

TALON CNC P-1 OPERATORS MANUAL



WM TALON CNC

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UNCONDITIONAL WARRANTY

The Talon Model P- 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.

INTRODUCTION

The TALON C.N.C. Model P- is a fully automatic, full profile grinder. Not to be confused with a "PLC" based machine, the abbreviation "C.N.C." stands for "Computer Numerical Control". This means that there is a fully functional (and sophisticated) industrial computer internal to the machine. C.N.C. based grinding machinery offers capabilities and performance previously unattainable in grinding machinery. The accuracy and finish provided by the TALON C.N.C. is unmatched, resulting in better saw performance. The fully automatic operation results in reduced labor per saw.

Although the TALON C.N.C. Model P- is technically sophisticated, operation of the machine is simple and straightforward. This machine is equipped with an easy to read LCD display and keyboard, and a small array of control sticks and buttons.

PRESETUP COOLANT:

Rust inhibiting grinding coolant **MUST** be used or severe rust damage to machine can result. Mix coolant according to manufacturer's instructions.

RUSTDAMAGEISNOTCOVEREDBY THEWARRANTY

MOUNTINGGRINDINGWHEELS:

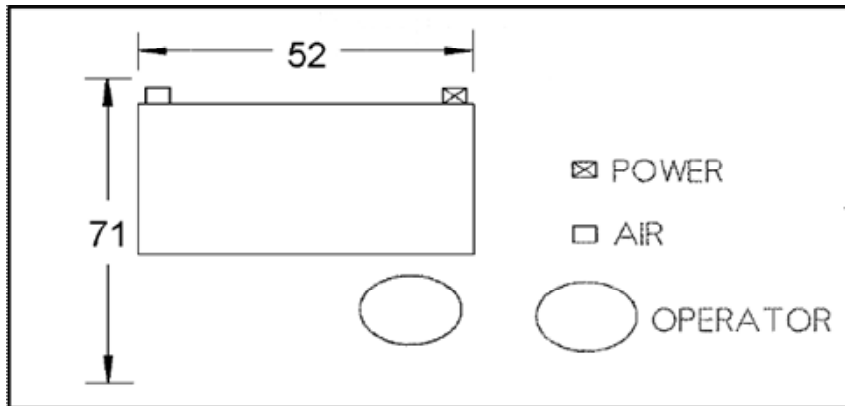
All grinding wheels must be rated for the RPM of this machine. Wheels exposed to higher than rated RPM are dangerous.

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.

MACHINEINSTALLATION:

Lifting this machine should only be done with forks under the machine base. Machine weight is approximately 2,200 pounds.

RECOMMENDED FLOORSPACE:



Glossary:

The terms relevant to the C.N.C. grinder are defined below:

Axis - A direction of movement. On the P-1 there are 2 axis of motion. One moves left and right (X axis), one moves up and down (Y axis). The concept is similar to the child’s toy “Etch-A-Sketch”. By combining movement of the two axes, the machine can move the grind head to produce the curves and straight lines necessary to grind a saw tooth.

Controller - The motion control computer inside the machine.

Dresser Pellet - The machine automatically shapes the wheel. The wheel is shaped using a very hard substance shaped into a small pellet. This small pellet removes material from the grinding wheel when the wheel passes over it. Note that the automatic shaping is done after a set number of teeth. This number is user adjustable.

Home Position - All grind operations are referenced to one known location, known as the “Home Position”. When the machine is first turned on, the controller executes a sequence of movements to “find” the home position.

Glossary:

Inverter -A device internal to the P- 1 that controls the RPM of the grinding wheel, and monitors the grinding load for abnormal conditions. If too much current is being demanded by the spindle motor, the inverter will automatically shut down the motor, and notify the controller of the error condition. The inverter also controls the direction the wheel will spin, how long it takes to reach the selected RPM, and several other functions related to the spindle motor.

Offsets - The grind path is fixed. Moving the grind path left or right, or up and down determines how hard the grinder will grind on the face, the back, gullet, etc.

Pitch - Tooth spacing. The distance measured from tip to tip of the saw.

VariablePitch - Tooth spacing that varies from tooth to tooth. For example, the first tooth is 1 3/4", the next is 2", and 1 1/2" then back to 1 3/4" and repeat. Variable pitch saws can dramatically reduce the vibration of a saw, and generally perform much better than standard fixed pitch saws.

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.

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.

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.

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 byproducts 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.

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

Warningsignsofimproperlymaintainedcoolant:

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 1-541-9429-3712.

General Operation

After loading the saw into the machine, turn power on to the machine by twisting the red Emergency Stop button in the direction of the white arrow on the button. The machine will then power up. At this point, the machine will take several seconds while the internal controller initializes, and the machine resets to the “home” position. The head move slightly while it seeks the home position.

When the machine is ready for operation, the name of the currently selected saw, the tooth counter, and various other items of information will be displayed.

At this point, the green light in the START button is not lit, and the clamp jaws are not clamped. The SAW joystick is now active, and is available to operate the saw lift. After raising the saw to the desired height, you can engage the saw clamp by pulling once on the green START button. The saw clamp will now clamp the saw at “drag” pressure, and the index will now be available. The light in the green START button should light. Note that the enclosure hood must be closed in order for the START button to work.

You can use the main joystick to index the saw by holding the joystick to INDEX, then releasing the joystick after the saw is fully indexed forward. Use this feature to index the saw until the index finger is at rest behind the first tooth you wish to grind. At this point the saw lift is still active, and the saw can be raised or lowered using the SAW joystick.

CAUTION: When raising or lowering the saw, the operator must ensure that the saw is not being lifted into the index finger, saw clamp, or dresser pellet assembly.

After the saw is positioned, and the index finger is resting behind the correct tooth, pull the start button again to engage the spindle motor. At this point the saw lift, and manual index feature are disabled. The machine is ready to grind the saw. The green light will now begin to flash.

General Operation:

Place the main joystick to AUTO to begin grinding. The grind head will move down and to the right, ready to grind. The last set of offset adjustments is used. During the grind head move, you can place the joystick into the center position to pause the motion. When the head is close to the tooth, you can engage the “creep mode” by first centering the main joystick, pushing the joystick to IN momentarily, then back into AUTO. The green light will now double its flashing rate to display that the “creep mode” is on. This mode is useful when setting up on the first tooth. During the grind, you can center the joystick at any time to pause the grind head. The grind head must be paused before you can make any offset adjustments. See the section on adjusting offsets.

After the offsets are adjusted to your liking, place the joystick into AUTO, and the machine will then grind the saw for the preset number of teeth, and shut off automatically. The approximate time left to finish the saw will be displayed on the HMI. This will be displayed after the first three teeth are ground, and will update every tooth thereafter. Also shown is the number of teeth remaining on this saw.

To stop grind operation at any time, center the main joystick and place it into the Home position. The machine will stop grinding and the head will retract into the home position.

This machine is designed for fully automatic operation. Once set up and grinding, the machine will monitor a variety of fault conditions, and will shut down automatically if any of those conditions is present. Fault conditions can exist for a variety of reasons. Worn cables to the servo motors, spindle motor, low air pressure, mechanical bind or blockage, etc. Should any of these conditions occur; the machine will stop, and indicate the reason for stopping.

CAUTION: This machine contains sensitive electronic components. Never use any form of arc welding, or any other form of induction welding on this machine, or on any saw or metal connected to this machine. Damage to the controller and other electronic components inside will result.

WARNING!

**DONOTPERFORM ANYMAINTENANCEONTHISMACHINEWITHOUT
FIRSTREMOVINGPOWERUSINGTHEEMERGENCY STOP.THIS
INCLUDESCHANGINGTHEGRINDINGWHEEL.**

WARNING!

DO NOT PUT FINGERS OR ANY OTHER PART OF YOUR HAND OR BODY BETWEEN THE CLAMP JAWS, WITHOUT FIRST REMOVING POWER USING THE EMERGENCY STOP.

Offsets:

The offsets are adjusted by using the head joystick. Movements are in .001 increments for each motion or the offset can be scrolled by holding the joystick. For example to move the head down over the top of the tooth:

- Place the joystick in the AUTO position until it starts to make a pass across the top of the tooth.
- Remove the joystick from the AUTO position.
- Move the Head joystick down 3 times (once for each .001). A pop-up screen will display the values changed.
- Place the Joystick back into the AUTO position. The pop-up screen will now disappear.

Note that the controller automatically compensates on the face, for a change on the top, and automatically compensates on the top, for a change on the face. This means that once you have set the grinder to grind the top of the tooth, you should not have to set it again, even if you change the grind on the face of the tooth. The same is true on the face - once you have set the grind on the face of the tooth, you should not have to change it even if you adjust the grind on the top of the tooth.

The z axis adjustment is adjusted in the same manner but uses the Saw Lift joystick instead of the Head joystick. Moving the joystick down moves the offset toward the operator.

When you are done adjusting offsets and place the main joystick back into AUTO, the tooth counter will be reset to zero, and the grinding head will retract and start the tooth again, with the new offsets in force.

Notes on Automatic Wheel Shaping:

The Talon CNC automatic profile grinder is equipped with an automatic wheel shaping feature, freeing the operator from shaping the wheel. Each time the wheel is shaped, the system in-feeds the head the same amount that was taken off the wheel. This eliminates the need to set the head down after each shaping.

The main component of the automatic shaping feature is known as the "Dress Pellet".

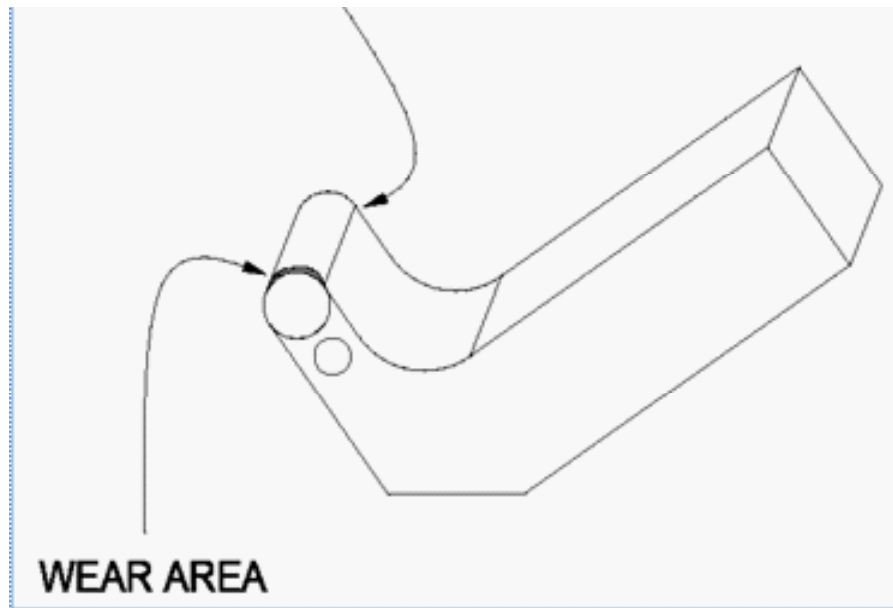
The dress pellet is made from a very hard substance known as polycrystalline-diamond (PCD). Although this substance is very hard, the edge of the PCD dresser pellet will become worn with use. Once this happens, the pellet must be rotated to present a sharp edge to the grinding wheel. If the pellet has already been rotated, usually times, the pellet must be replaced. It is very important to have a sharp edge for dressing. The controller inside the machine assumes that you have a sharp pellet and in-feeds a very precise amount. If the pellet is dull the wheel may not "dress" down as far as it normally would, and will therefore result in uneven grinding as the saw progresses through the grind.

Visually check the pellet at the beginning of each shift (a flashlight may be useful). Note the appearance of the top edge of the pellet. If the pellet is worn you will notice a dull looking appearance on the top edge where the pellet has been worn. See the simplified diagram on the following page.

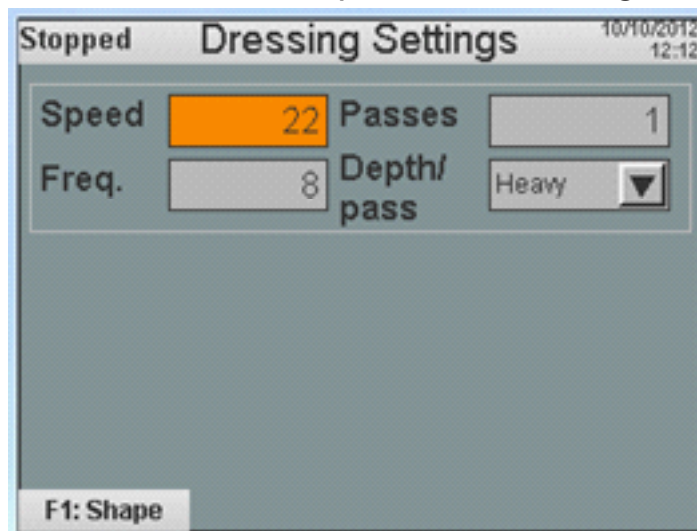
Both the front and back sides may be used for wheel shaping. If you have already rotated the pellet once, it can be removed from the holder and turned around.

To loosen the pellet holder, use a 1/4" wrench to loosen the screw on the back side of the holder. You do not need to remove the screw. After rotating the pellet, make sure the pellet is fully seated in the fixture, prior to tightening the screw again.

Simplified drawing of the PCD pellet holder:
Hex head screw located in back of fixture.

**Dress:**

Pressing the Dress Button on the HMI opens the following screen:



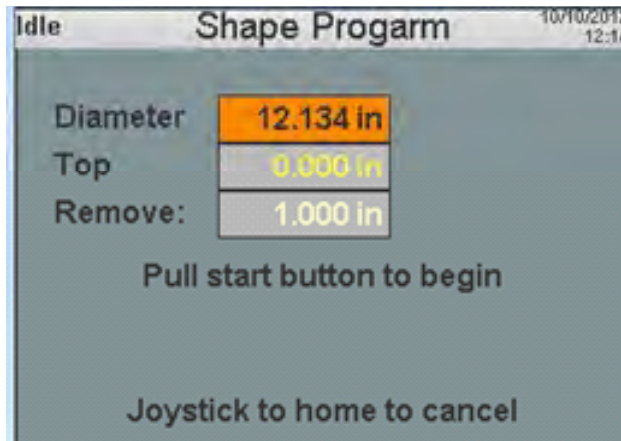
This screen allows modifications to the dress cycle settings. Toggle through the fields with the right/left arrow keys. Fields with numbers can be modified by inputting a new value into the field and pressing the enter key. The Depth/pass field is changed by toggling the up/down arrow keys and pressing enter when the desired choice is highlighted. Changes can be done while the machine is running with modifications seen on the next dress cycle.

Speed– This value is a percentage of the master speed of the machine and reflects the speed that the grinding head moves to and over the dressing pellet.

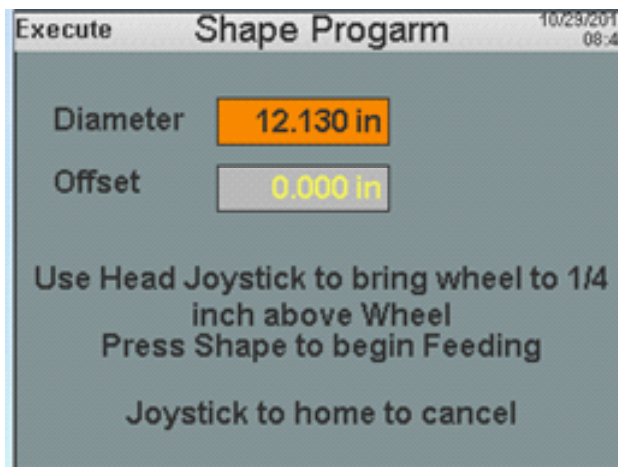
Frequency– How many teeth are ground before the grinding head dresses.

Passes– How many passes the grinding head makes over the dressing pellet per dress cycle.

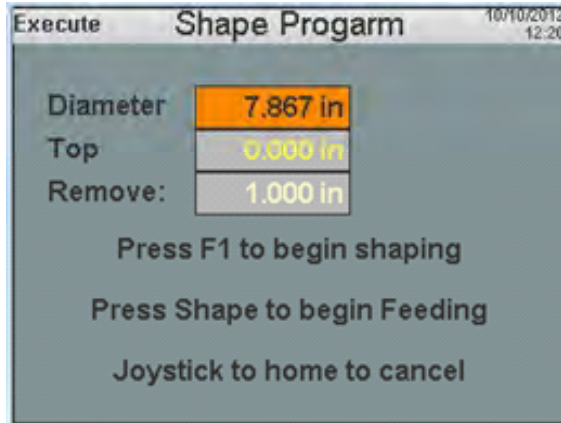
Depth/pass– The depth per pass that is made when the head moves over the dressing pellet. Light (.001), Medium (.002) and Heavy (.003). The Shape Program contains a series of screens containing instructions that walk the operator through the shaping process. Pressing F1 opens the shaping routine screen:



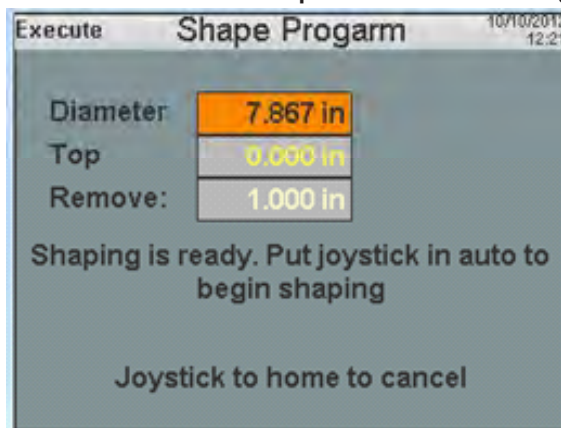
After the start button is pulled the grinding head stages above the pellet and the following screen appears:



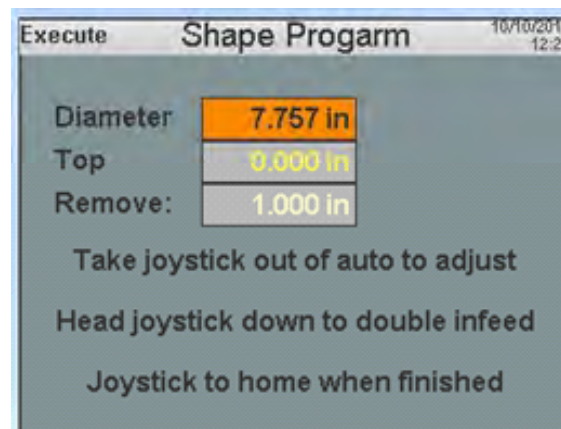
Holding down the Head Joystick moves the head down toward the pellet at a rapid rate of speed. Releasing the joystick and holding it down again moves the head in creep mode. Once the wheel is at the desired location, release the joystick and press the Shape button. The wheel will now oscillate and in-feed as long as the button is pushed. For a new unshaped wheel, leave the wheel at least ¼” off the pellet to allow the automatic cycle to dress the square wheel edges. Previously shaped wheels can be moved to a position just off the pellet. All four positions of the joystick are available for wheel positioning. After the initial joystick movement the following screen appears:



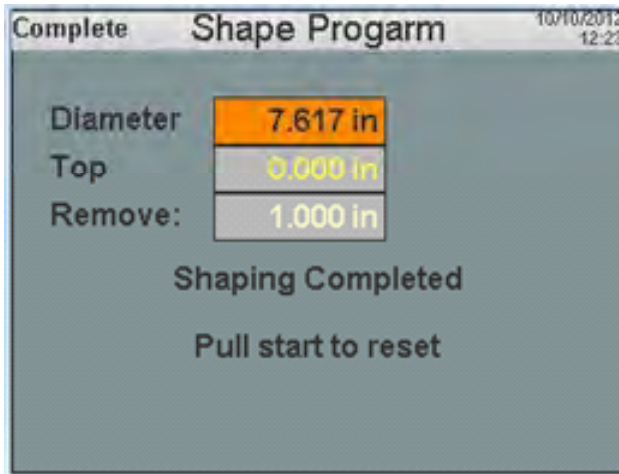
Press F1 to pre-stage the wheel and open the following screen:



When the joystick is placed into auto, the automatic cycle begins to dress the wheel. Holding the joystick down while the wheel is shaping will double the rate that the wheel feeds into the pellet as indicated on the screen:



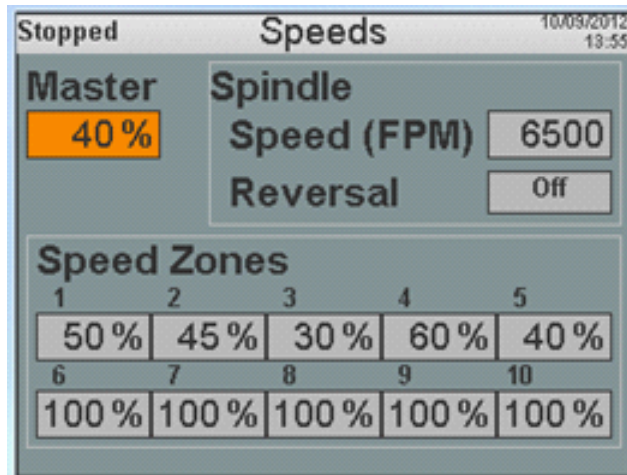
When the shaping is complete and the joystick is placed in the home position the following screen opens:



Adjustingspeedzones

In addition to the Master Speed, the grind path itself is broken up into 10 speed zones. This allows the user to speed up or slow down the speed of the grinding wheel over the tooth in one small area without affecting any of the other areas. This could be useful when the entire tooth looks good except for a small spot where a burn is noticed. If the speed is slowed down the speed in just that one spot, this could eliminate that problem without slowing down the entire grind. Typically the zones are set so that the grind is slowest in the gullet and on the tip, and fastest on the back and down the face.

Pressing the Speeds button of the Talon HMI opens the following screen:

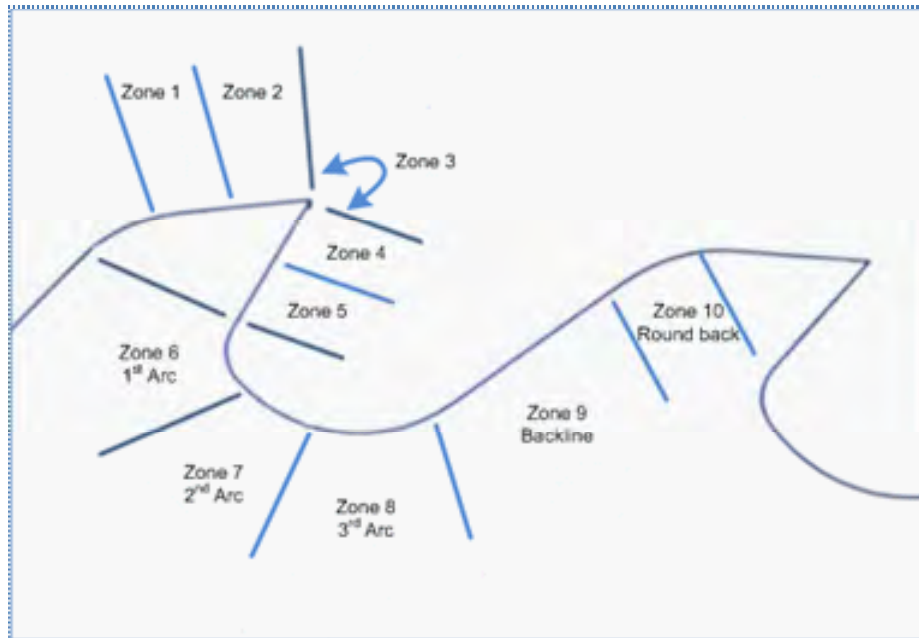


Each field on the Speeds screen can be edited even while the machine is in operation. Toggle through the fields with the left/right arrow keys. Each field with a number value is changed by entering a new value and pressing the enter button. The Reversal field is toggled on and off with the up/down arrow keys. Changes will take effect when the machine transitions to the next state. The current state is displayed in the header to the left of the screen title. In the above example the state was “stopped”.

SpindleSpeed(FPM)– The rim speed of the wheel. This speed is calculated automatically based on the wheel diameter.

SpindleReversal– The spindle reverses between teeth. Used mostly on ATB saws.

Master– The machines master speed. This speed can also be changed on the A chart and description of the speed zones is shown below:



- Speed zone 1 – The first half of the top of tooth.
- Speed zone 2 – The second half of the top of tooth to the tooth tip.
- Speed zone 3 – Movement around the tooth tip.
- Speed zone 4 – From the tip to half way down the face of the tooth.
- Speed zone 5 – Half way down the tooth face to the 1st arc.
- Speed zone 6 – The 1st arc.
- Speed zone 7 – The 2nd arc.
- Speed zone 8 – The 3rd arc.
- Speed zone 9 – The backline of the tooth.
- Speed zone 10 – The tooth round back.

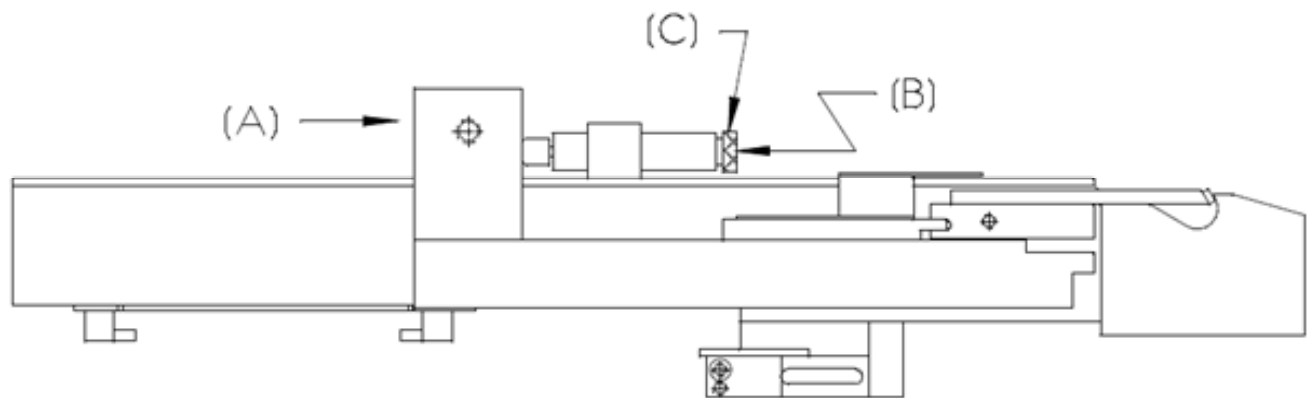
Adjustingtheindexdampener

The index assembly is equipped with a dampening system that prevents the saw from being “thrown”. If the index dampener is not adjusted correctly inconsistent grinding will result. Symptoms of a misadjusted dampener are periodic hard grinding, particularly noticeable on the top of the tooth. This type of problem can also indicate the drag pressure bleeder valve is malfunctioning.

Adjusting the index dampener

The index assembly is equipped with a dampening system that prevents the saw from being “thrown”. If the index dampener is not adjusted correctly inconsistent grinding will result. Symptoms of a misadjusted dampener are periodic hard grinding, particularly noticeable on the top of the tooth. This type of problem can also indicate the drag pressure bleeder valve is malfunctioning.

To adjust the index dampener, remove power to the machine by turning off the E-stop. Then disconnect air to the machine. Refer to the following diagram:



INDEX ASSEMBLY

Push the index fully forward at (A). The operator should feel approximately 10 lbs. of resistance. It should take about 2-3 seconds to move into the fully forward position. To adjust the dampener, loosen the set screw (B) and turn knob (C) to adjust the resistance of the dampener. Repeat the process until the operator feels about 10 lbs. of pressure. After this tighten the set screw.

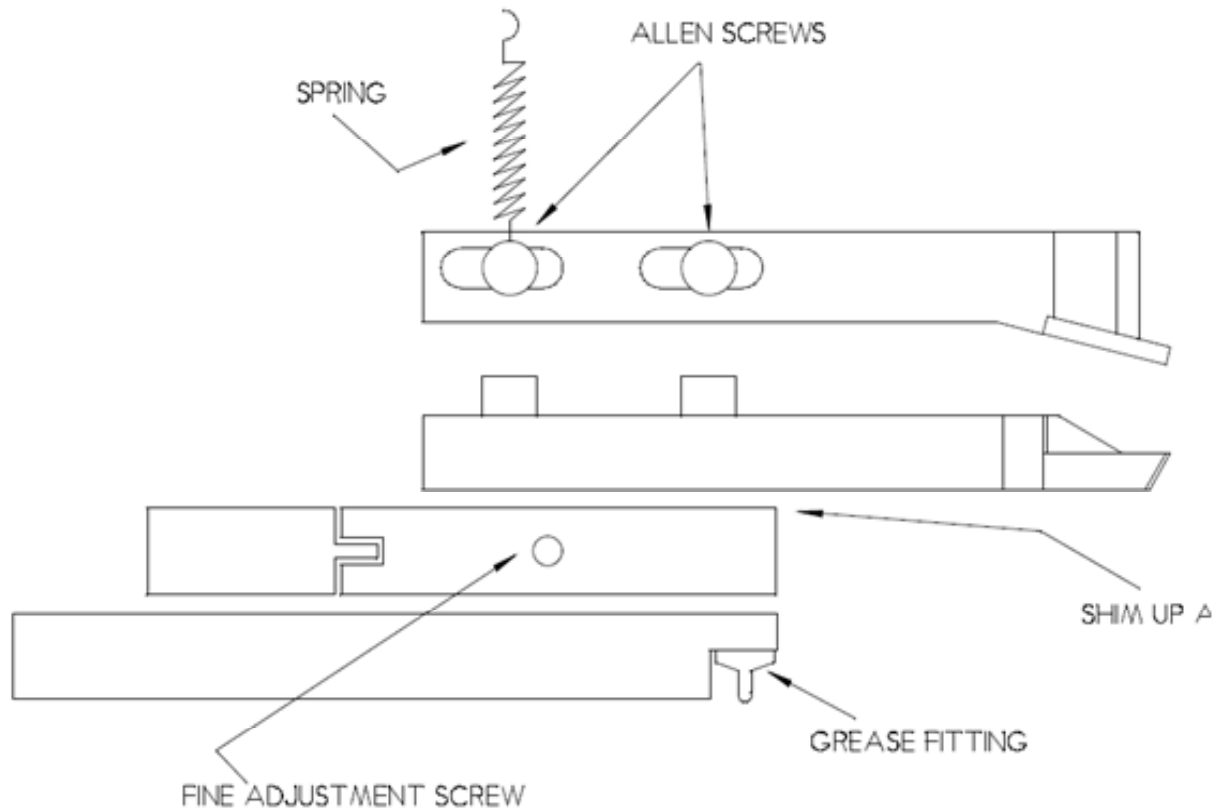
WARNING!

DONOT reconnect the air to the machine while hands are in the index area. Several pinch points exist that could cause bodily damage.

Adjusting the index finger

The index feed finger can be adjusted in several ways. Indications that the index finger needs to be adjusted include uneven grinding of the saw and/or feed finger slipping past the tooth (miss-indexing). Individual taste also dictates how the finger should be adjusted.

The finger may be adjusted up and down through the use of shims. Refer to the following illustration:



The finger may be adjusted forward and backward by loosening the Allen head screws on the top of the finger, then moving the finger forward or backward in the slots provided.

The carbide on the tip of the feed finger should be adjusted so that it is centered on the saw tooth being ground. This is done using the fine adjustment screw (Allen head) located on the side of the index finger assembly.

The grease fitting is located on the bottom of the assembly at the feed finger pivot point.

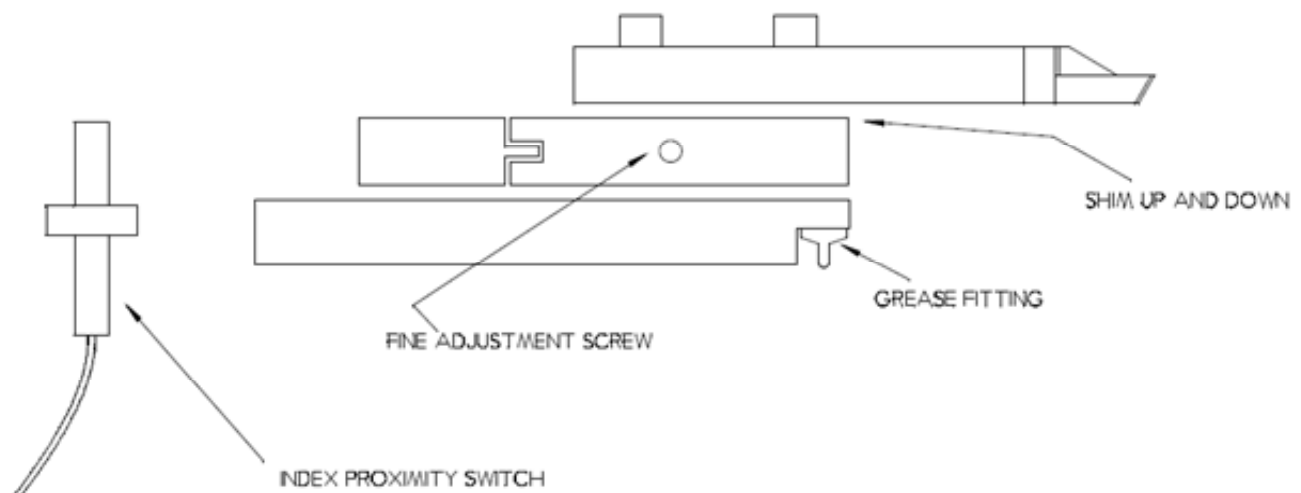
If the feed finger shows any play up and down, the nut on the outside of the grease fitting should be tightened until all play is removed. **Donot overtighten this adjustment as the feed finger must be able to spring back into position.** This fitting should be greased once a week.

Adjusting the index proximity switch

The index proximity switch is located underneath the index assembly. It can be identified by the small gray wire leading to it. When the index finger is fully forward, the small LED light on the bottom of the switch should not be lit. When the index is not fully forward, the small LED light on the bottom of the switch should be lit.

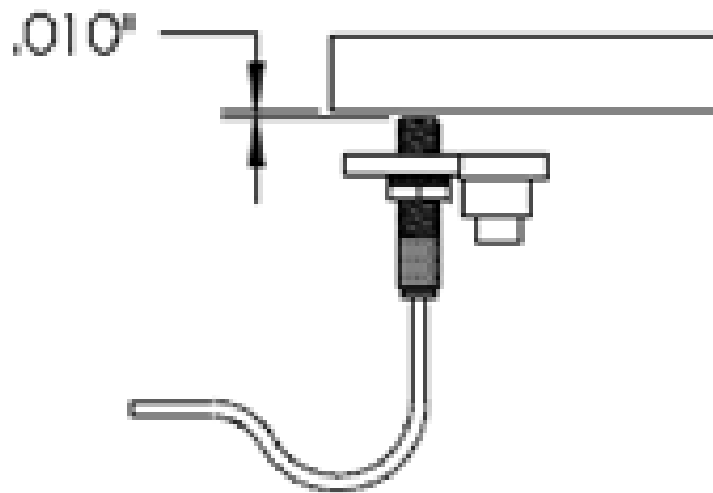
The proper adjustment of this switch is very important to the proper operation of the machine. All adjustments to this switch should be done with the air disconnected. The body of the switch is threaded and extends through a threaded hole in the prox mounting bracket. The switch is held locked with a locking nut. To adjust the proximity switch vertically, move the index finger into the fully retracted position then loosen the lock nut. Screw the proximity switch up until it contacts the index assembly. Then back the switch out 1/8 of a turn. The small LED light on the bottom of the switch should be lit up. Tighten the locking nut when you are done.

There is also an adjustment so that the index prox switch signals the controller when the index assembly is fully forward. When the index is fully forward, the small LED light on the bottom of the switch should not be illuminated. To adjust the switch, first remove air from the machine, then manually push and hold the index assembly fully forward. Loosen the machine screw that is through the adjustment slot on the prox mounting bracket. Slide the switch until the small LED light on the bottom of the prox illuminates. (The index should still be fully forward). Now slide the prox back until the small LED light on the bottom of the prox goes out. There should be about .010 inches of travel between when the light goes out, and when the index assembly is fully forward. After the prox is adjusted side to side, tighten the machine screw in the adjustment slot. The index proximity switch is located underneath the index assembly. It can be identified by the small gray wire leading to it. The illustration below shows the location of the prox switch in relation to the index finger:

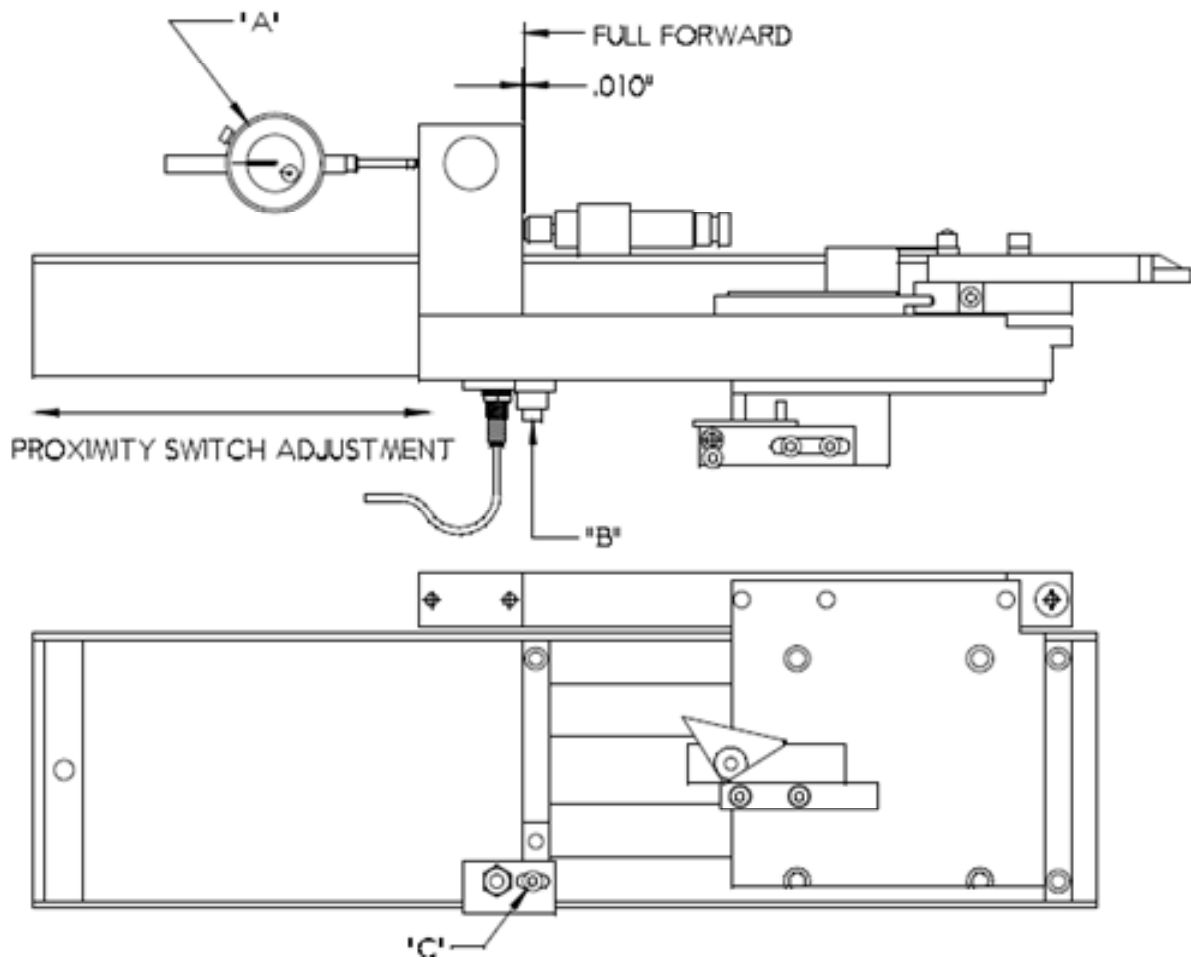


Adjustment steps:

- Disconnect air.
- Check prox to target clearance located inside of index unit. Set at .010" gap (use .010 feeler gauge). Make sure the prox target rod is straight in line and reads consistently on the feeler gauge at all points of travel.
- Push index to full forward position.
- Set up dial indicator as shown at "A".
- Be sure index is full forward, and zero indicator.
- Loosen 1/4 - 20 SHCS which secures prox bracket shown at "B and "C".

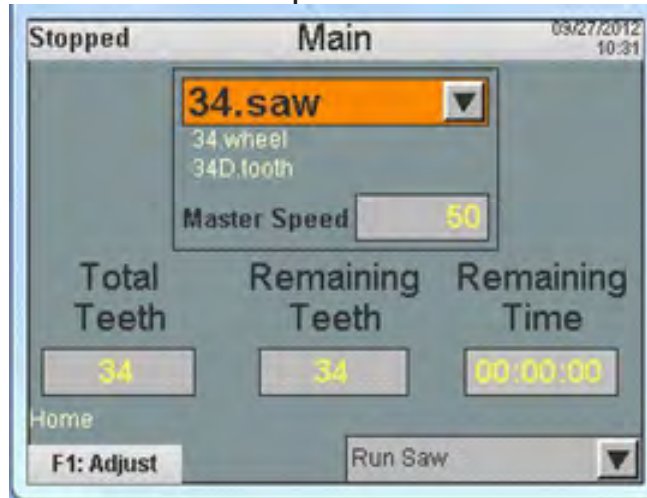


- Move index back from full forward .010”.
- Slide prox bracket so that prox switch just trips.
- Tighten 1/4 - 20 SHCS.
- Move index forward and back several times to monitor trip point of prox (should be at .010”). Note that the trip point of the prox is only accurate and consistent when index is moving forward. Quite often the adjustment changes upon re-tightening the cap bolt that holds the prox bracket. Re-adjust as necessary.

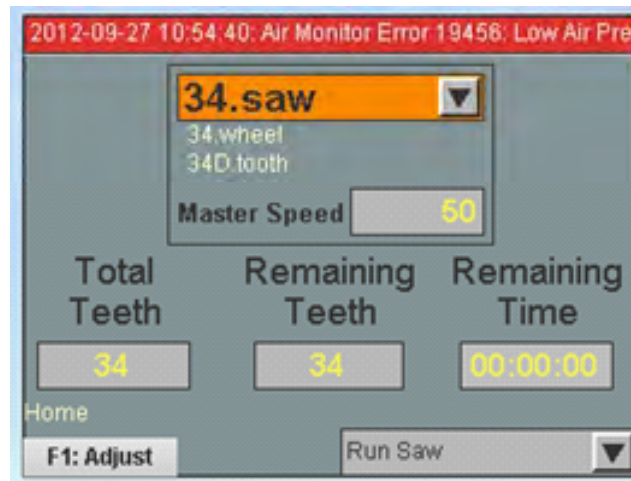


MainScreen:

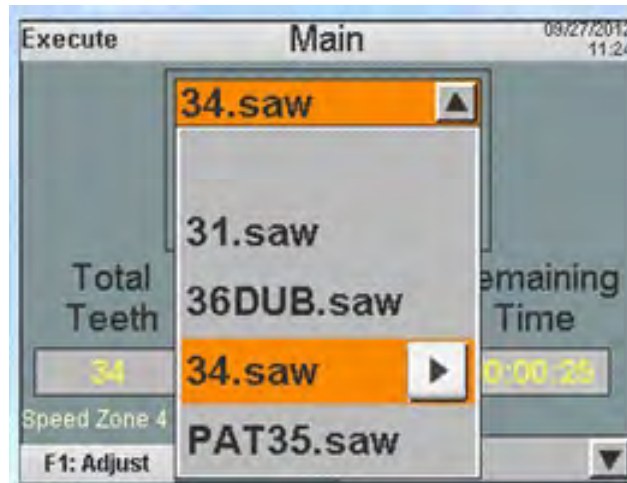
The Main screen of the Talon C.N.C. is loaded after boot-up when the power is applied to the machine via the e-stop:



The header of the display indicates the condition of the machine (stopped, idle, executing etc.) and the name of the screen being displayed. Error conditions will cause the header to turn red and display text relating to that condition. These errors are displayed in detail with corrective actions on the alarms screen. When the alarm conditions are dealt with the header becomes reset. These header actions are common to all screens on the Talon display.

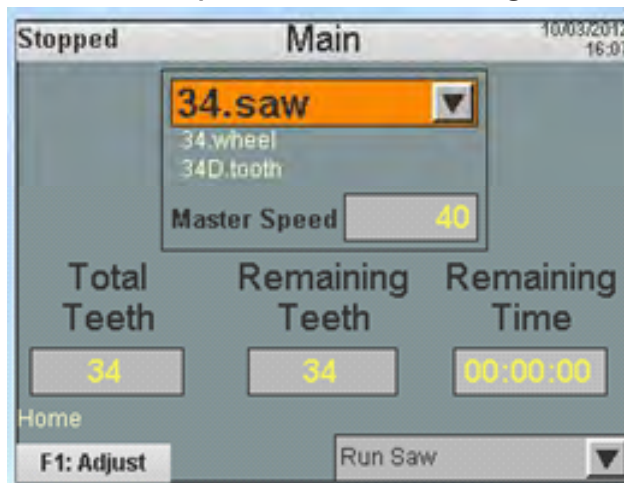


The left/right arrow keys allow the operator to toggle between fields that can be change by operator input. The field highlighted in **ORANGE** is available for change by pressing the arrow direction indicated to the right of the field. Pressing the down arrow in the above display example opens different saw file options.



