

**605
ACCU - SHARP
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 assembling or maintaining the equipment, paying particular attention to the Warning & Safety instructions.





*Setting the Standard with the
World's Most Valued Grinders*

WE ARE COMMITTED TO:

Providing superior customer support, training, and service.

Manufacturing the highest quality products at an unequaled value.

Setting the industry standard by investing in technological product innovation.

Manufacturing products specifically designed to maintain original equipment manufacturers' specifications.

Interacting with and supporting all original equipment manufacturers.

**WARNING**

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.

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, or expose it to rain. Keep work area well lighted.
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 cutting unit is securely fastened with the clamps provided before operating.
12. DON'T OVERREACH. Keep proper footing and balance at all times.

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

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 is OFF before plugging in the Grinder.
16. **USE RECOMMENDED ACCESSORIES.** Consult the manual for recommended accessories. Using improper accessories may cause risk of personal injury.
17. **CHECK DAMAGED PARTS.** A guard or other part that is damaged or will not perform its intended function should be properly repaired or replaced.
18. **NEVER LEAVE GRINDER RUNNING UNATTENDED. TURN POWER OFF.** Do not leave grinder until it comes to a complete stop.
19. **KNOW YOUR EQUIPMENT.** Read this manual carefully. Learn its application and limitations as well as specific potential hazards.
20. **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.
21. **DO NOT OPERATE THE GRINDER WHEN UNDER THE INFLUENCE OF DRUGS, ALCOHOL, OR MEDICATION.**

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

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

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.

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.



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.

⚠ WARNING

This machine is intended for reel mower reel blade grinding ONLY. Any use other than this may cause personal injury and void the warranty.

To assure the quality and safety of your machine and to maintain the warranty, you **MUST** use original equipment 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 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.

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



This symbol is used to indicate important information.



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



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



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



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

SERVICE DATA

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SPECIFICATIONS

Electrical Requirements.....	120 VAC 60/50 HZ, 15 Amp
Net Machine Weight	1290 Lbs. [585 Kg]
Shipping Weight	1530 Lbs. [694 Kg]
Maximum Grinding Length	35 inches [89 cm]

OPERATING CONDITIONS:

AMBIENT TEMPERATURE:

RELATIVE HUMIDITY:

ALTITUDE:

TRANSPORTATION AND STORAGE:

THIS MACHINE IS INTENDED FOR INDOOR USE ONLY.

+5°C/ 40°F to +40°C/ 100°F

50% RH, +40°C / 100°F. Higher RH may be allowed at lower temperatures.

- no condensation must be present.

up to 1000m/ 3280 ft. above mean sea level.

-25°C/-15°F to +55°C / 130°F

Means must be provided to prevent damage from humidity, vibration and shock.

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-Sharp 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	GRADE 5	GRADE 8
			
	SMOOTH HEAD	3 MARKS on HEAD	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

- ORIGINAL INSTRUCTIONS

UNPACK CARTONS

Remove the wood board structure and plastic wrap around the unit. The cartons should be opened and assembled in the following sequence:

1. Carton Assembly
2. Setup Gauge

Remove the two (2) boxes (carton assembly and set up gauge box) and place aside.

If any problems occur, refer to the shipping and receiving instruction. Double check the cartons for any miscellaneous items or other manuals before disposing of cartons.

UNSTRAP CARRIAGE

Remove the shipping strap which holds the carriage in place. The bolt that holds the shipping strap to the frame can be discarded.

REMOVE GRINDER FROM WOOD PALLET

Remove the grinder base from the wood pallet. This is accomplished by unbolting the bracket that holds each frame side to the bottom of the wood pallet. The four leveling screws are seated in countersunk holes in the wood pallet.



The unit weighs 1290 LBS. [585 kg], use power equipment to lift the unit. position base

The ACCU-Sharp will require an operating area of about 150" x 108" D x 80" H. The mowing unit will be lifted from behind the machine, and the machine operator will operate the unit from the operator's position on the opposite side of the unit. Position the base to allow sufficient operating room in both front and behind the machine. See FIG. 1.

The base should be placed on a relatively level concrete floor, with ample ceiling height to allow for the installation and operation of the reel winch and boom. Do not place the unit across two concrete slab seams or across a large crack. If the unit must be placed near a wall, we recommend the wall be located as per FIG. 2.



PLACING THE GRINDER ON FLOORING THAT IS BADLY OUT OF LEVEL OR BROKEN WILL AFFECT GRINDING QUALITY.

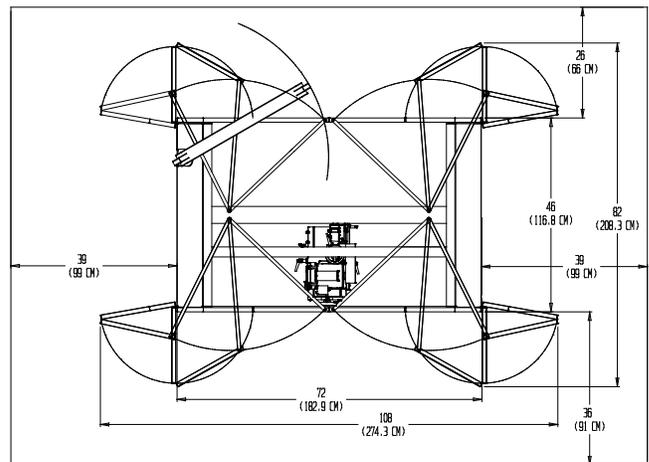
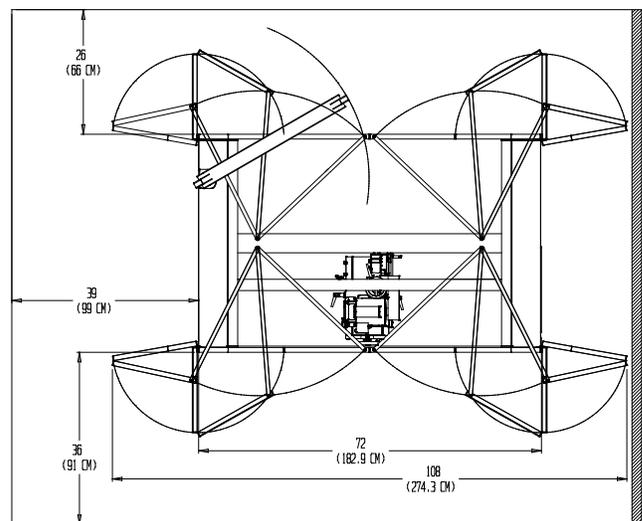


FIG. 1



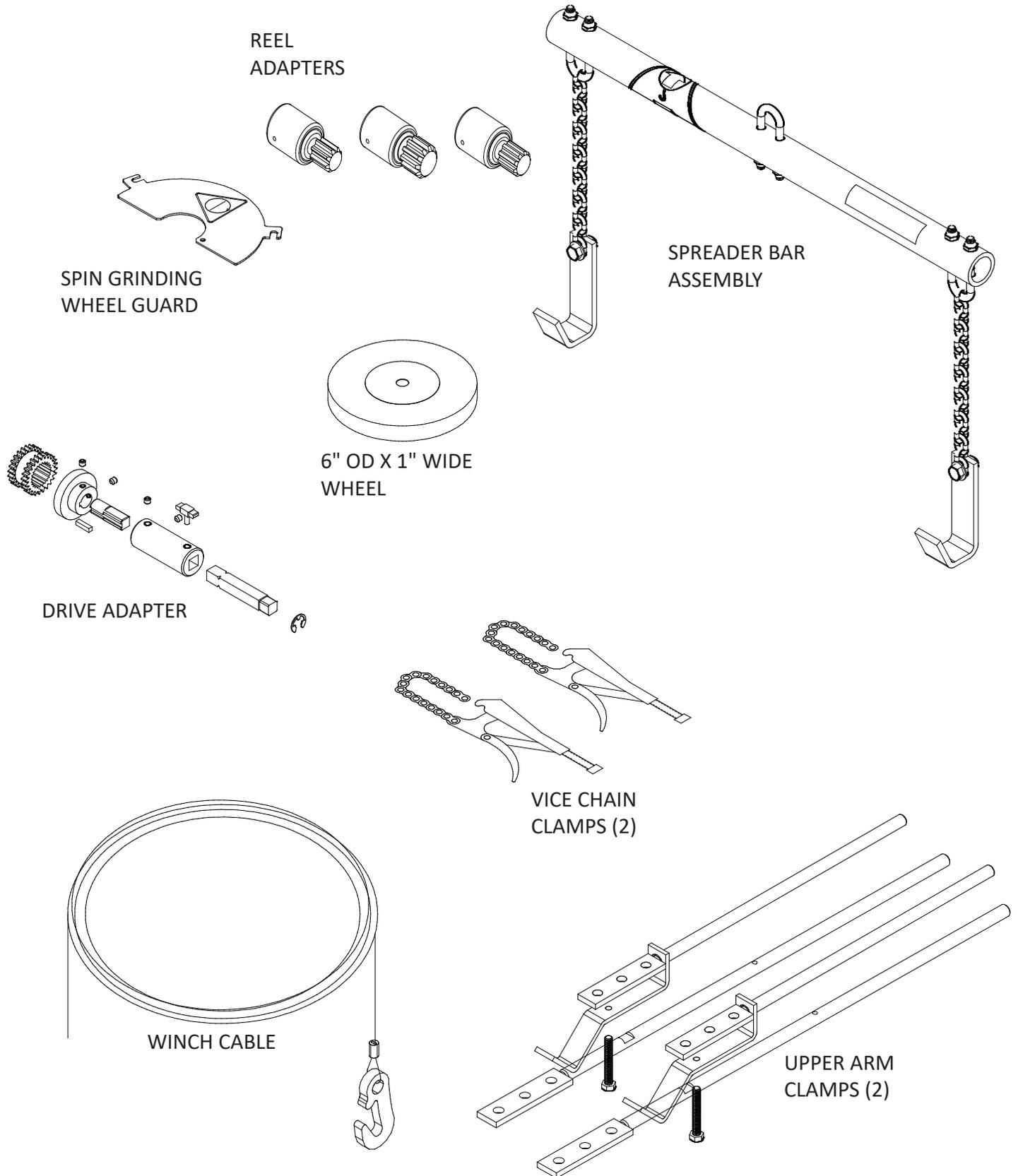
WALL

FIG. 2

ASSEMBLY INSTRUCTIONS (Continued)

- ORIGINAL INSTRUCTIONS

REMOVE THE CARTON AND REMOVE THE CONTENTS FROM THE CARTON ONTO A WORKBENCH. THE CARTON INCLUDES:



LEVEL BASE

Each leveling foot has been factory pre-adjusted so it protrudes from the base 1-3/4". See FIG. 3. Raise carriage bellows. See FIG. 4. Place a level on the top of the front carriage rail near one end of the machine and check the levelness of the unit from side to side. See FIG. 5. Adjust the leveling feet as necessary to bring to level.

Raise bellows and place a level across the front and rear carriage rails near the left end of the carriage bed. See FIG. 6. As viewed from the operator's position, adjust the two (2) leveling feet on the left end of the machine as necessary to level the left end. This adjustment is critical to proper operation of your unit.

Raise bellows and place a level across the two carriage rails at the right end of the machine and adjust to level. See FIG. 6. This adjustment is critical. These two steps will level the machine from front to back as viewed from the operator's position.

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 of the leg until they lock into place. Be careful not to move the leveling feet during this process. See FIG. 3.

Recheck with level after locking nuts are firmly tightened. Snap the carriage bellows back onto carriage rails.

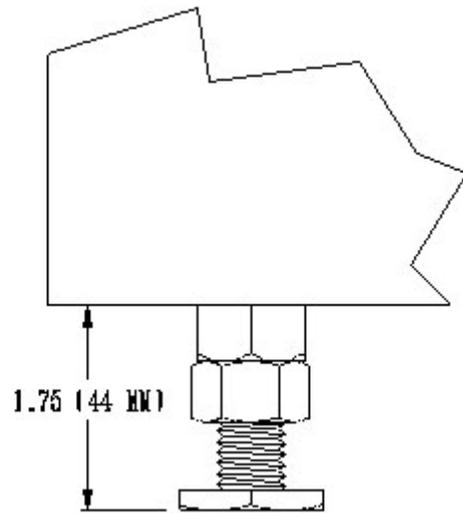


FIG. 3

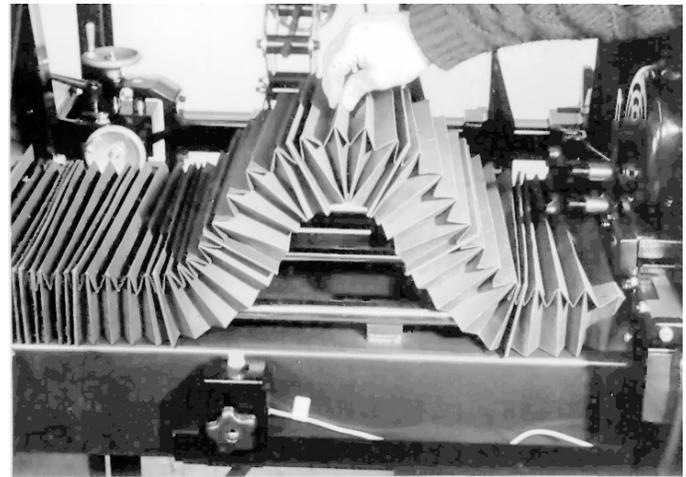
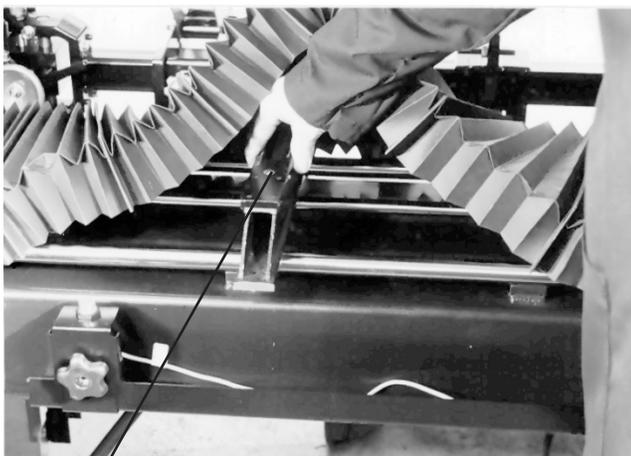


FIG. 4

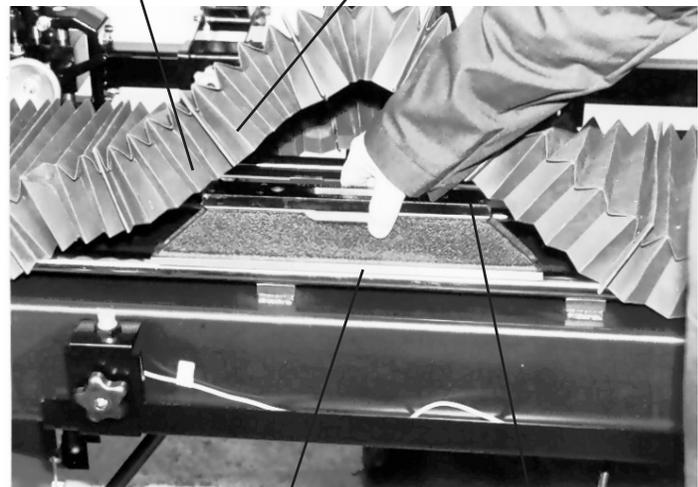
! FAILURE TO PROPERLY LEVEL YOUR GRINDER, OR BUMPING IT, OR KNOCKING IT OFF LEVEL WILL ADVERSELY AFFECT GRIND QUALITY.

LEFT END OF UNIT CARRIAGE BOOTS



LEVEL

FIG. 6



FRONT CARRIAGE RAIL

LEVEL

FIG. 5

INSTALL WINCH AND BOOM

With the use of a stool or ladder, install the boom assembly into the boom receiver tube that is welded in the frame. (See FIG. 7)

Thread cable through the hole in the boom arm and over both top pulleys, feed the cable down through the center of the boom vertical tube, and over the lower pulley. Install the cable to the winch per the winch instruction sheet.

The cable is reeled up by rotating handle in a clockwise direction, as it is reeled up it makes a clicking sound. The spring loaded handle actuates a brake when handle is released.



FIG. 7



Read separate directions on winch operation and maintenance that is included in the manual tube on machine.

Place spreader bar with chains and hooks onto cable hook (which has safety latch feature built in). See FIG. 8.



Do not overload the winch capacity. Winch capacity is a maximum of 400 lbs.



FIG. 8

SET UP GAUGE ASSEMBLY

1. Remove the dial indicator assembly from carton.

2. Remove anvil on dial indicator.

Mount dial into the casting. Remount anvil. Adjust dial indicator so anvil can be fully depressed without touching the casting and tighten set screw in casting to firmly mount dial indicator to casting.

DO NOT OVERTIGHTEN OR DAMAGE OR MALFUNCTION OF THE DIAL INDICATOR CAN OCCUR.

3. Mount the complete assembly to the machine (See FIG 10 and 11) or store on the tool tray when completed. See FIG. 9.



SET UP GAUGE

FIG. 9

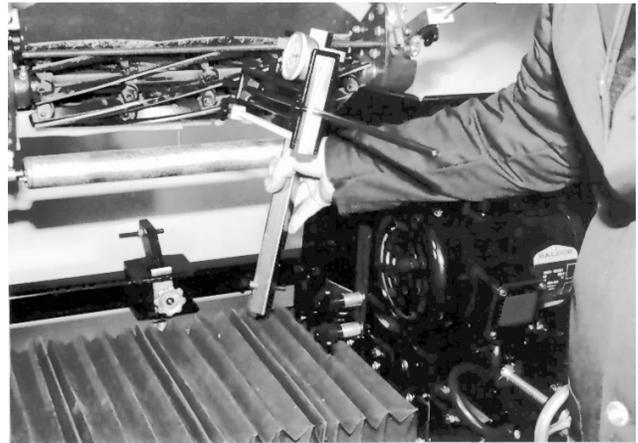


FIG. 10



FIG. 11

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. 6.

WARNING

220 VOLT MODEL ONLY. FOR 220 VOLT APPLICATIONS ORDER PART NO. 6720951, WHICH INCLUDES A 220 TO 110 VOLT STEP DOWN TRANSFORMER. SEE DETAILS ON PAGE 9.



FIG. 12

It is recommended that model 605 grinder has its own permanent power connection from the power distribution panel, with no other major power draw equipment on the same line.

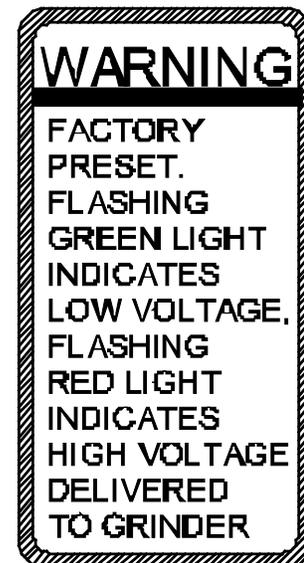
It is required that the power delivered to this grinder is 120 VAC - 15 amps. The tolerance on this power requirement is +/- 5%. Therefore the minimum voltage REQUIREMENT is 114 VAC with 15 amps. Voltage must be checked with all equipment under load (operating) on the circuit.

