INSTALLATION AND OPERATING INSTRUCTIONS

CHALLENGER KNIFE GRINDER

PRECAUTION

Before starting or testing a machine, all operators should read these instructions carefully and be familiar with the controls and operation of the Challenger Knife Grinder.

The following is a step-by-step procedure for installation and operation of the Challenger.

1. Removal From Skid & Machine Placement
2. Operation of Grinding Head & Removal of Blocking
3. Manual Movement of Carriage & Way Examination
4. Magnetic and Acme Bar
5. Leveling of Machine from Knife Bar
6. Installation of Coolant Tank and Coolant Pump
7. Initial Electrical Hook-Up of Challenger
8. Explanation of Control Panel
9. Grinding Wheel Information
10. Limit Switch Trip Settings/Auto Operation of Carriage
11. Wheel Dresser
12. Lubrication and Lubrication Points
13. D.C. Controller Adjustments
14. Programming the Timer

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1. REMOVAL FROM SKID AND MACHINE PLACEMENT

After the Challenger arrives, care should be used in removing the skid.

It is important that the knife grinder be placed on a solid foundation, preferably at ground floor level. A poured concrete foundation is recommended, approximately 8" to 30" deep (depending on machine mass and soil conditions) and large enough to accommodate the entire machine. A 4" space should be provided around the foundation for asphalt or other vibration absorbing material. Adequate lighting - either natural or artificial - should be provided for safe operation of the Challenger.

When the machine is placed on the leveling pads, the screws should be adjusted immediately so that each screw is supporting approximately the same load. This will help to avoid any excessive strain being placed on the base during the preliminary checkout period.

NOTE: THIS KNIFE GRINDER SHOULD NOT BE BOLTED TO THE FLOOR!!

Extreme care was taken during the course of manufacturing to produce as accurate a knife grinder as possible. Bolting to the floor can disrupt this built-in accuracy or even destroy it. Proper leveling is essential for grinding accuracy and must necessarily apply to the entire length as well as front to back. The knife bar must be maintained in a level position at all times, so a periodic check of the knife bar should be made. (See Section 5 for leveling information). The base may be blocked in at each end if so desired. We recommend using a suitable machine leveling gauge which has the capability of determining an inaccuracy of .0005" or less per foot.

2. OPERATION OF GRINDING HEAD & REMOVAL OF BLOCKING

WARNING!!! Before starting the grinding head or machine carriage in motion, make sure the grinding wheel has been raised to clear the knife bar and/or any mounted work pieces.

Raising and lowering the grinding head can be accomplished two ways; by manually turning the feed screw through a handwheel on top of the machine carriage, or by a motor-driven power assist system.

For manual operation, it is not necessary to actuate any electrical control, but the motor drive system must be disengaged from the handwheel by means of the toggle clamp located at the upper left corner of the carriage. To disengage the motor drive, lift the lever and push it forward (away from the operator) as far as it will go where it will lock in place. Turning the handwheel on top of the carriage in a clockwise direction, lowers the grinding head approximately .056" (1.4mm) per revolution. Turning the handwheel counter-clockwise will raise the grinding head.

When the Challenger was shipped, a block of wood was placed under the grinding wheel. Then the head was manually fed down placing enough pressure on the block to lift the back bearings on the carriage off the back round way. To remove the block, turn the feed screw handwheel clockwise until the grinding head moves up and down easily without resistance. The block can then be removed by moving the carriage. (See Section 3).

For power driven raising and lowering of the grinding head, the toggle clamp lever must be pulled out and down (toward the operator) to engage the gearing between the feed screw and the drive motor. The handwheel will still rotate when the head moves up or down, but by no means should force be applied to the handwheel when it is being power driven because of the resistance imposed by the reduction gearing in the drive system.

3. MANUAL MOVEMENT OF CARRIAGE AND WAY EXAMINATION

Movement of the carriage can be done in two ways, manual or motor-driven. In the manual mode the carriage is merely pushed by hand in the desired direction and at the desired speed. To disengage the motor-driven system, the small handwheel at the left of the head motor must be pushed forward (away from the operator) to overcome the transmission drive spring and to keep the drive sprocket clear of the stationary roller chain on the rear of the machine. Rotating the handwheel slightly will allow a pin (extending from the shaft) to engage a bracket and keep the sprocket disengaged. In the manual mode the "CARRIAGE TRAVEL" selector switch in the electrical control panel should be "OFF". The "MASTER CONTROL" switch can be in either the "OFF" or "ON" position.

