

ROTTLER

F10XS CNC BORING AND SURFACING MACHINE MACHINE MAINTENANCE AND PARTS MANUAL



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MANUAL SECTIONS

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MAINTENANCE

TROUBLESHOOTING

MACHINE PARTS

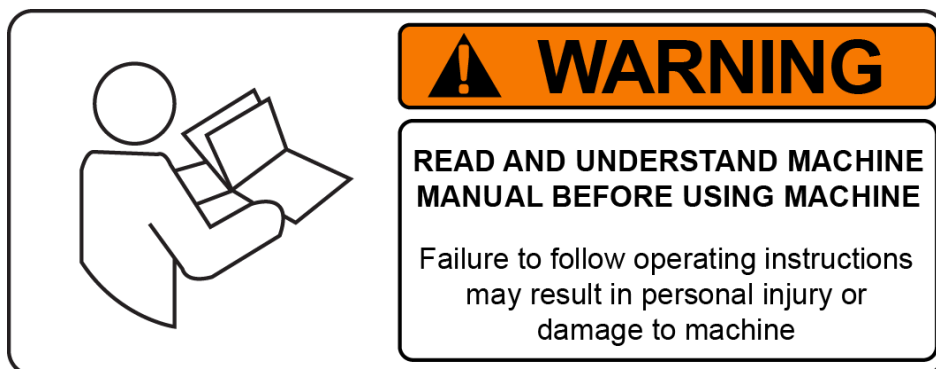
SDS

INTRODUCTION

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Introduction



READ THE SAFETY CHAPTER BEFORE INSTALLING MACHINE. THOROUGHLY UNDERSTAND ALL SAFETY ISSUES BEFORE OPERATING MACHINE.

ATTENTION OWNER/BUSINESS MANAGER

To validate the warranty on your new Rottler machine, please be sure to sign and complete the “Installation Report” located in the Installation Chapter of this manual.

We suggest that the new user of the F10XS read the CONTROL DEFINITIONS to get an idea how the machine operates.

The Operating Instructions chapter should be read in order to familiarize the user with the actual button pushing sequences required to carry out a job. These chapters in the manual should be considered an introduction. As the operators of the F10XS series machines gain experience with using the different functions of the machine, complicated setups and programs will make more sense.

The rest of the manual contains information and part number reference on fixtures, cutting tools, and machine maintenance. The operator should read and become familiar with these areas as well.

Description

The model F10XS machine is a precision, single point boring and surfacing unit. The machine can be equipped with tooling and accessories for re-boring and surfacing most passenger car and truck engines, In-lines, as well as 90 and 60 degree V-types.

The machine is designed, to maintain alignment of cylinder bores to the pan rails and main bearing bore locations, as was done in the original factory machining. This overcomes the many inaccuracies and out-of-alignment problems associated with clamping portable boring bars to the cylinder head surface of blocks.

Convenient controls and fast block clamping means considerable savings in floor to floor time, and operator involvement.

Change over or resetting time required to set up V-type or in-line engines is a minimum, making this machine highly suited to the jobber shop where engines cannot be run through in model lots.

All feeds and rapid travels are power operated and controlled from the control panel.

Disclaimer

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Limited Warranty

Rottler Manufacturing Company Model F10XS parts and equipment is warranted as to materials and workmanship. This limited warranty remains in effect for one year from the date of installation or two years from the date of the original shipment from Rottler or whichever date occurs first. This only applies if the machine is owned and operated by the original purchaser and is operated and maintained as per the instructions in the manual. A machine is warranted only if the Installation Report has been properly executed by a certified installation person and received by Rottler at the time of actual installation.

The products are warranted upon delivery to conform to their published specifications and to be free from defects in material and workmanship under normal use for a period of one year from shipment. Should a product not be as warranted, Rottler sole obligation shall be, at its option, to repair, correct or replace the product or to refund the amounts paid for the Product upon its return to a location designated by Rottler. No warranty shall extend to rapid wear Products (including tooling) or to Products which have been subject to misuse (including any use contrary to Rottler instructions), neglect, accident (including during shipment), improper handling or installation, or subject to any modification, repair or service not certified by Rottler. Rottler shall not be liable for any consequential, direct or indirect damages or for any other injury or loss. Buyer waives any right, beyond the foregoing warranty, to make a claim against Rottler. No warranty is provided for any Products not paid in full.

Merchandise cannot be returned to Rottler without prior approval. Customer must contact the Parts Department to get approval and to be issued a Return Goods Authorization number (**RGR#**). Merchandise authorized for return must be returned prepaid. If merchandise is returned with shipping charges collect, the actual amount of these charges may be deducted from any credit which may be due the customer. The **RGR #** assigned by the Parts Department should be written on the shipping label and must appear on a copy of the invoice(s) covering the original shipment. This invoice copy must be included in the box with the parts. Shipment must contain **ONLY** those items on the **RGR** as approved for return. Merchandise must be received within 10 days of the date of **RGR** or the **RGR** will be canceled. All returned merchandise may be subject to a 20% restocking fee on under \$1,000.00 amount or 10% on any items over \$1,000.00. Parts or tooling over 30 days old are considered as customer property and can only be returned with prior approval from Rottler Corporation Management.

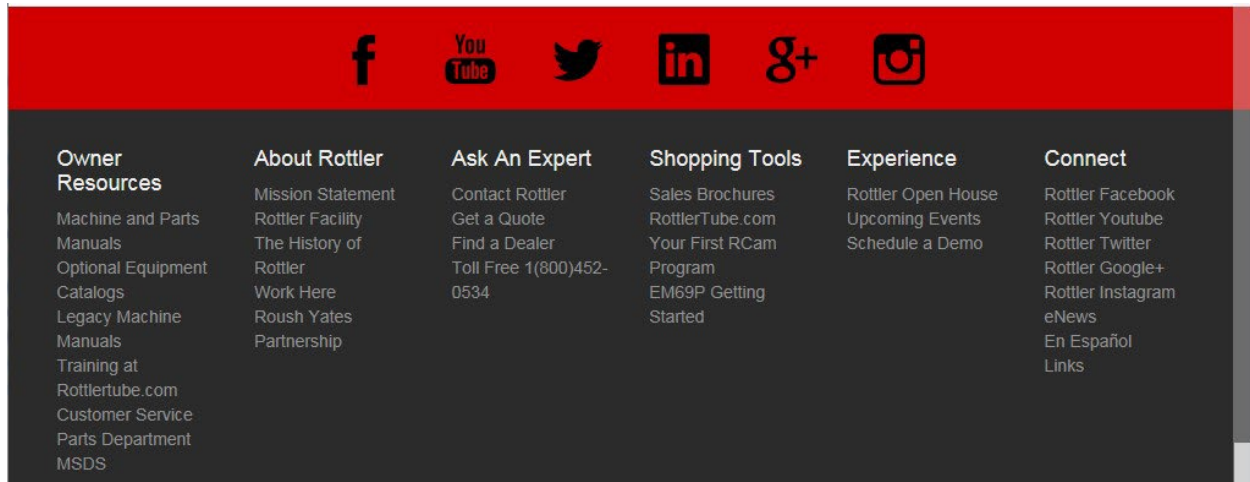
The issuance of a **RGR DOES NOT** guarantee credit - it is only authorization for the return of the goods. Credit for return merchandise is at the sole discretion of Rottler. Credit will be issued only after inspection of returned goods.

Tools proven to be defective within the warranty period will be repaired or replaced at the factory's option. We accept no responsibility for defects caused by external damage, wear, abuse, or misuse, nor do we accept any obligation to provide compensation for direct or indirect costs in connection with cases covered by the warranty.

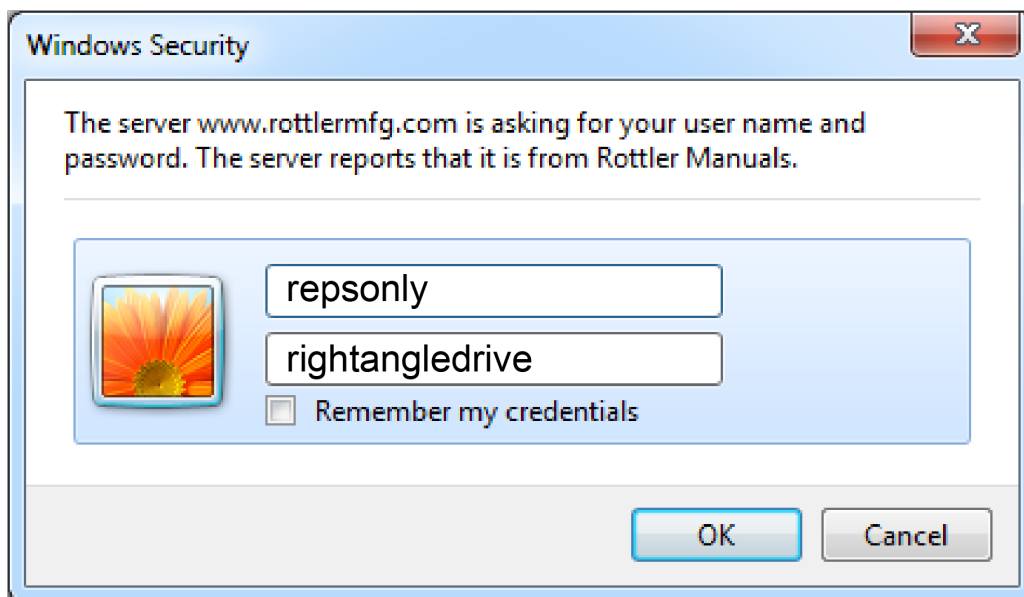
Online Documentation Access

Online documentation for machines and optional equipment can be accessed at the Rottler website. To access documentation open your browser and navigate to <https://www.rottlermfg.com>.

Scroll to the bottom of the page and under the Owner Resources title click the type of documentation you want to access.



If a log in window pops up asking for user name and password fill in the blanks as shown.



MAINTENANCE

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Maintenance

Lubrication

Refer to the illustration on *page 3*. Below are directions, that explain where and how to add oil to the various lubrication systems.

Vertical Ballscrew

The vertical ballscrew runs through the upper housing. Run the machine down to its lowest travel position. Open the door on the front of the machine, the ballscrew is now fully exposed.

Every 175 hours, Grease the ballscrew using **76 Unoba EP2 Grease**, or equivalent NLGI- 2 grease. Wipe a small amount of grease on the screw just above the upper housing (with the machine at its lowest travel position).

Vertical Ballscrew Bearings

The bearings are located at the bottom of the ballscrew inside the lower feed drive housing. Access the grease fitting on the left, outside of the spindle base.

Every 175 Hours, These bearings should be greased with, **76 Unoba EP2 Grease**, or equivalent NLGI- 2 grease.

Outer Spindle

The outer spindle is the chromed cylinder that travels up and down. It is supported in two bushings located in the spindle base. The outer spindle supports the inner spindle, bearings, seals, etc.. and maintains the boring rigidity.

Every 40 Hours the outer spindle surface should be cleaned with kerosene. Occasionally with ***a light weight #10 oil.*** should be wiped onto the outer spindle to prevent excessive dryness.

Inner Spindle: Oiler Setting

An air driven oil lubricator is located on the lower right of the main electrical rear enclosure. This lubricates the Inner spindle. Every time the Spindle Rotation button is pressed the oiler comes on for 60 seconds. If there is too much oil coming out of the Inner spindle turn the dial on the oiler clockwise. There should always be a slight amount of oil coming from the Inner Spindle, if there is not turn the dial counter clockwise to increase the amount of oil in the air line. Look at the top sight glass on the oiler, the oil should be set to drip at a rate of approximately 1 drop per minute.

There is air regulator located just to the left of the oiler. This should be set at 30 PSI for proper oil atomization. As mentioned above the oiler is only activated for 60 seconds every time the spindle is started. To set the oiler at one drop per minute you may have to start and stop the spindle several times.

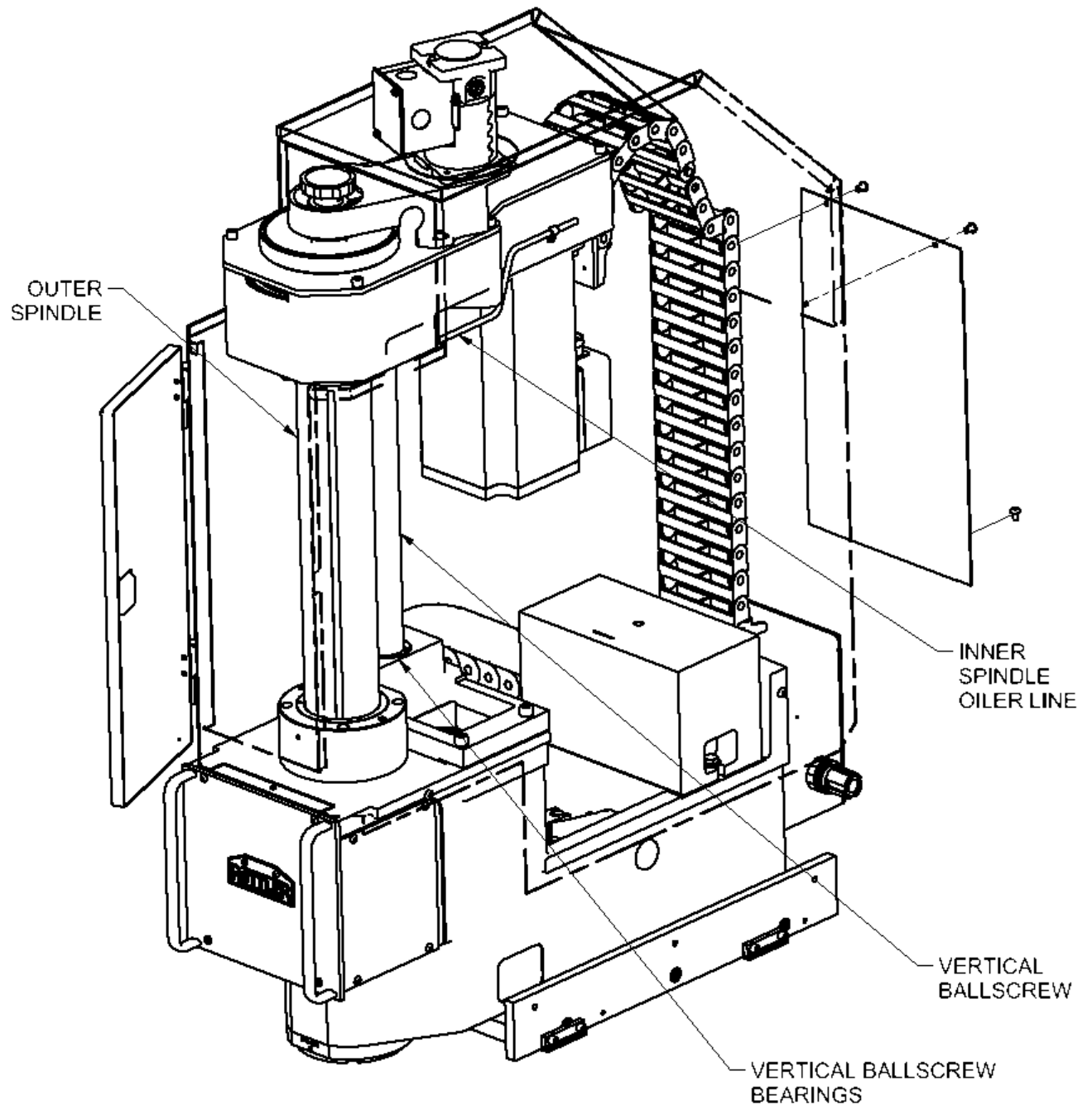
At the beginning of each shift, check the level in the reservoir. ***Fill with a ISO VG 32 hydraulic oil.*** Top off as necessary, There is a plug threaded into the top of the oiler for filling.

Clamp arms

There is a grease fitting located on each clamp arm cam body.

Every 175 hours, these fittings should be greased with **76 Unoba EP2 Grease**, or equivalent NLGI- 2 grease.

Lubrication Illustration



Air Adjustments

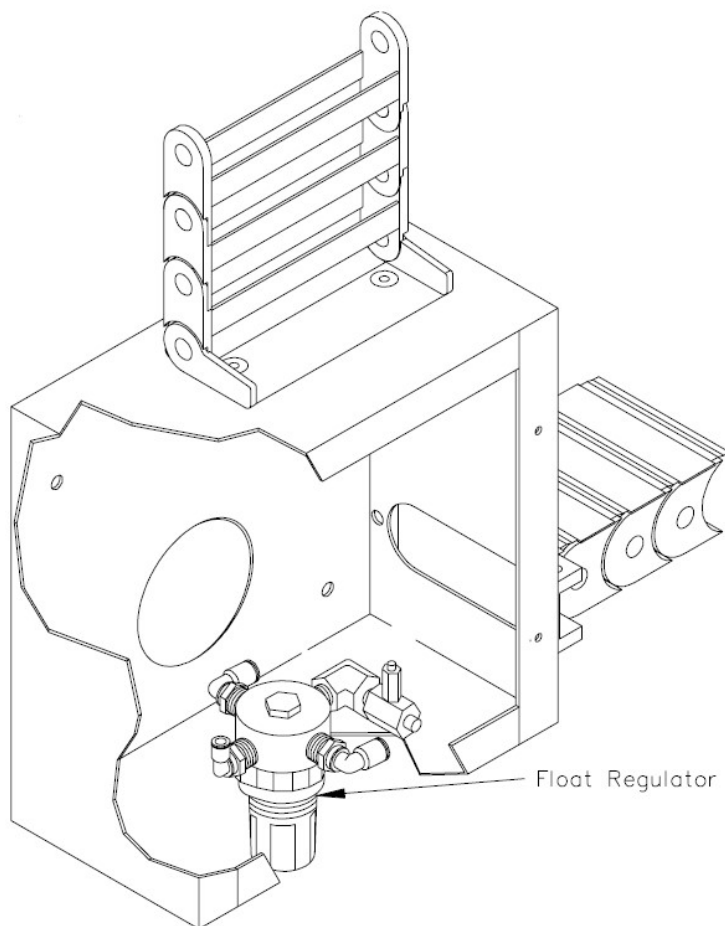
Float

The float regulator is located at the rear of the spindle base on the bottom of the interconnect box.

If the machine is not floating properly it could be from too much or too little air from the regulator. Turn the regulator all the way off (full counter clockwise). Start turning the regulator slowly clockwise while continually checking the spindle base for proper floatation. Once the correct float is established lock the regulator into place by pushing in on the black adjusting knob.

CAUTION: Use as little air as possible to achieve correct floatation. Using too much air will could cause the spindle base to move slightly to the right when going into tilt. This will cause a scratch up the side of the cylinder.

If you cannot get the spindle base to float properly by adjusting the regulator refer to “Not Floating” in the troubleshooting section of this manual.

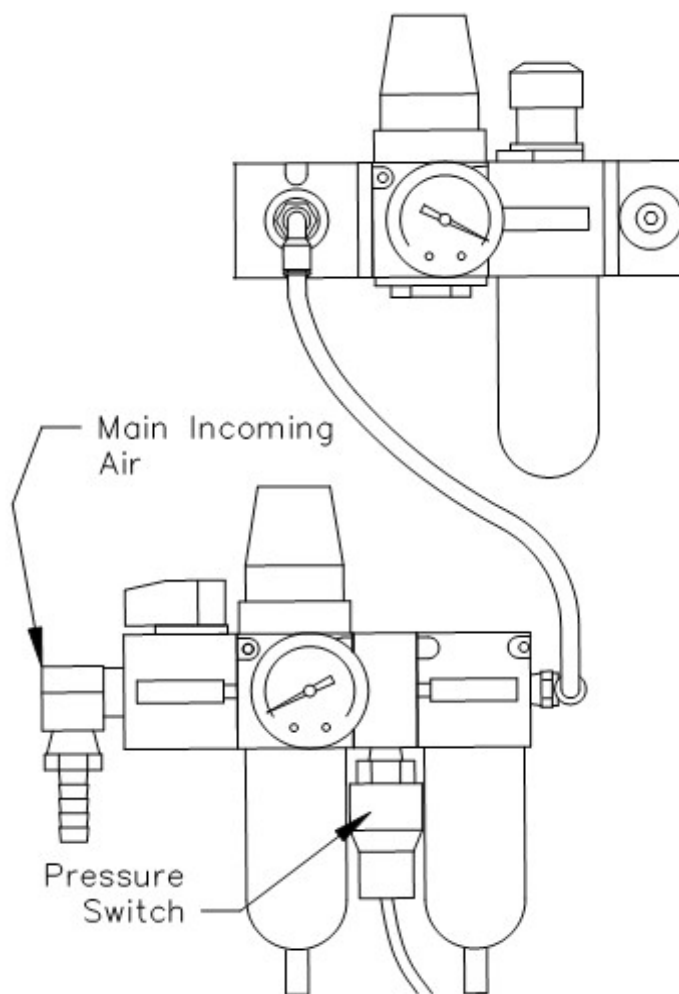


Pressure Switch

The pressure switch is located on the main intake air manifold, located on the right hand side of the rear electronic enclosure. The pressure switch is a solid state device that opens and closes at certain air pressure settings. It should be set on the F10XS to 70 PSI. If the main intake pressure goes below 70 PSI the pressure switch is designed to open and cut power from all drives. This is so the spindle base clamps do not break loose during a bore with the spindle still rotating.

Turn the main input air regulator down to 70 PSI. Remove the main air line to the machine to relieve any pressure in the system that may be over 70 PSI. Re-attach the main air to the machine

This will set the pressure switch to drop out at 70 PSI. Return the main incoming pressure to 100 PSI.



Spindle Sweep

The spindle must be swept into the main bed for accurate boring. If you are seeing “shadowing” in the bore the spindle may need to be swept in.

Note: If the fixturing is not square to the main bed, this may also cause “shadowing”

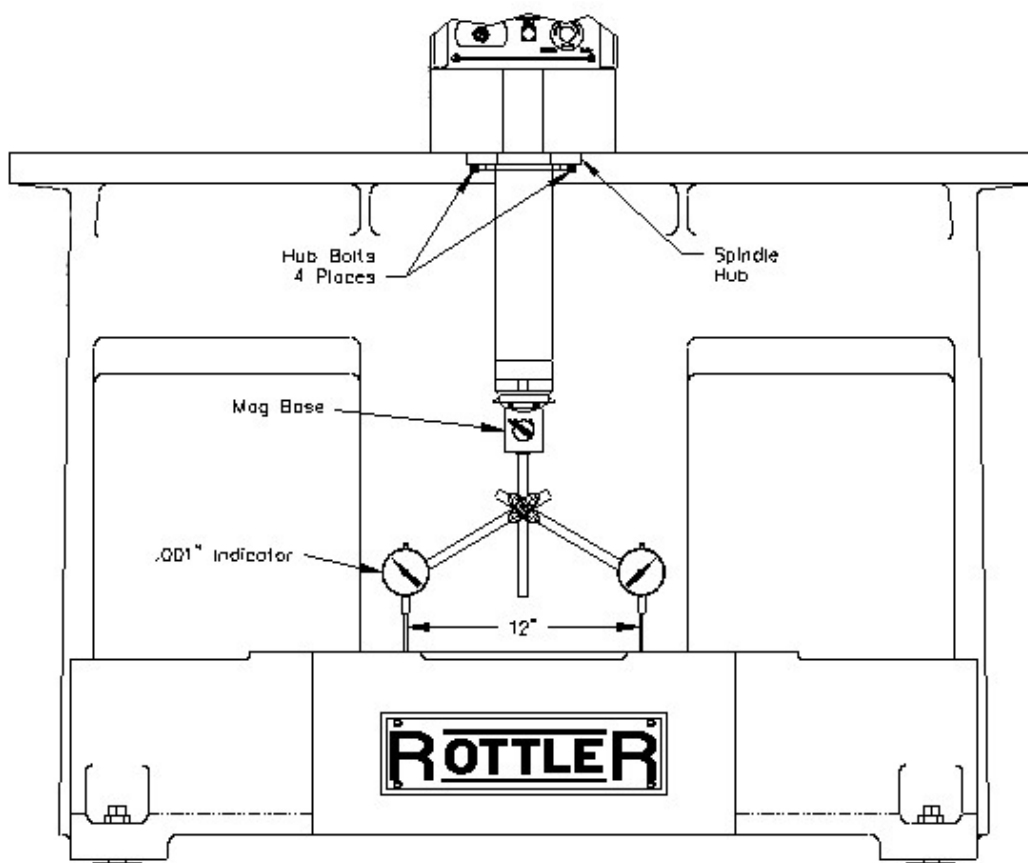
Adjustment

Remove all fixturing from the machine. Loosen the four Spindle Hub bolts and then bring them back up to a “snug” condition. If the bolts are too loose Hub will bounce when it is adjusted. The spindle Unit should be Clamped.

