SUPERIOR

FF-1800
I.D. Mount Flange Facer
Operating Manual

CONFIDENTIALITY STATEMENT

DOCUMENT NUMBER SPR-MAN-FF-1800

REV 01

SUPERIOR

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ABOUT US

Superior Portable Machine Tools (SPR) is your go-to source for specialty tools and equipment in the Oil and Gas, Mining, Heavy Construction, Shipbuilding, Aerospace, Defense, and Power Generation industries. With a strong presence across locations in the US and Canada, as well as a global network of dealers, we proudly offer a comprehensive range of cutting-edge machinery. From portable line boring machines and auto bore welders to linear/gantry and rotary milling machines, our lineup covers all your needs. We also provide top-of-the-line Aggressive® clamshells (pipe cutters), ID/OD flange facers, end-prep bevelers, and weld isolation and test plugs. Additionally, our expertise extends to the production and maintenance of heat exchangers, condensers, and boilers through our partnership with Maus Italia. SPR's engineering group is ready to customize existing products or create tailor-made solutions from scratch, and we excel in precision grinding and tooling services, offering a wide assortment of custom and standard tool bits.

We go above and beyond by providing value-added engineering, comprehensive training programs, and unwavering operational support. Rest assured, we prioritize the highest health, safety, and environmental standards in the industry. Our extensive experience in service, deep understanding of equipment requirements, and unwavering dedication to customer satisfaction are the pillars of our commitment to delivering exceptional equipment and unmatched customer care.

YORK
PORTABLE MACHINE TOOLS

SUPERIOR
PLANT RENTALS

CLIFF'S BITS
PRECISION GRINDING & TOOLING

YORK MACHINE SHOP
CUSTOM MACHINING, MANUFACTURING, AND REPAIRS

SUPERIOR HEAT EXCHANGERS
PORTABLE TOOLS AND MACHINERY

WARNING:

SPR is committed to continued product improvement; therefore, the machine you received may be slightly different than the one described herein. This manual and the information provided is a basic guideline for our customers. SPR will do its best to ensure that the information and procedures contained in this manual are correct and up-to-date. Superior cannot guarantee that the information and procedures contained herein are correct for all applications or situations.

The contents of this manual are subject to change without notice. It is the obligation of the user to read all information in this manual, become familiar with the equipment to be used, and exercise the utmost care in equipment operation. **Do not make any modifications to this equipment. Any modifications will void all warranty claims, as well as increase the risk of injury or harm.** Do not operate this equipment if all parts are not functioning at 100% efficiency. Notify us immediately for any needed repairs.

Note - SPR will supply all repair and replacement parts necessary for maintenance and operation of this machine. For repair, service, or additional information, please locate repair and replacement part description/part numbers within the O&M manual in the exploded view section and contact us for ordering.

USA

Superior Plant Rentals LLC.
350 Dowdy Road, Gonzales, LA 70737 | Phone: 225.647.7771

Superior Plant Rentals LLC.
1530 Live Oak Street, Webster, TX 77598 | Phone: 281.554.9400

Superior Plant Rentals LLC.
5450 Avenue A, Bldg. 1, Beaumont TX 77705 | Phone: 409.853.4382

Superior Plant Rentals LLC.
1745 N. Lexington Blvd., Corpus Christi, TX 78409 | Phone: 361-299-0496

Superior Plant Rentals LLC.
2030 Gladwick St., Unit B, Rancho Dominguez, CA 90220 | Phone: 310.356.6105

Superior Plant Rentals LLC.
3958 Airway Drive, Rock Hill, SC 29732 | Phone: 803.659.9822

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INTERNATIONAL

SPR York Portable Machine Tools
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TABLE OF CONTENTS

SUPERIOR

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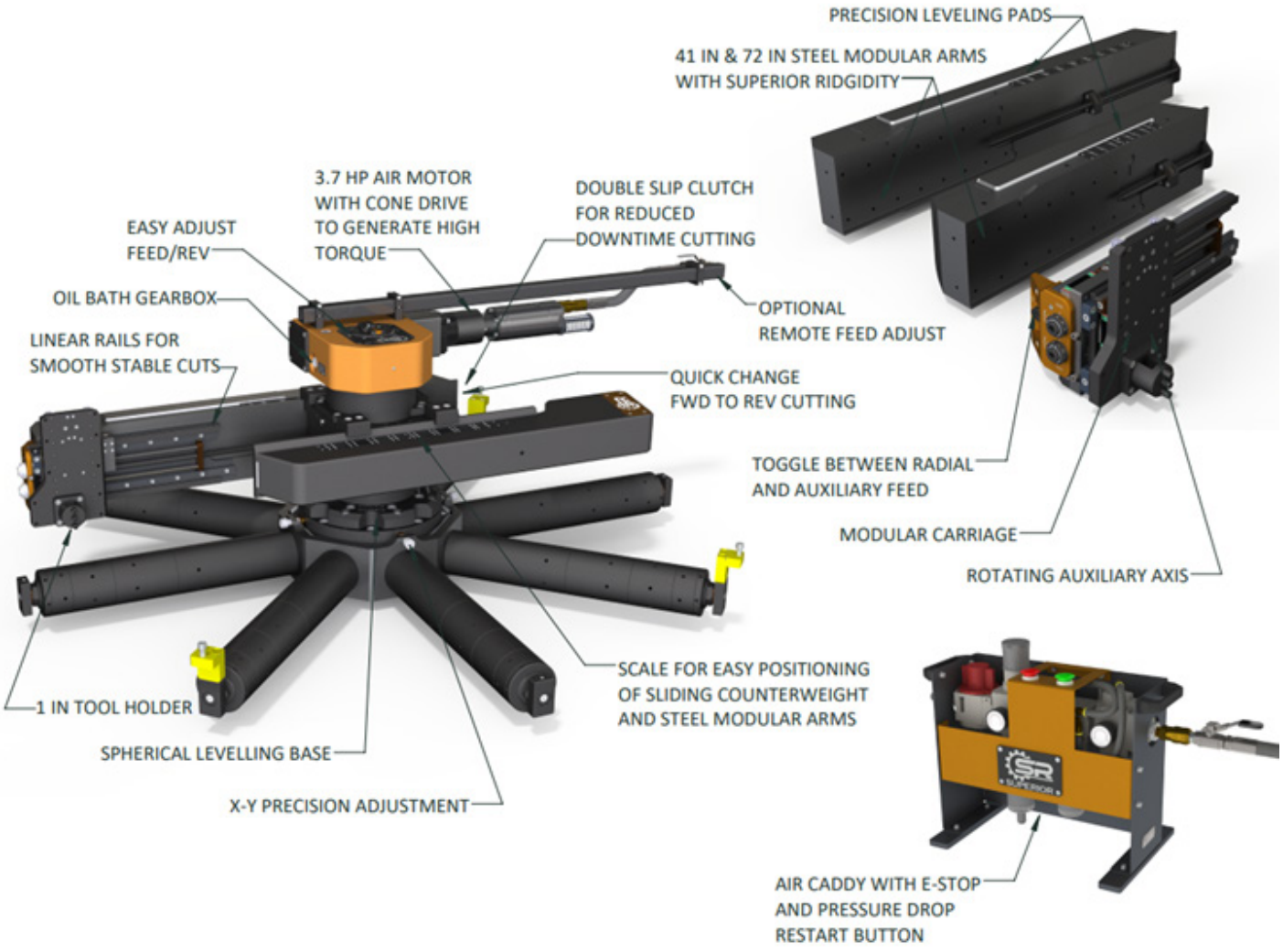
INTRODUCTION

This manual contains SUPERIOR information necessary for the setup, operation, maintenance, shipping, storage and decommissioning of your FF-1800. Appendices contain additional product information to further aid in setup, operation and maintenance tasks. This entire manual must be read to familiarize yourself with the FF-1800 before attempting to setup or operate it. Failure to do so may result in injury to the operator or damage to FF-1800.

RECEIPT AND INSPECTION

The FF-1800 was packaged in an aluminum crate anticipating normal shipping conditions. SPR does not guarantee the condition of your machine upon delivery. Upon receiving your FF-1800, you must:

1. Inspect the aluminum crate along with the machine for shipping damage.
2. Inspect all the components for damage.
3. If any components are missing, or if you have questions regarding your FF-1800, please contact an SPR location nearest you immediately.

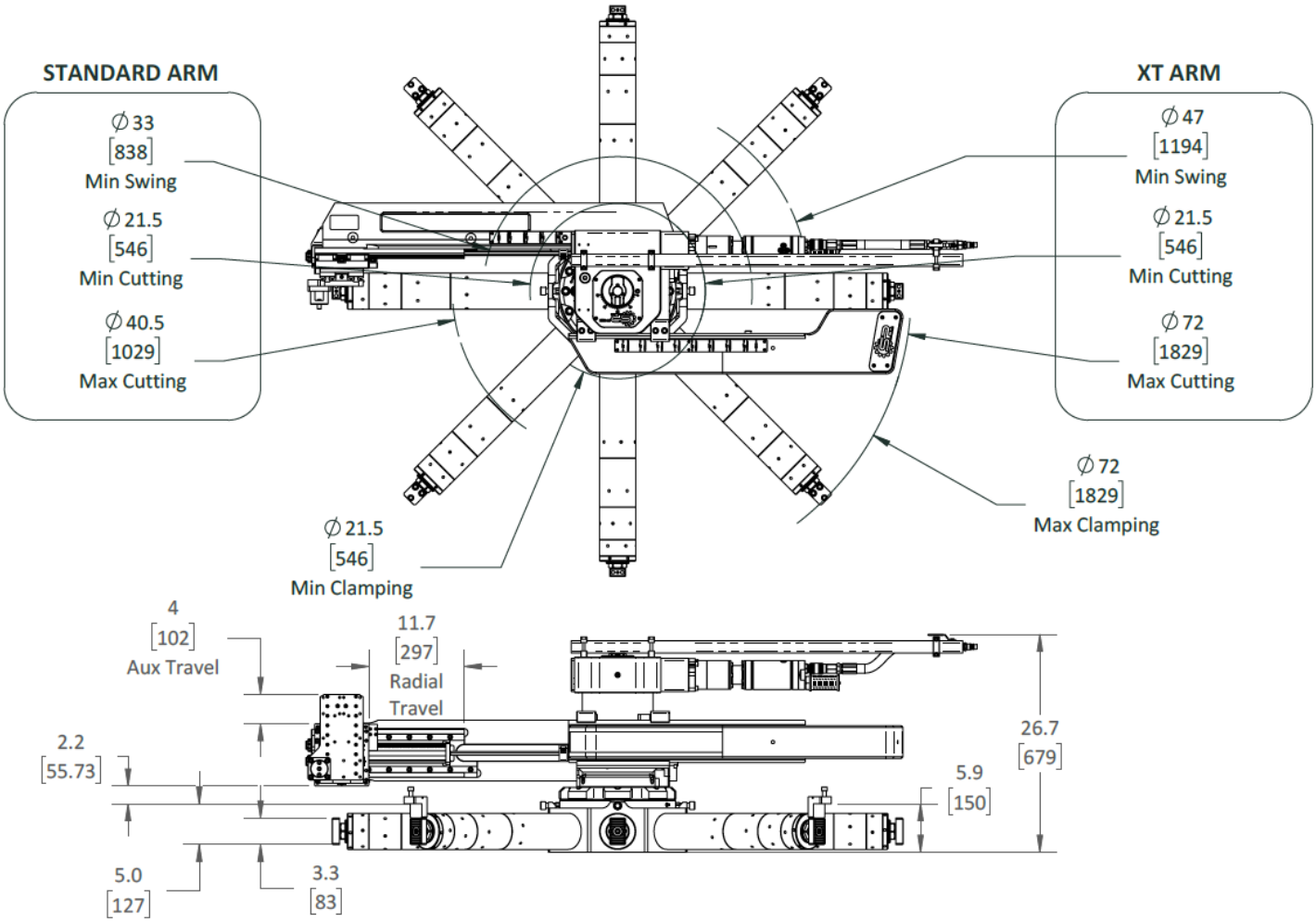


SPECIFICATIONS CHART

Specifications		
	Imperial	Metric
Shipping		
Shipping Weight	2000 lbs	907 kg
Shipping Dimensions	59 x 28 x 27 in	1500 x 710 x 685 mm
Machining Dimensions		
XT Arm Max Machining Diameter	72 in	1830 mm
XT Arm Min Machining Diameter	21.5 in	546.1 mm
XT Arm Min Swing Diameter	47 in	1194 mm
Standard Arm Max Machining Diameter	40.5 in	1028.7 mm
Standard Arm Min Machining Diameter	21.5 in	546.1 mm
Standard Arm Min Swing Diameter	33 in	840 mm
Clamping Dimensions		
Min Clamping	21.5 in	546 mm
Max Clamping	72 in	1830 mm
Speeds and Feeds		
Feed Rate	0-40 thou/rev	0-1 mm/rev
RPM	0-32 rpm	
Power Requirements		
Pneumatic	Max 90 psi @ 120 CFM	7 bar @ 56 l/s
Hydraulic Power Unit	10 HP	7.5 kW
Oil Type		
Mobil SHC 634 or equivalent		

