EXPRESS DUAL 3000

ED3000 Automatic Spin Grinder

User's Guide & Instruction Manual

Please read this manual carefully before using the Express Dual.
This manual should be kept in a safe place so that it can be used for future reference.

EXPRESS DUAL

ED3000 Precision Reel/Cylinder Grinder

You are now the owner/operator of a Bernhard's Express Dual 3000 which, if cared for and operated correctly, will give you years of good service.

This manual will enable you to obtain the best results from your Express Dual so please read it thoroughly before using your machine.

If you have any service or operational problems contact your distributor,

or phone our

Technical Helpline (USA only) – 1-888 474 6348

or

Bernhard and Company Ltd, England – (+44) 1788 811600

or email

techsupport@bernhard.co.uk

use the technical support feedback form on our web site

www.expressdual.com *or* **www.bernhard.co.uk**

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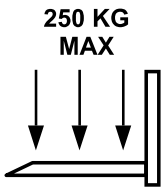
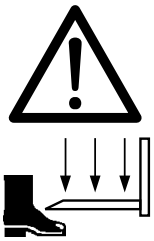
USA Toll Free **1-888 GRIND IT** (1-888 474 6348)

1. Identification of Pictograms

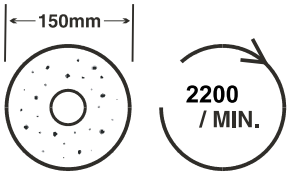


MAXIMUM LIFT PLATFORM LOAD - 250 KG (550 LBS)

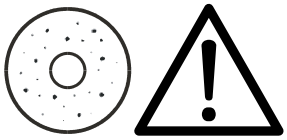


**BEWARE!
TRAPPING FEET OR OTHER OBJECTS WHEN LOWERING LIFT PLATFORM**

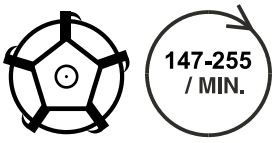
BEWARE! HIGH VOLTAGE



**MAXIMUM GRINDSTONE DIAMETER 150mm
MAXIMUM SPEED 2200 Rev/Min**



**BEWARE!
MOVING GRINDSTONE AND SHAFT**



REEL ROTATING AT BETWEEN 147 AND 255 Rev/Min

TOTAL WEIGHT OF MACHINE (KG)

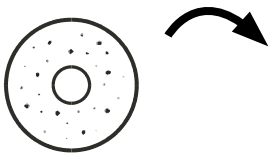
1. Identification of Pictograms *(Continued)*

POINTS FOR ATTACHING LIFTING EYES

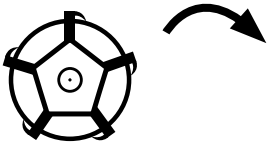
**BEWARE!
MOVING COMPONENTS KEEP HANDS AND OTHER OBJECTS CLEAR**

WEAR EYE, EAR AND BREATHING PROTECTION

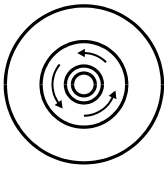
TRAVERSE START CONTROL



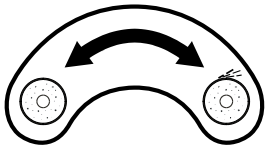
GRINDSTONE START CONTROL



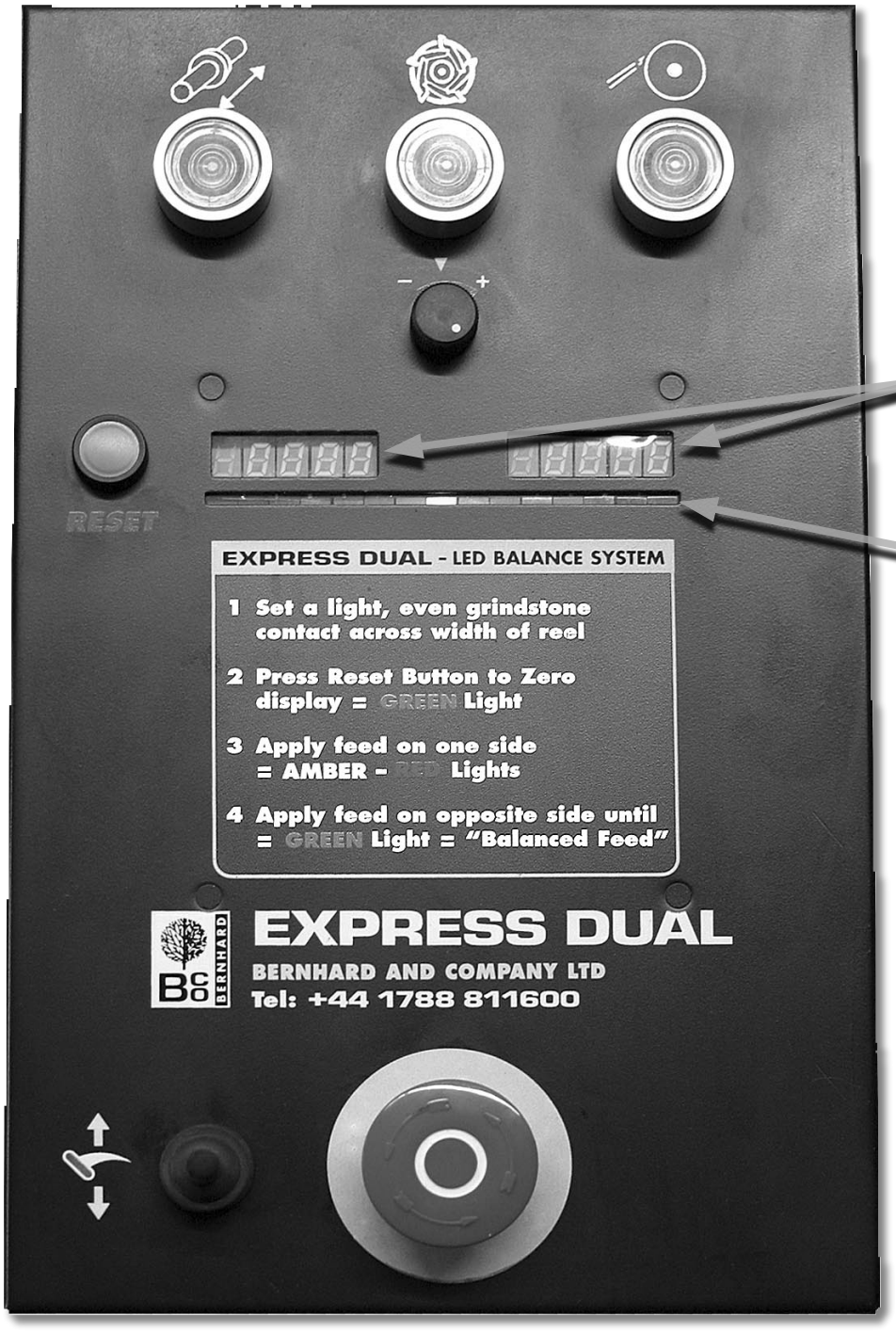
REEL START CONTROL



STOP CONTROL



ENGAGE / DISENGAGE (INCREASE / REDUCE) GRINDSTONE FEED



2. Safety

2.1 This machine is designed and manufactured **ONLY** for grinding lawn mower reels, rollers, groomers and verticut units, and **MUST NOT** be used for any other purpose.

2.2 This machine should be installed, operated and maintained by competent personnel who have received adequate training.

2.3 Before carrying out any work on the machine, other than grinding, **ALWAYS SWITCH OFF** the main electrical supply, or remove the power lead from its socket.

2.4 **ALWAYS** operate the machine with the guards in position.

2.5 **NOISE** - Owing to the widely varying conditions of use, noise emissions may vary considerably. There may be occasions when the safe noise level may be exceeded (see note on noise emission). In this case adequate ear protection **MUST** be worn.

2.6 **NEVER** fit or use a grinding wheel (or other spares) other than those supplied specifically for use on the **EXPRESS DUAL** (Warranty will be invalidated).

2.7 **NEVER** fit or use a grinding wheel which has been dropped or subjected to any other form of abuse.

NOTE: Grinding wheels should be fitted **ONLY** by competent, trained personnel.

2.8 **NEVER** leave rags or tools on the machine or wear any loose clothing or other articles which could be caught in moving components.

2.9 **NEVER** allow any combustible materials to be placed on or around the machine.

2.10 **ALWAYS** ensure that all parts of the cutting unit being ground are securely fixed.

2.11 **ALWAYS** ensure that all electrical connections are sound and all cables are safely routed.

2.12 **ALWAYS** carry out cleaning and maintenance of the machine as instructed in this manual (Refer to safety note 1.3).

2.13 **STAY ALERT**. Watch what you are doing. **NEVER** operate the machine when tired, or under the influence of drugs or alcohol.

If a lift table is fitted **NEVER** attempt to lift in excess of the rated capacity, and always ensure that the area is clear before lowering the load.

3. Set Up and Installation

3.1 Handling

If the machine is crated, it can be moved by a suitable fork lift truck or pallet truck under the pallet (skid). Once the lid and sides of the crate are removed, a fork lift truck may be used under the lifting members of the machine chassis.

The machine can be lifted off the pallet using suitable lifting tackle through 4 lifting eyes (provided) fitted at the points indicated on the top corners of the machine.

The total weight of the machine is indicated on the machine plate and also at the front of this manual.

3.2 Location

The machine should be located in a well lit environment with adequate headroom. For ideal operation, the machine should be accessible from the front, rear and at least one side, with clearance around it as indicated in the sketch (Fig. 3.2).

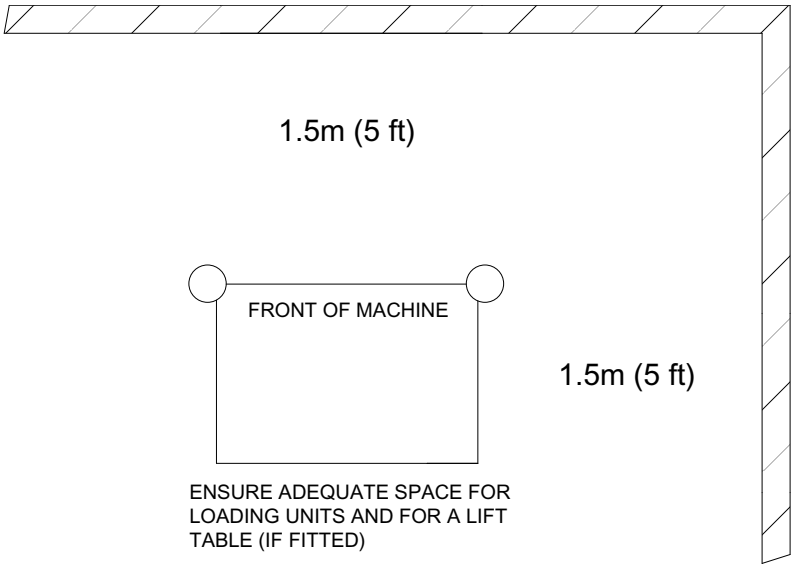


Fig: 3.2

3.3 Leveling

The machines should,ideally, be placed on a solid level floor, and this should be checked by placing a spirit level on the table. Check the level in both directions. Steel shims should be placed under the feet as necessary to ensure that the machine is firm and level. Bolt holes are provided in the feet which can be used for fixing down if required.

NOTE Ensure that the packing under the feet is correct before tightening the bolts, otherwise twisting of the frame may occur.

3. Installation *(Continued)*

3.4 Electrical Supply

USE A QUALIFIED ELECTRICIAN

The EXPRESS DUAL is supplied with a .55 kW (¾ HP) single phase main (grind) motor plus 2 fractional HP motors, for spin and traverse.

Power connection to the machine is via plug and socket termination of the lead supplied. Connection is at the rear of the main electrical control box on the right hand end of the machine.

Ensure that any cable or conduit run to the machine does not constitute a hazard to the operator or other personnel.

Machine should be connected to the supply via a 20A breaker.

The top of the reel and the top of the grinding wheel should both move away from the front of the machine (i.e. both rotate clockwise when viewed from right hand end of the machine). In this way, the reel and grinding wheel are moving in **OPPOSITE DIRECTIONS** at the point of contact.

[For full electrical spec's, see bid spec at rear of manual.]

3.5 Preparation

If the machine has been received in a crate, the handles on the control wheels should be removed from the underneath of the control wheels and refitted to the top (see Fig. 3.5).

Fig: 3.5

It is important that the protective film on the main shaft is removed prior to using the machine. This can be done using a WD40 or similar product (not gas/petrol) and then drying the shaft with a clean, dry cloth so that the grinding wheel assembly moves freely along the whole length of the shaft.

A spray lubricant, such as WD40, should be applied to all bare metal surfaces and moving parts; this includes the reversing bar and the shafts (along which the fork assembly traverse, but **NOT THE MAINSHAFT**).

The mainshaft should be washed down as instructed in the maintenance section of this manual. The feed control screws are normally coated with molycote, and may be washed down with WD40 if required and recoated with molycote (or similar anti friction coating) when dry.

4. Identification of Tools and Equipment

The items below may not necessarily be included since the tools and equipment supplied will vary according to the machine specification.

4.1 **Express Dual 3000 and 3000DX** (see illustrated parts list).

A4066 Long 1/2” AF Ball handled Allen Key

A2706 3/16” AF Tee handled Allen Key

A2719 Grinding Wheel Nut Wrench

A2720 1/2” AF Allen Key

A2714 Adjustable Sprocket Driver

A9182 Drive Rod Plain (short)

A4134 Drive Rod Square (short)

A4063 2 Pin Drive (large)

A4276 2 Pin Drive (small)

A9181 3 Pin Drive (small)

A4097 Adjustable Plain Shaft Driver

A2712 8mm Long Series Allen Key

A6161 1/8” Allen Key

A4087 Channels for Multifix Brackets

A6342 Backing up/Pressure Plate (not shown)

A4106 Ransomes 5/7 Driver (Standard only on European units)

A6737 Diamond Dresser

A9500 Adustable Front Roller / Multifix Brackets

5. Understanding the Machine

5.1 General Principles

The EXPRESS DUAL is designed to grind reels completely assembled, or as a separate “loose” reel. A Loose Reel Kit (Available as an optional extra, at additional cost) is required for this operation.

The basic principle of the EXPRESS DUAL is to grind mowers in exactly the same conditions that they mow in. The grinding wheel takes the place of the grass, striking the reel in relatively close proximity to that found in the mowing position.

5.2 Basic Requirements

It is important that grinding the cutting unit, when it remains completely assembled, takes place under the following conditions:

5.2.1 The reel bearings **MUST** be in good condition, adjusted correctly and if the roller is to be located on the roller mounting brackets or the multifix brackets, the roller bearings **MUST** also be in good condition.

5.2.2 The bedknife must be ground separately on a machine, such as the **ANGLEMASTER** bedknife grinder which can guarantee that the blade will be perfectly **STRAIGHT** and flat whilst mounted on the bedbar.

During the reel grinding process, it is advisable that the bedknife/bedbar assembly is replaced in the unit after having been ground. On many units the bedknife/bedbar is an integral part of the frame and contributes to its strength and rigidity.

