

ED5000 Precision Reel/Cylinder Grinder



User's Guide & Instruction Manual

Please read this manual carefully before using the Express Dual 5000. This manual should be kept in a safe place so that it can be used for future reference.



NOTES



ED5000 Precision Reel/Cylinder Grinder

Welcome to the Bernhard Express Dual 5000. If cared for and operated correctly this machine 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 issues please contact your distributor or phone our technical support hotline

Technical Helpline (USA only) 1-888 474 6348

Rest of World: UK Head Office, England (+44) 1788 811600

Email: support@bernhard.co.uk

Technical FAQs can be found on our web site: www.bernhard.co.uk

When ordering spare parts please quote the machine type and serial number. THE MANUFACTURERS ACCEPT NO RESPONSIBILITY FOR ANY SITUATION ARISING FROM THE FITTING AND/OR USE OF NON-ORIGINAL SPARE PARTS.

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BERNHARD & CO. LIMITED

Bilton Road · Rugby · England · CV22 7DT Tel +44 1788 811600 · Fax +44 1788 812640 Email: **info@bernhard.co.uk** USA Toll Free **1-888 GRIND IT** (1-888 474 6348)

ED5000/ENG/1004.3/2017RB

Serial #:





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 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

CONTROLS:



TRAVERSE START CONTROL



GRINDSTONE START CONTROL



REEL START CONTROL



STOP CONTROL



CLAMP / UNCLAMP



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 guard doors closed. The main motor functions will not work with the front doors open because of the fitted safety interlocks.
- 2.5 **NOISE** Owing to the widely varying conditions of use, noise emissions from grinding may vary considerably. Noise levels are kept to a safe level by the sound insulated enclosure.
- 2.6 **NEVER** fit or use a grinding wheel (or other spares) other than those supplied specifically for use on the **EXPRESS DUAL** (Warranty may 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.
- 2.14 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.
- 2.15 The machine is fitted with a "**SERVICE**" switch that can only be operated by a key. It enables certain machine function with the enclosure doors open and should only be used by suitably trained persons to carry out service or test operations **NOT** grinding.



3. 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 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 (for operation), rear (for loading)and requires minimum clearance around it as indicated in the sketch (Fig. 3.2.1.), plus space to get a cutting unit onto the lift table at the rear of the machine



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.



3. Installation (Continued)

3.4 Electrical Supply

USE A QUALIFIED ELECTRICIAN

The EXPRESS DUAL is supplied with a .55 kW (3/4 HP) single phase main (grind) motor plus 2 fractional HP motors, for spin and traverse.

Feed motors are Dc powered hybrid stepper drives.

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 r/h 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

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 cleaned as instructed in the maintenance section of this manual. The feed actuator screws are normally (lightly)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 5000

- A2706 3/16" AF Tee handled Allen Key.
- A2719 Grinding Wheel Nut Wrench
- A2720 1/2" AF Allen Key

10mm 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)
- 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 separate motors driving the different functions of the machine, all are controlled from the control panel, via the control handset and/or automatically by machine software.



The Handset



5. Understanding the Machine (Continued)

5.3.1 Traverse



This motor and the accompanying drive mechanism controls the automatic movement of the grinding wheel along the mainshaft. Screen and/or handset buttons "jog" the traverse to left and right stop/reverse positions. Screen and/or handset buttons "set" the traverse to left and right stop/reverse positions. Automatic traverse is engaged by a touch screen button in manual mode. The traverse engage screen button "toggles" on and off- touch once = motor on (button turns red), touch again = motor off (button returns to green). The traverse button will not work unless both traverse stops are set.

5.3.2 Reel/Spin drive

This suspended motor-drive assembly drives the reel through a flexible coupling. It is a three-phase motor controlled by an inverter for varying output speed. In manual mode a touch screen icon/button turns the motor on and off.

5.3.3 Grinding Wheel

A motor situated under the table, drives the mainshaft and grinding wheel at 2200 rpm. In manual mode a touch screen icon/button turns the motor on and off.

5.3.4 "E" Stop

Pressing the stop button stops all the motors, halts any automatic program 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. A program will return to a safe position.

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

6.1.1 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. 6.1.1).

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: 6.1.1

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

6.1.2 FOLLOW THE SCREEN PROMPTS



Press Auto icon button to progress from the welcome screen to automatic mode – display advances to next screen

Screen prompts to:

To mount mower

To engage clamp



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

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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 key on the operator display panel 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.).

