NOVUS X2

CNC TOP OR FACE SHARPENER

NOVUS X2 TOP & FACE SHARPENER

CONTENTS

NOVUS X2 TOP & FACE SHARPENER

LIMITED WARRANTY

This machine is warranted against defects in workmanship and materials under normal use and proper maintenance, for three years after date of purchase or 3,000,000 tips, whichever comes first. Any part which is determined to be defective in material or workmanship and returned to WRIGHT MACHINE TOOL CO., shipping costs prepaid will be repaired or replaced, at WRIGHT MACHINE TOOL CO. option.

WRIGHT MACHINE TOOL CO., INC.
365 Palmer Avenue
Cottage Grove, Oregon 97424

Phone (541) 942-3712
Fax (541) 942-0730

NOVUS X2 TOP & FACE SHARPENER

COOLANT SAFETY

Proper coolant maintenance will increase grinder life and grinding performance, and possibly reduce any risks associated with health concerns. Lack of proper coolant maintenance can result in increased exposure to grinding grit, bacteria, and other by products of grinding that may lead to increased skin sensitivity in some individuals.

WARNING!

Coolants used in this machine must be designed to be used in wet grinding operations. Do not use automotive coolant. Check with the manufacturer of the coolant to make sure it is designed for use in wet grinding of saws.

Water based coolants are designed to operate at precise mixture ratios. Check with the manufacturer of your coolant to determine the proper mix ratio.

CAUTION

Residual cleaning solutions on the saw will easily be dissolved into the coolant tank and can dramatically affect the chemistry of coolant which can significantly reduce wheel life, coolant efficiency, and corrosion efficiency.

Maintain the coolant filters that were shipped with this machine. If you have any questions on how to maintain the filters, call the factory at
1-541-942-3712

Test your coolant at regular intervals. Contact the manufacturer of your coolant to determine when to test, and which tests to perform.

Warning signs of improperly maintained coolant:

1. Strong (foul) odor coming from the coolant.
2. Color change in the coolant.
3. Noticeable stickiness on the saw.
4. Rust developing on the machine and/or saw steel.
5. Unexplained skin rash.
6. Deterioration of paint and/or plastic parts.

If you detect any of these warning signs consult the coolant manufacturer at once. If you are having trouble contacting the coolant manufacturer, call Wright Machine Tool Co. Inc. at 1-541-942-3712

NOVUS X2 TOP & FACE SHARPENER

GENERAL SAFETY RULES

Failure to follow the Safety Rules and other basic precautions, may result in serious injury.

Always use eye protection: When operating this machine, eye protection should be worn. Grinding particles and the possibility of wheel breakage make eye protection necessary. Also face or dust mask if operation is dusty. Use adequate ventilation.
Use ear protection: If operation is creating excessive noise.
Disconnect power: To machine when NOT in use.
Keep clear: Of grinding wheels and pinch points when machine is running.
Saws are sharp: Wear appropriate personal protective equipment when handling saw blades.
Mounting of wheels: Should only be done by persons with mechanical aptitude and good knowledge of mounting, care, and inspection of grinding wheels. Wheels must be rated for the RPM of the machine.
Dress properly: Do not wear loose clothing or jewelry. Nonskid foot wear is recommended. Wear protective hair covering to contain long hair.
Avoid dangerous environments: Don't use in wet location. Keep work area well lit. Do not use this machine in the presence of flammable liquid or gasses.
Keep children away: Do not let VISITORS contact this machine.
Keep work area clean: Cluttered areas invite accidents.
All electrical covers: Must be in place before applying electrical power to this machine. Electrical service must be locked out prior to removing any electrical covers or machine guards. Access to electrical components must be restricted to trained personnel only to avoid possible electrical shock.

NOVUS X2 TOP & FACE SHARPENER

GENERAL SAFETY RULES (CONTINUED)

Voltage greater: Than specified on name plate can result in serious injury to user.

Never stand on this machine: Serious injury could occur if the machine is tipped or if the grinding wheel is accidentally contacted.

Follow safety precautions: For wheels, coolant and material being ground. These items must also be compatible. This information is available on the Safety Data sheet for each of these products.

SPECIFICATIONS

MOVUS X2, an Automatic Top or Face Grinder Programmable for unlimited tooth geometries.

STANDARD VOLTAGE:	230 Volt, 3 Phase, 50/60 HZ
OPTIONAL VOLTAGE:	As Requested
SHIPPING WEIGHT:	2,800 lbs.
MACHINE WEIGHT:	2,600 lbs.
MACHINE SIZE:	L 54" X W 35" X H 74"
AIR REQUIREMENTS:	2 C.F.M. at 80 psi to 100 psi
STANDARD SAW SIZE:	4" to 34"
SPINDLE MOTOR:	(1) 2 h.p. 3450 RPM Motor
CIRCUIT SIZE:	230 VOLTS 15 A

NOVUS X2 TOP & FACE SHARPENER

OPTIONAL ACCESSORIES

LARGE BORE OPTION	W-50
3 PIN SAW CENTER	W-450
SPLINE BORE SAW CENTER	W-460
SAW CENTER BUSHING	C-5958 (specify)
FACE WHEEL	D-50 / D-51
TOP WHEEL	D-37-6-2

COMMON REPLACEMENT PARTS

FINGER ARM PIVOT BEARING	W-188 X 2
RAMP GUIDE	W-1330
FEED FINGER	W-259-1
FINGER BOSS	W-287
FINGER SPRING	W-883
FINGER ARM SPRING	W-384-1
FILTER PAPER	A-5825
FIXED CLAMP JAW	W-1322-4
FEED RAMP	W-1324

STANDARD ACCESSORIES

1 - 1/4 TEE HANDLE KEY	A-5920
1 - 13 PC. ALLEN WRENCH SET	A-5923
9 - SAW BUSHING SIZES 1/2", 5/8", 3/4", 1", 1-1/8", 30mm, 1-1/4", 1-3/8", 1-1/2".	C-5958-SPECIFY DIA.
1 - MAGNETIC SAW RECEIVER 1/2" TO 1-1/2"	M-101
2 - COOLANT FILTERS	A-5825
3 - WHEEL POSITION STOPS	
6" FACE	C-5265-6-F
6" TOP	C-5265-6-T
4.5" TOP	C-5266-4.5-TS

NOVUS X2 TOP & FACE SHARPENER

PRE SET UP

COOLANT

Coolant capacity is 15 gallons. A rust inhibiting grinding coolant **MUST** be used or severe rust damage to machine can result. Mix coolant according to manufacturer's instructions.

COOLANT FILTERS - Clean coolant will increase grinding wheel life, improve grind finish and increase removal rates. Change coolant filter as necessary. Part # A-5825.

RUST DAMAGE IS NOT COVERED BY THE WARRANTY

MOUNTING GRINDING WHEELS

All grinding wheels must be rated for the RPM of this machine.
Wheels exposed to higher than rated RPM are dangerous.

Mounting of the grinding wheel should only be done by persons with mechanical aptitude and good knowledge of mounting, care, and inspection of grinding wheels.
Manufacturer recommends that separate 6" wheels be used for topping(D-37-6-2) and facing(D-50) or (D-51).
The NOVUS X2 can use 2 wheels. (D-36 for facing and D-37 for topping). Install the D-36 6" diameter facing wheel first with the diamond facing to the left. Then install the D-37 4-1/2" diameter topping wheel with the diamond facing to the right. With those 2 wheels back to back it will not be necessary to change when going from top to face. Individual face or topping wheels are also available.

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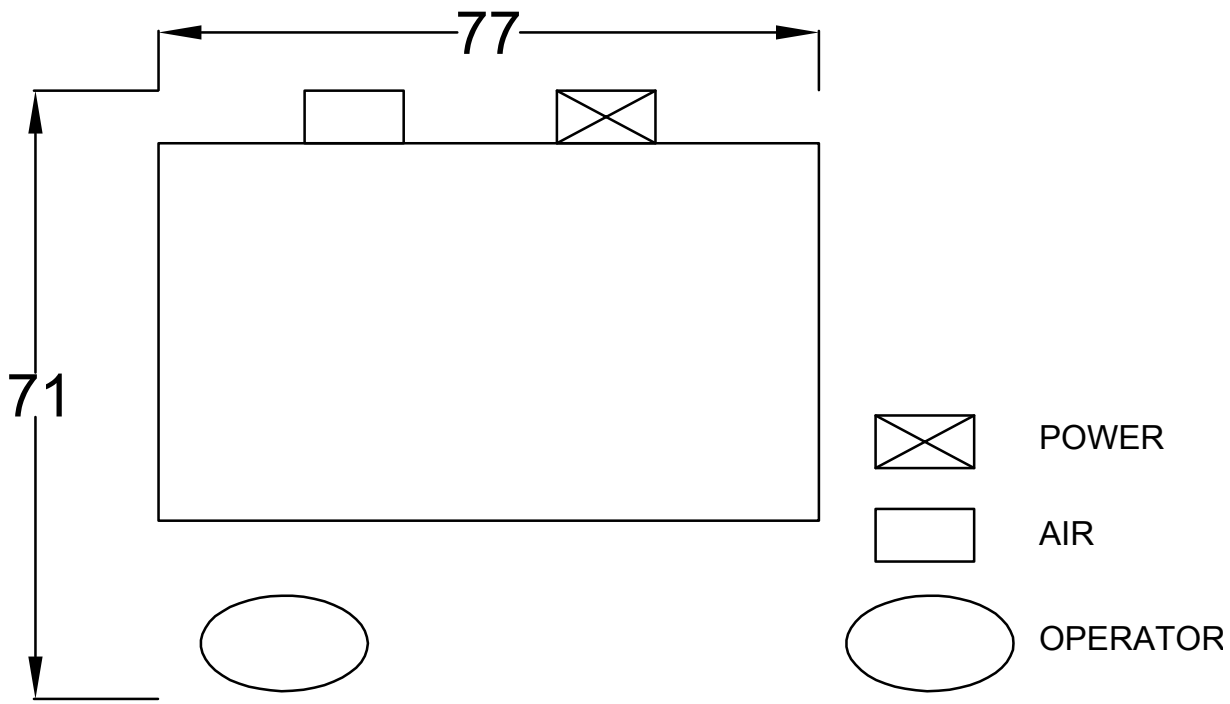
MACHINE INSTALLATION

Lifting this machine should only be done with a fork under the Machine base. Machine weight is approximately 2,600 pounds.

RECOMMENDED FLOOR SPACE FOR MACHINE AND OPERATOR



NOVUS X2 TOP & FACE SHARPENER

AIR SUPPLY

Your NOVUS X2 uses low pressure pneumatic over hydraulics actuators to index and provide head feed movements. These movements are superior to hydraulic controlled grinding machines.

Advantages of Pneumatic over Oil vs. Hydraulic pump sysyem

1. Does not add vibration to Grinding machine which improves finish, speed and accuracy.
2. Does not build up heat which increases accuracy and eliminates a need for " warm up".
3. No oil to dispose of.
4. No oil leaks.
5. Easy and inexpensive to repair.
6. Safety.

Your Pneumatic system should give years of trouble free operation if the following rules are followed.

1. Air pressure must be above 80 psi at all times during operation.
2. Do not use a oiler in the air line.
3. Do not use synthetic oil for lubrication as it can attack the o-rings in the machine.
4. The air should be reasonably dry and free of scale.
5. The air line to the machine must be 3/8 ID hose or larger.

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SETUP CHECKLIST

1. Enter the desired program
2. Set the parameters .
3. Set the hook / back angle.
4. Set the forward speed 1 to 2 turns open.
7. Position the saw.
8. Adjust the wheel position stops.
9. Close the door.
10. Pull start.
11. Place in auto.

NOVUS X2 TOP & FACE SHARPENER

SETUP

The general set up procedures for different saw types are basically the same irregardless of the type of saw that is being ground.

1. Turn the electrical disconnect to **ON.**

2. Select the program to use by inputting the number on the operator interface.

3. Set the number of teeth on the operator interface.

4. If there are alternating high and low teeth, then set the appropriate height setting for the amount of height difference required. H-2 on fixed programs.

5. Set the Hook / Back angle by moving Hook angle switch.

6. Adjust the feed speed to 1 turn open.

7. Place the height sensor on the index finger and hold the joy switch to IN. The saw will rise to position and lock. Rotate the height sensor out of the way resting on the coolant arm bracket.

8. Set the index length on the operator interface. If more than one index length is required, set the optional index lengths on the optional index screen. This is accessed by pressing F6 then using the arrow key to highlight the optional index #, then enter the value desired.

9. If the saw will be ground with either an alternate top, chamfer, or corner breaks, input the angle and percentage on the operator interface.

10. Input the plate value on the operator interface to match the plate thickness of the blade to be ground.

11. Pull the START button . This will cause the clamp to shut, and the index to retract. Use joy switch to index a tooth into position. On a saw with different tooth heights, this will usually be the tall tooth. This tooth will be used to set up the correct grinding height.

12. Set the height of grind by moving the head across the carbide. This is done by holding the joystick to IN. Adjust the head up and down with the head wobble switch.

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SETUP
(CONTINUED)

13. When the head is adjusted for the desired grind, index the blade until the index finger rests behind the first tooth to be ground, then place the joystick to AUTO. It is important to understand that one tooth will always be indexed prior to grinding. This means that prior to placing the joystick into AUTO, the saw should be indexed until the index finger is resting behind the first tooth that you want grind.

14. Position the correct tooth against the index finger.

15. Pull the **START / STOP** to start the machine.

16. Move the joy switch to index until the index is full forward. If the index finger does not follow the radius of the saw adjust the index guide ramp as necessary with the 1/4 hex Tee handle.

17. Move the joy switch to IN. This will move the grinding head forward. Adjust the top of tooth position using the Head joy switch.

18. Finish grinding the set up tooth.

19. Place joy switch **IN** to **AUTOMATIC**. The machine will complete the saw.

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Height Settings

There are eight different adjustable height settings, three that are general in nature and four that are used primarily for the adjustment of the chamfers and corner breaks and one is programmable from the user program.
The height settings are referred to as H1, H2, H3, H4, H5, H6, H7 and Accumulator. Except for Accumulator, these are set from the operator interface

H-4 & H-5/H-6 & H-7 Height Settings

The H-4, H-5 and H-6, H-7 heights serve a special purpose. Any time the machine rotates the head to do a chamfer, H-4/H-5 are called, and any time a the machine rotates for a corner grind, H6/H-7 is called. For an inside (right) chamfer or corner break, H-4/H6 are called. For an outside (left) chamfer or corner break H-5/H7 are called.

F-8 Cycles head for chamfer grind. Push F-8 once, Head bevels to inside or right. Uses H-4 valve.
Push F-8 again, head bevels to outside or left. Uses H-5 valve.
Push F-8 again, head bevels to center. This is the top of the tooth.
F-9 cycles head for corner grind.
Push F-9 again, head bevels to inside or right. Uses H-6 valve.
Push F-9 again, head bevels to outside or left. Uses H-7 valve.
Push F-9 again, head bevels to center. This is the top of the tooth.
F-7 will equalize inside and outside for chamfer or corner.

Chamfer and Corner Break Settings

The chamfer and corner break settings allow the operator to specify the number of degrees and the extent to which an alternate top, chamfer, or corner break will be ground.
The angle is specified in number of degrees from flat. The amount of grind is specified as a percentage of the total kerf width as viewed from the top of the tooth looking down.
For instance, if you set the chamfer at 33% then after the tooth is ground you should notice that 33% of the width of the tooth on either side is dedicated to the chamfer. It is similar with corner break.
Alternate top grind is simply a chamfer grind set to 100%.

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ADJUSTMENT CONTROL COMPONENTS

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LOWER CONTROL PANEL

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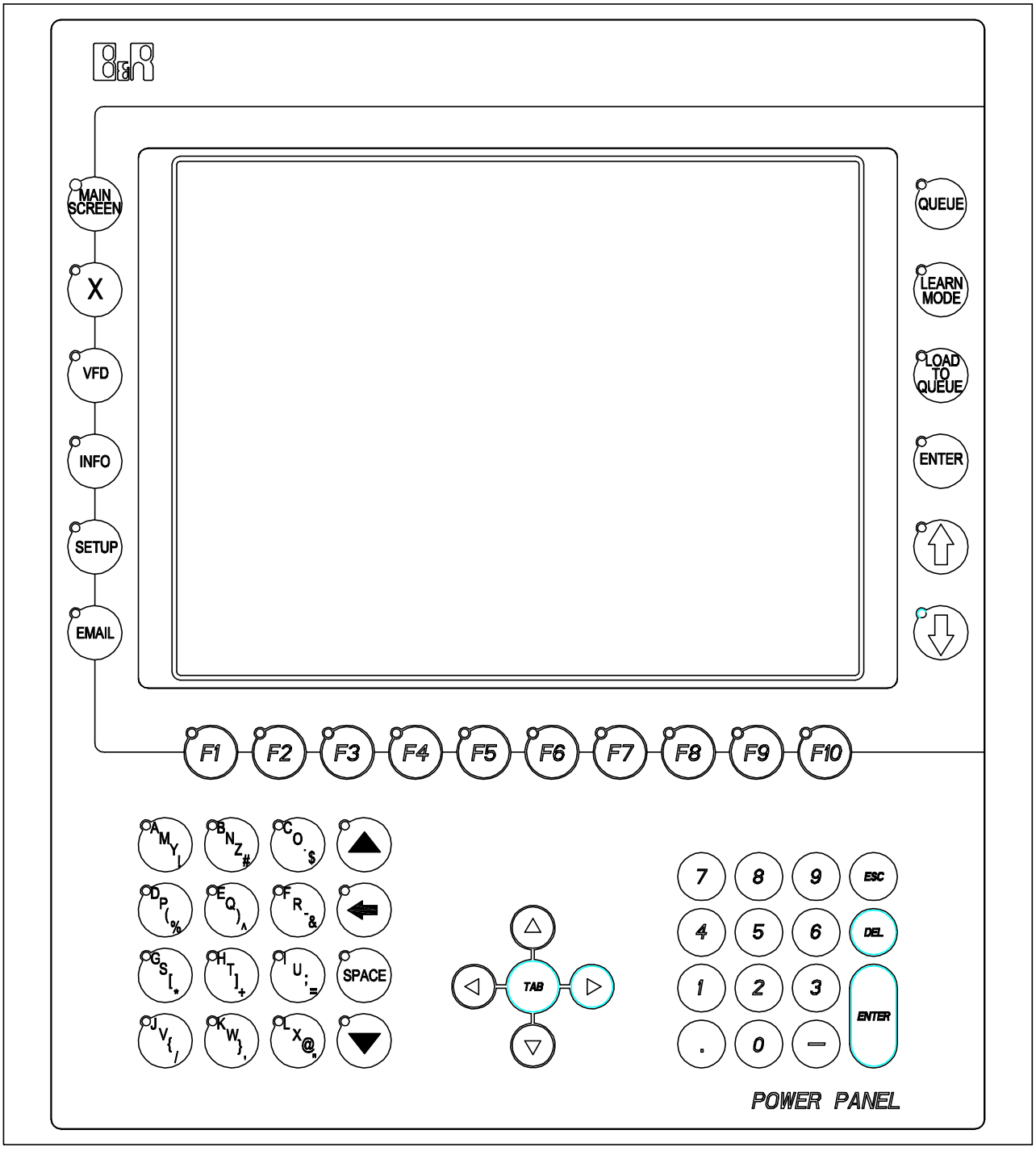
OPERATOR INTERFACE (HMI)



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OPERATOR INTERFACE FUNCTIONS

1) Main Screen Button:

This screen is used for the Main parameter screen for saw setup

2) X: Is not used.

3) VFD:

This screen is used for accessing the AC Inverter. This allows the operator to change some parameters on the spindle motor. The operator can also set low and high load limits top and face independently and shows the actual load on the motor. If high load is reached auto cycle will stop, orange light will flash. It will promt the the screen with a message. Low load limit will pause the feed forward movement untill actual load percentageis below pause setting.

4) INFO:

This screen allows the operator to cycle on and off the inputs and outputs for trouble shooting purposes. Current positions of the head pivot, head wheel height, plate, index and air pressure are also shown.

5) SETUP:

This screen allows the operator to view and set machine setup and info like basic offsets for running of the machine.

A) Index FWD window= adjustable value for index forward.
B) Index REV window= adjustable value for index reverse.
C) Index clear distance= amount index retracts before head moves forward.
D) Index offset= Value for computing forward position of index.
E) Absolute index position= the actual position from sensor to target.
F) Calibrations= F7 to level head and center place.
G) Memory stick function= F9 can save to or restore from the memory stick.
H) Top lift off= lift off the tooth in top grind position needs to be a negative value. High speed program will require more lift off.
I) Face lift off= Lift off the tooth in face grind position needs to be a positive value.
J) Top of tooth= The actual top grind position uses this value to calculate bevel height.
K) Front of face= The actual face grind position.

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OPERATOR INTERFACE FUNCTIONS

5) SETUP: Continued

L) Drag pressure tripped= stops cycle when drag pressure exceeds this value.
M) Min. drag pressure= Stops cycle when drag pressure is below this value.
N) Full clamp pressure= Will resume cycle when clamp pressure eceeds this value.
O) Bevel pivot location= Actual pivot position of home switch.
P) Outer rotation= Changes outer motor rotation.
Q) Inner rotation= Change inner motor rotation.
R) Center rotation= Changes center motor rotation.
S) Index slow stop distance= This valve is used to slow the index on the retract. This is the distance before index value is reached.
T) Index over shoot distance= This value is for the index retract. If value is exceeded cycle will stop, index error may occur.

6) EMAIL:

Allows operator to Email status report, error codes and tech info to factory or locations.

7) QUEUE:

This screen allows the operator to load or program the next saw while the machine is in operation.

8) LEARN MODE:

This screen allows the operator to view and edit saw programs.

9) LOAD TO QUEUE:

This screen allows the operator to load fixed and custom programs to the Queue.

10) ENTER:

Allows operator to enter from the list box.

11) UP ARROW:

Scrolls up in the list box.

12) DOWN ARROW:

Scrolls down in the list box.

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TROUBLE SHOOTING

HOOK ACTUATOR DOES NOT FUNCTION...

1. Check the main disconnect and panic button on control panel.
2. Check for a blown 8 amp fuse on primary and secondary side of transformer (located on power panel)
3. Check connections on main disconnect, diode bridge, capacitor (see power panel), and actuator (see hook actuator assembly).
4. Check the terminal strip located on the top side of power panel. Make sure connections are plugged in.
5. Check power at transformer (see power panel).
6. Check the speed control (see power panel).
7. Check the actuator. (see hook actuator assembly).
8. Call Wright Machine Tool.

SAWLIFT DOES NOT FUNCTION...

1. Check height sensor finger (see clamp assembly). The height sensor finger should be in the down position and proximity switch light should be on for sawlift to run.
2. Check the light on relay CR 3. If CR 3 relay does not light up in conjunction with height sensor proximity switch light then swap out CR 3 relay (see power panel).
3. Check connections on main disconnect, diode bridge, and capacitor (see power panel).
4. Check W-1429-1 transformer located on power panel.
5. Check the actuator. (see saw lift assembly).
6. Call Wright Machine Tool.

NO COOLANT...

1. Check coolant level at coolant tank.
2. Check the shut off valve on coolant nozzle and make sure it is free of clogs.
3. Check the coolant line for any cuts, kinks, or clogs.
4. Does the coolant pump run?
5. Check the light on relay CR 2. If CR 2 relay does not light up then swap out CR 2 relay (see power panel).
6. Check the CR 2 relay connections (see electrical schematics).
7. At the control panel, pull the start button one time to turn the coolant pump on. Pull the start button again to turn the pump off. The next time the start button is pulled on again the coolant pump will start automatically. Note: setting the joyswitch to auto will start the coolant pump.
7. Call Wright Machine Tool.

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The useful life of this machine can be dramatically extended if the following rules of operation are followed.

1. Clean the machine regularly to avoid carbide buildup in the enclosure.
2. Leave all inspection covers closed and in place. Only open inspection covers during maintenance.
3. A good rust inhibiting coolant must be used in the correct ratio. Too weak a mix will cause rust problems and too thick will damage the paint and load the Diamond wheels.
4. When not in use leave the enclosure door open. This eliminates humidity build up in the enclosure.
5. Do not clean the machine with high pressure air or water. This can blow grit into the internal parts of the machine and cause rusting problems which is not covered by warranty.

MAINTENANCE

DAILY	1. Check coolant level and filter. 2. Clean interior of machine. 3. Check oil level on central lube system. Use HD220 way oil.
WEEKLY	1. Check coolant tank for carbide buildup. 2. Replace coolant filters.
MONTHLY **or 100,000 CYCLES**	1. Grease hook pivot. 2. Inspect finger for wear. 3. Inspect clamp jaws and ramp for wear. 4. Check oil level of feed and index systems. Use AW32 hyd. oil.
EVERY 6 MONTHS **or 500,000 CYCLES**	1. Inspect spindle drive belt. 2. Clean spindle motor fan. 3. Remove stainless splash guards and clean completely. 4. Inspect and clean central lube points, linear slide system, bevel pivot, sawlift, and spindle slide. 5. Inspect lube filter.
EVERY 24 MONTHS **or 1,000,000 CYCLES**	1. Replace spindle drive belt and inspect pulleys. 2. Inspect pulleys for wear. 3. Replace central lube filter. (see central lubrication system).