5.2.3 The reel or bedknife must be adjusted away from one another to allow free rotation (There should be no reel to bedknife contact!).

5.2.4 It is essential that all work to be carried out on the mowing unit (all mower repairs – bearings, seals, roller work, etc.) has been completed prior to grinding the reel. The last operation of all, apart from final setting reel to bedknife, is the actual grinding of the reel in-frame.

It is essential that the unit is held totally firm during the grinding process. When in frame grinding, the front of the unit must be held firmly in the multifix brackets or on the front roller brackets.

5.2.5 It is essential that the unit is held totally firm during the grinding process. When in frame grinding, the front of the unit must be held firmly in the multifix brackets or on the front roller brackets.

The rear of the unit will be held by the radiused pressure bar at the rear of the grinder.

5. Understanding the Machine *(Continued)*

5.3 Machine Functions

The EXPRESS DUAL has 3 separate motors driving the different functions of the machine, all are controlled from the control panel . These functions are as follows:

5.3.1 Traverse

This motor and the accompanying drive mechanism controls the automatic movement of the grinding wheel along the mainshaft.

5.3.2 Reel/Spin drive

This motor drives the reel through a flexible shaft driving from a drive mechanism under the table. It is a three phase motor controlled by an inverter for varying output speed.

5.3.3 Grinding Wheel

A motor situated under the table, drives the mainshaft and grinding wheel at 2200 rpm.

5.3.4 Stop

Pressing the stop button shuts off all 3 motors and locks into the “off” position. None of the start buttons will operate until the stop button has been unlocked by twisting the knob counter-clockwise to release it.

NOTE The machine must **NOT** be stopped when there is contact between the reel and grinding wheel, except in cases of emergency.

5.3.5 Reset Button **(see also Electrical Fault Finding section)**

If the main motor is subject to a voltage drop or overloading, the current being drawn will rise and a safety device will automatically shut the grinder off. The overload trip switch is situated behind the blue reset button on the cover of the main electrical control box which is located on the right hand end of the machine.(looking from the front).

The trip setting will vary with the electrical specification of each machine and is normally set to the full load current of the motor. If the overload trip has shut off the grinder it can be reset by pushing the reset button after a few minutes delay. This will allow the grinder to be re started.

NOTE The reset button and overload are both variable and should be adjusted, if required, as indicated in the appropriate service bulletins.

The reel drive motor, traverse motor, and VSD inverter (reel spin speed control) are protected by individual fuses located in the electrical control box and accessible without the necessity of opening the box.

6. In-frame Grinding

6.1 Mower Preparation

Units of up to 36” long can be ground in frame, this includes most machines including Greens mowers and Fairway units. In order to spin / drive the reel, one end of the reel shaft drive must be exposed. This will require the removal of the hydraulic motor, the chain / belt or cover depending on which type of unit is being ground. This should be done before the mower is on the grinder (see example Fig. 6.1).

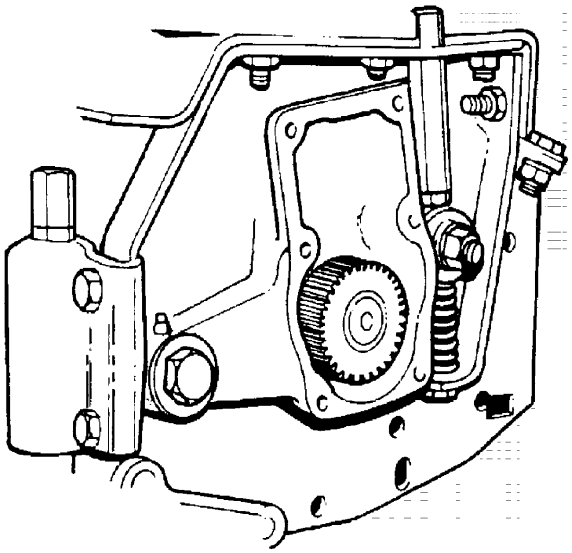


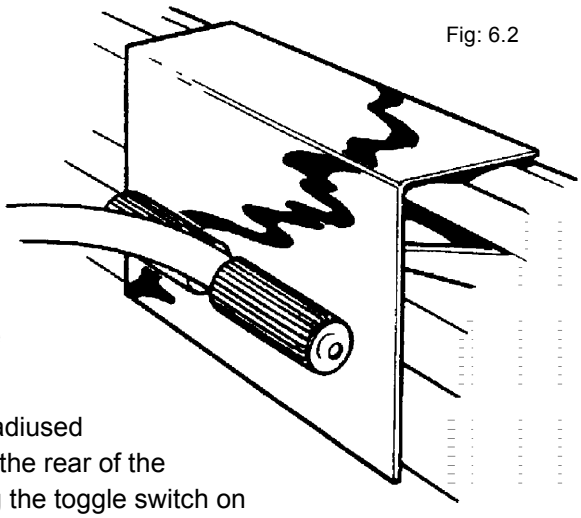
Fig: 6.1

Ensure that the mower is clean and that both reel and roller bearings are in good condition. Also ensure that the bedknife has been sharpened, if necessary, and replaced with a small amount of clearance between it and the reel.

6.2. Mounting Mower

The mainshaft / Grinding stone should be wound down to its lowest position and the unit placed on the table. The unit should then be carefully moved towards the multifix brackets or front roller brackets, which can be adjusted in any direction to allow the unit to be fixed in such a position that the grinding wheel can be raised towards the reel without coming into contact with either the bedknife or the front roller/groomer.

Fig: 6.2



With the mower correctly positioned the radiused pressure bar) is moved forward to rest on the rear of the mower and locked in position by operating the toggle switch on the operator control panel downwards. The operator should release the toggle switch as the pressure bar engages the cutting unit thus retaining pressure on the mower until the grinding operation is completed. A backing up plate is supplied to protect the rear of the units and to evenly disperse the force of the pressure bar across the width of the mower (see Fig. 6.2).

6. In-frame Grinding *(Continued)*

6.3 To ensure that the correct position for the mower unit has been achieved, both control wheels (right hand and left hand) should be wound in a clockwise direction so that the grinding wheel may be placed to contact each end of the reel evenly. If the grinding wheel touches the bedknife or any part other than the reel, the whole unit must be moved by adjusting the position of the multifix brackets or roller brackets. The exact position required will be easily seen by looking along the mainshaft from one end of the machine as the stone is raised to check that the point of contact is in a suitable position (see Figure 6.3).

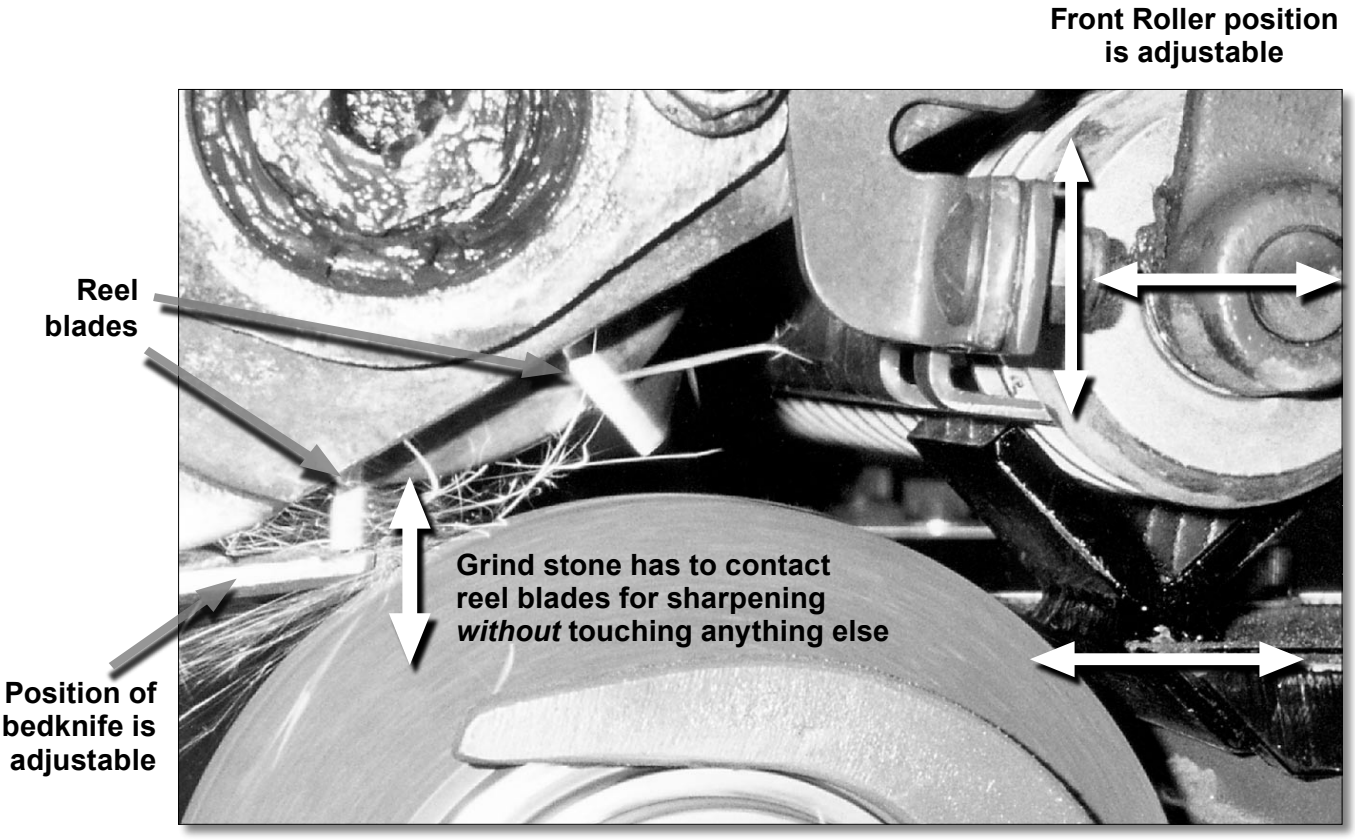


Fig: 6.3

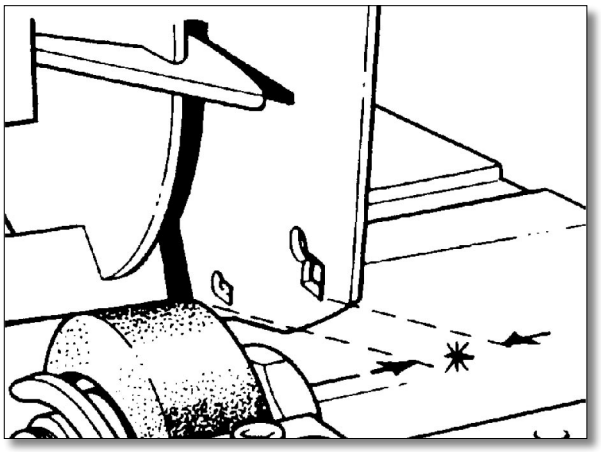
NOTE If the cutting unit has no front roller fitted so that the multifix brackets are used then, once the correct position for any particular unit has been finalised a “set up guide” should be completed and filed for future reference so that the identical multifix brackets positions can be used for all subsequent applications on the same type of unit.

6. In-frame Grinding *(Continued)*

6.4 Set up of Traverse

The reversing bar is located in the aperture to the front panel of the machine. Rotate hand wheels anti-clockwise to move grinding wheel away from reel, unscrew the traverse engagement screw until it is released from the traverse chain, traverse the grinding wheel by hand, using the Traverse Engagement Screw until it is at the extreme point of desired travel. Ensure that the traverse reversing bar is also moved in that direction and slide the reversing stop up to the grinding wheel traverse assembly and tighten. Move the grinding wheel to the opposite end of the desired travel and repeat the operation ensuring that the reversing bar has also been moved in the opposite direction. This is critical where the grinding wheel cannot pass beyond the end plates if they protrude below the maximum diameter of the reel.

NOTE On the EXPRESS DUAL it is not necessary for the whole width of the grinding wheel to pass the end of the reel and it **SHOULD NOT DO SO EVEN IF SPACE PERMITS** (see Fig. 6.4).



Ensure that the leading edge of grinding stone passes the end of the reel - but clearance must be maintained between stone and end frame of unit.

Fig: 6.4

NOTE: The reversing bar will move approximately 1/2” (13mm) before the direction of travel is reversed and will allow the grinding wheel to move with it. It is therefore **ESSENTIAL** that this is taken into account when setting the maximum point of travel.

Should the reversing bar be dragged by the traverse assembly in the direction of travel during the grinding processes, causing the stone traverse to reverse prematurely, it will be necessary to adjust the reversing bar damper as indicated in the service bulletin (No.003).

6. In-frame Grinding *(Continued)*

6.5 Linking Up The Reel Drive Unit to the Reel

Machines are supplied with the reel drive motor under the table and a flexible drive which can be attached to either end of the machine do not have to be prepared before the mower unit is placed on the table, as the complete drive unit can be moved to either side of the table with a mower unit in place.

6.5.1 Select the attachment with which to drive the reel. If the reel sprocket, gear or pulley is secured with a nut it may be easier to use a standard socket together with a 1/2" square end driver. Ensure the nut is tight as the direction of rotation may tend to unscrew it. Ensure that the drive shaft is through the flexible coupling/driver before setting the machine on the table and that the whole unit is at the correct end of the table.

Alternatively it may be easier to drive directly onto the sprocket using one of the pin or adjustable type sprocket drivers fitted to the plain drive rod.

6.5.2 When the cutting unit is in place and firmly fixed into the multifix brackets, or front roller brackets, and the rear clamped with the radiused pressure bar, adjust the drive unit left or right so that the appropriate drive rod will reach the end of the reel shaft. Tighten unit in place

Adjust the height and position, forwards and backwards and up and down, of the cable drive drive support so that the shaft is square with the driven end of the reel, and tighten clamps to hold it in place.

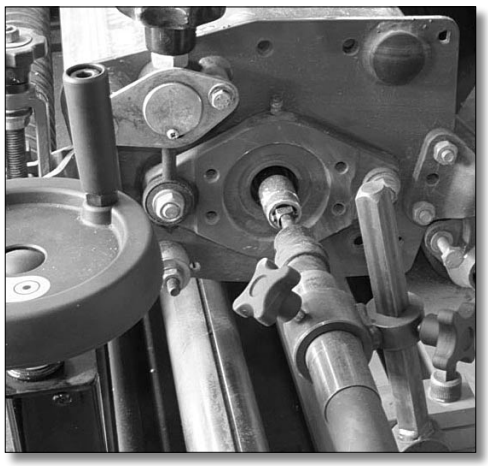
The black lobed hand screw allows the drive head to be moved along the square support shaft to adjust the height of the drive, while the 5/8" hex headed socket screw allows the support shaft to be clamped at any desired angle, and also allows the whole assembly to be moved left or right along the machine bed to engage in the drive mechanism on the reel.

The drive head of the shaft can also be slid through it's support for further adjustment or final connection/ disconnection of drive.

