SHIPPING AND RECEIVING

This equipment and its components have been inspected, wrapped, crated and/or skidded to prevent damage in shipment. Inspect the equipment as soon as possible after arrival and report any obvious damage to the carrier and to RETROFLEX immediately.

INTRODUCTION

Retroflex recommends that you have a Retroflex service technician assist with the installation of this equipment. The Retroflex technician will also train operators in the proper operation and maintenance of this equipment.

IMPORTANT: *Damage or failure due to improperly installed or improperly operated equipment may void the warranty.*

This manual is supplied as a guide in the operation and preventive maintenance of this equipment. It is not intended to be a substitute for proper training under the direction and supervision of a qualified instructor. It is the customer's responsibility to insure that all operators and maintenance personnel are properly trained on this equipment.

The operator(s) must fully understand the operation of this equipment, and how this equipment may be integrated into other production machinery. The operator(s) must know the location of all Emergency Stop controls, understand all emergency procedures, and comply with all safety requirements before operating this machine. The operator must review the safety precautions in this manual, as well as those affixed to the equipment.

RETROFLEX has made this manual as complete as possible. Customer changes, field changes, modifications or unintended use of this equipment may not be covered by these instructions. It is the customers' responsibility to contact RETROFLEX for specific information not covered in this manual.

Any descriptions and specifications herein are subject to change without notice and do not constitute express warranties. The only warranty applicable is our standard written warranty. We make no other warranty, express or implied, and particularly make no warranty of merchantability or fitness for a particular purpose.

To obtain additional copies of this Manual, write to:

RETROFLEX, Inc.

1205 Broadway Street

Wrightstown, WI 54180

Call [920] 532-4850 or Fax [920] 532-4854

IMPORTANT

Keep this manual, and any associated literature provided, where it is easily accessible to the machine operator and maintenance personnel.

Table of Contents

Section 1 General Information

This RETROFLEX Flexographic Print Deck is designed to fit an existing printer. The printer includes a Retroflex enclosed Reverse Angle Doctor Blade System.

This print deck does not include a drying system.

This equipment is designed for non-hazardous in-line applications.

Consult the order specifications for a detailed listing of specifications.

A. ENCLOSED BLADE THEORY OF OPERATION

1. WIPE THE ANILOX/GRAVURE ROLL:

Inking of the engraved roll is accomplished with this RETROFLEX enclosed Reverse Angle Doctor Blade System.

The Reverse Angle Blade (the blade that points opposite the direction of roll rotation) is designed to wipe, or doctor, the roll so as to leave on the roll only the amount of fluid that the roll is designed to carry. This is determined by screen values and cell volume. It should provide a constant and repeatable wipe regardless of machine speed. Thus the amount of fluid to be applied to the substrate is controlled by the gap adjustments, cell volume and the substrate itself.

2. CAPTURE OF EMISSIONS:

Fluid is pumped to the applicator head and drained back to the pump via hoses to reduce evaporation and chemical emissions. End seals, a doctor blade and a trailing blade contain the fluid within the chamber cavity. Full adjustment capabilities of the cavity assembly ensure proper alignment to minimize leakage and adjustment for blade wear. These features help maintain the original viscosity and fluid formulation, allowing for fluid consistency throughout your run.

3. REPEATABILITY:

The system is designed to repeat its functions time and time again in a way that the operator can easily achieve, regardless of machine speed. The cavity assembly can be disengaged from the engraved roll for maintenance, cleaning, cavity and blade changes and returned to its predetermined position against the engraved roll. This allows for less downtime along with higher quality and consistency.

4. REDUCE FLUID CONSUMPTION:

The system should only apply the amount of fluid that the Anilox/Gravure roll is designed to carry and no more. This helps to reduce fluid consumption. Proper fluid cleanup after the production run will further reduce fluid loss.

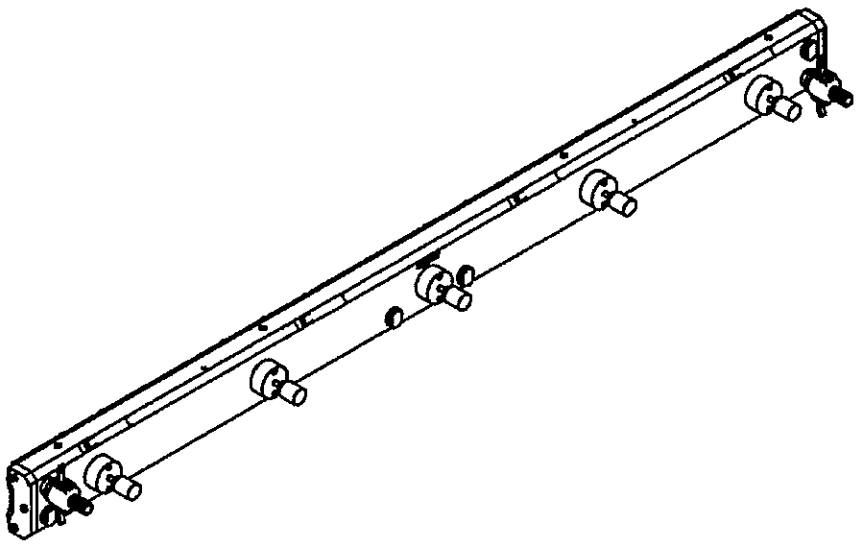

FIGURE 1 ENCLOSED DOCTOR BLADE ASSEMBLY

Section 2 Safety and Installation

A. SAFETY

1. SAFETY NOTATIONS

The following notations may be used throughout this manual to call attention to safety issues, special information or operating procedures. Review and understand the meaning of the signal words Danger, Warning, Caution, Important and Notes.

A DANGER designates the most serious safety hazard. Failure to follow the instructions or heed the warning will most likely result in severe personal injury or death.

WARNING

A WARNING describes a serious safety hazard. Failure to follow the instructions could result in severe personal injury or death.

CAUTION

A CAUTION identifies safe operating practices or indicates unsafe conditions that could result in personal injury, product or property damage.

IMPORTANT: *An IMPORTANT statement indicates specific procedures or information that is required to prevent damage to the machine or its components.*

NOTE: *A NOTE points out general reference information regarding proper operation and maintenance of this machine.*

2. SAFETY PROGRAM

The customer and operator of this equipment are responsible for organizing and promoting an effective safety program. Safe operating practices must conform to the specific use and working conditions over which RETROFLEX has no direct control.

The operator of this equipment is responsible for the safety of all personnel in the area where he is working. He should follow every procedure possible to insure safe operating practices and to protect equipment and personnel in the area. Take all possible precautions to avoid having an accident or to being a contributing factor in someone else having an accident.

3. INSTALLATION SAFETY

During installation, wear appropriate Personal Protective Equipment (PPE) for the task at hand. As an example, wear eye shields and gloves when removing shipping banding or uncrating equipment. The customer is responsible to provide PPE as needed.

Use appropriate lifting devices. Never lift heavy objects by hand. Never place any part of your body under a suspended load for any reason.

Replace any guard removed during installation or repair. Reset any other safety devices such as light curtains, safety cables, photo eyes, etc. before testing and operating this machine.

4. OPERATING SAFETY

Wipe up any spilled fluids, grease, oil, etc. before operating any machine. Remove tools and waste material.

Take precautions to keep hair, rings, scarves, sleeves, trouser legs or other loose fitting clothing from getting caught in nip points or other moving parts.

Use protective eye and skin covering when using corrosive materials during operation or clean up of this machine.

Before operating the machine, make sure all guards are in place and properly secured and all protective devices are in good working order.

Know the location of all emergency stop buttons before the machine is started.

Make a complete visual check of the machine to ensure that all personnel and tools are clear of the moving parts before starting.

5. MAINTENANCE AND TROUBLESHOOTING SAFETY

Before anyone performs any inspection, maintenance, lubrication, adjustment or repair procedure, make sure that all power is OFF and appropriate 'lock-out' & 'tag-out' procedures have been followed.

Never perform any lubrication, maintenance or repair while the machine is running.

Replace all guards that were removed to perform the lubrication, maintenance or troubleshooting procedure.

6. SAFETY SIGNE

Do not remove or cover up any safety signage on this machine.

B. INSTALLATION

IMPORTANT: *Qualified servicemen who are familiar with local, state, and federal codes and procedures must install this equipment.*

This equipment must be level and in precise alignment in ensure proper operation. In some cases, optical alignment may be required.

Install each section over the appropriate anchor bolts (not supplied) on the proper foundation or floor. Care must be taken to ensure that the frame is not distorted when the sections are bolted to the floor since this could cause excessive vibration or failure to the drive components. Leveling bolts are provided on the frame bases to make any adjustments.

CAUTION

Lifting heavy components can cause back, neck and other injuries.

When disassembling or assembling any part of this machine, be sure there is adequate support equipment available such as blocking and lifting devices.

Typically, components are shipped assembled. Information on any component modifications and installation is contained on the parts identification sheets at the end of this manual.

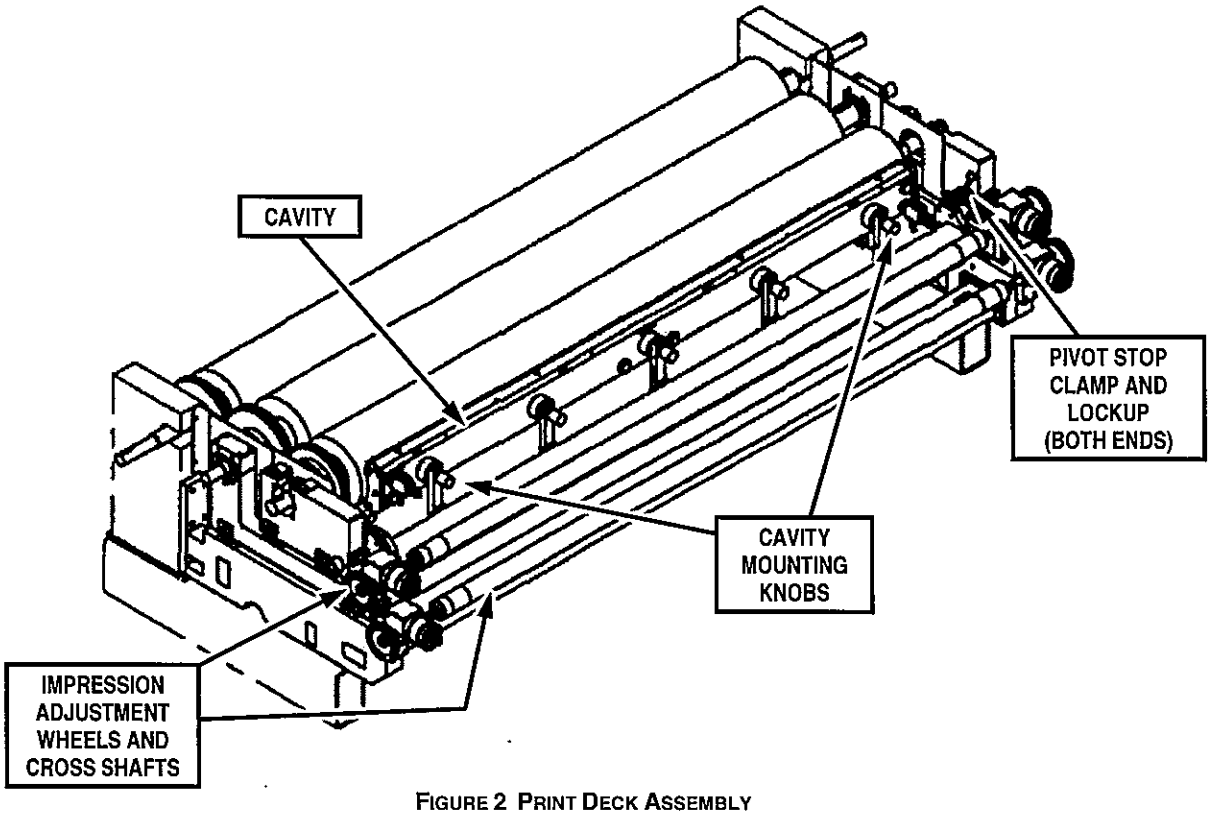

FIGURE 2 PRINT DECK ASSEMBLY

Section 3 Adjustments and Setups

A. ENCLOSED DOCTOR BLADE SYSTEM

1. ABOUT DOCTOR BLADES

The doctoring blade could be made from a variety of material, typically metal, plastic or UHMW. The other blade, called the trailing blade, is typically a Mylar or polyester blade and is wider than the doctoring blade. The trailing blade will lay on the roll face to reduce trail doctoring.

The standard blade material and end seals included with this unit may not provide for the optimum overall performance under every condition. Several different blade and seal materials are available that may help increase overall performance. Please contact Retroflex for further details and material availability.

In any event, whatever blade material is used, it is extremely important that they are installed correctly and that the cavity is setup parallel to the engraved roll. This installation and adjustment is well worth the time and effort and will help to insure optimum performance and blade life.

IMPORTANT: *It is important that the printer/coater rolls are parallel at time of cavity setup and prior to press impression setup. Roll parallelism should be rechecked each time a plate or plate sleeve is replaced.*

2. BLADE INSTALLATION

CAUTION

Blade Cutting Hazard.

Doctor blades are very sharp and can cut and dismember. Use appropriate gloves and other protection when handling doctor blades.

NEW CAVITY

For new enclosed blade system not yet setup and aligned to press/coater.

a. If the cavity has not been installed on the pivot shaft, place the cavity on a clean level work surface with the hose connectors downward.

   If the cavity is already installed on the pivot shaft, loosen the locking handle(s) and rotate the cavity away from the roll surface. Wrap the engraved roll to protect it.

b. Remove end plates, seals, and the blade clamps. Set them aside.

c. Wipe all surfaces and be sure that they are clean and dry.

d. Cut two pieces of UHMW doctor blade material to the same length as the blade clamps.

   IMPORTANT: *For Cavity Alignment check only – The Doctor and Trailing blades must be the same material (same thickness and width as production doctor blade).*

   NOTE; *This unit shipped with .050" UHMW doctor blade.*

ROUTINE BLADE CHANGE

As the blades wear and no further adjustments can be made to compensate for wear, or they become extremely dirty, the blades must be replaced.

IMPORTANT*: Units with Linear Adjustment - Back off to the rear stops to accommodate the new wider blades.*

a. Loosen the locking handle(s) and rotate the cavity away from the engraved roll or remove completely. Wrap the engraved roll to protect it.

b. Remove end plates, seals, blade clamps and old blades.

c. Thoroughly clean the entire surface of the cavity, especially the surface that supports the blades and seals, including the blade clamps and locator pins.

   IMPORTANT: *Installing new blades over dried fluid buildup will cause an uneven or wavy blade edge and result in cavity leakage.*

d. Cut two pieces of doctor and trailing blade material normally used for production to the same length as the blade clamps.

