

Snorkel

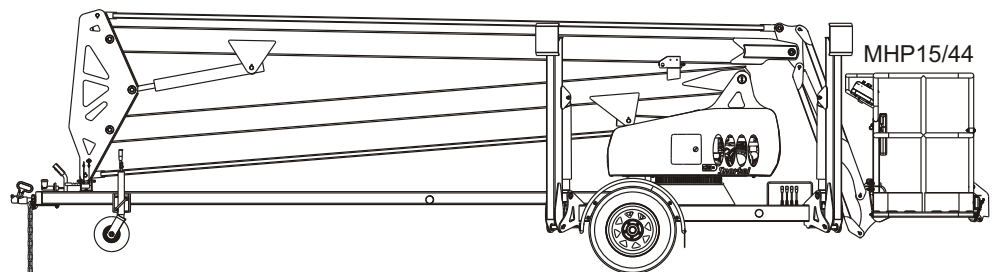
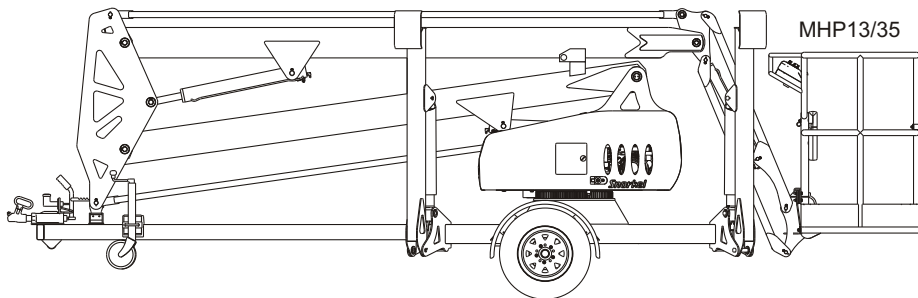
Maintenance and Repair Parts Manual

MHP 13/35

MHP 15/44

Mark II

**Engine Powered
Gasoline/Diesel
Battery Electric**



LIMITED WARRANTY

Snorkel warrants each new machine manufactured and sold by it to be free from defects in material and workmanship for a period of one (1) year from date of delivery to a Customer or for one year after the machine has been placed in first service in a Dealer rental fleet, whichever comes first. Any part or parts which, upon examination by the Snorkel Service Department, are found to be defective, will be replaced or repaired, at the sole discretion of Snorkel, through its local Authorized Dealer at no charge.

Snorkel further warrants the structural components; specifically, the mainframe chassis, turntable, booms and scissor arms, of each new machine manufactured by it to be free from defects in material and workmanship for an additional period of four (4) years. Any such part or parts which, upon examination by the Snorkel Service Department, are found to be defective will be replaced or repaired by Snorkel through its local Authorized Dealer at no charge; however, any labor charges incurred as a result of such replacement or repair will be the responsibility of the Customer or Dealer.

The Snorkel Service Department must be notified within forty-eight (48) hours of any possible warranty situation during the applicable warranty period. Personnel performing warranty repair or replacement must obtain specific approval by Snorkel Service Department prior to performing any warranty repair or replacement.

Customer and Dealer shall not be entitled to the benefits of this warranty and Snorkel shall have no obligations hereunder unless the "Pre-Delivery and Inspection Report" has been properly completed and returned to the Snorkel Service Department within ten (10) days after delivery of the Snorkel product to Customer or Dealer's rental fleet. Snorkel must be notified, in writing, within ten (10) days, of any machine sold to a Customer from a Dealer's rental fleet during the warranty period.

At the direction of the Snorkel Service Department, any component part(s) of Snorkel products to be replaced or repaired under this warranty program must be returned freight prepaid to the Snorkel Service Department for inspection. All warranty replacement parts will be shipped freight prepaid (standard ground) from the Snorkel Service Department or from Snorkel's Vendor to Dealer or Customer.

REPLACEMENT PARTS WARRANTY

Any replacement or service part made or sold by Snorkel is not subject to the preceding **Limited Warranty** beyond the normal warranty period of the machine upon which the part was installed.

THIS WARRANTY EXCLUDES AND SNORKEL DOES NOT WARRANT:

1. Engines, motors, tires and batteries which are manufactured by suppliers to Snorkel, who furnish their own warranty. Snorkel will, however, to the extent permitted, pass through any such warranty protection to the Customer or Dealer.
2. Any Snorkel product which has been modified or altered outside Snorkel's factory without Snorkel's written approval, if such modification or alteration, in the sole judgment of Snorkel's Engineering and/or Service Departments, adversely affects the stability, reliability or service life of the Snorkel product or any component thereof.
3. Any Snorkel product which has been subject to misuse, improper maintenance or accident. "Misuse" includes but is not limited to operation beyond the factory-rated load capacity and speeds. "Improper maintenance" includes but is not limited to failure to follow the recommendations contained in the Snorkel Operation, Maintenance, Repair Parts Manuals. Snorkel is not responsible for normal maintenance, service adjustments and replacements, including but not limited to hydraulic fluid, filters and lubrication.
4. Normal wear of any Snorkel component part(s). Normal wear of component parts may vary with the type application or type of environment in which the machine may be used; such as, but not limited to sandblasting applications.
5. Any Snorkel product that has come in direct contact with any chemical or abrasive material.
6. Incidental or consequential expenses, losses, or damages related to any part or equipment failure, including but not limited to freight cost to transport the machine to a repair facility, downtime of the machine, lost time for workers, lost orders, lost rental revenue, lost profits or increased cost.

This warranty is expressly in lieu of all other warranties, representations or liabilities of Snorkel, either expressed or implied, unless otherwise amended in writing by Snorkel's President, Vice President-Engineering, Vice President-Sales or Vice President-Marketing.

SNORKEL MAKES NO WARRANTIES WHICH EXTEND BEYOND THE DESCRIPTION OF THIS LIMITED WARRANTY. SNORKEL MAKES NO IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE AND DISCLAIMS ALL LIABILITY FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES, INCLUDING BUT NOT LIMITED TO INJURY TO PERSONS OR PROPERTY.

The Customer shall make all warranty claims through its local Authorized Dealer and should contact the Dealer from whom the Snorkel product was purchased for warranty service. Or, if unable to contact the Dealer, contact the Snorkel Service Department for further assistance.

Effective July 1995

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Section A. - General Specifications

The Snorkel MHP13/35 & MHP15/44 Mark II are boom supported elevating work platforms built to conform to these standards, American Standard ANSI A92.2

Australian Standard AS1418-10(Int) Elevating Work Platforms.

■ General Specifications MHP13/35 Mark II

SPECIFICATIONS	MHP13/35 Mark II	
Working height	12.6m	41'
Platform height	10.6m	35'
Rated load	250kg (227kg ANSI)	550lb (500lb ANSI)
Rated load (with rotator)	227kg (200kg ANSI)	500lb (440lb ANSI)
Platform size	1250 x 780 x 1070mm	4.1' x 2.6' x 3.5'
Platform construction	Steel	
Platform levelling	Mechanical	
Boom type	Articulating	
Horizontal reach	5.6m at 6m	18.4' at 19.7'
Maximum wind speed 12.5m/s	45kph	28mph
Turntable rotation	540° non-continuous or 360° continuous	
Power source (std.)	Gasoline engine 5.5hp	
Hydraulic system	Proportional electro/hydraulic	
Stabilisation	4 independently operated hydraulic outriggers with safety interlocks	
Stabiliser footprint (max.)	3.7 x 3.6m	12.1' x 11.8'
Standard colour	Snorkel orange base and covers, white turret and booms	
Transport height	2.05m	6.7'
Overall length	5.99m	19.7'
Overall width - outriggers extended	3.95m	12.1
Overall width - outriggers stowed	1.58m	5.2'
Tyre size (standard)	185 R14	
Brakes	Hydraulic disc	
Maximum towing speed	80kph	50mph
Maximum rated axle capacity	1750kg	3858lb
Weight (standard model)	1200kg	2645lb
Insulation rating	Nil	
Trailer tongue weight (approx)	65kg	143lb

General Specifications

■ General Specifications MHP15/44 Mark II

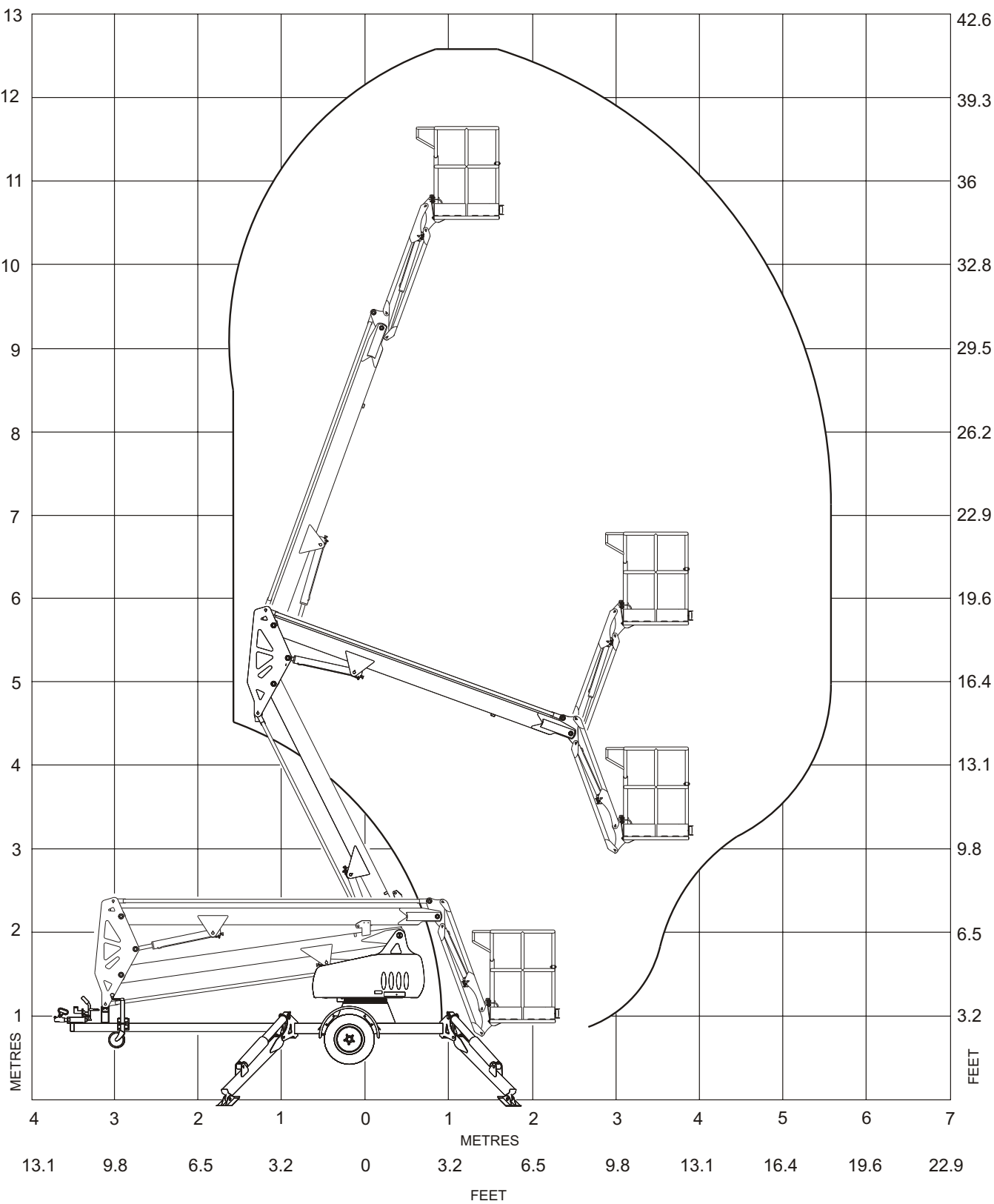
SPECIFICATIONS	MHP15/44 Mark II	
Working height	15.2m	50'
Platform height	13.4m	44'
Rated load	227kg	500lb
Rated load (with rotator)	200kg	440lb
Platform size	1250 x 780 x 1070mm	4.1' x 2.6' x 3.5'
Platform construction	Steel	
Platform levelling	Mechanical	
Boom type	Articulating	
Horizontal reach	6.45m at 8m	21' 1" at 26' 4"
Maximum wind speed 12.5m/s	45kph	28mph
Turntable rotation	540° non-continuous or 360° continuous	
Power source (std.)	Gasoline engine 5.5hp	
Hydraulic system	Proportional electro/hydraulic	
Stabilisation	4 independently operated hydraulic outriggers with safety interlocks	
Stabiliser footprint (max.)	3.7 x 3.6m	12' 1" x 13' 9"
Standard colour	Snorkel orange base and covers, white turret and booms	
Transport height	2.1m	6' 10"
Overall length	7.45m	24' 5"
Overall width - outriggers extended	3.95m	13'
Overall width - outriggers stowed	1.77m	5' 9"
Tyre size	185 R14	
Brakes	Hydraulic disc	
Maximum towing speed	80kph	50mph
Maximum rated axle capacity	1750kg	3858lb
Weight (standard model)	1500kg	3306lb
Insulation rating	Nil	
Trailer tongue weight	90kg	198lb

■ Engine Specifications

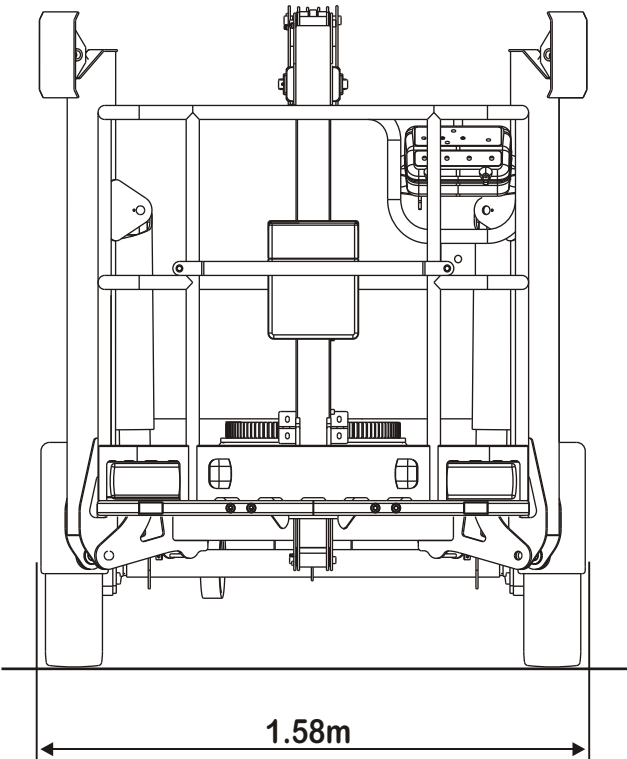
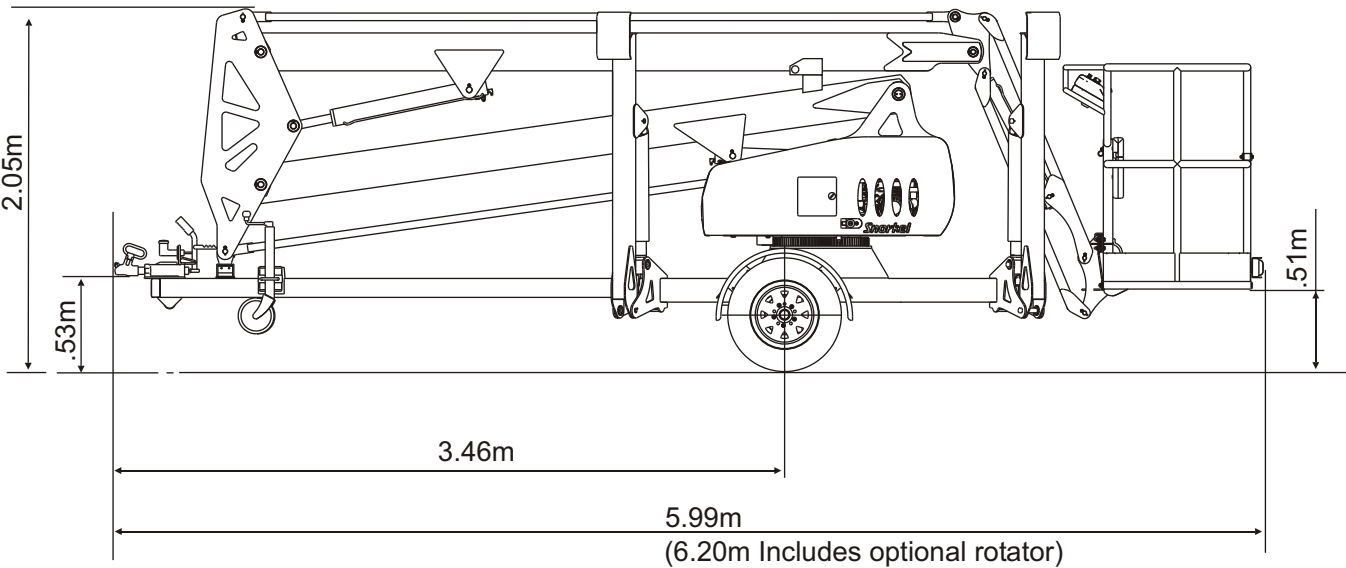
Engine Make	Honda (gasoline)
Model	GX 160
Engine type	4-stroke, over head valve, 1 cylinder
Displacement	163 cm ³ (9.9 cu-in)
Bore x Stroke	68 x 45 mm (2.7 x 1.8 in)
Max. output	4 kW/4,000 rpm
Max. torque	1.1 kg-m (8.0 ft-lb)/ 2500 rpm
Fuel	gasoline
Fuel Grade	automotive gasoline (unleaded or lowleaded preferred)
Fuel consumption	230 g/PSh
Cooling system	Forced air
Ignition system	Transistor magneto
PTO shaft rotation	Counterclockwise
Oil Capacity	0.60 litres (0.60 US qt, 0.53 Imp qt)
Oil Grade	SAE 10W-30

General Specifications

■ Working Envelope MHP13/35 Mark II



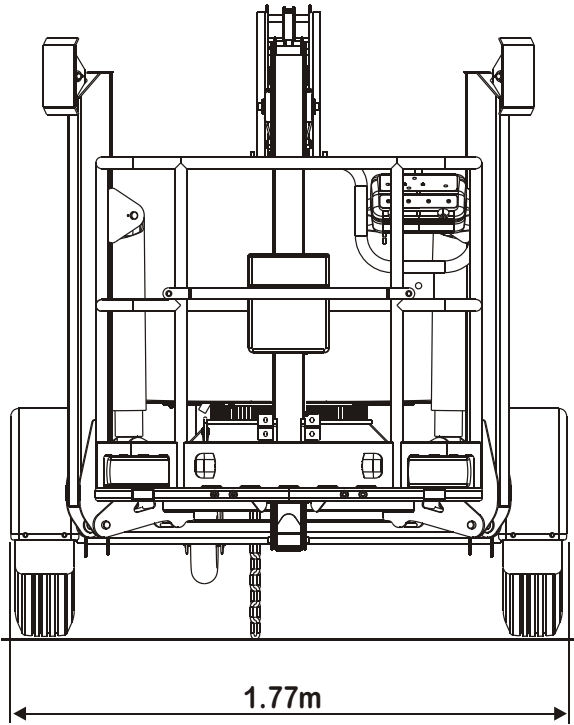
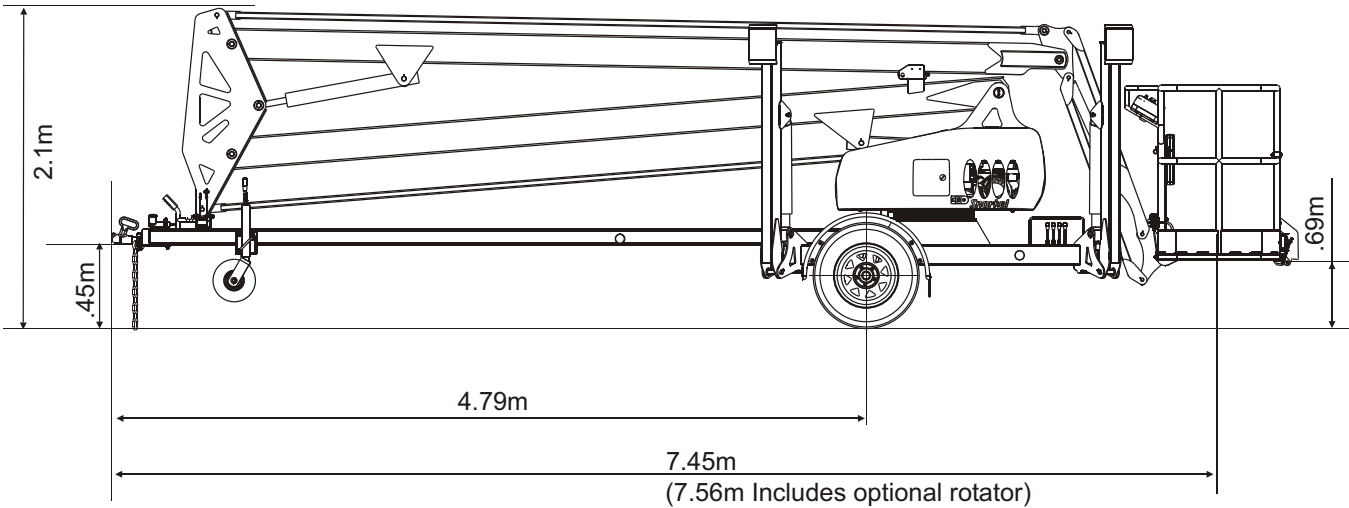
■ Stowed Unit Dimensions MHP13/35 MKII



■ Working Envelope MHP15/44 Mark II



■ Stowed Unit Dimensions MHP15/44 MKII



■ About this Manual:

This Maintenance and Repair Parts manual covers current production machines only.

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.

NOTE:

It is recommended that you record the serial and model number of your machine (see page 19 of this chapter). This information is found on the serial number placard.

■ Manual Organization

The Repair Parts Manual consists of five sections with an individual table of contents preceding sections 1 through 4.

Subassemblies and detailed parts are identified by index numbers on the drawings that correspond to the item numbers on the parts listing. When requesting any part, always specify complete part number, description, model and serial number of your unit.

The following is a general description of each section and its contents.

□ General Specifications

The section immediately preceding, contains information relating to the general specifications of the MHP13/35 & MHP15/44 Mark II.

□ Maintenance

The pages immediately following, contain information as to the maintenance schedules - lubricants and procedures for proper lubrication of the unit.

□ Repair parts and drawings

Repair Parts (Section 1), contains parts listings and drawings for general mechanical repair parts of all major installations and subassemblies of the unit.

□ Hydraulics

(Section 2), contains parts listings and drawings of hydraulic components installations including hydraulic schematics and individual components such as cylinders, controls valves and solenoid operated valves.

□ Electrical

Electrical (Section 3), contains listings and drawings of electrical components installations including wiring schematics.

□ Options

Options (Section 4), contains parts listings and drawings of optional installations that may be installed on your unit.

□ Parts index - Page locator

The parts index - page locator, identifies the component by name and directs you to the section and page number where you may find information for that part such as its part order number, etc.

■ Maintenance and Schematics

□ Maintenance information

The parts drawings located in the repair parts sections, are designed for use as a guide for proper disassembly of the machine and components as well as for parts replacement. Always refer to the hydraulic system installation drawings and the electrical wiring diagram before removing or disassembling associated parts.

▲ CAUTION

Do not attempt to disconnect or remove any hydraulic line before reading and understanding all text concerning the system hydraulics. In most cases, disassembly of the machine will be obvious from the drawing.

▲ CAUTION

DO NOT modify this ariel platform without prior written consent of Snorkel Engineering Department.

Modification may void the warranty, adversely affect stability, or affect the operational characteristics of the ariel platform.

When disassembling or reassembling components, complete the procedural steps 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.

The following list is a gentle reminder when disassembling or assembling the machine.

✓ Always be conscious of weight.

Maintenance Information

- ✓ Never attempt to lift heavy objects without the aid of a mechanical device.
- ✓ Do not allow heavy objects to rest in an unstable condition.
- ✓ Always make sure work platform is in stowed position - blocked or the weight removed by a suitable lifting device before disconnecting the hydraulic hose from the motor/pump unit to the lift cylinder.
- ✓ When raising a portion of the machine, be sure that adequate blocking is properly positioned - Do not depend on 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 machined surfaces by honing or polishing with #600 crocus cloth, followed by a thorough cleaning in 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 manifold installations. Replace any part having imperfect threads. In general, units that have been disassembled can be reassembled by reversing the order of disassembly.

Remember that the service life of a machine can be increased by keeping dirt and foreign materials out of the vital components. Precautions have been taken to safeguard against this; shields, covers, seals and filters are provided to keep air and oil supplies clean; however, these items must be maintained on a scheduled basis in order to function properly.

At any time air or oil lines are disconnected, clean surrounding areas as well as the opening and fittings themselves. 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 unit. This will assure that they are correctly reinstalled.

Proper assembly is critical to the successful rebuilding of any unit. 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.

■ Maintenance schedules

Snorkel has established a Preventive Maintenance Schedule that includes:

- ✓ Daily Maintenance (Operator's Inspection)
- ✓ 90 Day or 150 Hour (frequent) Maintenance
- ✓ Yearly or 500 Hour (annual) Maintenance,

These schedules should ensure the detection of any defective, damaged or improperly secured parts and provide information regarding lubrication and other minor maintenance items.

The Maintenance Schedule following, outlines the requirements of these maintenance checks for each time interval. The Operator's Pre-operational inspection must be performed by a trained operator. All other maintenance and inspections must be performed by a trained service technician only.

Note that the 90 Day or 150 hour (frequent) and yearly or 500 hour (annual) Maintenance, require use of the Preventive Inspection Maintenance Checklist to pinpoint all inspection items. Retain a copy of these forms for your records.

They also require that all placards and decals on the unit are to be inspected.

All placards and decals must be in place and legible. Use the placards installation drawing and parts listing in the repair parts section 1 of this manual to check these placards and decals.

Snorkel recommends that you make additional copies of the Preventive Inspection Maintenance Checklist forms for your use in performing these

▲ DANGER

Failure to perform the Preventive Maintenance at the intervals outlined in the Maintenance Schedule may result in a unit being operated with a defect that could result in INJURY or DEATH of the unit operator. DO NOT allow a unit to be operated that has been found to be defective.

Repair all defects before returning the unit to service.

■ Daily Maintenance

□ Pre-operational Inspection

Components	Service Required
Engine fuel level	Check fuel tank level (full)
Fuel tank cap	Visually inspect (installation, tightness)
Engine oil level	Check oil level (between dipstick lines)
Fuel leaks	Visually inspect (hoses, connections, etc.)
Wiring harnesses	Visually inspect (installation, condition)
Battery terminals	Visually inspect (no corrosion)
Battery fluid level	Check fluid level (1/4" or 6 mm below filler neck)
Hydraulic oil	Check fluid level (between lines on tank)
Hydraulic oil leaks	Visually inspect (hoses, tubes)
Tires and wheels	Visually inspect (condition)
Bolts and fasteners	Visually inspect (looseness)
Structural damage and welds	Visually inspect (weld cracks, dents)
Lanyard anchor points	Visually inspect (condition)
Platform gate	Visually inspect (operation)
Platform guardrails	Visually inspect (condition)
Air filter	Check condition
Control switches	Actuate and inspect (operation)
Emergency lower	Check operation (causes correct motion)
Placards and decals	Visually inspect (installation, condition)
Optional items	Check operation
Pins and pin keepers	Visually inspect (installation, condition)

■ Hydraulic Hose Age

Hoses used in Snorkel production units are manufactured by Hydraulink, Parker and Eaton and have a code stamped on them that offers the following information.

Hydraulink Sample Hose Code **2-2005 lot 050519/10**

Month of Manufacture — **2** — **2005** — **lot 050519/10** — Lot number
 Year of Manufacture

Parker Sample Hose Code **11-4Q 99**

Manufacturing Plant Number — **11** — **4Q** — **99** — Year of Manufacture
 Manufacturing Period (i.e. 4th Quarter)

Eaton Sample Hose Code **2Q 06**

Manufacturing Period (i.e. 2nd Quarter) — **2Q** — **06** — Year of Manufacture

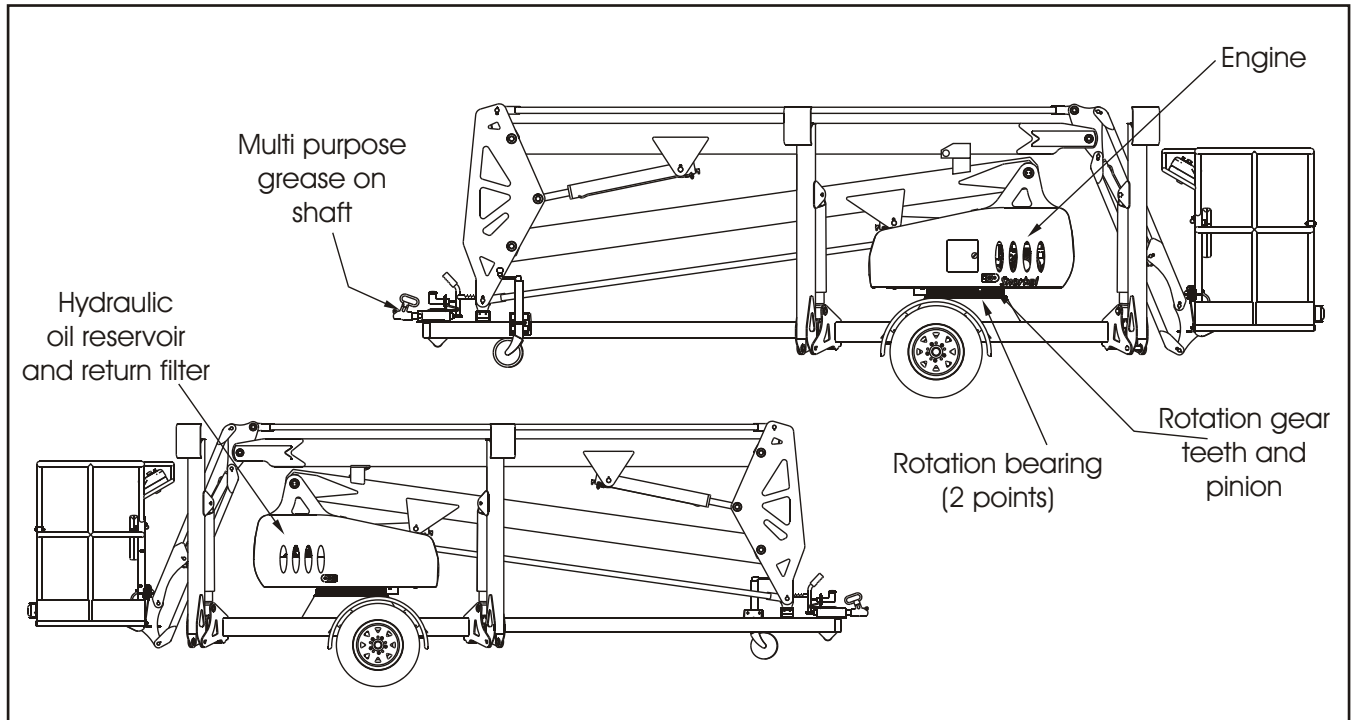
Maintenance Information

■ 90 Day or 150 Hour Maintenance (Trained Service Technician)

Components	Service Required	Recommended Lubricant or Further Instructions
Daily maintenance	Perform maintenance as per schedule	
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)	Replace any missing or unreadable decals/placards
Rotation bearing	Lubricate	Conoco Super Sta #2 Above 32° Mobilgrease CM-P Below 32° Mobilgrease CM-L
Rotation bearing teeth & pinion	Lubricate	Conoco Super Sta #2 Above 32° Mobilgrease CM-P Below 32° Mobilgrease CM-L
Platform rotator	Check smooth operation	Repair or replace if not working properly
Platform controller	Check smooth operation & speeds	
Battery	Check specific gravity	1.260/1.275 at 27° C.
Hydraulic return filter	Check condition	Replace if dirty
Engine RPM	Check for proper engine RPM (2500)	See engine manufactures owner's manual
Engine oil	Replace per engine owners manual	

■ Yearly or 500 Hour Maintenance (Trained Service Technician)

Components	Service Required	Recommended Lubricant or Further Instructions
90 day or 150 hour maintenance	Perform maintenance per schedule	
Hydraulic oil reservoir	Clean and replace fluid	Shell Tellus 32 or similar
Hydraulic return filter	Replace	After 1st. 50 hours, thereafter at recommended interval
Hydraulic pressures	Check pressures	



This drawing locates the lubrication points of the MHP13/35 and MHP15/44 Mark II.

■ Lubricants

To obtain maximum life of any industrial equipment, a well planned maintenance programme should be followed. The information provided on these and preceding pages is intended to provide guidelines for proper lubrication, however, some operating conditions will require more frequent checks and lubrication than listed - for example applications with much dust or moisture will require modification of the schedule to fit that particular application.

The use of high grade lubricants and fluids should be encouraged. Sources of these lubricants may be from almost any of the oil companies. Those listed are typical and any lubricant with equal specifications may be used. However if in doubt regarding the use of lubricants other than those listed, contact Snorkel.

□ Pressure gun application

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

□ Rotation bearing

Rotation bearing. Pressure gun lubricate bearing at recommended interval using lubricant as outlined in the maintenance schedule. Rotate while lubricating. Lubrication fitting is located on the front plate of the turntable.

□ Rotation gear teeth and pinion

Rotation gear teeth and pinion. Gear teeth and gear box pinion should be lubricated with a multi purpose grease.

□ Engines

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

□ Hydraulic oil reservoir

Hydraulic oil reservoir. The fluid level should be kept between the low and full marks on the sight gauge indicator and should be checked with all cylinders fully retracted and the platform in stowed position.

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

Maintenance Information

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

▲ CAUTION

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 for further information.

❑ Return filter

Return filter. On MHP13/35 & MHP15/44 Mark II models, the hydraulic oil return filter is mounted in hydraulic oil reservoir.

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 90 day or 150 hour Preventive Inspection Maintenance interval or more frequently under extreme working conditions.

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

❑ Filling hydraulic system

This procedure must be followed when starting up a new machine or after any major service affecting the hydraulic system when a considerable volume of oil may have been drained from the system.

▲ IMPORTANT

It is most important that the machine is not operated unless the lower boom cylinder is completely filled with oil.

It is also advisable to follow this procedure if there is any doubt about the condition of the machine, i.e. if it has been standing idle for more than a week, or as a safeguard, when a new operator is taking charge of the machine.

NOTE - Air in Oil

If a cylinder is empty, filling it will cause the level in the reservoir to fall and may result in air being discharged from the cylinder into the tank.

In this event, when the cylinder is fully extended the engine should be stopped to allow the air to separate from the oil (about five minutes is

sufficient) and the oil topped up again before restarting the engine.

1. Fill the reservoir with the recommended hydraulic oil. Leave the filler cap off so that any drop in the oil can be seen.
2. Lower the stabiliser legs to the operating position.
3. Raise the lower boom halfway.
4. Lower the lower boom and raise the hydraulic legs.
5. Check the oil level as in ①.
6. Lower stabiliser legs to operating position.
7. Raise the lower boom fully then raise the upper boom fully.
8. Rotate the turntable through 360°.
9. Lower all booms and raise the hydraulic legs.
10. Check the oil level as in ①.

The machine's hydraulic system is now correctly filled.

NOTE - Oil Seals:

It is best to leave oil seals undisturbed if the machine is operating satisfactorily. If replacement of seals is necessary, extreme care must be taken not to damage the surface of the seals, cylinder bore or the chrome plated piston shaft.

- Absolute cleanliness is essential.

▲ CAUTION

At all times when a cylinder is stripped down make sure that the cylinder bore and the piston rod are not damaged in any way. Particular care is necessary that the cylinder head nut is not allowed to drop off the head and damage the chromium plated shaft.

If questions still remain, contact Snorkel for further information.

■ Battery

Battery. The battery will have longer life if the water level is maintained and it is kept charged. The unit will have better starting characteristics with a fully charged battery.

In cold weather the battery should be maintained at full charge to keep from freezing. An extremely low or dead battery can freeze in cold weather. Make sure connections are clean and tight.

Make sure charging equipment is operating properly.

▲ DANGER

Lead-acid batteries 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.

