

AUTO - INDEX
SPIN / RELIEF
REEL MOWER GRINDER

181

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

SERVICE MANUAL



YOU MUST THOROUGHLY READ AND UNDERSTAND ALL MANUALS BEFORE OPERATING THE EQUIPMENT, PAYING PARTICULAR ATTENTION TO THE WARNING & SAFETY INSTRUCTIONS.



IMPORTANT SAFETY MESSAGE



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

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

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

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

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

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

Following these simple, basic safety rules, as well as others:

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

THROUGHOUT THIS MANUAL, THE FOLLOWING SAFETY SYMBOLS WILL BE USED TO INDICATE THE DEGREE OF CERTAIN HAZARDS.



This symbol is used throughout this manaul 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.

TABLE OF CONTENTS

Safety Message	2
Safety Instructions	3 -7
Service Data and Adjustments	8 -17
Trouble Shooting	18 -35
Parts Diagram	36 - 61
Wiring Diagram	62 - 63
Wiring Schematic	64

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

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

This machine is designed for sharpening reel type mower blades <u>ONLY.</u>
Any use other than this may cause personal injury and void the warranty.

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



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

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

INSTALLATION, DAILY MAINTENACE, LUBRICATION AND BASIC UPKEEP IS DISCUSSED IN THE OPERATORS MANUAL. THIS MANUAL SHOULD BE USED IN CONJUNCTION WITH THE OPERATORS MANUAL FOR PREFORMING SERVICE ON THIS EQUIPMENT.





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

- 1. **KEEP GUARDS IN PLACE** and in working order.
- 2. REMOVE WRENCHES AND OTHER TOOLS.
- 3. KEEP WORK AREA CLEAN.
- 4. DON'T USE IN DANGEROUS ENVIRONMENT.

Don't use Grinder in damp or wet locations. Machine is for indoor use only. Keep work area well lit.

- 5. **KEEP ALL VISITORS AWAY.** All visitors should be kept a safe distance from work area.
- 6. **MAKE WORK AREA CHILD-PROOF** with padlocks or master switches.
- 7. **DON'T FORCE THE GRINDER.** It will do the job better and safer if used as specified in this manual.
- 8. **USE THE RIGHT TOOL.** Don't force the Grinder or an attachment to do a job for which it was not designed.
- 9. **WEAR PROPER APPAREL.** Wear no loose clothing, gloves, neckties, or jewelry which may get caught in moving parts. Nonslip footwear is recommended. Wear protective hair covering to contain long hair. Wear respirator or filter mask where appropriate. Wear protective gloves.
- 10. ALWAYS USE SAFETY GLASSES.
- 11. **SECURE YOUR WORK.** Make certain that the cutting unit is securely fastened with the clamps provided before operating.
- 12. **DON'T OVERREACH.** Keep proper footing and balance at all times.

- 13. **MAINTAIN GRINDER WITH CARE.** Follow instructions in Service Manual for lubrication and preventive maintenance.
- 14. **DISCONNECT POWER BEFORE SERVICING,** or when changing the grinding wheel.
- 15. **REDUCE THE RISK OF UNINTENTIONAL STARTING.** Make sure the switch 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 GRINDER WHEN UNDER THE INFLUENCE OF DRUGS, ALCOHOL, OR MEDICATION.



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

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

DO

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

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.

WARNING

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



Carefully Read all the instructions below before attempting to operate or service your winch! Failure to comply with instructions could result in personal injury, death and/or property damage!

- 1. Maximum lifting capacity is 400 pounds (180 kg.) in a single line operation. DO NOT ATTEMPT TO MOVE LOADS GREATER THAN THE RATING.
- 2. **NEVER CARRY** personnel on the hook or the load.
- 3. **NEVER MOVE A LOAD** with this winch until all personnel are clear.
- 4. NEVER HOOK THE WIRE ROPE BACK ON ITSELF. USE THE SPREADER BAR ASSEMBLY. Hooking the wire rope 17. ALLOW WINCH TO COOL DOWN back on itself creates an unacceptable strain on the wire rope.
- 5. **DO NOT ALLOW** unqualified personnel to operate this unit.
- 6. KEEP CLEAR OF WINCH WIRE ROPE AND HOOK WHEN OPERATING WINCH. DO NOT ATTEMPT to guide wire rope by hand as it rewinds.
- 7. **DO NOT** use the wire rope as a ground for welding.
- 9. WHEN SPREADER BAR ASSEMBLY IS USED be sure it factory approved components may cause injury or is properly seated in the saddle of the hook.
- 10. AVOID excessive inching and quick reversals of load.
- 11. BE SURE that the power supply is disconnected before performing maintenance and repair procedure.
- 12. **DO NOT OPERATE** this unit if it is not functioning properly.
- 13. MAINTAIN A MINIMUM OF 4 TURNS OF WIRE **ROPE** around the winch drum to prevent the wire rope from pulling off under load.
- 14. **KEEP WINCHING AREA CLEAR**. Do not allow people to remain in the winching area. Do not stand between the winch and the load.

- 15. INSPECT WIRE ROPE FREQUENTLY. A frayed wire rope with broken strands should be replaced immediately. Never replace the wire rope with rope of any kind or with wire rope other than the type and size specified in the repair parts section of this manual.
- 16. USE HEAVY LEATHER GLOVES when handling the wire rope to eliminate the possibility of cuts or scratches from burrs and slivers from broken strands.

FREQUENTLY (Electric Winch), as the motor is designed for intermittent duty only. When the metal motor housing is hot to touch, it is time to let the winch cool down

- 18. DO NOT OPERATE WINCH WHEN UNDER THE INFLUENCE OF DRUGS, ALCOHOL, OR MEDICATION.
- 19. DO NOT USE WINCH TO HOLD LOADS IN PLACE. Use other means of securing loads, such as tie down straps.
- 8. NEVER TOUCH a welding electrode to the wire rope. 20. USE ONLY FACTORY APPROVED, PARTS, SWITCHES, REMOTE CONTROLS AND ACCESSORIES. Use of nonproperty damage and could void your warranty.
 - 21. DO NOT MACHINE OR WELD ANY PART OF THE **WINCH**. Such alterations may weaken the structural integrity of the winch and could result in personnel injury and void your warranty.
 - 22. DO NOT OPERATE THIS WINCH OUT DOORS OR IN A CORROSIVE OR EXPLOSIVE ENVIRONMENT.





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

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

REVIEW THE SYMBOLS AND DESCRIPTIONS ON PAGES 8 AND 9 OF THE OPERATORS MANUAL. UNDERSTAND ALL SYMBOLS BEFORE OPERATING OR SERVICING THIS EQUIPMENT.



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

IMPORTANT GROUNDING INSTRUCTIONS

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

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

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

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

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



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

SKILL AND TRAINING REQUIRED FOR SERVICING

This Service Manual is designed for technicians who have the necessary mechanical and electrical knowledge and skills to reliably test and repair the 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 section of this 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 AluminumUse 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	3 MARKS	6 MARKS
	HEAD	on HEAD	on HEAD
1/4 In.	6 ft-lbs	9 ft-lbs	13 ft-lbs
thread	(0.8 kg-m)	(1.25 kg-m)	(1.8 kg-m)
5/16 In.	11 ft-lbs	18 ft-lbs	28 ft-lbs
thread	(1.5 kg-m)	(2.5 kg-m)	(3.9 kg-m)
3/8 In.	19 ft-lbs	31 ft-lbs	46 ft-lbs
thread	(2.6 kg-m)	(4.3 kg-m)	(6.4 kg-m)
7/16 In.	30 ft-lbs	50 ft-lbs	75 ft-lbs
thread	(4.1 kg-m)	(6.9 kg-m)	(10.4 kg-m)
1/2 In.	45 ft-lbs	75 ft-lbs	115 ft-lbs
thread	(6.2 kg-m)	(10.4 kg-m)	(15.9 kg-m)

ADJUSTMENTS - ORIGINAL INSTRUCTIONS -

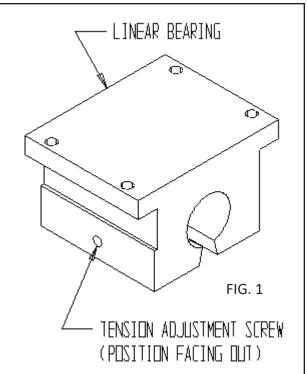
CARRIAGE LINEAR BEARING REPLACEMENT

STEP 1--Remove the four screws of one linear bearing and slide the linear bearing off the end of the carriage shaft.

STEP 2--Insert a new linear bearing onto the end of the carriage shaft with the tension adjustment screw pointing outward. See FIG. 1.

STEP 3--Adjust the tension screw of the linear bearing so when you radially rotate the linear bearing around the carriage shaft there should be no free play between the linear bearing and the carriage shaft.

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





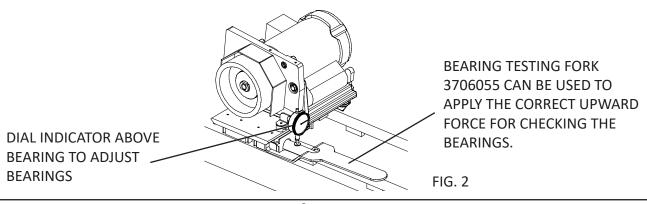
SETTING THE BEARING TENSION CORRECTLY IS CRITICAL TO PROPER GRINDING. BEARINGS WHICH ARE TOO TIGHT OR TOO LOOSE WILL CAUSE POORGRIND QUALITY. ALSO, BEARINGS WHICH ARE TOO TIGHT WILL HAVE SUBSTANTIALLY SHORTER LIVES AND may DAMAGE THE SHAFT.

STEP 4--Slide linear bearing under carriage and attach with the four screws.

Repeat Steps 1 through 3 with the other two linear bearings.

STEP 5--After all three linear bearings are secured to the carriage, check for correct bearing tension. The bearing tension is correct when you try to lift the carriage and can feel no carriage movement. If there is movement this means there is up and down free play. The most dependable method of checking free play is to use a magnetic base dial indicator attached to the traverse frame weldment and a bearing testing fork 3706055. Read the vertical movement above each bearing. This movement should be within .003" [.07 mm]. See FIG 2.

In addition, there should only be approximately 3lbs [13 Newtons] of force required to pull the carriage from side to side with the belt clamp disengaged. The grinding head assembly should have very uniform resistance through its full range of travel.



ADJUSTMENTS - ORIGINAL INSTRUCTIONS -

SPIN GRINDING ATTACHMENT ADJUSTMENT

The tension on the height adjustment screw can be adjusted by turning the adjustment setscrew. See FIG 3. If the screw moves during grinding, increase the tension on the screw with the adjustment setscrew.

If there is too much play in the spin drive pivot points, torque down the hex nut until the conical washer is compressed, then back off 1/2 turn. See FIG. 3.



The gib plate must be readjusted occasionally to eliminate free play. If the gib plate is not adjusted properly the grinding head can move from side to side. This movement may cause the reel to be ground unevenly.

The gib must allow the carriage to be moved freely forward and back without any side play. See FIG. 4.

To adjust:

- 1. Move the carriage all the way forward (toward the operator position).
- 2. Loosen the jam nut on the front gib screw then tighten the screw until the carriage has no side play but the horizontal handwheel can still be rotated easily. When set correctly lock the screw in place with the jam nut
- 3. Use the handwheel to graduallly move the carriage away from the operator position. Adjust the remaining gib screws as you move the carriage. THE CARRIAGE MUST BE OVER THE GIB SCREW WHEN IT IS ADJUSTED OR IT MAY BE OVERTIGHTENED.

