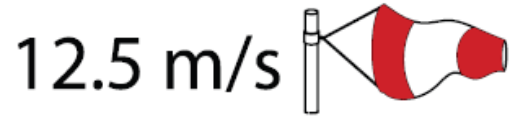
Maximum wheel loading

Battery size

Maximum allowable wind speed

SERIAL NUMBER PLATE

WIND SPEEDS



Death or serious injury can result from a tip-over accident.

Do not add anything to the aerial platform that will increase the wind loading such billboards, banners, flags, etc.

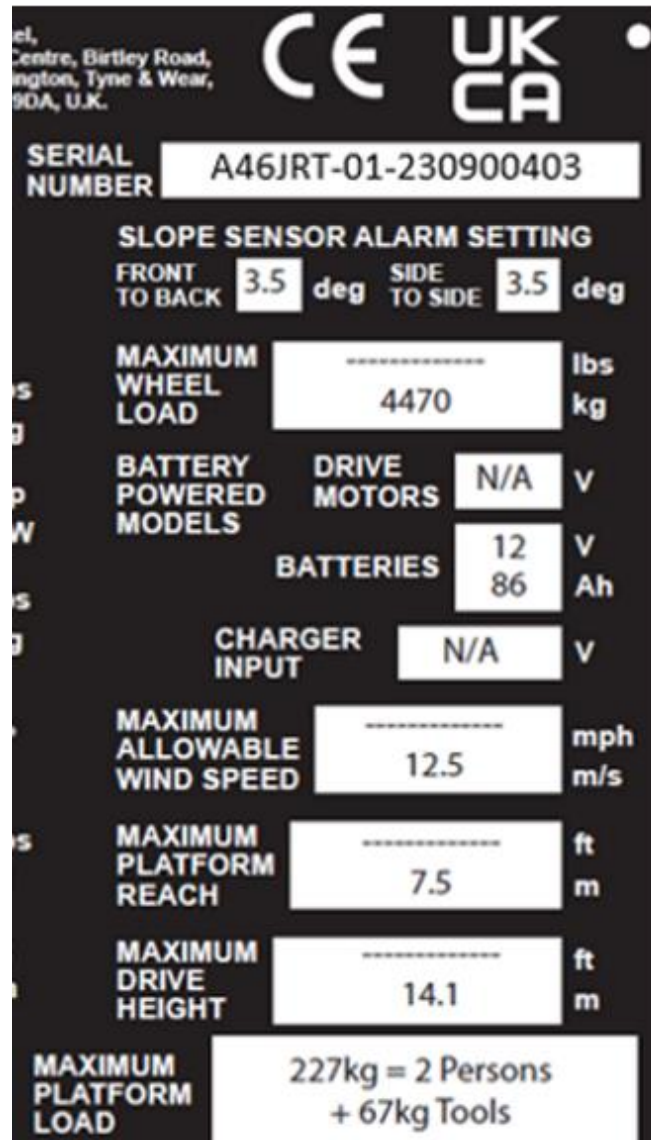
Do not operate the aerial platform in windy conditions with wind gusts or steady winds speeds of 28 m.p.h. (45 k.p.h.) = 12.5 m/s. or greater. (See chart below).

BEAUFORT RATING	WIND SPEED				GROUND CONDITIONS
	m/s	km/h	ft/s	mph	
3	3,4~5,4	12,25~19,4	11.5~17.75	7.5~12.0	Papers and thin branches move, flags wave.
4	5,4~8,0	19,4~28,8	17.75~26.25	12.0~18	Dust is raised, paper whirled up, and small branches sway.
5	8,0~10,8	28,8~38,9	26.25~35.5	18~24.25	Shrubs with leaves start swaying. Wave crests are apparent in ponds or swamps.
6	10,8~13,9	38,9~50,0	35.5~45.5	24.5~31	Tree branches move. Power lines whistle. It is difficult to open an umbrella.
7	13,9~17,2	50,0~61,9	45.5~56.5	31.~38.5	Whole trees sway. It is difficult to walk against the wind.

Figure 2 – Beaufort Scale

SERIAL NUMBER PLATE

PLATE INFORMATION



Machine serial number

Maximum tilt angle

Maximum wheel loading

Battery size

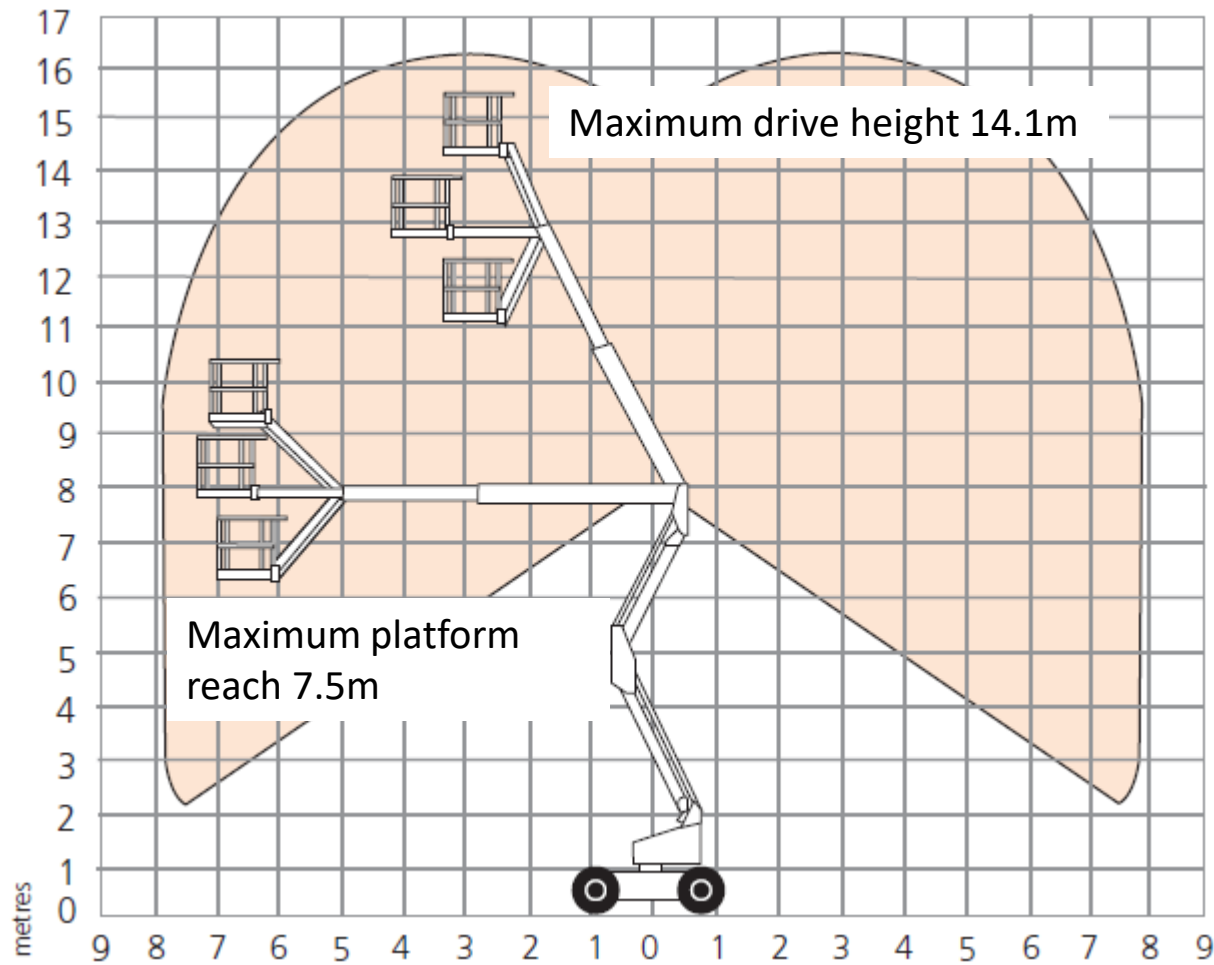
Maximum allowable wind speed

Maximum platform reach

Maximum drive height

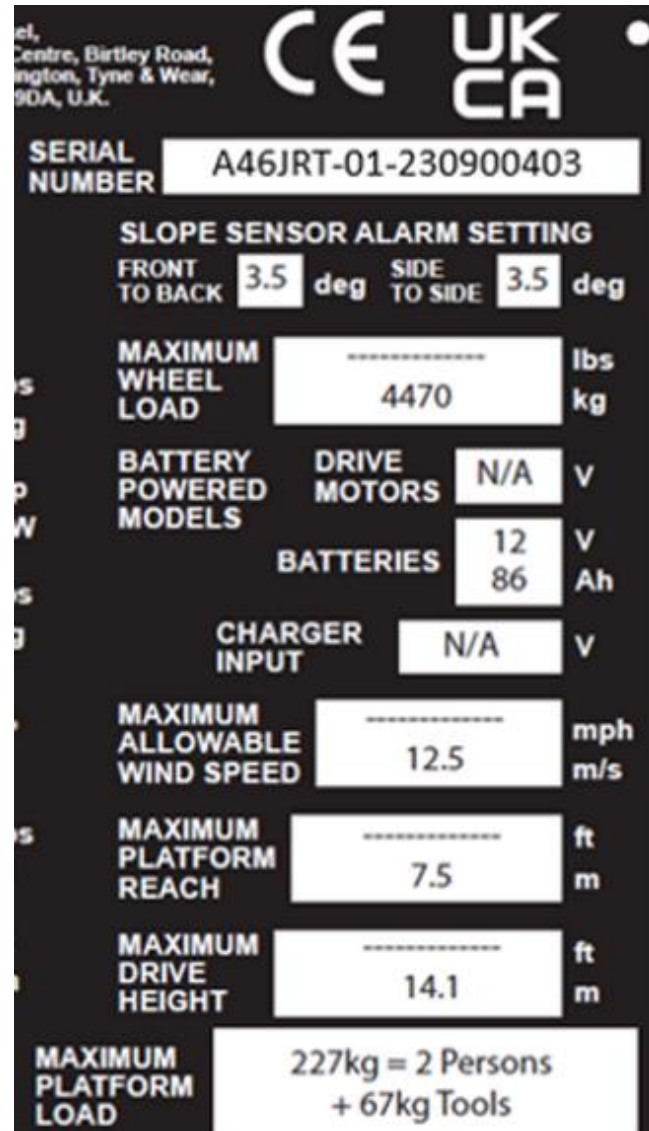
SERIAL NUMBER PLATE

WORKING RANGE



SERIAL NUMBER PLATE

PLATE INFORMATION



Machine serial number

Maximum tilt angle

Maximum wheel loading

Battery size

Maximum allowable wind speed

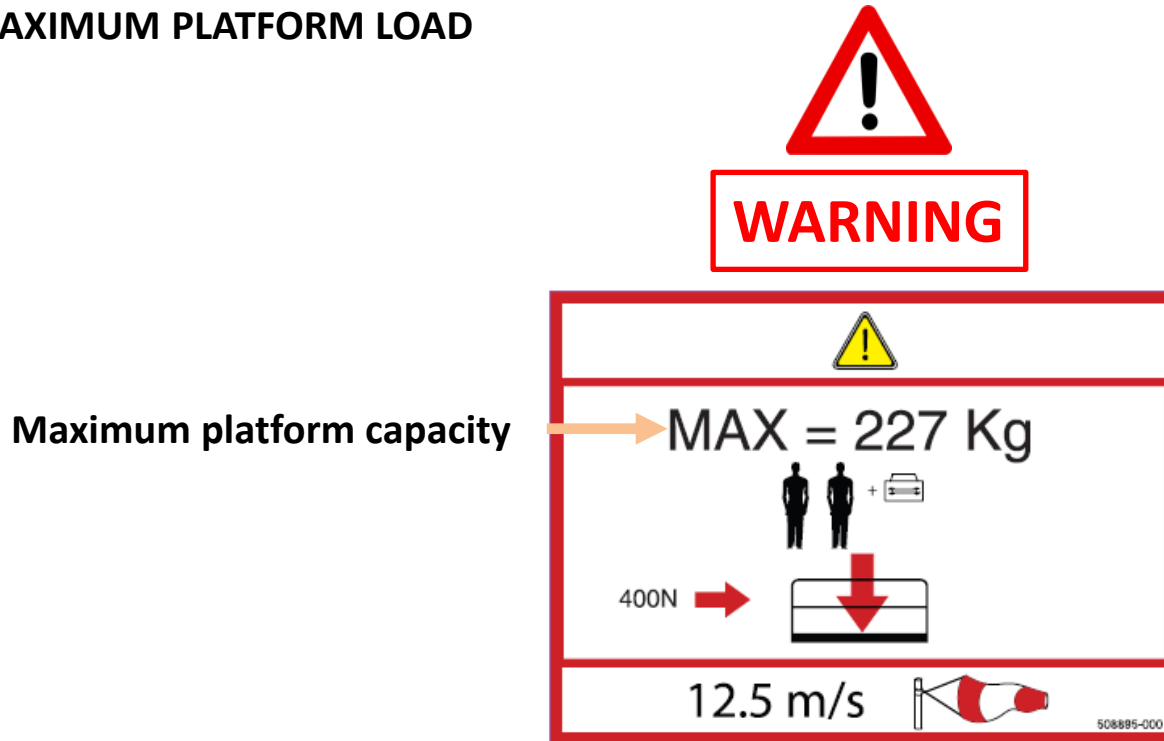
Maximum platform reach

Maximum drive height

Maximum platform capacity

SERIAL NUMBER PLATE

MAXIMUM PLATFORM LOAD



This is the TOTAL amount permissible in the platform.

It is not 2 people equalling 227 kgs plus their tools.



ENGINE AREA

Engine area covers :-

1. Page 41 :- Engine components.
2. Page 42 :- Transmission filter.
3. Page 43 :- Drive block.
4. Page 45 :- Battery disconnect panel.
5. Page 47 :- Engine relay panel.
6. Page 49 :- Kubota engine.
7. Page 51 :- Throttle solenoid.
8. Page 52 :- Transmission pump assembly.
9. Page 54 :- Hydraulic pump.

ENGINE AREA

ENGINE AREA COMPONENTS

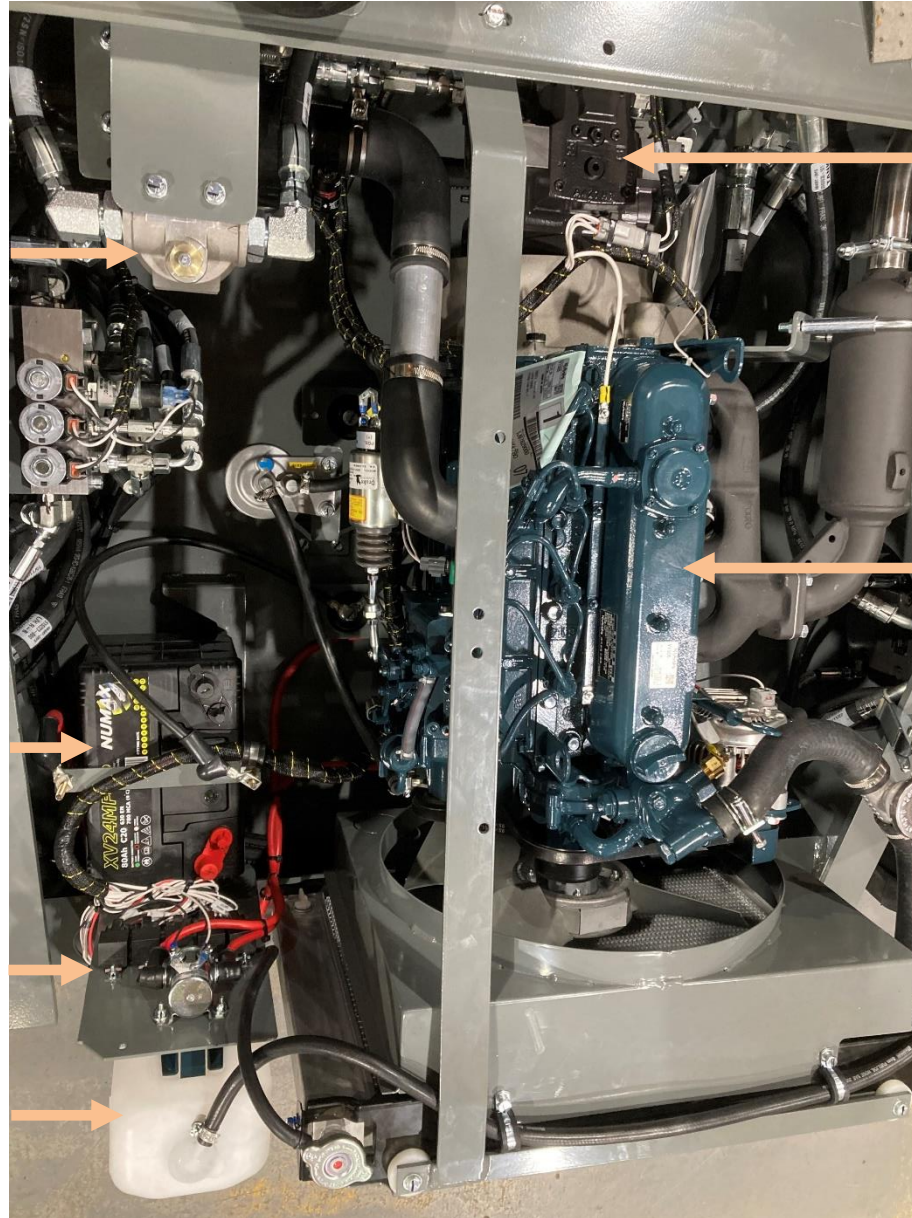
Transmission pressure filter

Drive block

12v battery

Relays, contactor & Master switch

Expansion tank

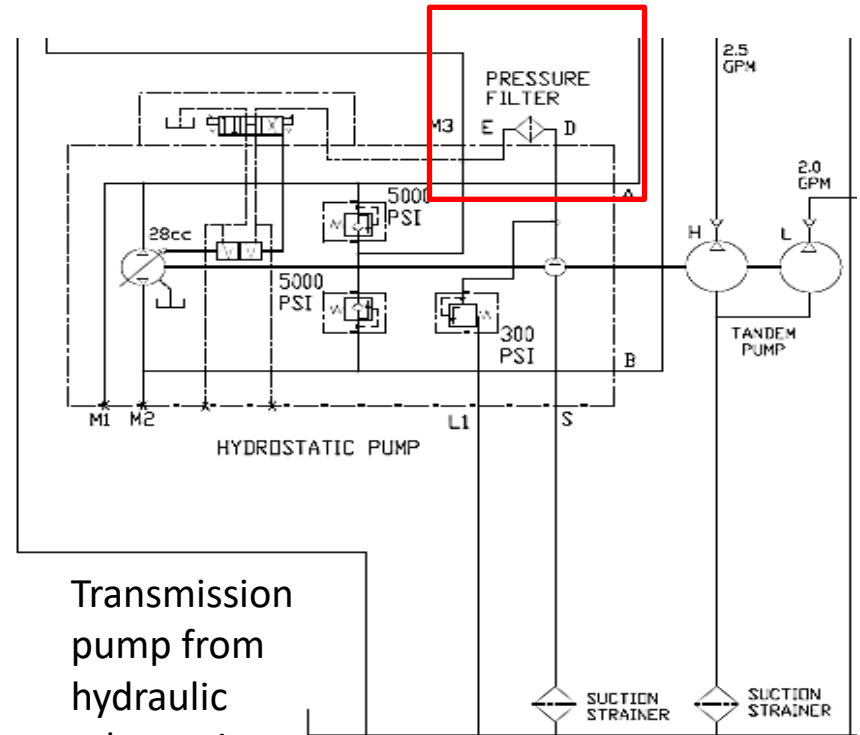


Transmission pump

Kubota engine

Radiator

TRANSMISSION PRESSURE FILTER



Transmission pump from hydraulic schematic

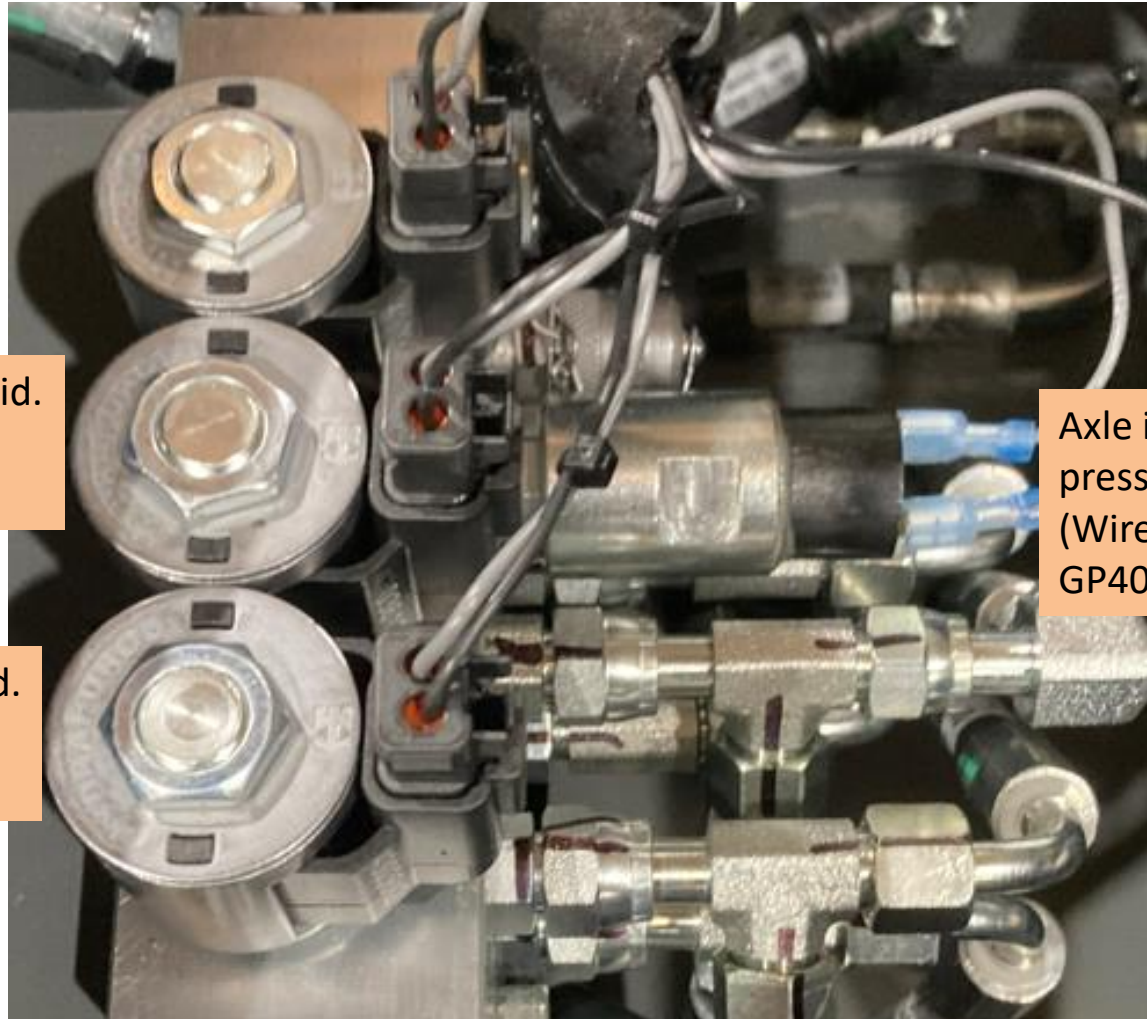
The filter requires changing after the first 50 hours of service then every 500 hours after that.

DRIVE BLOCK

Axle float solenoid.
(Wire 141 to P4-14,
GP400 Board).

2 speed motor solenoid.
(Wire 34A to P6-15,
GP400 Board).

Brake release solenoid.
(Wire 159A to P4-15,
GP400 Board).

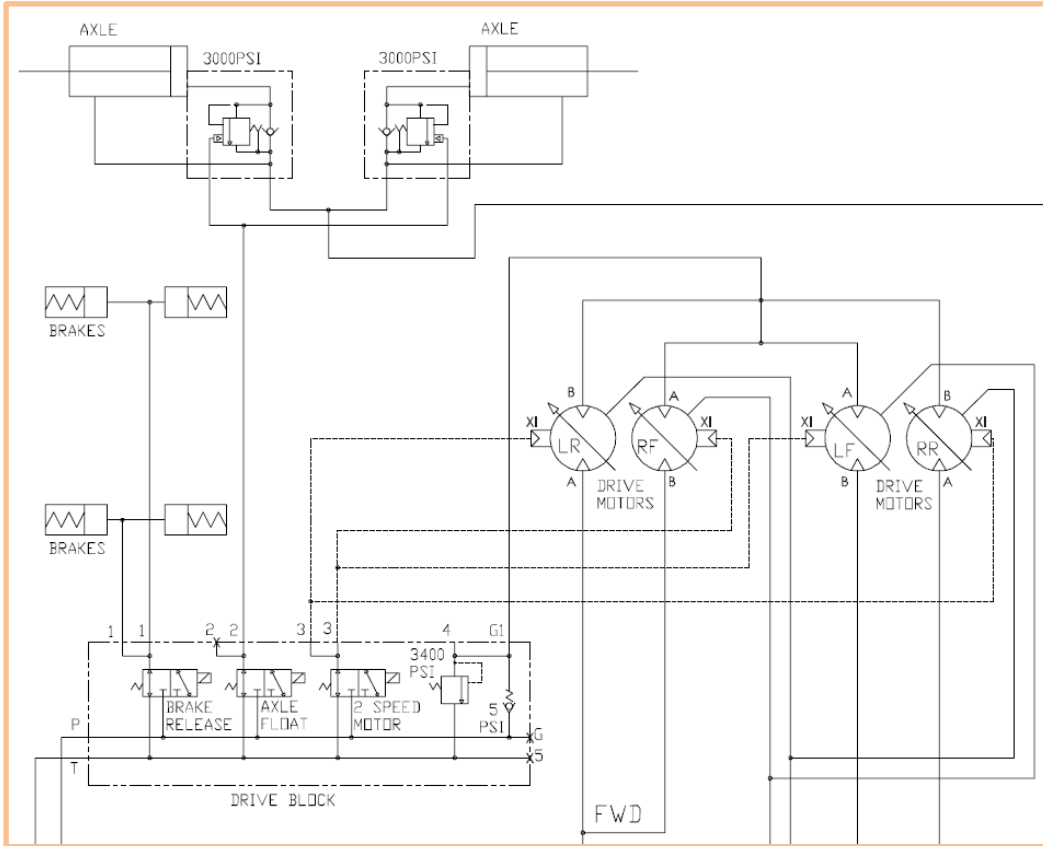


Axle interlock
pressure switch.
(Wire 141A to P7-14,
GP400 Board).

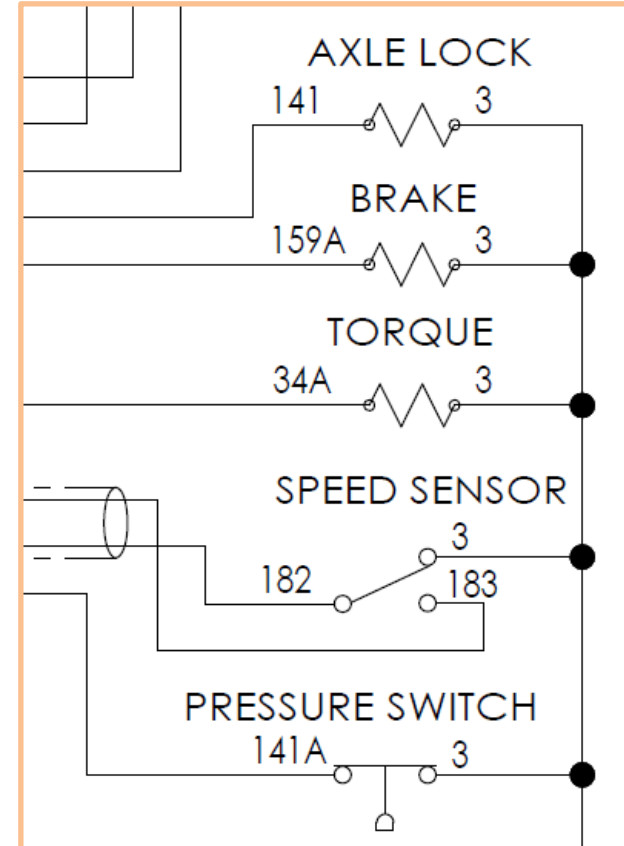
DRIVE BLOCK

The drive block controls the brake release, axle float, 2 speed motor and axle interlock pressure switch.