DO NOT operate this grinder with an extension cord.

Do not operate this grinder on a Ground Fault interrupter (GFI) circuit. The (GFI) will trip constantly.

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.



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 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.

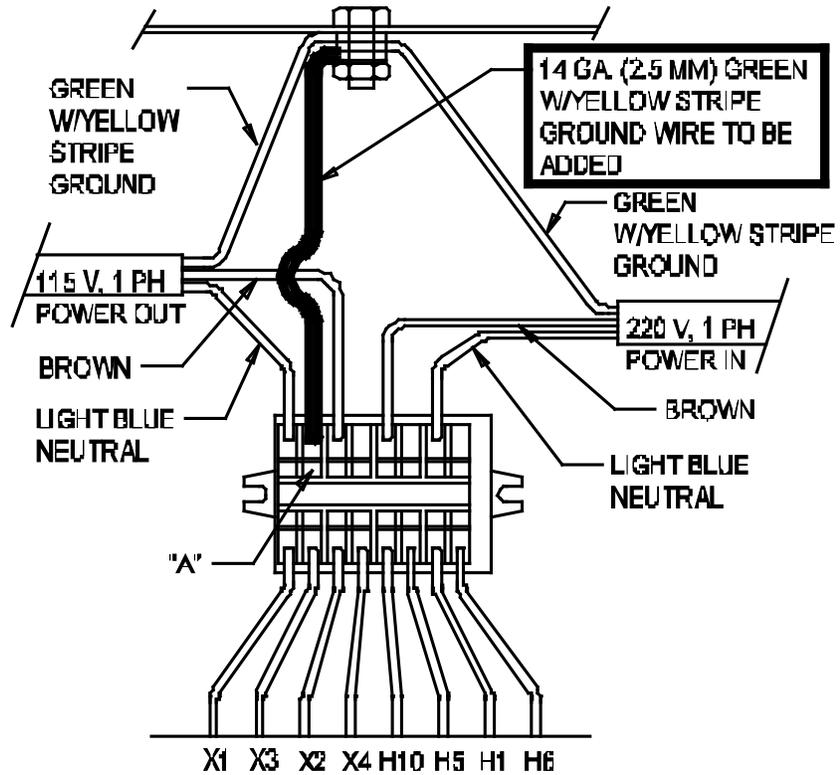
FOR 220-240 V 50 or 60Hz applications Product No. 6050951 should be ordered.

6050951 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. 13.

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

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. 13

IMPORTANT GROUNDING INSTRUCTIONS

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

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

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

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



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

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!

DAILY MAINTENANCE IS SPECIFIED ON PAGE 7 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. Check gib plate adjustment in the grinder carriage base monthly. See Troubleshooting Section for adjustment. Lubricate the gib area with high quality lithium grease every six months. Wipe off excess grease.
2. Wipe and re-oil with spray lubricant, the grinding wheel infeed adjusting lead screw and the grinding head height adjustment lead screw every three months. Wipe off all excess lubricant.
3. Inspect the V-belt for glazing or cracking and adjust the belt tension per procedure specified in the adjustment section every three months.
4. Wipe off and relube with never-seez, the vertical and horizontal cross slide shafts and lead screws, every six months.
5. Lift the bellows, (See FIG. 26) and wipe off the traverse bearing rails monthly. Follow the lubrication procedure linear bearings. Generally, this will be every six months to a year.
6. Check the brushes on the auto traverse drive motor and spin motor once a year. Replace as necessary. See Troubleshooting Section.
3. Check the free play in the grinding wheel shaft bearing once a year. Replace if excessive play exists.

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. 15 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.

LUBRICATION FREQUENCY

The lubrication frequency is to check the shaft monthly during grinder operation.

If the unit will be shut down for an extended period of time, more than two 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.

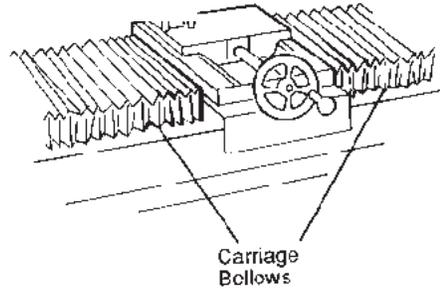


FIG. 14



FIG. 15

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 gauge.

-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 belt for cracking and adjust the tension if necessary.

-Check for damaged or missing parts.

TO REPLACE THE CARRIAGE LINEAR BEARINGS

1. Remove the carriage bellows from the carriage and the machine frame.
2. Remove the three linear bearing pillow blocks (four screws each) from the bottom of the carriage one at a time, slide the removed linear bearing off the end of the traverse shaft and discard them.
3. One at a time, slide the new linear bearing pillow blocks onto a carriage rail.
4. Adjust the tension screw (FIG. 16) on the side of each bearing block so that when you radially rotate the pillow block around the carriage (See FIG. 17) rail there is no free play between the bearing and rail. You should feel a strong drag.
5. When the bearing is adjusted correctly, reinstall the bearing and proceed to do the same with the other two bearings until all have been replaced.

NOTE: *The tension is too tight if you feel a cogging action when you rotate a pillow block around the rail. This cogging is caused by the bearing skidding on the rail.*

Rocking the bearing block back and forth should be a smooth uniform motion.



Bearings which are too tight or too loose will cause poor grinding quality. Bearings which are too tight will also have a much shorter life, and could damage the rail.

6. Recheck the bearing tension. The tension is correct when you try to lift the carriage and can feel no free carriage movement up or down. Check for excessive carriage-traverse load by using a spring scale to pull on the carriage parallel to the drive shaft (as in FIG. 18). There should be only about a 3 to 5 lbs pulling force.

To double-check, manually slide the carriage assembly from one end of its travel to the other. There should be uniform resistance through the full range of travel.

7. Reattach the two carriage bellows. Refer to the assembly section of this manual.

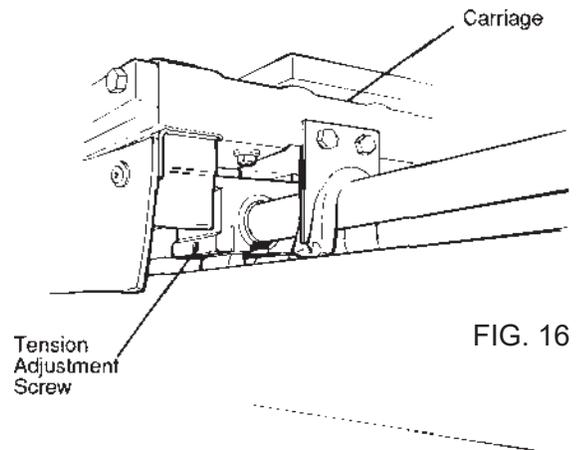


FIG. 16

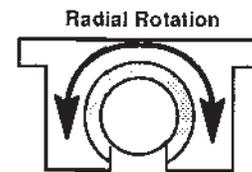


FIG. 17

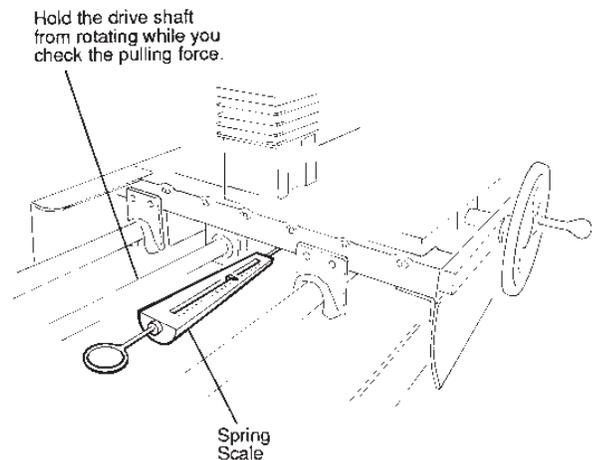
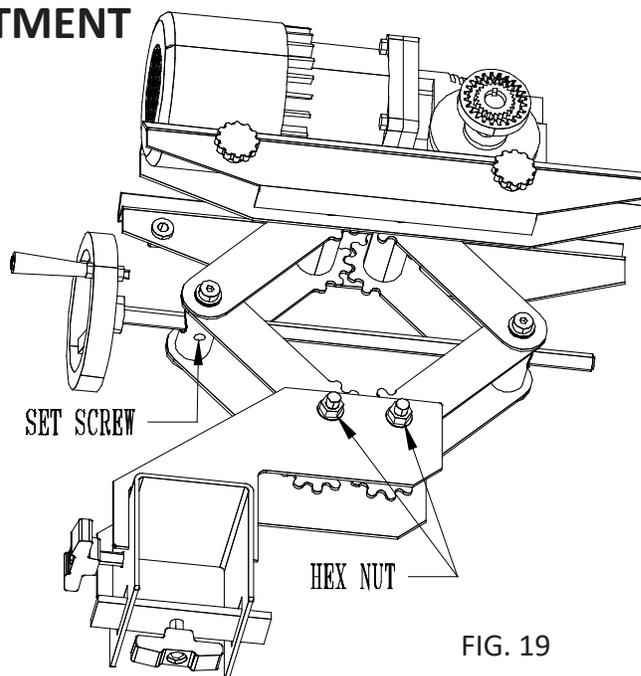


FIG. 18

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. 19.

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. 19.



TO ADJUST THE CARRIAGE GIB PLATE

The gib plate must be readjusted occasionally to eliminate free play. Otherwise, the grinding head can move from side to side, and the reel may be ground unevenly.

The gib must allow the carriage to be cranked freely forward and back without any side play. See FIG. 20.

TO ADJUST:

1. Crank the carriage all the way forward (toward the operator position).
2. Tighten the front gib screw until the carriage has no side play but the horizontal handwheel can still be cranked.
3. Crank the carriage gradually back (away from the operator position), and adjust the remaining gib screws as you go.

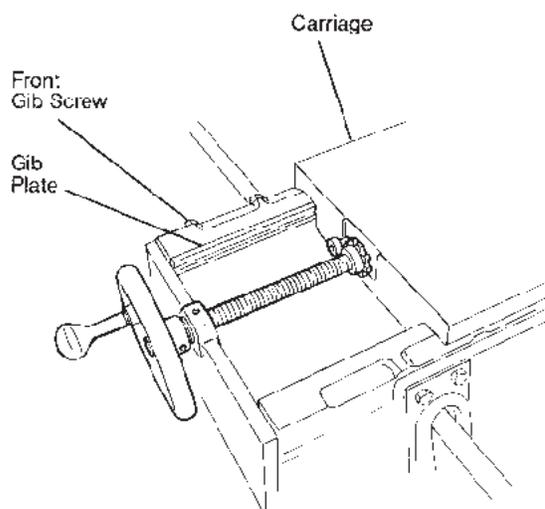


FIG. 20

ADJUSTABLE FINGER BACKSTOP TENSION

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

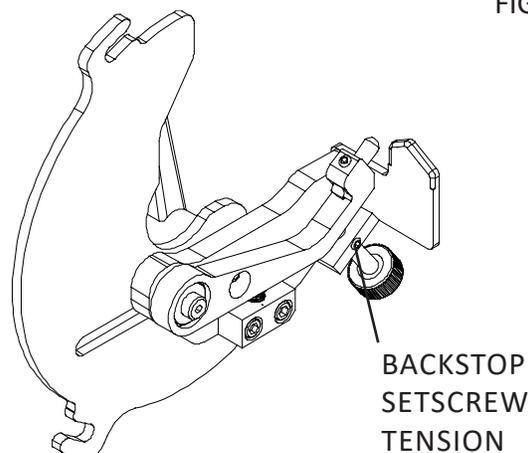


FIG. 21

CROSS SLIDE SHAFT REPLACEMENT

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

STEP 1--Loosen the two nuts on the support casting that hold the dutchman and tap with plastic hammer to loosen.

STEP 2--Loosen the locking handles and tap the center stud with a plastic hammer.

STEP 3--Loosen locknut and setscrew and remove the handwheel.

STEP 4--Remove the Slide Shaft.

STEP 5--Remove all burrs and resurface the shaft to a clean, smooth, polished surface. (OR REPLACE WITH A NEW SHAFT.)

STEP 6--Coat shaft with Never-Seez and re-install the shaft through the Support, Cross Slide Block and the three Dutchman. The shaft must move freely inside the Cross Slide Block before reassembling.

STEP 7--Retighten the nuts at the end of the Dutchman to lock shaft in place.

STEP 8--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 9--Test the Cross Slide, the handwheel should turn freely.

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

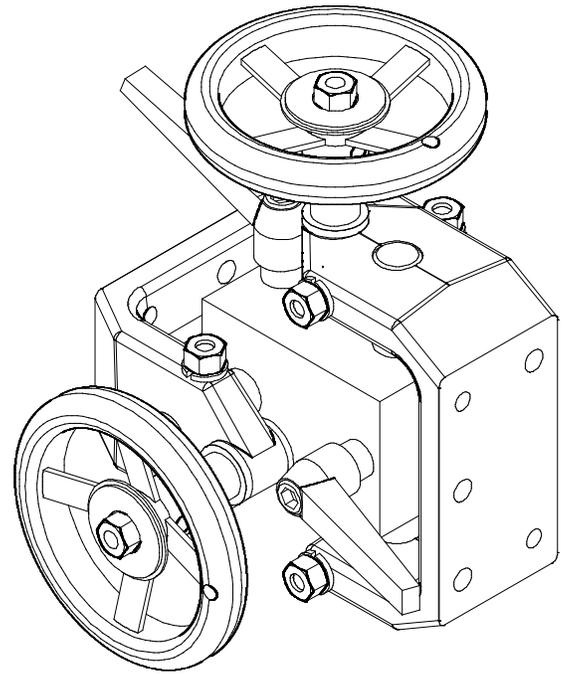
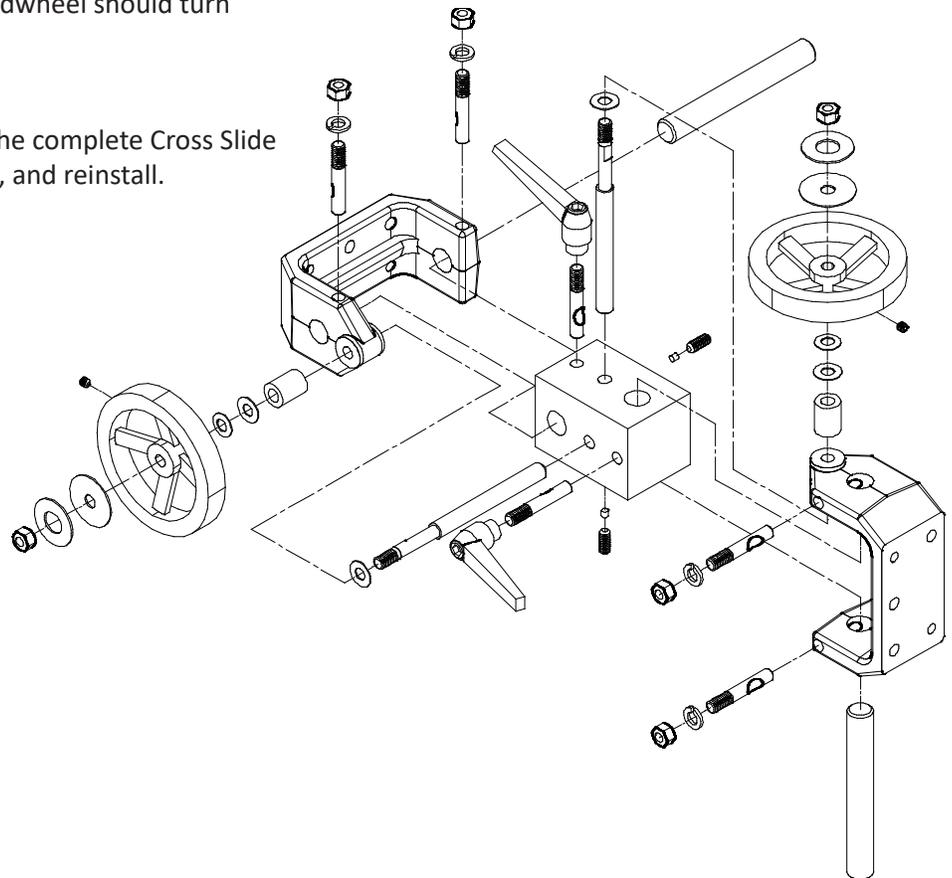


FIG. 22



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 compression springs measure $3/4"$. See FIG. 23. 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.

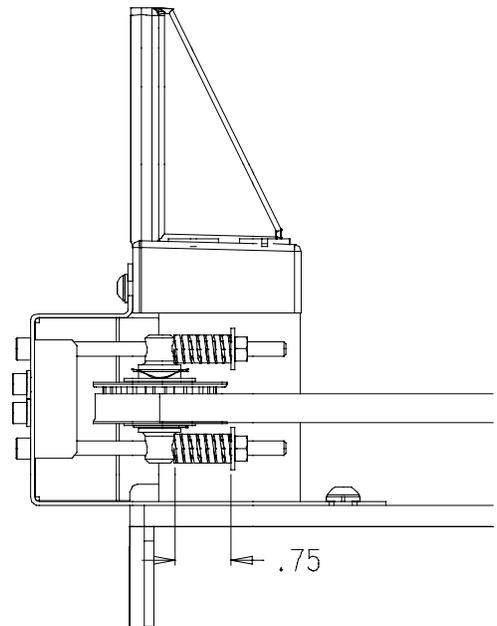


FIG. 23

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 24. 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.



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

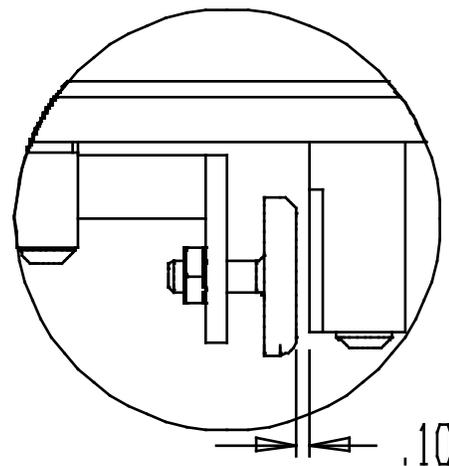


FIG. 24

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.

