ACCU-Pro 632
AUTO - INDEX
SPIN / RELIEF
REEL MOWER GRINDER

Patent No. 6,010,394
6,290,581 & 6,685,544

ASSEMBLY
and
SERVICE
MANUAL

WARNING

You must thoroughly read and understand this manual before operating the equipment, paying particular attention to the Warning & Safety instructions.

6327961 (8-13)

SAFETY INSTRUCTIONS

Safety Awareness Symbols are inserted into this manual to alert you to possible ***Safety Hazards***. Whenever you see these symbols, follow their instructions.

The ***Warning Symbol*** identifies special instructions or procedures which, if not correctly followed, could result in personal injury.

The ***Caution Symbol*** identifies special instructions or procedures which, if not strictly observed, could result in damage to or destruction of equipment.

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 foot wear is recommended. Wear protective hair covering to contain long hair.
10. **ALWAYS USE SAFETY GLASSES.**
11. **SECURE YOUR WORK.** Make certain that the cutting unit is securely fastened with the clamps provided before operating.
12. **DON'T OVERREACH.** Keep proper footing and balance at all times.
13. **MAINTAIN GRINDER WITH CARE.** Follow instructions in Service Manual for lubrication and preventive maintenance.
14. **DISCONNECT POWER BEFORE SERVICING, or** when changing the grinding wheel.
15. **REDUCE THE RISK OF UNINTENTIONAL STARTING.** Make sure the switch if 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 illustration in 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.

SAFETY INSTRUCTIONS

MPROPER 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 materiel 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.
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 COVERING** 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.

DON'T

1. **DON'T** use a cracked wheel or one that has become damaged.
2. **DON'T FORCE** a wheel onto the machine **OR ALTER** the size of the mounting hole - if 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 work gets hot.

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 maintain dust level below the Threshold Limit Value for nuisance dust as classified by OSHA.

This machine is intended for grinding the reel of reel type mower units <u>ONLY</u>. 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 manufacturers 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. Machine is for indoor use only. Do not use a power washer to clean the machine.

Low Voltage Relay

The grinder is equipped with a high-low voltage relay which is factory preset at 100-140 VAC. If the power supply line does not deliver 100-140 VAC power under load, the relay will open and trip out the starter. If this occurs, your power supply line is incorrect and must be correct before proceeding further with the grinder.

CONTENTS

SPECIFICATIONS

Electrical Requirements	115V 50/60 Hz, 20 amp circuit
Net Weight	1490 lbs (676 kg)
Shipping Weight	1770 lbs (803 kg)
Maximum Grinding Length	34 inches (86cm)

SERVICE DATA

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 *ACCU*-PRO Spin/Relief Grinder. For those without the 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 Manual, 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 questions not answered in this manual, please call your distributor. They will contact the manufacturer if necessary.

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 Thread Hole in Steel.
Refer to the table at the right.

Bolts Going Into a Thread Hole In Aluminum
Use the Grade 2 values in the table at the right.

Socket-Head Screws Going Into a Nut or Steel
Use the Grade 8 values in the table at the right.

Machine Screws
No. 6 screws: 11 in.- lbs (0.125kg - m)
No. 8 screws: 20 in. - lbs (0.23 kg - m)
No. 10 screws: 32 in. - lbs (0.37 kg - 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)

ASSEMBLY INSTRUCTIONS

Remove the sides, front, and back of the crate. Remove the plastic bag, shrink wrap and bubble wrap. Remove the metal clips that secure the grinder to the crate base. With a fork lift, raise the grinder from the wood base and set it in its final position. See FIG. 1 and 2.

THE UNIT WEIGHS 1490 LBS. (676 kg). USE POWER EQUIPMENT TO LIFT MACHINE.

Remove shipping straps from traverse carriage. Remove window protective sheets.

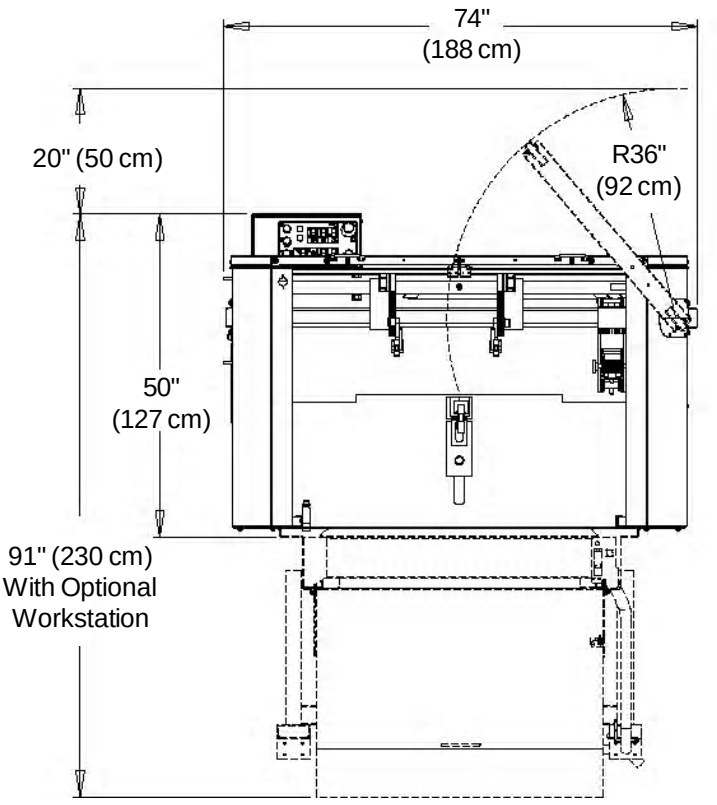


FIG.1

POSITION BASE

The *ACCU*-Pro Spin/Relief Grinder will require an operating area of about 120" W x 140" D x 90" H (305 x 356 x 229 cm). The mower reel will be lifted from the front of the machine if using the optional winch & boom and from the rear with the optional workstation. The machine operator will operate the unit from the front of the machine. Position the base to allow sufficient operating room in front of the machine (and behind if using the optional workstation). See FIG. 1 and 2.

The base should be placed on a relatively level concrete floor, with ample ceiling height to allow for the installation of the unit. Do not place the unit across two concrete slab seams or across a large crack.

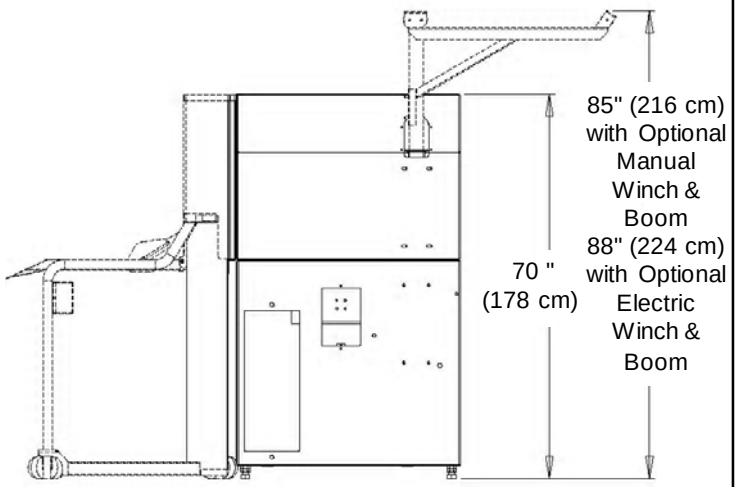
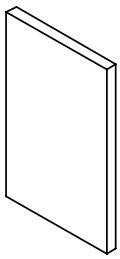


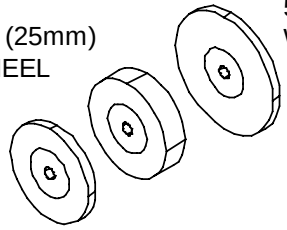
FIG. 2

ASSEMBLY INSTRUCTIONS (Continued)

Remove the carton and remove the contents from the carton onto a workbench. The carton includes:

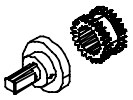


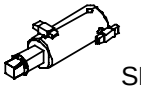
PRODUCT
PACKET



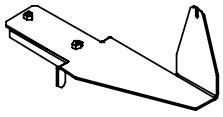
3.5" (89mm) DIA. X 1" (25mm)
WIDE GRINDING WHEEL

5" (127mm) DIA. X 3/8" (10mm)
WIDE GRINDING WHEEL





SPIN DRIVE
ADAPTER

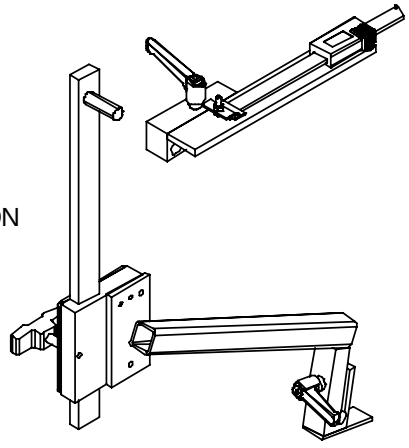


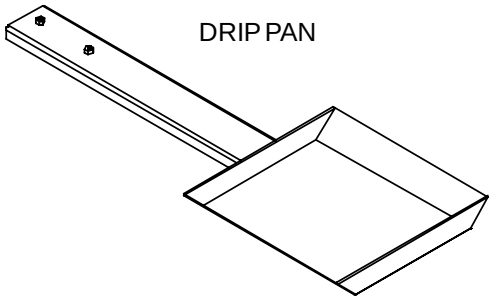
ALLEN WRENCH

3.5" (897mm) DIA. X 3/8" (10mm)
WIDE GRINDING WHEEL

REEL POSITION GAGE

ALIGNMENT GAGE





DRIP PAN

HORIZONTAL EXTENSION
(ALIGNMENT GAGE)

LEVEL BASE

Place level on the top of the table. Adjust the leveling feet as necessary to bring to level. See FIG. 4.

Place a level across the table from front to rear. Adjust the leveling feet on the end of the machine as necessary to level. See FIG. 5

When both front to back and side to side leveling procedures have been completed, thread the hex jam nuts up against the nut that is welded to the bottom until they lock into place. Be careful not to move the leveling feet during this process. See FIG. 3. Make certain that all four leveling feet are firmly contacting the floor.

Recheck with level after locking nuts are firmly tightened.

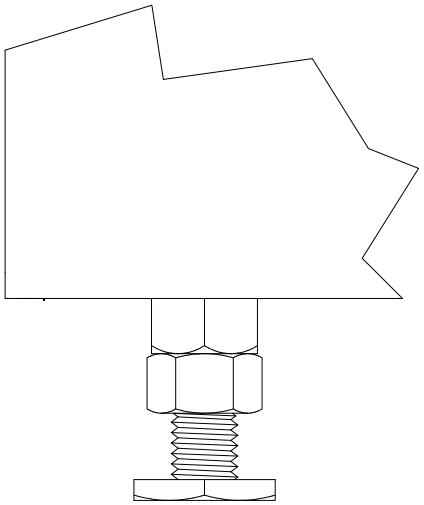


FIG. 3

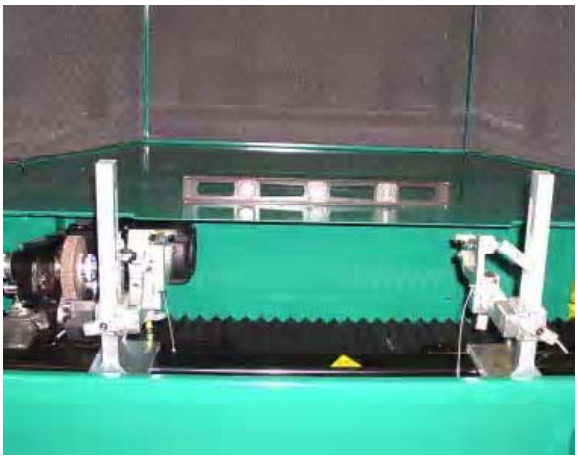


FIG. 4

FIG. 5

APPLY POWER

BEFORE YOU APPLY POWER TO THE GRINDER, REFER TO THE "IMPORTANT GROUNDING INSTRUCTIONS" ON PAGE 10.

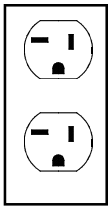


FIG. 7

115 Volt Model Only. Plug the control box power cord into a standard 115V AC 20-amp grounded receptacle. See FIG. 7.

220 Volt Model Only. For 220 Volt Applications order Part No. 6320916, which includes a prewired 3 KVA 220V step down to 110V 50-60Hz transformer. See Page 10.

IT IS RECOMMENDED THAT THIS ACCU-PRO SPIN/RELIEF GRINDER HAS ITS OWN PERMANENT POWER CONNECTION FROM THE POWER DISTRIBUTION PANEL, WITH NO OTHER MAJOR POWER DRAW EQUIPMENT ON THE SAME LINE.

IT IS REQUIRED THAT THE POWER DELIVERED TO THIS GRINDER IS 115 VAC - 20 AMPS. THE TOLERANCE ON THIS POWER REQUIREMENT IS +/- 5%. THEREFORE THE MINIMUM VOLTAGE REQUIREMENT IS 109VAC WITH 20 AMPS. VOLTAGE MUST BE CHECKED WITH ALL EQUIPMENT UNDER LOAD (OPERATING) ON THE CIRCUIT.

DO NOT OPERATE THIS GRINDER WITH AN EXTENSION CORD.

DO NOT OPERATE THIS GRINDER ON A GROUND FAULT INTERUPTER (GFI) CIRCUIT. THE (GFI) WILL TRIP CONSTANTLY.

PROPER GROUNDING OF THE RECEPTACLE GROUND IN YOUR BUILDING MUST BE VERIFIED. IMPROPER GROUNDING IN YOUR BUILDING MAY CAUSE THE GRINDER TO MALFUNCTION.

When installing the grinder, the following guidelines should be used to establish the wire size between the power panel in your building and the grinder receptacle. Note that the wiring in your building must be per code between main power panels and sub panels.

FOR 20 AMP RATED LARGE MACHINES

For 0 to 40 Feet from panel to receptacle = Use 12 Ga. Wire.
For 40 to 60 Feet from panel to receptacle = Use 10 Ga. Wire.
For 60 to 100 Feet from panel to receptacle = Use 8 Ga. Wire.
For 100 to 160 Feet from panel to receptacle = Use 6 Ga. Wire.

For 0 to 12 Meters from panel to receptacle = Use 2.5mm Wire.
For 12 to 30 Meters from panel to receptacle = Use 4.0mm Wire.

The grinder is equipped with a high-low voltage relay which is factory preset at 100-140 VAC.
If the power supply line does not deliver 100-140 VAC power under load, the relay will open and trip out the starter. If this occurs, your power supply line is incorrect and must be correct before proceeding further with the grinder.

ASSEMBLY INSTRUCTIONS (Continued)

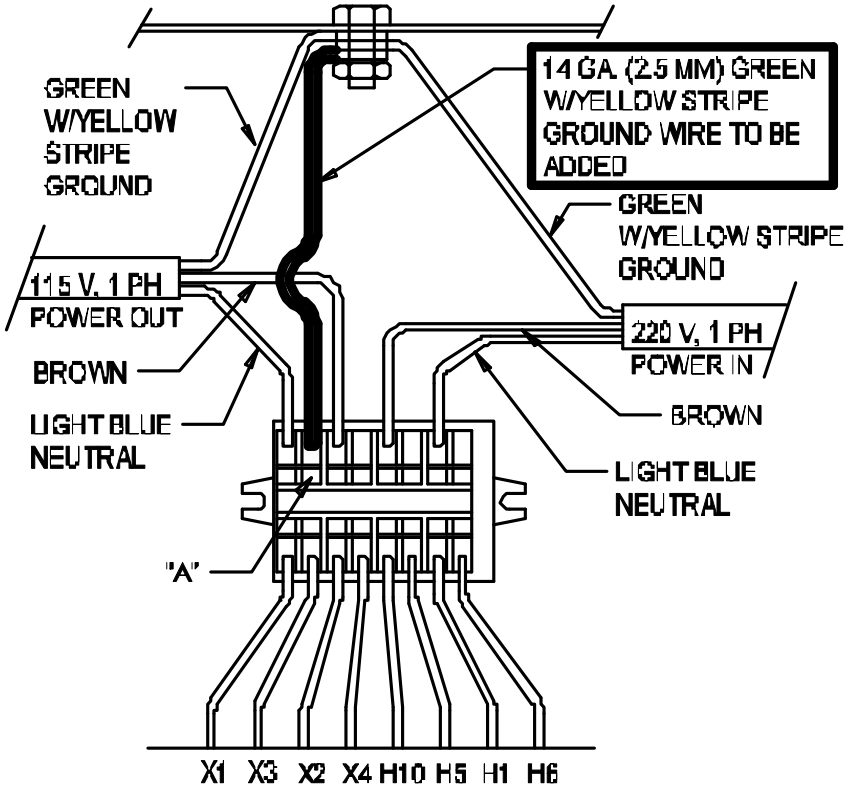
FOR 220 V 50 or 60Hz applications Product No. 6320916 should be ordered.

These models includes a 3KVA 220V, step down to 110 V 50-60 Hz transformer.

The wiring diagram is shown in FIG. 8.

The power cord has no connector. A connector which is appropriate for your locality and 220 volt, 10 amp application should be installed.

USE ONLY A QUALIFIED ELECTRICIAN TO COMPLETE THE INSTALLATION.



INDIVIDUALLY WIRE NUT TRANSFORMER LEADS H2, H3, H4, H7, H8 AND H9

INSTALL THE GREEN W/YELLOW STRIPE WIRE SUPPLIED INTO THE TERMINAL BLOCK IN THE HOLE OPPOSITE WIRE X3 AS SHOWN. TO INSTALL THE WIRE INSERT A SMALL SCREWDRIVER INTO THE CAVITY MARKED "A" TO OPEN THE WIRE HOLE.

ATTACH THE OTHER END OF THE GREEN W/YELLOW STRIPE WIRE SUPPLIED TO THE GROUND STUD ON THE TRANSFORMER.

FIG. 8

IMPORTANT GROUNDING INSTRUCTIONS

In case of a malfunction of electrical 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 FOR 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.

PERIODIC MAINTENANCE

DAILY MAINTENANCE IS SPECIFIED ON PAGE 4 OF THE OPERATOR'S MANUAL, AND IS TO BE PERFORMED BY THE OPERATOR. LISTED BELOW ARE PERIODIC MAINTENANCE ITEMS TO BE PERFORMED BY YOUR COMPANY'S MAINTENANCE DEPARTMENT:

1. Clean the tank and filter of the vacuum system weekly or more often depending on the number of reels ground. **(VACUUM SYSTEM IS OPTIONAL EQUIPMENT)**.

2. Use the grease fitting provided to grease the dove tail with high quality lithium grease monthly. Wipe off excess grease. See FIG. 7.

3. Wipe and re-oil with spray lubricant, the grinding wheel diameter adjusting lead screw every three months. Wipe off all excess lubricant. See FIG. 7.

4 Check the gib adjustment on the Grinding wheel diameter adjustment every 3 months. See FIG. 7.

5. Inspect the Grinding Wheel Poly-V belt for cracking and adjust the belt tension per procedure called out in the adjustment section every six months.

6. Wipe and relube with never-seez, the vertical and horizontal alignment shafts and lead screws, every six months. See FIG. 8.

7. Lift the bellows and wipe off the bearing rails monthly. Lubricate linear bearing, follow the lubrication procedure on the following pages. Generally, this will be every six months to a year.

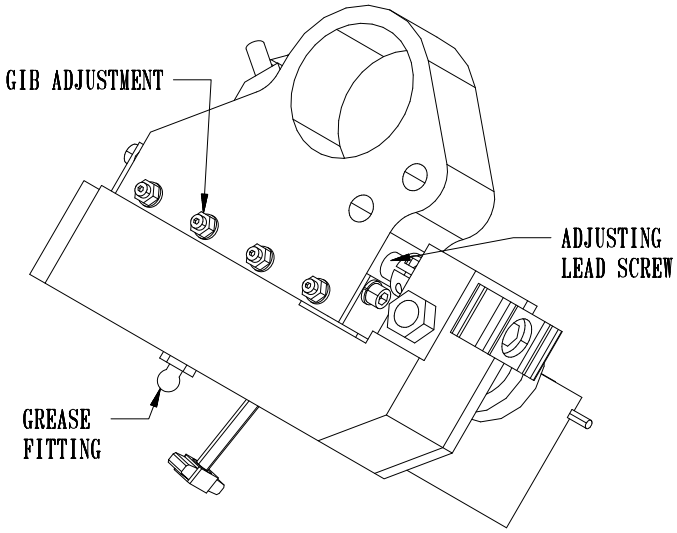


FIG. 7

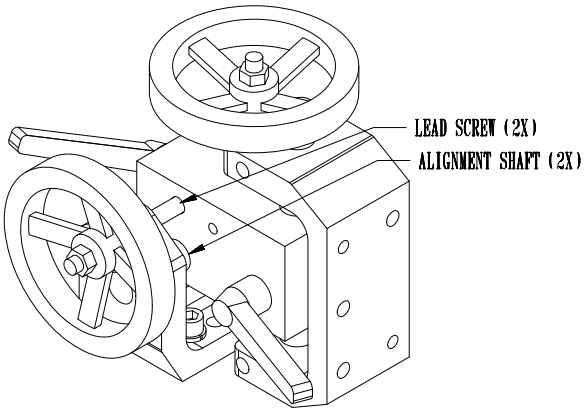


FIG. 8

STORAGE PROCEDURE

It is important to follow the procedures below when placing your grinding in storage for an extended period of time. Proper care will help maintain the working functions of the grinder and decrease maintenance and problems that occur when storing the grinder.

BEFORE STORING THE GRINDER:

-Clean the machine thoroughly. **(DO NOT USE COMPRESSED AIR OR A POWER WASHER TO CLEAN THIS MACHINE!)** See Maintenance section for instructions on cleaning polycarbonate.

-Lubricate the following parts by flooding the area with a spray lubricant and leaving it in place: (Do not use a Teflon based lubricant)

Traverse Shafts & Linear bearings (see Lubrication section of manual)
Remove grinding wheel and spray the movable parts of the finger system
Cross slide shafts and adjustment screws (Right side of Traverse Base)
Scratches in the paint or any other bare metal surfaces

-Work the lubricant in by moving parts through their full range of motion.

-Make sure all controls are in the off position and unplug the unit from the wall. Turn off the digital alignment gage.

-Cover the unit if possible with a sheet or tarp.

BRINGING THE UNIT BACK INTO SERVICE:

-Remove the cover and reapply lubricant to the items stated above. Wipe off all excess lubricant. (See Lubrication section for more details.)

-Plug the unit into the wall and test all electrical functions.

-Check the belts for cracking and adjust the tension if necessary.

-Check for damaged or missing parts.

LUBRICATION

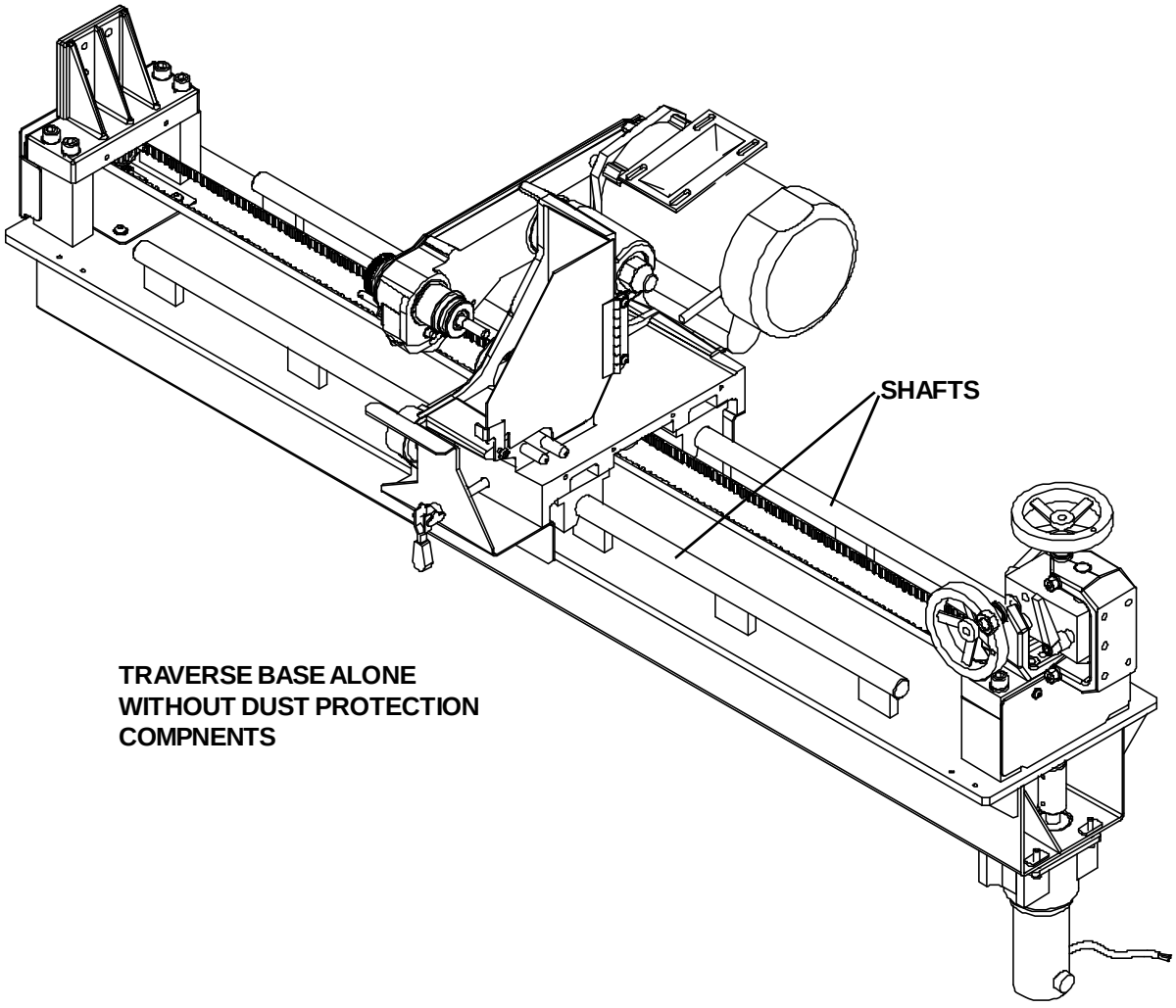
LUBRICATION OF LINEAR BEARINGS

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. See FIG. 10 Then run the carriage back and forth through its 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 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 and that lubricant 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.



TRAVERSE BASE ALONE WITHOUT DUST PROTECTION COMPNENTS

FIG. 10

CLEANING AND MAINTENANCE GUIDELINES FOR POLYCARBONATE WINDOWS

Cleaning Instructions

DO NOT USE GASOLINE
Adherence to regular and proper cleaning procedures is recommended to preserve appearance and performance.

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, a warm final wash should be made, using a mild dish washing liquid detergent solution and ending with a thorough rinsing 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.

Some Important "DON'TS"

- **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 (hair dryer) to soften the adhesive and promote removal.

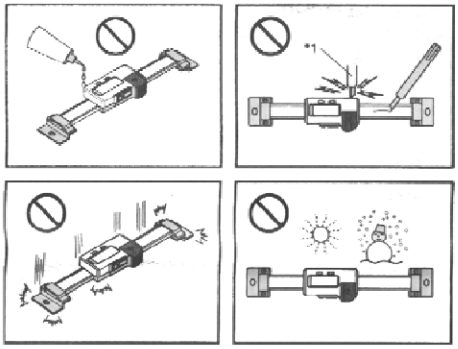
  GASOLINE SHOULD NOT BE USED!

