

EXPRESS DUAL 3000DX

ED3000DX Automatic Spin Grinder



User's Guide & Instruction Manual

Please read this manual carefully before using the Express Dual 3000DX.

This manual should be kept in a safe place so that it can be used for future reference.

EXPRESS DUAL

ED3000DX Precision Reel/Cylinder Grinder

You are now the owner/operator of a Bernhard's Express Dual 3000DX 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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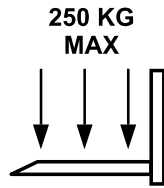
BERNHARD AND COMPANY LTD

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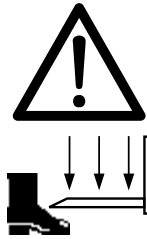
Email: info@bernhard.co.uk

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

1. Identification of Pictograms



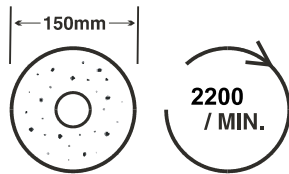
**MAXIMUM LIFT PLATFORM
LOAD - 250 KG (550 LBS)**



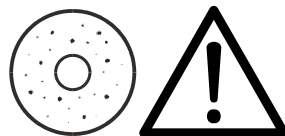
**BEWARE!
TRAPPING FEET OR OTHER OBJECTS
WHEN LOWERING LIFT PLATFORM**



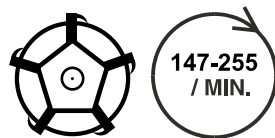
BEWARE! HIGH VOLTAGE



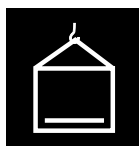
**MAXIMUM GRINDSTONE
DIAMETER 150mm
MAXIMUM SPEED 4000 Rev/Min
RUNS AT 2200 Rev/Min**



**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**



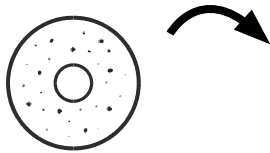
**BEWARE!
MOVING COMPONENTS KEEP HANDS
AND OTHER OBJECTS CLEAR**



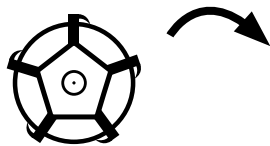
**WEAR EYE, EAR AND BREATHING
PROTECTION**



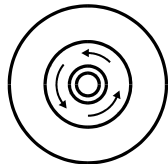
TRAVERSE START CONTROL



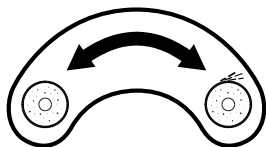
GRINDSTONE START CONTROL



REEL START CONTROL



STOP CONTROL



**ENGAGE / DISENGAGE (INCREASE /
REDUCE) GRINDSTONE FEED**

Express Dual 3000DX Control Box

**Control System
On/Off**

**Reel Spin
Speed Adjust**

**Emergency Stop
(Twist to release)**



Function Keys
(Screen prompts which to press)

**Pause/
Resume**

Finish

**Vacuum
On/Off**

Clamp

Unclamp

**Toggle
Auto/
Manual**

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).

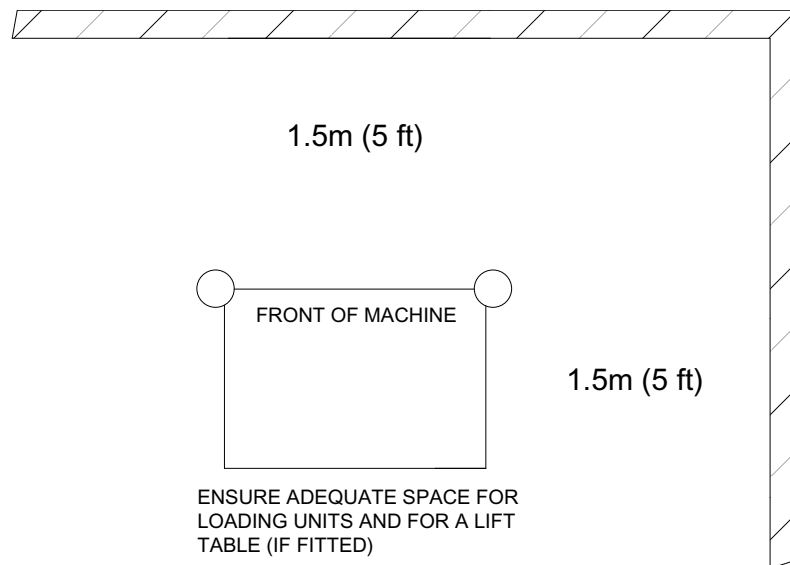


Fig: 3.2

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.

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).

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.



Fig: 3.5

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 Adjustable 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

6.1.1 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).

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.

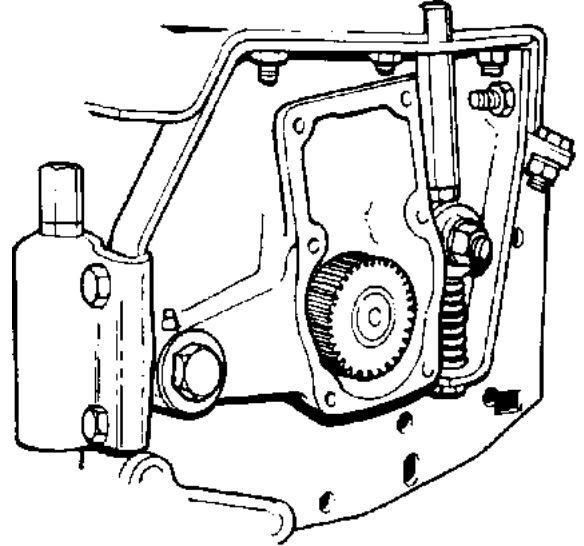


Fig: 6.1

FOLLOW THE ILLUSTRATED INSTRUCTIONS IN THE QUICK START GUIDE AT THE END OF THIS MANUAL

6.1.2 *Press F1 button to progress from the welcome screen*

FOLLOW THE SCREEN PROMPTS

6.1.3 *Press F1 button to select automatic mode* – display advances to next screen

6.1.4 Screen prompts to:

Ensure traverse is not engaged

To mount mower

To engage clamp

6.1.5 Unscrew the traverse engagement screw until it is released from the traverse chain so that fork/grindstone can be traversed manually along the mainshaft.

6. In-frame Grinding *(Continued)*

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.

6.3. Clamping

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 pressing the **F8** key on the operator display panel (**F9** undoes the clamp) on the operator control panel downwards. The operator should release the key 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. 6.3.1.)

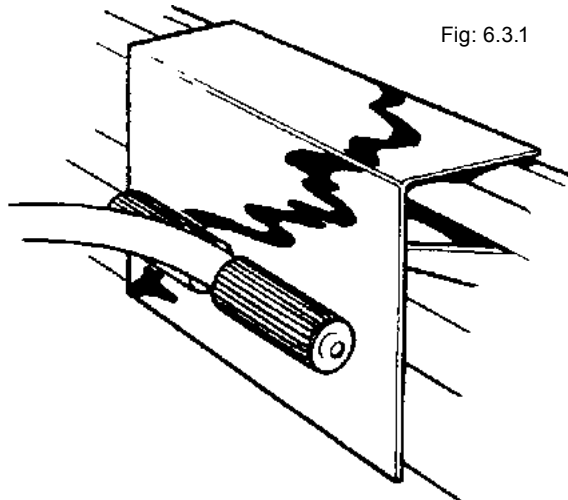


Fig: 6.3.1

6. In-frame Grinding (Continued)

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 6.3.2).