From hydraulic schematic



From electrical schematic



ENGINE AREA

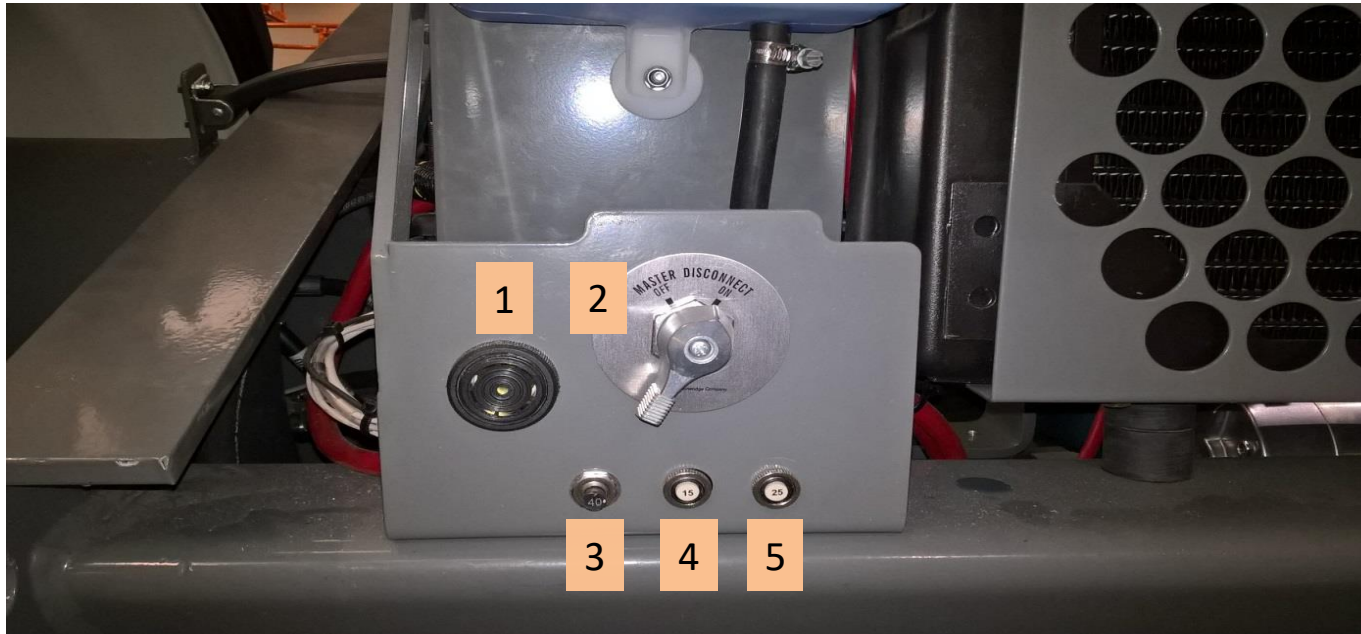
BATTERY DISCONNECT PANEL

The battery disconnect is located at the left rear of the chassis.



It removes electrical power from all electrically controlled functions when in the off position.

BATTERY DISCONNECT PANEL

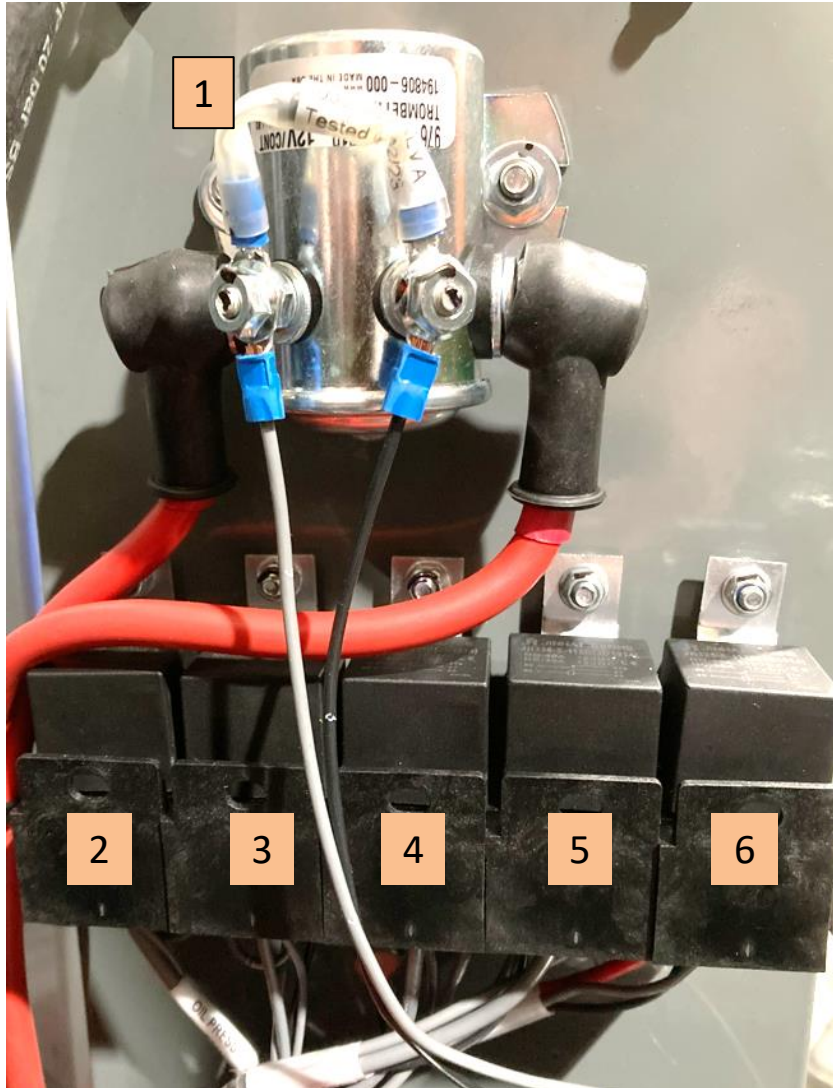


Also located on battery disconnect switch panel are :-

1. Alarm mini siren.
2. Master disconnect switch.
3. Relay 40 amp
4. Throttle circuit breaker 15 amp.
5. Main control system circuit breaker 25 amp.

The circuit breakers protect the electrical wiring and components from electrical overload in case of a short circuit or other fault.

ENGINE RELAY PANEL



Located behind battery master switch.

1. Emergency power solenoid.
2. Oil pressure relay.
3. Engine alarm relay.
4. Throttle relay.
5. Glow plug relay.
6. Start relay.

ENGINE AREA

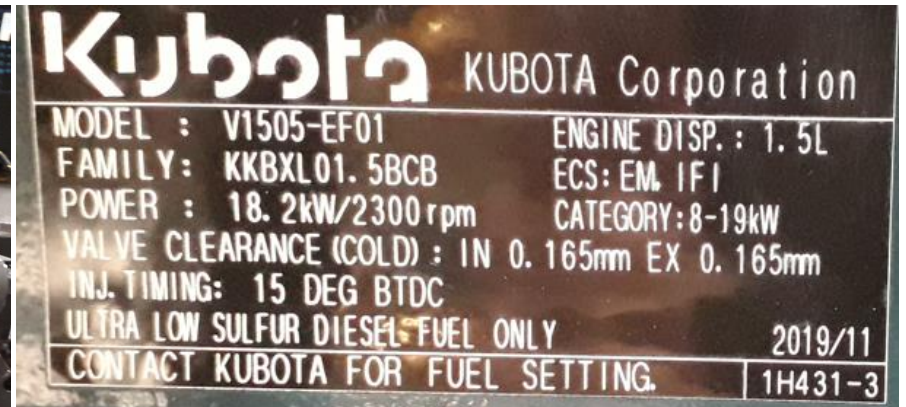
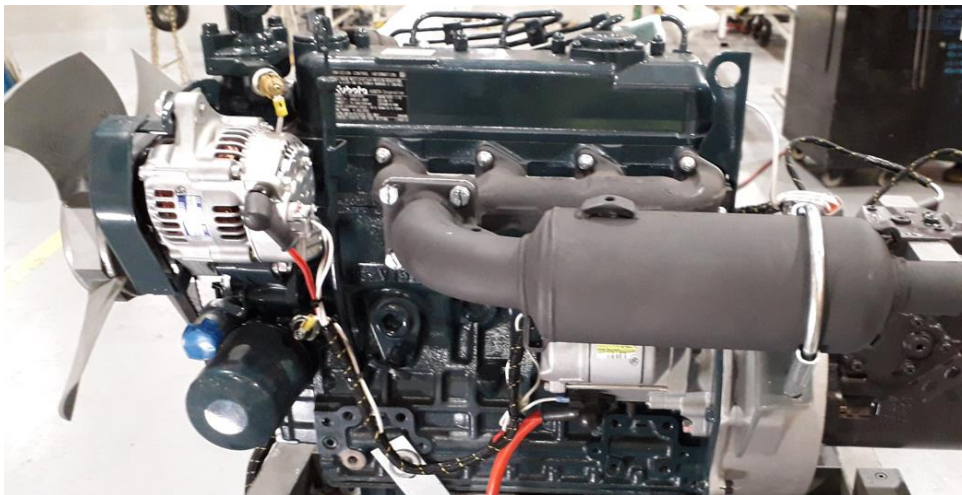


KUBOTA V1505 ENGINE

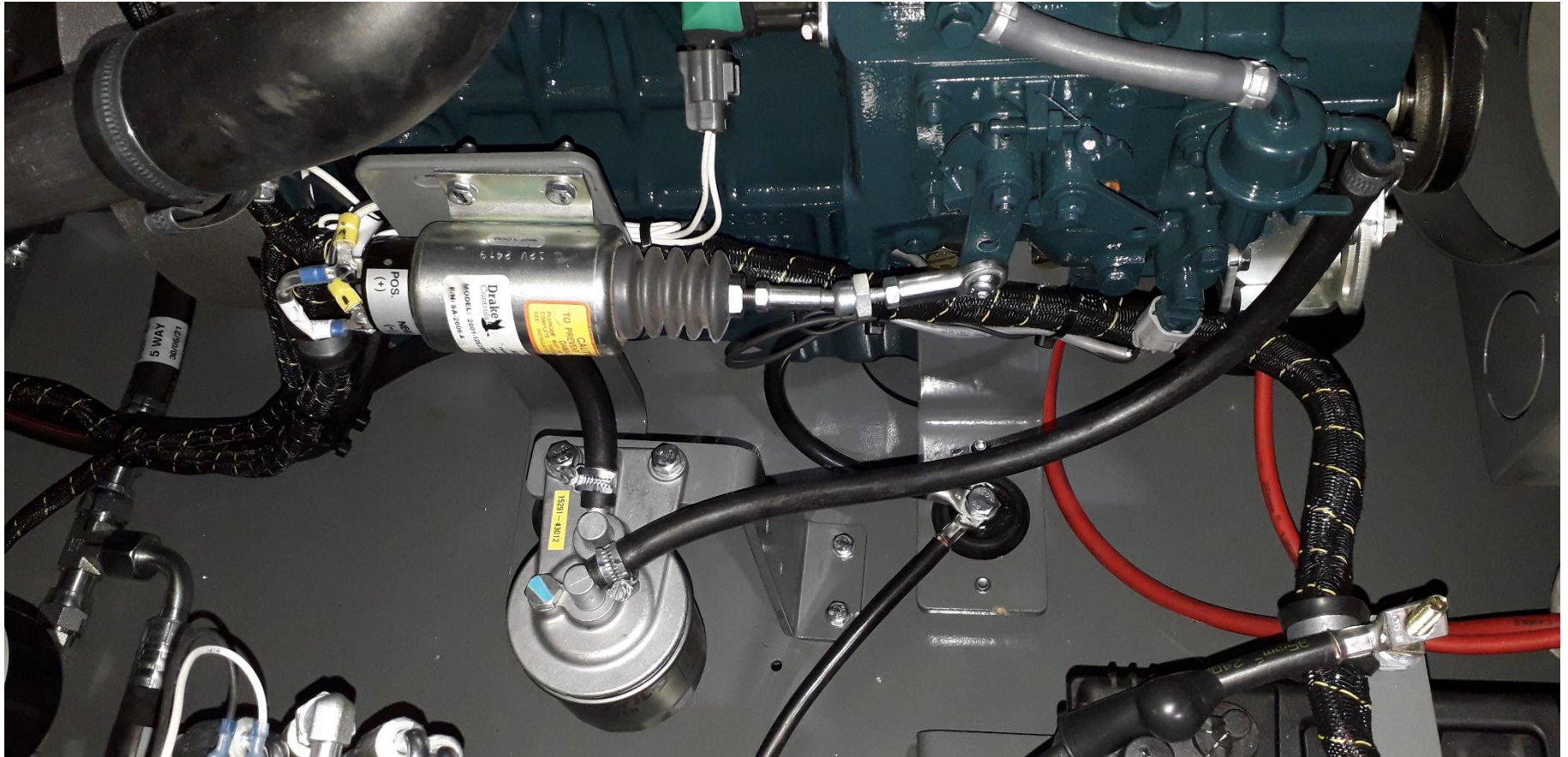


Current engines are Non-turbo engines.

Number of Cylinders	4
Total Displacement	1.5L
Starting System	Electric Start
Intake System	Naturally Aspirated



KUBOTA V1505 ENGINE



Left side of the engine showing throttle assembly, fuel filter and fuel pump assembly.

THROTTLE SOLENOID



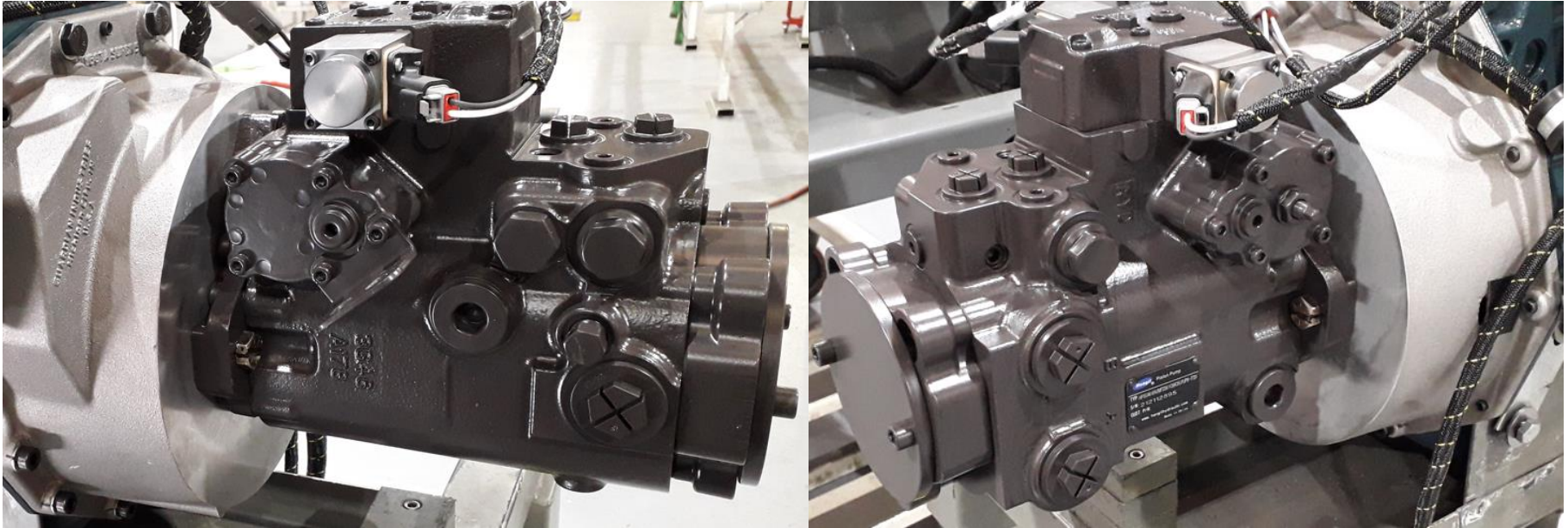
The throttle solenoid has a dual coil inside. One pull coil. One hold coil.

In the back of the solenoid there is a little push switch so when the solenoid plunger is pulled in it pushes this button. The solenoid will switch from pull coil (10amps) to hold coil (2 to 3 amps).

The pull rod on the solenoid needs to be adjusted in such a way it can pull in all the way. This can be checked by checking the fuel pump lever adjustment. The max rpm is set by a stop screw on the fuel pump with check stops the lever to go any further .

The solenoid pull rod which is connected to the solenoid plunger must be set up so there is a 1 mm gap between the fuel pump lever and stop screw .

TRANSMISSION PUMP ASSEMBLY



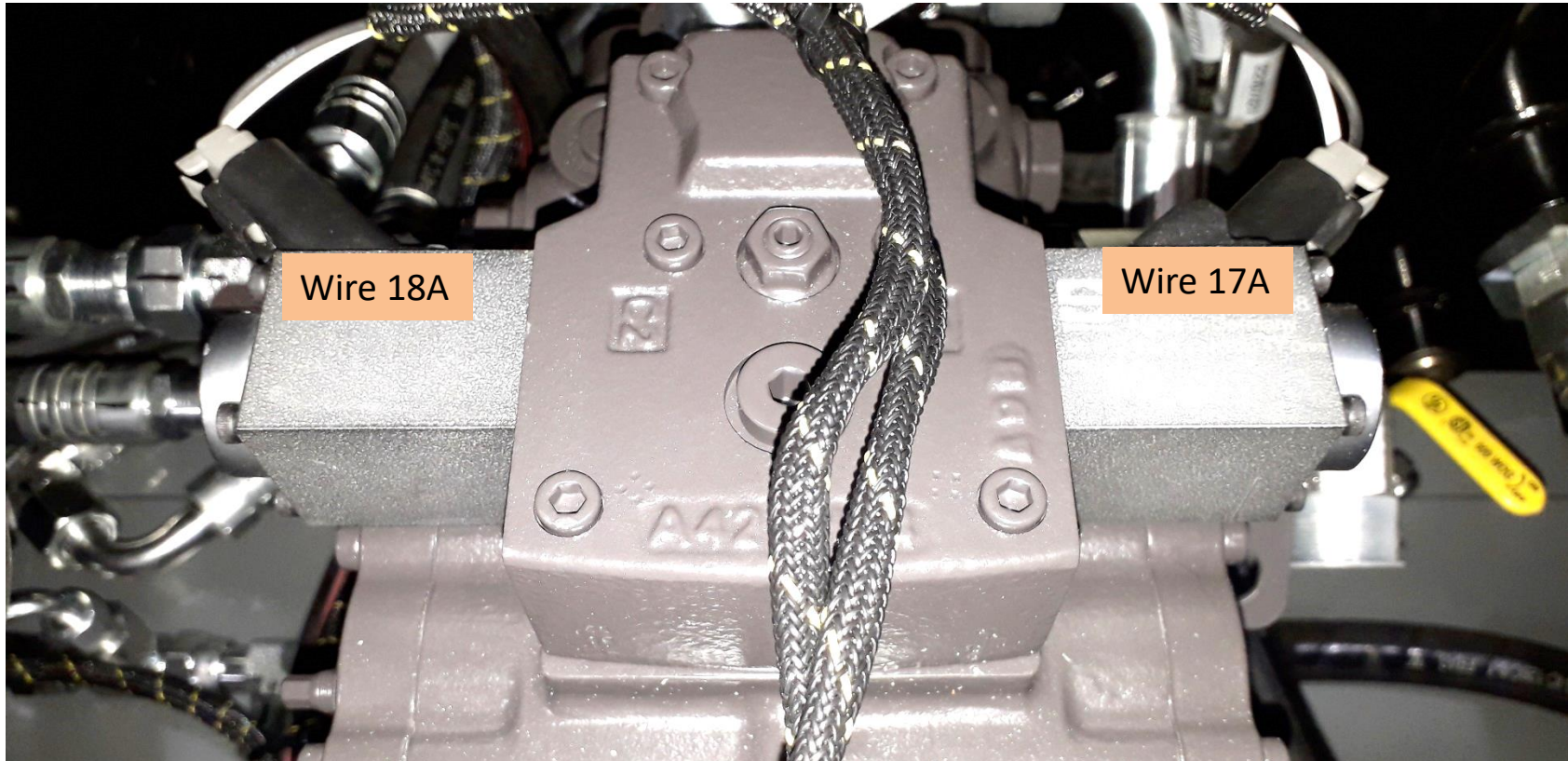
The transmission pump is located on the rear of the engine. It provides the power to drive the machine in either forward or reverse.

Pump rotation :- CW

Pump type :- Swashplate

Pump displacement (cm^3 / rev) :- 45.9

TRANSMISSION PUMP SOLENOIDS



On top of the pump are the directional solenoids for forward or reverse.

ENGINE AREA

HYDRAULIC PUMP



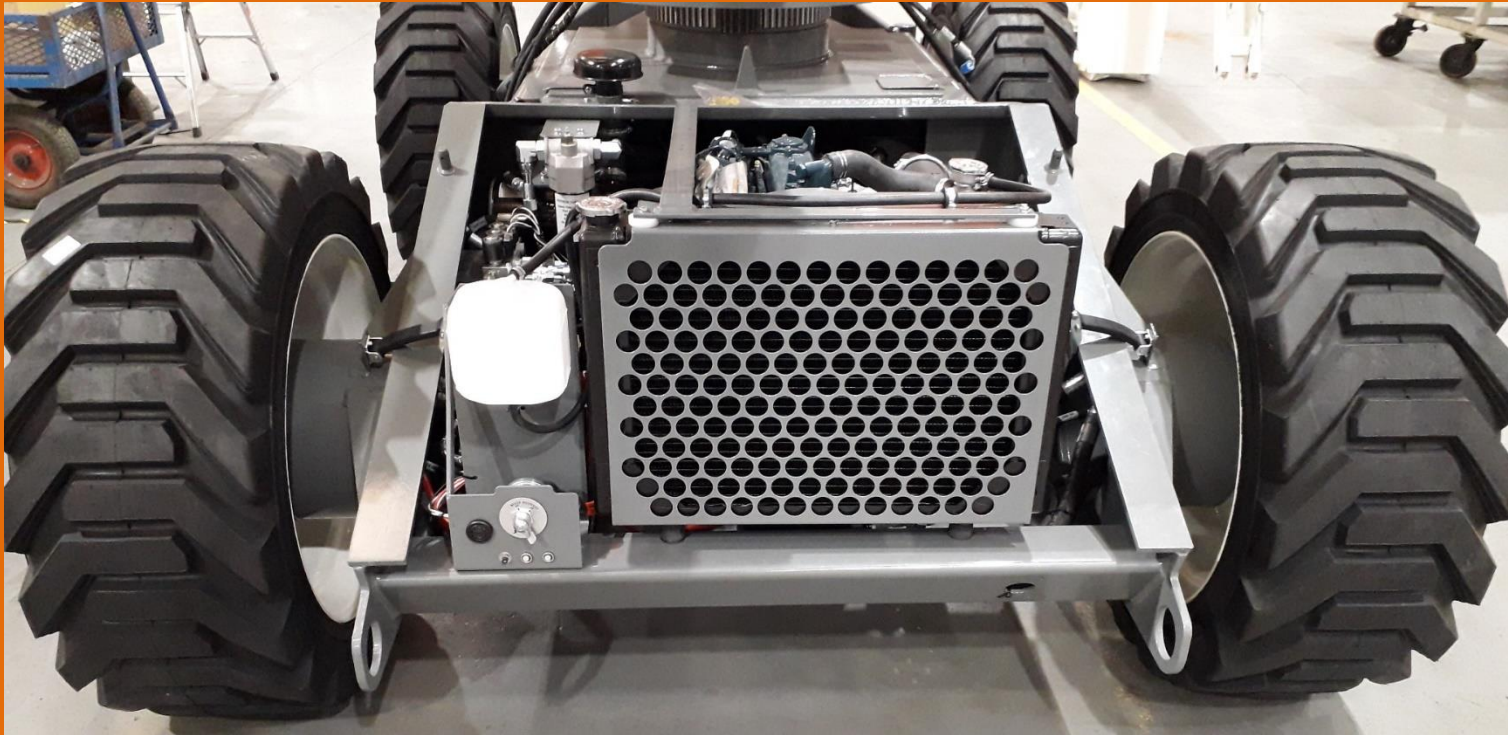
Hydraulic pump located on end of transmission pump.

Pump rotation :- CW

Displacement :- Front 4.47 mL/r, Rear 3.67 mL/r

Rated speed :- 2000-3600 rpm





CHASSIS COMPONENTS

Chassis components covers :-

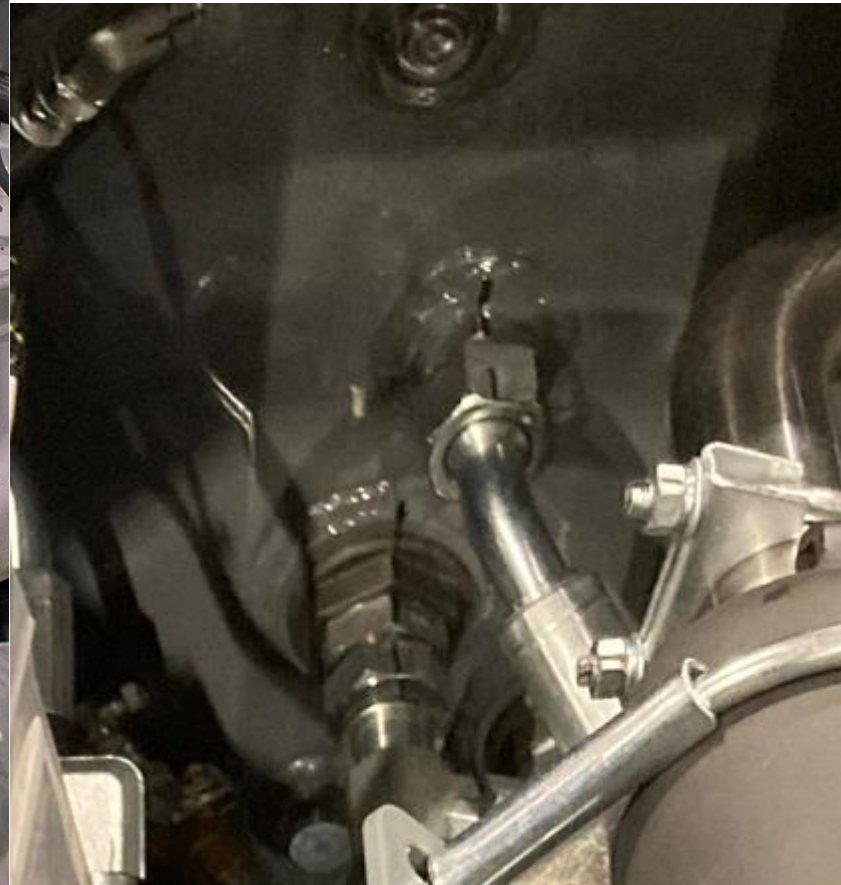
1. Page 57 :- Hydraulic oil reservoir.
2. Page 59 :- Pivoting front axle.
3. Page 62 :- Steering cylinder.
4. Page 64 :- Drive assembly.
5. Page 69 :- Turntable rotation.

CHASSIS COMPONENTS

HYDRAULIC OIL RESERVOIR

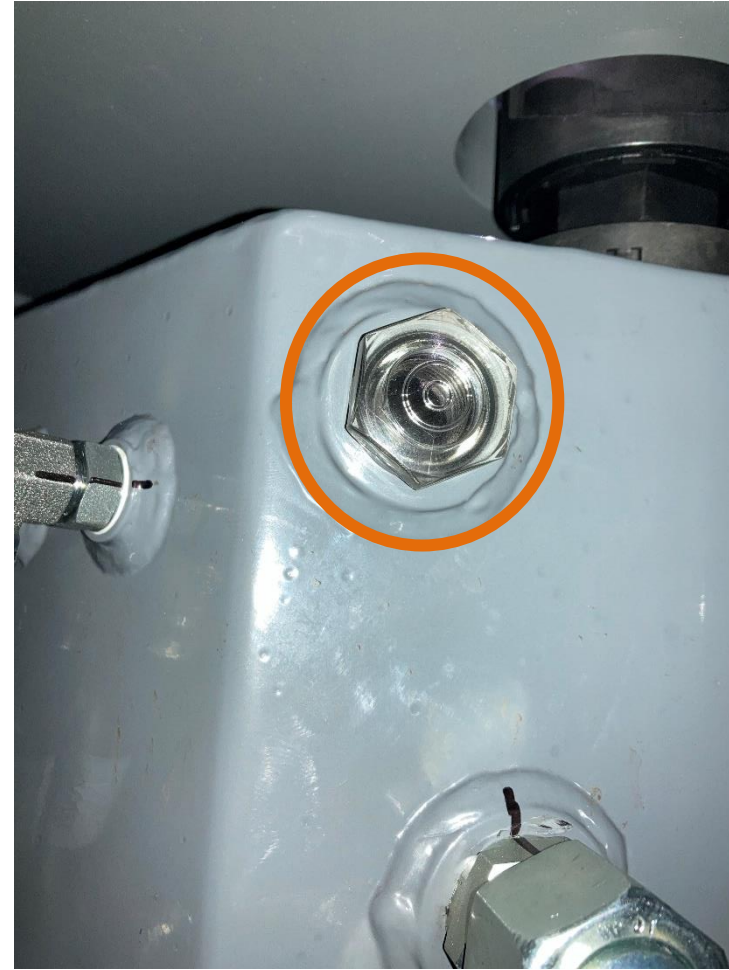


The hydraulic reservoir is located at rear of the engine area.



CHASSIS COMPONENTS

HYDRAULIC OIL RESERVOIR



There is a sight gauge located on the top left corner of the tank to check the oil level.

PIVOTING FRONT AXLE



When the machine is in the stowed position, with the booms lowered and retracted, the front axle pivots to keep all 4 wheels in contact with the ground surface.