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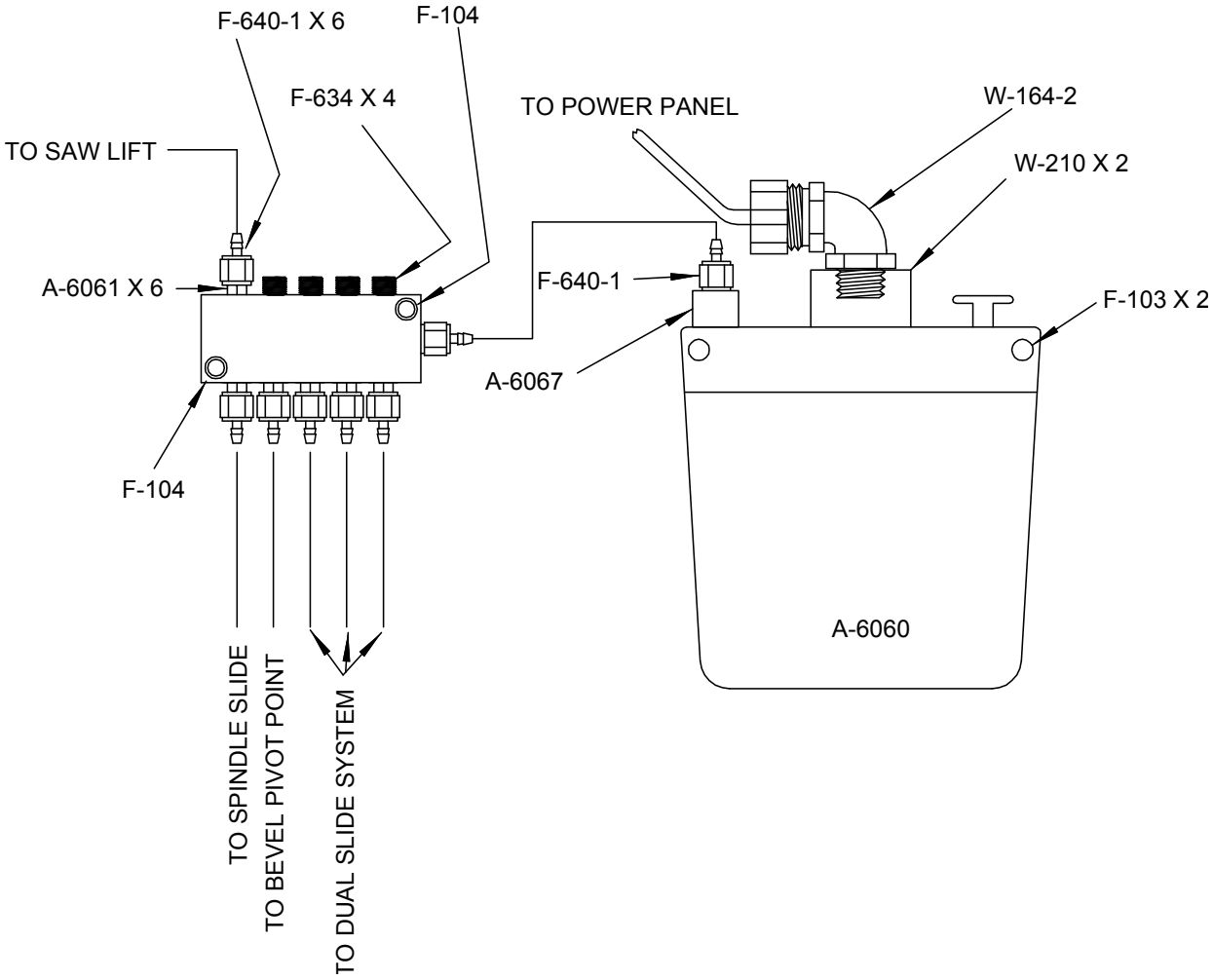
CENTRAL LUBRICATOR SYSTEM
C-6060

Description

This unit pumps once every fifteen minutes of operation. To manually lubricate pull knob up. Lubricator is located at the right of the machine.

Oil Type	HD 220 Way Oil
Expected Consumption	Every three months (250 hours of operation)
Filter Part #	A-6062
Replace	Every 12 Months



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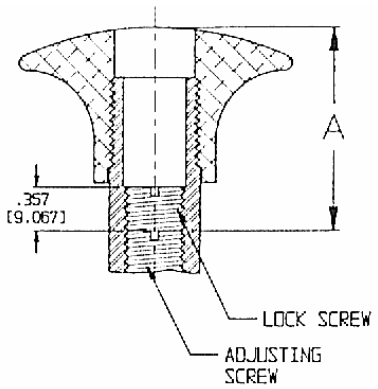
Discharge Volume Per Cycle: Adjustable from 2.5cc minimum to 5.0cc maximum. The lubricator is supplied at the maximum stroke setting. To reduce oil deliver, remove the lock screw, measure **A**, turn adjusting screw clockwise, increasing dimension **A** in the increment (corresponding to the desired discharge) as shown on Table.



dim. ↓

IN.	DISCHARGE
.400	2.5cc
.320	3.0cc
.240	3.5cc
.160	4.0cc
.080	4.5cc
0	5.0cc

Filter Replacement: A filter at pump inlet protects the lubrication system and should be inspected every six months. If not clean, replace. To remove filter, pry out snap ring with screwdriver and remove filter discs and screens. To reinstall, insert in the following order: Filter disc support (coarse screen), filter disc screen (fine screen), filter disc, filter clamp ring and filter snap ring.

Motor Replacement: Remove motor cover and the motor mounting screws. To reassemble, be sure slot in motor shaft engages with pin in drive shaft before replacing screws. When ordering motor, see instructions included in drawing on front of sheet.

Maintenance: Check oil level daily and refill when required. Replace filter group annually or as frequently as necessary.

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GRIND SPEED

* CYCLE TIME IN SEC. PER TIP	TEETH PER MINUTE	FEED RATE INCH PER MIN.	**MAX. RECOMMENDED DEPTH OF CUT.180 GRIT WHEEL
2.1	29	17.2	.006
2.5	24	12.6	.020
2.9	21	9.9	.030
3.3	18	8.2	.036
3.7	16	7.0	.043
4.1	15	6.1	.049 +
5.0	12	4.7	.049 +
6.0	10	3.8	.049 +
8.0	7.5	2.4	.049 +

* 10° ATB TOP 1-1/4 PITCH
.315 TOTAL HEAD MOVEMENT
3/16 DIAMOND SECTION
10 GPM COOLANT FLOW
OFF CARBIDE TIME IS 1.01 SEC.

** GRINDING WHEEL QUALITY,
CONCENTRATION, AND BOND HARDNESS
MAY REQUIRE REDUCED DEPTH OF CUT.

NOTE: In most cases the limiting factor is the performance of the grinding wheel. The NOVUS X2 is capable of cycling at speeds well beyond the ability of a grinding wheel to remove carbide. *In most cases, the slower that a grinding machine is cycled, the better the sharpening performance will be.*

NOVUS X2 TOP & FACE SHARPENER

Programming the NOVUS X-2

The NOVUS X2 comes pre-programmed to sharpen the majority of common tooth geometries. The X2 is also fully user programmable from the operator interface (HMI).

The grind programs are entered at the HMI and are made up of individual steps called "actions". Each action performs a set function that can be as simple as turning on the coolant pump, up to a complete grind cycle. Many actions also have optional parameters that can modify the way an action is performed, or how many times to perform the action before moving on to the next action.

The actions are entered onto a list. When the machine is running, the machine performs each acton on the list one at a time until it reaches the end of the list. Then it starts back at the top of the list. This continues until the tooth count entered on the main screen has been reached. For example, the following program grinds a flat top tooth would look like this:

1. 4 - Head Level
2. 5 - Normal Grind x1
3. 100 - End of program

Each step is numbered in the order it is done. Step 1 causes the head to bevel to the level position. If it is already level, this step has no effect

Step 2 is a complete grind cycle. The machine will index a tooth into place, clamp the tooth, and feed the head in to grind the tooth. After the tooth is ground, the tooth counter will be incremented. Since the optional parameter is x1, this step will only be done once before the program continues.

Step 3 indicates to the computer that the end of the complete grind program has been reached, and to start back at step 1. This will continue until the tooth count set on the HMI is reached.

Some of the actions allow the operator to input optional parameters. For instance, the action that bevels the head to the inside, Action 2 - Right Bevel, allows the operator to specify whether to use the corner settings, the chamfer settings, and/or a custom bevel angle setting as determined by the operator.

Some actions allow the operator to input the number of times to repeat. Others allow the operator to group together a series of actions to repeat, or at the users option to only occur once and not repeat until the next time the program is run.

Other actions allow the operator to coordinate with external machinery. This is useful in production environments when there is more than one machine producing a product at the same time. Among these actions are actions that look at external inputs and either pauses operation until an input is active, or pauses operation until and input goes inactive.

No Action - 0
This is ignored by the program.

P1: Not Used.
P2: Not Used.

Complete Index - 1

Initiates a complete index cycle. Will cause head to lift off and retract to feed reverse limit switch if not already there. If the index finger is already fully forward from a previous action, then the index will only retract to its full back position.

If there is positive number, and not zero in parameter 1, the current index distance is ignored and this value will be used for this one index.

P1: If not zero; distance to retract in inches.
P2: Not used.

Pivot Head Right - 2

Causes the head to pivot to the right (inside) position. Parameter 1 is used to indicate either a "chamfer" bevel, or "corner" bevel. Parameter 2 is used for custom bevelling angle. If a positive value other than zero is entered here, then the chamfer and corner angles are ignored and the head will bevel to this angle instead.

P1: 1 indicates chamfer bevel. 0 indicates corner bevel.
P2: Value other than zero overrides parameter 1 and bevels to the value entered here.

Pivot Head Left - 3

Causes the head to pivot to the left (outside) position. Parameter 1 is used to indicate either a "chamfer" bevel, or "corner" bevel. Parameter 2 is used for custom bevelling angle. If a positive value other than zero is entered here, then the chamfer and corner angles are ignored and the head will bevel to this angle instead.

P1: 1 indicates chamfer bevel. 0 indicates corner bevel.
P2: Value other than zero overrides parameter 1 and bevels to the value entered here.

Pivot Head To Level - 4

Causes the head to pivot to the level position.

P1: Not Used.
P2: Not Used.

Normal Grind Cycle With Index - 5

This initiates a complete grind cycle, including a normal index.
If parameter 1 is any positive value other than zero, then this will be the index distance for this grind cycle. Tooth counter advanced by one.

P1: If not zero; distance to retract in inches.
P2: Not used.

Normal Grind Cycle Without Index - 6

This initiates a complete grind cycle, excluding a normal index.
If parameter 1 is zero, then no tooth count is done. Any positive value other than zero will cause the tooth counter to advance by one.
P1: If zero don't count tooth, otherwise count tooth.
P2: Not used.

Count One Tooth - 7

Advances the tooth counter by one.
P1: Not used.
P2: Not used.

A negative number causes the grind to be higher, a positive number causes the grind to be lower.
P1: Not used.
P2: Not used.

Wheel-stop lift - 8
Directive to cause spindle to come to a stop upon reaching liftoff following grind.
Allows quicker wheel reverse on alternate type grinds.

P1: Not Used.
P2: Not Used.

Cancel wheel stop- 9
Cancels wheel stop directive. If wheel reversal is called for, wheel will not come to a stop untill head rear limit switch is tripped.

P1: Not Used.
P2: Not used.

High speed mode on - 10
Enables high speed grind mode. High speed grind mode enables simultaneous movement of the index and grind head. This mode is not compatible with all grinding programs, but can significantly speed up operation of the saws that are compatible.

P1: Not Used.
P2: Not used.

High speed mode off - 11
cancels high speed grind mode

P1: Not used.
P2: Not used.

Activate Height 1 - 20

Causes H1 to be used on subsequent grinds. Will stay active until "Clear Heights" (30) action is called. The H1 value is set on the main user screen (F1).

A negative number causes the grind to be higher, a positive number causes the grind to be lower.

P1: Not used.
P2: Not used.

Activate Height 2 - 21

Causes H2 to be used on subsequent grinds. Will stay active until "Clear Heights" (30) action is called. The H2 value is set on the main user screen (F1).

A negative number causes the grind to be higher, a positive number causes the grind to be lower.

P1: Not used.
P2: Not used.

Activate Height 3 - 22

Causes H3 to be used on subsequent grinds. Will stay active until "Clear Heights" (30) action is called. The H3 value is set on the main user screen (F1).

A negative number causes the grind to be higher, a positive number causes the grind to be lower.

P1: Not used.
P2: Not used.

Activate Custom Height - 28

Causes Custom Height to be used on subsequent grinds. Will stay active until "Clear Heights" (30) action is called. The custom height value is set in parameter 1.

A negative number causes the grind to be higher, a positive number causes the grind to be lower.

P1: Value to use for custom heights.
P2: Not used.

Clear Height 6 Accumulator - 29

Sets the height 6 accumulator to zero. This action does not deactive height 6, but only clears the accumulated value.

P1: Not used.
P2: Not used.

Clear Heights - 30

Deactivates all currently active heights. Note that this does not clear the height 6 accumulator.

P1: Not used.
P2: Not used.

Designate Index 1 To Be Primary Index - 31

Causes the index distance to be the value set as index 1.
This index distance will be used until another index is designated or
the "Restore Normal Index"(37) action is encuntered. When no indexes are specifically designated, the normal index value set at main screen (F1) will be used.

P1: Not used.
P2: Not used.

Designate Index 2 To Be Primary Index - 32

Causes the index distance to be the value set as index 2.
This index distance will be used until another index is designated or
the "Restore Normal Index"(37) action is encuntered. When no indexes are specifically designated, the normal index value set at main screen (F1) will be used.

P1: Not used.
P2: Not used.

Designate Index 3 To Be Primary Index - 33

Causes the index distance to be the value set as index 3.
This index distance will be used until another index is designated or
the "Restore Normal Index"(37) action is encuntered. When no indexes are specifically designated, the normal index value set at main screen (F1) will be used.

P1: Not used.
P2: Not used.

Designate Index 4 To Be Primary Index - 34

Causes the index distance to be the value set as index 4.
This index distance will be used until another index is designated or

Designate Index 3 To Be Primary Index - 33

Causes the index distance to be the value set as index 3.
This index distance will be used until another index is designated or
the "Restore Normal Index"(37) action is encuntered. When no indexes are specifically
designated, the normal index value set at main screen (F1) will be used.

P1: Not used.
P2: Not used.

Designate Index 4 To Be Primary Index - 34

Causes the index distance to be the value set as index 4.
This index distance will be used until another index is designated or
the "Restore Normal Index"(37) action is encuntered. When no indexes are specifically
designated, the normal index value set at main screen (F1) will be used.

P1: Not used.
P2: Not used.

Designate Index 5 To Be Primary Index - 35

Causes the index distance to be the value set as index 5.
This index distance will be used until another index is designated or
the "Restore Normal Index"(37) action is encuntered. When no indexes are specifically
designated, the normal index value set at main screen (F1) will be used.

P1: Not used.
P2: Not used.

Custom Index - 36

Causes the index distance to be the value set at the value set in parameter 1.
This index distance will be used until another index is designated or
the "Restore Normal Index"(37) action is encuntered. When no indexes are specifically
designated, the normal index value set at main screen (F1) will be used.

P1: Distance in inches to retract the index when an index is called for.
P2: Not used.

Restore Normal Index Distance - 37

Restores to index distance to the normal index distance set on the main screen (F1).

P1: Not used.
P2: Not used.

Turn On Drag Pressure - 40

Energizes drag pressure valve.

P1: Not used.
P2: Not used.

Turn On Full Clamp Pressure - 41

Energizes full clamp pressure valve.

P1: Not used.
P2: Not used.

Turn Off Drag Pressure - 42

De-energizes drag pressure valve.

P1: Not used.
P2: Not used.

Turn Off Full Clamp Pressure - 43

De-energizes full clamp pressure valve.

P1: Not used.
P2: Not used.

Head Out, Wait For Head Out Limit Switch - 44

Moves the head to the lift off position, then retracts the head until the head out limit switch is tripped.

P1: Not used.
P2: Not used.

Head In, Wait For Head In Limit Switch - 45

Moves the head to the normal grind position, then extends the head until the head in limit switch is tripped.

P1: Not used.
P2: Not used.

Move Head To Lift Off Position - 46

Move Head To Lift Off Position - 46

Moves the head to the normal lift off position.

P1: Not used.
P2: Not used.

Move Head To Normal Grind Position - 47

Moves the head to the normal lift off position.

P1: Not used.
P2: Not used.

Move Head To Home Position - 48

Moves the head to the home position. If the machine is in facing mode, the head will retract to the feed reverse limit switch prior to moving to the home position.

P1: Not used.
P2: Not used.

Spindle Motor Direction 1 - 49

Turns spindle motor on in direction 1.

P1: Not used.
P2: Not used.

Spindle Motor Direction 2 - 50

Turns spindle motor on in direction 2.

P1: Not used.
P2: Not used.

Spindle Motor Off - 51

Turns spindle motor off.

P1: Not used.
P2: Not used.

Move Head Out - 52

Moves the head to the lift off position, then retracts the head. This action does not wait for the head out limit switch before continuing.

P1: Not used.
P2: Not used.

Move Head In - 53

Moves the head to grind postion, then extends the head. This action does not wait for the head in limit switch before continuing.

P1: Not used.
P2: Not used.

Green Light On - 54

Turns on the green light in light stack. If parameter 1 is zero then light will be steady. If parameter 1 is an even number greater than zero then the light will blink at the rate, in seconds, of the parameter. For example a value of 1.5 in parameter 1 would cause the light to go on for 1.5 seconds, then off for 1.5 seconds, then repeat.

P1: Blink interval in seconds. Zero indicates steady light.
P2: Not used.

Green Light Off - 55

Turns off the green light in light stack.

P1: Not used.
P2: Not used.

Yellow Light On - 58

Turns on the yellow light in light stack. If parameter 1 is zero then light will be steady. If parameter 1 is an even number greater than zero then the light will blink at the rate, in seconds, of the parameter. For example a value of 1.5 in parameter 1 would cause the light to go on for 1.5 seconds, then off for 1.5 seconds, then repeat.

P1: Blink interval in seconds. Zero indicates steady light.
P2: Not used.

Yellow Light Off - 59

Turns off the yellow light in light stack.

P1: Not used.
P2: Not used.

Red Light On - 60

Turns on the red light in light stack. If parameter 1 is zero then light will be steady. If parameter 1 is an even number greater than zero then the light will blink at the rate, in seconds, of the parameter. For example a value of 1.5 in parameter 1 would cause the light to go on for 1.5 seconds, then off for 1.5 seconds, then repeat.

P1: Blink interval in seconds. Zero indicates steady light.
P2: Not used.

Red Light Off - 61

Turns off the red light in light stack.

P1: Not used.
P2: Not used.

Index Forward - 62

Extends the index. If parameter 1 is not zero, machine will not continue until index is fully forward. With parameter at zero, machine continues without checking for index full forward condition.

P1: Set at zero to send index forward without checking, non zero waits for index fully forward.
P2: Not used.

Index Reverse - 63

Retracts the index. If parameter 1 is not zero, machine will not continue until index is full back. With parameter at zero, machine continues without checking for index back. If parameter 2 is a positive number greater than zero, machine will retract index until it has reached that position (in inches).

P1: Set at zero to send index forward without checking, non zero waits for index fully forward.
P2: Positive number greater than zero is index distance.

Wait For Input - 64

Program will pause until input specified in parameter 1 is active. Program will resume when input turns on. If input is not available, program will not pause.

P1: Input number to wait for. See table below.
P2: Not used.

Pause On Input - 65

Program will pause until input specified in parameter 1 is not active. Program will resume when input turns off. If input is not available, program will not pause.

P1: Input number to pause on. See table below.
P2: Not used.

Pause On Input Off - 66

Disables all pause on input actions previousely activated

P1: Not used.
P2: Not used.

Turn Output On - 67

Will turn on the output specified in parameter 1.

P1: Output number to turn on. See table below.
P2: Not used.

Turn Output Off - 68

Will turn off the output specified in parameter 1.

P1: Output number to turn off. See table below.
P2: Not used.

Delay - 69

Will pause machine operation for the duration of the value in parameter 1. Time is in seconds.

P1: Time to delay in seconds.
P2: Not used.

Repeat Actions - 70

Will cause machine to repeat all previous action up to the current top of program for the number of times specified in parameter 1. When the machine has repeated those actions that number of times, the top of the program will be reset to the next action immediately following the repeat actions command.

P1: Number of times to repeat previous actions.
P2: Not used.

One Shot - 71

Will reset the top of program to the action immediately following the one shot action.

P1: Not used.
P2: Not used.

NOVUS X2 TOP & FACE SHARPENER

GRIND PROGRAMS QUICK REFERENCE

PROGRAM	DESCRIPTION	AUTOMATIC SEQUENCE
01	FLAT	
02	LEFT	
03	RIGHT	
04	ALTERNATE	
05	CHAMFER ONLY	
06	POINTED	
07	HI-LOW	
08	TRIPLE CHIP	
09	TRIPLE CHIP CORNERS	
10	POINT & FLAT	
11	CALIF. TRIPLE CHIP / RIGHT	
12	CALIF. TRIPLE CHIP / LEFT	
	ON COMBO SAWS THE FIRST TOOTH GROUND IS THE RAKER.	
13	4-1 COMBO / LEFT	
14	4-1 " / RIGHT	
15	4-1 " / BROKEN	
16	5-1COMBO / BROKEN	
17	6-1 " / LEFT	
18	6-1 " / RIGHT	
19	6-1COMBO / BROKEN	
20	7-1 " / "	
21	8-1 " / LEFT	
22	8-1COMBO / RIGHT	
23	8-1 " / BROKEN	
24	9-1COMBO / BROKEN	
25	10-1COMBO / LEFT	

NOVUS X2 TOP & FACE SHARPENER

PROGRAMS	DESCRIPTION	AUTOMATIC SEQUENCE
26	10-1 " / RIGHT	
27	10-1 " / BROKEN	
28	4+1 LEFT	ALL PITCH EQUAL
29	4+1 RIGHT	ALL PITCH EQUAL

PATTERNS

30 to 39 First tooth ground is the only right.

30	ALL LEFT
31	1L - 1R
32	2L - 1R
33	3L - 1R
34	4L - 1R
35	5L - 1R
36	6L - 1R
37	7L - 1R
38	8L - 1R
39	9L - 1R

40 to 49 First tooth ground is the last right.

40	ALL RIGHTS
41	1R - 1L
42	2R - 1L
43	3R - 1L
44	4R - 1L
45	5R - 1L
46	6R - 1L
47	7R - 1L
48	8R - 1L
49	9R - 1L

50 to 52 Starts on only right.

50	10L - 1R	
51	4L - 1 Raker	Dado Saw Left - Starts on Raker
52	5L - 1 Raker	Dado Saw Left - Starts on Raker
53	6L - 1 Raker	Dado Saw Left - Starts on Raker
54	7L - 1 Raker	Dado Saw Left - Starts on Raker
55	8L - 1 Raker	Dado Saw Left - Starts on Raker
56	9L - 1 Raker	Dado Saw Left - Starts on Raker
57	10L - 1 Raker	Dado Saw Left - Starts on Raker
58	2 - 1 Combo / Left	
59	2 - 1 Combo / Right	

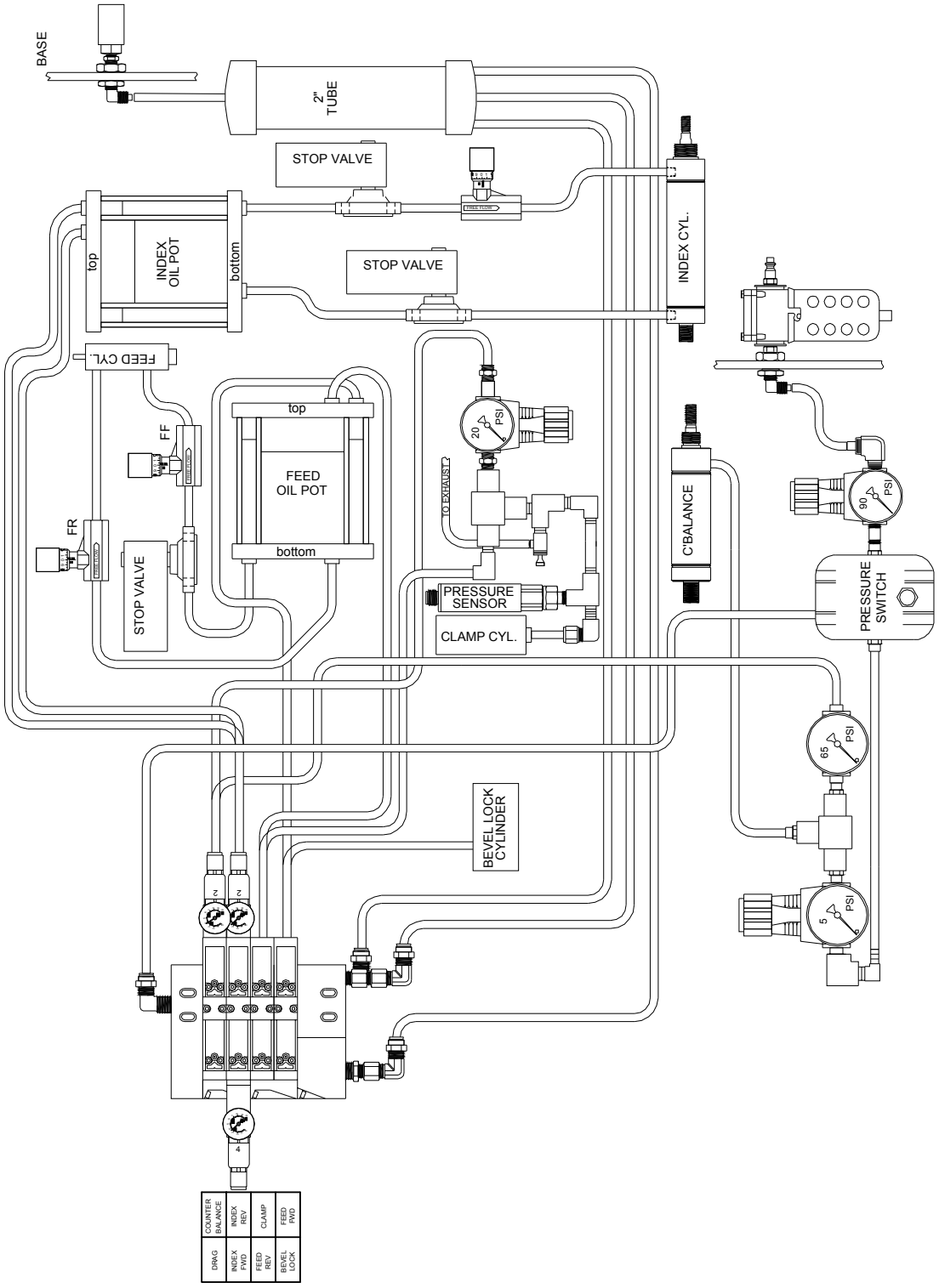
NOVUS X2 TOP & FACE SHARPENER

60 to 62 starts on last right.