MAINTENANCE (Continued)

DIGITAL GAGE

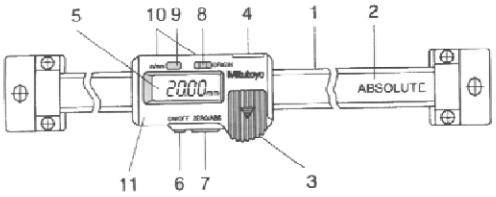
Important

- Do not mark the scale unit with and electric engraver or scratch the scale.
- Always use an SR44 battery (silver oxide cell)
- If the scale will not be used for more than three months, remove the battery and store it properly. Otherwise, leakage, if any, from the battery may damage the unit.



Description of Parts

1. Beam
2. Main Scale
3. Battery compartment
4. Output Connection
5. Display
6. ON/OFF Power
7. ZERO/ABS switch
8. Origin Switch
9. Inch/mm Switch
10. Tapped hole
11. Slider

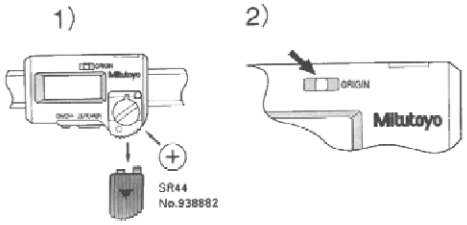


Battery Installation and Origin Setting

Set the origin of the scale after installing the battery. Otherwise, the error sign("E" at the least significant digit) may appear, resulting in incorrect measurements.

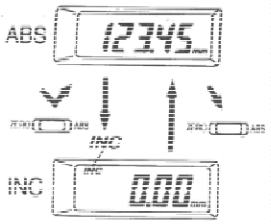
1) To install the battery, remove the compartment lid and install the SR44 battery with its positive side facing up. After the battery is installed, set the origin.

2) To set the origin, move the slider to an area you wish to set as your origin. Turn the power on. Hold the ORIGIN switch down for more than one second. The "0.00" display appears, indication Origin setting is complete. The origin will be retained even if the power is turned off.



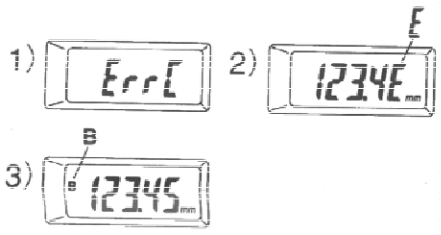
Incremental (INC) & Absolute (ABS) mode

The LCD will dispay measurements from the origin when turned on (ABS mode). To set the origin see above. The display can be set to zero at any desired position by pressing the ZERO/ABS switch. INC indicator will apper in the display (INC mode), permitting measurements from this zero point. To return to the ABS mode hold the ZERO/ABS buttton form more than 2 seconds.



Error Symptoms & Remedies

- **ERRC and display flickering:** Occurs when the scale surface is stained. Clean the scale surface and coat a thin film of low viscosity oil to keep out moisture.
- **E in the least significant digit:** This occurs when the slider is moved too quickly, but it does not affect the measurement. If it stays on when the slider stops, the scale surface is probably stained. If this is the case, take remedies as for ErrC.
- **B indication:** Battery voltage is low. Replace the battery as soon as possible.



Cleaning

Clean gage with CRC 3-36 Cleaning and Lubrication Oil. Wipe off excess after cleaning. If CRC 3-36 is not available, use Denatured Alcohol to clean, then apply light oil and wipe off excess.

CARRIAGE LINEAR BEARING REPLACEMENT

STEP 1--Detach the bellows mounting brackets from the carriage. Detach front and rear shields. See FIG. 15.
STEP 2--Remove the three screws of one linear bearing and slide the linear bearing off the end of the carriage shaft.
STEP 3--Insert a new linear bearing onto the end of the carriage shaft with the tension adjustment screw pointing outward. See FIG. 14. 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: 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 tension screw is too tight.

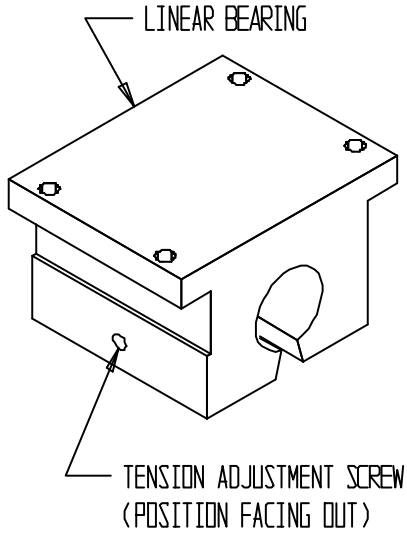


FIG. 14

Finally, sliding the bearing block back and forth should be a smooth uniform 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.

STEP 4--Slide linear bearing under carriage and attach with the three screws.
NOTE: Repeat Steps 2 thru 4 with the other three linear bearings.
STEP 5--After all four linear bearings are reattached to the carriage check for correct bearing tension. The bearing tension is correct when you try to lift the carriage and can feel no carriage movement, which is free play up and down. The most dependable method of checking free play is to use a magnetic base dial indicator attached to the traverse frame weldment and reading the vertical movement above each bearing. This movement should be within .001" (.03 mm) Also, when pulling the carriage in the traversing direction, there should be only approximately a 3 lb force, with the belt disengaged. To check this attach a spring scale to the carriage and pull parallel to the carriage shafts. To double check the assembly, slide the carriage assembly from "end of travel" to "end of travel", it should have very uniform resistance through the full range of travel.
STEP 6--Replace the bellows carriage mounting brackets onto the carriage. Replace front and rear shields.
See FIG. 15.

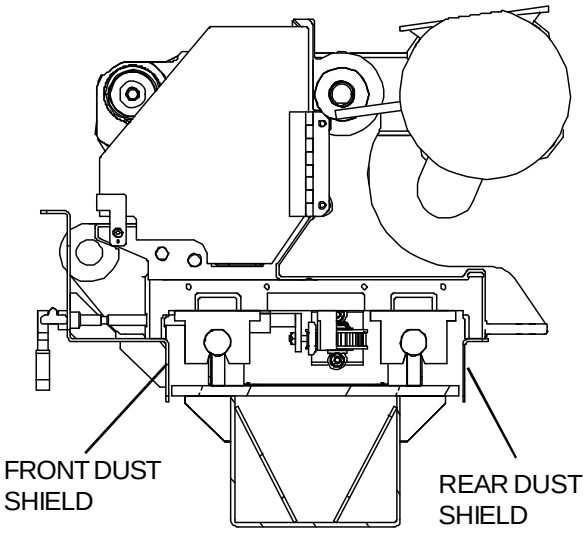


FIG. 15

REEL FINGER DOVETAIL GIB AND ADJUSTING KNOB ADJUSTMENTS

The reel finger slide to the reel finger positioner has a dovetail with an adjustable gib for tensioning. Tighten the gib set screws on the side so there is no free play in the dovetail slide. Check for movement when pushing on the relief finger side to side with 20 lbs. (44kg) force. Make sure the knob assembly for adjusting the relief finger to the grinding wheel is rotatable by hand. The gib adjustment should be sufficient to maintain a rigid position of the reel finger. See FIG. 16.

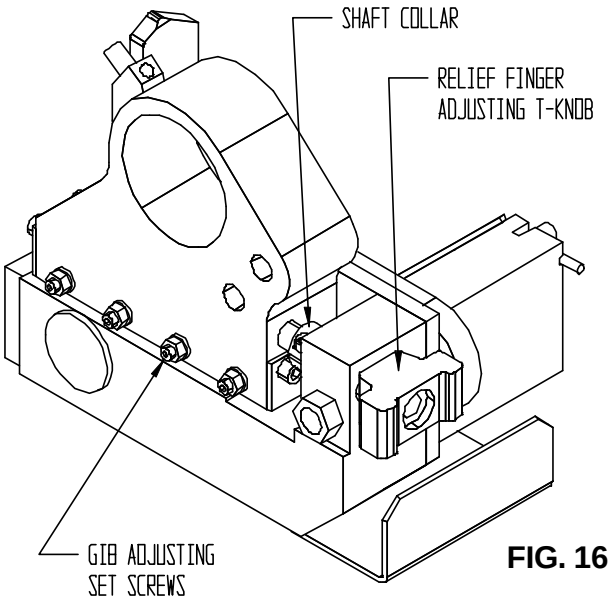


FIG. 16

Check the knob assembly rotating tension by checking the tightness of the nylon plug to the knob assembly threads. The tightness has to be sufficient so the knob assembly does not rotate during the relief grinding cycle. See FIG. 17.

NOTE: To adjust the nylon plug you must lock the index finger assembly down and then adjust the reel finger positioner so the clearance holes line up with the nylon plug set screw.

Take up any free play between the tee knob assembly, reel finger slide and .375 threaded split shaft collar. Loosen the shaft collar locking cap screw and rotate the shaft collar until there is no end play. Retighten locking cap screw on the threaded split shaft collar. See FIG. 16.

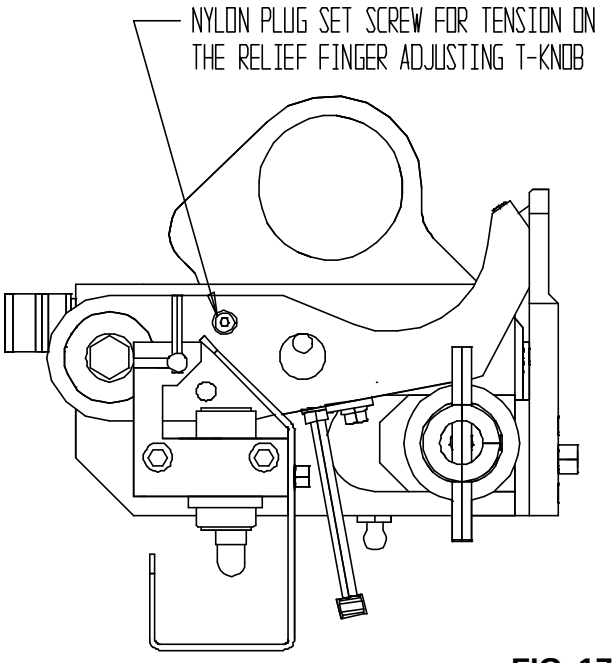


FIG. 17

GRINDING HEAD BELT TENSION ADJUSTMENT

The left side grip grinding wheel knob must be removed for belt tensioning adjustment. Remove the six screws holding, the two double tube clamps and the belt cover. For grinding motor belt adjustment, loosen the four socket head cap screws that attach the motor. Adjust the grinding motor for proper belt tension by pushing back on the motor and tighten the four socket head cap screws. The proper belt tension for the grinding head is to push down on the poly V belt half way between the two pulleys with 5 lbs. (2KG) of force and belt movement dimensions to be .12 inches (3mm). See FIG. 18. To verify belt tension mount the belt guard with two screws. Turn the motor on. If the belt is tensioned correctly, start-up torque of the motor through the pulley to the belt should have zero slippage. If there is belt slippage when turning on the motor there will be a slight squeal before the belt comes up to speed. When you achieve correct tension, reassemble all of the remaining parts that have been removed.

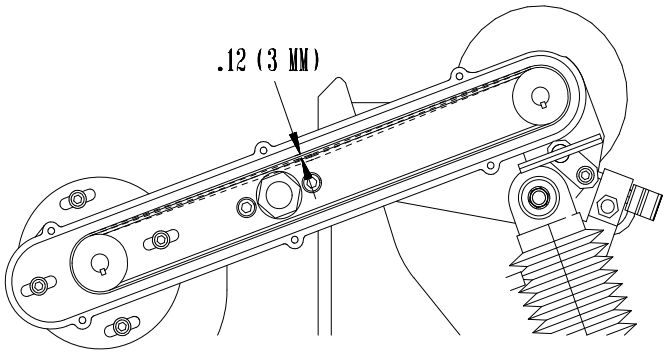
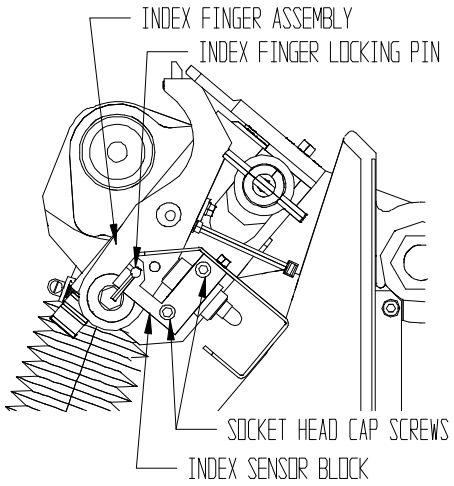


FIG. 18

LOCKING INDEX FINGER PIN

To align the Index Finger Locking Pin to the hole in the Index Finger Assembly loosen the two socket head cap screws so the index sensor block is movable. Push down on the index finger assembly until the spring loaded index finger locks into hole with no binding. Tighten the two socket head cap screws so the index sensor block is secured, and the locking pin moves freely. See FIG. 19.



INDEX FINGER PROXIMITY SETTING

Set all motor switches to the off position.

Press the machine system start switch, so the grinder is operational. Rotate the Traverse Speed dial to 0 and turn on the Traverse motor switch.

Push down on the index finger until the stop pin is within .06 inches (1.5 mm) of bottoming out. (You can use a 1/16" gage pin or rod stock between the stop pin and index finger). Set the proximity switch to activate the light at this setting. This assures the index finger to be close to its final stop position so the reel is completely indexed before the carriage starts to traverse. See FIG. 19.

The spring load force pushing up on the index finger brings it away from the proximity when released.

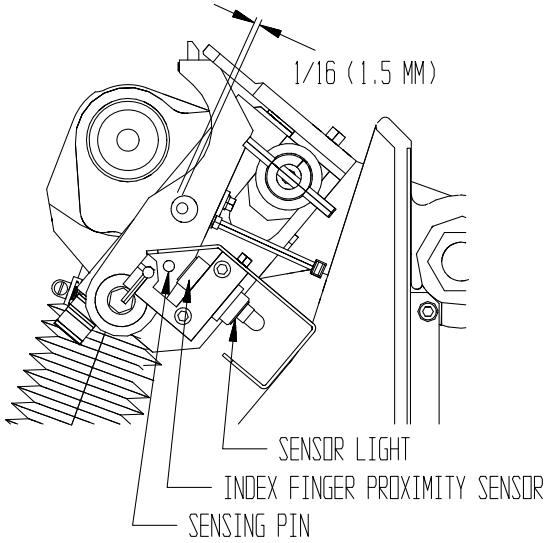


FIG. 19

PROXIMITY SWITCH

For the proximity switch to perform properly and reverse the direction of the carriage at each end of the rails, a distance of 3/16" (4 mm) to 1/4" (6 mm) needs to be maintained between the carriage proximity flag bracket and the proximity switch. See FIG. 20.

NOTE: Light on proximity activates when metal crosses in front of switch sensor.

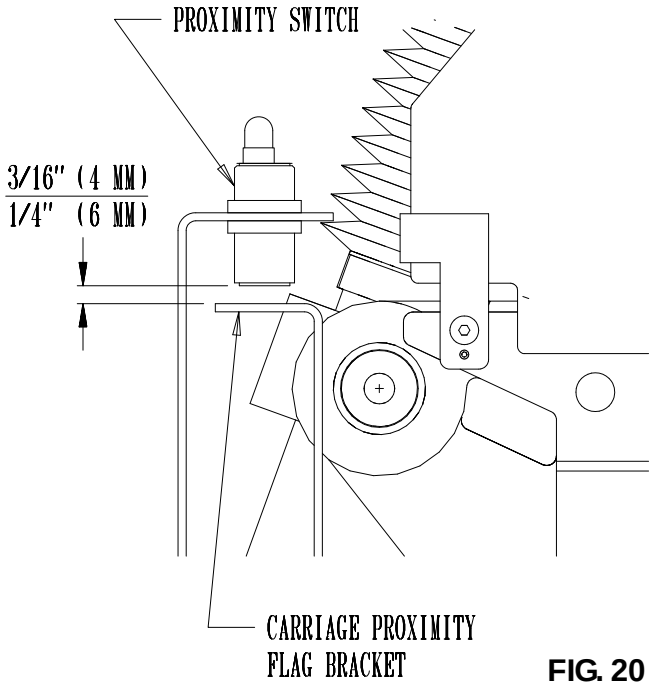


FIG. 20

ADJUSTABLE RELIEF TENSION

If the relief angle appears to vary during relief grinding, adjust the tension on the nylon plug and set screw. See FIG. 21.

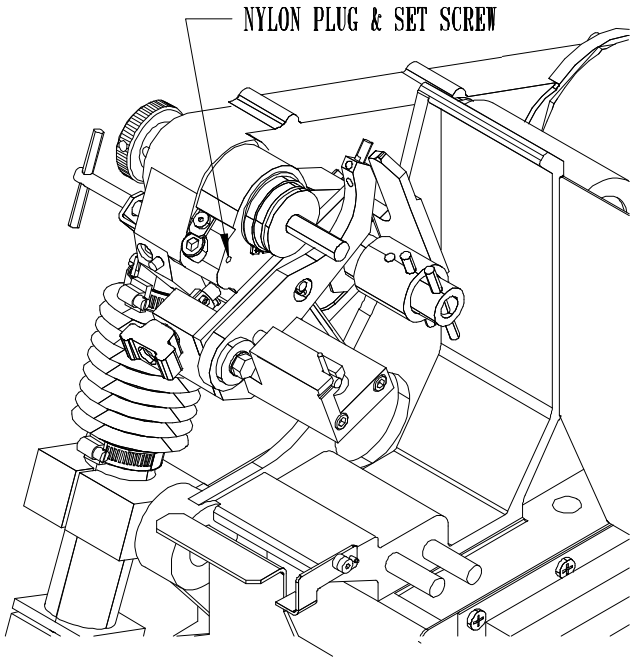


FIG. 21

SAFETY SWITCH ALIGNMENT

For the safety switches to work properly they must be adjusted so the sender and receiver are parallel to each other with a maximum gap of .19 inches (5mm). (Adjust by moving the doors or brackers. If this does not help, a special wrench is needed to adjust the safety screws used to hold the switch in place.) See FIG. 22.

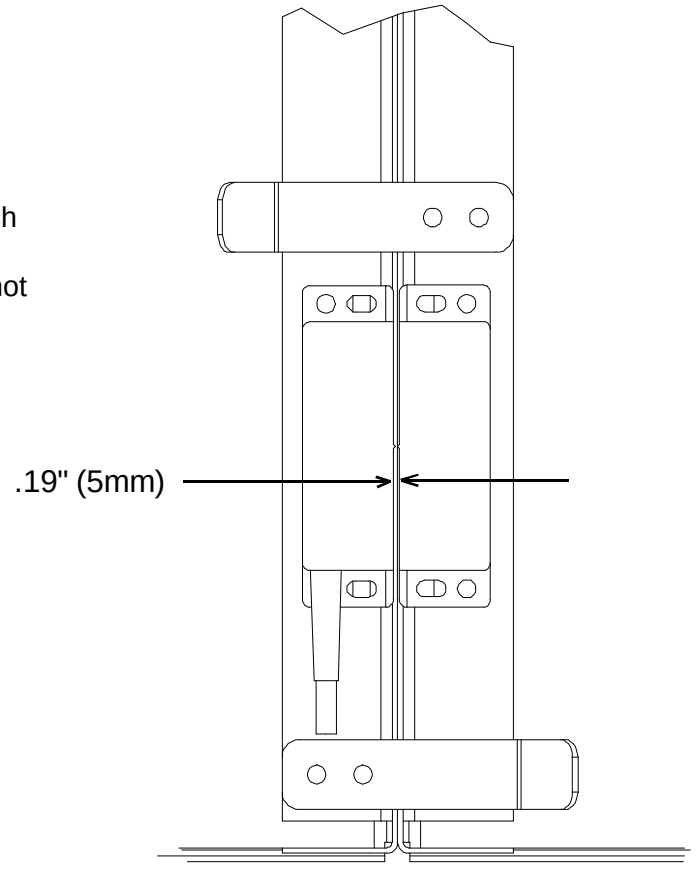


FIG. 22

SPIN GRINDING ATTACHMENT ADJUSTMENT

If play develops so crank handle wants to rotate in the scissor action on the spin grinding attachment, the play can be eliminated by tightening the set screw identified in FIG. 25.

If there is too much play in the spin drive pivot points, torque down the hex nut tight so conical washer is completely compressed, then back off 1/2 turn. See FIG. 25.

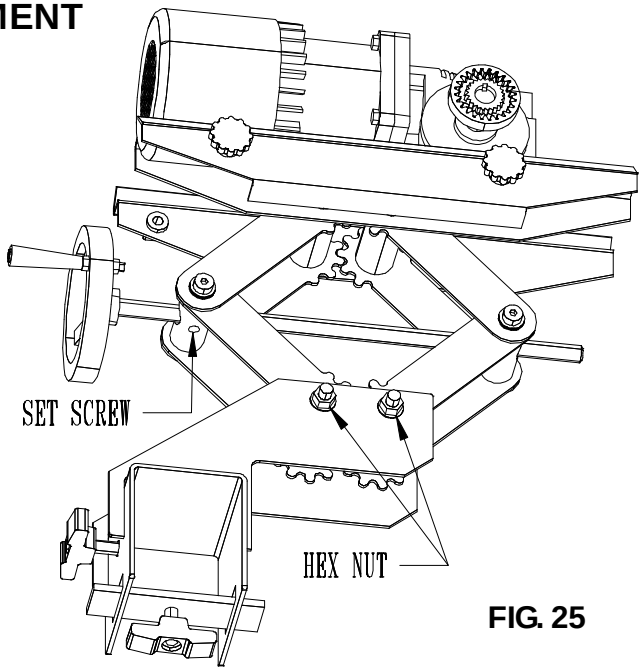


FIG. 25

REDUCER MOTOR ADAPTER TO ACTUATOR DRIVE SCREW CLAMPING COLLAR POSITIONING

The lower clamp collar, next to the reducer motor adapter, is to be positioned flush to the end of the actuator screw shaft and tighten down with 6 ft. lbs (0.8 kg) of torque. See FIG. 26. The top clamp collar is factory adjusted and does not need any further adjustment. There is to be no slippage between the reducer motor adapter shaft and actuator screw when pushing down on grinding head and stalling the reducer motor.

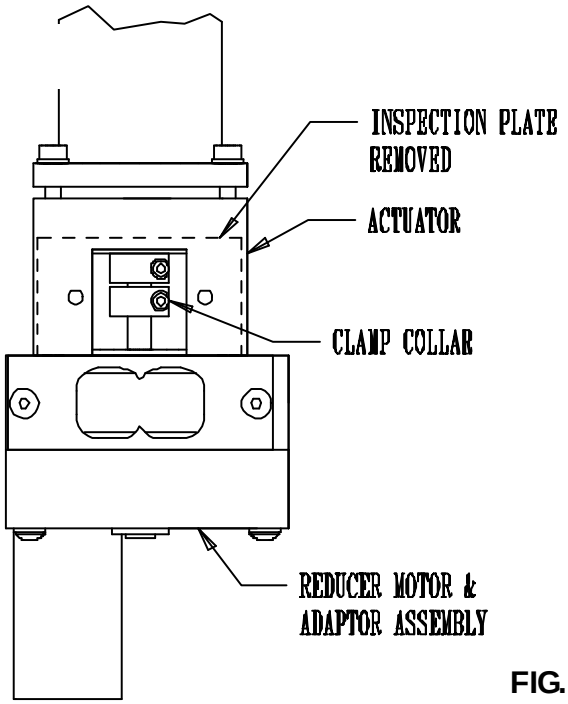
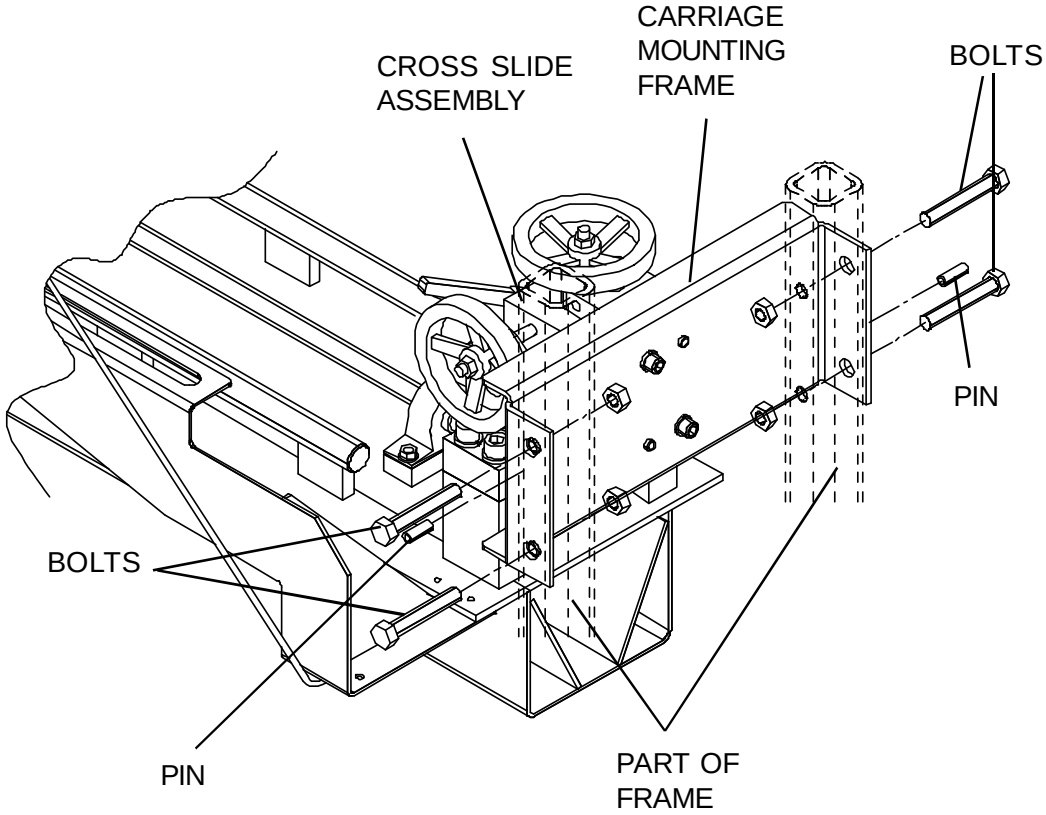


FIG. 26

ADJUSTING CROSS SLIDE ASSEMBLY

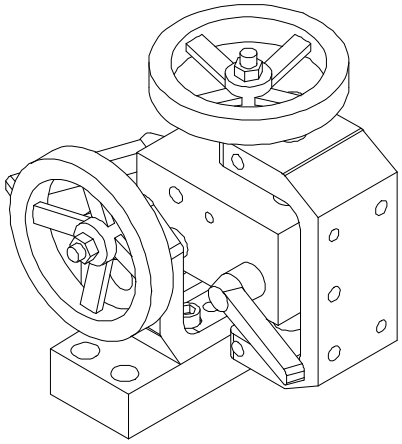
If the cross slide becomes very difficult to turn it may become necessary to adjust the assembly. To relieve the tension on the assembly follow the procedure listed below:

STEP 1--Using a hydraulic jack, raise the traversing carriage base just enough to alleviate the weight stress on the Cross Slide Assembly.
STEP 2--Knock the pins on either side of the Mounting Frame Adjuster and loosen the 4 bolts (B504801) that connect the Carriage Mounting Frame to the frame of the grinder.
STEP 3--Jack the traversing carriage base up to put a preload on the Cross Slide Assembly.
STEP 4--Tighten the 4 bolts on the Carriage Mounting Frame to 75 ft-lbs.
STEP 5--Release the jack pressure and test the vertical and horizontal handwheels for ease of movement through their full range of motion.
STEP 6--If the Cross Slides tend to bind, repeat above steps jacking higher or lower (STEP 1) until the handwheels move freely.
STEP 7--When the Cross Slides move freely through their full range of motion, drill new holes and repin assembly.