While driving between work site the pivoting axle :

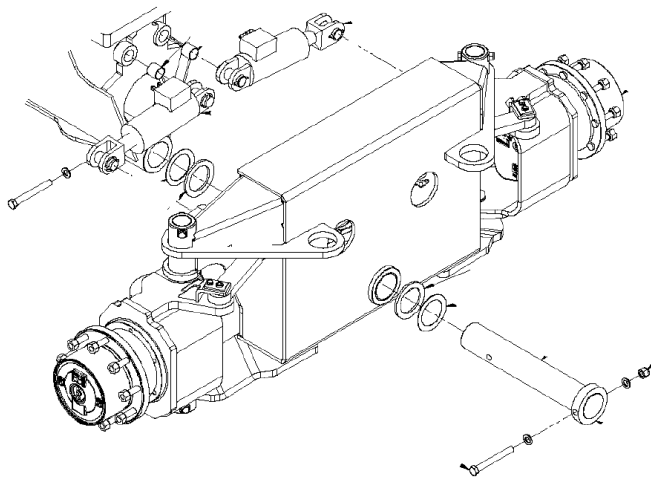
- Improves traction.
- Reduces ground pressure.

When the main or riser boom is raised from its rest the axle locks in position to maximize the stability of the machine while the platform is elevated.

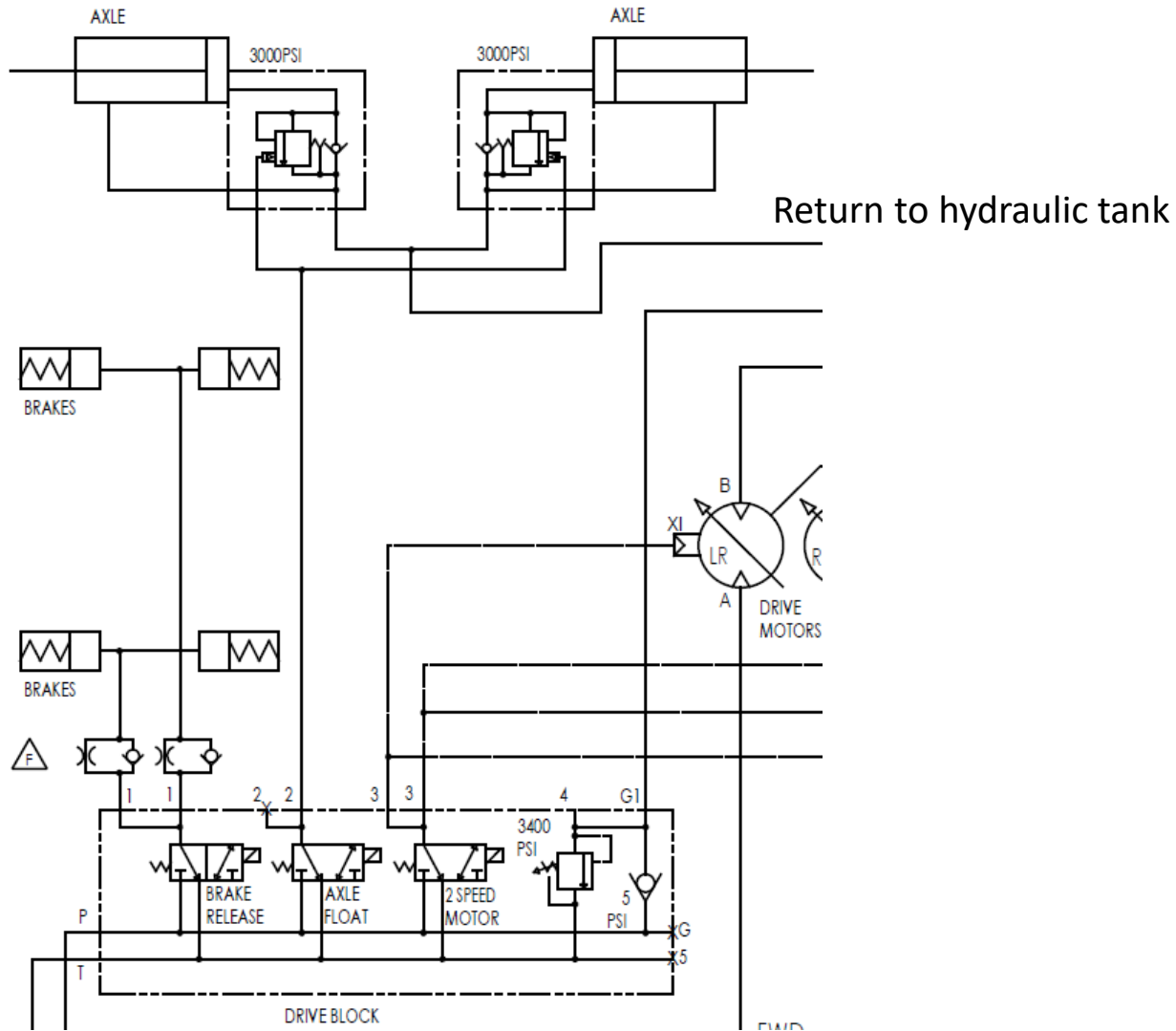
CHASSIS COMPONENTS

PIVOTING FRONT AXLE

The front axle is mounted to the front of the chassis on a pivot pin. Two hydraulic cylinders are mounted on the chassis and the steering yokes.

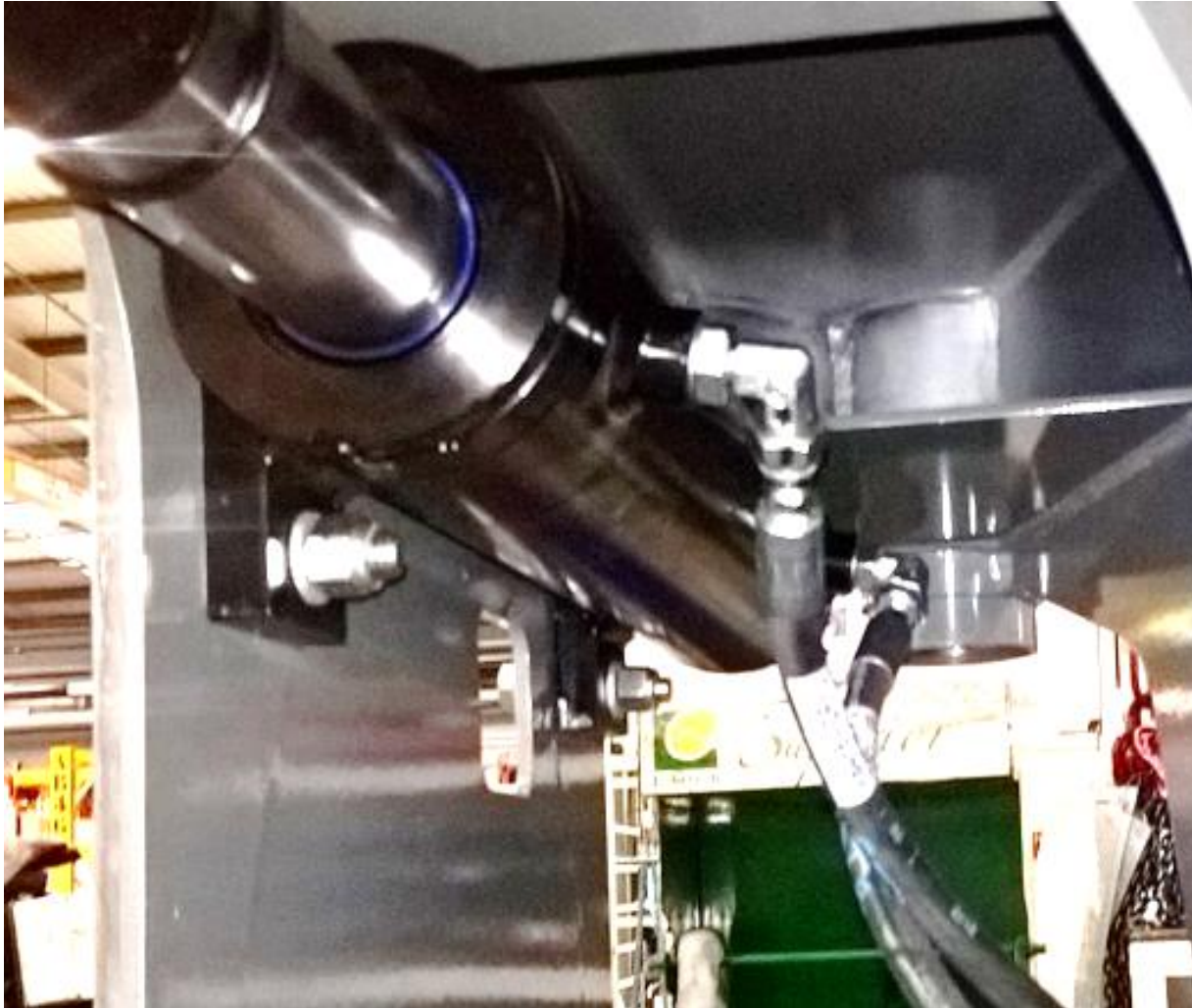


PIVOTING FRONT AXLE

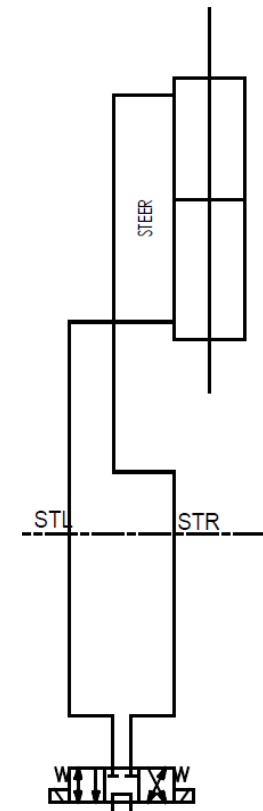


CHASSIS COMPONENTS

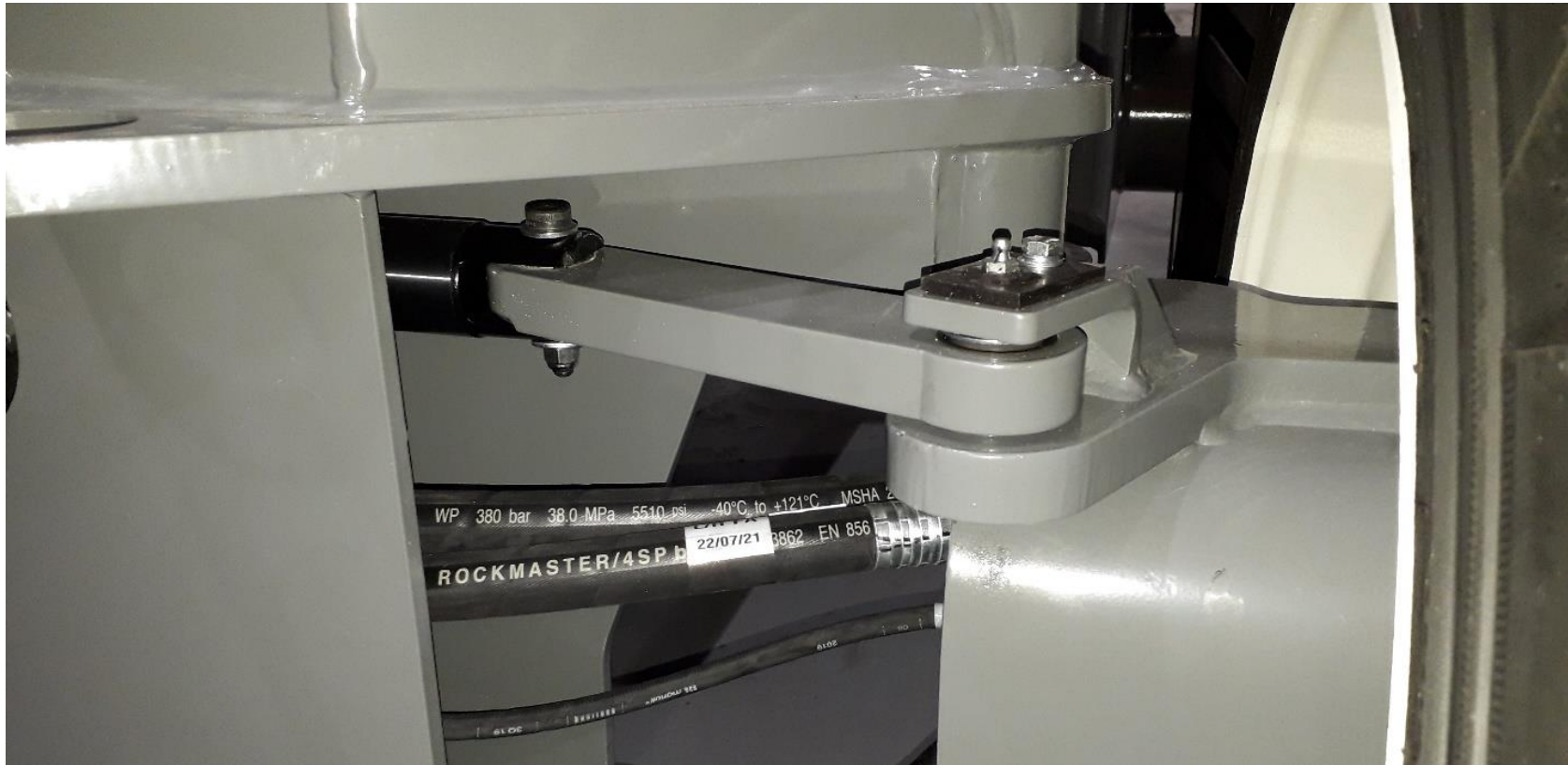
STEERING CYLINDER



The steering axle is located inside the front of the chassis.



STEERING SET UP

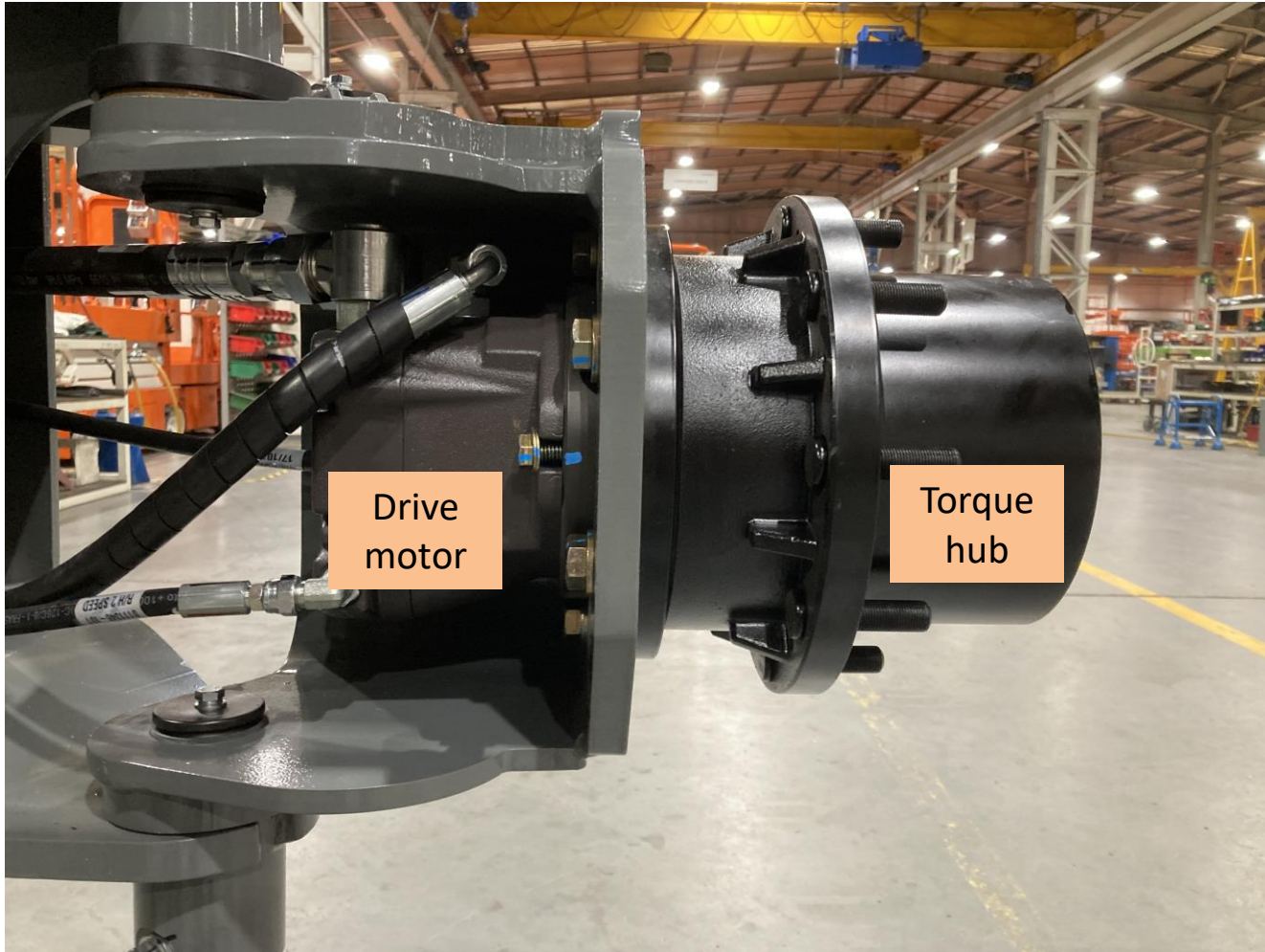


The steering axle is connected to the steering hub on each side by a steering link.

CHASSIS COMPONENTS

DRIVE ASSEMBLY

There are 4 Drive motor / torque hub assemblies on the machine.



TORQUE DRIVE HUB

Same planetary drive hub on front and rear



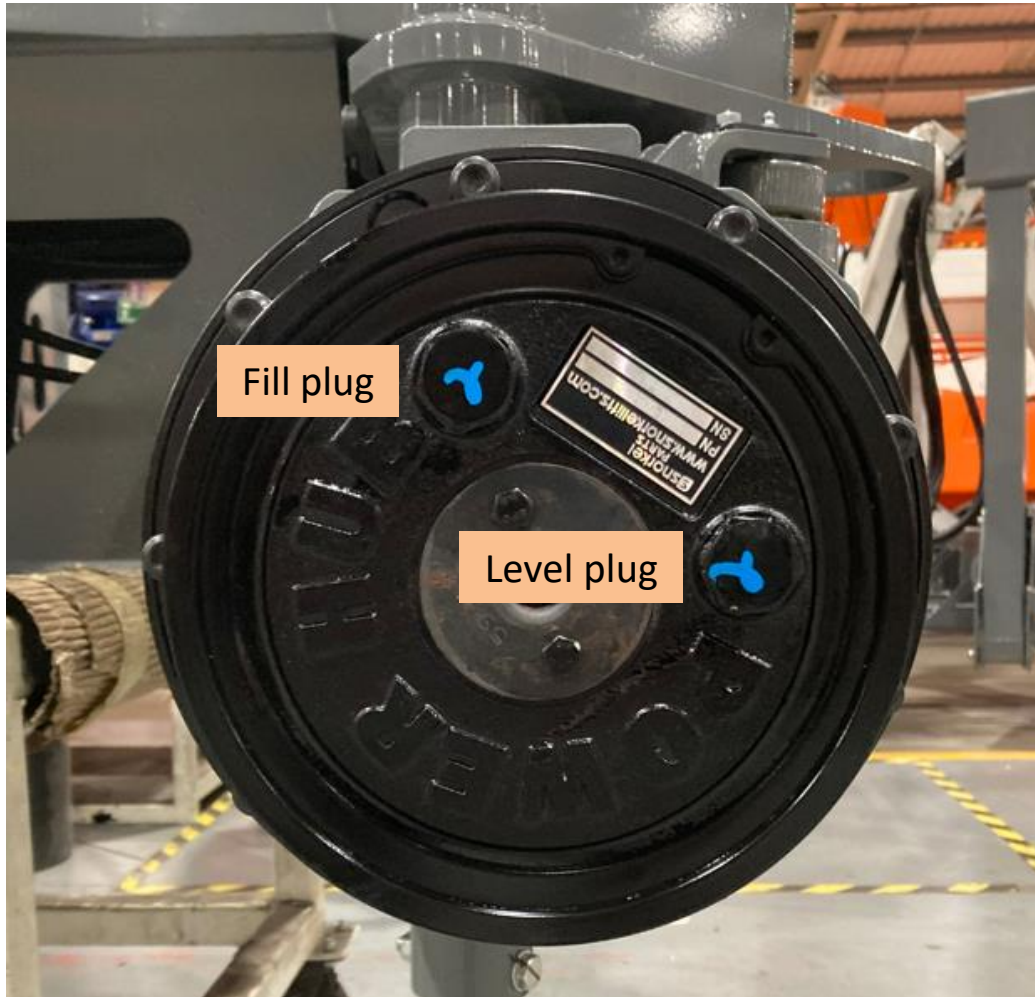
Rear hub, fixed

Front hub, steering



TORQUE DRIVE HUB

To check the oil level position the wheel so that the torque hub plugs are as shown.

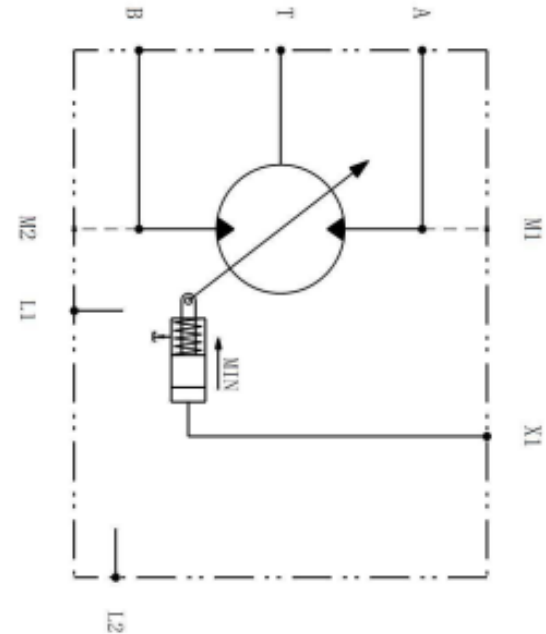


Remove the level plug. The oil should be close to level with the plug opening. If not, top up the hub with grade 80W-90 oil until it is level with the opening.