NOTE: *Take notice that one edge of the blade is flat and the other edge usually has a bevel or step design. Also note the design of the blade clamping surface; it will either contain multiple stainless steel locating pins or have a flat edge which the blades must rest against.*

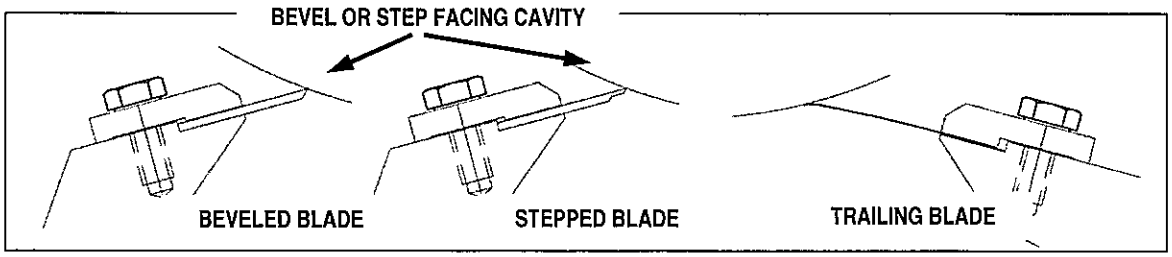

FIGURE 3 TYPICAL BLADE CONFIGURATIONS

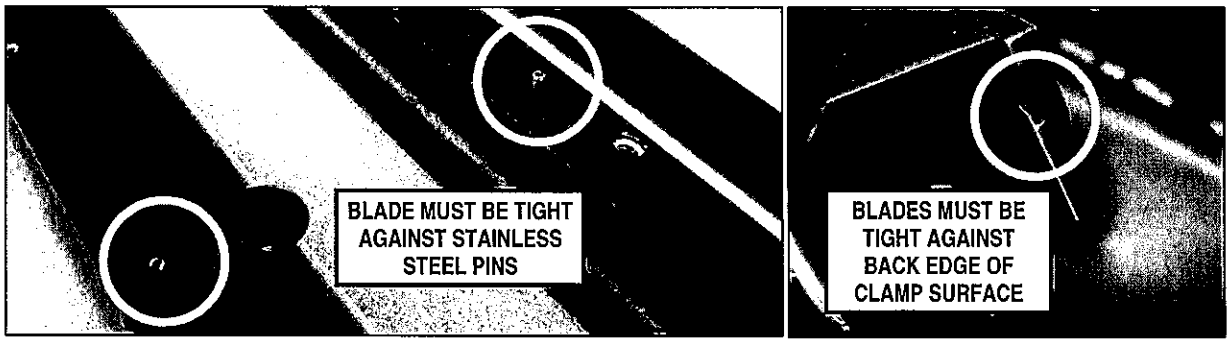

FIGURE 4 BLADE CLAMP STYLES

e. Place the flat edge of the doctor blades tight against the back edge of the cavity clamp surface (or the pins), with the bevel or step edge downward, facing the cavity.

f. Install the blade clamps and snug up the hex head capscrews by hand. Insure that the blade is centered, end-to-end, under the clamp. Adjust as necessary.

g. Using a torque wrench, tighten the clamp capscrews to **8 inch/pounds** of torque, starting at the center of the assembly and working outward toward both ends. This method will help prevent 'rippling' of the blades. (Approximate equivalency to 8 inch/pounds is finger tight then snug up with short handle wrench.)

IMPORTANT: *Do not exceed the recommended torque limit. Doing so may cause damage to the aluminum cavity body and to the engraved roll.*

IMPORTANT: *IF THIS CAVITY NEEDS TO BE ALIGNED, DO NOT INSTALL END SEALS AT THIS TIME.*

3. CAVITY MOUNTING

a. *Reinstall* the cavity onto the arms if previously removed.

1) With the Pivot Arms angled backward, back out the hand knobs or handles on the Cavity Studs.

2) Slide the Cavity Studs into the slots of the Pivot Arms until the studs rest firmly on the bottom of the arm slots and then snug up the knobs or handles.

b. Unwrap the engraved roll if was wrapped.

c. Rotate the cavity up into the doctoring position against the roll, tighten all locking handles or knobs.

NOTE: *Be sure that the blades are tight against the engraved roll.*

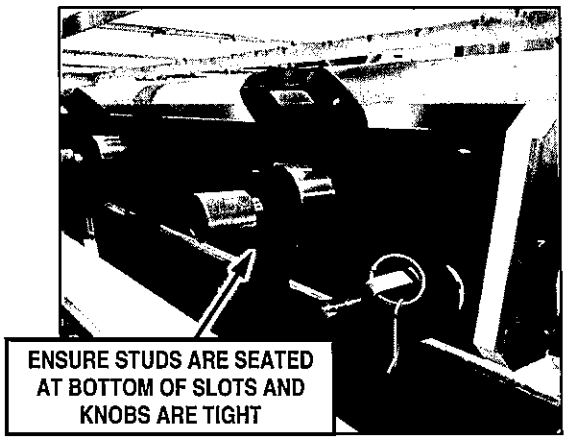

FIGURE 5 CAVITY MOUNTING

5. PIVOT STOP SETUP

The mechanical stop(s) are used to insure that the cavity is positioned at the same spot each time the cavity is brought up against the roll.

Once the setup blades are installed on a new cavity and the cavity is mounted to the pivot arms, the Pivot Stop is setup as follows.

a. Loosen the Pivot Shaft Lockup handle and rotate the cavity assembly toward the engraved roll until the cavity is perpendicular to the roll. It may be necessary to back out the Pivot Stop Adjustment Screw to rotate the cavity as far as needed.

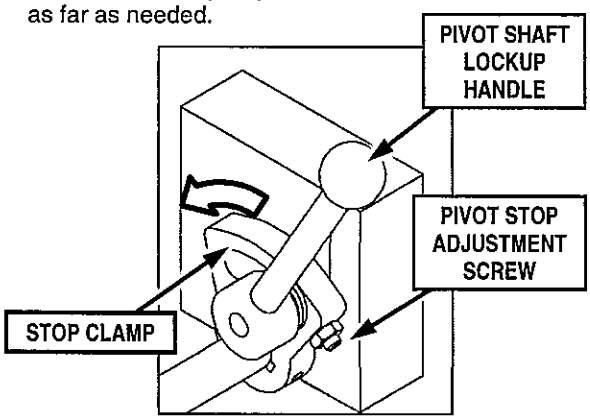

FIGURE 6 PIVOT STOP CLAMP

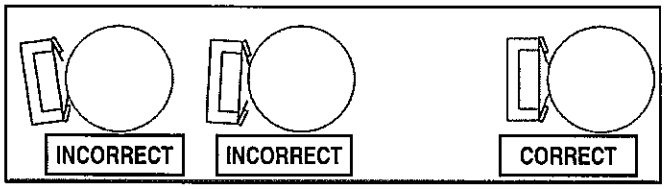

FIGURE 7 DOCTOR BLADE ALIGNMENT

b. Insert a .002" to .006" feeler gauge between the top blade (at the very end of the blade) and the roll. Move the gauge up and down to get a 'feel' for the resistance, or blade pressure. Then check the bottom blade pressure. It should feel the same. Then check end to end.

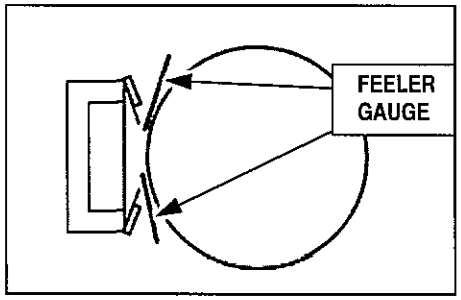

FIGURE 8 TESTING BLADE PRESSURE

IMPORTANT: *If the blade pressure is not equal end to end or top to bottom, check the blades for proper installation. Contact Retroflex if the cavity still does not align properly with the roll.*

c. Ensure the cavity is tight against the engraved roll and the lockup handles are tight.

d. Adjust the setscrew against the lockup handle shaft then tighten the setscrew jam nut.

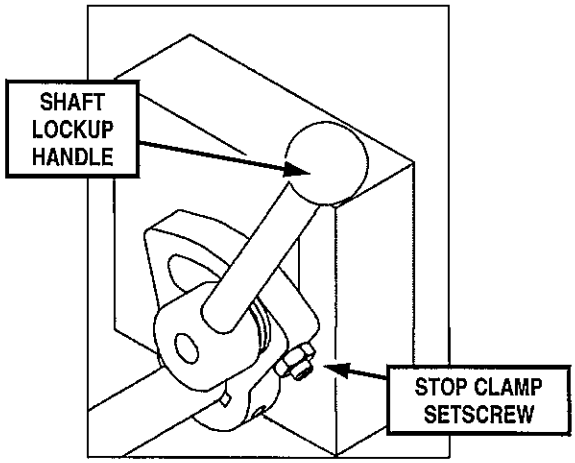

FIGURE 9 RETROFLEX STOP CLAMP ADJUSTMENT

e. Check for any gap between the blade and the roll, top and bottom across the face of the roll. There should be none. If there is, the previous blade or pivot stop adjustment must be done over.

6. INSTALLING PRODUCTION BLADES

After the Pivot Stop Clamp is set, the production blades (page 4) and seals can be installed.

Please contact Retroflex for more information on alternative blade and seal materials for your application.

7. END SEAL INSTALLATION

Once the cavity is aligned and setup, rotate the cavity away from the roll and install the required blades and end seals for production.

a. Place one seal on each end. Tuck the seal under the ends of the doctor blades, then push the bottom of the seal in place. The seals should extend about half way under the ends of the blades.

NOTE: *Some seals require a sealant which should be applied before installation.*

b. Install the End Plates over the seals and secure with two thumbscrews. Tighten evenly finger tight, enough to put slight pressure against the seal and ensure the seal is tight against the ends of the cavity.

Unit is now ready to install in the mounting brackets. See cavity mounting on page 2.

CAUTION

Blade Cutting Hazard.

Doctor blades are very sharp and can cut and dismember. Use appropriate gloves and other protection when handling doctor blades.

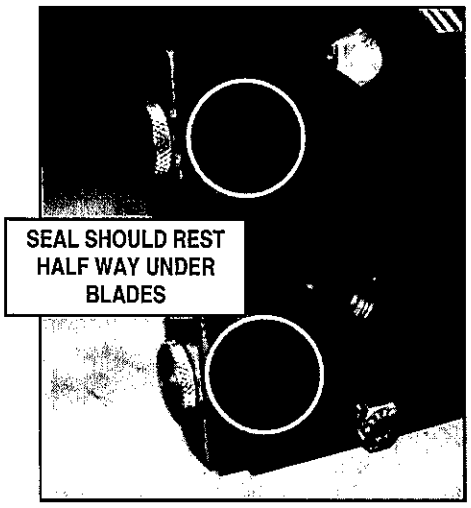

FIGURE 10 SEAL INSTALLATION

8. HOSE CONNECTIONS

Attach fluid hoses to the rear of the doctor blade cavity. Barbed tubing or quick disconnects are provided for hose connections.

If a pump or cart was included with this order, see the Pump drawing included with this manual.

Generally the upper larger diameter hole/tube is the return line back to the ink bucket or reservoir. The lower smaller diameter hole/tube is the supply line from the pump. Make sure all other holes are plugged.

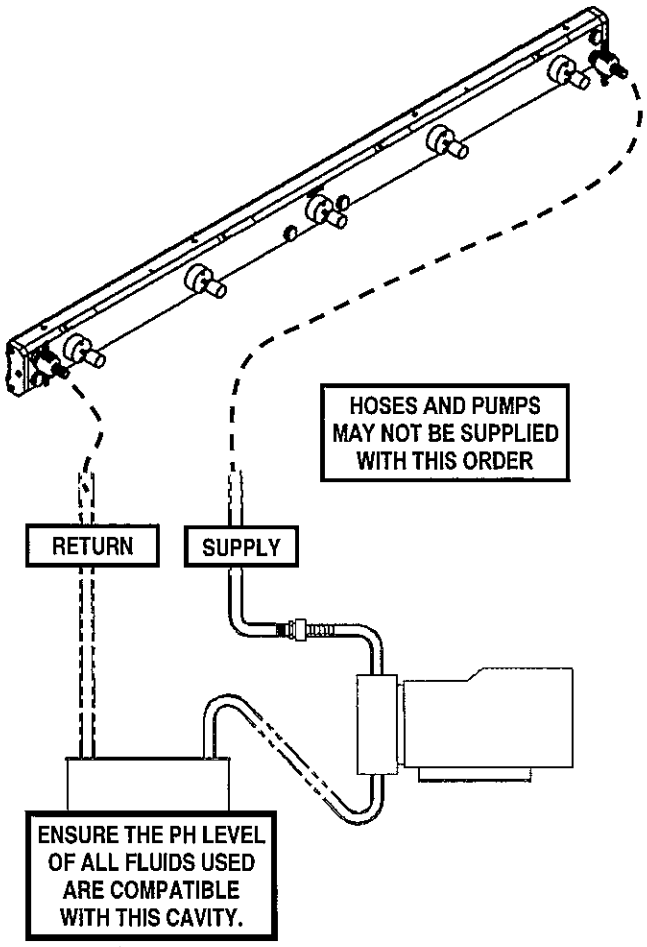

FIGURE 11 HOSE ATTACHMENT

9. SPARE CAVITY SETUP

All cavities manufactured by Retroflex Inc., for the same installation, are constructed to the same specifications. This enables all cavities to be interchangeable for that particular installation.

There should be no adjustment necessary for this spare cavity.

B. PRINTER SETUP AND OPERATION

1. CHECKING PRINTER ROLL PARALLELISM

It is very important that the print rolls are parallel prior to installation of a printing plate or sleeve or webbing up of the press.

During the course of setup and production, as adjustments are made for print quantity or plate/sleeve wear and irregularities, the rolls are no longer parallel. With continued adjustments or with the installation of new plates without re-alignment of the rolls, accelerated bearing wear, poor print quality, poor plate life and vibrations may occur. Cantilevered plate mandrel systems cause additional problems since the operator side housing is no longer parallel to the roll shaft, causing difficulty in changing sleeves among other problems.

Thus it is important to always be sure that the rolls are returned to a parallel state prior to installation of a new plate/sleeve or changes in substrate thickness. The adjustments should also be backed out to accommodate a new plate/sleeve which would be thicker than the old worn one.

Two fairly simple mechanical methods can be used to check the rolls for parallelism;

1) With the Impression OFF, gaps open, measure the distance between the machine frames on both ends of the rolls. Adjust as necessary so that the gaps are equal end to end.