The up/down arrow keys now allow the operator to toggle through the available saw files. When the desired choice is highlighted pressing the right arrow key loads that saw file. The display below the saw file text indicates the wheel that was loaded with the saw file and the current tooth that is being ground.

When the Master Speed field is highlighted the operator can enter a new value in with the keypad. Until the enter button is pressed the change is not made. The Master Speed value can be changed even while the machine is in operation but waits until the current speed zone is completed before taking effect.



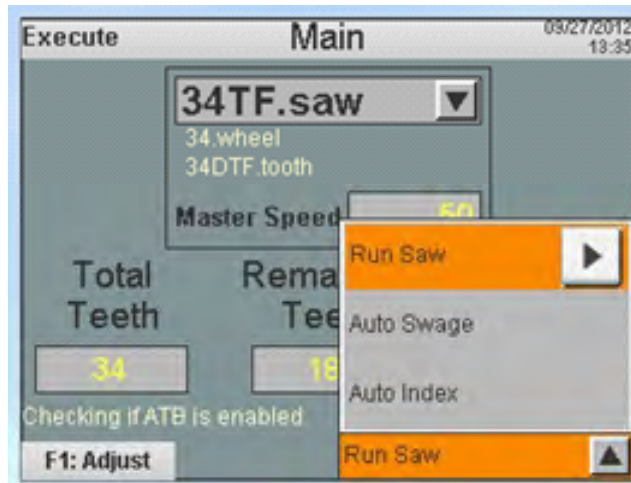
The Total Teeth, Remaining Teeth and Remaining Time fields are read only displays on the Main screen.

The “Home” field as displayed above indicates the current location or action of the grinding head and changes as the head moves. Pressing F1 from the Main screen enables the profile screen which depicts a live trace of the actual movement of the grinding head. The following example was captured when the grinding head was “moving to a safe location” before the next tooth was indexed. This grind was done at 5% of Master Speed and shows the grinding head movement

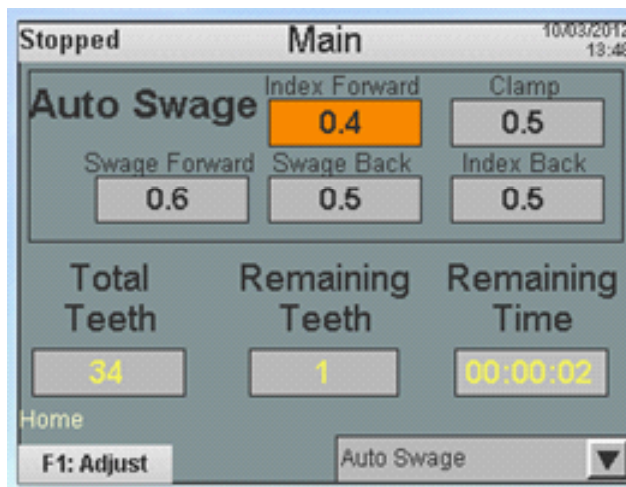
(green) and the profile created by the contact point where the wheel profiled the tooth (purple).



From the remaining field the operator has the option of running a normal saw, Auto Swage or Auto Index program.



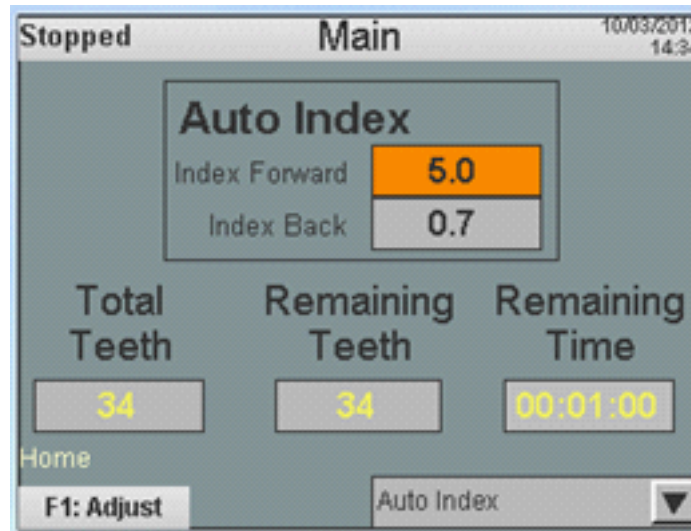
Selecting the Auto Swage option opens the following screen:



The Auto Swage function uses the tooth count from the saw file that was loaded when the function was turned on. The above values serve as a good starting point with the mac valve flow controls fully open. These field values can be adjusted to optimize swage operation:

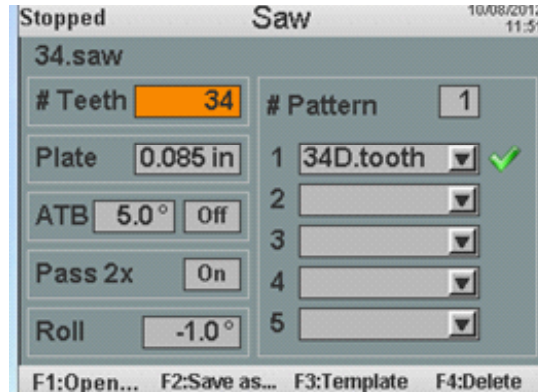
- Index Forward – The time necessary to index the tooth forward before starting the clamp and swage actions.
- Clamp – The delay time required before the clamp is turned on after the cycle begins.
- Swage Forward – The time required to swage the tooth.
- Swage Back – This time allows the swage to return to its home position before the index starts its return begin indexing the next tooth.
- Index Back – The time it takes for the index to return to the home position before repeating the cycle.

The Auto Index function also uses the tooth count from the saw file that was loaded when the function was turned on. This function allows the operator to do bench work while the saw is indexed based on time. Both the Index Forward and Index Back values are adjustable. Selecting the Auto Index option opens the following screen:



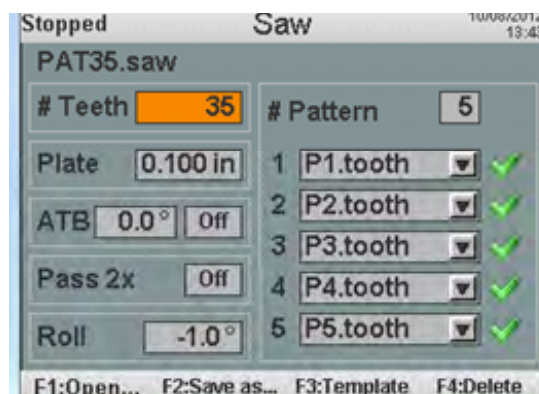
SawScreen:

The specifics of the saw program selected from the Main screen are displayed and changed on the Saw screen:



Each field on the saw screen that contains a numeric value can be changed by highlighting the field, inputting a value with the keyboard and pressing the enter button. Unless the enter button is pushed the value will revert to the previous entry. An incorrect value can be nullified by the Cancel button. Field descriptions are as follows:

- # Teeth – The amount of teeth on the currently loaded saw program. In this example there are 34 teeth in the saw program named 34.saw.
- Plate – The plate thickness of the saw.
- ATB – The alternate top bevel angle of the saw if there is one. The ATB can be turned on or off with the up/down arrow keys.
- Pass 2x – Turning on this option causes the grinding head to make a final pass over the top of tooth of .0005. This serves as a cleanup pass for each tooth.
- Roll – The Roll feature allows each tooth of the saw to be rotated. This is particularly valuable when grinding round back saws since the round back is blended between the top of tooth pass on one tooth and the gullet pass on the previous tooth.
- # Pattern – The number of teeth in the pattern.
- 1-5 – The drop down menu allows the operator to choose teeth from the tooth catalog. The following example is a variable pitch saw with 5 teeth. The teeth were designed, individually named and chosen from the tooth catalog:



Any saw program that is open can be modified from the Saw screen when the green start light is off. The changes will take effect immediately however the changes will not become a permanent part of the saw program unless the Save button is pushed. Failure to push the Save button will result in the original settings being loaded when the program is opened at a future time.

F1:Open – Opens the saw catalog for saw program selection. Toggle through the selections with the up/down arrow keys. Press F1 again to open the .saw file highlighted in orange.



F2:Saveas – Opens options for saving the saw program. Toggle through the selections with the up/down arrow keys and press F1 to save the saw as the .saw file highlighted in orange.



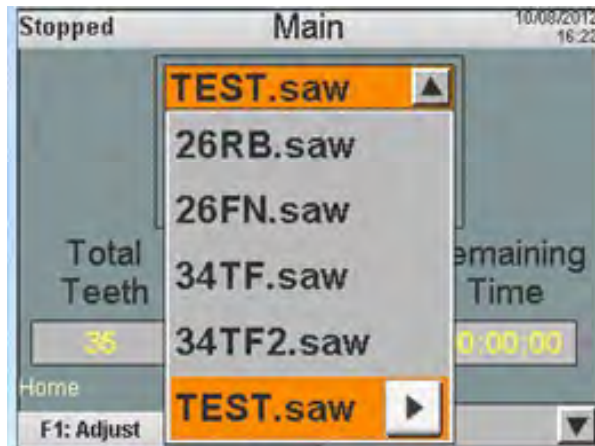
To make a new Saw program name, any existing saw program can be renamed and saved as a new program without being overwritten. To save the above program with a different name, press the right arrow key to place the cursor inside the field. Use the left/right arrow keys to move the cursor until it is just to the left of .saw as shown below

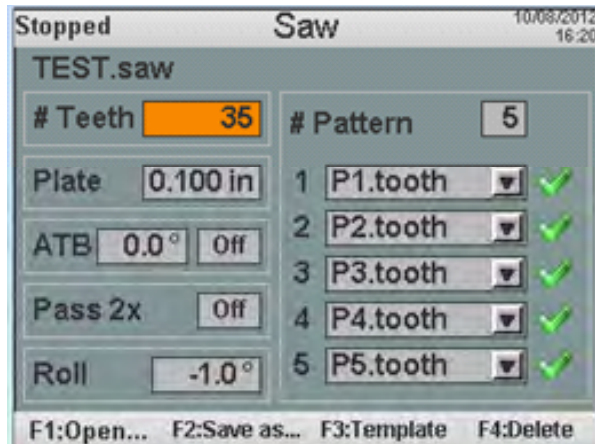


Pressing the F3 and F4 buttons toggle the keypad through numbers and letter options. Press the F4 button and use the delete button on the keypad to remove PAT35 from the name. Now type in TEST (or whatever name you choose) and press the enter key. **Unless the enter key is pressed the file will not be saved when the F1: Save key is pressed!** The screen should now look like this:



Press F1 to save the file. TEST saw will now be available for selection in the Saw drop down menu on the Main page.





F3:Template– Templates are files placed in the machine by the factory for back-up purposes. These files cannot be modified as factory files but can be transferred to a user folder and modified there. This is also the location files are placed in when updating with a USB stick. To transfer a saw program the operator must open the desired file, use the Save as command and name the file. This copies the file from the factory folder to the user folder where it can be modified without affecting the original factory file. The following is a sample menu of what could be available in the factory saw program file:



F4:Delete– Opens the menu for deleting a saw program. The saw highlighted in orange will be deleted.



Pressing F1 in the above example will bring up a pop up box that asks if you're sure you want to delete PAT35.saw. When a saw program is deleted the operator must select and load a saw program from the Main page. Wheel selection for saw programs: The wheel for each saw program is loaded when the saw program is opened and displayed below the saw name:



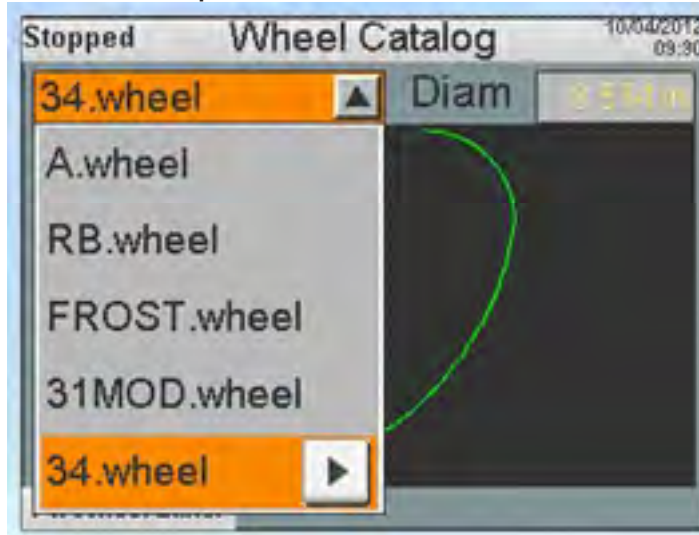
To change a wheel in a saw program open the wheel catalog and select wheel. Open the Main screen again and the wheel just opened will now be shown below the saw program name. The change will not be allowed if the green start light is on. **Greatcareshouldbetakenwhenchangingwheelsinasawprogram. Runthewheelinstallprogrambeforegrindingasawtodressthewheelto thepropershape!!** Open the Saw screen and press the save button to include the new wheel as a permanent part of the saw program. If save is not pressed from the Saw screen the change will not be made the next time the saw program is opened.



WheelScreen

Pressing the Wheel button of the Talon HMI opens the following screen:

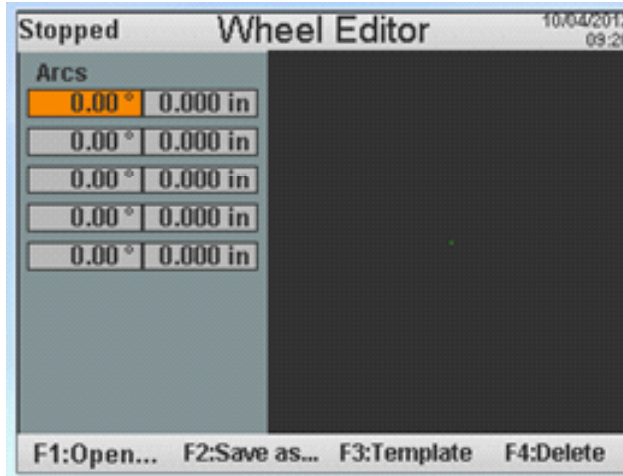
The Wheel Catalog displays the currently selected tooth and contains a drop-down menu that allows the operator to select and view any wheel currently available. Pressing the down arrow opens the menu.



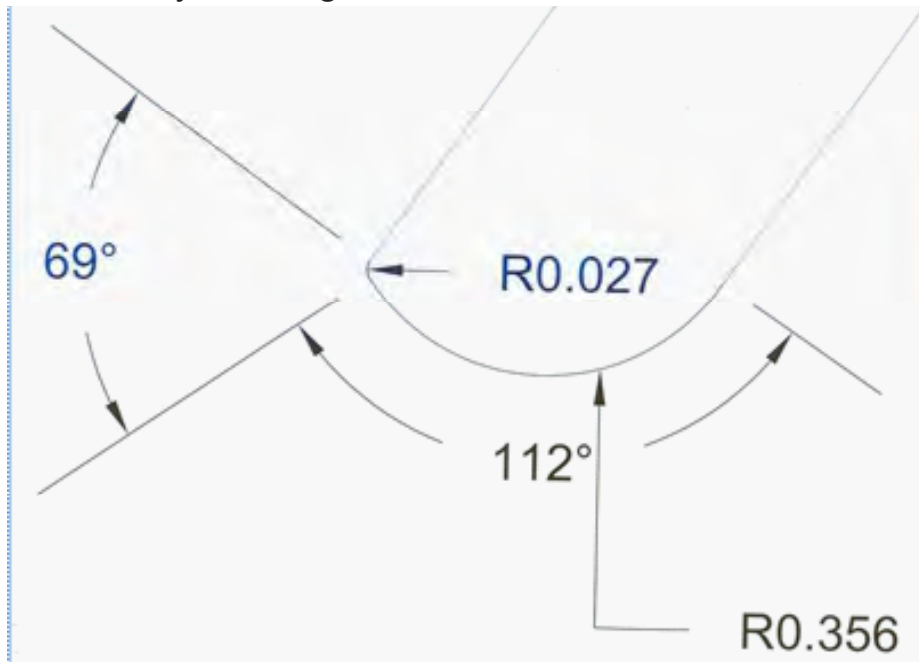
The up/down arrows allow movement through the options and the right arrow chooses the highlighted selection. **Opening a wheel that is different than the wheel loaded with the currently selected saw program will run the newly opened wheel when the saw is ground!!! Make sure to use the correct wheel for the saw program that is running. Should a wheel change be desired, make sure to run the wheel install program before grinding a saw.** The current wheel is displayed on the main screen:



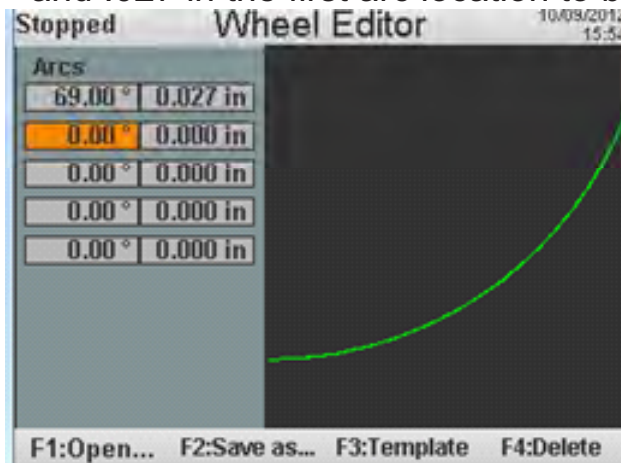
Pressing F1 opens the editor where wheels are created and modified. If no wheel has been opened since the last power-up, there will be no name displayed and all the values will read zero when the editor is opened



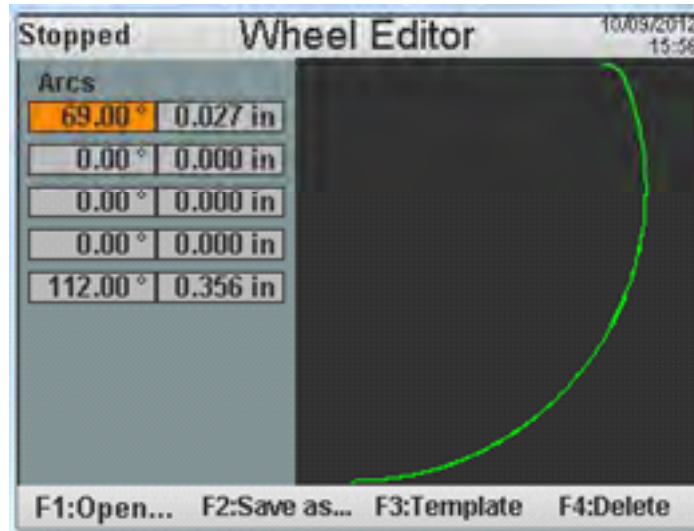
Begin building a wheel by entering in values from a CAD file. An example is shown below.



Enter the values of 69° and .027 in the first arc location to begin the design:



Each wheel is allowed up to 5 arcs. The values for the last arc must be entered into the 5th arc location. Since our example has only two arcs enter 112° and .356 into those fields. The finished wheel design looks like this:



To save the new wheel, begin by pressing F2:

An existing wheel name can be selected by using the up/down arrow keys. When the desired choice appears in the highlighted orange box, press F1 to save the wheel. The new wheel design has now replaced the previous design.



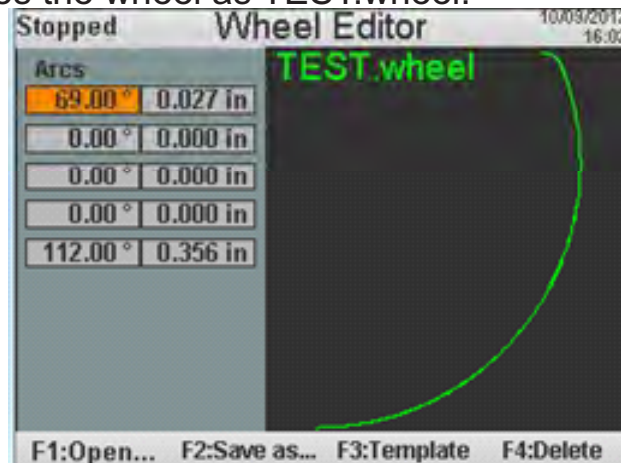
To save the new wheel with **anewname** press the right arrow key once to place the cursor inside the orange box. With the right/left arrow keys place the cursor just to the left of the .wheel characters. Press the F4 key once to change the number pad to letters and press the delete key until only .wheel is remaining. The editor should now look like this:



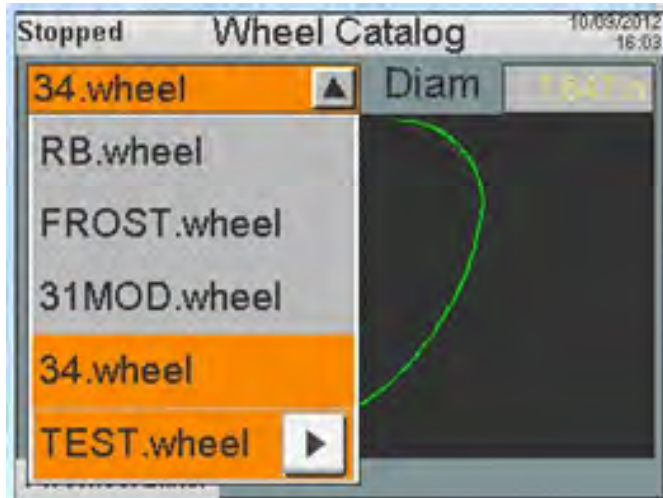
The F3 and F4 keys change the keypad through number and character options. Using the keypad type in TEST (or any name) and press enter. If the enter key is not pressed, the wheel name will not be saved when pressing F1.



Pressing F1 now saves the wheel as TEST.wheel.

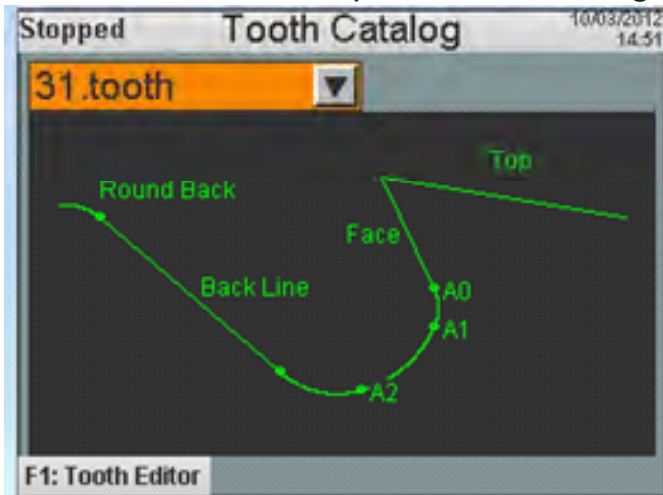


Once the wheel has been designed it can be opened and edited by selecting it in the wheel editor. Changes made to any wheel open in the editor can be saved by pressing the Save button on the HMI. After saving TEST.wheel, the selection becomes available for use in the wheel catalog as shown below:

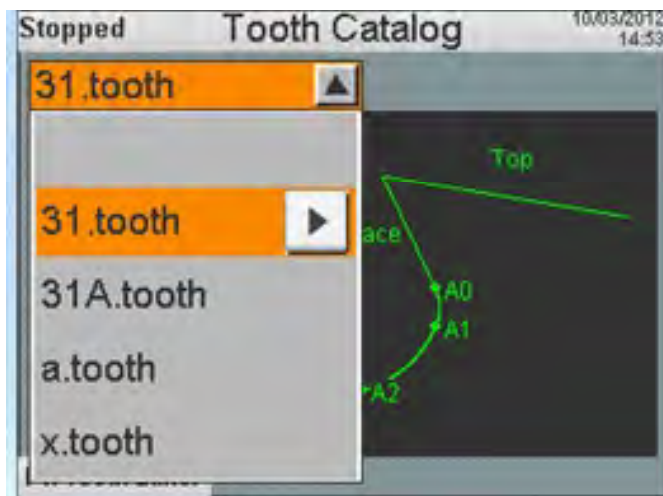


ToothScreen

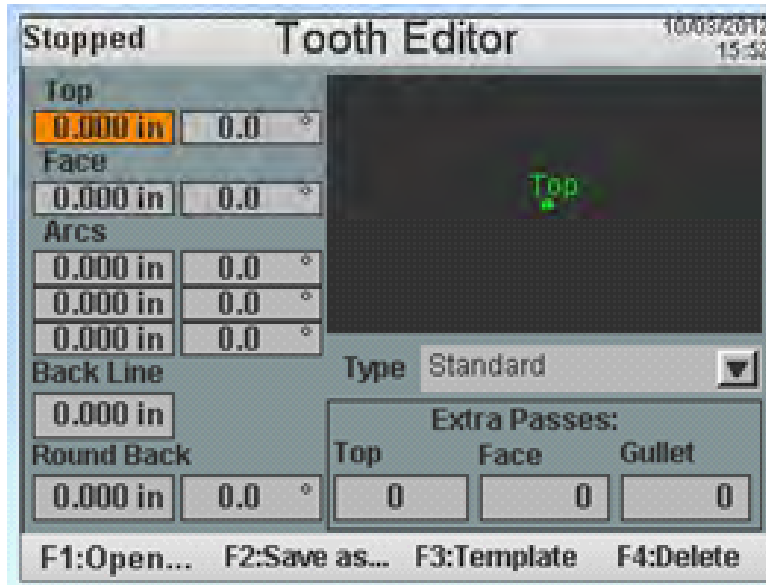
Pressing the Tooth button of the Talon HMI opens the following screen:



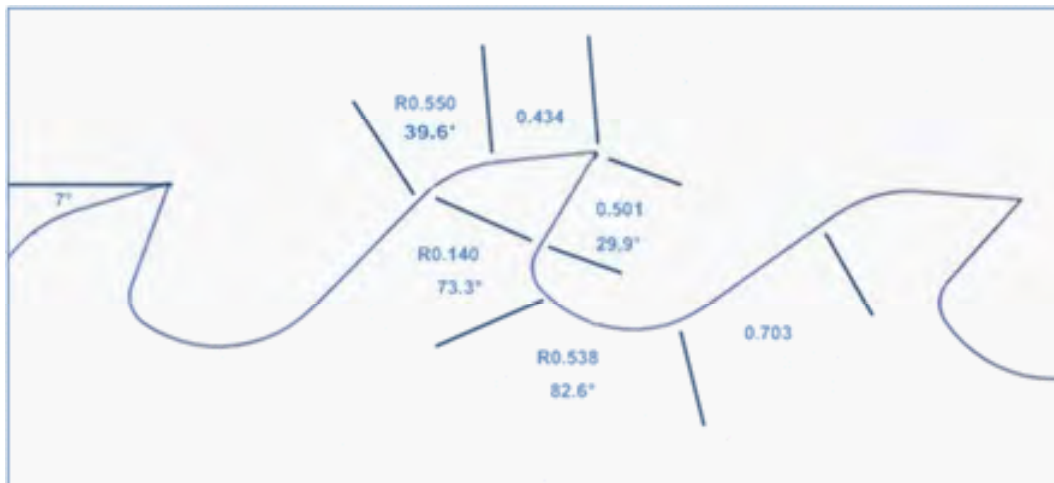
The Tooth Catalog displays the currently selected tooth and contains a drop-down menu that allows the operator to select and view any tooth available for use. Pressing the down arrow opens the menu.



The up/down arrows allow movement through the options and by pressing the right arrow the highlighted selection is chosen. Pressing F1 opens the Tooth Editor where teeth are created and modified.



If a tooth has been not opened since the last power-up, there will be no name displayed and all the values will read zero. Begin designing a tooth by entering the desired tooth values developed in a cad file. As the values are entered into the editor the tooth shape is drawn on the editor screen. Below is an example of how the tooth shape develops as the values are entered from the CAD diagram.



The top of the tooth is 0.434 at 7° while the tooth face is 0.501 at 29.9°. When these values are entered into the editor the drawing appears as:



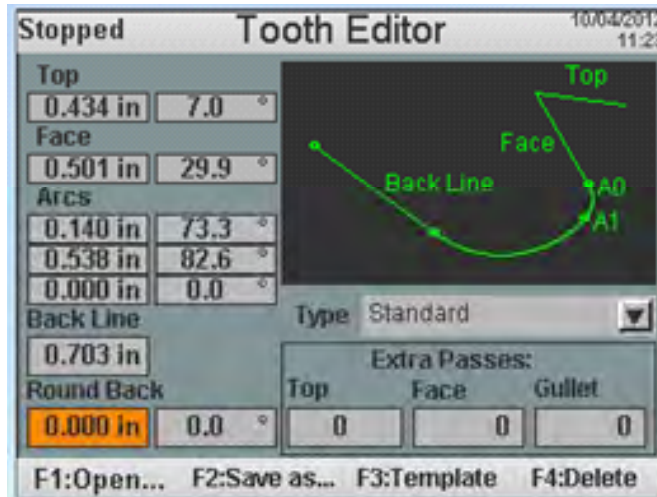
Each tooth is allowed up to 3 arcs to form the gullet shape. The first arc in the above example has a radius arc distance of 0.140 at 73.3°. These values must be entered into the first arc position. **Caution: Placing values in position two or three while leaving zeros in the position above it could cause the grinding wheel to move directly into the gullet!!** After the first arc values are entered the



The second arc values are entered: R0.538 at 82.6°



Since there are no values for the third arc in this example these fields are left with zeros. The backline has a length of 0.703 which results in:



The final shape values are for the Round Back. The distance value is 0.550 at 39.6°. The fully shaped tooth is now displayed and labeled in the Tooth Editor.



The Extra Passes field gives the operator the option of making multiple passes over each of the Top, Face and Gullet areas. These passes will be made in sequence. All top passes will be made first followed by face passes and finally gullet passes which include the Back Line and Round Back sections. Each extra pass takes off an additional .005 except for the final which removes .0005. Since the pass values are saved with each tooth the operator can make additional teeth and save them under another name for selection on the Saw screen. He can then select the appropriate tooth when the saw program is open. Another option is to open the tooth he is currently using, change the passes to his desired settings and press the save button. At that point the current tooth will take on the changes made in the editor.

The tooth Type for this example is Standard as is displayed in the Type field. Other options are displayed in the drop down menu. **Makesuretousethecorrecttooth typefortheoperationyouwanttoperform!**



To save our above example, press the F2 button to open the file options. The up/down arrows allow selection of previously designed teeth should the operator want to use an existing tooth name and overwrite a tooth that was previously made. To do that toggle through the options until your choice is displayed in the highlighted



To make a new tooth name, any existing tooth can be renamed and saved without being overwritten. Notice that 31.tooth is highlighted in orange in the above example. Since that's not what we want to call our new tooth we are going to change the name in the field and save it with a new name. Pressing the right arrow key places a cursor inside the field. Move the cursor until it is just to the left of .tooth



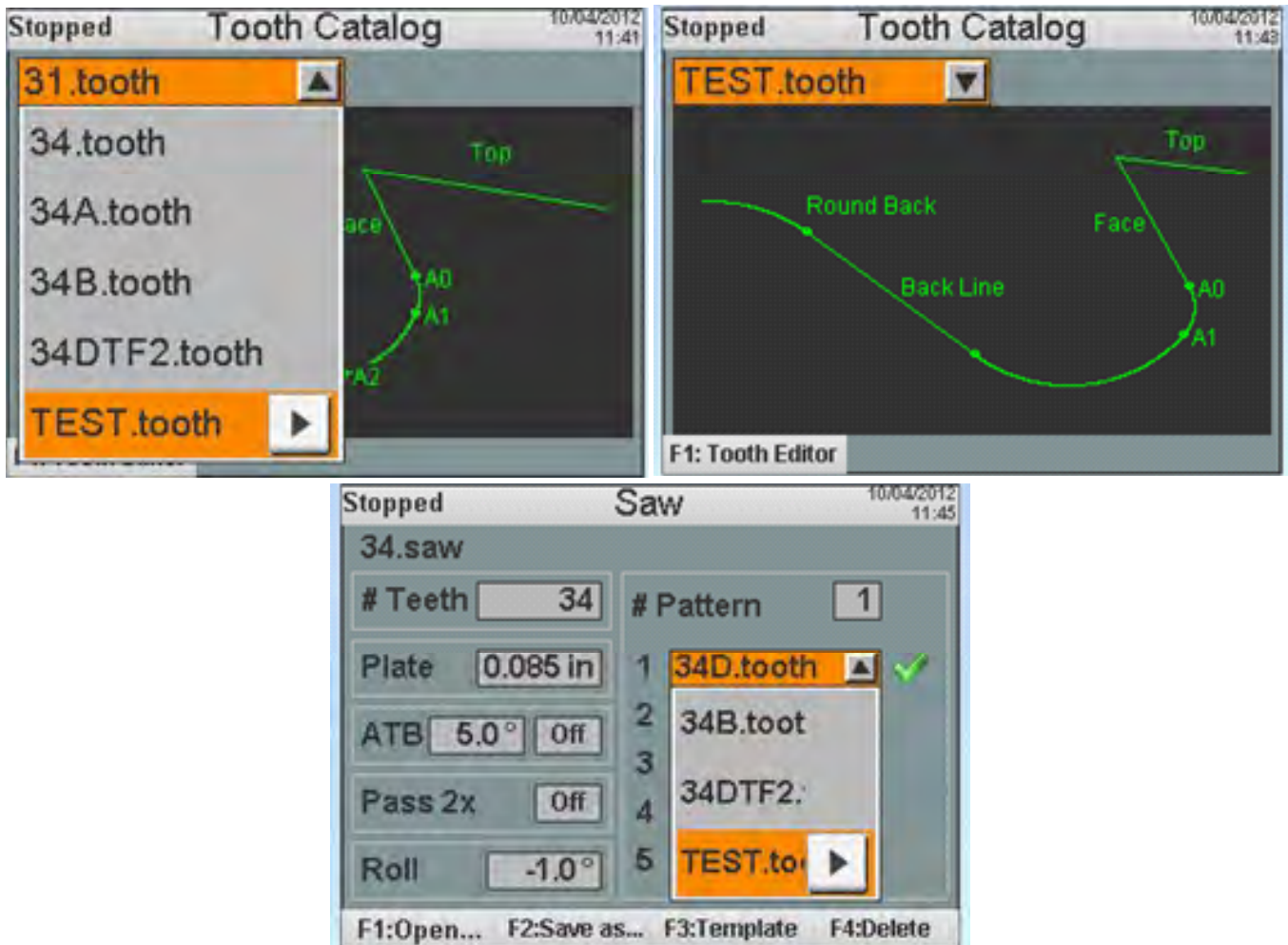
Pressing the F3 and F4 buttons toggle the keypad through numbers and letter options. Pressing F4 once will change the keypad as follows:



By pressing the delete button twice the 31 has been removed from the tooth name. Type in TEST (use the F3/F4 buttons to display the correct character options) and press enter. Note: The new tooth cannot be saved without pressing the enter button which removes the cursor from the highlighted field. The screen should now look as follows:



Pressing F1 now saves the newly designed tooth as TEST.tooth and makes it available in the Tooth Catalog for viewing and for selection in the Saw screen menu.



To edit an existing tooth, open the Tooth Editor and press the F1 button. Highlight the desired selection and Press F1 to open that selection. The tooth can now be modified and saved as a different tooth with a different name using the above procedure. Press the Save button to keep the same file name.

SaveButton:

Pressing the Save button of the Talon HMI performs certain operations when the following are open. The following describe these operations.

- Saw screen – Any changes to a saw program while the saw screen is open will be saved. Should a different wheel be opened than is saved in the saw program, opening the Saw screen and pressing the save button will also save the new wheel with the program.
- Tooth editor – Changes made to any tooth profile open in the Tooth editor will be saved.

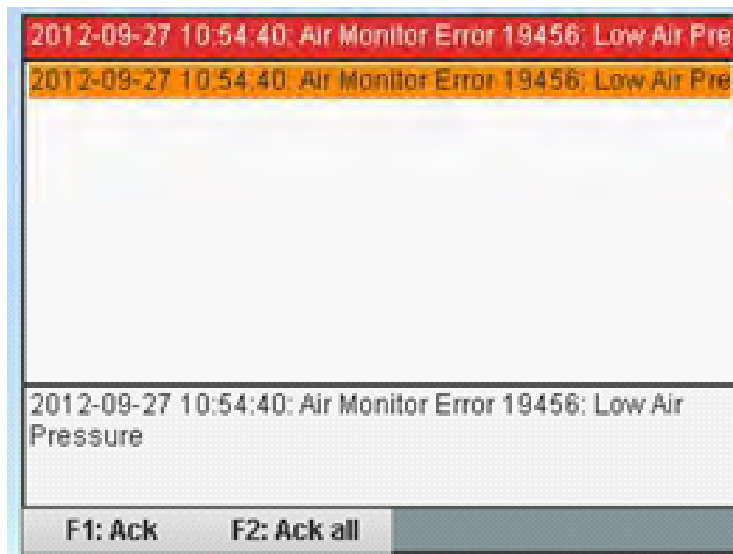
- Wheel editor – Changes to any wheel profile open in the Wheel editor will be saved.
- Machine settings – Any changes made will be save to the machine setting file that is currently in use. These settings are discussed in detail in the Configuration section of this manual.

CancelButton:

This button is used to cancel edits done to open fields that are being edited. For example, the operator wants to change the master speed to 50% but types in 80. Instead of pressing enter, the Cancel button can be pressed which restores the original value. Another case would be where the operator begins editing a field and looks up to find it's the wrong field being edited. Pressing the Cancel button restores the original value.

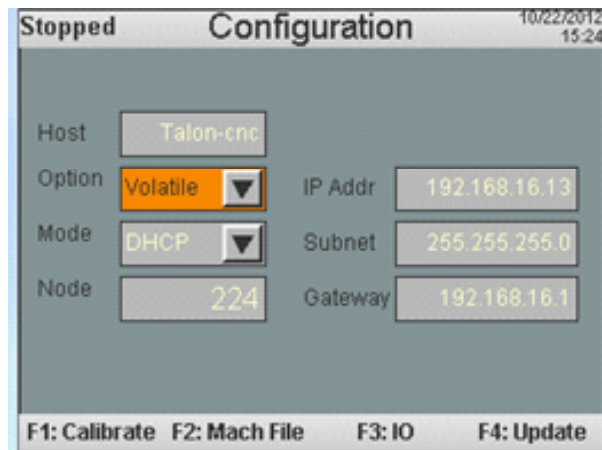
Errors:

Should the Talon CNC stop because on an error condition, pressing the Errors button will open a screen describing the error conditions and give options of acknowledging all the errors listed or one error at a time. Toggle through the errors with the up/down arrow keys. The highlighted error will be described in detail on the lower portion of the screen. The following example shows the screen when the air pressure to the machine drops below 70 pounds.



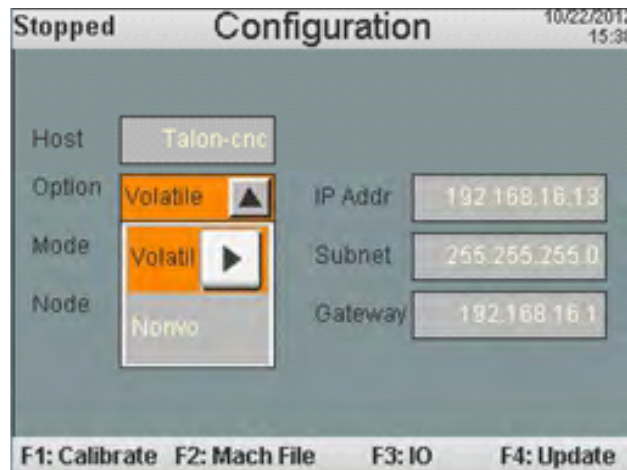
Configuration

Press the Config. Button on the HMI to open the following screen:

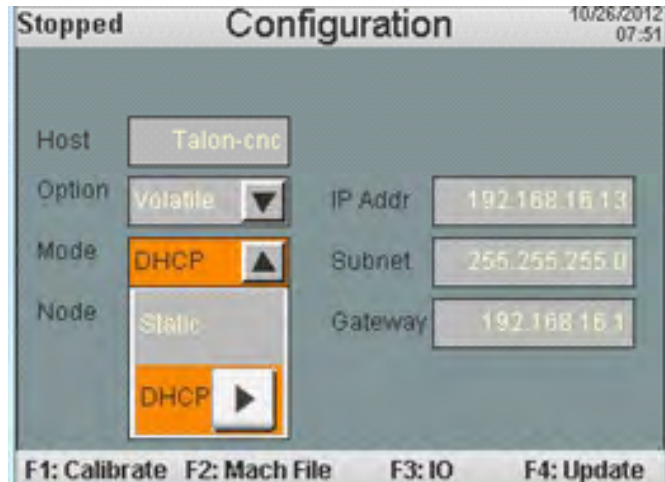


The values on the Configuration screen are used when connecting to the CNC through the Ethernet cable. When these values are changed by the user, connectivity is affected but not machine operation. Each field of the Configuration screen and the F-key functions are discussed below:

- **Host:** The name of the CNC machine used by the machine owner's network server for identification purposes.
- **Option:** Selecting Volatile will result in the changes made to this screen being in place for only the current session. A setting of Non-Volatile results in fixed changes.

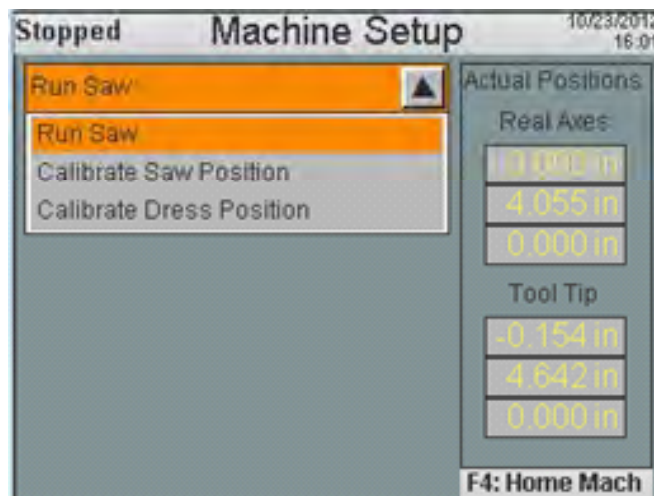


- **Mode:** Gives the network administrator options for setting up internet communication to the machine. There are two options available in the mode field. The Dynamic Host Configuration Protocol (DHCP) option allows the network server to assign the IP address, subnet mask and gateway to the machine. The Ethernet cable must be plugged in prior to powering up the machine for these values to be assigned. Should the network administrator choose to assign these values manually, the Static option in the drop down menu should be chosen.



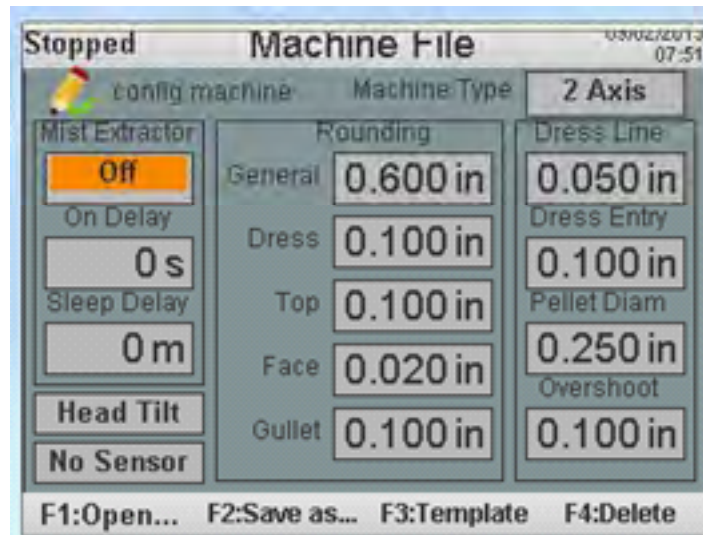
- Node:** The node value is set by adjusting the node switches on the side of the HMI. The factory setting is 224.
 The F1-F4 buttons on the Configuration screen bring up the following screens:

F1:Calibrate: The Calibrate screen shows the actual positions of the X, Y and Z axis and the tool tip location of each axis based on the current wheel diameter. Pressing F4 from this screen causes the CNC to home each axis off the home switches. Drop down menu selections are shown below. Run Saw is the normal selection:



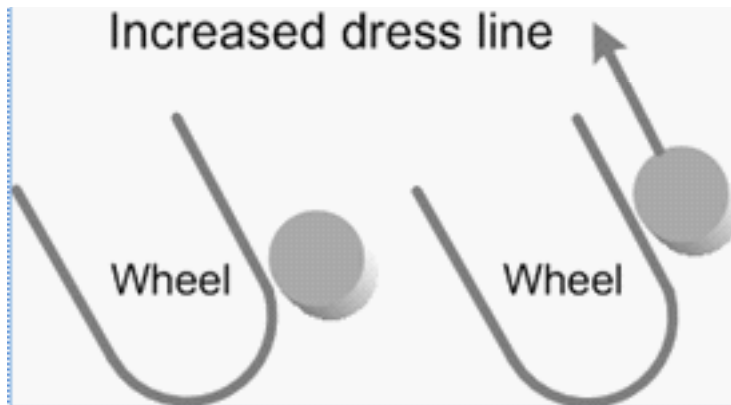
An initial calibration of the grinding head in relationship to the saw tip position and the dressing pellet is made when the machine is originally commissioned. These initial positions are overwritten when a wheel is installed and the grinding wheel is set up on a tooth. The operator should not have a need to use the calibrate options.

