

A38E PARTS MANUAL JANUARY 2019 AND AFTER

S/N 00715 AND AFTER

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snorkel

A38E



PARTS AND SERVICE MANUAL

Part number 514252-201
AUG 2018

Serial Number 01-00715 +

DANGER

The aerial platform is not electrically insulated. Death or serious injury will result from contact with, or inadequate clearance from, an energized conductor.

Do not go closer than the Minimum Safe Approach Distance as defined by ANSI standards.

NEVER get closer than the minimum distance recommended by your National Regulations.

Regard all conductors as energized.

Allow for electrical wire sag and aerial platform sway.

If the platform, boom structure, or any part of the aerial platform contacts a high-voltage electrical conductor, the entire machine can become electrically charged.

If that happens, remain on the machine and do not contact any other structure or object. This includes the ground, adjacent buildings, poles, and any other objects that are not part of the aerial platform.

Such contact could make your body a conductor to the other object, creating an electrical shock hazard resulting in death or serious injury.

If an aerial platform is in contact with an energized conductor the platform operator must warn ground personnel in the vicinity to stay away. Their bodies can conduct electricity creating an electrical shock hazard resulting in death or serious injury.

Do not approach or leave the aerial platform until the electricity has been turned off.

Do not attempt to operate the lower controls when the platform, scissors structure, or any part of the aerial platform is in contact with a high-voltage electrical conductor or if there is an immediate danger of such contact.

Personnel on or near an aerial platform must be continuously aware of electrical hazards, recognizing that death or serious injury can result from contact with an energized conductor.

California

Proposition 65 Warning

Battery posts, terminals and related accessories contain lead and lead components, chemicals known to the State of California to cause cancer and birth defects or other reproductive harm. Wash hands after handling.

General Information

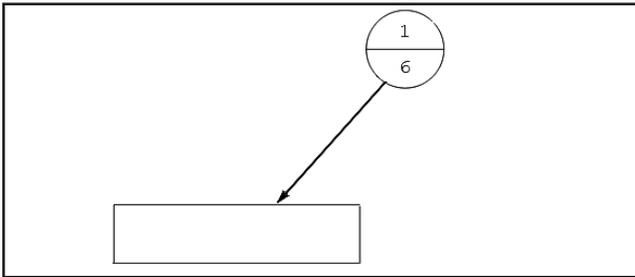
About This Manual

This manual covers A38E aerial platforms. Information is included for machines that have been manufactured to conform to all applicable requirements of the following organizations:

- American National Standards Institute (ANSI)
- Canadian Standards Association (CSA)
- European Committee for Standardization (CE)
- Australian Standards (AS) certification

Part pages include a drawing and a bill of material. The bill of material lists the item number that is on the drawing, the Snorkel part number, quantity used and a description of the item.

Some callouts in the drawings may have a balloon with two numbers. The top number is the item number and the bottom number is the quantity of the item at that location.



While Snorkel has attempted in every way to confirm that all information in this manual is correct, improvements are being constantly made to the machine that may not be reflected in this manual.

If you find information in this manual that is not correct or is confusing, you are urged to report your findings to Snorkel for our evaluation. Your input is important to us and will be used in future printings of this manual.

This machine is covered by a limited warranty that specifically identifies items warrantied by Snorkel and those items covered by original manufacturer's warranty. A copy of the Snorkel Limited Warranty is located on the inside of the back cover of this manual.

Repairs and Maintenance

Every person who maintains, inspects, tests or repairs the machine must be qualified and authorized to do so.

⚠Caution

Do not modify this aerial platform without prior written consent of Snorkel Engineering Department. Modification may void the warranty, adversely affect stability or affect the operational characteristics of the aerial platform.

Abbreviations

The following abbreviations may be used in this manual.

AC	alternating current
ANSI	American National Standards Institute
AR	as required
CCA	cold cranking amps
cm	centimeter
DC	direct current
ft	feet
GFCI	ground fault circuit interruptor
in	inch
lbs	pounds
mm	millimeter
no	number
NPT	national pipe thread
psi	pounds per square inch
qty	quantity
rpm	revolutions per minute
UL	Underwriters Laboratories Inc.

Additional Information

All correspondence relative to this machine, such as field reports, discrepancy reports, requests for information, etc., should be directed to:

Snorkel North America
P.O. Box 1160
St. Joseph, MO 64502-1160 USA
Phone: 1-800-255-0317

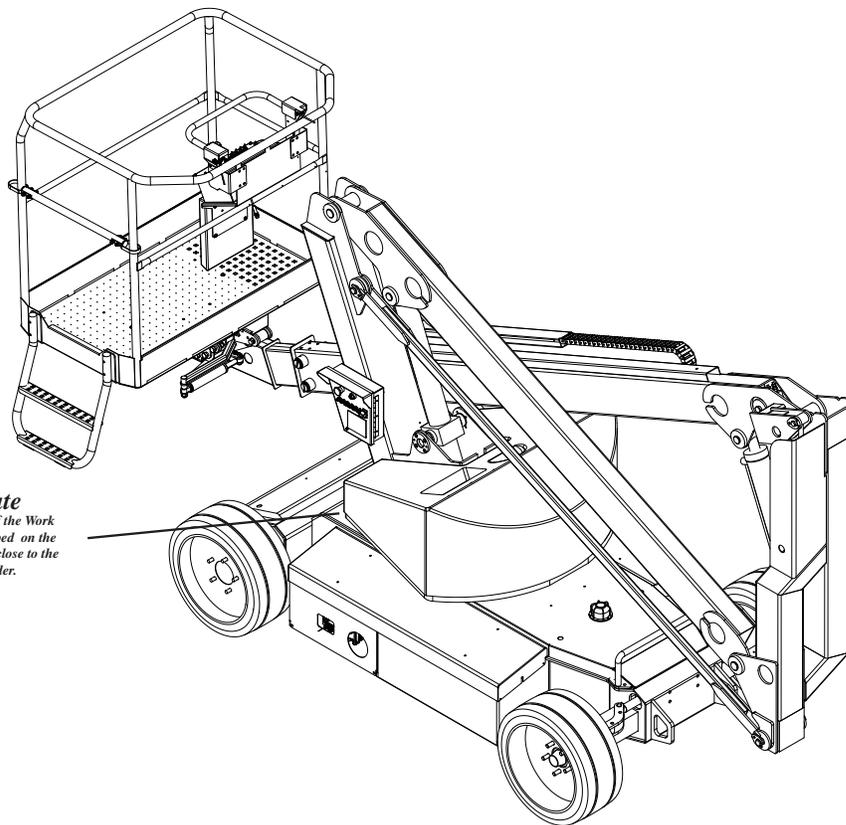
Snorkel Europe
Vigo Centre
Birtley Road
Washington
Tyne & Wear
NE38 9DA
Phone: +44 (0) 845 1550 058

<http://www.snorkellifts.com>

SERVICE & PARTS MANUAL

A38E

Aerial Work Platform



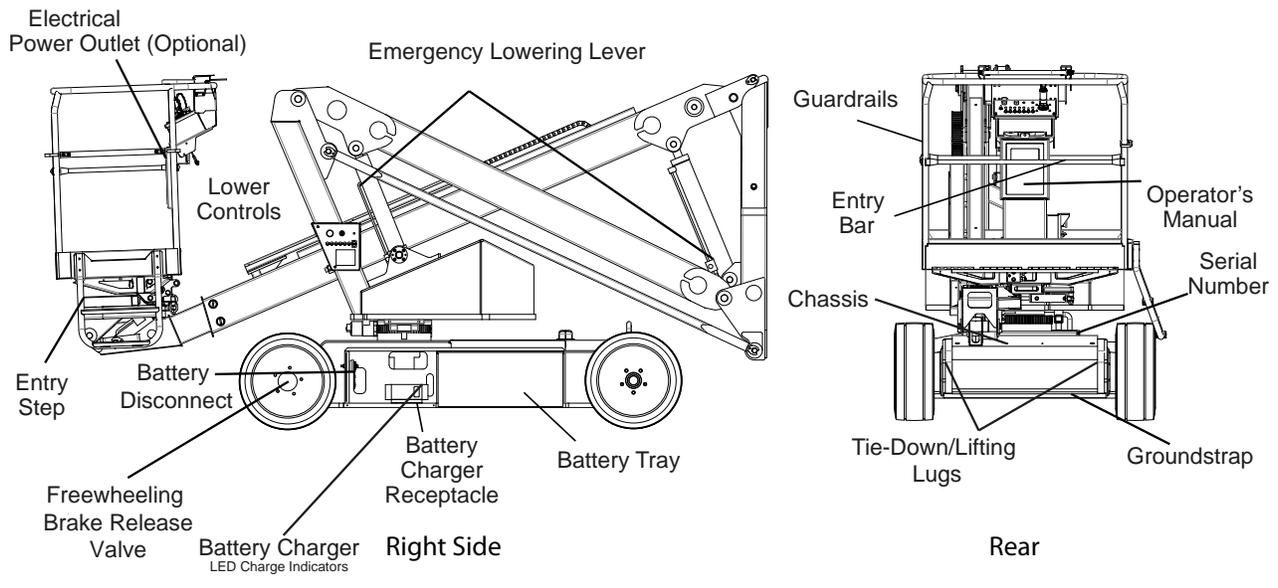
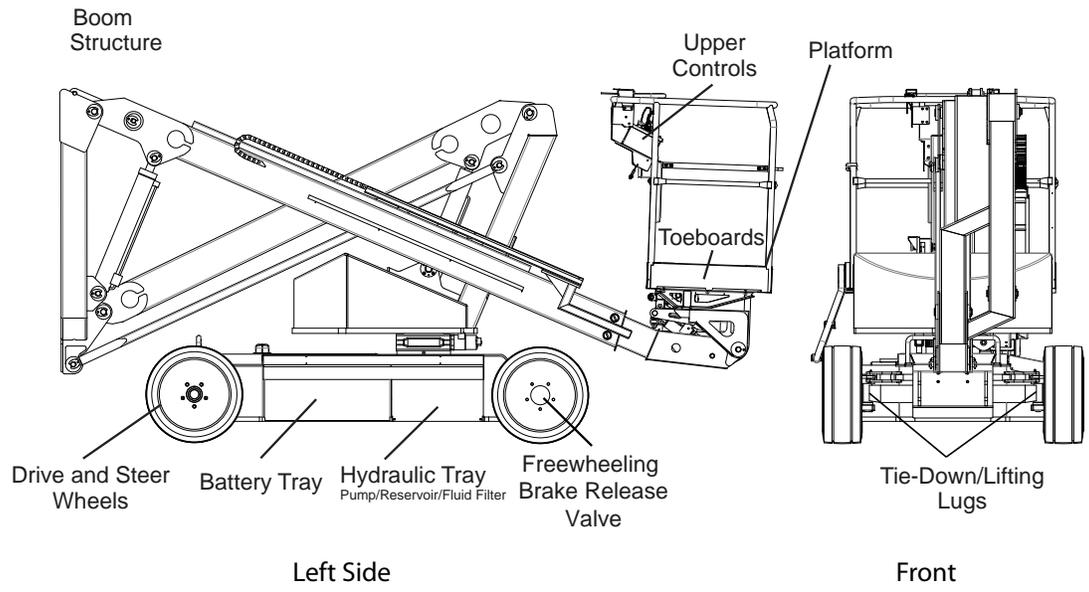
Nameplate
The Serial Number of the Work Platform is also stamped on the inside of the Chassis, close to the Steering Cylinder.



When contacting Snorkel for service or parts information, sure to include the MODEL and SERIAL NUMBERS from the equipment nameplate.

The Serial Number of the Work Platform is also stamped on the inside of the Chassis, close to the Steering Cylinder.
The A38E work platform meets and exceeds the requirements of both:
En280:2013+A1:2015 and ANSI A92.5 (1992)

Component Identification



Service and Parts Information

Ordering Parts

When placing an order for service or repair parts, please have the following machine information readily available.

- Model number
- Serial number
- Snorkel part number
- Description of part
- Quantity of parts required
- Your purchase order number
- Address for order to ship to
- The desired shipment method

If ordering parts off-line, the parts order form on the following page may be mailed or faxed to the attention of the Parts Department at the following location:

Snorkel North America
P.O. Box 1160
St. Joseph, MO 64502-1160 USA
Phone: 1-800-255-0317
Parts Fax: 1-785-989-3077

Snorkel Europe
Vigo Centre
Birtley Road
Washington
Tyne & Wear
NE38 9DA

Phone: +44 (0) 845 1550 058
Parts Fax: +44 (0) 1952 607 678

Attention: Parts Department

For your convenience, our electronic on-line ordering system is accessible from the following Internet location:

<http://www.snorkellifts.com>

CE Compliance

All users and service personnel using or working on the aerial platform must read, understand and comply with all applicable regulations. Refer back the the Operators Manual for more information on safe use.

The A38E work platform meets and exceeds the requirements of En280:2013+A1:2015

ANSI and OSHA Compliance

All owners,users of the aerial platform must read, understand and comply with all applicable regulations. Ultimate compliance to OSHA regulations is the responsibility of the user and their employer.

ANSI publications clearly identify the responsibilities of all personnel who may be involved with the aerial platform. A reprint of the "Manual of Responsibilities for Dealers, Owners, Users, Operators, Lessors and Lessees of ANSI A92.5 (1992) Self-Propelled Elevating Work Platforms" is available from Snorkel dealers or from the factory upon request.

Copies are also available from:

Scaffold Industry Association, Inc.
P.O. Box 20574
Phoenix, AZ 85036-0574 USA

Manuals

Manuals are available from Snorkel to support any of the machines that we produce.

The specific manuals for A38E aerial platforms are as follows:

A38E Operator's Manual ANSI / CE
Snorkel part number – 514252-001-EN

S3219E Repair Parts Manual
Snorkel part number – 514252-201-EN

ANSI Manual of Responsibilities

ANSI A92.5 (1992)
Snorkel part number – TBA

Machine Information

Model Number:

Serial Number:

Date of Purchase:

Purchased From:

Snorkel Dealer or Distributor:

1.0 Introduction

PURPOSE

The purpose of this Service & Parts Manual is to provide instructions and illustrations for the operation and maintenance of the A38E Work Platform manufactured by Snorkel (See Figure 1-1).

SCOPE

The manual includes the procedures and responsibilities which must be strictly adhered to for proper operation, maintenance, adjustment, and repair of this product. The Maintenance Section further covers preventative maintenance and trouble shooting.

1.1 General Information

The A38E is a quickly deployable self propelled aerial work platform, designed to raise two operators with hand tools to a work height of up to 13.45 m (44.12 ft.) i.e. a platform floor height of 11.45 m (37.56 ft.). It is designed to provide mobility with the Platform in the raised or lowered position, although travel with the Platform raised is limited to a low speed. The boom assembly and telescope functions are operated by a hydraulic pump driven by a DC electric motor. Two DC electric traction motors coupled to two braked gearboxes regulate the drive function.

PLATFORM

The platform is large enough for two operators and has a free-draining perforated floor with 150 mm (5.9 inches) toeboards. Hand rails are constructed from steel tubing and a safety drop-bar is provided at the entrance. Safety harness anchor points are also fitted in the floor of the platform. The primary Control Box is fitted permanently within this platform.

▲ WARNING ▲

DO NOT begin using the machine until the platform entrance drop bar is in the fully lowered position.

CONTROL BOX

The control box is permanently fitted at the front centre of the platform. It features a Joystick which will provide proportional control for raising or lowering either of the two booms, extending or retracting the Telescopic Boom, rotating (slewing) the entire Booms, Platform (if Platform Rotate fitted) & Posts Assembly or driving. A safety feature which is incorporated into the Joystick's operation is the Interlock Switch. This must be activated at all times while operation is required. This allows for one-handed operation. A complete explanation of control functions can be found in Section 3.

ELEVATING ASSEMBLY

The platform is raised and lowered by a combination of two steel lift booms and one telescopic boom, each of which 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 descent in the case of a hose burst.

ROTATION GEAR

The Booms & Posts Assembly can be rotated to provide up to 5.6 m (18.4 ft.) of side outreach, measured from the centreline of rotation to the front of the Platform. This is done by means of an integral hydraulic motor driving a Worm Drive Unit, around a large diameter Slew Gear.

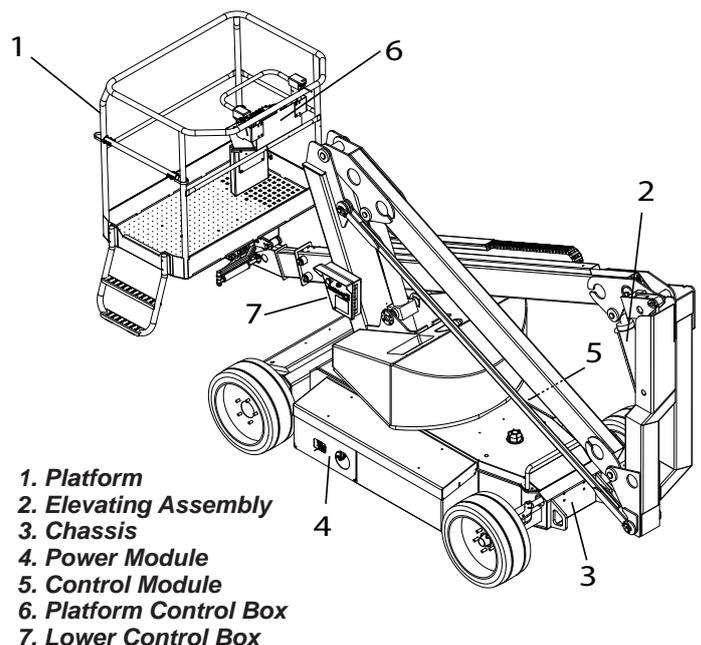


Figure 1-1: A38E Work Platform

DRIVE & STEER SYSTEMS

The A38E Work Platform is restricted to low speed drive when the Platform is raised above the Boom Rest Limit Switch. The Traction controller controls the application of drive from the Joystick by means of two Traction Motors, which are assembled to the drive wheels via a Drive Reduction Gearbox.

Steering of the A38E Work Platform is controlled by the P600, which controls the signals activating a double acting cylinder. An Operator can Steer left or right by depressing the Rocker Switches on top of the Joystick, while activating the Interlock Switch.

POWER SYSTEM

The power system incorporates eight 6V batteries driving the drive traction motors, or the 4kW (5.4HP) electric motor which in turn drives the hydraulic pump. The application of this hydraulic pressure is performed by the Control System.

CONTROL SYSTEM

The machine is provided with fully proportional controls by means of the interaction between a P600, electronic motor controller and a proportional joystick. The P600 and motor controller regulate the drive motor/pump speed and hence the flow of oil reaching the cylinders, the Worm Drive Unit or the Drive Reduction Gearbox. It regulates the direction of flow of the hydraulic oil via the solenoid valves located on the manifold block, and it also monitors the operation of all switches on the machine via the machine harness system.

The motor control units are located, in the left hand chassis module. The manifold block is located on the hydraulic tank. This is accessible by removing the main cover.

CHASSIS

The chassis is a structural frame designed to support all the components of the A38E Work Platform.

A38E PURPOSE & LIMITATIONS

The purpose of the A38E work platform is to provide a quickly deployable variable height work platform. It is capable of lifting two people with work tools up to an upper limit of 215 kg (ANSI 475 lbs) in total. The unit will provide the ability to reach over obstacles but must be used on firm level ground. See Specification table on page 1-3.

The platform must only be used on firm level or slightly uneven ground capable of supporting the maximum load generated under the four wheels. **Do not use on soft or severely sloping ground.**

⚠ DANGER ⚠

NOTE: It should be recognised that if the tilt switch senses a degree of slope greater than 3° the elevating circuits will lockout and sound a warning alarm. The Emergency Override should then be used, to lower the Elevating Assembly.

SNORKEL GUARD™

The Snorkel Guard™ is a secondary guarding solution which offers an additional level of protection for the operator at the upper controls. All A38E Machines manufactured after SN 01-xxxx00715, are equipped with 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, for example, in the case of the operator being involuntarily pushed against the controls. A blue beacon on the Chassis will also flash to indicate the Snorkel Guard has been activated.

SNORKEL GUARD OVERRIDE

SWITCH

When the Snorkel Guard system is activated, the Snorkel Guard override switch can be used to override the system to operate Upper and Lower Boom descent functions. The switch is spring returned to the normal operation position.

- Hold the switch upward to override the Snorkel Guard System.
- Release the switch to the downward position to resume normal machine operation.

1.2 Specifications

Table 1-1: Specifications

ITEM	METRIC	IMPERIAL (ANSI)
Duty Cycle	45% of 8 hour shift	45% of 8 hour shift
Platform Size	0.69 m x 1.11 m (inside gaurdrails)	2.26 ft x 3.6 ft (inside gaurdrails)
Max. Platform Capacity	215 kg	475 lbs
Indoors	2 People	2 People
Outdoors	1 Person	1 Person
Height		
Maximum Working Height	13.45 m	44.12 ft
Maximum Platform Height	11.45 m	37.56 ft
Min. Platform Floor Height	0.65 m	2.13ft
Max. Working Outreach	6.10 m	20.00 ft
Platform Height At Maximum Outreach	5.40 m	17.72 ft
Stowed Dimensions		
Length	4.04 m	13.25 ft
Width	1.50 m	4.92 ft
Height	2.00 m	6.56 ft
Ground Clearance	0.12 m	0.39 ft
Wheel Base x Gauge	2.00 m x 1.27 m	6.56 ft x 4.16 ft
Rotation	362 degrees non-continuous	362 degrees non-continuous
Unloaded Weight	3,795 kg	8,366 lbs
With Load/ Max Weight	4,010 kg	8,841 lbs
Drive Speed Stowed	0 - 4 km/h	0 - 2.49 mph
Drive Speed Elevated	0 - 0.65 km/h	0 - 0.04 mph
Maximum Gradeability	36%	36%
Inside Turning Radius	1.12 m	3.6 ft
Outside Turning Radius	2.40 m	7.87 ft
Power Source	48V DC 4kW, 8 X 6V 210Ah Batteries	48V DC 5.4HP, 8 X 6V 210Ah Batteries
System Voltage Control	12V	12V
Battery Charger	Auto Dual AC input 100-240V ~ 50/60Hz 15A Output 48V, 35A	(Auto Dual AC input 100-240V ~ 50/60Hz 15A) Output 48V, 35A
Hydraulic Oil Tank Capacity	25 Litres	6.5 Gallons US
Max. Hydraulic Pressure	145 bar	2105 psi
Hydraulic Oil Grade	ISO #46	ISO #46
Cylinder Types	2 Double Acting Lift Cylinders With Lock Valves And Manual Emergency Lowering Facility. 1 Double Acting Telescopic Cylinder 1 Double Acting Plat. Rotate Cylinder	2 Double Acting Lift Cylinders With Lock Valves And Manual Emergency Lowering Facility. 1 Double Acting Telescopic Cylinder 1 Double Acting Plat. Rotate Cylinder
	Refer to Section 5 of the Service & Parts Manual	Refer to Section 5 of the Service & Parts Manual
Control System	One handed Proportional Joystick Operating Energy Efficient Motor Control System	One handed Proportional Joystick Operating Energy Efficient Motor Control System
Wheels/Tyres	400 mm Diameter Steel Disc Wheel With Solid All Surface Tyres	15.75 inch Diameter Steel Disc Wheel With Solid All Surface Tyres
Braking	Automatic Spring Applied Hydraulic Release	Automatic Spring Applied Hydraulic Release
Operating temperature range	-20oC to +50oC	-20oC to +50oC
Max Noise Level	69.5 dB(A)	69.5 dB(A)

NOTES:

2.1 Preparation for use

⚠ CAUTION ⚠

Read, understand and follow all operating instructions before attempting to operate the machine.

2.2 Preparation for Shipment

1. Lubricate machine per lubrication instructions in Section 4.4, Maintenance.
2. Fully lower the platform and make sure the machine is stowed securely.
3. Check that the hydraulic oil level is adequate and that it is not over filled.

Check that the batteries are charged and disconnect the batteries using the Battery Disconnect Plug. This prevents excessive power drain prior to next using the machine.

2.3 Forklifting the Work Platform

⚠ CAUTION ⚠

The A38E is not designed to be consistently forklifted. This operation can be used for very short distances only.

Forklift from the side by lifting under the chassis modules as per Figure 2-1. When lifting the A38E with a forklift, great care should be taken not to damage the right or left hand modules as these contain sensitive equipment.

2.4 Lifting the Work Platform

⚠ CAUTION ⚠

See specifications (Section 1.2) for the weight of the work platform and be certain that lifting apparatus is of adequate capacity to lift the platform.

The A38E may be lifted by an overhead hoist/crane in the following manner:
Four lifting straps capable of safely supporting the total weight of the A38E (3,795 Kg) and at least 250 cm (8 ft.) long are required. This minimum length

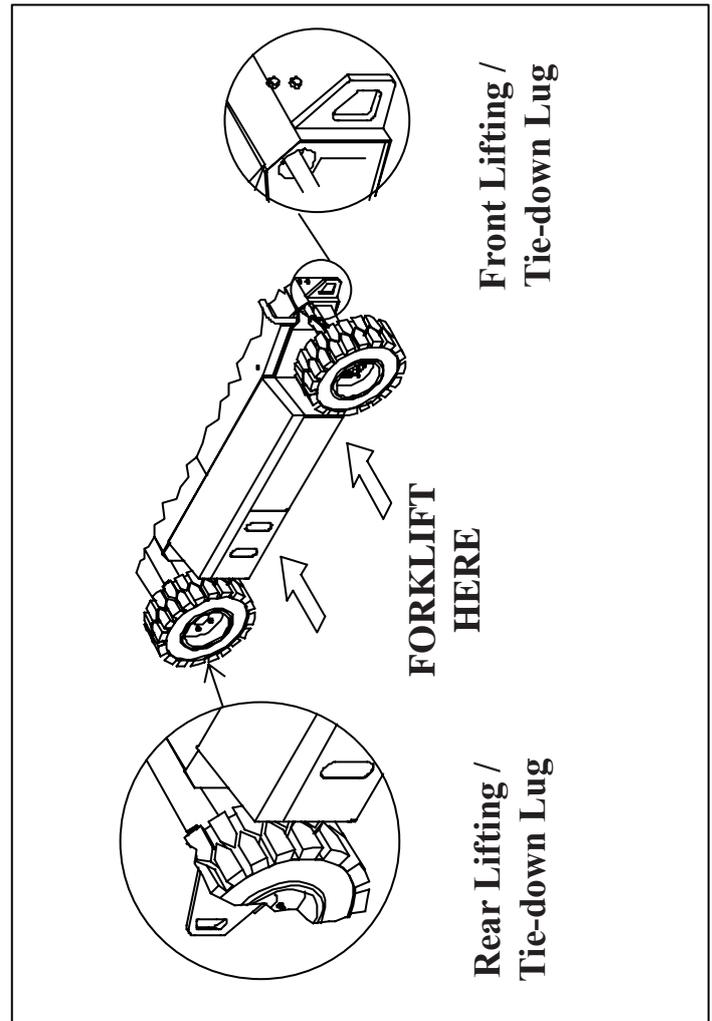


Figure 2-1: Forklifting & Lifting the A38E

is important to ensure the correct lifting angle. The straps should be positioned at the Lifting/Tie Down Lugs as shown in Figure 2-1. Great care must be taken to avoid damage to any of the components of the machine.

2.5 Transport by Truck

The A38E is normally carried upon a suitably rated transportation vehicle. Because of the high gradeability of the A38E it will be capable of driving directly on to most vehicles. If however the loading slope is greater than the gradeability or the batteries have been depleted sufficiently a winch should be used. The procedure when using a winch is to disengage the gearbox from the drive wheels using the Allen key release, and then winch the machine on to the vehicle in its freewheel state.

Refer to Section 2.6 which follows.

When the A38E is on the Truck it should then be made secure.

1. Chock the wheels of the A38E.
2. Secure the work platform to the transport vehicle with chains or straps of adequate load capacity attached to the lifting lugs on the chassis.

⚠ CAUTION ⚠

Overtightening of the chains or straps through tie down lugs may result in damage to the Work Platform.

2.6 Manual Brake Release

⚠ CAUTION ⚠

Perform this operation only when the machine will not operate under its own power and it is necessary to move the machine, or for winching onto a trailer for transportation. Ensure the machine is on level ground before commencing this operation and use wheel chocks as appropriate to prevent the machine from rolling inadvertently. Do not exceed 3 mph. Faster speeds will damage drive components and void warranty.

1. Ensure that the Platform is fully lowered and that the Elevating Assembly is slewed (rotated) such that the platform is stowed above the drive wheels. Turn the Upper Control Box to the OFF position and remove the key.
2. Attach a chain/cable of sufficient capacity for towing the machine to the front or rear lifting/tie down lugs. Take up the slack in the chain/cable.
3. Locate the Allen head socket screws located in the centre of the two drive (rear) wheels and using a 6 mm Allen key, turn each one clockwise to its full extent. The machine is now in freewheel mode.

⚠ WARNING ⚠

DO NOT leave the machine unattended or attempt to operate the A38E Work Platform until the Brake Release Screws have been re-engaged.

4. When towing is completed, turn both Allen head socket screws in a counter clockwise direction until they rest firmly against the locking circlip.



Figure 2-2 : Manual Brake Release

2.7 Storage

No preparation is required for storage when the Work Platform is in regular use. 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. Fluid should be visible on the Dip Stick. It is not recommended that the hydraulic fluid be drained.
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 batteries.
2. Disconnect the battery leads and secure to the chassis.

⚠ WARNING ⚠

Care should be taken, while disconnecting the battery leads, that a short circuit does not occur. i.e. grounding to the chassis with a spanner.

3. Remove the batteries and place in alternate service. Battery efficiencies are best realised when used consistently.

2.8 Charging

The aerial platform is equipped with a 35 amp battery charger. The battery charger is located in the electrical compartment on the right side of the chassis.

⚠ WARNING ⚠

Batteries give off hydrogen and oxygen that can combine explosively. Death or serious injury can result from a chemical explosion. Charge the batteries only in a well ventilated area away from sparks or flame. Batteries give off hydrogen and oxygen that can combine explosively. Death or serious injury can result from a chemical explosion. Charge the batteries only in a well ventilated area away from sparks or flame.

⚠ CAUTION ⚠

The batteries may be overcharged and/or damaged if the charger is plugged in after the charge cycle is complete. Do not leave the battery charger on for more than 48 hours.

It may take from 1½ to 16 hours to recharge the batteries depending on the amount of discharge. If the charging cycle exceeds 16 hours without the batteries being fully recharged, switch off the main battery disconnect switch.

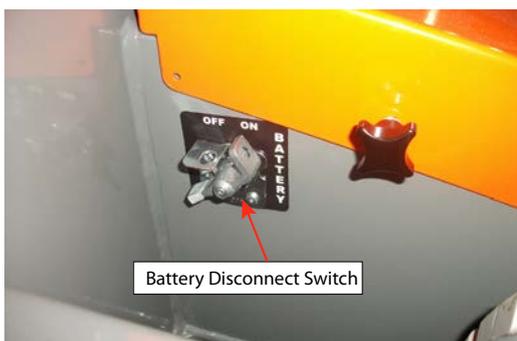


Figure 2-2 : Battery Disconnect Switch

- Fully recharge the batteries, immediately after use.
 - One charging cycle per day is preferred.
 - Fully charged batteries perform best.
 - The deeper the discharge, the fewer number of
- A38E Work Platform**

cycles a battery will deliver. Deep discharges deteriorate the battery quicker than light shallow cycles.

An overly discharged battery may need to be cycled a few times before it can fully recover.

If a battery begins to heat before becoming fully charged, it may be necessary to recharge and discharge the battery a few times.

Use the following procedure to charge the batteries.

1. Remove the cover on each side of the chassis to access the batteries. Remove the caps from each battery.

Note

Machines can also be supplied with maintenance free batteries, fluid check will not be necessary on this type of battery.

2. Visually check the battery fluid level making sure the level is 3/8" (10 mm) above the plates. If needed, add distilled water.
3. Tightly replace the caps on each battery and replace and latch the battery tray covers.
4. Plug the battery charger into a properly grounded outlet (110 -240 volt AC, 50/60 Hz) using a 3 conductor, 12 gauge (1.5 mm) or larger extension cord. The outlet must be equipped with GFCI protection. The extension cord must be as short as possible and in good electrical condition.

Note

Do not operate any of the aerial platform functions while the battery charger is plugged in.

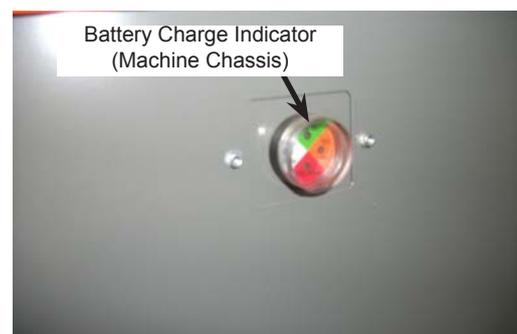


Figure 2.3 – Electrical Compartment

5. Visually inspect the battery charge indicator (refer to Figure 2.3).
 - The charger will turn on three to five seconds after a complete electrical connection is made.
 - The LED charge indicators will be lit while the batteries are charging.
 - When the batteries are fully charged, the charge indicator will blink.

⚠ CAUTION ⚠

The batteries may be overcharged and/or damaged if the charger is plugged in after the charge cycle is complete. Do not leave the battery charger on for more than 48 hours.

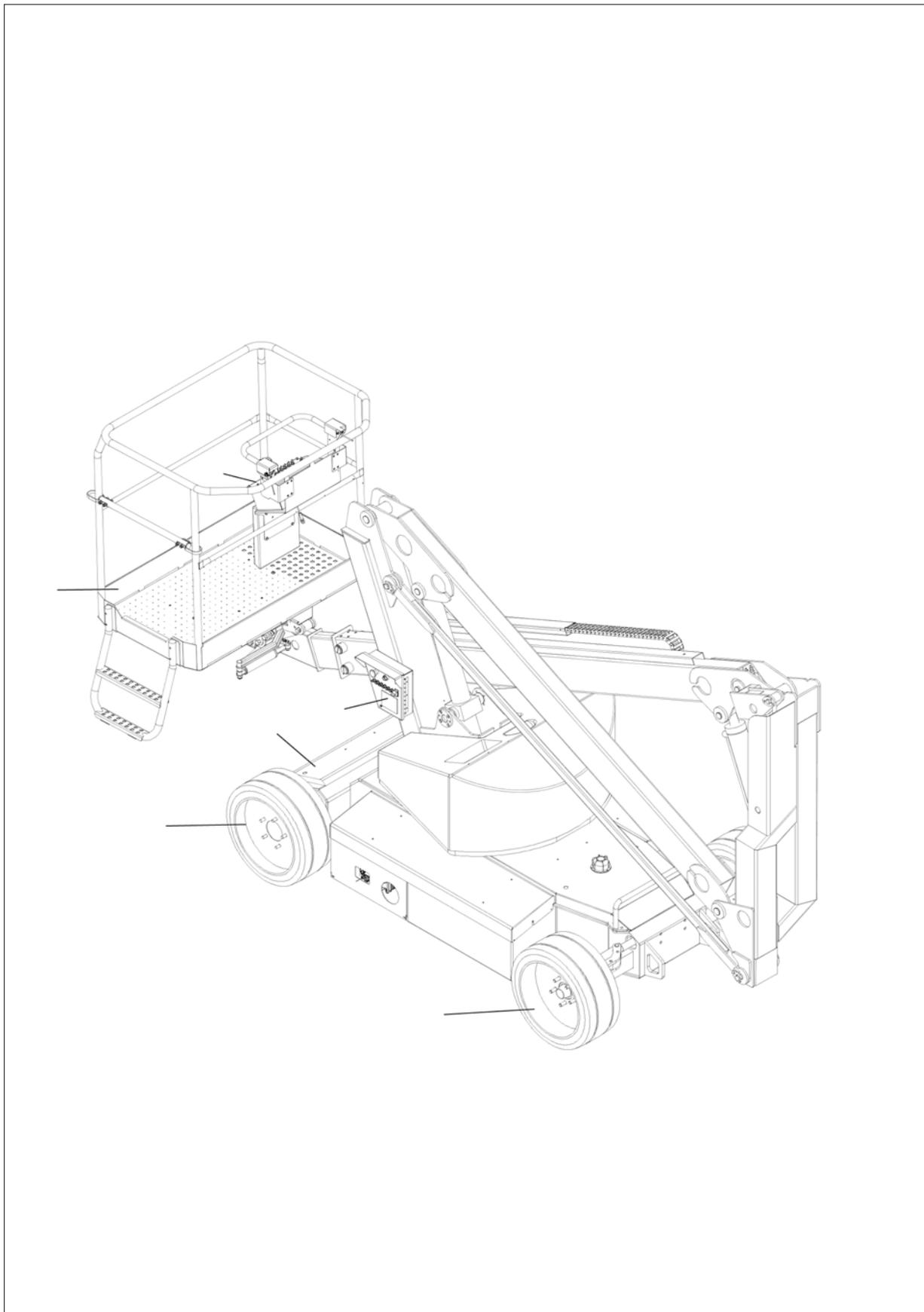
7. After the charge cycle is complete, unplug the extension cord from the battery charger and allow the batteries to cool.
8. Remove the cover on each side of the chassis to access the batteries. Remove the caps from each battery.

Note

Machines can also be supplied with maintenance free batteries, fluid check will not be necessary on this type of battery.