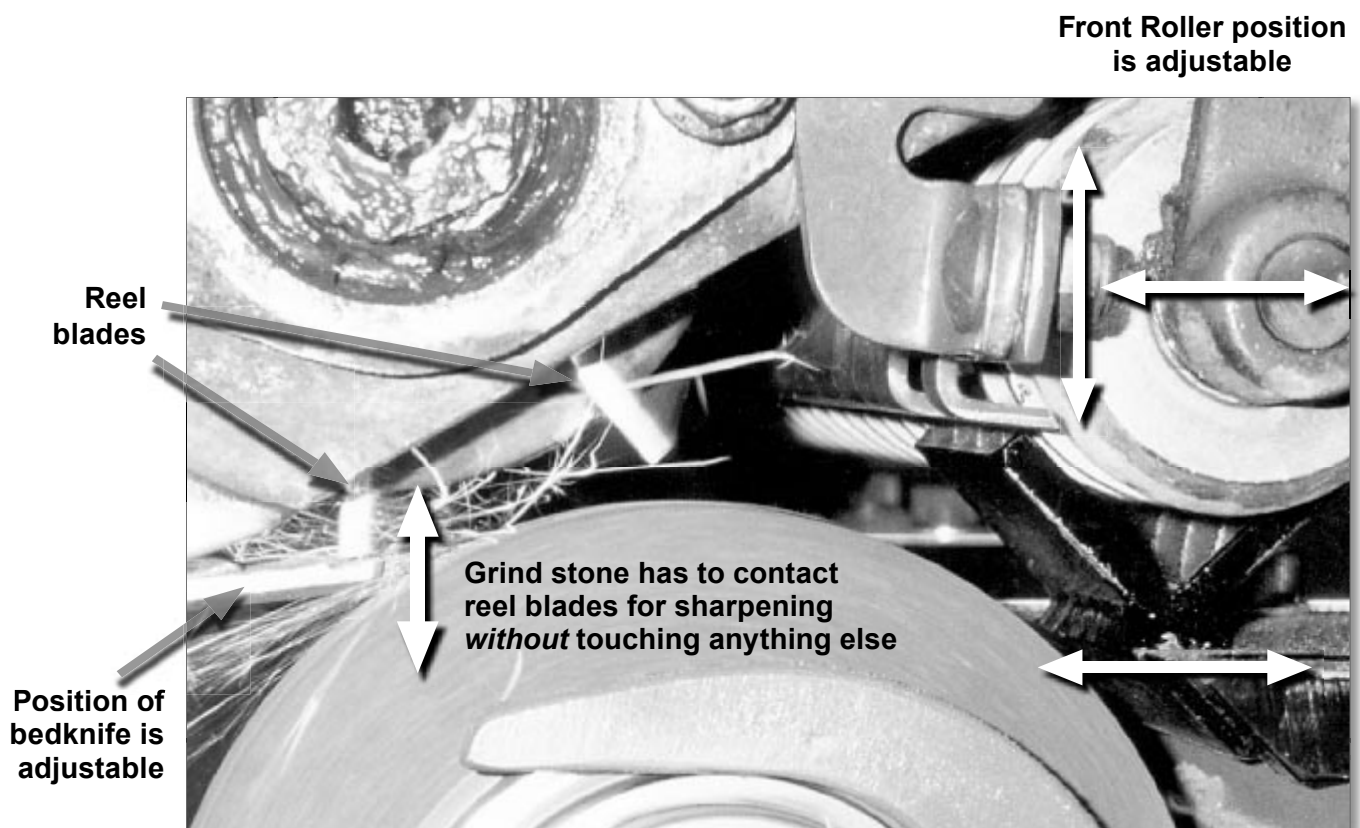


Fig: 6.3.2

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 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.

- 6.4.1 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.

- 6.4.2. 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 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.

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

6. In-frame Grinding *(Continued)*

6.4.4 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.



Press F1 key on operator display – display advances to next screen.

6. In-frame Grinding (*Continued*)

6.5 Actual Grinding

Screen requests size of mower.

6.5.1 **Press the relevant 'F' key to select size of mower:** (F1=Small, F2=medium or F3=large)

Display advances to the next screen.

Screen requests type of grind required.

6.5.2 **Press the relevant 'F' key to select type of grind required:**

- **F1** = "touch up" (mower needs little sharpening, probably part of a regular sharpening regime)
- **F2** = "maintain" (blades need just a little more material removing to get a good edge) or
- **F3** = "rectify" (damaged blades, or a unit rarely ground or heavily back-lapped)

Display advances to the next screen.

6.5.3 Screen shows selected answers (grind cycle) – **Press F1 key if OK**

CLOSE GUARD FIRST – display advances to the next screen

or press F2 if you wish to make an alternative selection-

Display returns to size of mower question.

When F1 is pressed the Grind, Traverse and Reel drive motors start in turn.

Display advances to the next screen.

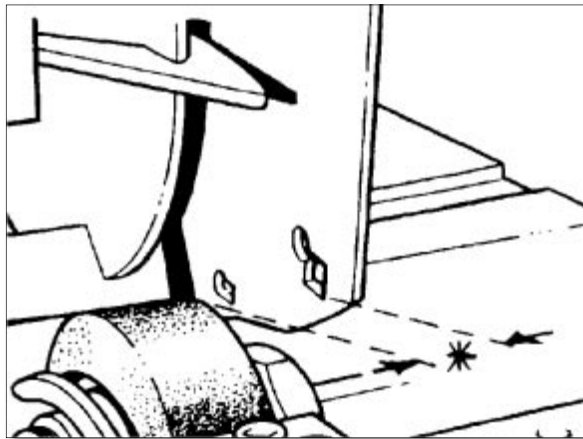
6. In-frame Grinding (*Continued*)

6.5.4 Set up of Traverse

With motors running, the screen prompts: “set grind stone to reel” and “set traverse limit stops”

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. 6.5.4).



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: 6.5.4

NOTE: The reversing bar will move approximately ½” (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.

6. In-frame Grinding (*Continued*)

- 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 traverse knob, moving the grinding wheel along the reel by hand using the traverse engagement screw, wind up the left hand control wheel clockwise until the grinding wheel strikes and sparks gently against the reel.
- 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, raise the shaft until the reel again can be gently rotates 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.
- 6.6.7 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 all along the reel is light, even and parallel.
- 6.6.8 Screw in traverse knob to engage power traverse.

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

6.6.9 ***Press F1 key to start grinding cycle***

Screen reads ***“GRINDING”***

Both handwheels will automatically rotate clockwise to apply a parallel cut to the reel.

After a pre-determined number of traverse passes of the ‘stone along the reel a further infeed will be applied.

According to the program selected a certain number of infeeds / traverse passes will follow until the cycle is completed. Both handwheels will then rotate counter- clockwise, to back the ‘stone away from the reel, and all motors will stop.

Screen reads ***“PROGRAM COMPLETE***

(Programme will ***NOT*** let a reel “spark-out”)

6. In-frame Grinding (*Continued*)

6.6.10 **Press F1 key if reel is satisfactory**

or

Press F2 key (“re-do”) if it needs more grinding, to repeat the whole cycle

or

Press F3 key if reel is almost there but could do with a “touch up” to finish it off.

6.6.11 Pressing F1 – *display* advances to the next screen **“Grinding completed – remove mower from machine”**.

6.6.12 **Press F9 key** to undo clamp and remove mower.

6.6.13 **Press F1 “next mower” key** to return to the starting screen.

6.7 ALTERNATIVES

6.7.1 If “re-do” or “touch up” are selected, (close the guard before selection). After a pause the motors will re-start and the handwheels will return the grindstone to the position where the grind cycle finished. Further feeds/traverse s will follow until the cycle is completed once more,

or

6.7.2 **The F4 “PAUSE” key** is pressed.

If **F4** is pressed during a grind cycle the ‘stone will be backed away from the reel and the motors will be stopped. Display screen will read:

“PAUSED” “Press F4 to resume, F5 to End”

6.7.3 At this time the guard can be opened and the condition of the reel checked.

6.7.4 If the blades are sharp enough the **“F5 Key”** can be pressed. The display will change to **“Grinding completed – remove mower from machine”** screen.

or

6.7.5 If the blades still need some grinding, the **“F4-resume, key”** can be pressed, after closing the guard. After a pause the motors will re-start and the handwheels will return the grindstone to the position where the grind cycle was paused. The cycle will continue to its conclusion.

6. In-frame Grinding (*Continued*)

6.8 MANUAL MODE GRINDING

If at screen #2 "**F2 – Manual Mode**" is selected, the Express Dual can be used as with any other machine in the ED series.

The operator display shows the three motor buttons as:

- **F1 – Grind**
- **F2 – Traverse**
- **F3 – Spin (reel)**

In manual mode, pressing one of these F – keys once will start a motor, pressing it a second time will then stop the motor.

Also displayed are two digital, numerical counters, one for each handwheel. Pressing the **F4 – Reset** key will set these counters to zero.

The **clamp** is still operated by the **F8** and **F9 keys** and the **vacuum** can be "toggled" on and off using the **F7 key**

For other screen information see QUICK START GUIDE at the back of this manual.

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.
- 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.