Attach a Magnetic Base to the bottom of the cutter head. Attach an indicator to the Magnetic Base and adjust it for a minimum of a 12” sweep diameter.

Bring the Spindle down until the indicator is touching the Main Base. You want no more than .010” pressure on the indicator. Zero the indicator. Sweep the indicator around the Main Base. If the spindle is more than .0005” off of zero on the indicator, it will need to be adjusted.

Use a Brass Drift and a Hammer to lightly tap the Spindle Hub in the direction it needs to go. Once you are within .0005” all the way through the sweep area, tighten the Spindle Hub Bolts. Check the sweep area again to be sure the sweep did not move as you tightened the bolts.



Outer Spindle Adjustment

The main spindle bearings are tapered split cast iron rings, held in a seat by an adjustment nut. These bearings normally require no adjustment for many boring cycles.

The upper bearing is preloaded by a Belleville spring washer, located below the adjustment nut. This adjustment should be checked **after** the shipment of the machine. Shock to the machine during shipment may result in some setting of the spring.

CAUTION: *Be careful not to over tighten these bearings. An over tight condition only serves to wear out the machine and make control operation difficult.*

If it is necessary to adjust, see the following instructions:

Move the spindle base to a clear position making sure the spindle can travel its full vertical length. Thoroughly clean and lightly oil the Outer Spindle before adjustment.

Remove the upper felt retaining nut and felt wiper from the flange sleeve. Tie a rag around the outer spindle to hold them up at the top of the spindle. This will expose the upper bushing adjustment nut.

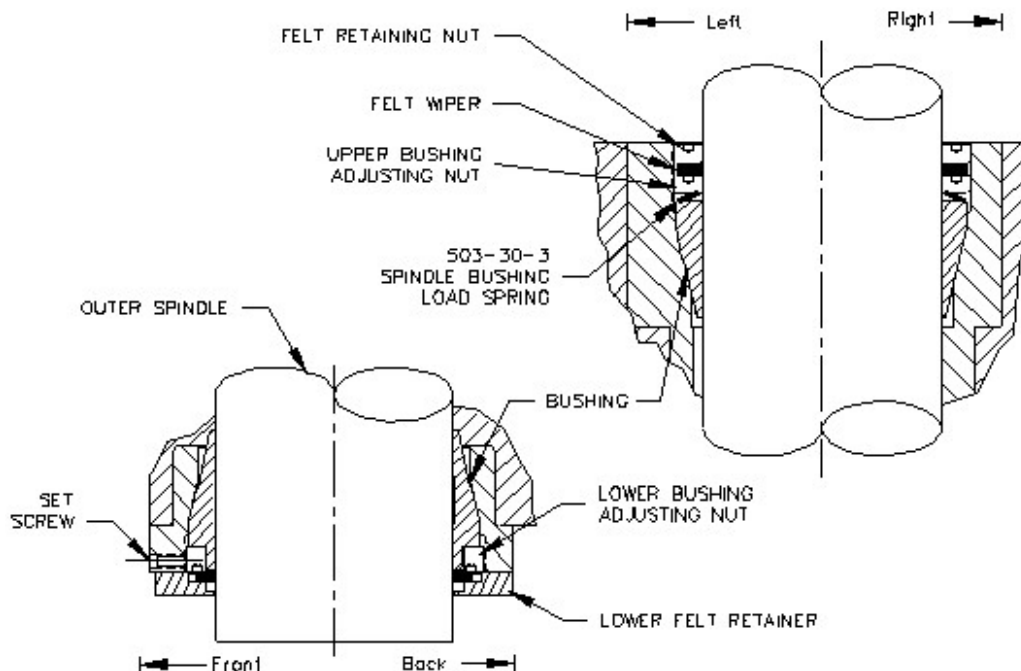
Remove the lower wiper retainer ring along with the wipers and felts to expose the lower spindle bushing adjustment nut.

Loosen the set screws located on the front of the upper and lower portion of the Spindle Base. Loosen the upper and lower bushing adjustment nuts to remove any pressure on the bushings. Tighten the upper and lower adjustment nuts evenly until they are lightly touching, but have no load on them.

Move the spindle down 3-4". Tighten the upper bushing. Tighten only by hand.

Move the spindle up. Tighten the lower bushing. Tighten only by hand.

If there is taper in the bore on large cuts tighten the lower bushing slightly more.



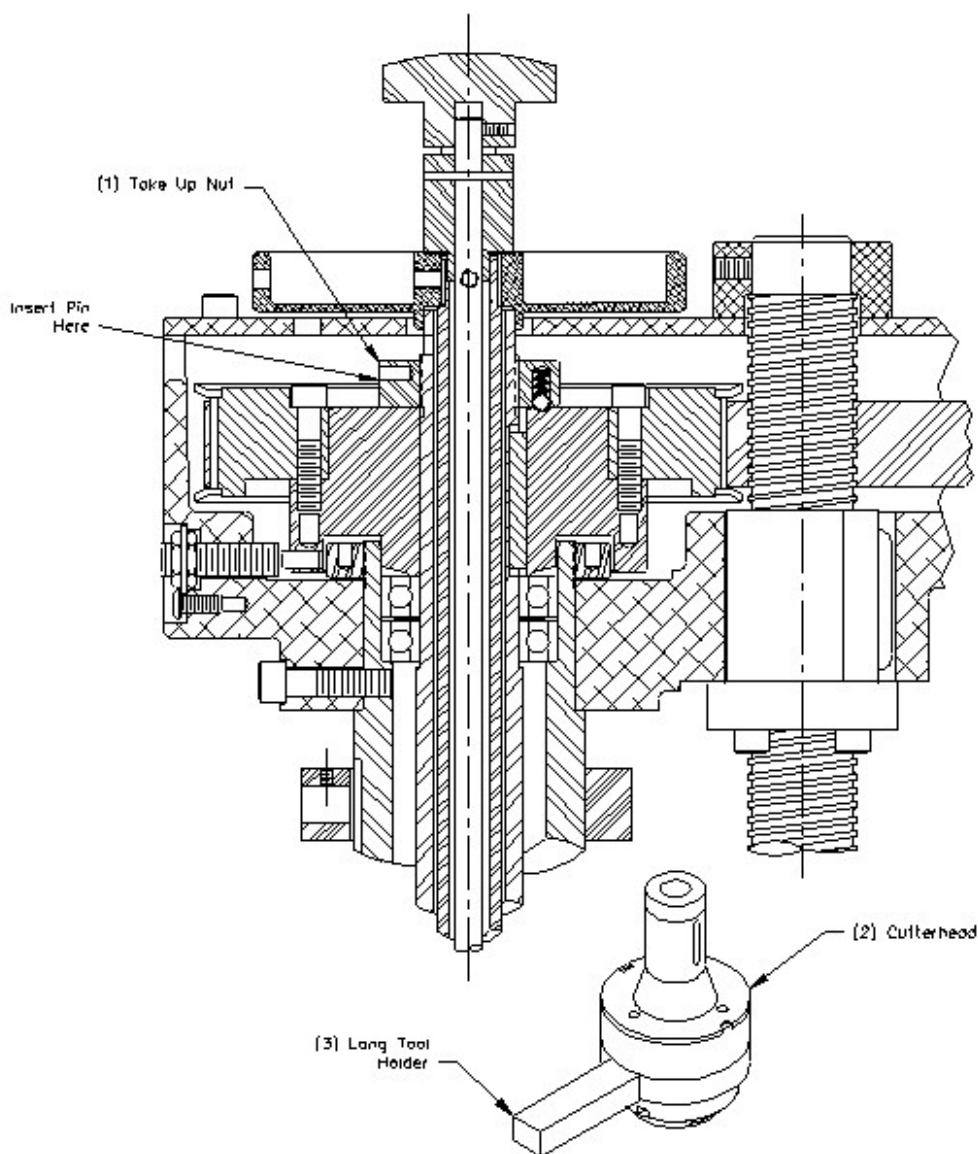
Inner Spindle Adjustment

This machine is equipped with anti-friction bearings at the top and bottom of the Inner Spindle. It is very important to properly adjust the preload of these bearings. Setting these bearings either too tight or too loose can greatly reduce bearing life or destroy them all together.

Adjustment

Insert a pin (diameter .180 or less) in one of the holes in the Outer Diameter of the Take Up Nut (this is located on top of the main spindle pulley). Secure a cutterhead (2) in the spindle, with a long tool holder (3) in place. Hold the cutterhead with your hand while turning the take up nut, to the left (clockwise). You will note the nut ratchets in notches as you take it up. Continue taking it up until the nut tightens up and then back off 1 notch. ***Do not over tighten the nut, this will cause a crushing of the bearings and it will have to be replaced.***

CAUTION: Be sure the detent is in a notch, not midway between, this would cause the nut to slip backwards off adjustment.



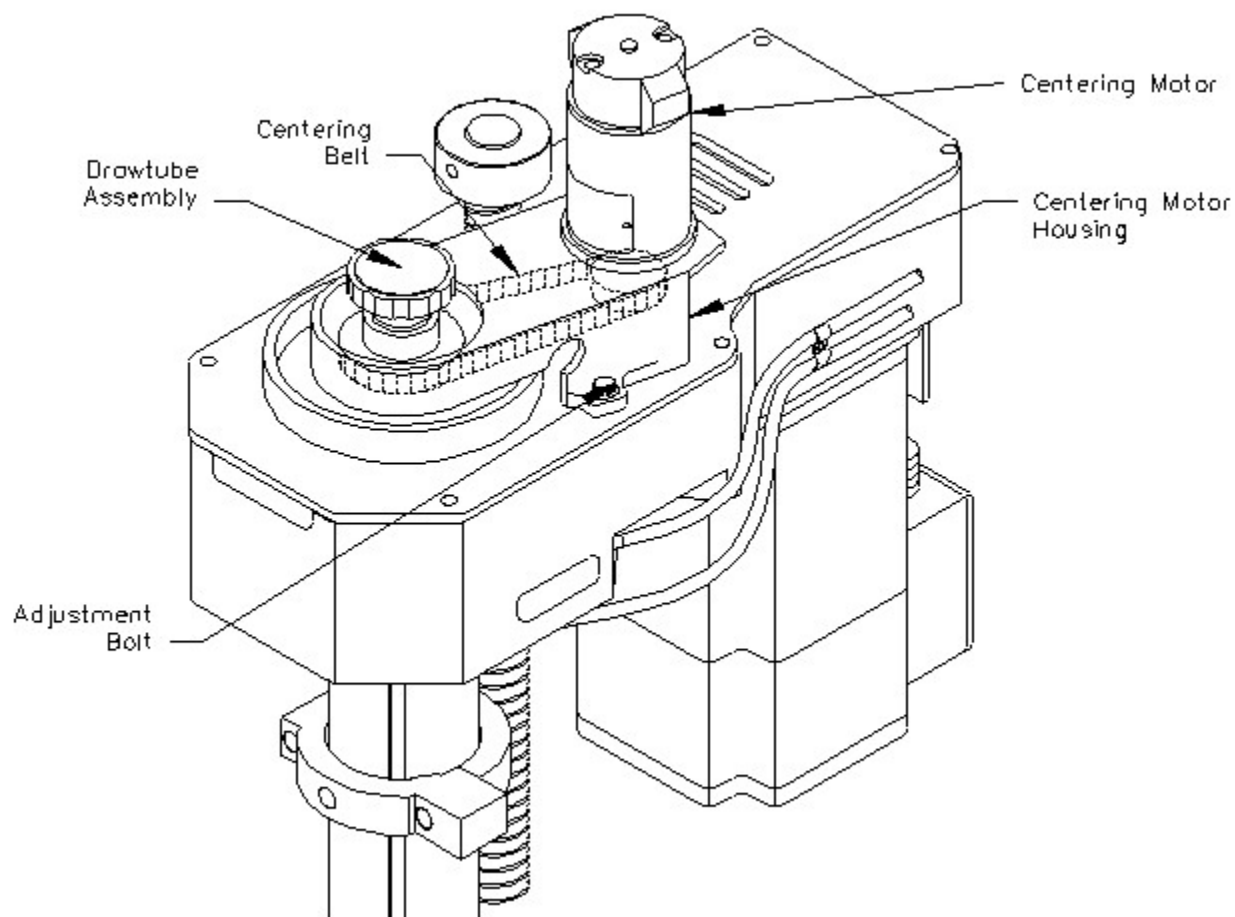
Centering Motor and Housing Belt Adjustment

The Centering Motor Housing is located on top of the Upper Housing. The Centering Motor is mounted to the top of this housing.

The Centering Motor and Housing can be accessed without taking off the machine shroud, however it is much easier to work on when the shroud is removed.

Belt Adjustment

If the tension on the Centering belt is too tight it could cause the centering Fingers to start to come out of the cutter head when the spindle is rotating. The belt may need adjustment also if the belt is slipping on the pulleys. These are cog type belt and pulleys, if the belt is slipping it will be very audible. Loosen the two adjustment bolts slightly. Push back on the Centering Motor Housing until you feel a small amount of resistance. Tighten the Adjustment bolts back down. ***Be careful not to put too much tension on the Drawtube.***



Spindle Drive Belt Removal/Replacement and Adjustment



Disconnect all power to the machine before proceeding.

Accessing Spindle Drive Belt

Remove the shroud from the machine. Make sure the shroud is supported from the top by an overhead lifting device before removing all of the screws. Remove the four allen screws located on each side. Remove the four from the back cover. Open the front door on the shroud and remove the screw located just below the door. Lift the shroud from the machine, being careful it doesn't hang up on anything as you lift.

Remove the set screws in the mechanical stop on top of the vertical ballscrew. Remove the stop. Remove the two socket head cap screws holding the centering motor housing. Remove any cutterheads in the machine. Lift the centering shaft and drawbar from the machine by lifting straight up on the centering knob. Remove 6 screws holding the upper housing cover; lift the cover off the housing.

Loosen, DO NOT REMOVE, the four screws securing the spindle drive motor. Loosening the screw at the very back of the upper housing will take the tension off the belt allowing the motor to slide forward (some machines may require the plastic cable carrier be loosened to expose the screw head).

Removing Spindle Drive Belt

Loosen the four screws attaching the driven pulley to its bushing. Lift the pulley and the belt straight up.

Do not loosen the inner-spindle adjustment nut.

Installing Spindle Drive Belt

Place the belt around the driven pulley and slide them together down over the driven pulley bushing. Rotate the pulley until you can line up the four mounting screw holes. Install the screws, and tighten. Pull the motor to the back of the upper housing, with the motor adjusting screw, to tighten the belt.

Belt Adjustment

Tighten the motor adjusting screw until you can deflect the belt .12 inch (3.17mm) when a pressure of 4.5 to 5 pounds (9.92kg to 11.02kg) is applied to the belt midway between the drive and driven pulleys.

Tighten the motor mount screws. Replace the upper housing cover, and tighten the mounting screws. Replace the drawbar / centering shaft assembly, by sliding it back down into the inner spindle from the top. Replace the vertical stop to the top of the ball screw and tighten the set screws. Replace the centering motor housing and belt. Adjust the belt tension. Lower the shroud back onto the machine and fasten the mounting screws.

Excessive Loads

Thrust Overload

The drive that controls the vertical motor on the F9A & F10A series machines, will trip out when a vertical stall occurs. This is a condition that happens when the machine is fed or rapid traveled into the top of a work piece. It would not make any difference if the spindle was turning or not. This can happen, by misaligning the machine with the bore, or by boring into a hole with an obstruction at the bottom. A vertical stall can also be caused by rapid traveling up into the mechanical stop at the top of the ballscrew.

The first step in correcting a vertical overload condition is to determine what happened to cause it. You will probably have to move the spindle off the obstruction manually, because the machine will tend to physically jam in position and the motor once reset will not be able to move.

Once the jam is cleared press the E-stop button on the face of the machine, wait for at least 1 ½ Minutes. Turn the E-stop button to release it. The machine will reset itself, and be ready to run again.

Be sure you have determined the cause of the crash before continuing.

Spindle Overload

If the spindle is turning, as in boring or counter-boring, and the tool bit hits an obstruction, the drive that controls the spindle motor will trip out. This can happen if there is an unseen web at the bottom of a bore, or if the machine is extremely off center when a cut is started.

The first step in correcting a spindle overload condition is to determine what happened to cause it. You will probably have to move the spindle off the obstruction manually, because the machine will tend to physically jam in position and the motor once reset will not be able to move.

Once the jam is cleared press the E-stop button on the face of the machine, wait for at least 60 seconds. Turn the E-stop button to release it. The machine will reset itself, and be ready to run again.

Be sure you have determined the cause of the crash before continuing.

Vertical Drive Housing



Disconnect all power to the machine before working on the Vertical Drive Housing.

All work being done to the vertical drive housing, such as replacing or adjusting the belt, replacing the motor, or the ballscrew bearings, requires the housing be removed from the spindle base. Following are details for working on the housing.

Accessing Vertical Drive Housing

Remove the shroud from the machine. Make sure the shroud is supported from the top by an overhead lifting device before removing all of the screws. Remove the four allen screws located on each side. Remove the two from the back cover. Open the front door on the shroud and remove the screw located just below the door. Lift the shroud from the machine, being careful it doesn't hang up on anything as you lift.

Removing Vertical Drive Housing

Remove the four mounting screws located at the left and right sides of the housing. Place an engine block or something under the end of the outer spindle to support its weight. Remove the electrical connections on the vertical drive motor. The two cables unscrew at the motor connection box. Manually, turn the ballscrew counter-clockwise to raise the housing up out of the spindle base.

Replacing Vertical Drive Belt

With the Vertical Drive Housing lifted, loosen, ***do not remove***, four screws securing the motor mount. Locate two, belt tension adjusting set screws on the side of the motor mount plate. Back off the set screws until the motor will slide all the way toward the ballscrew. Remove the motor, mount plate, and belt from the vertical drive housing. Place a new belt around the driven pulley, raise the motor and drive pulley into place. Adjust as described below.

Adjusting Vertical Drive Belt

If you installed a new belt, or if you disassembled the drive housing for another reason you need to adjust the belt. The vertical drive housing must be up out of the spindle base, and the motor mount plate screws in, but not tight. Make sure the drive pulley (attached to the motor) and the driven pulley (attached to the ballscrew) are lined up so the belt runs level. Screw in the belt tension adjusting set screws until the belt can be deflected .12" (3.17 mm) when 3 to 4 lbs.(6.61 to 8.82kg) pressure is applied midway between the drive and driven pulleys. Tighten the motor mount plate screws.

Replacing Vertical Drive Housing

Be sure the belt is adjusted properly and the motor mount plate is tightened down securely. Manually, turn the ballscrew clockwise to lower the vertical drive housing back into position. Put in the screws to secure the vertical drive housing but don't tighten them yet. Hook up the cables to the vertical drive motor. Turn on the machine and run the spindle all the way to the bottom. Loosen up the vertical drive housing mounting screws, and then tighten them fully. This ensures the ballscrew is lined up properly.

Inner Spindle Removal

Raise the spindle all the way to the top of its travel. Move the spindle base to the extreme left of its travel.



Disconnect all power to the machine before removing the inner spindle.

Remove the throw-back ring 504-34-17K at the bottom of the Outer Spindle.

Be sure to support the inner spindle with a block of wood or something to keep it from falling out. Loosen the inner spindle nut, remove it and the index bushing from the inner spindle. The inner spindle can now be lowered out of the outer spindle. The lower bearings should come out with the inner spindle. The upper ball bearings will stay inside the upper housing. The upper bearings can now be removed using a bearing puller. Take note as to how the Belleville springs and Spacer are installed.

Clean the bearings and re-install or install new bearings, on the inner spindle. Lubricate the bearings with several drops of oil prior to installing. Slide the spindle up in the outer spindle. Place a block or something under the inner spindle to hold it in place. Replace the upper bearings, spacer and Belleville springs. Be sure the springs are inserted correctly. Place the index bushing on the inner spindle and thread on the upper spindle nut.

Upper Housing Removal

Disconnect the motor cables from the connection box on the rear of the spindle motor. Disconnect the oiler line from the fitting located on the right side of the upper housing by pushing in on the outer ring of the fitting then pull the line free. Disconnect the electrical conduit mounting bracket at the rear of the upper housing. Place some sort of block under the outer spindle to keep it from falling. Remove the outer spindle nut from inside the upper housing. Remove the three bolts from the outside of the upper housing that bolt it to the outer spindle. Remove the four screws securing the ballscrew nut to the upper housing. The upper housing should now be free to lift off the outer spindle.

Digital Micrometer setting instructions

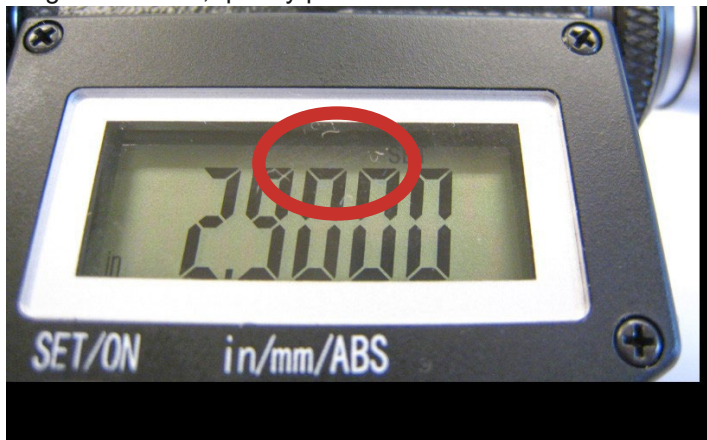
Turn the thimble until the '0' line on the thimble lines up with the vertical line nearest the spindle lock ring.



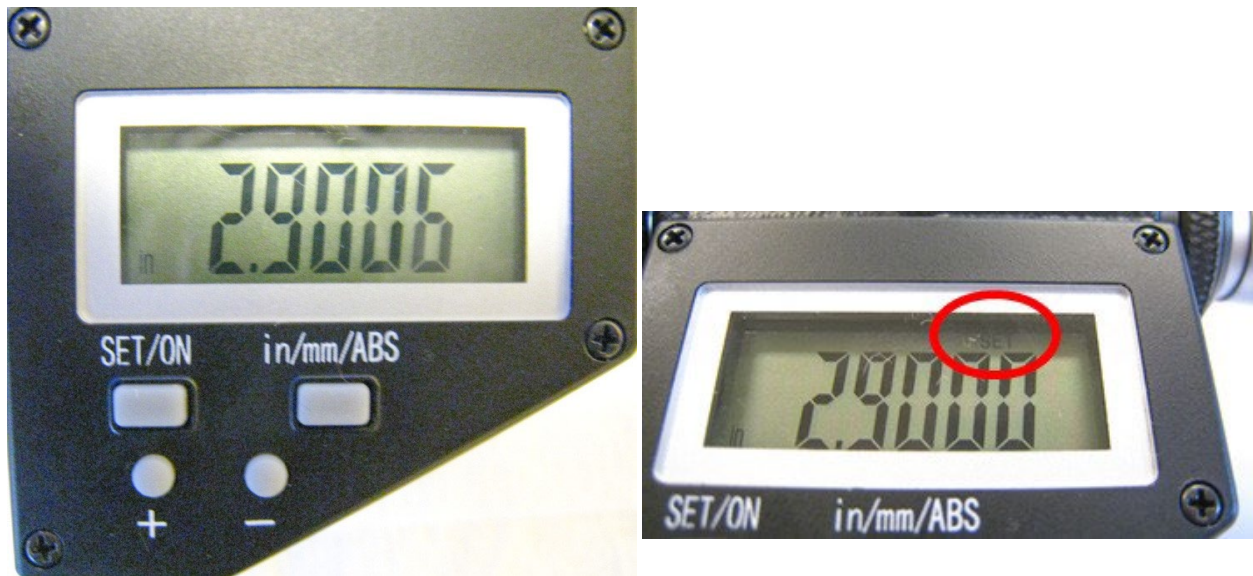
Determine which cutter head bore range the micrometer is going to be used on. (example; 2.9 – 6.0)
We want to initially set the micrometer to the minimum bore diameter of this cutterhead.