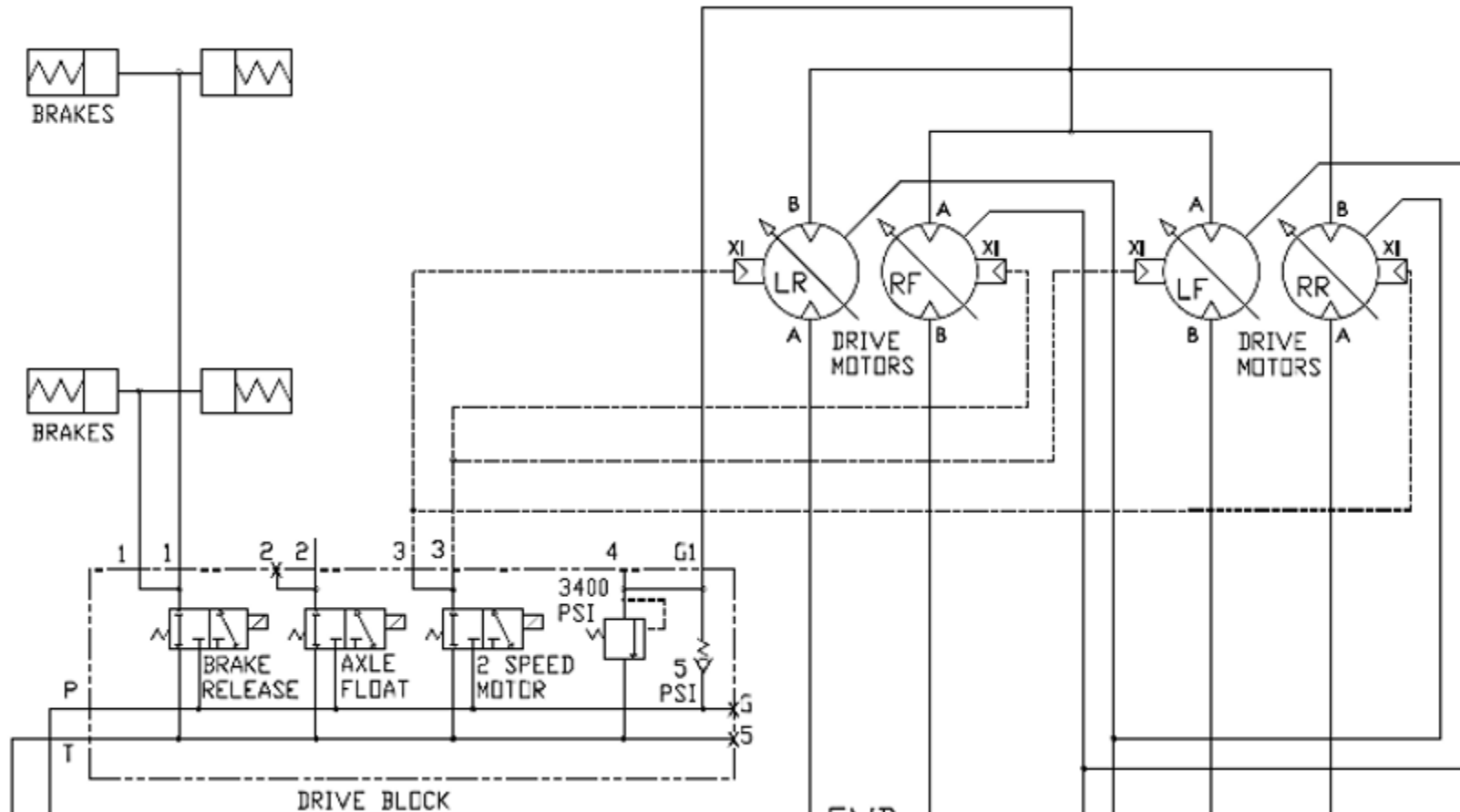
CHASSIS COMPONENTS

DRIVE MOTOR

Same drive motor on front and rear

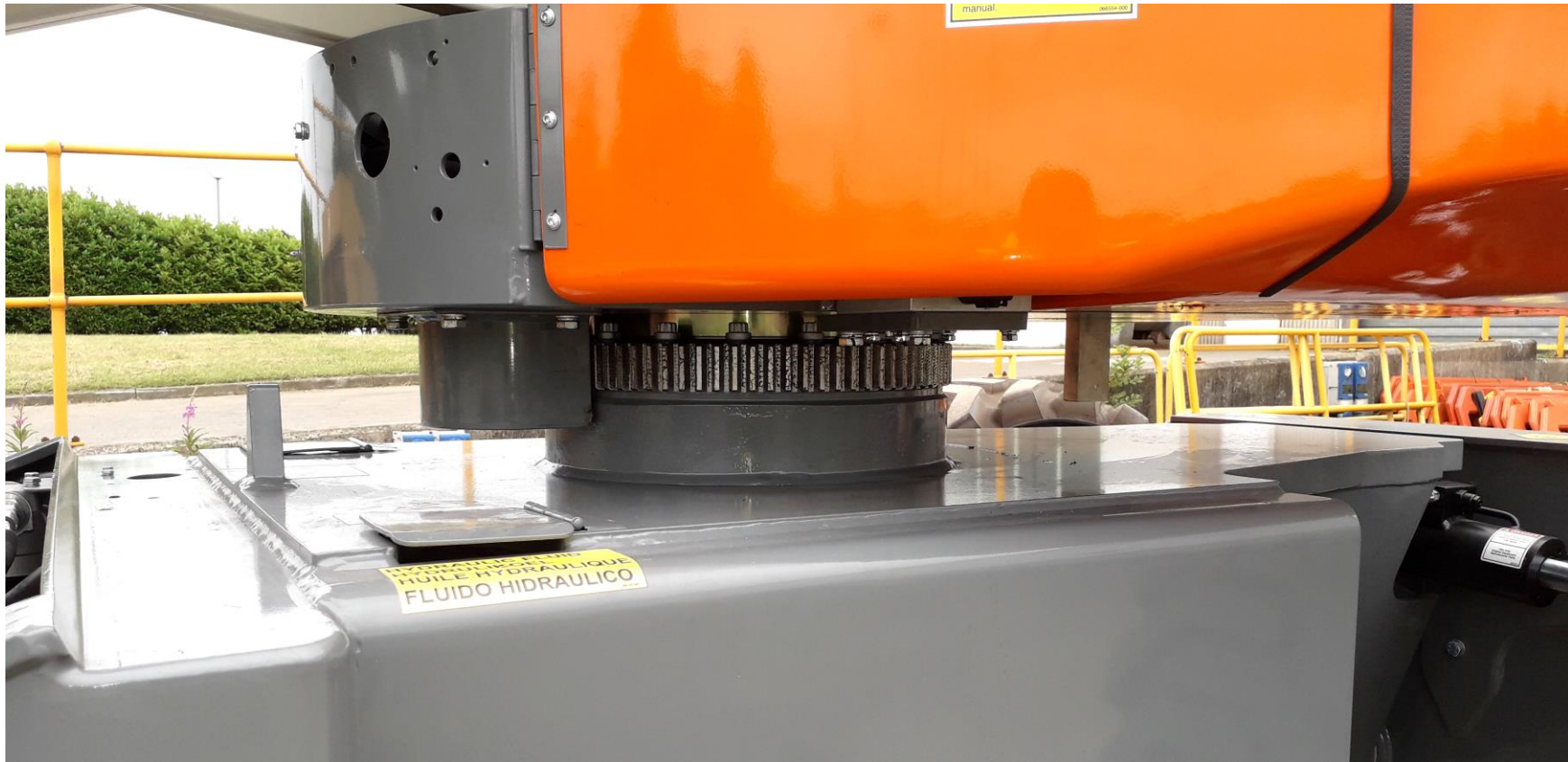


DRIVE MOTOR PIPING



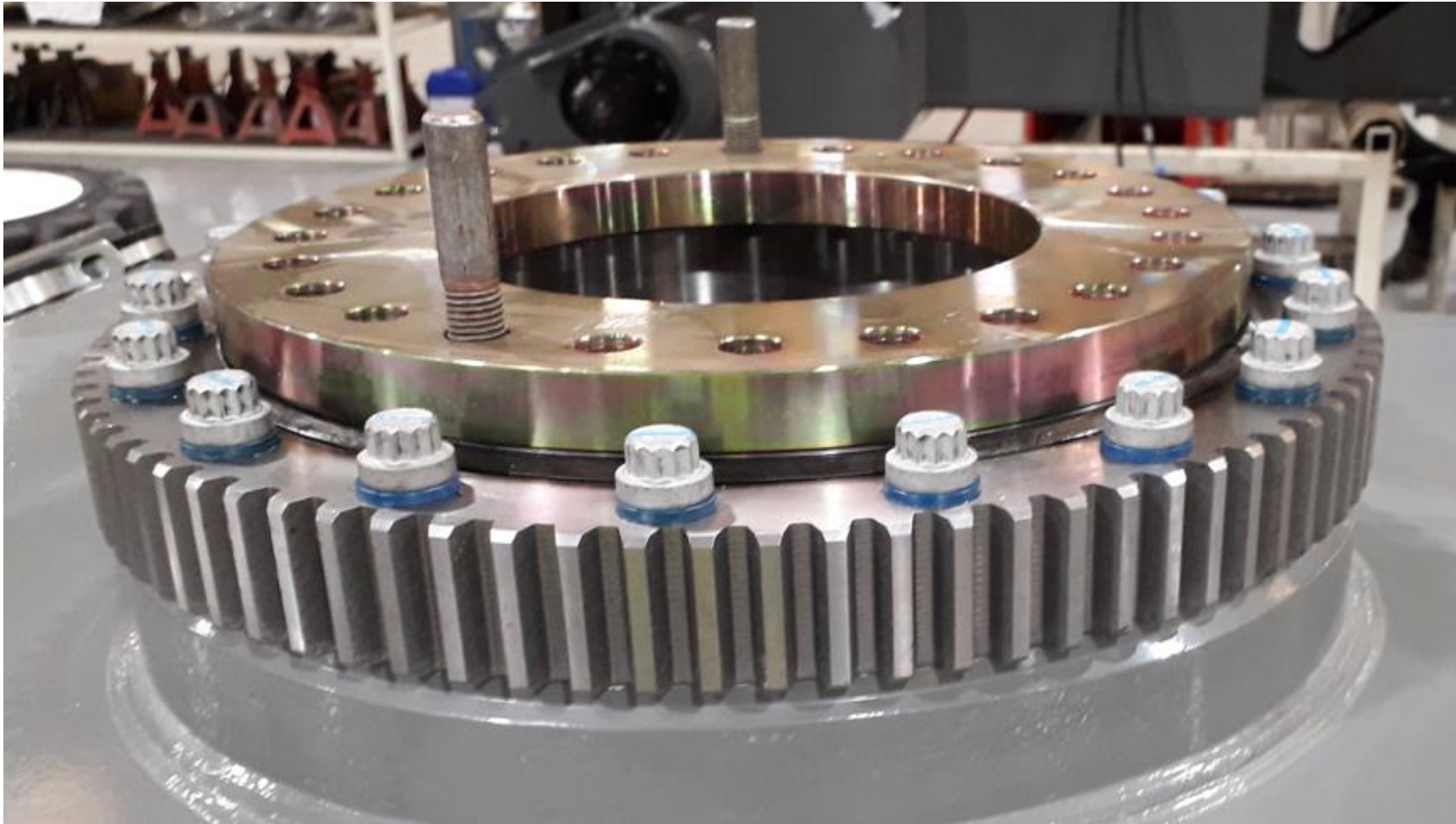
TURNTABLE ROTATION

The turntable sits on a Rotation bearing that enables it to rotate.



TURNTABLE ROTATION

The Rotation bearing is bolted to the chassis and in turn the turntable is bolted to it.



TURNTABLE ROTATION

When the operation is selected at the control panel hydraulic oil turns the swing drive assembly and via the gear wheel the turntable rotates.



Geared drive wheel

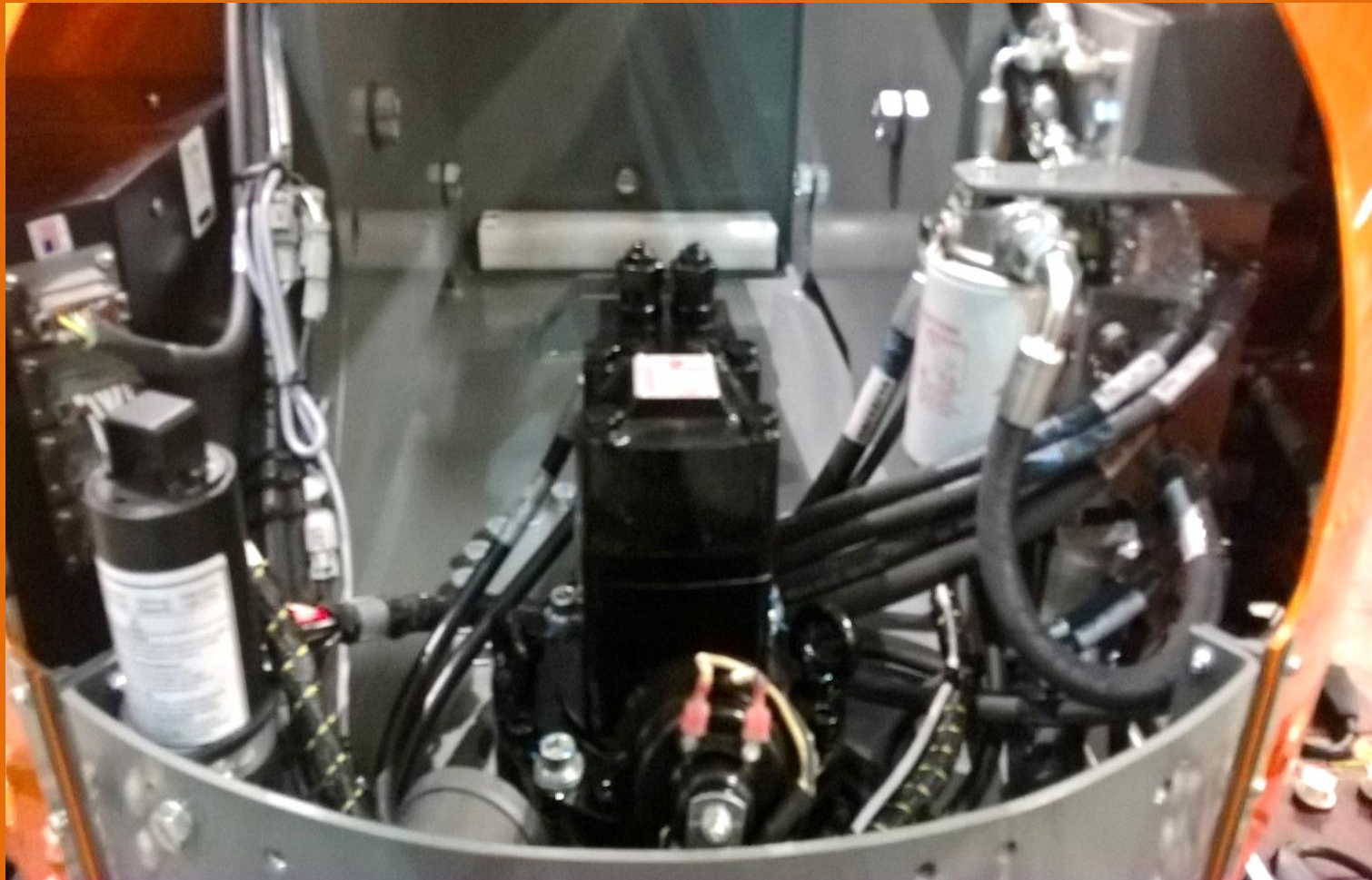
CHASSIS COMPONENTS

TURNTABLE ROTATION STOP

There is a Stop block assembly which prevents 360° rotation.



Rotation is 360° **NON-CONTINUOUS**



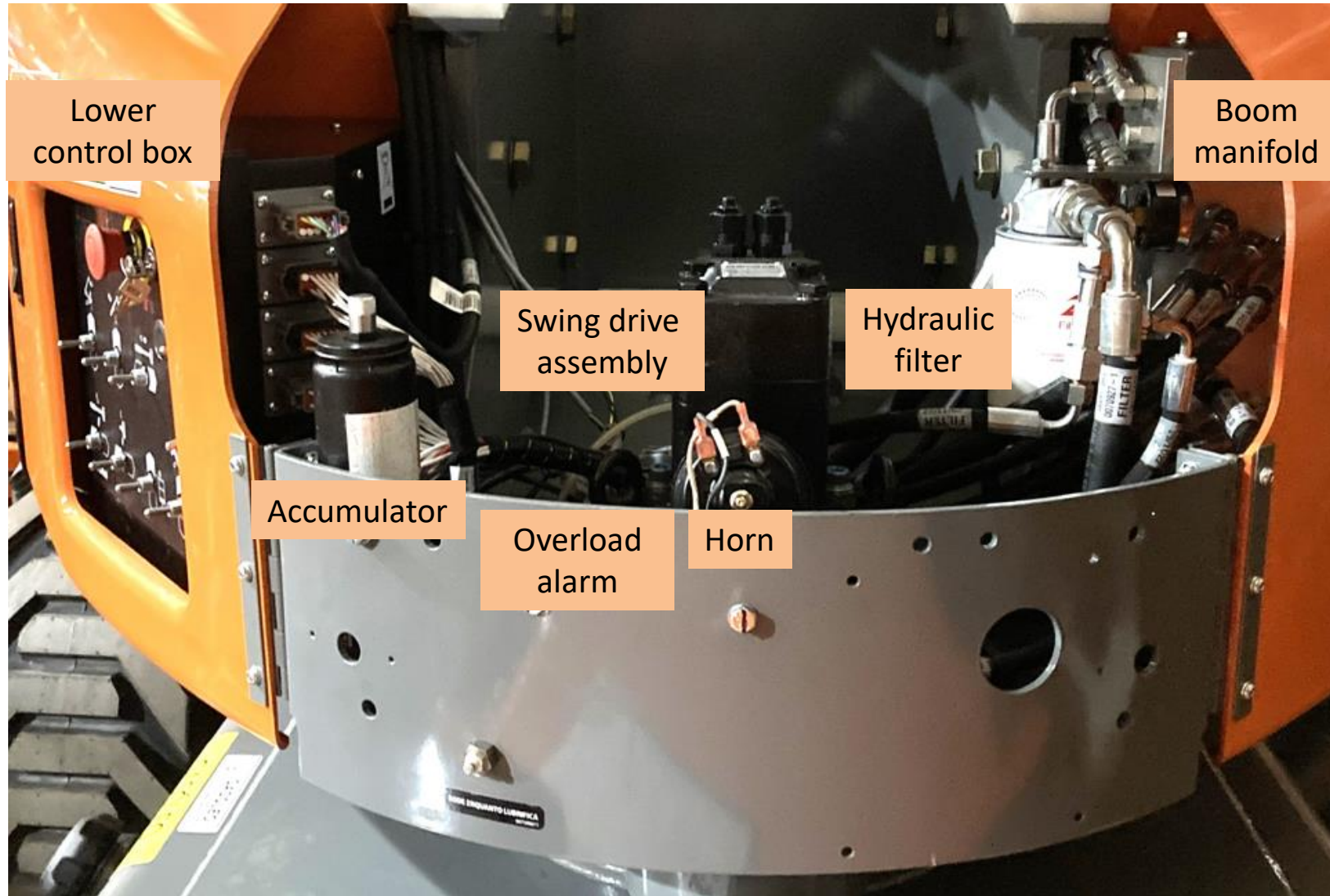
TURNTABLE ASSEMBLY

Turntable assembly covers :-

1. Page 75 :- Turntable components.
2. Page 76 :- Accumulator.
3. Page 77 :- Swing drive assembly.
4. Page 78 :- Hydraulic return line filter.
5. Page 79 :- Boom manifold.

TURNTABLE ASSEMBLY

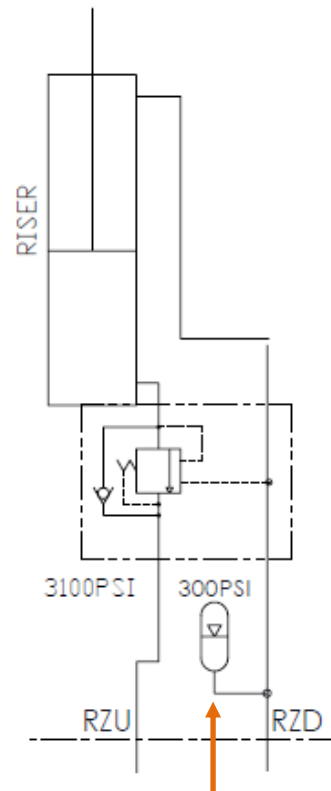
TURNTABLE COMPONENTS



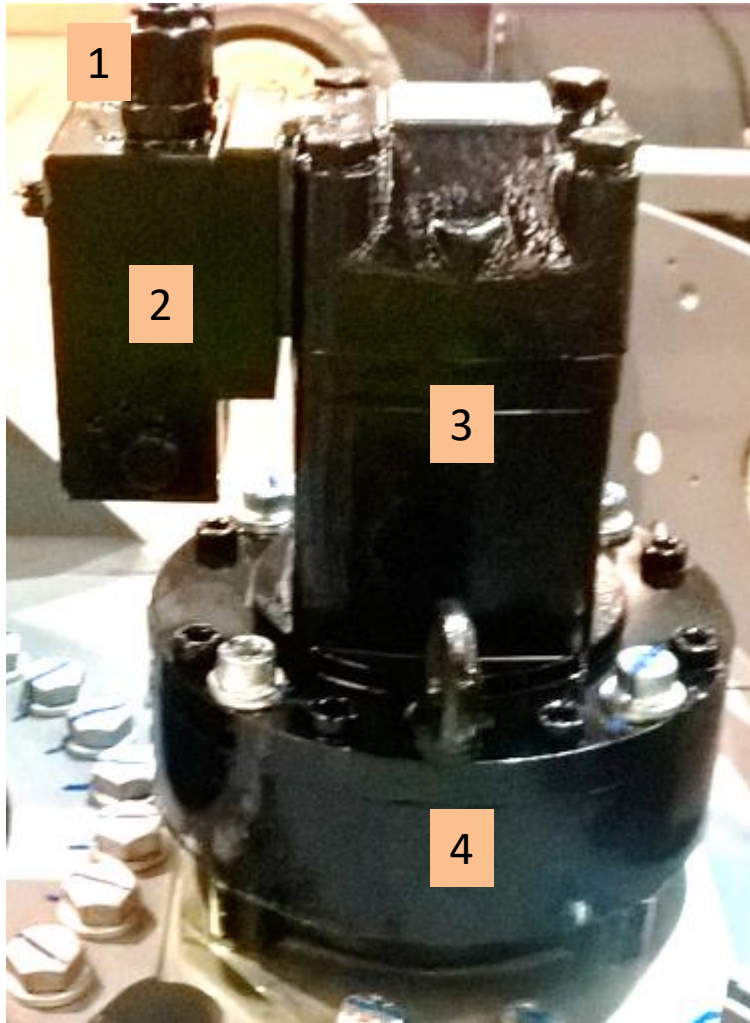
ACCUMULATOR



There is an accumulator located in the Riser Down line to cushion the motion and prevent bouncing when lowering is selected. It is located left side front of the turntable.



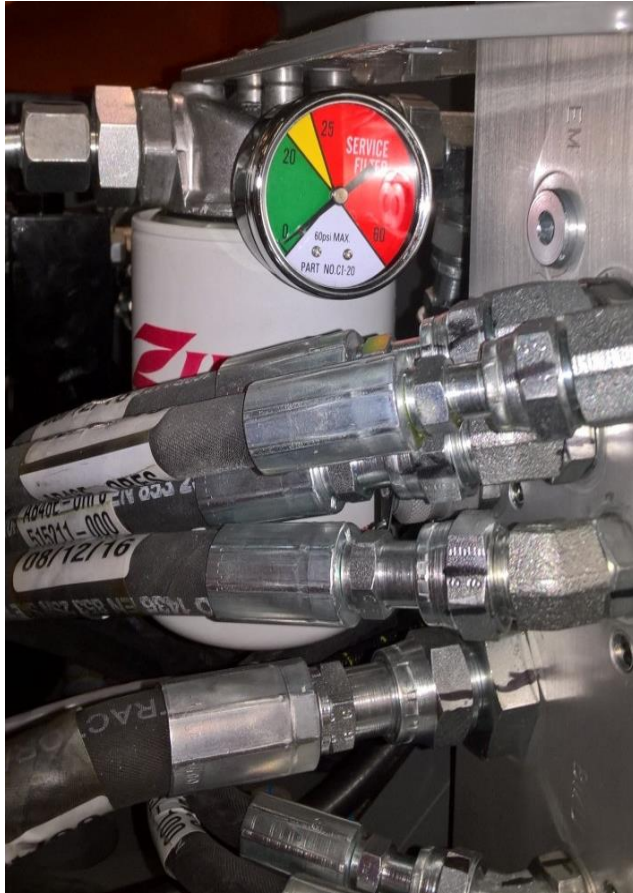
SWING DRIVE ASSEMBLY



The Swing Drive Assembly is located in the turntable. Attached to the end of the main shaft, which goes through the turntable, is a geared drive wheel.

1. Counterbalance valves.
2. Valve for swing drive.
3. Motor for swing drive.
4. Gearbox unit.

HYDRAULIC RETURN LINE FILTER



The filter is equipped with a hydraulic pressure gauge to indicate the filter element condition. A by-pass relief within the filter base is provided and is set to by-pass at 25 psi. If pressure readings are above 25 psi, the filter should be changed.

The filter condition should be checked at the 90 day or 150 hour Preventive Inspection Maintenance interval or more frequently under extreme working conditions.

The filter condition indicator is accurate only when the engine is running at maximum rpm and pump is discharging maximum flow, which occurs only during full speed driving. This requires that the indicator be observed while the unit is in motion, booms fully retracted and in stowed position, drive range switch in "LO" position, and drive controller fully forward. Oil temperature should be at least 90° F (32° C).

BOOM MANIFOLD



Located on the right side of the turntable is the Boom manifold block. This is the block which houses the solenoid valves and coils to select and direct the hydraulic oil to the motions when selected.

BOOM MANIFOLD

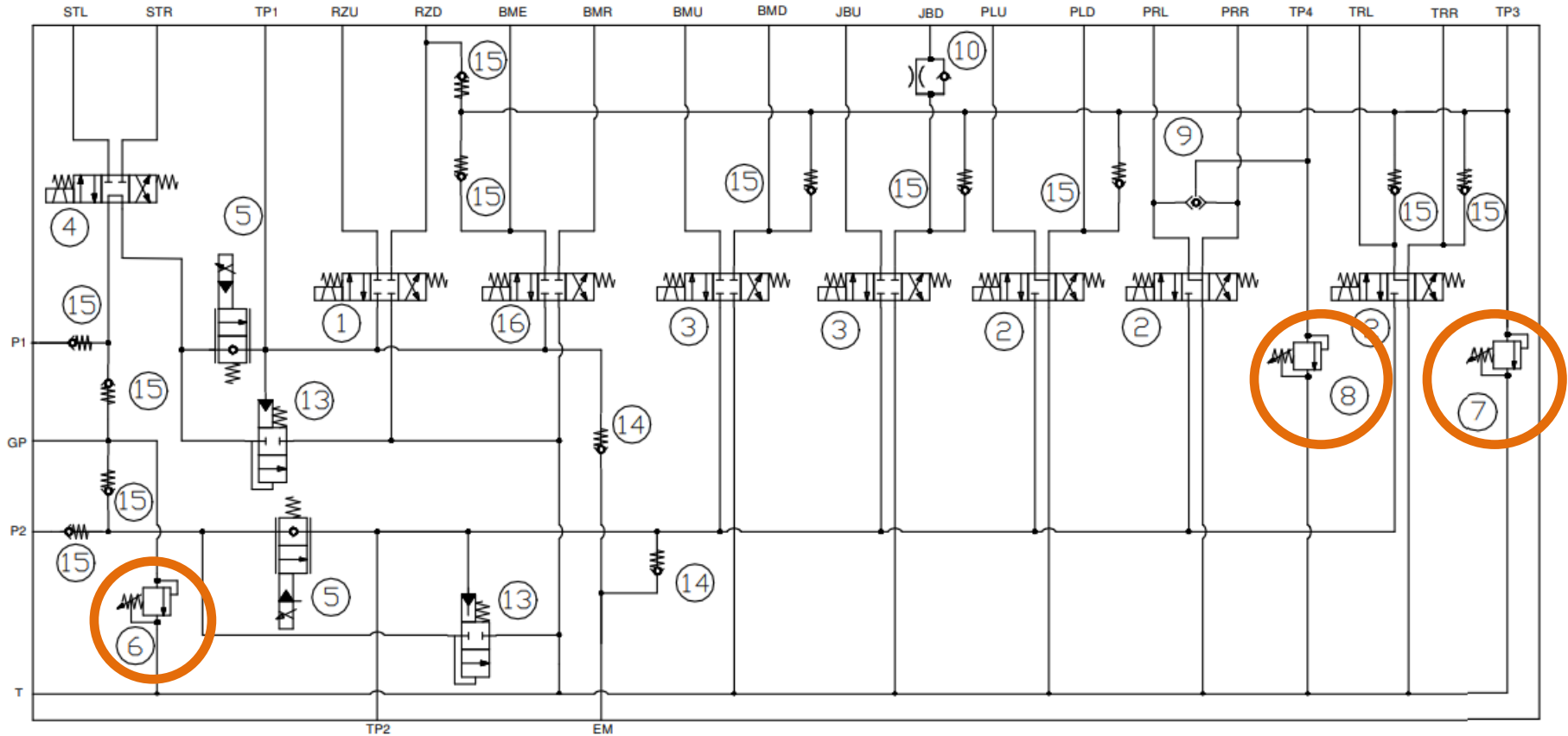


Boom manifold has the motion stamped next to the port.

E.g. BMD Boom DOWN,

E.g. BMU Boom UP.

BOOM MANIFOLD SCHEMATIC



1. Manifold rated for 3000 psi.
2. Main system relief: 2750 psi Crack. (Item 6)
3. Over stow relief : 1600 psi Crack. (Item 7)
4. Platform rotate relief : 1500 psi Crack. (Item 8)

BOOM MANIFOLD SCHEMATIC

16	6019297	CARTRIDGE, #10 SPOOL, 4W3P, SPECIAL CENTER	1
15	561176	CHECK VALVE HF#CV08-20-0-N-04	11
14	6019182	CHECK VALVE HF#CV08-20-0-N-10	2
13	6019225	LOGIC ELEMENT VALVE, EPFR58-35-0-N-150	2
12	6019180	COIL 4303612	14
11	6019184	COIL 4303712	4
10	6019177	ORIFICE PLATE 4500220	1
9	6010737	SHUTTLE VALVE HF#LS08-30-0-N	1
8	6019175	RELIEF VALVE HF#RV08-22H-0-N-13/15	1
7	6019224	RELIEF VALVE HF#RV08-22H-0-N-13/16	1
6	6019174	RELIEF VALVE HF#RV08-22H-0-N-35/27.5	1
5	6019194	ELEC.-PROPORTIONAL VALVE HF#SP08-20-0-N-00	2
4	6019075	SOLENOID VALVE HF#SV08-47A-0-N-00	1
3	6018952	SOLENOID VALVE HF#SV08-47C-0-N-00	2
2	6018940	SOLENOID VALVE HF#SV08-47D-0-N-00	3
1	6019077	CARTRIDGE, 4W3PCC, SV10-47C	1
ITEM	PART NO.	DESCRIPTION	REQD

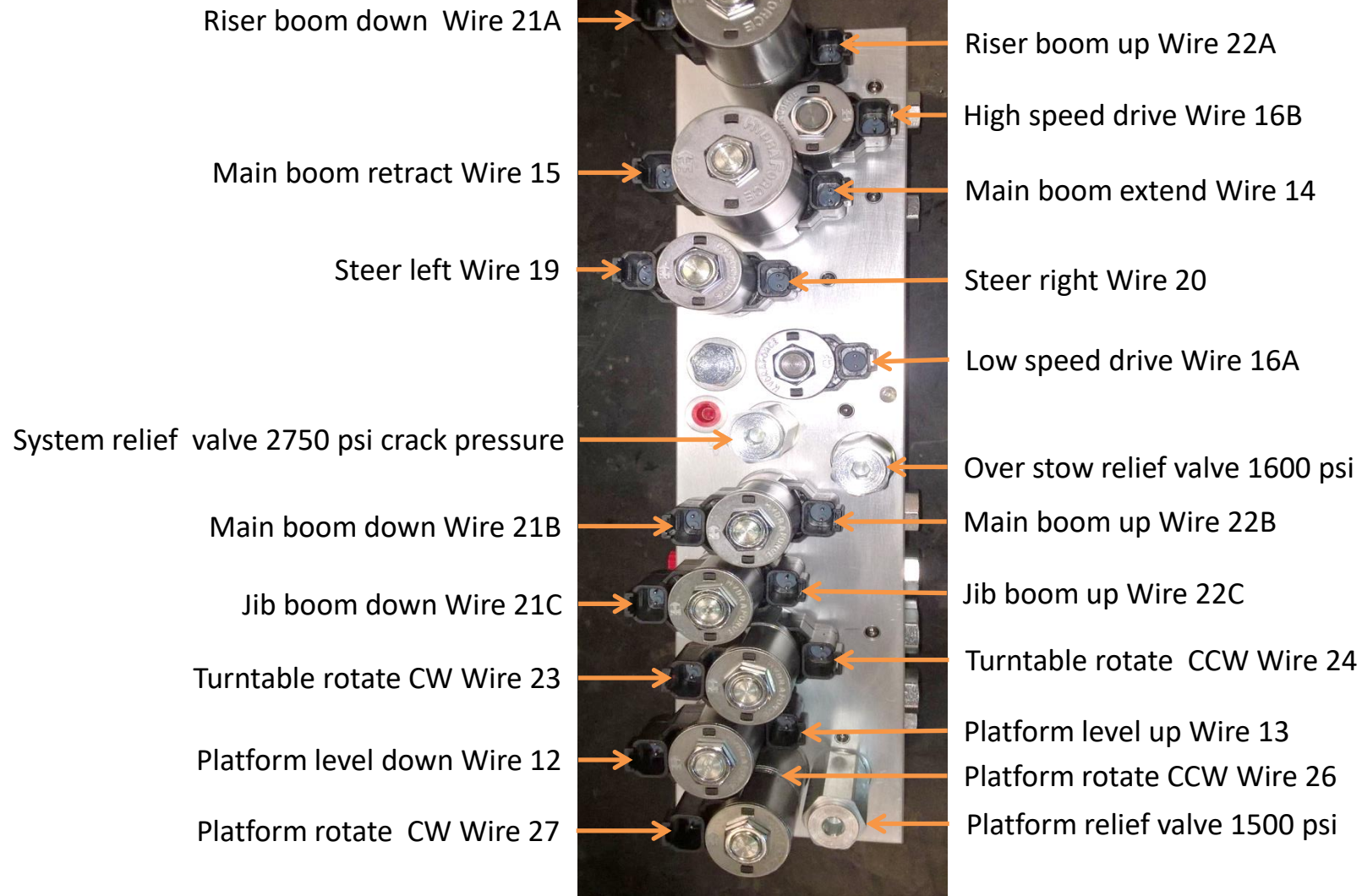
BOOM MANIFOLD



Boom manifold showing the solenoid coils and valves

TURNTABLE ASSEMBLY

BOOM MANIFOLD





LOWER CONTROLS

Lower control box covers :-

1. Page 87 :- Lower control box.
2. Page 91 :- Harness plugs.
3. Page 92 :- Wire numbers.
4. Page 94 :- GP400 Board.
5. Page 97 :- Terminal block module (TBM).
6. Page 98 :- VCCM board.

LOWER CONTROLS

LOWER CONTROL BOX



Lower control box

The lower control box is permanently fitted on the left side of the turntable.