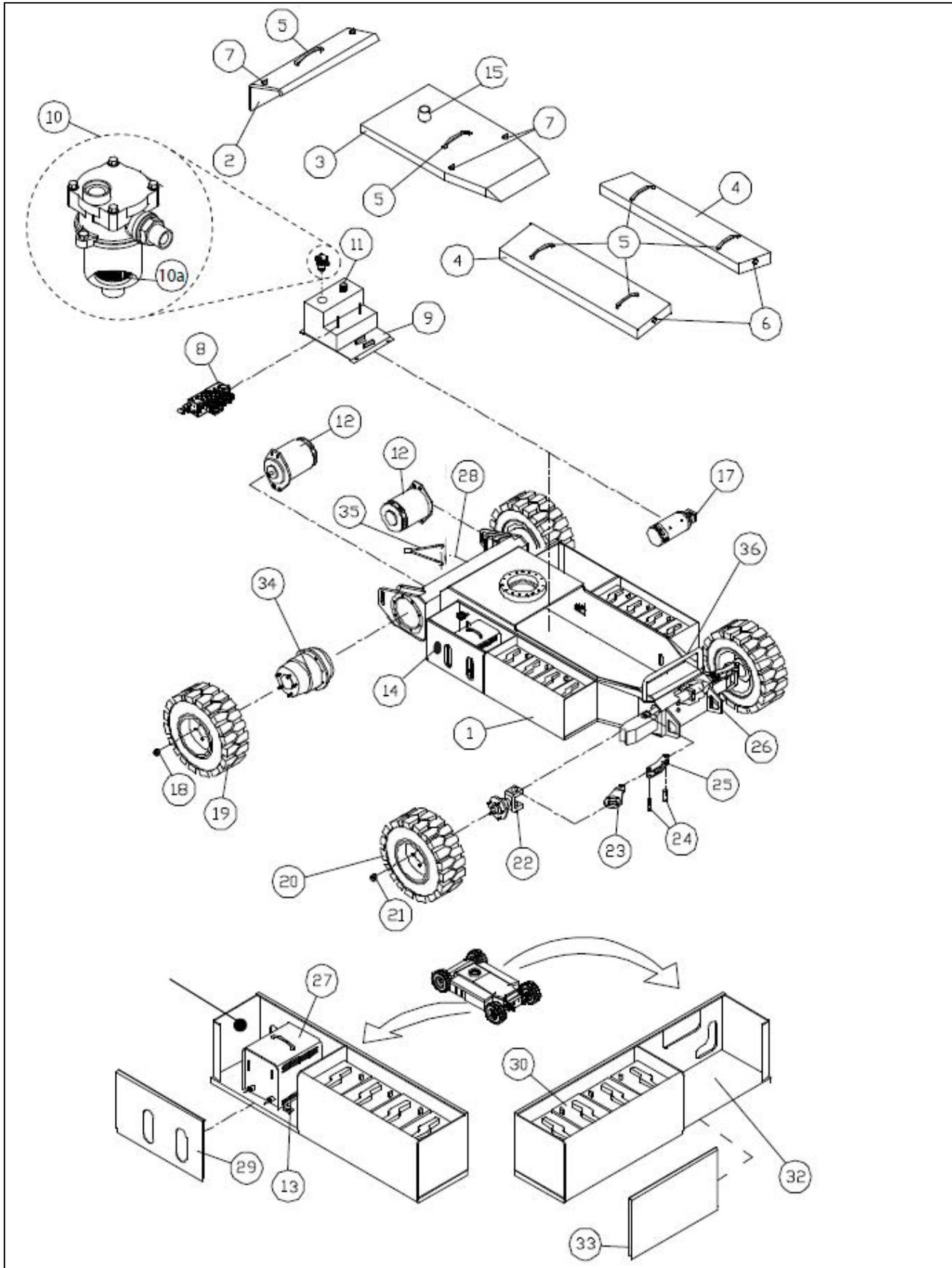
9. Visually check the battery fluid level making sure the level is 3/8" (10 mm) above the plates. If needed, add distilled water.
10. Tightly replace the caps on each battery

REPAIR PARTS



アイテム	部品番号	名前	数量	UOM
1	514371 000	Chassis Assembly	1	EA
	515508 000	Booms and Posts Assembly	1	EA
3	514554 000	Cage and Cradle Assembly	1	EA
	057580 000	DRIVE GEARBOX	2	EA
	514274 000	DRIVE MOTOR	1	EA
	515652 000	CB2A F6C1F, BI DIR PUMP MOTOR	1	EA
4	513429 000	FRONT WHEEL TYRE & RIM ASSEMBLY (sn: 004939 current)	1	EA
5	513430 000	REAR WHEEL TYRE & RIM ASSEMBLY (sn: 004939 current)	1	EA
	500284 000	SLEW DRIVE	1	EA
	500261 000	A38E MANIFOLD BLOCK (Manual/No Platform rotate)	1	EA
	504504 002	A38E LOWER LIFT CYLINDER	1	EA
	504505 000	Upper Cylinder Assembly	1	EA
	058461 000	Tele Cylinder Assembly	1	EA
	058463 000	STEERING CYLINDER ASSEMBLY	1	EA
	058734 000	Master Level Cylinder Assembly	1	EA
	058735 000	Slave Cylinder	1	EA
	12330	CYLINDER	1	EA
6	515044 000	Lower Control Box Assembly	1	EA
7	515039 000	Upper Control Box Assembly (CE / ANSI)	1	EA
	500360 000	Hose Kit	1	EA
	514349 000	Hose Kit additional	1	EA

REPAIR PARTS

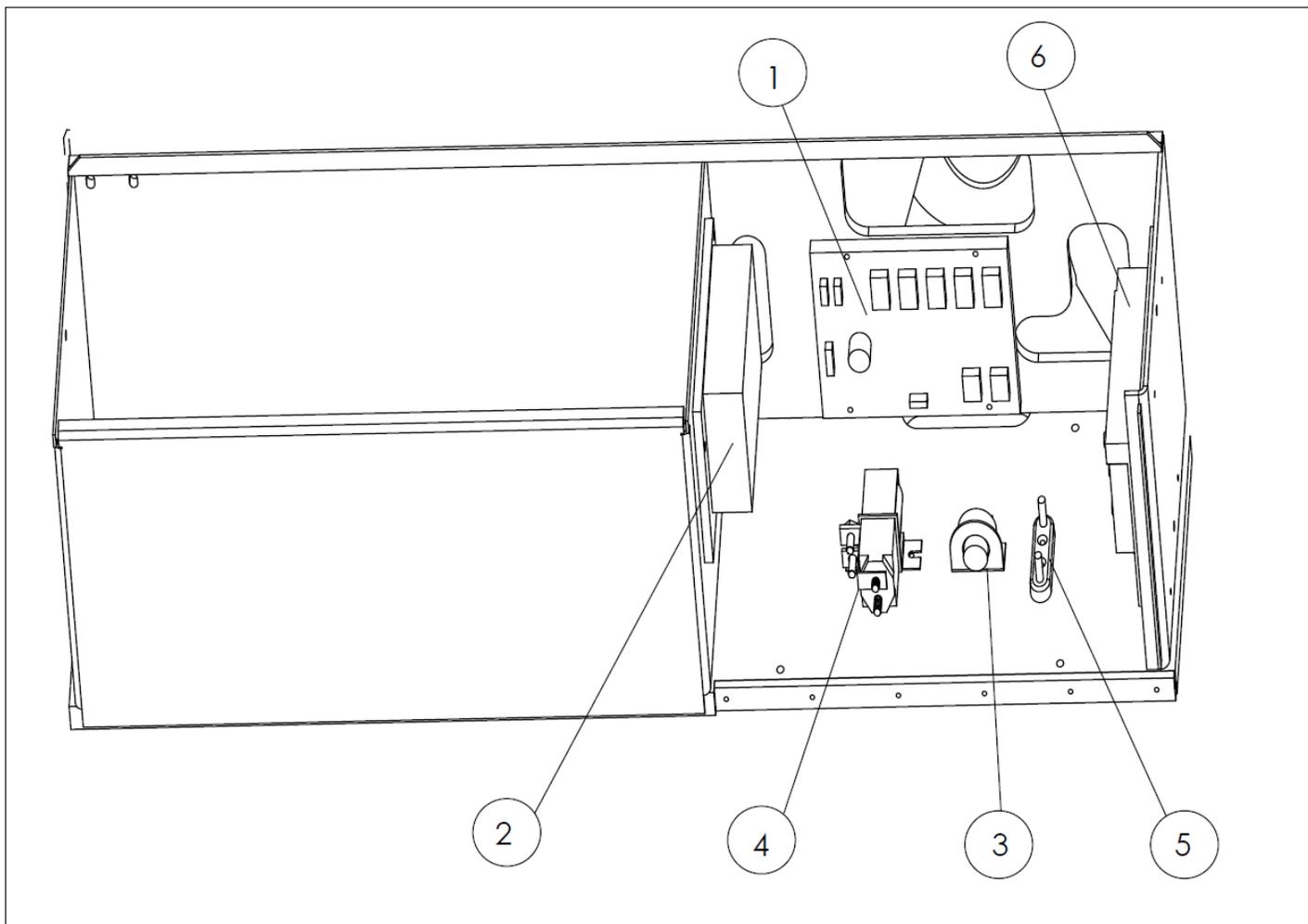


アイテム	部品番号	名前	数量	UOM
1	514347 000	A38E CHASSIS WELDMENT	1	EA
2	500232 000	A38E DRIVE MOTOR COVER	1	EA
3	515228 000	A38E CHASSIS BODY COVER ANSI	1	EA
3	514348 000	A38E CHASSIS BODY COVER	1	EA
4	500231 000	A38E MODULE COVER	2	EA
5	500052 000	GRAB HANDLE	6	EA
6	057727 000	TWIST SCREW FASTNER	4	EA
7	500259 000	A38 COVER GRIP LATCH	4	EA
8	514351 000	A38E MANIFOLD BLOCK (Hydraulic Platform Rotate)	1	EA
9	500260 000	A38E HYDRAULIC RESERVOIR ASSEMBLY	1	EA
10	057532 000	RESERVOIR RETURN LINE FILTER ASSEMBLY(Inc Filter)	1	EA
10A	058074 000	FILTER / WASHER / SPRING ASSEMBLY (Part of item 10)	1	EA
11	057534 000	FILLER / BREATHER CAP	1	EA
12	514274 000	DRIVE MOTOR	2	EA
13	238396	PLUGMALE STR 15AMP 125V NYLON	1	EA
14	3069521	INLET FLANGE	1	EA
15	515611 000	BEACON ASSY AMBER	1	EA
17	515652 000	CB2A F6C1F, BI DIR PUMP MOTOR	1	EA
Not Shown	514767 000	Fitting,Pump Elbow BK 1/2 x 35 (PUMP MOTOR)	1	EA
Not Shown	514768 000	Fitting,Pump Elbow BK 3/4 x 40 (PUMP MOTOR)	1	EA
18	057578 000	REAR WHEEL NUT M14	10	EA
19	513430 000	REAR WHEEL TYRE & RIM ASSEMBLY (sn: 004939 current)	2	EA

アイテム	部品番号	名前	数量	UOM
20	513429 000	FRONT WHEEL TYRE & RIM ASSEMBLY (sn: 004939 current)	2	EA
21	056066 016	Nut, NylockNut DIN985 M16 8.0	10	EA
22	057669 000	STEERING STUB AXLE ASSEMBLY (use 4 x 505087 012 Hardened Washer, M12 x 24mm, when securing)	1	EA
23	058427 000	A38E TORQUE ARMS	2	EA
24	500253 001	A38E STEERING LINKAGE PIN	4	EA
24	500252 000	CIRCLIP 16mm	4	EA
24	500408 000	BUSHINGS	2	EA
25	500250 000	A38E STEERING LINK ARM	2	EA
26	058463 000	STEERING CYLINDER ASSEMBLY	1	EA
26	058494 035	BOLT HEXSETSCREW DIN933 M12 X 35MM 8.8 ZP	4	EA
26	056021 006	WASHER SPRING WASHER M6 DIN 127B GR8.8 ZP	4	EA
27	3050134	CHARGER 48V GLOBAL CE, BEFORE sn01 00975	1	EA
27	515622 000	CHARGER 48V GLOBAL CE (Without remote display), AFTER sn 01 00976	1	EA
28	501868 001	HORN	1	EA
29	500234 002	A38E CHASSIS SIDE DROP PANEL WITH SLOTS (CE), BEFORE sn01 00975	1	EA
29	515606 000	A38E CHASSIS SIDE DROP PANEL WITH SLOTS (CE), AFTER sn 01 00976	1	EA
29	500234 003	A38E CHASSIS SIDE DROP PANEL WITH SLOTS (ANSI), BEFORE sn01 00975	1	EA
29	515607 000	A38E CHASSIS SIDE DROP PANEL WITH SLOTS (ANSI), AFTER sn 01 00976	1	EA
29	515808 000	A38E CHASSIS SIDE DROP PANEL WITH SLOTS (JAPAN)	1	EA

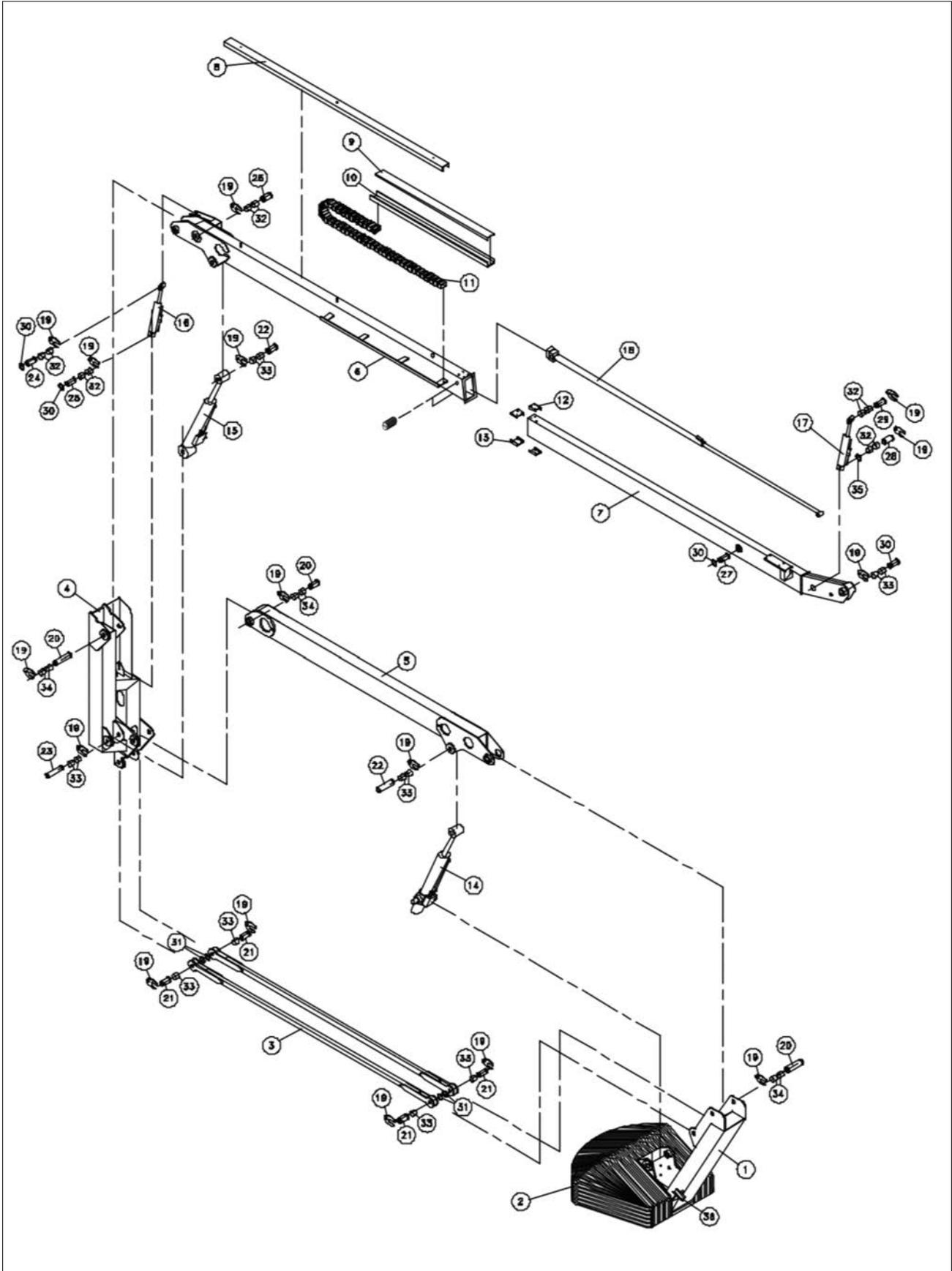
アイテム	部品番号	名前	数量	UOM
30	501074 000	BATTERY 6V 210AH	8	EA
Not Shown	3040269	Boot Cable Entry Black I/O GA	18	EA
32	SEE "SIDE TRAY PG ASSY"	SEE "SIDE TRAY PG ASSY"		EA
33	500234 001	A38E CHASSIS SIDE DROP PANEL WITHOUT SLOTS	1	EA
34	057580 000	DRIVE GEARBOX	2	EA
35	514331 000	CAPACITOR ASSEMBLY	1	EA
36	514867 000	CRASH BAR	1	EA
37	514450 000	DIODE ASSY	1	EA
38	3020061	Battery Disconnect Nut		EA

REPAIR PARTS



アイテム	部品番号	名前	数量	UOM
1	515688 000	GP400c ECU	1	EA
2	512943 000	P600 PUMP MOTOR CONTROLLER	1	EA
3	502588 000	ALARM, ECCO BEEPING 6 28VDC	1	EA
3	512684 000	ALARM BRACKET	1	EA
4	513550 000	CONTACTOR SPDT 200A 12VDC	1	EA
5	067387 022	FUSE	1	EA
6	512942 000	SEM 600 PGT 21 510 611	1	EA

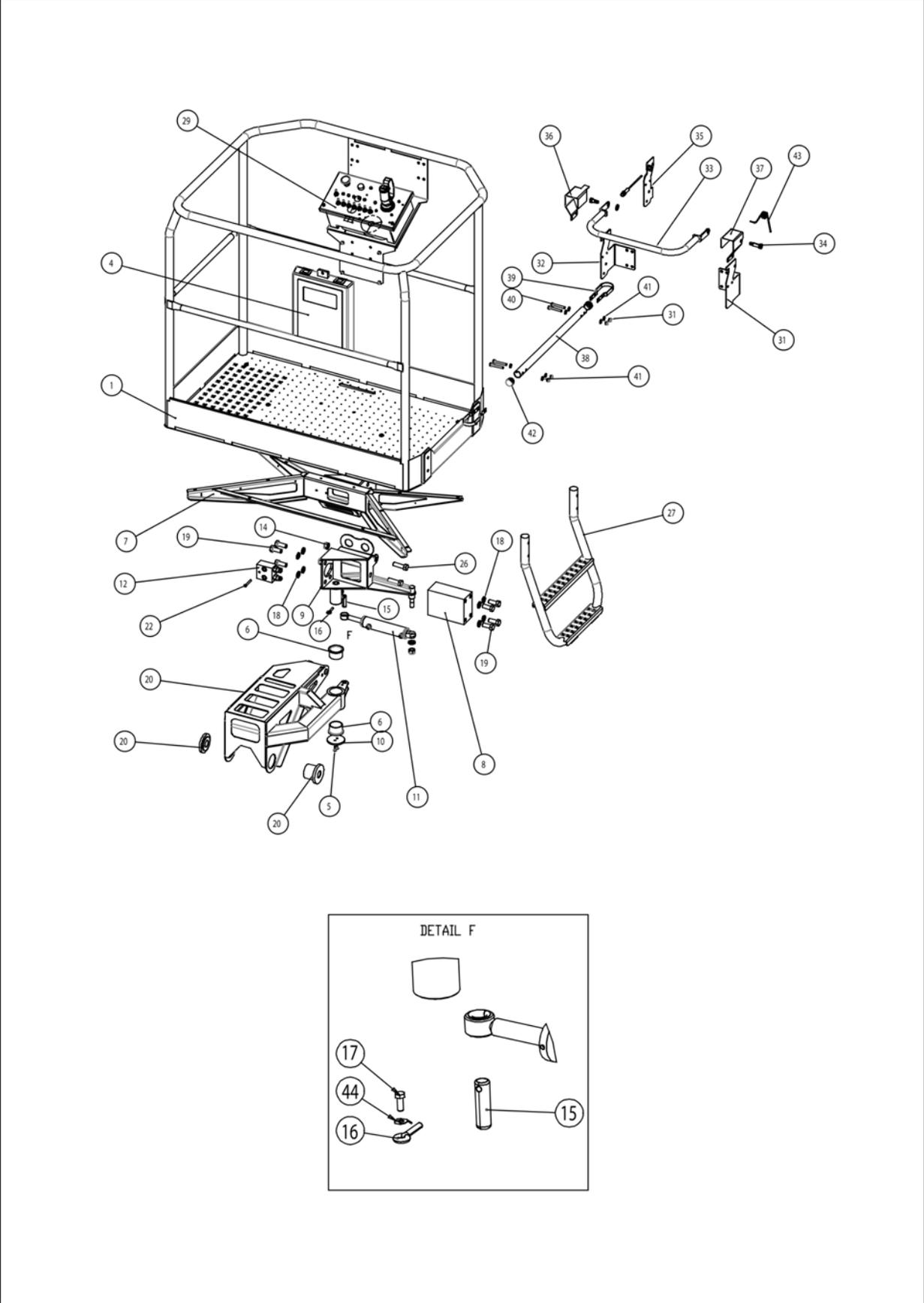
REPAIR PARTS



アイテム	部品番号	名前	数量	UOM
1	514346 000	A38E 1st POST WELDMENT	1	EA
2	515543 001	BALLAST ASSEMBLY CE	1	EA
3	058417 000	Lower Level Rod	2	EA
4	058416 000	Turret Weld	1	EA
5	058413 000	LOWER BOOM WELDMENT	1	EA
6	514801 000	OUTER BOOM	1	EA
Not Shown	0260297	Wear Pad, Adjustable	4	EA
7	514802 000	Inner Boom	1	EA
8	058457 002	A38E HOSE CABLE COVER	1	EA
9	500265 000	Cover For Energy Chain Support Channel	1	EA
Not Shown	057727 000	TWIST SCREW FASTNER	2	EA
10	500266 000	ENERGY CHAIN SUPPORT CHANNEL	1	EA
11	500468 000	ENERGY CHAIN, COMPLETE	1	EA
Not Shown	500468 002	ENERGY CHAIN (1 UNIT OF 24)	24	EA
Not Shown	500468 001	MOUNTING ELEMENTS	1	EA
12	057975 000	Wear Pad, Inner	2	EA
Not Shown	058510 016	M8 X 16 CSK	6	EA
Not Shown	058510 025	BLT FLSKTHD M8 1.25 25MM	2	EA
13	514799 000	Wear Pad, Outer	2	EA
Not Shown	058491 010	M6 X 10 HEX	8	EA
Not Shown	500519 006	1/4" T4 WASHER	8	EA
Not Shown	057975 300	6mm INSERTS	8	EA
14	504504 002	A38E LOWER LIFT CYLINDER	1	EA

アイテム	部品番号	名前	数量	UOM
15	504505 000	Upper Cylinder Assembly	1	EA
16	058734 000	Master Level Cylinder Assembly	1	EA
17	058735 000	Slave Cylinder	1	EA
18	058461 000	Tele Cylinder Assembly	1	EA
19	058056 000	Pin Keeper, Square	16	EA
Not Shown	056060 016	BOLT M10 X 16 mm	16	EA
Not Shown	056021 010	Washer, SpringWasher DIN127B M	16	EA
20	058055 006	Pin	3	EA
21	058054 001	Pin	4	EA
22	058066 001	Pin 80 x 230mm	1	EA
23	058066 007	Pin	1	EA
24	058053 004	Pin	1	EA
25	058053 005	Pin	1	EA
26	058065 006	PIN	1	EA
27	500254 000	Pin	1	EA
28	058053 001	Pin 25x93mm	1	EA
29	058065 005	Pin, 25 x 93mm	1	EA
30	058066 001	Pin 80 x 230mm	1	EA
31	057033 000	CIRCLIP 30mm	4	EA
32	057047 000	BUSH	8	EA
33	057054 000	BUSH	12	EA
34	057046 000	BUSH	8	EA
35	057034 000	CIRCLIP 25mm	4	EA
36	501085 000	BOOM REST (BOLT ON)	1	EA

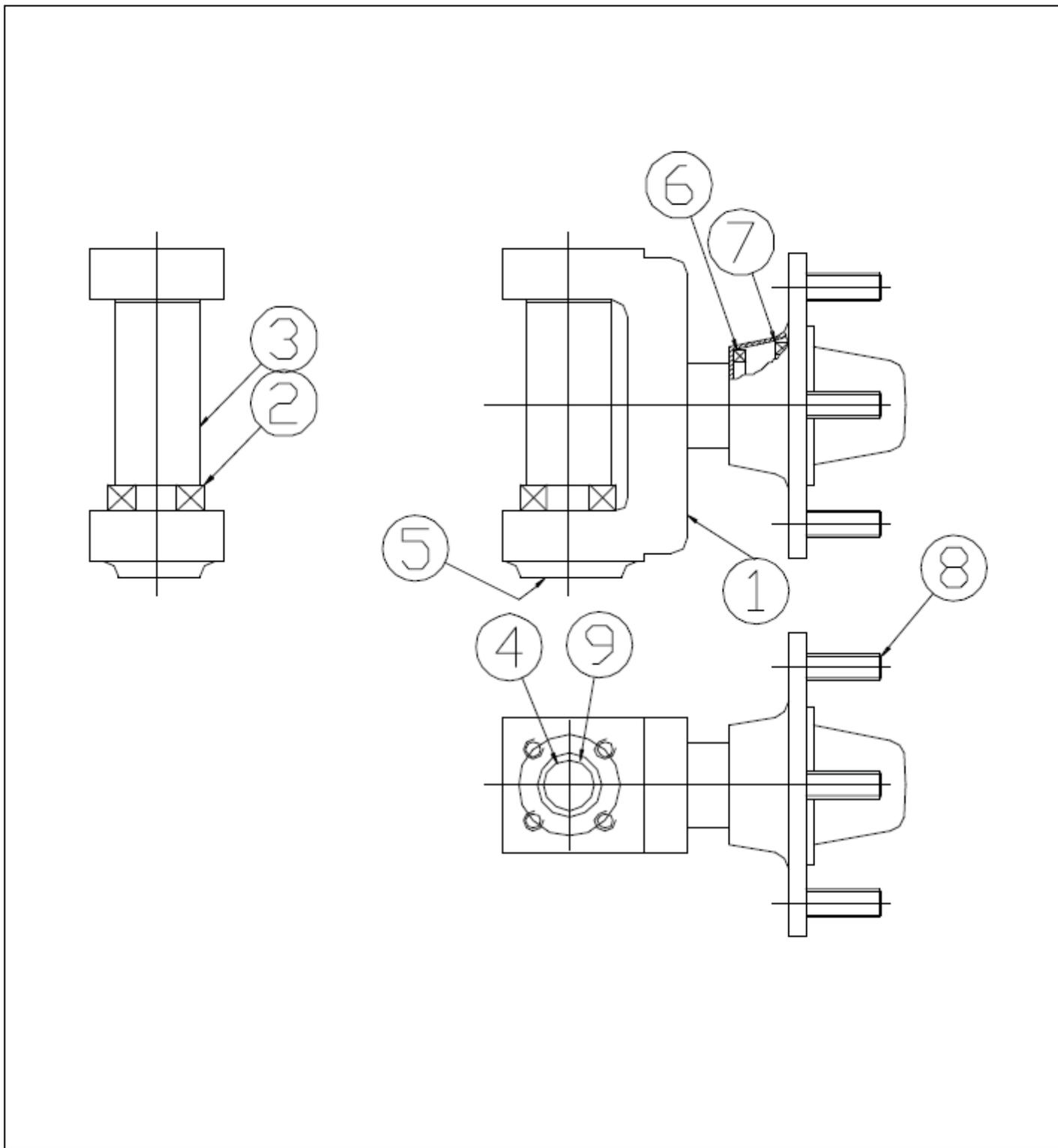
REPAIR PARTS



アイテム	部品番号	名前	数量	UOM
1	514554 001	A38E BASKET WELDMENT	1	EA
4	562386	Literature Compartment	1	EA
5	058491 016	BOLT HEXSETSCREW DIN933 M6 X 16MM 8.8 ZP	6	EA
6	504120 000	50 DIAMETER FLANGED BUSHING 2	2	EA
7	515500 000	Basket Bottom Mount	1	EA
8	515542 000	LOADCELL	1	EA
	515609 000	HARNES,LOADCELL TO UPPER CONTROL BOX (Not Illustrated)	1	EA
9	515505 000	Rotator Mount Basket	1	EA
10	13520 13	PIVOT CAP 1	1	EA
11	12330	CYLINDER	1	EA
12	13 0176	DOUBLE OVER CENTRE VALVE 1	1	EA
Not Shown	056069 016	WASHER STEELFLATWASHER M16 DIN	1	EA
14	056064 016	NUT NYLOCKNUT DIN985 M16 10.0	3	EA
15	12468 22	Pin, 16 x 55mm	1	EA
16	8628	Pin Keeper	1	EA
17	056058 016	HHD BLT M6 1.0 X 16 MM 8.8	1	EA
19	503101 040	M16 x 40 HEX. HD. SCREW x1.5 P	8	EA
20	515501 000	Tilt Quadrant	1	EA
21	11492 1	Tab Washer	1	EA
22	058491 050	M6 x 50 HEX. HD. BOLT 8.8	1	EA
24	056066 008	NUT NYLOCKNUT DIN985 M8 8.0 ZP	6	EA
26	056687 055	M16 x 55 HEX. HD. BOLT 8.8	2	EA
27	515541 000	PLATFORM STEP WELDMENT	1	EA
Not Shown	513767 018	TAB LOCK WASHER	1	EA

アイテム	部品番号	名前	数量	UOM
29	515039 000	Upper Control Box Assembly (CE / ANSI)	1	EA
Not Shown	514764 000	SNORKEL GUARD ASSEMBLY A38E	1	EA
31	514764 003	PLT, SNORKEL GUARD RH	1	EA
32	514764 004	CLAMP PLATE LH	1	EA
33	514764 001	TUBE ACTUATOR BAR	1	EA
34	0260857	PIN	1	EA
35	514764 008	PLATE SWITCH CLAMP HALF	1	EA
36	260838	Hinge Cover, LH	1	EA
37	260839	HINGE COVER, RH	1	EA
Not Shown	513767 006	Drop Bar Assy	1	EA
38	513767 010	Drop Bar	1	EA
39	508932 000	U BRACKET	2	EA
40	510566 055	M8 x 55 SOCKET HD.CAP SCREW ST.STEEL	4	EA
41	510561 008	M8 washer ST/ST	8	EA
42	058557 000	END CAP	2	EA
43	260852	Spring	1	EA
44	11492 1	Tab Washer	1	EA

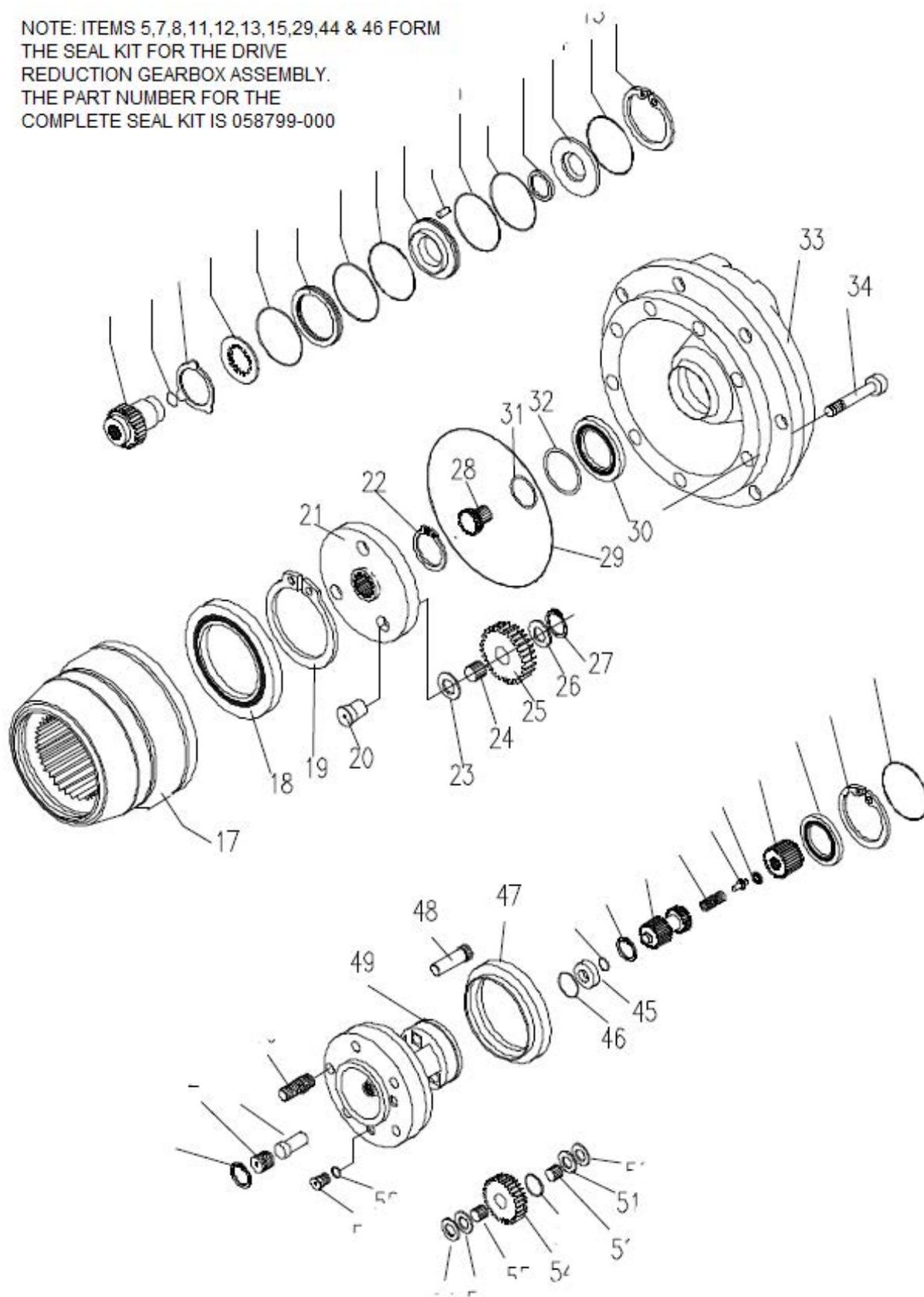
REPAIR PARTS



アイテム	部品番号	名前	数量	UOM
Not Shown	057669 000	STEERING STUB AXLE ASSEMBLY (use 4 x 505087 012 Hardened Washer, M12 x 24mm, when securing)		EA
1	057665 000	WHEEL HUB	1	EA
2	057664 000	THRUST BEARING	1	EA
3	057662 000	PIVOT BOSS	1	EA
4	057663 000	PIVOT PIN	1	EA
5	057585 000	COVER PLATE	1	EA
6	057584 000	OUTER HUB BEARING	1	EA
7	057583 000	INNER HUB BEARING	1	EA
8	057582 000	STUD	5	EA
9	057661 000	PIVOT BUSHING 30/38 x 30 long	2	EA

REPAIR PARTS

NOTE: ITEMS 5,7,8,11,12,13,15,29,44 & 46 FORM THE SEAL KIT FOR THE DRIVE REDUCTION GEARBOX ASSEMBLY. THE PART NUMBER FOR THE COMPLETE SEAL KIT IS 058799-000

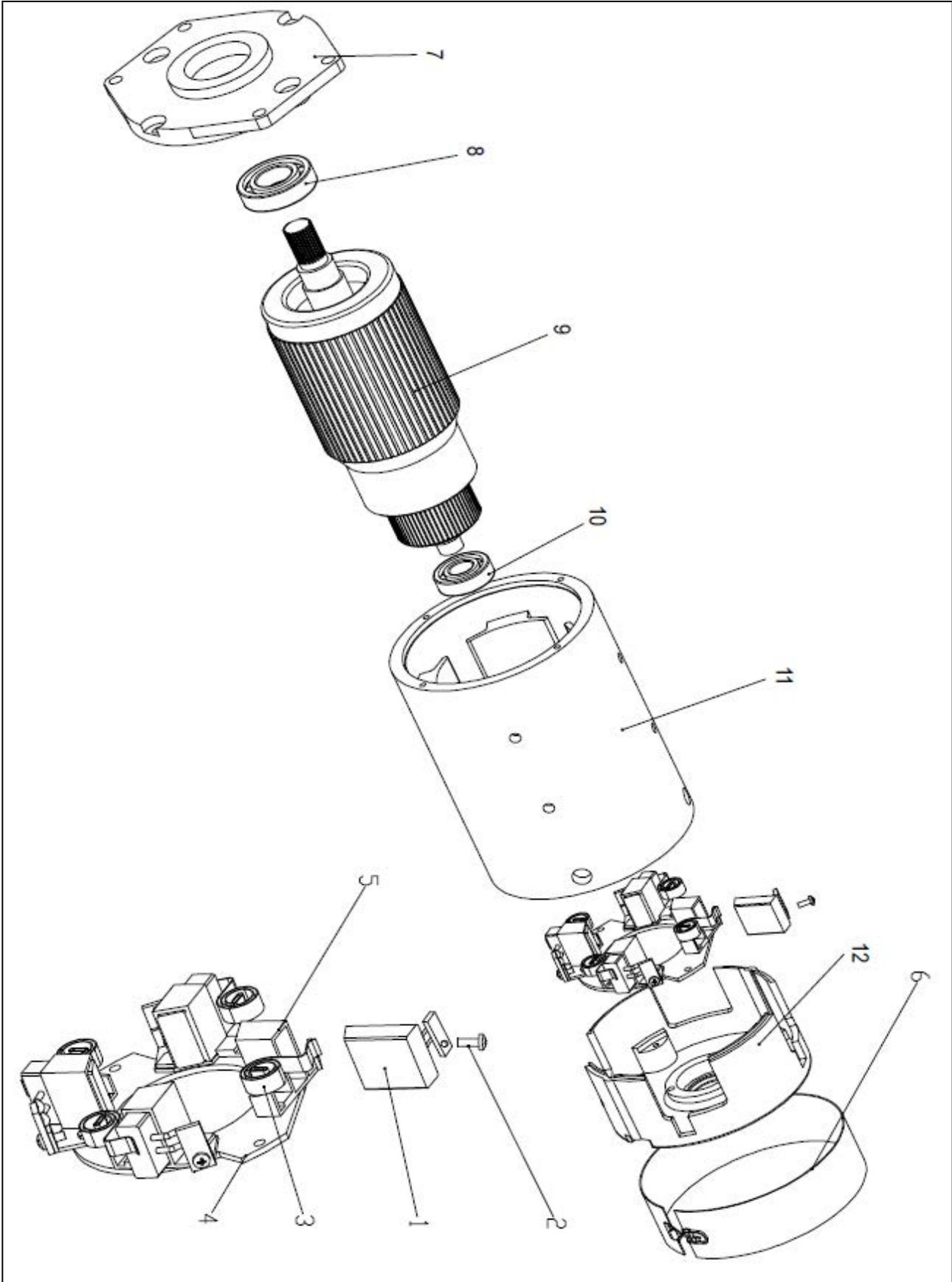


アイテム	部品番号	名前	数量	UOM
1	REF	COUPLING	1	EA
2	REF	EXPANSION PLUG	1	EA
3	REF	STEEL DISC	1	EA
4	REF	BRONZE DISC	1	EA
5	REF	O RING	1	EA
6	REF	SPACER	1	EA
7	REF	O RING	1	EA
8	REF	ANTI EXTRUS. RING	1	EA
9	REF	PISTON	1	EA
10	REF	SPRING	12	EA
11	REF	O RING	1	EA
12	REF	ANTI EXTRUS. RING	1	EA
13	REF	OIL SEAL	1	EA
14	REF	END PLATE	1	EA
15	REF	O RING	1	EA
16	REF	CIRCLIP	1	EA
17	REF	HUB	1	EA
18	REF	BEARING	1	EA
19	REF	CIRCLIP	1	EA
20	REF	PLANET SHAFT	1	EA
21	REF	PLANET CARRIER	1	EA
22	REF	CIRCLIP	1	EA
23	REF	THRUST WASHER	3	EA
24	REF	NEEDLE ROLLER	84	EA
25	REF	PLANET GEAR	3	EA
26	REF	THRUST WASHER	3	EA
27	REF	CIRCLIP	3	EA
28	REF	SUN PINION	1	EA
29	REF	O RING	1	EA

アイテム	部品番号	名前	数量	UOM
30	REF	BEARING	1	EA
31	REF	RETAINING RING	1	EA
32	REF	RETAINING RING	1	EA
33	REF	INPUT FLANGE	1	EA
34	REF	SCREW	8	EA
35	REF	SPACER	1	EA
36	REF	CIRCLIP	1	EA
37	REF	BEARING	1	EA
38	REF	COUPLING	1	EA
39	REF	BEARING	1	EA
40	REF	PIN	1	EA
41	REF	SPRING	1	EA
42	REF	SUN PINION	1	EA
43	REF	CIRCLIP	1	EA
44	REF	O RING	1	EA
45	REF	THRUST WASHER	1	EA
46	REF	O RING	1	EA
47	REF	RING + BEARING	1	EA
48	REF	PLANET SHAFT	3	EA
49	REF	SPINDLE	1	EA
50	REF	THRUST WASHER	3	EA
51	REF	THRUST WASHER	3	EA
52	REF	NEEDLE ROLLER	75	EA
53	REF	SPACER	3	EA
54	REF	PLANET GEAR	3	EA
55	REF	NEEDLE ROLLER	75	EA
56	REF	THRUST WASHER	3	EA
57	REF	THRUST WASHER	3	EA
58	REF	WASHER	2	EA

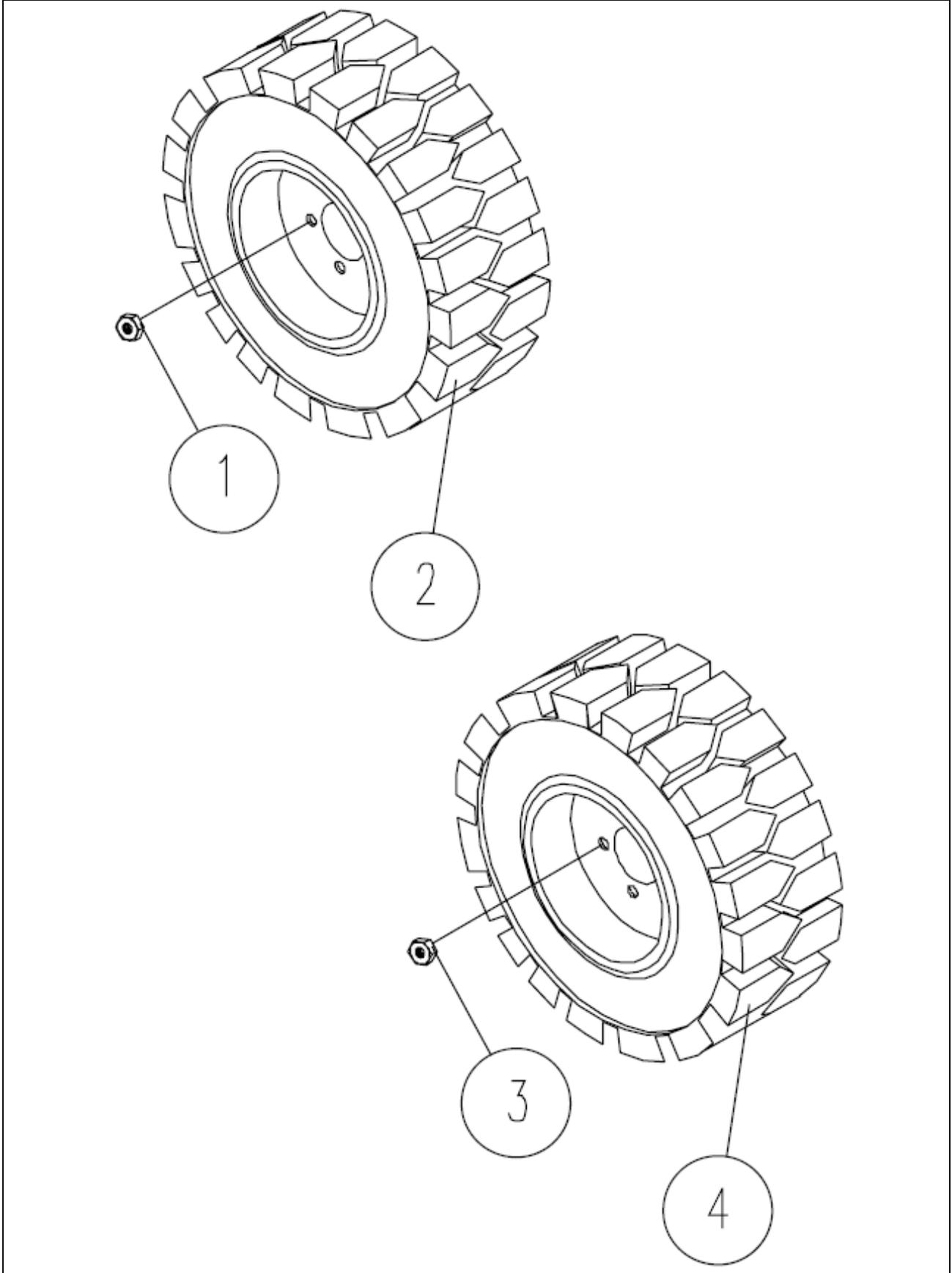
アイテム	部品番号	名前	数量	UOM
59	REF	PLUG	2	EA
60	REF	STUD M15 X 1.5	5	EA
61	REF	PIN	1	EA
62	REF	SCREW	1	EA
63	REF	CIRCLIP	1	EA

REPAIR PARTS



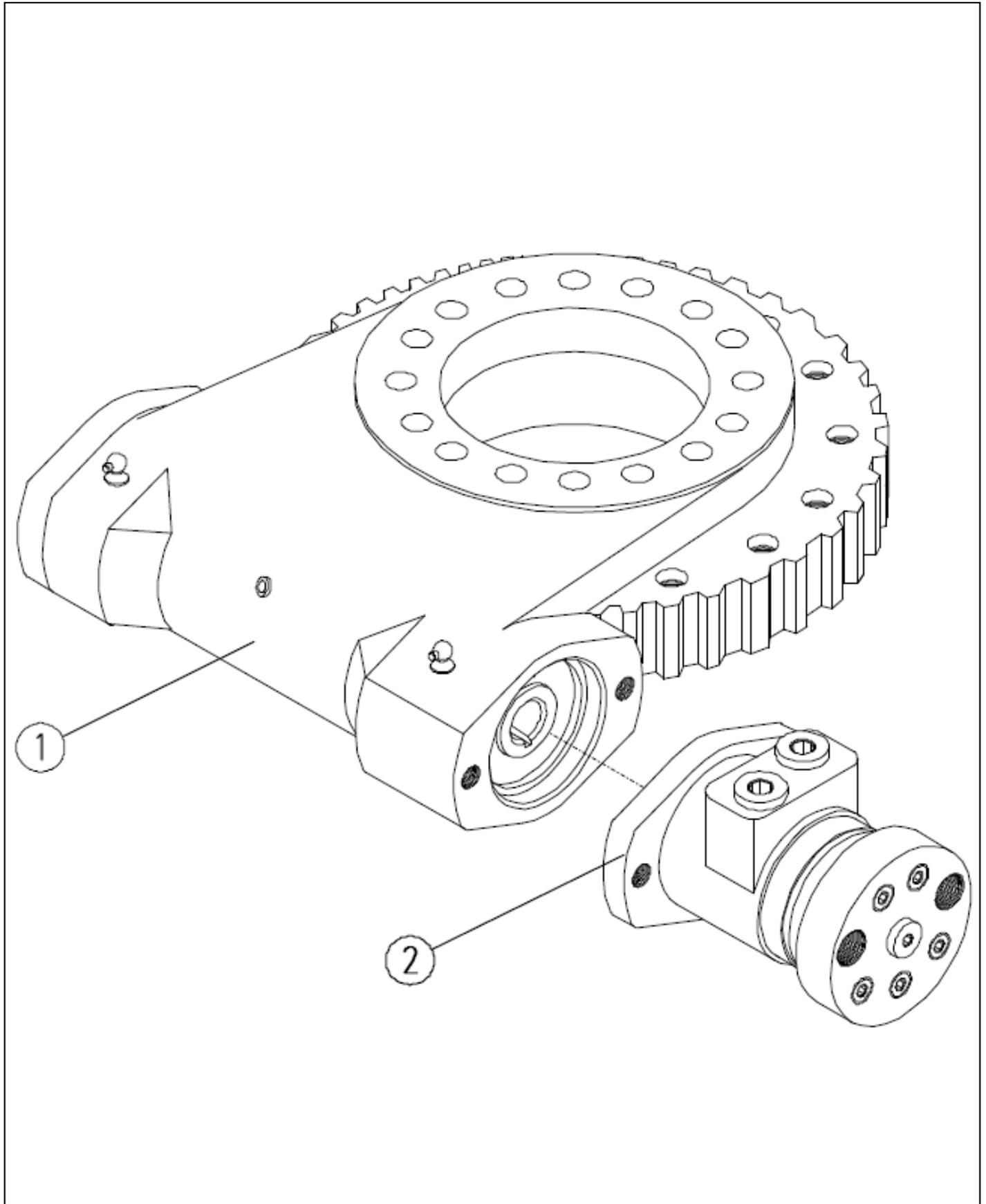
アイテム	部品番号	名前	数量	UOM
Not Shown	514274 000	DRIVE MOTOR		EA
1	514274 001	BRUSH	1	EA
2	514274 002	BOLT	1	EA
3	514274 003	SPRING	1	EA
4	514274 004	BRUSH BOX SUPPORT	1	EA
5	514274 005	BRUSH BOX	1	EA
6	514274 006	SHEATHING	1	EA
7	514274 007	FRONT ENDSHIELD	1	EA
8	514274 008	FRONT BEARING	1	EA
9	514274 009	ARMATURE	1	EA
10	514274 010	REAR BEARING	1	EA
11	514274 011	HOUSING	1	EA
12	514274 012	REAR ENDSHIELD	1	EA