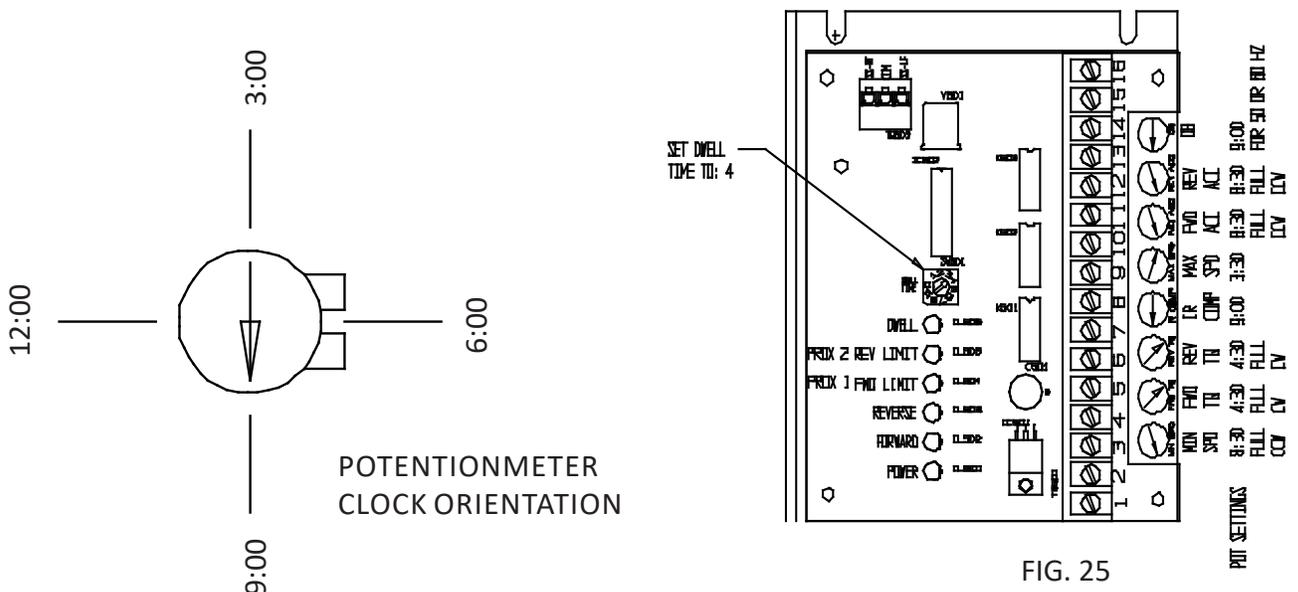
(Left Traverse) Reverse Acceleration--Factory set at full (CCW) 8:30. Do not change this setting.

(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 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.



SPIN DRIVE CONTROL BOARD (SDC)

The Spin Drive Control Board has four potentiometers, two switches and one dial as shown on FIG. 26. These potentiometers, switches and dial have been set at the factory to the positions shown on FIG. 26.

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 torque 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 dial 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. 26. 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 too 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. 99. 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 disconnected.

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.

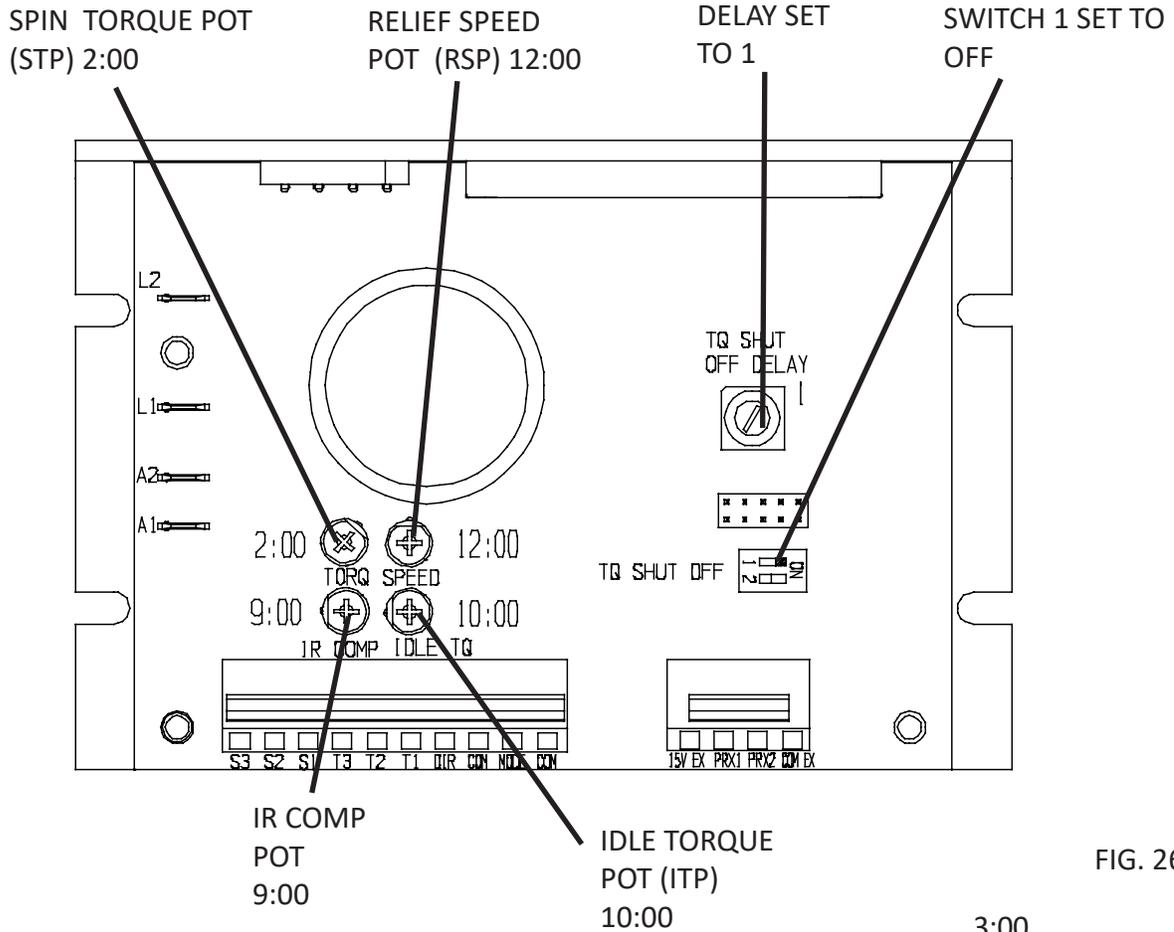


FIG. 26

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 4 mm [.156"] to 6 mm [.234"] needs to be maintained between the proximity sensing bracket and the proximity switch. See FIG. 30.

NOTE: Light on proximity activates when metal crosses over the switch.

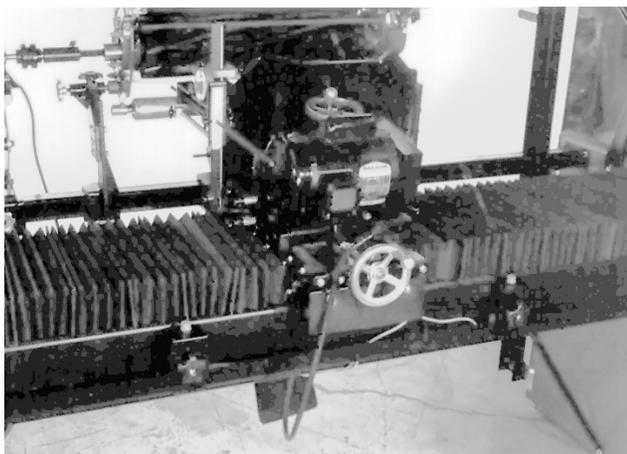
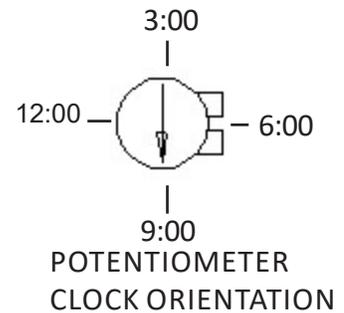


FIG. 29

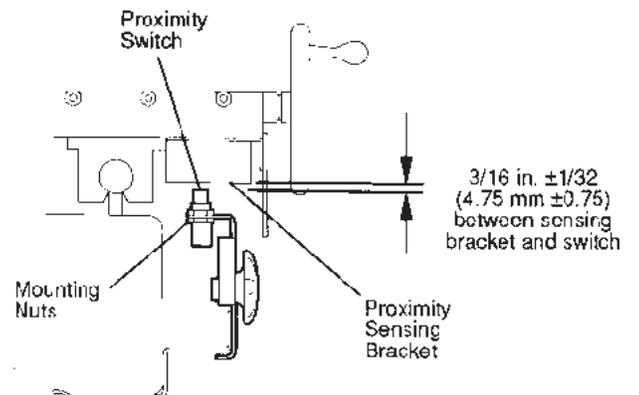


FIG. 30

ALIGNMENT FIXTURE ADJUSTMENT

The body of the dial indicator should be flush with the casting it is mounted in. The anvil should be able to be depressed fully without touching the casting. To adjust properly, loosen the set screw in the indicator mounting casting and adjust accordingly. See FIG. 31.

Tighten dial indicator set screw enough to lightly hold the indicator in place. Never overtighten so plunger does not have free travel.

SET UP GAUGE ADJUSTMENT

There should be no backlash in the fine adjustment screw on the set up gauge slide. See FIG. 32. Adjust hex nut tight so conical washer is completely pressed then back off 1/2 turn.

Make sure the set screw is compressing the nylon plug tightly on the vertical adjusting screw.



FIG. 38

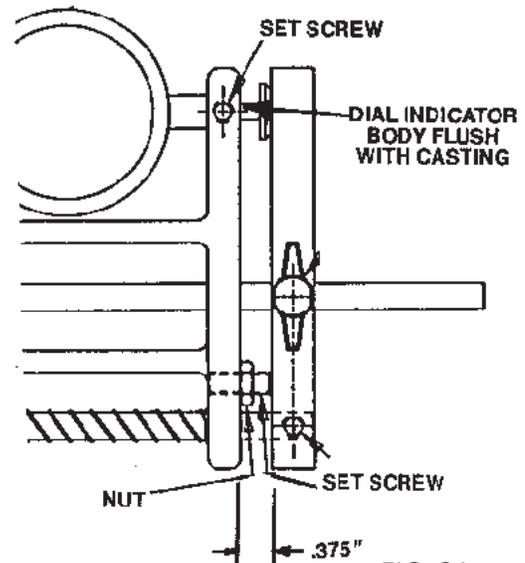


FIG. 31

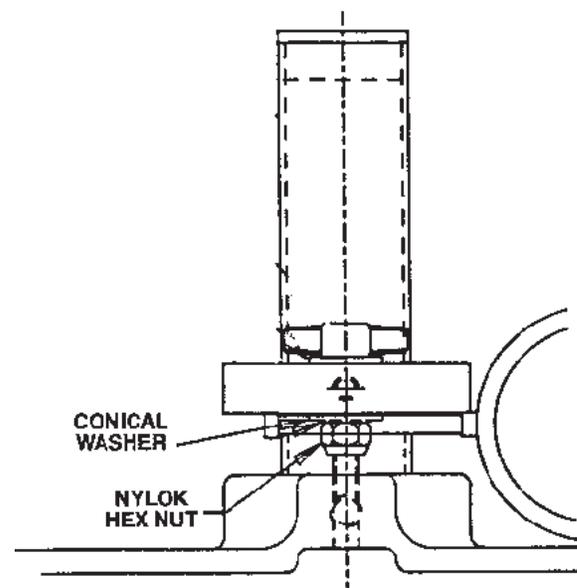


FIG. 32

ADJUSTMENTS (Continued)

to eliminate carriage infeed backlash
If there is backlash in the carriage infeed handwheel (See FIG. 33), there are two adjusting points to check:

1. Conical washers behind the shaft adjusting nut:
 - A. Unscrew the shoulder bolt.
 - B. Hold the horizontal handwheel, and turn the shaft adjusting nut counterclockwise until the conical washers are touching each other. Continue turning the nut counterclockwise until the next notch is centered over the shoulder-bolt hole. Then turn the nut one notch (40 degrees) further.
 - C. Reinstall the shoulder bolt to lock the nut in position.

2. Washers behind the handwheel:
 - A. Loosen (about one-half turn) the set screw holding the handwheel to the shaft.
 - B. Tighten the hex nut which secures the handwheel to 100 in.-lbs [1.15 kg-m), then back it off 1/2 turn.
 - C. Check for .015 in [.4 mm] gap between the wave washer and flat washer. See insert to FIG. 34.
 - D. Tighten the set screw holding the handwheel to the shaft.

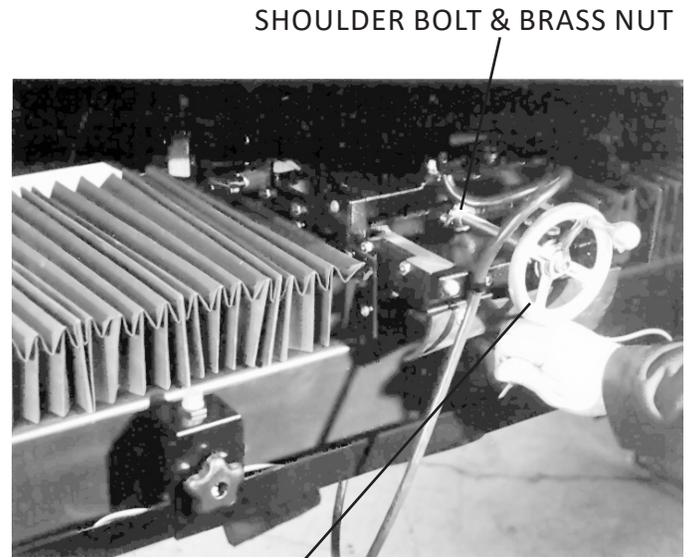


FIG. 33

CARRIAGE INFEED
HANDWHEEL

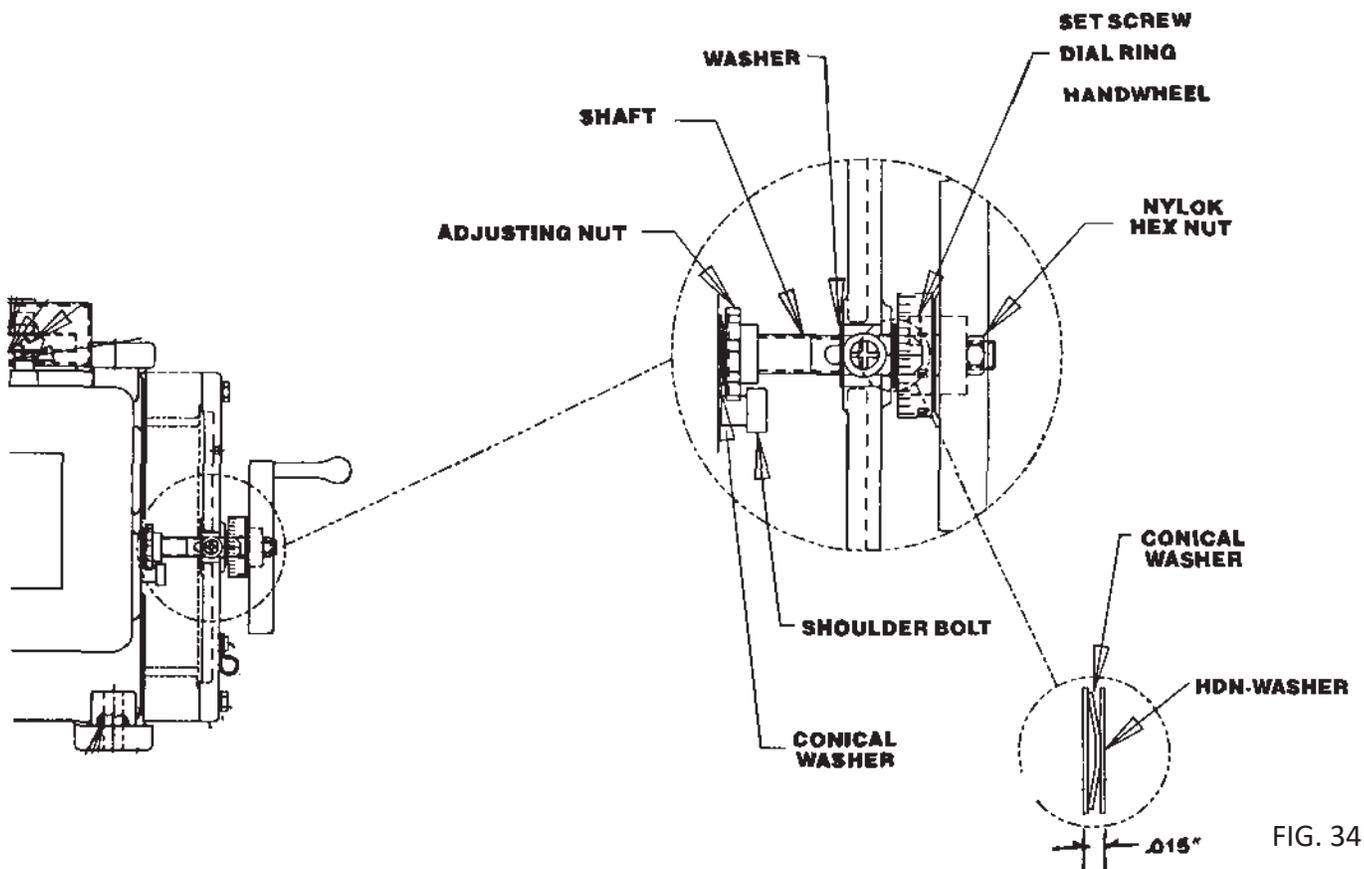


FIG. 34

BELT TENSION

The belt must be tensioned so when the lock handle is locked the maximum belt deflection is .12 at a 10lb./load.

SAFETY SWITCH ALIGNMENT

The front and rear door safety switches must be adjusted so the sender and receiver are parallel to each other and the maximum gap is .19 inches (5mm). See FIG. 35.

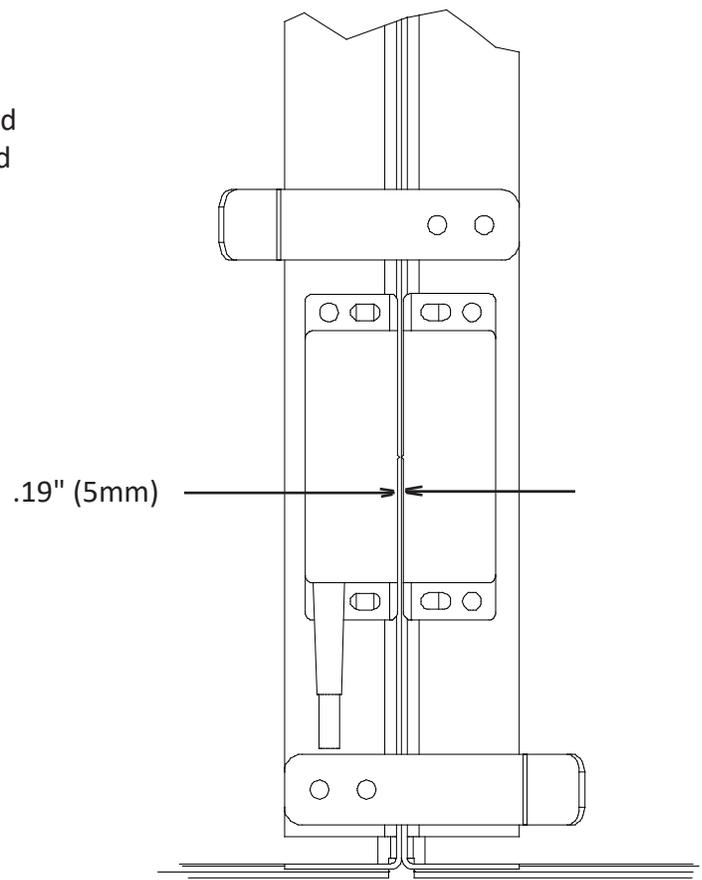


FIG. 35

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-Sharp 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-Sharp 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 position code. The first two digits are the wire number: 01-99. 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

AC Main Power Controls.....	Page 30-31
Spin Drive Controls in Spin Mode	Page 33-34
Spin Drive Controls in Relief Mode.....	Page 35-36
Spin Drive Controls - General	Page 37
Grinding Motor Controls	Page 38-39
Traverse Drive Controls-w/prox.....	Page 40-41
Traverse--stopping and reversing	Page 42-43

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

Verify all wires shown on the wiring diagram on pages 74-75 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.

