ROPER WHITNEY

of ROCKFORD, Inc.

10M14-H

10 FOOT 14 Ga SHEAR

OPERATIONS MANUAL

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10M14-H MECHANICAL SHEAR

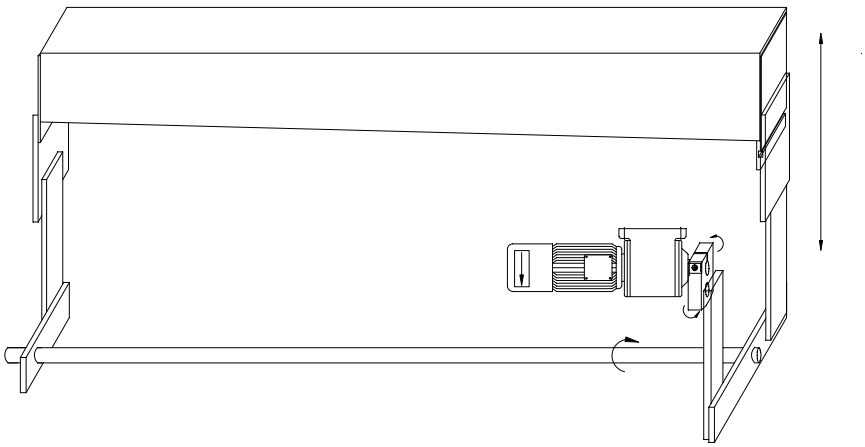
The ROPER WHITNEY 10M14-H mechanical shear is designed and tested to handle 14 gauge mild steel in 10-foot widths. The power drive is through a mechanical linkage with a 5HP motor brake and gear reducer. The cutting action can be set for single cycle or continuous cycle by means of a front mounted switch on the control box. All cutting is operator controlled by use of a foot-switch. The motor only operates when the foot-switch is actuated, thus reducing continuous electrical power drain in comparison to an "always on" running motor. The 10M14-H shear runs very quiet as a result of this motor actuation system. The shear blades are two edged, and upper and lower blades are interchangeable. The shear comes standard with a manual style backgauge that is offered either as a front or rear operated type gauging system.

Several optional features that are available include:

1.) full-length light beam
2.) front extension arms with drop stops
3.) front gauge bar to fit onto the front extension arms
4.) side squaring extension gauges in four foot increments up to 12-feet, with optional flip-type stops
5.) material support and cutoff return mechanism to the front of the shear
6.) DRO (digital read-out) powered backgauge
7.) NC (numerical controlled) programmable powered backgauge

The 10M14-H shear is ready for use upon uncrating -- no adjustments are required. All load bearings are steel-backed, lead impregnated, and self lubricating to provide rigid structural support, low maintenance and a long life. Overall the shear construction is of state-of-the-art heavy plate weldments that are machined with precision requirements to eliminate any need for adjustment upon its initial set-up and use. Blade clearance is factory set and adjustment, through the use of adjustment screws, is provided in the case of blade sharpening or blade replacement.

The following diagram shows the mechanical linkage as driven by the motor/brake gearbox:



10M14-H SPECIFICATIONS

Figure 1 (Appendix) : Overall machine and floor mounting dimensions

Figure 2 (Appendix) : Control panel with the location of the "ON/OFF" safety disconnect switch, the "PULL ON/PUSH OFF" power button, and the "CONTINUOUS CYCLE/SINGLE CYCLE/JOG" selector switch

Figure 3a (Appendix) : Electrical wiring diagram

Figure 3b (Appendix) : Electrical panel layout

The following are the specifications:

1. Capacity	14 Ga. mild steel 18 Ga. stainless steel (*)
2. Shear width	0-121.25 inches
3. Shear depth	0-24 inches
4. Table depth	15 inches
5. Motor HP	5 HP at 1700 RPM
6. Cycle rate	32 stroke per minute
7. Standard voltages	208/230/460 VAC, 3 PHASE, 60 HZ
8. Approximate weight	5500 lb.

* Roper Whitney of Rockford, Inc. recommends the use of high carbon/high chrome blades for shearing stainless steel in production quantities. Note, that these high carbon/high chrome blades are standard on all 10M14 shears.

For more information contact the factory at (815) 962-3011.

ROPER WHITNEY of ROCKFORD, INC.
SAFETY RULES --- 10M14-H SHEAR

1. *WARNING*:

Electrical Danger -- Misuse or improper installation of machinery connected to a source of electricity may result in accidental shock that could cause injury or death.
Installation must conform to National Electric Code (Article 250 - Grounding, etc.)

Electrical connections must be made by a trained and qualified electrician. Electrical characteristics shown on motor plate and control panel must match the power source; and all electrically powered equipment must be grounded.

2. *WARNING*:

Mechanical Danger -- Do no adjust the holddown; it is factory set for 3/16 inch gap and acts as the hand-guard. Do not exceed the work-piece material capacity -- otherwise serious damage will occur with your shear.

3. Machine to be operated by authorized personnel who have been trained by their supervisor with the working and safety features of the machine, and by reading and understanding the Operator's Manual.

4. Do not operate shear without reading this Operator's Manual and without proper supervisory instructions.

5. Perform all installation and set-up operations before applying power for electrical start-up.

6. Never operate machine with any guard removed; i.e., all required guarding to be installed and effective.

7. Never leave machine on or running unattended. When not in use, turn off all electrical power.

8. Never adjust machine with power on.

9. Avoid accidental start-up.

10. Do not use machine if servicing is required.

11. Use safety glasses and required protective tools.

12. Keep work areas clean and in proper order.

13. Be alert to all potential hazards.

INSTALLATION

RECEIVING

Immediately upon receiving the 10M14-H mechanical shear, check it very carefully for damage or loss of parts in transit. Report any loss or damage to the delivering carrier promptly to insure proper handling of your claim. Also contact your Roper Whitney of Rockford Dealer. Prior to uncrating your 10M14-H shear, read the instructions to remove and lift the shear. Note the "red" instruction tag attached to the lifting eye.

WARNING: Do not lift the shear with a "fork-truck" at any point on the shear structure, because serious damage will occur to the shear. The only permissible procedure is to lift at the ram by an "overhead sling" connected to an overhead crane or overhead lift of a "fork- truck". The "overhead sling" must be connected to the lifting ring which is passed through and bolted in position onto the ram assembly.

WARNING: Remove lifting ring after lifting, positioning, leveling and anchoring the shear to the floor is completed.

DO NOT OPERATE THE SHEAR WITH LIFTING RING INSTALLED!

LEVELING

WARNING: Shear must be removed from the shipping skid, and must be anchored securely to the floor. See lifting procedures of previously discussed Receiving Section. Reasonably level shear by referencing the table top in the length and depth directions. Leveling is accomplished with screws (owner supplied) installed in tapped 1/2-13 holes adjacent to each mounting hole.

CLEANING

WARNING: Machine electrical power must not be connected when cleaning transit shipment dirt. Clean machine thoroughly prior to connecting electrical power, and prior to running the shear. Despite precautions taken in preparing the shear for shipment, dirt and foreign material may accumulate on machine and other parts during transit, and can cause considerable damage unless thoroughly cleaned. It is extremely important to inspect and clean off any dirt and foreign material that may have accumulated. DO NOT attempt to blow dirt out or off with an air hose as this may force some foreign material into undesirable areas. Remove rustproofing compound with an acceptable solvent.

ELECTRICAL CONNECTIONS

WARNING:

Electrical Danger -- Misuse or improper installation of machinery connected to a source of electricity may result in accidental shock that could cause injury or death. Installation must conform to National Electric Code (Article 250) -- Grounding, etc.

Electrical connections must be made by a trained and qualified electrician. Electrical characteristics shown on motor plate and control panel must match the power source; and all electrically powered equipment must be grounded.

A fusible electric "disconnect" panel box must be installed for the line incoming three-phase electrical power. *CAUTION:* Motor direction must match the motor arrow. See Figure 1, below. Switch any two single-phase leads to reverse the motor rotation -- *WARNING:* Incoming three-phase electrical power must be turned off at the fusible "disconnect" panel box before reversing leads to reverse the motor direction.

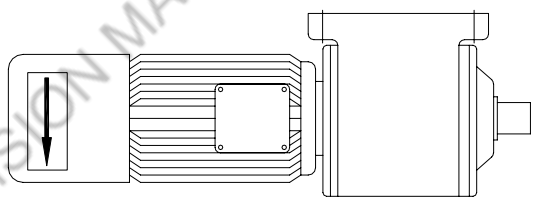


Figure 1

MAINTENANCE

The 10M14-H shear requires a minimum maintenance schedule. The rotating bearings are self-lubricating and require no maintenance. These are the bearings associated with the mechanical linkage pin connections, and the bearings between the actuator shaft and legs. The ram gib-guide bearings are made from bearing bronze, and have grease-pockets packed with bearing grease at the Factory. These are long-life bearings; however, if a problem occurs consult the Roper Whitney of Rockford, Service Department. The motor gear-box is grease packed and requires no maintenance.

CAUTION: The backgauge mechanism will require periodic oiling with standard machine lubricating oil, as needed, to insure smooth actuating.

OPERATING INSTRUCTIONS

WARNING -- Never operate, install blades, or perform maintenance work on your shear without proper supervision, instruction and without first reading and understanding the Operating Instructions in this manual.

NEVER OPERATE SHEAR WITH LIFTING EYE INSTALLED!
REMOVE THE LIFTING EYE BEFORE OPERATING SHEAR!

This shear has been inspected and tested at the factory to cut full length stock of capacity gauge. DO NOT EXCEED SHEARING CAPACITY LIMITS ON ANY LENGTH OF STOCK. The shear is shipped with the blades properly adjusted, thus your shear is factory-set to shear the capacity materials.

Refer to page 2 for the machine capacities.

CAUTION: Electrical connection must be made by a qualified electrician.

WARNING: Electrical characteristics shown on motor plate and control panel must match the power source; and electrically powered connections must be grounded. A fusible electric "disconnect" panel box must be installed for the line incoming three-phase electrical power.

CAUTION: Motor direction must match the motor arrow. See Figure 4. Switch any two single-phase leads to reverse the motor rotation.

WARNING: Incoming three-phase electrical power must be turned off at the fusible "disconnect" panel box before reversing leads to reverse the motor direction.

Operating Procedure:

1. Turn on electrical power by first switching MAIN disconnect to "ON" and then pulling start button -- see APPENDIX , Figure 2. Be aware that the motor is not turned on -- but power is noted by the illuminated red light.

2. Set selector switch to either single cycle, continuous cycle mode or jog mode.

3: Set backgauge to desired width of cut.

4. Position work-piece sheet -- to insure square cut, use care to locate sheet positively against table side squaring gauge and backgauge stop.

5. Depress the foot-switch to shear the workpiece sheet. Foot-switch must remain depressed when in CONTINUOUS mode.

PLEASE READ THE FOLLOWING!!

WARNING: *The 10M14-H shear is designed as a single action shear, and each stroke requires a repeat foot switch actuation. Once the foot switch has been tripped, the shear will make one complete stroke unless the stop button is pushed during the stroke.*

USE EXTREME CAUTION: *If the CONTINUOUS CYCLE mode is selected, the 10M14-H shear will continue to cycle as long as the operator maintains the footswitch in a depressed mode. If the operator releases the footswitch, the ram will finish its current cycle and stop in its up position. Pressing the stop button, at any time, will stop the ram.*

NOTE: *To reset after hitting the STOP push-button during a cycle:*

1. *Pull the START button out*
2. *Select JOG*
3. *Press and hold the footswitch down*
4. *Continue thru shear cycle until upper ram is at top dead center and*
5. *Release footswitch*
6. *Return to SINGLE or CONTINUOUS modes.*

NOTE: *If shear becomes "jammed" during a cut:*

1. *Have a qualified electrical personnel reverse two of the incoming phases*
2. *Select JOG and press footswitch.*
3. *If successful reverse incoming phases again returning them to their orginal positions.*
4. *If not successful call Factory (815-962-3011) and Service Dept can walk you through a procedure of manually releasing brake of shear motor and lifting ram.*

BLADE REPOSITIONING/REPLACEMENT PROCEDURE

The upper and lower blades are two edge blades that can be rotated 180° to provide a new cutting edge. Either when rotating blades or replacing them after regrinding, a procedure is applicable:

1. Refer to Figure 2.

2. *WARNING:* Turn off all 3-phase incoming electrical power at the fuse-disconnect box and turn the MAIN disconnect to OFF before performing any blade service maintenance.

3. *CAUTION:* Ram must be in top rest position.

4. Set backgauge to extreme "out" position.

5. Remove holddown assembly (item 4) --

    a. Remove two 5/16 x 2-1/2 socket head cap screws (item 2) at each end of the holddown assembly, and remove the two rod holders (item 1).

    b. Remove two hex nuts (item 3) -- one at each end of the holddown assembly (item 4).

    c. Thread a lifting-eye (3/8-16 thread) into the center of the holddown assembly, (item 4). Using an overhead or portable lift crane gently lift holddown assembly upward off of rods and set safely aside. The upper blade area is now exposed for servicing.

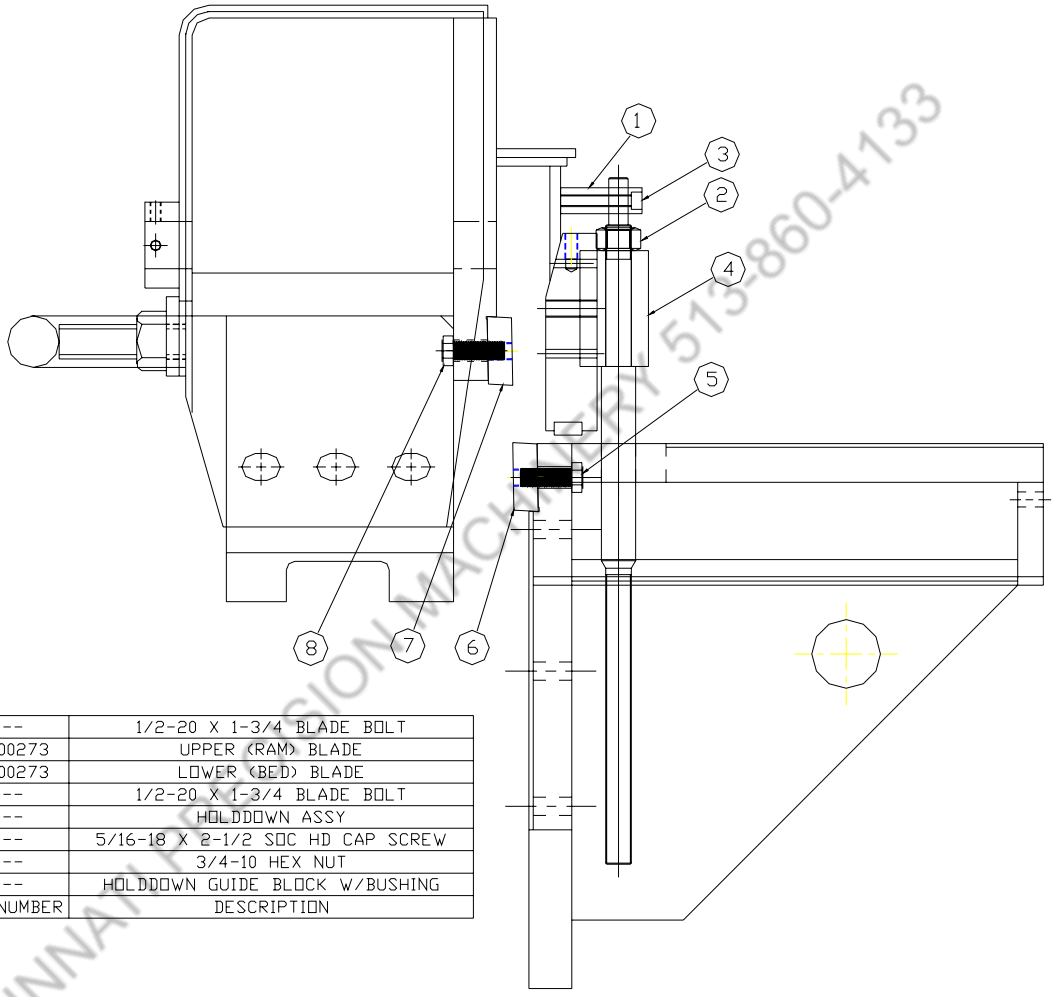
6. Remove and reposition upper blade (item 7) --

    a. Use blocks of wood between upper blade and table blade (one piece at each end) to prevent blade from dropping.

    b. Remove all blade bolts (21 each, item 8) from upper blade (item 7) by working from ends to the center.

CAUTION: Wear gloves when handling blades and use care to prevent damage to blades. Avoid all contact with all other materials except wood when blades are removed from shear.

    c. Remove upper blade (item 7) and rotate forward 180°.



ITEM	QTY.	PART NUMBER	DESCRIPTION
8	21	----	1/2-20 X 1-3/4 BLADE BOLT
7	1	350700273	UPPER (RAM) BLADE
6	1	350700273	LOWER (BED) BLADE
5	21	----	1/2-20 X 1-3/4 BLADE BOLT
4	1	----	HOLDDOWN ASSY
3	4	----	5/16-18 X 2-1/2 SOC HD CAP SCREW
2	2	----	3/4-10 HEX NUT
1	2	----	HOLDDOWN GUIDE BLOCK W/BUSHING

Figure 2

BLADE CLEARANCE ADJUSTMENT PROCEDURE

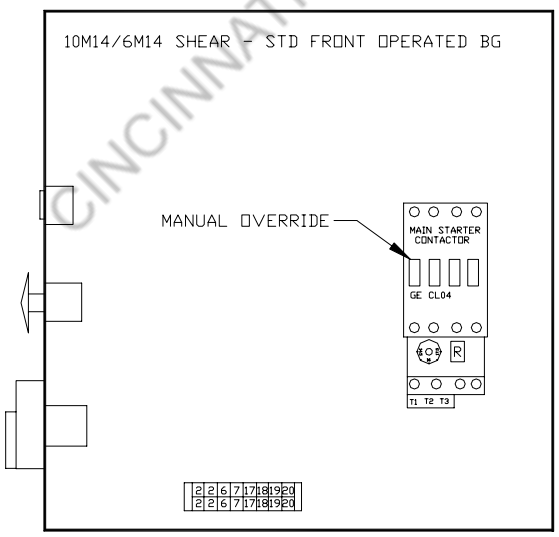
Blade adjustment is factory set to handle rated capacity materials and other various materials of varying thickness. When a blade is replaced, repositioned or resharpened, though, the cutting clearance needs to be checked and adjusted to make sure that the blades do not interfere, and/or an acceptable sheared-edge is obtained.

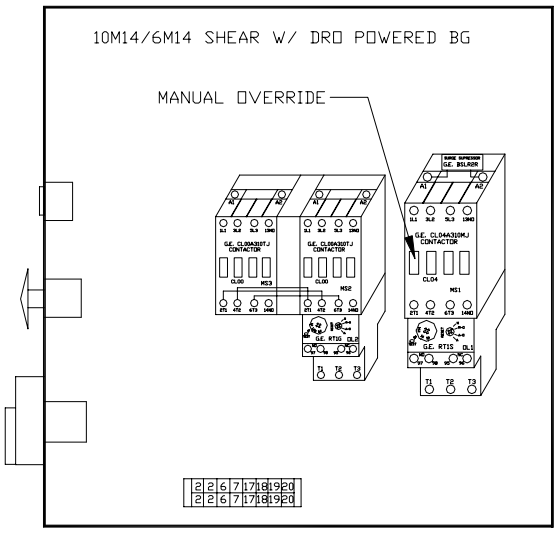
WARNING: The electrical power must be turned off to measure the clearance.

Blade clearance is measured at the cutting edge between the upper and lower blades with a machinist feeler-gauge. It is extremely important that this important measurement be made only at the exact point which the blades cross! The blade clearance is .003 inch at each end and .001 inch in the middle. Lower the upper blade incrementally along the length of the lower blade by pushing the black manual over-ride button on the main starter contactor. Check the blade clearances every 12 inches or every bolt hole.

Turn the control box off by pushing the START/STOP button (red light is now off). Open the control-box door and push the black button on the motor contactor. See diagram below.

CAUTION: USE A NON-CONDUCTING ROD SUCH AS WOOD OR PLASTIC.





BLADE CLEARANCE ADJUSTMENT PROCEDURE, cont.

The blade adjustment is made with the ram adjustment screws as follows -- refer to Figure 3a.

1. *Warning:* Always set a larger clearance prior to running ram downward after the blades have been replaced, repositioned or re-sharpened. They must not hit! And holddown must be installed while performing the adjustment procedure.

2. Begin on the right hand side. Bring the ram down, as if checking the blade clearance, until the blades, items 1 and 2, just pass each other.

3. Loosen the (3) main bolts, item 5 (1-1/8" socket or wrench).

4. Increase blade clearance by first loosening jam-nut, item 4 (3/4" wrench) and then tightening the adjustment screw, item 3 (5/8" wrench).

5. Decrease blade clearance by first loosening jam-nut, item 4 and then loosening the adjustment screw, item 3.

6. Tighten jam-nut, item 4, when proper clearance is achieved. Finish by re-torquing the (3) main bolts to 200 ft-LB.

7. "Jog" the ram down all the way. Repeat steps 3-6 on left hand end.

8. Bring the ram half way up. Increase clearance in the middle by loosening tension bar nut. Decrease clearance by tightening nut. See Figure 3b.

9. Recheck clearance on each end.

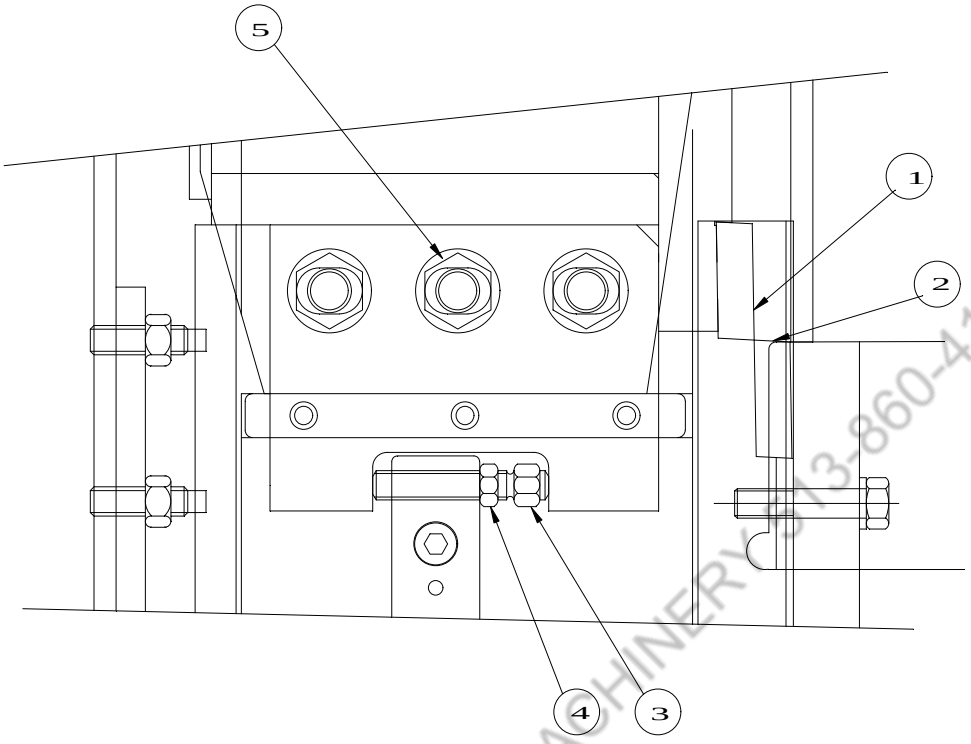


Figure 3a

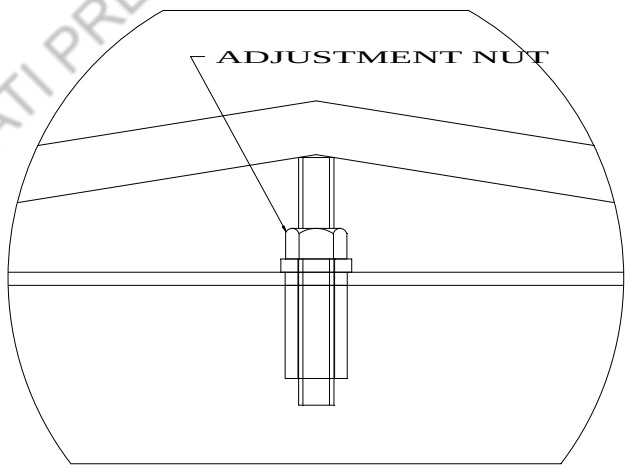


Figure 3b

SIDE EXTENSION SQUARING GAUGES

Part No. 273940042

The side extension squaring gauges are in 4-foot sections that can be assembled, with multiples, in 8 or 12 foot total gauge lengths. For most applications the four-foot section will be adequate. The four-foot sections are packaged in kit form with applicable scales for dimensional extension. The following kits are as follows:

1. Initial 4-foot, order P/N 273940042

2. Build-up 8-foot, order P/N 273940043

3. Build-up 12-foot, order P/N 273940044

Note that 8-foot length needs first two part numbers, and 12-foot length needs all the above part numbers.