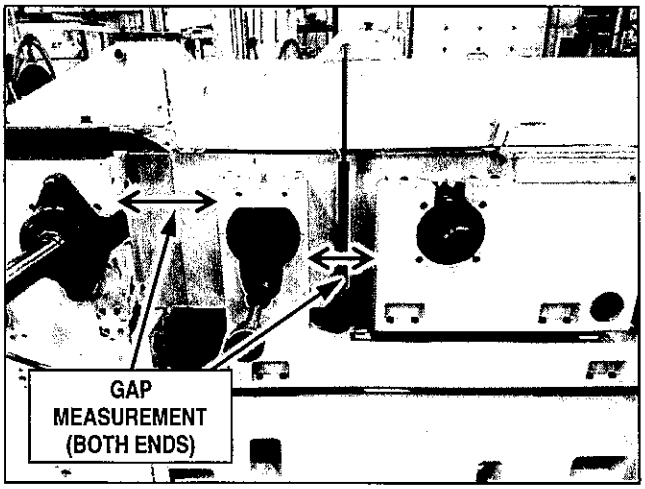

FIGURE 12 CHECK ROLL PARALLELISM

2) With the press at rest and no sleeve or web in the press. Cut a piece of non-metallic shim stock, about 18 inches long, and of equal thickness as the plate, adhesive strips and web, or, sleeve and web combined. Manually engage the Impression Rolls. Insert the shim between the Impression Roll and the Plate Mandrel at one end while adjusting the gap so there is resistance when removing the shim. Likewise adjust the other end of the roll in the same manner. The resistance on the shim should be as equal, end to end, as much as possible.

3) Cut a second piece of shim stock equal to the thickness of the plate and adhesive strips, or, the sleeve. Place between the Plate Mandrel and the Engraved Roll. Test in the same manner as the Plate to Impression gap.

2. PRINTER IMPRESSION ADJUSTMENTS

The Anilox to Plate roll nip (roll gap) and the Plate to Impression roll nip are hydraulically loaded during run mode. The Anilox to Plate roll nip transfers ink to the plate located on the plate roll. The Plate to Impression roll nip transfers the ink to the web.

Each nip can be adjusted independently and each end of each nip can be adjusted independently. An adjustment to either nip will not affect the setting of the other.

The adjustment wheels on both ends are connected via the cross-shafts. Rotating either wheel or cross-shaft moves both ends simultaneously.

The upper adjustment wheels (**Error! Reference source not found.**) open or close the gap between the Anilox and Plate rolls.

The lower adjustment wheels open or close the gap between the Plate and Impression rolls.

The cross-shaft can be disconnected by grasping with both hands and pulling sideways to disconnect from the gearbox. Doing so will allow each end of the roll to be adjusted separately.

IMPORTANT: *Do not disconnect the cross-shaft unless the rolls are no longer parallel or if adjustment is needed due to worn and uneven plates.*

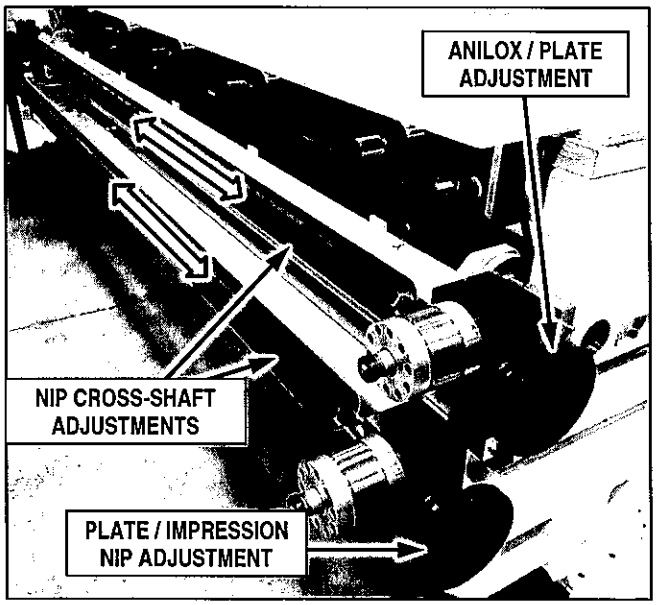

FIGURE 13 IMPRESSION ADJUSTMENT

3. RUNNING IMPRESSION ADJUSTMENTS

The following adjustments are made with the line webbed up, and ink being pumped to the doctor blade cavity. Once an initial setup is made with the line running at a slow speed, the 'fine tuning' can be made during a fast run.

1) Set the line speed to a slow setup speed - slowest speed to automatically engage the nips. An image should be printed on the web.

2) Start with the Plate to Impression roll nip, manually rotate the LOWER cross shaft until a uniform layer of ink is applied evenly across the web. If the ink is lighter on one side than the other, the plate and impression rolls are not parallel.

   a. To correct any unevenness, the side that is printing heavy must be backed off slightly. Pull and rotate the pin on the cross shaft to dislocate it from the locking hole. Then rotate the adjustment wheel (or the shaft) on the side that is printing heavy, to lighten the image.

   Both sides should now be printing light. Re-engage the cross-shaft pin in the locking collar. Rotate the cross-shaft again to increase the impression.

3) Check the image to see that it is printing evenly across the face of the web. If not, repeat the above procedure until the image density is even.

4) Once the proper amount of ink is applied to the web, adjust the Anilox to Plate roll nip.

5) Manually rotate the UPPER cross-shaft to lighten the impression - watch the image on the web. If one side should lighten in density before the other, this is an indication that the Anilox and Plate rolls are not parallel.

   a. To correct this, use the same procedure as above. Open the gap up slightly on the side that is heaviest by using cross-shaft adjustment feature. Then move both ends in simultaneously to check the image again.

6) Repeat the procedure if necessary.

Section 4 LUBRICATION AND PREVENTIVE MAINTENANCE

A. GENERAL NOTES

Clean each grease fitting, oil filling hole and drain before performing any lubrication or maintenance on those components. Use an air hose to blow debris from around the line.

Wipe up oil, grease and coating fluid spills immediately. Read safety instructions in this manual.

Lubrication instructions for components not manufactured by Retroflex Inc., such as gear cases, are contained in the vendor literature supplied with this machine. All available literature received from the manufacturer is supplied.

IMPORTANT: *Do not use pressurized greasing systems. Grease seals are used in some bearing applications. Forcing grease into a fitting where a seal is used may damage the seal. Use a hand grease gun for all applications.*

B. FLUIDS AND LUBRICANTS

Consult the Safety Data Sheets for all fluids and lubricants used in the operation and maintenance of this equipment whether provided by Retroflex or not.

IMPORTANT: *Use recommended lubricant or functional equivalent. Never mix more than one brand or type of oil in the same gear case or fluid reservoir. Mixing two brands of oil may cause a chemical reaction resulting in reduced lubrication and damage to the internal components.*

NOTE: *Anti-Seize Compounds should not be used as a lubricant.*

NOTE: *Always dispose of cleaning and coating fluids properly.*

C. LUBRICATION AND MAINTENANCE CHART

ITEM	MAINTENANCE POINTS	INTERVALS	Lubricant / Notes
D	Coater fluid system Clean-up. See Preventive Maintenance Notes and **Cleaning instructions on page** Error! Bookmark not defined..	**Daily**	Keep the coater clean and free of dirt as much as possible. Clean the drip pans, doctor blade cavities, hoses and pumping systems. **Do not use strong cleaning agents. See notes.** Use an air hose to blow debris from around the line. Wipe up oil, grease and coating fluid spills immediately. Read safety instructions in this manual.
	Doctor Blades and Seals		Blades – Replace when the Linear Adjustment mechanical stops are reached or when they no longer wipe the roll cleanly. Seals – Replace when blades are replaced or when excessive leaking occurs. **Lubricate roll edge of white seals with SL3310 Lithium grease. Impregnate felt seals with Synco Super Lube oil with PTFE food grade.**
	Hoses and Tubes	**Weekly**	Check condition of hoses and tubes. Replace as necessary.
F	All sliding, rotating and pivoting surfaces without grease fittings.	**Weekly**	Wipe clean then apply a thin film of oil, or white lithium grease, to all rotating, pivoting and sliding surfaces to prevent rust and/or keep the components moving freely.
G1	Linear Slides (8) (small grease fitting)	**Semi-Annually**	Apply CRC Stay-Lube SL3310 Lithium Bearing Grease to each grease fitting. Do not force grease into fittings. Use hand grease gun.
G2	Pivot Shaft Bushing (2)		
G5	Rack In/Out Jack Screws (4)		
G7	Gearbox, Impression (4)	**Annually**	Apply CRC Sta-Lube SL3151 Multi-purpose White Lithium Bearing Grease. Do not force grease into fittings. Use hand grease gun.
G8	Customer Equipment Grease Points		

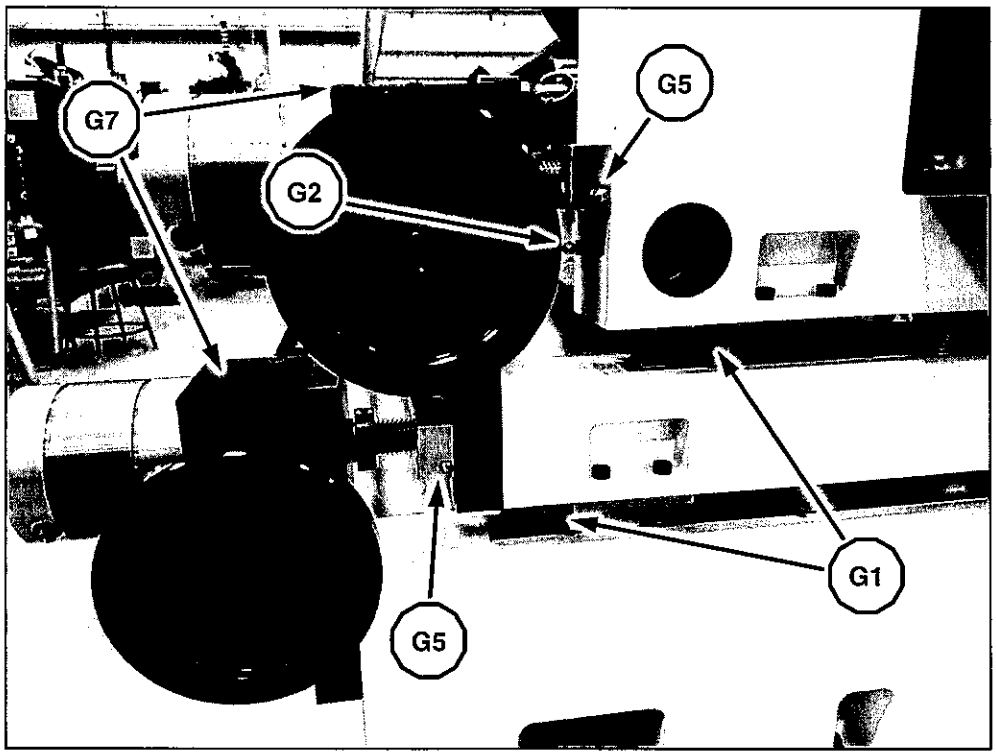

FIGURE 14 ADJUSTMENT LUBE POINTS

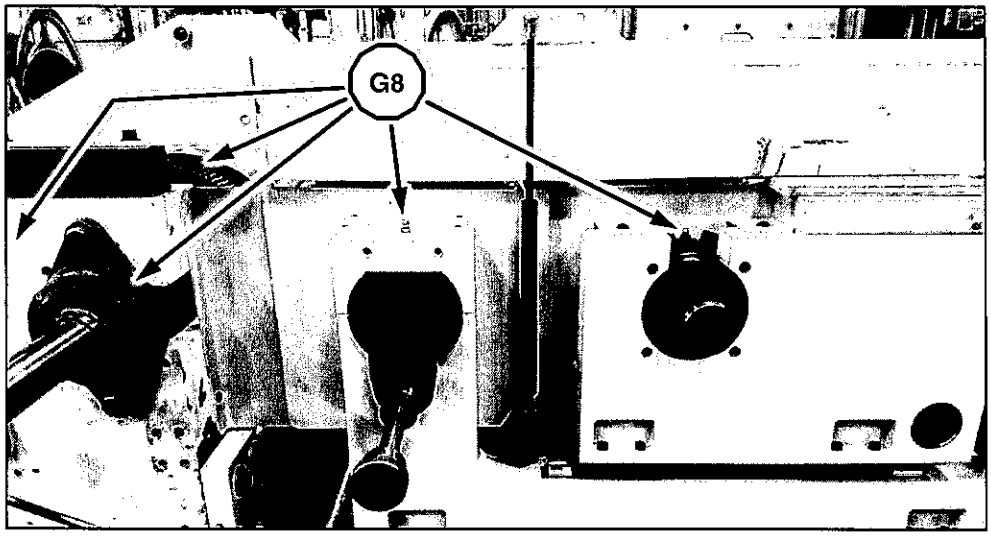

FIGURE 15 CUSTOMER LUBE POINTS

D. PREVENTIVE MAINTENANCE NOTES

The following item key notes apply to the preceding lubrication and maintenance charts.

B. Cleanup - Do not use strong cleaning agents. Check pH range. This blade cavity is made of Aluminum, with a hard coating, and should withstand a pH range from 5-9 (process and cleanup fluids).

Clean the drip pan, doctor blade cavity, hoses and pumping system. See "TROUBLESHOOTING

WARNING

Components in motion can cause serious personal injury.

Never attempt to fix a problem or perform any kind of service on this machine without first shutting OFF power and activating all 'lock-out' devices.

The following information applies to all RETROFLEX equipment and all machinery in general. It is provided as a reference only.

When a component wears unusually fast or frequently needs adjustment, it could mean a problem elsewhere in the system. Do not merely replace worn or damaged components without first investigation the cause of part failure or premature wear. Such things as too much or too little lubrication, poor quality lubricants, misalignment of parts, incorrect repairs and adjustments or improper operating methods can cause these types of problems.

Troubleshooting is best accomplished by using common sense and a systematic approach in determining the extent of a problem, the cause of it, and a possible solution.

First, determine as best as possible, exactly what the problem is. Try to isolate what part(s) or component(s) is being affected. What are the symptoms?

Also be alert for unusual odors, leaks, excessive wear or damage that could cause a part or component to malfunction. Try to recall any different or unusual noises or changes in the operation of any machine component.

Analyze the entire machine; then by the process of logical elimination, look for the source of the problem.

