INDEX - DANDO 3000 INVESTIGATOR MK2

INSTRUCTION MANUAL & SPARE PARTS

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SAFETY OF MACHINERY

As Designers, Manufacturers and Suppliers of Specialised Equipment, Dando Drilling International Limited, ensure so far as it is reasonable that our products are safe and without risk to health when properly used.

While every care has been taken to ensure that the information contained in the manual is clear and accurate, the information in it is supplied in performance of our duty under current E.C. Legislation with regard to C.E. Marking, and no legal liability, other than that imposed by the Act, is accepted.

You are requested to take the necessary steps to ensure that the appropriate information is make available to all those involved with the proper use of our products, or to anyone who may work on, purchase, or otherwise acquire products for their own use.

EEC DIRECTIVE 89/392/EEC

The above Directive has been adopted by HM Government and become effective in the United Kingdom from 1.11.1993 with a transitional period up to 31.12.94.

Notwithstanding other and various legally binding requirements, the Directive specifically requires manufacturers of products to provide instructions for the safe use of such products.

Dando Drilling International Ltd. supports all new products being supplied to their customers with a comprehensive Operator Manual, which clearly defines mandatory instructions for the operation, safe use and maintenance of the products.

Further, where proprietary items are incorporated into products of Dando Drilling International Ltd. comprehensive Operators Manuals on these items are also supplied together with the Operating Manuals etc., on any vehicle or other carrier supplied as part of a contract.

It is the responsibility of the owners or hirers of such products to ensure that operators are provided with these Manuals and are suitably instructed regarding the purpose of these Manuals and Safety Instructions. In addition operators should be suitably and adequately trained in the use of the product.

RIG DATA

MANUFACTURER	:	DANDO DRILLING INTERNATIONAL LTD., OLD CUSTOMS HOUSE, WHARF ROAD, LITTLEHAMPTON, WEST SUSSEX, BN17 5DD, ENGLAND.	
RIG MODEL	:	DANDO 3000 INVESTIGATOR MK2	
RIG TYPE	:	PERCUSSION DRILLING RIG	
SERIAL NUMBER	:	3000/	
ENGINE TYPE	:	LISTER MODEL TR3 DIESEL ENGINE	
HORSEPOWER	:	Continuous: 24 bhp @ 1600 r/min Intermittent: 26.5 bhp @ 1600 r/min	
ENGINE SERIAL NUMBER	:		
MAXIMUM DERRICK LOADING	:	9.0 TON	9,000 KG
WINCH - SINGLE LINE PULL	:	3.0 TON	3,000 KG

SPECIFICATION OF INTENDED USE OF THE MACHINE

DANDO 3000 INVESTIGATOR MK2 DRILLING RIG

The Dando 3000 Drilling Rig is intended for drilling of holes in the ground using the Cable Percussion method of drilling. The Dando 3000 is also suitable for performing site investigation work including U100 (U4) and S.P.T. Sampling and Testing.

GENERAL SPEFICIATIONS FOR GUIDANCE ONLY

Engine Power at 1600 rpm	Continuous 24 bhp Intermittent 26.5 bhp
Winch - Single line pull	3 ton
Drilling Depths and Diameters	6 inches (150mm) to 300 feet (90 metres) 18 inches (460mm) to 175 feet (55 metres)

Note: The Maximum drilling capacity is dependent on drilling conditions, type and size of tools. The figures given provide a general guide only.

Derrick Working Height under Sheaves		17 feet	5.2 metres
	Overall Height Derrick Erected	21.7 feet	6.65 metres
	Derrick Loading	9.0 ton	9000 kg
Travelling Dimensions	**Length**	28 feet	8.5 metres

WINCH AND POWER UNIT

The Winch is powered by a Lister Diesel Engine and backed by their world-wide service. The drive is transferred to the winch by a roller chain through a hand operated expanding shoe clutch with direct mechanical linkage to the lever. This type of drive gives a "snappy" drilling action and allows the operator to retain "feel" of the drill load. A powerful foot/hand brake allows easy and precise control of all loads. Dando Investigator Rigs provide for the operation of a second line powered from the cathead fitted as standard on the winch, the derrick crown incorporates two sheaves enabling the second line to be readily available for handling sampling and testing equipment. The second sheave also provides for ease of reeving hoisting block for withdrawing casing.

DERRICK

The Derrick is fabricated from rectangular box section steel. Rear legs are hinged on the winch frame and cross braced with crossbars. Front legs are secured at the top on double pivot joints, a strong brace bar with large skid feet joins the ends of the front legs.

SERVICE AGENTS
UNITED KINGDOM

DANDO 3000 MK2 DRILL RIG

Spare Parts and Servicing in the United Kingdom can be obtained from the Manufacturer:-

DANDO DRILLING INTERNATIONAL LIMITED
Old Customs House, Wharf Road,
Littlehampton, West Sussex, BN17 5DD.
Tel: +44 (0) 1903-731312 Fax: +44 (0) 1903-730305
e-mail: info@dando.co.uk
Web Site: www.dando.co.uk
Please Ask For The Spares Department

LISTER TR3 ENGINE

SERVICE AGENTS
OUTSIDE THE UNITED KINGDOM

DANDO 3000 MK2 DRILL RIG

Spare Parts and Servicing in the United Kingdom can be obtained from the Manufacturer:-

DANDO DRILLING INTERNATIONAL LIMITED
Old Customs House, Wharf Road,
Littlehampton, West Sussex, BN17 5DD.
Tel: +44 (0) 1903-731312 Fax: +44 (0) 1903-730305
e-mail: info@dando.co.uk

Please Ask For The Spares Department

LISTER TR3 ENGINE

SECTION 1

OPERATING INSTRUCTIONS

GENERAL

DANDO 3000 INVESTIGATOR MK2 DRILL RIG

OPERATING INSTRUCTIONS

GENERAL

It is the responsibility of the owners and hirers of this equipment to ensure that the operators of the equipment are aware that drilling sites can be potential hazardous environments and that safe drilling practice should be adhered to.

Dando Drilling International draw your attention to the code of Safe Drilling Practice as published by the British Drilling Association, and would recommend that all operators are fully conversant with all aspects covered by this publication and take the necessary steps to become B.D.A. Accredited Drillers. For operators outside the United Kingdom, we would recommend that their national equivalent to the B.D.A. publication is adhered to.

The Guidance Notes on Safety Section of this Manual is extracted from the British Drilling Association's publication "Code of Safe Drilling Practice", and Dando Drilling International would like to acknowledge with thanks their permission to reproduce this section.

TRANSPORT AND ASSEMBLY INSTRUCTIONS

1. TRANSPORT

The rig has its own integral trailer. The vehicle used to tow the rig should be of sufficient size and power for this function.

However, the operator should be mindful of any legislation in force in whatever E.C. Country the rig is being used, and comply fully with those regulations.

The rig is supplied with a towing hitch with overrun braking system which complies with current E.C. regulations.

When the rig is parked, the parking brake should be engaged by pulling the lever on the top of the unit.

The operator's attention is drawn to the Guidance Notes on Safety (Section 2) relating to general and specific areas to be noted with regard to transport and towing of the drilling rig.

2. ASSEMBLY OF RIG

2.1 SITE PREPARATION

Before erecting the drilling rig, the drilling site should be inspected and prepared, by removing debris and any obstructions if possible.

In selecting a suitable position for the rig, it is essential to allow sufficient room to swing the derrick legs around and for the derrick to be assembled in its flat position as shown on the appropriate illustration. Also the ground on which the drill hoist base is to be positioned must be reasonably level and firm.

The attention of the operator of the equipment is drawn to the Guidance Notes on Safety (Section 2) relating to general and specific areas to be noted with regard to site preparation and site safety.

2.2 ERECTING AND LOWERING THE RIG WITH THE ELECTRIC WINCH

Familiarise yourself with the Superwinch operation by reading the owner's manual.

ERECTING – refer to figures following

2.2.1 Apply the parking brake. Use chocks under the wheels if required. Unhitch and remove the vehicle. Remove any mast weights, lower crossbar & side stays, any tools or equipment from the derrick.

2.2.2 Remove the pins and slide out the two sinker bar carriers located in the base at the rear of the rig and replace the pins in the second set of holes.

2.2.3 Carefully allow the crown assembly to rise & the rear of the rig to sit on the ground. Remove the 3 part guard if fitted.

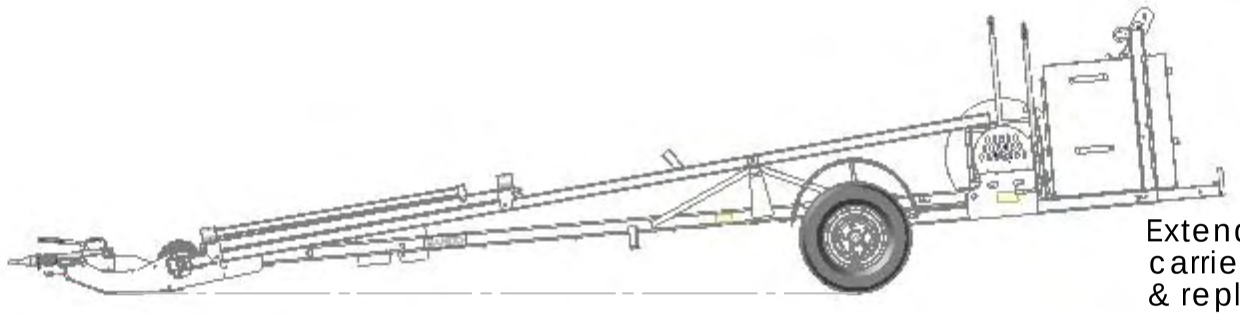
2.2.4 Place suitable timbers under the base of the rig, one at the front of the base, one under the pivot point and one under the rear. Ensure that they are level and in line with each other, both from side to side and back to front.

2.2.5 Remove the mudguards and the locking nuts for the legs, and the base locking pins. Release the drill line and allow this to lie on the ground.

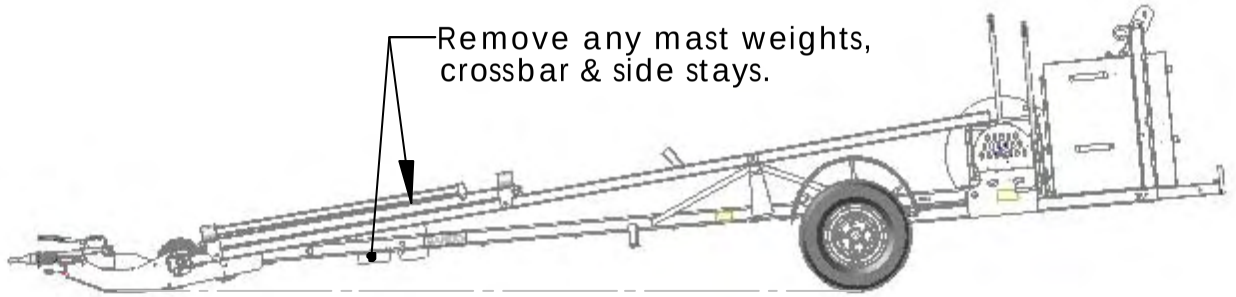
2.2.6 Place an adequate counter balance on the carriers at the rear of the rig, two sinker bars or more should be sufficient.

UNDER NO CIRCUMSTANCES SHOULD A HUMAN COUNTER BALANCE BE USED.

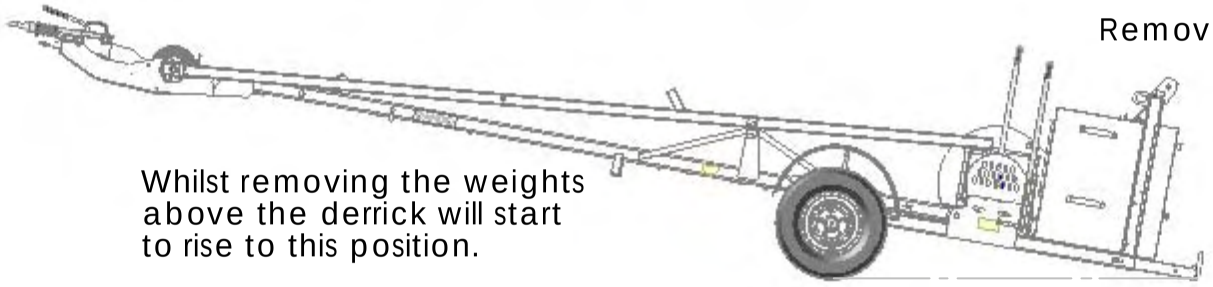
2.2.7 Place the front legs on top of the road wheels. Make sure there are no loose items on the rig. Make a final check that there are no overhead obstructions e.g. overhead cables.



Extend sinker bar carriers to second hole & replace locking pins.



Remove any mast weights, crossbar & side stays.



Remove 3 part guard.

Whilst removing the weights above the derrick will start to rise to this position.

2.2.8 **ENSURE ALL PERSONNEL STAND WELL CLEAR OF THE RIG AND MAST AREA.**

2.2.9 Connect the remote control to the electric winch. The winch can be used without starting the rig engine. Check that the wire rope of the electric winch is seated in the pulleys & has no visible signs of damage.

2.2.10 Move and hold the switch downwards of the remote control to raise the mast until the angle iron support on the rear of the mast is approximately vertical. Release the switch of the remote. This is spring loaded and will return to the centre position and automatically lock the winch brake.

2.2.11 BEFORE REMOVING THE FRONT LEGS FROM THE ROAD WHEELS ENSURE THAT THE SAFETY CABLE IS CONNECTED TO THE MAST AND SAMPSON POST

2.2.12 The front legs can now be walked round to the front of the rig, and the spreader bar can be attached to the rig. The front legs should be as close to the ground as possible during this time

2.2.13 Remove the safety chain from the mast, and adjust the setting of the mast as required to fit the side stays using the remote control.

2.2.14 Remove the remote control and store in a dry area until required.

2.2.15 If the ground permits firmly stake down the lower crossbar. The rig is now ready to operate,

2.2.16 LOWERING

2.2.17 Place an adequate counter balance on the sinker bar carriers at the rear of the rig, two sinker bars or more should be sufficient. If the exhaust extension has been fitted & it is necessary to remove it then adequate hand protection should be used to prevent the possibility of burning the skin.

UNDER NO CIRCUMSTANCES SHOULD A HUMAN COUNTER BALANCE BE USED.

2.2.18 Attach the remote control to the winch, and take up any slack in the wire rope and **CONNECT THE SAFETY CHAIN/CABLE TO THE MAST AND SAMPSON POST**

2.2.19 Remove the side stays and spreader bar The front legs should be as close to the ground as possible during this time.

2.2.20 Walk the front legs around and place on the road wheels.

2.2.21 **ENSURE ALL PERSONNELL STAND WELL CLEAR OF THE RIG AND MAST AREA.**

2.2.22 Move and hold the switch upwards which will lower the mast.

2.2.23 Place front legs onto the brackets and refit the nuts. Replace the base locking pins.

2.3 ERECTING AND LOWERING THE RIG WITHOUT AN ELECTRIC WINCH

ERECTING – refer to figures following

2.3.1 With the rig in the travelling position, place the drill hoist in the correct position relative to the centre of the required borehole. This is done by measuring approximately 1500mm from the centre of the required borehole to the centre line of the rig axle. Remove the locking pins, which secure the base unit to the mast.

2.3.2 Remove any mast weights, lower crossbar & side stays, this should allow the crown assembly to rise & the rear of the base to sit on the ground. Care should be taken during this operation as the derrick will assume a position as shown in the erecting diagrams. The crown assembly should be supported in this position by placing a suitably stable and safe support beneath the derrick legs. Check that the hoist is reasonably level. It may be necessary to level the ground or to pack up the base with timber.

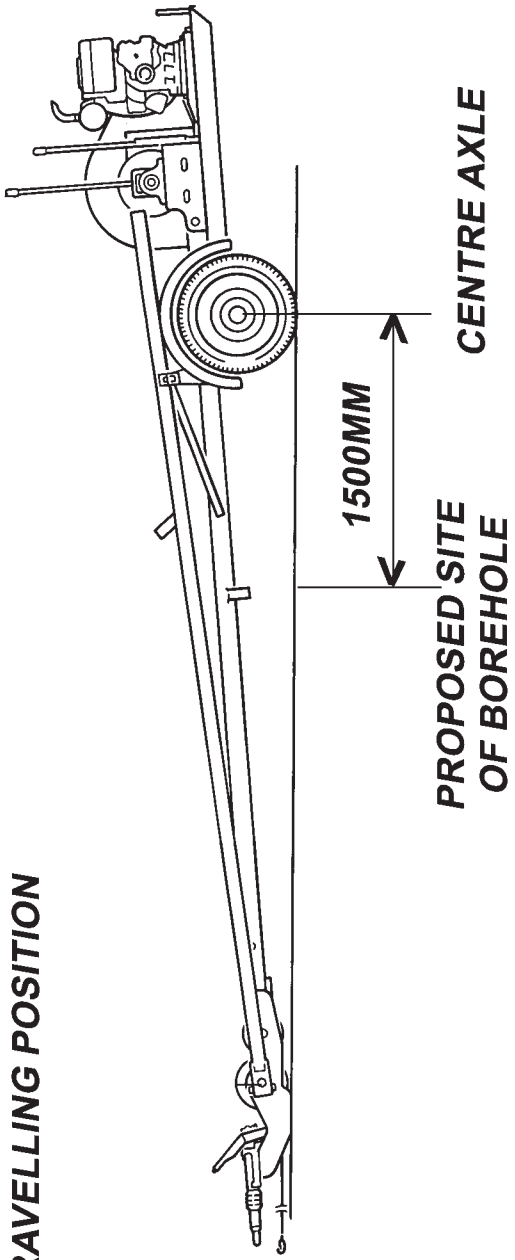
2.3.3 When in the travelling position, the two front legs of the derrick are each locked in position by a locking nut located toward the bottom end of each leg. Unscrew and remove these two locking nuts.

2.3.4 Lift up the bottom end of each front leg and carry it round, following a semi-circular path as necessitated by the other end of the leg pivoting on the hinge block attached to the crown sheave shaft. **Because of the weight involved this operation should not be carried out by one man alone.**

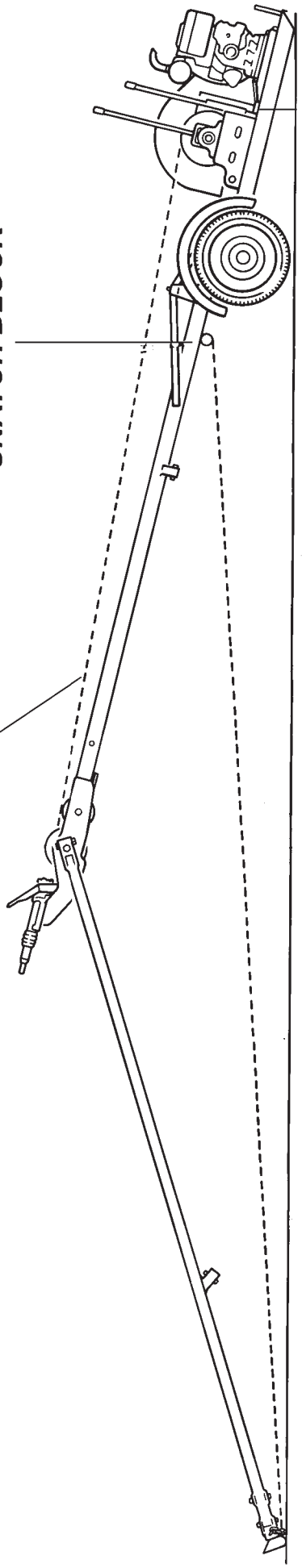
When the leg is at right angles to the rig (in line with crown sheave shaft) STOP AND ROTATE THE LEG THROUGH 180 DEGREES. It is essential to carry out this operation as the centre block on which the leg is hinged will NOT allow further movement until this is done. Having rotated the leg it will then be in correct alignment for the assembly of the derrick and can be carried to the front of the rig. The bottom ends of the two front legs should be positioned so that they are approx. 3000mm apart (i.e. 1500mm either side of the centre line).

2.3.5 Take the lower cross bar and bolt this between the bottom of the front two legs. Attach the feet, with the curved section resting on the ground, to the legs with the bolts provided. Attached to the feet are the front leg lifting chains.

