MODEL 465
AUTOMATIC
ROTARY BLADE GRINDER

PATENT NO. 7,329,172

ASSEMBLY
AND
SERVICE
MANUAL

WARNING

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

4657954 (10-11)

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 strictly observed, **could result in personal injury.**

The ***Caution Symbol*** identifies special instructions or procedures which, if not correctly followed, **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 footwear is recommended. Wear protective hair covering to contain long hair.
10. **ALWAYS USE SAFETY GLASSES.**
11. **SECURE YOUR WORK.** Make certain that the rotary blade is securely fastened with the components provided before operating.
12. **DON'T OVERREACH.** Keep proper footing and balance at all times.
13. **MAINTAIN GRINDER WITH CARE.** Follow instructions in the Assembly and Service Manual for lubrication and preventive maintenance.
14. **DISCONNECT POWER BEFORE SERVICING.**
15. **REDUCE THE RISK OF UNINTENTIONAL STARTING.** Make sure all switches are OFF before plugging in the Grinder.
16. **USE RECOMMENDED ACCESSORIES.** Consult the manual for recommended accessories. Using improper accessories may cause risk of personal injury.
17. **CHECK DAMAGED PARTS.** A guard or other part that is damaged or will not perform its intended function should be properly repaired or replaced.
18. **KNOW YOUR EQUIPMENT.** Read this manual carefully. Learn its application and limitations as well as specific potential hazards.
19. **KEEP ALL SAFETY DECALS CLEAN AND LEGIBLE.** If safety decals become damaged or illegible for any reason, replace immediately. Refer to replacement parts illustrations in 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

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

Grinding is a safe operation if the few basic rules listed below are followed. These rules are based on material contained in the ANSI B7.1 Safety Code for "Use, Care and Protection of Abrasive Wheels". For your safety, we suggest you benefit from the experience of others and carefully follow these rules.

DO

1. **DO** always **HANDLE AND STORE** wheels in a **CAREFUL** manner.
2. **DO VISUALLY INSPECT** all wheels before mounting for possible damage.
3. **DO CHECK MACHINE SPEED** against the established maximum safe operating speed marked on wheel.
4. **DO CHECK MOUNTING FLANGES** for equal and correct diameter.
5. **DO USE MOUNTING BLOTTERS** when supplied with wheels.
6. **DO** be sure **WORK REST** is properly adjusted.
7. **DO** always **USE A SAFETY GUARD 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.
10. **DO TURN OFF COOLANT** before stopping to avoid creating an out-of-balance condition.

DON'T

1. **DON'T** use a cracked wheel or one that **HAS BEEN DROPPED** or has become damaged.
2. **DON'T FORCE** a wheel onto the machine **OR ALTER** the size of the mounting hole. If 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.

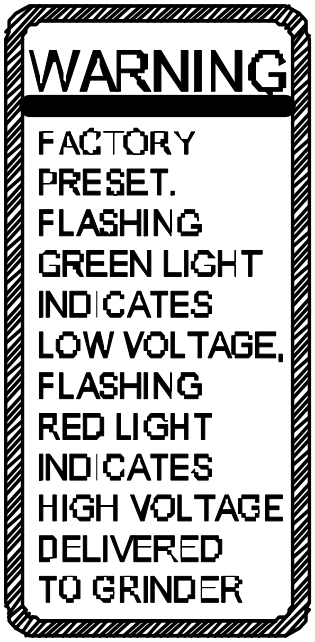
AVOID INHALATION OF DUST generated by grinding and cutting operations. Exposure to dust may cause respiratory ailments. Use approved NIOSH or MSHA respirators, safety glasses or face shields, and protective clothing. Provide adequate ventilation to eliminate dust, or to maintain dust level below the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

This machine is intended for grinding the rotary blades from a rotary type mowing unit <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 manufactures 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 <u>not</u> powerwash machine.



The grinder is equipped with a high/low voltage relay (LVR) which is factory preset at 100 VAC low voltage trip and 140 VAC high voltage trip. If the power supply line does not deliver a minimum of100 VAC and a maximum of 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.

A steady green light indicates - Power Up/ Fault cleared.
A steady red light indicates - Relay energized
A flashing red light indicates - Overvoltage trip
A flashing green light indicates - Undervoltage trip

CONTENTS

SPECIFICATIONS

Electrical Requirements ..... 115V 50/60 Hz, 15-amp circuit
Net Weight ..... 430 lbs [195 kg]
Shipping Weight ..... 620 lbs [281 kg]
Maximum Grinding Length ..... 34 in. [86 cm]
Sound Level ..... ….Less than 75 Dba

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 465 Rotary Blade Grinder. For those without that background, service can be arranged through a local distributor.

This Manual presumes that you are already familiar with the normal operation of the Grinder. If not, you should read the 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 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
Use the Grade 8 values in the table at the right.

Machine Screw

No. 6 Screws: 11in.-lbs [0.125 kg-m]
No. 8 Screws: 20 in.-lbs [0.23 kg-m]
No. 10 Screws: 32 in.-lbs [0.37kg-m]

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

ASSEMBLY INSTRUCTIONS

UNPACK THE CARTONS

NOTE: Before you install the machine, read the following assembly procedure completely. Then study "Getting to Know Your Bedknife Grinder" in the Operators Manual.

Use care when unpacking. Double-check the packing cartons for any miscellaneous items before discarding.

Inspect all items for shipping damage as they are removed from the shipping containers. If you find any damage, notify the carrier's claims agent and do not proceed further until the damage has been inspected by the agent. Refer also to the "Shipping and Receiving Instructions" packed with the unit.

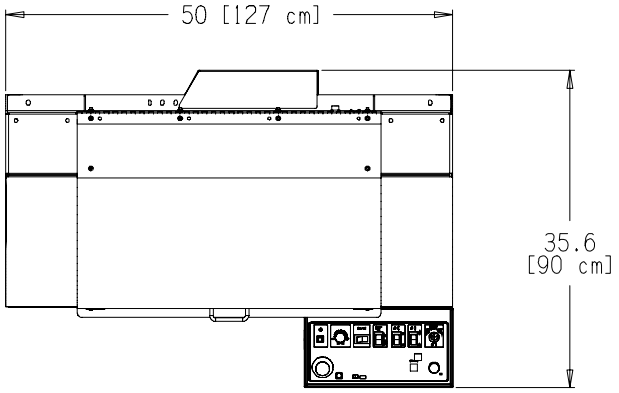


FIG. 1

Remove the Grinder from the Pallet

To remove the Grinder from the wood pallet, unbolt the four brackets that hold each end of the Grinder legs to the bottom of the pallet.

THE GRINDER WEIGHS 430 LBS [195 KG]. TO LIFT, USE POWER EQUIPMENT

The machine has adjustable feet that are located in holes in the wood pallet. Lift machine up straight to clear the pallet and then move machine to final position on floor.

Remove any additional shipping straps, and window protective sheets after positioning unit on the floor.

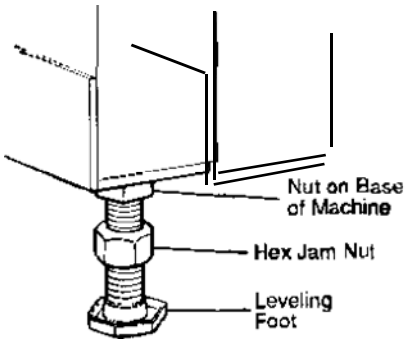


FIG. 2

LOCATE AND LEVEL THE GRINDER

Set the Grinder on a level concrete floor, on a single uncracked slab of concrete

The 465 Rotary Blade Grinder will require an operating area of about 50" W x 75" D x 85" H (127 x 190 x 190 cm). 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. See FIG. 1.

Place level on the top of the Traverse Rail. Adjust the leveling feet as necessary to bring to level. See FIG. 2.

Place a level across the Dust Tray from front to rear. Adjust the leveling feet on the end of the machine as necessary to level.

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. 2. Make certain that all four leveling feet are firmly contacting the floor.

Recheck with level after locking nuts are firmly tightened.

ASSEMBLY INSTRUCTIONS (Continued)

APPLY POWER

BEFORE YOU APPLY POWER TO THE GRINDER, REFER TO THE "IMPORTANT GROUNDING INSTRUCTIONS" ON PAGE 9.

115 Volt Model Only. Plug the control box power cord into a standard 115V AC 15-amp grounded receptacle. See FIG. 4.

FIG. 4

220 Volt Model Only. For 220 Volt Applications order Part No. 4650951, which includes a 230 to 115 Volt Step Down Transformer. See Details on page 8.

IT IS RECOMMENDED THAT THIS 465 ROTARY BLADE 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 - 15 AMPS. THE TOLERANCE ON THIS POWER REQUIREMENT IS +/- 5%. THEREFORE THE MINIMUM VOLTAGE REQUIREMENT IS 109VAC WITH 15 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.

The grinder is equipped with a high/low voltage relay (LVR) which is factory preset at 100 VAC low voltage trip and 140 VAC high voltage trip. If the power supply line does not deliver a minimum of 100 VAC and a maximum of 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.

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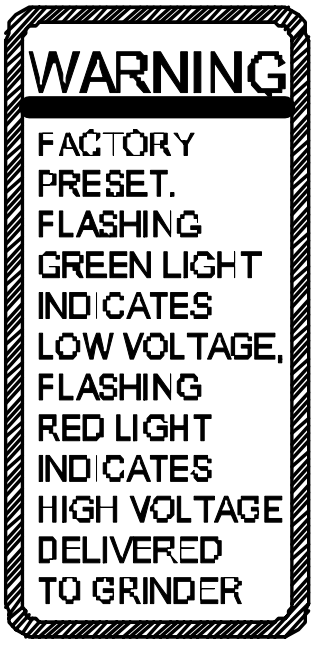


When installing the grinder, the following guidelines should be used to establish the wire size between the power panel in your building and the grinder receptacle. Note that the wiring in your building must be per code between main power panels and sub panels.

FOR 15 AMP RATED LARGE MACHINES

For 0 to 30 Feet from panel to receptacle = Use 14 Ga. Wire.
For 30 to 50 Feet from panel to receptacle = Use 12 Ga. Wire.
For 50 to 80 Feet from panel to receptacle = Use 10 Ga. Wire.
For 80 to 140 Feet from panel to receptacle = Use 8 Ga. Wire.

For 0 to 15 Meters from panel to receptacle = Use 2.5mm Wire.
For 15 to 42 Meters from panel to receptacle = Use 4.0mm Wire.

ASSEMBLY INSTRUCTIONS (Continued)

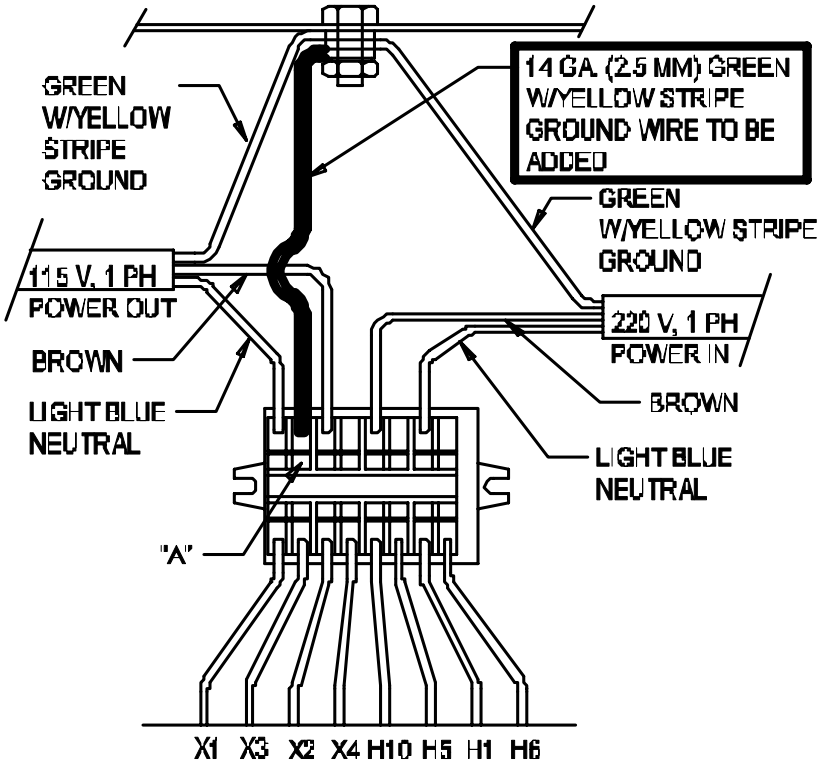
FOR 220-240 V 50 or 60Hz applications Product No. 4650951 should be ordered.

4650951 includes a 2 KVA 220-240 Volt Step Down to 110-120 Volt 50/60 Hz transformer which is prewired.

The wiring diagram is shown in FIG. 5.

The power cord has no connector. A connector which is appropriate for your locality and 220 volt, 8 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

FIG. 5

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.

IMPORTANT GROUNDING INSTRUCTIONS

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

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

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

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

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

MAINTENANCE & LUBRICATION

DAILY MAINTENANCE IS SPECIFIED ON PAGE 6 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. Monthly check movement of the blade clamping blocks. Remove and clean any parts that are sticking or binding. Reassemble taking care to line up all balancing marks. Check balance.

2. Monthly check for movement of bearings on the top rail. Adjust the lower ecentric bearing to remove excess movement if needed.

3. Every two months check the movement of the grinding heads in the veritical directions. Remove shoulder bolts, springs, and ratchet handles, clean all surfaces and re-assemble.

4. Every Six months check traverse belt tension. Adjust tension per procedure in adjustments section of this manual.

5. Every six months to a year check infeed screws on the grinding heads. Remove bellows and clean and grease if needed. Make any needed adjustments to the locknut, coupling, or infeed motor locations (See adjustments section for details.)

7. Every six months check brass backlash nut and rubber bellows on the infeed shaft. Replace if worn. (See adjustments section for details.)

8. Check the brushes on the auto traverse drive motor once every two years. Replace as necessary. See Troubleshooting Section.

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!

ADJUSTMENTS

TO ADJUST OR REPLACE THE CARRIAGE ROLLERS

Upper Rail Freeplay Adjusment:

1. The Motor assembly and Carriage is supported by 3 rollers on the top Hex Rail and 3 bearings on the lower rectangular rail. There are two fixed roller on the top of the Hex Rail and one adjustable roller on the bottom side of the Hex Rail. To Remove any play in the top Hex rail adjust the roller on the bottom by turning the offset cam support shaft. To access the offset support shaft remove the hole plug on the base and traverse the carriage so that the screw holding the Roller and support shaft is over the hole in the base.
2. With the carriage aligned with the hole in the base, loosen the screw holding the lower traverse roller. This will allow you to rotate the offset shaft and remove any freeplay on the rail. The offset support shaft has hole in the side. Insert a screw driver or other tool into hole in the side of the support shaft to rotate the shaft. The offset gives the roller a cam function bringing toward or away from the Hex shaft. Rotate the offset support shaft until this is no freeplay in the system (note: if the Screw is too loose the support will tip down and the correct preload will not be achieved.)
3. Once the freeplay is removed, tighten the screw holding the Offset support shaft and roller. Check to make sure the unit did not move while tightenting. If the freeplay is removed reinstall the hole plug, or repeat process if needed.

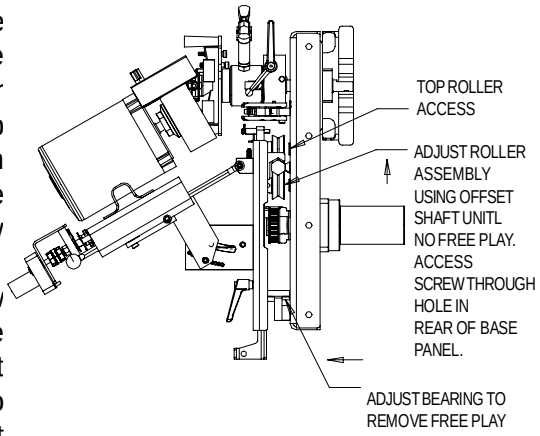


FIG. 6

Upper Rail Rail Roller Replacement:

1. The Motor assembly and Carriage is supported by 3 rollers on the top Hex Rail and 3 bearings on the lower rectangular rail. There are two fixed roller on the top of the Hex Rail and one adjustable roller on the bottom side of the Hex Rail. To replace any of the top bearings remove the hole plug on the Base and and traverse the carriage so that the screw holding the Roller and support shaft is over the hole in the base. Replace the rollers one at a time starting with the top ones. After the rollers have been replace adjust the lower roller on the top Hex rail to remove any freeplay (see above).

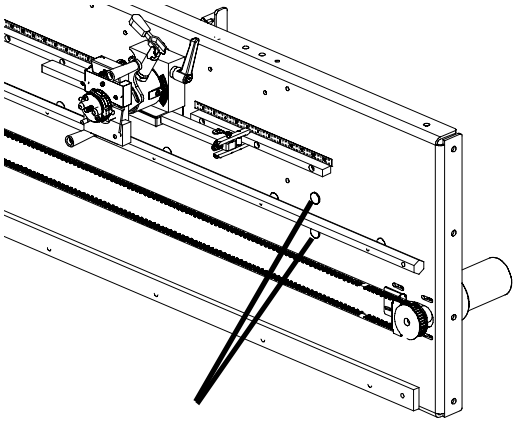


FIG. 7

Lower Rail Bearings:

1. To replace a bearing on either of the Lower Rail remove the Motor assembly from the Carriage. (To remove the motor assembly remove the two shoulder bolts, gas spring and two adjustable handles.)

USE CAUTION WHEN REMOVING THE GRINDNIG HEAD ASSEMBLY. THIS ASSEMBLY WEIGHS APPROXIMATLY 50 LBS [22.7 KG].

2. Remove the lower bearing support block. Replace the bearings on the block.
3. Put the support block with new bearings on the lower traverse rail. Slide the inner bearing toward the rail to remove any freeplay.
4. Reassembly the lower bearing support block to the carriage. Reinstall the Motor Assembly to the Carriage.

SPRING PLUNGER (ANGLE POSITION)

Adjust the position of the spring plunger for a positive detent at each position, but still easily moveable. See FIG 8.