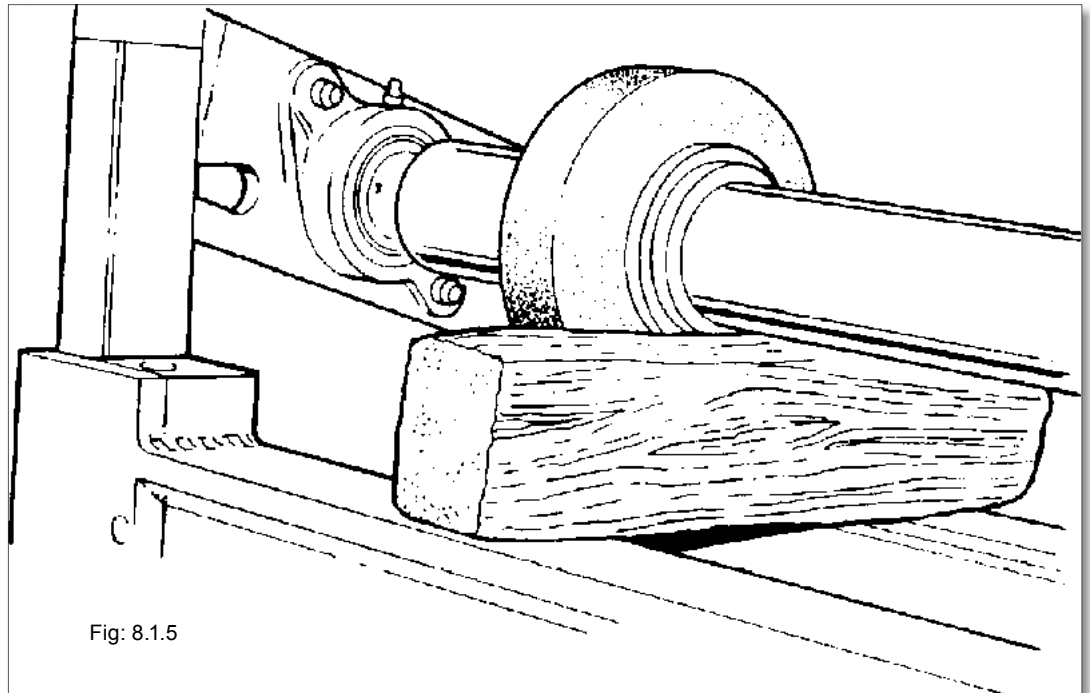
NOTE Before assuming that there is an electrical fault in any of the systems ensure that the mechanical drive assemblies attached to a particular motor are moving freely, and have not got increased resistance due to damage, or the build up of dirt. This can best be done by detaching the motor drive and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



- 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 surfaces 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 grindstone) 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 grindstone 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.

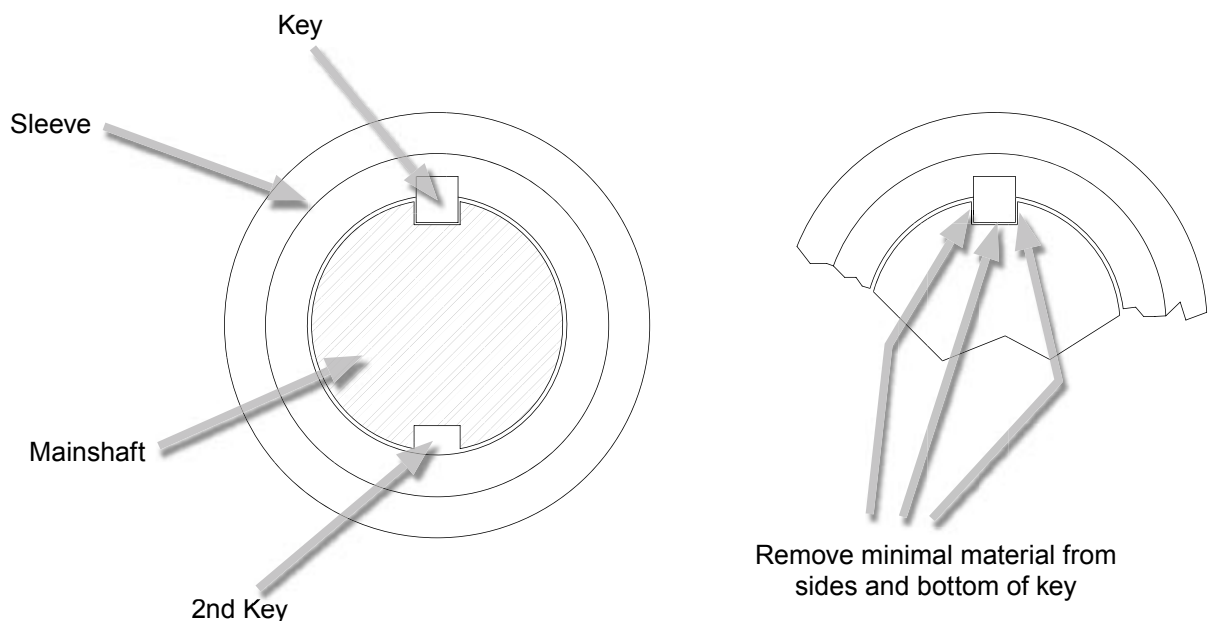
(The key is “peened” (like riveting) into the sleeve NOT welded).

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.



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 contact areas of the fork driver (with the sleeve and nut) with “MOLYCOTE” (Molybdenum 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 annually.

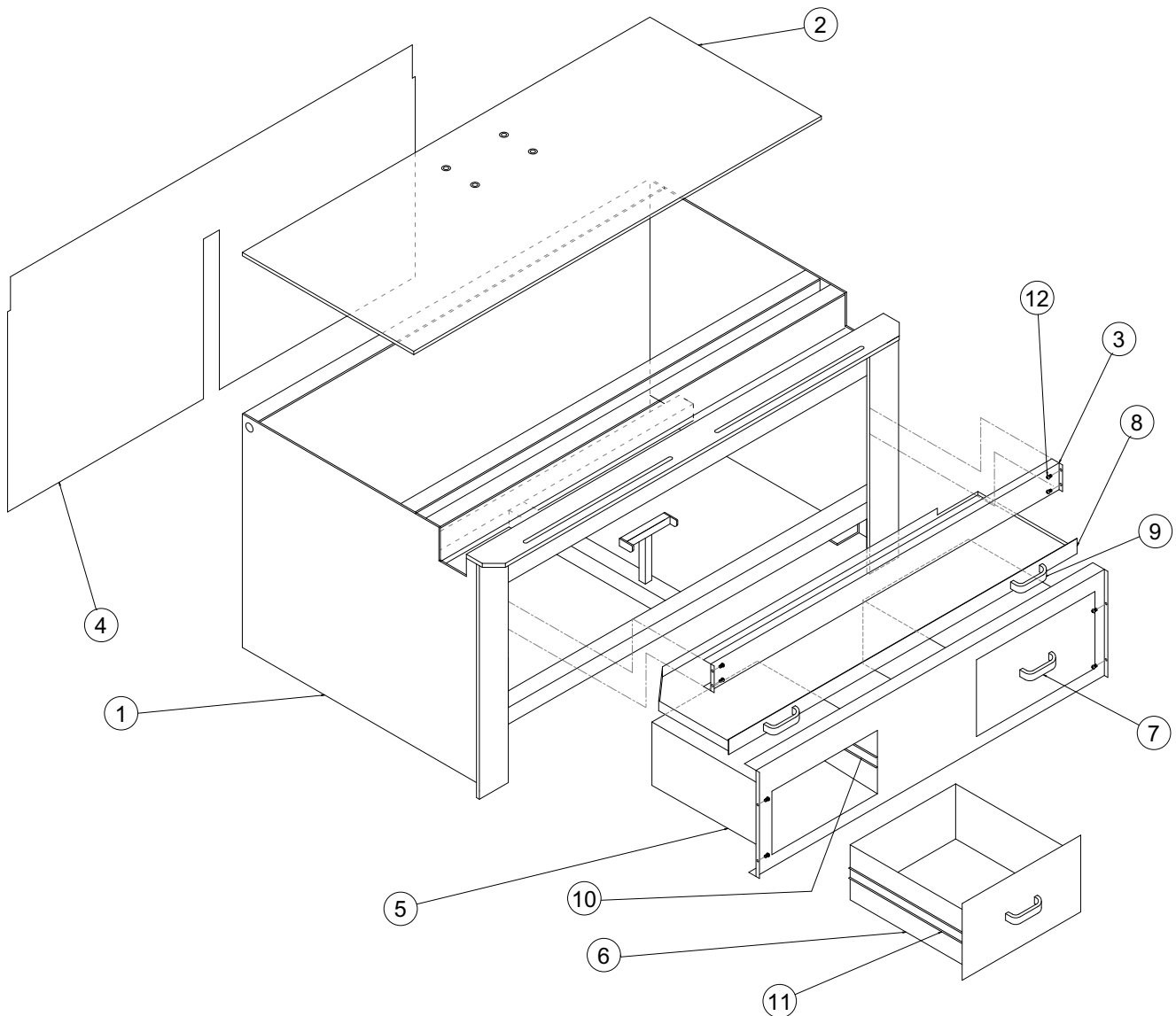
These bearings run warm/hot, that IS OK. Extra grease will not reduce the temperature, more likely the reverse, the seals and subsequently the bearings may fail prematurely.

