EXPRESS DUAL 4000

ED4000 Automatic Spin Grinder

Machines SN:- 20343 - Onwards

User's Guide & Instruction Manual - Issue 01

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.

NOTES

EXPRESS DUAL

ED4000 Precision Reel/Cylinder Grinder

You are now the owner/operator of a Bernhard's Express Dual 4000 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**

Contents

Please quote this serial number on all correspondence:

Serial #:

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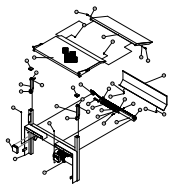
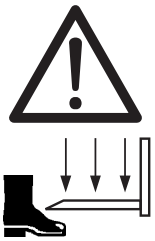
Email: info@bernhard.co.uk
USA Toll Free **1-888 GRIND IT** (1-888 474 6348)

1. Identification of Pictograms

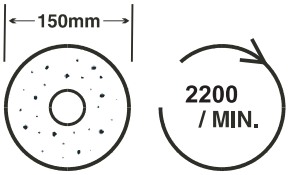


MAXIMUM LIFT PLATFORM LOAD - 250 KG (550 LBS)

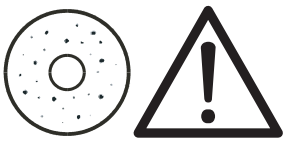


**BEWARE!
TRAPPING FEET OR OTHER OBJECTS WHEN LOWERING LIFT PLATFORM**

BEWARE! HIGH VOLTAGE



**MAXIMUM GRINDSTONE DIAMETER 150mm
MAXIMUM SPEED 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

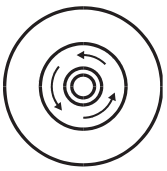
**BEWARE!
MOVING COMPONENTS KEEP HANDS AND OTHER OBJECTS CLEAR**

WEAR EYE, EAR AND BREATHING PROTECTION

TRAVERSE START CONTROL

GRINDSTONE START CONTROL

REEL START CONTROL



STOP CONTROL

ENGAGE / DISENGAGE (INCREASE / REDUCE) GRINDSTONE FEED

Position Value Display

Balance Indicator

Reset Display

Traverse On/Off

Reel (Spin) Drive On/Off

Reel (Spin) Drive Speed Control

Grindstone On/Off

Unclamp

Clamp

Service Switch

Emergency Stop
(Twist to release)

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 2.3).

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.

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).

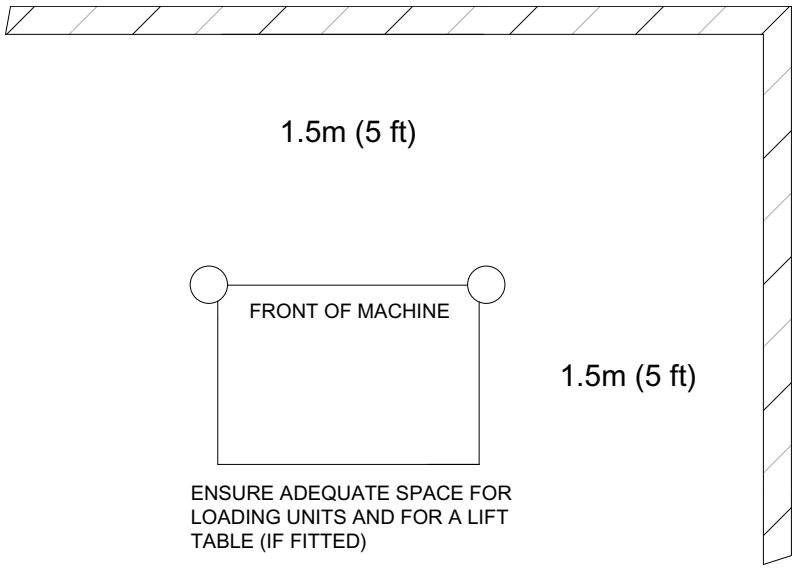


Fig: 3.2

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 .75 kW (1 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).

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 4000 and 4000DX** (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 E-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. Otherwise the individual motor buttons “toggle”. Press to turn on – press again to turn off.

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.

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).

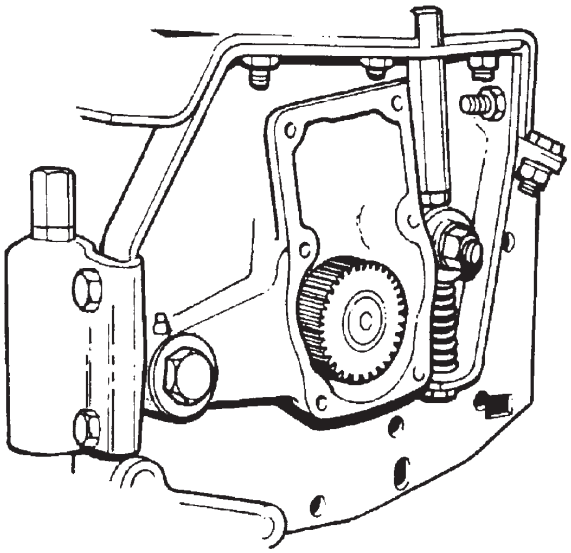


Fig: 6.1

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.

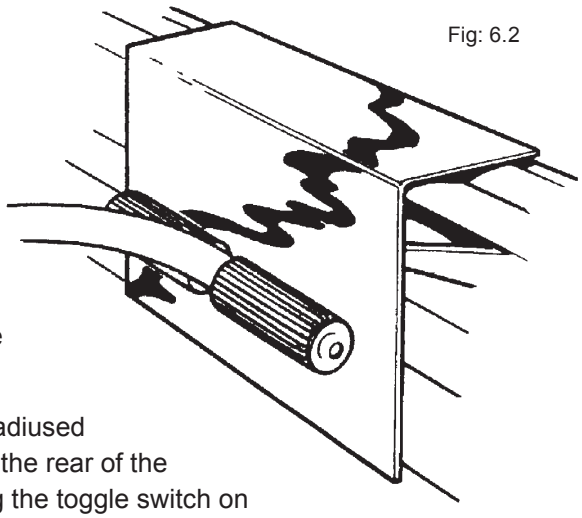


Fig: 6.2

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).

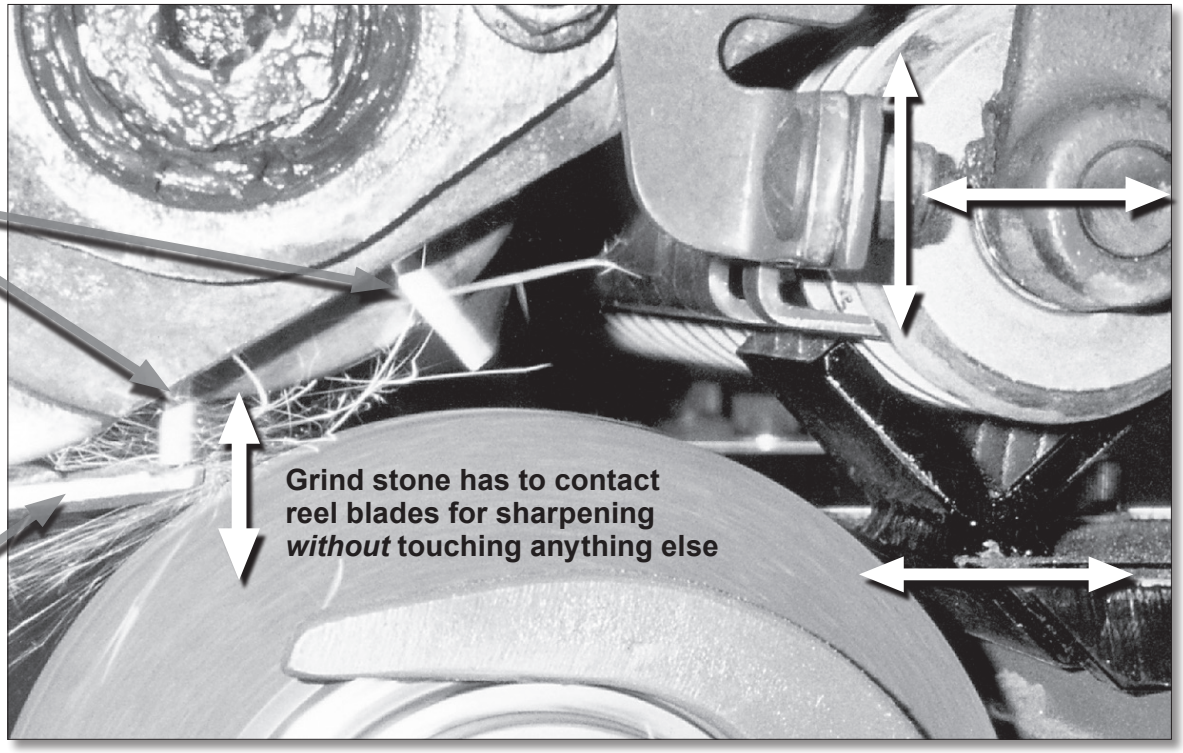


Fig: 6.3

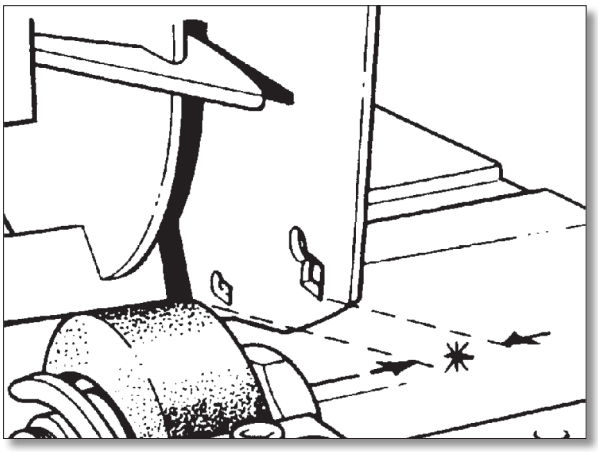
NOTE If the cutting unit has no front roller fitted so that the multifix brackets are used then, once the correct position for any particular unit has been finalised a “set up guide” should be completed and filed for future reference so that the identical multifix brackets positions can be used for all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

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 and 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.

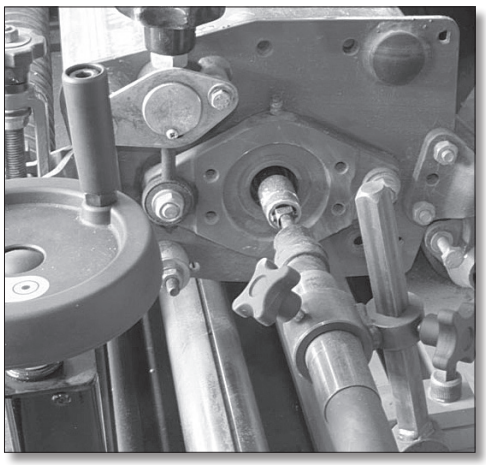
The black lobed hand screw allows the drive head to be moved along the square support shaft to adjust the height of the drive, while the 5/8” hex headed socket screw allows the support shaft to be clamped at any desired angle, and also allows the whole assembly to be moved left or right along the machine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

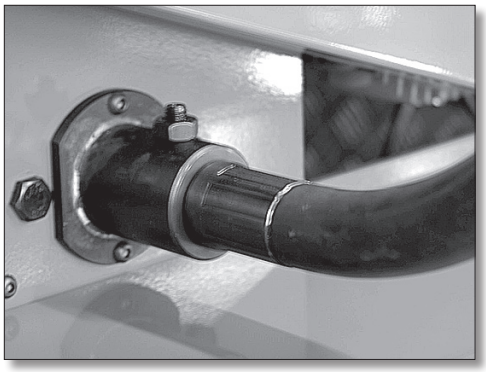
The drive head of the shaft can also be slid through it’s support for further adjustment or final connection/ disconnection of drive.

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 **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 red “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 on Control PCB in main electrical box.

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 – at PWR plug to Control PCB.

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 the start button on the individual motors, the contactors should audibly 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:

Look for an error code on the display on the front of the unit.

Disconnect the power to the machine, wait 2 minutes, then re-connect and try again (to re-set the inverter). If the eroor code remains 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 terminal on the plug marked “MAIN” on the Control PCB. 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.

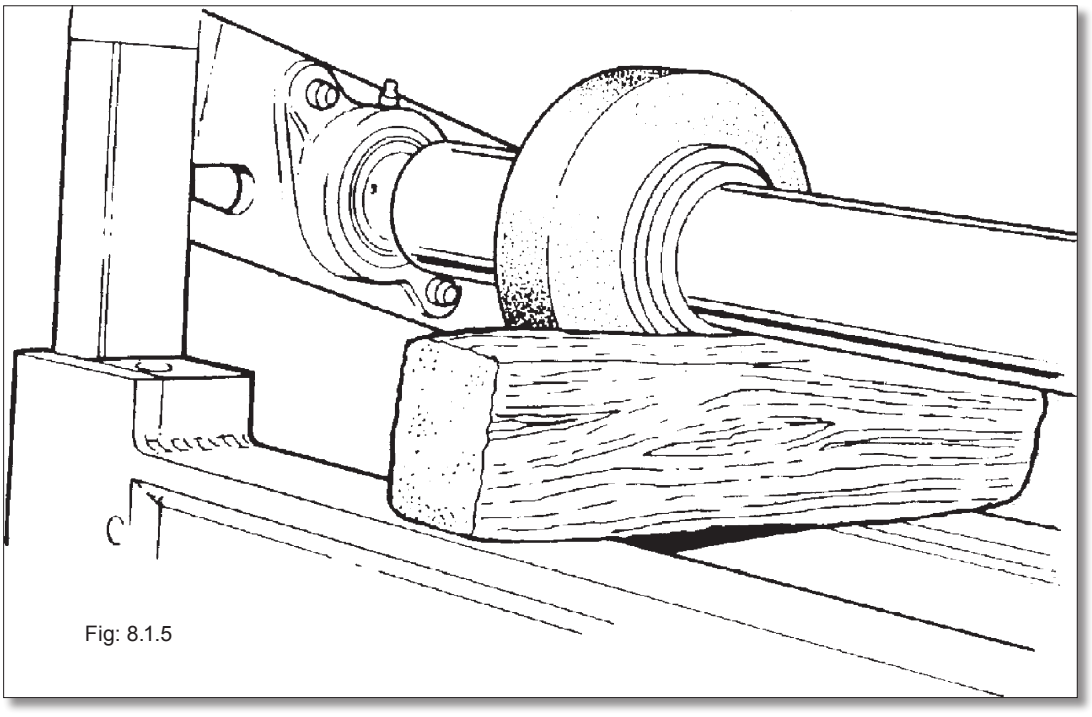


Fig: 8.1.5

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.

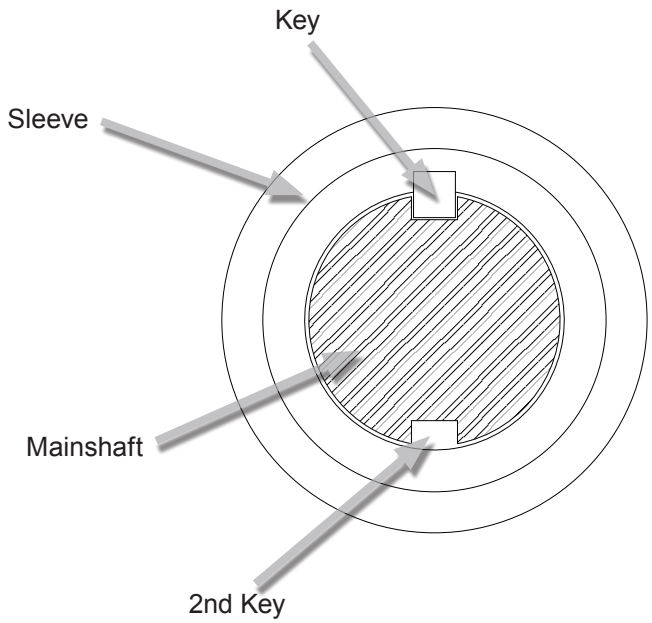
(The key is “peened” (like riveting) into the sleeve NOT welded).

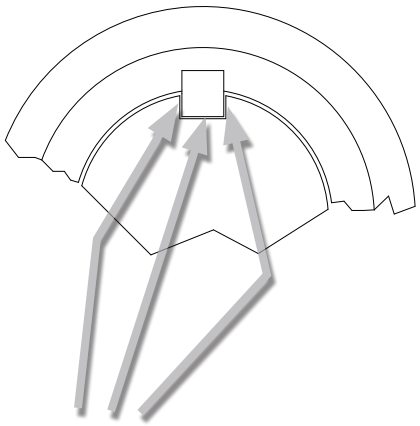
The key needs to be “fitted” to the mainshaft. This may entail filing a small amount of material from both the depth of the key and the sides. Remove only a very small amount of material at a time, then check the fit, until the sleeve and nut assembly slides freely along the length of the mainshaft without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

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 during use.
For extended periods of down-time spray on “bright” areas with Bernhard’s Protective oil – clean off with Bernhard’s Clean and Lube spray or WD40 before use.

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.

Check chain tension

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.

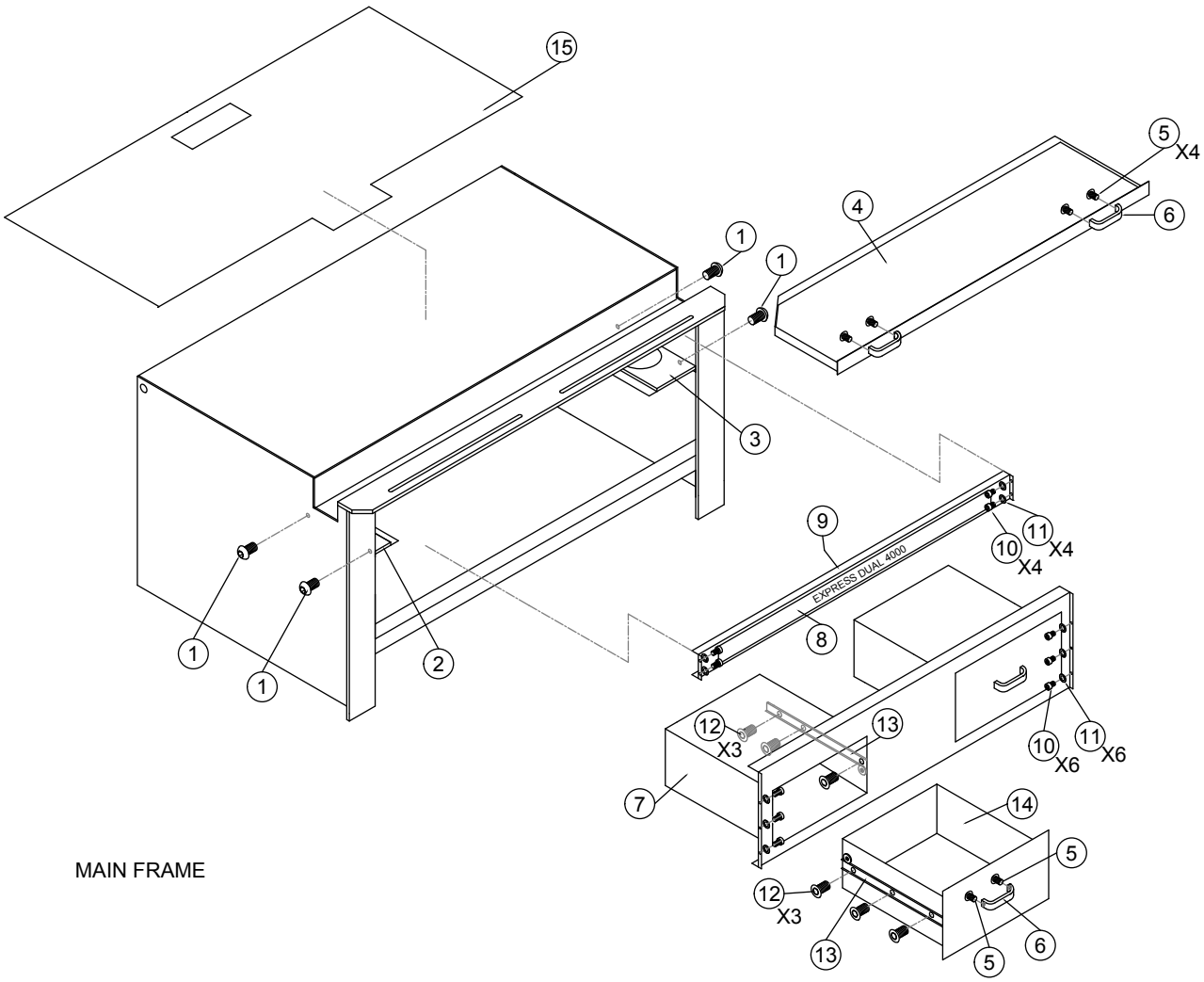
8.2.4 Yearly

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.