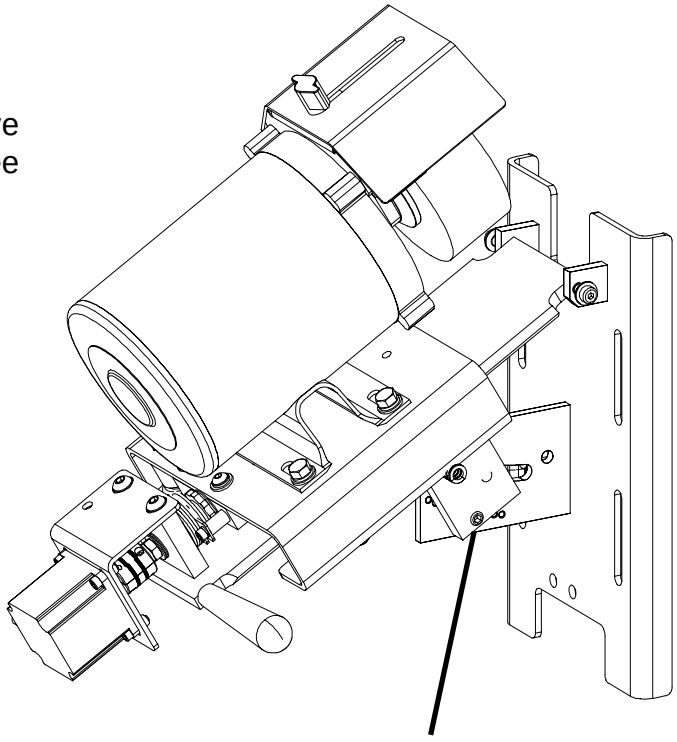


FIG. 8

PIVOT SHAFT CLAMP BLOCK ADJUSTMENT

To adjust the return position of the center support assembly, loosen the clamp shaft nut. See FIG. 10 Disengage the relief release system from bar by rotating it. This will allow the center support assembly to rotate. The springs located on the back of the traverse base return the assembly to the position so that the relief release system engages the bar located on the traverse base. With the clamp Shaft nut loose the assembly should rotate on the pivot shaft. (Note you may need to tap the end of the Clamp shaft with a rubber hammer if it appears to be bound up.) Adjust so the Relief Release bar is over the Anti-rotate bar on the frame. Tighten the Clamp Shaft nut and test to make sure the system works with both left and right sided blades.

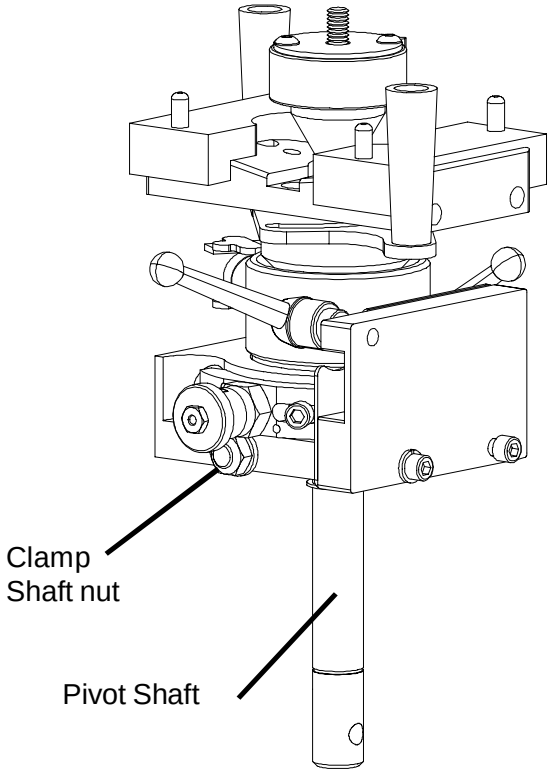


FIG. 10

BALANCER ASSEMBLY

If it becomes necessary to disassemble the Center Support Assembly, mark all parts in relation to each other before disassembly. The Assembly is balanced at the factory. To maintain this balance it must be assembled with the parts in there appropriate places. If the balance is not correct after assembly it may be necessary to balance by using set screws in the balance holes located on the clamp base assembly. (Note these are sealed with silocon to keep debis from affecting the balance.)

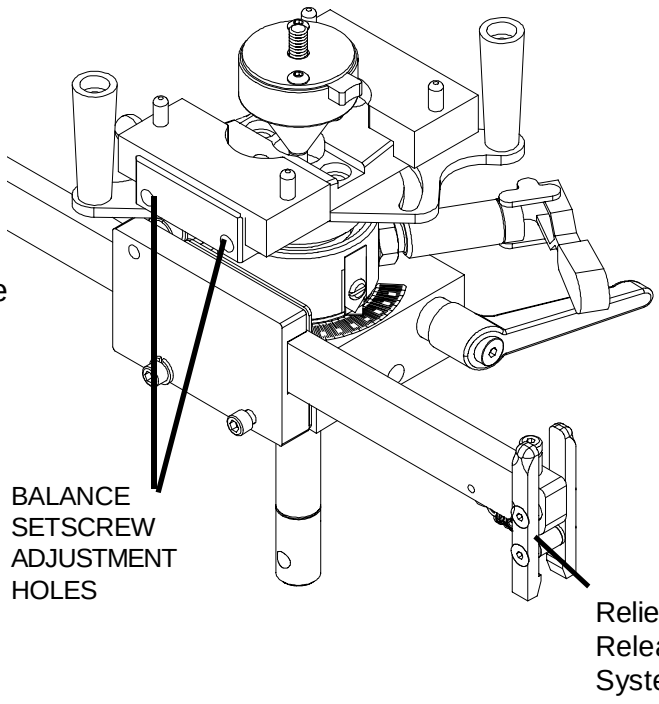


FIG. 11

ADJUSTMENTS (Continued)

CAM PLATE ALIGNMENT SETSCREW

To make adjustments to the cam plate start position loosen the nut located on the position setscrew and adjust the setscrew so that the relief slide bar pin engages the cam plate smoothly. See FIG 12 After this is adjusted lock the setscrew in place by tightening the nut on the setscrew.

The stop position for when the bottom head is moved to the left side of the grinder is done with the other setscrew. Make the adjustments as stated above and lock this in place.

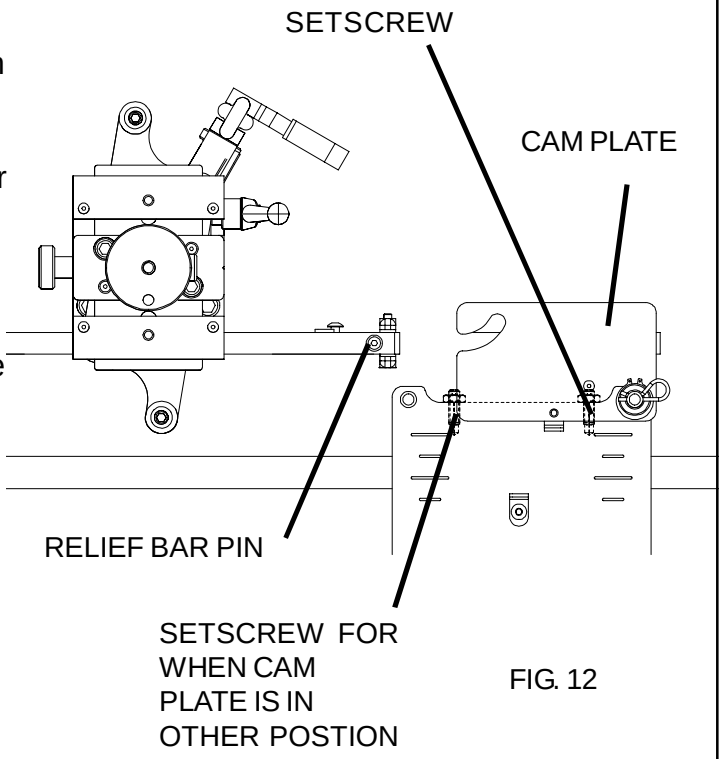


FIG. 12

TRAVERSE BELT TENSION

To adjust the belt tension, loosen the screws that hold the traverse motor to the traverse base. See FIG 13. Apply pressure (approximately 100 lbs) to the motor toward he right side of the machine. While applying pressure tighten the bolts that hold the motor in place. Check the tension on the belt.

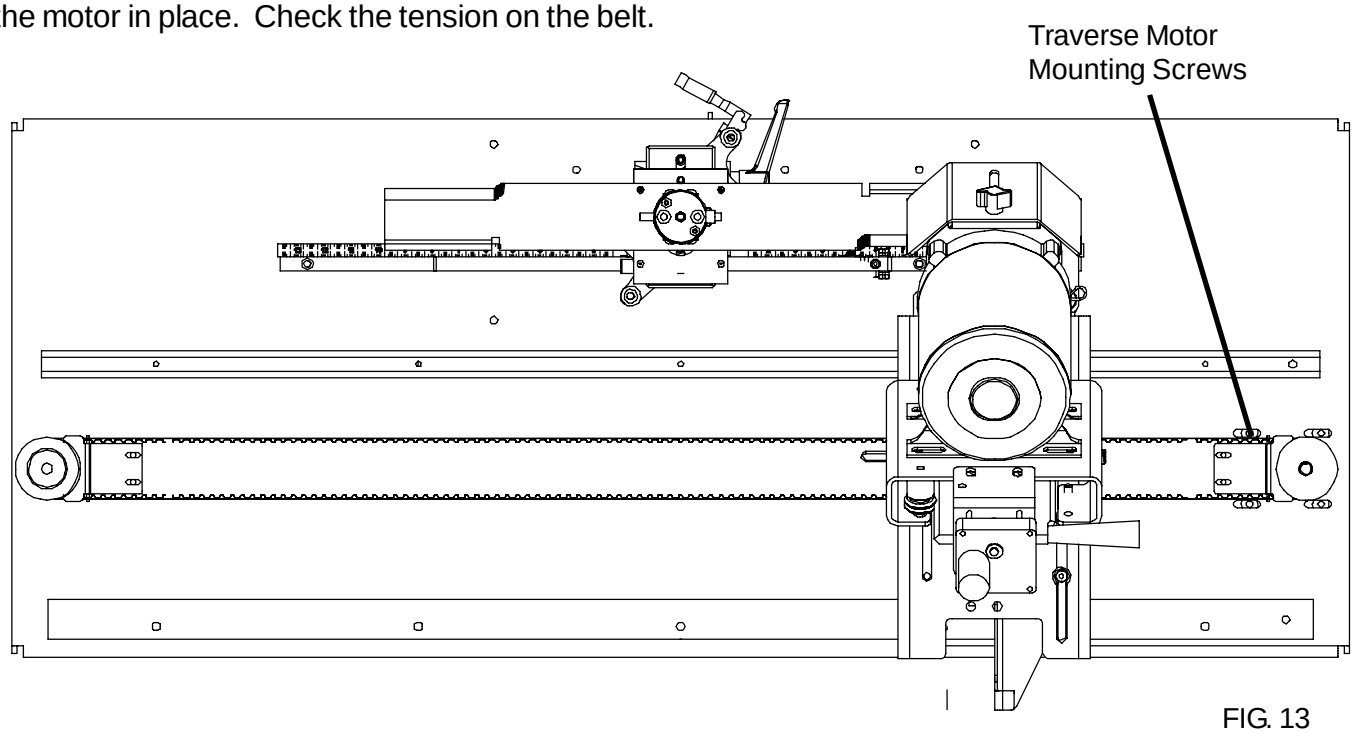


FIG. 13

TO ADJUST THE PROXIMITY SENSOR

For the proximity sensors to work properly and reverse the direction of the carriage at each end of a traverse, a distance of 3/16 in. +/- 1/32 [4.75 mm +/- 0.75] must be maintained between the top of the sensor and the actuator bracket on the bottom of the carriage. See FIG. 14.

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

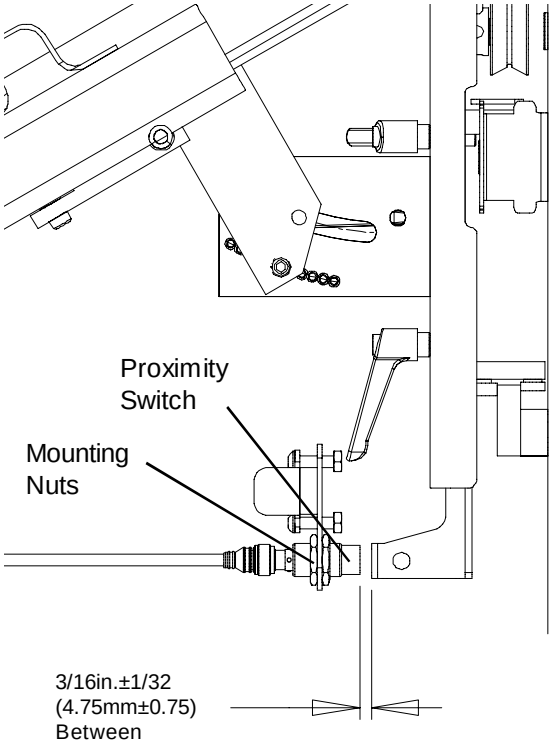


FIG. 14

ADJUSTING THE PRELOAD TENSION ON THE SMALL GRINDING HEAD SLIDE VEE ROLLERS

The small grinding head slide vee rollers are positioned two fixed and one adjustable on the side. To set the correct preload on the right side adjuster, tighten the setscrew in FIG. 15 until the spring is fully compressed solid, then back off 1/2 turn.

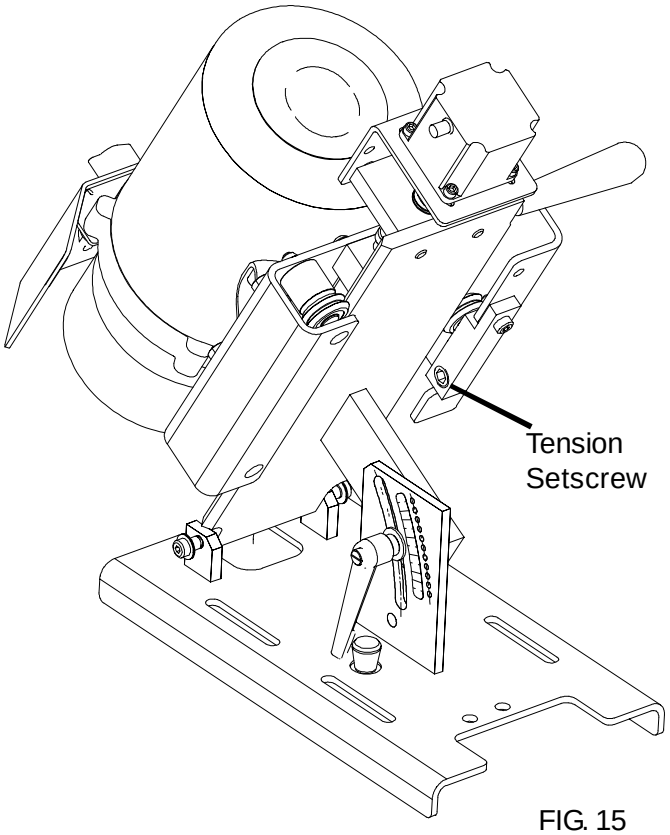


FIG. 15

ADJUSTMENTS (Continued)

TO ELIMINATE CARRIAGE INFEED BACKLASH

If there is backlash in the carriage infeed system, there are two adjusting points to check:

1.Conical washer and Shaft Backlash nut:

A. Remove rubber bellows retainer and pull back bellows to get access to the Backlash Nut.

B. Unscrew the shoulder bolt.

C. Turn the backlash nut counterclockwise until the conical washers are touching each other, finger tight. Continue turning the backlash nut counterclockwise one notches and any additional amount until the notch is centered over the shoulder-bolt hole.

D. Reinstall the shoulder bolt to lock the nut in position.

E. Reinstall the rubber bellows.

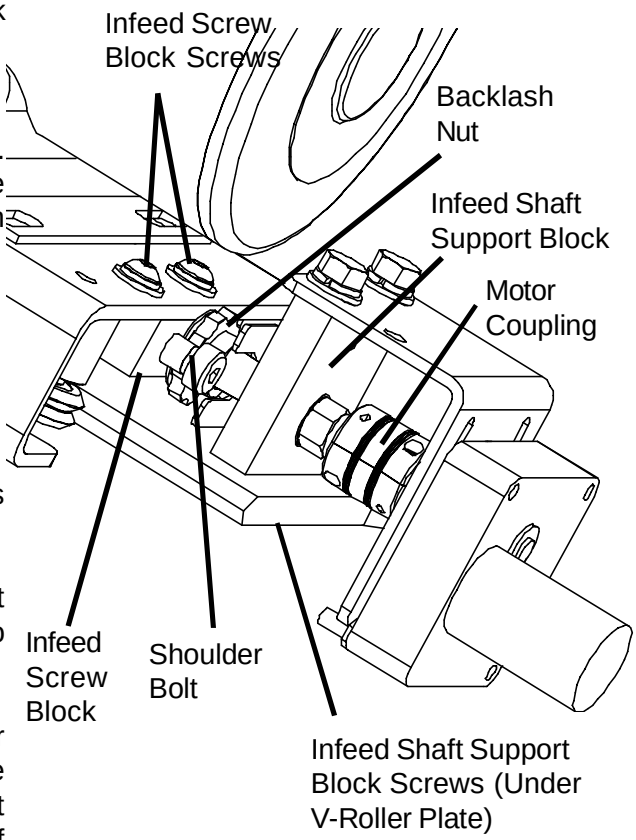


FIG. 16

2. Infeed bearing block adjustment:

A. Loosen the infeed shaft support block screws. (You may need to remove the Grind Motor to access the screws.)

B. With the screws loose any preload in the support block will be removed. Now snug the screws up, do not tighten completely.

C. Run the infeed system thru its full range. If the motor plate moves freely thru the full range, tighten the screws and recheck the travel for free movement thru the full range of motion. If good, you are done. If still binding move the grinding head to the binding location and repeat steps A, B and C. Repeat this process a few times until the motor plate moves freely thru its full range.

D. If repeated adjustments does not allow free travel thru the full range, it may be necessary to loosen the infeed screw block screws letting the infeed screw block find neutral and go thru the proceedure of floating both the infeed screw block and the Infeed shaft support block until you find the combination that allows free movement thru the full range when all screws are tight. These screws are located on the underside of the V-Roller Plate.