6.5.3 Tighten the drive rod via the allen screw in the flexible coupling onto the flat of the drive shaft.

6. In-frame Grinding *(Continued)*

6.5.4 Moving the flexible Shaft



There is a layshaft socket at both ends of the machine into which the flexible drive can be engaged as required. The other end of the flexible shaft can be disconnected if required but this would not generally be necessary as the bracket and shaft would normally be moved as an assembly.

The flexible drive shaft can be detached from its socket on the end of the machine by pulling sharply on the shaft, to release it from a spring loaded ball detent. (Earlier units by first removing the spring retainer (R-pin)), and withdrawing the complete shaft. When replacing the shaft, ensure that it is properly engaged in the layshaft socket (and if appropriate, the spring retainer securely replaced).

By loosening the socket screw and allowing the clamp nut, under the table, to twist through approximately 90 degrees, the whole assembly can be lifted clear of the table, and moved to the other side of the mower unit if required.

6.6 Applying the Cut

Before starting any of the motors it is necessary to bring the grinding wheel into its approximate cutting position.

6.6.1 With the stone positioned at the left hand end of the reel, place the left hand on the left hand control wheel and the right hand on the reel, wind the control wheel clockwise while slowly rotating the reel until the reel gently rides across the grinding wheel.

6.6.2 Unwind a complete turn to move the stone away from the reel.

6.6.3 Move the grinding wheel to the right hand end of the reel and, using the right hand on the right control wheel and the left hand on the reel, raise the shaft until the reel again can be gently rotated against the top of the grinding wheel.

6.6.4 Unwind half a turn.

6.6.5 Go back to the left hand end and repeat the process but this time, after contact has been made, unwind only sufficiently to release the contact.

6.6.6 Go back to the right hand end and repeat the process and again release the contact only slightly.

NOTE It is important that the grinding wheel should clear the highest blade along the full length of the reel before grinding commences.

6. In-frame Grinding *(Continued)*

6.7 To Commence Actual Grinding

NOTE With experience and familiarity setting / applying the cut can start here, speeding up the set up procedure

6.7.1 If the machine has them fitted, **CLOSE THE GUARDS.**

6.7.2 Start the reel drive motor and check for smooth, easy running.

6.7.3 Start the grinding wheel motor.

6.7.4 Start the traverse motor, first ensuring that the traverse engagement screw is unwound and not connected to the traverse chain.

6.7.5 Now repeat the adjustment process with the left hand on the control wheel and the right hand on the traverse knob, moving the grinding wheel along the reel by hand using the traverse engagement screw, winding up the left hand control wheel until the grinding wheel strikes and sparks gently against the reel.

Repeat this process on the right hand side of the reel, raising the shaft with your right hand and moving the grinding wheel along with your left hand. Repeat this process until the contact along the reel is even and parallel.

6.7.6 Screw in traverse knob to engage power traverse.

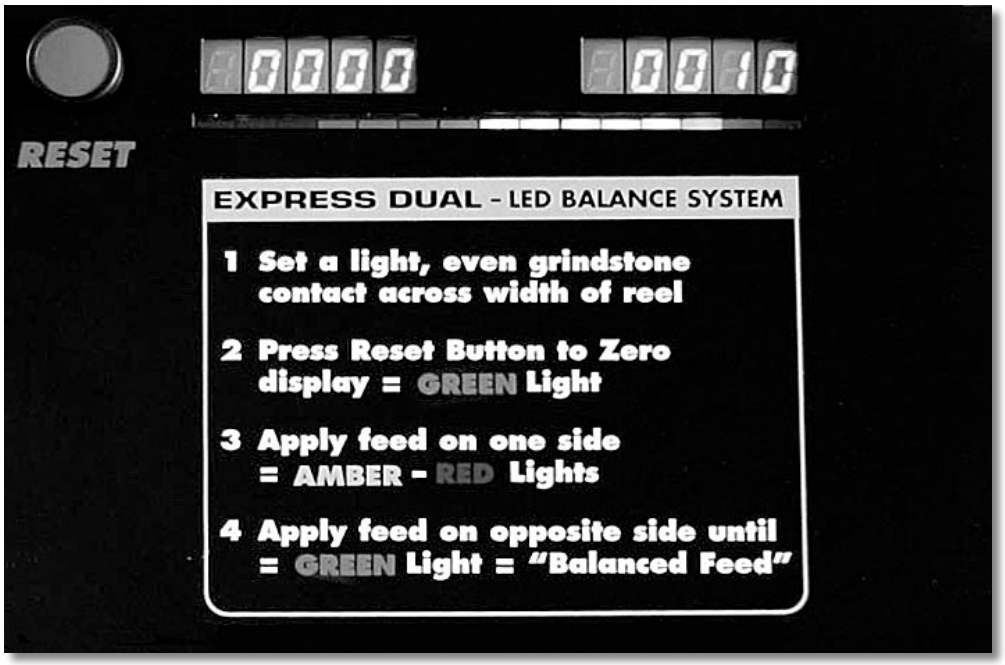
NOTE Check auto traverse is changing direction at correct point at each end of its movement.

6. In-frame Grinding *(Continued)*

6.7.7 Place hands on the left and right control wheels and move both hand wheels clockwise the same amount to apply an even cut.

The Light Emitting Diode (LED) feed balance system fitted to the Express Dual 3000 spin grinding machine is designed to ensure that the operator has a simple visual indication that ensures that feed of cut is applied parallel across the length on any reel.

- Set the grind stone to the reel as with any other Express Dual, adjusting the independent handwheels until there is a light and steady contact between reel and grind stone across the entire length of the reel.
- Press the green “reset” button to “zero” the display (zero the grinder to the reel) the central green LED illuminates and both counters zero.
- Winding the right hand handwheel will make the amber LED to the right of display centre illuminate (further winding would then illuminate the red led to the right of the display) counter readout increases in value.
- Winding the left hand handwheel will extinguish red and/or amber LED’s and return to the green LED illuminated. Both counters now read the same. Equal feed has now been applied to both sides and the feed is balanced (PARALLEL) – no taper has been applied.



NOTE It is important that the control wheels are moved equally.

6.7.8 Apply a good hard cut. Do not be afraid of the aggressive nature of the grinding process.

6. In-frame Grinding *(Continued)*

6.8 When Is The Job Done ?

6.8.1 You will hear the cut begin to run out - a rough guide of cutting times will be:

Fairway Units	**12–20 minutes**
Medium Triple Units	**10–15 minutes**
Greens & Hand Mowers	**8–10 minutes**

6.8.2 Now take off the cut by simultaneously moving both hand wheels anti-clockwise, when the stone is at one end of its traverse, until the grinding wheel is clear of the reel.

6.8.3 Push the total / “E”- stop button.

NOTE **NEVER** stop the machine while the grinding wheel and reel are in contact except in an emergency. Never allow the grinding wheel and reel to spark out. If this does happen put another cut on for a few more passes.

7. Electrical Fault Finding

USE A QUALIFIED ELECTRICIAN

In the event of any motor not starting, the following procedure should be adopted:

7.1. Check that **STOP BUTTON** in control panel on top of machine is not permanently in **STOP** position.

7.2 Check fuses - main fuses feeding machine and small fuses in junction box for traverse and reel motors.

7.3. Check that reset button on junction box is not making contact with red button on the overload. If it is adjust **RESET** so that it **CLEARS THE BUTTON**, this must be tested with lid held in position on box (see service Bulletin no.001).

7.4. Check voltage in electrical box, right hand side of machine – terminal block, terminals 1 and 4.

7.5. Check for open circuit on overload, terminals 95 and 96, to determine whether or not main motor is faulty. If open press red resetting button on overload.

7.6. To determine that all three contactors are OK test each one by pushing start button on the individual contactors, they should noticeably pull in. This can be checked by someone looking in the junction box while the start buttons are pressed.

7.7. **Traverse**

If the contactor is functioning properly check the microswitch. If this is found to be OK check capacitor if possible. If neither of these is faulty, then the motor is probably at fault.

7.8. **Reel Drive**

If the contactor is functioning properly, check the Inverter:

There is a small LED lamp on the front of the unit. This should be green. If it is red, or changes to red when pressing the start button, there is an inverter fault.

Disconnect the power to the machine, wait 2 minutes, then re-connect and try again (to re-set the inverter). If the LED is still red the inverter may have failed.

If neither are faulty then the motor is probably at fault.

7.9. **Main Motor**

If the contactor is functioning correctly, check the load current with an ammeter across terminals 2 and 3 on 12 way terminal block. If this exceeds full load current indicated on the motor identification plate then a new motor is needed. If the reading is below full load current then possibly the overload is set too low.

NOTE Before assuming that there is an electrical fault in any of the systems ensure that the mechanical drive assemblies attached to a particular motor are moving freely, and have not got increased resistance due to damage, or the build up of dirt. This can best be done by detaching the motor drive and ensuring that the mechanism is moving freely.

8. Maintenance

8.1 Grinding Wheel Replacement

NOTE Grinding wheels should always be fitted by competent, trained personnel.

8.1.1 The grinding wheel (stone) is held on the carrier by a nut which should be loosened, using the “C” Spanner provided, before the assembly is removed from the mainshaft.

8.1.2 Slide the grinding wheel to the left hand side of the machine (viewed from the operator position).

8.1.3 Release the 2 allen screws in the bearing flange ring on the left hand end of the main shaft.

8.1.4 Raise the mainshaft to its maximum height, maintaining the shaft as horizontal as possible until the right hand side comes up against the stop in the feed column and the left hand side is at its maximum height. At this point the fork will drop away from the grinding wheel assembly.

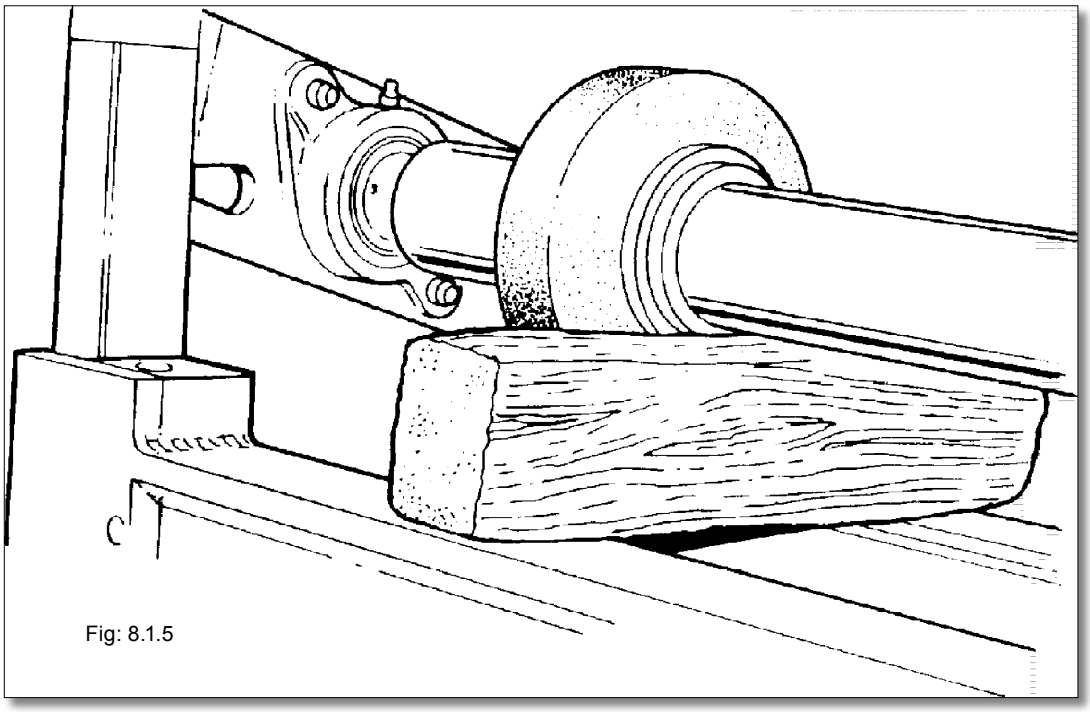


Fig: 8.1.5

8.1.5 Place a wooden block under the mainshaft to the right hand side of the grinding wheel assembly, bridging the front bed and front channel to take the weight of the mainshaft when the side arm is removed (see Fig. 8.1.5).

8. Maintenance *(Continued)*

8.1.6 USING THE “C” SPANNER PROVIDED, loosen the retaining nut.

8.1.7 Remove the circlip retaining the left hand side arm to the rear shaft. The side arm can now be removed from the machine.

8.1.8 The grinding wheel and sleeve can now be withdrawn. Remove the retaining nut and the old wheel. Clean sleeve and nut thoroughly.

8.1.9 Fit the new grinding wheel and replace the collar, ensuring that all mating services are clean and undamaged.

8.1.10 Ensure that the mainshaft and sleeve are perfectly clean and dry. Reassemble in the reverse order ensuring that when you replace the grinding wheel assembly onto the mainshaft, the nut is on the **LEFT HAND** side when viewed from the operator’s position **(Tighten nut whilst assembly is on the mainshaft).**

NOTE Be careful to guide the assembly into the fork when lowering the mainshaft. Make sure that the left hand side arm is centered in the channel.

8.1.12 Loosen the small allen key in the reel drive support block, pull the diamond dresser out a short way and re tighten the screw.

8.1.13 With the stone NOT running, bring the mainshaft (and grind-stone) up horizontally. Manually traverse the ‘stone past the diamond, making a light scratch, to confirm that the shaft is horizontal.

8.1.14 Move the stone just clear of the dresser then start the grind motor.

8.1.15 Bring up the shaft equally on each side and manually traverse the ‘stone across the dresser.

8.1.16 Switch on and engage the auto traverse with the stops set so that the stone completely passes the dresser back and forth.

8.1.17 Apply more feed as necessary to true the stone.

NOTE Dressing in this way should be carried out periodically to keep the ‘stone clean and true BUT remove only the minimum material off the stone to keep long service.

8. Maintenance *(Continued)*

NOTE When fitting a new sleeve and nut, it may appear that the assembly is too tight to fit onto the mainshaft of the Express Dual.

This is because all replacement sleeve and nut assemblies are shipped with the drive key left very slightly oversize to allow for varying degrees of wear in the mainshaft keyway.

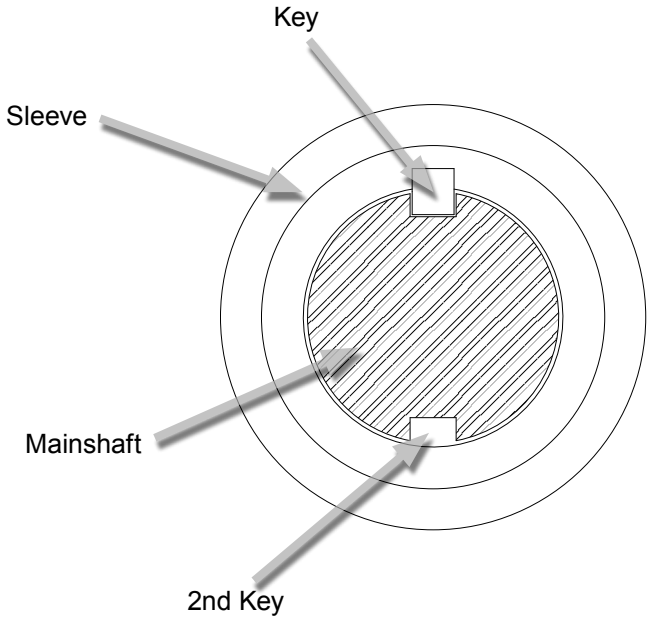
(The key is “peened” (like riveting) into the sleeve NOT welded).