REPAIR PARTS



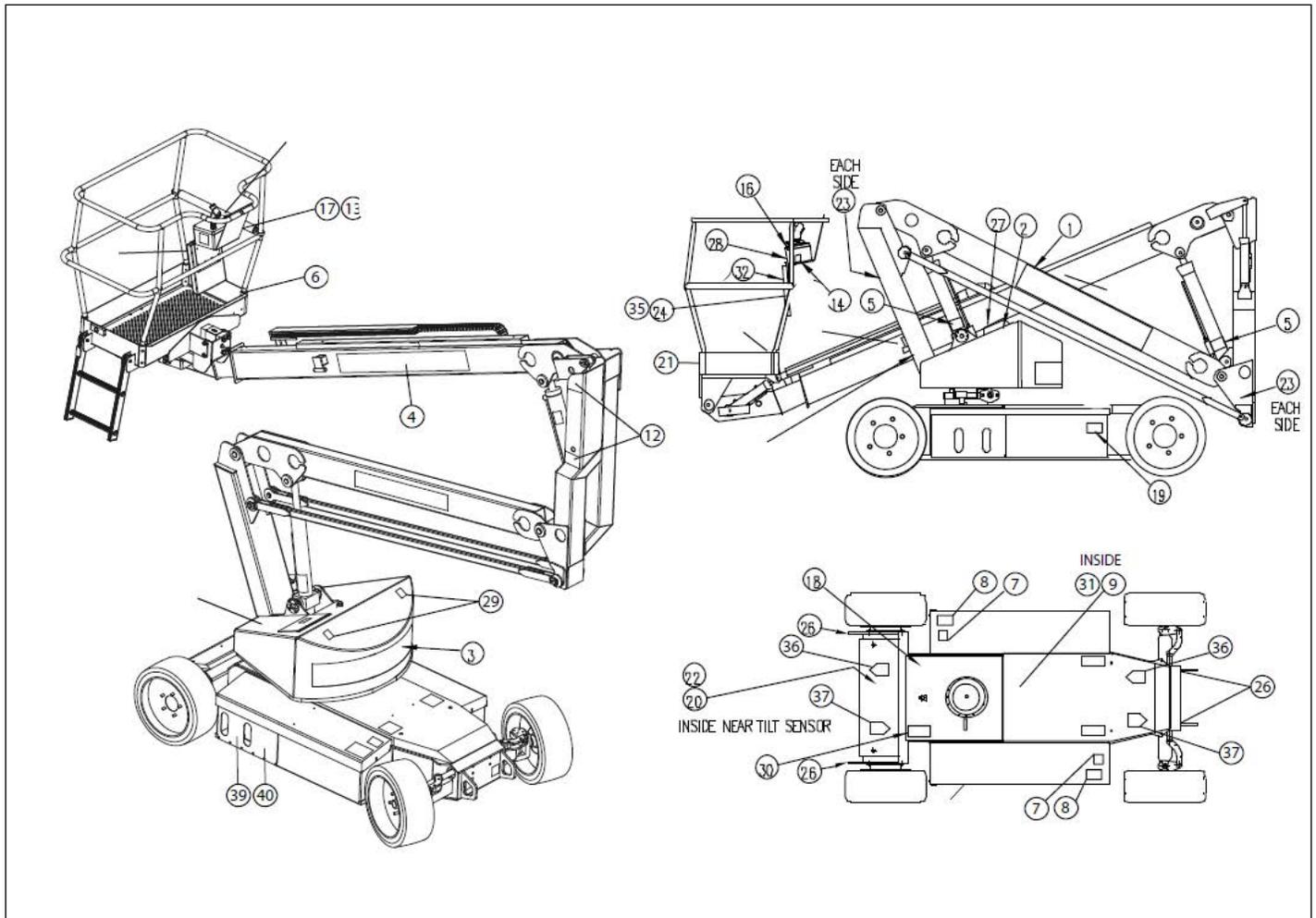
アイテム	部品番号	名前	数量	UOM
Not Shown	500494 000	REAR & FRONT WHEEL KIT (NON MARKING) SERIAL 004939 TO CURRENT		EA
1	057578 000	REAR WHEEL NUT M14	10	EA
2	513429 000	FRONT WHEEL TYRE & RIM ASSEMBLY (sn: 004939 current)	2	EA
3	057666 000	WHEEL NUT M16	10	EA
4	513430 000	REAR WHEEL TYRE & RIM ASSEMBLY (sn: 004939 current)	2	EA

REPAIR PARTS



アイテム	部品番号	名前	数量	UOM
Not Shown	500284 001	SLEW MOTOR, WORM DRIVE UNIT & SLEW BEARING ASSEMBLY		EA
1	500284 000	SLEW DRIVE	1	EA
Not Shown	500280 000	BOLT 5/8" 11 UNC X 3 1/2"	16	EA
Not Shown	500281 000	WSHR M16 HARDEND STL DIN 6016 PLTD	32	EA
2	500285 000	SLEW MOTOR	1	EA
Not Shown	500285 001	SEAL KIT	1	EA
Not Shown	500282 000	BOLT 1/2" 13 UNC X 1"	2	EA
Not Shown	056021 012	Washer, SpringWasher DIN127B M	2	EA

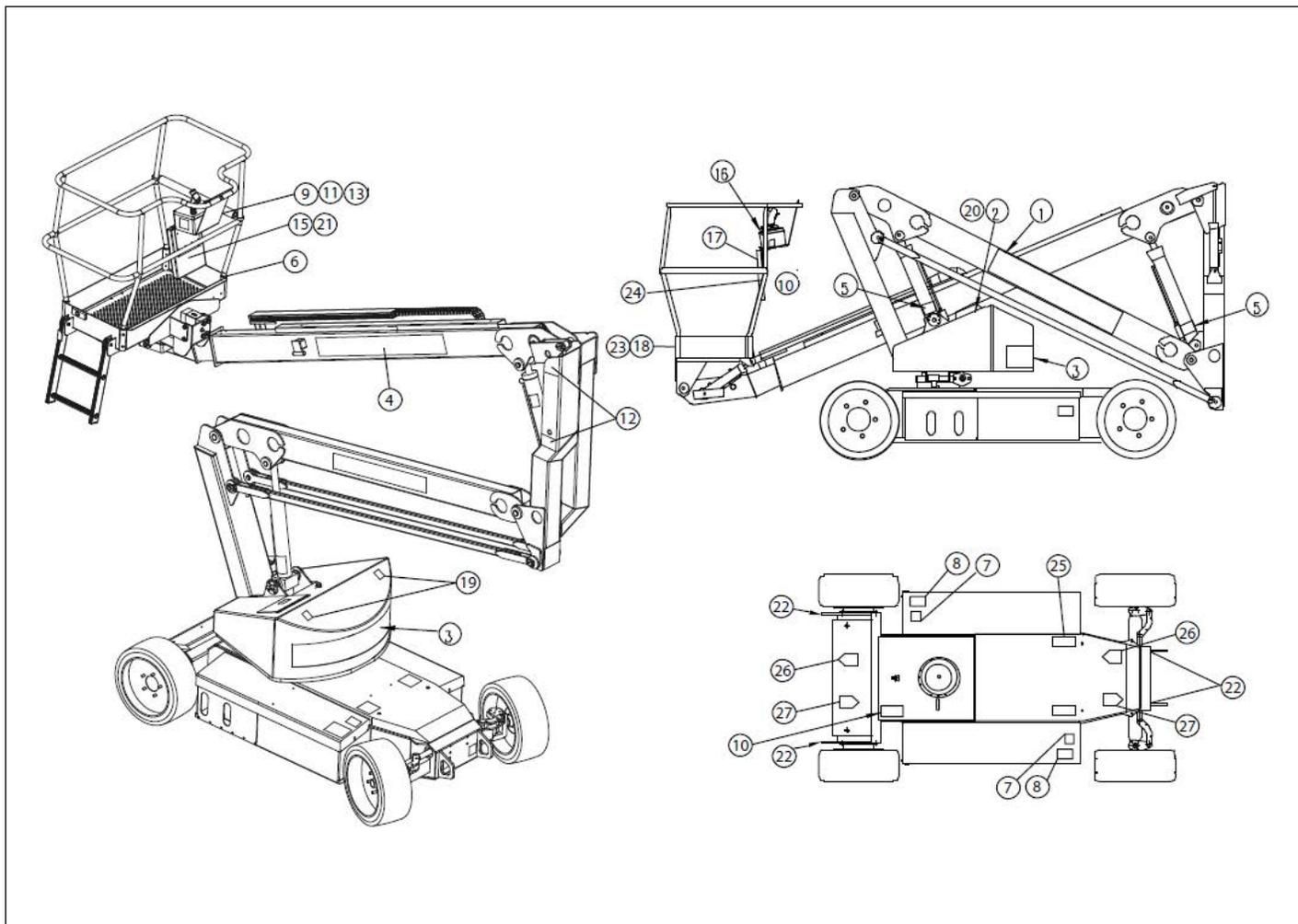
REPAIR PARTS



アイテム	部品番号	名前	数量	UOM
Not Shown	500206 001	DECAL KIT ENGLISH		EA
1	511069 000	DECAL SNORKEL A38E BOOM	2	EA
2	515087 002	OVERLAY	1	EA
3	512224 000	DECAL SNORKEL LOGO 75mm	1	EA
4	511067 000	Decal, www.snorkellifts.com	1	EA
5	510280 001	DECAL, IPAf EMERG LWR	2	EA
6	511099 000	Decal, Snorkel	1	EA
7	057429 000	DECAL BATTERY FLUID LEVEL	2	EA
8	057430 002	DECAL EXPLOSION HAZARD	2	EA
9	500467 000	DECAL HANDPUMP	1	EA
11	7030162	DECAL, OVERRIDE WARNING	1	EA
12	058881 001	DECAL HAZARD TAPE	2	EA
13	7030161	DECAL, SNORKEL GUARD OVERRIDE	1	EA
15	508772 000	DECAL, WARNING RESPONSIBILITIES	1	EA
16	515086 002	DECAL UPPER CONTROL BOX	1	EA
17	058538 000	DECAL DANGER/HAZARDS/INSTR	1	EA
18	0181562 27522	DECAL MACH COMPLIES WITH ANSI	1	EA
19	058534 000	DECAL, BATTERIES	2	EA
20	514698 000	DECAL SNORKEL GUARD OPERATION	2	EA
21	058761 000	DECAL S.W.L. LARGE ANSI	1	EA
22	057434 001	DECAL GENUINE REPLACEMENTS	2	EA
23	057424 001	DECAL CRUSH HAZARD	4	EA
24	300699	Decal, Operators Checklist	1	EA
25	058181 003	DECAL 3 POINTS	1	EA
26	058531 000	Lift/tie down point	4	EA

アイテム	部品番号	名前	数量	UOM
27	500438 000	DECAL AB38 LWR CTRL	1	EA
28	057382 000	DECAL EMER. LOWERING	2	EA
29	058537 000	DECAL PINCH POINT	2	EA
45	066555 000	DECAL, RELIEF VALVE	1	EA
30	060197 001	DECAL, HYDRAULIC FLUID	1	EA
31	514252 000	MANUAL, OPERATORS A38E PG CE/A	1	EA
32	068635 001	Harness anchor point	1	EA
33	010076 001	DECAL, ATTENTION	1	EA
34	0070540	DECAL, YELLOW ARROW	2	EA
35	0070541	DECAL, BLUE ARROW	2	EA
36	514252 200	SERVICE AND PARTS MANUAL	1	EA
37	511028 001	NAMEPLATE (ANSI)	1	EA
38	0070921	Decal, 125 Volts (USA Only)	1	EA
39	0150606	Decal, 125 Volts Power To Platform (USA Only)	1	EA
40	416836	DECAL BATTERY CHARGER PLUG	1	EA
41	515591 000	MANUAL OF RESPONSIBILITY A92.20 ANSI	1	EA
42	515843 000	DECAL OIL TYPE	1	EA
43	515335 000	QR DECAL	1	EA
44	058660 000	DECAL HAND PINCH POINT	2	EA

REPAIR PARTS



アイテム	部品番号	名前	数量	UOM
	500206 002	DECAL KIT COMPLETE GERMAN	1	EA
1	511069 000	DECAL SNORKEL A38E BOOM	2	EA
2	512940 000	OVERLAY	1	EA
3	512224 000	DECAL SNORKEL LOGO 75mm	1	EA
4	511067 000	Decal, www.snorkellifts.com	1	EA
5	510280 100	DECAL EMERGENCY LOWERING 2	2	EA
6	511099 000	Decal, Snorkel	2	EA
7	057507 024	DECAL BATTERY FLUID LEVEL 2	2	EA
8	057430 002	DECAL EXPLOSION HAZARD	2	EA
9	057507 025	DECAL IMPORTANT BEFORE USING 1	1	EA
10	511027 003	NAMEPLATE, CE 1	1	EA
11	515843 000	DECAL OIL TYPE	1	EA
12	514698 000 DE	DECAL SNORKEL GUARD PROCEDURE 1	1	EA
13	7030161 DE	DECAL SNORKEL GUARD SWITCH 1	1	EA
15	514252 001 DE	OPERATORS MANUAL CE 1	1	EA
16	7030162 DE	DECAL SNORKEL GUARD OVERRIDE 1	1	EA
17	058181 002	DECAL 3 POINT 1	1	EA
18	504199 005	DECAL S.W.L. LARGE 1	1	EA
19	058860 000	DECAL PINCH POINT 2	2	EA
20	500438 002	DECAL LOWER CONTROL COVER 1	1	EA
21	514252 201	SERVICE & PARTS MANUAL 1	1	EA
22	058531 200	DECAL TIE DOWN/LIFT POINT 4	4	EA
23	068635 001	Harness anchor point	1	EA
24	010076 901	DECAL SNORKEL LOGO, 183MM CAP	1	EA

アイテム	部品番号	名前	数量	UOM
25	060197 001	DECAL, HYDRAULIC FLUID	1	EA
26	0070540	DECAL, YELLOW ARROW	2	EA
27	0070541	DECAL, BLUE ARROW	2	EA
	509722 000	DECAL KIT COMPLETE FRENCH	1	EA
1	511069 000	DECAL SNORKEL A38E BOOM	2	EA
2	512940 000	OVERLAY	1	EA
3	512224 000	DECAL SNORKEL LOGO 75mm	1	EA
4	511067 000	Decal, www.snorkellifts.com	1	EA
5	510280 100	DECAL EMERGENCY LOWERING 2	2	EA
6	511099 000	Decal, Snorkel	2	EA
7	508834 000	DECAL BATTERY FLUID LEVEL 2	2	EA
8	057430 002	DECAL EXPLOSION HAZARD	2	EA
9	508852 001	DECAL IMPORTANT BEFORE USING 1	1	EA
10	511027 003	NAMEPLATE, CE 1	1	EA
11	515843 000	DECAL OIL TYPE	1	EA
12	514698 000 FR	DECAL SNORKEL GUARD PROCEDURE 1	1	EA
13	7030161 FR	DECAL SNORKEL GUARD SWITCH 1	1	EA
15	514252 001 FR	OPERATORS MANUAL CE 1	1	EA
16	7030162 FR	DECAL SNORKEL GUARD OVERRIDE 1	1	EA
17	508853 000	DECAL 3 POINT 1	1	EA
18	504199 005	DECAL S.W.L. LARGE 1	1	EA
19	058860 000	DECAL PINCH POINT 2	2	EA
20	508849 000	DECAL LOWER CONTROL COVER 1	1	EA
21	514252 201	SERVICE & PARTS MANUAL 1	1	EA
22	058531 200	DECAL TIE DOWN/LIFT POINT 4	4	EA

アイテム	部品番号	名前	数量	UOM
23	068635 001	Harness anchor point	1	EA
24	010076 901	DECAL SNORKEL LOGO, 183MM CAP	1	EA
25	060197 001	DECAL, HYDRAULIC FLUID	1	EA
26	0070540	DECAL, YELLOW ARROW	2	EA
27	0070541	DECAL, BLUE ARROW	2	EA
	510016 000	DECAL KIT SPANISH AB38N	1	EA
1	511069 000	DECAL SNORKEL A38E BOOM	2	EA
2	512940 000	OVERLAY	1	EA
3	512224 000	DECAL SNORKEL LOGO 75mm	1	EA
4	511067 000	Decal, www.snorkellifts.com	1	EA
5	510280 100	DECAL EMERGENCY LOWERING 2	2	EA
6	511099 000	Decal, Snorkel	2	EA
7	509944 000	DECAL BATTERY FLUID LEVEL 2	2	EA
8	057430 002	DECAL EXPLOSION HAZARD	2	EA
9	510014 001	DECAL IMPORTANT BEFORE USING 1	1	EA
10	511027 003	NAMEPLATE, CE 1	1	EA
11	515843 000	DECAL OIL TYPE	1	EA
12	514698 000 ES	DECAL SNORKEL GUARD PROCEDURE 1	1	EA
13	7030161 ES	DECAL, SNORKEL GUARD OVERRIDE,	1	EA
15	514252 001 ES	OPERATORS MANUAL CE 1	1	EA
16	7030162 ES	DECAL WARNING SNORKEL GUARD, S	1	EA
17	510015 000	DECAL 3 POINT 1	1	EA
18	504199 005	DECAL S.W.L. LARGE 1	1	EA
19	058860 000	DECAL PINCH POINT 2	2	EA
20	510017 000	DECAL LOWER CONTROL COVER 1	1	EA

アイテム	部品番号	名前	数量	UOM
21	514252 201	SERVICE & PARTS MANUAL 1	1	EA
22	058531 200	DECAL TIE DOWN/LIFT POINT 4	4	EA
23	068635 001	Harness anchor point	1	EA
24	010076 901	DECAL SNORKEL LOGO, 183MM CAP	1	EA
25	060197 001	DECAL, HYDRAULIC FLUID	1	EA
26	0070540	DECAL, YELLOW ARROW	2	EA
27	0070541	DECAL, BLUE ARROW	2	EA
	512231 000	DECAL KIT COMPLETE ITALIAN	1	EA
1	511069 000	DECAL SNORKEL A38E BOOM	2	EA
2	512940 000	OVERLAY	1	EA
3	512224 000	DECAL SNORKEL LOGO 75mm	1	EA
4	511067 000	Decal, www.snorkellifts.com	1	EA
5	510280 100	DECAL EMERGENCY LOWERING 2	2	EA
6	511099 000	Decal, Snorkel	2	EA
7	510848 000	DECAL BATTERY FLUID LEVEL 2	2	EA
8	057430 002	DECAL EXPLOSION HAZARD	2	EA
9	512236 000	DECAL IMPORTANT BEFORE USING 1	1	EA
10	511027 003	NAMEPLATE, CE 1	1	EA
11	515843 000	DECAL OIL TYPE	1	EA
12	514698 000 IT	DECAL SNORKEL GUARD PROCEDURE 1	1	EA
13	7030161 IT	DECAL SNORKEL GUARD SWITCH 1	1	EA
15	514252 001 IT	OPERATORS MANUAL CE 1	1	EA
16	7030162 IT	DECAL SNORKEL GUARD OVERRIDE 1	1	EA
17	512237 000	DECAL 3 POINT 1	1	EA
18	504199 005	DECAL S.W.L. LARGE 1	1	EA

アイテム	部品番号	名前	数量	UOM
19	058860 000	DECAL PINCH POINT 2	2	EA
20	512233 000	DECAL LOWER CONTROL COVER 1	1	EA
21	514252 201	SERVICE & PARTS MANUAL 1	1	EA
22	058531 200	DECAL TIE DOWN/LIFT POINT 4	4	EA
23	068635 001	Harness anchor point	1	EA
24	010076 901	DECAL SNORKEL LOGO, 183MM CAP	1	EA
25	060197 001	DECAL, HYDRAULIC FLUID	1	EA
26	0070540	DECAL, YELLOW ARROW	2	EA
27	0070541	DECAL, BLUE ARROW	2	EA
	510207 000	DECAL KIT COMPLETE DUTCH	1	EA
1	511069 000	DECAL SNORKEL A38E BOOM	2	EA
2	512940 000	OVERLAY	1	EA
3	512224 000	DECAL SNORKEL LOGO 75mm	1	EA
4	511067 000	Decal, www.snorkellifts.com	1	EA
5	510280 100	DECAL EMERGENCY LOWERING 2	2	EA
6	511099 000	Decal, Snorkel	2	EA
7	510215 000	DECAL BATTERY FLUID LEVEL 2	2	EA
8	057430 002	DECAL EXPLOSION HAZARD	2	EA
9	510220 001	DECAL IMPORTANT BEFORE USING 1	1	EA
10	511027 003	NAMEPLATE, CE 1	1	EA
11	515843 000	DECAL OIL TYPE	1	EA
12	514698 000 NL	DECAL SNORKEL GUARD PROCEDURE 1	1	EA
13	7030161 NL	DECAL SNORKEL GUARD SWITCH 1	1	EA
15	514252 001 NL	OPERATORS MANUAL CE 1	1	EA

アイテム	部品番号	名前	数量	UOM
16	7030162 NL	DECAL SNORKEL GUARD OVERRIDE 1	1	EA
17	510221 000	DECAL 3 POINT 1	1	EA
18	504199 005	DECAL S.W.L. LARGE 1	1	EA
19	058860 000	DECAL PINCH POINT 2	2	EA
20	510217 000	DECAL LOWER CONTROL COVER 1	1	EA
21	514252 201	SERVICE & PARTS MANUAL 1	1	EA
22	058531 200	DECAL TIE DOWN/LIFT POINT 4	4	EA
23	068635 001	Harness anchor point	1	EA
24	010076 901	DECAL SNORKEL LOGO, 183MM CAP	1	EA
25	060197 001	DECAL, HYDRAULIC FLUID	1	EA
26	0070540	DECAL, YELLOW ARROW	2	EA
27	0070541	DECAL, BLUE ARROW	2	EA

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

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NEW ZEALAND

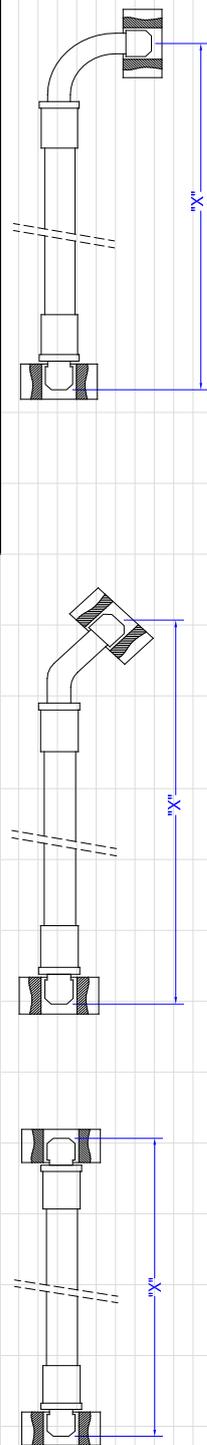
PHONE: +64 6 3689 168
FAX: +64 6 3689 164

 **snorkel**
www.snorkellifts.com

HOSE ASSEMBLY

500360-000

ITEM	PART NUMBER	QUANTITY OFF	ITEM DESCRIPTION	WORKING PRESSURE	HOSE SIZE	UPRIGHT POWERED ACCESS, VIGO CENTRE, BIRTLEY ROAD, WASHINGTON, TYNE & WEAR, NE38 9DA			MACHINE DESCRIPTION:			
						END 'A'	END 'B'	END FITTINGS	AB 38	TOTAL HOSE LENGTH (incl. fittings)	ANG. DISP.	
HYDRAULIC KIT												
HOSE KIT ONLY 513069-000												
1	500225-000	1	HOSE & LOCATION ON MACHINE	150 Bar	3/8"	3/8" BOF SWEPT 90	3/8" BOF SWEPT 90	3/8" BOF SWEPT 90	520mm	270°		
2	500226-000	2	HYDRAULIC MANIFOLD TO TANK	150 Bar	3/8"	3/8" BOF SWEPT 90	3/8" BOF SWEPT 90	3/8" BOF SWEPT 90	1770 mm	IN-LINE		
3	500227-000	2	MANIFOLD TO SLEW MOTOR	150 Bar	3/8"	3/8" BOF SWEPT 90	3/8" BOF SWEPT 90	3/8" BOF STRAIGHT	7270 mm	N/A		
4	500228-000	2	MANIFOLD TO TELE CYLINDER	150 Bar	1/4"	1/4" BOF SWEPT 90	1/4" BOF SWEPT 90	1/4" BOF SWEPT 90	9200 mm	IN-LINE		
5	500351-000	2	MASTER TO SLAVE CYLINDER ARMOURGUARD 1000mm ONE	150 Bar	1/4"	1/4" BOF SWEPT 90	1/4" BOF SWEPT 90	1/4" BOF SWEPT 90	1810 mm	IN-LINE		
6	500352-000	2	MANIFOLD TO LOWER LIFT CYLINDER	150 Bar	1/4"	1/4" BOF SWEPT 90	1/4" BOF SWEPT 90	1/4" BOF SWEPT 90	6890mm	IN-LINE		
7	500353-000	2	MANIFOLD TO UPPER LIFT	150 Bar	1/4"	1/4" BOF SWEPT 90	1/4" BOF SWEPT 90	1/4" BOF SWEPT 90	6710 mm	IN-LINE		
8	500354-000	2	MANIFOLD TO MASTER CYLINDER	150 Bar	1/4"	1/4" BOF SWEPT 90	1/4" BOF SWEPT 90	1/4" BOF SWEPT 90	1340 mm	IN-LINE		
9	500355-000	2	MANIFOLD TO STEERING CYLINDER	150 Bar	1/4"	1/4" BOF SWEPT 90	1/4" BOF SWEPT 90	1/4" BOF SWEPT 90	960 mm	N/A		
10	500356-000	2	BRAKES TEE PIECE TO BRAKES	150 Bar	1/4"	1/4" BOF STRAIGHT	1/4" BOF STRAIGHT	1/4" BOF SWEPT 90	1320 mm	N/A		
11	500357-000	1	MANIFOLD TO BRAKES TEE PIECE	150 Bar	1/2"	1/2" BOF STRAIGHT	1/2" BOF STRAIGHT	1/2" BOF SWEPT 90	342 mm	IN-LINE		
12	500358-000	1	HYDRAULIC TANK TO PUMP	150 Bar	3/8"	3/8" BOF SWEPT 90	3/8" BOF SWEPT 90	3/8" BOF SWEPT 90	260 mm	270°		
HYDRAULIC PUMP TO MANIFOLD												
FITTINGS KIT ONLY 513070-000												
BONDED SEAL												
	057376-000	1	1/2" BONDED SEAL			SELF CENTERING DOWTY						
	057124-000	14	1/4" BONDED SEAL			SELF CENTERING DOWTY						
	510214-000	2	M10 BONDED SEAL			SELF CENTERING DOWTY						
	057352-000	1	3/4" BONDED SEAL			SELF CENTERING DOWTY						
	509439-000	2	3/8" BONDED SEAL			SELF CENTERING DOWTY						
FITTINGS												
	057121-000	2	ADAPTER MALE - MALE			1/4" BSP MALE	3/8" BSP MALE	3/8" BSP MALE				
	057123-000	1	ADAPTER MALE - MALE			3/8" BSP MALE	1/2" BSP MALE	1/2" BSP MALE				
	057256-000	12	ADAPTER MALE - MALE			1/4" BSP MALE	1/4" BSP MALE	1/4" BSP MALE				
	12-1006	1	ADAPTER MALE - MALE			3/4" BSP MALE	1/2" BSP MALE	1/2" BSP MALE				
	056805-000	2	ADAPTER MALE - MALE			M10x1 MALE	1/4" BSP MALE	1/4" BSP MALE				
	057211-000	1	ADAPTER MALE - MALE			3/8" BSP MALE	3/8" BSP MALE	3/8" BSP MALE				
			END 'A'			END 'B'	END 'C'					
13	056852-000	1	EQUAL TEE			1/4" BSP MALE	1/4" BSP MALE	1/4" BSP MALE				
14*	13-3549	1	IN-LINE CHECK VALVE			3/8" BSP MALE	3/8" BSP MALE	3/8" BSP MALE				
ISSUE	25332	2	25338 (30/09/2008)	2A	AWL 29-01-2009	25576 (3/4/2009)	25588 (15/6/09)	25928 (28/11/2011)	26133* (29/02/12)	7	DRAWN BY : AW LISTER	DATE : 8 NOVEMBER 2007
ECR No.											APPROVED BY : S DOWNES	SHEET 1 of 1
												DRAWING N°
												500360-000



TIGHTENING TORQUES FOR HOSES AND FITTINGS

HOSE NUT	HOSE NUT	HOSE NUT
STD	O RING	
1/4" BSP	41 Nm	24 Nm
3/8" BSP	68 Nm	33 Nm
1/2" BSP	109 Nm	48 Nm
3/4" BSP	149 Nm	84 Nm

*NOTE:
ITEM 14 IS NOT INCLUDED IN THE HOSE KIT AND SHOULD BE ORDERED SEPARATELY

ALL HOSES TO BE R17 OR EQUIVALENT TO ALLOW TIGHT BEND RADII
ALL HOSES TO BE TESTED TO 1.5 TIMES THE WORKING PRESSURE
ALL HOSES TO BE CLEANED TO NAS 10' SPECIFICATIONS, AND ENDS PLUGGED OR CAPPED
ALL HOSES TO BE CLEARLY MARKED WITH THE Upright PART NUMBER
ANGULAR DISPLACEMENT CONVENTION - END A IS ALWAYS PLACED FURTHEST AWAY AND VERTICALLY UP.
END B IS THEN TURNED CLOCKWISE FROM THE VERTICAL DATUM

NOTES

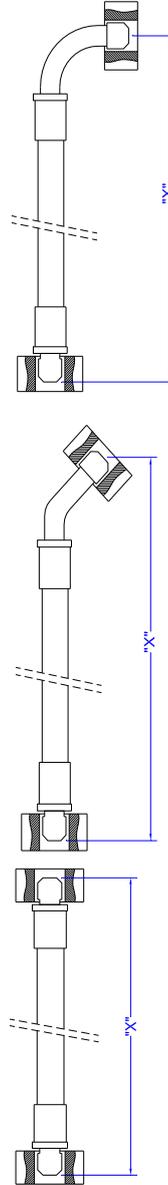
PLATFORM HYDRAULIC ROTATE HOSE/FITTING ASSY (To complete 500360-000)

514349-000

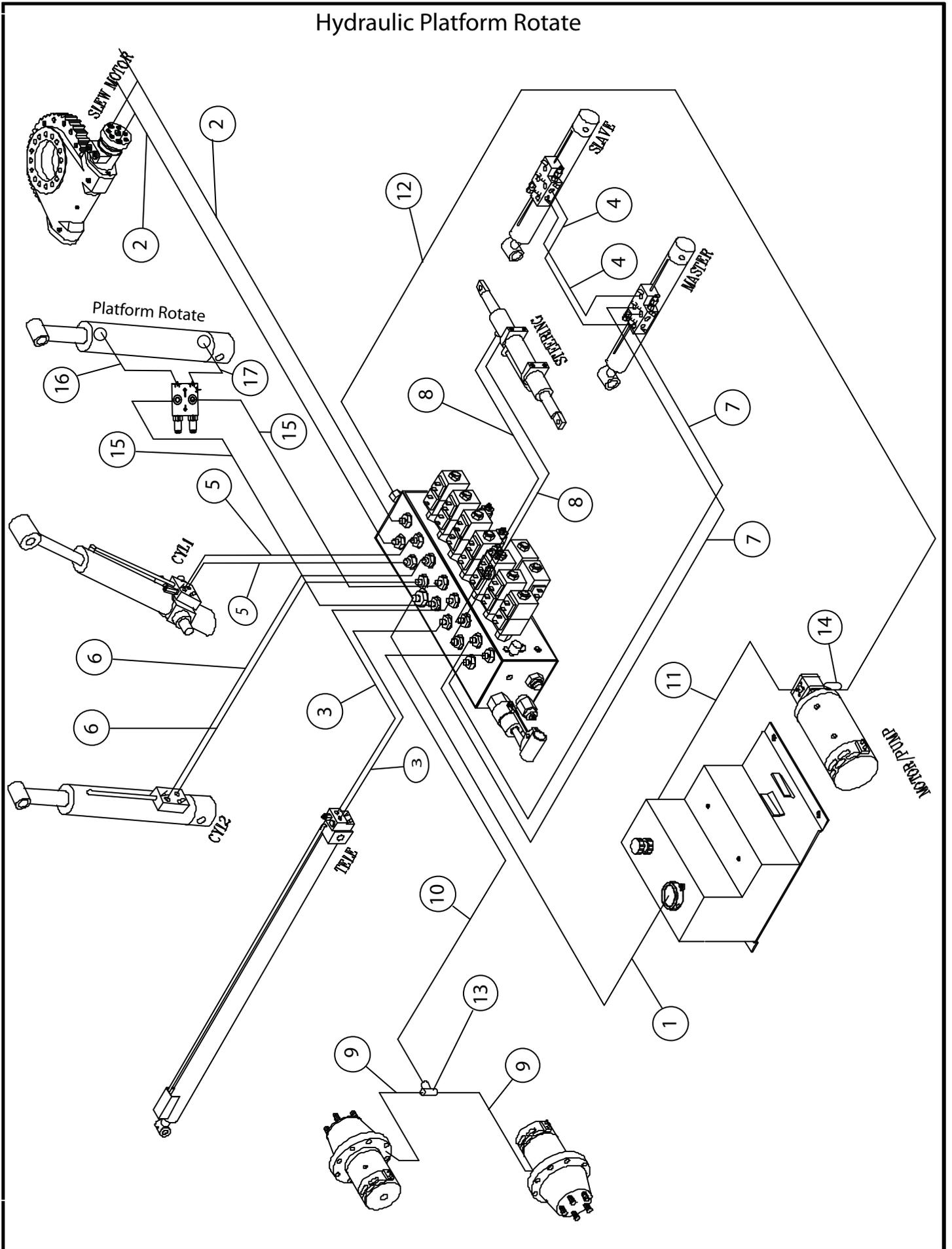
PART NUMBER	QUANTITY OFF	LOCATION ON MACHINE	WORKING PRESSURE	HOSE SIZE	END FITTINGS		MACHINE DESCRIPTION:	
					END 'A'	END 'B'		
HYDRAULIC KIT								
HOSES								
514356-000	2	MANIFOLD - DOUBLE OVERCENTRE VALVE	210BAR	1/4" R17	1/4" BSP FEMALE SWEEP 90DEG	1/4" BSP FEMALE STRAIGHT, spiral wrap for 1 meter starting from straight end.	A38E HYD ROT	
514357-000	1	DOUBLE OVERCENTRE VALVE - CYLINDER	210BAR	1/4" R17	1/4" BSP FEMALE SWEEP 90DEG	1/4" BSP FEMALE STRAIGHT, spiral wrap for full length.	TOTAL HOSE LENGTH (incl. fittings) Dimension "x"	
514358-000	1	DOUBLE OVERCENTRE VALVE - CYLINDER	210BAR	1/4" R17	1/4" BSP FEMALE SWEEP 90DEG	1/4" BSP FEMALE STRAIGHT, spiral wrap for full length.	15.300	
12-0901	4	FITTINGS						ANG. DISP.
12-1507	4	DOUBLE OVERCENTRE VALVE:-						
		1/4" BSP MALE-MALE STRAIGHT ADAPTOR						
		1/4" SELF CENTREING BONDED SEAL						
514352-000	2	ROTATE CYLINDER:-						
		ADAPTER- 60RB - 1/4" BSP MALE - MALE STRAIGHT						
514353-000	2	MANIFOLD BLOCK:-						
512851-000	11	ADAPTER- 60RB - 3/8" BSP MALE - MALE STRAIGHT						
514354-000	4	ADAPTER- 40RB - 1/4" BSP MALE - MALE STRAIGHT						
12-3149	1	ADAPTER- 40RB - 3/8" BSP MALE - MALE STRAIGHT						
12-2002	1	1/4" BSP MINIMESS TEST POINT						
12-1511	1	1/8" BSP PLUG						
		1/8" BSP DOWTY WASHER						
ALL HOSES TO BE TAGGED AT BOTH ENDS.								
ISSUE C.N.	1	2	3	4	5	6	DRAWING N°	
	FIRST RELEASE	26507	26658				514349-000	
							DATE - 21/8/14	
							SHEET 1 of 1	

TIGHTENING TORQUES FOR HOSES AND FITTINGS

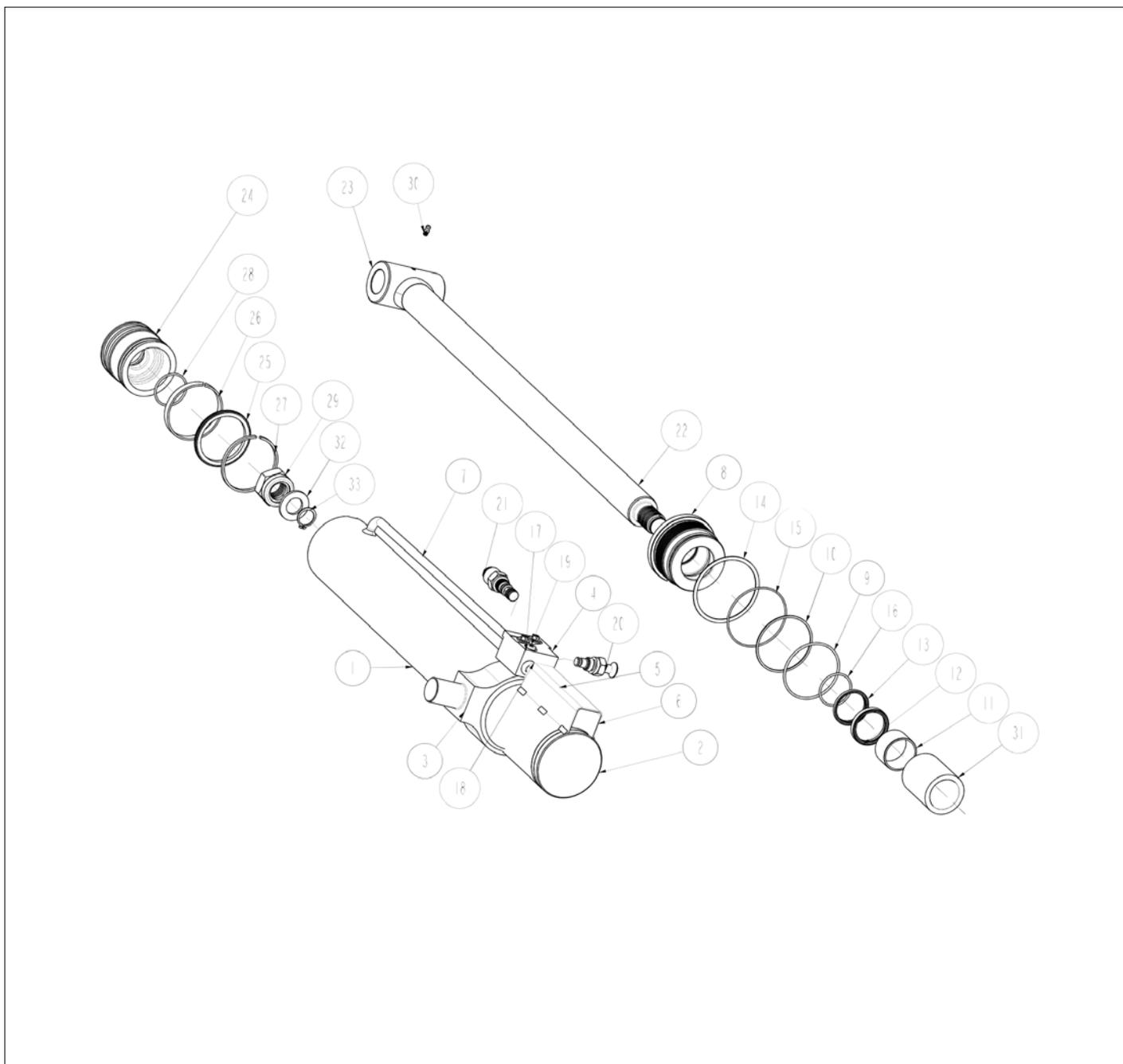
ADAPTER	HOSE NUT	O RING
1/4" BSP	34 Nm	41 Nm
3/8" BSP	47 Nm	66 Nm
1/2" BSP	102 Nm	109 Nm
3/4" BSP	149 Nm	149 Nm