1. DOCTORING SYSTEM

PROBLEM	PROBABLE CAUSE	POSSIBLE REMEDY
Gap or blade pressure problem between blades and roll.	Cavity not set up properly.	Check procedure – make sure cavity is perpendicular with the roll.
	Blade worn damaged or rippled.	Use correct installation procedure – tighten from middle outward. Check for debris under blades. Replace worn or damaged blades.
Excessive leakage (generally more than a few drops).	Blade or cavity setup procedure wrong.	Check for blade pressure. Drain and realign the cavity per procedure in manual.
	Dirt/dried fluid buildup under blades.	Thoroughly clean all surfaces.
	Blades damaged, rippled or installed backward.	Insure correct blades installation
	Incorrect blade material.	Insure blades are of the correct material and design.
Excessive seal leakage.	Seals are worn, the wrong type or not set up properly under ends of blades.	Replace wrong or worn/defective seals. Verify installation procedure is correct.
	Dirt/dried fluid buildup on seal.	Clean all surfaces before installing seals.
	Excessive or not enough end plate pressure.	End plates should be finger tight only.
Excessive fluid remains on roll.	Incorrect alignment of cavity and roll.	Re-align the cavity to the roll.
	Insufficient blade pressure.	Check linear adjustment if available. Hard blade material takes longer to 'seat'.
	Blades worn or wrong blade material.	Insure blades are of the correct material and design.
Fluid dries on Anilox roll.	Sunday drive problem.	Sunday drive too slow during stop mode or doesn't run at all.
	Excessive air blown on roll.	Fans, open doors, too much air flow over rolls
	Fluid problem.	Fluid used dries quickly – try to slow rate of drying.
Excessive fluid applied to substrate.	Impression setup incorrect.	Lighten up on impression adjustment.
	Wrong gravure pattern or volume for material being run.	Change to correct roll pattern or change viscosity of fluid.
Not enough fluid applied to substrate.	Impression setup incorrect.	Lighten up on impression adjustment.
	Wrong gravure pattern or volume for material being run.	Change to correct roll pattern or change viscosity of fluid.
	Fluid dried in roll cells.	Clean Anilox roll.
	Anilox roll worn.	Replace worn roll.
Uneven lay down across web.	Impression setup incorrect.	Check impression adjustments between rolls. Correct for non-parallel rolls.
	Rolls not clean.	Clean rolls.
	Worn or damaged Plates.	Install new plates.
Print quality varies from run to run.	Machine parameters changed.	Verify web tensions have not changed, the nip roll provides positive tension, dryers set up properly, the same engraved roll / plates are used, etc.
	Fluid changed.	Check fluid viscosity, pH levels, colors, manufacturer,

PROBLEM	PROBABLE CAUSE	POSSIBLE REMEDY
		etc.
	Dirty rolls/plates.	Be sure all rolls and plates are clean and free of dirt and dried fluid. Especially examine the engraved cells.
Voids or skips seen on web.	Plates or Anilox roll worn.	Inspect and replace worn plates or Anilox roll.
	Rolls / plate dirty.	Inspect and clean dirty plates or Anilox roll. Inspect for excessive roll run-out.
	Gear driven rolls - backlash or dirt buildup.	Clean dirt buildup on gears.
	Rolls bounce.	Insure lockdown handles are tight and rolls are secure.
Web wrinkles or does not track straight through line.	Web guides turned off.	Turn on web guides.
	Bowed guide roll needed.	Install bowed guide roll.
	Rolls not parallel somewhere in the line.	Optical alignment of rolls may be necessary.
	Coating or paper buildup on rolls.	Clean rolls.

" below. Metallic or sharp objects should not be used to clean the coated cavity. Use of ultrasonic cleaning methods should only be performed by experienced operators. Improper ultrasonic cleaning may cause permanent damage to the cavity and render it useless.

Keep all rolls clean. Use care when cleaning the Engraved roll. See Ceramic Roll Maintenance in this manual.

Use an air hose to blow debris from around the line. Wipe up oil, grease and coating fluid spills immediately. Read safety instructions in this manual.

E. CLEANING THE CAVITY

The blade system can be cleaned a number of ways. A lot depends on the fluid being used, drying time, equipment available, size of the cavity etc. The following is a general cleaning method which can be used if an automatic system is not available.

1. Stop the line, or printer deck. Stop the fluid pump. Stop the Sunday Drive.

IMPORTANT: *Do not leave the Engraved Roll in Sunday drive with the chamber loaded against the roll and the pump turned off.* ***Lack of a fluid to lubricate the surface could lead to Engraved Roll surface damage.***

2. If the pump is reversible, run the pump in reverse to drain fluid from the cavity back to the ink pail. Stop the pump immediately after draining the bulk of fluid from the cavity and lines. Do not back out or tilt the cavity away from the roll unless changing the cavity.

NOTE: *If this is a small cavity and a spare cavity with new blades and seals is available, it can be switched out at this time allowing the line to go back into production right away. The dirty cavity can then be cleaned and prepared off-line. If the cavity switch can't be done quickly, before the fluid on the engraved roll dries, continue with this cleaning process.*

3. Remove the supply line from the ink pail and place it into a container of cleaning fluid compatible with the fluid being used. Place the return line into a suitable empty container or drain system.

IMPORTANT: *If cleaning solvents or non-water based fluids are used, do not run the return line to a drain. Recycle or dispose of cleaning solutions in the proper manner.*

CAUTION

Using harsh chemicals may damage the cavity.

Process and cleaning agents must fall with the pH range of 5-9. Check fluid labels or use test strips before use.

1. Run the pump in the normal direction to pump the cleaning fluid up to the cavity. Be sure the Sunday Drive is ON to assist in cleaning the engraved roll.
2. Continue this process until it appears the returning fluid is clean.
3. Stop the pump, allow the lines to drain.
4. Tilt back the cavity and remove the supply and drain lines.
5. Remove seals and blades.

CAUTION

Remove Doctor Blades before cleaning the Cavity.

Doctor blades are very sharp and can cut and dismember. Use appropriate gloves and other protection when working around doctor blades.

6. Clean the cavity. Ensure the blade contact surfaces are extremely clean.
7. The end seals can be cleaned if still in good condition. **Do Not reinstall used blades.** If using linear adjustments, replace the blades anytime the stops are reached or when they no longer wipe the Anilox roll cleanly.
8. Wipe the engraved roll with a soft cloth. Wipe and cap the ends of the hoses.
9. Additional manual cleaning of components may be necessary if not washed by this process.
10. Also wash machine frame and adjustment components to ensure future accurate adjustments.

F. CERAMIC ENGRAVED ROLL MAINTENANCE (IF USED)

A clean engraved roll is just as important as a properly installed and adjusted doctoring system. Engraved ceramic rolls require extreme care and must be protected from scoring and damage due to mishandling.

1. SCORING

Ceramic rolls are scored primarily by metal particles trapped between the blades and the roll. Those particles can come from pumps, mixers, drums, etc. but usually from improperly adjusted doctor blades.

Insure that the blades are installed properly and that correct impression pressure is applied to the roll (just enough to wipe the roll surface clean. Too much pressure will cause the blade to bend. This causes accelerated wear and eventually breaks the tip of the blade and cause slivers and bits of metal to enter the system.

Misalignment of the blade holder will also cause excessive wear. Be sure that both blades, top and bottom, touch the roll at the same time.

Never run the roll dry with the blades against the roll. This will cause heat buildup and rapid wear of the blades and the engraved surface of the roll.

2. CHIPPING

Always protect the roll when working on or near the machine. Wrap with heavy paper or cardboard. Metal objects hitting the roll may cause chipping of the surface. Chipping may cause doctor blade deformation and metal particles to break off the blade. Repair chipped ceramic rolls before use.

3. CLEANING

Use only stainless bristle brushes when cleaning dried coatings from ceramic rolls. Soft bristle brushes, such as brass, will break off and fill the small cells of the roll and thus prevent proper coating of the web.

Section 5 Service and Repair

A. SCHEDULES AND RECORDS

Accurate record should be kept of all inspections, maintenance, lubrication and adjustments, including the date the work or inspection was performed. Keep an accurate record of all repairs, frequency of repair and condition of related components at the time of repair.

NOTE: *Record every inspection even though no maintenance or lubrication was performed. Record all problems encountered even though no immediate cause for the problem can be found.*

Correct operating procedures, preventive maintenance and proper lubrication as indicated in this manual, will ensure the continued operation of this machine for years to come. Follow a regularly scheduled maintenance and lubrication program to increase the life of the machine's components and help reduce downtime.

All mechanical parts are subject to normal wear, but normal wear can be minimized by proper maintenance and repair. Improper or haphazardly carried out maintenance will reduce the life of the machine's components.

A maintenance program that is effectively planned and carried out will help eliminate a majority of the causes of machine breakdowns through periodic inspection and timely repair of components.

B. GENERAL MAINTENANCE

The following maintenance information applies to all RETROFLEX equipment and all machinery in general. It is provided as a reference only.

IMPORTANT: *Do no operate the equipment if guards or other safety devices are missing or not working properly. Do not operate if any component appears to be malfunctioning. Have the item(s) repaired immediately.*

Periodically check for possible damage to guards, latches, interlocks, covers, or other safety devices. Lubricate hinges and latches and check fasteners for tightness.

Routine maintenance and inspection of machine components should include indications of unusual noise, discoloration, odors, etc. When performing any inspection, maintenance, lubrication or adjustment procedure, be alert for the above indications as well as excessive damage, malfunction, and other normal maintenance requirements.

1. GUARDS AND FASTENERS

Periodically check for possible damage to, or missing, guards, latches, interlocks, covers, or other safety devices. Check fasteners for tightness.

C. TROUBLESHOOTING

WARNING

Components in motion can cause serious personal injury.

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Gap or blade pressure problem between blades and roll.	Cavity not set up properly.	Check procedure – make sure cavity is perpendicular with the roll.
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	Rolls bounce.	Insure lockdown handles are tight and rolls are secure.
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	Bowed guide roll needed.	Install bowed guide roll.
	Rolls not parallel somewhere in the line.	Optical alignment of rolls may be necessary.
	Coating or paper buildup on rolls.	Clean rolls.

D. SERVICE PROCEDURES

Knowledge of disassembly, inspection and re-assembly procedures for all components of this machine is mandatory before servicing can begin. Do not attempt to repair any component unless its warranty has expired and proper repair facilities, equipment and instructions are available.

Most component assemblies on this machine are relatively simple mechanical devices. Common sense and good judgment should be exercised when servicing these assemblies. Machine downtime is a major factor in determining the scope of service to be performed. For instance, it is usually better, in terms of time and cost, to completely tear down an assembly and replace all worn or suspect parts at one time rather than to simply replace only the worst components, and then have to service that assembly again a few months later.

CAUTION

Lifting heavy components can cause back, neck and other injuries.

When disassembling or assembling any part of this machine, be sure there is adequate support equipment available such as blocking and lifting devices.

1. IMPRESSION CYLINDER THROW-OFF LIMIT

The air cylinder travel (throw) is set at the factory and should never be adjusted or changed unless the cylinder is replaced or the assembly repaired.

The cylinder travel is controlled by the clamp collar on the cylinder shaft. It is recommended to make this adjustment on a work bench prior to installation on the coater.

a. Assemble the new cylinder into the adjustment assembly, and the washers, bearing, and clamp collar onto the piston shaft.

b. Before installing air fittings on the cylinder, apply air pressure to the port which would extend the cylinder piston.

c. Place a .025" feeler gauge(s) between the clamp collar and first washer, or the last washer and the cylinder face.

   See **Error! Reference source not found.**.

d. Rotate the clamp collar against the gauge and secure with the setscrew.

e. All Impression Cylinders, drive and operator side, must be set to this dimension.

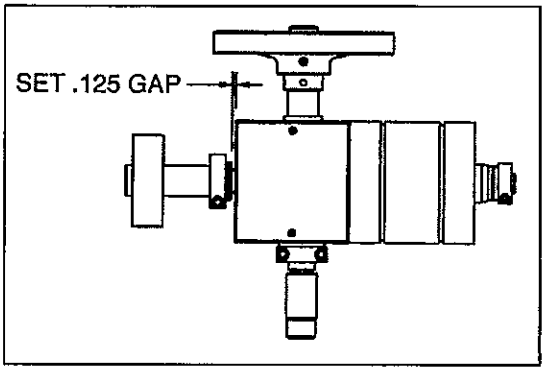


FIGURE 16 CYLINDER TRAVEL ADJUSTMENT

Section 6 Spare Parts

The following parts drawings are provided to show a complete list of all parts that make up the RETROFLEX Flexographic Print Deck. This list includes all part numbers and quantities of each part used, including consumable items such as blade material and end seals.

When ordering spare parts, please provide the RETROFLEX Machine Number (for this system the number is 20175830) along with the part number and quantity. If you ever have any questions please call us, we will assist in any way we can.

Please call or send parts orders to;

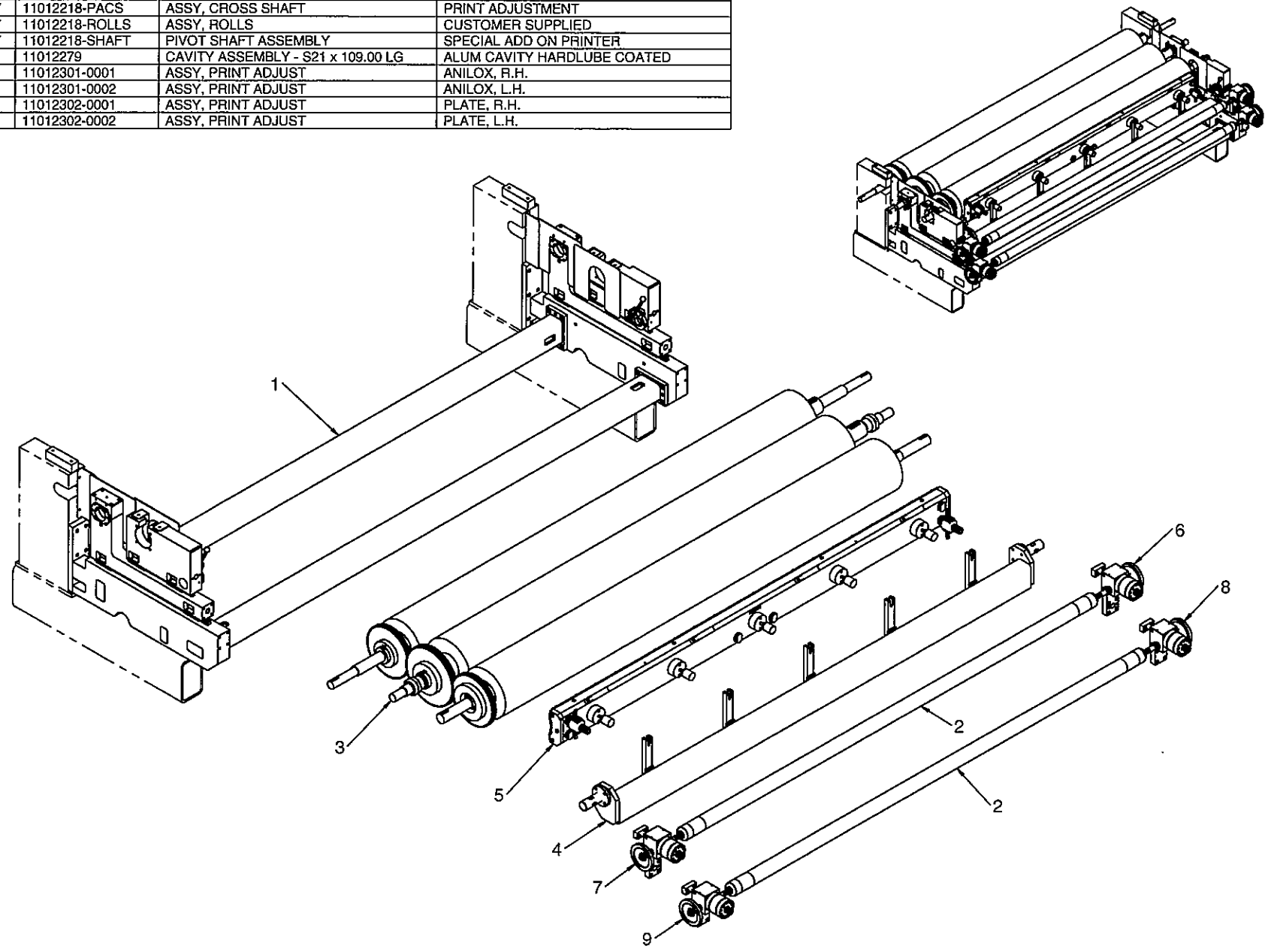
Service Department
RETROFLEX, Inc.
1205 Broadway Street
Wrightstown, WI 54180

A. DRAWINGS

The following drawings are provided for parts identification.