F2:Machinefile: The Machine File contains input fields that can be changed by the user to optimize CNC operation. These options as well as other screens that can be opened with the F-keys are discussed below:



- The **HeadTilt** option allows head rotation for alternate face angle grinds. This option can only be used on machines with alternative head options and additional I/O.
- When **NoSensor** is selected as shown above the machine will ignore the tooth sensor input while running.
- **Rounding** allows movement to a specific point using an arc motion instead of a straight line.
- **GeneralRounding** – Refers to grinding head motion not in the tooth profile. One example would be evident during a topping/facing program. After the tooth face is ground, the grinding head needs to stage itself above the top of the tooth before indexing. Too small of a value in the General Rounding field could cause the tip of the tooth to be clipped off as it moves to the staging location.
- **DressRounding**– controls the motion off both sides of the pellet while dressing or shaping the wheel.
- **TopRounding**– When making multiple grinding passes over the top of the tooth, Top Rounding controls how much the wheel rounds above the tooth while moving in position to make additional passes.
- **FaceRounding** – When making two or more grinding passes across the face of the tooth, Face Rounding controls how much the wheel rounds away from the face while moving in position to make another pass. This value should be set to Zero for example if making a plunge grind on a frost notch saw to keep the notch from getting ground off.
- **GulletRounding** – When grinding multiple passes from the gullet area through the end of the round back of a saw, Gullet Rounding controls the motion between each pass.

- **DressLine**– Controls where the dress cycle begins in relationship to the wheel. A higher number moves the initial contact point the pellet touches the wheel toward the midpoint of the wheel. The contact direction is diagrammed below:



- **DressEntry** – This value works the same as the dress line but only on the first and last pass of the dressing.
- **PelletDiameter** – The Talon CNC pellet diameter is .025 inches.
- **Overshoot**– The amount past the tooth tip to go to avoid dulling the tooth when transitioning from the top to the face.



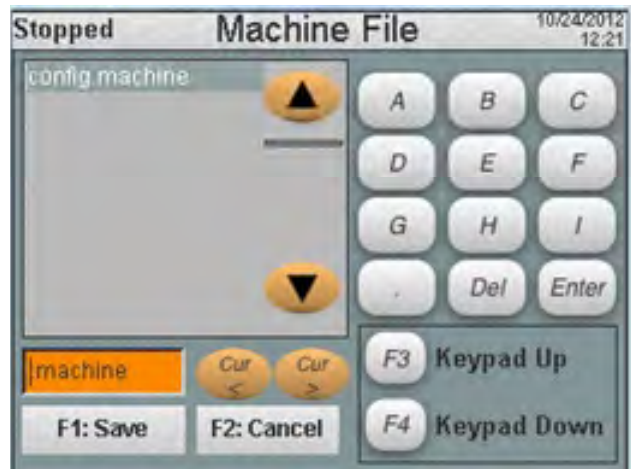
- **MachineType**– Options for this field are 3 Axis and 2 Axis. Trying to run a 2 Axis machine in 3 Axis mode will cause an error at power up because of the missing hardware. A 3 Axis machine can be run in 2 Axis mode as long as the Z Axis is centered over the saw plate and clamped. Changes in Machine Type will not take effect until the next power cycle.
- **F1:Open**– Machine File options can be opened by pressing F1. The screen below has only one option available (config.machine). To add additional configurations see the following section



- F2: Save as** – To create different Machine File options, first change the values for rounding, dress line etc. on the main Machine File screen and press the F2 button. Use the right arrow key to insert the cursor inside the orange box and position it just to the left of .machine by using the left/right arrow keys. The screen should now look like this:



Pressing the F3 & F4 keys changes the keypad from numbers to letters. Press F4 once to reveal the location for the Delete button on the keypad. Press Delete until the screen looks like this:



Now type a new name for the file and press F1 to save the file. In the example below the file is saved as **PLUNGE**.machine. The .machine file extension must be used for each Machine File setting:



The file can now be seen as an optional configuration:



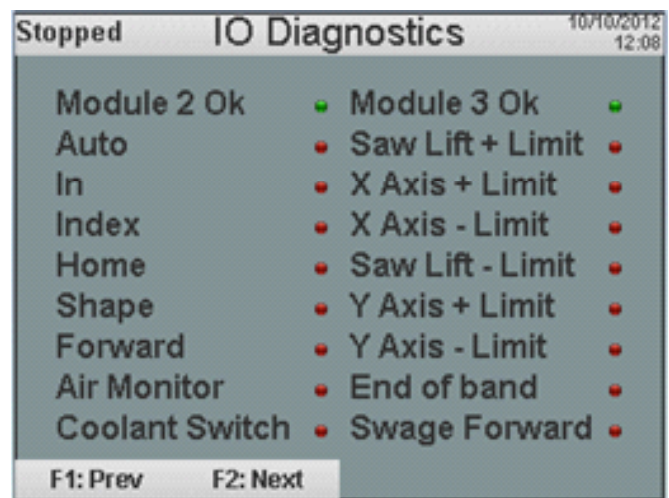
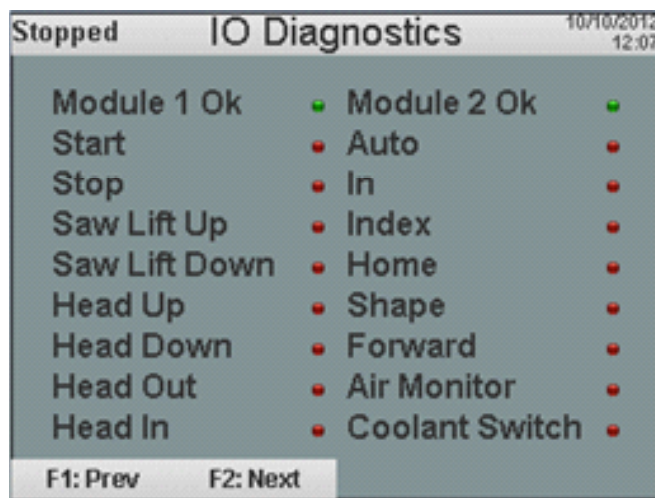
- F3: Template – The original factory machine settings are saved here as a backup. Press F1: Open to open the template. Save the file with the original or a new name to make it available as a user file. The template will not be affected and can be opened and saved in the user file at any time.

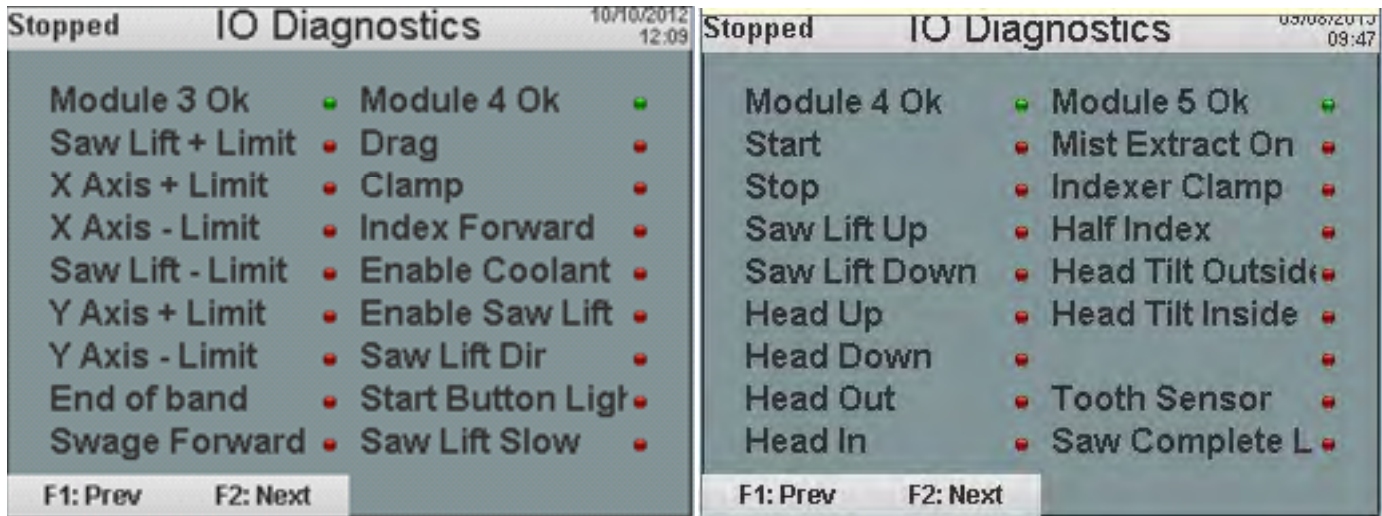


- F4:Delete** – Pressing F4 opens the screen that allows selection of machine files to delete. Select the file to delete with the up/down arrow keys. The file highlighted in orange will be deleted when F1 is pressed after acknowledging a popup screen.



F3:IO: The IO Diagnostics screens indicate the status of the corresponding input or output. The operator can view two modules at a time (1&2, 2&3 or 3&4). Toggling between screens is done with the F1 & F2 buttons. If an input or output is turned on the display light turns green. The Module OK lights are green on the screen displays below. All other inputs and outputs are off.





F4:Update:

CompactFlashtoUSBStickTransfer:

- Press the configuration button on the HMI.
- Press F4.
- Highlight the Source field by toggling the left/right arrow keys.
- Select Compact flash by using the up/down arrow keys.
- Highlight the Destination field by using the left/right arrow keys.
- The green dot beside the USB graphic on the screen shows the current USB stick location. The left graphic corresponds to USB 1.
- Select the desired USB stick location with the up/down arrow keys and press enter.



- Press F2 to save a current machine log.
- Press F1 to copy files to the USB stick.
- The files will be saved on the USB stick in a folder called Talon_Files. The folder contains Factory files, Logs and User files.

MachineUpdateViaUSBStick:

- Insert the USB stick into the USB extension behind the upper rear door.
- Press the configuration button on the HMI.
- Press F4.
- Highlight the Source field by toggling the left/right arrow keys.
- The green dot beside the USB graphic on the screen shows the current USB stick location. The left graphic corresponds to USB 1.
- Select the desired USB stick location with the up/down arrow keys.
- Highlight the Destination field by using the left/right arrow keys.
- Select Compact flash by using the up/down arrow keys and press enter.

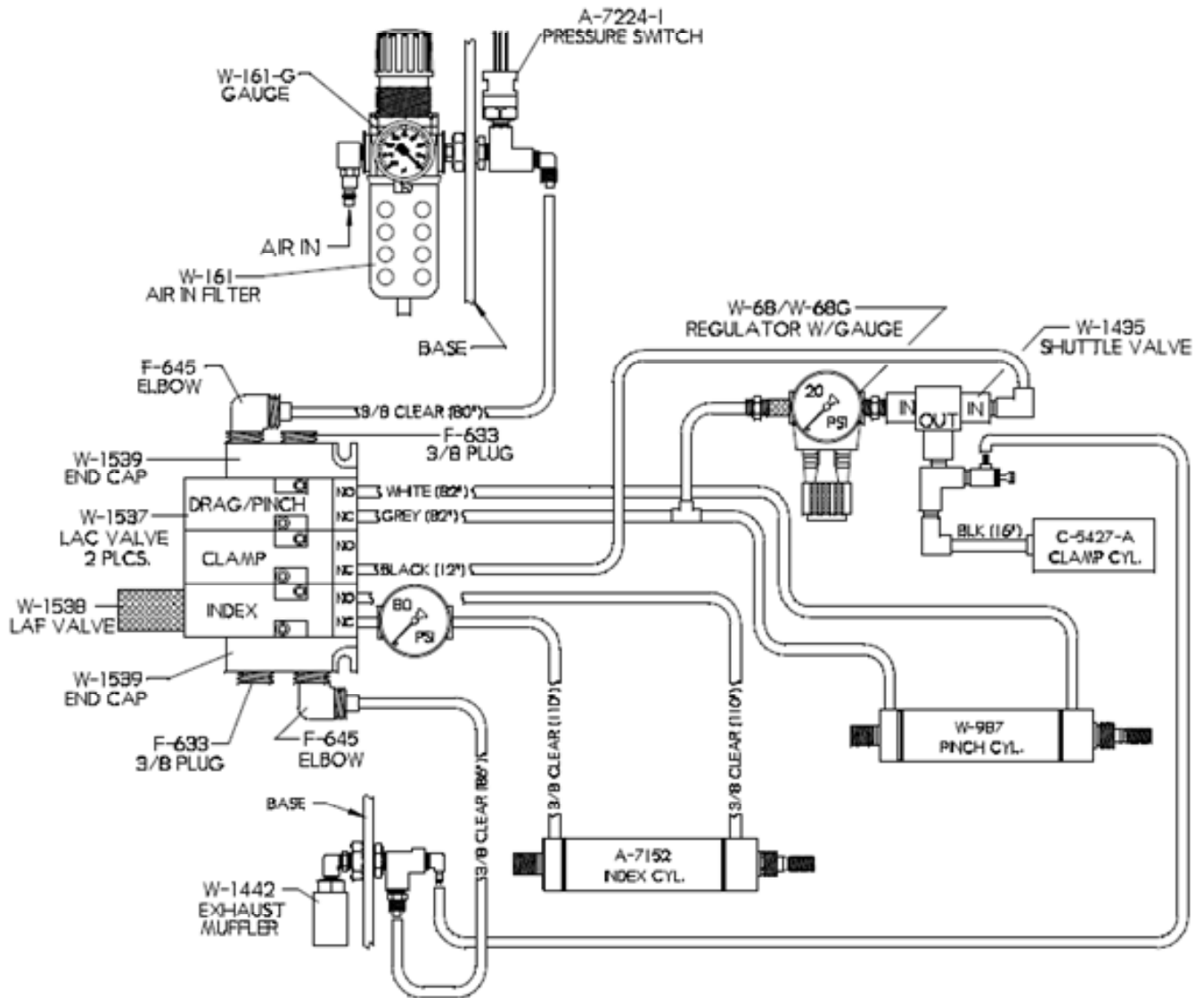


- Press F1 to update all factory files.
- Once the factory files are updated the files can be accessed by retrieving them from the template folder. Once a file is opened from the template folder it must be saved using the “save” command in the editor. This process moves the tooth to the user folder where it can be used and edited without affecting the template in the factory folder.

SAW GAUGE TABLE

Gauge	Thickness (In thousandths)	WMTShimLetter (Currently not in use)
8	.165	
9	.148	
10	.134	
11	.120	
12	.109	E
13	.095	G
14	.083	I
15	.072	K
16	.065	M
17	.058	O
18	.049	Q
19	.042	S
20	.035	U
21	.032	Y
22	.028	
23	.025	
24	.022	
25	.020	

Air Diagram

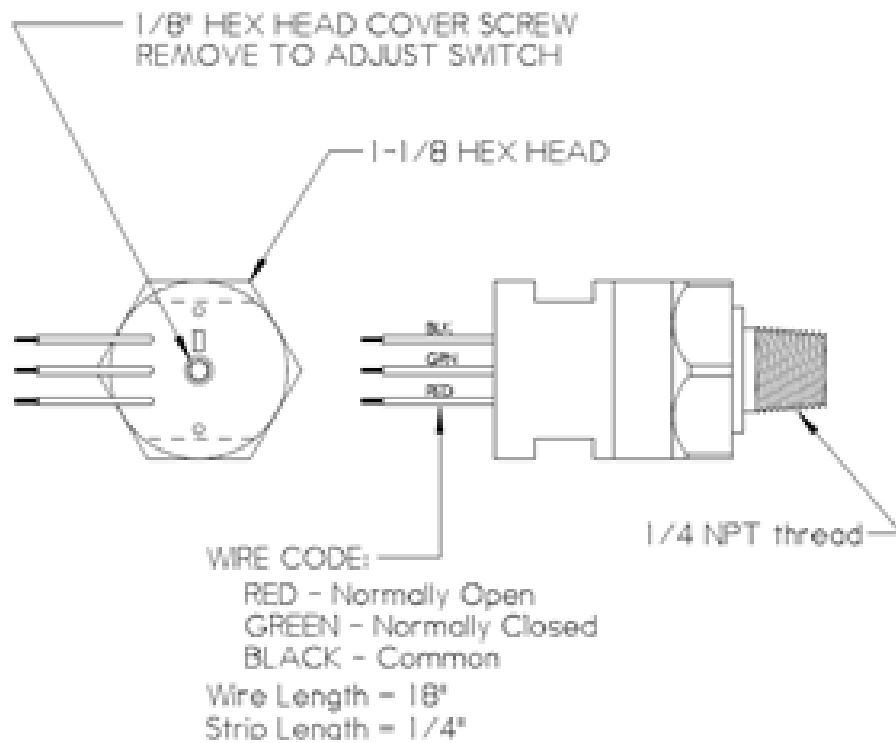


ADJUSTING AIRPRESSURESWITCH(A-7124-1)

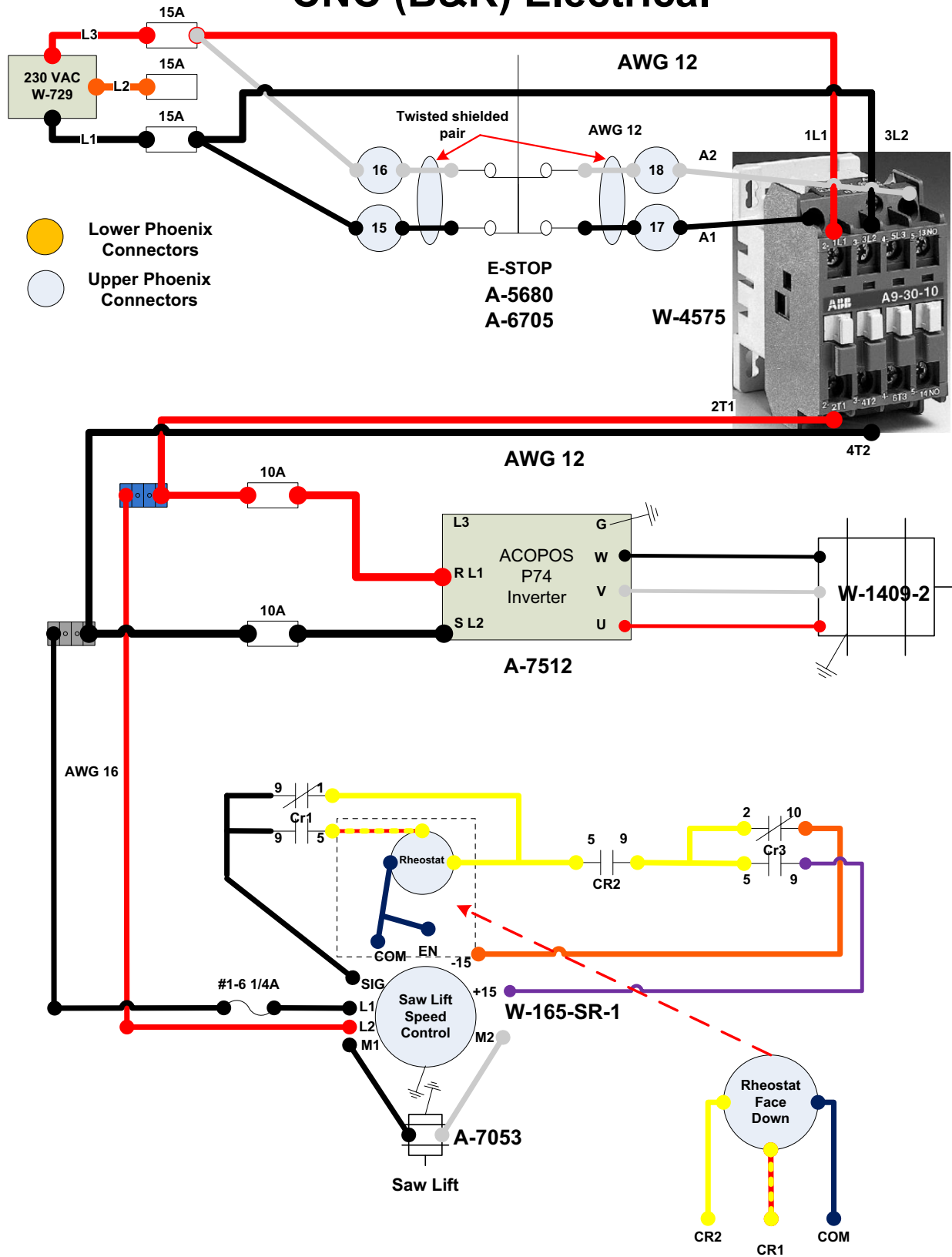
The air pressure switch monitors air pressure and provides an electrical output when the pressure drops below or exceeds an adjustable preset pressure.

To make an adjustment;

- Remove screw from top of switch.
- Using a 1/8" (3mm) Allen head wrench, turn the adjustment screw clockwise to increase set point or counterclockwise to decrease set point.
- Replace screw.

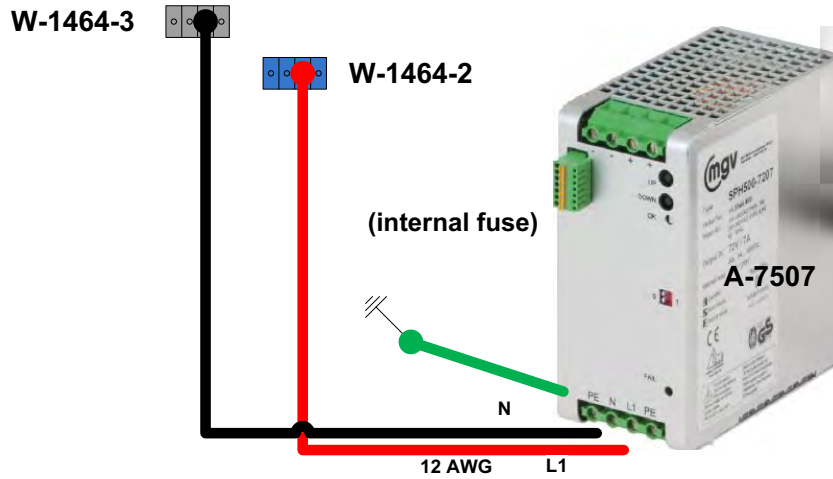


CNC (B&R) Electrical



CNC (B&R) Electrical (2)

X,Y& Z Power Supply

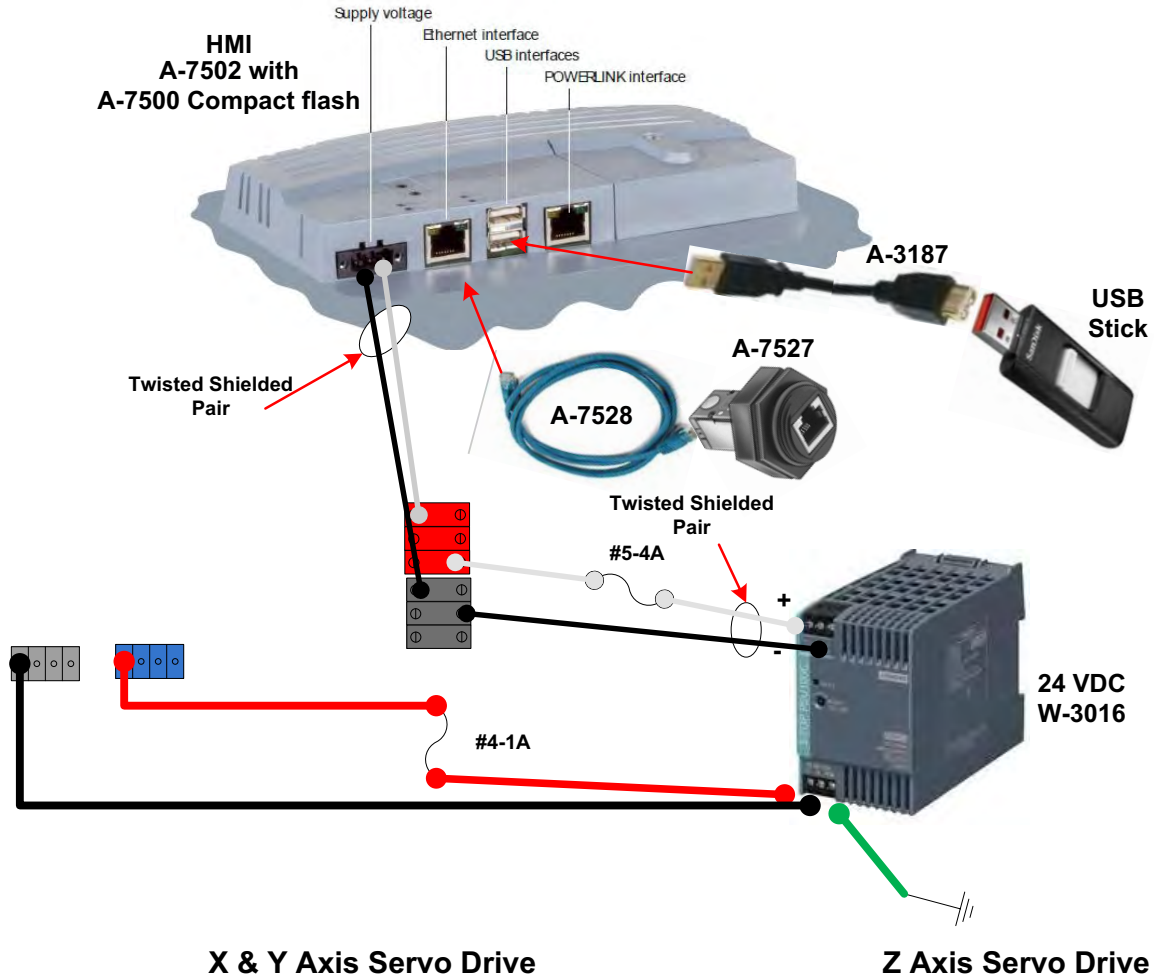


A-5755



Label	Saw Lift	X & Y axis	24 V PS	24 VDC +	Z axis
Rating	6 ¼ Amp	6 ¼ Amp	1 Amp	4 Amp	6 ¼ Amp
Fuse #	1	2	3	4	5

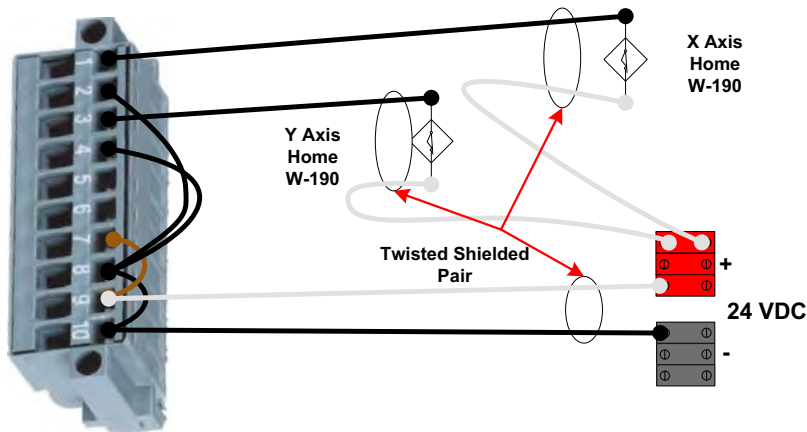
CNC (B&R) Electrical (3)



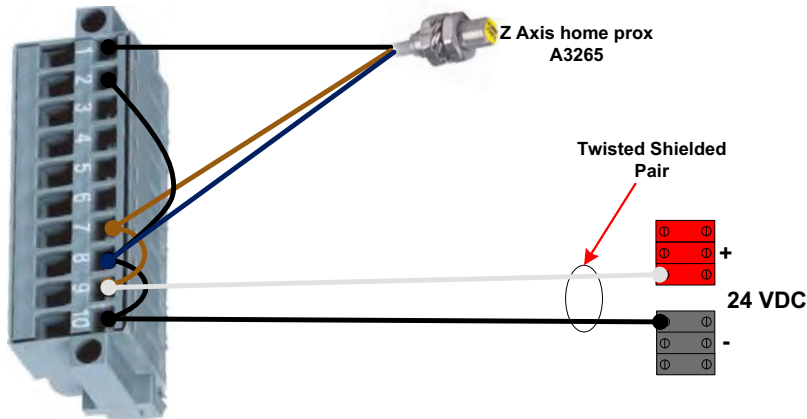
CNC (B&R) Electrical (4)

Figure		Pin assignments	
<p>Micro 100D Servo View from below</p> <p>A-7510 A-7524 connector kit</p>		Pin	Name
		1	Digital input 1
		2	Digital input 1 GND
		3	Digital input 2
		4	Digital input 2 GND
		5	24 VDC brake supply voltage ¹⁾
		6	24 VDC brake output
		7	Enable
		8	Enable GND
		9	CPU supply +24 VDC
		10	CPU supply GND

X2 Connection for X & Y



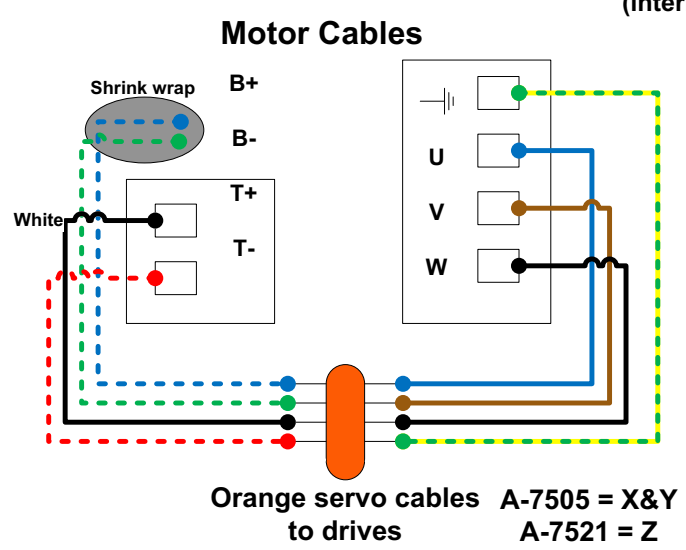
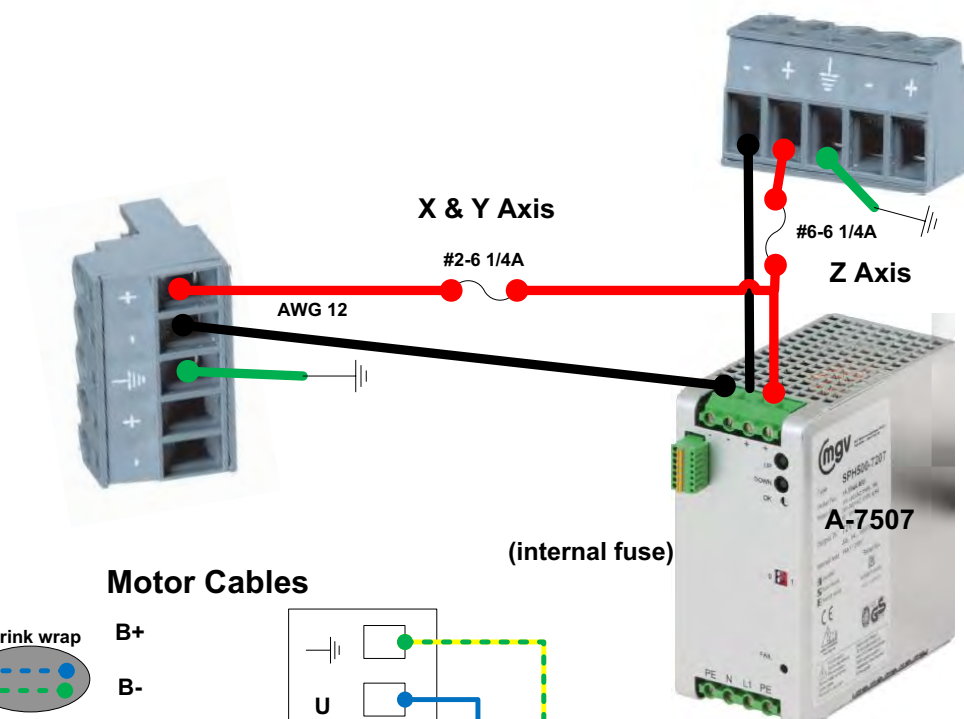
X2 Connection for Z



CNC (B&R) Electrical (5)

Micro 100D Servo

Figure	Pin assignments												
	<table border="1"> <thead> <tr> <th>Pin</th> <th>Name</th> </tr> </thead> <tbody> <tr> <td>+</td> <td>DC1+</td> </tr> <tr> <td>-</td> <td>DC1-</td> </tr> <tr> <td>⊥</td> <td>PE (ground)</td> </tr> <tr> <td>+</td> <td>DC2+</td> </tr> <tr> <td>-</td> <td>DC2-</td> </tr> </tbody> </table>	Pin	Name	+	DC1+	-	DC1-	⊥	PE (ground)	+	DC2+	-	DC2-
	Pin	Name											
	+	DC1+											
	-	DC1-											
	⊥	PE (ground)											
	+	DC2+											
-	DC2-												
<p>A-7510 A-7524 connector kit</p>													



CNC (B&R) Electrical (6)

Dimensions				
<p>A-7516</p>				
Pin assignments				
4-pin M8 socket	Pin	Name	Wire colors	Open
	1	24 VDC	Brown	For custom wiring
	2	24 VDC	White	
	3	GND	Blue	
	4	GND	Black	

Table 563: X67CA0P20 module supply attachment cable - Measurements and pin assignments

Dimensions				
<p>A-7520</p>				
Pin assignments				
Plugs	Pin	Name	Wire colors	Open
	1	Sensor/actuator supply 24 VDC	Brown	For custom wiring
	3	GND	Blue	
	4	Input/output x	Black	

Table 581: X67CA0D40 M8 sensor cable - Measurements and pin assignments

CNC (B&R) Electrical (7)

HMI (PP-65)
A-7502 with
A-7500 compact flash card

Inverter for Spindle Motor
A-7512

To set drive:

- Press esc
- Turn dial until Cbd shows
- Push dial in
- Turn dial until AdrC shows
- Push dial in
- Turn dial to 1
- Push and hold dial in for 2 seconds (lights stop blinking)

Jumper STO and P24
Inside cover

Node settings:
0 and 3
For P1 & P3

X & Y Axis micro 100 D
A-7510

Powerlink Cable
A-7530

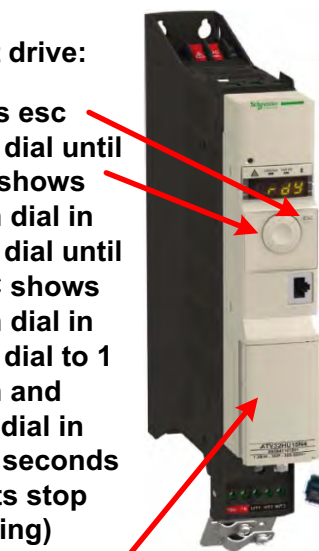
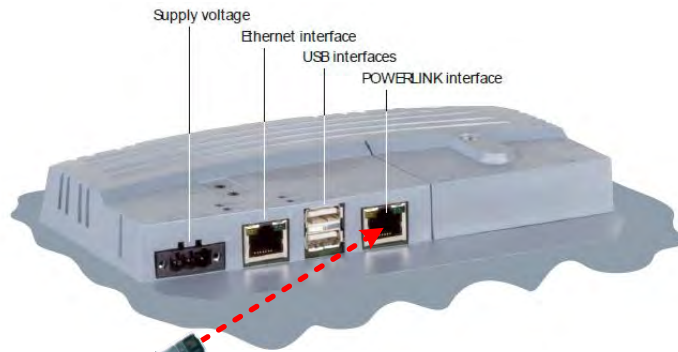
POWERLINK cable
A-7517

Powerlink Cable
A-7529

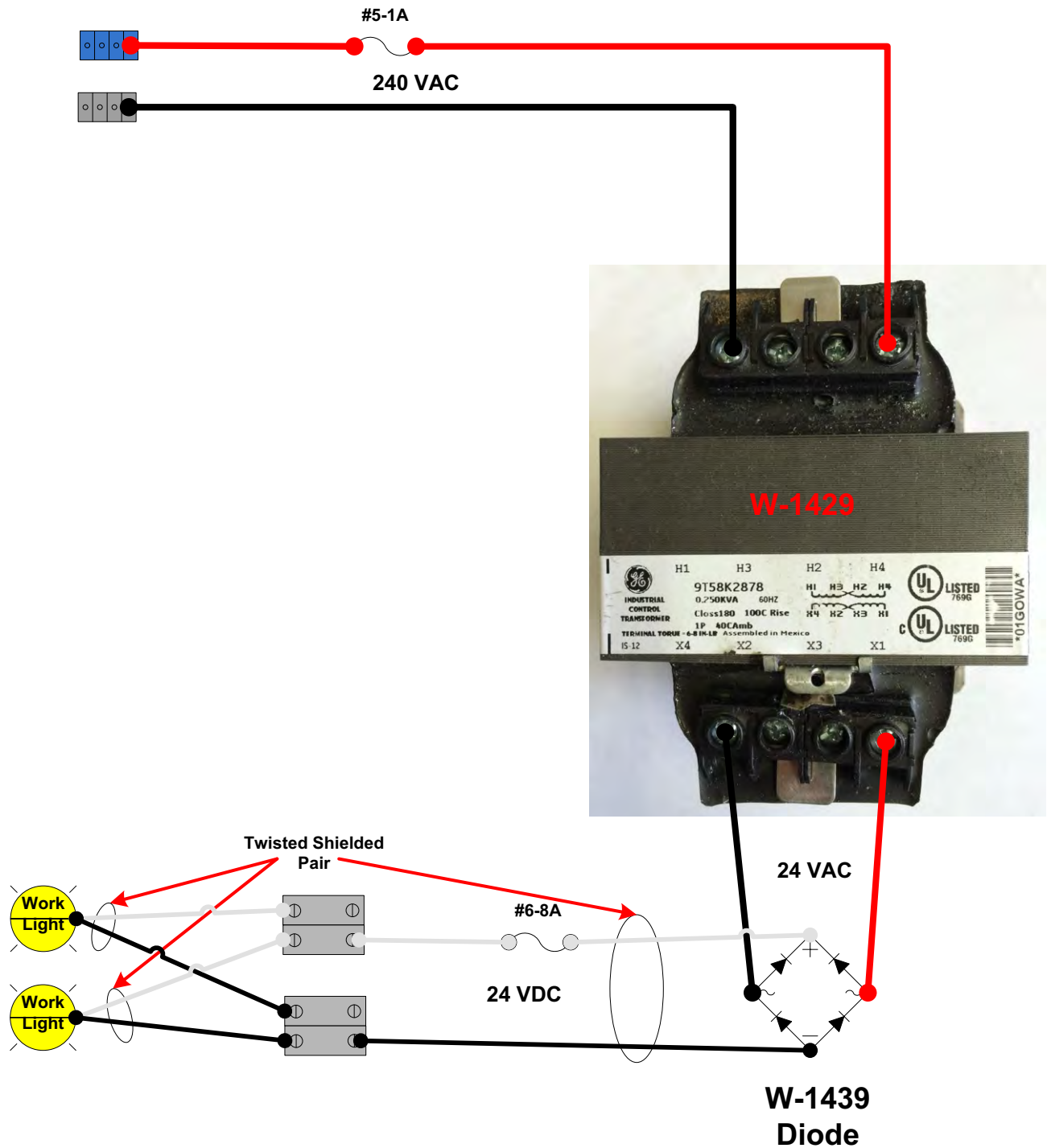
Z Axis micro 100 D
A-7510

Node settings:
0 and 2
For P3

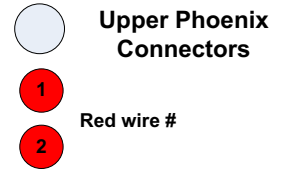
Power Brick
A-7514
Node settings 0
on left and 4 on
right



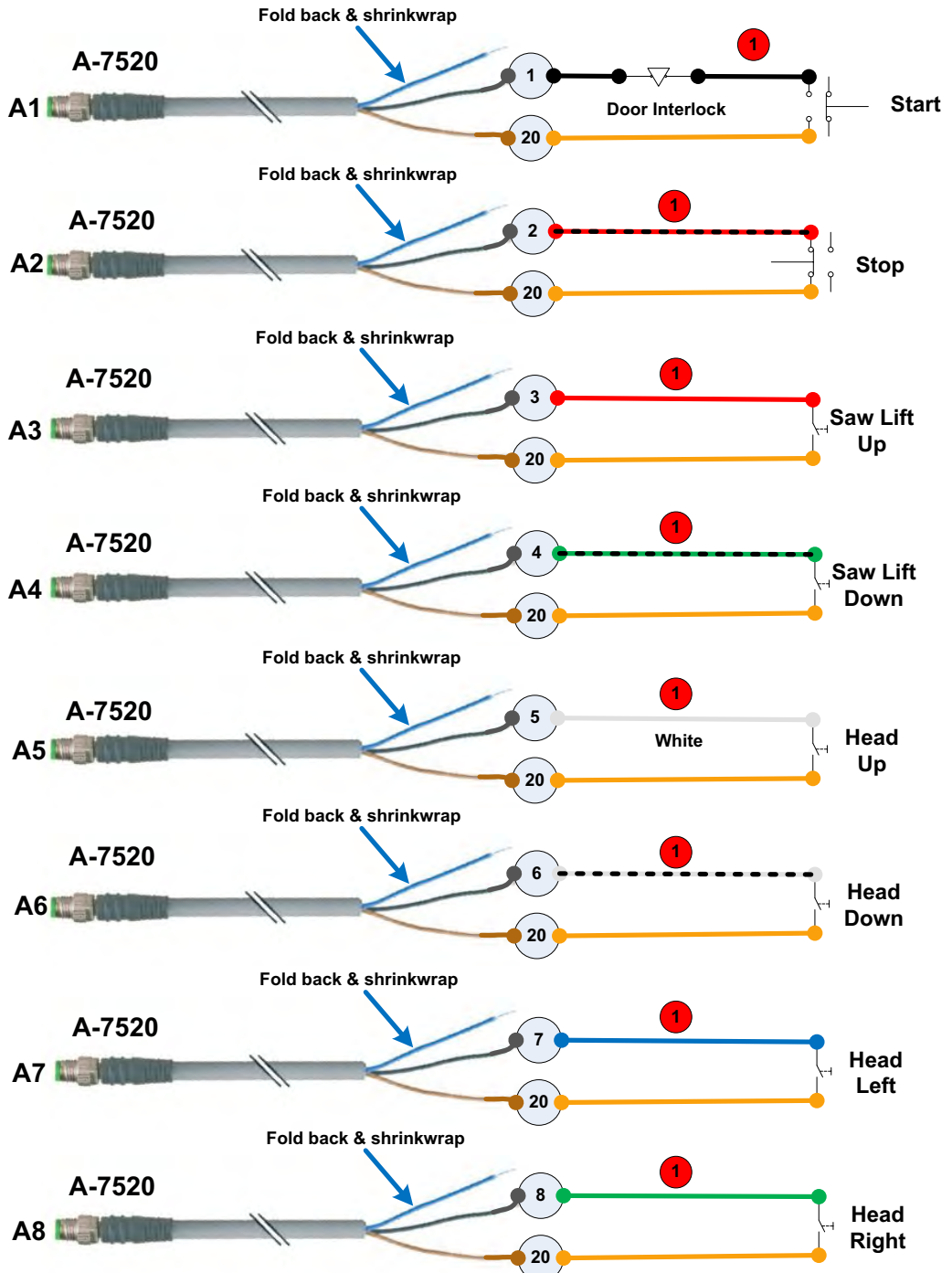
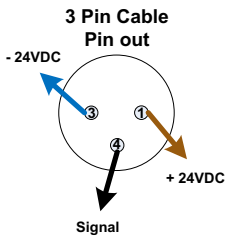
CNC (B&R) Electrical Lights



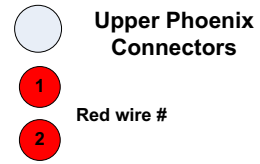
CNC Component Wiring (Brick A)