60	10R - 1L	
61	4R - 1Raker	Dado Saw right - Starts on Raker
62	5R - 1Raker	Dado Saw right - Starts on Raker
63	6R - 1Raker	Dado Saw right - Starts on Raker
64	7R - 1Raker	Dado Saw right - Starts on Raker
65	8R - 1Raker	Dado Saw right - Starts on Raker
66	9R - 1Raker	Dado Saw right - Starts on Raker
67	10R - 1Raker	Dado Saw right - Starts on Raker
68	High Speed. Alternates tops all right then all left.	
69	High Speed. Alternate tops same as 68 for high ATB 25° and higher.	
70	Extra wide program #8.	
71	Extra wide program #9.	
72	Extra wide program #11.	
73	Extra wide program #12.	
74	Triple Chip with extra flat.	
75	Point with 2 flats.	
76	10L - 1 Raker	
77	10R - 1 Raker	
78	High Speed. Flat tops with adjustable lift off.	
79	High Speed. Flat tops fixed lift off.	
80	High Speed. Hi-low.	
81	3 Rights - 1 Flat	
82	Double Pass. High Speed Flat.	
83	Double Pass. High Speed Alt.	
84	Double Pass. High Speed High Low.	
85	Double Pass. High Speed Triple Chip.	
86	7 Lefts - 1 Right	
87	7 Rights - 1 Left	
88	High Speed Triple Chip - 3 revolutions.	
89	High Speed Triple Chip with Corner Breaks.	
90	Custom - Flat (01)	
91	Custom High Speed Flat (78)	
92	Custom Alternate (04)	
93	Custom High Speed Alt. (68)	
94	Custom T.C. (08)	
95	Custom High Speed T.C. (95)	
96	4-1 Combo broken with equal tooth pitch.	
97	3L - 1 Raker	
98	6L - 1 Raker	
99	6R - 1 Raker	

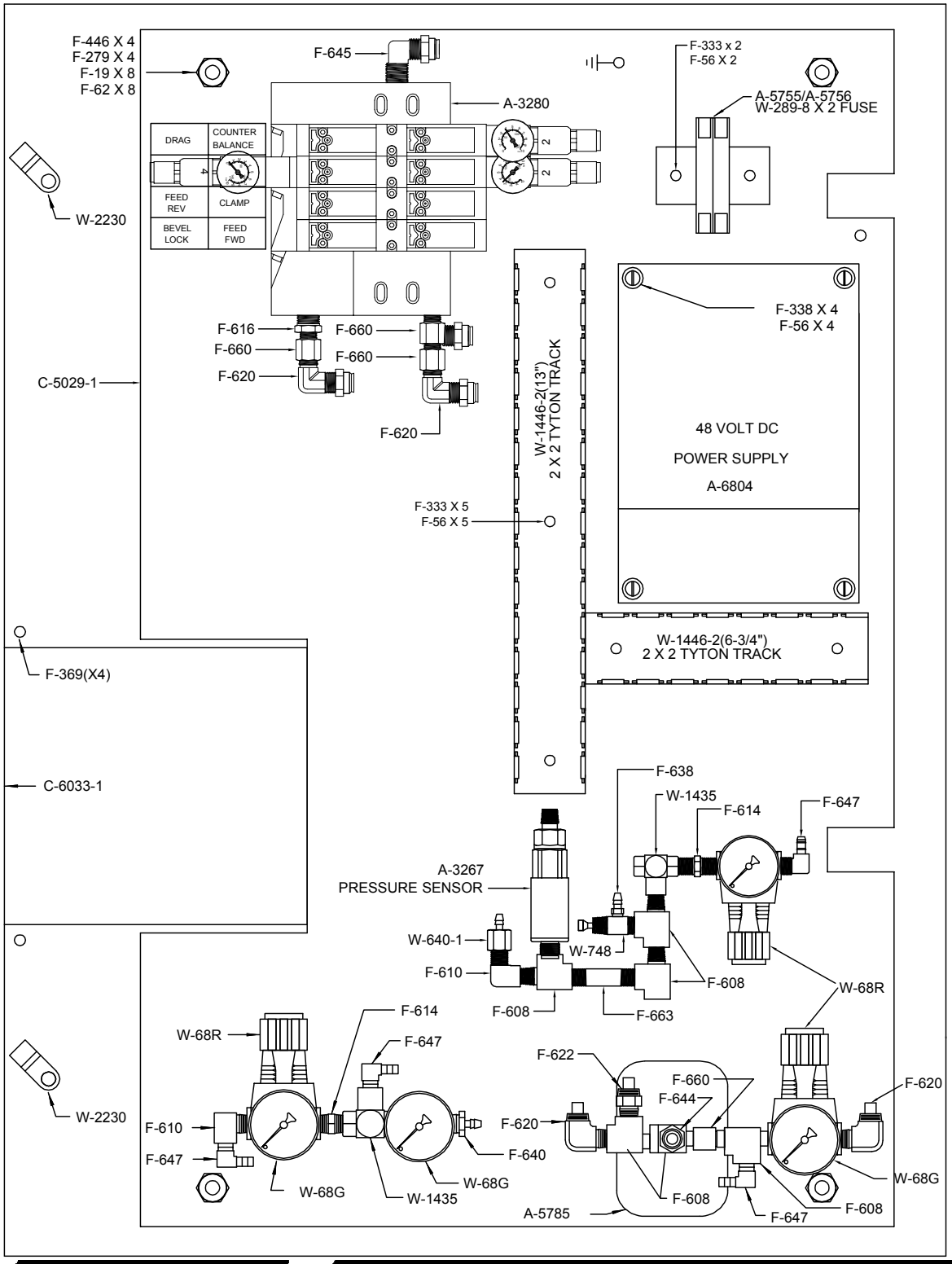
NOVUS X2 TOP & FACE SHARPENER

AIR SCHEMATIC



NOVUS X2 TOP & FACE SHARPENER

UPPER DOOR PANEL LAYOUT

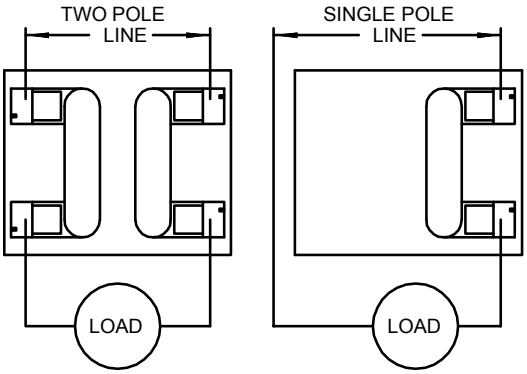


NOVUS X2 TOP & FACE SHARPENER

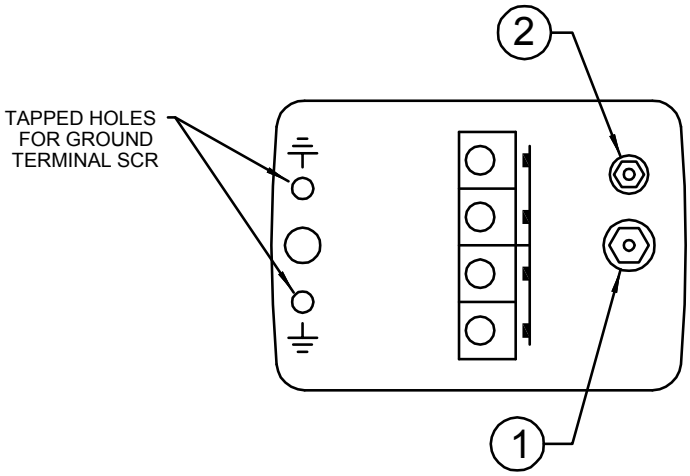
ADJUSTING AIR PRESSURE SWITCH (A-5785)

When air pressure to the machine falls below normal limits (80 P.S.I.), the machine cycle will lock up. The air pressure switch may be adjusted to compensate for low air pressure only if the maximum pressure does NOT exceed 80 P.S.I.. See upper door panel layout or call Wright Machine Tool if you have any questions or are in need for further details.

WIRING DIAGRAM



ADJUSTMENTS



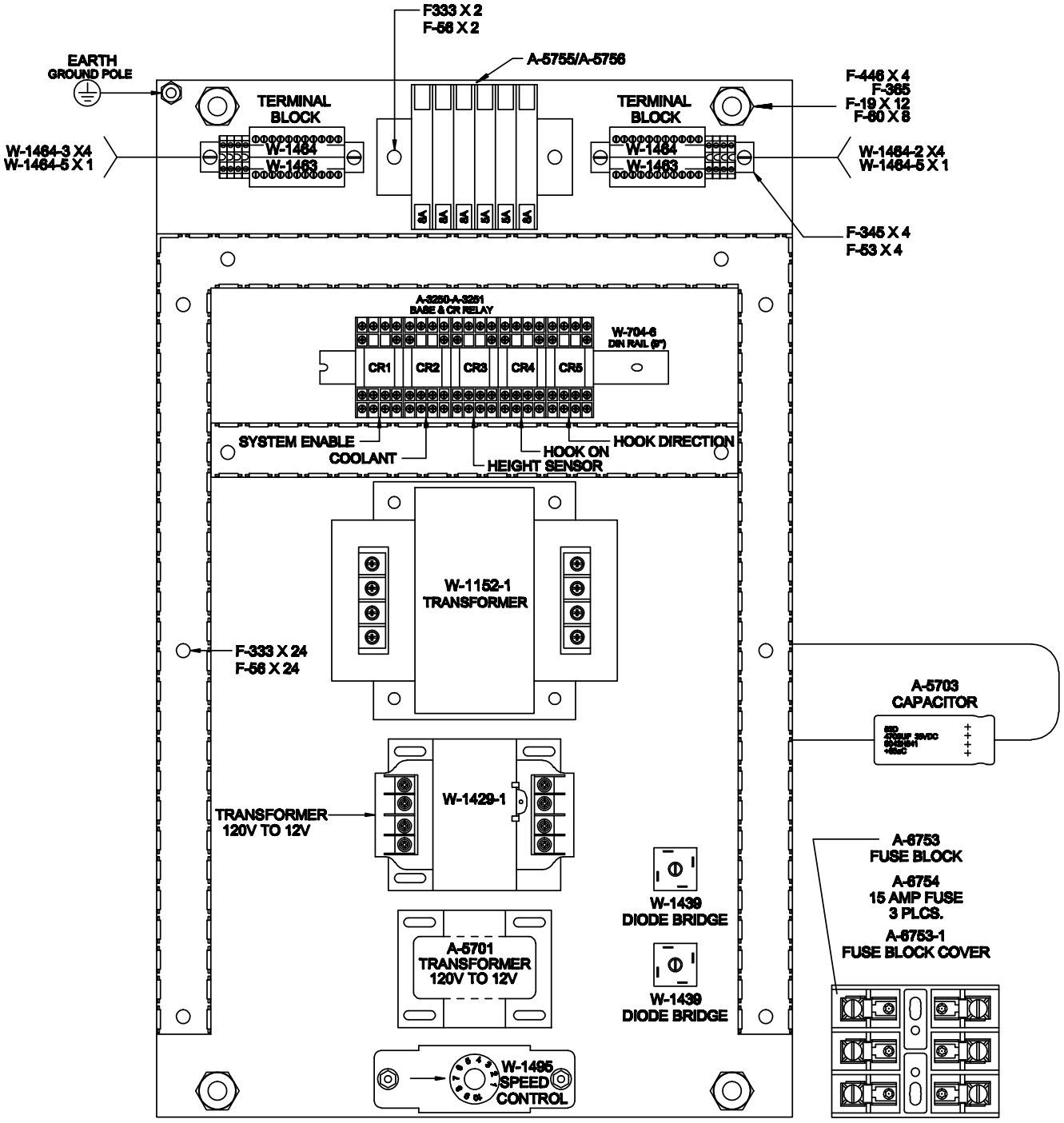
ADJUST IN PROPER SEQUENCE

1. Turn nut 1 down to raise low operating point.
2. Turn nut 2 down to raise high operating point.

CAUTION: TO AVOID DAMAGE DO NOT EXCEED THE MAXIMUM ALLOWABLE PRESSURE. CHECK SWITCH OPERATION AFTER RESETTING.

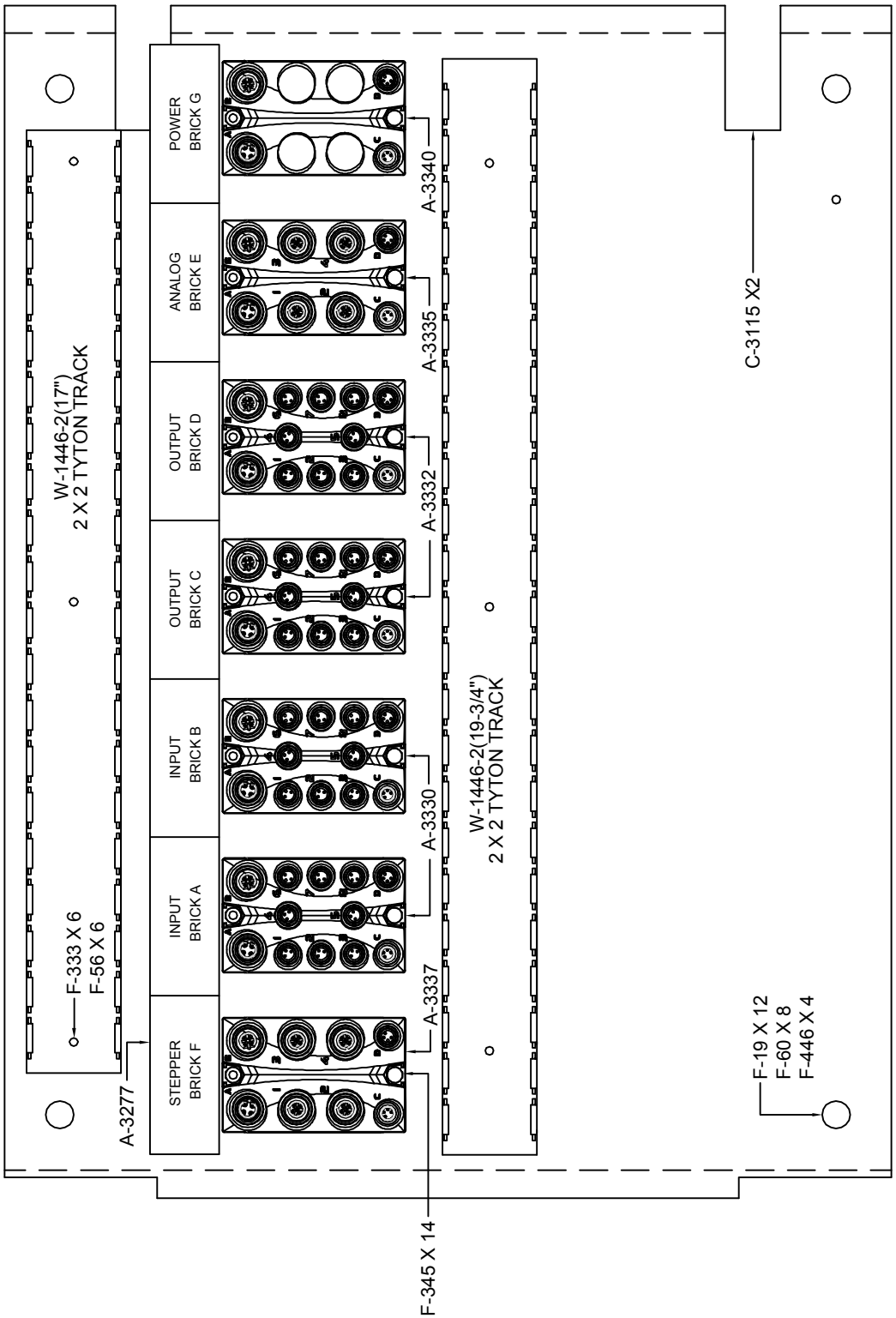
NOVUS X2 TOP & FACE SHARPENER

POWER PANEL LAYOUT



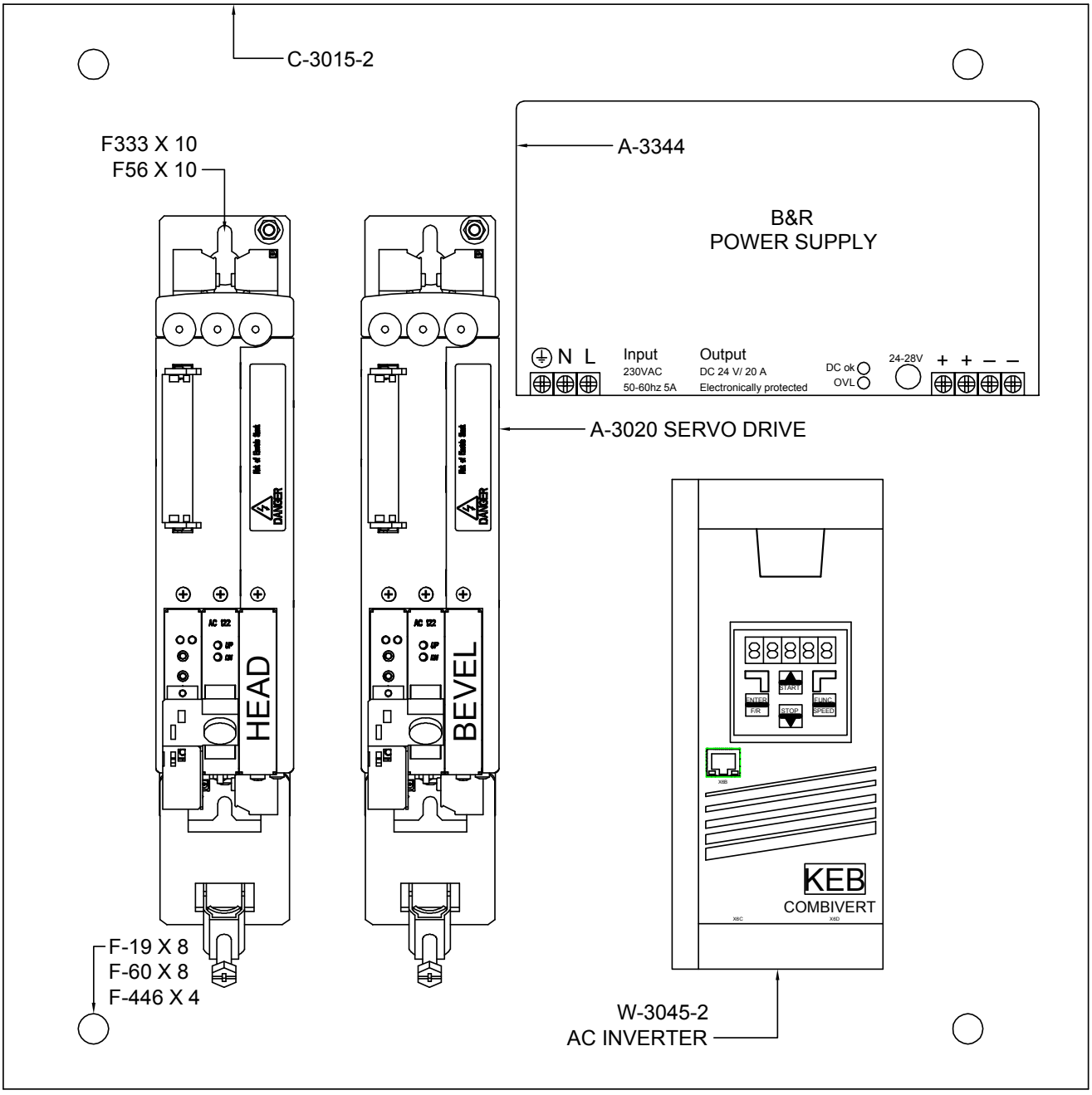
NOVUS X2 TOP & FACE SHARPENER

LOWER DOOR PANEL LAYOUT



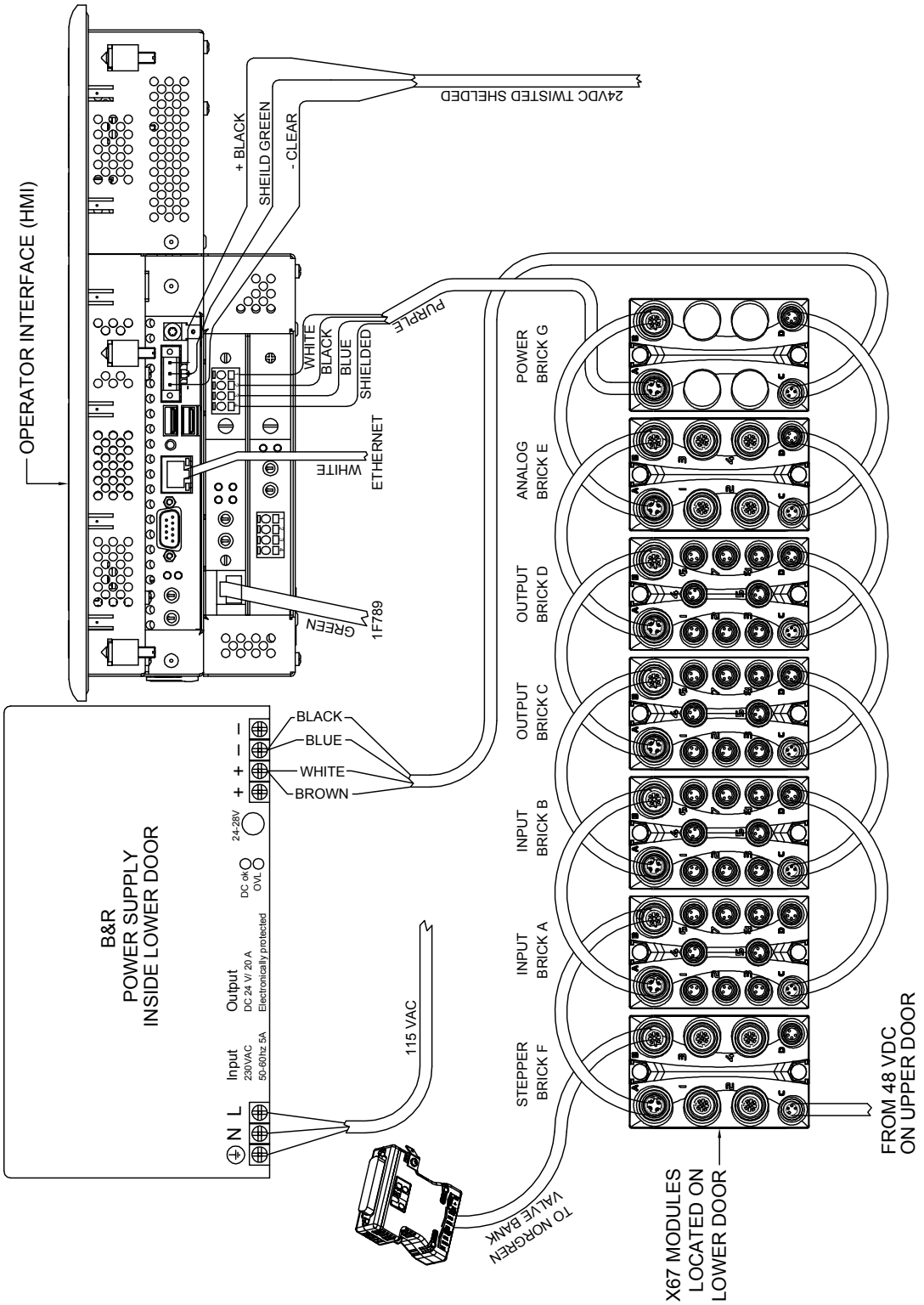
NOVUS X2 TOP & FACE SHARPENER

INSIDE LOWER DOOR



NOVUS X2 TOP & FACE SHARPENER

X67 MODULES



NOVUS X2 TOP & FACE SHARPENER

X67 MODULES

INPUT BRICK A
A-1= START
A-2= STOP
A-3= AUTO
A-4= OUT
A-5= INDEX
A-6= IN
A-7= HEAD UP
A-8= HEAD DOWN

INPUT BRICK B
B-1= LS1 HEAD OUT
B-2= LS2 HEAD IN
B-3= CLOSED IN FACE
B-4= LOW AIR PRESSURE
B-5= HOOK + UP
B-6= HOOK - DOWN
B-7=
B-8=

OUTPUT BRICK C
C-1= INDEX STOP #1
C-2= INDEX STOP #2
C-3= CR1 COIL SYSTEM ENABLE
C-4= CR2 COIL COOLANT PUMP
C-5= FEED STOP
C-6= HOOK ON
C-7= HOOK DIRECTION
C-8= GREEN LIGHT START