11012218 (3)	Overall Assembly Drawing
11012218–FRAMES (2)	Frames Detail
11012218–PACS	Cross Shaft Detail
11012218–SHAFT	Pivot Shaft Detail Drawing
11012279	Cavity Detail Drawing
11012301-0001	Anilox Print Adjust Gearbox Detail – Right Hand
11012301-0002	Anilox Print Adjust Gearbox Detail – Left Hand
11012302-0001	Plate Print Adjust Gearbox Detail – Right Hand
11012302-0002	Plate Print Adjust Gearbox Detail – Left Hand
11000608-0001	Blade Configurations

ITEM	QTY	CODE	PART NUMBER	RETROFLEX PART NAME	RETROFLEX PART DESCRIPTION
1	1	207	11012218-FRAMES	ASSY, FRAMES	SPECIAL ADD ON PRINTER
2	2	207	11012218-PACS	ASSY, CROSS SHAFT	PRINT ADJUSTMENT
3	1	207	11012218-ROLLS	ASSY, ROLLS	CUSTOMER SUPPLIED
4	1	207	11012218-SHAFT	PIVOT SHAFT ASSEMBLY	SPECIAL ADD ON PRINTER
5	1	201	11012279	CAVITY ASSEMBLY - S21 x 109.00 LG	ALUM CAVITY HARDLUBE COATED
6	1	421	11012301-0001	ASSY, PRINT ADJUST	ANILOX, R.H.
7	1	421	11012301-0002	ASSY, PRINT ADJUST	ANILOX, L.H.
8	1	421	11012302-0001	ASSY, PRINT ADJUST	PLATE, R.H.
9	1	421	11012302-0002	ASSY, PRINT ADJUST	PLATE, L.H.



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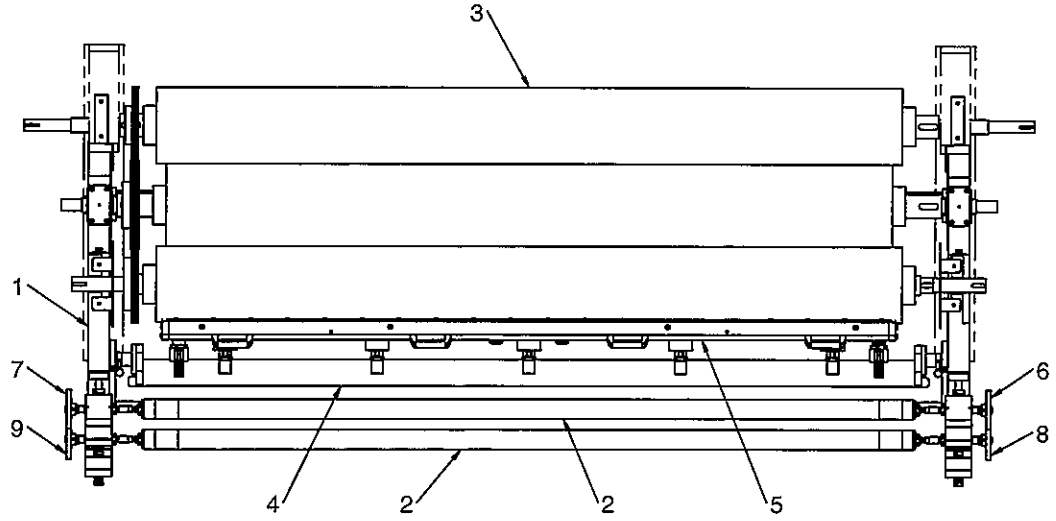
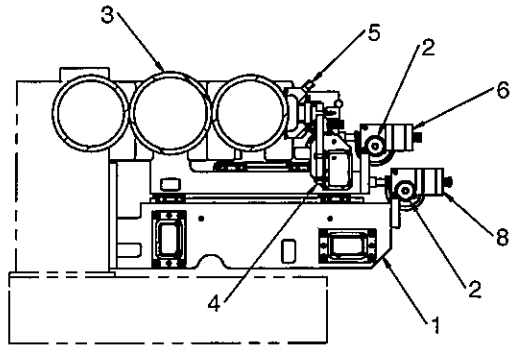
PART DESCRIPTION: SPECIAL ADD ON PRINTER		SURFACE FINISH: FINISHED SURFACES TO BE (125) UNLESS SPECIFIED	DRAWN: RLH						
		TOLERANCE: 2 DECIMAL DIM ± .02, 3 DECIMAL DIM ± .005, FRACTIONAL DIM ± 1/64, UNLESS OTHERWISE NOTED							
MATERIAL: SEE BILL OF MATERIAL	MATERIAL DESCRIPTION: MACHINE #20175886		CHECKED: WAGNER	WEIGHT: 7483.80	REVISION:	DATE: 10/10/17	CODE NO.: 207	SHEET: 1 OF 2	DRAWING NO.: 11012218

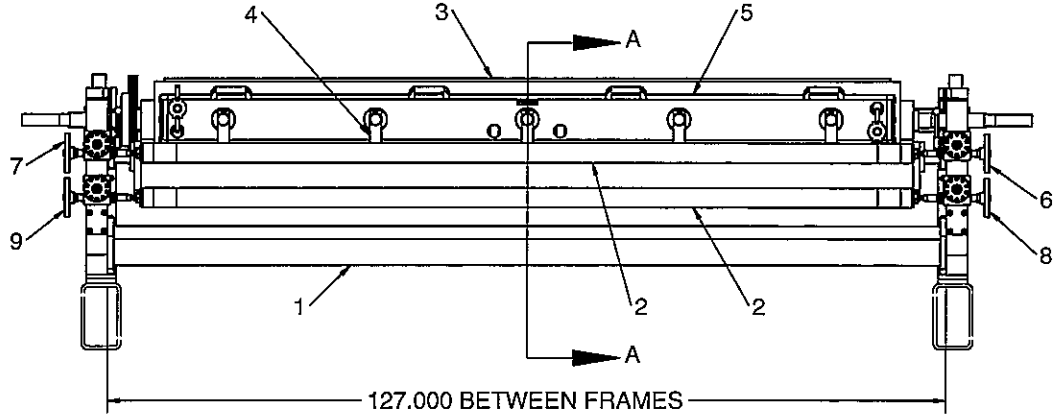


TOP VIEW



OPER SIDE

SECTION A-A



FRONT VIEW

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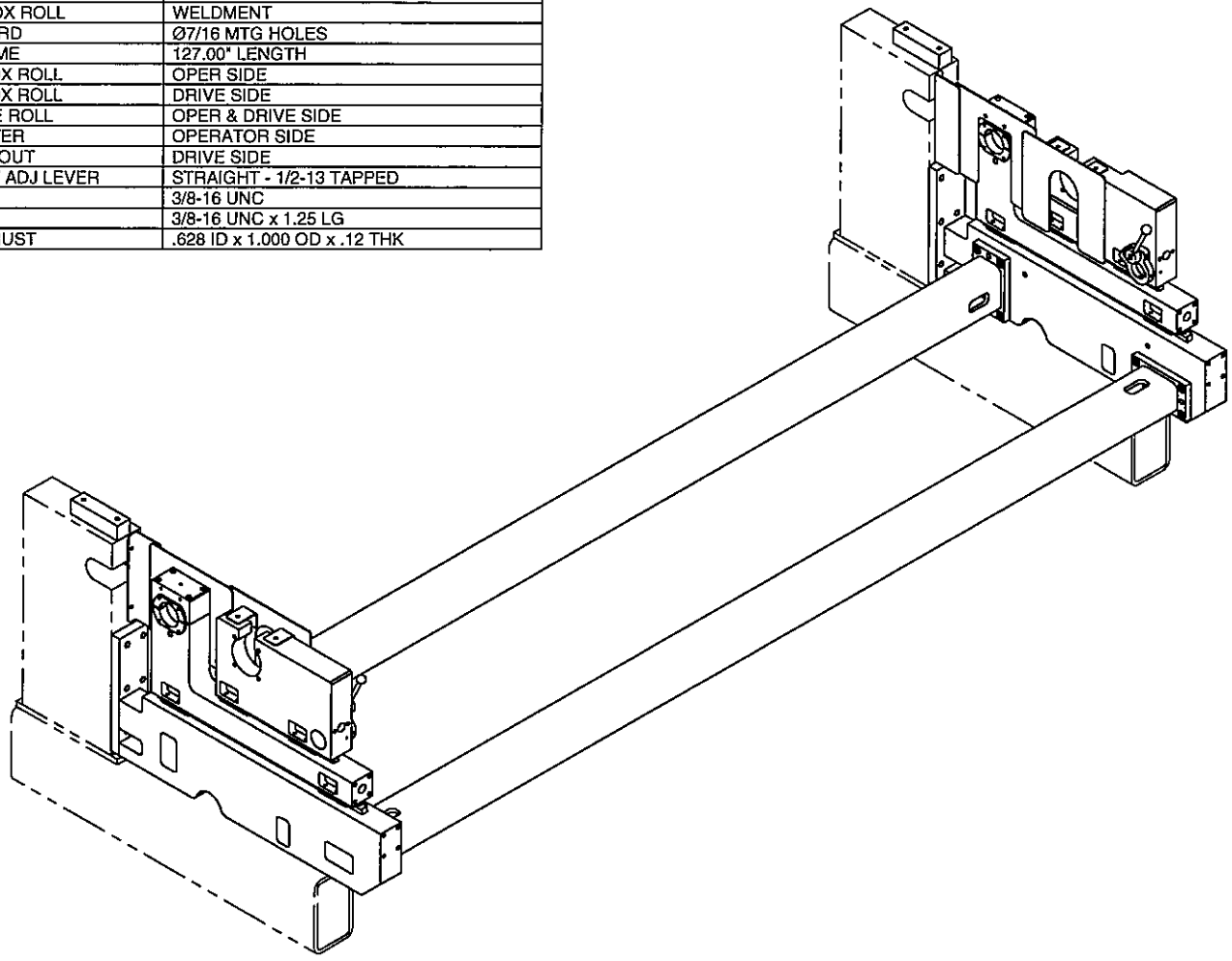
	TOLERANCE: 2 DECIMAL DIM ± .02 FRACTIONAL DIM ± 1/64; 3 DECIMAL DIM ± .005 UNLESS OTHERWISE NOTED	DRAWN: RLH							
MATERIAL: SEE BILL OF MATERIAL	MATERIAL DESCRIPTION: MACHINE #20175886	CHECKED: WAGNER	WEIGHT: 7483.80	REVISION:	DATE: 10/10/17	CODE NO.: 207	SHEET: 2 OF 2	DRAWING NO.: 11012218	

ITEM	QTY	CODE	PART NUMBER	RETROFLEX PART NAME	RETROFLEX PART DESCRIPTION
1	2	035	11000179-0037	WASHER - 18-8 Stainless Steel	37mm OD x 13mm ID x 3mm THK
2	2	500	11006247-0039	BEARING, LINEAR	THK SHS25LC X 460mm LG
3	2	500	11006247-0040	BEARING LINEAR	THK SHS25LC x 820mm LG
4	2	016	11007147-0021	SHAFT, HANDLE EXTENSION	Ø .62 SHAFT with 1/2-13 NC THREADS
5	4	047	11008226-0020	RETAINER, BEARING	
6	2	010	11011766-0008	STOP, PIVOT SHAFT - Ø2.00	65° ROTATION - 3/8-16 SCREWS
7	2	018	11012161	BUSHING, FLANGE - ALTER	2.00 ID x 2.25 OD x 1.25 LG
8	1	051	11012290-0001	PLATE, MOUNTING	OPER FRAME
9	1	051	11012290-0002	PLATE, MOUNTING	DRIVE FRAME
10	2	034	11012298-0001	GUARD, IMPRESSION ROLL	
11	2	034	11012299-0001	GUARD, PLATE ROLL	
12	2	034	11012300-0001	GUARD, ANILOX ROLL	WELDMENT
13	2	050	11012441	SPACER, GUARD	Ø7/16 MTG HOLES
14	2	032	21000003-0018	SPACER, FRAME	127.00" LENGTH
15	1	031	21002290-0001	FRAME, ANILOX ROLL	OPER SIDE
16	1	031	21002290-0002	FRAME, ANILOX ROLL	DRIVE SIDE
17	2	031	21002291	FRAME, PLATE ROLL	OPER & DRIVE SIDE
18	1	031	31000596	FRAME, PRINTER	OPERATOR SIDE
19	1	031	31000596	FRAME, BURNOUT	DRIVE SIDE
20	2	525	8TA34D	HANDLE, FLAT ADJ LEVER	STRAIGHT - 1/2-13 TAPPED
21	2	555	JAMNUT3-8-16	JAM NUT	3/8-16 UNC
22	2	555	SETSCR3-8-16X1	SET SCREW	3/8-16 UNC x 1.25 LG
23	2	502	TB1016-2	BEARING, THRUST	.628 ID x 1.000 OD x .12 THK