When the Lower position on the key switch is selected the engine can be started on the start button.

Selecting the enable toggle switch first then the required motion toggle switch you can operate the raising or lowering of the riser booms, tip boom, jib boom, extending or retracting the telescopic boom, rotating (slewing) the entire booms, platform and posts assembly.

Also, the Ezcal diagnostic display is located here.

LOWER CONTROLS

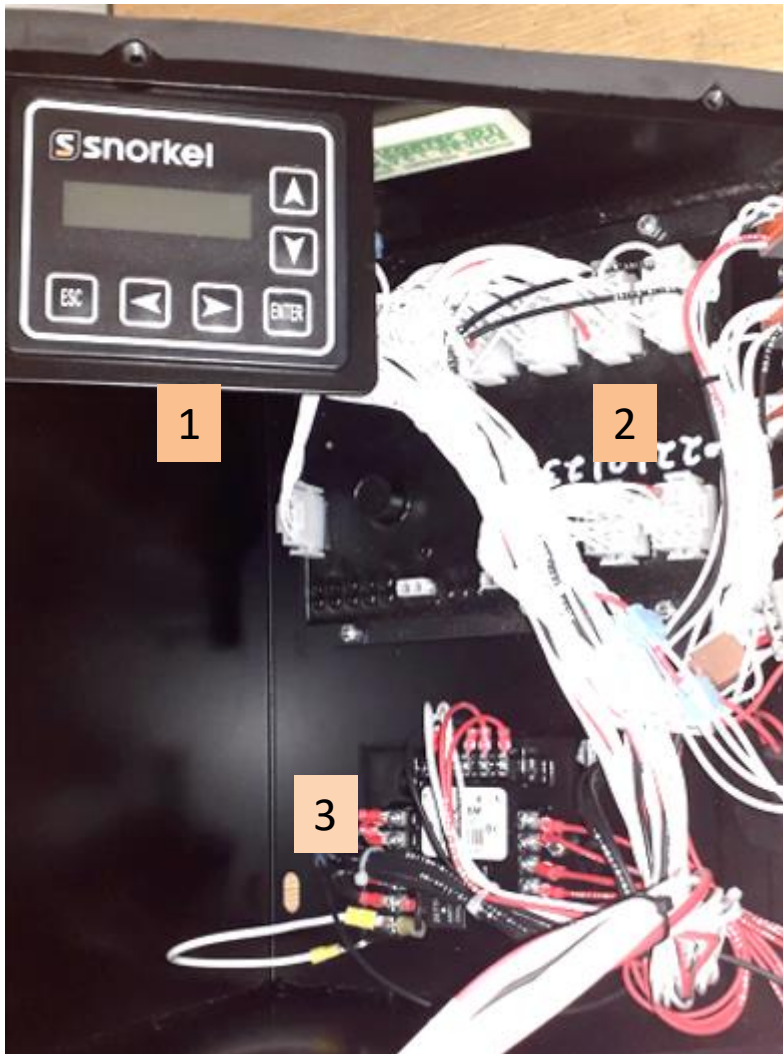
LOWER CONTROL BOX



- 1) Ezcil diagnostic display.
- 2) Emergency stop.
- 3) Upper / Lower control key switch.
- 4) Overload / Tilt warning light.
- 5) Riser raise / lower switch.
- 6) Boom raise / lower switch
- 7) Boom extend / retract switch.
- 8) Engine start button.
- 9) Emergency recovery switch.
- 10) Ground operation switch.
- 11) Rotation left / right switch..
- 12) Platform rotation switch.
- 13) Platform level switch
- 14) Jib articulation switch

LOWER CONTROLS

LOWER CONTROL BOX

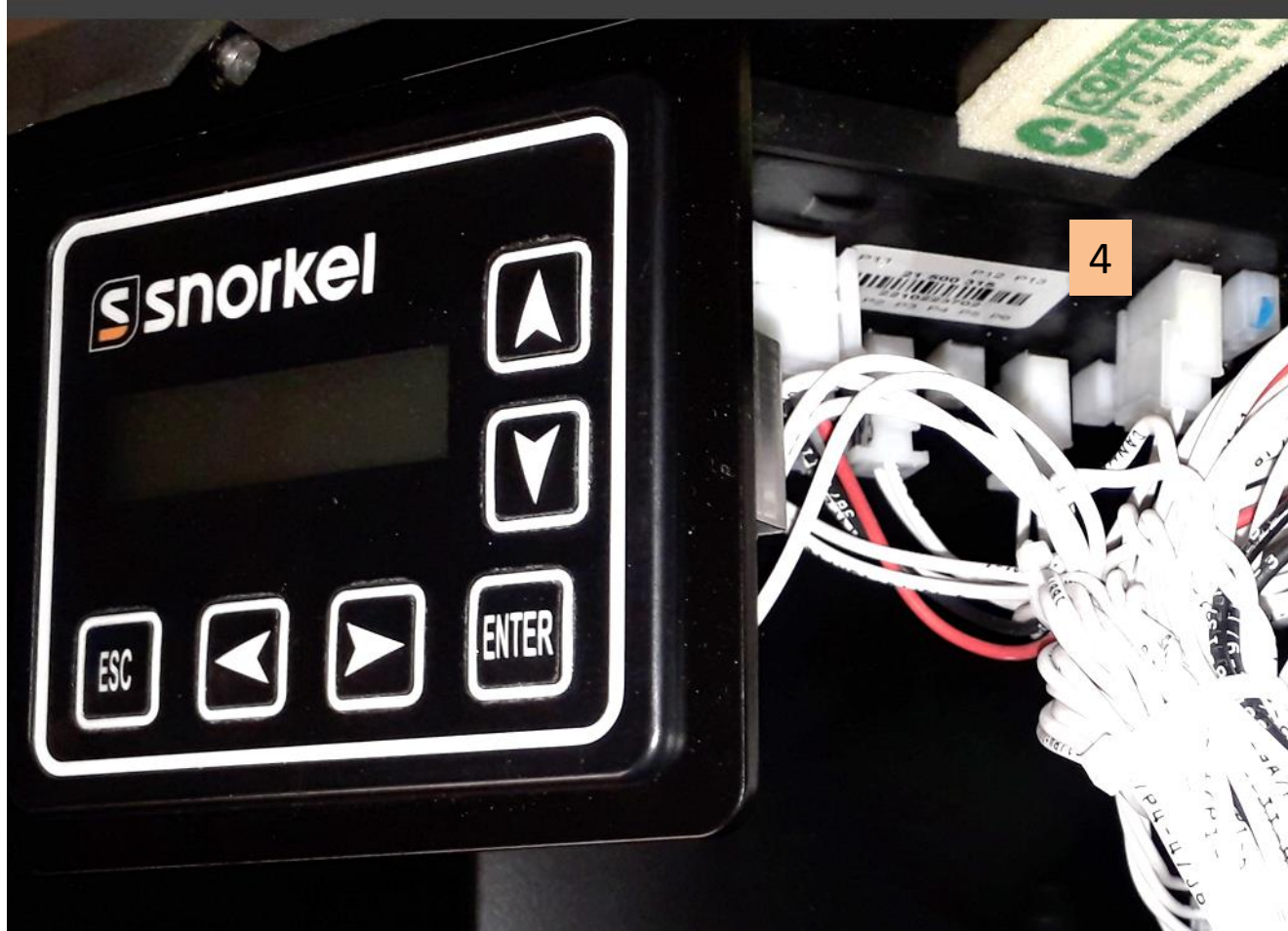


Once the control box door is open you can see :-

1. EzCal Diagnostic display.
2. GP400 Board
3. TBM Board.

LOWER CONTROLS

LOWER CONTROL BOX



4. V.C.C.M. Board.
It is located behind and above the display screen.

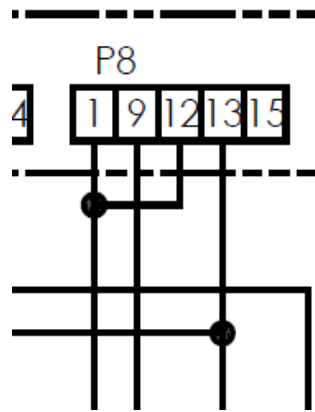
LOWER CONTROLS

HARNESS PLUGS



Look for slight raised ridge on corner of the plug. This is position 1 for the wires.

E.g. P8 – 1.



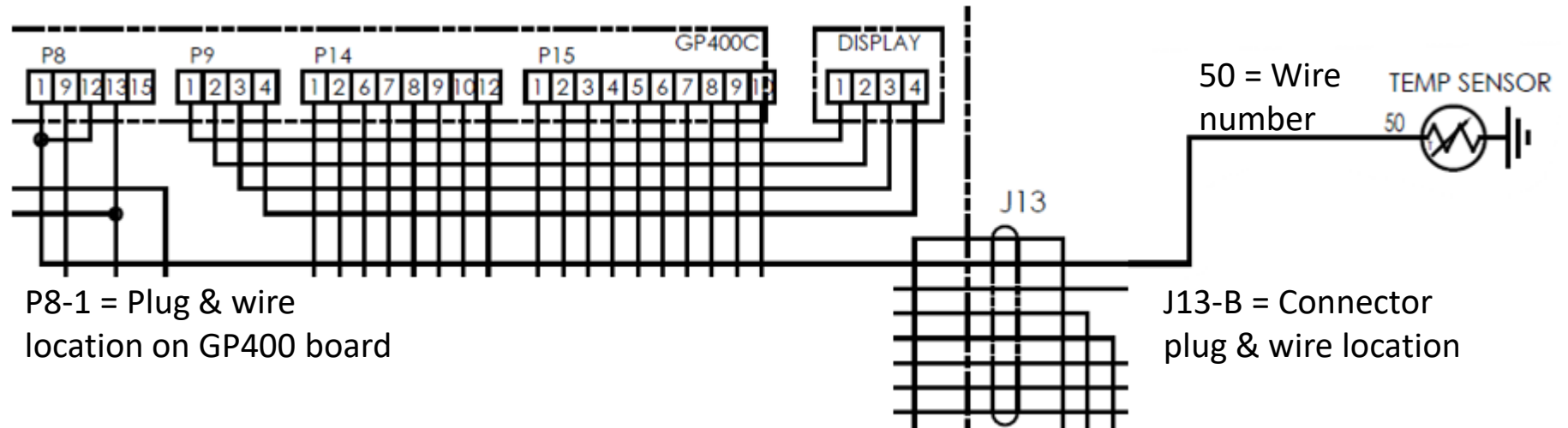
The wire number is 50/P8-1/J13-B.

WIRE NUMBERS

There is a printed number on each wire casing. The example below is from the GP400 wiring.



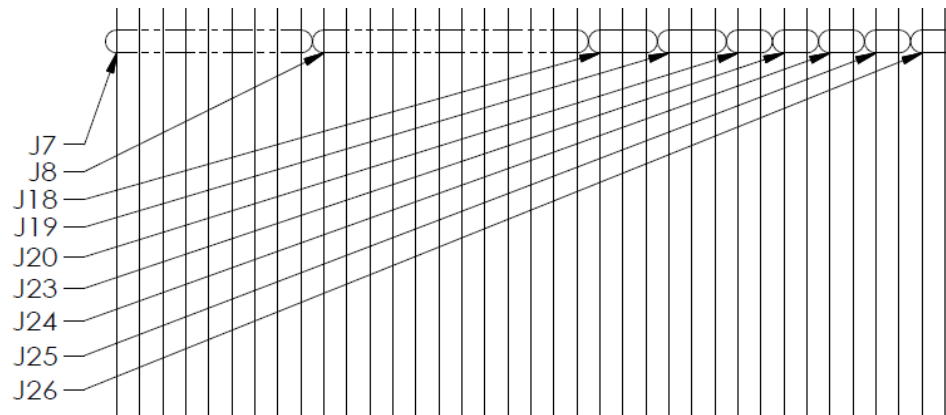
Extract from the electrical schematic.



LOWER CONTROLS

WIRE NUMBERS

Plug connections

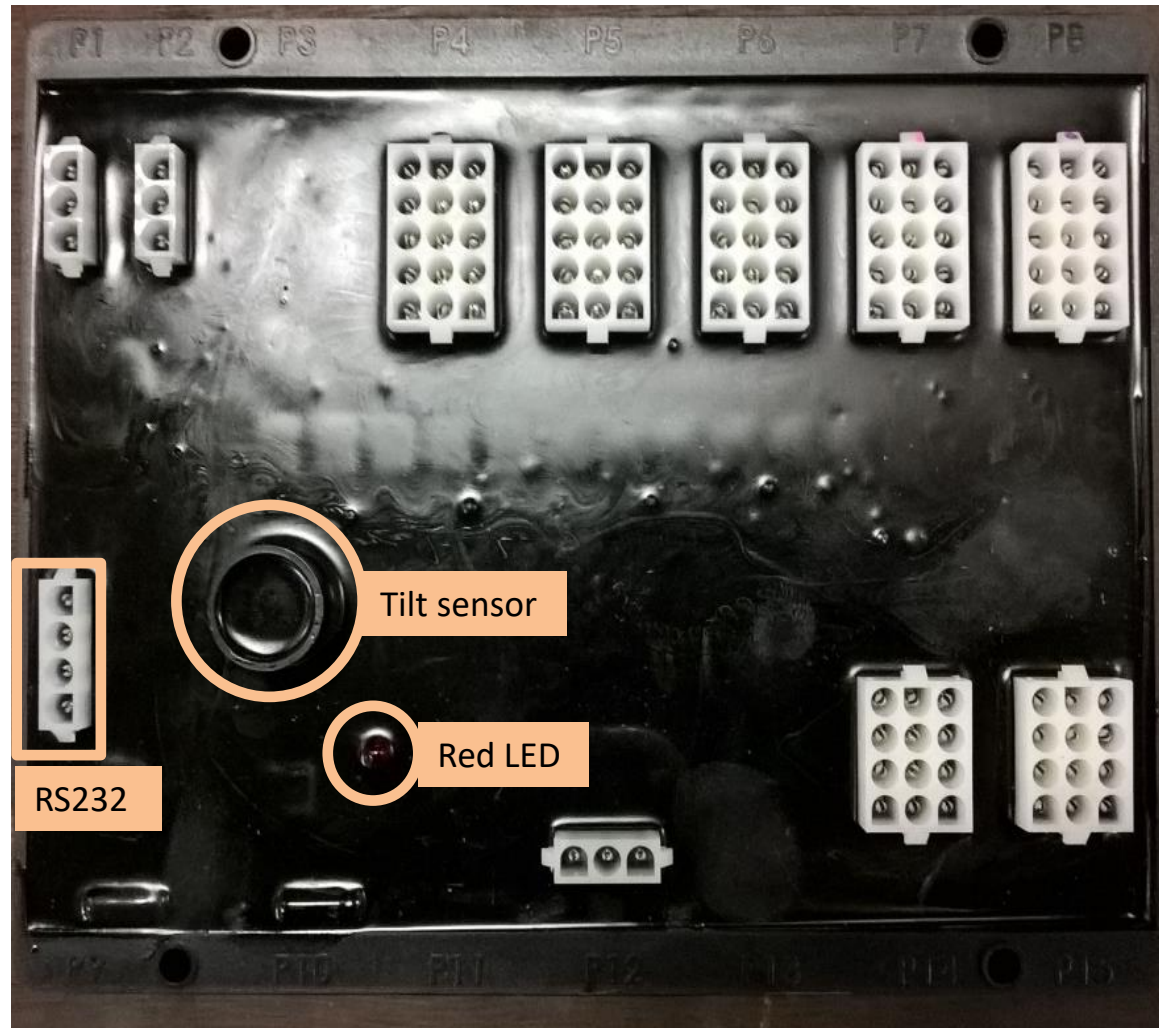


Extract from the electrical schematic.

CONNECTOR PAIRINGS			
J4:	A-CANH	J7:	2-24
	B-CANL		3-23
	D-2		4-22B
	E-3		5-21B
	G-2A		6-14
	H-1D		7-15
J12:	1-CANH		10-22A
	2-CANL		11-21A
	4-2	J8:	12-3
	5-3		1-19
	7-2A		2-22C
	8-1D		3-21C
			4-26
			5-27
			6-13
			7-12
			8-20
			9-16A
			10-16AR
			11-16B
			12-16BR
		J18:	1-70
			2-70A
			3-70C
		J19:	1-70
			2-70B
			3-70D
		J20:	1-29A
			2-3
		J23:	1-39
			2-3
		J24:	1-47
			2-3
		J25:	1-169
			2-3
		J26:	1-155
			2-3
		J21:	1-168
			2-17A
			3-18A
			4-141
			5-159A
			6-6
			7-SHIELD
			8-34A
			9-126A
			10-183
			11-182
			12-141A
		J13:	A-1B
			B-50
			C-164
			D-111
			E-3
			F-55
			G-5A
			H-167

LOWER CONTROLS

GP400 CONTROL BOARD



The GP400 Electronic control module is designed to be configurable to the complete control system needs of a lift vehicle. Additional inputs / outputs allow for the total control of a boom or scissor machine.

It includes :-

- Integrated tilt sensor.
- 12V / 24V supply.
- The module supports Canbus to connect to a GP442 I/O module in the upper control box.
- RS232 connection to handheld Ezcal for calibration and diagnostics.
- Red LED shows Power on when solid. Also flashes 2-digit error when faults occur.

LOWER CONTROLS



GP400 CONTROL BOARD

I/O List

TERM	I/O TYPE	DESTINATION
P1-1	CAN HIGH	CANBUS TO VCCM
P1-2	CAN LOW	
P2-1	CAN HIGH	CANBUS TO GP440
P2-2	CAN LOW	
P4-1	HIGH SIDE PWM	PLATFORM LEVEL UP
P4-2	HIGH SIDE 2A	THROTTLE RELAY
P4-4	HIGH SIDE PWM	PLATFORM LEVEL DOWN
P4-5	HIGH SIDE PWM	STEER RIGHT
P4-6	HIGH SIDE 2A	GLOW PLUG RELAY
P4-7	HIGH SIDE PWM	GUARD LIGHT
P4-8	HIGH SIDE PWM	BOOM DOWN
P4-9	HIGH SIDE PWM	STEER LEFT
P4-10	HIGH SIDE PWM	BOOM UP
P4-13	SAFE HIGH SIDE	STARTER RELAY
P4-14	SAFE HIGH SIDE	AXLE LOCK
P4-15	SAFE HIGH SIDE	BRAKE RELEASE
P5-1	HIGH SIDE PWM	ENGINE ALARM
P5-2	HIGH SIDE 2A	EMERGENCY POWER RELAY
P5-5	HIGH SIDE 2A	IGNITION
P5-6	HIGH SIDE 2A	0/L TILT LIGHT
P5-7	HIGH SIDE PWM	BOOM RETRACT
P5-8	HIGH SIDE PWM	BOOM EXTEND
P5-9	HIGH SIDE 2A	SWING CW
P5-11	HIGH SIDE PWM	JIB DOWN
P5-12	HIGH SIDE 2A	SWING CCW
P5-13	BATTERY +	MAG SWITCH COMMON
P5-15	HIGH SIDE PWM	JIB UP

TERM	I/O TYPE	DESTINATION
P6-1	HIGH SIDE 2A	HYD GENERATOR
P6-4	HIGH SIDE 2A	RISER UP
P6-5	HIGH SIDE 2A	RISER DOWN
P6-7	HIGH SIDE 2A	PLATFORM CW
P6-10	HIGH SIDE 2A	PLATFORM CCW
P6-11	HIGH SIDE 2A	DRIVE LIGHTS
P6-12	HIGH SIDE 2A	HORN
P6-13	HIGH SIDE 2A	MOTION ALARM
P6-14	HIGH SIDE 2A	AMBER BEACON
P6-15	HIGH SIDE 2A	TORQUE
P7-1	DIGITAL INPUT	TBM B+
P7-2	DIGITAL INPUT	TBM 2
P7-3	DIGITAL INPUT	HYD WARM-UP
P7-4	DIGITAL INPUT	TBM 1
P7-5	DIGITAL INPUT	ENABLE
P7-6	DIGITAL INPUT	EMERGENCY POWER
P7-8	DIGITAL INPUT	ENGINE START
P7-9	DIGITAL INPUT	PLATFORM LEVEL UP
P7-10	DIGITAL INPUT	PLATFORM LEVEL DOWN
P7-11	DIGITAL INPUT	OIL PRESSURE
P7-12	DIGITAL INPUT	HYD WARM UP
P7-14	DIGITAL INPUT	AXLE INTERLOCK PRESSURE

LOWER CONTROLS



GP400 CONTROL BOARD

I/O List

TERM	I/O TYPE	DESTINATION
P8-1	ANALOG INPUT	ENGINE TEMPERATURE
P8-9	ANALOG INPUT	TBM 3
P8-12	+5V	P8-1
P8-13	GND	TBM B-
P8-15	GND	GROUNDNS
P9-1	RS232	DISPLAY
P9-2	RS232	
P9-3	RS232	
P9-4	RS232	
P14-1	DIGITAL INPUT	PLATFORM ROTATE CW
P14-2	DIGITAL INPUT	PLATFORM ROTATE CCW
P14-6	DIGITAL INPUT	RISER UP
P14-7	DIGITAL INPUT	RISER DOWN
P14-8	DIGITAL INPUT	RISER LIMIT SWITCH N/O
P14-9	DIGITAL INPUT	BOOM LIMIT SWITCH N/O
P14-10	DIGITAL INPUT	BOOM LIMIT SWITCH N/C
P14-12	COUNTABLE INPUT	ENGINE RPM
P15-1	DIGITAL INPUT	BOOM EXTEND
P15-2	DIGITAL INPUT	BOOM RETRACT
P15-3	DIGITAL INPUT	SWING CW
P15-4	DIGITAL INPUT	SWING CCW
P15-5	DIGITAL INPUT	BOOM UP
P15-6	DIGITAL INPUT	BOOM DOWN
P15-7	DIGITAL INPUT	JIB UP
P15-8	DIGITAL INPUT	JIB DOWN
P15-9	DIGITAL INPUT	RISER LIMIT SWITCH N/C
P15-10	BATTERY +	SWITCH COMMONS

TERMINAL BLOCK MODULE (T.B.M.)



In boom the TBM simplifies E-Stop wiring, reduces wiring to the boom/platform and simplifies power connection installation as well as increases reliability in the case of voltage drops.

The TBM's current sensing allows the main controller to test & detect short circuits & open coils.

The TBM enables :-

- B+ output when EMS platform or ground switched on.
- Measures current of B+ output.
- Used to diagnose open circuit valve.
- "Boost circuit" to increase reliability when engine cranking.

VCCM CONTROL BOARD



Valve Current Control Module. (VCCM).

- Provides 3 x 2 PWM current controlled outputs.
- Ensures precise & repeatable control of solenoids.
- Canbus enabled.

Connection guide

- P1 – P6 Valve coil
 - 1 - positive
 - 2 – negative
- P11 – 1 = B+ Supply
- P11 – 2 = B – Supply
- P12 – 1 = Can H
- P12 – 2 = Can L
- P12 – 3 = Shield
- P13 – 1 = Can H
- P13 – 2 = Can L
- P13 – 3 = Shield



ELEVATING ASSEMBLY

Elevating assembly covers :-

1. Page 101 :- Elevating assy.
2. Page 102 :- Riser boom.
3. Page 105 :- Main boom.
4. Page 107 :- Master – slave system.
5. Page 110 :- Tip boom.
6. Page 112 :- Jib boom.
7. Page 114 :- Rotator / Load cell.
8. Page 119 :- Boom microswitches.

ELEVATING ASSEMBLY



The platform is raised and lowered by a combination of two steel riser booms and one main boom.

The tip boom extends & retracts, and jib boom rotates through an arc of 140°.

Each operation is operated by a hydraulic cylinder which in turn is actuated by hydraulic power from the motor driven pump.

Solenoid operated valves control to which cylinder the hydraulic oil is directed.

Each cylinder features an integral holding valve to prevent uncontrolled decent in the case of a hose burst.

RISER BOOM



The platform is raised and lowered by a combination of two steel riser boom assemblies.



RISER BOOM

The two steel riser booms are extended and lowered using a combination of one hydraulic cylinder.



RISER BOOM

Each cylinder features an integral holding valve to prevent uncontrolled decent in the case of a hose burst.



MAIN BOOM



The Main boom



is raised and lowered using one hydraulic cylinder.

ELEVATING ASSEMBLY

MAIN BOOM CYLINDER

Each cylinder features an integral holding valve to prevent uncontrolled decent in the case of a hose burst.



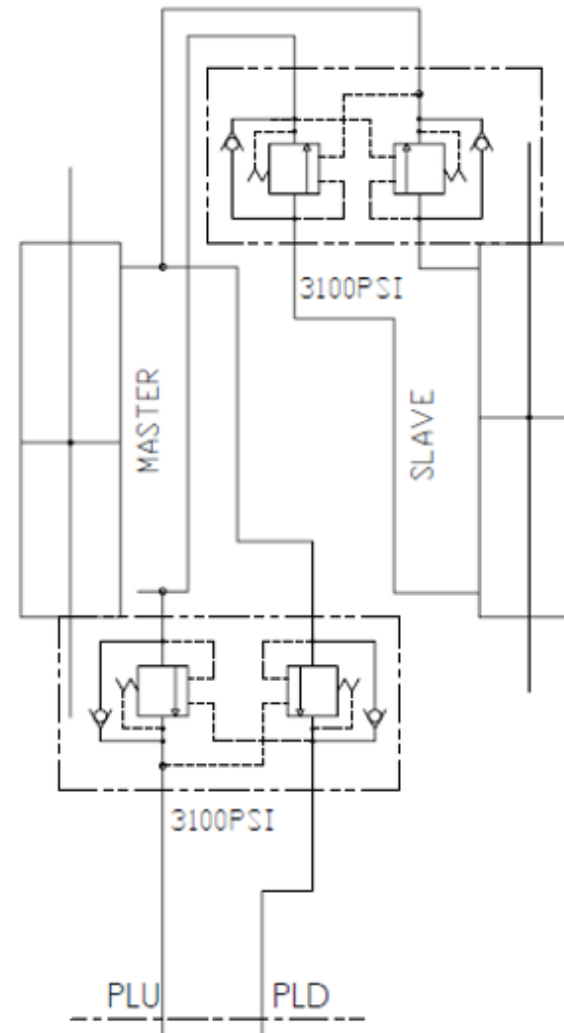
MASTER – SLAVE SYSTEM

To keep the platform level during raising and lowering a hydraulic system called the Master – Slave system is used

Each cylinder features an integral holding valve to prevent uncontrolled decent in the case of a hose burst.

When the Main boom is moved either up or down it pulls or pushes the Master cylinder in or out. Hydraulic oil is transferred between the two cylinders.

The flow is controlled by the Counterbalance valves located in both the Master and Slave cylinder keeping the platform in the same position while the Main boom moves.



ELEVATING ASSEMBLY

MASTER CYLINDER

The Master cylinder is attached to the pivot end of the Main boom.



Master cylinder anchor point.



ELEVATING ASSEMBLY

SLAVE CYLINDER

The Slave cylinder is positioned inside of the tip boom and attached at the pivot end of the Jib boom.



TIP BOOM

The platform is also raised or lowered by the tip boom extending and retracting.



ELEVATING ASSEMBLY

TIP BOOM CYLINDER

Each cylinder features an integral holding valve to prevent uncontrolled decent in the case of a hose burst.

The Tip boom cylinder is positioned inside of the tip boom.



JIB BOOM

The platform is also raised or lowered by the jib boom extending and retracting.



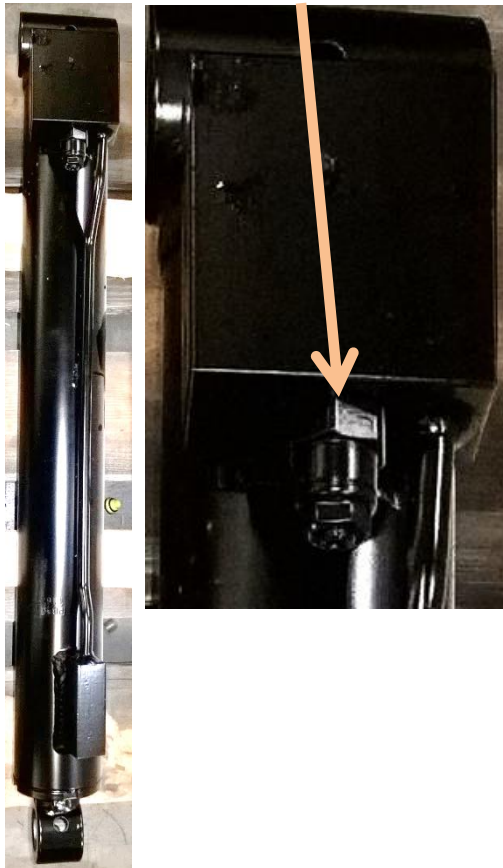
The jib boom rotates through an arc of 140° .

ELEVATING ASSEMBLY

JIB BOOM CYLINDER

Each cylinder features an integral holding valve to prevent uncontrolled decent in the case of a hose burst.

The Jib boom cylinder is positioned inside of the jib boom.