Component Weights		
	LBS	KG
Rotor	400	181.4
Max. Large Spider	547	248.1
Radial Arm w/ tool holder 828mm (32.6")	154	69.9
Radial Arm XT w/tool holder 1092mm (43.0")	212	96.2
Counterweight arm	143	64.9
XT Counterweight Arm	210	95.3
Pneumatic Motor	22	10
Aluminum shipping container	290	131.5

DIMENSIONS


STANDARD ARM
∅33
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Min Swing
∅21.5
[546]
Min Cutting
∅40.5
[1029]
Max Cutting
XT ARM
∅47
[1194]
Min Swing
∅21.5
[546]
Min Cutting
∅72
[1829]
Max Cutting
∅72
[1829]
Max Clamping
∅21.5
[546]
Min Clamping
4
[102]
Aux Travel
11.7
[297]
Radial
Travel
2.2
[55.73]
26.7
[679]
5.9
[150]
5.0
[127]
3.3
[83]

SAFETY PRECAUTIONS

GENERAL SAFETY PRECAUTIONS

SPR does its best to promote the safe use of its tools. However, safety is a joint effort and you, the end user must also do your part by being aware of your work environment, closely follow the operating procedures and safety precautions contained in this manual. The end user shall ensure that only people thoroughly trained in safe work procedures operate this machine. Safe working procedures are required when operating rotating machine tools. The misuse of this machine could result in severe injury or death.

- Proper training and safety precautions can help avoid accidents.
- Please observe all company and government work safety practices.
- Keep others clear from the machine when it is running.
- Keep clear of the cutting head and other moving parts. Never try to remove chips while the machine is running.
- Disconnect the air hose when inserting or adjusting the cutting tool.
- Wear protective glasses, footwear and ear plugs. Please observe all Company and Government work-safe practices
- Do not wear loose fitting clothing that could get caught up or wrapped in the machine. Tie up long hair.
- Flying chips can cut or burn you. Do not remove cuttings with bare hands.
- Do not operate in water.

MACHINE SPECIFIC SAFETY PRECAUTIONS

- Disconnect air line before handling the machine and making adjustments.
- Beware of pinch points when sliding the arm and counterweight.
- Beware of pinch points between the carriage and the motor and hose support
- Ribbon chips can form with certain materials and cutting conditions. Always disconnect the air motor prior to removal, and use pliers to remove chips.
- Do not operate unless securely mounted to a workpiece
- Always check arm clamping fasteners prior to lifting
- Always use set-up tabs for placing into workpiece.
- Only use lifting brackets on rotor for lifting entire machine. Never lift full machine with hoist rings mounted to arms or counterweights.

WARNING!
MOVING PARTS.
Keep hands, loose clothing, and hair away from rotating or moving parts. Disconnect the air supply from the machine and unplug all equipment prior to adjusting or servicing. If electric, remove power from the machine prior to adjusting or servicing.

WARNING!
ELECTRICAL SHOCK.
Possible shock if not handled properly.

WARNING!
KEEP DRY.
Keep all equipment and components away from any water source.

WARNING!
EYE PROTECTION.
Eye protection must be worn while operating or working near powered equipment.

WARNING!
EAR PROTECTION.
Ear protection should be worn while operating or working near loud equipment.

WARNING!
FOOT PROTECTION.
Foot protection must be worn while operating or working near heavy equipment.

FEATURES

SUPERIOR SAFETY
- Remote feed adjustment ensures the user can stop feed of the machine from a safe distance
- Air Caddy has a lock-out inlet valve, E-stop and low pressure shut-off valve, to ensure users can stop the machine quickly, and that machine never starts up unintentionally if pressure is lost momentarily.

SUPERIOR FEED
- The FF-1800 has a mechanical feed driven by the rotation of the machine, ensuring reliability and accuracy, as opposed to pneumatic feed systems which can ice up or feed inconsistently.
- Feed clutch acts as torque limit stop and/or travel limit stop, to prevent damage to the machine if it reaches end of travel or binds up in the cut.

SUPERIOR CONFIGURATIONS
- The FF-1800 comes with two arm lengths to achieve maximum cutting range, while minimizing swing diameter in the case of nearby obstructions.

SUPERIOR RIGGING
- Each component of the FF-1800 can easily be lifted with their designated lifting points allowing the machine to be moved by its individual components or assembled unit.
- The FF-1800 has lifting brackets to support it balanced in any orientation.

SUPERIOR CLAMPING
- The 4.5-in diameter tubular clamping legs provides an extremely rigid connection between the FF-1800 and the workpiece, guaranteeing the best possible machining results.

SUPERIOR LEVELLING AND POSITIONING
- This machine is easily levelled with its incredibly rigid spherical levelling base, eight levelling screws and eight locking screws, providing quick and reliable position relative to the machined face.
- FF-1800 is capable of precision concentric adjustment within a bore with its XY positioning screws that allow a total of 1/4-in of fine adjustment.

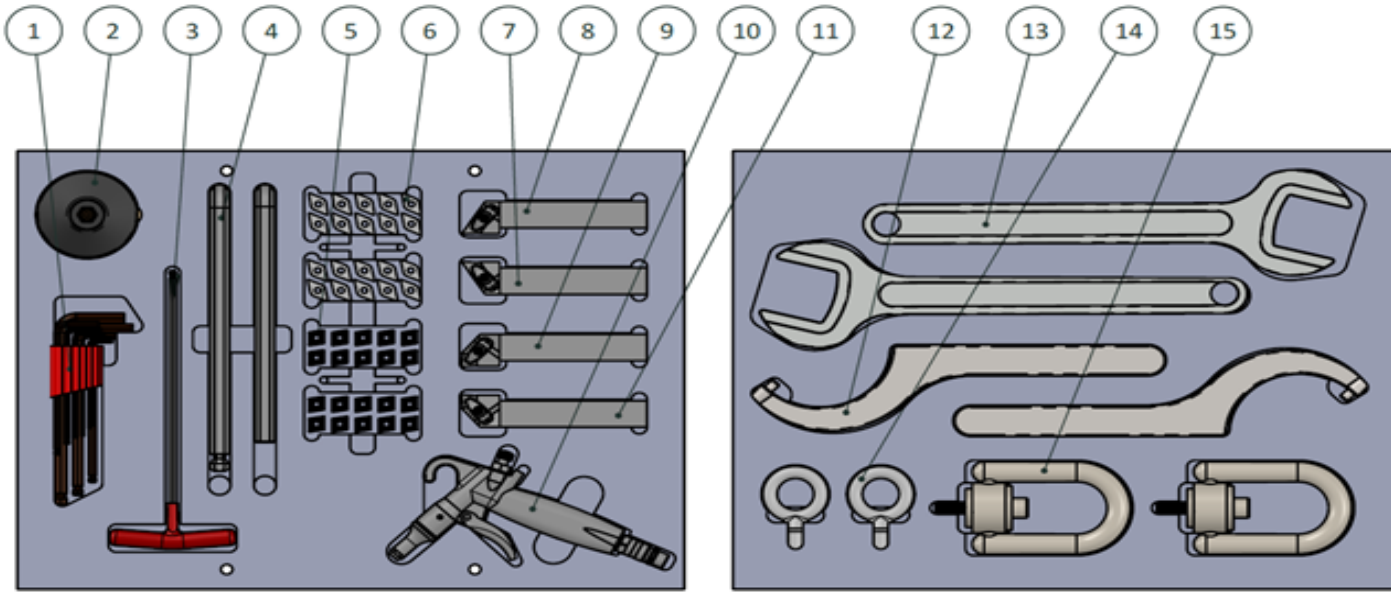
SUPERIOR SET UP
- The radial arms and counterweights provide convenient markings for speedy set-up to specific diameters.
- Both the arm and counterweights have infinite adjustment positions within their ranges, to ensure a perfectly balanced machine.

SUPERIOR MACHINING CAPABILITIES
- With nearly 12in of radial travel and 4in of axial travel, and lock-out brakes in both axis, there are few jobs this machine can’t perform
- 1in shank insert holders and 5 tool holder positions, maximizes tool rigidity and work flow.
- The carriage can rotate 360° for machining chamfers and advanced seal surfaces.

SUPERIOR HIGH TORQUE MACHINING
- The cone gear drive allows smooth, high torque machining even during interrupted cuts.

TOOLS

The tool case supplied with the machine has two levels and the table below shows where each tool is used.

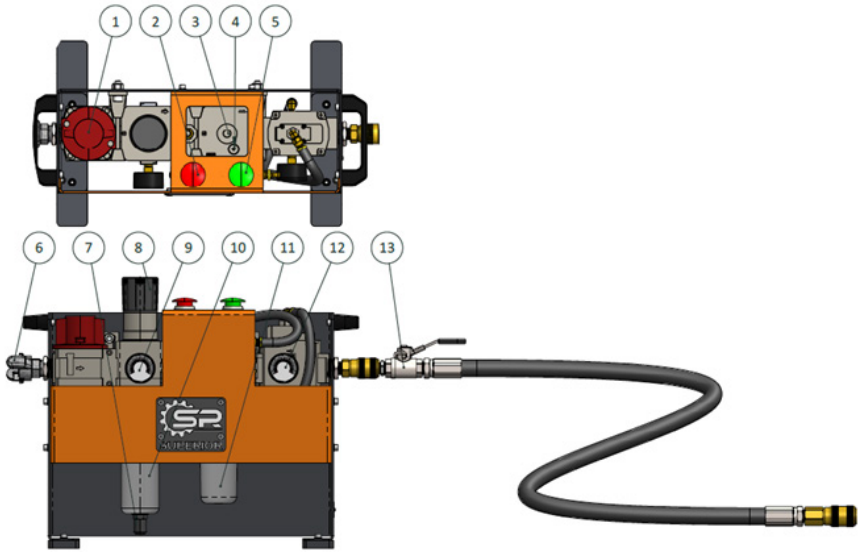


Item	Compnent	Function
1	Metric Hex Key Set	General use – 10mm Hex Key for removal of set-up tabs
2	Speed Handle 10mm	Quickly manual moving the carriage, plugs into the end of the arm
3	T-handle 6mm	Carriage brakes, locks, manual feed and tool holder
4	Hex Key 14mm	X-Y Positioning and Tilt Adjust
5	Insert CNMG 431 & 432	Tooling
6	Insert DNGG 431 & 432	Tooling
7	Insert Holder DDJN 1in LH	Tooling
8	Insert Holder DDJN 1in RH	Tooling
9	Low Pressure Air Gun	Blowing chips
10	Insert Holder DCLN 1in RH	Removes water from air flow
11	Insert Holder DCLN 1in LH	Holds oil and displays oil level (AW-32)
12	Pin Spanner 115mm	Displays outlet pressure (after regulator)
13	Wrench 50mm	Tightening Clamping Feet
14	Eyebolt M12	Lifting Arms and Counterweights
15	Hoist Ring M12	Lifting the machine