Before initial start-up, it is essential that the round ways be cleaned thoroughly with an industrial strength solvent. Disengage the carriage drive motor and sprocket from the drive chain. Check to make sure the grinding wheel clears the knife bar and all other obstacles. Then, move the carriage approximately 8" in either direction, clean and examine the round ways just exposed. The carriage should then be moved approximately 2 feet in the opposite direction and the ways should be cleaned, inspected and cared for.

4. MAGNETIC AND ACME KNIFE BARS

Magnetic and Acme knife bars are also available as optional equipment. When the machine is equipped with a magnetic knife bar, an additional electrical control station, mounted at the right hand end of the machine, is also included. In addition to switching the magnetic knife bar "ON" for holding ferrous work pieces, it provides an automatic demagnetizing cycle to reduce residual magnetism when the control is switched to "OFF" or "RELEASE". For further information on Magnetic and/or Acme knife bars, consult the factory.

5. LEVELING OF MACHINE FROM KNIFE BAR

Leveling of the Challenger Knife Grinder is done from the knife bar using the machine type level as mentioned in Section 1. First turn the knife bar so a flat surface is up and the Miracle Point Indicator reads 0°. Now place the machine level approximately in the center of the knife bar. Adjust the leveling screws as required. Lightly lubricate the round ways (See Section 14 for lubrication specifications) and disengage the carriage drive motor.

Then, with the level or an accurate dial indicator on the carriage, move the carriage by hand back and forth the full length of the machine 4 or 5 times, observing the machine level gauge to detect any possible twist in the base. When leveling is complete, return the carriage to loading position and engage the drive gear with the drive chain.

6. INSTALLATION OF COOLANT TANK AND COOLANT PUMP

Standard equipment for the Challenger Knife Grinder includes a free standing coolant tank with removable strainer and a submersible pump for 115 volts, 60 Hz operation. The pump should be plugged into the receptacle at the lower rear edge of the machine base. Power to this receptacle is controlled by the "COOLANT PUMP" switch in the upper center of the electrical control panel. The coolant system can be turned "ON" or "OFF" independently of the "MASTER CONTROL" switch.

The large diameter clear plastic tubing supplied with the machine is for connecting the pump outlet to the manifold on the right side of the carriage, using the hose clamps supplied to ensure leak-proof connections. The coolant tank should be under the rear of the machine so that the coolant carrying grit and particles returned through the machine discharge tube (extending down from the underside of the base) will pass through the strainer over the coolant tank.

One flexible nozzle from the manifold passes through a collar in the wheel cover panel so it can be directed against the outer edge of the grinding wheel near the point where it is in contact with the work piece. The other nozzle extends down the right side of the carriage so it can be directed to further flood the work piece.

One gallon of Hanchett Red Anchor II Grinding Compound is included with each machine. The fluid is in concentrated form and should be diluted in a ratio of 1 part compound to 40-50 parts water. Replacement supplies can be ordered from Hanchett Mfg.

Part No: COOLRA201-One gallon Red Anchor II Concentrated Compound
Part No: COOLRA205-Five gallon Red Anchor II Concentrated Compound

7. INITIAL ELECTRICAL HOOK-UP OF CHALLENGER

The Challenger Knife Grinder controls were fully adjusted and preset at the factory. **WARNING!!! DO NOT EXPERIMENT WITH NOR INDISCRIMINATELY RE-ADJUST THE CONTROLS ON THE MAIN PANEL AS THIS WILL VOID THE WARRANTY!!!** In all cases, it would be advisable to consult the factory prior to changing any of the initial adjustments. **BEFORE STARTING - READ THE WIRING DIAGRAM!!!**

The Challenger was completely wired and run-tested at the factory. It is necessary only to connect the electric power line to the terminal strips labeled L1, L2 and L3. However, prior to this connection, a check of all other connections should be made to assure that none have vibrated loose during shipment. This check should include all push-buttons, selector switches, starters, relays, and grounds for each motor.

Make sure the three phase service is of ample capacity and the correct voltage and frequency.

The use of a properly sized, fused disconnect switch (not included as standard equipment) is recommended.

Connect the three phase service to result in correct motor rotation. The grinding wheel should rotate clockwise as viewed from the top of the motor (looking down on top of the grinding wheel). Direction of rotation is also indicated by a label (arrow) near the top of the motor.