<u>Possible Cause</u>	<u>Checkout Procedure</u>	
Emergency Stop Button (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 click	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 for contactor to pull in.	D. Close guard doors and turn off all switches.	Machine works Yes--end troubleshooting No--go to step E. next.
Main 15 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)	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 120V at Cord into FTR (Power Cord #32)	FTR "Line" Terminals for 120 Volts AC Yes--Go to Step G. next. No--Replace Power Cord
No 120 Volts AC power out of Filter	G. Check for 120V out of FTR	FTR "Load" Terminals for 120 Volts AC Yes--Go to Step H. next. No--Replace Filter
No 120 Volts AC power to Main Circuit Breaker (MCB) 15 Amp	H. Check for 120V to MCB	MCB Bottom Terminal to Terminal Block 4 (White) for 120 Volts AC Yes--Go to Step I. next. No--Check wires & replace if needed.
No 120 Volts AC power from Main Circuit Breaker (MCB) 15 Amp	I. Check for 120V to MCB	MCB Top Terminal to Terminal Block 4 (White) for 120 Volts AC Yes--Go to Step J. next. No--Flip Switch on MCB to "ON" - Machine works-- end trouble shooting. Machine does not work-- replace MCB
No 120 Volts AC power to Secondary Circuit Breaker (SCB) 6 Amp.	J. Check for 120V to SCB	SCB (03SCB--) to neutral (blue) terminal out of FTR for 120VAC Yes--Go to Step K. next. No--Check wires & replace if needed.

<u>Possible Causes</u>	<u>Checkout Procedure</u>	
No 120 Volts AC power from Secondary Circuit Breaker (SCB) 6 Amp.120	K. Check for 120V from SCB	SCB (67SCB--) to neutral (blue) terminal out of FTR for 120 VAC Yes-- Go to Step L. next. No--Flip Switch on SCB to "ON"-Machine works--end of troubleshooting. Machine does not work--replace SCB
Volts AC power not delivered to Terminal Strip	L. Check for 120 Volts AC at terminal strip.	Terminal "11" on Terminal Strip 2 "7TB2-11" to Terminal Block 4 (White) for 120 Volts AC Yes--Go to Step M. next. No--Check wires #7 & #3, Check Jumper on Terminal Blocks 1-3.
Grinding Motor Switch (GMS) not working	M. Check for 120 Volts AC at GMS Terminals 1	Measure 120 volts AC from GMS Terminal 1 to Term Block 4(White) Yes--Go to Step N. next. No--Flip Switch and check again- Works--Switch is upside down. Does not work--Check wiring/Verify Continuity/ Replace Switch
Spin Motor Switch (SMS) not working	N. Check for 120 Volts AC at SMS Terminals 1	Measure 120 volts AC from SMS Terminal 1 to Term Block 4(White) Yes--Go to Step O. next. No--Flip Switch and check again- Works--Switch is upside down. Does not work--Check wiring/ Verify Continuity/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 to Term Block 4(White) Yes--Go to Step P. next No--Check wire for continuity, then verify switch continuity. If bad replace ESS contactor (NC)
Bad System Start Switch (SSS)	P. Hold in SSS and Check voltage after the (SSS)	Measure 120 Volts AC from (SSS) term 3 to Term Block 4(White) Yes--Go to Step Q. next No--Check wire for continuity, then verify switch continuity. If bad replace SSS contactor (NO)
Low Voltage Relay (REL) not operating	Q. Hold in SSS and Check voltage at LVR. LVR must be installed in 8-pin socket.	Measure 120 Volts AC from LVR term 8 to Term Block 4(White) Yes--Go to Step R. next No--Check for 120 Volts AC from LVR term 6 to term 7. Yes--Verify Continuity of term 1 to term 8 on LVR. Replace LVR if bad. No--Verify Continuity of Wires.
Bad Main Contactor (MAG)	R. 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 clunk, if not replace MAG. No--Verify Continuity of Wires.

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

<u>Possible Cause</u>	<u>Checkout Procedure</u>	
Guard Doors are Open	A. Close the front and rear Guard Doors	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 and Rear Guard Doors.	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. next. 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 Door Switch is Bad	F. With Rear doors Closed Verify 24Volts DC back form rear Door Switch.	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 Alignment of Rear door switch. If no Voltage to Term14 or 15 then replace rear switch.
Front Door Switch is Bad	G. With Front doors Closed 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 Term2 or 4 then replace front switch.

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

<u>Possible Cause</u>	<u>Checkout Procedure</u>	
(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(White) 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.

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 pages 74-75 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.

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 Circuit Breaker on front of Control Panel. Push in if tripped.	Spin Motor works Yes--end troubleshooting No--go to Step C. next
------------------------------------	--	---

OPEN CONTROL BOX AND SWITCH KEYED SELECTOR SWITCH TO TEST. PRESS START SWITCH IF MAG IS NOT PULLED IN. ALSO TURN ON SWITCHES AS STATED ABOVE.

Spin Drive Control (SDS) is not working	D. Check (SDS) L1 to L2 for 120 Volts AC	(SDC)Remove wires to Terminals L1 and L2 and test between 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 at A1 and A2, 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	Remove wires at Terminal Strip 1, Term 4 & 5 check 0 ohms across the black and white wires (These are the wires from the motor) Yes--end troubleshooting, spin drive should run, if not, replace motor. No--go to Step J.
-------------------------	---------------------------------------	--



Disconnect Power from Machine!

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 44SDC-COM 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 next to SP is on but machine does not work. Go to Step H. next
-----------------------------------	---	--

Possible Cause	Checkout Procedure	
Spin Torque Pot (STP) is not set correctly	H. Check (STP) remote torque on the (SDC) board	(STP) on (SDC) board, should be set as labeled on pages 22 and 23. 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	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



DISCONNECT POWER FROM MACHINE !

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 74-75 are correct and pull on wire terminals with approximately 3 lbs force to verify there are no loose terminal connections and/or 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 Circuit Breaker on front of Control Panel. Push in if tripped.

Spin Motor works.
Yes--end troubleshooting
No--go to step **D.** next

OPEN CONTROL BOX AND SWITCH KEYED SELECTOR SWITCH TO TEST. PRESS START SWITCH IF MAG IS NOT PULLED IN. ALSO TURN ON SWITCHES AS STATED ABOVE.

Spin Drive Control (SDC) is not working

D. Check (SDC) L1 to L2 for 120 Volts AC

((SDC)Remove wires to Terminals L1 and L2 and test between 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 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 Red Line)

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

Remove motor wires at Terminal Strip 1 (left side), 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



DISCONNECT POWER FROM THE MACHINE

Worn Motor Brushes

H. 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



DISCONNECT POWER FROM MACHINE !

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 L.
Relief Speed Pot (RSP) is not set correctly.	L. Check (RSP) remote speed (10k) on (SDC) board	(RSP) on the (SDC) board and should be set as specified on pages 22 and 23. Adjust if incorrect and check Relief Torque function. Machine works Yes--end of troubleshooting No--go to Step M. next
(RTP) is not working	M. (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--Replace (SDC) No--replace (RTP)
Proximity sensor not working.	N. With the Traverse motor on and the right proximity sensory on. Check for input into SDC.	Remove wires 174SDC15EX and 172SDCCOMEX and check for 12-15 VDC between the wires. Yes--Contact Factory (replace SDC) No-- check wires, verify traverse is working, if not see Traverse Motor section of Troubleshooting.

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 W
white wire to term L
black wire to term H

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 22 and 23. (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 23.

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.

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 pages 74-76 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.	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 front of Control panel. 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	GMS term 5 to Terminal Block 9 (White) for 120 Volts AC Yes--go to Step E. next No--With power off, check continuity of wires to GMS.

SWITCH KEYED SELECTOR SWITCH TO TEST. PRESS START SWITCH IF MAG IS NOT PULLED IN. ALSO TURN ON SWITCHES AS STATED ABOVE.

	E. Check for power from GMS	GMS Term 6 to Terminal Block 9 (White) for 120 Volts AC Yes--Go to Step F. next No--replace GMS
Relay contacts not working	F. Check for power to relay contacts	(REL) Term 2 to Term 6 for 120 Volts AC Yes--Go to Step G. next No--Check wires to REL Term 2 & 6
Keyed Selector Switch (KSS) not Working	G. Check for power to KSS	(KSS) Term 2 to Terminal Block 9 (White) for 120 Volts AC Yes--Go to Step H. next No--Check wires from GMS to KSS

Possible Cause

Checkout Procedure

SWITCH KEYED SELECTOR SWITCH TO RUN. PRESS START SWITCH IF MAG IS NOT PULLED IN. TURN OFF ALL SWITCHES.

H. Check Continuity of contact on KSS



DISCONNECT POWER FROM MACHINE!

With GMS OFF, Turn Keyed Switch to RUN. Verify Continuity of Contact Term 2 to 1.
 Yes--Go to Step I. next
 No--Replace Contact (NC)

Relay Not Working

I. Turn off Power and disconnect wire to motor. Reconnect Power. Close Guard Doors and turn on GMS. Check for 120 Volts AC at end of cord.

Measure 120 Volts AC at Grinding Motor Cord Grind Motor End.
 Yes--Reconnect Motor. If it does not work replace motor.
 No--Verify Continuity of grind motor wire and replace if bad. If Grind motor checks ok then replace Relay (REL).

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 74-76 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
Fuse on Traverse Drive Control (TDC) has failed	C. 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. Fuses must be continuity checked.	Traverse works Yes--end troubleshooting No--go to Step D. next
Traverse Drive Control (TDC) is bad	D. 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 E. next
Bad Traverse Motor Switch (TMS)	E. Check for 120 Volts AC at (TMS). (Make certain (TMS) is on)___	Measure 120 volts AC from TMS Terminal 5 to Term Block 4(White) Yes--Go to Step L. next. No--Flip Switch and check again- Works--Switch is upside down. Does not work-- Check wiring/Verify Continuity/ Replace Switch

Possible Cause

Checkout Procedure

No DC Voltage from (TDC) Traverse Drive Control

F. 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 **G.** next

No--go to Step **H.** next

Traverse Motor is bad

G. Check grinding 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

No--go to Step **K.** next

(TSP) is not working

H. 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--replace the (TDC)

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

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

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 #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--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.

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	<p>First check to see if proximity light comes on. When the light is on, it means that there is electricity coming to proximity switch.</p> <p>Actuate prox switches with steel tool to take measurements.</p> <p>Left proximity (PROX1) check Traverse drive Control (TDC) between terminals #14 (black wire) and #15 (brown wire).</p> <p>Right proximity (PROX) check (TDC) between terminals #13 (black wire) and #15 (brown wire).</p>	<p>The light coming on shows the proximity is getting electrical contact.</p> <p>Proximity light on- 0 Volts DC Proximity light off- 12 Volts DC</p> <p>Proximity light on- 0 Volts DC Proximity light off- 12 Volts DC</p> <p>Replace proximity switch if the voltages do not read as above.</p>
The dwell time on the traverse drive control not set properly.	<p>Reset dwell time as required. One increment increases Dwell time by 1/2 second. NOTE: Factory dwell setting is 4.</p>	
Loose wire to proximity switch.	<p>Check wire connections from the proximity switches and tighten down screws.</p>	<p>A loose wire connection will give intermittent electrical contact.</p>

Possible Cause

Checkout Procedure

PROBLEM--Reel ground concave, convex or with irregular shape.

Too heavy a grind on the final grinding passes.

Grind out reel using correct sparkout procedure as specified in the Operators Manual.

Overhead clamps and tooling bar clamps not tight.

Tighten all locking hand knobs, Four knobs on the tooling bar, four knobs on the overhead bar clamp and two on the overhead clamp swivels.

When using center brackets, insure the fixed center is tight as well as the moveable center lock knob.

Cross slide lock handles not tight.

Tighten the horizontal and vertical cross slide lock handles.

Grinding head lock handles not tight.

Tighten the two lock handles on the adjusting arm slots and one on the vertical height adjustment.

Loose gibs on the carriage.

Adjust the gibs per the procedure in the adjustment section in this manual.

Linear bearings on the grinding head carriage are bound with grit, loose or damaged .

The linear bearing must be preloaded to the traverse shafts with no vertical movement. See manual adjustment section for carriage linear bearing adjustments.

Lubricate the linear bearings per the procedure as specified in this manual. Replace bearings if they cannot be properly adjusted.

PROBLEM--Roundness of reel varies, High low reel blades are observed.

Possible Cause

Checkout Procedure

Too heavy a grind on the final grinding passes.

Grind out reel using correct sparkout procedure as specified in the Operators Manual.

PROBLEM--Stock removal much different traversing left compared to traversing right.

The possible causes and checkout procedures are the same as listed above for concave, convex or with irregular shape.

Possible Cause

Checkout Procedure

PROBLEM--Relief grind on the reel blades does not go full length.

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 for information of using the grinding wheel.

PROBLEM--Too heavy a burr on cutting edge of reel blades.

Possible Cause

Checkout Procedure

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.

Too heavy a grind on the final grinding passes.

Grind out reel using correct sparkout procedure as specified in the Operators Manual.

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-- Traverse speed is too slow.

Possible Cause

Remedy

Linear bearings in the carriage are set too tight.

Readjust linear bearings for proper tension per the adjustment section of this manual.

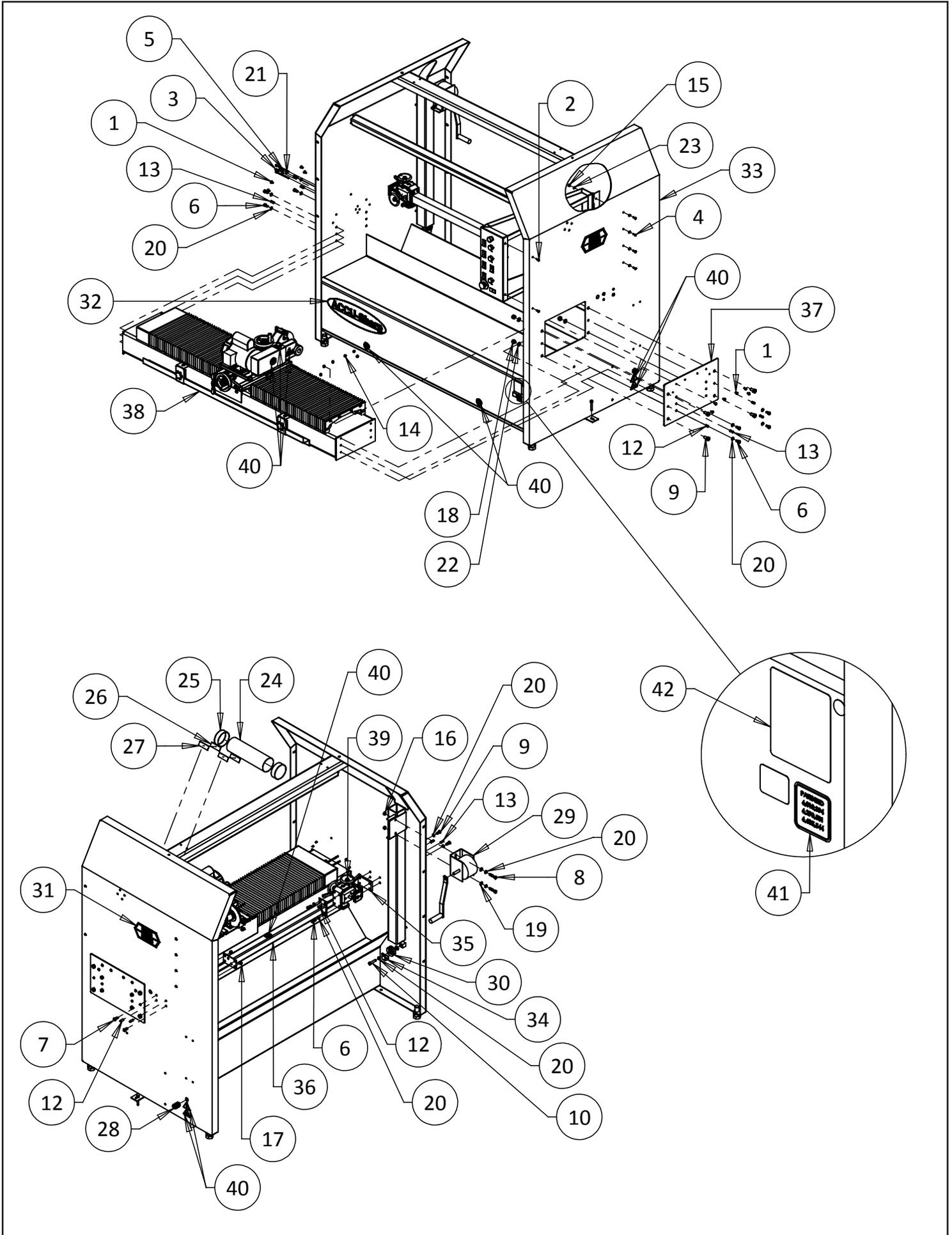
Traverse belt slipping

Check to see if the belt is slipping when traverseing. Verify proper adjustment per the adjustment section of this manual.