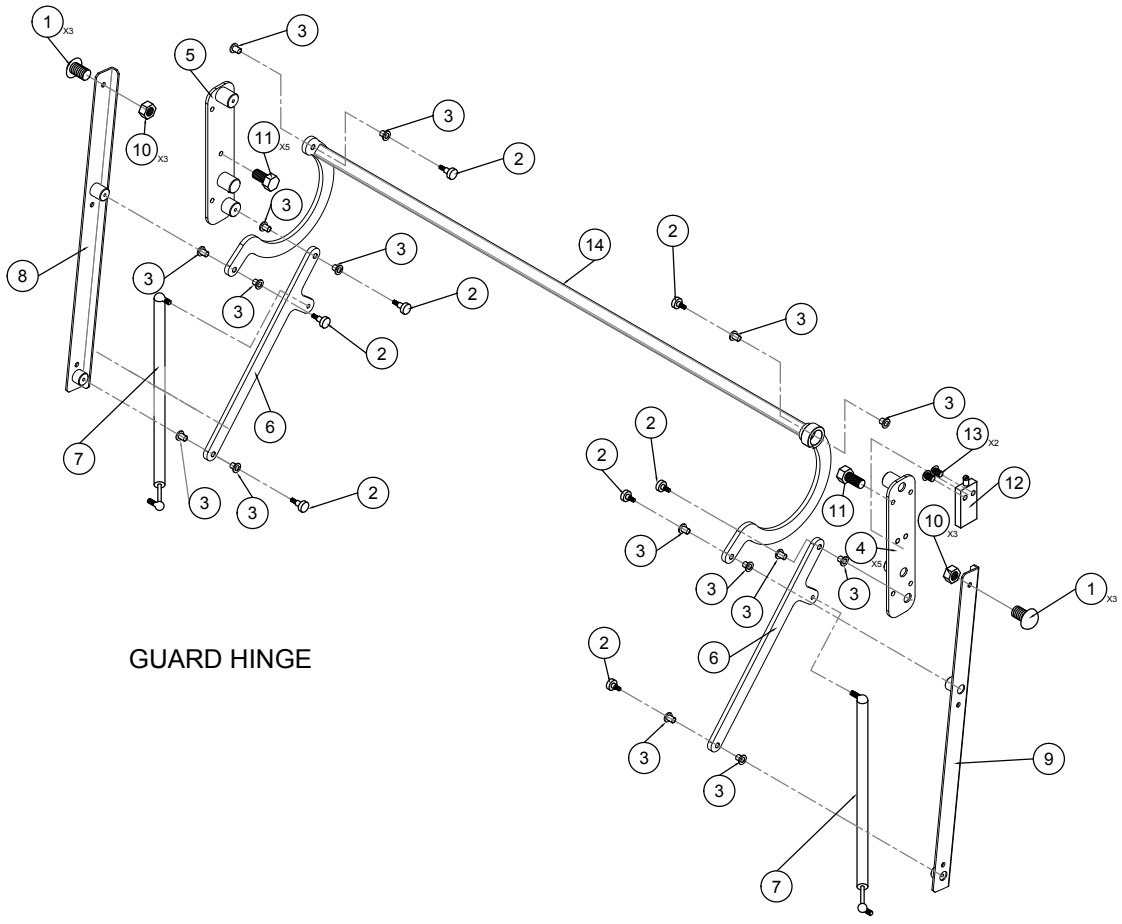
9. Parts List

Part	Part #	Description	Qty
1	05148	M6 X 16 BTN HD SOCKET SCREW	4
2	06324	DUST TRAY RUNNER LH	1
3	06421	DUST TRAY RUNNER RH	1
4	03120	DUST TRAY ED SN:- 16391 - ONWARDS	1
5	05158	M6 X 40 CAP HEAD SOCKET SCREW	4
6	06110	DRAWER HANDLE	4
7	03231	FRONT SKIRT ED SN:- 16391 - ONWARDS	1
8	07013	ED4000 MACHINE LABEL	1
9	03261	UPPER FRONT SKIRT SN:- 16391 - ONWARDS	1
10	05759	M5 X 8 CAP HEAD SOCKET SCREW	10
11	05318	M5 FORM B WASHERS	10
12	05127	M4 X 8 CSK SKT SCREW	24
13	06741	DRAWER RUNNER SET (L & R)	2
14	06321	DRAWER ED4	2
15	03619	TABLE TOP MAT ED4000 ED4000DX ED3000MC	1

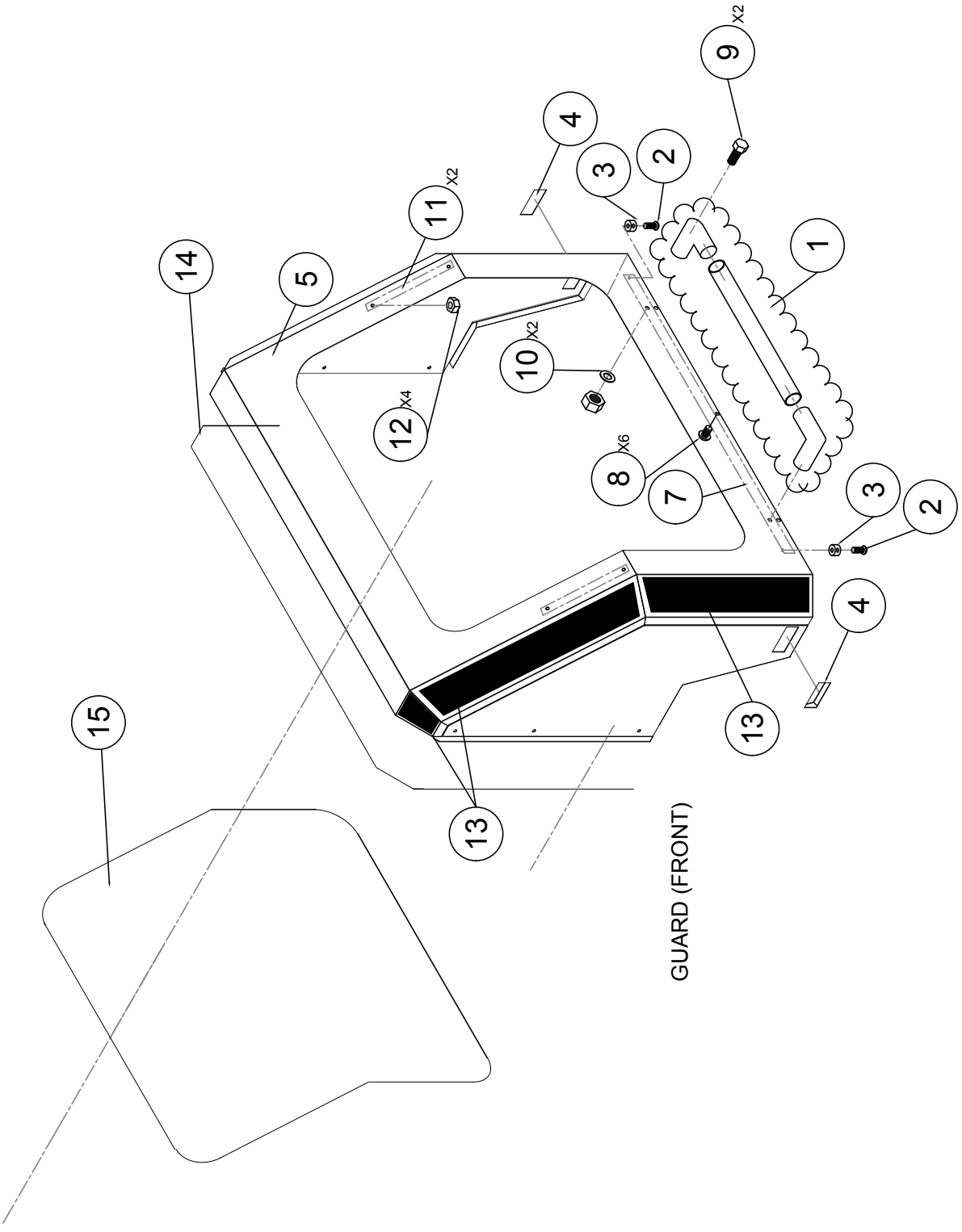


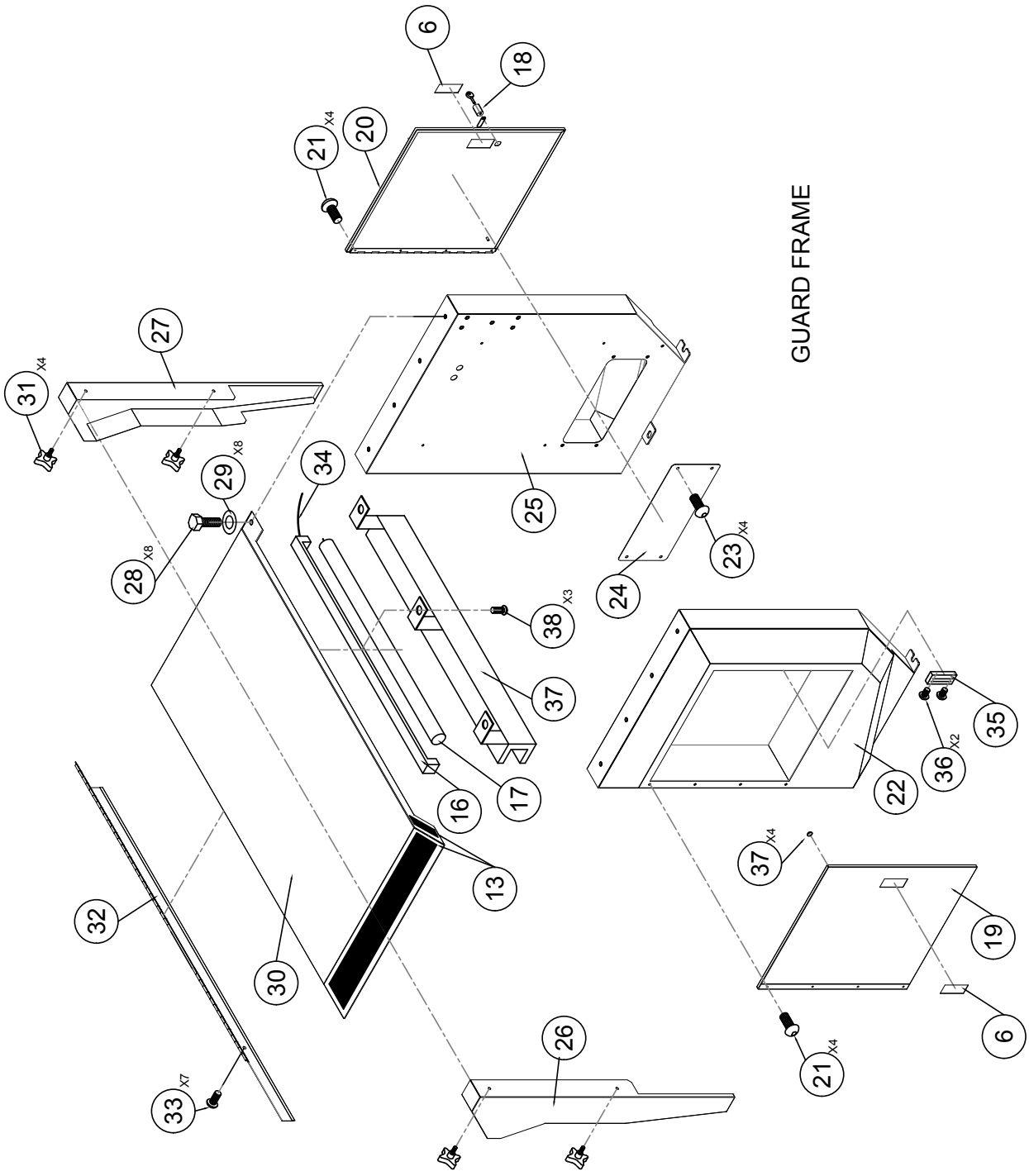
MAIN FRAME

Part	Part #	Description	Qty
1	05183	M8 X 16 BUTTON HEAD SCREW	6
2	05165	M8 X M6 X 12MM SHOULDER SCREW	8
3	03101	Igus Bush	16
4	03548	RIGHT HAND HINGE BRACKET ED4/ED4DX GUARD	1
5	03547	LEFT HAND HINGE BRACKET ED4/ED4DX GUARD	1
6	03552	GUARD STAY LONG ED4/ED4DX GUARD	2
7	06825	GAS STRUT	2
8	03549	LEFT HAND FRONT HINGE ED4/ED4DX GUARD	1
9	03550	RIGHT HAND FRONT HINGE ED4/ED4DX GUARD	1
10	05520	M8 Nylock Nut	6
11	05731	M8 X 16 HEX SET SCREW	10
12	04925	Guard Switch Assy ED4000/ED4000DX	1
13	05412	M4 X 20 PAN HD POZI DRIVE MC SCREW	2
14	03551	GUARD LINK ARM ED4 GUARD	1