NOTE: MICROMETER CAN NOT BE PROGRAMMED IF THE LETTERS INC APPEAR IN THE DISPLAY.

To get rid of INC, quickly press the in/mm/ABS button.



To set or edit micrometer



Press and hold the set/on button and the + or – button at the same time. “Set” will flash in the display. This places the micrometer in edit mode. (**CAUTION:** use a pencil tip or something similar to gently push the small round buttons - they are quite small and a bit delicate.)

Press and hold the + or – buttons to change the display number to the minimum bore diameter determined earlier (example; 2.9). Caution: Pushing the + or – buttons and holding in place will cause the numbers to scroll automatically. The numbers will count slowly at first and once 0.010” has been counted off the scrolling speed will pick dramatically.

After you have reached the desired number in the display, **press the set/on button twice quickly** to exit the edit mode. “Set” should no longer be flashing in the display. The micrometer is now ready for use.

CAUTION: AFTER MICROMETER SET-UP IS COMPLETE, DO NOT PUSH SET/ON BUTTON AGAIN. PUSHING THE SET/ON BUTTON DURING USE WILL RETURN THE DISPLAY TO THE ORIGINAL MINIMUM BORE DIAMETER. THE ONLY TIME YOU SHOULD USE THE SET/ON BUTTON AGAIN IS TO- A. To shut micrometer off at which time you push and hold the button or B. to turn micrometer display back on at which time you push button one time. The display will then show the last reading before micrometer was shut off.

CAUTION: DO NOT BACK THE THIMBLE ALL THE WAY OUT TO THE END OF IT’S TRAVEL. ONCE THE THIMBLE IS BACKED ALL THE WAY OUT, IT WILL NO LONGER ROTATE PROPERLY AND THE DIGITAL HEAD WILL NEED TO BE REPLACED.

Micrometer is calibrated in inch mode. If metric is desired, press and hold in/mm/ABS button until mode changes to metric (approximately 3-4 seconds). A quick press of the in/mm/ABS button will put micrometer in ABS mode: 0.000, with another quick press returning it to initial setting.

Set up the cutter head and bore a set up hole. Measure the bore accurately. Set the digital display to this bore dimension and then -

Loosen the set screw holding the large diameter anvil. Slide the anvil back out of the way.



Place the tool holder used to bore the hole into the micrometer frame. Slide the location nub on the back of the tool holder gently up against the end of the digital micrometer shaft.



Slide the large diameter anvil up until it touches the end of the cutting tip of the tool holder. Tighten the set screw.





Back the digital micrometer shaft off, then bring it up to touch the tool holder and recheck that the numbers in the display are the same as the numbers previously shown.



The micrometer is now set up for use with this cutter head.

Note: this procedure must be repeated to set the micrometer to a different cutter head. The micrometer can only be set to one cutter head at a time.

To shut off micrometer press and hold set/on button until screen goes blank or let micrometer set until display disappears.

With initial setting of micrometer it is recommended that you use the procedure detailed below in the event you think you have size problems.

**Procedure:**

The short vertical lines that cross the horizontal scale on the micrometer sleeve are reference marks. Set the zero on the micrometer thimble even with the first vertical line and note the size shown in the digital display. Record this size for future reference. Now follow the same procedure for each line and record the sizes. At any time you feel your micrometer is reading incorrectly, you can quickly refer to the recorded size of the line closest to the range you are using and check that the micrometer is still accurate.

Alignment Definitions for Angular Bearings and Belleville Washers

Bearing Alignment



VIEW OPEN END UP



VIEW CLOSED END UP

Belleville Washer Alignment

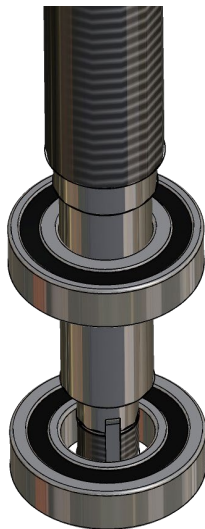


VIEW CUP DOWN



VIEW CUP UP

Vertical Z-Axis Ballscrew Lower Bearing Stacking Order



Install 1st bearing with open end up.

Install 2nd bearing with closed end up.



Install 3rd bearing with closed end up.

Inner Spindle Lower Section Bearing Stacking Order

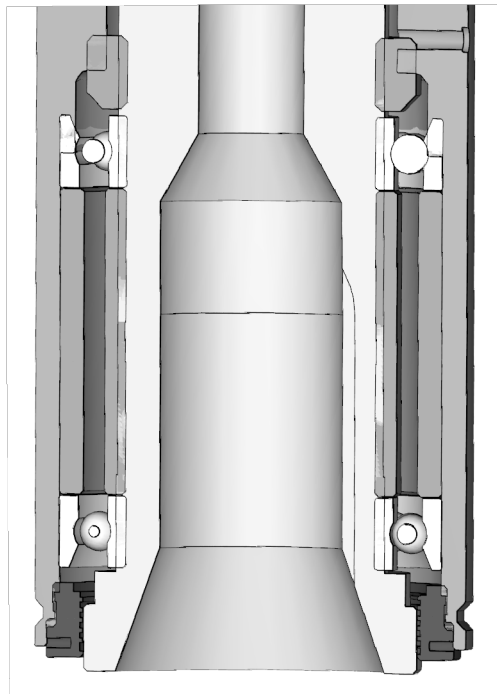
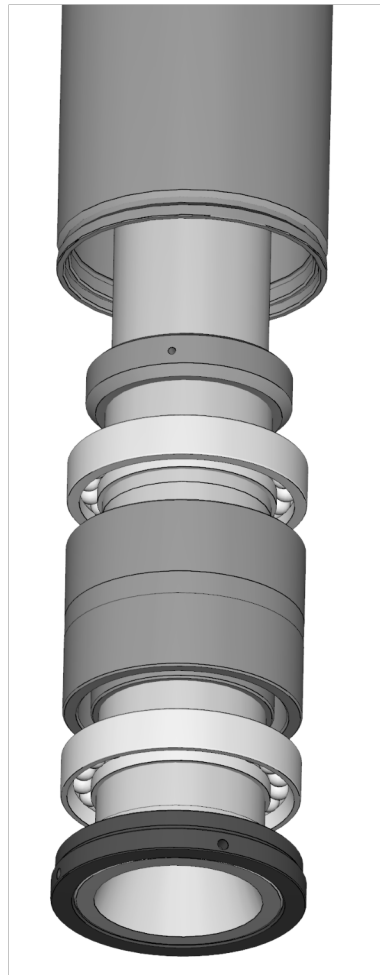
Install 2nd bearing with closed

end down.

Install 1st bearing with open

end down.

Cross Section View



TROUBLESHOOTING

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 Fault and Error Codes 3-1
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For further assistance in troubleshooting:

Please visit the service tab of our web page at Send a Service Request www.rottlermfg.com or contact the Rottler Factory Service at service@rottlermfg.com for assistance and your service request.

You may also call Rottler at 1-800-452-0534 or 1-253-872-7050

Please ensure you have the Machine Model and Serial Number available when contacting Rottler for Service

Troubleshooting

Fault and Error Codes

Fault	Possible Cause	Possible Solutions
Spindle Falling When Power is Off.	Outer bushings too loose.	Refer to operator manual for adjustment procedures.
Chatter in bore.	Inner spindle out of adjustment.	Refer to operator manual for adjustment procedures.
	Cutterhead has oil in it.	Remove cutterhead from machine, disassemble and clean counter weight. Counter weight must be dry and have free movement.
Bore out of Round.	Inner spindle out of adjustment	Refer to operator manual for adjustment procedures.
	Fixturing is moving.	Check fixturing for security.
Taper in Bore	Outer spindle out of adjustment	Refer to operator manual for adjustment procedures.
	Dull tooling.	Sharpen tool or change corners on indexable tooling.
Not floating properly	Castle nut too tight	Back Castle nut off until the washer below has free movement in the neutral mode.
	Air setting incorrect	Adjust air setting. See instructions
Shadowing in bore	Spindle misaligned	Correct alignment. See instructions
	Fixturing not square to main bed	Check and correct fixturing

Problem:

Icon On Screen Does Not Move To Area Touched.

Solution:

Follow the procedure below to recalibrate the touchscreen.

1. Get to the Alignment screen.
 1. If an Elo icon is available in the tool tray at the lower right side of the desktop, click it, then click Align.
 2. Otherwise, go to the Windows Control Panel, double-click Elo Touchscreen and click the Align button on the General tab.
 1. If Windows XP and no Elo icon, click the "Switch to Classic View" button on the left
 2. If Windows 7 and no Elo icon, look for "View by: Category" text toward the upper right; click it and select "Small icons"
2. Touch and release the upper left target; the target should jump to the lower right.
3. Touch and release the lower right target; the target should jump to the upper right.
4. Touch and release the upper right target; a check screen should appear.
5. Touch and release the green check mark; the check screen should disappear.
6. The cursor should now jump to the point of touch.
7. If the Elo Control Panel is open, close it and the Windows Control Panel.

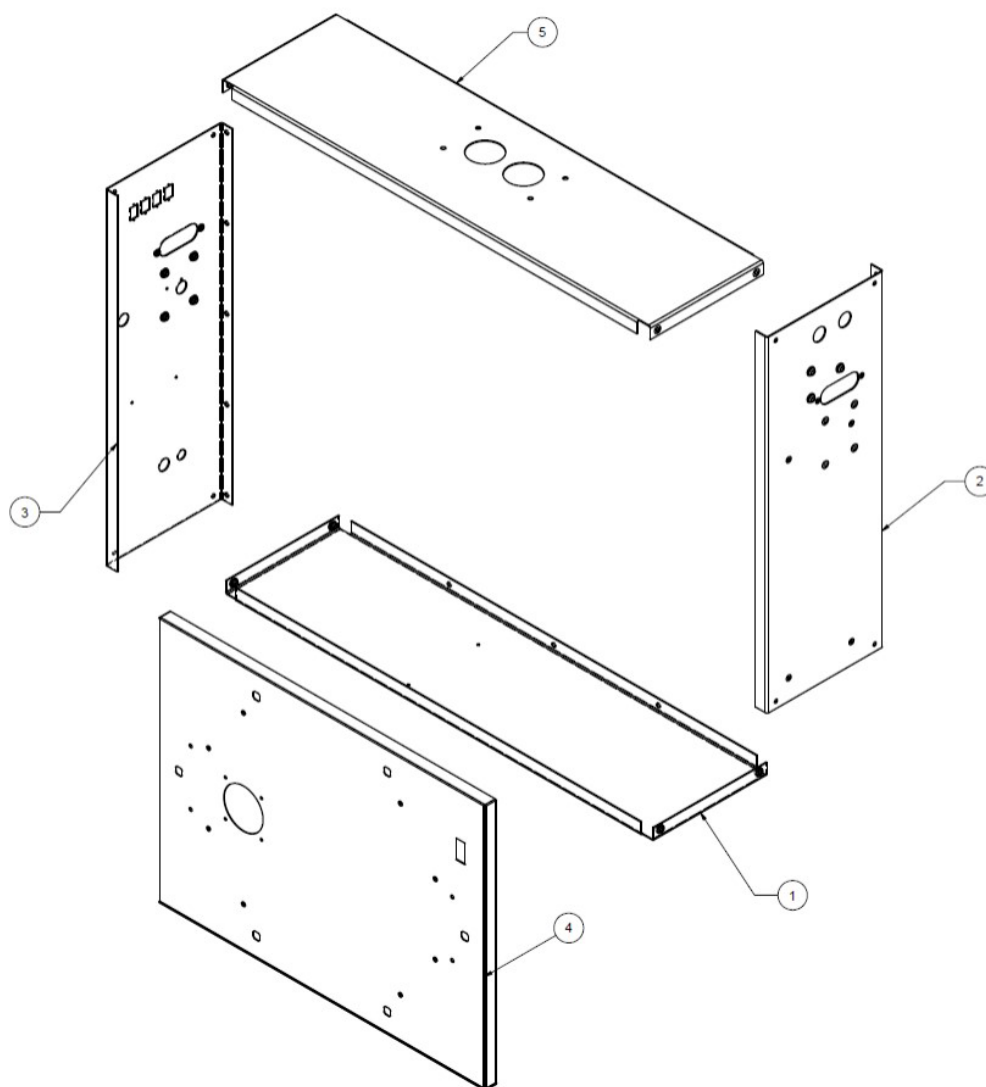
MACHINE PARTS

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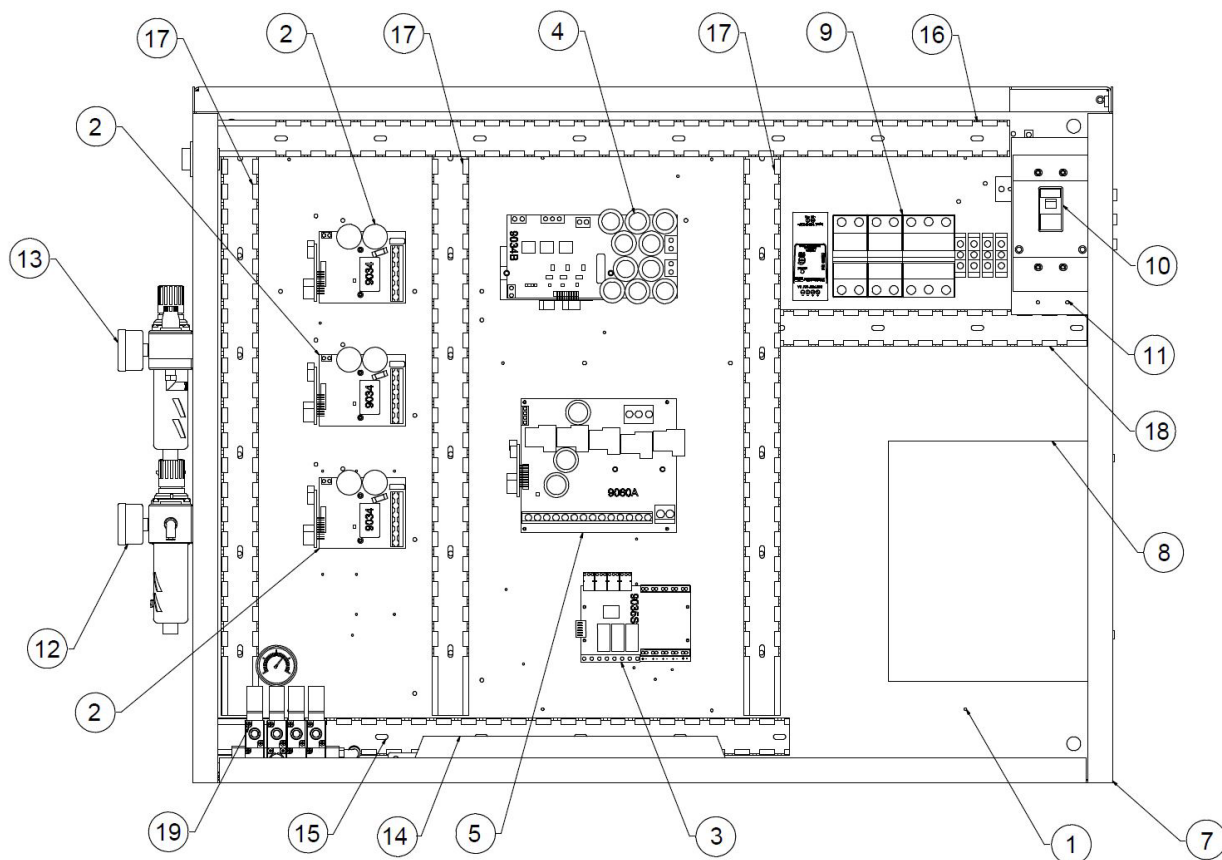
Machine Parts

Electrical Enclosure



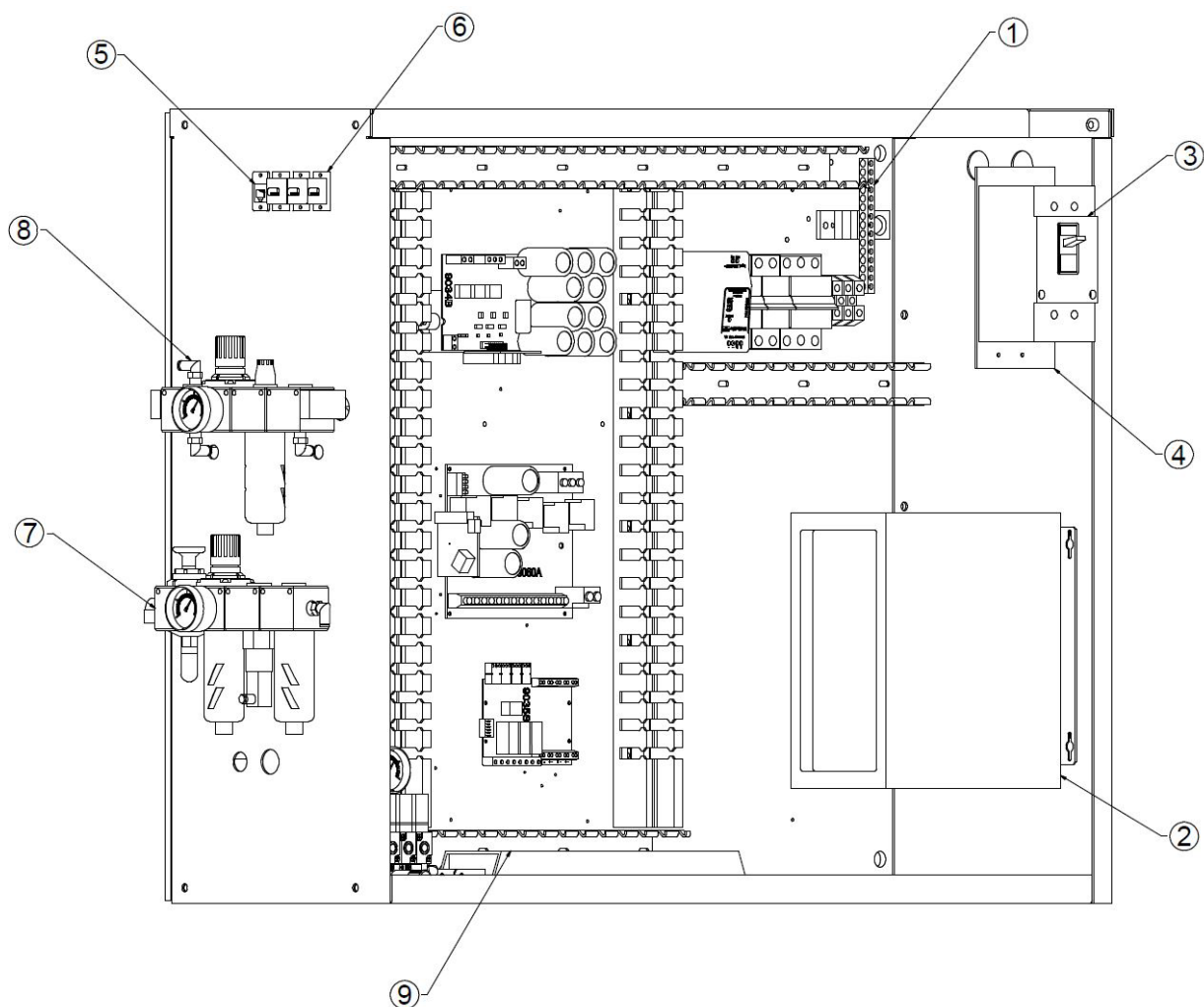
Parts List			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	7629C	TOP/BOTTOM PANEL - ELECTRICAL ENCLOSURE
2	1	7629A	RIGHT SIDE PANEL - ELECTRICAL ENCLOSURE
3	1	7629B	LEFT SIDE PANEL - ELECTRICAL ENCLOSURE
4	1	7629E	ENCLOSURE DOOR
5	1	7629D	TOP/BOTTOM PANEL - ELECTRICAL ENCLOSURE

Electrical Enclosure Components



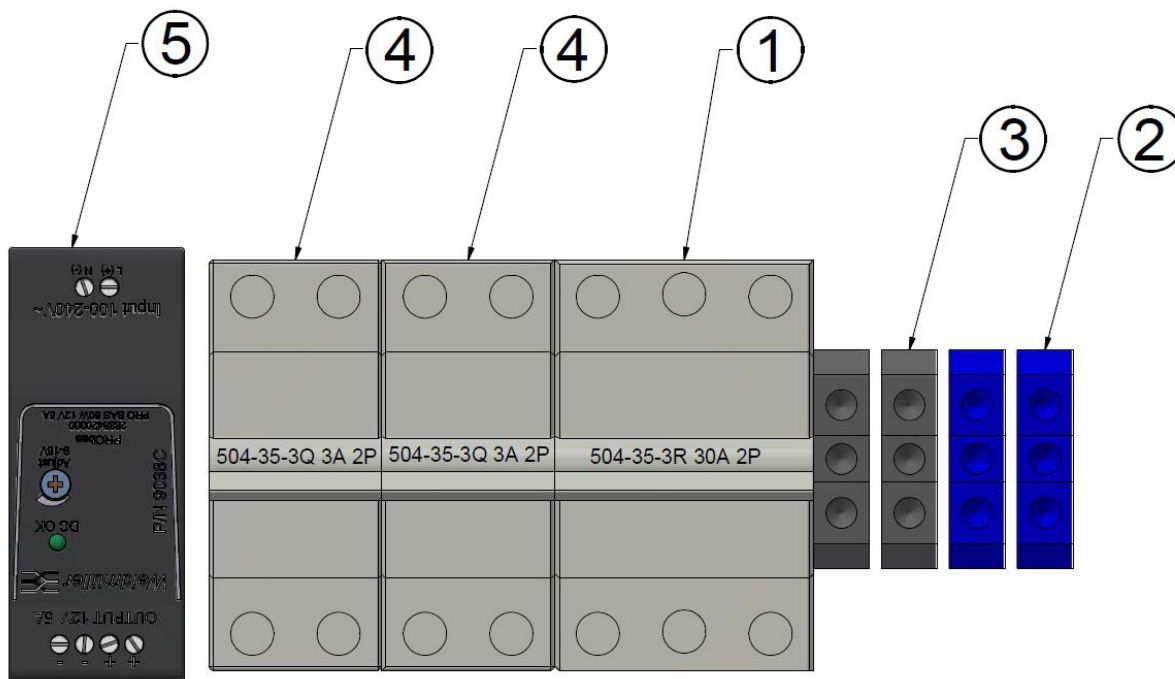
Parts List			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	7627A	Back Panel Heat Sink
2	3	9034	30A Drive Amp
3	1	9035L	I/O Board
4	1	9034B	100A SPINDLE DRIVE
5	1	9060A	Lg. power board
6	1	6496J	Ground Buss
7	1	7629F	FULL ENCLOSURE
8	1	4420	CPU
9	1	POWER DIST.	SEE DIN LAYOUT
10	1	9035H With Hasp	Main Breaker
11	1	9090A	Main Breaker mount
12	1	504-34-75K (A)	AIR MANIFOLD
13	1	504-34-75K (B)	OILER
14	1	9038E	BRAKE RESISTOR
15	1	6554L 23 inch	Wire Track
16	1	6554L 31 inch	Wire Track
17	3	6554L 22-75 inch	Wire Track
18	1	6554L 12_3 inch	Wire Track
19	1	504-34-75M	VALVE ASSEMBLY