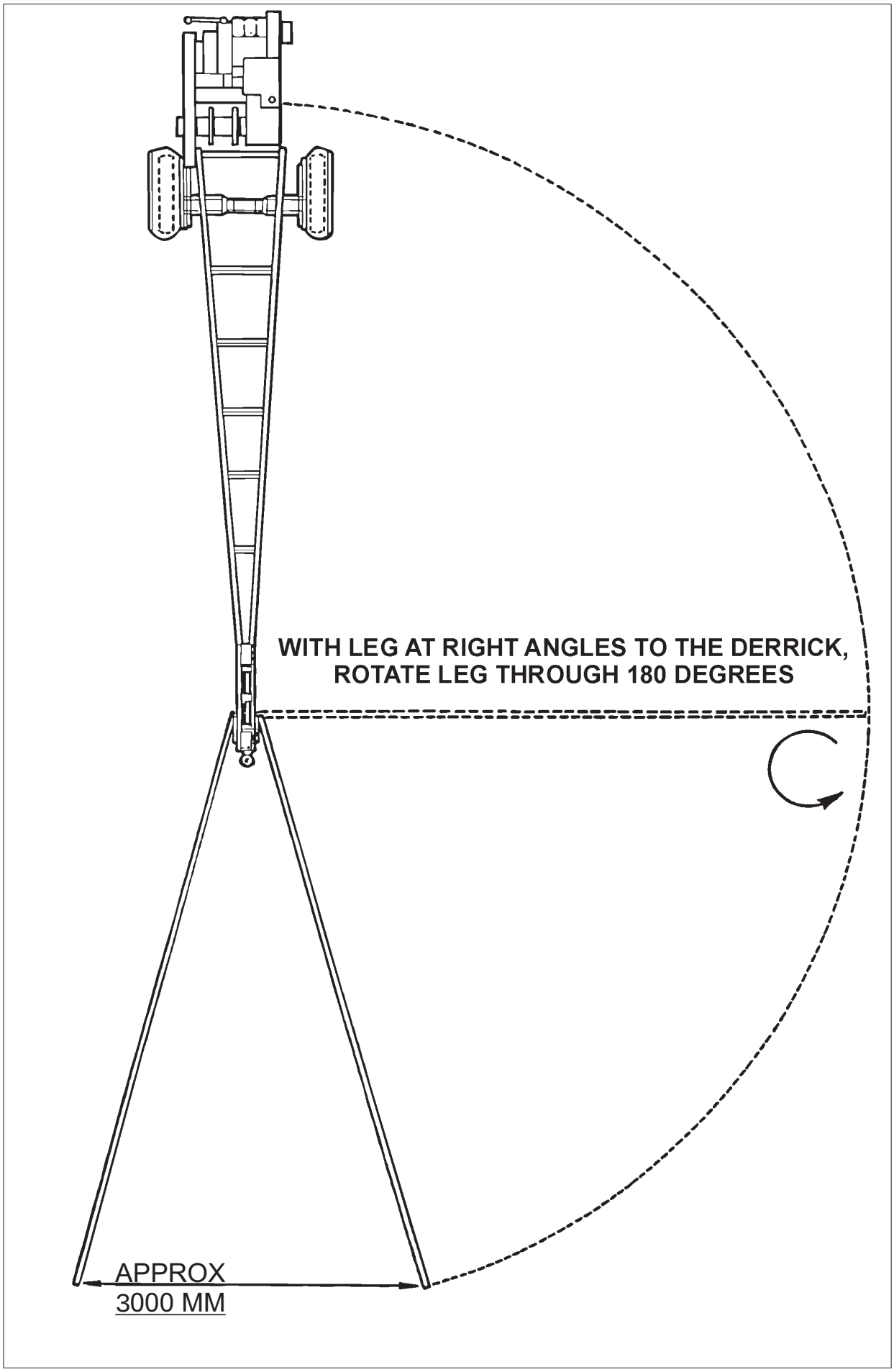
2.3.6 Attach snatch block onto the dead eye on the front of the hoist skid.



RIG IN TRAVELLING POSITION



RIG PARTIALLY ERECTED WINCH ROPE READY FOR RAISING DERRICK


WITH LEG AT RIGHT ANGLES TO THE DERRICK,
ROTATE LEG THROUGH 180 DEGREES
APPROX
3000 MM

2.3.7 With the drum clutch control lever in the disengaged position, and the foot brake control released, unwind the wireline from the drum. Thread the line up the back of the derrick, over and through the crown wheel retainers, then down to the snatch block on the front of the hoist, along the ground, and end up by fixing the line on the centre ring of the front leg lifting chains.

2.3.8 Check that the ground over which the feet of the front legs will travel as the derrick is pulled up, is reasonably open and level. If necessary, timber skid boards can be placed under one or both of the feet as required.

2.3.9 The derrick is now ready to be pulled up by the winch under power.

2.3.10 Start up the engine as described in the engine manufacturer's handbook provided. Disengage the brake locking device by placing foot on brake foot pedal or the hand on brake hand lever to release brake mechanism. Keep brake under control, do not remove hand or foot from control. The Operator then pulls the clutch lever towards him slowly. This will cause the winch to rotate slowly and take up the slack line.

Check to see that the line is clear and is seating correctly on crown sheave and snatch block pulley. Continue to pull in the front legs until they are approximately 3m from the hinge pin of the rear legs (i.e. scissor the derrick to the raised position).

2.3.11 If the borehole is to be accurately sited, make any adjustments necessary to the position of the winch and derrick so as to locate the front of the crown sheave vertically above the required spot. If the ground permits, firmly stake down the lower cross bar.

2.3.12 Disconnect the end of the wireline from the front leg lifting chains, remove the rope block and chains. Fit side stay bars between the front and rear legs using bolts provided. It is important that both the lower crossbar and the two side stay bars are fitted before commencing any drilling or related operation. This will ensure that the derrick structure is locked into the most stable configuration.

2.3.13 The wireline is now attached to a spring hook prior to commencement of drilling operations.

2.4 DISMANTLING THE RIG

To dismantle and remove the derrick; the procedure is described above but in the reverse order. Briefly as follows:-

2.4.1 Fit draw chain block and reeve line as previously; using winch just take up the strain on the line.

2.4.2 Remove side stays and stakes from front legs, check that the ground over which the feet of the front legs will travel is even and reasonably level.

2.4.3 Pull the front legs out, at the same time allowing the line to unwind from the drum by releasing the brake as necessary, using either the foot or hand control lever.

IMPORTANT: The Operator must be in full control of the winch during the time the legs are lowered.

2.4.4 Continue to lower until the rear legs are safely resting on the ground then dismantle in the reverse order to assembly.

2.4.5 Insert the locking pins to secure the base unit to the mast.

2.5 ERECTING AND LOWERING CABLE PERCUSSION BORING RIGS BY THE SAMSON POST METHOD.

The following is the BDA Recommended Procedure for erecting DANDO Boring Rigs fitted with Samson Post.

ERECTING

2.5.1 Apply parking brake. Use chocks if necessary. Unhitch and remove vehicle.

2.5.2 Remove mudguards, **OR** leave mudguards in place if the are fitted with L, or U shaped leg guidance brackets to prevent legs slipping inwards.

2.5.3 Release leg locking nuts and base locking pins.

2.5.4 Place timbers under the leg pivot positions and rig frame at the front and rear of the rig. Ensure that they are level and in line with each other, both from side to side and back to front.

2.5.5 Run the winch cable over the crown wheel, back through the A frame above the first cross member and then attach with a shackle to the Samson Post.

2.5.6 Start the Engine.

2.5.7 Place an adequate counter balance to the rear of the rig. This can be achieved by placing and thoroughly securing drilling tools on the sinker bar carriers until there is enough weight to ensure the rear does not move.

UNDER NO CIRCUMSTANCES SHOULD A HUMAN COUNTER BALANCE BE USED.

2.5.8 Place the front legs on the top of the road wheels or on mud guard if they are fitted with L. or U. shaped leg guidance brackets to prevent legs slipping inwards. If the conditions are slippery the legs should be placed on the ground at the side of the rig.

2.5.9 Ensure that all personnel, other than the winch operator, stand clear of the rig.

2.5.10 Release the winch brake and ensure that the wire rope is located on the empty working side of the drum.

2.5.11 Make sure that there are no loose items that could fall off the rig when it is being erected.

2.5.12 Make a final check that there are no overhead obstructions e.g. overhead cables.

2.5.13 Set throttle and gently winch until the rig base rests on all the timbers then stop.

2.5.14 Check that the timbers are still level and central.

2.5.15 Once checks are complete, winch the rig gently, ensuring that the operators foot is over the brake at all times, until the crown wheel is within 25 degrees (approximately 3 feet or 1 metre) of vertical. Apply winch brake.

2.5.16 Reduce the engine revs. The legs should now be walked round to the front by the assistant driller and the spreader bar and side stay bars attached with the approved bolts. This job is carried out from the floor of the Dando Rig. The front legs should be as close to the floor as possible at all times during this part of the operation.

Only properly designed stay bars and spreader bar should be used.

The Driller **MUST** remain on the controls at all times.

2.5.17 On concrete, soft or boggy ground, place timbers under the feet of the legs before gently lowering to the ground.

2.5.18 Remove shackle and rethread the rope through the A frame.

The rig is now ready to operate.

LOWERING

2.5.19 Thread the wire rope through the A frame above the first cross member and then attach with a shackle to the Sampson Post.

2.5.20 Place and secure sufficient weight on the sinker bar carriers.

2.5.21 Check the position of the timbers. Ensure that the front timber is right to the front of the rig base.

2.5.22 Gently take the weight of the A frame on the winch and switch off the engine. Remove the spreader bar and side straps.

2.5.23 The legs should now be carefully walked round by the assistant driller and rested on the road wheels or on top of the mudguards that may be fitted with L or U shaped guidance brackets.

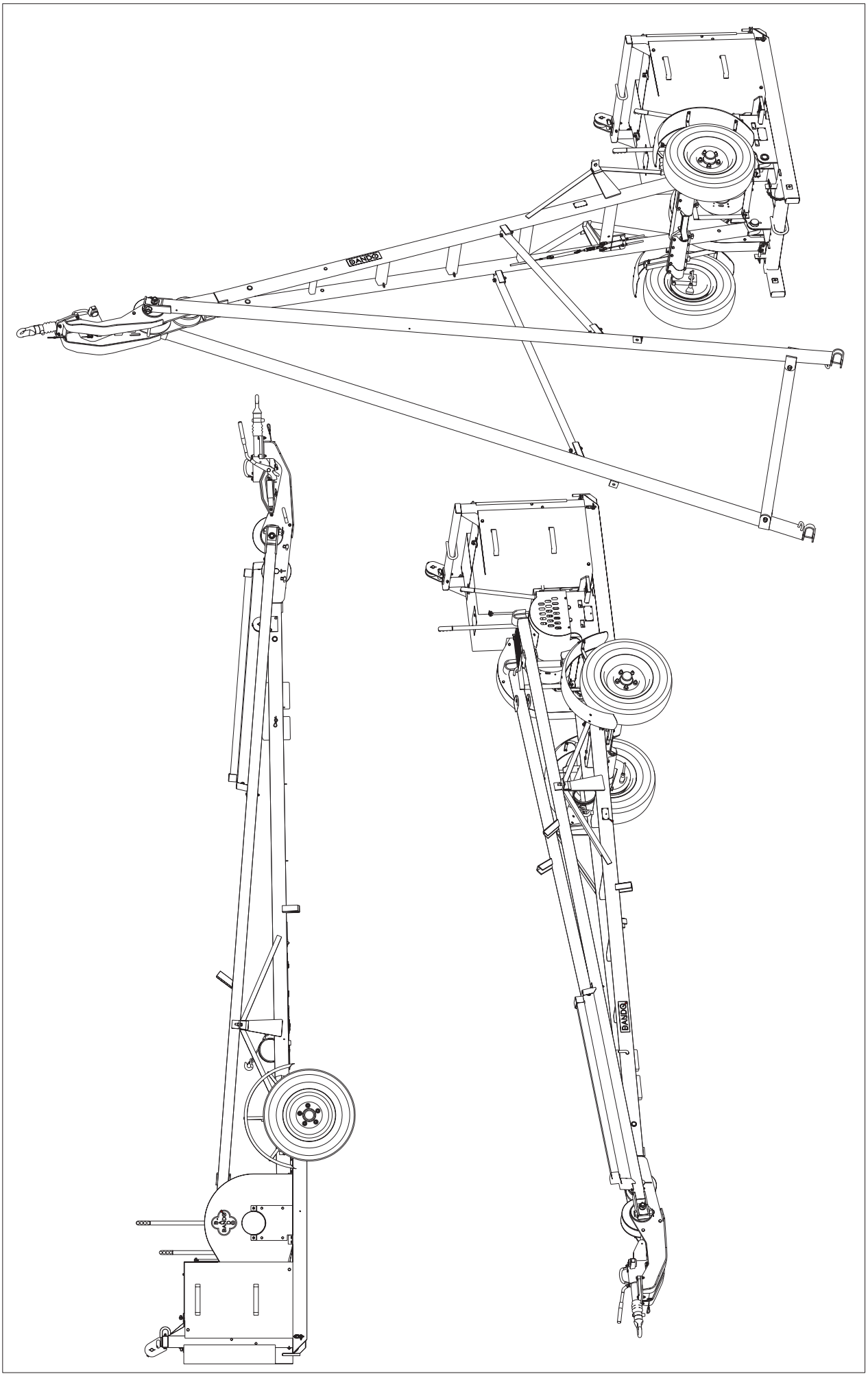
2.5.24 Check that there are no loose items that can fall off the rig. Ensure that all personnel are clear and that nothing lies under where the rig will be lowered. Gently lower the rig using both the clutch and the brake in a slow and steady manner until the A frame meets the rig base. Ensure that the parking brake is on and position the rig legs into the stirrups. Refit the base locking pins. Remove the counter balances from the rig. The rig is now ready to move to the next location.

SAFETY HARNESSES

Due consideration should be given to the wearing of safety harnesses when working at a height above 6ft and when undertaking repairs or maintenance the mast and sheaves etc.

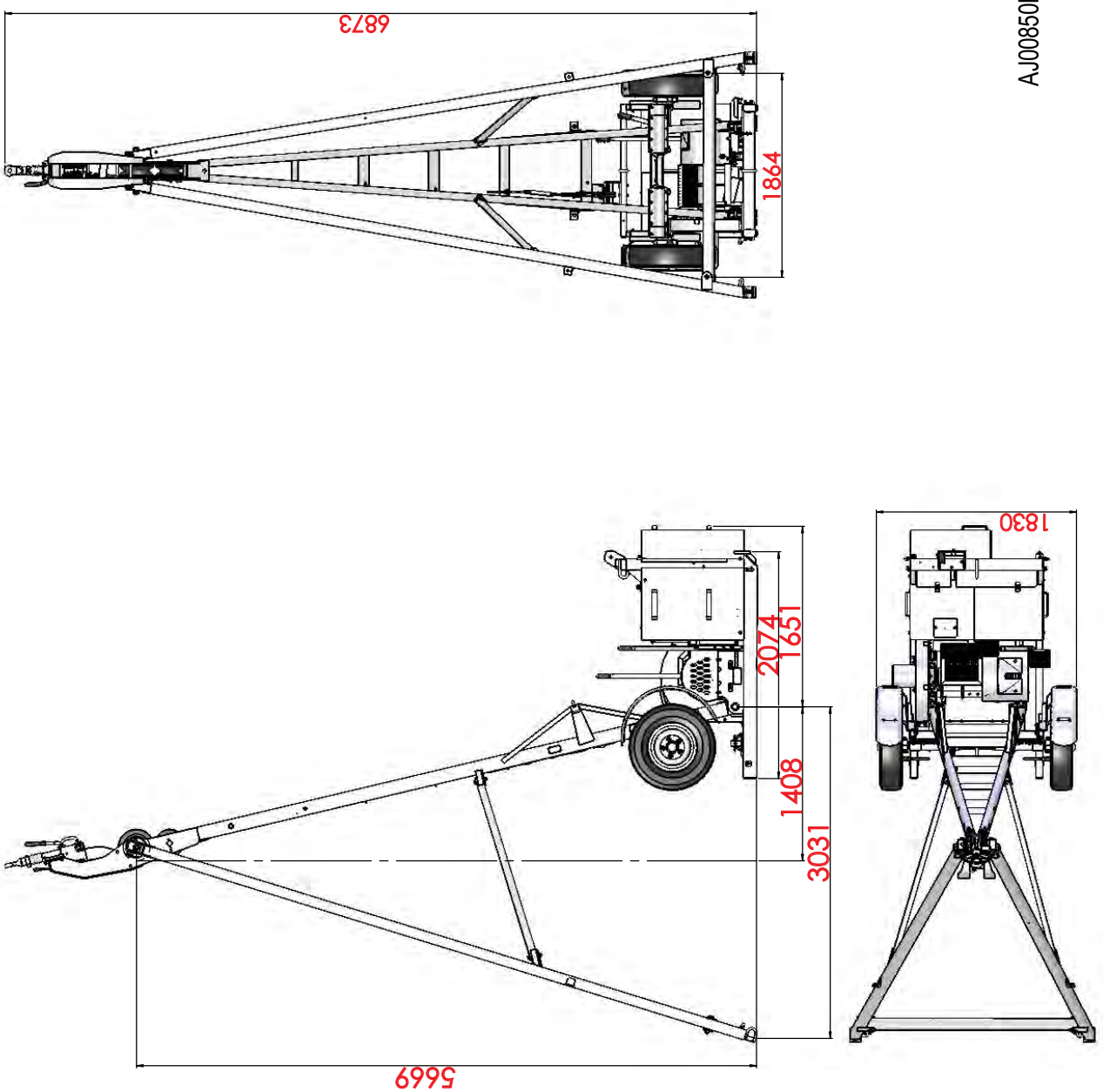
3. ILLUSTRATIONS

GENERAL ASSEMBLY OF RIG



3. ILLUSTRATIONS

GA with Overal Basic Dimensions



4. RIG CONTROLS

PLEASE REFER TO FOLLOWING DIAGRAM FOR THE POSITION AND GENERAL LAYOUT OF THE RIG MAIN COMPONENTS AND CONTROLS.

4.1. HOISTING REEL CLUTCH

The clutch is controlled by the operation of the Clutch Lever. This is pulled towards the operator to engage the clutch, and pushed away from the operator to disengage.

4.2. HOISTING REEL BRAKE

The Hoisting Reel Brake has two controls: a hand lever and a foot pedal.

To engage the Hand Lever is pulled towards the operator, or the foot pedal is depressed.

To disengage the Hand Lever is pushed away from the operator, or the foot pedal allowed to rise.

There is a brake locking device which is situated above the foot pedal. This should be turned to lock the brake on.

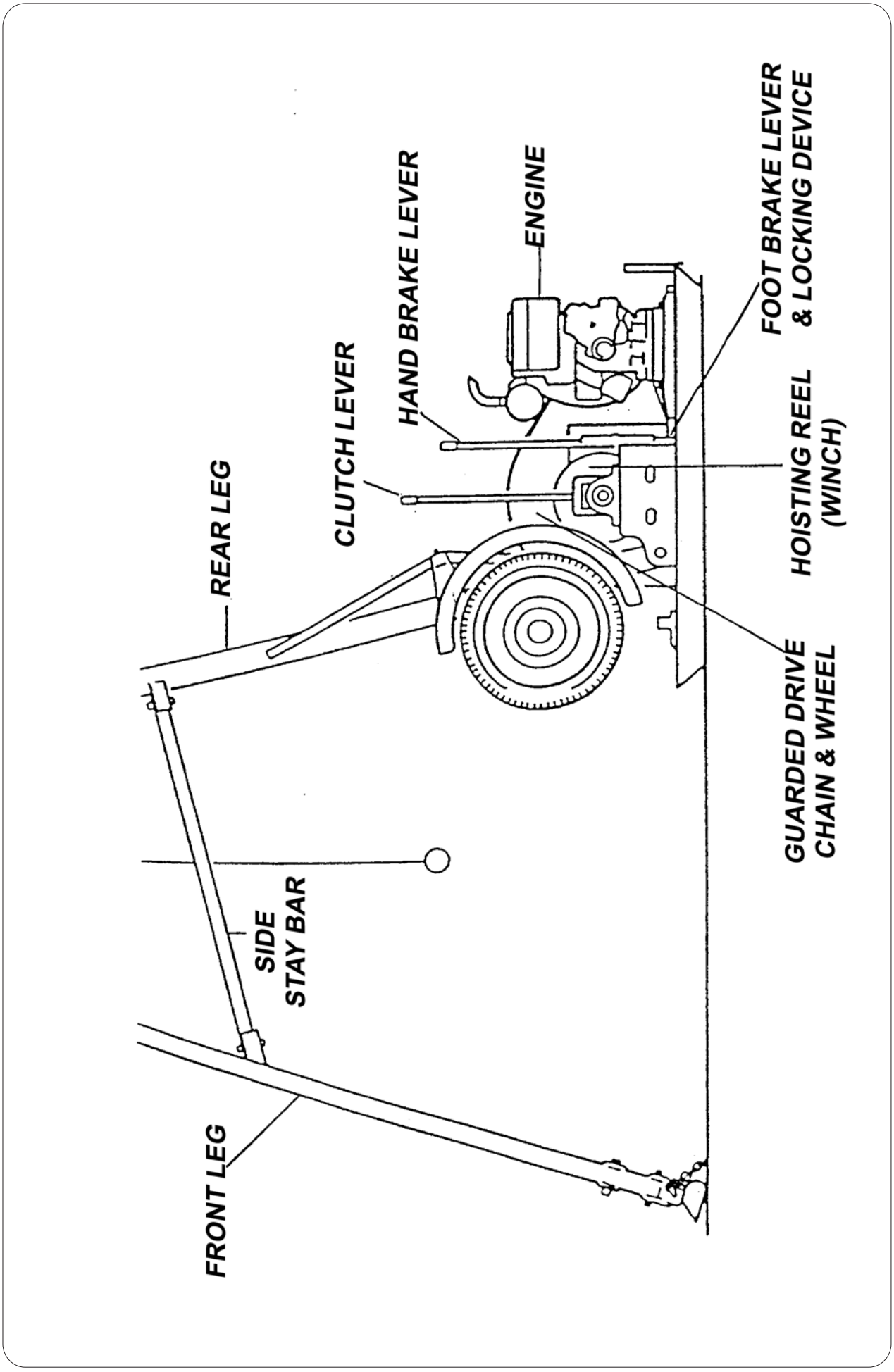
It is important that the brake control be left in the locked position when the machine is not being used, or when tools are being handled in the working area.

The attention of the operator is drawn to the Guidance Notes of Safety - Section 2 - Drilling Operations Cable Percussion, relating to general and specific areas to be noted with regard to the safe operation of the drilling rig.