E. It rarely is involved, but it may be necessary to loosen the four mounting screws that hold the infeed motor and allow it to float into alignment with the infeed shaft and retighten to achieve a smooth infeed.

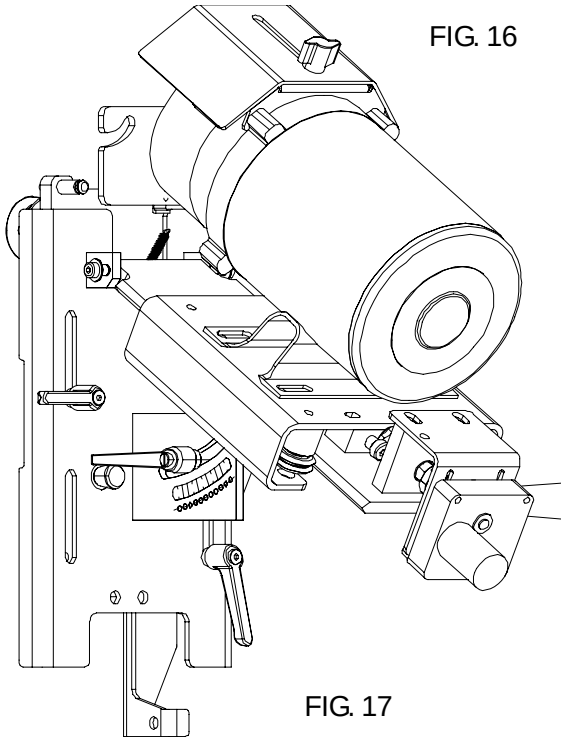


FIG. 17

ADJUSTMENTS (Continued)

POTENTIOMETER ADJUSTMENTS TRAVERSE DRIVE CONTROL (TDC)

(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.

Max. Speed--Set at 2:30 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.

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.

(Right Traverse) Forward Torque--Factory set at full (CW) 11:00. Do not change this setting.
(Left Traverse) Reverse Torque--Factory set at full (CW) 11:00. Do not change this setting.

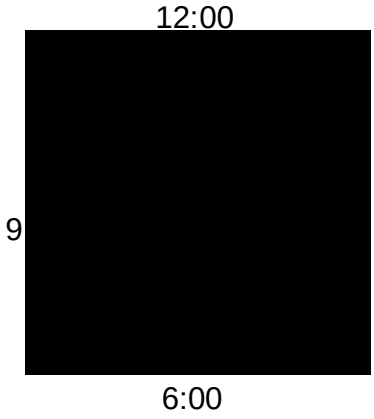
(DB) Dead Band is the potentiometer setting for the 50 or 60 Hz cycle control. Factory set to 3:00 for 60 Hz operation. Recalibrate to the 9:00 position for 50 Hz power.

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

Armature Voltage Selector switch (SW504) is on the top board and set to 90VDC. Do not change this setting.

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

- **POWER indicates that ac power is being applied to the control.**
- **Limit FWD and REV are not used and should not light up.**



Potentionmeter
Clock Orientation

FWD ACC - 8:30
REV ACC - 8:30
MAX SPD - 2:30
IR COMP - 9:00
REV TQ - 11:00
FWD TQ - 11:00
DB - 3:00 60Hz/
9:00 50Hz
MIN SPD - 8:30
TACH - NA

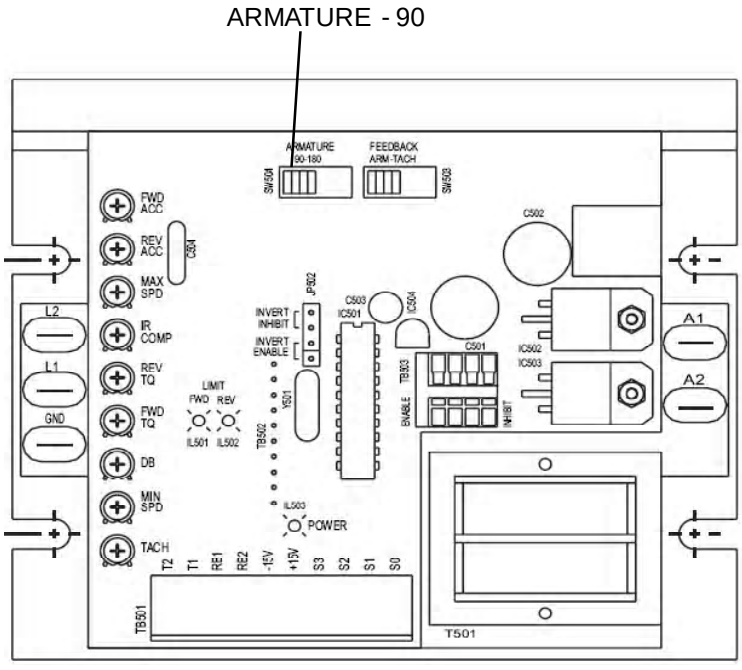


FIG. 18

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 465 Rotary Blade Grinder 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.

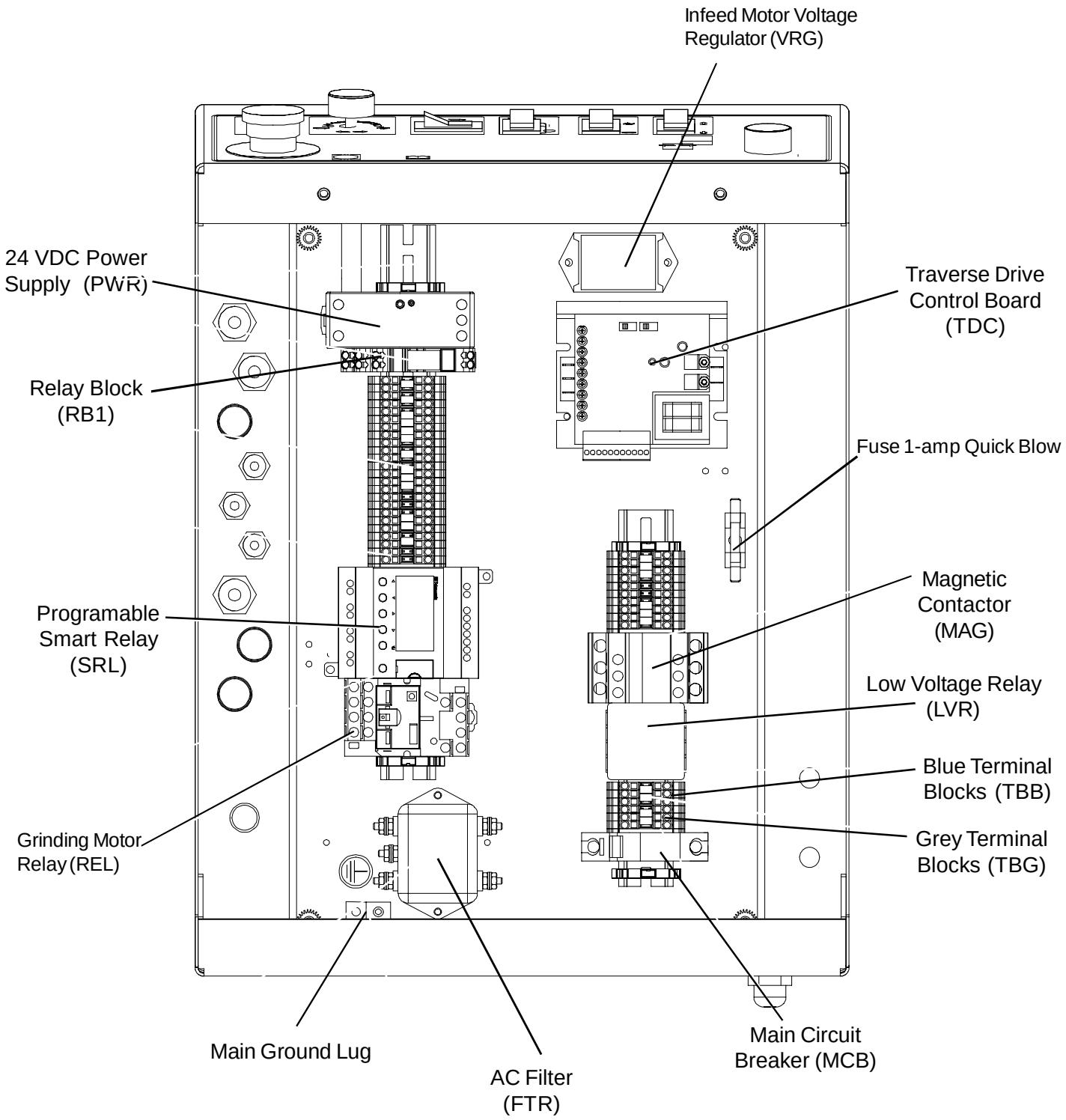
If you have any question not answered in this manual, please call your distributor. They will contact the manufacturer if necessary.

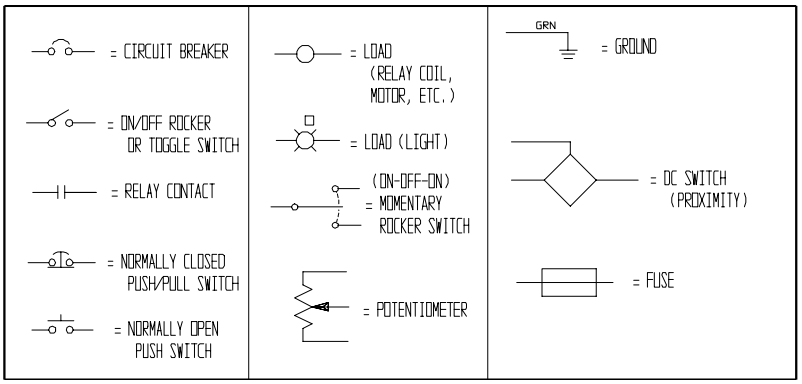
WIRE LABELS

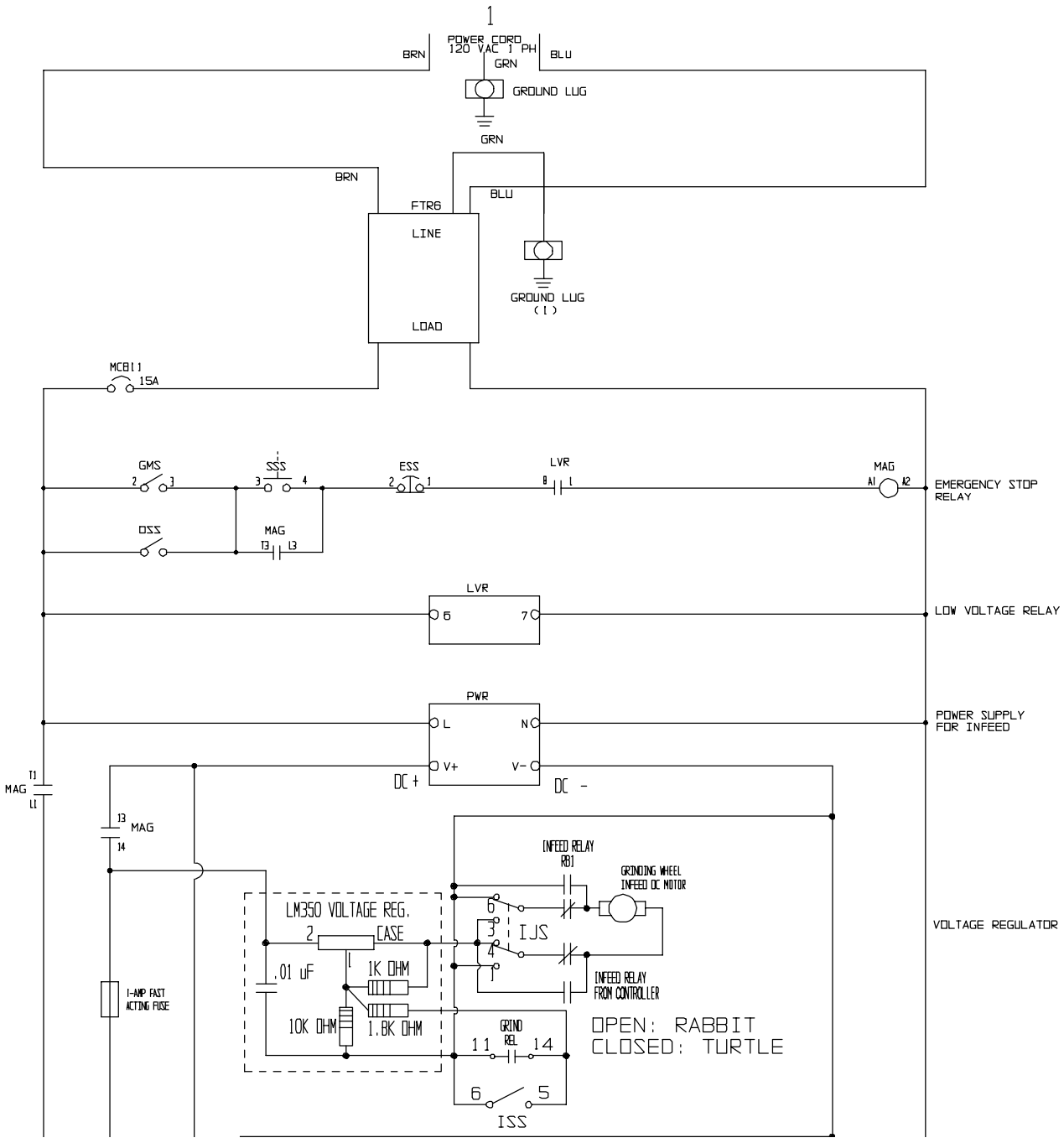
All wires on the 465 Rotary Blade Grindier have a wire label at each end for troubleshooting. The wire label has a code which tells you wiring information. The wire label has a seven-twelve position code. The first two or three digits are the wire number: 01-118. The next three numbers or letters are the code for the component to which the wire attaches. Example: LVR for Low Voltage Relay. The last two to four numbers or letters give the location of the terminal on the component to which the wire attaches.