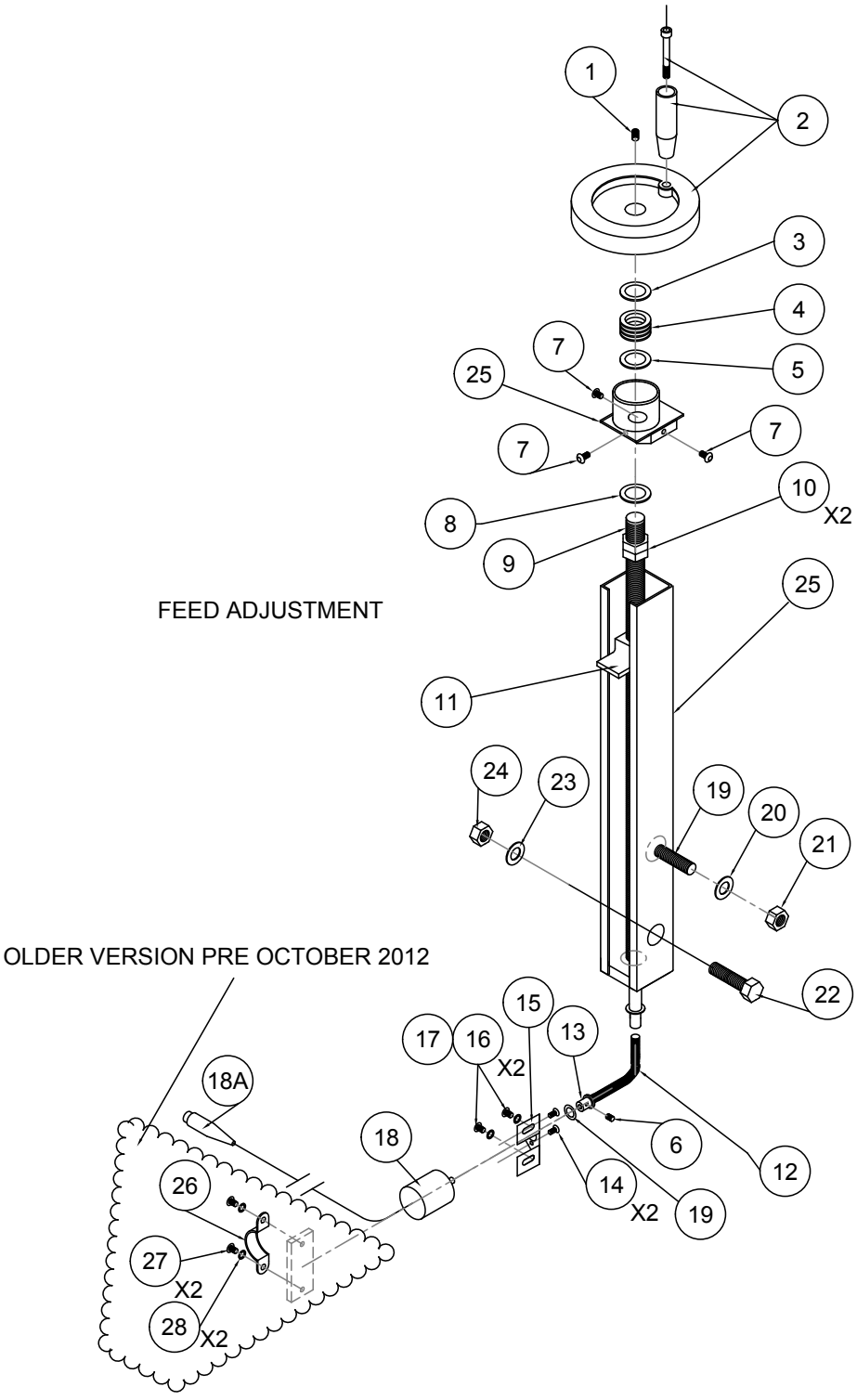


GUARD HINGE

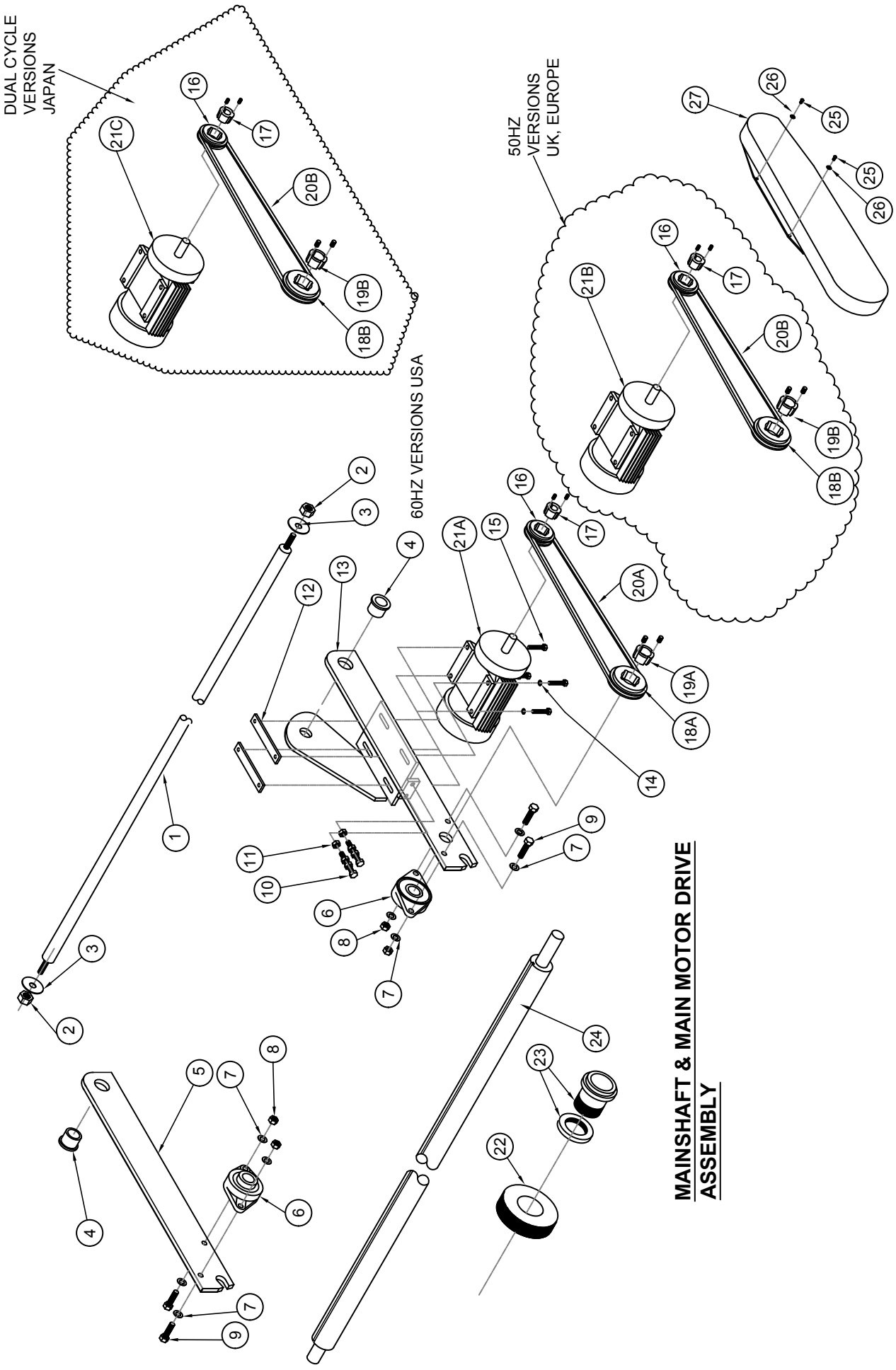




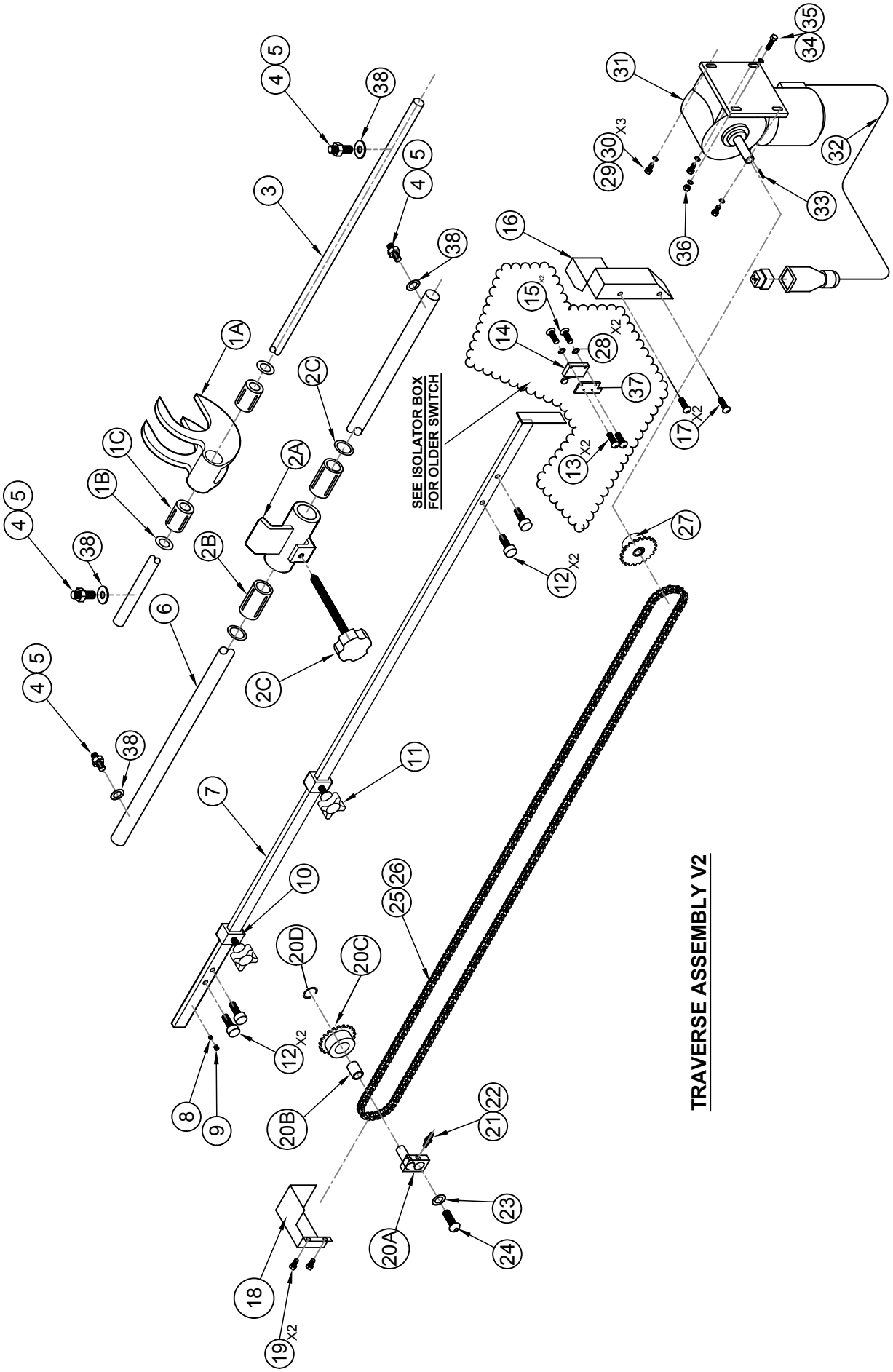
Part	Part #	Description	Qty
1	03286	LARGE DOOR HANDLES FOR ED5 AND ED4	1
2	05125	M4 X 8 BTN HD SKT SCREW	2
3	03632	FRONT STOP FOR ED4000 GUARD	2
4	06197	ROTORMASTER CABINET DOOR HANDLE	2
5	03556	GUARD FRONT FABRICATION ED4	1
6	06197	CABINET DOOR HANDLE	2
7	03557	GUARD LOWER POLY RETAINER ED4	1
8	05145	M6 X 12 BTN HEAD SOCKET SCREW	6
9	05705	10 X 30 CAP HEAD	2
10	05310	M10 FORM B WASHER	2
11	03196	ED/AM4000 GUARD POLYCARB GLAZING BKTS	2
12	05516	M6 NUTS	2
13	03589	ED4000 GUARD (GREY) DECAL SET	1
14	06921	EPDM SEALING STRIP (10M)	3m
15	03560	POLYCARBONATE FOR ED4000 GUARD	1
16	08239	Fluorescent Light	1
17	03729	FLUORESCENT TUBE ONLY ED/AM GUARD	1
18	03568	KEY FOR ELECTRICAL DOOR ED4000	1
19	03567	GUARD LH END DOOR FABRICATION ED4	1
20	03566	GUARD RH END DOOR FABRICATION ED4	1
21	04900	4 X 12 BTN HEAD	8
22	03555	GUARD LH END FABRICATION ED4	1
23	05145	M6 X 12 BTN HEAD SOCKET SCREW	4
24	04905	ED4/ED4DX Cable Access Cover Plate	1
25	03554	GUARD RH END FABRICATION ED4	1
26	03559	GUARD LH REAR INFILL FABRIC. ED4	1
27	03558	GUARD RH REAR IN FILL FABRIC. ED4	1
28	05731	M8 X 16 HEX SET SCREW	8
29	05335	M8 X 25 O/D PENNY WASHER	8
30	03553	GUARD ROOF FABRICATION ED4	1
31	06131	M8 X 15 CROSS KNOBS	4
32	03565	GUARD REAR FLAP FABRICATION ED4	1
33	05145	M6 X 12 BTN HEAD SOCKET SCREW	7
34	08408	CABLE FOR ED3/4 AM3/4 GUARD LIGHT (	1
35	06740	DOOR MAGNET	2
36	04900	M4 X 12 BTN HEAD	2
37	03564	GUARD LIGHT BRACKET ED4	1
38	05145	M6 X 12 BTN HEAD SOCKET SCREW	3



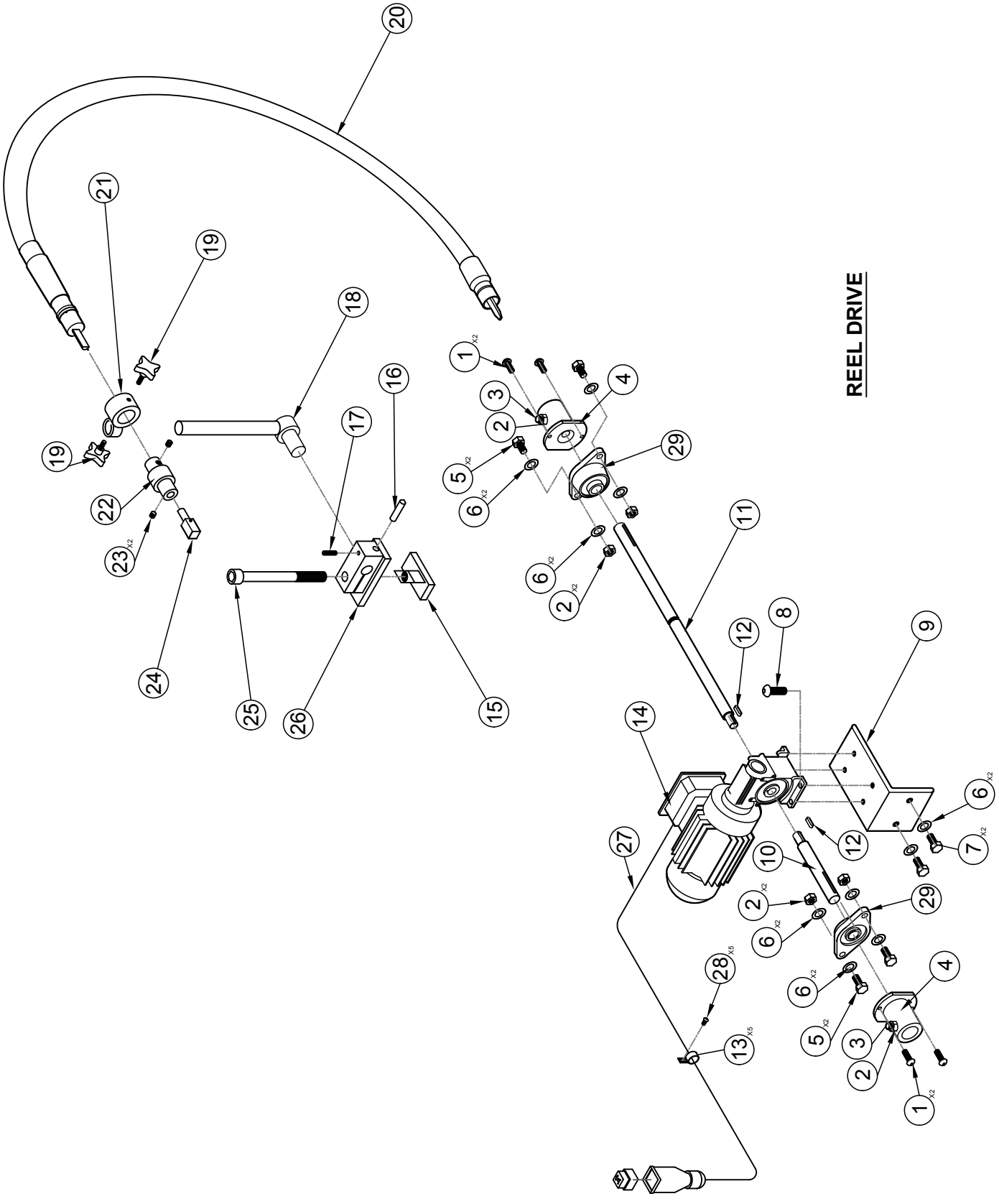
Part	Part #	Description	Qty
1	05110	5/8 WHIT X 5/8 SKT SCREW KCP(GRUB)	2
2	06113	HANDWHEEL 150MM	2
3	05305	5/8 TABLE 3 WASHER TURNED	2
4	06278	DIE SPRING FOR FEED COLUMN	2
5	05305	5/8 TABLE 3 WASHER TURNED	2
6	05208	M4 X 4 SOCKET SET SCREW KCP	2
7	05129	M5 X 10 BTN HD SOCKET SCREW	6
8	05305	5/8 TABLE 3 WASHER TURNED	2
9	09208	FEEDSCREW ED3/ED4 FROM MC NO 12586	2
10	05502	5/8 WHIT HALF NUT (FEEDSCREW L'NUT)	4
11	04043	FEED NUT	2
12	06849	ENCODER COMPRESSION SPRING	2
13	09210	ENCODER COUPLING ENCODER END	2
14	08108	M3 X 6 POSI DRIVE PAN HEAD	4
15	04690	ENCODER BRACKET FOR EXPRESS DUAL	2
16	05129	M5 X 10 BTN HD SOCKET SCREW	4
17	05318	M5 FORM B WASHERS	4
18	04901	Left Hand Long Encoder	1
18	04902	Right Hand Short Encoder	1
18A	08802	4 POLE DIN PLUG BLACK	2
19	05479	M12 X 20 BT HD SKT SCWS	2
20	05315	M12 FORM B WASHER	2
21	05506	M12 HEX NUTS	2
22	04306	M12 X 60 HEX HEAD BOLT MACHINED	2
23	05315	M12 FORM B WASHER	2
24	05506	M12 HEX NUTS	2
25A	04041	FEED CHNL-LH INC TOP & BTM CAP ONLY (Left Hand)	1
25B	04042	FEED CHNL-RH INC TOP & BTM CAP ONLY (Right Hand)	1
26	06851	SADDLE BAND 283 2382	1
27	05129	M5 X 10 BTN HD SOCKET SCREW	4
28	05318	M5 FORM B WASHERS	4



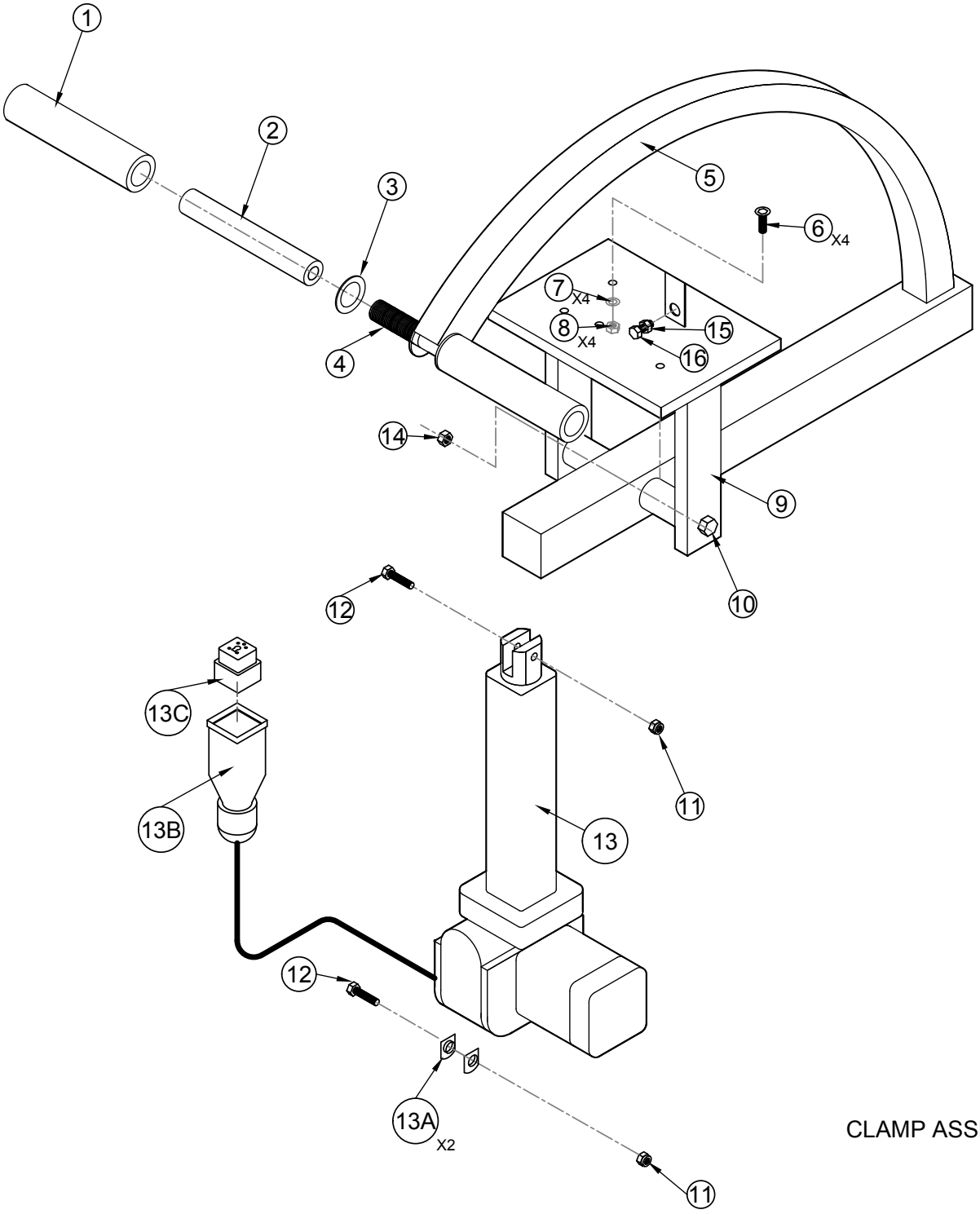
Part	Part #	Description	Qty
1	09108	REAR SHAFT WITH GRUB SCREWS	1
2	05507	M12 NYLOCK NUT	2
3	03739	CLAMPING WASHER FOR ED REAR SHAFT	2
4	07701	1 1/4 OILITE BUSH FGH 403 ED SIDE A	2
5	04321	SIDE ARM WITH BUSH LH	1
6	07721	MAINSHAFT BEARING SFT 1 1/4	2
7	05315	M12 WASHER	8
8	05506	M12 HEX NUTS	4
9	05179	M10 X 40 COUNTERSUNK SKT SCREW	4
10	05711	M10 X 70 HEX SET SCREWS	2
11	05503	M10 HEX NUTS	6
12	04078	MOTOR BOLT RETAINING PLATES ED3/ED4	2
13	04322	SIDE ARM WITH BUSH RH	1
14	05321	M8 FORM B WASHER	4
15	05219	M8 X 30 HEX HEAD SET SCREW	4
16	07202	71X1 SPZ T/LOCK PULLEY	1
17	07301	1108 X 19MM T/LOCK BUSH	1
18A	07201	112X1 SPZ T/LOCK PULLEY (MAINSHAFT)	1
18B	07203	95X1 SPZ T/LOCK PULLEY 50HZ MOTOR	1
19A	07303	1610 X 1 1/4" TAPERLOCK BUSH	1
19B	07304	TAPERLOCK BUSH 1210 X 1 1/4"	1
20A	07103	SPZ 1270 VEE BELT 60HZ (MAINSHAFT)	1
20B	07102	SPZ 1212 VEE BELT 50HZ (MAINSHAFT)	1
21A	06080	ED MAIN MOTOR 60HZ CARPANELLI	1
21B	06090	ED MAIN MOTOR 50HZ (HUC09)	1
21C	06040	ED3 MAIN MOTOR 50 / 60 HZ	1
22	06505	GRINDSTONE 6x1 1/2x2 3/4 ED	1
23	09506	SLEEVE AND NUT COMPLETE ED	1
24	09068	MAINSHAFT: EXPRESS DUAL	1
25	05318	M5 FORM B WASHERS	2
26	05759	M5 X 8 CAP HEAD SOCKET SCREW	2
27	06967	MAIN BELT GUARD FROM 10/04/03	1



Part	Part #	Description	Qty	
1A	09512	TRAV.FORK MACHINED W/O BB&SEALS ED	1	
1B	07707	3/4 DUST SEAL FOR FORK DRIVER	2	09505
1C	07706	3/4 BALL BUSHING (A12) - FORK DRIVE	2	
2A	09518	TRAVERSE PICKUP MACHINED ED	1	
2B	07702	1" BALL BUSHING (A16) FOR PICKUP	2	09509
2C	09519	ENGAGEMENT SCREW COMPLETE ED1/ED3/ED4	2	
3	09050	HARDENED 3/4"SHAFT FOR FORK DRIVER	1	
4	05516	M6 NUTS	4	
5	03037	M6 X 20 SKT HEAD SET SCREW KR CUP	4	
6	03652	PICKUP SHAFT **(May 2008 - Onwards)**	1	
7A	04111	REVERSING BAR ED3/ED4/DX **SN 21262 - Onwards**	1	
7B	04926	REVERSING BAR ED3/ED4/DX **UPTO SN 21261**	1	
8	06746	FRICTION SPRING FOR REV. BAR	1	
9	05156	M6 X 6 CAP SOCKET SCREW	1	
10	04113	REVERSING BAR STOP	1	
11	06141	M6 X 20 X 40 OD MULTI LOBE KNOB	2	
12	05759	M5 X 8 CAP HEAD SOCKET SCREW	4	
13	05760	M5 X 20 CSK SKT SCREWS	2	
14	04892	ED4000/ED4000DX Trav Switch Assy	1	
15	04906	M4 X 16 PAN HEAD	2	
16	04459	MICROSWITCH GUARD 2011	1	
17	05138	M5 X 6 BUTTONHEAD SOCKET SCREW	2	
18	06344	PROXIMITY SWITCH GUARD	1	
19	05138	M5 X 6 BUTTONHEAD SOCKET SCREW	2	
20A	03229	SPROCKET BRACKET (JULY 2005 ONWARDS	1	09495
20B	07704	1/2" OILITE BUSH FOR IDLER SPRKT	1	
20C	07609	IDLER SPROCKET FOR TRAVERSE	1	
20D	05602	1/2" Circlip	1	
21	05152	M6 X 20 SOCKET CAP SCREW	1	
22	05516	M6 NUTS	1	
23	05310	M10 FORM B WASHER	1	
24	05195	M10 X 25 BUTTON HEAD	1	
25	03324	TRAV CHAIN P'LUX MOTOR 16391 - ONWARDS	1	
26	07502	CHAIN LINK	1	
27	03320	Parvalux Trav Motor Sprocket	1	
28	04891	M4 S/C Spring Washer	2	
29	05754	M6 X 16 CAP HD SOCKET SCREW	3	
30	05320	M6 FORM B WASHER	3	
31	06022	Traverse Motor	1	
32	03741	TRAVERSE MOTOR LEAD FOR ED4	1	
33	03311	CYLINDER DRIVE KEY	1	
34	05320	M6 FORM B WASHER	2	
35	05152	M6 X 25 SOCKET CAP SCREW	1	
36	05517	M6 NYLOCK NUT	1	
37	04460	MICROSWITCH ADAPTER PLATE 2011	1	