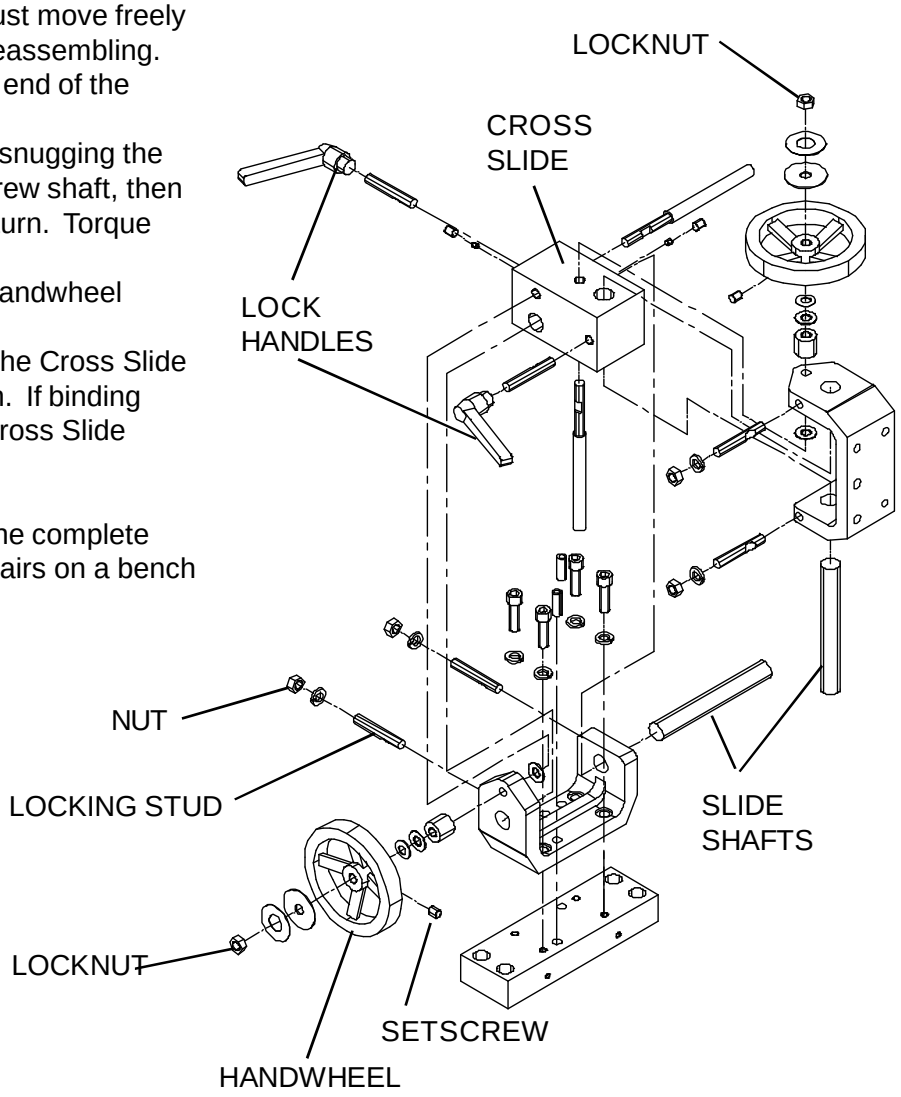
CROSS SLIDE SHAFT REPLACEMENT

If the cross slide shafts become scarred or gnarled, replace them by the following procedure:



STEP 1--Use a hydraulic jack to raise the weight off the Cross Slide Assembly.
STEP 2--Loosen the two nuts on the support casting that hold the locking studs and tap with plastic hammer to loosen.
STEP 3--Loosen the locking handles and tap the center stud with a plastic hammer.
STEP 4--Loosen locknut and setscrew and remove the handwheel.
STEP 5--Remove the Slide Shaft.
STEP 6--Remove all burrs and resurface the shaft to a clean, smooth, polished surface.
(OR REPLACE WITH A NEW SHAFT.)
STEP 7--Coat shaft with Never-Cease and re-install the shaft through the Support, Cross Slide Block and the three locking studs. The shaft must move freely inside the Cross Slide Block before reassembling.
STEP 8--Retightening the nuts at the end of the locking studs to lock shaft in place.
STEP 9--Reinstall the Handwheel by snugging the setscrew to the flat located on the screw shaft, then torque nut until tight and back off 1/2 turn. Torque the setscrew to 70 in-lbs.
STEP 10--Test the Cross Slide, the handwheel should turn freely.
STEP 11--Lower the jack and retest the Cross Slide Assembly through full range of motion. If binding occurs, follow the procedure under Cross Slide Assembly located on page 21.

NOTE: It is also possible to remove the complete Cross Slide Assembly and do the repairs on a bench then reinstall.



TRAVERSE BELT TENSION

To adjust the tension on the traverse belt tighten the screws and nuts located at the left side of the traverse belt. Tighten nuts until the comprension springs measure 3/4". See FIG. 29. If the springs are not tensioned equally, uneven loading on the traverse system may cause parts to fail.

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

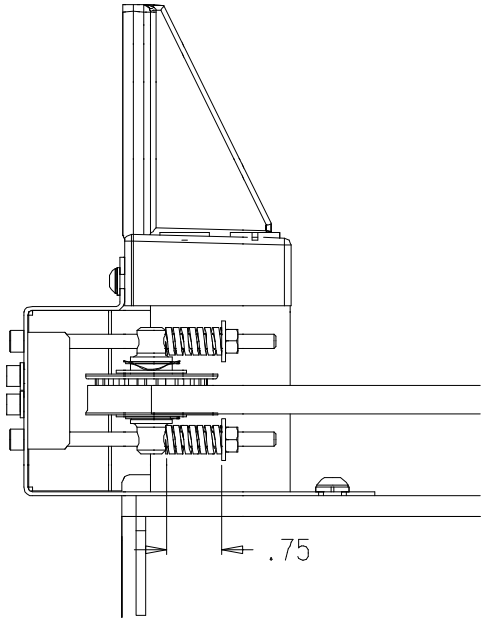


FIG. 29

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 on the clamp tip. Screw the tip out so there is .10" gap between the tip and the Clamp Support Block. See FIG 30. Lock in place by tightening the jam nut against the clamp being careful not to move the tip. Verify the distance between the clamp tip and block is still .10". The .10" setting allows slippage in a jam situation and damage can occur if this adjustment is set to narrow.

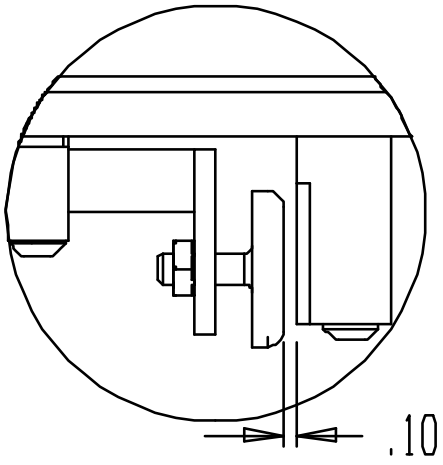


FIG. 30

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

CONTROL BOARD POTENTIOMETER ADJUSTMENTS

SPIN DRIVE CONTROL BOARD (SDC)

The Spin Drive Control Board has four potentiometers, two switches and one dial as shown on FIG. 31. These potentiometers,swtiches and dial have been set at the factory to the positions shown on FIG. 31.

In the Relief Grinding Mode--
The Torque Shut Off mode selector allows you to turn on or off the Torque Shut Off feature. When switch 1 is set to ON, the board will decrease the spin motor torque once the shut time is achieved after leaving the right proximity sensor. The amount of time it takes before the torque is decreased is set with the Torque Shut Off Delay dial. The spin motor toque will be increased to the higher value once the right proximity switch is activated again. If the Torque Shut Off selector is in the OFF position the torque will remain constant during relief grinding.

Torque Shut Off Delay dail is used to set the duration of time before the torque is decreased after leaving the right proximity sensor during relief grinding. If the dial is turned clockwise (higher number) the higher torque value will stay on for a longer period of time.

The Relief Speed (RSP) and the Relief Torque Pot (RTP) interact with each other. The (RSP) is located on the spin board as a remote speed preset at 12:00 (20 Volts DC). See FIG. 31. The (RTP) is located on the control panel and is for relief torque adjustment.

Relief Speed Pot (RSP) when rotated clockwise will increase spin drive speed (the speed at which the reel indexes to the next blade). This speed should never be above the 3:00 setting.

Relief Torque Pot (RTP) is used to vary the reel to finger holding torque for relief grinding. The recommended starting point is 30 in/lbs of torque setting. Never adjust the (RTP) potentiometer dial past the red line marking. Setting the reel to finger torque to high could cause the spin motor system to not operate smoothly.

Relief Idle Torque Pot (ITP) is used to vary the reel to finger holding torque once the shut time is achieved after leaving the right proximity sensor if the Torque Shut Off Selector is set to on.

In the Spin Grinding Mode--
The Spin Torque Potentiometer (STP) and the Spin Speed Pot (SSP) interact with each other. The (STP) is located on the spin board as remote torque preset at 2:00 for torque setting. See FIG. 31. The (SSP) is located on the control panel and is for spin speed adjustment.

Spin Torque Pot (STP) controls maximum torque allowable in the spin grinding cycle only. This should never be adjusted past the 3:00 position. If the reel does not turn check that the reel is free turning by hand spinning with the power off and the spin drive disconected.

The Spin speed Pot (SSP) controls reel spin speed, adjust as required. This controls the spin drive speed for spinning the reel.

IR COMP Pot--
The IR Compensation is factory set at 9:00.

Regulation of the spin or relief grind spin motor may be improved by a slight adjustment of the IR COMP 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 pot counterclockwise until symptoms just disappear.

CONTROL BOARD POTENTIOMETER ADJUSTMENTS

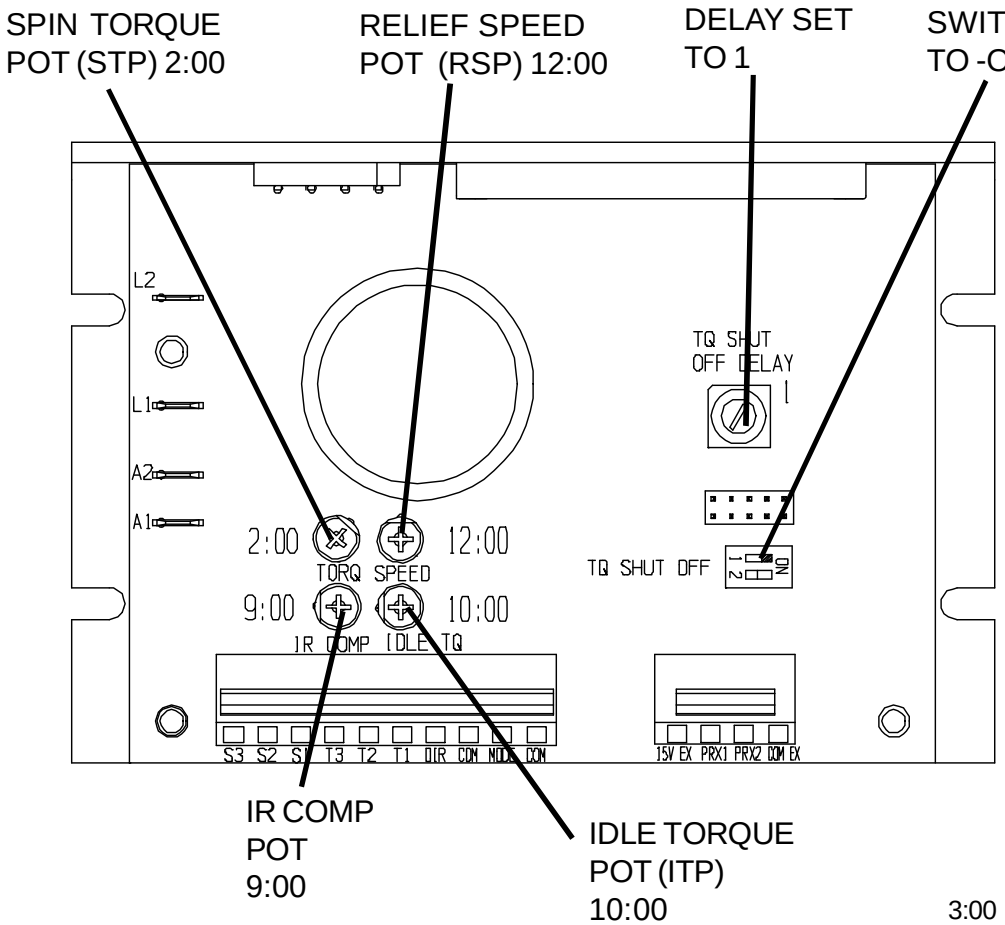
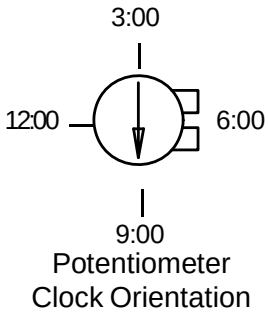


FIG. 31



Potentiometer
Clock Orientation

CONTROL BOARD POTENTIOMETER ADJUSTMENTS

POTENTIOMETER ADJUSTMENTS TRAVERSE DRIVE CONTROL (TDC)

Min. Speed--Factory set at full (CCW) 8:30. Do not change this setting.

(Right Traverse) Forward Torque--Factory set at full (CW) 4:30. Do not change this setting.
(Left Traverse) Reverse Torque--Factory set at full (CW) 4:30. Do not change this setting.

IR COMP--Factory set to 9:00. IR COMP is current (I) resistance (R) compensation (COMP).
IR COMP adjusts the output voltage of the drive which balances load to motor RPM. Regulation of a 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 disappear.

Max. Speed--Set at 3:30 for maximum voltage of 90 Volts DC to the traverse motor. When voltage is above 90 volts DC, the traverse motor will start to pulsate and not run smoothly.

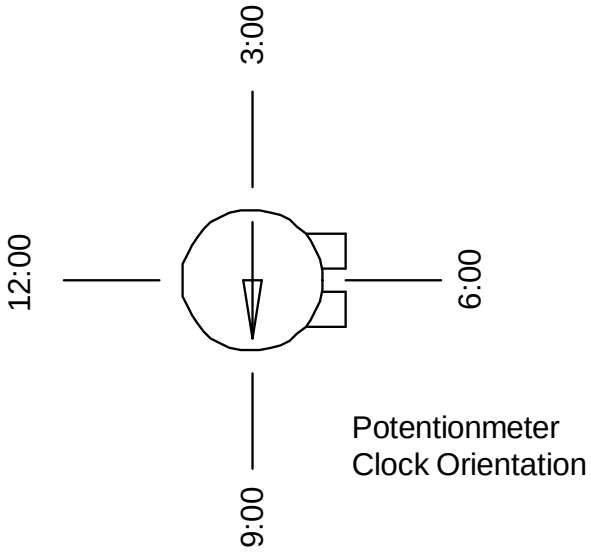
(Right Traverse) Forward Acceleration--Factory set at full (CCW) 8:30. Do not change this setting.
(Left Traverse) Reverse Acceleration--Factory set at full (CCW) 8:30. Do not change this setting.

(DB) Dead Band is the potentiometer setting for the 50 or 60 Hz cycle control. Factory set to 9:00, works for both 50 and 60 Hz. Do not change this setting.

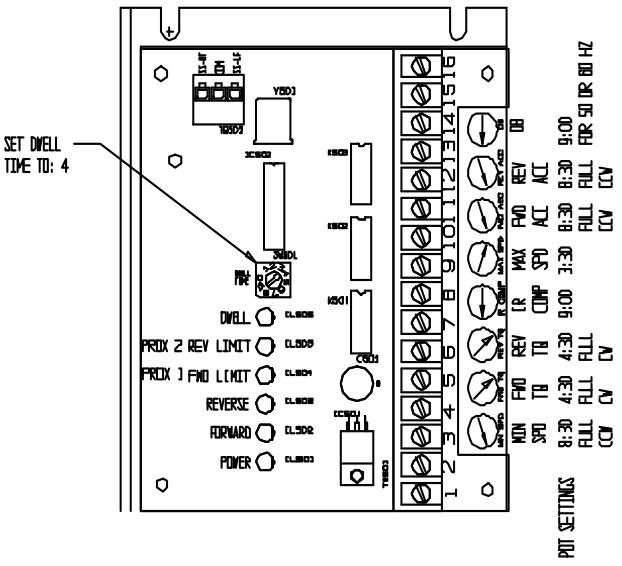
Calibrating the **DWELL TIME** rotary DIP switch adjusts the amount of time the process remains in the stop position after a limit switch is actuated. The **DWELL TIME** range is adjustable from 0 - 4 seconds. A DIP switch setting of 0 sets the **DWELL TIME** to 0 seconds, while a setting of 8 sets the **DWELL TIME** to 4 seconds. Dwell time is factory preset to #4 setting for a 2 second dwell time when reversing at each end of stroke.

Diagnostic LED's indicate the function that is currently being performed:

- **POWER indicates that ac power is being applied to the control.**
- **FORWARD indicates that the process is running in the forward direction (traversing left).**
- **REVERSE indicates that the process is running in the reverse direction (traversing right).**
- **PROX 1 FWD LIMIT lights when the forward limit switch is actuated (left prox).**
- **PROX 2 REV LIMIT lights when the reverse limit switch is actuated (right prox).**
- **DWELL lights when the process remains stopped after a proximity switch is actuated.**



Potentionmeter
Clock Orientation



REPLACEMENT OF GRINDING HEAD SHAFT & BEARINGS

Remove grinding wheel and grinding wheel knob. The Grinding Head Spindle Assembly consists of the grinding head spindle and a ball bearing press fit together. The left side ball bearing is slip fit on the opposite end. To replace the spindle assembly remove the left side grinding wheel grip knob, square key and belt cover. See FIG. 29. Loosen the 4 socket head cap screws on the motor plate to remove the poly-V belt. Loosen the 2 set screws on the spindle pulley and remove the pulley, square key and pulley spacer. Push on the right hand side of the spindle assembly to compress conical washers so there is no pressure on the shaft retaining ring. Using a retaining ring pliers remove the small external retaining ring from the spindle assembly. You can now remove the spindle assembly out the right side by lightly tapping on the left end with a rubber mallet. The second ball bearing can be removed from the belt side of the Grinding Head Housing.

To reassemble place the 4 conical washers (2 Pair nested and then place the 2 pairs back to back) against the ball bearing on the new spindle assembly. See FIG. 30. Thoroughly clean the housing bore and the outside diameter of both bearings. **APPLY BLUE LOCTITE #243 TO THE OUTSIDE DIAMETER OF THE TWO BEARINGS.** Slide the spindle assembly into the right side of the Grinding Head Housing. Install the bearing sleeve against the bearing on the spindle assembly. Slip fit the new left side ball bearing onto the spindle assembly and into grinding head housing. **APPLY BLUE LOCTITE #243 TO THE INSIDE THREAD OF THE 9/16-18 NUT** and install onto the spindle shaft with the grooved side toward the bearing. onto the spindle shaft and using a spanner wrench on the right side of the spindle and a 7/8 deepwell socket on the left side, torque the locknut to 15 Ft. Lbs.

APPLY BLUE LOCTITE #243 TO THE BORE OF THE PULLEY BEFORE INSTALLATION. Replace the square key and install the new pulley pushing the counterbore side of the pulley against the spindle nut with no end play. **NEXT INSTALL BLUE LOCTITE #243 ON THE PULLEY SETSCREWS AND TIGHTEN THE TWO PULLEY SET SCREWS.** Then install the new external retaining ring on the spindle shaft. Mount the new poly-V belt. (See Grinding Head Belt Tension and Alignment Adjustments in the adjusting sectionof the manual). Install the new belt cover gasket on the belt cover and install the belt cover and square key. Mount the left side grinding wheel grip knob with a slight gap to the cover and tighten the two set screws.

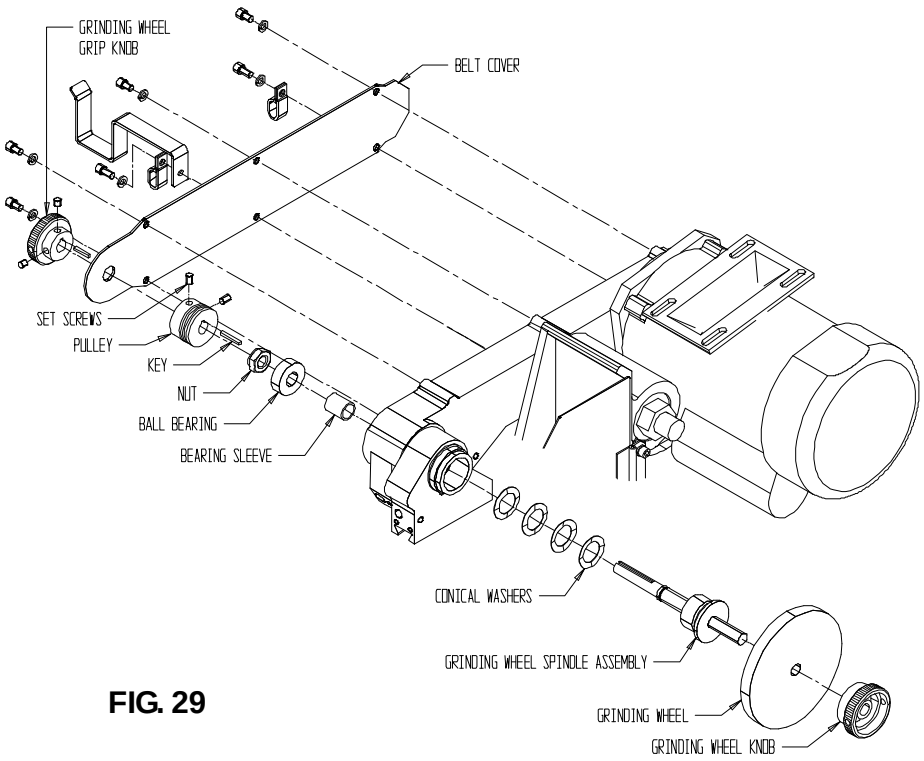


FIG. 29

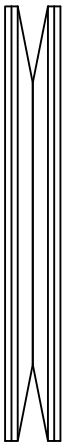
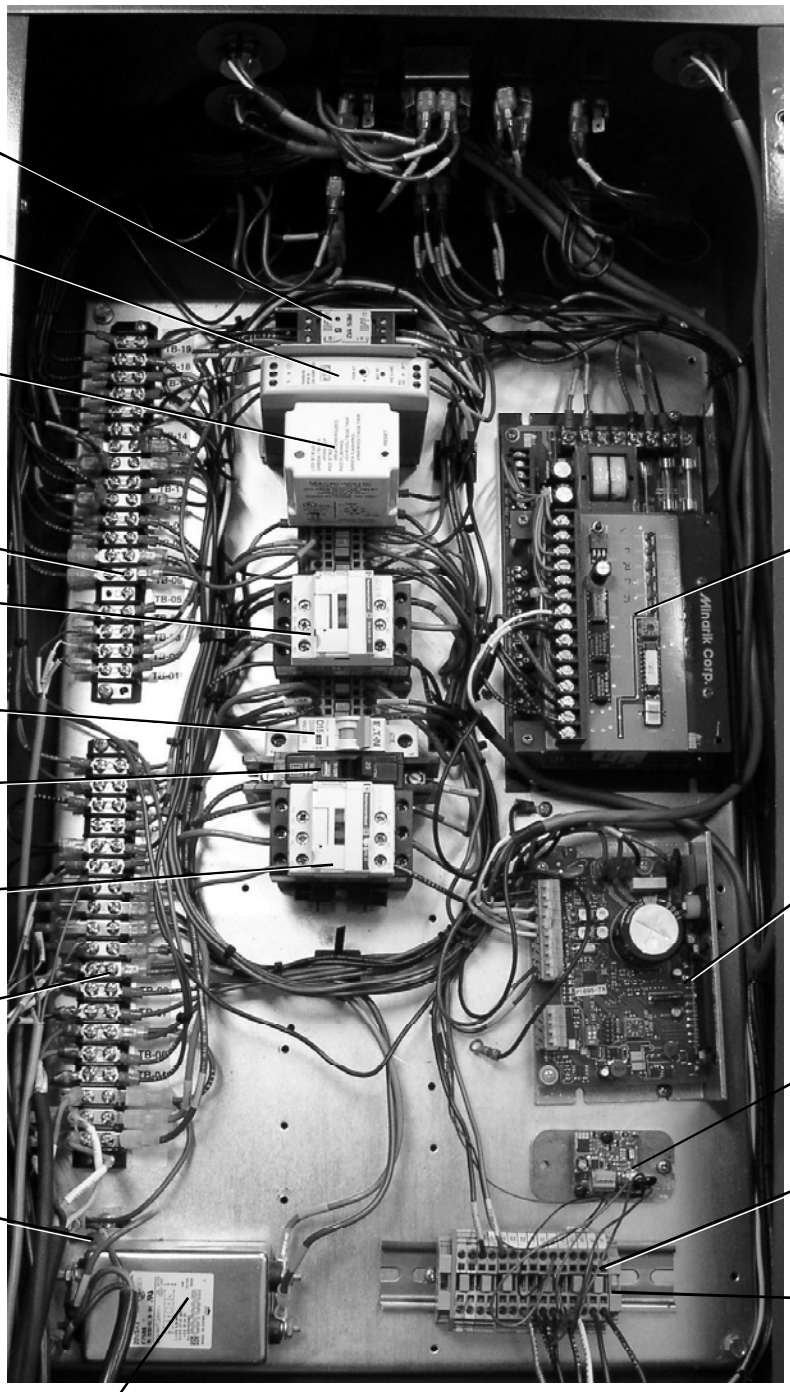


FIG. 30

632 MANUAL CONTROL PANEL



ELECTRICAL TROUBLESHOOTING

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 *ACCU*-Pro 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 Manual, 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 on the ACCU-Pro 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 more position code. The first two or three digits are the wire number: 01-999. 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.

ELECTRICAL TROUBLESHOOTING INDEX

ELECTRICAL TROUBLESHOOTING (Continued)

PROBLEM--AC Main Power Controls: no electrical power to control panel.

Verify all wires shown on the wiring diagram on pages 80-81 are correct and pull on wire terminals with approximately 3 lbs force to verify there are no loose terminal connections and/or no loose crimps between wire and terminal. If problem persists, test as listed below.

Possible Cause	Checkout Procedure	
Emergency Stop Botton(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) to get power to control Panel	**B.** 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 Then Press SSS.	Machine works Yes--end troubleshooting No--go to step **D.** next.
Guard doors must be closed and ALL Switches **MUST** be turned **OFF** for contactor to pull in.	**D.** Close guard doors and turn off all switches. Then press SSS.	Machine works Yes--end troubleshooting No--go to step **E.** next.
Main 20 amp 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) Follow steps A-D and test.	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.
No 120 Volts AC power to Filter (FTR)	**F.** Check for 120VAC at Cord into FTR (Power Cord #32)	FTR "Line" Terminals for 120 Volts AC Yes--Go to Step **G**. next. No--Replace Power Cord- 6059054
No 120 Volts AC power out of Filter	**G.** Check for 120V out of FTR Note: The nuetral Blue wire connection "02FTRBU" will be used in other voltage checks	Check for 120 VAC at FTR "Load" Terminals (between wires labeled "02FTRBU" to "01FTRBR") Yes--Go to Step **H**. next. No--Replace Filter
No 120 Volts AC power to Main Circuit Breaker (MCB) 20 Amp.	**H.** Check for 120V in to MCB	Check for 120 VAC from MCB (01MCB--) to blue wire "02FTRBU" Yes--Go to Step **I**. next. No--Check wire #01 replace if needed.
No 120 Volts AC power from Main Circuit Breaker (MCB) 20 Amp.	**I.** Check for 120V from MCB	Check for 120 VAC from MCB (03MCB--) to blue wire "02FTRBU" Yes--Go to Step **J**. next. No--Flip Switch on MCB to "ON" - Machine works-- end trouble shooting Machine does not work-- Recheck voltage and replace MCB if no voltage.