ADJUSTABLE FINGER STOP TENSION

To increase or decrease the tension on the finger stop knob, adjust the setscrew on the side of the relief finger assembly. There is a nylon ball that presses against the threads of the knob. If the knob is moving when grinding, increase the tenstion by rotating the sectscrew clockwise. See FIG 5

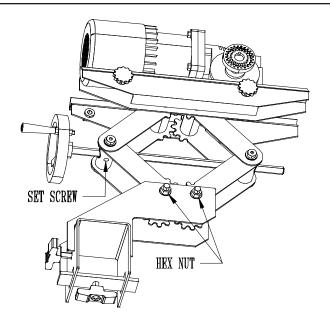


FIG. 3

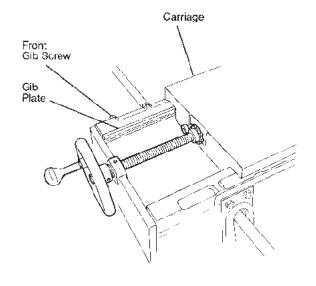


FIG. 4

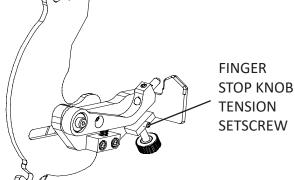


FIG. 5

ADJUSTMENTS - ORIGINAL INSTRUCTIONS -

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 locking studs 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.

freely.

FIG. 6 and 7.

STEP 5--Remove all burrs and resurface the shaft to a clean, smooth, polished surface.

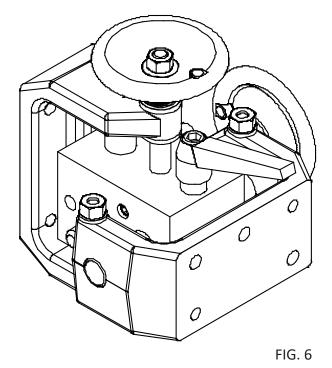
(OR REPLACE WITH A NEW SHAFT.)

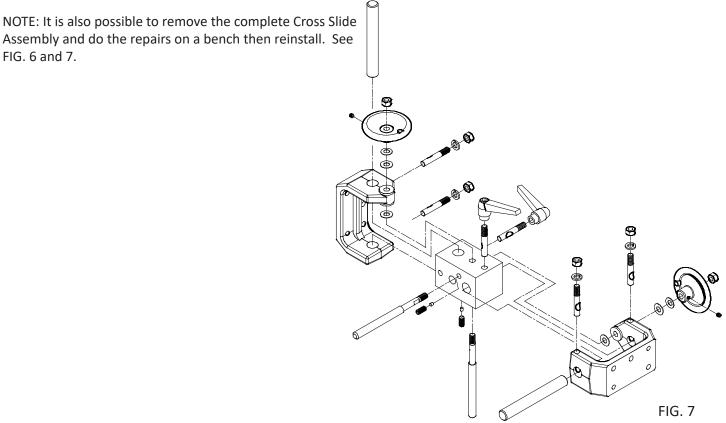
STEP 6--Coat shaft with Never-Seez and re-install the shaft through the Support, Cross Slide Block and the three Locking studs. The shaft must move freely inside the Cross Slide Block before reassembling.

STEP 7--Retighten the nuts at the end of the locking stud 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

NOTE: It is also possible to remove the complete Cross Slide





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" [19 mm]. See FIG. 8. 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.

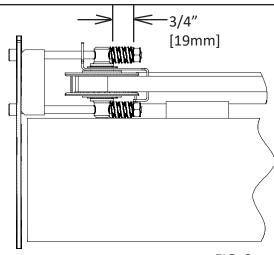


FIG. 8

TRAVERSE CLAMP FORCE

If the traverse clamp is slipping during regular operation it may be necessary to tighten the clamp. To tighten, loosen the jam nut and screw the tip out. Move the traverse belt out of the way and verify the clamped distance from the tip to the clamping block (shoe). See FIG. 9. Lock in place by tightening the jam nut against the clamp, being careful not to move the tip.

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

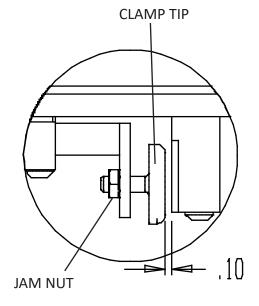


FIG. 9

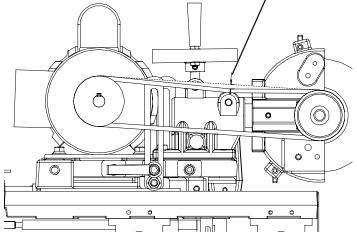


CAUTION SHOULD BE USED AS ADJUSTING THE TIP WILL AFFECT THE SLIP LOAD AND COULD DAMAGE THE CLAMP TIP, BELT OR TRAVERSE DRIVE SYSTEM.

BELT TENSION

The belt must be tensioned so when the lock handle is locked the maximum belt deflection is .12 [3 mm] at a 10lb [4.5 Kg] load.

BELT DEFLECTION .12"
[3mm] WITH 10 LBS
[4.5 Kg] LOAD



NOTE: SHOWN WITH BELT GUARD REMOVED. NEVER OPERATE GRINDER WITH ANY GUARD REMOVED.

FIG. 10

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. 11.

NOTE: The light on proximity switch activates when metal crosses over sensing part of the switch.

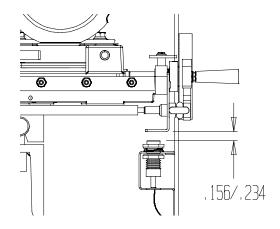
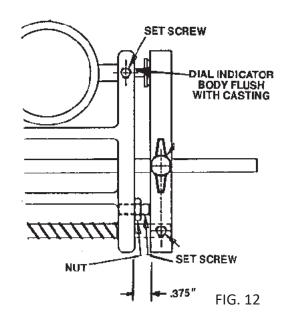


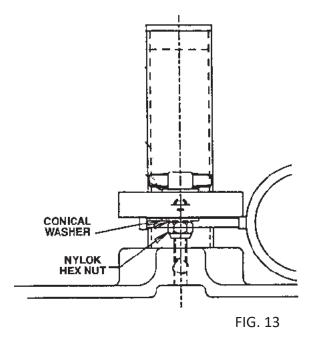
FIG. 11

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. 12.

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. 13. If necessary, adjust hex nut until the conical washer is completely compressed then back off 1/2 turn.

TO ELIMINATE CARRIAGE INFEED BACKLASH

If there is backlash in the carriage infeed handwheel (See FIG. 14), 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.

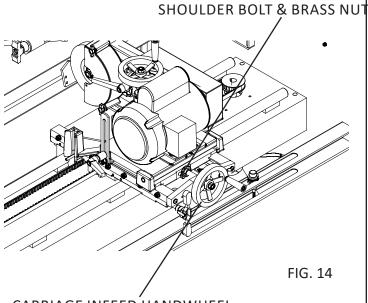


A. Remove the calibration ring setscrew and rotate the calibration ring to access the handwheel setscrew. Loosen the handwheel setscrew (about half a turn).

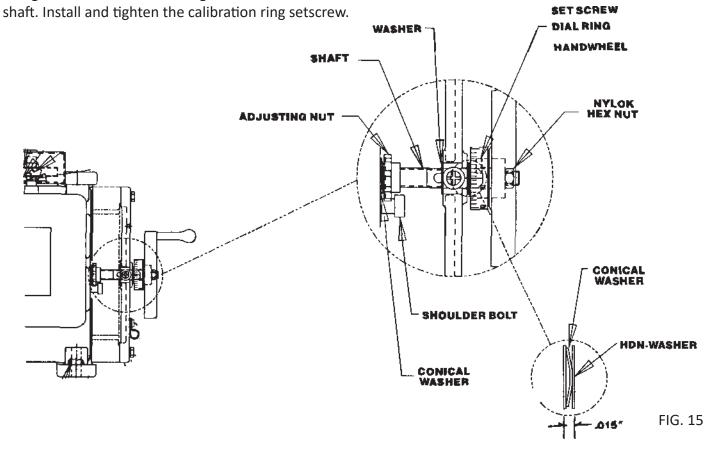
B. Hold the handwheel and torque the hex lock nut which secures the handwheel to 100 in. lbs. [1.15 kg-m], then back off 1/2 turn.

C. Verify that the gap between the wave washer and flat washer is .015 in. [.04mm]. See FIG 15. Adjust the hex lock nut if necessary.

D. Tighten the setscrew holding the handwheel of the shaft. Install and tighten the calibration ring setscrew.



CARRIAGE INFEED HANDWHEEL



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 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 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 9 sets the **DWELL TIME** to 4.5 seconds. Dwell time is preset to #4 setting for a 2 second dwell time when reversing at each end of stroke. A setting of 6, sets the dwell time at 3 seconds, etc.

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

POWER indicates that AC power is being applied to the control.

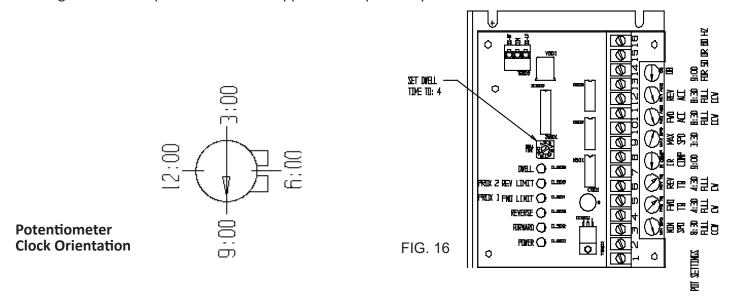
FORWARD indicates that the process is running in the forward direction (traversing left).

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.



ADJUSTMENTS - ORIGINAL INSTRUCTIONS -

SPIN DRIVE CONTROL BOARD (SDC)

The Spin Drive Control Board has four potentiometers, two switches and one dial. These potentiometers, swtiches and dial have been set at the factory to the positions shown on Figure 17. 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. This should be set to OFF.

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). The (RTP) is located on the control panel and is for relief torque adjustment.

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

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

In the Spin Grinding Mode--

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

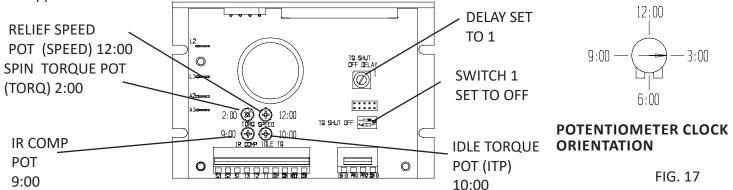
Spin Torque Pot (STP) controls maximum torque allowable in the spin grinding cycle only. This should never be adjusted past the 3:00 position. If the reel does not turn check that the reel is free turning by hand spinning with the power off and the spin drive disconnected.

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.



CONTROL PANEL located on the right side of the machine.

Low Voltage Relay (LVR) Terminal Strip #2 (TB2) Magnetic Contactor (MAG) Blue Terminal Blocks (TBB) **Grey Terminal** Blocks (TBG) Secondary Circuit Breaker (SCB) Main Circuit Breaker (MCB) Grinding Motor

Traverse Drive Control Board FUSES 3A Slow Blow

Traverse Drive Control Board (TDC)

Spin Drive Control Board (SDC)

FIG. 18

Grinding Motor Relay (REL)

Termial Strip #1 (TB1)

Main Ground Lug

AC Filter (FTR)

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 181 electrical system. For those without that background, service can be arranged through your local distributor.

This section 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 panel cover or attempt any internal troubleshooting, adjustments, or parts replacement.

If you have any question not answered in this manual, please call your local dealer.