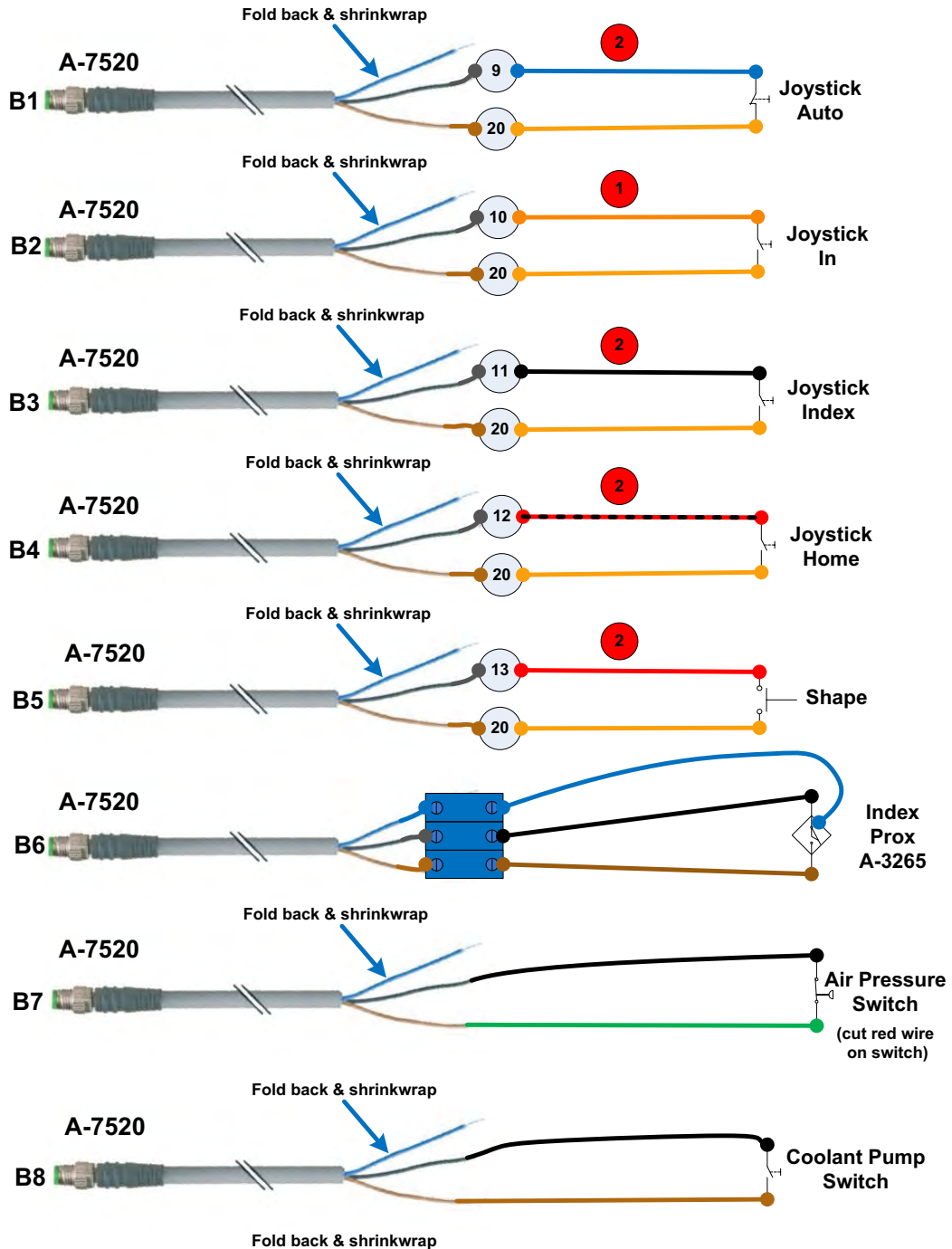
**Brick A
A-7515**



CNC Component Wiring (Brick B)



Brick B
A-7515

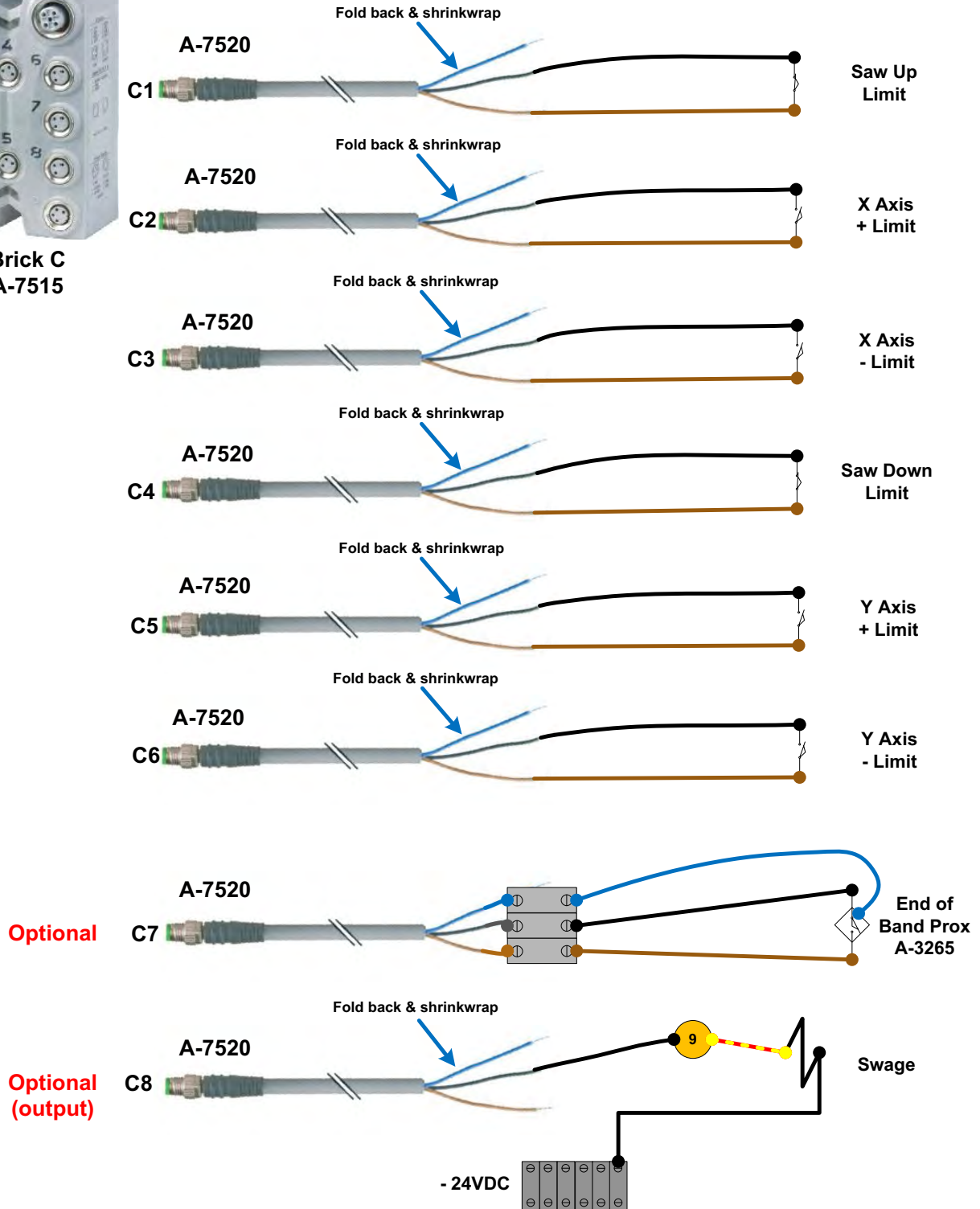


CNC Component Wiring (Brick C)

Upper Phoenix Connectors



**Brick C
A-7515**

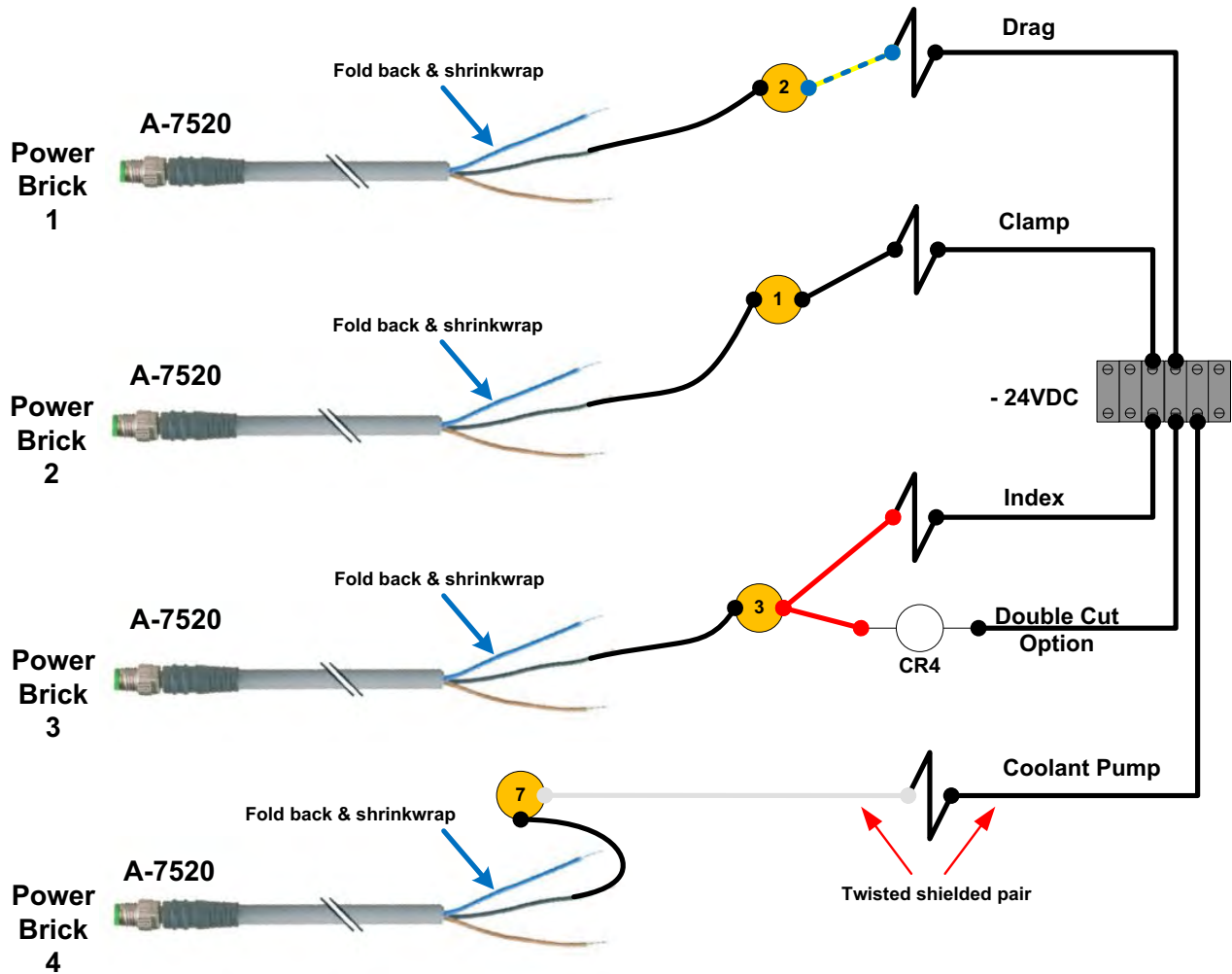


CNC Component Wiring (Outputs A)



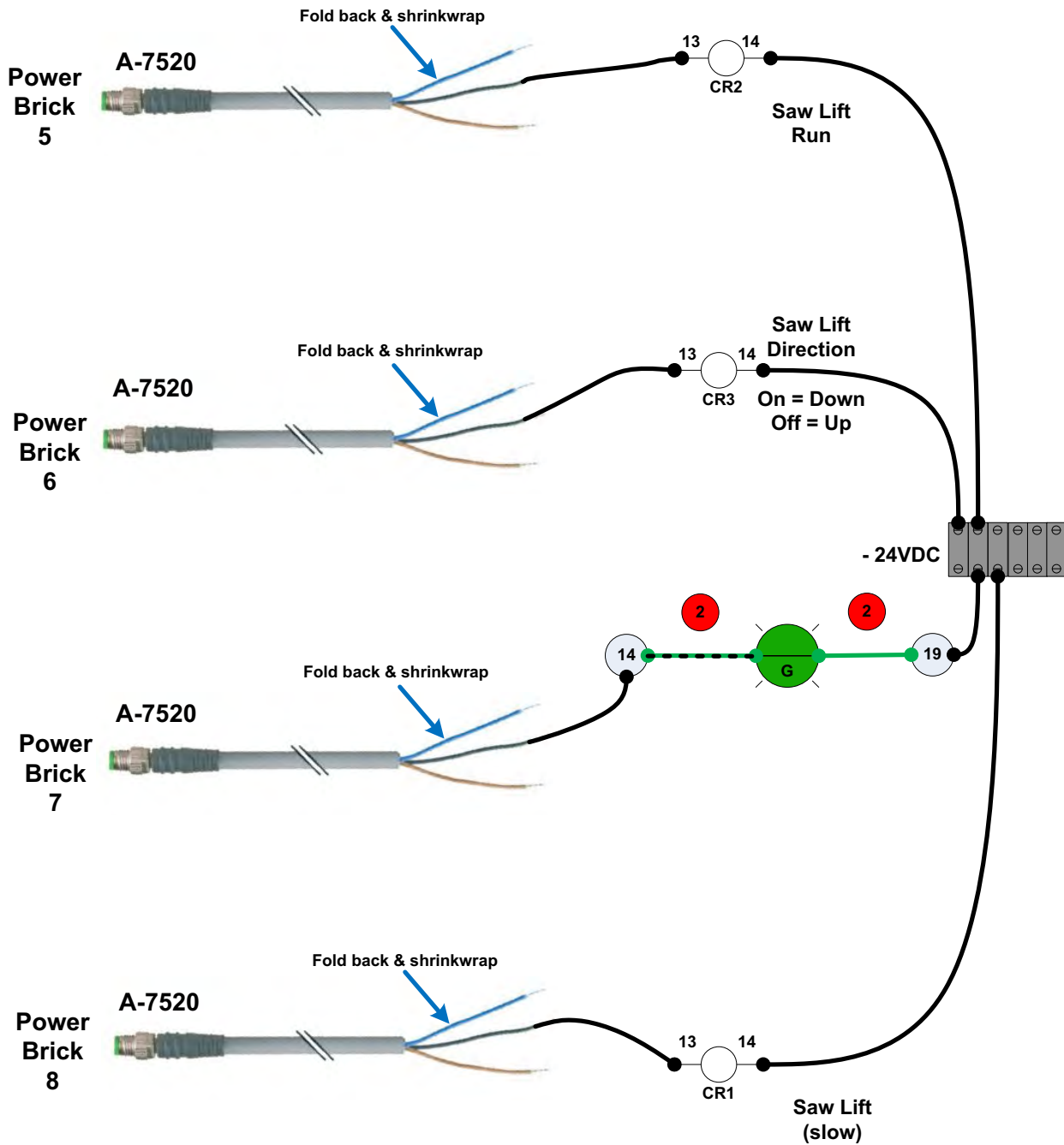
**Power Brick
A-7514**

- Lower Phoenix Connectors
- Upper Phoenix Connectors

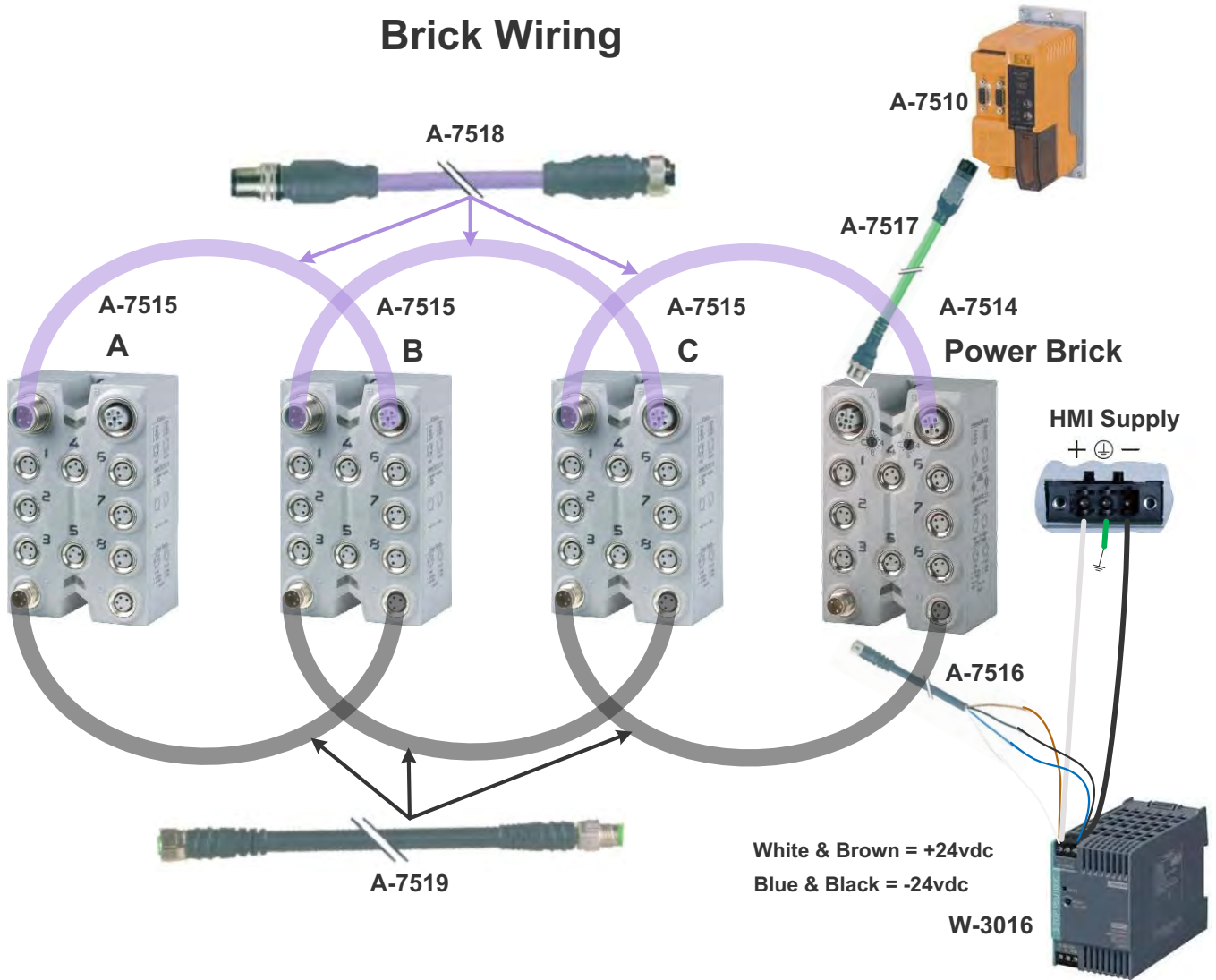


CNC Component Wiring (Outputs B)

- Lower Phoenix Connectors
 - Upper Phoenix Connectors
 - 1
 - 2
- Red wire #

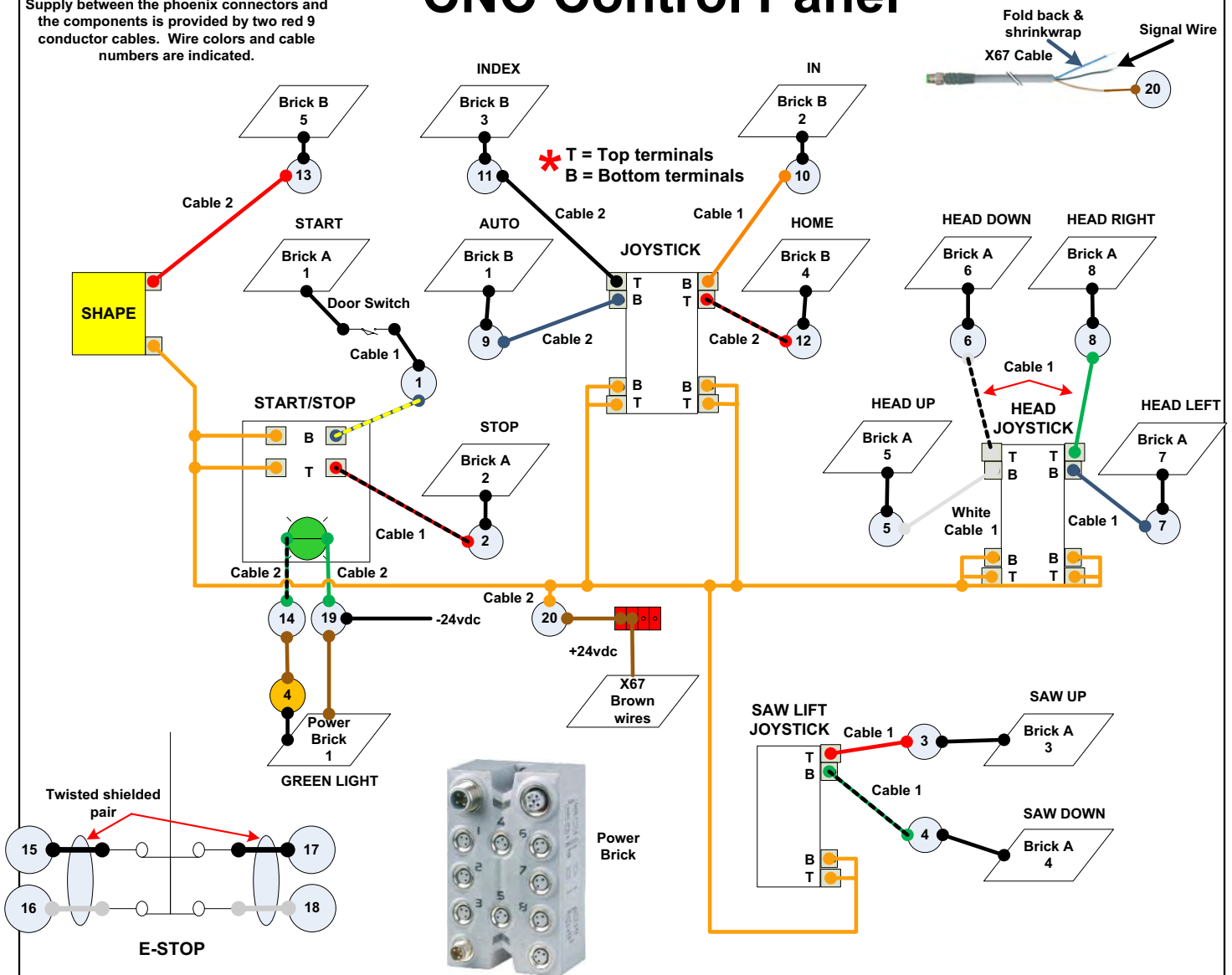


Brick Wiring



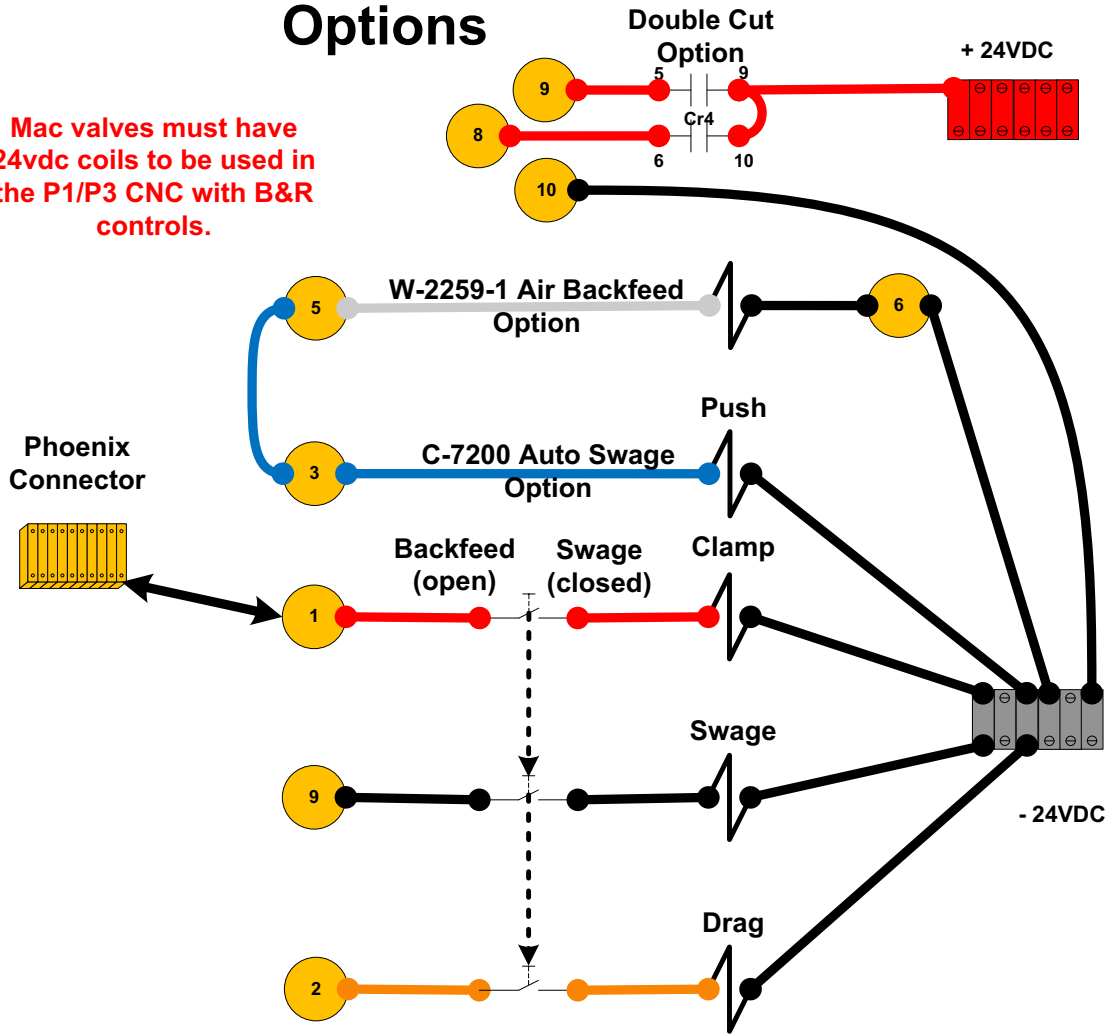
CNC Control Panel

Supply between the phoenix connectors and the components is provided by two red 9 conductor cables. Wire colors and cable numbers are indicated.

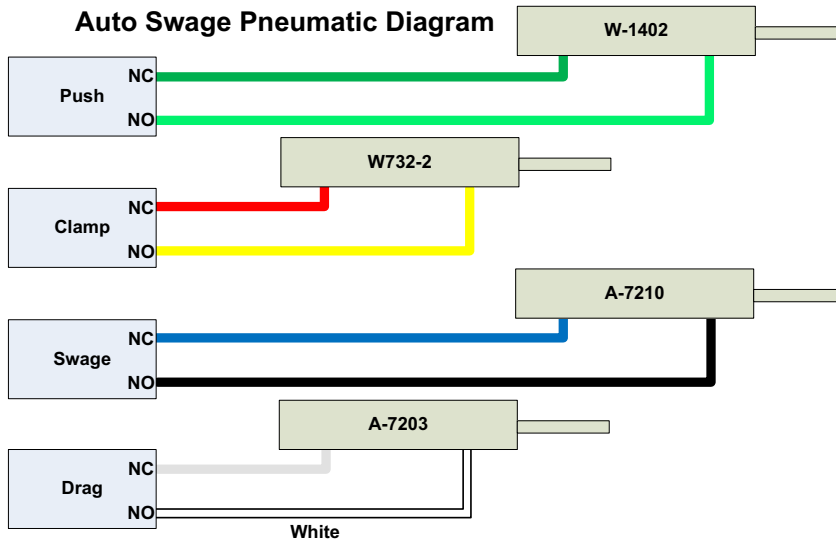


Options

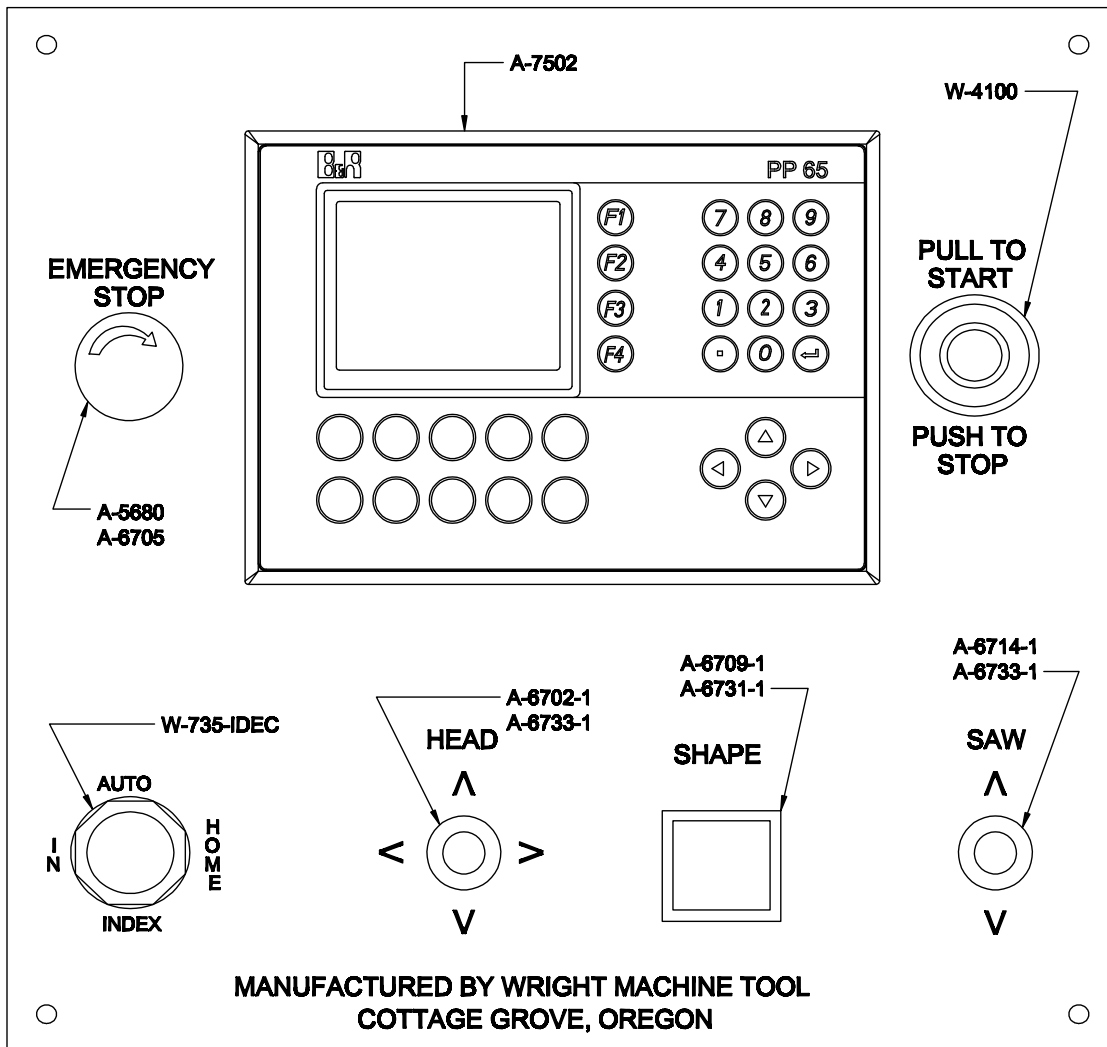
Mac valves must have 24vdc coils to be used in the P1/P3 CNC with B&R controls.



Auto Swage Pneumatic Diagram



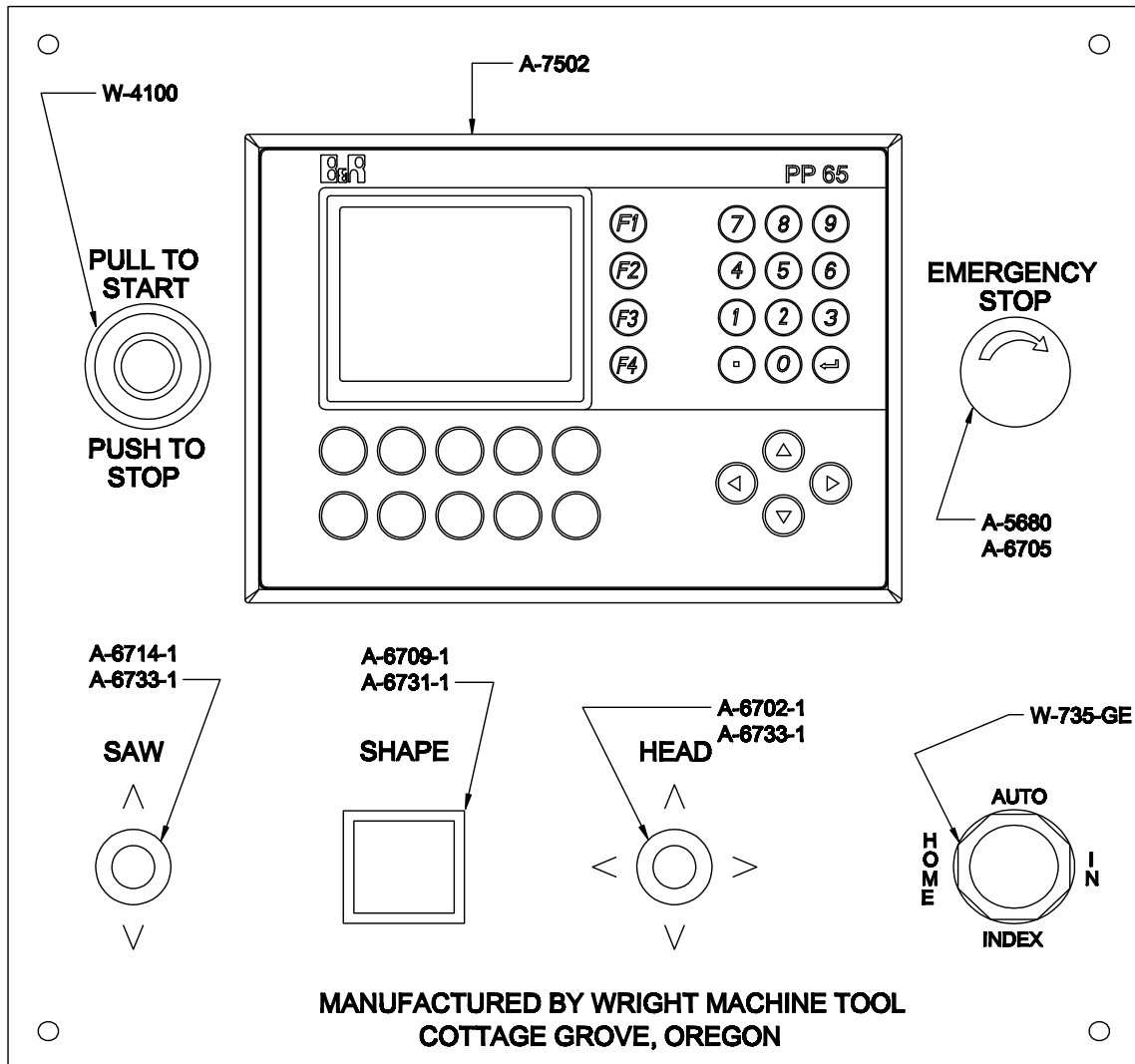
CONTROL PANEL LAYOUT RIGHT HAND MACHINE



PART #

- | | |
|------------|----------------------------------|
| A-5680-A | EMERGENCY STOP BUTTON |
| A-6702-1 | JOY STICK |
| A-6705 | CONTACT BLOCK FOR EMERGENCY STOP |
| A-6709-1 | PUSH BUTTON |
| A-6714-1 | JOY STICK |
| A-6731-1 | CONTACT BLOCK |
| A-6733-1 | CONTACT BLOCK |
| A-7502 | POWER PANEL |
| W-194-GE | START STOP |
| W-735-IDEC | JOY STICK |

CONTROL PANEL LAYOUT LEFT HAND MACHINE



PART #

- | | |
|------------|----------------------------------|
| A-5680-A | EMERGENCY STOP BUTTON |
| A-6702-1 | JOY STICK |
| A-6705 | CONTACT BLOCK FOR EMERGENCY STOP |
| A-6709-1 | PUSH BUTTON |
| A-6714-1 | JOY STICK |
| A-6731-1 | CONTACT BLOCK |
| A-6733-1 | CONTACT BLOCK |
| A-7502 | POWER PANEL |
| W-194-GE | START STOP |
| W-735-IDEC | JOY STICK |

MAINTENANCE

The next following few pages gives reference points to the maintenance schedule below.

CheckDaily:

- Coolant level
- Coolant mix ratio

CheckWeekly;

- Coolant tank grinding grit build-up
- Drain air/water trap

CheckMonthly:

- Change coolant
- Clean coolant tank
- Lube feed finger pivot: See page 18.
- Check grit buildup in clamp support arm: see sheet 2.

Check6Monthsor1000Hoursofoperation:

- Clean and lube linear ways and ball screws; see sheet 3.
- Grease areas show on sheet 1.

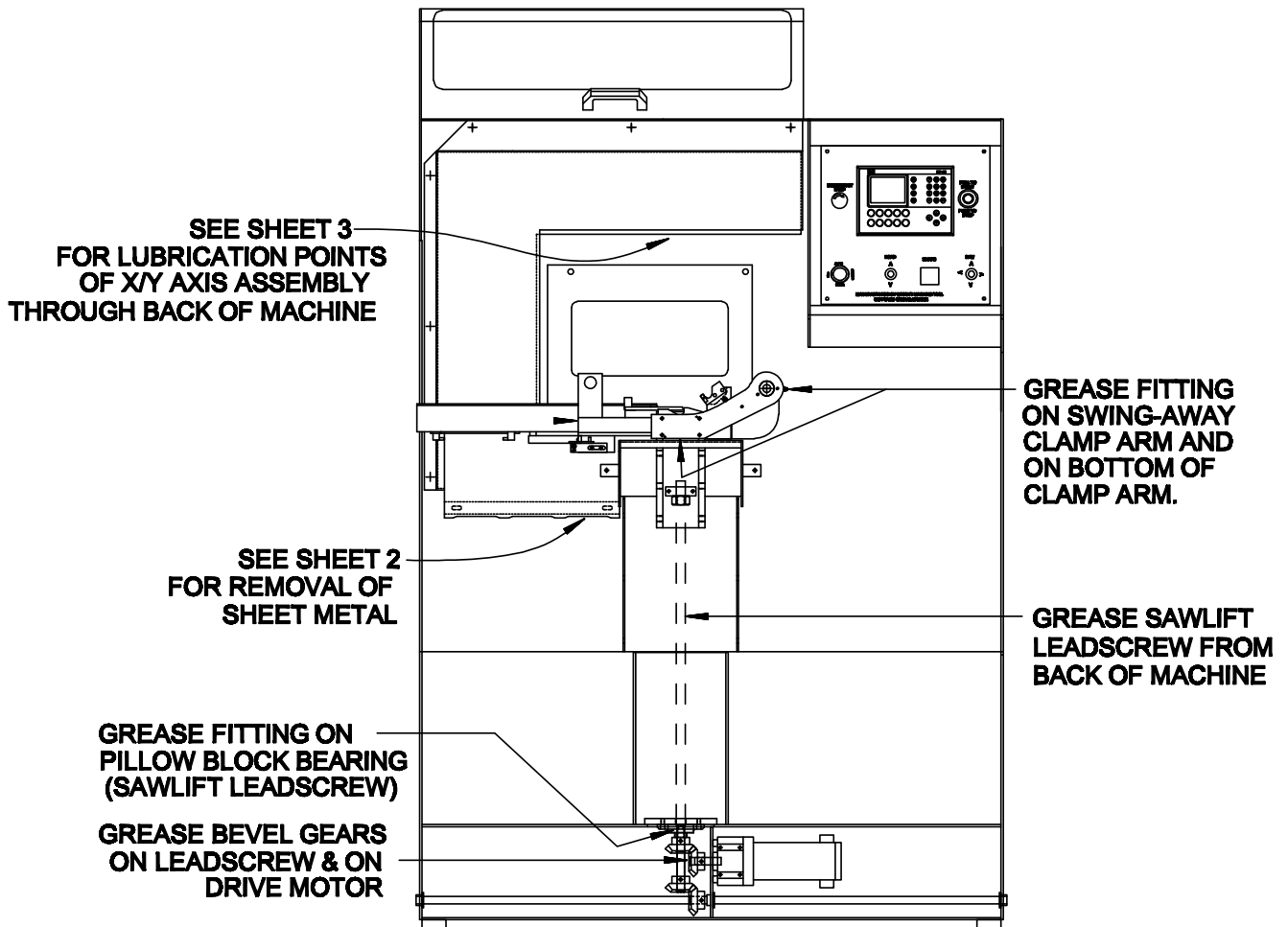
CheckEvery12Months:

- Inspect spindle drive belt and pulleys

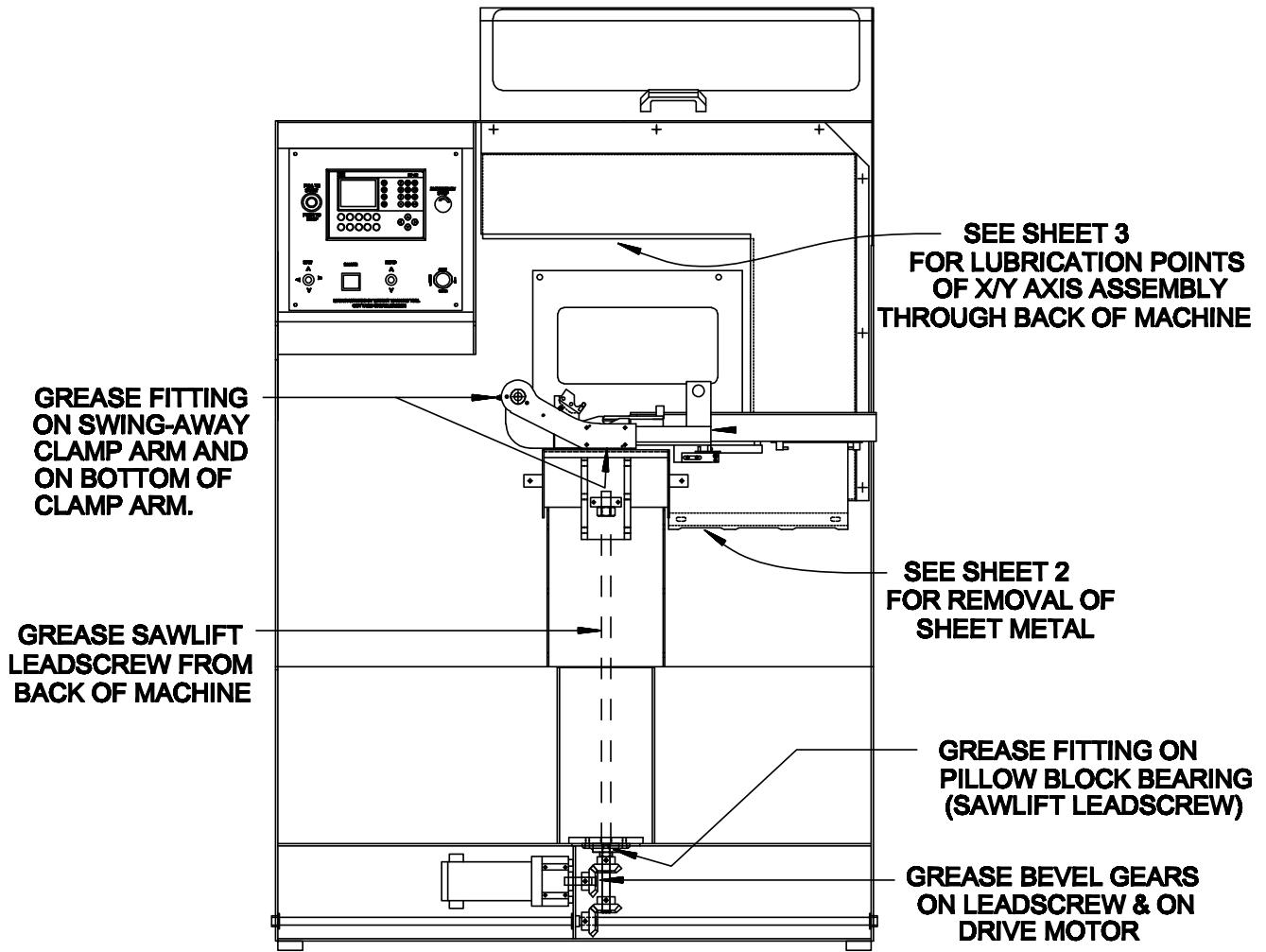
The service life of this machine will extend well beyond the warranty period if the maintenance procedures listed are followed.

Failure to comply with these procedures may void the Wright Machine Tool Inc. warranty.

