



MODEL 673 AUTOMATIC BEDKNIFE GRINDER

SERVICE MANUAL

 **WARNING**

You must thoroughly read and understand this manual before assembling or maintaining the equipment, paying particular attention to the Warning & Safety Instructions.



IMPORTANT SAFETY MESSAGE



As manufacturers of sharpening equipment, we want to confirm to you, our customers, our concern for safety. We also want to remind you about the simple, basic, and common sense rules of safety when using this equipment. Failure to follow these rules can result in severe injury or death to operators or bystanders.

It is essential that everyone involved in the assembly, operation, transport, maintenance, and storage of this equipment be aware, concerned, prudent, and properly trained in safety. Always use proper shielding and personal protective equipment as specified by the manufacturer.

Our current production machines include, as standard equipment, guards or shields for the grinding wheel, safety signs, and operators and service manuals. Never bypass or operate the machine with any of the guards or safety devices removed or without the proper personal safety equipment.

Read and fully understand all the safety practices discussed in this manual and the Operator's Manual . All safety rules must be understood and followed by anyone who works with knife grinders.

Before operating this grinder, an operator must read and understand all of the information in the Operator's Manual and understand all of the safety signs attached to the product. A person who has not read or understood the Operator's Manual and safety signs is not qualified to operate the unit. Accidents occur often on machines that are used by someone who has not read the Operator's Manual and is not familiar with the equipment. If you do not have an Operator's Manual or current production safety signs, contact the manufacturer or your dealer immediately.

The equipment is designed for one-man operation. Never operate the equipment with anyone near, or in contact with, any part of the grinder. Be sure no one else, including bystanders, are near you when you operate this product.

Follow these simple, basic safety rules, as well as others, including:

- Find and understand all safety signs in the Operator's Manual and on the equipment. This will help minimize the possibility of accidents and increase your productivity in using this product.
- Be careful and make sure that everyone who operates the grinder knows and understands that it is a very powerful piece of machinery, and if used improperly, serious injury or death may result. The final responsibility for safety rests with the operator of this machine.

Throughout this manual, the following safety symbols will be used to indicate the degree of certain hazards.



This symbol is used throughout this manual to call attention to the safety procedures.

 **DANGER**

The word **DANGER** indicates an immediate hazardous situation, which if not avoided, will result in death or serious injury.

 **WARNING**

The word **WARNING** indicates a potential hazardous situation, which if not avoided, could result in death or serious injury.

 **CAUTION**

The word **CAUTION** preceded with a safety alert symbol indicates a potential hazardous situation which, if not avoided, may result in minor or moderate injury.

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Read the Operator's Manual before operating this equipment. Keep this manual handy for ready reference. Require all operators to read this manual carefully and become acquainted with all adjustments and operating procedures before attempting to operate the equipment. Replacement manuals can be obtained from your selling dealer or the manufacturer.

The equipment you have purchased has been carefully engineered and manufactured to provide dependable and satisfactory use. Like all mechanical products, it will require cleaning and upkeep. Lubricate and clean the unit as specified in the Operator's Manual. Please observe all safety information in this manual, the Operators Manual, and the safety decals on the equipment.



This machine is designed for sharpening the bedknives used on reel type mower cutting units ONLY. Any use other than this may cause personal injury and void the warranty.

To assure the quality and safety of your machine and to maintain the warranty, you MUST use original equipment manufacturer's replacement parts and have any repair work done by a qualified professional.

ALL operators of this equipment must be thoroughly trained BEFORE operating the equipment.

Do not use compressed air to clean grinding dust from the machine. This dust can cause personal injury as well as damage to the grinder.



INSTALLATION, DAILY MAINTENANCE, AND BASIC UPKEEP IS DISCUSSED IN THE OPERATOR'S MANUAL. THIS MANUAL SHOULD BE USED IN CONJUNCTION WITH THE OPERATOR'S MANUAL FOR PERFORMING SERVICE ON THIS EQUIPMENT.

**WARNING**

TO AVOID INJURY, READ AND UNDERSTAND THE SAFETY ITEMS LISTED BELOW. IF YOU DO NOT UNDERSTAND ANY PART OF THIS MANUAL AND NEED ASSISTANCE, CONTACT YOUR LOCAL DEALER.

- 1. KEEP GUARDS IN PLACE** and in working order.
- 2. REMOVE WRENCHES AND OTHER TOOLS.**
- 3. KEEP WORK AREA CLEAN.**
- 4. DON'T USE IN DANGEROUS ENVIRONMENT.**
Don't use grinder in damp or wet locations. Machine is for indoor use only. Keep work area well lit.
- 5. KEEP ALL VISITORS AWAY.** All visitors should be kept a safe distance from work area.
- 6. MAKE WORK AREA CHILD-PROOF** with padlocks or master switches.
- 7. DON'T FORCE THE GRINDER.** It will do the job better and safer if used as specified in this manual.
- 8. USE THE RIGHT TOOL.** Don't force the grinder or an attachment to do a job for which it was not designed.
- 9. WEAR PROPER APPAREL.** Wear no loose clothing, gloves, neckties, or jewelry which may get caught in moving parts. Nonslip footwear is recommended. Wear protective hair covering to contain long hair.
- 10. ALWAYS USE SAFETY GLASSES.**
- 11. SECURE YOUR WORK.** Make certain that the bedknife is securely fastened by the electromagnets provided before operating.
- 12. DON'T OVERREACH.** Keep proper footing and balance at all times.
- 13. MAINTAIN GRINDER WITH CARE.** Follow instructions in the Service Manual for lubrication and preventive maintenance.
- 14. DISCONNECT POWER BEFORE SERVICING.**
- 15. REDUCE THE RISK OF UNINTENTIONAL STARTING.** Make sure the switch is OFF before plugging in the grinder.
- 16. USE RECOMMENDED ACCESSORIES.** Consult the manual for recommended accessories. Using improper accessories may cause risk of personal injury.
- 17. CHECK DAMAGED PARTS.** A guard or other part that is damaged or will not perform its intended function should be properly repaired or replaced.
- 18. KNOW YOUR EQUIPMENT.** Read this manual carefully. Learn its application and limitations as well as specific potential hazards.
- 19. KEEP ALL SAFETY DECALS CLEAN AND LEGIBLE.** If safety decals become damaged or illegible for any reason, replace immediately. Refer to replacement parts illustrations in the Service Manual for the proper location and part numbers of safety decals.
- 20. DO NOT OPERATE THE GRINDER WHEN UNDER THE INFLUENCE OF DRUGS, ALCOHOL, OR MEDICATION**

**WARNING**

IMPROPER USE OF GRINDING WHEEL MAY CAUSE BREAKAGE AND SERIOUS INJURY.

GRINDING IS A SAFE OPERATION IF THE FEW BASIC RULES LISTED BELOW ARE FOLLOWED. THESE RULES ARE BASED ON MATERIAL CONTAINED IN THE ANSI B7.1 SAFETY CODE FOR "USE, CARE AND PROTECTION OF ABRASIVE WHEELS". FOR YOUR SAFETY, WE SUGGEST YOU BENEFIT FROM THE EXPERIENCE OF OTHERS AND CAREFULLY FOLLOW THESE RULES.

DO

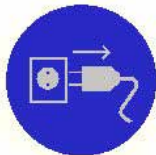
1. **DO** always **HANDLE AND STORE** wheels in a **CAREFUL** manner.
2. **DO VISUALLY INSPECT** all wheels before mounting for possible damage.
3. **DO CHECK MACHINE SPEED** against the established maximum safe operating speed marked on wheel.
4. **DO CHECK MOUNTING FLANGES** for equal and correct diameter.
5. **DO USE MOUNTING BLOTTERS** when supplied with wheels.
6. **DO** be sure **WORK REST** is properly adjusted.
7. **DO** always **USE A SAFETY GUARD THAT COVERS** at least one-half of the grinding wheel.
8. **DO** allow **NEWLY MOUNTED WHEELS** to run at operating speed, with guard in place, for at least one minute before grinding.
9. **DO** always **WEAR SAFETY GLASSES** or some type of eye protection when grinding.
10. **DO TURN OFF COOLANT** before stopping to avoid creating an out-of-balance condition.

DON'T

1. **DON'T** use a cracked wheel or one that **HAS BEEN DROPPED** or has become damaged.
2. **DON'T FORCE** a wheel onto the machine **OR ALTER** the size of the mounting hole. If a wheel won't fit the machine, get one that will.
3. **DON'T** ever **EXCEED MAXIMUM OPERATING SPEED** established for the wheel.
4. **DON'T** use mounting flanges on which the bearing surfaces **ARE NOT CLEAN, FLAT AND FREE OF BURRS**.
5. **DON'T TIGHTEN** the mounting nut **EXCESSIVELY**.
6. **DON'T** grind on the **SIDE OF THE WHEEL** (see Safety Code B7.2 for exception).
7. **DON'T** start the machine until the **WHEEL GUARD IS IN PLACE**.
8. **DON'T JAM** work into the wheel.
9. **DON'T STAND DIRECTLY IN FRONT** of a grinding wheel whenever a grinder is started.
10. **DON'T FORCE GRINDING** so that motor slows noticeably or the work gets hot.

**WARNING**

AVOID INHALATION OF DUST generated by grinding and cutting operations. Exposure to dust may cause respiratory ailments. Use approved NIOSH or MSHA respirators, safety glasses or face shields, and protective clothing. Provide adequate ventilation to eliminate dust, or to maintain dust level below the Threshold Limit Value for nuisance dust as classified by OSHA.



UNPLUG THE EQUIPMENT PRIOR TO DOING ANY SERVICE ON THIS EQUIPMENT. FAILURE TO REMOVE POWER TO THIS EQUIPMENT BEFORE SERVICING MAY RESULT IN INJURY OR DEATH.

IF POWER IS REQUIRED FOR TESTING OR TROUBLESHOOTING, THIS SHOULD BE PERFORMED BY A TRAINED PROFESSIONAL OR LICENSED ELECTRICIAN.

REVIEW THE SYMBOLS AND DESCRIPTIONS ON PAGES 10 AND 11 OF THE OPERATOR'S MANUAL. UNDERSTAND ALL SYMBOLS BEFORE OPERATING OR SERVICING THIS EQUIPMENT.



This is the electrical hazard symbol. It indicates that there are **DANGEROUS HIGH VOLTAGES PRESENT** inside the enclosure of this product. TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, do not attempt to open the enclosure or gain access to areas where you are not instructed to do so. **REFER SERVICING TO QUALIFIED SERVICE PERSONNEL ONLY.**

IMPORTANT GROUNDING INSTRUCTIONS

If electrical testing is required, always verify the machine has a proper ground before performing any tests.

In case of a malfunction or breakdown, grounding reduces the risk of electrical shock by providing a path of least resistance for electrical current.

This grinder has an electrical cord with an equipment grounding conductor and a grounding plug. The plug must be plugged into a matching outlet that is properly installed and grounded according to all local or other appropriate electrical codes and ordinances.

Before plugging in the grinder, make sure it will be connected to a supply circuit protected by a properly sized circuit breaker or fuse. SEE SERIAL NUMBER PLATE FOR FULL LOAD AMP RATING OF YOUR MACHINE.

Never modify the plug provided with the machine--if it won't fit the outlet, have a proper outlet and circuit installed by a qualified electrician.



ALWAYS PROVIDE A PROPER ELECTRICAL GROUND FOR YOUR MACHINE. AN IMPROPER CONNECTION CAN CAUSE A DANGEROUS ELECTRICAL SHOCK. IF YOU ARE UNSURE OF THE PROPER ELECTRICAL GROUNDING PROCEDURE, CONTACT A QUALIFIED ELECTRICIAN.

SKILL AND TRAINING REQUIRED FOR SERVICING

This Service Manual is designed for technicians who have the necessary mechanical and electrical knowledge and skills to reliably test and repair the Bedknife Grinder. For those without that background, service can be arranged through a local distributor.

This manual presumes that you are already familiar with the normal operation of the grinder. If not, you should read the Operator's Manual or do the servicing in conjunction with someone who is familiar with its operation.

PERSONS WITHOUT THE NECESSARY KNOWLEDGE AND SKILLS SHOULD NOT OPEN THE CONTROL BOX OR ATTEMPT ANY INTERNAL TROUBLESHOOTING, ADJUSTMENTS, OR PARTS REPLACEMENT.

If you have questions not answered in this manual, please call your distributor.



TORQUE REQUIREMENTS

Throughout this manual we refer to torque requirements as "firmly tighten" or the like. For more specific torque values, refer to the information below.

Bolts going into a Nut or into a Threaded Hole in Steel.

Refer to table at the right.

Bolts going into a Threaded Hole in Aluminum.

Use the Grade 2 values in the table at the right.

Socket-Head Screws




Use the Grade 8 values in the table at the right.

Machine Screw

No. 6 Screws: 11 in.-lbs [0.125 kg-m]

No. 8 Screws: 20 in.-lbs [0.23 kg-m]

No. 10 Screws: 32 in.-lbs [0.37kg-m]

	GRADE 2  SMOOTH HEAD	GRADE 5  3 MARKS on HEAD	GRADE 8  6 MARKS on HEAD
1/4 In. thread	6 ft-lbs (0.8 kg-m)	9 ft-lbs (1.25 kg-m)	13 ft-lbs (1.8 kg-m)
5/16 In. thread	11 ft-lbs (1.5 kg-m)	18 ft-lbs (2.5 kg-m)	28 ft-lbs (3.9 kg-m)
3/8 In. thread	19 ft-lbs (2.6 kg-m)	31 ft-lbs (4.3 kg-m)	46 ft-lbs (6.4 kg-m)
7/16 In. thread	30 ft-lbs (4.1 kg-m)	50 ft-lbs (6.9 kg-m)	75 ft-lbs (10.4 kg-m)
1/2 In. thread	45 ft-lbs (6.2 kg-m)	75 ft-lbs (10.4 kg-m)	115 ft-lbs (15.9 kg-m)

LUBRICATION OF LINEAR BEARINGS

STEP 1--Thoroughly clean the shafts.

STEP 2--Flood spray the two shafts with a spray lubricant (**do not use a teflon based lubricant**) until the lubricant is dripping off the shafts. Then run the carriage back and forth through its full range of travel. This will carry the lubricant into the bearings.

STEP 3--With a clean rag, wipe off the excess amount of lubricant from the shafts. Run the carriage back and forth through its full range of travel and wipe the shafts after each traverse. Repeat until the shafts are dry to the feel. This completes the lubrication process.

If the unit will be shut down for an extended period of time, more than four weeks, then the shafts and other appropriate parts of the unit should be flooded with lubricant. That lubricant should be left in place until the unit is brought back into service. When the unit is brought back into service the full lubrication procedure, as stated above, should be repeated.