Electric Enclosure Components

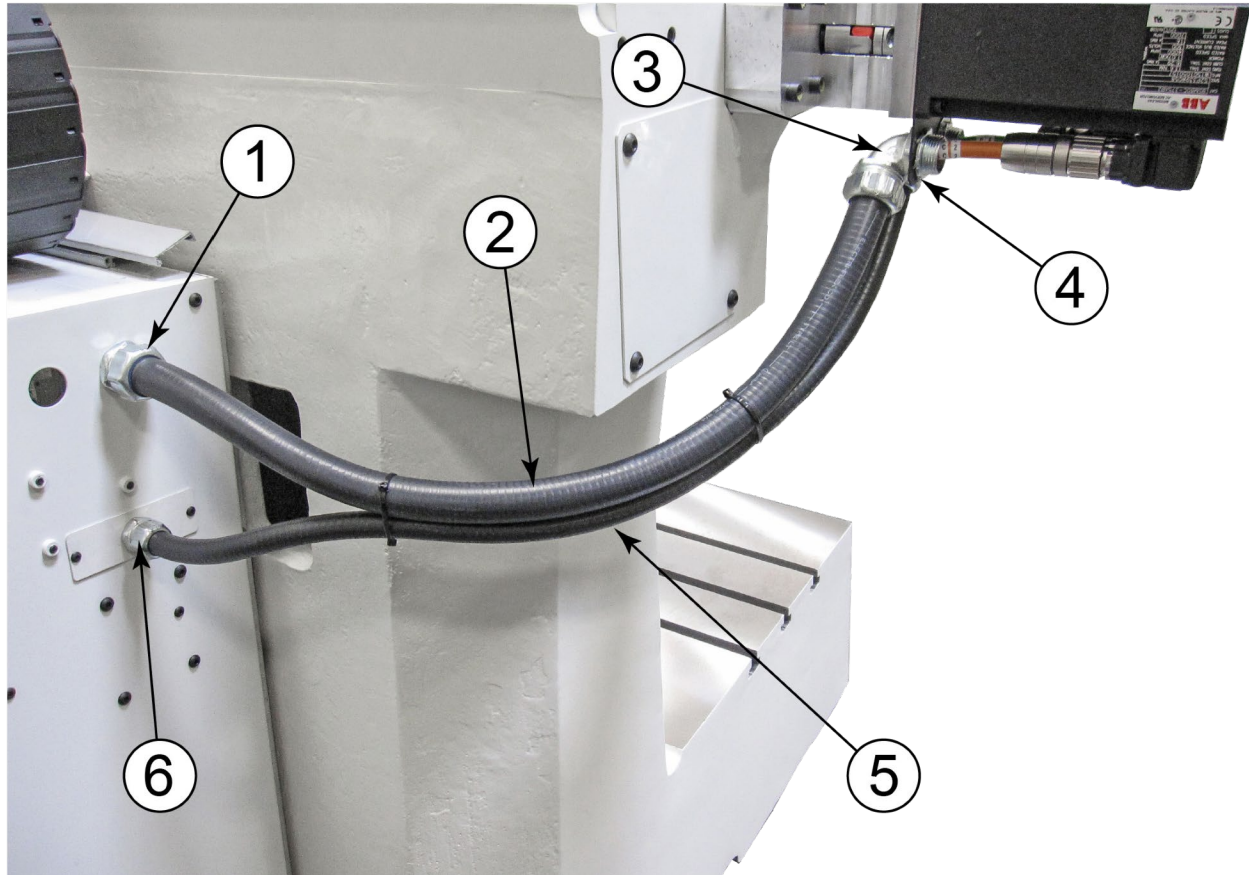


Parts List			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	8496J	Ground Strip
2	1	4420	CPU
3	1	9035H With Hasp	Main Breaker
4	1	9090A	Main Breaker mount
5	1	650-5-23H	CAT5 DATA PORT
6	3	650-5-23F	USB DATA PORT
7	1	504-34-75K (A)	Air Manifold
8	1	504-34-75K (B)	Oiler
9	1	9038E	resistor

DIN Rail Components

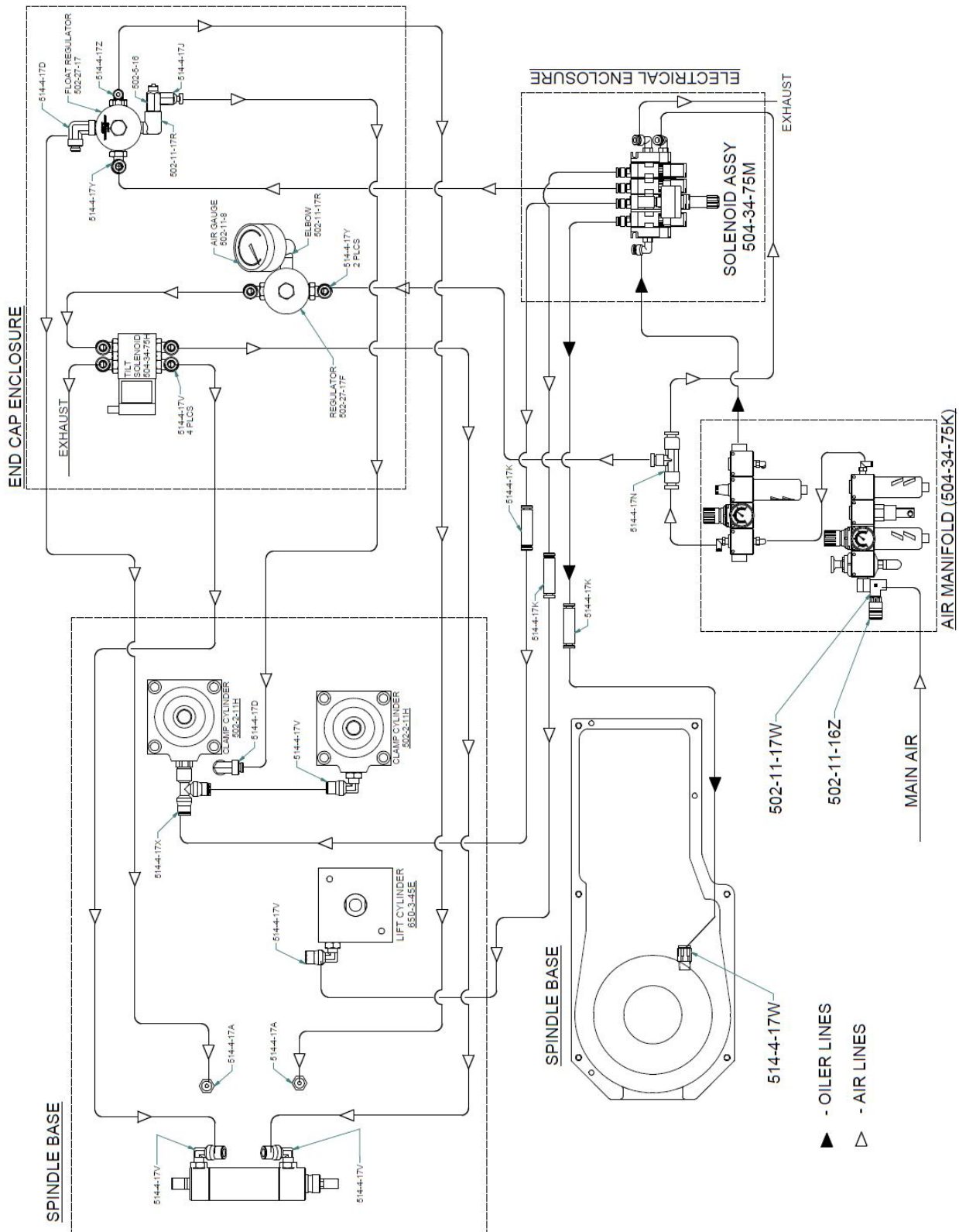


Parts List			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	504-35-3R	BREAKER 30 AMP
2	2	9022B	Blue Term block
3	2	9022C	Gray Term block
4	2	504-35-3Q	BREAKER 3 AMP
5	1	9038C	12V POWER SUPPLY

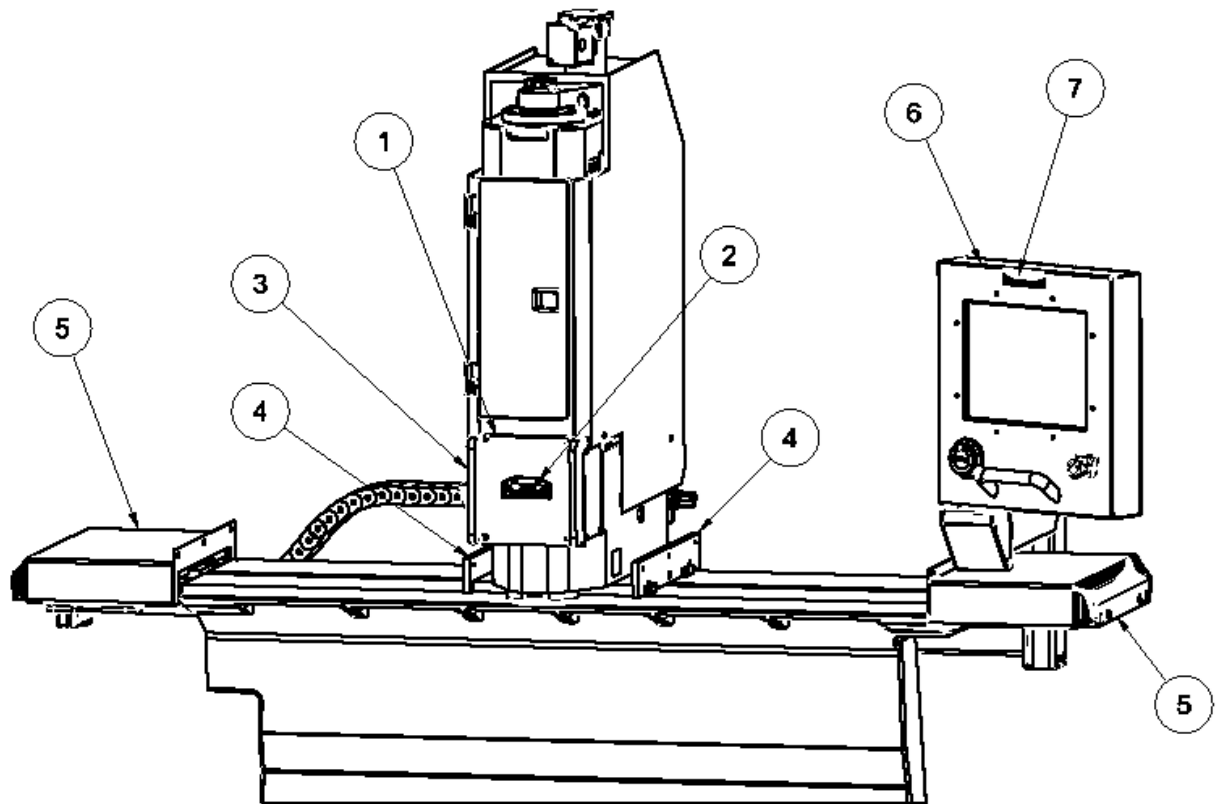


ITEM	PART #	DESCRIPTION
1	502-11-12	CONNECTOR,STRAIGHT-3/4"
2	502-11-11A	CONDUIT,BLACK SEALTITE-3/4"
3	502-6-8	ELBOW, 90 DEGREE-3/4"
4	502-2-26	CONNECTOR, RIGHT ANGLE 3/8"
5	502-2-23	CONDUIT, BLACK SEALTITE, 3/8"
6	502-11-43	CONNECTOR, 3/8" - STRAIGHT

Air Logic Diagram

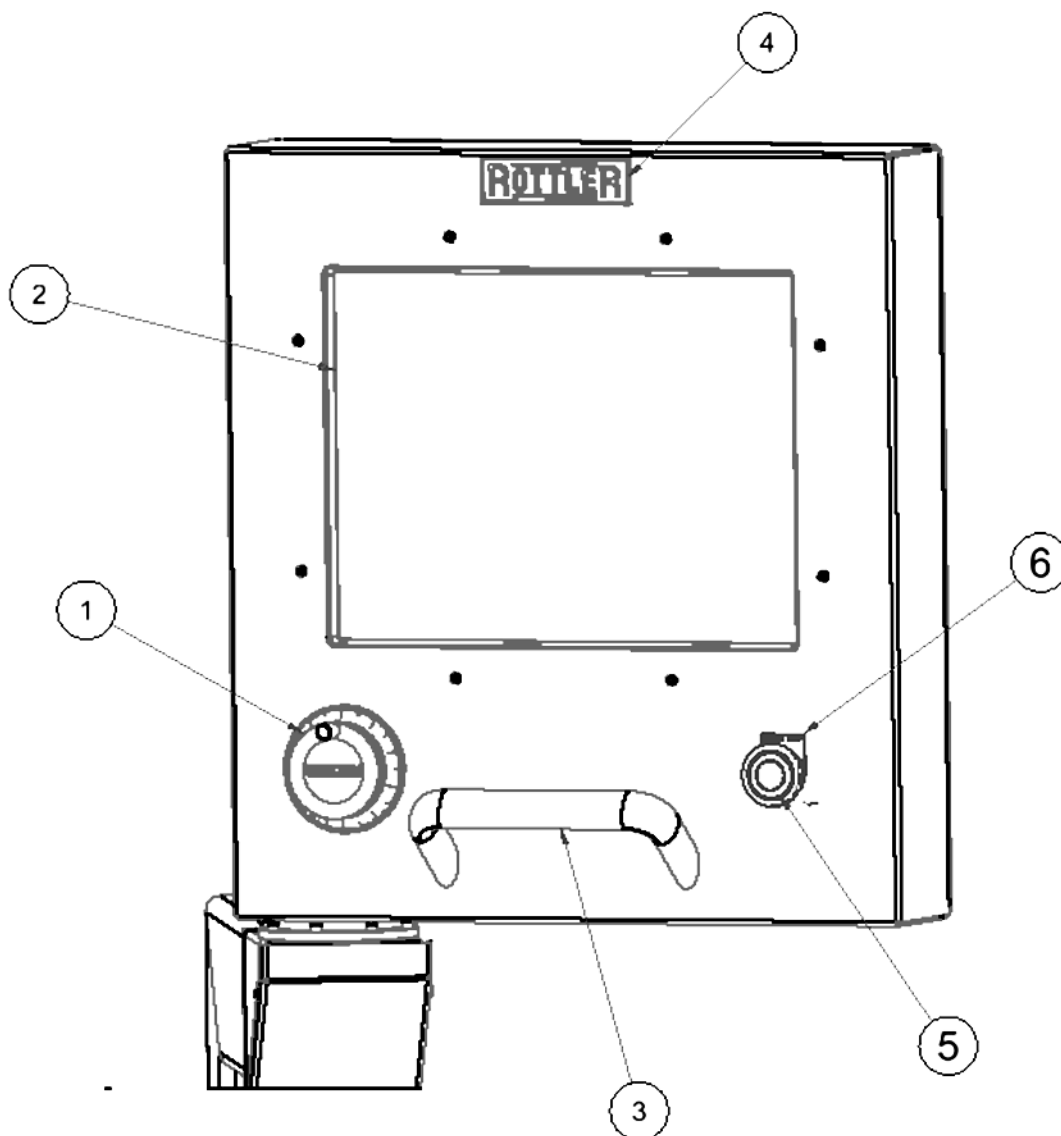


Base Upper Section Parts



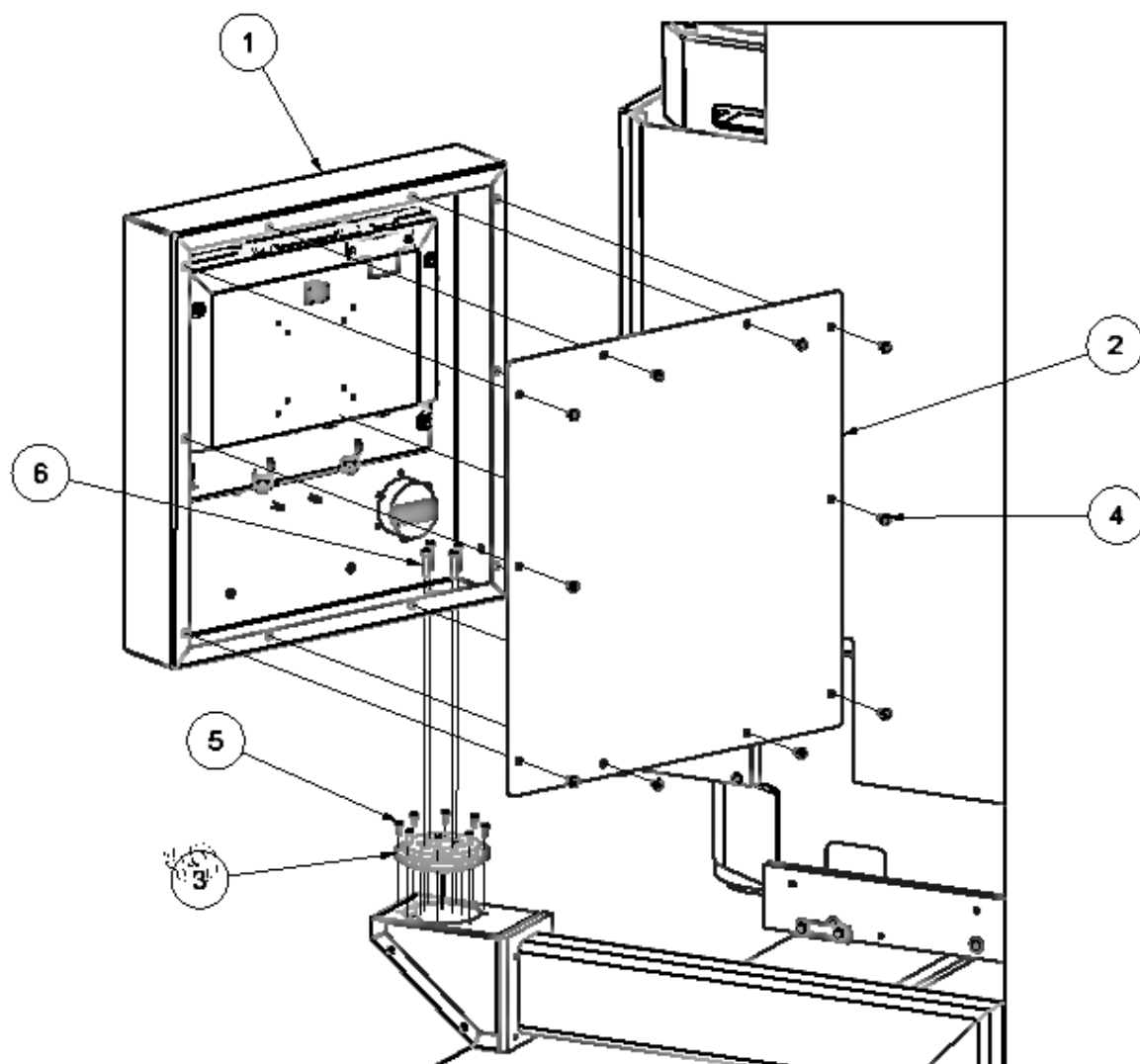
F10XS BASE UPPER SECTION PARTS			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	504-34-78D	FRONT COVER - F 10X
2	1	502-1-19C	NAMEPLATE, ROTTLE - SMALL
3	2	504-34-84B	HANDLE
4	2	504-37-3A	BASE PLATE SIDE BAR
5	2	7240	WAY COVER ASSEMBLY
6	1	514-14-95	H80 PENDANT ENCLOSURE
7	1	502-1-19E	BOLT ON NAME PLATE

Control Panel Housing



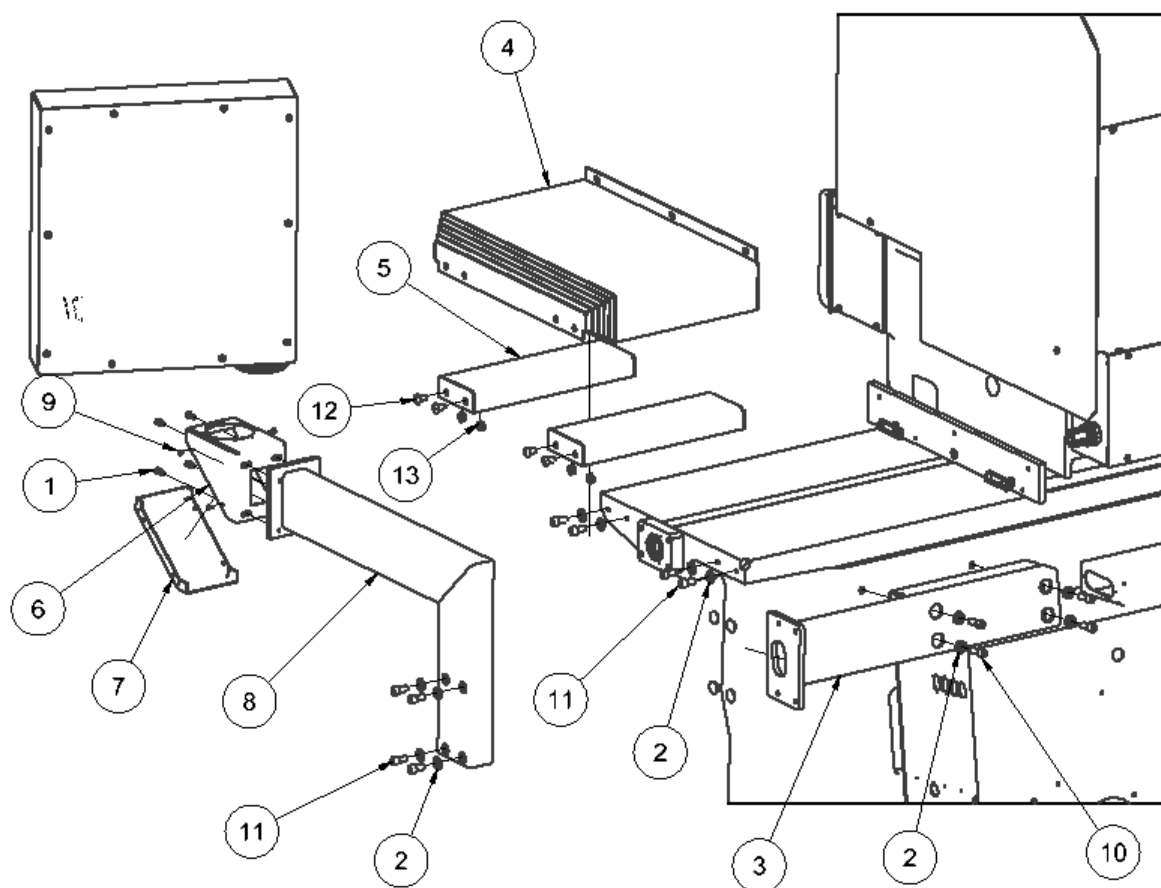
F10XS PENDANT CONTROL ASSEMBLY			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	6428	Electronic Handwheel
2	1	514-14-89	TOUCHSCREEN, RESISTIVE, 15" - H80 & F10X
3	1	650-1-2G	HANDLE, TOUCH PANEL (DM CONTROL)
4	1	502-1-19E	BOLT ON NAME PLATE
5	1	6389D	PUSHBUTTON, EMERGENCY STOP
6	1	6389B	PLATE, LEGEND - EMERGENCY STOP PUSHBUTTON

Control Panel Housing



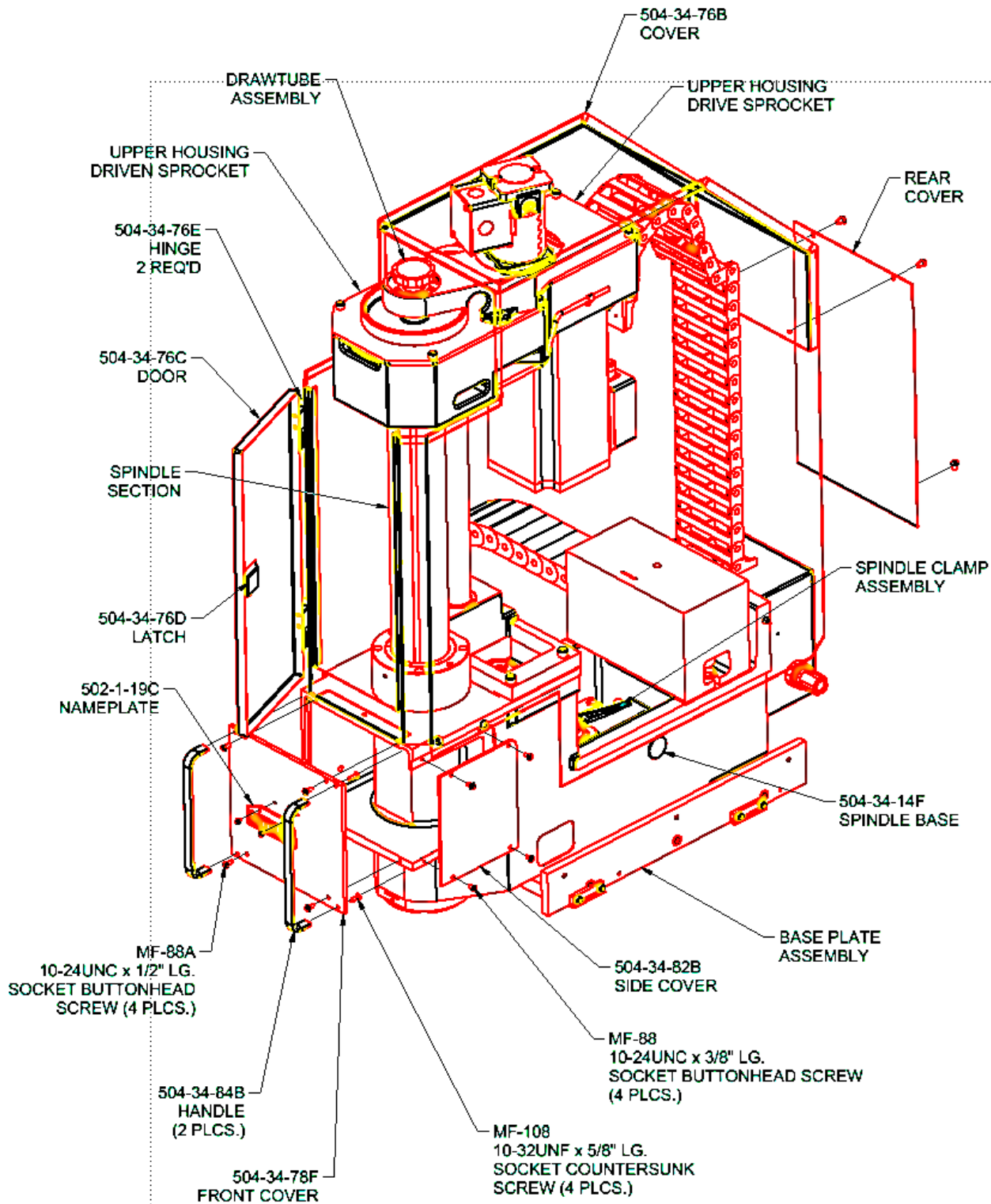
F10XS PENDANT ENCLOSURE			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	514-14-95	H80 PENDANT ENCLOSURE
2	1	514-14-96	H80 PENDANT ENCLOSURE DOOR
3	1	7322C	BEARING, SLEWING RING
4	22	MF-248	Socket Button Head 1/4 - 20 x 3/8
5	8	MF-3D	8-32UNC x 3/8" LONG S.H.C.S.
6	4	MF-6A	10-24UNC x 1" LG. S.H.C.S.