Illustrated Parts Breakdown



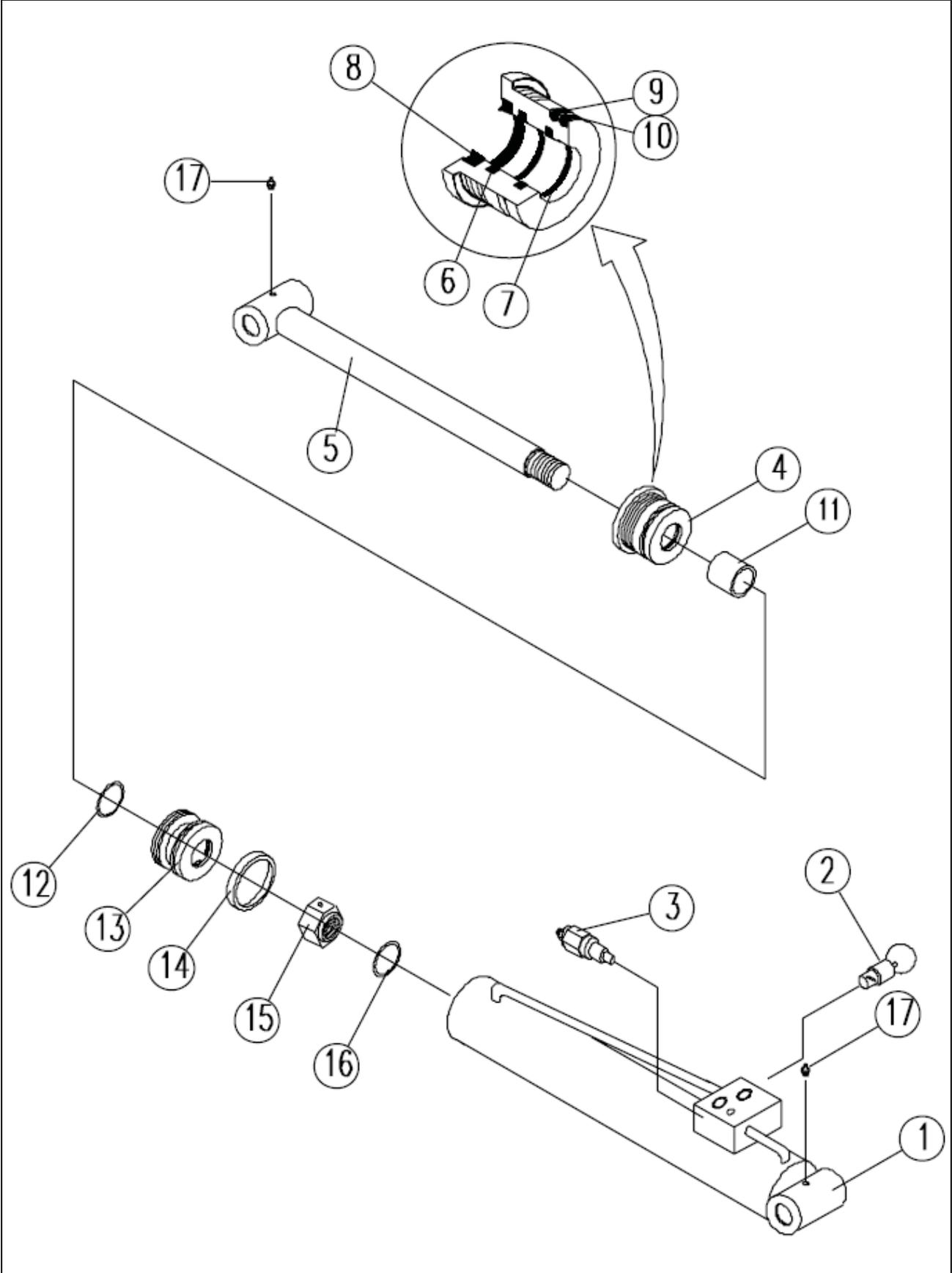
HYDRAULICS



アイテム	部品番号	名前	数量	UOM
	516202 000	FIRST POST CYLINDER, A38	1	EA
33	515874 000	EXT Ø25 CIRCLIP	1	EA
32	515875 000	Ø25 WASHER	1	EA
31	515876 000	SPACER	1	EA
30	515877 000	M6x1 GREASE NIPPLE	1	EA
29	515878 000	M30x3.5 LOCKNUT	1	EA
28	515879 000	O RING	1	EA
27	515880 000	Ø85 PISTON RING	1	EA
26	515881 000	WEAR RING 80*85*9.7	1	EA
25	515882 000	SEAL P/H SIMCO300/8	1	EA
24	515883 000	Ø85 PISTON HEAD	1	EA
23	515884 000	BOSS (Ø34xØ60x94 Lg	1	EA
22	515885 000	ROD(3B075A 02) CK4	1	EA
21	515886 000	OVERCENTRE VALVE	1	EA
20	515887 000	LOWERING VALVE	1	EA
19	515888 000	1/4" BSP PLUG	2	EA
18	515889 000	1/4" BSP PLUG	1	EA
17	515890 000	1/8" BSP PLUG	1	EA
16	515891 000	O RING	1	EA
15	515892 000	O RING	1	EA
14	515893 000	TAB WASHER	1	EA
13	515894 000	WIPER	1	EA
12	515895 000	U RING	1	EA
11	515896 000	Ø45xØ50 BUSH	1	EA
10	515897 000	BACK UP RING	1	EA
9	515898 000	X8600 O RING	1	EA
8	515899 000	Ø85xØ45 GLAND	1	EA
7	515900 000	OIL PIPE	1	EA
6	515901 000	PIPE PROTECTOR	1	EA

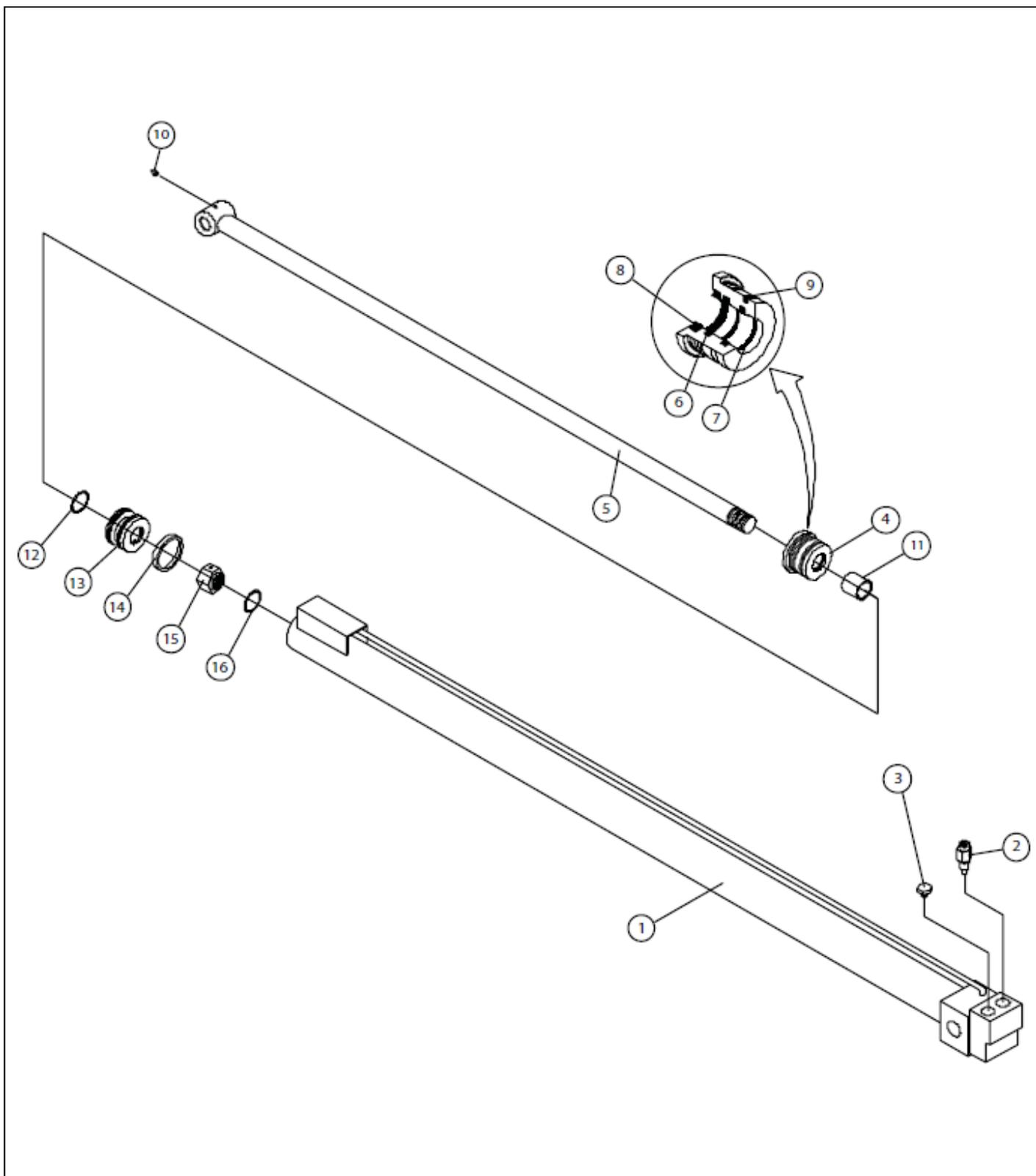
アイテム	部品番号	名前	数量	UOM
5	515902 000	OIL PIPE	1	EA
4	515903 000	VALVE BLOCK	1	EA
3	515904 000	TRUNNION	1	EA
2	515905 000	CYL END (Ø85xØ100x1	1	EA
1	515906 000	TUBE(3A08092C 01)	1	EA

HYDRAULICS



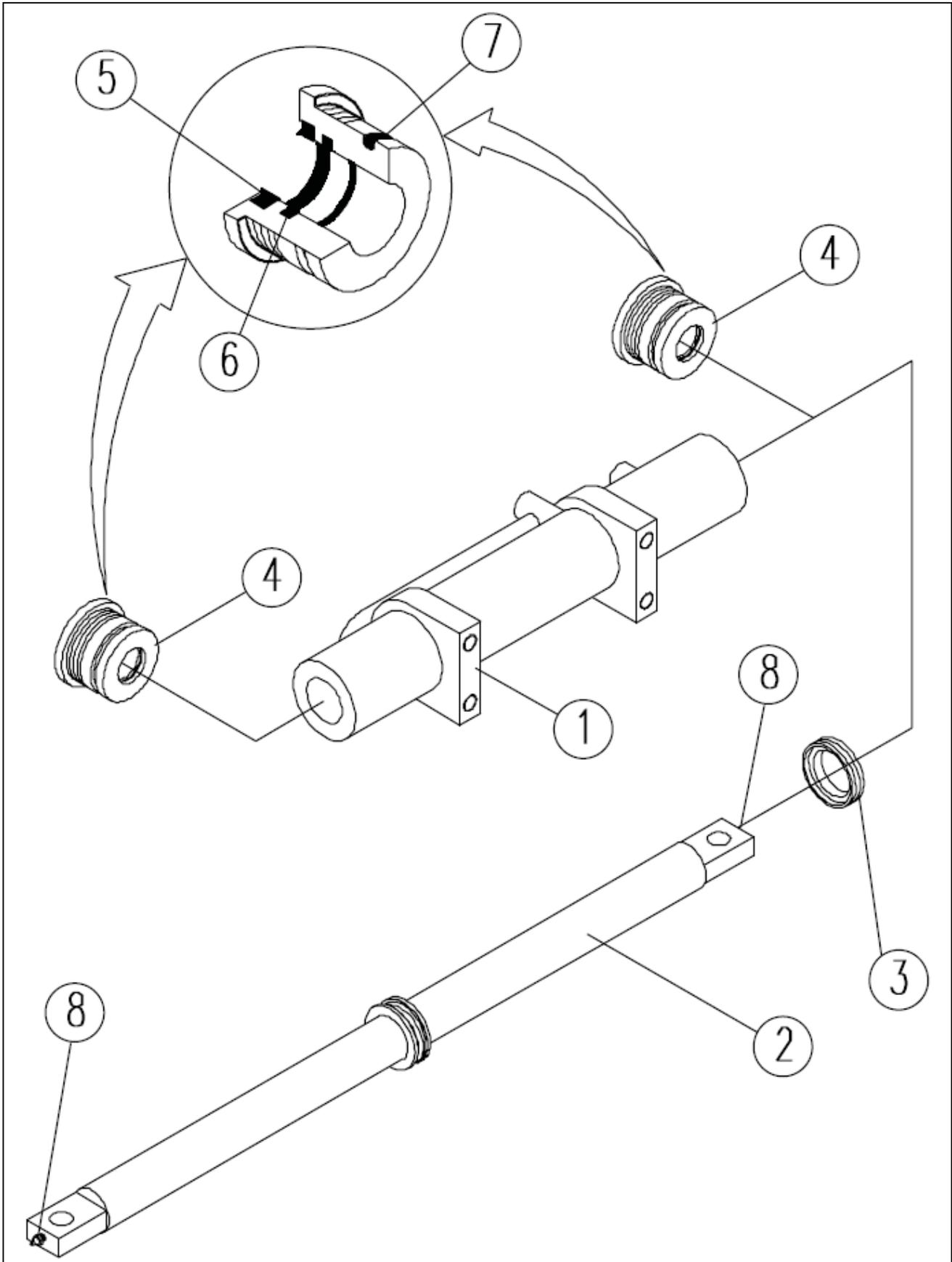
アイテム	部品番号	名前	数量	UOM
Not Shown	504505 000	Upper Cylinder Assembly		EA
1	REF	CYLINDER BODY	1	EA
2	515174 000	EMERGENCY LOWERING VALVE	1	EA
3	058728 000	SINGLE OVERCENTRE VALVE	1	EA
4	REF	END CAP	1	EA
5	REF	ROD AND END PIVOT	1	EA
	500458 000	Energy Chain, Complete	1	EA
6	KIT ITEM	O RING	1	EA
7	KIT ITEM	O RING	1	EA
8	KIT ITEM	O RING	1	EA
9	KIT ITEM	O RING	1	EA
10	KIT ITEM	O RING	1	EA
11	REF	SPACER	1	EA
12	KIT ITEM	O RING	1	EA
13	REF	PISTON HEAD	1	EA
14	KIT ITEM	PISTON SEAL	1	EA
15	REF	PISTON LOCKNUT	1	EA
16	REF	WASHER	1	EA
17	501964 001	GREASE NIPPLE	2	EA

HYDRAULICS



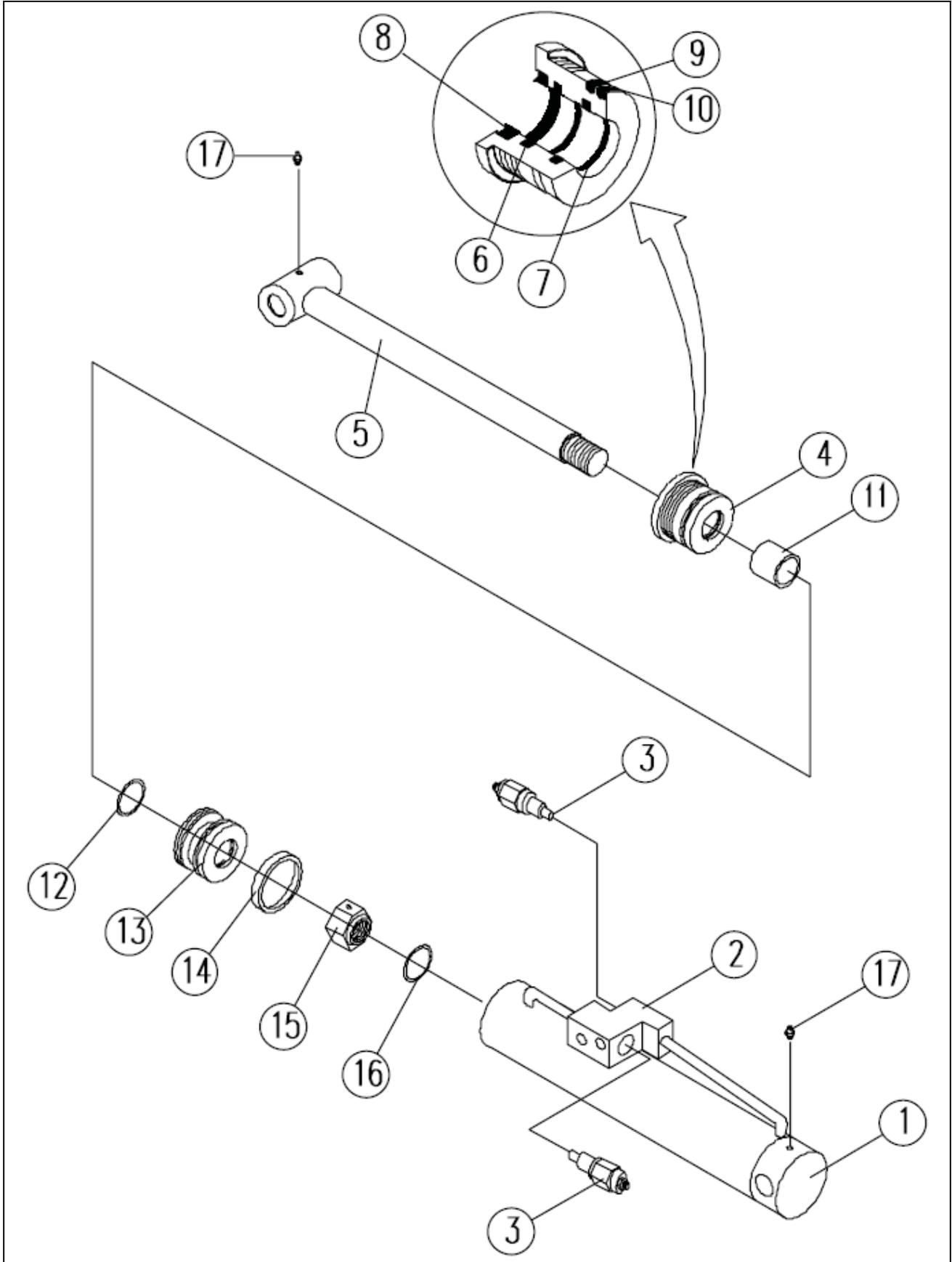
アイテム	部品番号	名前	数量	UOM
Not Shown	058461 000	Tele Cylinder Assembly		EA
1	REF	CYLINDER BODY	1	EA
2	058728 000	SINGLE OVERCENTRE VALVE	1	EA
3	058714 000	SINGLE P.O. CHECK VALVE	1	EA
4	REF	END CAP	1	EA
5	REF	ROD AND END PIVOT	1	EA
	500459 000	SEAL KIT (6 THRU 9, INCLUDING 12 AND 14)	1	EA
6	KIT ITEM	O RING	1	EA
7	KIT ITEM	O RING	1	EA
8	KIT ITEM	O RING	1	EA
9	KIT ITEM	O RING	1	EA
10	057048 000	GREASE NIPPLE		EA
11	REF	SPACER	1	EA
12	KIT ITEM	O RING	1	EA
13	REF	PISTON HEAD	1	EA
14	KIT ITEM	WEARBAND	1	EA
15	057121 000	PISTON LOCKNUT	1	EA
16	501964 000	WASHER	1	EA

HYDRAULICS



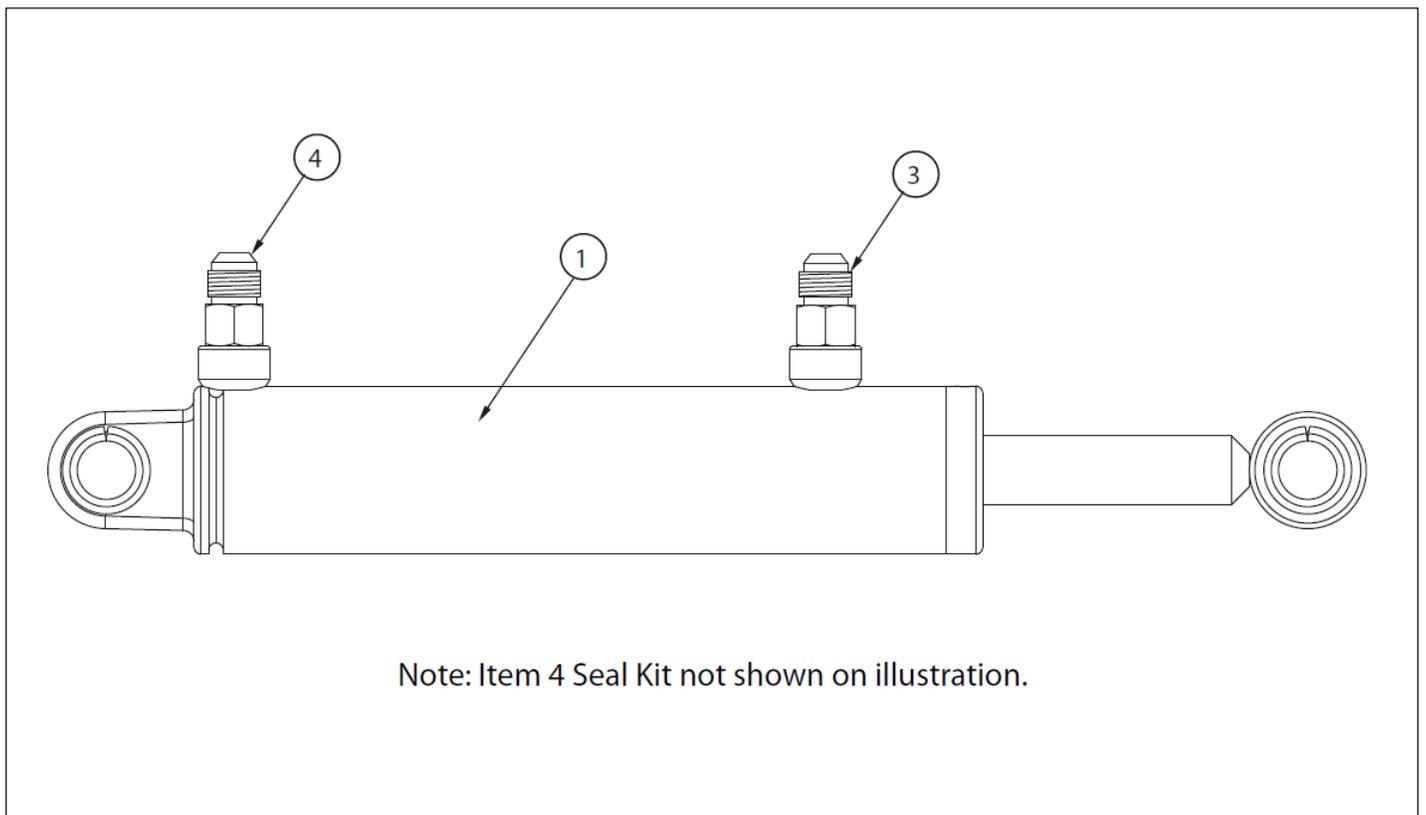
アイテム	部品番号	名前	数量	UOM
Not Shown	058463 000	STEERING CYLINDER ASSEMBLY		EA
1	REF	CYLINDER BODY	1	EA
2	REF	CYLINDER ROD	1	EA
	500460 000	SEAL KIT (CONTAINS 3, 5, 6 AND 7)	1	EA
3	KIT ITEM	WEARBAND	1	EA
4	REF	END CAP	1	EA
5	KIT ITEM	O RING	1	EA
6	KIT ITEM	O RING	1	EA
7	KIT ITEM	O RING	1	EA
8	057048 000	GREASE NIPPLE	3	EA

HYDRAULICS



アイテム	部品番号	名前	数量	UOM
Not Shown	058734 000	Master Level Cylinder Assembly		EA
Not Shown	058735 000	Slave Cylinder		EA
1	REF	CYLINDER BODY	1	EA
2	REF	VALVE BLOCK BODY	1	EA
3	058728 000	SINGLE OVERCENTRE VALVE	1	EA
4	REF	END CAP	1	EA
5	REF	ROD AND END PIVOT	1	EA
	058750 000	SEAL KIT	1	EA
6	KIT ITEM	O RING	1	EA
7	KIT ITEM	O RING	1	EA
8	KIT ITEM	O RING	1	EA
9	KIT ITEM	O RING	1	EA
10	KIT ITEM	O RING	1	EA
11	REF	SPACER	1	EA
12	KIT ITEM	O RING	1	EA
13	REF	PISTON HEAD	1	EA
14	KIT ITEM	WEARBAND	1	EA
15	REF	PISTON LOCKOUT	1	EA
16	REF	WASHER	1	EA
17	057048 000	GREASE NIPPLE	2	EA

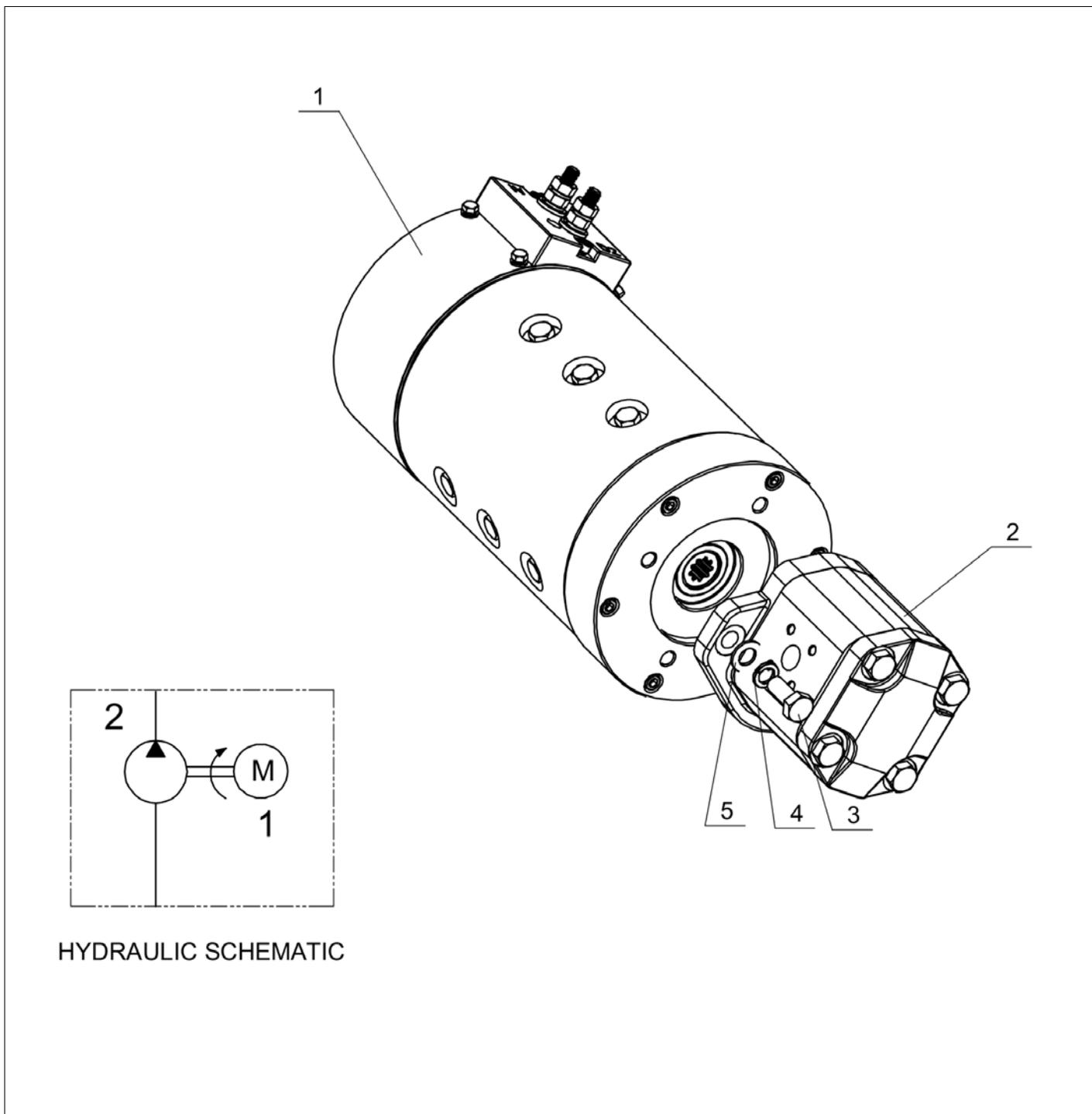
HYDRAULICS



Note: Item 4 Seal Kit not shown on illustration.

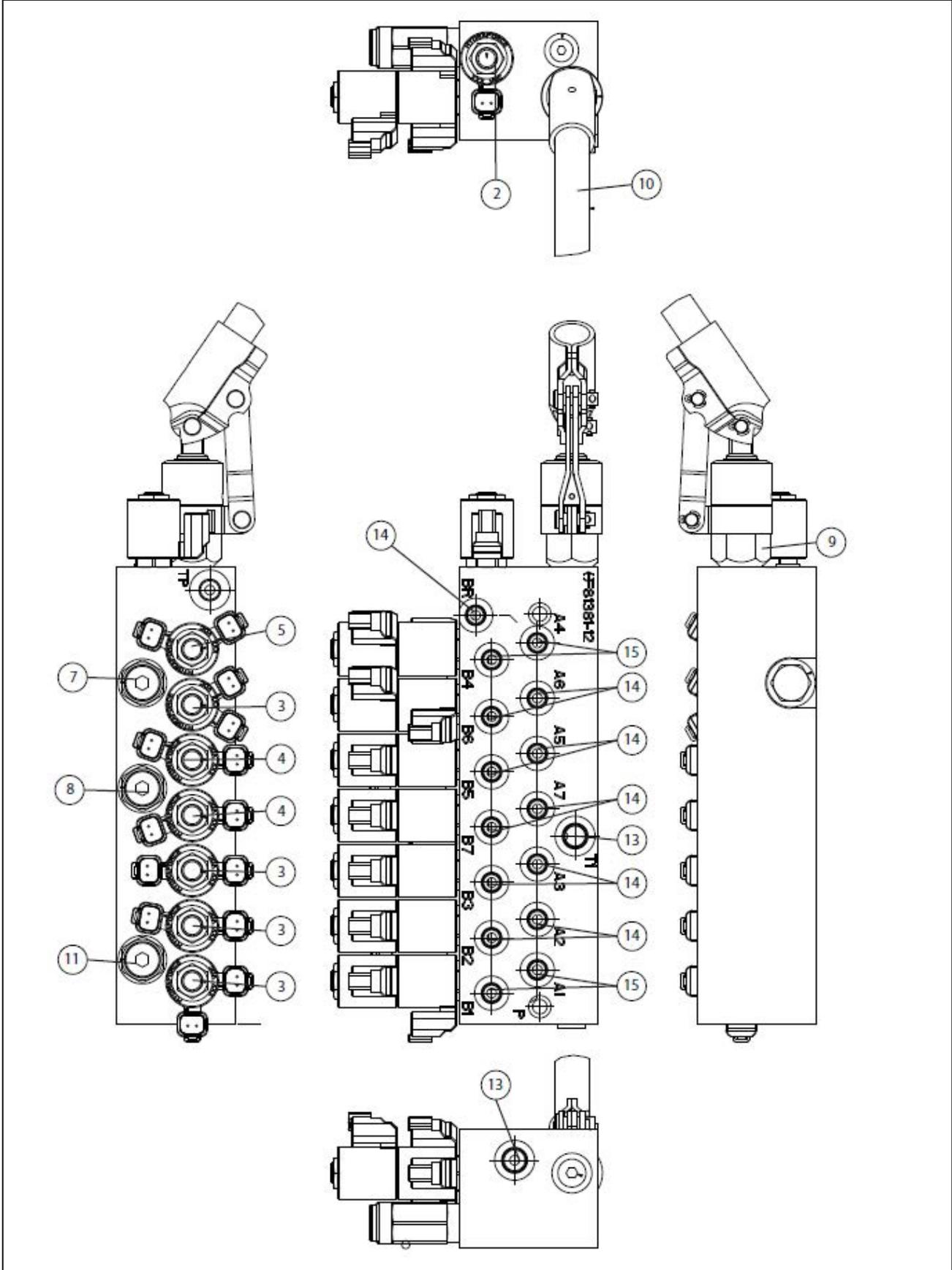
アイテム	部品番号	名前	数量	UOM
Not Shown	CYLINDER 12330	PLATFORM ROTATE CYLINDER ASSEMBLY		EA
1	12330	CYLINDER	1	EA
2	12330K	SEAL KIT	1	EA
3	514352 000	ADAPTER, 6ORB 1/4 BSP MALE MALE STRAIGHT	1	EA
4	514352 000	ADAPTER, 6ORB 1/4 BSP MALE MALE STRAIGHT	1	EA

HYDRAULICS



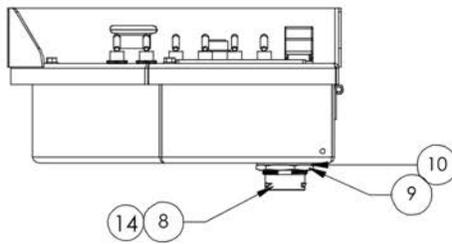
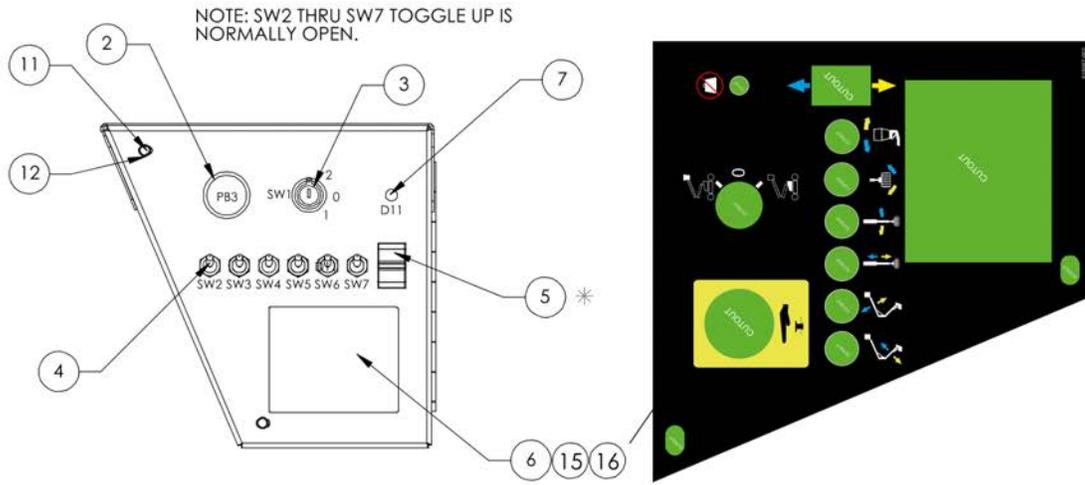
アイテム	部品番号	名前	数量	UOM
	515652 000	CB2A F6C1F, BI DIR PUMP MOTOR	1	EA
1	515921 000	Motor 48VDC 4KW 1750RPM S2=15Min	1	EA
2	515652 100	Pump CB2A F6C1F 6.37cc/r, 20Mpa	1	EA
3	515923 000	Screw M10X25	2	EA
4	515924 000	Spring Washer Ø10	2	EA
5	515925 000	Flat washer Ø10	2	EA
6	515652 010	PUMP SEAL KIT	1	EA

HYDRAULICS

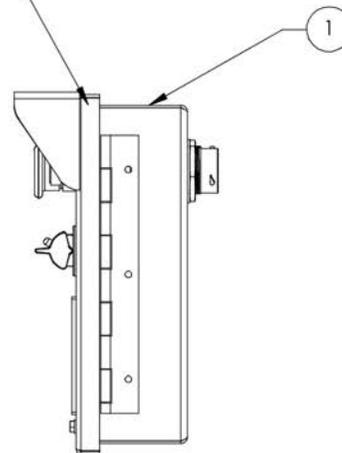


アイテム	部品番号	名前	数量	UOM
Not Shown	514351 000	A38E MANIFOLD BLOCK (Hydraulic Platform Rotate)		EA
1	REF	MAIN MANIFOLD BLOCK ONLY	1	EA
2	6010472	VALVECART 3 WAY VALVE	1	EA
2	514526 000	COIL	2	EA
3	12567 4	Cartridge, Solenoid Spool, 4 Way, 3 Posn, Motor Spool	4	EA
3	514526 000	COIL	2	EA
4	6018952	SOLENOID VALVE	2	EA
4	514526 000	COIL	2	EA
5	514523 000	VALVE	1	EA
5	514526 000	COIL	2	EA
6	12 3149	PRESSURE TEST POINT FITTING	1	EA
7	514525 000	PRESSURE REDUCING VALVE	1	EA
8	514524 000	MAINRELIEF VALVE	1	EA
9	500261 002	MANUAL TELE RETRACTIONVALVE	1	EA
10	0163373	HANDLE BLEED DOWN VALVE	1	EA
11	514527 000	CROSS LINE RELIEF VALVE	2	EA
13	514353 000	ADAPTER, 6ORB 3/8 BSP M M STR	2	EA
14	512251 000	ADAPTER, 4ORB 1/4 BSP M M STR	11	EA
15	514354 000	ADAPTER, 4ORB 3/8 BSP M M STR	4	EA

ELECTRICAL



USE SINGLE SIDED ADHESIVE SEAL TAPE TO SEAL FRONT PANEL.

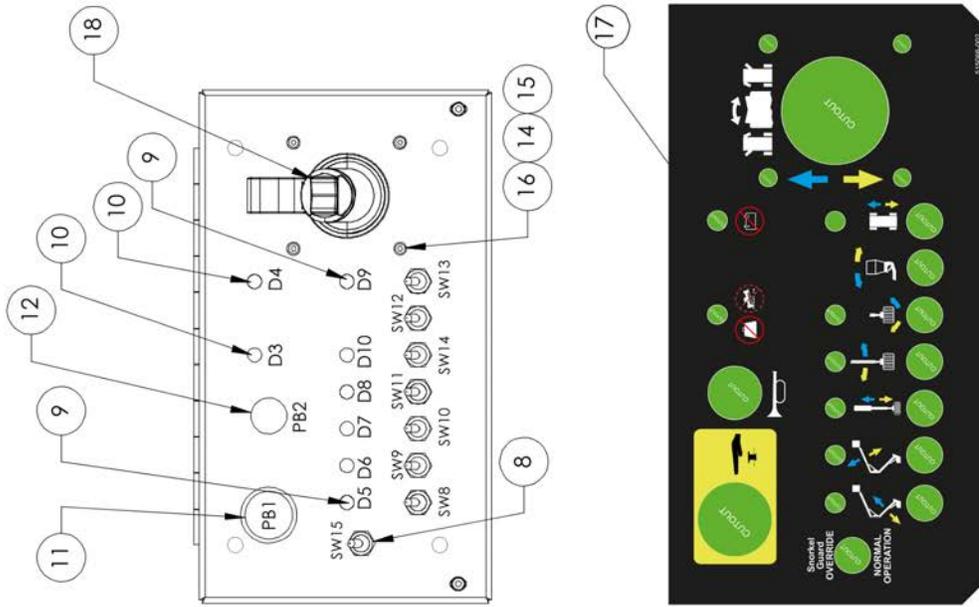


WIRE TO CIRCUIT DIAGRAM 515490-000
 USING BLACK CABLE 1.0mm CSA 510671-000
 AND CABLE MARKERS 510644-000 THRU -009.
 * ENSURE THE THUMB CONTROL SWITCH IS SECURED
 IN PLACE WITH A SUITABLE BULK ADHESIVE OVER
 THE TWO SPRING RETAINER TANGS.

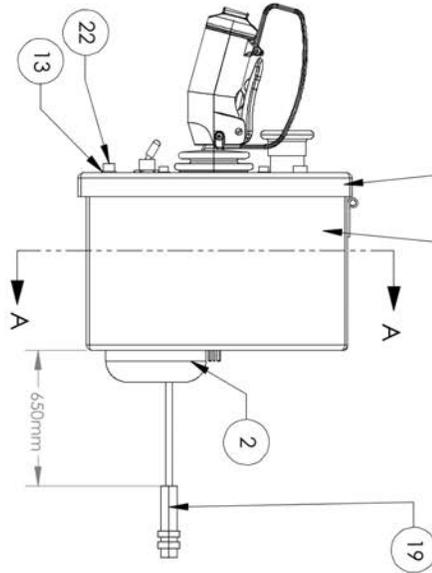
515044-000

アイテム	部品番号	名前	数量	UOM
1	515045 000	A36E LCB ENCLOSURE	1	EA
2	3028810	PUSH/PULL EMERGENCY STOP	1	EA
3	512543 000	3 POS'N KEY SWITCH STAYPUT	1	EA
4	3020080	TOGGLE SWITCH	6	EA
5	514131 000	THUMB CONTROL UNIT	1	EA
6	3087803	EZCal Panel Trionics	1	EA
7	512934 000	LED RED 12V	1	EA
8	3220275	20PIN PANEL MOUNT RECEPTACLE DEUTSCH HDP24 18 20PN	1	EA
9	514605 000	LOCKNUT DEUTSCH 114020 90	1	EA
10	514604 000	LOCKWASHER DEUTSCH 114021	1	EA
11	056057 012	HEX HEAD, M5 x 16mm	2	EA
12	056069 005	Washer SteelFlatWasher DIN125A	2	EA
Not Shown	100338 013	CRIMP PIN DEUTSCH	16	EA
14	512366 000	4 WAY PANEL PLUG	1	EA
15	509755 000	Mate N lock socket contact	4	EA
16	515087 002	OVERLAY	1	EA
Not Shown	514450 001	DIODE, 3 AMP 600V	2	EA

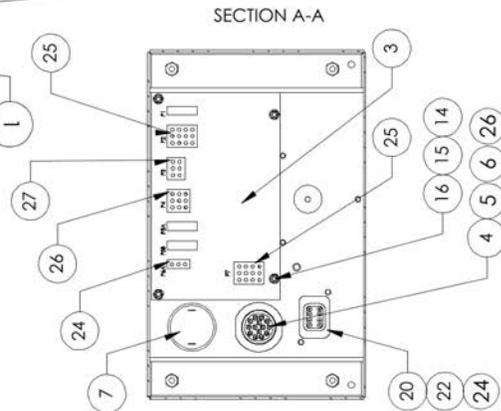
ELECTRICAL



NOTE: SW8 THRU SW15, TOGGLE UP IS NORMALLY OPEN.



USE SINGLE SIDED ADHESIVE SEAL TAPE TO SEAL FRONT PANEL



WIRE TO CIRCUIT DIAGRAM 515490-000 USING BLACK CABLE 1.0mm CSA 510671-000 AND CABLE MARKERS 510644-000 THRU -009.