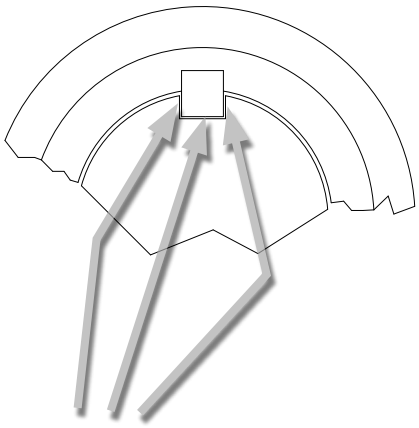
The key needs to be “fitted” to the mainshaft. This may entail filing a small amount of material from both the depth of the key and the sides. Remove only a very small amount of material at a time, then check the fit, until the sleeve and nut assembly slides freely along the length of the mainshaft without any play between key and keyway.

REMEMBER

The mainshaft keyway will be less worn at the ends of the shaft than where the normal traverse of the grindstone occurs, do not remove too much metal from the key.

NEVER grip the sleeve and nut assembly in a vice. Fully tighten the nut when the assembly is fitted to the mainshaft.





Remove minimal material from sides and bottom of key

8. Maintenance *(Continued)*

8.2 Lubrication

8.2.1 Daily

Mainshaft – Wipe off any deposits of grinding dust with a dry cloth or brush ensuring the keyways are kept clean. Using a fine spray oil, such as WD40, spray the whole shaft. Use an excess of WD40 in one place and slide the grinding wheel assembly backwards and forwards over that area in order to wash out thoroughly the inside of the sleeve. This will remove any build up of material and ensure the free movement of the assembly along the shaft.

After thoroughly cleaning the shaft, dry and ensure that no oil remains at all.

It is essential that the grinding wheel sleeve and nut can be moved freely along the entire length of the mainshaft at all times.

Occasionally lubricate the contacct areas of the fork driver (with the sleeve and nut) with “MOLYCOTE” (Molydbenum Disulphide), this will impregnate the surface. Excess lubricant / propellant should be wiped off again after a short time.

NOTE Never apply nor leave any oil or grease on the mainshaft.

8.2.2 Weekly

Spray WD40 or equivalent onto all moving parts (the mainshaft must be completely dried before any grinding is carried out). This includes the threads under the feed column handwheels, the reversing bar and the shafts on which the fork and pickup assembly run. The majority of bearings are either oil impregnated or are ball races and, apart from those mounted in special sealed housings or fitted with grease nipples, require the occasional drop of oil. These include the reel drive coupling bearings and the pressure lever pivot bearings.

8.2.3 6 Monthly

Chain and idler sprocket require cleaning and oiling.

Examine belts for wear and tension. **DO NOT OVER-TIGHTEN.** Examine fork assembly for wear – some slight discolouration may occur, this is not a problem.

8.2.4 Yearly

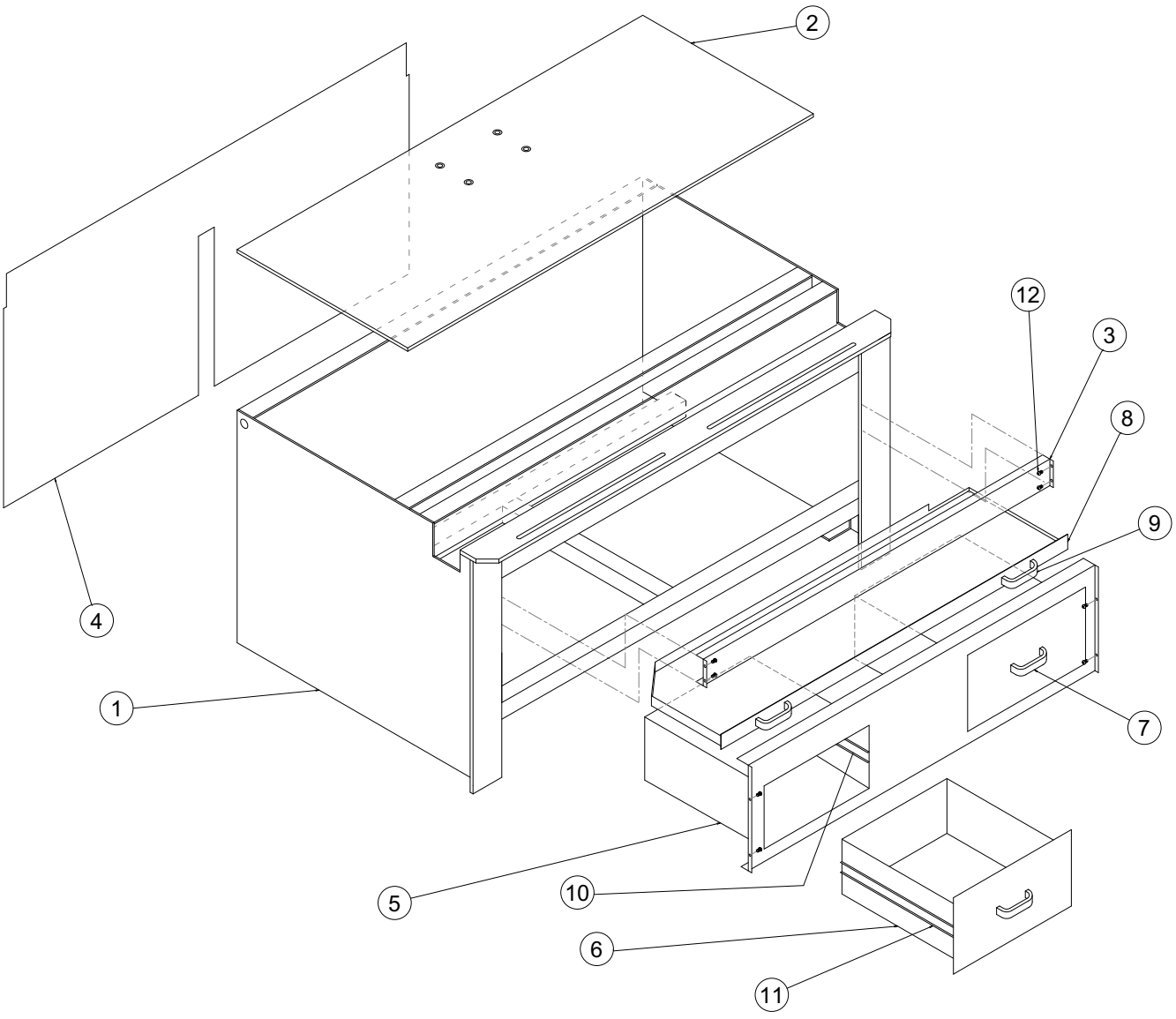
Mainshaft bearings are pre-packed with grease. **IF** grease nipples are fitted **ONLY 1 SMALL SHOT** of grease should be applied annualy.

These bearings run warm/hot, that IS OK. Extra grease will not reduce the temperature, more likely the reverse, the seals and subsequently the bearings may fail prematurely.

9. Parts List

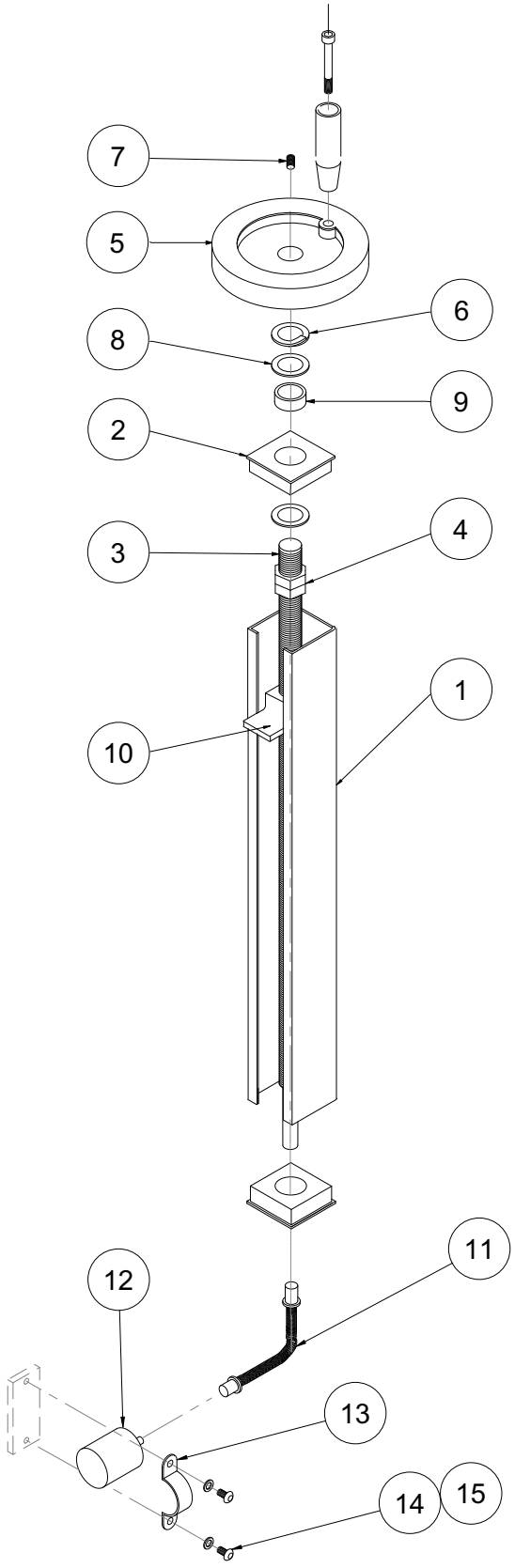
9. Parts List *(Continued)*

Ref #	Name of Part	Qty.	Part #
MAIN FRAME			
1	Frame	1	A4050
2	Top Plate	1	A4142
3	Upper Front Skirt	1	A6352
4	Rear Skirt	1	A6397
	(not required if Lift Table fitted)		
5	Front Skirt	1	A6328
6	Drawer	2	A6321
7	Drawer Handle	2	A6110
8	Dust Tray	1	A6323
9	Dust Tray Handle	2	A6111
10	Drawer Runner (Pad)	4	A6742
11	Drawer Runner (Drawer)	4	A6741
12	M5 x 10 Button Socket Screw	8	A5129



9. Parts List *(Continued)*

Ref #	Name of Part	Qty.	Part #
FEED ADJUSTMENT			
1	Feed Channel L.H. c/w top and bottom cap	1	A4041
	Feed Channel R.H. c/w top and bottom cap	1	A4042
2	Feedscrew Cap c/w Bush	4	A4044
3	Feedscrew (before Serial No. 12586)	2	A9039
	Feedscrew (from Serial No. 12586)	2	A9208
4	Locknut	4	A5502
5	Handwheel 150mm dia	2	A6113
6	Die Spring	2	A6278
	5/8” Double Coil Spring Washer (older machines)	2	A5303
7	5/8” whit x 5/8” Socket Screw	2	A5110
8	5/8” Washer	4	A5305
9	Bush (included with item 2)	4	
10	Feed Nut	2	A4043
11	Spring Coupling Kit	2	A9700
12	Encoder	2	A8074
13	Saddle Clamp	2	A6851
14	M5 x 10 Button Head Screw	4	A5129
15	M5 Washer	4	A5318