(To undo the clamp press





To ensure that the correct position for the mower unit has been achieved, both sides of the mainshaft should be raised (using the feed jog buttons) so that the grinding wheel may contact each end of the reel. 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.)

Feed the grinding wheel away from reel. It is important that the grinding wheel should clear the highest blade along the full length of the reel before proceeding.



Fig: 6.3.2

Adjustable Front Roller support

Front Roller position is adjustable

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.



6.4 Linking Up The Reel Drive Unit to the Reel

Machines are supplied with a reel drive assembly suspended from the machine enclosure. The complete drive assembly unit can be slid along the supporting rail to either side of the table with a mower unit in place.

The height of the drive can be easily adjusted.

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.

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.



Position and connect the reel drive to the cutting head using an appropriate drive adaptor.

The drive can be connected to either side of the mower cutting unit as necessary. Tighten the locking lever on the support rail when the drive is connected to lock the position and tighten the 4 lobed knob to lock the height.

When mower is positioned and secured for grinding

press "next" icon on operator display – display advances to next screen



6.5 Set Traverse Stops



- 6.5.1 Use traverse "jog" buttons on handset (or screen) to position the grindstone at each traverse reverse position.
- 6.5.2 Mark each position with the corresponding traverse stop set button. An LED illuminates to confirm each position is set.
- **NOTE:** The traverse stop must always be set following a jog movement towards that stop position NEVER following a jog movement away from that set position.
- **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. 6.5.2)



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.

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

Fig: 6.5.2



press "next" icon on operator display – display advances to next screen





6.6 Select Grinding Program

Screen requests size of mower.

6.6.1 **Press the relevant icon to select size of mower**:

- Smaller units (or Greens)
- Medium sized units (or Tees / Light Fairway)
- ■■■ Large units (or Fairway)

Display advances to the next screen.

Screen requests type of grind required.



6.6.2 **Press the relevant icon to select type of grind required**:

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

Display advances to the next screen.



6.6.3 Screen shows selected answers (grind cycle)

CLOSE GUARD FIRST



Press check/tick ("accept") icon if OK. (display advances to the next screen).

or



Press cross ("reject") icon if you wish to make an alternative selection (display returns to size of mower question).



Press "next" icon on operator display – display advances to next screen



STONE TO REEL

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6. In-frame Grinding (Continued)

6.7 Set "Ready to grind" (Motors are running)

The grindstone is moved towards the reel, by pressing the feed jog buttons on the handset. Using the independent feed buttons it should be set so that it touches and gently sparks at both ends of & across the width of the reel. Contact/ sparks should remain light and constant as the stone traverses the length of the reel.

he stone then raise the

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ED 5000

Set contact at one side first as the stone approaches that end of the reel then raise the

other side as that end is approached after the traverse reverses. REMEMBER, that as one side is raised the other side is raised slightly also, so that the 'stone may have to be moved away from the reel after traverse reverses once more.

NOTE: Jog buttons are duplicated on the screen as are the buttons to toggle between fast/slow feed and to toggle between individual feed on eah side and parallel feed of both sides simultaneously.

Press forward arrow ("next") to start the automatic grind cycle and proceed to next screen.



NOTE: When fast infeed is engaged the feed starts slow then accelerates to the higher level.



Press "next" icon to start grinding cycle



Automatic Grinding Cycle 6.8

Screen reads "GRINDING" - Pictures on display animate.

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.

6.8.1 Screen reads "PROGRAM COMPLETE" - (Programme will NOT let a reel "Spark-out")



Press "finished" icon if reel is satisfactory



or

or

Press "re-do" icon if it needs more grinding, to repeat the whole cycle

Press "touch-up" icon if reel is almost there but could do with a "touch up" to finish it off.



Press "finished" icon to advance display to the next screen "Grinding completed"remove mower from machine"



Press "unlock" icon to undo clamp and remove mower

- 6.8.4
- Press "next" icon to return to the starting screen

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/traverses will follow until the cycle is completed once more.

To check the condition of a reel during a grind cycle:

6.8.5

Press "PAUSE" icon during a grind cycle the 'stone will be backed away from the reel and the motors will be stopped. Display screen will read:"PAUSED"

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

- If the blades are sharp enough Press the "finished" icon. 6.8.6
- The display will change to "Grinding completed remove mower from machine" 6.8.7 screen.
- 6.8.8

 \triangleright





6.9 MANUAL MODE GRINDING



If at welcome screen *"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:



- Grind - Vacuum comes on automatically with grindstone



– Traverse

In manual mode, pressing one of these icons once will start a motor (icon colour changes to red). Pressing it a second time will then stop the motor.