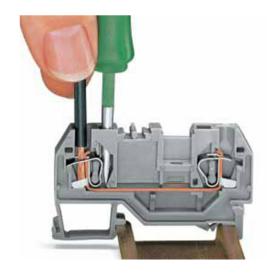
WIRE LABELS

All wires have a wire label at each end for troubleshooting. The wire label has a code which tells you wiring information. The wire label has a position code. The first two or three digits are the wire number: 01-199. The next three numbers or letters are the code for the component to which the wire attaches. Example: TDC for Traverse Drive Control. The last two or three numbers or letters indicate which the terminal on the component the wire attaches.

TERMINAL BLOCKS:

To insert or remove a wire from the terminal block insert a small screw driver into the square hole. Then insert or remove wire from the round hole. Remove screwdriver to lock the wire in place.

Note the square hole can also be used when checking for voltages. The probe tip of the multimeter can be inserted into the square hole to take readings.



TROUBLESHOOTING INDEX

AC Main Power Controls	Page 20-22
Spin Drive Controls	
Grinding Motor Controls	Page 27
Traverse Drive Controls	Page 28-32
Door Switch	Page 33
Mechanical Troublshooting	Page 34-35

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

Verify all wires shown on the wiring diagram 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 the wire and the terminal. If problem persists, test as listed below.

Possible Cause Checkon	ut Procedure	
Emergency Stop Botton(ESS) is Depressed.	A. Pull Up on ESS Button	Machine works Yesend troubleshooting Nogo to Step B. next
You must push the System Start Switch (SSS) to get power to control Panel.	B. Push the SSS. Listen for the Magnetic Starter (MAG) contacts to pull in with a clunk	Machine works Yesend troubleshooting Nogo to step C. next.
Main Power Cord is not plugged in.	C. Plug in main power cord	Machine works Yesend troubleshooting Nogo to step D. next.
ALL switches MUST be turned OFF for contactor to pull in.	D. Turn all switces off.	Machine works Yesend troubleshooting Nogo 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 Yesend troubleshooting Nogo to step F. next.
No 120 Volts AC power to Filter (FTR).	F. Check for 120VAC at Cord into FTR (Power Cord Wire No. 32)	You have 120VAC at Filter input. Yesgo to Step G. next. Nobut light works in outlet Replace Power Cord
No 120 Volts AC power out of Filter.	G. Check for 120VAC out of FTR	You have 120VAC at Filter output. Yes go to step H. next. NoReplace the Filter.
No 120 Volts AC power to Main Circuit Breaker (MCB).	H. Check for 120VAC to MCB	You have 120VAC at MCB input. MCB left side Terminal to Terminal Block 4 (Blue) for 120 Volts AC YesGo to Step I. next. NoVerify continuity of wires from Filter to MCB and replace if bad.
No 120 Volts AC power from Main Circuit Breaker (MCB).	I. Verify that MCB is "ON" or flip switch to "ON" position. Then check for 120VAC out of MCB.	You have 120VAC at MCB output. MCB right side Terminal to Terminal Block 4 (Blue) for 120 Volts AC YesIf machine works, end of troubleshooting, if not, go to Step J. next. NoReplace MCB.

LLLCTNICAL TING	JODELSHOOTHVO	- ONIGINAL INSTRUCTIONS
Possible Causes No 120 Volts AC power to Secondary Circuit Breaker (SCB) 6 Amp.	Checkout Procedure J. Check for 120V to SCB	SCB (03SCB) to nuetral (blue) terminal out of FTR for 120VAC YesGo to Step K. next. NoCheck wires & replace if needed.
No 120 Volts AC power from Secondary Circuit Breaker (SCB) 6 Amp.	K. Check for 120V from SCB	SCB (67SCB) to nuetral (blue) terminal out of FTR for 120 VAC Yes Go to Step L. next. NoFlip Switch on SCB to "ON"-Machine worksend of troubleshooting. Machine does not workreplace SCB
120 Volts AC power not delivered to Terminal Strip	L. Check for 120 Volts AC at terminal strip.	Terminal "11" on Terminal Strip 2 "07TB2-11" to Terminal Block 4 (Blue) for 120 Volts AC YesGo to Step M . next. NoCheck 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(Blue) YesGo to Step N . next. NoFlip Switch and check again-WorksSwitch 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(Blue) YesGo to Step O. next. NoFlip Switch and check again-WorksSwitch 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(Blue) YesGo to Step P. next NoCheck 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(Blue) YesGo to Step Q. next NoCheck 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(Blue) YesGo to Step R. next NoCheck for 120 Volts AC from LVR term 6 to term 7. YesVerify Continuity of term 1 to term 8 on LVR. Replace LVR if bad. NoVerify 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 YesMAG Should pull in with clunck, if not replace MAG. NoVerify Continuity of Wires.

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

Possible	Cause	Checkout Procedure

No Power to MAG holding Contact

A. Check voltage to MAG holding

contact in.

Measure 120 Volts AC at MAG term T3 to Term Block 4(Blue) with E-Stop Pulled out.

(Do NOT press start button while

checking.)

Yes--Go to Step **B**. next.

No--Verify continuity of wiring to MAG T3.

MAG holding contact has failed

B. Verify the magnetic starter (MAG) holding contact is working. Disconnect Wire to MAG L3 and Measure 120 Volts AC from MAG term L3 to Term Block 4(Blue). Press and hold Green Start button to hold in MAG contacts while

Yes--Verify continuity of wiring from MAG

No--Replace MAG.

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 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 the wire and the terminal. If problem persists, test as listed below.

Checkout Procedure

A. Set (SSP) to 200 on the

Spin Motor works

control panel.

Yes--end troubleshooting No--go to Step **B** next

B. Turn (SMS) switch on

Spin Motor works

Yes--end troubleshooting No--go to Step C. next

C. Reset Circiut Breaker on front of Control Panel. Push in if tripped.

Spin Motor works

Yes--end troubleshooting No--go to Step **D.** next

D. Check (SDS) L1 to L2 for

120 Volts AC

(SDC)Remove wires to Terminals L1and L2 and test betwen wires for 120V AC.

Yes--reconnect wires to board then go to

Step E. next

No--Verify Power to Circuit Breaker and SMS and continuity of wires. Replace CB

E. With the Selector switch in spin and the spin pot set to 400RPM Check (SDC) A1 and

A2 for 90-120 Volts DC

or SMS if needed.

(SDC) Remove wires, test Terminals A1 to A2 on the board for approx 90-120 V DC Yes--reconnect wires and go to Step F.

next

No--go to Step G.

Possible Cause Checkout Procedure

Spin Drive motor is bad

F. Check spin motor continuity



DISCONNECT POWER FROM MACHINE!

Remove wires at Terminal Strip 1, Term 4 & 5 check 0 ohms across the black and white wires

Yes--end troubleshooting, spin drive should run, if not, replace motor. No--go to Step J.

Spin drive control in Torque mode

G. Check continuity of mode selector switch.

Light on SDC next to SP should be ON. If not, remove wires 41SDCMOD and 44SDCCOM from SDC control board. Check continuity of wires, should read 0 ohms. Continuity checks out? No--Check continuity of STS switch, replace if bad. (Machine was in Torque mode)

Yes-- Light next to SP is on but machine does not work. Reinstall wired, Go to

Step \mathbf{H} . next

Spin Torque Pot (STP) is not set correctly

H. Check (STP) remote torque on the top (SDC) board

(STP) on (SDC) board, should be set as labled on pages 17. 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)

WARNING

DISCONNECT POWER FROM MACHINE!

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

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 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 the wire and the terminal. 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. Yesend troubleshooting Nogo to Step B. next
Spin Motor Switch (SMS) is not on.	B. Turn (SMS) switch on.	Spin Motor works. Yesend troubleshooting Nogo to Step C. next
Circuit Breaker is Tripped (4 AMP)	C. Reset Circiut Breaker on the right side of the machine. Push in if tripped.	Spin Motor works. Yesend troubleshooting Nogo to step D. next
Spin Drive Control (SDC) is not working	D. Check (SDC) L1 to L2 for 120 Volts AC	((SDC)Remove wires to Terminals L1and L2 and test betwen wires for 120V AC. Yesreconnect wires, go to Step F. NoGo to Step E . next
CB or Spin Motor Switch (SMS) is bad	E. Check power into (SMS) terminal 6 for 120 Volts AC	Remove Wire to SMS Terminal 6 "89sms-6" and check between the wire and Terminal Block 4 (Blue) for 120 VAC YesCheck switch continuity, replace NoCheck CB continuity, replace.
	F. Check (SDC) A1 & A2 for approx. 20 Volts DC (Have Relief Torque set to maximum torque full clockwise.	Check for approx. 20 VDC from Terminal Strip 1 Terminal 4 (48TB1-4) to Terminal 5 (49TB1-5) Yesgo to Step G. next NoGo to Step J .
Spin Drive motor is bad	G. Check spin motor continuity	Remove motor wires at Terminal Strip 1 (left side lower strip), Term 4 & 5 and check 0 ohms across the black and white motor wires
A WARNING	DISCONNECT POWER FROM THE MACHINE	Yesend troubleshooting motor should work (if it does not, replace motor) Nogo to Step H. next
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
A WARNING	DISCONNECT POWER FROM MACHINE!	Yesreplace motor brushes Noreplace Spin Drive Motor

Possible Cause Checkout Procedure

Board is in spin mode. J. Spin Torque Selector not work- Light next to TQ on SDC board should be

ing
ON. If not remove wires 41SDCMOD and
44SDCCOM from SDC control board. Ma-

chine 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.

K. Check (RSP) remote speed

(10k) on (SDC) board

Verify (SPEED) pot setting on the (SDC) board. Should be set as specified on page

24. Adjust if incorrect and check Relief

Torque function. Works Yes--end of troubleshooting

No--go to Step L. next

(RTP) is not working L. (RTP) (10K) Remove

3 Remote Torque Wires red wire to term 2 white wire to term 1. black wire to term 3.

Check for 10,000 ohms Red wire to white wire Full CCW--0 ohms Full CW--10,000 ohms Red wire to black wire

Full CCW--10,0000 ohms

Full CW--0 ohms Yes--go to Step **M**. nest No--replace (RTP)

Switches on SDC

incorrect

M. Verify postion of all pots and

switch on SDC

Verify postion of 4 pots on board. Should be set as specified on page 24. Verify that the Troque reduction feature is in the OFF position. (pushed toward the pots on

board). Motor works

Yes--end of troubleshooting

No--replace SDC.

PROBLEM: Spin drive speed goes at one speed only.

Possible Cause

Remedy

Wiring hookup to potentiometer is improper. (If components have been replaced).

A. Check potentiometer wiring for proper hookup. See that speed pot is wired per electrical diagram.

If wiring is wrong, correct and test. Yes--end of troubleshooting No--Go to Step B. next

Defective spin speed control (SSP) potentiometer.

B. (SSP) 10K Remove 3 remote speed wires.

red wire to term 2 white wire to term 1 black wire to term 3 Check for 10,000 ohms
Red wire to white wire
Full CCW--0 ohms
Full CW--10,000 ohms
Red wire to black wire
Full CCW--10,000 ohms
Full CW--0 ohms
Yes-- Go to Step C. next
No--Replace (SSP)

Main circuit board dial pot settings not correct. (If board has been replaced). C. Check all pot settings on both boards as of the (SDC) shown on Page 17. (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.

See adjustment section for trim pot setting on Page 17.

Torque to rotate the reel too high.

Readjust bearing preload for the reel. Maximum torque load 25 in./ lb to rotate reel.

Check all terminal connections for tightness.

When .250 female spade terminals are not tight, remove and crimp slightly together. When reinstalling, push on pressure should have increased for good contact.