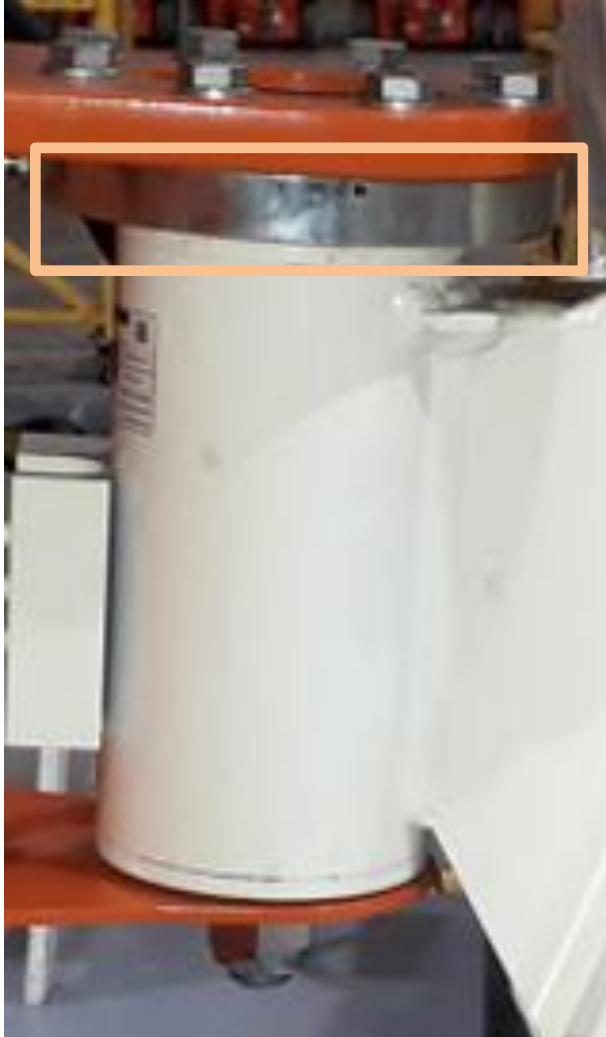
PLATFORM ROTATOR



The Rotator unit connects the jib boom to the mounting bracket on the platform base.

ELEVATING ASSEMBLY

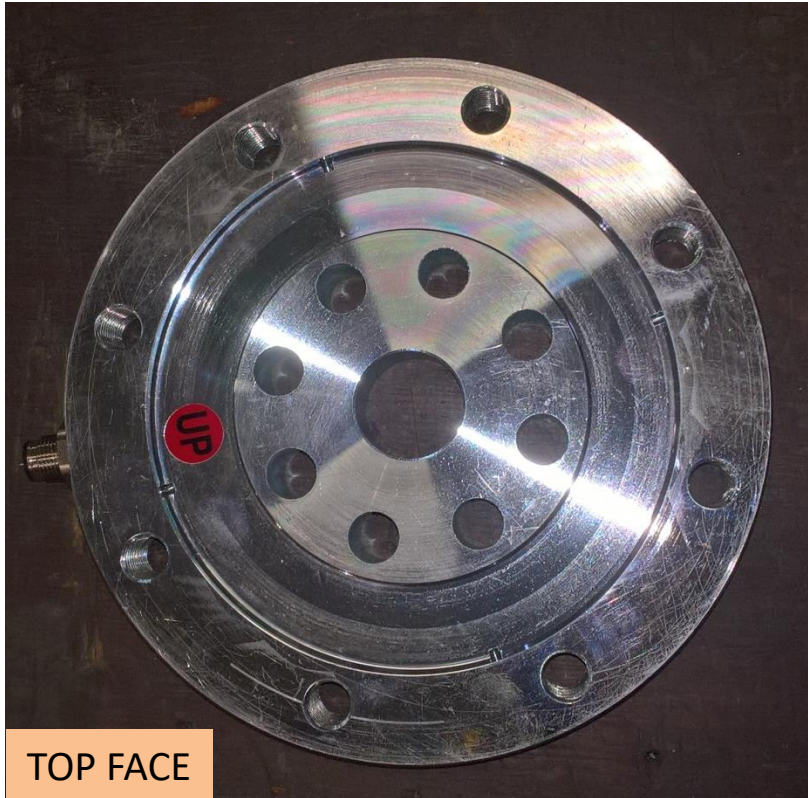
LOAD CELL



Located on the top of the Rotator unit is the Load cell.

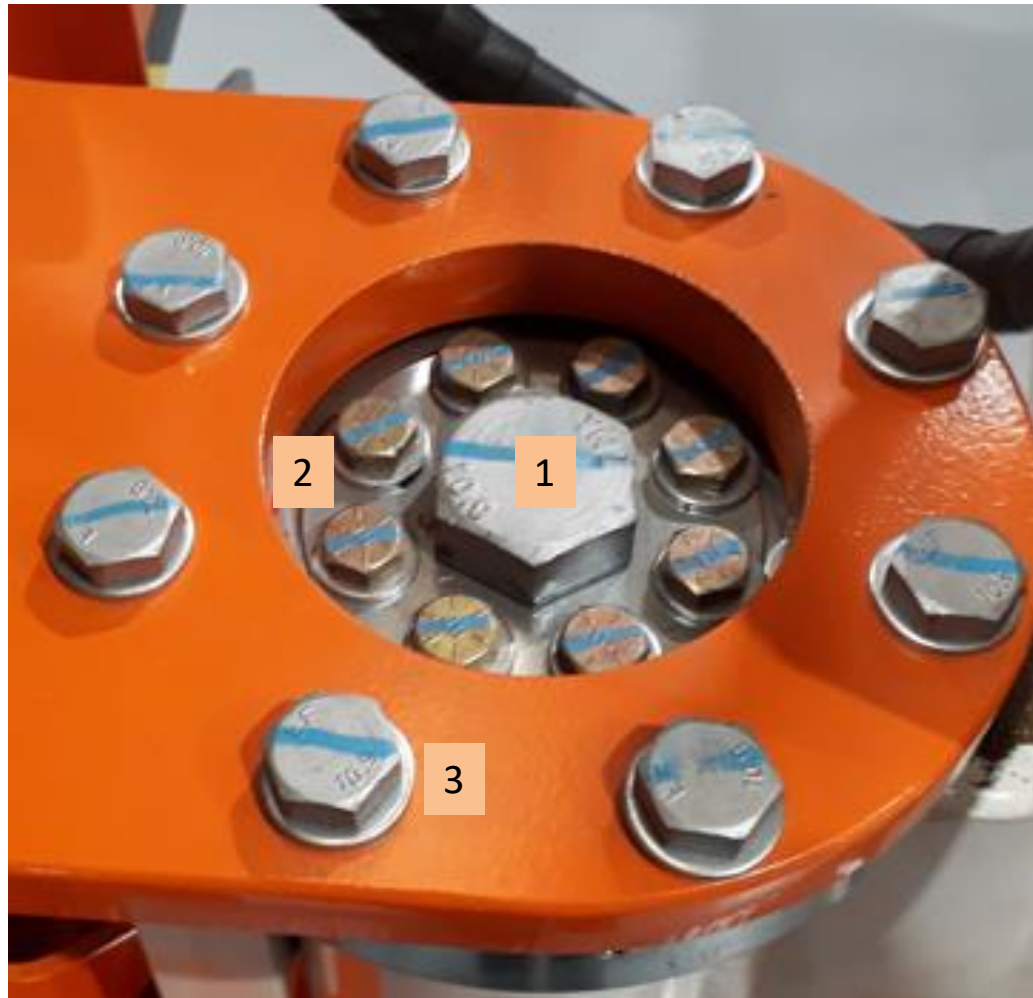
LOAD CELL

The Load Cell is located on top of the rotator unit. This assembly is located in the mounting bracket on the platform base. As the platform is loaded the increase in weight is registered at the Load cell.

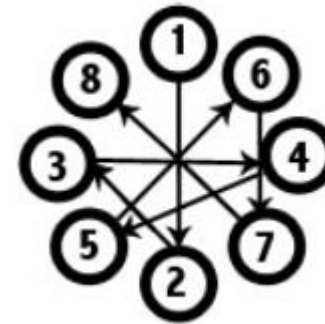


ELEVATING ASSEMBLY

ROTATOR / LOAD CELL BOLTS



The bolts should be torqued in the following sequence.



Rotator / platform torque values :-

- 1. 480ft/lbs. 650Nm
- 2. 50ft/lbs. 50Nm
- 3. 96ft/lbs. 130.16Nm

BOOM MICROSWITCHES

Drive speed ranges are interlocked through limit switches that sense the Tip boom position and the Top boom position.



ELEVATING ASSEMBLY

BOOM MICROSWITCHES



When the Tip boom is fully retracted



and the Top boom is fully lowered

the Drive can be selected in **Hi speed** or **Low speed**.

BOOM MICROSWITCHES



When the Tip boom is extended away from the microswitch



or the Top boom is raised away from the microswitch

the Drive is always in the **SLOWEST speed** regardless of the Drive range switch position.
These microswitches also control the Tilt interlocking and the locking of the front articulating axle.



PLATFORM

Platform covers :-

1. Page 123 :- Platform.
2. Page 126 :- Platform footswitch.
3. Page 127 :- Platform control box.
4. Page 137 :- GP442 Board.

PLATFORM

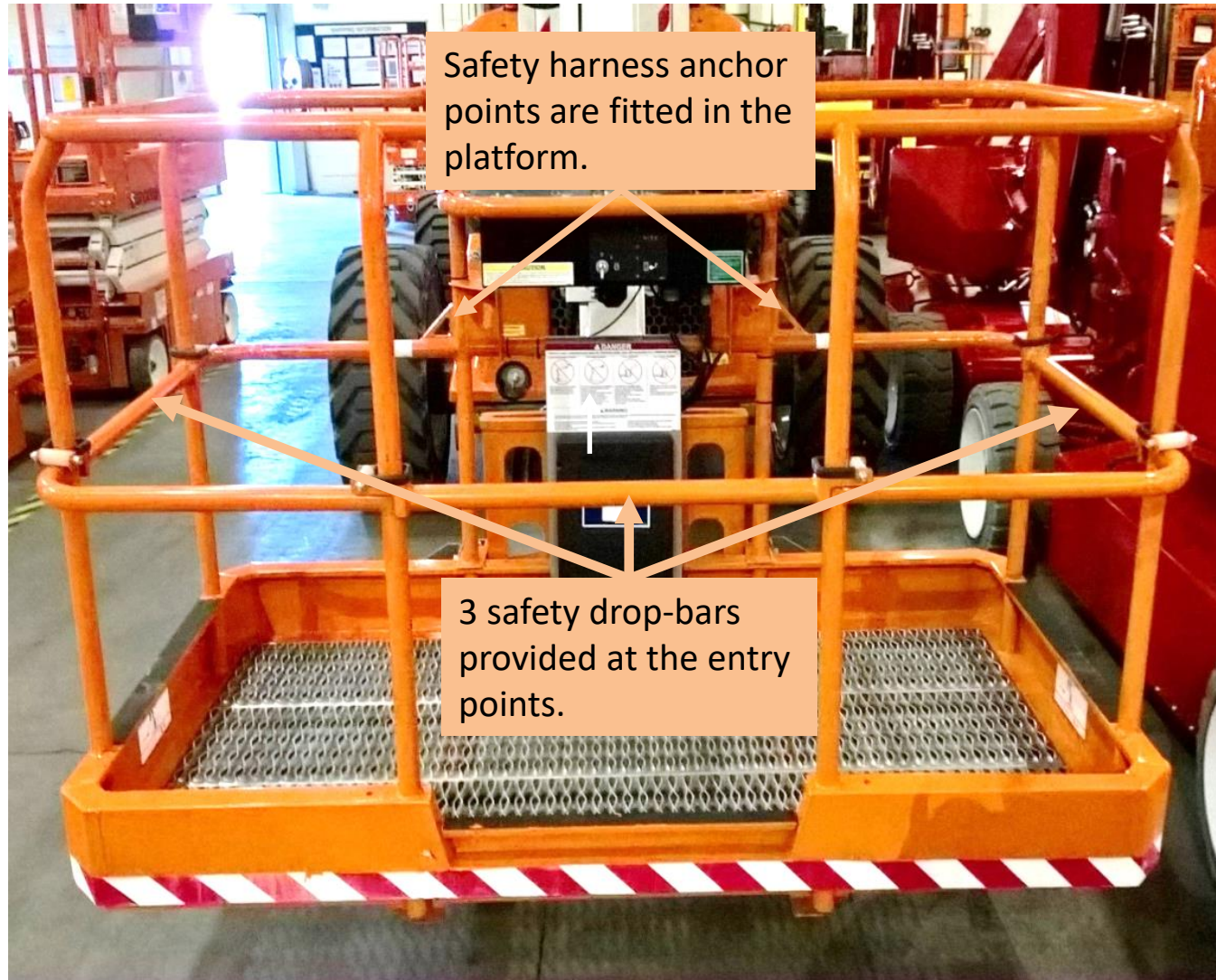
PLATFORM DESCRIPTION



The platform is large enough for two operators and has a free-draining perforated floor with 165mm toe boards. Handrails are constructed from steel tubing

PLATFORM

PLATFORM SAFETY POINTS



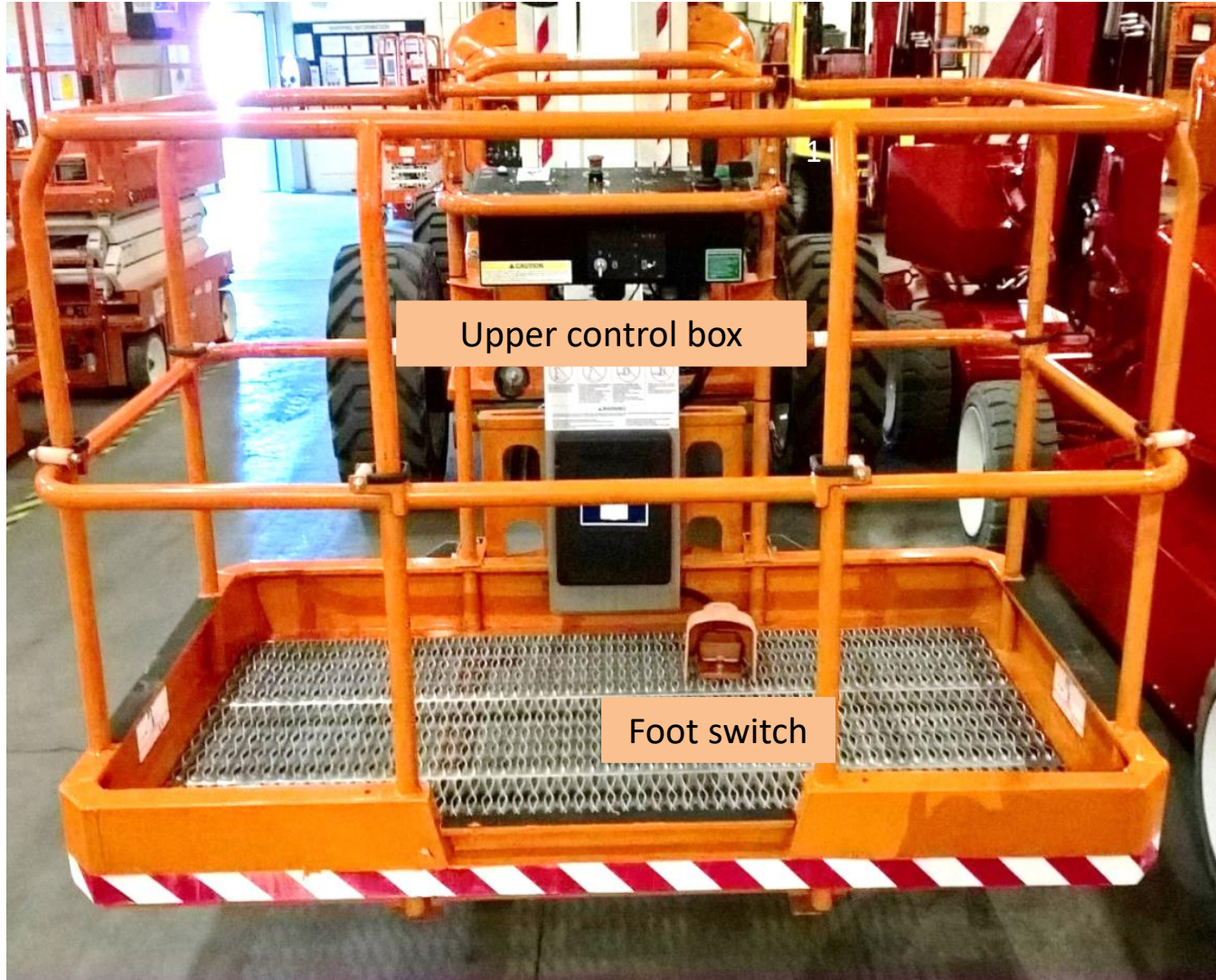
Safety harness anchor points are fitted in the platform.

3 safety drop-bars provided at the entry points.

DO NOT begin to operate the machine until the platform entrance safety bars are in the fully lowered position.

PLATFORM

PLATFORM COMPONENTS



The Upper Control Box is fitted permanently within the platform.

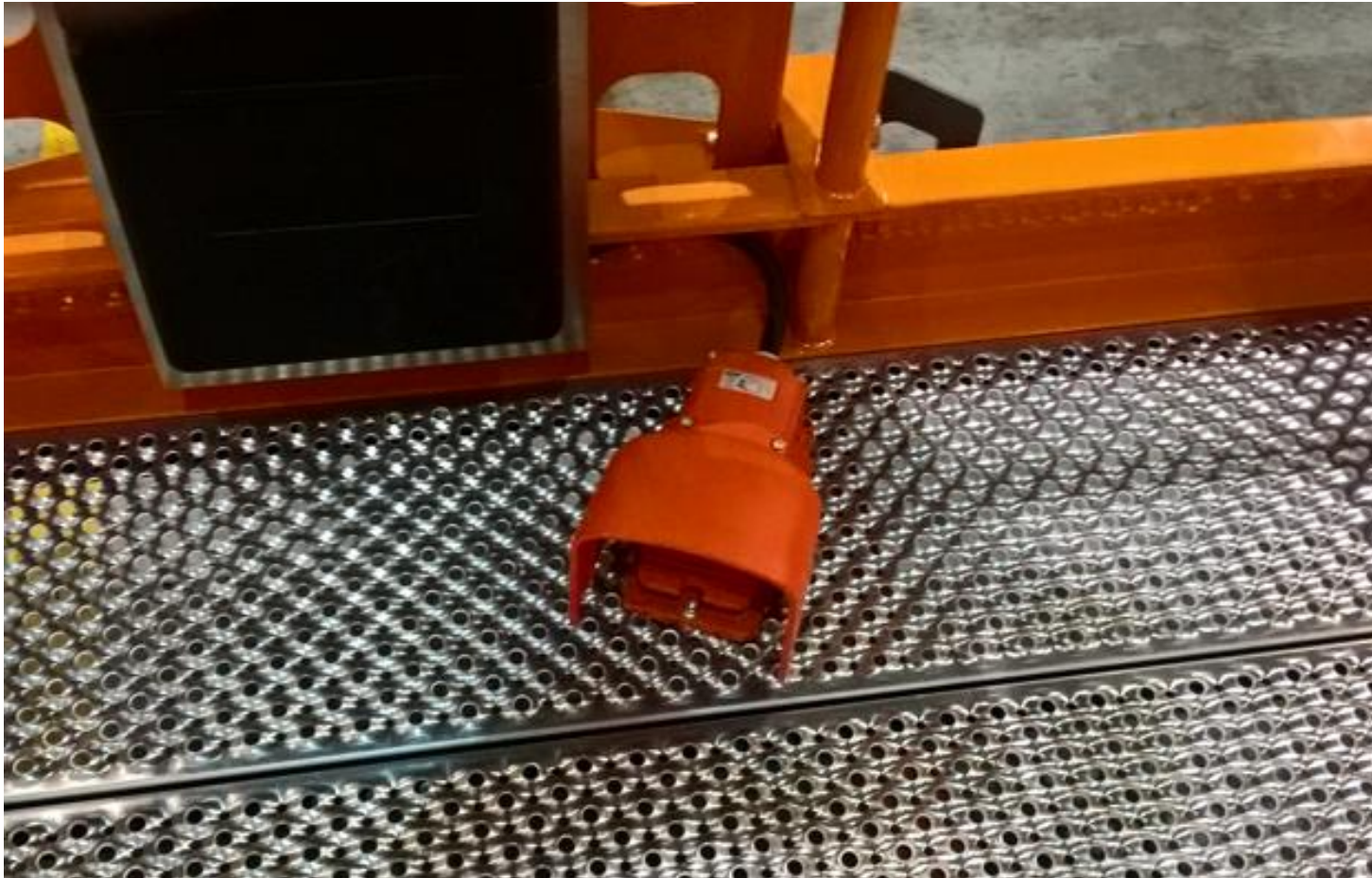
Enable footswitch is located on platform floor.

PLATFORM

PLATFORM FOOT SWITCH

A foot switch is located on the platform floor. This must always be activated when an operation is required.

If nothing is operated after 10 seconds, the foot switch must be pressed again.



PLATFORM CONTROL BOX



The Upper control box is permanently fitted at the front centre of the platform. It features a Joystick which will provide proportional control for driving.

You can :-

- Extend / retract the main boom.

Raise / lower :-

- Riser booms
- Tip boom
- Jib boom

Rotate (swing) :-

- Turntable
- Platform

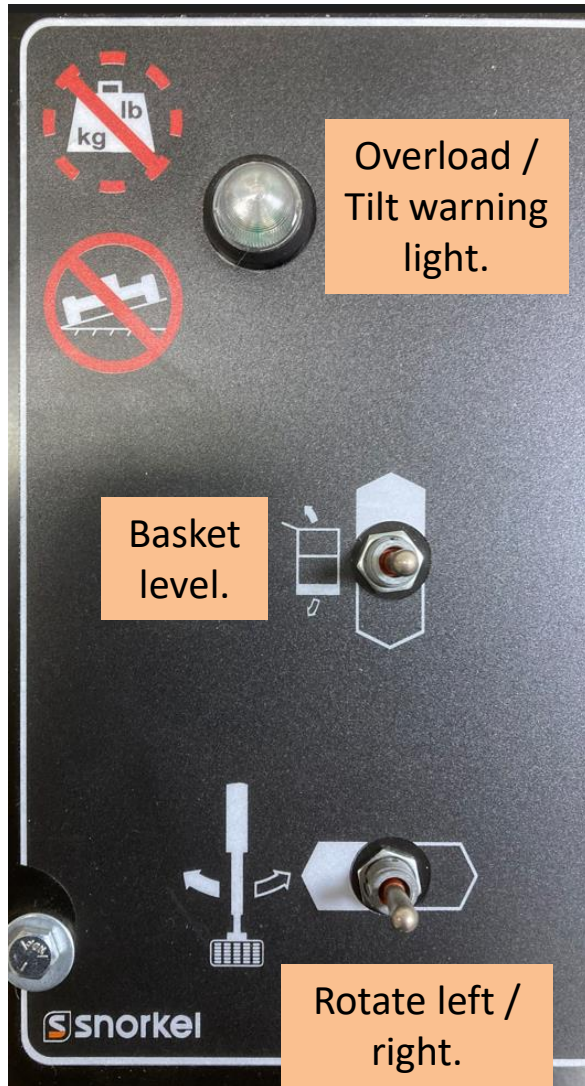
PLATFORM CONTROL BOX



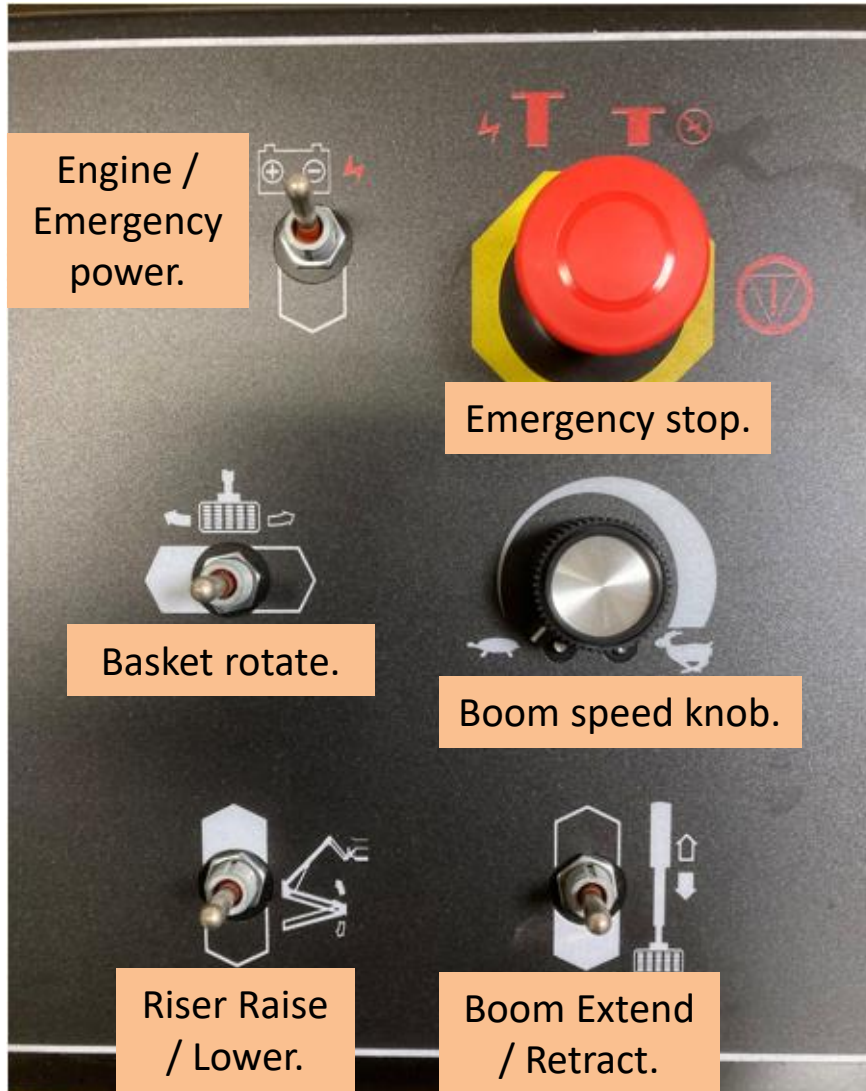
On the front of the control box is the ignition key.

PLATFORM

PLATFORM CONTROL BOX



PLATFORM CONTROL BOX



Boom Speed Knob

Use the boom speed control knob to control the speed of the following boom functions:

- Main boom raise/lower
- Main boom extend/retract
- Turntable rotation clockwise/counterclockwise

Set the knob to slow (turtle) when beginning a boom movement. The speed may be increased by slowly rotating the knob toward fast (rabbit). For smooth operation, rotate the knob to slow when ending boom movement.

PLATFORM CONTROL BOX



PLATFORM

PLATFORM CONTROL BOX



PLATFORM CONTROL BOX OPERATION

1. Twist and Pull Emergency switch out to have power to the lower controls.



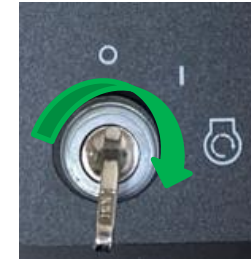
2. Turn the keyswitch to the "Platform" position.