4.3. ENGINE

Please refer to the instructions in the Engine Manufacturer's Handbook provided.

CONTROL LEVERS AND GENERAL LAYOUT



SECTION 2

GUIDANCE NOTES ON SAFETY

DANDO 3000 INVESTIGATOR MK2 DRILL RIG

2. GUIDANCE NOTES ON SAFETY

1. PERSONNEL

1.1. Drilling may entail the employment of men inexperienced in this class of work. Particular care should therefore be taken to explain and enforce safety precautions, and to teach good practice in the handling and use of equipment and plant.

1.2. No workman should be employed on any work unless he has been adequately instructed and trained in that work and is competent to do that work without supervision, or he is working under the instruction and supervision of some person competent to give instruction in and supervision in the doing of that work. This is especially important when employing young persons on drilling sites.

1.3. Alcohol should not be consumed on the site and persons who have been drinking should not be allowed on the site.

1.4. Pranks and horseplay are a common cause of accidents and should be forcefully discouraged. Safe successful work requires serious attention and good teamwork.

1.5. Operators should not lift, carry or move any load which is so heavy as to be likely to cause injury. When lifting it is recommended that the person should stand squarely with a solid footing and should lift the load slowly by straightening the legs rather than the back.

1.6. Care should be exercised when handling weights which must be moved with artificial means, such as pipe used for casing. etc.

1.7. If pipe is to be moved by rolling by hand, this must be done from the ends and the person must ensure that the hands are kept out of the ends of the pipe. Whenever possible the pipe should be rolled away from the person rolling it.

1.8. In general, care should be exercised whenever lifting something, be it heavy or light. In the case of lifting and moving heavy weights, chains, ropes and pipe hooks should be checked to ensure that they are in good conditions and employees should never stand under a raised load.

1.9. Visitors to the drilling site are in more danger than the operator, and should be steered clear of operational areas unless the nature of their visit demands otherwise. If necessary, operations should be suspended until visitors have been moved to a safer part of the site.

2. TRAVELLING TO, ON AND FROM DRILLING SITES.

2.1. Vehicles travelling on public highways must comply with the Highway Code, relevant Road Traffic Acts and with the appropriate Motor Vehicle Regulations currently in force in the United Kingdom or other E.C. Country.

2.2. Before travelling, checks should be made to all vehicles for road worthiness, giving special attention to lights, indicators, screen wiper, registration plates, brakes, brake lights, steering, security of loads, particularly overhanging loads, tyre pressure and wear mud before proceeding onto a public highway.

2.3. Important: It is drawn to your attention that the Dando 2000/3000 models of drilling rigs are **NOT** trailers and should not be loaded with drilling equipment during travel from drilling site to drilling site.

2.4. It is important that checks are make of the coupling and/or hitching of the drilling rig to any towing vehicle. The nose weight of the rig must comply the requirements stated in the vehicle handbook for the necessary positive load.

2.5. Where required long vehicle signs, caution or towing boards should be securely attached.

2.6. When towing equipment, correct towing speeds, reversing and maneuvering procedures should be observed and assistance obtained where necessary. Due regard should be paid to road conditions and visibility at all times. Care should be taken when towing in icy conditions as "jack-knifing" can occur. The safe towing speed should not be exceeded as there is a risk that "snaking" may suddenly develop, which may cause the trailer to lose a wheel.

2.7. Consideration should be given to other road users who may become impatient and take risks - it is advisable to pull into the side occasionally to let them pass.

2.8. Where wide, long or heavy loads are to be moved it is advisable to have all lights on for road travel, even in broad daylight.

2.9. On arrival at the site, ground conditions should be checked before driving in, and a watch kept for temporary overhead obstructions.

2.10. If necessary, an assistant should be used to control traffic if safety dictates.

2.11. Passengers should not be carried on or around the machine.

2.12. The driver of the vehicle should check for all round visibility before commencing any maneuver, especially reversing. If necessary, an assistant should be used to signal. The presence of an assistant does not relieve the driver of his responsibility, so he should constantly check the rear view in his mirror, and by direct sight.

2.13 When maneuvering vehicles, due regard should be paid to soft ground, potholes, gradients, slippery grass and mud, and overhead cables. Special Care should be taken when crossing dykes with improvised bridges. At all times personnel should be kept well clear of moving vehicles in case they overturn. Where winches have to be used, a watch should be kept for flying ground anchors and rope failures.

2.14. Loading and unloading the plant should only be carried out on firm level ground.

2.15. The vehicle's driver should act as assistant during loading and unloading operations. Signals should be agreed beforehand and standard procedures followed.

2.16. When loading or unloading on a public highway, assistants should be used to hold back traffic. These men should be responsible to the vehicle driver only.

2.17. Where the access to and from the site does not have good visibility in all directions, traffic leaving the site should be controlled by a person nominated for that purpose.

2.18. Vehicles should not reverse out of the drilling site on to a public highway.

3. DRILLING SITE PREPARATORY AND RESTORATION WORKS.

3.1. It is of greatest importance that a proper site appraisal should be made before any work is commenced. The results, together with any records of any underground installations, services, workings, etc., should have been made available to the drilling contractor who in any event should take all reasonable steps to obtain them.

3.2. A plan of the site showing the location of hazards to site preparatory work and to drilling operations should be prepared before any equipment is taken on site.

3.3. The drilling contractor should always act with competent engineering advice and assess the general hazards which may arise during construction and drilling due to the nature of the ground, the existence of high water, gas or oil pressures in the strata, surface and underground installations and services.

3.4. The site should be inspected before rig entry to find a safe approach route to the proposed drilling position. Some guidance may be required for winching or lowering rigs on steep slopes and in setting up in marshy or other soft areas.

3.5. It should be ascertained that the load bearing quality of the proposed site is adequate for safe working conditions. Hazardous situations such as old rock fill, unstable material, surface holes on sloping rock surfaces, under dangerous banks or quarry sides and on quarry edges should be avoided.

3.6. A clear access to and from the site should be provided with good visibility in all directions. If this is not possible, traffic leaving the site should be controlled by a person nominated for that purpose.

3.7. The working area should be suitable and where necessary levelled, surfaced and drained. Means should be provided to trap any escape of petrol, diesel fuel or oil which might leak into the water courses, fields or public drains, before it leaves the site.

3.8 The site should be adequately fenced and warning notices posted, with separate fencing and warning notices being provided for any mud or slurry pits.

3.9 Where working platforms are required to support men, equipment and/or materials, the platform should be properly constructed. It should be of adequate dimensions, and if over 2 metres above ground, should have guard rails and toe boards so placed to prevent falls of persons or articles from the platform. Similar guard rails and two boards may be considered desirable on platforms constructed at lesser heights in some circumstances. The platform construction and stability should be checked weekly for defects.

4. SETTING UP

4.1 The site must be kept in a well organised tidy state and clear of all debris and extraneous material.

4.2 It is preferable for acoustic barriers to be constructed of non-flammable material.

4.3 It should be ensured that all relevant machine guards have been installed before starting up any machine.

4.4 Bulk stocks of fuel, oil and gas cylinders should be stored in a designated compound remote from the immediate working area.

4.5 Rods, casings etc. should be neatly stacked, preferably on appropriate racks and maintained in a clean condition.

4.6 Threads and connectors should be regularly cleaned and greased, and preferable protected with thread protectors.

4.7 Tools and materials should be laid out accordingly to requirements and in order of use.

5. DRILLING OPERATIONS - GENERAL

5.1 Drilling may entail the employment of some personnel inexperienced in this class of work. In such circumstances, particular care should be taken to explain and enforce safety precautions, and teach practice in the handling and use of equipment. It is important that safe working systems of work are adhered to by all personnel.

5.2 Inexperienced men should always remain under expert supervision.

5.3 At the commencement of each shift the incoming crew should always make certain that the equipment is in a useable and safe condition. Unsafe conditions and any significant change in operating conditions should be reported in the driller's log book and any action taken thereon should also be logged.

5.4 Each operation must have its set routine, each team member knowing exactly what part he is to play.

5.5 Under no circumstances must a rig be operated by one man.

5.6 High noise level areas should be identified and hearing protection worn where necessary.

5.7 Where engine noise or other sounds prohibit verbal communication, a clear set of signals which are clearly understood and known by each team member should be used. This will also apply when ear defenders are worn.

5.8 It should be ensured that the winch operator has a clear view of men operating equipment at all times.

6. DRILLING OPERATIONS - CABLE PERCUSSION

6.1 A firm and level working surface should be established for the erection of the rig using timber sleepers where necessary. Mast guys, if applicable, should be correctly positioned and securely anchored, properly tensioned and frequently checked.

6.2 The equipment should always be operated in a safe manner and in accordance with the manufacturer's instructions.

6.3 Cable tools which are not in use should be laid down horizontally on timber grillage and should not be left in an upright position resting against the derrick.

6.4 The correct tool should always be used for the operation being undertaken.

6.5 Personnel should keep clear of suspended equipment and use a rope, strap or bail hook to swing tools away from the borehole. They should never look down the borehole beneath a suspended tool.

6.6 When the drive clamps are suspended or in use the operator should not place his hand on the drive head. When casing is being driven the drive clamps should not be suspended above the operator's head. Short lengths of casing can be used for this operation.

6.7 Tools should not be held in suspension be means of only the hand or foot control when personnel are changing or working on them.

6.8 The winch operation should be in accordance with the manufacturer's instructions, and should not be overloaded when pulling casing. When additional force is required proper jacking equipment with positive connections between jack head and casing should be employed, or an appropriate casing jar.

6.9 Casing tubes and tool joints should always be screwed well home in order to avoid damage to the threads and to prevent parting.

6.10 When driving casing, personnel should not place their fingers in tommy bar holes or over the lip of the casing.

6.11 All worn or splintered drive heads, drilling tools, sinker bars. Etc. should be replaced. Crushed, bruised or damaged wirelines should be removed immediately.

6.12 Sheave Wheels shafts and pins should be checked daily, kept well lubricated and replaced when worn.

6.13 Personnel should be alert for indications of broken strands of wire ropes and of shackles becoming undone.

6.14 Cuttings or spoil at the hole collar should not be cleared by hand or any tool unless the rig is in neutral and the clutch disengaged.

6.15 Slurry pits should be positioned so that they can be reached safely and easily by the bailer/shell without danger to the drill crew or undue stress on the bailing line. They should not be so close to the rig as to undermine the rig grillages.

7. PLANT MAINTENANCE

7.1 Plant, machinery and structures should be inspected at regular intervals in accordance with the manufacturer's recommendations. In the case of plant which is subject to corrosion, steps should be taken to effect repairs before corrosion reaches dangerous limits.

7.2 A planned preventative maintenance system covering shaft, daily, weekly and periodic times should be established for the different types of machine used. This should include the inspection of all pulleys, drum surfaces and ropes, and should stipulate their regular cleaning and lubrication. The system should include a three part sequence of inspection, thorough examination and testing. Results of each stage should be recorded and signed.

7.3 Cleaning, repair, maintenance, oiling or greasing of machines or the topping up of fuel tanks should not be carried out whilst a machine is operating.

7.4 If inspection involves the running of a petrol or diesel engine in an enclosed space, all doors and windows to the workshop should be opened and even then the engine should only be run intermittently to avoid dangerous build-up of fumes.

7.5 All plant should be kept clean by the regular removal of mud and dirt and of snow and ice in the winter, if applicable.

7.6 When major dismantling of components is necessary, the correct lifting equipment should always be used and is should be ensured that struts and chocks are strategically placed as the process continues.

7.7 The ignition key should always be removed, and a notice placed in a prominent position that it cannot be missed, if it is necessary to work underneath a machine, or to leave it in an incomplete unsafe state.

7.8 Moving parts of machinery are guarded where possible and such guards should be in position when machinery is in normal operation. Guards should not be removed except as required for maintenance purposes when the machine should be immobilised.

7.9 Lifting machines and tackle should be inspected and tested at set intervals and certified for the maximum permissible working loads, and these loads should not be exceeded. Following and major repair, they should be re-certified before returning into service. The owner/operator should be aware of current legislation in force in their own country and comply with all regulations with regard to re-testing of equipment.

7.10 Electrical installations should be effectively earthed.

7.11 Electrically operated hand tools, together with leads and earth wires, should be inspected at regular intervals to ensure that they have been maintained in good order, and such inspections should be recorded.

7.12 Trailing cables, except for hand-lamps and small portable tools should be of a standard equal to BE 708. Pliable armoured cables are preferred.

7.13 When high pressure grease guns are used, protective gloves should always be worn and care taken to avoid injecting grease under the skin.

7.14 Hose used for steam cleaning should be of the type make for steam service. The metal nozzle should be securely clamped to the hose and maintained in serviceable conditional at all times.

7.15 A flammable liquid with the classification of Class 'A' or Class 'B' petroleum should not be used for cleaning purposes, except in very special circumstances, and then by written permission only.

7.16 Loose board and materials not in use should be removed from the derrick floor.

7.17 Steps and guard rails, where applicable, should be maintained in good condition. If it is necessary to remove them temporarily during installation of the machinery, they should be replaced without delay when finished.

7.18 To eliminate slipping hazards, drilling floors, etc. should be kept as free of mud and oil as practicable. Better footing is provided if the floor is washed while the next stand of pipe is being picked up. Non-skid materials are useful in some areas to prevent slipping.

8. SITE ABANDONMENT

8.1 Every uncompleted borehole should be fenced or temporarily capped in a safe manner when the rig has moved off and until the hole is finally capped.

8.2 Unless a borehole is required to be kept open for some specific purpose, it should be infilled, consolidated and capped in such a manner that there will be no subsequent depression at ground surface due to settlement of the infill material.

8.3 A surface standpipe should be withdrawn or cut at least one metre below ground level prior to infilling the borehole.

8.4 Capping pads should be placed at least one metre below ground level.

8.5 Mud and slurry pits should remain adequately fenced and signposted until emptied, backfilled and consolidated. Any impervious membrane should be removed prior to restoration.

8.6 The site should be left in a safe, clean and tidy state, with all gates and fences left as found.

9. TRAINING

9.1 The most important factor of all on site safety is the full education and practical technical training of all drill crew members, in all aspects of drilling and associated operations.

9.2 Such training should include not only basic safety precautions but also a thorough understanding of the correct use of all plant, equipment and tools.

9.3 In addition, knowledge should be given of the forces of both energy and mass with the crew control through the medium of the drill rig.

9.4 The prime concept of this training is to teach each crew member to do his own job efficiently and safely and to so work with the other members of the crew that good and safe team work become instinctive.

9.5 This not only results in steady and safe progress, but secures higher production.

9.6 All training whatever the size of the organisation, should be formally programmed throughout the number of stages required by the personnel concerned. Each step in the training module or syllabus should be monitored by a fully trained instructor and duly recorded towards the eventual certification of the trained upon completion of the course concerned.

9.7 Training should be presented that the stimulation of personal interest and the known attainment of craft and skill achievement is a main aim and result. Such training therefore, should be initiated and encouraged by both management and supervisory staff.

9.8 One emphasis should be made on the value of efficient teamwork and towards the goal of high and safe production.

9.9 It cannot be too strongly stressed that the operatives involvement and outlook is dependent upon the quality and support of the employer.

9.10 The responsibility for all aspects if site safety rest with all levels of management.

10. WELFARE AND PERSONAL PROTECTION.

10.1 The Health and Safety at Work Act 1974 (United Kingdom) requires every employee, while at work, to take reasonable care for the health and safety of himself and of other personal who may be affected by his acts or omissions at work. In this connection personal and site safety and hygiene are most important.

10.2 Adequate and suitable protective clothing should be provided for any person employed who by reason of the nature of his work is required to continue working in the open air during rain, snow, sleet or hail.

10.3 Adequate accommodation for personnel to take shelter during bad whether, for the storage, drying and changing of clothing and for taking of meals should be available. Such accommodation should include the facility for boiling water, heating food, the provision of washing facilities to permit personal hygiene. Personnel should be encouraged to wash before partaking of food.

10.4 Washing and kitchen waste water should be discharged into a pit or sump dug into the ground remote from ditches and water courses.

10.5 Empty cans, bottles, plastic containers, drums and scrap metal, wire rope etc., should be placed in containers for transport to recognised waste disposal sites.

10.6 Suitable ventilated chemical toilets hosed to provide privacy, should be available. These should be regularly serviced and contents disposed of in accordance with manufacturer's instructions. Personnel should be encouraged to wash after using these facilities.

10.7 Potable/drinking water should be available and containers clearly marked from non-potable/non-drinkable water.

10.8 Oil saturated clothing is a fire risk and also a health risk in that it irritates the skin. They should be changed as soon as possible.

10.9 Advice should be sought from the local water authority and their medical officer of health prior to working in sewers or in waste water disposal sites. When working in these situations rubbing of the nose or mouth with the hands should be avoided. On completion of the work, hands and forearms should be thoroughly washed with soap and clean water with an added disinfectant. Any cut, scratch or abrasion should be cleaned, treated with antiseptic and completely covered until healed.

10.10 The possibility of existing excavations transmitting bacteria carrying liquids into a working area should not be overlooked.

10.11 It is advisable that drilling crews should receive regular anti-tetanus injections, and always carry the anti-tetanus injection card with them.

10.12 Relatively harmless materials can cause irritation leading to more harmful effects by repeated or prolonged exposure so that every effort should be made to avoid inhaling dust, fumes or smoke. Should such conditions have to be endured as a temporary measure, suitable protective equipment should be used.

10.13 Similarly, prolonged or repeated contact with the skin of certain substances, chemicals, oils or other fluids can be harmful. Under these circumstances protective gloves. clothing should be worn, and/or barrier creams used. Any such skin contact should be washed before eating food, and this should not be consumed in the working or contaminated areas.

10.14 Personnel should be fully protected against any hazard likely to be incurred in carrying out their work. Protective clothing and equipment should therefore be issued, maintained in good order and replaced when necessary.

10.15 Rig personnel should wear only close-fitting clothing, preferable distinctly coloured overalls. Clothing should be kept clean by frequent washing, and each crew member should have a clean change of work clothes on location at all times. Particular care should be taken to ensure that drawstrings to hoods or other items of clothing are not left dangling so as to become entangled in any moving parts.

10.16 If overalls are not worn, long-sleeved shirts with tails tucked in will provide protection against sunburn, insect bites, scratches, injurious chemicals and flash burns.

10.17 Safety helmets must be worn by members of the drilling crew and visitors to the site. Safety boots and safety wellingtons should be worn.

10.18 When working on or adjacent to the public highway, a top coat, jerkin or waistcoat, with fluorescent markings should be worn at all times.

10.19 The use of gloves whenever practicable is recommended. Gloves prevent minor injuries when employees are handling rough materials or skin irritants. Only short, tightfitting gloves should be worn. Gauntlets may become caught in the machinery and workers may be pulled into moving machinery they wear them.

10.20 Hairnets should be worn by persons with dangerously long hair. Loose clothing, i.e. trailing scarves, ties etc. should be avoided, especially when working near rotating machinery.

10.21 Rig personnel should never wear finger rings or bracelets while working.

10.22 Eye protection is of the utmost importance. An eye injury, no matter how slight, should receive prompt medical attention. Even a slight eye injury may lead to serious complications.

10.23 The correct eye protection should be provided and should be maintained in good condition on each drilling site. Employees should wear approved safety glasses or goggles when chipping, grinding, scraping, buffing, breaking or cutting any metal or material that involves a flying chip hazard.

10.24 Operators who wear contact lenses should wear eye protection and should always be aware of the problems posed by contact lenses when attempting prompt emergency treatment following the introduction of foreign material into the eye.

10.25 Splashproof chemical goggles or face-shields should be used when handling potentially hazardous or injurious chemical liquids, powders or vapours such as cement, chemicals, chemical cleaning solutions, creosoted material, molten metal, asphalt and bitumastic compounds. Goggles also should be worn by person near operations which require the use of safety goggles by the operator.

11. WIRE ROPES - GENERAL SAFETY AND MAINTENANCE.

11.1 Regular inspection of ropes in service is essential if high standards of safety are to be ensured, and the relevant test certificate obtained and available.

11.2 All running ropes in continuous service should be visually inspected once every working day by an authorised person.

11.3 A thorough inspection of all ropes in use should be made at least once a month and a full written, dated and signed report of rope condition kept on file and be readily available.

11.4 Any deterioration resulting in appreciable loss of strength, such as described below should be carefully noted and the rope should not be used if any of the following situations are present:

a) Reduction of rope diameter below nominal diameter due to loss of core support, internal or external corrosion or wear of outside wires.

b) In any length of diameters of the total number of visible broken wires exceeds five percent of the total number of wires in the rope.

c) Corroded or broken wires at end-connections.

d) Corroded, cracked, bent, worn or improperly applied end-connections.

e) Severe kinking, crushing, cutting or unravelling.

f) Heavy wear and/or broken wires may occur in sections in contact with equaliser sheaves, or other sheaves where rope travel is limited, or with saddles. Particular care should be taken to inspect ropes at these locations.

g) All rope which has been idle for a period of a month or more due to shutdown should be given a thorough inspection before it is placed in service. This inspection should be for all types of deterioration and should be performed by an authorised person whose approval should be required for further use of the rope.

h) Particular care should be taken in the inspection of non-rotation rope.

i) Wire rope removed from service due to defects should be plainly marked or identified as being unfit for further use on load carrying devices.