Pendant and Waycover Supports

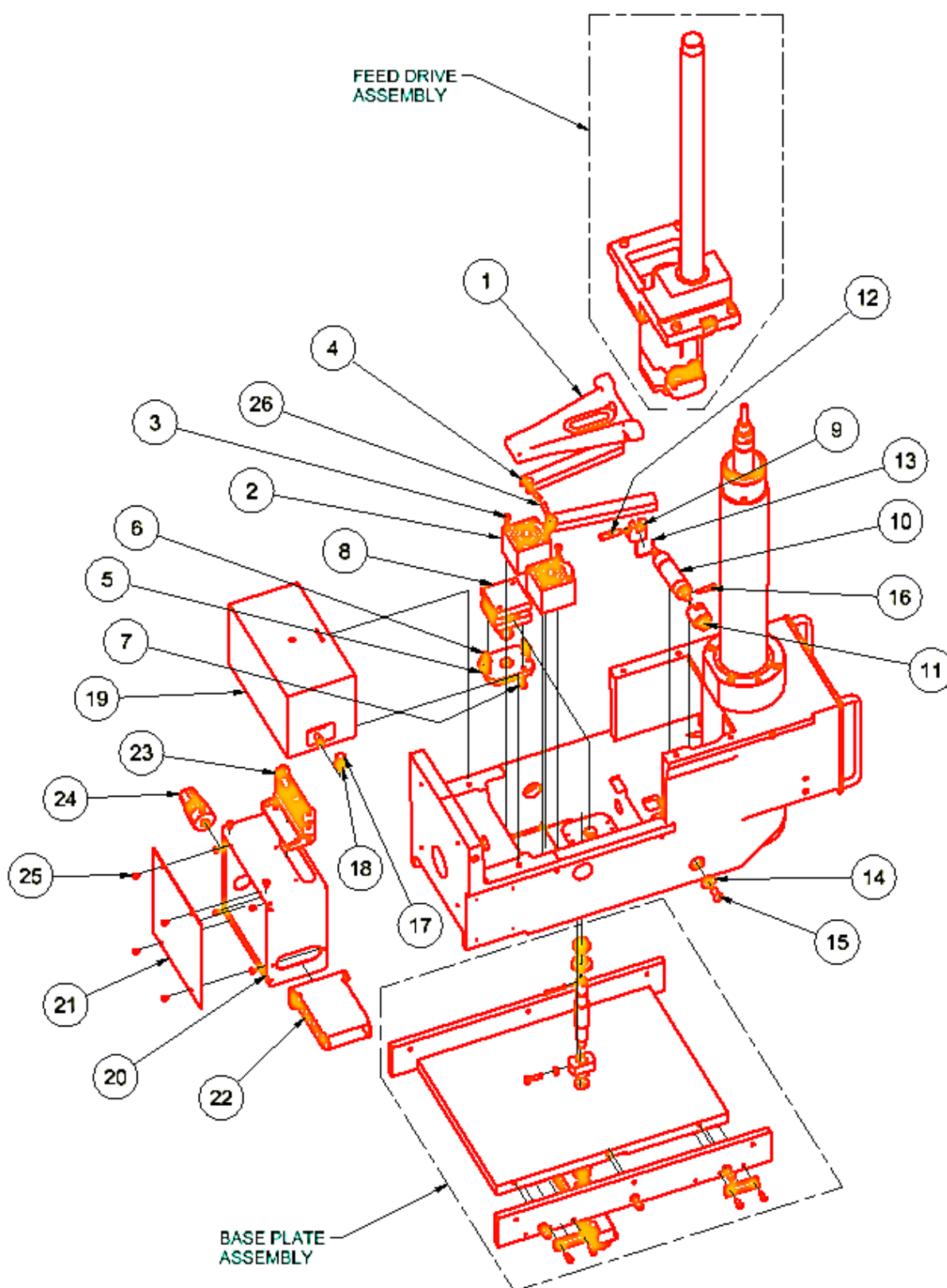


F10XS PENDANT MOUNT			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	16	MF-12	1/4-20UNC x 1/2" LONG S.H.C.S.
2	18	MF-178	SAE 3/8" FLAT WASHER
3	1	504-37-1A	F-10X PENDENT BASE MOUNT
4	2	7240	WAY COVER ASSEMBLY
5	4	7240 bracket	Way cover bracket, Surfacer
6	1	504-37-1G	PENDANT SUPPORT BRACKET, F10X
7	1	504-37-1H	COVER, PENDANT SUPPORT, F10X
8	1	504-37-1F	F10X - PENDENT ARM
9	6	MF-86	8-32UNC x 1/4" LONG SOCKET BUTTONHEAD SCREW
10	4	MF-31	3/8-16UNC x 1" LONG S.H.C.S.
11	12	MF-30	3/8-16UNC x 3/4" LONG S.H.C.S.
12	8	MF-97	3/8-16UNC x 5/8" LG. SOCKET BUTTONHEAD SCREW
13	8	MF-167	3/8-16UNC HEX NUT

Spindle Base Assembly

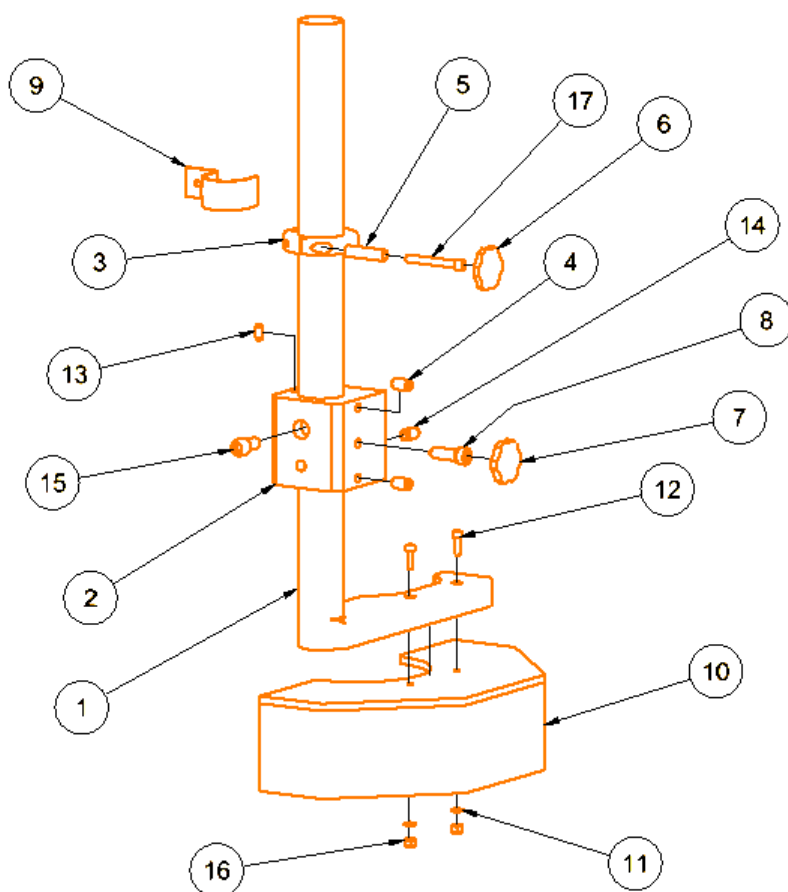


Spindle Base



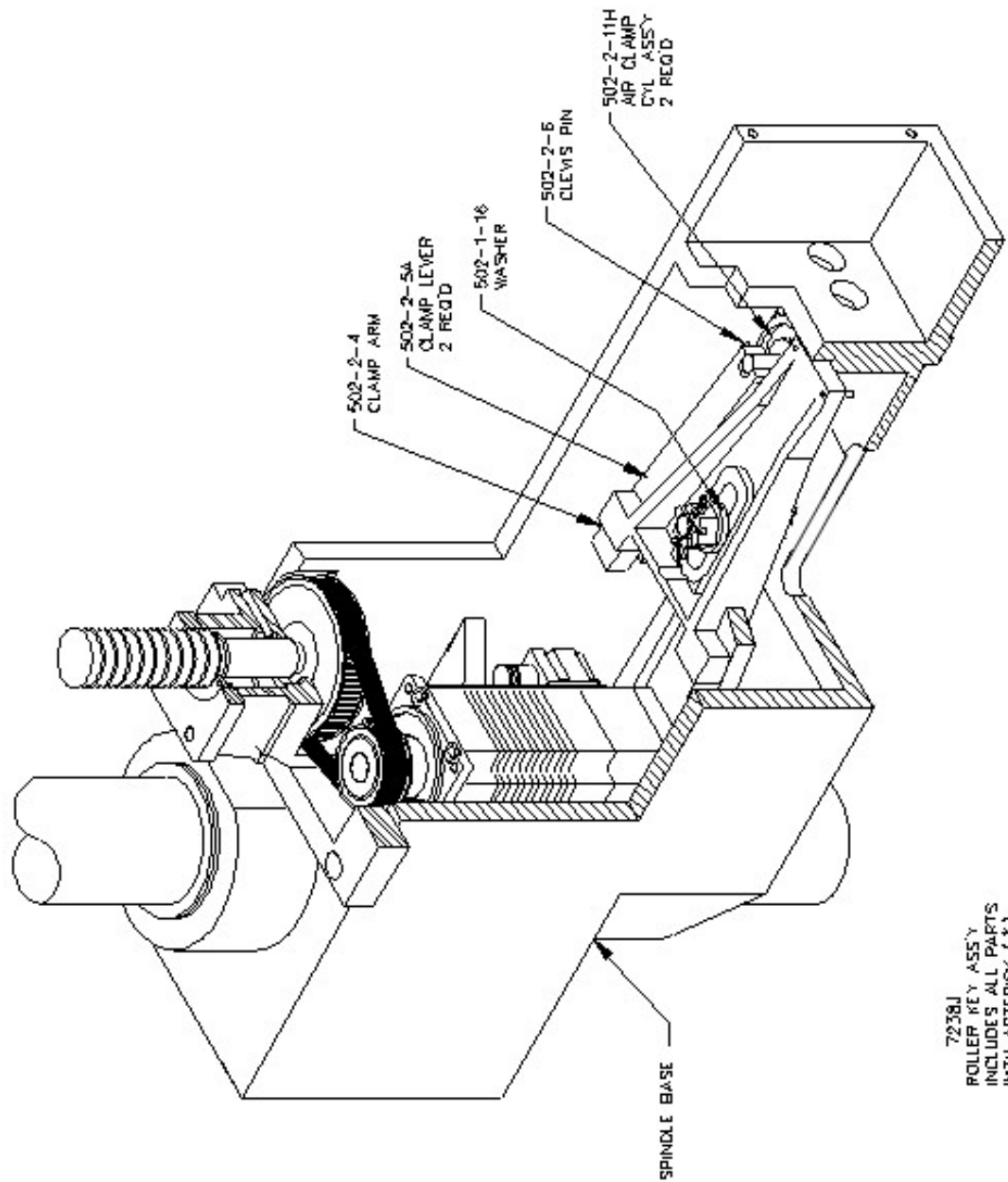
F10XS SPINDLE BASE ASSEMBLY			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	502-2-4	CLAMP ARM, AIR CLAMP ASSEMBLY ('F' STYLE)
2	2	502-2-11H	
3	4	ANSI B18.3 - 1/4-20 UNC - 2.25(31)	S.H.C.S. 1/4 - 20 UNC - 2 1/4
4	2	502-2-5A	LEVER ARM
5	1	504-34-14R	SPACER, MILL TILT CYLINDER - F10XS
6	4	ANSI B18.3 - No. 10 - 24 UNC - 3/4 HS HCS	Hexagon Socket Head Cap Screw
7	10	ANSI B18.3 - 1/4 - 20 UNC - 1/2 HS HCS	Hexagon Socket Head Cap Screw
8	1	650-3-45E	CLAMP ARM CYLINDER CONROD FIXTURE ASSEMBLY
9	1	504-34-14H	TILT SHIM, MILL TILT - F10X
10	1	504-34-14G	AIR CYLINDER, MILL TILT - F10X
11	1	504-34-14J	TILT CYLINDER MOUNT, F10X MILL TILT
12	1	504-34-14L	PIVOT PIN, TILT SHIM - F10X MILLING
13	1	504-34-14Q	PIVOT PIN SPRING, TILT SHIM - F10X MILLING
14	1	504-34-14K	WASHER, CYLINDER MOUNT, F10X TILT
15	1	ANSI B18.3 - 3/8 - 16 x 3/4	Hexagon Socket Button Head Cap Screw
16	1	ANSI B18.3 - 0.250 x 0.75 ANSI B18.3	Hexagon Socket Head Shoulder Screw
17	2	ANSI B18.2.1 - 3/8-16 UNC - 1	Hex Cap Screw
18	2	MF-178	SAE 3/8" FLAT WASHER
19	1	504-34-14S	COUNTERWEIGHT BLOCK, SPINDLE BASE - F10XS
20	1	504-34-64	JUNCTION BOX
21	1	504-34-65	JUNCTION BOX COVER
22	3	504-34-86C Extension	
23	2	504-34-86B SECTION	CABLE CARRIER SECTION, UPPER HOUSING F5 SERIES
24	1	502-27-17	Regulator 0 - 60 PSI
25	8	ANSI B18.3 - 10 - 24 x 1/4	Hexagon Socket Button Head Cap Screw
26	2	502-2-6	CLEVIS PIN

Chip Shield Parts

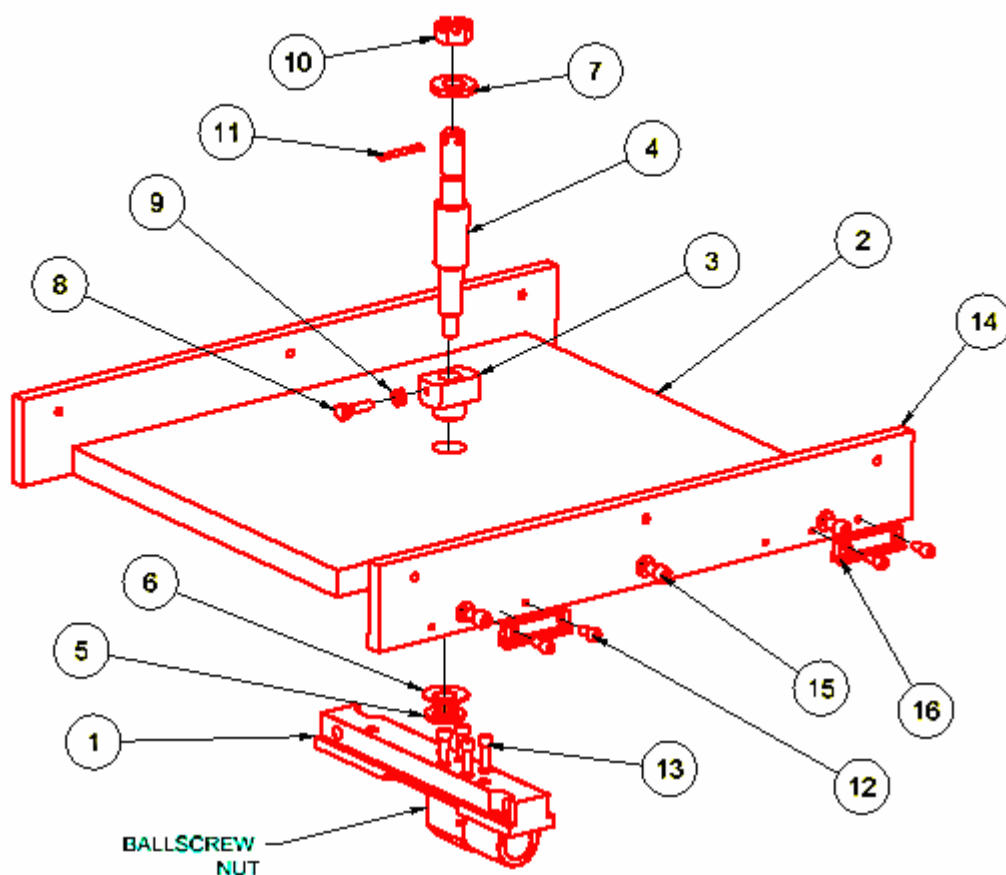


504-35-11F CHIP SHIELD ASSEMBLY			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	504-35-11	VACUUM TUBE AND HOOD ASSEMBLY
2	1	504-35-11B	VACUUM HOOD CLAMP - F-5 MACHINES
3	1	504-35-11T	COLLAR, STEEL HINGE SHAFT
4	2	7046	Spring Plunger
5	1	504-35-11N	CLAMP SLEEVE F5 CHIP SHIELD ASSEMBLY
6	1	502-2-55	SLK-8-Thumb Screw Knobs - Lobed
7	1	504-35-11H	SLK-8-Thumb Screw Knobs - Lobed
8	1	504-35-11G	TNT-200-Socket Head Cap Screws
9	1	502-28-26M	1-1/2" PIPE STRAP
10	1	504-35-11U	CHIP SHIELD - F10XS
11	2	MF-175	#10 FLAT WASHE3R
12	2	MF-5	10-24UNC x 5/8" LG. S.H.C.S.
13	1	MF-224	1/4" x 1/2" LG. ROLL PIN
14	1	MF-230	3/8" x 3/4" LG. ROLL PIN
15	1	MF-30	3/8-16UNC x 3/4" LG. S.H.C.S.
16	2	MF-186B	10-24UNC HEX NYLOCK NUT
17	1	6913D	1/4-28UNF x 2" LG. S.H.C.S.