Lead-acid batteries produce flammable and explosive gases. NEVER allow smoking, flames or sparks around batteries.

■ Preventive inspection maintenance 90 day or 150 hour checklist

Serial Number

Check	OK	✓	X
Chassis			
Structural (1)			
Tires (5)			
Tire pressure (5)			
Hydraulic tubes and hoses (3,5)			
Decals and placards (2,8)			
Wheel nuts (6) Torque 50 lbft 68NM			
Battery disconnect switch (4)			
Lubrication points			
Pins, pin keepers (2)			
Turntable			
Structural (1)			
Swivel mount assembly (2,3)			
Hydraulic tubes and hoses (3,5)			
Cowling (5,6)			
Wire harness (2,5)			
System pressure (Max 2500 psi)			
Lubrication points			
Emergency bleed down valve (4,3)			
Engine (2,4)			
Engine charging system (4)			
Engine air filter (5)			
Engine oil level (5)			
Hydraulic pump (4)			
Engine oil (5)			
Electric choke (4)			
Hydraulic oil reservoir (2,3,5)			
Hydraulic oil reservoir filler/breather cap (2,6)			
Hydraulic oil reservoir fluid level (5)			
Hydraulic oil return filter (3,4)			
Pins, pin keepers (2)			
Lower Booms			
Structural (1)			
Boom lift cylinder pin caps (2,6)			
Boom lift cylinder and holding valve (3,4)			
Jib cylinder pin (3,4)			
Hydraulic tubes and hoses (3,5)			
Electrical Wires (5,2)			
Upper Booms			
Structural (1)			
Electrical wires (5)			
Jib cylinder pin caps (2,6)			
Jib cylinder and holding valve (3,4)			
Hydraulic hoses and tubes (3,5)			

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

All items have been properly checked and tested and found to be operating satisfactory or necessary corrective action has been completed.

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Maintenance Information

■ Torque chart

NOM SIZE X PITCH	TENSILE STRESS AREA A _s (mm ²)	PROPERTY CLASS 8.8			PROPERTY CLASS 10.9		
		CLAMP LOAD W (N)	TORQUE (N.m)		CLAMP LOAD W (N)	TORQUE (N.m)	
			DRY k=0.20	LUBED k=0.15		DRY k=0.20	LUBED k=0.15
M3 x 0.5	5.03	2 200	1.32	0.99	2 990	1.79	1.34
M3.5 x 0.6	6.78	2 960	2.07	1.55	4 030	2.82	2.11
M4 x 0.7	8.78	3 830	3.07	2.30	5 220	4.17	3.13
M5 x 0.8	14.2	6 200	6.20	4.65	8 430	8.43	6.33
M6 x 1	20.1	8 770	10.5	7.90	11 950	14.3	10.8
M8 x 1.25	36.6	15 975	25.6	19.2	21 750	34.8	26.1
M8 x 1	39.2	17 100	27.4	20.5	23 275	37.3	27.9
M10 x 1.5	58.0	25 325	51	38.0	34 450	69	52
M10 x 1.25	61.2	26 725	53	40.1	36 350	73	55
M12 x 1.75	84.3	36 800	88	66	50 075	120	90
M12 x 1.25	92.1	40 200	96	72	54 700	130	98
M14 x 2	115	50 200	140	105	68 300	190	145
M14 x 1.5	125	54 550	155	115	74 250	210	155
M16 x 2	157	68 525	220	165	93 250	300	225
M16 x 1.5	167	72 900	235	175	99 200	320	240
M20 x 2.5	245	106 950	430	320	145 550	580	435
M20 x 1.5	272	118 750	475	355	161 550	650	485
M24 x 3	353	154 100	740	555	209 700	1 010	755
M24 x 2	384	167 600	805	605	228 100	1 100	820
M27 x 3	459	200 350	1 080	810	272 650	1 470	1 100
M27 x 2	496	216 500	1 170	875	294 600	1 590	1 150
M30 x 3.5	561	244 900	1 470	1 100	333 250	2 000	1 500
M30 x 3	580	253 150	1 520	1 140	344 500	2 070	1 550
M30 x 2	621	271 050	1 630	1 220	368 850	2 210	1 660
M33 x 3.5	694	302 950	2 000	1 500	412 250	2 720	2 040
M33 x 2	761	332 200	2 200	1 640	452 050	2 980	2 240
M36 x 4	817	356 600	2 570	1 930	485 300	3 490	2 620
M36 x 3	865	377 600	2 720	2 040	513 800	3 700	2 780
M39 x 4	976	426 000	3 320	2 490	579 750	4 520	3 390
M39 x 3	1 028	448 700	3 500	2 630	610 650	4 760	3 570
M42 x 4.5	1 121	489 300	4 110	3 080	665 850	5 590	4 200
M42 x 3	1 206	526 400	4 420	3 320	716 350	6 020	4 510
M45 x 4.5	1 306	570 050	5 130	3 850	775 750	6 980	5 240
M45 x 3	1 398	610 250	5 490	4 120	830 400	7 470	5 610
M48 x 5	1 473	642 950	6 170	4 630	874 950	8 400	6 300
M48 x 3	1 604	700 150	6 720	5 040	952 800	9 150	6 860
Grade marking   							

■ To order service or repair parts

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

- ✓ Machine model number
- ✓ Machine serial number
- ✓ Snorkel part number
- ✓ Description of part
- ✓ Quantity of parts required
- ✓ Your purchase order number
- ✓ Address for order to "Ship To"
- ✓ Your desired shipment method

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

Snorkel
36 Bruce Road
P.O. Box 1041
Levin 5510
New Zealand

Phone: +64 06 368-9168
Fax: +64 06 368-9164

Attention: Parts Department

□ Manuals

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

The specific manuals for MHP13/35 & MHP15/44 Mark II are as follows:

- ✓ Operator's Manual
Snorkel part number - 12785A
- ✓ Repair Parts Manual
Snorkel part number - 12785B

□ ANSI and OSHA compliance

All owners and 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/SIA A92.5-1992 Boom-Supported Elevating Work Platforms" is available from Snorkel dealers or from the factory upon request.

Copies are also available from:

Scaffold Industry Association
20335 Ventura Blvd. Suite 310
Woodland Hills, CA 91364-2471 USA

Record machine information here:

Model number*

Serial number*

Date of purchase

Purchased from

Snorkel dealer or distributor

* This information is found on the serial number placard attached to your machine.

■ Stability Testing MHP13/35

□ Introduction

The purpose of this test is to assess if the MHP 1335 meets the requirements of AS 1418-10 2004 Appendix G Stability Calculations. The situation for minimum stability is with the booms at maximum outreach over the drawbar, with the maximum rated load in the platform, a manual force pulling toward the drawbar and maximum wind load acting on the back of the machine.

Since this testing involves taking the machine to the edge of its stability envelope care must be taken to ensure the test is failsafe i.e. the machine can not tip over if it fails the test. To this end the rated load is to be hung from the Test Weight Harness and the test weight is suspended 200mm above the ground during the test. If the machine starts to tip over the test weight will contact the ground, reducing the overturning moment, so that the machine can not continue to tip over.

□ Equipment

- MHP 13/35
- Spirit level
- Rope
- Pulley
- Test weights & harness
- Ratchet tie down

□ Setup and Procedure

The Test Weight harness location is at the rear edge of the platform. The test load for a standard machine is 239kg and the test load for a machine with an optional basket rotator is 217kg.

The manual force is 400N with an additional multiplication factor of 1.1 giving 440N or 44.8kg. The line of action of this force is such that it produces the greatest overturning moment. That is the line of action of the force is perpendicular to a line joining the top rail of the platform to the tipping line (see Figure 1).

The wind load is assumed to act at the centre of area of the elevated components. The Wind Load is 336N at 5.54m above ground. The overturning moment from the wind is used to find an equivalent force along the line of action of the manual force. The calculated force due to wind is 248N or 25.3kg

The load simulating the wind and manual force is therefore 70.1kg.

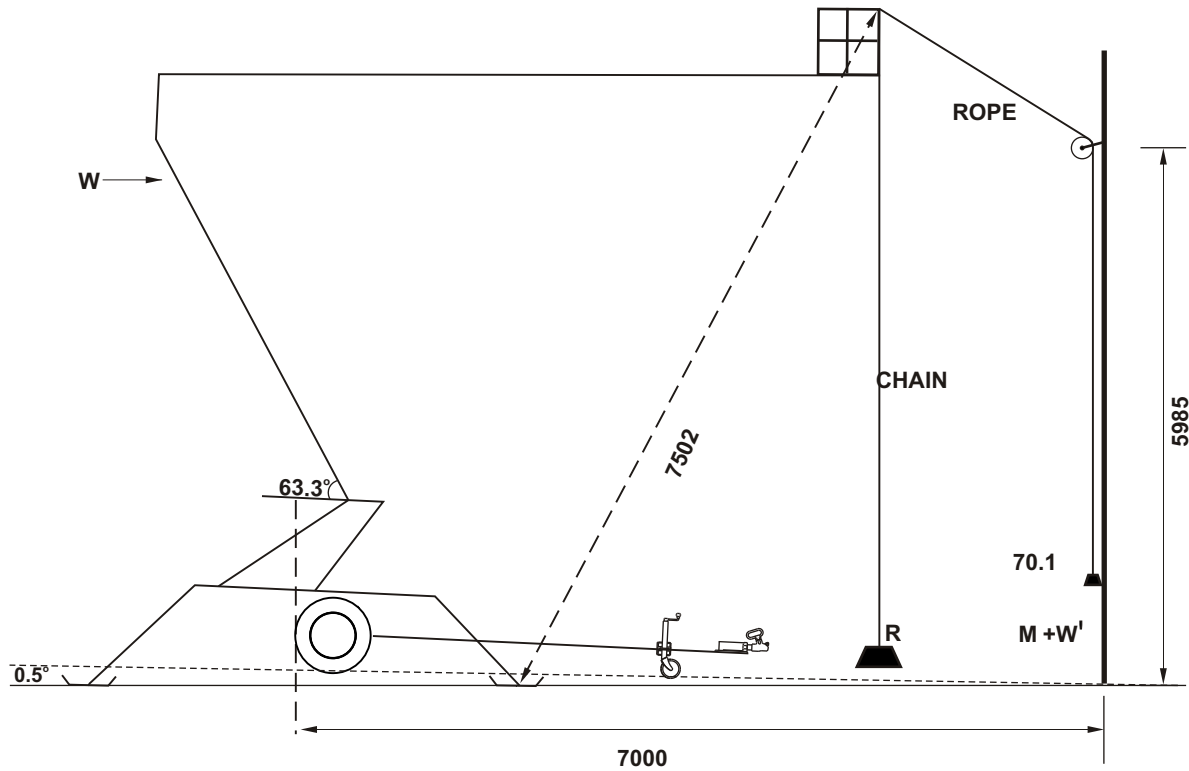
The test procedure is as follows (Refer Figure 1).

1. Set a pulley with rope, 5.985m above the ground on a fixed pole.
2. Place the machine so that the drawbar is pointing towards the fixed pole. The centre of the slew bearing must be 7m from a point directly beneath the pulley.
3. Raise the machine on the stabilisers to maximum height.
4. Level the machine laterally using the spirit level.
5. Level the machine fore and aft such that it is 0.5 deg drawbar down from level. (This simulates a poor setup by the end user).
6. Slew the booms until the rear of the basket is pointing towards the pole.
7. Tie the rope from the pulley around the top rail of the platform on the basket centre line.
8. Attach the Test Weight Harness and the Test Weight to the platform.
9. Raise the booms to maximum outreach (lower boom fully up and top boom and jib boom horizontal). The "Test load" must be between 100 and 200mm above ground.
10. Attach a ratchet tie down to the rope coming from pulley. Attach the other end to the "Load simulating the wind and manual force".
11. Raise the "Load simulating the wind and manual force" with the ratchet tie down until the load is between 100 and 200mm above the ground. Ensure that the loads are not swinging i.e. the loads are static. (If both 'rear' legs lift clear of the ground STOP the test and release the ratchet).

□ Pass Criteria

The machine can be assessed as meeting the requirements of AS 1418-10 2004 Appendix G Stability Calculations if the "Test Load" and the "Load simulating the wind and manual force" can be raised clear of the ground simultaneously while maintaining at least 3 point contact i.e. not more than 1 stabiliser foot off the ground.

□ Figure 1



RATED LOAD $R = 239\text{kg}$
 STANDARD MACHINE
 = 217kg
 WITH ROTATOR

MANUAL FORCE $M = 44.8\text{kg}$
 WIND FORCE $W = 25.3\text{kg}$
 LOAD ON PULLEY = 70.1kg

■ Stability Testing MHP15/44

□ Introduction

The purpose of this test is to assess if the MHP 1544 meets the requirements of AS 1418-10 2004 Appendix G Stability Calculations. The situation for minimum stability is with the booms at maximum outreach over the drawbar, with the maximum rated load in the platform, a manual force pulling toward the drawbar and maximum wind load acting on the back of the machine.

Since this testing involves taking the machine to the edge of its stability envelope care must be taken to ensure the test is failsafe i.e. the machine can not tip over if it fails the test. To this end the rated load is to be hung from the Test Weight Harness and the test weight is suspended 200mm above the ground during the test. If the machine starts to tip over the test weight will contact the ground, reducing the overturning moment, so that the machine can not continue to tip over.

□ Equipment

- MHP 15/44
- Spirit level
- Rope
- Pulley
- Test weights & harness
- Ratchet tie down

□ Setup and Procedure

The Test Weight harness location is at the rear edge of the platform. The test load for a standard machine is 220kg and the test load for a machine with an optional basket rotator is 194kg.

The manual force is 400N with an additional multiplication factor of 1.1 giving 440N or 45kg. The line of action of this force is such that it produces the greatest overturning moment. That is the line of action of the force is perpendicular to a line joining the top rail of the platform to the tipping line (see Figure 1).

The wind load is assumed to act at the centre of area of the elevated components. The Wind Load is 336N at 5.54m above ground. The overturning moment from the wind is used to find an equivalent force along the line of action of the manual force. The calculated force due to wind is 248N or 27.2kg

The load simulating the wind and manual force is therefore 72.2kg.

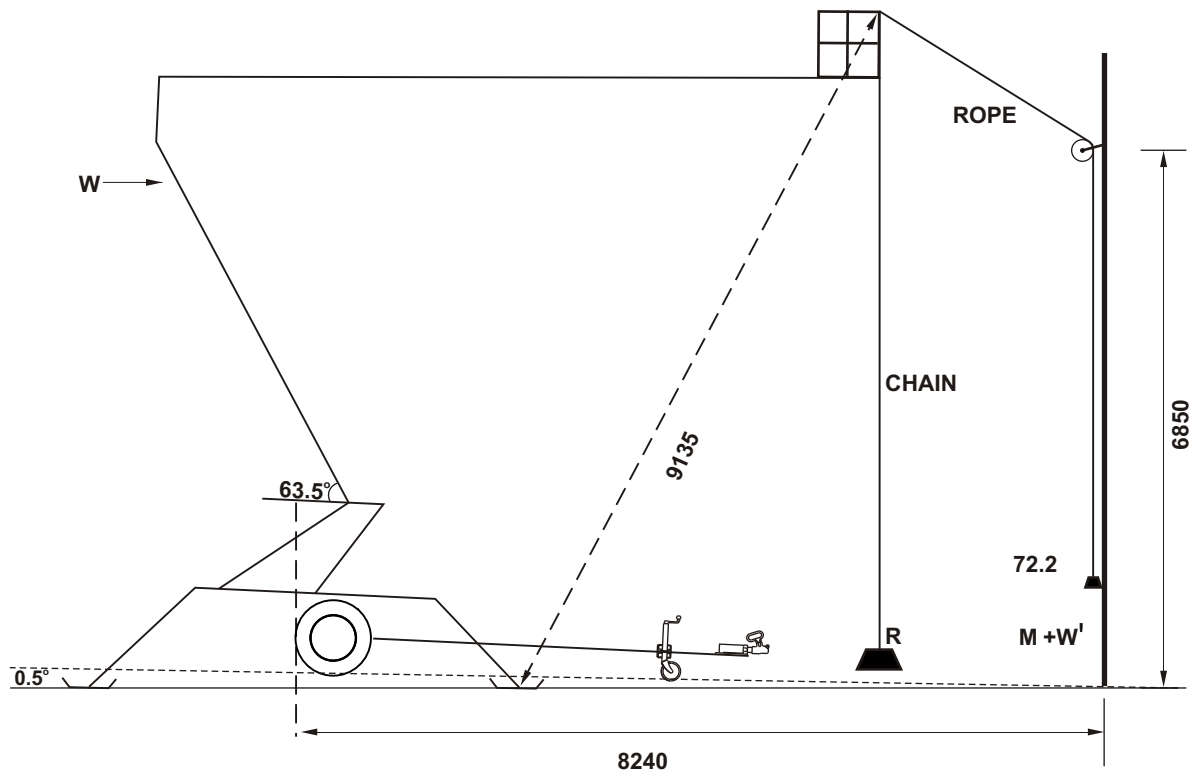
The test procedure is as follows (Refer Figure 2).

1. Set a pulley with rope, 6.85m above the ground on a fixed pole.
2. Place the machine so that the drawbar is pointing towards the fixed pole. The centre of the slew bearing must be 8.2m from a point directly beneath the pulley.
3. Raise the machine on the stabilisers to maximum height.
4. Level the machine laterally using the spirit level.
5. Level the machine fore and aft such that it is 0.5 deg drawbar down from level. (This simulates a poor setup by the end user).
6. Slew the booms until the rear of the basket is pointing towards the pole.
7. Tie the rope from the pulley around the top rail of the platform on the basket centre line.
8. Attach the Test Weight Harness and the Test Weight to the platform.
9. Raise the booms to maximum outreach (lower boom fully up and top boom and jib boom horizontal). The Test load must be between 100 and 200mm above ground.
10. Attach a ratchet tie down to the rope coming from pulley. Attach the other end to the Load simulating the wind and manual force.
11. Raise the Load simulating the wind and manual force with the ratchet tie down until the load is between 100 and 200mm above the ground. Ensure that the loads are not swinging i.e. the loads are static. (If both 'rear' legs lift clear of the ground STOP the test and release the ratchet).

□ Pass Criteria

The machine can be assessed as meeting the requirements of AS 1418-10 2004 Appendix G Stability Calculations if the Test Load and the Load simulating the wind and manual force can be raised clear of the ground simultaneously while maintaining at least 3 point contact i.e. not more than 1 stabiliser foot off the ground.

□ Figure 2



RATED LOAD R = 220kg
 STANDARD MACHINE
 = 194kg
 WITH ROTATOR

MANUAL FORCE M = 45kg
 WIND FORCE W = 27.2kg
 LOAD ON PULLEY = 72.2kg

Trailer assembly MHP13/35	1-3
Trailer assembly MHP13/35	1-4
Trailer assembly drawing MHP13/35	1-5
Trailer assembly drawing MHP15/44	1-6
Trailer assembly MHP15/44	1-7
Trailer assembly MHP15/44	1-8
Boom assembly MHP13/35	1-10
Boom assembly drawing MHP13/35	1-11
Boom assembly drawing MHP15/44	1-12
Boom assembly MHP15/44	1-13
Jib boom assembly	1-14
Jib boom assembly drawing	1-15
Column assembly drawing	1-16
Column assembly	1-17
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1750kg axle	1-32
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Item	Part No	Qty	Description
	12775		Trailer assembly
1.	1273	1	Level bubble
2.	1651	1	4 bank Casappa valve - (Not used when auto stabiliser option fitted)
3.	1771-1	1	Lynch pin
4.	3603-06	18	Plain washer
5.	3603-08	22	Plain washer
6.	3603-10	6	Plain washer
7.	3603-12	8	Plain washer
8.	3606-06025	4	Metric countersunk screw
9.	3610-10016	12	Metric bolt
10.	3610-06016	4	Metric bolt
11.	3610-06020	4	Metric bolt
12.	60030-061	2	Plain washer
13.	3610-08025	8	Metric bolt
14.	3610-08065	3	Metric bolt
15.	3610-10030	2	Metric bolt
16.	3610-12090	2	Metric bolt
17.	3610-12110	2	Metric bolt
18.	3611-16	4	Nyloc nut
19.	3611-06	10	Metric nylock nut
20.	3611-08	11	Metric nylock nut
21.	3611-10	4	Metric nylock nut
22.	3611-12	8	Metric nylock nut
23.	8626	12	Pin keeper
24.	12790	4	Foot plate weldment
25.	9875-1	4	Reflector lens, orange
26.	9875-2	2	Reflector lens, white
27.	11369	4	Foot pin
28.	9973-1	1	Safety chain
29.	10993-1	1	Hammer lock
30.	11112-3	1	Boom lock pin
31.	11492-3	12	Tab washer
32.	12780	1	Tow coupling, 50mm
	11571	1	Tow coupling (New Zealand option), 1 $\frac{7}{8}$ "
33.	12475	2	Mudguard, plastic
	12469	2	Optional mudguard (heavy duty steel)
34.	11585-3	2	Mud-flap
35.	1649-041	10	Wheel nut
36.	12062	2	Pin lock retainer
37.	12701	1	Axle assembly
38.	3602-10	2	Nut
39.	12405	1	Jockey wheel, standard
	12771	1	Jockey wheel, heavy duty, option
40.	12412 REV F	4	Stabiliser leg weldment
41.	12419-4	2	Wear pad
42.	12418-1	1	Control guard
43.	12419	1	Boom rest weldment
44.	12420	1	Slew stop traveler - (Not used when continuous rotation option fitted)
45.	12741	8	Pin
46.	12742	4	Pin
47.	12426 REV L	1	Trailer chassis
48.	12444	1	Slew traveler hold down - (Not used when continuous rotation option fitted)
49.	45500-6	2	Key ring
50.	3633-3	8	Roll pin

Trailer assembly MHP13/35

Item	Part No	Qty	Description
51.	3610-20040	1	Bolt
52.	12336A	4	Leg cylinder assembly
53.	12772-2	2	Tyre
54.	3603-20	1	Plain washer
55.	3611-20	1	Nylock nut
56.	3626-5	8	Flanged bush
57.	3626-1	16	Flanged bush
58.	12439	1	Hose protector
59.	3610-16100	2	Bolt (check thread length)
60.	3604-06020	2	Screw
61.	12703-3	2	U-bolt
62.	12826	2	U-bolt attachment plate
63.	12772-1	2	Wheel rim
64.	12702	PR	Spring assembly
66.	3603-16	4	Plain washer
67.	3602-12	8	Nut
68.	3605-012	8	Washer

F

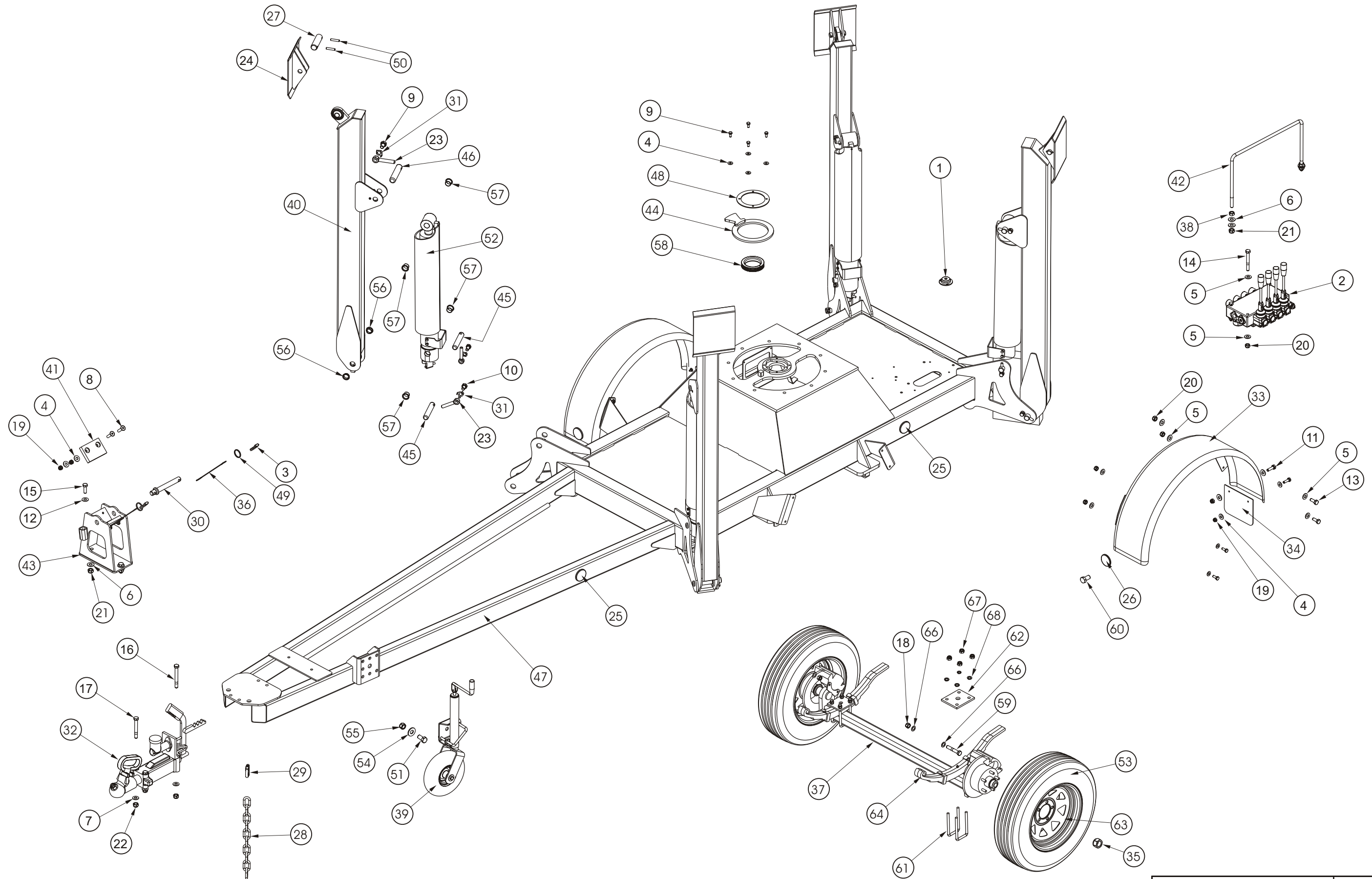
E

D

C

B

A



TITLE Trailer Assembly

Snorkel Model MHP13/35 MKII

Snorkel

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F

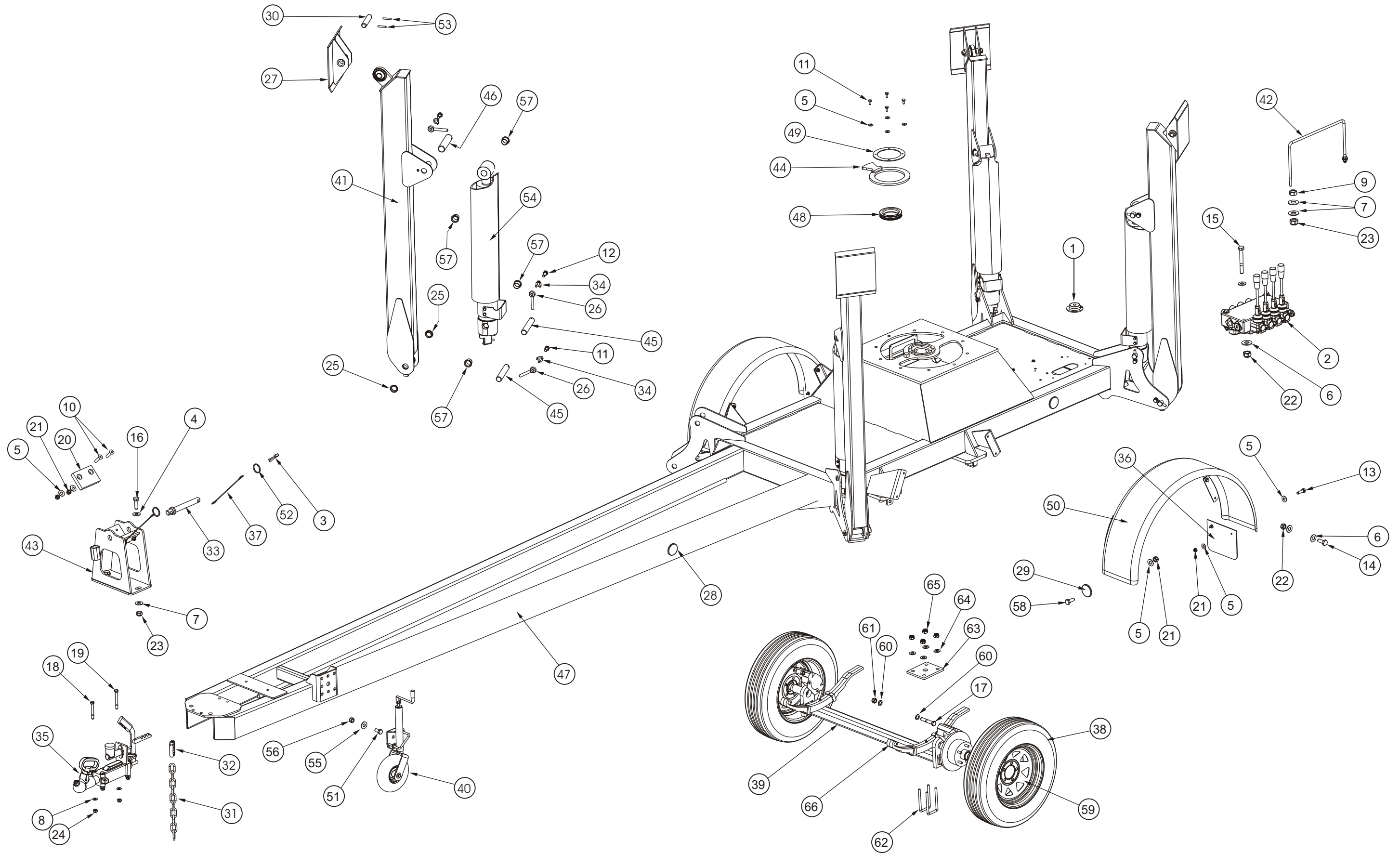
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A

**Snorkel**

TITLE Trailer Assembly

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Snorkel Model MHP1544 MKII

DWG. 12427B

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9

Item	Part No	Qty	Description
	12777		Trailer assembly
1.	1273	1	Level bubble
2.	1651	1	4 bank Casappa valve - (Not used when auto stabiliser option fitted)
3.	1771-1	1	Lynch pin
4.	60030-061	2	Plain washer
5.	3603-06	16	Plain washer
6.	3603-08	22	Plain washer
7.	3603-10	4	Plain washer
8.	3603-12	4	Plain washer
9.	3602-10	2	Nut
10.	3606-06025	4	Countersunk screw
11.	3610-10016	12	Metric bolt
12.	3610-06016	4	Metric bolt
13.	3610-06020	4	Metric bolt
14.	3610-08020	8	Metric bolt
15.	3610-08065	3	Metric bolt
16.	3610-10030	2	Metric bolt
17.	3610-16100	2	Metric bolt, (check thread length)
18.	3610-12090	2	Metric bolt
19.	3610-12100	2	Metric bolt
20.	12419-4	2	Wear pad
21.	3611-06	8	Nylock nut
22.	3611-08	11	Nylock nut
23.	3611-10	2	Nylock nut
24.	3611-12	4	Nylock nut
25.	3626-5	2	Flanged bush
26.	8628	12	Pin keeper
27.	12790	4	Foot plate weldment
28.	9875-1	4	Reflector lens, orange
29.	9875-2	2	Reflector lens, white
30.	11369	4	Foot pin
31.	9973-1	1	Chain
32.	10993-1	1	Hammer lock
33.	11112-3	1	Boom lock pin
34.	11492-1	12	Tab washer
35.	11571	1	Tow coupling, (NZ option), 1 $\frac{7}{8}$ "
	12780	1	Tow coupling, 50mm
36.	11585-3	2	Mudflap
37.	12062	2	Pin lock retainer
38.	12772-2	2	Tyre
39.	12701	1	Axle assembly
40.	12405	1	Jockey wheel
41.	12412 REV F	4	Stabiliser leg weldment
42.	12418	1	Control guard
43.	12419	1	Boom rest weldment
44.	12420	1	Slew stop traveller - (Not used when continuous rotation option fitted)
45.	12741	8	Pin
46.	12742	4	Pin
47.	12427 REV M	1	Trailer weldment
48.	12439	1	Trim panel
49.	12444	1	Slew traveller hold down - (Not used when continuous rotation option fitted)
50.	12475	2	Plastic mudguard
	12469	2	Optional mudguard (heavy duty steel)
51.	3610-20040	1	Bolt
52.	45500-6	2	Key ring

Trailer assembly MHP15/44

Item	Part No	Qty	Description
53.	60000-036	8	Roll pin
54.	12336A	4	Leg cylinder assembly
55.	3603-20	1	Plain washer
56.	3611-20	1	Nylock nut
57.	3626-1	8	Flanged bush
58.	3604-06020	2	Screw
59.	12772-1	2	Wheel rim
60.	3603-16	4	Plain washer
61.	3611-16	4	Nylock nut
62.	12703-3	2	U bolt
63.	12826	2	U bolt attachment plate
64.	3605-012	8	Washer
65.	3602-12	8	Nut
66.	12703	PR	Spring assembly

Boom assembly MHP13/35

Item	Part No	Qty	Description
	12774		Boom assembly
1.	1814	1	Nylon cable gland
2.	3604-04040	2	Metric head pan screw
3.	1771-1	1	Lynch pin
4.	3606-06020	4	Countersunk screw
5.	3610-10020	4	Metric bolt
6.	3603-06	4	Plain washer
7.	3626-1	2	Flanged bush
8.	3626-10	2	Flanged bush
9.	3626-13	2	Flanged bush
10.	3626-5	12	Flanged bush
11.	3626-6	4	Flanged bush
12.	3626-9	2	Flanged bush
13.	8626	14	Pin keeper
14.	11492-3	9	Tab washer
15.	12371 REV J	1	Upper boom weldment
16.	12372 REV I	1	Lower boom weldment
17.	11112-10	1	Boom lock pin
18.	12372-17	1	Wear pad, boom rest
19.	12373	1	Floating turret weldment
20.	12374	1	Upper level rod
21.	12375	2	Lower level rod
22.	12740	1	Pin
23.	12383 REV H	1	Quadrant, jib/upper boom weldment
24.	12739	1	Pin
25.	12735	2	Pin
26.	12737	1	Pin
27.	12396	2	Pin
28.	12738	2	Pin
29.	12432-2510	2	Nylon spacer washer
30.	12432-3010	4	Nylon spacer washer
31.	12445	1	Micro switch
32.	12062	2	Pin lock retainer
33.	12333A REV B	1	Upper lift cylinder
34.	12334A	1	Lower lift cylinder
35.	11143-2	2	Wear pad, boom rest
36.	12372-17	1	Wear pad, boom rest
37.	45500-6	2	Ring
38.	3611-06	4	Metric nylock nut
39.	3606-06025	4	Metric countersunk screw
40.	3611-04	2	Metric nylock nut
41.	1816	17m	5 core cable (not shown)
42.	1812	12.5m	3 core cable (not shown)
43.	12437	1	Loom control (not shown)