8. EXPLANATION OF CONTROL PANEL

The coolant pump is independently controlled by a two-position ("ON"-"OFF") selector switch. However, in order for the remainder of the electrical system to function, the "MASTER CONTROL" switch (large red mushroom head push-button) must be pulled out and left in its "ON" position. Pushing the "MASTER CONTROL" into its "OFF" position interrupts electrical power to all machine functions except the coolant pump.

A total of four controls - in a convenient grouping of the two center units in the bottom and second rows - are for controlling movements of the grinding head. With the "DOWNFEED SELECTOR" switch in its "MANUAL" position, motor-driven raising or lowering of the head can be initiated by depressing the "JOG UP" or "JOG DOWN" push-buttons. The rate at which the head moves will be determined by the setting of the "DOWNFEED RATE" knob; turning the knob clockwise will increase the speed at which the head moves. Head movement will continue as long as either "JOG" button is held in. Use care to avoid running the head to the extreme limits of its travel, or jam-ups may occur.

With the "DOWNFEED SELECTOR" switch in its "AUTOMATIC" position, traversing the carriage will be accompanied by a predetermined downfeed of the grinding head each time the carriage reaches the left hand end of its travel. The operator can select the desired downfeed movement by setting of the "DOWNFEED RATE" knob, with increased movement when the knob is turned clockwise. With the "DOWNFEED RATE" knob at its maximum setting, downfeed movement is about .0032" (.08mm). NOTE: The arc encompassed by seven teeth of the feedscrew gear is equivalent to .0032" vertical movement.

9. GRINDING WHEEL INFORMATION

In support of system performance and industrial standardization, current model Challenger Knife Grinders employ a 10-inch cylinder grinding wheel and a 7 1/2HP - 1800 RPM Head motor arrangement. However, as an option, earlier model grinding system groupings may be provided using 14-inch cylinder/segmental grinding wheel and a 5 HP - 1200 RPM head motor. This wheel can be used for grinding a variety of steel work pieces providing it has been properly dressed (see Section 11), there is adequate coolant flow, and downfeed is at the proper rate. Replacement wheel can be obtained from Hanchett Manufacturing, or you may order a 14" Red Anchor segmental wheel chuck and grinding segments as optional equipment. Consult the factory for further information.

IMPORTANT!!! Grinding wheel should be handled and stored in a careful manner. Before mounting, visually inspect all grinding wheels for possible damage that may have occurred in storage or handling. Tapping a wheel lightly before installation may also be helpful in detecting hidden cracks.

To remove or install the grinding wheel, remove the wheel access door and elevate the grinding head until the lower face of the grinding wheel is above the horizontal floor of the carriage. A steel plate which is provided with the machine can then be positioned under the wheel to serve as a support, leaving the hands free to tighten or loosen mounting screws, etc. Make certain the lower surface of the wheel plate is clean and free of burrs before mounting the grinding wheel. The eight 3/8-16 NC X 1-1/4" socket head cap screws for securing the wheel to the wheel plate are accessible through the swing away door in the wheel cover panel and should initially be tightened just enough to retain the wheel. Check to make sure the wheel is centered by rotating the wheel spindle by hand while positioning a pencil to lightly touch the outer wall of the wheel. Re-position the wheel as needed to center it, and tighten the wheel screws evenly to 550-600 inch-pounds torque. After running two to three hours on initial installation, stop the wheel and re-tighten the screws.

CAUTION!!! Over-tightening or using screws that are too long may result in hazardous conditions.

10. LIMIT SWITCH TRIP SETTINGS & AUTOMATIC OPERATION OF CARRIAGE

For motor-driven carriage travel (as used in normal grinding operations), the handwheel to the left of the head motor is rotated to release the locking pin to allow the wheel and shaft to return fully outward (toward the operator). This engages the drive sprocket at the rear of the machine with the stationary roller chain. With the "MASTER CONTROL" switch "ON", the "CARRIAGE TRAVEL" switch (lower right hand corner of electrical control panel) may be turned "ON" and the carriage will move either right or left. When the carriage trips either limit switch trip at the end of the machine, the carriage will decelerate, stop, and reverse direction.

The carriage is driven by a 1/2 H.P. DC motor which is supplied and controlled by the DC-1 controller and the POT-1 "CARRIAGE SPEED" potentiometer in the operator's control panel. With POT-1 turned down (extreme counter-clockwise setting), turn on the carriage travel switch. The carriage should move at slow speed (approximately 5 fpm). Slowly turn POT-1 clockwise and observe if the carriage speed increases (to approximately 55 fpm at top setting).