515039-000

アイテム	部品番号	名前	数量	UOM
1	515040 000	A38E UCB ENCLOSURE	1	EA
2	514404 001	FLASHING BEACON BLUE	1	EA
3	515049 000	GP200 ECU 21 200 301	1	EA
4	3049862	Receptacle, Flgd HD30, 14 Way	1	EA
5	514604 000	LOCKWASHER DEUTSCH 114021	1	EA
6	514605 000	LOCKNUT DEUTSCH 114020 90	1	EA
7	502588 000	ALARM, ECCO BEEPING 6 28VDC	1	EA
8	3020080	TOGGLE SWITCH	8	EA
9	512935 000	LED GREEN 12V	6	EA
10	512934 000	LED RED 12V	2	EA
11	3028810	PUSH/PULL EMERGENCY STOP	1	EA
12	510542 000	PUSHBUTTON BLACK C/W 1 N/O CON	1	EA
13	056069 005	Washer SteelFlatWasher DIN125A	2	EA
14	056069 004	Wshr, SteelFlatWshr M4 DIN125	8	EA
15	056066 004	NUT NYLOCK DIN985 M4 8.0 ZP	8	EA
16	058500 025	M4 x 25 SHCS 12.9	8	EA
17	515086 002	DECAL UPPER CONTROL BOX	1	EA
18	3028933	Joystick 1 Axis, Deadman Guard	1	EA
19	3028844	IFS241 (IFM PROXY)	1	EA
20	514627 000	CONN, DEUTSCH DT06 8SA	1	EA
21	514629 000	LOCK WEDGE W8P	1	EA
22	058501 016	M5 x 16 S.H.C.S. GR 12.9	2	EA
23	100338 013	CRIMP PIN DEUTSCH	13	EA
24	510155 000	3WAY PANEL PLUG SW TWIST RELEASE E/STOP; SCHNEIDER	1	EA
25	510157 000	12 way panel plug	2	EA
26	510156 000	9WAY PANEL PLUG	1	EA
27	510154 000	6WAY PANEL PLUG	1	EA

アイテム	部品番号	名前	数量	UOM
28	509755 000	Mate N lock socket contact	32	EA

アイテム	部品番号	名前	数量	UOM
1	515521 000	A38E WIRE HARNESS TO PLATFORM AND GROUND CONTROL PANELS KIT	1	EA
1a	515521 001	PANELS KIT ,PLATFORM CABLE HARNESS	1	EA
1b	515521 002	PANELS KIT ,GROUND PANEL CABLES	1	EA
2	513540 001	A38E VALVE CABLE	1	EA
3	513541 000	A38E CAN LINK CABLE KIT	1	EA
4	515502 000	A38E POWER CABLE KIT	1	EA
5	513542 002	SEM600 MOTOR LHS	1	EA
6	513542 003	SEM600 MOTOR RHS	1	EA
7	513542 004	MOTOR LHS MOTOR RHS	1	EA
8	51502 001	BATTERY +VE VE 300A FUSE	1	EA
9	515502 002	BATTERY VE LHS BATTERY DISCONNECT SW	1	EA
10	515502 003	BATTERY DISCONNECT SW VE EARTH STUD	1	EA
11	513542 005	BATTERY BATTERY	1	EA
12	513542 008	FUSE 300A CONTACTOR N/O	1	EA
13	513542 010	P600 PUMP	1	EA
14	513542 012	P600 EARTH STUD	1	EA
15	513542 014	SEM600 LEFT MOTOR	1	EA
16	513542 016	SEM600 RIGHT MOTOR	1	EA
17	513542 018	SEM600 CONTACTOR OUT N/O	1	EA
18	513542 006	BATTERY BATTERY	1	EA
19	513542 009	CONTACTOR P600	1	EA
20	513542 011	PUMP P600	1	EA
21	513542 013	EARTH STUD SEM600	1	EA
22	513542 015	LEFT MOTOR SEM600	1	EA
23	513542 017	LEFT MOTOR RIGHT MOTOR	1	EA

OPTIONS

OPTION LIST

ITEM	PART NO.	DESCRIPTION	PAGE
1	514782-850	OPTION - SNORKELGUARD	7-68
2	514783-850	OPTION -HORN SOUND ON E/STOP	7-69
3	514784-850	OPTION -EMERGENCY POWER DESCEND	7-69
4	514785-850	OPTION -DRIVE LIGHT KIT	7-69
5	514786-850	OPTION -DRIVE DE-ACTIVATED ABOVE 8M	7-69
6	058191-000	OPTION, POWER TO PLATFORM 110V	---
7	058191-001	OPTION, POWER TO PLATFORM 220V	---
8	058275-000	OPTION, FLASHING BEACON	---
9	058284-000	OPTION, SPOTLIGHT IN PLATFORM	---
10	514209-850	OPTION,MOTION ALARM FOR AUSTRALIA	---
11	514225-850	FLASHING BEACON & CAGE	---
12	514404-850	SMALL FLASHING BEACON	---
13	504551-001	FRIENDLY OIL	---
14	514303-850	JAPAN (PLUG + NUT), OPTION	---
15	058928-000	COLD WEATHER OIL	---
16	514195-853	COLD WEATHER PARTS, A38E, 12V	---
17	512221-000	TWO PIN PLUG	---
18	514783-850	HORN SOUNDS WHEN E-STOP PRESSED	---
19	514784-850	EMERGENCY POWERED DOWN	---
20	514786-850	CUT DRIVE AT 8M	---
22	513629-850	POWER TO PLATFORM KIT	---
23	515171-000	WEATHER COVER FOR UPPER CONTROL	---

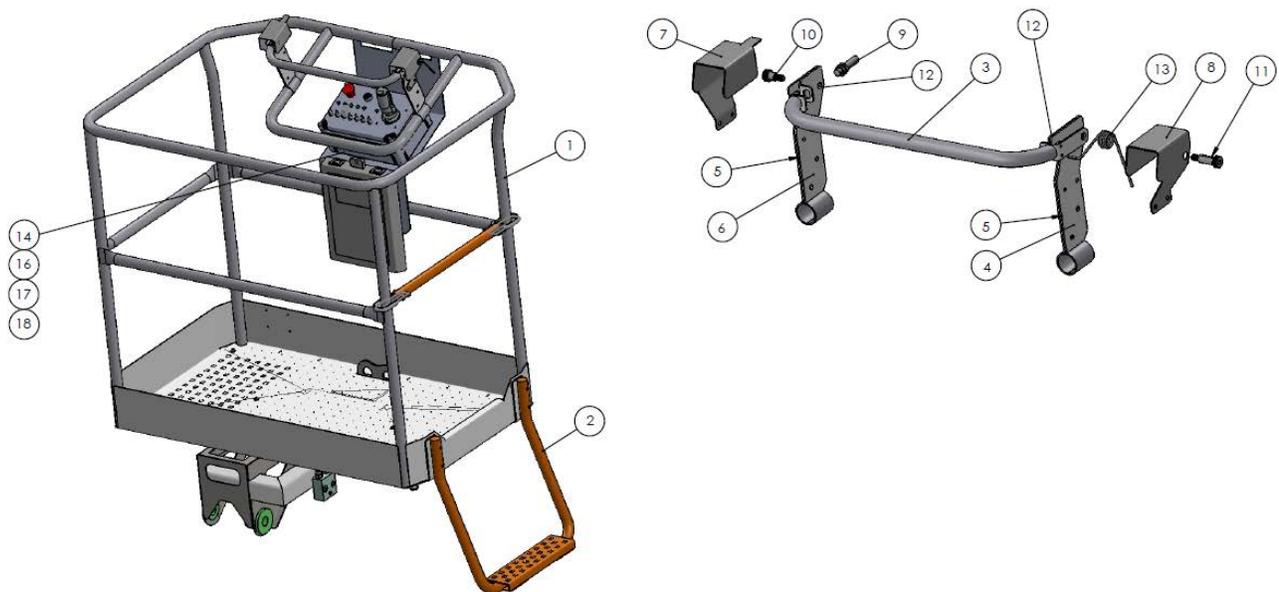
The options outlined opposite are available from Snorkel when ordering a new machine or as a spare part to be retrofitted to an existing machine. However, because the Options are not considered a normal spare part, the standard parts delivery policy may not always apply.

When required as a Spare Part please contact Snorkel Product Support for more information.

When required with new machine please contact Snorkel Sales & Marketing prior to placing machine order.

OPTIONS

Note: part numbers shown with * should end with language code (EN=English, DE=German, ES=Spanish, IT=Italian, NL=Dutch) to ensure correct language selection.



アイテム	部品番号	名前	数量	UOM
1	514675 001	Basket Weldment	1	EA
2	514557 000	Platform Step Weldment	1	EA
3	514677 000	Actuator Bar Weldment	1	EA
4	514684 000	Clamp Mount Weldment LH	1	EA
5	514685 000	Clamp Mount Weldment RH	2	EA
6	514686 000	Switch Clamp Weldment	1	EA
7	514688 000	Hinge Cover LH	1	EA
8	514689 000	Hinge Cover RH	1	EA
9	3028844	IFS241 (IFM PROXY)	1	EA
10	301403	BOLT SHOULDER .375 .500 GR5	1	EA
11	0260857	PIN	1	EA
12	5560123	.375 16UNC THIN HEX LOCK NUT	2	EA
13	0260852	SPRING, GUARD ACTUATOR	1	EA
14	510521 000	GROUND OP SWITCH (ENABLE)	1	EA
15	514404 001	FLASHING BEACON BLUE	1	EA
16	7030161 *	Decal Snorkel Guard Override	1	EA
17	7030162 *	Decal Warning Snorkel Guard	1	EA
18	514698 000 *	Decal Snorkel Guard Override Oper	1	EA

OPTIONS

OPTION HORN SOUND ON E/STOP - 514783-850

ITEM	DESCRIPTION	PART NUMBER	QTY (PER M/C)
1	N/O CONTACT BLOCK	510527-000	2

OPTION EMERGENCY POWER DESCEND - 514784-850

ITEM	DESCRIPTION	PART NUMBER	QTY (PER M/C)
1	POWER UNIT	6020058	1
2	BATTERY	062299-002	1
3	12VOLT CONTACTOR	3040506	1
4	12VOLT CHARGER	510870-000	1
5	TOGGLE SWITCH	510521-000	2
6	DIODE 8AMP	510067-000	2
7	Lower Control Panel	512939-002	1
8	Upper Control Enclosure	510546-001	1
9	LCB Overlay	512940-002	1
10	UCB OVERLAY	512937-004	1

OPTION DRIVE LIGHT KIT - 514785-850

ITEM	DESCRIPTION	PART NUMBER	QTY (PER M/C)
1	LED OVAL LIGHT ASSY	0260721	2
2	PLAC LIGHTS ON/OFF	0181376	1
3	BRACKET FRONT LIGHTS	514761-000	2
4	CONR 2 PIN DEUTSCH RECEP	3049804	6
5	PIN CONTACT	3040314	16
6	LOCK WEDGE	3049808	6
7	LED RED LIGHT STOP/TAIL	069533	2
8	RELAY SPDT	3040469	1
9	CONR 2 PIN DEUTSCH PLUG	3049803	6
10	SKT CONTACT	3040342	16
11	LOCK WEDGE	3049807	6
12	CONR 4 PIN DEUTSCH RECEP	3049889	1
13	LOCK WEDGE	3049891	1
14	CONR 4 PIN DEUTSCH PLUG	3049888	1
15	LOCK WEDGE	509750-000	1
16	AMBER LIGHT	512492-000	4
17	LED FLASHER RELAY	514780-000	1
18	RELAY BASE	514781-000	1
19	TOGLE SWITCH SPDT	509472-000	1
20	INDICATOR OVERLAY	514778-000	1
21	Upper Control Enclosure	510546-001	1
22	UCB OVERLAY	512937-004	1

OPTION DRIVE DE-ACTIVATED ABOVE 8M - 514786-850

ITEM	DESCRIPTION	PART NUMBER	QTY (PER M/C)
1	ELEVATION SWITCH	058864-000	2

Maintenance

Every person who maintains, inspects, tests or repairs the aerial platform must be qualified to do so. Maintenance functions must be performed by maintenance personnel who are qualified to work on the aerial platform.

Caution

Welding current can be very intense. Damage to electronic components can result. Connect the ground clamp as close as possible to the area being welded. Disconnect the battery cables and any microprocessors and engine control modules before welding on the machine.

If it becomes necessary to weld aerial platform components as a method of repair, take all precautions to prevent damage to electronic circuitry and devices on the machine. This includes, but may not be limited to, disconnecting battery cables and electronic devices.

Do not modify this aerial platform without prior written consent of the Snorkel Engineering Department. Modification may void the warranty, adversely affect stability or affect the operational characteristics of the aerial platform.

Maintenance Schedules

Snorkel has established a preventative maintenance schedule to detect any defective, damaged or improperly secured parts and provide information regarding lubrication and other minor maintenance items.

This schedule includes the following:

- Daily Prestart Inspection
- Frequent Inspection and Maintenance – Every 30 Days or 50 Hours
- Frequent Inspection and Maintenance – Every 180 Days or 250 Hours
- Annual Maintenance – Every 500 Hours

The Daily Prestart Inspection must be performed by a trained operation. All other maintenance and inspection must be performed by a trained service technician only. Retain a copy of these forms for your records.

All placards and decals on the machine must be in place and legible. Use the Placards and Decals parts page in the Repair Parts section of this manual to check these placards and decals.

Snorkel recommends that you make additional copies of the preventative inspection and maintenance checklists for your use in performing these inspections.

Warning

The potential for accident increases when operating an aerial platform that is damaged or malfunctioning. Death or serious injury can result from such accidents. Do not operate the aerial platform if it is damaged or malfunctioning.

Repair all defects before returning the machine to service.

General Information

The parts drawings located in the Repair Parts section are designed for use as a guide for proper disassembly of the machine and components, as well as, for parts replacement.

Danger

Hydraulic fluid escaping under pressure can have enough force to inject fluid into the flesh. Serious infection or reaction will result if medical treatment is not given immediately. In case of injury by escaping hydraulic fluid, seek medical attention at once.

Always refer to the hydraulic system installation drawings and the electrical wiring diagram before removing or disassembling associated parts.

When disassembling or reassembling components, complete the procedural step in sequence. Do not partially disassemble or assemble one part, then start on another. Always check your work to assure that nothing has been overlooked.

Keep the following in mind when disassembling or assembling the machine.

- Always be conscious of weight.
- Never attempt to lift heavy objects without the aid of a mechanical device.
- Do not allow heavy object to rest in an unstable condition.
- Always make sure the work platform is in the stowed position, blocked or the weight removed by a suitable lifting device before removing any components from the machine.
- When raising a portion of the machine, be sure that adequate blocking is properly positioned. Do not depend solely on the lifting device to hold and secure weight.
- If a part resists removal, check to see if all fasteners, electrical wiring, hydraulic lines, etc., have been removed or that other parts are not interfering.

Parts should be thoroughly inspected before restoring to service at the time of reassembly. Burrs, nicks or scratches may be removed from machines surfaces by honing or polishing with a #600 crocus cloth, followed by a thorough cleaning with an approved cleaning solvent, and blown dry with compressed air. Do not alter the contour of any part. If this operation does not restore the part to a serviceable condition, replace the part.

Replace all o-rings, seals and gaskets at reassembly. Use new roll pins or cotter pins. Dip all packing rings and seals in hydraulic oil before reassembling in cylinder and manifolds. Replace any part having imperfect threads. In general, machines that have been disassembled can be reassembled by reversing the order of disassembly.

The service life of a machine can be increased by keeping dirt and foreign materials out of the vital components. Shields, covers, seals and filters help to keep air and oil supplies clean. However, these items must be maintained on a scheduled basis in order to function properly.

Clean surrounding areas, as well as the opening and fittings before disconnecting air or oil lines. As soon as a line or component is disconnected, cap or cover all openings to prevent the entry of dirt or foreign materials.

New parts should remain in their container until they are ready to be used.

Clearly mark or tag hydraulic lines and electrical wiring connections when disconnecting or removing them from the machine. This will assure that they are correctly reinstalled.

Proper assembly is critical to the successful rebuilding of any machine. Carefully, inspect any parts which are to be reused. If in doubt, replace.

“Safety First” is a good slogan.

Replace any guards and protective devices that have been removed to carry out maintenance and repair work.

Daily Prestart Inspection

Item	Inspect For	Ok
Operator's Manual	In place, all pages readable and intact	
Electrical System		
Battery	Condition and charged for proper operation	
Battery fluid level and terminals	Proper level/clean, connectors tight	
Cables and wiring harness	No wear, pinching or physical damage	
Hydraulic System		
Fluid level	Between full and add marks	
Hose, tubes and fittings	No leaks, pinching or rubbing points	
Cold weather warm-up kit	Proper operation	
Emergency Hydraulic System	Operate the emergency lowering valve and check for serviceability	
Drive Motor/Gear Box	Check operation and leaks	
Tires	Good condition	
Wheels	All wheel lug nuts present and properly torqued	
Lower Control Station		
Operating controls	Proper operation	
Emergency stop and emergency power	Shuts off lower controls/proper operation	
Level Sensor	Sounds tilt alarm	
Flashing Light	Proper operation	
All Motion Alarm	Sounds when machine is operated and/or driven	
Structures		
Weldments – Chassis, turntable, booms, platform, etc.	Welds intact, no damage, cracks or deformation – whiffle bracket straight	
Slide pads	In place, no damage or deformation	
Fasteners	In place and tight	
Entire unit	Check for and repair collision damage	
Upper Control Station		
Guardrail system and lanyard anchors	Welds intact, no damage or deformation	
Operating controls – Boom functions, drive, brakes, etc.	Proper operation	
Emergency stop and emergency power	Shuts off upper controls/proper operation	
Horn	Sounds when activated	
Snorkel Guard	Proper operation	
Placards and Decals	In place and readable	

Performed by: _____ Date: _____

Frequent Inspection and Maintenance – Every 30 Days or 50 Hours

Item	Procedure	Information	OK
Battery System			
Check specific gravity		1.28(US 1275) at 32.2°C (90°F)	
Hydraulic Pump			
Wipe clean			
Check for hose fittings leaks			
Check for leaks at mating surfaces			
Check mounting bolt for proper torque			
Hydraulic System			
Check hose connections			
check for exterior wear			
Tyres / Wheels			
Torque drive and steer wheel lug nuts.	Torque lug bolts/nuts to proper value	Front: 175 Nm (130 lb ft) Rear: 145 Nm (107 lb ft)	
Overload System			
Check/torque nuts		220Nm (162 ft. lbs)	
Steering Assembly			
CheckSteering Cylinder for Leaks			
Turtable (Slew System)			
Check slew motor fo leaks and mounting bolts for proper torque.			
Slew System/First post			
Check torque on all bolts, 15 outer ring and 20 inner ring	Re-torque Bolts	220Nm (160 ft.lbs)	
Elevating Assembly			
Check pivot pins for damage			
Check pivot pin retaining rings			
Upper / Lower Cylinders			
Check Cylinder rod for wear			
Check pivot pin retaining rings			
Grease all fittings			
Entire unit			
Lubricate			
Grease all fittings			
Turntable (Slew)			
Grease Slew gear	Clear and lubricate,check for damage	Interflon LS 1/2	

Performed by: _____ Date: _____

Frequent Inspection and Maintenance – Every 180 Days or 250 Hours

Item	Procedure	Information	OK
Chassis			
Structural	Check for damage and cracked welds		
Steering cylinder snap rings	Verify that all fasteners are in place and are tight		
Steering linkage	Check for proper operation		
Steering cylinder	Check for leaks, wear, damage, and for proper operation		
Tires	Check for wear and damage		
Hydraulic tubes and hoses	Check for leaks, wear, and damage		
Drive motor brake	Check for proper operation		
Torque drive and steer wheel lug nuts.	Torque lug bolts/nuts to proper value	Front: 175 Nm (130 lb ft) Rear: 145 Nm (107 lb ft)	
Right drive motors	Check for leaks		
Left drive motors	Check for leaks		
Tie-down and lifting lugs	Check for damage and cracked welds		
Decals and placards	Check for damage and readability Order replacements as necessary		
Tunable (Slew)			
Structural	Check for damage and cracked welds		
Torque turntable top bolts	Torque to proper value	220 Nm (162 lb ft)	
Torque turntable bottom bolts	Torque to proper value	220 Nm (162 lb ft)	
Hydraulic tubes and hoses	Check for leaks, wear, and damage		
Centerpost	Check for leaks, wear, and damage		
Centerpost mounting bolts	Verify that all fasteners are in place and are tight		
Lower cylinder pin caps	Verify that all fasteners are in place and are tight		
Lower cylinder and holding valve	Check for leaks, wear, damage, and for proper operation		
Emergency bleed down valve	Check for proper operation		
Cowling	Check for wear/damage and that fasteners are in place and are tight		
Wire harness	Check for wear/damage and that fasteners are in place and are tight		
Rotation brake	Check for proper operation		
Rotation backlash	Check for wear and damage		
Operator's Manual	Proper manual in document holder		
System pressure	Check maximum system pressure	175 Bar (2538 p.s.i.)	
Decals and placards	Check for damage and readability Order replacements as necessary		

Frequent Inspection and Maintenance – Every 180 Days or 250 Hours

Item	Procedure	Information	OK
Lower Controls			
Control switch in the lower controls position	Check for proper operation	With selector in the lower controls position, upper controls do not work	
Station selector switch in the upper controls position	Check for proper operation	With selector in the upper controls position, lower controls do not work	
Turntable CW – CCW	Check for proper operation		
Boom elevation Up – Down	Check for proper operation		
Boom Extend – Retract	Check for proper operation		
Platform level Up – Down	Check for proper operation		
Platform rotation CW – CCW	Check for proper operation		
Emergency power, all functions	Check for proper operation		
Emergency stop	Check for proper operation		
Boom			
Structural	Check for damage and cracked welds		
Upper cylinder pin caps	Verify that all fasteners are in place and are tight.		
Upper cylinder and holding valve	Check for leaks, wear, damage, and for proper operation		
Hydraulic tubes and hoses	Check for leaks, wear, and damage		
Platform Rotate cylinder pin caps and bolt retainer	Verify that all fasteners are in place and are tight		
Telescopic Boom cylinder	Check for leaks, wear, damage, and for proper operation		
Master cylinder and pin caps	Verify that all fasteners are in place and are tight, check for leaks, wear, damage, and for proper operation		
Master level cylinder and holding valves	Check for leaks, wear, damage, and for proper operation		
Hose carrier tube and support	Check for residue buildup/proper operation		
Lower Rod and pin caps	Check for wear and damage, Verify that all fasteners are in place and are tight		
Electrical wires	Check for wear and damage		
Decals and placards	Check for damage and readability Order replacements as necessary		
Platform			
Structural	Check for damage and cracked welds		
Entry Bar	Check for proper operation		
Hydraulic tubes and hoses	Check for leaks, wear, and damage		
Slave level cylinder pin caps and tie wire	Verify that all fasteners are in place and are tight		
Slave level cylinder holding valves	Check for leaks, wear, damage, and for proper operation		
Rotate cylinder and holding valves	Check for leaks, wear, damage, and for proper operation		
Decals and placards	Check for damage and readability Order replacements as necessary		

Frequent Inspection and Maintenance – Every 180 Days or 250 Hours

Item	Procedure	Information	OK
Upper Control Statio			
Turntable (Slew) CW – CCW	Check for proper operation		
Boom elevation Up – Down	Check for proper operation		
Boom Extend – Retract	Check for proper operation		
Platform level Up – Down	Check for proper operation		
Platform rotation CW – CCW	Check for proper operation		
Drive speed	Boom up and/or extended Low – 0.75 mph	0.25 mph	
	Boom down and retracted High – 3.5 mph	2.5 mph	
Drive range – boom stowed	Check for proper operation	Slow speed only with boom raised	
Emergency power, all functions	Check for proper operation		
Emergency stop	Check for proper operation		
Horn	Check for proper operation		
Gradual start to stop lift/swing/drive controls	Check for proper operation		
Tilt alarm	Check for proper operation	3° Front/Back - 3° Side/Side	
110 volt AC power to platform	Check for proper operation		
Hydraulic Oil Reservoir			
Filler/breather cap and tank	Check for wear/securely fasten		
Hydraulic fluid level	Check for proper level	Q8	
Hydraulic filter	Replace after the first 50 hours, every 180 days or 250 hours thereafter Inspect filter for foreign matter that could indicate component wear		
Platform Rotator			
Structural	Check for damage and cracked welds		
Hydraulic rotator actuator	Check for leaks, wear, and damage		
Platform rotation holding valve	Check for proper operation		
Mounting bolts and pin caps	Verify that all fasteners are in place and are tight		
Options			
110 volt AC generator	Check for proper operation		
220 volt AC generator	Check for proper operation		
Drive motion alarm	Check for proper operation		
Flashing light	Check for proper operation		
Hydraulic system cold weather warm up kit	Check for proper operation		
Driving lights	Check for proper operation		
Platform work lights	Check for proper operation		
Platform control cover	Check condition and for proper operation		
Airline to platform	Check for proper operation		

Frequent Inspection and Maintenance – Every 180 Days or 250 Hours

Item	Procedure	Information	OK
Daily maintenance	Perform maintenance as per schedule	Retain copy of checklist	
Preventive inspection maintenance checklist	Perform inspection, complete form	Retain copy of checklist	
Placards and decals inspection	Inspect using drawing and parts listing in Section 1 – Repair Parts Manual	Replace any missing or unreadable decals/placards	
Door hinges and latches	Lubricate	Spray lubricant Interflon EP+	
Rotation bearing	Lubricate	EP.2 Lithium Grease	
Rotation bearing teeth and pinion	Lubricate	Interflon LS 1/2	
Tie rods	Lubricate	Interflon LS 1/2	
Gear hubs	Check fluid level, fill if low		
Swing drive	Check fluid level, fill if low	EP.2 Lithium Grease	
Platform rotator	Refill if disassembled for repairs	Consult factory	
Platform controller	Check smooth operation/speeds		
Batteries	Check specific gravity	1.28(US 1275)at 32.2° C(90°F)	
Hydraulic return filter	Check condition	Replace if dirty	

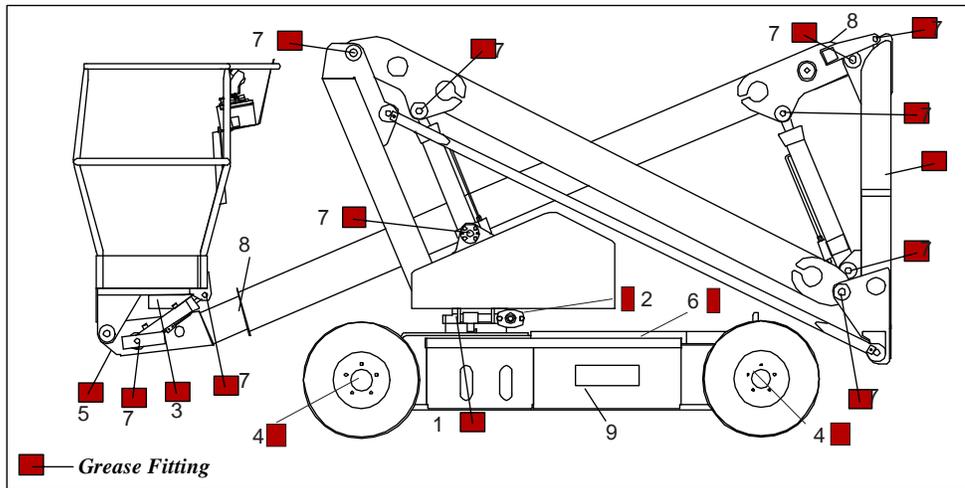
Performed by: _____ Date: _____

Annual Maintenance – Every 500 Hours

Item	Procedure	Information	OK
180 day or 250 hour maintenance	Perform maintenance per schedule	Retain copy of checklist	
Hydraulic oil reservoir	Clean and replace fluid	Q8 Oil	
Hydraulic return filter	Replace	After first 50 hours, then at recommended interval	
Hydraulic high pressure filter	Clean and reinstall		
Hydraulic pressures	Pump setting	Standby pressure: 300 psi	
	Function pressure	Boom up(max): 180Bar(2610psi) – 190Bar (2755 psi)	
Gear hubs	Replace fluid		
Overload			
Calibrate System			
Drive motors			
Check for wear of brushes			
Check that commutator or springs are undamaged.			
Change oil in drive reduction gearbox		CWD2012/CFD/42,4A.D.IEC (7,06x6_OMALA150) Omala or Shell Oil	

Performed by: _____ Date: _____

Lubrication 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.

Slew Ring

Slew Ring – Item 1. Pressure gun lubricate bearing at recommended interval using lubricant as outlined in the maintenance schedule. Rotate while lubricating. The lubrication fittings are located on the turntable motor below the ballast.

Rotation Gear Teeth and Pinion

Rotation gear teeth and pinion – Item 2. Gear teeth and gear box pinion should be lubricated with Interflon LS1/2 gear lubricant. Grease Slew Ring evenly and sparingly every 10 hours or 7 days. DO NOT subject this area to powerwashing.

Tie Rods

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

Pivot Pins

Pivot Pins – Item 7 Apply grease liberally to the Pivot Pin and Pin Lock Plate locations using a brush or cloth. Force as much Interflon LS1/2 grease as possible between the Pins & Pin Lock Plates and the Weldments. Wipe away all excess grease.

Gear Hubs

Gear hubs – Item 4. To check and fill Gear hubs:

1. Rotate the Gearbox into the horizontal position with one of the filler/drain plug holes in the 3 O' Clock position and the other plug hole above it.
2. Remove plug bolts with drive ratchet and extension.
3. Fill until half full 0.9 Litres (0.23 Gallons) ,oil will just start to trickle out the plug hole in the 3 O'Clock position.

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

Hydraulic Oil Reservoir(Tank)

Hydraulic oil reservoir – Item 6. With platform fully lowered i.e. stowed, oil should be visible on the dipstick. If the oil is NOT visible, fill the tank until oil is then visible on the dipstick. DO NOT fill above the upper line on the dipstick or when the platform is elevated.

Note: oil grades may vary depending on machine specification. Contact Snorkel Product Support for further advice.

The interior of the reservoir should be wiped out and cleaned each time the hydraulic oil is changed. The reservoir filler/breather cap and the filter housing should be removed and 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.

Hydraulic Oil Return Filter

Return filter – Item 6. The hydraulic oil return filter is mounted inside of the hydraulic oil reservoir(Tank).

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 condition should be checked at the 180 day or 250 hour Preventive Inspection Maintenance interval or more frequently under extreme working conditions.

Warning

Wear safety gloves and safety glasses when handling hot oil (hydraulic oil can be a skin irritant). The hydraulic oil may be of sufficient temperature to cause burns.

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.

Slide Pads

Slide pads – Item 8. Check slide pads for excessive wear and replace as required. Slide pads do not require lubrication.

Batteries

Batteries – Item 9. Batteries will have longer life if the water level is maintained and they are kept charged. 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.

If acid contacts eyes, flush immediately with clear water and get medical attention. Wear rubber gloves and protective clothing to keep acid off skin, if acid contacts skin, wash off immediately with clear water.

Battery Care and Maintenance

The following information about battery care and maintenance was supplied by Interstate Batteries and is reprinted here with their permission.

1. New batteries need to be cycled several times before reaching full capacity (20-50 cycles, depending on type). Usage should be limited during this period.
2. Always recharge batteries fully, immediately after use. Batteries perform best when they are fully charged. More capacity and longer life will result from this practice.
3. The deeper the discharge, the fewer number of cycles a lead-acid battery will deliver. Deep discharges deteriorate the battery quicker than lighter shallow cycles.
4. Battery cables should be intact and connectors kept tight at all times. Systematic inspection is recommended.
5. Batteries should be kept clean – free of dirt and corrosion – at all times. Always keep the top of batteries clean. A film on top of the battery can cause the current to migrate between the posts, accelerating self discharge.
6. A fully charged battery will give you the best and longest service. Be sure the batteries are fully charged before testing or using. A fully charged battery, without a drain or load, after the surface charge has dissipated, is 6.35 volts for a 6 volt battery.
7. Batteries should not be discharged below 20% of capacity (approximately 1.8 volts per cell under normal operating load; 1.98 volts open circuit; 1.145 specific gravity). Proper battery sizing will help avoid excessive discharge.
8. Battery chargers should be sized to fully charge batteries in an eight hour period. Chargers should be kept in proper operating condition.
9. Do not use a mismatched charger of any type; i.e., a 12 volt charger on a 24 volt pack or a 24 volt charger on a 12 volt pack. An undersized charger will never get the job done, no matter how long it tries. An oversized charger will cause excess gassing and heat that could possibly result in a battery meltdown and/or explosion.
10. Never charge a lead-acid battery with a sealed (gel cell) battery charger. The lead-acid battery needs higher voltage to finish its charge. Without it the battery will never come back to 100% and sulfation can occur.
11. Always allow batteries to cool off after charging. The cooling time is very important because heat is generated during the recharge and discharge cycles. Without the cooling time the heat grows, accelerating grid corrosion which is one of the major causes of battery failure. Charging practice should enable batteries to cool before use.

-
12. Deep cycle batteries need to be equalized periodically. Equalizing is an extended, low current charge performed after the normal charge cycle. It helps keep cells in balance. Actively used batteries should be equalized once per week. Manually timed chargers should have the charge time extended approximately 3 hours. Automatically controlled chargers should be unplugged and reconnected after completing a charge cycle.
 13. In situations where multiple batteries are connected in series, parallel or series-parallel, a replacement battery's should be of the same size, age and usage level as the companion batteries. Do not put a new battery in a pack that has 50 or more cycles. Either replace all the batteries with new batteries or install a good used battery's in place of the bad. New batteries should be given a full charge before use.
 14. Periodic battery testing is an important preventative maintenance procedure. Hydrometer readings of each cell (fully charged) give an indication of balance and true charge level. Imbalance could mean the need for equalizing and is often a sign of improper charging or a bad cell. Voltage checks (open circuit, charged and discharged) can locate a bad cell or weak battery. Load testing will pick out a bad cell when other methods fail. The point is to look for the abnormal. A weak cell or battery will cause premature failure of companion cells or batteries respectively.
 15. As batteries age, their maintenance requirements change, Generally their specific gravity is higher and gassing voltage goes up. This means longer charging time and/or higher finish rate (higher amperage at the end of charge). Usually, older batteries need to be watered more often and their capacity decreases.
 16. "Opportunity charging", a short partial charge during an extended duty cycle, is a controversial subject. Generally, the practice is a "crutch" to make up for undersized batteries. The correct approach is to install adequate battery capacity. If this is impossible because of lack of space in the battery compartment or extreme operating conditions (24 hour intermittent use, as an example), "opportunity charging" is better than excessive battery discharging. However, the practice can cause batteries to overheat, require more watering and usually will shorten battery life. "Opportunity charging" is a trade off; something to avoid if possible. One charging cycle per day is preferable.
 17. Extreme temperatures can substantially affect battery performance and charging. Cold reduces battery capacity and retards charging. Heat increases water usage and can result in overcharging. Very high temperature can cause "thermal run away" which may lead to an explosion or fire. If extreme temperature is an unavoidable part of an application, consult a battery/charger specialist about ways to deal with the problem.
 18. An overly discharged battery might need to be cycled a few times before it can recover fully. If a battery begins to heat before coming up to a full charge, it might be necessary to discharge the battery and recharge it a few times. The charge and discharge cycle might help the current acceptance of the battery and facilitate its recovery to a usable condition.
 19. Inactivity can be harmful to deep cycle batteries. If they sit for several months, a "boost" charge should be given – more frequently in warm climate (about once a month) than in cold (every 2-3 months).
 20. Never store a battery in a discharged state. The sulfate that forms during discharge can make the battery impossible to recharge fully.

Fastener Torque Chart

Bolt Grade	SAE Grade 1 or 2	SAE Grade 5	SAE Grade 6	SAE Grade 8
Marking				
Definition	Indeterminate Quality	Minimum Commercial Quality	Medium Commercial Quality	Best Commercial Quality
Material	Low Carbon Steel	Medium Carbon Steel Tempered	Medium Carbon Steel Quenched and Tempered	Medium Carbon Alloy Steel Quenched and Tempered
Minimum Tensile Strength	64,000 psi.	105,000 psi	133,000 psi.	150,000 psi
Bolt Size	Recommended Torque Value (ft lbs)			
1/4	5	7	10	10.5
5/16	9	14	19	22
3/8	15	25	34	37
7/16	24	40	55	60
1/2	37	60	85	92
9/16	53	88	120	132
5/8	74	120	167	180
3/4	120	200	280	296
7/8	190	302	440	473
1	282	466	660	714

Torque chart information:

- Consult manufacturers' specific recommendations, when available.
- The chart may be used with both coarse and fine thread fasteners lightly lubricated.
- Increase torque by 20% when multiple tapered tooth (shake proof) lock washers are used.
- The torque values are given in foot-pounds.
- Inch/pound equivalent may be obtained by multiplying by 12.

Fastener Torque Chart – Metric System

Capscrew Size	Grade 8.8					Grade 10.9				
	In-LBS Dry	In-LBS Lubed	FT-LBS Dry	FT-LBS Lubed	Clamp Load (lb)	In-LBS Dry	In-LBS Lubed	FT-LBS Dry	FT-LBS Lubed	Clamp Load (lb)
M4 - 0.7	27	20			861	36	24			1,173
M5 - 0.8	55	41			1,394	72	60			1,895
M6 - 1.0	93	70			1,971	132	96			2,686
M8 - 1.25	228	168	19	14	3,591	312	228			4,889
M8 - 1.0	240	180	20	15	3,844	336	252			5,232
M10 - 1.5			37	28	5,693			51	38	7,744
M10 - 1.25			39	30	6,008			54	41	8,171
M12 - 1.75			65	49	8,273			89	66	11,257
M12 - 1.25			71	53	9,037			96	72	12,297
M14 - 2.0			103	77	11,285			140	107	15,354
M14 - 1.5			114	85	12,263			155	114	16,691
M16 - 2.0			162	122	15,404			221	166	20,963
M16 - 1.5			173	129	16,388			236	177	22,311
M18 - 2.5			222	167	19,423			235	176	
M18 - 1.5										
M20 - 2.5			317	236	24,042			428	321	32,720
M20 - 1.5			350	262	26,695			479	358	36,316
M22 - 2.5			428	321	30,651			452	339	
M22 - 1.5										
M24 - 3.0			546	409	34,642			745	557	47,141
M24 - 2.0			594	446	37,676			811	605	51,277
M27 - 3.0			796	597	45,039			1,084	811	61,292
M27 - 2.0			863	645	58,785			1,173	848	66,226
M30 - 3.5			1084	811	55,054			1,475	1106	74,915
M30 - 3.0			1121	841	56,908			1,527	1143	77,444
M30 - 2.0			1202	900	60,932			1,630	1224	82,917

Rev D

Torque chart information:

- Consult manufacturers' specific recommendations, when available.
- The chart may be used with both coarse and fine thread fasteners lightly lubricated.
- Increase torque by 20% when multiple tapered tooth (shake proof) lock washers are used.
- Foot/pound equivalent may be obtained by dividing by 12.
- Inch/pound equivalent may be obtained by multiplying by 12.
- Newton/meter equivalent may be obtained by multiplying inch/pound by 0.1130.
- Newton/meter equivalent may be obtained by multiplying foot/pound by 1.3558.

4.0 Introduction



WARNING

Be sure to read, understand and follow all information in the *Operation Section* of this manual before attempting to operate or perform service on any A38E Work Platform.

This section contains instructions for the maintenance of the A38E Series Work Platform. Procedures for scheduled maintenance and repair/removal are included.

Referring to *Section 3.0 and Section 6.0* will aid in understanding the operation and function of the various components and systems of the A38E Work Platform and help in diagnosing and repair of the machine.

Refer to Table 4-1, the Preventative Maintenance Checklist for the recommended Maintenance intervals.

TOOLS REQUIRED

The following is a list of items which may be required to perform certain maintenance & repair procedures on the A38E Work Platform.

- 1 x Multi-meter capable of reading Voltage, Ohms and Amps.
- 1 x Hydraulic Pressure Gauge
- Range (0 - 3000 PSI)
- 1 x Calibrator EZcal (Snorkel Part No: 504560-001)

Note:

EZcal Display can be used in place of the above Calibrator, the calibrator may only be necessary when working in the Platform as the EZ Display is located within the ground Controls.

4.1 Preventative Maintenance

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 schedules are 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 this page.



WARNING

Before performing preventative maintenance familiarise yourself with the operation of the machine.

Ensure that the machine is fully secured and supported when carrying out maintenance procedures in the elevated position.

Maintenance Schedules

Snorkel has established a preventative maintenance schedule to detect any defective, damaged or improperly secured parts and provide information regarding lubrication and other minor maintenance items.

Maintenance Schedule tables have been designed primarily to be used for machine service and maintenance repair.

Please use a copy of the Maintenance Schedule table at the beginning of this maintenance section as a checklist when inspecting the machine at service intervals

Maintenance intervals are as follows:

Daily Prestart Inspection

Frequent Inspection and Maintenance – Every 30 Days or 50 Hours

Frequent Inspection and Maintenance – Every 180 Days or 250 Hours

Annual Maintenance – Every 500 Hours

Notes:

4.2 Battery Maintenance

Electrical energy for the motor is supplied by eight 6 volt batteries wired in series to give a 48 volts DC supply. Each of these batteries consist of three cells which can supply a maximum voltage of 2.1V ea =>6.3V per battery =>50.4V per battery pack. Proper care and maintenance of the batteries and motor will ensure maximum performance from the work platform.



Hazard of explosive gas mixture. Keep sparks, flames 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.

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; use of tap water with a high mineral content will shorten battery life.



If battery water level is not maintained, batteries will not fully charge, creating a low discharge rate which 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 at 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 clean, warm water. Clean battery and cable contact surfaces to a bright metal finish whenever a cable is removed.

Basic Rule for maximum duty cycle of deep cycle traction batteries

- Always recharge Battery as soon as possible after the low Battery L.E.D illuminates.
- Allow the charger to charge the batteries until it automatically shuts off.

BATTERY CHARGING

Batteries do not reach **full** potential until they have been through 50 charge/discharge cycles (however the rate at which the potential increases is exponential, and the batteries will normally have 95% potential after 15 charge/discharge cycles). Hence do not use a new battery in a battery pack that already has more than 15 cycles Charge batteries at the end of each work shift or sooner if batteries have been discharged. A battery is considered to have a faulty cell if it has less than 80% of the potential of the other batteries in the pack while measured under load.



DO charge batteries in a well-ventilated area.
DO NOT charge batteries in the vicinity of sparks or flames.
NEVER leave charger operating unattended for more than two days.
NEVER disconnect cables from batteries when charger is operating.
Permanent damage to batteries will result if they are not immediately recharged after discharging.
Keep charger dry.

To ensure a proper charge several items must first be checked.

1. Correct voltage and current are available to the charger.
2. Extension cord in good condition, is no longer than 8 m (26 ft.) and is 1.5 mm (12g a) or larger.
3. Charger will have an adequate time to allow a full charge i.e. ensure that power supply will not be switched off overnight.

All Snorkel battery operated Work Platforms, including the A38E can operate at ambient temperatures to a value of -20°C (-4°F). However for this there are two provisions which must be met.

- The ISO#46 grade of hydraulic oil normally used in Snorkel Work Platforms must be replaced with a grade suitable for these low temperature conditions.
- When ambient temperatures fall below 18°C (65°F) batteries cannot deliver 210 Ampere hours and so should be placed on charge as soon after use as possible. Under such conditions a 4 hour equalize charge once a week in the early afternoon will improve state of charge and battery life.

Charging

1. Check battery fluid level. If electrolyte level is lower than 10 mm (3/8 in) above plates add distilled water only.
2. Connect battery charger lead to properly earthed outlet of correct voltage and frequency.
3. The Charger will turn on automatically after going through a self test sequence. LED's will indicate the status of charging.
4. The Charger indicates that the charge is complete when the batteries are fully charged.

BATTERY CELL EQUALIZATION

Specific Gravity is a measurement of the strength of the electrolyte in a battery and is measured using a hydrometer. For a fully charged battery the temperature corrected reading should be about 1.28. The specific gravity of the electrolyte in the battery cells should be equalized monthly, or weekly when used in low temperature conditions. To do this, charge batteries as described above. After this initial charge, check the electrolyte level in all cells and add distilled water as necessary, and turn the charger on until a full charge is again indicated. During this time, the charging current will be low (four Amps) as cells are equalizing.

After equalization, the specific gravity of each cell should be checked with a hydrometer. The **temperature corrected** specific gravity in this state should be **1.28**. If any corrected readings are below **1.23**, the batteries contain bad cells and therefore the battery should be replaced.