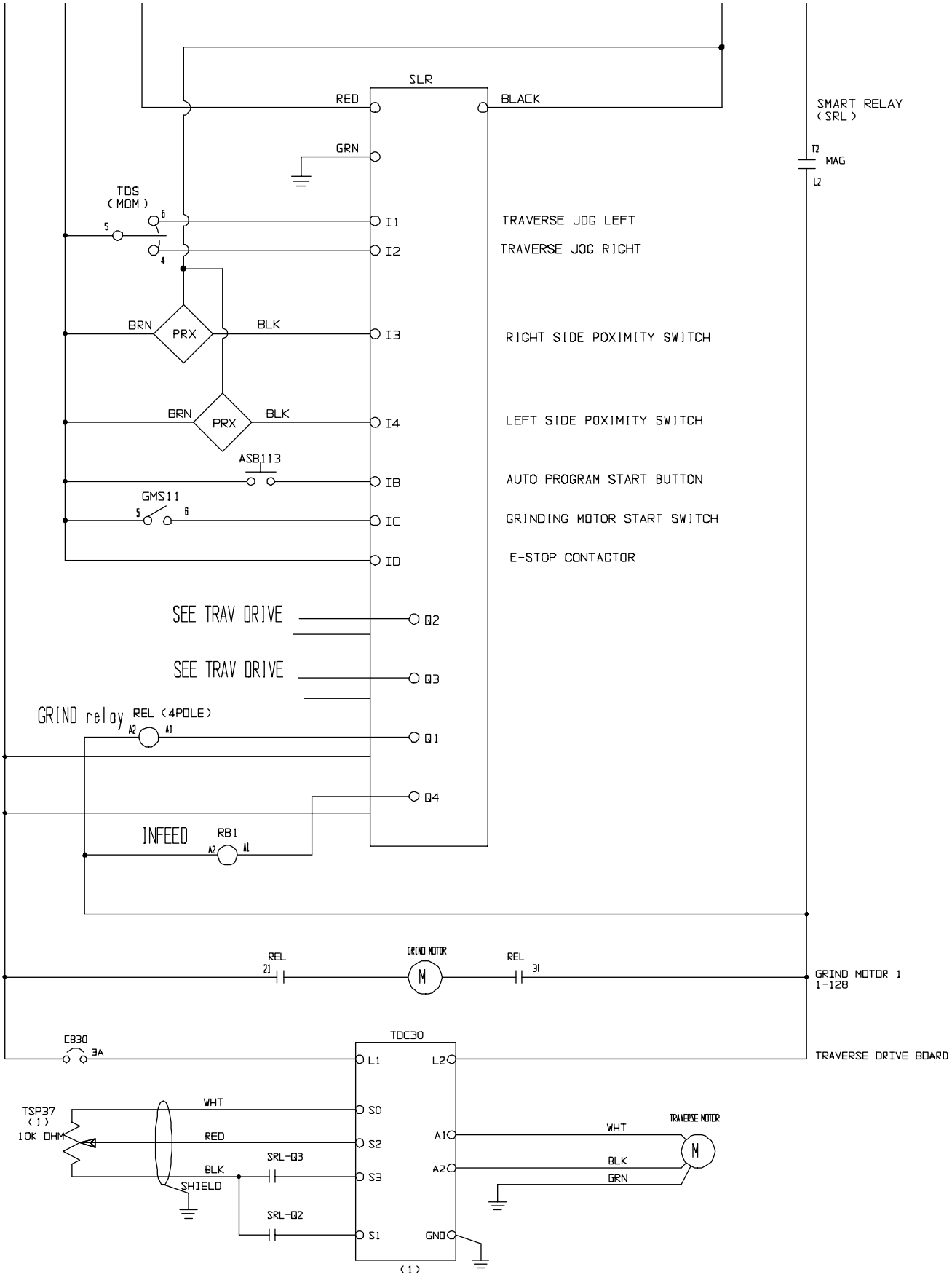
ELECTRICAL TROUBLESHOOTING INDEX

460 MANUAL CONTROL PANEL IDENTIFICATION



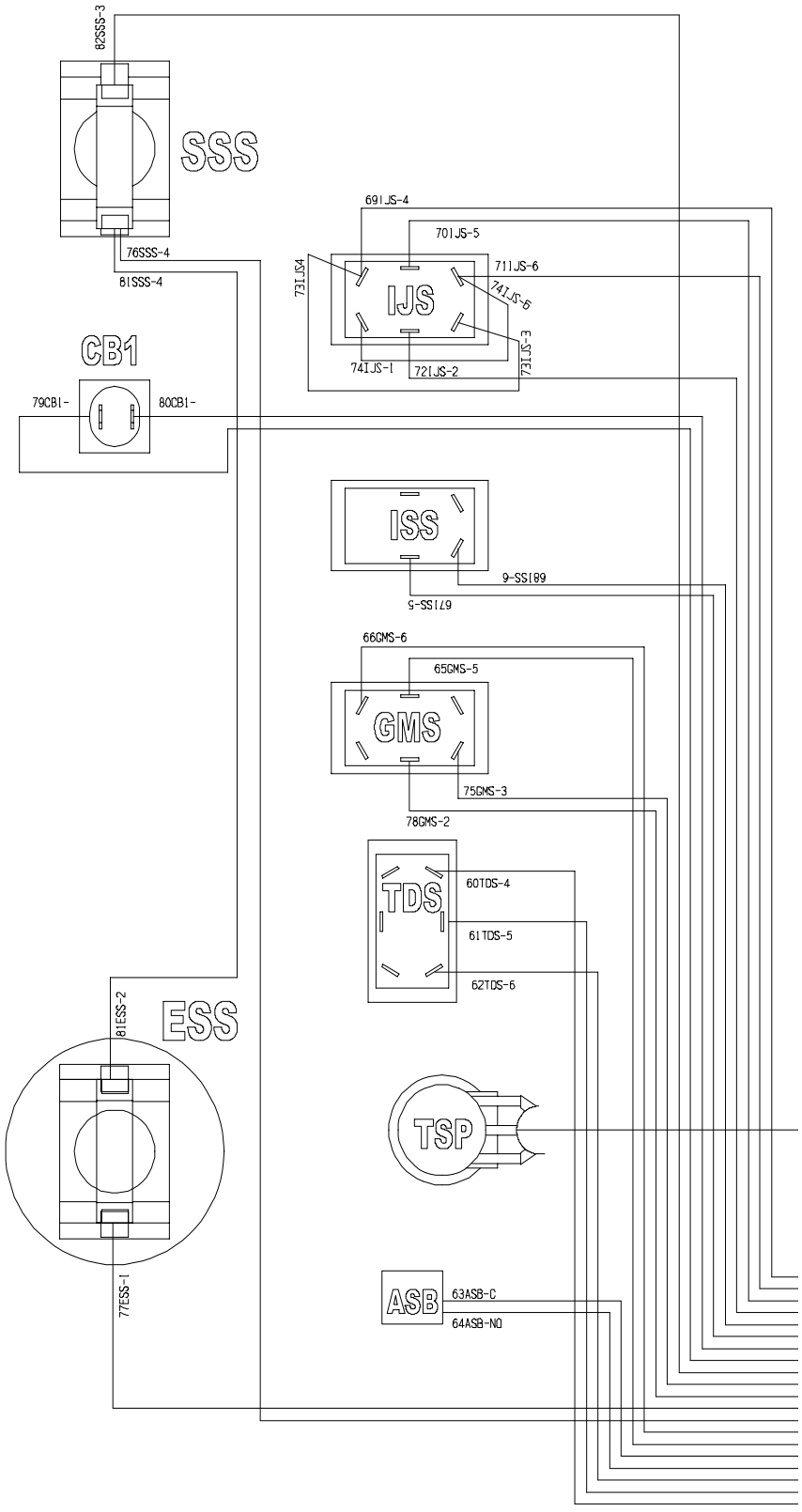

= CIRCUIT BREAKER
= ON/OFF ROCKER OR TOGGLE SWITCH
= RELAY CONTACT
= NORMALLY CLOSED PUSH/PULL SWITCH
= NORMALLY OPEN PUSH SWITCH
= LOAD (RELAY COIL, MOTOR, ETC.)
= LOAD (LIGHT)
(ON-OFF-ON) = MOMENTARY ROCKER SWITCH
= POTENTIOMETER
GRN
= GROUND
= DC SWITCH (PROXIMITY)
= FUSE


1
POWER CORD 120 VAC 1 PH
BRN
GRN
BLU
GROUND LUG
FTR6
LINE
LOAD
GROUND LUG (1)
MCB(1) 15A
GMS
SSS
ESS
LVR
MAG
EMERGENCY STOP RELAY
LOW VOLTAGE RELAY
PWR
L
N
V+
V-
DC +
DC -
POWER SUPPLY FOR INFEED
T1
L1
MAG
I-AMP FAST ACTING FUSE
LM350 VOLTAGE REG.
CASE
.01 uF
1K OHM
10K OHM
1.8K OHM
INFEED RELAY
GRINDING WHEEL INFEED DC MOTOR
IJS
INFEED RELAY FROM CONTROLLER
GRIND REL
ISS
OPEN: RABBIT
CLOSED: TURTLE
VOLTAGE REGULATOR


SLR
RED
BLACK
GRN
SMART RELAY
(SRL)
T2
MAG
L2
TDS
(MOM)
6
5
4
I1
I2
TRAVERSE JOG LEFT
TRAVERSE JOG RIGHT
BRN
PRX
BLK
I3
RIGHT SIDE POXIMITY SWITCH
BRN
PRX
BLK
I4
LEFT SIDE POXIMITY SWITCH
ASB113
IB
AUTO PROGRAM START BUTTON
GMS11
5
6
IC
GRINDING MOTOR START SWITCH
ID
E-STOP CONTACTOR
SEE TRAV DRIVE
Q2
SEE TRAV DRIVE
Q3
GRIND relay REL (4POLE)
A2
A1
Q1
Q4
INFEED
RB1
A2
A1
REL
21
GRIND MOTOR
M
REL
31
GRIND MOTOR 1
1-128
CB30
3A
TDC30
L1
L2
TRAVERSE DRIVE BOARD
TSP37
(1)
10K OHM
WHT
RED
BLK
SHIELD
S0
S2
S3
S1
SRL-Q3
SRL-Q2
GND
A1
A2
TRAVERSE MOTOR
WHT
BLK
GRN
M
(1)

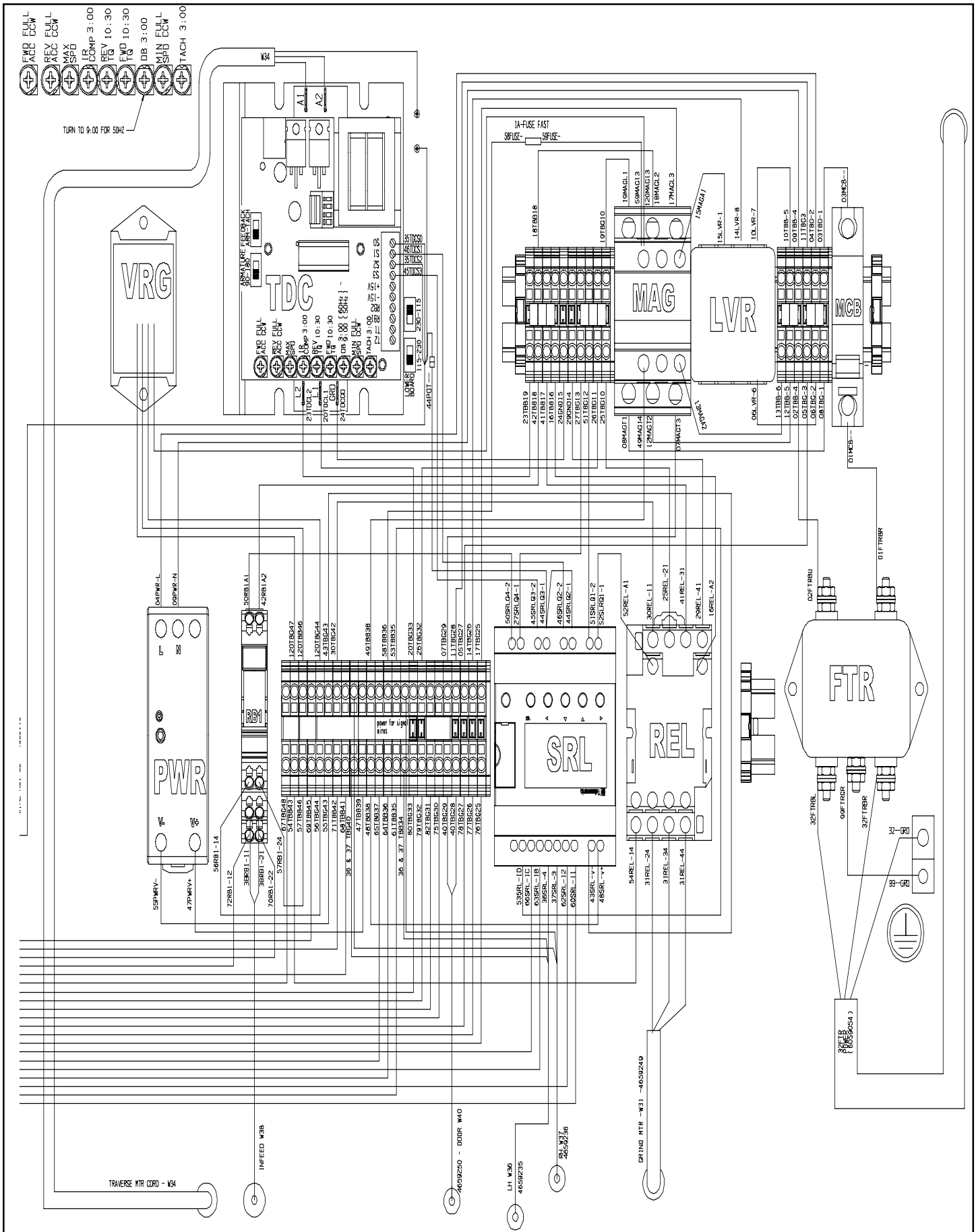
ELECTRIC DIAGRAM 4654504

ASB - AUTOMATIC START BUTTON
CB1 - CIRCUIT BREAKER 1
ESS - EMERGENCY STOP SWITCH
FTR - FILTER
GMS - GRIND MOTOR SWITCH
GND - GROUND TERMINAL BLOCK
IJS - INFFED JOG SWITCH
ISS - INFEED SPEED SELECTOR
LVR - LOW VOLTAGE RELAY
MAG - MAGNETIC STARTER
MCB - MAIN CIRCUIT BREAKER
PWR - POWER SUPPLY AC-12VDC
RB1 - RELAY BLOCK 1
REL - GRDINING MOTOR RELAY
SRL - SMART RELAY
SSS - SYSTEM START SWITCH
TBB - TERMINAL BLOCK BLUE
TBG - TERMINAL BLOCK GREY
TDC - TRAVERSE DRIVE CONTROL
TDS - TRAVERSE DIRECTION JOG SWITCH
TSP - TRAVERSE SPEED POTEN-TIOMETER
VRG - VOLGAGE REGULATOR



ELECTRIC DIAGRAM

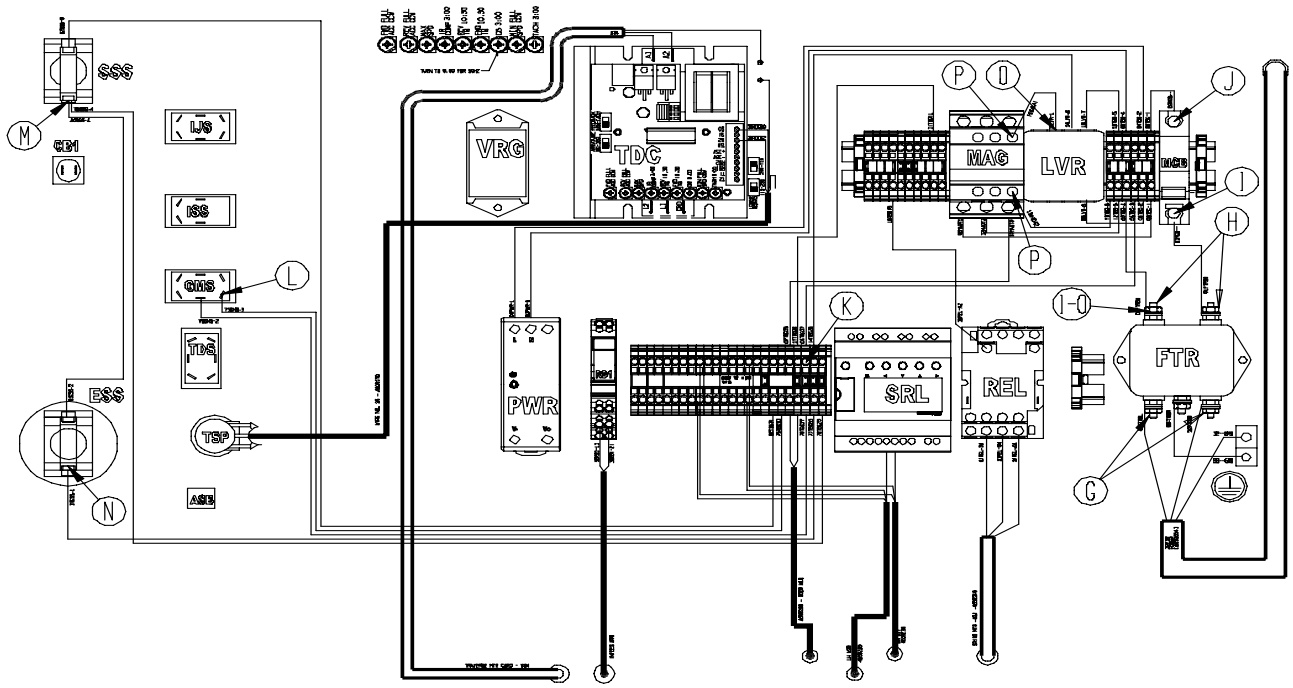
4654504



ELECTRICAL TROUBLESHOOTING (Continued)

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

Verify all wires shown on the wiring diagram on pages 88 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	Machine works Yes--end troubleshooting No--go to step **D.** next.
Guard doors must be closed and ALL Switches **MUST** be turned **OFF.**	**D.** Close guard doors and turn off **ALL** switches.	Machine works Yes--end troubleshooting No--go to step **E.** next.
LVR has detected improper voltage or is not functioning	**E.** Check light on top of LVR to verify the machine is getting the power necessary to run the machine.	-Light on top should be steady red. This indicates Relay is energized. -Flashing Green indicates Undervoltage -Flashing Red indicates Overvoltage trip. (If light is flashing press reset button located on top of LVR. Light should change to green then steady red.) If flashing after reset is pressed then you must solve your power delivery problem independent of machine. Steady Red light--Skip to Step **K.** No light-- go to step **F.** next.

ELECTRICAL TROUBLESHOOTING (Continued)

Possible Causes	***Checkout Procedure***	
Main 15 amp outlet circuit Breaker has tripped in the Building Electrical Panel	**F.** Check circuit breaker in your building and reset if necessary. (Check wall outlet with a light to make sure it works)	Machine works Yes--end troubleshooting No-- But a light works in the outlet-- Then go to Step **G.** next. No-- light does not work in outlet. You must solve your power delivery problem independent of machine.
No 120 Volts AC power to Filter (FTR)	**G.** Check for 120V at Cord into FTR (Power Cord #32)	FTR "Line" Terminals for 120 Volts AC Yes--Go to Step **H**. next. No--Replace Power Cord
No 120 Volts AC power outof Filter	**H.** Check for 120V out of FTR	FTR "Load" Terminals for 120 Volts AC Yes--Go to Step **I**. next. No--Replace Filter
No 120 Volts AC power to Main Circuit Breaker (MCB)	**I.** Check for 120V to MCB	MCB left terminal (01MCB--) to Neutral (Blue) term on FTR for 120 volts AC Yes--Go to Step **J**. next. No--Check wires (#01), replace if bad
No 120 Volts AC power from Main Circuit Breaker (MCB)	**J.** Check for 120V from MCB	MCB right terminal (03MCB--) to Neutral (Blue) Terminal on FTR for 120 Volts AC Yes--Go to Step **K**. next. No--Flip Switch on MCB to "ON" - Machine works--end trouble shooting Machine does not work-- replace MCB
	K. Check for 120 Volts AC at terminal Block 27.	Measure 120 volts AC from Terminal Block 27 (05TBG27) to the Neutral (Blue) Terminal on FTR Yes--Go to Step **L**. next. No--Check wire # 05. Verify Jumpers on grey Terminal Blocks 1-3.
Grind Motor Switch not working	**L.** Check for 120 Volts AC out of Grind Motor Switch (GMS) at Terminals 3	Measure 120 volts AC from GMS Terminal 3 (82GMS-3) to the Neutral (Blue) Terminal on FTR Yes--Go to Step **M**. next. No--Flip Switch and check again- Works--Switch is upside down. Does not work-- Check wiring/Verify continuity of W#78 / Replace Switch if bad
System Start Switch not working	**M.** Hold in green System Start Switch (SSS) and Check voltage out of contact at terminal 4	Measure 120 Volts AC from (SSS) terminal 4 to the Neutral (Blue) Terminal on FTR Yes--Go to Step **N.** next No--Check wire #82 for continuity, then verify contact continuity. Replace bad part.
Emergency Stop Switch not working	**N.** Hold in SSS and Check voltage out of contact at terminal 1 of the red Emergency Stop Switch (ESS) MAKE SURE ESS SWITCH IS PULLED UP!	Measure 120 Volts AC from (ESS) terminal 1 to the Neutral (Blue) Terminal on FTR Yes--Go to Step **O.** next No--Check wire #81 for continuity, then verify NC contact continuity. Replace bad part.
LVR Contact not Working.	**O.** Light should be Steady Red on Top (see Step E). If not fix power issue to Machine. If Steady Red, hold in SSS and check for power out of LVR relay contact at terminal 1.	Measure 120 Volts AC from LVR terminal 1 (15LVR-1) to the Neutral (Blue) Terminal on FTR Yes--Go to Step **P.** next No--Check for 120 Volts AC from LVR terminal 8 to to the Neutral (Blue) Terminal on FTR. If there is 120 VAC to Terminal 8 and the light is Steady Red on Top then Replace LVR.
Mag Starter is bad	**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 (#13 & 16)

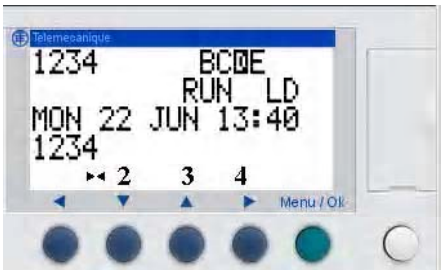
ELECTRICAL TROUBLESHOOTING (Continued)

PROBLEM-- **MAG Starter Pulls in but the Traverse and Grind Motor do not work.**

Possible Cause	***Checkout Procedure***	
Power Supply is not working	**A.** Check for word on the Smart Relay Display.	Display on Smart Relay Has some Words on it. (Power supply is working) Yes---Skip to Step **E.** No--go to Step **B.** next
	B. Check for 24VDC out of Power Supply.	Measure 24 VDC out of Power Supply from V+ to V- Yes--go to Step **C.** next No--Verify 120 VAC into Power Supply. Replace if there is 120 VAC into and nothing out.
1-Amp Fuse is Blown	**C.** Unplug Mahcine. Remove 1 Amp Fuse and Test Continuity.	Fuse has Continuity (0 Ohms) Yes--Reinstall Fuse go to Step **D.** next No--Replace Fuse (1-amp Quick blow)
Smart Relay is not Working	**D.** Check for 24 VDC into Smart Relay. .	Measure 24 VDC from Termainal V- to V+ on Smart Relay Yes--Replace Smart Relay No--Verify Continuity of Wires to Smart Relay.
No Signal from Mag	**E.** With MAG Starter pulled in Message on Smart Relay Display should look similar to below.	Display is still in E-stop? Yes--Go to Step **F.** next No--Go to other sections of this trouble shooting to cottect plroblems.