CONTROLS

AIR CADDY

The FF-1800 has operational controls both on the air caddy and on the machine itself. These controls and their functions are as follows:



Item	Compnent	Function
1	Inlet Pressure Switch & Lock-out	Allows air flow into the system with lock out feature
2	E-stop	Quickly shuts of air flow to the system
3	Oil drip sight glass and adjuster	Shows and controls oil drip rate (1 drip every 8-10 seconds)
4	Oil fill cap	Remove to fill reservoir with oil
5	Start button	Must be engaged after pressure loss to start air flow
6	Air hose inlet	Attaches the caddy to air system
7	Water drain	Releases water filtered from system
8	Regulator	Controls max outlet pressure (pull up to adjust)
9	Inlet pressure gauge	Displays inlet pressure
10	Water filter	Removes water from air flow
11	Oil Reservoir	Holds oil and displays oil level (AW-32)
12	Outlet pressure gauge	Displays outlet pressure (after regulator)
13	Outlet ball valve	Controls FF-1800 rpm

The air caddy is a filter, lubricator and regulator, which removes water from the air flow, while adding oil to extend the air motor life, and regulates the air flow to precisely control the rpm of the machine. Additionally, the air caddy, has safety features such as a flow control lock-out and low pressure shut off.

Low Pressure Shut Off – If the air system loses inlet pressure for any reason, the air caddy automatically shuts an internal valve and the green start button needs to be engaged to bring air pressure back to the outlet valve. This prevents unintended rotation of the machine.

Oil Lubrication – AW-32 oil should be used with this air caddy. In colder climates, an air tool antifreeze lubricant, such as Polar-Lube can be used. The oil drip rate should be adjusted to one drip every 8-10 seconds and can be adjusted by turning the oil site glass with a flat head screwdriver.

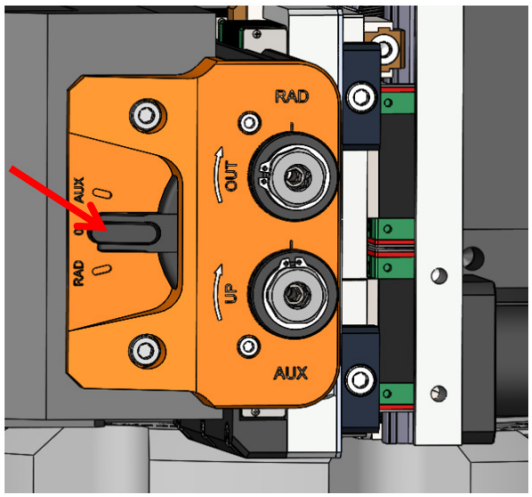
Air Caddy Operation – To operate the air caddy do the following:

1. Turn the main inlet pressure valve to the off position.
2. Ensure there is oil in the oil reservoir.
3. Ensure the water reservoir is not full.
4. Connect the air caddy to shop air.
5. Ensure the outlet ball valve to the machine is shut off.
6. Connect the air caddy to the machine.
7. Turn on the red main inlet pressure valve confirming there is air pressure on the inlet pressure gauge.
8. Adjust the inlet air pressure, by pulling up on the regulator knob and rotating it until the desired operating pressure is reached on the regulator pressure gauge.
9. Check that there are no obstructions to the machine and that no one is near the rotating components.
10. Ensure e-stop is released.
11. Press the green start button and check that there is air pressure showing on the outlet pressure gauge.
12. Turn the outlet ball valve until the desired rpm is reached.
13. Stop the machine rotation by turning the outlet ball valve to the closed and latched position.
14. Press the e-stop before making any adjustments to the machine.
15. Follow steps 9 through 12 to restart the machine.

Warning - The air motor can operate unexpectedly when the air hose is re-connected. Close and latch the outlet ball valve before connection the air hose to the air motor.

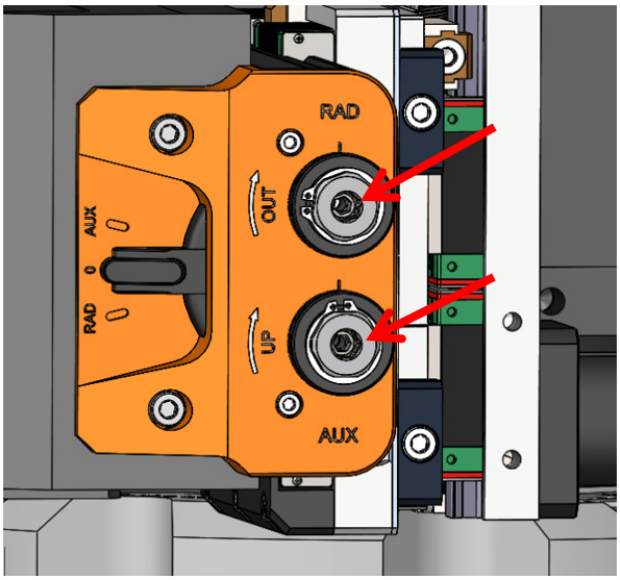
RADIAL-AUXILIARY SELECTOR

The radial-auxiliary feed selector is found on the end of the carriage assembly on the arm and determines if the carriage feeds radially (Rad) or if the carriage feeds in the auxiliary (Aux) direction. The radial direction is parallel to the arm. The auxiliary (Aux) direction will typically be perpendicular to the arm, but as the carriage can rotated 360 degrees this feed can be at any angle, which can be used for cutting bevels or advanced seal surfaces. To choose a feed type, press the lever button and then press the lever up for auxiliary or down for radial. The center position is neutral, and is used for manually feeding either the radial or auxiliary.



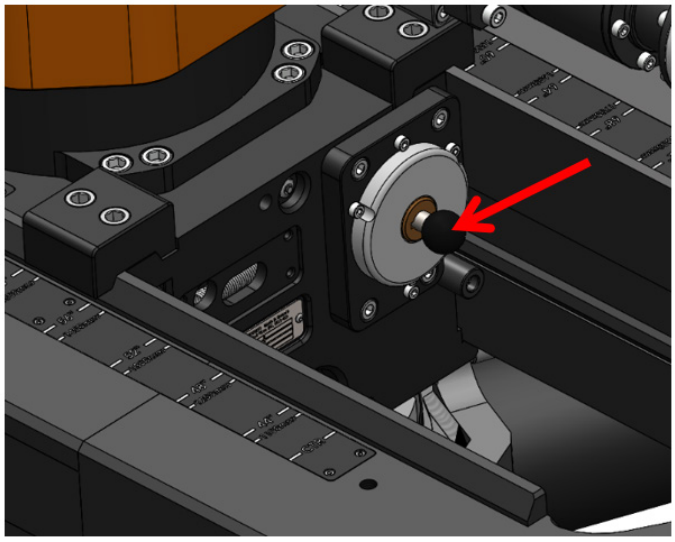
MANUAL CARRIAGE POSITIONING

To manually position the carriage, insert either a 6mm t-handle or 10mm speed wheel into the end of the radial (Rad) or auxiliary (Aux) positions on the carriage, in the location below.



FEED DIRECTION SELECTOR

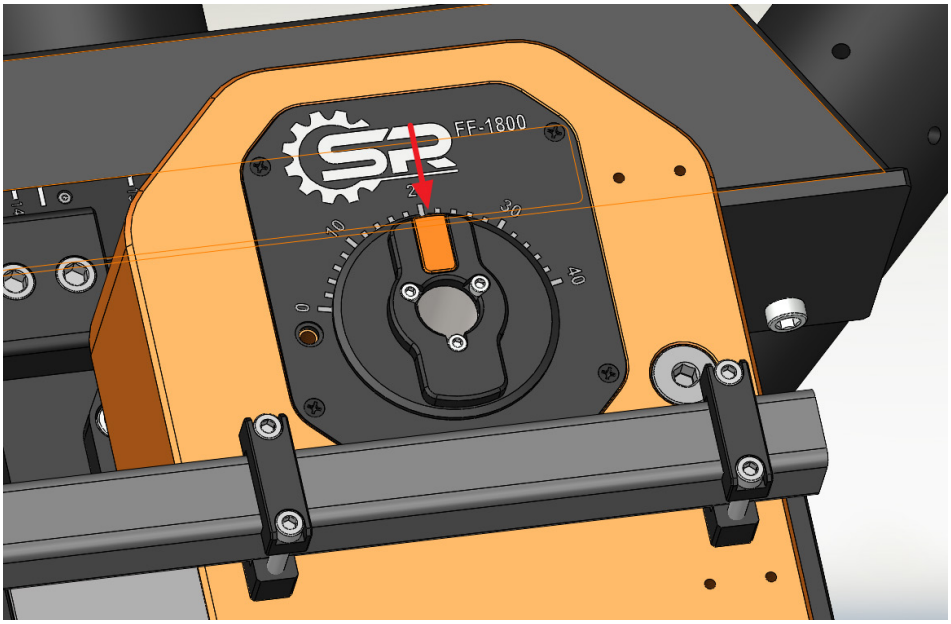
Use the feed direction selector knob to change the direction of travel of the tool as per the image below.
Knob In = Radial Feed In (or Auxiliary Feed Down)
Knob Out = Radial Feed Out (or Auxiliary Feed Up)



FEED RATE SELECTOR

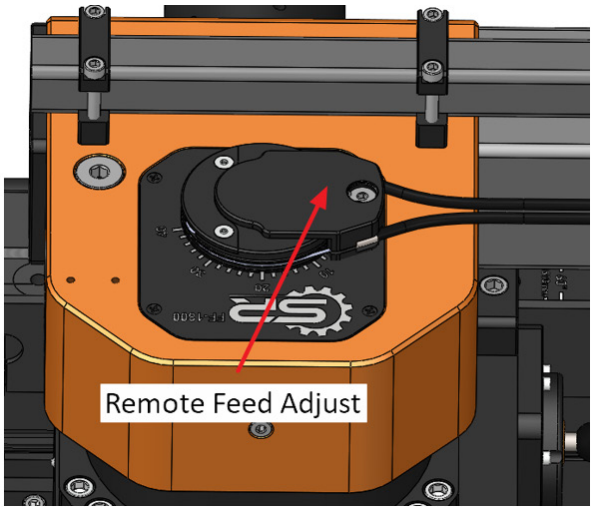
The FF-1800 will automatically feed once per revolution at a rate of 0-40 thou (0-1mm) per revolution. To adjust the feed rate, push in the orange button on the top of the machine and rotate the feed selector. The feed rate selector can be extended by attaching the remote feed selector.

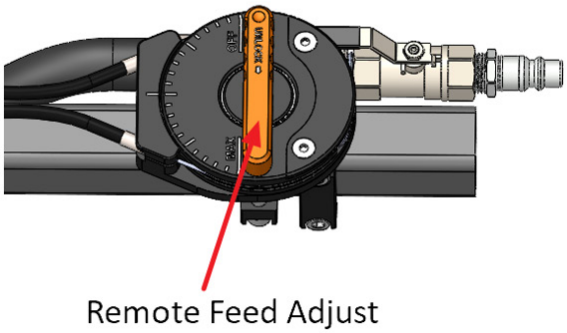
Note - The feed rates are approximate.