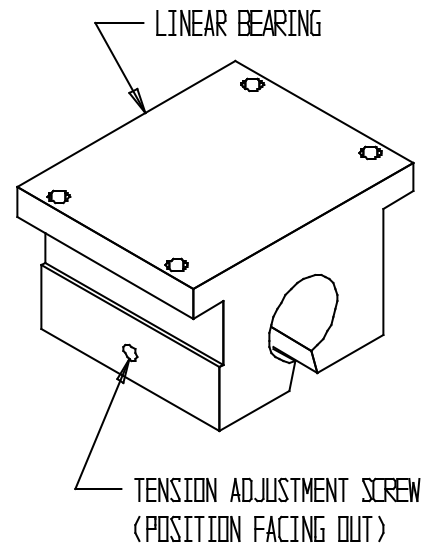


FIG. 1

TESTING FOR PLAY IN THE BEARINGS USING THE BEARING TESTER FORK

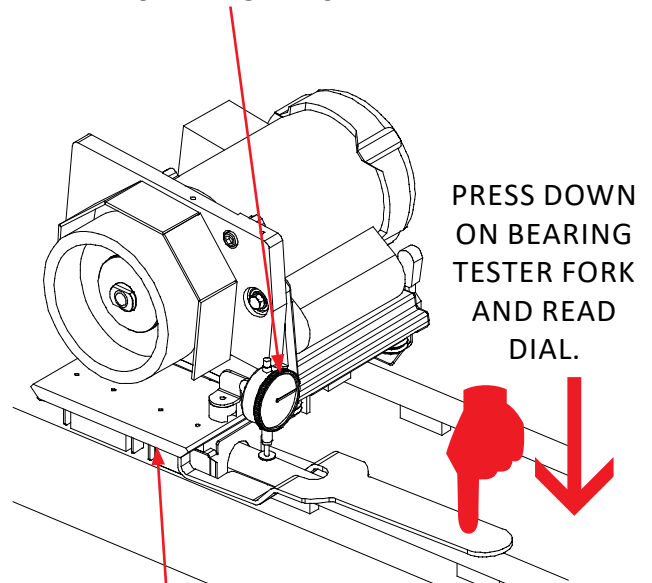
The traverse bearings on this grinder tend to wear and typically last around 3-6 years. If you believe your bearings are still in good working condition they may be tested and adjusted on the machine using the bearing tester fork and a dial indicator. If you do not have a dial indicator you may purchase a dial indicator kit (part no. 3706060) designed to be used with the bearing tester fork. If the bearings are being replaced follow the procedures on the next page. The tester fork may be used at a later date to adjust the bearings in place if needed.

TESTING PROCEDURE:

1. Position the dial indicator assembly on the machine grinding head assembly next to the bearing to be tested. Remove the bellows if the machine has them installed. The dial indicator should be within 1" of the side of the grinding head carriage directly above the bearing being tested. It is best to measure to the traverse shaft with a wide flat tip.
2. Insert the bearing testing fork 3706055 until the fork contacts the wiper bracket or the bearing.
3. With the tip of the dial indicator on the traverse shaft zero out the dial indicator.
4. Use your hand and press on the end of the bearing tester fork until it contacts the traverse rail. See FIG. 2. Read the movement on the dial indicator. If the movement exceeds .003" the bearing needs to be adjusted. Retest the bearing after adjusting the tension on the bearing. If the bearing does not improve to below the .003" reading then the bearing needs to be replaced.

Repeat steps 1-4 for the other other bearings on the carriage.

DIAL INDICATOR MUST BE POSITIONED OVER THE BEARING BEING TESTED AND LOCATED WITHIN 1" OF THE SIDE OF THE CARRIAGE BASE.



PRESS DOWN ON BEARING TESTER FORK AND READ DIAL.

IF DIAL READS MORE THAN .003" OF MOVEMENT, ADJUST BEARING TENSION USING THE BEARING TENSION SCREW. SEE FIG 2.

FIG. 2

CARRIAGE LINEAR BEARING REPLACEMENT

1. Remove the optional carriage bellows (if used) from the carriage.
2. Remove the four screws of one linear bearing and slide the linear bearing off the end of the carriage shaft.
3. Insert a new linear bearing onto the end of the carriage shaft with the tension adjustment screw pointing outward. See FIG. 3.
4. Adjust the tension screw of the linear bearing so when you radially rotate the linear bearing around the carriage shaft there should be no free play between the linear bearing and the carriage shaft.

NOTE: The tension is too tight if you feel a cogging action when you rotate the linear bearing around the shaft. This cogging is from the skidding of the bearing on the shaft and indicates the tension screw is too tight. Sliding the bearing block back and forth should be a smooth uniform motion.

5. Slide the linear bearing under carriage and attach with the four screws.

Repeat Steps 2 through 5 with the other two linear bearings.

6. After all three linear bearings are secured to the carriage, you may check for correct bearing tension using the bearing tester fork as described on the previous page. Also, pulling the carriage in the traversing direction should require approximately three pounds of force (with the belt clamp disengaged). To double check the assembly, slide the carriage from "end of travel" to "end of travel". The carriage should have very uniform resistance through its full range of motion.



SETTING THE BEARING TENSION CORRECTLY IS CRITICAL TO PROPER GRINDING. BEARINGS WHICH ARE TOO TIGHT OR TOO LOOSE WILL CAUSE POOR GRIND QUALITY. ALSO, BEARINGS WHICH ARE TOO TIGHT WILL HAVE SUBSTANTIALLY SHORTER LIVES AND MAY DAMAGE THE SHAFT.

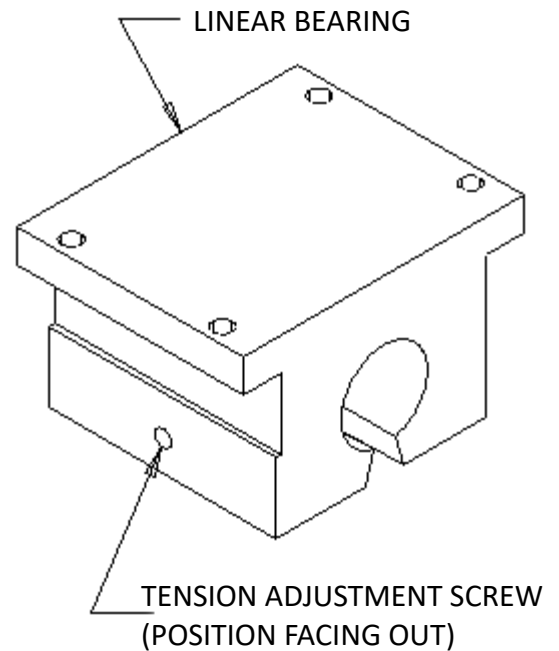


FIG. 3

MAGNET REPAIR ASSEMBLY

If a magnet is damaged or fails on your 673 ACCU-Pro Bedknife Grinder or if the linear bearing fails, follow the detailed instructions below:

1. Contact the Foley United Customer Service Department at 800-225-9810 and get a Return Goods Authorization (RGA) number. Your Repair Part No. is 6729510, Magnet Repair Assembly - INA.

This Repair Assembly part number includes the labor to regrind the magnet set, but does not include replacement parts. When the magnet assemblies are returned to Foley United, we test the magnets. Foley United Customer Service Department will then contact you with a list of parts that are required to repair your magnet assemblies. Then we will install the new parts and regrind both magnets on our production fixture. The magnet assemblies are then retested and returned to you for reinstallation.

Please provide your grinder serial number and all contact information for communication on the repairs. Your grinder has an INA linear bearing that uses a shipping guide. This shipping guide was included in your product packet assembly. **IF YOU DO NOT HAVE THE SHIPPING GUIDE YOU MUST CALL THE FACTORY AND HAVE ONE SENT TO YOU BEFORE YOU ATTEMPT TO REMOVE THAT BEARING.** To use the shipping guide you must perfectly align the bearing shipping guide to the profile rail and slide the bearing off the profile rail and immediately onto the bearing shipping guide.

2. Disconnect the electrical wiring for both electromagnets and coil up the wire next to the electromagnets. Remove the left side fixed magnet assembly.
3. Drive down the two roll pins and remove the four attaching screws, saving the screws. Remove the right side moveable magnet assembly. Remove both bellows and the lock block, saving all fasteners. Great care must be taken when removing the moveable magnet assembly from the profile rail. See the warning above.
4. See FIG. 4 which illustrates which parts to return to Foley United. Make certain the bearing shipping guide is in place and then wrap the assembly in heavy paper and tape. Package the two magnet assemblies in a very sturdy shipping container with adequate filler material around and between the magnet assemblies. Note: the magnet assemblies weigh approximately 30 lbs. each and have sharp edges. Make sure to package accordingly.

NOTE: INADEQUATE PACKAGING MAY CAUSE SHIPPING DAMAGE TO THE MAGNETS AND REQUIRE REPLACEMENT OF ONE OR BOTH MAGNETS.

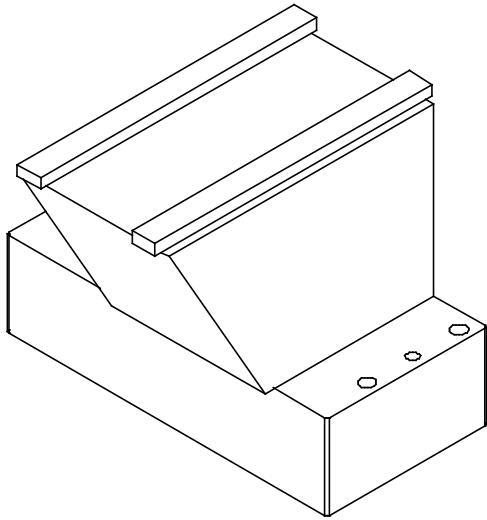
5. To reinstall the left magnet assembly, reinstall with four screws just snugged up, then drive the two new roll pins supplied to you in the return package. Then tighten the four mounting screws.
6. To reinstall the right magnet assembly, slide the linear bearing onto the profile rail. Again, the installation of the INA bearing is critical. You must slide the bearing off the bearing shipping guide and onto the profile rail with perfect alignment between the guide and the rail, or bearing damage will result.
7. Once the bearing is successfully on the profile rail, pump three pumps of grease from a standard grease gun into the bearing. Wipe off any excess grease that is visible. Then remove the grease fitting and install the plug supplied to you in the return package. The plug must be seated below the surface of the bearing.

Continued on next page.

8. Now reinstall the lock block and bellows using the saved fasteners. The screw indicated in FIG. 4 must be left installed in both sides of the INA bearing or the bearing will come apart. The lock block and bellows are designed to use the remaining three screws on the INA bearing for each side for attachment, avoiding the retained screw in the bearing.
9. Reconnect and reattach the wiring for both magnets. Replacement cable ties are supplied to you in the return package. Your grinder should now be operational.

NOTE: FAILURE TO USE THE INA BEARING SHIPPING GUIDE WILL DAMAGE THE BEARING AND REQUIRE YOU TO PURCHASE A REPLACEMENT BEARING.

LEFT SIDE BEARING ASSEMBLY



RIGHT SIDE BEARING ASSEMBLY

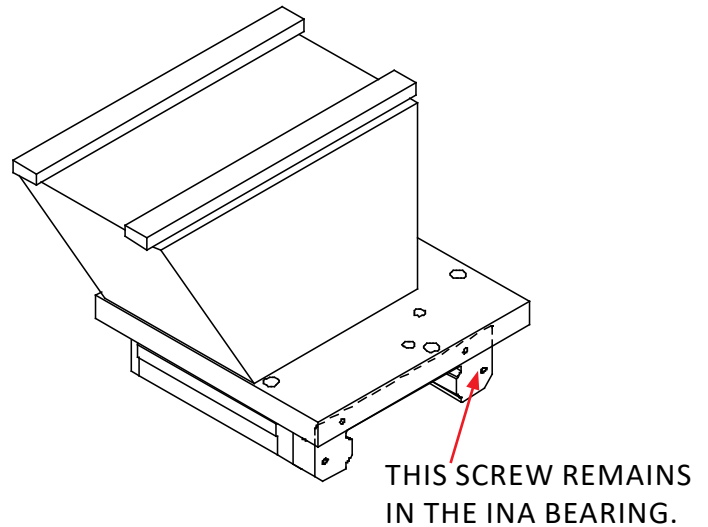


FIG. 4

CLEANING AND MAINTENANCE GUIDELINES FOR POLYCARBONATE WINDOWS

Adherence to regular and proper cleaning procedures is recommended to preserve appearance and performance. **DO NOT USE GASOLINE** to clean polycarbonate windows!

WASHING TO MINIMIZE SCRATCHING

Wash polycarbonate windows with a mild dish-washing liquid detergent and lukewarm water, using a clean soft sponge or a soft cloth. Rinse well with clean water. Dry thoroughly with a moist cellulose sponge to prevent water spots. Do not scrub or use brushes on these windows. Also, do not use butyl cellosolve in direct sunlight.

Fresh paint splashes and grease can be removed easily before drying by rubbing lightly with a good grade of VM&P naphtha or isopropyl alcohol. Afterward, wash with warm water and a mild dish washing liquid detergent solution and then thoroughly rinse with clean water.

MINIMIZING HAIRLINE SCRATCHES

Scratches and minor abrasions can be minimized by using a mild automobile polish. Three such products that tend to polish and fill scratches are Johnson Paste Wax, Novus Plastic Polish #1 and #2, and Mirror Glaze Plastic Polish (M.G. M10). It is suggested that a test be made on a corner of the polycarbonate window with the product selected following the polish manufacturer's instructions.

IMPORTANT

- **DO NOT** use abrasive or highly alkaline cleaners on the polycarbonate windows.
- **Never** scrape polycarbonate windows with squeegees, razor blades or other sharp instruments.
- Benzene, gasoline, acetone or carbon tetrachloride should **NEVER** be used on polycarbonate windows.
- **DO NOT** clean polycarbonate windows in hot sun or at elevated temperatures.

GRAFFITI REMOVAL

- Butyl cellosolve, (for removal of paints, marking pen inks, lipstick, etc.)
- The use of masking tape, adhesive tape or lint removal tools works well for lifting off old weathered paints.
- To remove labels, stickers, etc., the use of kerosene, VM&P naphtha or petroleum spirits is generally effective. When the solvent will not penetrate sticker material, apply heat from a hair dryer to soften the adhesive and promote removal. **DO NOT USE GASOLINE!**

LUBRICATION FOR EXTENDED DOWN TIME/STORAGE:

If the machine will be shut down for more than one month, flood the traverse shafts and other appropriate parts with lubricant as outlined on previous page. Leave the lubricant in place until the unit will be used again. Then repeat the lubrication procedure before operating. This procedure applies to the bearing rail and bearing for the moveable right side electromagnet as well.

TO ADJUST THE TRAVEL LIMIT SENSORS

For the travel limit sensors to work properly and reverse the direction of the carriage at each end of a traverse, a distance of 3/16 in. +/- 1/32 [4.75 mm +/- 0.75] must be maintained between the top of the switch and the actuator bracket on the bottom of the carriage. See FIG. 5.

To adjust the clearance, loosen one of the switch mounting nuts while tightening the other.

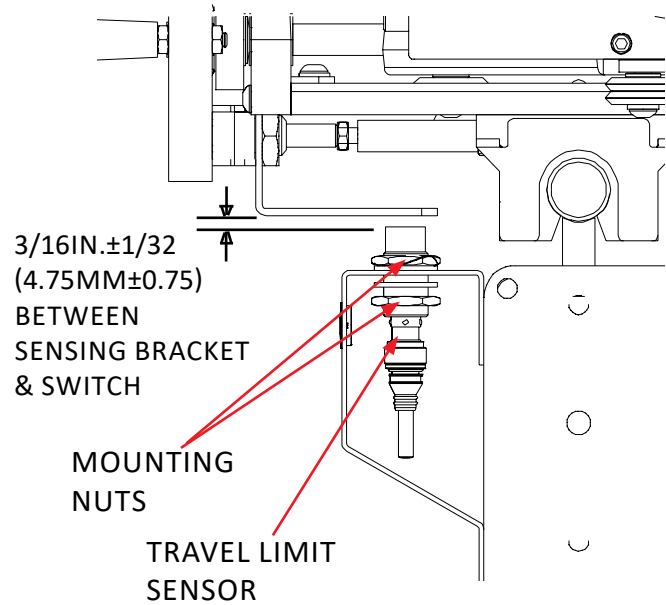


FIG. 5

TO ELIMINATE MOVEMENT IN THE DIAMOND DRESSER ADJUSTMENT COLLAR

The adjustment collar on the diamond dresser (see FIG. 6) has a nylon ball and set screw to put a holding drag on the diamond dresser shaft. If the adjustment collar is moving when not wanted or moving too freely, tighten the setscrew (this will put more load on the nylon ball). If the adjustment collar is difficult to turn, loosen the setscrew decreasing the load on the nylon ball.