An optional flip-type stop for the side extension gauges is available. It can be ordered under P/N 273940046.

The extension gauge can mount to the shear table at either the right or left side. A leg is supplied to support the end of the gauge. There may be some manufacturing variations that will require adjustment of the scales, gauge height and squares. Allowances are provided for these adjustments.

For specific assembly instructions,
refer to the instruction sheets enclosed with the kits.

FRONT EXTENSION ARMS

Part No. 273940006

The front extension arm kit includes two cast arms, T-bolts and nuts, and a 8-foot gauge bar. The arms are connected to the table with 7/16-14 machine bolts and lock washers (included in the kit), by using the two inner set of screw holes on the table front face.

LIGHT BEAM ASSEMBLY

Part No. 273940005

The light beam assembly fits onto the legs and is held with 1/4-20 screws. Electrical connections are made through the control box wall, and connected to terminal strip as shown in Figure 4. ***WARNING:*** The electrical connections must be properly grounded by the Green wire, and the 24 volt AC black and white wires must be appropriately connected to the box per Figure 4.

When the electrical power is switched on at the Operator's control panel, the light-beam will automatically turn on. Thus, no special switching nor attention is required to turn on the light beam assembly.

Replacement 24V bulbs can be ordered under P/N 660000223.

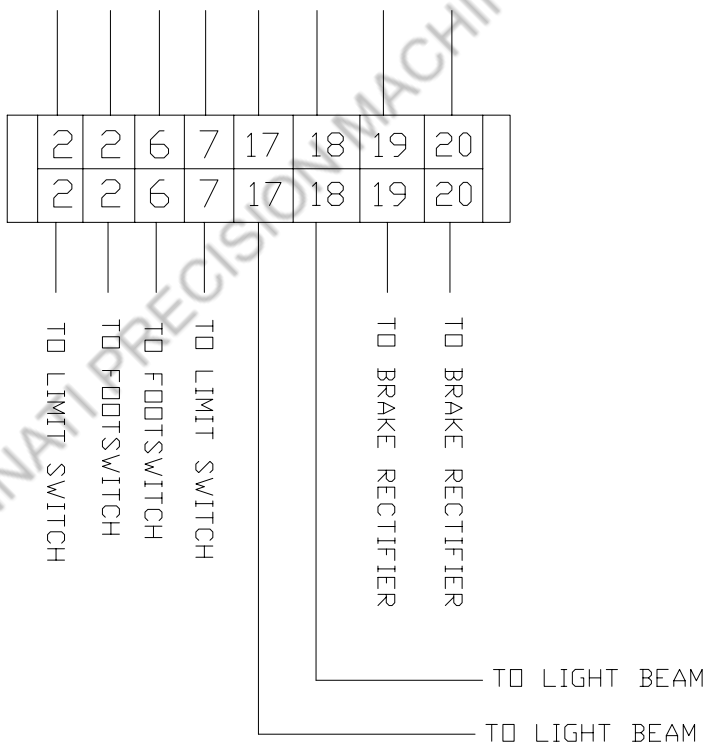
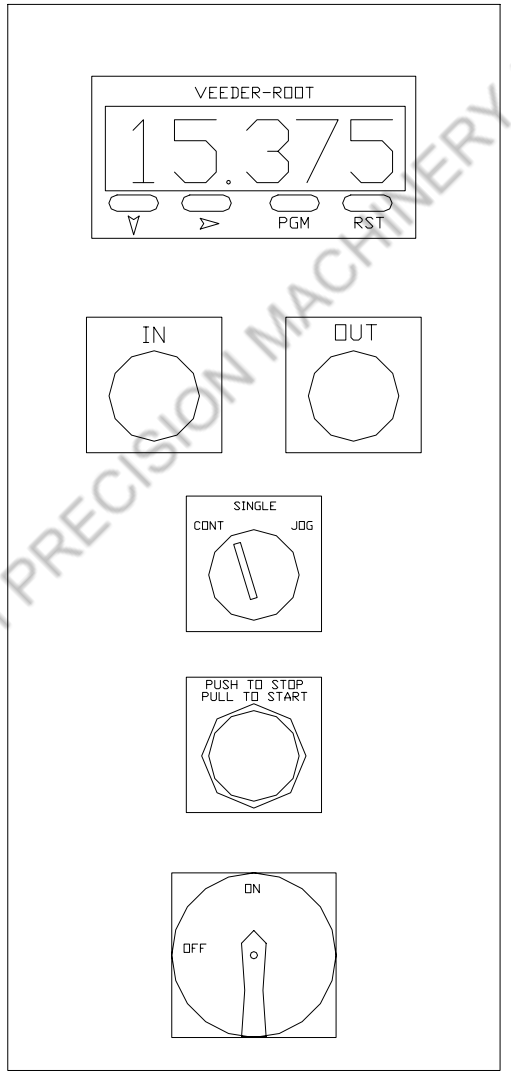


Figure 4

DRO BACKGAUGE PERFORMANCE SPECS

1. Power feed backgauge for quick in and out positioning.
2. Final position is set with hand wheel.
3. Large .71" LED display pre-programmed at factory.
4. 24” (in) backgauge travel.
5. Forward (IN) and reverse (OUT) over-travel switches to prevent backgauge crash.
6. Digital readout can be reset at anytime.
7. Guarding to protect backgauge assembly.



USING THE DRO BACKGAUGE

1. To operate the backgauge:

   a. Press and hold the “IN” button located on the control box to move backgauge in.

   b. Press and hold the “OUT” button located on the control box to move backgauge out.

NOTE: FORWARD AND REVERSE OVER-TRAVEL SWITCHES ARE INSTALLED TO PREVENT BACKGAUGE CRASHES.

   c. Use the jog buttons to power the backgauge close to the desired position. Then reach the final position by using the handwheel located on the backgauge drive motor. When moving backgauge out to a position always remember to take out any backlash by first moving past the final position and then coming back in. This will result in the most accurate gauging.

WARNING: KEEP HANDS AWAY FROM HANDWHEEL WHEN BACKGAUGE IS MOVING.

WARNING: DO NOT PRESS ANY BUTTONS ON THE COUNTER UNLESS YOU INTEND TO RESET THE READ OUT OR ADJUST THE SCALE FACTOR.

2. To “zero” or reset the digital read out:

Manual reset to zero is accomplished by pressing the front panel button marked “RST”. Also, be sure the backstop is all the way “home” to insure accurate gauging after resetting. Backgauge is considered “home” when the backstop is flush against the lower blade.

3. To adjust the Scale Factor or Calibration (CAL):

The Calibration, “CAL”, has been preset at the factory to obtain optimum accuracy. However, due to physical variances some adjusting may be necessary once the machine is set-up for use.

Pressing & Holding the “PGM” push button in for several seconds will change the display from Position value to "CAL". Release the "PGM" push button and the current "CAL" value will be displayed. Pressing the "arrow right" push button will enter Edit mode and each press of the same key will toggle between each of the digits which will blink when activated.

To change the blinking digit value, press the "down arrow" push button. Each press will decrease the value by one (9,8,7,6,5,4,3,2,1,0,-) until the desired value is obtained.

When finished changing all the digits press the “PGM” push button to accept this new value. Hold "PGM" push button for several seconds to return to Position display.

Adjust the “CAL” value slightly up if counter position is short of actual cut length or down if cut length is too short compared to counter position. Continue adjusting “CAL” value slightly until desired accuracy is achieved.

NOTE:
Value for “CAL” should fall in the range of 0.9600< CAL<1.0400

Always "HOME" backgauge between adjustments.

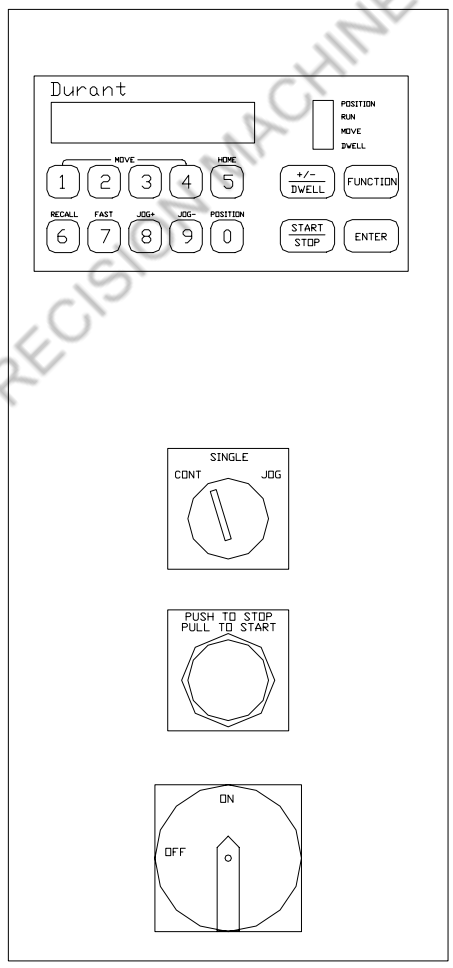
DRO PROGRAMMING PARAMETERS

NOTE: All parameters for the Veeder-Root have been factory programmed and should not need changing or adjusting.

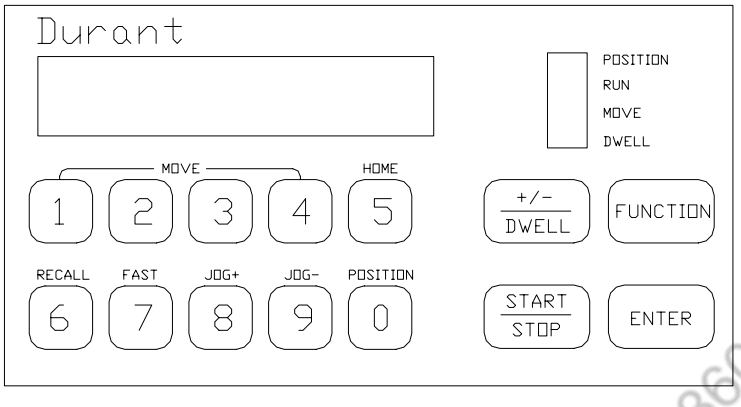
Please call factory if changes are necessary.

NC GAUGE PERFORMANCE SPECS

1. 5 user-programmable preset moves
2. Large 6-digit LED display set at factory to read in inches. Metric display is possible.
3. High speed of 88 IPM and slow speed of 21.5 IPM
4. 24” (in) backgauge travel
5. Positioning either automatically or manually
6. Forward (IN) and reverse (OUT) over-travel switches to prevent backgauge crash.
7. Programmable decimal point
8. Programmable backlash
9. Programmable high and low limits
10. Optional password protection
11. Guarding to protect backgauge assembly.



PROGRAMMING THE NC BACKGAUGE



There are 5 Programmable Presets which are buttons 1-5.

To set the #1 Preset:

1. Push the "1" button.

2. Push the "ENTER" button. The display shows the current value.

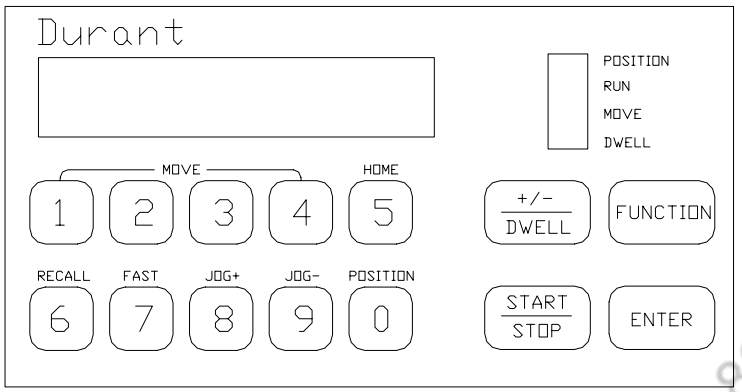
3. Key in desired position.

4. Push "ENTER" button again to store value. If the number falls out of the pre-programmed range then the number will flash on the screen. Repeat until value is in the correct range.

5. Follow steps 1-4 for remaining 4 presets.

6. Push "0" or "POSITION" button to display current position.

USING THE NC BACKGAUGE



There are 5 programmable presets and also jog controls both "in" and "out" in either slow or fast speeds.

To jog the backgauge:

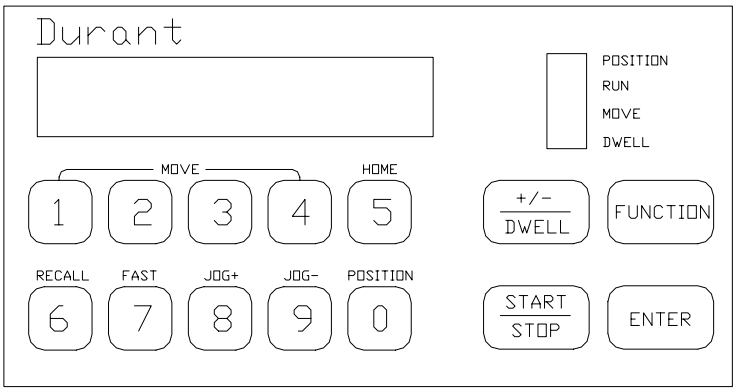
1. Push the "0" or "POSITION" button to verify that the current position is being displayed.

2. Pushing the "8" or "JOG+" button will cause the backgauge to move "out" or away from the operator in the slow speed mode.

3. Pushing the "9" or "JOG-" button will cause the backgauge to Move "in" or towards the operator in slow speed mode.

4. Pushing the "7" or "FAST" button at the same time as either the "JOG+" or "JOG-" buttons will cause the backgauge to move in the direction chosen in fast speed mode.

USING THE NC BACKGAUGE , cont



To move to the #1 Preset:

1. Push the "1" button.

2. Display shows what is programmed into "1".

3. Push the "START"/"STOP" button to start movement.

4. Backgauge will move to desired position.

5. If the "START"/"STOP" button is pushed before the destination is reached then the backgauge will stop at its current position. If pushed again, then the backgauge will proceed to the value set in preset "2". See #7 below.

6. To move to any of the other 4 presets follow steps 1-4 above but press the desired preset button instead of "1".

NOTE: The "5" preset is not really a "HOME" preset.
It can be programmed just like the other presets 1-4.

7. By pushing the "START"/"STOP" button without a specified preset number, the backgauge will move to the next preset value. If preset "1" was the last command for the backgauge to go to and the "START"/"STOP" button is pushed, the backgauge will go to preset "2". If the "START"/ "STOP" button is pushed again, the backgauge will go to preset "3", etc....

INTERNAL DURANT PARAMETERS

NOTE: All parameters for the DURANT have been factory programmed and should not need changing or adjusting.

Please call factory if changes are necessary.

EXTRACTING FUNCTION CODES FROM DURANT CONTROLLER

1. Hit **FUNCTION ENTER**.
   Note that all four (4) LED's are flashing.

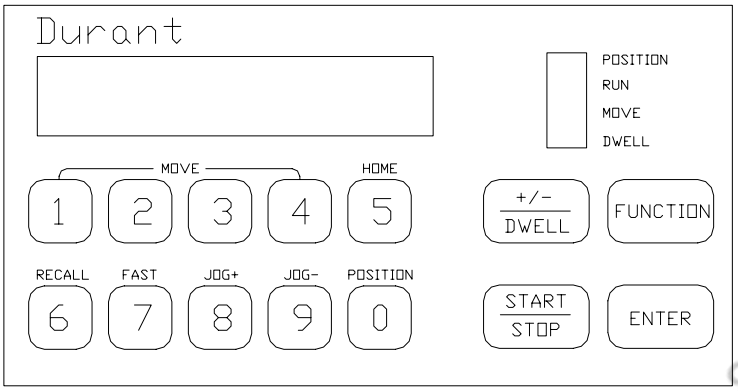
2. Hit **FUNCTION 5 ENTER**.
   The display will show the current value for this function code.

3. Press **ENTER**.
   The next code number will display briefly and then its value will remain on screen.

4. Continue pressing **ENTER** until all values are known.

5. Press **START/STOP** to exit.

CHANGING FUNCTION CODES
IN DURANT CONTROLLER



1. Hit **FUNCTION ENTER**.
   Note that all four (4) LED's are flashing.

2a. Hit **FUNCTION (FUNCTION CODE) ENTER**.
   Note that all four (4) LED's are still flashing. If they are not, a password lock has been entered. The password can be displayed by pressing and holding in **FUNCTION and 0** when power is first turned on.

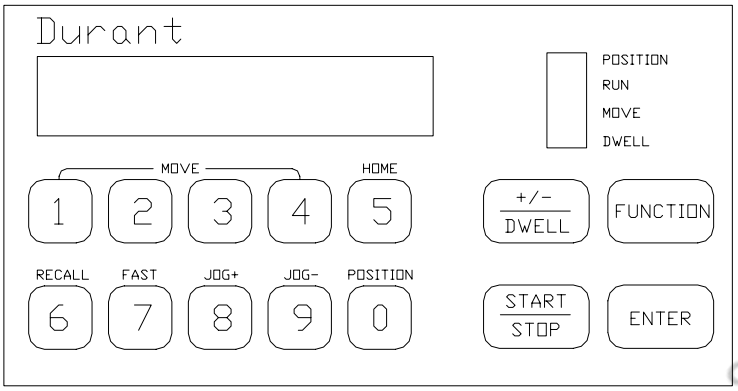
2b. To enter password, hit **FUNCTION ENTER**.
   Enter password and hit **ENTER**.
   Display should show **00** and all LED's should be flashing.

3. Hit **FUNCTION (FUNCTION CODE) ENTER**.
   Enter new value. Accept it by pressing **ENTER**.

4. Repeat step three as necessary.

5. Press **START/STOP** to exit.

TO CHANGE CURRENT DISPLAYED POSITION



Since there is no “home” or “zero” position, we use the following procedure to tell the backgauge where it is and it begins to count from that position.

1. Hit **FUNCTION ENTER**.
   Note that all four (4) LED's are flashing.

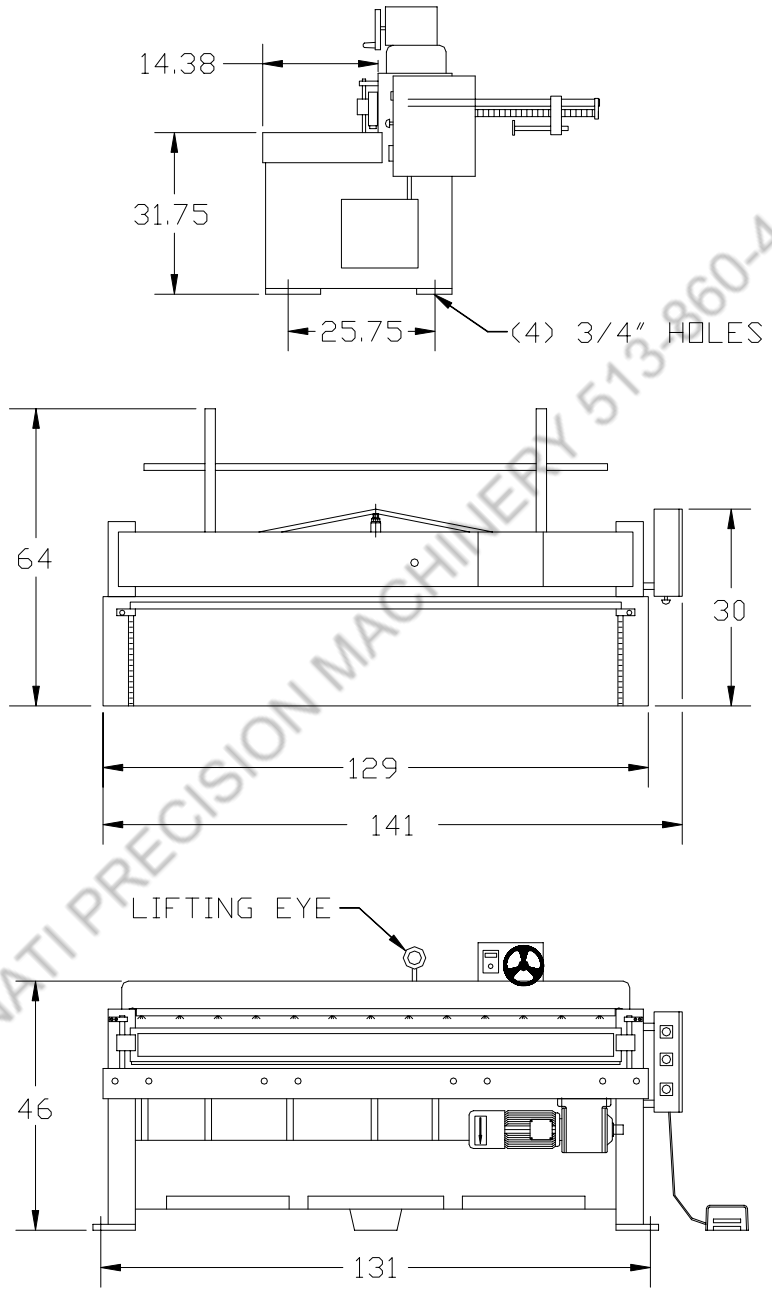
2. Hit **FUNCTION 65 ENTER.**
   Input new current position.