9. Parts List

	Page
MAIN FRAME _____	27
FEED ADJUSTMENT _____	28
MAINSHAFT MOUNTING AND MAIN MOTOR DRIVE _____	30
TRAVERSE ASSEMBLY _____	32
REEL DRIVE _____	34
CLAMP ASSEMBLY _____	36
MULTI-FIX BRACKET ASSEMBLY _____	37
GUARD _____	39
CONTROL BOX _____	41
ELECTRICAL CABINET _____	42

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 & bottom cap	1	A4041
	Feed Channel R.H. c/w top & bottom cap	1	A4042
2	Feedscrew Cap c/w Bush	4	A4044
3	Feedscrew	2	A9039
4	Locknut	4	A5502
5	Handwheel 150mm dia	2	A6113
6	5/8" Double Coil Spring Washer	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
16	Cross Helical Gearbox 1:3	2	A6007
17	Feed Layshaft	2	A9069
18	Electromagnetic Clutch 24v	2	A8057
19	Feed Motor 24v	2	A6018

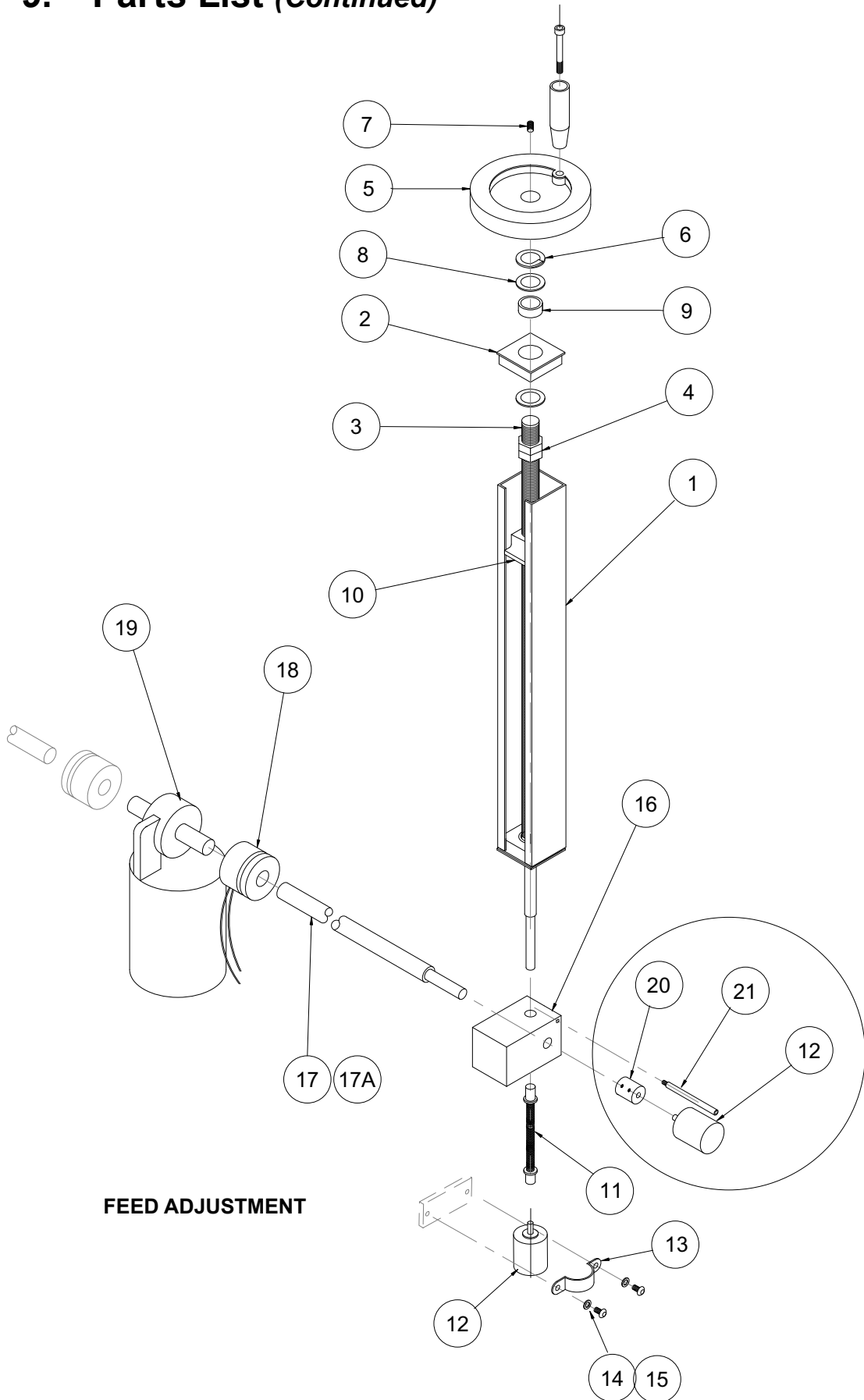
Alternative Encoder Mounting

12	Encoder	2	A8074
17A	Feed Layshaft for		A9069
20	Encoder Layshaft Coupling	2	A9284
21	Encoder Support Stud	2	A9285

N.B.

Item 6 is replaced by a die spring of known compression from machine no. 13392.

9. Parts List (Continued)

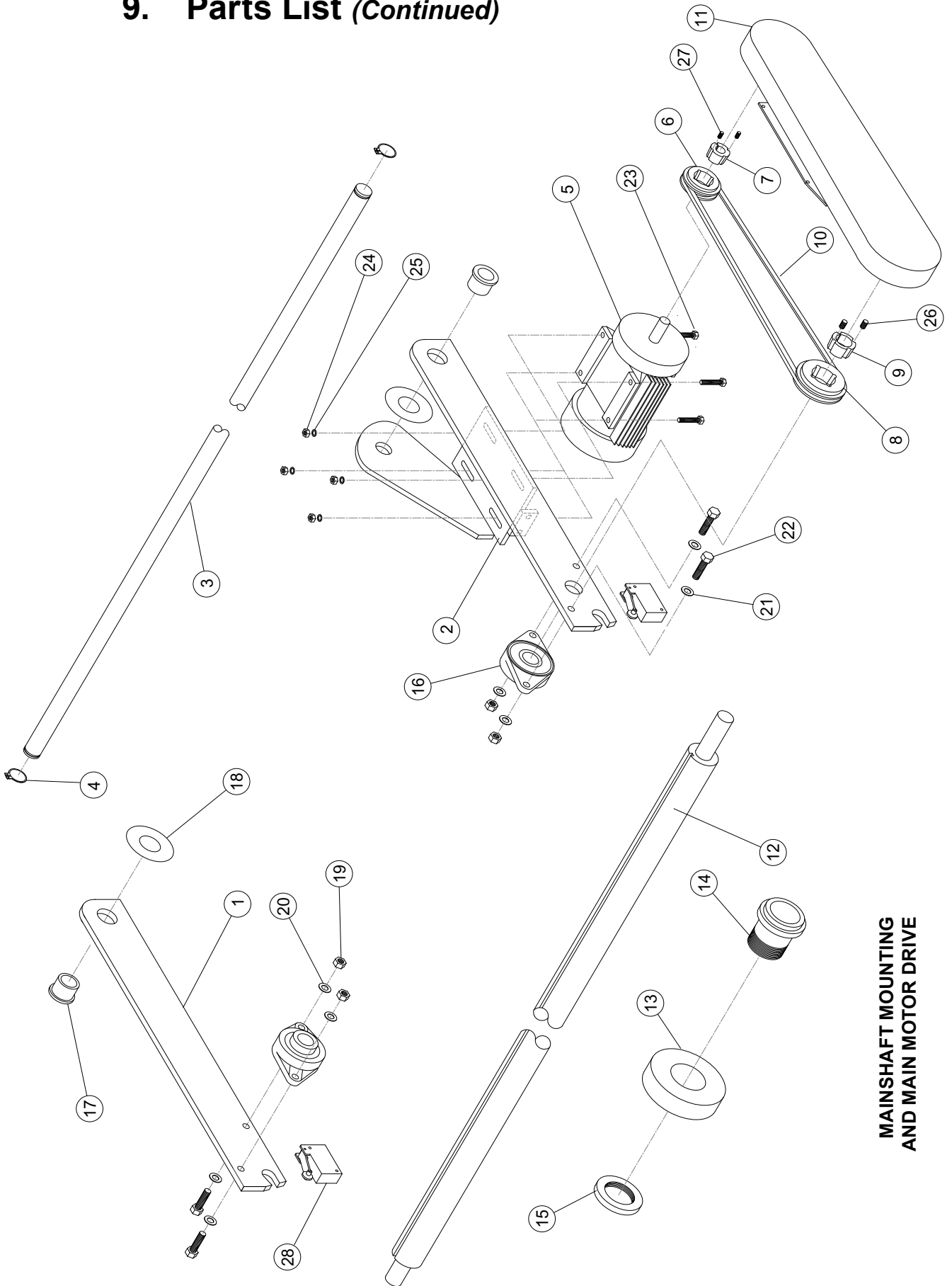


FEED ADJUSTMENT

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 1 ¼"	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 & Nut assembly	1	A9506
16	Mainshaft Bearing	1	A7721
17	Oilite Bush 1 ¼" 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
28	Limit Switch	2	A8842