LUBRICATION(right hand) SHEET 1

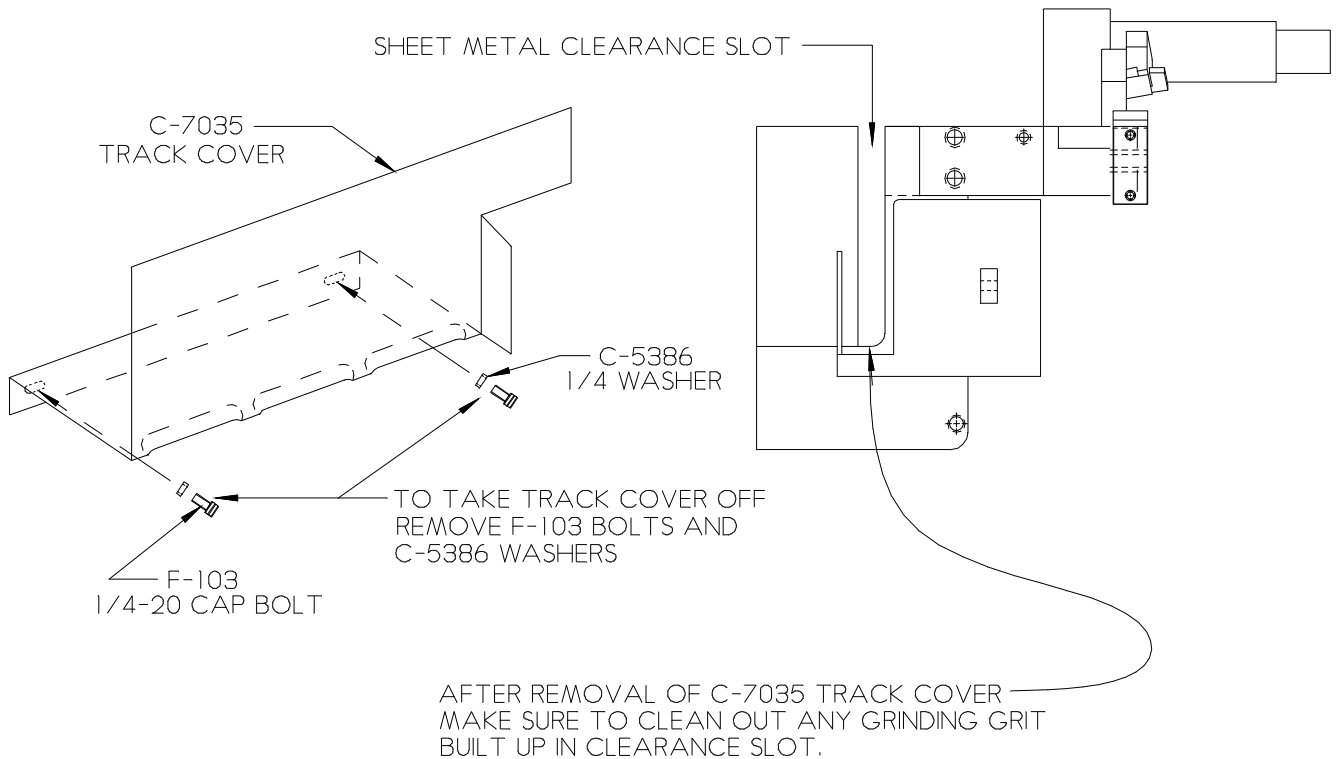


LUBRICATION(left hand) SHEET 1



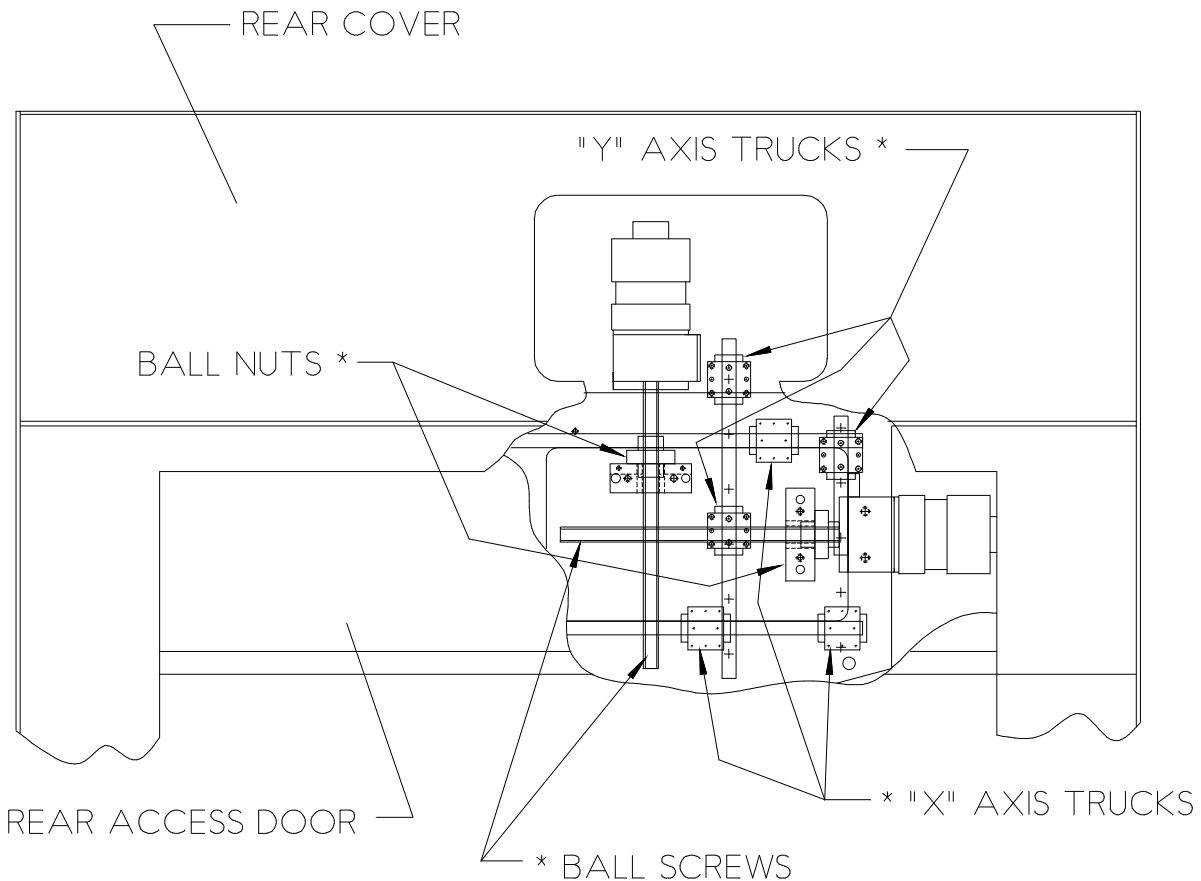
GRIT BUILDUP IN CLAMP SUPPORT ARM SHEET 2

END VIEW CLAMP ASSEMBLY WELD-UP



LUBRICATION (Back of Machine)

SHEET 3



* = LUBE POINTS

Lubrication of ways and ball screws must be done every six months or 1,000 hours of operating or premature wear will occur which may void warranty.

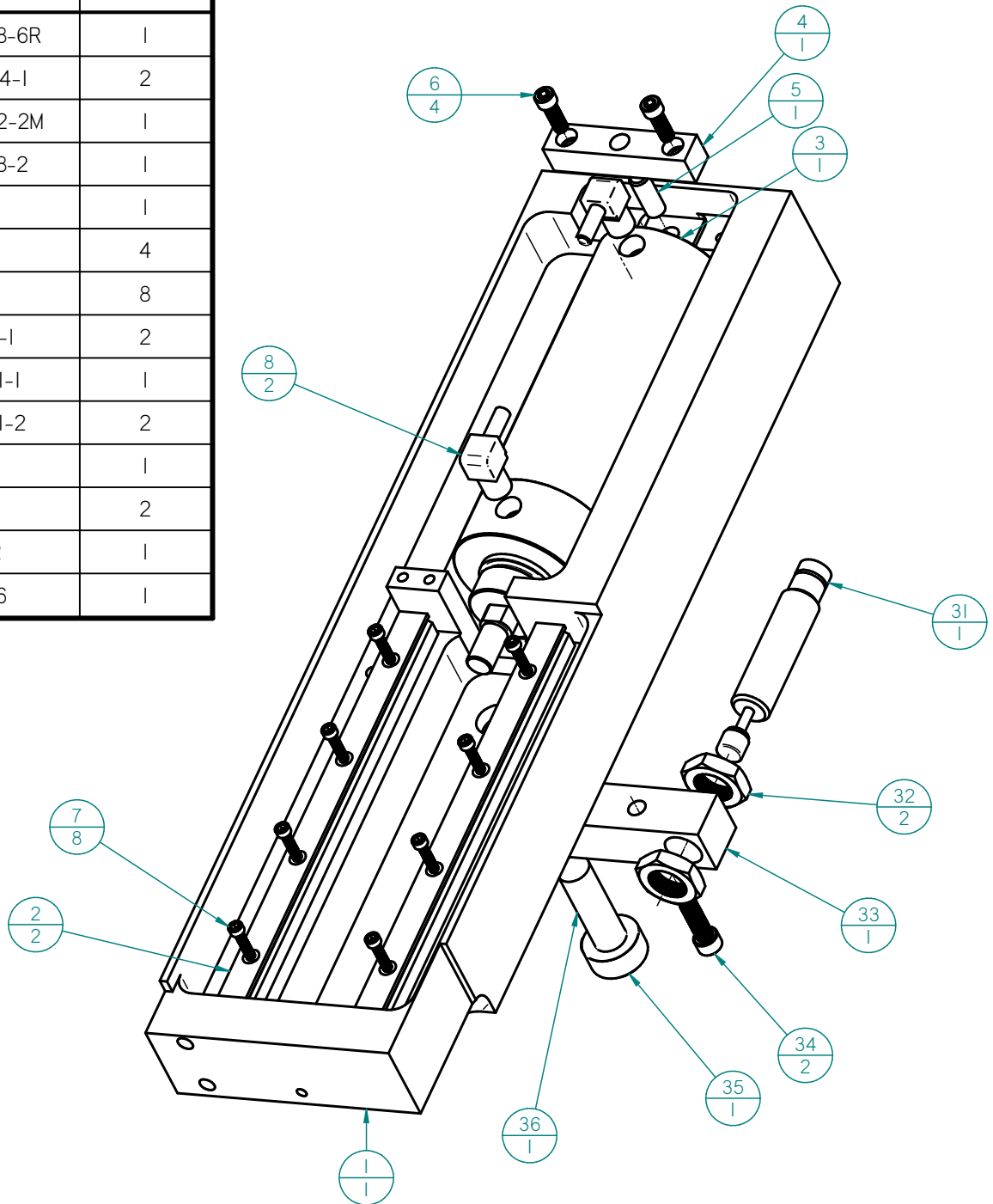
1. Disconnect power to machine
2. Open rear access door and rear cover.
3. Use UNOCAL way lube 220 or similar product. Use 10 drops at each of the indicated places (10).
4. Replace access door and cover.

MECHANICAL DRAWINGS

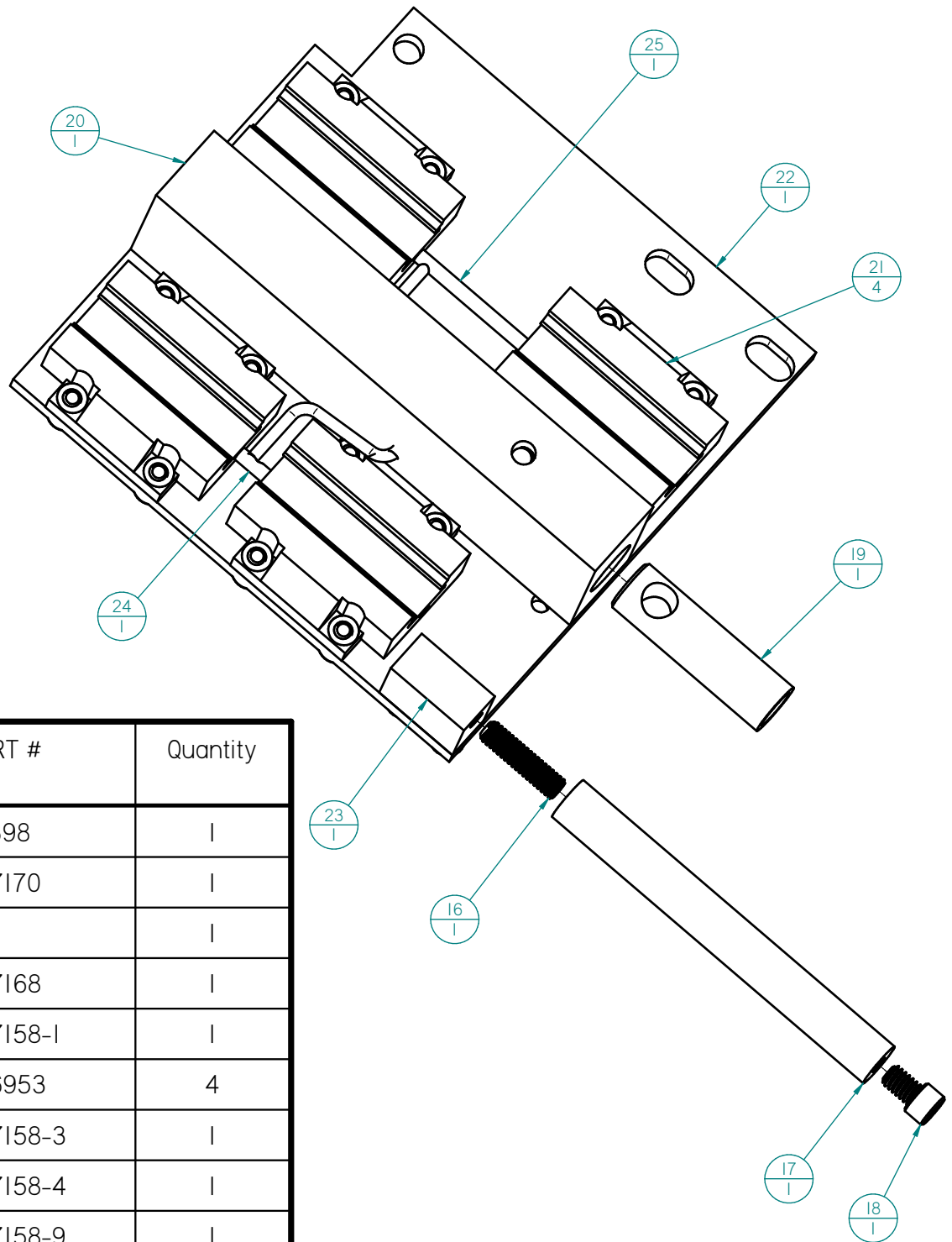
INDEX.....	79
FEED FINGER ASSEMBLY(BAND SAW).....	85
FEED FINGER ASSEMBLY(CIRCLE SAW).....	87
DRESSER ASSEMBLY.....	91
CLAMP ARM ASSEMBLY.....	93
CLAMP JAW ASSEMBLY.....	95
BAND SAW CARRIER ASSEMBLY.....	98
X-Y AXIS ASSEMBLY.....	100
SAW LIFT ASSEMBLY.....	107
SPINDLE ASSEMBLY.....	111
HEAD ASSEMBLY.....	112
GATE ASSEMBLY.....	121

RIGHT HAND INDEX ASSEMBLY

Item Number	PART #	Quantity
1	C-7158-6R	1
2	A-6954-1	2
3	C-7152-2M	1
4	C-7158-2	1
5	F-442	1
6	F-102	4
7	F-139	8
8	F-647-1	2
31*	W-1051-1	1
32*	W-1051-2	2
33*	C-7171	1
34	F-III	2
35*	W-462	1
36*	C-7176	1



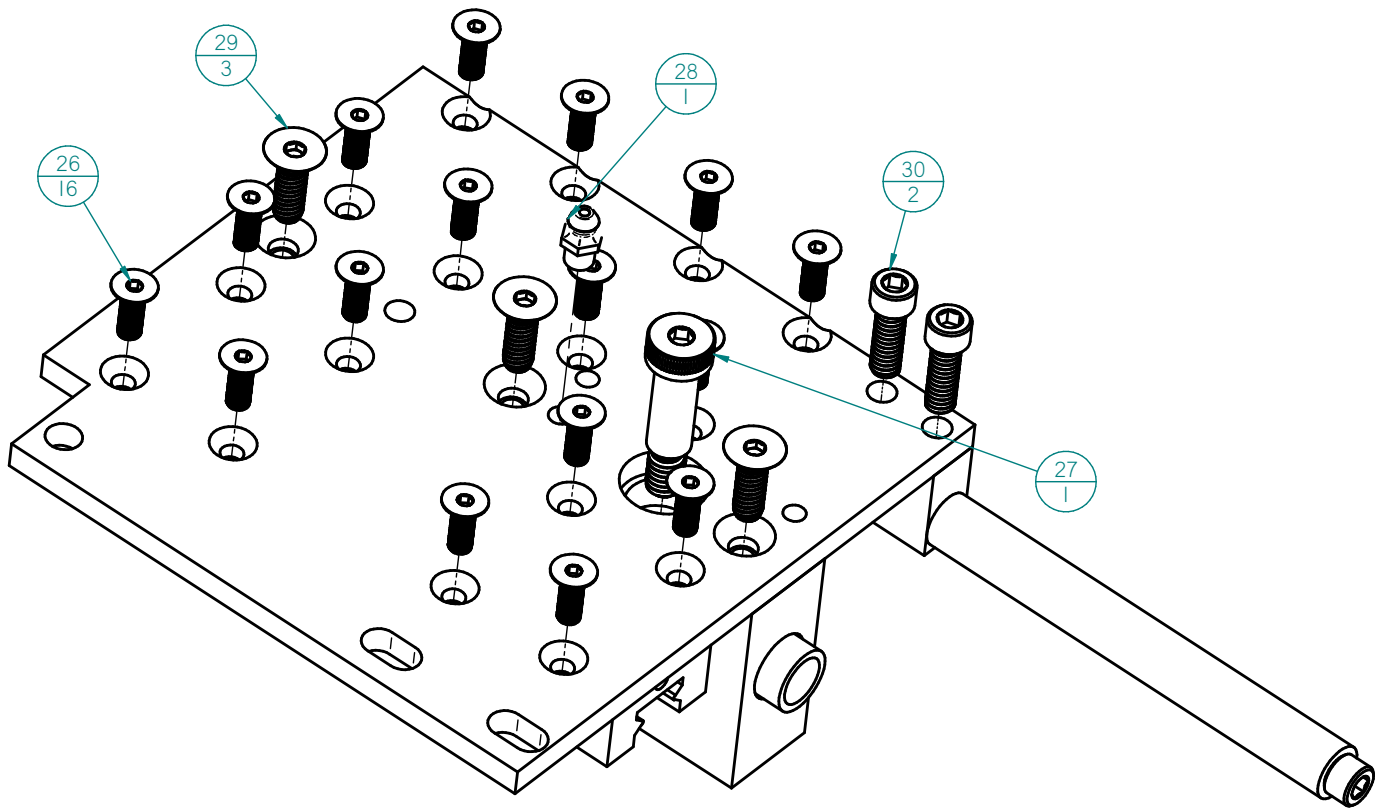
RIGHT HAND INDEX ASSEMBLY



Item Number	PART #	Quantity
16	F-398	1
17	C-7170	1
18	F-1	1
19	C-7168	1
20	C-7158-1	1
21	A-6953	4
22	C-7158-3	1
23	C-7158-4	1
24	C-7158-9	1
25	C-7158-10	1

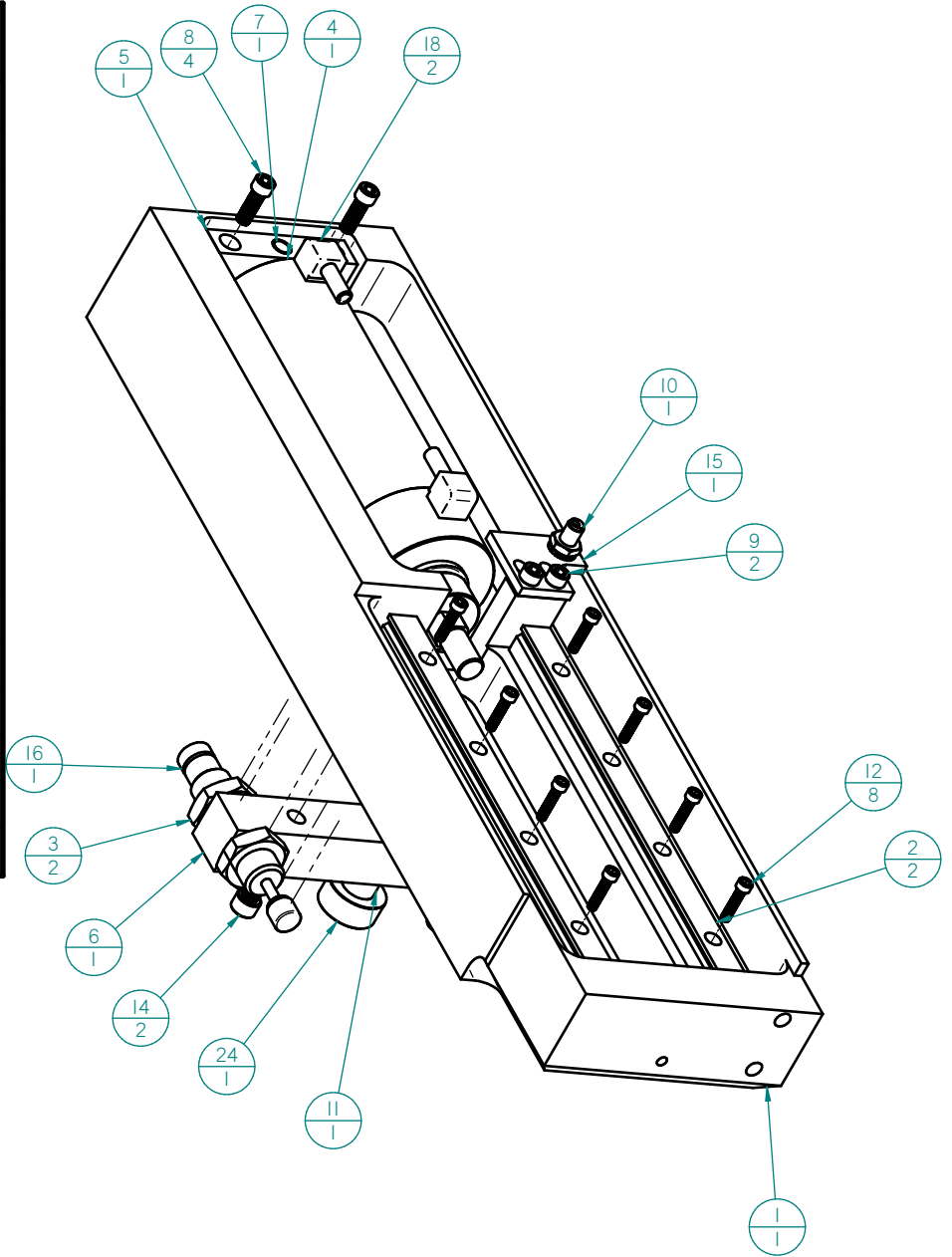
RIGHT HAND INDEX ASSEMBLY

Item Number	PART #	Quantity
26	F-322	16
27	F-160	1
28	W-357	1
29	F-313	3
30	F-102	2

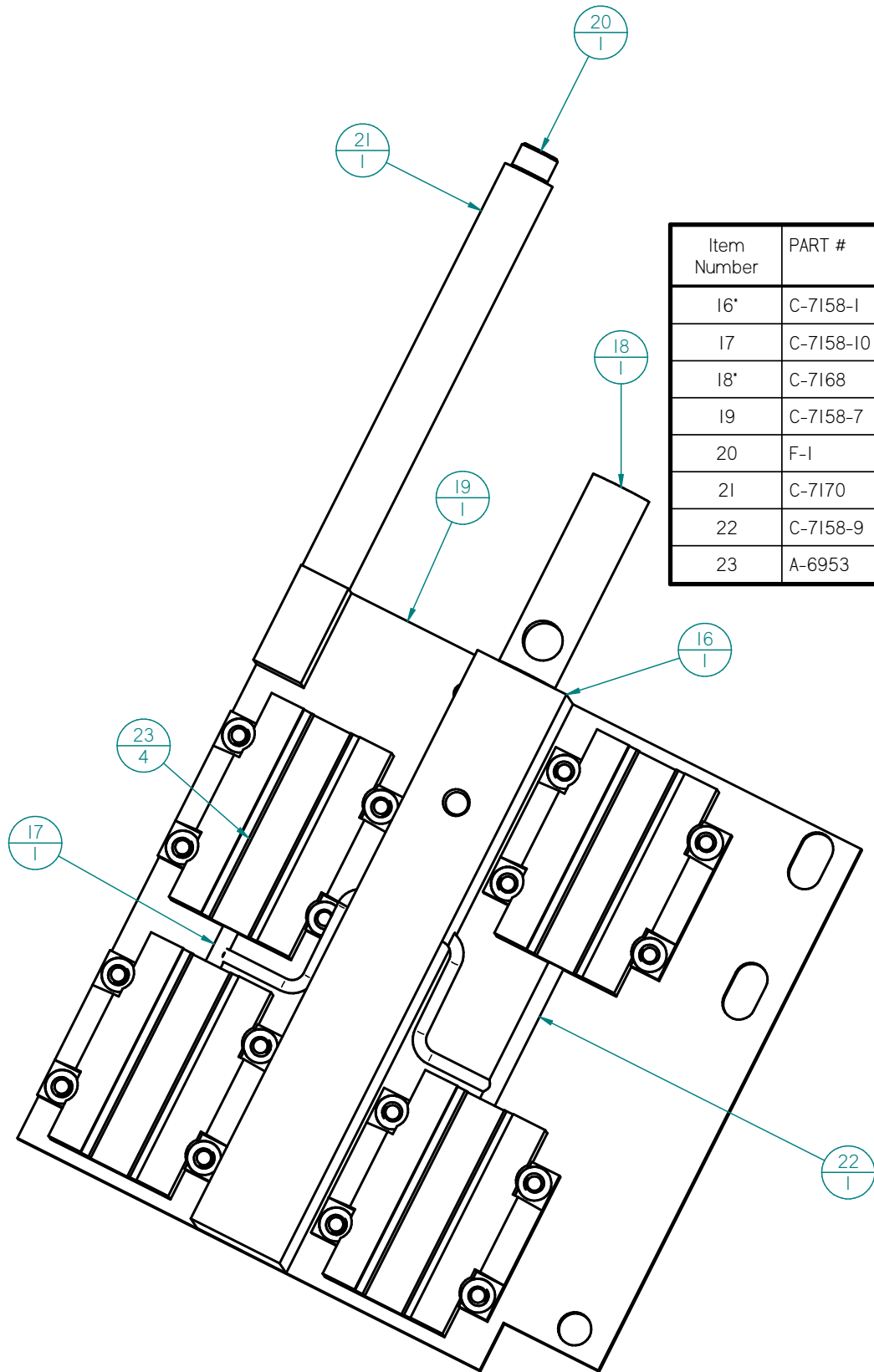


LEFT HAND INDEX ASSEMBLY

Item Number	PART #	Quantity
1	C-7158-6R	1
2	A-6954-1	2
3	W-1051-2	2
4	C-7152-2M	1
5	C-7158-2	1
6	C-7171	1
7	F-442	1
8	F-102	4
9	F-101	2
10	A-3265	1
11	C-7176	1
12	F-139	8
14	F-111	2
15	C-7158-5	1
16	W-1051-1	1
18	F-647-1	2
24	W-462	1



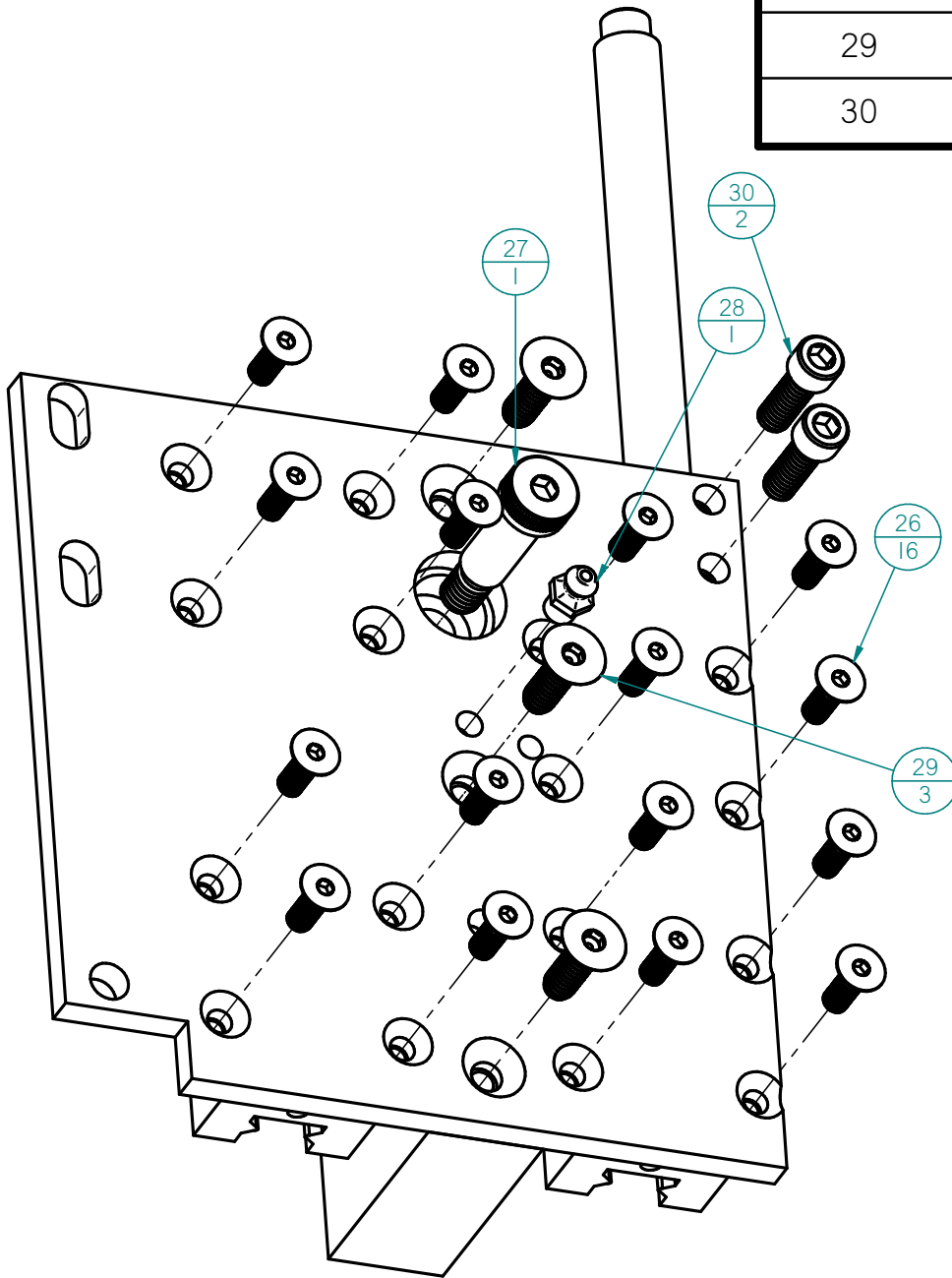
LEFT HAND INDEX ASSEMBLY



Item Number	PART #	Quantity
16*	C-7158-1	1
17	C-7158-10	1
18*	C-7168	1
19	C-7158-7	1
20	F-1	1
21	C-7170	1
22	C-7158-9	1
23	A-6953	4

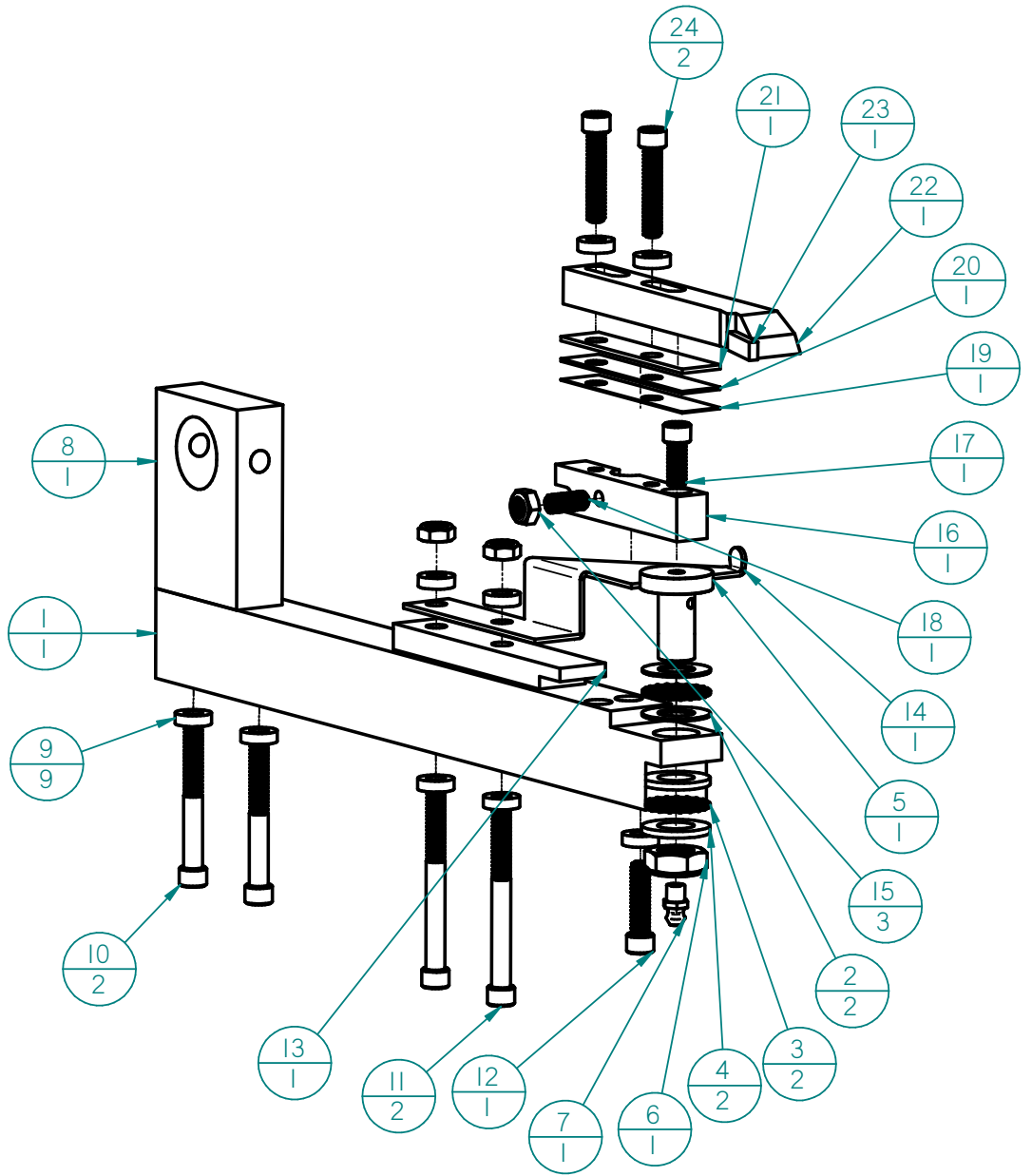
LEFT HAND INDEX ASSEMBLY

Item Number	PART #	Quantity
26	F-322	16
27	F-160	1
28	W-357	1
29	F-313	3
30	F-102	2

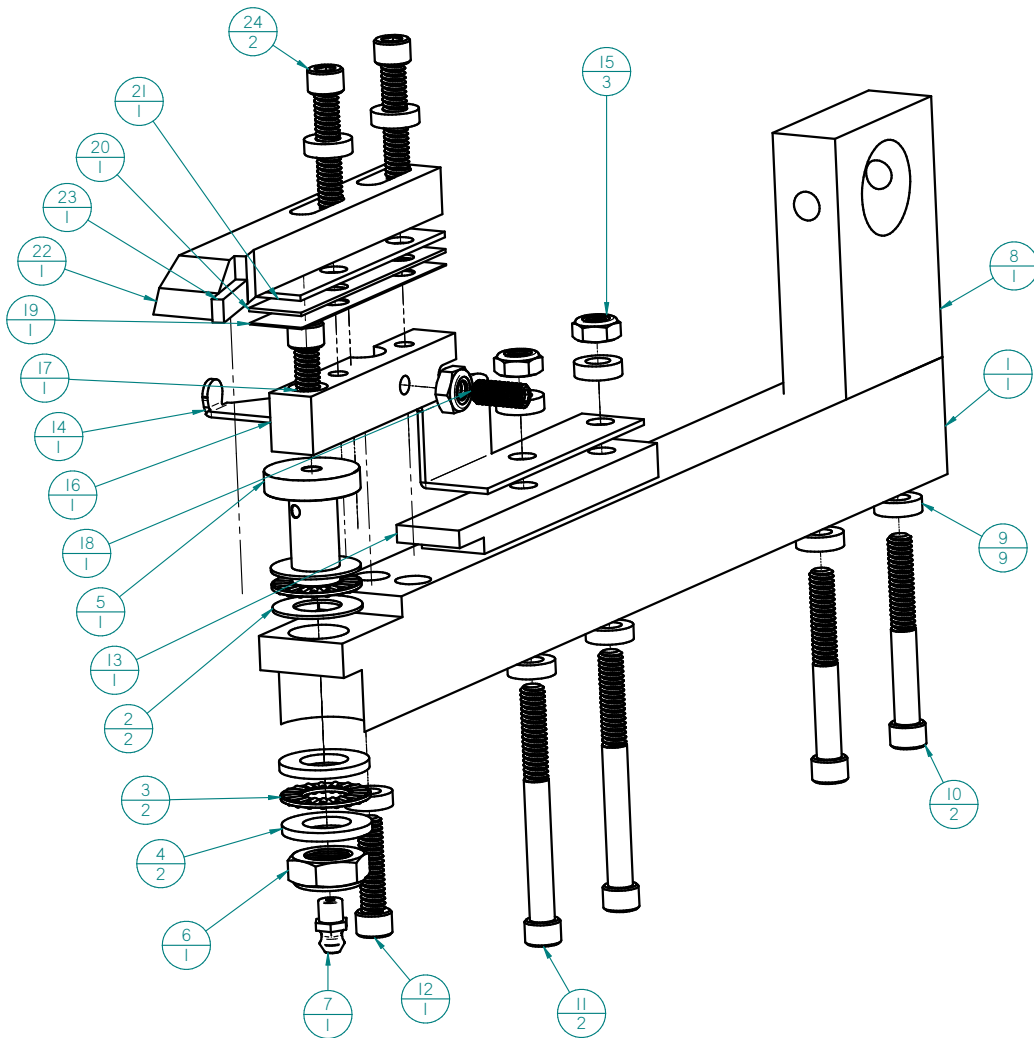


RIGHT HAND BAND SAW FEED FINGER ARM ASSEMBLY

Item Number	PART #	Quantity
1	C-7159	1
2	W-435	2
3	W-434	2
4	W-284	2
5	C-7177	1
6	F-43	1
7	W-357	1
8	C-7165	1
9	C-5386	9
10	F-108	2
11	F-107	2
12	F-104	1
13	C-7178	1
14	C-7179	1
15*	F-25	3
16	C-7160	1
17	F-101	1
18*	F-375	1
19	C-7166-3	1
20	C-7166-2	1
21	C-7166-1	1
22	C-7162	1
23	C-7172	1
24	F-105	2



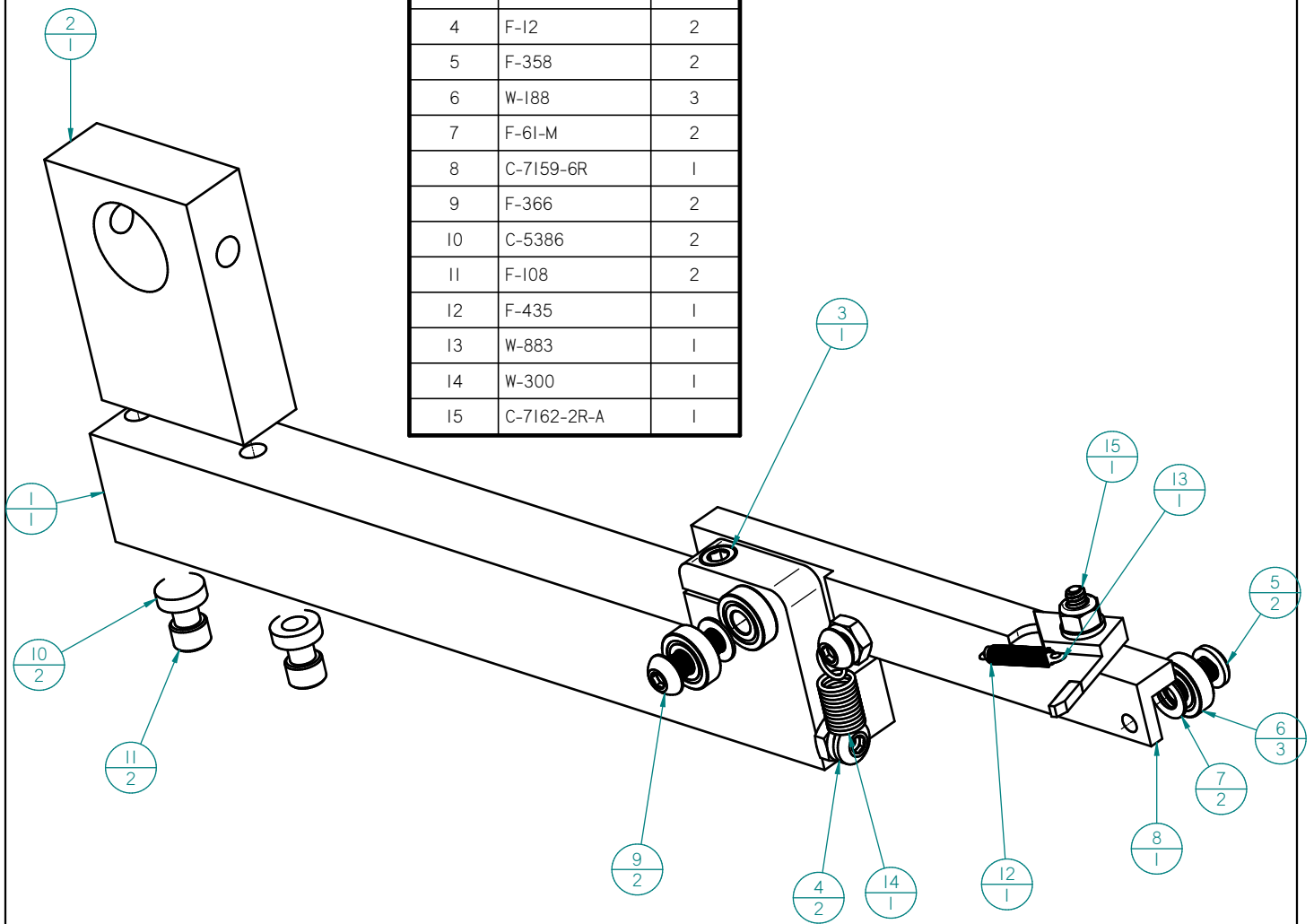
LEFT HAND BAND SAW FEED FINGER ARM ASSEMBLY



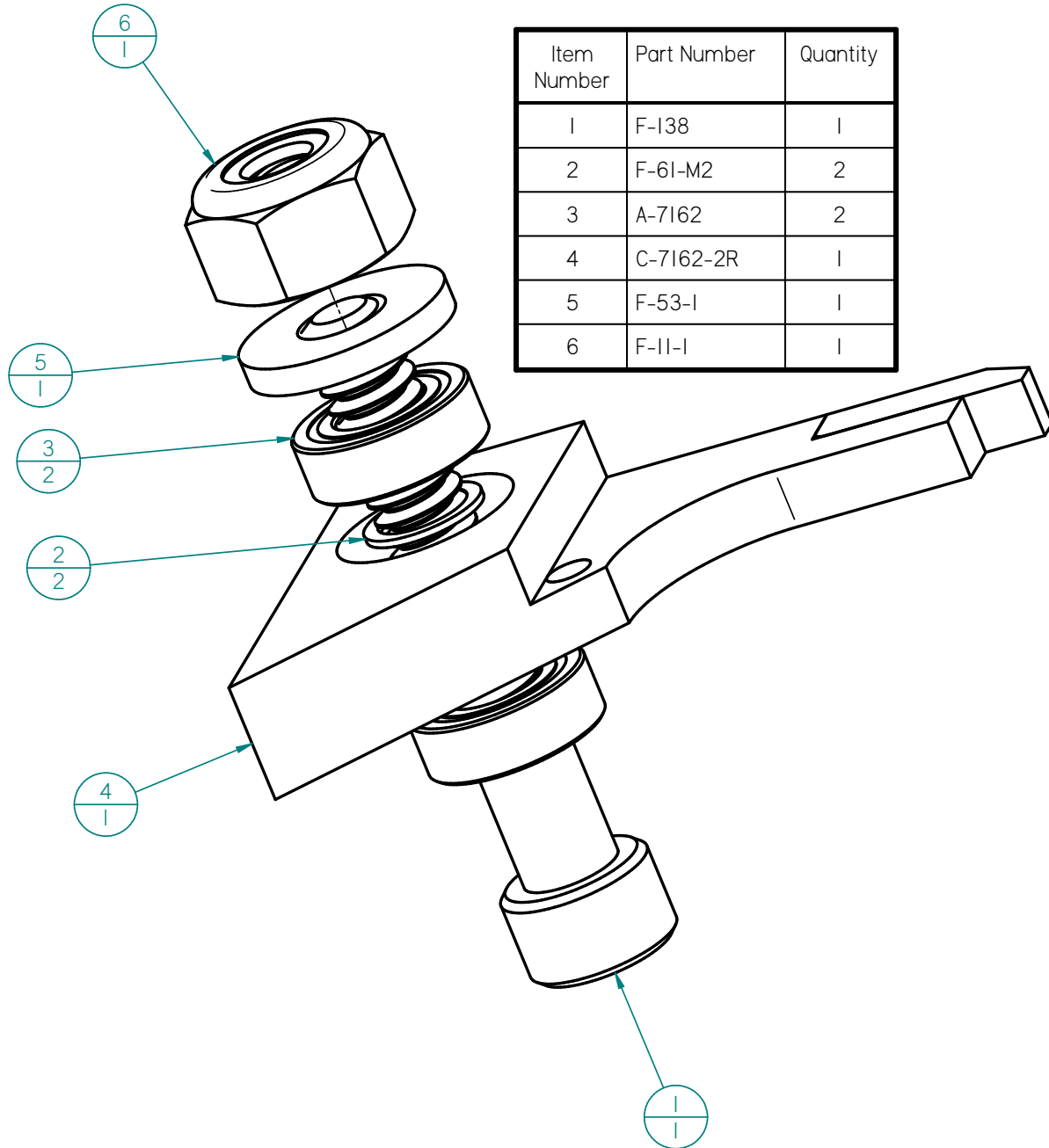
Item Number	PART #	Quantity
1	C-7159	1
2	W-435	2
3	W-434	2
4	W-284	2
5	C-7177	1
6	F-43	1
7	W-357	1
8	C-7165	1
9	C-5386	9
10	F-108	2
11	F-107	2
12	F-104	1
13	C-7178	1
14	C-8179	1
15	F-25	3
16	C-8160	1
17	F-101	1
18	F-375	1
19	C-7166-3	1
20	C-7166-2	1
21	C-7166-1	1
23	C-7172	1
24	F-105	2