NO SIGNAL FROM MAG

CORRECT



Bad Contact in MAG	**F.** Measure 24 VDC Voltage out of Terminal 14 of MAG Starter	Measure 24VDC from Terminal V- on the power supply to Terminal 14 on the MAG. (MAG must be pulled in) Yes--Verify Continuity of Wires 49 and 53 . No--Replace MAG.

ELECTRICAL TROUBLESHOOTING (Continued)

***PROBLEM*--Machine Shuts off 2 seconds after you turn on Grind Motor Switch.**

Possible Cause	***Checkout Procedure***	
Low Voltage	**A.** Remove electrical box cover and watch LVR light on top of LVR	-Light on top should be steady red. Indicates Relay is energized. If the light turns off then comes back green then red this means the sensor has detected a trip mode and restarted. (It is tripping under load and the unloaded power is not outside the range. This is a power delivery problem independent of machine. Make sure there is no other equipment on the circuit and that the correct size wire was used for the outlet.) -Flashing Green indicates Undervoltage trip. -Flashing Red indicates Overvoltage trip. (If light is flashing press reset button located on top of LVR. Light should change to green then steady red.) If flashing after reset is pressed then you must solve your power delivery problem independent of machine.

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

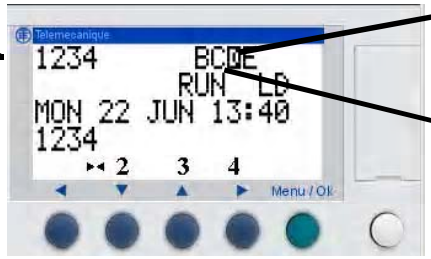
Possible Cause	***Checkout Procedure***	
(MAG) holding contact has failed	**A.** Check wiring to MAG holding contact in T3 . Verify the magnetic starter holding contact is recieving power.	Measure 120 Volts AC at MAG term T3 to Neutral (Blue) Terminal on FTR for 120 Volts AC. Yes--Go to Step **B.** next. No-- Check wiring to MAG T3. Replace wire #07 if necessary.
	B. Check continuity of MAG holding contact. **UNPLUG MACHINE**. Remove cover plate on top of MAG. Hold in center of MAG (Blue Area) to manual pull in contact. Check continuity between T3 to L3.	Verify continuity between T3 to L3 Yes-- Check wiiring from MAG L3 to Grey Terminal Block 25 wire #17. Then from TBG 25 to SSS Terminal 4 wire #76. No-- Replace MAG

ELECTRICAL TROUBLESHOOTING (Continued)

***PROBLEM*-- Grinding Motors DoESn't turn on when GMS is switched to On.**
Assuming 115 Volts AC to control panel and all other manual mode functions are working.

Possible Cause	***Checkout Procedure***	
Guard Door is Open	**A.** Close the front door	Machine works Yes--end troubleshooting No--go to Step **B.** next
Door Safety Switch is not working properly	**B.** Check Door Safety Switches on door. Needs to be close to 90° when door is closed	Check position of door switch. Make adjustments if necessary. Yes--end troubleshooting No--go to Step **C.** next
No Input into Smart Relay	**C.** Check for Smart Relay input C. Note: machine must be on and Green Start button must be pushed.	Input C and Output 1 are ON (see below) Yes--Skip to Step **F.** No--go to Step **D.** next (Note if dispay is not on or is different see other section of troubleshooting.)

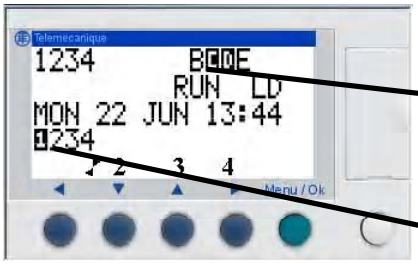
INPUTS (BLACK LETTERS = NO INPUT)
(BLACK BOX WITH WHITE
LETTER = INPUT IS ON)



D= ON
(E-STOP INPUT)

C= Off
(GRIND MOTOR INPUT)

OUTPUTS (BLACK LETTERS = NO INPUT)
(BLACK BOX WITH WHITE
LETTER = OUTPUT IS ON)



C=ON (Grind Motor)

1=ON (Grind Motor)

Grind Motor Switch (GMS) is not working properly	**D.** Check for 24VDC into GMS.	Measure 24VDC from Terminal V- on the power supply to Terminal 5 on the GMS. Yes--Go to Step **E.** next No--Verify continuity of wire 65.
	E. Check for 24 VDC Out of GMS**.**	Measure 24VDC from Terminal V- on the power supply to Terminal 6 on the GMS. Yes--Verify Continuity of Wire 66. No--Replace GMS.
Grinding Motor Relay Not Working	**F.** Check for Green Light on Relay	Green light is on (See below) Yes--Go to Step **G**. next. No--Skip to Step **I.**

TEST BUTTON - RED
(!CAUTION DOORS MUST BE CLOSED!)

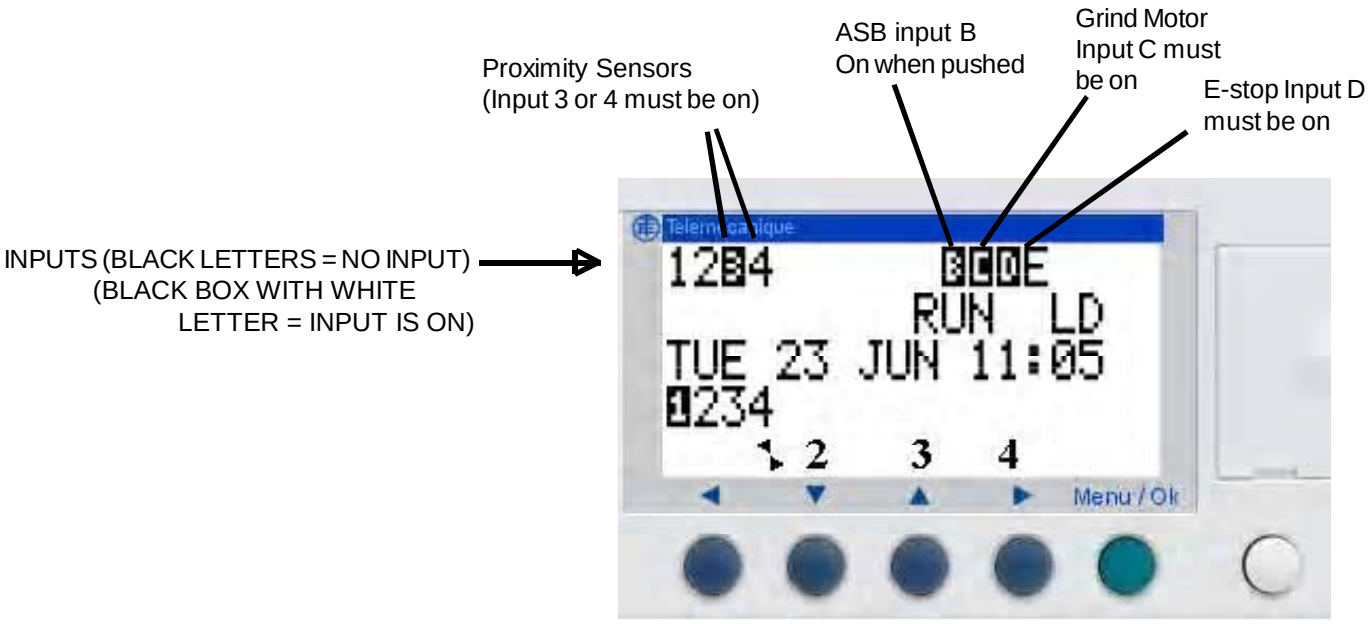
GREEN LIGHT
(If ON indicates relay is energized)

ELECTRICAL TROUBLESHOOTING (Continued)

***PROBLEM*-- Auto Mode not working**

Assuming 115 Volts AC to control panel and all Manual mode functions are working.

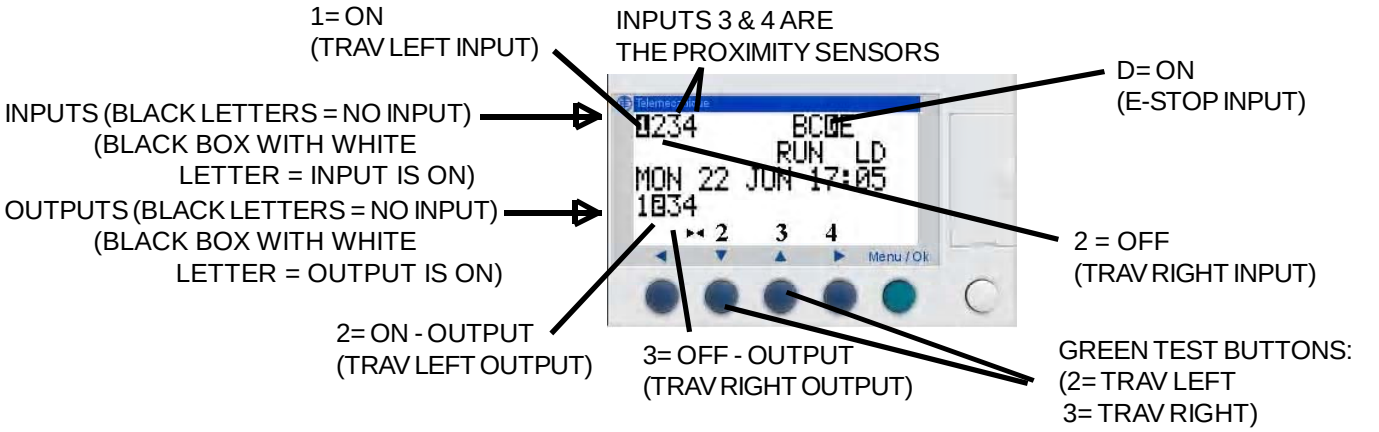
Possible Cause	***Checkout Procedure***	
Guard Door is Open	**A.** Close the front door	Machine works Yes--end troubleshooting No--go to Step **B.** next
Grind Motor Switch is not on.	**B.** Grind motor Switch must be on for Auto mode to work.	Turn on Grind Motor- Machine Auto works Yes--end troubleshooting No--go to Step **C.** next
Not on Proximity Sensor	**C.** Grinding Head must be posistioned so that one of the Proximity switches are activated.	Move Head to Activate Prox switch. Machine Auto Works Yes--end troubleshooting No--go to Step **D.** next
Traverse Pot is set to Zero	**D.** Turn Traverse Potentiometer on control panel Clockwise	Machine Auto works Yes--end troubleshooting No--go to Step **E.** next
Automatic Start Button (ASB) not functioning.	**D.** Check Smart Relay Screen for input from ASB. See below	Smart Relay input changes when ASB is pushed. Yes--Reprogram or Replace Smart Relay No--Check connections on Back of ASB. Check continuity of ASB, replace if bad.



ELECTRICAL TROUBLESHOOTING (Continued)

PROBLEM--Traverse Drive not working in (manual) jog mode
Assuming 115 Volts AC to control panel and all other manual mode functions are working.

Possible Cause	Checkout Procedure	
Traverse Speed Pot (TSP) set to zero	**A.** Set (TSP) to 35 on the control panel	Traverse works Yes--end troubleshooting No--go to step **B.** next
Circuit Breaker 1 (CB1) (3 amp) tripped	**B.** Press in on CB1 to Reset. Too heavy a grind causes grinding head traverse motor to overload and trip the circuit breaker.	Traverse works Yes--end troublshooting No--go to Step **C.** next
Traverse Drive Control (TDC) does not have power	**C.** Check for 120 Volts AC incoming to (TDC).	The Green Power LED on TDC should be lit. Light on--Skip to Step **D.** Light off-- Measure 120 volts AC from wire #20 at L1 to wire #23 at L2 Yes-- Replace TDC No--Check continuity of wire #20 at L1 and #23 at L2 and CB1 Replace CB1 if bad.
Traverse Direction Switch (TDS) not working	**D.** Hold in the Traverse Left Button on the control panel. Check display of Smart Relay for input I1. (Right Button turns on I2)	Input 1 and Output 2 are ON (see below) Yes--Skip to Step **G.** No--go to Step **E.** next (Note: if dispay is not on or is different see other section of troubleshooting.)



	E. Check for 24 volts DC into TDS. (Remove yellow wire at TDS terminal 5 and check voltage from wire to power supply)	Measure 24 volts DC from PW1 V- to wire at TDS terminal 5 (61TDS-5) Yes--go to step **F.** next No-- Check continuity of wire #61
	F. Hold in the Traverse Left Button on the control panel. Check for 24 volts DC Out of TDS. (Terminal 4 is on the right side of the switch. Use Term 6 for Traversing right.)	Measure 24 volts DC from PW1 V- to TDS terminal 4 (60TDS-4) Yes--Check continuity of wire#60 from TDS to TTB, and PLC input cable. No-- Replace TDS.

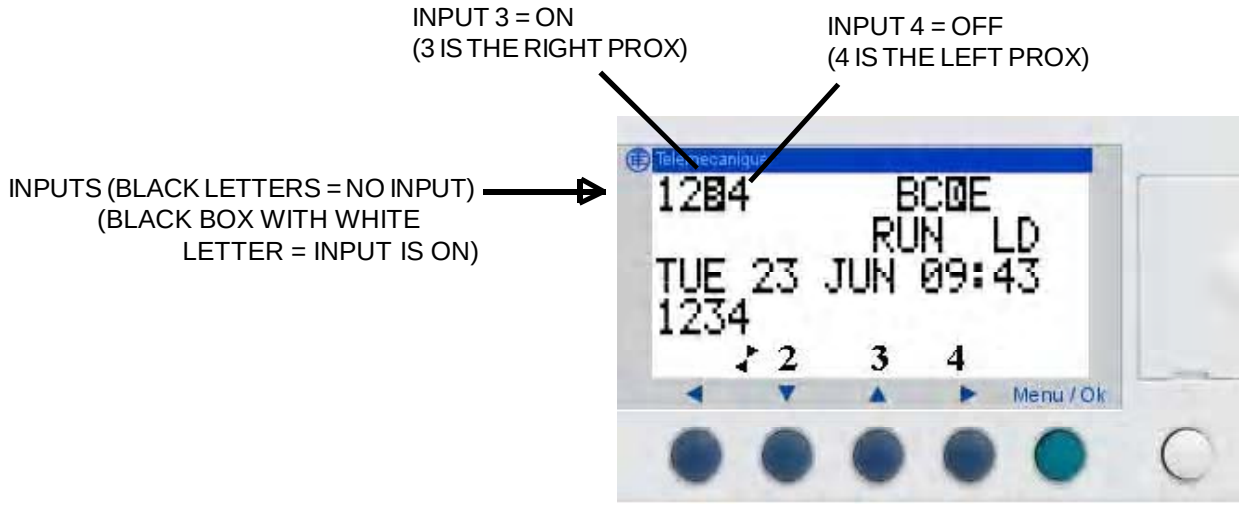
ELECTRICAL TROUBLESHOOTING (Continued)

Possible Cause	Checkout Procedure	
BAD RELAY IN SMART RELAY	**G.** Test Relay by pushing GREEN test button. Press the button under the number 2 to test the left traverse function. Press 3 to test right trav.	Traverse works when using the buttons (The Output State (see figure on previous pg) should change on display) Yes--Verify step D (Input is working) No-- go to Step **H.** next
	H. Test continuity of Relay in Smart Relay.	Test for Continuity between Q2-1 to Q2-2 for left trav. Press Green test button to test for continuity. Test Q3-1 to Q3-2 for right traverse (press green button 3). Continuity of Relay Yes--got to Step **I.** next No--Replace Smart Relay
(TSP) (10K) is bad	**I.** Check (TSP) for 10,000 ohms Remove three wires from (TDC) red from term S2 white from term S0 black from inline connector (Wire 39) **!REMOVE POWER BEFORE DISCONNECTING WIRES!**	Check for 10,000 ohms red to white wire Full CCW--0 ohms Full CW--10,000 ohms Red to black wire Full CCW--10,000 ohms Full CW--0 ohms Yes--go to Step **J.** next No--replace (TSP)
No DC Voltage from (TDC) Traverse Drive Control	**J.** 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, and Left or Right Direction must be pressed on TDS	Check (TDC) terminals A1 to A2 for 90 Volts DC Yes--go to step **K.** next No--Replace TDC Note:If voltage is less than 90 VDC verify pots on TDC. See page 24
Traverse Motor is bad	**K.** Check traverse motor continuity	Remove wires from terminals A1 & A2 0 ohms across the black and white wires Yes--Replace motor. No--go to Step **L.**
Worn motor brushes	**L.** 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 Traverse Drive Motor

ELECTRICAL TROUBLESHOOTING (Continued)

PROBLEM--Traverse Proximity Switches not working in (manual) jog mode
Assuming 115 Volts AC to control panel and all other manual mode functions are working.