REMOTE FEED SELECTOR

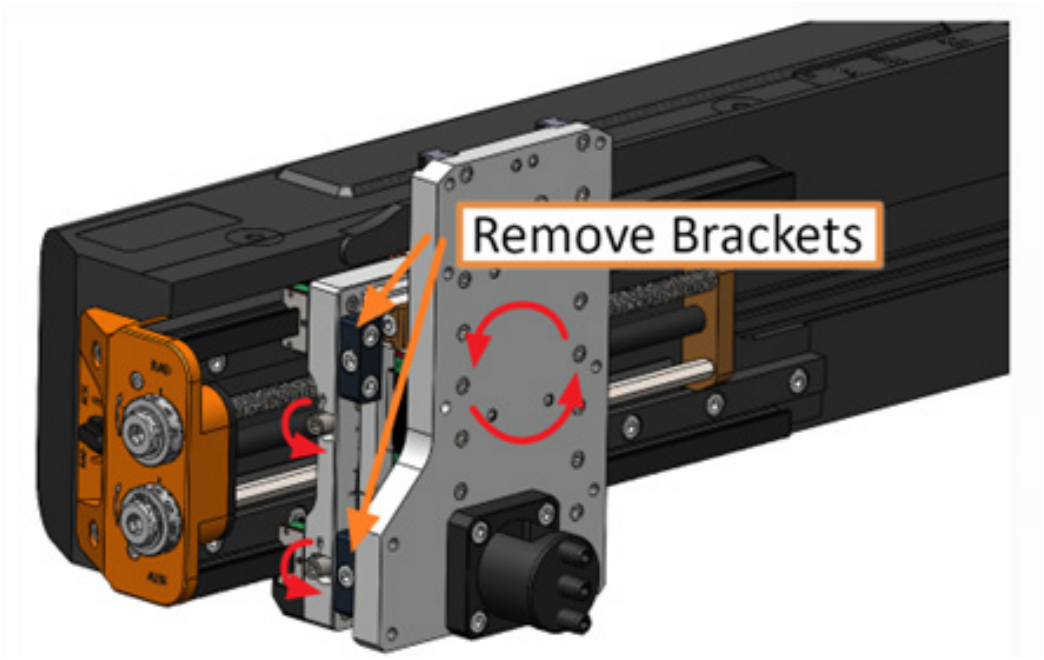
The remote feed selector allows the operator to safely change or stop the feed while the machine is running. Instructions on attaching and using this option can be found in the Set-Up section. Attach the remote feed selector to the rotor as per the image below and secure the control knob to the end of the hose support bar, making sure there are minimum bends in the cable, to avoid unnecessary friction.





CARRIAGE ANGULAR ROTATION ADJUSTMENT

To cut angles for bevels, chamfers or advanced seal surfaces, the carriage can be rotated to any angular position. To do so, remove the locking brackets, undo the rotation locks by turning them counterclockwise and rotating the carriage to the preferred angle. Angles are shown on the top of the machine but for precise applications should be confirmed with an angle finder. Once an angle is selected, the locks need to be re-engaged.

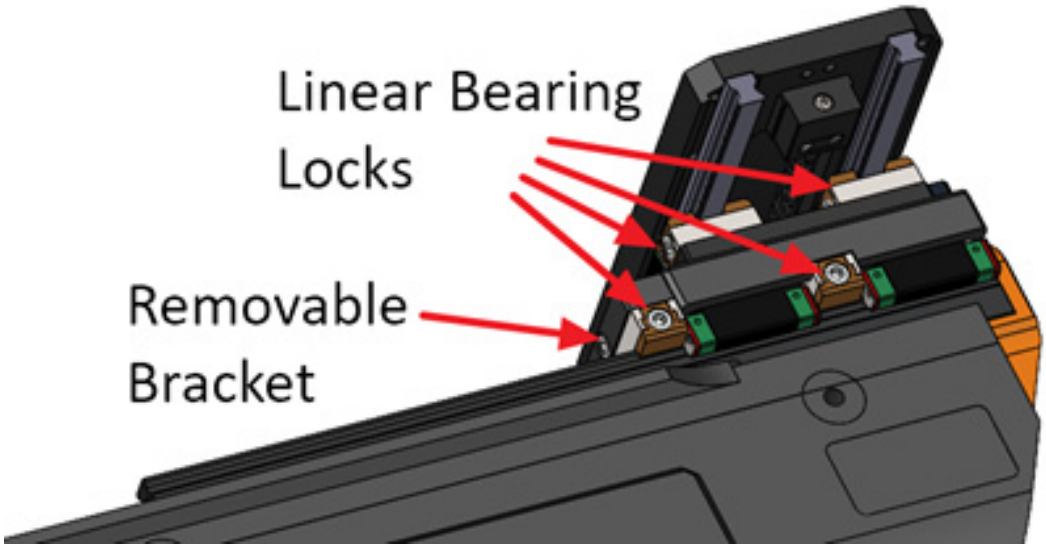


CARRIAGE LOCKS

There are a total of four locks on both the radial and auxiliary axis. For best results completely lock out a non-feeding axis and lightly tighten the feed axis to remove backlash.

Note - The inner radial lock and mounting bracket can be removed for additional inwards radial travel.

Warning - Tightening the feeding axis too much may prevent feeding, due to the system's clutch.

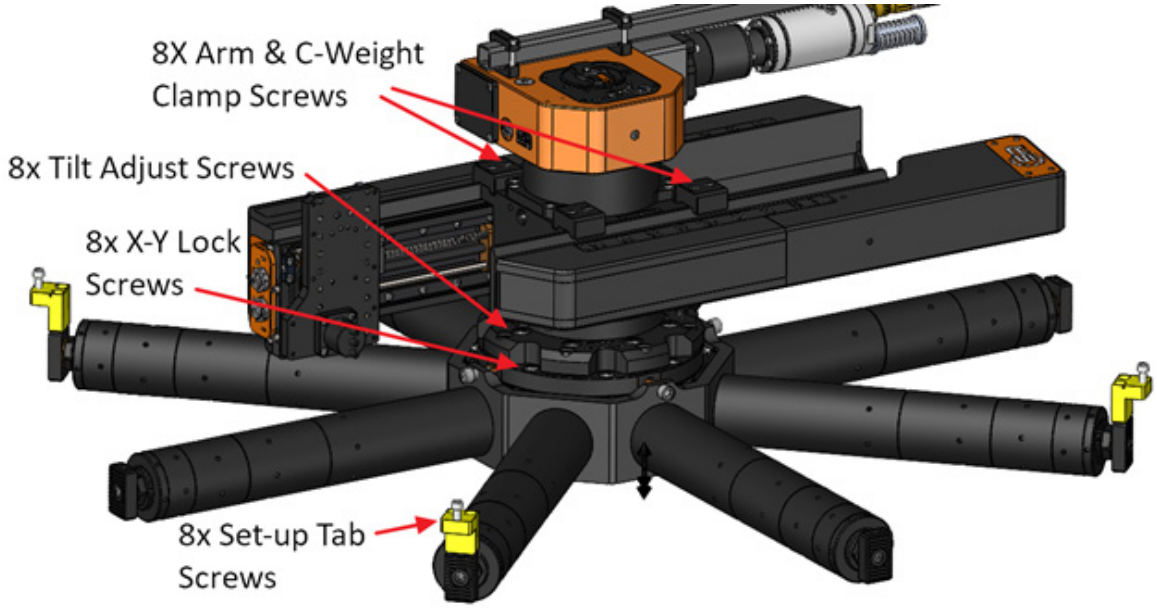


SETUP

INSTALLATION HAZARDS

The installation process can be extremely dangerous and even fatal. Proper installation of your FF-1800 requires the operator and other personnel following the recommended safety precautions.

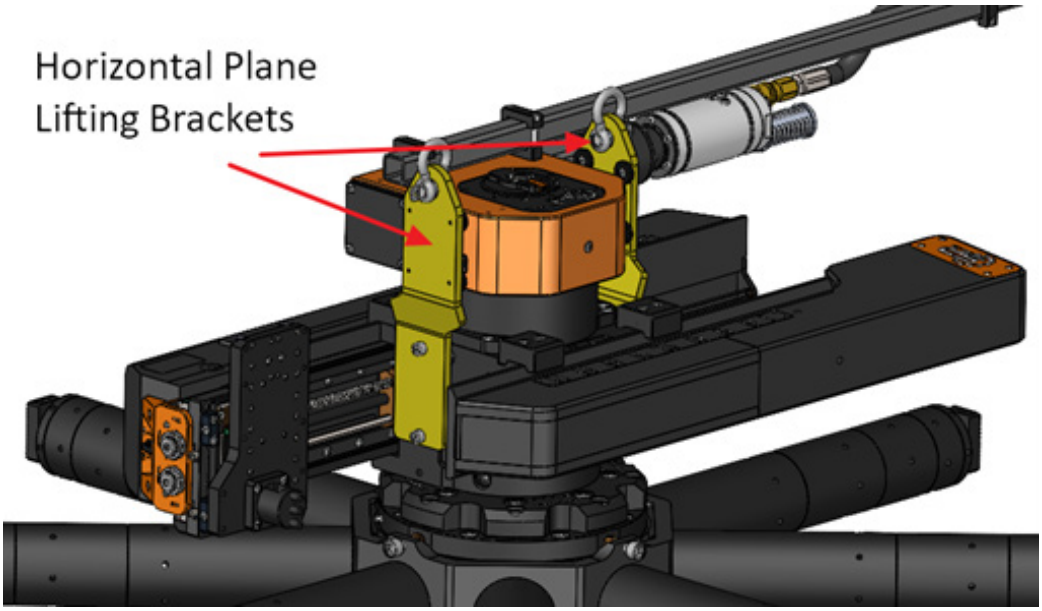
Prior to lifting ensure the following screws are all tightened.



REMOVAL FROM CRATE

If not already installed, attach the yellow lifting brackets as shown, ensuring all fasteners are tightened and lift the machine from the crate and set it down on a level surface.

Note: These brackets are designed for crate removal or when installing in a work piece in a horizontal plane. Vertical-plane lifting brackets should be used for installation in a work piece.



PREPARING FLANGE INSTALLATION

Measure the inner diameter of the work piece and use the table below to choose the legs combo to insert into the spider.

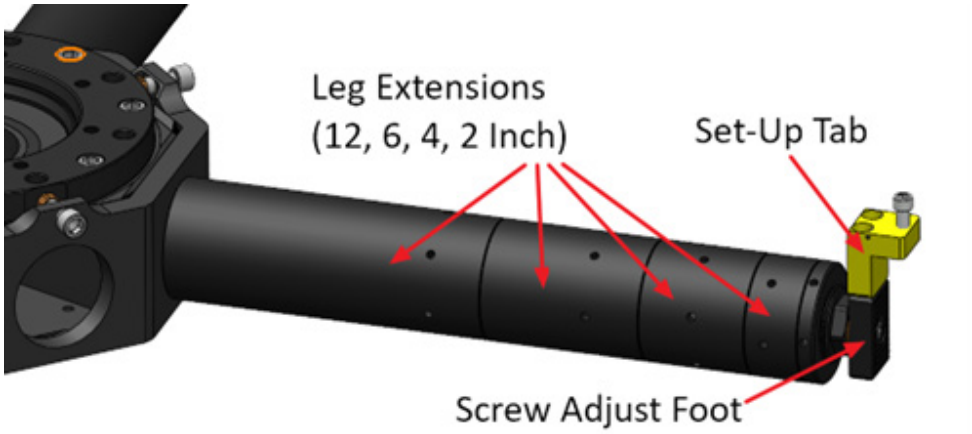
Note - Its easiest and safest to attach the legs when the machine is on the ground.

Note - The legs should only be hand tightened to each other.