3. Twist and Pull Emergency switch out to have power to the upper controls.



4. Turn the key to start the engine



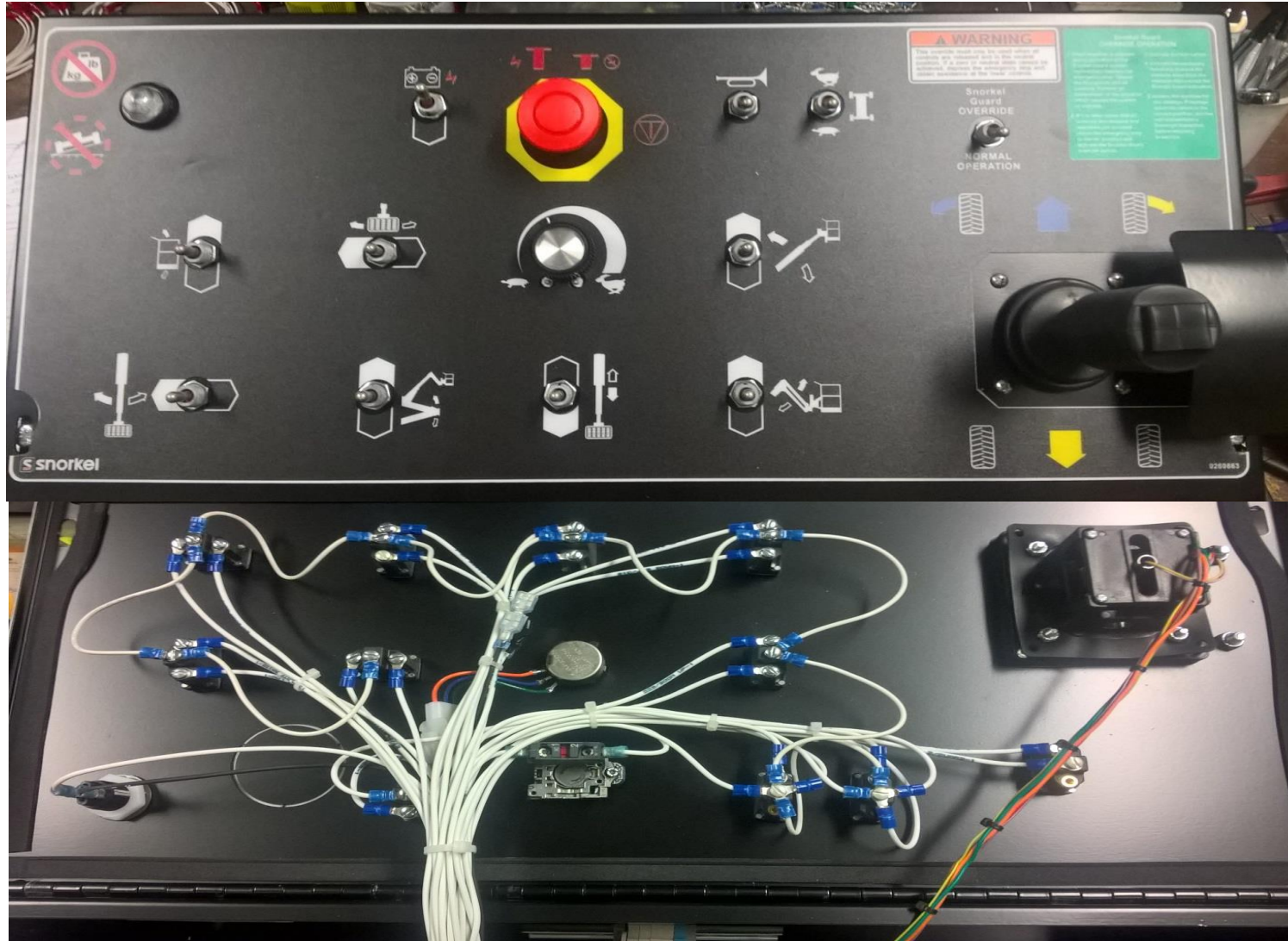
5. Step onto the platform footswitch.



6. Select and hold in position the required operation switch, e.g., Riser Up.



PLATFORM CONTROL BOX

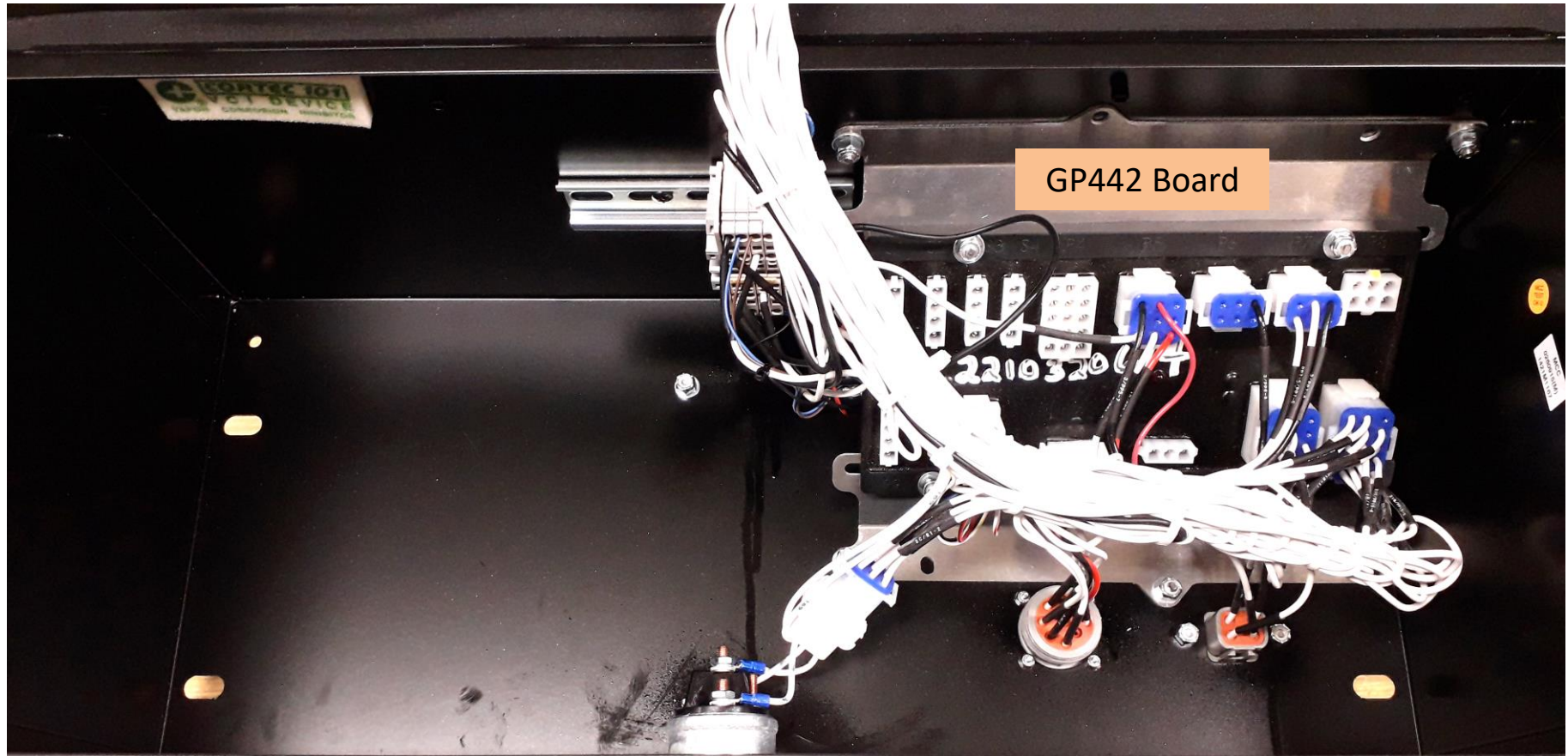


PLATFORM

PLATFORM CONTROL BOX

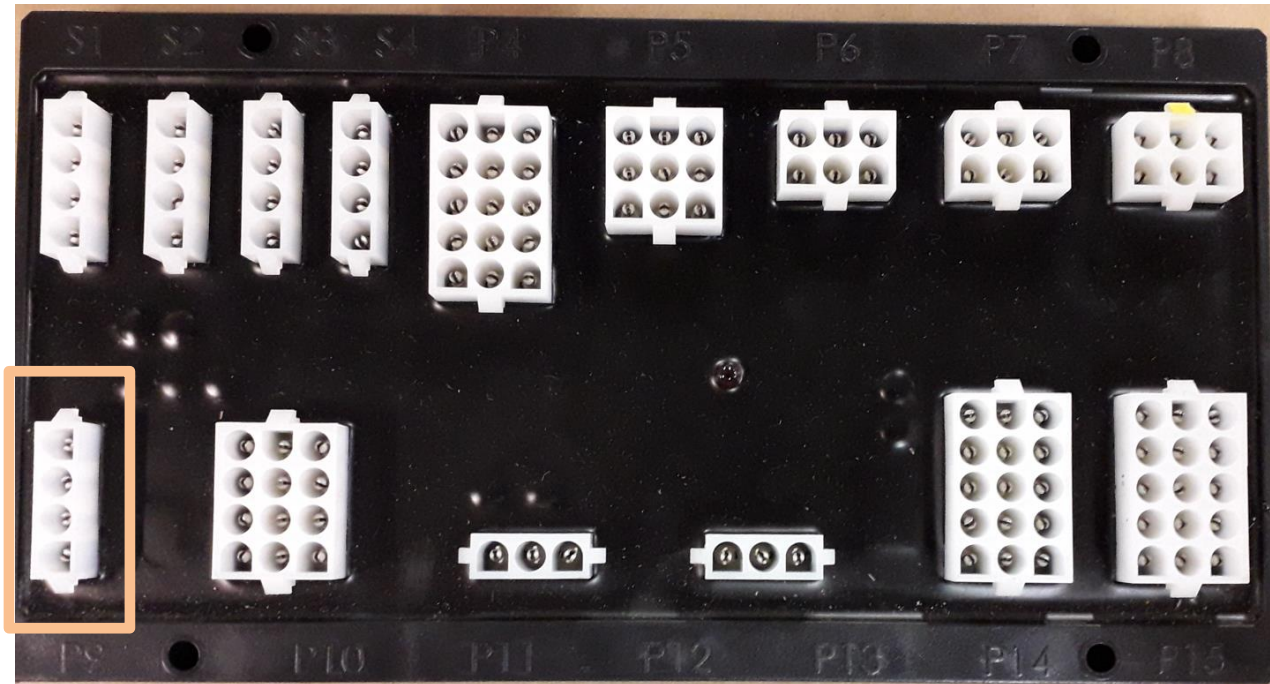


PLATFORM CONTROL BOX



Machines have a GP442 board fitted in the platform control box.

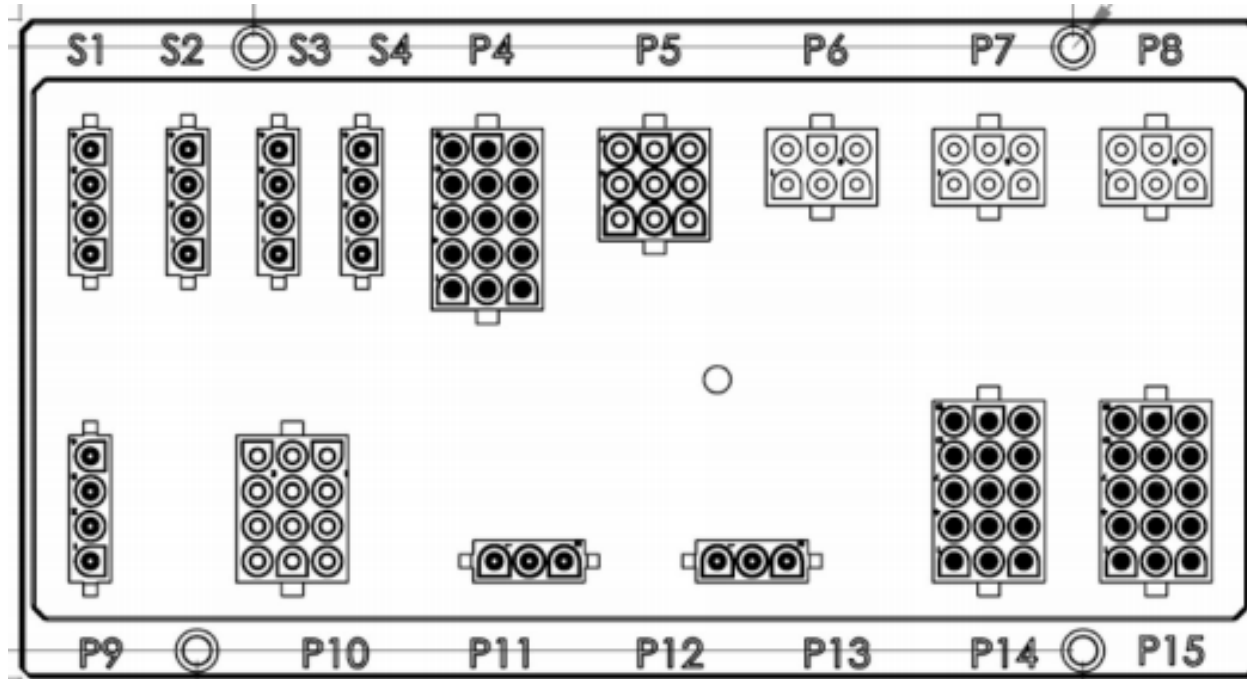
GP442 CONTROL BOARD



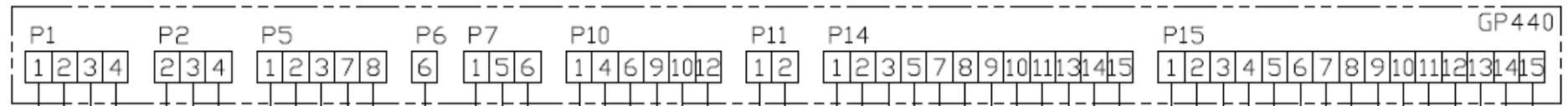
1. The GP442 I/O module has been specifically designed to minimize the number of connections & plugs needed to connect the platform controls of a Boom lift. As a result, only CAN & power wires need to be run up the boom.
2. The GP442 I/O module provides a control solution for the Boom Lift vehicles when used in conjunction with a GP400 it completes an IC Boom Lift control system.
3. Provides protected High side outputs.
4. CANbus interface.
5. RS232 connection to handheld Ezcal for diagnostics. (P9 plug).

GP442 CONTROL BOARD

Plug location numbers



Plug number and wire location as shown on the Electrical schematic.



GP442 CONTROL BOARD

I/O List

TERM	I/O TYPE	DESTINATION
PP1-1	+5V	LOAD CELL
PP1-2	+ DIFF	
PP1-3	- DIFF	
PP1-4	GND	
PP2-2	+ DIFF	
PP2-3	- DIFF	
PP2-4	GND	
PP5-1	2A OUTPUT	ALARM
PP5-2	2A OUTPUT	0/L TILT LIGHT
PP5-3	SUPPLY	TBM B+
PP5-7	GND	TBM B-
PP5-8	2A OUTPUT	GUARD LIGHT
PP6-6	GND	GROUNDNS
PP7-1	ANALOG INPUT	RHEOSTAT
PP7-5	+5V	
PP7-6	GND	
PP10-1	ANALOG INPUT	JOYSTICK
PP10-4	+5V	
PP10-6	GND	
PP10-9	DIGITAL INPUT	
PP10-10	DIGITAL INPUT	
PP10-12	BATTERY +	

TERM	I/O TYPE	DESTINATION
PP11-1	CAN HIGH	CANBUS TO GP400
PP11-2	CAN LOW	
PP14-1	DIGITAL INPUT	PLATFORM LEVEL UP
PP14-2	DIGITAL INPUT	PLATFORM LEVEL DOWN
PP14-3	DIGITAL INPUT	DRIVE HIGH SPEED
PP14-5	DIGITAL INPUT	START SWITCH
PP14-7	DIGITAL INPUT	FOOT SWITCH
PP14-8	DIGITAL INPUT	HYD WARM UP
PP14-9	DIGITAL INPUT	HYD GENERATOR
PP14-10	DIGITAL INPUT	GUARD PROX SWITCH
PP14-11	DIGITAL INPUT	GUARD OVERRIDE SWITCH
PP14-13	DIGITAL INPUT	BUMP GUARD 1
PP14-14	DIGITAL INPUT	BUMP GUARD 2
PP14-15	DIGITAL INPUT	BUMP GUARD OVERRIDE
PP15-1	DIGITAL INPUT	MAIN BOOM UP
PP15-2	DIGITAL INPUT	MAIN BOOM DOWN
PP15-3	DIGITAL INPUT	RISER UP
PP15-4	DIGITAL INPUT	RISER DOWN
PP15-5	DIGITAL INPUT	JIB UP
PP15-6	DIGITAL INPUT	JIB DOWN
PP15-7	DIGITAL INPUT	TELE EXTEND
PP15-8	DIGITAL INPUT	TELE RETRACT
PP15-9	DIGITAL INPUT	SWING CW
PP15-10	DIGITAL INPUT	SWING CCW
PP15-11	DIGITAL INPUT	PLATFORM CW
PP15-12	DIGITAL INPUT	PLATFORM CCW
PP15-13	DIGITAL INPUT	HORN
PP15-14	DIGITAL INPUT	EMERGENCY POWER
PP15-15	DIGITAL INPUT	DRIVE LIGHTS

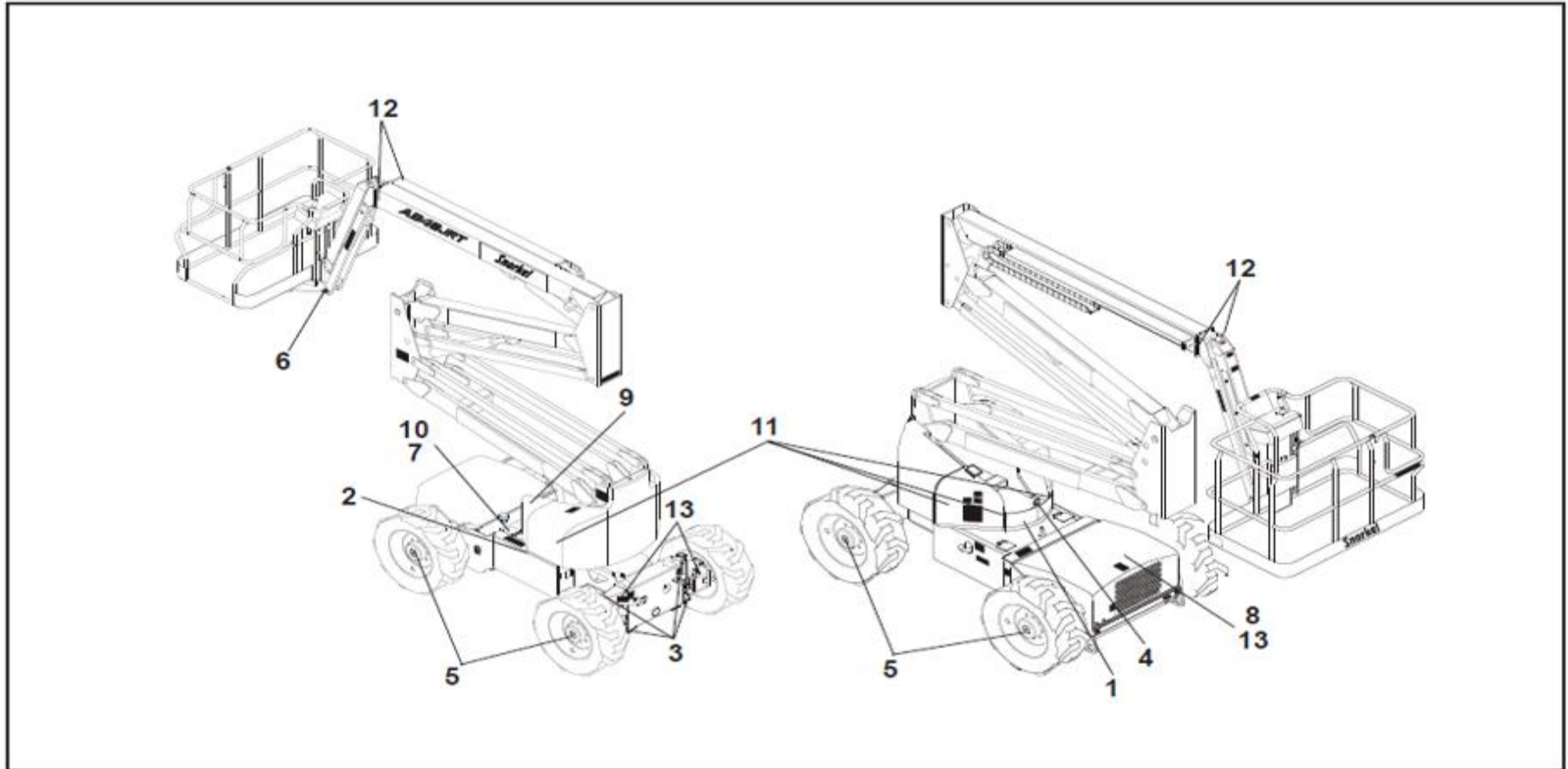


MAINTENANCE

Maintenance covers :-

1. Page 142 :- Maintenance points.

MAINTENANCE POINTS



Lubrication Points

MAINTENANCE POINTS

Lubrication

Specific lubricants as recommended by Snorkel, should be used in maintaining the unit. If in doubt regarding the use of lubricants other than those listed, contact Snorkel Customer Service Department for evaluation and recommendation.

Refer to the above lubrication illustration to locate component item numbers.

Service all fittings as indicated on the Frequent Maintenance schedule and lubrication illustration. Wipe away all excess lubricant from exposed surfaces. Over lubrication can collect dirt and foreign matter which acts as an abrasive. Lubrication of accessory equipment should be in accordance with the manufacturer's recommendations.

Rotation Bearing

Rotation bearing – Item 1. Pressure gun lubricate bearing at recommended interval using lubricant as outlined in the maintenance schedule. Rotate while lubricating. The lubrication fitting is located on the rear of the turntable.

Rotation Gear Teeth and Pinion

Rotation gear teeth and pinion – Item 2. Gear teeth and gear box pinion should be lubricated with a spray-on type open gear lubricant.

Tie Rods

Tie rods – Item 3. Lubricate at recommended interval using lubricant as outlined in the maintenance schedule.

Swing Drive

Swing drive – Item 4. To check oil level, remove check plug located on the side of the gear box. Unit is full if oil is level with bottom of fill hole or just starts to run out.

Gear Hubs

Gear hubs – Item 5. To check and fill Gear hubs:

1. Rotate wheel until bottom of filler/drain plug is about 1 inch above horizontal centerline.
2. Remove plug with drive ratchet and extension.
3. Fill until lubricant is level with bottom of fill hole.

Note

Do not overfill gear hubs as they are not vented and need air space for expansion of oil to prevent damage to hubs.

Platform Rotator

Platform Rotator – Item 6. Platform rotators will require lubrication only if disassembled for repairs. Consult factory for proper lubricant if replacement of platform rotator is required.

MAINTENANCE POINTS

Hydraulic Oil Reservoir

Hydraulic oil reservoir – Item 7. The fluid level should be visible in the bottom of the sight gauge and should be checked with the machine in the stowed position.

The interior of the reservoir should be wiped out and cleaned each time the hydraulic oil is changed.

The reservoir filler/breather cap should be removed and the cap strainer cleaned with Kerosene, fuel oil, or other solvent at this time.

It is absolutely necessary that only new, clean hydraulic oil is added.

Note

If it becomes necessary to add or use an oil other than the recommended fluid, it is important that it be compatible and equivalent to the factory fill. Local oil suppliers can generally furnish this information.

If questions still remain, contact Snorkel Customer Service Department for further information.

Engine

Engine – Item 8. Refer to the engine manufacturer's instruction manual or consult your local engine service representative if engine adjustments or repairs are needed. The engine must be operated in accordance with manufacturer's instructions and serviced at recommended intervals.

MAINTENANCE POINTS

Hydraulic Oil Return Filter

Return filter – Item 9. The hydraulic oil return filter is located on the control valve behind the door on the right side of the turntable

The filter element is a throw-away type filter and should be changed after the initial break-in period (approximately 50 hours operation time).

The filter is equipped with a hydraulic pressure gauge to indicate the filter element condition. A by-pass relief within the filter base is provided and is set to by-pass at 25 psi. If pressure readings are above 25 psi, the filter should be changed.

The filter condition should be checked at the 90 day or 150 hour Preventive Inspection Maintenance interval or more frequently under extreme working conditions.

The filter condition indicator is accurate only when the engine is running at maximum rpm and pump is discharging maximum flow, which occurs only during full speed driving. This requires that the indicator be observed while the unit is in motion, booms fully retracted and in stowed position, drive range switch in "LO" position, and drive controller fully forward. Oil temperature should be at least 90° F (32° C).

Warning

Use extreme caution while observing the condition indicator because of the motion of the drive wheels. The condition indicator is best observed from outside of the tract of the vehicle wheels to avoid possible personal injury or machine damage.

When changing the filter element, the oil inside of the filter element, should be examined for deposits of metal cuttings, which is present, could indicate excessive wear in some of the system components.

MAINTENANCE POINTS

Suction Strainer

Suction strainer – Item 10. Two 100 mesh strainers are located within the hydraulic oil reservoir, one on the inlet and one on the outlet, and filters the pump suction flow.

The strainers should be cleaned at the time interval shown in the maintenance schedule chart, using Kerosene, fuel oil or other solvent and a soft bristled brush.

Inspect the filter wire cloth for damage. Holes in the filter cloth leak dirt into the pump and other vital hydraulic components. If element is damaged, replace.

When the filter has been thoroughly cleaned, reinstall in suction line and tighten securely.

Door Hinges and Latches

Door hinges and latches – Item 11. After lubricating, remove any excess lubricant or over spray so it will not collect dirt or debris.

Slide Pads

Slide pads – Item 12. Check slide pads for excessive wear and replace as required. Slide pads do not require lubrication.

Yokes

Yokes – Item 13. Some machines have a grease fitting on the front axle yokes. Pressure gun lubricate both front yokes at recommended interval using lubricant as outlined in the maintenance schedule. A lubrication fitting is located on the top of each yoke.

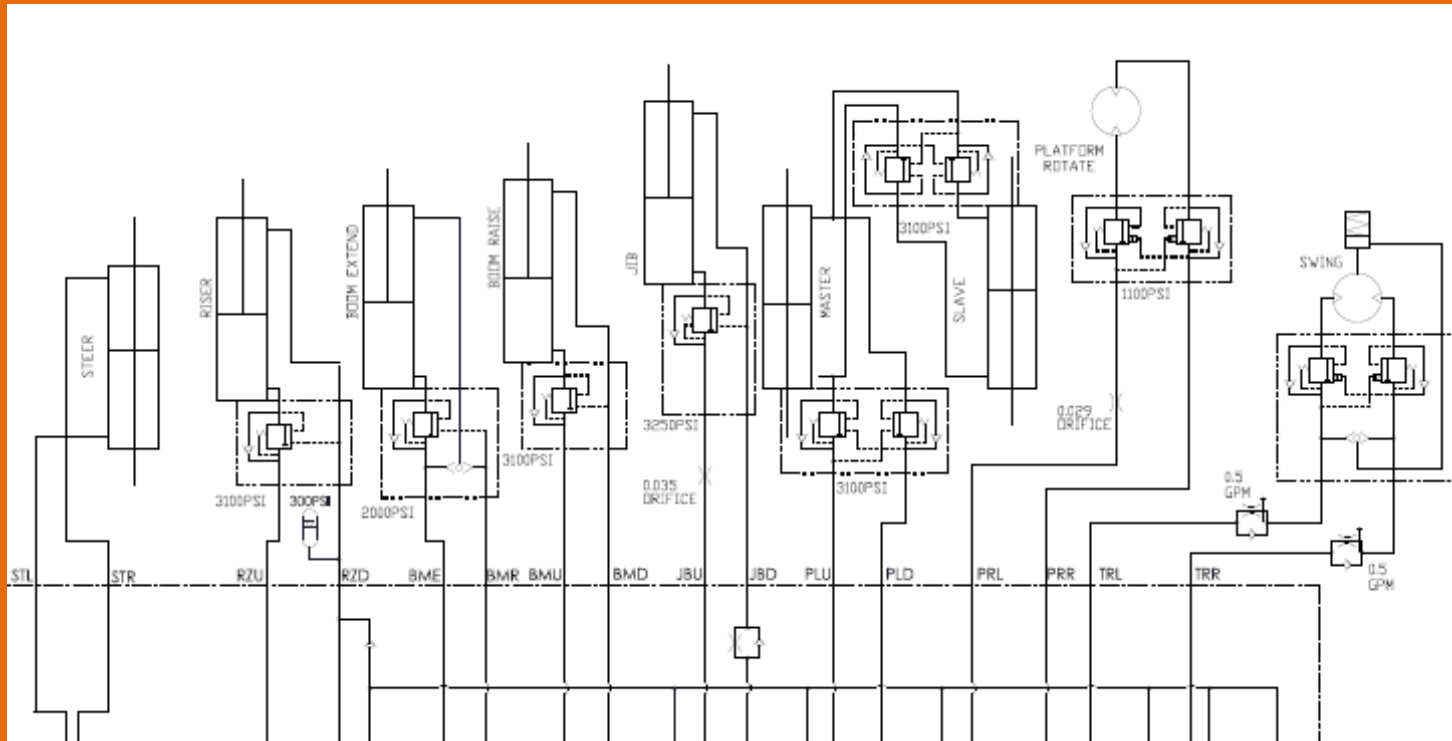
Battery

Battery – Item 13. The battery will have longer life if the water level is maintained and they are kept charged. The engine will have better starting characteristics with a fully charged battery. In cold weather the battery should be maintained at full charge to keep from freezing. An extremely low or dead battery can freeze in cold weather. Make sure connections are clean and tight.

Make sure charging equipment is operating properly.

Danger

Lead-acid batteries produce flammable and explosive gases. Never allow smoking, flames or sparks around batteries. Lead-acid batteries contain sulfuric acid which will damage eyes or skin on contact. When working around batteries, always wear a face shield to avoid acid in eyes.