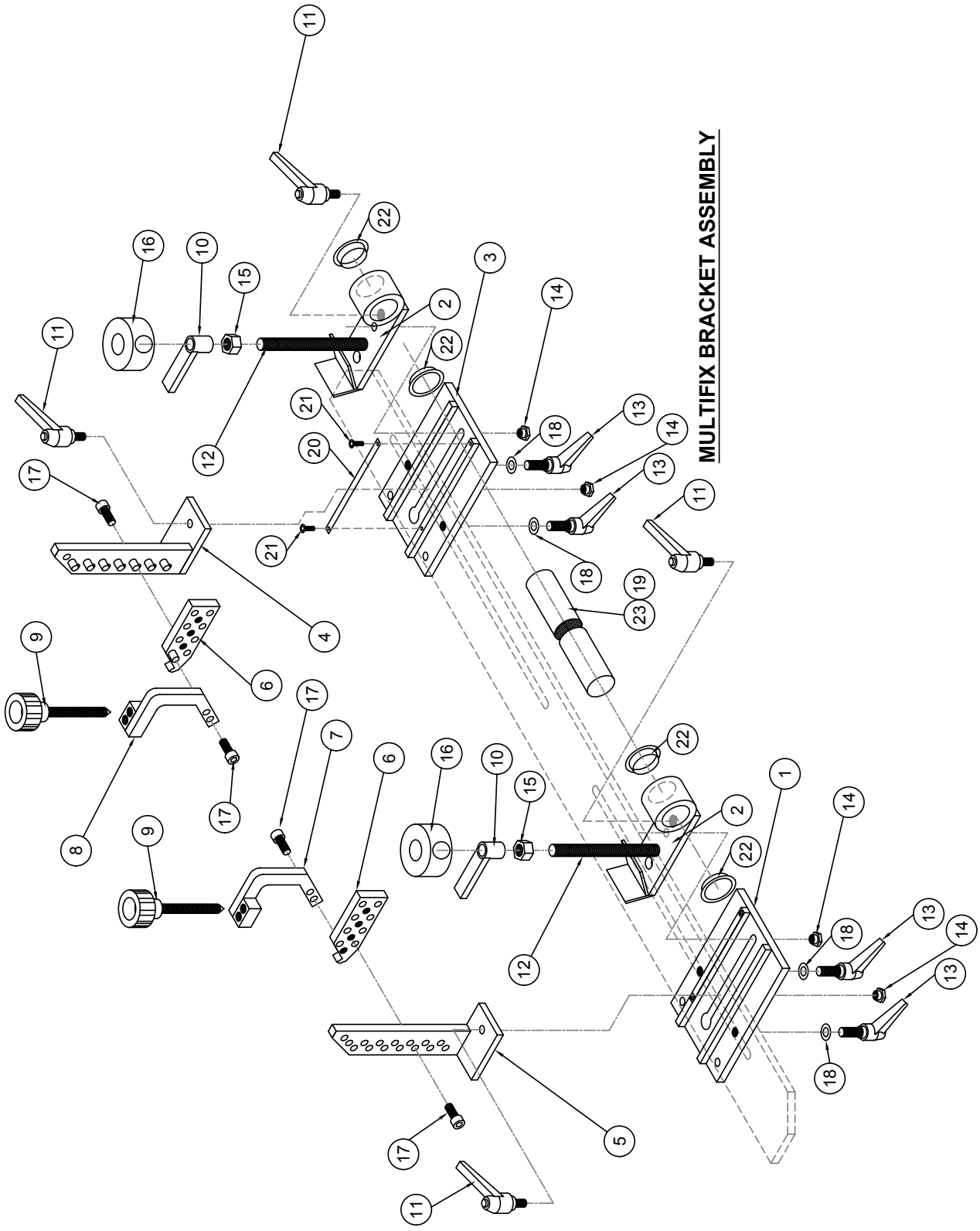


Part	Part #	Description	Qty
1	05145	M6 X 12 BTN HEAD SOCKET SCREW	4
2	05503	M10 HEX NUTS	5
3	05460	BALL SPRING PLUNGER SOCKET SCREW	2
4	09121	TOP HAT SCKT FOR FLEXIBLE DRIVE	2
5	05704	M10 X 30 HEX BOLT	4
6	05310	M10 FORM B WASHER	2
7	05702	M10 X 20 HEX SET SCREW	2
8	05148	M6 X 16 BTN HD SOCKET SCREW	4
9	04031	CYLINDER DRIVE MOTOR BRACKET	1
10	09060	LAYSHAFT - SHORT	1
11	09059	LAYSHAFT - LONG	1
12	03311	CYLINDER DRIVE KEY	2
13	08164	P CLIP SIZE 3	5
14	06011	CYLINDER DRIVE MOTOR ED	1
15	04110	RETAINING NUT - LEFT HAND (T NUT)	1
16	06737	DIAMOND DRESSER	1
17	05156	M6 X 25 SOCKET CAP SCREW	1
18	04001	L" POST DRIVE HEAD SUPPORT BAR	1
19	06131	M8 X 15 CROSS KNOBS	2
20	07404	FLEXIBLE DRIVE SHAFT FROM MC 10716	1
21	04045	FLEX DRIVE BRKT (ROUND.TO ROUND)	1
22	06744	MACHINED FLEXIBLE COUPLING ED3/ED4	1
23	05106	3/8 WHIT X 3/8 SOCKET SCREW KCP	2
24	04134	SQUARE DRIVE ROD SHORT	1
25	05109	5/8 WHIT X 5 1/2 CAP HD SKT SCREW	1
26	04046	FLEX.DRIVE BRKT BASE/DIA.DRESS.HOLD	1
27	03170	CABLE FOR ED3/ED4 CYLINDER MOTOR	1
28	05129	M5 X 10 BTN HD SOCKET SCREW	5
29	07722	LAYSHAFT BEARINGS SFT 3/4	2

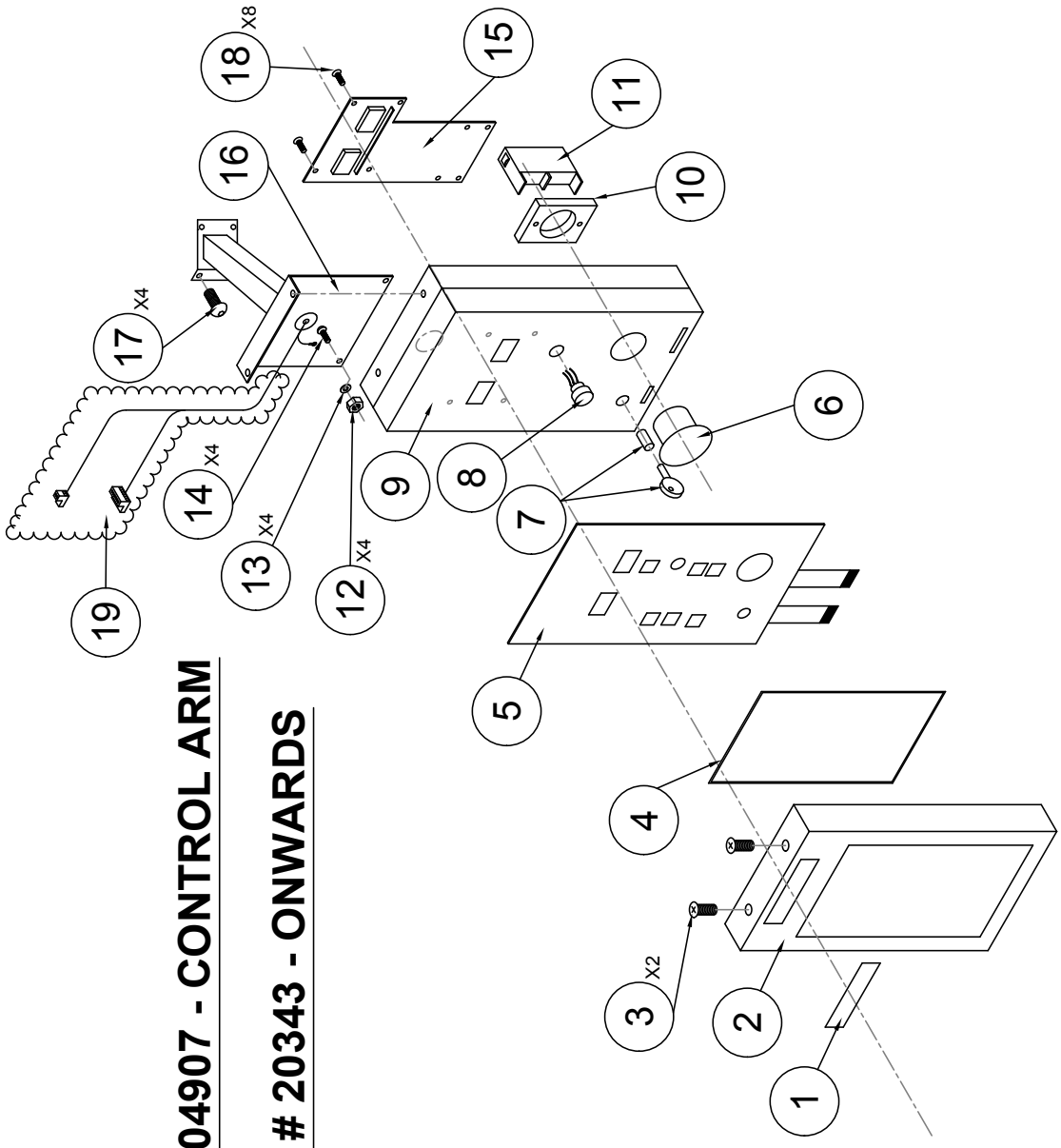


CLAMP ASSEMBLY

Part	Part #	Description	Qty
1	04903	Clamp Rubber cut to length	2
2	09102	PRESSURE BAR	1
3	05304	5/8 TABLE 3 PLAIN WASHER	2
4	09524	5/8 THREADED ROD ED	1
5	04100	RADIUS PRESSURE ARM ED	1
6	05117	M10 X 30 CSK SKT SCREW	4
7	05310	M10 FORM B WASHER	4
8	05503	M10 HEX NUTS	4
9	04101	RADIUS PRESSURE ARM BRACKET ED	1
10	05749	M16 x 170mm HT Bolt	1
11	05505	M10 NYLOCK NUT	2
12	05706	M10 X 45 HEX BOLTS	2
13	09522	LINEAR ACTUATOR WITH CABLE ED	1
13A	-	Plastic bush (included with linear actuator)	2
13B	08833	TOP ENTRY COVERS	1
13C	08121	HA-4 MALE INSERT SCREW TERMINAL	1
14	05524	M16 NYLOC NUT	1
15	05503	M10 HEX NUTS	1
16	05702	M10 X 20 HEX SET SCREW	1



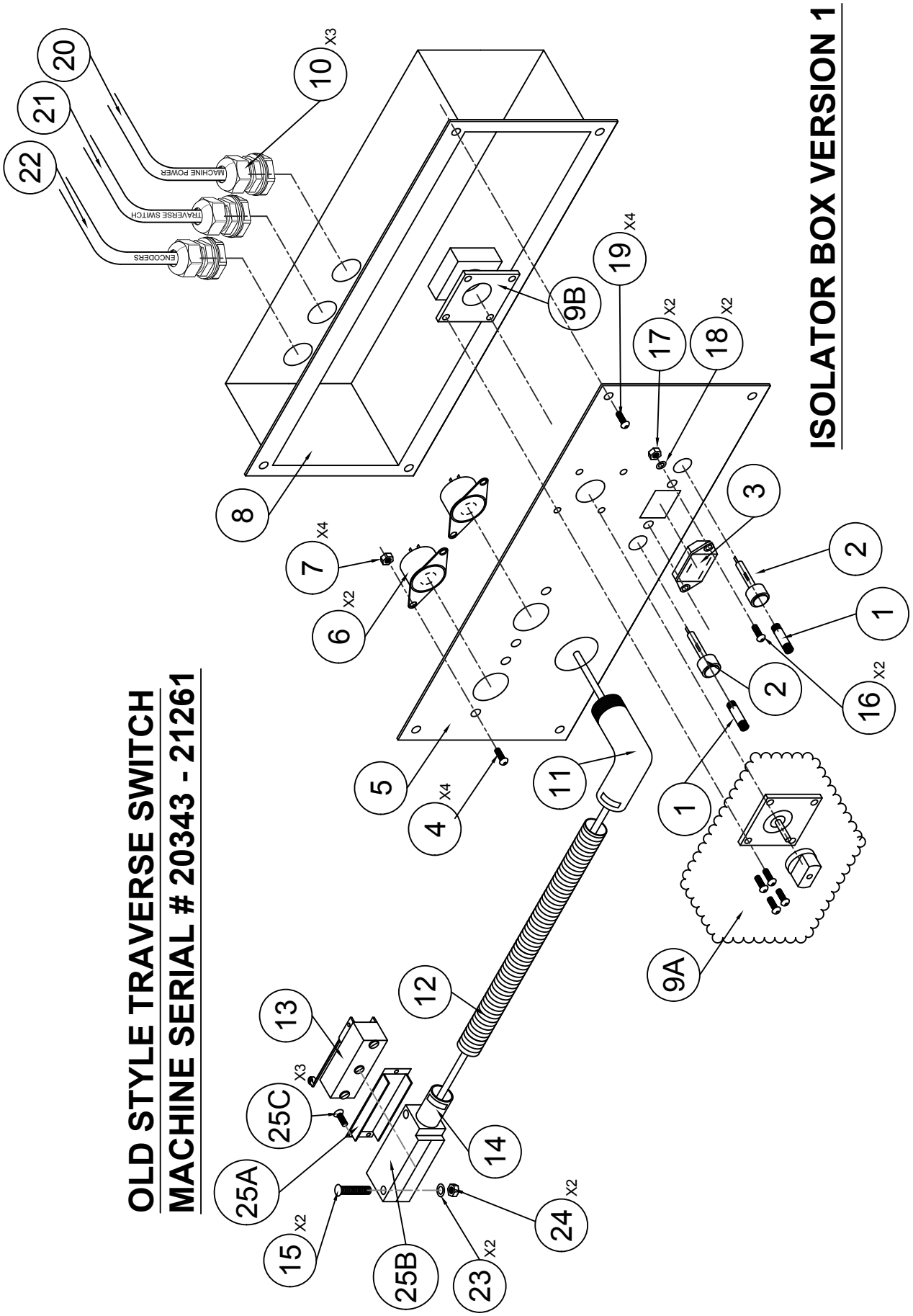
Part	Part #	Description	Qty
1	04012	ADJ.MOUNTING BRACKET BASE	1
2	03086	ADJ MOUNT BRACKET "V" BASE C/W LINK	2
3	04012	ADJ.MOUNTING BRACKET BASE	1
4	04010	ADJ.MOUNTING BRKT "L" UPRIGHT - R/H	1
5	04009	ADJ.MOUNTING BRKT "L" UPRIGHT - L/H	1
6	04016	Adjustable Bracket Horizontal	2
7	04006	Mounting Bracket "C" Clamp L.H	1
8	04007	Mounting Bracket "C" Clamp R.H	1
9	04899	Multifix C Clamp Screw Assy	2
10	04003	ADJ.MNTG BRK "V" BRACKET FINGER	2
11	06118	M10 X 20 LOCKING LEVERS	4
12	05401	V" BRACKET STUD M16	2
13	06121	M12 X 30 ZINC LOCKING LEVER	4
14	04180	SLIDE NUT FRONT ROLL.MNTG BRKT (2)	2
15	05508	M16 HEX NUT Z/PLATED	2
16	03166	KNURLED (QUICK) NUT M16 FR MTG BRT	2
17	05116	M10 X 25 SOCKET CAP HEAD	4
18	05315	M12 FORM B WASHER	4
19	03072	END CAP FOR SS TUBE	2
20	06601	ADJ. MOUNTING BRKT BASE SCALE	2
21	05125	M4 X 8 BTN HD SKT SCREW	4
22	03092	V BRACKET LINK BAR BUSH	4
23	03061	ADJUSTABLE BRACKET LINK BAR	1