3. Hit **ENTER** again.

4. Hit **START/STOP** to exit programming mode.

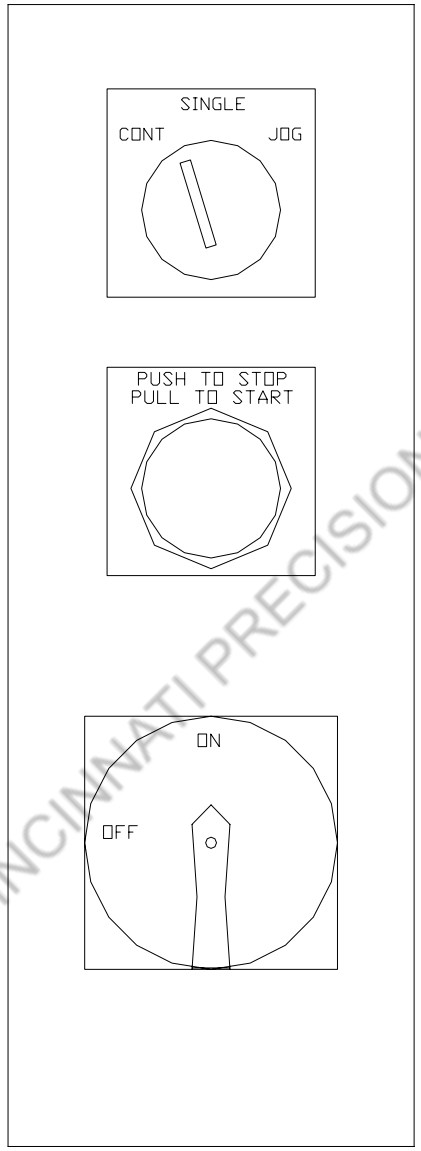
APPENDIX
10M14-H PHYSICAL DIMENSIONS

FIGURE 1



OPERATOR'S CONTROL PANEL

FIGURE 2



MODE OF OPERATION SWITCH:

1. CONTINUOUS
2. SINGLE or
3. JOG

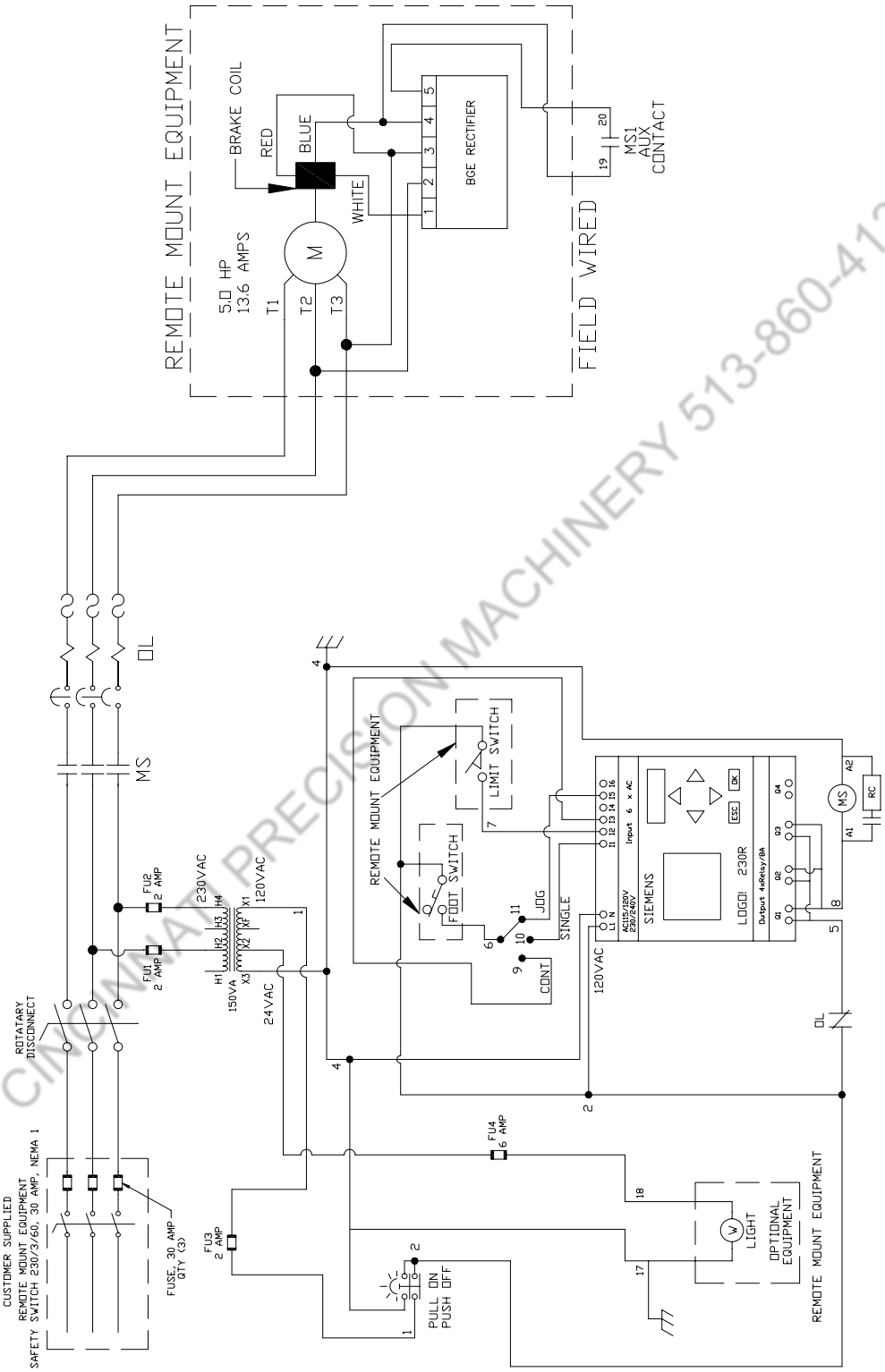
PULL: TURN ON MACHINE
(ILLUMINATED RED WHEN ON)

PUSH: TURN OFF MACHINE
PUSH: EMERGENCY STOP

3-PHASE ELECTRICAL
POWER DISCONNECT SWITCH

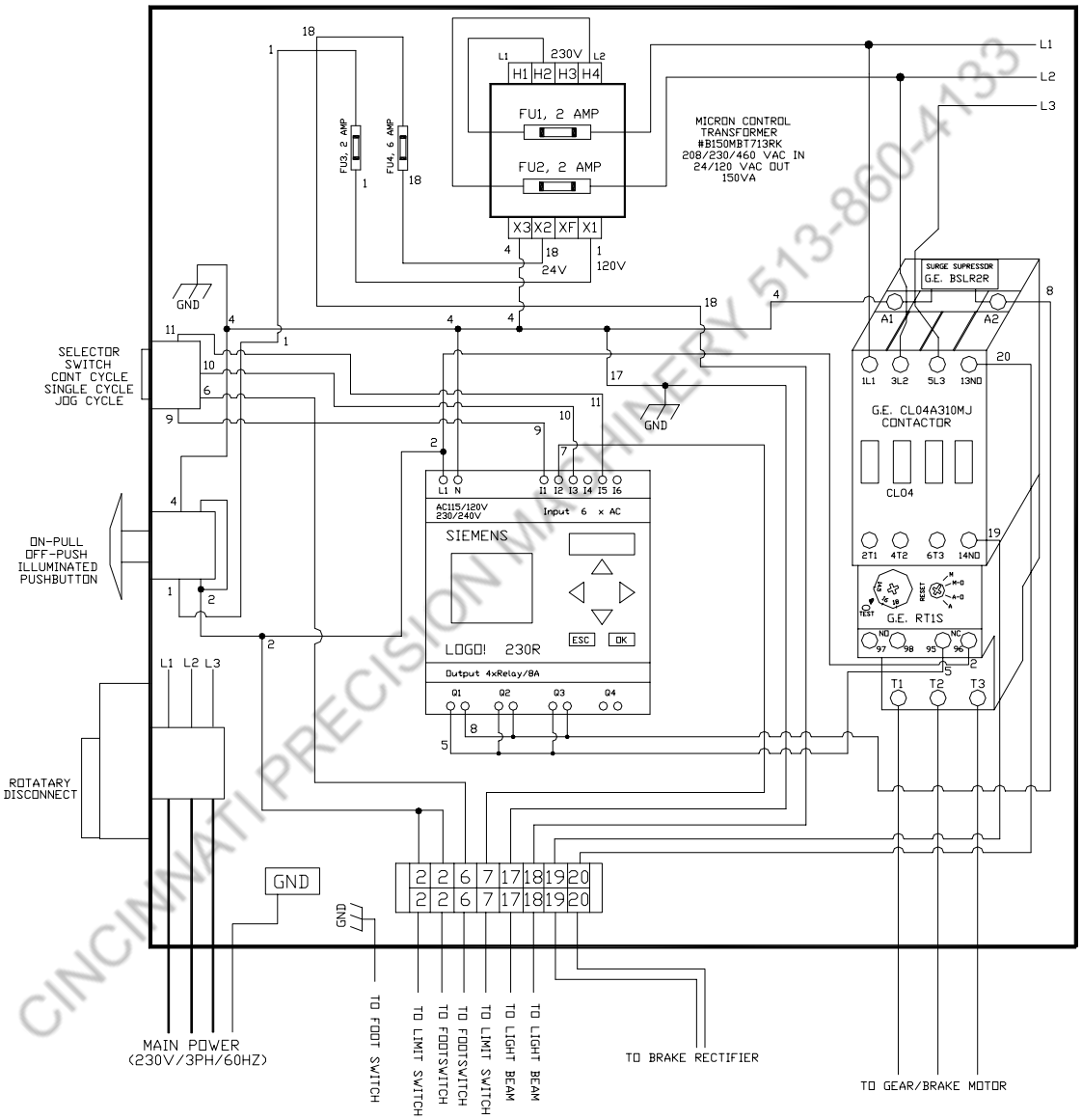
230V STD ELECTRICAL WIRING DIAGRAM

FIGURE 3A



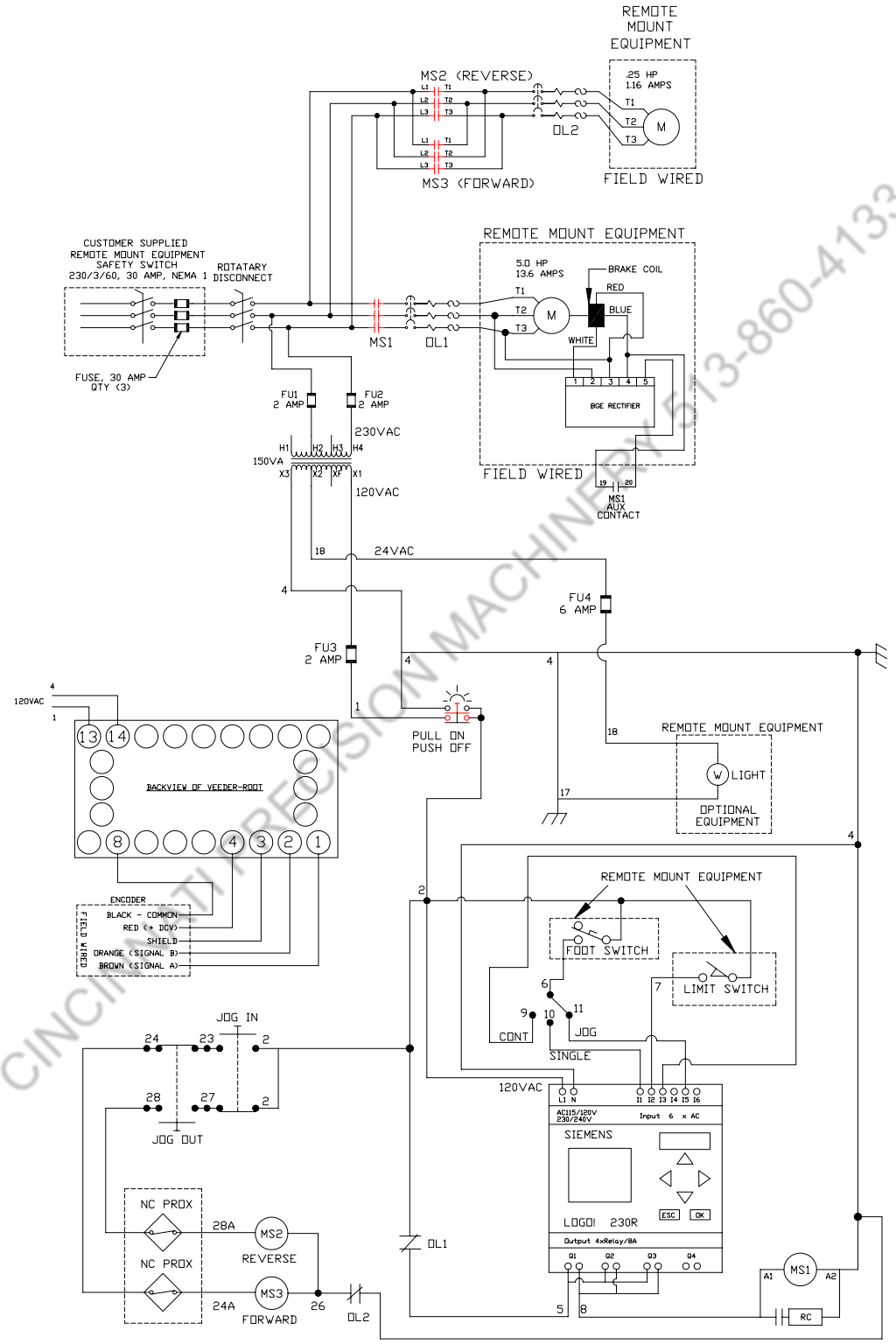
230V STD ELECTRICAL PANEL LAYOUT

FIGURE 3B



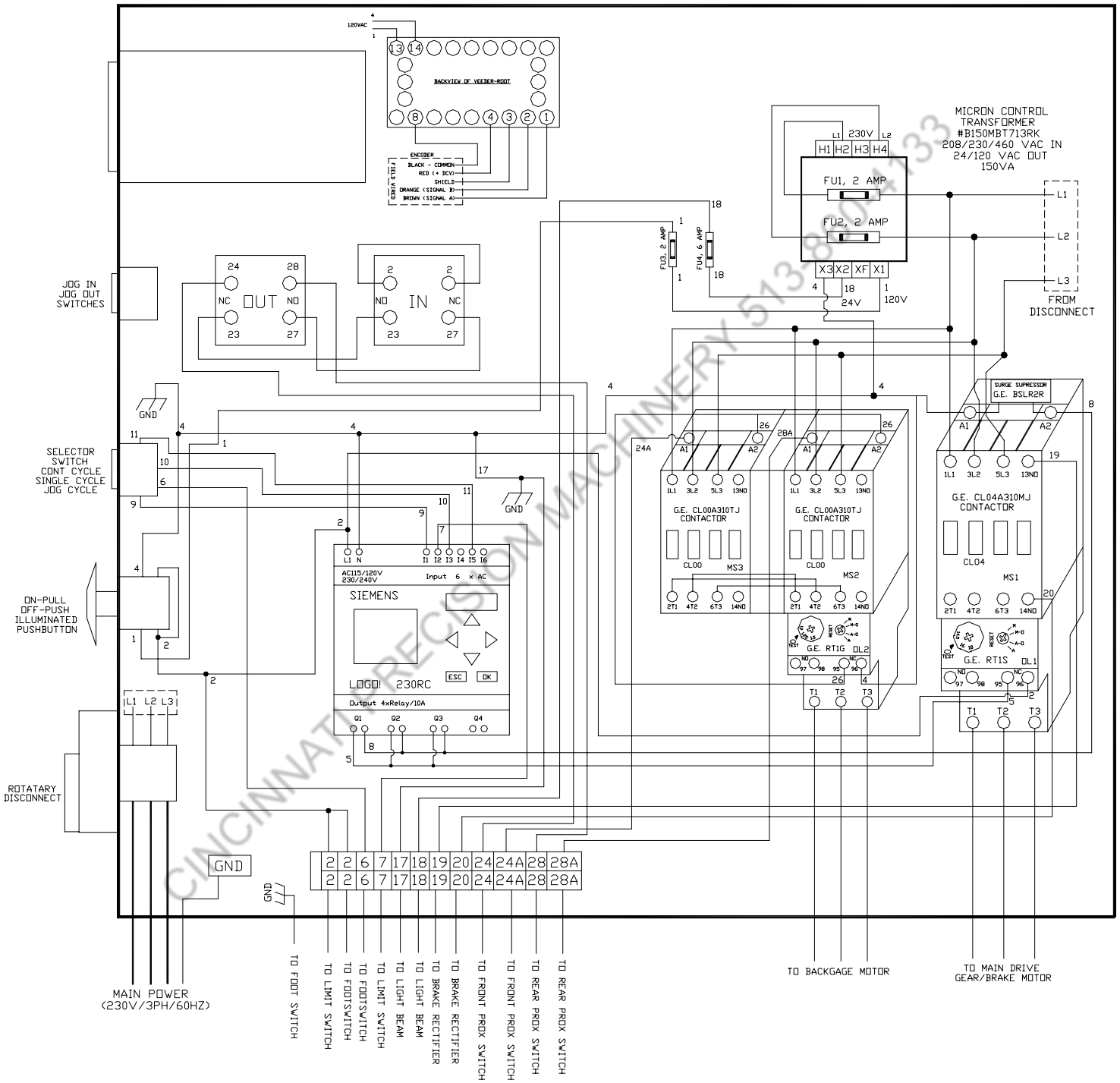
230V DRO ELECTRICAL WIRING DIAGRAM

FIGURE 4A



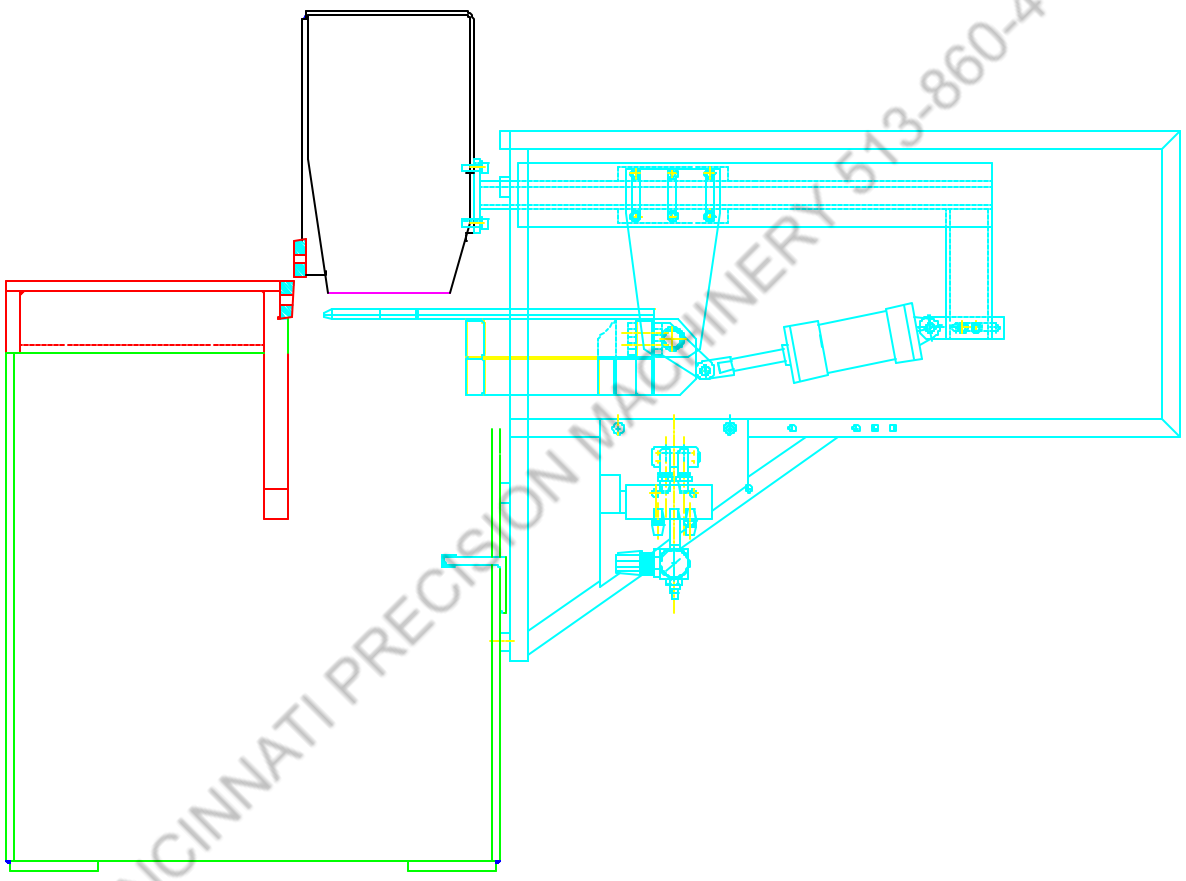
230V DRO ELECTRICAL PANEL LAYOUT

FIGURE 4B



6M14 / 10M14

AIR-OPERATED
FRONT MATERIAL RETURN



OPERATIONS MANUAL

ver 1.0

10/9/00

ROPER WHITNEY
OF ROCKFORD, INC.

TC

Table of Contents

About This Manual

Safety Precautions

System Operations

1

About This Manual:

WARNING

POTENTIAL FOR INJURYOR DEATH

The product described in this publication may employ or create conditions that could, through misuse, inattention, or lack of understanding, result in personal injury or dea th, or damage to the product or other equipment. It is imper ative that personnel involved in the installation, operation, programming, and maintenance of this product understand the operation of the product and the contents of this and all supporting documents.

This manual explains the principles and procedures needed to competently operate the 6M14 / 10M14 Air-operated Front Material Return. This manual is written for the 6M14 / 10M14 Shear operator. The operator must be qualified to operate the 6M14 / 10M14 shear, and must possess a basic understanding of sheet metal fabrication.

Special skills normally possessed by a qualified shear machine operator (print reading; knowledge of tooling, materials, methods, and processes; inspection familiarity; etc.) are not addressed in this manual.

This manual contains all the information necessary to operate the material return system. Except for a brief description of those features that can affect operations, this manual does not address installation and maintenance.

Conventions Used in This Manual

To make this manual easier to read and use, a few special symbols, conventions, and terms are used.

Attention Boxes

Attention boxes are used to: alert you to hazards which could result in harm to you, others, or the equipment; remind you of important information to be considered. The following are examples and explanations of attention boxes used in this manual.

WARNING

TYPE OF HAZARD

A warning box is used to emphasize that a hazardous environment that could cause personal injury or death exists in the equipment or may be associated with its use and that inattention to proper safety, operation or maintenance procedures could result in personal injury or death and damage to the equipment.

CAUTION

A caution box is used to emphasize that inattention to proper safety, operation, or maintenancc procedures could result in damage to the equipment.

NOTE

A note box is used to call attention to information that is especially significant to understanding the subject matter, to provide important information, or to make a recommendation.

Obtaining Assistance

Should any questions remain unanswered, our Field Service Technicians and inhouse Product Support staff can provide you with assistance. Before calling for assistance, service, or parts, please have the following available:

- the machine type and serial number - listed on the nameplate on the front of the righthand leg
- a description of the problem
- a description of the operating conditions and setup
- operating device, feature, and function status
- the manuals and prints provided with your system

To obtain assistance, service, or parts please contact:

Roper Whitney of Rockford, Inc.

2833 Huffman Boulevard, Rockford, IL 61103

PHONE: (815) 962-3011

FAX: (815) 962-2227

E-MAIL: info@roperwhitney.com

NOTE

It may be required that you obtain service or parts through an authorized Roper Whitney distributor.

2

Safety Precautions:

WARNING

POTENTIAL FOR INJURYOR DEATH

Inattention to proper safety, operation, and maintenance procedures could result in per sonal injury or death and damage to the equipment. Before using the system, carefully read and fully understand the safety precautions described in this chapter and the supplemental sources listed below.

Although the system has been designed with safety in mind and is equipped with numerous safety features, no amount of design and features can replace an informed, proficient, safety-conscious attitude on your part. This chapter describes various safety precautions which must be observed when operating and maintaining the system. This chapter must not be considered all-inclusive on the subject of safety. Use this chapter as a guide to supplement safety precautions, warnings, and instructions in:

Other manuals about this machine

Local, plant, and shop safety rules and codes

Governmental safety laws and regulations

Personal Safety

DO

Ensure that you know how to do the work in a correct, safe manner. Know the hazards associated with the work and how to protect yourself. If you are in any way uncertain about your job and the safe way to perform the work, ask your supervisor for instructions.

Notify your supervisor whenever you feel there is any hazard involving the equipment or the performance of your job.

Report all injuries or illness, regardless of severity, to your company's first aid or safety officer. Never attempt self-treatment.

Observe and follow safety instructions in your work area, paying special attention to posted warnings such as "NO SMOKING", "HIGH VOLTAGE", and "DANGER."

Use safety protective equipment. Always wear approved eye and hearing protection. Wear safety-toe shoes with slip-proof soles. Keep this safety equipment in good condition.

Avoid any pinch-points created by the movement of the machine's components.

DO NOT

Do not allow untrained and/or unauthorized personnel to service, operate, or conduct tests on the system.

Do not wear loose, hanging clothing or jewelry while operating or servicing the system.

Do not use compressed air for cleaning debris from yourself or your clothing.

Do not place speed above safety.

Tool Safety

DO

Use the proper tool and equipment for the task.

Inspect tools before each use to ensure that they are in proper working condition.

Maintain tools in their proper working condition.

Keep tools in their proper storage place when not in use.

Remove all hand tools such as wrenches, hammers, and diagnostic equipment from the machine immediately after each use.

Report defective tools to your supervisor and turn defective tools in for replacement.

Use hoists and cranes to lift heavy machine units, workpieces, or any other load too heavy for one person. Be sure loads are balanced.

DO NOT

Do not use broken, burned, mushroomed, or defective tools.

Do not strike two hardened steel surfaces together.

Never use a crane, hoist, or other lifting device to lift more than its rated capacity.

Do not use makeshift climbing aids as a substitute for a ladder.

Work Area Safety

DO

Keep the work area well lighted, clean, neat, and orderly. Oils, water, or debris on the floor can cause someone to slip and fall.

Use only approved cleaning fluids.

Deposit trash, refuse, debris, and other waste in the proper refuse container. Combustible material must be kept in metal containers provided for that purpose.

Hazardous materials require special containers, handling, and disposal procedures. Follow your company's and governmental procedures for the proper identification, containment, storage, and disposal of waste materials.

Clear the work area of any hazardous obstructions that could result in injury.

Beware of protruding machine elements or assemblies.

DO NOT

Do not allow extension cords, hoses, or wires to be placed where they will create a tripping hazard.

Do not use explosive liquids such as gasoline as cleaning agents.

Do not dispose of any hazardous waste in 'ordinary' refuse containers, on the ground, in sewers, streams, or waterways.

Do not use compressed air for cleaning debris or grit from yourself or the machine.

Machine Setup and Operation Safety

DO

Read, understand, and follow all machine-mounted warning and instruction plates and signs.

Make sure safety guards, shields, barriers, covers, and protective devices are in place, connected, and functional before operating the system.