Original adjustment was not set properly.

Too much load on drive motor will cause motor to hunt and vary speed.

When connections are not tight the control board varies voltage to the DC motor which then varies speed.

PROBLEM-- Machine will go to E-stop when the Grinding motor or Spin motor is turned on.

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 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 the wire and the terminal. If problem persists, test as listed below.

Possible Cause Bad contact on Door Switch Relay. (DRL) Remedy
A. Check for 120 VAC coming to the Door Switch Relay.

Measure 120 VAC from DRL Terminal 11 (102DRL-11) to Terminal block 4 (Blue) (02TBW-4).

Yes--go to Step B. next No--Replace wire#102

B. Check for 120 VAC leaving the Door Swich Relay,

Measure 120 VAC from DRL Terminal 14 (100DRL-14) to Terminal block 4 (Blue)

(02TBW-4). Yes--go to Step D. No--go to Step C. next

Bad Door Switch Relay.

C. Check for 120 VAC at DRL coil (A1 to A2). Power must be on (traverse works).

Measure 120 VAC from DRL Terminal A1 (103DRL-A1) to Terminal A2 (104DRL-A2). Yes--Replace Relay in DRL

(3707798)

No--Check/Replace wires #103

and #104

Bad Door Safetly Switch (DSS)

D. Check for 120 VAC Back from Door Switch. Door must be closed and power on (Traverse works) Measure 120 VAC from Terminal Strip 2 Terminal 2 (41TB2-2) to Terminal block 4 (Blue) (02TBW-4).

Yes--Check/Replace wire #101 No--Verify Cord to DSS is good, Check Door Switch Alignment (Switch should be at 90

degrees when door is down), if alignment is good then

Replace DSS.

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 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 the wire and the terminal. If problem persists, test as listed below.

Possible Cause Grinding Motor Switch (GMS) is not on. 12 Amp Circuit Break-	Remedy A. Turn switch on	Grinding Motor works Yesend troubleshooting Nogo to Step B. next
er (CB) is tripped. GMS not working.	B. Check 12 amp CB on front of Control panel. Press in if tripped.	Grinding Motor works Yesend troubleshooting Nogo to Step C. next
GIVIS HOT WORKING.	C. Check for power to GMS.	GMS term 5 to Terminal Block 4 (Blue) for 120 V AC Yesgo to Step D. next NoWith power off, check continuity of wires to GMS.
Relay (REL) coil not working.	D. Check for power from GMS.E. Check for power to the	GMS Term 6 to Terminal Block 4 (Blue) for 120 V AC YesGo to Step E. next Noreplace GMS
	(REL) coil.	(REL) Term's A1 to A2 for 120 VAC YesGo to Steep F. next. (REL) should pull in, if not replace (REL). NoCheck wires to Term's A1 and A2, if bad replace.
Polov contacts not	F. Check for power to (REL) relay contacts.	(REL) Term L1 to Term L2 for 120 Volts AC YesGo to Step G. next NoCheck wires to REL Term L1 and L2.
Relay contacts not working Circuit breaker	G. Check for power from the (REL) relay.	(REL) Term T2 to Term T2 for 120 V AC YesGo to Step H. next No Replace the relay (REL).
(CB-1) not working.	H. Check the power to and from the 12 amp circuit breaker.	(CB-1) input term to Terminal Block 4 (Blue) for 120 VAC. Then (CB-1) output term to Terminal Block 4 (Blue) for 120 VAC. YesGo to Step I. next. No Check appropriate wire and (CB-1), if bad replace.
Grinding Motor Not Working	I. Check for power to the Grinding Motor cord	Measure 120 Volts AC at Grinding Motor Cord Grind end Terminal 42TB1-1 and 64TB1-2. Yes If Grinding Motor does not work replace motor. NoVerify Continuity of wires 42, 64 and 84. Replace wire if bad.

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 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 the wire and the terminal. If problem persists, test as listed below.

Possible Cause	Checkout Procedure	
Traverse Motor Switch (TMS) is not on.	A. Turn on (TMS)	Traverse works Yesend troubleshooting Nogot to Step B. next
Traverse Speed Pot (TSP) set to zero.	B. Set (TSP) to 35 on the control panel	Traverse works Yesend troubleshooting Nogo 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 Yesend troubleshooting Nogo 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 VAC YesGo to Step F. next NoGo 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(Blue) YesCheck wires to the (TDC) and replace if bad. NoFlip Switch and check again- WorksSwitch is upside down. Does not work Check wiring/Verify Continuity/ Replace Switch or wires.

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

Remove motor wires from Terminal Strip 1 terminals #7 & #8 check for 0 ohms across the



DISCONNECT POWER FROMck and white wires

Yes-end troubleshooting, traverse should work,

if not, replace motor. No--go to Step J. next

(TSP) is not working

H. Check (TSP) (10K) on control panel

(TDC) 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--replace the (TDC) No--go to Step I. next

(TSP) (10K) is bad

I. Check (TSP) for 10,000 ohms. Re-

move 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

J. 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.

Left proximity (PROX 1) check Traverse drive Control (TDC) between terminals #14 (black wire) and #15 (brown wire).

Right proximity (PROX) check between terminals #13 (black wire) and #15 (brown wire).

The light coming on shows the proximity is getting electrical contact.

Proximity light on-0 Volts DC Proximity light off-12 Volts DC

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 YesPot is OK NoGo 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 YesGo to Step C. next Noreplace potentiometer. Wiper inside of potentiometer controls speed. Wiper may be bad and not making contact.
Wiring hookup to potentiometer is improper.	C. Check potentiometer wiring for proper hookup. See that speed pot is wired per electrical diagram	Wrong wire hookup effects traverse control. Check for Proper function. Yesend troubleshooting NoGo to Step D. next

(If components have been

replaced.)

Minimum and maximum pot settings effect traverse speed.

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.)

Incorrect potentiometer settings effects traverse control. Check for proper function. Yes--end of troubleshooting

No-- replace (TDC)

switch.

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

screws.

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

intermittent electrical contact.

PROBLEM-- Power goes off when Grinding Motor or Spin Motor is turned on - Door Switch.

Verify all wires shown on the wiring diagram 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 the wire and the terminal. If problem persists, test as listed below.

Possible Cause	Checkout Procedure	
Door is open	A. Close Front door	Machine works Yesend troubleshooting Nogo to Step B. next
No Power to Door Relay	B. With power on to machine (Traverse works) check for power to Door Relay (DRL)	Check for 120 VAC at A1 (103DRL-A1) to A2 (104DRL-A2) Yesgo to step C. next. NoCheck wires to #103 and #104
Door Relay	C. Check for 120 VAC out of Door Relay Conact.	Check for 120 VAC at Terminal Strip 2 Terminal 1 (100TB2-1) to Neutral (light blue wire) on filter (02FTRBU). Yesgo to step D. next. NoReplace Door Relay.
Door Switch	D. Check for Power coming back from door switch.	Check for 120 VAC at Terminal Strip 2 Terminal 2 (101TB2-2) to Neutral (light blue wire) on filter (02FTRBU). YesCheck wire 101. NoCheck door switch alignment, make adjustments if necessary and retest. If machine still does not run replace door switch.

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

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.
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 lineal 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.

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

Possible Cause

Checkout Procedure

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 on 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

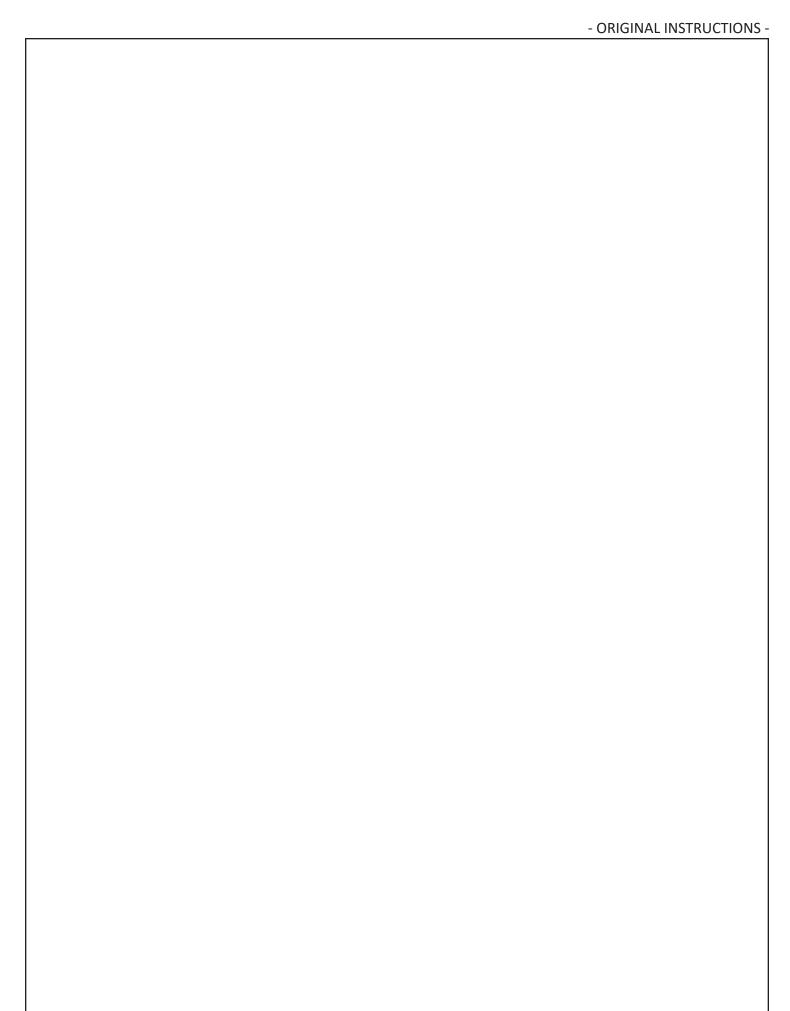
Remedy

Lineal bearing in the carriage are set too tight.

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

Traverse drive belt tension springs set too tight

Check to see if traverse drive belt tension springs have been overloaded, causing the bearings to not rotate freely. Verify proper adjustment per the adjustment section of this manual.