PART NAME: ASSY, FRAMES	PATH:U:\207 Printer\Specialty & Add On\11012218 American Custo	DESIGNED: RLH	THIS PRINT IS PROPERTY OF RETROFLEX, INC. IT MUST NOT BE COPIED, REPRODUCED, OR MANUFACTURED WITHOUT WRITTEN PERMISSION BY RETROFLEX, INC.	RETROFLEX, INC. 1205 Broadway St. Wrightstown, WI 54180					
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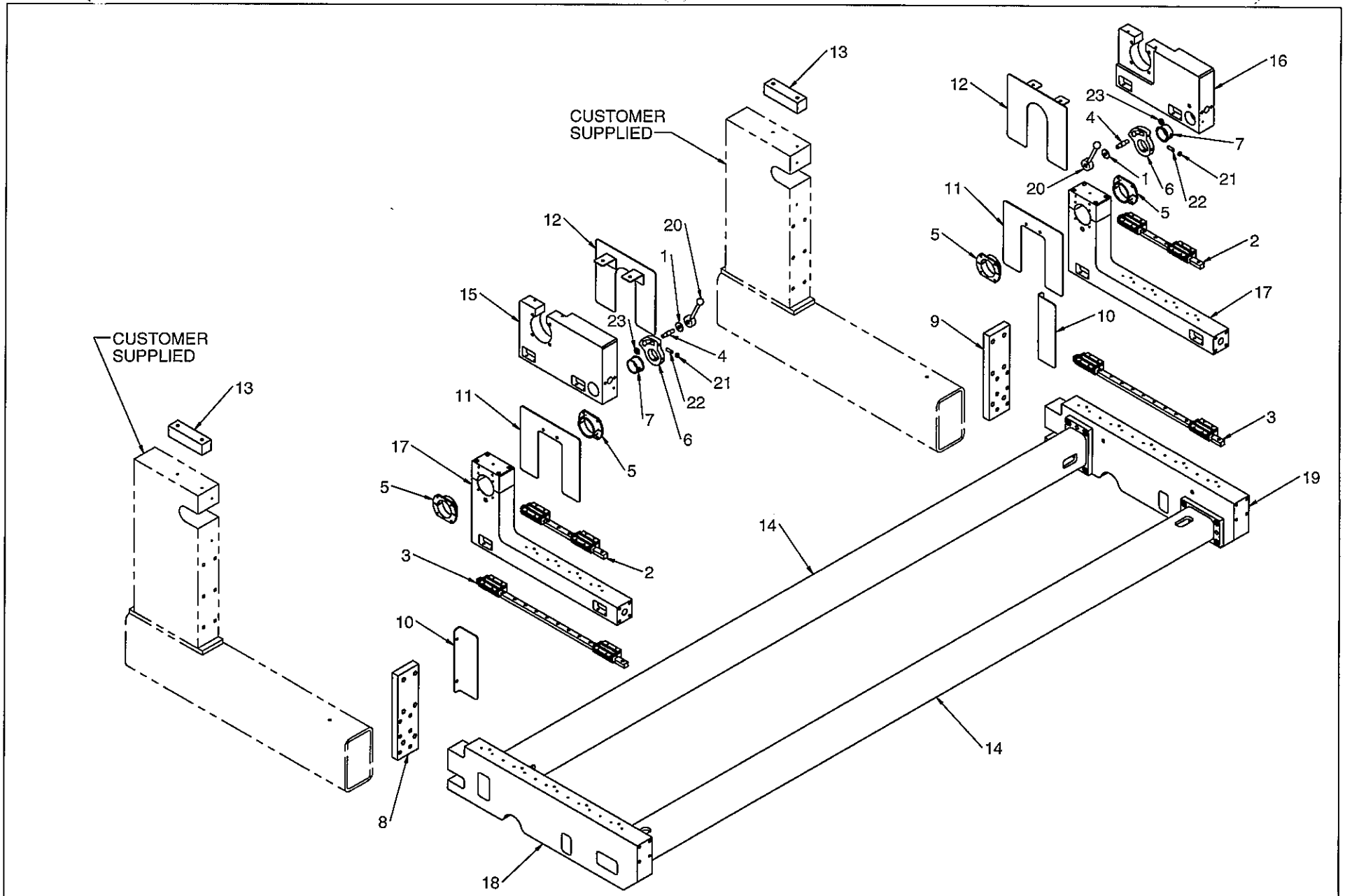
MATERIAL: SEE BILL OF MATERIAL	MATERIAL DESCRIPTION: MACHINE #20175886	CHECKED: WAGNER	WEIGHT: 3373.18	REVISION:	DATE: 10/10/17	CODE NO.: 207	SHEET: 1 OF 2	DRAWING NO.: 11012218-FRAMES	



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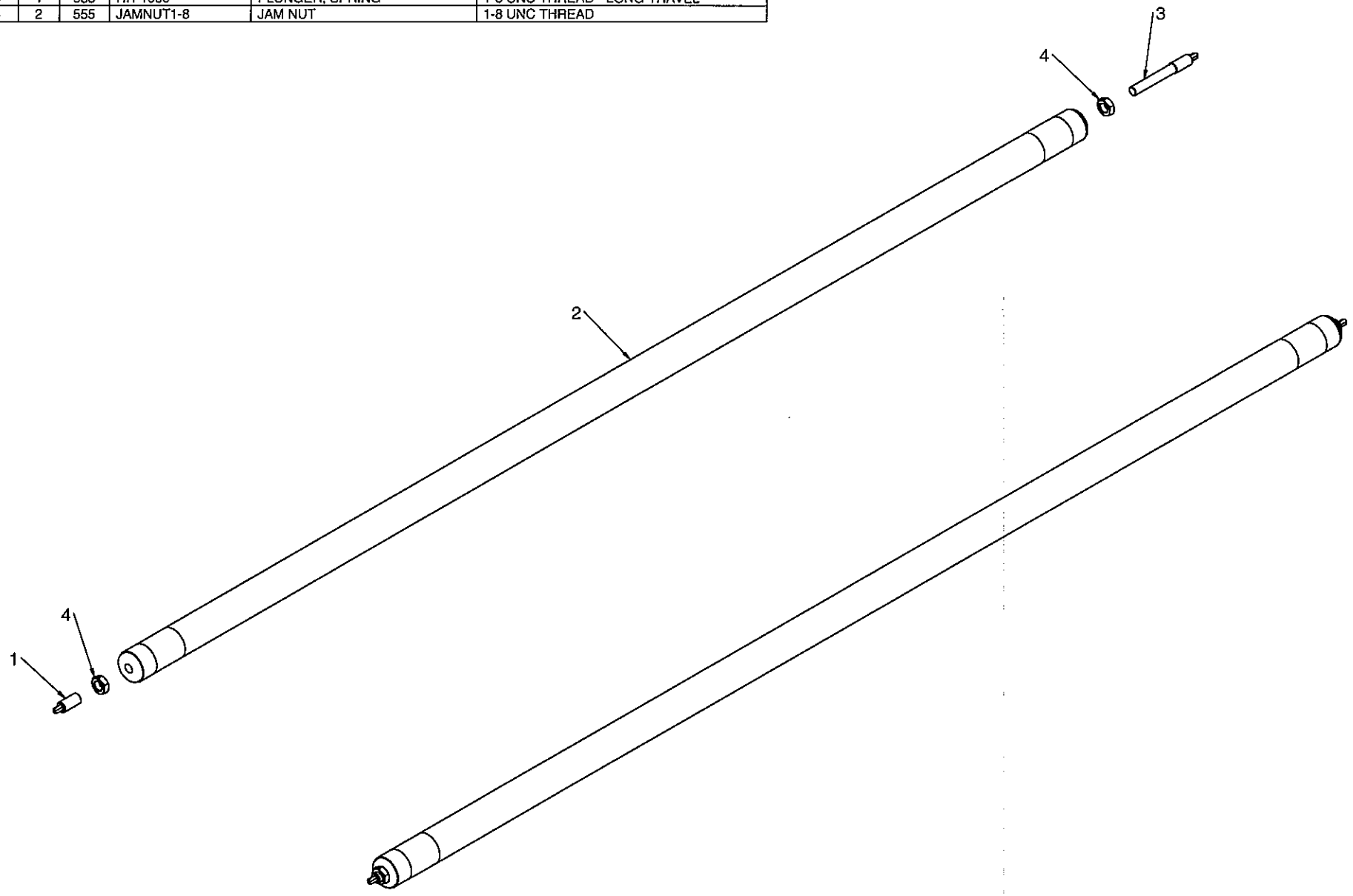
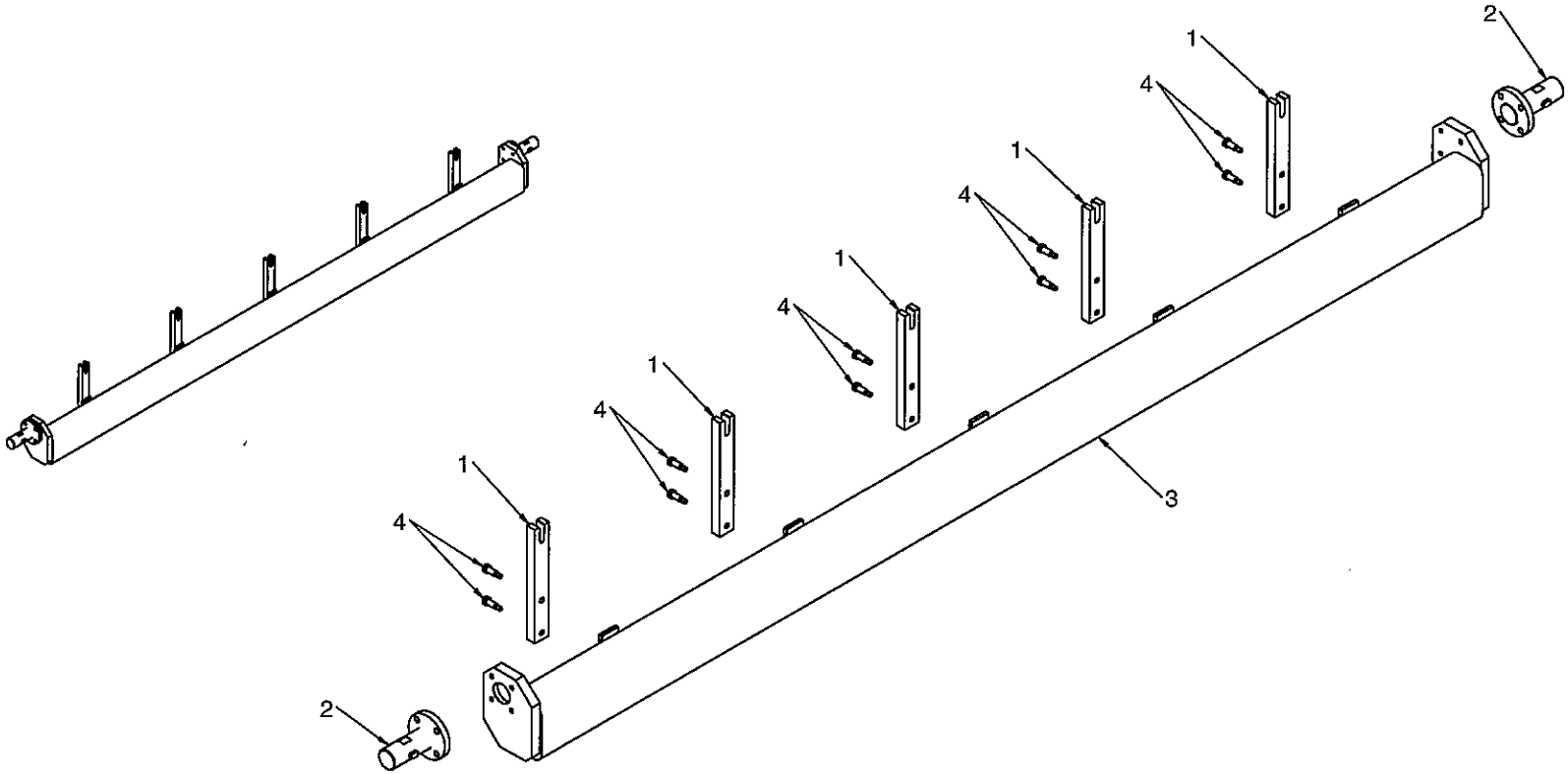
MATERIAL: SEE BILL OF MATERIAL	MATERIAL DESCRIPTION: MACHINE #20175886	CHECKED: WAGNER	WEIGHT: 3373.18	REVISION:	DATE: 10/10/17	CODE NO.: 207	SHEET: 2 OF 2	DRAWING NO.: 11012218-FRAMES		

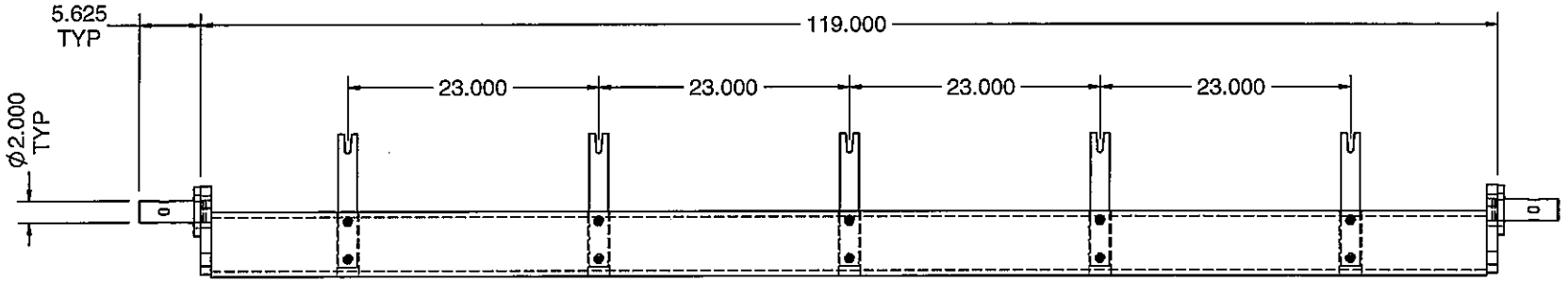
ITEM	QTY	CODE	PART NUMBER	RETROFLEX PART NAME	RETROFLEX PART DESCRIPTION
1	1	026	11004566-0001	HEX END, CROSS SHAFT	Ø1.00-8 NC THREAD
2	1	026	21001083-0011	SHAFT, CROSS	95.25 LG - ALUMINUM
3	1	558	HH-1000	PLUNGER, SPRING	1-8 UNC THREAD - LONG TRAVEL
4	2	555	JAMNUT1-8	JAM NUT	1-8 UNC THREAD