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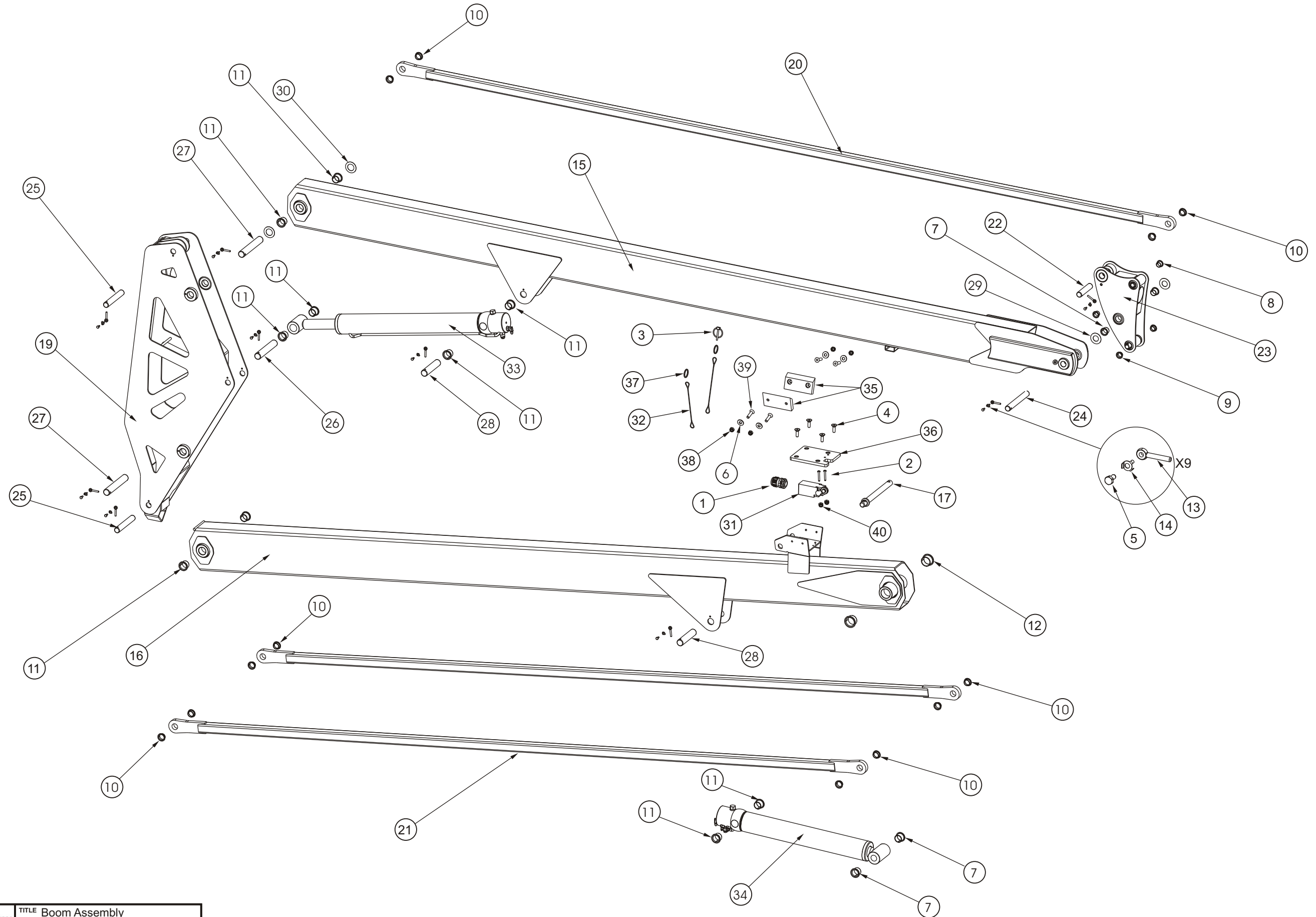
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TITLE Boom Assembly

Page 1-11

Snorkel Model MHP13/35 MKII

DWG. 12774

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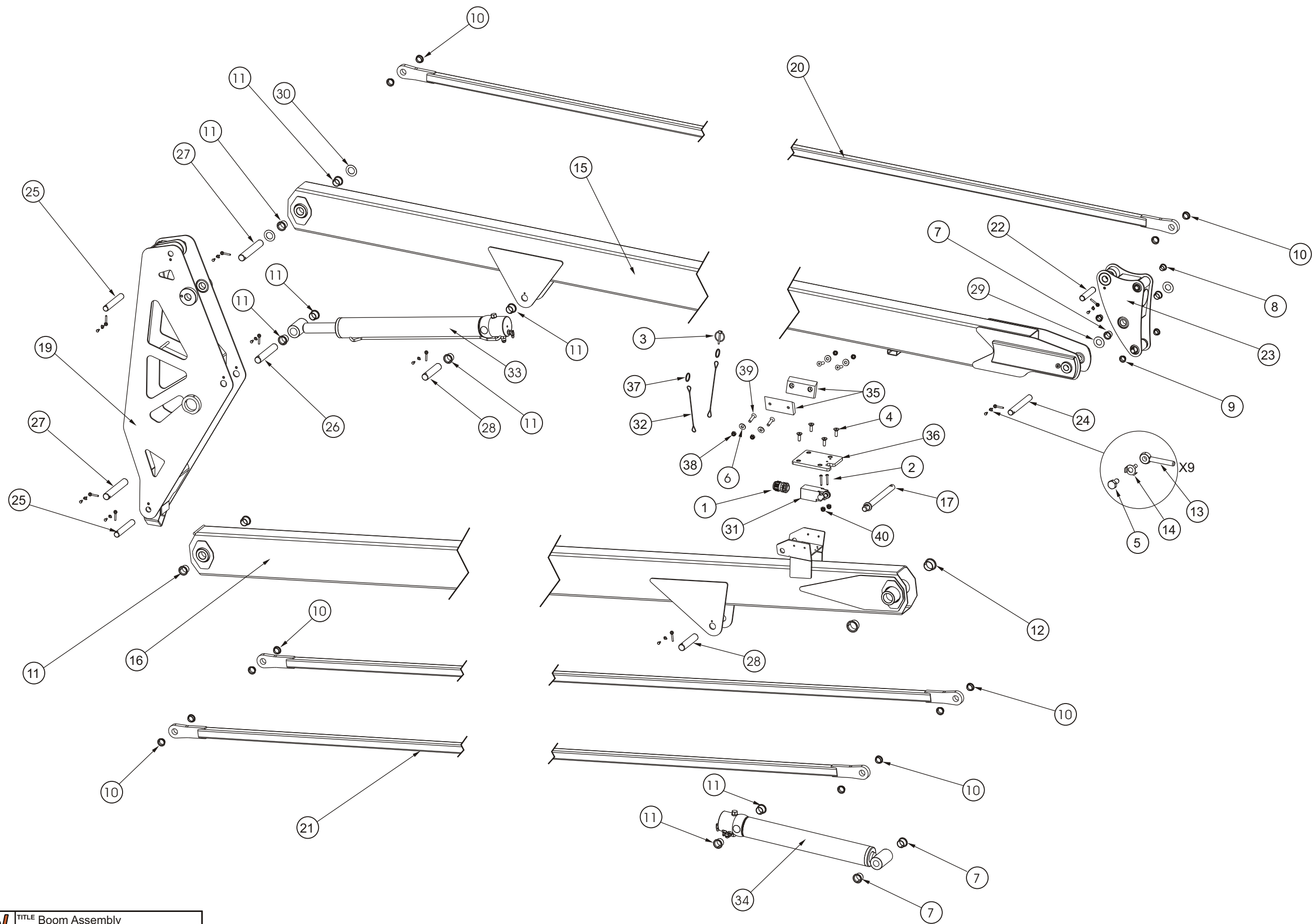
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**Snorkel**

TITLE Boom Assembly

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Snorkel Model MHP15/44 MKII

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Item	Part No	Qty	Description
	12776		Boom assembly
1.	1814	1	Nylon cable gland
2.	3604-04040	2	Metric head pan screw
3.	1771-1	1	Lynch pin
4.	3606-06020	4	Countersunk screw
5.	3610-10020	10	Metric bolt
6.	3603-06	4	Plain washer
7.	3626-1	2	Flanged bush
8.	3626-10	2	Flanged bush
9.	3626-13	2	Flanged bush
10.	3626-5	12	Flanged bush
11.	3626-6	4	Flanged bush
12.	3626-9	2	Flanged bush
13.	8626	9	Pin keeper
14.	11492-3	9	Tab washer
15.	12455 REV I	1	Upper boom weldment
16.	12456 REV J	1	Lower boom weldment
17.	11112	1	Boom lock pin
18.	12372-17	1	Wear pad, boom rest
19.	12373 REV C	1	Floating turret weldment
20.	12457	1	Upper level rod
21.	12458	2	Lower level rod
22.	12740	1	Pin
23.	12383 REV H	1	Quadrant, jib/upper boom weldment
24.	12735	1	Pin
25.	12737	2	Pin
26.	12395	1	Pin
27.	12736	2	Pin
28.	12738	2	Pin
29.	12432-2510	2	Nylon spacer washer
30.	12432-3010	4	Nylon spacer washer
31.	12445	1	Micro switch
32.	12062	2	Pin lock retainer
33.	12333A REV B	1	Upper lift cylinder
34.	12334A	1	Lower lift cylinder
35.	11143-2	2	Wear pad, boom rest
36.	12372-17	1	Wear pad, boom rest
37.	45500-6	2	Ring
38.	3611-06	4	Metric nylock nut
39.	3606-06025	4	Metric countersunk screw
40.	3611-04	2	Metric nylock nut
41.	1816		5 core cable (not shown)
42.	1812		3 core cable (not shown)
43.	12437	1	Loom control (not shown)

Jib boom assembly

Item	Part No	Qty	Description
	12774		Jib boom assembly, MHP13/35
	12776		Jib boom assembly, MHP15/44
1.	3610-10020	6	Bolt
2.	3626-1	2	Flanged bush
3.	3626-10	10	Flanged bush
4.	3626-13	2	Flanged bush
5.	8626	6	Pin keeper
6.	11492-3	6	Tab washer
7.	12288-120	1	Upper flyboom weldment
8.	12288-110	1	Lower flyboom weldment
9.	12349	5	Pin
10.	12739	1	Pin
11.	12383 REV H	1	Quadrant jib/upper boom weldment
12.	12327A	1	Basket assembly
13.	12332A	1	Flyboom cylinder
14.	3611-10	6	Nylock nut
15.	12451-3	As Req	Basket spacer
16.	3610-10050	4	Bolt
17.	3610-10070	2	Bolt
18.	3603-10	12	Washer, plated
19.	12451	1	Fixed basket mounting

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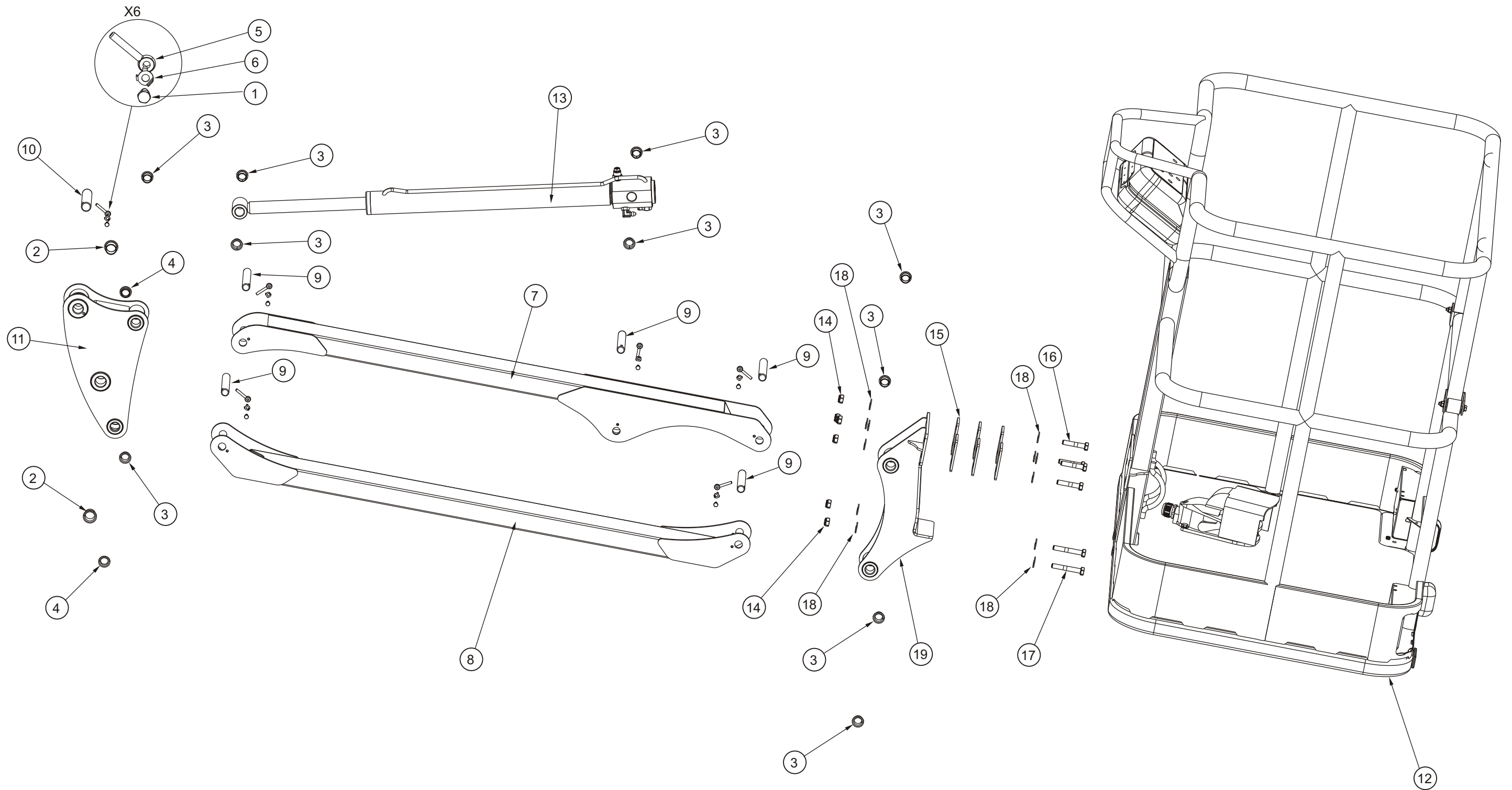
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Item	Part No	Qty	Description
	12778		Column assembly
1.	1034-120	12	Hardened washer
2.	1067	1	Slew ring
3.	1288	1	Battery
4.	1814	1	Cable gland
5.	11942	1	Slew pinion
6.	3605-05	8	Plain washer
7.	3603-06	23	Plain washer
8.	60030-197	1	Plain washer
9.	12377A	1	Main control manifold
10.	3603-12	2	Plain washer
11.	3603-12HD	2	Plain washer
12.	3604-04030	2	Metric panhead screw
13.	3605-05	8	Spring washer
14.	3605-06	14	Spring washer
15.	3605-08	2	Spring washer
16.	11430A	1	Hydraulic oil tank assembly
17.	3610-05010	8	Metric bolt
18.	3610-06012	5	Metric bolt
19.	3610-06016	19	Metric bolt
20.	3610-08025	5	Metric bolt
21.	60021-028N	12	Nut
22.	3610-12050	2	Metric bolt
23.	60021-016	12	Bolt
24.	3611-05	8	Nyloc nut
25.	3611-06	8	Nyloc nut
26.	12483	1	Remote grease nipple mount
27.	3611-12	2	Nyloc nut
28.	3613-12035	10	Cap screw
29.	3631-12	10	Disc lock washer
30.	3631-16	12	Disc lock washer
31.	3660-05020	8	Counter sunk screw
32.	8626	1	Pin keeper
33.	12453	2	Lock tab
34.	10268-2	1	Battery bracket
35.	12445	1	Micro switch
36.	12521	1	Lower control box
37.	11492-1	1	Tab washer
38.	11943	1	Slew drive and brake assembly
39.	12239-3	1	Pin end cap
40.	12381 REV M	1	Column weldment
41.	12381-18	1	Lower control box mount
42.	12381-25	1	Pinion gear guard
44.	12392	4	Hinge weldment
45.	12392-2	4	Cover, hinge spacer
46.	12734	1	Pin
47.	12399	1	Pin
48.	12413	1	Engine assembly
49.	12414-10	1	Stay mount weldment
50.	12414-11	1	Stay side mount, right hand
51.	12414-5	1	Cover stay weldment (not shown)
53.	11943-2	1	Plain washer
54.	5570003	1	Right angle grease nipple
55.	12483-3	1	Connector

Column assembly

Item	Part No	Qty	Description
56.	12483-4	1	Tube
57.	12483-3	1	Connector
58.	12483-2	1	Adaptor
59.	12381-40	1	Heat deflector
60.	9990	4	Thrust washer

Column covers

Item	Part No	Qty	Description
1.	3603-05	16	Plain washer
2.	3603-08	2	Plain washer
3.	3606-03008	2	Countersunk screw
4.	3611-03	2	Metric nylock nut
5.	3611-05	16	Metric nylock nut
6.	12406	1	Spur washer
7.	3660-05020	20	Countersunk screw
8.	12388	1	Cover kit
Note: Covers can not be purchased individually, only as a complete kit			
9.	12401	1	Latch, compression
10.	12403	2	Butt hinge
11.	12414-20	2	Stay pivot mount
12.	12414-5	2	Cover stay weldment
13.	12440	2	Tool clip
14.	60038-006	2	Split pin
15.	5510014	2	Latch, side cover

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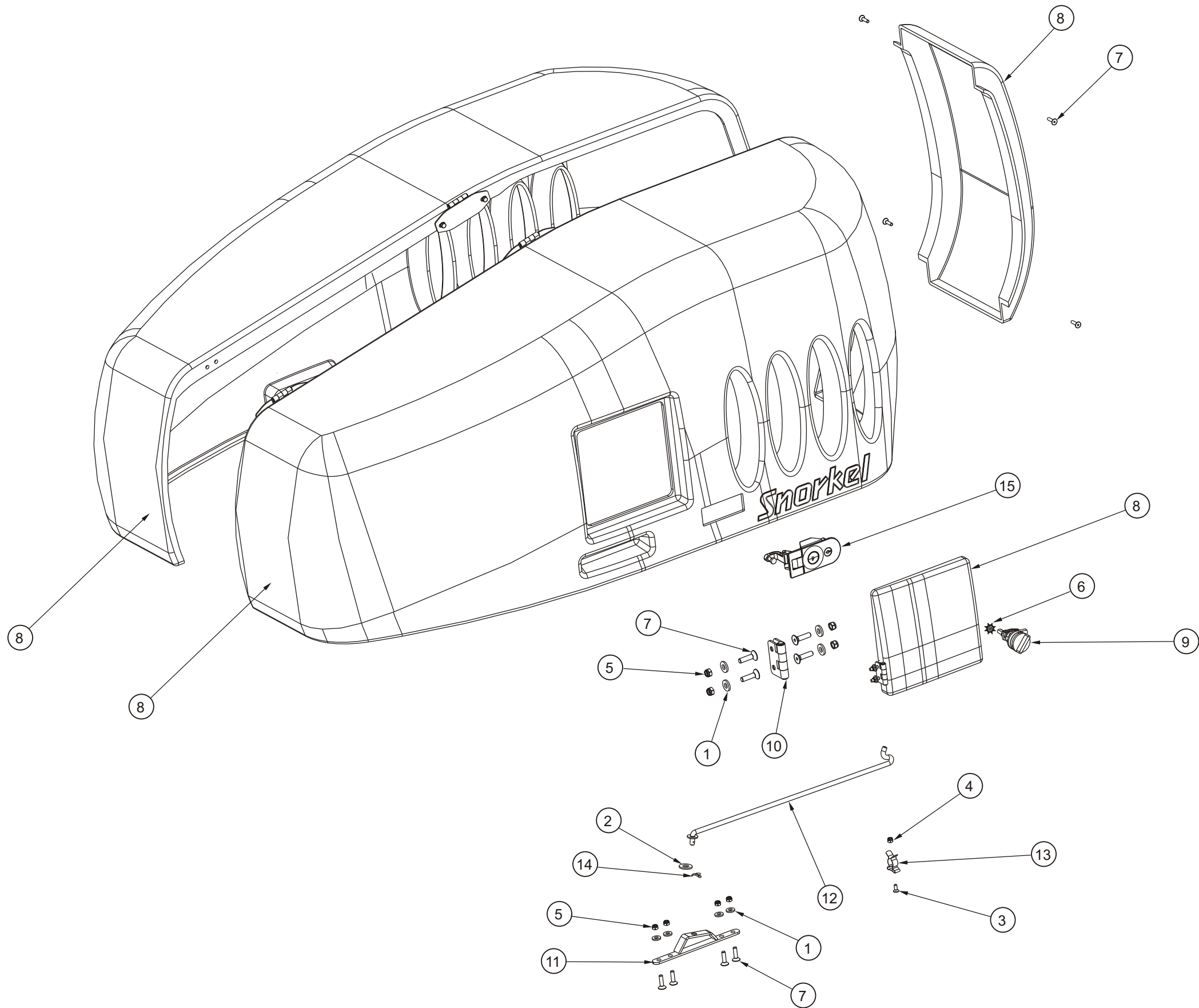
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DWG. 12381A

TITLE Covers
Snorkel Models
MHP13/35 & MHP15/44 MKII

Snorkel
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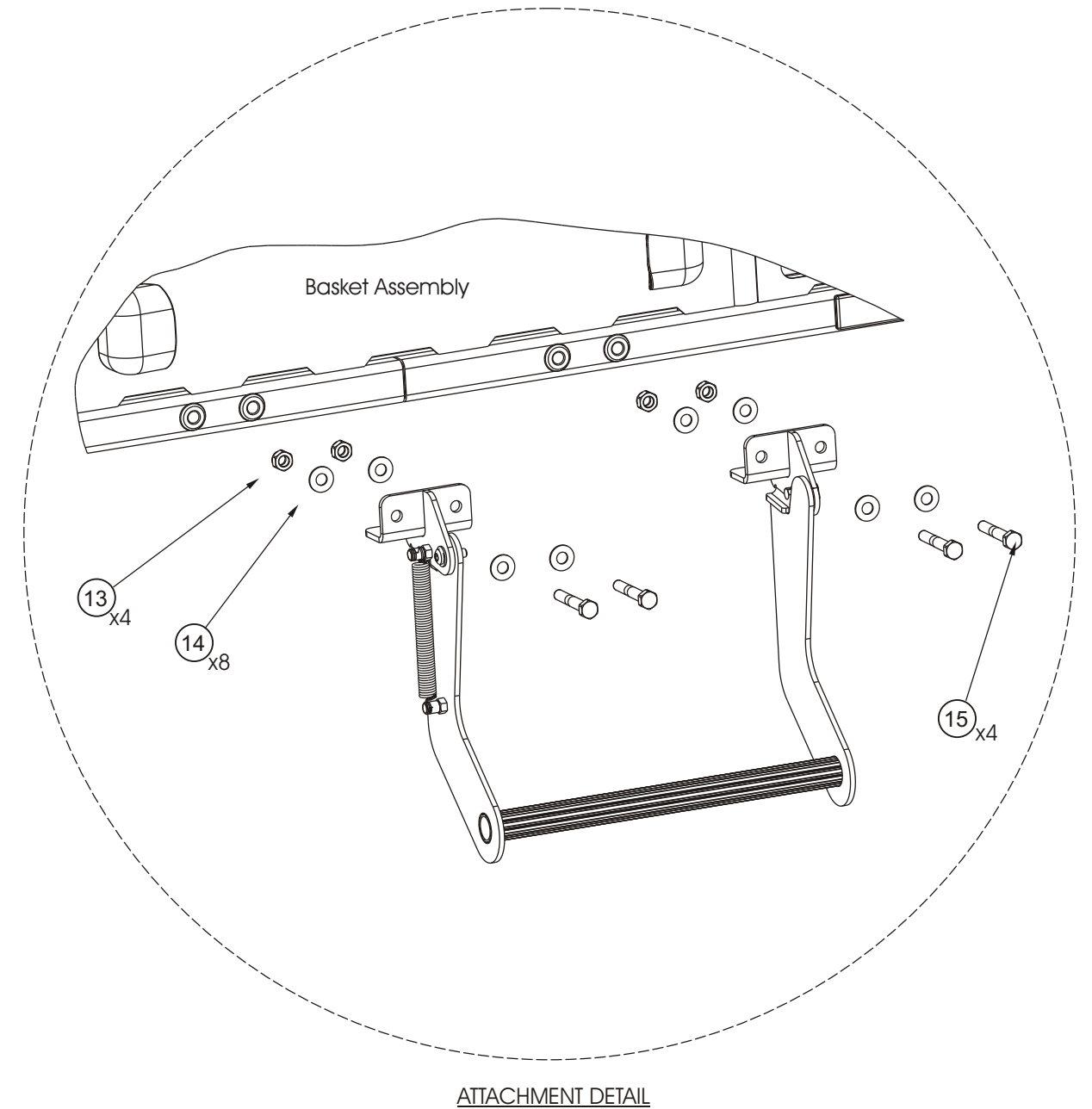
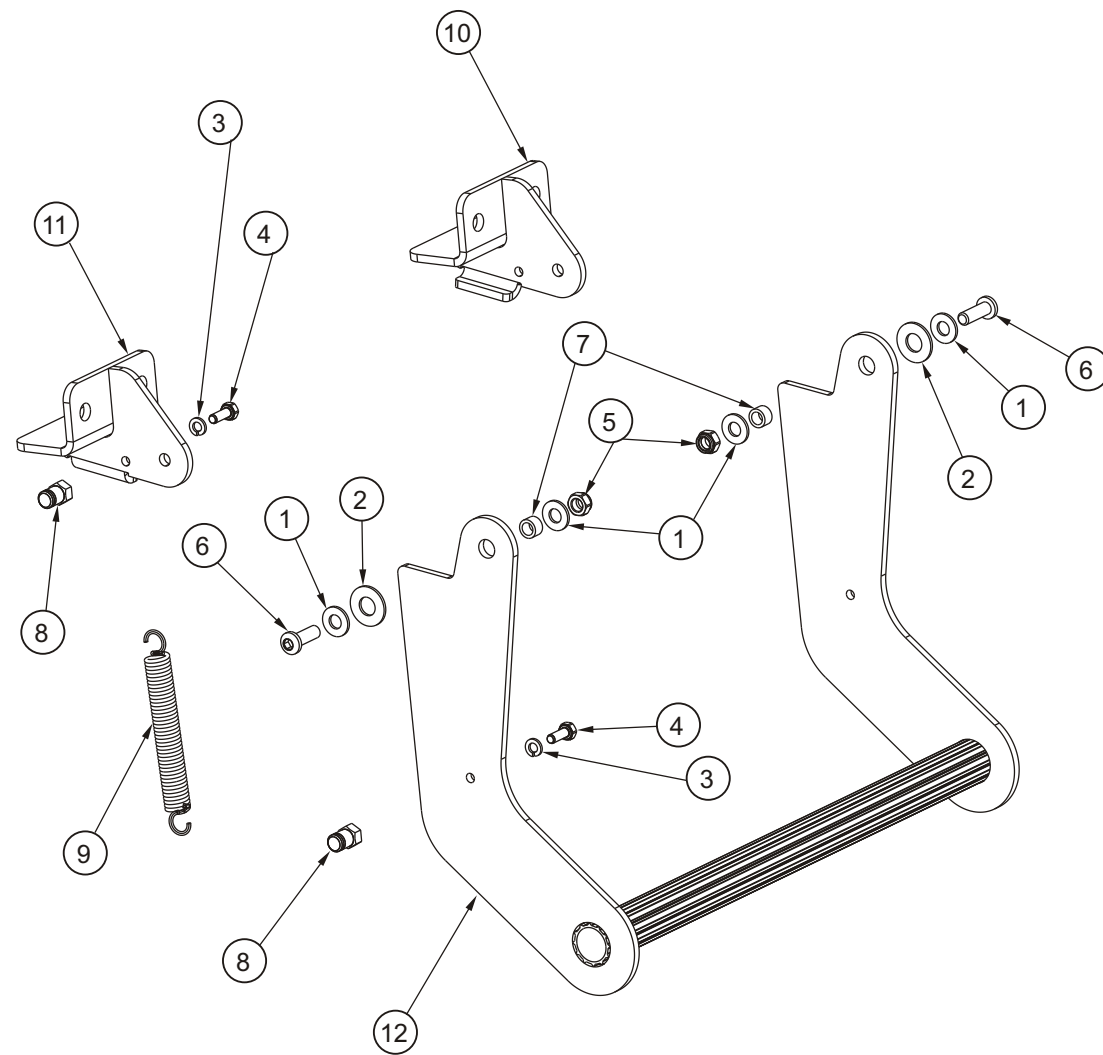
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Snorkel

TITLE Fold Down Step Assembly
Snorkel Models
MHP13/35 & MHP15/44 MKII

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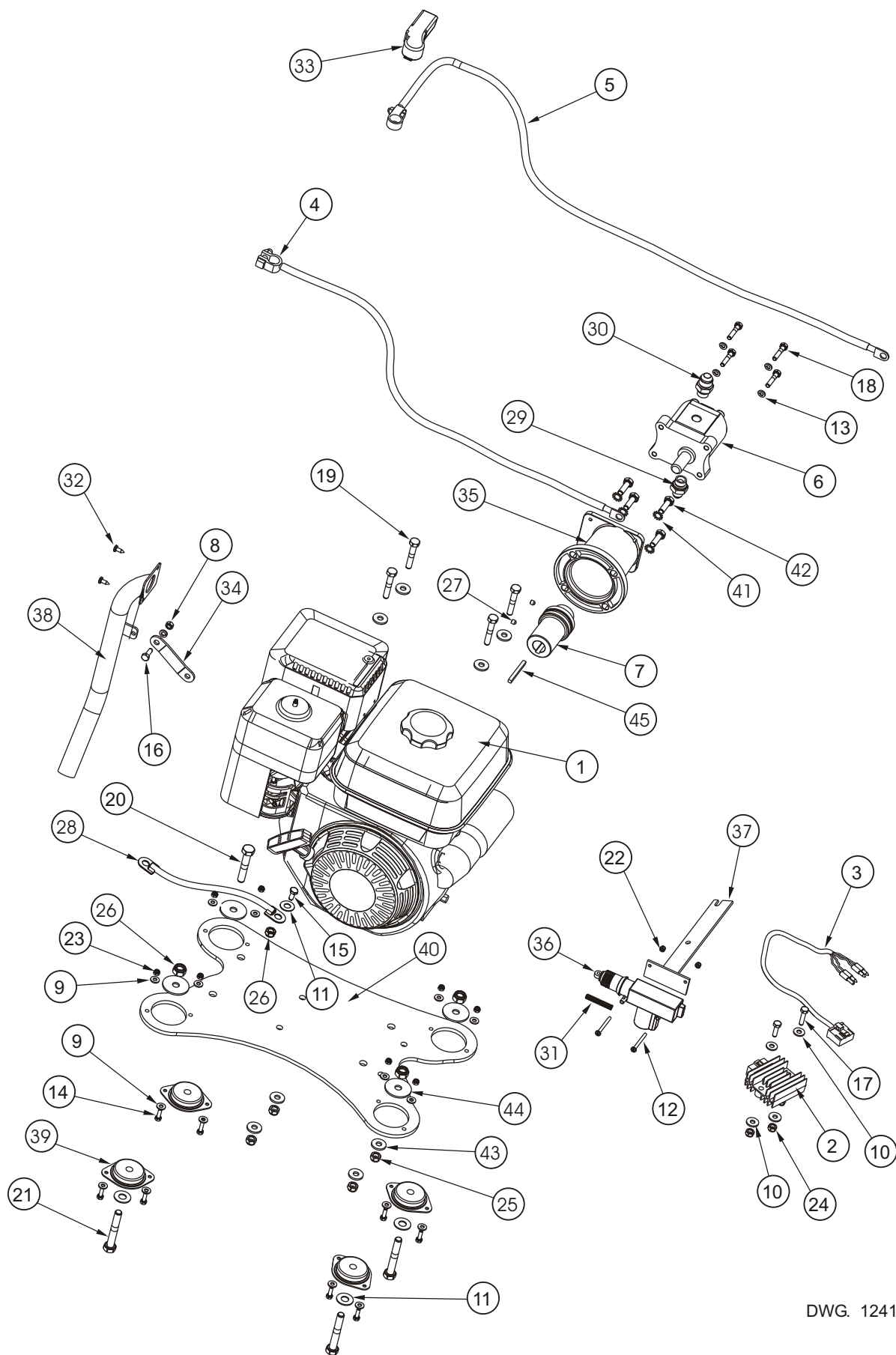
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Item	Part No	Qty	Description
	12480A		Fold down step assembly
1.	3603-08	4	Plain washer
2.	3603-12	2	Plain washer
3.	3605-06	2	Spring washer
4.	3610-06016	2	Metric bolt
5.	3611-08	2	Metric nylock nut
6.	3668-08025	2	Socket button head screw
7.	11429-32	2	Bush
8.	11429-33	2	Spring retainer
9.	11429-34	1	Spring
10.	12480-10	1	Step mount, left
11.	12480-20	1	Step mount, right
12.	12480-30	1	Rung weldment
13.	3611-10	4	Nylock nut
14.	3603-10	8	Plain washer
15.	3610-10070	4	Bolt

Engine assembly

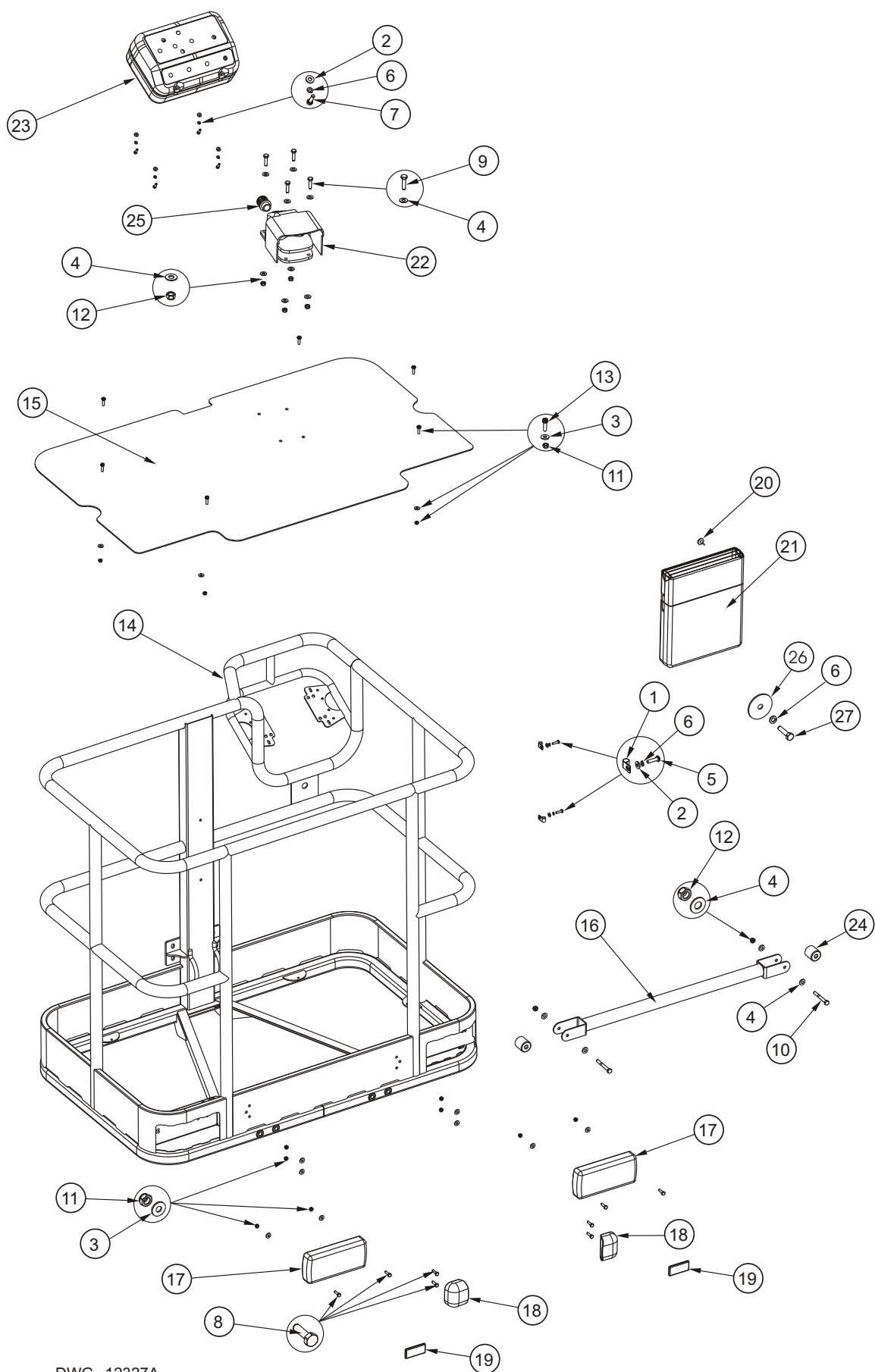
Item	Part No	Qty	Description
	12413	1	Engine assembly
1.	1171-4	1	Honda GX160
2.	1171-4-022	1	Regulator / rectifier GX160
3.	1171-4-025	1	Loom, Honda rectifier
4.	1650-030	1	Battery cable
5.	1650-031	1	Battery cable
6.	1659	1	Gear pump
7.	1880	1	Drive coupling
8.	3602-06	1	Metric nut
9.	3603-05	16	Plain washer
10.	3603-06	4	Plain washer
11.	3603-10	4	Plain washer
12.	3604-04040	2	Metric screw pan head
13.	3605-06	5	Spring washer
14.	3610-05016	8	Metric bolt
15.	3610-10020	1	Metric bolt
16.	3610-06016	1	Metric bolt
17.	3610-06025	2	Metric bolt
18.	3610-06030	4	Metric bolt
19.	3610-08045	4	Metric bolt
20.	3610-10055	1	Metric bolt
21.	3610-10065	3	Metric bolt
22.	3611-04	2	Metric nylock nut
23.	3611-05	8	Metric nylock nut
24.	3611-06	2	Metric nylock nut
25.	3611-08	4	Metric nylock nut
26.	3611-10	4	Metric nylock nut
27.	3612-06006	2	Grub screw
28.	3649-10	1	Battery cable
29.	7013-003	1	BSPP (Dowty) x JICM nipple
30.	7013-004	1	BSPP (Dowty) x JICM nipple
31.	8398	1	Spring
32.	8978-1	2	Screw, self tapping
33.	10254	1	Cover, battery terminal
34.	10350-4	1	Exhaust bracket
35.	10417	1	Bell housing
36.	11444	1	Choke solenoid 12V
37.	11497	1	Choke solenoid bracket
38.	12407	1	Exhaust weldment
39.	12524	4	Engine mount
40.	12526	1	Engine mount plate
41.	60005-054	4	Lockwasher
42.	60016-090N	4	Bolt, plated
43.	60030-3N	8	Flat washer
44.	5560179	4	Flat washer, special
45.	1875KEY	1	Key steel