Visually and functionally inspect all tooling and system components before operating the equipment. Check for cracks, chips, burrs, overheating, and other evidence of failure.

Pay attention to the machine process during operation. Unusual noises or vibrations can indicate problems requiring immediate attention.

Shut off power to the system when cleaning or servicing the machine or when guards, shields, or protective devices are removed or otherwise made inoperable.

Remove debris and grit with a rake or brush - not your hands.

DO NOT

Do not remove, paint over, alter, or deface any machine-mounted warning and instruction plates and signs.

Do not override the safety features of the equipment.

Do not operate the machine in excess of its rated capacity.

Do not make adjustments, measure workpieces, or remove debris and grit until the machine has stopped moving and appropriate safety features are activated.

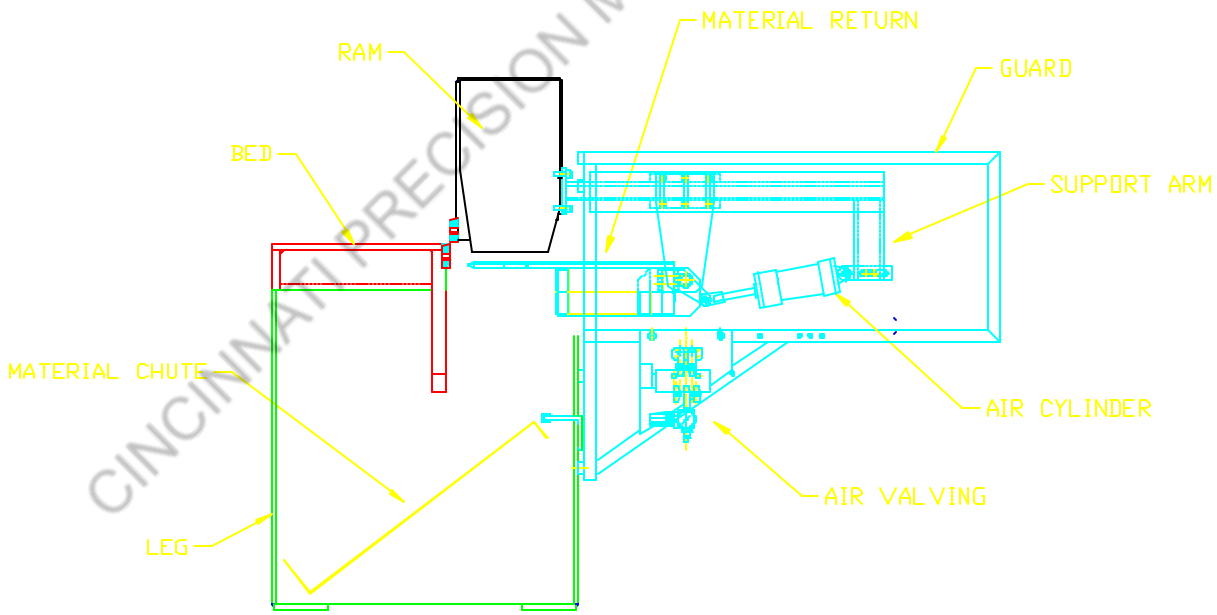
Do not brake or slow down moving equipment.

Do not use combustible fluids without adequate fire protection equipment.

3 System Operations:

The Air-Operated Front Material Return is an air actuated support table used in conjunction with the 6M14 / 10M14 electro-mechanical shear. The Air-Operated Front Material Return (or the Material Return) supports the work material during the shearing process, and then directs the cut piece into the material chute, located at the front of the machine.

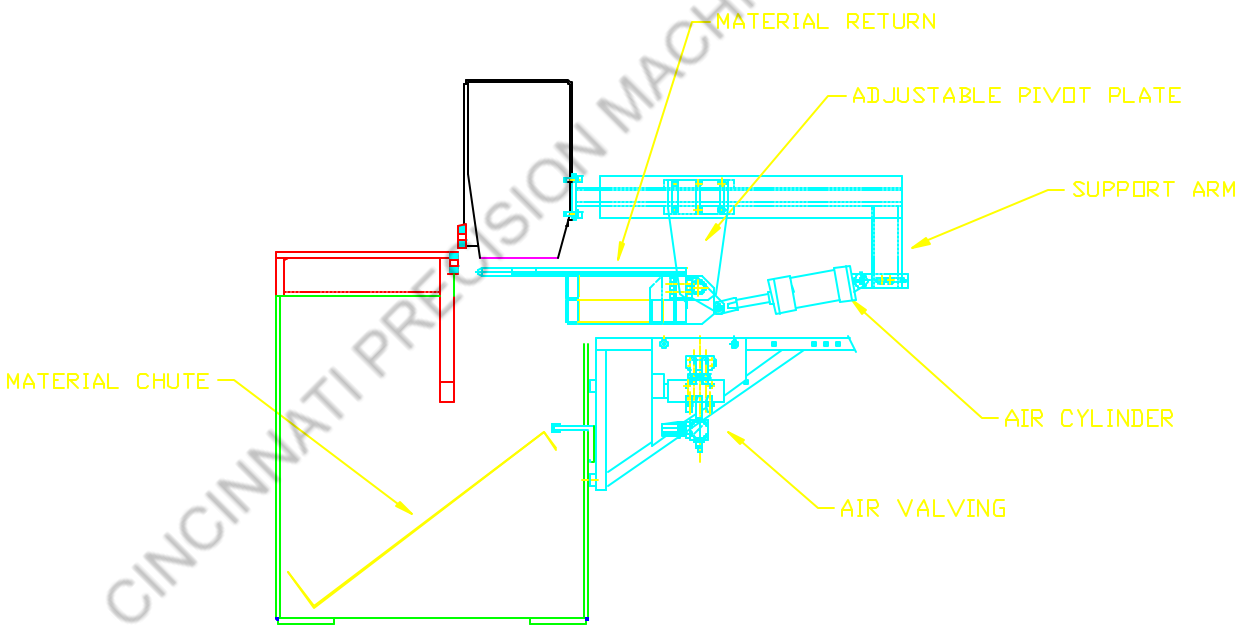
This chapter explains the construction of the Material Return system, its operation, and the maintenance of the system.

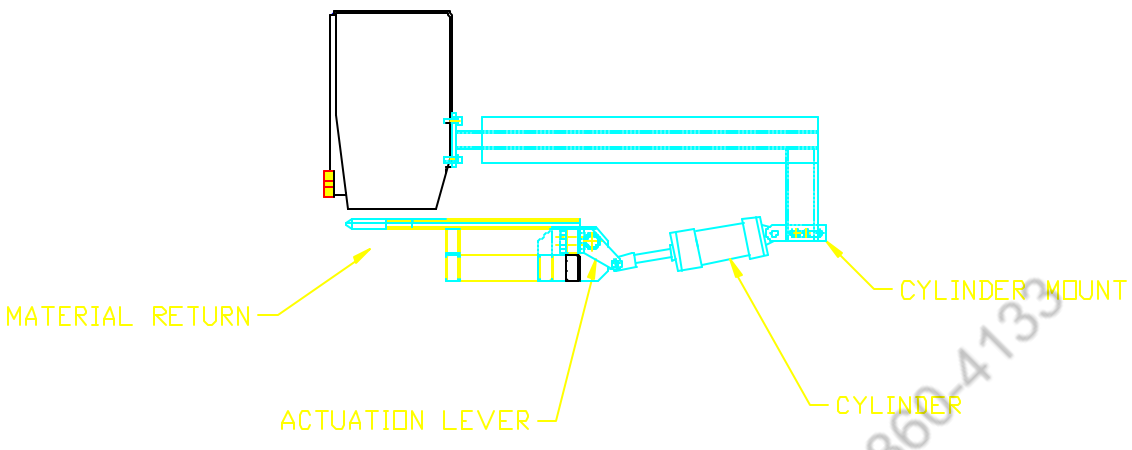


System Description

The Material Return system is comprised of the Material Return, two Support Arm assemblies, actuating Air Cylinder, mating air valving, and Control Switch. The Support Arms are mounted to the upper Ram, and are used to attach the pivots for the Material Return and Air Cylinder.

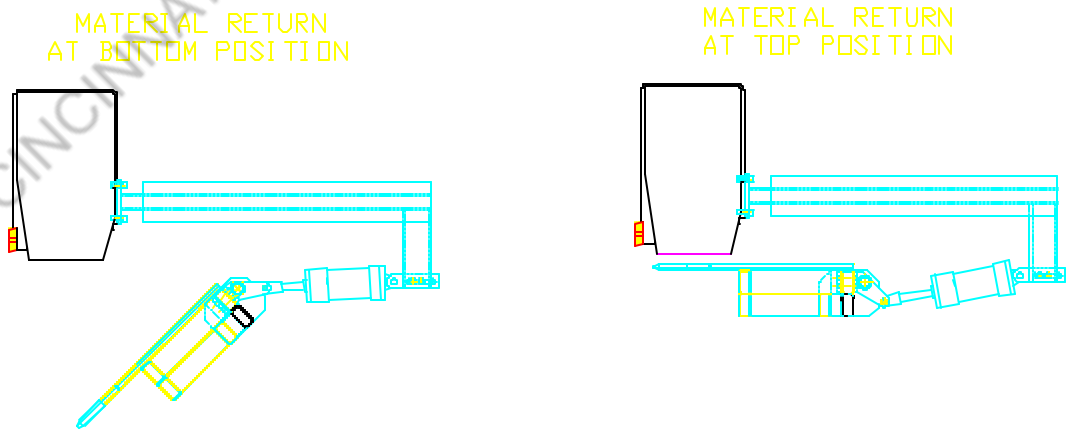
The Material Return attaches to the Support Arms by way of two adjustable plates, containing the pivots about which the Material Return rotates. The adjustment in the pivot plates allows alignment of the Material Return to the Backgauge Stop and to the Bed of the machine.





The Air Cylinder attaches to the right-hand Support Arm through an adjustable mount. The rod of the Air Cylinder attaches to the Material Return through an actuation lever, attached to the rear of the Material Return. The alignment of the Air Cylinder is achieved by adjusting the actuation lever to ensure easy extension of the cylinder rod without binding within the cylinder.

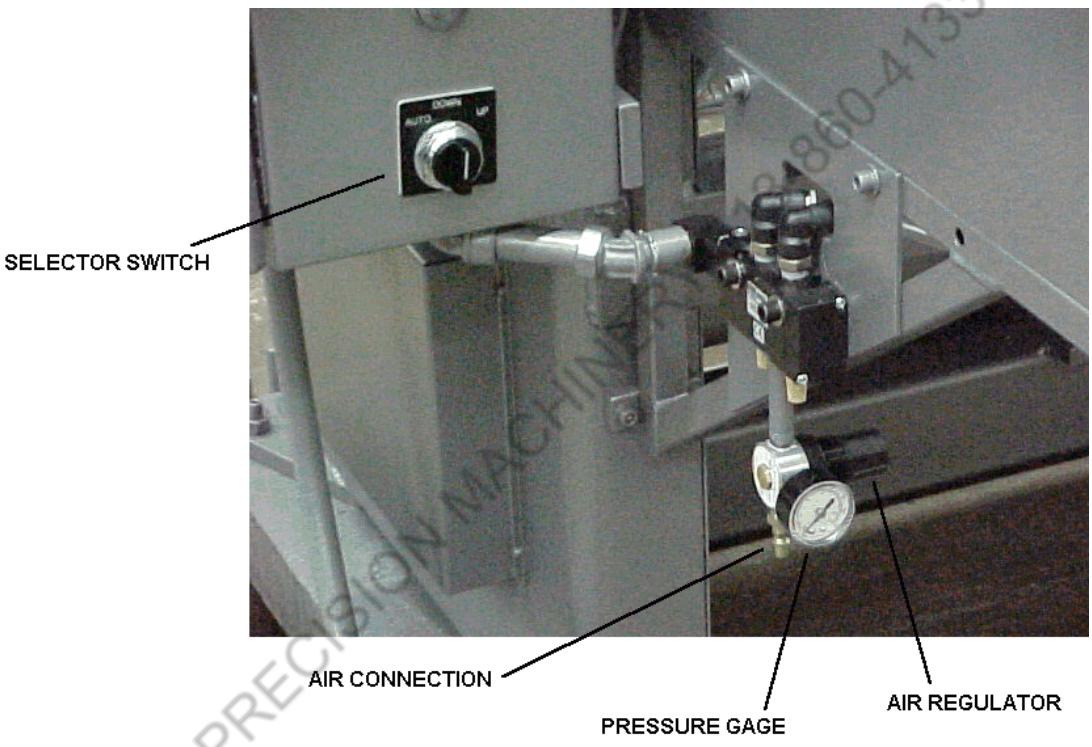
The extended position of the cylinder rod determines the top resting position of the Material Return. The cylinder mount adjusts to position the Material Return level with the Bed of the machine.



The Air Cylinder is connected to an Air Valve that controls the rotation of the Material Return. The air pressure for the system is set by an air regulator. Incoming air is connected to system through a male connector attached to the air regulator.

Operating Instructions

The Air-Operated Front Material Return requires 80 to 100 psi clean filtered shop air. The system has an operating range of 60 to 100 psi, adjustable at the air regulator provided with the system. The incoming shop air is connected just below the regulator.



Air System

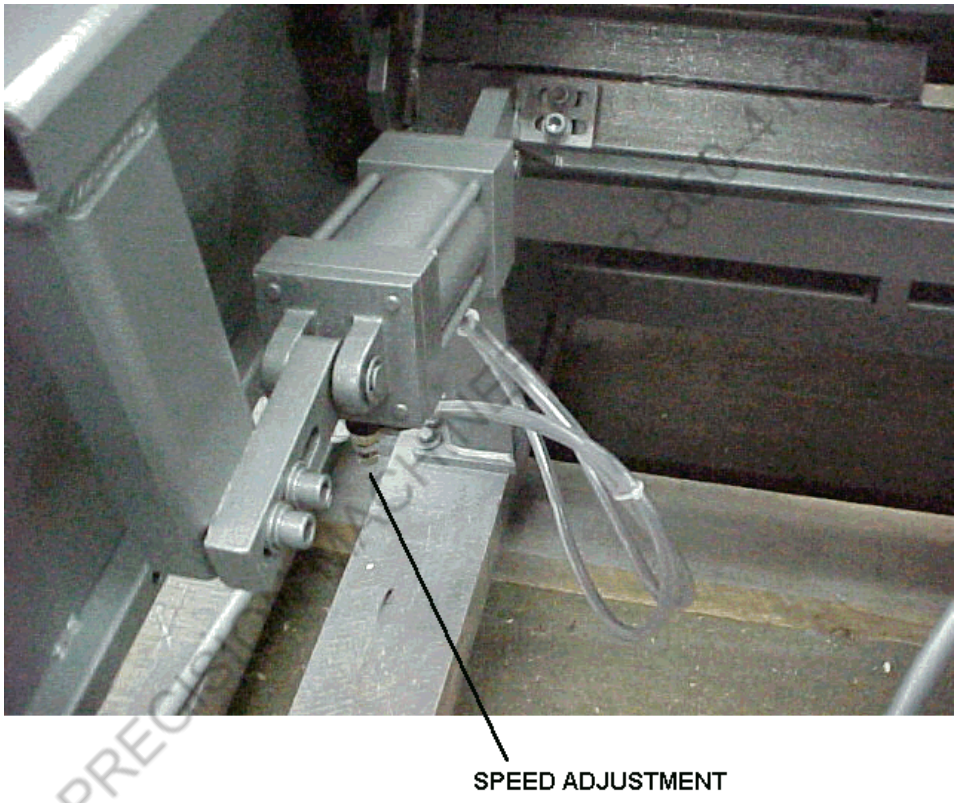
The air valve located immediately above the air regulator uses one electric solenoid to actuate the Material Return. The default position of the air valve rotates the Material Return upward as soon as air is provided to the air connection.

WARNING

POTENTIAL FOR INJURY

The Material Return will rotate upward immediately after air is provided to the system whenever the Selector Switch is set to "UP" or "AUTO", or if electrical power is OFF. Keep all parts of the body clear of the Material Return system at all times.

Adjusting the Air Regulator varies the pressure with which the Material Return rotates. The pressure is preset at the factory to provide smooth quiet operation. If the air pressure requires adjusting, rotating the knob on the regulator clockwise will reduce the pressure, and rotating the knob counterclockwise will increase the pressure: observe the air pressure on the Pressure Gage.



The rotation speed of the Material Return is set at the factory to provide smooth quiet operation. The speed setting is critical for proper operation of the Material Return. The speed has been set to deliver the cut material into the Material Chute after the part has been completely cut, and rotate the Material Return back to its horizontal position only after the work material has cleared the Material Return.

If the changes in the speed are required, then two (2) small valves attached to the underside of the Air Cylinder must be adjusted. The valve located away from the machine controls the downward speed of the Material Return, and the valve located nearest to the machine

controls the upward speed. Rotating these valves clockwise reduces the speed of the Material Return. Each valve has a locking nut to prevent changes in the speed once the valves are set.

CAUTION
Excessive speed of the Material Return can cause vibration of the Return at its top position, and impacting (or banging) of the Material Return at its bottom position. Slow speed of the Material Return will prevent it from returning to its top position in time to be used to support the work material before the next cut is made.

Control System

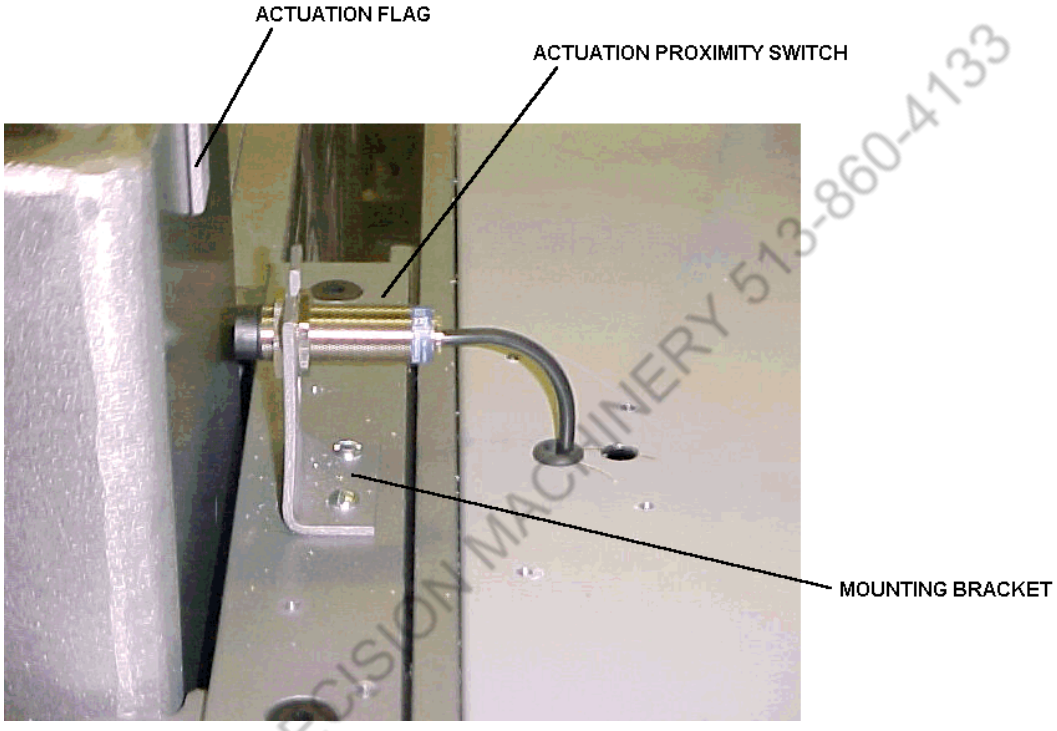
The Material Return can be operated in three modes. Machines equipped with this system have a selector switch located at the rear of the electrical box. The switch has three positions that are marked:

"AUTO"

"DOWN"

"UP"

Rotating the Selector Switch to "AUTO" prepares the Material Return to actuate each time the upper Ram is lowered to cut the work material. The Material Return remains in the horizontal position until a flag attached to the right hand side of the Ram activates the Actuation Proximity Switch (or the Prox Switch). This switch is located on top of the electrical enclosure beneath a protective shield.



The Prox Switch has been adjusted at the factory to activate the rotation of the Material Return properly, delivering the cut work material into the Material Chute and return to its starting position without interfering with the cut piece. The position of the Prox Switch is set to activate the Material Return after the part has been completely cut, and prevent the upward rotation of the Return until the cut piece has cleared the Material Return.

NOTE
Improper setting of the Proximity Switch may cause the cut work material to become damaged by either rotating the Material Return before the work material is completely cut or by trapping the work material against the underside of the Bed as the Return rotates upward.

If the Prox Switch requires adjusting, the two (2) nuts threaded on to the switch can be rotated to move the switch in or out relative to the Actuation Flag. There is an LED light located at the rear of the Prox Switch that indicates the switch is activated when the light is on. The Prox Switch must be close enough to the Actuation Flag to keep the LED light on the entire time the flag is in front of the switch.

NOTE

If the LED light is flickering, then the Prox Switch is being turned on and off intermittenly. When this happens the Material Return may raise and lower erratically.

The location where the Material Return rotates is set by adjusting the vertical position of the Prox Switch relative to the lower edge of the Actuation Flag. This position is set at the factory for proper operation of the Material Return.

The timing for rotating the Material Return can be altered by moving the Prox Switch up or down: causing the Material Return to rotate earlier or later during the stroke of the Ram. The position of the Prox Switch affects the point of rotation of the Material Return during both the upward and downward motion of the Ram. Once the new position of the switch is attained, secure the nuts on the Prox Switch to prevent movement of the switch.

CAUTION

Shearing of some work materials can cause vibrations within the machine. Check that all adjustments and connections are secure prior to operating the equipment.

Automatic Operation

When the Selector Switch is set to "AUTO" the Material Return will raise and lower automatically as the Ram moves through its cutting cycle. The Air Cylinder holds the Material Return horizontally, allowing the work material to rest on it, until the Prox Switch is activated by the Actuation Flag. The solenoid on the air valve is then turned on, causing the cylinder to retract, and rotating the Material Return downward. The cut material is then directed into the Material Chute.

The Material Return remains angled downward as the Ram moves upward until the Actuation Flag is raised above the Prox Switch. The solenoid on the air valve is then turned off, causing the Air Cylinder to extend, and raising the Material Return back to its horizontal position. Once the Ram has reached its top position, the Material Return is ready to support the next piece to be cut.

The "AUTO" mode is designed for use with the Single and Jog cutting modes of the shear. It is not recommended for use in Continuous cycle cutting.

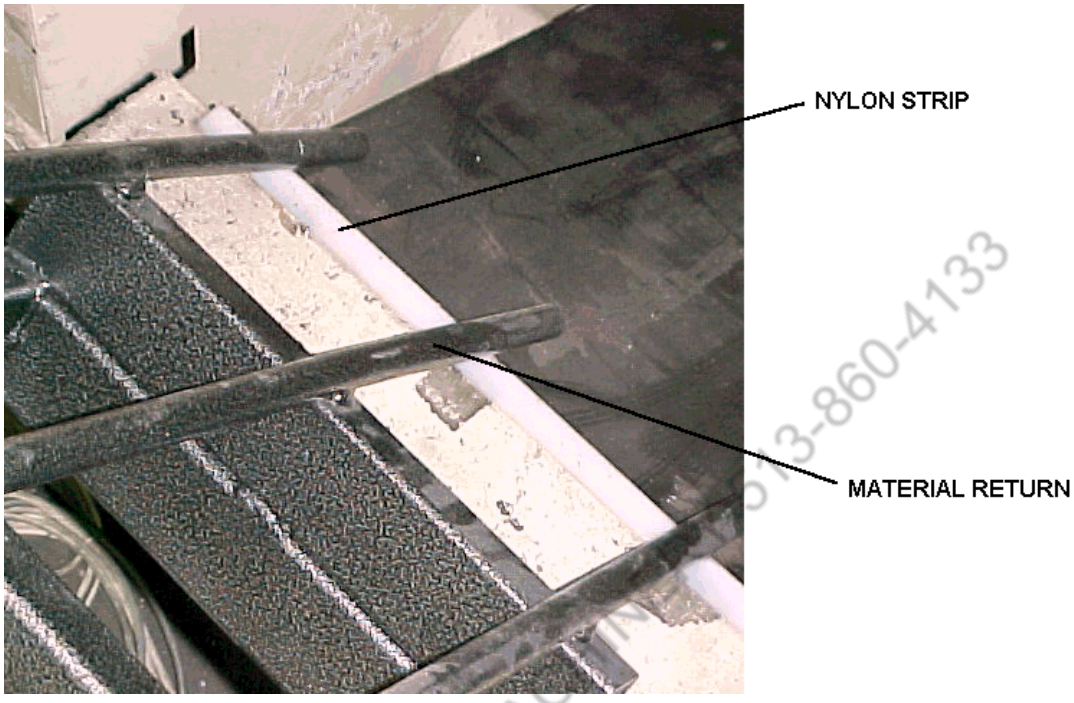
NOTE
The time to complete a cutting cycle in Continuous mode may not be sufficient for the Material Return to reach its top horizontal position before the next cutting cycle starts. Keeping the Material Return set to "AUTO" under these conditions may yield unexpected results.