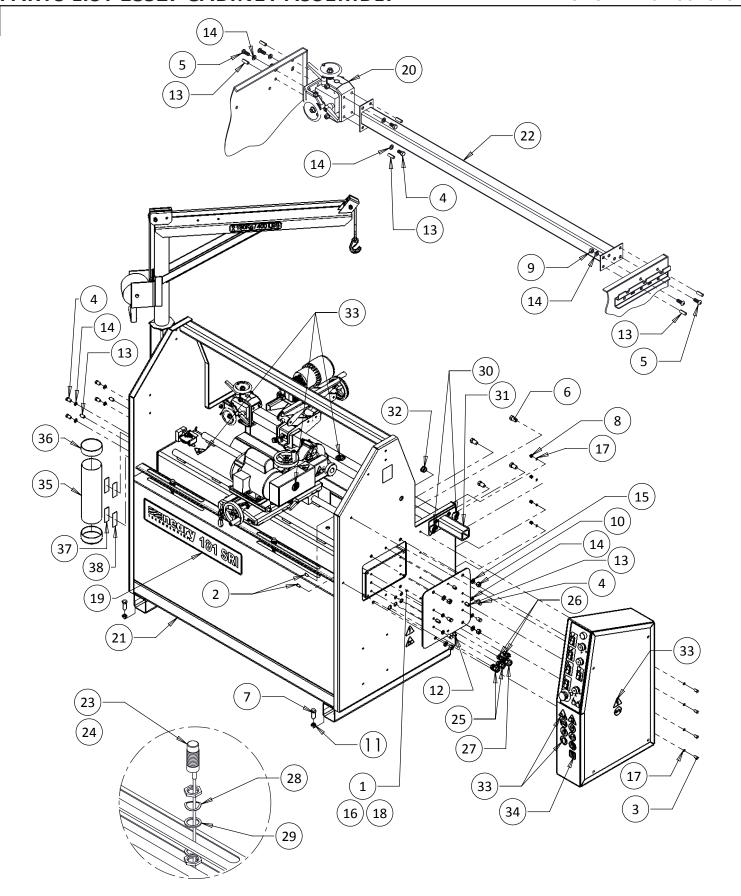


DIAGRAM NO.	PART NO.	DESCRIPTION
1	B190809	10-24 x 1/2 Round Head Machine Screw
2	B251016	Button Head Socket Cap Screw 1/4-20 x 5/8 Long
3	B251216	Button HeadSocket Cap Screw 1/4-20 x 3/4 Long
4	B371201	Hex Head Cap Screw 3/8-16 x 3/4 Long
5	B371616	Button Head Socket Cap Screw 3/8-16 X 1 Long
6	B501601	Hex Head Cap Screw 1/2-13 x 1 Long
7	B502401	Hex Head Cap Screw 1/2-13 x 1-1/2 Long
	J257100	
9	J371000	3/8-16 Hex Nut
10	J501000	1/2-13 Hex Nut
11	J502000	1/2-13 Hex Jam Nut
12	H371202	Roll Pin 3/8 Diameter x 3/4 Long
13	H371602	Roll Pin 3/8 Diameter x 1 Long
14	K371501	3/8 Lockwasher
	K501501	
16	R000483	Internal Tooth Lock Washer #10
17	R000536	Internal Tooth Lock Washer 1/4
18	R000553	Kep Nut 10-24
19	18517	Tooling Bar Extension Weldment
	18518	•
	18528	
		Tooling Bar Weldment
		Proximity Sensor only - 18MM DC
		Proximity Cord Assembly - Traverse Left Hand
		Proximity Sensor only - 18MM DC
		Proximity Cord Assembly - Traverse Right Hand
		Strain Relief27/.47 Cord Diameter
		Strain Relief19/.30 Cord Diameter
		Strain Relief43/.55 Cord Diameter
	3708419	
29	3708421	Flatwasher75 ID x 1.0 OD x .075 Thick
		T - Knob Assembly - 3/8-16 x .75 Long
		Carriage Support Plate
	3707595	
		Decal Sheet - (Contains Multiple Decals)
	3708872	
		Warning 3600 RPM min rating for Grinding Wheels.
	3706133	
	3706134	
	3706135	
38	3706136	

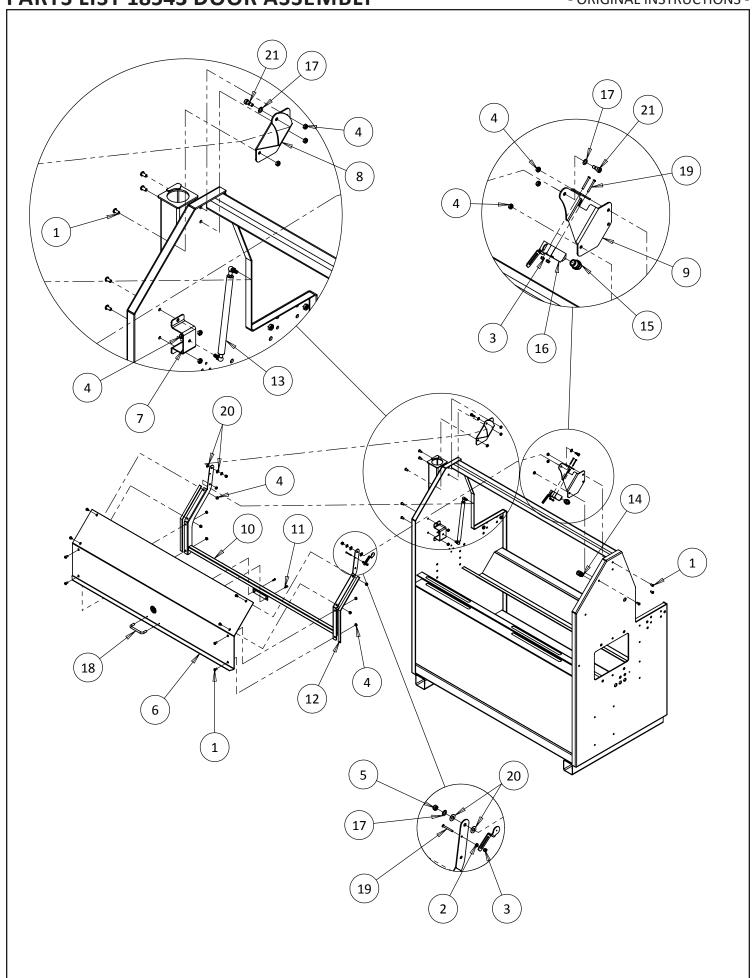


DIAGRAM NUMBER		DESCRIPTION 5/16-18 x 5/8 Button Head Socket Cap Screw
	. J161000	
	. J167000	
4	. J317000	5/16-18 Locknut Thin
	. J317100	
6	18110	Door
7	18111	Gas Spring Mounting Bracket
8	18114	Left Door Mount Bracket
9	18115	Right Door Mount Bracket
10	18542	Door Support Weldment
11	3706042	#8 x 3/4 Thread forming Screw
12	3706052	Adhesive Backed Foam Seal
13	. 3706088	Gas Spring
14	. 3707009	Strain Relief (side frame)
15	3707563	Strain Relief (door switch)
16	. 3707828	Door Switch (rotate)
17	. 3708214	Conical Washer
18	3708857	Black Pull Handle
19	. 3708865	#8-32 x 1.5 Button Head Safety Screw
20	. 3709304	Thrust Washer
21	. 3709809	Shoulder bolt 3/8 x 3/8

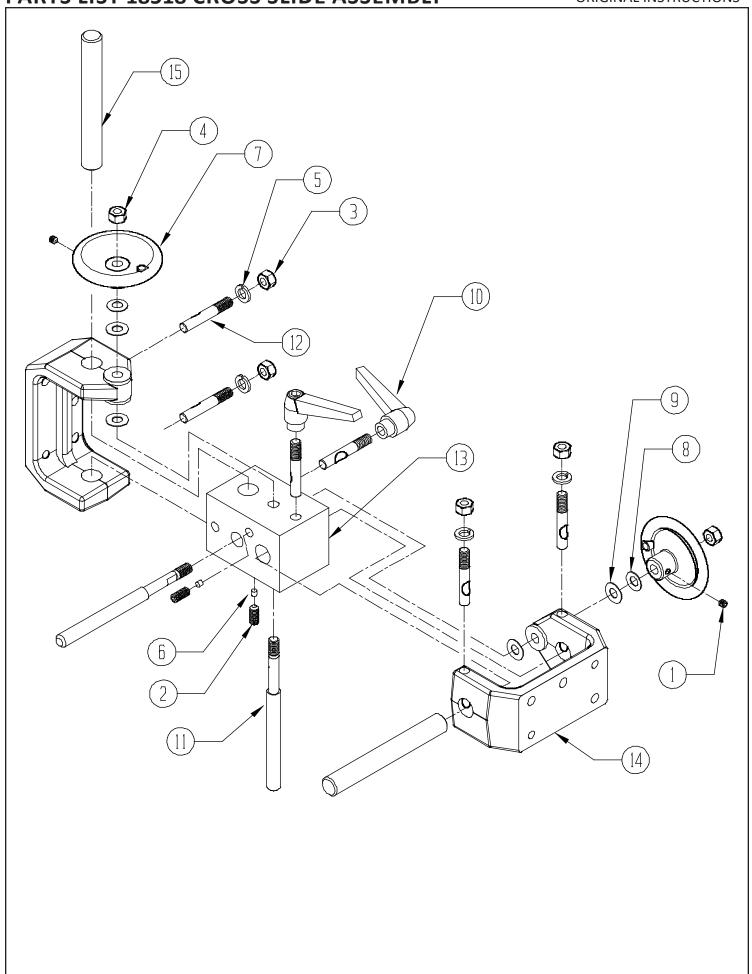


DIAGRAM NO.	PART NO.	DESCRIPTION
1	C250420	
2	C311220	5/16-18 x 3/4" Long Socket Set Screw
3	J371000	3/8-16 Hex Nut
4	J377000	3/8-16 Jam Locknut
5	K371501	3/8 Split Lockwasher
6	3579109	3/16 Dia. Nylon Plug
7	3708393	Handwheel
8	3709062	Conical Washer
9	3709304	Thrust Washer
10	3708437	3/8-16 Adjustable Handle
		Acme Adjusting Shaft
12	6009035	3/8-16 Locking Stud Shaft
13	6009081	Cross Slide
14	6009082	Cross Slide Support
15	6009095	Slide Shaft

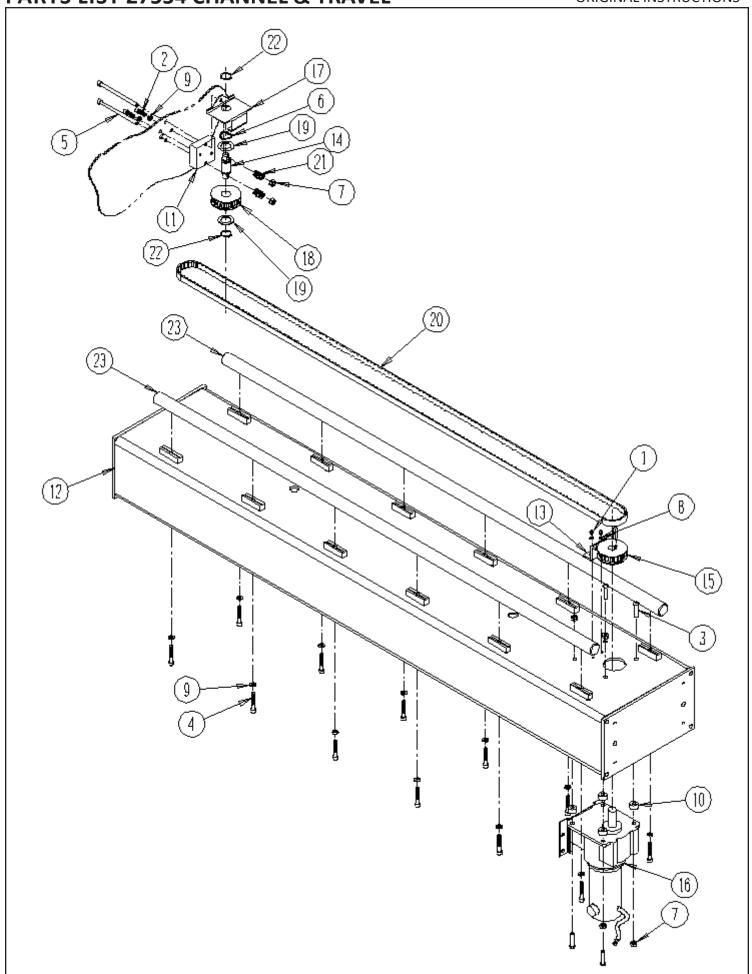


DIAGRAM NO	. PART NO.	DESCRIPTION
1	B160607	8-32 x 3/8 Button Head Socket Cap Screw
2	B251211	1/4-20 x 3/4 Socket Head Cap Screw
		1/4-20 x 1-1/4 Button Head Socket Cap Screw
4	B252011	1/4-20 x 1-1/4 Socket Head Cap Screw
		1/4-20 x 4 Socket Head Cap Screw
6	3708419	Wave Spring .78 ID x 1.00 OD
7	J257000	1/4-20 Locknut Thin
8	K161501	#8 Lockwasher Split
	K251501	
10	3708884	Spacer .281 ID x .62 OD x .38 Long
11	28192	Support - Travel Pulley
12	27156	Traverse Base Machined
13	28197	Guard - Travel RH
14	50309	Shaft- Travel Pulley
15	3706056	Pulley - Cog Drive
16	6059062	Motor Assembly - Travel W34
17	50363	Guard - Traverse Pulley
18	55553	Idler Pulley Assembly
19	80355	Washer - Thrust .75ID x 1.25OD
20	80375	Belt -Cog
	3708658	_
	3709331	
	6509063	