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PARTS LIST

6059534 MAIN BASE ASSEMBLY



PARTS LIST (Continued)**6059534 MAIN BASE ASSEMBLY**

DIAGRAM NO.	PART NO.	DESCRIPTION
1	B250819	Truss Head Machine Screw 1/4-20 x 1/2" Long
2	B251211	Socket Head Cap Screw 1/4-20 x 3/4" Long
3	B371201	Hex Head Cap Screw 3/8-16 x 3/4" Long
4	B372016	Button Head Socket Cap Screw 3/8-16 x 1 1/4" Long
5	B501601	Hex Head Cap Screw 1/2-13 x 1" Long
6	B371601	Hex Head Cap Screw 3/8-16 x 1" Long
7	H371202	3/8 Dia. x 3/4" Long Roll Pin
8	H371602	3/8 Dia. x 1" Long Roll Pin
9	B256411	Socket Head Cap Screw 1/4-20 x 4" Long
10	J257000	1/4-20 Thin Locknut
11	J377100	3/8-16 Locknut
12	J501000	1/2-13 Hex Nut
14	K251501	1/4" Split Lockwasher
15	K371501	3/8" Split Lockwasher
16	K501501	1/2" Split Lockwasher
17	J371000	3/8-16 Hex Nut
18	K370001	3/8" SAE Flat Washer
19	B372801	Hex Head Cap Screw 3/8-16 x 1 3/4" Long
20	3707093	Strain Relief
21	3708645	Winch
22	3708693	3/8-16 x .75" Long Hex Head Tapping Screw
23	3709990	Foley United Decal
24	3709795	Pulley
25	6009223	Accu-Sharp Decal
26	6009540	Main Base Weldment
27	6059005	Tooling Bar Spacer Block
28	6059010	Tooling Bar Weldment
30	6059552	Cross Slide Assembly
31	6059003	Pulley Guard Bracket
32	6309037	Winch Warning Decal
33	6059525	Traverse, Carrigage & Grinding Head Sub-assembly

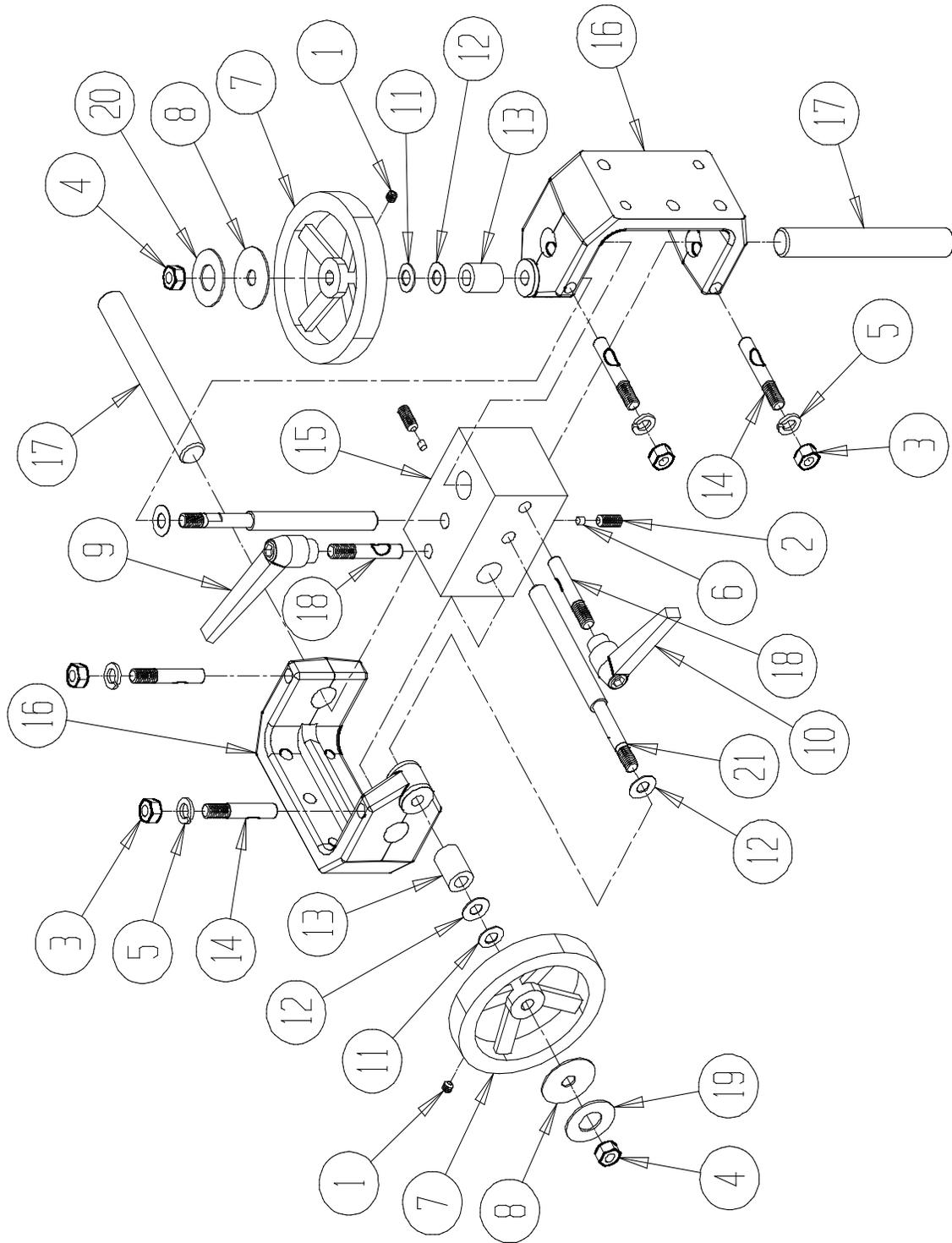


DIAGRAM NO.	PART NO.	DESCRIPTION
1	C310820	5/16-18 x 1/2" Long Socket Set Screw
2	C311220	5/16-18 x 3/4" Long Socket Set Screw
3	J371000	3/8-16 Hex Nut
4	J377000	3/8-16 Jam Locknut
5	K371501	3/8 Split Lockwasher
6	3579109	3/16 Dia. Nylon Plug
7	3708148	Handwheel
8	3708665	5/8 OD Flat Washer
9	3708705	5/16-18 Orange Adjustable Handle
10	3708706	5/16-18 Grey Adjustable Handle
11	3709062	Conical Washer
12	3709304	Thrust Washer
13	3969065	Spacer
14	6009035	Shaft Locking Stud
15	6009081	Cross Slide
16	6009082	Cross Slide Support
17	6009095	Slide Shafts
18	6309113	5/16-18 Shaft Locking Stud
19	6309114	Orange Decal
20	6309115	Grey Decal
21	6309390	ACME Adjusting Shaft

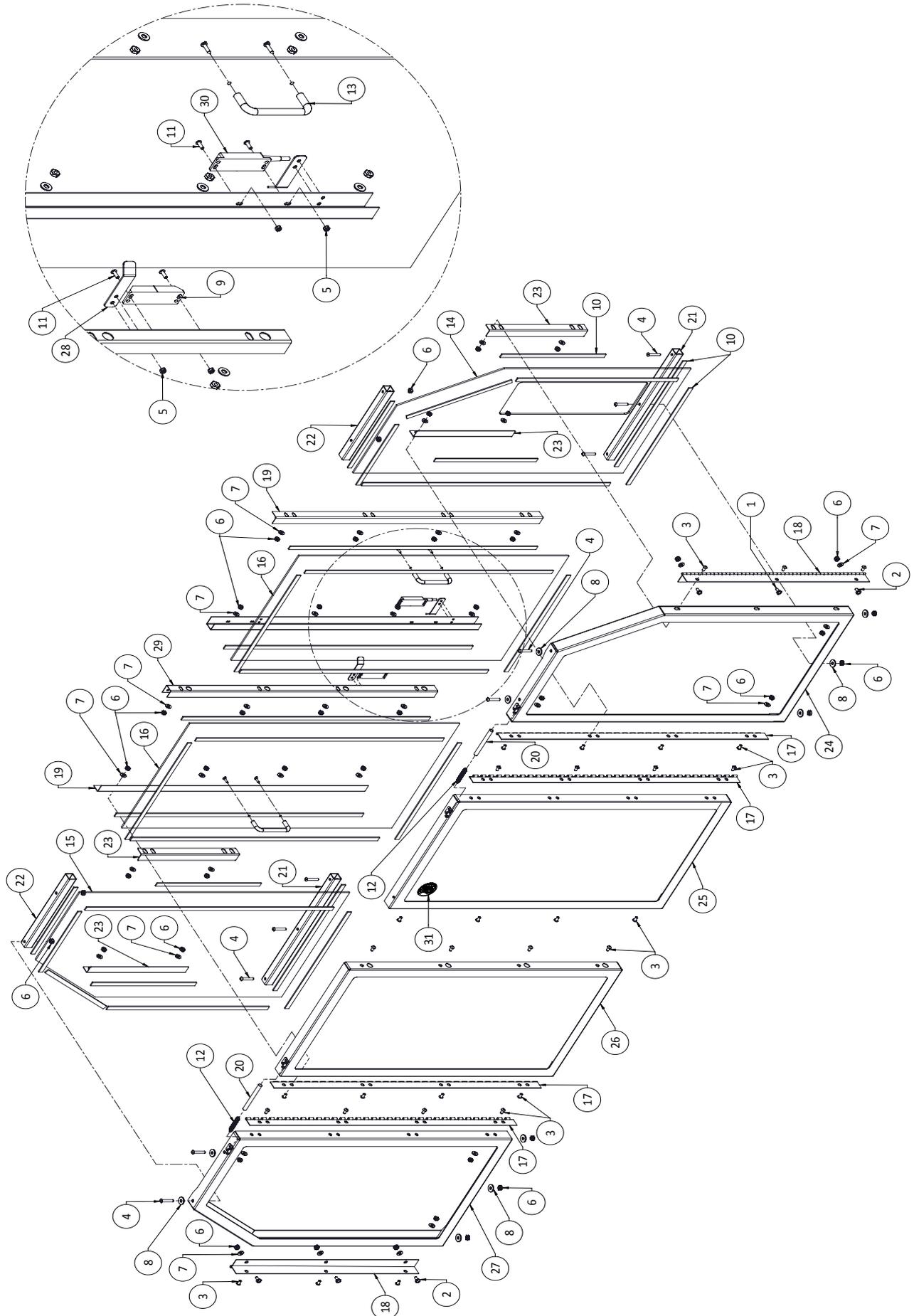


DIAGRAM NO.	PART NO.	DESCRIPTION
1	B250601	
2	B251801	
3	B250816	1/4-20 x 1/2" Long Button Head Socket Cap Screw
4	B252416	
5	J167000	#8-32 Thin Locknut
6	J257000	
7	K250001	
8	R000453	
9	3707647	Coded Door Safety Magnet
.....	3706042	#8 Thread Forming Screw x .75 Long
10	3708378	Foam Strip
11	3708820	
12	3708855	
13	3708857	Pull Handle
14	6059012	Front Outside Window - RH
15	6059013	Front Outside Window - LH
16	6059014	Front Inside Window
17	6059029	Front Center Hinge
18	6059030	Front End Hinge
19	6059036	Center Window Support
20	6059044	Spring Cover Sleeve
21	6059066	Bottom Window Support
22	6059067	Top Window Support
23	6059068	Short Window Support
24	6059069	Front Outside Window Frame Weldment - RH
25	6059070	Front Inside Window Frame Weldment - RH
26	6329071	Window and Switch Support
27	6059072	Front Outside Window Frame Weldment - LH
28	6309038	
.....	3708675	
30	6059021	Front Door Safety Switch Assembly
31	3706105	

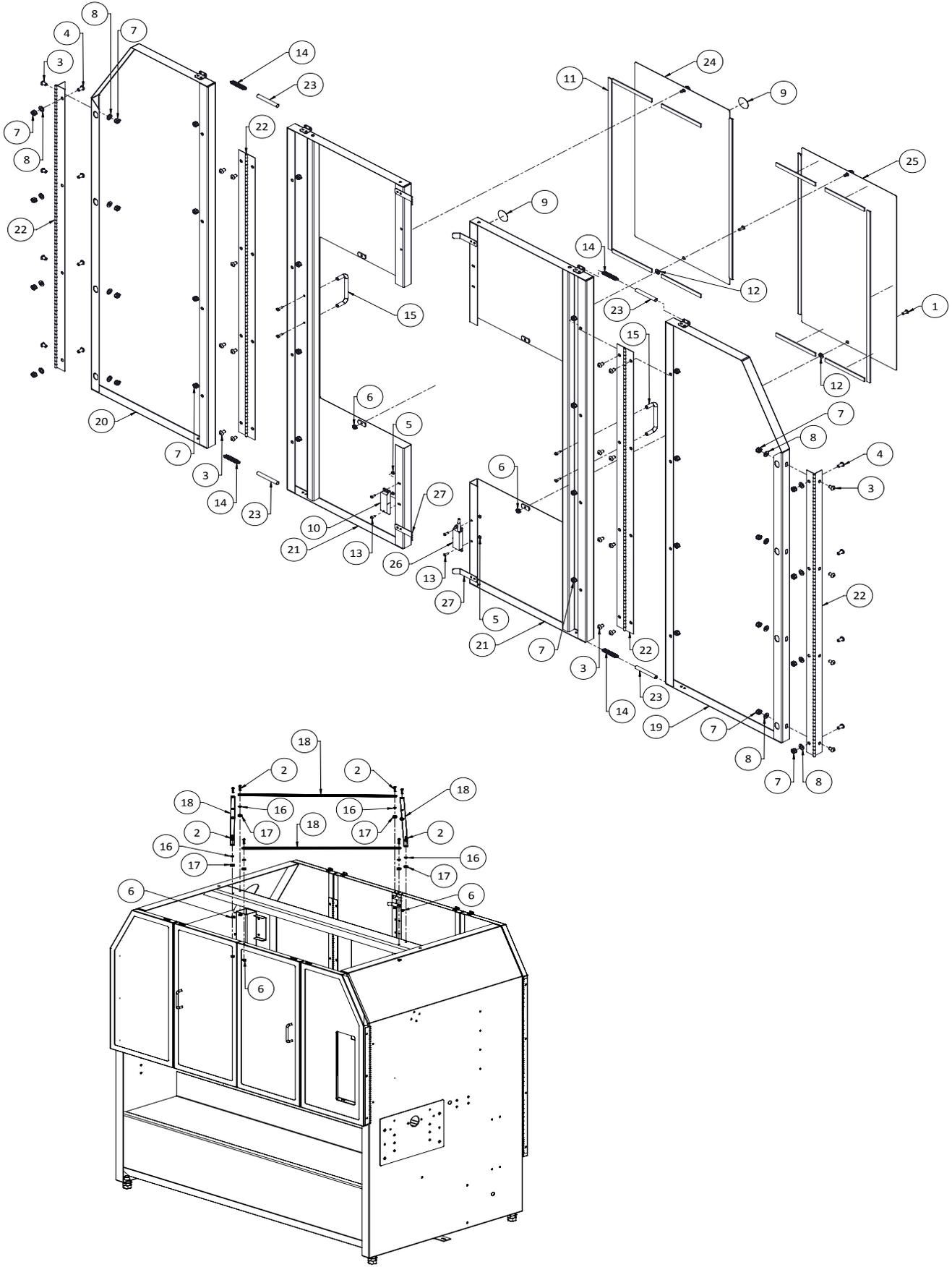
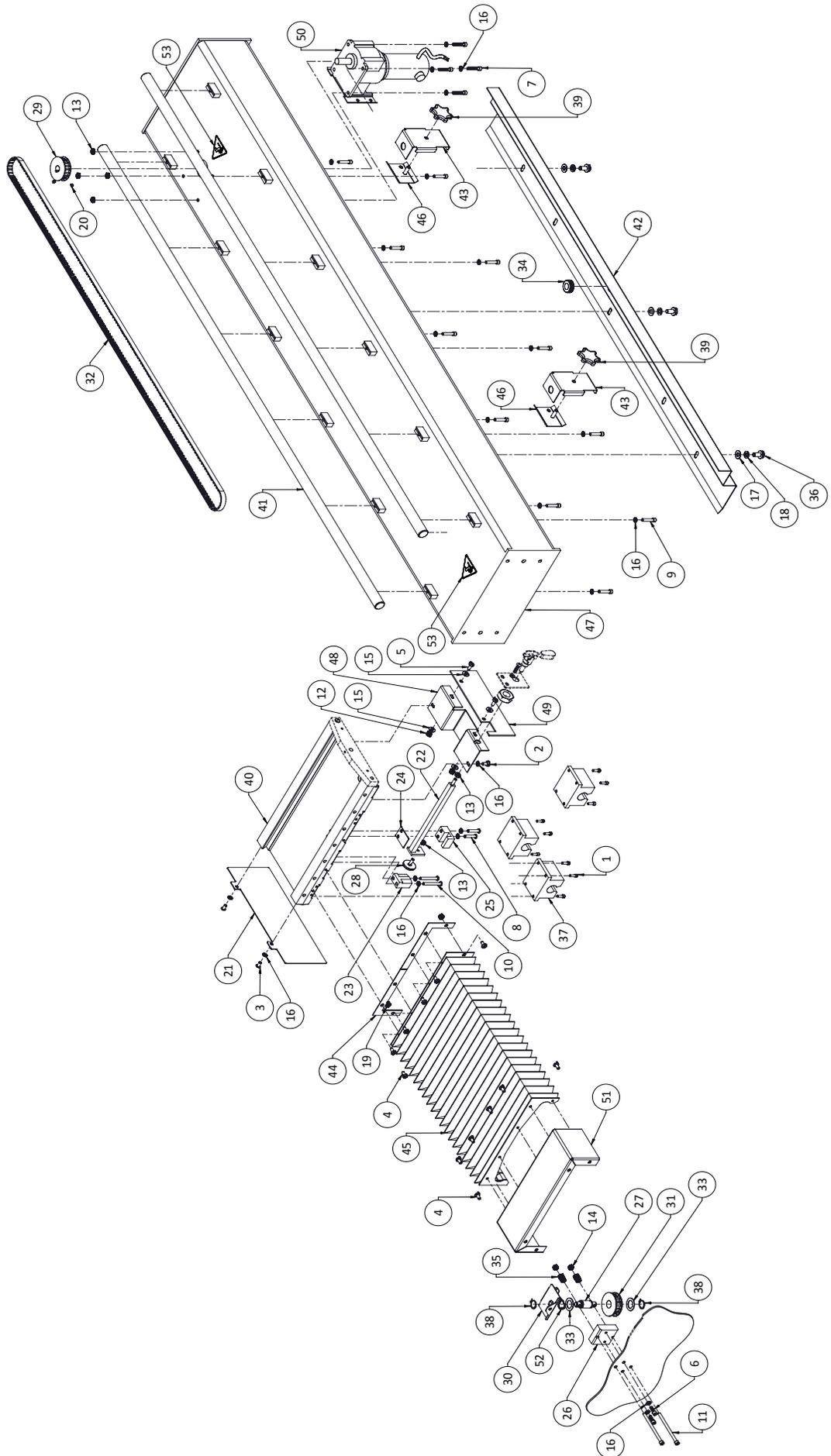
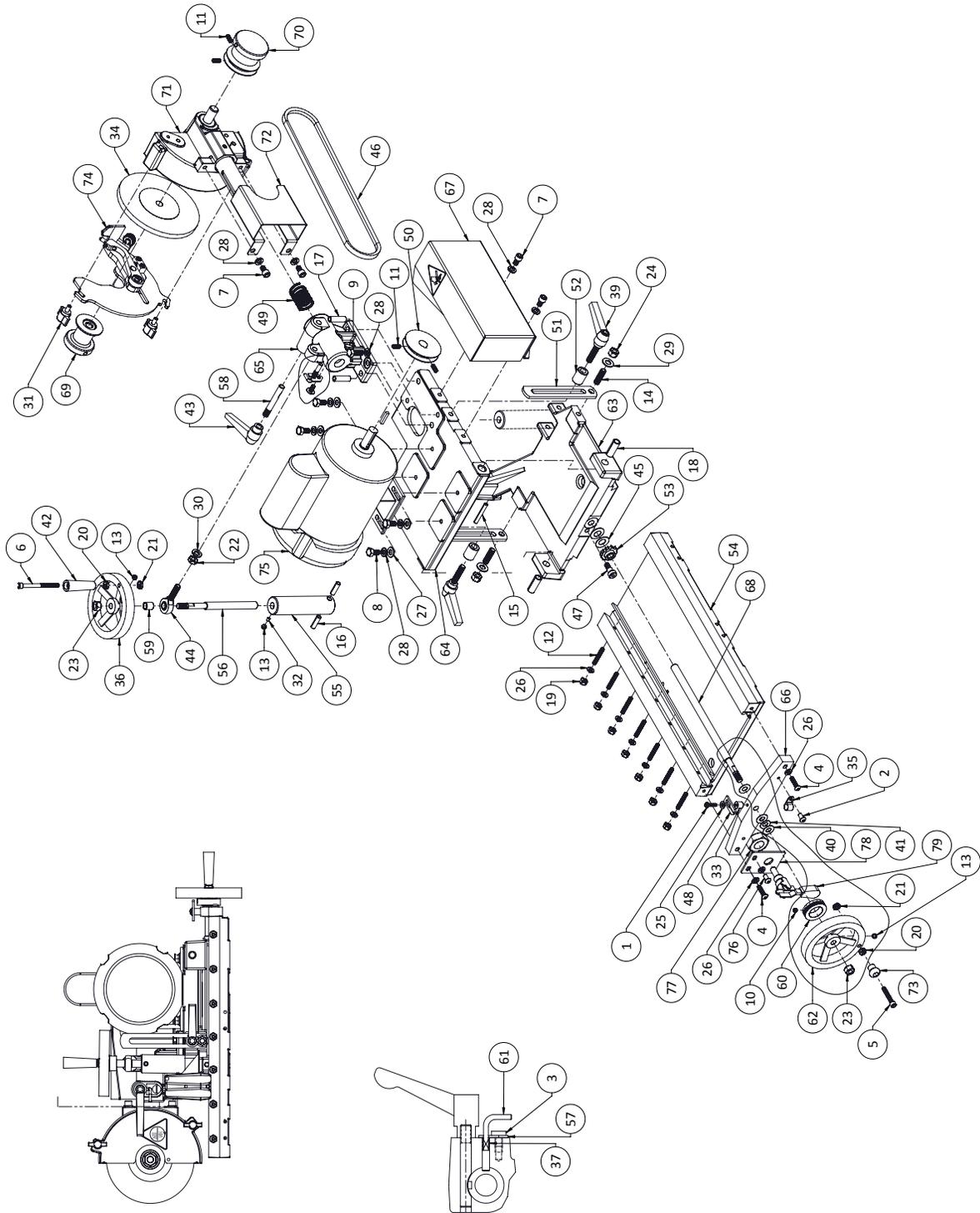