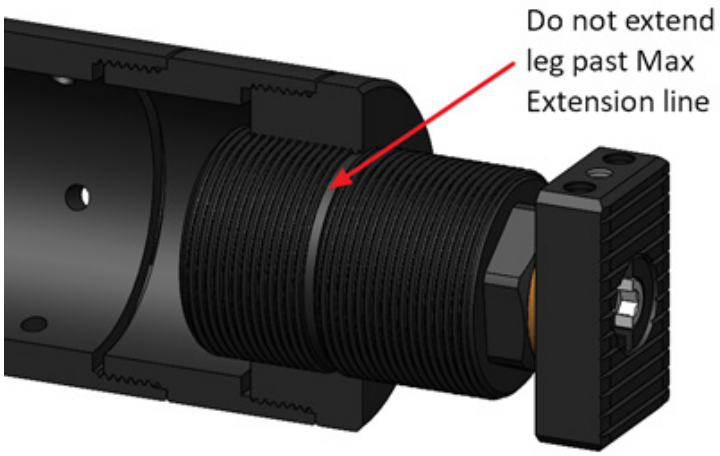
Note - Ensure the legs threads are lubricated to help get them apart.

MIN	MAX	EXTENSION LEG			
		2IN	4IN	6IN	12IN
21.5	26				
25.5	30	X			
29.5	34		X		
33.5	38			X	
37.5	42	X		X	
41.5	46		X	X	
45.5	50				X
49.5	54	X			X
53.5	58		X		X
57.5	62			X	X
61.5	66	X		X	X
65.5	70		X	X	X
69.5	74	X	X	X	X

Once legs combinations are attached to the spider, add the foot assembly shown below and secure the four yellow set-up tabs to every second leg.



Warning - never extend the screw adjust foot on the legs past the line indicated below.



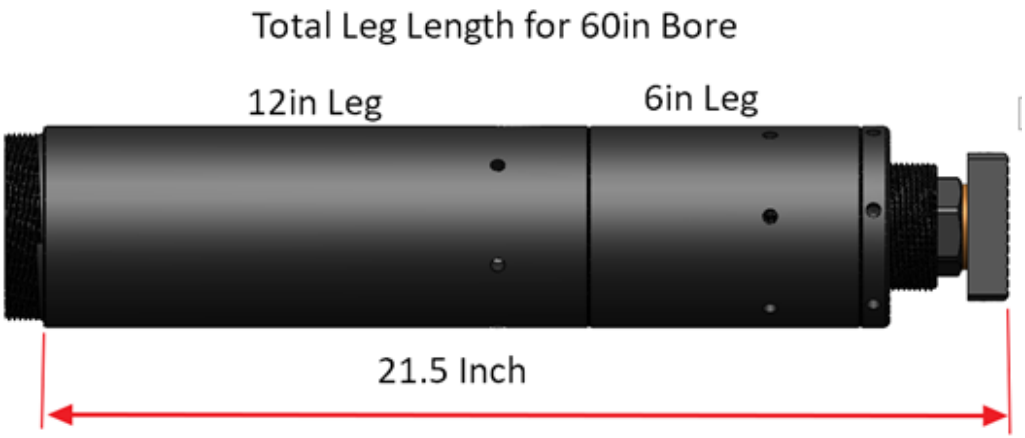
SCREW ADJUST FOOT POSITIONING

To ensure the assembled spider fits into the workpiece, the screw adjustment feet should be retracted ¼ inch (6mm) less than the inside diameter of the workpiece. It's easiest to do this while the machine is on the ground.

To calculate the distance from the edge of the spider to the pad on the adjustment foot, measure the work piece diameter. Subtract from this diameter the spider width of 17-in (432mm). Divide this number by two and subtract ¼ inch off this, to ensure ¼ inch of clearance between the workpiece and the screw adjust foot.

Example:

1. Measured Workpiece ID = 60 in
2. Spider Base Width = 17 in
3. Foot Clearance = 0.25 in
4. 60 – 17 = 43 in
5. 43/2 = 21.5 in
6. 21.5-.25 = 21.25 in (This is the distance from the side of the spider to the pad)



CHOOSING ARM AND COUNTERWEIGHT

An arm and counterweight will typically be stored on the machine. Both arms have the same minimum machining diameter, so the default arm will be the larger arm if there are no obstructions. The large arm has a minimum swing diameter of 47-in (23.5-in radius).

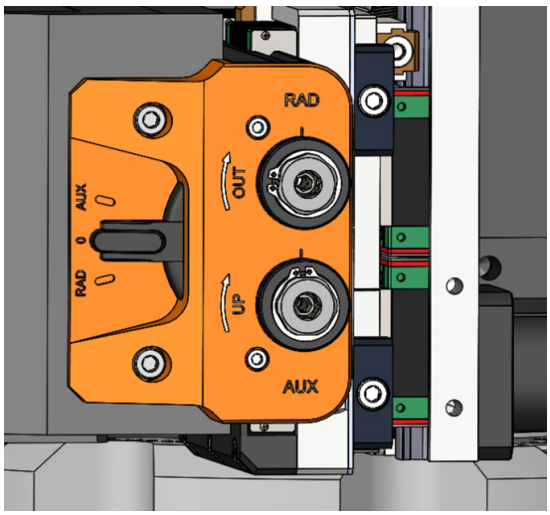
If there are obstructions within this swing, the smaller arm and counterweight must be used. The small arm has a minimum swing diameter of 33-in (16.5-in radius). If there is an obstruction within 33in, a smaller flange facer such as our FF-1100 should be used.

REMOVING ARM AND COUNTERWEIGHT

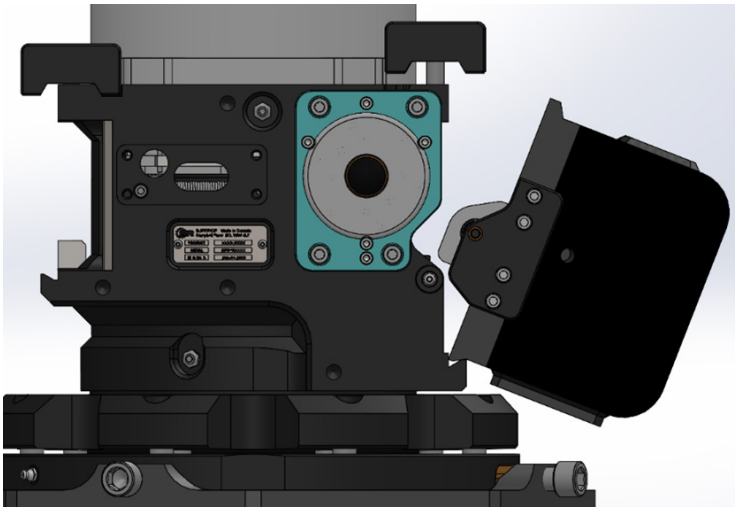
Warning - Always swap arms and counterweights when machine is in a horizontal position, ideally sitting on the ground.

The following demonstrates how to remove and arm, but the procedure for the counterweight is similar.

1. Attach eyebolts and slings to the top of the arm and support lightly with crane.
2. Loosen the clamp screws a half rotation and slide the arm or counterweight to a neutral position, such that it is approximately centered on the machine.
3. Put the feed selector on the end of the arm into the neutral position.



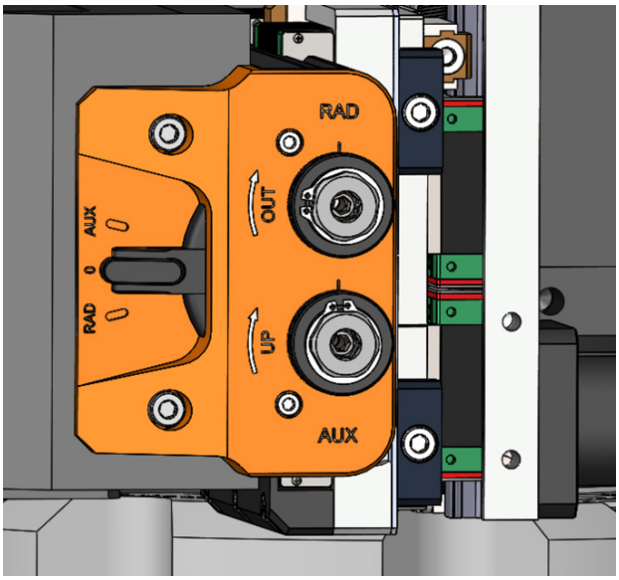
4. Ensure there is sufficient tension with the crane to support the weight of the arm, but without lifting the machine.
5. With one person running the crane and the other supporting the arm, further loosen the clamp screws.
6. Lower the crane and tilt the top of the arm backwards, ensuring the bottom remains cradles in the lower dovetail.
7. Once the arm is clear of the clamps, it can be lifted off the machine.



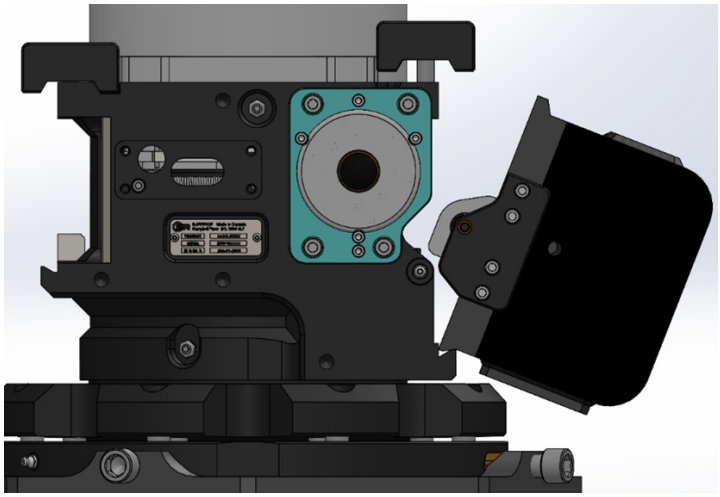
INSTALLING ARM AND COUNTERWEIGHT

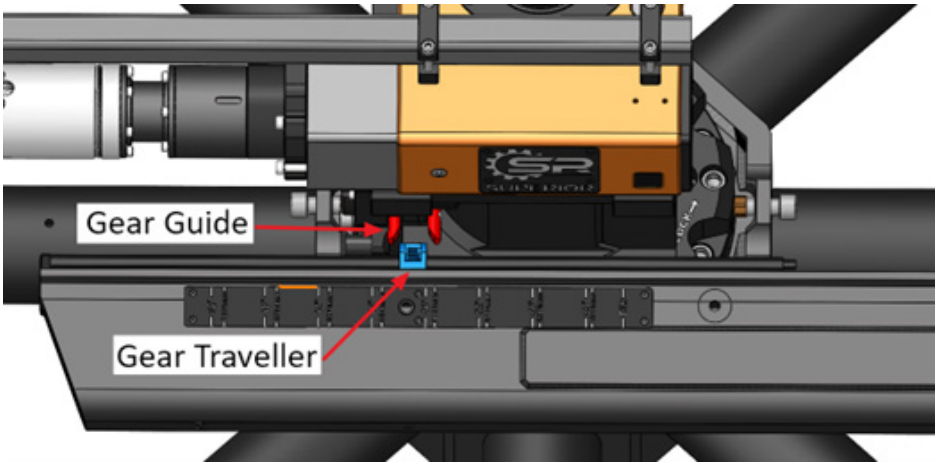
The following demonstrates how to install an arm, but the procedure for the counterweight is essentially the same.

1. Attach eyebolts and slings to the top of the arm and lift it near the machine, with one person controlling the arm and the other running the crane.
2. Ensure the clamp screws are sufficiently loosened.
3. Put the feed selector on the end of the arm into the neutral position.