Spindle Base Clamp System

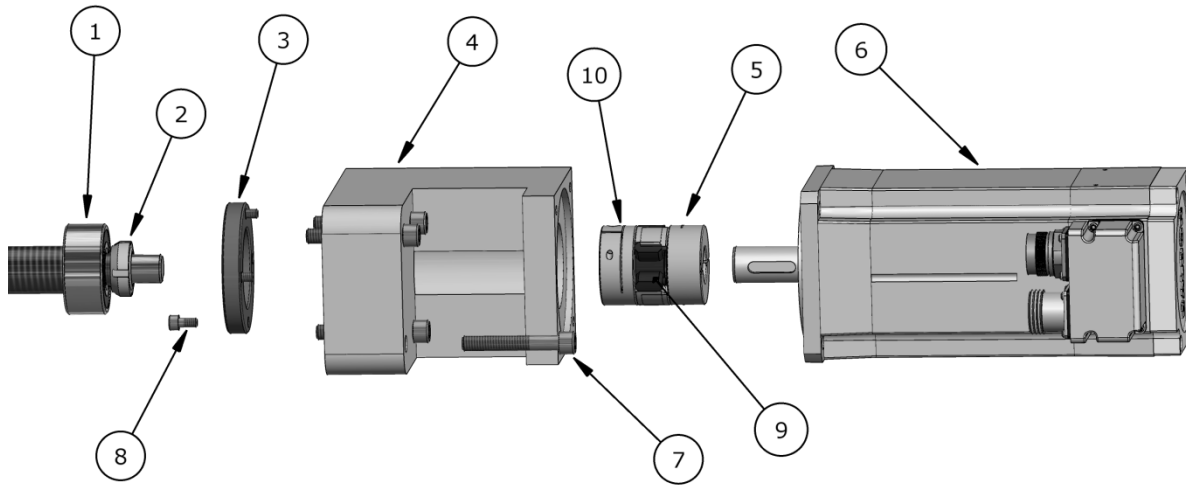


Base Plate Parts

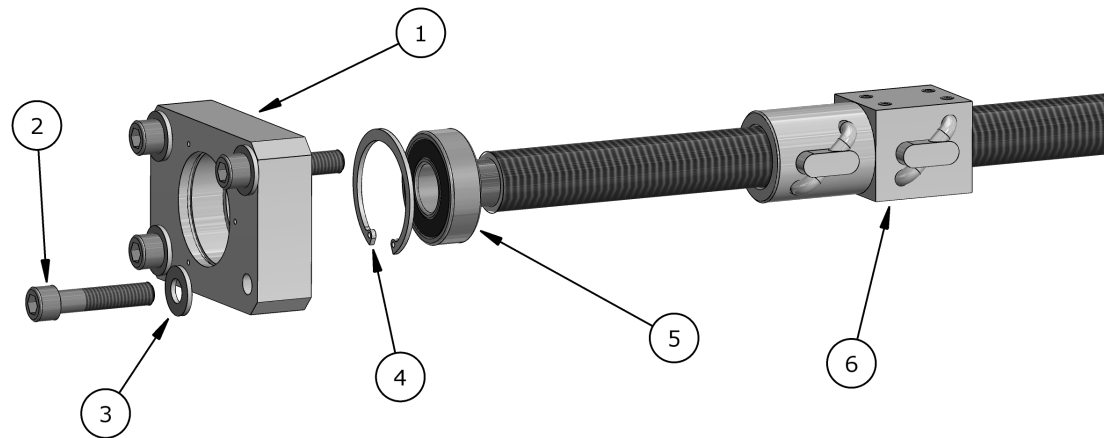


F10XS BASE PLATE ASSEMBLY			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	7238H	KEY ASSEMBLY W/TURCITE
2	1	504-37-2C	BASE PLATE ASSEMBLY WITH TURCITE.
3	1	504-37-2A	SPINDLE BASE GUIDE
4	1	504-37-2B	SPINDLE BASE CLAMP STUD
5	1	504-34-14M	FLAT WASHER, CLAMP - F10XS
6	1	504-34-14N	BELLEVILLE SPRING, CLAMP - F10XS
7	1	502-1-16	WASHER, 5/8" HARDENED
8	1	MF-136	1/4-20UNC x 1" LG. HEX BOLT
9	1	MF-163	1/4-20UNC HEX NUT
10	1	MF-188	5/8-11UNC SLOTTED HEX NUT
11	1	MF-232A	Pin - Cotter
12	10	MF-12	1/4-20UNC x 1/2" LG. S.H.C.S.
13	8	MF-14	1/4-20UNC x 3/4" LG. S.H.C.S.
14	2	504-37-3A	BASE PLATE SIDE BAR
15	6	MF-21A	5/16-18UNC x 1/2" LG. S.H.C.S.
16	4	7043A	Wiper, Spindle Base F-100

X-Axis Drive End Parts

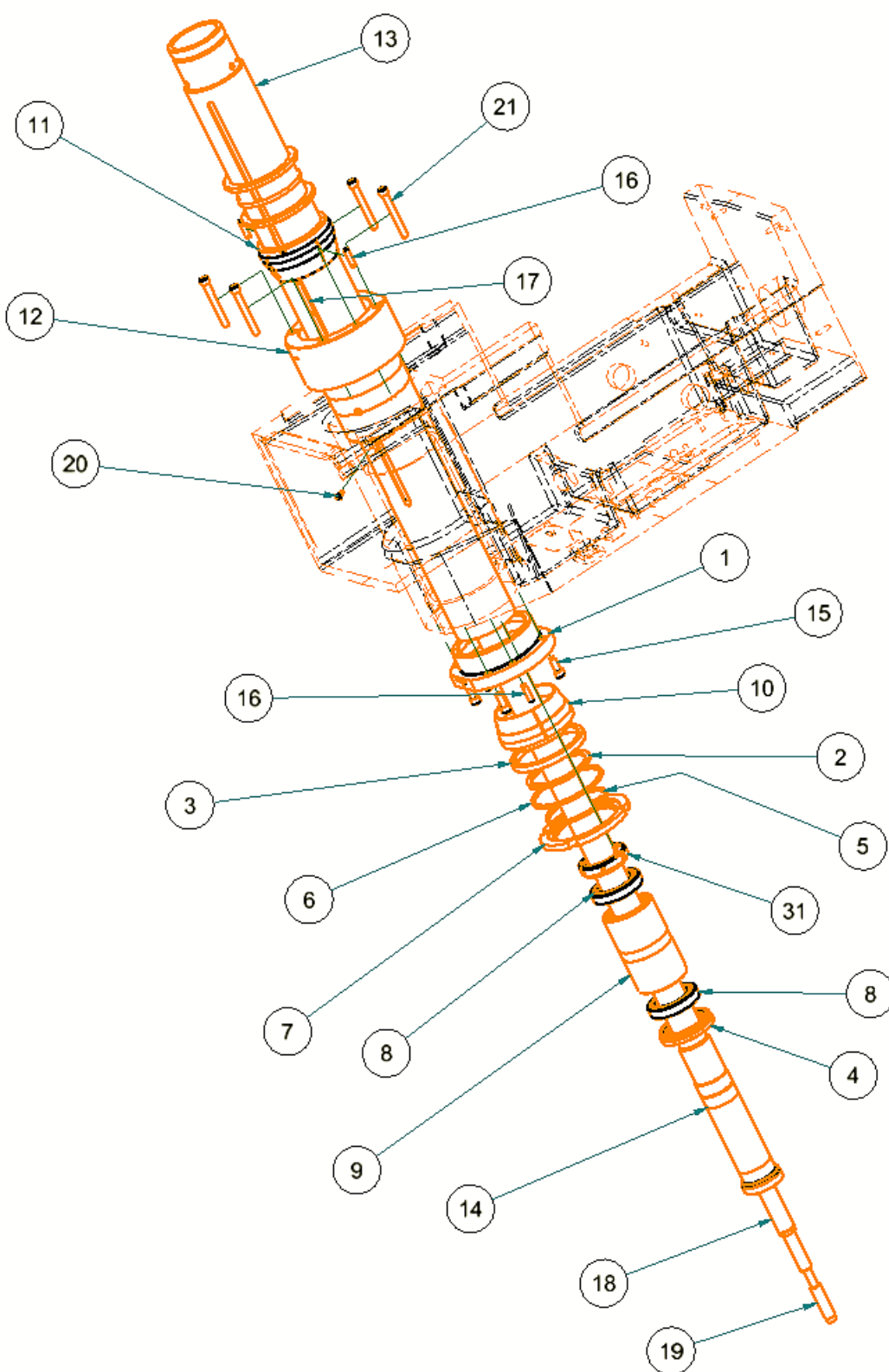


X-AXIS DRIVE END PARTS			
ITEM	PART NUMBER	DESCRIPTION	QTY
1	500-74	BEARING	1
2	6777C	LOCK NUT	1
3	7237	BEARING RETAINER	1
4	514-13-67B	MOTOR MOUNT	1
5	514-13-82A	MOTOR COUPLING	1
6	9020N	MOTOR	1
7		SOCKET HEAD CAP SCREW 5/16-18 X 2	4
8		SOCKET HEAD CAP SCREW 10-24 X 3/8	4
9	514-13-82C	COUPLING SPIDER	1
10	514-13-82D	BALLSCREW COUPLING	1

X-Axis Idle End Parts

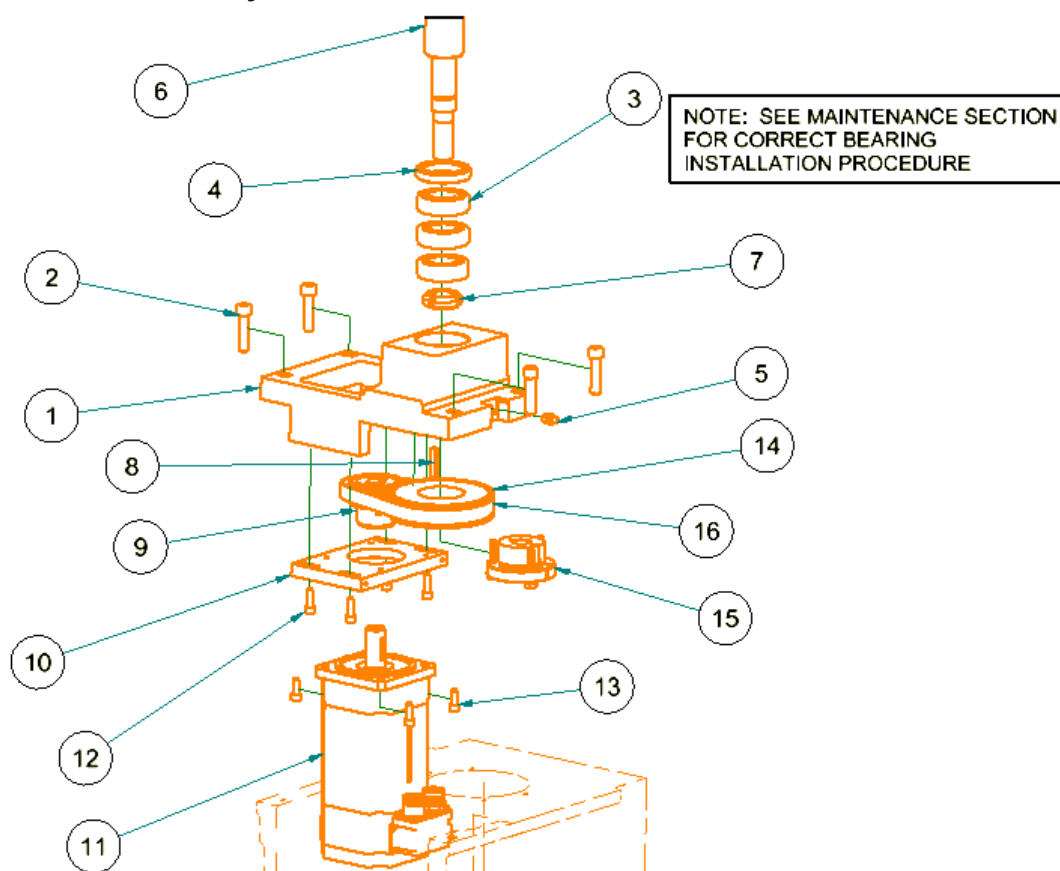
X-AXIS IDLE END PARTS			
ITEM	PART NUMBER	DESCRIPTION	QTY
1	7236B	BEARING HOUSING	1
2		SOCKET HEAD CAP SCREW 3/8-16 X 1 3/4	4
3		3/8 FLAT WASHER	4
4	6060	SNAP RING	1
5	502-35-14	PINION BEARING	1
6	514-13-67A	BALLSCREW ASSEMBLY	1

Spindle Section Type 2



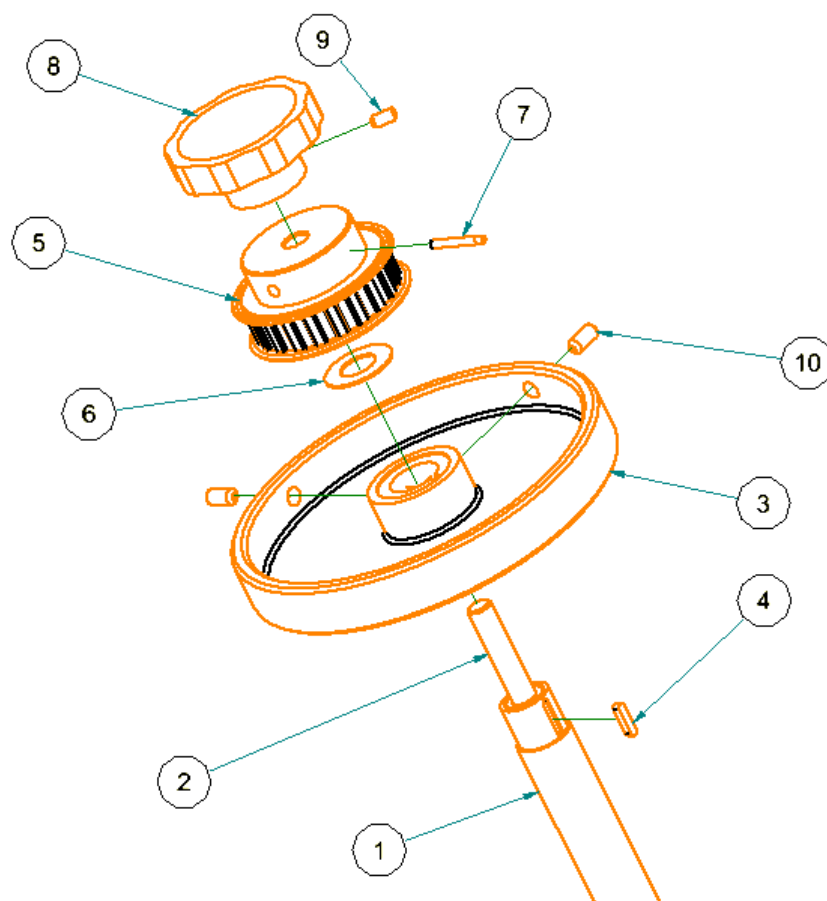
F10XS SPINDLE ASSEMBLY			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	504-34-13	LOWER BEARING CARRIER
2	1	503-12-1	FELT OILER, OUTER SPINDLE F4
3	1	504-34-7	OUTER SPINDLE NUT SPINDLE FE54X, FE5A, F5M
4	1	504-34-17K	THROWBACK RING, SPINDLE F5A, F5M, F54X
5	1	503-12-3	RING, SQUARE - WIPER AND FELT COMPRESSOR F4 AND F5 SERIES
6	1	503-12-4	RING, SQUARE (FELT COMPRESSOR) F4 AND F5 SERIES
7	1	502-35-52B	WIPER RETAINER
8	2	504-34-17L	BEARING,PRECISION- SPINDLE (SET OF 3) F10 INNER SPINDLE
9	1	504-34-17H	SPACER, OUTER - F5A, F5M, F54X SPINDLE
10	1	504-34-9b	BUSHING, LOWER, OUTER SPINDLE F54X, F5A, F5M
11	1	504-34-9C	BUSHING, UPPER, OUTER SPINDLE F54X, F5A, F5M
12	1	504-34-12B	FLANGED SLEEVE - UPPER BRG. RETAINER F54X, F5A, F5M
13	1	504-34-17F	OUTER SPINDLE F5 / F7 / F8
14	1	504-34-17E	ASSEMBLY, INNER SPINDLE F5
15	4	MF-22	5/16-18UNC x 3/4" LG. S.H.C.S.
16	4	MF-204	1/4" x 1" LG. DOWEL PIN
17	1	504-34-10	KEY, OUTER SPINDLE - SPINDLE & BASE FE54X, FE5A, F5M
18	1	504-34-27D	DRAWBAR ASSEMBLY, CUTTERHEAD F54X, F5A, F5M
19	1	504-34-35A	SHAFT, CENTERING ASSEMBLY - SPINDLE F5 SERIES
20	1	MF-86C	8-32UNC x 1/2" LG. SOCKET BUTTONHEAD SCREW
21	4	MF-27A	5/16-18UNC x 2-1/2" LG. S.H.C.S.

Vertical Drive Assembly



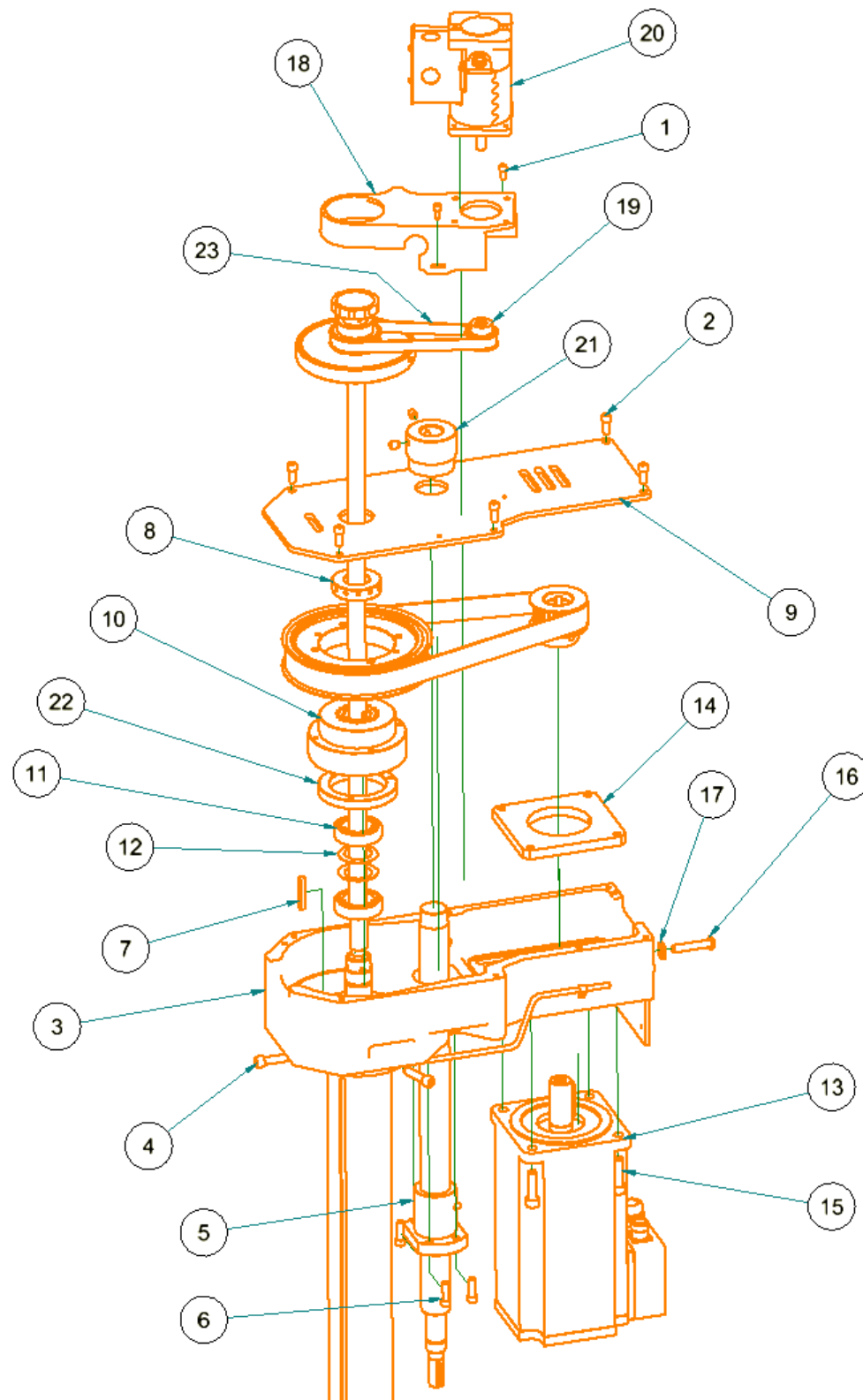
F10XS VERTICAL DRIVE ASSEMBLY			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	504-34-4D	Lower Housing Casting
2	4	MF-33	3/8-16UNC x 1-1/2" LG. S.H.C.S.
3	3	504-34-52	BEARING, ANGULAR CONTACT BALL (25 MM) F5 SERIES
4	1	504-34-15A	Bearing Retaining Nut
5	1	MF-191A	Grease Fitting 5/16-18
6	1	502-35-11A	BALLSCREW ASSY SCREW
7	1	504-34-54	Bearing Nut
8	1	502-35-7B	KEY, PINION
9	1	504-34-95B	Sprocket
10	1	504-34-6A	Motor Mount Plate, Machining
11	1	9020N	BSM80C-375AB2
12	4	MF-14	1/4-20UNC x 3/4" LG. S.H.C.S.
13	4	MF-13	1/4-20UNC x 5/8" LG. S.H.C.S.
14	1	504-34-57	Sprocket
15	1	504-34-58	BUSHING, SPROCKET- FEED DRIVEN (19MM BORE)
16	1	504-34-59	Belt, Vertical

Drawtube Assembly



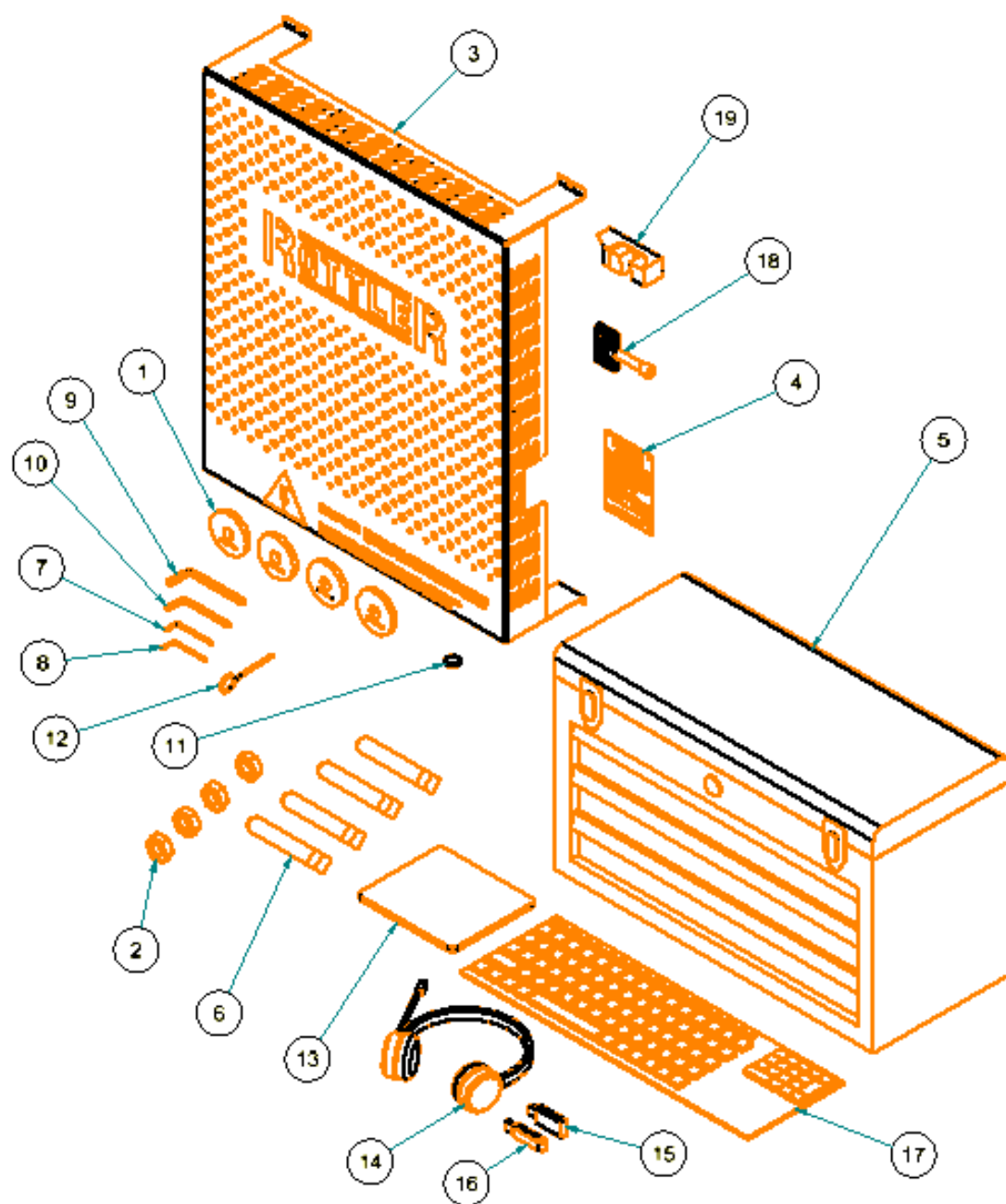
F10XS DRAWTUBE ASSEMBLY			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	504-34-27D	DRAWTUBE ASSEMBLY, CUTTERHEAD F54X, F5A, F5M
2	1	504-34-34A	SHAFT, CENTERING SPINDLE F5 SERIES
3	1	504-34-28A	HAND WHEEL, LOWER SPINDLE
4	1	504-34-79	KEY, UPPER SPINDLE KNOB
5	1	504-34-44A	Timing Belt Sprocket 20 T
6	1	100-28-35	WASHER, THRUST .59 ID X 1/32" F5 SERIES
7	1	MF-193A	1/8" x 1" LG. DOWEL PIN
8	1	504-34-49	KNOB
9	1	MF-56	10-32UNC x 3/8" LG. SOCKET SET SCREW CUP POINT
10	2	MF-60	1/4-20UNC x 1/2" LG. SOCKET SET SCREW CUP POINT

Upper Housing Driven Sprocket



F10XS UPPER HOUSING DRIVEN SPROCKET ASSEMBLY			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	2	MF-12	1/4-20UNC x 1/2" LG. S.H.C.S.
2	6	MF-22	5/16-18UNC x 3/4" LG. S.H.C.S.
3	1	504-34-1A	UPPER HOUSING (MACHINING)
4	3	MF-33	3/8-16UNC x 1-1/2" LG. S.H.C.S.
5	1	502-35-11A NUT	FELT OILER, OUTER SPINDLE F4
6	4	MF-23	5/16-18UNC x 1" LG. S.H.C.S.
7	1	504-34-21	KEY, INDEX BUSHING, UPPER HOUSING FE54X, FE52, F5M
8	1	504-34-25	Nut, Spindle Adjustment, Upper Housing
9	1	504-34-22	COVER, UPPER HOUSING (MACH.) FE54X, FE5A, F5M
10	1	504-34-19	INDEX BUSHING
11	2	504-34-46	BEARING, BALL-UPPER INNER SPINDLE F5 SERIES
12	2	504-34-73A	SPRING, BELLEVILLE PRELOAD BEARING F5 SERIES
13	1	650-5-20K	MOTOR WITH BISS ENCODER, SPINDLE DRIVE -F79A/F69A/F9A/F10A/SG80A/S7AD/S8AD
14	1	504-34-3	Motor Plate(MACHINING)
15	4	MF-39A	7/16-14UNC x 1-1/2" LG. S.H.C.S.
16	1	MF-97A	3/8-16UNC x 2" LG. SOCKET BUTTONHEAD SCREW
17	1	100-28-18	WASHER, FLAT - CLAMP ARM & WEAR PADS
18	1	504-34-24C	HOUSING, CENTERING BELT F10X, MACHINING
19	1	504-34-85C	
20	1	504-34-85B	STEP AP203
21	1	504-34-42A	STOP, BALLSCREW F54X
22	1	504-34-20	UPPER HOUSING NUT, FE54X, FE5A, F5M
23	1	504-34-72	Belt, Vertical

Toolbox



F9A/F10A/F10XS TOOL BOX ASSEMBLY			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	4	502-1-12	Leveling Pad
2	4	502-1-12F	3/4-10UNC HEX JAM NUT
3	1	514-13-23E	Drive Cover
4	1	ROTTLER NAMEPLATE	NAME PLATE
5	1	506-5	TOOL BOX
6	4	7170	3/4-10UNC x 4" LG. SQ. HEAD SET SCREW
7	1	501-72C	7/64" ALLEN WRENCH
8	1	501-72B	3/32" ALLEN WRENCH
9	1	501-72H	1/4" ALLEN WRENCH
10	1	501-72E	3/16" ALLEN WRENCH
11	1	900-2-19B	BATTERY
12	1	100-24	TOOL PULLER
13	1	650-7-2D	MOUSE PAD
14	1	650-7-2B	USB HEADSET
15	1	650-7-1V	WIRELESS ADAPTER USB 2.0
16	1	650-7-1Q	USB FLASH DRIVE
17	1	4401R	KEYBOARD
18	1	9080B	KEY, LOCKING LATCH
19	1	4050	LOCKOUT/TAGOUT UNIT

SDS

The Safety Data Sheets list shown in this section are the substances and materials that an operator is most likely to come in contact with while using this machine.