PART NAME: ASSY, CROSS SHAFT	PATH:U:\207 Printer\Specialty & Add On\11012218 American Custo	DESIGNED: RLH	THIS PRINT IS PROPERTY OF RETROFLEX, INC. IT MUST NOT BE COPIED, REPRODUCED, OR MANUFACTURED WITHOUT WRITTEN PERMISSION BY RETROFLEX, INC.	**RETROFLEX, INC.** 1205 Broadway St. Wrightstown, WI 54180					
PART DESCRIPTION: PRINT ADJUSTMENT	SURFACE FINISH: FINISHED SURFACES TO BE (125) UNLESS SPECIFIED								
	TOLERANCE 2 DECIMAL DIM ± .02 FRACTIONAL DIM ± 1/64 3 DECIMAL DIM ± .005 UNLESS OTHERWISE NOTED	DRAWN: RLH							
MATERIAL: SEE BILL OF MATERIAL	MATERIAL DESCRIPTION: MACHINE #20175886	CHECKED: WAGNER	WEIGHT: 28.32	REVISION:	DATE: 10/05/17	CODE NO.: 207	SHEET: 1 OF 1	DRAWING NO.: 11012218-PACS	

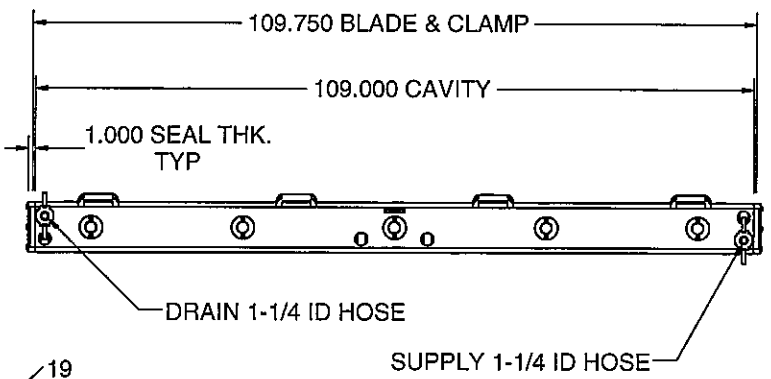
ITEM	QTY	CODE	PART NUMBER	RETROFLEX PART NAME	RETROFLEX PART DESCRIPTION
1	5	011	11005366-0044	ARM, CAVITY	0.50 STUD
2	2	013	21001637-0005	SHAFT, PIVOT	Ø2.00 SHAFT
3	1	013	31000474-0006	SHAFT, PIVOT	Ø2.00 BORE
4	10	555	SHSCREW-1-2X1-00	SCREW, SHOULDER	Ø.50 x 1.00 LG - 3/8-16 THD



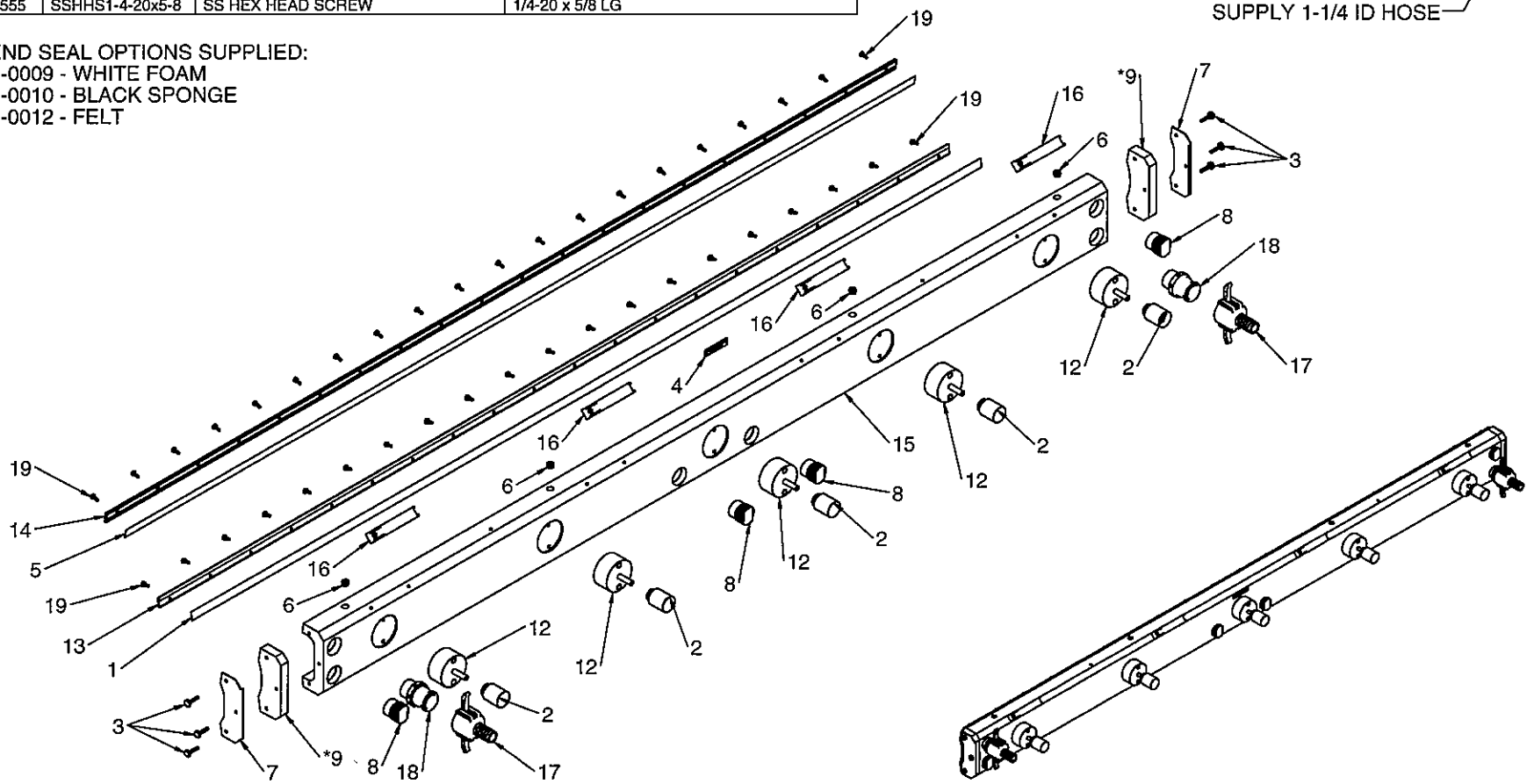


PART NAME: PIVOT SHAFT ASSEMBLY	PATH:U:\207 Printer\Specialty & Add On\11012218 American Custo	DESIGNED: RLH	THIS PRINT IS PROPERTY OF RETROFLEX, INC. IT MUST NOT BE COPIED, REPRODUCED, OR MANUFACTURED WITHOUT WRITTEN PERMISSION BY RETROFLEX, INC.	**RETROFLEX, INC.** 1205 Broadway St. Wrightstown, WI 54180					
PART DESCRIPTION: SPECIAL ADD ON PRINTER	SURFACE FINISH: FINISHED SURFACES TO BE (125) UNLESS SPECIFIED	DRAWN: RLH							
	TOLERANCE: 2 DECIMAL DIM ± .02, 3 DECIMAL DIM ± .005, FRACTIONAL DIM ± 1/64, UNLESS OTHERWISE NOTED								
MATERIAL: SEE BILL OF MATERIAL	MATERIAL DESCRIPTION: MACHINE #20175886	CHECKED: WAGNER	WEIGHT: 349.23	REVISION:	DATE: 09/13/17	CODE NO.: 207	SHEET: 1 OF 1	DRAWING NO.: 11012218-SHAFT	

ITEM	QTY	CODE	PART NUMBER	RETROFLEX PART NAME	RETROFLEX PART DESCRIPTION
1	1	001	11000028-0144-6	BLADE, TRAILING - MYLAR	STR: .014 x 1.38 x 109.75 LG
2	5	525	11000085-0031	KNOB, KNURLED	Ø1.75 & 1/2-13 UNC TAP
3	6	016	11000313-0013	SCREW, KNURLED HEAD	1/4-20 UNC, (FOR 1" THK SEAL)
4	1	038	11000455-0019	TAG, NAME	STANDARD SIZE - STN STL
5	1	001	11000494-0109-6	DOCTORING BLADE - UHMW	45° BEV .050 x 1.00 x 109.75
6	4	511	11000662-0021	PLUG, PIPE	3/8 NPT - BRASS
7	2	003	11003685	PLATE, END	SERIES 21
8	4	511	11005983-1-50	PLUG, PIPE	1-1/2 NPT, BLACK DELRIN
*9	2	002	11007616-0009	SEAL, END - S21 x 1.00 THK	WHITE FOAM MEDIUM Ø<12.25
10	2	002	11007616-0010	SEAL, END - S21 x 1.00 THK	BLACK SPONGE FIRM Ø<12.25
11	2	002	11007616-0012	SEAL, END - S21 x 1.00 THK	GRAY FELT Ø<12.25
12	5	007	11012041-0005	STUD & SO=PACER , CAVITY	Ø3.50 X 1.625 THK SPACER - 1/2-13 THREAD
13	1	005	11012282-018	CLAMP, BLADE S21/22 x 109.75 LG V16	.018 STEP - ALUM & HARDLUBE COATED
14	1	005	11012282-054	CLAMP, BLADE S21/22 x 109.75 LG V16	.054 STEP - ALUM & HARDLUBE COATED
15	1	004	21002289	CAVITY, S21 x 109.00 LG V16	ALUM & HARDLUBE COATED
16	4	525	6333210	HANDLE, PULL	8.5mm x 132mm (WINCO - 6333210)
17	2	511	PPC125	QUICK DISCONNECT	QUICK DISCONNECT - 1-1/4 TYPE C
18	2	511	PPF150	QUICK DISCONNECT	QUICK DISCONNECT - 1-1/2 TYPE F
19	40	555	SSHHS1-4-20x5-8	SS HEX HEAD SCREW	1/4-20 x 5/8 LG

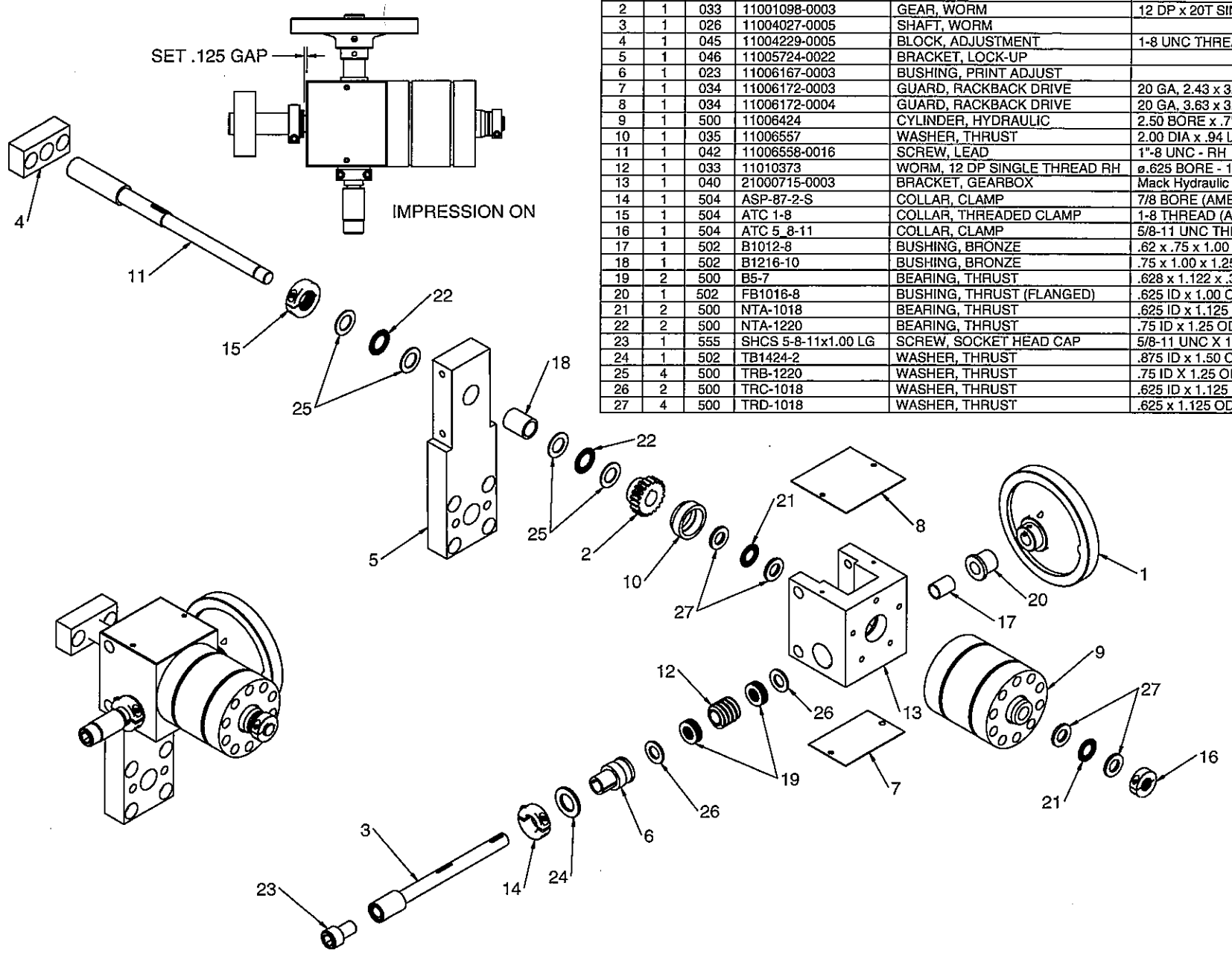


*THREE END SEAL OPTIONS SUPPLIED:
11007616-0009 - WHITE FOAM
11007616-0010 - BLACK SPONGE
11007616-0012 - FELT



PART NAME: CAVITY ASSEMBLY - S21 x 109.00 LG	PATH:U:\201\Retroflex\Series21\11012279\	DESIGNED: RLH	THIS PRINT IS PROPERTY OF RETROFLEX, INC. IT MUST NOT BE COPIED, REPRODUCED, OR MANUFACTURED WITHOUT WRITTEN PERMISSION BY RETROFLEX, INC.	RETROFLEX, INC. 1205 Broadway St. Wrightstown, WI 54180					
PART DESCRIPTION: ALUM CAVITY HARDLUBE COATED	SURFACE FINISH: FINISHED SURFACES TO BE (125) UNLESS SPECIFIED	DRAWN: RLH							
MATERIAL: SEE BILL OF MATERIAL	MATERIAL DESCRIPTION: FITS RETROFLEX PRINTER	CHECKED: WAGNER	WEIGHT: 171.60	REVISION:	DATE: 09/18/17	CODE NO.: 201	SHEET: 1 OF 1	DRAWING NO.: 11012279	