RIGHT HAND CIRCLE SAW FEED ARM ASSEMBLY

Item Number	Part Number	Quantity
1	C-7159-4R	1
2	C-7165	1
3	F-103	1
4	F-12	2
5	F-358	2
6	W-188	3
7	F-61-M	2
8	C-7159-6R	1
9	F-366	2
10	C-5386	2
11	F-108	2
12	F-435	1
13	W-883	1
14	W-300	1
15	C-7162-2R-A	1



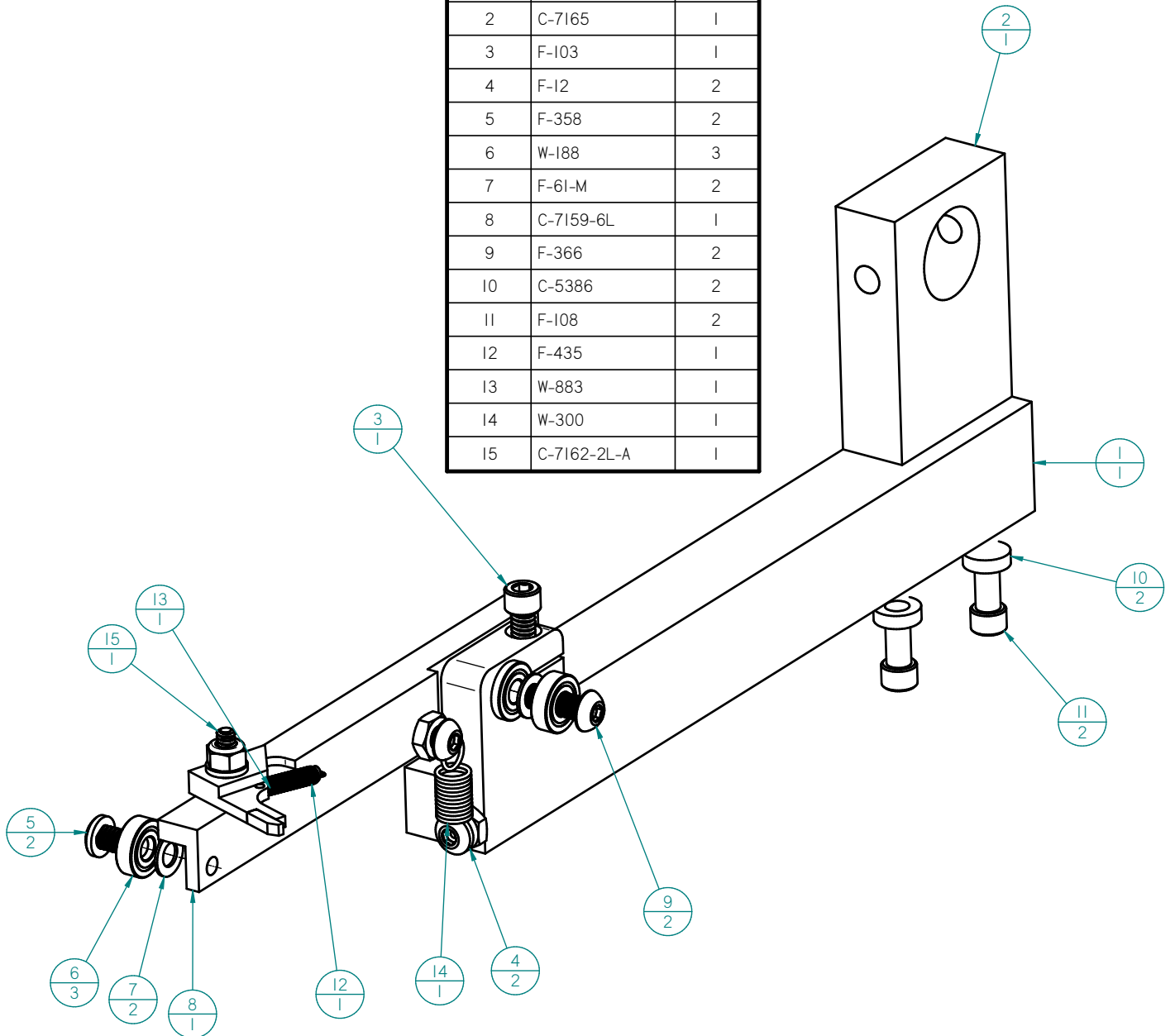
C-7162-2R-A, FEED FINGER



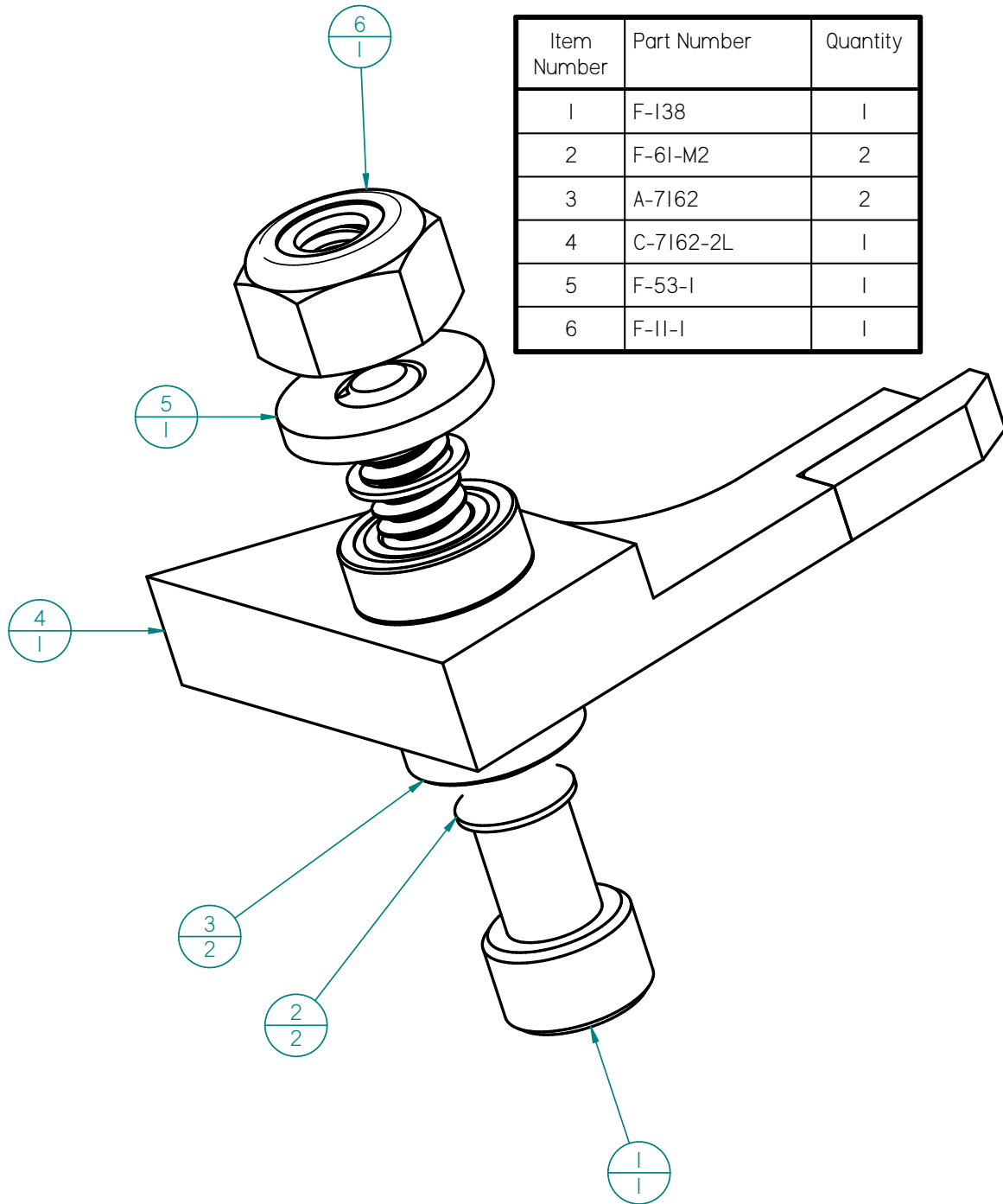
Item Number	Part Number	Quantity
1	F-138	1
2	F-61-M2	2
3	A-7162	2
4	C-7162-2R	1
5	F-53-1	1
6	F-11-1	1

LEFT HAND CIRCLE SAW FEED ARM ASSEMBLY

Item Number	Part Number	Quantity
1	C-7159-4L	1
2	C-7165	1
3	F-103	1
4	F-12	2
5	F-358	2
6	W-188	3
7	F-61-M	2
8	C-7159-6L	1
9	F-366	2
10	C-5386	2
11	F-108	2
12	F-435	1
13	W-883	1
14	W-300	1
15	C-7162-2L-A	1

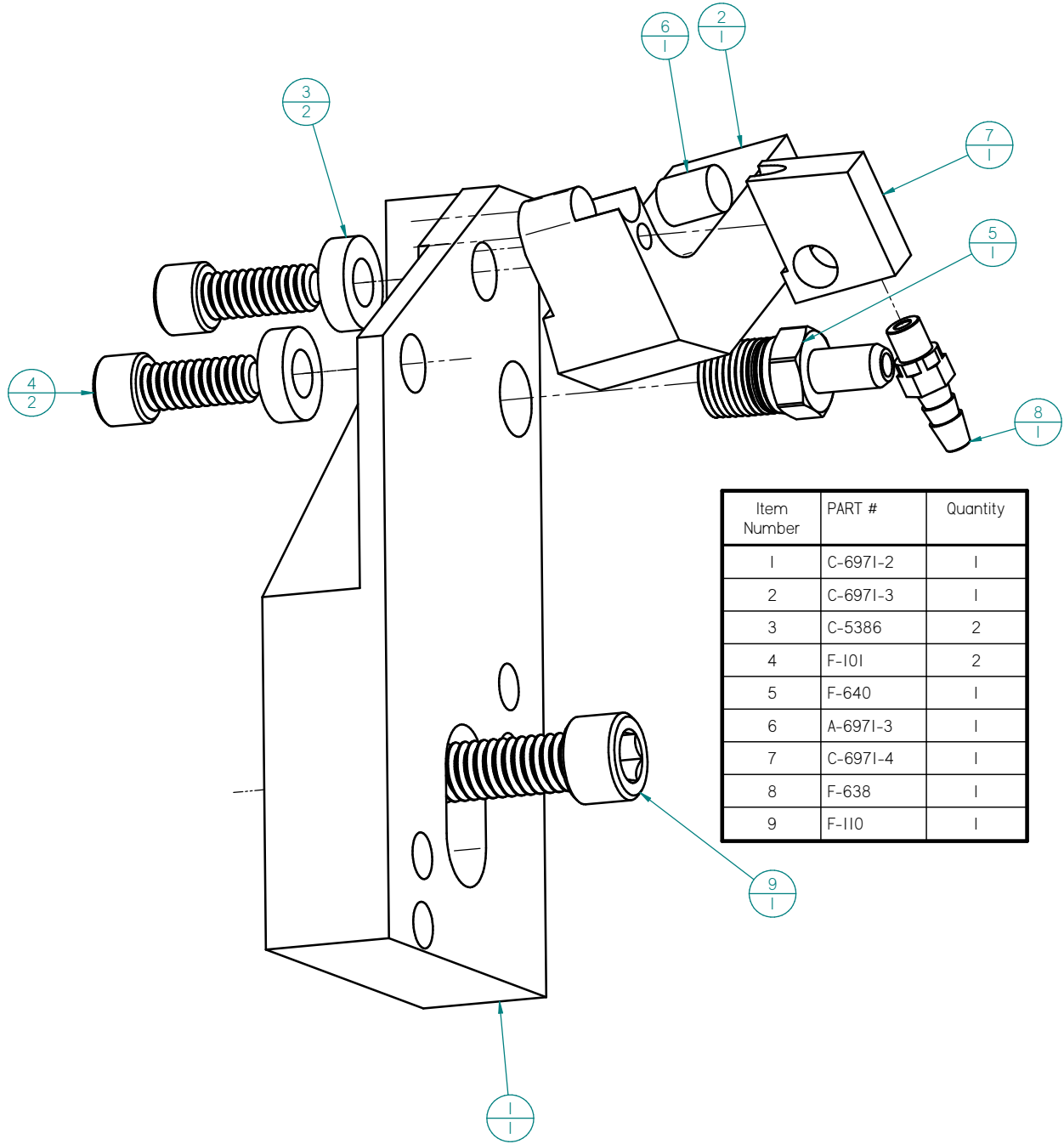


C-7162-2L-A, FEED FINGER



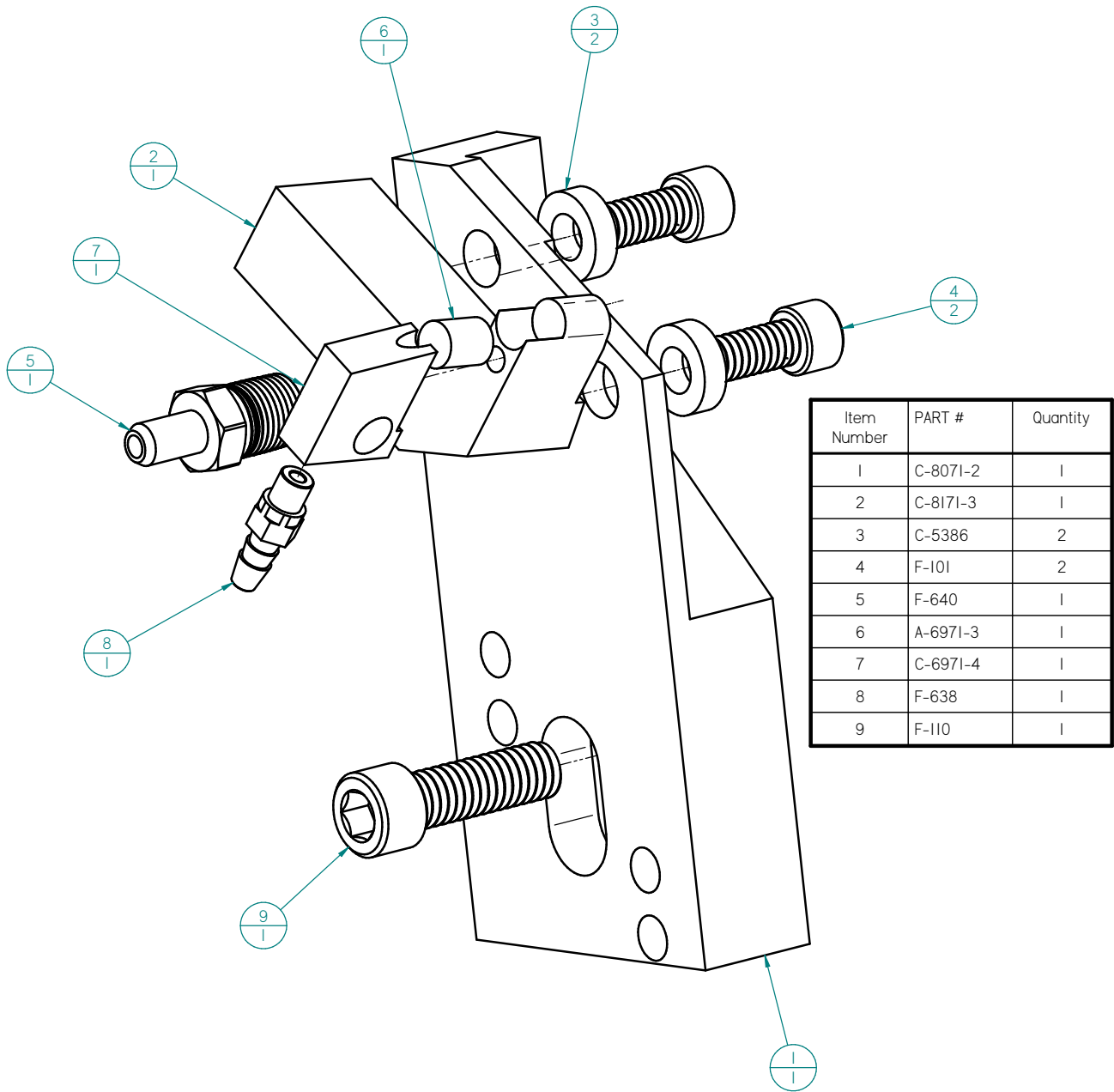
Item Number	Part Number	Quantity
1	F-138	1
2	F-61-M2	2
3	A-7162	2
4	C-7162-2L	1
5	F-53-1	1
6	F-11-1	1

RIGHT HAND DRESSER ASSEMBLY



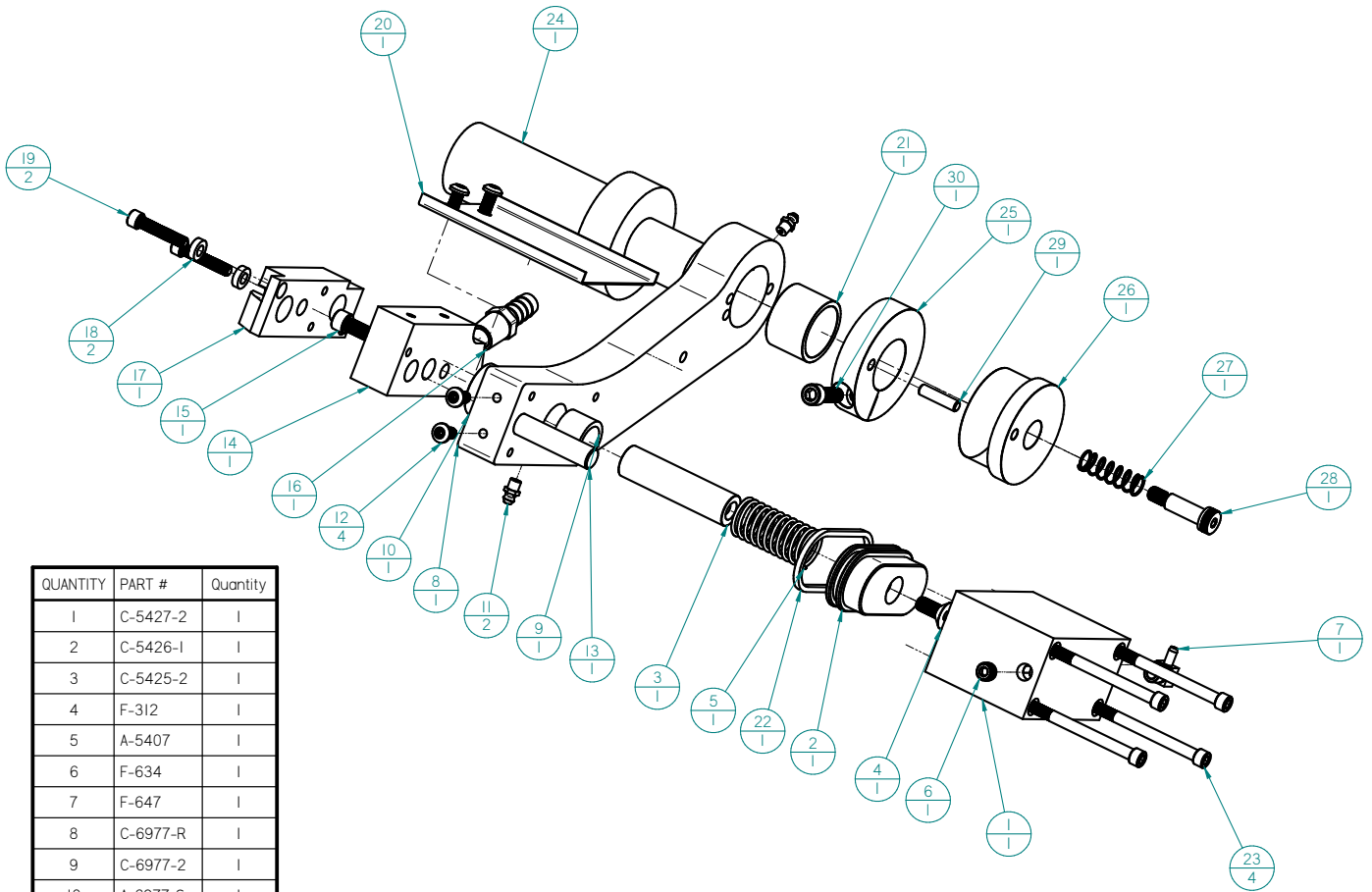
Item Number	PART #	Quantity
1	C-6971-2	1
2	C-6971-3	1
3	C-5386	2
4	F-101	2
5	F-640	1
6	A-6971-3	1
7	C-6971-4	1
8	F-638	1
9	F-110	1

LEFT HAND DRESSER ASSEMBLY



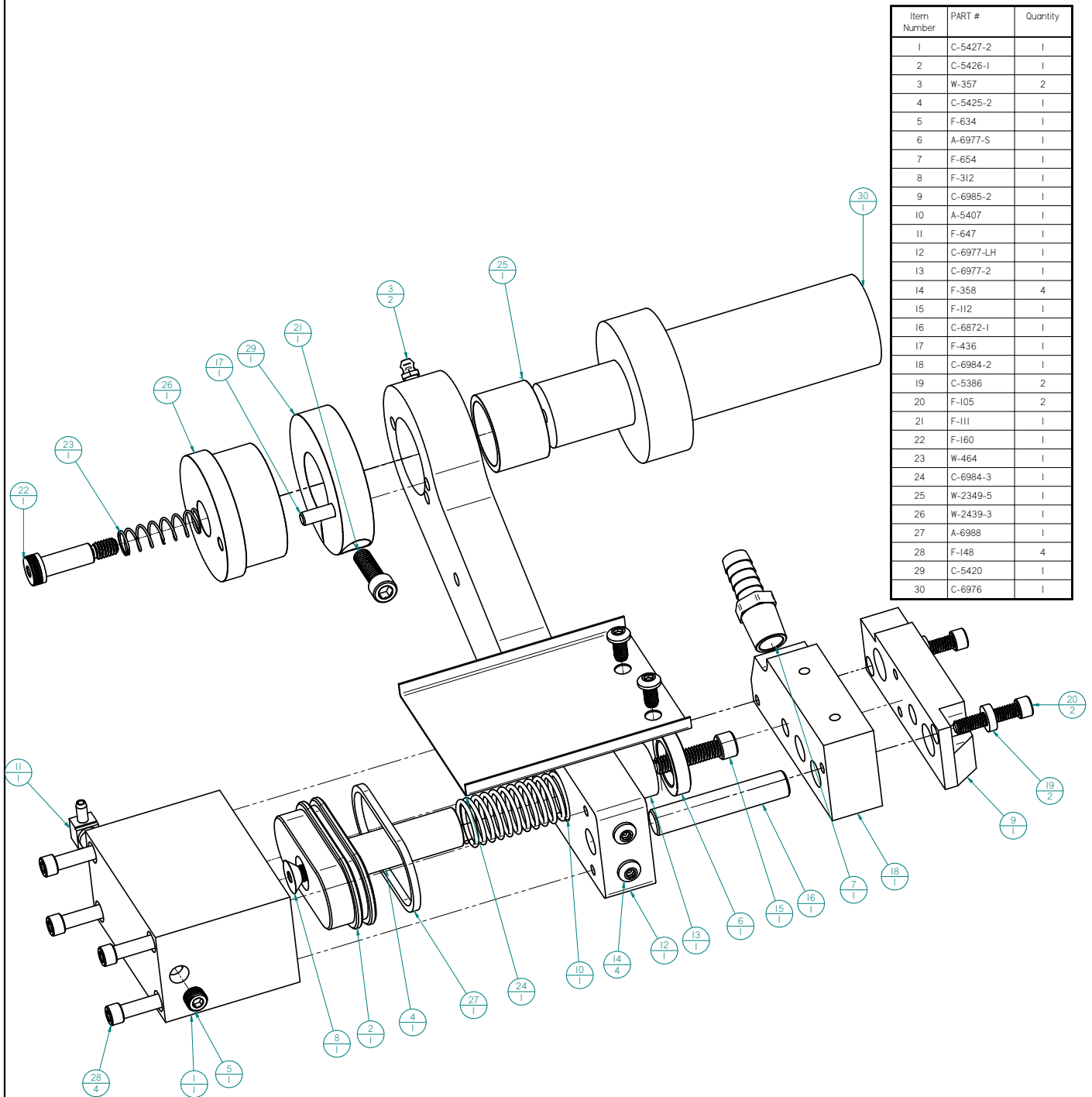
Item Number	PART #	Quantity
1	C-8071-2	1
2	C-8171-3	1
3	C-5386	2
4	F-101	2
5	F-640	1
6	A-6971-3	1
7	C-6971-4	1
8	F-638	1
9	F-110	1

RIGHT HAND CLAMP ARM ASSEMBLY



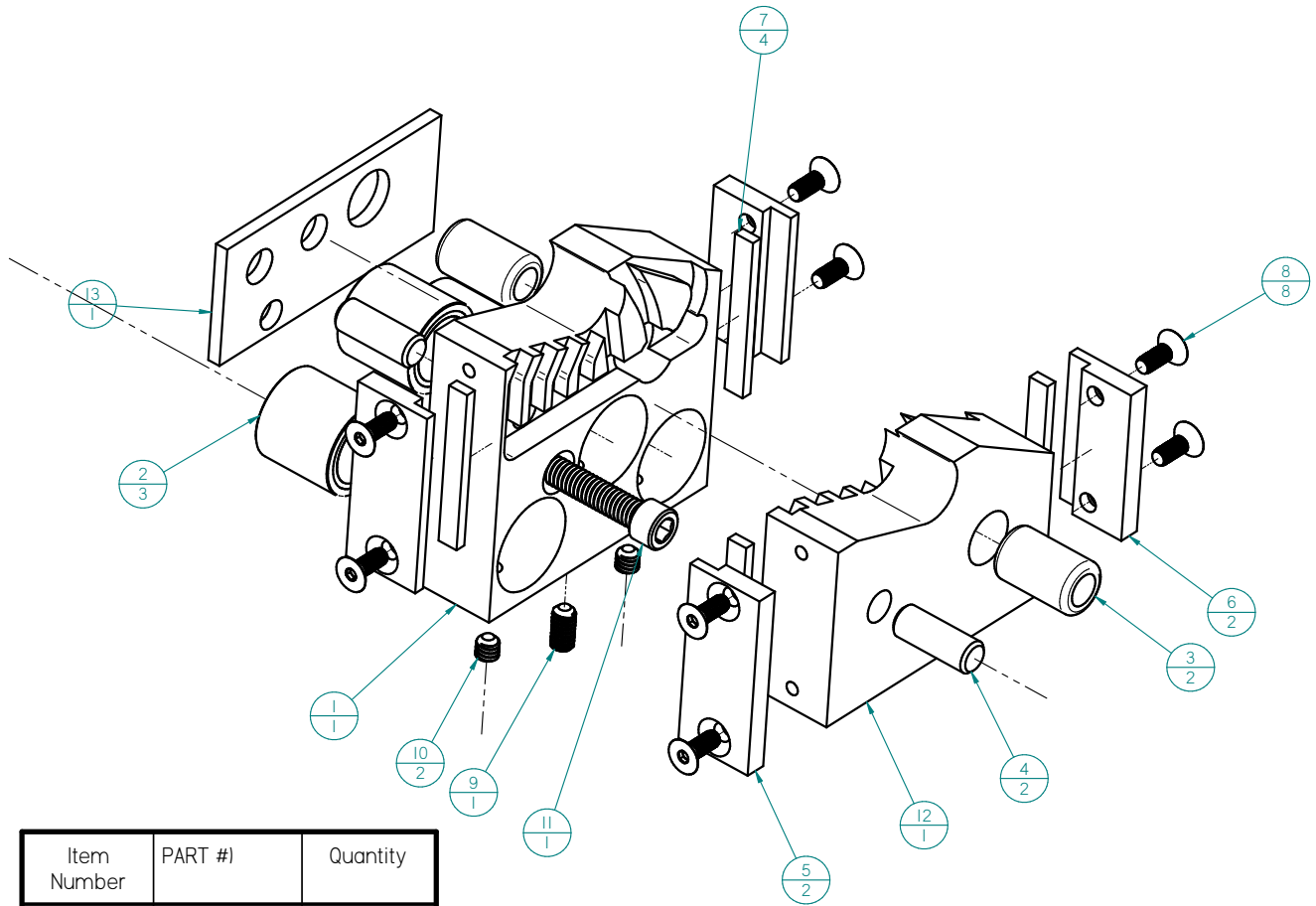
QUANTITY	PART #	Quantity
1	C-5427-2	1
2	C-5426-1	1
3	C-5425-2	1
4	F-312	1
5	A-5407	1
6	F-634	1
7	F-647	1
8	C-6977-R	1
9	C-6977-2	1
10	A-6977-S	1
11	W-357	2
12	F-358	4
13	C-6872-1	1
14	C-6984	1
15	F-112	1
16	F-654	1
17	C-6985	1
18	C-5386	2
19	F-105	2
20	C-6984-1	1
21	W-2349-5	1
22	A-6988	1
23	F-148	4
24	C-6976	1
25	C-5420	1
26	W-2439-3	1
27	W-464	1
28	F-160	1
29	F-436	1
30	F-III	1

LEFT HAND CLAMP ARM ASSEMBLY



Item Number	PART #	Quantity
1	C-5427-2	1
2	C-5426-1	1
3	W-357	2
4	C-5425-2	1
5	F-634	1
6	A-6977-S	1
7	F-654	1
8	F-312	1
9	C-6985-2	1
10	A-5407	1
11	F-647	1
12	C-6977-LH	1
13	C-6977-2	1
14	F-358	4
15	F-112	1
16	C-6872-1	1
17	F-436	1
18	C-6984-2	1
19	C-5386	2
20	F-105	2
21	F-111	1
22	F-160	1
23	W-464	1
24	C-6984-3	1
25	W-2349-5	1
26	W-2439-3	1
27	A-6988	1
28	F-148	4
29	C-5420	1
30	C-6976	1

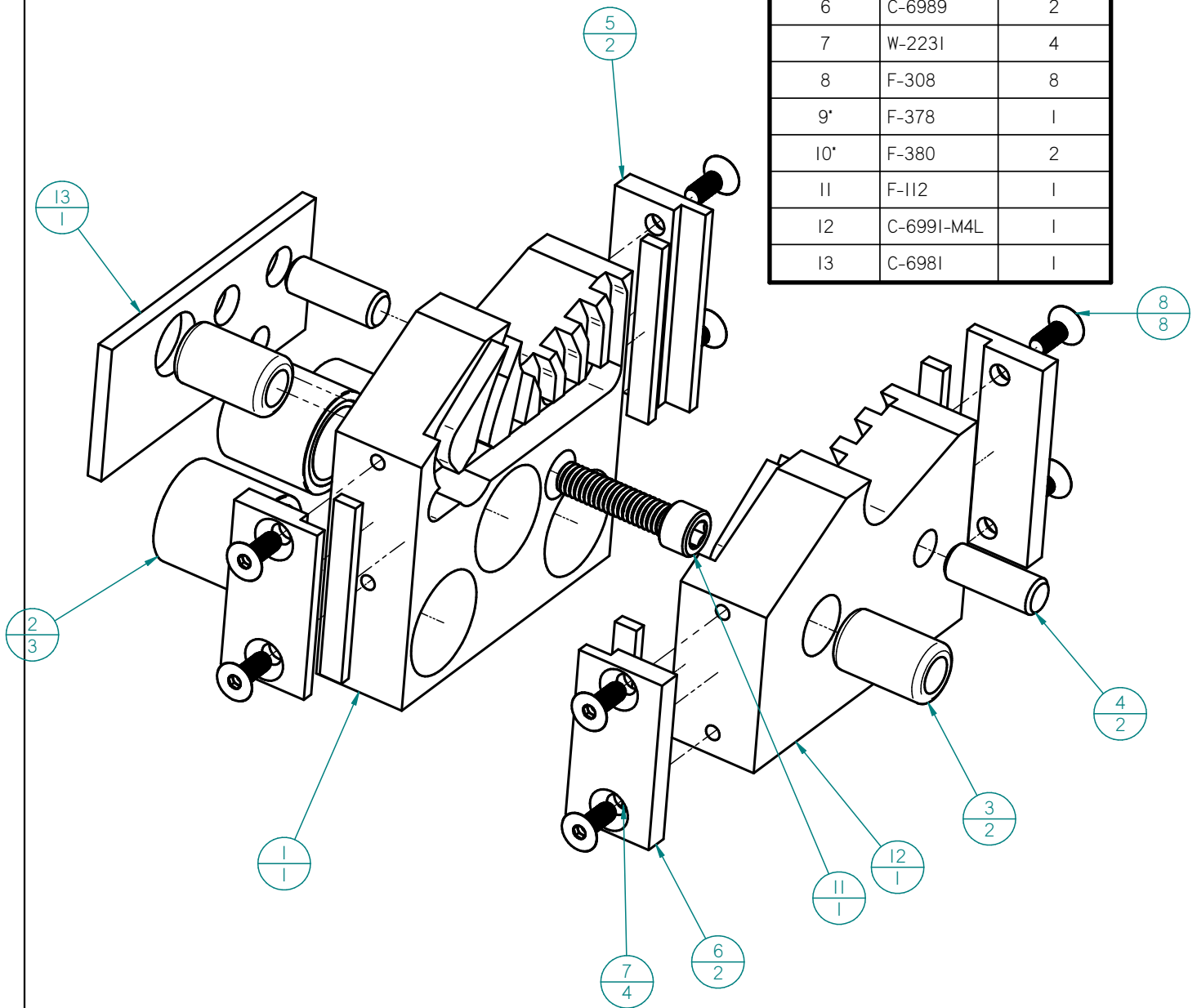
RIGHT HAND CLAMP JAW ASSEMBLY(BAND SAW)



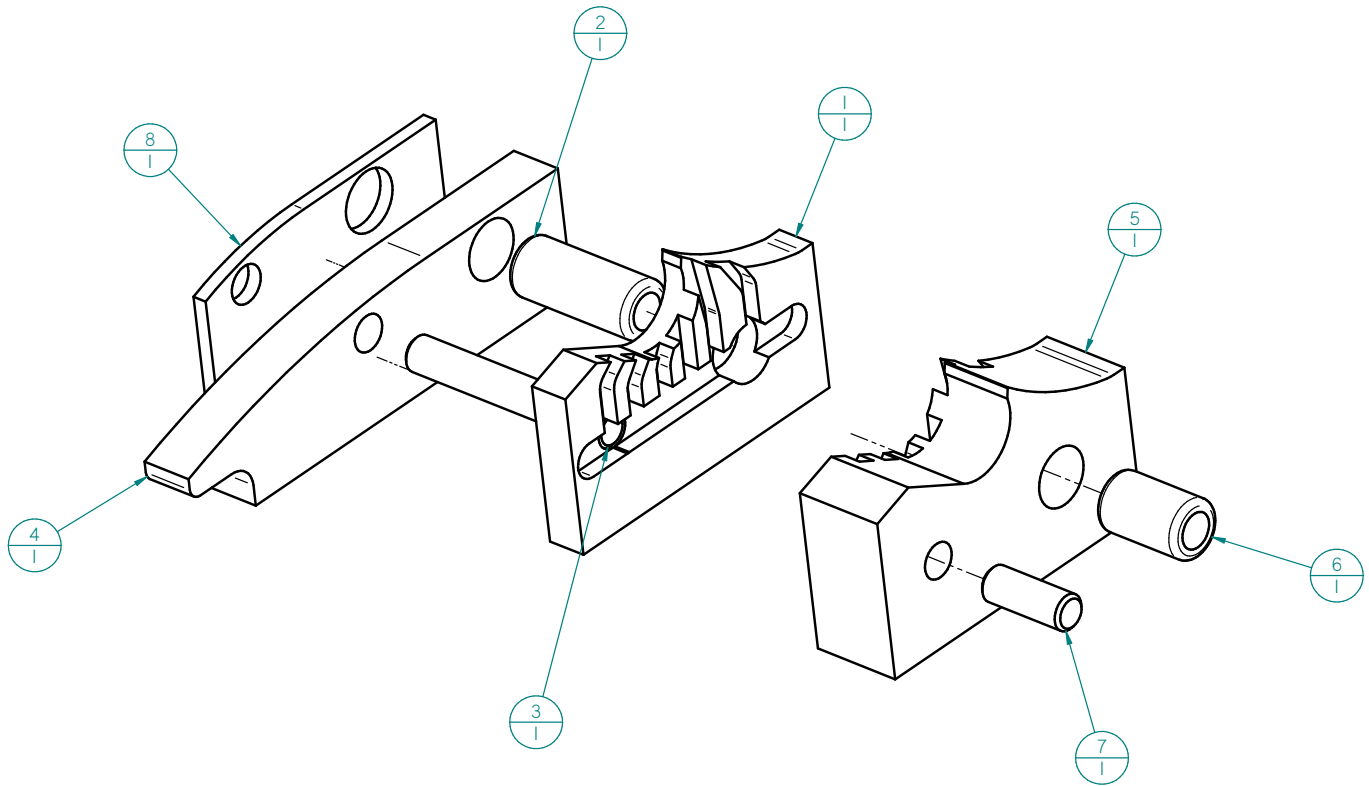
Item Number	PART #	Quantity
1	C-6991-M3	1
2	W-1457	3
3	C-6986	2
4	F-442	2
5	C-6987	2
6	C-6989	2
7	W-2231	4
8	F-308	8
9	F-378	1
10	F-380	2
11	F-112	1
12	C-6991-M4	1
13	C-6981	1

LEFT HAND CLAMP JAW ASSEMBLY(BAND SAW)

Item Number	PART #	Quantity
1	C-6991-M3L	1
2	W-1457	3
3	C-6986	2
4	F-442	2
5	C-6987	2
6	C-6989	2
7	W-2231	4
8	F-308	8
9*	F-378	1
10*	F-380	2
11	F-112	1
12	C-6991-M4L	1
13	C-6981	1



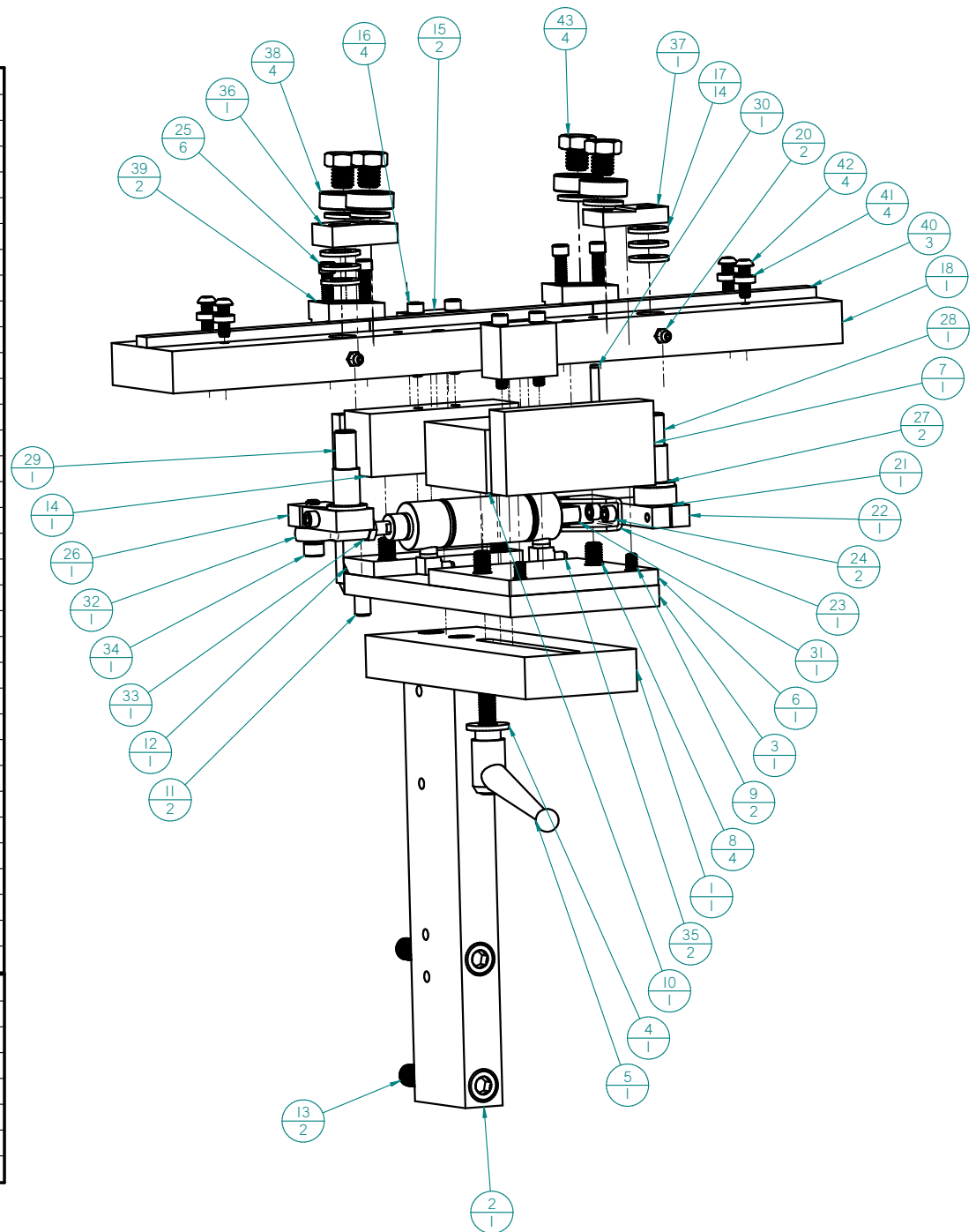
RIGHT HAND CLAMP JAW ASSEMBLY (CIRCLE SAW)



Item Number	PART #	Quantity
1	C-699I-S5FM	1
2	C-6986-1	1
3	F-424	1
4	W-1790-8	1
5	C-699I-S5MM	1
6	C-6986	1
7	F-442	1
8	C-698I-1	1

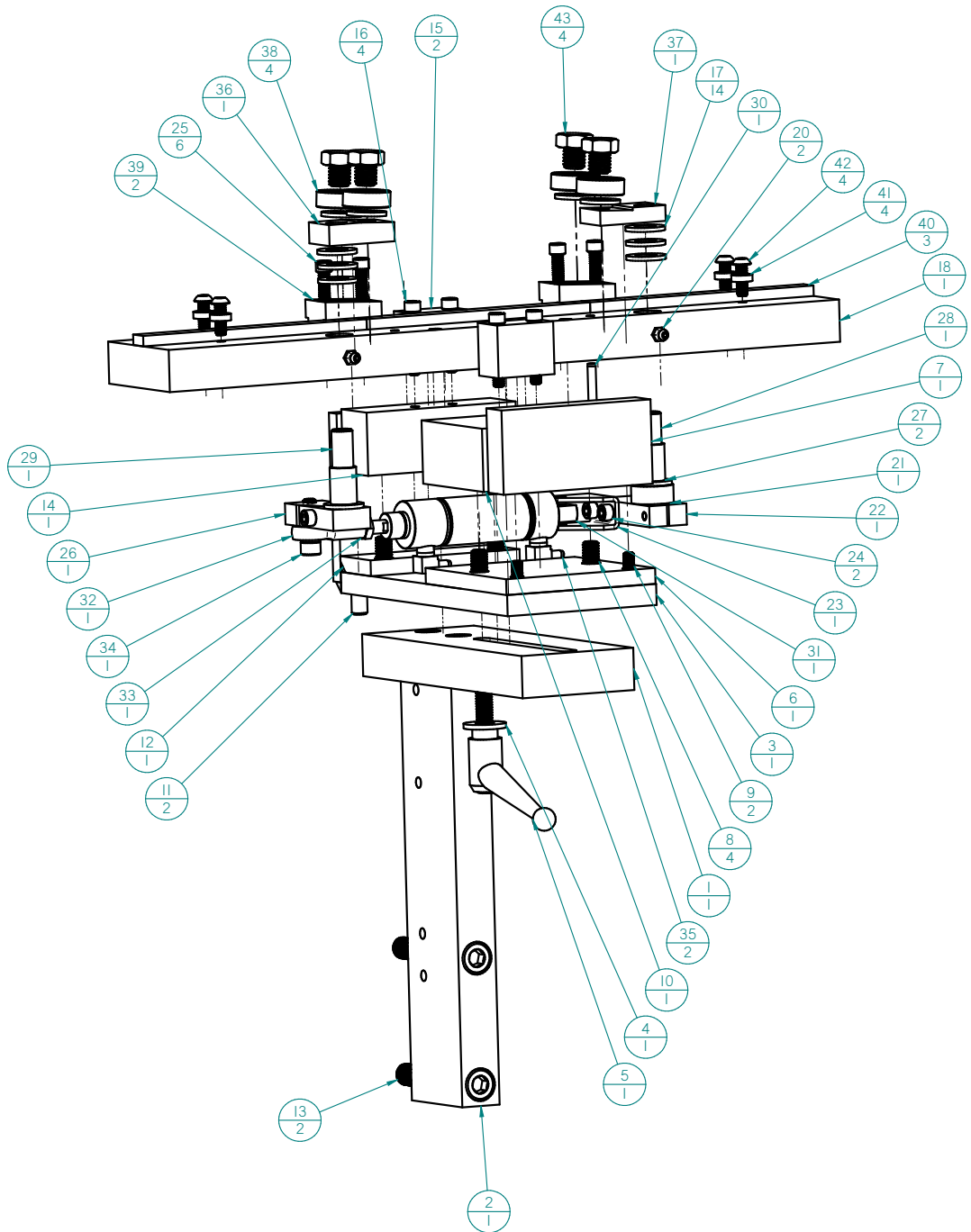
RIGHT HAND BAND SAW CARRIER

1	C-6853	1
2	C-6857	1
3	C-6851	1
4	F-62	1
5	W-240	1
6	C-6864	1
7	C-6859	1
8	F-116	4
9	F-104	2
10	C-6863	1
11	F-442	2
12	C-6864-1	1
13	F-151	2
14	C-6863-1	1
15	C-6867	2
16	F-106	4
17	W-284	14
18	C-6856	1
19	F-441	2
20	W-357	2
21	W-231	1
22	C-6868	1
23	A-6873	1
24	F-103	2
25	F-102	6
26	C-6869	1
27	W-1408	2
28	C-6872-1	1
29	C-6872	1
30	F-411	1
31	W-987	1
32	W-61	1
33	F-13	1
34	F-111	1
35	F-647	2
36	C-6870	1
37	C-6871	1
38	W-733	4
39	C-6858	2
40	A-6865	3
41	C-5386	4
42	F-366	4
43	F-269	4