Fixed Operation

The position of the Material Return may be fixed in either the horizontal position or angled downward. When the Selector Switch is set to "DOWN" the Material Return is lowered downward until the Air Cylinder is fully retracted. The Material Return remains angled down at all times during the cutting cycle of the Ram.

When the Ram nears the bottom of its stroke, the Material Return will rub against the nylon strip mounted on the rear angle connecting

the legs of the machine together. This prevents damage to the Material Return.



The "DOWN" mode is recommended for use in Continuous cycle cutting. It is also useful to create clearance between the Material Return and the Backgauge Stop. This permits long sheets to be extended beyond the limits of the backgauge for shearing.

When the Selector Switch is set to "UP" the Material Return is raised to its horizontal position with the Air Cylinder fully extended. The Material Return remains in the horizontal position during the cutting cycle of the Ram, and does **not** return the work material to the Material Chute.

Periodic Maintenance

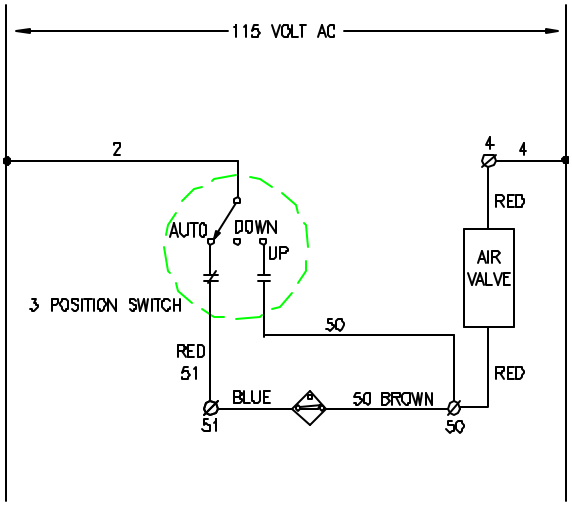
The Air-Operated Material Return system requires very little maintenance. However, following these procedures will increase the life of the system, and help provide trouble-free operation.

Although the system uses self-lubricated bearings, the pivot bearings for the Material Return should be inspected once a week (depending on use of the system) for signs of excessive wear.

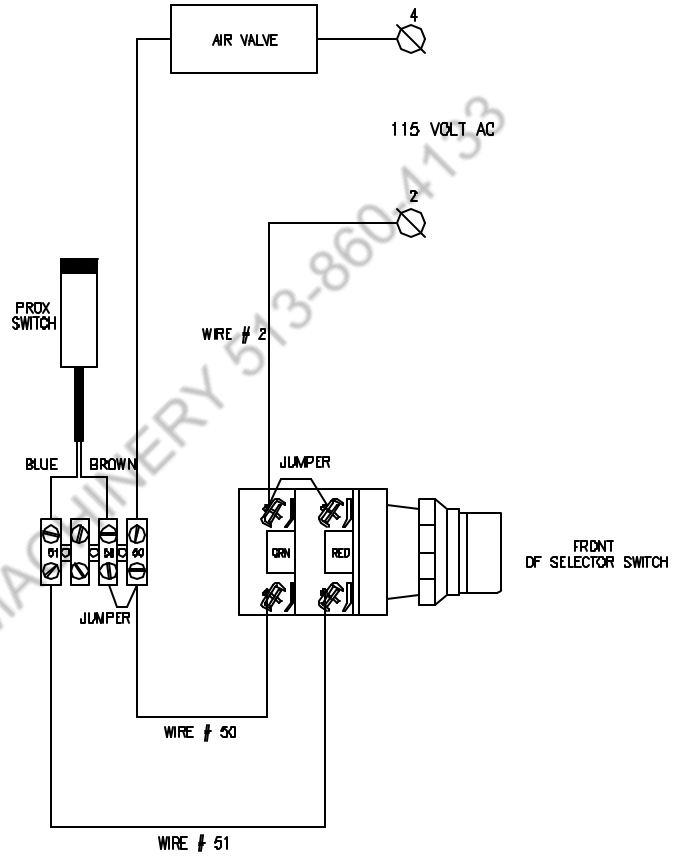
General cleaning of the system is recommended once a week as well. Pay particular attention to the Air Cylinder and rod to make certain they remain free of dirt.

The system should be inspected once a week to check that all fittings are free of corrosion and properly connected. Report any abnormalities to your supervisor.

Electrical Diagram

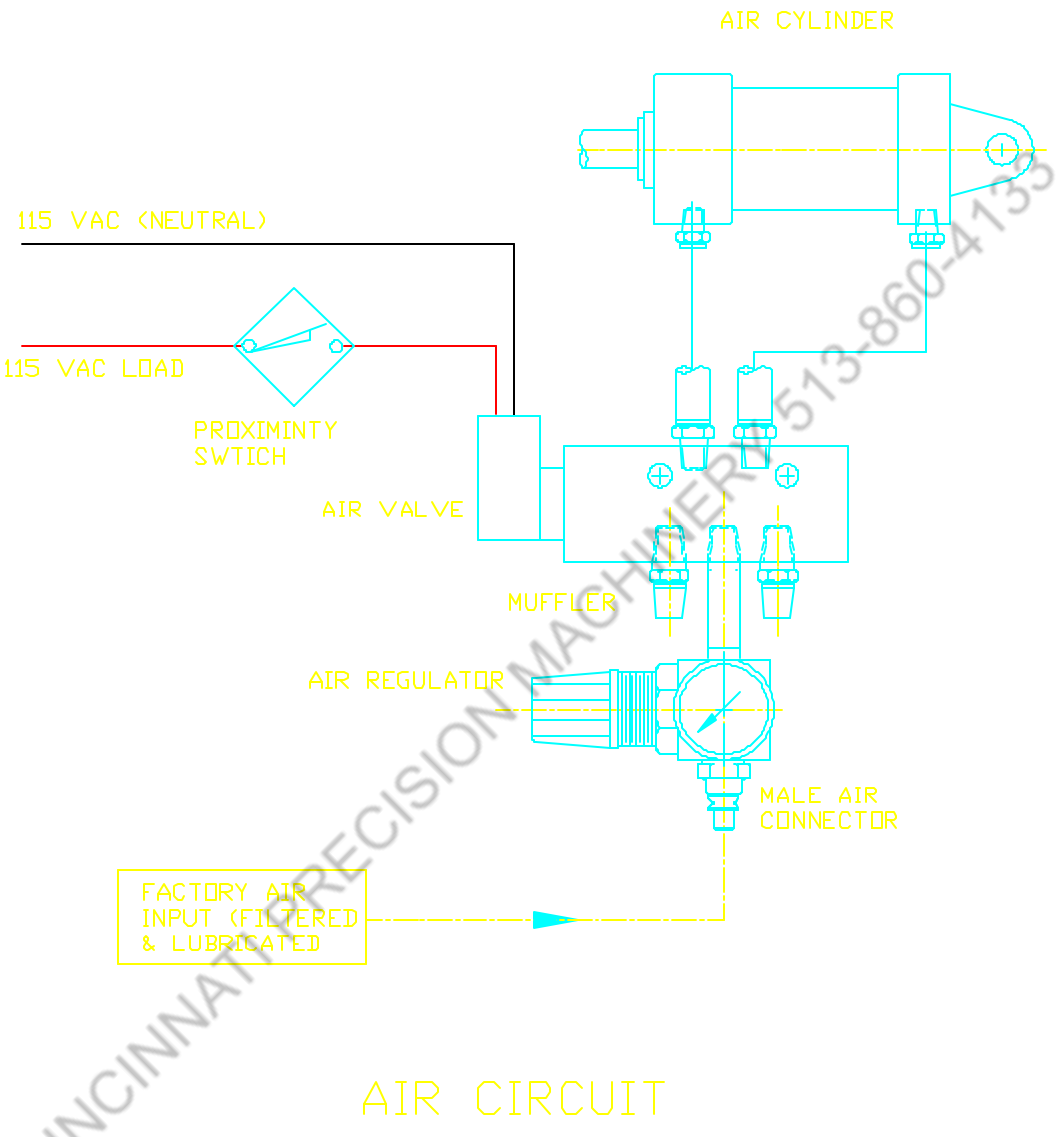


WIRING DIAGRAM



CONNECTION DIAGRAM

Air Circuit Diagram



NOTES:

SHEAR

MODEL: 10M14

PARTS MANUAL

ROPER WHITNEY OF ROCKFORD
2833 HUFFMAN BLVD
ROCKFORD, IL 61103
815-962-3011

www.roperwhitney.com

10M14 SHEAR

TABLE OF CONTENTS:

SECTION 1:

BASIC MECHANICAL

BASIC MECHANICAL - 10M14

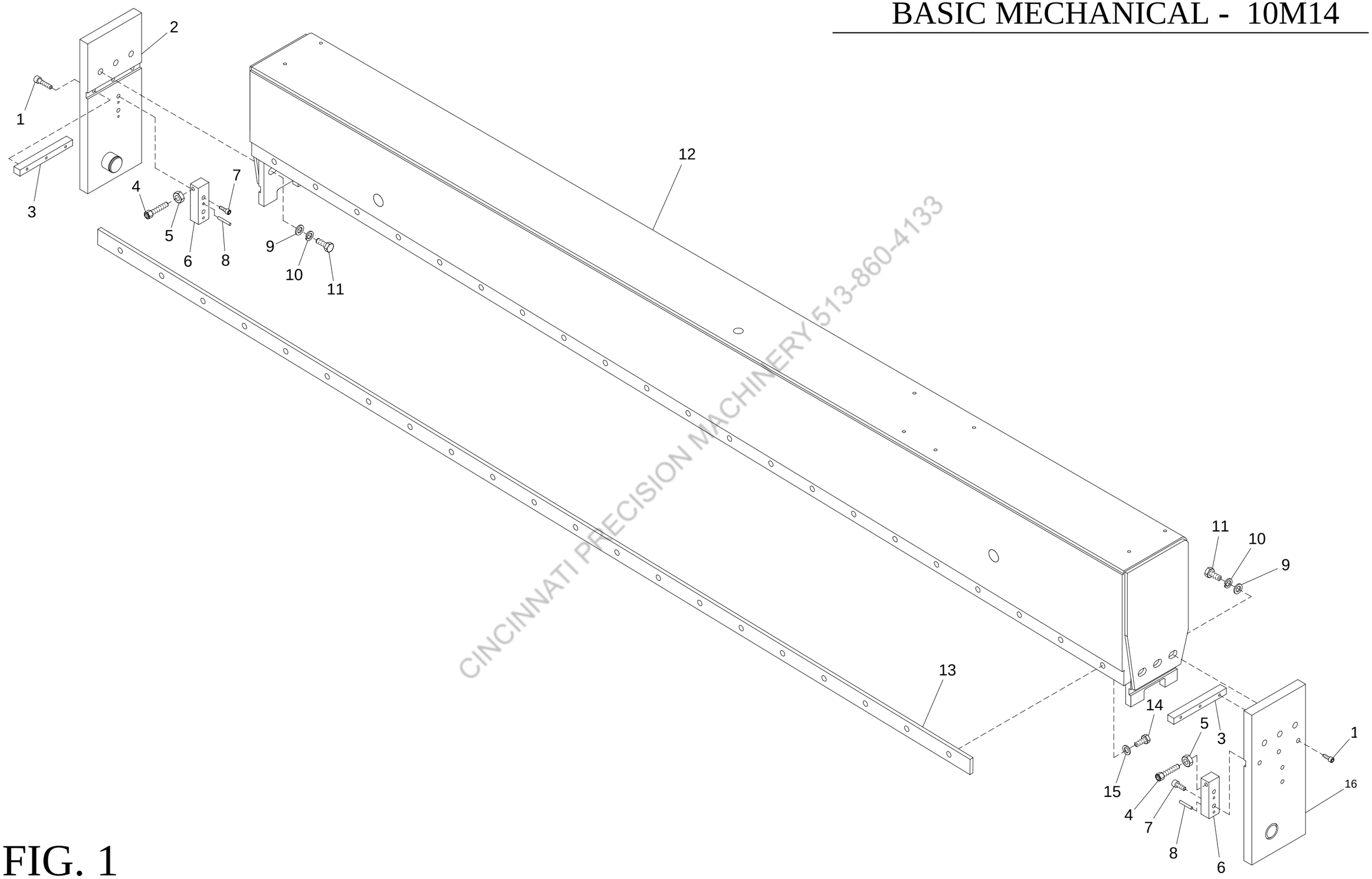


FIG. 1

RAM

ITEM	QTY	RW PART #	RW PART DESCRIPTION	ITEM	QTY	RW PART #	RW PART DESCRIPTION
1	6	611012133	5/16 X 1 SHC SCREW	**9**	6	678033110	3/4 FLAT WASHER
2	1	773000170	LH GIB PLATE	**10**	6	679033110	3/4 LOCK WASHER
3	2	773530176	KEY	**11**	6	603012416	3/4-10 X 2-1/2 HEX HEAD CAP SCREW
4	2	773650180	ADJUSTMENT SCREW	**12**	1	773610196	RAM
5	2	652023007	1/2-20 JAM HEX NUT	**13**	1	350700273	UPPER/LOWER HC BLADE
6	2	773180177	BLADE ADJUSTMENT BLOCK	**14**	21	602012277	1/2-20 X 1-3/4 HHC SCREW
7	4	611012275	1/2-13 x 1-1/2 SHC SET SCREW	**15**	21	679033107	1/2 LOCK WASHER
8	4	600063473	1/4 X 2 ROLL PIN	**16**	1	773000169	RH GIB PLATE

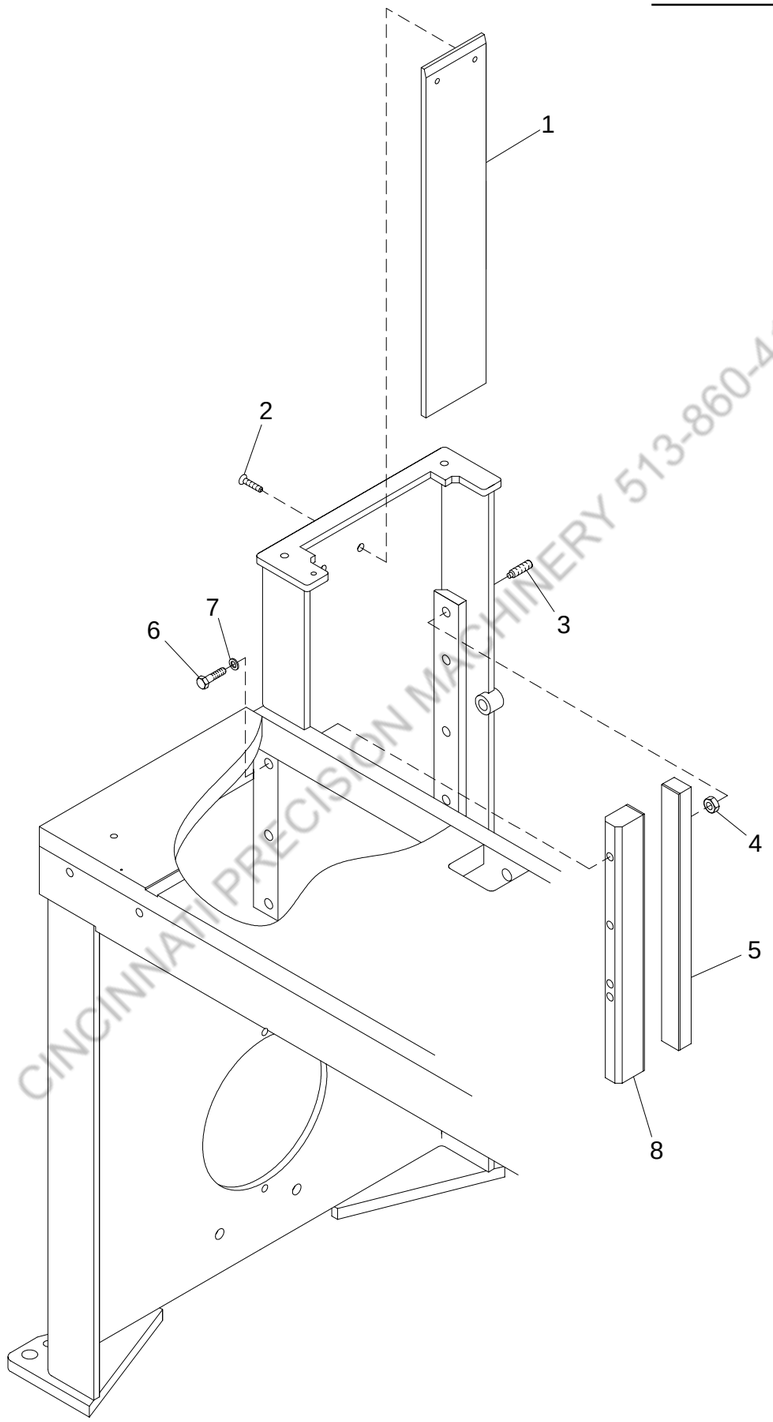


FIG. 2

RAM GUIDE

ITEM	QTY	RW PART #	RW PART DESCRIPTION
1	2	773000175	RAM END BEARING
2	4	613012173	3/8-16 X 3/4 SHF SCREW
3	8	690012660	1/2-20 X 2 FULL DOG POINT SHS SCREW
4	8	652023007	1/2-20 JAM HEX NUT
5	2	773400174	ADJUSTABLE GIB ASSEMBLY
6	6	601012275	1/2-13 X 1-1/2 HHC SCREW
7	6	679033107	1/2 LOCK WASHER
8	2	773400173	FIXED GIB ASSEMBLY

BASIC MECHANICAL - 10M14

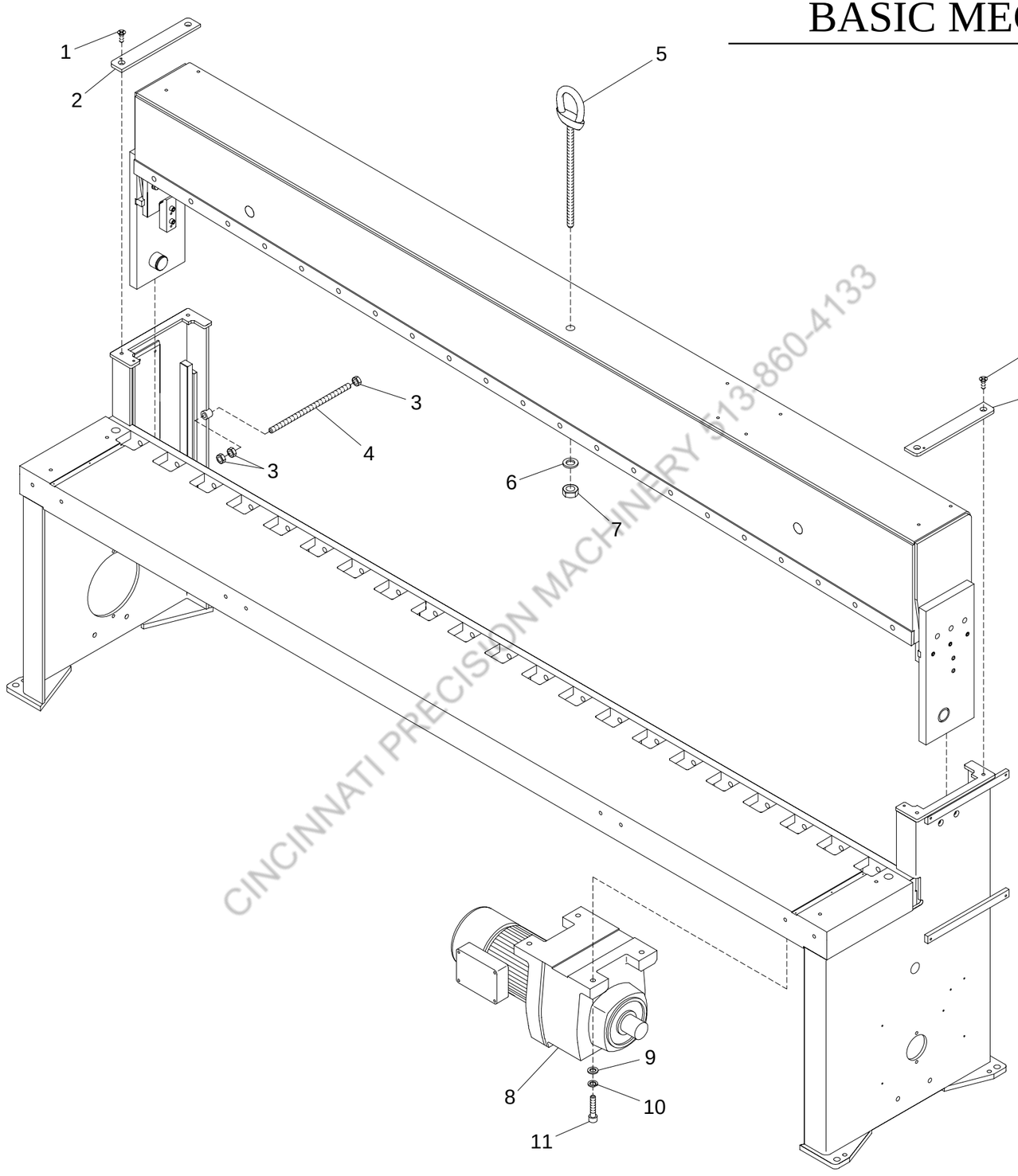


FIG. 3

RAM AND LEG

ITEM	QTY	RW PART #	RW PART DESCRIPTION
1	4	613012172	3/8-16 X 5/8 FLAT HEAD CAP SCREW
2	2	773180178	LEG TIE BAR
3	6	645023007	1/2-20 FULL HEX NUT
4	2	773030106	THREADED ROD
5	1	773000227	EYEBOLT ASSEMBLY
6	1	679033111	7/8-9 LOCK WASHER
7	1	643023011	7/8-9 HEX NUT
8	1	660011214	GEAR BRAKE MOTOR
9	4	678033109	5/8 FLAT WASHER
10	4	679033109	5/8 LOCK WASHER
11	4	601012376	5/8-11 X 3-1/4 HHC SCREW