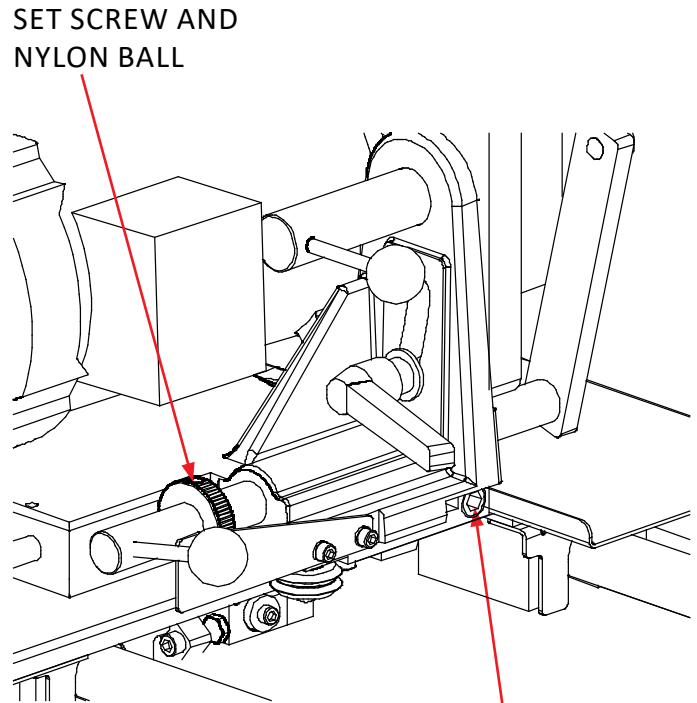


FIG. 6

ADJUSTING THE PRELOAD TENSION ON THE SMALL GRINDING HEAD SLIDE V-ROLLERS

The small grinding head slide V-rollers are positioned two fixed on the left and one adjustable on the right side. To set the correct preload on the right side adjuster, tighten the setscrew in FIG. 6 until the spring is fully compressed solid, then back off 1/2 turn.

TRAVERSE BELT TENSION

To adjust the tension on the traverse belt tighten the screws and nuts located at the right side of the traverse belt. Tighten nuts until the compression springs measure 3/4" [19.0 mm]. See FIG. 7. If the springs are not tensioned equally, uneven loading on the traverse system may cause parts to fail.

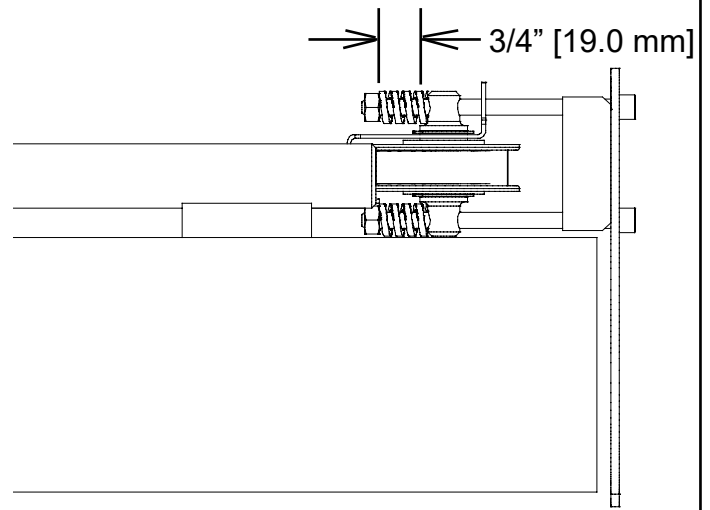


FIG. 7



DO NOT OVERTIGHTEN. OVERTIGHTENING COULD DAMAGE THE BELT OR TRAVERSE DRIVE SYSTEM.

TRAVERSE CLAMP FORCE

If the traverse clamp is slipping during regular operation it may be necessary to tighten the clamp. To tighten, loosen the jam nut and rotate the clamp tip out to adjust the position. Move the traverse belt out of the way and verify the clamped distance from the tip to the clamping block (shoe). See FIG. 8. Lock in place by tightening the jam nut against the clamp, being careful not to move the tip.

Do not set the adjustment at less than .10" [2.5 mm]. The .10" [2.5 mm] setting allows slippage in a jam situation and damage can occur if this adjustment is set to narrow.

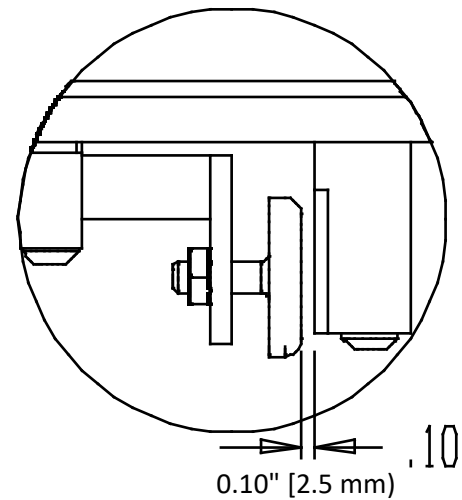


FIG. 8



CAUTION SHOULD BE USED AS ADJUSTING THE TIP WILL AFFECT THE SLIP LOAD AND COULD DAMAGE THE CLAMP TIP, BELT, OR TRAVERSE DRIVE SYSTEM.

TRAVERSE DRIVE CONTROL BOARD (TDC)

The Traverse Drive Control Board has nine potentiometers and four switches as shown on drawing 6734502 which is included. These potentiometers and switches have been set at the factory to the positions shown on the drawing. Also see FIG. 10 and FIG. 11.

Fwd Accel & Rev Accel---FWD ACC & REV ACC

The potentiometer is factory preset to the minimum full counterclockwise 8:30 position. This position turns the Acceleration/Deceleration off for this application.

Maximum Speed---MAX SPD

The maximum speed potentiometer is preset to position for 90 Volts DC output to the traverse motor at terminals A1 and A2.

IR Compensation---IR COMP

The IR Comp control is preset to 3:00 position. Never adjust past the 4:30 position.

Regulation of the traverse motor may be improved by slight adjustment of the IR COMP trim pot clockwise from its factory set position. Overcompensation causes the motor to oscillate or to increase speed when fully loaded. If you reach such a point, turn the IR COMP trim pot counterclockwise until the symptoms just disappear.

Rev Torque---REV TQ

The Reverse Torque setting determines the maximum current limit for driving the motor in the reverse direction. The potentiometer is preset to the 10:30 position. It should not require adjustment.

Fwd Torque---FWD TQ

The Foward Torque setting determines the maximum current limit for driving the motor in the forward direction. The potentiometer is preset to the 10:30 position. It should not require adjustment.

Deadband---DB

This motor control board has a potentiometer which must be set for 50 HZ or 60 HZ operation. For 60 HZ set to 3:00 position. For 50 HZ set to 9:00 position.

Minimum Speed---MIN SPD

The potentiometer is factory preset to the minimum full counterclockwise 8:30 position.

Tach---TACH

The tach potentiometer is not used in this application. It should be a the factory setting of 8:30.

Armature Switch---ARMATURE 90-180

This switch is factory preset to the 90 position for a 90 VDC motor..

Feedback Switch--- FEEDBACK ARM-TACH

This switch is factory preset to the ARM position.

The lower control board has two switches. Both switches are factory preset to 115 for 115 VAC operation.

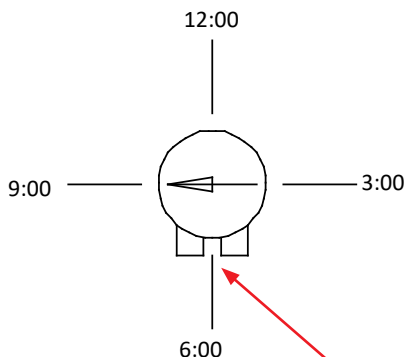


FIG. 9

Potentiometer
Clock Orientation

Terminal ends (Feet) are always at the 6:00 position,
no matter how the potentiometer is orientated on the board.

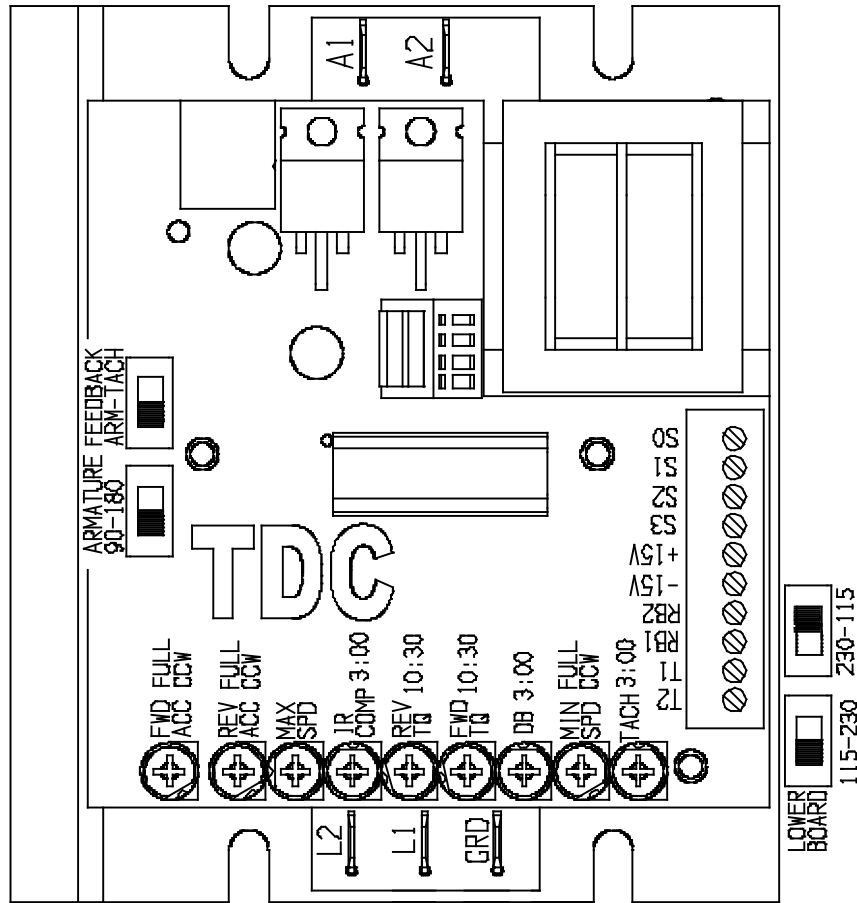


FIG. 10

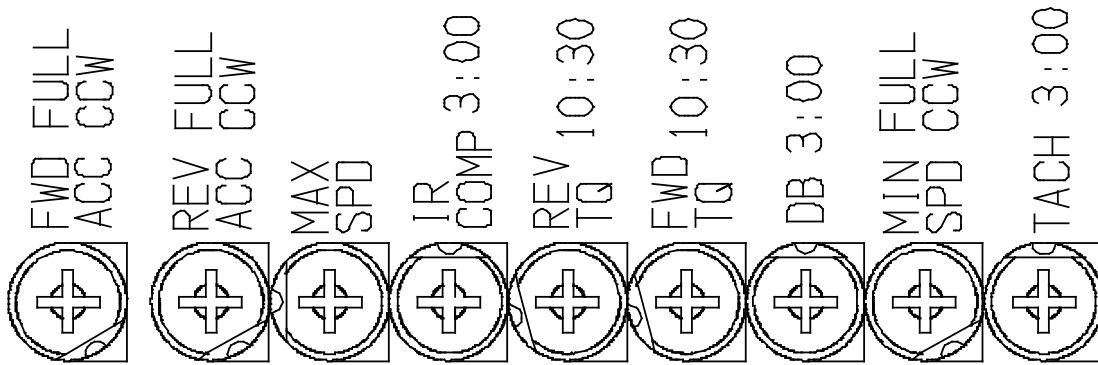


FIG. 11

CONTROL BOX

RELAYS: RY2, RY3, RY4, RY5, RY6

LOW VOLTAGE RELAY (LVR)

BLUE TERMINAL BLOCKS (TBW) OR (TBB)

GREY TERMINAL BLOCKS (TBG)

TERMINAL STRIP #2 (TB2)

MAGNETIC CONTACTOR (MAG)

SECONDARY CIRCUIT BREAKER (SCB)

MAIN CIRCUIT BREAKER (MCB)

GRINDING MOTOR RELAY (REL)

TERMINAL STRIP #1 (TB1)

MAIN GROUND LUG

AC FILTER (FTR)

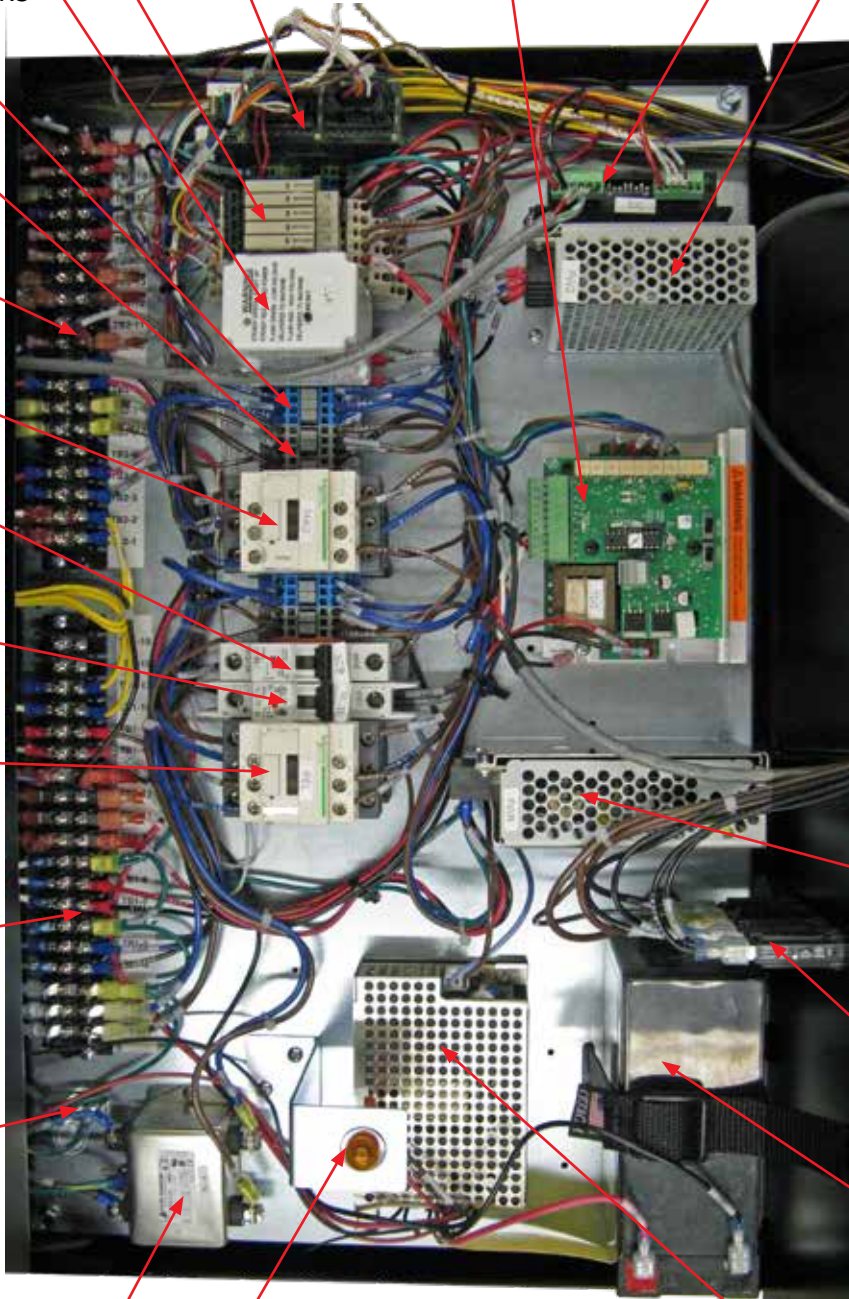
POWER LIGHT FOR MAGNETS (LGT)

PROGRAMMABLE LOGIC CONTROL (PLC)

TRAVERSE DRIVE CONTROL BOARD (TDC)

STEPPER INFEEED CONTROL (SIC)

STEP MOTOR POWER SUPPLY



ACTUATOR POWER SUPPLY (PWR)

CIRCUIT BREAKERS (CB1-CB4)

BATTERY FOR MAGNETS (BAT)

UNINTERRUPTABLE POWER SUPPLY (UPS)

FIG. 12

SKILL AND TRAINING REQUIRED FOR ELECTRICAL SERVICING

This Electrical Troubleshooting section is designed for technicians who have the necessary electrical knowledge and skills to reliably test and repair the electrical system. For those without that background, service can be arranged through your local distributor.