DIAGRAM NO.	PART NO.	DESCRIPTION
1	B251016	1/4-20 x 5/8" Long Button Head Socket Cap Screw
2	B251616	1/4-20x1" Long Button Head Socket Cap Screw
3	B310813	5/16-18 x 1/2" Long Button Head Socket Cap Screw
4	B311213	5/16-18 x 3/4" Long Button Head Socket Cap Screw
5	J167000.....	#8-32 Thin Locknut
6	J257000.....	1/4-20 Thin Locknut
7	J317000.....	5/16-18 Thin Locknut
8	K310001	5/16 SAE Flat Washer
9	3706105.....	
10	3707647.....	Coded Door Safety Magnet
11	3708378.....	Foam Strip
12	3708691.....	Flat Washer
13	3708820.....	#8-32 x 1/2" Long Button Head Safety Screw
14	3708855.....	Extention Spring
15	3708857.....	Pull Handle
.....	3706042.....	#8 Thread Forming Screw x .75 Long
16	3708861.....	Conical Washer
17	3859016.....	Spacer
18	6059006.....	Door Support Rod
19	6059007.....	Rear Outside Door Weldment - RH
20	6059008.....	Rear Outside Door Weldment - LH
21	6059009.....	Raer Inside Door Weldment
22	6059025.....	Rear Door Hinge
23	6059044.....	Spring Cover Sleeve
24	6059011.....	Rear Walker Door Assembly - LH
25	6059026.....	Rear Walker Door Assembly - RH
26	6059040.....	Rear Door Safety Switch Assembly
27	6309038.....	Door Bracket
.....	3708675.....	



PARTS LIST (Continued) 6059533 CARRIAGE & TRAVERSE DRIVE ASSEMBLY

DIAGRAM NO.	PART NO.	PART NAME
1	B191011	#10-24 x 5/8" Long Socket Head Cap Screw
2	B250801	1/4-20 x 1/2" Long Hex Head Cap Screw
3	B250816	1/4-20 x 1/2" Long Button Head Socket Cap Screw
4	B250819	1/4-20 x 1/2" Long Truss Head Machine Screw
5	B251017	1/4-20 x 5/8" Long Round Head Machine Screw
6	B251211	1/4-20 x 3/4" Long Socket Head Cap Screw
7	B252011	1/4-20 x 1 1/4" Long Socket Head Cap Screw Full
8	B252016	1/4-20 x 1 1/4" Long Button Head Socket Cap Screw
9	B252211	1/4-20 x 1 3/8" Long Socket Head Cap Screw Full
10	B253216	1/4-20 x 2" Long Button Head Socket Cap Screw
11	B256411	1/4-20 x 4" Long Socket Head Cap Screw
12	J251000	1/4-20 Hex Nut
13	J252000	1/4-20 Hex Nut Jam
14	J257000	1/4-20 Locknut - Thin
15	K250001	1/4" Flat Washer
16	K251501	1/4" Split Lockwasher
17	K370001	3/8" Flat Washer
18	K371501	3/8" Split Lockwasher
19	R000552	1/4-20 Kep Nut
20	C250460	1/4-20 Socket Set Screw
21	18077	Front Bearing Dust Plate
22	18571	Traverse Clamp Assy
23	28187	Traverse Clamp Block
24	28188	Traverse Clamp Spacer
25	28189	Clamp Support Block
26	28192	Traverse Pulley Support
27	50309	Traverse Pulley Shaft
28	50310	Belt Clamp Tip
29	3706056	Drive Pulley
30	50363	Traverse Pulley Guard
31	55553	Idler Pulley Assembly
32	80354	Cog Belt
33	80355	Thrust Washer
34	3708046	Rubber Grommet
35	3708658	Compression Spring
36	3708693	3/8-16 x 3/4" Long Hex Head Tapping Screw
37	3709044	Ball Bushing Bearing
38	3709331	Retaining Ring
39	3709613	5/16-18 Female Star Knob
40	6059086	Carriage Base
41	3969018	Carrier Shaft
42	6009068	Proximity Switch Support Rail
43	6009070	Proximity Switch Bracket
44	6009098	Bellows Retainer
45	6009140	Way Cover Bellows
46	6009572	Proximity Rail Clamp Weldment
47	6059057	Machined Main Base
48	6059058	Proximity Switch Sensing Bracket
49	6059059	Rubber Pad
50	6059062	Traverse Motor Assembly
51	6059536	Bellows End Bracket Weldment
52	3708419	Wave Spring .78 ID x 1.00 OD
53	3706105	



PARTS LIST (Continued)

6059532 GRINDING HEAD ASSEMBLY

DIA. NO.	PART NO.	PART NAME	DIA. NO.	PART NO.	PART NAME
1	B191233	10-32x3/4 Pan Head Machine Screw	43	3709437	3/8-16 Adj Handle
2	B190633	10-32x3/8 Pan Head Machine Screw	44	3709463	Rod End Bearing
3	B250819	1/4-20x1/2 Truss Head Machine Screw	45	3709620	Conical Washer
4	B251616	1/4-20x1 Button Head Cap Screw	46	3709764	V-Belt
5	B252411	1/4-20x1 1/2 Socket Head Cap Screw	47	3709809	.375 Dia x .38 Lg Shoulder Bolt
6	B255011	1/4-20x3-1/8 Socket Head Cap Screw	48	3809047	Clear Indicator
7	B310811	5/16-18x1/2 Socket Head Cap Screw	49	3889059	1.13 OD 2.0 Lg Compr. Spring
8	B311001	5/16-18x5/8 Hex Head Cap Screw	50	3889088	.62 Bore Pulley
9	B311401	5/16-18x7/8 Hex Head Cap Screw	51	3969027	Adjusting Arm
10	C250420	1/4-20x1/4 Socket Setscrew Cup Pt.	52	3969065	.406ID x 1Lg Steel Spacer
11	C251020	1/4-20x5/8 Socket Setscrew Cup Pt.	53	6009024	1/2-10 ACME Backlash Nut
12	C252420	1/4-20x1-1/2 Socket Setscrew Cup Pt.	54	6009025	Gib Plate
13	C310420	5/16-18x1/4 Socket Setscrew Cup Pt.	55	6009026	Tapped Pivot Sleeve
14	C372020	3/8-16x1-1/4 Socket Setscrew Cup Pt.	56	6009027	ACME Adjusting Shaft
15	H252802	.25 Dia x 1.75Lg Roll Pin	57	6009029	Keeper Plate
16	H311602	.31 Dia x 1 Lg Roll Pin	58	6009030	Shaft Locking Stud
17	H372002	.38 Dia x 1.25 Lg Roll Pin	59	6009031	.386 ID x .56Lg Steel Spacer
18	H502001	.50 Dia x 1.25 Lg Dowel Pin	60	6059082	Calibrated Ring
19	J251000	1/4-20 Hex Nut	61	6009041	Angle Locking Pin
20	J252000	1/4-20 Hex Jam Nut	62	6009044	4.50 Dia Modified Handwheel
21	J257000	1/4-20 Thin Locknut	63	6009083	Grinding Head Slide Base
22	J371100	3/8-24 Hex Nut	64	6009084	Grinding Head Pivot Base
23	J377000	3/8-16 Locknut Jam Nylon	65	6009088	Grinding Head Swivel Base
24	J377100	3/8-16 Locknut Hex Nylok Full	66	6009136	Feed Screw Guide
25	K190001	#10 Flat Washer	67	6009216	Rear Belt Guard
26	K251501	1/4 Split Lock Washer	68	6009218	ACME Adjusting Shaft
27	K310001	5/16 Flat Washer	69	6009272	Grinding Wheel Knob
28	K311501	5/16 Split Lock Washer	70	6009277	V-Belt Pulley Knob
29	K370001	3/8 Flat Washer	71	6009587	Grinding Head Arbor Assembly
30	K371501	3/8 Split Lock Washer	72	6059023	Front Belt Guard
31	09394	2-Prong Knob	73	6059028	Spinning Knob
32	3579109	Nylon Plug 3/16 Dia.	74	6059550	Index Finger Assembly
33	6009224	Spacer .50 OD x .191 ID x .43 Lg	75	3707690	1 HP Motor
34	3700091	Relief Grinding Wheel 6" Dia x .375" W	76	B250816	1/4-20x1/2 Button Head Cap Screw
	3700095	Spin Grinding Wheel 6" Dia x .1" W	77	J627200	5/8-18 Thin Locknut
35	3707933	Cord Clip	78	6009265	Traverse Belt Clamp Bracket
36	3708148	Handwheel 4.5 Dia	79	80335	Destaco Clamp
37	3708213	.24 OD x .62 Lg Comp. Spring			
39	3708561	3/8-16x1.56Lg Adj. Handle			
40	3709062	Conical Washer			
41	3709304	Thrust Washer			
42	3709370	Handle			

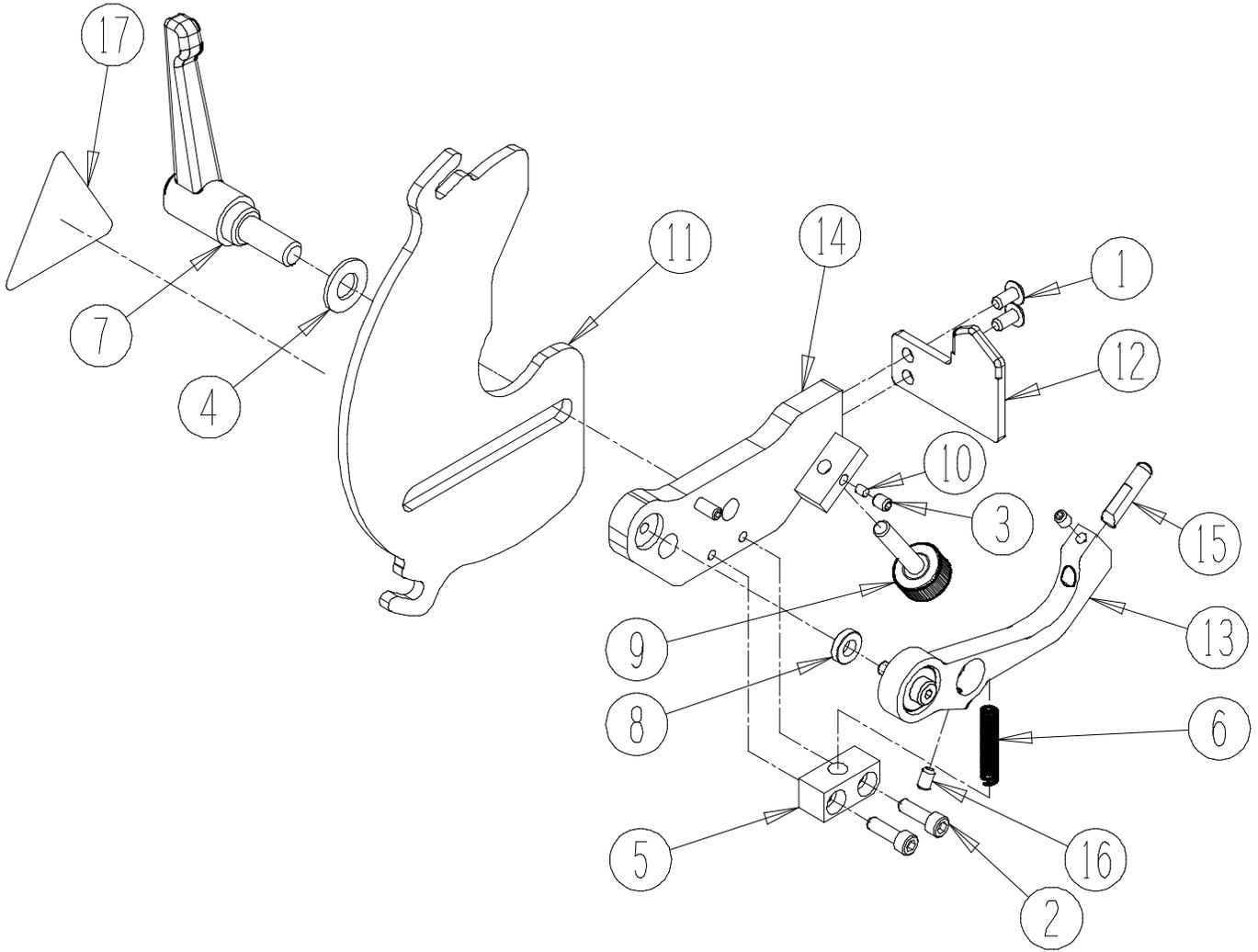


DIAGRAM NO.	PART NO.	DESCRIPTION
1	B190634	10-32 x 3/8 Long Button Head Socket Cap Screw
2	B191031	10-32 x 5/8 Long Socket Head Cap Screw
3	C190467	10-32 x 1/4 Long Socket Setscrew Nylock Cup Point
4	K310001	5/16 Flat Washer
5	55116	Index Finger Spring Block
6	3708919	Compression Spring
7	3708786	5/16-18 x 5/8" Long Adjustable Handle
8	3708833	Spacer
9	3708854	Knob Assembly
10	3709852	1/8" Diameter Nylon Ball
11	6009271	Grinding Wheel Guard & Finger Support
12	6009276	Fixed Finger
13	6059584	Index Finger Assembly
14	6059585	Finger Support Assembly
15	6509007	Index Stop Pin
16	C190667	10-32 x 3/8 Long Socket Setscrew Cup Point w/Patch
17	3708461	Decal - Warning 3600 RPM

PARTS LIST

6059524 MOWER SUPPORT ASSEMBLY

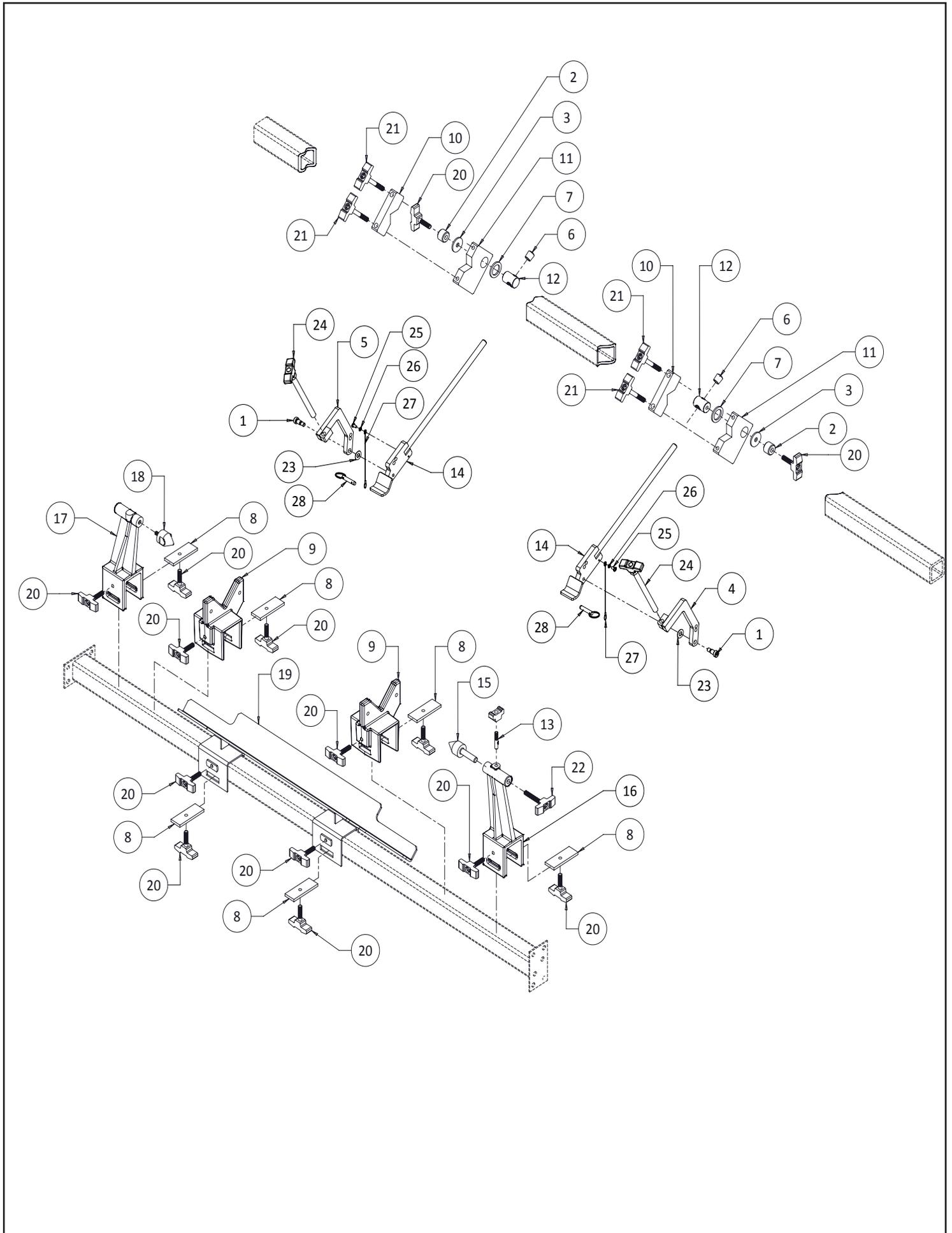


DIAGRAM NO.	PART NO.	DESCRIPTION
1	3708158.....	
2	3109026.....	Spacer
3	3589106.....	Flat Washer 1.38 OD
6	3709258.....	Bumper
7	3709808.....	Flat Washer 1.5 OD
8	3889066.....	Center Stand Lock
9	3969017.....	Mower Support V-Bracket
10	3969094.....	Top Clamp
11	3969095.....	Bottom Clamp
12	3969096.....	Clamp Bar
13	3969160.....	Stud Locking Shaft
14	18537.....	Upper Tooling Clamp Weldment
15	6009020.....	Adjustable Center
16	6009221.....	Adjustable Center Stand
17	6009222.....	Fixed Center Stand
18	6009517.....	Fixed Center Assembly
19	6009545.....	Greensmower Mounting Bracket Weldment
20	6009555.....	T-Knob Assembly 1.5 Long
21	6009566.....	T-Knob Assembly 3.25 Long
22	6009577.....	T-Knob Assembly 2.25 Long
23	3709304.....	
24	6509559.....	
25	B190614	
26	K191501	
27	3708366.....	
28	3708364.....	