9. Parts List (Continued)

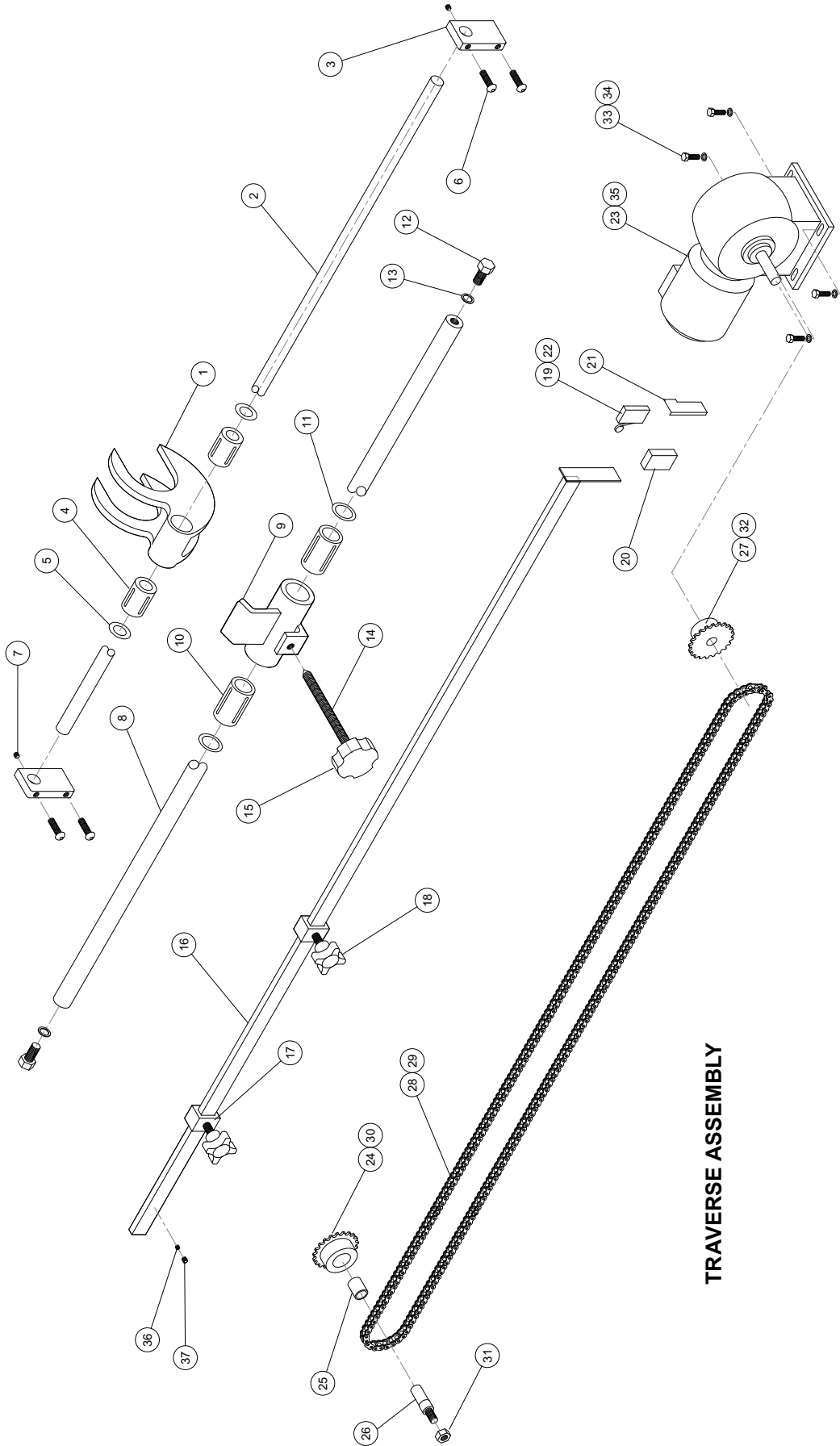


**MAINSHAFT MOUNTING
AND MAIN MOTOR DRIVE**

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 3/4"	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 1/2"	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 1/4" Whit x 1/4"	1	A5101