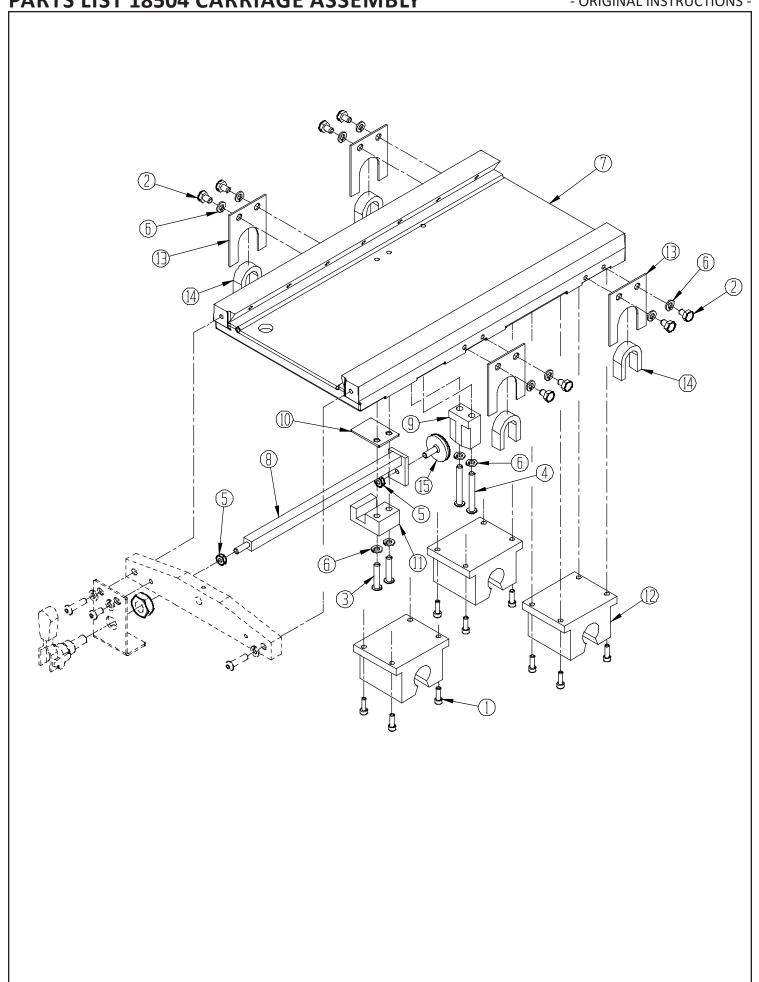
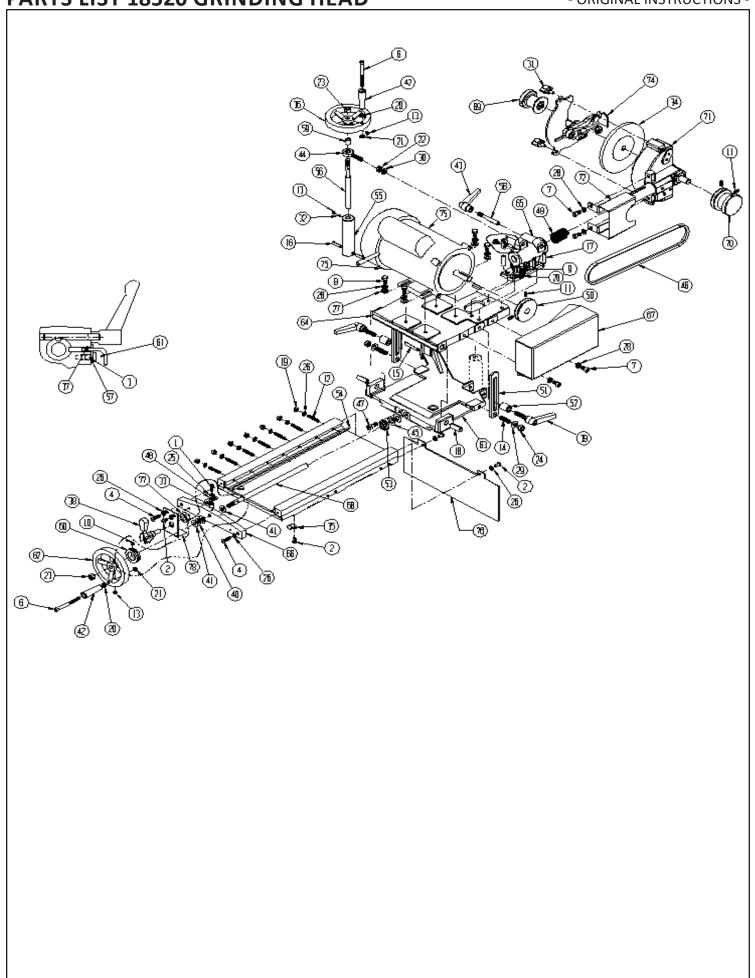


DIAGRAM NO. PART NO. DESCRIPTION 1...... #10-24x5/8 Socket Head Cap Screw 4...... B253216...... 1/4-20x2 Button Head Socket Cap Screw 7...... 18065...... Carriage Base 8...... Traverse Clamp Assembly 9...... Traverse Clamp Block 10...... Traverse Clamp Spacer 12...... Ball Bushing Bearing 13...... Sponge Wiper Holder 14...... 3969064..... Foam Wiper 15...... Belt Clamp Tip



DIA. NO.	PART NO.	PART NAME
1	B191233	10-32 x 3/4 Pan Head Machine Screw
		1/4-20 x 1/2 Button Head Cap Screw
3	B250819	1/4-20 x 1/2 Truss Head Machine Screw
4	B251616	1/4-20 x 1 Button Head Cap Screw
6	B255011	1/4-20 x 3-1/8 Socket Head Cap Screw
		5/16-18 x 1/2 Socket Head Cap Screw
8	B311001	5/16-18 x 5/8 Hex Head Cap Screw
		5/16-18 x 7/8 Hex Head Cap Screw
10	C250420	1/4-20 x 1/4 Socket Setscrew Cup Pt.
		1/4-20 x 5/8 Socket Setscrew Cup Pt.
		1/4-20 x 1-1/2 Socket Setscrew Cup Pt.
		5/16-18 x 1/4 Socket Setscrew Cup Pt.
		3/8-16 x 1-1/4 Socket Setscrew Cup Pt.
		25 Dia x 1.75Lg Roll Pin
		31 Dia x 1 Lg Roll Pin
		38 Dia x 1.25 Lg Roll Pin
		50 Dia x 1.25 Lg Dowel Pin
		1/4-20 Hex Nut
20	1252000	1/4-20 Hex Jam Nut
21	J257000	1/4-20 Thin Locknut
22	J371100	3/8-24 Hex Nut
23	J377000	3/8-16 Locknut Jam Nylon
24	J377100	3/8-16 Locknut Hex Nylok Full
25	K190001	#10 Flat Washer
26	K251501	1/4 Split Lock Washer
27	K310001	5/16 Flat Washer
28	K311501	5/16 Split Lock Washer
29	K370001	3/8 Flat Washer
30	K371501	3/8 Split Lock Washer
31	09394	2-Prong Knob
		Nylon Plug 3/16 Dia.
33	6009224	Spacer .50 OD x .191 ID ID x .43 Long
34	3700091	Grinding Wheel 6" Dia x .375" Wide
3	3700095	Spin Grinding Wheel 6" Dia x 1" Wide
35	3707935	Cord Clip
		Handwheel 4.5 Dia
		24 OD x .62 Lg Comp. Spring
		Destaco Clamp
		3/8-16 x 1.56 Lg Adj. Handle
40	3709062	Conical Washer
		Thrust Washer
	3709370	

DIA.	PART	PART
NO.	NO.	NAME
43	3709437	3/8-16 Adj Handle
		Rod End Bearing
45	3709620	Conical Washer
46	3709764	V-Belt
47	3709809	375 Dia x .38 Lg Shoulder Bolt
		Clear Indicator
49	3889059	1.13 OD 2.0 Lg Compr. Spring
50	3889088	62 Bore Pulley
		Adjusting Arm
		406ID x 1Lg Steel Spacer
		1/2-10 ACME Backlash Nut
	6009025	
		Tapped Pivot Sleeve
		ACME Adjusting Shaft
		Keeper Plate
		Shaft Locking Stud
		386 ID x .56Lg Steel Spacer
		Calibrated Ring
		Angle Locking Pin
		4.50 Dia Modified Handwheel
		Grinding Head Slide Base
		Grinding Head Pivot Base
		Grinding Head Swivel Base
		Feed Screw Guide
		Rear Belt Guard
		ACME Adjusting Shaft
69	6009272	Grinding Wheel Knob
70	6009277	V-Belt Pulley Knob
71	6009587	Grinding Head Arbor Assembly
		Front Belt Guard
73	6059028	Spinning Knob
74	6059550	Index Finger Assembly
		1 HP Motor
		Front Bearing Dust Plate
		5/8-18 Thin Locknut
78	18067	Traverse Belt Clamp Bracket