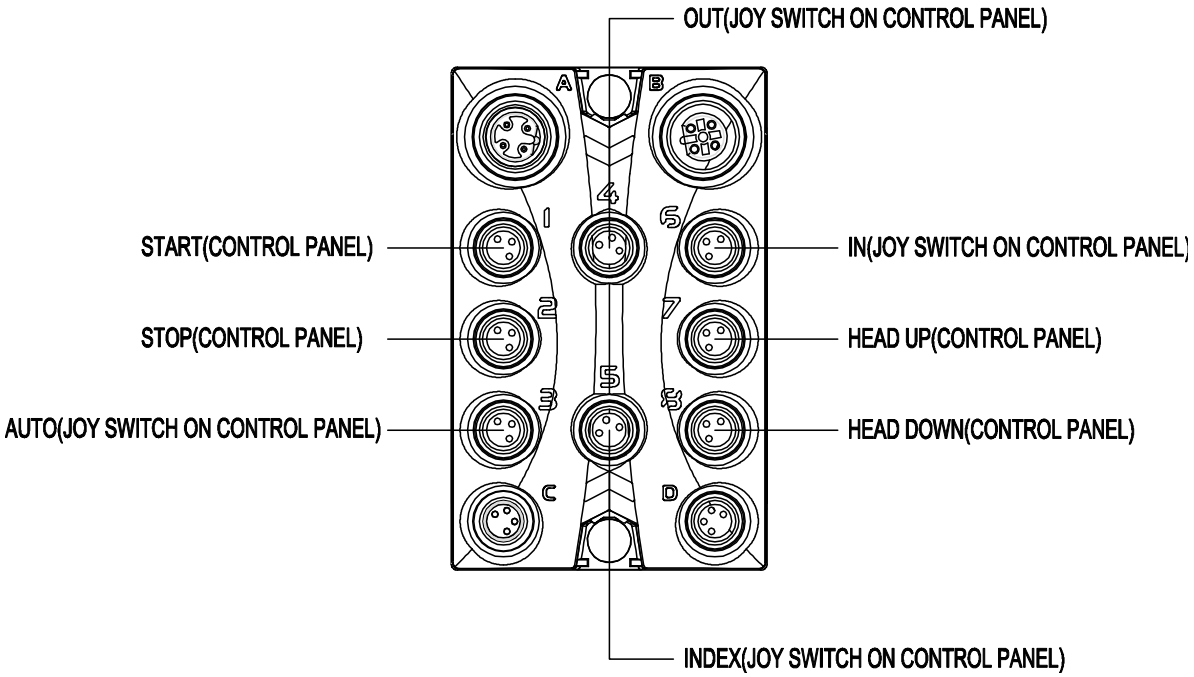
OUTPUT BRICK D
D-1= LIGHT #1 RED
D-2= LIGHT #2 GREEN
D-3= LIGHT #3 AMBER
D-4= INVERTER ENABLE
D-5= HOOK LOCK
D-6=
D-7=
D-8=

BRICK E ANALOG
E-1= ULTRASONIC SENSOR
E-2= PRESSURE SENSOR
BRICK G POWER

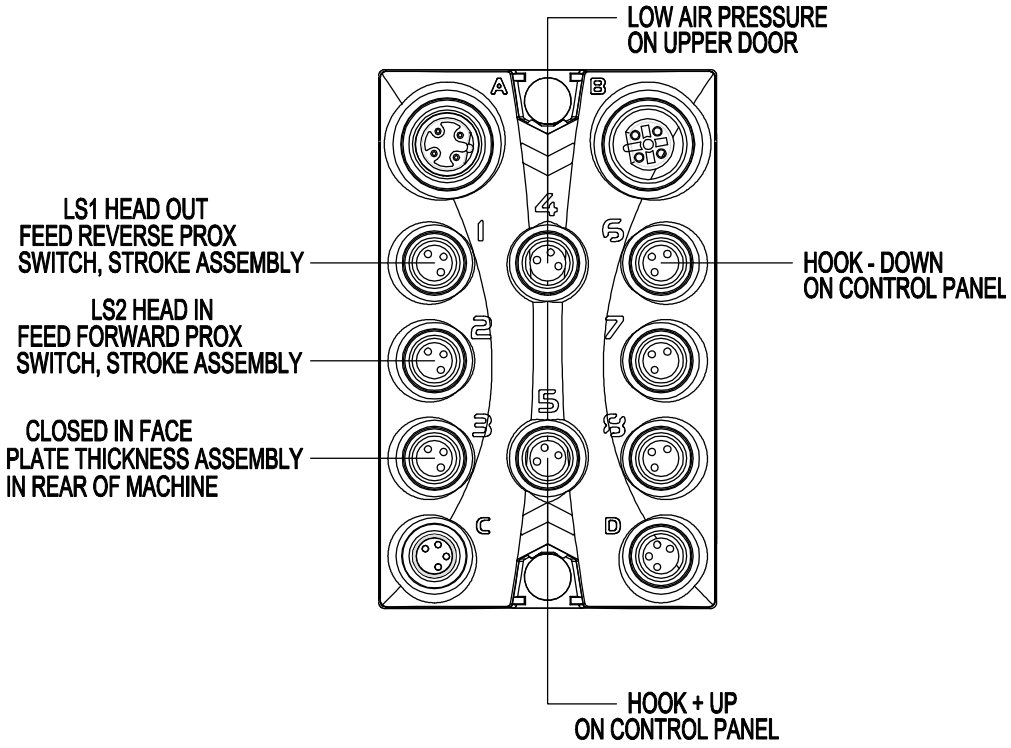
BRICK F 48VDC PLATE ATEPPER
F-1= PLATE STEPPER MOTOR
F-2=
F-3= PLATE HOME/PLATE INDEX
F-4= PLATE ENCODER

NOVUS X2 TOP & FACE SHARPENER

INPUT BRICK A

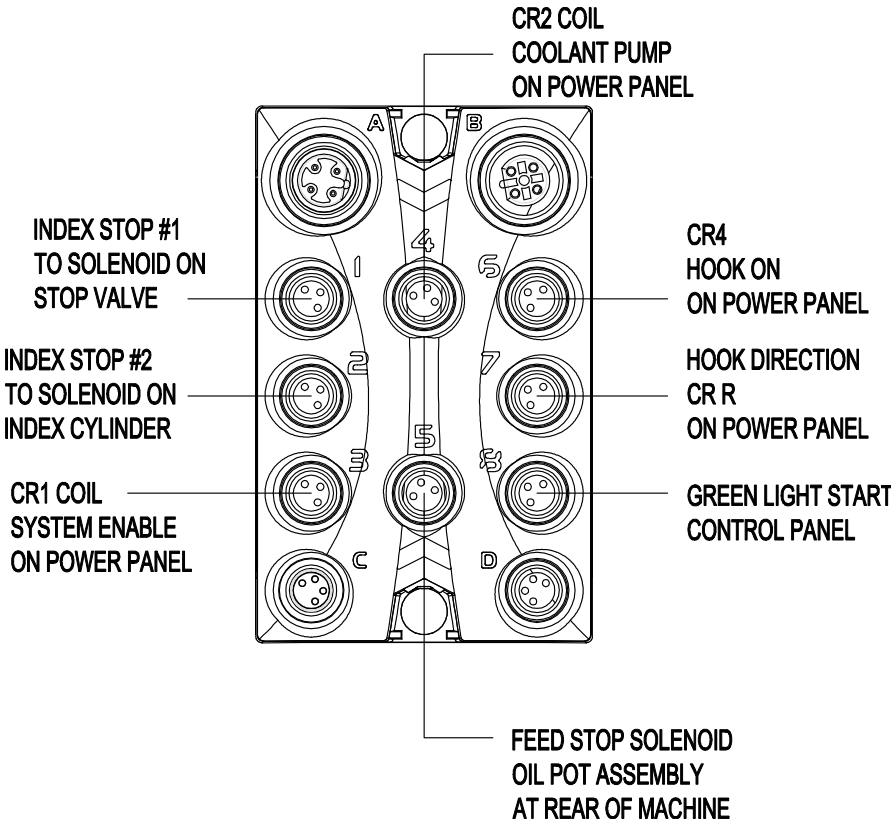


INPUT BRICK B

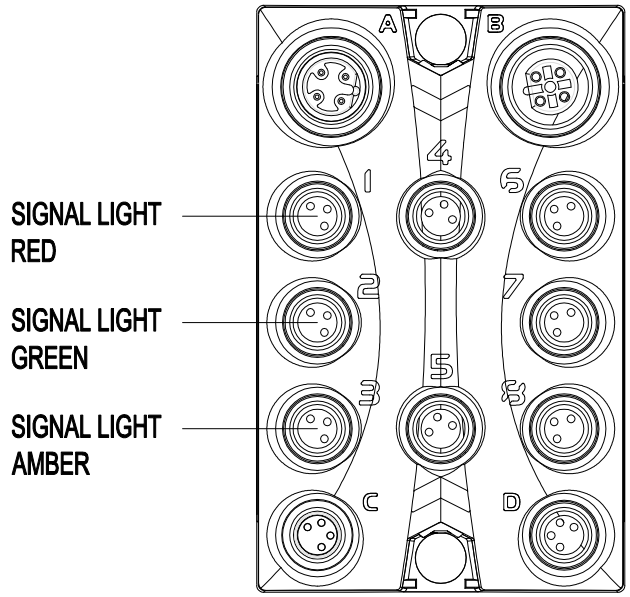


NOVUS X2 TOP & FACE SHARPENER

OUTPUT BRICK C

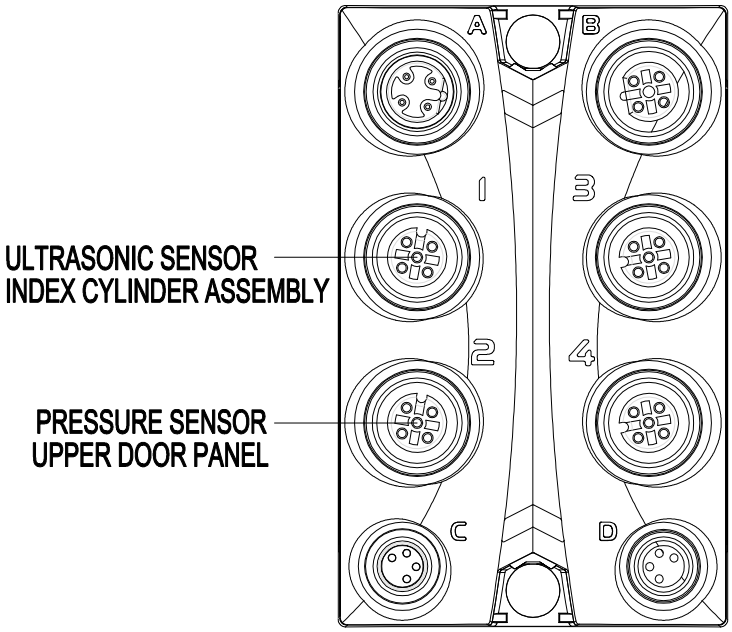


OUTPUT BRICK D

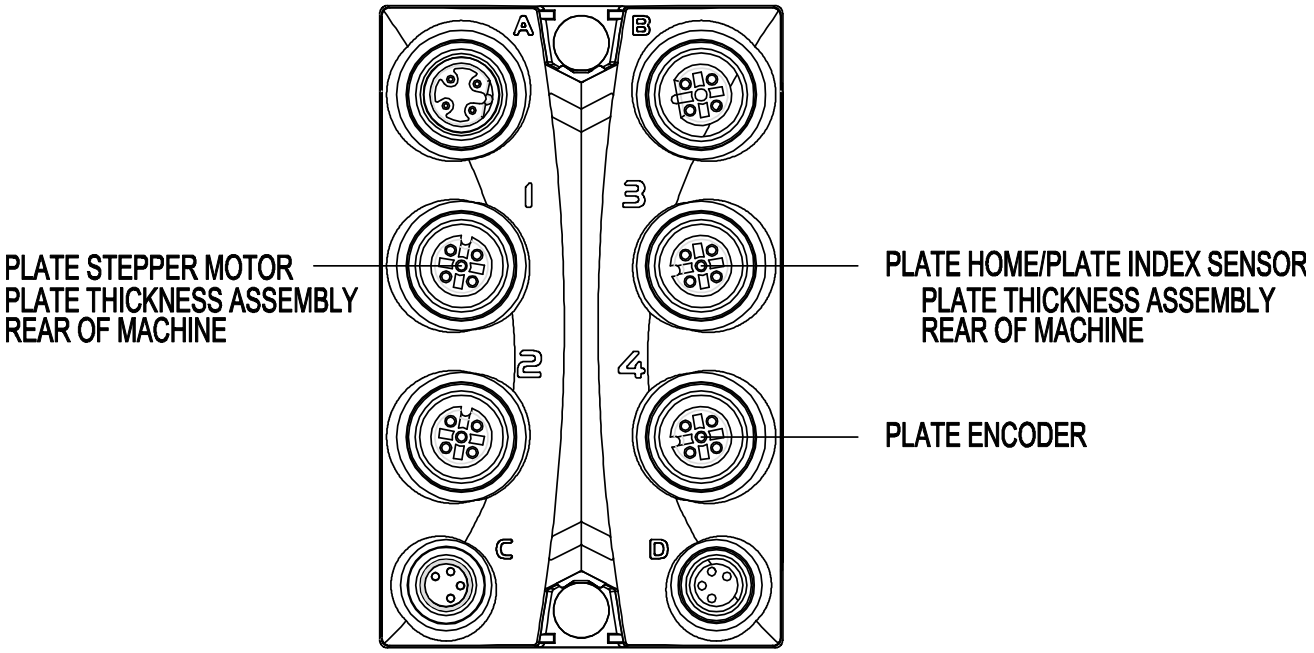


NOVUS X2 TOP & FACE SHARPENER

ANALOG BRICK E

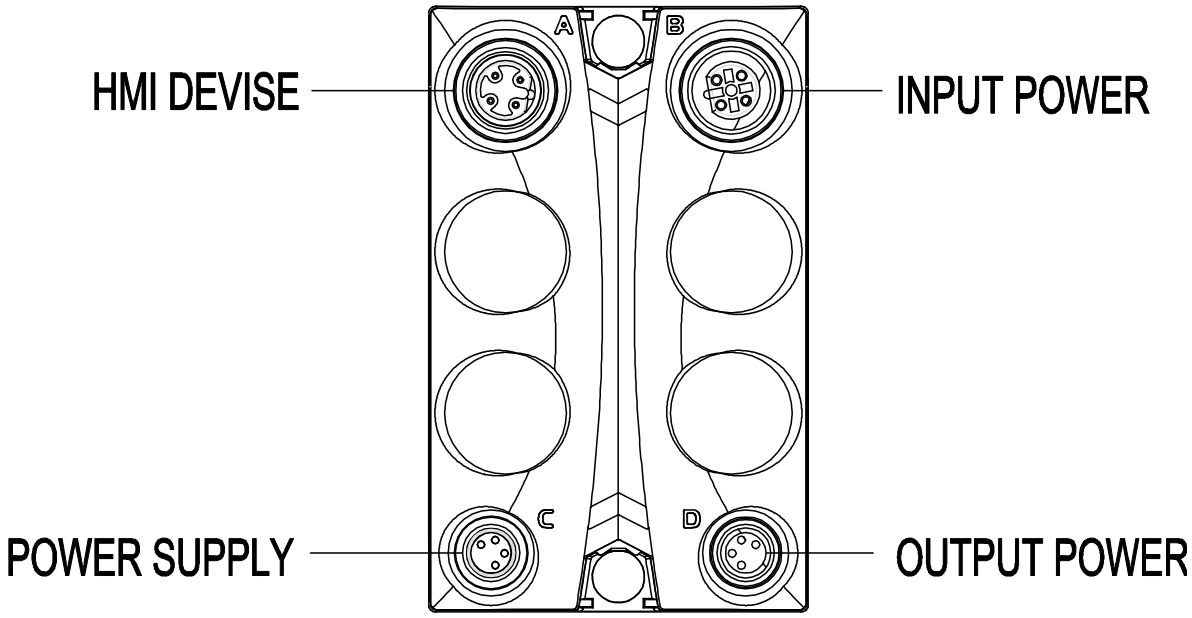


48 VOLT DC BRICK F



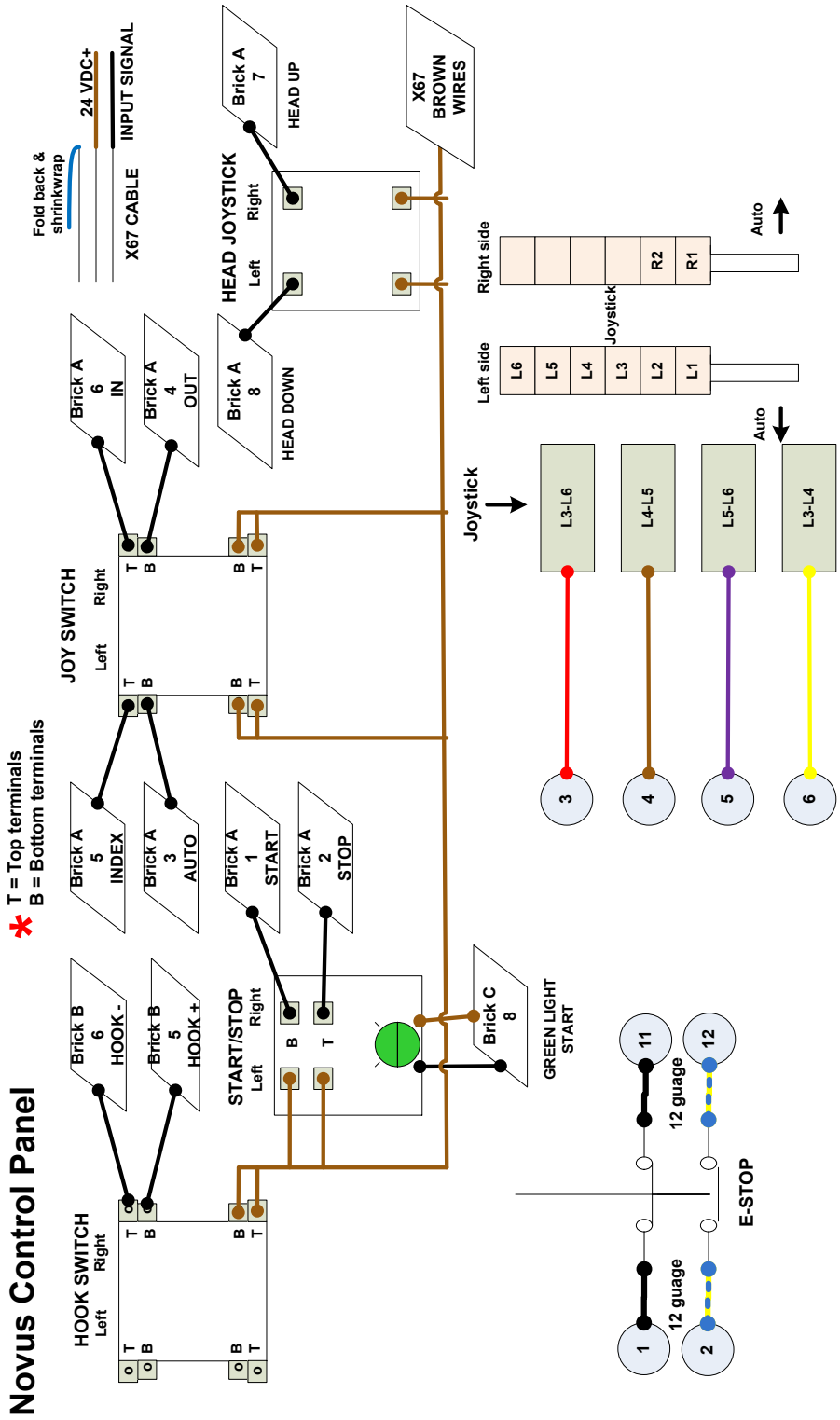
NOVUS X2 TOP & FACE SHARPENER

POWER BRICK G



NOVUS X2 TOP & FACE SHARPENER

ELECTRICAL SCHEMATICS

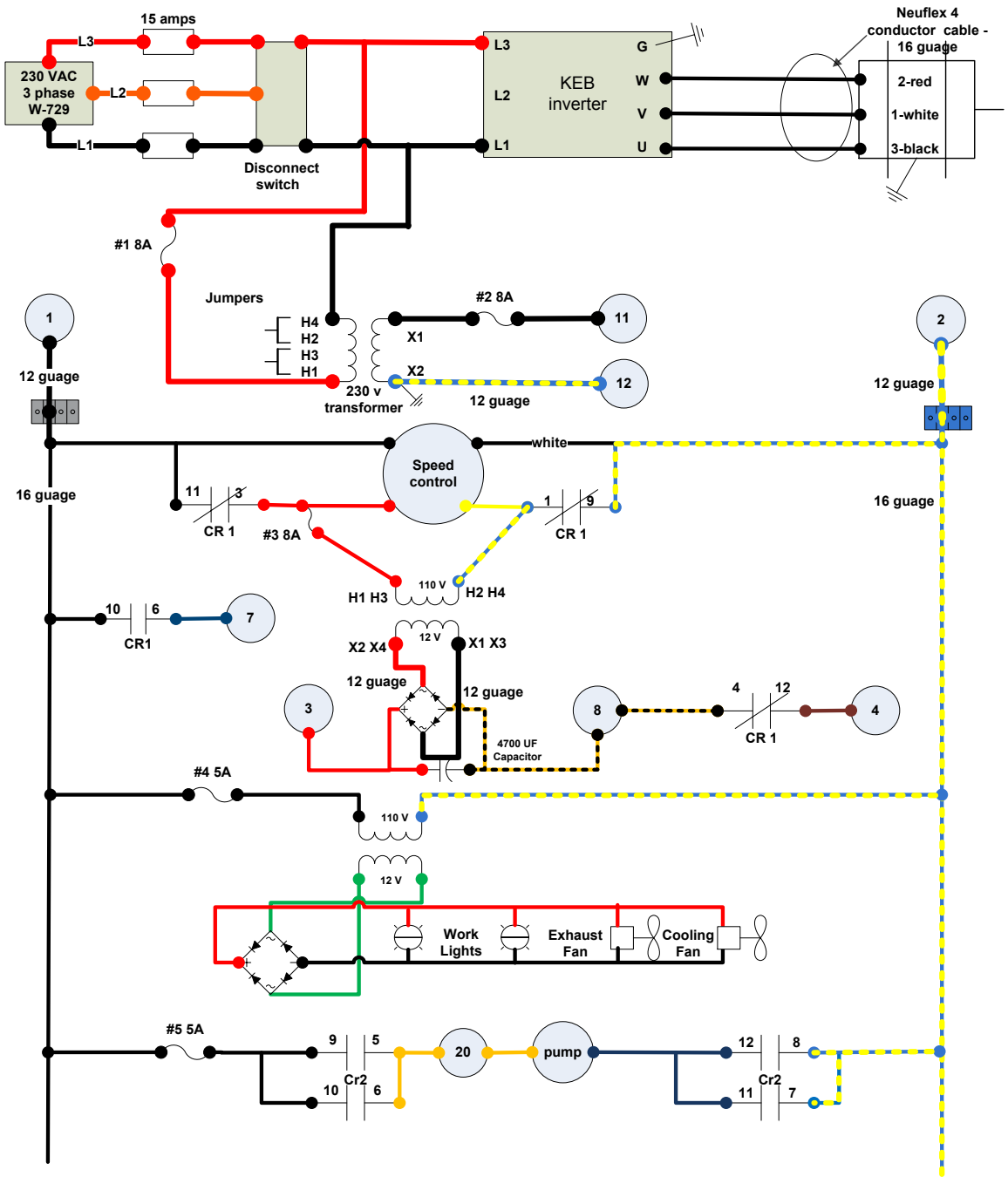


NOVUS X2 TOP & FACE SHARPENER

ELECTRICAL SCHEMATICS CONT.