9. Parts List (Continued)

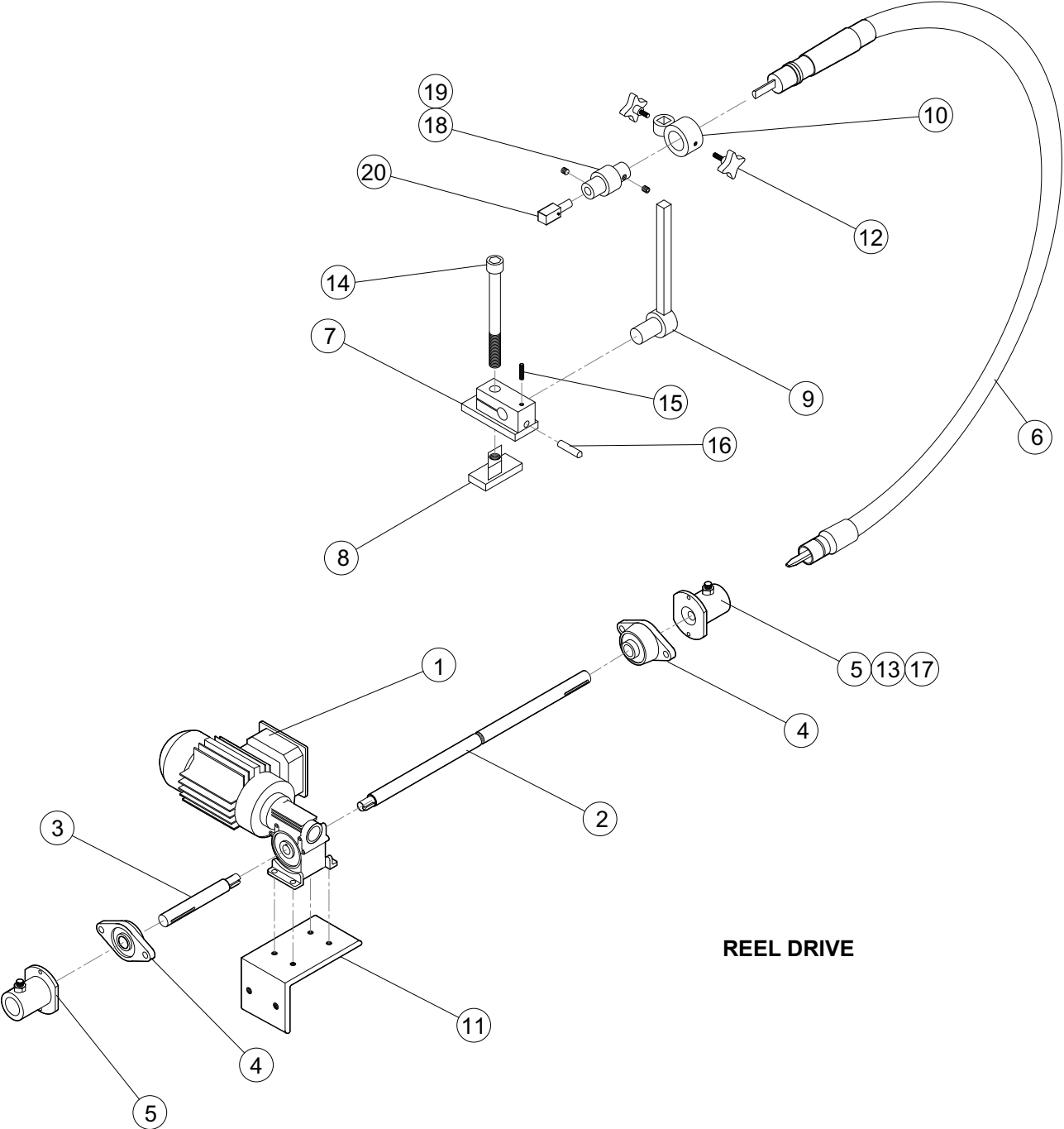


TRAVERSE ASSEMBLY

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

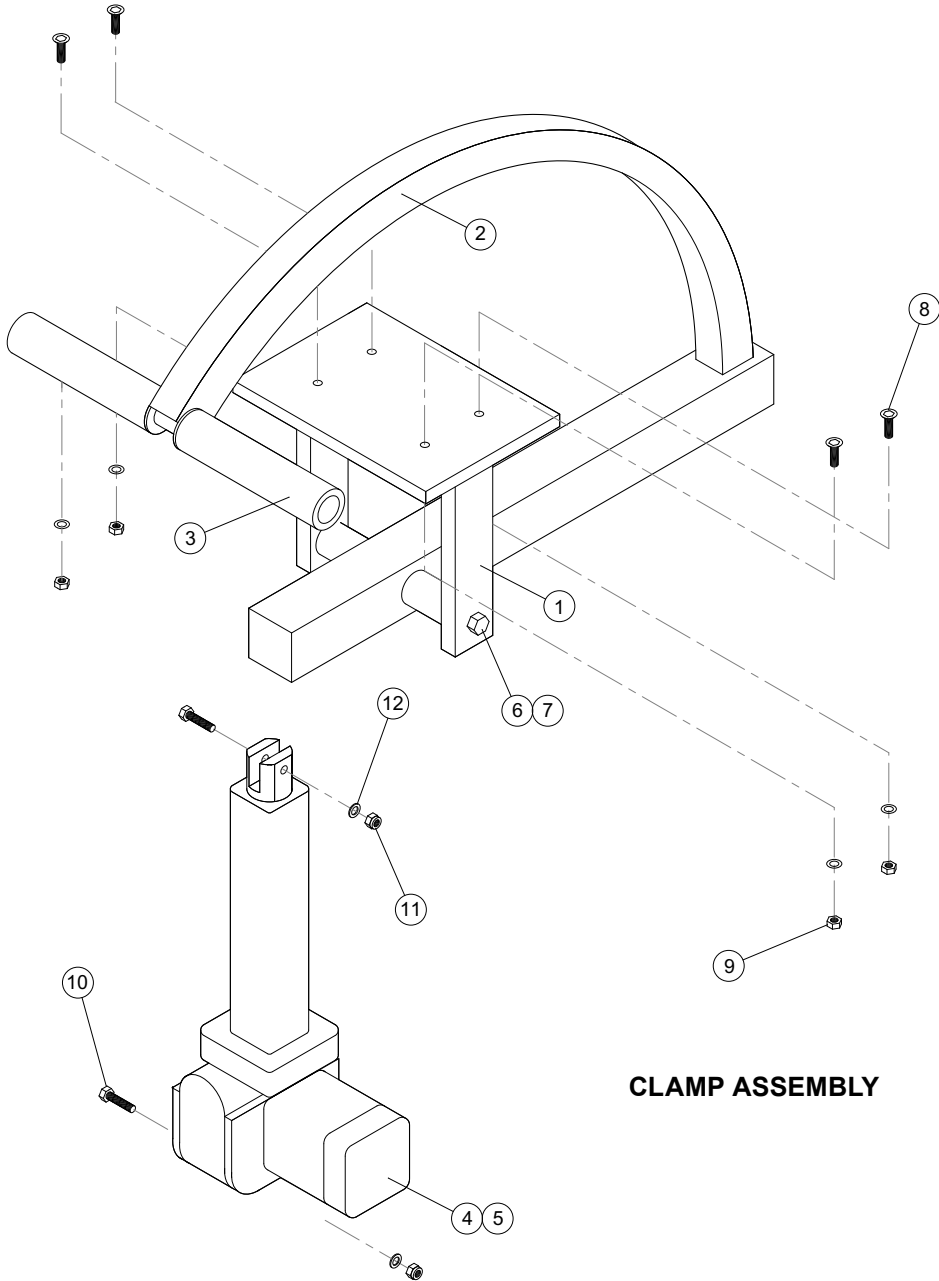
9. Parts List (Continued)



REEL DRIVE

9. Parts List (Continued)

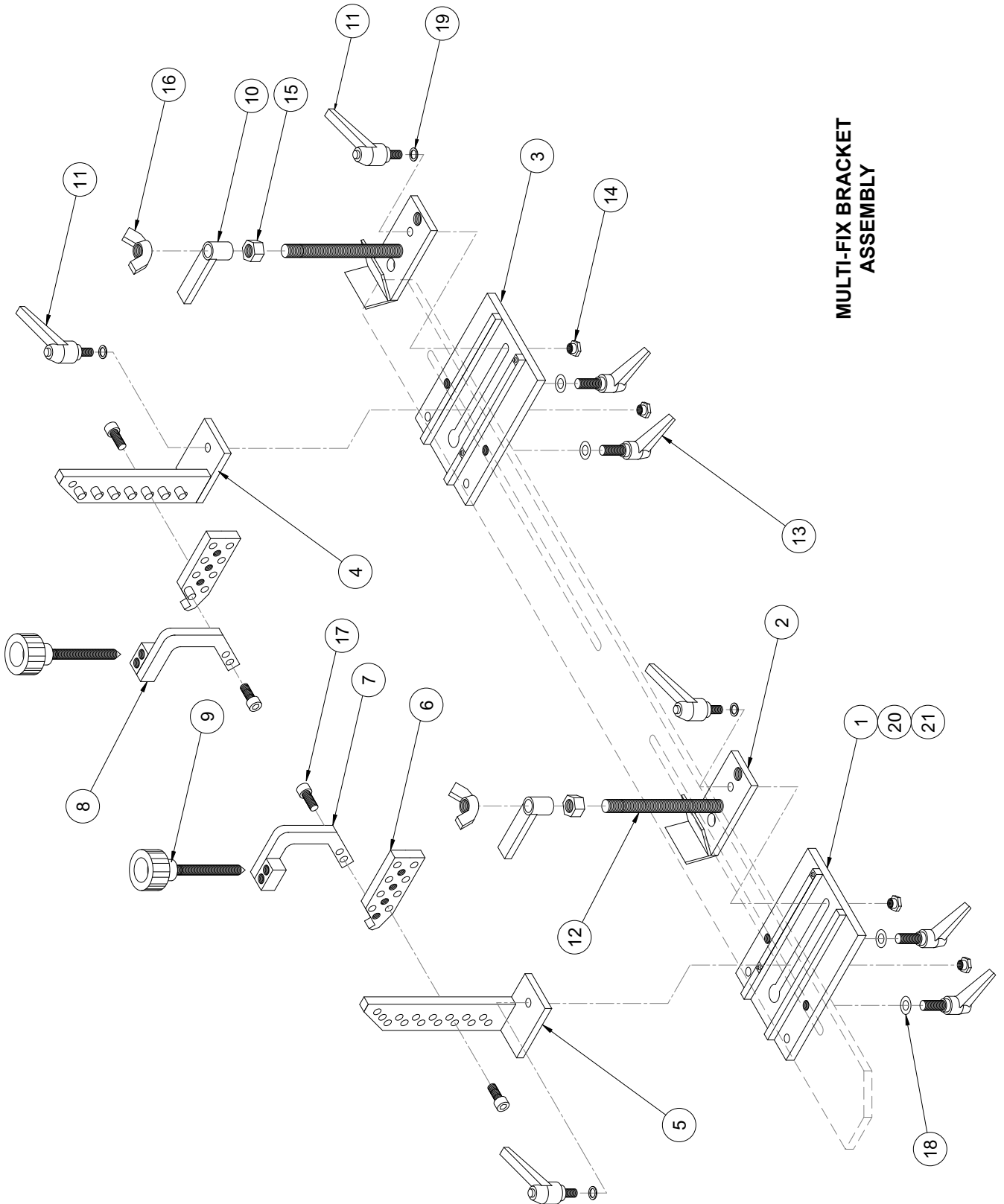
Ref #	Name of Part	Qty.	Part #
CLAMP ASSEMBLY			
1	Radius Pressure Arm Bracket.....	1	A4101
2	Radius Pressure Arm	1	A4100
3	Pressure Bar Rubber.....	2	A6761
4	Linear Actuator	1	A6013
5	Plug 4 Pin	1	A8121
6	Hex Head Bolt M16 x 170.....	1	A5749
7	Nyloc Nut M16	1	A5524
8	C's'k Socket Screw M10 x 30	4	A5117
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



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)