DWG. 12413

Basket assembly

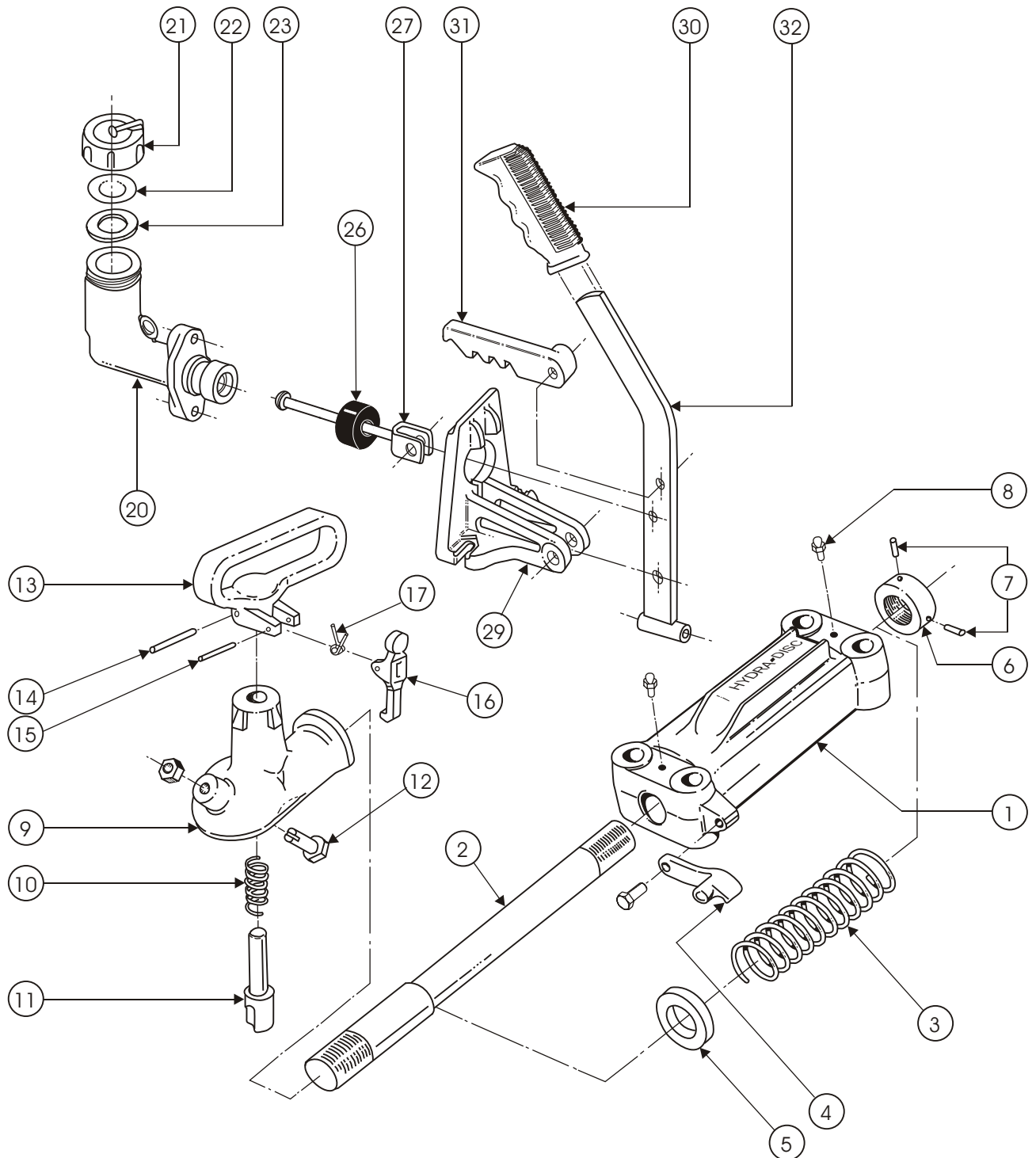
Item	Part No	Qty	Description
	12327A		Basket assembly
1.	2022-002	2	Clamp
2.	3603-05	6	Plain washer
3.	3603-06	14	Plain washer
4.	3603-08	12	Plain washer
5.	3604-05020	2	Machine screw
6.	3605-05	8	Spring washer
7.	3610-05016	4	Metric bolt
8.	3610-06020	8	Metric bolt
9.	3610-08030	4	Metric bolt
10.	3610-08065	2	Metric bolt
11.	3611-06	14	Nylock nut
12.	3611-08	6	Nylock nut
13.	3663-06020	6	Cap screw
14.	12327	1	Basket weld
15.	12327-1	1	Floor plate
16.	12327-50	1	Drop down bar
17.	12386-1	2	Rear direction indicator lamp LED
18.	12386-2	2	licence plate lamp LED
19.	12386-3	2	Retro reflector
20.	7895	4	Anti-rattle button
21.	562386	1	Literature compartment
22.	3020021	1	Foot switch
23.	12385A	1	Upper control box assembly
24.	12327-53	2	Roller
25.	1815	1	Nylon cable gland
26.	60030-198	2	Fender washer
27.	3610-05020	2	Bolt



DWG. 12327A

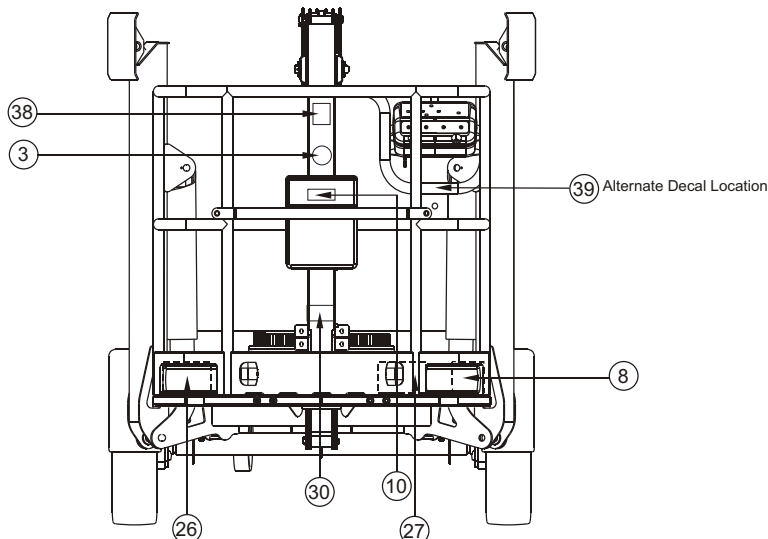
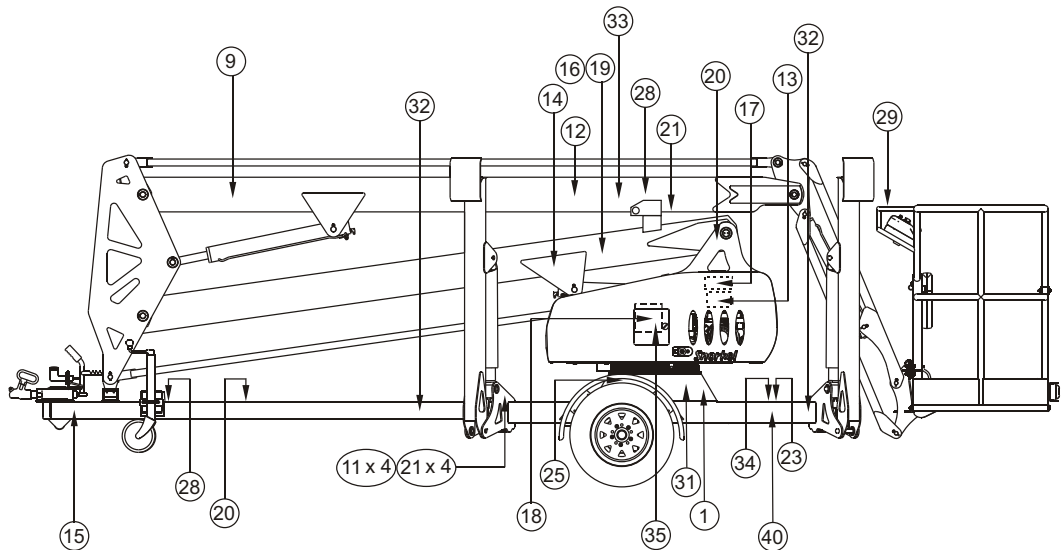
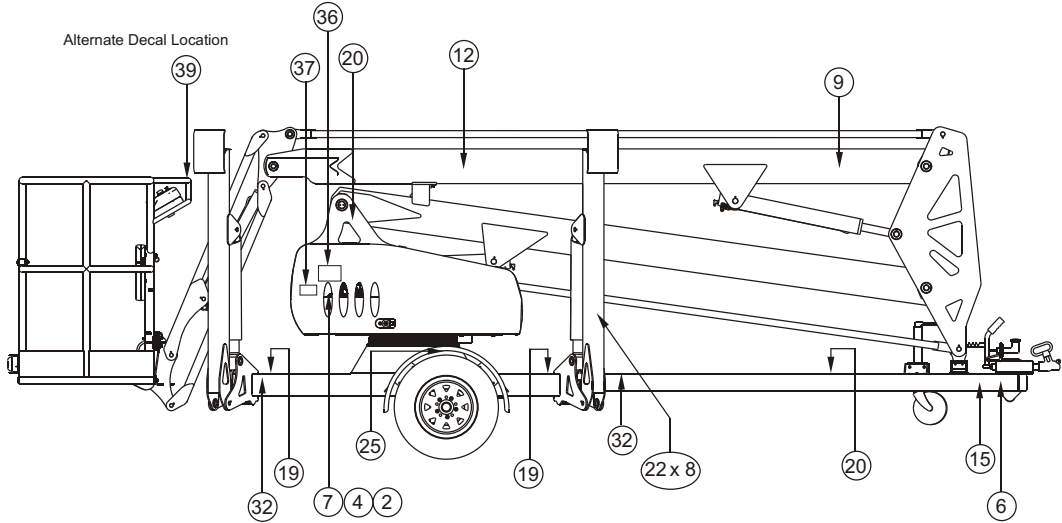
Tow coupling hydraulic

Item	Part No	Qty	Description
	11572	1	Coupling assembly, TC40HM/50mm
	12780	1	Coupling assembly, (NZ only, 1 $\frac{7}{8}$ ")
1.	11572-1	1	Body
2.	11572-2	1	Main shaft and head assembly
3.	9946-15	1	Main shaft spring
4.	9946-13	1	Reverse lock
5.	9946-14	1	Thrust ring
6.	9946-17	1	Collar
7.	60015-017	2	Grub screw 1 $\frac{1}{4}$ " x $\frac{1}{4}$ " BSW
8.	2030-001	2	Grease nipple
9.		Ref	Refer item 2
10.	9946-11	1	Lock pin spring (Includes 11)
11.		1	Lock pin
12.	9946-10	1	Adjusting screw M16
13.	9946-8	1	Handle assembly (Including 14, 15, 16, 17)
14.		1	Tension pin
15.		1	Tension pin
16.	9946-9	1	Trigger assembly (Including 15, 16, 17)
17.		1	Trigger spring
20.	10053-4	1	Master cylinder
21.	10053-1	1	Plastic cap (Includes 22, 23)
22.		1	Deflector
23.		1	Gasket
26.	10053-7	1	Rubber boot
27.	11572-3	1	Pushrod
29.	11572-4	1	Bracket, handle mounting
30.		Ref	Handgrip
31.	11572-5	1	Latch, handle
32.	11572-6	1	Handle (Includes item 30)



Placards and decals installation

Item	Part No	Qty	Description
1.	9972-MHP	1	Serial number plate
2.	12814	1	Decal, hydraulic fluid
3.	9751	1	Decal, NZ made
4.	302950	1	Decal, hydraulic oil level
6.	12424	1	Decal, towing speed
7.	9207	1	Decal, hydraulic oil
8.	9428	1	Decal, danger (Australia only)
	1843	1	Decal, warning (New Zealand only)
9.	569295	2	Decal, Snorkel
10.	562426	1	Decal, operation manual
11.	0083426	4	Decal, tie down
12.	12447	2	Decal, MHP13/35
	12461	2	Decal, MHP15/44
13.	9213	1	Decal, petrol
14.	300699	1	Decal, operator checklist
15.	302559	2	Decal, pinch point
16.	0323897	1	Decal, danger must not operate
17.	476706	1	Decal, danger explosive gas
18.	11420	1	Decal, lower control box
19.	0323896	2	Decal, electrocution hazard
20.	0150602	4	Decal, descending boom
21.	451986	6	Decal, limit switches
22.	9223-3	8	Decal, chevron
23.	12448	1	Decal, outrigger control
24.	8945	1	Decal, vin plate (not fitted to machines from early 2008)
25.	7856-45	2	Decal, tyre pressure, MHP13/35 only
	7856	2	Decal, tyre pressure, MHP15/44 only
26.	12423-250	1	Decal, safe working load (NZ/Aust machines without rotator)
	12423-227	1	Decal, safe working load (NZ/Aust machines with rotator MHP13/35)
	12423-227	1	Decal, safe working load (US/CE machines without rotator)
	12423-200	1	Decal, safe working load (US/CE machines with rotator)
27.	99228-1	1	Decal, caution
28.	1772-002K	2	Decal, boom lock pin
29.	0072531	1	Decal, electrocution hazard (prior to serial number NZ070801)
30.	0150448	1	Decal, lanyard
31.	12545	1	Decal, auto stabiliser operation
32.	12617	4	Decal, forklift
33.	12830	1	Decal, overhead lift method (Option only)
34.	621486	1	Decal, stabiliser enable/disable switch (Option only)
35.	12523-1	1	Decal, fuel/electric switch (Option only)
36.	11948	1	Decal, battery service instructions (Option only)
37.	11944	1	Decal, DC motor isolate switch (Option only)
38.	13030	1	Decal, electrocution hazard (after serial number NZ070801)
39.	45198-7	1	Decal, danger maximum allowable wind speed
40.	13183	1	Decal, remove from towing vehicle before operating (from serial number NZ080616)



1750kg axle

Item	Part No	Qty	Description
A.	12701	Ref	Axle assembly
1.	11570-10	2	Wheel bearing kit (Includes 1,2,3,4)
2.		Ref	Wheel bearing
3.		Ref	Wheel bearing
4.		Ref	Wheel bearing
5.	12362-1	1	Wheel hub
6.	9297-7	2	Seal kit, hub
7.	12362-2	1 Pair	Brake pads
9.	1033-008	2	Nut kit (Includes 10,11)
10.		Ref	Washer
11.		Ref	Split pin
12.	9922-7	2	Grease cap
13.	2045-001	Ref	Caliper assembly, (Includes items -14 to 24)
14.	9945-9	2	Anchor plate
15.	2045K	Ref	Seal kit, caliper
17.	2045-003	2	Bleed screw
18.	2045-13	2	Housing
19.	2045-5	4	Guide pin
20.	3605-08	4	Spring washer M8
21.	3610-08030	4	Set screw M8 x 30 HT
22.	60005-013	2	Lockwasher
23.	3610-12035	2	Set screw M12 x 35 HT
24.	2045-010	2	Piston
25.	1649-042	10	Wheel nut, UNF 7/16"
26.	1649-034	10	Wheel stud, UNF 7/16"

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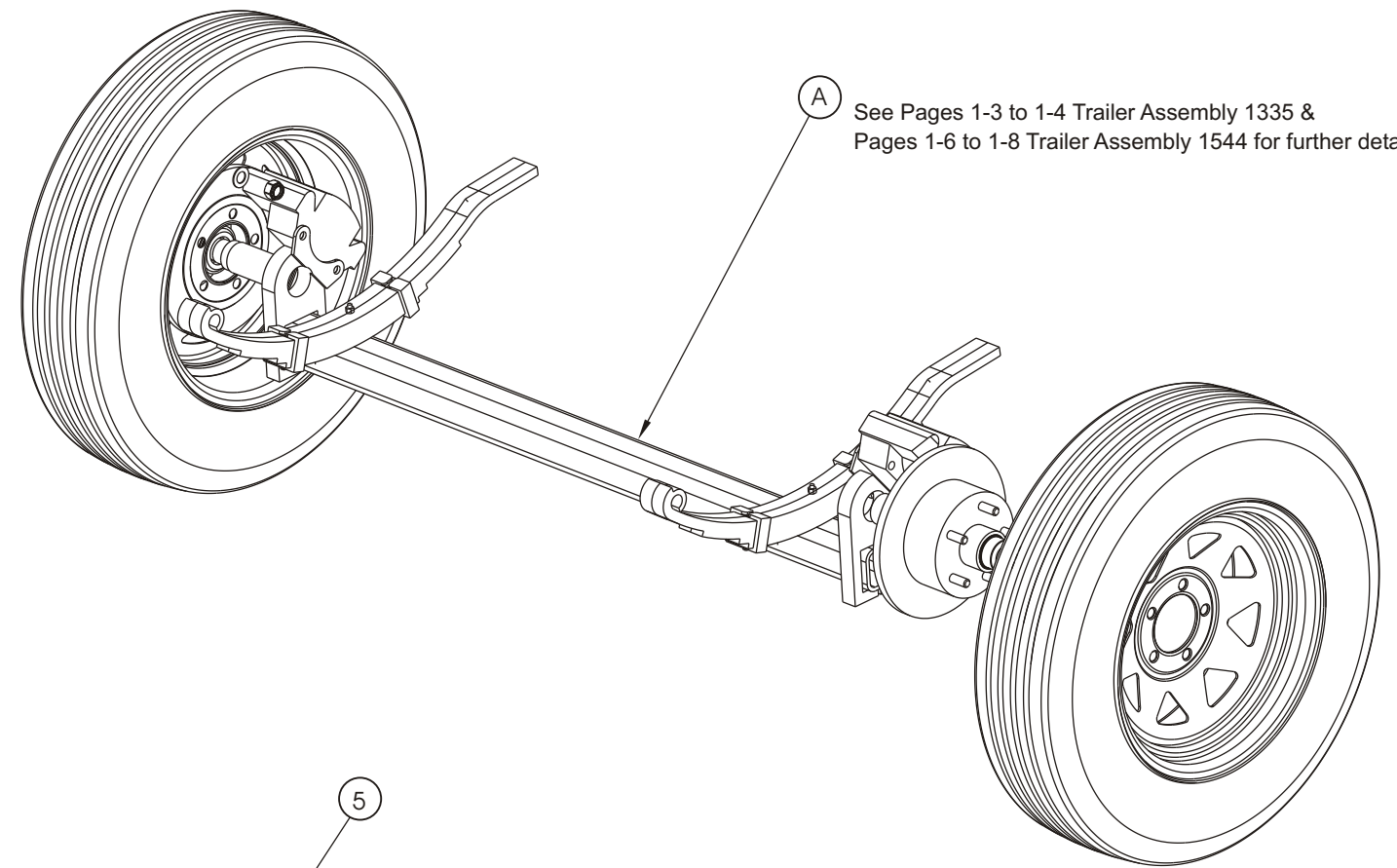
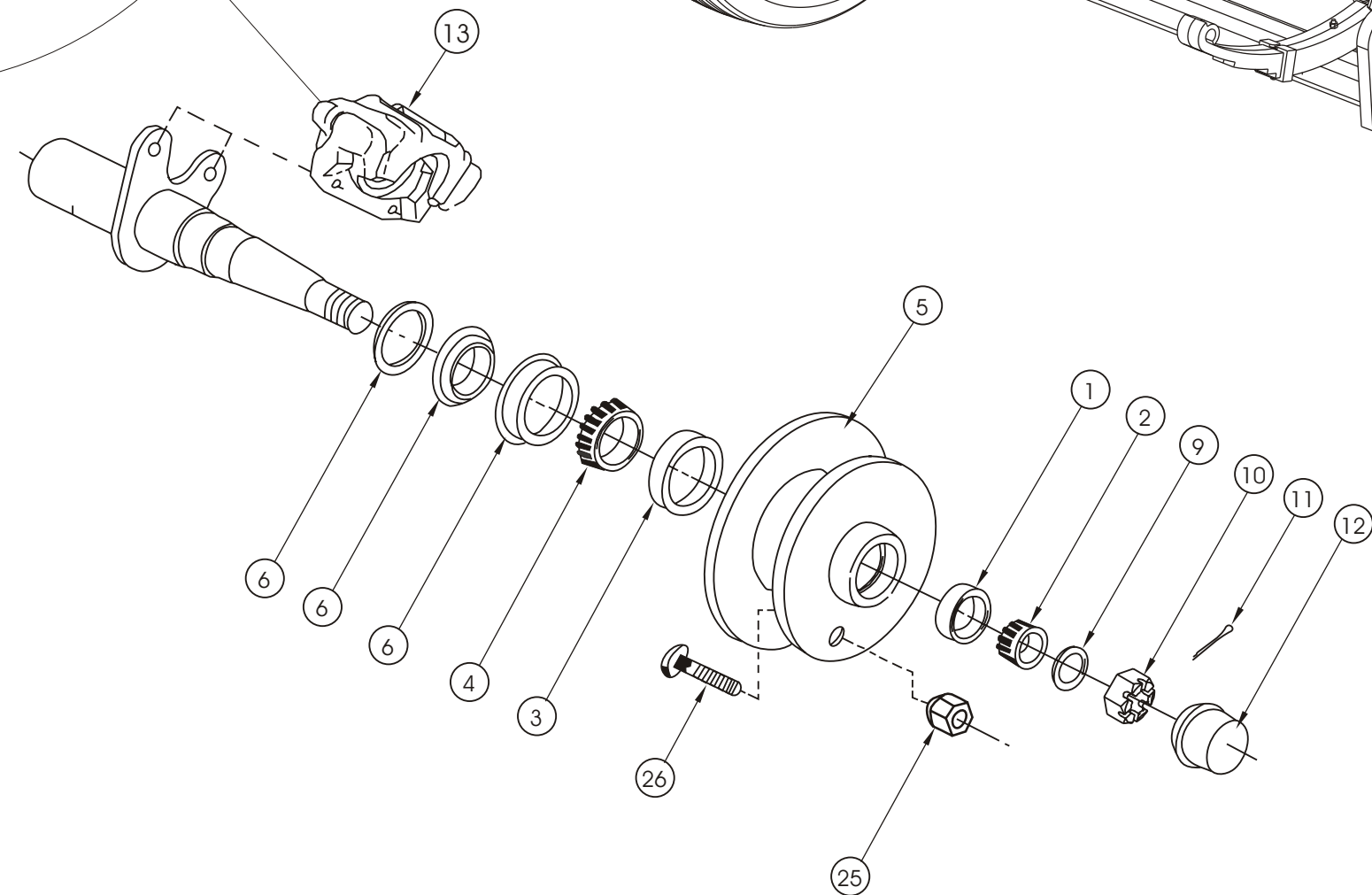
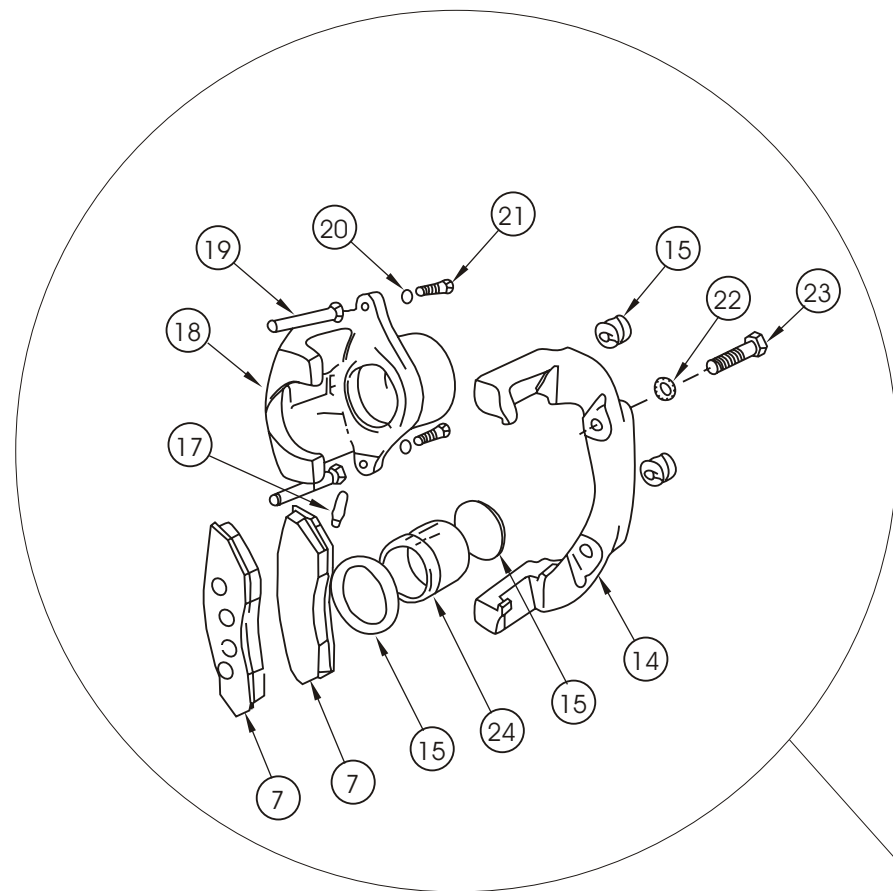
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TITLE 1750kg Axle Assembly
Hydraulic, Disc Brakes
Snorkel models MHP13/35 & 15/44

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Hydraulic schematic drawing for standard units . . .	2-3
Hydraulic schematic drawing	
for units fitted with self level stabilisers	2-4
Main control valve	2-5
Upper lift cylinder assembly	2-6
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Flyboom cylinder assembly	2-8
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Optional Rotator cylinder assembly	2-11
Optional Oil distributor assembly - 2 port	2-12
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Optional Automatic stabiliser	2-14

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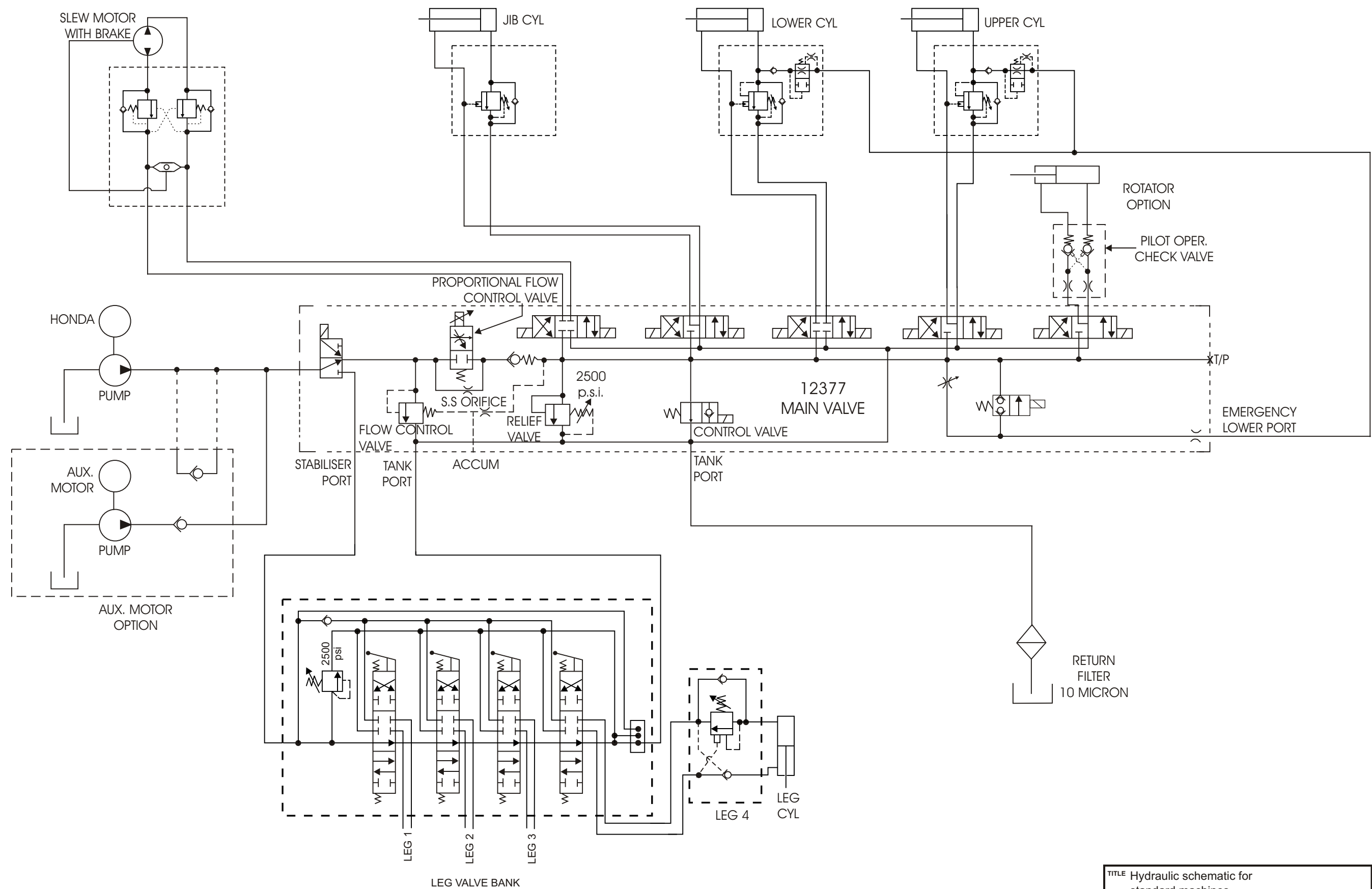
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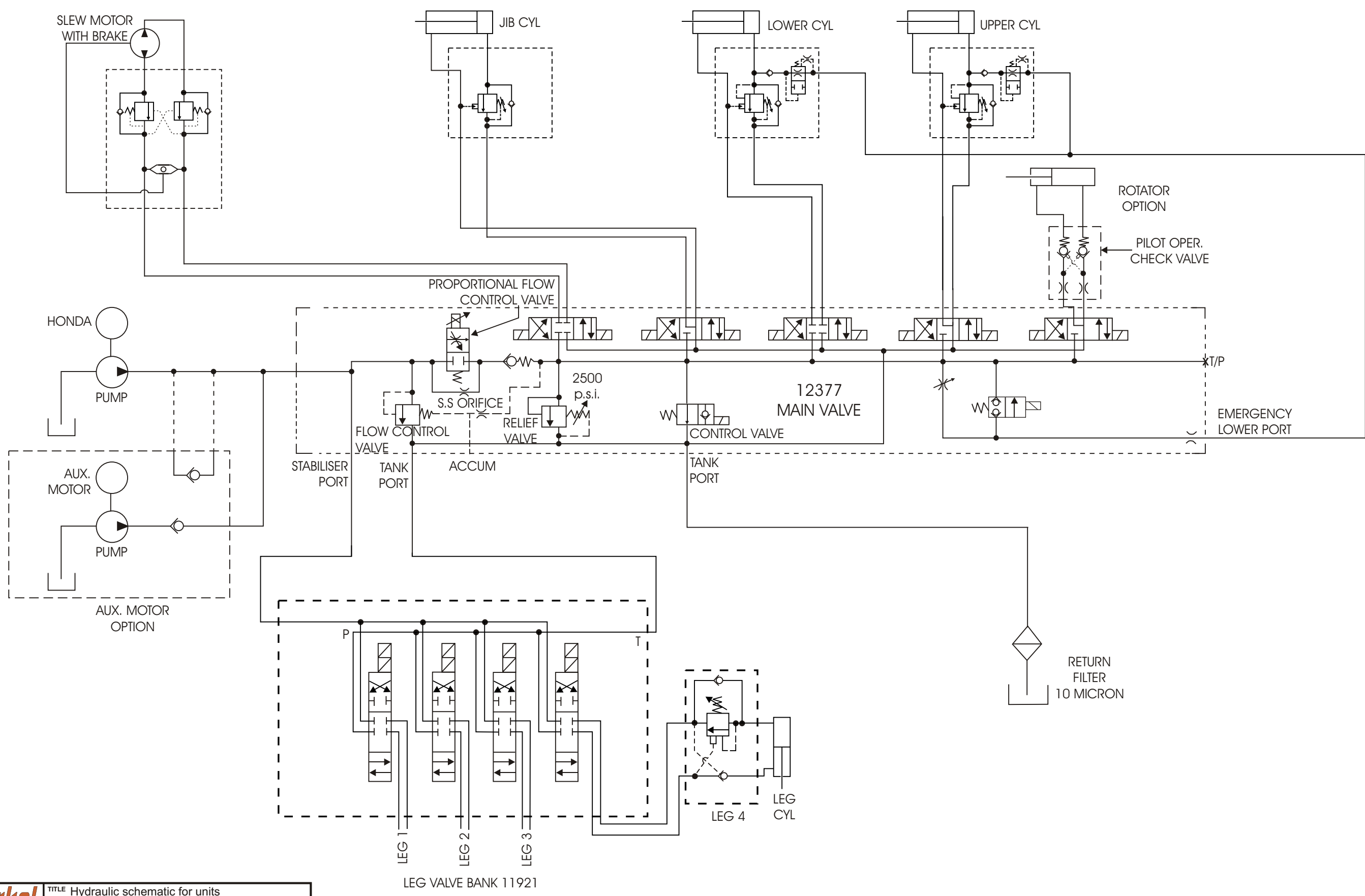
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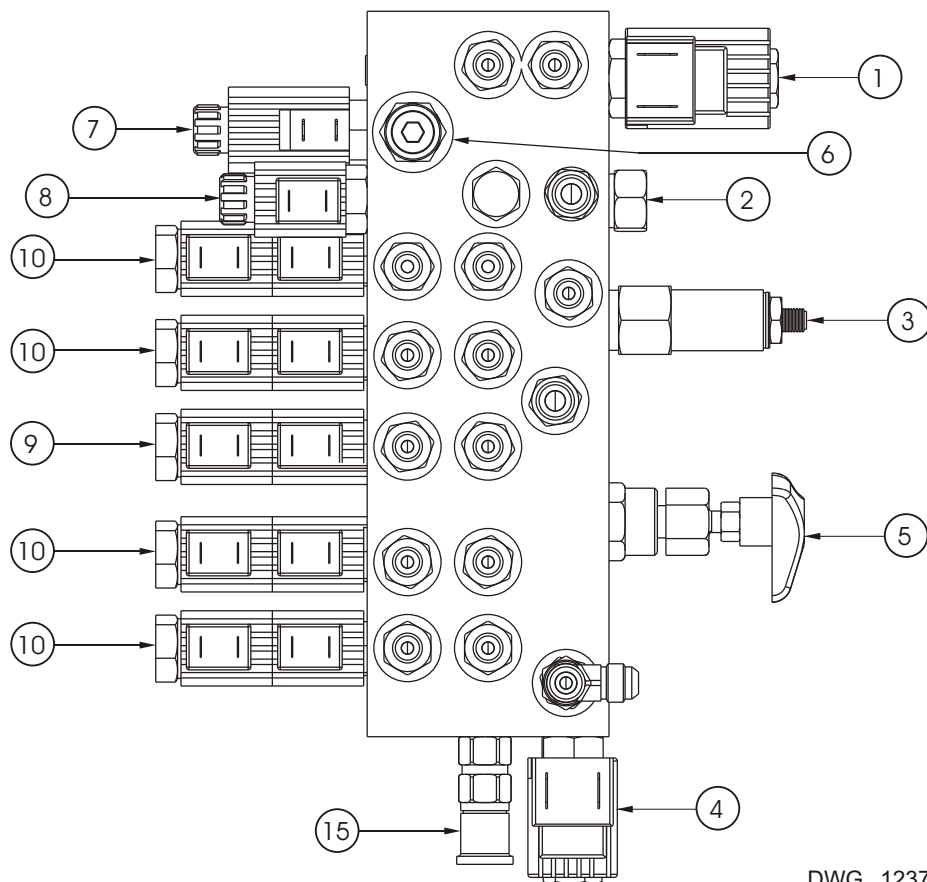
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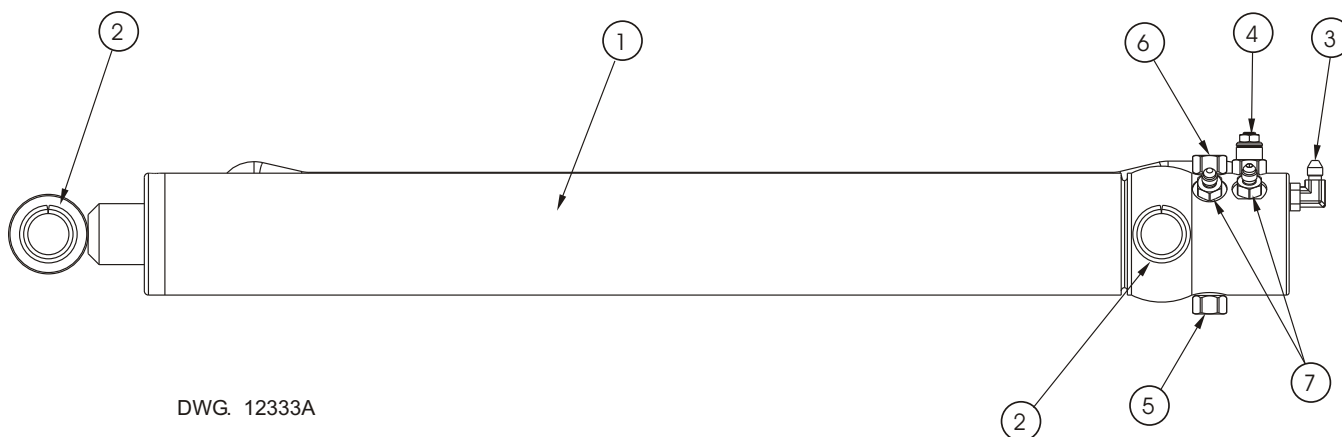
Item	Part No	Qty	Description
	12377A		Main control valve assembly
1.	11415-1P	1	Stabiliser solenoid
2.	11415-2	1	Flow compensator
3.	11415-3P	1	Main relief valve 2500 psi
4.	11415-4P	1	Solenoid emergency lower
5.	11415-5P	1	Manual emergency lower
6.	11415-6P	1	Check valve 4 psi
7.	11415-77	1	Proportional flow control
8.	11415-8P	1	Control solenoid
9.	11415-9P	1	Solenoid valve, closed centre
10.	11415-10P	4	Solenoid valve, floating centre
11.	11415-6P	1	Check valve 4 psi
12.	11415-11PS	12	Solenoid coil, 12 volt
13.	11415-12	1	Minimum flow setting orifice
14.	11415-12	1	Emergency lowering orifice
15.	10996-1	1	Test point