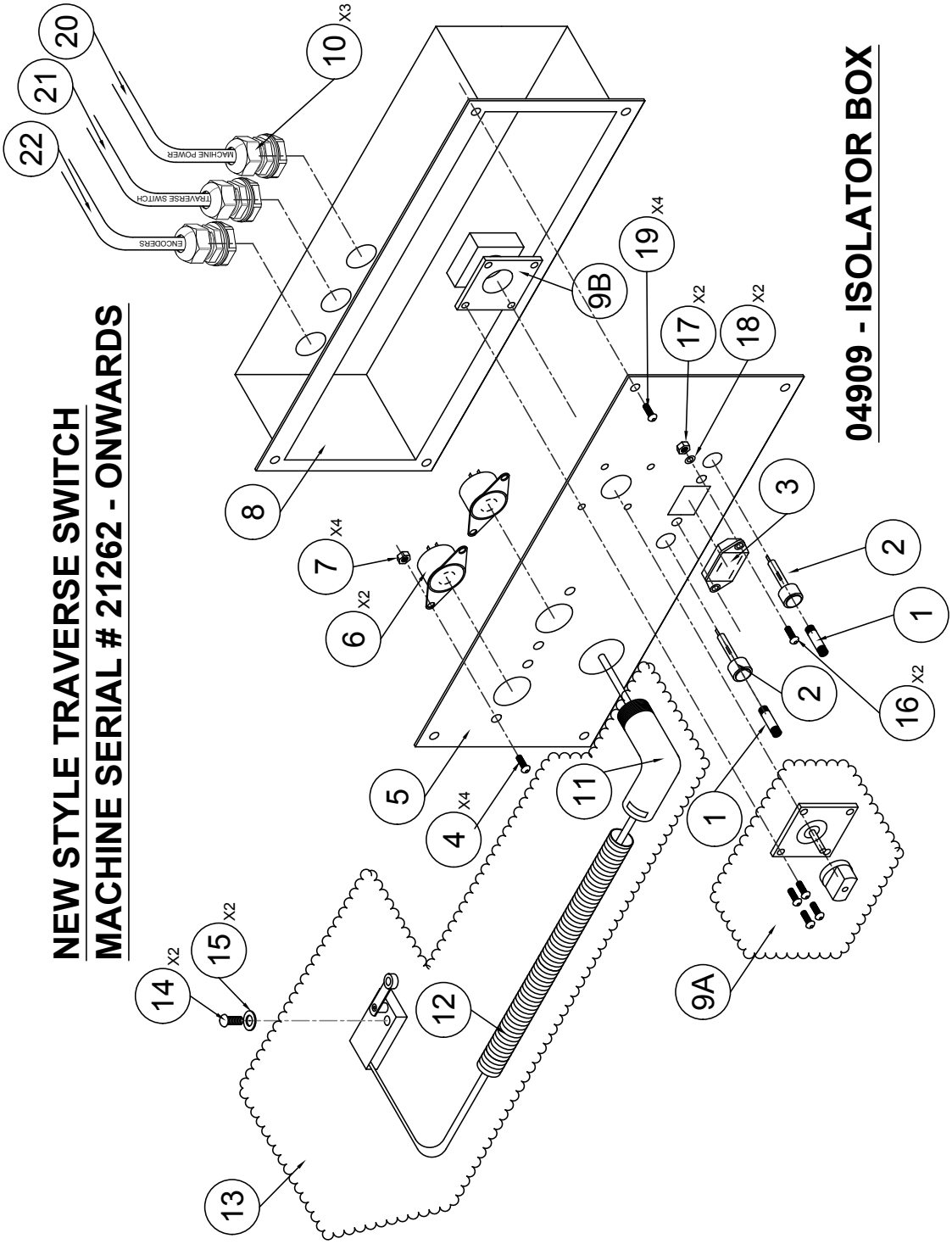
04907 - CONTROL ARM

SERIAL # 20343 - ONWARDS

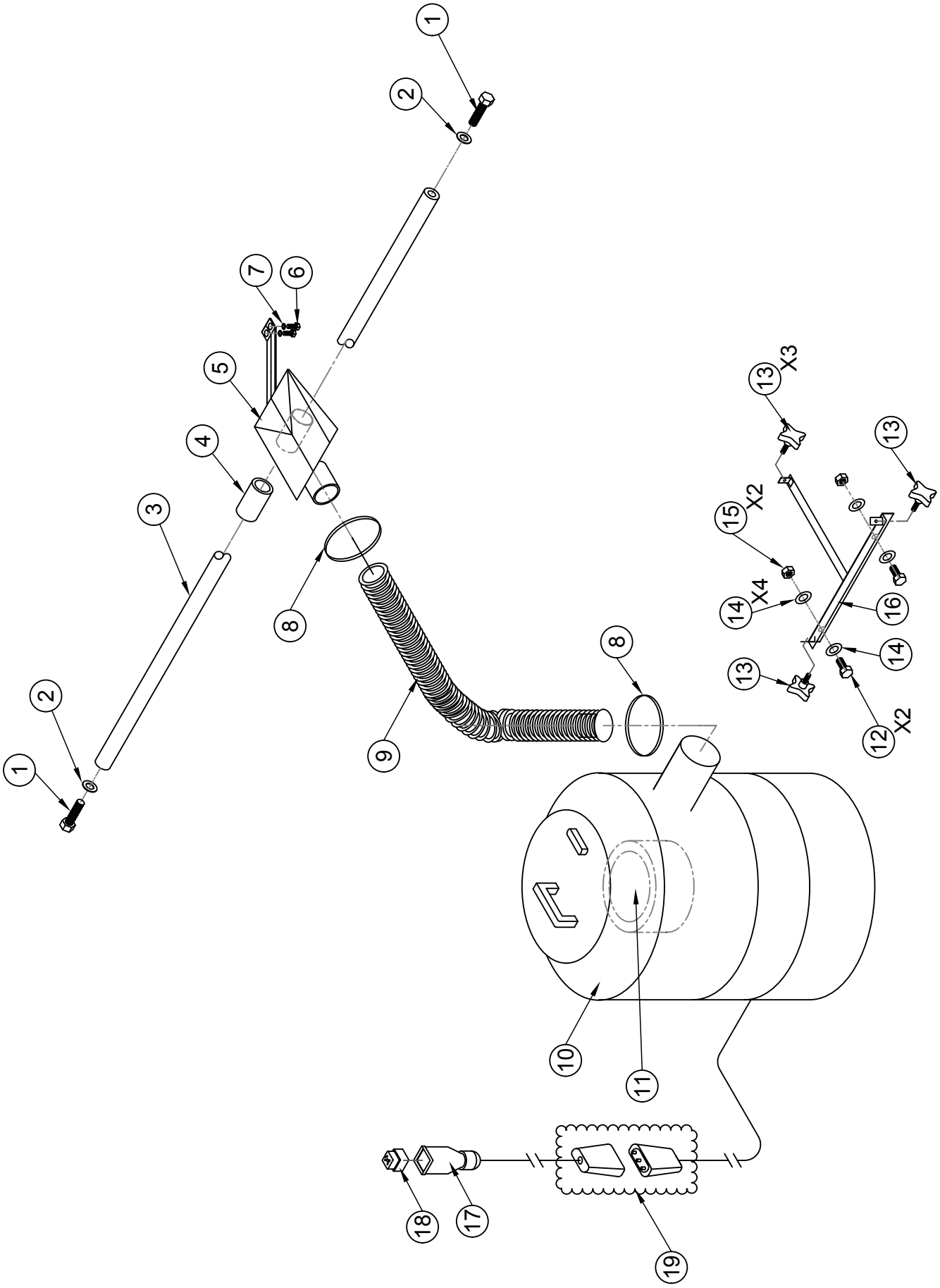
Part	Part #	Description	Qty
1	06981	SMALL GRP LABEL EXPRESS DUAL	1
2	03645	CONTROL BOX BEZEL (PLASTIC)ED4/AM4	1
3	04896	M3 x 12 Pozi Screw	2
4	02298	DOUBLE SIDED TAPE 25MMW X 50ML	1
5	03329	ED3000/4000 MEMBRANE KEY PANEL	1
6	08073	Emergency Stop Button	1
7	03060	GUARD SERVICE KEY SWITCH	1
8	04897	ED4000 Reel Speed Dial Assy	1
9	03691	METAL CONTROL BOX BASE ED4000	1
10	08037	B3M CONNECTORS	1
11	08038	Normally Closed Contact Block	1
12	05512	M5 HEX NUTS	4
13	05339	M5 ZP SHAKEPROOF WASHER	4
14	05474	M5 X 12 SLOTTED PAN HD MC SCWS Z/P	4
15	03732	DISPLAY/INTERFACE PCB NEW ED/AM4 **(Serial Number 20343 - Onwards)**	1
16	03677	ED4000 CONTROL ARM FABRICATION	1
17	05183	M8 X 16 BUTTON HEAD SCREW	4
18	04888	M4 X 8 Pozi Polycarbonate screw	8
19	04898	ED4 Control Arm Cable Assy	1



Part	Part #	Description	Qty
1	08084	FUSES 16AMP X 32 SUPPLY	2
2	08174	1 1/4 FUSE HOLDER	2
3	08901	16 AMP CHASSIS PLUG	1
4	04889	M2.5 x 6mm Pozi Screw	4
5	03629	ISOLATER BOX LID (PALLET FRAME) ED4	1
6	08803	4 POLE DIN SOCKET BLACK	2
7	04890	M2.5 Nylock	4
8	03628	ISOLATER BOX (PALLET FRAME) ED4000	1
9A+9B	03303	ROTARY CAM SWITCH CS20A-A2	1
10	08114	Cable Gland	3
11	08099	KOPEX PMA 90 DEGREES FITTING	1
12	08264	CONDUIT 20MM FOR MOTORS (MTR)	0.6
13	08111	MICROSWITCH FOR TRAVERSE	1
14	08101	KOPEX PMA 90 STRAIGHT FITTING	1
15	05210	M5 X 45 COUNTERSUNK SCREW	1
16	05406	M3 X 10 PAN HEAD SCREWS	2
17	05510	M3 HEX NUTS	2
18	05316	M3 STAR WASHER	2
19	05145	M6 X 12 BTN HEAD SOCKET SCREW	4
20	04893	Machine power cable	1
21	04894	Traverse switch cable	1
22	04895	Encoder cable with sockets	1
23	05318	M5 FORM B WASHER	2
24	05512	M5 NUT	2
25A	-	Switch box - Obsolete - No replacement	1
25B	-	Switch housing - Obsolete - No replacement	1
25C	-	Screw - Obsolete - No replacement	3



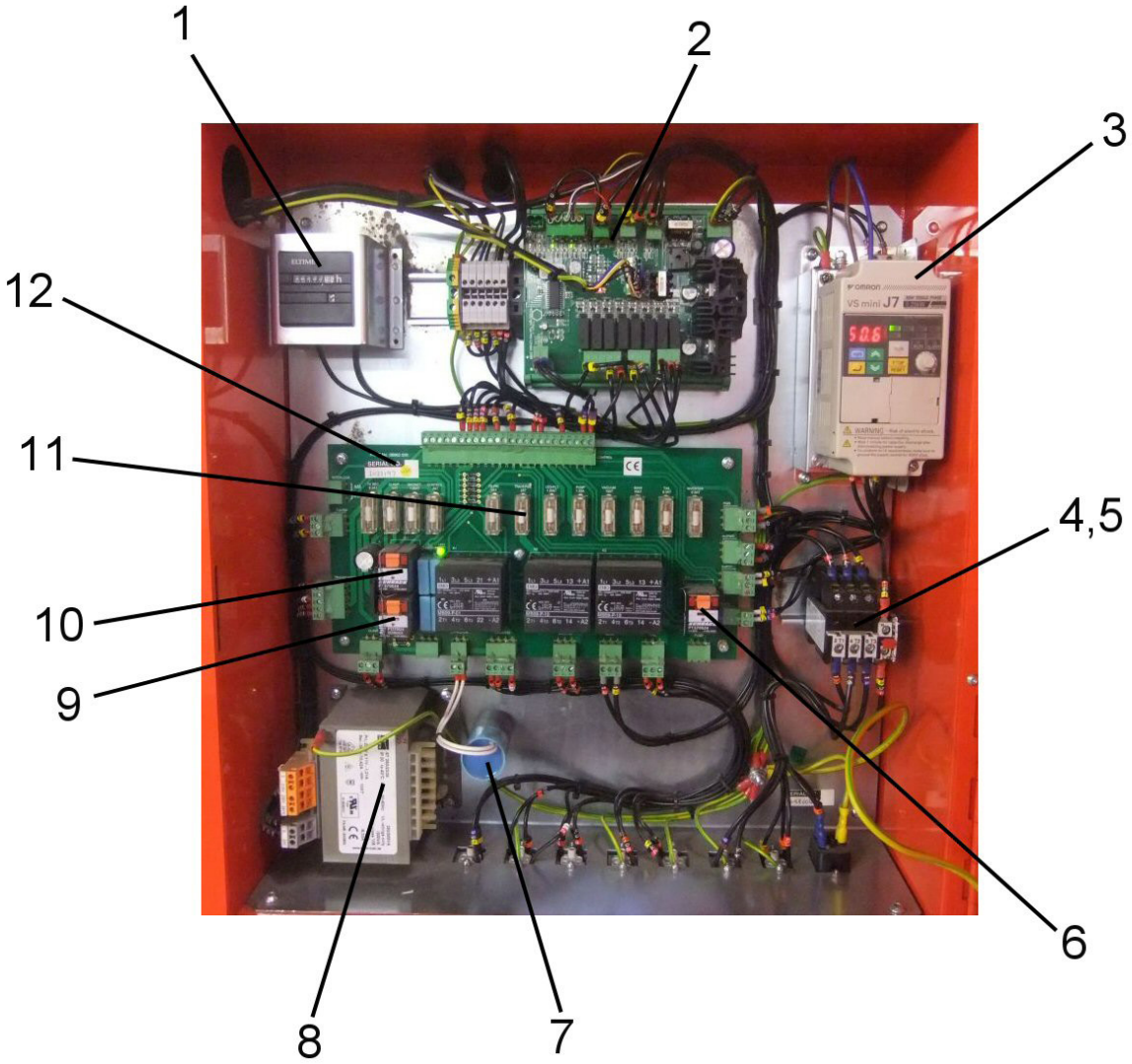
Part	Part #	Description	Qty
1	08084	FUSES 16AMP X 32 SUPPLY	2
2	08174	1 1/4 FUSE HOLDER	2
3	08901	16 AMP CHASSIS PLUG	1
4	04889	M2.5 x 6mm Pozi Screw	4
5	03629	ISOLATER BOX LID (PALLET FRAME) ED4	1
6	08803	4 POLE DIN SOCKET BLACK	2
7	04890	M2.5 Nylock	4
8	03628	ISOLATER BOX (PALLET FRAME) ED4000	1
9A+9B	03303	ROTARY CAM SWITCH CS20A-A2	1
10	08114	Cable Gland	3
11	08099	KOPEX PMA 90 DEGREES FITTING	1
12	08264	CONDUIT 20MM FOR MOTORS (MTR)	0.6
13	04892	ED4000/ED4000DX Trav Switch Assy	1
14	04906	M4 X 16 PAN HEAD	2
15	04891	M4 S/C Spring Washer	2
16	05406	M3 X 10 PAN HEAD SCREWS	2
17	05510	M3 HEX NUTS	2
18	05316	M3 STAR WASHER	2
19	05145	M6 X 12 BTN HEAD SOCKET SCREW	4
20	04893	Machine power cable	1
21	04894	Traverse switch cable	1



Part	Part #	Description	Qty
1	05702	M10 X 20 HEX SET SCREW	2
2	05310	M10 FORM B WASHER	2
3	09007	19MM OD SHAFT FOR ED VAC SCOOP	1
4	09096	NYLON BUSH FOR DUST SCOOP	1
5	09576	VAC DUST SCOOP ASSY	1
6	04904	M6 x 16 Hex head	2
7	05320	M6 FORM B WASHER	2
8	02750	2A JUBILEE CLIP (BOX 10)	2
9	06975	VAC HOSE - 1 LENGTH	1
10	06064	INDUSTRIAL VACUUM	1
11	06288	CARTRIDGE FILTER FOR PC220 VACUUM	1
12	05748	M8 X 60 HEX HEAD SCREW	2
13	06141	M6 X 20 X 40 OD MULTI LOBE KNOB	3
14	05321	M8 FORM B WASHER	4
15	05520	M8 Nylock Nut	2
16	06455	VACUUM MOUNT HOLDER	1
17	08833	TOP ENTRY COVERS	1
18	08121	HA-4 MALE INSERT SCREW TERMINAL	1
19	08835	IN LINE CONNECTOR (SET OF M&F)	1

CONTROL PANEL V1 - SERIAL NUMBER 20343 - 21033

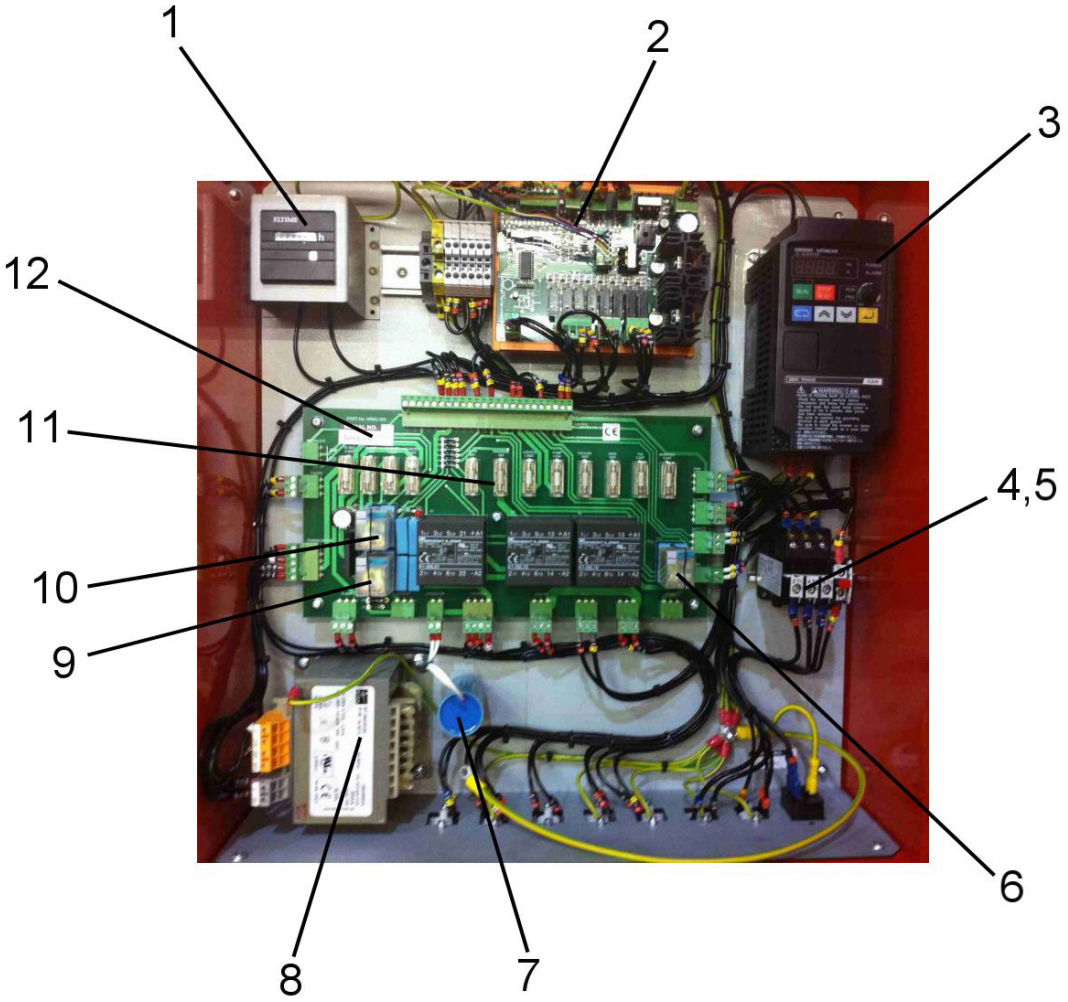
J7 INVERTER



Part	Part #	Description	Qty
1	08206	24V DC HOUR METER FOR PCB	1
2	08620	INPUT/OUTPUT PCB NEW ED4/AM4	1
3	08620	Programmed Omron JX Inveter 0-5v	1
4	08203	THERMAL OVERLOAD BASE FOR PCB	1
5	08117	THERMAL OVERLOAD 6-9A	1
6	-	Please contact Bernhard & Co	1
7	08148	3MF CAPACITOR	1
8	03301	NEW TRANSFORMER FOR ED5/ED3PCB	1
9	-	Please contact Bernhard & Co	1
10	-	Please contact Bernhard & Co	1
11	08990	ED4000 SPARE FUSE KIT	1
12	08962	MACHINE CONTROL PCB FOR EX DUAL	1

CONTROL PANEL V2 - SERIAL NUMBER 21043 - 22387

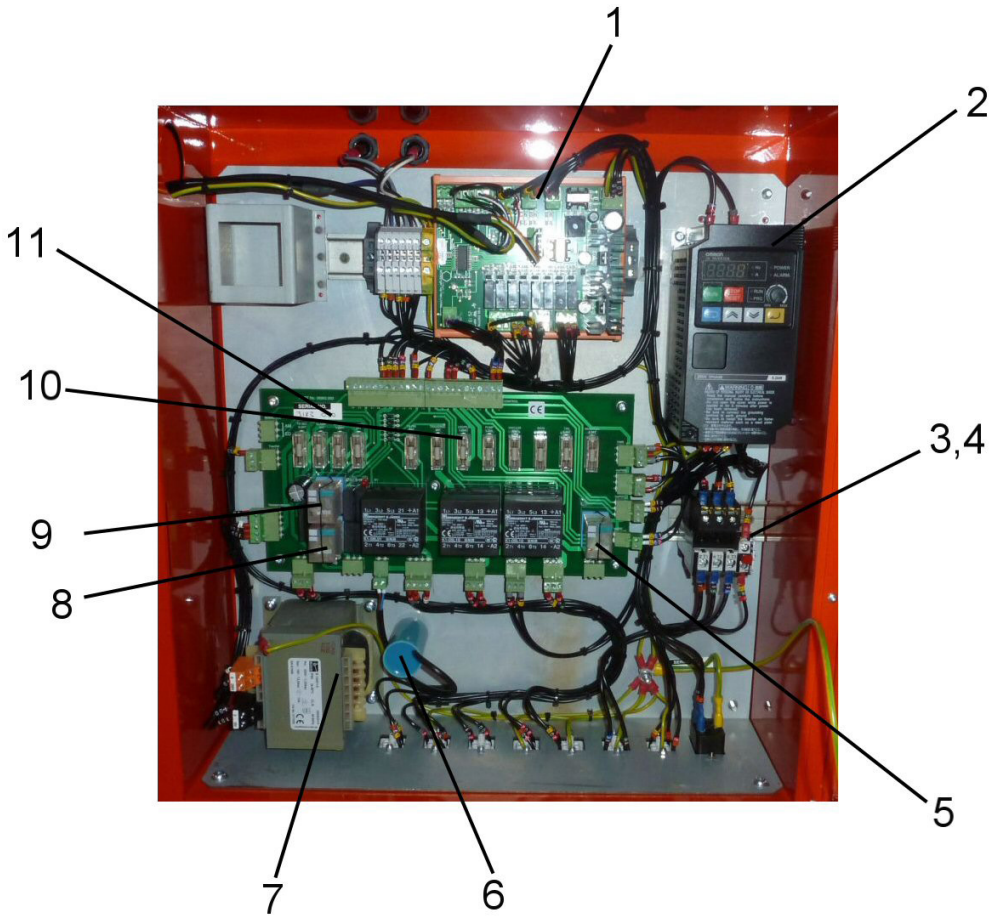
JX INVERTER



Part	Part #	Description	Qty
1	08206	24V DC HOUR METER FOR PCB	1
2	08620	INPUT/OUTPUT PCB NEW ED4/AM4	1
3	08620	Programmed Omron JX Inveter 0-5v	1
4	08203	THERMAL OVERLOAD BASE FOR PCB	1
5	08117	THERMAL OVERLOAD 6-9A	1
6	-	Please contact Bernhard & Co	1
7	08148	3MF CAPACITOR	1
8	03301	NEW TRANSFORMER FOR ED5/ED3PCB	1
9	-	Please contact Bernhard & Co	1
10	-	Please contact Bernhard & Co	1
11	08990	ED4000 SPARE FUSE KIT	1
12	08962	MACHINE CONTROL PCB FOR EX DUAL	1

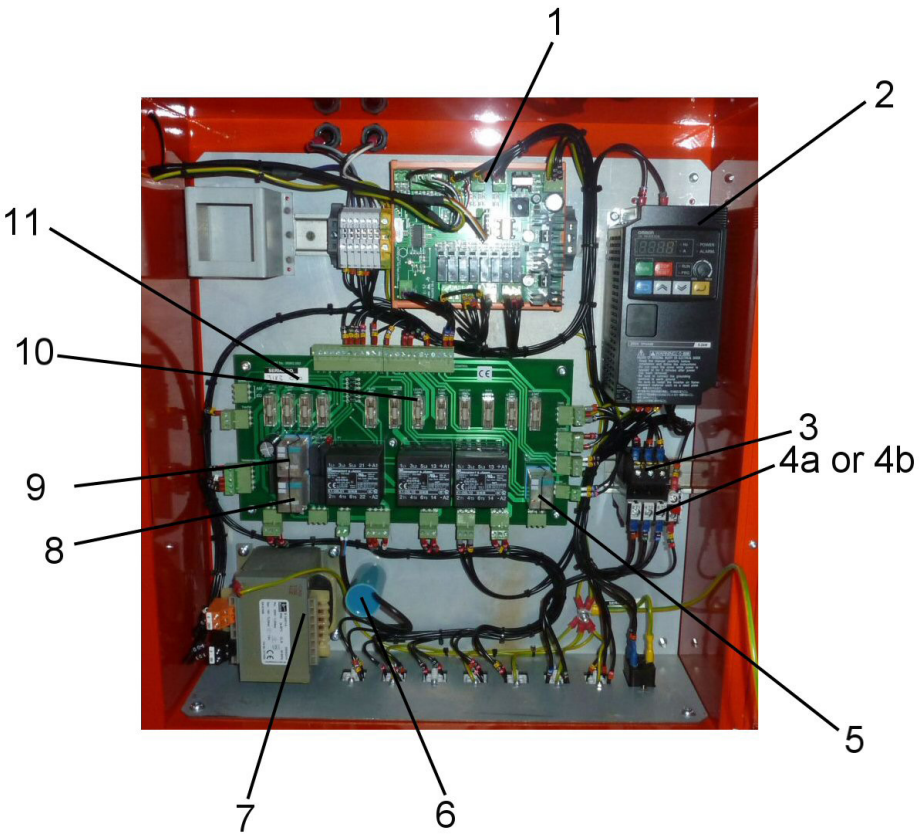
CONTROL PANEL V3 - SERIAL NUMBER 22388 - 22529