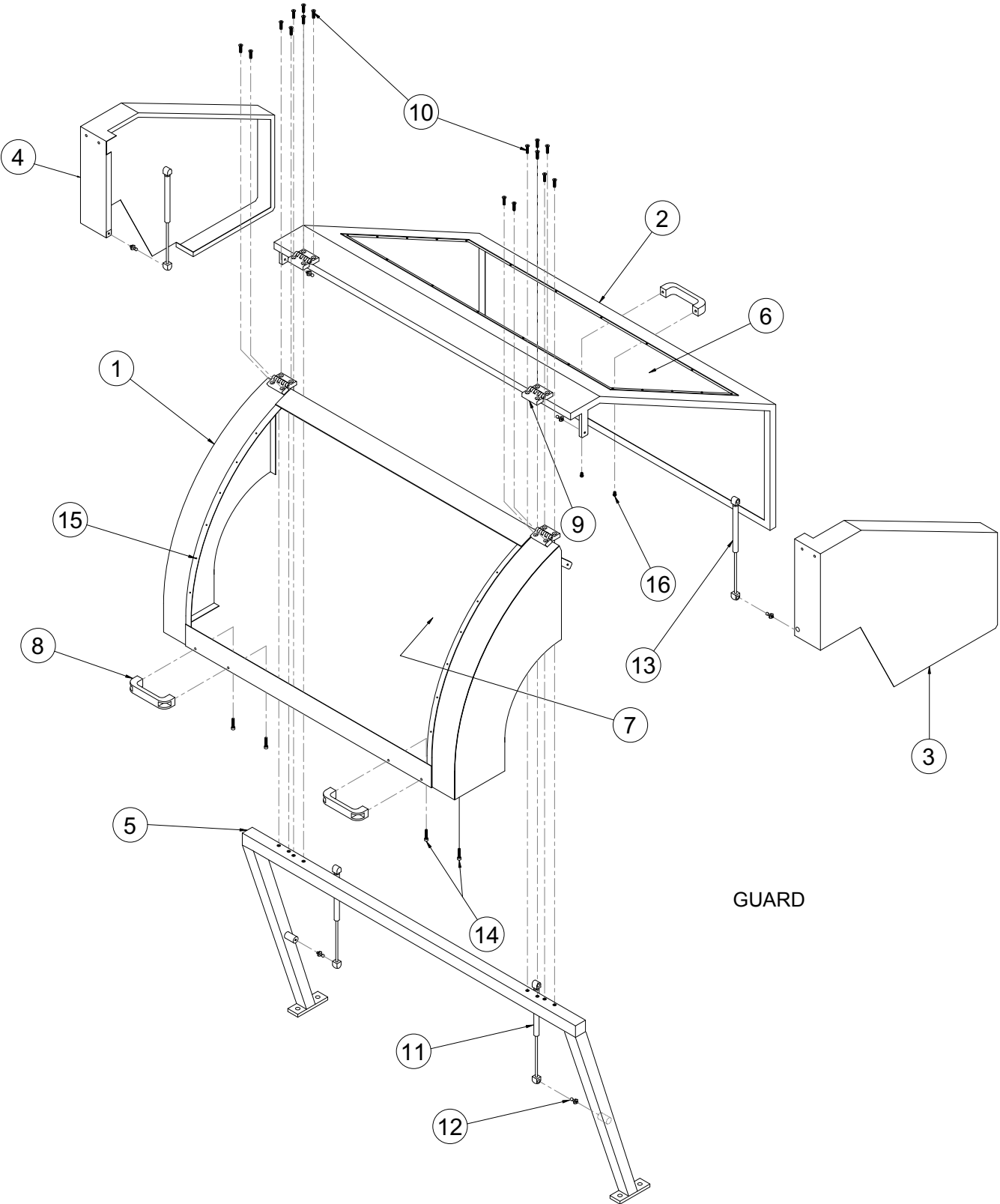


MULTI-FIX BRACKET ASSEMBLY

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	A6747
14	Cap Head Screw M6 x 30	4	A5153
15	Plastic Rivet.....	32	A6758
16	Button Head Screw M6 x 10	2	A5142

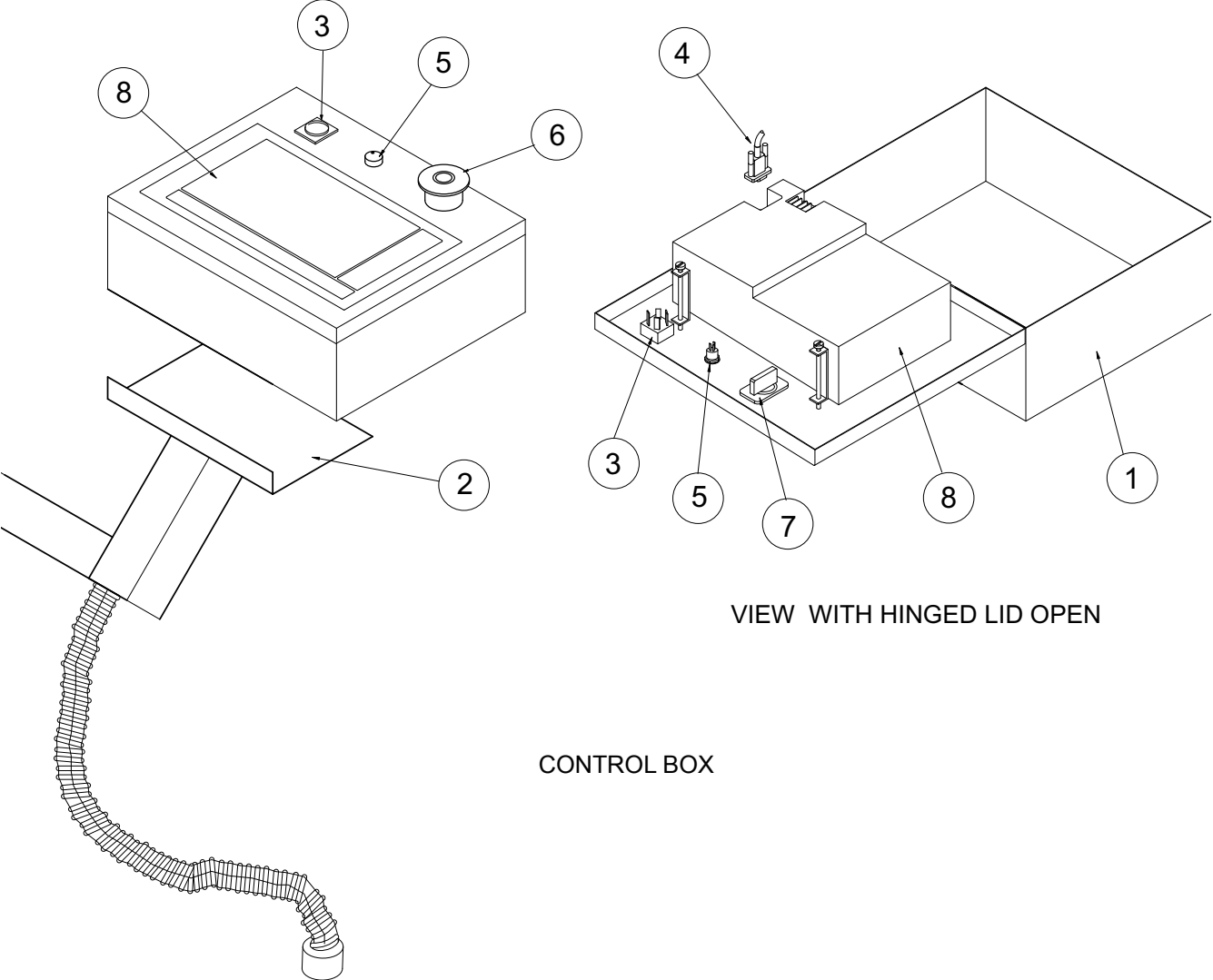
9. Parts List (Continued)



GUARD

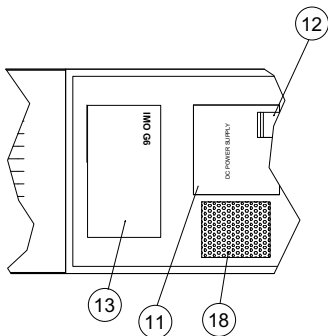
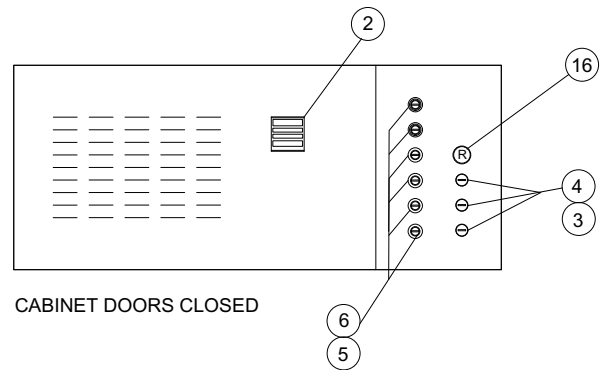
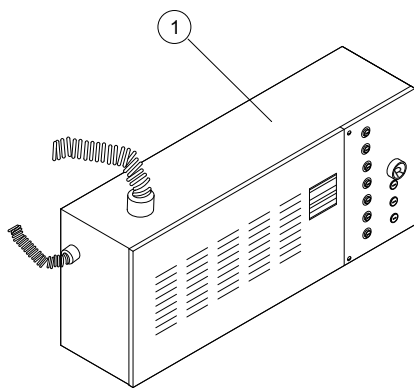
9. Parts List (Continued)

Ref #	Name of Part	Qty.	Part #
CONTROL BOX (DX PMU200)			
1	Control Box + Lid.....	1	A6439
2	Control Box Arm.....	1	A4028
3	On -Off switch (control system).....	1	A8155
4	Comm's Lead, HMI - PLC.....	1	A8794
5	1k Potentiometer	1	A8014
6	Emergency Stop Button	1	A8073
7	B4T02 Contact Block (for the above).....	1	A8358
8	PMU 200 Graphical Operator Panel (HMI).....	1	A8382
	(complete with retaining brackets)		