Other substances and materials are used in the manufacture, testing, and shipping of this machine. A complete list of the Safety Data Sheets of substances and materials used by Rottler Manufacturing during manufacturing, testing, and shipping is located on the Manual flash drive shipped with the machine. Safety Data Sheets are also located on the company web site: <http://www.rottlermfg.com/documentation.php>

1) Megaflow AW Hydraulic Oil

2) NAPA Lithe-Ease Grease

Safety Data Sheet

According to OSHA HCS 2012 (29 CFR 1910, 1200),
Health Canada (SOR/2015-17), and Mexico NOM-018-STPS-2015



SECTION 1: Identification

Product Identifier	Megaflow® AW HVI Hydraulic Oil 22-100
Other means of Identification	Phillips 66 Megaflow® AWHVI Hydraulic Oil 22 Phillips 66 Megaflow® AWHVI Hydraulic Oil 32 Phillips 66 Megaflow® AWHVI Hydraulic Oil 46 Phillips 66 Megaflow® AWHVI Hydraulic Oil 68 Phillips 66 Megaflow® AWHVI Hydraulic Oil 100
Code	LBPH814633
Relevant identified uses	Hydraulic Fluid
Uses advised against	All others
24 Hour Emergency Phone Number	CHEMTREC 1-800-424-9300 CHEMTREC Mexico 01-800-681-9531

Manufacturer/Supplier	SDS Information	Customer Service
Phillips 66 Lubricants	URL: www.Phillips.com	U.S. 800-368-7128
P.O. Box 4428	Phone: 800-762-0942	International: 1-832-765-2500
Houston, TX 77210	Email: SDS@P66.com	Technical Information
		1-877-445-9198

SECTION 2: Hazard Identification

Classified Hazards	Hazards Not Otherwise Classified (HNOC)
No classified hazards	PHNOC: None known HHNOC: None known

Label Elements
No classified hazards

SECTION 3: Composition/Information on Ingredients

Chemical Name	CASRN	Concentration ¹
Distillates, petroleum, hydrotreated heavy paraffinic	64742-54-7	<100
Distillates, petroleum, hydrotreated light paraffinic	64742-55-8	<30

¹All concentrations are percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume

SECTION 4: First Aid Measures

Eye Contact: If irritation or redness develops from exposure, flush eyes with clean water. If symptoms persist, seek medical attention.

Skin Contact: Remove contaminated shoes and clothing and cleanse the affected area(s) thoroughly by washing with mild soap and water or a waterless hand cleaner. If irritation or redness develops and persists, seek medical attention. If product is injected into or under the skin, or into any part of the body, regardless of the appearance of the wound or its size, the individual should be evaluated immediately by a physician. (see Note to Physician).

Inhalation: First aid is not normally required. If breathing difficulties develop, move victim away from the source of exposure and into fresh air in a position comfortable for breathing. Seek immediate medical attention.

Ingestion: First aid is not normally required; however, if swallowed and symptoms develop, seek medical attention.

Most important symptoms and effects, both acute and delayed: Inhalation of oil mists or vapors generated at elevated temperatures may cause respiratory irritation. Accidental ingestion can result in minor irritation of the digestive tract, nausea, and diarrhea. Prolonged or repeated contact may dry skin and cause irritation.

Notes to Physician: Acute aspirations of large amounts of oil-laden material may produce a serious aspiration pneumonia. Patients who aspirate these oils should be followed for the development of long-term sequelae. Inhalation exposure to oil mists below current workplace exposure limits is unlikely to cause pulmonary abnormalities. When using high-pressure equipment, injection of product under the skin can occur. In this case, the casualty should be sent immediately to the hospital. Do not wait for symptoms to develop. High-pressure hydrocarbon injection injuries may produce substantial necrosis of underlying tissue despite an innocuous appearing external wound. These injuries often require extensive emergency surgical debridement and all injuries should be evaluated by a specialist in order to assess the extent of injury. Early surgical treatment within the first few hours may significantly reduce the ultimate extent of injury.

SECTION 5: Firefighting Measures

NFPA 704 Hazard Class

Health: 0 **Flammability:** 1 **Instability:** 00 (Minimal)



- 1 (Slight)
- 2 (Moderate)
- 3 (Serious)
- 4 (Severe)

Extinguishing Media: Dry chemical, carbon dioxide, foam, or water spray is recommended. Water or foam may cause frothing of materials above 212°F/100°C. Carbon dioxide can displace oxygen. Use caution when applying carbon dioxide in confined spaces. Simultaneous use of foam and water on the same surface is to be avoided as water destroys the foam.

Specific Hazards arising from the chemical

Unusual Fire & Explosion Hazards: This material may burn but will not ignite readily. If container is not properly cooled, it can rupture in the heat of a fire.

Hazardous Combustion Products: Combustion may yield smoke, carbon monoxide, and other products of incomplete combustion. Oxides of sulfur, nitrogen, or phosphorus may also be formed.

Special protective actions for fire-fighters: For fires beyond the initial stage, emergency responders in the immediate hazard area should wear protective clothing. When the potential chemical hazard is unknown, in enclosed or confined spaces, a self-contained breathing apparatus should be worn. In addition, wear other appropriate protective equipment as conditions warrant (see Section 8). Isolate the hazard area and deny entry to unnecessary and unprotected personnel. Stop spill/release if it can be done safely. Move undamaged containers from immediate hazard area if it can be done safely. Water spray may be useful in minimizing or dispersing vapors and to protect personnel. Cool equipment exposed to fire with water if it can be done safely. Avoid spreading burning liquid with water used for cooling purposes.

See Section 9 for Flammable Properties including Flash Point and Flammable (Explosive) Limits

SECTION 6: Accidental Release Measures

Personal precautions, protective equipment, and emergency procedures: This material may burn but will not ignite readily. Keep all sources of ignition away from spill/release. Stay upwind and away from spill/release. Avoid direct contact with material. For large spillages, notify persons down-wind of the spill/release, isolate immediate hazard area and keep unauthorized personnel out. Wear appropriate protective equipment, including respiratory protection, as conditions warrant (see Section 8). See Sections 2 and 7 for additional information on hazards and precautionary measures.

Environmental Precautions: Stop and contain spill/release if it can be done safely. Prevent spilled material from entering sewers, storm drains, or unauthorized drainage systems and natural waterways. Use water sparingly to minimize environmental contamination and reduce disposal requirements. If spill occurs on water, notify appropriate authorities, and advise shipping of any hazard. Spills into or upon navigable waters, in the contiguous zone, or adjoining shorelines that cause a sheen or discoloration on the surface of the water, may require notification of the National Response Center (phone number 800-424-8802)

Methods and Material for Containment and Cleaning Up: Notify relevant authorities in accordance with all applicable regulations. Immediate cleanup of any spill is recommended. Dike far ahead of spill for later recovery or disposal. Absorb spill with inert material such as sand or vermiculite, and place in suitable container for disposal. If spilled on water, remove with appropriate methods (e.g. skimming, booms, or absorbents). In case of soil contamination, remove contaminated soil for remediation or disposal, in accordance with local regulations.

Recommended measures are based on the most likely spillage scenarios for this material; however local conditions and regulations may influence or limit the choice of appropriate actions to be taken. See Section 13 on appropriate disposal.

SECTION 7: Handling and Storage

Precautions for Safe Handling: Keep away from flames and hot surfaces. Wash thoroughly after handling. Use good personal hygiene practices and wear appropriate personal protective equipment (see Section 8). Spills will produce very slippery surfaces. High pressure injection of hydrocarbon fuels, hydraulic oils, or greases under the skin may have serious consequences, even though no symptoms or injury may be apparent. This can happen accidentally when using high pressure equipment such as high pressure grease guns, fuel injection apparatus, or from pinhole leaks in tubing of high pressure hydraulic oil equipment.

Do not enter confined spaces such as tanks or pits without following proper entry procedures such as ASTM D-4276 and 29CFR 1910.146. Do not wear contaminated clothing or shoes.

Conditions for Safe Storage: Use and store this material in cool, dry, well-ventilated area away from heat and all sources of ignition. Keep container(s) tightly closed and properly labeled. Store only in approved containers. Keep away from any incompatible material (see Section 10). Protect container(s) against physical damage.

"Empty" containers retain residue and may be dangerous. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose such containers to head, flame, sparks, or other sources of ignition. They may explode and cause injury or death. "Empty" drums should be completely drained, properly bunged, and promptly shipped to the supplier or a drum reconditioner. All containers should be disposed of in an environmentally safe manner and in accordance with governmental regulations. Before working on or in tanks which contain or have contained this material, refer to OSHA regulations, ANSI Z49.1, and other references pertaining to cleaning, repairing, welding, or other contemplated operations.

SECTION 8: Exposure Controls/Personal Protection

Occupational Exposure Limits				
Chemical Name	ACGIH	OSHA	Mexico	Phillips 66
Distillates, petroleum, hydrotreated heavy paraffinic	TWA: 5mg/m ³ STEL: 10mg/m ³ As Oil Mist, if generated	—	—	—
Distillates, petroleum, hydrotreated heavy paraffinic	TWA: 5mg/m ³ STEL: 10mg/m ³ As Oil Mist, if generated	—	—	—

Note: State, local, or other agencies or advisory groups may have established more stringent limits. Consult an industrial hygienist or similar professional, or your local agencies, for further information.

Biological Occupational Exposure Limits: This Product, as supplied, does not contain any hazardous materials with biological limits established by the region specific regulatory bodies.

Engineering Controls: If current ventilation practices are not adequate to maintain airborne concentrations below the established exposure limits, additional engineering controls may be required.

Eye/Face Protection: The use of eye/face protection is not normally required; however, good industrial hygiene practice suggests the use of eye protection that meets or exceeds ANSI Z.87.1 whenever working with chemicals.

Skin/Hand Protection: The use of skin protection is not normally required; however, good industrial hygiene practice suggests the use of gloves or other appropriate skin protection whenever working with chemicals. Suggested protective materials: Nitrile

Respiratory Protection: Where there is potential for airborne exposure above the exposure limit a NIOSH certified air purifying respirator equipped with R or P95 filters may be used.

A respiratory protection program that meets or is equivalent to OSHA 29 CFR 1910.134 and ANSI Z88.2 should be followed whenever workplace conditions warrant a respirator's use. Air purifying respirators provide limited protection and cannot be used in atmospheres that exceed the maximum use concentration (as directed by regulation or the manufacturer's instructions), in oxygen deficient (less than 19.5 percent oxygen) situations, or under conditions that are immediately dangerous to life and health (IDLH).

Suggestions provided in this section for exposure control and specific types of protective equipment are based on readily available information. Users should consult with the specific manufacturer to confirm the performance of their protective equipment. Specific situations may require consultation with industrial hygiene, safety, or engineering professionals.

SECTION 9: Physical and Chemical Properties

Note: Unless otherwise stated, values are determined at 20°C (68°F) and 760 mmHg (1 atm). Data represent typical values and are not intended to be specifications.

Appearance: Amber, Transparent

Physical Form: Liquid

Odor: Petroleum

Odor Threshold: No Data

pH: Not Applicable

Vapor Density (air=1): >1

Upper Explosive Limits (vol % in air): No Data

Lower Explosive Limits (vol % in air): No Data

Evaporation Rate (nBuAc=1): No Data

Particle Size: Not Applicable

Percent Volatile: Negligible

Flammability (solid, gas): Not Applicable

Solubility in Water: Negligible

Flash Point: >284°F / >140°C

Test Method: Pensky-Martens Closed Cup (PMCC), ASTM D93, EPA1010

Initial Boiling Point/Range: No Data

Vapor Pressure: <1mmHg

Partition Coefficient (n-octanol/water)(Know): No Data

Melting/Freezing Point: < -31°F/-35°C

Auto-ignition Temperature: No Data

Decomposition Temperature: No Data

Specific Gravity (water=1): 0.86-0.88 @ 60°F (15.6°C)

Bulk Density: 7.14-7.32 lbs/gal

Viscosity: 4-14 cSt @ 100°C; 22-108 cSt @ 40°C

Pour Point: < -31°F/-35°C

SECTION 10: Stability and Reactivity

Reactivity: Not chemically reactive.

Chemical Stability: Stable under normal ambient and anticipated conditions of use.

Possibility of Hazardous Reactions: Hazardous reactions not anticipated.

Conditions to Avoid: Extended exposure to high temperatures can cause decomposition. Avoid all possible sources of ignition.

Incompatible Materials: Avoid contact with strong oxidizing agents and strong reducing agents.

Hazardous Decomposition Products: Not anticipated under normal conditions of use.

SECTION 11: Toxicological Information

Information on Toxicological Effects Substance/Mixture

Acute Toxicity	Hazard	Additional Information	LC50/LD50 Data
Inhalation	Unlikely to be Harmful		>5 mg/L (mist, estimated)
Dermal	Unlikely to be Harmful		>2 g/kg (estimated)
Oral	Unlikely to be Harmful		>5 g/kg (estimated)

Aspiration Hazard: Not expected to be an aspiration hazard.

Skin Corrosion/Irritation: Not expected to be irritating. Repeated Exposure may cause skin dryness or cracking

Serious Eye Damage/Irritation: Not expected to be irritating.

Skin Sensitization: No information available on the mixture, however none of the components have been classified for skin sensitization (or are below the concentration threshold for classification).

Respiratory Sensitization: No information available.

Specific Target Organ Toxicity (Single Exposure): No information available on the mixture, however none of the components have been classified for target organ toxicity (or are below the concentration threshold for classification).

Specific Target Organ Toxicity (Repeated Exposure): No information available on the mixture, however none of the components have been classified for target organ toxicity (or are below the concentration threshold for classification).

Germ Cell Mutagenicity: No information available on the mixture, however none of the components have been classified for target organ toxicity (or are below the concentration threshold for classification).

Reproductive Toxicity: No information available on the mixture, however none of the components have been classified for target organ toxicity (or are below the concentration threshold for classification).

Information on Toxicological Effects of Components

Lubricant Base Oil (Petroleum)

Carcinogenicity: The petroleum base oils contained in this product have been highly refined by a variety of processes including severe hydrocracking/hydroprocessing to reduce aromatics and improve performance characteristics. All of the oils meet the IP-346 criteria of 3 percent PAH's and are not considered carcinogens by NTP, IARC, or OSHA.

SECTION 12: Ecological Information

GHS Classification:

No classified hazards

Toxicity: All acute aquatic toxicity studies on samples of lubricant base oils show acute toxicity values greater than 100 mg/L for invertebrates, algae, and fish. These tests were carried out on water accommodated fractions and the results are consistent with the predicted aquatic toxicity of these substances based on the hydrocarbon compositions.

Persistence and Degradability: The hydrocarbons in this material are not readily biodegradable, but since they can be degraded by microorganisms, they are regarded as inherently biodegradable.

Bioaccumulative Potential: Log K_{ow} values measured for the hydrocarbon components of this material are greater than 5.3, and therefore regarded as having the potential to bioaccumulate. In practice, metabolic processes may reduce bioconcentration.

Mobility in Soil: Volatilization to air is not expected to be a significant fate process due to the low vapor pressure of this material. In water, base oils will float and spread over the surface at a rate dependent upon viscosity. There will be significant removal of hydrocarbons from the water by sediment absorption. In soil and sediment, hydrocarbon components will show low mobility with absorption to sediments being the predominant physical process. The main fate process is expected to be slow biodegradation of the hydrocarbon constituents in soil and sediment.

Other Adverse Effects: None anticipated.

SECTION 13: Disposal Considerations

The generator of a waste is always responsible for making proper hazardous waste determinations and needs to consider state and local requirements in addition to federal regulations. This material, if discarded as produced, would not be a federally regulated RCRA "listed" hazardous waste and is not believed to exhibit characteristics of hazardous waste. See Sections 7 and 8 for information on handling, storage and personal protection and Section 9 for physical/chemical properties. It is possible that the material as produced contains constituents which are not required to be listed in the SDS but could affect the hazardous waste determination. Additionally, use which results in chemical or physical change of this material could subject it to regulation as a hazardous waste. This material under most intended uses would become "Used Oil" due to contamination by physical or chemical impurities. Whenever possible, Recycle used oil in accordance with applicable federal and state or local regulations. Container contents should be completely used, and containers should be emptied prior to discard.

SECTION 14: Transport Information

U.S. Department of Transportation (DOT)

UN Number: Not regulated

UN proper shipping name: None

Transport Hazard Class(es): None

Packing Group: None

Environmental Hazards: This product does not meet the DOT/UN/IMDG/IMO criteria of a marine pollutant

Special Precautions for User: If shipped by land in a packaging having a capacity of 3,500 gal or more, the provisions of 49 CFR,

Part 130 apply. (Contains oil)

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code: Not Applicable

SECTION 15: Regulatory Information

CERCLA/SARA – Section 302 Extremely Hazardous Substances and TPQs (in pounds)

This material does not contain any chemicals subject to the reporting requirements of SARA 302 and 40 CFR 372.

CERCLA/SARA – Section 311/312 (Title III Hazard Categories)

Should this product meet EPCRA 311/312 Tier reporting criteria at 40 CFR 370, refer to Section 2 of this SDS for appropriate classifications.

CERCLA/SARA – Section 313 and 40 CFR 372

This material does not contain any chemicals subject to the reporting requirements of SARA 313 and 40 CFR 372

EPA (CERCLA) Reportable Quantity (in pounds)

This material does not contain any chemicals with CERCLA Reportable Quantities

California Proposition 65

This material does not contain any chemicals which are know to the State of California to cause cancer, birth defects, or other reproductive harm at concentration that trigger the warning requirements of California Proposition 65.

International Inventories

All components are either listed on the US TSCA Inventory, or are not regulated under TSCA.

All components are either on the DSL, or are exempt from DSL listing requirements.

SECTION 16: Other Information

Issue Date:	Previous Issue Date:	SDS Number:	Status:
07-Sep-2017	23-Jun-2016	LBP814633	FINAL

Revised Section or Basis for Revision:

Format change.

Legend (pursuant to NOM-018-STPS-2015):

The information within is considered correct but is not exhaustive and will be used for guidance only, which is based on the current knowledge of the substance or mixture and is applicable to the appropriate safety precautions for the product.

Guide to Abbreviations:

ACGIH = American Conference of Governmental Industrial Hygienists; CASRN = Chemical Abstracts Service Registry Number; CEILING = Ceiling Limit (15 minutes); CERCLA = The Comprehensive Environmental Response, Compensation, and Liability Act; EPA = Environmental Protection Agency; GHS = Globally Harmonized System; HPR = Hazardous Products Regulations; IARC = International Agency for Research on Cancer; INSHT = National Institute for Health and Safety at Work; IOPC = International Oil Pollution Compensation; LEL = Lower Explosive Limit; NE = Not Established; NFPA = National Fire Protection Association; NTP = National Toxicology Program; OSHA = Occupational Safety and Health Administration; PEL = Permissible Exposure Limit (OSHA); SARA = Superfund Amendments and Reauthorization Act; STEL = Short Term Exposure Limit (15 minutes); TLV = Threshold Limit Value (ACGIH); TWA = Time Weighted Average (8 hours); UEL = Upper Explosive Limit; WHMIS = Worker Hazardous Materials Information System (Canada)

Disclaimer of Expressed and Implied Warranties:

The information presented in this Safety Data Sheet is based on data believed to be accurate as of the date this Safety Data Sheet was prepared.

HOWEVER, NO WARRANTY OF MERCHANTABILITY, FITNESS FOR ANY PARTICULAR PURPOSE, OR ANY OTHER WARRANTY IS EXPRESSED OR IS TO BE IMPLIED REGARDING THE ACCURACY OR COMPLETENESS OF THE INFORMATION PROVIDED ABOVE, THE RESULTS TO BE OBTAINED FROM THE USE OF THIS INFORMATION OR THE PRODUCT, THE SAFETY OF THIS PRODUCT, OR THE HAZARDS RELATED TO ITS USE. No responsibility is assumed for any damage or injury resulting from abnormal use or from any failure to adhere to recommended practices. The information provided above, and the product, are furnished on the condition that the person receiving them shall make their own determination as to the suitability of the product for their particular purpose and on the condition that they assume the risk of their use. In addition, no authorization is given nor implied to practice any patented invention without a license.



SAFETY DATA SHEET

1. Identification

Product Identifier NAPA® White Lithium Grease

Other Means of Identification

Product Code No. 095037 (Item# 1008003)

Recommended Use Lubricating grease

Recommended Restrictions None known

Manufacturer/Importer/Supplier/Distributor Information

Manufactured or Sold by:

Company Name CRC Industries, Inc.

Address 885 Louis Dr.
Warminster, PA 18974 USA

Telephone

General Information 215-674-4300

Technical Assistance 800-251-3168

Customer Service 800-272-4620

24-Hour Emergency 800-424-9300 (US)

(CHEMTREC) 703-527-3887 (International)

Website www.crcindustries.com

2. Hazard(s) Identification

Physical Hazards	Flammable aerosols	Category 1
	Gasses under pressure	Liquefied gas
Health Hazards	Skin corrosion/irritation	Category 2
	Serious eye damage/eye irritation	Category 2B
	Reproductive Toxicity (fertility)	Category 2
	Specific target organ toxicity, single exposure	Category 3 narcotic effects
	Aspiration hazard	Category 1
Environmental Hazards	Hazardous to the aquatic environment, acute hazard	Category 2
	Hazardous to the aquatic environment, long-term hazard	Category 2
OSHA Defined Hazards	Not classified	

Label Elements



Signal Word

Danger

Hazard Statement Extremely flammable aerosol. Contains gas under pressure; may explode if heated. May be fatal if swallowed and enters airways. Causes skin irritation. Causes eye irritation. May cause drowsiness or dizziness. Suspected of damaging fertility. Toxic to aquatic life with long lasting effects.