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



The *clamp* is still operated by the *"lock"* and *"unlock"* icon buttons.

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:

(Ensure that the front doors of the machine enclosure are closed- or use the service key switch to bypass the interlocks-ONLY qualified personnel)

- 7.1. Check that **STOP BUTTON** in control panel on top of machine is not permanently in **STOP** position.
- 7.2 Check fuses in main electrical box.
- 7.3. Check that reset button on main thermal overload in main electrical box.
- 7.4. Check voltage in electrical box, right hand side of machine enclosure.
- 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 capacitor if possible. If this isn't 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 T2 and T3 on terminal overload. 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 Jog the grinding wheel to the left hand side of the machine (viewed from the operator position) or disengage the traverse pickup from the chain by loosening the 10mm allen key.
- 8.1.3 Raise the mainshaft to its maximum height (FEED LIMIT screen will display). Raise both sides of the mainshaft (Parallel feed).
- 8.1.4 Loosen the 2 allen screws and nuts securing the bearing flange to the side arm the left hand end of the main shaft.
- 8.1.3 Raise the mainshaft to its maximum height (FEED LIMIT screen will display). Raise both sides of the mainshaft (Parallel feed).
- 8.1.5 Undo the Hex socket (allen) screw and remove the left hand fork shoe from the fork driver.
- 8.1.6 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 bearing is removed (see Fig. 8.1.6).



Fig: 8.1.6



8. Maintenance (Continued)

- 8.1.7 Remove the allen bolts & nuts retaining the left hand mainshaft bearing to the side arm.
- 8.1.8 Jog the left-hand feed down a little. The mainshaft can now be raised clear of the side arm so that 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).** Re-tigthen 10mm allen screw in pickup if necessary.
- 8.1.11 Raise the left-hand side-arm and refit the mainshaft bearing.
- 8.1.12 Lower the mainshaft (parallel feed).
- 8.1.13 Fit the diamond dresser block through the slot in the machine table.
- 8.1.14 With the stone NOT running, bring the mainshaft (and grindstone) up horizontally. Manually traverse the grindstone past the diamond, making a light scratch, to confirm that the shaft is horizontal – set horizontal using independent jog feed.
- 8.1.15 Move the stone just clear of the dresser then start the grind motor.
- 8.1.16 Bring up the shaft equally on each side using parallel feed and manually traverse the stone across the dresser.
- 8.1.17 Set traverse stops and engage the auto traverse with the stops set so that the stone completely passes the dresser back and forth.
- 8.1.18 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 contacct areas of the fork driver (with the sleeve and nut) with "MOLYCOTE" (Molydbenum Disulphide), this will impregnate the surface. Excess lubricant / propellant should be wiped off again after a short time.

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

8.2.2 Weekly

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

8.2.3 6 Monthly

Chain and idler sprocket require cleaning and oiling.

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





9. Parts List

MAIN FRAME

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	04050-22	LH End Frame Complete	1
2	04050-23	RH End Frame Complete	1
3	04050-13	Center Box For H Frame	1
4	04050-12	Long Box For H Frame	2
5	04050-19	Front Channel Complete	1
6	04050-11	Lug For H Frame	1
7	04050-17	3/4 Shaft Bracket	2
8	04050-24	Top Plate Complete	1
9	03124		1
10	03125	RH Limit Switch Bracket	1
11	03126	Reversing Bar Encoder Bracket	1
12	03119		1
13	06323-3	L.H Dust Tray Runner	1
14	03261	Upper Front Skirt	1
15	03120	Dust Tray Complete	1
16	03231	Front Skirt Assembly	1
17	06321	Draw Complete	2
18	08126	Proximity Switch	3
19	B18.3.4M - 5 x 0.8 x 10 SBHCS N		4
20	B18.3.5M - 6 x 1.0 x 16 Socket FCHS 16N		6
21	B18.3.1M - 5 x 0.8 x 8 Hex SHCS 8NHX		8
22	B18.3.6M - M6 x 1.0 x 12 Hex Socket Cone Pt. SSC		2
23	Hexagon Nut ISO - 8675 - M8 x 1.0 - N		6







ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	03232	Motor Side Arm	1
	03117	Side Arm Plate	1
	03289	R.H Side Arm Motor Support	1
	03288	R.H Side Arm Motor Plate	1
	03290	R.H Side Arm Motor Adjuster	1
2	03117	Side Arm Plate	1
3	07701	Oilite Bush 1 1/4" Bore	2
4	09108	Rear Circlip Shaft	1
5	06759	Plastic Washer	2
6	09068-1	mainshaft Complete With Stone	1
	09068	MainShaft	1
	09537	Sleeve & Nut Complete With Stone	1
	06505	Grinding Stone	1
	09116	Sleeve	1
	09095	Nut	1
	09116-1	Drive Key For Sleeve	1
7	06040	ED Dual Cycle Main Motor	1
8	07740	SPZ 1112 Vee Belt 60Hz	1
9	07203	95x1 SPZ T/Lock Pulley [C/W 07304]	1
10	07202	71x1 SPZ T/Lock Pulley [C/W 07301]	1
11	04078	Motor Retaing Strip	2
12	05120	Shoulder Screw M10x12x25	2
13	03123	Side Arm Nylon Spacer	2
14	06967	Main Motor Belt Guard	1
	06967-1	Belt Guard	1
	06967-2	Belt Guard Angle	1
15	Truarc 5100-112 - \$1.125		1
16	Truarc 5100-125 - \$1.25		1
17	B18.22M - Plain washer, 8 mm, narrow		4
18	B18.2.3.2M - Formed hex screw, M8 x 1.25 x 3030CN		4
19	B18.2.4.1M - Hex nut, Style 1, M10 x 1.5, with 16mm WAFD-N		2
20	B18.2.3.2M - Formed hex screw, M10 x 1.5 x 60 26CN		2
21	B18.22M - Plain washer, 12 mm, narrow		8
22	B18.2.3.3M - Heavy hex screw, M12 x 1.75 x 4545N		4
23	B18.2.4.1M - Hex nut, Style 1, M12 x 1.75 D-N		4
24	07721	1 1/4" Flange Bearing	2







ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	03118-2	Trav Gearbox	1
2	03118-3	Traverse Motor 60Hz	1
3	03118-5	Trav Sprocket Key	1
4	03118-4	Trav Motor Key	2
5	03121	Trav Motot Drive Shaft	1
6	03122	Sprocket	2
7	03127	Trav Motor Encoder Bolt	1
8	08074	Encoder	1
9	06851	Copper Saddel	1
10	03128	Trav Encoder Bracket Boss	1
11	03129	Trav Encoder Bracket	1
12	03233	3/8 Pitch Chain	1
13	03229-1	Sprocket Bracket	1
14	03229-2	Sprocket Pin	1
15	03227	Limit Bar	1
16	09050	Shaft For Forkdriver	1
17	09183	Shaft For Pick Up	1
18	09259	Fork Bearing Tube	1
19	03114	Fork Profile Bracket	2
20	03115	Brass Fork Profile	2
21	07706	Ball Bushing For Forkdriver	2
22	07707	Dust Seal For Forkdriver	2
23	B18.2.3.2M - Formed hex screw, M10 x 1.5 x 2020WN		2
24	03226	M10 x 20 Mills Pin	2
25	03156	Pickup	1
26	06102	Lobed Knob M12	1
27	06112	Engagment Screw	1
28	07704	Oillite Bush	1
29	B18.22M - Plain washer, 8 mm, wide		1