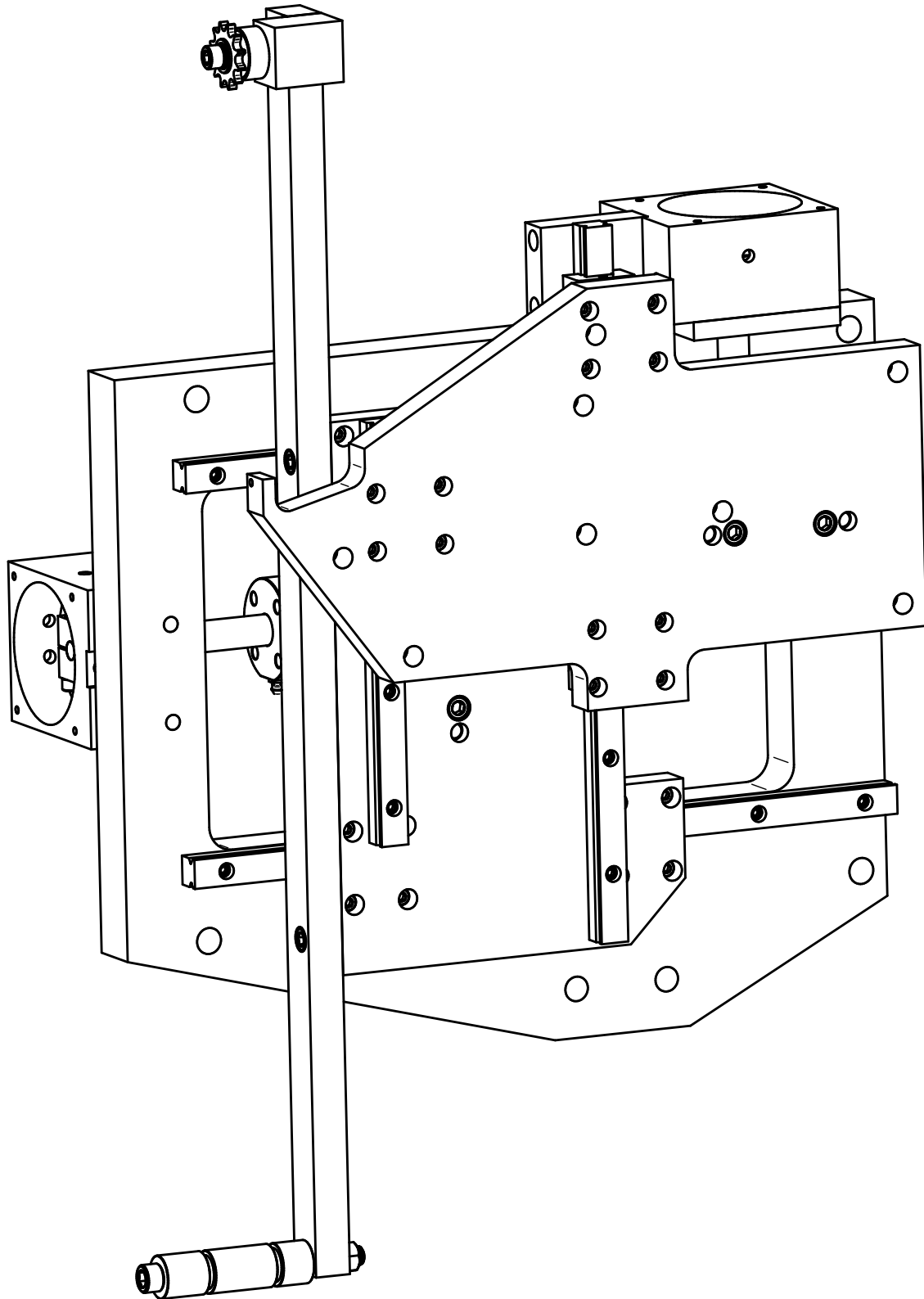


LEFT HAND BAND SAW CARRIER

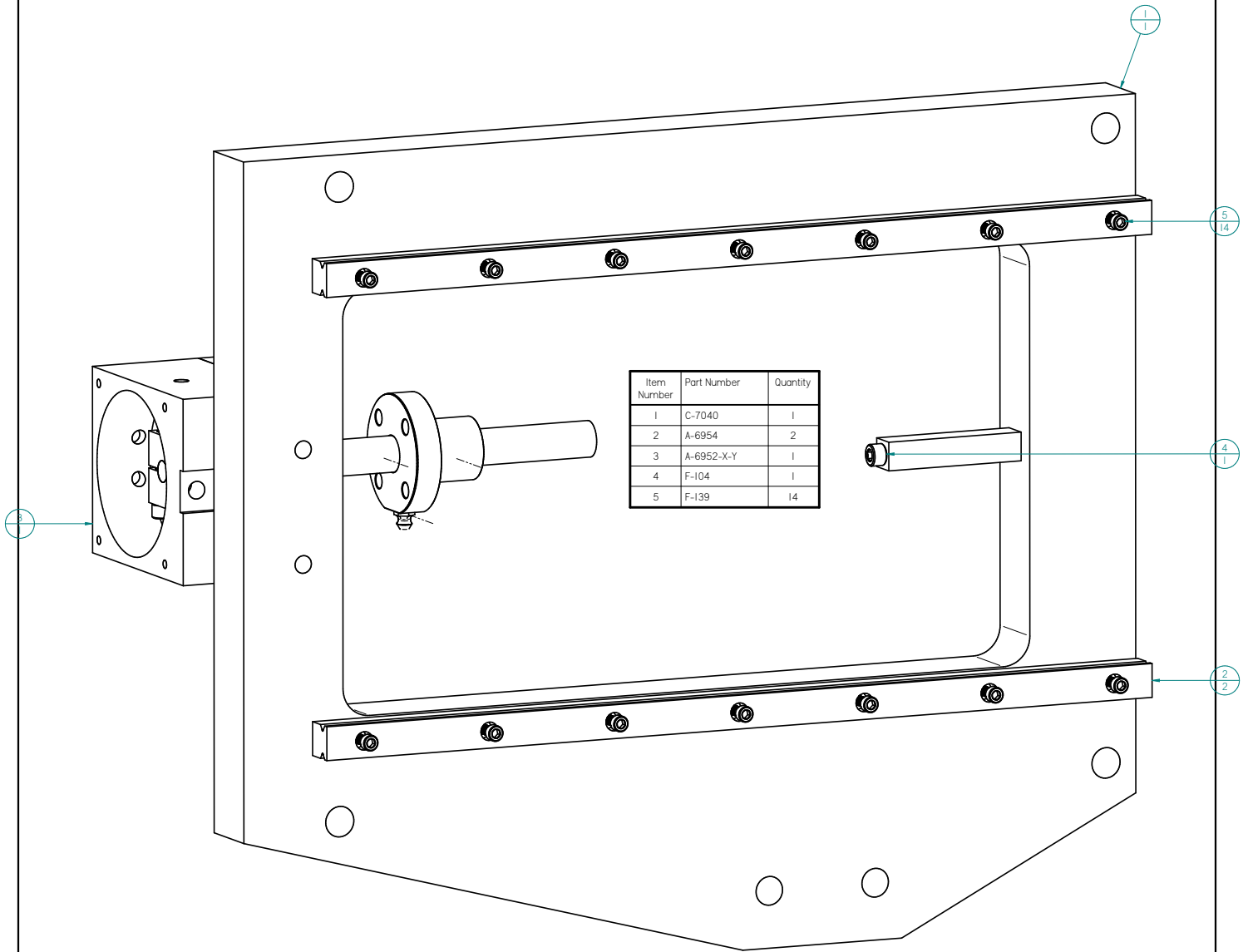
1	C-6853	1
2	C-6857	1
3	C-6851	1
4	F-62	1
5	W-240	1
6	C-6864	1
7	C-6859	1
8	F-116	4
9	F-104	2
10	C-6863	1
11	F-442	2
12	C-6864-1	1
13	F-151	2
14	C-6863-1	1
15	C-6867	2
16	F-106	4
17	W-284	14
18	C-6856	1
19	F-441	2
20	W-357	2
21	W-231	1
22	C-6868	1
23	A-6873	1
24	F-103	2
25	F-102	6
26	C-6869	1
27	W-1408	2
28	C-6872-1	1
29	C-6872	1
30	F-411	1
31	W-987	1
32	W-61	1
33	F-13	1
34	F-111	1
35	F-647	2
36	C-6870-1	1
37	C-6871-1	1
38	W-733	4
39	C-6858	2
40	A-6865	3
41	C-5386	4
42	F-366	4
43	F-269	4



X-Y AXIS ASSEMBLY



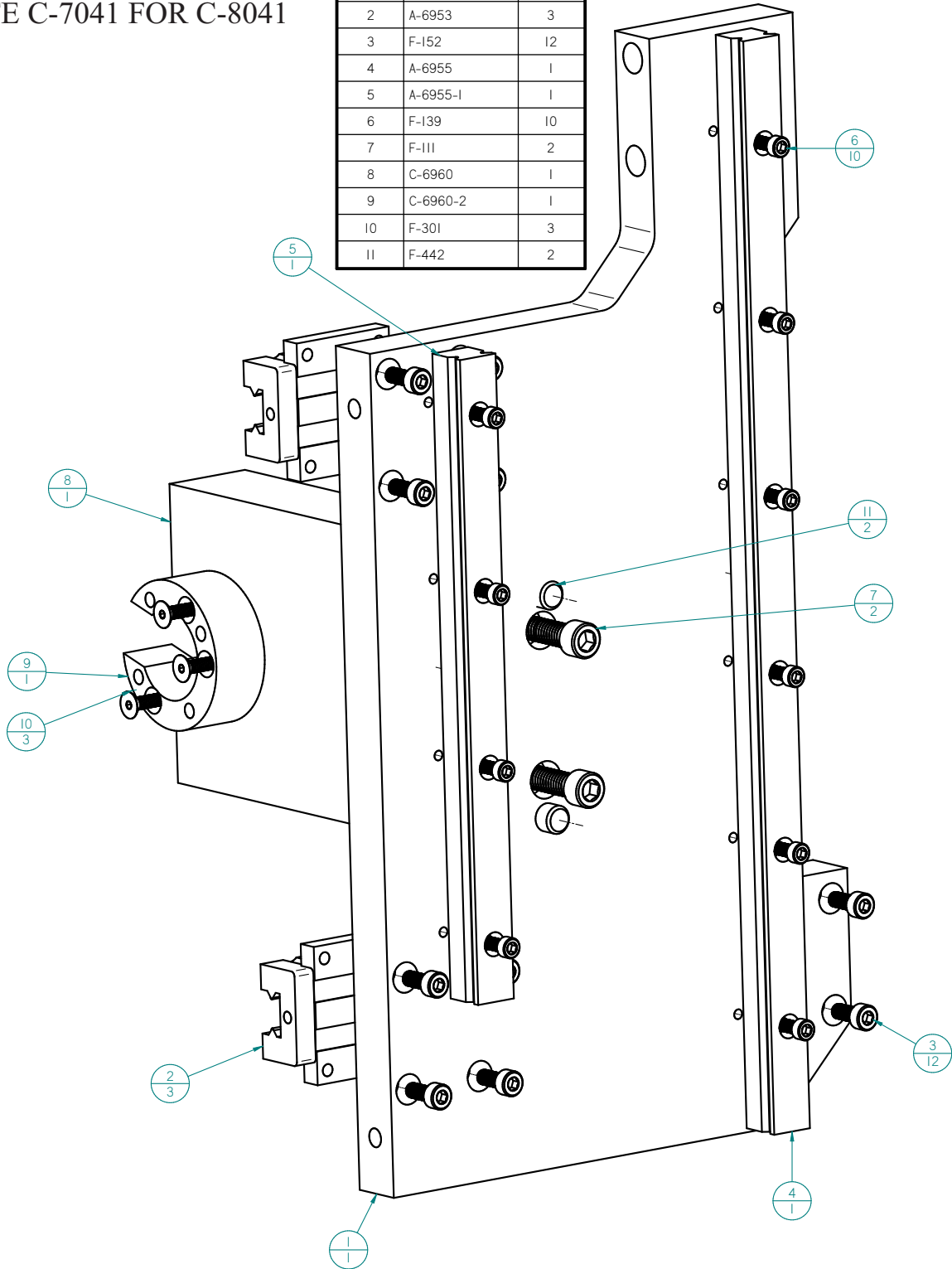
BASE PLATE



HORAZONTAL PLATE

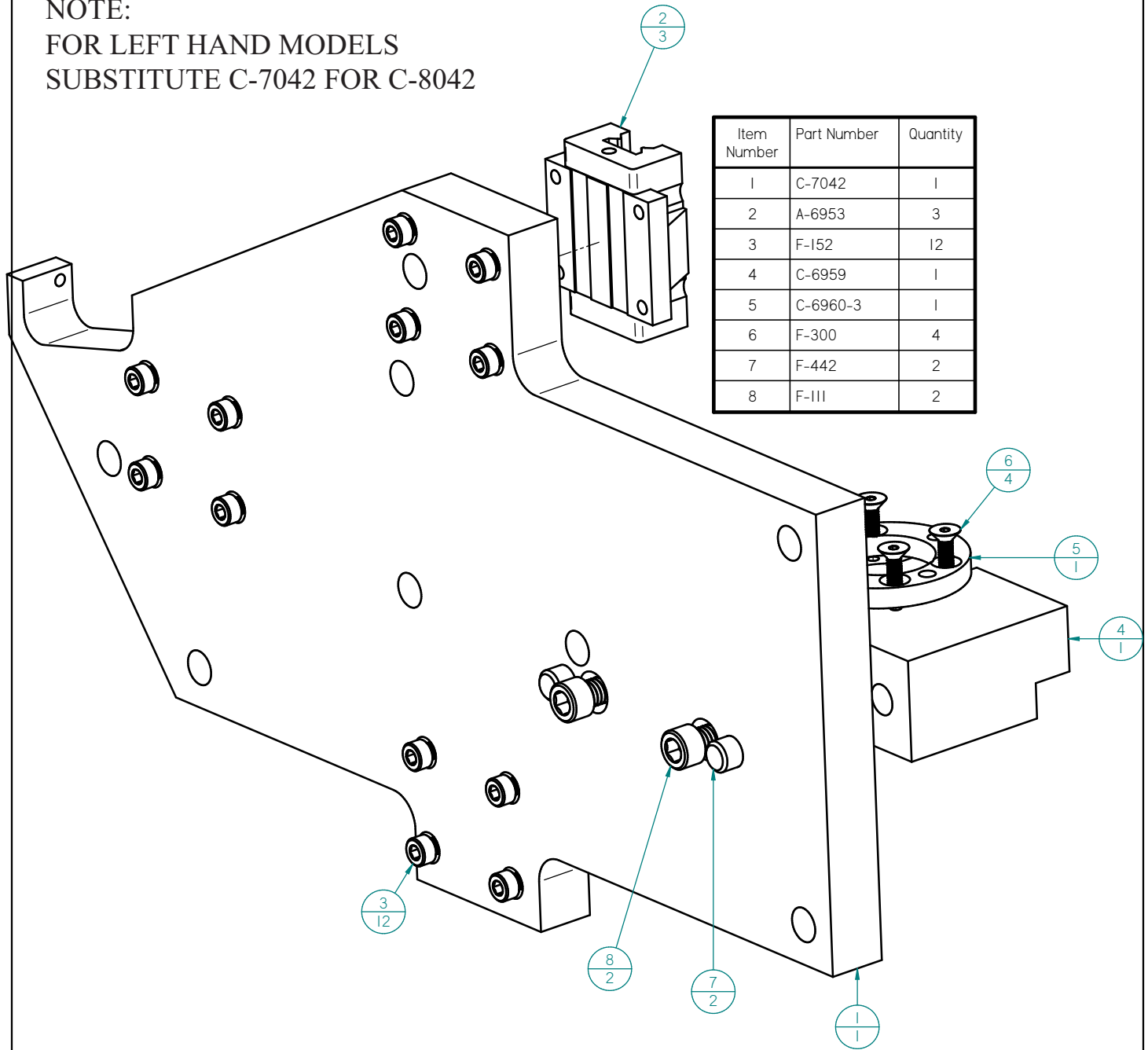
NOTE:
FOR LEFT HAND MODELS
SUBSTITUTE C-7041 FOR C-8041

Item Number	Part Number	Quantity
1	C-7041	1
2	A-6953	3
3	F-152	12
4	A-6955	1
5	A-6955-1	1
6	F-139	10
7	F-111	2
8	C-6960	1
9	C-6960-2	1
10	F-301	3
11	F-442	2



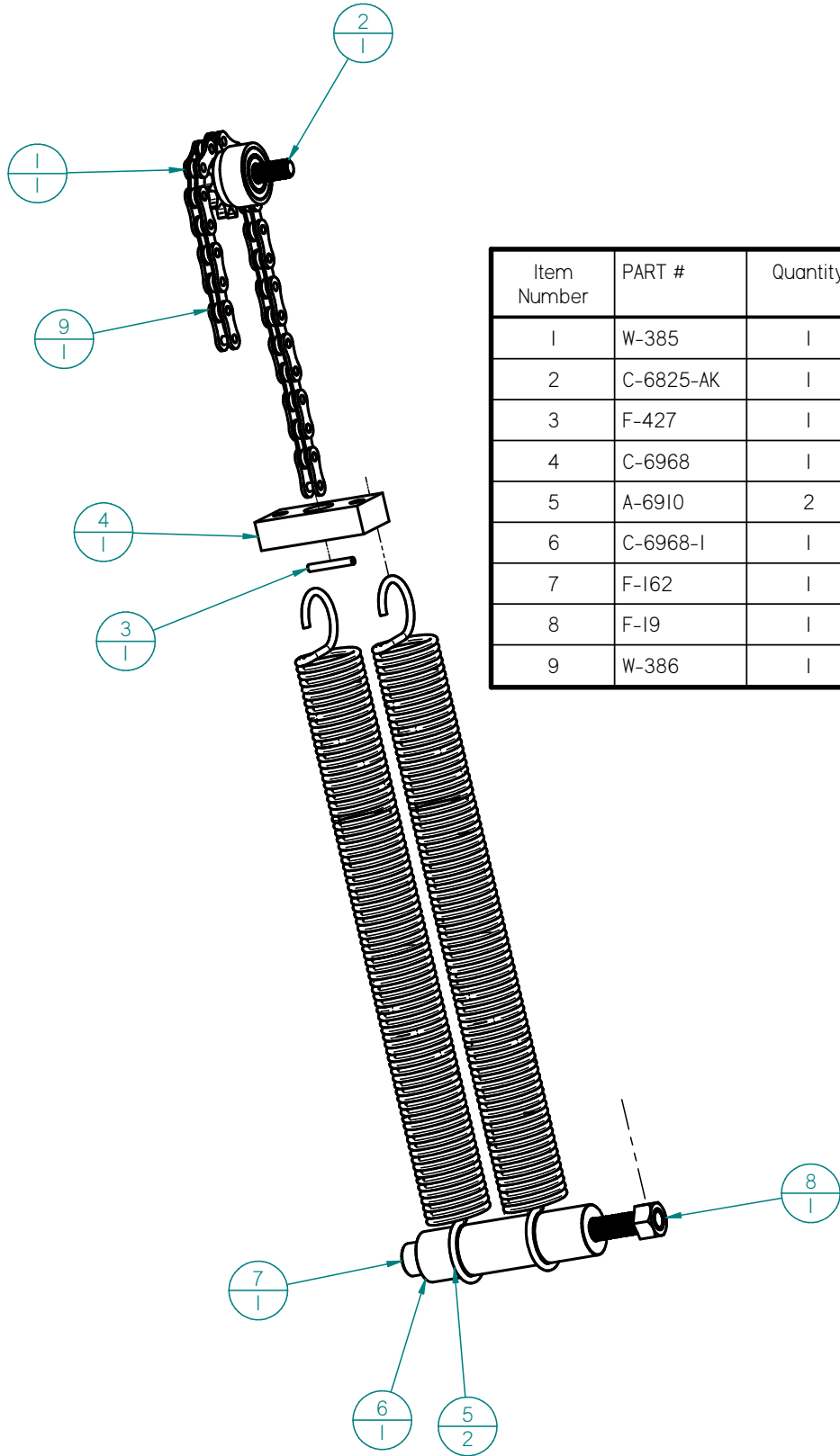
VERTICAL PLATE

NOTE:
FOR LEFT HAND MODELS
SUBSTITUTE C-7042 FOR C-8042



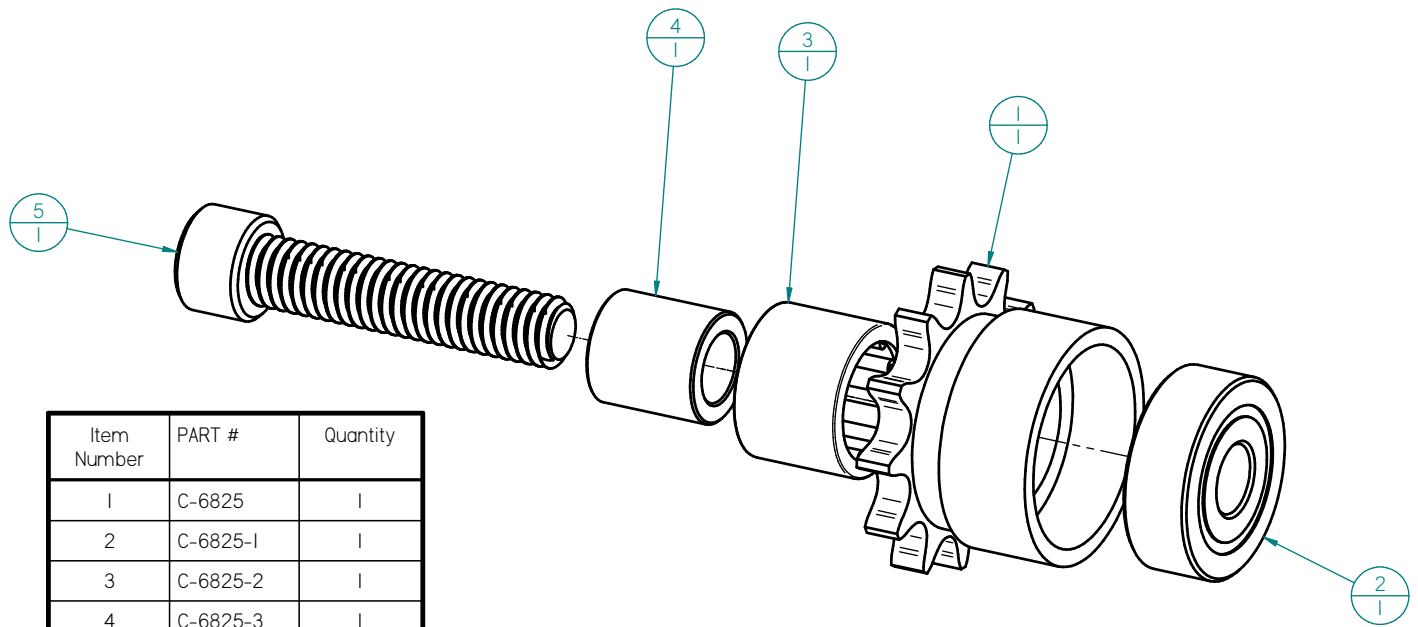
Item Number	Part Number	Quantity
1	C-7042	1
2	A-6953	3
3	F-152	12
4	C-6959	1
5	C-6960-3	1
6	F-300	4
7	F-442	2
8	F-III	2

COUNTER BALANCE



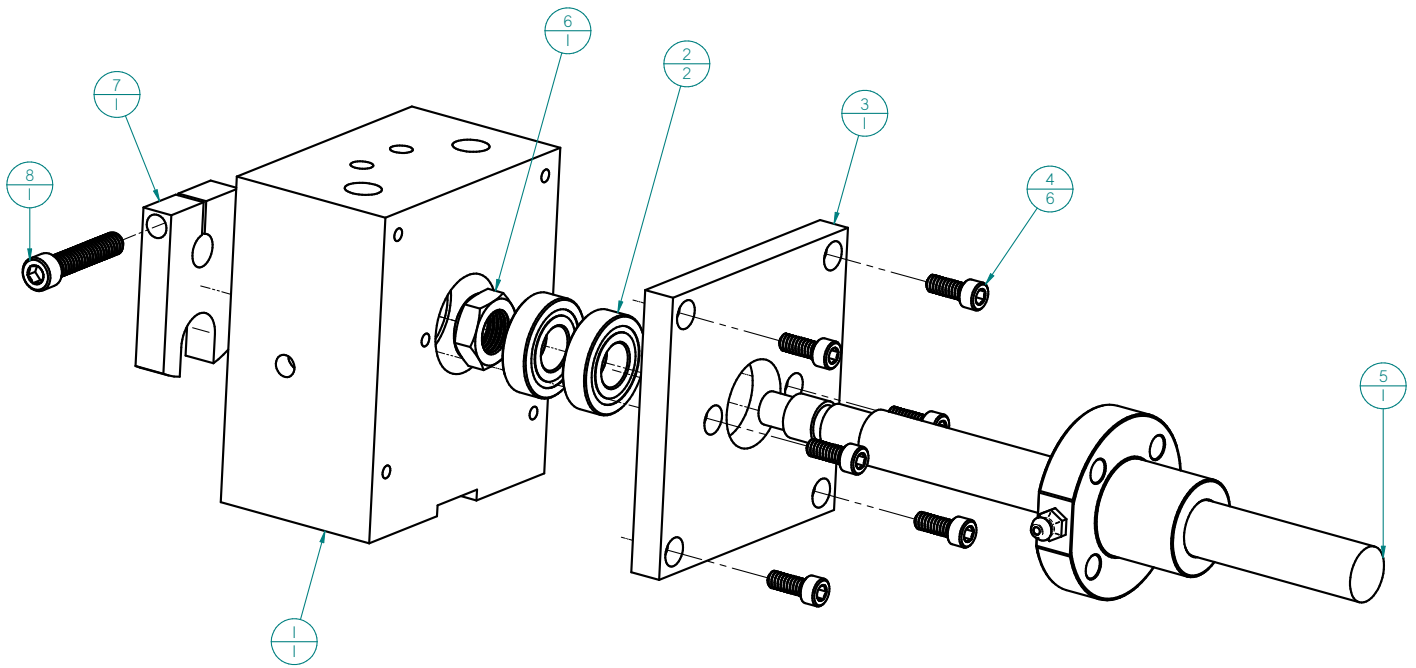
Item Number	PART #	Quantity
1	W-385	1
2	C-6825-AK	1
3	F-427	1
4	C-6968	1
5	A-6910	2
6	C-6968-1	1
7	F-162	1
8	F-19	1
9	W-386	1

C-6825-AK COUNTER BALANCE SPROCKET



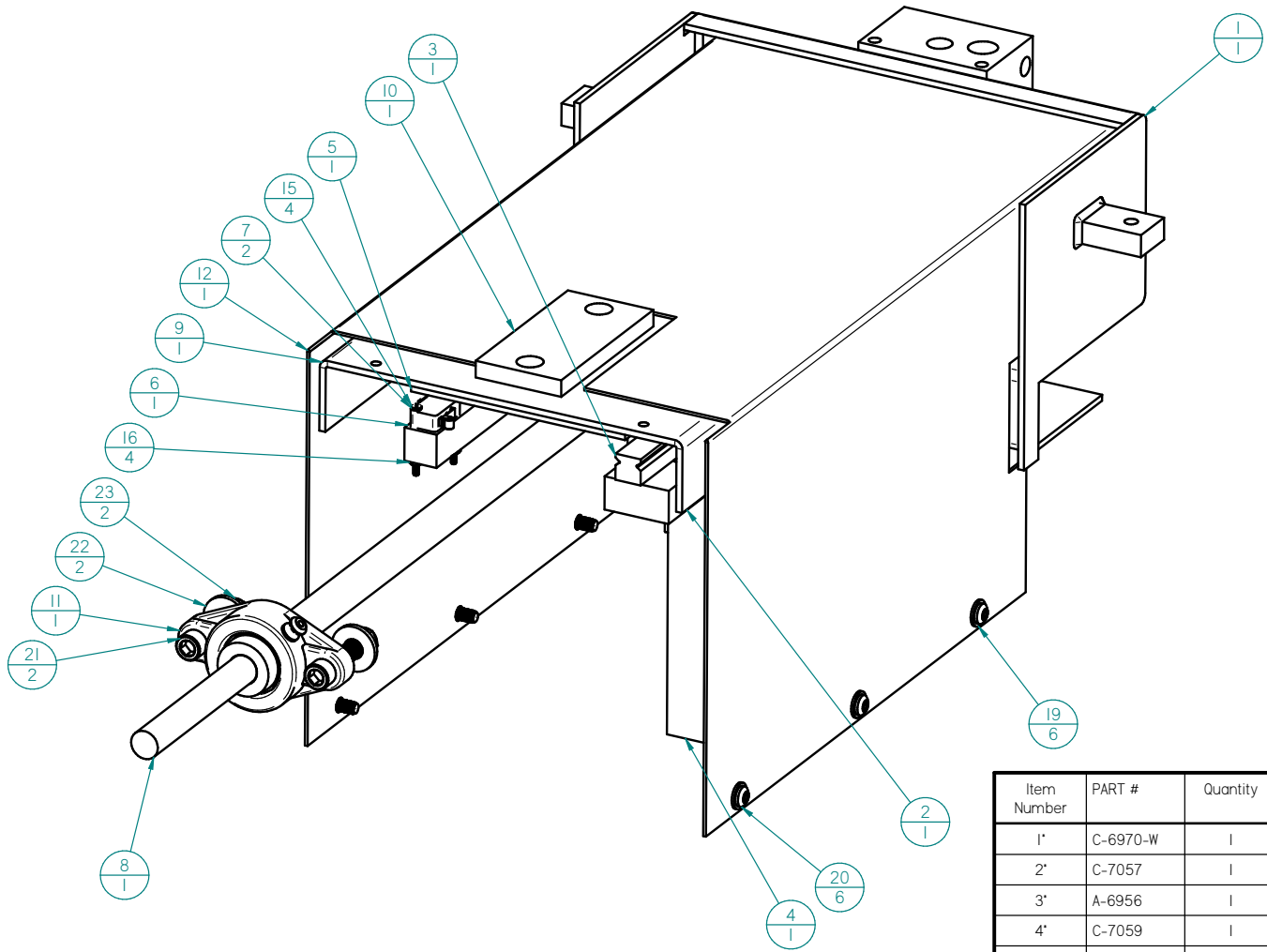
Item Number	PART #	Quantity
1	C-6825	1
2	C-6825-1	1
3	C-6825-2	1
4	C-6825-3	1
5	F-114	1

X-Y AXIS BALL SCREW ASSEMBLY



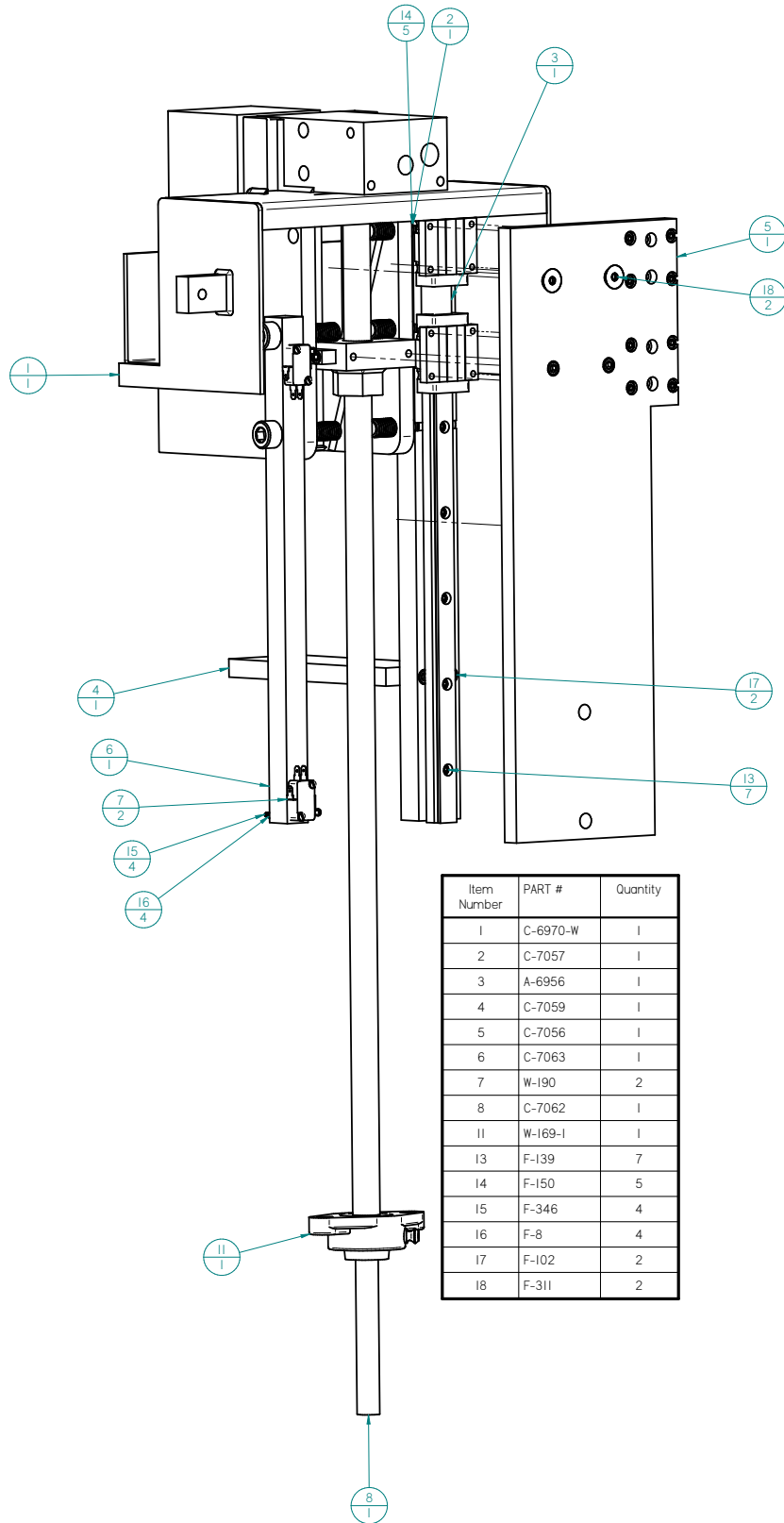
Item Number	PART #	Quantity
1	C-6961	1
2	A-6957	2
3	C-6962	1
4	F-137	6
5	A-6952	1
6	F-30	1
7	C-6964	1
8	F-105	1

RIGHT HAND SAW LIFT ASSEMBLY



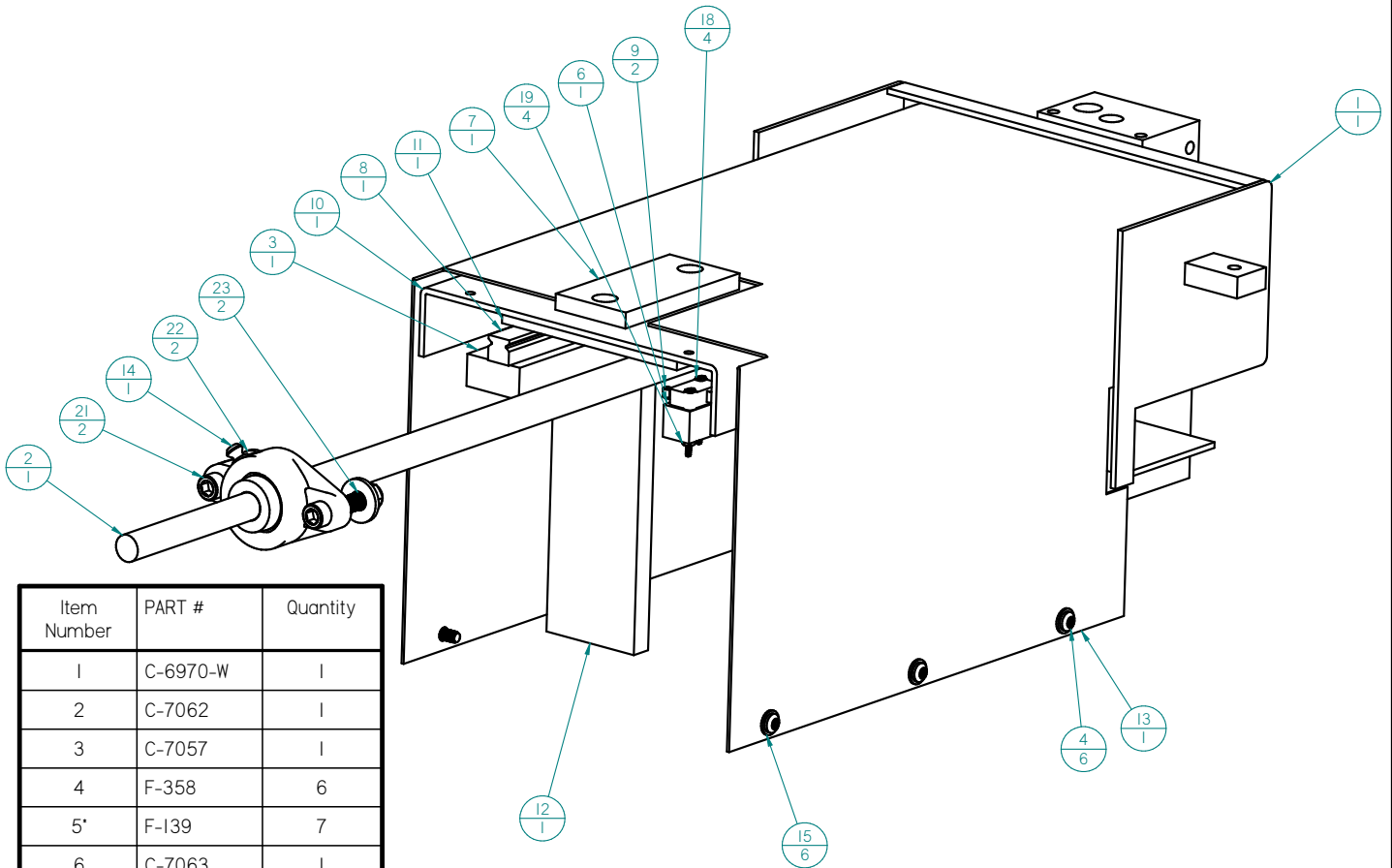
Item Number	PART #	Quantity
1*	C-6970-W	1
2*	C-7057	1
3*	A-6956	1
4*	C-7059	1
5*	C-7056	1
6*	C-7063	1
7*	W-190	2
8*	C-7062	1
9*	C-7055	1
10*	C-6854	1
11*	W-169-1	1
12*	C-7054	1
13*	F-139	7
14*	F-150	5
15*	F-346	4
16*	F-8	4
17*	F-102	2
18*	F-311	2
19*	F-61	6
20*	F-358	6
21*	F-118	2
22*	F-62	2
23*	F-23	2

RIGHT HAND SAW LIFT ASSEMBLY



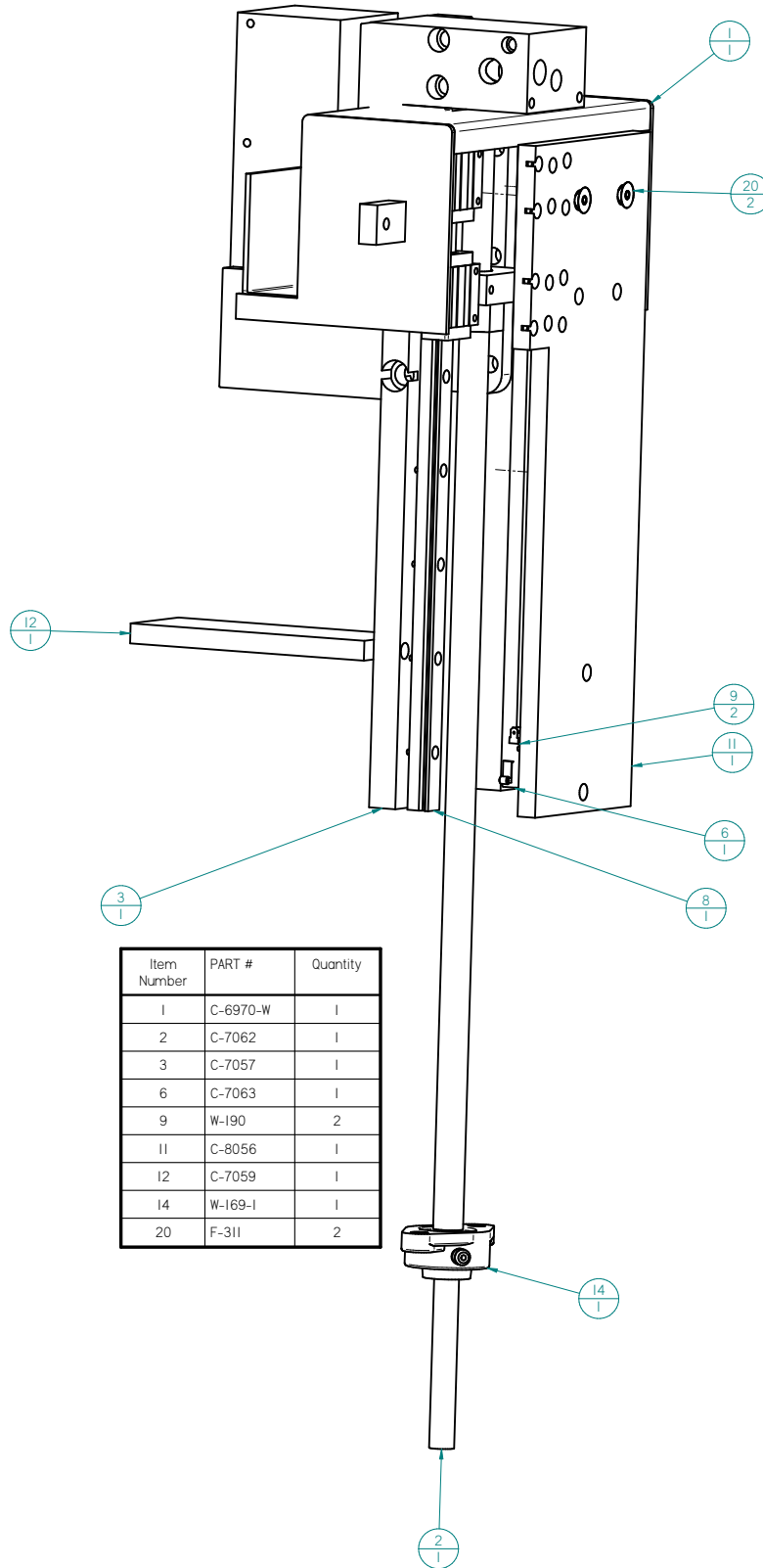
Item Number	PART #	Quantity
1	C-6970-W	1
2	C-7057	1
3	A-6956	1
4	C-7059	1
5	C-7056	1
6	C-7063	1
7	W-190	2
8	C-7062	1
11	W-169-1	1
13	F-139	7
14	F-150	5
15	F-346	4
16	F-8	4
17	F-102	2
18	F-311	2