Precautionary Statement

Prevention Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Keep away from heat/sparks/open flames/hot surfaces. No smoking. Do not spray on an open flame or other ignition source. Pressurized container. Do not pierce or burn, even after use. Do not apply while equipment is energized. Extinguish all flames, pilot lights and heaters. Vapors will accumulate readily and may ignite. Use only with adequate ventilation; maintain ventilation during use and until all vapors are gone. Open doors and windows or use other means to ensure a fresh air supply during use and while product is drying. If you experience any symptoms listed on this label, increase ventilation, or leave the area. Avoid breathing mist or vapor. Wash thoroughly after handling. Wear protective gloves/protective clothing/eye protection/face protection. Avoid release to the environment.

Response If swallowed; immediately call a poison center/doctor. DO NOT induce vomiting. If on skin; wash with plenty of water. If skin irritation occurs; get medical advice/attention. Take off contaminated clothing and wash before reuse. If inhaled; remove person to fresh air and keep comfortable for breathing. Call a poison center/doctor if you feel unwell. If in eyes; rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists; get medical advice/attention. If exposed or concerned; get medical advice/attention. Collect spillage

Storage Store in a well-ventilated place. Store locked up. Protect from sunlight. Do not expose to temperatures exceeding 50°C/122°F. Exposure to high temperature may cause can to burst.

Disposal Dispose of contents/container in accordance with local/regional/national regulations

Hazard(s) not otherwise classified Static accumulating flammable liquid can become electrostatically charged even in bonded and grounded equipment. Sparks may ignite liquid and vapor. May cause flash fire or explosion.

3. Composition/Information on Ingredients

Mixtures

Chemical Name	Common name and Synonyms	CAS Number	%
Liquefied petroleum gas		68476-86-8	30-40
2-methylpentane		107-83-5	20-30
Distillates (petroleum), hydrotreated heavy naphthenic		64742-52-5	10-20
Naphtha (petroleum), hydrotreated light		64742-49-0	10-20
n-hexane		110-54-3	3-5
Zinc oxide		1314-13-2	<1
2,2-dimethylbutane		75-83-2	<0.3
2,3-dimethylbutane		79-29-8	<0.3
3-methylpentane		96-14-0	<0.3
Calcium bis (dinonylnaphthalenesulphonate)		57855-77-3	<0.3

Specific chemical identity and/or percentage of composition has been withheld as a trade secret.

4. First-aid Measures

Inhalation Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or doctor/physician if you feel unwell

Skin Contact Remove contaminated clothing. Wash with plenty of soap and water. If skin irritation occurs: Get medical advice/attention. Wash contaminated clothing before reuse.

Eye Contact	Immediately flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical advice/attention.
Ingestion	Call a physician or poison control center immediately. Rinse mouth. Do not induce vomiting. If vomiting occurs, keep head low so that stomach content does not get into the lungs.
Most Important symptoms/effects, acute and delayed	Aspiration may cause pulmonary edema and pneumonitis. May cause drowsiness and dizziness. Headache. Nausea, vomiting. Irritation of eyes. Exposed individuals may experience eye tearing, redness, and discomfort. Skin irritation. May cause redness and pain.
Indication of Immediate Medical attention and special treatment needed	Provide general supportive measures and treat symptomatically. Keep victim under observation. Symptoms may be delayed.
General Information	IF exposed or concerned: Get medical advice/attention. Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves. Show this safety data sheet to the doctor in attendance.

5. Fire-fighting Measures

Suitable Extinguishing Media	Water fog. Foam. Carbon dioxide (CO ₂). Dry chemical powder, carbon dioxide, sand or earth may be used for small fires only.
Unsuitable Extinguishable Media	Do not use water jet as an extinguisher, as this will spread the fire.
Specific hazards arising from the chemical	Contents under pressure. Pressurized container may rupture when exposed to heat or flame. This product is a poor conductor of electricity and can become electrostatically charged. If sufficient charge is accumulated, ignition of flammable mixtures can occur. Static electricity accumulation may be significantly increased by the presence of small quantities of water or other contaminants. Material will float and may ignite on surface of water. During fire, gases hazardous to health may be formed.
Special protective equipment and precautions for firefighters	Firefighters must use standard protective equipment including flame retardant coat, helmet with face shield, gloves, rubber boots, and in enclosed spaces, SCBA.
Fire-fighting Equipment/Instructions	In case of fire: Stop leak if safe to do so. Move containers from fire area if you can do so without risk. Containers should be cooled with water to prevent vapor pressure build up.
General Fire Hazards	Extremely flammable aerosol. Contents under pressure. Pressurized container may rupture when exposed to heat or flame.

6. Accidental Release Measures

Personal precautions, protective equipment, and emergency procedures	Keep unnecessary personnel away. Keep people away from and upwind of spill/leak. Remove all possible sources of ignition in the surrounding area. Keep out of low areas. Many gases are heavier than air and will spread along ground and collect in low or confined areas (sewers, basements, tanks). Wear appropriate protective equipment and clothing during clean-up. Avoid breathing mist or vapor. Emergency personnel need self-contained breathing equipment. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Ventilate closed spaces before entering them. Use appropriate containment to avoid environmental contamination. Local authorities should be advised if significant spillages cannot be contained. For personal protection, see Section 8 of the SDS.
Methods and materials for containment and cleaning up	Eliminate all ignition sources (no smoking, flares, sparks, or flames in immediate area). Keep combustibles (wood, paper, oil, etc.) away from spilled material. The product is immiscible with water and will spread on the water surface. Prevent product from entering drains. Stop the flow of material if this is without risk. Wipe up with absorbent material (e.g. cloth, fleece). Clean surface thoroughly to remove residual contamination. For waste disposal, see Section 13 of the SDS.
Environmental precautions	Avoid release to the environment. Inform appropriate managerial or supervisory personnel of all environmental releases. Prevent further leakage or spillage if safe to do so. Avoid discharge into drains, water courses, or onto the ground. Use appropriate containment to avoid environmental contamination.

7. Handling and Storage

Precautions for safe handling

Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Minimize fire risks from flammable and combustible materials (including combustible dust and static accumulating liquids) or dangerous reactions with incompatible materials. Pressurized container: Do not pierce or burn, even after use. Do not use if spray button is missing or defective. Do not spray on a naked flame or any other incandescent material. Do not smoke while using or until sprayed surface is thoroughly dry. Do not cut, weld, solder, drill, grind, or expose containers to heat, flame, sparks, or other sources of ignition. Use caution around energized equipment. The metal container will conduct electricity if it contacts a live source. This may result in injury to the user from electrical shock and/or flash fire. Protect containers from physical damage; do not drag, roll, slide, or drop. When moving containers, even for short distances, use a cart (trolley, hand truck, etc.) designed to transport containers. Avoid breathing mist or vapor. Avoid contact with eyes, skin, and clothing. Avoid prolonged exposure. Pregnant or breastfeeding women must not handle this product. Should be handled in closed systems, if possible. Use only in well-ventilated areas. Wear appropriate personal protective equipment. Wash hands thoroughly after handling. Avoid release to the environment. Observe good industrial hygiene practices. For product usage instructions, see the product label.

Conditions for safe storage, including any incompatibilities

Level 3 Aerosol.

Pressurized container. Protect from sunlight and do not expose to temperatures exceeding 50°C/122 °F. Do not puncture, incinerate or crush. Do not handle or store near an open flame, heat, or other sources of ignition. This material can accumulate static charge which may cause spark and become an ignition source. Avoid spark promoters. These alone may be insufficient to remove static electricity. Store in a well-ventilated place. Store away from incompatible materials (see Section 10 of the SDS).

8. Exposure Controls/Personal Protection

Occupational Exposure Limits

The following constituents are the only constituents of the product which have a PEL, TLV or other recommended exposure limit. At this time, the other constituents have no known exposure limits.

US OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)			
Components	Type	Value	Form
Distillates (petroleum), hydrotreated heavy naphthenic (CAS 64742-52-5)	PEL	5 mg/m3	Mist.
Naphtha (petroleum), hydrotreated light (CAS 64742-49-0)	PEL	2000 mg/m3 500 ppm 400 mg/m3	
n-hexane (CAS 110-54-3)	PEL	100 ppm 1800 mg/m3 500 ppm	
Zinc oxide (CAS 1314-13-2)	PEL	5 mg/m3 5 mg/m3 15 mg/m3	Respirable fraction Fume Total dust
US ACGIH Threshold Limit Values			
Components	Type	Value	Form
2,2-dimethylbutane (CAS 75-83-2)	STEL	1000 ppm	
2,3-dimethylbutane (CAS 72-29-8)	TWA STEL	500 ppm 1000 ppm	
2-methylpentane (CAS 107-83-5)	TWA STEL	500 ppm 1000 ppm	
3-methylpentane (CAS 96-14-0)	TWA STEL	500 ppm 1000 ppm	

Distillates (petroleum), hydrotreated heavy naphthenic (CAS 64742-52-5)	TWA	500 ppm	Inhalable fraction
n-hexane (CAS 110-54-3)	TWA	5 mg/m3	
Zinc oxide (CAS 1314-13-2)	STEL	10 mg/m3	Respirable fraction
	TWA	2 mg/m3	Respirable fraction
US NIOSH: Pocket Guide to Chemical Hazards			
Components	Type	Value	Form
2,2-dimethylbutane (CAS 75-83-2)	Ceiling	1800 mg/m3	
	TWA	510 ppm	
		350 mg/m3 100 ppm	
2,3-dimethylbutane (CAS 79-29-8)	Ceiling	1800 mg/m3	
	TWA	510 ppm	
		350 mg/m3 100 ppm	
2-methylpentane (CAS 107-83-5)	Ceiling	1800 mg/m3	
	TWA	510 ppm	
		350 mg/m3 100 ppm	
3-methylpentane (CAS 96-14-0)	Ceiling	1800 mg/m3	
	TWA	510 ppm	
		350 mg/m3 100 ppm	
Distillates (petroleum), hydrotreated heavy naphthenic (CAS 64742-52-5)	Ceiling	1800 mg/m3	Mist
	STEL	10 mg/m3	
	TWA	5 mg/m3	
Naphtha (petroleum), hydrotreated light (CAS 64742-49-0)	TWA	400 mg/m3	
n-hexane (CAS 110-54-3)	TWA	100 ppm	
		180 mg/m3	
		50 ppm	
Zinc oxide (CAS 1314-13-2)	Ceiling	15 mg/m3	Dust
	STEL	10 mg/m3	Fume
	TWA	5 mg/m3	Fume
		5 mg/m3	Dust

Biological Limit Values

ACGIH Biological Exposure Indices				
Components	Value	Determinant	Specimen	Sampling Time
n-hexane (CAS 110-54-3)	0.4 mg/L	2,5-Hexanedio n, without hydrolysis	Urine	*

* For sampling details, please see the source document.

Exposure Guidelines

US – California OELs: Skin Designation

n-hexane (CAS 110-54-3)

Can be absorbed through skin.

US ACGIH Threshold Limit Values: Skin Designation

n-hexane (CAS 110-54-3)

Can be absorbed through skin.

Appropriate Engineering Controls

Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If Exposure limits have not been established, maintain airborne levels to an acceptable level. Provide eyewash station. Eyewash fountain and emergency showers are recommended.

Individual protection measures, such as personal protective equipment

Eye/face Protection	Wear safety glasses with side shields (or goggles).
Skin Protection	
Hand Protection	Wear protective gloves such as: Nitrile, Polyvinyl chloride (PVC), Viton/butyl.
Other	Wear appropriate chemical resistant clothing.
Respiratory Protection	If engineering controls are not feasible or if exposure exceeds the applicable exposure limits, use a NIOSH-approved cartridge respirator with an organic vapor cartridge. Use a self-contained breathing apparatus in confined spaces and for emergencies. Air monitoring is needed to determine actual employee exposure levels.
Thermal Hazards	Wear appropriate thermal protective clothing when necessary.
General Hygiene Considerations	Observe any medical surveillance requirements. When using, do not smoke. Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants

9. Physical and Chemical Properties

Appearance

Physical State	Liquid
Form	Aerosol. Grease.
Color	Off-white
Odor	Solvent
Odor Threshold	Not available
pH	Not available
Melting point/freezing point	-244.7°F (-153.7°C) estimated
Initial boiling point and boiling range	118.4°F (48°C) estimated
Flash Point	< 0°F (-17.8°C) Tag Closed Cup
Evaporation Rate	Fast
Flammability (solid, gas)	Not available
Upper/lower Flammability or explosive limits	
Flammability limit – lower (%)	1% estimated
Flammability limit – upper (%)	8% estimated
Vapor Pressure	2377.8 hPa estimated
Vapor Density	> 1 (air=1)
Relative Density	0.64 estimated
Solubility (water)	Insoluble
Partition Coefficient (n-octanol/water)	Not available
Auto-ignition Temperature	437°F (225°C) estimated
Decomposition Temperature	Not available
Viscosity (kinematic)	Not available
Percent Volatile	98.4% estimated

10. Stability and Reactivity

Reactivity	The product is stable and non-reactive under normal conditions of use, storage, and transport.
Chemical Stability	Material is stable under normal conditions.
Possibility of hazardous reactions	No dangerous reaction known under conditions of normal use.
Conditions to avoid	Heat, flames, and sparks. Contact with incompatible materials.
Incompatible materials	Strong oxidizing agents.
Hazardous decomposition products	No hazardous decomposition products are known.

11. Toxicological Information

Information on likely routes of exposure

Inhalation	May cause drowsiness and dizziness. Headache. Nausea, vomiting. Prolonged inhalation may be harmful.
Skin Contact	Causes skin irritation.
Eye Contact	Causes eye irritation.
Ingestion	Droplets of the product aspirated into the lungs through ingestions or vomiting may cause a serious chemical pneumonia.

Symptoms related to the physical, chemical, and toxicological characteristics

Aspiration may cause pulmonary edema and pneumonitis. May cause drowsiness and dizziness. Headache. Nausea, vomiting. Irritation of eyes. Exposed individuals may experience eye tearing, redness, and discomfort. Skin irritation. May cause redness and pain.

Information on toxicological effects

Acute toxicity May be fatal if swallowed and enters airways.

Components	Species	Test Results
Calcium bis (dinonylnaphthalenesulphonate) (CAS 57855-77-3)		
Acute Dermal LD50	Rabbit	>20 g/kg
Oral LD50	Rat	>5000 mg/kg
distillates (petroleum), hydrotreated heavy naphthenic (CAS 64742-52-5)		
Acute Dermal LD50	Rabbit	>2000 mg/kg
Oral LD50	Rat	>5000 mg/kg
naphtha (petroleum), hydrotreated light (CAS 64742-49-0)		
Acute Dermal LD50	Rabbit	>2000 mg/kg
n-hexane (CAS 110-54-3)		
Acute Dermal LD50	Rabbit	>1300 mg/kg
Oral LD50	Rat	15840 mg/kg
zinc oxide (CAS 1314-13-2)		
Acute Oral LD50	Rat	>5000 mg/kg

*Estimates for product may be based on additional component data not shown.

Skin Corrosion/Irritation	Causes skin irritation
Serious eye damage/irritation	Causes eye irritation
Respiratory Sensitization	Not a respiratory sensitizer
Skin Sensitization	This product is not expected to cause skin sensitization
Germ Cell Mutagenicity	No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic

Carcinogenicity

IARC Monographs. Overall Evaluation of Carcinogenicity

Not listed

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not regulated

US National Toxicology Program (NTP) Report on Carcinogens

Not listed

Reproductive Toxicity	Suspected of damaging fertility
Specific target organ toxicity-single exposure	May cause drowsiness and dizziness
Specific target organ toxicity-	Not classified

repeated exposure

Aspiration hazard

May be fatal if swallowed and enters airways. If aspirated into lungs during swallowing or vomiting, may cause chemical pneumonia, pulmonary injury or death.

Chronic Effects

Prolonged inhalation may be harmful

12. Ecological Information

Ecotoxicity

Toxic to aquatic life with long lasting effects.

Components		Species	Test Results
2-methylpentane (CAS 107-83-5)			
Aquatic <i>Acute</i> Crustacea Fish	EC50 LC50	Daphnia Fish	1-10 mg/L, 48 hours 1-10 mg/L, 96 hours
distillates (petroleum), hydrotreated heavy naphthenic (CAS 64742-52-5)			
Aquatic Crustacea Fish	EC50 LC50	Water Flea (Daphnia magna) Rainbow trout, Donaldson trout (Oncorhynchus mykiss)	1000 mg/L, 48 hours 5000 mg/L, 96 hours
naphtha (petroleum), hydrotreated light (CAS 64742-49-0)			
Aquatic <i>Acute</i> Crustacea Fish	EC50 LC50	Daphnia Fish	1-10 mg/L, 48 hours 1-10 mg/L, 96 hours
n-hexane (CAS 110-54-3)			
Aquatic Fish	LC50	Fathead minnow (Pimephales promelas)	2.101-2.981 mg/L, 96 hours
zinc oxide (CAS 1314-13-2)			
Aquatic <i>Acute</i> Crustacea Fish	EC50 LC50	Water Flea (Daphnia magna) Rainbow trout, Donaldson trout (Oncorhynchus mykiss)	0.098 mg/L, 48 hours 1.1 mg/L, 96 hours

*Estimates for product may be based on additional component data not shown.

Persistence and Degradability

Bioaccumulative Potential

Partition coefficient n-octanol / water (log Kow)

2,2-dimethylbutane	3.82
2,3-dimethylbutane	3.42
2-methylpentane	3.74
3-methylpentane	3.6
n-hexane	3.9

Bioconcentration factor (BCF)

naphtha (petroleum), hydrotreated light	10-25000
zinc oxide	60690

Mobility in Soil

No data available

Other adverse effects

No other adverse environmental effects (e.g. ozone depletion, photochemical ozone creation potential, endocrine disruption, global warming potential) are expected from this component.

13. Disposal Considerations

Disposal of waste from residues / unused products	If discarded, this product is considered a RCRA ignitable waste, D001. Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Contents under pressure. Do not puncture, incinerate, or crush. Do not allow this material to drain into sewers/water supplies. Do not contaminate ponds, waterways, or ditches with chemical or used container. Dispose in accordance with all applicable regulations.
Hazardous waste code	D001: Waste flammable material with a flash point <140°F

Contaminated packaging	Since emptied containers may retain product residue, follow label warnings even after container is emptied. Empty containers should be taken to an approved waste handling site for recycling or disposal.
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14. Transport Information

DOT

UN Number	UN1950
UN proper shipping name	Aerosols, flammable, Limited Quantity
Transport hazard class(es)	
Class	2.1
Subsidiary risk	-
Label(s)	2.1
Packing group	Not applicable
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling
Special provisions	N82
Packaging exceptions	306
Packaging non bulk	None
Packaging bulk	None

IATA

UN Number	UN1950
UN proper shipping name	Aerosols, flammable, Limited Quantity
Transport hazard class(es)	
Class	2.1
Subsidiary risk	-
Packing group	Not applicable
ERG Code	10L
Special precautions for user	Read safety instructions, SDS, and emergency procedures before handling
Other information	
Passenger and cargo aircraft	Allowed with restrictions
Cargo aircraft only	Allowed with restrictions

IMDG

UN Number	UN1950
UN proper shipping name	Aerosols, Limited Quantity
Transport hazard class(es)	
Class	2
Subsidiary risk	-
Packing group	Not applicable
Environmental hazards	
Marine pollutant	No
EmS	Not available
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling

15. Regulatory Information

US Federal Regulations

This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated

SARA 304 Emergency Release Notification

Not regulated

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not regulated

US EPCRA (SARA Title III) Section 313 – Toxic Chemical: Listed substance

n-hexane (CAS 110-54-3)

zinc oxide (CAS 1314-13-2)

CERCLA Hazardous Substance List (40 CFR 302-4)

n-hexane (CAS 110-54-3)

Listed

zinc oxide (CAS 1314-13-2) Listed
CERCLA Hazardous Substances: Reportable quantity
n-hexane (CAS 110-54-3) 5000 Lbs

Spills or releases resulting in the loss of any ingredient at or above its RQ require immediate notification to the National Response Center (800-424-8802) and to your Local Emergency Planning Committee

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

n-hexane (CAS 110-54-3)

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Not regulated

Safe Drinking Water Act (SDWA)

Not regulated

Food and Drug Administration (FDA)

Not regulated

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Section 311/312 Hazard categories
Immediate Hazard – Yes
Delayed Hazard – Yes
Fire Hazard – Yes
Pressure Hazard – Yes
Reactivity Hazard – No

SARA 302 Extremely Hazardous Substance No

US State Regulations

US California. Candidate Chemicals List. Safer Consumer Products Regulations (Cal. Code Regs, tit. 22, 69502.3, subd. (a))

distillates (petroleum), hydrotreated heavy naphthenic (CAS 64742-52-5)
liquefied petroleum gas (CAS 68476-68-8)
naphtha (petroleum), hydrotreated light (CAS 64742-49-0)
n-hexane (CAS 110-54-3)

US New Jersey Worker and Community Right-to-Know Act

2,2-dimethylbutane (CAS 75-83-2)
2,3-dimethylbutane (CAS 79-29-8)
2-methylpentane (CAS 107-83-5)
naphtha (petroleum), hydrotreated light (CAS 64742-49-0)
n-hexane (CAS 110-54-3)
zinc oxide (CAS 1314-13-2)

US Massachusetts RTK – Substance List

2,2-dimethylbutane (CAS 75-83-2)
2,3-dimethylbutane (CAS 79-29-8)
2-methylpentane (CAS 107-83-5)
naphtha (petroleum), hydrotreated light (CAS 64742-49-0)
n-hexane (CAS 110-54-3)
zinc oxide (CAS 1314-13-2)

US Pennsylvania worker and Community Right-to-Know Law

2,2-dimethylbutane (CAS 75-83-2)
2,3-dimethylbutane (CAS 79-29-8)
2-methylpentane (CAS 107-83-5)
naphtha (petroleum), hydrotreated light (CAS 64742-49-0)
n-hexane (CAS 110-54-3)
zinc oxide (CAS 1314-13-2)

US Rhode Island RTK

distillates (petroleum), hydrotreated heavy naphthenic (CAS 64742-52-5)
naphtha (petroleum), hydrotreated light (CAS 64742-49-0)
n-hexane (CAS 110-54-3)

US California Proposition 65

WARNING: This product contains a chemical known to the State of California to cause cancer.

US California Proposition 65 – CRT: Listed date/Carcinogenic Substance

titanium dioxide (CAS 13463-67-7) Listed: September 2, 2011

Volatile Organic Compounds (VOC) Regulations

EPA

VOC Content (40 CFR 54.100(s)) 100%
Consumer Products (40 CFR 59, Subpt. C) Not regulated

State

Consumer Products Not regulated (semi-solid lubricant)

VOC Content (CA) 84.7%
VOC Content (OTC) 84.7%

International Inventories

Country(s) or region	Inventory Name	On Inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	Yes
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	Yes
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	Yes
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	No
Korea	Existing Chemicals List (ECL)	Yes
New Zealand	New Zealand Inventory	Yes
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	Yes
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

*A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s). A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

16. Other Information, Including date of preparation or last revision

Issue Date 01-16-2015
Revision Date 10-09-2017
Prepared By Allison Yoon
Version # 03
Further Information CRC# 568F-G/1002591-1002592
HMIS® Ratings Health: 2*
Flammability: 4
Physical Hazard: 0
Personal Protection: B

NFPA Ratings



NFPA Ratings

Disclaimer

The information contained in this document applies to this specific material as supplied. It may not be valid for this material if it is used in combination with any other materials. This information is accurate to the best of CRC's knowledge or obtained from sources believed by CRC to be accurate. Before using any product, read all warnings and directions on the label. For further clarification of any information contained on this (M)SDS consult your supervisor, a health & safety professional, or CRC Industries, Inc.

Revision Information

Product and Company Identification: Product Codes
Transport Information: Material Transportation Information
Other Information, including date of preparation or last revision: Further information