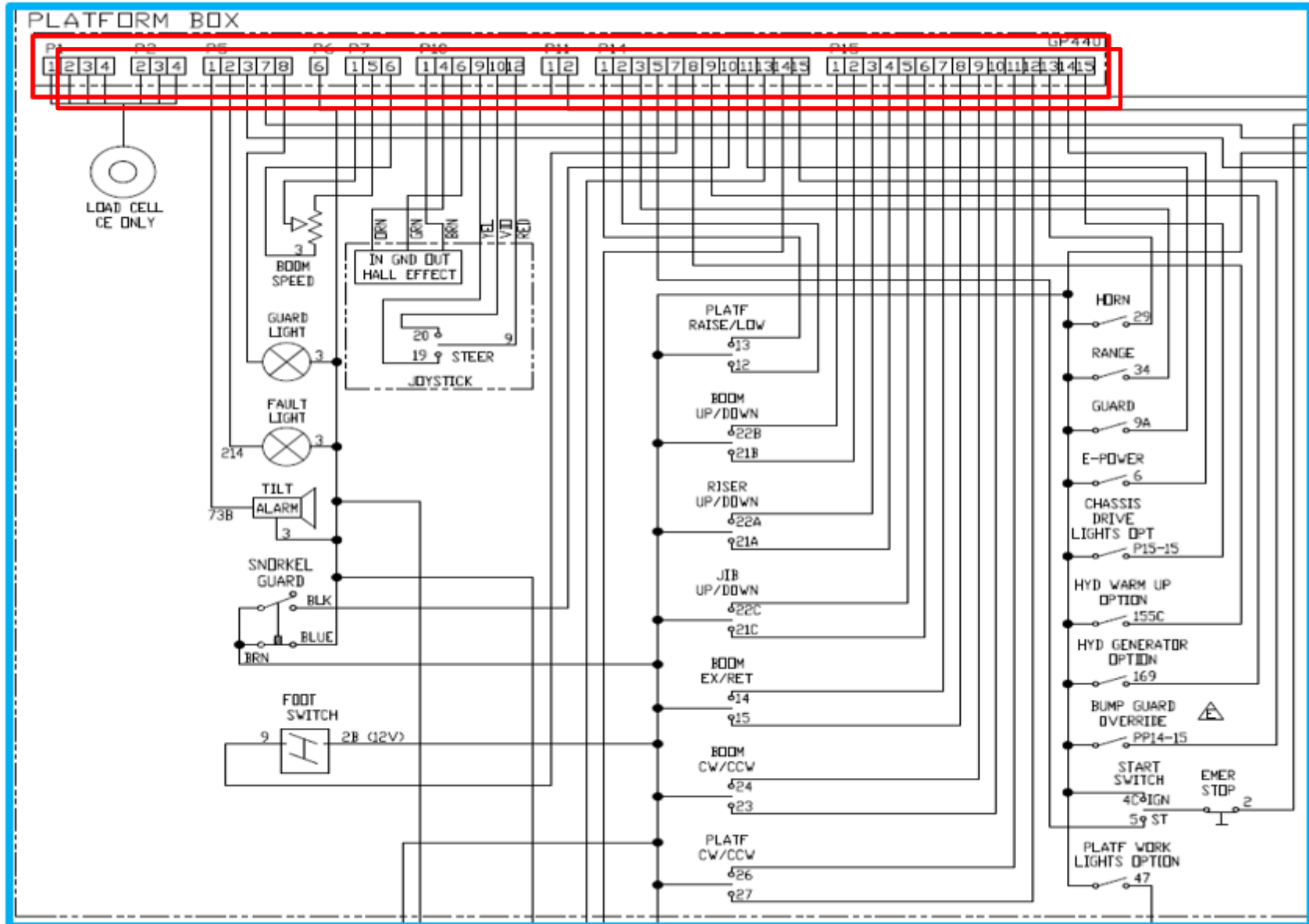


SCHEMATICS

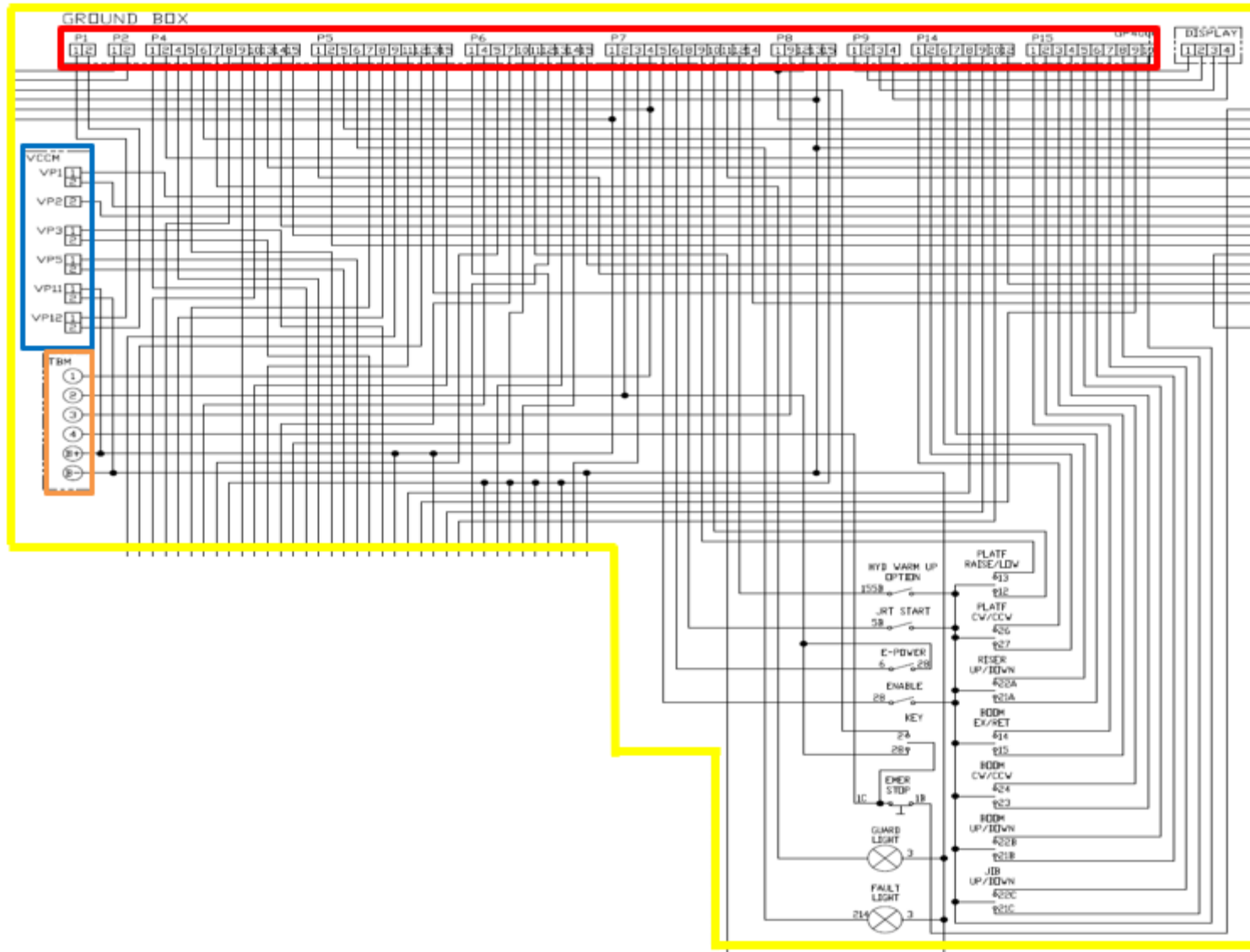
Schematics covers :-

1. Page 149 :- Electrical schematic.
2. Page 150 :- Upper control box schematic.
3. Page 151 :- Lower control box schematic.
4. Page 152:- L.C.B. to Motion solenoids.
5. Page 153 :- Hydraulic schematic.
6. Page 154 :- Boom manifold schematic.
7. Page 156 :- Transmission pump.
8. Page 157 :- Drive block.

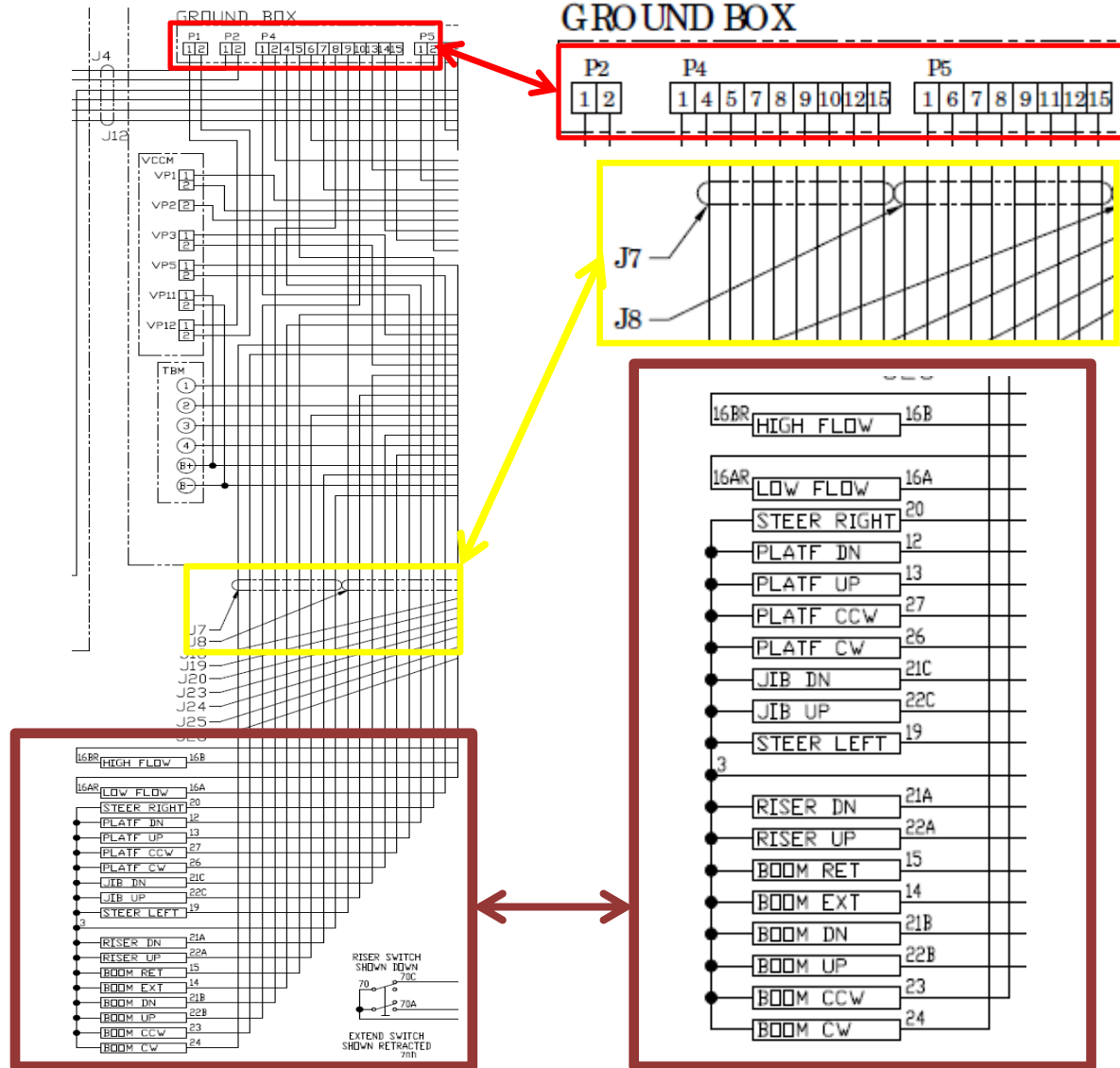
UPPER CONTROL BOX SCHEMATIC



LOWER CONTROL BOX SCHEMATIC

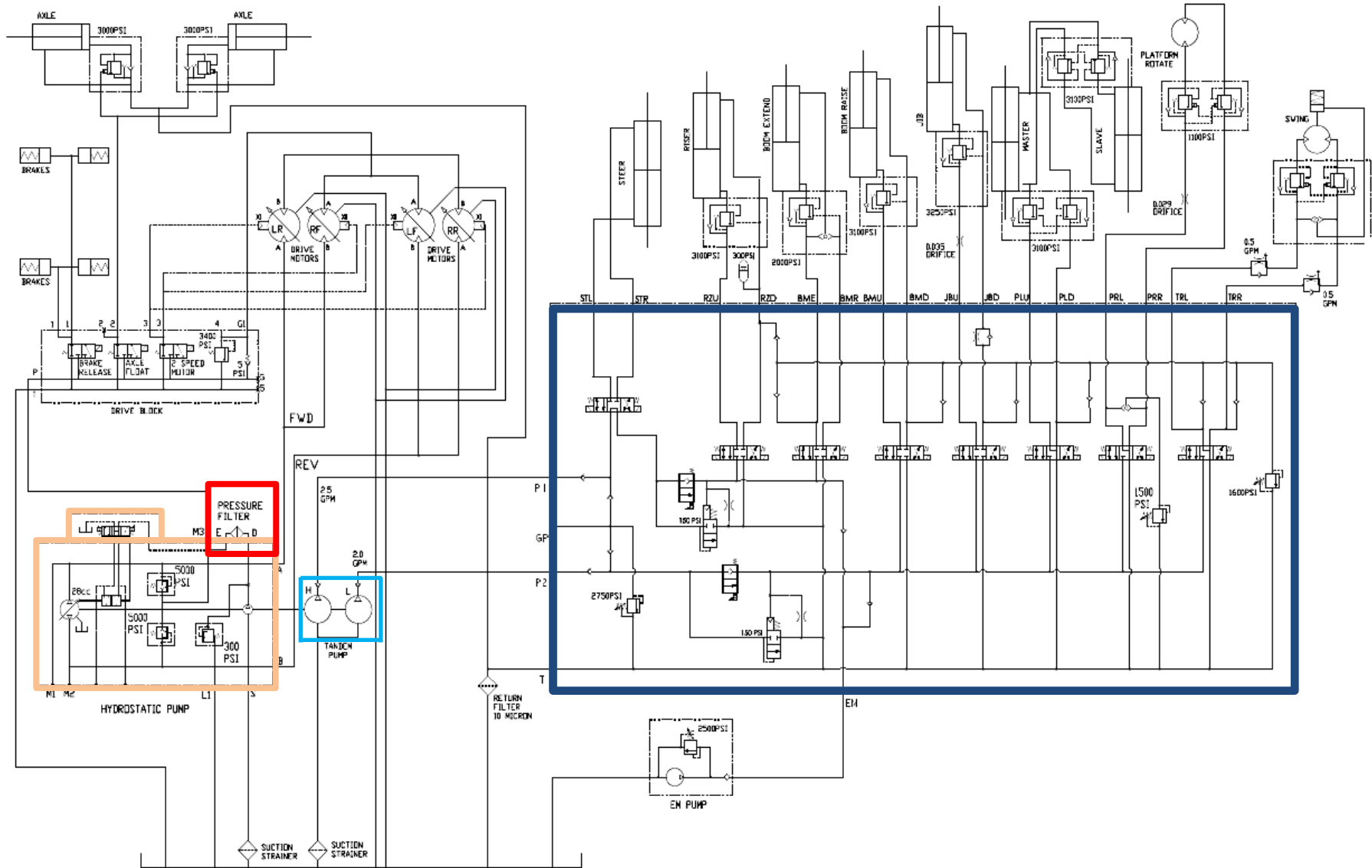


L.C.B. TO MOTION SOLENOIDS

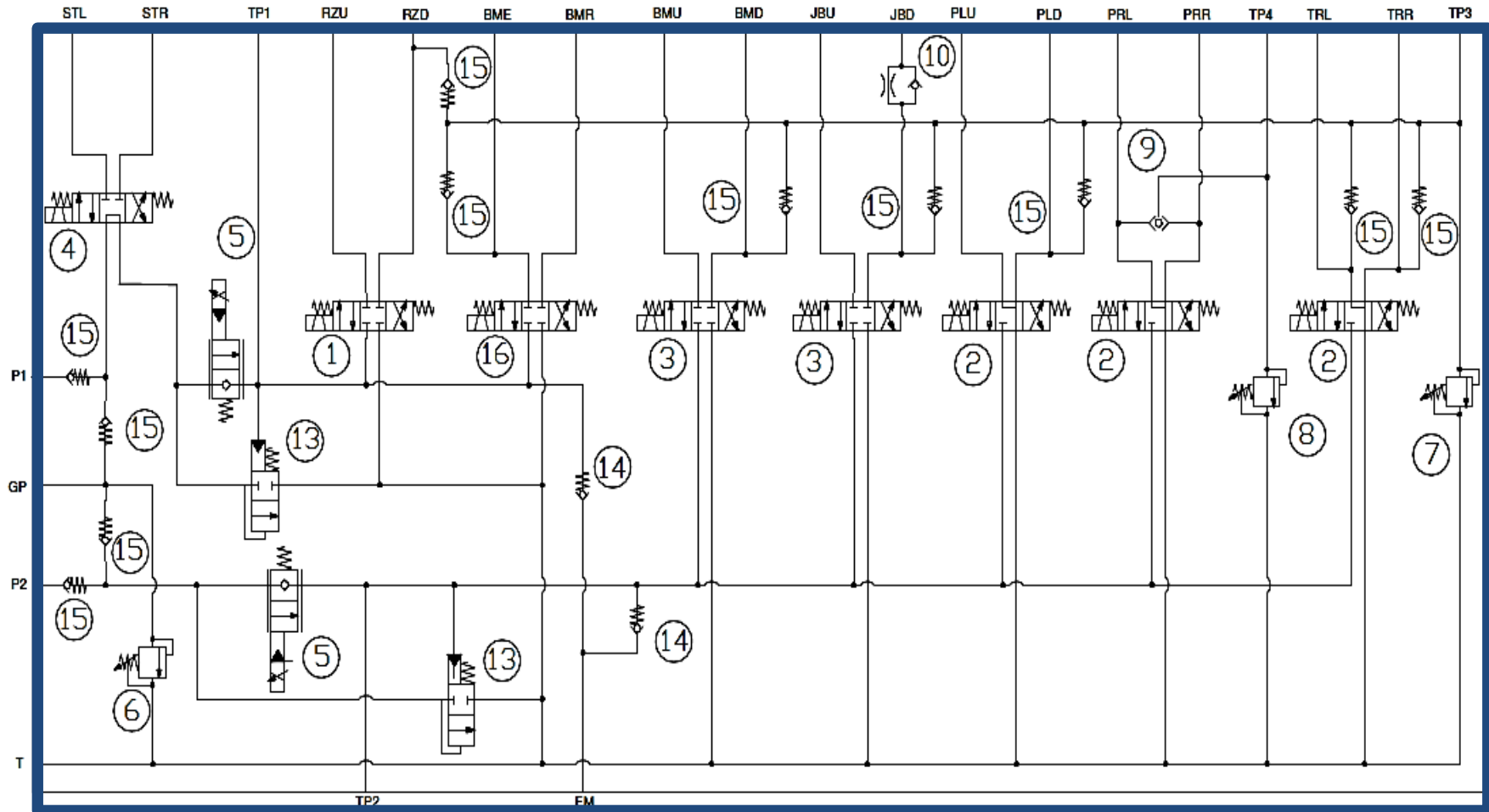


Motion	Wire no.	Plug no.	GP400 Plug / pin	VCCM Plug / pin
High flow	16B	J8		VP3 - 2
Low flow	16A	J8		VP5 - 2
Steer right	20	J8	P4 - 5	
Platform down	12	J8	P4 - 4	
Platform up	13	J8	P4 - 1	
Platform CCW	27	J8	P6 - 10	
Platform CW	26	J8	P6 - 7	
Jib down	21c	J8	P5 - 11	
Jib up	22c	J8	P5 - 15	
Steer left	19	J8	P4 - 9	
Riser down	21A	J7	P6 - 5	
Riser up	22A	J7	P6 - 4	
Boom retract	15	J7	P5 - 7	
Boom extend	14	J7	P5 - 8	
Boom down	21B	J7	P4 - 8	
Boom up	22B	J7	P4 - 10	
Boom CCW	23	J7	P5 - 12	
Boom CW	24	J7	P5 - 9	

HYDRAULIC SCHEMATIC



BOOM FUNCTION MANIFOLD

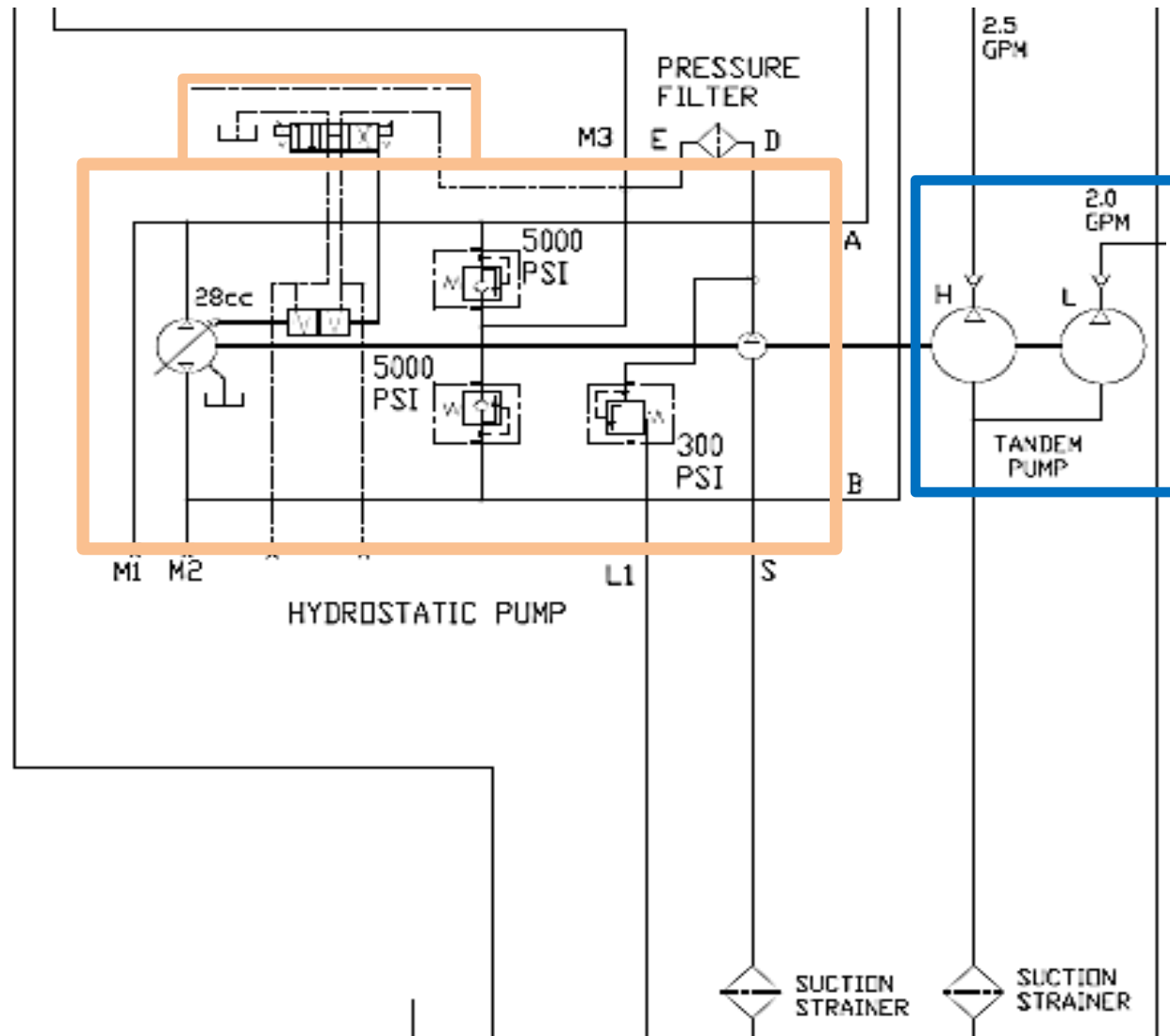


BOOM FUNCTION MANIFOLD PARTS

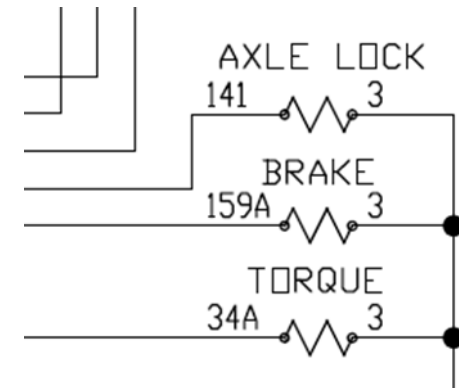
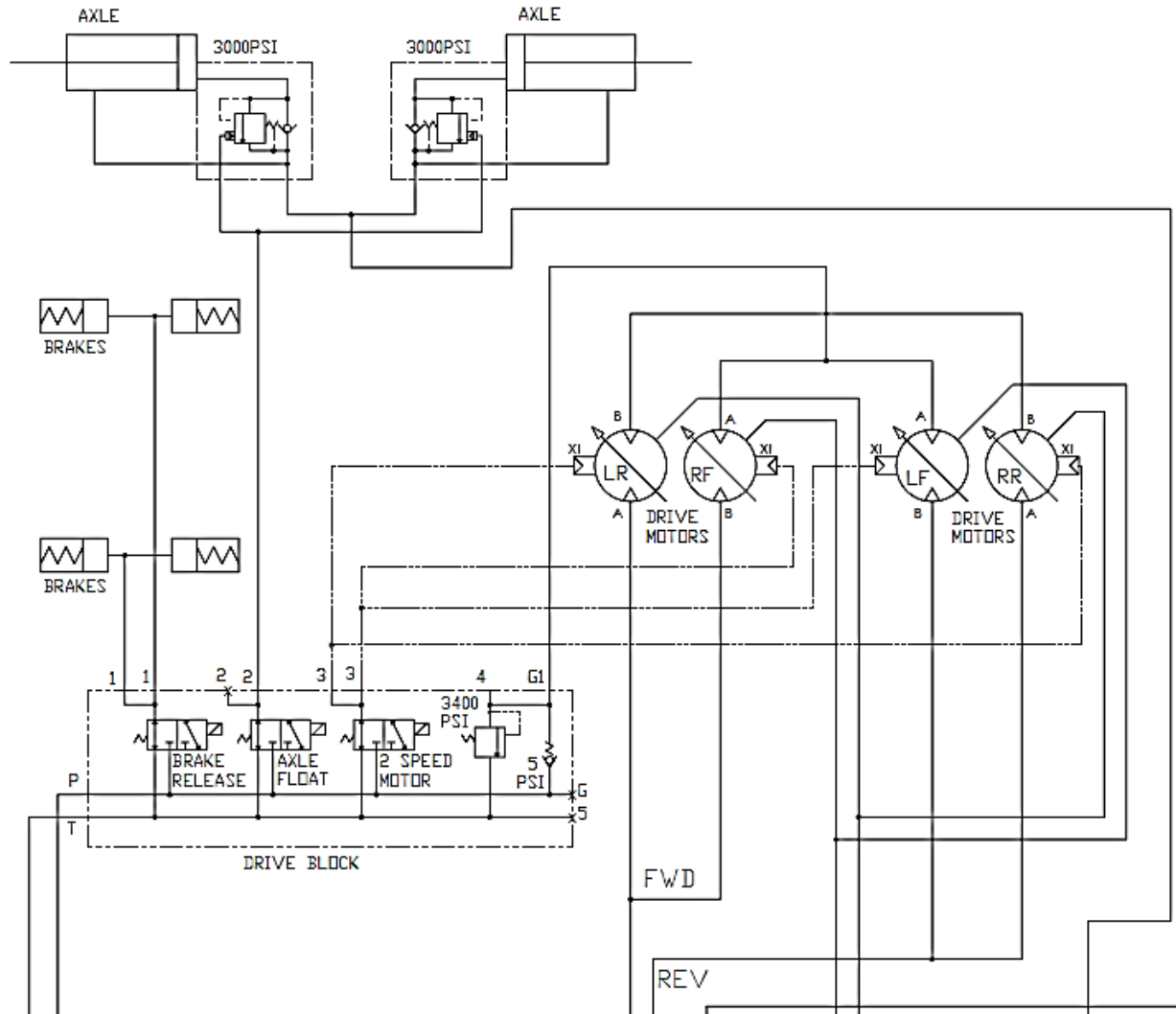


16	6019297	CARTRIDGE, #10 SPOOL, 4W3P, SPECIAL CENTER	1
15	561176	CHECK VALVE HF#CV08-20-0-N-04	11
14	6019182	CHECK VALVE HF#CV08-20-0-N-10	2
13	6019225	LOGIC ELEMENT VALVE, EPFR58-35-0-N-150	2
12	6019180	COIL 4303612	14
11	6019184	COIL 4303712	4
10	6019177	ORIFICE PLATE 4500220	1
9	6010737	SHUTTLE VALVE HF#LS08-30-0-N	1
8	6019175	RELIEF VALVE HF#RV08-22H-0-N-13/15	1
7	6019224	RELIEF VALVE HF#RV08-22H-0-N-13/16	1
6	6019174	RELIEF VALVE HF#RV08-22H-0-N-35/27.5	1
5	6019194	ELEC.-PROPORTIONAL VALVE HF#SP08-20-0-N-00	2
4	6019075	SOLENOID VALVE HF#SV08-47A-0-N-00	1
3	6018952	SOLENOID VALVE HF#SV08-47C-0-N-00	2
2	6018940	SOLENOID VALVE HF#SV08-47D-0-N-00	3
1	6019077	CARTRIDGE, 4W3PCC, SV10-47C	1
ITEM	PART NO.	DESCRIPTION	REQD

TRANSMISSION/HYDRAULIC PUMP



DRIVE BLOCK



**Local Distributor / Lokaler Vertiebs­händler / Distributeur local
El Distribuidor local / Il Distributore locale**

EUROPE, MIDDLE EAST
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