4. Lower the arm and position it such that it is approximately centered on the rotor and the dovetail on the arm engages with the dovetail on the rotor, as per the picture below.
5. Slide the gear traveler along the hex bar such that it aligns with the gear guides.



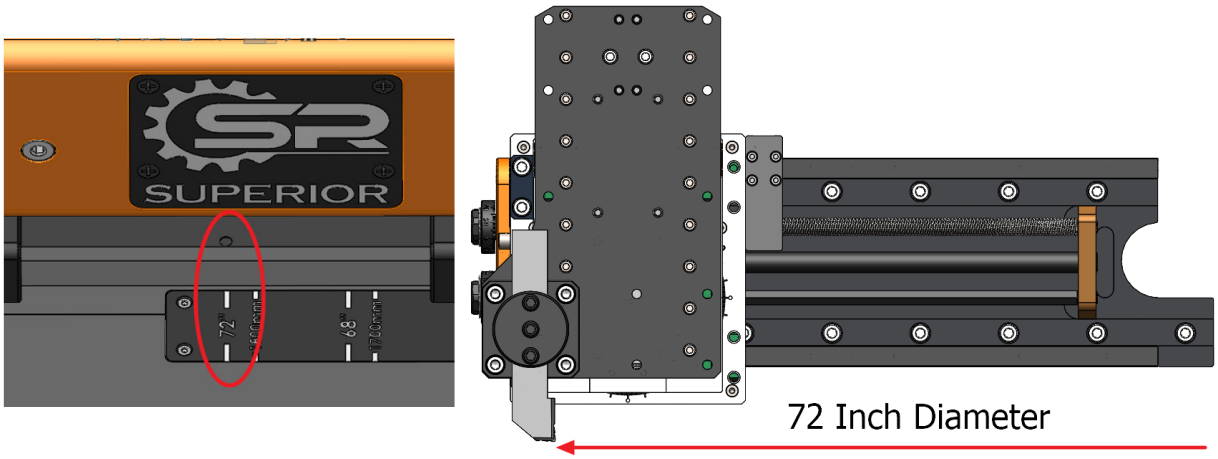


6. Tilt the arm upwards until it hooks under the clamps and lightly tighten the clamps.
7. Position the arm to the desired position.
8. Tighten the clamps.

POSITIONING ARM AND COUNTERWEIGHT FOR MACHINING RANGE

There are position marks on the arm to help position it for the range to be machined.

Note - The mark represents the max diameter the machine can cut when the insert holder in its outermost position, the tool straight up and down, and the tool cutting inwards, as shown below. The tool has 11.5-in of radial travel, so if the arm is set at the 72-in diameter mark, the machine can cut from 49-in to 72-in.



To position the arm, the four clamp bolts need to be loosened one full rotation. Slide the arm by pushing on the end, being careful of any pinch points.

Warning - Beware of pinch points when moving the arm.

Warning - Never adjust the arm position when the machine is mounted in a vertical machine plane workpiece as the arm can slide suddenly.

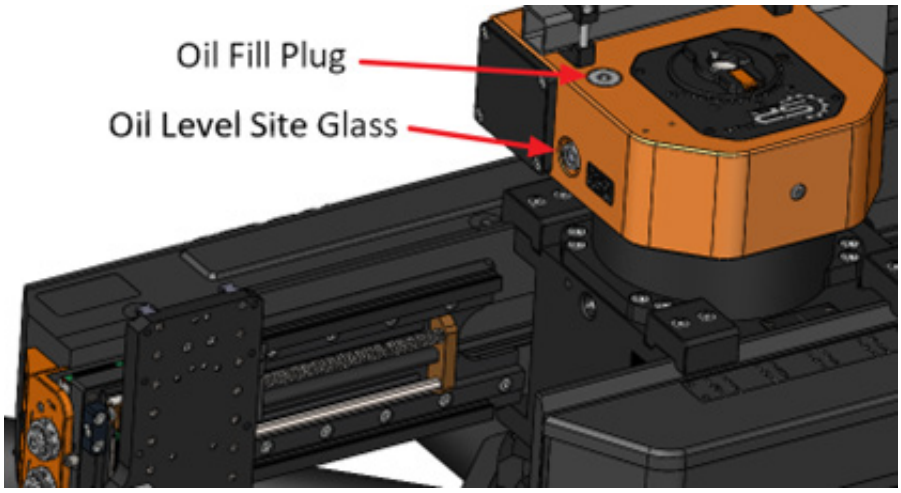
Once the arm is positioned, the counterweight should be positioned at the corresponding mark. Due to the movement of the carriage, the balance will not be perfect depending on the range being machined and can be adjusted accordingly if desired, although adjustment should not be necessary.

Note - Counterweight balance is most important when machining in a vertical plane. The easiest way to check the balance is to remove the air motor and rotate by hand.

CHECKING OIL LEVEL

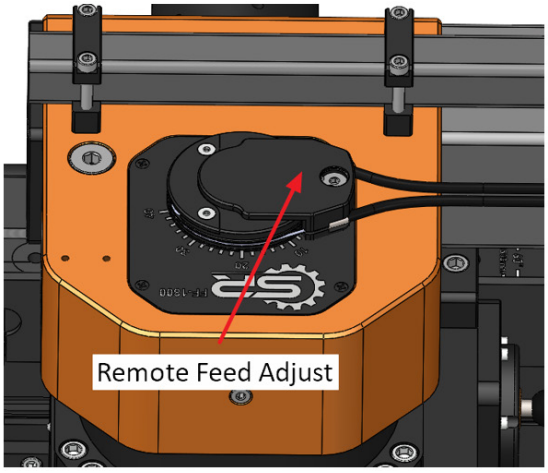
Checking the oil level and filling the oil is most easily done when the machine is on the ground in the horizontal position. Check the oil level as per the sight glass below.

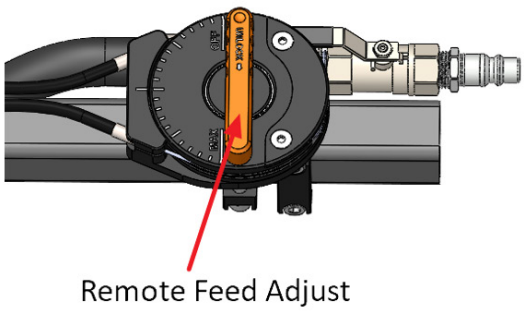
Use Mobil SHC 634 or equivalent oil and remove the cap on the top of the machine shown below to fill with oil.



REMOTE FEED ADJUST

If the feed needs to be adjusted or stopped while the machine is turning, the remote feed adjust should be used to keep the user away from rotating parts. Attached the it to the top of the rotor and the end of the hose support bar, as shown below.





Warning - Never reach in over rotating parts to adjust the feed.

Tip - Stopping the feed and allowing the machine to do a few revolutions without feeding, prior to stopping the machine's rotation will extend the life of the carbide inserts.

Tip - The remote feed relies on a cable sliding a housing. Care should be taken to minimize the number of bends in the cable to ensure smooth motion.

AIR HOSE (HYDRAULIC HOSE) AND SUPPORT BAR POSITION

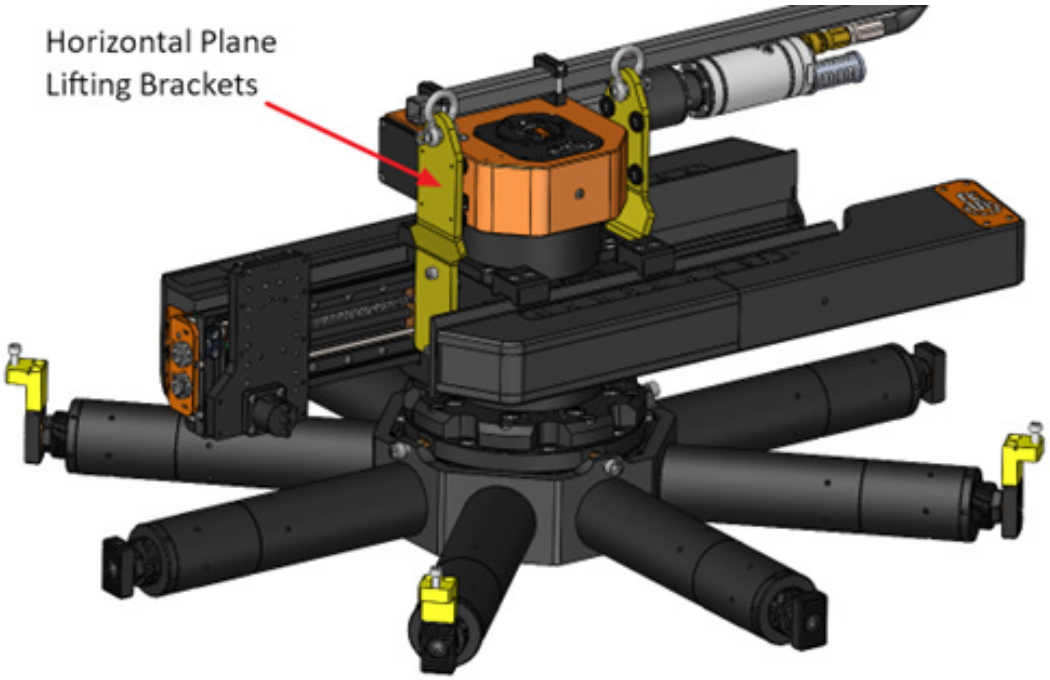
Prior to placing the machine in the work piece, consider the position of the air hose and air hose support bar to ensure the bar has no obstructions and the air hose leaves the machine in a convenient position for connecting the air hose.

If unsure, position the machine with the support bar close to horizontal.

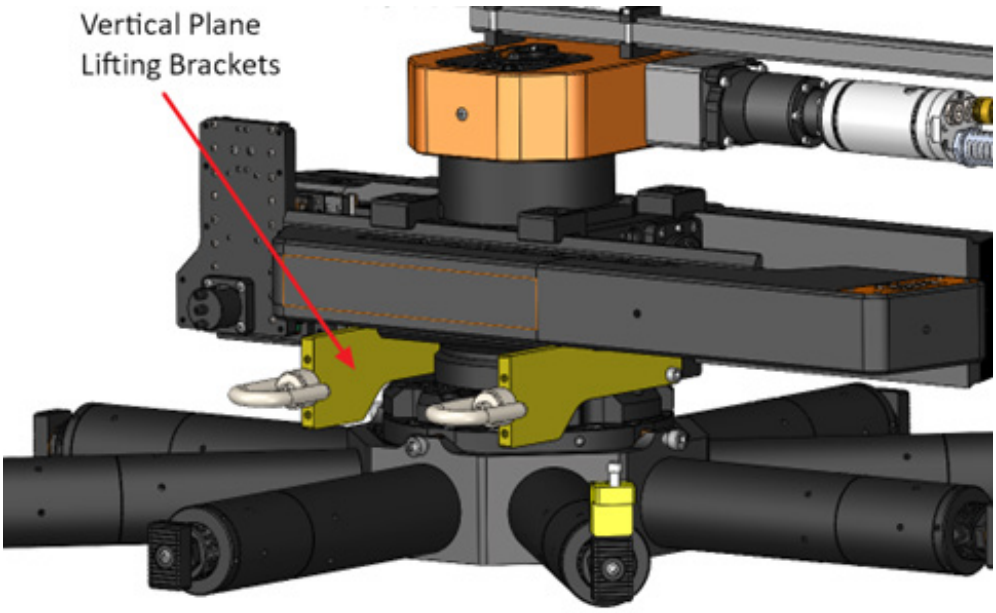
LIFTING THE MACHINE

Caution - Prior to lifting, screw in all screw adjust feet as per the above section to ensure they will clear inside diameter of the workpiece.