REEL DRIVE

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	03202	Reel Drive Y Frame	1
	03130	Top Bearing Tube	1
	03131	Support Rod Boss	1
	03202-1	Support Rod	2
	03205	Tool Balancer Btacket	2
2	03203	Motor Support Rod Complete	1
	03204	Motor Support Boss	1
	03203-1	Motor Support Rod	1
3	06011	Cly/Drive Motor Gearbox	1
	06011-1	Cly/Drive Motor	1
	06011-2	Cly/Drive Gearbox	1
4	04044-3	Oilite Bush For Cap	2
5	03200	Tool Balancer	1
6	07702	Ball Bushing For Pickup	2
7	07703	Dust Seal For Pickup	2
8	06123	Kip Lever M12x80	1
9	03133	Gear Box Plate	2
10	03134	Gear Box Brace Plate	2
11	03160	Bosch Grinder Handle	1
12	06273	Flexible Coupling	2
13	04134	Drive Rod	2
14	03201	Gearbox Shaft	1
15	06131	M8x15 4 Lobe Knob	1
16	B18.2.3.2M - Formed hex screw, M12 x 1.75 x 2525CN		1
17	B18.2.4.2M - Hex nut, Style 2, M12 x 1.75 D-N		1
18	B18.3.1M - 5 x 0.8 x 30 Hex SHCS 22NHX		3
19	B18.22M - Plain washer, 5 mm, narrow		3
20	B18.2.4.1M - Hex nut, Style 1, M5 x 0.8 D-N		3
21	B18.3.4M - 5 x 0.8 x 10 SBHCSN		4
22	B18.2.3.2M - Formed hex screw, M8 x 1.25 x 2020CN		2
23	SSCUPSKT 0.375-16x0.4375-HX-N		4









FEED ADJUSTMENT

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	03102-1	Stepper Motor Gearbox	1
2	03102-2	Stepper Motor	1
3	B18.6.7M - M3 x 0.5 x 6 Type I Cross Recessed PHMS6N		4
4	03112	Step Motor Guard	1
5	03103	Step Motor Bracket	1
6	03105	Step Motor Bracket Boss	1
7	03106	Step Motor Feed Tube	1
8	03107	Step Motor Tube Cap	1
9	05303	5/8 Die Spring	1
10	03109	Step Motor To sidearm Boss	1
11	03110	Limit Stop Small	1
12	03111	Limit Stop Large	1
13	B18.3.5M - 6 x 1.0 x 40 Socket FCHS 40N		1
14	05120	Shoulder Screw M10x12x25	2
15	B18.3.6M - M6 x 1.0 x 6 Hex Socket Cone Pt. SSN		1
16	B18.3.6M - M6 x 1.0 x 10 Hex Socket Cone Pt. SSN		1
17	ISO 104 - 111226 - B,10,SI,NC,10_68		1
18	B18.3.4M - 5 x 0.8 x 10 SBHCSN		4
19	B18.3.6M - M6 x 1.0 x 10 Hex Socket Oval Pt. SSN		1
20	03236-2	Stepper Feed Screw	1
21	03236-1	Step Motor Feed Screw Boss	1







MULTI-FIX ASSEMBLY

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	04012-2	Adjusterble Bracket Base	2
2	04012-1	Adjustable Bracket Guide	4
3	04012-3	Base Scale	2
4	B18.3.4M - 6 x 1.0 x 8 SBHCSN		4
5	04009-2	"L" Bracket Base	2
6	04009-1	"L" Bracket Up Right L.H	1
7	04009-3	Pin For Multifix Bracket	16
8	04016	Adjustable Bracket Horizontal	2
9	04006-1	Mounting Bracket "C" Clamp	2
10	04006-2	Mounting Bracket "C" Clamp Block	2
11	06118	Kip Lever M10 x 20	4
12	04180	Slide Nut M10	2
13	04008-1	"V" Clamp Screw Knod	2
14	04008	"C" Clamp Screw	2
15	B18.3.1M - 10 x 1.5 x 20 Hex SHCS 20NHX	M6 Cap/Hd Turned Down To Ø9.0	4
16	04011-4	V Bracket Base	2
17	04011-2	V Bracket Link Bar Boss	2
18	04011-1	V Bracket Angle	2
19	05401	V Bracket Stud M16	2
20	05509-3	Quick Nut Outer Body	2
21	05509-2	Quick Nut Inner Body	2
22	04003-2	"V" Bracket Clamp Boss	2
23	04003-1	"V" Bracket Clamp Finger	2
24	04011-3	V Bracket Link Bar Bush	4
25	B18.2.4.2M - Hex nut, Style 2, M16 x 2D-N		2
26	04807	Multifix Channel	2
27	04010-1	"L" Bracket Up Right R.H	1
28	03072	End Cap	2
29	04011-5	Adjustable Bracket Link Bar	1
30	06121	Kip Lever M10x30	4
31	05211	Special Washer M12	4