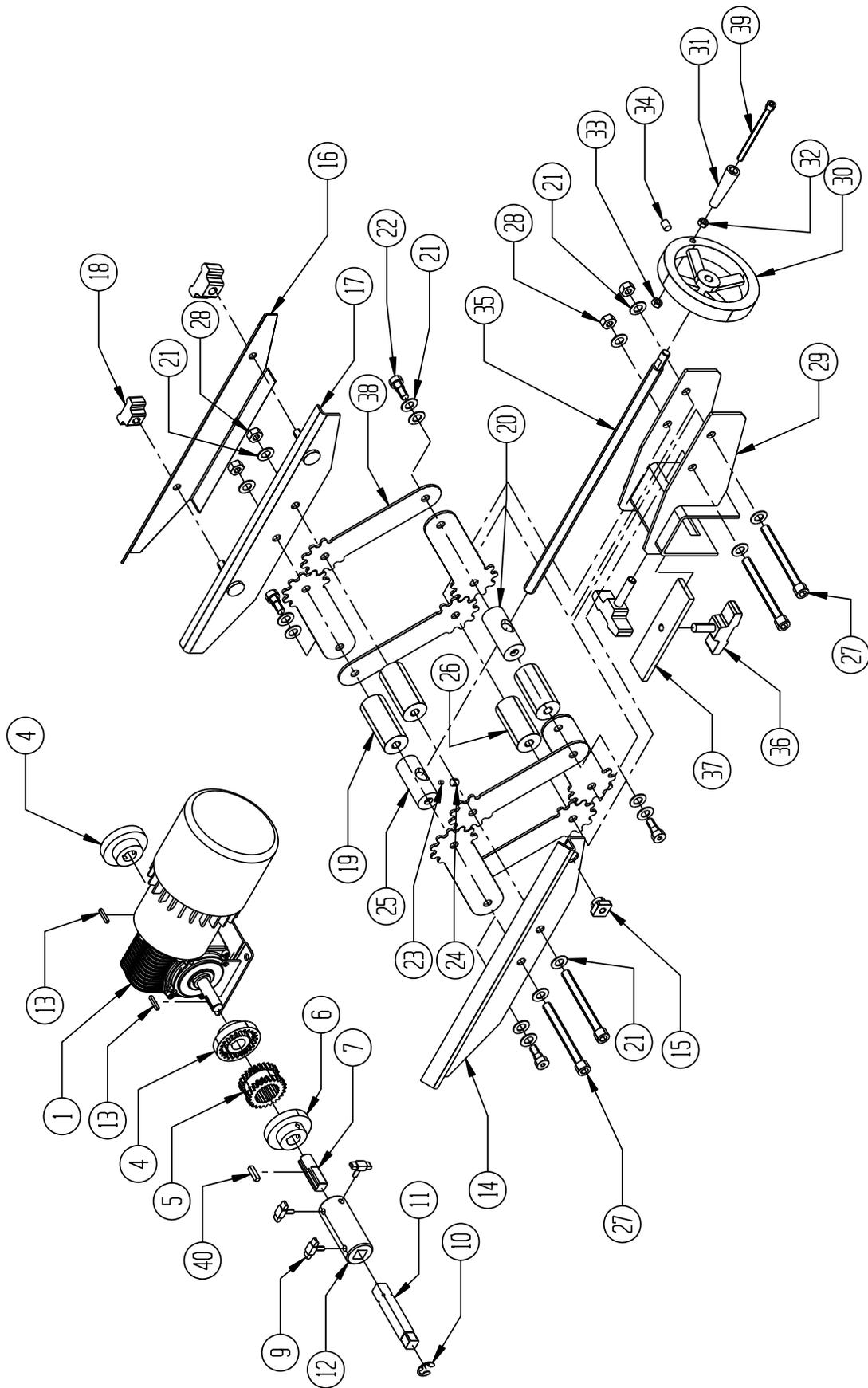
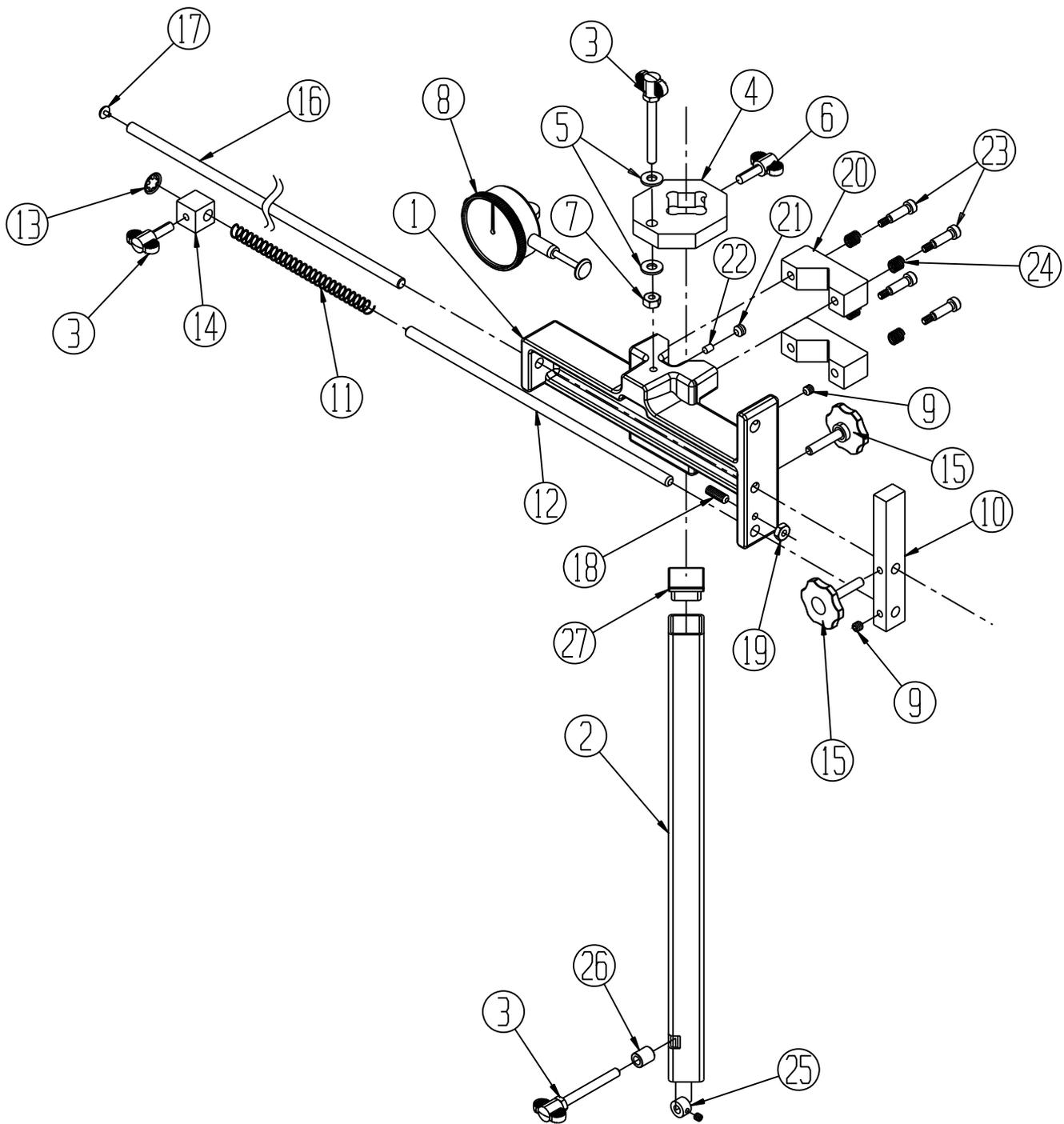


DIAGRAM NO.	PART NO.	DESCRIPTION
1	6329160	Motor Assembly , Electric 90 VDC .25 HP
4	3709586	Flange Coupler .50
5	3709585	Sleeve Coupler
6	3709584	Flange Coupler 5/8
7	6009217	Adapter, Drive Coupling
9	09394	T Knob Assembly 1/4-20 x .50 Lg.
10	3709073	Retaining Ring
11	6009051	Drive Adapter 1/2 Square
12	6009052	Adapter
13	R000376	Square Key 1/8 x 1/8 x 3/4
14	6009078	Bracket, Gearbox Slide
15	3707279	Strain Relief
16	6009079	Bracket, Gearbox Clamp
17	6009580	Bracket, Gearbox Slide Weldment
18	3708262	T-Knob
19	6009048	Spacer, Linkage 2.50 Lg.
20	6009047	Spacer, Linkage L.H. Thd.
21	3709062	Bellevill Washer 3/8"
22	3709809	Shoulder Screw
23	3709705	Nylon Plug
24	C310420	SSS 5/16-18 x 1/4" CP-PT
25	6009046	Spacer, Linkage R.H. Thd.
26	6009045	Spacer, Linkage 2.29 Lg.
27	B375611	SKHCS 3/8-16 x 3.50"
28	J377100	Locknut--Nylon 3/8-16 Full
29	6009575	Linkage--Support Bracket Weldment
30	3708148	Handwheel, 4.50 Diameter
31	3709370	Handle, Spinning
32	J252000	1/4-20 Hex Jam Nut
33	J257000	1/4-20 Nylok Nut
34	C310620	SKSS, SP-PT, 5/16-18 x 3/8"
35	6009076	Rod, Double Thread
36	6009555	Knob Assembly
37	3889066	Center Stand Lock
38	6009067	Linkage, Geared
39	B255011	SHCS 1/4-20 x 3-1/8"
40	R000377	Square Key 3/16 x 3/4"



PARTS LIST (Continued) 6009527 REEL SET UP GAUGE ASSEMBLY

DIAGRAM NO.	PART NO.	DESCRIPTION
1	6009089.....	Slide, Setup Gage
2	18003.....	Tube, Gage Slide
3	6009597.....	Tee Knob Assembly 1.75 lg.
4	6009049.....	Block, Adjust Slide
5	K250001	1/4 Flat SAE Washer
6	3706033.....	T-Knob Assembly 1/4-20 x .79 Long
7	J257100.....	Locknut--Nylon 1/4-20 Full
8	3579123.....	Dial Indicator
9	C250420.....	SKSS, CP-PT, 1/4-20 x 1/4"
10.....	6009054.....	Bar, Indicator Stop
11.....	3709278.....	Spring--Compression
12.....	3969109.....	Spring Guide Rod
13.....	3709336.....	Push on Ring
14.....	3109022.....	Saddle Stop
16.....	6009055.....	Rod, Gage Alignment
17.....	3708540.....	Domed Anvil 3/8
18.....	C251220.....	SKSS, CP-PT, 1/4-20 x 3/4"
19.....	J252000.....	1/4-20 Jam Nut
20.....	6009050.....	Clamp, Spring Loaded
21.....	C310420.....	SSS 5/16-18 x 1/4" CP-PT
22.....	3579109.....	Nylon Plug
23.....	3708453.....	Shoulder Bolt 1/4" D x 3/4"
24.....	3708175.....	Spring
25.....	3708674.....	Set Collar 1/4 with SSS
26.....	6009057.....	Square
28.....	3708154.....	Plug--Spacer
29.....	6009596.....	Tee Knob Assembly, Nylon

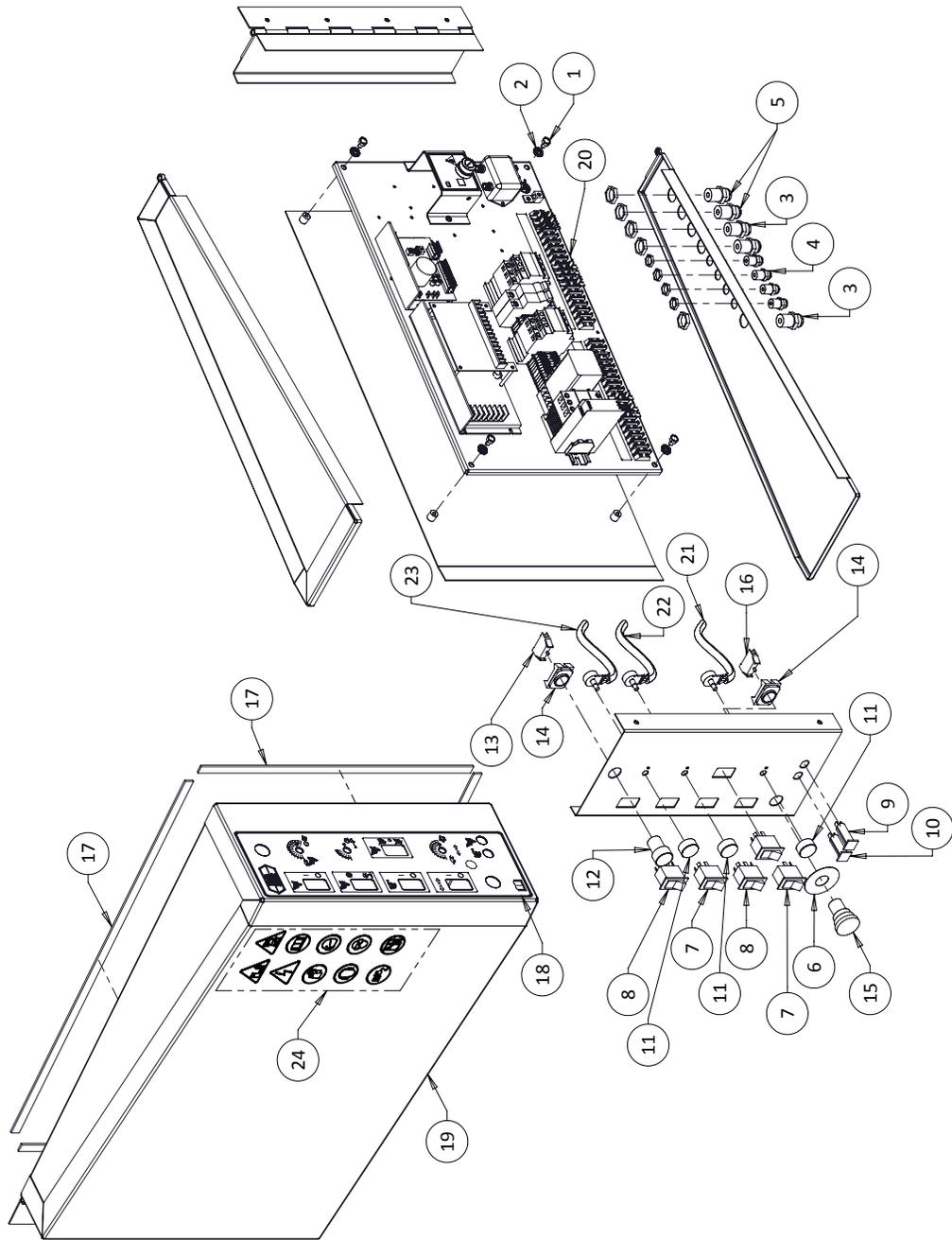
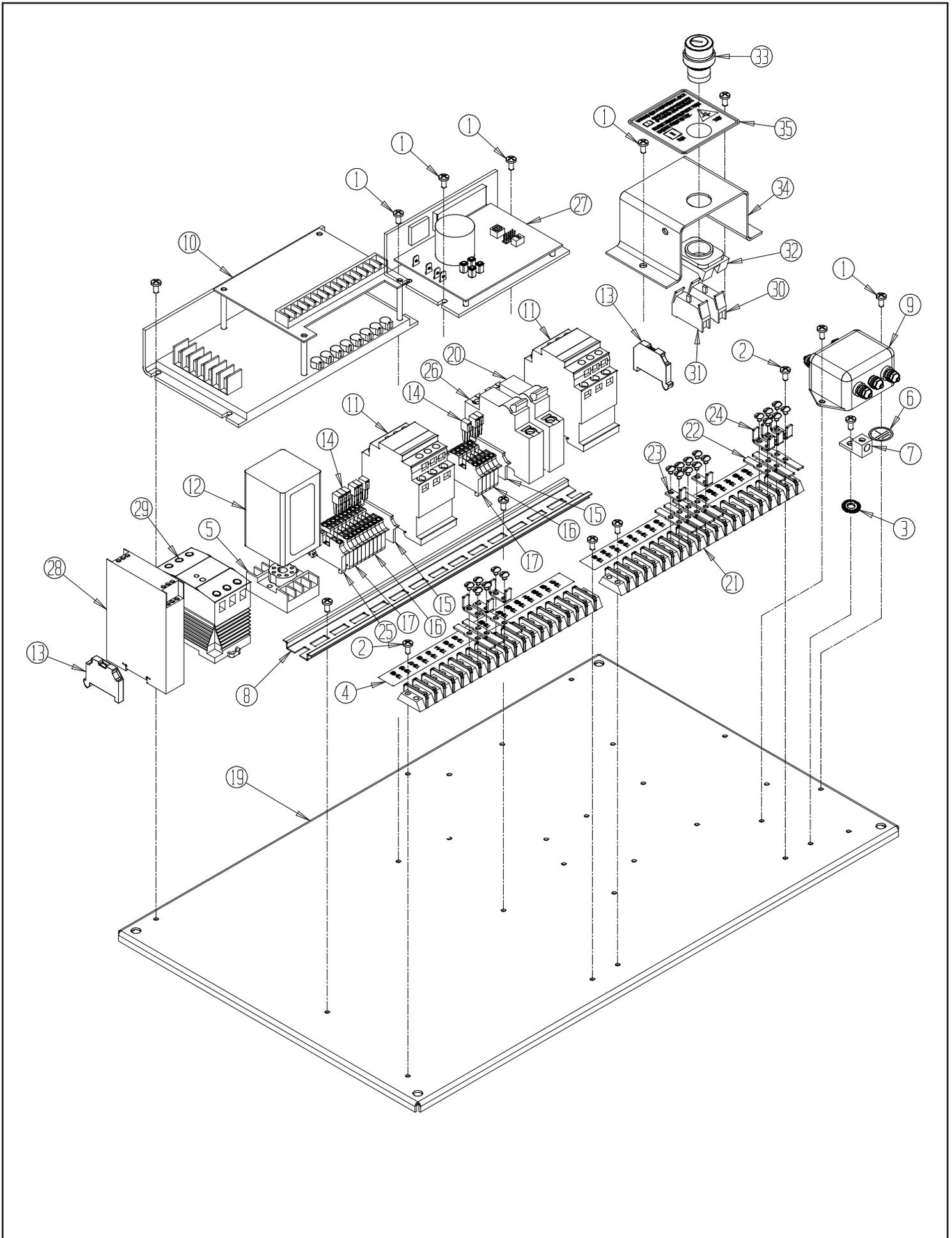