Changed to 1A 7/9/2008

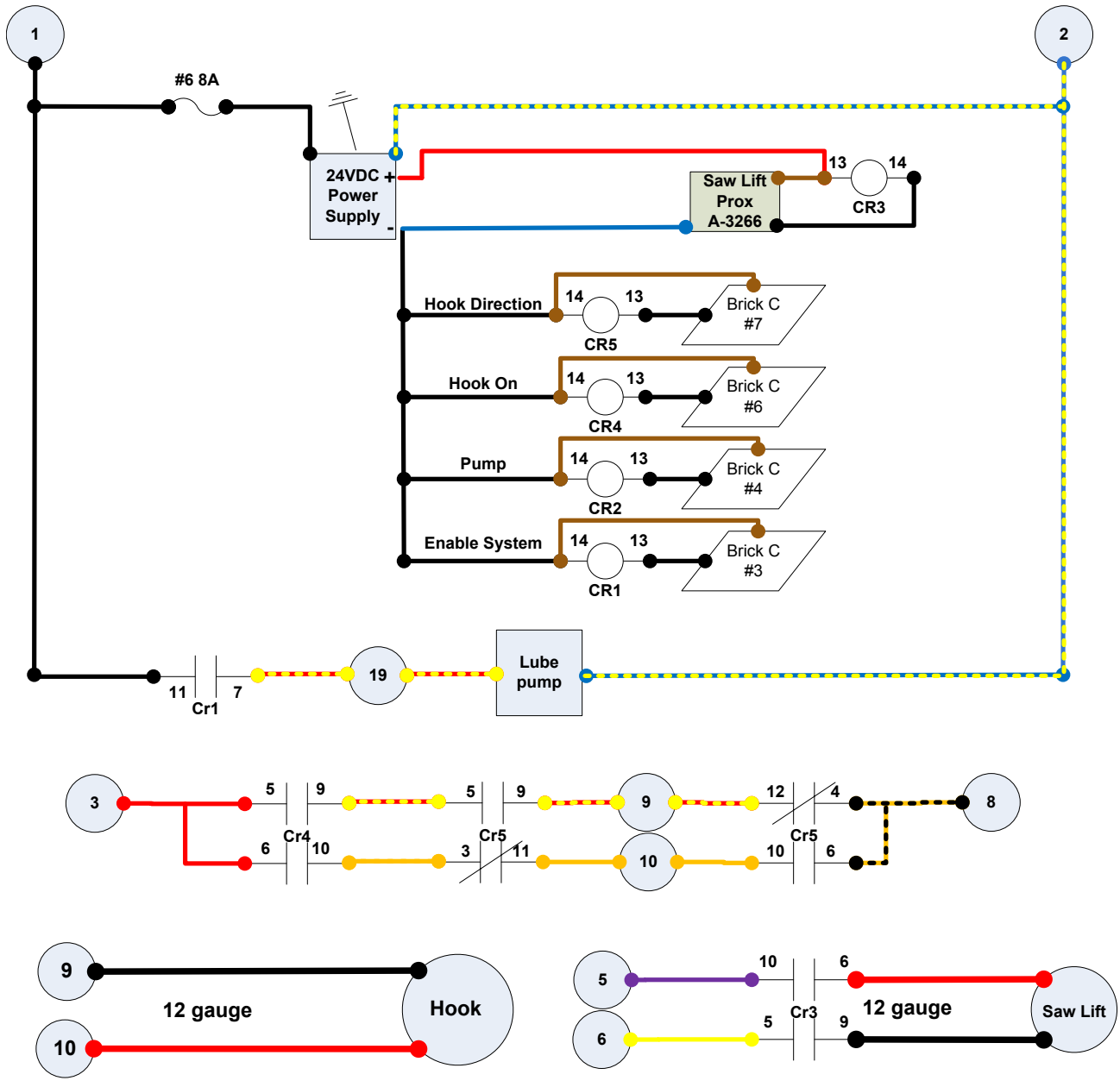
Novus X2 (Power Panel)



NOVUS X2 TOP & FACE SHARPENER

ELECTRICAL SCHEMATICS CONT.

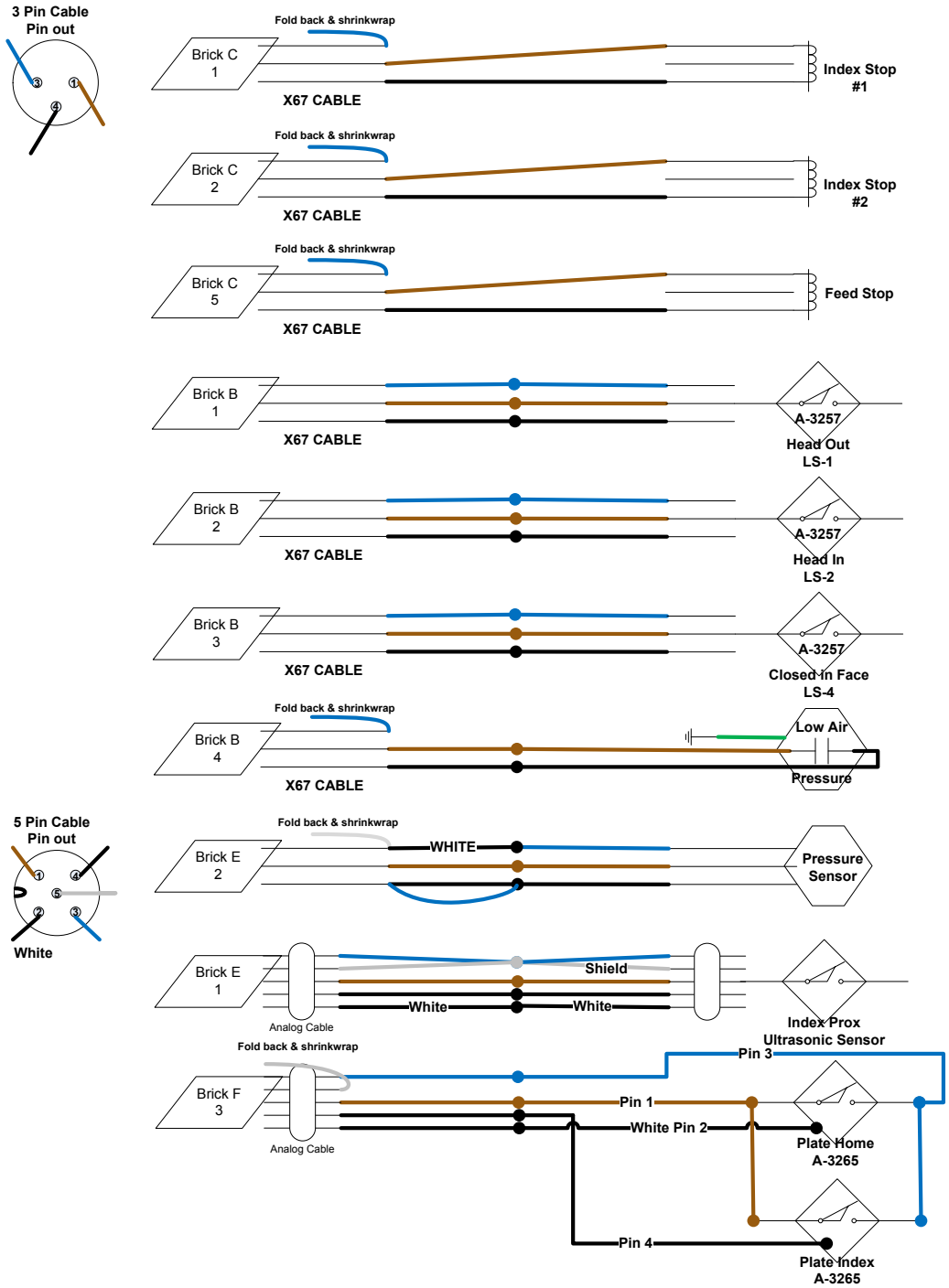
Novus X2 Power Panel (2)



NOVUS X2 TOP & FACE SHARPENER

ELECTRICAL SCHEMATICS CONT.

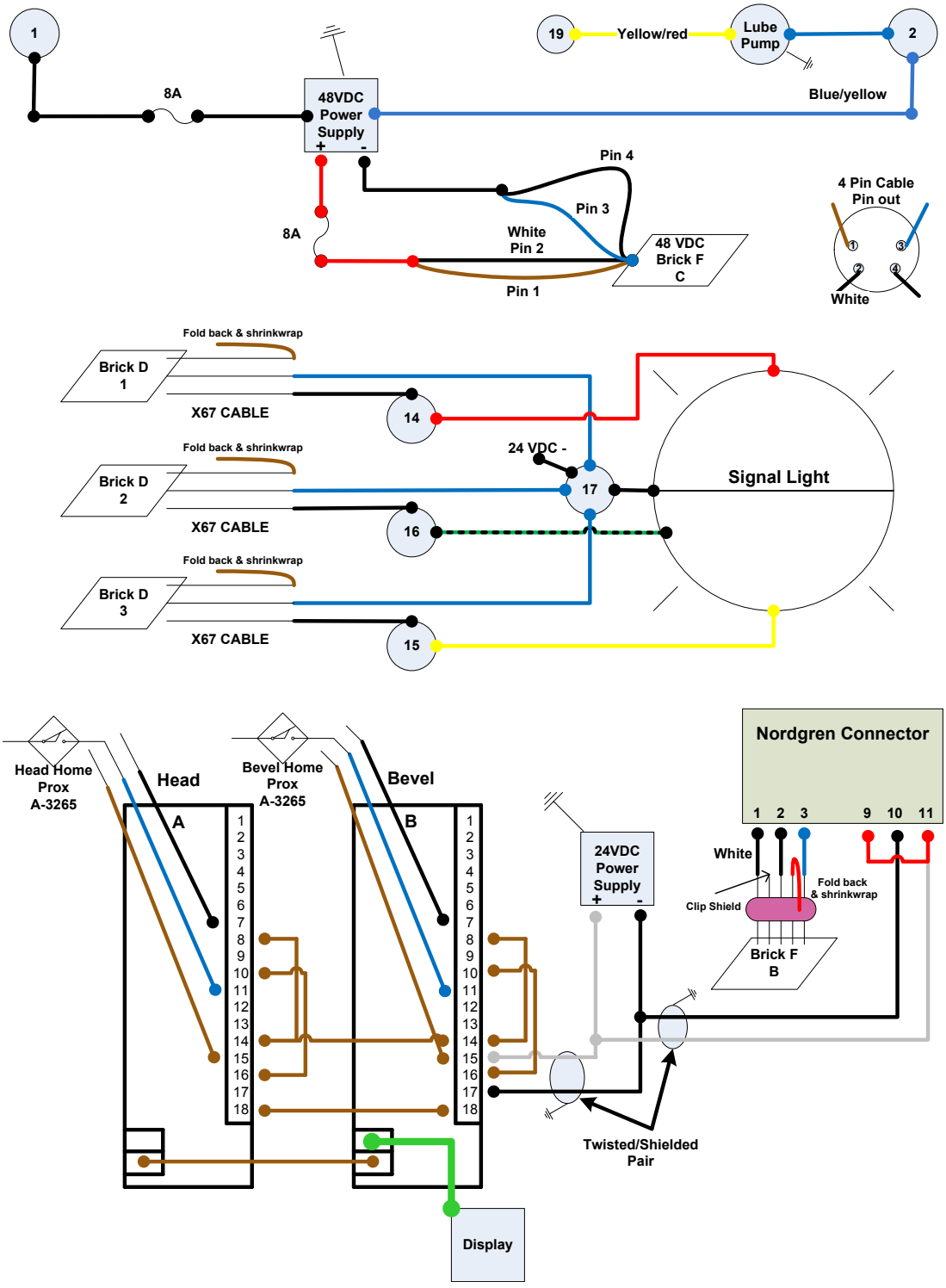
Novus Component Wiring



NOVUS X2 TOP & FACE SHARPENER

ELECTRICAL SCHEMATICS CONT.

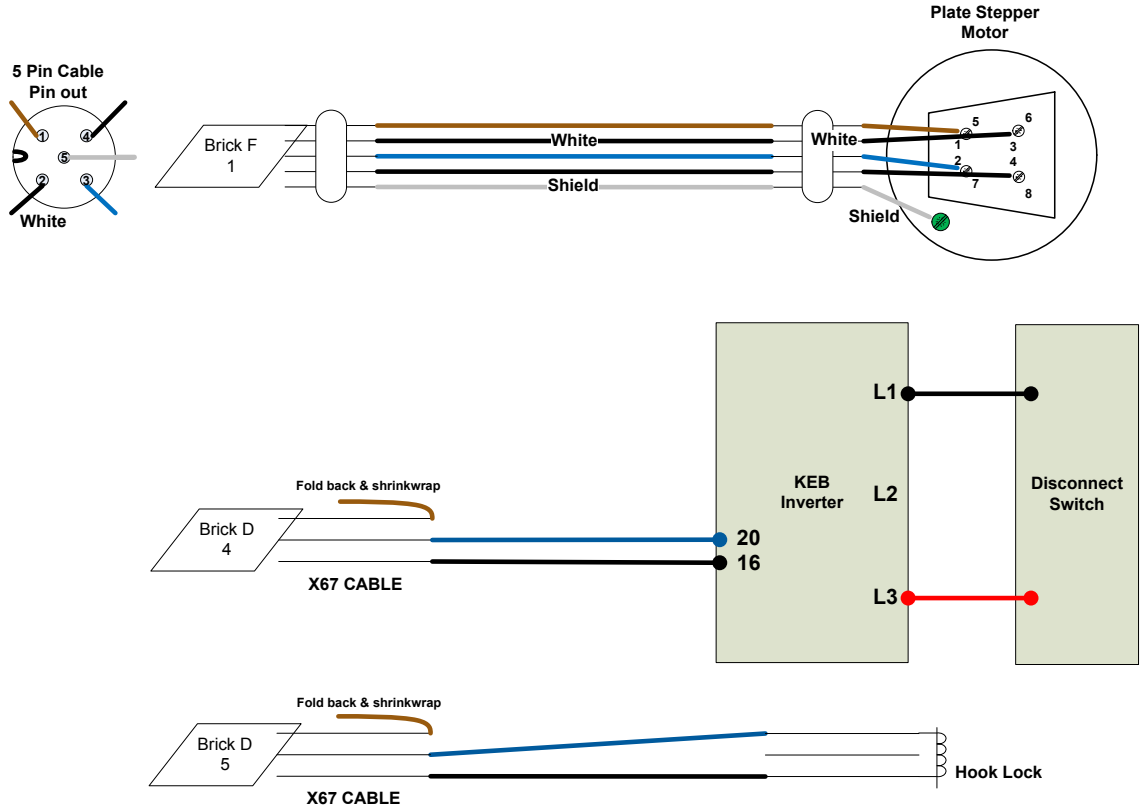
Novus Component Wiring (2)

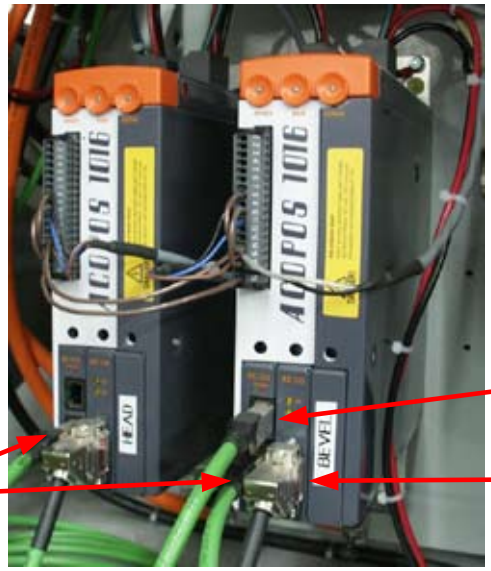


NOVUS X2 TOP & FACE SHARPENER

ELECTRICAL SCHEMATICS CONT.

Novus Component Wiring (3)



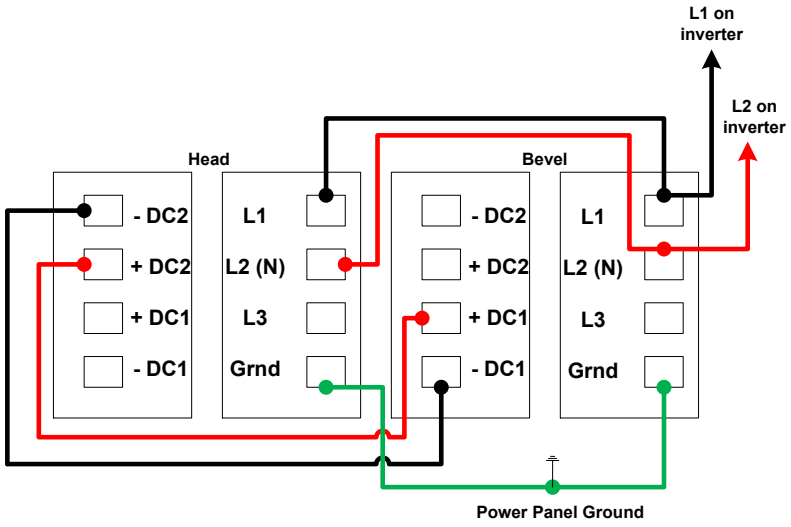


Acopos Servo Drives

NOVUS X2 TOP & FACE SHARPENER

ELECTRICAL SCHEMATICS CONT.

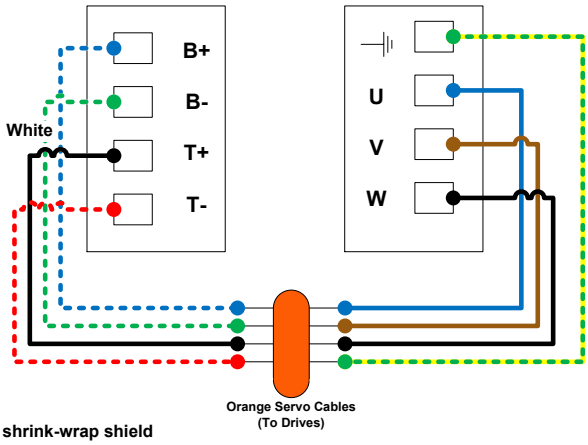
Novus Component Wiring (4)
230V Single or 3-phase



Top View

Acopos 1016

Bottom View



Cut & shrink-wrap shield before installing strain relief.

NOVUS X2 TOP & FACE SHARPENER

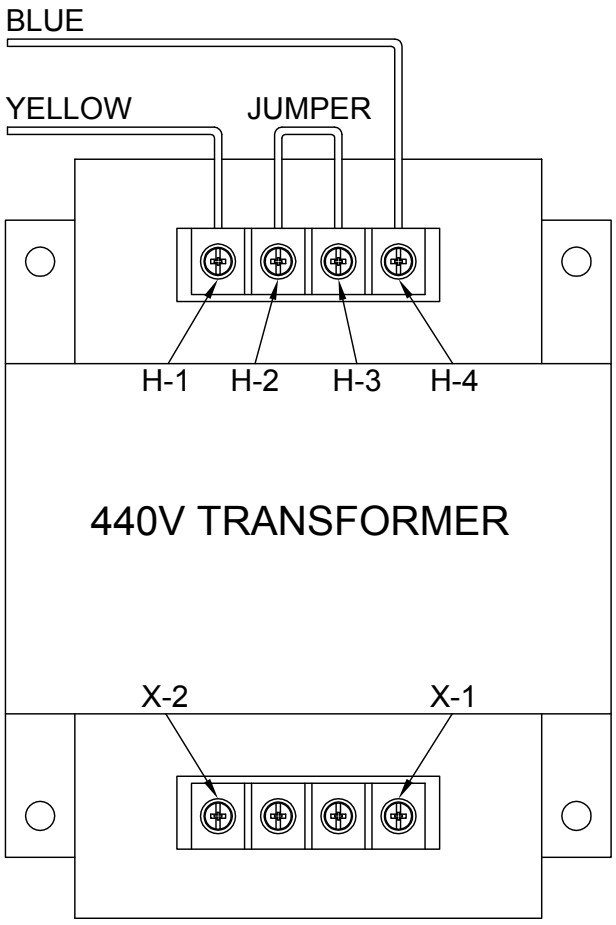
NOTE: DISCONNECT POWER FIRST!
CONVERTING 230V TO 440V

WIRING CHANGE FOR MOTOR

LINE 1	WHITE
LINE 2	RED
LINE 3	BLACK

SET MOTOR STARTER OVERLOAD AT 3.2

JUMP TOGETHER 6 & 9
5 & 8
4 & 7



TAKE JUMPER OFF H-1 AND H-3 AND OFF H-2 AND H-4, SO THE RED AND BLACK WIRE ARE THE ONLY WIRES IN THE CONNECTION.
CONNECT A JUMPER BETWEEN H-2 AND H-3. PUT THE 440 STICKER OVER THE 240 ON THE ELECTRICAL NAMEPLATE

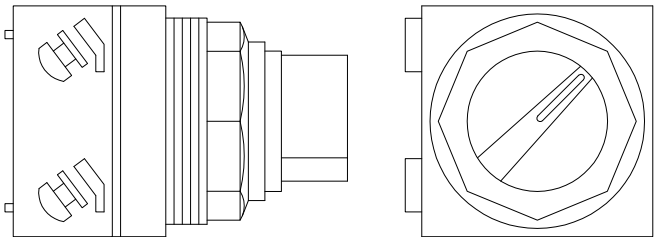
NOVUS X2 TOP & FACE SHARPENER

LOWER CONTROL PANEL

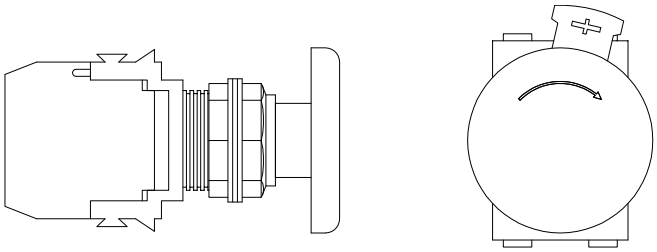
NOVUS X2 TOP & FACE SHARPENER

LOWER CONTROL PANEL COMPONENTS

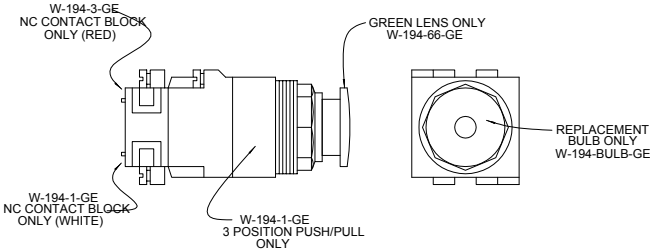
2 POSITION SELECTOR SWITCH - W1004-GE



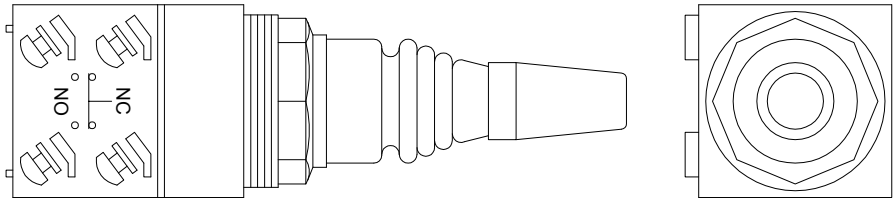
EMERGENCY STOP (PANIC BUTTON) - A-5680



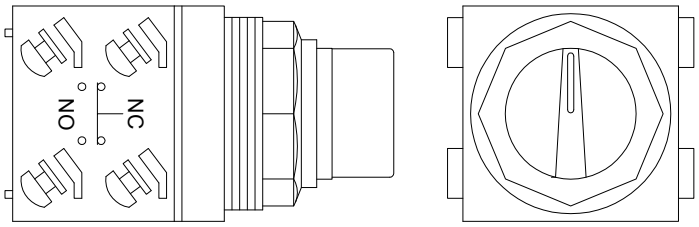
PUSH / PULL : START / STOP BUTTON - W-194-GE



JOY SWITCH - W-735-GE



HOOK SWITCH - A-5690-GE



NOVUS X2 TOP & FACE SHARPENER

MACHINE ASSEMBLY SHEETS

The following pages provide drawings of various assemblies contained in this machine.

DRAWINGS OF...