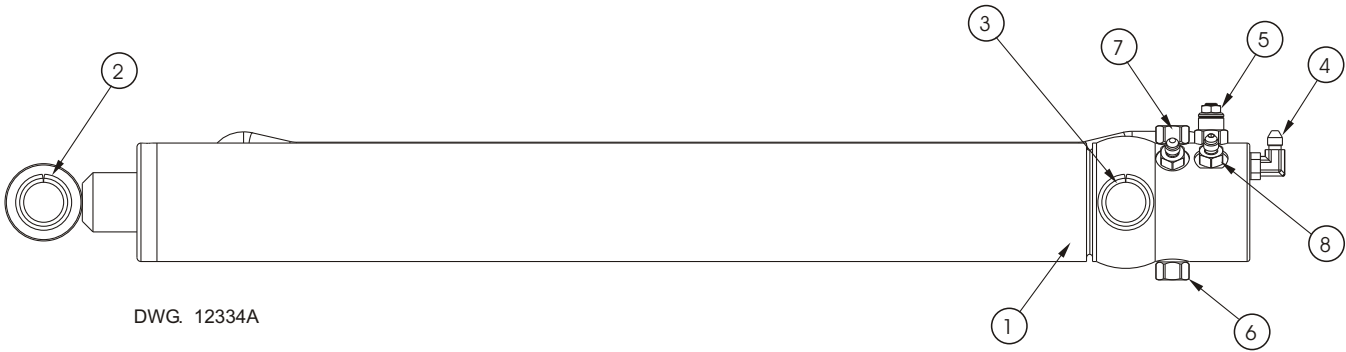
DWG. 12377A

Upper lift cylinder assembly

Item	Part No	Qty	Description
	12333A		Upper lift cylinder assembly
1.	12333	1	Upper Lift cylinder
	12333K	1	Seal kit
2.	3626-6	4	Flanged permaglide bush
3.	7031-002	1	JICM x UN O-Ring M elbow
4.	10856-1	1	Counterballance cartridge
5.	10856-2	1	Check cartridge
6.	10856-3	1	Velocity fuse
7.	506-5705	2	JICM x UN O-Ring M nipple

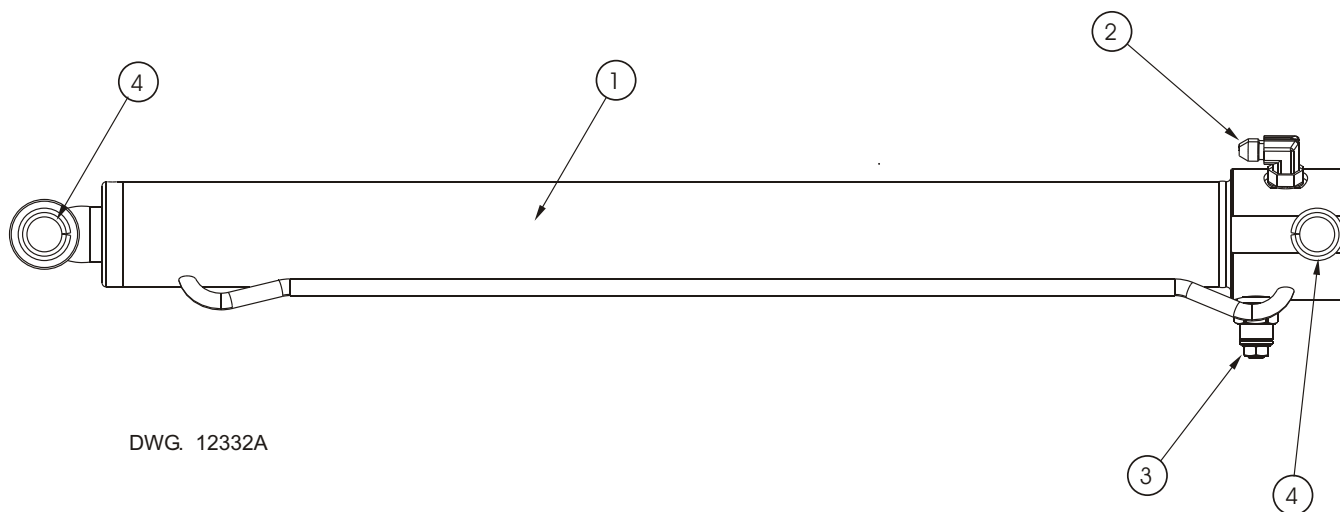


Item	Part No	Qty	Description
	12334A		Lower lift cylinder assembly
1.	12334	1	Lower lift cylinder
	12334K	1	Seal kit
2.	3626-1	2	Flanged permaglide bush
3.	3626-6	2	Flanged permaglide bush
4.	7031-002	1	JICM x UN O-Ring M Elbow
5.	10856-1	1	Counterbalance cartridge
6.	10586-2	1	Check cartridge
7.	10586-3	1	Velocity fuse
8.	506-5705	2	JICM x UN O-Ring M Nipple



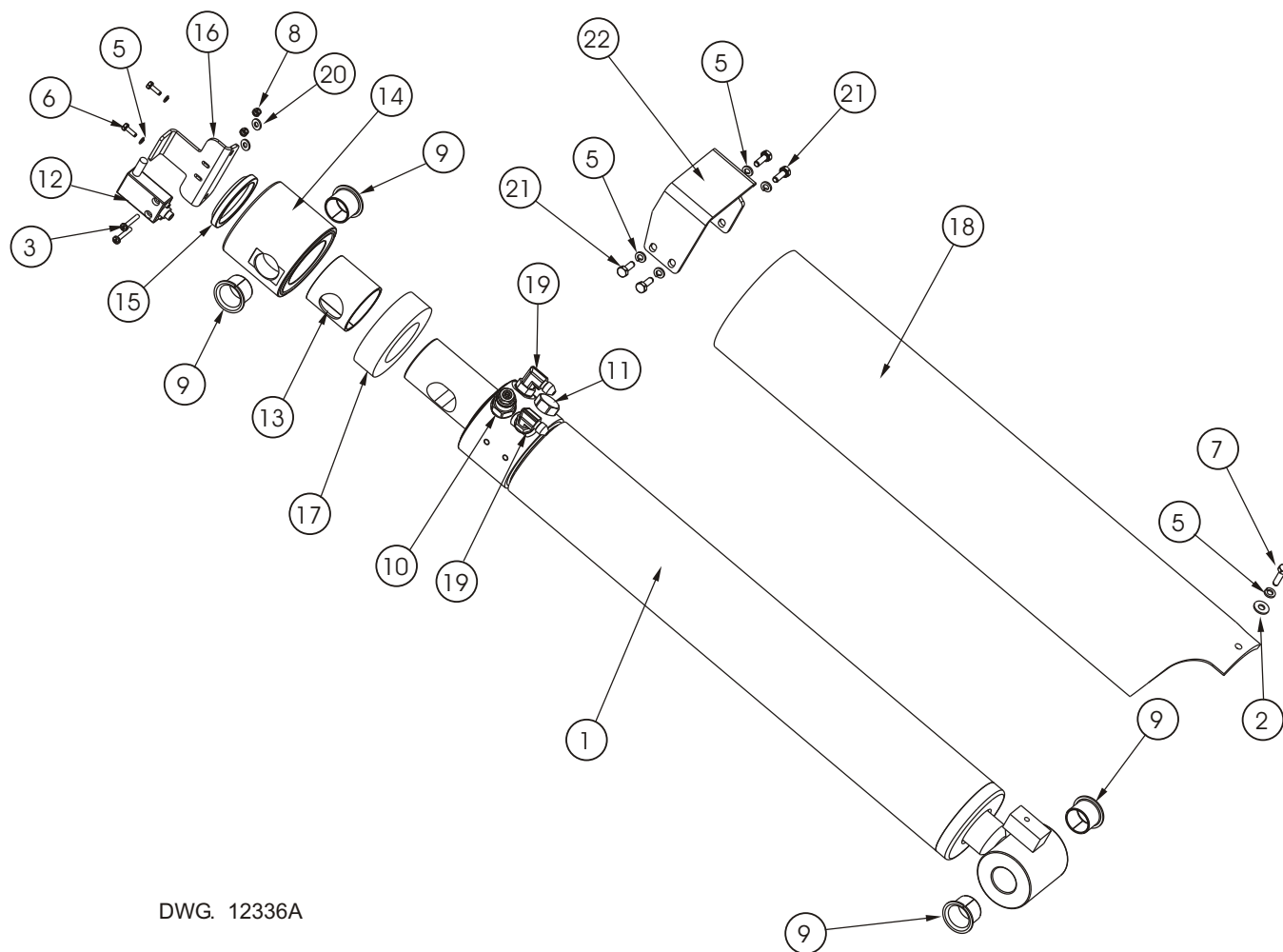
Flyboom cylinder assembly

Item	Part No	Qty	Description
	12332A		Flyboom cylinder assembly
1.	12332	1	Flyboom cylinder
	12332K	1	Seal kit
2.	7031-002	2	JICM x UN O-Ring M elbow
3.	10856-1	1	Counterbalance cartridge
4.	10976-1	1	Cavity plug
5.	3626-10	4	Flanged permaglide bush



Stabiliser leg cylinder assembly

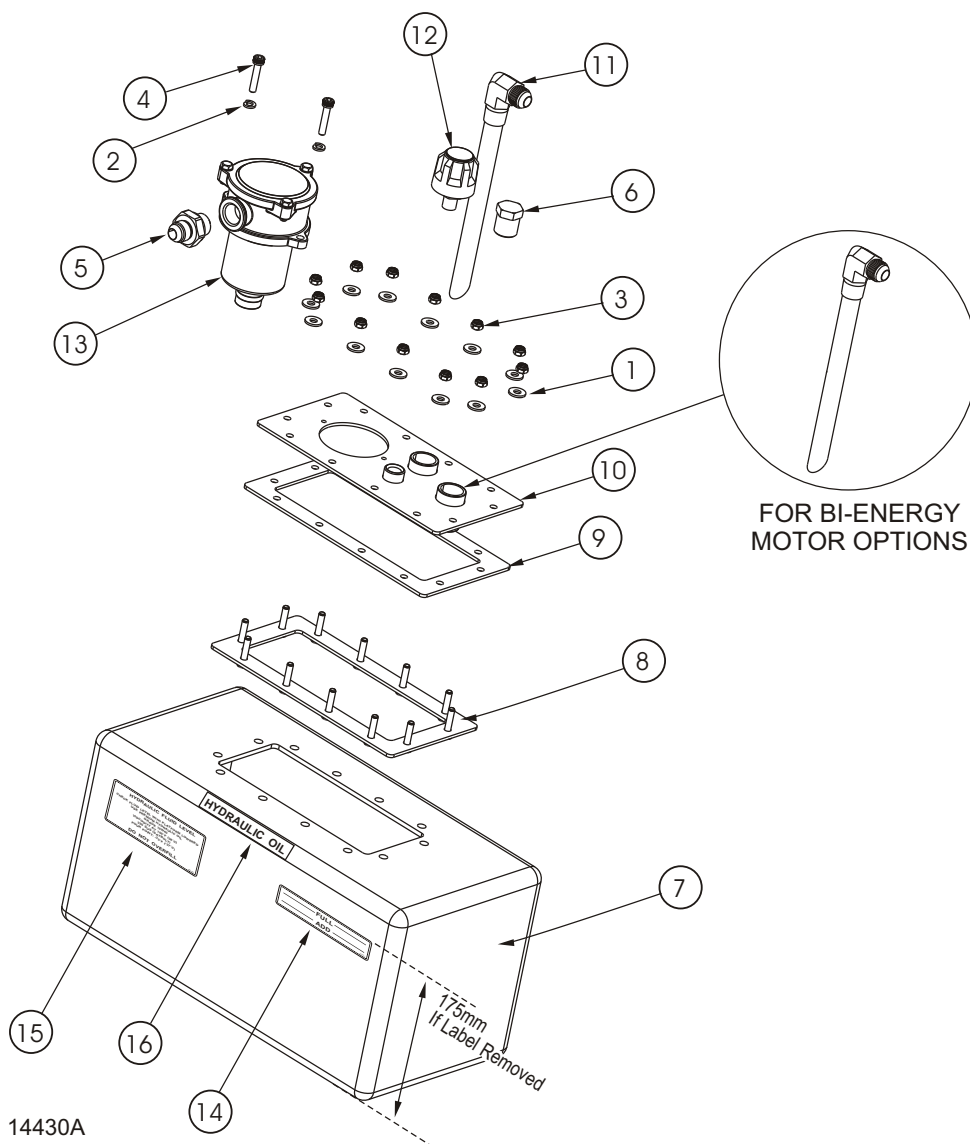
Item	Part No	Qty	Description
	12336A		Stabiliser leg cylinder assembly
1.	12336	1	Stabiliser leg cylinder
	12336K	1	Seal kit
2.	3603-06	1	Plain washer
3.	3663-04025	2	Hex head socket cap screw
5.	3605-06	7	Spring washer
6.	3610-06012	2	Metric bolt
7.	3610-06020	1	Metric bolt
8.	3611-04	2	Metric Nylock nut
9.	3626-1	4	Flanged permaglide bush
10.	10286-3	1	Counterbalance cartridge
11.	10286-4	1	Check cartridge
12.	12336-10	1	Limit switch
13.	12336-11	1	Sliding bush
14.	12336-2	1	Cylinder base
15.	12336-3	1	Wiper seal
16.	12336-4	1	Switch mount
17.	12336-7	1	Rubber spring
18.	12425	1	Leg cylinder guard
19.	7031-002	2	JICM x UN O-Ring M elbow
20.	3603-04	2	Plain washer
21.	3610-06016	4	Metric bolt
22.	12336-20	1	Valve guard



DWG. 12336A

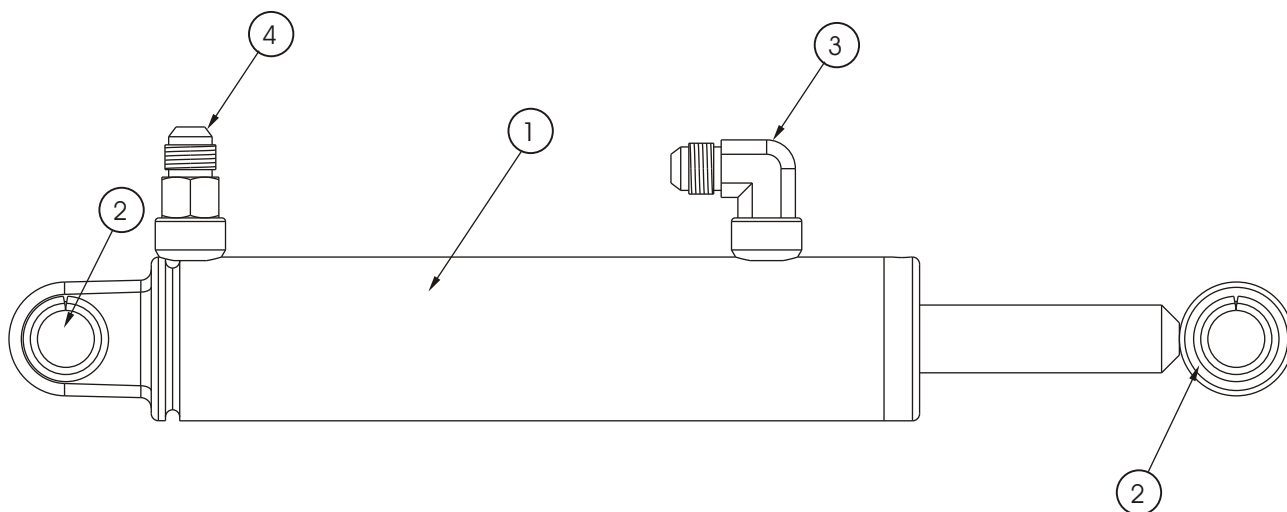
Hydraulic oil tank assembly

Item	Part No	Qty	Description
	14430A		Hydraulic oil tank assembly
1.	3603-06	12	Plain washer
2.	3605-06	2	Spring washer
3.	3611-06	12	Metric Nylock nut
4.	3613-06030	2	Metric cap screw
5.	7013-002	1	BSPP (Dowty) x JICM nipple
6.	7034-004	1	0.5" BSPTM plug
	11430-7	1	Suction pipe weldment (Replaces plug for electric motor option)
7.	11430-10	1	Oil tank, molded
8.	11430-11	1	Base plate weldment
9.	11430-15	1	Gasket
10.	11430-23	1	Top tank plate weldment
11.	11430-7	1	Suction pipe weldment
12.	11487	1	Filter breather
13.	11488-10	1	Tank top filter
14.	302950	1	Decal, hydraulic oil level, min/max
15.	12814	1	Decal, hydraulic fluid
16.	9207	1	Decal, hydraulic oil



Optional Rotator cylinder assembly

Item	Part No	Qty	Description
	12330A		Rotator cylinder assembly
1.	12330	1	Rotator cylinder
	12330K	1	Seal kit
2.	3626-3	2	Flanged permaglide bush
3.	7046-012	1	Elbow, BSPTM x JICM
4.	7019-018	1	Nipple, BSPTM x JICM

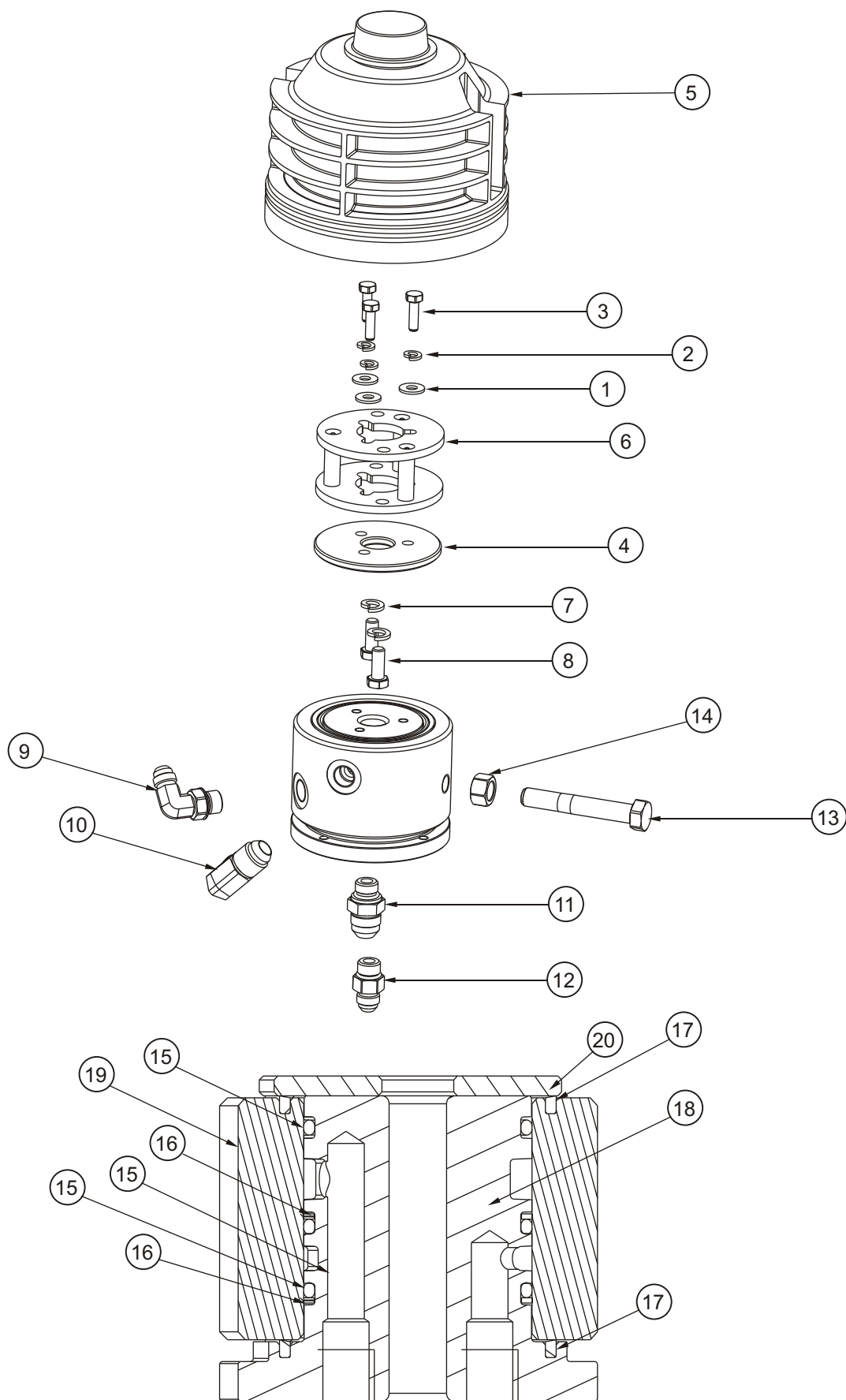


DWG. 12330A

Optional Oil distributor assembly - 2 port

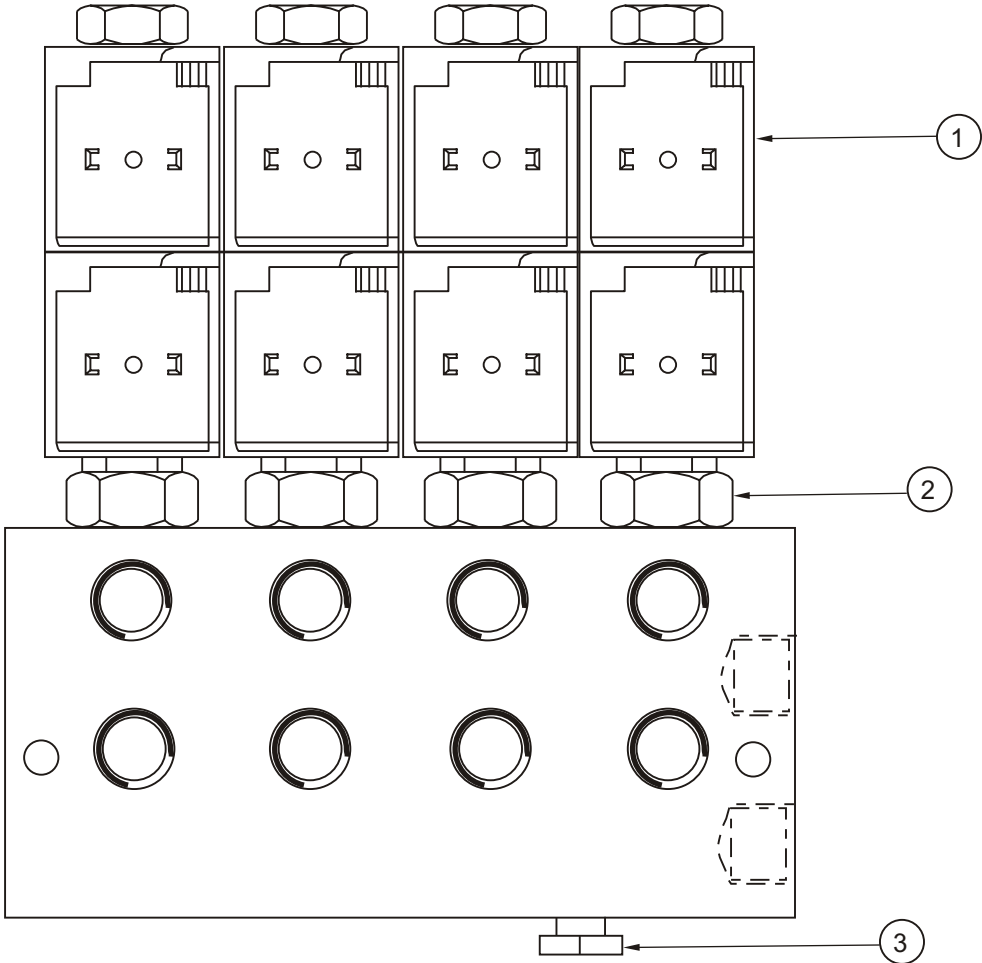
Item	Part No	Qty	Description
	12679A		Oil distributor assembly, 2 port
1.	3603-06	3	Plain washer
2.	3605-06	3	Spring washer
3.	3610-06020	3	Metric bolt
4.	11957-3	1	Distributor cap
5.	12679	1	Power plate rotator
6.	12679-20	1	Spacer plate
7.	60005-008	2	Spring washer
8.	60016-003	2	Bolt
9.	7031-001	1	JICM UN O-Ring elbow
10.	7031-007	1	JICM UN O-Ring elbow
11.	7025-002	1	JICM UN O-Ring straight
12.	506-7707	1	JICM UN O-Ring straight
13.	3615-12075	1	Metric set screw
14.	3602-12	1	Metric nut
15.	13-228	3	O-Ring
16.	11768-228	2	PTFE backup washer
17.	11956-5	2	Wiper seal
18.	11957-1	1	Distributor 2 port pillar
19.	11957-2	1	Distributor 2 port barrel
20.	11957-3	1	Distributor cap

Optional Oil distributor assembly drawing

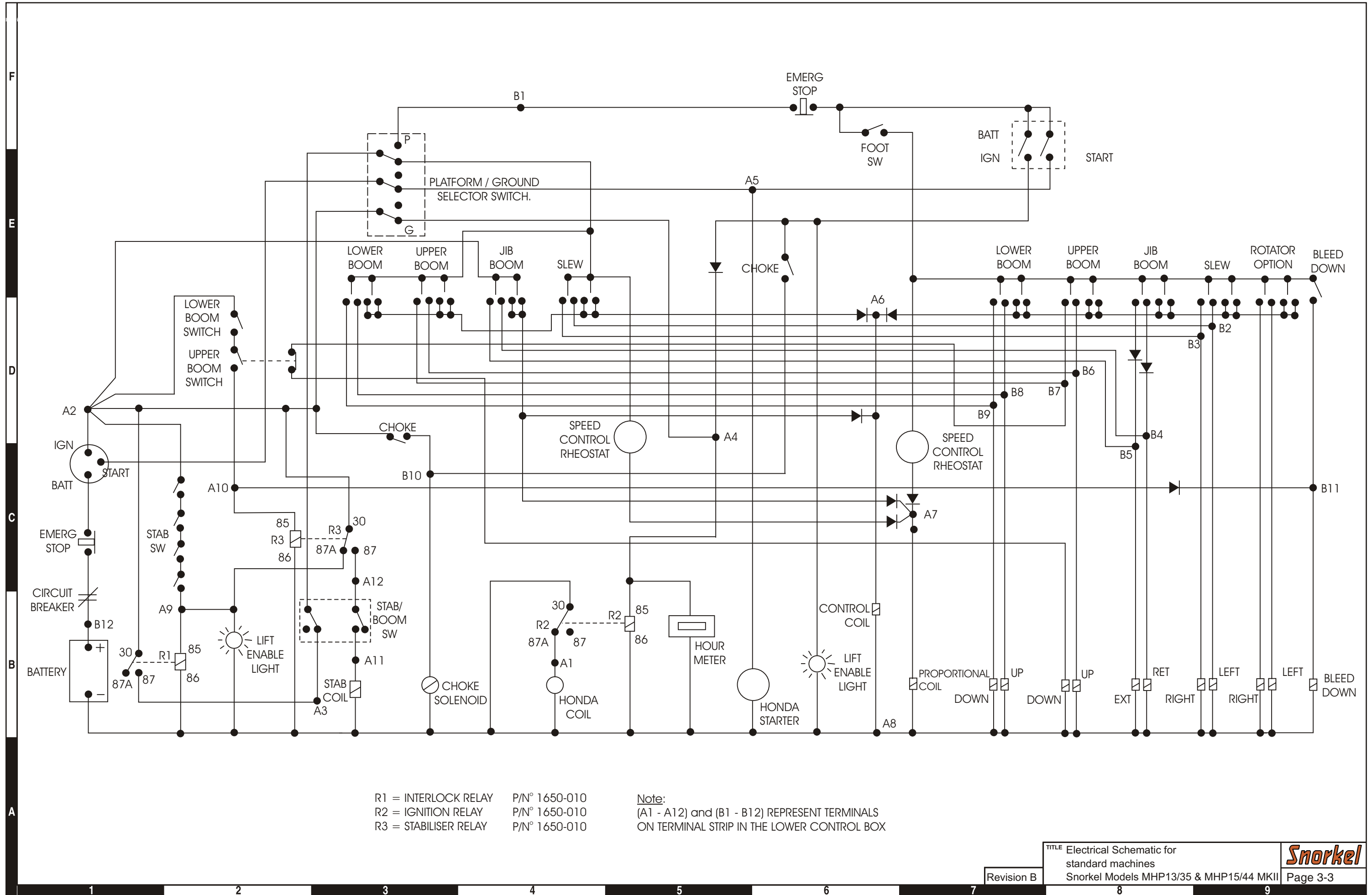


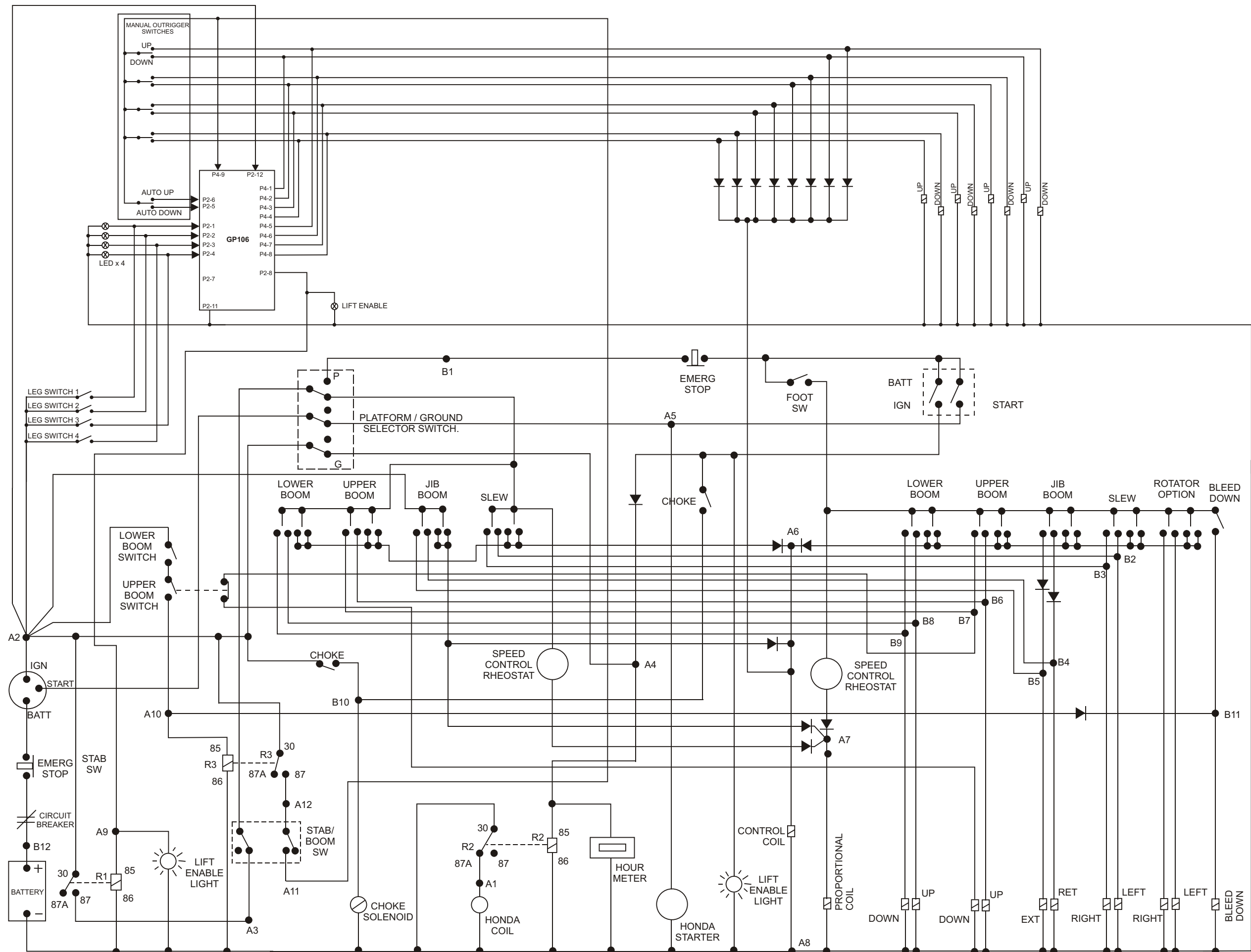
Optional Automatic stabiliser

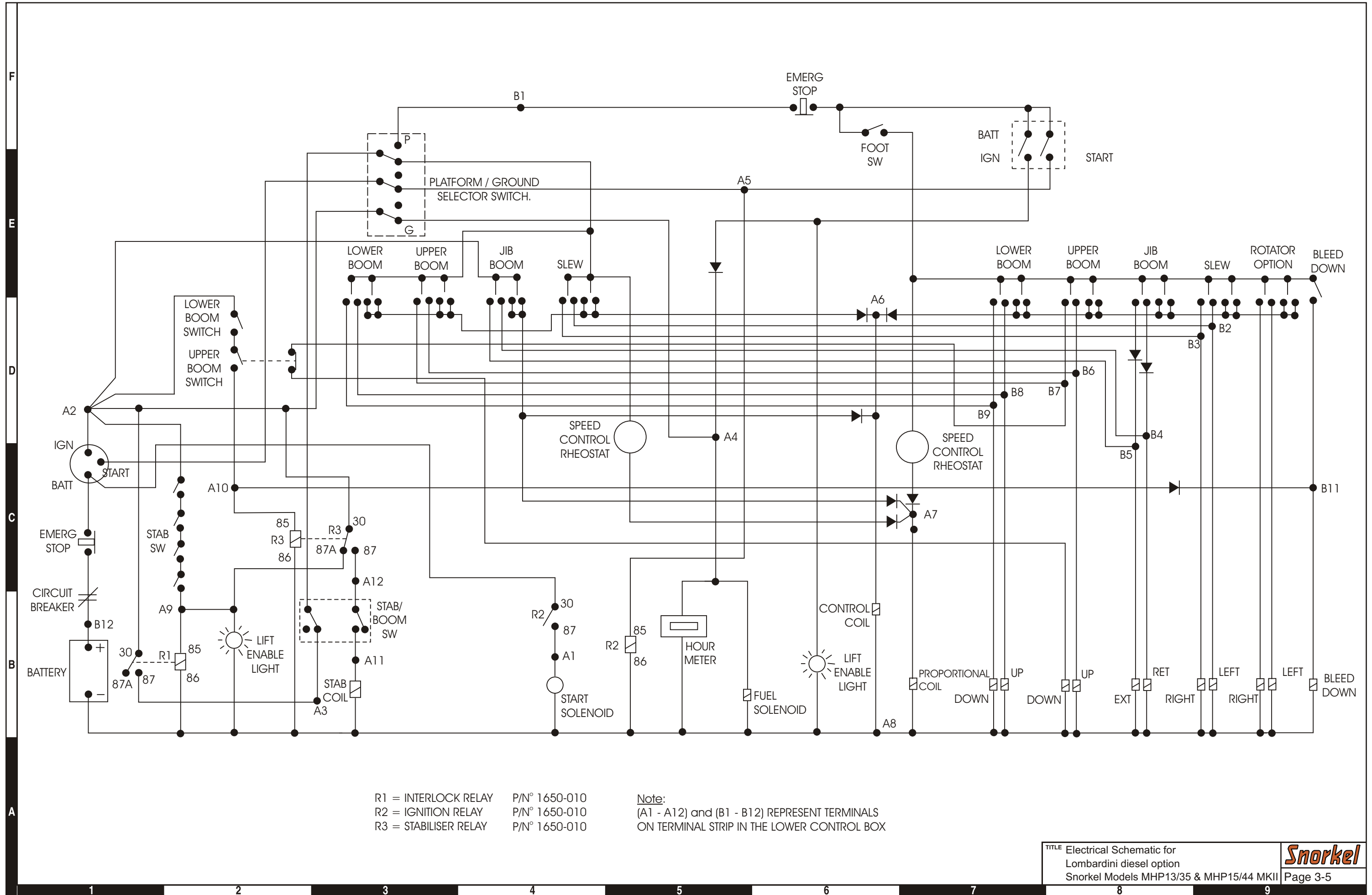
Item	Part No	Qty	Description
	11921A	Ref	Manifold block assembly
1.	11415-11	8	12V coil
2.	11415-9	4	Valve spool
3.	7034-001	1	Cavity Plug