DIAGRAM NO.	PART NO.	DESCRIPTION
1	D250800	1/4-20 x 1/2" Long Thread Cutting Screw
2	R000536	1/4 Internal Teeth Lock Washer
3	3707009	Strain Relief - Large
4	3707029	Strain Relief - Small
5	3707093	Strain Relief - X-Large
6	3707342	Yellow E-Stop Ring
7	3707367	Rocker Switch DPST
8	3707429	Rocker Switch DPDT
9	3707443	4-Amp Circuit Breaker
10	3707543	12-Amp Circuit Breaker
11	3707446	Potentiometer Knob
12	3707564	Green Start Pushbutton
13	3707565	Normal Open Contact Block
14	3707566	Mounting Switch Latch
15	3707567	Push-Pull Red E-Stop
16	3707568	Normal Closed Contact Block
17	3708378	Foam Strip
18	3706043	Control Panel Decal
19	6059544	Electrical Box Weldment
20	6059581	Electrical Panel Sub-Assembly
21	6059050	Traverse Potentiometer
22	6529052	Relief Torque Potentiometer
23	6529053	Spin Speed Potentiometer
24	3706105	
--	6059054	Cord - Main Power (Not Shown)
--	6059083	Cord - Light Receptacle (Not Shown)
--	6059078	Prox Cord - Traverse LH [Service] (Not Shown)
--	6059079	Prox Cord - Traverse RH [Service] (Not Shown)
--	3707601	Prox Head [Service] (Not Shown)
--	3707224	Cable Tie Mount (Not Shown)
--	3707225	Cable Tie 6.5 Long x .18 Wide (Not Shown)
--	3707255	Cable Tie 4.0 Long x .10 Wide (Not Shown)



PARTS LIST**6059581 CONTROL PANEL SUB-ASSEMBLY**

<u>DIAGRAM NUMBER</u>	<u>PART NUMBER</u>	<u>DESCRIPTION</u>
1.....	D160666.....	Pan Head Self-Tapping Screw #8 x 3/8 Long
2.....	D161266.....	Pan Head Self-Tapping Screw #8 x 3/4 Long
3.....	R000480.....	#8 Lockwasher
4.....	55223.....	Terminal Strip Decal
5.....	3707073.....	8-Pin socket
6.....	3707163.....	Primary Ground Decal
7.....	3707164.....	Primary Ground Lug
8.....	3707378.....	14" Din Rail
9.....	3707764.....	Power Line Filter 20 Amp
10.....	3707850.....	Traverse Control Board
11.....	3707556.....	Magnetic Starter
12.....	3707688.....	High/Low Voltage Sensor Relay
13.....	3707625.....	Screwless Terminal Block End Stop
14.....	3707626.....	Terminal Block Jumper
15.....	3707627.....	Terminal Block End Plate
16.....	3707628.....	2-Conductor Terminal Block - Grey
17.....	3707629.....	2-Conductor Terminal Block - Blue
18.....	3708920.....	Low Voltage Warning Decal
19.....	6009270.....	Electrical Sub Panel
20.....	3707589.....	15-Amp Circuit Breaker
21.....	3707706.....	19 Pole Terminal Strip
22.....	3707707.....	Double Spade Terminal
23.....	3707709.....	Single Spade Terminal 90°
24.....	3707708.....	Double Spade Terminal 90°
25.....	3707624.....	Ground Terminal Block
26.....	3707779.....	6 Amp Circuit Breaker
27.....	3707942.....	Spin/Relief Control Board
28.....	3707328.....	Door Safety Switch Monitor
29.....	3707333.....	24 VDC Power Supply
30.....	3707565.....	Contact Block - Normally Open NO
31.....	3707568.....	Contact Block - Normally Closed NC
32.....	3707566.....	Switch Mounting Latch
33.....	3707592.....	Keyed Position Switch
34.....	6059046.....	Key Switch Mount Bracket
35.....	6059049.....	Key Switch Position Decal

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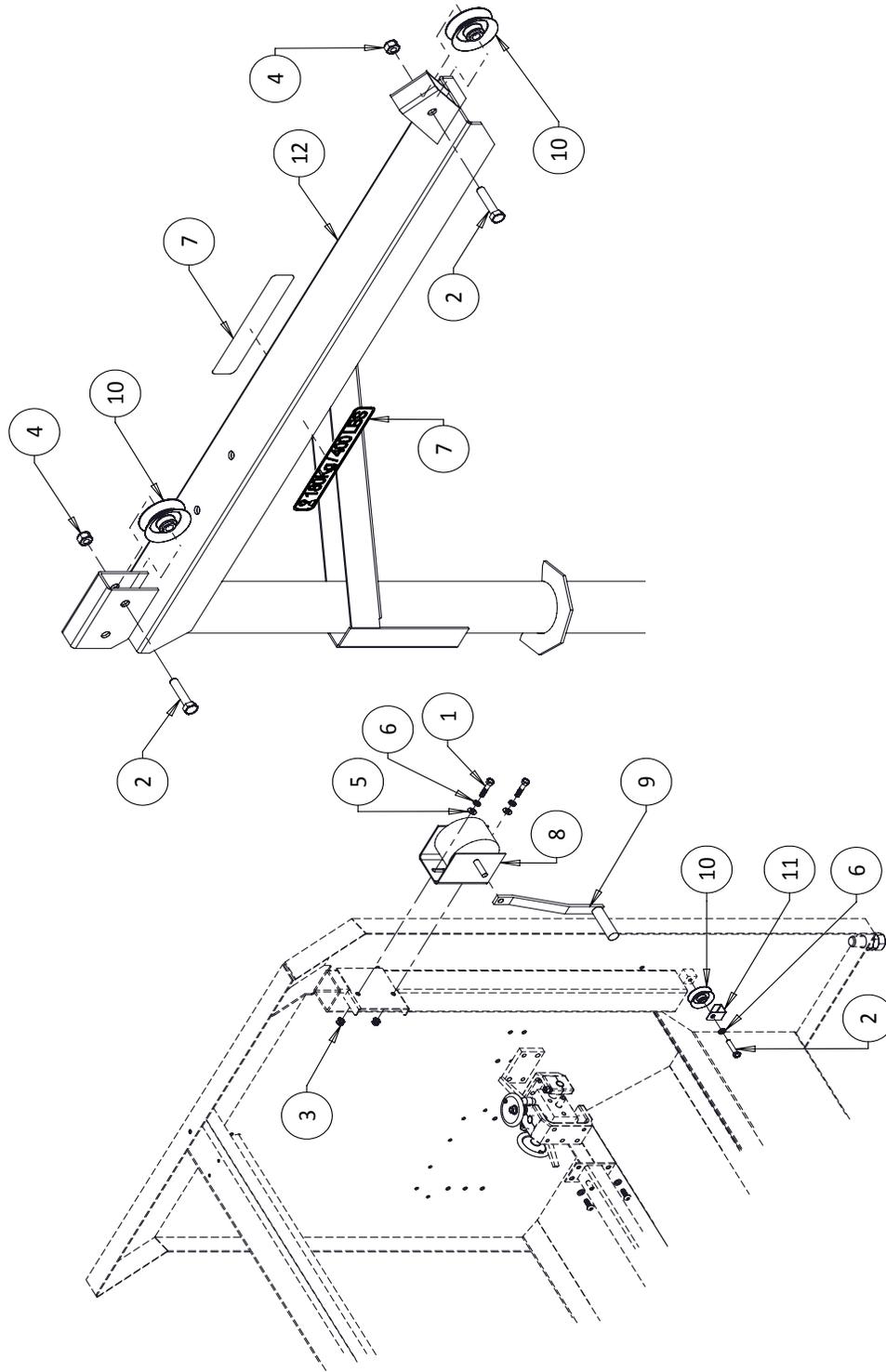


DIAGRAM NO.	PART NO.	DESCRIPTION
1	B371601	3/8-16 x 1" Long Hex Head Cap Screw
2	B372801	3/8-16 x 1 3/4 Hex Head Cap Screw
3	J371000	3/8-16 Hex Nut
4	J377100	3/8-16 Hex Nilyok Locknut
5	K370001	3/8 Flat Washer
6	K371501	3/8 Split Lockwasher
7	3706111	Boom Capacity Warning Decal
8	3708578	Winch With 11" Handle
9	3708647	Handle 7"
10	3709795	Pulley
11	6059003	Pulley Guard Bracket
12	6059527	Boom Weldment
12	6309036	Boom Capacity Decal

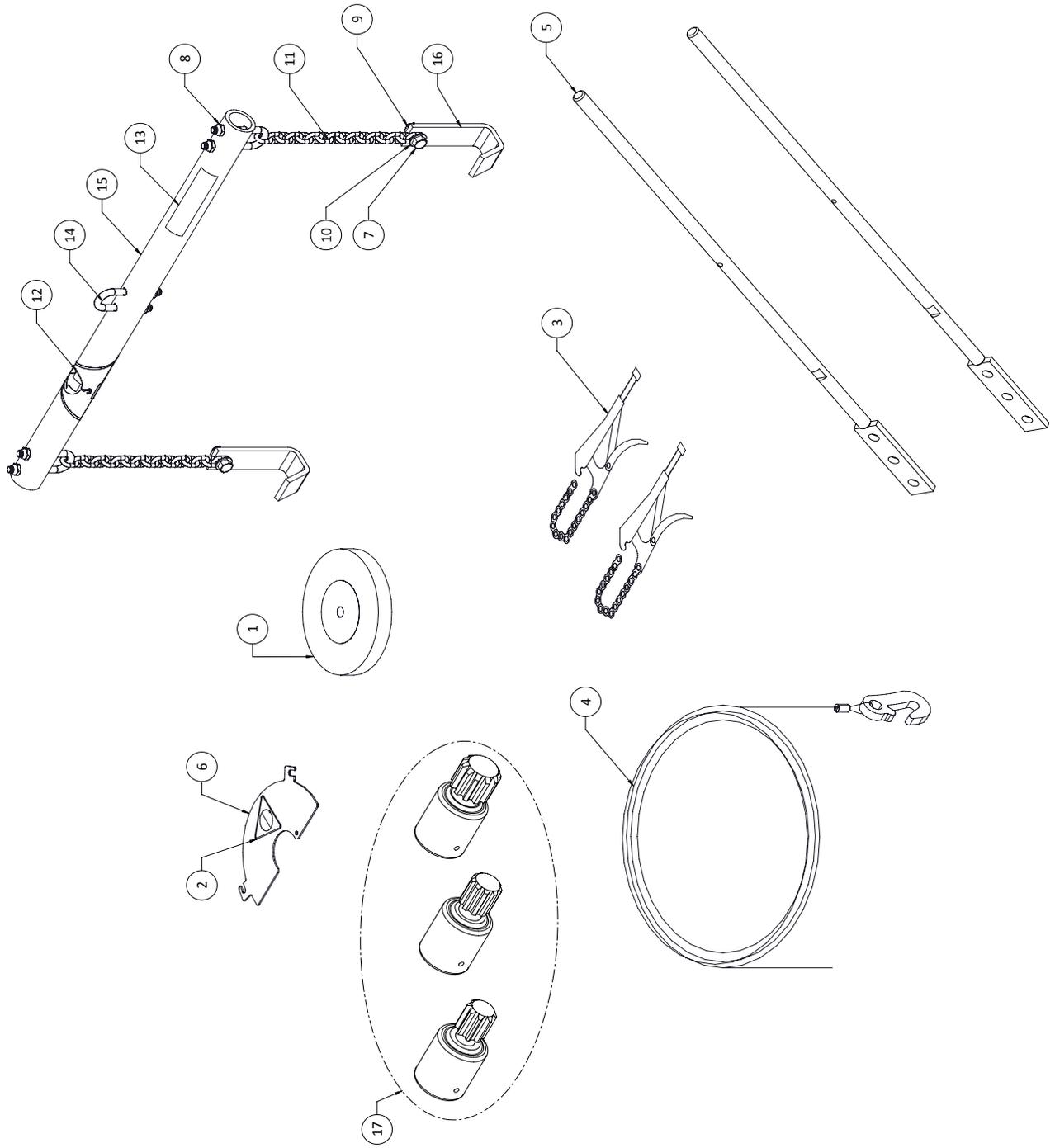
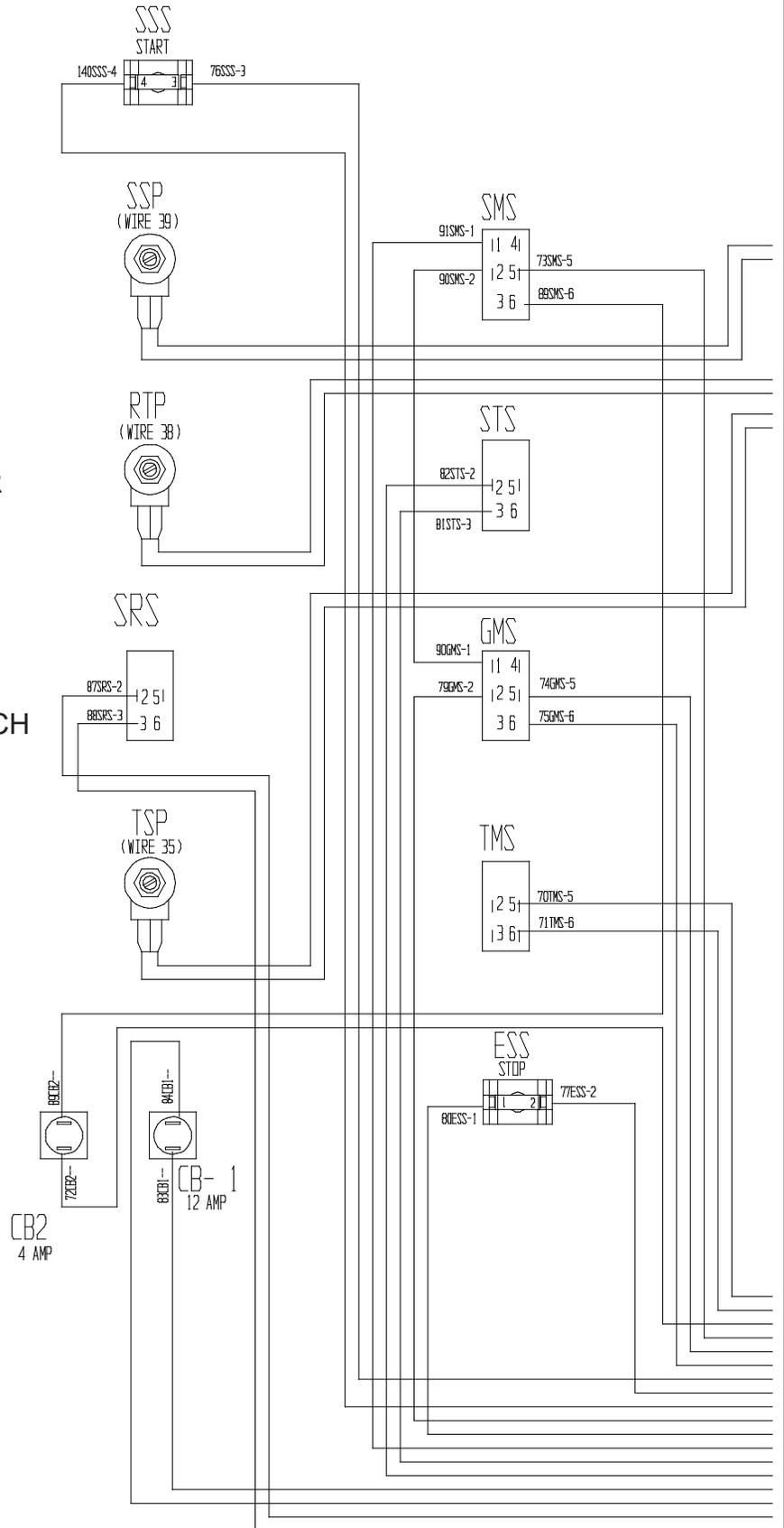


DIAGRAM NO.	PART NO.	DESCRIPTION
1	3700095.....	Spin Grinding Wheel - Straight 6" x 1"W x .5 Bore
.....	3700091.....	Relief Grinding Wheel 6" Dia x .375" W x .5" Bore
2	3708461.....	Decal - Warning 3600 RPM
3	3709298.....	Chain Clamp - Vice Grip
4	3709407.....	Hook and Cable Assembly
5	3889531.....	Mower Holder Clamp
6	6009037.....	Guard - Wheel
7	B372011	3/8-16 x 1-1/4 Socket Head Cap Screw
8	J317100.....	5/16-18 Locknut - Full Height
9	J377100.....	3/8-16 Locknut - Full Height
10	3599028.....	Flatwasher 1.00 OD x .375 ID x .188 T
11	3649005.....	Chain
12	3708456.....	Decal - Warning Load
13	3708856.....	Decal - Spreader Bar
14	3709316.....	U Bolt 5/16-18 x 3
15	6009011.....	Spreader
16	6009102.....	Grab Hook
17	3706130.....	

PARTS LIST

6054580 WIRING DIAGRAM

- CB1 - CIRCUIT BREAKER 1
- CB2 - CIRCUIT BREAKER 2
- DSS1 - FRONT DOOR SAFETY SWITCH
- DSS2 - REAR DOOR SAFETY SWITCH
- ESS - EMERGENCY STOP SWITCH
- FTR - LINE FILTER
- GMS - GRINDING MOTOR SWITCH
- KSS - KEY SELECTOR SWITCH
- LVR - LOW VOLTAGE RELAY
- MAG - MAGNETIC STARTER
- MCB - MAIN CIRCUIT BREAKER
- PWR - 24V POWER SUPPLY
- PX1 - RIGHT PROXIMITY SWITCH
- PX2 - LEFT PROXIMITY SWITCH
- REL - GRINDING MOTOR RELAY
- 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 SELECTOR 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



ELECTRICAL SCHEMATIC