This manual presumes that you are already familiar with the normal operation of the grinder. If not, you should read the operators section, or do the servicing in conjunction with someone who is familiar with its operation.

Persons without the necessary knowledge and skills should not remove the control box cover or attempt any internal troubleshooting, adjustments, or parts replacement.

If you have any question not answered in this manual, please call your distributor. They will contact the manufacturer if necessary.

WIRE LABELS

All wires have a wire label at each end for troubleshooting. The wire label has a code which tells you wiring information. The wire label has a seven or eight position code. The first two or three digits are the wire number: 01-99 or 123. The next three numbers or letters are the code for the component to which the wire attaches. Example: GMC for Grind Motor Control. The last two numbers or letters are the number of the terminal on the component to which the wire attaches.

TROUBLESHOOTING INDEX

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ELECTRICAL TROUBLESHOOTING

- ORIGINAL INSTRUCTIONS -

PROBLEM--AC Main Power Controls: no electrical power to control panel.		
Possible Cause	Checkout Procedure	
Emergency Stop Switch(ESS)is depressed	A. Pull Up on ESS Button	Machine works Yes--end troubleshooting No--go to Step B. next
You must push the System Start Switch (SSS) /RESET to get power to control Panel	B. Press the Green RESET button. Listen for the Magnetic Starter (MAG) contacts to pull in with a clunk	Machine works Yes--end troubleshooting No--go to Step C. next
Main Power Cord is not plugged in	C. Plug in main power cord	Machine works Yes--end troubleshooting No--go to Step D. next
ALL Switches MUST be turned OFF for machine to start.	D. Turn off all switches. Repeat steps A & B	Machine works Yes--end troubleshooting No--go to Step E. next
Outlet circuit breaker has tripped	E. Check circuit breaker in your building and reset if necessary. (Check wall outlet with a light to make sure it works)	Machine works Yes--end troubleshooting No--but light works in outlet--go to Step F. next. No--but light does not work in outlet. You must solve your power delivery problem independent of machine.
LVR is Tripped	F. Reset LVR by pressing the reset button on top of LVR or by unplugging and plugging the machine back in.	Reset LVR - Machine Works Yes--end troubleshooting No--go to Step G. next
No 120 Volts AC power to Filter (FTR)	G. Check for 120VAC at Cord into FTR (Power Cord #32)	FTR "Line" Terminals for 120 Volts AC wires labled 32FTRBL to 32FTRBR Yes--Go to Step H. next. No--Replace Power Cord
Bad Filter	H. Check for 120V out of FTR	FTR "Load" Terminals for 120 Volts AC wires labled 01FTRBR to 02FTRBU Yes--Go to Step I. next. No--Replace Filter
No 120 Volts AC power to Main Circuit Breaker (MCB) 15 Amp.	I. Check for 120V to MCB	MCB (01MCB--) to neutral (blue) terminal out of FTR for 120VAC Yes--Go to Step J. next. No--Check wires & replace if needed.
Bad Main Circuit Breaker	J. Check for 120V from MCB	MCB (03MCB--) to neutral (blue) terminal out of FTR for 120 VAC Yes--Go to Step K. next. No--Flip Switch on MCB to "ON" - Machine works-- end trouble shooting Machine does not work-- replace MCB

Continued on next page.

PROBLEM--AC Main Power Controls: no electrical power to control panel.		
Possible Cause	Checkout Procedure	
No 120 Volts AC power to Secondary Circuit Breaker (SCB) 6 Amp.	K. Check for 120V to SCB	SCB (03SCB--) to neutral (blue) terminal out of FTR for 120VAC Yes--Go to Step L. next. No--Check wires & replace if needed.
Bad Secondary Circuit Breaker	L. Check for 120V from SCB	SCB (67SCB--) to neutral (blue) terminal out of FTR for 120 VAC Yes--Go to Step M. next. No--Flip Switch on SCB to "ON" - Machine works-- end trouble shooting Machine does not work-- replace SCB
120 Volts AC power not delivered to Grinding Motor Relay (REL)	M. Check for 120 Volts AC at terminal 22 on REL	REL 22 "120REL22" to neutral (blue) terminal out of FTR for 120 VAC Yes--Go to Step N. next. No--Check wires #120 and replace if needed.
Grinding Motor Relay (REL) not working	N. Check for 120 Volts AC out of REL at terminal 21. NOTE: REL should not be engaged if it is replace	REL Terminal 21 "121REL-21" to FTR terminal (Blue) for 120 VAC Yes--Go to Step O. next No--Replace REL.
Bad Emergency Stop Switch (ESS)	O. Check voltage after the (ESS) at terminal 2 on ESS MAKE SURE SWITCH IS PULLED UP!	(ESS) Terminal 2 "109ESS-2" to FTR terminal (Blue) for 120 VAC Yes--Go to Step P. next No--Check wire for continuity, then verify switch continuity. If bad replace ESS contactor (NC)
Bad System Start Switch (SSS)	P. Hold in SSS and Check voltage after the SSS at Terminal 3 on SSS	(SSS) terminal 3 "108SSS-3" to FTR terminal (Blue) for 120 VAC Yes--Go to Step Q. next No--Check wire for continuity, then verify switch continuity. If bad, replace SSS contactor (NO)
Low Voltage Relay (REL) not operating	Q. Hold in SSS and Check voltage at LVR. LVR must be installed in 8-pin socket.	Measure 120 Volts AC from LVR terminal 8 to FTR terminal (Blue) Yes--Go to Step R. next No--Check for 120 Volts AC from LVR terminal 6 to terminal 7. Replace LVR if there is 120VAC from terminals 6 to 7.
Bad Main Contactor (MAG)	R. Hold in SSS and Check voltage at MAG A1 & A2.	Measure 120 Volts AC from MAG Terminal A1 "12MAGA1" to Terminal A2 "10MAG-A2" Yes--MAG Should pull in with clunk, if not replace MAG. No--Verify Continuity of Wires.

PROBLEM--Machine Shuts off when you turn on Grinding Motor switch.		
Possible Cause	Checkout Procedure	
Guard Door is open.	A. Close the guard doors.	Machine works Yes--end troubleshooting No--go to Step B. next
Low Voltage Relay is tripping.	B. Power delivered to the grinder is inadequate. Verify that adequate power is delivered to the grinder. See LVR note at beginning of the manual. Fix the problem with building power.	Machine works Yes--end troubleshooting No--go to step C. next.
Door Safety Switch is not aligned	C. Check Alignment of Door Safety Switch on guard door.	Check alignment of door switch. Yes--end troubleshooting No--go to step D. next.
Door Safety Switch is not working properly.	D. Verify Door Switch is Working properly.	Disconnect door safety switch cord at terminal 14 and 15 on Terminal Strip 1. Verify Conituity of switch with door closed. Yes--Reconnect Terminals and verify continuity of wires. No--Verify continuity of cord and replace cord or switch.

PROBLEM-- Grinding Motor not working.		
Possible Cause	Checkout Procedure	
Grinding Motor Switch (GMS) is not on	A. Turn GMS switch to on	Machine works Yes--end troubleshooting No--go to Step B. next
Guard door is not closed	B. Close Front guard doors	Machine works Yes--end troubleshooting No--go to step C. next.
12 Amp Circuit Breaker (CB) is tripped	C. Check 12 amp CB on front of Control panel. Press in if tripped.	Machine works Yes--end troubleshooting No--go to step D. next.
No Power to GMS	D. Check for power to GMS terminal 6. Remove wire and test from wire to V+ on PW2 for 24 VDC	Wire "107GMS-6" to PW2 "193PW2-V+" for 24 VDC Yes--go to step E. next. No--Verify PW2 is working, check wires #107, 96, and 194
Grind Motor Switch (GMS) not working	E. Reconnect wire 107 to GMS. Check for 24 VDC out of GMS terminal 5. (Check terminal on GMS not wire.)	Wire "106GMS-5" to PW2 "193PW2-V+" for 24 VDC Yes--go to step F. next. No--Replace GMS.
PLC not working	F. Check for signal into PLC. Check for light next to X6 on PLC.	Light next to X6 on PLC is ON when switch is ON Yes--go to step G. next. No--Verify PLC is working and check wires #106 and 21
PLC Output not on	G. Check for signal out of PLC. Check for Light next to Y5 on PLC.	Light next to Y5 on PLC is ON when switch is ON Yes--go to step H. next. No--Verify PLC is working - Replace PLC.
Relay Y5 is not working	H. Check for light on Relay-Y5.	Light on Relay Y5 is ON when switch is ON Yes--go to step I. next. No--Replace Relay Y5.
No Power to Grinding Motor Relay (REL)	I. Check for 120 VAC at A1 to A2 on REL.	REL-A1 "139REL-A1" to REL-A2 "92REL-A2" for 120 VAC Yes--If Relay does not pull in with click, replace Relay (REL), if it does Go to Step J. next No--Replace Relay Y5.
No Power to Relay Contacts	J. Verify Power to into REL at Relay Contacts L1 and L2	(REL) Term L1 to Term L2 for 120 VAC Yes--go to step K. next. No--Check wires to REL Term L1 and L2
Bad Contacts in Grinding motor Relay "	K. Verify power out of Grinding Motor Relay T1 to T2. GMS in ON position.	With relay pulled in (click) check (REL) Term T1 to Term T2 for 120 VAC Yes--go to step L. next. No--Replace Grinding Motor Relay (REL)

Continued on next page.

PROBLEM-- Grinding Motor not working.		
Possible Cause	Checkout Procedure	
Bad Circuit Breaker	L. Verify Power out of Circuit Breaker at Terminal Strip 2 (TB2) terminal 6.	Check for 120 Volts (AC) from terminals TB2-6 (terminal 6 on right terminal strip) to FTR Terminal (Blue)- neutral Yes--Go to Step M. next No--Replace Circuit Breaker
Bad Grinding Motor	M. Verify Power to Grinding motor Cord at Terminal Strip 1 Terminals 1 and 2.	Terminal 1 to Terminal 2 on Terminal Strip 1 (ITB1). For 120 VAC. Yes--Replace Grinding Motor. No-- Check wires from Grinding Motor Relay and Circuit Breaker to Terminal Strip 1.

PROBLEM--(MAG) turns on only with System Start Switch held in.		
Possible Cause	Checkout Procedure	
No Power to MAG holding Contact	A. Check voltage to MAG holding contact in.	Measure 120 Volts AC at MAG term T3 "25MAG-T3" to FTR terminal (Blue) with E-Stop Pulled out. (do NOT press start button while checking.) Yes---go to Step B. next No-Verify continuity of wiring to MAG T3.
MAG holding contact has failed	B. Verify the magnetic starter (MAG) holding contact is working.	Disconnect Wire to MAG L3 and Measure 120 Volts AC from MAG term L3 to FTR Terminal (Blue). Press and hold Green Start button to hold in MAG contacts while checking. Yes--Verify continuity of wiring from MAG L3 No--Replace MAG

PROBLEM--Traverse Drive not working.		
Possible Cause	Checkout Procedure	
Traverse Motor Switch (TMS) is not on	A. Turn TMS switch to on	Traverse Works Yes--end troubleshooting No--go to Step B. next
"Traverse Speed Pot (TSP) set to zero	B. Set (TSP) to 35 on the control panel	Traverse Works Yes--end troubleshooting No--go to step C. next.
No Power to TDC	C. Check for power light on top of TDC is on	Power light is ON. Yes--Skip to Step J. No--go to step D. next.
No Power to Traverse Motor Switch (TMS)	D. Check for power to TMS terminal 5. Remove wire and test from wire to V+ on PW2 for 24 VDC	Wire "102TMS-5" to PW2 "193PW2-V+" for 24 VDC Yes--go to step E. next. No--Verify PW2 is working, check wires #102, 206, and 194
Traverse Motor Switch (TMS) not working	E. Reconnect wire 102 to TMS. Check for 24 VDC out of TMS terminal6. (Check terminal on TMS, not wire.)	Wire "103TMS-6" to PW2 "193PW2-V+" for 24 VDC Yes--go to step F. next. No--Replace TMS.
PLC not working	F. Check for signal into PLC. Check for light next to X2 on PLC.	Light next to X2 on PLC is ON when switch is ON Yes--go to step G. next. No--Verify PLC is working and check wires #103 and 23
PLC Output not on	G. Check for signal out of PLC. Check for Light next to Y4 on PLC.	Light next to Y4 on PLC is ON when switch is ON Yes--go to step H. next. No--Verify PLC is working - Replace PLC.
Relay Y4 is not working	H. Check for light on Relay-Y4.	Light on Relay Y4 is ON when switch is ON Yes--go to step I. next. No--Replace Relay Y4.
No Power to Traverse Drive Control (TDC)	I. Remove wires and check between wires that attached to TDC at L1 to L2 for 120 VAC.	"60TDC-L1" to "18TDC-L2" for 120 VAC Yes--If no lights on TDC when wires are plugged back in , replace TDC. No--Replace Relay Y4. (Note: relay can be removed, change with other relay to test.)
Relay RY2 or RY3 is not working	J. Check for light on PLC next to Y2 or Y3 to be on when Y4 is on. Y2 is for Traverse Right, Y3 is for Traverse Left	PLC light Y2 or Y3 is on. Yes-- go to Step K. next No--Replace PLC.

Continued on next page.

PROBLEM--Traverse Drive not working.		
Possible Cause	Checkout Procedure	
No DC Voltage from (TDC) Traverse Drive Control	K. Check for 90 Volts DC across (TDC) terminals #A1 to #A2 this voltage drives the DC traverse motor. NOTE: Traverse must be on and have (TSP) turned full CW to maximum voltage of 90 VDC	Check (TDC) terminals #A1 to #A2 for 90 VDC Yes--got to Step L next No--skip to step N.
Traverse Motor is bad	L. Check traverse motor continuity	Remove motor wires from Terminal Strip 1 terminals #7 and #8 check for 0 ohms across the black and white wires. Yes--end troubleshooting, motor should run, if not, replace motor. No--Skip to Step N. next
(TSP) (10K) is bad	M. Check (TSP) for 10,000 ohms. Remove three wires from (TDC) red, white and black.	Check for 10,000 ohms red to white wires Full CCW--0 ohms Full CW--10,000 ohms Red to black wires Full CCW--10,000 ohms Full CW--0 ohms Yes--replace bad relay Y2 or Y3. (Note: relay can be removed, change with other relay to test.) No--replace (TSP)
Worn motor brushes	N. Inspect Motor Brushes DISCONNECT POWER FROM MACHINE	Remove the brushes one at a time and maintain orientation for reinsertion. See if brush is worn short, 3/8" (10 mm) minimum length. Yes--replace motor brushes No--replace Traverse Motor

PROBLEM--Traverse does not stop to reverse directions when flag goes under the traverse limit sensor on the left side or right side of machine.