LEFT HAND SAW LIFT ASSEMBLY



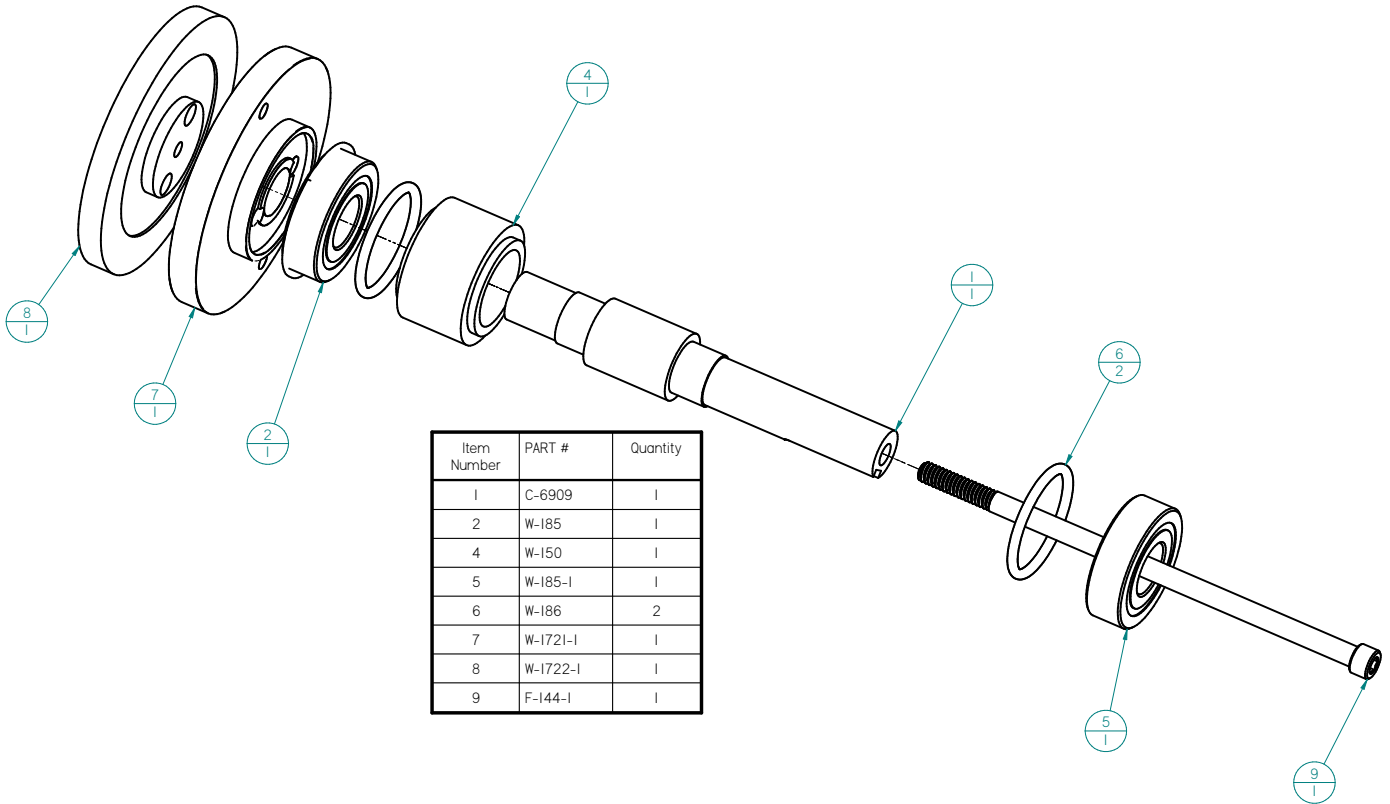
Item Number	PART #	Quantity
1	C-6970-W	1
2	C-7062	1
3	C-7057	1
4	F-358	6
5*	F-139	7
6	C-7063	1
7	C-6854	1
8	A-6956	1
9	W-190	2
10	C-7055	1
11	C-8056	1
12	C-7059	1
13	C-7054	1
14	W-169-1	1
15	F-61	6
16*	F-150	5
17*	F-102	2
18	F-346	4
19	F-8	4
20*	F-311	2
21	F-118	2
22	F-62	2
23	F-23	2

LEFT HAND SAW LIFT ASSEMBLY



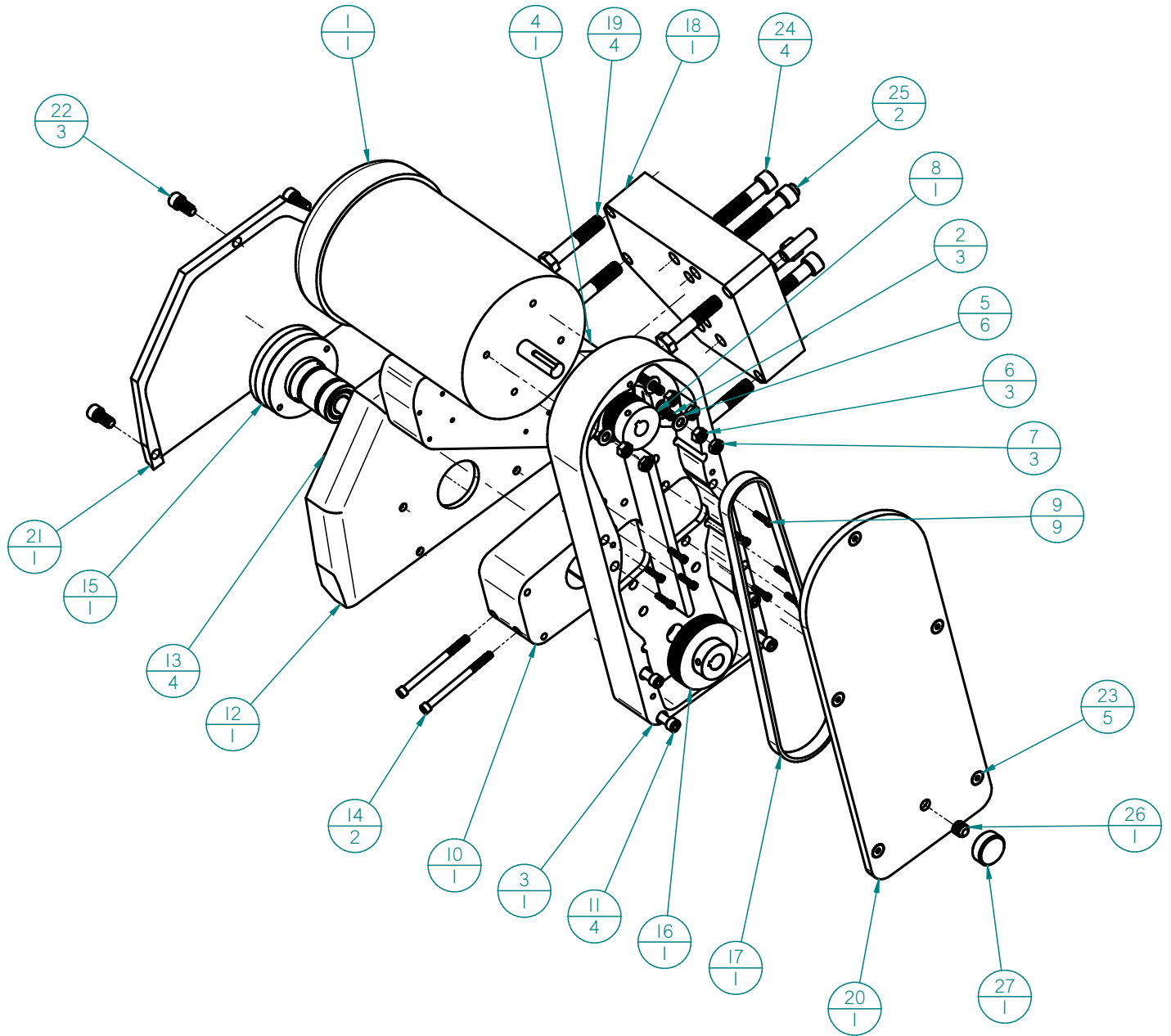
Item Number	PART #	Quantity
1	C-6970-W	1
2	C-7062	1
3	C-7057	1
6	C-7063	1
9	W-190	2
11	C-8056	1
12	C-7059	1
14	W-169-1	1
20	F-311	2

SPINDLE ASSEMBLY



Item Number	PART #	Quantity
1	C-6909	1
2	W-185	1
4	W-150	1
5	W-185-1	1
6	W-186	2
7	W-1721-1	1
8	W-1722-1	1
9	F-144-1	1

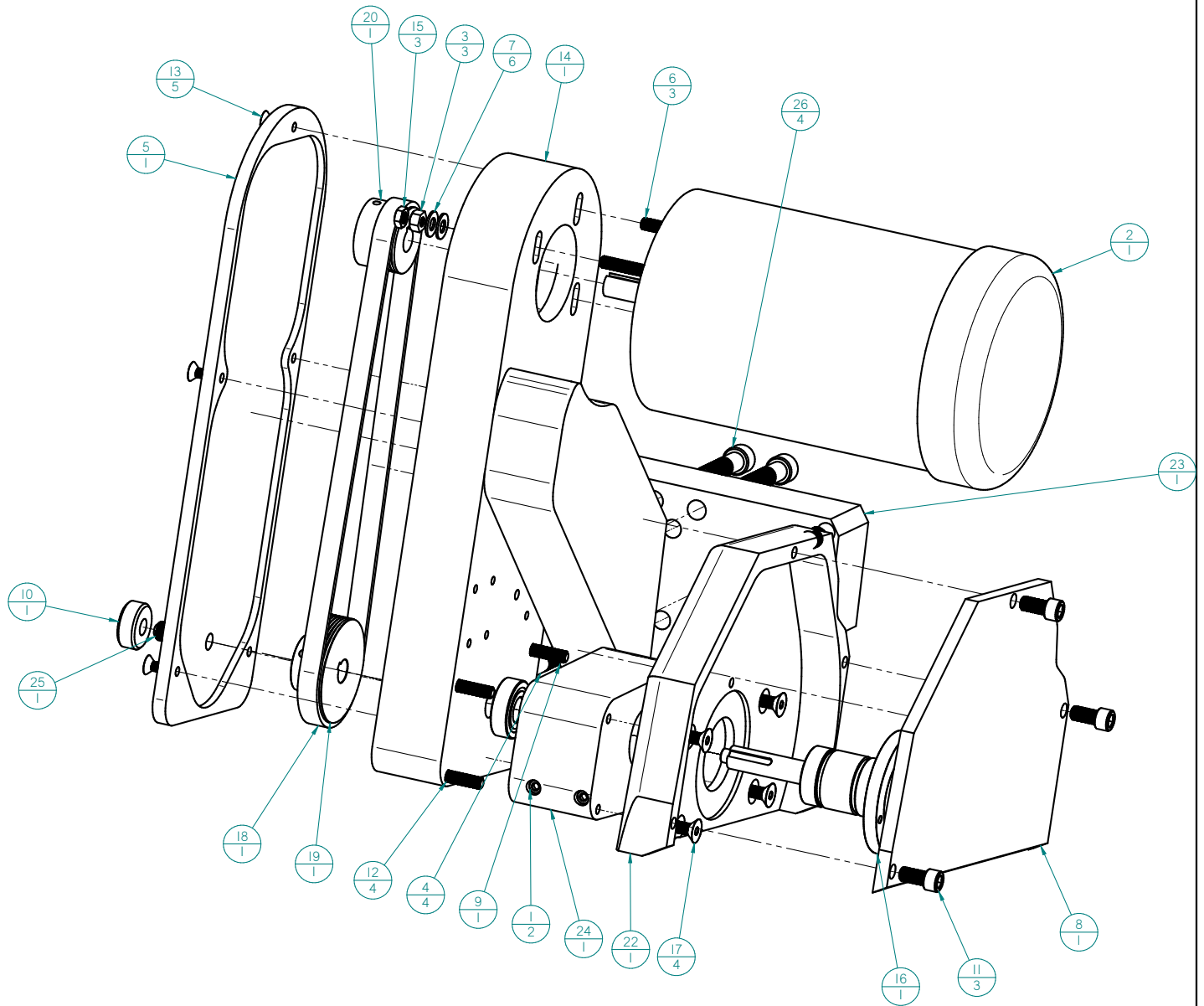
RH-2 AXIS GRIND HEAD ASSEMBLY



RH-2 AXIS GRIND HEAD PARTS LIST

Item Number	PART #	Quantity
1	W-1409-2	1
2	F-388	3
3	C-7404	1
4	C-7426	1
5	F-60	6
6	F-15	3
7	F-18	3
8	W-654-1	1
9	F-139	9
10	C-7403	1
11	F-113	4
12	C-7401	1
13	F-312	4
14	F-148	2
15	C-6909-A	1
16	C-6908	1
17	A-6913	1
18	C-7425	1
19	F-267	4
20	C-7407	1
21	C-7402	1
22	F-115	3
23	F-313	5
24	F-150	4
25	F-441	2
26	F-392	1
27	C-5267-1	1

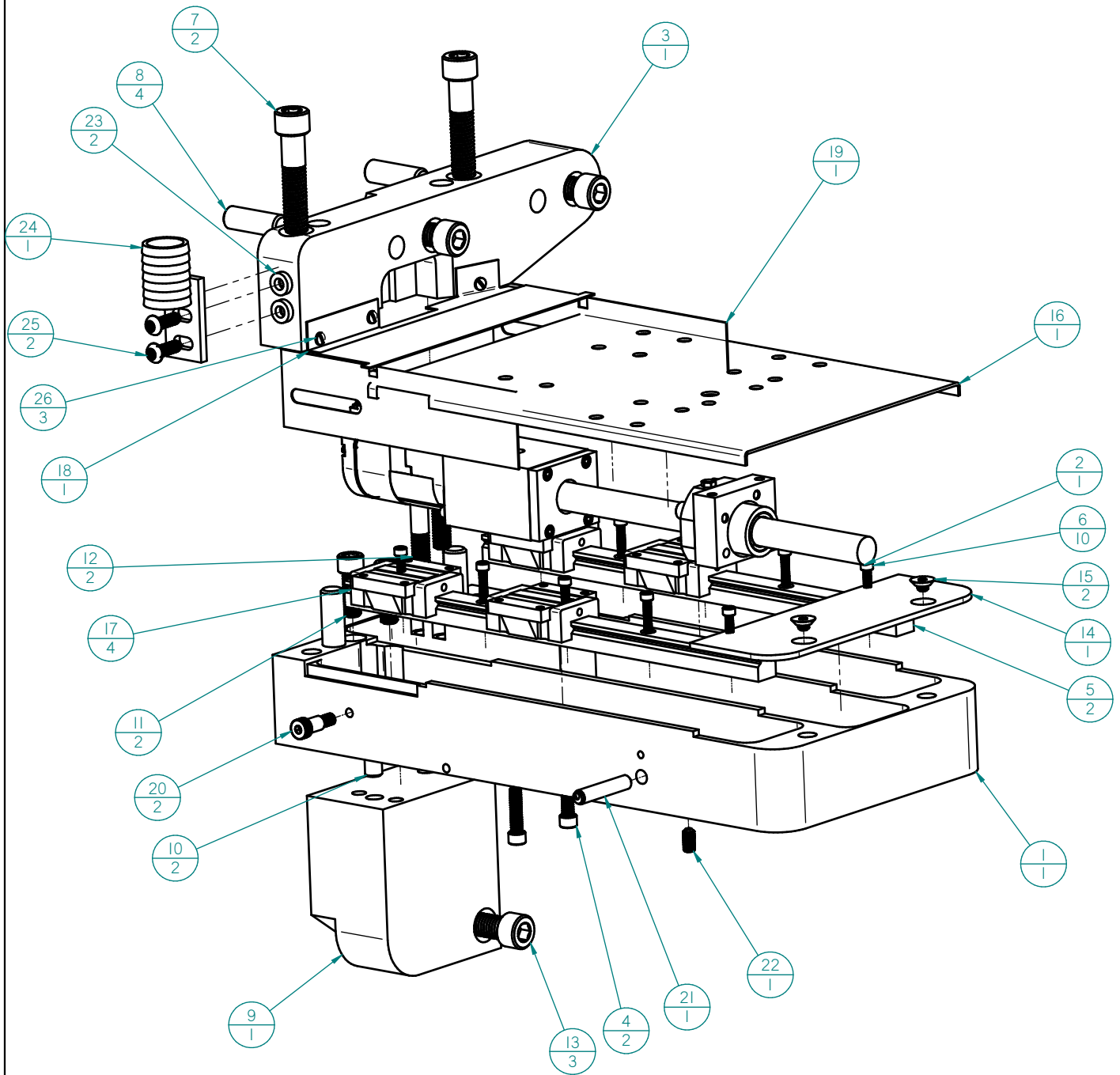
LH-2 AXIS GRIND HEAD ASSEMBLY



LH-2 AXIS GRIND HEAD PARTS LIST

Item Number	PART #	Quantity
1	F-148	2
2	W-1409-2	1
3	F-15	3
4	F-267	4
5	C-7407	1
6	F-388	3
7	F-60	6
8	C-7402-L	1
9	C-8184	1
10	C-5267-1	1
11	F-115	3
12	F-113	4
13	F-313	5
14	C-7404-L	1
15	F-18	3
16	C-6909-A	1
17	F-312	4
18	A-6913	1
19	C-6908	1
20	W-654-1	1
21*	F-139	9
22	C-7401-L	1
23	C-8183	1
24	C-7403-L	1
25	F-392	1
26	F-150	4
27*	F-441	2

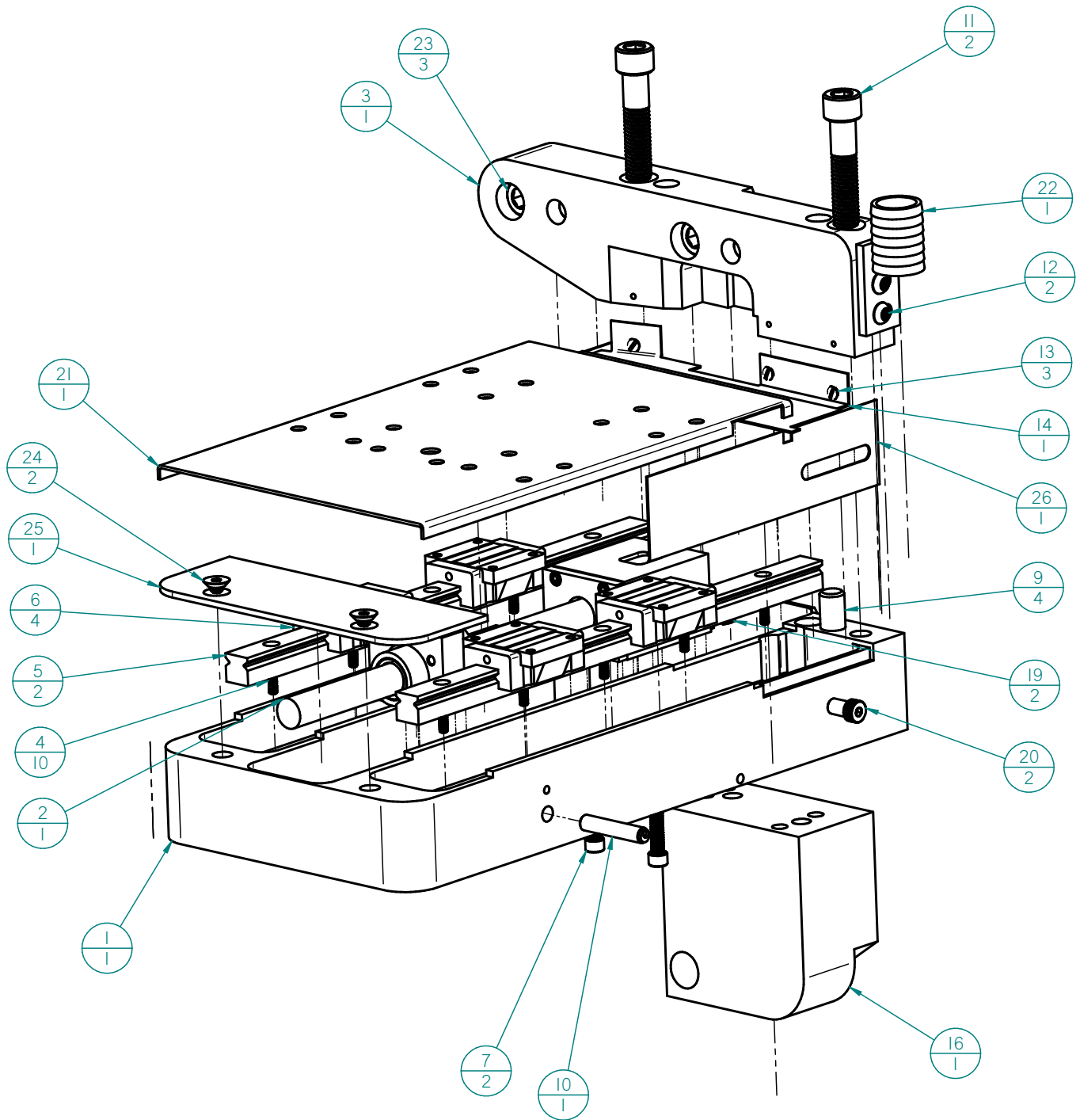
RH-3 AXIS GRIND HEAD ASSEMBLY



RH-3 AXIS GRIND HEAD PARTS LIST

Item Number	PART #	Quantity
1	C-7405-R B&R	1
2	Z-AXIS BALL SCREW ASSEMBLY	1
3	C-7409-R B&R	1
4	F-104	2
5	C-7417	2
6	F-139	10
7	F-150	2
8	F-441	4
9	C-7408	1
10	F-442	2
11	F-116	2
12	F-122	2
13	F-164	3
14	C-7428	1
15	F-309	2
16	C-7419	1
17	A-6953	4
18	C-7418-1	1
19	C-7421	1
20	F-157	2
21	A-3265 CNC	1
22	F-378	1
23	C-5386	2
24	C-7411	1
25	F-366	2
26	F-335	3

LH-3 AXIS GRIND HEAD ASSEMBLY

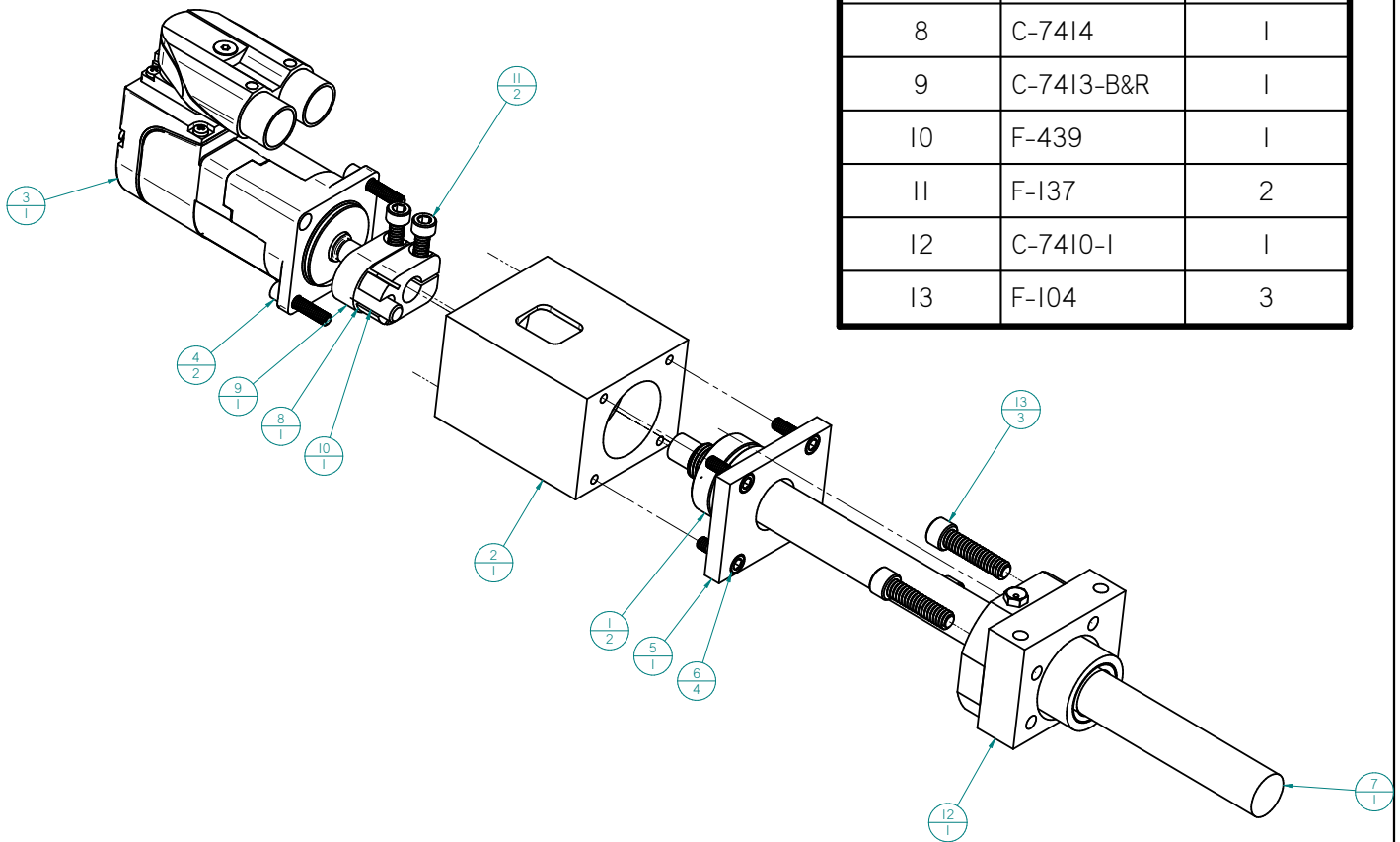


LH-3 AXIS GRIND HEAD PARTS LIST

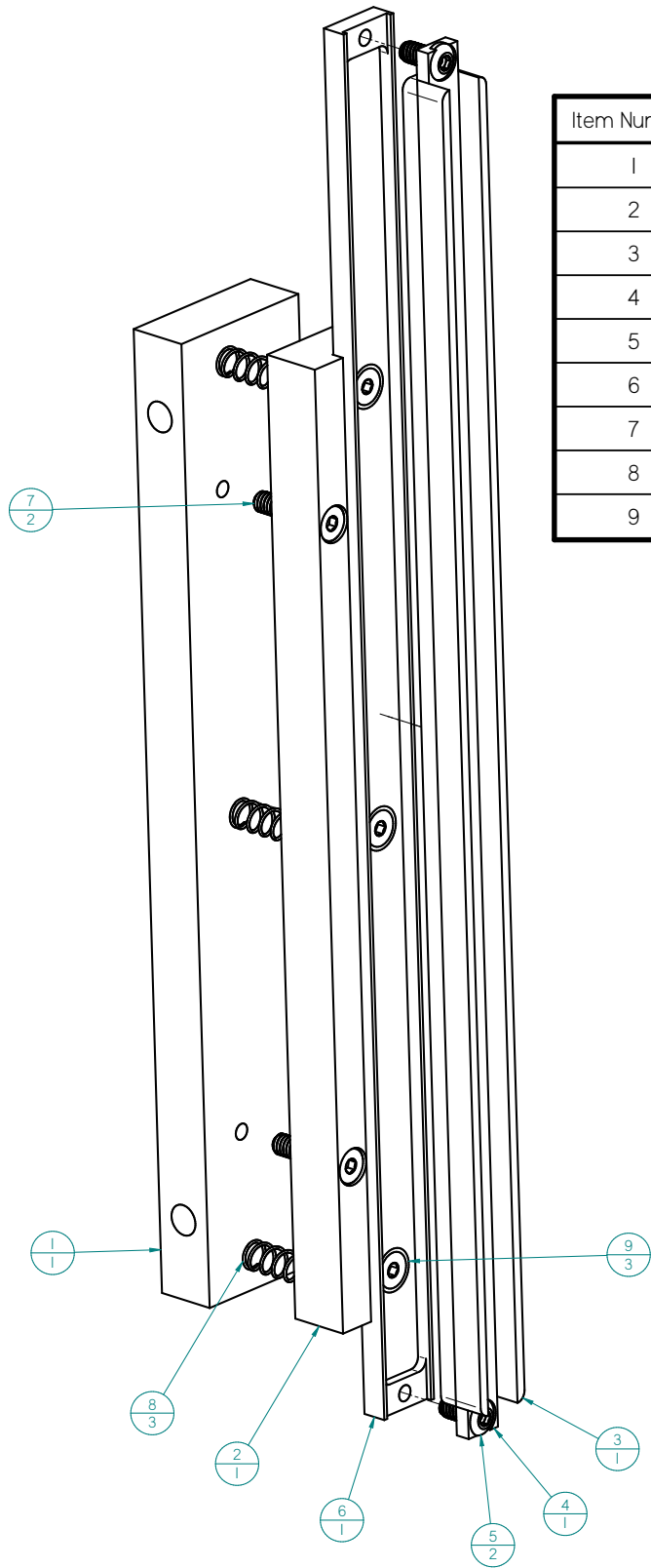
Item Number	PAGE #	Quantity
1	C-7405-L B&R	1
2	Z-AXIS BALL SCREW ASSEMBLY_ mir	1
3	C-7409-L B&R_	1
4	F-139	10
5	C-7417	2
6	A-6953	4
7	F-104	2
8*	F-378	1
9	F-441	4
10	A-3265 CNC	1
11	F-150	2
12	F-366	2
13	F-335	3
14	C-7418-1	1
15*	C-5386	2
16	C-7408	1
17*	F-442	2
18*	F-116	2
19	F-122	2
20	F-157	2
21	C-7419	1
22	C-7411	1
23	F-164	3
24	F-309	2
25	C-7428	1
26	C-7421	1

Z-AXIS BALL SCREW ASSEMBLY

Z-AXIS BALL SCREW ASSEMBLY		
Item Number	PART #	Quantity
1	A-6957	2
2	C-7406-B&R	1
3	A-7526	1
4	F-139-3	2
5	C-7412	1
6	F-139-2	4
7	C-7416-A B&R	1
8	C-7414	1
9	C-7413-B&R	1
10	F-439	1
11	F-137	2
12	C-7410-1	1
13	F-104	3

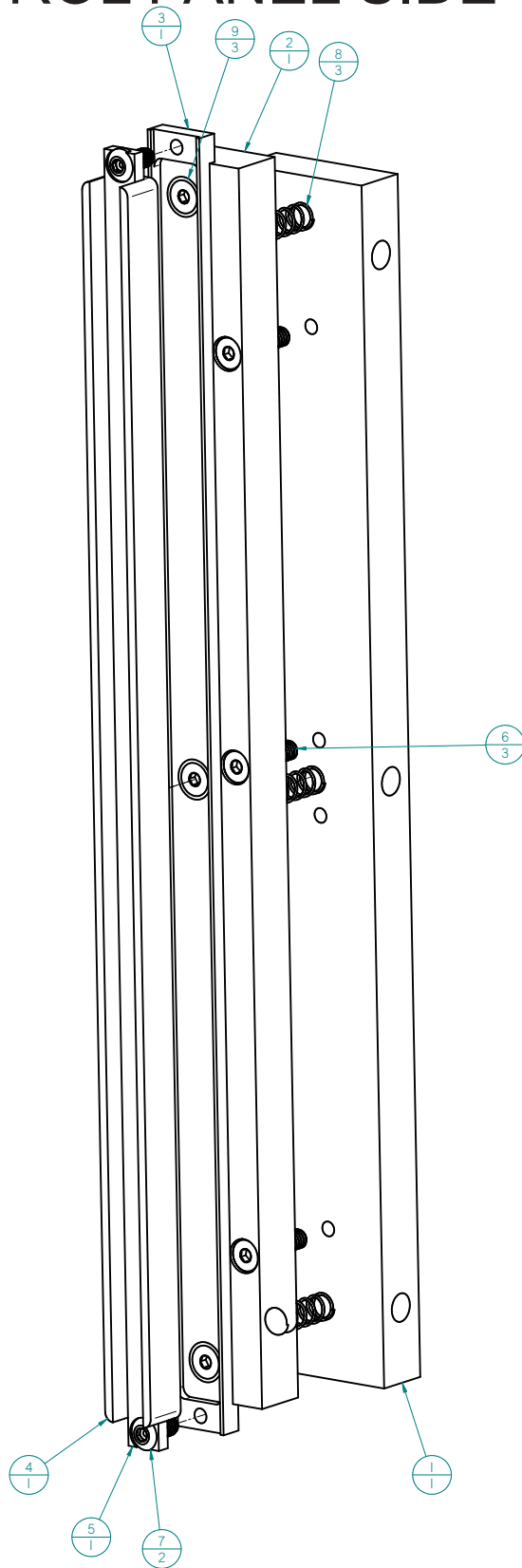


INDEX SIDE WIPER ASSEMBLY



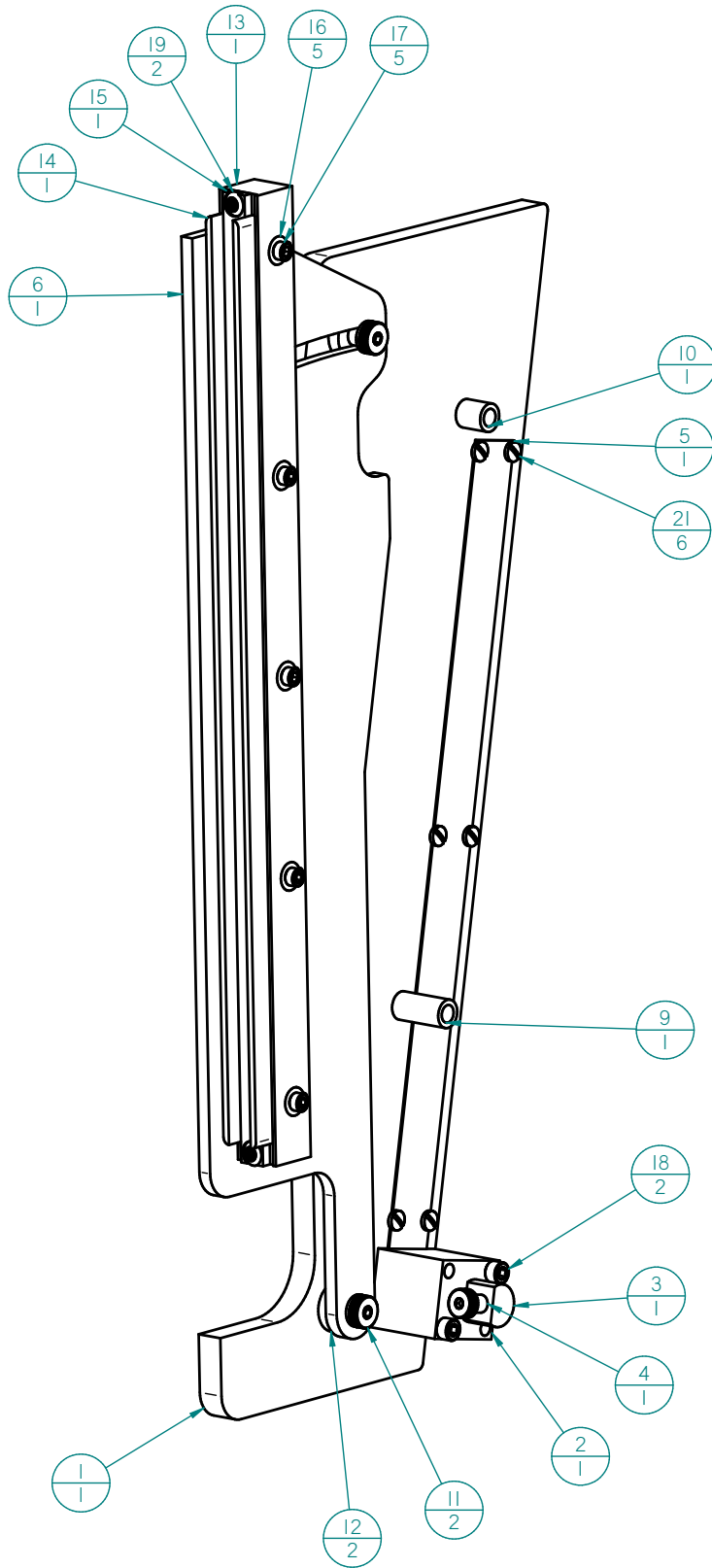
Item Number	Part Number	Quantity
1	C-7025-14	1
2	C-7025-35	1
3	C-7025-34	1
4	C-7025-38	1
5	F-358	2
6	C-7025-37A	1
7	F-157	2
8	A-7025	3
9	F-309	3

CONTROL PANEL SIDE WIPER ASSEMBLY



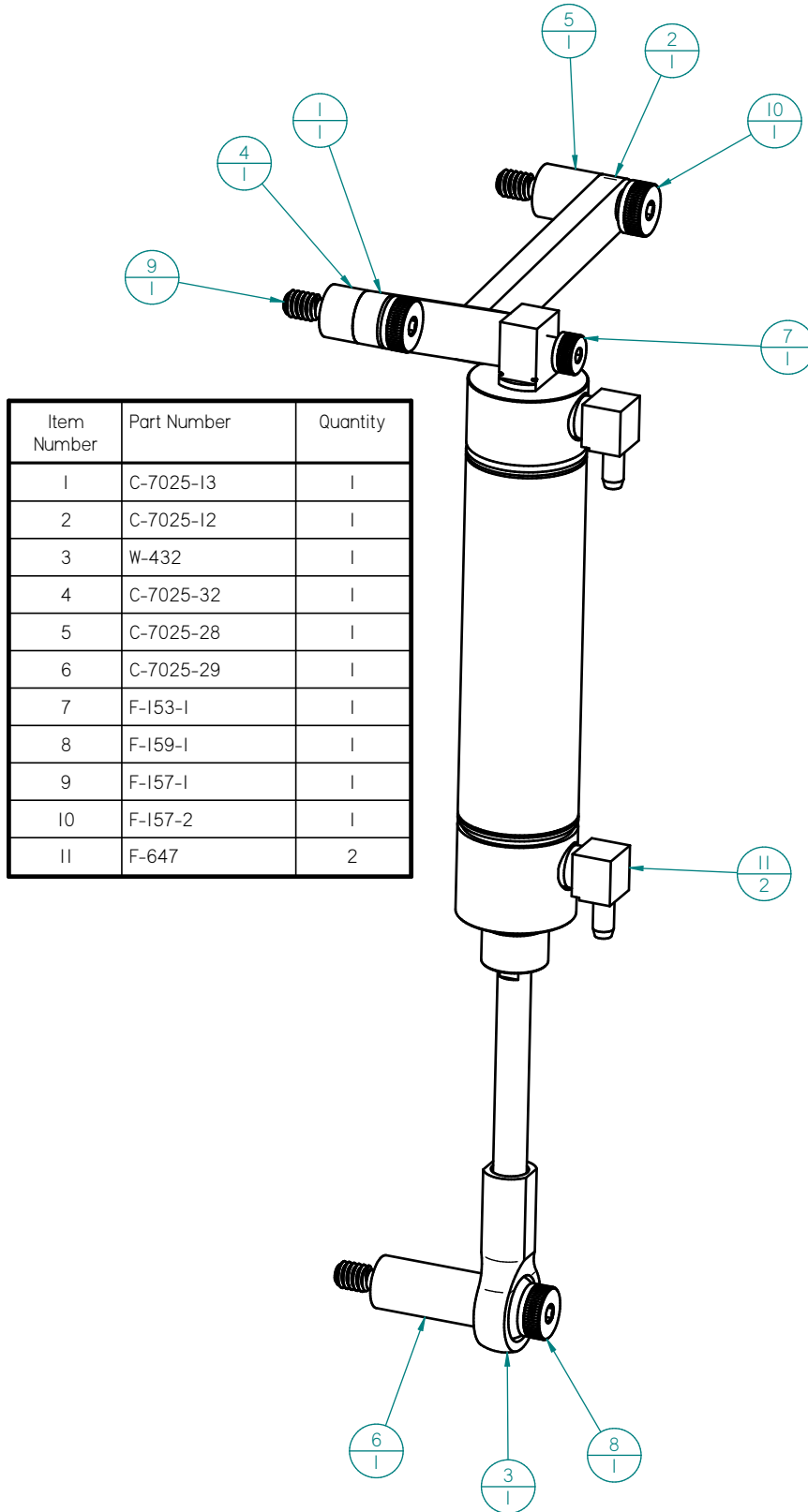
Item Number	Part Number	Quantity
1	C-7025-15	1
2	C-7025-36	1
3	C-7025-37B	1
4	C-7025-34	1
5	C-7025-38	1
6	F-157	3
7	F-358	2
8	A-7025	3
9	F-309	3

GATE WIPER ASSEMBLY



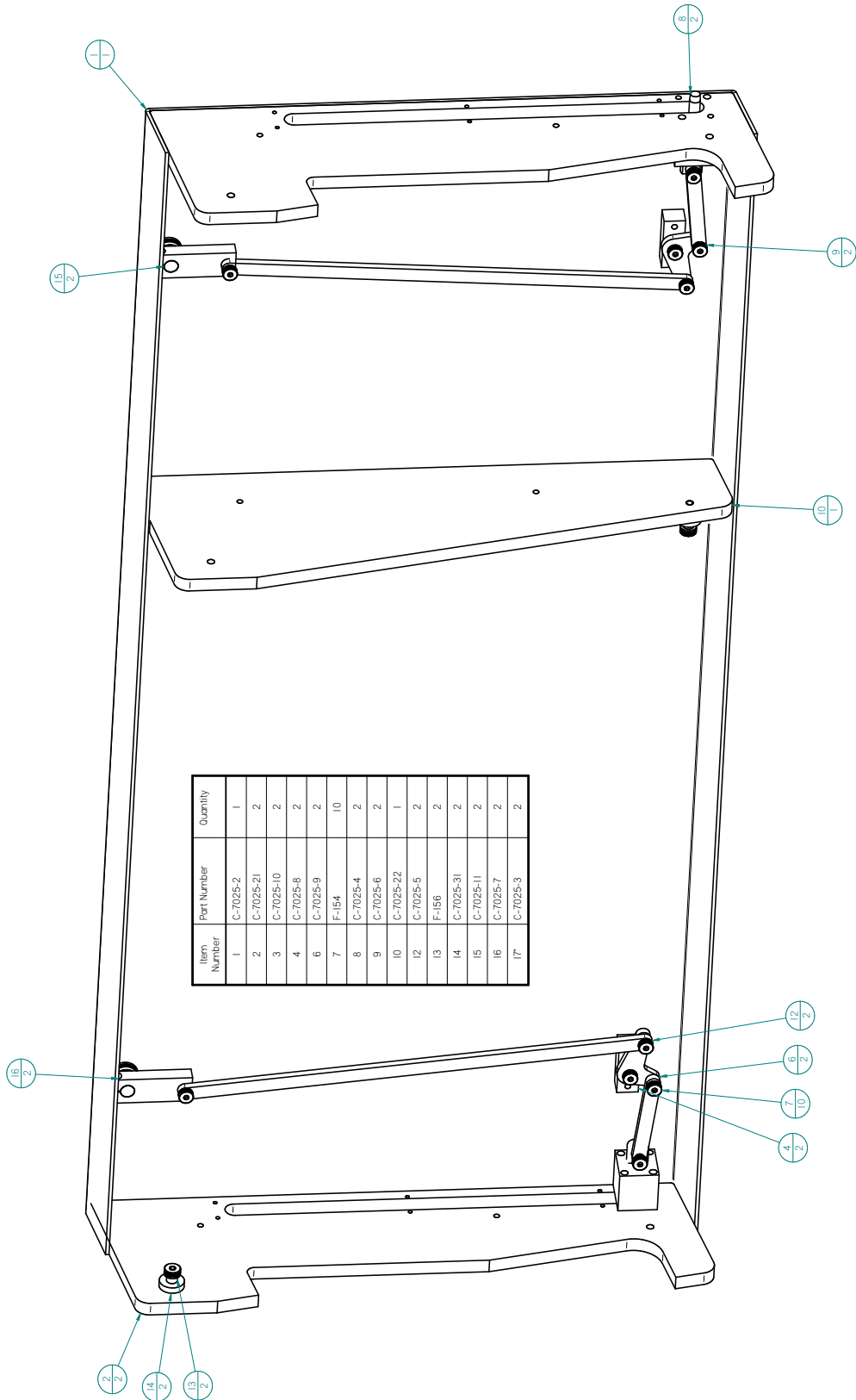
Item Number	Part Number	Quantity
1	C-7025-21	1
2	C-7025-10	1
3	C-7025-4	1
4	F-154	1
5	C-7025-33	1
6	C-7025-23	1
7	C-7025-24	1
8	C-7025-25	1
9	C-7025-29	1
10	C-7025-28	1
11	F-156	2
12	C-7025-31	2
13	C-7025-39	1
14	C-7025-34	1
15	C-7025-38	1
16	F-56	5
17	F-138	5
18	F-108	2
19	F-358	2
20	C-7025-32	1
21	F-333	6

GATE AIR CYLINDER ASSEMBLY



Item Number	Part Number	Quantity
1	C-7025-13	1
2	C-7025-12	1
3	W-432	1
4	C-7025-32	1
5	C-7025-28	1
6	C-7025-29	1
7	F-153-1	1
8	F-159-1	1
9	F-157-1	1
10	F-157-2	1
11	F-647	2

GATE ASSEMBLY BACK SIDE



Item Number	Part Number	Quantity
1	C-7025-2	1
2	C-7025-21	2
3	C-7025-10	2
4	C-7025-8	2
6	C-7025-9	2
7	F-154	10
8	C-7025-4	2
9	C-7025-6	2
10	C-7025-22	1
12	C-7025-5	2
13	F-156	2
14	C-7025-31	2
15	C-7025-11	2
16	C-7025-7	2
17	C-7025-3	2

GATE AIR CYLINDER ASSEMBLY

Item Number	Part Number	Quantity
11.1	W-284	4
11.2	W-434	4
11.3	W-435	4
15	C-7025-11	2
17	C-7025-3	2
18	F-395	2