ELECTRICAL TROUBLESHOOTING (Continued)

Possible Causes	***Checkout Procedure***	
No 120 Volts AC power to Secondary Circuit Breaker (SCB) 6 Amp.	**J.** Check for 120VAC in to SCB	Check for 120 VAC from SCB (03SCB--) to blue wire "02FTRBU" out of FTR Yes--Go to Step **K.** next. No--Check wire #03 from MCB to SCB replace if needed.
No 120 Volts AC power from Secondary Circuit Breaker (SCB) 6 Amp.	**K.** Check for 120VAC from SCB	Check for 120 VAC from SCB (67SCB--) to blue wire "02FTRBU" out of FTR Yes-- Go to Step **L.** next. No--Flip Switch on SCB to "ON"-Machine works--end of troubleshooting. Machine does not work--replace SCB
120 Volts AC power not delivered to Terminal Strip	**L.** Check for 120 VAC at terminal strip.	Check for 120 VAC from Terminal "11" on Terminal Strip 2 "07TB2-11" to blue wire "02FTRBU" out of FTR Yes--Go to Step **M**. next. No--Check wires #7 "07TBBG-2" and wire #67 "67TBG-3", Check Jumper on Grey Terminal Blocks 1-3.
Grinding Motor Switch (GMS) not working	**M.** Verify that GMS is off and Check for 120 Volts AC out of GMS at Terminals 1	Measure 120 volts AC from GMS Terminal 1 "90GMS-1" to blue wire "02FTRBU" out of FTR Yes--Go to Step **N**. next. No--Flip Switch and check again- Works--Switch is upside down. Does not work-- Check wire to GMS/ Replace GMS
Spin Motor Switch (SMS) not working	**N.** Verify that SMS is off and Check for 120 VAC out of SMS Terminals 1	Measure 120 volts AC from SMS Terminal 1 "91SMS-1" to blue wire "02FTRBU" out of FTR Yes--Go to Step **O**. next. No--Flip Switch and check again- Works--Switch is upside down. Does not work-- Check Wire #90/ replace Switch
Bad Emergency Stop Switch (ESS)	**O.** Check voltage after the (ESS) MAKE SURE SWITCH IS PULLED UP!	Measure 120 Volts AC from (ESS) term 2 "77ESS-2" to blue wire "02FTRBU" out of FTR Yes--Go to Step **P.** next No--Check wire #80 for continuity, then verify switch continuity. If bad replace ESS contactor (NC)
Bad System Start Switch (SSS)	**P.** Hold in SSS and Check voltage out of the (SSS)	Measure 120 Volts AC out of (SSS) at Terminal "13" on Terminal Strip 2 "76TB2-13" to blue wire "02FTRBU" out of FTR (hold in SSS when checking) Yes--Go to Step **Q.** next No--Verify switch continuity. If bad replace SSS contactor (NO), if not switch check wires #76, #140 & #77
Low Voltage Relay (REL) not operating	**Q.** Hold in SSS and Check voltage at LVR. LVR must be installed in 8-pin socket. Note: light on top of LVR should be on and steady RED. if not Press the Reset button.	Measure 120 Volts AC from LVR terminal 8 to blue wire "02FTRBU" out of FTR Yes--Go to Step **R.** next No--Check for 120 Volts AC from LVR term 6 to term 7. Yes-- Replace LVR if bad. No--Check wires to LVR
Bad Main Contactor (MAG)	**P.** Hold in SSS and Check voltage at MAG A1 & A2.	Measure 120 Volts AC from MAG Term A1 to Term A2 Yes--MAG Should pull in with clunck, if not replace MAG. No--Verify Continuity of Wires.

ELECTRICAL TROUBLESHOOTING (Continued)

***PROBLEM*--Machine Shuts off when you turn on Grind motor switch or Spin Motor Switch.**

Possible Cause	***Checkout Procedure***	
Guard Doors are Open	**A.** Close the front doors and rear slide up door or workstation ramp depending on option installed.	Machine works Yes--end troubleshooting No--go to Step **B.** next
Door Safety Switches are not working properly	**B.** Check Alignment of Door Safety Switches on Front doors and rear slide up door.	See Alignment section of this Manual. Machine works Yes--end troubleshooting No--go to Step **C.** next
No 24 Volts DC to Safety Monitor (SSM)	**C.** Check SSM for 24 Volts DC. (Turn switches off and press start switch to pull in MAG before testing voltages)	Measure 24 volts DC from SSM Terminal A1+ to Terminal A2- Yes--Go to Step **E**. No--Go to Step **D**. next.
No Power into 24 Volt DC Power Supply (PWR)	**D.** Check PWR for 120 Volts AC. (Turn switches off and press start switch to pull in MAG before testing voltages)	Measure 120 volts AC from PWR Terminal L to Terminal N Yes--Verify 24 VDC out of PWR (V+ to V-). Replace if no Voltage out; or Check Wiring & Verify Continuity to SSM if there is 24 VDC. No--Verify Wiring and Continuity from PWR to terminal blocks.
No Power Out to Door Switches	**E.** Verify 24Volts DC out to Door Switches.	Measure approximately 24 volts DC from Terminal Strip 1 Terminal 17 to Terminal Strip 2 Terminal 3 Yes--Go to Step **F**. next. No--Verify Continuity of Wires to Terminal strip, Replace SSM if wires check OK.
Rear Safety Switch on the slide up door or workstation ramp depending on option installed is Bad.	**F.** With Rear slide up door closed Verify 24Volts DC back form rear Safety Switches.	Measure approximately 24 volts DC from Terminal Strip 2 Terminal 3 to Terminal Strip 1 Terminals 14 and 15. Yes--Go to Step **G**. next. No--Check Alingment of Rear switches. If no Voltage to Term14 or 15 then replace rear switch.
Front Door Switch is Bad	**G.** With Front doors Cloded Verify 24Volts DC back form Front Door Switch.	Measure approximately 24 volts DC from Terminal Strip 1 Terminal 17 to Terminal Strip 2 Terminals 2 and 4. Yes--Replace SSM No--Check Alingment of Front door switch. If no Voltage to Terminal 2 or 4 then replace front switch.

***PROBLEM*--(MAG) turns on only with System Start Switch held in.**

Possible Cause	***Checkout Procedure***	
(MAG) holding contact has failed	**A.** Check wiring to and from MAG holding contact in. Verify the magnetic starter holding contact is working.	Measure 120 Volts AC at MAG term L3 to Term Block 4(Blue) after SSS is pushed. Yes--Verify Wiring to LVR No--Check voltage at T3. If 120 Volts AC Replace MAG. If no 120 Volts AC verify wiring to T3.

ELECTRICAL TROUBLESHOOTING (Continued)

PROBLEM-- Grinding motor not working.

Assuming (SSS) System Start Switch is on with 120 volts AC to control panel and all other functions are working.

Verify all wires shown on the wiring diagram on page 80-81 are correct and pull on wire terminals with approximately 3lbs force to verify there are no loose terminal connections and/or no loose crimps between wire and terminal. If loose terminals are found, retighten and retest system. If problem persists, test as listed below.

Possible Cause	Checkout Procedure	
Grinding Motor Switch (GMS) is not on	**A.** Turn switch on	Grinding Motor works Yes--end troubleshooting No--go to Step **B.** next
Guard doors are not closed	**B.** Close front and rear guard doors (and rear ramp - lift option)	Grinding Motor works Yes--end troubleshooting No--go to Step **C.** next
15 Amp Circuit Breaker (CB) is tripped	**C.** Check 15 amp CB on the side of the grinder above the control cover. Press in if tripped.	Grinding Motor works Yes--end troubleshooting No--go to Step **D.** next
GMS not working	**D.** Check for power to GMS	Terminal strip 2 terminal #15 to terminal block 4(Blue) for 120VAC Yes--go to Step **E.** next No-- check continuity of wires to GMS.
	E. Check for power from GMS	Terminal strip 2 terminal #14 to terminal block 4(Blue) for 120VAC Yes--Go to Step **F.** next No--replace GMS
Grinding Motor Relay not working	**F.** Check for power to relay Coil (Relay should click when GMS is turned on.)	Check for 120 Volts (AC) from A1 to A2 of Grinding motor Relay. Yes--Go to Step **G.** next No-- check wires to Grinding motor Relay A1 & A2.
No Power to Relay Contacts	**G.** Verify Power to Relay Contacts	(REL) Term L1 to Term L2 for 120 Volts (AC) Yes--Go to Step **H.** next No--Check wires to REL Term L1 & L2
Bad Contacts in Grinding motor Relay	**H.** Verify power out of Grinding Motor Relay.	(REL) Term T1 to Term T2 for 120 Volts (AC) Yes--Go to Step **I.** next No--Replace Gringing Motor Relay
Bad Circuit Breaker/ Bad Grinding Motor	**I.** Verify Power to Grinding motor Cord.	Verify wiring at terminals 1, 2 & 3 on Terminal Strip 1. Check TB1-1 to TB1-2 for 120 Volts (AC). Yes-- Check motor cord terminals. Replace motor. No-- Check continuity of circuit breaker. Replace.

ELECTRICAL TROUBLESHOOTING (Continued)

PROBLEM--SPIN DRIVE NOT WORKING IN SPIN MODE.

Assuming (SSS) System Start Switch is on with 120 volts AC to control panel and all other functions are working.

Verify all wires shown on the wiring diagram on page 80-81 are correct and pull on wire terminals with approximately 3 lbs force to verify there are no loose terminal connections and/or not loose crimps between wire and terminal. If loose terminals are found, retighten and retest system. If problem persists, test as listed below.

Possible Cause	*Checkout Procedure*	
Spin Speed Pot (SSP) set to zero	**A.** Set (SSP) to 200 on the control panel.	Spin Motor works Yes--end troubleshooting No--go to Step **B** next
Spin Motor Switch (SMS) is not on	**B.** Turn (SMS) switch on	Spin Motor works Yes--end troubleshooting No--go to Step **C.** next
Circuit Breaker is Tripped (4 AMP)	**C.** Reset Circiut Breaker on front of Control Panel. Push in if tripped.	Spin Motor works Yes--end troubleshooting No--go to Step **D.** next
Spin Drive Control (SDS) is not working	**D.** Check (SDS) L1 to L2 for 120 Volts AC	(SDC)Remove wires to Terminals L1and L2 and test betwen wires for 120V AC. Yes--reconnect wires to board then go to Step **E.** next No--Verify Power to Circuit Breaker and SMS and continuity of wires. Replace CB or SMS if needed.
	E. With the Selector switch in spin and the spin pot set to 400RPM Check (SDC) A1 and A2 for 90-120 Volts DC	(SDC) Remove wires, test Terminals A1 to A2 on the board for approx 90-120 V DC Yes--reconnect wires and go to Step **F.** next No--go to Step **G.**
Spin Drive motor is bad	**F.** Check spin motor continuity  **DISCONNECT POWER FROM MACHINE !**	Remove wires at Terminal Strip 1, Term 4 & 5 check 0 ohms across the black and white wires Yes--end troubleshooting, spin drive should run, if not, replace motor. No--go to Step **J.**
Spin drive control in Torque mode	**G.** Check continuity of mode selector switch.	Light on SDC next to SP should be ON. If not Remove wires 41SDCMOD and 44SDCCOM from SDC control board. Check continuity of wires, should read 0 ohms. Yes--Check continuity of STS switch, replace if bad. (Machine was in Torque mode) No-- Light nest to SP is on but machine does not work. Go to Step **H**. next

ELECTRICAL TROUBLESHOOTING (Continued)

Possible Cause	Checkout Procedure	
Spin Torque Pot (STP) is not set correctly	**H.** Check (STP) remote torque on the top (SDC) board	(STP) on (SDC) board, should be set as labled on pages 24 and 25. Adjust if incorrect and check Spin Drive Function. Yes--Go to Step **I**. next No--Replace (SDC)
(SSP) is not working	**I.** (SSP) (10K) Remove 3 Remote Speed wires. Red wire to term 2 White wire to term 1 Black wire to term 3  **DISCONNECT POWER FROM MACHINE !**	Check for 10,000 ohm Red wire to white wire Full CCW--0 ohms Full CW-10,000 ohms Red wire to black wire Full CCW--10,000 ohms Full CW--0 ohms Yes--replace (SDC) No--replace (SSP)
Worn Motor Brushes	**J.** Inspect Motor Brushes	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 Spin Drive Motor

ELECTRICAL TROUBLESHOOTING (Continued)

PROBLEM--Spin Drive not working in relief mode.

Assuming (SSS) System Start Switch is on with 120 volts AC to control panel and all other functions are working.

Verify all wires shown on the wiring diagram on pages 80-81 are correct and pull on wire terminals with approximately 3 lbs force to verify there are no loose terminal connections and/or no loose crimps between wire and terminal. If loose terminals are found, retighten and retest system. If problem persists, test as listed below.

Possible Cause	Checkout Procedure	
Relief Torque Pot (RTP) set to zero.	**A.** Set (RTP) to 20 on the control panel.	Spin Motor works. Yes--end troubleshooting No--go to Step **B.** next
Spin Motor Switch (SMS) is not on.	**B.** Turn (SMS) switch on.	Spin Motor works. Yes--end troubleshooting No--go to Step **C.** next
Circuit Breaker is Tripped (4 AMP)	**C.** Reset Circiut Breaker on the right side of the machine. Push in if tripped.	Spin Motor works. Yes--end troubleshooting No--go to step **D.** next
Spin Drive Control (SDC) is not working	**D.** Check (SDC) L1 to L2 for 120 Volts AC	((SDC)Remove wires to Terminals L1and L2 and test betwen wires for 120V AC. Yes--reconnect wires, go to Step **F.** No--Go to Step **E**. next
CB or Spin Motor Switch (SMS) is bad	**E.** Check power into (SMS) terminal 6 for 120 Volts AC	Remove Wire to SMS Terminal 6 "89sms-6" and check between the wire and Terminal Block 4 (Blue) for 120 VAC Yes--Check switch continuity, replace No--Check CB continuity, replace.
	F. Check (SDC) A1 & A2 for approx. 20 Volts DC (Have Relief Torque set to maximum torque - full clockwise.	Check for approx. 20 VDC from Terminal Strip 1 Terminal 4 (48TB1-4) to Terminal 5 (49TB1-5) Yes--go to Step **G.** next No--Go to Step **J**.
Spin Drive motor is bad	**G.** Check spin motor continuity  **DISCONNECT POWER FROM THE MACHINE**	Remove motor wires at Terminal Strip 1 (left side lower strip), Term 4 & 5 and check 0 ohms across the black and white motor wires Yes--end troubleshooting motor should work (if it does not, replace motor) No--go to Step **H.** next
Worn Motor Brushes	**H.** 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 Spin Drive Motor

ELECTRICAL TROUBLESHOOTING (Continued)

Possible Cause	Checkout Procedure	
Board is in spin mode.	**J.** Spin Torque Selector not working	Light next to TQ on board should be ON. If not remove wires 41SDCMOD and 44SDCCOM from SDC control board. Machine works. Yes--Machine was in spin mode. Check continuity of STS switch. Replace if bad. No-- Light next to TQ is ON but machine does not work, go to step **K**.
Relief Speed Pot (RSP) is not set correctly.	**K.** Check (RSP) remote speed (10k) on (SDC) board	Verify (SPEED) pot setting on the (SDC) board. Should be set as specified on pages 24 and 25. Adjust if incorrect and check Relief Torque function. Works Yes--end of troubleshooting No--go to Step **L**. next
(RTP) is not working	**L.** (RTP) (10K) Remove 3 Remote Torque Wires red wire to term 2 white wire to term 1. black wire to term 3.	Check for 10,000 ohms Red wire to white wire Full CCW--0 ohms Full CW--10,000 ohms Red wire to black wire Full CCW--10,0000 ohms Full CW--0 ohms Yes--go to Step **M**. nest No--replace (RTP)
Switches on SDC incorrect	**M.** Verify postion of all pots and switch on SDC	Verify postion of 4 pots on board. Should be set as specified on pages 24 and 25. Verify that the Troque reduction feature is in the OFF position. (pushed toward the pots on board). Motor works Yes--end of troubleshooting No--replace SDC.

PROBLEM : Spin drive speed goes at one speed only.

Possible Cause	Remedy	
Wiring hookup to potentiometer is improper. (If components have been replaced)	**A.** Check potentiometer wiring for proper hookup. See that speed pot is wired per electrical diagram	If wiring is wrong, correct and test. Yes--end of troubleshooting No--Go to Step B. next
Defective spin speed control (SSP) potentiometer.	B. (SSP) 10K Remove 3 remote speed wires. red wire to term 2 white wire to term 1 black wire to term 3	Check for 10,000 ohms Red wire to white wire Full CCW--0 ohms Full CW--10,000 ohms Red wire to black wire Full CCW--10,000 ohms Full CW--0 ohms Yes-- Go to Step C. next No--Replace (SSP)
Main circuit board dial pot settings not correct. (If board has been replaced	C. Check all pot settings on both boards as of the (SDC) shown on Pages 24 and 25. (See Adjustment Section Spin Drive Control [SDC] Board Setting).	Yes-- end of troubleshooting No--replace (SDC)

PROBLEM: Spin drive motor speed varies

IR Comp trim pot not adjusted properly.	A. See adjustment section for trim pot setting on Page 24.	Original adjustment was not set properly
Torque to rotate the reel too high.	B. Readjust bearing preload for the reel. Maximum torque load 25 in./lb to rotate reel.	Too much load on drive motor will cause motor to hunt and vary speed.
Check all terminal connections for tightness.	C. When .250 female spade terminals are not tight, remove and crimp slightly together. When reinstalling, push on pressure should have increased for good contact.	When connections are not tight the control board varies voltage to the DC motor which then varies speed.

ELECTRICAL TROUBLESHOOTING (Continued)

PROBLEM--Traverse Drive not working.

Assuming (SSS) System Start Switch is on with 120 volts AC to control panel and all other functions are working.

Verify all wires shown on the wiring diagram on pages 88 are correct and pull on wire terminals with approximately 3lbs force to verify there are no loose terminal connections and/or no loose crimps between wire and terminal. If loose terminals are found, retighten and retest system. If problem persists, test as listed below.

Possible Cause	Checkout Procedure	
Traverse Motor Switch (TMS) is not on	**A.** Turn on (TMS)	Traverse works Yes--end troubleshooting No--got 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
Traverse is waiting for signal from Index Finger Proximity Sensor (In Torque mode only)	**C.** If the Spin/Torque selector is in torque mode and the carriage is on the right proximity sensor, the traverse board wats for the indexing finger to be activated before traveling to the right.	Press on the indexing finger until the Indexing Proximity sensor lights. Traverse works Yes- end troublshooting No- Verify Poximity sensor works, and go to Step **D.** next
Fuse on Traverse Drive Control (TDC) has failed	**D.** Check fuse and replace if failed. See Page 23. Too heavy a grind causes grinding head traverse motor to overload and blow the fuse, NOTE: Fuse can not be checked visually. Use Ohm test to check fuse. If needs replacing **MUST** use a **3 amp slo-blo fuse.** Part Number 3707546.	Traverse works Yes--end troubleshooting No--go to Step **E.** next
Traverse Drive Control (TDC) is bad	**E.** Check for 120 Volts (AC) incoming to (TDC)	On (TDC) Terminal L1 to L2 for 120 Volts AC Yes--Go to Step **F.** next No--Go to Step **G.** next
Bad Traverse Motor Switch (TMS)	**F.** Check for 120 Volts AC at (TMS). (Make certain (TMS) is on)	Measure 120 volts AC from TMS Terminal 5 to Term Block 4(Blue) Yes--Go to Step **K**. next. No--Flip Switch and check again- Works--Switch is upside down. Does not work-- Check wiring/Verify Continuity/ Replace Switch

ELECTRICAL TROUBLESHOOTING (Continued)

Possible Cause	Checkout Procedure	
No DC Voltage from (TDC) Traverse Drive Control	**G.** 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 Volts DC Yes--go to Step **H.** next No--go to Step **I.** next
Traverse Motor is bad	**H.** Check traverse motor continuity  **DISCONNECT POWER FROM MACHINE**	Remove motor wires from Terminal Strip 1 terminals #7 & #8 check for 0 ohms across the black and white wires Yes--end troubleshooting, motor should work (if it does not, replace motor) No--go to Step **K.** next
(TSP) is not working	**I.** Check (TSP) (10K) on control panel	(TDC) Pin #8 to #7 Pot Full CCW Pot Full CW 0VDC 9.75 VDC Pin #8 to 9 Pot Full CCW Pot Full CW 9.75 VDC 0 VDC Yes--go to setp **K**. No--go to Step **J.** next
(TSP) (10K) is bad	**J.** Check (TSP) for 10,000 ohms. Remove three wires from (TDC) red from term #8 white from term #7 black from term #9	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 the (TDC) No--Replace (TSP)
Worn motor brushes	**K.** 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

ELECTRICAL TROUBLESHOOTING (Continued)

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

Possible Cause	Checkout Procedure		
Gap between flag and prox is incorrect.	A. Gap between flag and prox should be 3/16 to 1/4" (4-6 mm). Prox LED does not light when flag is under prox.	If incorrect, adjust per adjustment section of manual. Yes--end troubleshooting No--go to Step B. next	
Proximity Switch is bad.	B. Proximity switch is not working properly or wire connections are loose.	First check to see if proximity light comes on. When the light is on, it means that there is electricity coming to proximity switch. Actuate prox switches with steel tool to take measurements.	The light coming on shows the proximity is getting electrical contact.
		Left proximity (PROX 1) check Traverse drive Control (TDC) between terminals #13 (black wire) and #15 (brown wire).	Proximity light on- 0 Volts DC Proximity light off- 12 Volts DC
		Right proximity (PROX) check #14 (black wire) and #15 (brown wire).	Proximity light on- 0 Volts DC Proximity light off- 12 Volts DC
			Replace proximity switch if the voltages do not read as above.

ELECTRICAL TROUBLESHOOTING (Continued)

PROBLEM--Traverse speed control goes at one speed only.

Possible Cause	Checkout Procedure	
Defective speed control potentiometer	**A.** Check potentiometer on control panel.	Traverse Drive Control Pin #8 to 7 Pot full CCW Pot Full CW 0 VDC 9.75 VDC Pin #8 to 9 Pot full CCW Pot Full CW 9.75 VDC 0 VDC Yes--Pot is OK No--Go to Step **B.** next
	B. Check potentiometer for 10,000 ohms. Remove three wires from Traverse Drive Control red from term #8 white from term #7 black from term #9	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 **C.** next No--replace potentiometer. Wiper inside of potentiometer controls speed. Wiper may be bad and not making contact.
Wiring hookup to potentiometer is improper. (If components have been replaced.)	**C.** Check potentiometer wiring for proper hookup. See that speed pot is wired per electrical diagram	Wrong wire hookup effects traverse control. Reversing red and orange wires to potentiometer to the D C motor will run at zero speed but maximum will be too slow. Reversing red and white wires does not affect speed control. Check for Proper function. Yes--end troubleshooting No--Go to Step **D.** next
Main circuit board dial pot settings not correct. (If board has not been replaced.)	**D.** Check all pot settings on circuit board as shown in wiring diagram. (See adjustment section Traverse Motor Control Board Settings.)	Minimum and maximum pot settings effect traverse speed.

ELECTRICAL TROUBLESHOOTING (Continued)

PROBLEM--If the carriage traverses to one end of stroke or the other and it stops and does not reverse direction.

Possible Cause	Remedy	Reason
Proximity switch is not working properly or wire connections are loose	First check to see of proximity light comes on. When the light is on, it means that there is electricity coming to proximity switch. Actuate prox switches with steel tool to take measurements.	The light coming on shows the proximity is getting electrical contract.
Machine is in Torque mode and the indexing finger is not being activated.	Check to see that the finger Proximity sensor is lit when the moveable indexing finger is in the back position. [To test swiitch the torque selector to spin, if the carriage travels back and forth then its the finger proximity sensor is the most likely the issue.]	The moveable indexing proximity sensor is not adjusted correctly or is not working. Test the proximity sensor by pressing on the index finger and look for the light on the end of the proximity sensor. Adjust the position of the proximity sensor if not adjusted correctly.
	Left proximity (PROX1) check Traverse drive Control (TDC) between terminals #14 (black wire) and #15 (brown wire).	Proximity Light on- 0 Volts DC Proximity Light off- 12 Volts DC
	Right proximity (PROX) check (TDC) between terminals #13 (black wire) and #15 (brown wire).	Proximity Light on- 0 Volts DC Proximity Light off- 12 Volts DC
		Replace proximity switch if the voltages do not read as above.

PROBLEM--Insufficient hesitation at carriage stops prior to reversing traverse.

The dwell time on the traverse drive control not set properly.	Reset dwell time as required. One increment increases Dwell time by 1/2 second.	

PROBLEM--Traverse changes directions erratically while running in traverse cycle.

Loose wire to proximity switch.	Check wire connections from the proximity switches and tighten down screws.	A loose wire connection will give intermittent electrical contact.

ELECTRICAL TROUBLESHOOTING (Continued)

PROBLEM--Infeed motor not working.

Assuming (SSS) System Start Switch is on with 115 Volts AC to control panel and all other functions are working.

Possible Cause	Checkout Procedure	
Infeed Jog Switch (IJS) is not held to on position	**A.** (IJS) Hold switch on in either direction	Infeed motor works Yes--end troubleshooting No--go to Step **B.** next
Infeed Speed Switch (IJS) is not on high speed	**B.** Put (IJS) on high speed for ease of checkout.	High speed works Yes--end troubleshooting No--go to Step **C.** next
Infeed motor/reducer drive coupling is loose	**C.** Open infeed motor coupling inspection plate to check for loose coupling. Retighten coupling to drive actuator screw. See adjustment section of manual.	Infeed works-- Yes--end troubleshooting No--go to Step **D.** next
No DC voltage to Grinding Wheel Infeed Motor (GIM)	**D.** With the Infeed Speed Switch in rabbit position, check for 24 Volts DC across terminals labeled 2 and 5 of the (IJS) with (IJS) held on.	Check term 2 & 5 of (IJS) for 24 Volts DC. Yes--go to Step **E.** next No--go to Step **G.** next
Infeed Motor/Reducer will not function	**E.** With the Infeed Speed Switch in rabbit, check for 24 Volts DC at the terminals 137TBB-21 and 137TBG-22.	Check for 24 Volts DC at Term marked 137TBB-21 and 137TBG-22. Yes--Go to Step **F.** next No--Replace wires #127 and #128
	F. Disconnect (GIM) from the infeed actuator and check (GIM) function under no load.	Check (GIM) function when disengaged from Infeed Actuator. Yes--Replaced Infeed Actuator No--Replace (GIM)
Switch (IJS) is bad	**G.** Check for 24 Volts DC to (IJS).	Check for 24 Volts DC at Terminal 6 and 4 then check Terminals 3 and 1 of (IJS). Yes--Replace (IJS) No--go to Step **H.** next.
No DC Voltage to the Infeed Control Board (ICB).	**H.** Check for 24 volts DC Input to ICB.	Remove the Red and Blue wires goint to the ICB and Check for 24 Volts DC between the wires. 150ICBB+ to 133ICBB- Yes--Replace (ICB) No--Replace 24 VDC power supply (PWR)

ELECTRICAL TROUBLESHOOTING (Continued)

PROBLEM--Infeed motor has no low speed (turtle) function.

Assuming (SSS) System Start Switch is on with 115 volts AC to control panel and all other functions are working and infeed motor works in high speed (rabbit position).