CLAMP ASSEMBLY

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	04100	Radius Pressur Arm	1
	04100-1	Radius Pressure Arm Main Box Section	1
	04100-2	Radius Pressure Arm Rolled Box	1
	04100-6	Radius Pressure Arm Long Boss	1
	04100-4	Radius Pressure Arm Small Boss	1
	04100-5	Radius Pressure Arm Lug	1
	04100-8	Radius Pressure Arm Cap	2
2	04101	Radius Pressure Arm Bracket	1
	04101-1	Radius Pressure Arm Bracket Base	1
	04101-3	Radius Pressure Arm Bracket Stop Plate	1
	04101-2	Radius Pressure Arm Bracket Support	2
3	B18.2.3.6M - Heavy hex bolt M16 x 2.0 x 16044N		1
4	B18.2.4.5M - Hex jam nut, M16 x 2D-N		1
5	B18.2.3.2M - Formed hex screw, M10 x 1.5 x 2525CN		1
6	B18.2.4.2M - Hex nut, Style 2, M10 x 1.5, with 16mm WAF D-N		5
7	B18.3.5M - 10 x 1.5 x 30 Socket FCHS 30N		4
8	B18.22M - Plain washer, 10 mm, narrow		4
9	09523	Pressure Bar Complete With Rubber	2
	04100-3	Radius Pressure Bar	1
	04100-7	Radius Pressure Bar Rubber	1
10	09524	Pressure Bar Stud	1







CONTROL ARM

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	03139	Control Arm assembly	1
2	03244	Control Arm Nylon Bush	1
3	Control Box Top Plate Complete	To Be Entered	1
4	Control Box & Lid	To Be Entered	1
5	screen	To Be Entered	1
6	08073	Emergency Stop Button	1
7	Hand Controller Assembly	Hand Controller Assembley	1
8	B18.22M - Plain washer, 6 mm, narrow		2
9	LW 0.25		2
10	B18.3.1M - 6 x 1.0 x 25 Hex SHCS 25NHX		2
11	B18.3.4M - 6 x 1.0 x 12 SBHCSN		4





10. Wiring Diagrams





















NOTES



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 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

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BERNHARD & CO. LIMITED

Bilton Road · Rugby · England · CV22 7DT Tel +44 1788 811600 · Fax +44 1788 812640 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 Capacity Max Hydraulic Pressure

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



ED5000 Precison Reel/Cylinder Grinder



Quick Start Guide

Please read this manual carefully before using the Express Dual 5000. This manual should be kept in a safe place so that it can be used for future reference.



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

Backlit control panel screen (HMI) should light up and, following a warm up/initiation routine, (around 90 seconds as the programme is loaded into the operator panel) display the first screen. If not, switch on the on-off/reset switch on the operator control (HMI) box.

Follow the screen prompts/instructions

- Press the icons/buttons on the screen.
- Operation buttons run along the "button bar" at the base of the display screen and are green until turned on when they change to red.
- Certain buttons will turn grey to show that they are inactive when it would not be appropriate for that function to be accessed.
- Selection buttons (for mower size, grind type) are larger icons in the central area of the screen.

Screen 1 — "Welcome" screen



Select Automatic operation

Or



Select Manual operation

ED 5000 Bernhard & Co Express Dual 5000 Express Dual 5000

Selection proceeds to next screen

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

To change mode:

- · Press the required operation mode button (only appears in certain screens) or
- Press the on-off/reset switch on the operator control (HMI) box, to reset control system (HMI screen goes blank).
- · Wait 20 seconds before turning switch back on again.
- Select alternative mode of operation when system re-loads.





AUTO MODE:

Screen 2 — "Mount mower"

- Place mower on m/c table.
- · ·
 - Engage clamp
 - Undo clamp
 - Press Green arrow to continue



Screen 3 — "Set traverse stops"

- Use traverse "jog" buttons on handset to position the grindstone at each traverse reverse position.
- Mark each position with the corresponding traverse stop set button. An LED illuminates to confirm each position is set
- NOTE: The traverse stop must always be set following a jog movement towards that stop position NEVER following a jog movement away from that set position











AUTO MODE:

Screen 4 — "Define size of mower"

- Press icon / button to select size of cutting unit (Picture size represents unit size)
- Smaller units (or Greens)
- Medium sized units (or Tees/Light Fairway)
- Large units (or Fairway)

Selection proceeds to next screen

Screen 5 — "Choose rate of grind"

- Press icon / button to select grind required (Picture size represents aggression of grind cycle)
- Touch-up grind, quickest, to restore sharpness on a well maintained but "dulled" unit.
- Maintain grind, more work required to restore the edge.
- Rectification grind, restoration of a damaged blade.