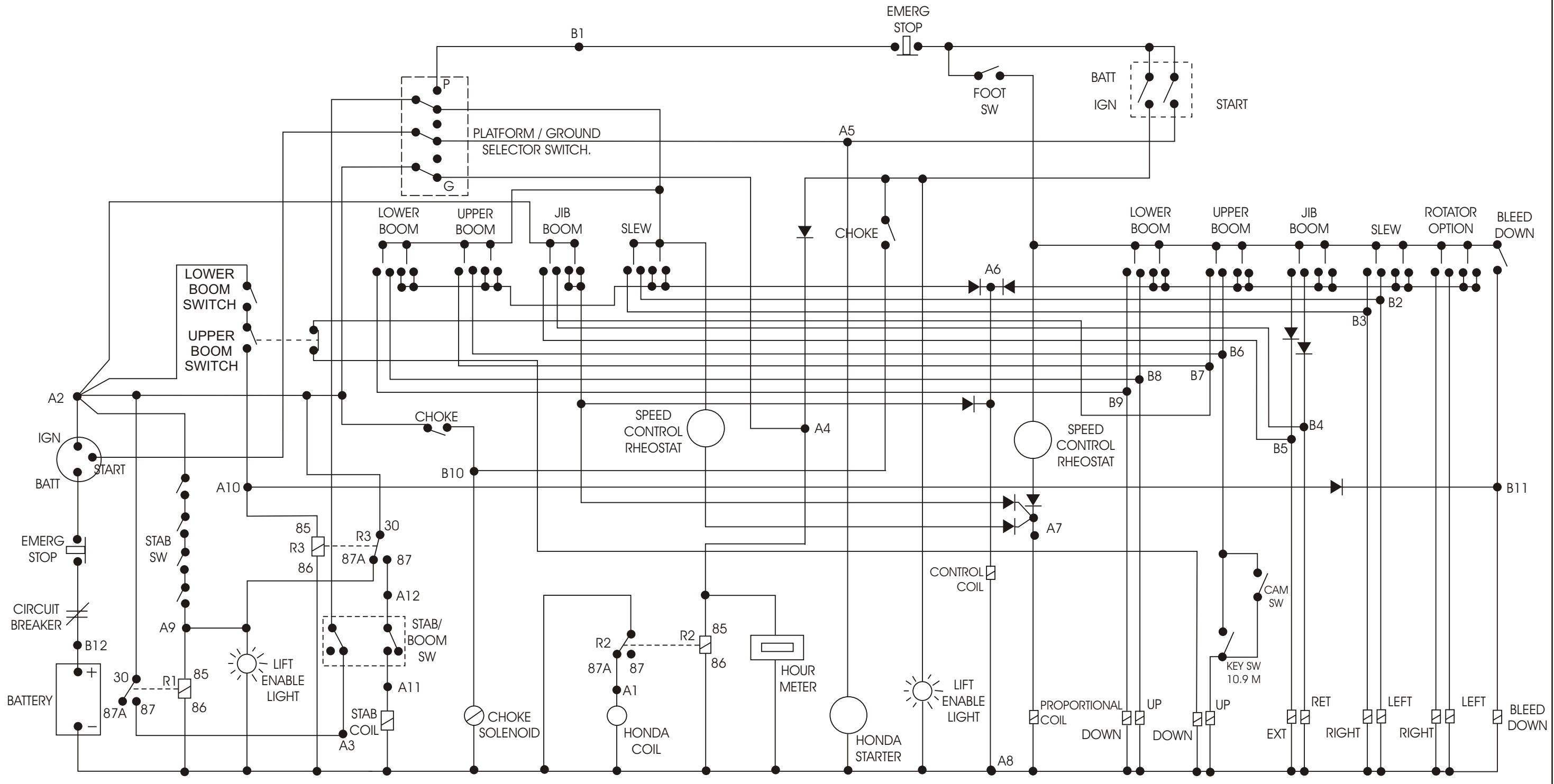
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R1 = INTERLOCK RELAY P/N° 1650-010
R2 = IGNITION RELAY P/N° 1650-010
R3 = STABILISER RELAY P/N° 1650-010

Note:
(A1 - A12) and (B1 - B12) REPRESENT TERMINALS
ON TERMINAL STRIP IN THE LOWER CONTROL BOX

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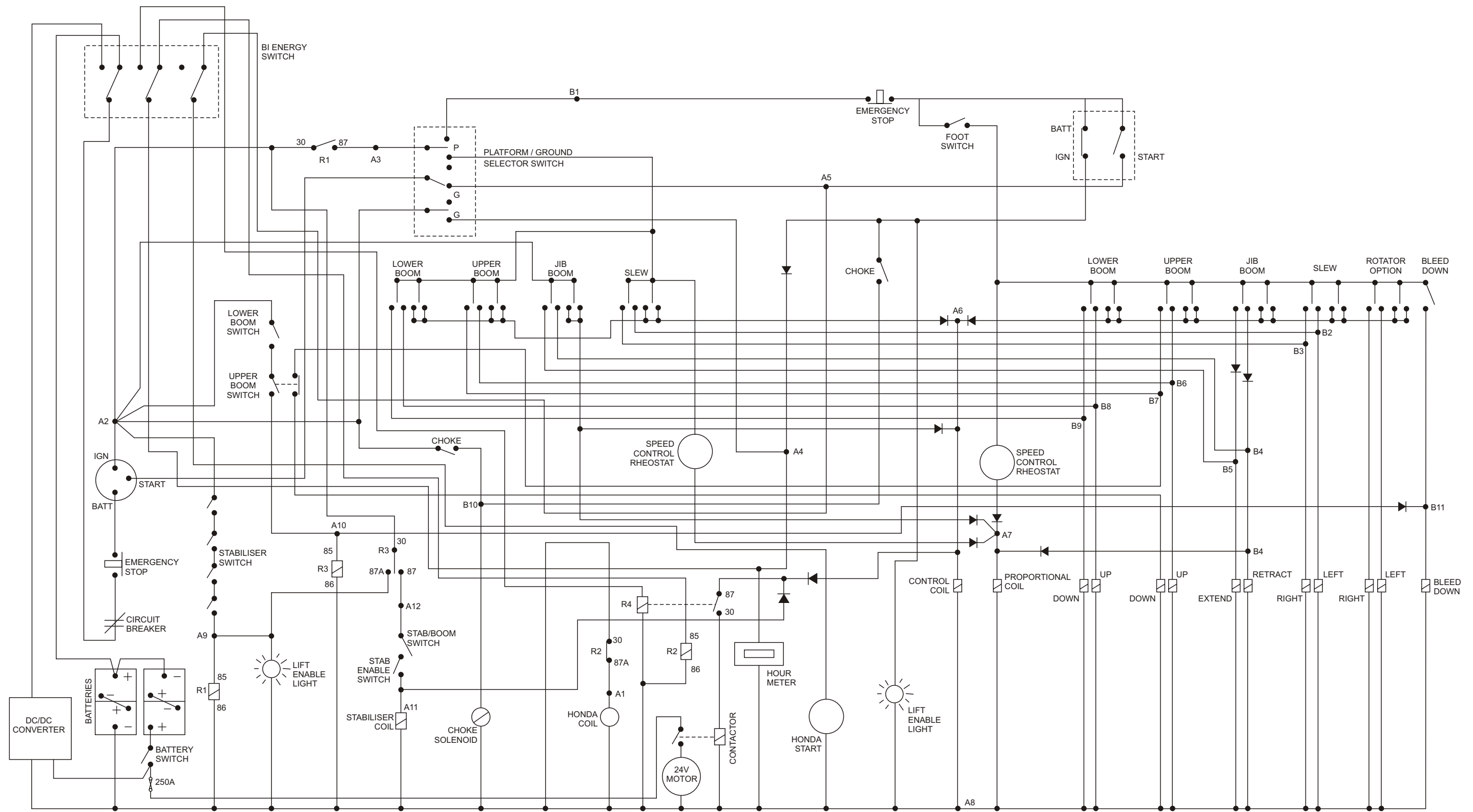
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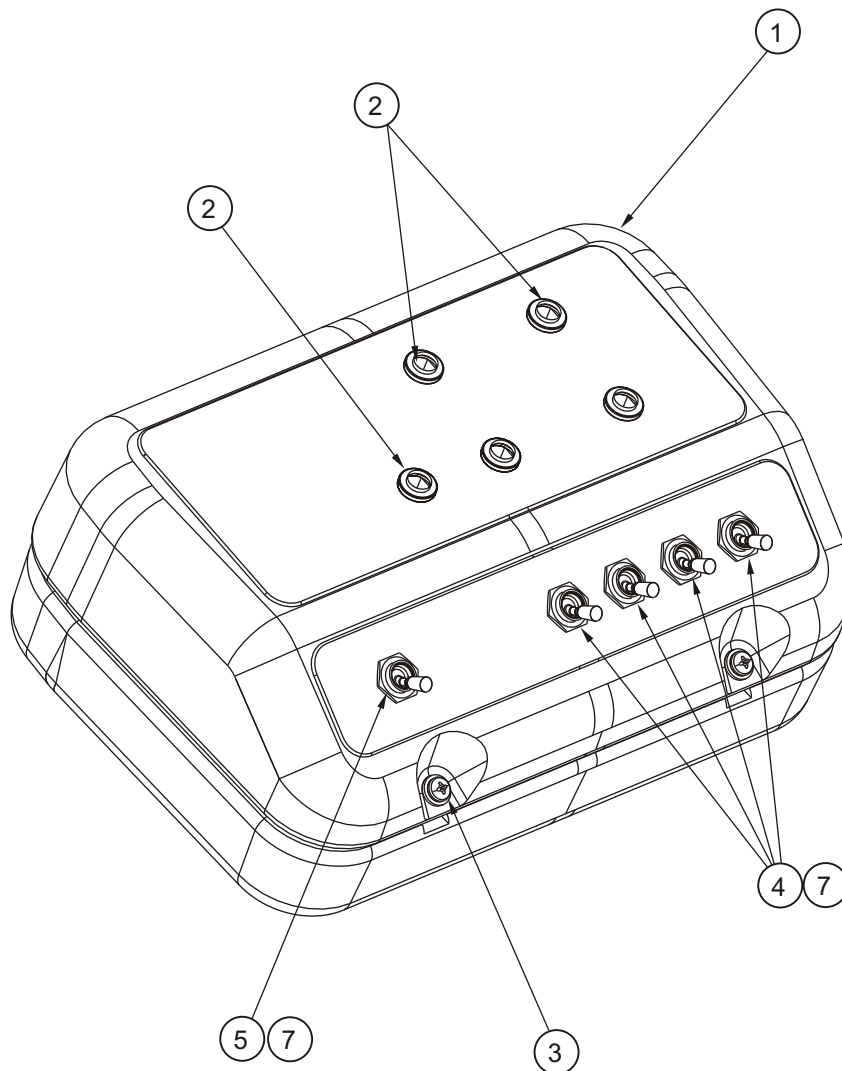
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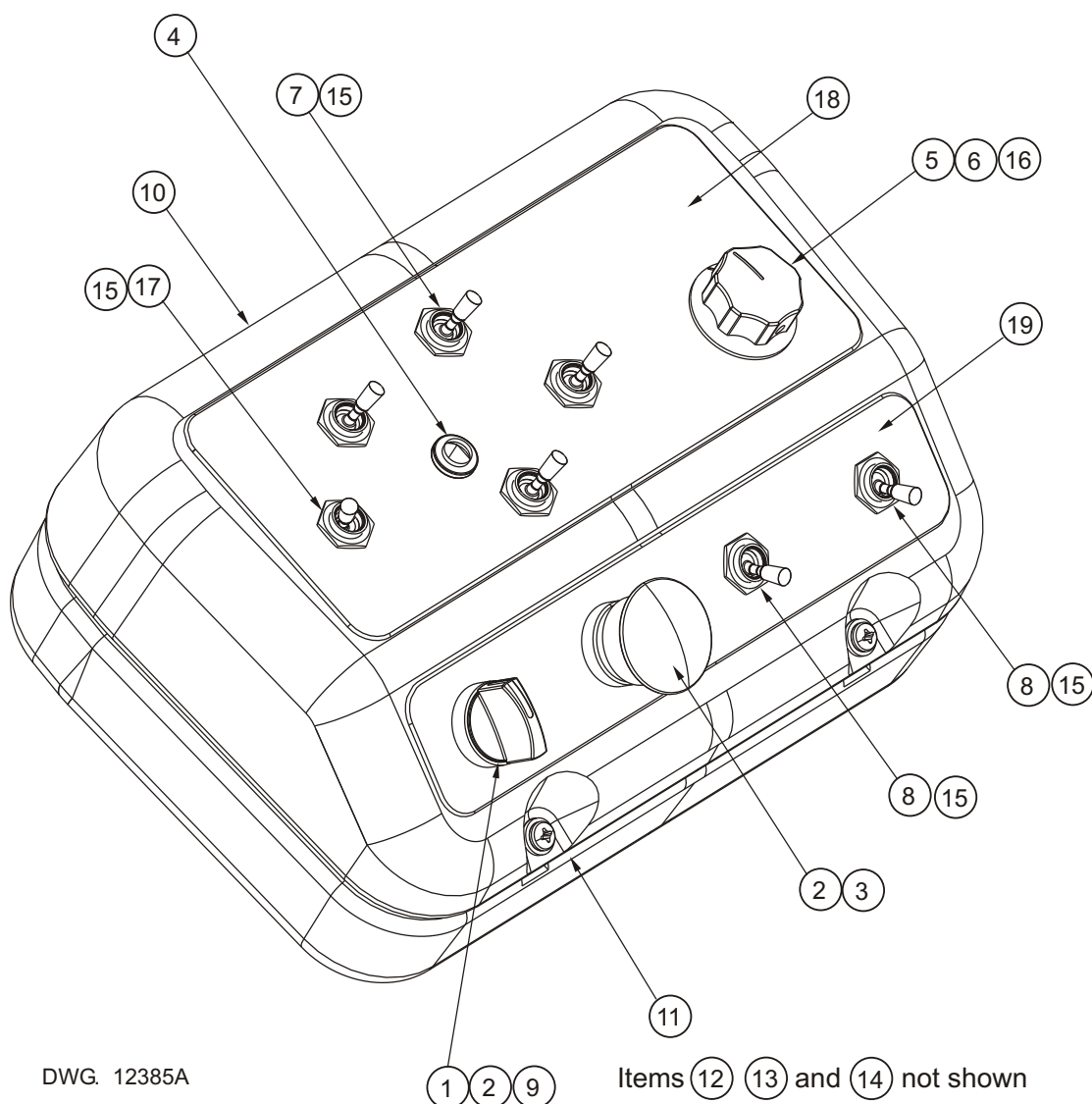
Automatic stabiliser control box assembly

Item	Part No	Qty	Description
	12433-1		Control box assembly, auto stabiliser
1.	12404	1	Control box
2.	12536-3	5	LED, 12V green
3.	3604-05020	2	Pan head screw
4.	302-0016	5	Switch, toggle, SPDT (M/OFF/M)
5.	12416	1	Hinge (not shown)
6.	12408	1	Seal (not shown)
7.	12515	5	Washer
8.	1815	2	Cable gland (not shown)

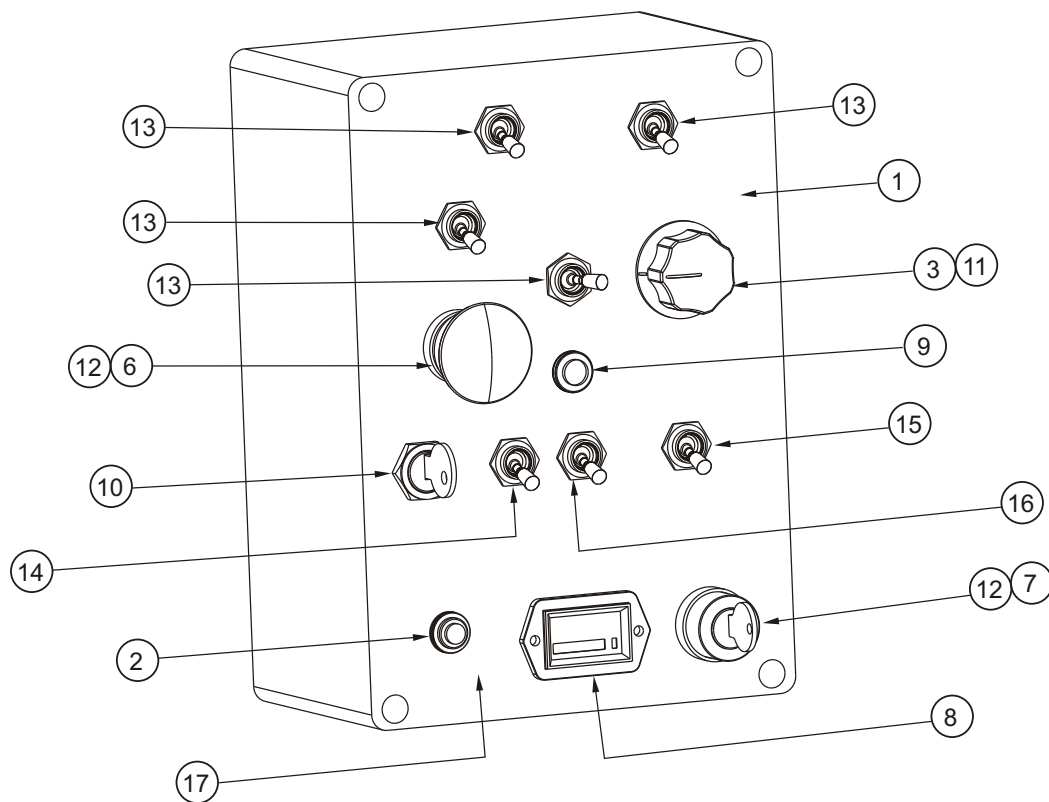


Upper control box assembly

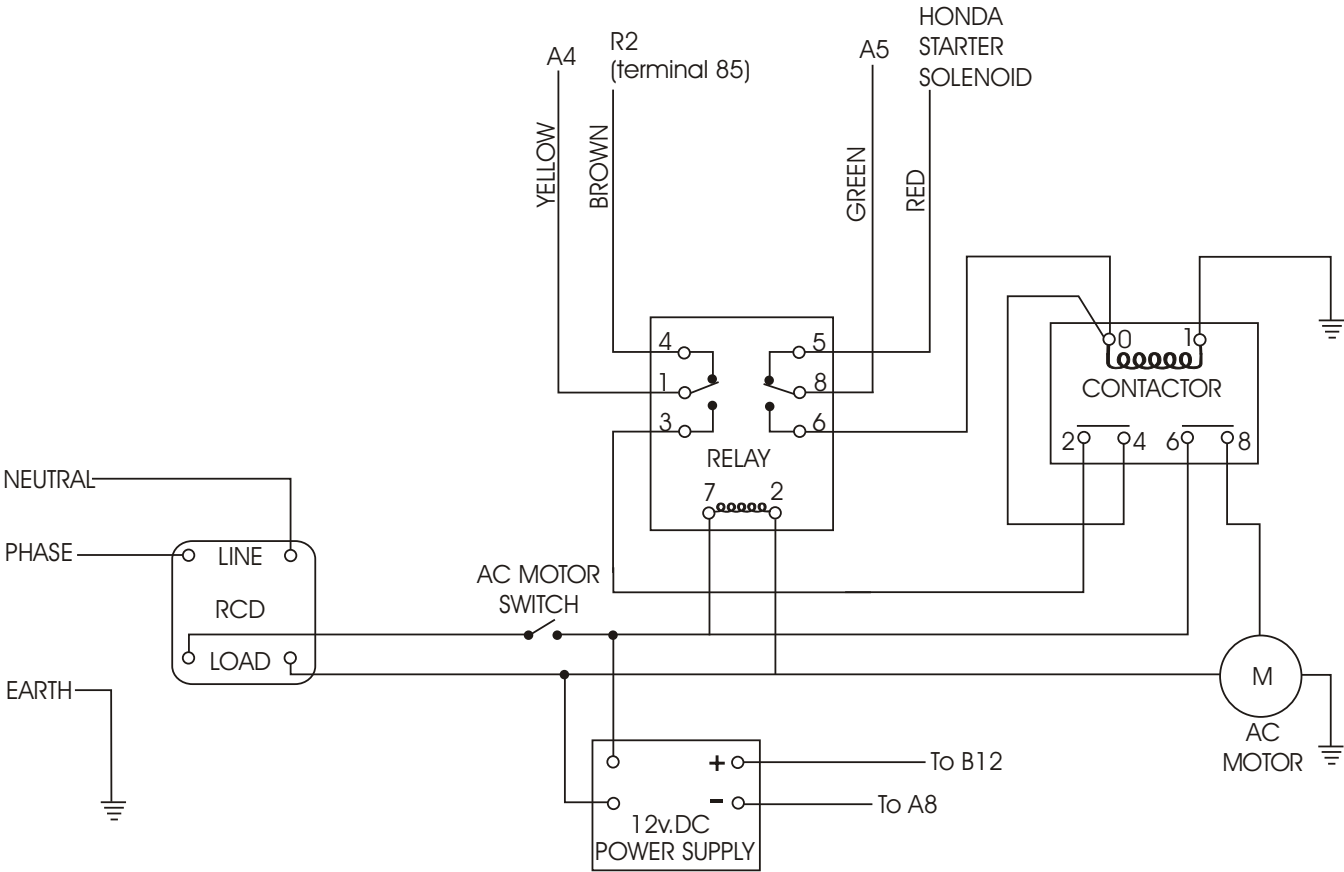
Item	Part No	Qty	Description
	12385A		Upper control box assembly
1.	8808-1	1	Start switch 3 position
2.	9776	1	Collar and contact block
3.	9775	1	Stop switch head
4.	12536-3	1	LED, 12V, green
5.	304-0412	1	Rheostat
6.	304-0348	1	Knob, speed control switch
7.	302-0018	4	Switch, toggle DPDT (M/OFF/M)
8.	302-0015	2	Switch, toggle SPST (MOM/OFF)
9.	10114	1	Contact set, additional
10.	12385	1	Control box, upper
11.	3604-05020	2	Pan head screw, plated
12.	12408	1	Rubber seal (not shown)
13.	12416	1	Hinge (not shown)
14.	304-0338	1	Plug assembly (not shown)
15.	7084-005	6	Seal
16.	7084-007	1	Seal
17.	302-0018	1	Used with rotate option only
18.	12385-12	1	Replacement decal, Boom Function
19.	12385-13	1	Replacement decal, Start-Stop

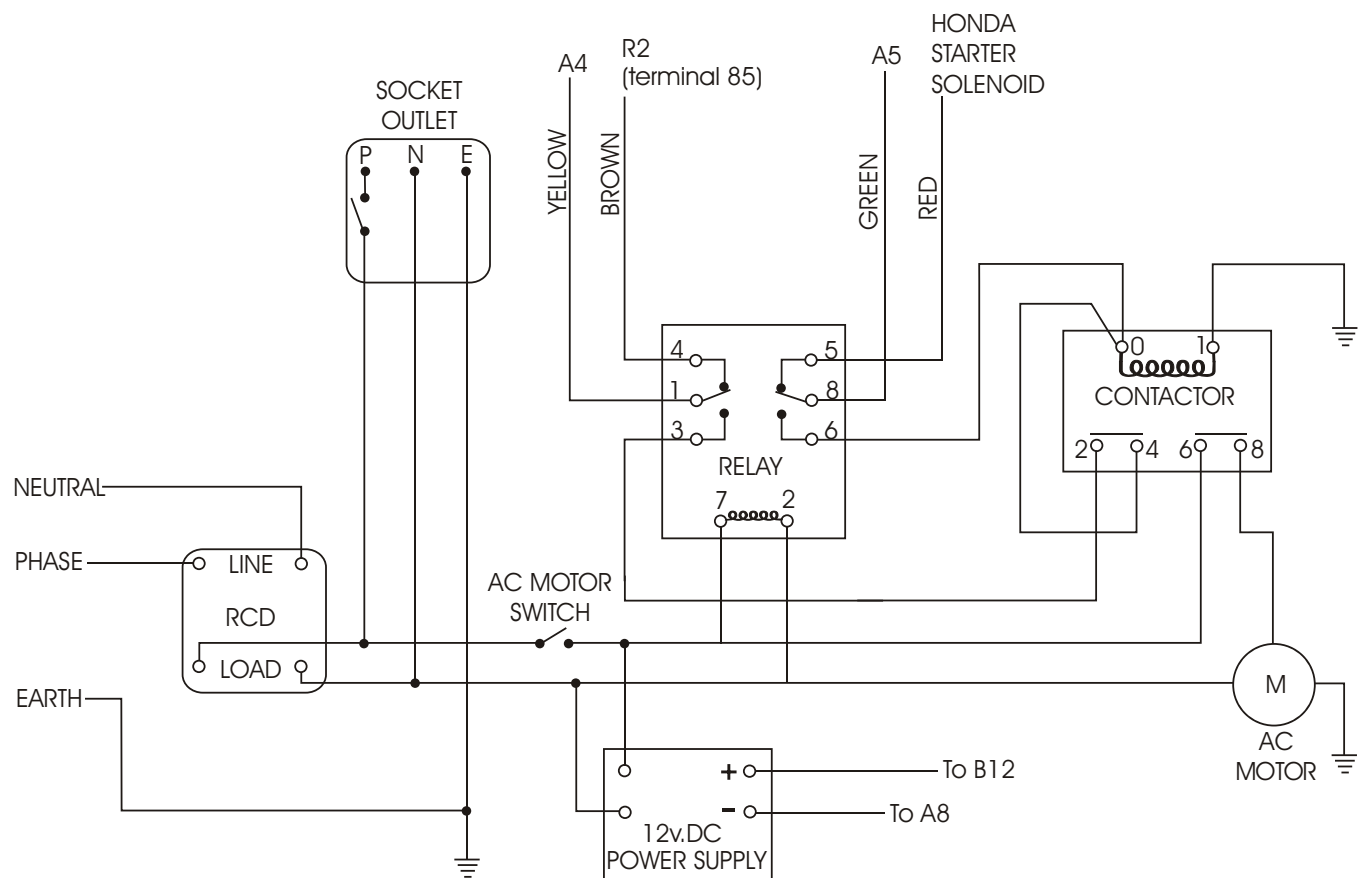


Item	Part No	Qty	Description
	12521A	1	Lower control box assembly
1.	12521-1	1	Control box, lower
2.	56368-6	1	Circuit breaker, 15 amp
3.	304-0438	1	Knob, speed control switch
4.	1814	3	Cable gland (not shown)
5.	1815	1	Cable gland (not shown)
6.	9775	1	Stop switch head
7.	10744	1	Key switch
8.	455186	1	Hourmeter
9.	12536-3	1	LED, 12V, green
10.	3020087	1	Key switch
11.	304-0412	1	Rheostat
12.	9776	2	Collar and contact block
13.	302-0018	4	Switch,toggle, DPDT (M/OFF/M)
14.	302-0015	1	Switch, toggle, SPST (MOM/OFF)
15.	302-0048	1	Switch, toggle, 4PDT (ON/ON)
16.	302-0097	1	Switch, toggle, DPDT (ON/ON)
17.	12523	1	Decal, lower control box

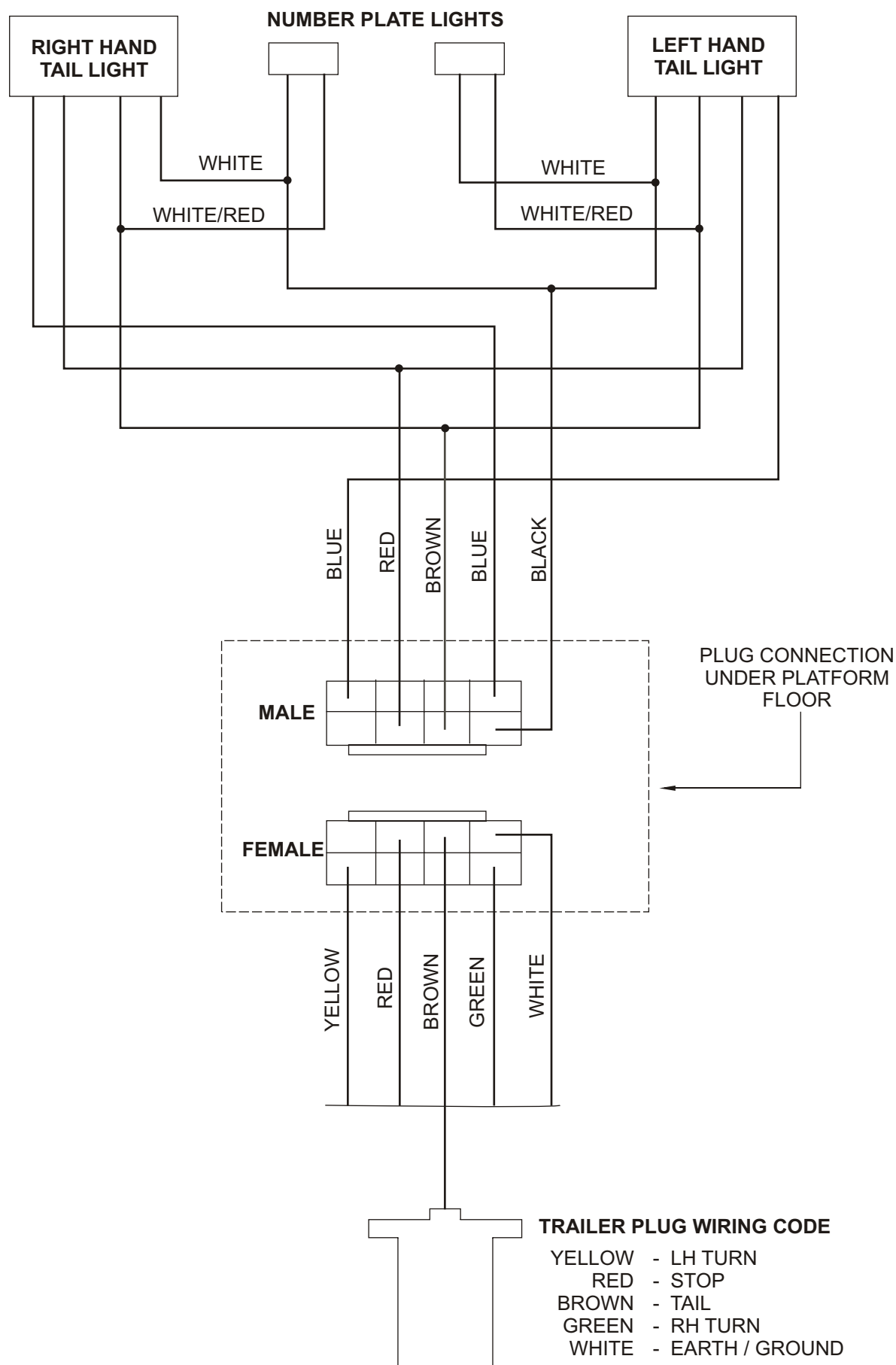


240V AC motor option drawing





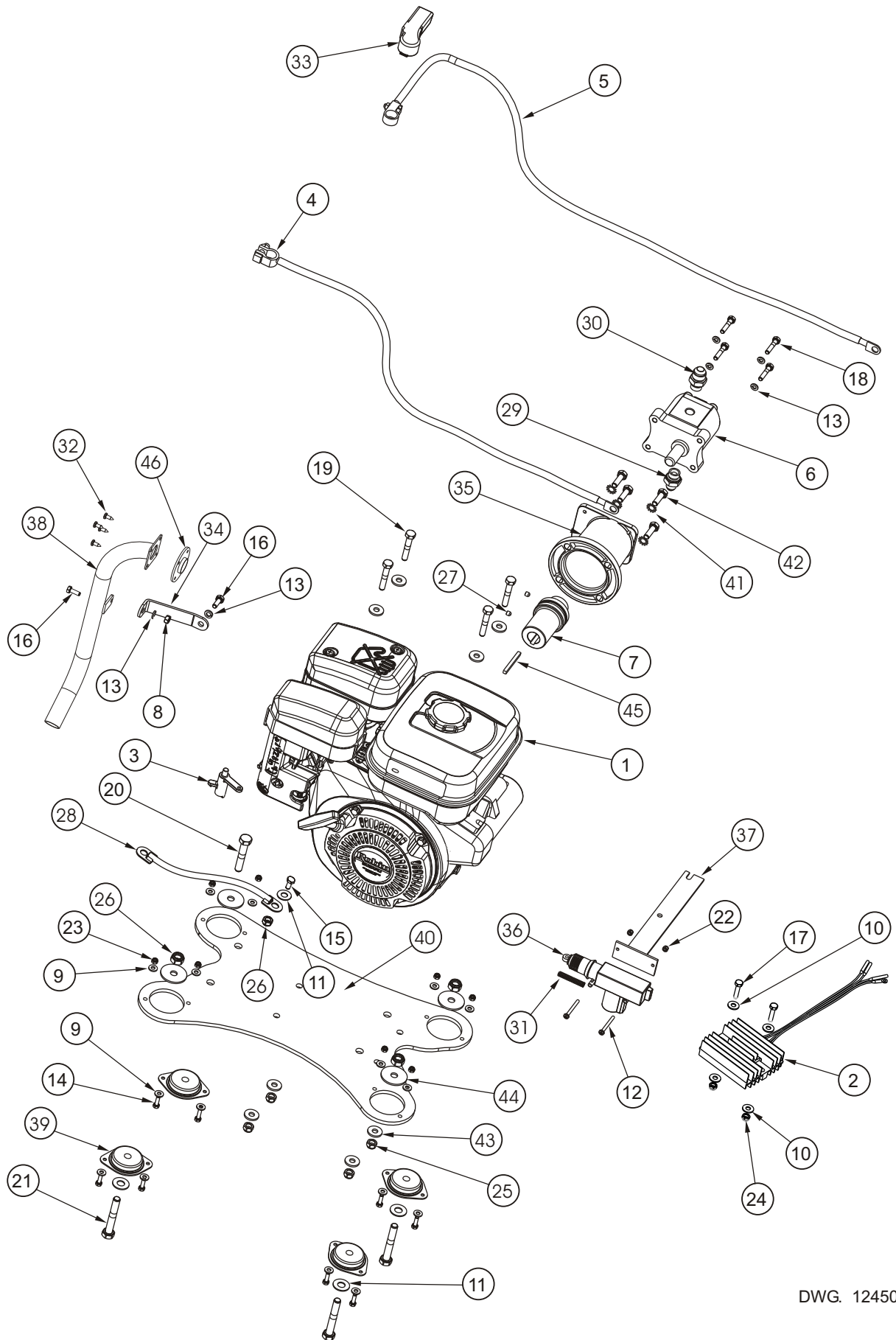
Wiring diagram for LED tail lights



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Engine assembly, Robin (Sheet 1)