Possible Cause	Checkout Procedure	
Gap between flag and sensor is incorrect.	A. Gap between flag and sensor should be 3/16 to 1/4" (4-6 mm). Sensor LED does not light when flag is over sensor	If incorrect, adjust per adjustment section of manual. Yes--end troubleshooting No--go to Step B. next
Travel Limit Sensor is bad.	B. First check to see if sensor light comes on. When the light is on, it means that there is electricity coming to the sensor. Actuate the travel limit sensors with a steel tool to take measurements.	Light on Limit Sensor comes ON. Yes--go to Step C. next No--Skip to Step D. next
	C. Check for light on PLC X0 (Left sensor) or X1 (Right sensor)	Light on PLC at X0 or X1 comes ON. Yes--Sensor is working. Replace Relay Y2 or Y3 No--Skip to Step D. next
	D. Unscrew Sensor from Cord and switch with other sensor or sensor from a different machine. Note: Power goes out to sensor at Terminals 13 and 10 on Terminal Strip 1. Note: Power comes back from Sensor at Terminals 11 and 12 on Terminal Strip 1.	Problem moves to other direction when sensors are switched. Yes-- Replace bad sensor No-- Cord is bad, replace bad cord.

PROBLEM--Traverse Speed Control goes at one speed only.		
Possible Cause	Checkout Procedure	
Defective speed control potentiometer	A. Check potentiometer for 10,000 ohms. Remove three wires from Traverse Drive Control red, white, and black.	Check for 10,000 ohms red to white wires Full CCW--0 ohms Full CW--10,000 ohms Red to black wires Full CCW--10,000 ohms Full CW--0 ohms Yes--go to Step B. next No--replace (TSP)
Wiring hookup to potentiometer is improper. (If components have been replaced.)"	B. Check potentiometer wiring for proper hookup. See that speed pot is wired per electrical diagram	Wrong wire hookup effects traverse control. Reversing wires from the potentiometer will cause the the D C motor to run slower than designed or may not function correctly. Check for Proper function. Yes--end troubleshooting No--Go to Step C. next
Traverse Drive Control Board (TDC) dial pot settings not correct. (If board has not been replaced.)	D. Check all pot settings on Traverse Drive Control Board (TDC) as shown in wiring diagram. (See adjustment section Traverse Motor Control Board Settings.)	Minimum and maximum pot settings effect traverse speed. --Replace TDC if settings are correct and traverse is not working correctly

PROBLEM--Traverse changes directions erratically while running in traverse cycle.		
Possible Cause	Checkout Procedure	
Loose wire to travel limit sensor.	Check wire connections from the travel limit sensors and tighten down screws.	A loose wire connection will give intermittent electrical contact.

PROBLEM--Electromagnets do not function.		
Possible Cause	Checkout Procedure	
Electromagnet switch (EMS) is not on.	A. Turn EMS switch to on	Traverse Works Yes--end troubleshooting No--go to Step B. next
Circuit Breaker tripped	B. Check Circuit breaker on front of Control Panel. Press in if Tripped.	Electromagnets work Yes--end troubleshooting No--go to Step C. next
No Power out of UPS	C. Check for 12 Volts (DC) out of UPS at Terminal Strip 2.	From Terminal Strip 2 Terminal 4 (146TB2-4) to Terminal 3 (146TB2-3) check for 12VDC Yes--go to step D. next. No--go to step F. next.
Circuit Breaker is Bad	D. Check for 12 VDC at input to switch. Remove wires #153 and #162 and check for voltage out of wires.	From wires removed from switch 162EMS-5 to 153EMS-2 check for 12 VDC out of wires. Yes--go to step E. next. No--Replace Circuit Breaker
Electromagnet Switch is Bad	E. With EMS on, Check for 12 VDC out of Electromagnet switch (EMS) at Terminal Strip 2. NOTE: With 12 VDC at electromagnet switch terminals 166EMS-6 and 165EMS-3 the light above the switch on the outside of the panel should be ON. If not, replace the bulb or wires.	From Terminal Strip 2 Terminal 1 (157TB2-1) to Terminal 2 (158TB2-2) check for 12 VDC. Yes-- Bad Magnets- Call local Distributor or Factory Customer Service for assistance. No-- Replace EMS switch.
UPS is Bad	F. Check for 120 Volts (AC) into UPS at Terminals 1 and 3 on UPS. Remove connector from UPS and measure pins in connector.	Pin 1 to Pin 3 on UPS connector for 120 VAC Yes--Replace UPS - Check battery (see step G) No--Check wires to UPS.
Bad Battery	G. Check for 10.5 -14 Volt DC at battery. Remove wires to battery and check across terminals on the battery.	Check for between 10.5-14 Volts (DC) out of Battery at Battery Terminals. Yes-- Battery is good. No-- Machine must be plugged in to charge battery. Leave machine plugged in and check after 24 Hours. If battery still low replace Battery.

PROBLEM--Tooling Bar Rotation Actuator does not function		
Possible Cause	Checkout Procedure	
Actuator Motor Switch (AMS) is not on	A. Push (AMS) switch to the up or Down position.	Actuator works Yes--end troubleshooting No--go to Step B. next
Circuit Breaker tripped	B. Check Circuit breaker on front of Control Panel. Press in if Tripped.	Actuator works Yes--end troubleshooting No--go to Step C. next
No Power To Power Supply	C. Check for 120 VAC at input to Power Supply (L to N on PWR).	From Terminal 149PWR-L to 150PWR-N check for 120VAC Yes--go to step D. next. No-- Verify continuity of wires
No Power out of Power Supply	D. Check for 12 VDC from Power Supply (V- to V+ on PWR)	From Terminals 152PWR-V- to 151PWR-V+ on PWR check for 12VDC Yes--go to step E. next. No-- Replace PWR.
Circuit Breaker is Bad	E. Check for 12 V DC into Actuator Motor Switch (AMS). Remove wires and test between wires.	From wires 161AMS-4 to 163AMS-1 removed from AMS check 12 VDC Yes--go to step F. next. No-- Replace PWR.
Actuator Motor Switch (AMS) is Bad	F. While pressing switch (AMS) up or down, measure 12 Volts (DC) at Terminal Strip 1 terminals 16 to 17.	from Terminals 16 (TB1-16) to 17 (TB1-17) on Terminal Strip1 check for 12VDC Yes--go to step G. next. No-- AMS - Switch
Bad Actuator Cord or Motor	G. While pressing switch (AMS) up or down, measure 12 Volts (DC) at end of Actuator Cord . Disconnect from the motor.	From Cord Terminals 169ACT-B to 169ACT-O Check for 12VDC. Yes--Replace Actuator Assembly No-- Replace motor cord 6709210

PROBLEM-- Coolant Pump does not function		
Possible Cause	Checkout Procedure	
Coolant Pump Switch (CPS) is not on.	A. Push CPS switch to ON.	Coolant Pump works Yes--end troubleshooting No--go to Step B. next
Coolant flow valve closed.	B. Open coolant flow valve.	Coolant Pump works Yes--end troubleshooting No--go to Step C. next
2 Amp Circuit Breaker (CB) is tripped.	C. Check 2 amp CB on front of Control panel. Press in if tripped.	Coolant Pump works Yes--end troubleshooting No--go to Step D. next
2 Amp Circuit Breaker (CB) failed.	D. Check power from CB at CPS switch terminal 6. Remove wire and check between wire to 120VAC Neutral.	From Wire 116CPS-6 to FTR Terminal (Blue-Neutral) check for 120 VAC. Yes--go to Step E. next No--Replace Circuit Breaker
Coolant Pump Switch (CPS) not working.	E. Reconnect wire 116 from step D. Check for 120 VaC from CPS at Terminal Strip 2 Terminal 16 to Neutral	From Terminal Strip 2 Terminal 16 to FTR Terminal (Blue- Neutral) for 120 Volts AC Yes--go to Step F. next No--Replace CPS - switch
Coolant Pump Not Working	F. Check for power out to Coolant Pump	From Terminal strip 1 at TB1-4 to TB1-5 check for 120 VAC. Yes--Replace Coolant Pump. No--Check wires

PROBLEM-- Infeed does not function		
Possible Cause	Checkout Procedure	
Infeed Switch is not pressed.	A. Press and hold Infeed Jog Switch (IJS) switch to ON. (Infeed or Outfeed) Note: Pressing infeed will cause a .001" infeed, after .5 sec it will do a slow infeed. After 2 seconds it will go to a fast infeed.	Infeed works works Yes--end troubleshooting No--go to Step B. next
Infeed screw is stuck.	B. Rotate infeed screw using handwheel. Handwheel should turn freely.	Infeed works Yes--end troubleshooting No--go to Step C. next
No Signal to PLC	C. Press and hold Infeed Jog Switch (IJS) switch to ON. Check for signal to PLC light next to inputs: Press infeed - PLC input X4 on Press outfeed - PLC input X5 on	Light on PLC inputs X4 and X5 come on when switch is press in the infeed and outfeed positions. Yes--go to Step D. next No--skip to Step G.
No Output Signal from PLC	D. Press and hold Infeed Jog Switch (IJS) switch to ON. Check for signal on PLC light next to outputs Y0 and Y1. Y0 is pulse output, Y1 is direction output on for infeed.	Pressing infeed the lights next to Y0 and Y1 on PLC com on Yes--go to Step E. next No--Replace PLC
Stepper Infeed Controller (SIC) error.	E. Check for green Light on SIC. If flashing red then read error on side of SIC.	Green steady light on SIC when not infeeding. Blinking Green when IJS is pressed. Yes--go to Step F. next No--Skip to Step H
Stepper motor bad	F. Connection at Stepper motor. Ensure motor is connected to cord.	Connection at motor is good Yes--Replace motor No--Replace stepper motor cord - 6739011
Bad Switch IJS	G. Power out if IJS. Press and hold in feed position. Check for 12 VDC from switch Terminal 3 to V+ on PW2	PW2 -V+ (red) to Terminal 3 on IJS for 24VDC when IJS is pressed Yes--Replace PLC No--Replace IJS
Bad SIC	H. Check power to SIC. If lights are blinking fix error. If no lights check power at V+ to V- on SIC	V+ to V- on SIC for 24 VDC Yes--No lights- Replace SIC No-- Check PW2 -check wires to SIC

PROBLEM-- No Auto function		
Possible Cause	Checkout Procedure	
Power is not on.	A. Pull up on Red E-stop button and press Reset Button	Display comes on- Displays 0 Yes--Skip to Step D No--go to Step B. next
Power Supply 2 (PW2) failed	B. Check for green light on PW2.	PW2 has green light. Yes--go to Step C. next No--replace PW2
PLC failed.	C. Check for green lights on PLC.	Green lights on PLC. Yes--Replace Display DSP. No--Replace PLC
Right Travel Limit not activated.	D. Move head to Right travel limit sensor. Check for lights on Sensor. Note: display will show "E" for error if not on Right Travel Limit Sensor.	Light on Sensor is on. Yes--go to Step E. next. No--Replace Limit sensor.
	E. With head on Right travel limit sensor. Check for lights on PLC.	Light on PLC input X1 is on. Yes--go to Step F. next. No--Replace Limit sensor.
Bad Auto Button	F. Press Auto Select Button SLC and light on PLC input X3.	Light X3 on PLC comes on when pressing SLC Yes--Replace PLC No--Replace SLC - button.

PROBLEM--Top face of bedknife is ground in a convex shape (high in the center) or concave shape (low in the center)

Possible Cause	Checkout Procedure	Reason
Grinding wheel is loading up with grinding grit.	A. Dress the wheel as prescribed in the <u>Operator's Manual</u> .	A loaded wheel creates undue pressure on the surface being ground.
Too heavy a grind on the final grinding pass.	B. Follow the procedures in the <u>Operator's Manual</u> . On the final pass, infeed only about .001" [.025 mm]. Let the wheel spark out for 10-20 passes at a slow speed, with no additional infeed.	For precise grinding, sparking-out process is critical. It eliminates excessive final-grinding pressure which helps maintain grinding straightness.
Small Grinding Head Slide Vee Roller loose	C. Adjust V-rollers per procedure on Page 14.	Looseness in roller causes erratic grind.

PROBLEM--The top face of the bedknife is ground unevenly across the width.

Possible Cause	Checkout Procedure	Reason
Grinding wheel rim is not completely over the top face being ground.	A. The wheel rim must extend over the bedknife top face by 1/2" [13 mm] whenever possible. See <u>Operator's Manual</u> . If not possible, dress the wheel more often.	When the rim doesn't extend over the top face, it wears unevenly and causes grooves across the bedknife.
Small grinding Head Slide Vee Roller loose.	B. Adjust V-rollers per procedure on Page 14.	Looseness in rollers causes erratic grind.
Backlash in infeed handwheel.	C. Eliminate backlash in infeed handwheel.	Backlash allows grinding wheel to move under load.

PROBLEM--Too coarse a grind on bedknife.

Possible Cause	Checkout Procedure	Reason
Grinding head is traversing too fast.	Slow down the traversing speed.	Traversing speed controls the grinding surface texture. A slower traverse produces grind marks closer together.

PROBLEM--The top face of the bedknife shows burn marks from being too hot.

Possible Cause	Checkout Procedure	Reason
Coolant not directed onto the bedknife and grinding wheel.	A. Direct coolant into the bedknife, at the point of the grind. See <u>Operator's Manual</u> .	When the front face of the bedknife gets too hot, the steel loses its temper (softens).
Too heavy stock removal during grinding.	B. Take off about .002 to .003" [.05 to .075mm] per pass during rough grind. See <u>Operator's Manual</u> .	Too much stock removal in one pass creates too much heat and softens the steel.
Grinding wheel is glazing.	C. Dress the wheel before the finish-grinding pass on each bedknife. See <u>Operator's Manual</u> .	Wheel will glaze if not dressed often enough. Also, as a general rule, use a higher traverse speed for the heavy grind.

PROBLEM--Grinding Wheel is glazing too quickly.

Possible Cause	Checkout Procedure	Reason
Wheel needs dressing.	A. Dress the wheel before the finish-grinding pass on each bedknife. See <u>Operator's Manual</u> .	Wheel will glaze if not dressed often enough. If grinding wheel is not extended 1/2" [12 mm] over bedknife, it will glaze more quickly because there is less dressing.
Too light a cut when rough grinding.	B. Take off about .002 to .003" [.05 to .075 mm] per pass during rough grind. See <u>Operator's Manual</u> .	Too light a grinding cut doesn't permit enough dressing action on the wheel, so it glazes.
Grinding head is traversing too slow.	C. Speed up traverse.	Too slow a traverse speed can cause excessive heat buildup in the grinding wheel, which glazes the wheel.

PROBLEM--Grinding Motor vibrates excessively.

Possible Cause	Checkout Procedure	Reason
Grinding wheel is out of balance.	Visually check the outside diameter runout while slowly rotating the wheel by hand. Also check the motor without a wheel installed. Replace the wheel if out-of-round. A minor imbalance between the grinding wheel and motor armature can sometimes be corrected by rotating the wheel position on the motor shaft in 90° increments. This is called clocking the wheel. Try clocking the wheel 3 times. If this does not correct the problem, replace the wheel.	A grinding wheel which isn't properly trued up on outside or inside diameters can vibrate excessively and transfer that vibration to the motor.