11.5 Upon receipt of wire ropes, whether they arrive in coil form or on reels, it is advisable to examine, and if necessary remove, the outer protective wrapping. This may have become wet during transit and, if left on the rope, local corrosion will appear in course of time. Ropes should be stored in a dry atmosphere and preferable off the floor, on well seasoned timber.

11.6 Rope delivered in reel form should have the reel jacked up to turn freely, so that the rope can be carried straight from the reel. Provision should be made to stop reel rotation by a braking device, however simple.

11.7 When rope is delivered in coil form, it should be rolled along a smooth surface, like a hoop, away from the end of the rope, and protected from unnecessary bending and abrasion.

11.8 When rope cannot be stretched out straight, it should be arranged in a long narrow "U" or series of "U"s with as wide a radius for the turn of the "U" as possible.

11.9 When handling wire rope it should be manipulated so that this natural twisting action will not cause it to kink.

11.10 A replacement rope must be of the same type and specification as the original fitted to the rig by the manufacturer and also of the correct safe working load.

11.11 Care should be taken when installing ropes on winding drums to ensure that there is even tension of the new rope being pulled round that system, that sharp bends are avoided and that the rope is kept clear of dirt and abrasive materials.

11.12 Rope should be kept tightly and evenly wound on the drums.

11.13 When the rope is feeding onto the drum it should not be touched by hand.

11.14 In order to prevent crushing the rope where a drum divider is used, there should not be more than four turns on the working section when the tools are at the deepest point.

11.15 Overruns should be avoided by correct winch operation.

11.16 The rope should be firmly fastened in the drum with set-screws, or a suitable clamp, and three full turns of the rope should be kept on the drum at all times.

11.17 Every rope should be thoroughly lubricated with the correct wire rope dressing as it is installed, and kept similarly coated throughout its life.

11.18 When equipment using wire rope is kept in dead storage for any length of time, the rope should not be left on the equipment.

11.19 Connections, fittings, fastenings parts, etc. used in connection with cables and ropes should be of good quality and of proper size and strength and should be installed in accordance with the recommendation of the manufacturer.

11.20 Socketing, splicing and sizing of wire rope should be performed by qualified persons.

11.21 All eye splices should contain the proper size of rope thimble.

11.22 When wire rope clips are used, the base of the clip must bear on the "live" end of the rope - the "live" end being the free-running portion of the rope. The "U" section of the clip bears on the dead end of termination fold of the rope. Failure to follow this procedure could cause the "U" bolt to kink or cut the live end of the anchor and cause failure.

11.23 Spacing of the clips, or "U" Bolts, is also important. They should be installed about six rope diameters apart, and tightened securely before the rope is placed in tension - and tightened again after the rope is put into use. The pulling on the rope can cause a slight reduction in its diameter with a resulting loosening of the clips.

11.24 When a wedge socket-type of fastening is used, the dead or shortened end of the rope should be clipped with “U” Bolts or otherwise made secure against loosening.

11.25 Winch ropes should not be looped, knotted or kinked around themselves or any other object except a suitably designed "D" etc.

11.26 Lifting hooks or shackles should be attached to the winch rope via a swivel connection which can operate under maximum load.

11.27 Whenever possible, new wire rope should be run under light load for a short period after it has been installed in order to adjust the rope to working conditions.

11.28 Sudden, severe stresses are injurious to wire rope and such applications should be reduced to a minimum. A jerk line may be rigged and clamped to the drilling line when it is necessary to be subjected to jarring in one place.

11.29 Experience has indicated what wear increases with speed: economy results from moderately increasing the load and diminishing the speed.

11.30 All winch ropes should be checked from time to time for excessive wear and be replaced when necessary.

11.31 Personnel should be kept a safe distance from lines being used for hoisting and pulling. They should never straddle them or reach across them, since serious injuries can result from the whiplash of a line that either breaks or is loosened suddenly. When straightening cable of winding it onto a hoist drum, the operator should be constantly alert at the controls.

11.32 If rope is used to haul equipment to the working areas a straight pull should be maintained from the winch through the pulley to the equipment.

11.33 Protective gloves should be used when handling wire ropes.

SECTION 3

MAINTENANCE AND ADJUSTMENTS

DANDO 3000 INVESTIGATOR MK2 DRILL RIG

3. MAINTENANCE AND ADJUSTMENTS

1. ADJUSTMENTS TO WHEELS & BRAKE CABLES.

WARNING:

Due to natural initial stretch associated with wire lines, it is advisable after the first few days of towing the rig to check and adjust the over-run brake operating cable. Adjustment can be made using the turn-buckle.

Brake cable condition etc., should be checked at regular intervals and adjustments made if necessary.

Wheel brakes must be adjusted by rotating wheel forwards & tightening until it locks up, then back off two complete turns.

2. HOISTING REEL - DIVIDING PLATE

CAUTION:

When using hoisting reels fitted with a dividing plate to provide a storage and working section of the drum, it is important that the correct section of the drum is used for each function.

The working section is the part nearest the mast or derrick centre line, while the storage side is off centre and incorporates the rope anchor. Using the storage section on the working side will lead to premature failure of drilling sheaves and damage to the rope.

3. MAINTENANCE

3.1 **ENGINE:** Maintenance of the engine should be carried out in accordance with the engine manufacturer's instructions.

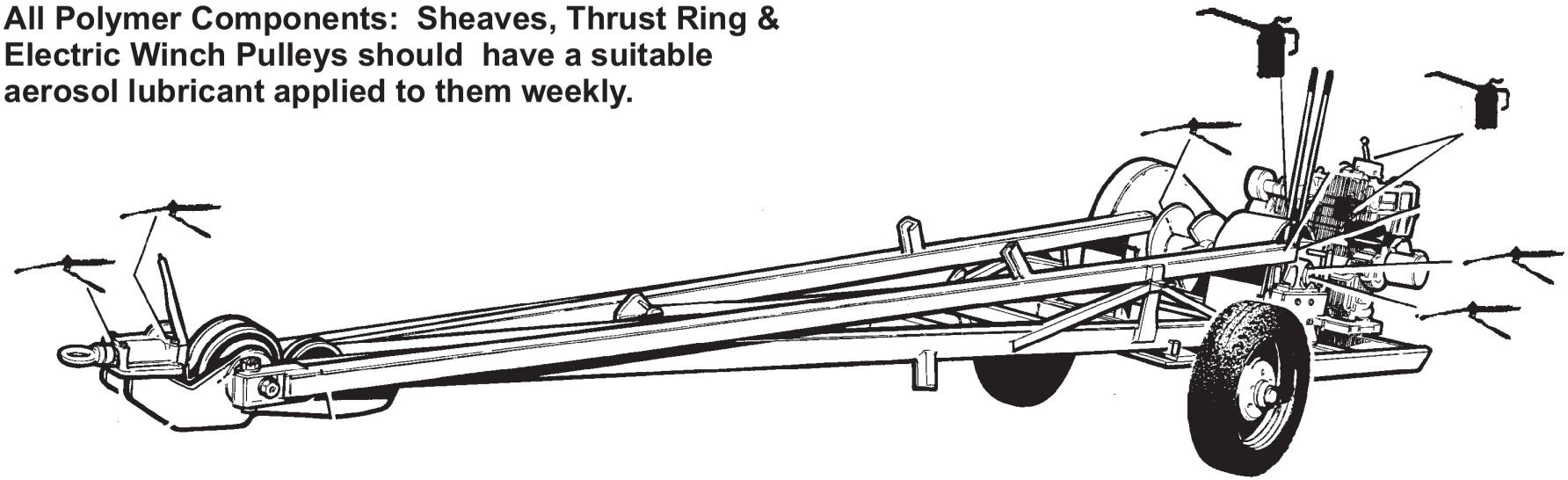
3.2 **DRIVE:** The chain drive should be kept well lubricated using a good quality grease. (See Lubrication Chart).

3.3 **WINCH:** The winch shaft and drum are mounted on sealed roller bearing units which should require no maintenance. The clutch operating mechanism should be greased daily using a grease gun to the nipple provided at the end of the shaft. A suitable aerosol lubricant should be applied to the thrust ring & sheave shafts each week. Occasionally oil the control lever and brake lever pivot points.

3.4 **GEARBOX:** Check daily level of gearbox oil, all other bearings are sealed units which should require no maintenance.

DANDO LUBRICATION CHART

All Polymer Components: Sheaves, Thrust Ring & Electric Winch Pulleys should have a suitable aerosol lubricant applied to them weekly.



GREASE POINTS

Overrider & Towing Eye (2)
Pillow Block (2)
Hoisting Reel Shaft

Recommended Grease - Lithium based No. 2 Grease.

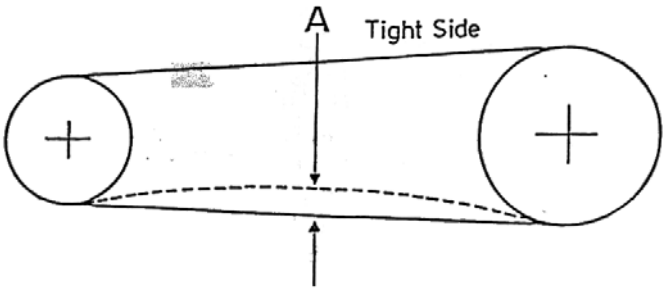
Recommended Oil - SAE EP 90.
Gearbox Oil - 3 Pints - 1.72 Litres (Approx)
Check Daily

Occassionally oil the Control/Brake Lever Pivot Points.
All other Bearings are Sealed Units which should require no maintenance.

4. ADJUSTMENTS

4.1 DRIVE

The chain may in time become slack due to stretch and wear. This should be taken up by pulling back on the engine, slots are provided on the engine bearers.



See diagram above:

N.B. The Drive Chain should be adjusted to allow movement of between 12 and 20mm (Distance A)

4.2 BRAKE - HOISTING REEL

(SEE SPARE PARTS SECTION – ASSEMBLY OF FOOT BRAKE)

It is important to keep the brake correctly adjusted at all times. On the brake there are three points which should be checked in the following order:-

1. There is a screw connection between the brake band and the brake lever which must be clear of the base side member. Small amounts of adjustment are possible by disconnecting the lower 'fork end', and rotating. This should however, only be used to ensure that the rod is vertical in the off position or the free fall performance of the winch will be affected.

2. The main adjustment screw, used to compensate for the wear and stretch, is situated below the brake band. Adjustments are made by slackening the locknut on one side of the pull cable saddles and tightening the lock nut on the opposite side.

3. With the brake lever correctly adjusted position the brake lever retaining catch to suit. To do this turn the bolt head in the centre of the handle clockwise to lower and anti-clockwise to raise the retaining catch.

WARNING: it is essential that the brake control and its lock are kept properly adjusted at all times, such that the blade is seated in its notch with the brake securely on.

4.3 CLUTCH

For the satisfactory operation of the rig, it is essential that the clutch unit should be maintained in correct adjustment. The clutch unit fitted on the drilling hoist is capable of transmitting far more power than is available from the engine.

In consequence if the hoist drum is held stationary by the brake then providing the clutch is in good condition and correctly adjusted it should need only a small amount of pressure on the operating lever to stall the engine.

The power of the clutch cannot be increased, but adjustment can be made to take up wear on the clutch shoes if this is causing excessive movement on the operating lever.

The small expansion and contraction of the clutch shoes resulting from the available movement of the operating lever must be regulated to allow both full application of pressure for driving and complete release to give free drum rotation.

The clutch adjuster provided for this purpose has to be correctly set to allow the shoes to move within the required limit. To make the necessary adjustment see that there is no load on the winch then with the engine stopped and the brake off, remove the Clutch Guard, slacken the locknut and turn adjuster anti-clockwise to slacken operating pull cable.

Rotate clutch assembly 180º to bring clutch shoe adjuster slot to the operational area, and turn the adjuster downwards with a screwdriver until the shoes lock onto the winch drum. Turn adjuster upwards until winch is just free to rotate.

Rotate clutch assembly through 180º to bring Pull Cable into the operational area. Tighten adjuster to give operating handle travel required, locking the Pull Cable in the desired position using the locknut.

NOTE WELL: IN ORDER TO MINIMISE FRICTION IN THE PULL MECHANISM BEFORE PINCHING LOCKNUT TIGHT, ENSURE THAT THE INDICATOR SLOT ON THE END OF THE PULL CABLE IS VERTICAL. ITS POSITION MAY BE ADJUSTED BY EITHER INSERTING A SCREWDRIVER IN THE INDICATOR SLOT AND TURNING, OR EASING BACK THE HEXAGON ADJUSTING NUT.

The clutch should now be set ready for operation, but extraneous causes can however result in the clutch failing to operate correctly, the most common being:-

a) Damage to the Pull Cable operating mechanism. This being most frequently caused by the drill line getting wrapped around it beyond the limits of the drum, but this can only occur if the guard is not fitted.

b) Damage to the surface of the shoes and to the internal face of the drum caused by small pieces of stone or grit getting into the clutch and being trapped between shoe and drum.

In addition to keeping the clutch itself correctly adjusted it is also essential to see the operating mechanism between the clutch lever and the Pull Cable attaching to the clutch expander is maintained in reasonable working order.

If this mechanism including the trust ring is allowed to become slack and badly worn, then it will be impossible to transmit the necessary movement in order to expand and contract the shoe. The main points to be watched are:-

a) See that the nut which locks the Pull Cable plate is kept tightened.

b) The main wearing component is the thrust ring. If this is allowed to become slack, then it will be impossible to transmit the necessary movement between the clutch lever and the clutch unit. The thrust ring is held in position by a locking ring which can be rotated to take up wear as it occurs.

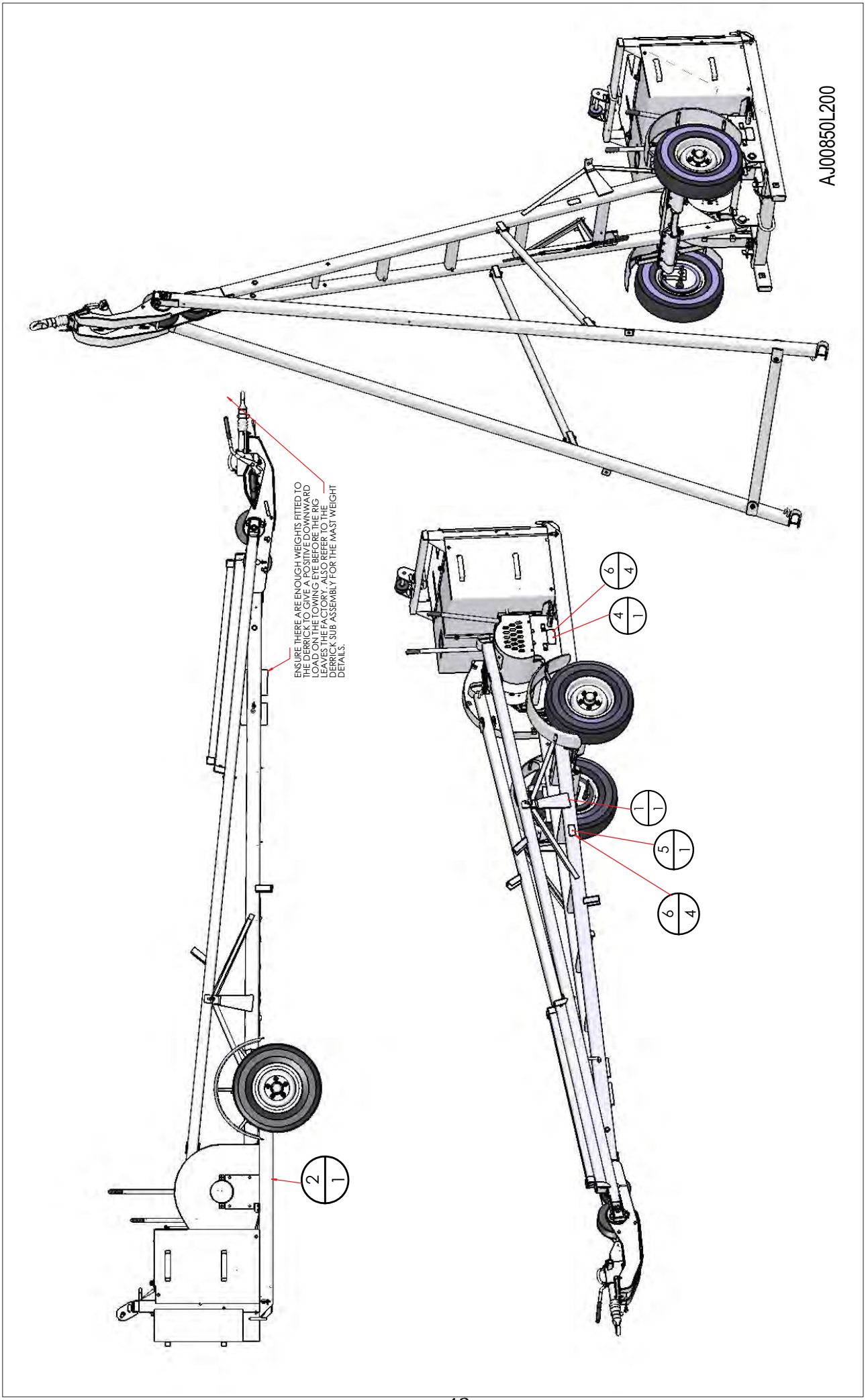
   To carry out this adjustment, remove the two locking screws which seat in keyways on the main body. Then rotate the ring a quarter turn or so in order to take up the wear that has occurred on the thrust ring. Position the ring so that the locking screw holes are opposite the keyways. Insert the locking screws and tighten.