18V TRANSFORMER



Part	Part #	Description	Qty
1	03733	INPUT/OUTPUT PCB NEW ED4/AM4	1
2	08620	Programmed Omron JX Inveter 0-5v	1
3	08203	THERMAL OVERLOAD BASE FOR PCB	1
4	08117	THERMAL OVERLOAD 6-9A	1
5	03929	3PDT plug-in relay,10A 24Vdc coil	1
6	08148	3MF CAPACITOR	1
7	08638	TRANSFORMER FOR ED 18 VOLT	1
8	03930	DPDT plug-in relay,12A 24Vdc coil	1
9	03929	3PDT plug-in relay,10A 24Vdc coil	1
10	08990	ED4000 SPARE FUSE KIT	1
11	08962	MACHINE CONTROL PCB FOR EX DUAL	1

CONTROL PANEL V4 - SERIAL NUMBER 22530 - ONWARDS
THERMAL OVERLOAD OPTIONS



Part	Part #	Description	Qty
1	03733	INPUT/OUTPUT PCB NEW ED4/AM4	1
2	08620	Programmed Omron JX Inverter 0-5v	1
3	08203	THERMAL OVERLOAD BASE FOR PCB	1
4a	08116	THERMAL OVERLOAD 4-6A	-
4b	08117	THERMAL OVERLOAD 6-9A	-
5	03929	3PDT plug-in relay,10A 24Vdc coil	1
6	08148	3MF CAPACITOR	1
7	08638	TRANSFORMER FOR ED 18 VOLT	1
8	03930	DPDT plug-in relay,12A 24Vdc coil	1
9	03929	3PDT plug-in relay,10A 24Vdc coil	1
10	08990	ED4000 SPARE FUSE KIT	1
11	08962	MACHINE CONTROL PCB FOR EX DUAL	1

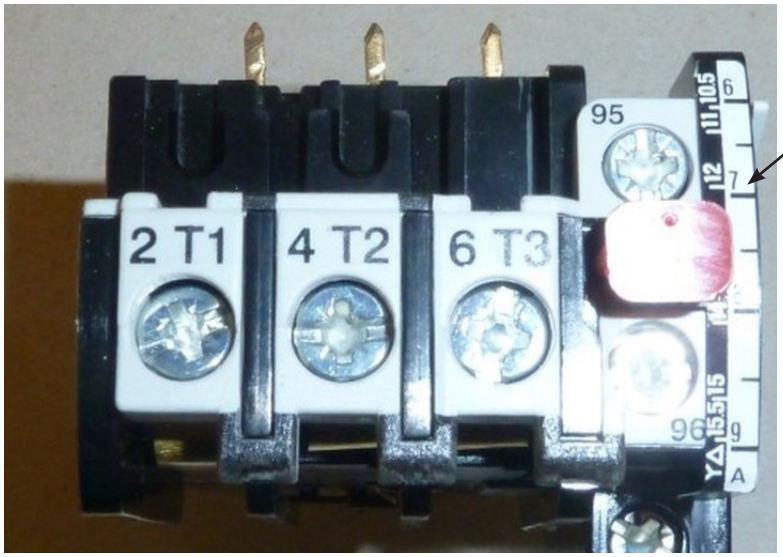
THERMAL OVERLOAD OPTIONS

When a replacement thermal overload is required,

check the scale of the side of the unit.

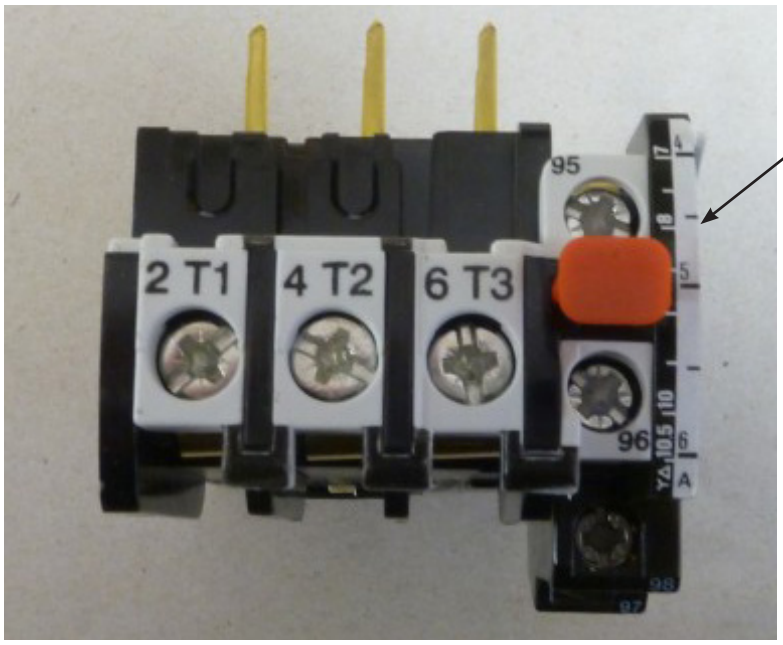
If this runs from 6-9 then replace with part 08117

If this runs from 4-6 then replace with part 08116



Scale from 6 - 9

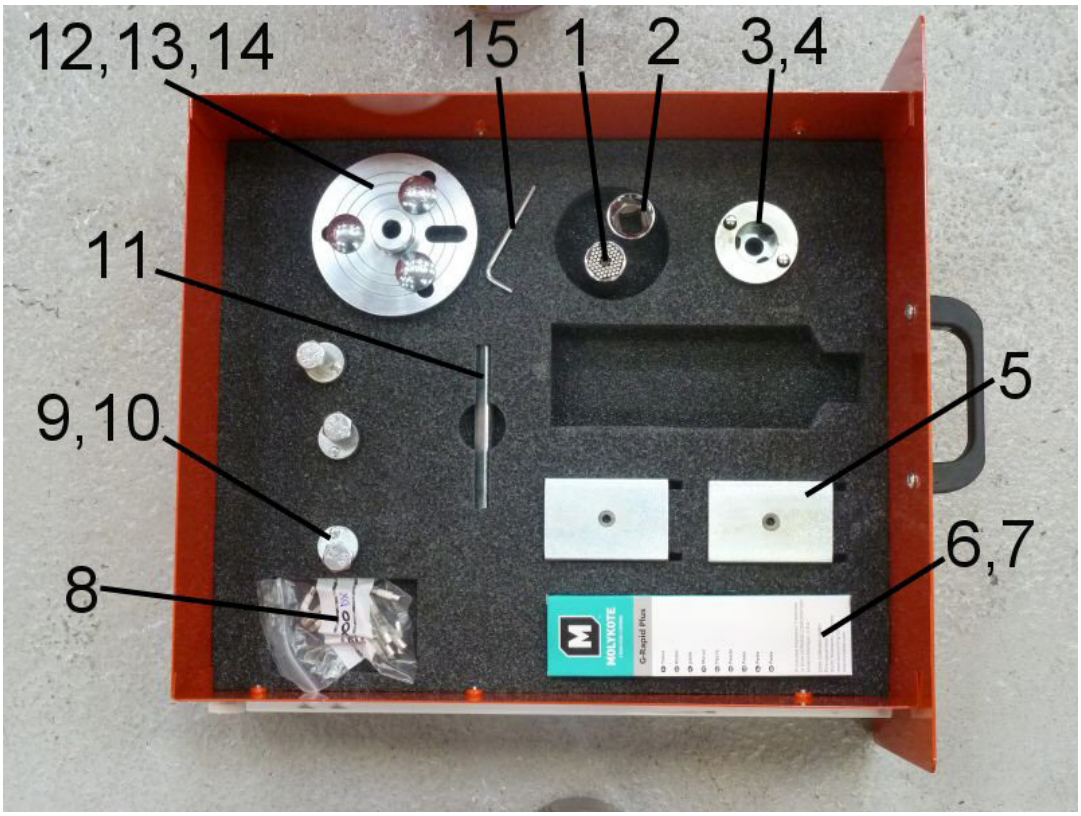
Part number 08117

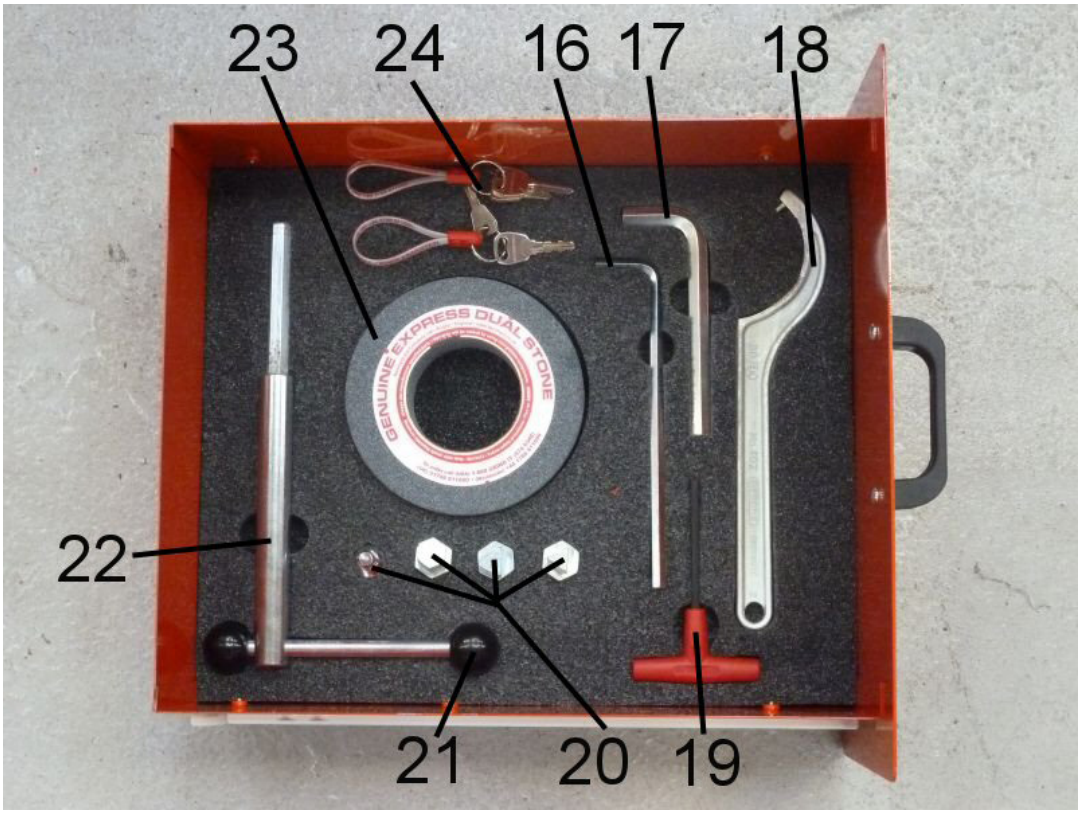


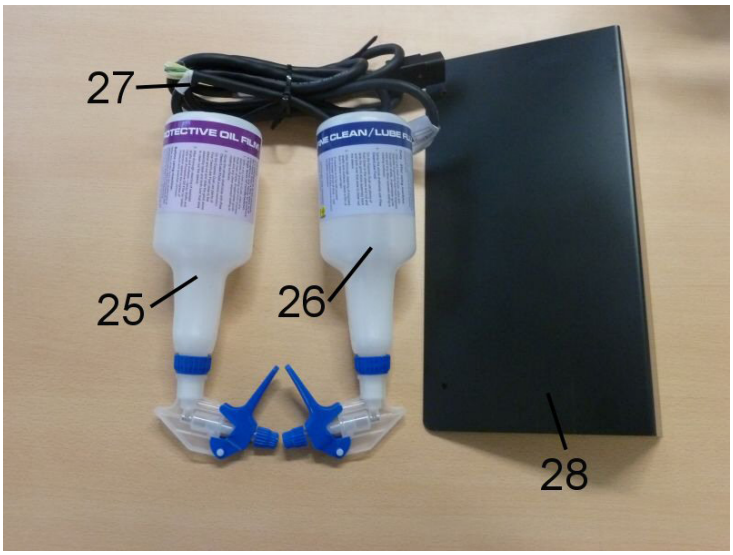
Scale from 4 - 6

Part number 08116

TOOLKIT UPTO SERIAL NUMBER:- 22560

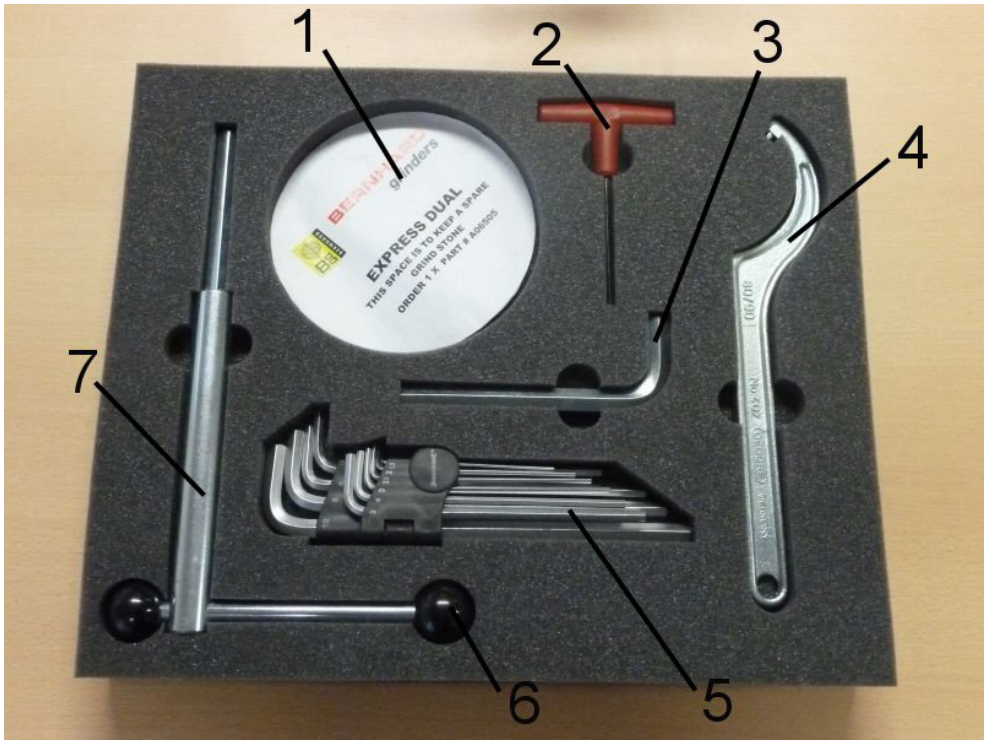


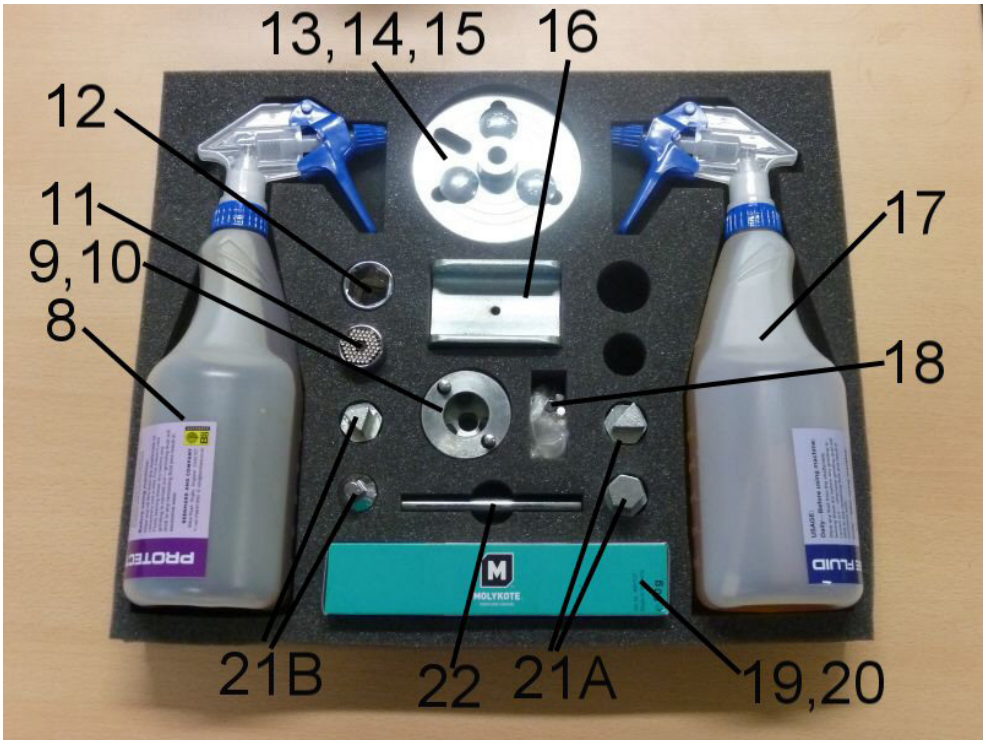


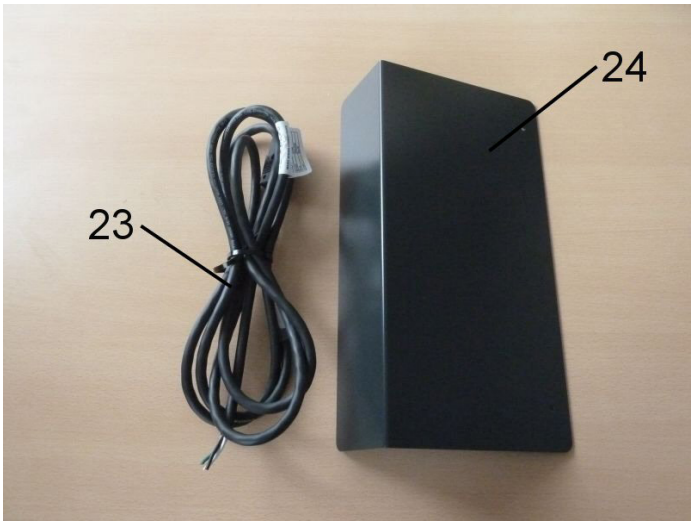


Part	Part #	Description	Qty
1	03476	GATOR GRIP FOR ED TOOL KIT	1
2	03306	22mm 6POINT 1/2 DRIVE SHORT SOCKET	1
3	04063	LARGE TWO PIN SPROCKET DRIVER	1
4	05209	3/8 WHIT X 5/8 KCP SOCKET SCREW	1
5	04087	MULTIFIX CHANNELS	2
6	02722	MOLYCOTE PASTE	1
7	06847	MOLYCOTE BRUSH	1
8	08990	ED4000 SPARE FUSE KIT	1
9	09534	ECCENTRIC PIN FOR ADJ SPK DRIVE ED	3
10	05701	M10 X 20 HEX BOLT	3
11	04095	PLAIN DRIVE ROD SHOR FOR MUT MODELS	1
12	02735	Drive Bolt for Adj Sprocket Driver	3
13	09534	ADJUST. SPROCKET DRIVER COMPLETE ED	1
14	05503	M10 HEX NUTS	3
15	02708	3MM AF HEX KEY	1
16	02712	8MM LONG ALLEN KEY	1
17	02720	SHORT ARM HEX KEY 1/2"	1
18	02719	GRINDING WHEEL NUT SPANNER	1
19	02706	3/16 T HANDLED ALLEN KEY	1
20	04133	SPLINE DRIVER (SET)	1
21	06173	7/16BSFX1 1/4" KNOB (LG BALL AL.KEY	2
22	04066	LONG BALL HANDLED ALLEN KEY	1
23	06505	GRINDSTONE 6x1 1/2x2 3/4 ED	1
24	-	Keys - Only supplied with the lock, cannot order seperately	1
25	03492	SPRAY BOTTLE WITH ANTI RUST 1/2 LTR	1
26	03493	SPRAY BOTTLE WITH FINE CLEAN 1/2LTR	1
27	08902	3M MAINS LEAD 16AMP PLUG TO TAILS	1
28	06342	PRESSURE PLATE	1