PROBLEM--Carriage traversing varies speed while grinding

Possible Cause	Checkout Procedure	Reason
Linear bearings in the carriage do not rotate freely	A. Adjust bearing for proper tension. See adjustments section of this manual.	When bearing preload is too tight, it causes excessive loading to drive carriage.
	B. Flush linear bearing per lubrication procedure and replace wipers. Or replace three linear bearings and wipers.	Grinding grit is getting into the linear bearings and causing excessive driving torque of the carriage.
Belt is slipping.	C. Adjust belt clamping force. See adjustment section of manual.	If the traverse belt clamp is damaged or not adjusted properly the belt will slip.
Traverse belt tension is too loose.	D. Adjust traverse belt tension. See adjustments section of this manual.	If the belt is too loose it will tend to vibrate or the belt tensioning springs may tend to jump when loaded.

Diagram No.	Part No.	Description
1.....	B190834.....	10--32 x 1/2 Button Head Socket Cap Screw
2.....	B250816.....	1/4-20 x 1/2 Button Head Socket Cap Screw
3.....	B251011.....	1/4-20 x 5/8 Socket Head Cap Screw
4.....	B251411.....	1/4-20 x 7/8 Socket Head Cap Screw
5.....	B256411.....	1/4-20 x 4 Socket Head Cap Screw
6.....	B310813.....	5/16-18 x 1/2 Button Head Socket Cap Screw
7.....	B311013.....	5/16-18 x 5/8 Button Head Socket Cap Screw
8.....	B311213.....	5/16-18 x 3/4 Button Head Socket Cap Screw
9.....	B312413.....	5/16-18 x 1-1/2 Button Head Socket Cap Screw
10.....	B371001.....	3/8-16 x 5/8 Hex Head Cap Screw
11.....	B371201.....	3/8-16 x 3/4 Hex Head Cap Screw
12.....	B371601.....	3/8-16 x 1 Hex Head Cap Screw
13.....	C161020.....	8-32 x 5/8 Socket Set Screw Cap Point
14.....	H371602.....	Roll Pin .375 D x 1.00 L
15.....	J167000.....	8-32 Locknut Jam Nylon Insert
16.....	J257000.....	1/4-20 Locknut Jam Nylon Insert
17.....	J317000.....	5/16-18 Locknut Jam Nylon Insert
18.....	J317100.....	5/16-18 Locknut Full Nylon Insert
19.....	J371000.....	3/8-16 Hex Nut
20.....	J377000.....	3/8-16 Locknut Jam Nylon Insert
21.....	J377100.....	3/8-16 Locknut Full Nylon Insert
22.....	J507000.....	1/2-13 Locknut Jam Nylon Insert
23.....	K160001.....	Flat Washer #8 SAE
24.....	K190101.....	Flat Washer .225 ID x .75 OD x .05 T
25.....	K250001.....	Flat Washer 1/4 SAE
26.....	K251501.....	1/4 Lockwasher Split
27.....	K310001.....	Flat Washer 5/16 SAE
28.....	K311501.....	5/16 Lockwasher Split
29.....	K370001.....	Flat Washer 3/8 SAE
30.....	K371501.....	3/8 Lockwasher Split
31.....	27168.....	Prox Cord - Trav LH (Service)
32.....	27169.....	Prox Cord - Trav RH (Service)
33.....	28192.....	Support Traverse Pulley
34.....	50309.....	Shaft Traverse Pulley
35.....	3706057.....	Idler Cog Pulley 7/8 B x 2.149 PD
36.....	50363.....	Guard Traverse Pulley
37.....	55553.....	Idler Pulley Assy
38.....	80141.....	Screw - Self Drill #10 x 1" Hex
39.....	80354.....	Belt Cog 1252L050 UK .375 P .50 W
40.....	80355.....	Thrust Washer .75 ID x 1.25 OD
41.....	3389038.....	Rubber Washer .31 x .75 x .06 T
42.....	3529041.....	Washer - Flat .328 x .875 x .125 T
43.....	6739508.....	Hinge Weldment
44.....	3706022.....	Pipe Plug 3/4 NPTF (Steel)
45.....	3706088.....	Gas Spring 60# 7.8" Stroke
46.....	3706106.....	Decal Sheet (Bedknife Grinders)
47.....	3707009.....	Strain Relief Liq T.27-.47 W .804 H
48.....	3707029.....	Strain Relief Liq T.19-.30 W .599 H
49.....	3707132.....	Key - Safety Switch 90 Degree
50.....	3707273.....	Strain Relief .33-.36 Wire .625H
51.....	3707275.....	Strain Relief .37-.43 Wire .875H
52.....	3707563.....	Strain Relief Liq T.27-.46W .825H
53.....	3707595.....	Hole Plug .875 Diameter
54.....	3707597.....	Hole Plug .625 Diameter
55.....	3707728.....	Safety Switch NC/NC
56.....	3707933.....	Cord Clamp Single .44 Dia Black
57.....	3708121.....	Cord Clamp Double .38 Dia.

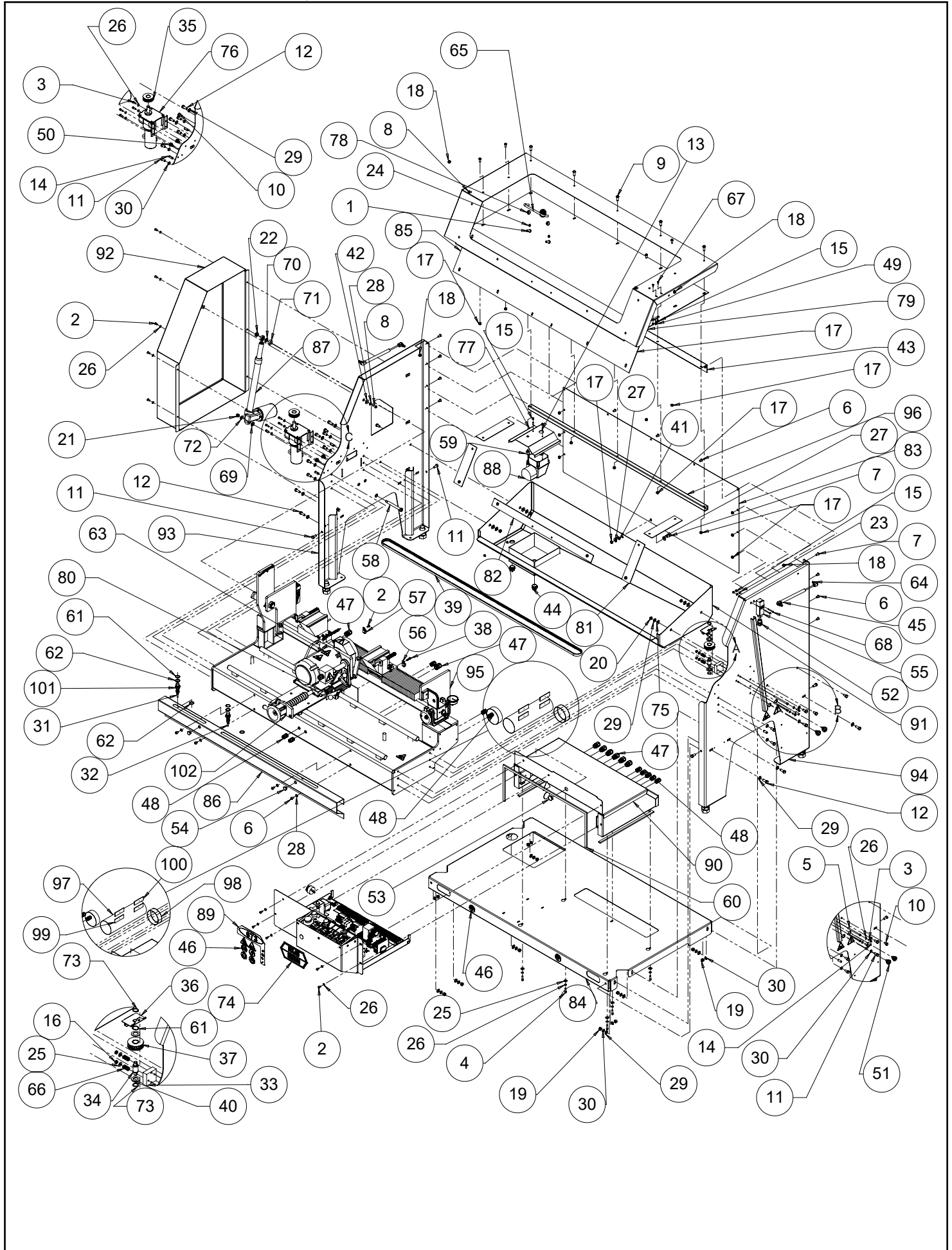


Diagram No.	Part No.	Description
58.....	3708330.....	Shoulder Bolt .500 D x 4.00 L
59.....	3708339.....	Connector - Barbed Insert
60.....	3708378.....	Strip Foam .25 T
61.....	3708419.....	Wave Spring .78 ID SSR-0100
62.....	3708421.....	Flat Washer .75 x 1.0 x .075 T
63.....	3708461.....	Decal Warning 3600 RPM
64.....	3708572.....	Ball Stud - 10 mm
65.....	3708577.....	Handle - D
66.....	3708658.....	Spring Compression Danly
67.....	3708820.....	8-32 x .50 Button Head Safety Screw
68.....	3708865.....	8-32 x 1.5 Button Head Safety Screw
69.....	3709016.....	Thrust Washer .500 x .937 x .093 T
70.....	3709019.....	Thrust Washer .500 x .937 x .032 T
71.....	2109095.....	Spacer .50 ID x 1.0 OD x .38 L Steel
72.....	3709304.....	Thrust Washer .375 x .812 x .032 T
73.....	3709331.....	Retaining Ring External 5100-75
74.....	3709990.....	Decal Foley United Large
75.....	6009125.....	Rubber Washer .34 x .88 x .06 T
76.....	6059062.....	Motor Assembly Traverse
77.....	6609046.....	Coolant Pump Cover
78.....	6709071.....	Ferrule - Handle
79.....	6739012.....	Hood Top Panel
80.....	6729509.....	Traverse Base Assy
81.....	6739013.....	Window Support Plate
82.....	6739014.....	Window Support Long Plate
83.....	6709186.....	Upper Tank Back Panel
84.....	6709197.....	Lower Frame Panel
85.....	6739016.....	Door Polycarbonate
86.....	6709199.....	Proximity Panel
87.....	6729014.....	Actuator Assembly W168 (12V Rod End)
88.....	6709209.....	Coolant Pump Assembly W118
89.....	6739002.....	673 Decal W/CB Symbols
90.....	6709568.....	Electrical Box Weldment
91.....	6709569.....	Coolant Tank Weldment
92.....	6709573.....	Actuator Cover Weldment
93.....	6729523.....	LH Side Frame Weldment
94.....	6729524.....	RH Side Frame Weldment
95.....	6709562.....	Bedknife Support Assembly
96.....	6739015.....	Window Rear Support Tube
97.....	3706133.....	Clear Tube 3.5 OD x 12" L
98.....	3706134.....	End Cap - 3.5 ID Black Vinyl
99.....	3706135.....	Velcro Hook - 1"W Adhesive Back
100.....	3706136.....	Velcro Loop - 1"W Adhesive Back
101.....	3707601.....	Prox Head - 18 mm DC (Service)
102.....	6739504.....	Auto Mode Stepper Assembly

PARTS LIST (Continued)**6729514 GRINDING HEAD ASSEMBLY**

Diagram No.	Part No.	Description
1.....	B190611.....	10-24 x 3/8 Socket Head Cap Screw
2.....	B192011.....	10-24 x 1-1/4 Socket Head Cap Screw
3.....	B251216.....	1/4-20 x 3/4 Button Head Socket Cap Screw
4.....	B252016.....	1/4-20 x 1-1/4 Button Head Socket Cap Screw
5.....	B371611.....	3/8-16 x 1 Socket Head Cap Screw
6.....	C190820.....	10-24 x 1/2 Socket Set Screw Cap Point
7.....	C250420.....	1/4-20 x 1/4 Socket Set Screw Cap Point
8.....	C621060.....	5/8-18 x 5/8 Socket Set Screw Cap Point
9.....	H250802.....	Pin - Roll .25 D x.50 L
10.....	J377000.....	3/8-16 Locknut Jam Nylon Insert
11.....	K190001.....	Flat Washer #10 SAE
12.....	K191501.....	#10 Lockwasher Split
13.....	K251501.....	1/4 Lockwasher Split
14.....	K310101.....	Flat Washer 5/16 USS Cut Zinc
15.....	K371501.....	3/8 Lockwasher Split
16.....	3679116.....	Connector - Shut Off Valve
17.....	3702086.....	Diamond Dresser
18.....	3707009.....	Strain Relief Liq T.27-.47 W .804 H
19.....	3708103.....	Conical Washer .258 x .50 x.019 T
20.....	3708543.....	Shoulder Bolt .313 D x .313 L
21.....	3708553.....	Spring - Comp.924 OD x .78 ID x 8.75 L
22.....	3708561.....	Adjustable Handle 3/8-16 x 1.56 L
23.....	3708657.....	Roller - Dual Vee
24.....	3708658.....	Spring Compression Danly
25.....	3709304.....	Thrust Washer .375 x .812 x .032 T
26.....	3709526.....	Knob 1/4-20F 1" Ball
27.....	3709593.....	Connector - Barbed Female NPT
28.....	3709595.....	Valve - Shut Off Needle
29.....	3709642.....	Coolant Line Assembly
30.....	3709705.....	Nylon Ball 5/32 Diameter
31.....	6609027.....	Arm - Roller Pivot
32.....	6609028.....	Bushing - V Roller Short
33.....	6609029.....	Bracket - Dresser Lock
34.....	6609058.....	Bushing - V Roller Long
35.....	6609502.....	Motor Assy - 3/4HP C-Face
36.....	6609505.....	Motor Pivot Assembly
37.....	6709035.....	Stud 1/4-20 x 3.00 Ht
38.....	6709038.....	Collar - Adjuster
39.....	6709103.....	Flange - Outer 5/8-11 LH
40.....	6709501.....	Tee Knob Assembly
41.....	6709503.....	Eccentric Pin Assembly
42.....	6709509.....	Dresser Arm Weldment
43.....	6709552.....	Gr Wheel Guard Weldment
44.....	6729043.....	Base - Carriage Slide
45.....	6729003.....	Coolant Hose
46.....	3700411.....	Grinding Wheel straight Cup 6x2x1.25
47.....	3700409.....	Reducer Bushing 1.25-.62