Do not check the specific gravity in a cell to which water has just been added. If there is not enough electrolyte in a fully charged cell to obtain a sample for the hydrometer, add water and continue charging for one to two hours before checking again.

4.3 Temperature correction for Electrolyte readings

SPECIFIC GRAVITY CONVERSION CHART

Electrolyte Temperature		Temperature Corrected Specific Gravity, Fully Charged	
Fahrenheit	Celsius	USA	Euro
120	48.9	1291	1.29
110	43.3	1287	1.29
100	37.8	1283	1.28
90	32.2	1275	1.28
80	26.7	1275	1.28
70	21.1	1275	1.28
60	15.6	1267	1.27
50	10.0	1263	1.26
40	4.4	1259	1.26
30	-1.1	1255	1.26
20	-6.7	1251	1.25
10	-12.2	1247	1.25
5	-15.0	1245	1.25
0	-17.8	1243	1.24
-5	-20.6	1241	1.24
-10	-23.3	1239	1.24
-15	-26.1	1237	1.24
-20	-28.9	1235	1.24
-25	-31.7	1233	1.23
-30	-34.4	1231	1.23

Table 4-2: Specific Gravity Conversion Chart

4.4 Lubrication

Refer to Table 4-1 and Figure 4-1 for location and lubrication intervals required for the items that necessitate lubrication service. Refer to the appropriate sections for lubrication information on the Hydraulic Oil Tank and Filter.

PIVOT PINS

Apply grease liberally to the Pivot Pin and Pin Lock Plate locations using a brush or cloth. Force as much grease as possible between the Pins & Pin Lock Plates and the Weldments. Wipe away all excess grease.

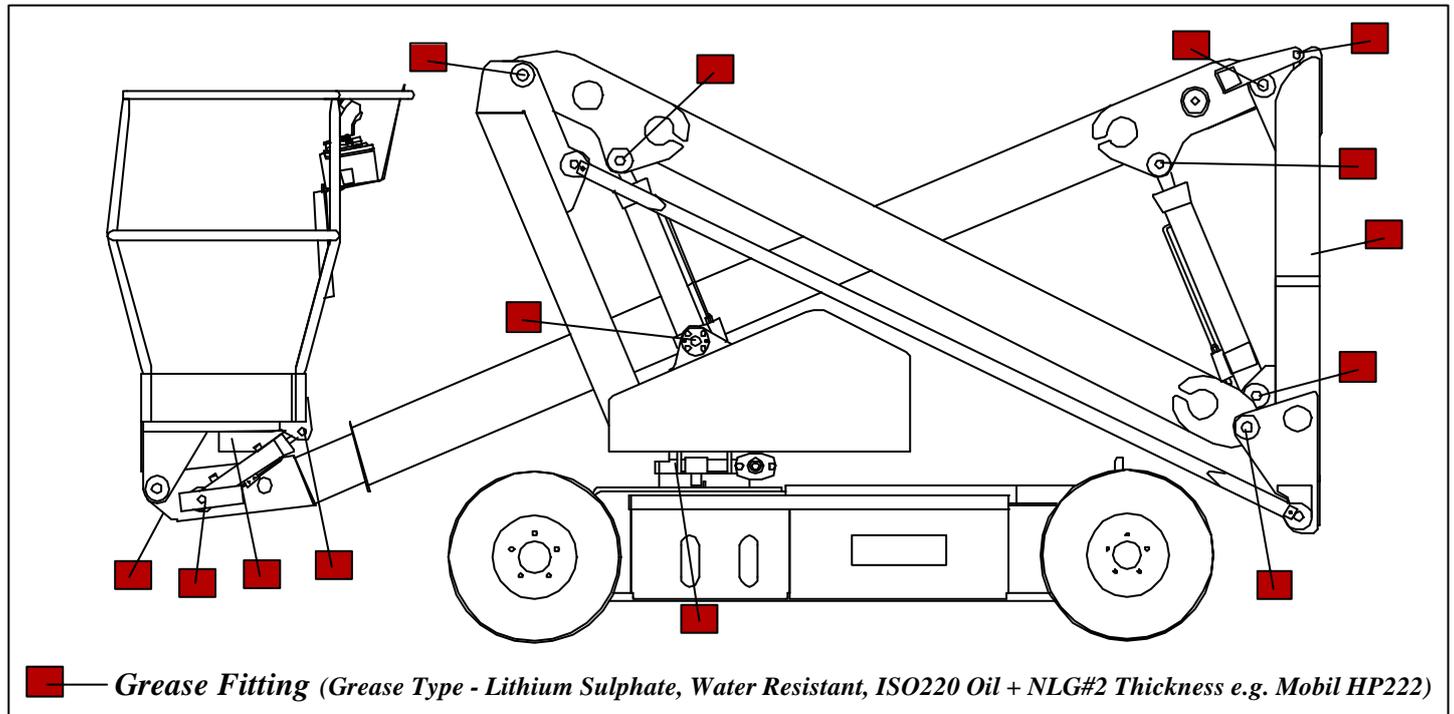


Figure 4-1: Lubrication Points

GREASE FITTINGS

Wipe each grease fitting before and after greasing. Using multipurpose grease in a grease gun, pump the grease into the fitting until grease just begins to appear at the edges of the pivot, then wipe of any excess grease.

Grease Fitting Locations

Lower Boom	2
Upper Boom	1
Telescopic Boom	1
Lower Cylinder (including Trunnions)	3
Upper Cylinder	2
Telescopic Cylinder	1
Master Cylinder	2
Slave Cylinder	2
Steering Cylinder	2
Torque Arms	4
Pinion Gearbox & Slew Bearing Assembly	3
Total	23

SLEW RING

Grease Slew Ring evenly and sparingly every 10 hours or 7 days as per the intervals in Table 4-1. **DO NOT** subject this area to powerwashing.

HYDRAULIC OIL TANK AND FILTER (Figure 4-2)

Fluid Level

With platform fully lowered i.e. stowed, oil should be visible on the dipstick. If the oil is NOT visible, fill the tank until oil (ISO#46) is then visible on the dipstick.

DO NOT fill above the upper line on the dipstick or when the platform is elevated.

Note: oil grades may vary depending on machine specification. Contact Snorkel Product Support for further advice.

Oil and Filter Replacement

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



CAUTION



Wear safety gloves and safety glasses when handling hot oil (hydraulic oil can be a skin irritant). The hydraulic oil may be of sufficient temperature to cause burns.

2. Provide a suitable container to catch the drained oil. Hydraulic tank has a capacity of 25 Litres (6.5 Gallons US).
3. Remove the drain plug on the lower side and allow all oil to drain.
4. Clean the magnetic drain plug and reinstall.
5. Disconnect the return hose and hose fitting from inlet port of the hydraulic return filter. Loosen and remove the filter cover retaining bolts. Remove filter (10 micron) assembly. Replace with a new filter.
6. Fill the hydraulic reservoir with hydraulic oil (see Section 1-2) checking level with dipstick.
7. Recycle used oil as per local environmental regulations.

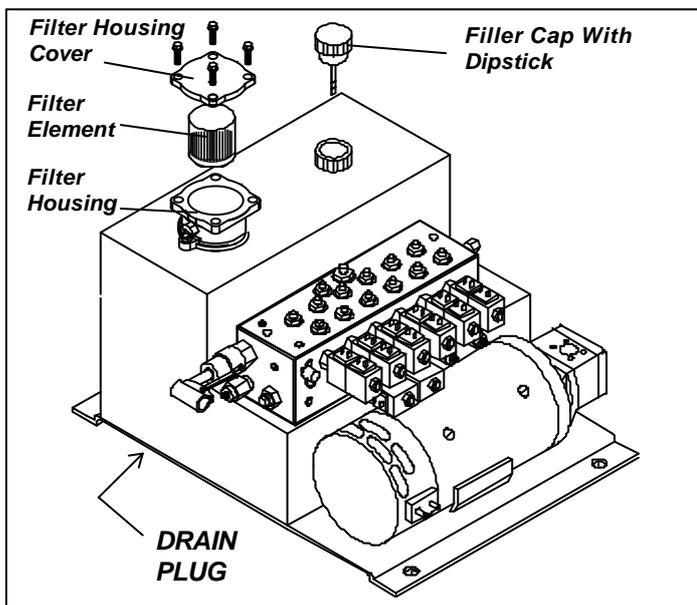


Figure 4-2: Oil and Filter Replacement

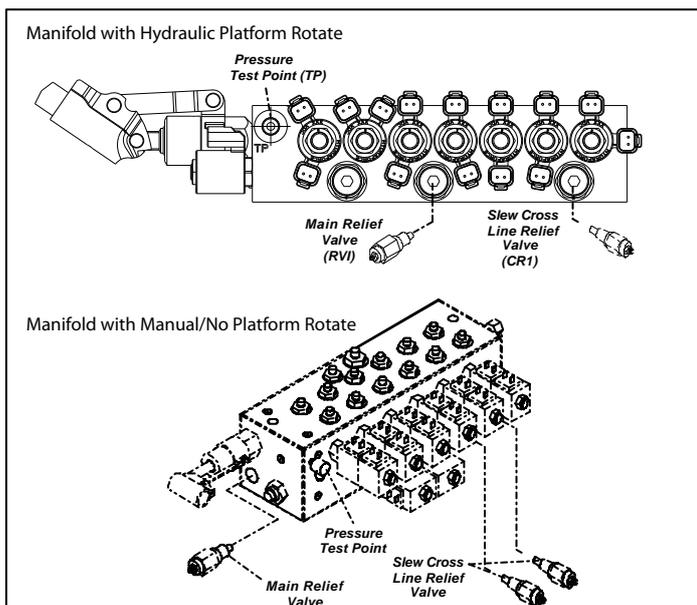


Figure 4-3: Manifold Block

4.5 Setting Hydraulic Pressures (Figure 4-3)

Check the hydraulic pressures whenever the pump, 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 4-3,4)

1. Operate the hydraulic system for 10-15 minutes to warm the oil.
2. Remove the cover from the Chassis body.
3. Insert pressure gauge into the high pressure gauge port (TP) on the Manifold Block.
4. Loosen locknut on main relief valve and turn adjusting screw anticlockwise two full turns using a 4 mm Allen key.
5. Operate the Telescope RETRACT function switch from lower controls and keep it activated.
6. Slowly turn the main relief valve adjusting screw clockwise until the pressure gauge reads 175 Bar (2538 p.s.i.) pressure.
7. Release the Telescope RETRACT switch.
8. Tighten locknut on main relief valve while holding the adjusting screw in position.

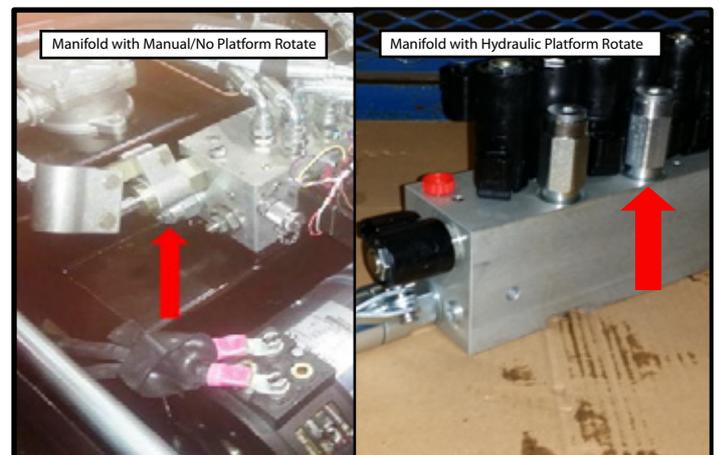


Figure 4-4: Setting Main Relief Pressures

SLEW CROSS-LINE RELIEF VALVES

1. Repeat steps 1-3 as outlined above
2. Loosen Locknuts on both cross-line relief valves and turn adjusting screws anticlockwise two full turns.
3. Operate slew function from lower controls and rotate the Elevating Assembly until the slew stop prevents further rotation.
4. Slowly turn the cross-line relief valve adjusting screw clockwise using a 4 mm Allen key until the pressure gauge reads 50 Bar (725 p.s.i.) pressure.
5. Now operate the slew function in the opposite direction through approximately 360° until the Slew Stop prevents further rotation.
6. Slowly turn the remaining cross-line relief valve adjusting screw clockwise until the pressure gauge reads 50 Bar (725 p.s.i.) pressure (Only applicable to Non Hydraulic Rotate manifold).
7. Tighten the locknuts on both cross-line relief valves while holding the adjusting screws in position (single valve on Hydraulic Rotate).

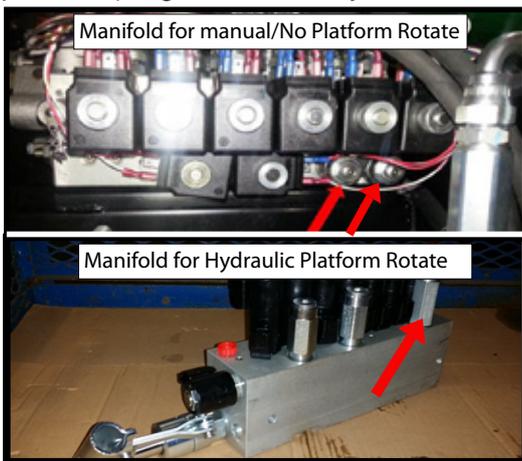


Figure 4-5: Setting Cross-Line Relief Pressures

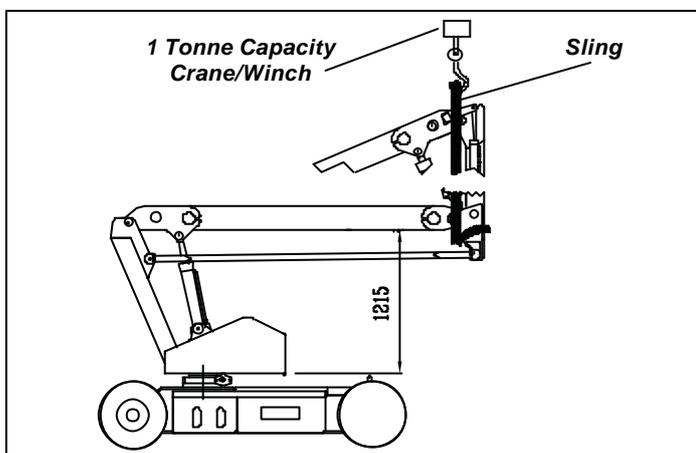


Figure 4-6: Supporting Elevating Assy.

4.6 Maintenance on Elevating Assembly (Figure 4-6)

The only time the Elevating Assembly needs to be elevated is to allow service work to be carried out on the lower parts of the Elevating Assembly, the Lower Lift Cylinder or the Slewing mechanisms. All other work (Bearings, Cylinders, Booms & Tension Bars) can and must be performed with the Elevating Assembly in the stowed position.

! WARNING !

BEFORE entering Elevating Assembly, to perform maintenance on the Work Platform while elevated, ensure that Elevating Assembly is properly supported by suitable crange of adequate capacity. (Recommended 1 tonne capacity crane and sling.)

INSTALLATION OF ELEVATING ASSEMBLY SUPPORT

1. Park the work platform on firm level ground.
2. Verify Platform Emergency Stop Switch is ON.
3. Hold the Chassis/Platform Selector Switch on the Lower Control Box to the 'Chassis' position.
4. Select Lower Control Boom 1 Switch and elevate until the lower boom is slightly above horizontal.
5. Place a sling of 1 Tonne load capacity at the end of the lower boom and second post. Ensure sling is secured so that it will not slip up along the boom.
6. Gradually lower the platform until Lower Boom is supported by the sling.

REMOVAL OF ELEVATING ASSEMBLY SUPPORT

1. Select Lower Control Boom 1 Switch and gradually raise the platform until the sling can be removed.
2. Remove the sling.
3. Completely lower platform.
4. Turn Key Switch to "OFF"

4.7 Switch Adjustments (Figure 4-7 & 4-8)

TILT SENSOR

The Tilt Sensor is incorporated in the GP400 control module.

Function: This limit switch is activated when the internal sensor in the 'Tilt Sensor' is tilted 3° or more (factory set at this value). When the Tilt Sensor activates the elevating and telescope extend functions will be locked out and an audible warning alarm will sound. It will activate if the Chassis tilts 3° in any direction.

SETTING THE TILT SENSOR TO ZERO

⚠ WARNING ⚠

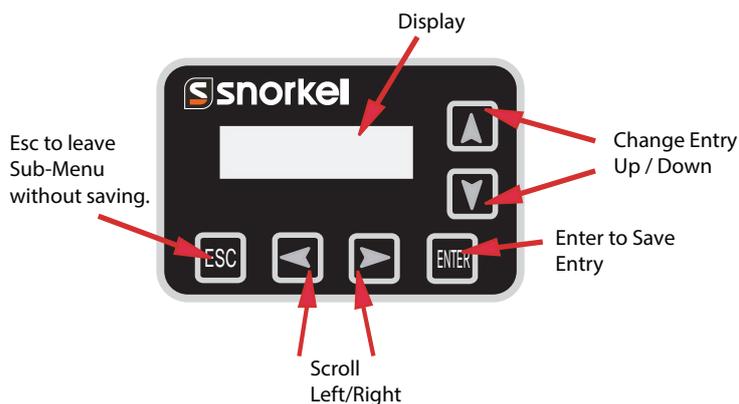
If the EZ230 control module is replaced and/of moved within the machine for any reason the tilt sensor must be reset for zero° using the following procedure. Failure to do so could result in serious injury or death.

To follow this procedure you need to switch the Ezcal display in the Lower Control Box into "Calibration mode".

1. Place the machine on a firm level surface , $\leq 0.25^\circ$
2. Use a Gauge to confirm that the front and rear of the chassis are level to within $\pm 0.25^\circ$ in both directions
3. Switch the machine on, press and hold Esc for 5 seconds until "Ezlift Menu" Appears.
4. Scroll to access level.(Enter)
5. Enter code 2222 for access level 2 .(Enter)
6. Scroll to setups.(Enter)
7. Scroll to tilt setups . (Enter)
8. Calibrate level. (Enter)
9. Enter for yes.

To confirm calibration has worked switch the machine of then back on again.

10. Scroll to Diagnostics. (Enter)
11. System. (Enter)
12. Scroll to tilt, both readings should be below 0.2° if not repeat from 3.



BOOM REST LIMIT SWITCH

Function: This limit switch is activated when the Elevating Assembly is fully stowed and the upper boom is sitting in the boom rest. The Boom Rest is located on the side of the First Post on the A38E Work Platform. The high speed drive can only be operated when this switch is activated. When the boom leaves the boom rest the Normally Open contacts of the limit switch open and power is cut to the high speed drive function.

Location: The switch is located on the side of the First Post on the Boom Rest Weldment. (see fig 4-8)

Adjustment: The switch should be activated when the boom sits in the boom rest. The lever is adjustable and should be adjusted so that the switch's activation/deactivation point occurs just as Boom 2 leaves the Boom Rest. To adjust the switch loosen the lever clamping nut and rotate the lever. Tighten the lever clamping nut. The switch should periodically be checked for freedom of movement and be kept clean from dirt and other contaminants that might affect its free movement.

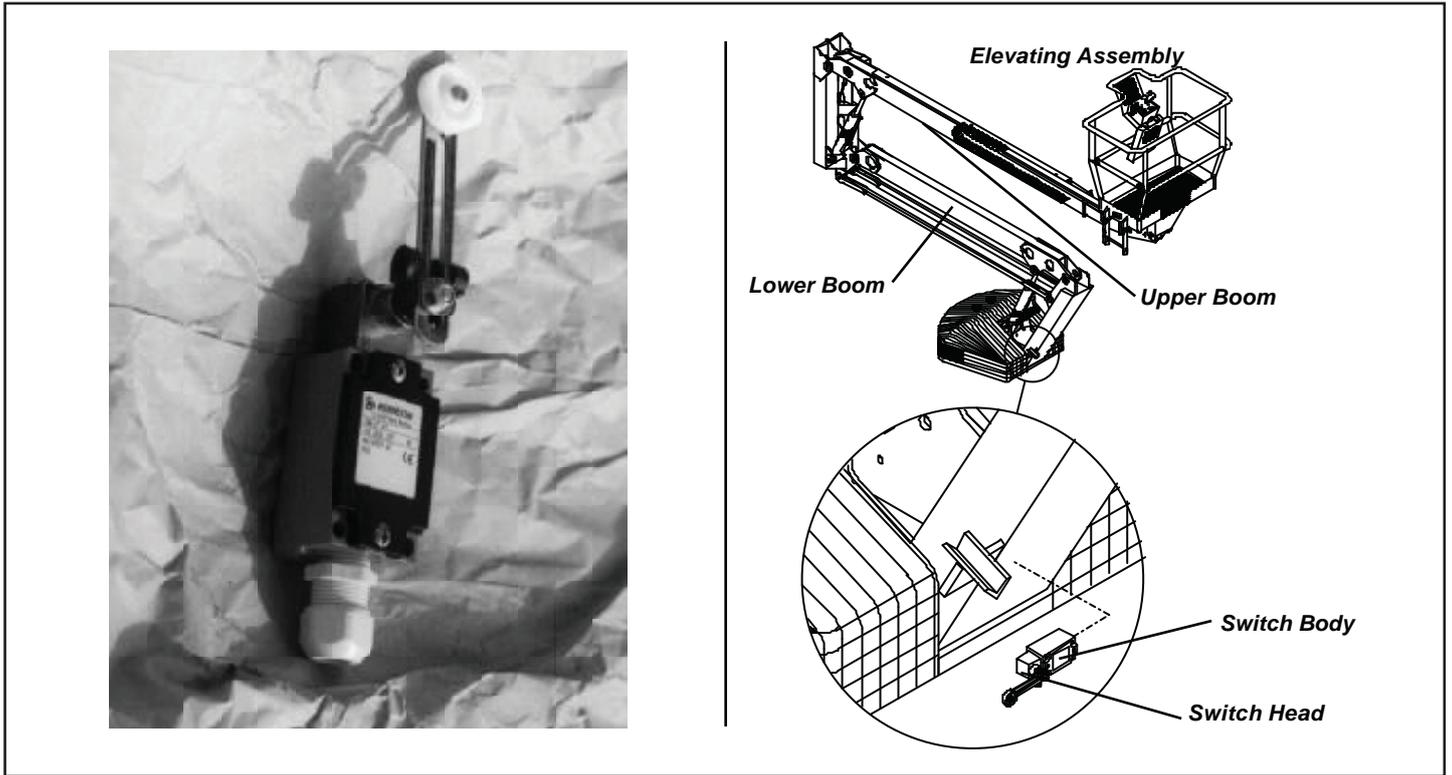


Figure 4-8: Boom Rest Limit Switch

4.8 Hydraulic Manifold (Figure 4-9)

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.

REMOVAL

1. Disconnect the Battery Disconnect Plug.
2. Remove the cover from the Chassis body.
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 hydraulic reservoir.
6. Remove the manifold block.

DISASSEMBLY



CAUTION

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

1. Remove coils from solenoid valves.
2. Remove solenoid valves and the relief valves.
3. Remove fittings and bonded washers.

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



CAUTION



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

1. Install fittings, plugs and bonded seals.
2. Install the solenoid valves and tighten the coils on to the valves.
3. Install the Main Relief Valve and the Slew Cross- Line Relief Valves .

Note: Torque relief valves to 45 Nm (33 ft. lbs).
Torque solenoid spool cartridges to 20 Nm (14.75 ft. lbs)
Torque coil retaining nuts to 1.5 Nm (1.01 ft. lbs)

INSTALLATION

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

1. **Valve Block**
2. **Solenoid Valve**
3. **Coil**
4. **Locking Nut**
5. **Fitting, straight**
6. **Bonded Washer**
7. **Pressure Reduction Valve**
8. **Main Relief Valve** (for Hydraulic Platform Rotate manifold for see page 4-6)
9. **Pressure Test Point**
10. **Telescopic Retraction Valve**
11. **Cross Line Relief Valves** (Only one valve on Hydraulic Platform Rotate manifold)

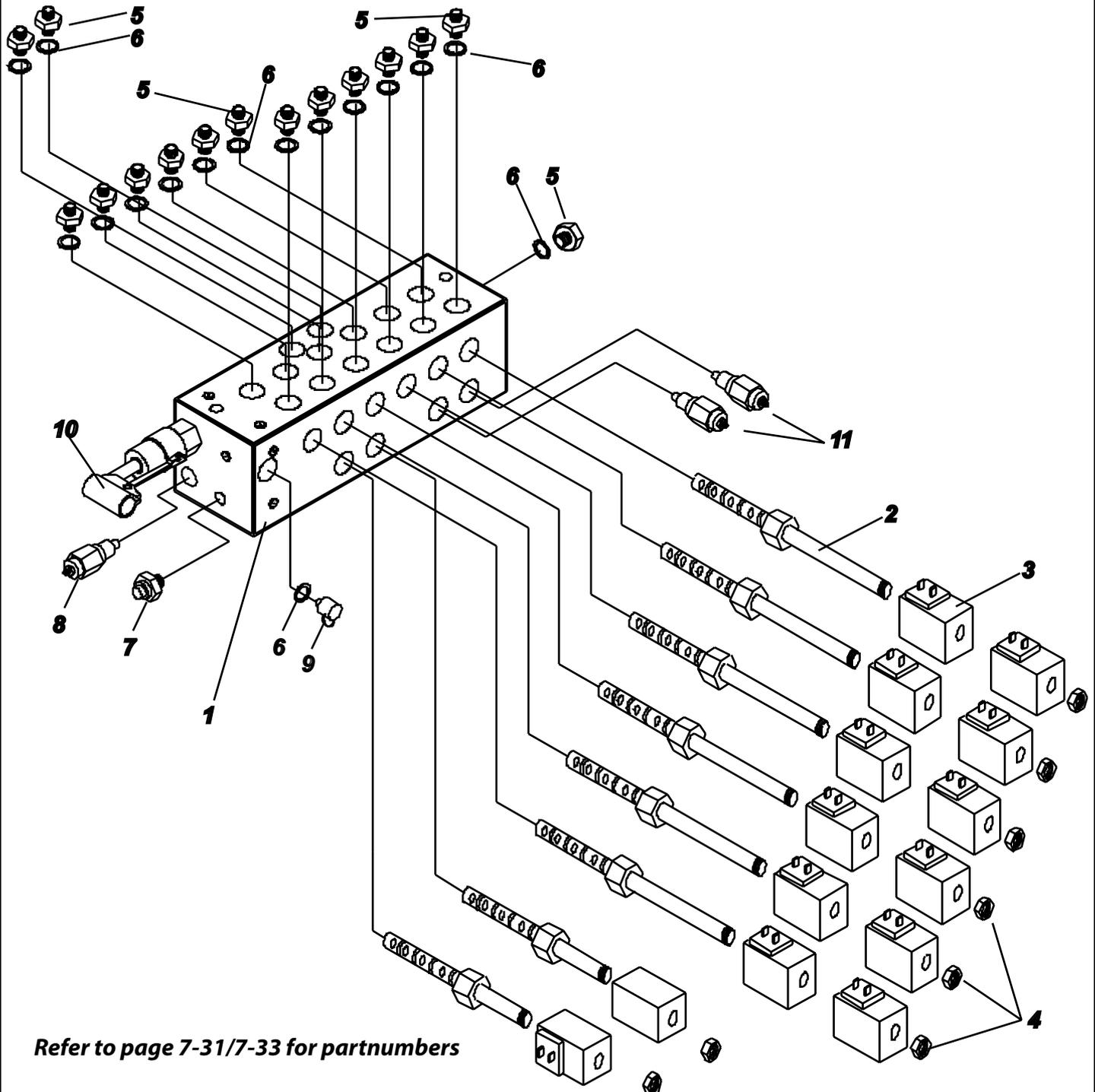


Figure 4-9: Manifold Block Components

4.9 Hydraulic Pump (Figure 4-10)



CAUTION



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

REMOVAL

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 crisscross pattern torque each capscrew a little at a time until all the capscrews are torqued to 27 Nm (20 ft. lbs).
3. Unplug and reconnect the hydraulic hoses.
4. Check the oil level in the hydraulic tank before operating the work platform.

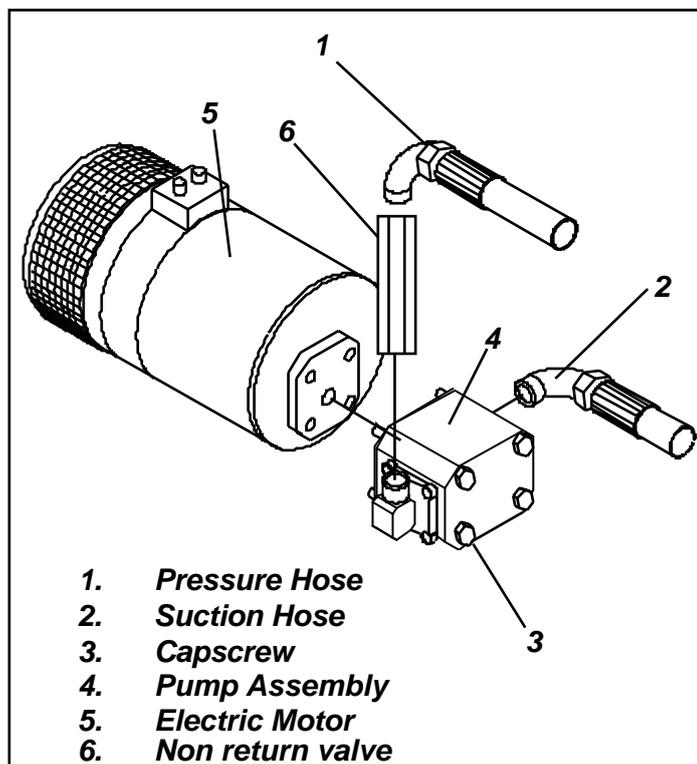


Figure 4-10: Hydraulic Pump

4.10 Traction Motor Maintenance - 514274-000 (See 7-19)



CAUTION



Before carrying out any maintenance procedures on the Drive Motors ensure that the electric circuit is disconnected i.e. disconnect the batteries and unplug the charger. It is also important that when dealing with batteries the proper safety precautions are adhered to. There is always a hazard of sparks or explosive gas.

INSPECTING THE DRIVE MOTORS

Remove the Seathing (Item 6) from the rear section of the motor and examine the brushes for excessive wear.

If required the brushes may need to be changed as follows:

1. Lift the spring (Item 3)
2. Release the brushes and unscrew the bolts (Item 2) from the brush box (Item 5)
3. Remove the brushes by pulling the electric leads.



WARNING



During these operations take care that screws, washers or other materials do not fall inside the motor.

4. After thoroughly cleaning the brush boxes, insert the new brushes and check that they slide correctly inside the seat (Item 5).
5. Tighten and lock the bolts (Item 2).
6. Push the springs back in place. Check the constant pressure on all the brushes, and the correct contact with the commutator.
7. Replace the inspection/ventilation covers.

4.10 Traction Motor Maintenance -512944-000 (See 7-21)

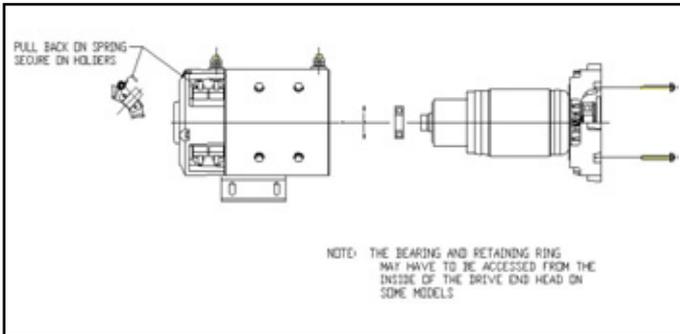


Figure 1. Exploded view of Drive End Locked Motor

- b. Hook spring scale as shown.
- c. Pull spring scale on a line directly opposite the line of force exerted. When the paper strip begins to move freely read the spring tension on the scale.

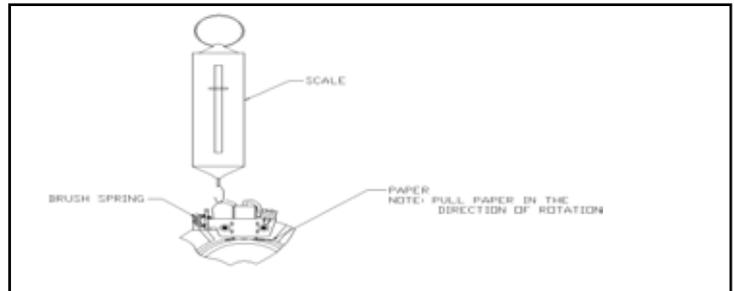


Figure 8. Brush Tension Testing

1. Pull back the brush springs and latch them on the holders in the open position (or if the brush box assembly has no holders, pull the springs out, pull the brush back and rest the springs on the side of the brush). See Figure 1. The brushes should move freely within the holders.
2. Check the brush springs for correct alignment on the back of the brush. A brush spring that does not apply equal pressure on the center of the brush will cause the brush to wear unevenly. Check for correct clearance and freedom of brush movement in the holder.
3. Replace brushes that are worn below their usable length, show signs of uneven wear or signs of over heating, such as discoloured brush shunts and brush springs.
4. Make sure the brush box assembly is tight on the commutator end head. Replace brush box assemblies in the commutator end head if they are physically damaged or brush holders are loose on the brush plate.
5. Brushes should always be replaced in complete sets of four or eight. Use identical replacement parts; do not substitute brush grades as they are matched to the motor type and application to provide the best service. Substituting brushes of the wrong grade can cause premature commutator failure and excessive brush wear.
6. Carefully release the brush springs allowing the brushes to contact the commutator. Brushes should be checked for proper tension using the following procedure:
 - a. Place paper strip between brush face and commutators. See Figure 8.

Motor Diameter		Ounce	Gram
5.5 inch	New Brush	55	1540
	Worn Brush	35	980
6.7 Inch	New Brush	65	1820
8.0 inch	Worn Brush	40	1120
9.0 Inch			

Table 2. Brush Tension Values

Every **500** working hours, or annually

- Brushes - Check the wear, the correct seating, and the regularity of the working surface.
- Springs - They should not be burned or damaged, and they must apply a constant and equal pressure on the brushes.
- Commutator - The surface must be clean and regular without grooving or burning.
- General - Check that foreign bodies or dirt have not entered the motor. Check that the ventilation holes are clean and not obstructed.

Every **1000** working hours, or every two years

- Bearings- All the bearings are fitted with a double shield and lubricated with high temperature grease. Check for leaks, vibration and noise. If necessary replace with bearings of identical type.
- Screws - Check that all nuts, particularly the cable nuts and screws are tight.

4.11 Electric Pump Motor (Figure 4-13)



WARNING



Before carrying out any maintenance procedures on the electric motor ensure that the electric circuit is disconnected i.e. disconnect the batteries and unplug the charger. It is also important that when dealing with batteries the proper safety precautions are adhered to. There is always a hazard of sparks or explosive gas.

TROUBLESHOOTING

1. Read the nameplate to become familiar with the motor, especially the rated voltage.
2. Try to turn the shaft by hand. Keep motor leads separated while doing this. **If the shaft turns freely go to step 3. If the shaft won't turn, proceed to step 2A.**
- 2A. The shaft could be tight for a number of reasons, this check is to determine if the tightness is of a temporary nature only. Obtain power to produce the nameplate voltage. Do not make a permanent connection. First touch the motor leads quickly to the power supply just long enough to observe if the shaft runs. If it does turn, then hold the motor leads on the power supply for a longer time. If the motor sounds normal, go to step 3. If the motor is noisy it should be taken apart as described in the **DISASSEMBLY** section.
3. If the motor turned freely, connect an ammeter in the circuit as shown in Figure 4-12. With rated voltage applied and the shaft running free, the ammeter should read less than 20% of the nameplate full load current. If the motor meets the above conditions then it can be assumed that the original problem is external to the motor.

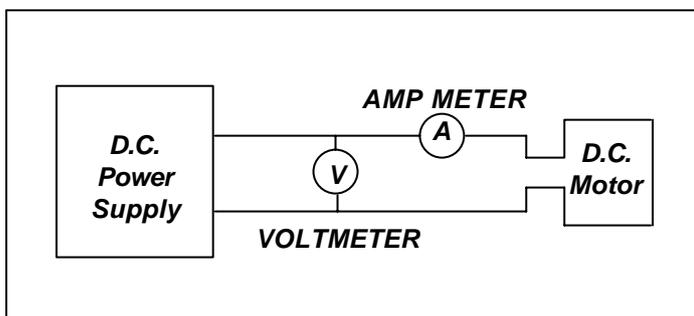


Figure 4-12: Electrical Test Circuit

DISASSEMBLY

1. Remove through bolts.
2. Remove pulley end cover
3. Pull the armature out of the assembly in one swift motion.
4. Remove commutator end cover.



CAUTION



NOTE: Do not place the stator ring in any mechanical holding device during the disassembly or assembly operation. Permanent distortion or other damage will result.

INSPECTION

Once the motor has been disassembled, go through the following check list steps to determine where the problem lies.

1. Bearings should spin smoothly and easily and have ample lubrication and be free of corrosion.
2. Armature should be checked for grounds and shorted Windings. Refinish commutator surface if pitted or excessively worn.
3. Brushes should be checked for wear and to ensure that they are free in the brush holders. **NOTE:** Observe how the brushes are assembled in brush holders and position of brush lead. New brushes must be installed in same manner. Brushes should be removed as follows:
 - Remove brush spring clip from its mounting on brush assembly.
 - Lift brush assembly from the brush holder
 - Disconnect brush assembly lead.
 - New brush assembly to be installed by reversing the above procedure.
4. Inspect wire harness and all connections for signs of damage due to overheating.
5. Check stator to see if it is securely mounted.

REASSEMBLY

1. Install new brushes and be sure they are free in the holder. Install brush with the lead wires positioned as when received.
2. Place commutator cover on a work bench with brush assembly facing upward.

3. Place the bearing spring into the bearing bore.
4. Take a complete armature assembly, including bearings, and insert commutator end bearing into the bearing bore.
Note: Do not reuse bearings which have been removed from armature shaft. Keep assembly in a vertical position. Use extreme care not to damage armature with bearing pullers. New bearings should be installed by pressing inner race of bearing onto proper position on armature shaft.
5. Set the brushes to final position and lock with springs.
6. Place the complete stator down over the vertical armature, and into position on the commutator cover.
7. The stator assembly must be placed in a definite relationship with the commutator covers in order to obtain a neutral brush setting. There is a match-mark on both items. These two marks must line up exactly. Rotate until they do.
8. Assemble the pulley end cover in the proper relationship. Insert mounting bolts and tighten alternately to ensure a good mechanical alignment.
9. Spin the shaft by hand to see if it is free. Be sure motor leads (if used) are not touching together. If the leads are touching, a generator action will give the effect of friction in the motor. A no-load test can now be performed. At rated voltage, observe the no-load current. It should be less than 20% of the nameplate full load current. Anything higher will indicate:
 - Brushes are not on neutral setting (check matchmarks for exact alignment)
 - Faulty armature.

NOTE: Following assembly, the electric motor may turn in the wrong direction. The cause of this will be that the brush holder assembly has been connected the wrong way. To solve this disassemble and reconnect in the proper way. Reversing the polarity will not solve this problem as this is a series wound motor.

MAINTENANCE INTERVALS & PROCEDURES

Every **500** working hours, or annually

- Brushes - Check the wear, the correct seating, and the regularity of the working surface.
- Springs - They should not be burned or damaged, and they must apply a constant and equal pressure on the brushes.
- Commutator - The surface must be clean and regular without grooving or burning.
- General - Check that foreign bodies or dirt have not entered the motor. Check that the ventilation holes are clean and not obstructed.

Every **1000** working hours, every two years

- Bearings- All the bearings are fitted with a double shield and lubricated with high temperature grease. Check for leaks, vibration and noise. If necessary replace with bearings of identical type.
- Seals - Check that hydraulic seals are in perfect condition.
- Screws - Check that all nuts, particularly the cable nuts and screws are tight.

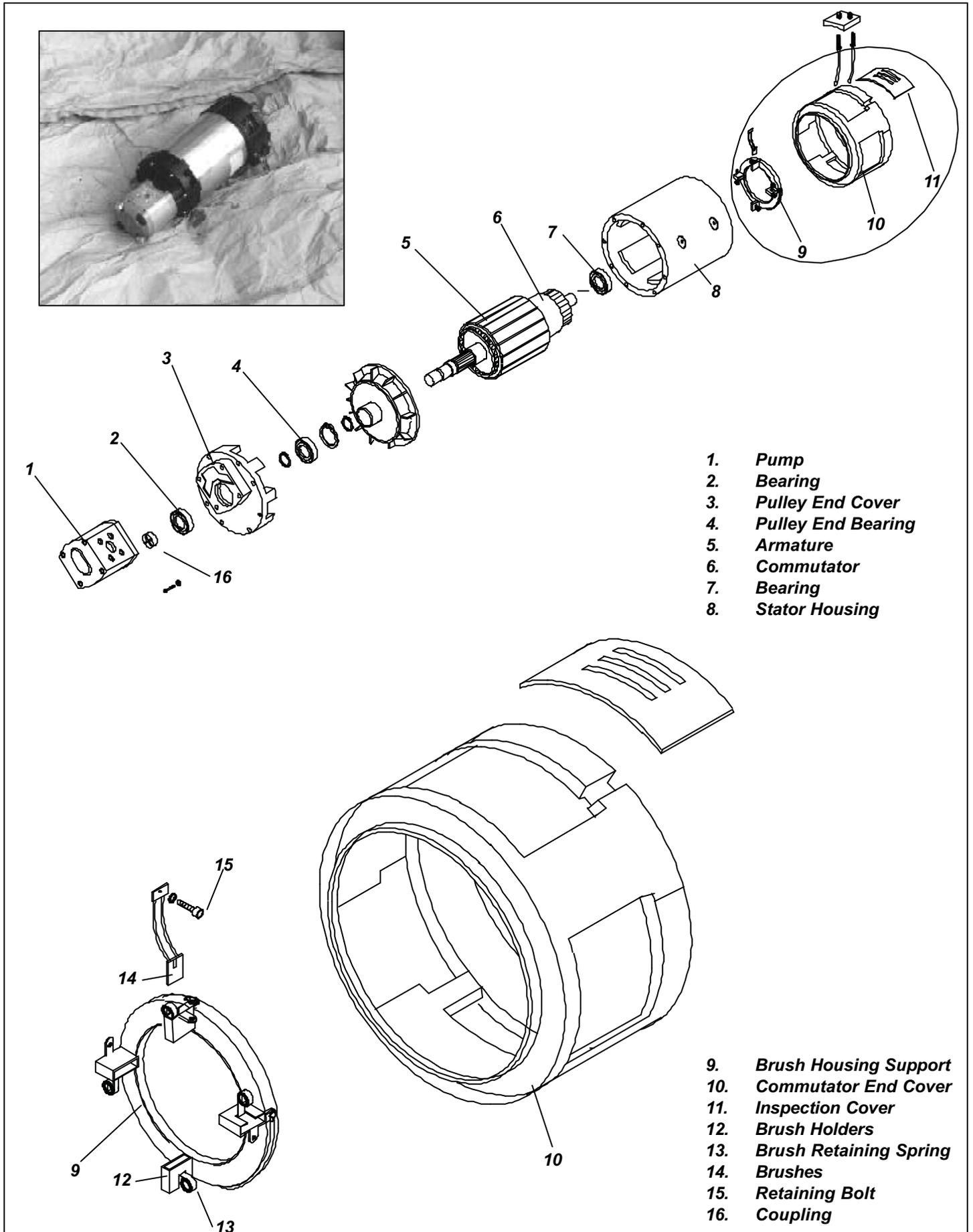


Figure 4-13: Electric Motor Assembly

4.12 Drive Reduction Gearbox (Figure 4-14)

As with most gearboxes oil changes must be carried out at regular intervals. Initially this should be done after the first 50/100 working hours and then subsequently every 500 working hours or at least every 12 months.