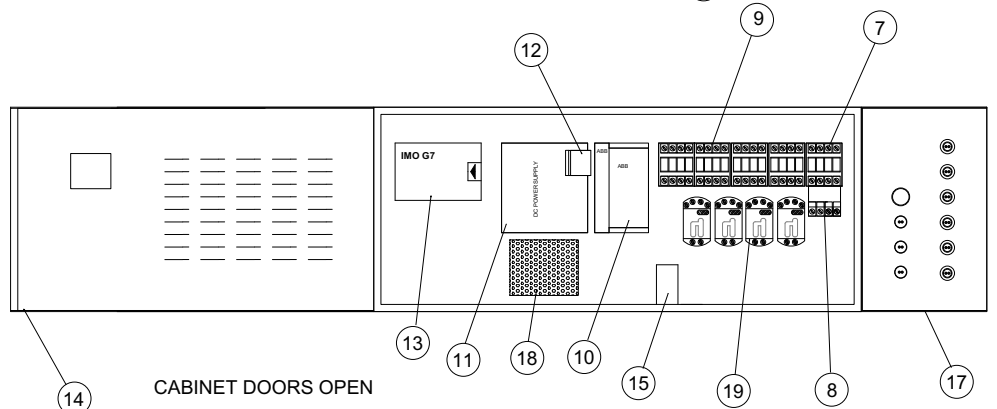


9. Parts List (Continued)

Ref #	Name of Part	Qty.	Part #
ELECTRICAL CABINET			
1	Electrical Cabinet	1	A6325
2	Identification Plate	1	A6612
3	Fuse Holder	3	A8081
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	1	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 (30 I / O).....	1	A8421
	G6 PLC	1	A8200
14	Door.....	1	A6336
15	Traverse Motor Capacitor 3uf.....	1	A8148
16	Reset Button.....	1	A8130
17	Fuse Door	1	A6329
18	Regulated 24v Power Supply	1	A8774
19	Relay 24v DC	4	A8380



(with G6 PLC- PART VIEW)



(with G7 PLC)

QUICK START GUIDE – 1

Connect grinder to 220/240v a.c. mains supply.

The backlit control panel screen (HMI) should light up and display the first screen. If not, switch on the on-off/reset switch on the operator control (HMI) box.

• Screen 1

“Welcome” screen

- Press **F1** button
(as per screen prompt)



• Screen 2

“Manual” or “Auto”

- Press **F1** to select Automatic operation
OR
- Press **F2** to select Manual operation



NOTE: Once a mode has been selected, the unit will remain in that mode, Manual or Automatic for all subsequent operations.

To change mode:

- Switch off the on-off/reset switch on the operator control (HMI) box, to reset control system (HMI screen goes blank).
- Wait 30 seconds – 1 minute before turning switch back on again.
- Select alternative mode of operation.

QUICK START GUIDE – 2

AUTO MODE

• Screen 3

“Mount mower”

- Place mower on m/c table.
- Engage clamp - press **F8** button to clamp (**F9** to unclamp).
- Undo traverse engagement screw (**VERY IMPORTANT**).
- Press **F1** to continue.



• Screen 4

“Define size of mower”

- Press button to select size of cutting unit:
- picture size represents unit size.
- **F1** = smaller units (or Greens)
- **F2** = medium sized units (or Tees / Light Fairway)
- **F3** = large units (or Fairway)
- Selection proceeds to next screen.



• Screen 5

“Choose rate of grind”

- Press button to select grind required:
- **F1** = Touch-up grind, quickest, to restore sharpness on a well maintained but “dulled” unit.
- **F2** = Maintain grind, more work required to restore the edge.
- **F3** = Heavy grind, restoration of a damaged blade.
- Selection proceeds to next screen.



QUICK START GUIDE – 3

AUTO MODE (Continued)

• Screen 6

“Confirmation of selected cycle”

- Screen displays mower size and degree of grind selected.
- **F2** = return to screen 3 to re-select cycle.
- **F1** = confirm selection to proceed to next stage.

NOTE: Reel (spin), grindstone and traverse motors will now start.



• Screen 7

Set “Ready to grind” (motors are running)

- Set grind-stone to reel, ‘stone is moved, by manual adjustment of the feed handwheels, so that it touches and gently sparks at both ends of the reel. Using the (still loosened) feed engagement screw, manually traverse the ‘stone along the length of the reel ensuring even contact all the way across.
- Set traverse / reversing stops so that the leading edge of the grindstone passes the end of the reel but does not contact any part of the mower frame. The ‘stone should NOT completely pass the end of the reel.
- Engage the traverse screw. Screw in the knob so that the stone is automatically traversing the length of the reel.
- Press **F1** to continue.



QUICK START GUIDE – 4

AUTO MODE (Continued)

- **Screen 8**

“Running programme”

- Grinding cycle commences. Images of reel and grind stone blink on screen.
- Both handwheels move together to apply a parallel cut to the reel (Amount according to cycle selected).
- After several traverse passes of 'stone across the reel a further feed of cut is applied.
- Several feeds / traverses may be applied according to the cycle selected.
- After the final feed extra traverse passes will be made to ensure a good finish then:
- Both handwheels reverse, grindstone moves away from reel.
- All motors stop.
- Next screen appears.
- **To interrupt a grind cycle** (eg: to check if reel condition before completion of a grind cycle) Press **F4** to “**PAUSE**” the cycle.
- Both handwheels reverse, grindstone moves away from reel.
- All motors stop.



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AUTO MODE (Continued)

• Screen 9

“Programme Paused”

- Check condition of reel
- Press **F4** to restart machine, “resume” and complete cycle. Motors will re-start, handwheels will feed grind stone to position where cycle was interrupted and cycle will continue as before until handwheels back off and motors stop.
- Press **F5** to “End” cycle. Screen 10 appears.



• Screen 10

“Programme completed”

- Check condition of reel / result of grind.
DO NOT ADJUST FEED HANDWHEELS.
- **F1** = Finished; Select if reel is finished OK.
Progress to Next Screen.
- **F2** = Re-Do; select if you think blades still require some work, and re run complete cycle.
- **F3** = “Touch up”; select if blades are “not quite there” and require a light finishing grind.
- If F2 / F3 are selected, machine motors will re-start, handwheels will feed grind stone to position where previous cycle finished and next cycle will commence and proceed as before until handwheels back off and motors stop. **Screens 8 and 10** will appear accordingly.



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AUTO MODE (Continued)

• Screen 11

“Grinding Completed”

- Press **F9** to undo clamp and remove mower from machine.
- Press **F1** to return to welcome screen ready for next mower.



• Screen 12

“Programme completed”

- Check condition of reel / result of grind.
DO NOT ADJUST FEED HANDWHEELS.
- **F1** = Finished; Select if reel is finished OK.
Progress to Next Screen.
- **F2** = Re-Do; select if you think blades still require some work, and re run complete cycle.
- **F3** = “Touch up”; select if blades are “not quite there” and require a light finishing grind.
- If **F2** / **F3** are selected, machine motors will re-start, handwheels will feed grind stone to position where previous cycle finished and next cycle will commence and proceed as before until handwheels back off and motors stop. **Screens 8** and **10** will appear accordingly.



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MANUAL MODE

- Left and Right hand position values appear on operator panel.



- Motors can be **started and stopped** by pressing the function keys as directed:

- **F1** = grind stone motor
- **F2** = traverse motor
- **F3** = reel control (spin) motor

- **F4** = RESET Counters



- Express Dual can now be operated as a normal, non-automatic machine.
- Individual motors can be started and stopped using the relevant function keys (The keys “toggle” **on** then **off**).
- All motors can be stopped using the Red, mushroom headed, “E” stop button.
- This will result in an error screen appearing on the operator panel. This is for information only, follow the screen prompts to continue operation (Also see Notes – “Other screens”).
- For general operation notes see main user manual.

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NOTES

FUNCTION KEYS

- **F1 – F5 = selection keys in response to screen prompts**
- **F7 = Vacuum on / off toggle** (press once = **on**; press again = **off**.)
- **F9 = Engage clamp - lock down mower**
- **F8 = Disengage / undo clamp**

TROUBLESHOOTING

- If programme cycle should “hang” (nothing happens for a while”) or you are unsure of a machine action, Press Emergency stop then F1 to return to welcome screen. If F1 fails to free up programme, switch off the on-off/reset switch on the operator control (HMI) box, to reset control system (HMI screen goes blank).
- Wait 1 minute before turning switch back on again.

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WARNING SCREENS

“Emergency Stop Actuated”

- Warning message indicates emergency stop button has been depressed.
- Check machine for any potential problems before releasing “E” stop button and re-setting machine by pressing **F1**.



“Main Motor Thermal Overload Activated”

- Warning message when machine is tripped out by the overload relay on the main grind motor.
- Could be low voltage (increased Amperage) or a motor/drive problem.
- Check machine before pressing blue rest button on main electrical control box and re-setting machine by pressing **F1** button.



“Mainshaft has bottomed out”

- Mainshaft has reached lowest limit of travel, (bottomed out against chassis limit switch). Machine stops since further travel would cause m/c control to lose position reference. Could crash program or damage feed drive train.
- Display advises manual raising of shaft by two revolutions of the handwheel on each side.
- Press **F1** to re-set the machine.



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

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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

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