SECTION 4

SPARE PARTS ILLUSTRATIONS AND LISTINGS

DANDO 3000 INVESTIGATOR MK2 DRILL RIG

GENERAL ASSEMBLY



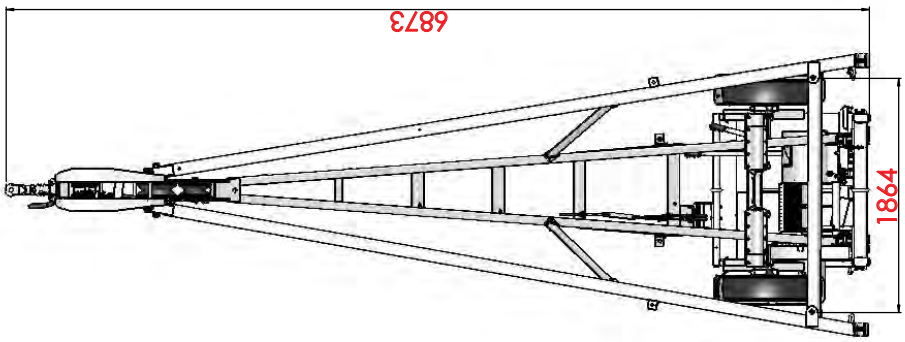
DANDO 3000 INVESTIGATOR MK2

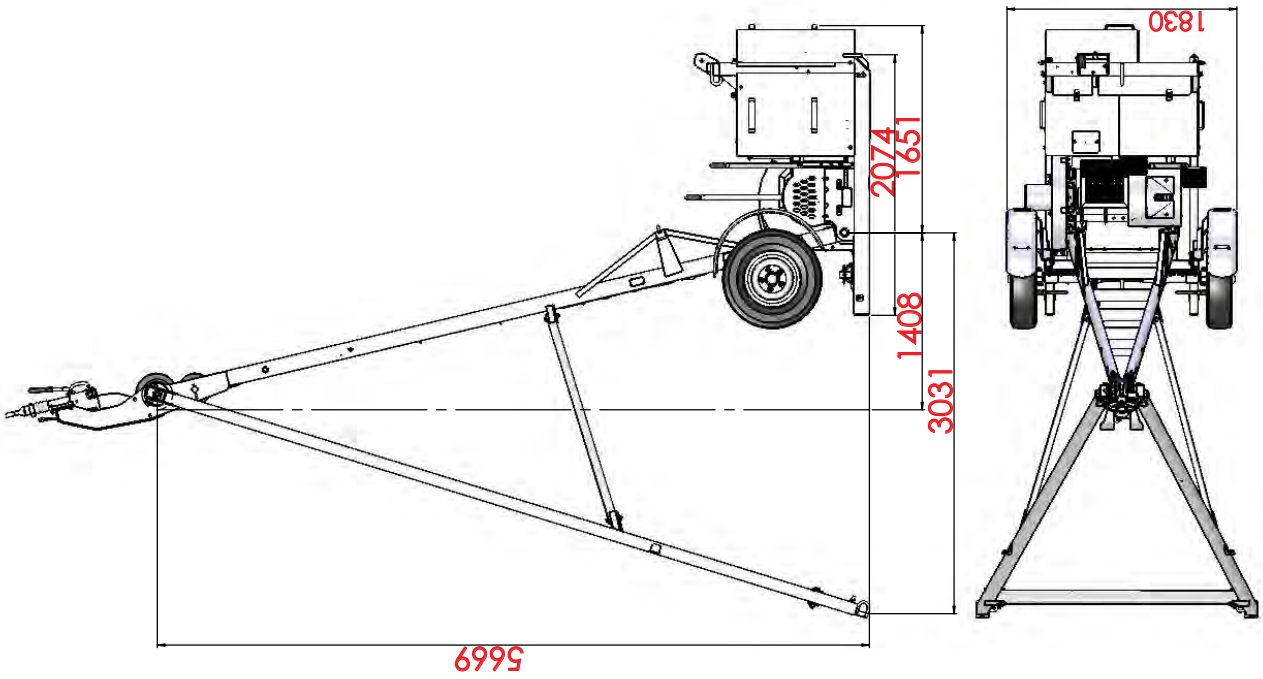
GENERAL ASSEMBLY - AJ00850L200

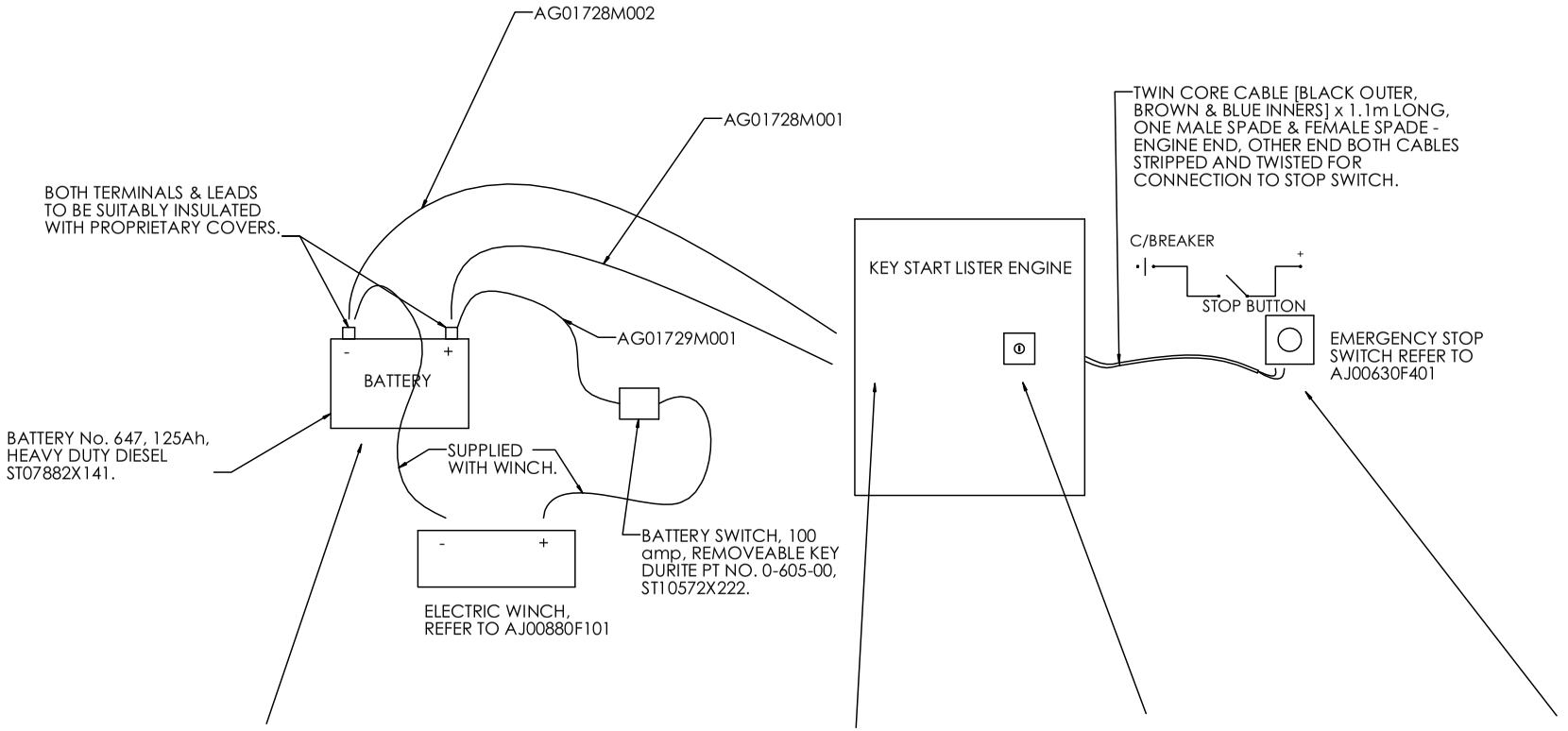
ITEM	PART NUMBER	QTY	DESCRIPTION
1	AJ00780L401issA	1	Derrick Sub Assembly
2	AJ00800L401	1	Power Pack Assembly Tr3 Mk2
3	AJ00885H101	A/R	Electrical/Diagram Parts - Not Shown
4	ST09905X500	1	Serial Number Plate
5	ST09906X500	1	Winch Rating Plate
6	ST03554X693	8	Pop Rivet

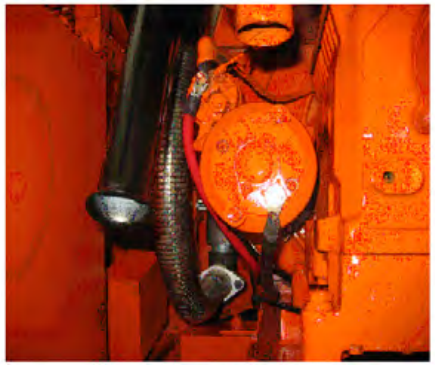
GA with Overal Basic Dimensions

AJ00850L200







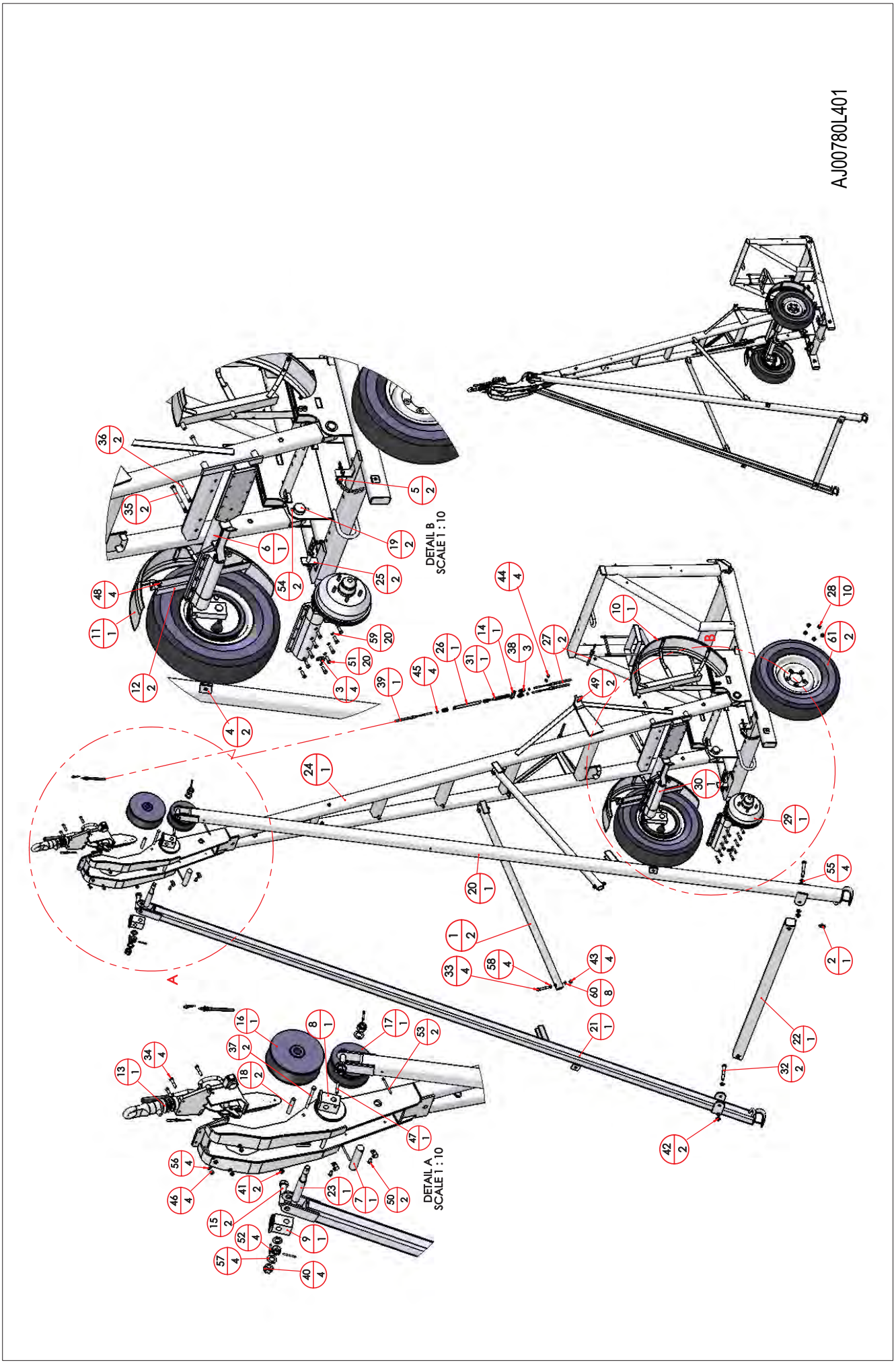


SEE COVER NOTE ABOVE

NOTE ALL THE ABOVE GUIDE PHOTOGRAPHS ARE FROM THE D2000 & ONLY TO BE USED AS A GUIDE.

AJ00885H101

DERRICK SUB ASSEMBLY

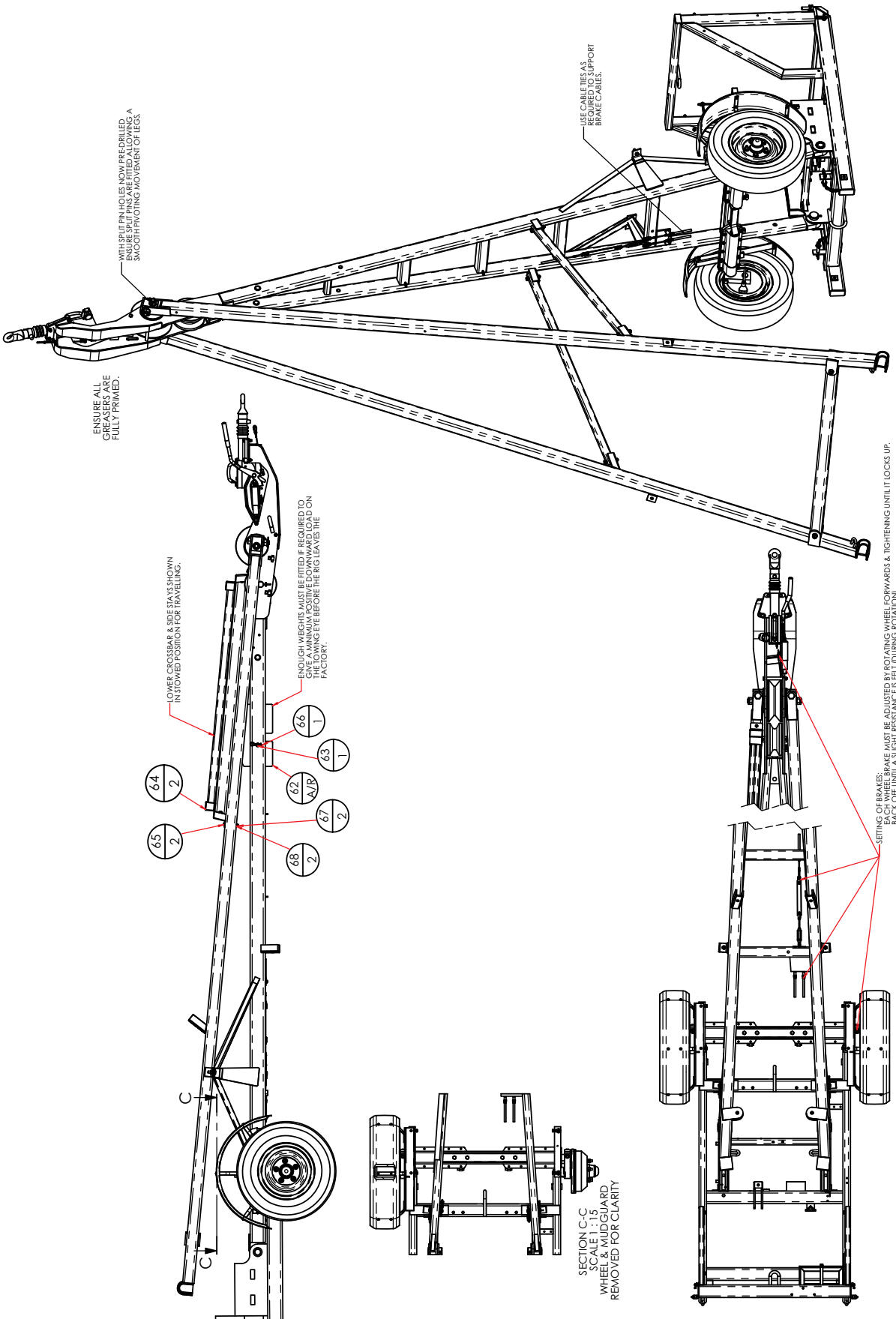


DANDO 3000 INVESTIGATOR MK2

DERRICK SUB-ASSEMBLY - AJ00780L401 (Iss.B)

ITEM	PART NUMBER	QTY	DESCRIPTION
1	AG00335H101	2	Side Stay Bar
2	AG00386H001	1	Hoisting Chains Set
3	AG01222H001	4	Clamp - Cable
4	AG01231H001	2	Front Leg Angle
5	AG01233H001issA	2	Lock Pin - Rear Leg
6	AG01235H101	1	Wheel Suspension Bar
7	AG01236H001issA	1	Cat Sheave Shaft
8	AG01238H001	1	Front Leg Pivot (Anti Rotation)
9	AG01238H002	1	Front Leg Pivot
10	AG01245F001issA	1	Mudguard Assembly - Nearside
11	AG01245F002issA	1	Mudguard Assembly - Offside
12	AG01246H001	2	Support – Mudguard
13	AG01680H001	1	Knott Over Rider Towing Eye – Mod
14	AG01681M001	1	Joint Bar
15	AG01683M001	2	Hex Hd Bolt
16	AG01691H001issA	1	Crown Sheave
17	AG01692H001	1	Cat Sheave
18	AG01693M001	2	Spacer Tube
19	AJ00601H001	2	Rear Leg Pivot Pin
20	AJ00603F001issB	1	Front Leg - Left Hand
21	AJ00603F002issB	1	Front Leg - Right Hand
22	AJ00605H101	1	Lower Cross Bar
23	AJ00653H001issA	1	Crown Sheave Shaft
24	AJ00775L301issC	1	Rear Derrick Leg Welded Assembly
25	AJ00779H001	2	Rear Leg Lock Angle
26	AJ00884M001issA	1	Link Bar - Mk2
27	ST05918X100	2	Brake Cable To Wheel
28	ST07514X100	10	Conical Nut
29	ST07512X100	1	Flextitor With Brake & Hub L/H
30	ST07513X100	1	Flextitor With Brake & Hub R/H
31	ST01219X103	1	Brake Adjuster
32	ST00830X133	2	Hex Head Bolt
33	ST02164X133	4	Bolt Hex Head
34	ST04143X133	4	Hex Head Bolt
35	ST06169X133	2	Hex Hd Bolt

DERRICK SUB ASSEMBLY



DANDO 3000 INVESTIGATOR MK2

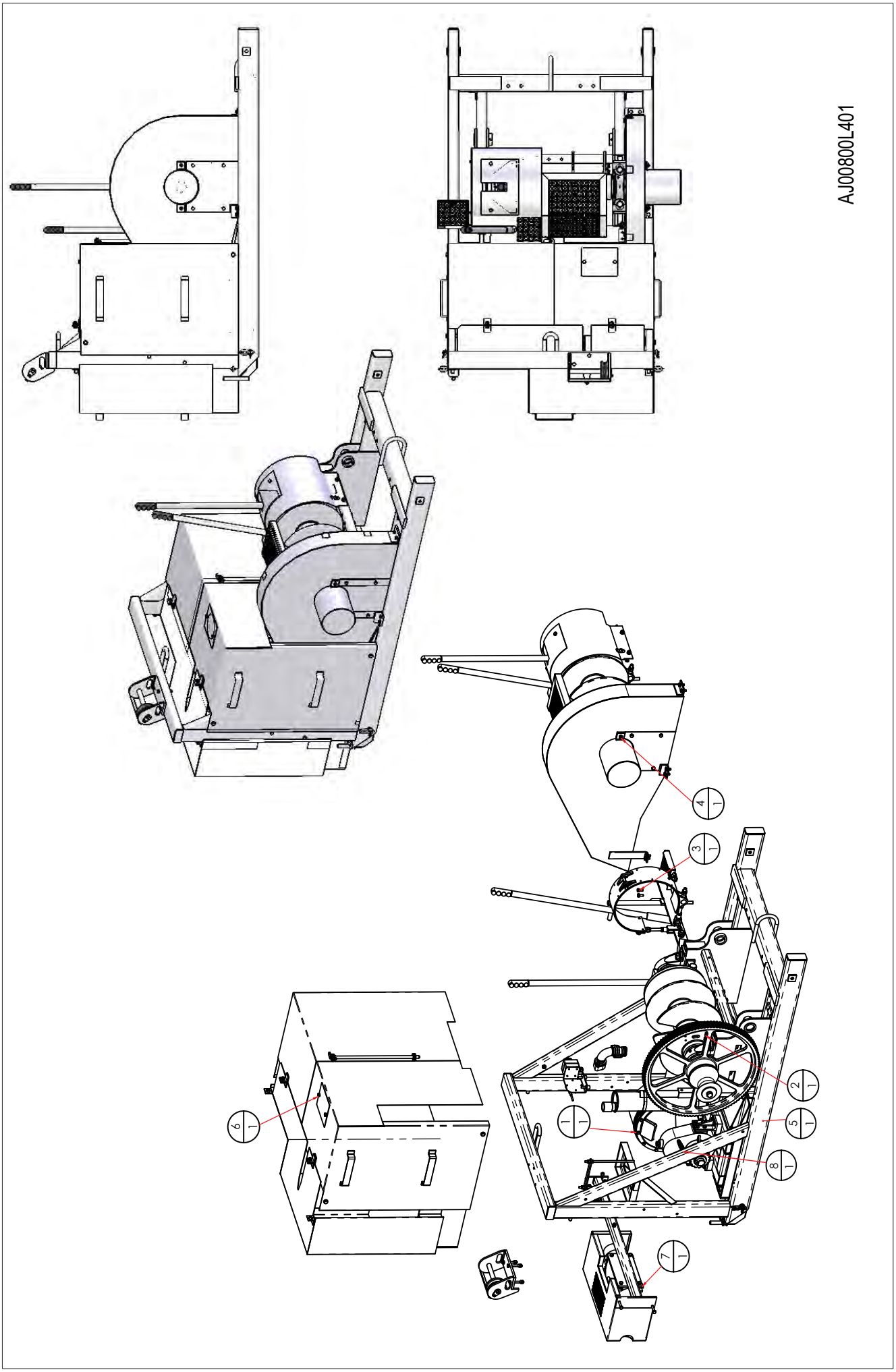
DERRICK SUB-ASSEMBLY - AJ00780L401 (Iss.B)

ITEM	PART NUMBER	QTY	DESCRIPTION
36	ST09215X133	2	Bolt Hex Hd
37	ST09870X133	2	Hex Hd Bolt
38	ST09864X170	3	Clevis Fork End C/W Spring Pin
39	ST07524H178	1	Brake Cable
40	ST01101X509	4	Slotted Nut
41	ST09871X510	2	Nyloc Nut
42	ST00590X511	2	Full Nut
43	ST00650X511	4	Full Nut
44	ST00652X511	4	Thin Nut
45	ST01380X511	4	Thin Nut
46	ST00787X523	4	Nyloc Nut
47	ST03852X691	1	Roll Pin
48	ST00796X715	4	Hex Hd Set Screw
49	ST05188X715	2	Hex Hd Set Screw
50	ST05893X715	2	Hex Head Set Screw
51	ST07896X715	20	Set Screw
52	ST00714X750	4	Split Pin
53	ST03048X750	2	Split Pin
54	ST05180X750	2	Split Pin
55	ST00665X881	4	Plain Washer
56	ST00788X881	4	Plain Washer
57	ST01322X883	4	Plain Bright Washer
58	ST04295X883	4	Bright Washer
59	ST00648X885	20	Spring Washer
60	ST00651X885	8	Spring Washer
61	ST01360X888	2	Wheel 5 Stud

ITEM	PART NUMBER	QTY	DESCRIPTION
62	AG01719M001	A/R	Mast Weight
63	AG01723M001issA	1	Weight Pin
64	AJ00888H001	2	Bar Bracket
65	ST05257X133	2	Hex Hd Bolt
66	ST00224X163	1	"R" Clip
67	ST00776X511	2	Full Nut
68	ST00777X885	2	Spring Washer

POWER PACK ASSEMBLY - TR3, 2:1 GEARBOX.