This machine will typically be used on workpieces whose machined face will be either in a horizontal or vertical plane.



To lift the machine into a vertical plane workpiece, attach the yellow lifting brackets to the machine, as shown below. Using a crane, straps and shackles, slowly lift the machine up allowing it to rotate over on two legs until it is suspended in the vertical plane. A best safe practice is to use a dynamometer when lifting the machine to measure and record the total weight when installing the machine. Install safety backup rigging in the event of dynamometer failure. The recorded weight will be used when removing the machine from the flange.

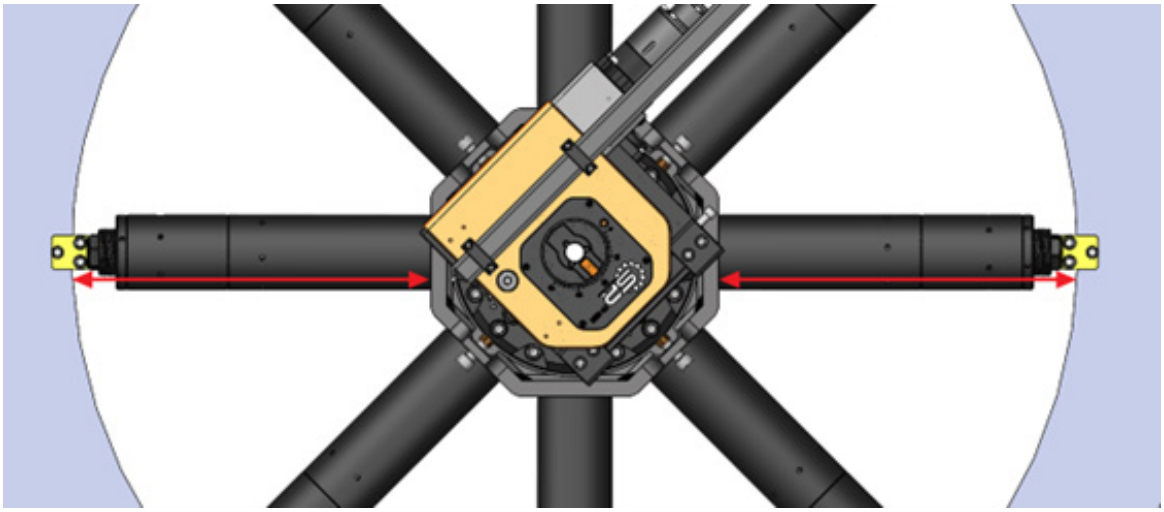


Ensuring the yellow set-up tabs have been added to every second leg, slowly position the machine into the work piece. Screw out the four legs with set-up tabs until they touch in the ID of the work piece. Gently move the machine onto the set-up tabs until they are all in contact with the workpiece. Tighten the screw adjust feet to the work piece.

Warning - Always keep rigging attached to the machine until the final tightening of all 8 legs have been completed.

CENTERING THE MACHINE

Using a tape measure, and starting with two opposite legs, measure from the edge of the work piece to the edge of the spider, as shown below, and loosen and tighten opposing screw adjust feet until the measurement matches to as close to 1/16 in (1.5mm) as possible. Once complete, tighten these legs to 50% of final tightening torque. Repeat on the two legs perpendicular.



QUICK TIPS

Tip - There are two 50mm wrenches supplied with the machine. Use one to hold the clamping pad while using the other to tighten the screw adjust foot.

Once satisfied with the position of the machine, tighten all 8 screw adjustment feet to the final torque.

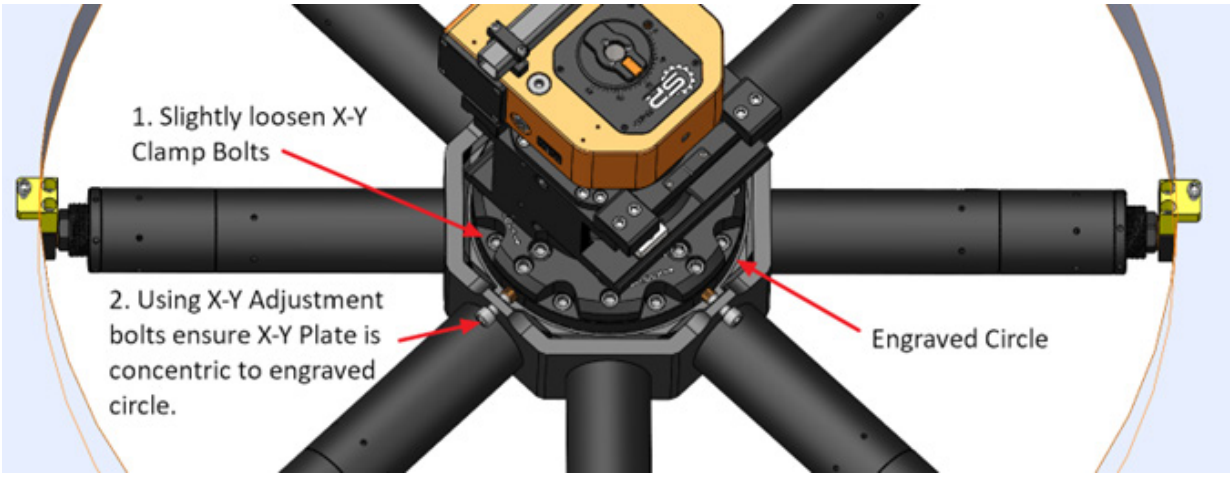
PRECISION CENTERING OF THE MACHINE

For most applications the course centering of the machine above will be sufficient. If more precision centering is required, such as for seals or counter-bores the X-Y positioning can be used.

QUICK TIPS

Tip - The X-Y positioning plate has 1/8 in (3mm) of adjustment in any direction, so the machine must be course-adjusted to within 1/8in to ensure the precision adjustment is possible.

To begin, ensure each of the X-Y clamp bolts shown below are loosened slightly, such that the screws are secured but the X-Y plate can slide. There is a scribed circle shown below. Use the X-Y adjustment bolts to center the rotor such that it is concentric with this circle.



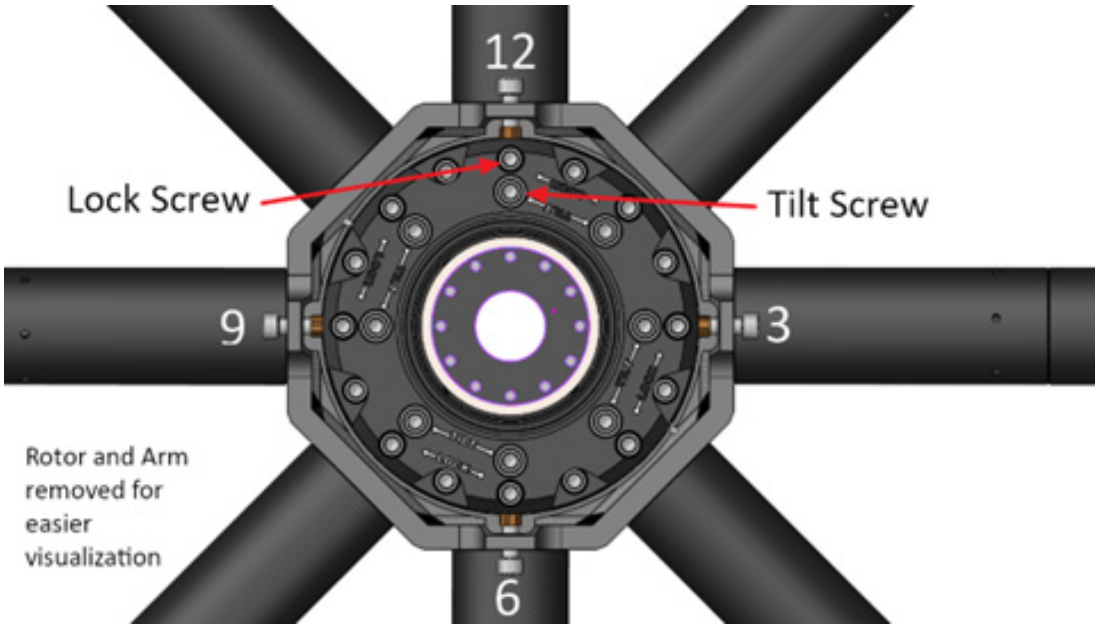
Place a dial indicator on the circular surface you want to reference. Starting in line with an adjustment screw, set the dial indicator to zero. Rotate the machine 180 degrees and adjust the machine in or out until the value on the indicator is reduced by half. Re-zero the indicator and move it 180 degrees to confirm that the values are the same.

Note - You may need to loosen the adjustment screw on the side you are adjusting the X-Y plate towards.

Repeat this procedure on the legs perpendicular to the first legs adjusted.

Warning - Make sure X-Y plate screws are tightened after precision adjusting.

LEVELLING THE MACHINE



To level the machine, complete the following steps, based on the diagram above.

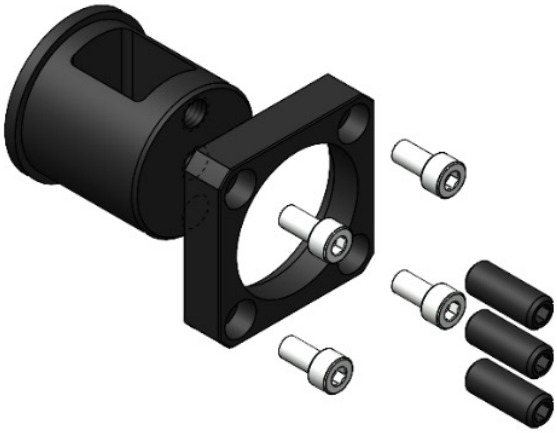
1. Ensure the outer 8 lock screws are all loosened by a full revolution.
2. Determine your starting position which we will call 12 o'clock, which should be aligned with a set of tilt and lock Screws.
3. Loosen every second tilt screw starting with the one 45 degrees from 12 o'clock. Ensuring tilt screws at the 12, 3, 6 and 9 o'clock positions remain lightly tightened.
4. Place a dial indicator between the carriage and the surface to be machined.
5. Move the dial indicator to the machine surface in line with the 12 o'clock position and zero the indicator.
6. Rotate the machine 180 degrees to 6 o'clock.
7. Reduce the value on the dial indicator by half by tightening and loosening opposing adjustment screws. (If dial reads .100 inch, reduce to .050 inch). Tilt screws are moving a spherical socket, so loosening one side will be required to tighten the other.
8. Re-zero the indicator and move the carriage back to the 12 position, ensuring no change and adjusting accordingly.
9. Move the machine 90 degrees to the 3 position and repeat the process above, between the 3 and 9 positions.
10. Verify the machine alignment is four point indicated as desired and make the adjustments as required.
11. Return to the 12 position and rezero the indicator. Tighten the tilt screw to show a positive 2 thou (80 microns), and then tighten the lock screw to bring it back to zero.
12. Maintaining the zero, move the arm to the 6 position and tighten the tilt screw to show a positive 2 thou reading before bringing back to zero by tightening the lock screw.

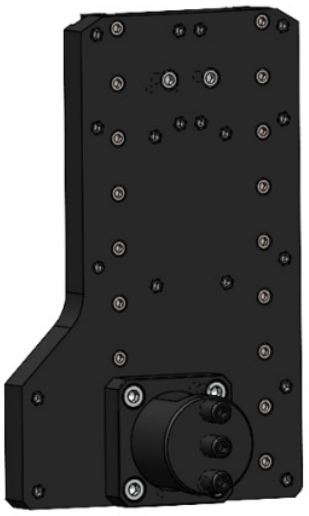
13. Repeat at the 3 and 9 positions.
14. Repeat with the 4 remaining positions in between the 12, 3, 6 and 9. These can be done in any order.
15. Verify the machine alignment, making any small adjustments prior to machining.