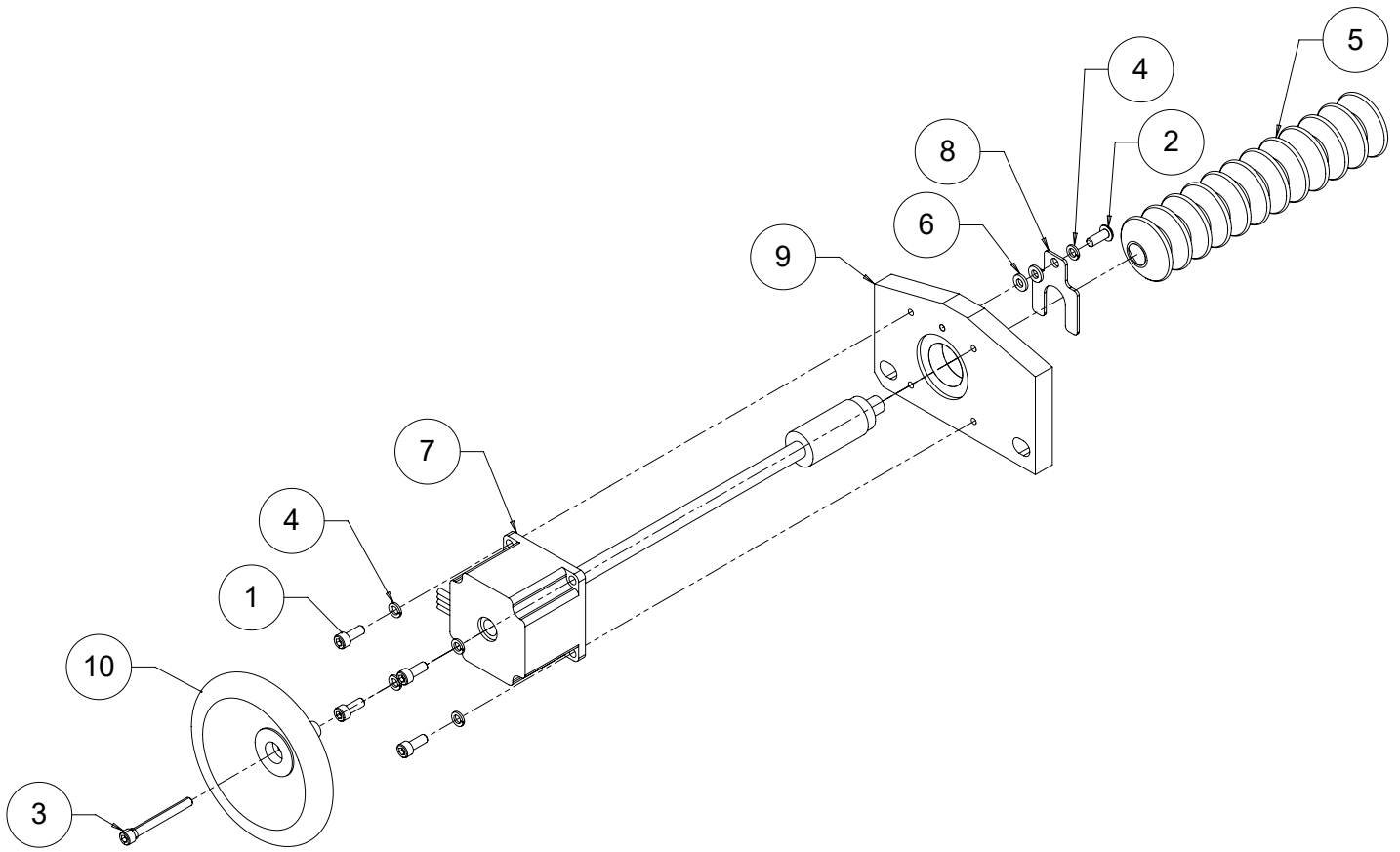


Diagram No.	Part No.	Description
1.....	B190811	10-24 x 1/2 Socket Head Cap Screw
2.....	B190813	10-24 x 1/2 Button Head Cap Screw
3.....	B192831	10-32 x 1-3/4 Socket Head Cap Screw
4.....	K191501.....	#10 Lockwasher Split
5.....	3109025.....	Boot
6.....	3589127.....	Flat Washer .190 x .375 x .058 T
7.....	3706245.....	Infeed Stepper Motor Assembly
8.....	4609033.....	Retainer - Boot
9.....	6729042.....	Stepper Motor Mounting Plate
10.....	6739507.....	Handwheel Assembly

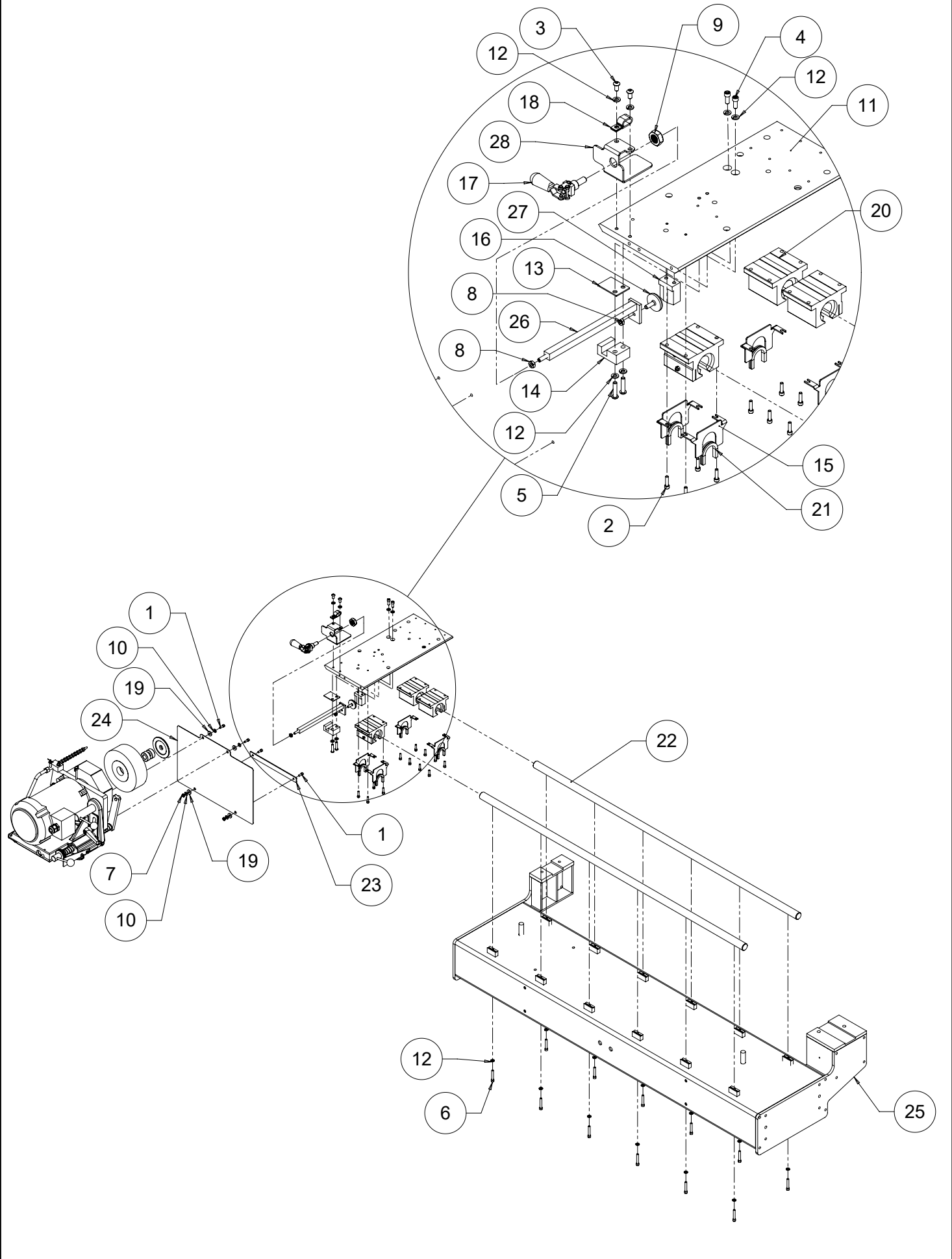
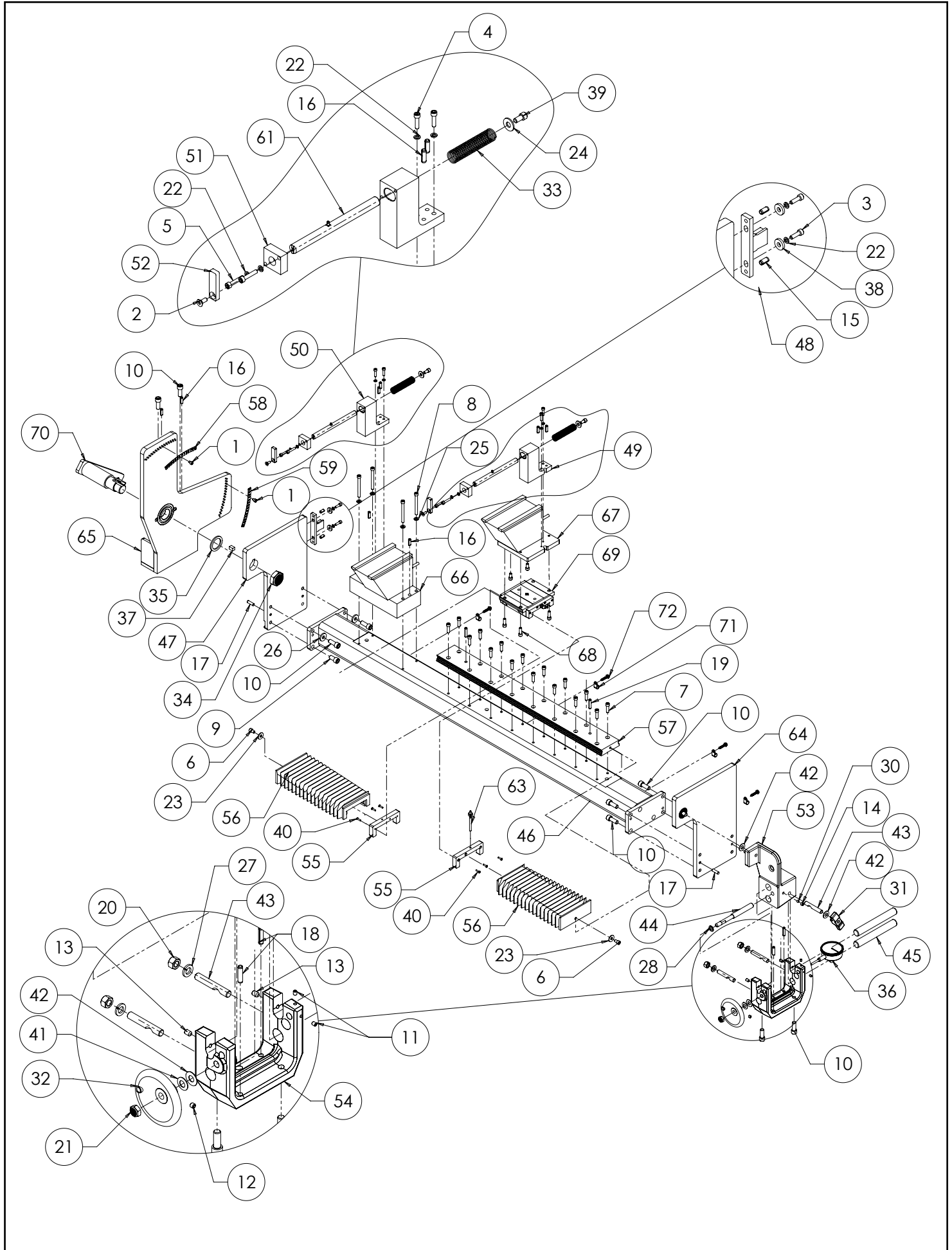


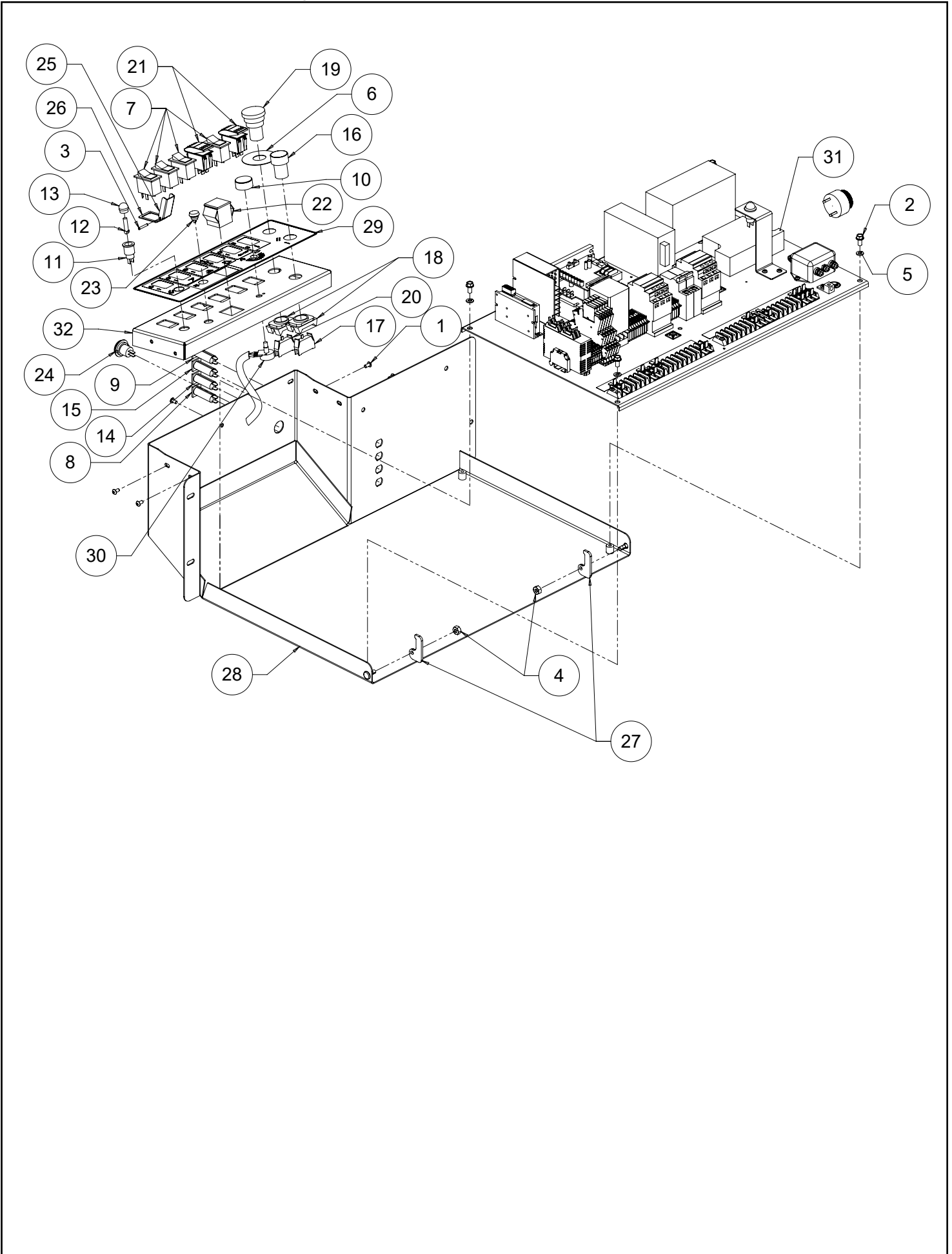
Diagram No.	Part No.	Description
1.....	B190811	10-24X1/2 Socket Head Cap Screw
2.....	B191211	10-24X3/4 Socket Head Cap Screw
3.....	B250816	1/4-20X1/2 Button Head Socket Cap Screw
4.....	B251026	1/4-28X5/8 Socket Head Cap Screw
5.....	B252016	1/4-20X1-1/4 Button Head Socket Cap Screw
6.....	B252411	1/4-20X1-1/2 Socket Head Cap Screw Full Thread
7.....	J197000	10-24 Locknut Jam Nylon Insert
8.....	J252000	1/4-20 Hex Jam Nut
9.....	J627200	5/8-18 Locknut Jam Nylon Insert
10.....	K190001	Flat Washer #10 SAE
11.....	6729041	Carriage (Belt)
12.....	K251501	1/4 Lockwasher Split
13.....	28188	Spacer Traverse Clamp
14.....	28189	Block Clamp Support
15.....	28211	Brkt - Rail Wiper 1" Shaft
16.....	50310	Tip Belt Clamp
17.....	80335	Clamp Destaco
18.....	3708121	Cord Clamp Double .38 Diameter
19.....	3708691	Flat Washer .25X.62X.12T
20.....	3709044	Ball Bearing Bushing
21.....	3969064	Wiper - Foam
22.....	6509063	Carrier Shaft
23.....	6709039	Brkt - Rubber Cover
24.....	6709149	Cover - Rubber
25.....	6709174	Traverse Base Machined (Belt)
26.....	6709566	Belt Clamp Bar Assembly
27.....	6729004	Traverse Clamp Block
28.....	6729040	Traverse Clamp Bracket