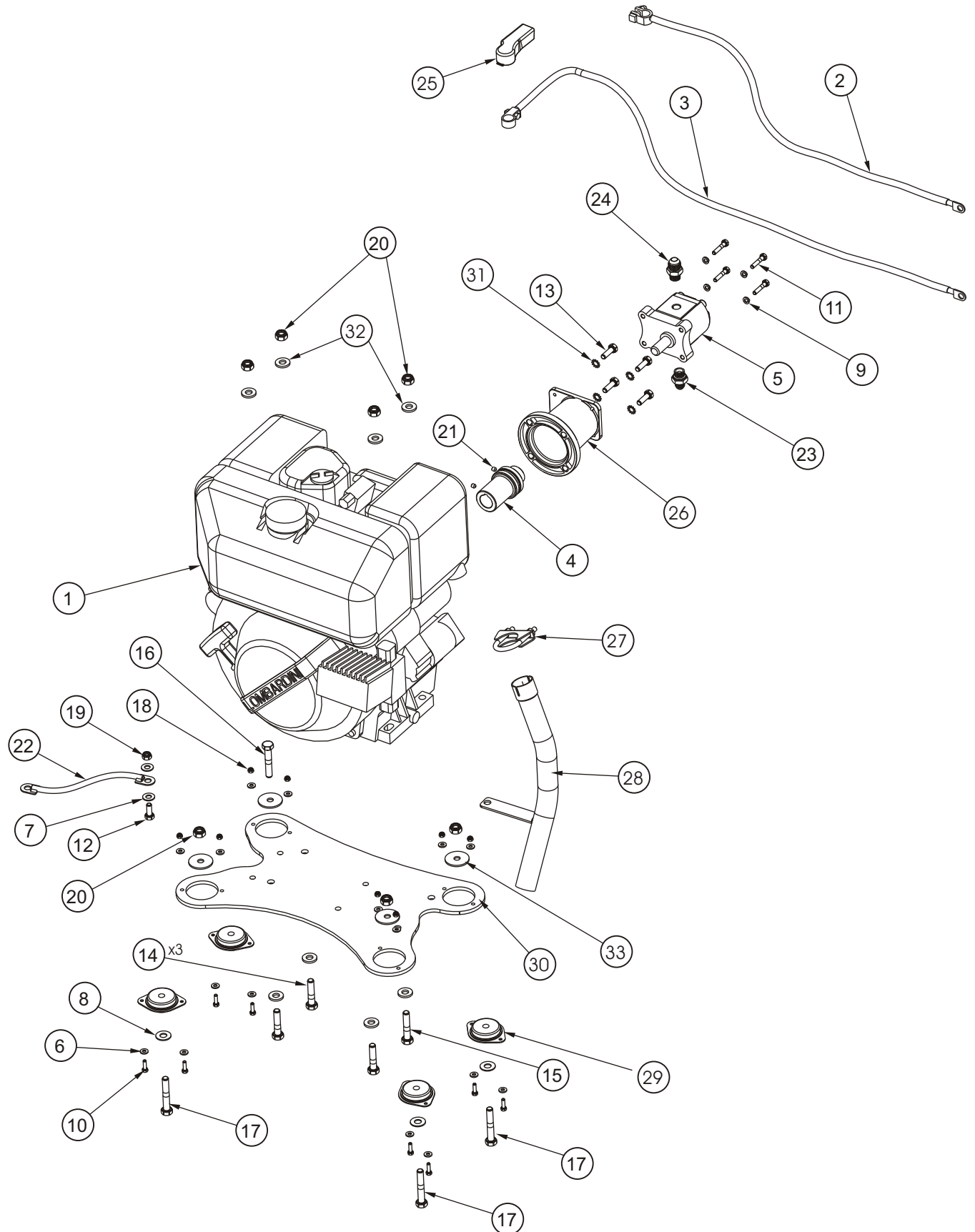
Item	Part No	Qty	Description
0.	12450		Engine assembly EX17DS
	12542		Engine assembly EX21DS
1.	1171-11	1	Robin EX17 6.0HP
	1171-12	1	Robin EX21 7.0HP
2.	1171-11-022	1	Regulator / rectifier Robin
3.	1171-11-031	1	Choke actuator lever
4.	1650-030	1	Battery cable
5.	1650-031	1	Battery cable
6.	1659	1	Gear pump
7.	1880-003	1	Drive coupling
8.	3602-06	1	Metric nut
9.	3603-05	16	Plain washer
10.	3603-06	4	Plain washer
11.	3603-10	4	Plain washer
12.	3604-04040	2	Metric screw pan head
13.	3605-06	5	Spring washer
14.	3610-05016	8	Metric bolt
15.	3610-10020	1	Metric bolt
16.	3610-06016	1	Metric bolt
17.	3610-06025	2	Metric bolt
18.	3610-06030	4	Metric bolt
19.	3610-08045	4	Metric bolt
20.	3610-10055	1	Metric bolt
21.	3610-10065	3	Metric bolt
22.	3611-04	2	Metric nylock nut
23.	3611-05	8	Metric nylock nut
24.	3611-06	2	Metric nylock nut
25.	3611-08	4	Metric nylock nut
26.	3611-10	4	Metric nylock nut
27.	3612-06006	2	Grub screw
28.	3649-10	1	Battery cable
29.	7013-003	1	BSPP (Dowty) x JICM nipple
30.	7013-004	1	BSPP (Dowty) x JICM nipple
31.	8398	1	Spring
32.	8978-1	2	Screw, self tapping
33.	10254	1	Cover, battery terminal
34.	12539-4	1	Exhaust bracket
35.	10417	1	Bell housing
36.	11444	1	Choke solenoid 12V
37.	12541	1	Choke solenoid bracket
38.	12539	1	Exhaust weldment, EX17DS
	12543	1	Exhaust weldment, EX21DS
39.	12524	4	Engine mount
40.	12526	1	Engine mount plate
41.	60005-054	4	Lockwasher
42.	60016-090N	4	Bolt, plated
43.	60030-3N	8	Flat washer
44.	5560179	4	Flat washer, special
45.	5KEY	1	Key steel
46.	12539-50	1	Exhaust shroud



DWG. 12450

Engine assembly, Lombardini (Sheet 1)

Item	Part No	Qty	Description
0.	12449		Engine assembly
1.	1171-8	1	Lombardini 15LD315 diesel engine
2.	1650-030	1	Battery cable
3.	1650-031	1	Battery cable
4.	1657-11	1	Drive coupling
5.	1659	1	Gear pump
6.	3603-05	16	Plain washer
7.	3603-08	2	Plain washer
8.	3603-10	3	Plain washer
9.	3605-06	4	Spring washer
10.	3610-05016	8	Metric bolt
11.	3610-06030	4	Metric bolt
12.	3610-08020	1	Metric bolt
13.	3610-08025	4	Metric bolt
14.	3610-10045	3	Metric bolt
15.	3610-10050	1	Metric bolt
16.	3610-10055	1	Metric bolt
17.	3610-10060	3	Metric bolt
18.	3611-05	8	Nyloc nut
19.	3611-08	1	Nyloc nut
20.	3611-10	7	Nyloc nut
21.	3612-06006	2	Grub screw
22.	3649-10	1	Battery cable
23.	7013-003	1	BSPP (Dowty) x JICM nipple
24.	7013-004	1	BSPP (Dowty) x JICM nipple
25.	10254	1	Cover, battery terminal
26.	10417	1	Bell housing
27.	12409	1	Exhaust clamp
28.	12450	1	Exhaust weld, Lombardini
29.	12524	4	Engine mount
30.	12526	1	Engine mount plate
31.	60005-054	4	Lockwasher
32.	60030-061	8	Washer, heavy duty
33.	5560179	4	Flat washer, special



Basket rotator (Sheet 1)

Item	Part No	Qty	Description
0.	12441		Basket rotator assembly
1.	12468-2	1	Rotator, jib side
2.	3611-10	6	Nylock nut
3.	3626-10	4	Flanged bush
4.	3603-10	12	Plain washer
5.	12470	1	Stepped pin 25 x 235
6.	12468-1	1	Rotator, basket side
7.	12451-3	As Req	Basket spacer
8.	3610-10050	4	Bolt
9.	12349	2	Pin 20 x 144mm
10.	3610-10090	2	Bolt, M10 x 90, C8.8
11.	3611-06	2	Nylock nut
12.	12327A	1	Basket assembly
13.	3603-06	4	Plain washer
14.	3613-06080	2	Cap screw
15.	506-5705	4	JIC M x UN O-Ring Nipple
16.	11586	1	Double pilot check valve
17.	12468-16	1	Valve mount
18.	3626-5	2	Flanged bush
19.	12330A	1	Rotator cylinder
20.	3626-3	2	Flanged bush
21.	12468-22	1	Pin
22.	8628	4	Pin keeper
23.	11492-1	4	Tab washer
24.	3610-06012	4	Bolt
25.	3603-16	3	Plain washer
26.	3608-16C	1	Conelock nut
27.	12036-5	2	Spacer

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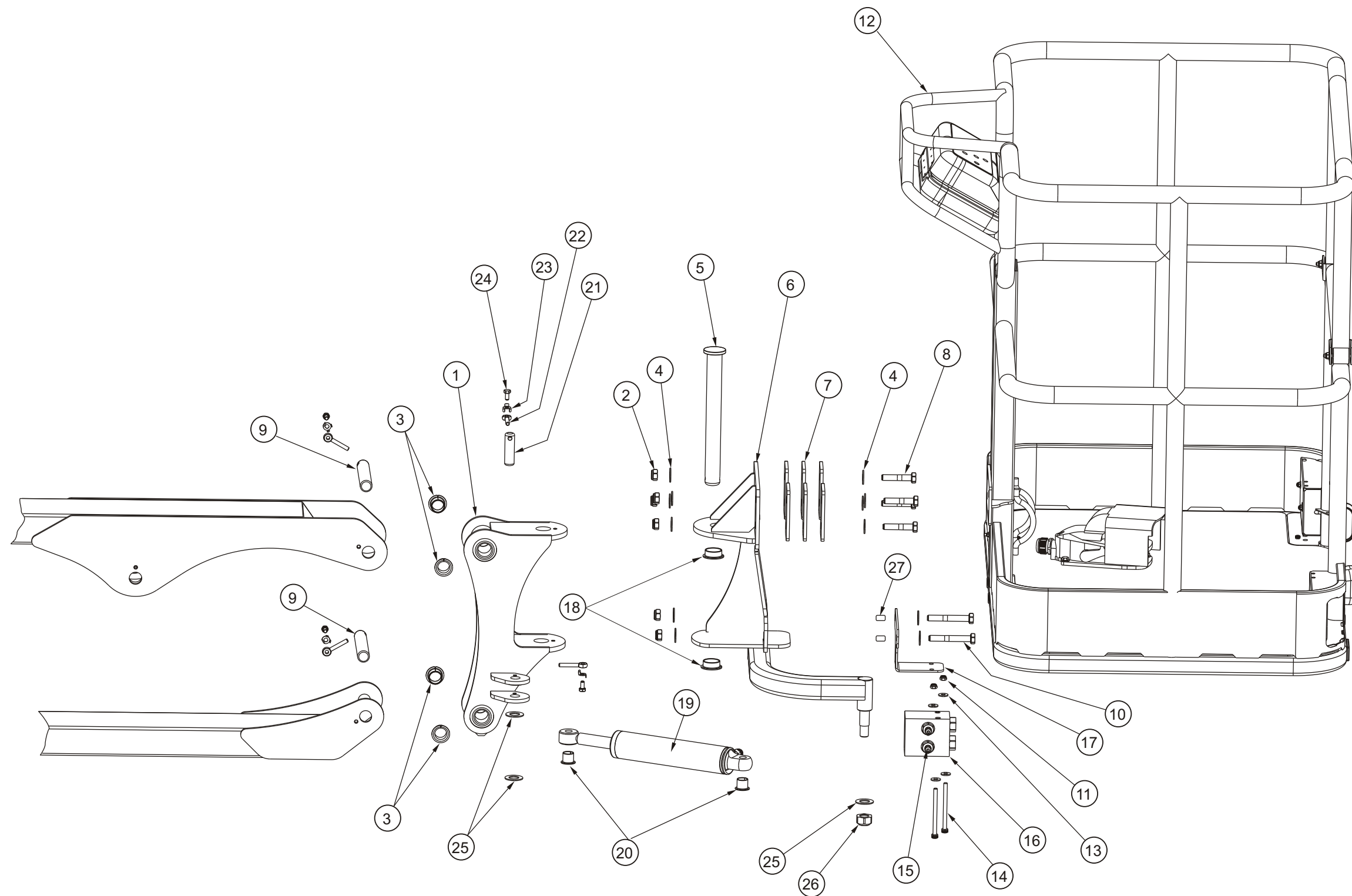
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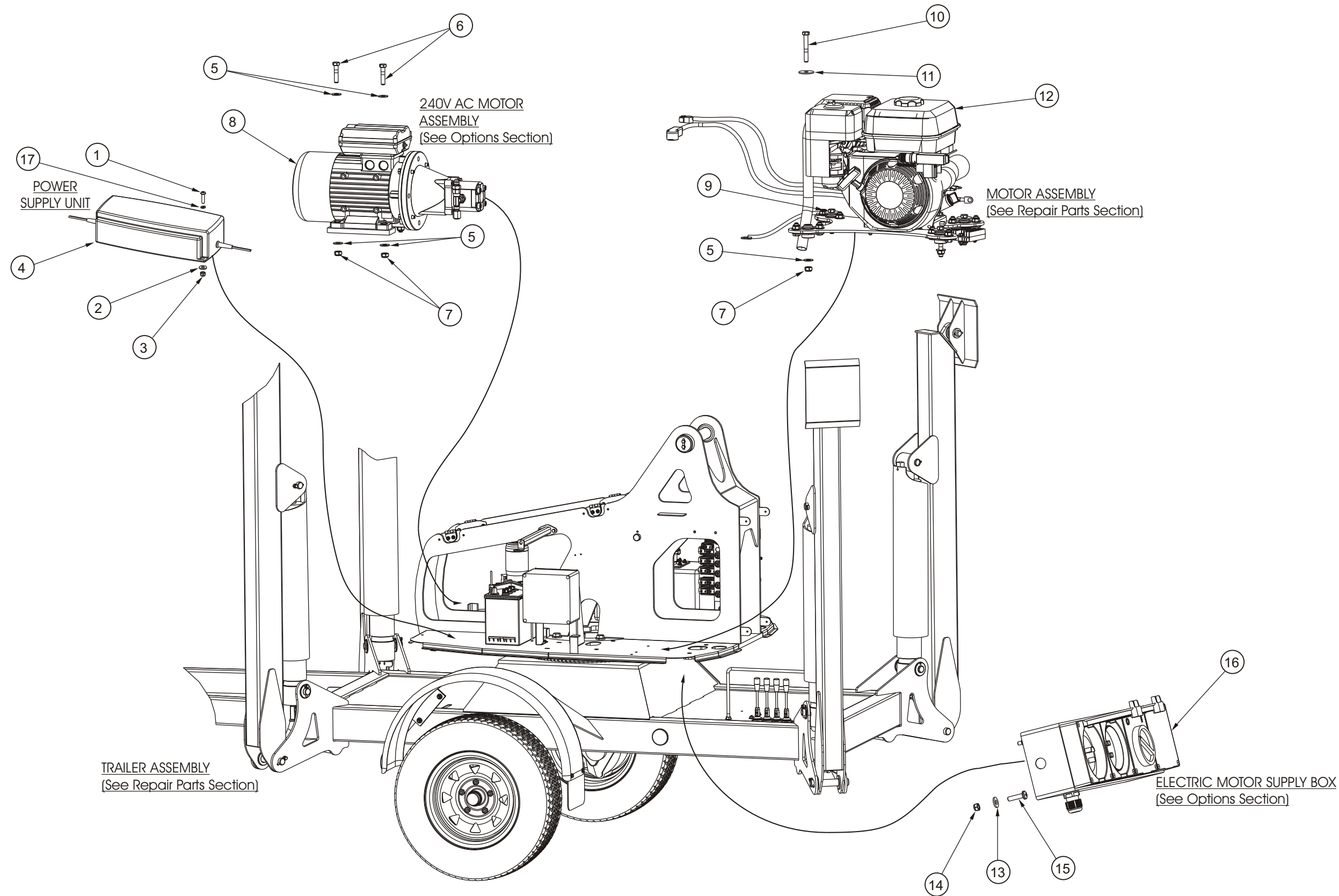
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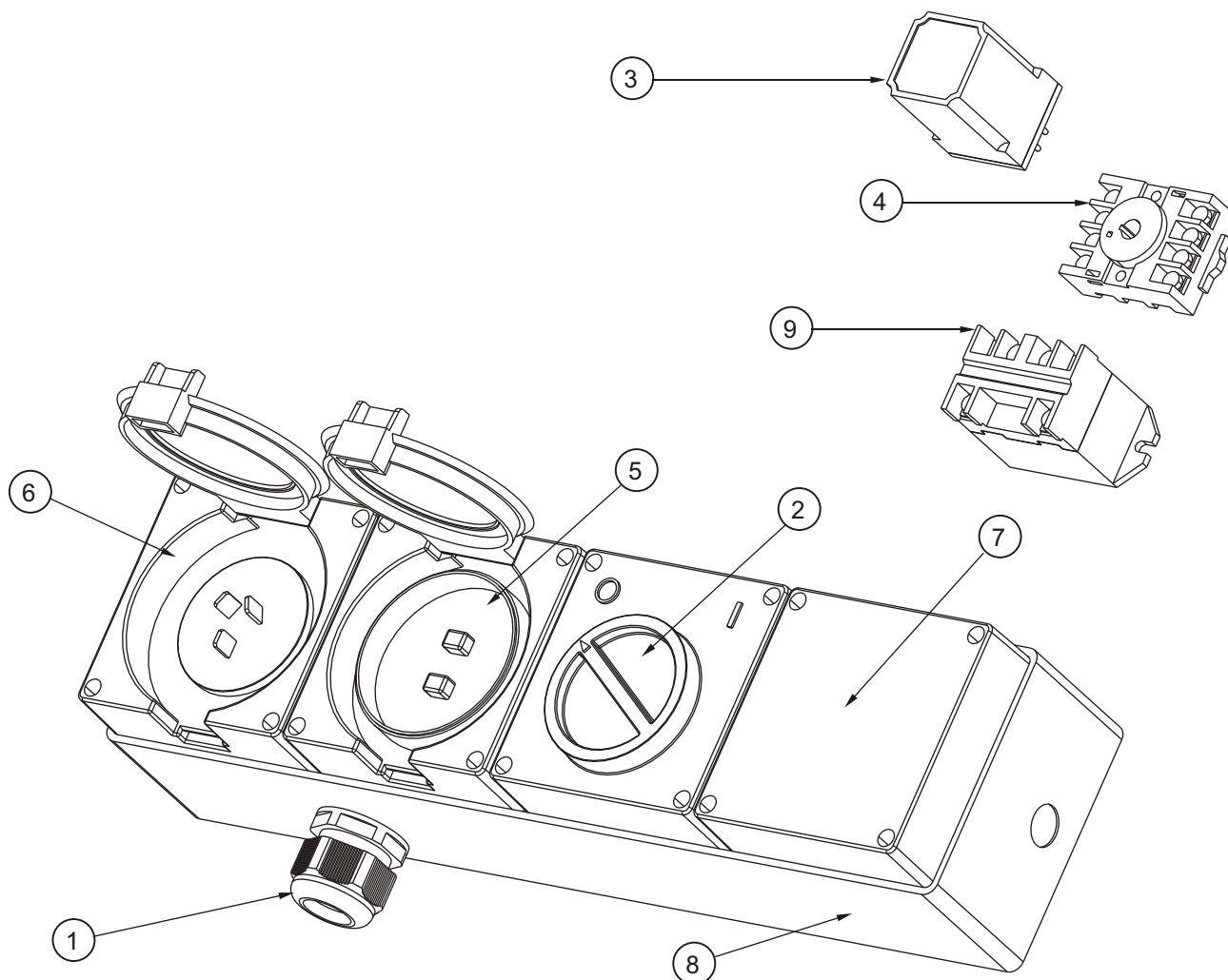




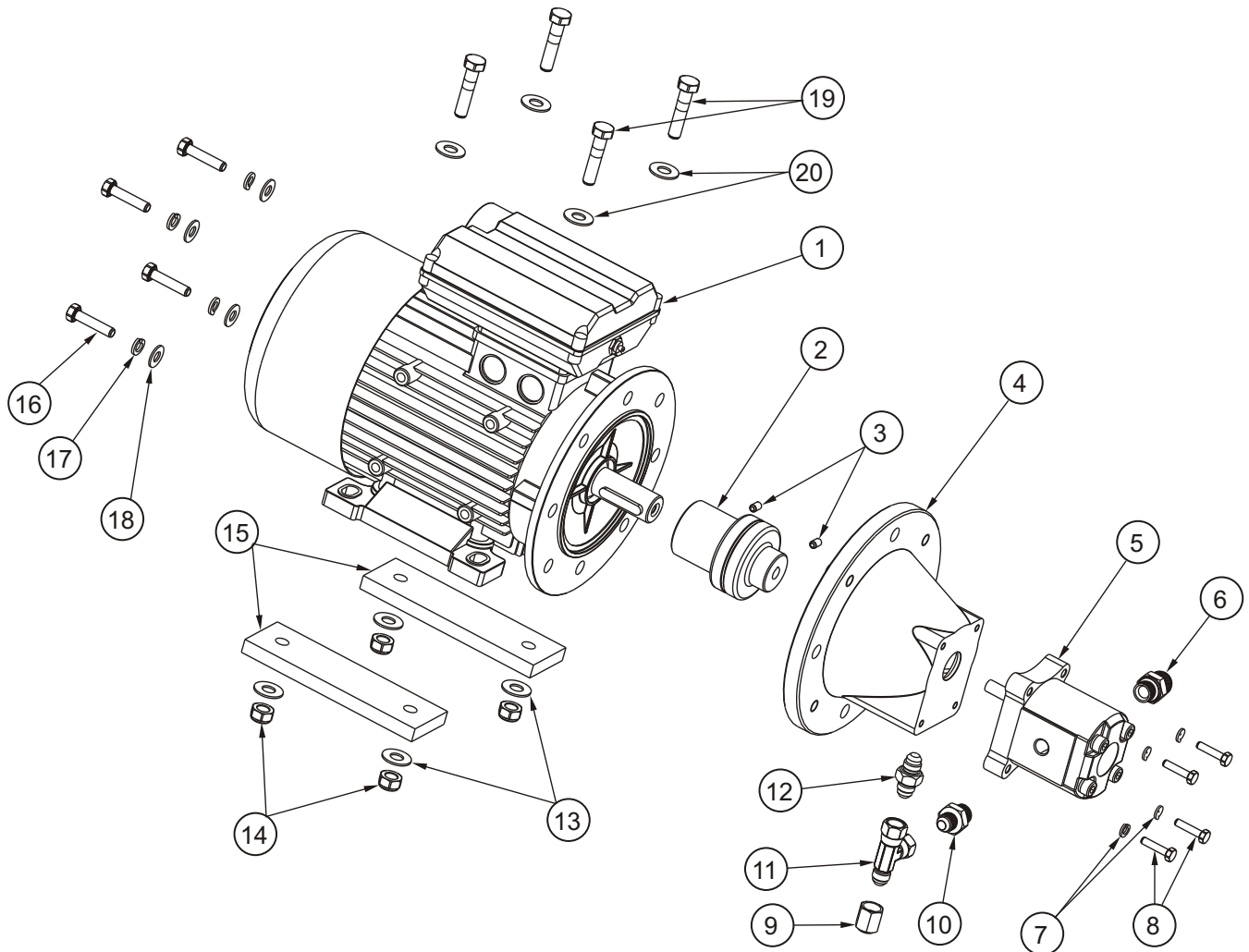
Item	Part no	Qty	Description
0.	12436		Honda 240V Gas/AC option
1.	3668-04016	2	Screw
2.	3603-04	2	Plain washer
3.	3611-04	2	Nylock nut
4.	12779	1	Power supply unit
5.	3603-10	12	Plain washer
6.	3610-10045	4	Bolt
7.	3611-10	8	Nylock nut
8.	9018-5	1	240V AC motor assembly
9.	3610-10055	1	Bolt
10.	3610-10065	3	Bolt
11.	5560179	4	Plain washer
12.	12413A	1	Honda engine assembly
13.	3603-05	4	Plain washer
14.	3611-05	4	Nylock nut
15.	3604-05020	4	Bolt
16.	12486A	1	Electric motor supply box
17.	3605-04	2	Spring washer

Honda 240V Gas/AC option (Sheet 3)

Item	Part No	Qty	Description
0.	12486		Electric motor supply box
1.	1815	1	Compression gland
2.	1865-001	1	Switch
3.	2500-5	1	Relay
4.	2500-6	1	Relay mounting base
5.	10967-1	1	RCD
6.	10967-2	1	Appliance inlet
7.	10967-4	1	Enclosure lid
8.	10967-6	1	Enclosure
9.	11588	1	Relay



Item	Part No	Qty	Description
0.	12436-1		Pump and motor assembly
1.	1867-001	1	240V AC electric motor
2.	1657-007	1	Coupling taper shaft
3.	3612-06010	2	Grub screw
4.	1658-006	1	Bell housing
5.	11432	1	Pump
6.	7013-004	1	BSPP x JICM nipple
7.	3605-06	4	Spring washer
8.	3610-06025	4	Bolt
9.	6983-001	1	JIC F tapped hole plug
10.	7013-003	1	BSPP x JICM nipple
11.	9501-2	1	Hydraulic fitting
12.	11058-1	1	Check fitting
13.	3605-10	4	Plain washer
14.	3611-10	4	Nylock nut
15.	1867-005	2	Motor foot plate
16.	3610-08035	4	Bolt
17.	3605-08	4	Spring washer
18.	3603-08	4	Plain washer
19.	361070045	4	Bolt
20.	3603-10	4	Plain washer



240V AC basket outlet (Sheet 1)

Item	Part No	Qty	Description
0.	12485-2		240V AC basket outlet assembly
1.	1807	1	Appliance outlet
2.	1865-001	1	Switch
3.	10263	1	Compression gland
4.	10967-3	1	Switch enclosure
5.	10967-5	4	Mounting feet
6.	3611-05	4	Nylock nut
7.	3603-05	8	Plain washer
8.	3610-05010	4	Bolt

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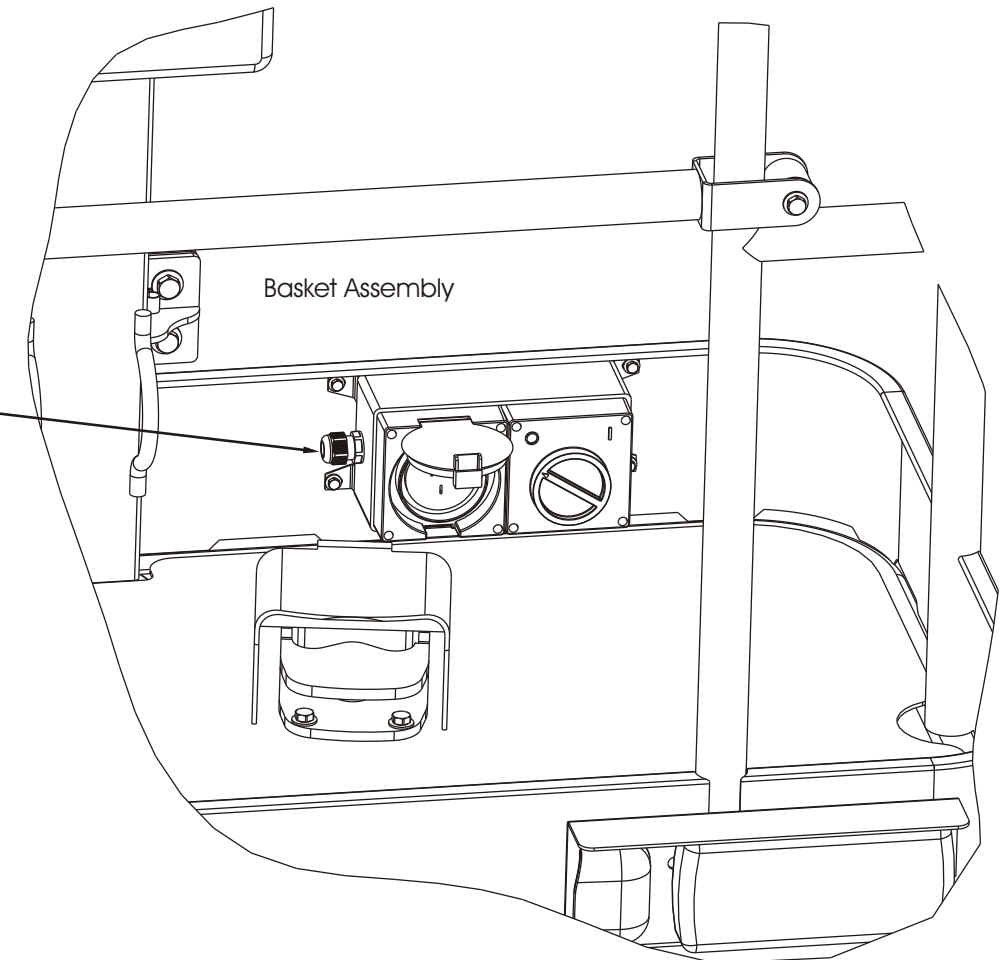
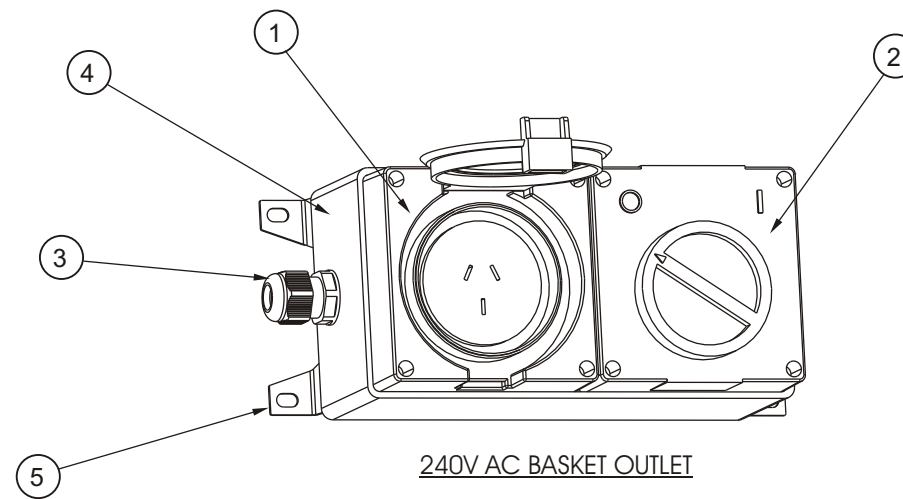
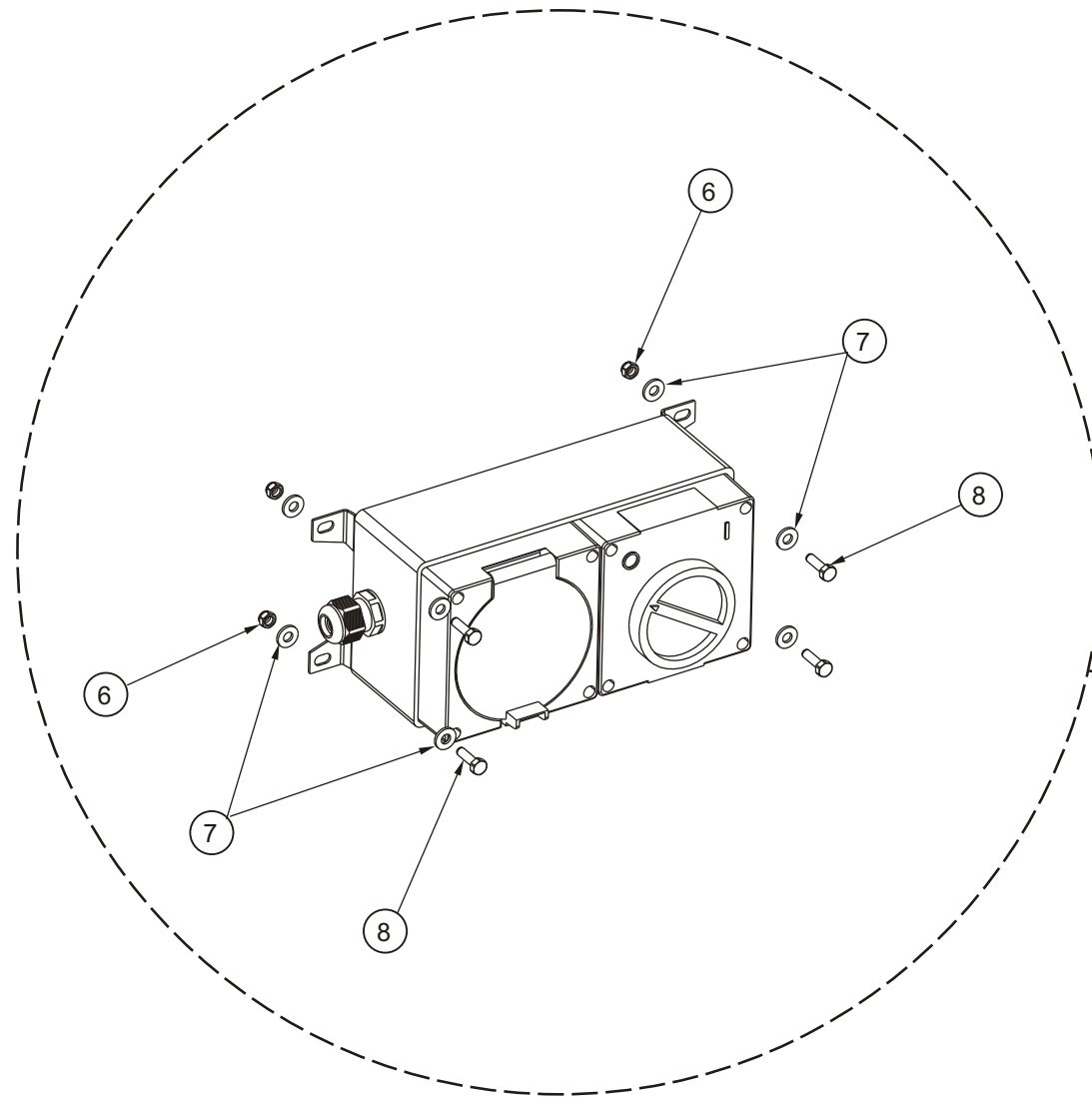
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D