For this gearbox the **minimum** recommended viscosity index is 95. Depending on the ambient temperature of the work place the viscosity index should vary as follows:

Ambient Temperature	Viscosity Index (ISO 3448)
-20°C (-4°F) / 5°C (41°F)	VG 100
5°C (41°F) / 30°C (86°F)	VG 150
30°C (86°F) / 50°C (122°F)	VG 320

During oil change, we recommend that the inside of the Gearcase is flushed out with flushing fluid recommended by the lubricant manufacturer. Oil should be changed when hot to prevent a build up of sludge deposit. It is advisable to check the oil level at least once per month. If more than 10% of total oil capacity has to be added, check for oil leaks. Do not mix oils of different types even of the same make. Never mix mineral and synthetic oils.



CAUTION



Service Engineers must be aware of the dangers during an oil change involving hot oil i.e. scalding. The Service Engineer must also be responsible when disposing of the discarded oil. This should be done in accordance with local environmental regulations.

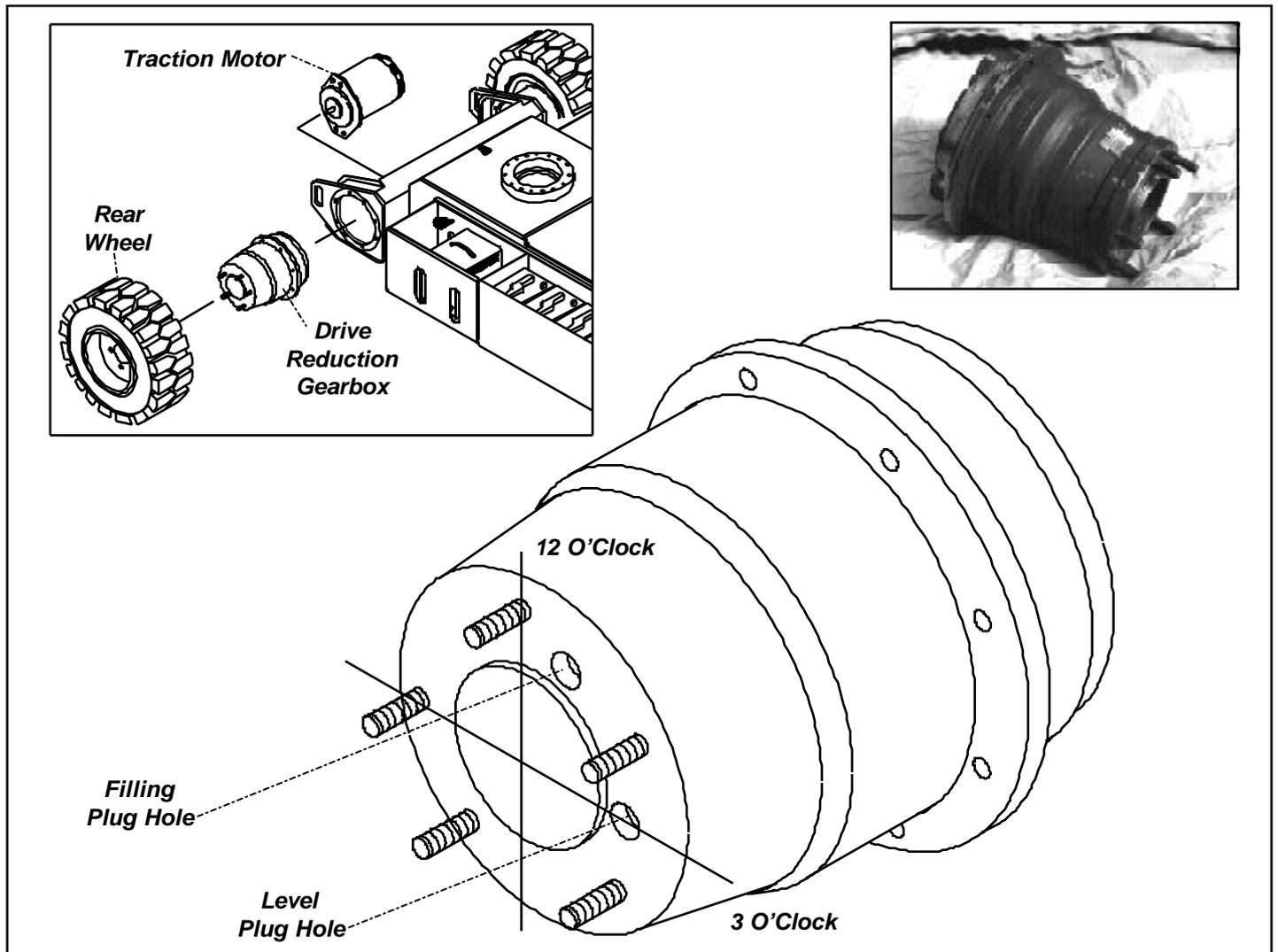


Figure 4-14: Drive Reduction Gearbox

CHANGING THE OIL

Unless an oil suction system can be used, it is necessary to remove the gearbox to fully drain the oil.

1. The A38E should be driven for five minutes in order to bring the oil up to working temperature.
2. The Electric Traction Motor must be disconnected from the Gearbox.



WARNING



Disconnect the batteries when working near the traction motors.

3. Unscrew the four bolts that hold the traction motor to the Gearbox and pull the Motor away from the rear face of the Gearbox.
4. Disconnect the brake hose from the brake port on the Gearbox and plug to avoid excessive oil spillage and contamination.
5. Loosen the five wheel nuts securing the Wheel Assembly to the Gearbox studs.
6. Jack up the rear of the A38E and chock the front wheels to prevent the machine from moving during the service.
7. Remove the Wheel Assembly by unscrewing the five wheel nuts
8. Unscrew the eight securing bolts that hold the Gearbox to the Chassis, and remove the Gearbox, noting its orientation on the chassis before removal.
9. Remove the oil filler and drain plugs from the front (stud) face of the Gearbox.
10. Stand the Gearbox vertically (studs facing down) in a suitable oil disposal container and allow the oil to drain fully.
11. The Gearbox needs to be half filled which requires approximately 0.9 Litres (0.23 Gallons US) of oil. To check this level, rotate the Gearbox into the horizontal position with one of the filler/drain plug holes in the 3 O' Clock position and the other plug hole above it (See fig 4-14). When the Gearbox is half full oil will just start to trickle out the plug hole in the 3 O'Clock position.
12. Insert and tighten both plugs and clean the surfaces of the gearbox.
13. Reattach the Gearbox to the Chassis in its original position with the eight securing bolts.



CAUTION



The Gearbox Securing Bolts must be torqued to 130 Nm (96 ft. lbs).

14. Reattach the brake hose to the brake port.
15. Reattach the Wheel Assembly to the Gearbox using the five M14 nuts.



CAUTION



The Wheel Assembly Nuts must be torqued as per values given in Table 4-1.

16. Reattach the Electric Traction Motor to the Gearbox.



CAUTION



The Electric Traction Motor Bolts must be torqued to 74 Nm (55 ft. lbs).

Repeat this procedure for the other Drive Gearbox.

4.13 Torque Specifications

RETAINING BOLTS

Use the following values to torque bolts used on **Snorkel** A38E Work Platform unless a specific torque value is called out for the part being installed.

Thread Size	Location	Torque	
		Metric	Imperial
M4	SPIRIT LEVEL	3 Nm	2 Ft/Lbs
M6	VARIOUS	10 Nm	7 Ft/Lbs
M8	TRUNNION	25 Nm	18 Ft/Lbs
M10	PIN LOCK PLATES	45 Nm	33 Ft/Lbs
M12	TORQUE ARMS	90 Nm	67 Ft/Lbs
5/8" -11 UNC x 3 1/2" (ISO 10.9) (US Grade 8)	SLEW BEARING	220 Nm	165 Ft/Lbs

Table 4-3: Bolt Torques

NOTE: All Bolts are ISO Grade 8.8 unless otherwise stated

4.14 Lower Lift Cylinder (Figure 4-15)

REMOVAL



CAUTION



The Lower Lift Cylinder is heavy, so utilise appropriate lifting equipment to support the unit before removing pins.

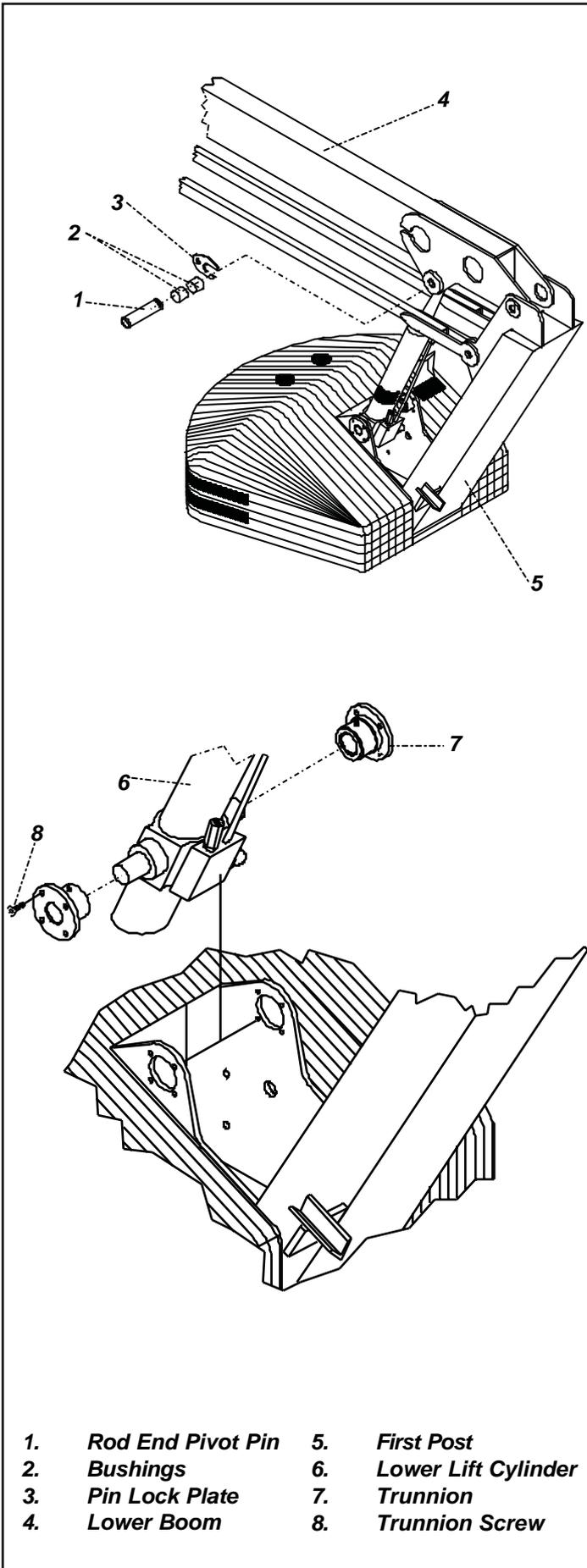
1. Ensure that the A38E is on firm level ground, the Elevating Assembly is completely stowed, the Keyswitch is to the 'OFF' position and the Emergency Stop Button is pressed.
2. Provide a suitable container to collect the hydraulic fluid, then disconnect the hydraulic hoses. Immediately plug hoses to prevent foreign material from entering.
3. Remove securing bolts and pin lock plates from the cylinder pins.
4. Support rod end of cylinder and remove rod end pivot pin. Move cylinder backwards to rest against the first post.
5. Support the cylinder so that the Trunnion Pivot bushings can be removed. This is done by releasing the eight M8 Allen head bolts. Remove the cylinder from the machine.
6. Move the cylinder to a prepared work area. It is important that clean assembly practices are observed, as seals and other hydraulic cylinder components are sensitive to contamination.

DISASSEMBLY

1. Unscrew the headcap and withdraw the rod and piston assembly from the barrel tube.
2. Unscrew the piston nut and remove piston and headcap from the cylinder rod.
3. Remove the piston static O-ring from the cylinder rod.
4. Remove the piston seal from the piston.
5. Remove the rod seal, rod wiper and static seal from the headcap.
6. Care should be taken to save the O-ring and all other seals for reassembly, if they have been deemed serviceable following the cleaning and inspection phase of maintenance.

CLEANING AND INSPECTION

1. Clean all metal parts in solvent and blow dry



- | | |
|----------------------|------------------------|
| 1. Rod End Pivot Pin | 5. First Post |
| 2. Bushings | 6. Lower Lift Cylinder |
| 3. Pin Lock Plate | 7. Trunnion |
| 4. Lower Boom | 8. Trunnion Screw |

Figure 4-15: Lower Lift Cylinder

- with filtered compressed air.
2. Check all threaded parts for stripped or damaged threads.
3. Check the bearing surfaces inside of the headcap, outer edge surface of the piston, inside of the cylinder barrel and the shaft for signs of scoring, pits, excessive wear or polishing. Scratches or pits deep enough to catch a fingernail are unacceptable. Polishing is a sign of uneven loading and if sufficiently polished the affected parts should be replaced.
4. Replace any parts or seals found to be unserviceable.

REASSEMBLY/SEAL REPLACEMENT

Note: During seal replacement do not use sharp edged tools to avoid cutting the seals, and allow at least one hour for the seals to elastically restore to their original shape before assembly.

1. Lubricate and install new rod seal, rod wiper and static seal on the headcap.
NOTE: Multi-purpose lubricant should be used.
2. Install a new piston seal on the piston.
3. Install the headcap on the cylinder from the piston end.
4. Install the piston, piston nut and a new piston static O-ring on the cylinder rod. Screw nut to end of thread and secure with circlip.

5. Lubricate the piston seal and install the piston and rod assembly in the barrel tube.
6. Thread headcap onto barrel tube and hand tighten, then turn 1/4 turn further.
7. Install the lower cylinder Overcentre Valve.

INSTALLATION

NOTE: Before installing Lift Cylinder check cylinder pins, bearings and Trunnion Pivot for wear and replace if necessary.

1. Locate the Trunnion Pivot on the cylinder and place the lift cylinder against the first post.
2. Maintaining the Trunnion Pivot in place put the first Allen Bolt in one turn. Repeat for all of the bolts. When all bolts are in place tighten fully.

NOTE: Take care in aligning the holes so that the bolts can be made turn by hand. If holes are not properly aligned the Trunnion Pivot will be positioned incorrectly.

3. Install rod end bearings (if removed).
4. Lift rod end of cylinder into place and insert pin. Install pin lock plate. Fix pin lock plate with bolt.
5. Test with weight at rated platform load to check system operation.

Note: Diagram below shows a sample cylinder breakdown for the Upper Lift Cylinder. Component Breakdowns of the other cylinders are shown in the Illustrated Parts Breakdown.

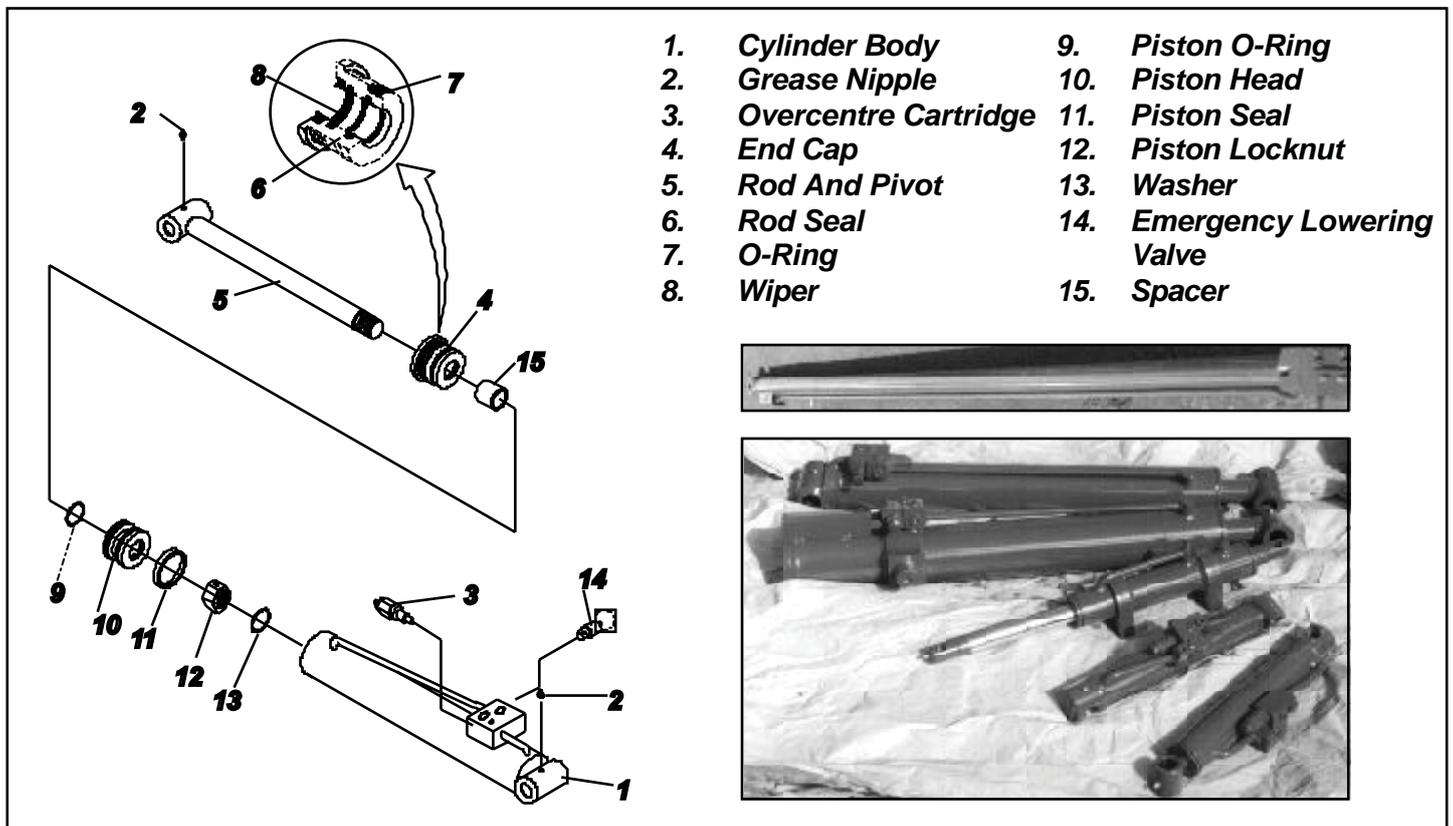


Figure 4-16: Hydraulic Cylinder Component Breakdown

4.15 Upper Lift Cylinder (Figure 4-17)

REMOVAL



CAUTION



The Upper Lift Cylinder is heavy, so utilise appropriate lifting equipment to support the unit before removing pins.

1. Ensure that the A38E is on firm level ground, the Elevating Assembly is completely stowed, the Keyswitch is to the 'OFF' position and the Emergency Stop Button is pressed.
2. Provide a suitable container to collect the hydraulic fluid, then disconnect the hydraulic hoses. Immediately plug hoses to prevent foreign material from entering.
3. Remove securing bolts and the pin lock plates from the cylinder pins.
4. Support rod end of cylinder and remove rod end pivot pin. Let cylinder down to hang freely.
5. Support the cylinder so that the barrel end cylinder pin can be removed, then remove the cylinder from the machine.
6. Move the cylinder to a prepared work area. It is important that clean assembly practices are observed as seals and other hydraulic cylinder components are highly sensitive to contamination.

DISASSEMBLY (Refer to Figure 4-16)

1. Unscrew the headcap and withdraw the rod and piston assembly from the barrel tube.
2. Unscrew the piston nut and remove piston and headcap from the cylinder rod.
3. Remove the piston static O-ring from the cylinder rod.
4. Remove the piston seal from the piston.
5. Remove the rod seal, rod wiper and static seal from the headcap.
6. Care should be taken to save the O-ring and all other seals for reassembly, if they have been deemed serviceable following the cleaning and inspection phase of maintenance.

CLEANING AND INSPECTION

1. Clean all metal parts in solvent and blowdry

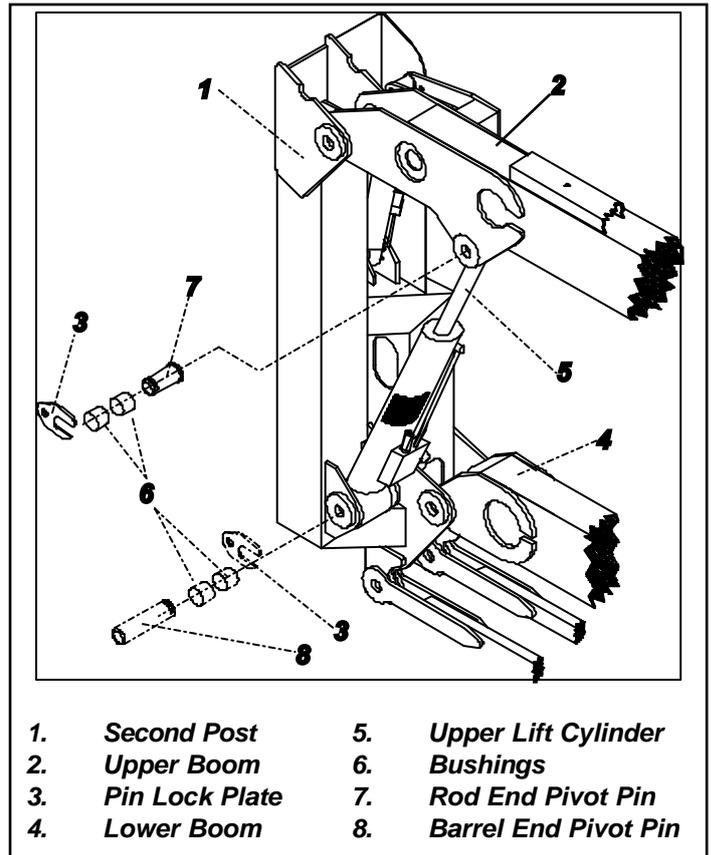


Figure 4-17: Upper Lift Cylinder

- with filtered compressed air.
2. Check all threaded parts for stripped or damaged threads.
3. Check the bearing surfaces inside of the headcap, outer edge surface of the piston, inside of the cylinder barrel and the shaft for signs of scoring, pits, excessive wear or polishing. Scratches or pits deep enough to catch a fingernail are unacceptable. Polishing is a sign of uneven loading and if sufficiently polished the affected parts should be replaced.
4. Replace any parts or seals found to be unserviceable.

REASSEMBLY/SEAL REPLACEMENT

Note: During seal replacement do not use sharp edged tools to avoid cutting the seals, and allow at least one hour for the seals to elastically restore to their original shape before assembly.

1. Lubricate and install new rod seal, rod wiper and static seal on the headcap.
NOTE: Multi-purpose lubricant should be used.
2. Install a new piston seal on the piston.
3. Install the headcap on the cylinder from the piston end.
4. Install the piston, piston nut and a new piston static O-ring on the cylinder rod. Screw nut to

5. Lubricate the piston seal and install the piston and rod assembly in the barrel tube.
6. Thread headcap onto barrel tube and hand tighten, then turn 1/4 turn further.
7. Install the upper cylinder Overcentre valve.

INSTALLATION

NOTE: Before installing Lift Cylinder check cylinder pins and bearings for wear and replace if necessary.

1. Install barrel end bearing (if removed)
2. Lift the barrel end of the cylinder into place and push the cylinder pin in.

NOTE: Take care in aligning the holes so that the pin can be pushed in by hand. Bearings will be damaged if holes are not properly aligned and the pin is forced.

3. Align pin lock plate on cylinder pin with hole in the mast and push the cylinder pin completely in. Fix pin lock plate with bolt.
4. Install rod end bearings (if removed).
5. Lift rod end of cylinder into place and insert pin. Install pin lock plate. Fix pin lock plate with bolt.
6. Test with weight at rated platform load to check system operation.

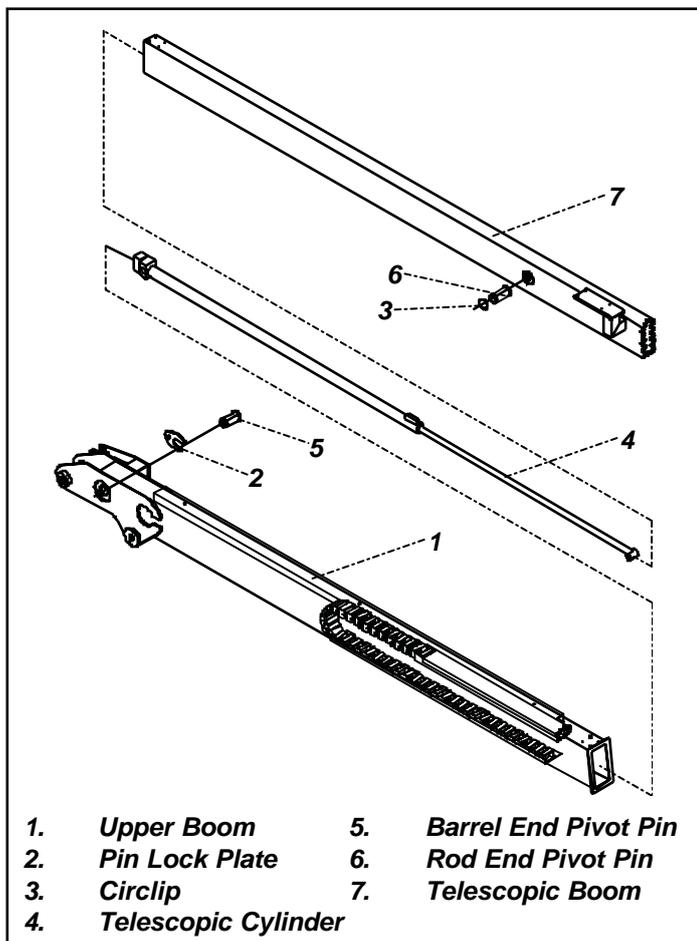


Figure 4-18: Telescopic Cylinder

4.16 Telescopic Cylinder (Figure 4-18)

REMOVAL

1. Ensure that the A38E is on firm level ground, the Elevating Assembly is completely stowed, the Keyswitch is to the 'OFF' position and the Emergency Stop Button is pressed.
2. From Chassis Controls extend the Telescope until the Rod End Pin is just visible. This will leave a small amount of clearance between the ground and the Telescopic Boom.
3. Support the Telescopic Boom & Platform Assembly to avoid any damage while removing the Telescopic Cylinder.
4. Provide a suitable container to collect the hydraulic fluid, then disconnect the hydraulic hoses. Immediately plug hoses to prevent foreign material from entering.
5. Remove securing bolts and pin lock plates from the barrel end cylinder pin.
6. Remove the Telescopic Cylinder rod end circlip and then push the rod end pin out.
7. Support the cylinder so that the barrel end cylinder pin can be removed, then remove the cylinder from the machine. This is done by pulling the cylinder forward through the gap provided in Boom 2 at the 2nd post end.
8. Move the cylinder to a prepared work area. It is important that clean assembly practices are observed. Seals and other cylinder components are highly sensitive to contamination.

DISASSEMBLY (Refer to Figure 4-16)

1. Unscrew the headcap and withdraw the rod and piston assembly from the barrel tube.
2. Unscrew the piston nut and remove piston and headcap from the cylinder rod.
3. Remove the piston static O-ring from the cylinder rod.
4. Remove the piston seal from the piston.
5. Remove the rod seal, rod wiper and static seal from the headcap.
6. Care should be taken to save the O-ring and all other seals for reassembly, if they have been deemed serviceable following the cleaning and inspection phase of maintenance.

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 headcap, outer edge surface of the piston, inside of the cylinder barrel and the shaft for signs of scoring, pits, excessive wear or polishing. Scratches or pits deep enough to catch a fingernail are unacceptable. Polishing is a sign of uneven loading and if sufficiently polished the affected parts should be replaced.
4. Replace any parts or seals found to be unserviceable.

REASSEMBLY/SEAL REPLACEMENT

Note: During seal replacement do not use sharp edged tools to avoid cutting the seals, and allow at least one hour for the seals to elastically restore to their original shape before assembly.

1. Lubricate and install new rod seal, rod wiper and static seal on the headcap.
NOTE: Multi-purpose lubricant should be used.
2. Install a new piston seal on the piston.
3. Install the headcap on the cylinder from the piston end.
4. Install the piston, piston nut and a new piston static O-ring on the cylinder rod. Screw nut to end of thread and secure with circlip.
5. Lubricate the piston seal and install the piston and rod assembly in the barrel tube.
6. Thread headcap onto barrel tube and hand tighten, then turn 1/4 turn further.
7. Install the telescopic cylinder's Overcentre and Check Valves.

INSTALLATION

NOTE: Before installing Telescopic Cylinder check cylinder pins and bearings for wear and replace if necessary.

1. Lift the Telescopic Cylinder so that it will be able to slide down Boom 2.
2. While maintaining a positive hold on the cylinder position the barrel end of the cylinder into place. Push the cylinder pin in.
NOTE: Take care in aligning the holes so that the pin can be pushed in by hand. If holes are not properly aligned and the pin is forced in, the bearings will be damaged.
3. Align pin lock plate on cylinder pin with hole in

- Boom 2 and push the cylinder pin completely in and fix pin lock plate with bolt.
4. Position the rod end of cylinder into place and insert the pin until the circlip groove is exposed. Replace the circlip.
5. From the Chassis Controls retract the Telescopic Cylinder fully.
7. Test with weight at rated platform load to check system operation.

4.17 Steering Cylinder (Figure 4-19)

REMOVAL

1. Ensure that the A38E is on firm level ground, the Elevating Assembly is completely stowed but slewed away from centre, the Keyswitch is to the 'OFF' position and the Emergency Stop Button is pressed.
2. Straighten the drive wheels.
3. Provide a suitable container to collect the hydraulic fluid, then disconnect the hydraulic hoses. Immediately plug hoses to prevent foreign material from entering.
4. Remove the circlips from each steering pivot pin. Push the steering pivot pins out and rotate the steering link arm away from the rod.
5. While supporting the cylinder remove the four bolts from the front panel of the A38E's chassis.
6. Move the cylinder to a prepared work area. It is important that clean assembly practices are observed as seals and other hydraulic cylinder components are highly sensitive to contamination.

DISASSEMBLY (Refer to Figure 4-16)

1. Unscrew both of the headcaps and withdraw the rod piston assembly (this is one unit) from the barrel tube.
2. Remove the piston static O-ring from the cylinder rod.
3. Remove the piston seal from the piston.
4. Remove the rod seal, rod wiper and static seal from the headcap.
5. Care should be taken to save the O-ring and all other seals for reassembly, if they have been deemed serviceable following the cleaning and inspection phase of maintenance.

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 headcap, outer edge surface of the rod & piston assembly or inside of the cylinder barrel and the shaft for signs of scoring, pits, excessive wear or polishing. Scratches or pits deep enough to catch a fingernail are unacceptable. Polishing is a sign of uneven loading and if sufficiently polished the affected parts should be replaced.
4. Replace any parts or seals found to be unserviceable.

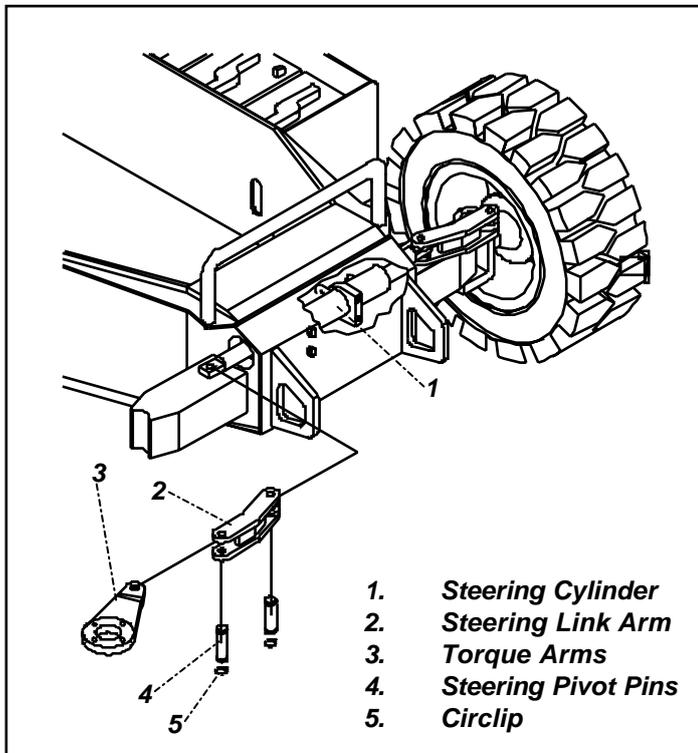


Figure 4-19: Steer Cylinder

REASSEMBLY/SEAL REPLACEMENT

Note: During seal replacement do not use sharp edged tools to avoid cutting the seals, and allow at least one hour for the seals to elastically restore to their original shape before assembly.

1. Lubricate and install new rod seal, rod wiper and static seal on the headcap.
NOTE: Multi-purpose lubricant should be used.
2. Install a new piston seal on the piston.
3. Install the headcap on one end of the cylinder barrel.
4. Lubricate the piston seal and install the rod &

piston assembly in the barrel tube.

6. Thread the headcap onto the free end of the barrel tube and hand tighten, then turn 1/4 turn further.

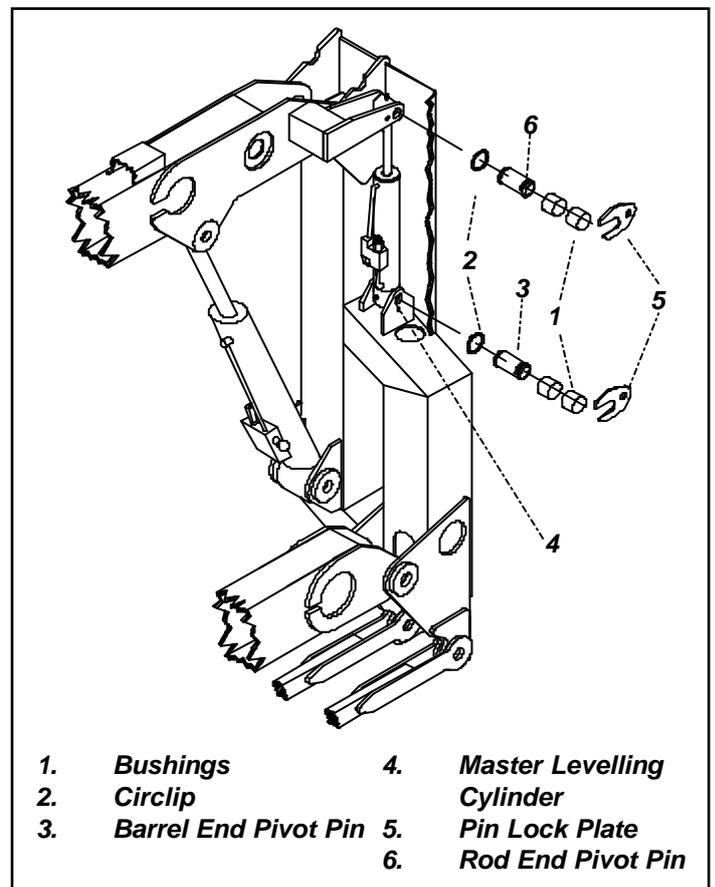
INSTALLATION

NOTE: Before installing the Steering Cylinder check cylinder pins and bearings for wear and replace if necessary.

1. While supporting the cylinder replace the four washers and bolts at the front panel of the A38E's chassis.
2. Move the steering arm so that the holes for positioning the pins are correct. Install each of the steering pivot pins and ensure that the circlips are attached properly.

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

- Torque these four bolts to 90 Nm (66 ft. lbs).
3. Reconnect the hydraulic hoses.
4. Test system operation by carrying out a 'figure of eight' driving pattern for 5 cycles. This should be sufficient to prove proper function.



1. Bushings
2. Circlip
3. Barrel End Pivot Pin
4. Master Levelling Cylinder
5. Pin Lock Plate
6. Rod End Pivot Pin

Figure 4-20: Master Levelling Cylinder

4.18 Master Levelling Cylinder (Figure 4-20)

REMOVAL

1. Ensure that the A38E is on firm level ground, the Elevating Assembly is completely stowed, the Keyswitch is to the 'OFF' position and the Emergency Stop Button is pressed.
2. Provide a suitable container to collect the hydraulic fluid, then disconnect the hydraulic hoses. Immediately plug hoses to prevent foreign material from entering.
3. Remove securing bolts and pin lock plates from the rod end cylinder pin. Remove the circlip from the barrel end of the cylinder
4. Support barrel end of cylinder and remove rod end pivot pin. Move cylinder backwards and allow to hang freely.
5. Support the cylinder so that the barrel end cylinder pin can be removed, then remove the cylinder from the machine.
6. Move the cylinder to a prepared work area. It is important that clean assembly practices are observed as seals and other hydraulic cylinder components are highly sensitive to contamination.

DISASSEMBLY (Refer to Figure 4-16)

1. Unscrew the headcap and withdraw the rod and piston assembly from the barrel tube.
2. Unscrew the piston nut and remove piston and headcap from the cylinder rod.
3. Remove the piston static O-ring from the cylinder rod.
4. Remove the piston seal from the piston.
5. Remove the rod seal, rod wiper and static seal from the headcap.
6. Care should be taken to save the O-ring and all other seals for reassembly, if they have been deemed serviceable following the cleaning and inspection phase of maintenance.

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 headcap, outer edge surface of the piston,

inside of the cylinder barrel and the shaft for signs of scoring, pits, excessive wear or polishing. Scratches or pits deep enough to catch a fingernail are unacceptable. Polishing is a sign of uneven loading and if sufficiently polished the affected parts should be replaced.

4. Replace any parts or seals found to be unserviceable.

REASSEMBLY/SEAL REPLACEMENT

Note: During seal replacement do not use sharp edged tools to avoid cutting the seals, and allow at least one hour for the seals to elastically restore to their original shape before assembly.

1. Lubricate and install new rod seal, rod wiper and static seal on the headcap.
NOTE: Multi-purpose lubricant should be used.
2. Install a new piston seal on the piston.
3. Install the headcap on the cylinder from the piston end.
4. Install the piston, piston nut and a new piston static O-ring on the cylinder rod. Screw nut to end of thread and secure with circlip.
5. Lubricate the piston seal and install the piston and rod assembly in the barrel tube.
6. Thread headcap onto barrel tube and hand tighten, then turn 1/4 turn further.
7. Install the Master Cylinders Overcentre Valves.

INSTALLATION

NOTE: Before installing the Master Cylinder check cylinder pins and bearings for wear and replace if necessary.

1. Install barrel end bearing (if removed).
2. Lift the barrel end of the cylinder into place and push the barrel end pivot pin in until the circlip grooves are exposed, then attach the circlip.
NOTE: Take care in aligning the holes so that the pin can be pushed in by hand. If holes are not properly aligned and the pin is forced in, the bearings will be damaged.
3. Align pin lock plate on cylinder pin with hole in the 2nd Post and push the cylinder pin completely in and fix pin lock plate with bolt.
4. Install rod end bearings (if removed).
5. Lift rod end of cylinder into place and insert the rod end pivot pin until the circlip grooves are exposed, then attach the circlip. Install the pin lock plate.
6. Fix pin lock plate with bolt.
7. Test with weight at rated platform load to check system operation.

4.19 Slave Levelling Cylinder (Figure 4-21)

REMOVAL

1. Ensure that the A38E is on firm level ground, the Elevating Assembly is completely stowed, the Keyswitch is to the 'OFF' position and the Emergency Stop Button is pressed.
2. Provide a suitable container to collect the hydraulic fluid, then disconnect the hydraulic hoses. Immediately plug hoses to prevent foreign material from entering. Support the Platform
3. Remove securing bolts and pin lock plates from the cylinder pins.
4. Support barrel end of cylinder and remove rod end pivot pin. Move cylinder backwards allowing it to hang freely. Rotate the cylinder backwards.
5. Support the cylinder so that the barrel end cylinder pin can be removed, then remove the cylinder from the machine.
6. Move the cylinder to a prepared work area. It is important that clean assembly practices are observed as seals and other hydraulic cylinder components are highly sensitive to contamination.

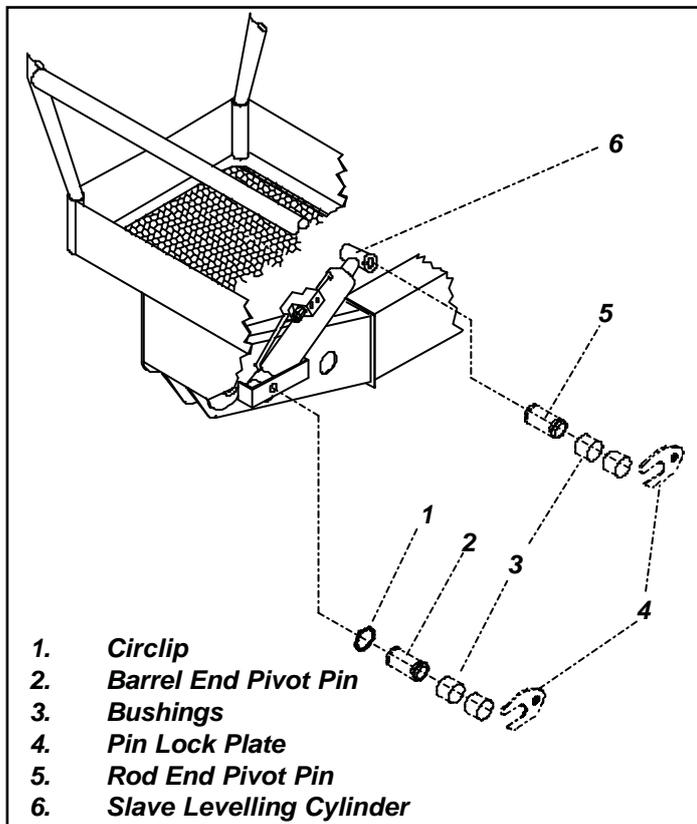


Figure 4-21: Slave Levelling Cylinder

DISASSEMBLY (Refer to Figure 4-16)

1. Unscrew the headcap and withdraw the rod and piston assembly from the barrel tube.
2. Unscrew the piston nut and remove piston and headcap from the cylinder rod.
3. Remove the piston static O-ring from the cylinder rod.
4. Remove the piston seal from the piston.
5. Remove the rod seal, rod wiper and static seal from the headcap.
6. Care should be taken to save the O-ring and all other seals for reassembly, if they have been deemed serviceable following the cleaning and inspection phase of maintenance.