Base Assembly Layout
Lower Control Panel Components
Adjustment Control Components
Adjustment Control Components / Plate Thickness Knob Assembly
Adjustment Control Components / Index Adjustment Knob Assembly
Adjustment Control Components / Speed Control Adjustment Knob Assembly
Inside of Enclosure Assemblies
Head Assembly
Stroke Assembly
Feed System Assembly
Saw Clamp/Coolant Pump Assembly
Index Arm Assembly
Index Cylinder Oil Pot Assembly
Feed Cylinder Oil Pot Assembly
Saw Lift Assembly
Hook Actuator Assembly
Plate Thickness Drive Assembly
Bevel System
HD Clamp System And Saw Carrier

NOVUS X2 TOP & FACE SHARPENER

BASE ASSEMBLY LAYOUT

A-3254
SIGNAL LIGHT

UPPER DOOR

A-3300 (HMI)
OPERATOR INTERFACE

ADJUSTMENT
CONTROLS

TOOL DRAWER

LOWER DOOR

C-5070 HOOD
A-5085 FAN
(BACK OF MACHINE

HEAD

C-5050 DOOR
A-5050-2 GLASS
A-5050-3 SEAL

W-267
HANDLE

W-267
HANDLE

C-5800
TANK

A-5805
WHEELS

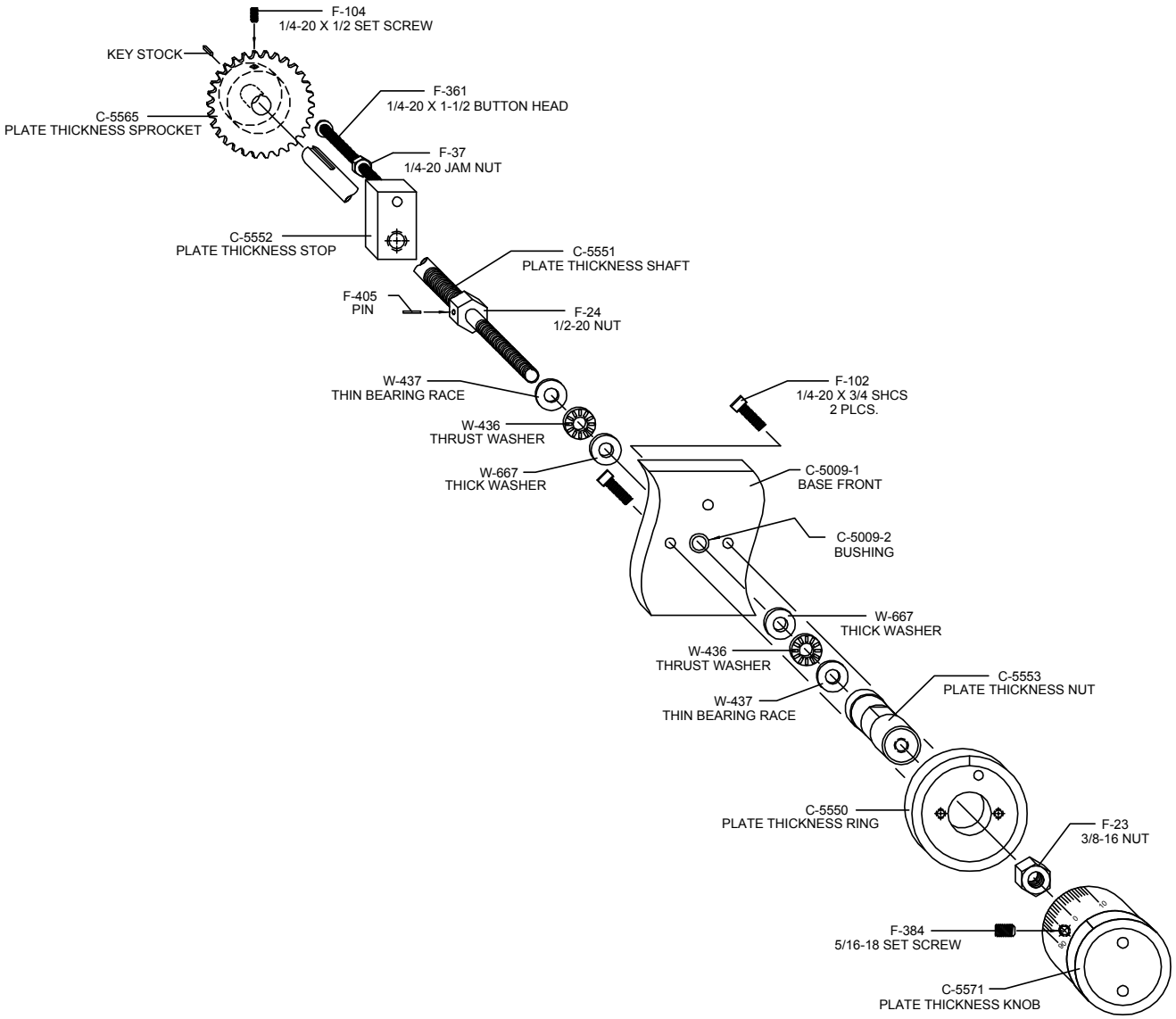
A-5807
COOLANT LEVEL
GAUGE

NOVUS X2 TOP & FACE SHARPENER

ADJUSTMENT CONTROL COMPONENTS

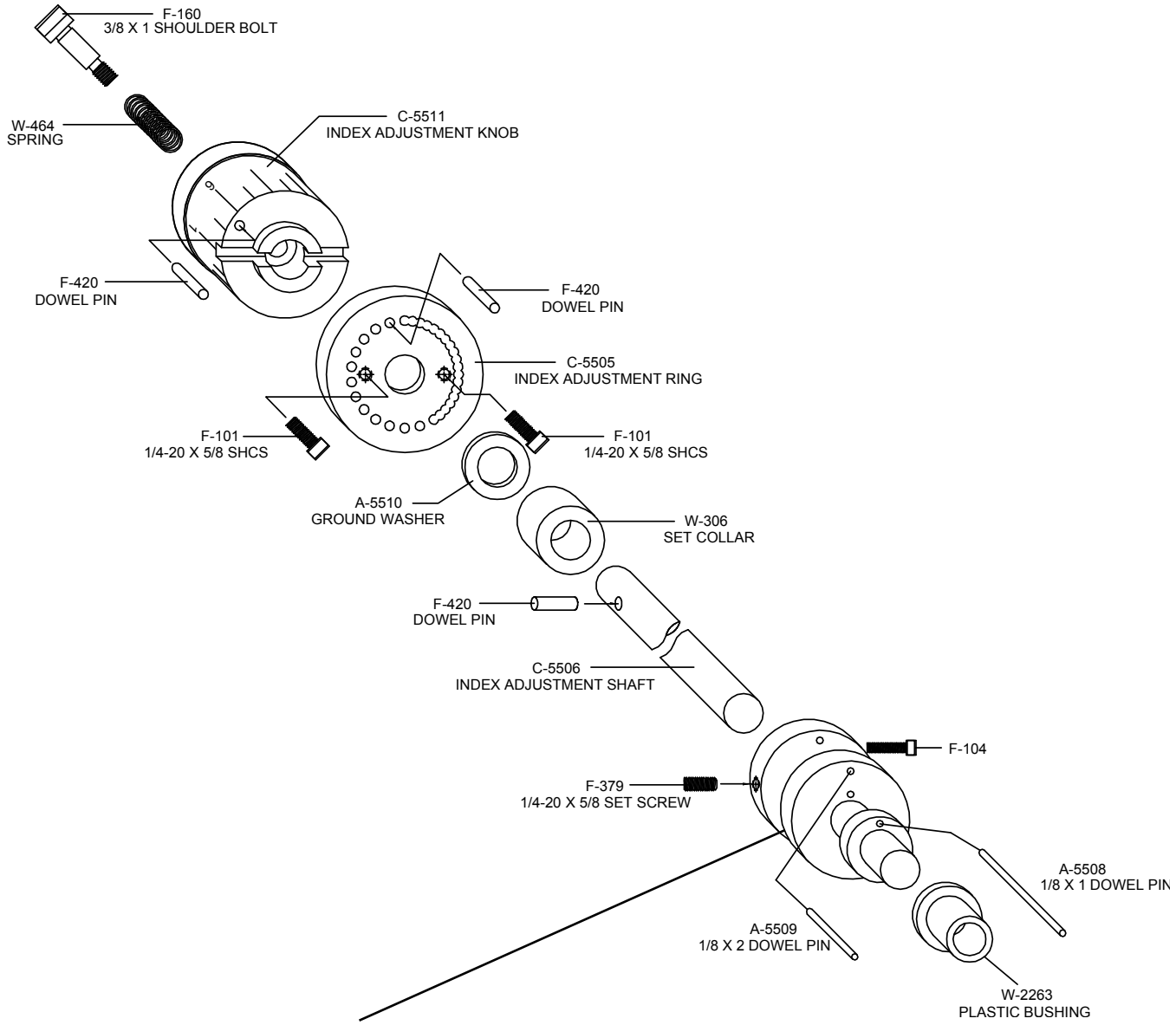
NOVUS X2 TOP & FACE SHARPENER

ADJUSTMENT CONTROL COMPONENTS CONTINUED...



NOVUS X2 TOP & FACE SHARPENER

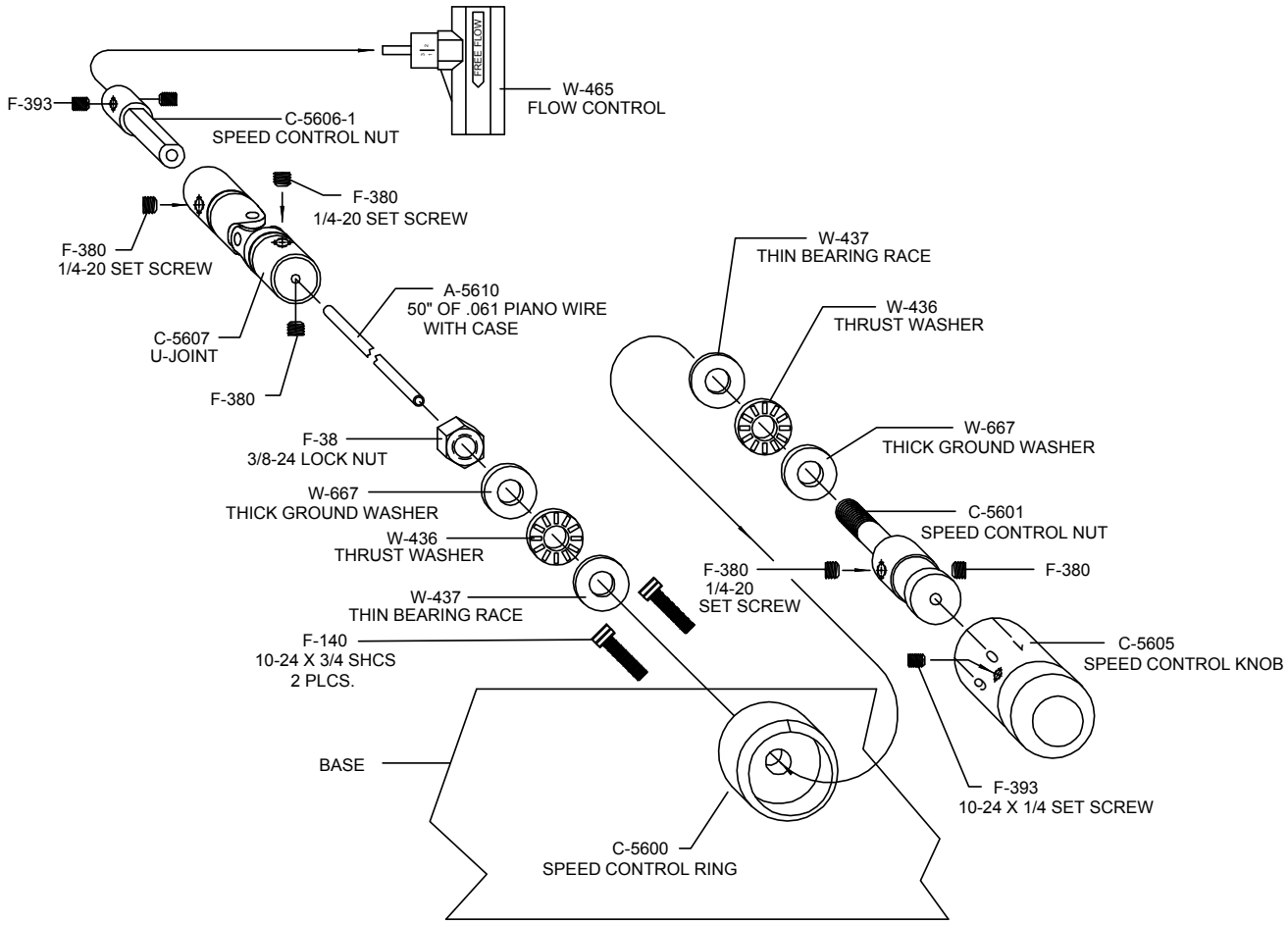
ADJUSTMENT CONTROL COMPONENTS CONTINUED...
INDEX ADJUSTMENT KNOB ASSEMBLY



Use #35 chain 5' 10" long, W-385. Master link W-386.