Possible Cause	Checkout Procedure	
Incorrect DC Voltage from the Voltage Regulator in low speed turtle position.	**A.** Verify voltage to grind infeed motor (GIM). With the infeed speed switch in turtle, check the DC voltage at the terminal strip where the Grinding Wheel Infeed Motor (GIM) cord attaches.	Check 3-8Volts DC at terminal 137TBB-21 and 137TBG-22. Yes--Go to Step **B.** next. No--Go to Step **C.** next.
Infeed Actuator is bound and will not allow low speed (turtle) function.	**B.** Disconnect (GIM) from the infeed actuator and check (GIM) function under no load.	Check (GIM) function when disengaged from Infeed Actuator. Motor should step slowly. Yes--Replaced Infeed Actuator No--Replace Grind Infeed Motor.
Infeed Speed Selector not working (ISS)	**C.** Remove wires from ISS terminals 2 and 3. Check continuity between terminals on Switch (ISS).	Switch has continuity when on and not when switch if off. Yes-- Replace Resistors assembly on ICB. No-- Replace switch (ISS)

Possible Cause	Checkout Procedure
PROBLEM--Reels ground have high/low blades	
Traverse Speed set too fast.	Check roundness using a magnetic base dial indicator. Traverse speed should be set approximately 12 ft/min. (4 meters/ min.) if roundness is varying.
Lineal bearings for the grinding head carriage are out of adjustment (loose) or have grit buildup causing uneven traversing load.	Relubricate and adjust linear bearings per adjustment section. If problem persists, replace lineal bearings on the carriage base. Check for any holes in the bellows that would permit any grinding grit penetration. See adjustment section for lineal bearing replacement.
PROBLEM--Excessive grinding stock being removed when traversing to the right in the relief grinding mode.	
Gib adjustment for the relief finger assembly is loose so reel finger has movement. When traversing to the right minimum grinding stock removal should be seen as compared with heavy stock removal when traversing to the left.	Tighten the set screws for the gib adjustment. See procedure in the adjustment section in the manual.
PROBLEM-- Grinding stock removal from reel is irregular during spin grinding.	
Lineal bearings on the grinding head carriage are too loose .	The lineal bearing must be preloaded to the traverse shafts with no vertical movement. See manual adjustment section for carriage bearing adjustments.
PROBLEM--Carriage traversing varies speed while grinding.	
Lineal bearings in the carriage do not rotate freely.	Check for grinding grit getting into the lineal bearings and causing excessive driving torque of carriage. Abrasive noise is detectable when excessive grit is in the lineal bearings. Replace the four lineal bearings in the main carriage. Check bellows for holes and replace if necessary.
Belt is slipping	Belt Clamp may have moved. See manual adjustment section for Traverse Clamp Force.
Traverse Belt tension to loose	Check the spring length on left side of travese belt. See manual adjustment section for Traverse Belt Tension.

MECHANICAL TROUBLESHOOTING (Continued)

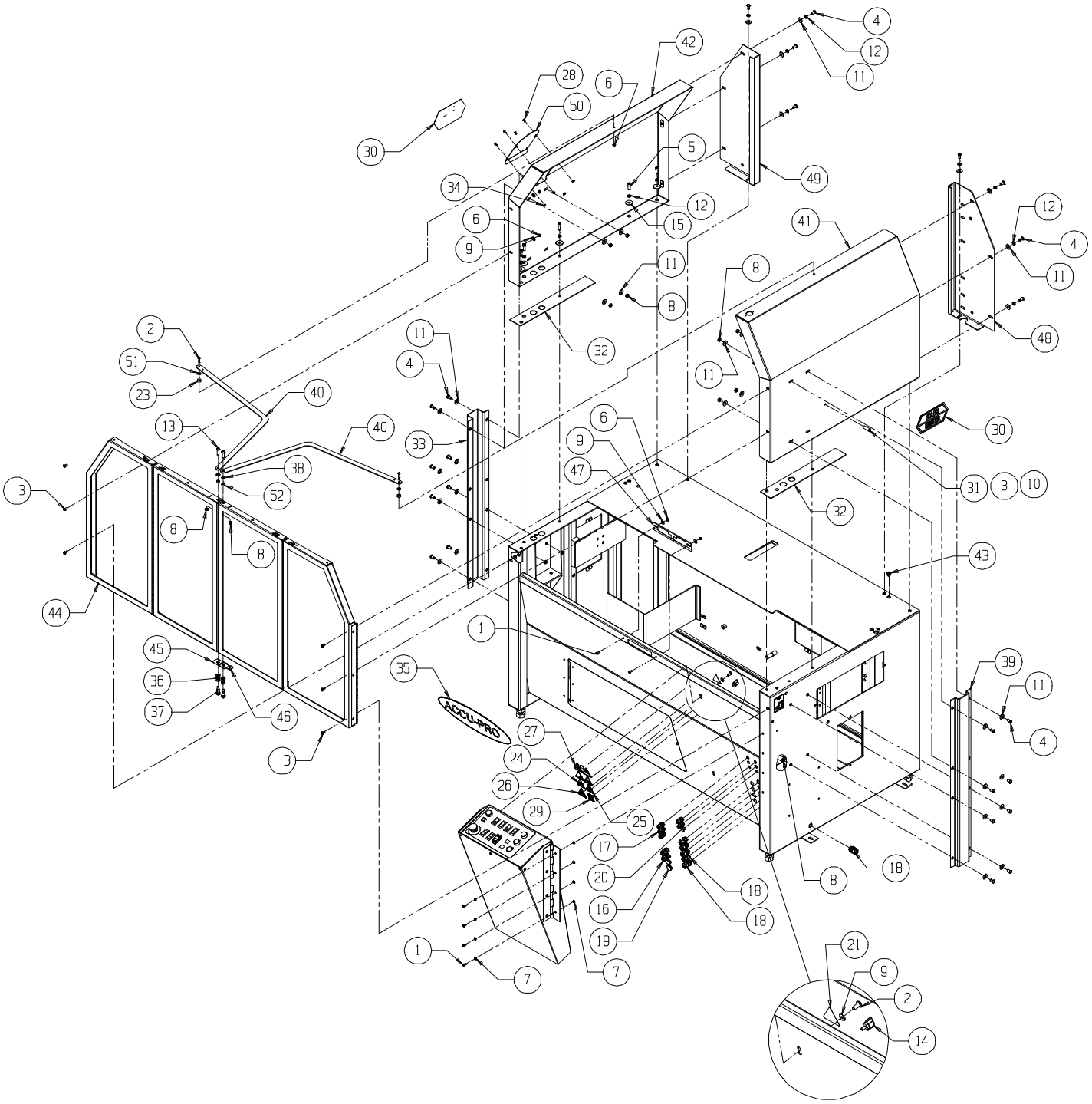
Possible Cause	Checkout Procedure
PROBLEM--Too heavy a burr on cutting edge of reel blades.	
Traverse speed set too high causing a heavy burr on the reel blade when spin grinding.	Traverse speed should be set lower approximately 12 ft/min. (meters/min.) for a smaller burr on cutting edge.
PROBLEM--Cone shaped reel after grinding.	
Grinding head travel not parallel to the reel center shaft.	Grinding head travel was not setup parallel to the reel center shaft in vertical and horizontal planes. See Align the Reel Section in operator's Manual
PROBLEM--Relief grind on the reel blades do not go the full length of the reel.	
The right side corner of the grinding wheel is always to be in contact with the reel blade. This is high point of the relief finger.	The right hand side of the grinding wheel is not in full contact for relief grinding. See Operators Manual for NORMAL HELIX AND REVERSE HELIX.

PROBLEM-- Traverse speed is too slow.

Possible Cause	Remedy	Reason
Lineal bearing in the carriage are set too tight.	A. Readjust bearings for proper tension. (for more detail see lineal bearing replacement in the adjustment section of the manual.)	When bearing preload is too tight, it causes excessive loading to drive the carriage. When traverse belt is disengaged, the proper traverse load is 2 to 3 lbs. Use a tension scale to check. (A general guide only.)

PROBLEM--Spin Drive cranks up and down too hard.

The two top and two bottom pivot screws are compressing the conical washer too tight.	A. Tighten down the locknut until it bottoms out and back off 1/2 turn. Check to see if there is a cone shape to the washer. Four (4) pivot points.	Have enough play so the crank turns snugly but during operation it is free.
Check screw adjustment tension on nylon plug riding against the screw thread.	B. Loosen set screw and check. (See adjustment section.)	


ACCU-PRO

6329557 CANOPY ASSEMBLY

DIAGRAM NUMBER	PART NUMBER	DESCRIPTION
1	B250816	Button Head Cap Screw 1/4-20 x 1/2 Long
2	B251616	Button Head Cap Screw 1/4-20 x 1 Long
3	B250801	Hex Head Cap Screw 1/4-20 x 1/2 Long
4	B371216	Button Head Cap Screw 3/8-16 x 3/4 Long
5	B371611	Socket Head Cap Screw 3/8-16 1 Long
6	J257000	1/4-20 Nylon Jam Locknut
7	R000536	Internal Tooth Lock Washer 1/4
8	J377000	3/8-16 Nylon Jam Locknut
9	K250001	1/4 Flat Washer
10	K251501	1/4 Split Lockwasher [Gage Holder]
11	K370001	3/8 Flat Washer SAE
12	K371501	3/8 Split Lockwasher
13	B372016	Button Head Cap Screw 3/8-16 x 1.25 Long
14	09394	2 Prong Knob
15	3589106	Flat Washer (1.38 OD x .39 ID)
16	3707009	Liquid Tight Strain Relief .27-.47 Wire
17	3707029	Liquid Tight Strain Relief .19-.30 Wire
18	3707093	Liquid Tight Strain Relief .43-.55 Wire
19	3707595	7/8 Hole Plug
20	3707597	5/8 Hole Plug
21	3708448	Electrical Warning Decal
22	3708458	Sharp Warning Decal
23	3859016	Spacer .28 ID x .75 OD x .25 Thick
24	3708605	Respirator Warning Decal
25	3708606	Hearing Protection Warning Decal
26	3708612	No Fuel Warning Decal
27	3708703	Multiple Safety Symbols Decal
28	B190613	10-24 x 3/8 Button Head Socket Cap Screw
29	3708872	Patent Decal
30	3709990	Foley United Decal
31	3706044	Gage Mounting Pin
32	6329022	Side Frame Spacer Plate
33	6329024	Canopy Boom Support Bracket
34	J197000	10-24 Lock Nut
35	6329053	ACCUPro Decal
36	3706036	Compression Spring .72 OD x 1.25 Long
37	3706037	Shoulder Bolt 1/2 Diameter x 3/4 Long
38	3708214	Conical Washer .38 ID x .68 OD
39	6329059	Canopy Support Bracket
40	6329148	Door Overhead Arm
41	6329543	Guard Weldment - RH
42	6329542	Guard Weldment - LH
43	3707279	Strain Relief
44	6329533	Front Guard Door Assembly (see page 60)
45	6329144	Door Catch Bracket Right
46	6329145	Door Catch Bracket Left
47	6329146	Catch Plate
48	6329109	Right Hand Rear Guard Panel
49	6329110	Left Hand Rear Guard Panel
50	6329112	Boom Hole Cover Panel
51	3708861	Conical Washer .68 OD x .25 ID
52	4609063	Spacer .69 OD x .38 ID x .25 Long

6329533 FRONT GUARD DOOR ASSEMBLY

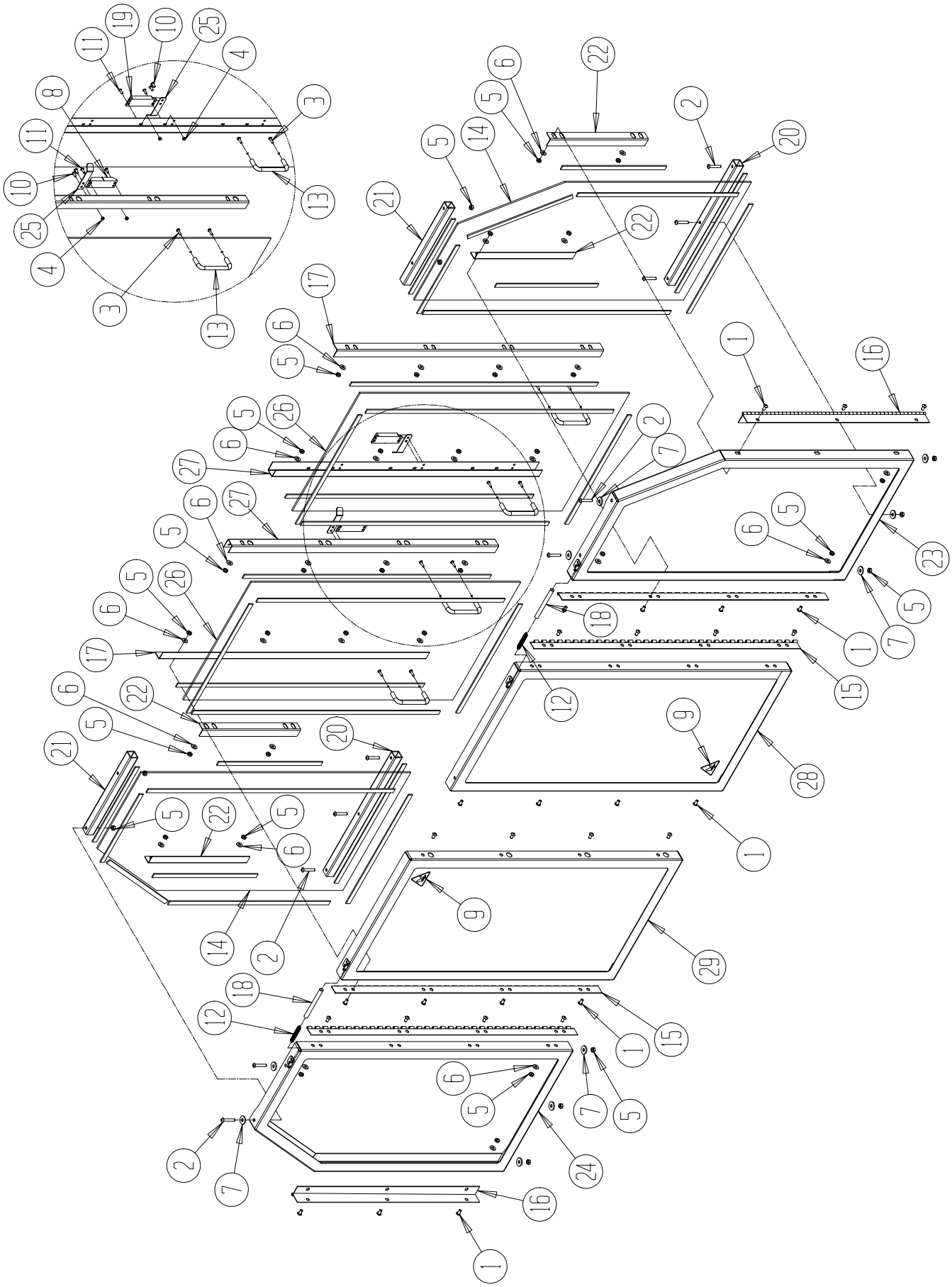


DIAGRAM NUMBER	PART NUMBER	DESCRIPTION
1	B250816	Button Head Cap Screw 1/4-20 x 1/2 Long
2	B252416	Button Head Cap Screw 1/4-20 x 1 1/2 Long
3	3706042	Pan Head Screw #8 x 3/4 Long
4	J167000	8-32 Nylon Jam Locknut
5	J257000	1/4-20 Nylon Jam Locknut
6	K250001	1/4 Flat Washer
7	R000453	Flat Washer
8	3707647	Door Safety Switch Coded Magnet
9	3708458	Sharp Warning Decal
10	3708675	3/16 Blind Rivet
11	3708820	Button Head Safety Screw #8-32 x 1/2 Long
12	3708855	Extension Spring
13	3708857	Black Pull Handle
14	6059013	Front Outside Window
15	6059029	Front Center Hinge
16	6059030	Front End Hinge
17	6059036	Center Window Support
18	6059044	Spring Cover Sleeve
19	6059021	Door Safety Switch (Front)
20	6059066	Bottom Window Support
21	6059067	Top Window Support
22	6059068	Short Window Support
23	6059069	Front RH Window Frame Weldment
24	6059072	Front LH Window Frame Weldment
25	6309038	Door Bracket
26	6329046	Front Inside Window
27	6329071	Window Retainer/ Switch Mount
28	6329512	Front RH Inside Window Frame Weldment
29	6329513	Front LH Inside Window Frame Weldment

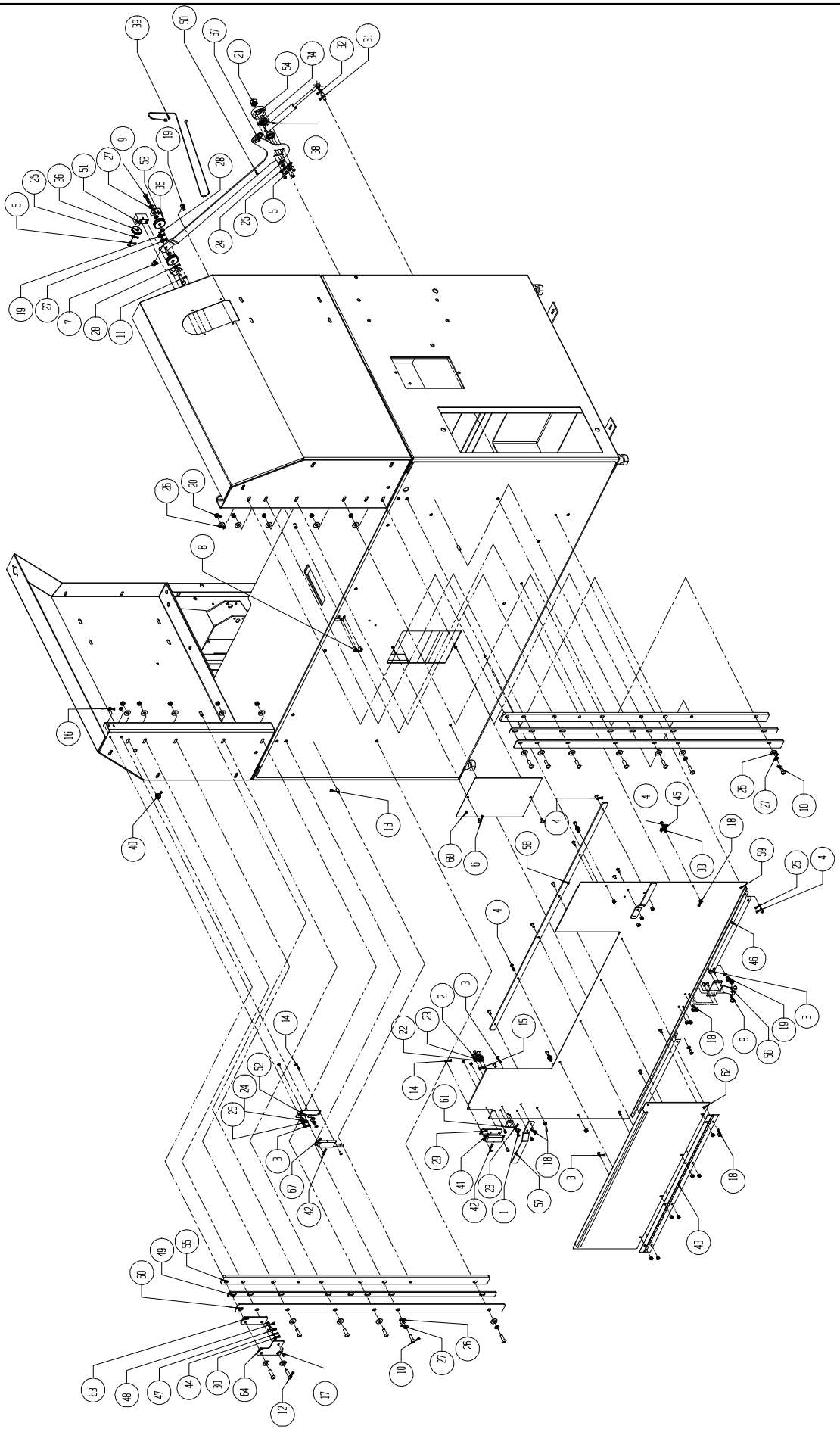


DIAGRAM NUMBER	PART NUMBER	DESCRIPTION
1	B190411	Socket Head Cap Screw 10-24 x 1/4 Long
2	B190613	Button Head Socket Cap Screw 10-24 x 3/8 Long
3	B250816	Button Head Socket Cap Screw 1/4-20 x 1/2 Long
4	B251016	Button Head Socket Cap Screw 1/4-20 x 5/8 Long
5	B251216	Button Head Socket Cap Screw 1/4-20 x 3/4 Long
6	B310813	Button Head Socket Cap Screw 5/16-18 x 1/2 Long
7	B370801	Hex Head Cap Screw 3/8-16 x 1/2 Long
8	B370816	Button Head Socket Cap Screw 3/8-16 x 1/2 Long
9	B372001	Hex Head Cap Screw 3/8-16 x 1-1/4 Long
10	B372016	Button Head Socket Cap Screw 3/8-16 x 1-1/4 Long
11	B372401	Hex Head Cap Screw 3/8-16 x 1-1/2 Long
12	B372416	Button Head Socket Cap Screw 3/8-16 x 1-1/2 Long
13	H371202	3/8 Diameter Roll Pin x 3/4 Long
14	J167000	#8-32 Jam Locknut
15	J191000	#10-24 Jam Locknut
16	J252000	1/4-20 Hex Jam Nut
17	J257000	1/4-20Jam Locknut
18	J257100	1/4-20 Locknut Full
19	J371000	3/8-16 Hex Nut
20	J377000	3/8-16 Jam Locknut
21	J627100	5/8-11 Locknut
22	K190001	#10 Flat Washer
23	K191501	#10 Lock Washer
24	K250001	1/4 Flat Washer
25	K251501	1/4 Lock Washer
26	K370001	3/8 Flat Washer
27	K371501	3/8 Lock Washer
28	09054	Flat Washer .63 OD x .39 ID
29	55492	Door Switch Spacer
30	80406	Flat Washer .5 OD x .27 ID
31	80418	Gas Spring Stud
32	80421	Retaining Clip for Gas Spring
33	3249153	Flat Washer .38 OD x .25 ID
34	3706032	Ball Bearing R10
35	3706097	Pulley 1.75 OD x .37 ID
36	3706098	Pulley 1.50 OD x .25 ID
37	3706099	Clevis Rod End
38	3706100	Gas Spring 3.9 Stroke
39	3706101	Cable Assembly
40	3707279	Strain Relief
41	3707647	Coded Door Magnet
42	3708820	#8-32 x 1/2 Long Button Head Safety Screw
43	3708869	Spring Hinge
44	3708998	Wave Spring
45	3709597	Ball Bearing R4
46	6209165	Lower Guide Bar
47	6329131	Catch
48	6329133	Catch Pin
49	6329136	Rear Slide Spacer Plate

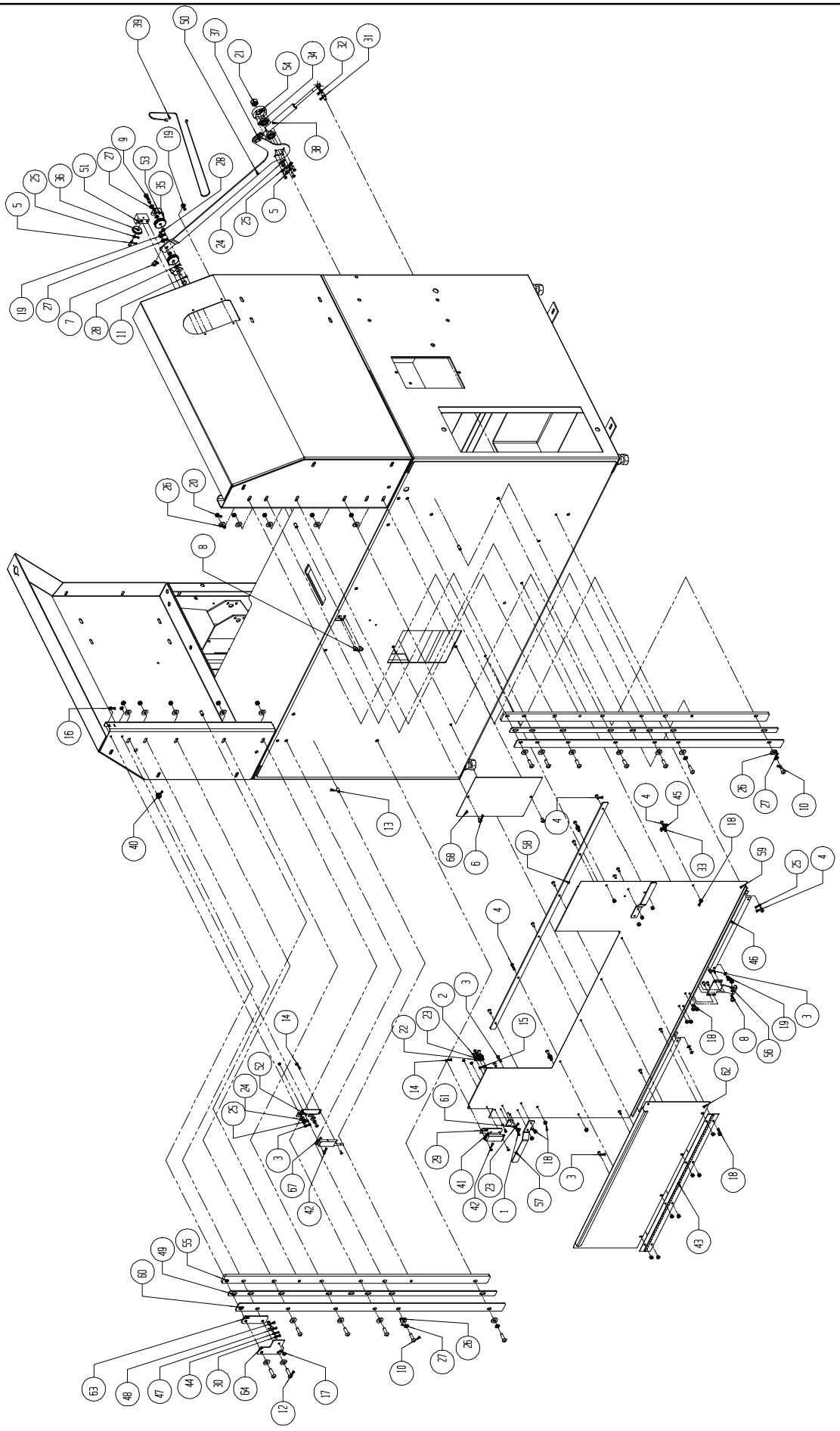


DIAGRAM NUMBER	PART NUMBER	DESCRIPTION
50	6329163	Rear Door Arm
51	6329164	Pulley Block
52	6329165	Door Switch Bracket (Rear Door)
53	6329166	Cable Guide
54	6329167	Bearing Block
55	6329172	Rear Door Inner Slide
56	6329173	Cable Bracket (Door)
57	6329174	Rear Door Lift Handle
58	6329175	Rear Door Stiffener
59	6329177	Rear Door Sliding
60	6329179	Rear Door Outer Plate
61	6329180	Door Stop Block
62	6329181	Hinged Walker Panel
63	6329182	Door Stop Spacer Plate
64	6329183	Door Catch Bracket
67	6329184	Door Switch Assembly
68	6509040	Panel Acess LH Small