BASIC MECHANICAL - 10M14

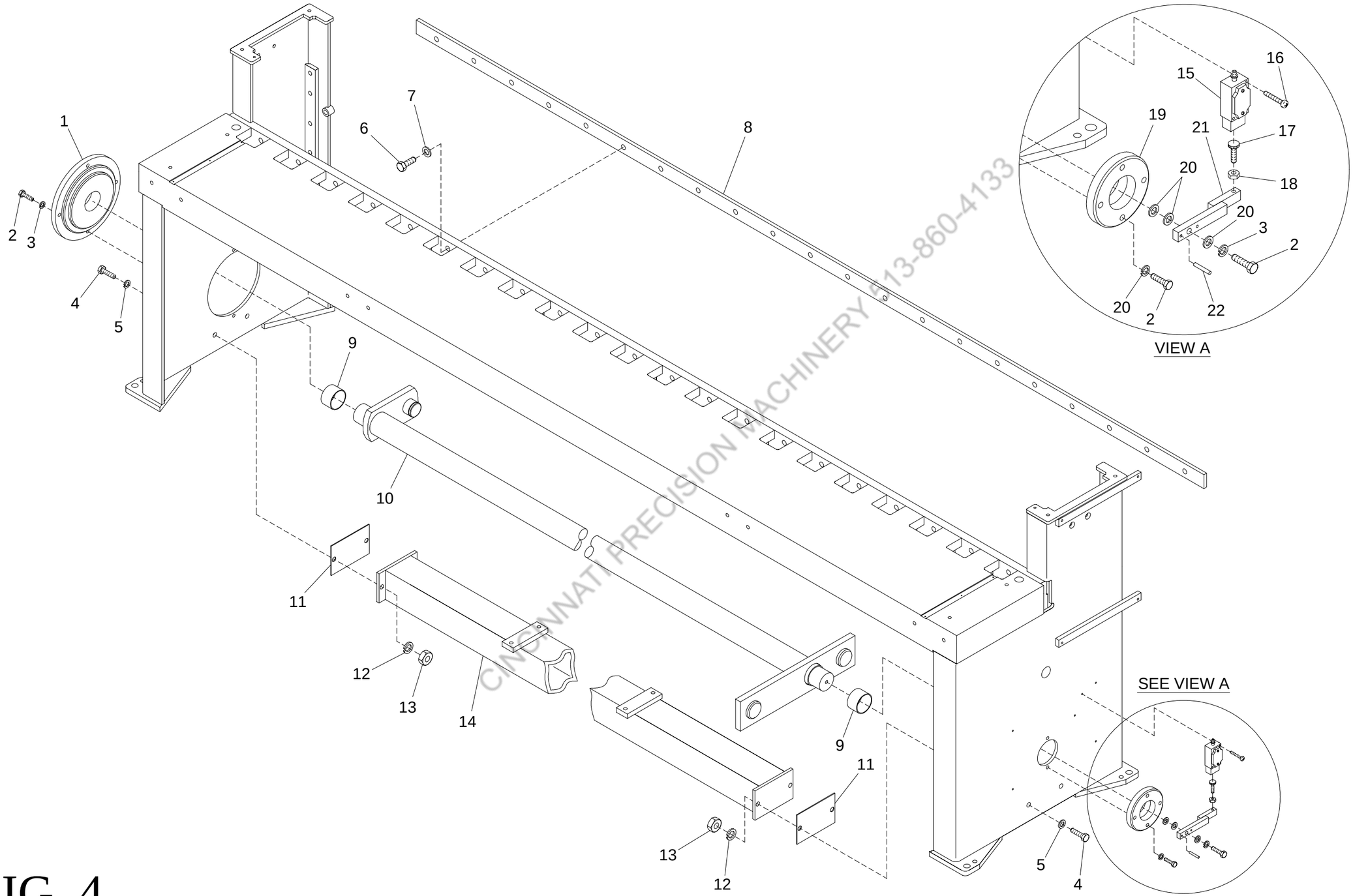


FIG. 4

DRIVESHAFT

ITEM	QTY	RW PART #	RW PART DESCRIPTION	ITEM	QTY	RW PART #	RW PART DESCRIPTION
1	1	773060046	LARGE BEARING PLATE	**12**	4	679033107	1/2 LOCK WASHER
2	5	601012175	3/8-16 X 1 HHC SCREW	**13**	4	643023007	1/2-13 FULL HEX NUT
3	5	679033105	3/8 LOCK WASHER	**14**	1	773820036	STIFFENER TUBE
4	4	601012275	1/2-13 X 1-1/2 HHC SCREW	**15**	1	660152638	A.B. LIMIT SWITCH
5	4	678033107	1/2 FLAT WASHER	**16**	2	611012065	#10-24 X 2-1/4 SHC SCREW
6	21	602012277	1/2-20 X 1-3/4 HHCS SCREW	**17**	1	673012659	SCREW CLAMP #AHS312A VLIER
7	21	679033107	1/2 LOCK WASHER	**18**	1	643023004	5/16-18 FULL HEX NUT
8	1	350700273	UPPER/LOWER HC BLADE	**19**	1	773060045	SMALL BEARING PLATE
9	2	773080083	SLEEVE BEARING	**20**	3	678033105	3/8 FLAT WASHER
10	1	773000035	ACTUATOR SHAFT ASSEMBLY	**21**	1	773200063	LIMIT SWITCH BRACKET
11	2	773720085	SHIM (AS REQUIRED)	**22**	2	600063455	3/16 X 1 ROLL PIN

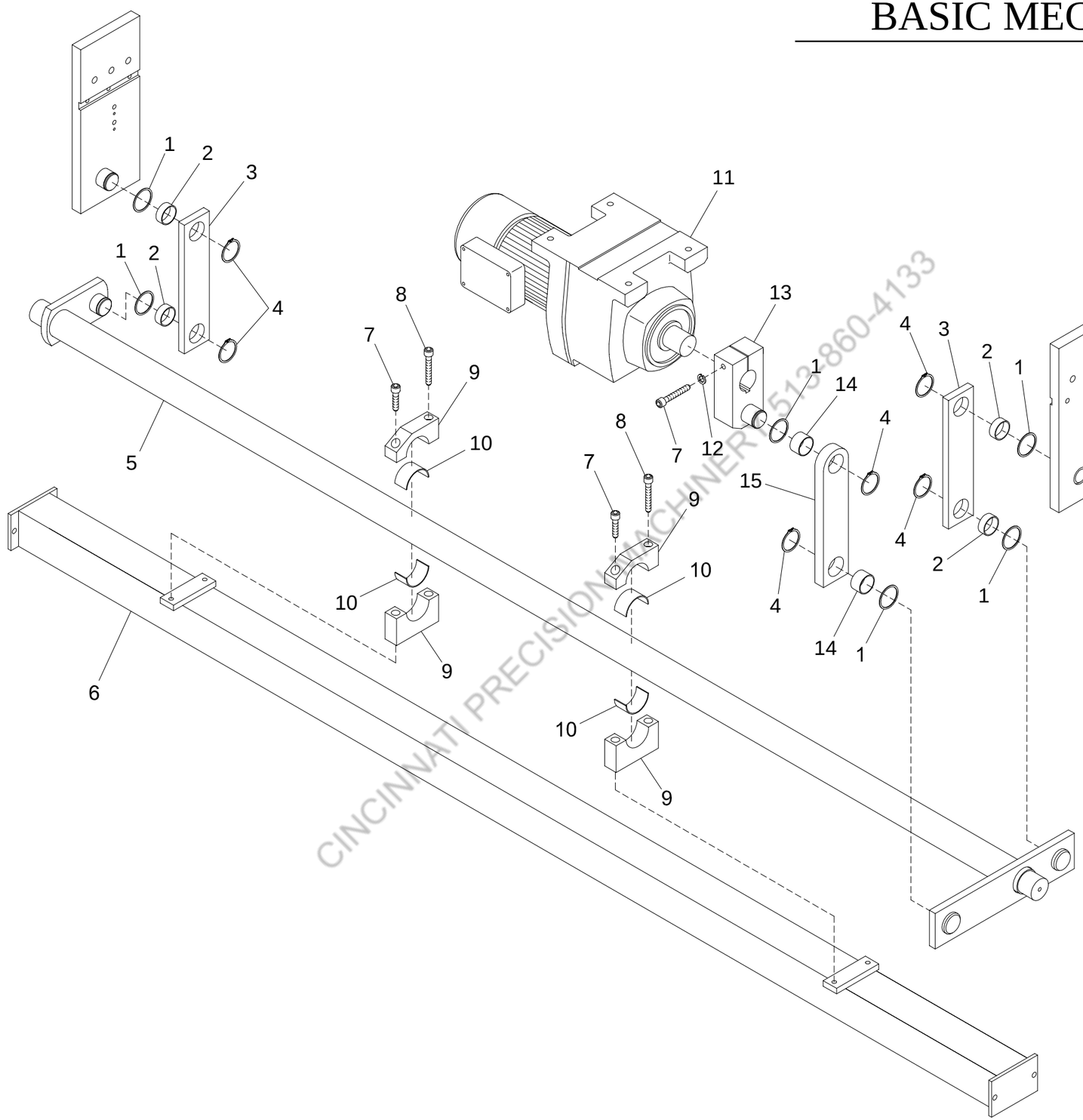


FIG. 5

DRIVESHAFT

ITEM	QTY	RW PART #	RW PART DESCRIPTION	ITEM	QTY	RW PART #	RW PART DESCRIPTION
1	6	773630080	SPACER	**9**	2	773130039	BEARING BLOCK
2	4	773080081	SLEEVE BEARING	**10**	2	773080110	SLEEVE BEARING
3	2	773030043	ACTUATOR TO RAM LINK	**11**	1	660011214	GEAR BRAKE MOTOR
4	6	600164316	RETAINING RING (#5100-175)	**12**	1	679033107	1/2 LOCK WASHER
5	1	773000035	ACTUATOR SHAFT ASSEMBLY	**13**	1	773000150	GEARBOX LINK ECCENTRIC ASSEMBLY
6	1	773820036	STIFFENER TUBE	**14**	2	773080082	SLEEVE BEARING
7	3	611012287	1/2-13 X 4 SHC SCREW	**15**	1	773030149	GEARBOX DRAG LINK
8	2	611012292	1/2-13 X 5-1/4 SHC SCREW				

BASIC MECHANICAL - 10M14

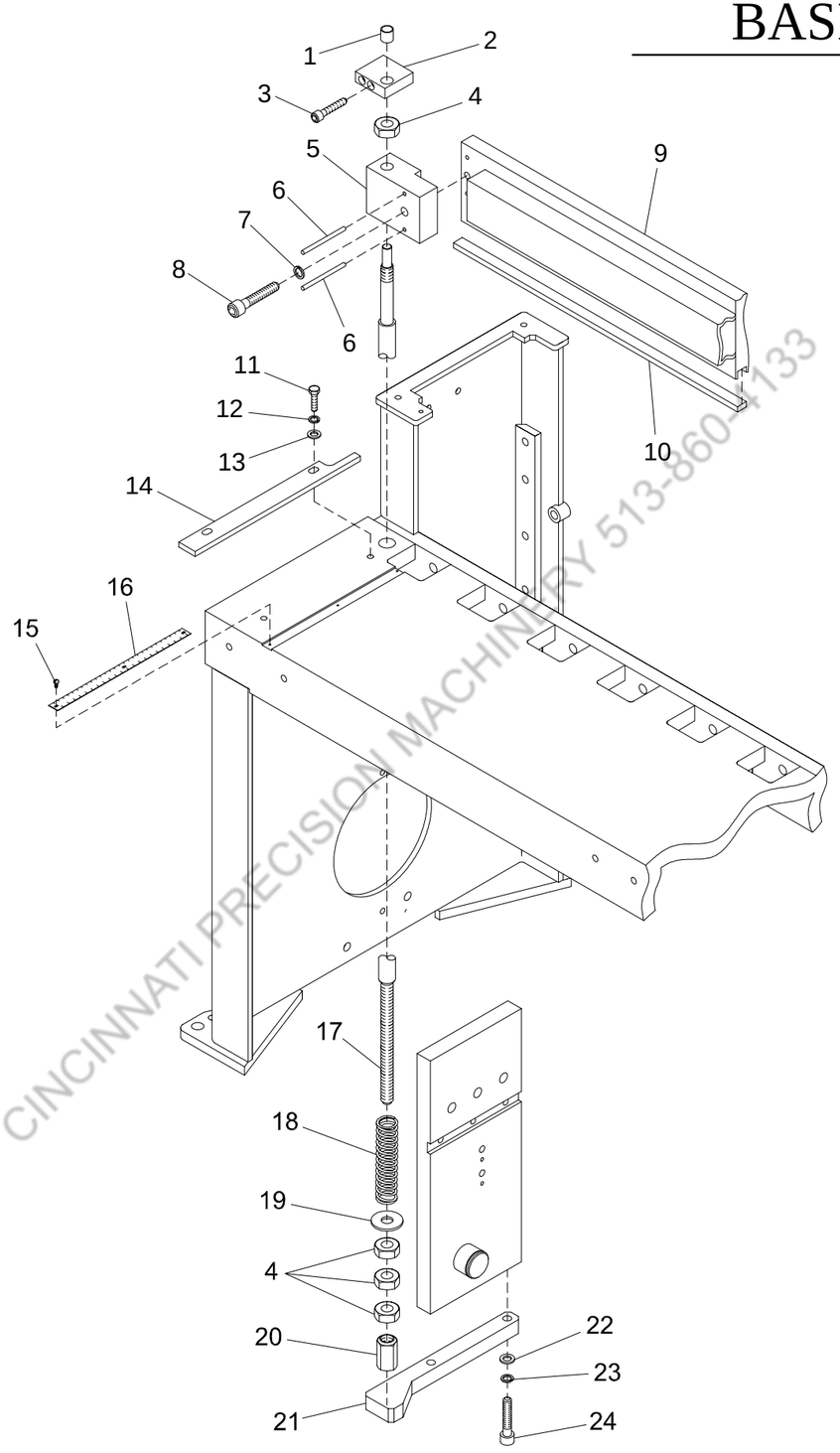


FIG. 6

BED SIDE ASSEMBLY

ITEM	QTY	RW PART #	RW PART DESCRIPTION	ITEM	QTY	RW PART #	RW PART DESCRIPTION
1	2	673194679	BRONZE BUSHING	**13**	4	678033105	3/8 FLAT WASHER
2	2	773130049	BUSHING BLOCK	**14**	2	773030144	BED SQUARING BAR
3	4	611012143	5/16-18 X 2-1/2 SHC SCREW	**15**	6	607012643	#4-40 X 1/4 PAN HEAD SCREW
4	8	643023010	3/4-10 FULL HEX NUT	**16**	2	673000425	BED SCALE
5	2	773130048	UPPER HOLD-DOWN GUIDE BLOCK	**17**	2	773030044	HOLD-DOWN GUIDE SHAFT
6	4	600063473	1/4 X 2 ROLL PIN	**18**	2	673184615	HELICAL COMPRESSION SPRING
7	2	678033107	1/2 FLAT WASHER	**19**	2	678033110	3/4 FLAT WASHER
8	2	611012282	1/2-13 X 2-3/4 SHC SCREW	**20**	2	773560041	HOLD-DOWN ADJUSTMENT NUT
9	1	773010195	HOLD-DOWN BAR	**21**	2	773030047	HOLD-DOWN RELEASE BAR
10	1	673000431	URETHANE STRIP	**22**	4	678033107	1/2 FLAT WASHER
11	4	601012177	3/8-16 X 1-1/4 HHC SCREW	**23**	4	679033107	1/2 LOCK WASHER
12	4	679033105	3/8 LOCK WASHER	**24**	4	621012277	1/2-13 X 1-3/4 SSC SCREW

BASIC MECHANICAL - 10M14

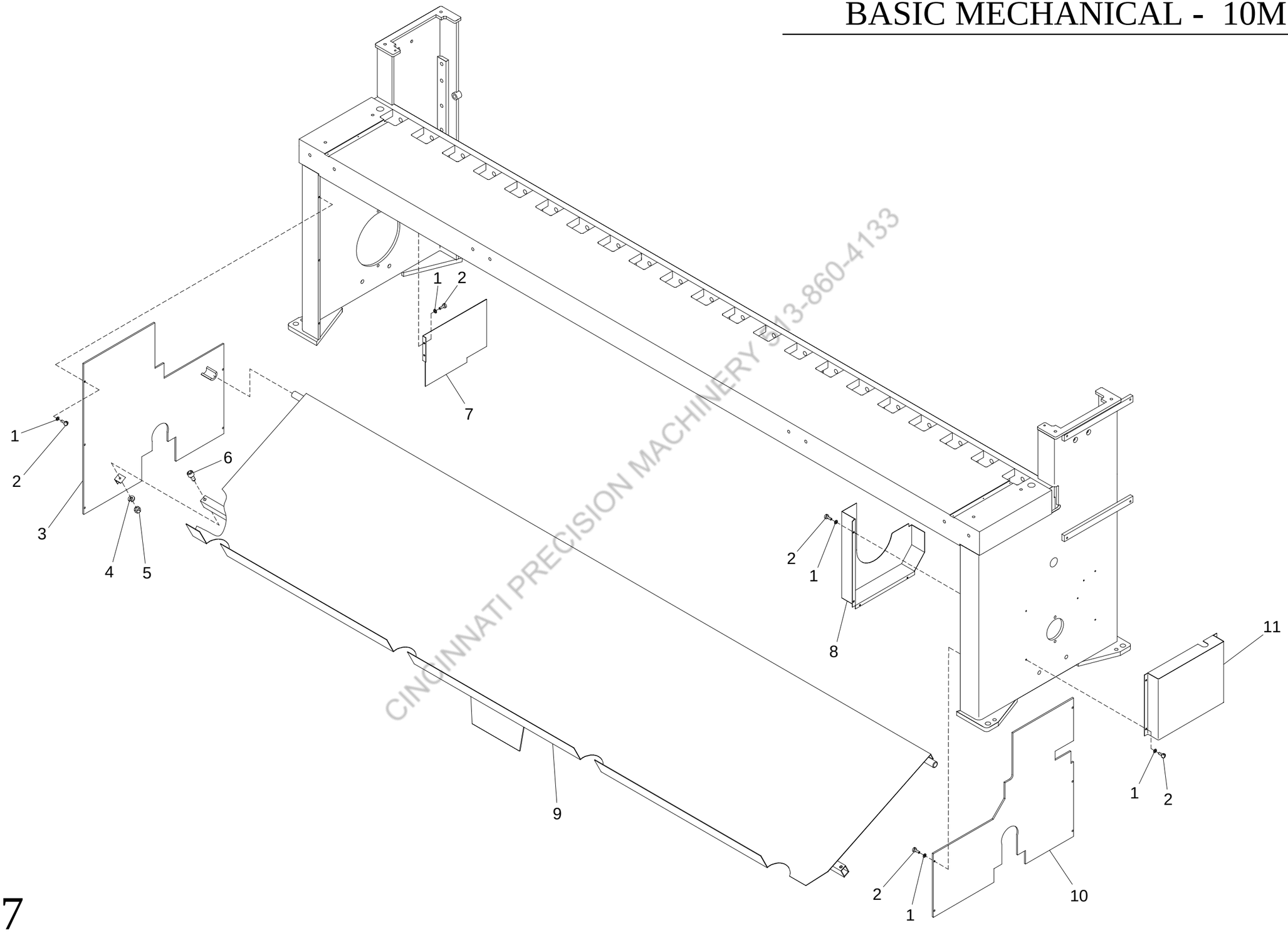


FIG. 7

GUARDS

ITEM	QTY	RW PART #	RW PART DESCRIPTION
1	22	679033102	#10 LOCK WASHER
2	22	609012053	#10-24 X 5/8 RHM SCREW
3	1	773440197	LEFT LEG GUARD
4	2	679033103	1/4 LOCK WASHER
5	2	643023003	1/4-20 FULL HEX NUT
6	2	611012084	1/4-20 X 3/8 SHC SCREW
7	1	773440198	LEFT LEG GUARD
8	1	773440075	GEAR BOX GUARD
9	1	773380059	MATERIAL RETURN WELDMENT
10	1	773440071	RIGHT LEG GUARD
11	1	773220084	LIMIT SWITCH COVER

BASIC MECHANICAL - 10M14

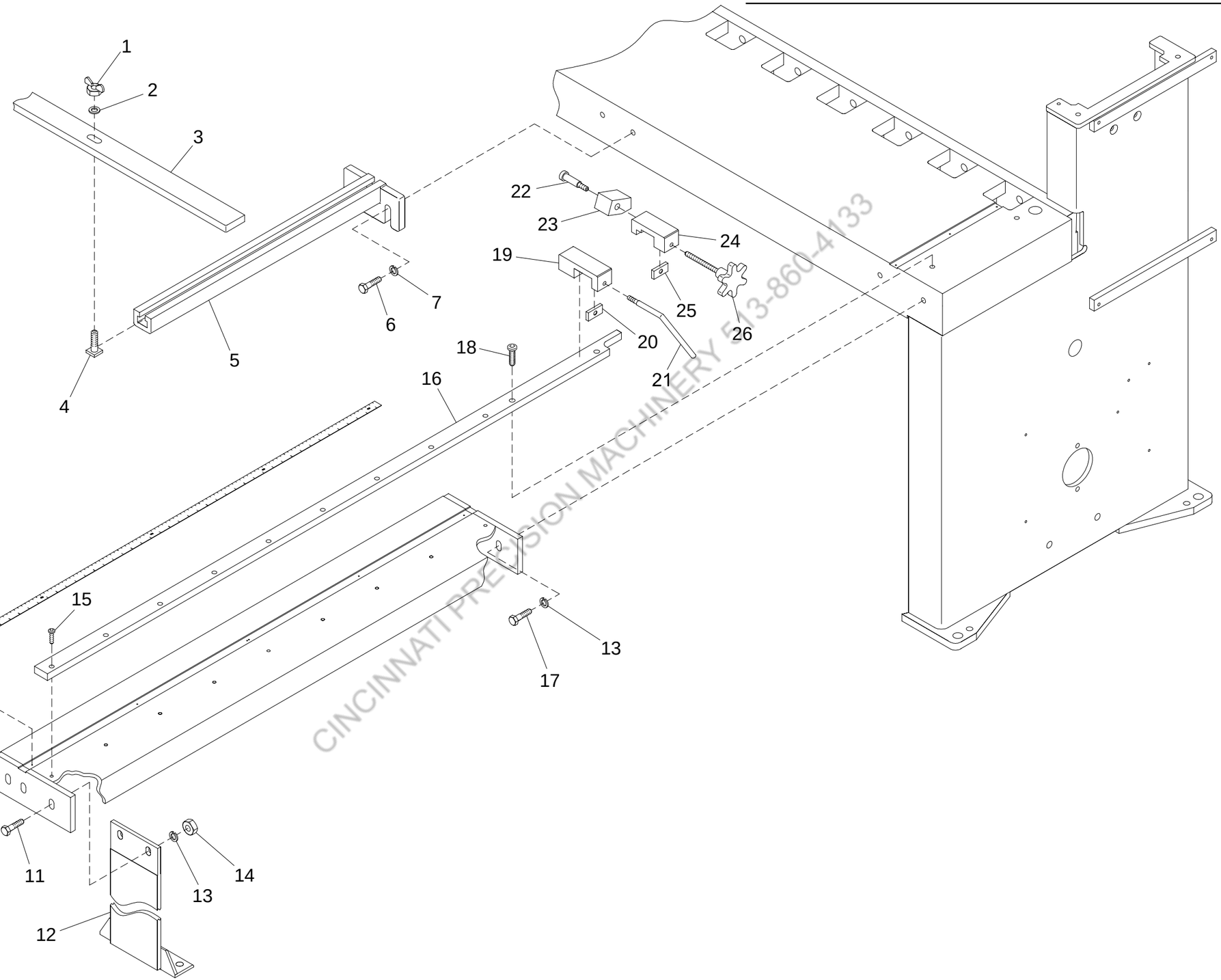


FIG. 8

FRONT AND SIDE EXTENSIONS

273940006 - 25" FRONT EXTENSION

ITEM	QTY	RW PART #	RW PART DESCRIPTION	ITEM	QTY	RW PART #	RW PART DESCRIPTION
1	2	673023007	1/2-13 WING NUT	**5**	2	762030035	FRONT ARM
2	2	678033107	1/2 FLAT WASHER	**6**	4	601012225	7/16-14 X 1-1/4 HHC SCREW
3	1	773420020	FRONT GAUGE	**7**	4	679033106	7/16 LOCK WASHER
4	2	762160036	SQUARE HEAD TEE BOLT				

273940042 - SIDE EXTENSION 16"-63"

ITEM	QTY	RW PART #	RW PART DESCRIPTION	ITEM	QTY	RW PART #	RW PART DESCRIPTION
8	5	607012643	#4-40 X 1/4 PAN HEAD SCREW	**15**	9	615012133	5/16-18 X 1 SHB SCREW
9	1	673000441	SCALE, 16" - 63"	**16**	1	773420143	GAUGE BAR
10	1	773420202	GAUGE HOLDER	**17**	2	601012225	7/16-14 X 1-1/4 HEX BOLT
11	2	601012231	7/16-14 X 2 HEX BOLT	**18**	2	615012175	3/8-16 X 1 SHB SCREW
12	1	773140145	SUPPORT LEG	**19**	1	773130026	FIXED STOP
13	4	679033106	7/16 LOCKWASHER	**20**	1	773010025	CLAMP
14	2	643023006	7/16-14 HEX NUT	**21**	1	773030027	LOCKING LEVER

273940046 - OPTIONAL FLIP STOP FOR SIDE EXTENSION

ITEM	QTY	RW PART #	RW PART DESCRIPTION	ITEM	QTY	RW PART #	RW PART DESCRIPTION
22	1	673012370	1/2 DIA X 1-1/2 LG WITH 3/8-16 THD SHOULDER BOLT	**25**	1	773010025	CLAMP STRIP
23	1	773420214	STOP	**26**	1	673356351	LOCKING HANDLE
24	1	773420213	GUIDE				

SECTION 2:

ELECTRICAL AND CONTROLS

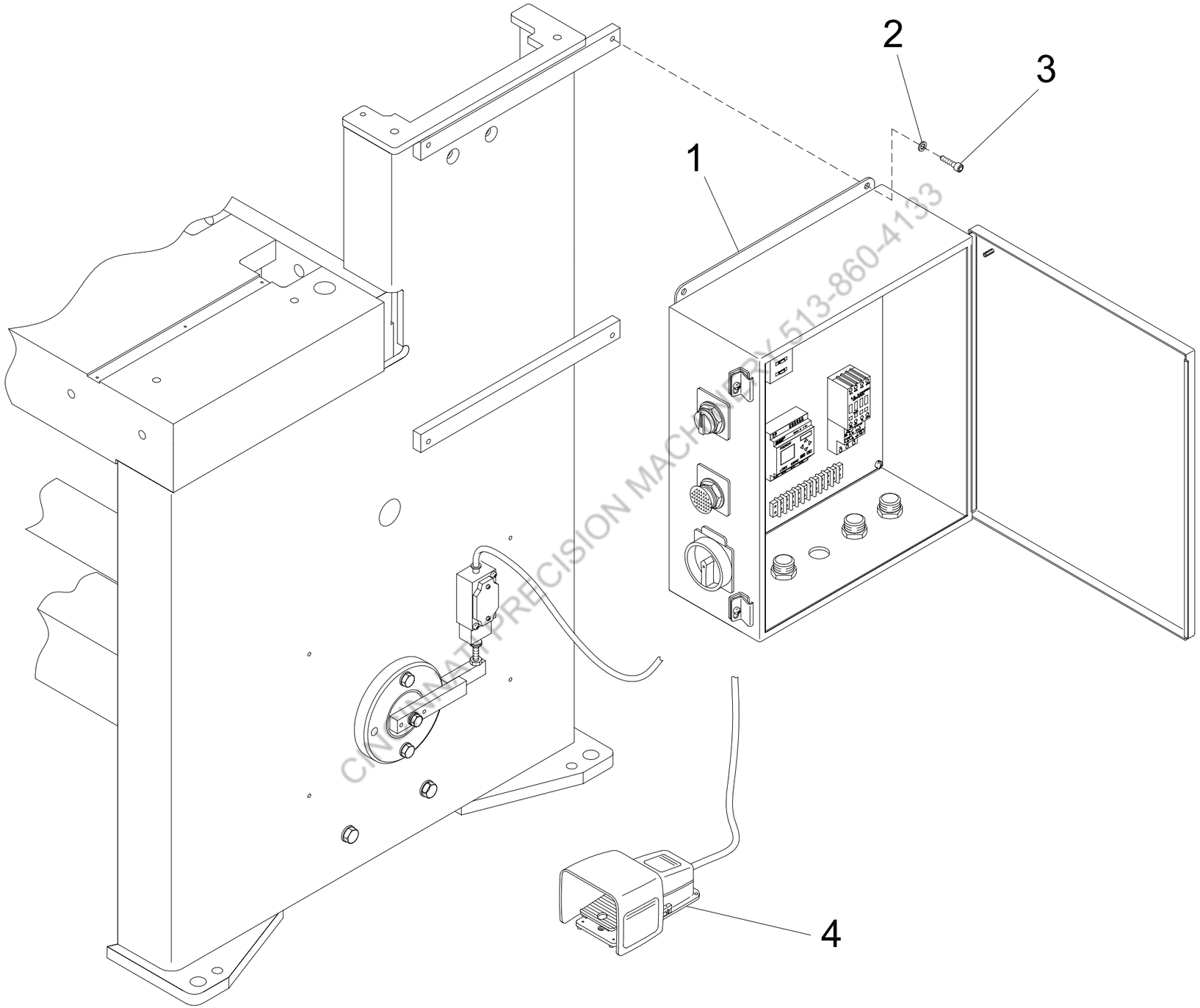


FIG. 1

FRONT OPERATED PANEL

ITEM	QTY	RW PART #	RW PART DESCRIPTION
1	1	660193190	230V STD PANEL
2	4	679033103	1/4 LOCK WASHER
3	4	611012088	1/4-20 X 5/8 SOC HD CP SCREW
4	1	660092104	FOOT SWITCH (LM #511-BO)

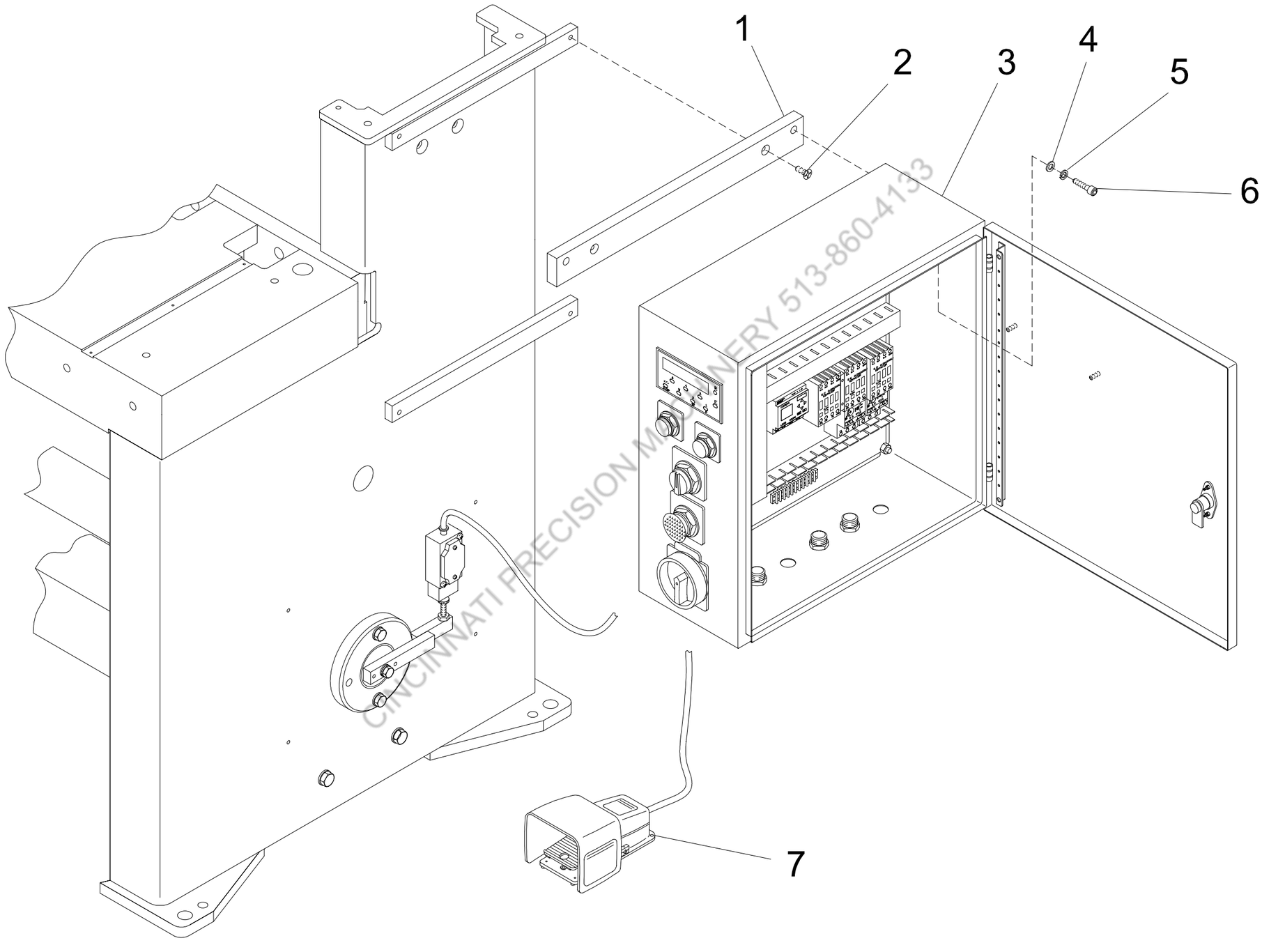


FIG. 2

DRO PANEL

ITEM	QTY	RW PART #	RW PART DESCRIPTION
1	2	773180216	ELECTRIC PANEL SUPPORT MOUNTING BRACKET
2	4	613012089	1/4-20 X 3/4 SOC HD FLAT SCREW
3	1	660193193	DRO 230V PANEL
4	4	678033103	1/4 FLAT WASHER
5	4	679033103	1/4 LOCK WASHER
6	4	611012130	5/16-18 X 5/8 SOC HD CP SCREW
7	1	660092104	FOOT SWITCH (LM #511-BO)

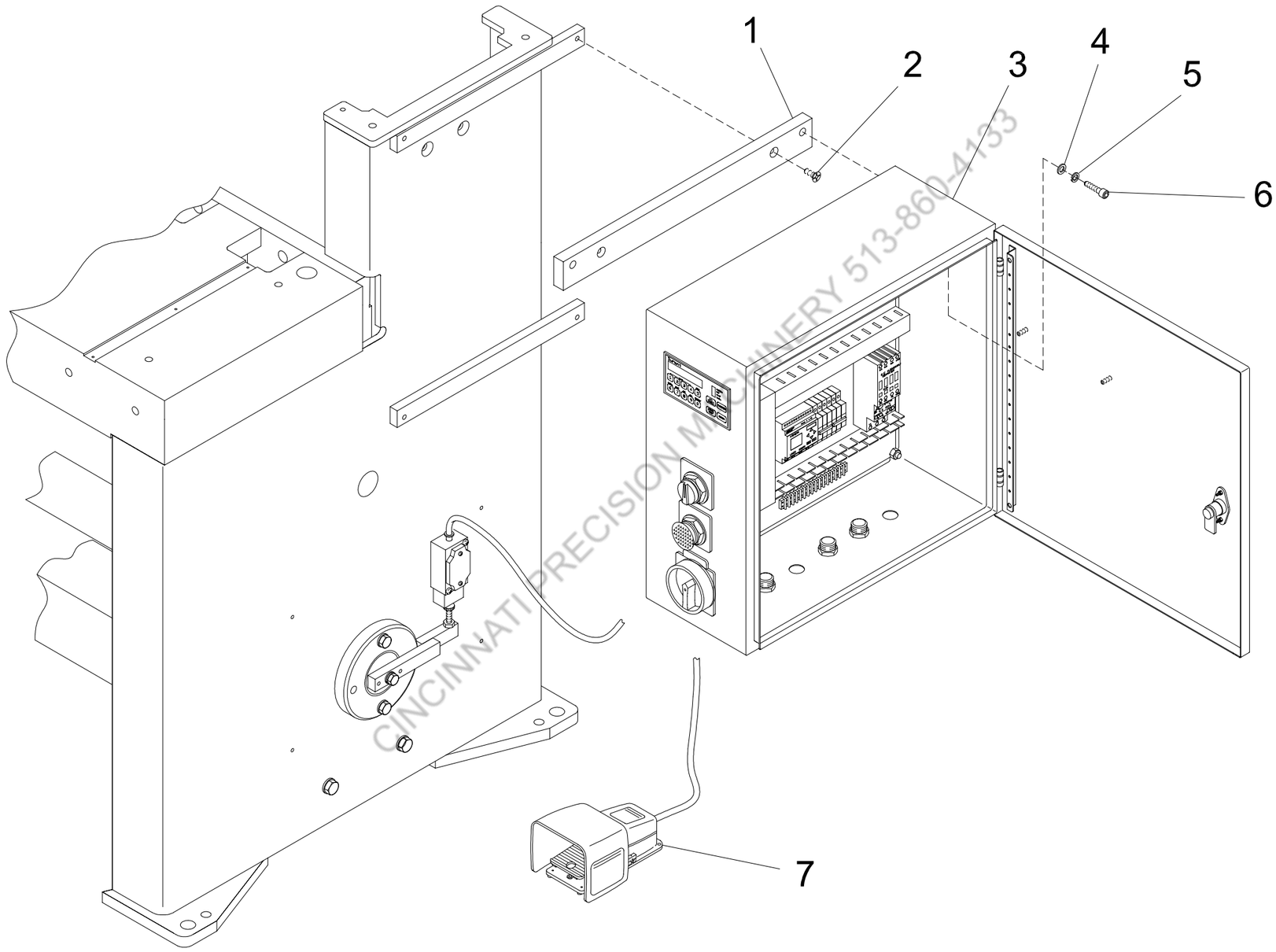


FIG. 3

NC PANEL

ITEM	QTY	RW PART #	RW PART DESCRIPTION
1	2	773180216	ELECTRIC PANEL SUPPORT MOUNTING BRACKET
2	4	613012089	1/4-20 X 3/4 SOC HD FLAT SCREW
3	1	660193196	NC 230V PANEL
4	4	678033103	1/4 FLAT WASHER
5	4	679033103	1/4 LOCK WASHER
6	4	611012130	5/16-18 X 5/8 SOC HD CP SCREW
7	1	660092104	FOOT SWITCH (LM #511-BO)

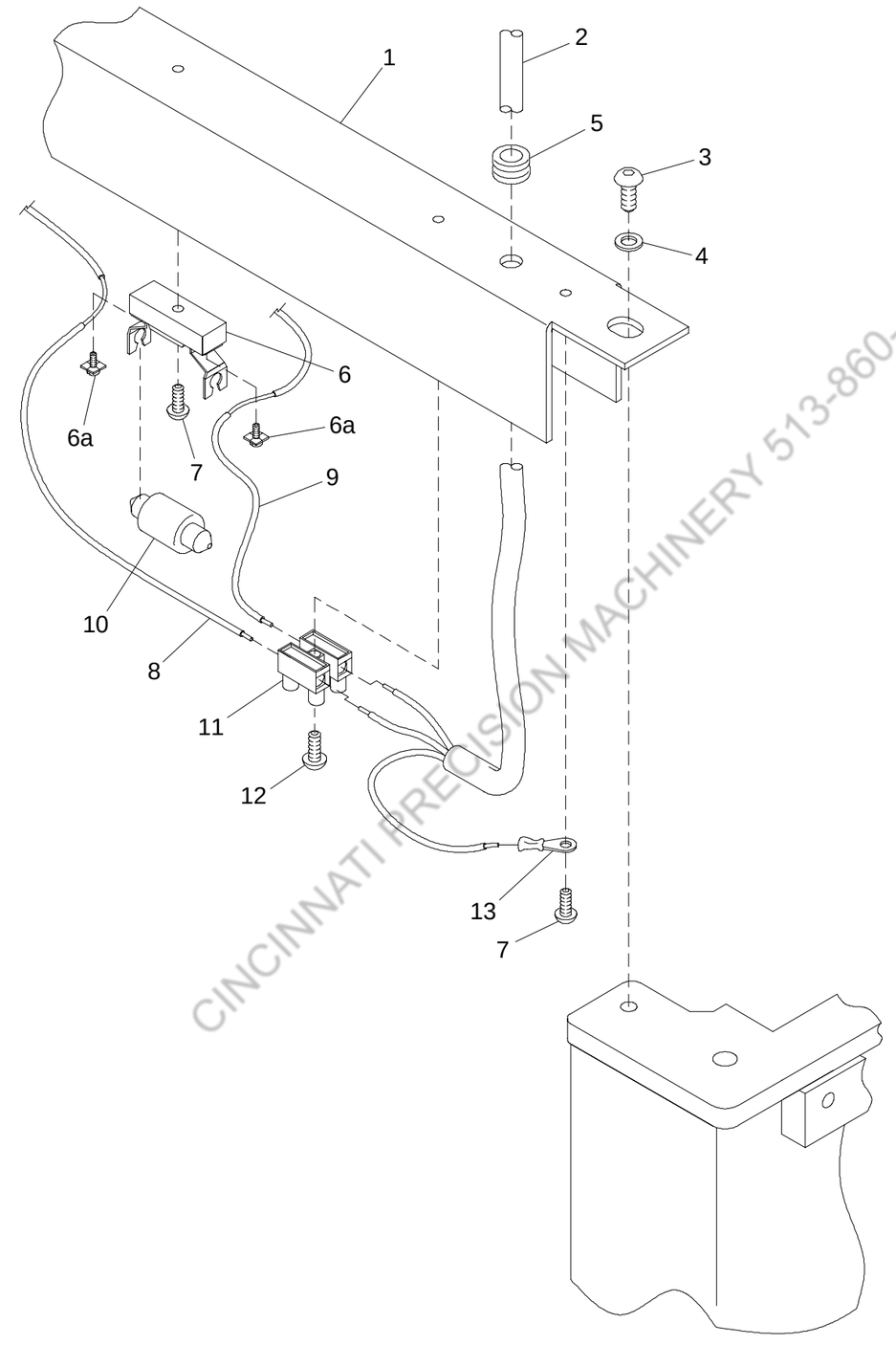


FIG. 4

LIGHT ASSEMBLY

ITEM	QTY	RW PART #	RW PART DESCRIPTION
1	1	773140053	LIGHT FRAME
2	1	660000022	WIRE-CORD #16/3 TYPE SJ
3	2	615012084	1/4-20 X 3/8 SOCKET HEAD BUTTON SCREW
4	2	678033103	1/4 FLAT WASHER
5	1	600000378	RUBBER GROMMET #9600K33
6	10	660000224	LAMP SOCKET
7	11	609012003	#6-32 X 3/8 RHM SCREW
8	1	660000225	SOLID 16 GA. WHITE WIRE
9	1	660000226	SOLID 16 GA. BLACK WIRE
10	10	660000223	LAMP (FESTOONE)
11	1	660000227	TERMINAL STRIP
12	1	607012005	#6-32 X 1/2 FM SCREW
13	1	660182900	16 GA. RING TERMINAL

SECTION 3:

BACKGAUGE
AND MATERIAL RETURN

BACKGAUGE AND RETURN - 10M14

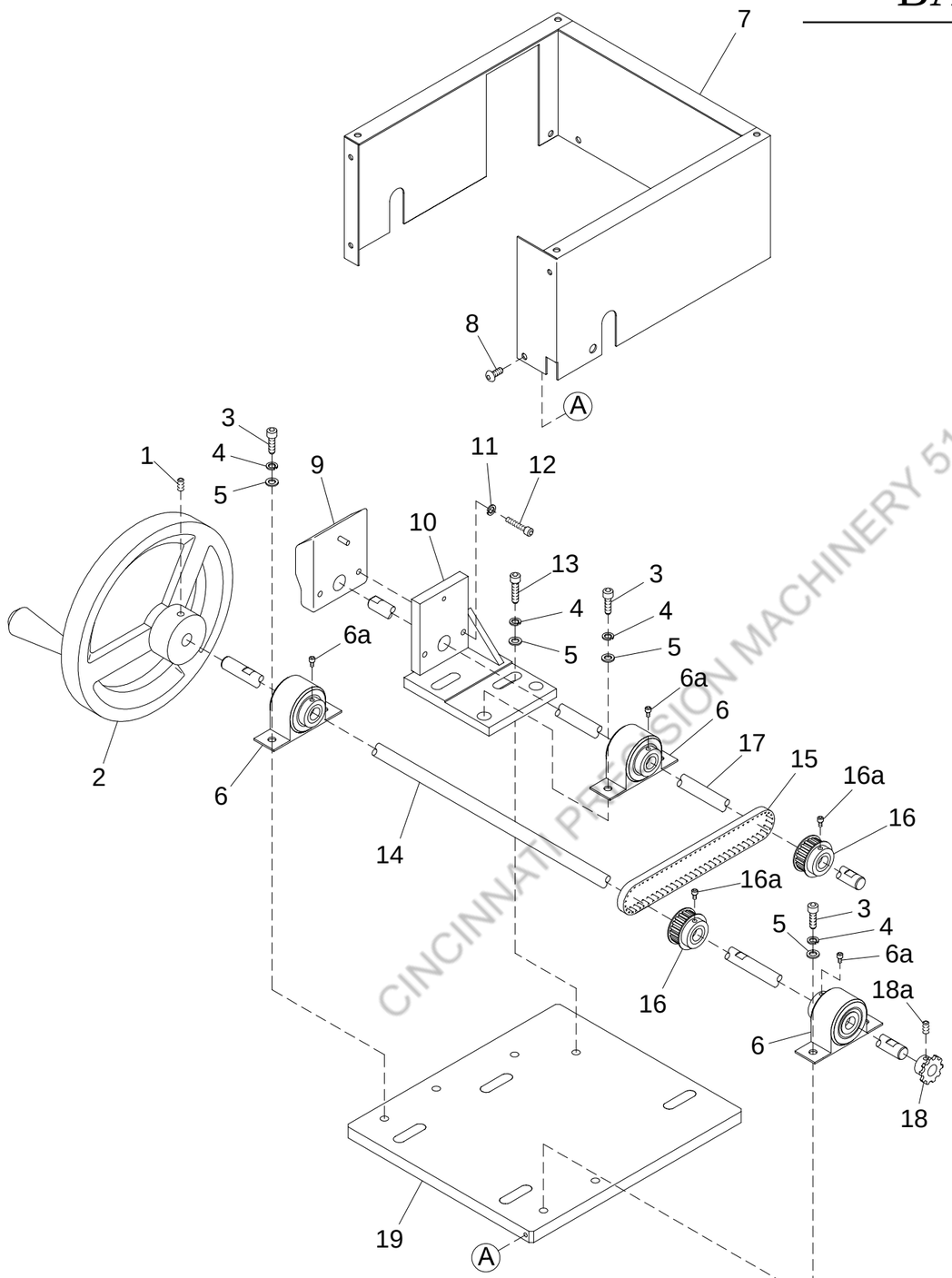


FIG. 1

FRONT OPERATED COUNTER

ITEM	QTY	RW PART #	RW PART DESCRIPTION	ITEM	QTY	RW PART #	RW PART DESCRIPTION
1	2	621012086	1/4-20 X 1/2 SSCP SCREW	**11**	2	679033102	#10 LOCK WASHER
2	1	773000108	HANDWHEEL	**12**	2	612012054	#10-32 X 3/4 SHC SCREW
3	6	611012131	5/16-18 X 3/4 SHC SCREW	**13**	2	611012133	5/16-18 X 1 SHC SCREW
4	8	679033104	5/16 LOCK WASHER	**14**	1	773680014	DRIVE SHAFT
5	8	678033104	5/16 FLAT WASHER	**15**	1	673265324	BROWNING GEARBELT #160XL025
6	3	673315805	PILLOW BLOCK WITH BEARING	**16**	2	673275435	GEARBELT PULLEY
7	1	773440018	GUARD	**17**	1	773680015	COUNTER SHAFT
8	5	615012026	#8-32 X 3/8 SHB SCREW	**18**	1	673285515	SPROCKET, .500 I.D.
9	1	673000371	COUNTER 250AM-X00.20(50)CCW1/2	**19**	1	773060017	COUNTER MOUNTING PLATE
10	1	773200016	COUNTER MOUNTING BRACKET				