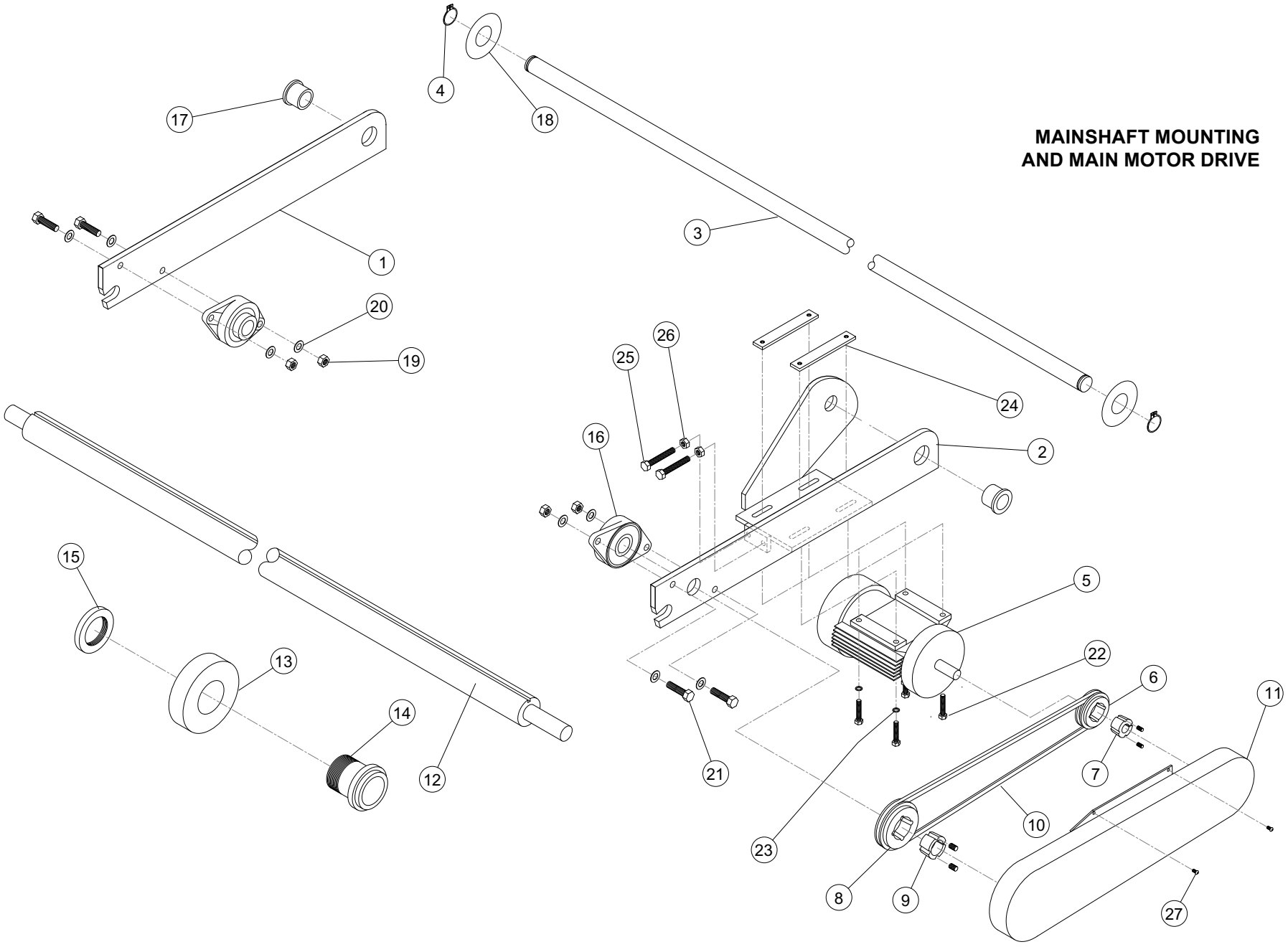


FEED ADJUSTMENT

9. Parts List *(Continued)*

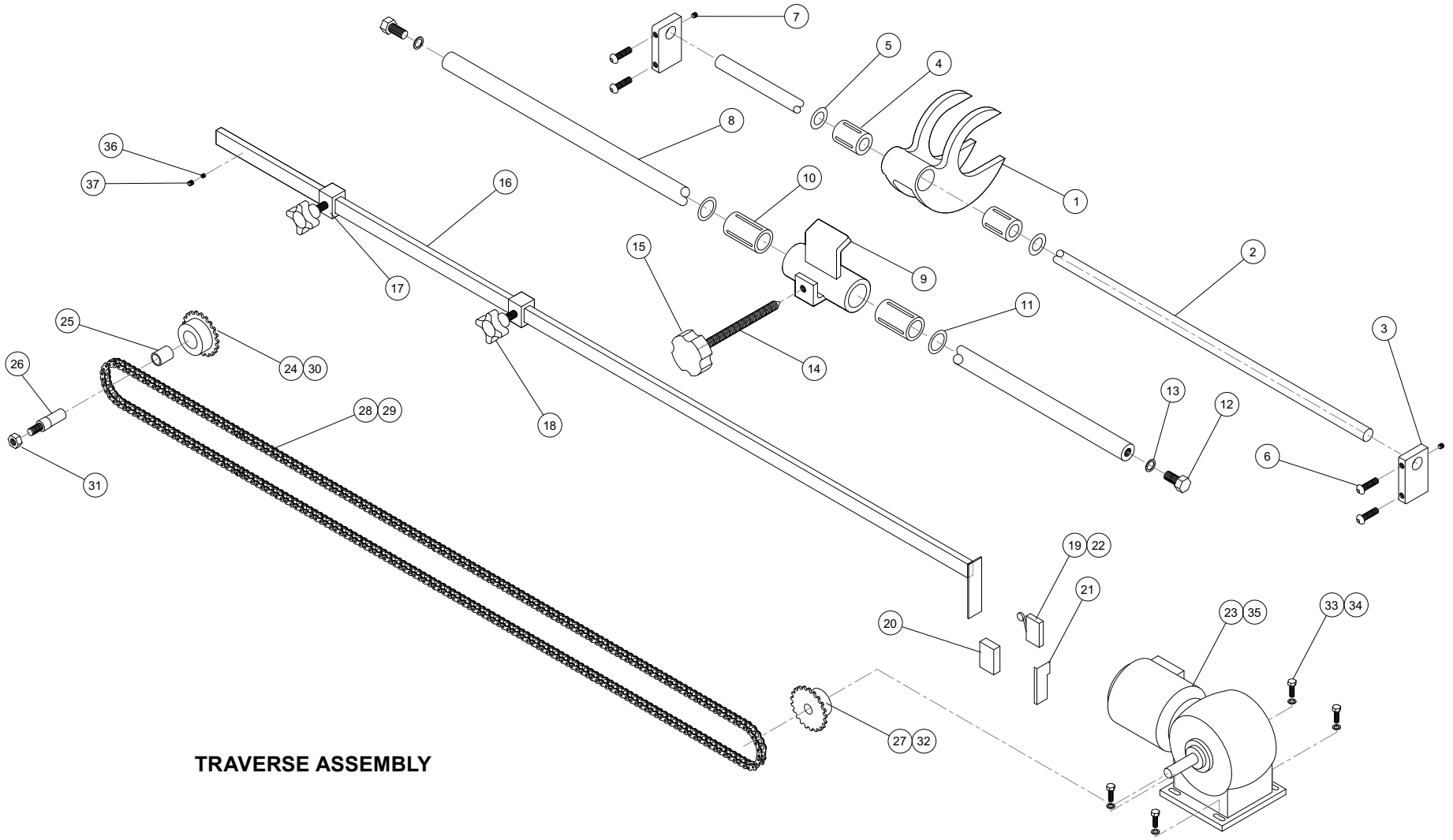
Ref #	Name of Part	Qty.	Part #
MAINSHAFT MOUNTING AND MAIN MOTOR DRIVE			
1	Side Arm L.H.	1	A4122
2	Side Arm R.H.	1	A4123
3	Rear Shaft c/w circlips	1	A9108
4	Circlip	2	A5601
5	Main Motor 220v 60Hz	1	A6014
	Main Motor 240v 50Hz	1	A6015
	Main Motor 3 phase	1	A6016
6	Drive Pulley 60 Hz	1	A7202
	Drive Pulley 50Hz	1	A7203
7	Taperlock Bush 1108 x 19	1	A7301
8	Driven Pulley	1	A7201
9	Taperlock Bush 1610 x 1¼"	1	A7303
10	SPZ Drive Belt 60 Hz	1	A7103
	SPZ Drive Belt 50Hz	1	A7102
11	Drive Belt Guard	1	A6334
12	Mainshaft	1	A9068
13	Grinding Stone	1	A6505
14	Sleeve	1	A9116
15	Nut	1	A9095
	Sleeve and Nut assembly	1	A9506
16	Mainshaft Bearing	1	A7721
17	Oilite Bush 1¼" bore	2	A7701
18	Plastic Washer	2	A6759
19	Hex.Nut M12	4	A5506
20	Washer M12	8	A5315
21	Hex. Head Bolt M12 x 45	4	A5714
22	Hex. Head Bolt M8 x 25	4	A5216
23	Washer M8	4	A5321
24	Motor Bolt Retaining Plate	2	A4078
25	Hex. Set Screw M10 x 70	2	A5711
26	Locknut M10	2	A5503
27	Button Head Socket Screw M5 x 10	2	A5129

MAINSHAFT MOUNTING AND MAIN MOTOR DRIVE



9. Parts List *(Continued)*

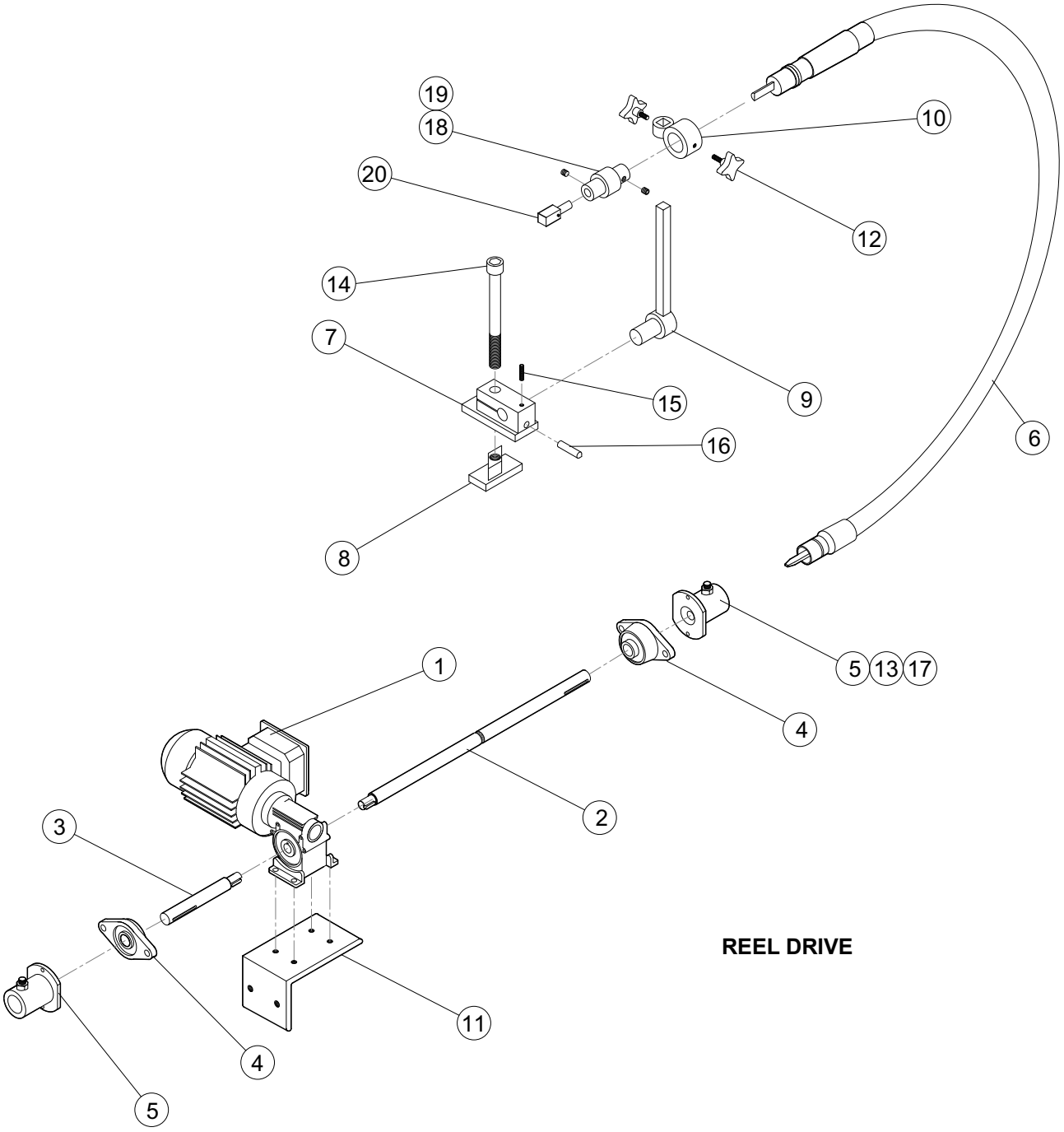
Ref #	Name of Part	Qty.	Part #
TRAVERSE ASSEMBLY			
1	Forkdriver (only)	1	A9512
	Forkdriver c/w bushings & seals	1	A9505
2	Shaft for Forkdriver	1	A9050
3	Brackets for Forkdriver Shaft	2	A4049
4	Ball Bushing for Forkdriver	2	A7706
5	Dust Seals for Forkdriver	2	A7707
6	Button Head Screw M8 x 30	4	A5164
7	Socket Screw M6 x 6	2	A5156
8	Shaft for Pick up	1	A9183
9	Traverse Pick Up	1	A9518
10	Ball Bushing for Trav. Pick Up	2	A7702
11	Dust Seal for Trav. Pick Up	2	A7703
12	Hex. Head Screw M12 x 25	2	A5712
13	Washer M12	2	A5315
14	Engagement Screw	1	A6112
15	Lobed Knob M12	1	A6102
16	Reversing Bar	1	A4111
17	Reversing Bar Stop	2	A4113
18	Cross Knob M8 x 15	2	A6131
19	Microswitch	1	A8111
20	Housing for Microswitch	1	A8113
21	Guard for Microswitch	1	A6382
22	Screw 2BA x 1 ¾”	2	A5404
23	Traverse Motor 60Hz	1	A6024
	Traverse Motor 50Hz	1	A6022
24	Idler Sprocket	1	A7609
25	Oilite Bush for Sprocket	1	A7704
26	Spindle for Idler Sprocket	1	A9057
27	Drive Sprocket	1	A7603
28	Traverse Chain	1	A7406
29	Link for Traverse Chain	1	A7502
30	Circlip ½”	1	A5602
31	Hex. Nut M10	1	A5503
32	Socket Screw	1	
33	Hex Head Screw M6 x 18	4	A5719
34	Washer M6	4	A5320
35	Capacitor 3uf for Traverse Motor	1	A8148
36	Friction Spring for Reversing Bar	1	A6746
37	Socket Screw ¼”Whit x ¼”	1	A5101



TRAVERSE ASSEMBLY

9. Parts List *(Continued)*

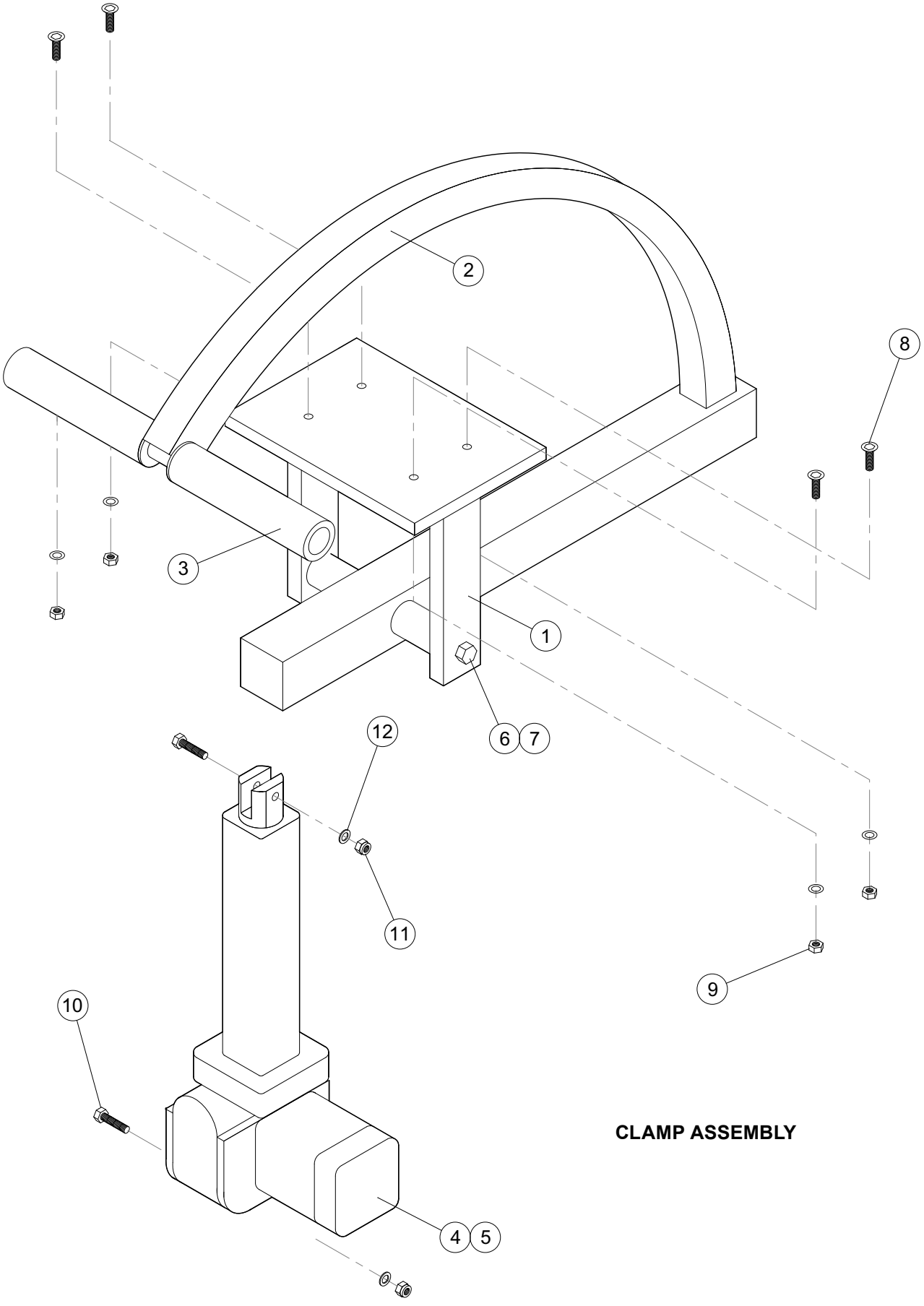
Ref #	Name of Part	Qty.	Part #
REEL DRIVE			
1	Reel Drive Motor	1	A6011
2	Layshaft (Long)	1	A9059
3	Layshaft (Short)	1	A9060
4	Layshaft Bearing	2	A7722
5	Socket for Flexible Drive	2	A9121
6	Flexible Drive Shaft	1	A7404
7	Flexible Drive Bracket Base	1	A4046
8	Retaining Nut	1	A4110
9	'L' Post Drive Hd Support Bar	1	A4001
10	Flexible Drive Bracket	1	A4045
11	Cylinder Drive Motor Bracket	1	A4031
12	Cross Knob M8 x 15	2	A6131
13	Ball Spring Plunger	2	A5460
14	Cap Hd Screw 5/8"Whit x 5 1/2"	1	A5109
15	Socket Screw M6 x 12	1	A5146
16	Diamond Dresser	1	A6737
17	Locknut M10	1	A5503
18	Flexible Coupling	1	A6744
19	Grub Screw 3/8" Whit x 3/8"	2	A5106
20	Short Square Drive Shaft	1	A4134