PARTS LIST (Continued)

6709562 BEDKNIFE SUPPORT ASSEMBLY

DIAGRAM NO.	PART NO.	DESCRIPTION
1.....	B190411.....	Socket Head Cap Screw 10-24 x 1/4
2.....	B190805.....	Flat Head Socket Cap Screw 10-24 x 1/2
3.....	B191011.....	Socket Head Cap Screw 10-24 x 3/8
4.....	B191211.....	Socket Head Cap Screw 10-24 x 3/4
5.....	B191611.....	Socket Head Cap Screw 10-24 x 1
6.....	B250611.....	Socket Head Cap Screw 1/4-20 x 3/8
7.....	B251411.....	Socket Head Cap Screw 1/4-20 x 7/8
8.....	B253611.....	Socket Head Cap Screw 1/4-20 x 2-1/4
9.....	B371211.....	Socket Head Cap Screw 3/8-16 x 3/4
10.....	B371611.....	Socket Head Cap Screw 3/8-16 x 1
11.....	C190420.....	Set Screw Cup Point 10-24 x 1/4
12.....	C250420.....	Set Screw Cup Point 1/4-20 x 1/4
13.....	C250627.....	Set Screw Cup Point 1/4-20 x 3/8 with nylon patch
14.....	C310420.....	Set Screw Cup Point 5/16-18 x 1/4
15.....	H250802.....	Roll Pin .25 D x .50 LG
16.....	H251202.....	Roll Pin .25 D x .75 LG
17.....	H251406.....	Drive Lock Pin .25 D x .875 LG
18.....	H251602.....	Roll Pin .25 D x 1.00 LG
19.....	H251802.....	Roll Pin .25 D x 1.125 LG
20.....	J371000.....	Hex Nut 3/8-16
21.....	J377000.....	Nylon Locknut Jam 3/8-16
22.....	K191501.....	Split Lockwasher #10
23.....	K250001.....	Flat Washer 1/4
24.....	K250101.....	Washer - Flat .31 x .73 x .052 T
25.....	K251501.....	Split Lockwasher 1/4
26.....	K310101.....	Flat Washer 5/16
27.....	K371501.....	Split Lockwasher 3/8
28.....	09054.....	3/8 ID x 5/8 OD x 1/16 Thick Flat Washer
30.....	3579109.....	Nylon Plug 3/16 Diameter
31.....	3708245.....	T-Knob 2.5 3/8-16F
32.....	3708393.....	Handwheel 3.5 Diameter
33.....	3708554.....	Compression Spring .625 OD x 3.0 L
34.....	J997200.....	1-14 Locknut Jam Nylon Insert
35.....	3708564.....	Oilite Thrust Bearing 1.25 ID
36.....	3708581.....	Inch Dial Indicator
37.....	3708593.....	Square Key 5/16 x 1/2 L
38.....	3708691.....	Washer .25 x .62 OD x .12
39.....	B250811.....	Button Head Socket Cap Screw M3-.5 x 16
40.....	3706256.....	Button Head Socket Cap Screw M3-.5 x 25
41.....	3709062.....	Conical Washer .382 x .75 x .035
42.....	3709304.....	Thrust Washer
43.....	6009035.....	Locking Stud Shaft
44.....	6009036.....	Acme Adjusting Shaft
45.....	6009095.....	Slide Shaft
46.....	6709004.....	Machined Tooling Bar
47.....	6709008.....	Left-hand Pivot Plate
48.....	6739019.....	Index Stop Bracket
49.....	6709012.....	Right-Hand Gage Base
50.....	6709013.....	Left-Hand Gage Base
51.....	6709015.....	Retainer Block Gage
52.....	6709021.....	Gage Tip
53.....	6709107.....	Tooling Slide Mounting
54.....	6709108.....	Cross Slide Support
55.....	6739048.....	Bellows MNT Plate Velcro
56.....	6709135.....	Bellows INA Wide Rail Velcro
57.....	6709136.....	Wide Machined Rail 25/70
58.....	6709151.....	Decal - Upper Tooling Index
59.....	6709152.....	Decal - Lower Tooling Index
61.....	6729502.....	Gage Shaft Assembly
63.....	6709501.....	Tee Knob Assembly
64.....	6709519.....	Pivot Bearing Assembly
65.....	6729512.....	Tooling Mounting Bracket Assembly
66.....	6729510.....	Magnet Repair Assembly - INA 672
67.....	6729510.....	Magnet Repair Assembly - INA 672
68.....	B251211.....	Socket Head Cap Screw 1/4 -20 x 3/4
69.....	3708694.....	Linear Bearing Wide
70.....	6729511.....	Tooling Rotate Arm Weldment
71.....	3707661.....	Single Cord Clamp
72.....	80141.....	Screw Self Drill



PARTS LIST (Continued)**6739502 CONTROL PANEL ASSEMBLY**

DIAGRAM NO.	PART NO.	DESCRIPTION
1.....	B190634	10-32X3/8 Button Head Socket Cap Screw
2.....	D250800	Hex Head Thread Cutting Screw 1/4-20 x .5"
3.....	H121302	Roll Pin .125 D x .813 L
4.....	J257000	1/4-20 Nylon Insert Jam Locknut
5.....	R000536	Lock Washer 1/4 Internal Teeth
6.....	3707342.....	Yellow E-Stop Ring
7.....	3707367.....	Rocker Switch On/Off Dpst
8.....	3707442.....	Circuit Breaker 2 Amp
9.....	3707444.....	Circuit Breaker 10 Amp
10.....	3707446.....	Speed Knob W/Pointer
11.....	3707487.....	Pilot Lamp Socket
12.....	3707489.....	Lamp - 24V .073 Amp
13.....	3707539.....	Green Fluted Dome Lens
14.....	3707543.....	Circuit Breaker 12 Amp
15.....	3707547.....	Circuit Breaker 15 Amp
16.....	3707564.....	Pushbutton Green Start
17.....	3707565.....	No Contact Block
18.....	3707566.....	Switch Latch
19.....	3707567.....	Push/Pull Red Stop Button
20.....	3707568.....	No Contact Block
21.....	3707713.....	Rocker Switch Mom On/Off/On Wide
22.....	3707945.....	7 Segment Display
.....	3707961.....	7 Segment Display Mounting Cap
23.....	3707959.....	Green Push Button
24.....	3707964.....	Blue Led Light
.....	3707970.....	Blue LED Light Mounting Trim
25.....	6709122.....	Switch Guard Cover
26.....	6709123.....	Switch Guard Base
27.....	6709213.....	Control Travel Stop
28.....	6739509.....	Control Panel Weldment W/LED
29.....	6739001.....	673 Control Panel Decal
30.....	6739005.....	673 Traverse Potentiometer
31.....	6739501.....	Control Sub Panel Assembly
32.....	6739503.....	673 Control Panel Top Weldment

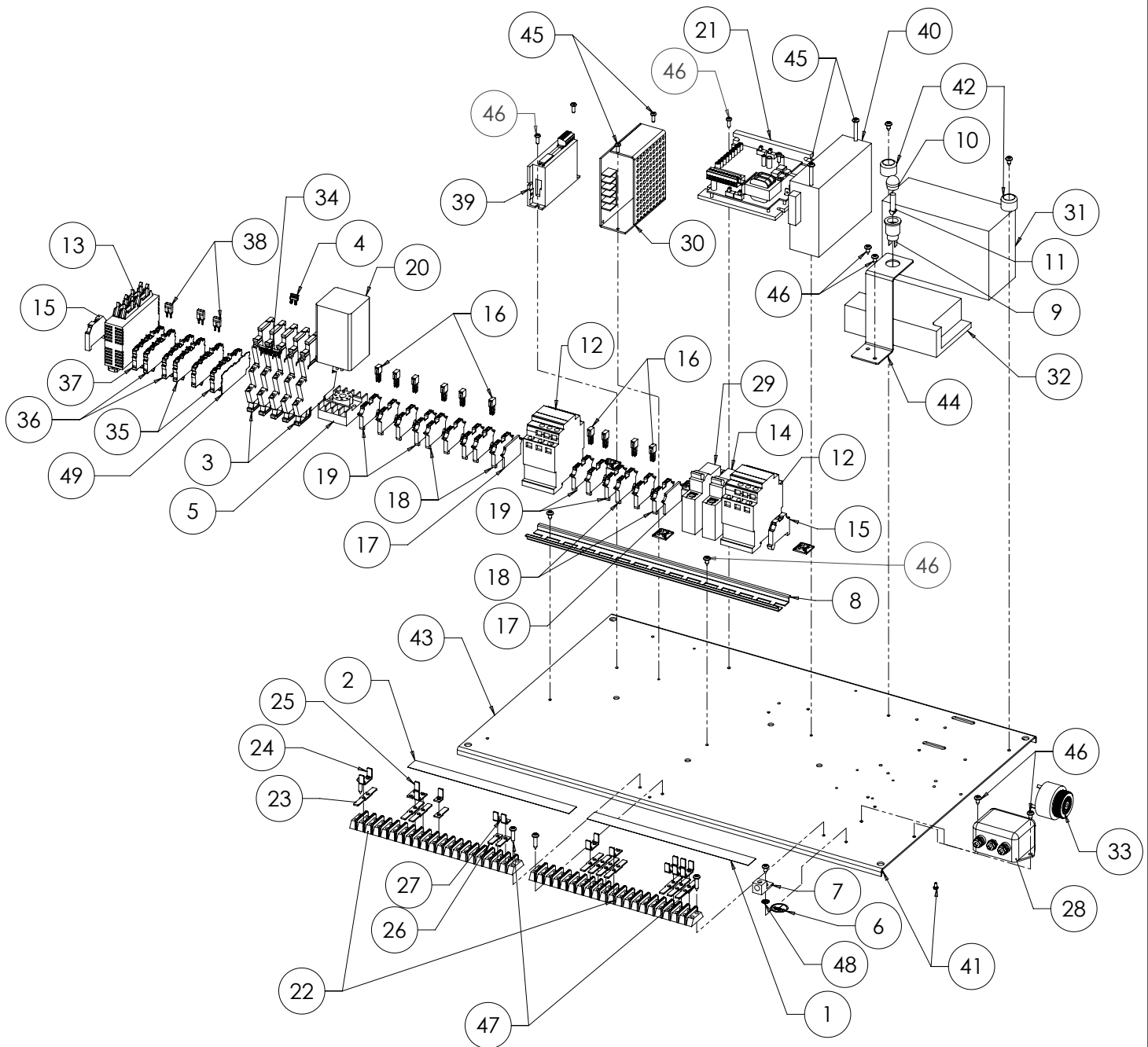


DIAGRAM NO.	PART NO.	DESCRIPTION
1.....	3706078.....	19 POLE DECAL (TB1)
2.....	3706079.....	19 POLE DECAL (TB2)
3.....	3706148.....	TERMINAL BLOCK RELAY 6A
4.....	3706149.....	2-POLE JUMPER FOR TERMINAL BLOCK RELAY
5.....	3707073.....	8 PIN SOCKET
6.....	3707163.....	PRIMARY GROUND DECAL
7.....	3707164.....	GROUND PRIMARY LUG
8.....	3707378.....	DIN RAIL 14.0 LG
9.....	3707487.....	PILOT LAMP SOCKET
10.....	3707488.....	AMBER FLUTED DOME LENS
11.....	3707489.....	LAMP - 24V
12.....	3707556.....	STARTER MAGNETIC 1 HP
13.....	6729009.....	PLC AROMAT FOR 673

DIAGRAM NO.	PART NO.	DESCRIPTION
14.....	3707589.....	CIRCUIT BREAKER 15 AMP
15.....	3707625.....	SCREWLESS TERMINAL BLOCK END STOP
16.....	3707626.....	JUMPER ADJACENT TERMINAL BLOCK
17.....	3707627.....	TERMINAL BLOCK END PLATE
18.....	3707628.....	TERMINAL BLOCK 2 CONDUCTOR GREY
19.....	3707629.....	TERMINAL BLOCK 2 CONDUCTOR BLUE
20.....	3707688.....	LOW VOLTAGE RELAY
21.....	3707697.....	TRAVERSE DRIVE
22.....	3707706.....	TERMINAL STRIP - 2 ROW 19 POLE
23.....	3707707.....	SPADE - DOUBLE FOR TERM STRIP
24.....	3707708.....	SPADE - DOUBLE 90 FOR TERMINAL STRIP
25.....	3707709.....	SPADE - SINGLE 90 FOR TERMINAL STRIP
26.....	3707741.....	SPADE - FLAT SINGLE FOR TERMINAL STRIP
27.....	3707742.....	SPADE - 90 SINGLE FOR TERMINAL STRIP
28.....	3707764.....	RFI LINE FILTER
29.....	3707779.....	6 AMP CIRCUIT BREAKER
30.....	3707839.....	24 VDC POWER SUPPLY 50W
31.....	3707854.....	BATTERY 12V
32.....	3707855.....	POWER SUPPLY W/BATTERY BACKUP (UPS)
33.....	3707856.....	ALARM (6-28VDC)
34.....	3707904.....	5 POLE JUMPER
35.....	3707913.....	TERMINAL BLOCK 4-POLE GRAY
36.....	3707914.....	TERMINAL BLOCK 4- POLE BLUE
37.....	3707917.....	TERMINAL BLOCK 4- POLE GRND
38.....	3707919.....	2-POLE TERMINAL BLOCK JUMPER
39.....	3707923.....	STEPPER DRIVE 2AMP-
40.....	3707948.....	POWER SUPPLY 12VDC 150W
41.....	3708574.....	M3- .5X6 FHSCS METRIC
42.....	3709767.....	RUBBER BUMPER
43.....	6009270.....	PANEL ELECTRICAL SUB
44.....	6729027.....	LIGHT BRACKET
45.....	D130608.....	6-32X.38 PHMS THD CUT TYPE F+
46.....	D160866.....	8 X 1/2 LG PHIL PAN SELF TAP
47.....	D161266.....	8 X 3/4 PMSMS TYPE AB+
48.....	R000480.....	LOCK WASHER #8 EXTERNAL TEETH
49.....	3707918.....	TERMINAL BLOCK END PLATE -4 POLE

NOT SHOWN

.....	3707224.....	CABLE TIE MOUNT
.....	3707225.....	CABLE TIE 6.5LX.18WX.05T
.....	3707255.....	CABLE TIE 4LX.1WX.03T
.....	3707631.....	TERMINAL BLOCK TAG 1-10
.....	3707632.....	TERMINAL BLOCK TAG 11-20
.....	6729026.....	WIRE PACK FOR UPS
.....	6739004.....	PANEL WIRE HARNESS
.....	6739006.....	CONTROL WIRE HARNESS
.....	6739007.....	PLC - OUTPUT CABLE ASSEMBLY
.....	6739008.....	PLC - INPUT CABLE ASSEMBLY