Possible Cause	Checkout Procedure	
Gap between flag and prox is incorrect.	**A.** Gap between flag and Prox should be 3/16" to 1/4" [4-6mm]. Prox light does not light when Grinding head is over prox.	If incorrect, adjust per adjustment section of manual. Light on Prox works Yes--Skip to Step **D.** No-- go to step **B.** next
Proximity switch is bad	**B.** Disconnect Prox from cable at Prox head and switch with other Prox on machine.	Place metal object in front of Prox. Light on Prox come on. Yes-- Replace bad Prox Head No-- go to step **C.** next
	C. Measure 24 volts DC to Prox cord at TB	Measure 24 volts DC from Blue terminal Block (TBB34) to Grey terminal Block (TBG40) Yes-- Replace Prox Cord. No-- Verify Jumpers on TTB
	D. With Prox light on, the correlating Input on Smart Relay Should be on. See below.	Smart Relay Changes when Prox light is on Yes--Should work- Reprogram Smart Relay. No--Replace Prox and Prox Cord.



ELECTRICAL TROUBLESHOOTING (Continued)

PROBLEM-- Infeed Motor not working in (manual) jog mode.
Assuming 115 Volts AC to control panel and all other manual (jog) mode functions are working.

Possible Cause	Checkout Procedure	
Infeed Jog Switch is not held to on position	**A.** Hold switch on in either direction	Infeed Motor works: Yes--end troubleshooting No--go to Step **B.** next
Actuator is at physical limit	**B.** Move Infeed motor in opposite direction	Infeed Motor works: Yes--end troubleshooting No--go to step **C.** next
High Low Switch is not on high speed	**C.** Put switch on high speed (rabbit) for ease of checkout of Voltage Regulator (VRG)	High speed works: Yes--end troubleshooting No--go to Step **D.** next
Motor plate or infeed shaft is jammed	**D.** Loosen infeed coupler on side away from motor. This will allow the coupler to spin if the motor is working. Check for motor rotation. **Note:** verify coupler is tight on infeed motor shaft. Motor may be rotating inside of coupler.	Motor moves with coupler loose Yes-- Fix issues with the infeed shaft. See adjustments shaft No--go to Step **E.** next
Not power to Infeed Jog Switch	**E.** Check for 12 VDC into Infeed Jog Switch (IJS).	Remove wires to terminal 4 (69 IJS-4) and terminal 6 (71IJS-6) Measure between wires for 12 VDC Yes--reconnect wires and go to Step **F.** next No--If less than 12 VDC but greater than 6 VDC, then infeed is in turtle mode, see next page. If 0 VDC then verify wiring and replace Voltage Regulator (VRG).
Infeed Jog Switch not working	**F.** Hold down IJS and check for 12 VDC out of Infeed Jog Switch (IJS). Note: reconnect wires from step E.	Hold down IJS and measure 12 VDC out of IJS terminals 2 to 5 Yes--go to Step **G.** next No--replace IJS
Bad Relay in Relay Block (RB1)	**G.** Hold down IJS and check for 12 VDC out of Relay Block 1.	Hold down IJS and measure 12 VDC out of RB1 terminals 11 (38RB1-11) to 21 (38RB1-21) Yes--go to Step **H.** next No--Replace Relay in RB1
Bad Infeed motor Cord	**H.** Disconnect cord at Infeed motor (You will need to remove the black shrink wrap) verify 12 VDC to motor	Hold down IJS and measure 12 VDC out of Infeed motor cord Yes--Replace Infeed Motor No--Replace Infeed Motor Cord

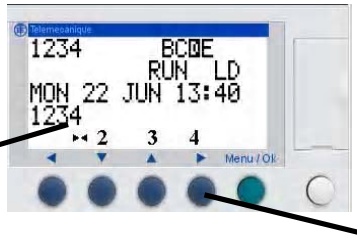
ELECTRICAL TROUBLESHOOTING (Continued)

PROBLEM-- Infeed is in Turtle mode and will not switch to Rabit mode.
Assuming 115 Volts AC to control panel and all other manual (jog) mode functions are working.

Possible Cause	Checkout Procedure	
Infeed Speed Selector (ISS) is in Turtle Mode	**A.** Press ISS to Rabbit mode	Infeed works in Rabit: Yes--end troubleshooting No--go to Step **B.** next
Grind Motor is on	**B.** Turn off Grind Motor. (Note: if the Grind motor is on the Infeed is limited to Turtle mode)	Infeed works in Rabit: Yes--end troubleshooting No--go to Step **B.** next
ISS is not Working	**C.** Remove power to machine. Verify Continuity of Switch	Continuity when in Turtle and no continuity when in Rabbit. Yes--go to Step **D.** next No--Replace ISS
Grind Motor Relay (REL) contact bad	**D.** Verify Continuity of Contact 14.	Verfy Continuity of Relay Contact from terminal 14 (54 REL-14) to Terminal 11 (30REL-11) Yes--Check wiring, Replace Voltage Regulator (VRG) No--Replace Grind Motor Relay (REL)

PROBLEM--Infeed motor does not work during Auto mode
Assuming 115 Volts AC to control panel and all other manual (jog) mode functions are working.

Possible Cause	Checkout Procedure	
Infeed motor not working	**A.** Verify Infeed motor is working in Jog mode.	Infeed motor works in jog mode: Yes--go to Step **B.** next No--Fix infeed motor in Jog mode first.
Bad Relay in Smart Relay (SRL)	**B.** Use the Test button to check the Continuity of Relay 4 in smart relay.	Check continuity of Smart Relay Q4-1 to Q4-2 (wires 27 and 50). Continuity when pushed: Yes--go to Step **C.** next No-- Replace Smart Relay
Bad Relay in Relay Block (RB1)	**C.** Check for 115 VAC into RB1 at A1 and A2 while pushing test button 4.	Measure 115 VAC from A1 to A2 of RB1 Yes-- Verify Continuity of Conacts 21 to 24 and 12 to 14. Replace Relay in RB1 No-- Verify Continuity of wires to A1 and A2.



Relay 4 indicator should change when test button is pressed

Test Relay 4. Infeed

MECHANICAL PROBLEM -- Excess vibration in grinder.

Possible Cause	Checkout Procedure	
Lower grinding wheel is loading up with grinding dust on the inside in an out of balance position.	Vacuum out the center of the cupped lower grinding head grinding wheel.	Vibrration is gone. Yes--end troubleshooting No--Inspect for loose components or damaged grinding wheel.

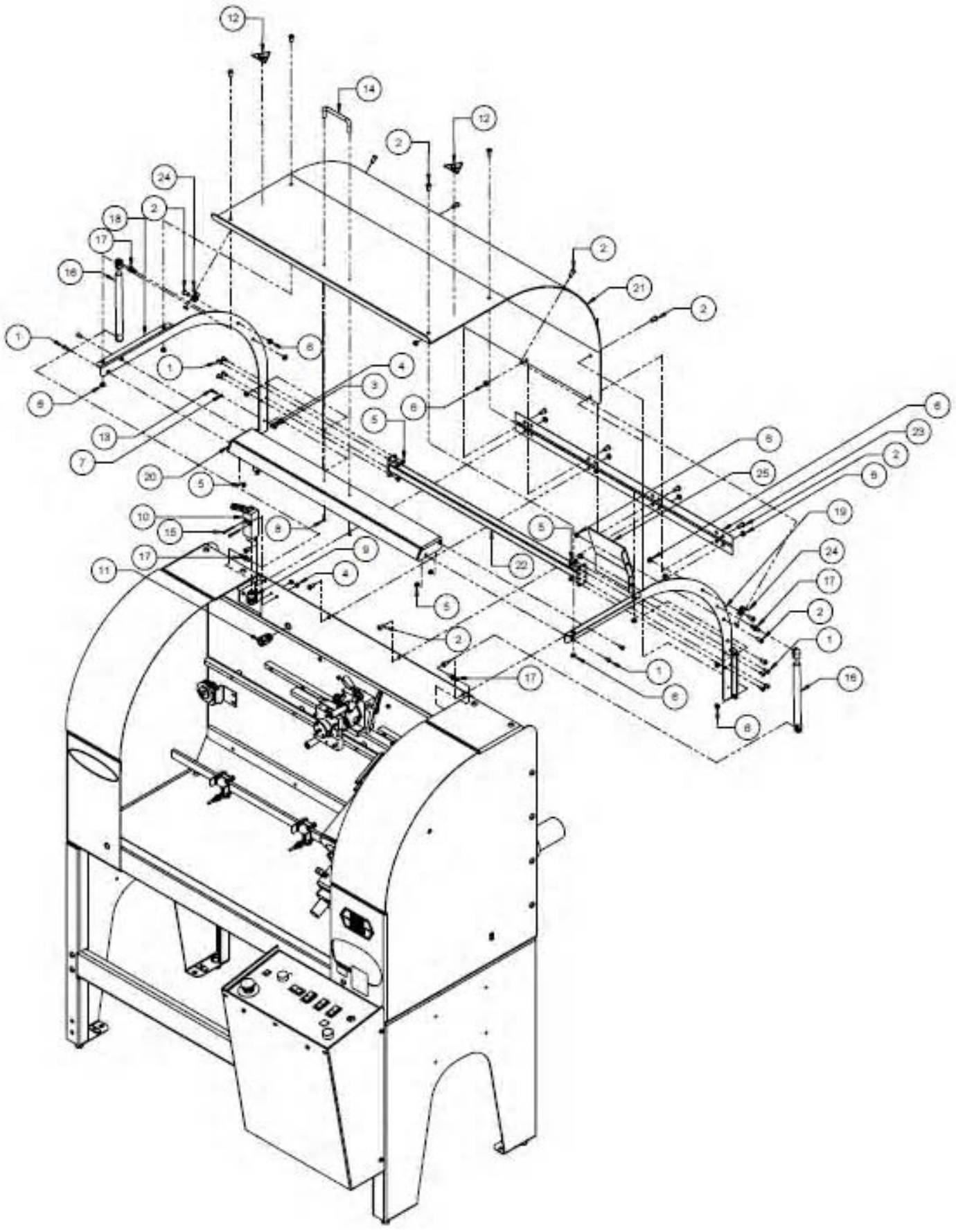


DIAGRAM NUMBER	PART NUMBER	DESCRIPTION
1	B250816	1/4-20 x 1/2" Long Button Head Socket Cap Screw
2	B311013	5/16-18 x 5/8" Long Button Head Socket Cap Screw
3	J161000	8-32 Hexnut
4	J167000	8-32 Locknut Jam with Nylon Insert
5	J257000	1/4-20 Locknut Jam with Nylon Insert
6	J317000	5/16-18 Locknut Jam with Nylon Insert
7	K161501	#8 Split Lockwasher
8	3706042	No.8 Thread forming screw
9	3707563	Liquid Tight Strain Relief (for Wire Dia .27-.46)
10	3707828	Rotating Safety Switch
11	3707009	Liquid Tight Strain Relief (for Wire Dia .27-.47)
12	3708458	Sharp Warning Decal
13	3708819	8-32 x 3/4" Long Butto n Head Safety Screw *
14	3708857	Black Pull Handle
15	3708865	8-32 x 1 1/2" Long Button Head Safety Screw *
16	3708866	Gas Spring
17	3708917	10 MM Ball Stud for Gas Spring
18	4659241	Door Brace LH
19	4659242	Door Brace RH
20	4659243	Door Cross Support
21	4659244	Door
22	4659540	Door Support Weldment
23	6059029	Hinge
24	4659255	Door Tab
25	4659256	Spark Deflection Plate
	3706052	Door Foam (4 ft per side)

* Screws are safety screws and require special tool to adjust. Order tool 3706040 if needed.

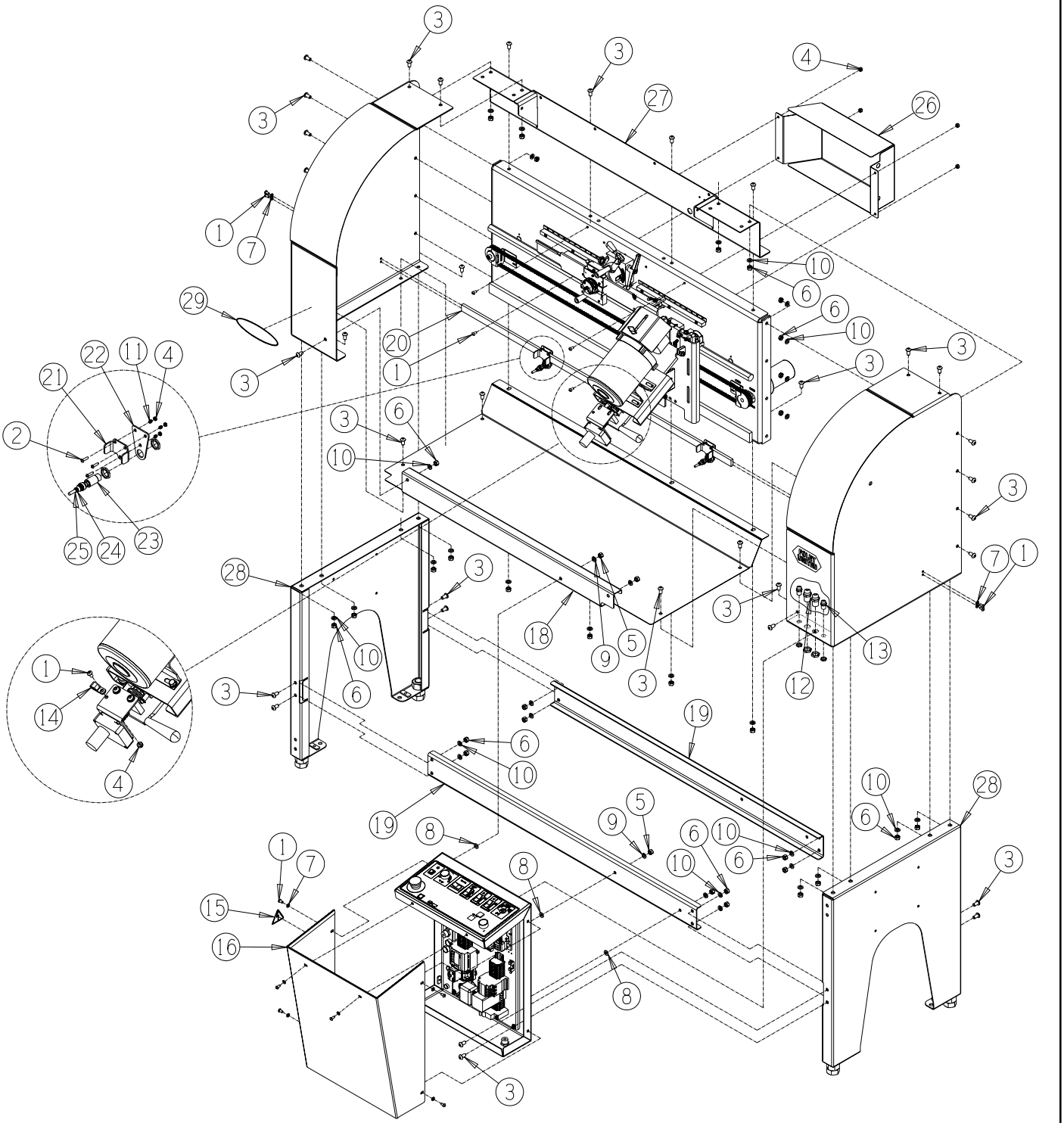

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DIAGRAM NUMBER	PART NUMBER	DESCRIPTION
1	B250816	1/4-20 x 1/2" Long Button Head Socket Cap Screw
2	B251616	1/4-20 x 1" Long Button Head Socket Cap Screw
3	B371216	3/8-16 x 3/4" Long Button Head Socket Cap Screw
4	J257000	1/4-20 Locknut Jam with Nylon Insert
5	J311000	5/16-18 Hexnut
6	J371000	3/8-16 Hex Nut
7	K251501	1/4 Split Lockwasher
8	K310101	5/16 Flat Washer SAE
9	K311501	5/16 Split Lockwasher
10	K371501	3/8 Split Lockwasher
11	3706049	Compression Spring
12	3707009	Strain Relief (Wire Dia .27-.47)
13	3707029	Strain Relief (Wire Dia .19-.30)
14	3708121	Double Cord Clamp
15	3708448	Electrical Warning Decal
16	4609081	Control Panel Cover
17	4609140	Patent Decal
18	4659229	Dust Panel
19	4659231	Leg Support Rail
20	4659233	Prox Rail
21	4659234	Front Prox Bracket
22	4659234	Rear Prox Bracket
23	3707802	Proximity Sensor
24	4659237	Prox Cord LH
25	4659238	Prox Cord RH
26	4659252	Spring Cover Panel
27	4659557	Hinge Panel Weldment
28	4659530	Leg Weldment
29	4659251	465 decal