REEL DRIVE

9. Parts List *(Continued)*

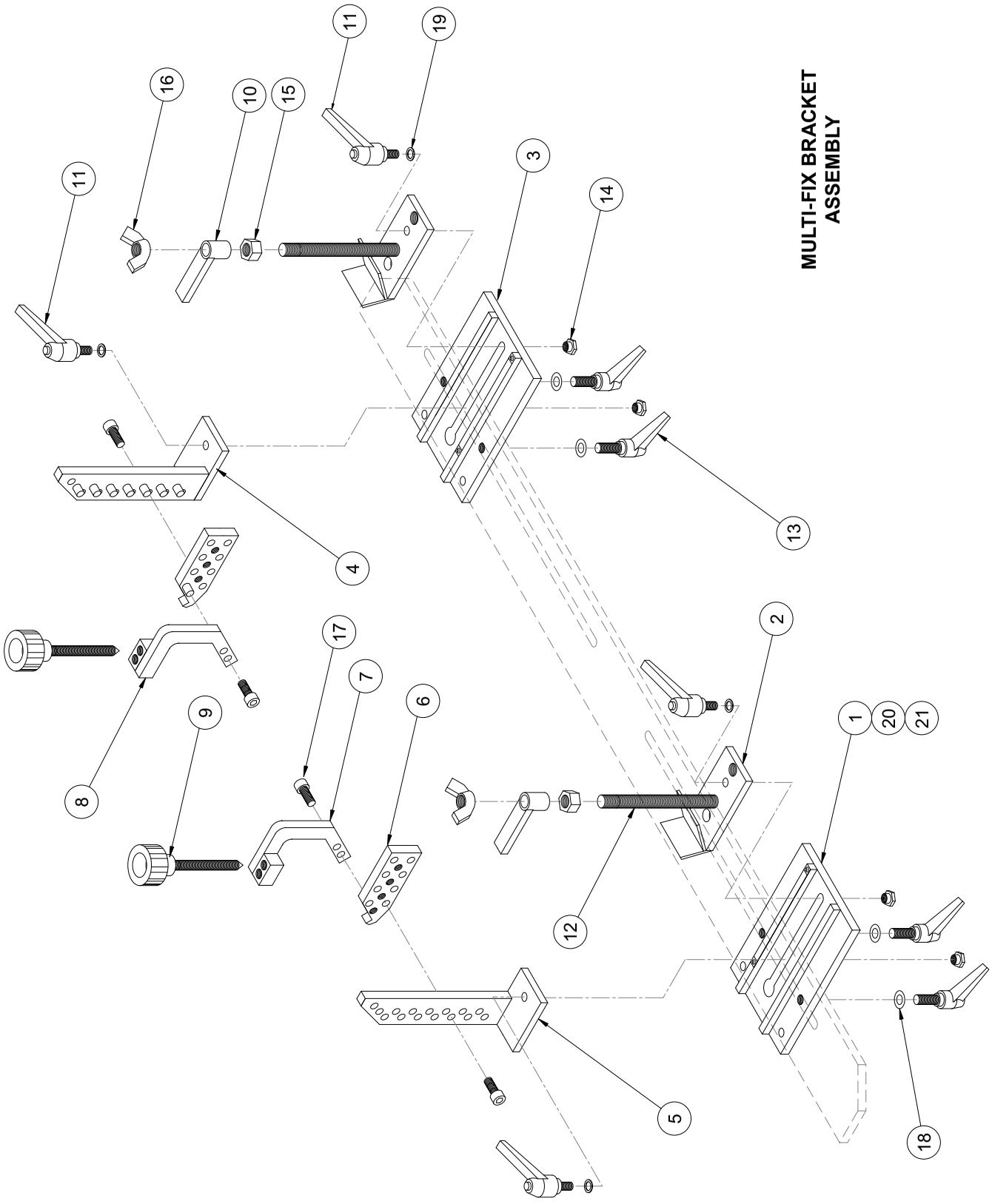
Ref #	Name of Part	Qty.	Part #
CLAMP ASSEMBLY			
1	Radius Pressure Arm Bracket	1	A4101
2	Radius Pressure Arm	1	A4100
3	Pressure Bar Rubber	2	A6761
4	Linear Actuator	1	A6013
5	Plug 4 Pin	1	A8121
6	Hex Head Bolt M16 x 170	1	A5749
7	Nyloc Nut M16	1	A5524
8	C's'k Socket Screw M10 x 30	4	A5117
9	Nut M10	4	A5503
10	Hex Head Bolt M10 x 45	2	A5706
11	Nyloc Nut M10	2	A5505
12	Washer M10	6	A5310
13	Pressure Plate (not shown)	1	A6342



CLAMP ASSEMBLY

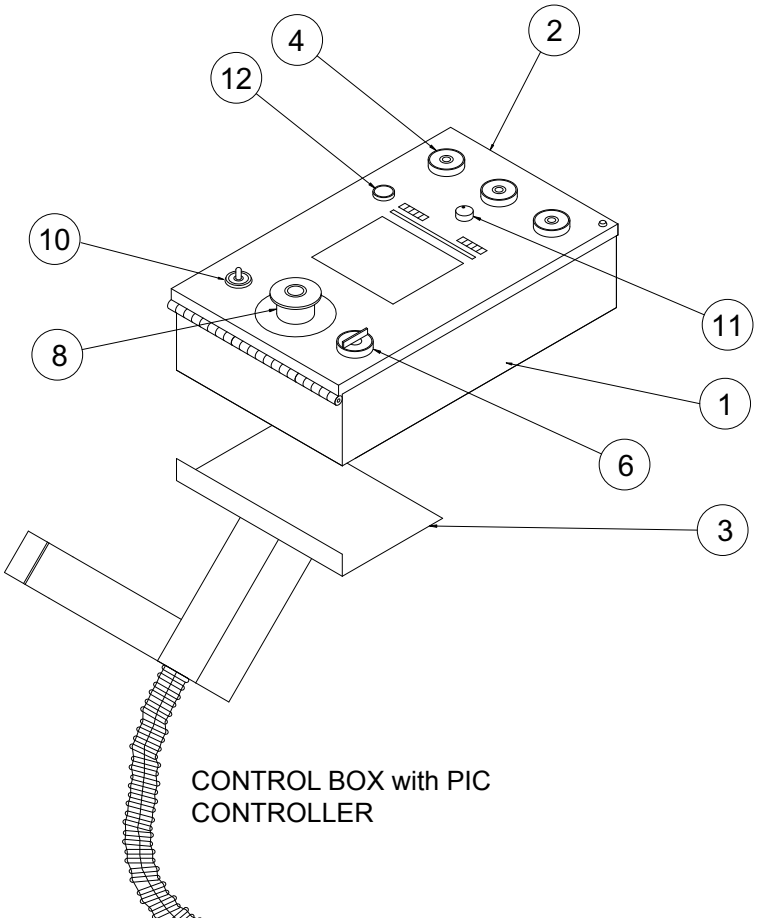
9. Parts List *(Continued)*

Ref #	Name of Part	Qty.	Part #
MULTI-FIX BRACKET ASSEMBLY			
1	Adjustable Mtg Brkt Base L.H.	1	A4012
2	Adjustable Mtg Brkt 'V' Base	2	A4011
3	Adjustable Mtg Brkt Base R.H.	1	A4014
4	'L' Upright Mounting Brkt R.H.	1	A4010
5	'L' Upright Mounting Brkt L.H.	1	A4009
6	Adjustable Mtg Brkt Horizontal	2	A4016
7	Mounting Brkt 'C' Clamp L.H.	1	A4006
8	Mounting Brkt 'C' Clamp R.H.	1	A4007
9	'C' Clamp Screw	2	A4008
10	'V' Bracket Clamp Finger	2	A4003
11	Kip Lever M10 x 20	4	A6118
12	'V' Bracket Stud M16	2	A5401
13	Kip Lever M12 x 30	4	A6121
14	Slide Nut M10	2	A4180
15	Nut M16	2	A5508
16	Wing Nut M16	2	A5509
17	Cap Head Skt Screw M10 x 25	4	A5116
18	Washer M12	4	A5315
19	Washer M10	4	A5310
20	Base Scale	2	A6601
21	Button Head Skt Screw M4 x 8	4	A5125
22	Multifix Channel (not shown)	2	A4087

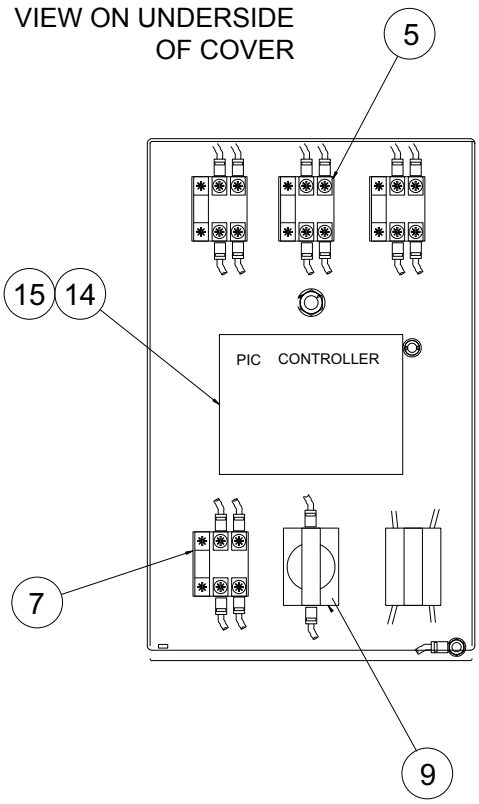


9. Parts List *(Continued)*

Ref #	Name of Part	Qty.	Part #	
CONTROL BOX				
1	Control Box	1	A8042	
2	Control Box Lid	1	A8043	
	Control Box Lid with Vac Switch	1	A8764	(option)
3	Control Box Arm	1	A4028	
4	Pushbutton	3	A8040	
5	B3T10 Contact Block	3	A8039	
6	2 Position Switch (for vacuum)	1	A8147	(if fitted)
7	Contact Block (for the above)	1	A8059	(")
8	Emergency Stop Button	1	A8073	
9	B4T02 Contact Block	1	A8358	
10	Toggle Switch	1	A8071	
11	1k Potentiometer	1	A8014	
12	Reset Button (LED)	1	A8131	
13	LED Light Red	2	A8129	(not with PIC)
	LED Light Yellow	2	A8150	(not with PIC)
	LED Light Green	1	A8088	(not with PIC)
14	PIC Control PCB	1	A8839	
15	Lead for PIC Control PCB	1	A8853	