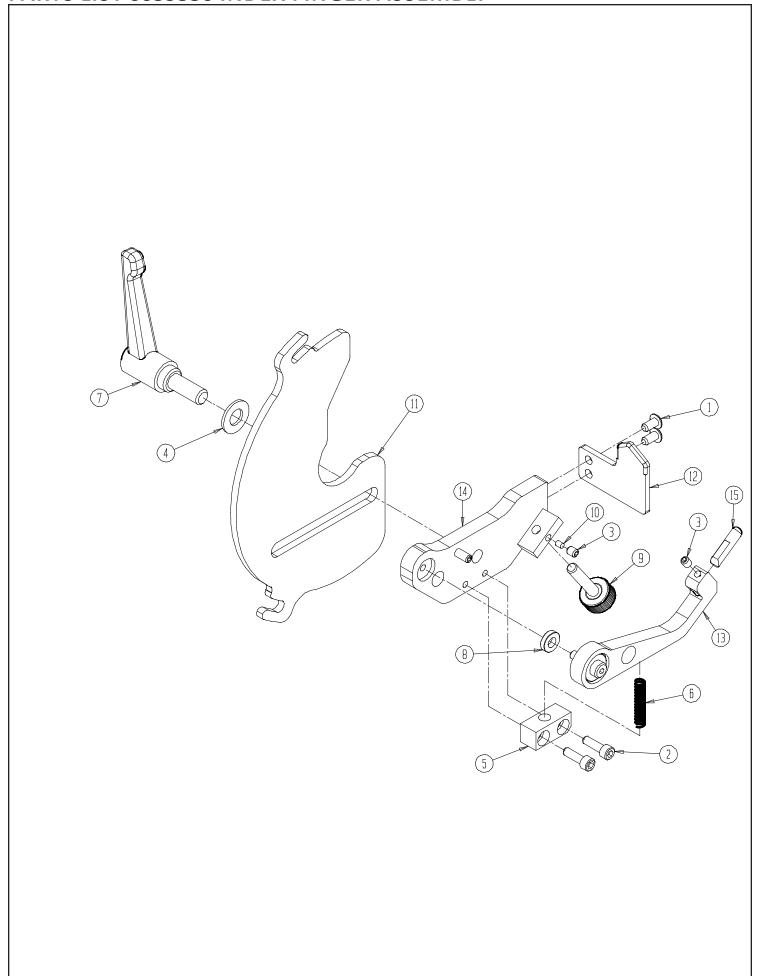
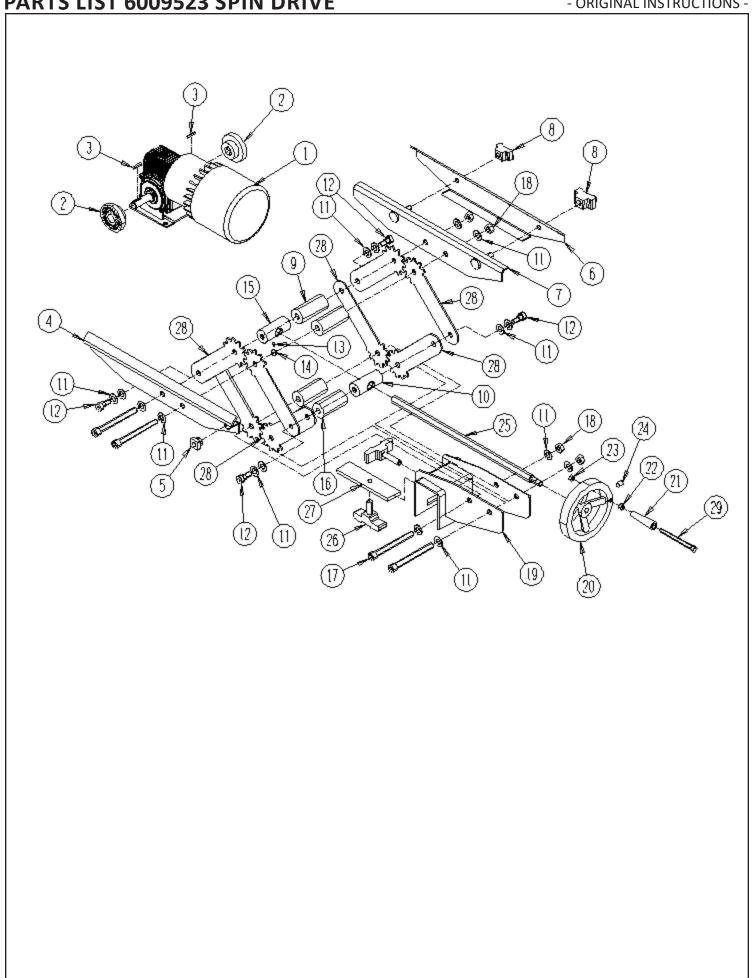


DIAGRAM NO.	PART NO.	DESCRIPTION
1	B190634	10-32 x 3/8 Long Button Head Socket Cap Screw
2	B191031	10-32 x 5/8 Long Socket Head Cap Screw
3	C190467	10-32 x 1/4 Long Socket Setscrew Nylock Cup Point
4	K310001	5/16 Flat Washer
5	55116	Index Finger Spring Block
6	3708919	Compression Spring
7	3708786	5/16-18 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



PARTS LIST (continued) 6009523 SPIN DRIVE ASSEMBLY ORIGINAL INSTRUCTIONS -

DIAGRAM NO. PART NO.	DESCRIPTION
1 6329160	Motor Assembly , Electric 90 VDC .25 HP
2 3709586	Flange Coupler .50
3 R000376	Square Key 1/8 x 1/8 x 3/4
4 6009078	Bracket, Gearbox Slide
5 3707279	Strain Relief
6 6009079	Bracket, Gearbox Clamp
	Bracket, Gearbox Slide Weldment
8 3708262	
9 6009048	Spacer, Linkage 2.50 Lg.
10 6009047	Spacer, Linkage L.H. Thd.
	Bellevill Washer 3/8"
123709809	
13 3709705	
	SSS 5/16-18 x 1/4" CP-PT
15 6009046	Spacer, Linkage R.H. Thd.
16 6009045	Spacer, Linkage 2.29 Lg.
17 B375611	SKHCS 3/8-16 x 3.50"
18 J377100	LocknutNylon 3/8-16 Full
19 6009575	LinkageSupport Bracket Weldment
20	Handwheel, 4.50 Diameter
21 3709370	•
22J252000	· · · · · ·
23 J257000	
	SKSS, SP-PT, 5/16-18 x 3/8"
25 6009076	
26 6009555	Knob Assembly
27 3889066	Center Stand Lock
28 6009067	Linkage, Geared
29 B255011	SHCS 1/4-20 x 3-1/8"

PARTS LIST 6009527 REEL SET UP GAUGE ASSEMBLY - ORIGINAL INSTRUCTIONS -

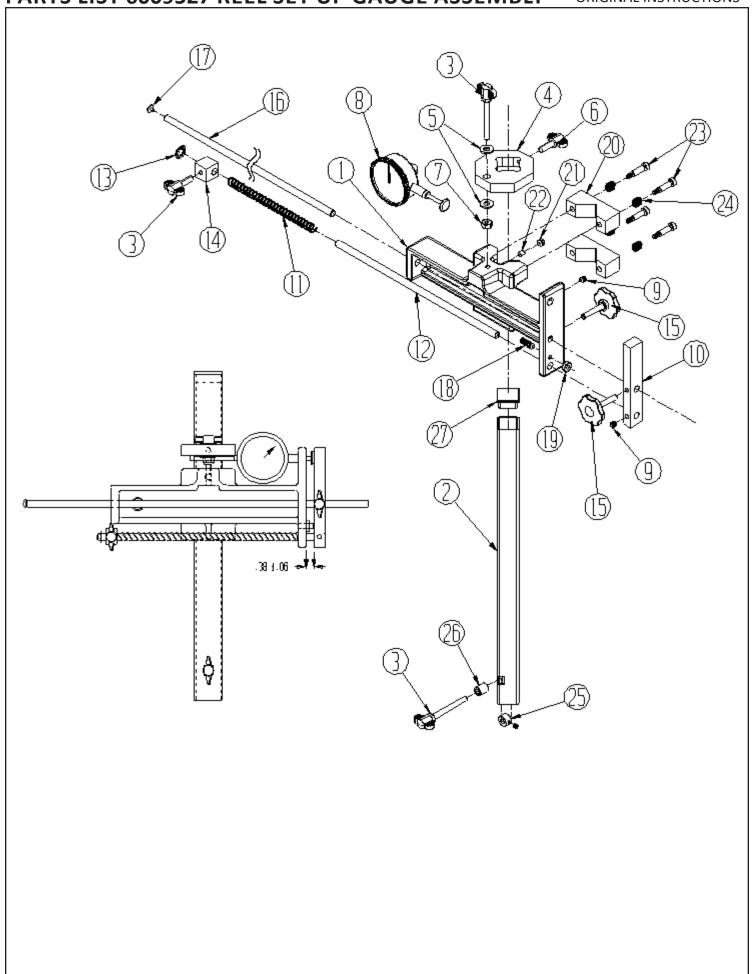


DIAGRAM NO. PART NO. DESCRIPTION

2	6009049 K250001 3706033 J257100 3579123	Tube, Gage Slide Tee Knob Assembly 2.25 lg. Adjust Slide Block 1/4 Flat SAE Washer T-Knob Assembly 1/4-20 x .79 Long LocknutNylon 1/4-20 Full Dial Indicator SKSS, CP-PT, 1/4-20 x 1/4"
12	3708540	Spring Guide Rod Push on Ring Saddle Stop Tee Knob Assembly, Nylon Rod, Gage Alignment Domed Anvil 3/8 SKSS, CP-PT, 1/4-20 x 3/4" 1/4-20 Jam Nut
22 23 24 25 26	3579109	Shoulder Bolt 1/4" D x 3/4" Spring Set Collar 1/4 with SSS Spacer .438 OD

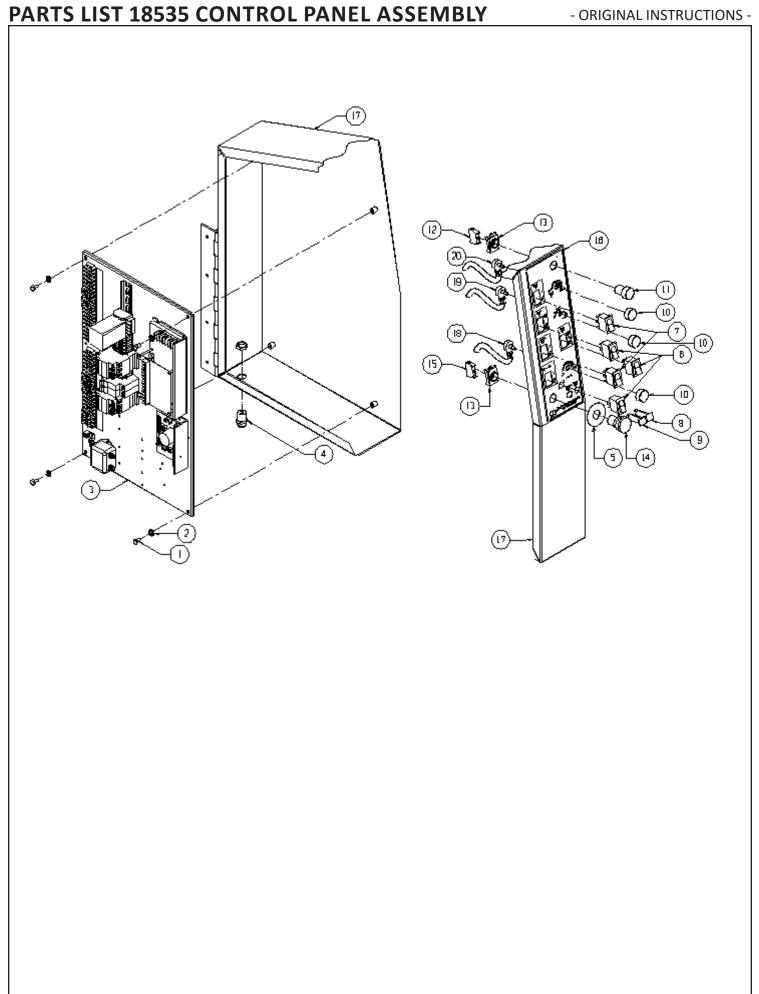
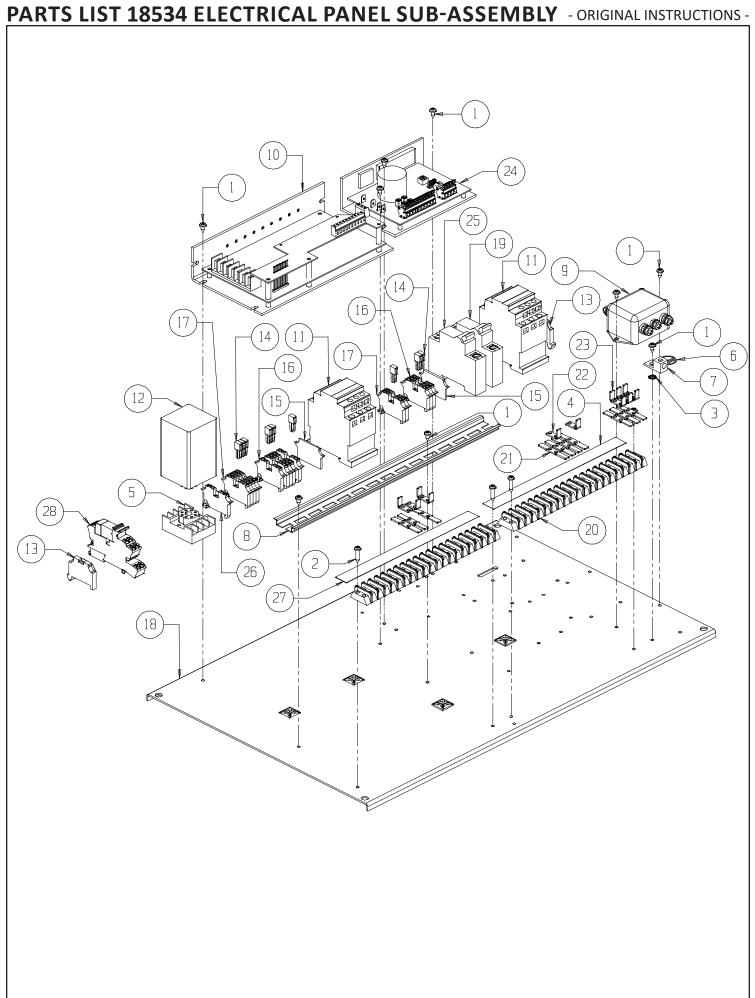
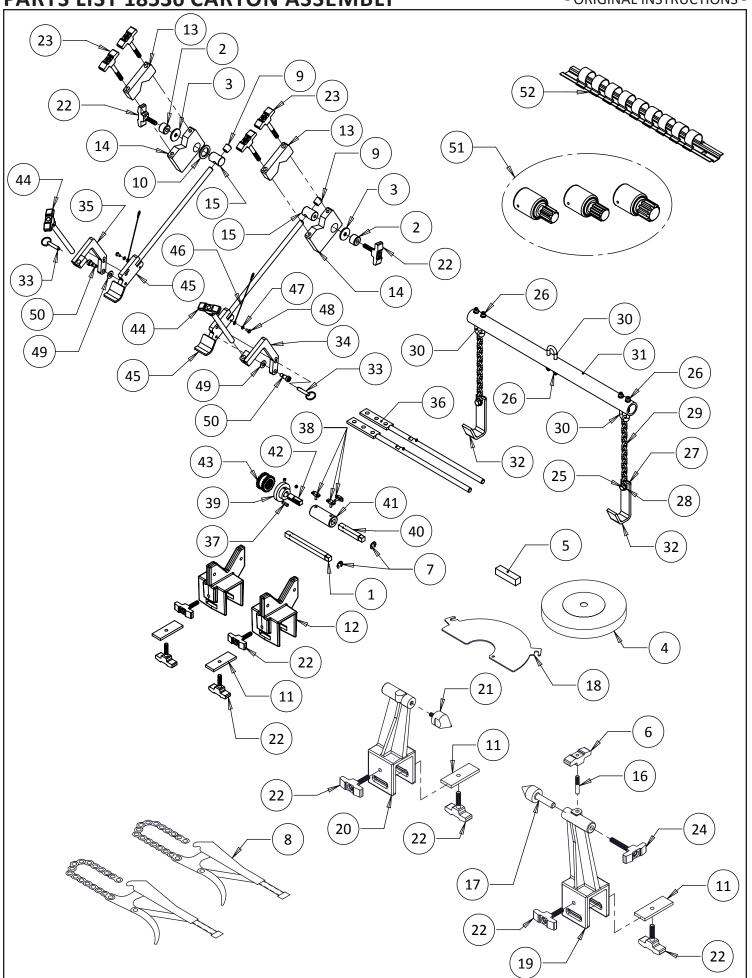