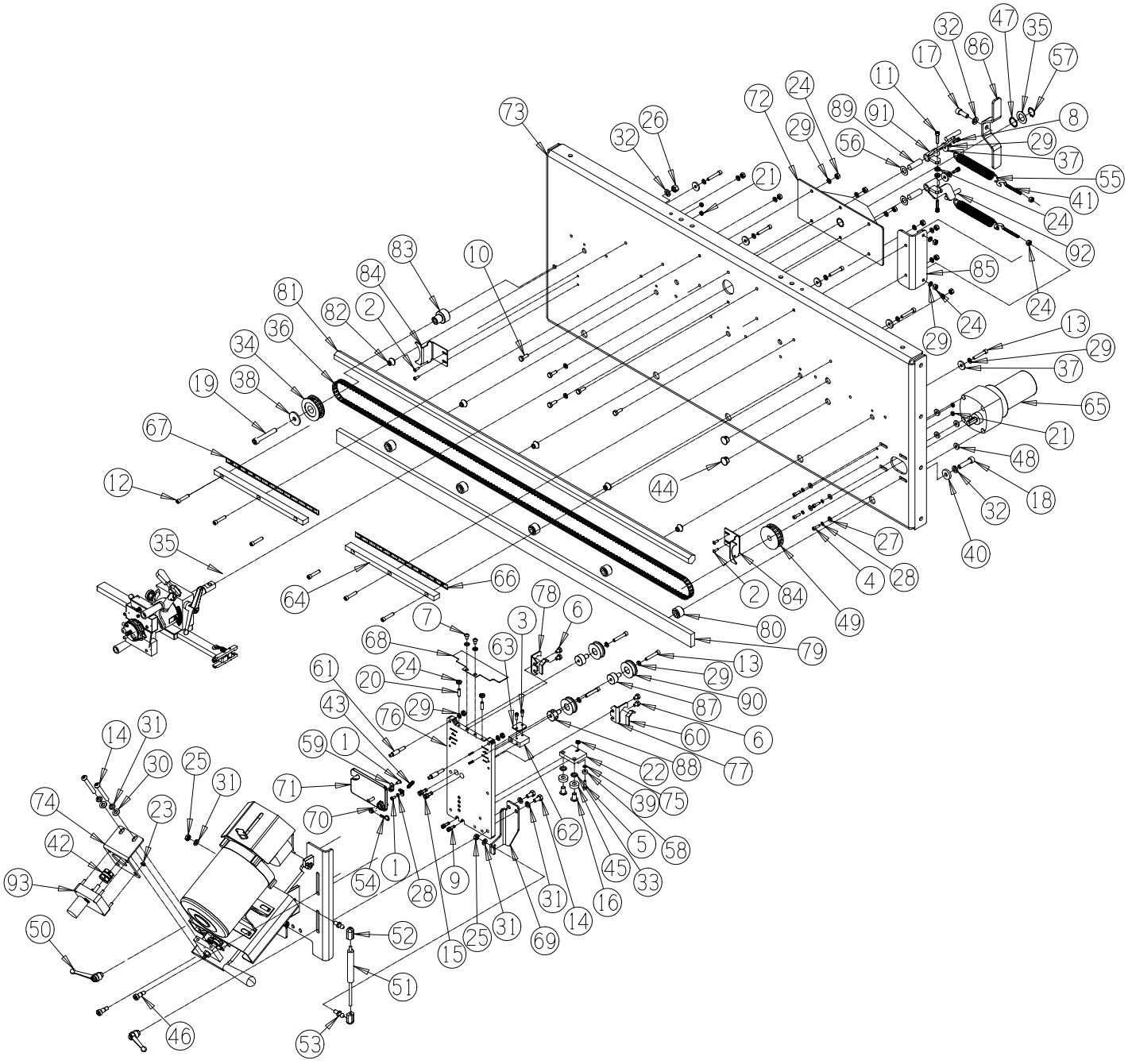
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DIAGRAM NUMBER	PART NUMBER	DESCRIPTION
1	B160613	8-32 x 3/8" Long Round Head Machine Screw
2	B160807	8-32 x 1/2" Long Button Head Socket Cap Screw
3	B190811	10-24 x 1/2" Long Socket Head Cap Screw
4	B191231	10-32 x 3/4" Long Button Head Socket Cap Screw
5	B191413	10-24 x 7/8" Long Button Head Socket Cap Screw
6	B250601	1/4-20 x 3/8" Long Hex Head Cap Screw
7	B250616	1/4-20 x 3/8" Long Button Head Cap Screw
8	B250811	1/4-20 x 1/2" Long Socket Head Cap Screw
9	B251011	1/4-20 x 5/8" Long Socket Head Cap Screw
10	B251201	1/4-20 x 3/4" Long Hex Head Cap Screw
11	B251611	1/4-20 x 1" Long Socket Head Cap Screw
12	B252011	1/4-20 x 1 1/4" Long Socket Head Cap Screw
13	B252411	1/4-20 x 1 1/2" Long Socket Head Cap Screw
14	B311001	5/16-18 x 5/8" Long Hex Head Cap Screw
15	B311011	5/16-18 x 5/8" Long Socket Head Cap Screw
16	B371216	3/8-16 x 3/4" Long Button Head Cap Screw
17	B371611	3/8-16 x 1" Long Socket Head Cap Screw
18	B372411	3/8-16 x 1 1/2" Long Socket Head Cap Screw Full Thread
19	B374011	3/8-16 x 2 1/2" Long Socket Head Cap Screw
20	C251020	1/4-20 x 5/8" Long Cup Point Socket Head Set Screw
21	J167000	8-32 Locknut Jam with Nylon Insert
22	J197000	10-24 Locknut Jam with Nylon Insert
23	J197200	10-32 Locknut Jam with Nylon Insert
24	J252000	1/4-20 Hex Jam Nut
25	J312000	5/16-18 Hex Jam Nut
26	J377000	3/8-16 Locknut Jam with Nylon Insert
27	K190001	#10 Flat Washer SAE
28	K191501	#10 Split Lockwasher
29	K251501	1/4 Split Lockwasher
30	K310001	5/16 Flat Washer SAE
31	K311501	5/16 Split Lockwasher
32	K371501	3/8 Split Lockwasher
33	09054	Flat Washer .387 ID x .625 OD x .06 Thick
34	55553	Idler Pulley Assembly
35	80355	Thrust Washer 1.25 OD x .75 ID
36	80375	Cog Belt
37	3589089	Flat Washer- .88 OD x .27 ID x .12 Thick
38	3589106	Flat Washer - 1.38 OD x .39 ID x .13 Thick
39	3589127	Flat Washer- .38 OD x .19 ID x .05 Thick
40	.599028	Flat Washer 1 OD x .38 ID x .19 Thick
41	3706025	Eyebolt
42	3706047	Flex Coupler
43	3708935	Extention Spring
44	3707597	5/8 Diameter Hole Plug
45	3708036	Ball Bearing
46	3708158	3/8 x 1/2"Long Shoulder Bolt
47	3708419	Wave Spring
48	3708691	Flat Washer- .62 OD x .25 ID x .12 Thick
49	3708898	Cog Drive Pulley
50	3708908	3/8-16 x 7/8" Long Adjustable Handle
51	3708915	Gas Spring
52	3708916	10mm Ball Socket
53	3708917	10mm ball stud w/ 5/16-18 x .55 long thread
54	3708931	Hairpin
55	3708933	Extension Spring .84OD x 6" Long
56	3709027	Thrust Washer .92 OD x .51 ID
57	3709331	External Retaining Ring for 3/4" Shaft
58	3709356	Ball Bearing
59	3929040	Spring Clip

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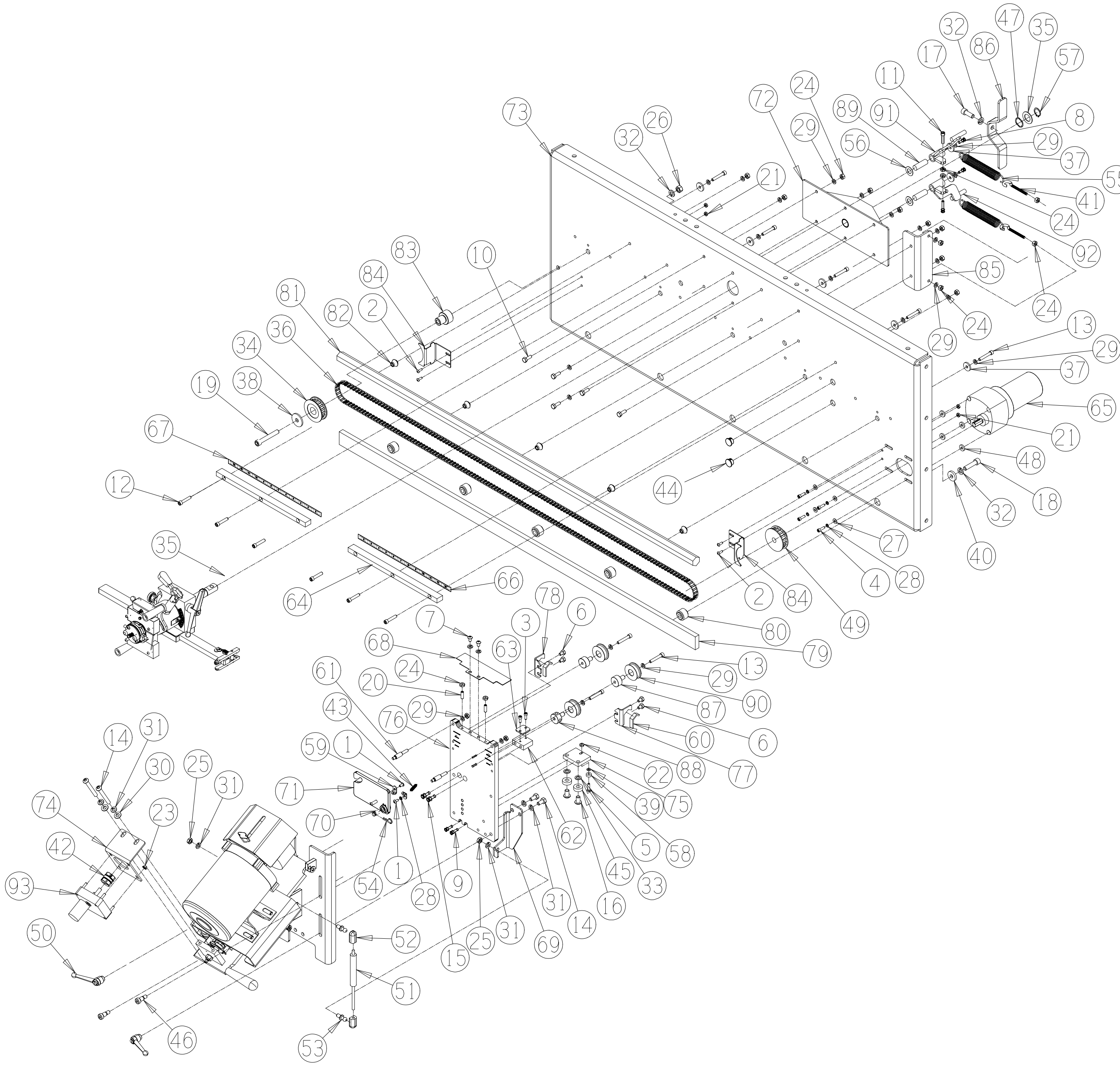
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DIAGRAM NUMBER	PART NUMBER	DESCRIPTION
60	3969064	Foam Wiper
61	4609020	Pivot Shaft
62	4609024	Belt Clamp Block
63	4609025	Belt Clamp Plate
64	4609054	Anti-rotate Bar
65	4609100	Traverse Motor Assembly
66	4609111	Scale Decal - Right Side
67	4609112	Scale Decal - Left Side
68	4609118	Dust Shield
69	4609149	Lower Gas Spring Bracket
70	3709304	Thrust Washer .81 OD x .38 ID
71	4609532	Cam Plate Assembly
72	4609541	Base Support Assembly
73	4659201	Base Panel
74	4659202	Motor Mount Bracket
75	4659203	Lower Bearing Support
76	4659204	Carriage Base Plate
77	4659205	Right Wiper Bracket
78	4659206	Left Wiper Bracket
79	4659207	Lower Traverse Rail
80	4659208	Lower Traverse Rail Spacer
81	4659209	Hex Traverse Bar
82	4659210	Hex Bar Spacer
83	4659211	Idler Pulley Shaft
84	4659212	Pulley Guard
85	4659213	Spring Tensioner Bracket
86	4659214	Rear Spring Bar
87	4659215	Carriage V-Roller Shaft
88	4659217	Offset V-Roller Shaft
89	4659218	Return Pivot Shaft
90	4659507	Traverse V-Roller Assembly
91	4659517	Upper Spring Return Weldment
92	4659518	Lower Spring Return Weldment
93	6309500	Infeed Motor-Reducer Assembly

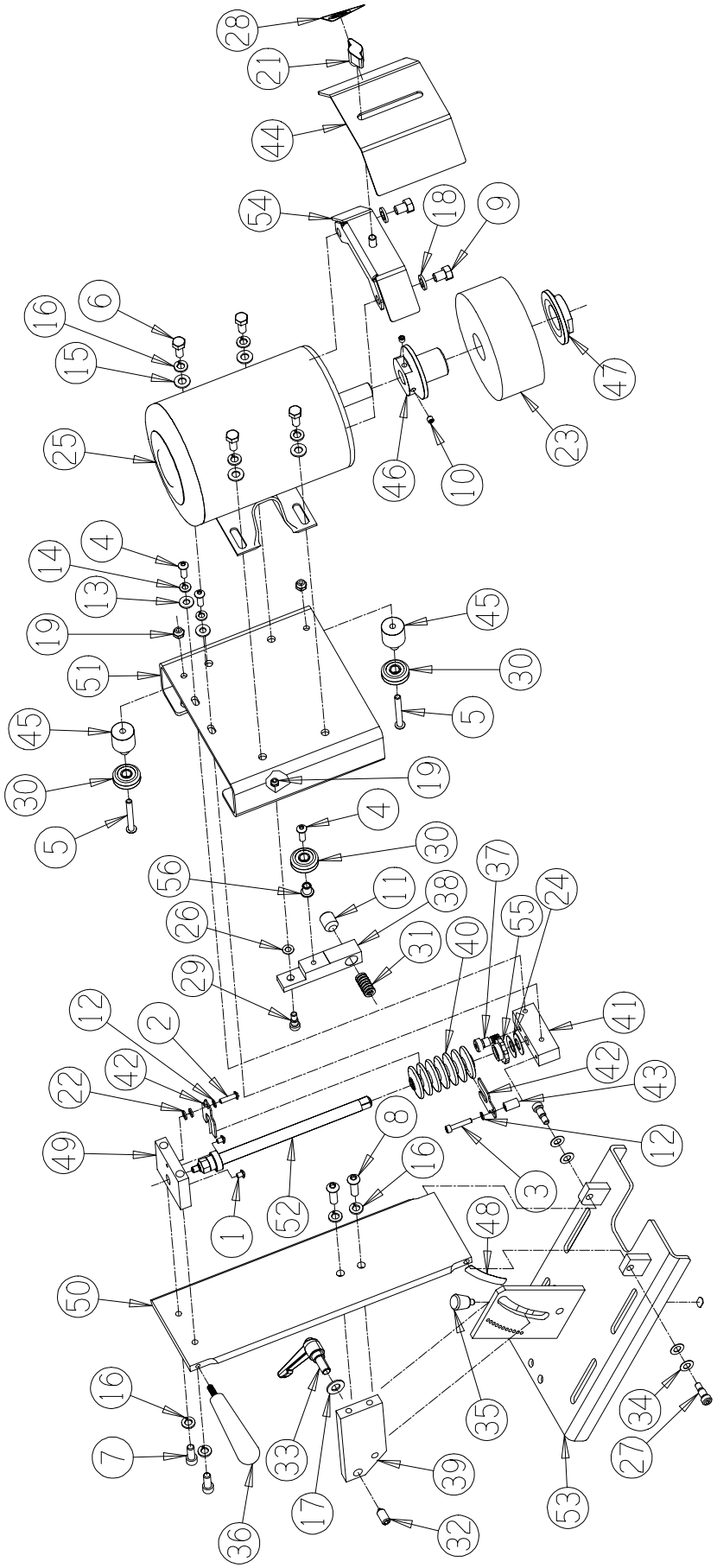
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DIAGRAM NUMBER	PART NUMBER	DESCRIPTION
1	B190402	10-24 x 1/4" Long Round Head Machine Screw
2	B191213	10-24 x 3/4"Long Button Head Socket Cap Screw
3	B191611	10-24 x 1" Long Socket Head Cap Screw
4	B251216	1/4-20 x 3/4" Long Button Head Socket Cap Screw
5	B253216	1/4-20 x 2" Long Button Head Socket Cap Screw
6	B311201	5/16-18 x 3/4" Long Hex Head Cap Screw
7	B311611	5/16-18 x 1" Long Socket Head Cap Screw
8	B311613	5/16-18 x 1"Long Button Head Socket Cap Screw
9	B371201	3/8-16 x 3/4" Long Hex Head Cap Screw
10	C250460	1/4-28 X 1/4" Long Socket Set Screw
11	C621060	5/8-18 x 5/8" Long Socket Head Set Screw
12	K191501	#10 1/4 Split Lockwasher
13	K250001	1/4 Flat Washer SAE
14	K251501	1/4 Split Lockwasher
15	K310001	5/16 Flat Washer SAE
16	K311501	5/16 Split Lockwasher
17	K370101	3/8 Heavy Flat Washer
18	K371501	3/8 Split Lockwasher
19	J257000	1/4-20 Locknut Jam with Nylon Insert
21	80169	2-Prong Knob - 5/16-18 Female
22	3589127	Spacer Washer .37 OD x .19 ID x .06 Thick
23	3700046	Straight Cup Grinding Wheel - 5 x 2 x 1.25 Bore
24	3706021	Conical Washer
25	3707960	1/2 HP Motor
26	3708103	Conical Washer .50 OD x .26 ID x .02 Thick
27	3708425	Shoulder Bolt 5/16 Dia. x 3/8 Long
28	3708461	3600 RPM Warning Decal
29	3708543	Shoulder Bolt .5/16 Dia. x 5/16 Long
30	3708657	Dual Vee Roller
31	3708658	Compression Spring
32	3708907	1/2-13 Ball Nose Srping Plunger
33	3708908	3/8-16 x .78" Long Adjustable Handle
34	3708912	Conical Washer .63 OD x .23 ID x .02 Thick
35	3708914	Spring loaded Plunger
36	3709384	1/4-20 x 3/4" Long Knob
37	3709809	Shoulder Bolt 3/8 Dia. x 3/8 Long
38	4609011	Roller Pivot Arm
39	4609013	Angle Clamp Plate
40	4609015	460 Boot
41	4609016	Infeed Screw Block
42	4609033	Boot Retainer
43	4609043	Spacer - .20 x .375 x .62 Long
44	4609048	Spact Guard Cover
45	4609069	V Roller Bushing - 1.46 Long
46	4609084	Grinding Wheel Adapter
47	4609085	Grinding Wheel Flange
48	4609086	Grind Angle Decal
49	4609147	Infeed Shaft Support Block
50	4609148	V-Roller Plate
51	4609504	Motor/Bearing Plate Weldment
52	4609519	Infeed Left Hand ACME Shaft Assembly
53	4609527	Adjustable Base Plate
54	4609570	Spark Guard Bracket Weldment
55	6009024	1/2-10 ACME Backlash Nut
56	6609028	V Roller Short Bushing