Internal adjustments of the DC control unit in the main electrical enclosure were made at the factory and should remain undisturbed. Consult the factory for further information.

If the carriage movement is jerky and irregular, it may be necessary to re-adjust the spring tension engaging the drive sprocket with the roller chain and the stop bolt at the rear of the machine. The erratic motion can result from either excessive or insufficient spring tension, and can best be determined by the trial and error approach.

The 1/8 H.P. DC motor which turns the feedscrew when the machine is in its automatic downfeed mode is controlled by the POT-2 potentiometer on the operator's control panel, and adjustable time delay relay TD-1 and the DC-2 controller. The DC-2 controller also supplies the DC power to operate the motor. Automatic downfeed is initiated each time the carriage reaches the left hand end of its travel and trips the limit switch. Each downfeed movement is limited to .0035" maximum and is governed by the length of time the motor is energized in conjunction with the speed at which the motor is set to run.

REMINDER! The arc encompassed by seven teeth of the feedscrew gear is equivalent to .0032" vertical movement. Speed of the downfeed motor is controlled by the POT-2 setting and the DC-2 controller settings. Operator control is entirely through POT-2, with maximum downfeed at the extreme clockwise setting.

TD-1 time delay relay controls the length of time the feed motor runs each time a downfeed movement is initiated. A knob on the relay allows infinite adjustments from 0.1 to 10.0 seconds. Start with the knob counter-clockwise to a minimal time interval, gradually increasing the setting until each downfeed movement equals .0030" - .0035" with POT-2 in its full clockwise setting. The TD-1 adjustment should be kept at the low end of its time range so that it can time out and close its contact to maintain carriage movement in the right hand direction.

11. WHEEL DRESSING

A Hanchett rotating cutter, ball bearing wheel dresser is included as standard equipment on the Challenger Knife Grinder. The dresser assembly is mounted in the machine base at the left end of the knife bar. It can be adjusted to the desired height and locked in place by tightening two 3/8 screws securely. The grinding head should be elevated to clear the wheel dresser, and the carriage should be set up for manual movement (turn the "CARRIAGE TRAVEL" switch to "OFF", and disengage the drive sprocket). This allows the carriage to be manually moved as desired. Coolant should be turned off as dressing is done dry.

Position the carriage with the grinding wheel over the dresser and lower the wheel (preferably manually by turning the handwheel counter-clockwise) until it contacts the dresser cutters. Move the carriage to clear the dresser assembly and lower the grinding wheel .015" - about one quarter of a turn of the handwheel - from the setting where it initially made contact. Move the carriage so the wheel slowly moves back and forth across the dresser until the sounds indicate the cutting has been completed. Back the carriage off so the wheel is again clear of the dresser, lower the wheel another .015", and repeat the operation. On completing the dressing operation, the dresser bracket should be lowered and locked below the grinding plane before resuming grinding. Benefits of dressing the grinding wheel regularly are improved quality of work and increased production.

12. LUBRICATION AND LUBRICATION POINTS

Motors and gear boxes of the Challenger Knife Grinder have been lubricated at the factory for life, and under normal conditions should require no further lubrication. Regularly scheduled lubrication of the few remaining points will aid in prolonging machine life and enhancing performance.

LUBE POINT	LOCATION	LUBE SCHEDULE
1. Feed screw nut	Zerk fitting at upper end of wheel slide	Daily
2. Knife bar bearing	Zerk fitting in pillow block each end of the knife bar	Daily
3. Front and rear shafts	On base	As required to keep from rusting
4. Shaft on carriage	Grinding motor downfeed behind	As required to keep from rusting.

13. D.C. CONTROLLER ADJUSTMENT

As previously stated, it is advisable to contact the factory before any adjustments are attempted. Experimentation or indiscriminately re-adjusting could void any warranty.

Six trimmers on the DC-1 controller allow for various adjustments of carriage movement:

"MIN" - increases minimum speed when it is turned clockwise.

"MAX" - increases top speed when it is turned clockwise. **NOTE:** Highest setting must not exceed 55 volts DC measured at terminals #12 and #13 with POT-1 at maximum setting.

"IR COMP" - controls load regulation of motor. Set POT-1 at 20% speed. Turn "IR COMP" trimmer clockwise until motor begins to "hunt". Back off "IR COMP" trimmer counter-clockwise until hunting stops. Then back off "IR COMP" trimmer at least 1/3 of the span between this setting and zero.