DIAGRAM NO. PART	NO.	DESCRIPTION
1	D250800	1/4-20 x 1/2" Long Thread Cutting Screw
2	R000536	1/4 Internal Teeth Lock Washer
		Control Panel Sub-Assembly
4	3707093	Strain Relief4355 Cord Diameter
5	3707342	Yellow E-Stop Ring
6	3707367	Rocker Switch - On/Off DPST
7	3707429	Rocker Switch - On/Off DPDT
8	3707443	4-Amp Circuit Breaker
9	3707543	12-Amp Circuit Breaker
10	3707446	Potentiomoter Knob
11	3707564	Green Start Pushbutton
12	3707565	Normal Open Contact Block
13	3707566	Mounting Switch Latch
14	3707567	Push-Pull Red E-Stop
15	3707568	Normal Closed Contact Block
16	3706043	Control Panel Decal
17	18526	Control Panel Weldment
18	6059050	Traverse Potentiometer
19	6529052	Relief Torque Potentiometer
		Spin Speed Potentiometer
	3707255	Cable Tie 4" Long x .10 Wide (Not Shown)
	3708378	Foam Strip .25 Tall (Not Shown)



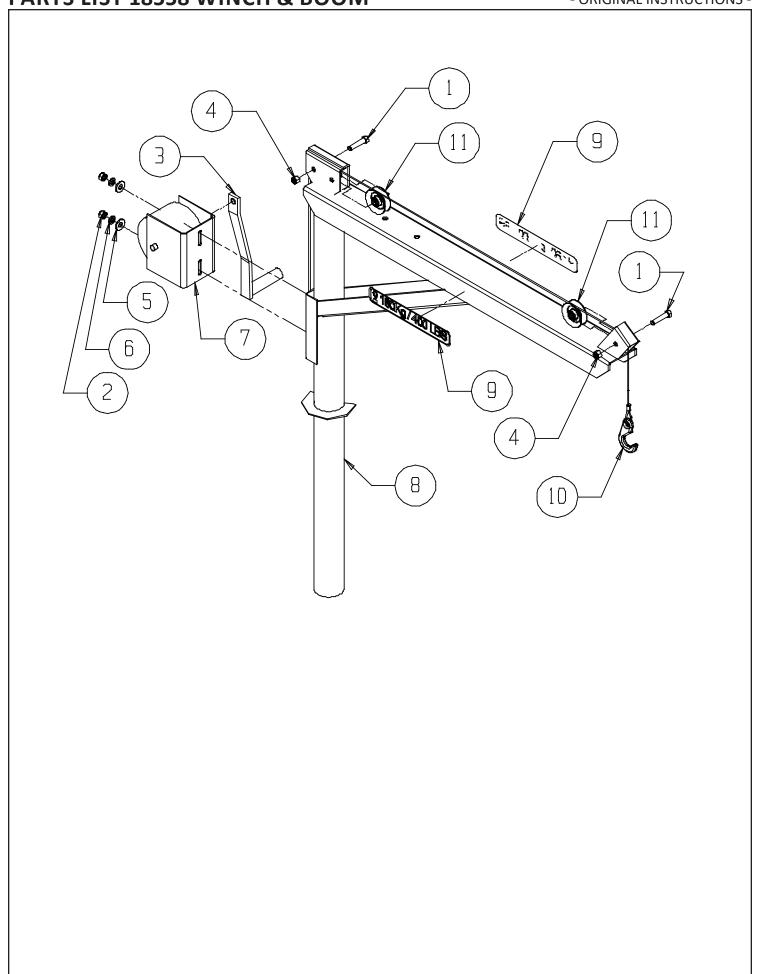
PARTS LIST 18534 ELECTRICAL PANEL SUB-ASSEMBLY - ORIGINAL INSTRUCTIONS -

DIAGRAM NO.	PART NO.	DESCRIPTION
1	D160666	#8 x 3/8" Long Pan Head Tapping Screw
2	D161266	#8 x 3/4" Long Pan Head Tapping Screw
3	R000480	#8 Lock Washer - External Teeth
4	55223	Terminal Strip Decal
5	3707073	8-Pin Socket
6	3707163	Primary Ground Decal
7	3707164	Primary Ground Lug
8	3707378	Din Rail - 14"
9	3707764	Power Line Filter
10	3707550	Traverse Motor Control Board
		Magnetic Starter 1 HP
		Low Voltage Relay
		End Stop - Terminal Block
		Jumper - Terminal Block
		End Plate - Terminal Block
		Terminal Block - Grey
		Terminal Block - Blue
19	6009270	Electrical Sub - Panel
		15-Amp Circuit Breaker
		Terminal Strip - 19 Pole
		Straight Double Spade Terminal
		Single 90° Spade Terminal
		Double 90° Spade Terminal
		Spin Drive Motor Control Board
		6-Amp Circuit Breaker
		Ground Terminal Block
		Relay Terminal Block 8amp 115V
		Cable Tie Mount (Not Shown)
		Cable Tie 6.5 Long x .18 Wide (Not Shown)
		Cable Tie 4.0 Long x .10 Wide (Not Shown)
		Terminal Block Tag 1-10 (Not Shown)
	3707632	Terminal Block Tag 11-20 (Not Shown)



PARTS LIST 18536 CARTON ASSEMBLY

DIAGRAM NO.	PART NO.	DESCRIPTION	
1	18053	. Drive Adapter - 10.5" Long	
1		. Spacer 1.0 Diameter x .75 Long	
3	3589106	. Flat Washer 1.4 OD x .13 Thick	
4	3700095	. Spin Grinding Wheel 6" OD x 1" Wide x .5" Bore	
		. Relief Grinding Wheel 6" OD x 3/8" Wide x .5" Bore	
		Dressing Stick .75 x .75 x 3.0 Long	
		. T-Knob Assembly 5/16-18 Female	
7	3709073	. Retaining Ring - External	
	3709298		
	3709258		
10	3709808	. Flat Washer 1.5 OD x .11 Thick	
	3889066		
		. V - Bracket - Mower Mount	
	3969094		
	3969095	·	
	3969096	·	
	3969160	•	
	6009020	•	
	6009037		
		. Adjustable Center Stand	
20 6	6009222	Fixed Center Stand	
1		. Fixed Center Assembly	
		. T - Knob Assembly 3/8-16 x 1.5 Long	
		. T - Knob Assembly 3/8-16 x 3.25 Long	
		. T - Knob Assembly 3/8-16 x 2.25 Long	
		. 3/8-16 x 1.25 Long Socket Head Cap Screw	
	J317100		
1	J377100	•	
		. Flat Washer 1.00 OD x .375 ID x .188 T	
	3649005		
30	2700216	E/16 19 II Bolt	
	3709316 6009011		
		. Spreader Bai . Warning Decal - Boom Capacity	
	3708856		
	6009102	·	
	3708364		
	6509576		
	6509564	• •	
		. Short Holder Clamp Assembly	
		. Snort Holder Clamp Assembly . Long Holder Clamp Assembly (Not Included)	
		. Square Key 3/16 x .75 Long	44 6509559
		. Square key 5/16 x ./5 Long . Knob - 2 Prong 1/4-20 x .50 Long	45 18537
1		. Knob - 2 Prong 1/4-20 x .50 Long . Flange Coupler .625 Bore	46 3708366
35	3103304	. Halige Couplet .023 bole	47 K191501
100	6000051	Drive Adapter - 2.5 Long	48 B190614
	6009051	. Drive Adapter - 3.5 Long	49 3709304
		. Adapter . Drive Coupling Adapter	50 3709304
	3709585	, -	51 3706130
		. Sieeve Coupler . CD - Neary Training 181	52 3708025
	O, OO11,	. 55 Teary Hamming 101	52



PART NO.	DESCRIPTION
B372801	3/8-16X1-3/4 Hex Head Cap Screw
J371000	3/8-16 Hex Nut
3708647	7" Winch Handle
J377100	3/8-16 Locknut Nylon Full
K370001	3/8 Flat Washer
	3/8 Split Lockwasher
3708578	
6059527	Boom Weldment
3706111	Boom Capacity Warning Decal
3709407	Hook & Cable Assembly
3709795	•
	B372801