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 headcap, outer edge surface of the piston, inside of the cylinder barrel and the shaft for signs of scoring, pits, excessive wear or polishing. Scratches or pits deep enough to catch a fingernail are unacceptable. Polishing is a sign of uneven loading and if sufficiently polished the affected parts should be replaced.
4. Replace any parts or seals found to be unserviceable.

REASSEMBLY/SEAL REPLACEMENT

Note: During seal replacement do not use sharp edged tools to avoid cutting the seals, and allow at least one hour for the seals to elastically restore to their original shape before assembly.

1. Lubricate and install new rod seal, rod wiper and static seal on the headcap.
NOTE: Multi-purpose lubricant should be used.
2. Install a new piston seal on the piston.
3. Install the headcap on the cylinder from the piston end.
4. Install the piston, piston nut and a new piston static O-ring on the cylinder rod. Screw nut to end of thread and secure with circlip.
5. Lubricate the piston seal and install the piston and rod assembly in the barrel tube.
6. Thread headcap onto barrel tube and hand tighten, then turn 1/4 turn further.
7. Install the upper cylinder valve block. Check O-rings.

INSTALLATION

NOTE: Before installing the Slave Cylinder check cylinder pins and bearings for wear and replace if necessary.

1. Install barrel end bearing (if removed)
2. Lift the barrel end of the cylinder into place.
NOTE: Take care in aligning the holes so that the barrel end pivot pin can be pushed in by hand. If holes are not properly aligned and the pin is forced in, the bearings will be damaged.
3. Align pin lock plate on cylinder pin with hole in the bracket, push the cylinder pin completely in and fix pin lock plate with bolt. Attach the circlip inside the Telescopic Boom.
4. Install rod end bearings (if removed).
5. Lift rod end of cylinder into place and insert rod end pivot pin. Install pin lock plate.
6. Fix pin lock plate with bolt.
7. Test with weight at rated platform load to check system operation.

BLEEDING THE MASTER/SLAVE LEVELLING CIRCUIT

When air enters the Master/Slave Levelling circuit the Slave Levelling Cylinder is prevented from following the master cylinder precisely. If it seems there may be air in the system the following procedures should be followed.

1. While outside the Platform activate the Levelling Switch function and level the cage in the forward direction. Continue this until, and for 30 seconds after, the Platform comes to a stop.
2. Activate the Levelling function in the backward direction. Continue this until, and for 30 seconds after, the Platform comes to a stop. Care must be taken that the Platform Cage does not impact on the ground. Repeat this procedure until the cage becomes level when elevated.

The above two procedures have the effect of 'Priming' the Levelling Circuit. Test to see if the Slave Cylinder is operating correctly. If not follow the procedures below.

3. Ensure the Elevating Assembly is fully stowed and the booms are in their rest position.
4. Remove securing bolts and pin lock plates from the rod end cylinder pin of the Master Cylinder.
5. Remove the rod end pivot pin. Move cylinder backwards and allow to hang freely.
6. Loosen, but do not fully disconnect, the hose fitting at 'B'. Prepare to activate the Levelling

- Switch while a colleague holds a cloth at the fitting 'B'. Air will be expelled through this fitting.
7. Activate the Switch slowly in both directions until all air is expelled and hydraulic fluid begins to appear.
8. Repeat the above procedure for fitting 'A'. Lift the rod end of the cylinder into place and insert the pin until the circlip grooves are exposed, then attach the circlip. Install the pin lock plate.
9. Fix the pin lock plate with the bolt.
10. Support the Platform before removing the securing bolts and pin lock plates from the Slave Cylinders rod end pivot pin.
11. Remove the rod end pivot pin. Move the cylinder backwards allowing it to hang freely. Rotate the cylinder backwards.
12. Repeat the procedures outlined in Items 6, 7 & 8 for the Slave Cylinder.
13. Lift rod end of cylinder into place and insert pin. Install pin lock plate.
14. Fix pin lock plate with bolt.

4.20 Adjustment of Overcentre Valves on A38E Lift Cylinders (Figure 4-22)

The valve supplier delivers the Overcentre valve preset 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 :-

- Place the max. SWL (Safe Working Load), evenly distributed, in the cage.
- Raise the boom to 50 mm stroke on the cylinder.
- First loosen the Locknut, then using an Allen Key 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.
- Screw the adjuster **1 (one)** further turn **clockwise** and secure Locknut.

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



The Overcentre Valves are located towards the Rod End of the Lower Lift and Upper Lift Cylinders.

Figure 4-22: Overcentre Valve



CAUTION



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

- Cylinder drifts down under load less than the SWL (Safe Working Load).
- 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.
- Damaged seals in cylinders due to high ambient temperature rise.
- High pitched sound from hydraulic system when lowering.

4.21 REPLACING THE GP400 CONTROL MODULE

If for any reason you have to replace the GP400 control module it is important that you complete the following procedures:



WARNING



If the GP400 control module is replaced and /or moved with the machine for any reason the tilt sensor must be result for zero ° and the loadcell re-calibrated using the following procedure.

Failure to do so could result in serious injury or death.

To follow this procedure you need to switch the Ezcal display in the lower control box into "Calibration mode".

To zero the tilt sensor :-

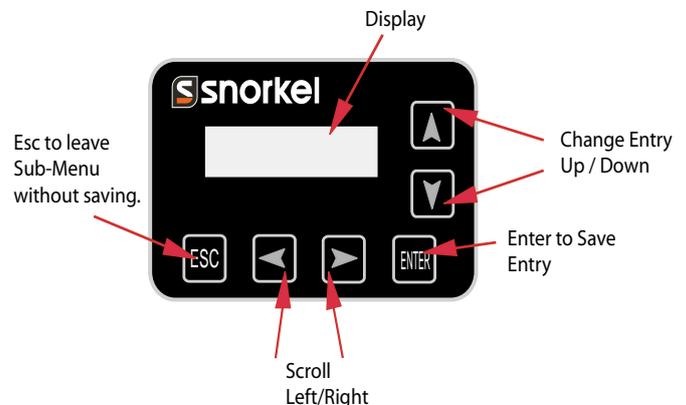
1. Place the machine on firm level surface, $\leq 0.25^\circ$
2. Use a Gauge to Confirm that the front and rear of the chassis are level to within $\pm 0.25^\circ$ in both directions.
3. Switch the machine on and press and hold Esc for 5 Seconds until "Ezlift Menu" is displayed.
4. Scroll to access level.(Enter)
5. Enter code 2222 for access level 2. (Enter)
6. Scroll to setups. (Enter)
7. Change defaults. (Enter)
8. Select Part number 1 (Enter)
9. Scroll to model
10. 1 = code(Enter followed by ESC)
11. Scroll to tilt setups. (Enter)
12. Calibrate level. (Enter)
13. Enter for yes.

To confirm calibration has worked switch the machine off then back on again.

14. Scroll to Diagnostics. (Enter)
15. System. (Enter)
16. Scroll to tilt, both reading should be below 0.2° if not repeat from 5.

Now Re-Calibrate the loadcell:-

17. Scroll to setups. (Enter)
18. Scroll to load setups. (Enter)
19. Scroll to Calibrate load (Enter)
20. Redo loaded? Press up arrow for yes, place SWL in basket and press enter twice.
21. Redo empty? Press up arrow for yes, remove load from platform and press enter twice.
22. Use arrow to enter calibration date and press Enter.
23. Place 120% of SWL in the platform and verify that the lift function cuts out automatically when raised off the boom switch.



4.22 CALLIBRATION OF THE LOAD CELL

If for any reason you have to replace the LOAD CELL it is important that you complete the following procedures:



WARNING

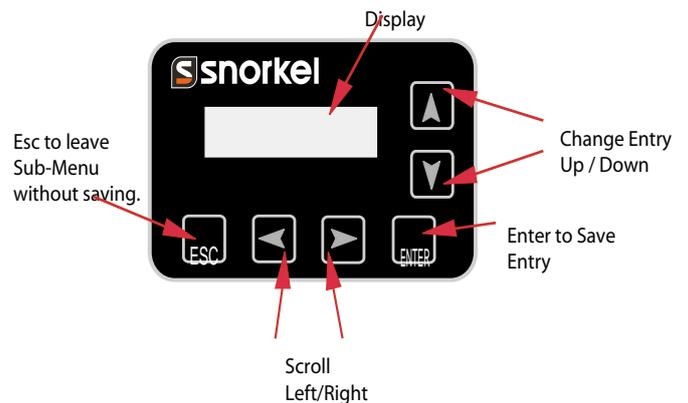


If the LOAD CELL is replaced and /or tampered with for any reason the loadcell must be re-calibrated using the following procedure.

Failure to do so could result in serious injury or death.

To follow this procedure you need to switch the Ezcal display in the lower control box into "Calibration mode".

1. Switch the machine on and press and hold Esc for 5 seconds until "Ezlift Menu" is displayed.
2. Scroll to access level. (Enter)
3. Enter code 2222 for access level 2. (Enter)
4. Scroll to setups. (Enter)
5. Scroll to load setups. (Enter)
6. Scroll to Calibrate load. (Enter)
7. Redo loaded? Press up arrow for yes, Place SWL in basket and press enter twice.
8. Redo empty? Press up arrow for yes, remove load from platform and press enter twice.
9. Use arrow to enter calibration date and press Enter.
10. Place 120% of SWL in the platform and verify the lift function cuts out automatically when raised off the boom switch.



5.0 Introduction

The following section provides troubleshooting guidelines to be used to locate and correct most of the operational problems which may occur. Problems which arise and which are not solved by following corrective actions should be referred to a technically qualified person, as there is no substitute for a thorough knowledge of and practical experience in the servicing and repair of related equipment and machines.

For further assistance contact the local distributor and if warranted the Snorkel product support at:

EUROPE, MIDDLE EAST
AFRICA & ASIA
PHONE: +44 (0) 845 1550 058
FAX: +44 (0) 845 1557 756

NORTH & SOUTH AMERICA
PHONE: +1 785 989 3000
TOLL FREE: +1 800 255 0317
FAX: +1 785 989 3070

AUSTRALIA
PHONE: +61 1300 700 450
FAX: +61 2 9609 3057

NEW ZEALAND
PHONE: +64 6 3689 168
FAX: +64 6 3689 164

Referring to Operators Manual and to Section 3.0 and Section 6.0 will aid in understanding the operation and function of the various components and systems of the A38E Work Platform and help diagnosing and repair of the machine.



WARNING



When troubleshooting, ensure that the work platform is resting on a firm, level surface. Disconnect the batteries when replacing or testing the continuity of any electrical component.

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, or equivalent, of suitable capacity.

GENERAL PROCEDURE

Each malfunction is followed by a list of probable causes which will enable determination of the remedial action.

The Probable causes and remedial action should be followed in the order in which they are listed in the following tables.

Note that the majority of problems will be related to the electrical and hydraulic systems.

For this reason much attention has been paid to these areas in the troubleshooting charts.

The lists are not guaranteed to include all possible causes and remedies. The immediately obvious causes and remedies are not necessarily listed.

1. Verify your problem.

- Do a full function test from both the platform and chassis controls, and note all functions that are not operating correctly.

2. Narrow the possible causes of the malfunction.

- Use the troubleshooting guide to determine which components are common to all circuits that are not functioning correctly.

3. Identify the problem component.

- Test components that are common to all circuits that are not functioning correctly. Remember to check wires and terminals between suspect components, be sure to check connections to battery negative.

4. Repair or replace any component found to be faulty.

5. Verify that repair is complete.

- Do a full function test from both the platform and the chassis controls to verify that all functions are operating correctly and that the machine is performing to specified values.

SPECIAL TOOLS

The following is a list of tools which may be required to perform certain maintenance procedures on the AB38.

- Flow Meter with Pressure Gauge (**Snorkel** P/N: 067040-000).
- 0-69 bar (0-1000 psi) Hydraulic Pressure Gauge with Adapter Fittings (**Snorkel** P/N: 014124-010).
- 0-207 bar (0-3000 psi) Hydraulic Pressure Gauge with Adapter Fittings (**Snorkel** P/N: 014124-030).
- Adapter Fitting (**Snorkel** P/N: 063965-002).
- Inclinator (**Snorkel** P/N: 010119-000)
- Crimping Tool (**Snorkel** P/N: 028800-009)
- Terminal Removal Tool (**Snorkel** P/N: 028800-006)
- Calibrator EZcal (**Snorkel** P/N: 504560-001)

ADJUSTMENT PROCEDURES

Hydraulic settings must be checked whenever a component is repaired or replaced. Remove counterbalance valves and “bench test” them if they are suspect. Connect a pressure gauge of appropriate range to the test port located on the hydraulic manifold. Correct pressure settings are listed in the hydraulic schematic.

CHECKING PUMP PRESSURES

Remove hose from pump port and connect pressure gauge.

DIAGNOSTICS USING EZCAL DISPLAY

The EZcal Display can be switched into calibration mode to become an invaluable tool when troubleshooting on this machine.

Switch the machine on, press and hold Esc for 5 seconds until “SNORKEL EBOOM” is displayed then select diagnostics, the following menu’s are available:

1.	SYSTEM -	ENABLED	Display status of joystick trigger or enable switches.
		B+ SUPPLY	Displays Battery Voltage
		TRACTION	Demand ON or OFF, Armature & Field Current and SEM600 controller Temperature.
		PUMP	Pump Motor Voltage and Current and P600 Controller Temperature
		TILT	Displays tilt angle of the machine in X and Y, both should be less than 3 degrees
		HEIGHT	N/A
		LOAD	Displays load as a percentage of SWL
		OVERLOADED	Yes or No
		ELEVATED	Yes or No
2.	FUNCTIONS-	DRIVE	These display the percentage demand for each function.
		STEER	
		LL (LOWER LIFT)	
		UL (UPPER LIFT)	
		JIB (N/A)	
		BASKET	
		TELE	
		SLEW	
		INTERLOCK	
3.	DIGITALS	VERIOUS	Displays the condition of all digital inputs to the relevant controller & matrix, refer to the following table and the circuit diagram on page 6.1 for full list of I/O's.
4.	ANALOG	VERIOUS	Displays the condition of all analogue inputs to relevant controller & matrix.
5.	OUTPUT	VERIOUS	Displays the condition of all outputs from the relevant controller & matrix.

TROUBLESHOOTING TABLES

The next step is to refer to the Troubleshooting charts in tables.

Refer to Hydraulics section for detailed troubleshooting information on the pump/motor controller.

Read and understand the principles of operation before commencing any troubleshooting.



WARNING



RISK OF SERIOUS INJURY.

Ensure that the work platform is resting on firm, level surface.
The elevating assembly must be supported by an overhead hoist
when troubleshooting and servicing the electrical/hydraulic system.

5.1 GENERAL TROUBLESHOOTING

PROBLEM	CAUSE	ACTION
All functions inoperable. Electric motor does not start.	1. Blown main fuse	Check the 300A fuse and replace if necessary
	2. Faulty Battery Charger	Connect charger to batteries and check the output voltage. If less than 48v, repair or replace. Check input voltage to charger. Check the internal charger protection fuse.
	3. Faulty Battery	Charge batteries overnight. Check individual cell voltage. Replace as necessary.
	4. Loose or broken battery leads	Check resistance and continuity of each individual lead. Replace as required.
	5. Emergency Stop buttons contacts failed	Check resistance and continuity of each individual lead. Replace as required.
	7. Loose Upper Control Box Terminal	Unscrew connector, align locating tabs and reconnect
	8. Battery Disconnect plug loose	Check and reconnect. Check the internal steel points for pitting or damage
	Electric motor starts but all functions are inoperable	1. Low hydraulic oil
2. Faulty hydraulic pump		Insert a pressure gauge in the G1 port of the valve block. Operate a function to the limit of stroke. Check that relief valve pressure develops. Repair or replace.
3. Faulty controller		Check the 10mm cable terminals for tightness.
Electric motor continues to run when action has ceased	1. Line contactor malfunction	Check the contact faces. Fusing or arcing due to contamination destroys the contacts. Replace the unit.
Pl.atform elevates very slowly or not at all	1. Leaking emergency lowering valves	Check the operating levers and cables. Check closure of the control knob at the base of the control valve block. Remove and replace the cylinder-mounted valves as necessary.
	2. Faulty lift valve solenoids	Test the voltage to the mast and jib solenoids. Swap around solenoids to isolate the problem. Solenoids are not serviceable.
	3. Platform overloaded	Remove excessive load. Check the pressure setting of the hydraulic 'lift limit' relief valve (CT11) on the block. This may only be reset at 215 kg payload in the platform.
	4. Low Battery level	Check the battery cell voltages after recharging. Total battery pack voltage should exceed 18v. Charge the batteries or replace faulty battery unit.
Platform drifts down uncontrollably	1. Leaking emergency lowering / hose burst valves	Check the operating levers and cables. Check contamination within the valve. Check closure of the control knob (CT14) at the base of the control valve block. Remove and replace the cylinder-mounted valves as necessary.
	2. Cylinder piston seal internal leakage	Switch off all power functions. Disconnect the hose from the annular side of the cylinder and check for small oil flow. Oil flow indicates a faulty cylinder piston seal. Remove and repair the cylinder.
	3. Platform is overloaded	Remove excessive weight. The Safe Working Load is 215kg for A38

PROBLEM	CAUSE	ACTION
Platform assembly will not slew	1. Faulty controller	Check the I/O's Using EZcal diagnostics
	2. Faulty slew solenoid	Check voltage at the solenoid electrical connections. Use a screw driver or similar component to check the magnetic effect of solenoid.
	3. Incorrect cross-line relief setting	Insert a pressure gauge in the TP port of the valve block. Operate a slew function and measure the pressure. Provided the main relief pressure has been preset properly, the gauge should register 20-50 bar. Reset or replace CLRV valves thus preventing bypassing of oil.
	4. Faulty slew select switch	Replace the complete switch assembly.
Platform assembly will not descend	1. Faulty controller	Check the I/O's using EZcal diagnostics. Check the programmed mast speed settings. Check the continuity of mast speed enabling cables to the controller. Repair as necessary.
	2. Faulty mast or jib solenoids	Check the voltage to the solenoids V7 & V8 for the mast functions. Swap solenoids to confirm fault and replace if necessary.
Machine will not steer	1. Malfunction of joystick toggle switch	Check I/O's using EZcal diagnostics. Remove and service the switch &/or joystick.
	2. Faulty steering solenoid & valve	Check that the solenoids at V5 are energised while the steering Check the cables feeding these solenoids. Replace the solenoids if necessary. Check the valve cartridges for contamination.
	3. Faulty controller	Check I/O's using EZcal diagnostics. Check the continuity of the steer speed enabling cable to the controller. Repair or replace as necessary.
	4. Steer cylinder malfunction	Check the hose connections to the cylinder. Check the cylinder rod-end pins and the cylinder mounting bolts.
	5. Seized wheel mounting frame pivot(s)	Refer to the maintenance section for assembly and repair of the pivot and associated parts.
	6. Damaged steering link plates	Replace the steering link plates, associated pins and lock plates.
Machine will not drive	1. Temp	Reset system and allow the system to cool down.
	2. Towing valve open	Locate the towing valve CT 21 on the valve block. Ensure that it is fully closed by turning clockwise.
	3. Incorrect hose connections	Refer to the hydraulic diagram for correct connections of valve ports to the motor ports. Incorrect connection may result in locking of wheels.
	4. Fail-safe brake-circuit malfunction	Blocked brake line to either motor. Clear blockage and/or replace hoses and fittings. Check the correct function of the check valves V1 and V2 on the valve block. These valve should open to allow brake chamber evacuation.

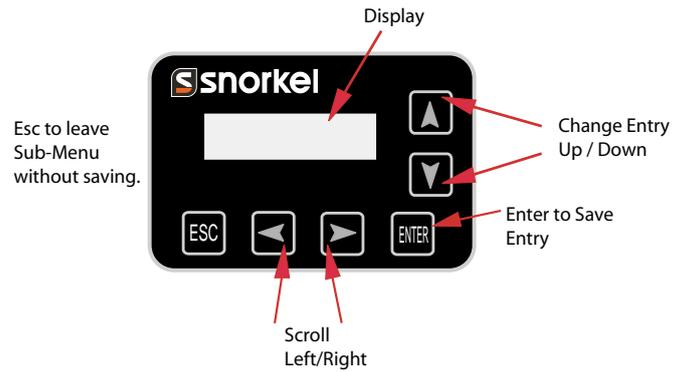
NOTES:

REPLACING THE GP400 CONTROL MODULE

If for any reason you have to replace the GP400 control module it is important that you complete the following procedures:

WARNING

If the GP400 control module is replaced and/or moved within the machine for any reason the tilt sensor must be reset for zero° using the following procedure.
Failure to do so could result in serious injury or death.



To follow this procedure you need to switch the Ezcal display in the upper Control box into "calibration mode".

1.	Place the machine on a firm level surface , $\leq 0.25^\circ$
2.	Use a Gauge to confirm that the front and rear of the chassis are level to within $\pm 0.25^\circ$ in both directions.
3.	Switch the machine on and press and hold Esc for 5 Seconds until "Ezlift Menu" is displayed.
4.	Scroll to access level.(Enter)
5.	Enter code 2222 for access level 2 .(Enter)
6.	Scroll to setups.(Enter)
7.	Scroll to tilt setups.(Enter)
8.	Calibrate level. (Enter)
9.	Enter for yes.

To confirm calibration has worked switch the machine of then back on again.

10.	Scroll to Diagnostics. (Enter)
11.	System. (Enter)
12.	Scroll to tilt, both readings should be below 0.2° if not repe at from 5.

Now re-calibrate the load cell:-

17.	Scroll to setups. (Enter)
18.	Scroll to load setups. (Enter)
19.	Scroll to Calibrate load (Enter)
20.	Redo Loaded? Press up arrow for yes, place SWL in basket and press enter twice.
21.	Redo empty? Press up arrow for yes, remove load from platform and press enter twice.
22.	Use arrow to enter calabration date and press Enter.
23.	Place 120% of SWL in the platform and verify that the lift function cuts out automatically when raised off the boom switch.

Troubleshooting

GP400 I/O allocations		AB 38	
Pin #	Description	A38 Allocation	Comments
P1-1	CANH		
P1-2	CANL		
P1-3	GND		
P2-1	CANH		
P2-2	CANL		
P2-3	GND		
P4-4	High side PWM output	Lighting package	Option
P4-6	High side 2A output	Horn	
P4-12	Safe High side output	48V protected See Note 1 Line contactor	
P4-13	Safe High side output	Brake unlock	V1 & V2; both powered when driving
P4-14	Safe High side output	Brake unlock	
P5-6	High side 2A output	Overload lamp	
P5-13	B+ protected Supply	(PTC 140mA) Elev switch supply	
P6-1	High side 2A output	Lower Boom up	V8
P6-2	High side 2A output	Lower Boom down	
P6-3	High side 2A output	Upper boom up	V7
P6-4	High side 2A output	Upper boom down	
P6-5	High side 2A output	Tele out	V6
P6-6	High side 2A output	Tele in	
P6-7	High side 2A output	Steer left	V5
P6-8	High side 2A output	Steer right	
P6-9	High side 2A output	Turntable CW	V4
P6-10	High side 2A output	Turntable CCW	
P6-11	High side 2A output	Basket level up	V9; basket leveling only operates when the booms are fully stowed, elevation sw. closed (B+)
P6-12	High side 2A output	Basket level down	
P6-13	High side 2A output	Basket Rotate	V10
P6-14	High side 2A output	Basket Rotate	
P6-15	High side 2A output	Buzzer	
P7-1	B+ Digital Input	Valve supply	from P600
P7-2	B+ Digital Input	Valve & Logic supply (ground mode)	Key sw grnd mode also to P600
P7-3	B+ Digital Input		Elevation sw. Pole 1
P7-4	B+ Digital Input	Logic supply (platform mode)	Key sw platform mode also to P600
P7-5	B+ Digital Input		Lower boom sw.
P7-6	B+ Digital Input		Upper boom sw.
P7-7	B+ Digital Input		Tele sw.
P7-8	B+ Digital Input		Turntable sw.
P7-9	B+ Digital Input		Elevation sw. Pole 2
P7-12	B+ Digital Input		Emergency power Option
P8-1	Analog Input		gnd finger joystick o/p Ground control; direction and proportional control of gnd control selected function Std 0.5V/2.5V/4.5V
P8-13	GND		gnd finger joystick
P8-15	GND		
P15-1	B+ Digital Input		Basket Rotate
P15-2	B+ Digital Input		Basket Level Ground control; enable function, direction and proportional control from gnd fingerjoystick (P8-1), need to hold while function

6.0 Introduction

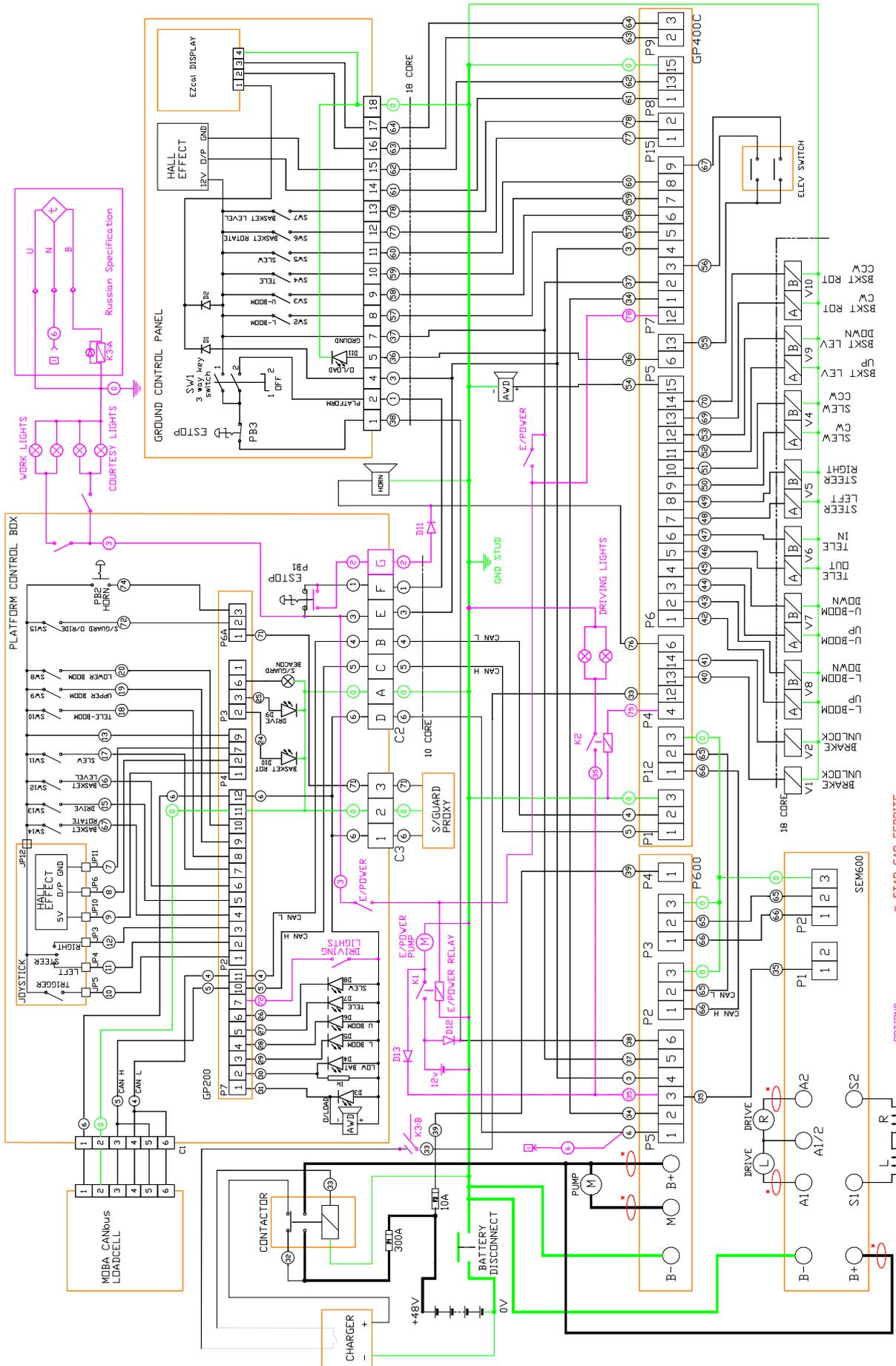
This section contains electrical and hydraulic power schematics and associated information for maintenance purposes.

A38E CE/ANSI Electric Kit Parts.

DESCRIPTION	PART NUMBER	QTY.
PLATFORM CONTROL BOX	515039-000	1
A38E UCB ENCLOSURE	515040-000	1
BEACON BLUE FLASHING	514404-001	1
GP200 ECU 21 200 301	515049-000	1
14 WAY CONNECTOR DEUTSCH HD3	3049862	1
LOCKWASHER DEUTSCH 114021	514604-000	1
LOCKNUT DEUTSCH 114020-90	514605-000	1
ALARM, ECCO BEEPING 6-28VDC	502588-000	1
SW TGL SPDT ON - (ON)	3020080	8
LED GREEN 12V	512935-000	6
LED RED 12V	512934-000	2
SW PUSH/PULL RELEASE E/STOP	3028810	1
PUSHBUTTON; SCHNEIDER XB2BA21	510542-000	1
M5 WASHER - GRADE 8	056069-005	2
M4 FLAT WASHER - GRADE 8	056069-004	8
M4 NYLOCK NUT - 8	056066-004	8
M4 x 25 SHCS - 12.9	058500-025	8
OVERLAY	515086-002	1
JOYSTICK - OEM, HJS7M18718	3028933	1
Proxy Sensor IFS241 (IFM)	3028844	1
8 WAY CONNECTOR, DEUTSCH DT04	514627-000	1
WEDGE, DEUTSCH W8P	514629-000	1
M5 x 16 S.H.C.S. - GR 12.9	058501-016	2
CRIMP PIN DEUTSCH 0460-202-1614	100338-013	13
3WAY PANEL PLUG	510155-000	1
12WAY PANEL PLUG	510157-000	2
9WAY PANEL PLUG	510156-000	1
6WAY PANEL PLUG	510154-000	1
Mate-N-Lock SCKT CONTACT	509755-000	32
GROUND COUNTRONL PANEL	515044-000	1
A36E LCB ENCLOSURE	515045-000	1
SW PUSH/PULL RELEASE E/STOP	3028810	1
3 POS'N KEY SWITCH - STAYPUT	512543-000	1
SW TGL SPDT ON - (ON)	3020080	6
THUMB CONTROL UNIT	514131-000	1
EZcal DISPLAY	3087803	1
LED RED 12V	512934-000	1
20PIN PANEL MOUNT RECEPTACLE	3220275	1
LOCKNUT DEUTSCH 114020-90	514605-000	1
LOCKWASHER DEUTSCH 114021	514604-000	1
M5 x 12 HEX. HD. SCREW - 8.8	056057-012	2
M5 WASHER - GRADE 8	056069-005	2
CRIMP PIN DEUTSCH 0460-202-1614	100338-013	16
4 WAY PANEL PLUG	512366-000	1
Mate-N-Lock SCKT CONTACT	509755-000	4
OVERLAY	515087-002	1
DIODE, 3 AMP 600V	514450-001	2

External Components		
12v Solenoid coil	505555-016	14
Alarm	502588-000	1
Alarm bracket	512684-000	1
Fuse 300Amp	067387-022	1
Fuse holder	501877-000	1
Contactor	513550-000	1
GP400c	515532-000	1
SEM600	512942-000	1
P600	512943-000	1
Load Cell	515542-000	1
Load Cell Cable Harness	515522-000	1
Trac on motors	512944-000	2
Eleva on Switch	058864-000	1
Horn	501868-001	1
Ferrite	510437-000	5
Capacitor Assy	514331-000	1
Cable Assemblies		
A38E Wire Harness PG Trionics	515521-000	1
A38E Valve Cable	513540-001	1
A38E Addi onal Cable Kit	513541-000	1
A38E Power Cable Kit	513542-000	1

Electrical Schematics



515610-000 Rev 3
CCT DIAG - A38E CE/ANSI

A38E CE/ANSI Electric Options:**Horn Sound on E/Stop, Emergency Power Desend, Drive Light.****Circuit Diagram: 515490-000**

OPTIONS	DESCRIPTION	PART NUMBER	QTY (PER M/C)
HORN SOUND ON E/STOP	N/O CONTACT BLOCK	510527-000	2
EMERGENCY POWER DESCEND	POWER UNIT	6020058	1
	BATTERY	062299-002	1
	12VOLT CONTACTOR	3040506	1
	12VOLT CHARGER	510870-000	1
	TOGGLE SWITCH	510521-000	2
	DIODE 8AMP	510067-000	2
DRIVE LIGHT KIT	LED OVAL LIGHT ASSY	0260721	2
	PLAC LIGHTS ON/OFF	0181376	1
	CONR 2 PIN DEUTSCH RECEP	3049804	6
	PIN CONTACT	3040314	16
	LED RED LIGHT STOP/TAIL	3069533	2
	RELAY SPDT	3040469	1
	CONR 2 PIN DEUTSCH PLUG	3049803	6
	SKT CONTACT	3040342	16
	LOCK WEDGE	3049807	6
	CONR 4 PIN DEUTSCH RECEP	3049889	1
	LOCK WEDGE	3049891	1
	CONR 4 PIN DEUTSCH PLUG	3049888	1
	LOCK WEDGE	509750-000	1
	AMBER LIGHT	512492-000	4
	LED FLASHER RELAY	514780-000	1
	RELAY BASE	514781-000	1
	TOGLE SWITCH SPDT	509472-000	1
	INDICATOR OVERLAY	514778-000	1
DRIVE DE-ACTIVATED ABOVE 8M	ELEVATION SWITCH	058864-000	2

Note : Options displayed in Schematic Diagram as Red.

6.2. Hydraulic Schematics

Table 6-3: Hydraulic Schematic Legend

REFERENCE	NAME	FUNCTION	LOCATION
BRAKE	Brake.	Spring applied - hydraulically released brakes to stop rotation of drive wheels. (Set at 100 Bar).	On front end of wheel drive motors on chassis.
CLRV	Cross-line relief valve.	To limit the max. operating pressure of the slew motor. (Set at 50 Bar).	On main manifold block.
CV	Check Valve.	To prevent oil pressure in the brake line from being lost through the main pressure line.	On main manifold block.
CYL1	Lower boom lift cylinder.	Provides the force to lift the lower boom - Boom1.	Forward of first post
CYL2	Upper boom lift cylinder.	Provide the force to lift the upper boom - Boom2.	Behind second post
CYL3	Telescopic cylinder.	Provides the force to push/pull the tele-boom - Boom3.	Inside Boom2 & Tele boom.
CYL4	Steering cylinder.	Provides the force to push/pull the steering torque arms.	Inside front of chassis.
CYL5	Master levelling cylinder.	Provides the pressure to the slave cylinder for cage levelling.	Behind the second post
CYL6	Slave levelling cylinder.	Provides the force to level the cage up/down.	Close to cage pivot at inner Tele boom.
CYL7	Hydraulic Platform Rotate Cylinder.	Provides the force to rotate the platform clockwise/anticlockwise.	Under Platform Assy.
FL1	Return line filter. (10 Micron)	Continuously filters hydraulic return oil.	On top of the hydraulic reservoir.
HP	Handpump.	Used for retraction of tele boom in the case of power failure. Delivers 15cc/stroke.	On side of manifold block.
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 hydraulic reservoir in chassis.
MOT1	Slew Motor.	Drives slew bearings drive pinion.	Connected to drive pinion.
MP	Motor/Pump set.	Gear pump close coupled to D.C electric motor. Provides pressurised oil flow for all hydraulic functions.	On chassis.
V1	Brake oil supply valve.	This valve is energised to allow oil into the brake release chamber.	On main manifold block
V2	Brake valve.	When energised this valve prevents the pressurised brake oil from venting back to tank. When the machine is stationary this valve de-energises and the brake oil vents to tank and the brake springs apply themselves and keep the machine stationary.	On main manifold block.
V3	Pressure reduction valve.	Prevents pressures in excess of 100 Bar entering the brake chambers.	On main manifold block.
V4	Slew Directional Control Valve.	Send oil to the left or right side of the slew motor.	On main manifold block.

REFERENCE	NAME	FUNCTION	LOCATION
V5	Steer Directional Control Valve.	Send oil to the annular or full-bore side of the steering cylinder.	On main manifold block.
V6	Tele Directional Control Valve.	Send oil to the annular or full-bore side of the telescopic cylinder.	On main manifold block.
V7	Boom2 Directional Control Valve.	Send oil to the annular or full-bore side of the Boom2 cylinder.	On main manifold block.
V8	Boom1 Directional Control Valve.	Send oil to the annular or full-bore side of the Boom1 cylinder.	On main manifold block.
V9	Levelling Directional Control Valve.	Send oil to the annular or full-bore side of the levelling cylinders.	On main manifold block.
V10 (RV)	Main relief valve.	Sets max system pressure to 175 Bar	On main manifold block.
V11	Single Overcentre valve.	Prevents back flow and provides a hydraulic lock on the cylinder.	On base of upper, lower & tele cylinders.
V12	Emergency lowering valve.	Allows upper and lower boom to be manually lowered.	On base of upper and lower cylinders.
V13	Pilot operated check valve.	Holds tele cylinder in position after controls are released	On base of tele cylinder.
V14	Dual Overcentre valve.	Holds pressure in master/slave closed circuit and provides hose burst protection. (Set 160 Bar).	On base of master cylinder.
V15	Dual Overcentre valve.	Holds pressure in slave cylinder and provides hose burst protection. (Set 120 Bar).	On base of slave cylinder.
V16	Directional Control Valve.	Send oil to the annular or full-bore side of the platform rotate cylinder.	On main manifold block.

Notes:

- All of the Overcentre Valves represented within this schematic have a 5:1 Pilot Ratio.
- The P/O Check Valve represented has a 3:1 Pilot Ratio.
- The maximum flow rate of the Pump/Motor Unit is limited to 15 L/min @ 100% speed. Although it should be noted that the actual flow rate will depend on the applied load and the D.C. Motor speed.
- The maximum 'Return' flow rates for each of the functions are restricted to the following values;
 - Slew... 4 L/min
 - Boom1... 8 L/min
 - Boom2... 5 L/min
 - Tele... 5 L/min
 - Steering... 6 L/min.

A	REAR & FRONT WHEEL KIT (NON MARKING) .	2-9
A38E LOWER CONTROL BOX ASSEMBLY	SCHEMATIC	7-1
(CE/ASSY) (Harnesses are not part of this	SLEW MOTOR, WORM DRIVE UNIT & SLEW	
assembly)	BEARING ASSEMBLY	2-10
4-1	STEERING CYLINDER ASSEMBLY	3-6
A38E_MAINTENANCE	TELESCOPIC CYLINDER ASSEMBLY	3-5
6-1	TRACTION MOTOR ASSEMBLY -- SERIAL BREAK:	
ADDITIONAL OPTIONS, A38E	(SN:006001 - 006204 / 006800 - Current)	2-8
5-3	TROUBLESHOOTING	6-2
BOOMS & POSTS ASSEMBLY	UPPER CONTROL BOX ASSEMBLY ANSI/CE	
2-4	(Hydraulic Platform Rotate)	4-2
CABLES & ELECTRICAL COMPONENT	UPPER LIFT CYLINDER ASSEMBLY	3-4
LEGEND	WHEEL HUB ASSEMBLY	2-6
4-3		
CAGE HYDRAULIC ROTATOR ASSEMBLY .		
2-5		
CHASSIS ASSEMBLY A38E		
2-2		
CONTACT SNORKEL		
2-13		
DECAL KIT ENGLISH (ANSI)		
2-11		
DECAL KIT INTERNATIONAL (CE)		
2-12		
DRIVE REDUCTION GEARBOX ASSEMBLY		
2-7		
FINAL ASSEMBLY		
2-1		
FRONT_PAGE_A38E_AUG2018		
1-1		
HOSE KIT		
3-1		
HOSE KIT ADDITIONAL		
3-2		
INTRODUCTION & SPECIFICATION		
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LOWER LIFT CYLINDER		
3-3		
MACHINE PREPARATION		
1-3		
MANIFOLD BLOCK ASSEMBLY (Hydraulic		
Platform Rotate)		
3-10		
MASTER/SLAVE CYLINDER ASSEMBLY .		
3-		
7		
MOTOR/PUMP ASSEMBLY		
3-9		
OPTION LIST		
5-1		
OPTION SNORKEL GUARD		
5-2		
PG PART ASSEMBLY, A38E		
2-3		
PLATFORM ROTATE CYLINDER		
ASSEMBLY		
3-8		

B		057424-001	2-11
0070540	2-11, 2-12, 2-12, 2-12, 2-12, 2-12	057429-000	2-11
0070541	2-11, 2-12, 2-12, 2-12, 2-12, 2-12	057430-002	2-11, 2-12, 2-12, 2-12, 2-12, 2-12
0070921	2-11	057434-001	2-11
010076-001	2-11	057507-024	2-12
010076-901	2-12, 2-12, 2-12, 2-12, 2-12	057507-025	2-12
0150606	2-11	057532-000	2-2
0163373	3-10	057534-000	2-2
0181562-27522	2-11	057578-000	2-2, 2-9
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0260852	5-2	057582-000	2-6
0260857	2-5, 5-2	057583-000	2-6
056021-006	2-2	057584-000	2-6
056021-010	2-4	057585-000	2-6
056021-012	2-10	057661-000	2-6
056057-012	4-1	057662-000	2-6
056058-016	2-5	057663-000	2-6
056060-016	2-4	057664-000	2-6
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056066-004	4-2	057666-000	2-9
056066-008	2-5	057669-000	2-2, 2-6
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057054-000	2-4	058065-006	2-4
057121-000	3-5	058066-001	2-4, 2-4
057382-000	2-11	058066-007	2-4

058074-000 2-2	066555-000 2-11
058181-002 2-12	067387-022 2-3
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058413-000 2-4	100338-013 4-1, 4-2
058416-000 2-4	11492-1 2-5, 2-5
058417-000 2-4	12-3149 3-10
058427-000 2-2	12330 2-1, 2-5, 3-8
058457-002 2-4	12330K 3-8
058461-000 2-1, 2-4, 3-5	12468-22 2-5
058463-000 2-1, 2-2, 3-6	12567-4 3-10
058491-010 2-4	13-0176 2-5
058491-016 2-5	13520-13 2-5
058491-050 2-5	238396 2-2
058494-035 2-2	260838 2-5
058500-025 4-2	260839 2-5
058501-016 4-2	260852 2-5
058510-016 2-4	300699 2-11
058510-025 2-4	301403 5-2
058531-000 2-11	3020061 2-2
058531-200 2-12, 2-12, 2-12, 2-12, 2-12	3020080 4-1, 4-2
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058538-000 2-11	3028933 4-2
058557-000 2-5	3040269 2-2
058660-000 2-11	3049862 4-2
058714-000 3-5	3050134 2-2
058728-000 3-4, 3-5, 3-7	3069521 2-2
058734-000 2-1, 2-4, 3-7	3087803 4-1
058735-000 2-1, 2-4, 3-7	3220275 4-1
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