Note - Do not try and get locations 90 degrees from each other to read the same value as the surface may not be flat.

INSTALLING A CUTTING TOOL BRACKET

The FF-1800 has 5 cutting tool locations located on the auxiliary axis carriage. The primary locations will be the three at the bottom on the outside, middle and inside. There are two more at the top of the carriage. Once you've chosen your cutting tool location, follow these steps for installing the cutting tool.





OPERATION

PRE-MACHINING CHECKS

1. Ensure all clamping screws are adequately torqued to the workpiece.
2. Ensure all components of the FF-1800 are tightly installed.
3. Ensure all pneumatic lines are connected correctly.
4. Lock out both brakes in the non-feeding axis.
5. Rotate the machine slowly without tool contact, to ensure adequate arm and counterweight clearance.
6. Adjust rotational speed and feed rate to suit tooling and material.
7. Check the feed direction knob is in the correct direction
8. Check the auxiliary-radial feed selector on the end of the arm is in the correct position.
9. Check the feed rate knob on the top of the machine is set to desired feed rate.
10. Ensure the carbide insert is in good condition and the insert screw is secured tightly.
11. Ensure the chosen insert holder corresponds to the feed direction

MACHINING DANGERS

Note - The FF-1800 rotates clockwise.

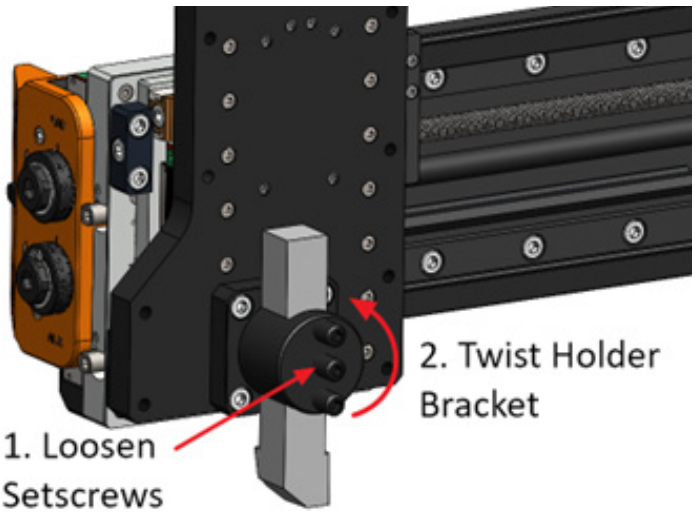
Warning - Do not reach inside the swing diameter of the radial arm (XT) during rotating or while an airline is connected.

Warning - Do not remove chips by hand or when the machine is rotating. To remove chips disconnect the machine from the air source and pull chips away with a set of pliers.

Warning - If the FF-1800 stops unexpectedly, disconnect the air line from the air motor before proceeding to troubleshoot.

ADJUSTING INSERT HOLDER ANGLE

Any 1x1 inch insert holder can be used with this machine. To choose an angle for the insert holder loosen the three set screws on the front of the bracket and twist the holder and holder bracket to desired location.



ADJUSTING TOOL FOR MACHINING

Note - For best results minimize the amount the insert holder sticks out and adjust the position using the auxiliary feed.

To adjust the tool and carriage position:

1. Put the feed selector on the end of the arm to the neutral position.
2. Use either the speed handle or a 6mm T-handle in the corresponding location on the end of the arm to move the carriage in either the radial or auxiliary position.
3. Lower the insert down onto the workpiece and moving it back and forth radially until it barely scores the surface.
4. Alternatively, use a piece of paper (~.002 inch thick) between the insert holder and the work piece and slide the paper back and forth while lower the insert holder down until it starts to grab the paper. This point will typically be within .001 inch fo the surface.
5. Move the insert holder radially off the surface to machine and lower the insert holder downwards the desired depth of cut. This can be done coursely with the scales on the end of the arm or more accurately, by using a dial indicator between the top of the arm and the top of the carriage.

TIPS FOR SUPERIOR RESULTS

1. For the maximum rate of metal removal, determine a machine RPM in line with the cutting tool type, depth of cut, feed rate per revolution, and the material being machined.
2. Do not allow ribbon cutting to collect a warp around machine rotor body. Should this occur, stop machine, disconnect air supply from motor, and clear the cuttings.
3. Close the box when not in use to keep the machine and components clean and dry when not in use.

REMOVING THE FF-1800 FROM A WORKPIECE

To remove the machine from a work piece complete the following:

1. Disconnect airline from air motor.
2. Install the 4 safety tabs on the adjustable clamping legs.
3. Retract the cutting tool from workpiece and remove the cutting tool.
4. Attach vertical or horizontal lifting brackets depending on the orientation of the workpiece, connect rigging and take slack out of straps. The best safe practice is to use a dynamometer to apply the lifting force recorded when installing the machine. Install safety backup rigging in the event of dynamometer failure. This practice eliminates a possible injury caused by a sudden shift of the load.
5. Loosen clamping legs approximately 3/8 inch smaller than the bore ID.

MAINTENANCE & TROUBLESHOOTING

Ensure all machined surfaces are cleaned and lightly lubricated as assembled. Wipe off excess oil as oil will attract dirt and debris.

DO NOT weld directly to any part of the machine.

DO NOT use high pressure air to clear debris as debris may be forced into running components resulting in damage.

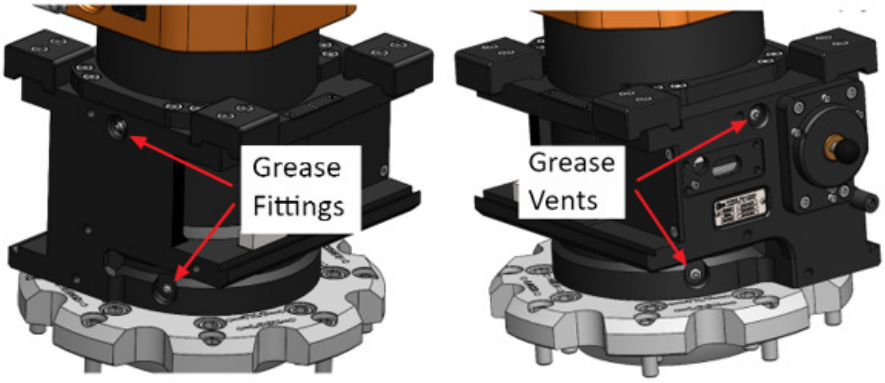
When not in use, the FF-1800 should be stored in its aluminum crate and kept in a clean and dry environment.

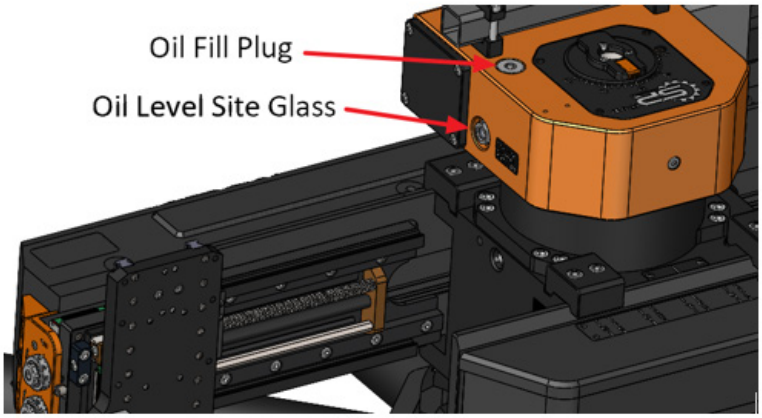
LUBRICATION

To ensure optimal performance and extend the service life of the machine, regular lubrication and maintenance are required. Always check that the main drive gear has sufficient oil

The most critical point of lubricating is the worm gear lubrication.

- Remove drain plug(s)
- Drain old oil from gear housing
- Reinstall drain plug
- With the machine in the horizontal position, fill to center of sight glass with SHC 634 Gear Oil
- Rotor main bearing lubrication.
  - ◊ Every 100 hours of operation, apply 1oz. of moly grease EP2





APPROVED LUBRICANTS

SPR recommends using the following lubricants on the following components. Failure to use the appropriate lubricants can result in damage and premature wear of the FF-1800.

APPLICATION AREA	LUBRICANT
Worm Gear	Mobil SHC 634 or equivalent
Dovetail	Light weight oil
Leadscrew	Light weight oil
PTO	5% Moly EP 2
Clamping Screws	Moly Grade Anti-Seize
Adjustable Feet	Moly Grade Anti-Seize
Feed Drive Gearbox	5% Moly EP 2
Shaft Bearings	5% Moly EP 2

TROUBLE SHOOTING

This section's purpose is to solve basic machine performance problems. For any questions or concerns contact SPR.

The FF-1800 Isn't Rotating

If the machine isn't rotating, check the following:

- The radial arm can manually be rotated by pushing on the end of the radial arm.
- The airline is connected properly.
- The air caddy lock-out is in the open position.
- The air caddy e-stop is pressed.
- The air caddy start button has not been pressed.

The FF-1800 Isn't Feeding

If the machine isn't feeding properly, check the following:

- The brake pads are loosened in the feed axis
- The feed selector on the end of the arm is in the desired feed type (Radial or Auxiliary).
- The feed direction knob is pushed all the way in or out, depending on preferred feed direction
- The feed rate is set on the top of the machine

The FF-1800 Is Cutting Poorly

If the machine is cutting poorly, check the following:

- The cutting tool is installed correctly and is tight.
- The cutting tool or insert is sharp and has the correct geometry for the material and type of cut.
- The machines feed rate and depth of cut are set correctly.
- The modular sections are tightly connected to each other.
- The brakes on the non-feeding axis is tight.
- The brakes on the feed axis are lightly secured.

WARRANTY

Superior Plant Rentals, LLC (SPR) warrants that the equipment manufactured by it will: (i) conform to SPR's written specifications and descriptions, and (ii) be free from substantial defects in design, materials, and workmanship for a period of one year from date of shipment to the original buyer, or six months from date of placing in service by buyer, whichever date is earlier.

During this period, if any equipment is proved to SPR's satisfaction to be defective, SPR will, at our sole and absolute discretion, and as SPR's sole warranty liability and buyer's sole remedy, repair, replace, or credit buyer's account for any equipment that fails to conform to the warranties, provided that: (i) SPR is notified in writing within 10 days following discovery of such failure with a detailed explanation of any alleged deficiencies; (ii) SPR is given a reasonable opportunity to investigate all claims; and (iii) SPR's examination of such equipment confirms the alleged deficiencies and that the deficiencies were not caused by accident, misuse, neglect, improper use, unauthorized alteration, repair, or improper testing.

Shipping cost of the alleged defective equipment to SPR is to buyer's account. However, if SPR agrees that the equipment is defective, then pursuant to this warranty, SPR will reimburse buyer its shipping cost to return the equipment to SPR.

The warranty against defects does not apply to: (1) consumable components or ordinary wear items, and (2) use of the equipment with equipment, components, or parts not specified or supplied by SPR or contemplated under the equipment documentation.

The following actions will void the one-year warranty:

1. Repairs or attempted repairs have been made by persons other than SPR personnel, or authorized service repair personnel;

2. Repairs are required because of normal wear;

3. The tool has been abused or involved in an accident;

4. There is evidence of misuse such as overloading of the tool beyond its rated capacity, use after partial failure, or use with improper accessories.

5. Damage to the motor due to lack of oiler/mister while tool was in use (pending motor type).

NO OTHER WARRANTY IS VALID

SUPERIOR

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Edmonton, AB | Gonzales, LA | Houston, TX | Moss Point, MS
Rancho Dominguez, CA | Rock Hill, SC | Webster, TX