TOOLKIT SERIAL NUMBER:- 22561 - ONWARDS

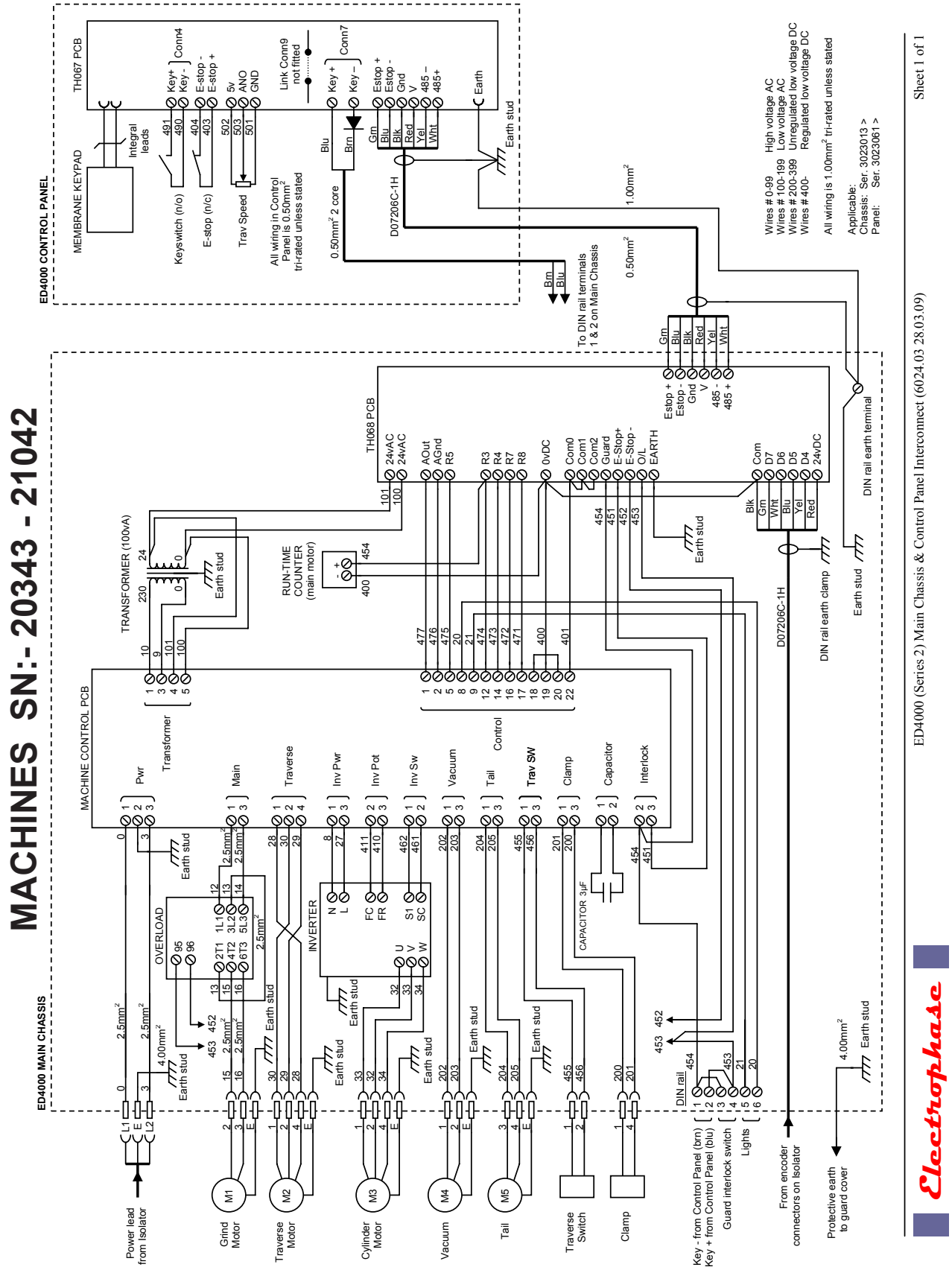




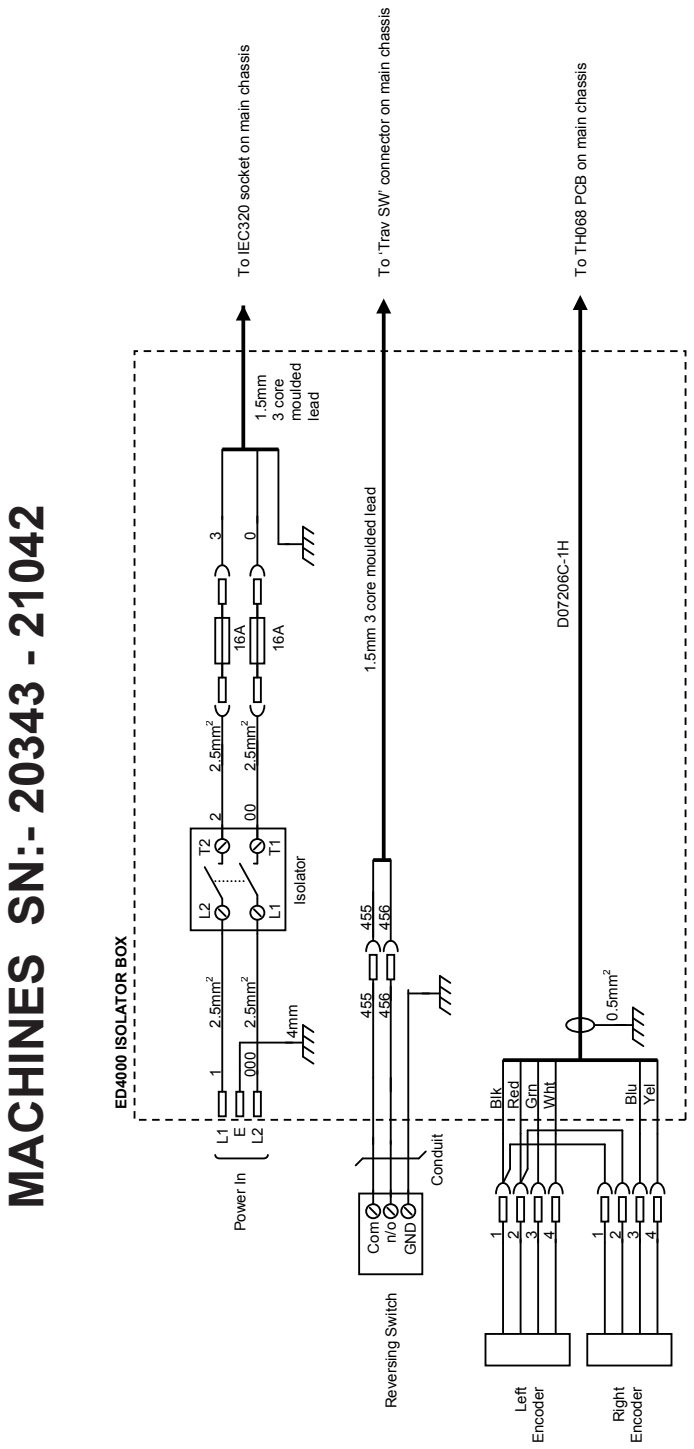


Part	Part #	Description	Qty
1	06505	GRINDSTONE 6x1 1/2x2 3/4 ED	1
2	02706	3/16 T HANDLED ALLEN KEY	1
3	02720	SHORT ARM HEX KEY 1/2"	1
4	02719	GRINDING WHEEL NUT SPANNER	1
5	07042	HEX KEY METRIX EXPERT 10 PIECE SET	1
6	06173	7/16BSFX1 1/4" KNOB (LG BALL AL.KEY	2
7	04066	LONG BALL HANDLED ALLEN KEY	1
8	03492	SPRAY BOTTLE WITH ANTI RUST 1/2 LTR	1
9	04063	LARGE TWO PIN SPROCKET DRIVER	1
10	05209	3/8 WHIT X 5/8 KCP SOCKET SCREW	1
11	03476	GATOR GRIP FOR ED TOOL KIT	1
12	03306	22mm 6POINT 1/2 DRIVE SHORT SOCKET	1
13	02735	Drive Bolt for Adj Sprocket Driver	3
14	09535	ADJUST. SPROCKET DRIVER COMPLETE ED	1
15	05503	M10 HEX NUTS	3
16	04087	MULTIFIX CHANNELS	2
17	03493	SPRAY BOTTLE WITH FINE CLEAN 1/2LTR	1
18	08990	ED4000 SPARE FUSE KIT	1
19	02722	MOLYCOTE PASTE	1
20	06847	MOLYCOTE BRUSH	1
21	04133	SPLINE DRIVER (SET)	1
22	04095	PLAIN DRIVE ROD SHOR FOR MUT MODELS	1
23	08902	3M MAINS LEAD 16AMP PLUG TO TAILS	1
24	06342	PRESSURE PLATE	1

10. Wiring Diagrams *(Continued)*



10. Wiring Diagrams *(Continued)*

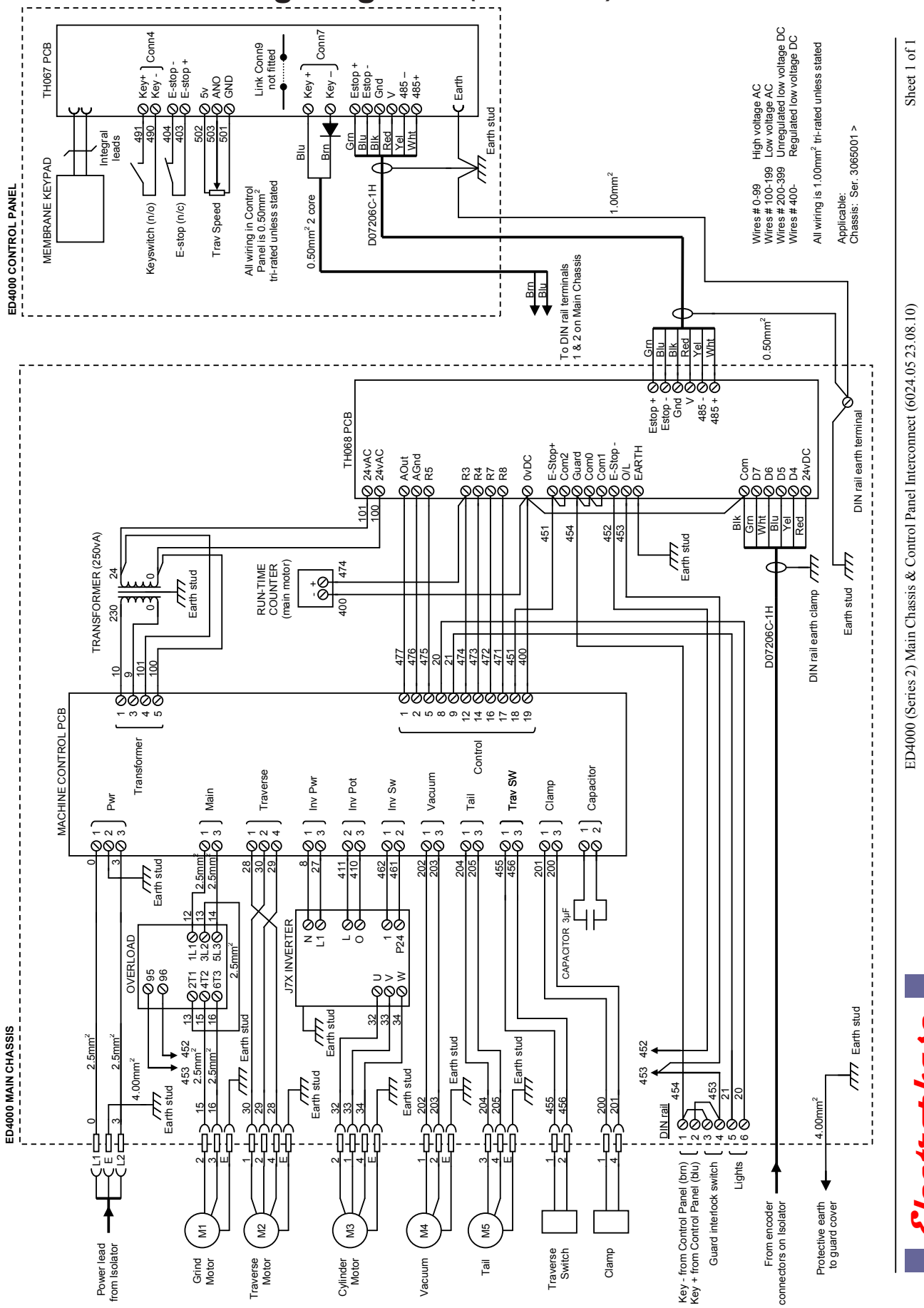


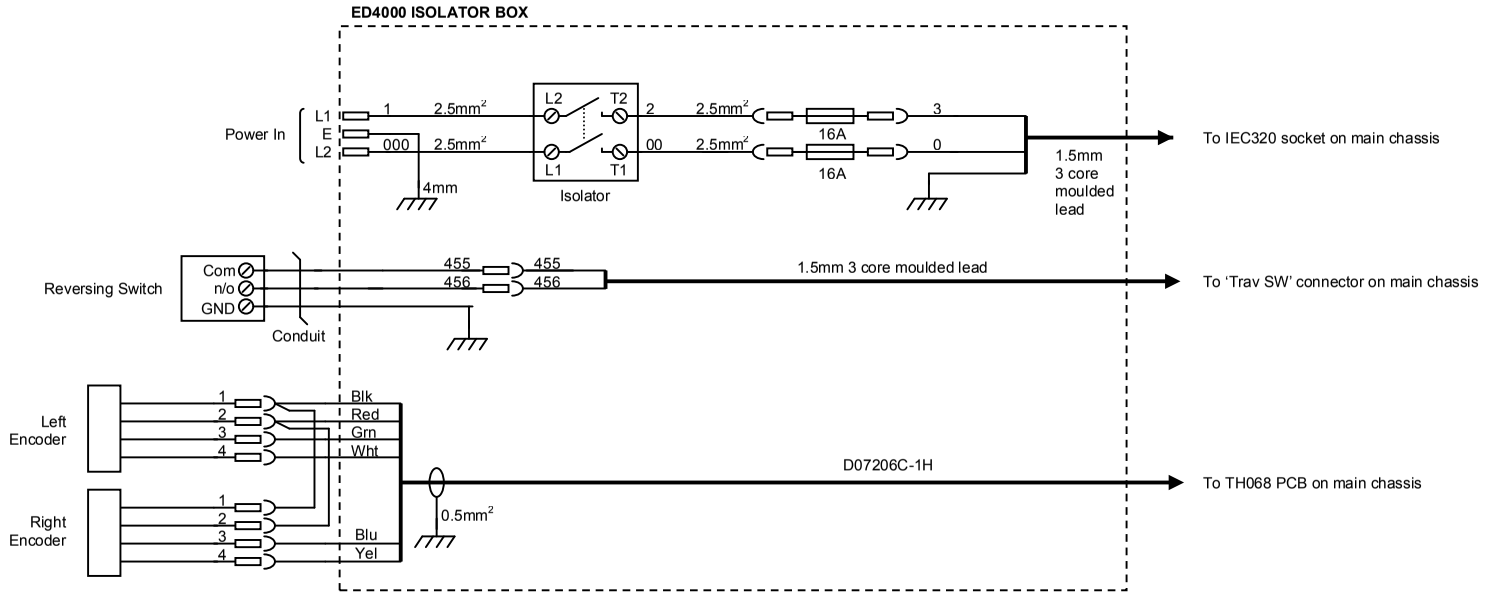
ED4000 Isolator Box Interconnect (6026.02 26.02.09)

Sheet 1 of 1

Electrophase

10. Wiring Diagrams *(Continued)*





MACHINES SN:- 21042 - 22380

Wires # 0-99 High voltage AC
Wires # 100-199 Low voltage AC
Wires # 200-399 Unregulated low voltage DC
Wires # 400- Regulated low voltage DC

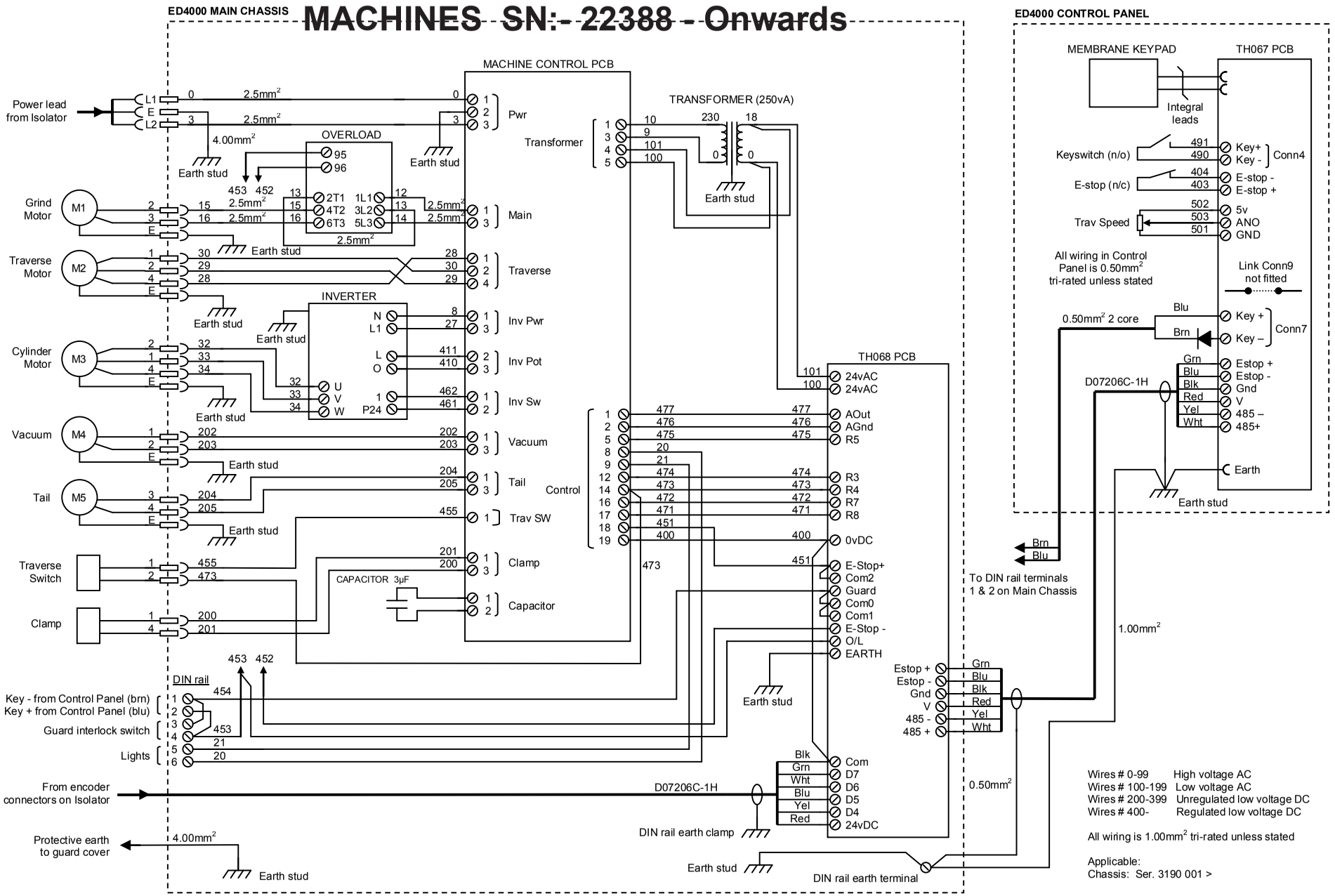
All wiring is 1.00mm² tri-rated unless stated

All chassis earths to terminate at same earth stud

Applicable:

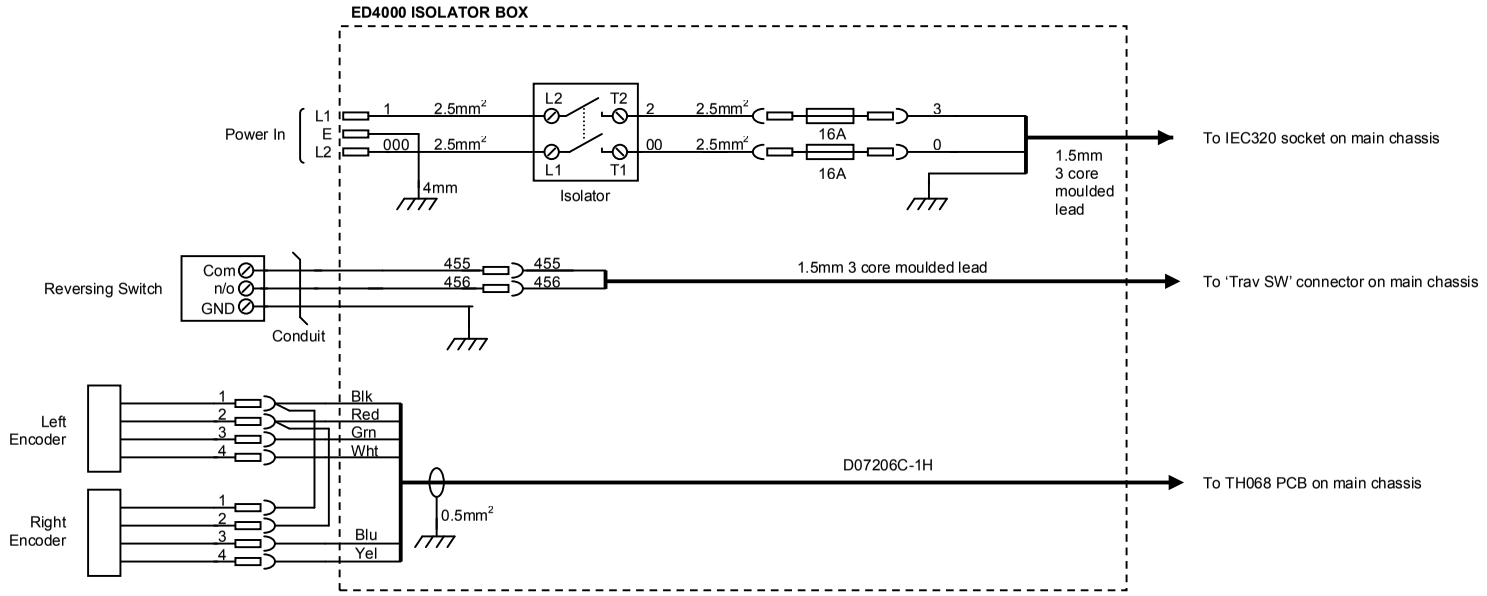
Ser. 3023025 >

MACHINES SN:- 22388 - Onwards



BERNHARD grinders

EXPRESS DUAL 4000



MACHINES SN:- 22388 - Onwards

Wires # 0-99 High voltage AC
Wires # 100-199 Low voltage AC
Wires # 200-399 Unregulated low voltage DC
Wires # 400- Regulated low voltage DC

All wiring is 1.00mm² tri-rated unless stated

All chassis earths to terminate at same earth stud

Applicable:

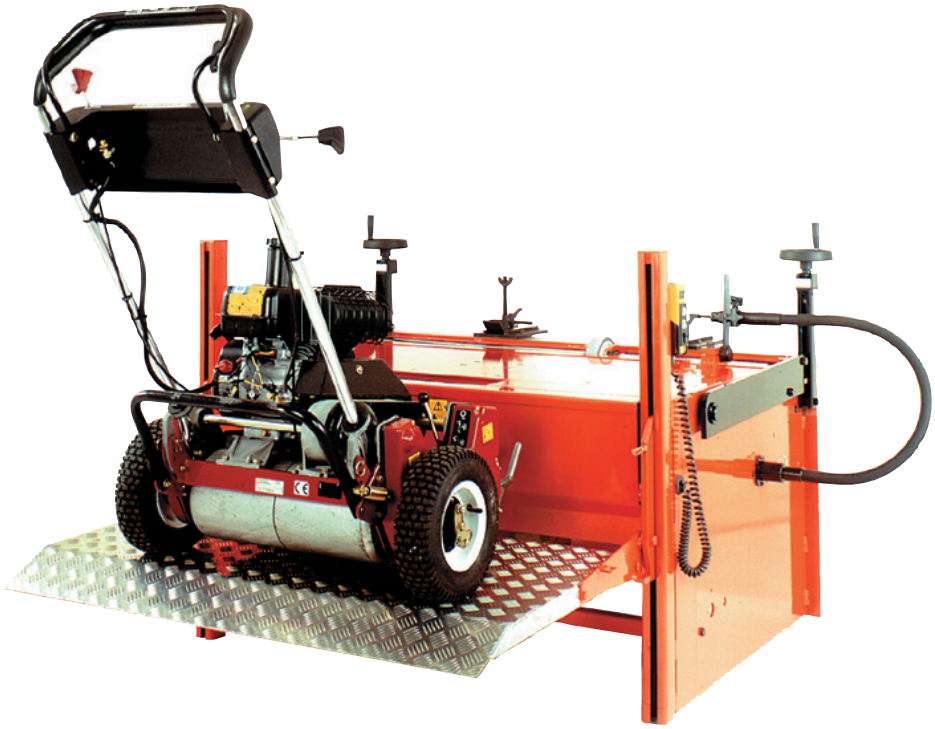
Ser. 3023025 >

BERNHARD grinders

EXPRESS DUAL 4000

EXPRESS LIFT TABLE

for Express Dual Spin Grinders



User's Guide & Instruction Manual

Please read this manual carefully.

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

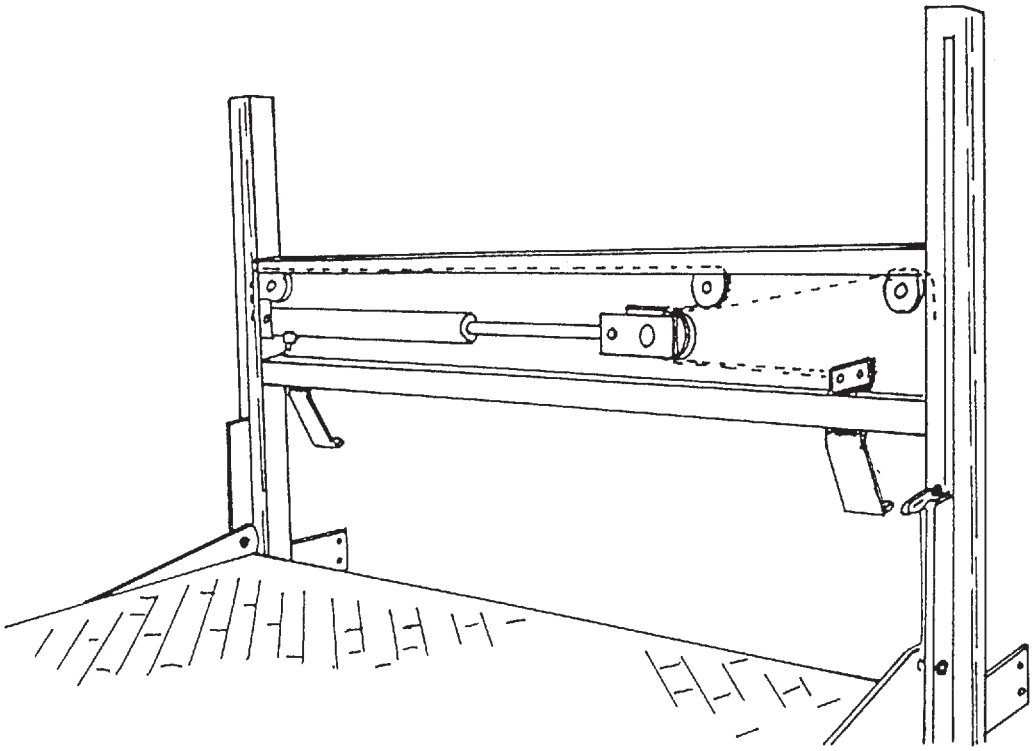


FIG. 1. - OVERALL VIEW WITH COVER REMOVED

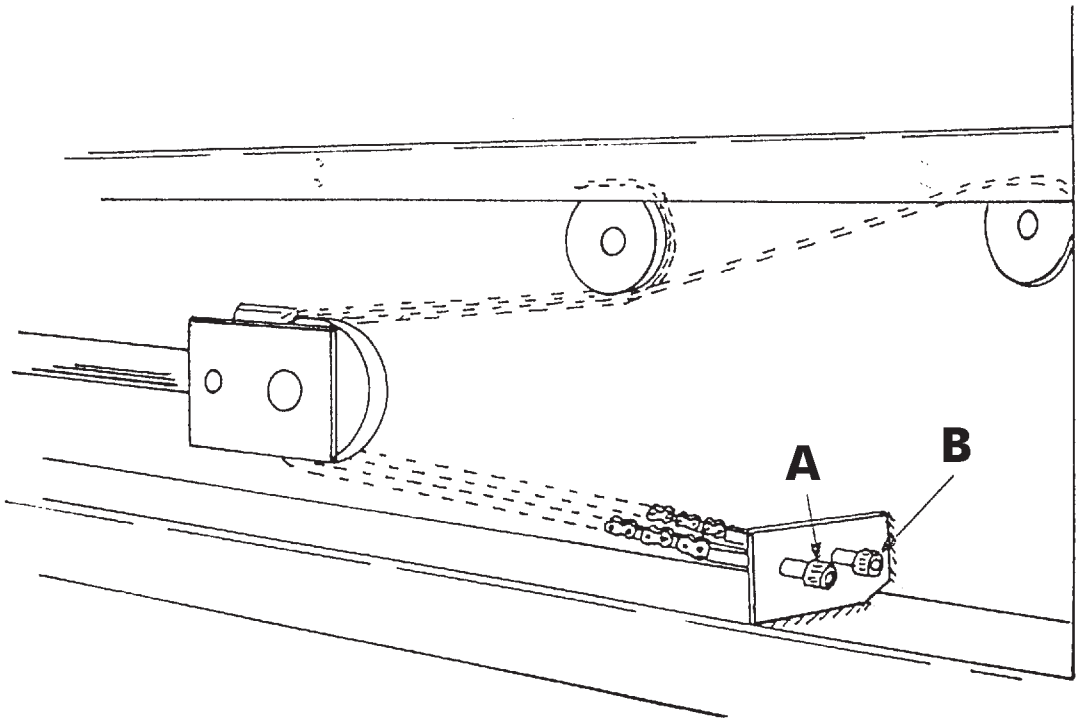


FIG. 2. - TABLE HEIGHT ADJUSTING DETAIL

ADJUSTER A – Raises/Lowers Left Hand Side
ADJUSTER B – Raises/Lowers Right Hand Side

EXPRESS DUAL

Express Dual Lift Table

The Express Lift Table is a carefully designed hydraulic lift table purpose built for attachment to the Express Dual lawn mower reel-grinding machine. Its robust construction and attention to detail should ensure a long and trouble free life.

However, as with all mechanical handling devices caution is required, safe operation can be assured only by constant attention to the operating and maintenance instructions contained in this manual.

It is therefore essential that the responsible person ensure that this machine is operated and/or serviced only by suitably qualified personnel who have read and properly understood this manual.

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**

Contents

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Email: info@bernhard.co.uk
USA Toll Free **1-888 GRIND IT** (1-888 474 6348)

1. Safety

1.1 Never load the lift table with more than the rated weight (The rating is shown on a label on the rear of the cover plate – visible when the lift platform plate is in it's lowered position).

1.2 Always ensure that any load is placed as near as possible in the centre of the table.

1.3 Never ride on the left lift.

1.4 Never attempt to lift an unstable load.

1.5 Never use the table to try to assist another lifting device to lift a large load.

1.6 Always carry out routine checks and maintenance as instructed in this manual and at the correct intervals.

1.7 When lowering the platform from the vertical position do not let it fall under its own weight.

1.8 When not in use always latch the platform into the vertical position or leave it horizontal at ground level.

1.9. When lowering a load ensure that the floor space below the table is clear of all objects.

2. General Description

The Express Lift table consists of a fabricated steel mainframe assembly with two vertical rolled steel channels in which the platform carriages are located. The hinged platform is constructed from aluminium-chequered plate to give high strength combined with ease of handling.

Power is supplied by an electro-hydraulic pack with the single hydraulic ram exerting the lift force through a pair of adjustable lifting chains.

Early units used a power pack with a 12v DC electric motor, powered through a transformer wired directly into the Express Dual grinding machine.

Then from March 1998 units utilised a 24v DC power pack and transformer.

From March 2003 the lift power unit is now 220v AC.

All are controlled by a hand held push button panel, which controls both the raising and lowering functions.

3. Operating Procedure

3.1 When not in use the lift platform is normally stored in its lowest position, with the table clipped in the vertical position.

3.2 To bring into use press the ‘UP’ button on the control panel until the platform has risen to a convenient height, then unclip the platform and lower it into the horizontal position.

NOTE: It is advisable not to allow the platform to fall under its own weight.

3.3 When the platform is horizontal press the ‘DOWN’ button to lower the platform to the floor and place the mower unit onto the platform. Ensure that the unit is as central as possible and stable before pressing the ‘UP’ button to bring the platform to the height of the Express Dual table.

NOTE: When the platform reaches its top position the hydraulic power pack will bypass the lifting pressure. Release the “UP” button. DO NOT PRESS IT AGAIN WHILST THE TABLE IS IN IT’S UPPERMOST POSITION.

3.4 When the unit has been moved onto the Dual table return the platform to its normal storage position to allow better access to the Dual table and avoid the risk of personal injury on the projecting corners of the platform.

3.5 Unload the Dual table in the reverse order.

4. Maintenance and Adjustment

NOTE: Maintenance and adjustment should be carried out by suitably qualified/trained personnel in accordance with the information in this Manual.

As the conditions and frequency of use will vary greatly the following recommendations should be modified if required to suit the prevailing circumstances.

The Express Dual Lift Table is designed and constructed to require the minimum of maintenance. The 3 main requirements are:

1. The correct voltage at the motor terminals when the controls are activated.
2. The correct amount of clean hydraulic fluid of an appropriate grade in the hydraulic system.
3. No build up of dirt or debris around any of the moving parts.

NOTE: When cleaning the Express Dual machine ensure that none of the dust or debris from the grinding process is allowed to enter the Lift table mechanism.

The following checks should be carried out at approximately the intervals stated:

MONTHLY

Visually check the complete unit, confirm that all fixings are secure, that all electrical connections are tight, and that the hydraulic fluid is at the correct level with no visible hydraulic leaks.

3 MONTHLY

In addition to the monthly checks, ensure that the lift platform is level with the Express Dual table at the top of its travel. Adjust if required using the two adjusters (part#14 on exploded parts diagram)

12 MONTHLY

In addition to the above checks, ensure that all parts are clean and free from any damage or obvious wear. Raise the table to the top of its travel and apply a small amount of grease over the whole length of both chains.

On DC powered units visually check the motor brushes for wear.

NOTE: When any moving parts have been replaced or cleaned with a degreasing agent, ensure that they are re-assembled with an adequate quantity of medium grease.

5. Fault Finding

In the event of faulty operation, the following procedure is recommended.

- Check that all moving components are clean and are able to move freely and that they are free from any obvious damage or wear.

- If the lift fails to raise:

1. Check the fuses.
2. Use a test meter to check that the correct voltage is present at the motor terminals when the control buttons are operated. If the voltage is low/missing, check back through the circuit to locate the loss of voltage, usually a loose or dirty connection is the cause (on DC units- finally, check the condition of the motor brushes and their freedom to move).

- If the lift fails to lower:

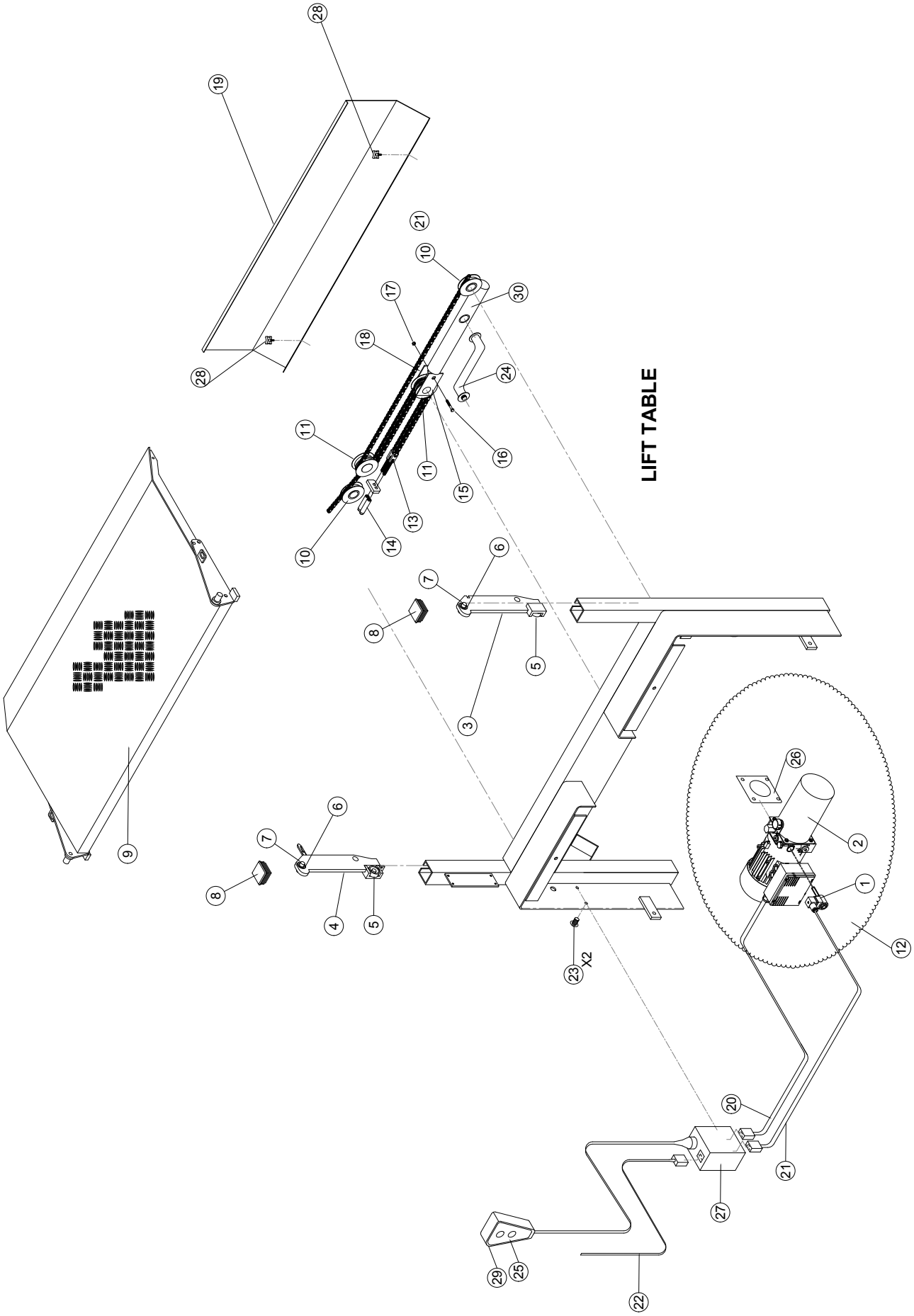
1. Check the fuses.
2. Check the voltage at the dump solenoid – if all is OK then the solenoid has probably failed. If not check back check back through the circuit to locate the loss of voltage.

- If the table drifts/drops slightly over time:

1. Visually check for leaks throughout the system (Power pack, ram, hose) (possible seal failure).
2. Check dump valve solenoid – could be debris under the seating or a valve failure.

TECHNICAL SPECIFICATIONS

Hydraulic Oil	I.S.O.32 (eg catrol hysol XH)
Capacity	0.9litre (2 pints USA)
Max Hydraulic Pressure	140 Bar (Full Load)



Part	Part #	Description	Qty
1	08943	230V MAINS DUMP VALVE	1
2	04745	220v hydraulic reservoir tank (Whit	1
3	04127	SLIDER PLATE	1
4	04128	SLIDER PLATE	1
5	07744	T/LIFT SLIDER BALL RACE	2
6	07744	T/LIFT SLIDER BALL RACE	2
7	04127	SLIDER PLATE	2
8	06194	60 X 60 BLACK PLASTIC CAP	2
9	04139	TAILLIFT PLATFORM	1
10	07209	SINGLE PULLEY	2
11	07204	DOUBLE PULLEY	2
12	08954	MAINS HYDRAULIC POWER PACK	1
13	04119	SCREW TENSIONER	2
14	04022	BOTTLE TENSIONER	2
15	04098	PULLEY MOUNT	2
16	05722	M6 X 40 HEX BOLT	1
17	05517	M6 NYLOCK NUT	1
18	04099	PULLEY MOUNT (2)	1
19	06319	COVER PLATE	1
20	03174	CABLE FOR TAIL LIFT MAIN MOTOR	1
21	03173	CABLE FOR TAIL LIFT SOLENOID	1
22	03742	CABLE FOR TAIL LIFT POWER	1
23	05148	M6 X 16 BTN HD SOCKET SCREW	2
24	06750	HOSE ADAPTOR KIT	1
25	06552	LABEL FOR TAILIFT PENDANT	1
26	04537	SEAL FOR MAINS POWER PACK	1
27	08964	MAINS LIFT TABLE CONTROL MODULE	1
28	06167	M6 X 15 FLOWER KNOB	1
29	08963	CNTRL PENDANT C/W CABLE & CONNECTOR	1
30A	03671	Tail Lift Ram **(SN:- 18575 - 22351) (High)**	1
Seal Kit	04912	Seal kit for Lift Table Ram A03671	1
30B	04910	Tail Lift Ram **(SN:- 22352 - Onwards)**	1
Seal Kit	04911	Seal kit for Lift Table Ram A04910	1

NOTES

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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