AJ00800L401

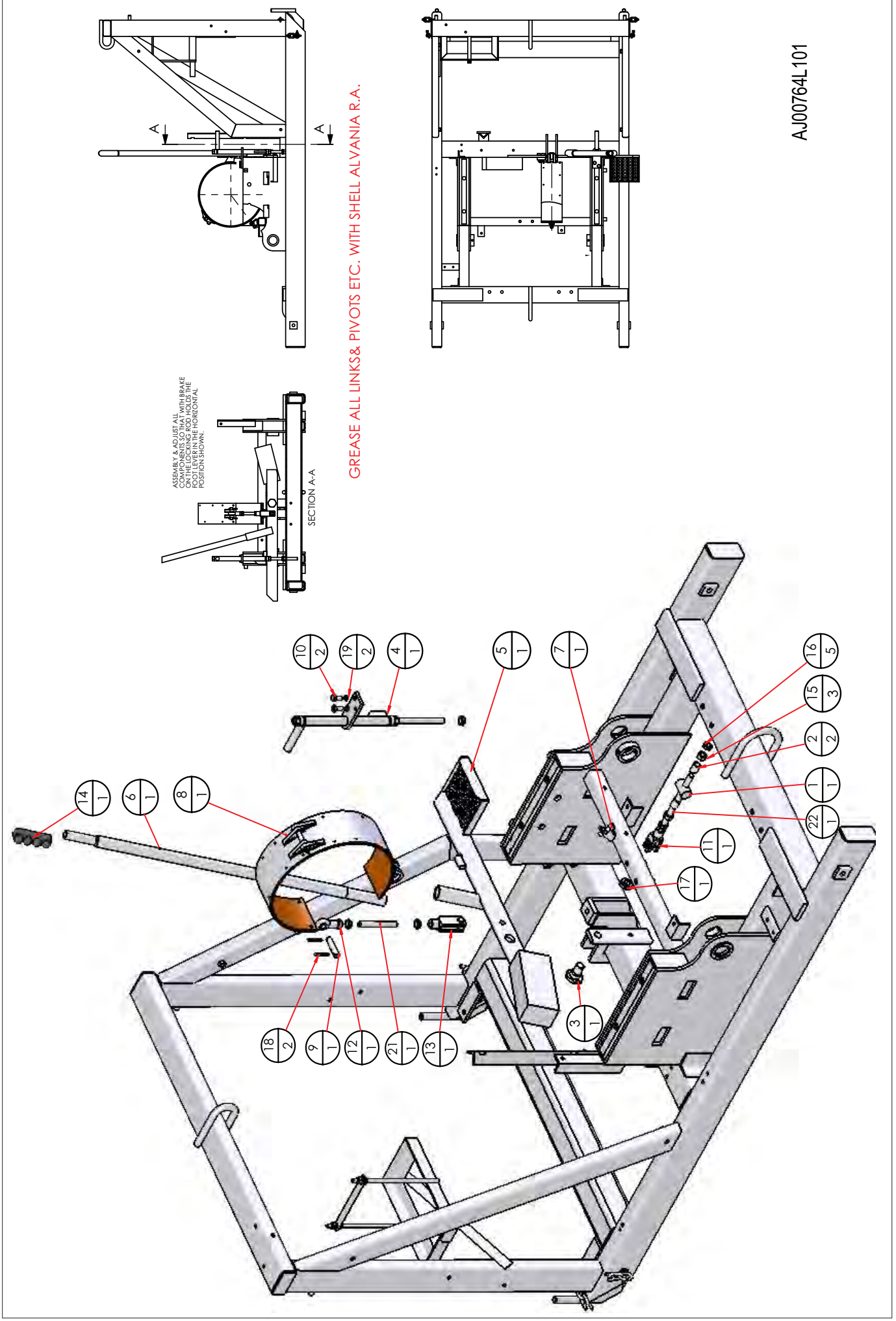


DANDO 3000 INVESTIGATOR MK2

POWER PACK ASSEMBLY - AJ00800L401

ITEM	PART NUMBER	QTY	DESCRIPTION
1	AJ00630F401	1	Engine Mounting Sub Assembly
2	AJ00750L401issA	1	Hoisting Reel Assembly
3	AJ00764L101issB	1	Foot Brake Assembly
4	AJ00864F101	1	Guards Assembly - Mk2
5	AJ00875F101	1	Standard Base With Sampson Post Mk2
6	AJ00878F101	1	Three Part Guard Assembly
7	AJ00880F101	1	Electric Mast Raising
8	ST00555X161	1	Triplex Chain C/W Connecting Link

ASSEMBLY OF FOOT BRAKE

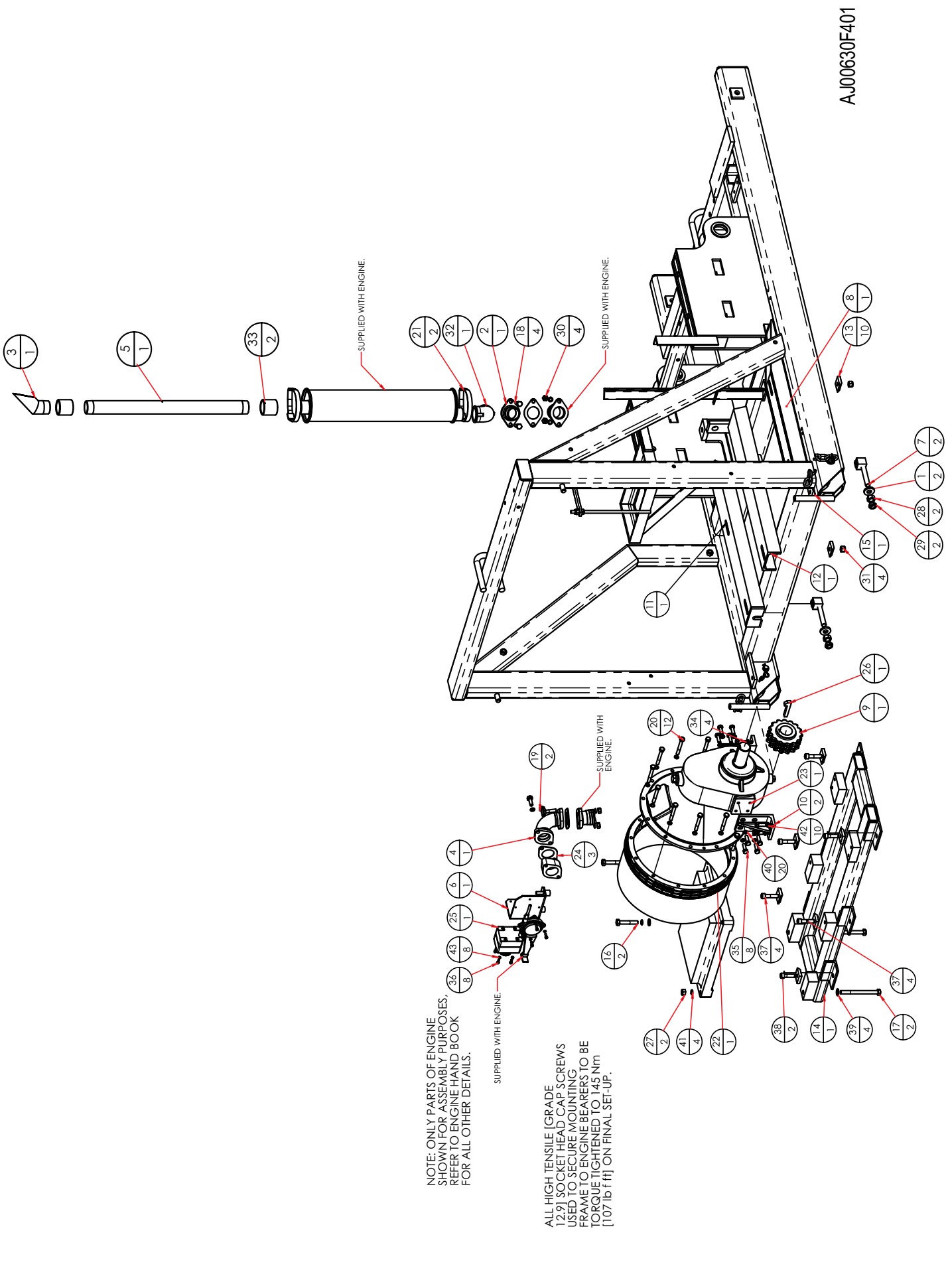


DANDO 3000 INVESTIGATOR MK2

FOOTBRAKE ASSEMBLY - AJ00764L101 (Iss.B)

ITEM	PART NUMBER	QTY	DESCRIPTION
1	AA01668H001	1	Brake Band Pin
2	AA01669H101	2	Pull Rod Pin Saddle
3	AJ00576H001	1	Pivot Stud
4	AJ00577H001issA	1	Locking Rod Handle Unit
5	AJ00578H201issC	1	Foot Brake Sub Assembly
6	AJ00579H001	1	Detachable Hand Lever
7	AJ00580H001issA	1	Support
8	AJ00765F101issB	1	Brake Band - Complete
9	AK00747H101	1	Pull Rod Pin
10	ST01258X133	2	Hex Hd Bolt
11	ST00794X170	1	Fork End C/W Pin & Clip
12	ST00795X170	1	Spherical Rod End
13	ST03949X170	1	Fork End C/W Pin & Clip
14	ST00320X295	1	Bore Rubber Grip
15	ST00650X511	3	Full Nut
16	ST00652X511	5	Thin Nut
17	ST00716X511	1	Thin Nut
18	ST00195X749	2	Split Cotter Pin
19	ST00777X885	2	Spring Washer
20			
21	14190390160	1	Studding
22	14190390160	1	Studding

ENGINE MOUNTING SUB ASSEMBLY - TR3, 2:1 GEARBOX



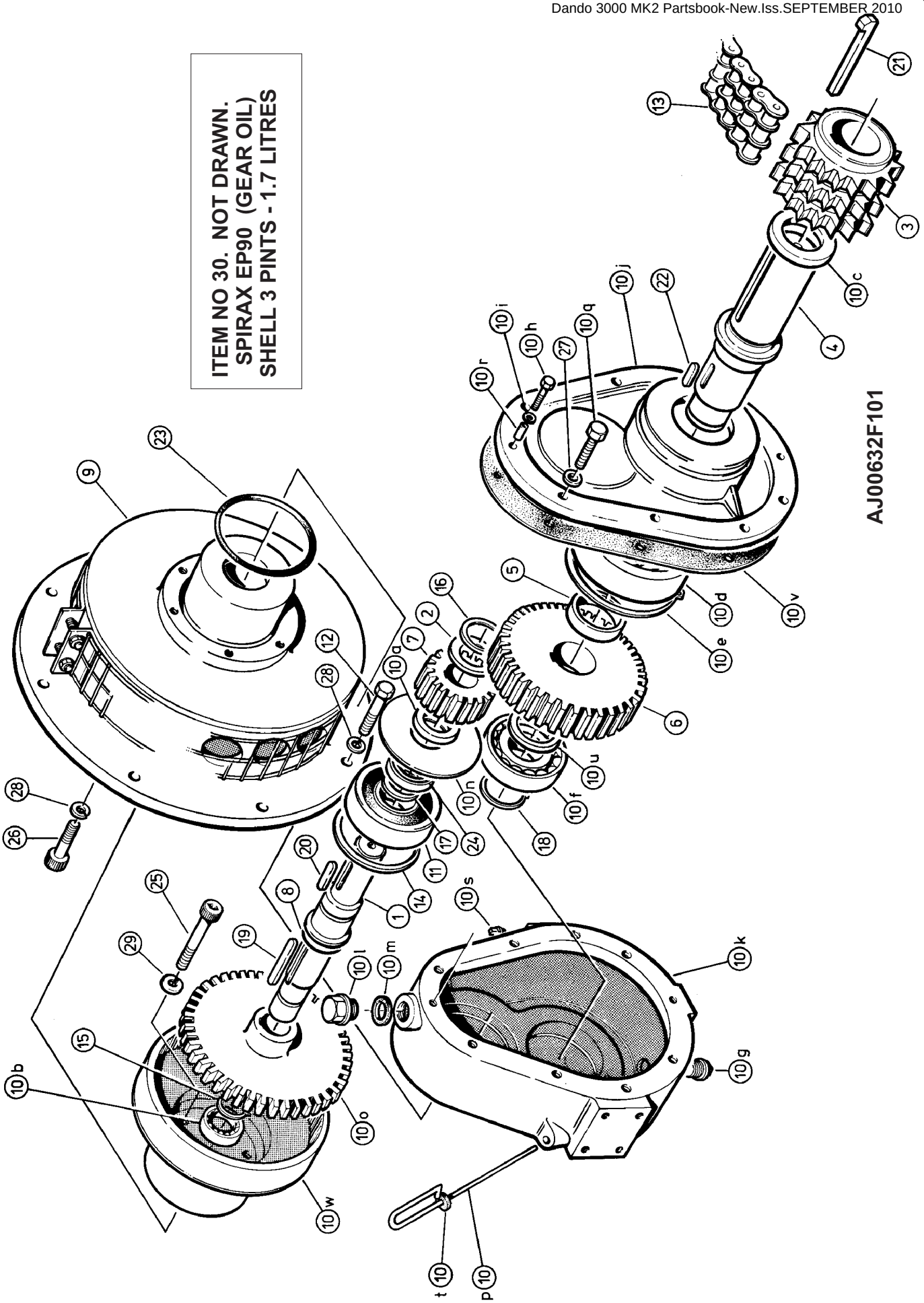
DANDO 3000 INVESTIGATOR MK2

ENGINE MOUNTING SUB-ASSEMBLY - AJ00630F401

ITEM	PART NUMBER	QTY	DESCRIPTION
1	AG01620M001	2	Special Washer
2	AG01708M001	1	Exhaust Adapter
3	AG01709M001	1	Exhaust End
4	AG01710M001	1	Exhaust Elbow Tr3
5	AG01711M001	1	Exhaust Extension Pipe
6	AG01715M001issB	1	Throttle & Emergency Stop Bracket
7	AJ00350H101	2	Engine Adjuster
8	AJ00354H001	1	Outrigger/Adjuster Channel
9	AJ00393H001	1	Engine Sprocket
10	AJ00395H001	2	Gearbox Support Bracket
11	AJ00626H101	1	Engine Bearer - Nearside
12	AJ00626H102	1	Engine Bearer – Centre
13	AJ00634H001issC	10	Special Washer
14	AJ00858F001	1	Engine Mounting Adapter - Tr3, 2:1 Gearbox
15	AJ00875F101	1	Standard Base With Sampson Post Mk2
16	ST01068X133	2	Hex Head Bolt
17	ST01082X133	2	Hex Head Bolt
18	ST01084X133	4	Hex Hd Bolt
19	ST07305X133	2	Hex Hd Bolt
20	ST03584X135	12	Hex Head Bolt
21	ST09952X163	2	Hi-Torque Hex Hd Jubilee Clip
22	ST09932X221	1	Tr3 Engine
23	ST08734X276	1	2 :1 Reduction Gearbox
24	ST09891X221	3	Lister Exhaust Gasket
25	ST08819X224	1	Emergency Stop Switch
26	ST04082X425	1	Square Gib Head Key
27	ST00579X511	2	Full Nut
28	ST00650X511	2	Full Nut
29	ST00652X511	2	Thin Nut
30	ST00776X511	4	Full Nut
31	ST06828X523	4	Nyloc Nut
32	ST02558X577	1	Equal Elbow
33	ST08991X629	2	Fem Socket
34	ST00775X715	4	Hex Head Set Screw
35	ST04083X731	8	Hex Head Set Screw
36	ST06149X743	8	Socket Head Cap Screw
37	ST10330X743	4	Socket Head Cap Screw
38	ST11143X743	2	Socket Head Cap Screw High Tensile
39	ST00788X881	4	Plain Washer
40	ST00115X884	20	Spring Washer
41	ST00648X885	4	Spring Washer
42	ST00777X885	10	Spring Washer
43	ST04149X885	8	Spring Washer

DANDO 2 ½ - 1 REDUCTION GEARBOX FOR LISTER TR3 ENGINE

ITEM NO 30. NOT DRAWN.
SPIRAX EP90 (GEAR OIL)
SHELL 3 PINTS - 1.7 LITRES

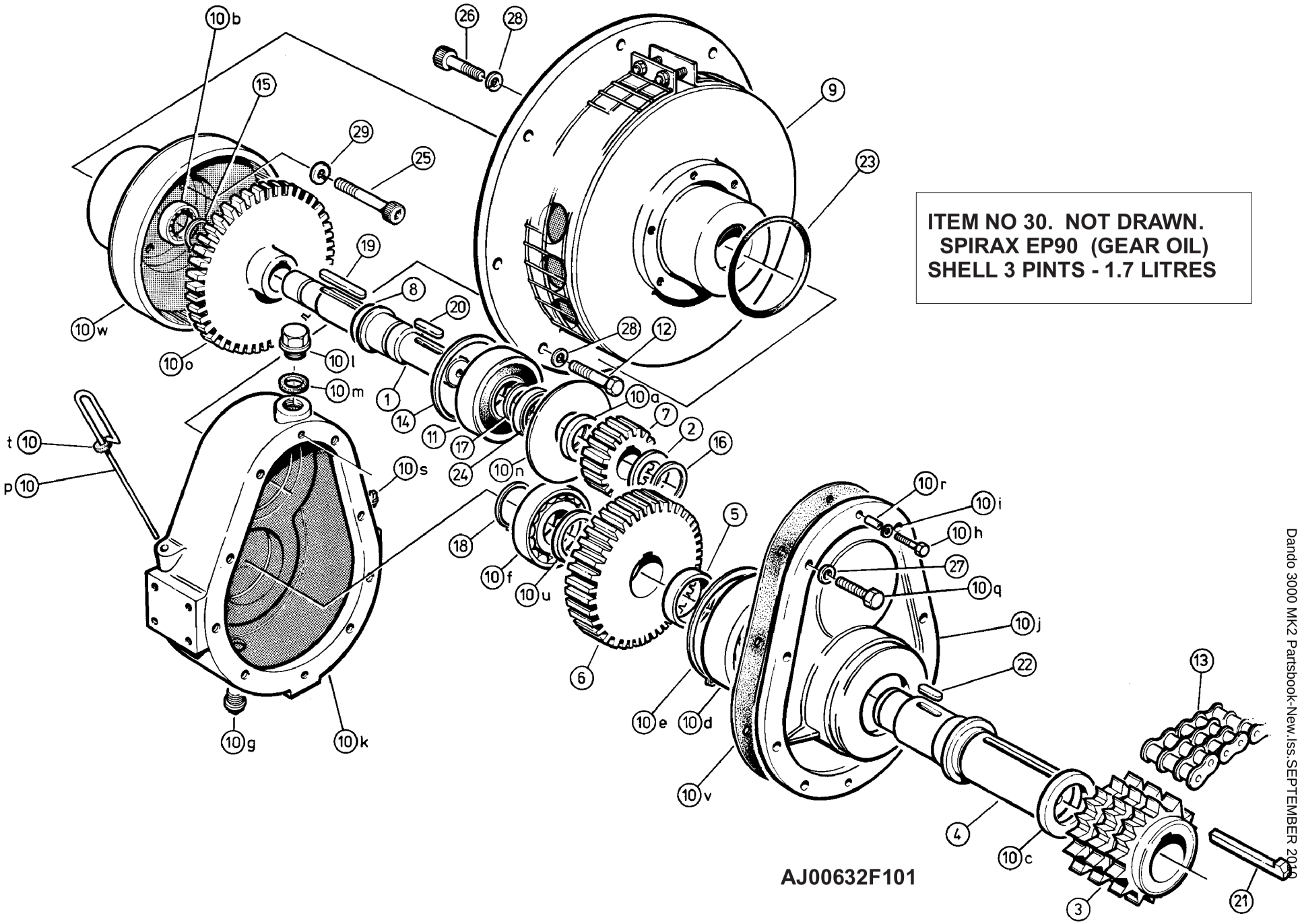


DANDO 3000 INVESTIGATOR MK2

2 ½ :1 REDUCTION GEARBOX FOR LISTER TR3 ENGINE - AJ00632F101

ITEM	PART NUMBER.	QTY	DESCRIPTION
1	AJ00389F101	1	Gear Box Drive Shaft
2	AJ00392H001	1	Drive Shaft Spacer
3	AJ00393H001	1	Engine Pinion (15 tooth)
4	AJ00420H001	1	Gear Box Output Shaft
5	AJ00421H001	1	Output Shaft Spacer
6	AJ00444H001	1	Gear wheel (51 tooth)
7	AJ00445H001	1	Gear Pinion (21 tooth)
8	AJ00629H001	1	Spacer
9	AJ00633F001	1	Engine/Gear Box Adaptor
10a	AJ00628H001	1	Spacer
10b	ST03357X127	1	Ball Bearing
10c	ST04104X276	1	Oil Seal
10d	ST04105X276	1	Ball Bearing
10e	ST04106X276	1	Circlip
10f	ST04111X276	1	Roller Bearing
10g	ST04113X276	1	Plug - Magnetic Drain
10h	ST04114X276	2	Screw
10i	ST04115X276	2	Washer - Spring
10j	ST04116X276	1	Gear Box End Cover
10k	ST04117X276	1	Gear Box Housing
10l	ST04118X276	1	Plug - Filler
10m	ST04119X276	1	Washer
10n	ST04122X276	1	Oil Thrower
10o	ST04124X276	1	Solid Centre
10p	ST04126X276	1	Dipstick
10q	ST04556X276	8	Screw
10r	ST04557X276	2	Dowel
10s	ST04558X276	1	Plug
10t	ST05168X276	1	Washer - felt for dipstick
10u	ST05169X276	1	Spacer
10v	ST05170X276	1	Gasket
10w	ST06322X276	1	External