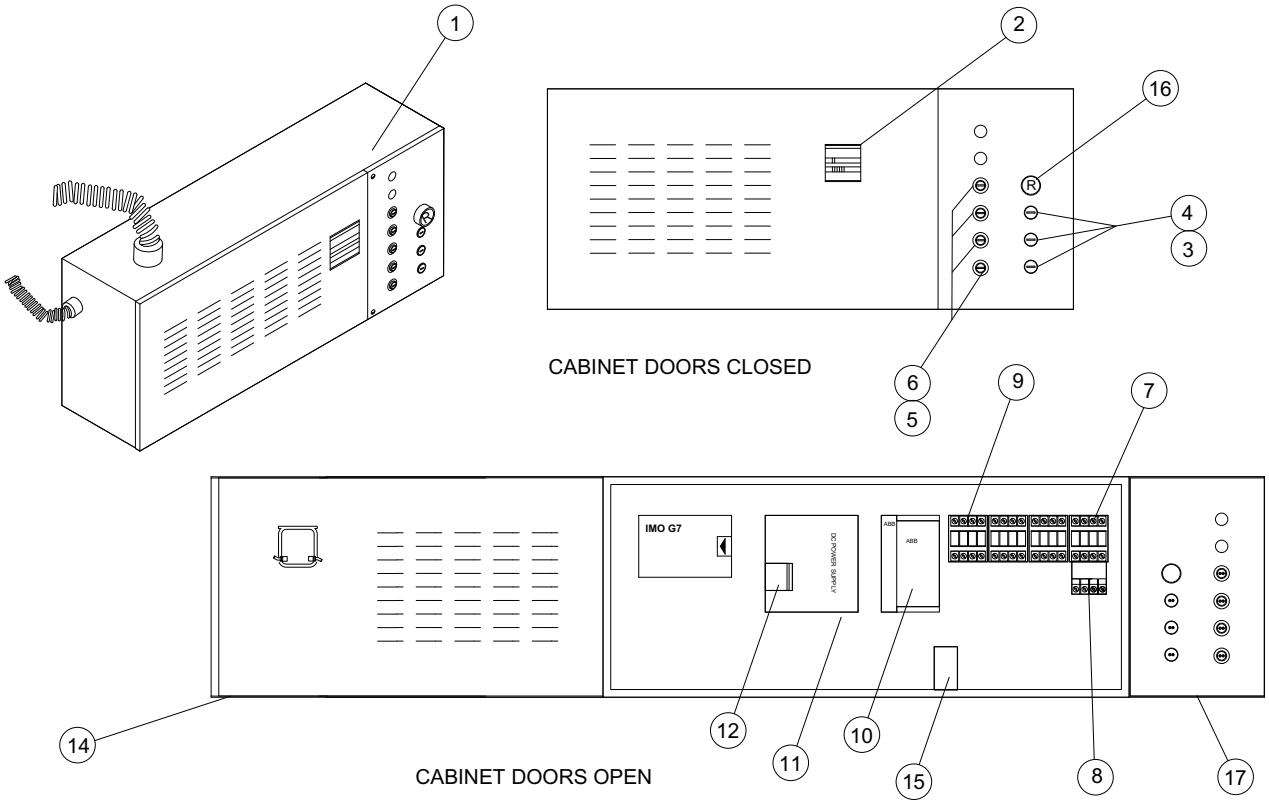


CONTROL BOX with PIC CONTROLLER



9. Parts List *(Continued)*

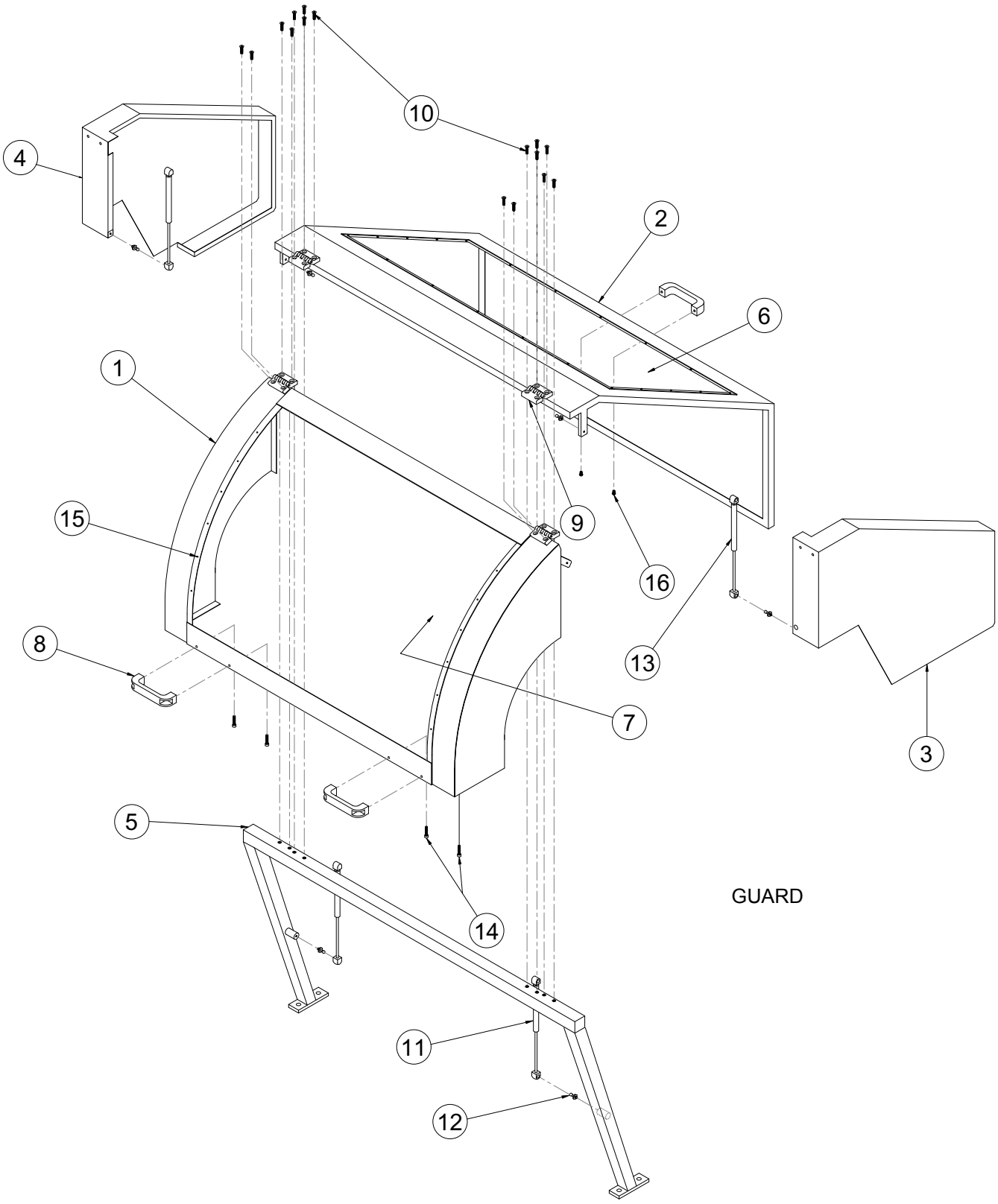
Ref #	Name of Part	Qty.	Part #
ELECTRICAL CABINET			
1	Electrical Cabinet	1	A6325
2	Hours Meter 60Hz	1	A8398
	Hours Meter 50Hz	1	A8093
3	Fuse Holder	3	A8174
4	Fuse 16 amp (Supply)	2	A8084
	Fuse 10 amp (Lift Table)	1	A8083
5	Fuse Holder	4	A8081
6	Fuse 2 amp (Traverse Motor)	1	A8085
	Fuse 6.3 amp (Inverter)	1	A8087
	Fuse 5 amp (Clamp)	1	A8086
	Fuse 1.25 amp (LED Lights)	1	A8082
7	Contactor K209A10	3	A8063
8	Thermal Overload 60Hz	1	A8116
	Thermal Overload 50 Hz	1	A8117
	Thermal Overload 3 Phase	1	A8115
9	Reversing Contactor K209A01	1	A8062
10	ABB Inverter	1	A8829
11	Transformer	1	A8024
12	Smoothing Capacitor 10000uf	1	A8004
13	G7 PLC (20 I / O)	1	A8420
	G7 PLC (10 I / O)	1	A8762
	K10 PLC	2	A8119
14	Hours Meter Door	1	A6336
15	Traverse Motor Capacitor 3uf	1	A8148
16	Reset Button	1	A8130
17	Fuse Door	1	A6329



9. Parts List *(Continued)*

Ref #	Name of Part	Qty.	Part #
GUARD			
1	Front Guard	1	A6326
2	Rear Guard	1	A6345
3	R.H. Side Panel	1	A6431
4	L.H. Side Panel	1	A6430
5	Frame	1	A6429
6	Rear Guard Window	1	A6768
7	Front Guard Window	1	A6748
8	Bridge Handle	3	A6108
9	Hinge	4	A6109
10	C's'k Head Screw M6 x 25	16	A5757
11	Rear Guard Gas Strut	2	A6731
12	Ball Pin for Gas Strut	4	A9281
13	Front Guard Gas Strut	2	A6731
14	Cap Head Screw M6 x 30	4	A5153
15	Plastic Rivet	32	A6758
16	Button Head Screw M6 x 10	2	A5142

9. Parts List *(Continued)*

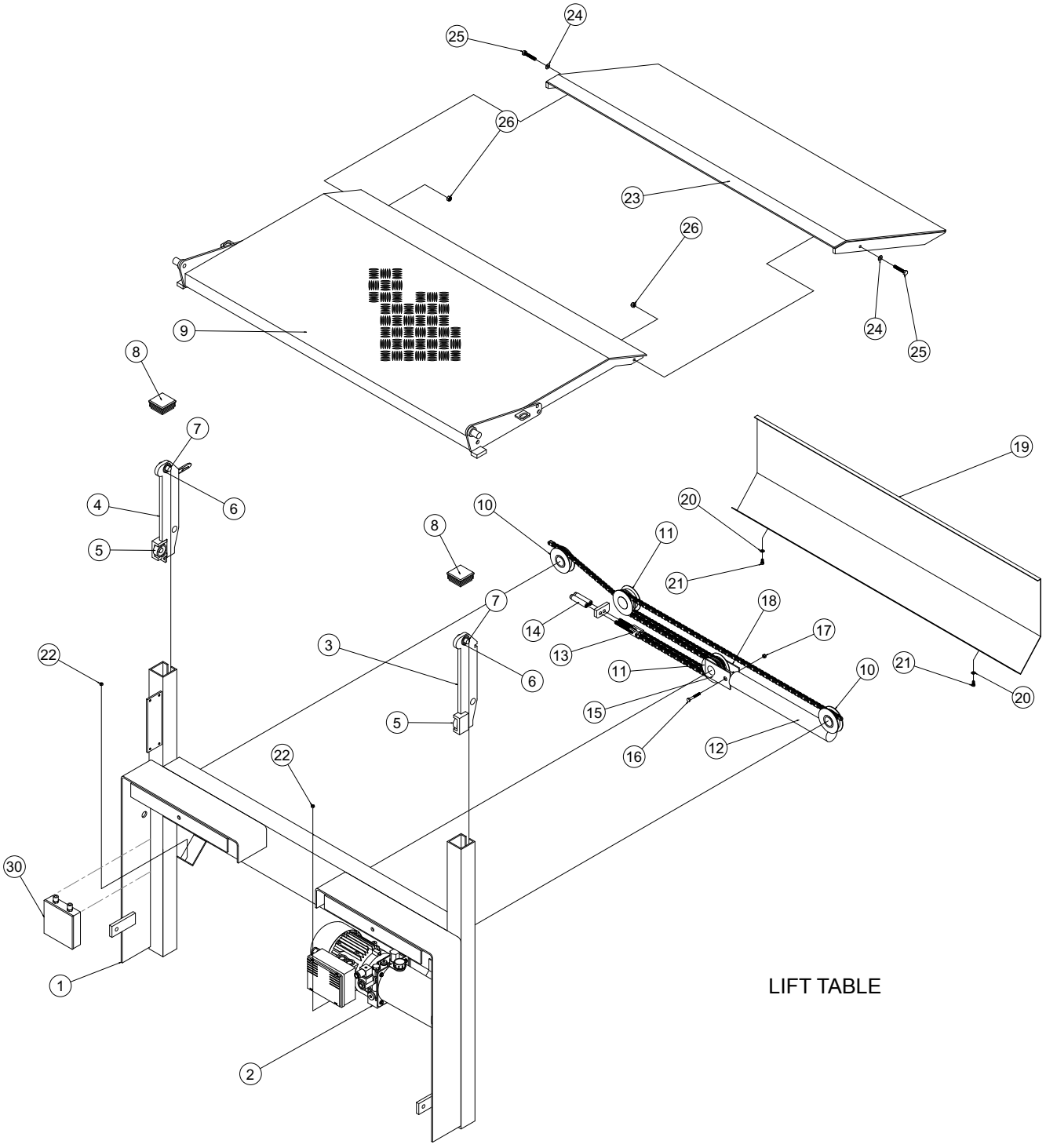


GUARD

9. Parts List *(Continued)*

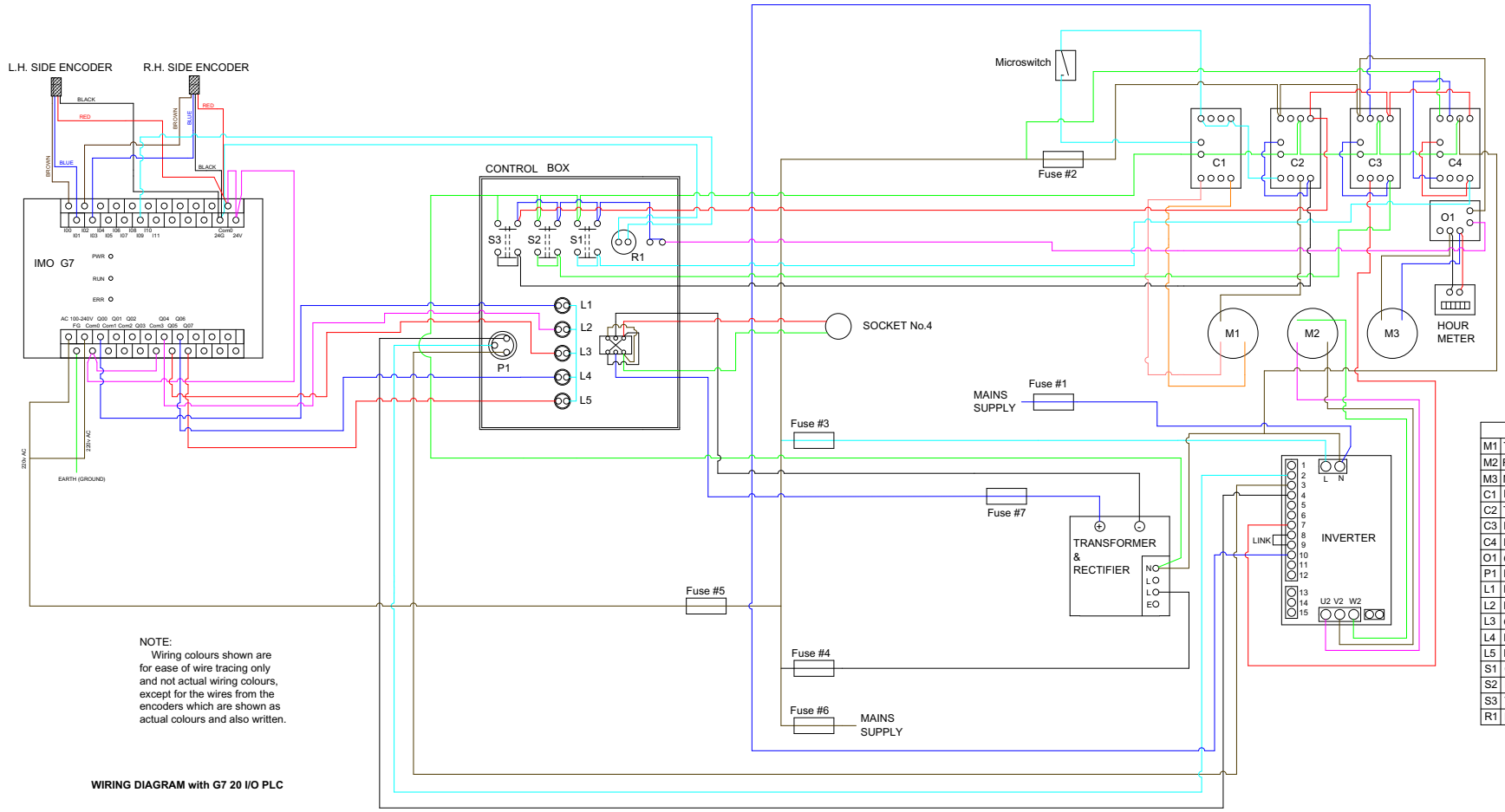
Ref #	Name of Part	Qty.	Part #
LIFT TABLE			
1	Frame	1	A4138
2	Power Pack 220v	1	A8954
	Power Pack 24v	1	A8023
	Power Pack 12v	1	A8770
3	L.H. Slider Plate	1	A4127
4	R.H.Slider Plate	1	A4128
5	Bearing	2	A7744
6	Bearing	2	A7744
7	Slider Plate Pin	2	A4127
8	Plastic End Cap 60 x 60	2	A6194
9	Taillift Platform	1	A4139
10	Single Pulley	2	A7209
11	Double Pulley	2	A7204
12	Hydraulic Cylinder complete	1	A6923
13	Chain Screw Tensioner	2	A4119
14	Chain Bottle Tensioner	2	A4022
15	L.H. Pulley Mounting Plate	2	A4098
16	Hex Head Bolt M6 x 45	1	A5722
17	Nyloc Nut M6	1	A5517
18	R.H.Pulley Mounting Plate	1	A4099
19	Cover Plate	1	A6319
20	Washer M6	2	A5320
21	Hex Head Screw M6 x 12	2	A5718
22	Nut M6	2	A5516
23	Lift Platform Extension	1	A4137
24	Washer M8	2	A5321
25	Hex Head Set Screw M8 x 45	2	A5725
26	Nyloc Nut M8	2	A5220
27	Lift Table Lowering Solenoid 220v	1	A8943
	Lift Table Lowering Solenoid 24v	1	A8392
	Lift Table Lowering Solenoid 12v	1	A8391
28	Control Pendant 24v (not shown)	1	A8018
	Mains Control Pendant (not shown)	1	A8890
29	Label for Tail Lift Pendant (not shown)	1	A6552
30	Mains Tail Lift Controller (not shown)	1	A8904