C

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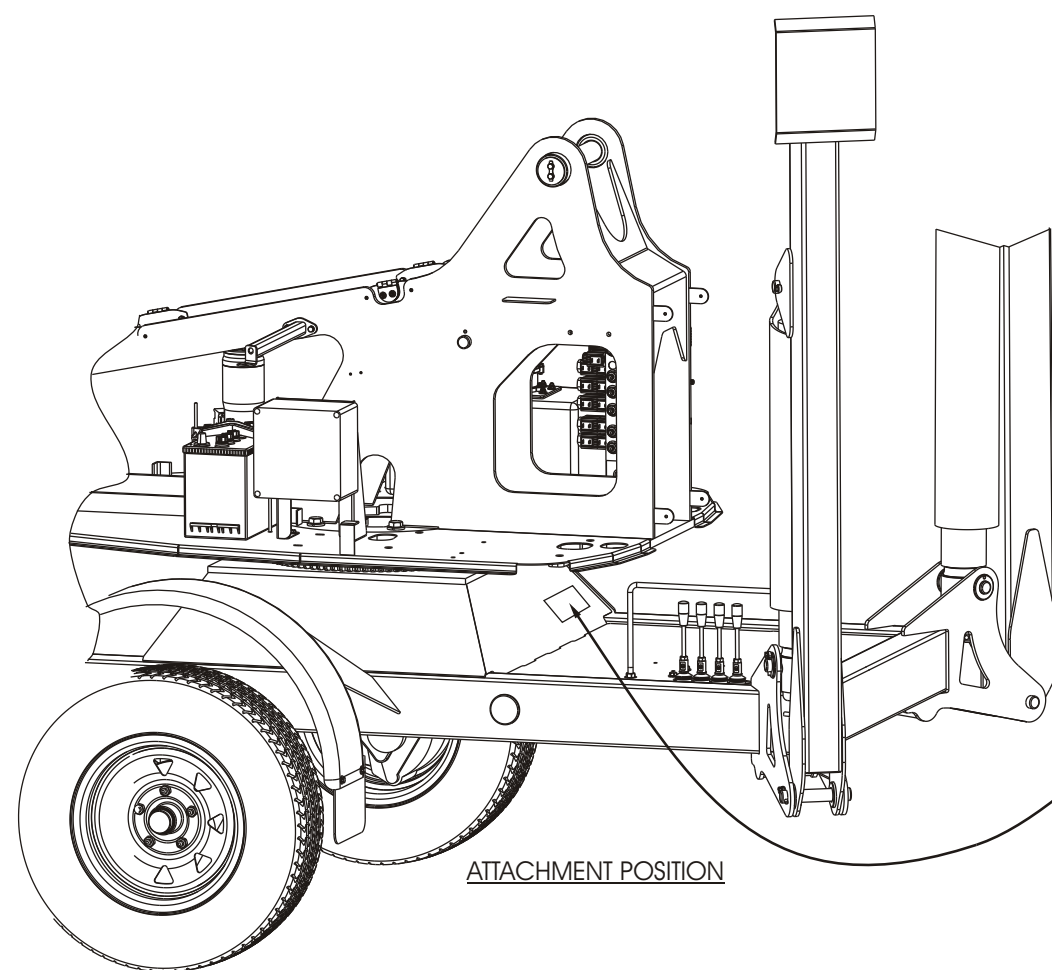
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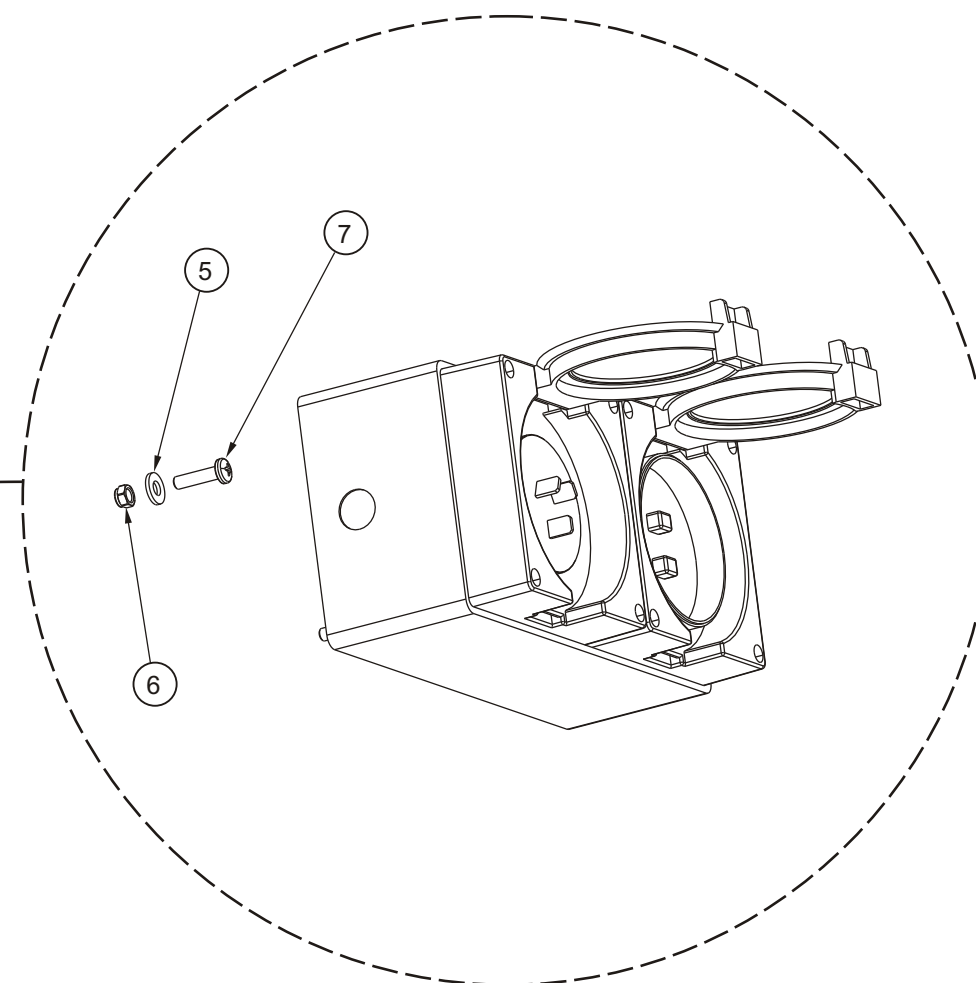
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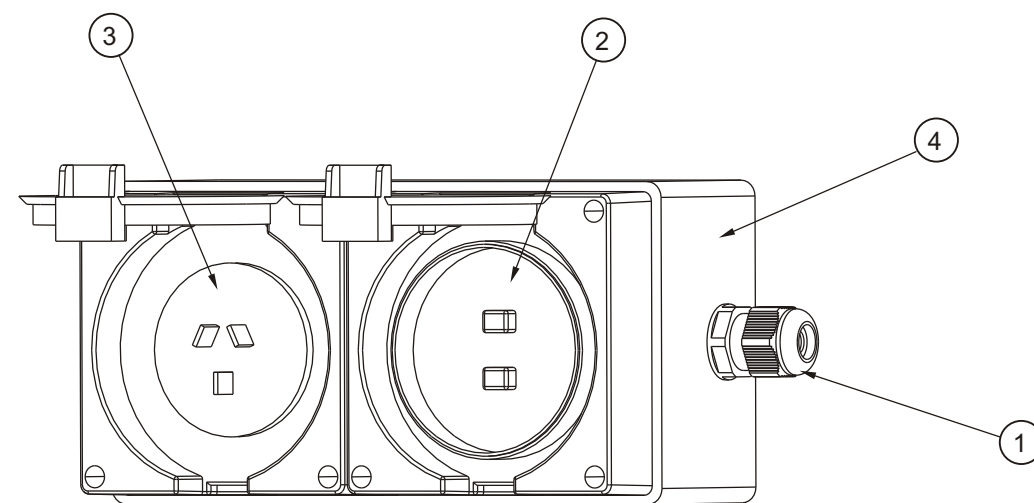
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ATTACHMENT POSITION



ATTACHMENT DETAIL

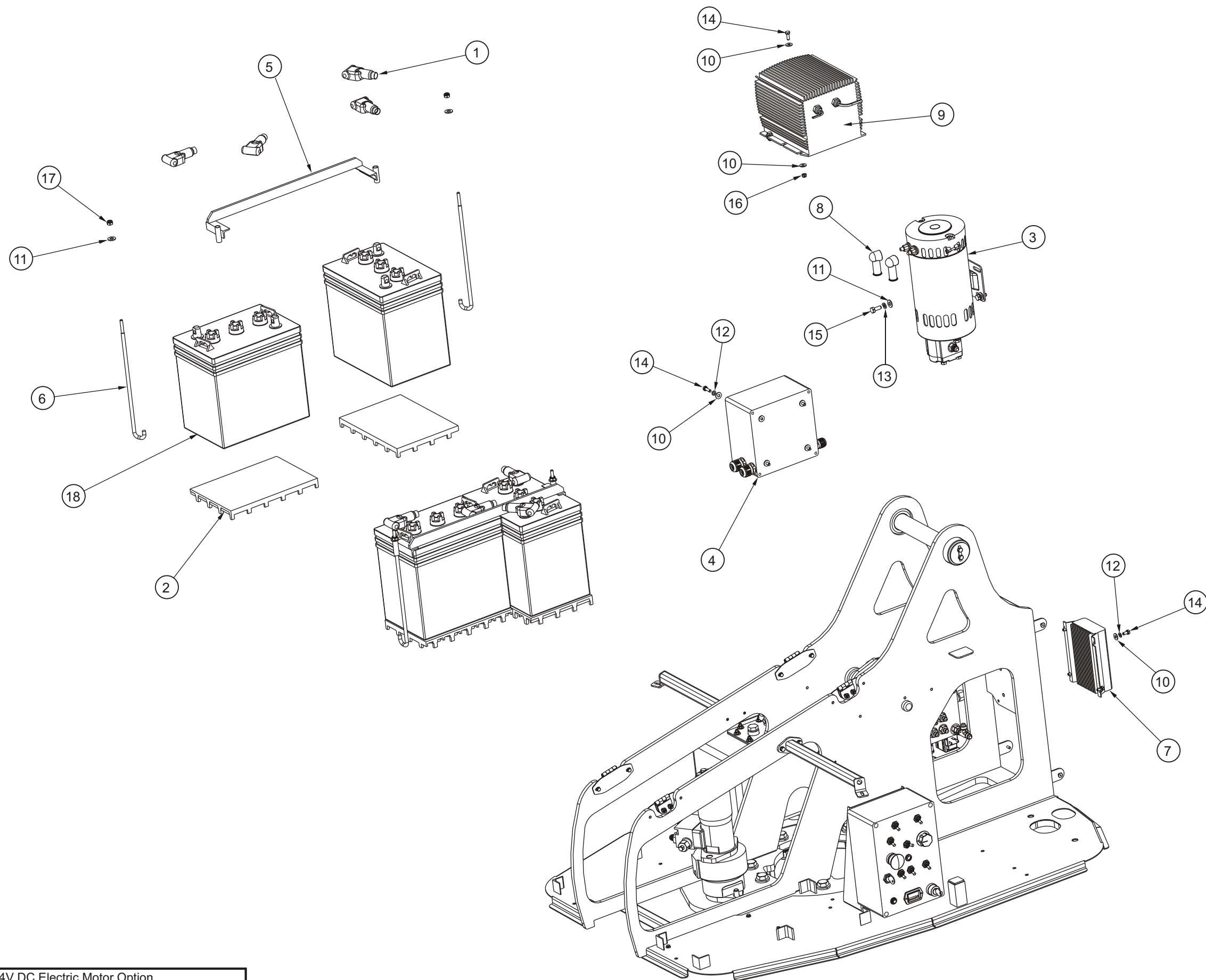


GROUND POWER SUPPLY

Item	Part No	Qty	Description
0.	12485-1		Ground power supply inlet assembly
1.	10263	1	Compression gland
2.	10967-1	1	RCD
3.	10967-2	1	Appliance inlet
4.	10967-3	1	Enclosure
5.	3603-05	4	Plain washer
6.	3611-05	4	Nylock nut
7.	3604-05020	4	Bolt

Bi-Energy power option (Sheet 1)

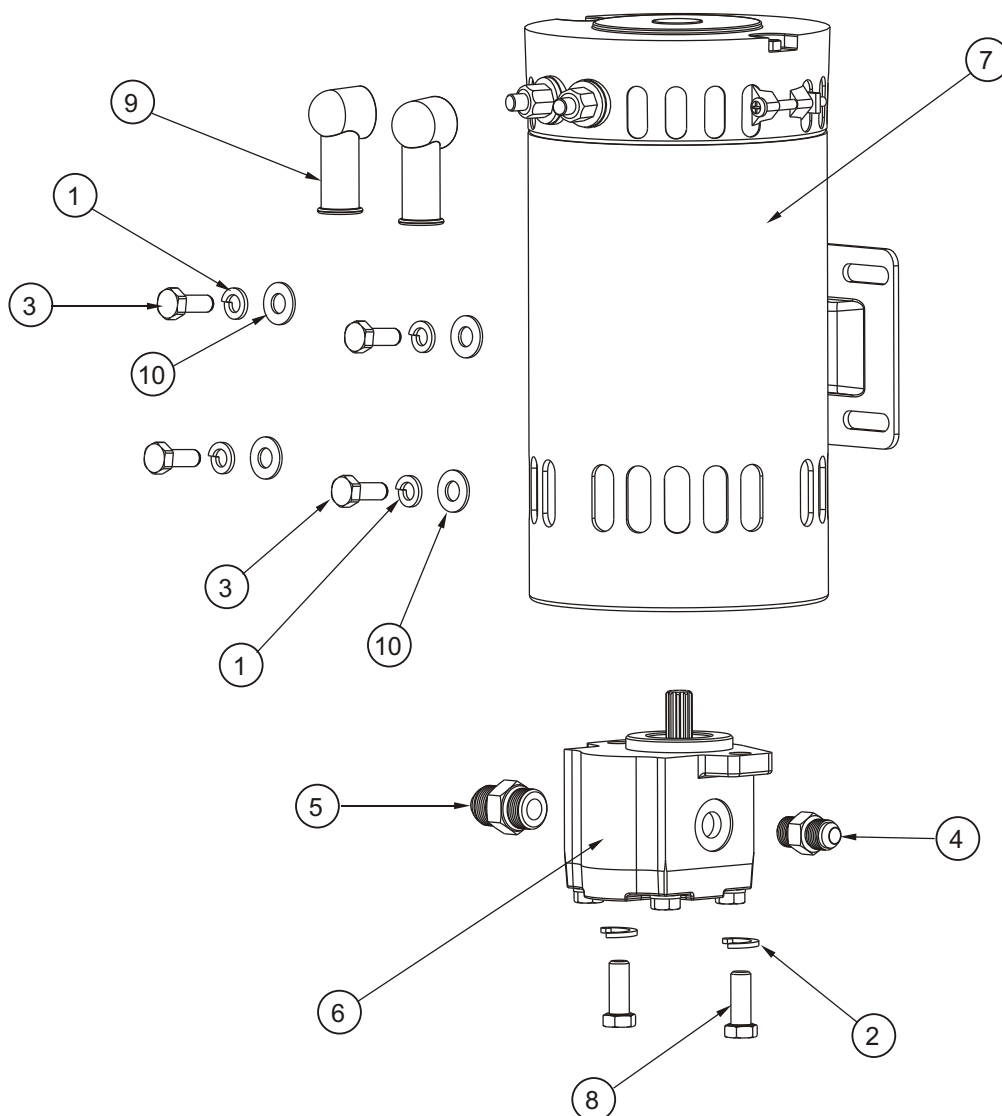
Item	Part No.	Qty	Description
1.	12413A	1	Honda engine assembly
2.	3566-1	1	Check valve
3.	3603-10	4	Plain washer
4.	3610-10065	4	Bolt
5.	3611-10	4	Nylock nut
6.	5560179	4	Washer, special
7.	11946	8	Rubber boot
8.	12434-10	4	Battery pad
9.	12434A	1	Pump assembly 24V DC
10.	12705	1	24Volt master switch assembly
11.	12706	2	Battery clamp
12.	12706-11	4	Battery "J" bolt
13.	12707	1	24V - 12V converter
14.	3040269	2	Cable boot
15.	3059907	1	Battery charger
16.	3603-06	16	Plain washer
17.	3603-08	8	Plain washer
18.	3605-06	8	Spring washer
19.	3605-08	4	Spring washer
20.	3610-06012	8	Bolt
22.	3610-08020	4	Bolt
23.	3611-06	4	Nylock nut
24.	3611-08	4	Nylock nut
25.	92222-1	4	6V battery



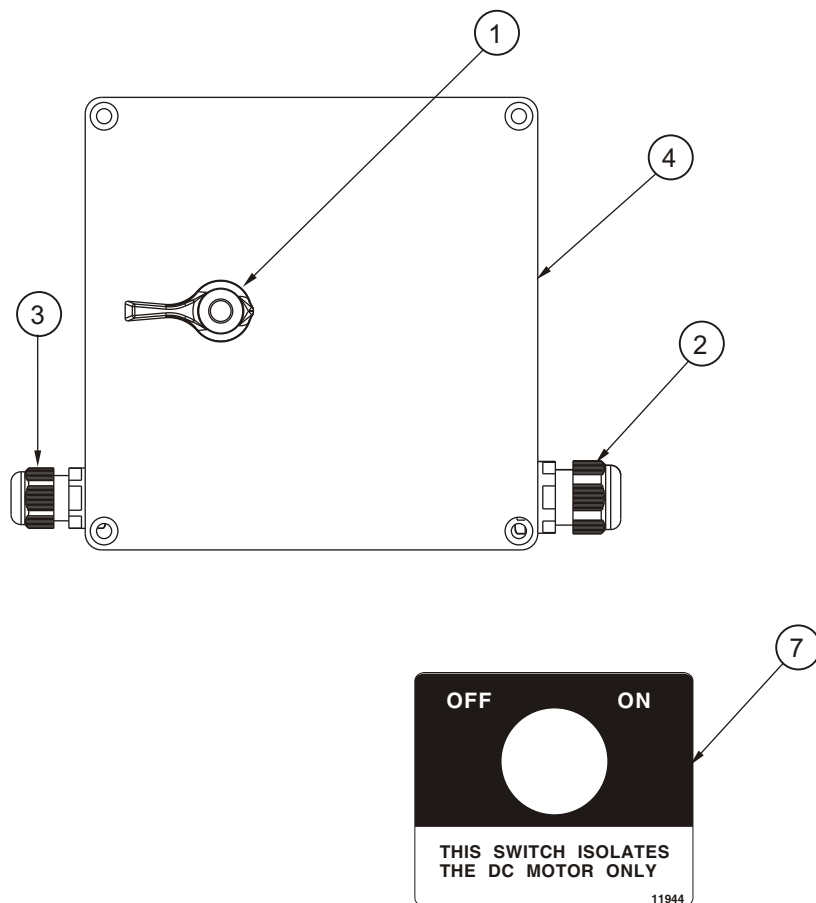
Item	Part No.	Qty	Description
0.	12434		24V DC Electric motor option
1.	11946	8	Rubber boot
2.	12434-10	4	Battery pad
3.	12434A	1	Pump assembly 24V DC
4.	12705	1	24Volt master switch assembly
5.	12706	2	Battery clamp
6.	12706-11	4	Battery "J" bolt
7.	12707	1	24V - 12V converter
8.	3040269	2	Cable boot
9.	3059907	1	Battery charger
10.	3603-06	16	Plain washer
11.	3603-08	8	Plain washer
12.	3605-06	8	Spring washer
13.	3605-08	4	Spring washer
14.	3610-06012	8	Bolt
15.	3610-08020	4	Bolt
16.	3611-06	4	Nylock nut
17.	3611-08	4	Nylock nut
18.	92222-1	4	6V battery

24V DC electric motor option (Sheet 3)

Item	Part No.	Qty	Description
0.	12188		Emergency pump assembly
1.	3605-08	4	Spring washer
2.	3605-10	2	Spring washer
3.	3610-08020	4	Metric bolt
4.	7025-001	1	Adaptor JICM - UNO
5.	7025-003	1	Adaptor JICM - UNO
6.	11930	1	Pump
7.	3080046	1	24V DC motor
8.	60017-007	2	Bolt
9.	3040269	2	Cable boot
10.	3603-08	4	Flat washer

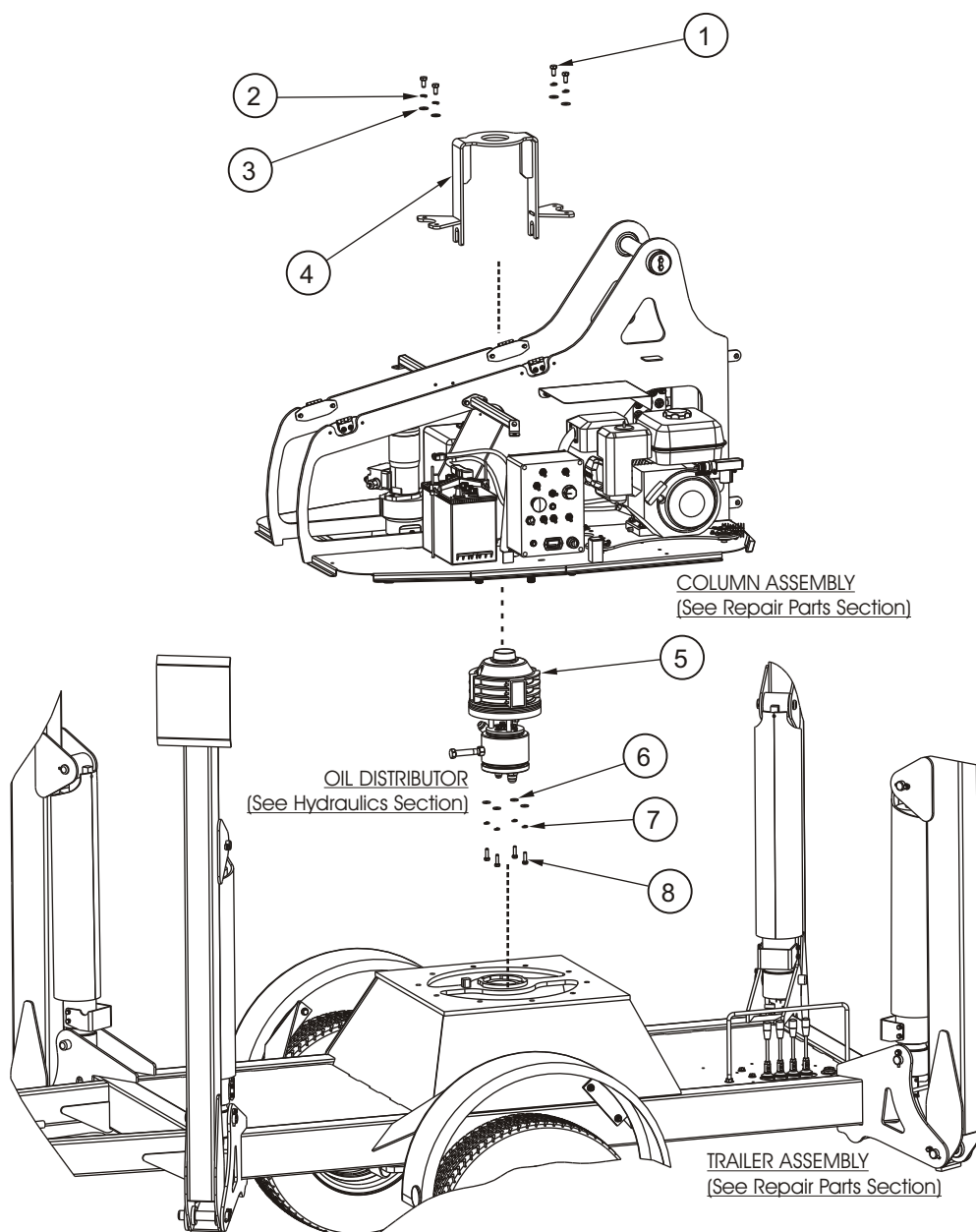


Item	Part No.	Qty	Description
0.	12705		Master switch assembly
1.	302-0049	1	Battery disconnect switch
2.	1814	2	Cable gland
3.	10263	1	Compression gland
4.	11408	1	Enclosure
5.	3040671	1	Contactor, 12 volt (not shown)
6.	44607-6	1	Fuse (not shown)
7.	11944	1	Decal, DC motor isolator
8.	3611-04	4	Nylock nut (not shown)
9.	3604-04020	4	Screw (not shown)
10.	3603-04	4	Flat washer (not shown)

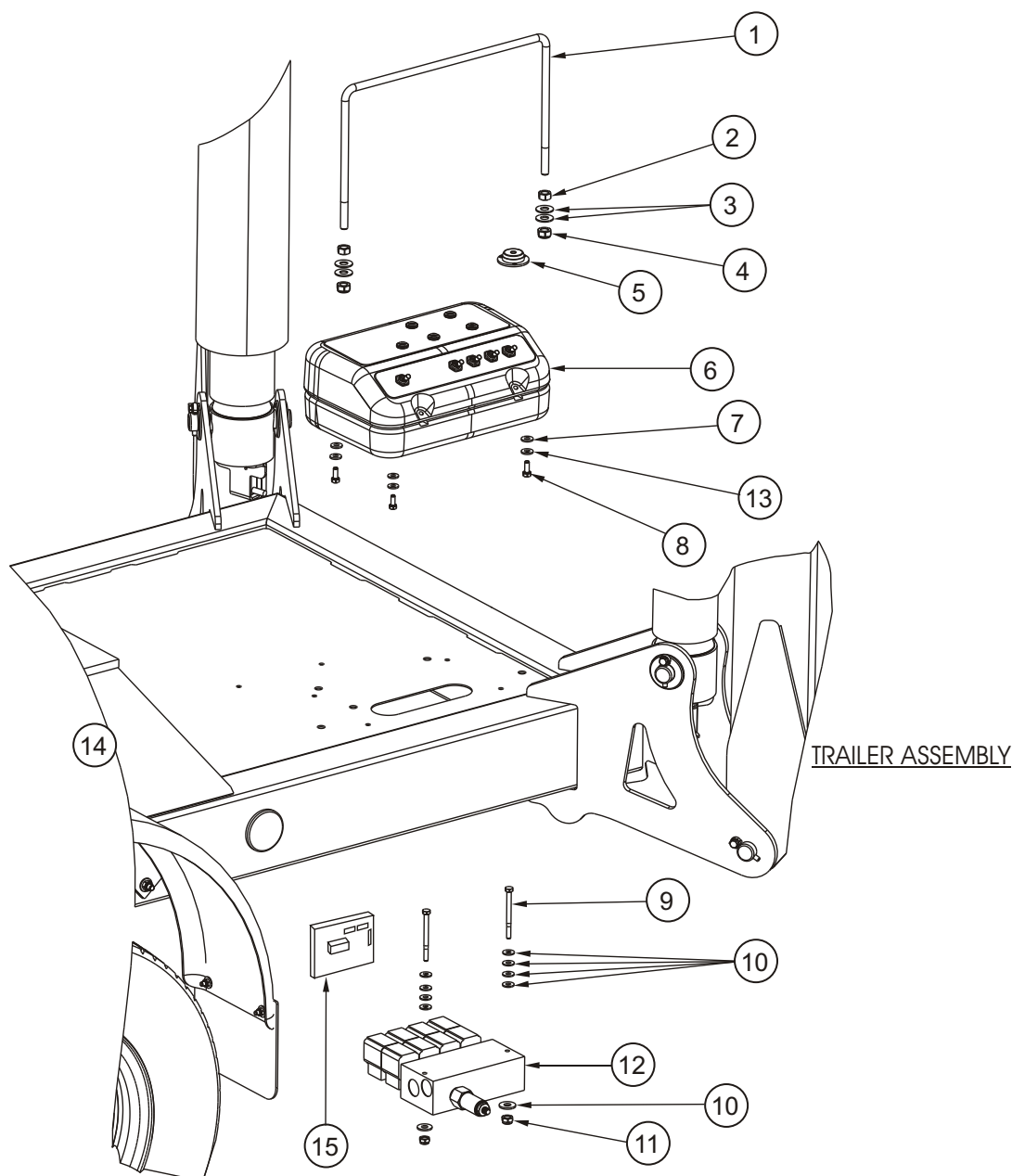


Continuous rotation option

Item	Part No	Qty	Description
0.	12443		Continuous rotation option
1.	3610-08016	4	Bolt
2.	3605-08	4	Spring washer
3.	3603-08	4	Flat washer
4.	12679-40	1	Moving bracket
5.	12679A	1	Oil distributor
6.	3603-06	4	Flat washer
7.	3605-06	4	Spring washer
8.	3610-06020	4	Bolt

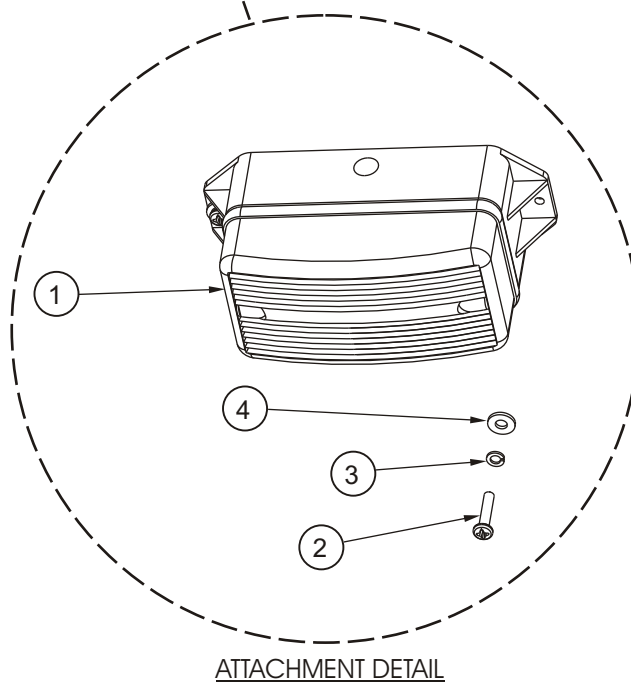
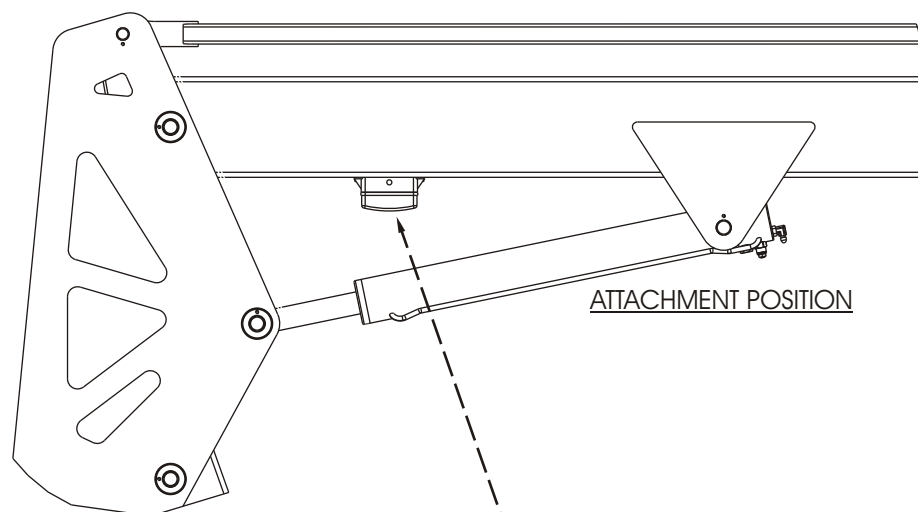


Item	Part No	Qty	Description
0.	12433		Auto stabiliser option, Trionics
1.	12418	1	Control lever guard
2.	3602-10	2	Nut
3.	3603-10	4	Plain washer
4.	3611-10	2	Nylock nut
5.	1273	1	Level bubble
6.	12433-1	1	Control box, auto stabiliser
7.	3603-05	8	Plain washer
8.	3610-05012	4	Bolt
9.	3610-06070	2	Bolt
10.	3603-06	10	Plain washer
11.	3611-06	2	Nylock nut
12.	11921A	1	Manifold block - auto stabiliser
13.	3605-05	4	Spring washer
14.	12545	1	Decal, auto stabiliser operation (not shown)
15.	12546	1	Printed circuit board



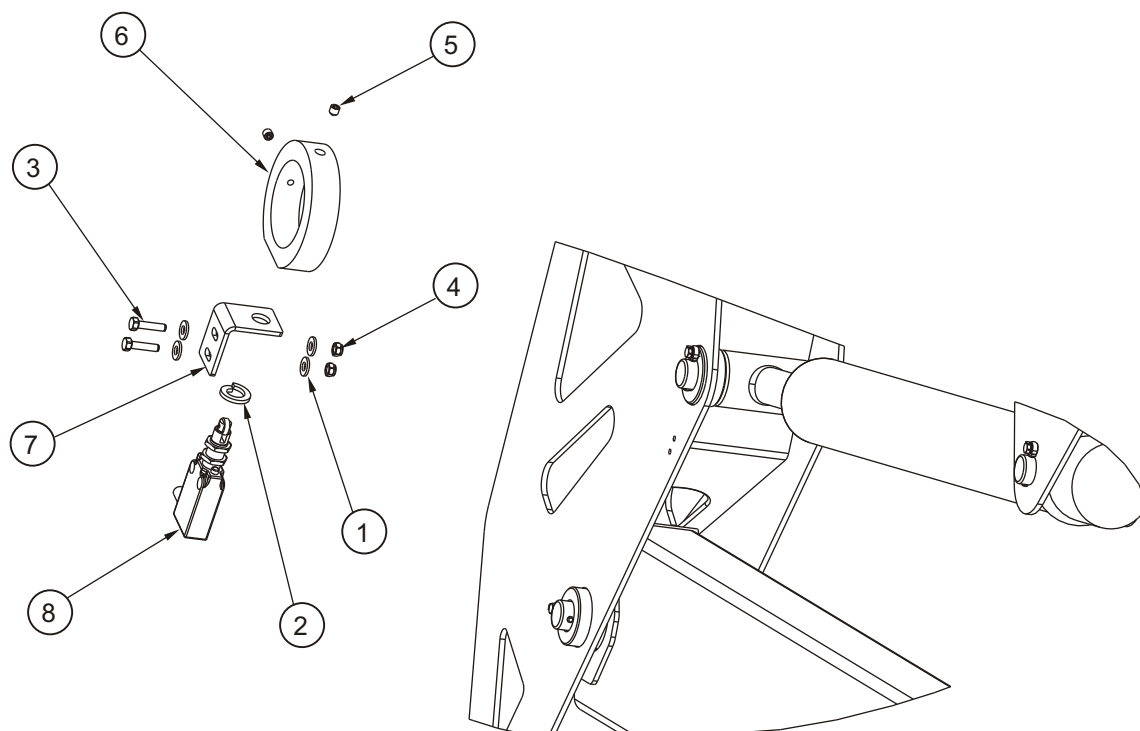
Flashing light option

Item	Part No	Qty	Description
0.	12488A		Flashing light assembly
1.	12488	1	Flashing light
2.	3604-04020	2	Bolt
3.	3605-04	2	Spring washer
4.	3603-04	2	Plain washer



Item	Part No	Qty	Description
0.	12462		10.9 metre kit
1.	3603-05	4	Plain washer
2.	3605-12	1	Spring washer
3.	3610-05020	2	Metric bolt
4.	3611-05	2	Nyloc nut
5.	3612-06006	2	Grub screw
6.	12518	1	Cam, 10.9 metre option
7.	12518-2	1	Bracket, 10.9 cam switch
8.	12525	1	Limit switch

Not shown is key switch - Refer to lower control box on page



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