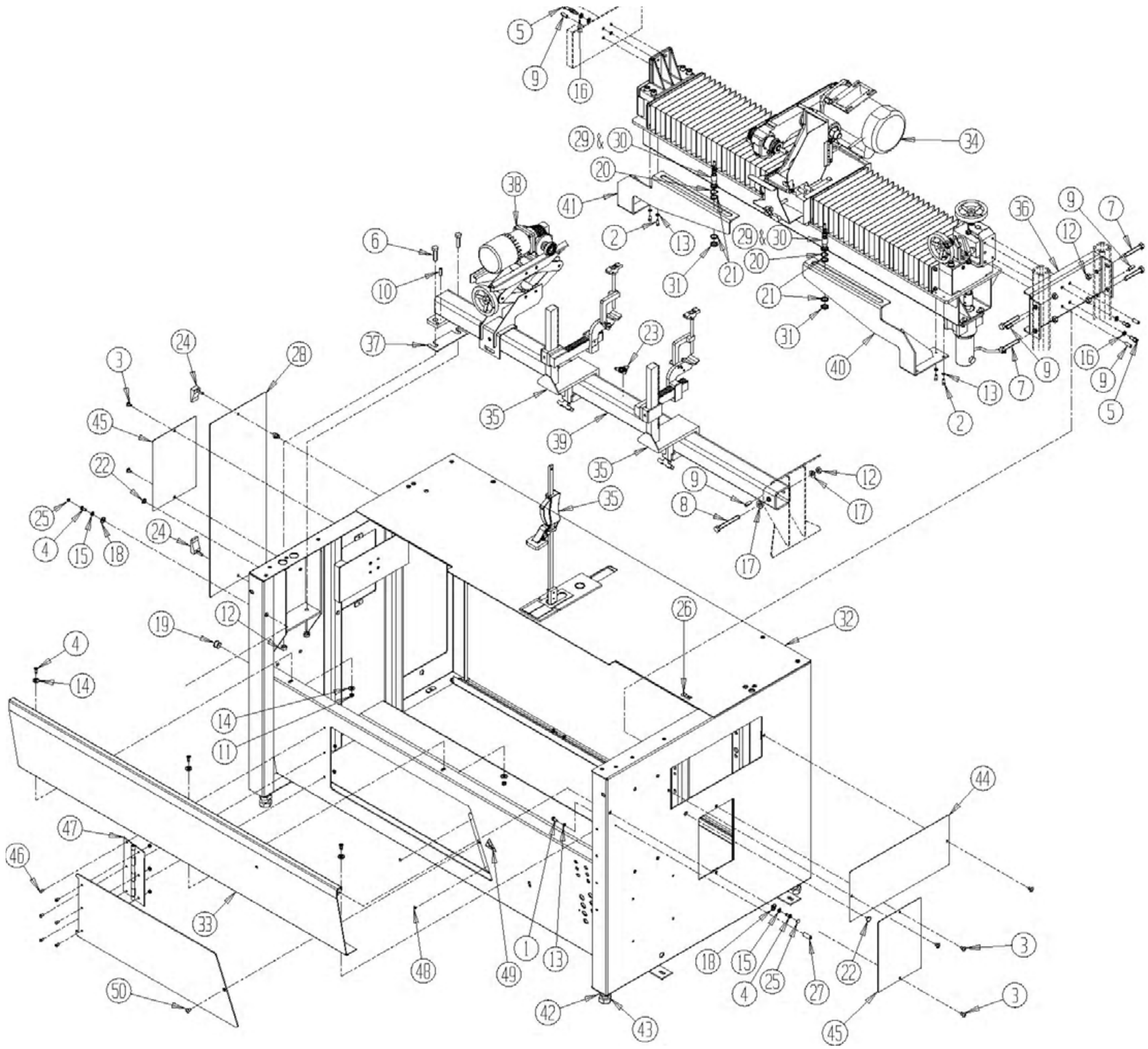

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DIAGRAM NUMBER	PART NUMBER	DESCRIPTION
1	B250801	Hex Head Cap Screw 1/4-20 x 1/2
2	B251011	Socket Head Cap Screw 1/4-20 x 5/8
3	B310813	Button Head Socket Cap Screw 5/16-18 x 1/2
4	B311213	Button Head Socket Cap Screw 5/16-18 x 3/4
5	B371211	Socket Head Cap Screw 3/8-16 x 3/4
6	B502801	Hex Head Cap Screw 1/2-13 x 1 3/4
7	B504801	Hex Head Cap Screw 1/2-13 x 3
8	B506801	Hex Head Cap Screw 1/2-13 x 4.25
9	H371602	Roll Pin .375 Dia. x 1 Long
10	H372002	Roll Pin .375 Dia. x 1 1/4 Long
11	J317100	5/16-18 Locknut
12	J507100	1/2-13 Locknut
13	K251501	1/4 Split Lockwasher
14	K310001	5/16 Flat Washer SAE
15	K311501	5/16 Split Lockwasher
16	K371501	3/8 Split Lockwasher
17	K500001	1/2 Flat Washer SAE
18	R000453	Flat Washer (.88 OD x .31 ID x .104 T)
19	3707595	7/8" Hole Plug
20	3708419	Wave Spring
21	3708421	Flat Washer (1.0 OD x .75 ID x .08T)
22	3708542	5/8" Hole Plug
23	3708612	Fuel Warning Decal
24	3708867	Swell Latch
25	3709372	1/2" Hole Plug
26	6309111	Decal - Up/Down
27	3706044	Gage Pin Mounting
28	6329098	Vac Door
29	3707601	Proximity Switch Head
30 a	6329075	LH Traverse Proximity Switch Cord
30 b	6329076	RH Traverse Proximity Switch Cord
31	3707459	Proximity Switch Nut
32	6329501	Cabinet Weldment
33	6329504	Front Panel Weldment
34	6329525	Traverse Base Assembly (see page 64)
35	6329535	Mower Support Assembly (see page 78)
36	6509035	Cross slide Mount
37	6509389	Tooling Bar Shim
38	6509465	Spin Drive Assembly (see page 80)
39	6509510	Tooling Bar Weldment
40	6509560	Proximity Switch Bracket Weldment RH
41	6509561	Proximity Switch Bracket Weldment LH
42	J992000	1-8 Hex Jam Nut
43	A993201	Adjustable Leveling Bolt
44	6509039	Right-Hand Access Panel
45	6509040	Left-Hand Access Panel - Small
46	B250816	1/4-20 x 1/2 Button Head Socket Cap Screw
47	50382	Hinge
48	3659083	Bumper
49	3708458	Warning Decal - Sharp
50	B370816	3/8-16 x 1/2 Button Head Socket Cap Screw

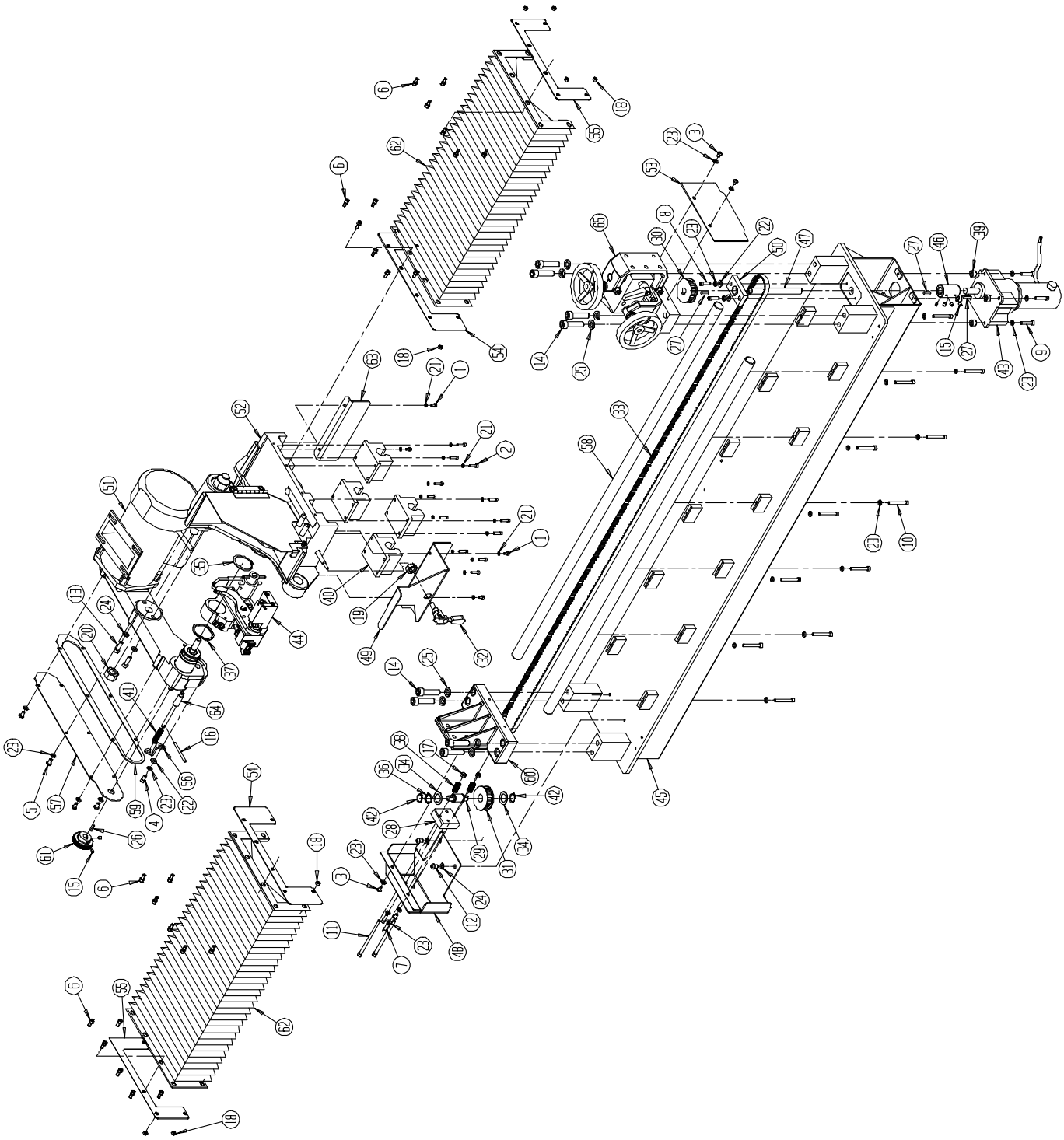

DIAGRAM NUMBER	PART NUMBER	DESCRIPTION
1	B190611	Socket Head Cap Screw 10-24 x 3/8 Long
2	B191211	Socket Head Cap Screw 10-24 x 3/4 Long
3	B250616	Button Head Socket Cap Screw 1/4-20 x 3/8 Long
4	B250811	Socket Head Cap Screw 1/4-20 x 1/2 Long
5	B250818	Pan Head Machine Screw 1/4-20 x 1/2 Long
6	B250819	Button Head Socket Cap Screw 1/4-20 x 1/2 Long
7	B251211	Socket Head Cap Screw 1/4-20 x 3/4 Long
8	B251411	Socket Head Cap Screw 1/4-20 x 7/8 Long
9	B252011	Socket Head Cap Screw 1/4-20 x 1 1/4 Long
10	B253211	Socket Head Cap Screw 1/4-20 x 2 Long
11	B256411	Socket Head Cap Screw 1/4-20 x 4 Long
12	B310813	Button Head Socket Cap Screw 5/16-18 x 1/2 Long
13	B311611	Socket Head Cap Screw 5/16-18 x 1 Long
14	B503211	Socket Head Cap Screw 1/2-13 x 2 Long
15	C250420	Socket Head Set Screw Cup Point 1/4-20 x 1/4 Long
16	H184002	3/8 Diameter Roll Pin x 2 1/2 Long
17	J257000	1/4-20 Nylon Locknut Thin
18	J257100	1/4-20 Nylon Locknut
19	J627200	5/8-18 Nylon Locknut Thin
20	J757300	3/4-16 Nylon Locknut
21	K191501	No. 10 Washer
22	K250001	1/4 Flat Washer SAE
23	K251501	1/4 Split Lockwasher
24	K311501	5/16 Split Lockwasher
25	K501501	1/2 Split Lockwasher
26	R000376	Square Key 1/8 x 3/4 Long
27	R000377	Square Key 3/16 x 3/4 Long
28	28192	Traverse Pulley Support
29	50309	Traverse Pulley Shaft
30	3706056	Drive Pulley (Cog)
31	55553	Idler Pulley Assembly
32	80335	Destaco Clamp
33	80354	Cog Belt
34	80355	Thrust Washer (1 1/4OD x 3/4 ID)
35	3708195	External Retaining Ring
36	3708419	Wave Spring (.78 ID)
37	3708436	Wave Spring
38	3708658	Compression Spring
39	3708884	Spacer 5/8 OD x 9/32 ID x 3/8 Long
40	3709044	Linear Ball Bearing

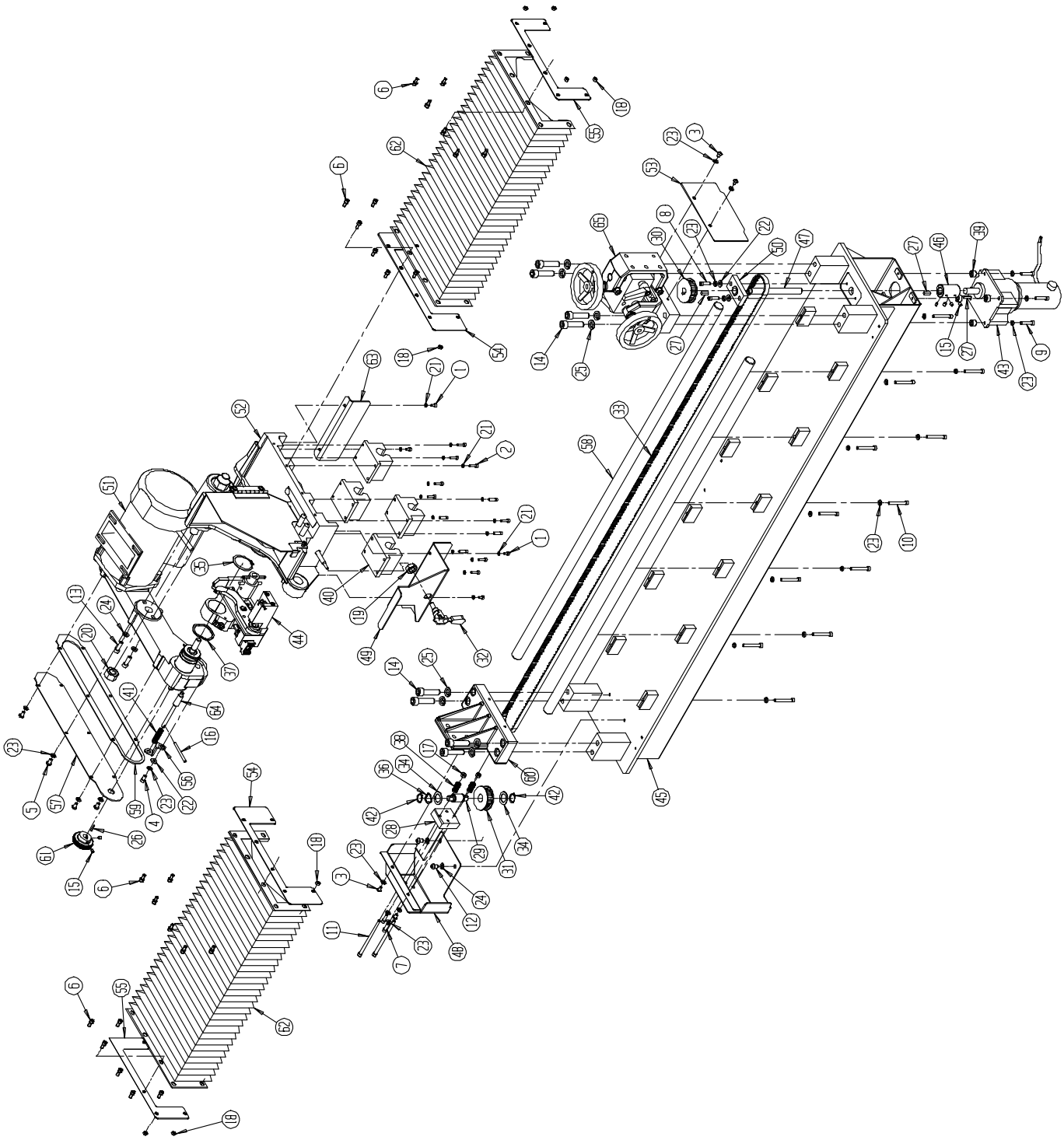

DIAGRAM NUMBER	PART NUMBER	DESCRIPTION
41	3709072	Compression Spring
42	3709331	External Retaining Ring
43	6059062	Traverse Motor Assembly
44	6309573	Finger & Body Assembly (see page 74)
45	6329032	Traverse Base
46	6329034	5/8 Shaft Coupler
47	6329035	Motor Extension Shaft 6.00 Long (Prior to 8-08)
	6329141	Motor Extension Shaft 5.75 Long (After 8-08)
48	6329036	Pulley Mount Bracket
49	6329507	Prox Flag Bracket Weldment
50	6329511	Shaft Support Block Assembly
51	6329526	Grinding Head Assembly (see page 70)
52	6329527	Carriage Assembly (see page 72)
53	6509020	Traverse Base Adjuster End Cap
54	6509021	Bellows Bracket Carriage Mount
55	6509025	Bellows Bracket End Mount
56	6509054	Plunger Pin Retainer
57	6509055	Belt Cover
58	6509063	Carrier Shaft
59	6509210	Belt Cover Gasket
60	6509221	Traverse Base Fixed Bracket
61	6509238	Grinding Wheel Grip Knob
62	6509250	Bellows - Way cover
63	6509253	Carriage Dust Cover Bracket
64	6509484	Plunger Pin
65	6509565	Cross Slide Assembly (see page 68)

6509565 CROSS SLIDE ASSEMBLY

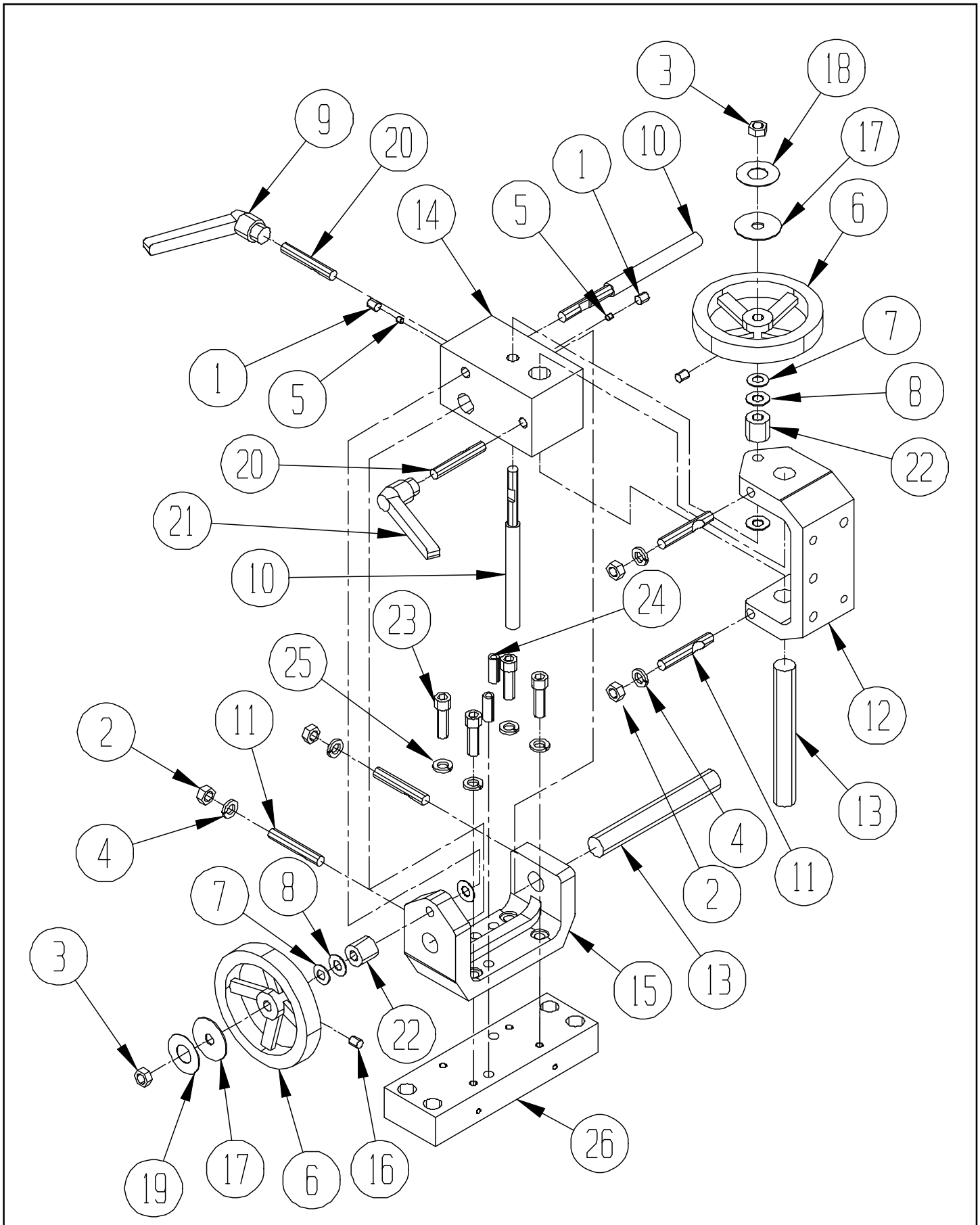

DIAGRAM NUMBER	PART NUMBER	DESCRIPTION
1	C311220	Socket Set Screw CPPT 5/16-18 x 3/4 Long
2	J371000	3/8-16 Hex Nut
3	J377000	3/8-16 Hex Jam Nylon Locknut
4	K371501	3/8 Split Lockwasher
5	3579109	3/16 Dia. Nylon Plug
6	3708148	Handwheel 4.5 Dia. .38 Bore
7	3709062	Bell V Washer .75 O. D. x .035 T
8	3709304	Thrust Washer
9	3708705	Adjustable Handle 5/16-18 Female - Orange
10	6509390	Adjusting ACME Shaft
11	6009035	Locking Stud Shaft
12	6009082	Cross Slide Support
13	6009095	Slide Shaft
14	6509011	Cross Slide
15	6509015	Cross Slide Horizontal support
16	C310820	Socket Set Screw 5/16-18 x 5/8 Long
17	3708665	Flat Washer
18	6309115	Grey Decal
19	6309114	Orange Decal
20	6309113	5/16-18 Locking Stud
21	3708706	Adjustable Handle 5/16-18 Female - Grey
22	3969065	Spacer .406 ID x .75 OD x 1.0 Long
23	B372011	Socket Head Cap Screw 3/8-16 x 1 1/4 Long
24	H371602	Rollpin 3/8 Dia. x 1 Long
25	K371501	3/8 Split Lockwasher
26	6509010	Traverse Base Adjuster Bracket

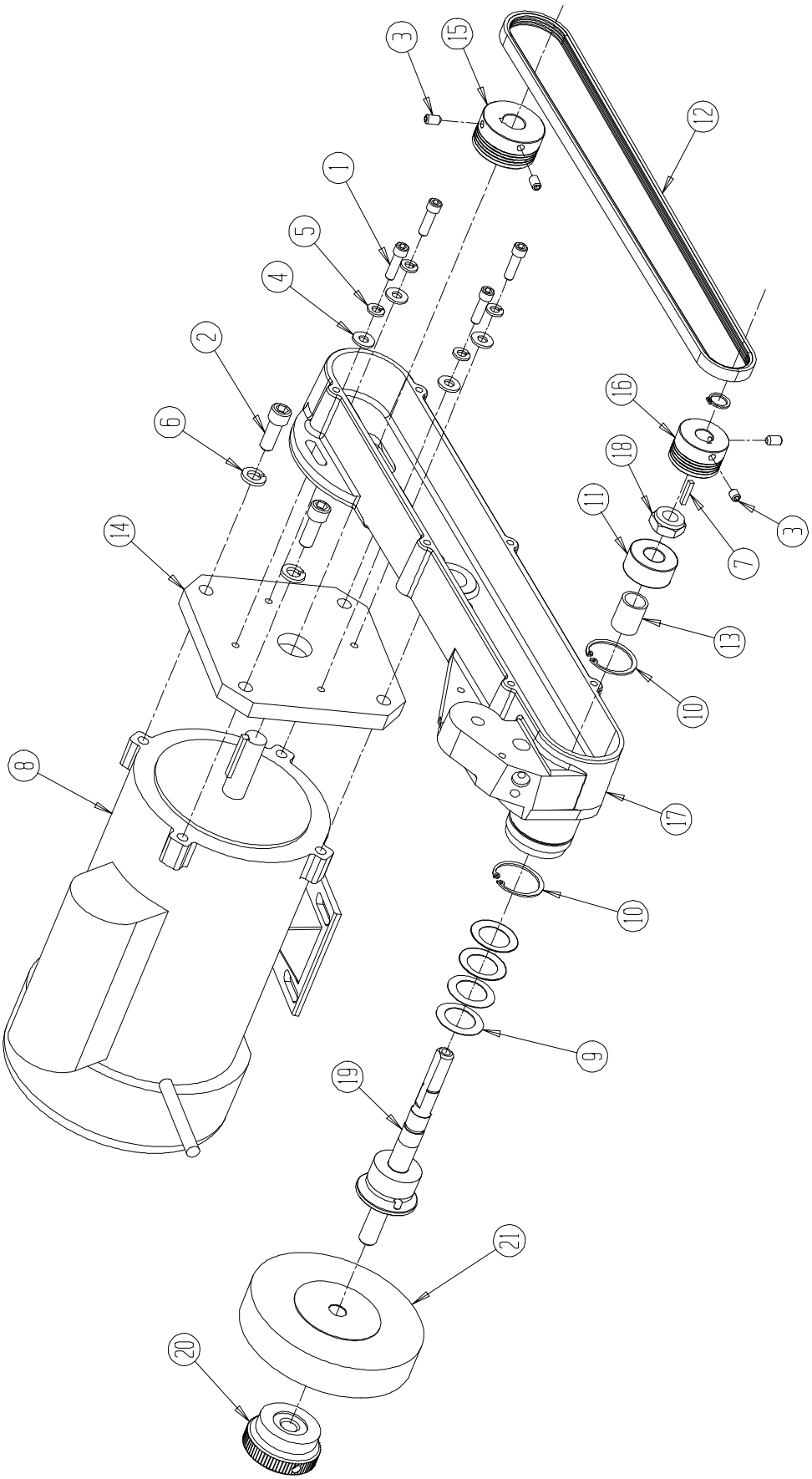
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DIAGRAM NUMBER	PART NUMBER	DESCRIPTION
1	B251411	Socket Head Cap Screw 1/4-20 x 7/8 Long
2	B371611	Socket Head Cap Screw 3/8-16 x 1 Long
3	C250627	Socket Set Screw Cup Pt 1/4-20 x 3/8 Long - Lock Patch
4	K250001	1/4 Flat Washer SAE
5	K251501	1/4 Split Lockwasher
6	K371501	3/8 Split Lockwasher
7	R000376	Square Key 1/8 x 3/4 Long
8	3707690	1 HP 120 VAC Motor
9	3708193	Conical Washer 1.36 OD x .88 OD
10	3708194	Internal Retaining Ring
11	3708204	Double Row Ball Bearing
12	3708202	Poly-V Belt
13	6329089	Bearing Sleeve
14	6329041	Motor Mount Plate
15	6329042	Pulley - Poly V 1.80 Diameter
16	6329100	Pulley - Poly V 1.44 Diameter
17	6509018	Grinding Head Housing
18	6509494	9/16-18 Spindle Nut
19	6329523	Grinding Head Spindle Assembly
20	6509237	Grinding Wheel Knob
21		Grinding Wheel (see page 83)
22	3708870	Retaining Ring - External .50 Shaft Heavy Duty