BACKGAUGE AND RETURN - 10M14

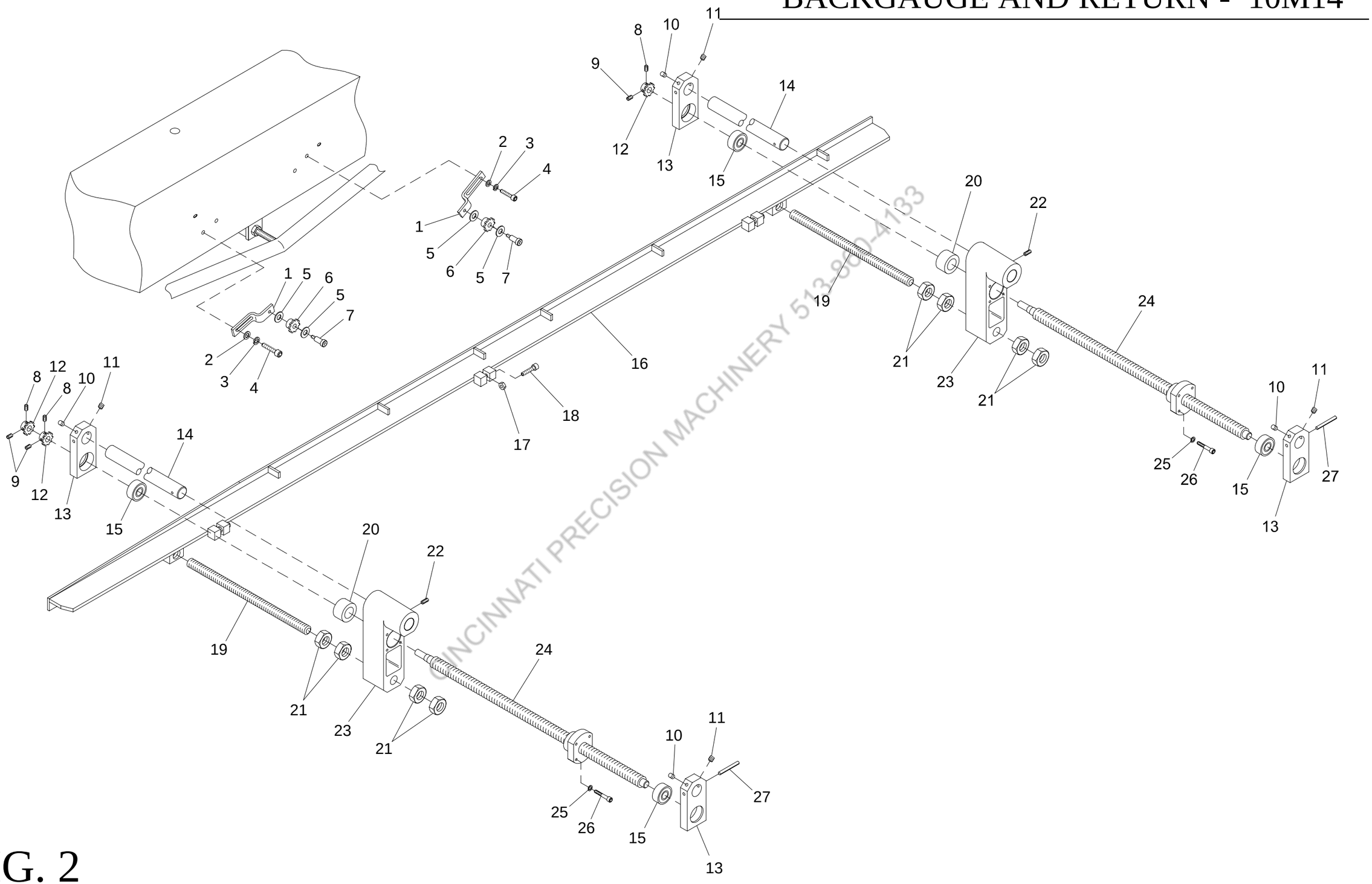


FIG. 2

FRONT OPERATED BACKGAUGE

ITEM	QTY	RW PART #	RW PART DESCRIPTION	ITEM	QTY	RW PART #	RW PART DESCRIPTION
1	2	773200021	IDLER BRACKET	**15**	4	673204725	BEARING, SKF#6304_2RSI
2	4	678033104	5/16 FLAT WASHER	**16**	1	773130232	BACKGAUGE STOP (NEW)
3	4	679033104	5/16 LOCK WASHER	**17**	3	649023005	3/8-16 JAM HEX NUT
4	4	611012133	5/16-18 X 1 SHC SCREW	**18**	3	611012183	3/8-16 X 2 SHC SCREW
5	4	633033137	1/2 SILICON BRZ. FLAT WASHER	**19**	2	773030000	BACKGAUGE HOLDER ROD
6	2	673285514	IDLER SPROCKET .500 I.D.	**20**	2	773080006	GUIDE BUSHING
7	2	642012656	1/2 X 1 SHOULDER SCREW	**21**	8	649023012	1-8 JAM HEX NUT
8	3	625012084	1/4-20 X 3/8 DOG POINT SOCKET SET SCREW	**22**	2	621012084	1/4-20 X 3/8 SSCP SCREW
9	3	621012086	1/4-20 X 1/2 CUP POINT SOCKET SET SCREW	**23**	2	773130009	GUIDE BLOCK
10	4	625012130	5/16-18 X 5/8 DOG POINT SOCKET SET SCREW	**24**	2	600000396	ACME SCREW/NUT ASSEMBLY
11	4	621012128	5/16-18 X 1/2 CUP POINT SOCKET SET SCREW	**25**	8	679033103	1/4 LOCK WASHER
12	3	673285513	SPROCKET, .625 I.D.	**26**	8	611012095	1/4-20 X 1-1/2 SHC SCREW
13	4	773010003	BEARING MOUNT	**27**	2	600063497	1/4 X 2-3/4 ROLL PIN
14	2	773680001	BACKGAUGE SUPPORT SHAFT				

BACKGAUGE AND RETURN - 10M14

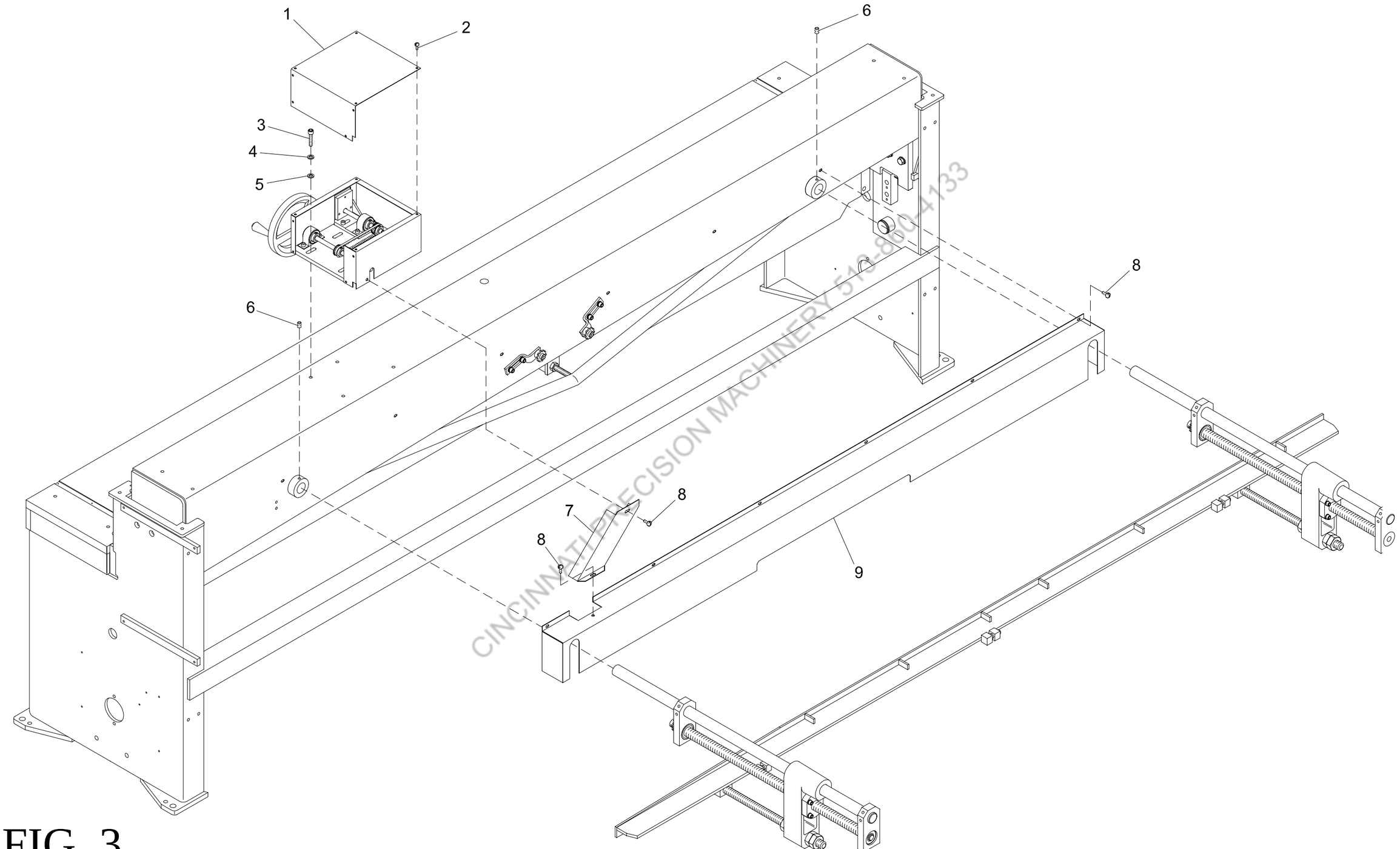


FIG. 3

FRONT OPERATED BACKGAUGE ATTACHMENT

ITEM	QTY	RW PART #	RW PART DESCRIPTION
1	1	773220019	GUARD COVER
2	7	615012026	8-32 X 3/8 SHB SCREW
3	4	611012137	5/16-18 X 1-1/2 SHC SCREW
4	4	679033104	5/16 LOCK WASHER
5	4	678033104	5/16 FLAT WASHER
6	4	621012128	5/16-18 X 1/2 SSCP SCREW
7	1	773440022	UPPER CHAIN GUARD
8	8	615012086	1/4-20 X 1/2 SOCKET HEAD BUTTON SCREW
9	1	773440023	LOWER CHAIN GUARD

BACKGAUGE AND RETURN - 10M14

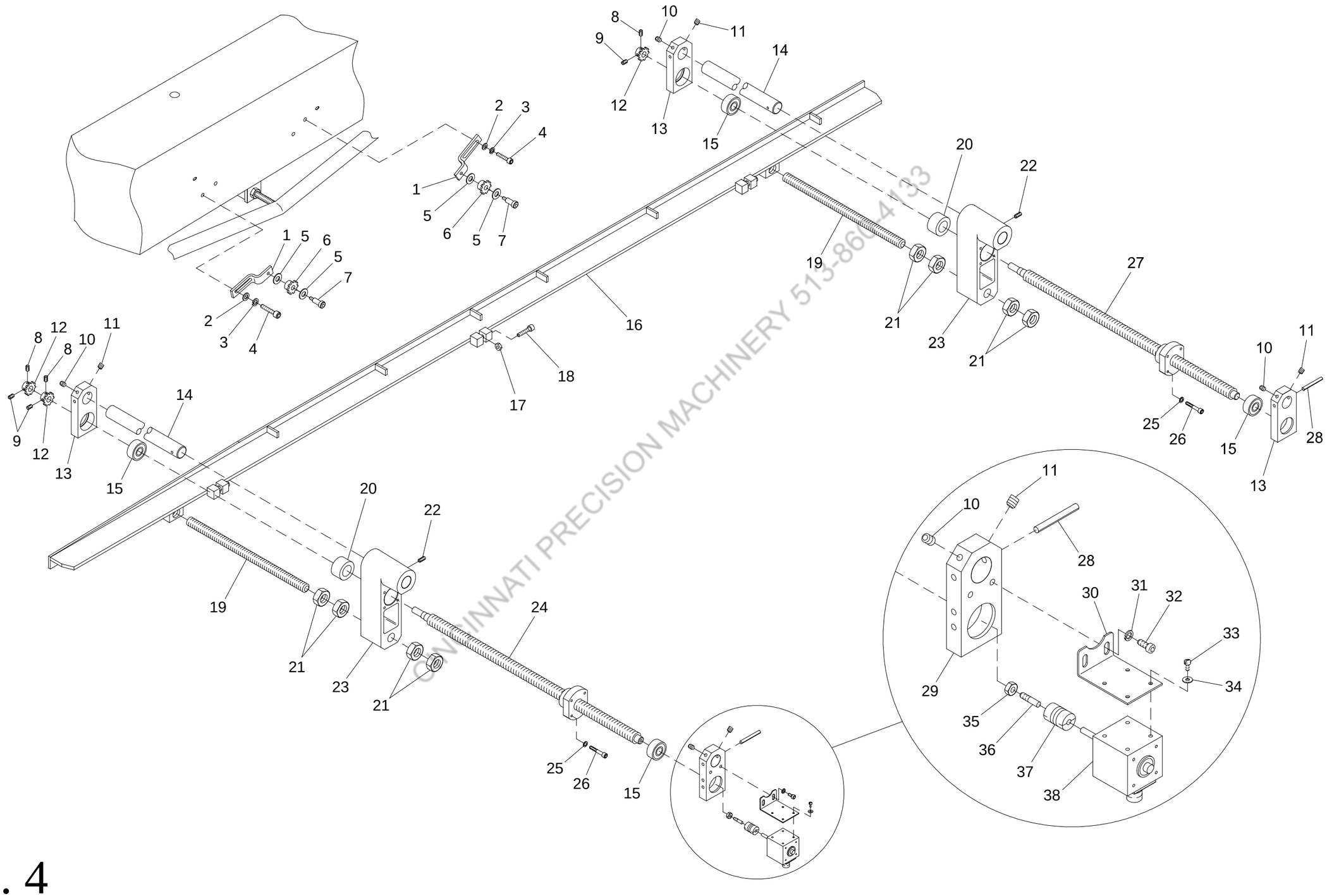


FIG. 4

DRO/NC BACKGAUGE

ITEM	QTY	RW PART #	RW PART DESCRIPTION	ITEM	QTY	RW PART #	RW PART DESCRIPTION
1	2	773200021	IDLER BRACKET	**20**	2	773080006	GUIDE BUSHING
2	4	678033104	5/16 FLAT WASHER	**21**	8	649023012	1-8 JAM HEX NUT
3	4	679033104	5/16 LOCK WASHER	**22**	2	621012084	1/4-20 X 3/8 SSCP SCREW
4	4	611012133	5/16-18 X 1 SHC SCREW	**23**	2	773130009	GUIDE BLOCK
5	4	633033137	1/2 SILICON BRZ. FLAT WASHER	**24**	1	600000432	SCREW/NUT ASSEMBLY, NC/DRO MODEL
6	2	673285514	IDLER SPROCKET .500 I.D.	**25**	8	679033103	1/4 LOCK WASHER
7	2	642012656	1/2 X 1 SHOULDER SCREW	**26**	8	611012095	1/4-20 X 1-1/2 SHC SCREW
8	3	625012084	1/4-20 X 3/8 DOG POINT SOCKET SET SCREW	**27**	1	600000396	ACME SCREW/NUT ASSEMBLY
9	3	621012086	1/4-20 X 1/2 CUP POINT SOCKET SET SCREW	**28**	2	600063497	1/4 X 2-3/4 ROLL PIN
10	4	625012130	5/16-18 X 5/8 DOG POINT SOCKET SET SCREW	**29**	1	773010190	BEARING MOUNT - DRO
11	4	621012128	5/16-18 X 1/2 CUP POINT SOCKET SET SCREW	**30**	1	773200154	ENCODER BRACKET - DRO
12	3	673285513	SPROCKET, .625 I.D.	**31**	2	679033103	1/4 LOCK WASHER
13	3	773010003	BEARING MOUNT	**32**	2	611012088	1/4-20 X 5/8 SHC SCREW
14	2	773680001	BACKGAUGE SUPPORT SHAFT	**33**	4	609012003	#6-32 X 3/8 ROUND HEAD SCREW
15	4	673204725	BEARING, SKF#6304_2RSI	**34**	4	678033100	#6 FLAT WASHER
16	1	773130232	BACKGAUGE STOP (NEW)	**35**	1	649023005	3/8-16 JAM HEX NUT
17	3	649023005	3/8-16 JAM HEX NUT	**36**	1	773680199	ENCODER SHAFT - DRO/NC
18	3	611012183	3/8-16 X 2 SHC SCREW	**37**	1	660386621	ENCODER COUPLING
19	2	773030000	BACKGAUGE HOLDER ROD	**38**	1	660000068	ENCODER WITH CABLE (200 PPR)

BACKGAUGE AND RETURN - 10M14

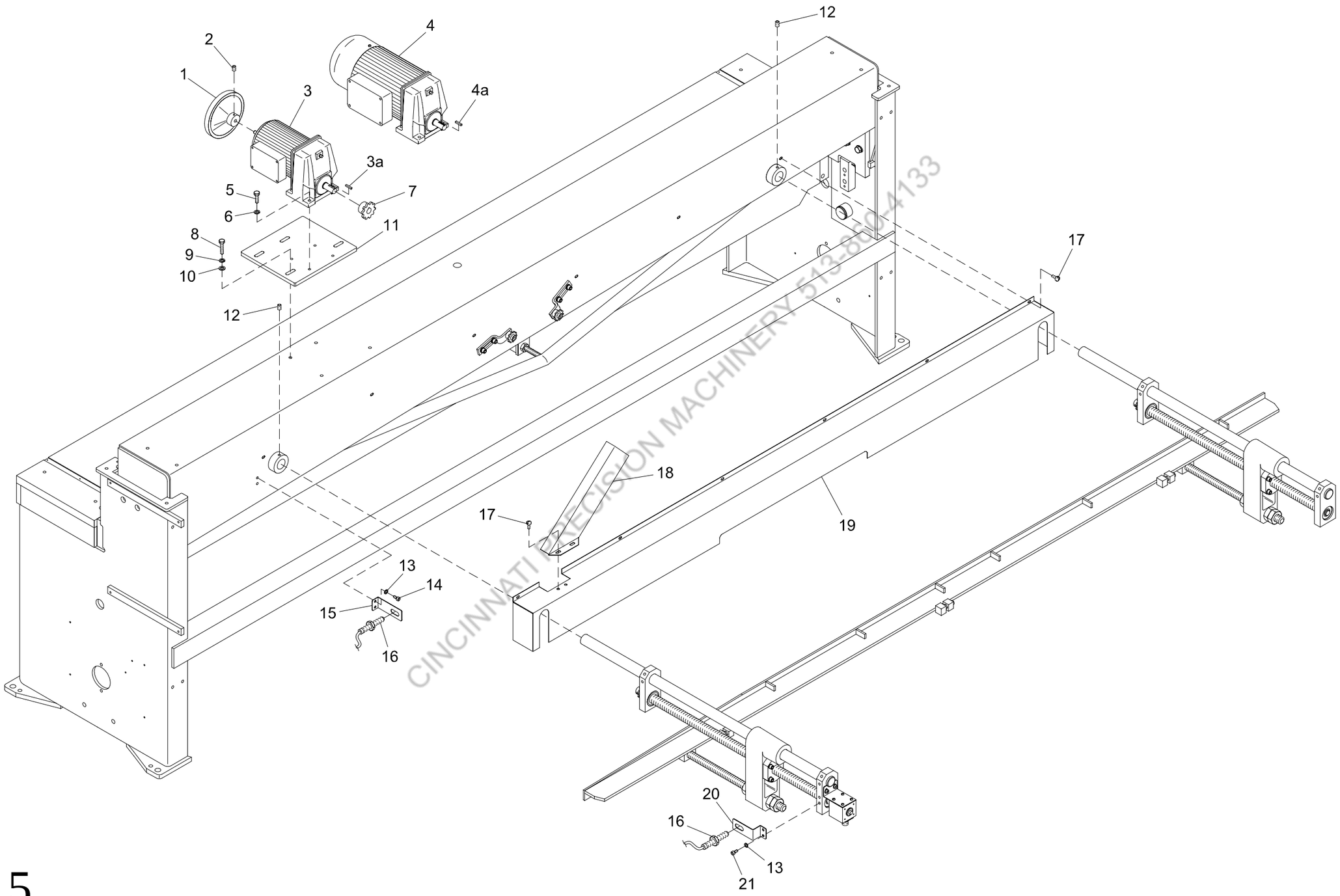
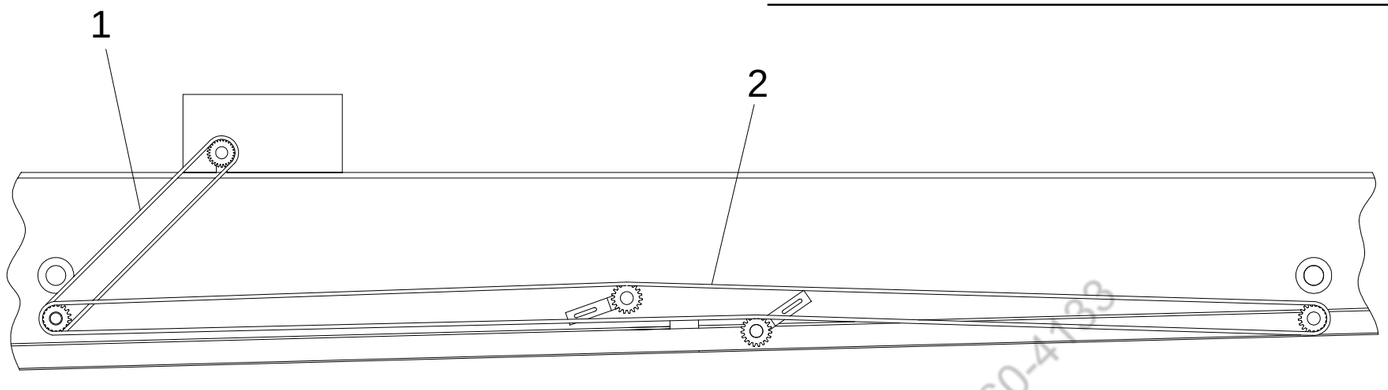


FIG. 5

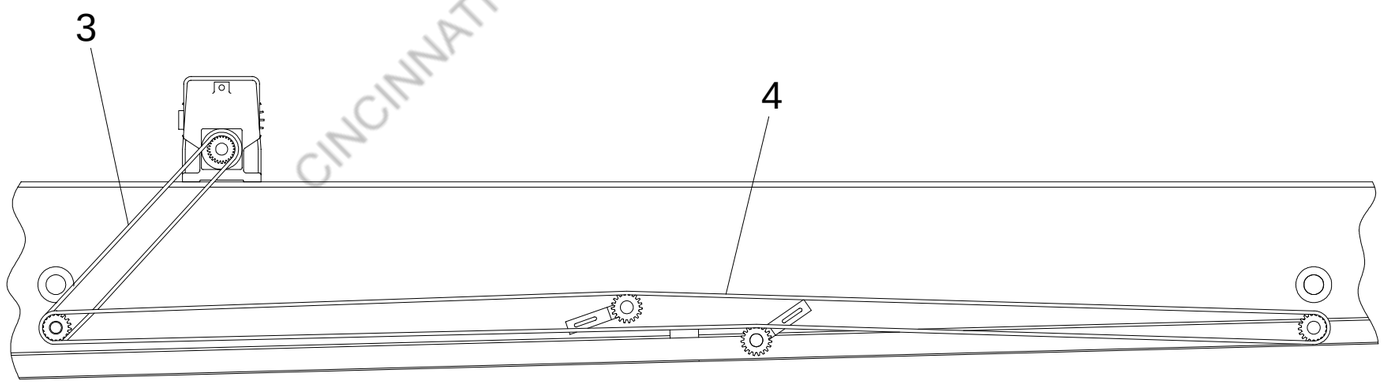
DRO/NC BACKGAUGE ATTACHMENT

ITEM	QTY	RW PART #	RW PART DESCRIPTION	ITEM	QTY	RW PART #	RW PART DESCRIPTION
1	1	773000223	MOTOR HANDWHEEL - DRO	**12**	4	621012128	5/16-18 X 1/2 SSCP SCREW
2	2	621012086	1/4-20 X 1/2 CUP POINT SET SCREW	**13**	4	678033103	1/4 FLAT WASHER
3	1	660011110	MOTOR AND GEAR BOX - DRO	**14**	2	611012088	1/4-20 X 5/8 SHC SCREW
4	1	660011171	MOTOR AND GEAR BOX - NC	**15**	1	773200189	FRONT OVERTRAVEL BRACKET - NC/DRO
5	4	601012133	5/16-18 X 1 HHC SCREW	**16**	2	660152632	A.C. PROX SENSOR
6	4	679033104	5/16 LOCK WASHER?	**17**	8	615012086	1/4-20 X 1/2 SOCKET HEAD BUTTON SCREW
7	1	773000222	B/G MOTOR SPROCKET NC/DRO	**18**	1	773440230	UPPER CHAIN GUARD - NC/DRO
8	4	611012137	5/16-18 X 1-1/2 SHC SCREW	**19**	1	773440228	LOWER CHAIN GUARD - NC/DRO
9	4	679033104	5/16 LOCK WASHER	**20**	1	773200155	REAR OVERTRAVEL BRACKET - NC/DRO
10	4	678033104	5/16 FLAT WASHER	**21**	2	615012084	1/4-20 X 3/8 SOCKET HEAD BUTTON SCREW
11	1	773060186	MOTOR MOUNT PLATE - NC/DRO				

BACKGAUGE AND RETURN - 10M14



Rear View of Ram with Handwheel Assembly



Rear View of Ram with NC/DRO Assembly

FIG. 6

CHAINS

RAM WITH HANDWHEEL ASSEMBLY

ITEM	QTY	RW PART #	RW PART DESCRIPTION
1	1	673000373	ROLLER CHAIN 156 LINKS 39" LONG
2	1	673000372	ROLLER CHAIN 730 LINKS 182.50" LONG

RAM WITH NC/DRO ASSEMBLY

ITEM	QTY	RW PART #	RW PART DESCRIPTION
3	1	673000405	CHAIN WITH CONNECTING LINK - NC/DRO - 47" LONG
4	1	673000372	ROLLER CHAIN 730 LINKS 182.50" LONG