Adjusting the other three trimmers, "CUR LIM", "ACCEL", and "DECEL", in the field **is not** recommended.

Five trimmers on the DC-2 controller allow for various adjustments to influence downfeed movement. When adjusting these trimmers, the POT-2 potentiometer should be at its maximum clockwise setting unless otherwise specified.

"MAX" - calibrates the speed at which the motor turns when POT-2 is turned fully clockwise. Top speed is increased by turning "MAX" clockwise. Highest setting must not exceed 50 volts DC measured at terminals #19 and #20 with POT-2 at its maximum setting.

"MIM" - sets the zero calibration of the POT-2 knob. With POT-2 at zero (full counter-clockwise) rotate the "MIM" trimmer clockwise until the motor starts to rotate. Then decrease the "MIM" setting until the motor rotation stops.

"IR COMP" - Controls load regulation of the motor. As slowdown under load is of minimal concern in this system, the "IR COMP" can be left fully counter-clockwise.

Adjusting the other two trimmers, "CUM LIM" and "ACCEL" in the field **is not** recommended.

HANCHETT MANUFACTURING

14. PROGRAMMING THE TIMER

1) Press the large Red Mushroom Head pushbutton in. This will remove the control power from the timer.

2) Press and hold the "**<<**" button. Press the "**>>**" button and release both buttons. This will "wake-up" the timer. The letters "**DE**" should be flashing.

3) Press the "**A**" button until the letters "**INT**" are flashing. Press the "**S**" button. This sets the timer to the interval timing mode. The "▲" symbol should be flashing.

4) Press the "**A**" button until the "▼" symbol is flashing. Press the "**S**" button. This sets the timer to count down. The letters "**DEC**" should be flashing.

5) Press the "**A**" button until the letters "**DEC**" are not showing. Press the "**S**" button. This tells the timer to count in Minutes and Seconds. The first "**0**" should be flashing.

6) Press the "**>>**" button until the display reads"**00 M 00 S**". This sets the timer to display in Minutes and Seconds with the first two digits being minutes and the last two digits being seconds.

7) Press the "**<<**" button or the "**>>**" button to position the blinking number to the digit you wish to change. Remember, the first to digits are minutes and the last two digits are seconds. Press the "**A**" button to advance the numbers one number at a time. When the proper number is displayed, press the "**S**" button to save all settings.

8) Pull the large Red Mushroom Head pushbutton out. This will restore the power to timer. Operate machine as usual.

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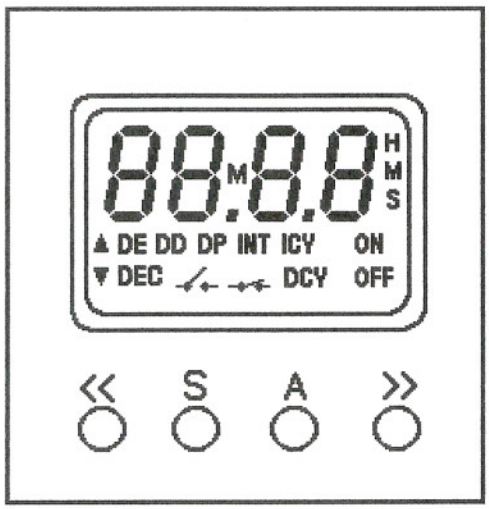

ILLUSTRATION OF TIMER FACE AND LOCATION OF COMMANDS

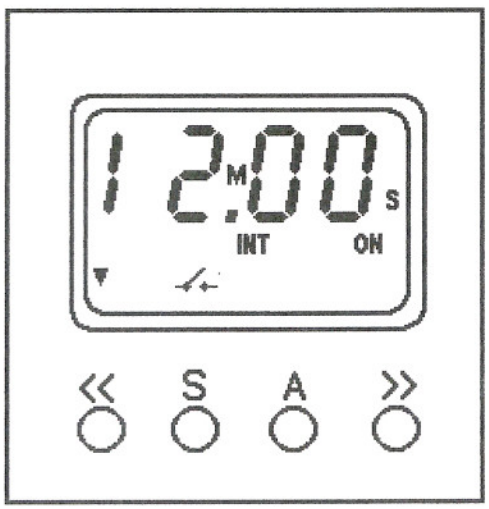

ILLUSTRATION OF PROGRAMMED TIMER
(12 MINUTE TIMED PROGRAM)