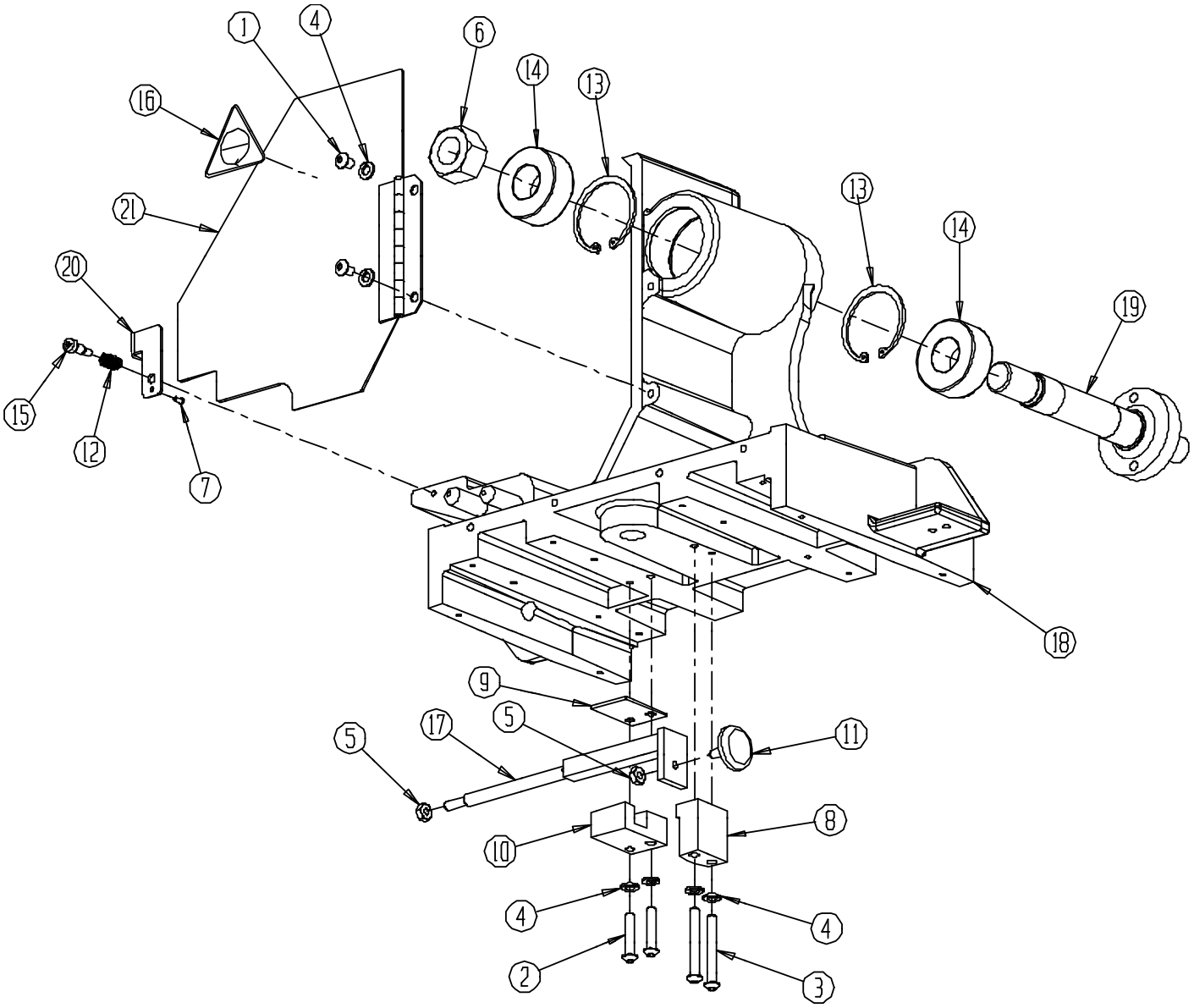
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DIAGRAM NUMBER	PART NUMBER	DESCRIPTION
1	B250616	Button Head Cap Screw 1/4-20 x 3/8 Long
2	B252016	Button Head Cap Screw 1/4-20 x 1 1/4 Long
3	B253216	Button Head Cap Screw 1/4-20 x 2 Long
4	K251501	1/4 Split Lockwasher
5	J252000	1/4-20 Jam Nut
6	J887300	7/8-14 Nylon Jam Locknut
7	R602031	#4 x .31 Drive Screw
8	28187	Traverse Clamp Block
9	28188	Traverse Clamp Spacer Plate
10	28189	Clamp Support Block
11	50310	Belt Clamp Tip
12	3708105	Compression Spring
13	3708184	Retaining Ring
14	3708186	Ball Bearing
15	3708208	Shoulder Bolt .250 Dia. x .387 Long
16	3708462	Decal - RPM, Symbol
17	6329040	Traverse Clamp
18	6329058	Carriage Base
19	6509023	Grinder Head Pivot Shaft
20	6509251	Swing Door Latch
21	6509584	Swing Door Weldment

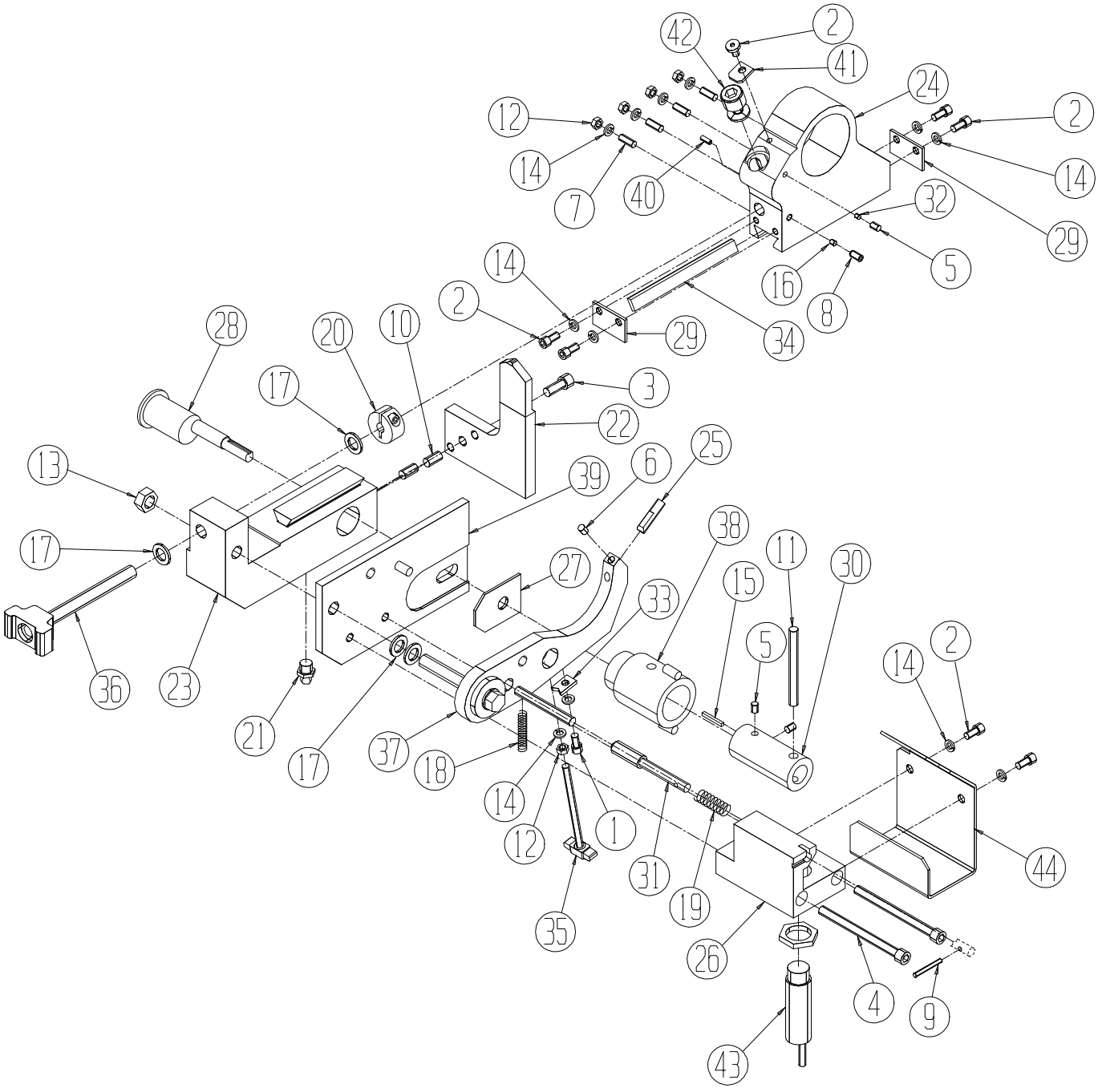
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DIAGRAM NUMBER	PART NUMBER	DESCRIPTION
1	B190631	Socket Head Cap Screw 10-32 x 3/8 Long
2	B190634	Button Head Socket Cap Screw 10-32 x 3/8 Long
3	B251011	Socket Head Cap Screw 1/4-20 x 5/8 Long
4	B254811	Socket Head Cap Screw 1/4-20 x3 Long
5	C190460	Socket Set Screw 10-24 x 1/4
6	C190467	Socket Set Screw - Nylok Cup 10-32 x .25 Long
7	C190860	Socket Set Screw - CP-PT 10-32 x 1/2 Long
8	C190860	Socket Set Screw - 10-32 x 1/2 Long
9	H122002	Roll Pin 1/8 Dia. x 1 1/4 Long
10	H250813	Dowel Pin 1/4 Dia. x .5 Long
11	H253202	Drive Lock Pin 1/4 x 1.75 Long
12	J191100	10/32 Hex Nut
13	J377200	3/8-24 Jam Nylok Locknut
14	K191501	No. 10 Lock Washer
15	R000351	Square Key .093 x .75 Long
16	3579284	1/8 Dia. Nylon Plug
17	3709304	Thrust Washer
18	3708107	Compression Spring
19	3708175	Compression Spring
20	3708199	3/8-16 Dia. Split Shaft Collar
21	3709472	Straight Grease Fitting
22	6509432	Relief Finger
23	6509004	Reel Finger Slide
24	6509357	Reel Finger Positioner
25	6509007	Index Stop Pin
26	6509008	Index Sensor Block
27	6509009	Slide Washer
28	6509058	Eccentric Index Pin
29	6509060	Gib Stop Plate
30	6509215	Adjustable Index Lever
31	6509229	Locking Index Finger Pin
32	3579284	1/8" Diameter Nylon Plug
33	6509239	Anti Rotation Plate
34	6509258	Dovetail Gib
35	6509501	Tee Knob Assembly
36	6509547	Knob Assembly
37	6329592	Index Finger Assembly
38	6329593	Index Lock Handle Weldment
39	6509592	Index Finger Positioner Weldment
40	H120402	1/8" Diameter x 1/4" Long Pin Roll
41	6509358	Stop Plate
42	6509356	Reel Positioner Adjuster
43	6329169	Finger Proximity Switch Cord
	3707601	Proximity Sensor
44	6509230	Guard for Index Sensor

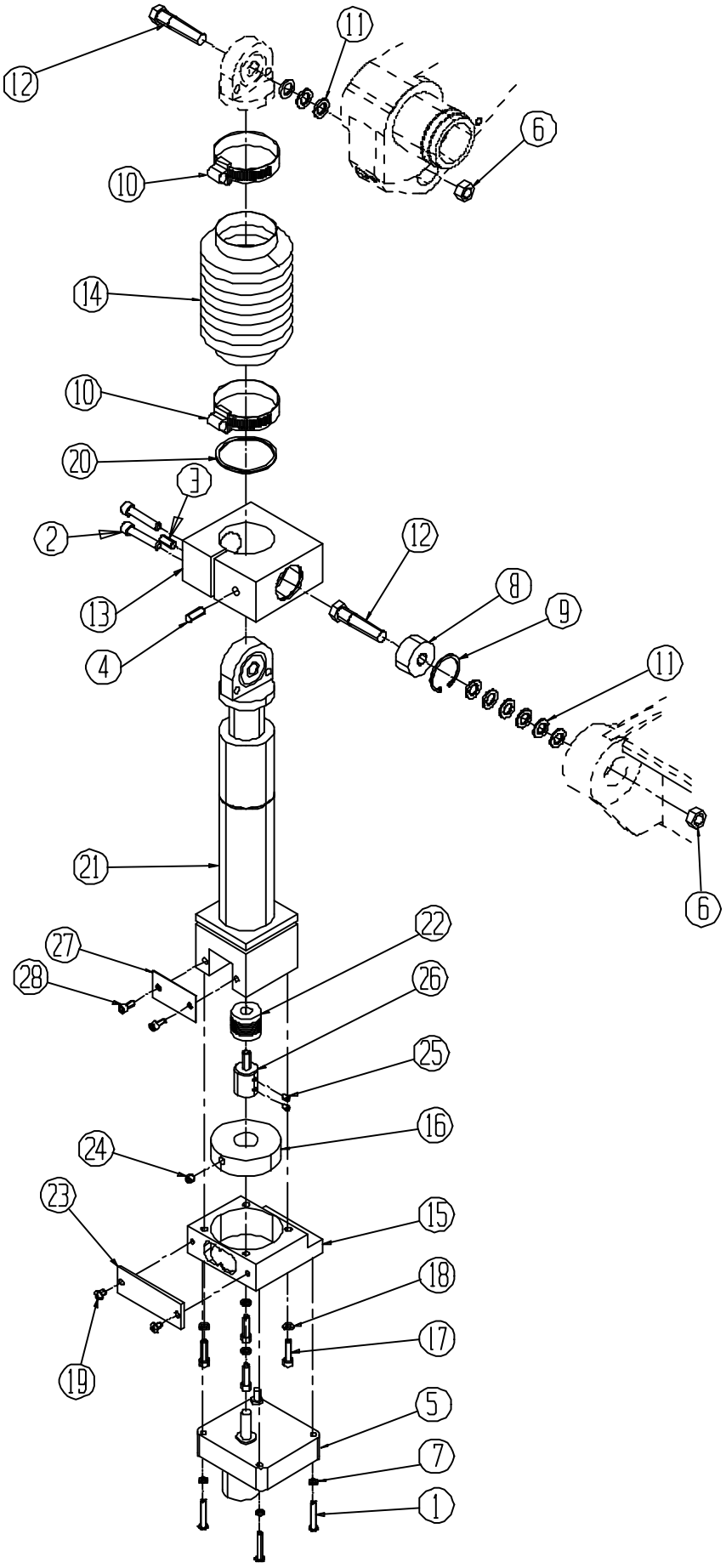
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DIAGRAM NUMBER	PART NUMBER	DESCRIPTION
1	B161811	Socket Head Cap Screw 8-32 x 1 1/8 Long
2	B252011	Socket Head Cap Screw 1/4-20 x 1 1/4 Long
3	C250825	Socket Set Screw 1/4-20 x 1/2
4	C251020	1/4-20 x 5/8" Set Screw
5	6329186	DC Motor/Reducer Assembly
6	J377200	3/8-24 Nylok Jam Locknut
7	K161501	#8 Split Lockwasher
8	3708187	Ball Bearing
9	3708189	Retaining Ring
10	3708192	Hose Clamp 2.25 Dia.
11	3709304	Thrust Washer
12	6509048	Hex Pivot Pin
13	6509051	Trunion Block
14	6509056	Bellows, 1.88 I.D.
15	6309052	Actuator Motor Mounting Bracket
16	6309053	Calibration ring
17	B191611	Socket Head Cap Screw 10-24 x 1" Long
18	K191501	#10 Lockwasher
19	B160407	8-32 x 1/4 Button Head Socket Cap Screw
20	3708424	Retaining Ring Ext. 1.75
21	6509384	Infeed Stepper Assembly
22	3708629	Split Shaft Collar .25 I.D.
23	6309055	Window
24	C250420	1/4-20 x 1/4 Socket Set Screw
25	C160420	8-32 x 1/4 Socket Set Screw
26	6309040	Adapter
27	6509381	Base Cover Plate
28	B190613	Socket Head Cap Screw 10-24x 3/8 Long

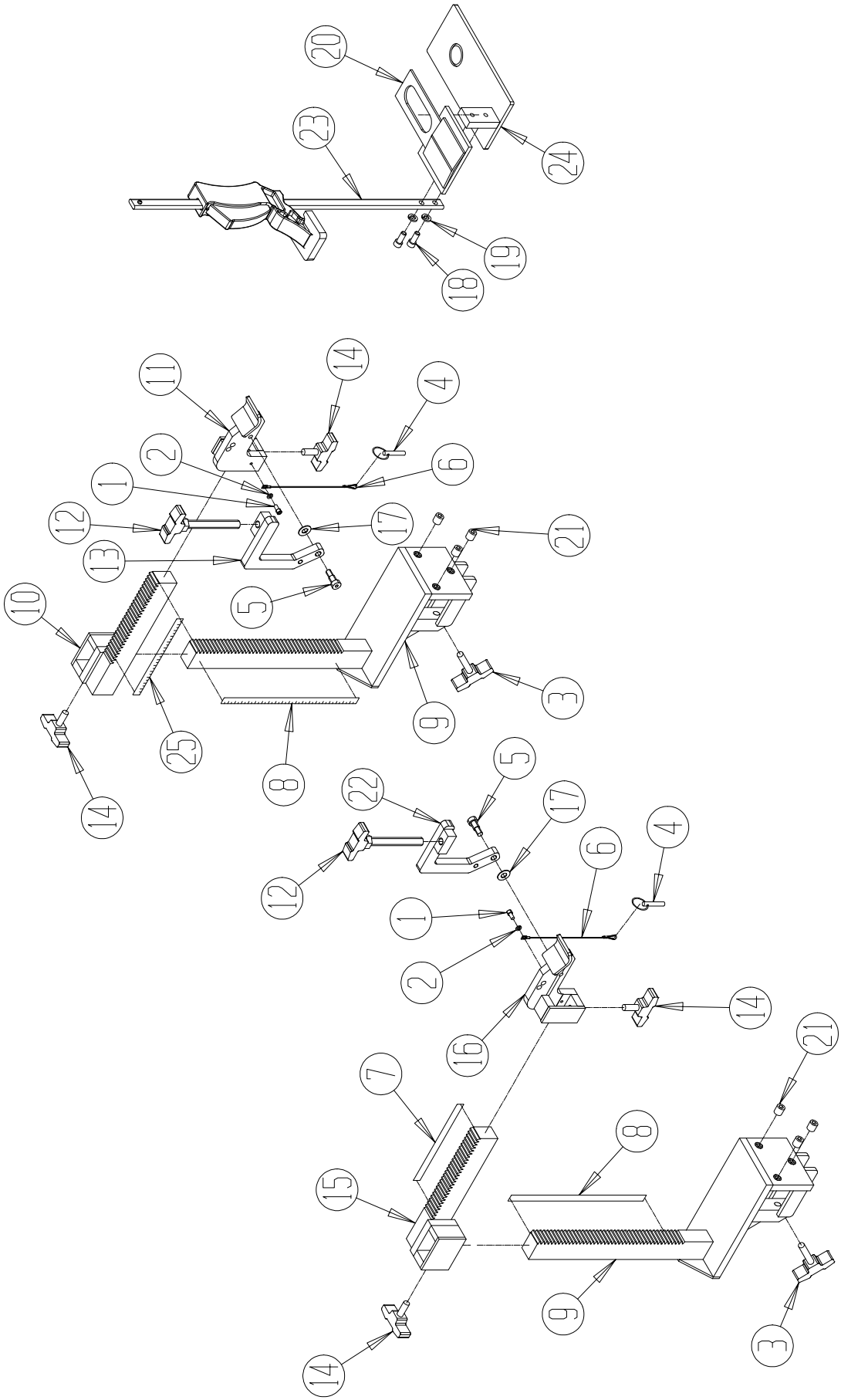
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DIAGRAM NUMBER	PART NUMBER	DESCRIPTION
1	B190614	Pan Head Machine Screw 10-24 x 3/8 Long
2	K191501	No.10 Lockwasher
3	6009577	Knob Assembly
4	3708364	Quick Release Pin .31 Dia.
5	3708158	Shoulder Bolt .375 Dia. x .50 Long
6	3708366	6" type B Lanyard
7	6509128	Horizontal Scale Decal RH
8	6329072	Vertical Scale Decal
9	6509507	Bar Mounting Weldment Bracket
10	6509517	L.H. Front Roller Horiz. Weldment Bracket
11	6329587	L. H. Roller Clamp Weldment Bracket
12	6509559	Knob Assembly
13	6509564	L.H. Front Roller Clamp Weldment
14	6509588	Knob Assembly
15	6509515	R.H. Front Roller Horiz. Welment Bracket
16	6329586	R.H. Roller Clamp Weldment Bracket
17	3709304	Thrust Washer
18	B311211	Socket Head Cap Screw 5/16-18 x 3/4 Long
19	K311501	5/16 Lockwasher
20	70512	Rear Roller Support Bracket Weldment
21	C500861	1/2-20 x 1/2 Flat Pt Socket Head Set Screw
22	6509576	R.H. Front Roller Clamp Weldment
23	3708881	Rear Clamp
24	6329514	Rear Clamp Base Weldment
25	6509304	Horizontal Scale Decal LH

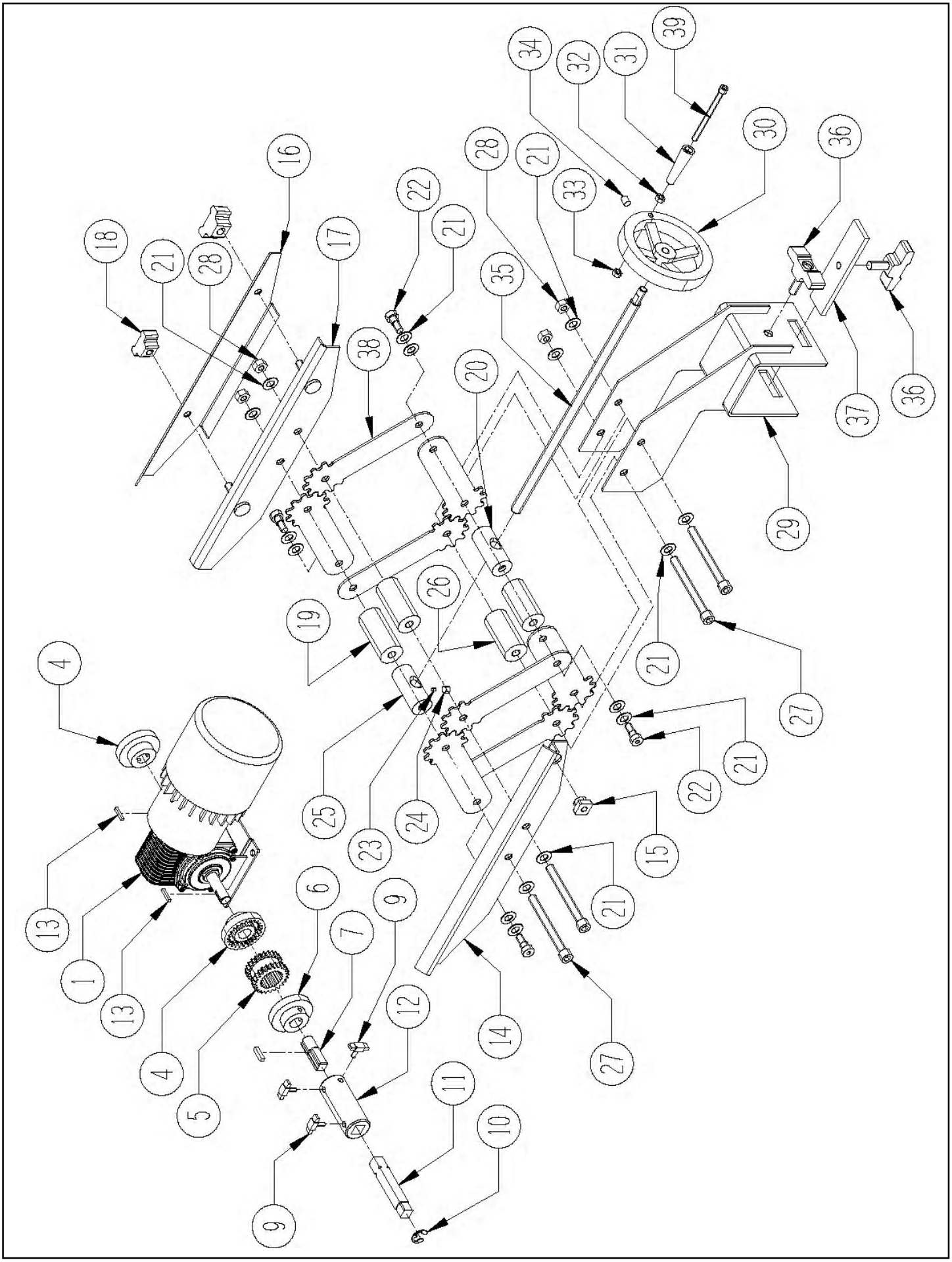
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DIAGRAM NUMBER	PART NUMBER	DESCRIPTION
1	6329160	Gearmotor, DC (Spin)
4	3709586	Flange Coupler .50
5	3709585	Sleeve Coupler
6	3709584	Flange Coupler 5/8
7	6009217	Drive Coupling Adapter
9	09394	Tee Knob Assembly
10	3709073	Retaining Ring
11	6009051	Drive Adapter 1/2 Square
12	6009052	Adapter
13	R000376	Square Key 1/8 x .75 Long
14	6009078	Gearbox Slide Bracket
15	3707279	Strain Relief Wire
16	6009079	Gearbox Clamp Bracket
17	6009580	Gearbox Slide Weldment Bracket
18	3708262	T-Knob - 5/16-18
19	6009045	Linkage Spacer 2.29 Long
20	6009046	Linkage Spacer R.H. Thread
21	3709062	Belleville .75 Dia. x .35 T
22	3709809	Shoulder Bolt .375 Dia. x .375 Long
23	3709705	Nylon Ball 5/32 Dia.
24	C310420	Socket Set Screw 5/16-18 x 1/4
25	6009047	Linkage spacer L. H. Thread
26	6009048	Linkage Spacer 2.5 Long
27	B375611	Socket Head Cap Screw
28	J377100	Nylok Hex Locknut 3/8-16
29	6509519	Support Bracket Weldment
30	3708148	Handwheel 4.5 Dia.
31	3709370	Handle
32	J252000	Hex Jam Nut 1/4-20
33	J257000	1/4-20 Nylok Locknut
34	C310620	Socket Set Screw 5/16-18 x 3/8 Long
35	6009076	Double Thread Rod
36	6009555	Knob Assembly
37	6509114	Spin Drive Plate Lock
38	6009067	Geared Linkage
39	B255011	Socket Head Cap Screw 1/4-20 x 3 1/8 Long
40	R000377	Square Key 3/16 x .75 Long

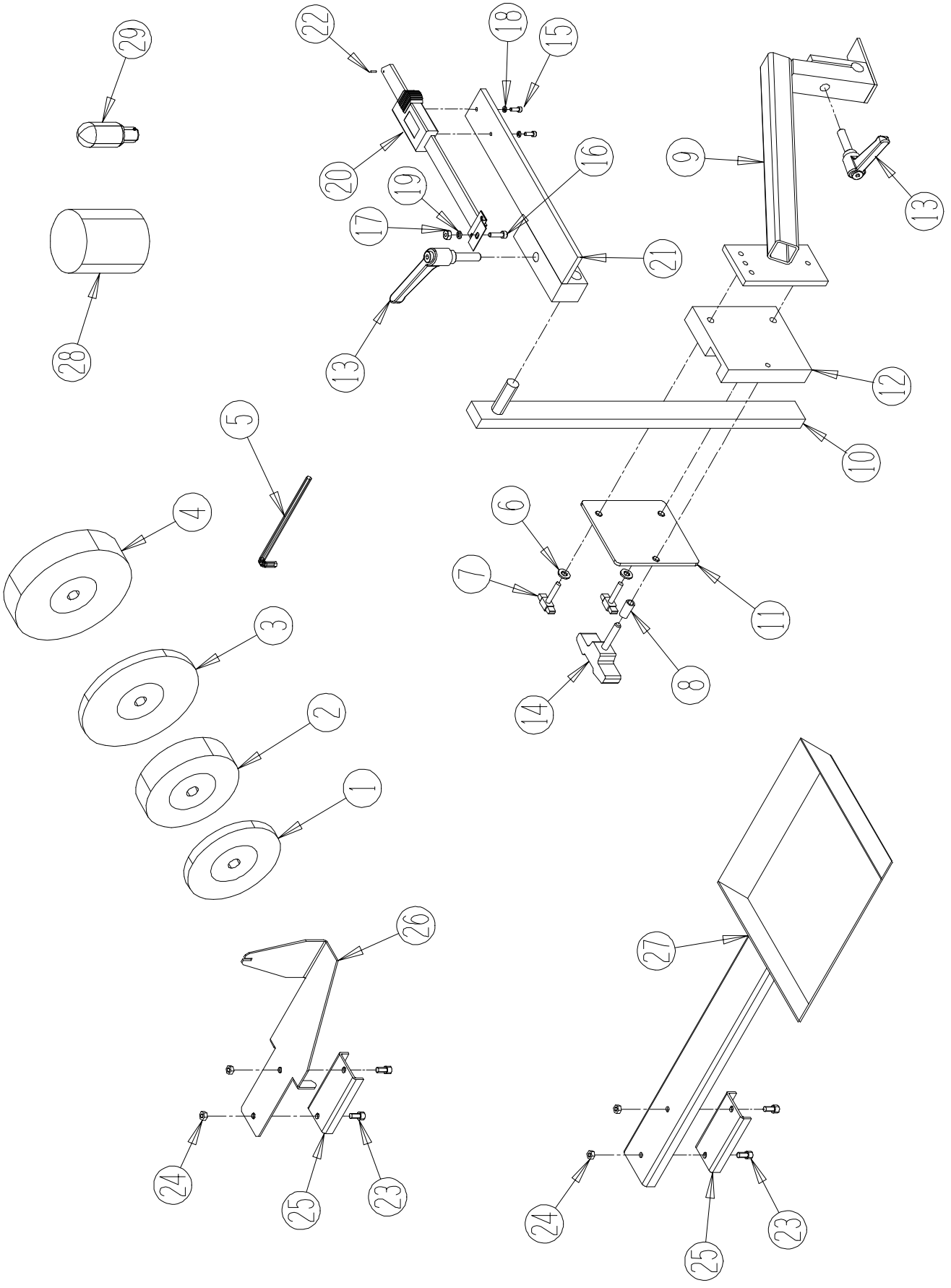
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DIAGRAM NUMBER	PART NUMBER	DESCRIPTION
1	3700088	Grinding Wheel 3.5" Dia. x .38 Wide
2	3700086	Grinding Wheel 3.5" Dia. x 1" Wide
3	3700087	Grinding Wheel 5" Dia. x .38" Wide
4	3700089*	Grinding Wheel 5" Dia. x 1" Wide
5	R000863	5/16 Allen Key
6	K251501	1/4 Lockwasher
7	80396	T-Knob Assembly
8	3529069	Space
9	6329555	Alignment Extension Weldment
10	6329518	Gage Bar Weldment
11	6509349	Retaining Plate
12	6509418	Plate-Pivot
13	3708094	Adjustable Handle 5/16-18 x 1.25 Long
14	3708894	T-Knob Assembly
15	B120611	Socket Head Cap Screw 5-40 x .38 Long
16	B161011	Socket Head Cap Screw 8-32 x 5/8 Long
17	J161000	8-32 Hex Nut
18	K121501	No. 5 Split Lockwasher
19	K161501	No. 8 Lockwasher
20	6509359	Digital Gage
	3707712	Battery Cover - Digital Gage
21	6329556	Base Weldment Indicator
22	H060302	1/16 x 3/16L Roll Pin
23	B190811	Socket Head Cap Screw 10-24 x 1/2
24	J197100	10-24 Nylok Locknut
25	3708384	Magnet
26	6509474	Reel Positioner Gage
27	6509557	Drip Pan Weldment

* 3700089- Grinding wheel is installed on grinding head when shipped. The other wheels are located in the carton assembly.