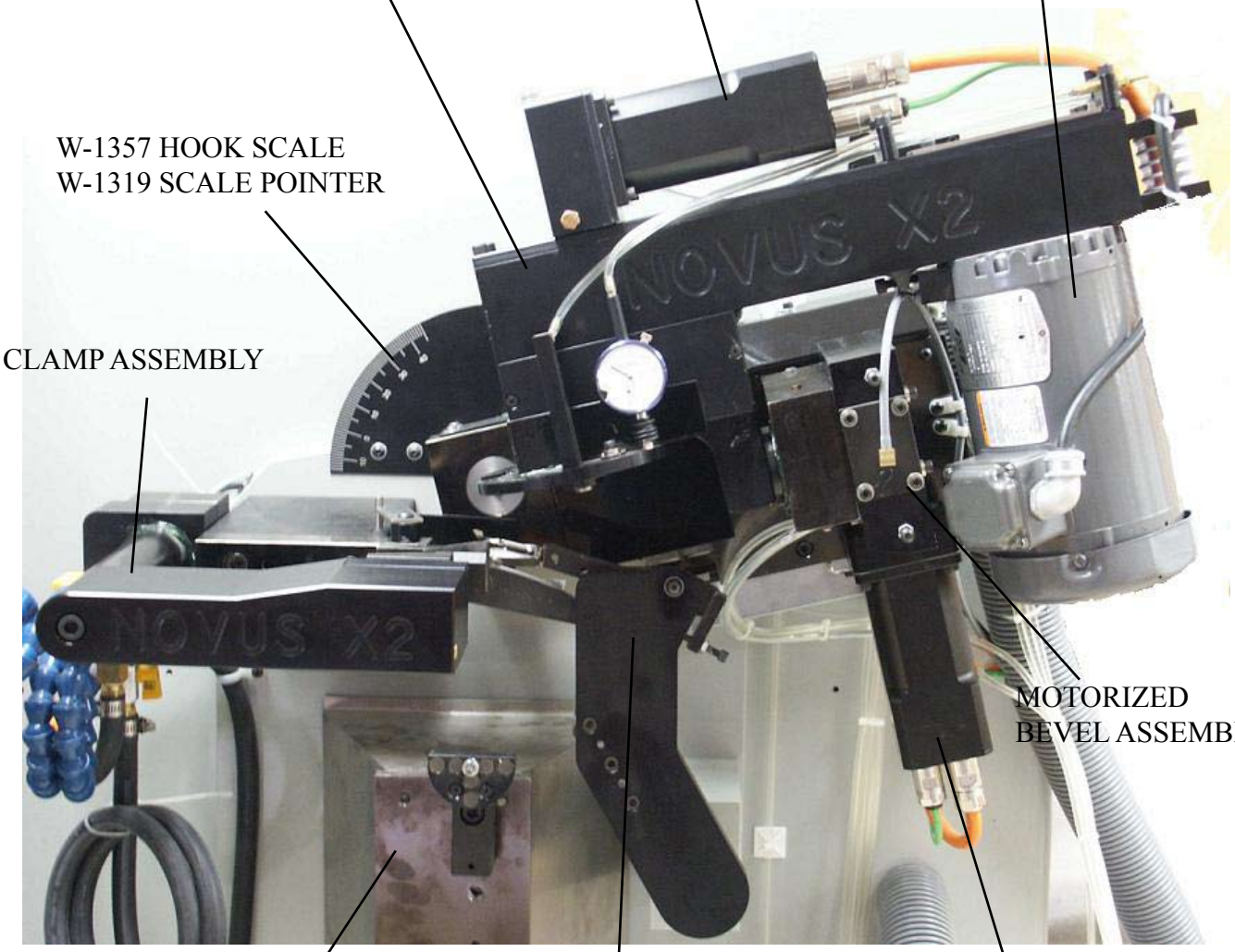
NOVUS X2 TOP & FACE SHARPENER

ADJUSTMENT CONTROL COMPONENTS CONTINUED...
SPEED CONTROL KNOB ASSEMBLY



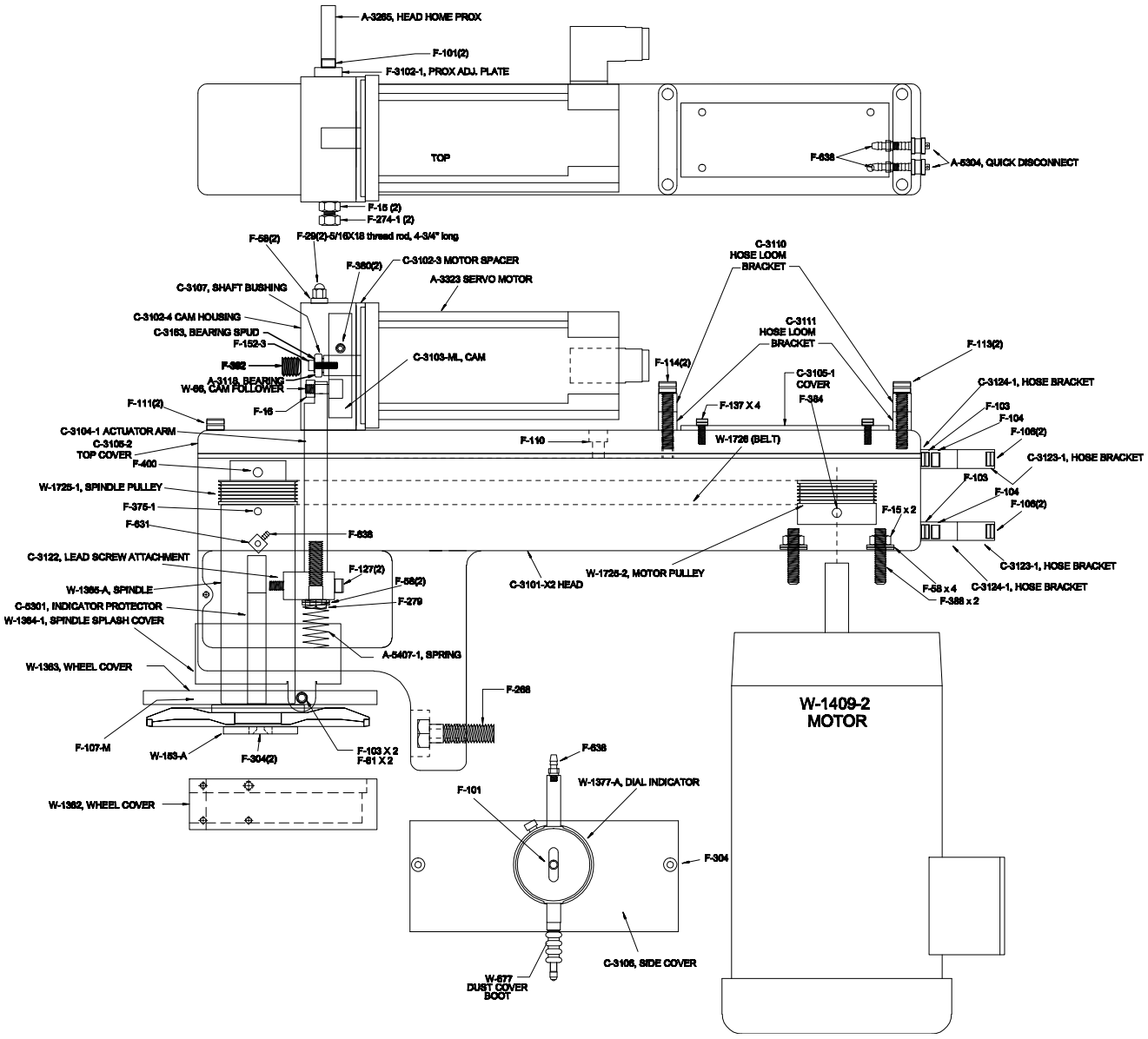
NOVUS X2 TOP & FACE SHARPENER

INSIDE ENCLOSURE



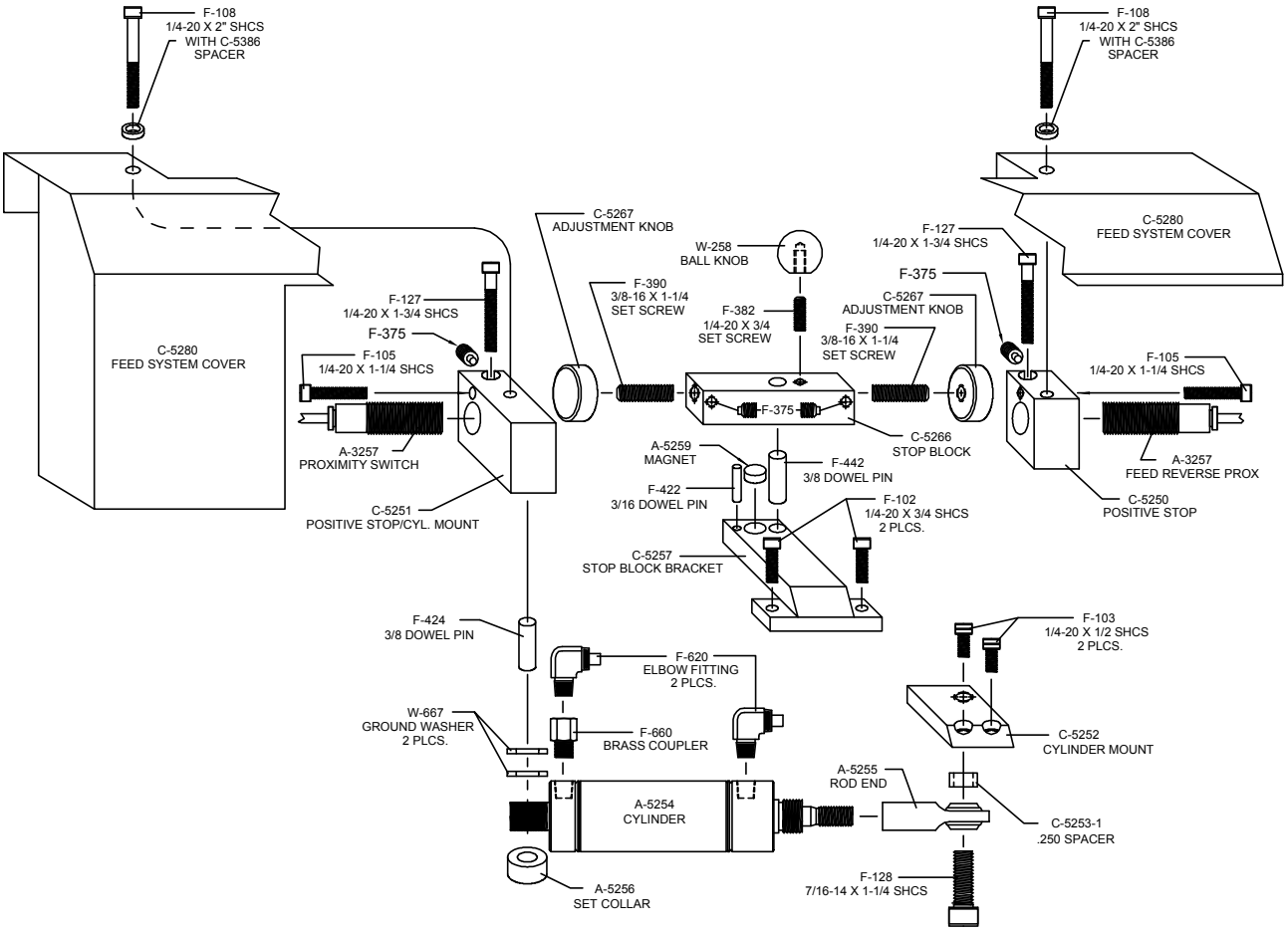
NOVUS X2 TOP & FACE SHARPENER

HEAD ASSEMBLY



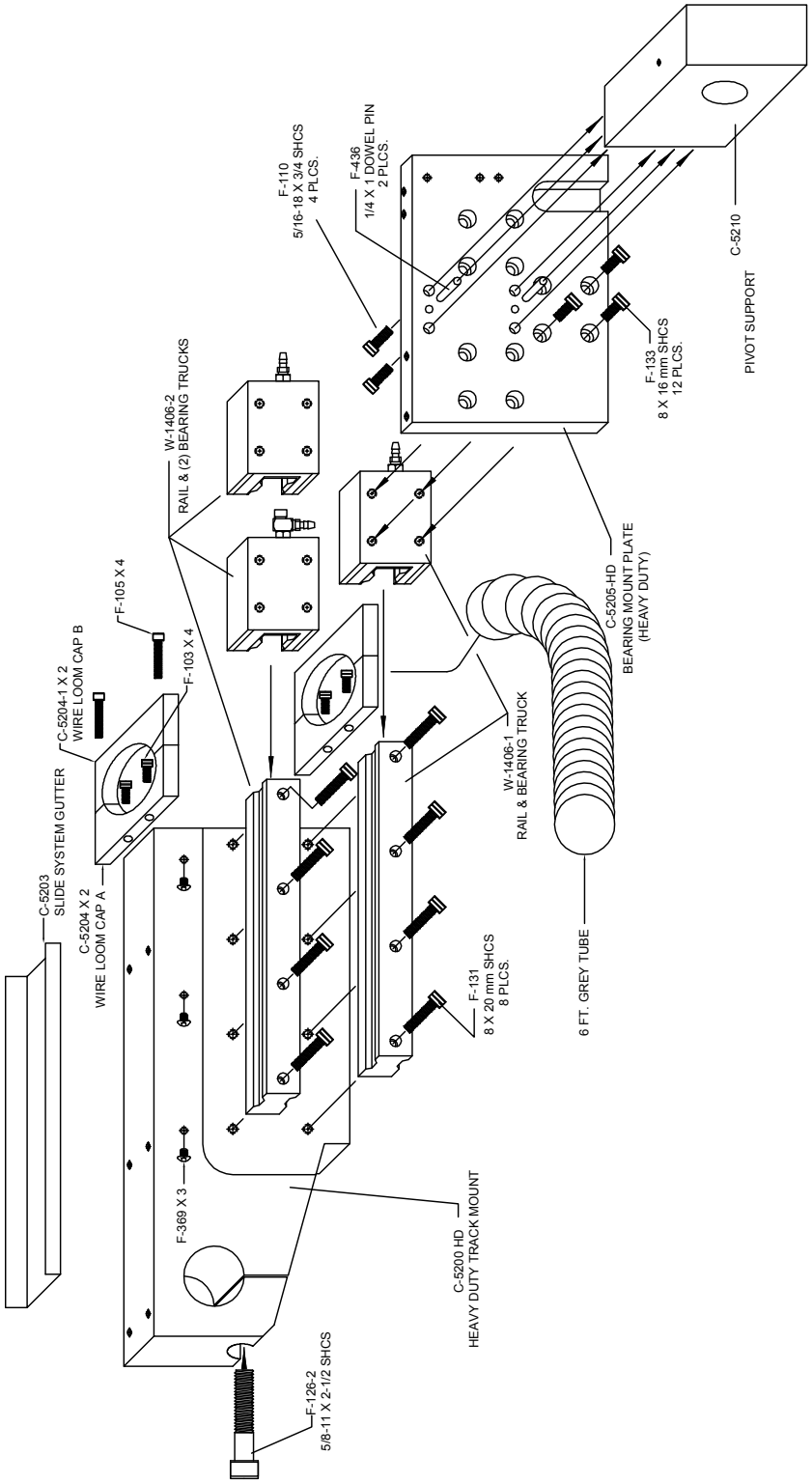
NOVUS X2 TOP & FACE SHARPENER

STROKE ASSEMBLY



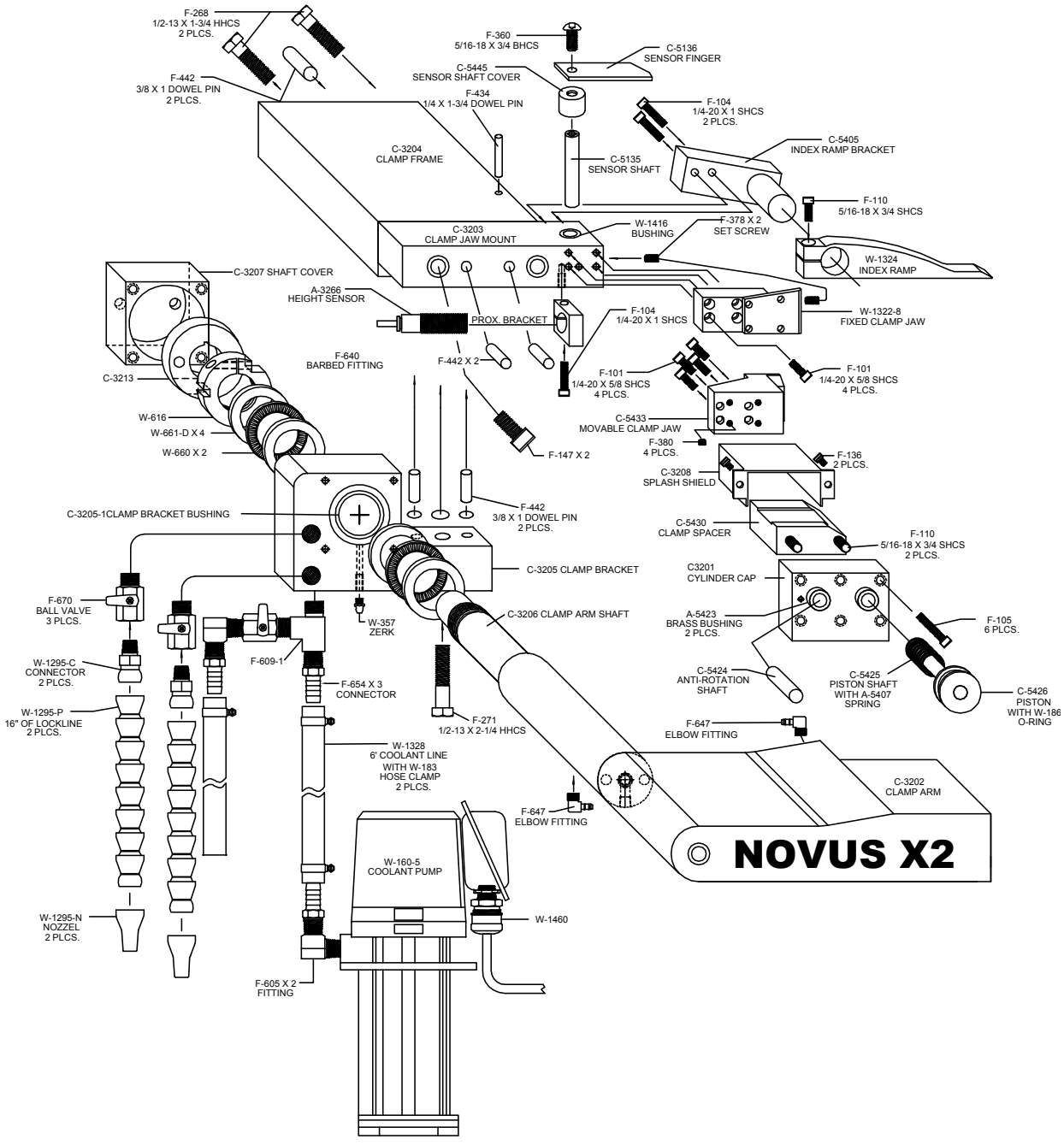
NOVUS X2 TOP & FACE SHARPENER

FEED SYSTEM ASSEMBLY



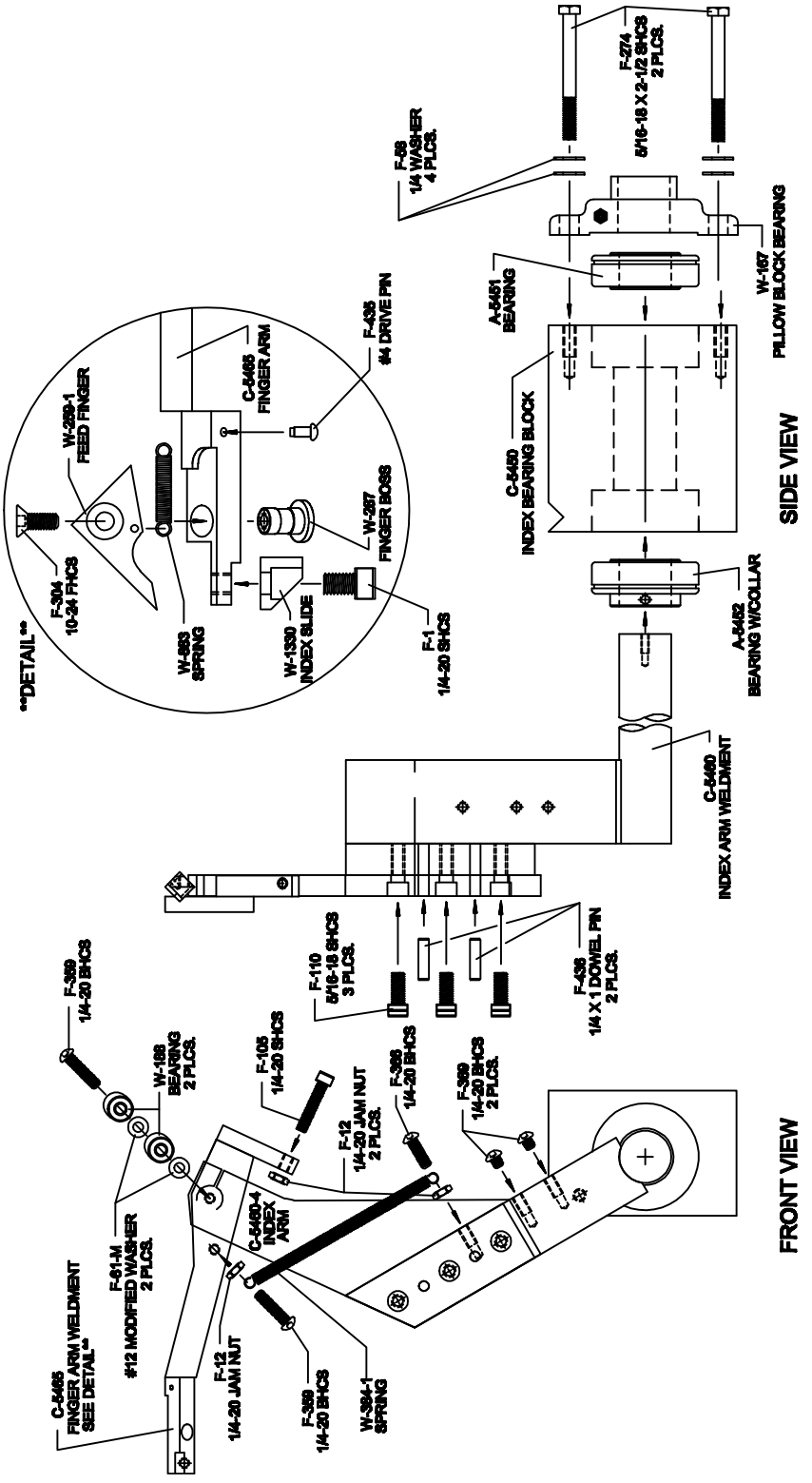
NOVUS X2 TOP & FACE SHARPENER

SAW CLAMP/COOLANT PUMP ASSEMBLY



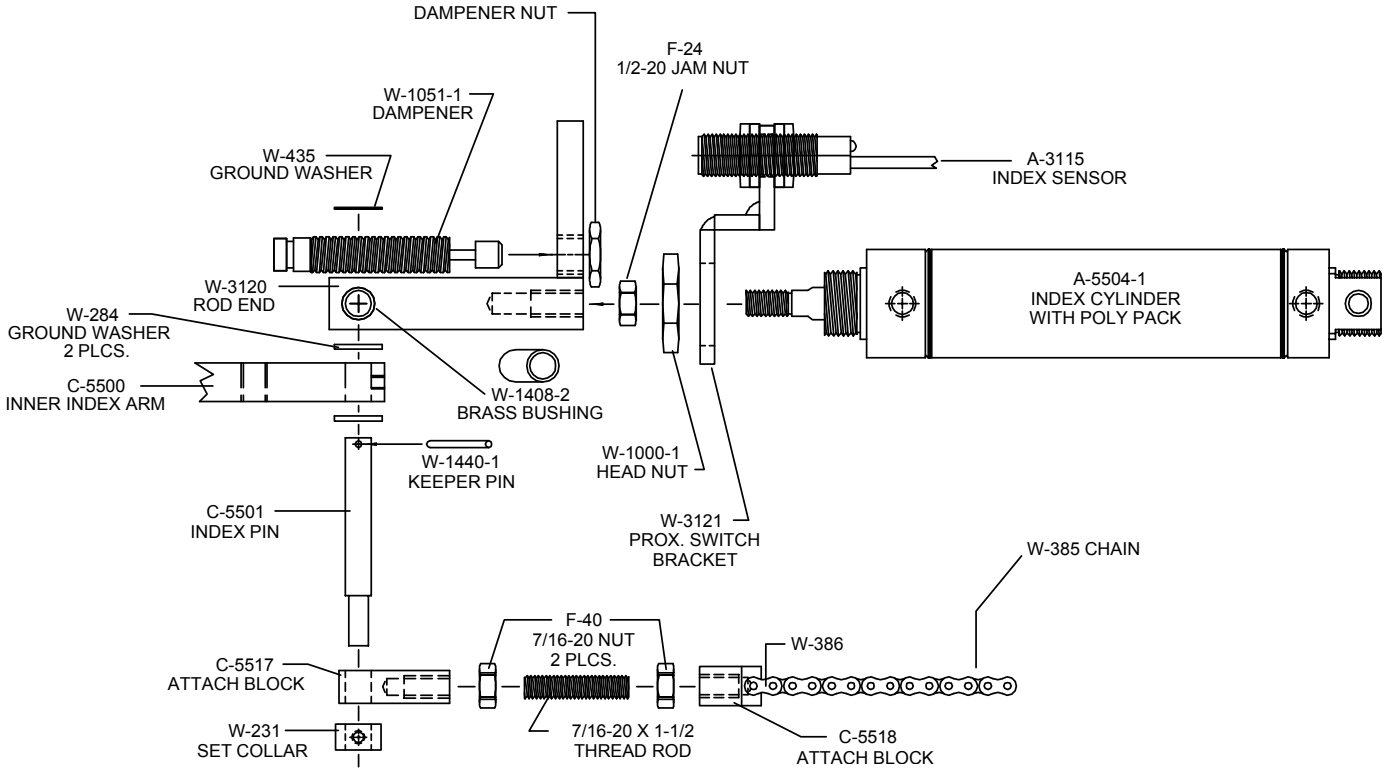
NOVUS X2 TOP & FACE SHARPENER

INDEX ARM ASSEMBLY



NOVUS X2 TOP & FACE SHARPENER

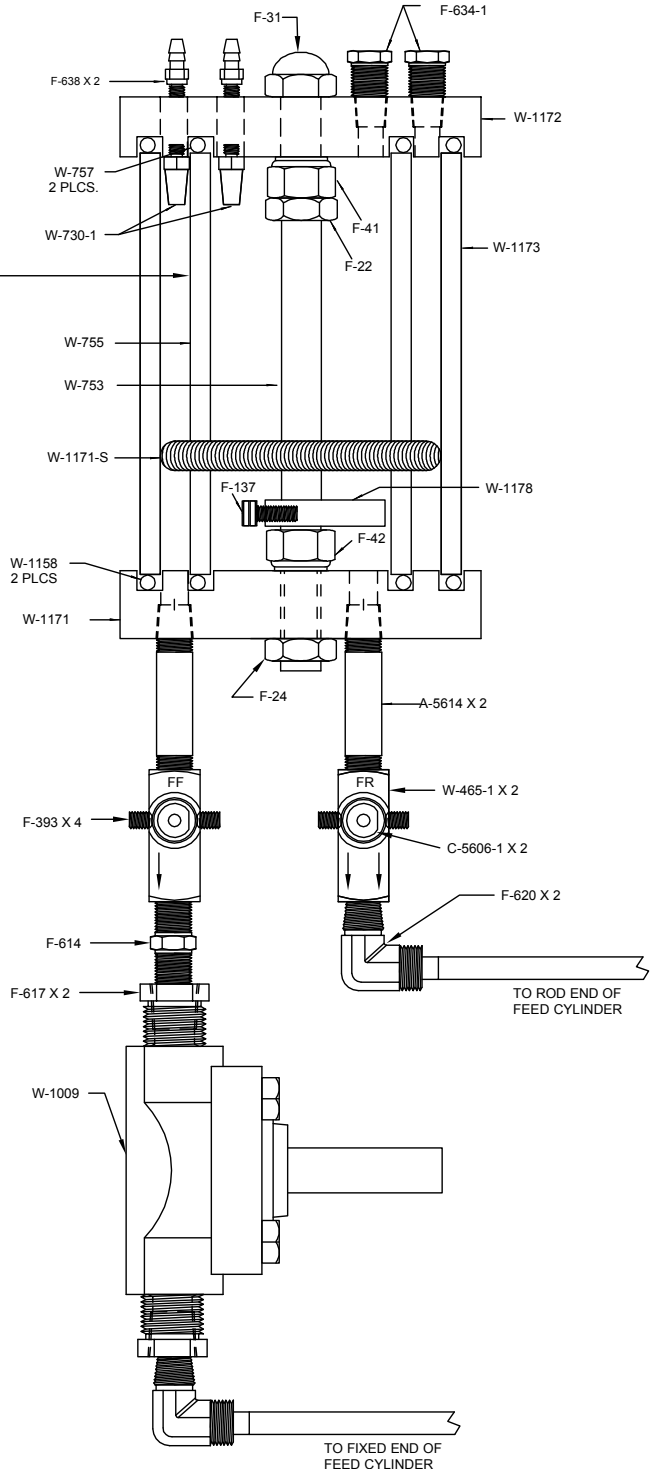
INDEX CYLINDER ASSEMBLY



NOVUS X2 TOP & FACE SHARPENER

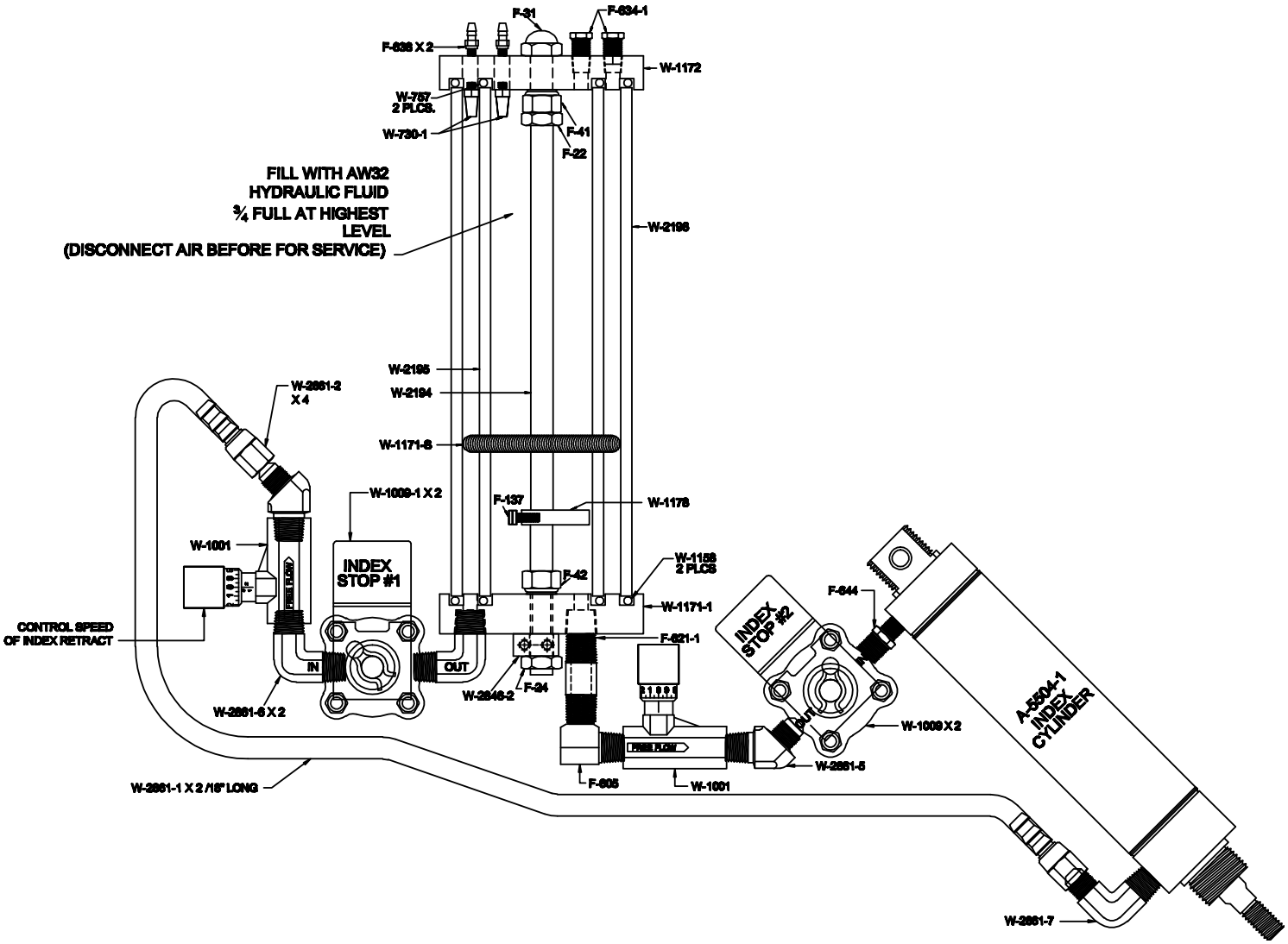
FEED SYSTEM
OIL POT ASSEMBLY

FILL WITH AW32
HYDRAULIC FLUID
¾ FULL
DISCONNECT AIR
BEFORE SERVICE



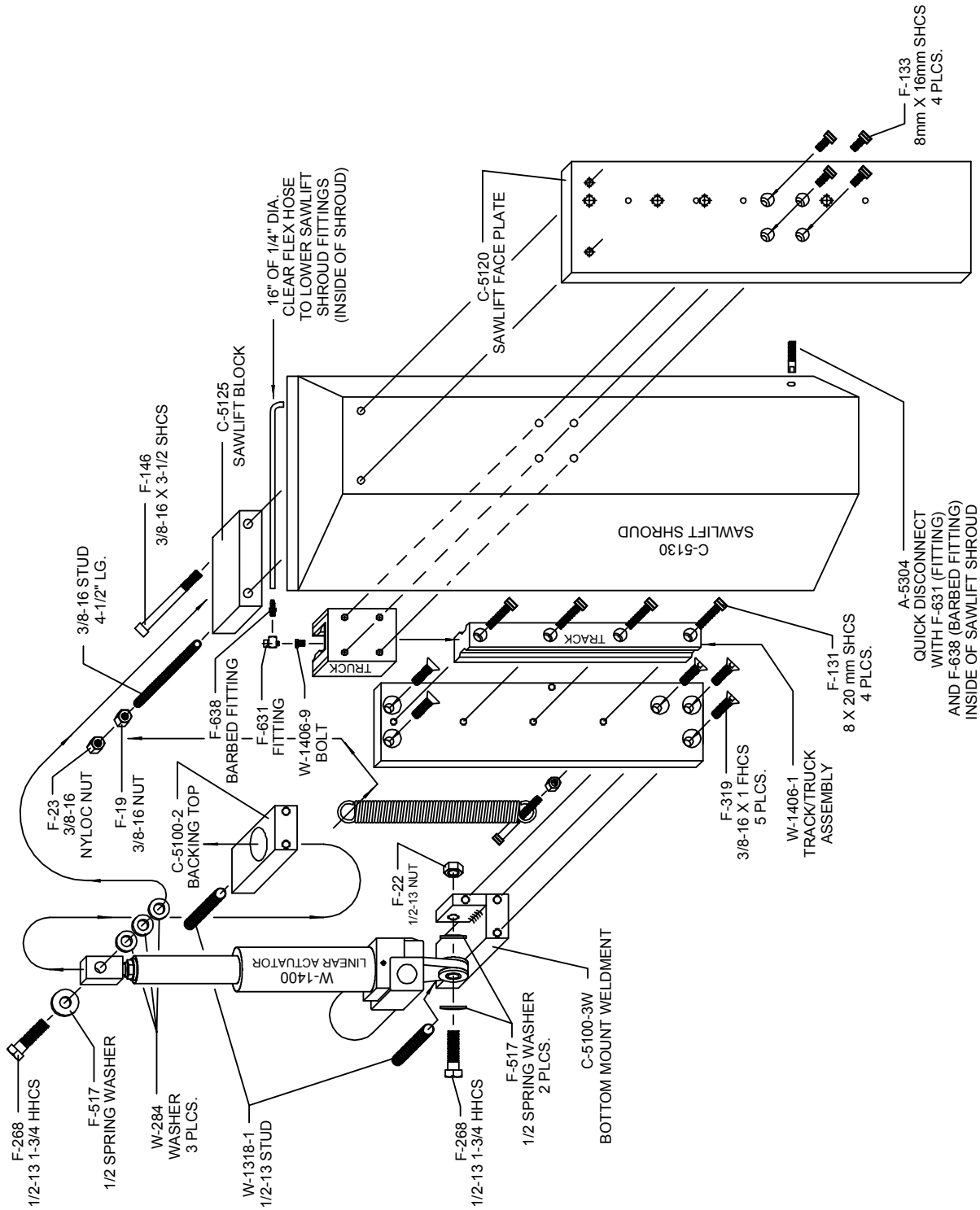
NOVUS X2 TOP & FACE SHARPENER

INDEX SYSTEM
OIL POT ASSEMBLY



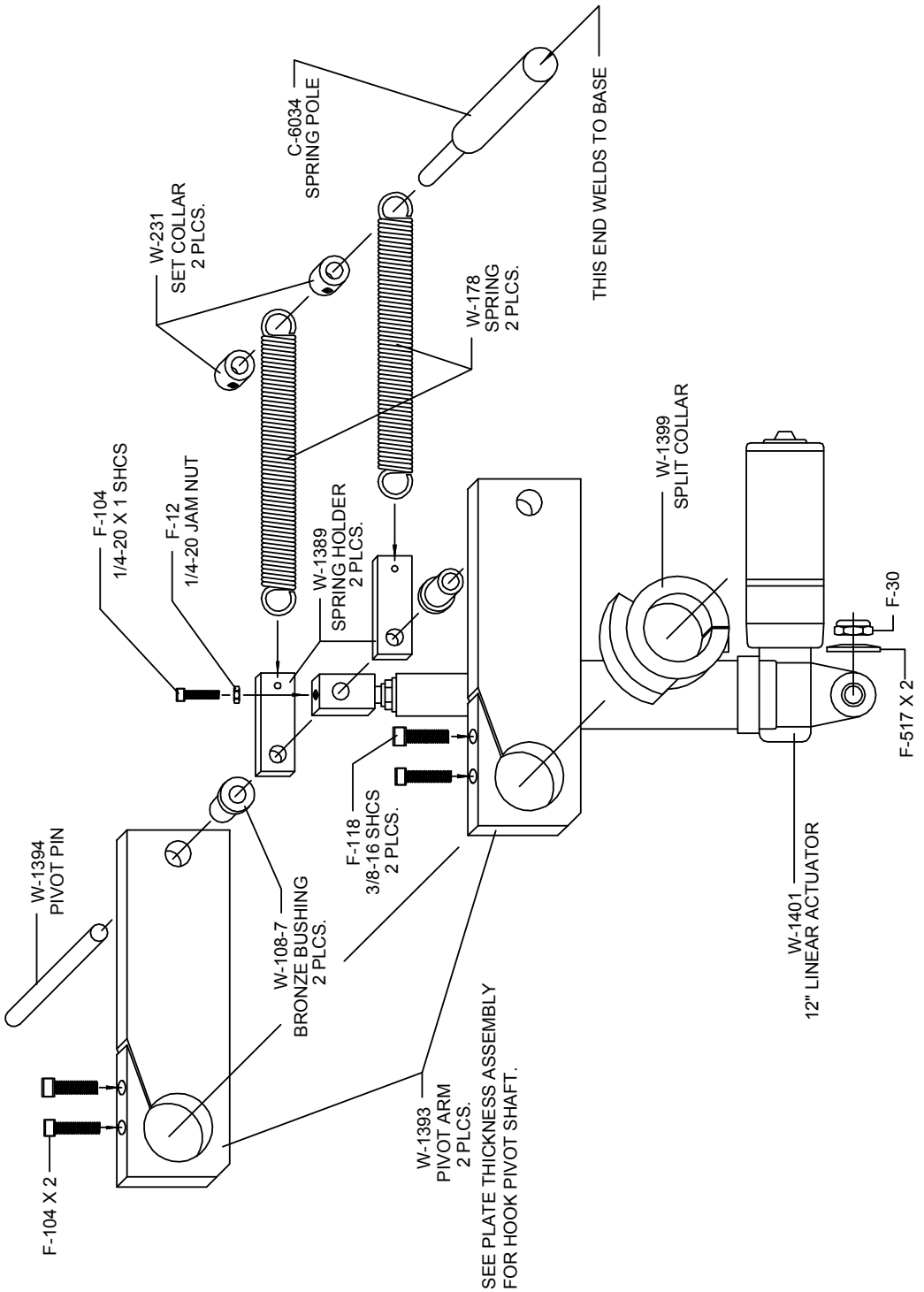
NOVUS X2 TOP & FACE SHARPENER

SAW LIFT ASSEMBLY



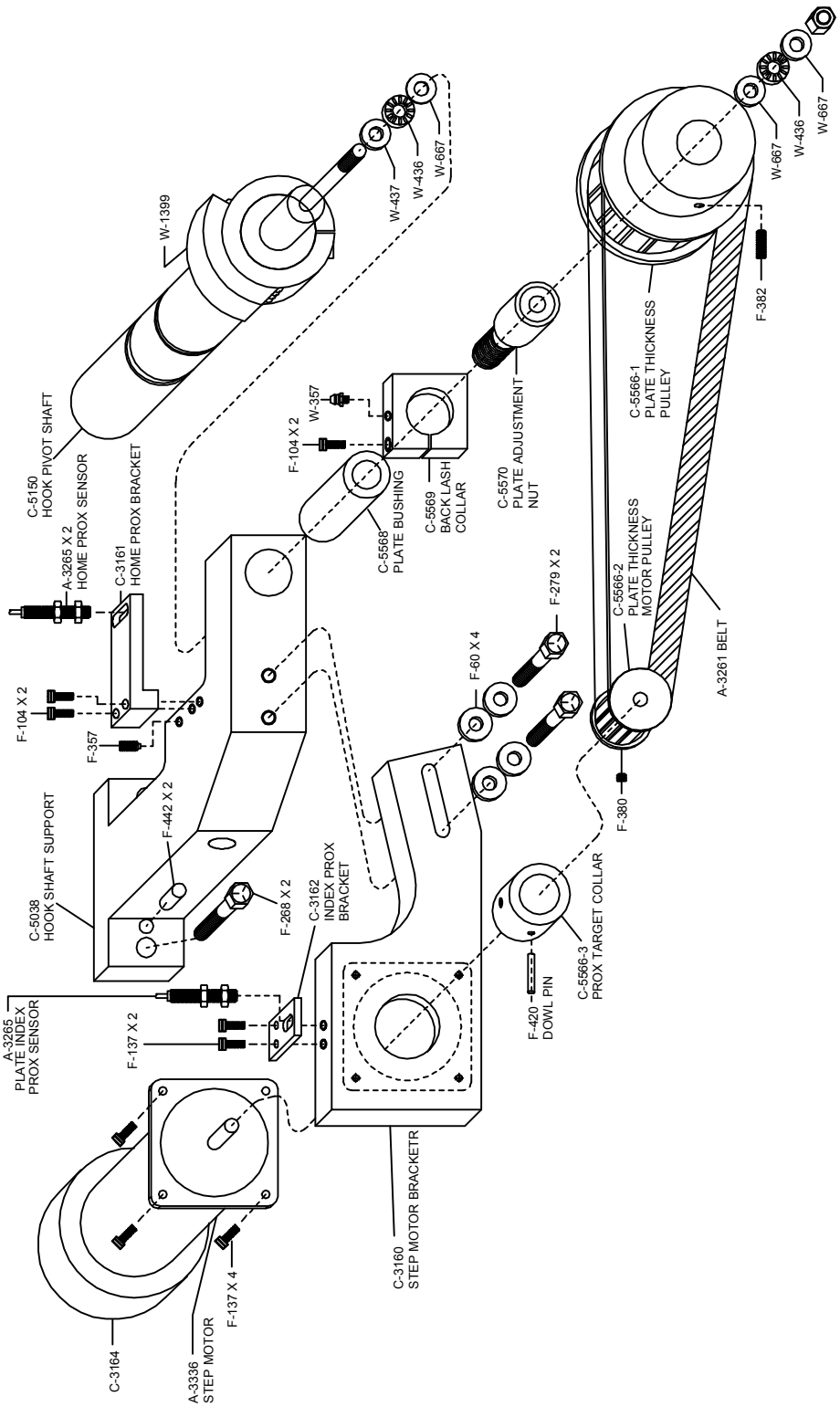
NOVUS X2 TOP & FACE SHARPENER

HOOK ACTUATOR ASSEMBLY



NOVUS X2 TOP & FACE SHARPENER

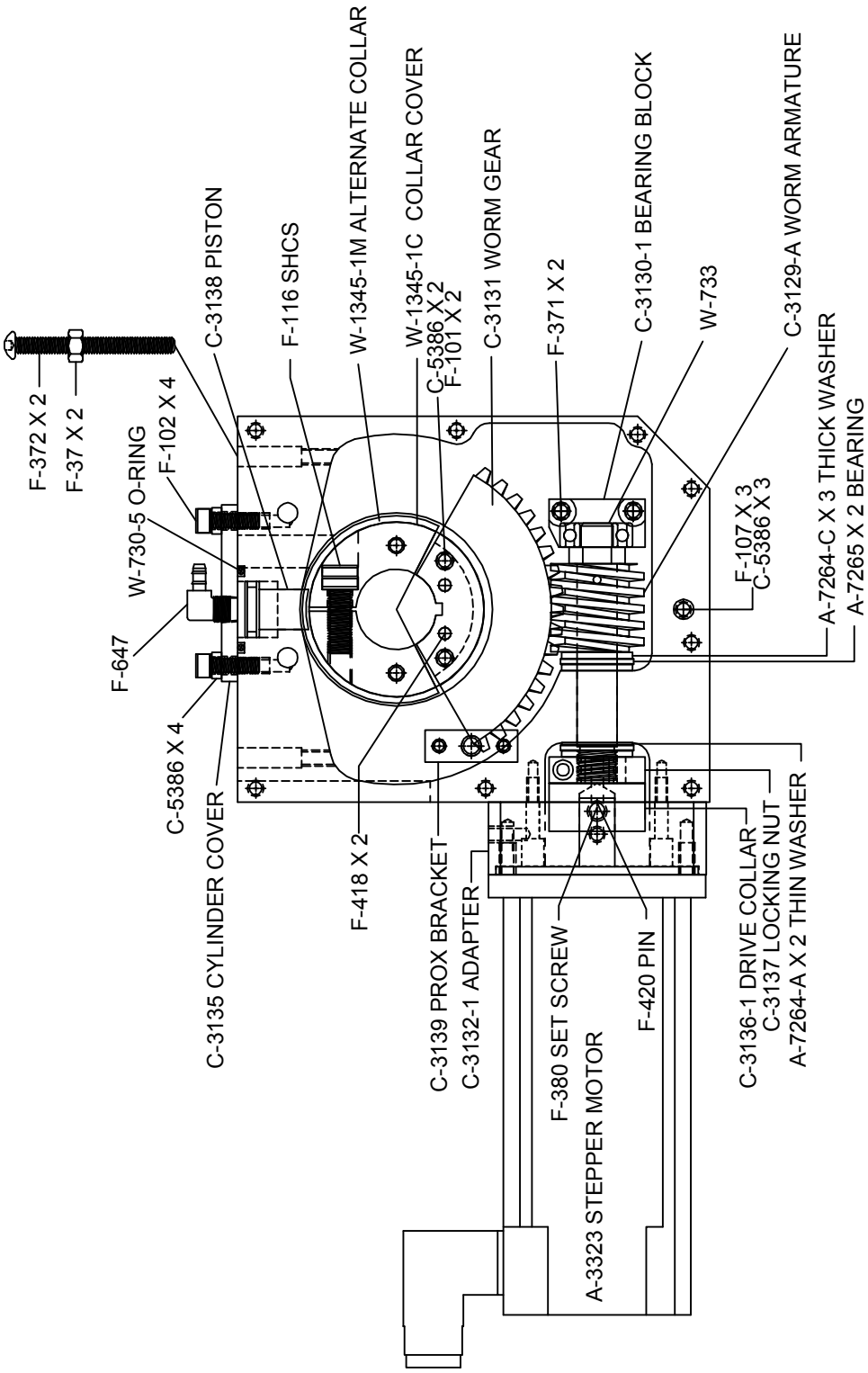
PLATE THICKNESS ASSEMBLY



Revised 3-18-2013

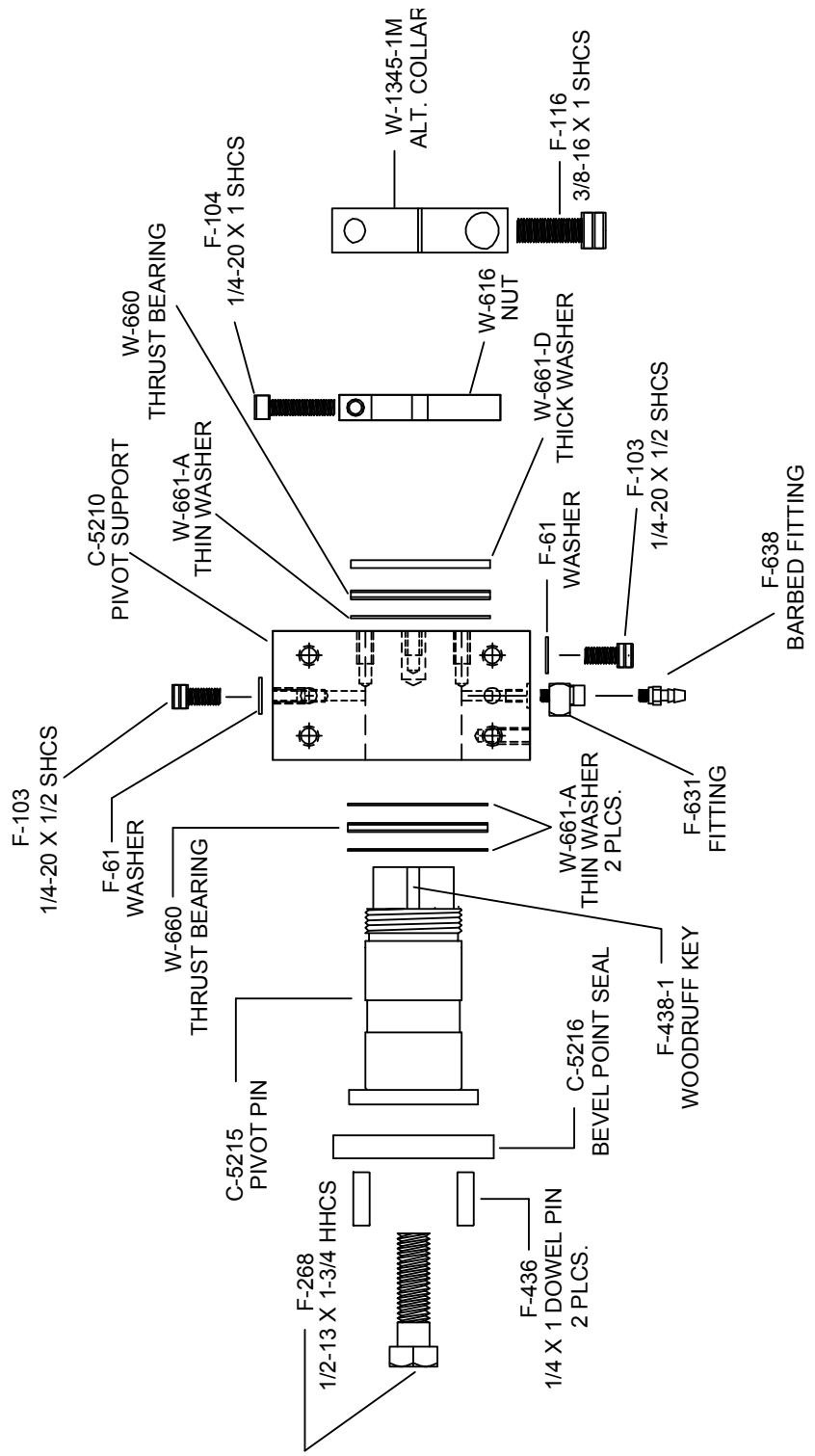
NOVUS X2 TOP & FACE SHARPENER

BEVEL SYSTEM



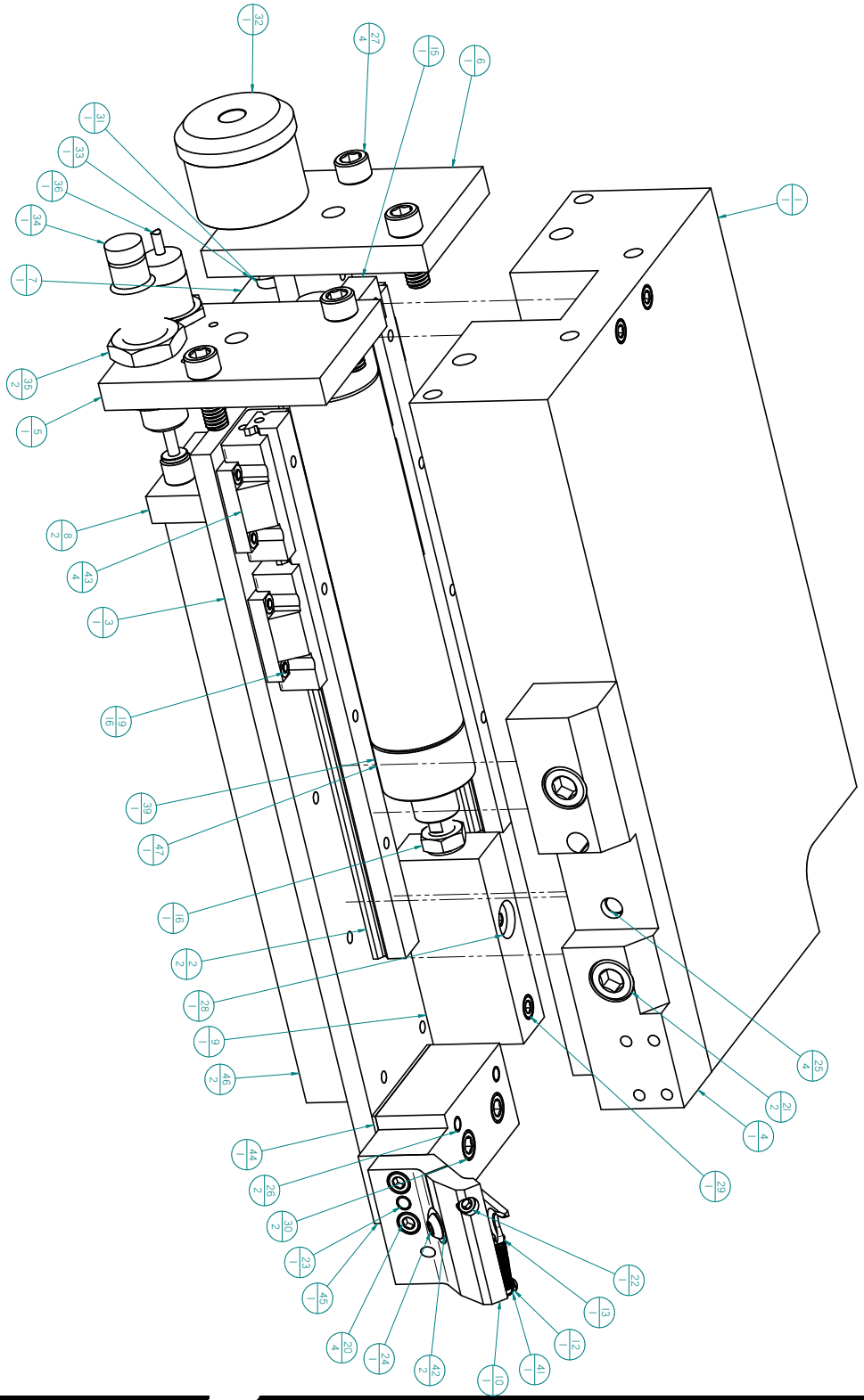
NOVUS X2 TOP & FACE SHARPENER

BEVEL SYSTEM CONTINUED



NOVUS X2 TOP & FACE SHARPENER

LINEAR INDEX ASSEMBLY



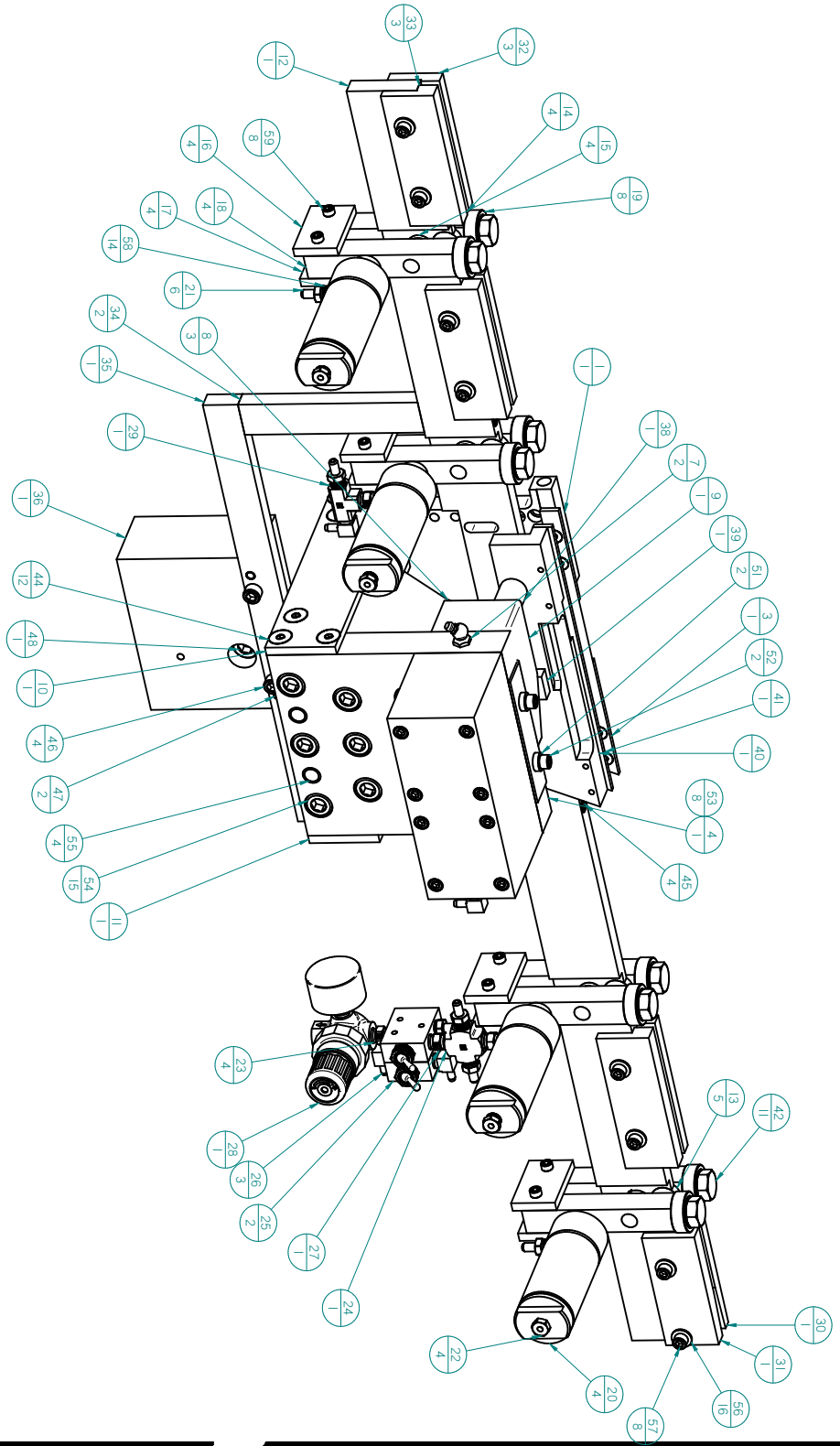
NOVUS X2 TOP & FACE SHARPENER

LINEAR INDEX ASSEMBLY

Item Number	Part Number	Quantity