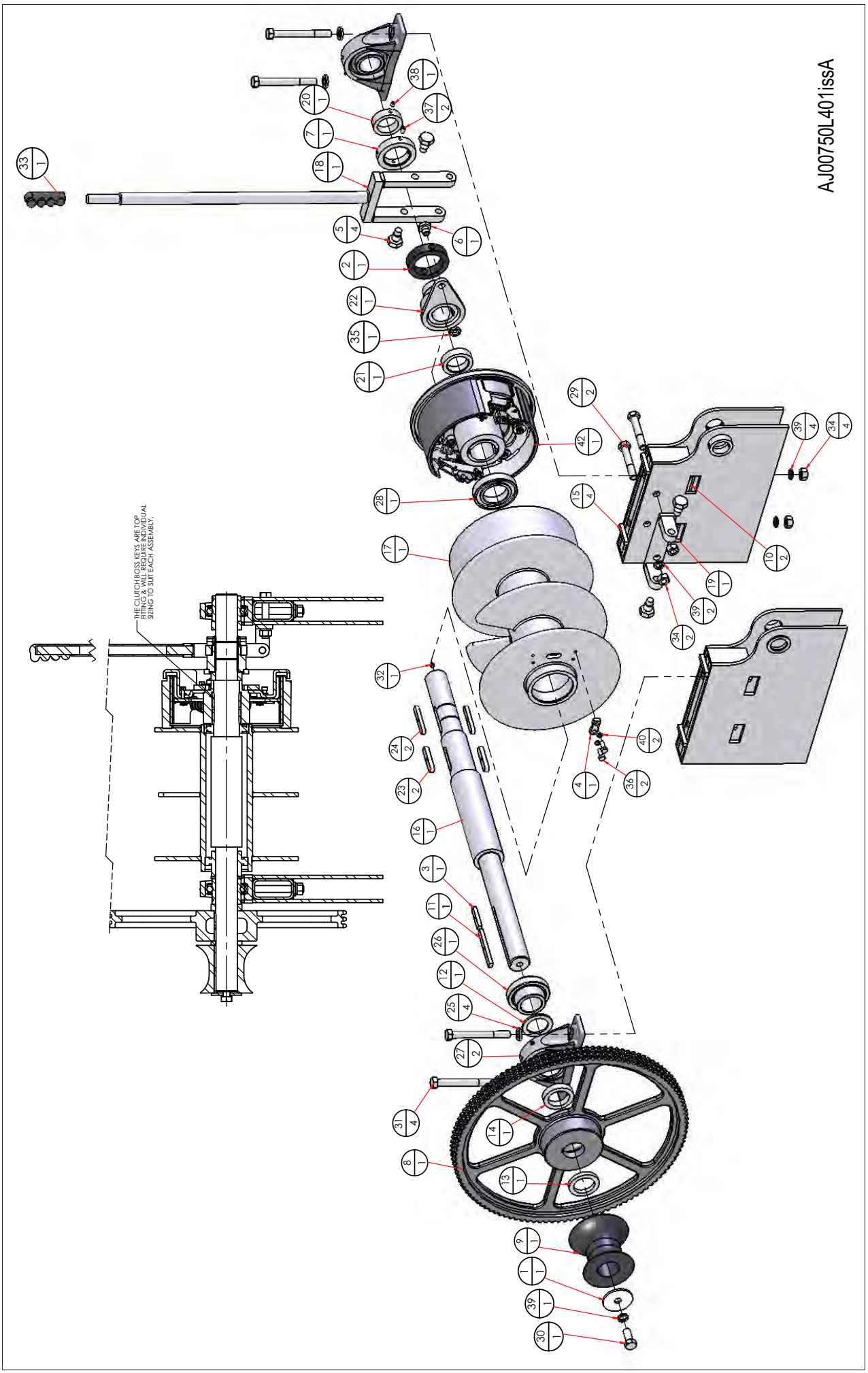
DANDO 2 ½ - 1 REDUCTION GEARBOX FOR LISTER TR3 ENGINE



2 ½ :1 REDUCTION GEARBOX FOR LISTER TR3 ENGINE - AJ00632F101

ITEM	PART NUMBER.	QTY	DESCRIPTION
11	ST05227X127	1	Radial Ball Bearing
12	ST04077X135	12	Bolt - Hex Head
13	ST05172X161	1	Triplex Chain
14	ST04046X163	1	Circlip - Internal
15	ST04047X163	1	Circlip - External
16	ST04048X163	1	Circlip - External
17	ST04080X163	1	Circlip - External
18	ST04226X163	1	Circlip - External
19	ST04073H425	1	Key - Rectangular
20	ST04074H425	1	Key - Rectangular
21	ST04082X425	1	Key - Gib Head Square
22	ST04227H425	1	Key - Rectangular
23	ST04078X544	1	'O' Ring
24	ST04081X722	1	Oil seal - Single lipped
25	ST06678X743	6	Screw - Soc Head Cap
26	ST03994X744	6	Screw - Soc Head Cap
27	ST05104X883	8	Washer - Plain
28	ST00115X884	18	Washer - spring
29	ST00648X884	6	Washer - Spring
30	50300030000	3 PINT	Gear Oil

HOISTING REEL ASSEMBLY

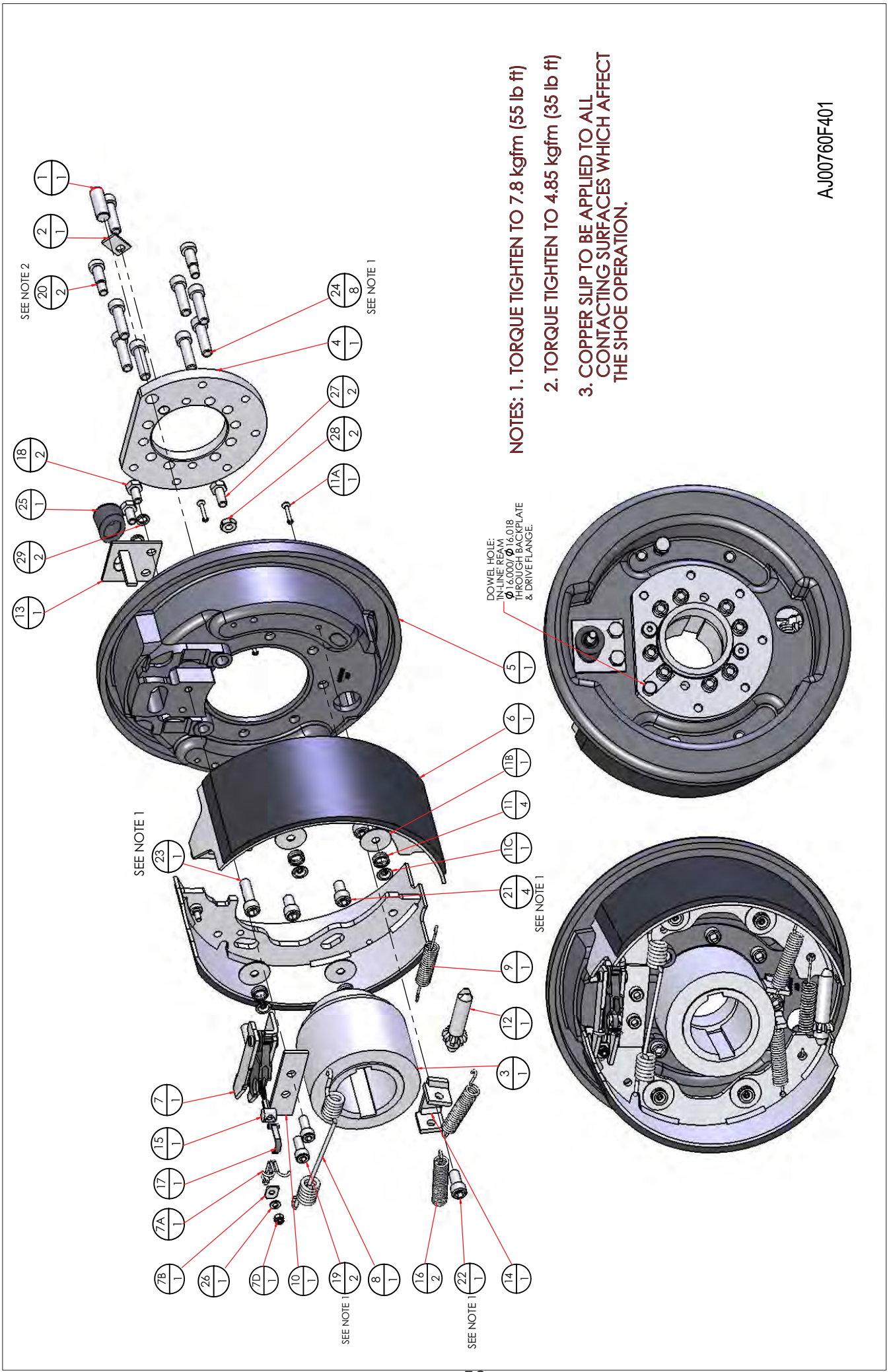


DANDO 3000 INVESTIGATOR MK2

HOISTING REEL ASSEMBLY - AJ00750L401 (Iss.B)

ITEM	PART NUMBER	QTY	DESCRIPTION
1	AG00145H102	1	Cathead Cover Plate
2	AG00145H103issA	1	Thrust Ring (Nylon)
3	AG00237H204issA	1	Driving Sprocket Key
4	AG00467M001	1	Line Clamp
5	AG00741H001	4	Pivot Set Screw
6	AG00792H001	1	Adjuster
7	AG00794H001	1	Locking Ring
8	AJ00256H001	1	Chain Wheel
9	AJ00267H001	1	Cathead
10	AJ00268M001	2	Clamping Plate
11	AJ00325M101	1	Cathead Key
12	AJ00328M001	1	Distance Piece
13	AJ00328M002	1	Distance Piece
14	AJ00328M003	1	Distance Piece
15	AJ00371M001	4	Bearing Stop
16	AJ00751F001issC	1	Shaft
17	AJ00752L101issD	1	Hoisting Reel Drum
18	AJ00755H001	1	Operating Handle
19	AJ00756H001	1	Pivot Unit
20	AJ00757H001	1	Spacer – Bearing
21	AJ00759H001	1	Spacer - Sliding Member
22	AJ00760F501	1	Clutch Assembly - Reversed Pull
23	AJ00761F001issB	1	Sliding Member
24	AJ00859M001	2	Clutch Boss Drive Key
25	AJ00860M001	2	Sliding Member Key
26	AJ00861M001	4	Special Washer
27	ST00551X127	1	Self Lube Bearing Insert
28	ST00786X127	2	Ina
29	ST00800X127	1	Bearing
30	ST02154X133	2	Hex Head Bolt
31	ST06170X133	1	Hex Hd Bolt
32	ST06414X133	4	Hex Head Bolt
33	ST00180X270	1	Straight Greaser
34	ST00320X295	1	Rubber Grip
35	ST00590X511	6	Full Nut
36	ST01043X511	1	Thin Nut
37	ST00775X715	2	Hex Head Set Screw
38	ST01051X747	2	Socket Set Screw
39	ST01190X747	1	Socket Set Screw
40	ST00661X885	7	Spring Washer
41	ST00777X885	2	Spring Washer

CLUTCH ASSEMBLY



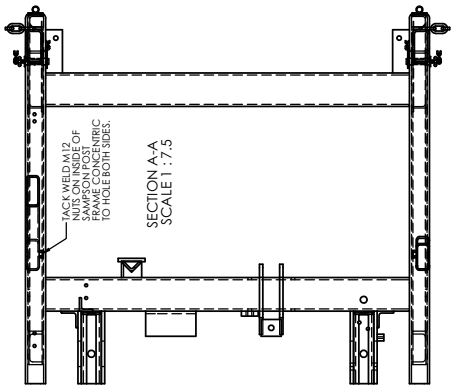
DANDO 3000 INVESTIGATOR MK2

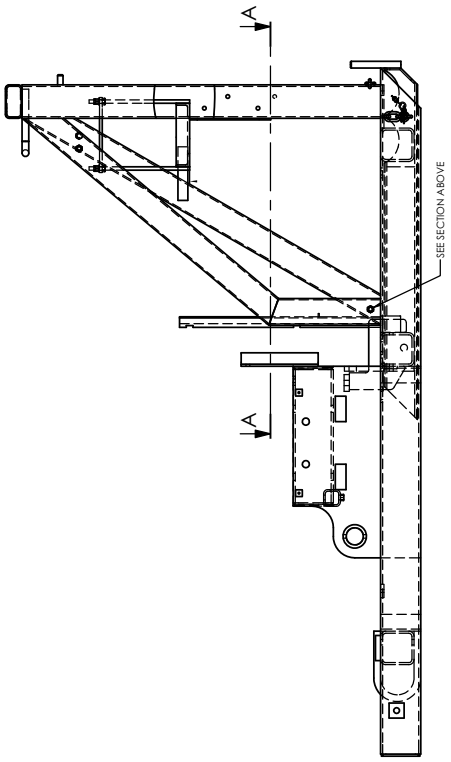
CLUTCH ASSEMBLY - AJ00760F401

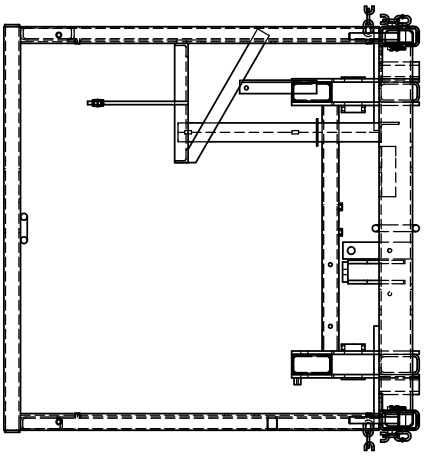
ITEM	PART NUMBER	QTY	DESCRIPTION
1	AG00782H001	1	Dowel
2	AG00783H001	1	Keep Plate
3	AJ00753F201issC	1	Clutch Boss
4	AJ00754H201	1	Drive Flange
5	AJ00851M001	1	Modified Clutch
			Including: Backplate
6	(ST09614X165)	1	Shoe – Pair
7	(ST09615X165)	1	Actuator Assembly,
			Comprising:
	(ST09616X165)		Actuator
7A	(ST09617X165)	1	Actuator Spring Set,
			Comprising: Spring
7B	-	1	Actuator Rectangular Washer
7D	-	1	Self Locking Nut
8	(ST09618X165)	1	Main Spring
9	(ST09619X165)	1	Lower Spring
10	(ST09620X165)	1	Shoe Plate
11	(ST09621X165)	4	Shoe Retaining Set,
		(1)	**Including:** Spring
11A	-	1	Shoe Retaining Pin
11B	-	1	Shoe Retaining Washer - Large
11C	-	1	Shoe Retaining Washer – Slotted
12	(ST09622X165)	1	Bottom Adjuster
13	AJ00852M001	1	Grommet Plate With Stop
14	AL01645H001	1	Spring Anchor Bracket
15	ST06192H165	1	Pull Cable
16	ST06701X165	2	Spring
17	ST06705X165	1	Clip Retaining Trunnion
18	ST01060X715	2	Set Screw
19	ST01393X743	2	Socket Cap Screw
20	ST06165X782	2	Shoulder Screw
21	ST06772X784	4	Socket Cap Screw Patched
22	ST06773X784	1	Socket Cap Screw Patched
23	ST06775X784	1	Socket Cap Screw Patched
24	ST06776X784	8	Socket Cap Screw Patched
25	ST09623X165	1	Rubber Grommet
26	ST01096X881	1	Plain Washer
27	ST00796X715	2	Hex Hd Set Screw
28	ST01380X511	2	Thin Nut
29	ST00777X885	2	Spring Washer

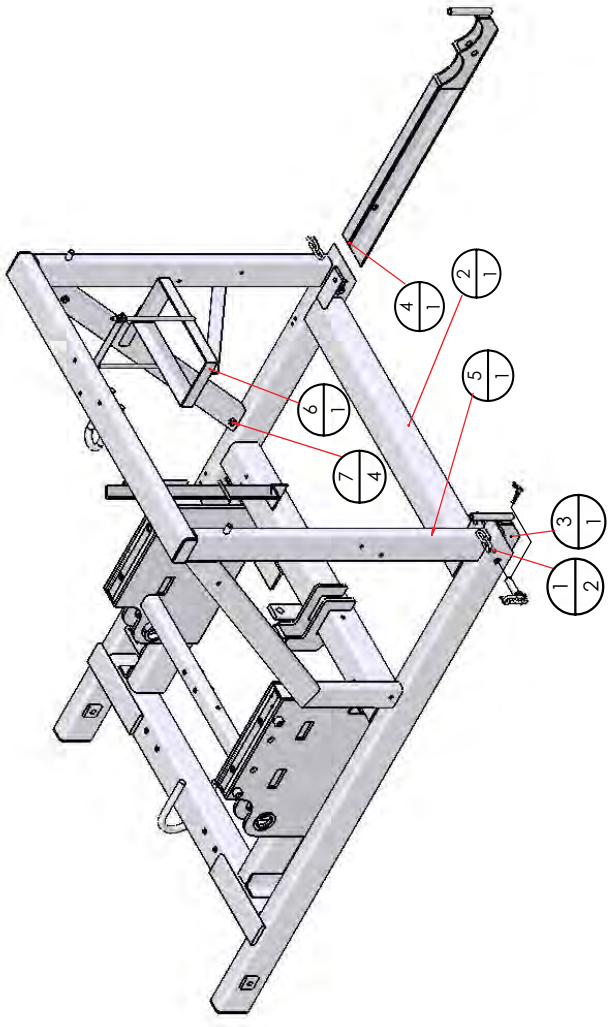
STANDARD BASE WITH SAMPSON POST

AJ00875F101





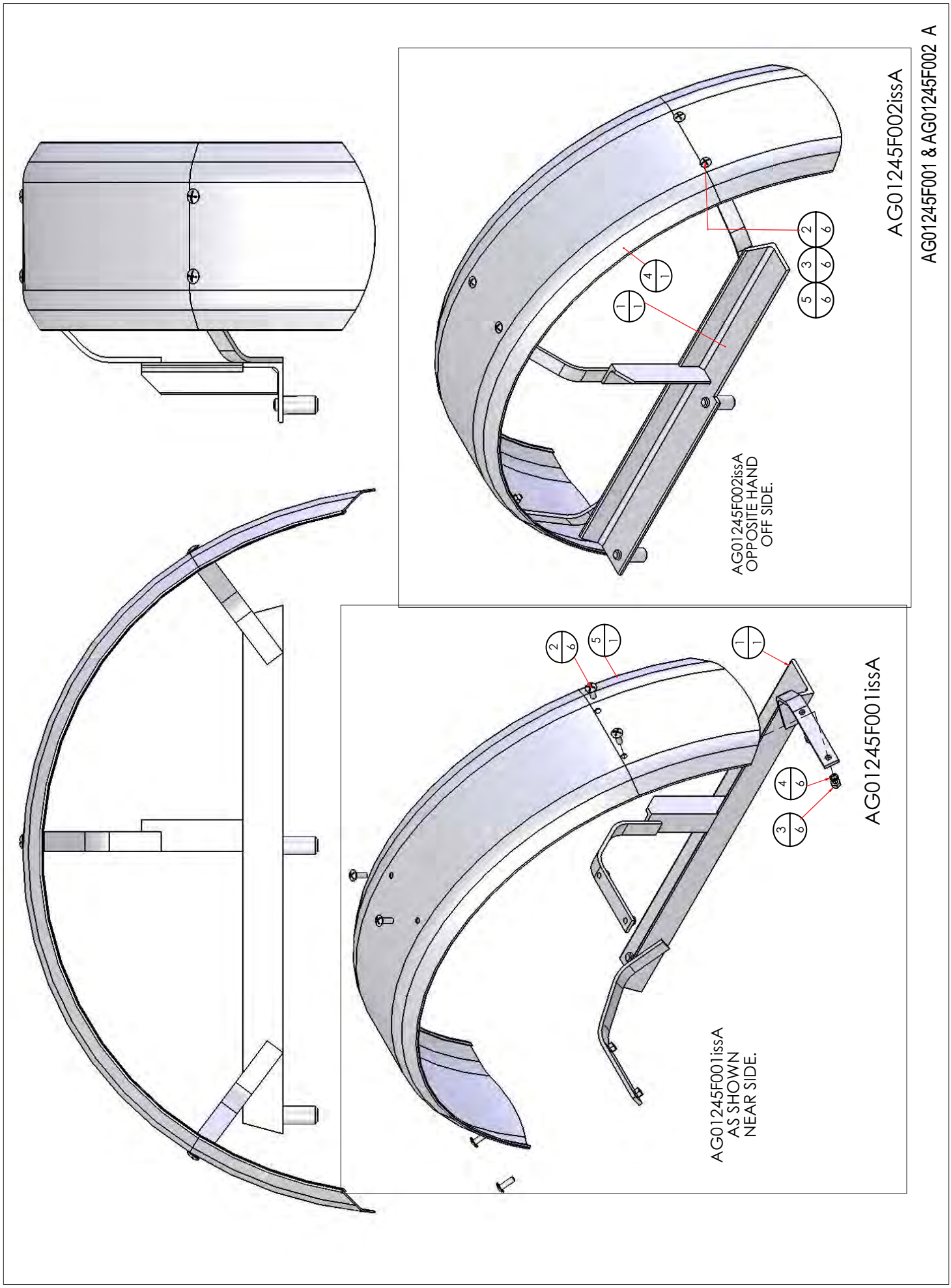




DANDO 3000 INVESTIGATOR MK2

STANDARD BASE WITH SAMPSON POST ASSEMBLY - AJ00875F101

ITEM	PART NUMBER	QTY	DESCRIPTION
1	AG01636H001	2	Sinker Bar Carrier Pin
2	AJ00450L401	1	Base Fabrication
3	AJ00469F001issA	1	Sinker Bar Bracket – Rh
4	AJ00469F002issA	1	Sinker Bar Bracket - Lh
5	AJ00870F101	1	Sampson Post Welded Assembly
6	AJ00879H001	1	Battery Carriage - Mk2
7	ST00579X511	4	Full Nut


MUDGUARD ASSEMBLY
AG01245F001 & AG01245F002 A
AG01245F002issA
AG01245F002issA
OPPOSITE HAND
OFF SIDE.
AG01245F001issA
AG01245F001issA
AS SHOWN
NEAR SIDE.