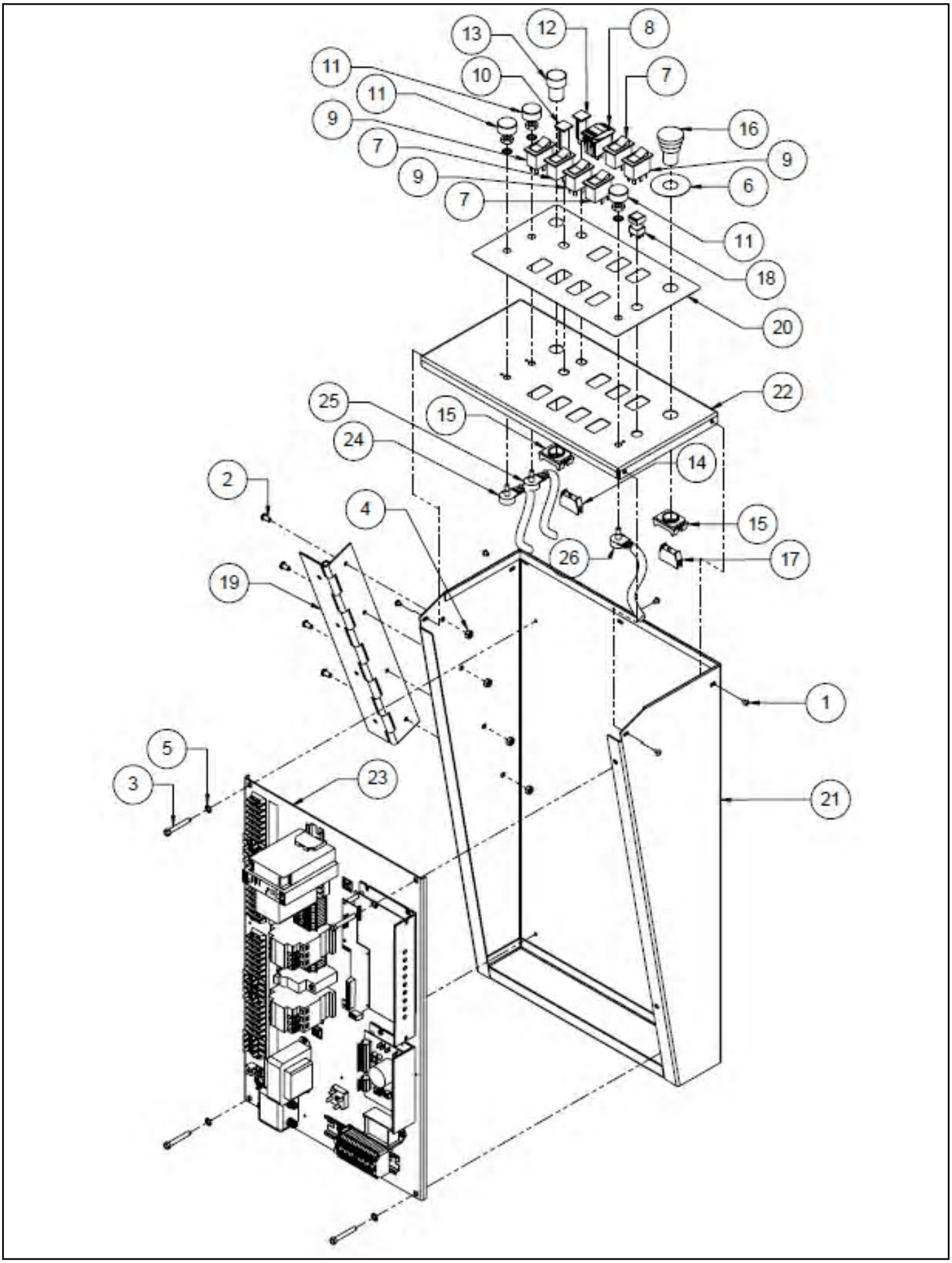
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DIAGRAM NUMBER	PART NUMBER	DESCRIPTION
1	B190834	Button Head Cap Screw 10-32 x 1/2 Long
2	B250816	Button Head Cap Screw 1/4-20 x 1/2 Long
3	D250800	Thread Cutting Screw 1/4-20 x 1/2 Long
4	J257000	1/4-20 Nylon Jam Locknut
5	R000536	1/4 Internal Tooth Lock Washer
6	3707342	Yellow Emergency Stop Ring
7	3707367	Rocker Switch DPST
8	3707713	Rocker Switch Momentary (On-Off-On)
9	3707429	Rocker Switch DPDT
10	3707443	4-Amp Circuit Breaker
11	3707446	Potentiometer Knob
12	3707547	15-Amp Circuit Breaker
13	3707564	Green Start Push-button
14	3707565	Normally Open Contact Block
15	3707566	Switch Mounting Latch
16	3707567	Push/Pull Red Emergency Stop Button
17	3707568	Normally Closed Contact Block
18	3707826	Square Green Push Button
20	6329161	Control Panel Decal
22	6329568	Control Panel Top Weldment
19	6329070	Hinge
21	6329509	Control Box Weldment
23	6329572	Electrical Panel Sub-Assembly
24	6529053	Potentiometer Assembly - Spin Speed
25	6529052	Potentiometer Assembly - Relief Torque
26	6059050	Potentiometer Assembly - Traverse Speed

Not Shown

	6329078	Main Power Cord
	6329079	Infeed Motor Cord
	6329080	Light Receptacle Cord
	6329081	Dust Collector Receptacle Cord
	3707224	Cable Tie Mount (used throughout machine)
	3707225	Cable Tie 6.5 Long x .18 Wide
	3707255	Cable Tie 4.0 Long x .10 Wide
	3708378	Strip Foam .25 Thick

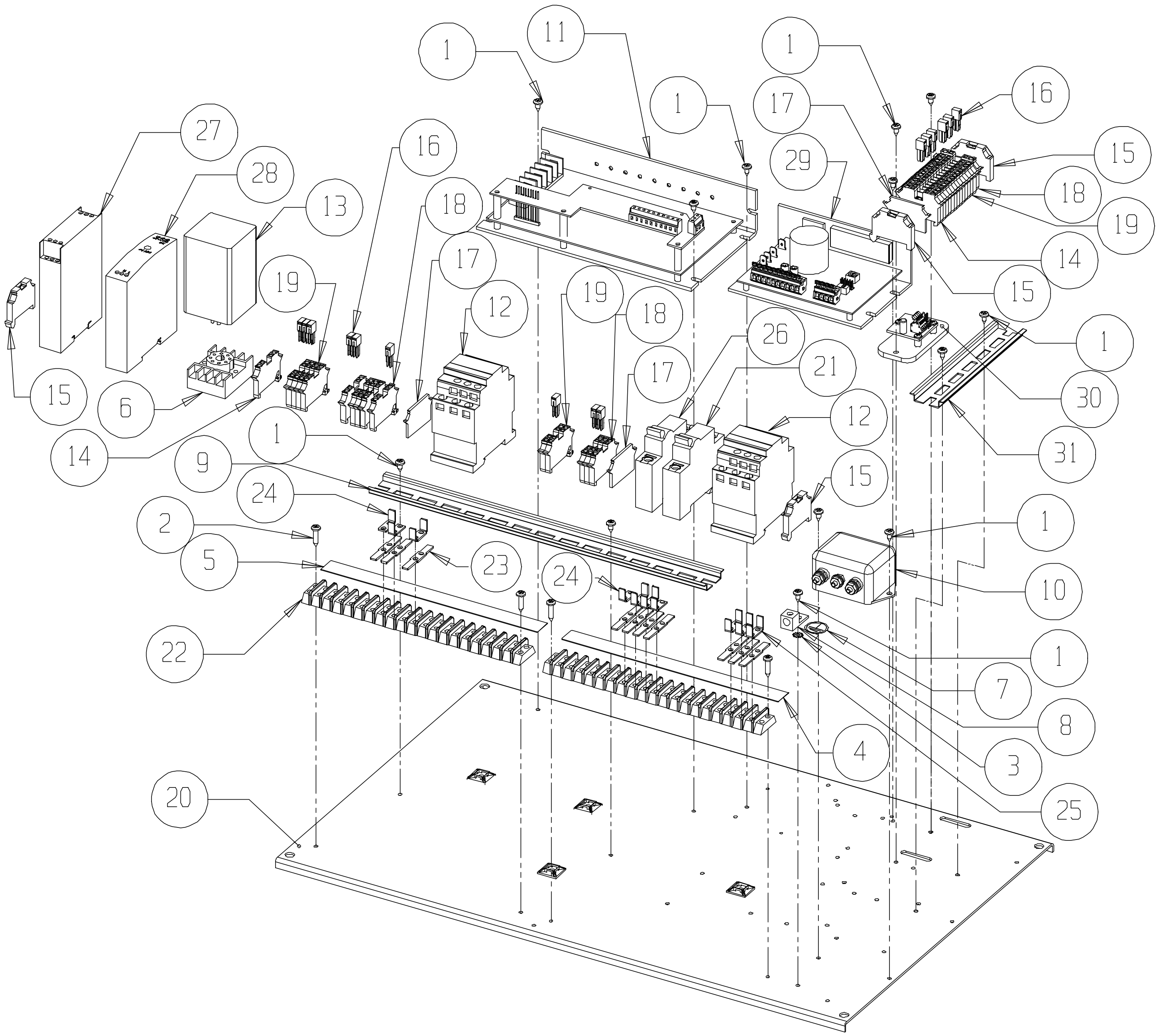
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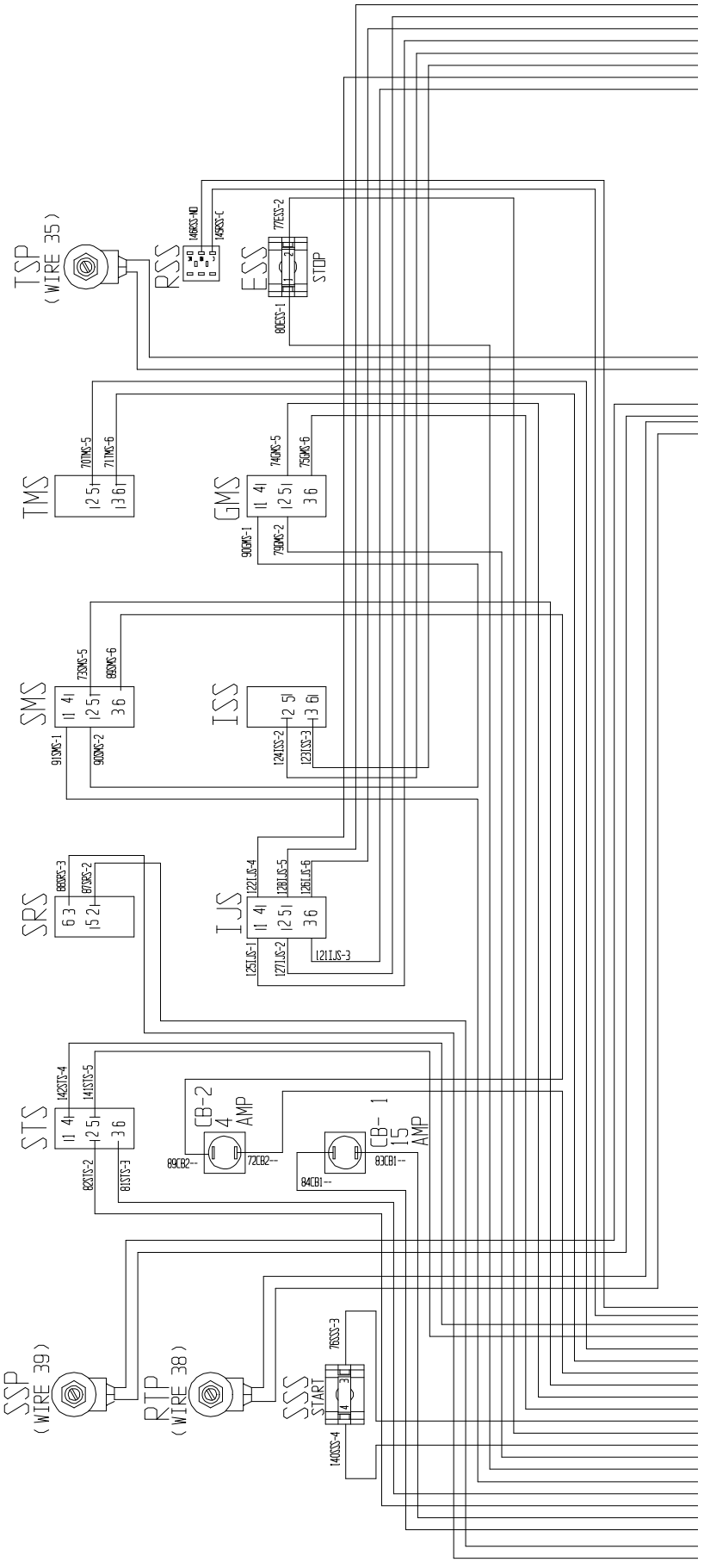
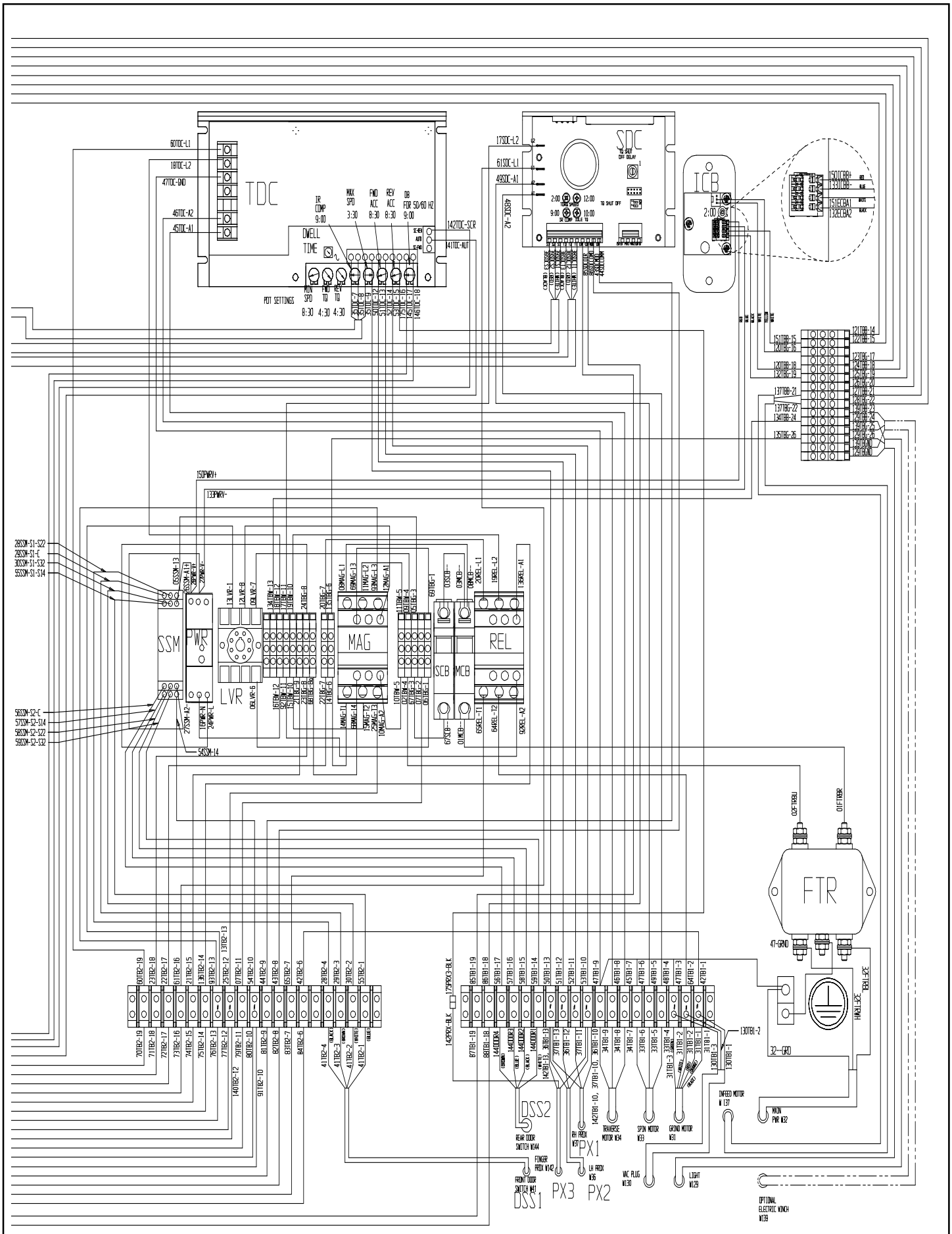
DIAGRAM NUMBER	PART NUMBER	DESCRIPTION
1	D160666	No. 8 x 3/8 Pan Head Self Tapping Screw
2	D161266	No. 8 x 3/4 Pan Head Self Tapping Screw
3	R000480	Lockwasher No. 8 External Teeth
4	3706078	19 Pole Decal (TB1)
5	3706079	19 Pole Decal (TB2)
6	3707073	8 Pin Socket
7	3707163	Primary Ground Decal
8	3707164	Primary Ground Lug
9	3707378	Din Rail - 14" Long
10	3707764	Power Line Filter
11	3707850	Traverse Control Board
12	3707556	Magnetic Starter 1 HP
13	3707688	Voltage Sensor Relay
14	3707624	Ground Terminal Block
15	3707625	Terminal Block End Stop
16	3707626	Terminal Block Jumper
17	3707627	Terminal Block End Plate
18	3707628	2 Conductor Geey Terminal Block
19	3707629	2 Conductor Blue Terminal Block
20	6009270	Electrical Panel
21	80259	Circuit Breaker - 20 Amp
22	3707778	Terminal Strip - 2 Row 19 Pole
23	3707707	Terminal Strip Double Flat Spade
24	3707709	Terminal Strip Single 90° Spade
25	3707708	Terminal Strip Double 90° Spade
26	3707779	6-amp Circuit Breaker
27	3707328	Door Safety Switch Monitor
28	3707859	Power Supply 24 VDC
29	3707830	Spin Control Board
30	3707781	Infeed Control Assembly
31	3707602	6" Din Rail

6324576 WIRING DIAGRAM

CB1 - CIRCUIT BREAKER 1 15 AMP
CB2 - CIRCUIT BREAKER 2 4 AMP
DSS1 - FRONT DOOR SAFETY SWITCH
DSS2 - REAR DOOR SAFETY SWITCH
ESS - EMERGENCY STOP SWITCH
FTR - LINE FILTER
GMS - GRINDING MOTOR SWITCH
ICB - INFEED CONTROL BOARD
IJS - INFEED JOG SWITCH
ISS - INFEED SPEED SWITCH
LVR - LOW VOLTAGE RELAY
MAG - MAGNETIC STARTER
MCB - MAIN CIRCUIT BREAKER
PWR - 24V POWER SUPPLY
PX1 - RIGHT PROXIMITY SWITCH
PX2 - LEFT PROXIMITY SWITCH
PX3 - FINGER PROXIMITY SWTICH
REL - GRINDING MOTOR RELAY
RSS - REVERSE SELECTOR SWITCH
RTP - RELIEF TORQUE POT
SCB - SECONDARY CIRCUIT BREAKER
SDC - SPIN DRIVE CONTROL
SMS - SPIN MOTOR SWITCH
SRS - SPIN ROTATION SWITCH
SSM - SAFETY SWITCH MONITOR
SSP - SPIN SPEED POT
SSS - SYSTEM START SWITCH
STS - SPIN/TORQUE SELCTOR SWITCH
TB1 - TERMINAL STRIP 1
TB2 - TERMINAL STRIP 2
TBG - TERMINAL BLOCK GREY
TBW - TERMINAL BLOCK BLUE
TDC - TRAVERSE DRIVE CONTROL
TMS - TRAVERSE MOTOR SWITCH
TSP - TRAVERSE SPEED POT

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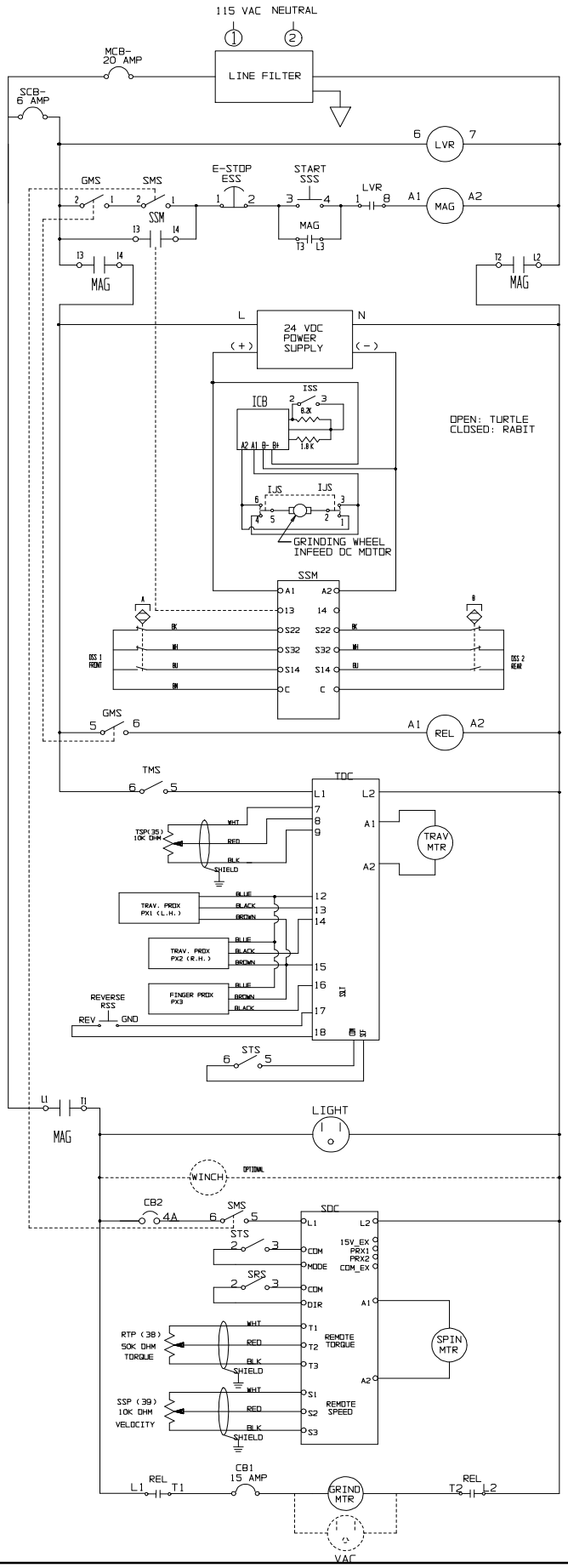
MAG
REL
SCB
MCB
FTR
DSS1
DSS2
PX1
PX2
PX3
TRAVERSE MOTOR M34
SPIN MOTOR M33
GRIND MOTOR M31
INFEED MOTOR M137
MAIN PWR M32
VAC PLUG W130
LIGHT W129
OPTIONAL ELECTRIC WINCH W139
REAR DOOR SWITCH W144
FRONT DOOR SWITCH W41
FINGER PROX W142
RH PROX W37
LH PROX W36
47-GND
32-GND

632 WIRING SCHEMATIC



CB1 - CIRCUIT BREAKER 1 15 AMP
CB2 - CIRCUIT BREAKER 2 4 AMP
DSS1 - FRONT DOOR SAFETY SWITCH
DSS2 - REAR DOOR SAFETY SWITCH
ESS - EMERGENCY STOP SWITCH
GMS - GRINDING MOTOR SWITCH
ICB - INFEED CONTROL BOARD
IJS - INFEED JOG SWITCH
ISS - INFEED SPEED SWITCH
LVR - LOW VOLTAGE RELAY
MAG - MAGNETIC STARTER
MCB - MAIN CIRCUIT BREAKER
PX1 - RIGHT PROXIMITY SWITCH
PX2 - LEFT PROXIMITY SWITCH
PX3 - FINGER PROXIMITY SWTICH
REL - GRINDING MOTOR RELAY
RSS - REVERSE SELECTOR SWITCH
RTP - RELIEF TORQUE POT
SCB - SECONDARY CIRCUIT BREAKER
SDC - SPIN DRIVE CONTROL
SMS - SPIN MOTOR SWITCH
SRS - SPIN ROTATION SWITCH
SSM - SAFETY SWITCH MONITOR
SSP - SPIN SPEED POT
SSS - SYSTEM START SWITCH
STS - SPIN/TORQUE SELCTOR SWITCH
TDC - TRAVERSE DRIVE CONTROL
TMS - TRAVERSE MOTOR SWITCH
TSP - TRAVERSE SPEED POT