Selection proceeds to next screen

Screen 6 — "Confirmation of selected cycle"

 Screen displays mower size and degree of grind selected.



- Confirm selection is ok.
- Re-select (returns to screen 4-"mower size")
- CLOSE SAFETY GUARD and confirm selection to proceed to next stage

NOTE: REEL (SPIN), GRINDSTONE AND TRAVERSE MOTORS WILL NOW START

NOTE: If guard is not closed a warning screen will appear

Closing guard will return to display screen 5 (confirm selection)











AUTO MODE:

Screen 7 — "Set 'Ready to grind' (motors are running)"

 Set grindstone to reel, grindstone is moved, by pressing the feed jog buttons on the handset, so that it touches and gently sparks at both ends of & across the width of the reel. traversing the length of the reel.



 NOTE: Jog buttons are duplicated on the screen as are the buttons to toggle between fast/slow feed and to toggle

between individual feed on eah side and parallel feed of both sides simultaneously

Press forward arrow ("next") to start the automatic grind cycle and proceed to next screen.



NOTE: When fast infeed is engaged the feed starts slow then accelerates to the higher level.







Screen 8 — "Running programme"

- Grinding cycle commences. Images of reel and grind stone appear on screen.
- Both handwheels move together to apply a parallel cut to the reel (Amount according to cycle selected).
- After several traverse passes of the grindstone 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 button shown to "**PAUSE**" the cycle.
 - Both handwheels reverse, grindstone moves away from reel.
 - · All motors stop.

Screen 9 — "Programme Paused"

- Check condition of reel
- Press "GO" button 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.
- **NOTE:** If guard is not closed warning screen will appear. Closing guard will return to "paused" screen.



- Press "finished" button to "End" cycle. Screen 10 appears.





Screen 10 — "Programme completed"

- Check condition of reel / result of grind.
 DO NOT ADJUST FEED POSITION with the handset jog buttons.
- Select "Finished" if reel is finished OK. Progress to Next Screen.
- Select "Re-Do" if you think blades still require some work, and re run complete cycle.



- Select "Touch up" if blades are "not quite there" and require a light finishing grind.
- If "re-do" or "touch up" buttons 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.

Screen 11 — "Grinding completed"



- Press button to undo clamp and remove mower from machine.
- Press "next" to return to "mount mower" screen 2, ready for next mower.
- Press "Hand" button to go to manual mode.
- Ş
- Press to return to Welcome screen.

End of "Automatic" Section.









MANUAL MODE:

- Left and Right hand position values appear on operator panel.
- Engage clamp lock down mower
- Disengage / undo clamp
- Motors can be started <u>and stopped</u> by pressing the icons as directed: Icon is green (to start) turns red when on (to stop).





- Grind stone motor.
- Reel control (spin) motor.
- Traverse motor.
- RESET counters.
- Slow/Fast Infeed. Toggle switch: press once to change. Once again to change back..
- Individual feed (each side)/parallel feed (both sides together) Toggle switch: Press once to chance, once again to change back..
- Automatic (change mode).

In Manual Mode, Express Dual can 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.

End of "Manual" Section.





Other Screens:

(I) "Emergency Stop Activated"

- Warning message indicates emergency stop button has been depressed.
- 0
- Check machine for any potential problems before releasing "E" stop button (by twisting counterclockwise) and re-setting machine by pressing this button.



(II) "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 this button.





Other Screens:

(III) "Main Shaft has bottomed out"

- Mainshaft has reached highest/ lowest limit of travel,. Machine stops since further travel would cause m/c control to lose position reference. Could crash program or damage feed drive train.
- Display indicates limit position, only the feed jog button to feed off that limit position is enabled (example shown is top left feed limit)

(IV) "Traverse Limit"

- Should the grindstone move too far to either side –it reaches a point where traverse stops and a traverse limit switch is activated
- Display advises operator to jog away from the limit position (using the handset)
- Press "next" (forward arrow)
 button to proceed.



S

- In the rare event that the feed system should move more that the program cycle intends, all motors will stop and the feed system overrun error screen will appear.
- Press the forward symbol to reset.
 - Set up for grind will have to be re done









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 BERNHARD & CO. LIMITED

 Bilton Road · Rugby · England · CV22 7DT

 Tel +44 1788 811600 · Fax +44 1788 812640

 Email: info@bernhard.co.uk

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