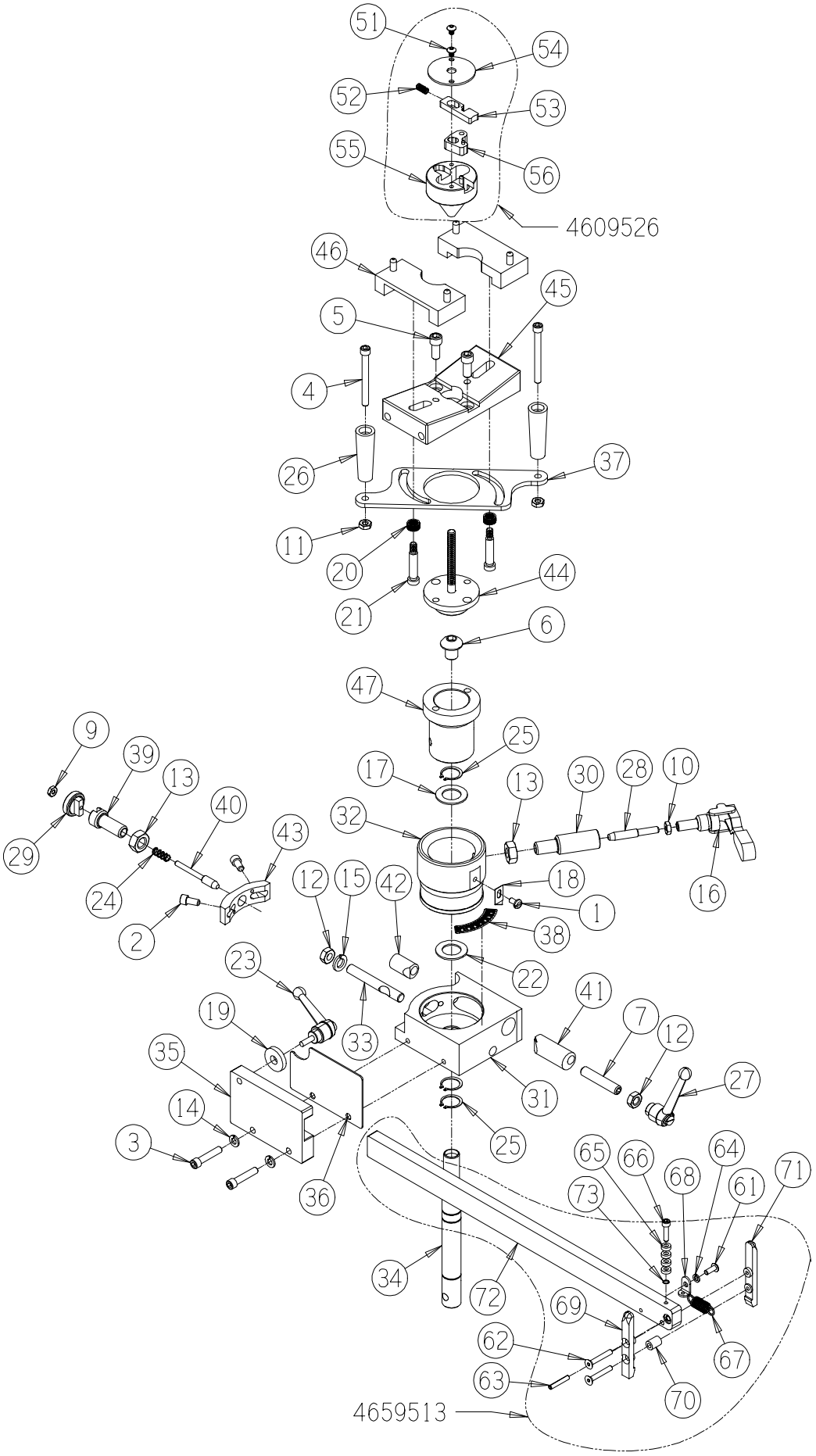
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DIAGRAM NUMBER	PART NUMBER	DESCRIPTION
1	B190602	10-24 x 3/8" Round Head Machine Screw
2	B251011	1/4-20 x 5/8" Long Socket Head Cap Screw
3	B252011	1/4-20 x 1 1/4" Long Socket Head Cap Screw
4	B254011	1/4-20 x 2 1/2" Long Socket Head Cap Screw
5	B311211	5/16-18 x 3/4" Long Socket Head Cap Screw
6	B501216	1/2-13 x 3/4" Long Button Head Cap Screw
7	C376420	3/8-16 x 4" Long Socket Head Set Screw
8	H120802	1/8" Diameter x 1/2" Long Roll Pin
9	J191100	10-32 Hex Nut
10	J252000	1/4-20 Hex Jam Nut
11	J257000	1/4-20 Locknut Jam with Nylon Insert
12	J372000	3/8-16 Hex Jam Nut
13	J502100	1/2-20 Hex Jam Nut
14	K251501	1/4 Split Lockwasher
15	K371501	3/8 Split Lockwasher
16	80335	Clamp - Destaco
17	80355	Thrust Washer 3/4 ID x 1 1/4 OD
18	3559024	Pointer
19	3599028	Spacer 3/8 x 1 x .188 Thick
20	3706031	Wave Spring
21	3708125	Shoulder Bolt 5/16 Diameter x 1 1/4" Long
22	3708193	Conical Washer .88 ID x 1.36 OD x .02 Thick
23	3708786	Adjustable Handle 5/16-18 x 5/8" Long
24	3708949	Compression Spring
25	3709331	Retaining Ring
26	3709370	Handle
27	3709437	Adjustable Handle 3/8-16 Female
28	4609091	Balance Lock Pin
29	4609092	Balancer Lock Knob
30	4609116	Alignment Pin Body
31	4609125	Angle Lock Block
32	4609126	Angle Position Ring
33	4609127	Shaft Locking Stud
34	4609130	Center Pivot Shaft
35	4609131	Rotate Bar Clamp Block
36	4609132	Clamp Block Plate
37	4609135	Cam Plate
38	4609139	Blade Angle Decal
39	4609141	Zero Pin Housing
40	4609142	Zero Position Pin
41	4609143	Rotate Lock Bar
42	4609144	Threaded Lock Bar
43	4609145	Zero Pin Bracket
44	4609534	Center Shaft Block Assembly
45	4609538	Clamp Base Plate Assembly
46	4609539	Blade Clamp Block Assembly
47	4659545	Bearing Housing Assembly
51	B190613	10-24 x 3/8" Long Button Head Cap Screw
52	3706030	Compression Spring
53	4609122	Cone Release Slide Plate
54	4609123	Cone Cover Plate
55	4609524	Center Cone Sub Assembly
56	4609537	Cone Cam Assembly
61	B190813	10-24 x 1/2" Long Button Head Cap Screw
62	B192005	10-24 x 1 1/4 " Long Flat Head Cap Screw
63	H191602	3/16 Diameter x 1" Long Roll Pin
64	K191501	#10 Split Lockwasher
65	3706051	Ball Bearing .38 OD
66	B191231	10-32 x 3/4" Long Socket Head Cap Screw
67	3706048	Extension Spring
68	3929040	Spring Clip
69	4609051	Release Bar
70	4609052	Spacer
71	4609072	Release Bar Threaded
72	4609518	Rotate Bar Assembly
73	3706050	Shim Washer .25 OD

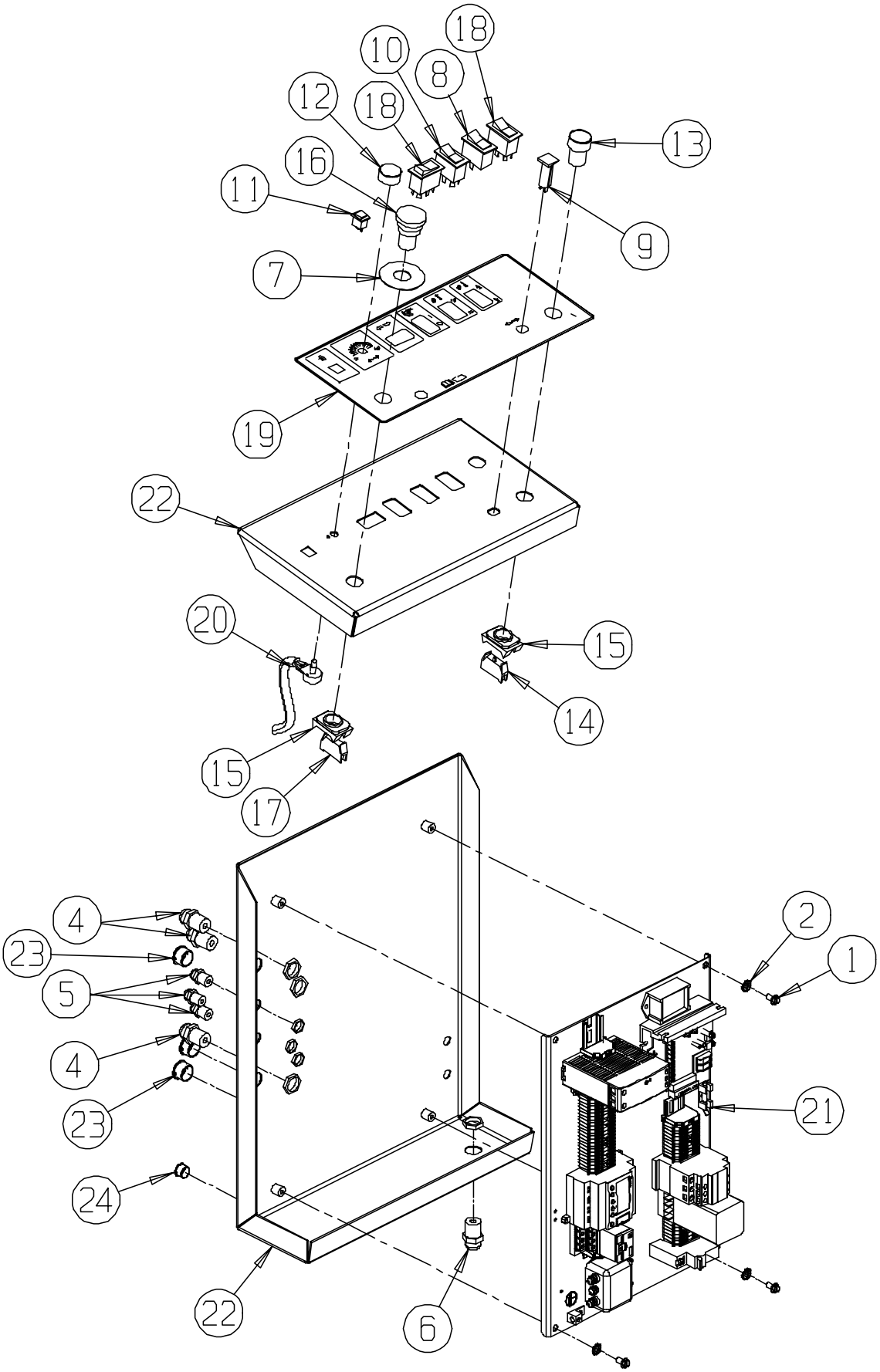
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DIAGRAM NUMBER	PART NUMBER	DESCRIPTION
1	B250800	1/4-20 x 1/2" Long Thread Cutting Screw
2	R000536	1/4 Lock Washer
4	3707009	Liquid Tight Strain Relief (for Wire Dia. .27 - .47)
5	3707029	Liquid Tight Strain Relief (for Wire Dia. .19 - .30)
6	3707093	Liquid Tight Strain Relief (for Wire Dia. .43 - .55)
7	3707342	Yellow Emergency Stop Ring
8	3707367	ON/OFF Rocker Switch (DPST)
9	3707399	3 Amp Circuit Breaker
10	3707429	ON/OFF Rocker Switch (DPDT)
11	3707434	Square Unlight Push Button
12	3707446	Potentiometer Knob with Pointer
13	3707564	Green Start Push Button
14	3707565	Normaly Open (NO) Contact Block
15	3707566	Switch Mounting Latch
16	3707567	Push/Pull Red Emergency Stop Button
17	3707568	Normaly Closed (NC) Contact Block
18	3707713	ON/OFF/ON Momentary Rocker Switch
19	4659001	Control Panel Decal
20	4609110	Traverse Potentiometer Assembly
21	4659503	Electrical Panel Sub-Assembly (see page 48)
22	4609568	Control Panel Weldment
23	3707595	7/8 Dia. Hole Plug
24	3707597	5/8 Dia. Hole Plug
	D160666	8 X 3/8 Self Tap Phil. Pan Hd (Ground - Not Shown)
	4659248	Infeed Motor Cord
	4659249	Grinding Motor Cord (Not Shown)
	4659250	Door Safety Switch Cord (Not Shown)
	6059054	Main Power Cord (Not Shown)

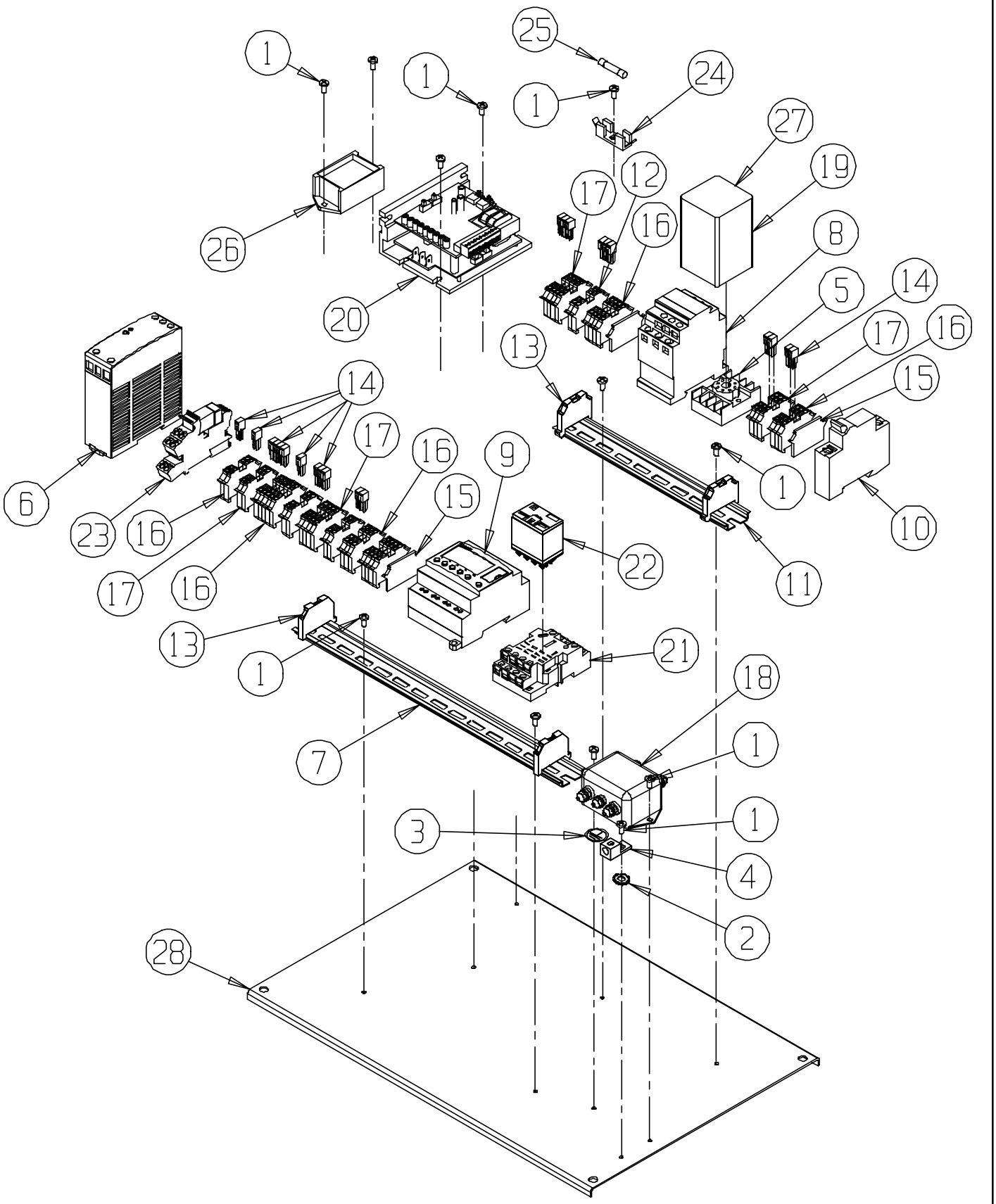
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DIAGRAM NUMBER	PART NUMBER	DESCRIPTION
1	D160666	#8 x 3/8" Long Phillips Pan Head Self Tapping Screw
2	R000480	#8 Lock Washer
3	3707163	Primary Ground Decal
4	3707164	Primary Ground Lug
5	3707073	8 Pin Socket
6	3707791	12 VDC 30 Watt Power Supply
7	3707378	14" Long Din Rail
8	3707556	1 HP Magnetic Starter
9	3707794	Programable Smart Relay
10	3707589	15 Amp Circuit Breaker
11	3707606	9" Long Din Rail
12	3707624	Ground Terminal Block
13	3707625	Screwless Terminal Block End Stops
14	3707626	Adjacent Terminal Block Jumper
15	3707627	Terminal Block End Plate
16	3707628	Grey 2-Conductor Terminal Block
17	3707629	Blue 2-Conductor Terminal Block
18	3707764	Line Filter
19	3707688	Low Voltage Relay (Low/High)
20	3707697	Traverse Drive
21	3707796	Relay Base 4-Pole
22	3707797	4-Pole Relay - 15 Amp
23	3707694	Relay Terminal Block (8A - 115VAC)
24	3707091	Fuse block
25	3707799	Fuse - 1 amp Quick Blow
26	3707801	Voltage Regulator Assembly
27	3708920	LVR Warning Decal (Low/High)
28	4609079	Electrical Sub Panel
	3707804	Terminal Markers 1-50 (not shown)