1	C5400-33	1
2	C5400-17	2
3*	C5400-44	1
4	C5400-18	1
5	C5400-15	1
6	C5400-14	1
7	C5400-13	1
8	C5400-11	2
9	C5400-10	1
10	C5400-6	1
11*	F-419	1
12	F-437	1
13	C5400-7	1
14*	C5400-9	1
15	C5400-12	1
16	F-40	1
17*	F-104	16
18*	F-158	1
19	F-152	16
20	F-102	4
21	F-164	2
22	F-125	1
23	F-436	1
24	F-366	1
25	F-442	4
26	F-434	2
27	F-116	4
28	F-160	1
29	F-108	1
30	F-112	2
31	C5400-8	1
32	W-1369	1
33	F-24	1
34	W-1051-1	1
35	W-1051-2	2
36	W-1404-1	1
38*	F-620	1
39	F-622	1
40*	C5400-16	1
41	W-883	1
42	W-188	2
43*	A-6953	4
44	C5400-21	1
45	C5400-5	1
46	C5400-19	2
47	A-5254-1	1

NOVUS X2 TOP & FACE SHARPENER

C-6000 HD CLAMP AND SAW CARRIER ASSEMBLY



NOVUS X2 TOP & FACE SHARPENER

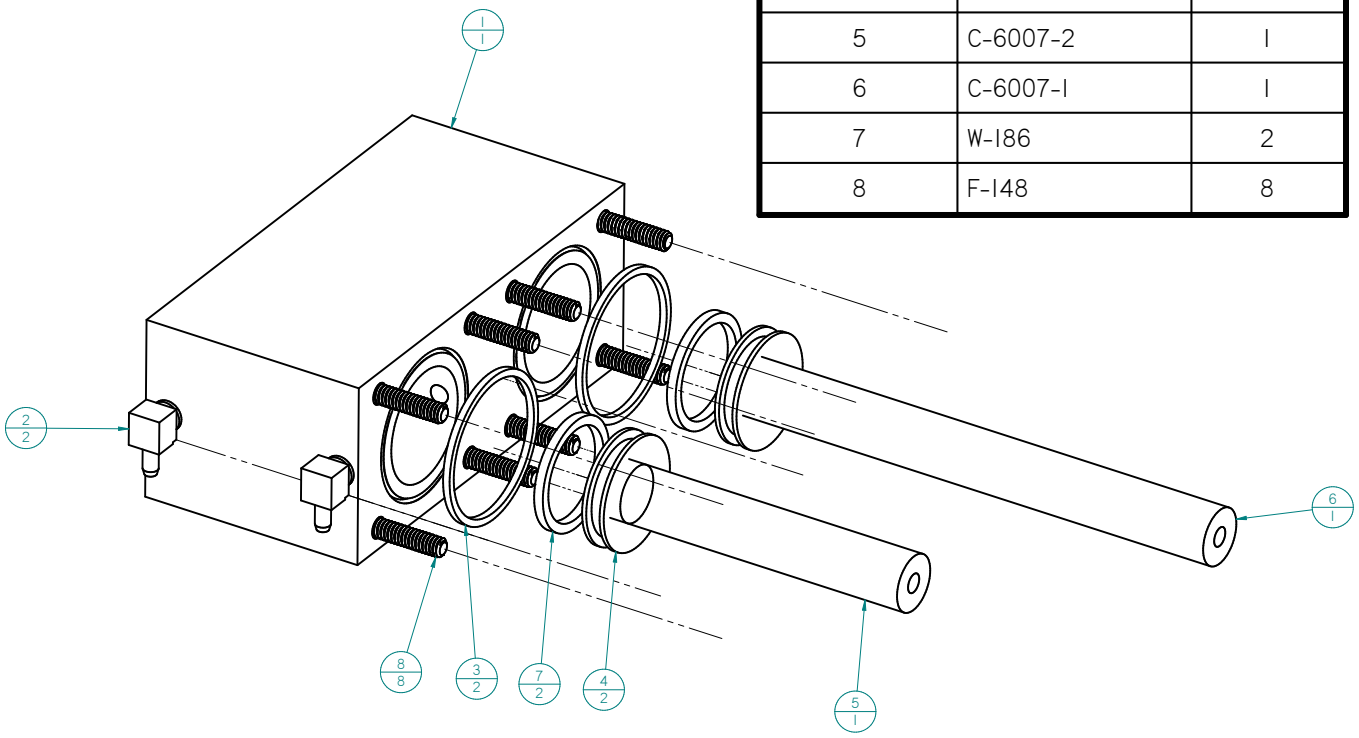
C-6000 HD CLAMP AND SAW CARRIER ASSEMBLY

Item Number	Part Number	Quantity
1	C-6001-3CM	1
2*	C-6003-1	1
3	L-6014-HD-F	1
4	C-6004-1	1
5*	C-6004-7	2
6*	W-1411	2
7	W-357-1	2
8	C-6004-3	3
9	C-6011-2	1
10	C-6006-2	1
11	C-6006-3	1
12	C-6005-4	1
13	C-6029	5
14	C-6035-1	4
15	W-253	4
16	W-2171-1	4
17	W-2171	4
18	C-6035-2	4
19	W-733	8
20	W-2388	4
21	F-640	6
22	F-648	4
23	F-614	4
24	F-665-1	1
25	W-745	2
26	F-647	3
27	F-634	1
28	W-68	1
29	F-613	1
30	C-6008-5	1
31	C-6008-7	1
32	C-6008-4	3
33	C-6008-6	3
34	C-6008-3	2
35	C-6008-2	1
36	C-6004-5	1
37*	A-6977-S	2
38	C-6004-2	1
39	C-6007-3	1
40	C-6001-1CM	1
41	L-6014-HD-M	1
42	F-269	11
43*	F-115	3
44	F-312	12
45	F-107	4
46	F-110	4
47	F-436	2
48	F-164	1
49*	F-407	1
50*	F-105	4
51	C-5386	2
52	F-103	2
53	F-305	8
54	F-147	15
55	F-441	4
56	F-61	16
57	F-106	8
58	F-25	14
59	F-125	8

NOVUS X2 TOP & FACE SHARPENER

C-6000 HD CLAMP HOUSING ASSEMBLY

Item Number	Part Number	Quantity
1	C-6004-2	1
2	F-647	2
3	W-1412	2
4	C-6004-4	2
5	C-6007-2	1
6	C-6007-1	1
7	W-186	2
8	F-148	8



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