DANDO 3000 INVESTIGATOR MK2

NEAR-SIDE MUDGUARD ASSEMBLY – AG01245F001 (Iss.A)

ITEM	PART NUMBER	QTY	DESCRIPTION
1	AG01249F001issA	1	Mudguard Frame - Nearside
2	ST03636X134	6	Roofing Bolt
3	ST01123X511	6	Full Nut
4	ST01146X885	6	Spring Washer
5	ST09915X891	1	Steel Mudguard

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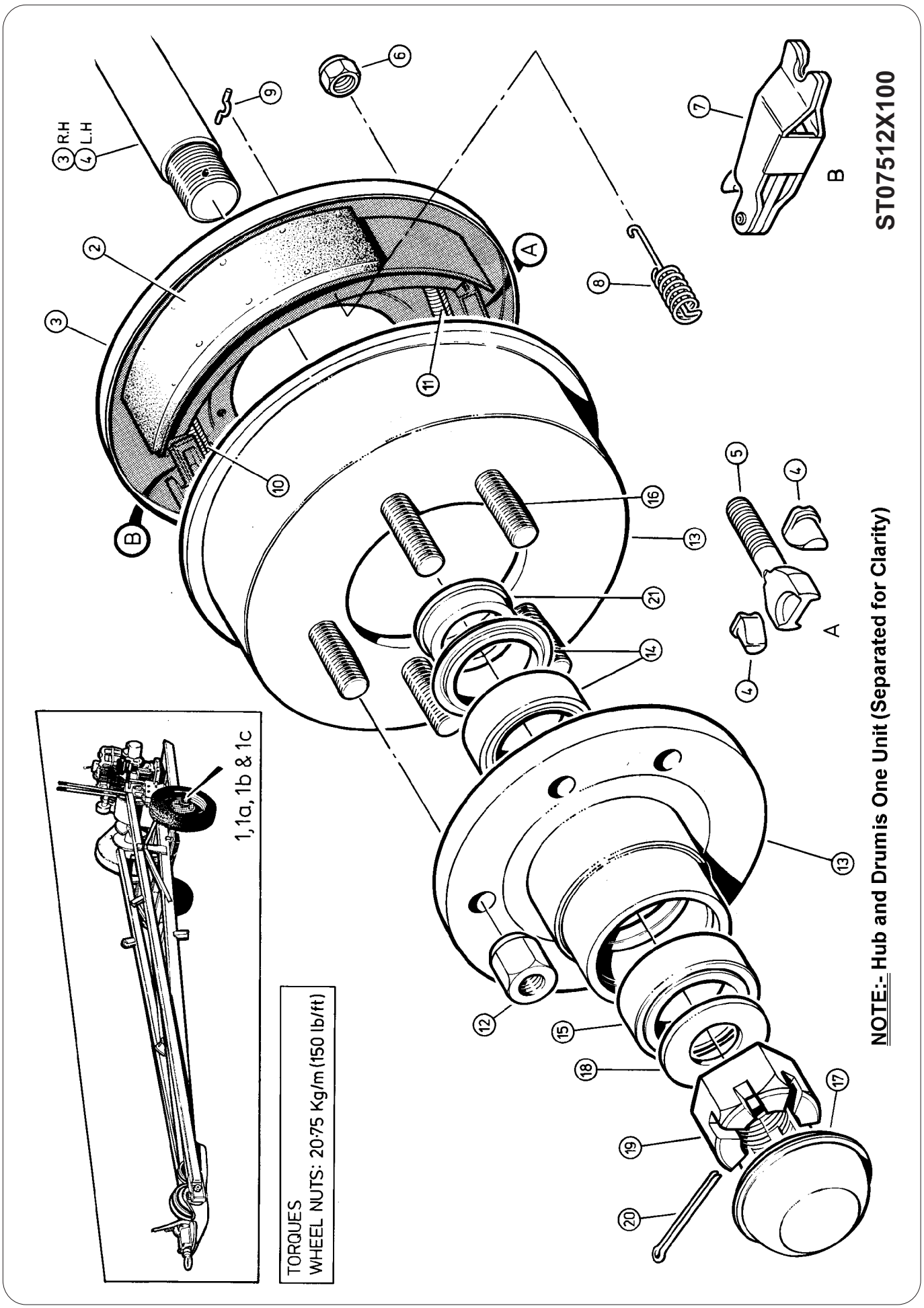
OFF-SIDE MUDGUARD ASSEMBLY – AG01245F002 (Iss.A)

ITEM	PART NUMBER	QTY	DESCRIPTION
1	AG01249F002issA	1	Mudguard Frame - Offside
2	ST03636X134	6	Roofing Bolt
3	ST01146X885	6	Spring Washer
4	ST09915X891	1	Steel Mudguard
5	ST01123X511	6	Full Nut

ASSEMBLY OF WHEEL HUB AND BRAKE UNIT



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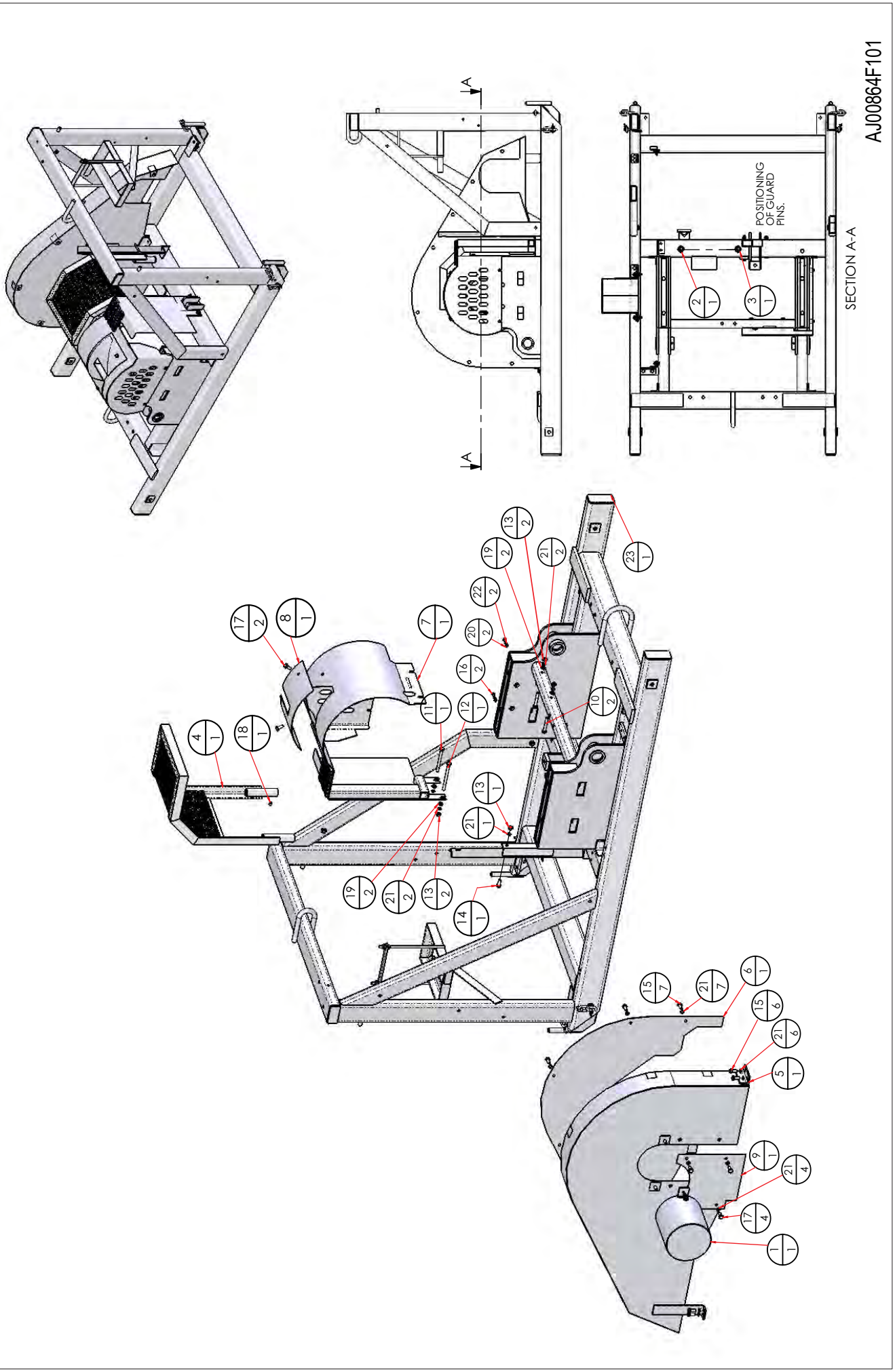
ASSEMBLY OF FLEXITOR UNIT C/W WHEEL HUB-NEARSIDE (LEFT HAND) ST07512X100

ITEM	PART NUMBER	QTY	DESCRIPTION
1	ST07512X100	1	Nearside (L/H) Unit Complete
COMPRISING OF:			
1A	**See separate illustration of brake cable assembly derrick assembly**		
C/W			
2A	ST07529X337	1	Lined Brake Shoe
2B	ST07530X337	1	Brake Shoe Assembly (Not Illustrated)
COMPRISING:			
	ST07531X337	1	Brake Shoe (Sliding)
	ST07532X337	1	Brake Shoe Carrier
	ST07533X337	1	Spring
3	ST07534X337	1	Back Plate Assembly
4	ST06334X337	2	Adjuster Tappet
5	ST06335X337	1	Adjuster Bolt
6	ST07538X337	1	Adjuster Nut
7	ST06337X337	1	Expander Sub-Assembly
8	ST06338X337	2	Conical Spring
9	ST06339X337	2	Retainer For Conical Spring
10	ST06340X337	1	Pull Off Spring-Expander Side
11	ST06341X337	1	Pull Off Spring-Adjuster Side
C/W 12	ST07514X100	5	Wheel Nut
13	ST07535X100	1	Hub/Drum M/C And Drilled
C/W 14	ST06212X337	1	Inner Bearing
15	ST06213X337	1	Outer Bearing
16	ST07528X337	5	Wheel Stud
17	ST06342X337	1	Grease Cap
18	ST06343X337	1	Axle Washer
19	ST06344X337	1	Axle Nut
20	ST06345X337	1	Split Pin
21	ST06346X337	1	Oil Seal Insert

FOR OFFSIDE (RIGHT HAND) FLEXITOR UNIT PLEASE QUOTE PART NUMER: ST07513X100

GUARDS ASSEMBLY



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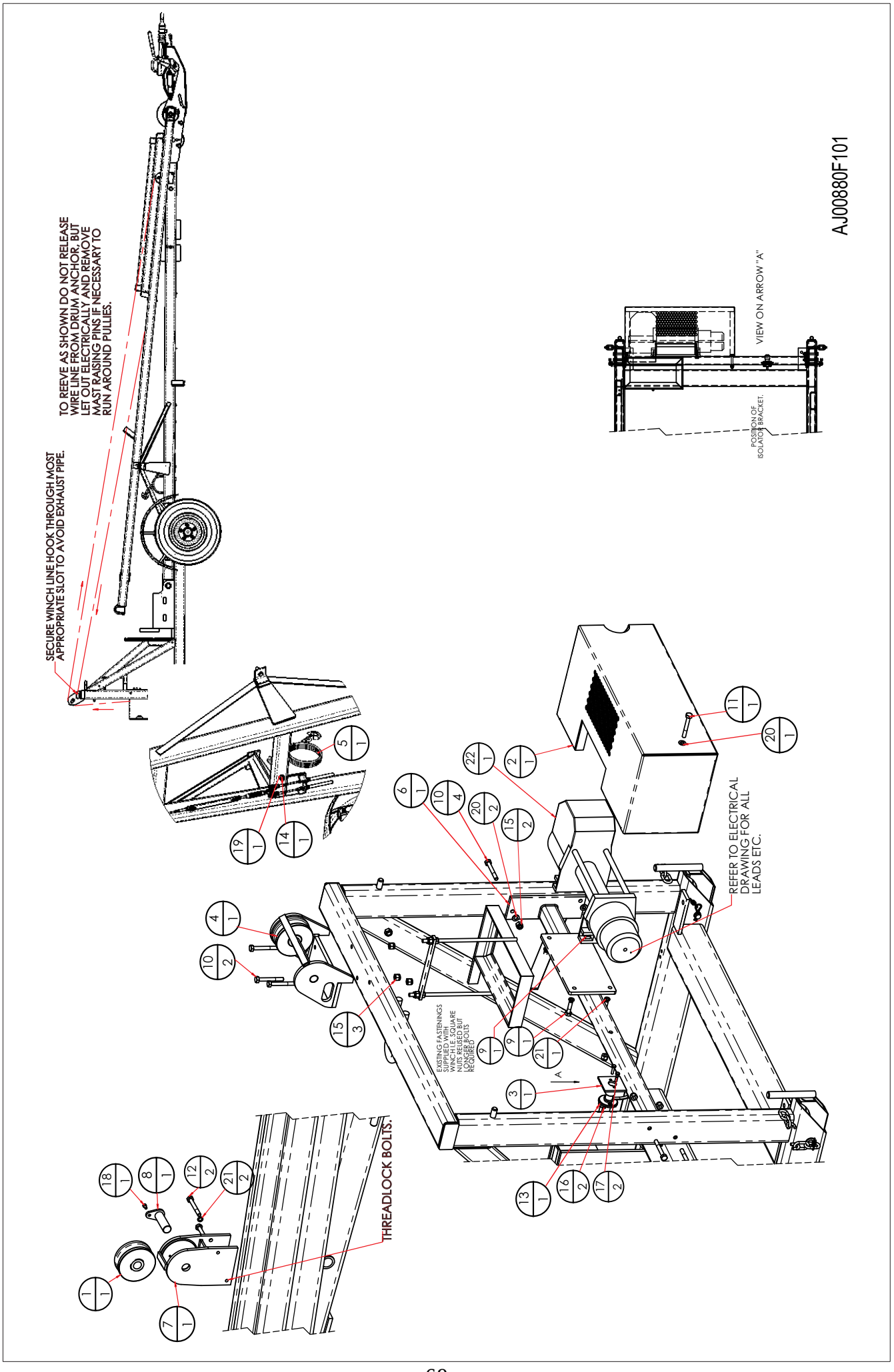
GUARDS ASSEMBLY - AJ00864F101

ITEM	PART NUMBER	QTY	DESCRIPTION
1	AG00676H001	1	Cathead Cover
2	AG01724M001	1	Guard Pin
3	AG01724M002	1	Guard Pin
4	AG01750F101	1	Reel Guard
5	AJ00478F101	1	Chain Guard - Lister Tr3
6	AJ00480F101	1	Back Plate
7	AJ00862F001	1	Drum Clutch Guard
8	AJ00863M001	1	Inspection Cover
9	AJ00871M001	1	Guard Slot Cover
10	ST01208X133	2	Hex Head Bolt
11	ST02142X133	1	Hex Hd Bolt
12	ST04335X133	1	Hex Hd Bolt
13	ST00776X511	7	Full Nut
14	ST00775X715	1	Hex Head Set Screw
15	ST00796X715	13	Hex Hd Set Screw
16	ST02259X715	2	Hex Head Set Screw
17	ST04914X715	6	Hex Head Set Screw
18	ST01190X747	1	Socket Set Screw
19	ST01048X881	4	Plain Washer
20	ST01096X881	2	Plain Washer
21	ST00777X885	24	Spring Washer
22	ST01179X885	2	Spring Washer

ELECTRIC MAST RAISING WINCH



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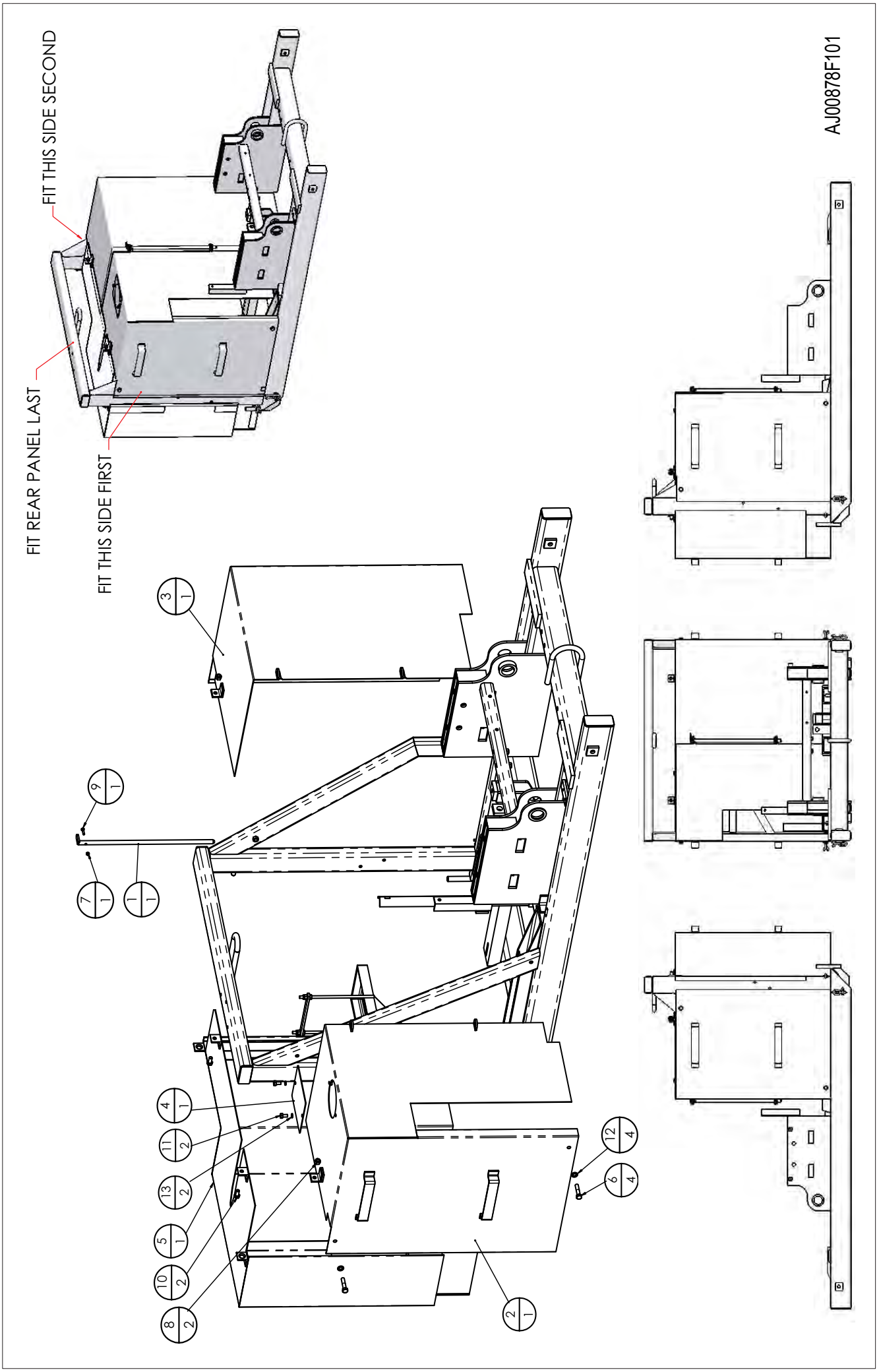
ELECTRIC MAST RAISING WINCH ASSEMBLY - AJ00880F101

ITEM	PART NUMBER	QTY	DESCRIPTION
1	AG01665M001issB	1	Pulley - Mast Raising
2	AG01725F001	1	Winch Guard – Main
3	AG01726M001	1	Isolator Bracket
4	AG01739H101	1	Sampson Pulley
5	AJ00869M001	1	Electric Winch Safety Line
6	AJ00872H101	1	Superwinch Bracket
7	AJ00881M001issA	1	Mast Raising Bracket
8	AK40009H007	1	Locating Shaft - Single Fixing
9	ST01084X133	4	Hex Hd Bolt
10	ST09809X133	7	Hex Hd Bolt
11	ST10052X133	1	Hex Hd Bolt
12	ST11150X133	2	Hex Hd Bolt
13	ST10572X224	1	Isolator Switch
14	ST00934X510	1	Nyloc Nut
15	ST01109X510	8	Nyloc Nut
16	ST04435X510	2	Nyloc Nut
17	ST00774X715	2	Hex Head Set Screw
18	ST11079X743	1	Soc Head Cap Screw.
19	ST04295X883	1	Bright Washer
20	ST05104X883	3	Plain Bright Washer
21	ST00777X885	6	Spring Washer
22	ST10144X889	1	Super Winch EP6

THREE PART GUARD ASSEMBLY



DANDO 3000 INVESTIGATOR MK2

THREE PART GUARD ASSEMBLY - AJ00878F101

ITEM	PART NUMBER	QTY	DESCRIPTION
1	AG01694M001issA	1	Lock Pin
2	AJ00874F001	1	Right Hand Side Cover
3	AJ00876F001	1	Left Hand Side Cover
4	AJ00877M001	1	Cover
5	AJ00894F001	1	Rear Panel
6	ST04143X133	4	Hex Head Bolt
7	ST04435X510	1	Nyloc Nut
8	ST00787X523	2	Nyloc Nut
9	ST05095X715	1	Hex Head Set Screw
10	ST05893X715	2	Hex Head Set Screw
11	ST08401X715	2	Hex Hd Set Screw
12	ST00788X881	4	Plain Washer
13	ST00777X885	2	Spring Washer