9. Parts List *(Continued)*



LIFT TABLE

10. Wiring Diagrams

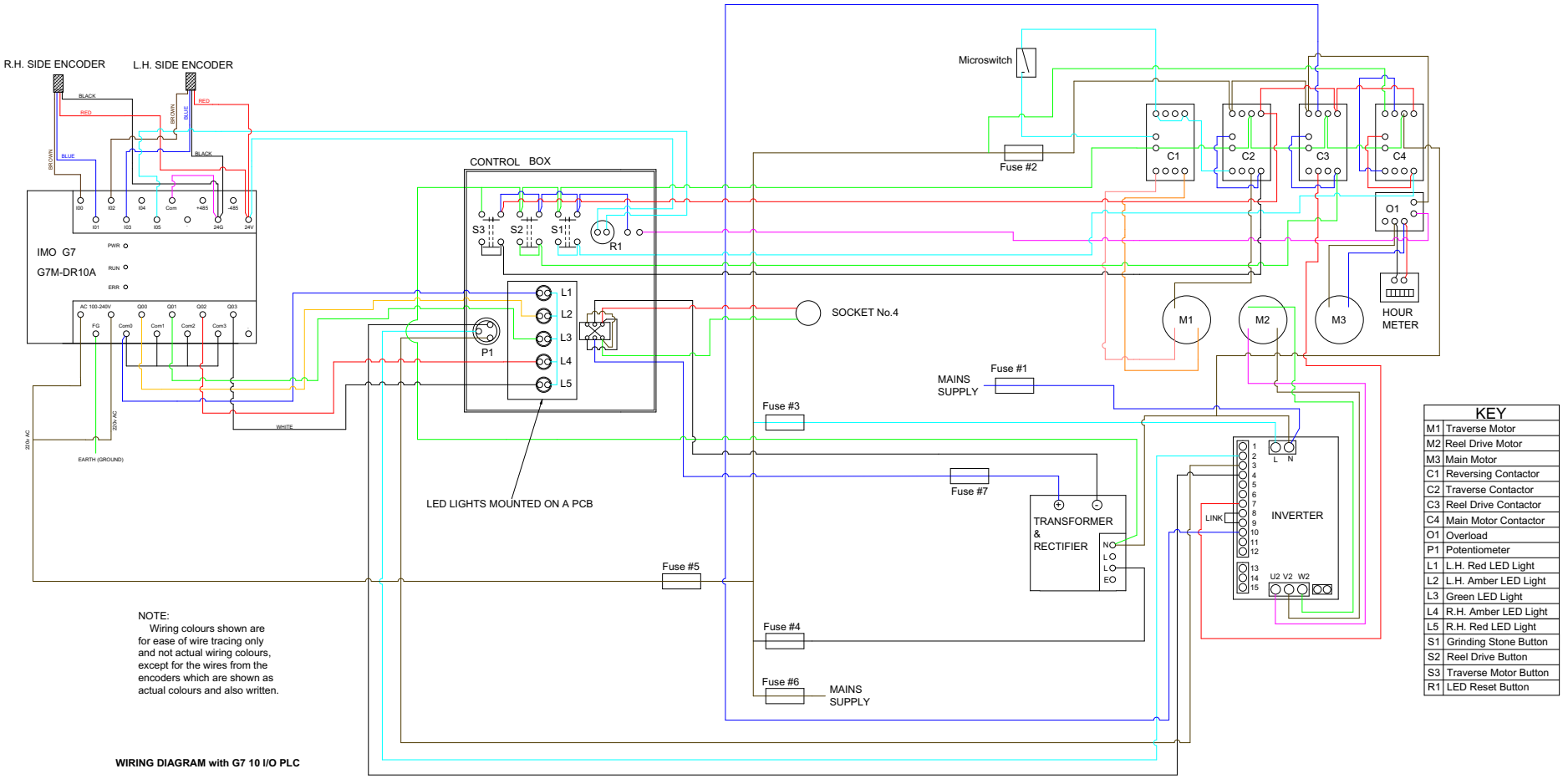


NOTE:
Wiring colours shown are for ease of wire tracing only and not actual wiring colours, except for the wires from the encoders which are shown as actual colours and also written.

WIRING DIAGRAM with G7 20 I/O PLC

KEY	
M1	Traverse Motor
M2	Reel Drive Motor
M3	Main Motor
C1	Reversing Contactor
C2	Traverse Contactor
C3	Reel Drive Contactor
C4	Main Motor Contactor
O1	Overload
P1	Potentiometer
L1	L.H. Red LED Light
L2	L.H. Amber LED Light
L3	Green LED Light
L4	R.H. Amber LED Light
L5	R.H. Red LED Light
S1	Grinding Stone Button
S2	Reel Drive Button
S3	Traverse Motor Button
R1	LED Reset Button

10. Wiring Diagrams

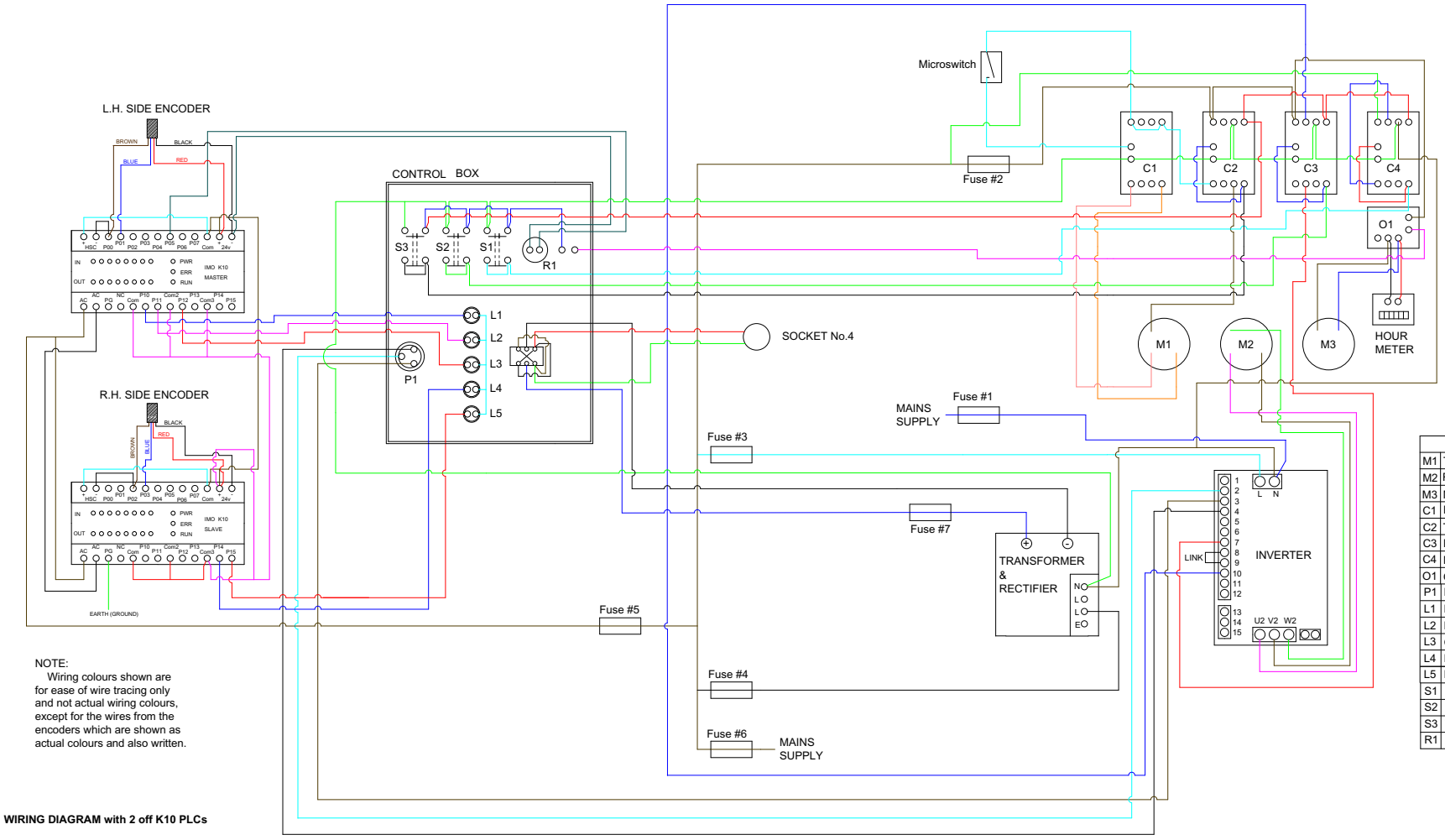


NOTE:
Wiring colours shown are for ease of wire tracing only and not actual wiring colours, except for the wires from the encoders which are shown as actual colours and also written.

WIRING DIAGRAM with G7 10 I/O PLC

KEY	
M1	Traverse Motor
M2	Reel Drive Motor
M3	Main Motor
C1	Reversing Contactor
C2	Traverse Contactor
C3	Reel Drive Contactor
C4	Main Motor Contactor
O1	Overload
P1	Potentiometer
L1	L.H. Red LED Light
L2	L.H. Amber LED Light
L3	Green LED Light
L4	R.H. Amber LED Light
L5	R.H. Red LED Light
S1	Grinding Stone Button
S2	Reel Drive Button
S3	Traverse Motor Button
R1	LED Reset Button

10. Wiring Diagrams

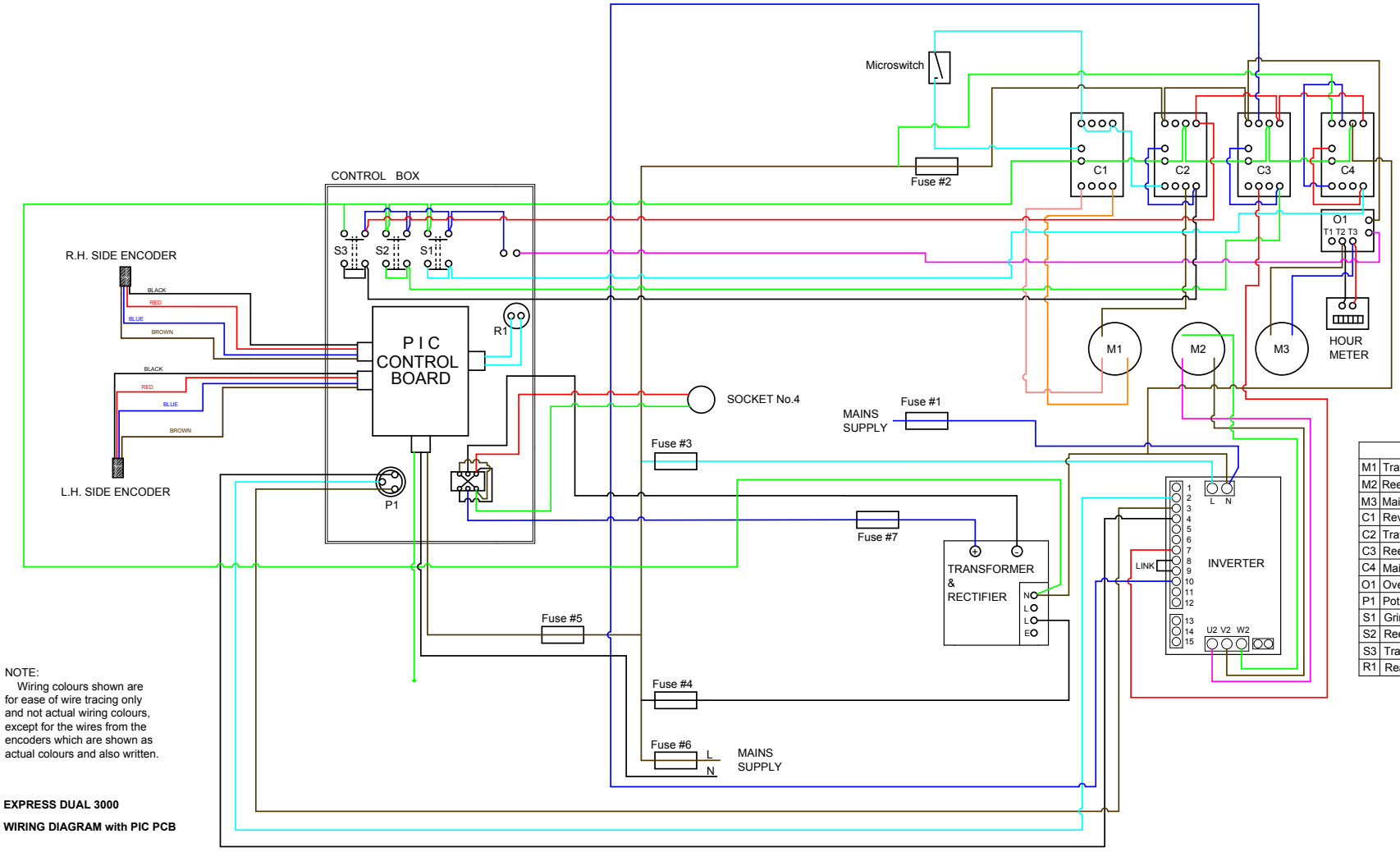


NOTE:
Wiring colours shown are for ease of wire tracing only and not actual wiring colours, except for the wires from the encoders which are shown as actual colours and also written.

WIRING DIAGRAM with 2 off K10 PLCs

KEY	
M1	Traverse Motor
M2	Reel Drive Motor
M3	Main Motor
C1	Reversing Contactor
C2	Traverse Contactor
C3	Reel Drive Contactor
C4	Main Motor Contactor
O1	Overload
P1	Potentiometer
L1	L.H. Red LED Light
L2	L.H. Amber LED Light
L3	Green LED Light
L4	R.H. Amber LED Light
L5	R.H. Red LED Light
S1	Grinding Stone Button
S2	Reel Drive Button
S3	Traverse Motor Button
R1	LED Reset Button

10. Wiring Diagrams



KEY	
M1	Traverse Motor
M2	Reel Drive Motor
M3	Main Motor
C1	Reversing Contactor
C2	Traverse Contactor
C3	Reel Drive Contactor
C4	Main Motor Contactor
O1	Overload
P1	Potentiometer
S1	Grinding Stone Button
S2	Reel Drive Button
S3	Traverse Motor Button
R1	Readout Reset Button

NOTE:
Wiring colours shown are for ease of wire tracing only and not actual wiring colours, except for the wires from the encoders which are shown as actual colours and also written.

EXPRESS DUAL 3000

WIRING DIAGRAM with PIC PCB

If you have any service or operational problems contact your distributor,

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