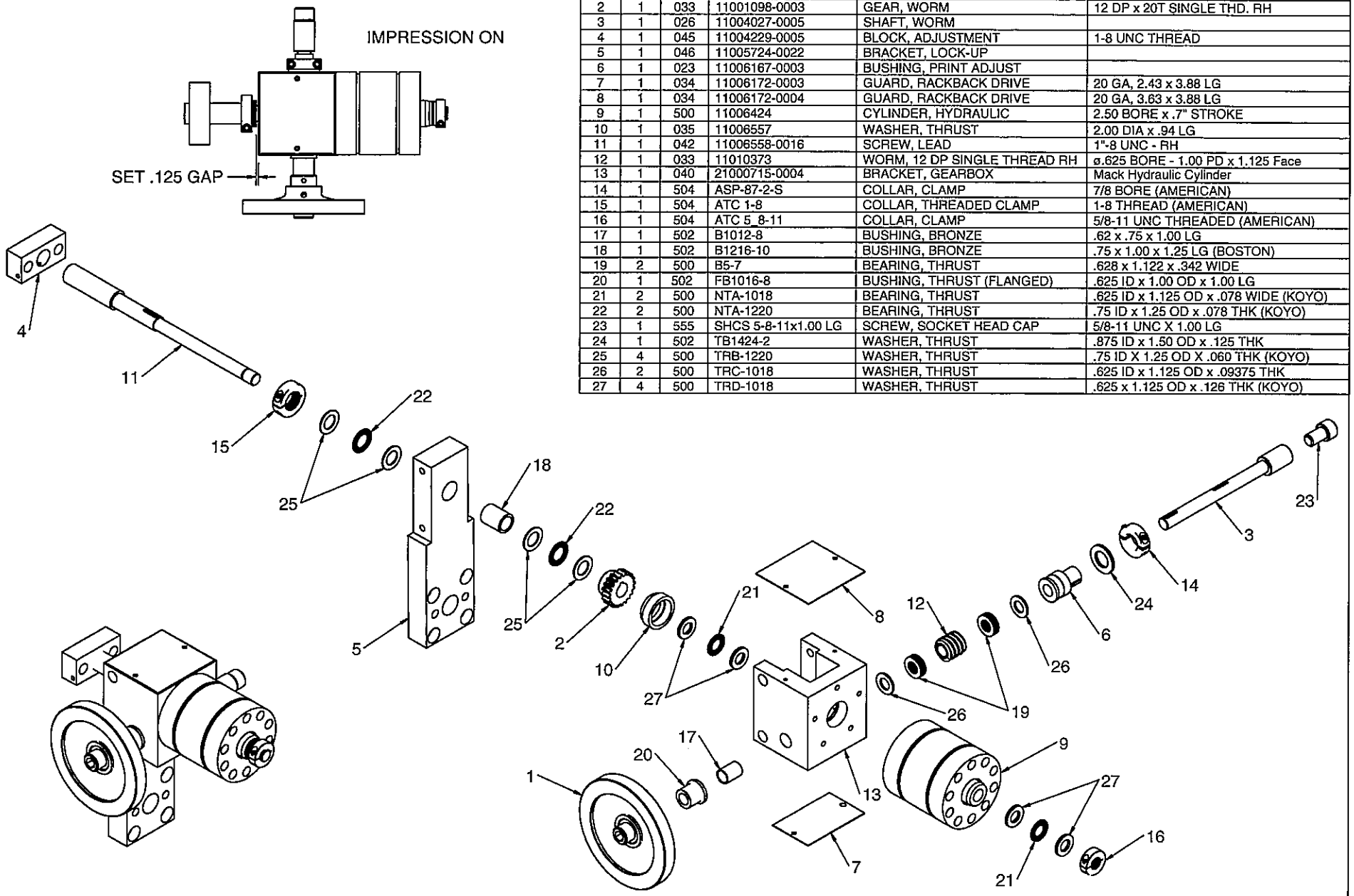
TOLERANCE: 2 DECIMAL DIM ± .02, FRACTIONAL DIM ± 1/64; 3 DECIMAL DIM ± .005, UNLESS OTHERWISE NOTED



ITEM	QTY	CODE	PART NUMBER	RETROFLEX PART NAME	RETROFLEX PART DESCRIPTION
1	1	016	11000350-0013	HANDWHEEL	ALTER #7101016 (WINCO)
2	1	033	11001098-0003	GEAR, WORM	12 DP x 20T SINGLE THD. RH
3	1	026	11004027-0005	SHAFT, WORM	
4	1	045	11004229-0005	BLOCK, ADJUSTMENT	1-8 UNC THREAD
5	1	046	11005724-0022	BRACKET, LOCK-UP	
6	1	023	11006167-0003	BUSHING, PRINT ADJUST	
7	1	034	11006172-0003	GUARD, RACKBACK DRIVE	20 GA, 2.43 x 3.88 LG
8	1	034	11006172-0004	GUARD, RACKBACK DRIVE	20 GA, 3.63 x 3.88 LG
9	1	500	11006424	CYLINDER, HYDRAULIC	2.50 BORE x .7" STROKE
10	1	035	11006557	WASHER, THRUST	2.00 DIA x .94 LG
11	1	042	11006558-0016	SCREW, LEAD	1"-8 UNC - RH
12	1	033	11010373	WORM, 12 DP SINGLE THREAD RH	ø.625 BORE - 1.00 PD x 1.125 Face
13	1	040	21000715-0003	BRACKET, GEARBOX	Mack Hydraulic Cylinder
14	1	504	ASP-87-2-S	COLLAR, CLAMP	7/8 BORE (AMERICAN)
15	1	504	ATC 1-8	COLLAR, THREADED CLAMP	1-8 THREAD (AMERICAN)
16	1	504	ATC 5_8-11	COLLAR, CLAMP	5/8-11 UNC THREADED (AMERICAN)
17	1	502	B1012-8	BUSHING, BRONZE	.62 x .75 x 1.00 LG
18	1	502	B1216-10	BUSHING, BRONZE	.75 x 1.00 x 1.25 LG (BOSTON)
19	2	500	B5-7	BEARING, THRUST	.628 x 1.122 x .342 WIDE
20	1	502	FB1016-8	BUSHING, THRUST (FLANGED)	.625 ID x 1.00 OD x 1.00 LG
21	2	500	NTA-1018	BEARING, THRUST	.625 ID x 1.125 OD x .078 WIDE (KOYO)
22	2	500	NTA-1220	BEARING, THRUST	.75 ID x 1.25 OD x .078 THK (KOYO)
23	1	555	SHCS 5-8-11x1.00 LG	SCREW, SOCKET HEAD CAP	5/8-11 UNC X 1.00 LG
24	1	502	TB1424-2	WASHER, THRUST	.875 ID x 1.50 OD x .125 THK
25	4	500	TRB-1220	WASHER, THRUST	.75 ID X 1.25 OD X .060 THK (KOYO)
26	2	500	TRC-1018	WASHER, THRUST	.625 ID x 1.125 OD x .09375 THK
27	4	500	TRD-1018	WASHER, THRUST	.625 x 1.125 OD x .126 THK (KOYO)

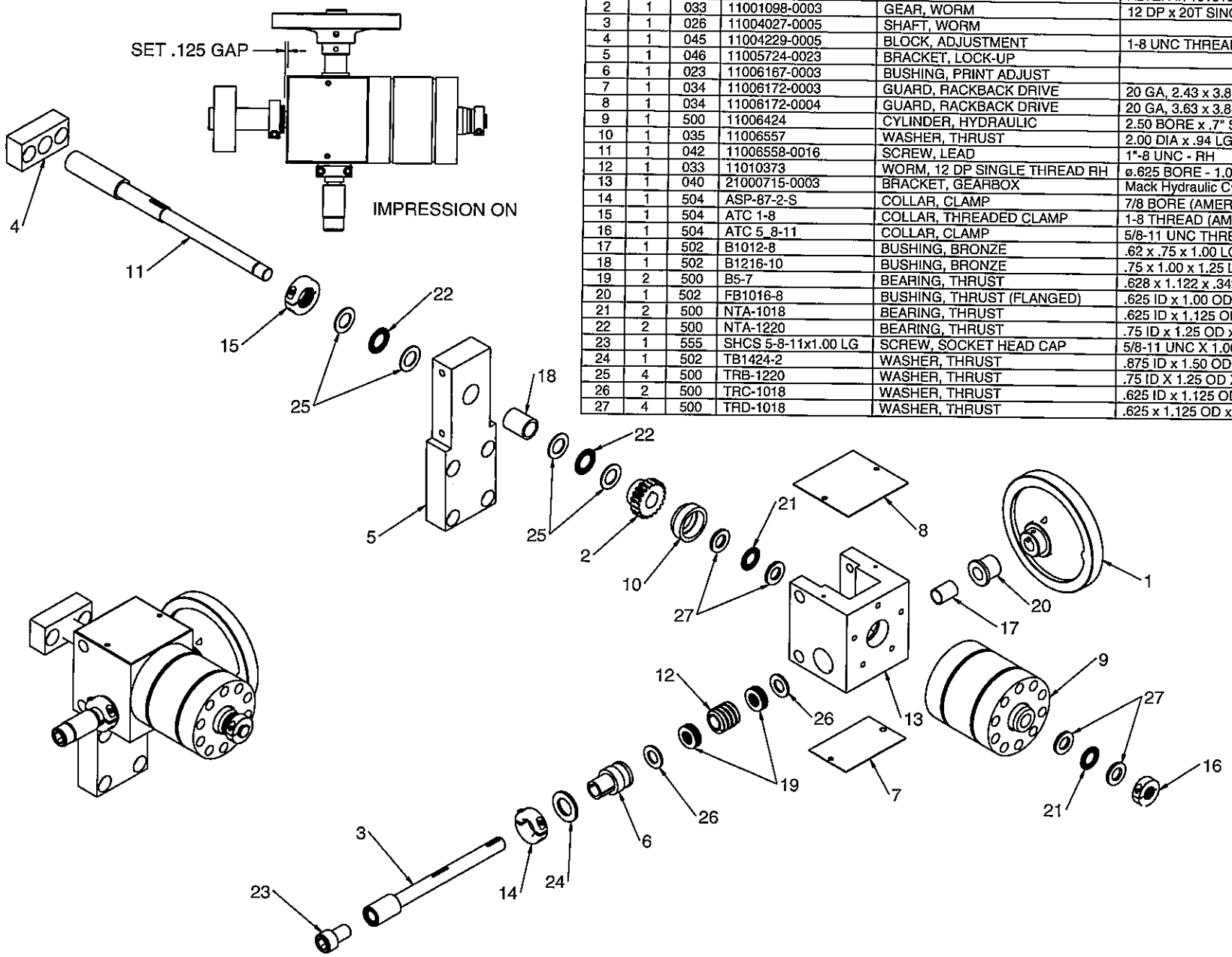
PART NAME: ASSY, PRINT ADJUST	PATH:U:\421\Specialty\	DESIGNED: RLH	THIS PRINT IS PROPERTY OF RETROFLEX, INC. IT MUST NOT BE COPIED, REPRODUCED, OR MANUFACTURED WITHOUT WRITTEN PERMISSION BY RETROFLEX, INC.	**RETROFLEX, INC.** 1205 Broadway St. Wrightstown, WI 54180					
PART DESCRIPTION: ANILOX, R.H.	SURFACE FINISH: FINISHED SURFACES TO BE (125) UNLESS SPECIFIED	DRAWN: RLH							
MATERIAL: SEE BILL OF MATERIAL	MATERIAL DESCRIPTION: ASSEMBLY	CHECKED: WAGNER	WEIGHT: 40.60	REVISION:	DATE: 10/03/17	CODE NO.: 421	SHEET: 1 OF 1	DRAWING NO.: 11012301-0001	

TOLERANCE: 2 DECIMAL DIM ± .02, FRACTIONAL DIM ± 1/64; 3 DECIMAL DIM ± .005, UNLESS OTHERWISE NOTED



ITEM	QTY	CODE	PART NUMBER	RETROFLEX PART NAME	RETROFLEX PART DESCRIPTION
1	1	016	11000350-0013	HANDWHEEL	ALTER #7101016 (WINCO)
2	1	033	11001098-0003	GEAR, WORM	12 DP x 20T SINGLE THD. RH
3	1	026	11004027-0005	SHAFT, WORM	
4	1	045	11004229-0005	BLOCK, ADJUSTMENT	1-8 UNC THREAD
5	1	046	11005724-0022	BRACKET, LOCK-UP	
6	1	023	11006167-0003	BUSHING, PRINT ADJUST	
7	1	034	11006172-0003	GUARD, RACKBACK DRIVE	20 GA, 2.43 x 3.88 LG
8	1	034	11006172-0004	GUARD, RACKBACK DRIVE	20 GA, 3.63 x 3.88 LG
9	1	500	11006424	CYLINDER, HYDRAULIC	2.50 BORE x .7" STROKE
10	1	035	11006557	WASHER, THRUST	2.00 DIA x .94 LG
11	1	042	11006558-0016	SCREW, LEAD	1"-8 UNC - RH
12	1	033	11010373	WORM, 12 DP SINGLE THREAD RH	ø.625 BORE - 1.00 PD x 1.125 Face
13	1	040	21000715-0004	BRACKET, GEARBOX	Mack Hydraulic Cylinder
14	1	504	ASP-87-2-S	COLLAR, CLAMP	7/8 BORE (AMERICAN)
15	1	504	ATC 1-8	COLLAR, THREADED CLAMP	1-8 THREAD (AMERICAN)
16	1	504	ATC 5_8-11	COLLAR, CLAMP	5/8-11 UNC THREADED (AMERICAN)
17	1	502	B1012-8	BUSHING, BRONZE	.62 x .75 x 1.00 LG
18	1	502	B1216-10	BUSHING, BRONZE	.75 x 1.00 x 1.25 LG (BOSTON)
19	2	500	B5-7	BEARING, THRUST	.628 x 1.122 x .342 WIDE
20	1	502	FB1016-8	BUSHING, THRUST (FLANGED)	.625 ID x 1.00 OD x 1.00 LG
21	2	500	NTA-1018	BEARING, THRUST	.625 ID x 1.125 OD x .078 WIDE (KOYO)
22	2	500	NTA-1220	BEARING, THRUST	.75 ID x 1.25 OD x .078 THK (KOYO)
23	1	555	SHCS 5-8-11x1.00 LG	SCREW, SOCKET HEAD CAP	5/8-11 UNC X 1.00 LG
24	1	502	TB1424-2	WASHER, THRUST	.875 ID x 1.50 OD x .125 THK
25	4	500	TRB-1220	WASHER, THRUST	.75 ID X 1.25 OD X .060 THK (KOYO)
26	2	500	TRC-1018	WASHER, THRUST	.625 ID x 1.125 OD x .09375 THK
27	4	500	TRD-1018	WASHER, THRUST	.625 x 1.125 OD x .126 THK (KOYO)

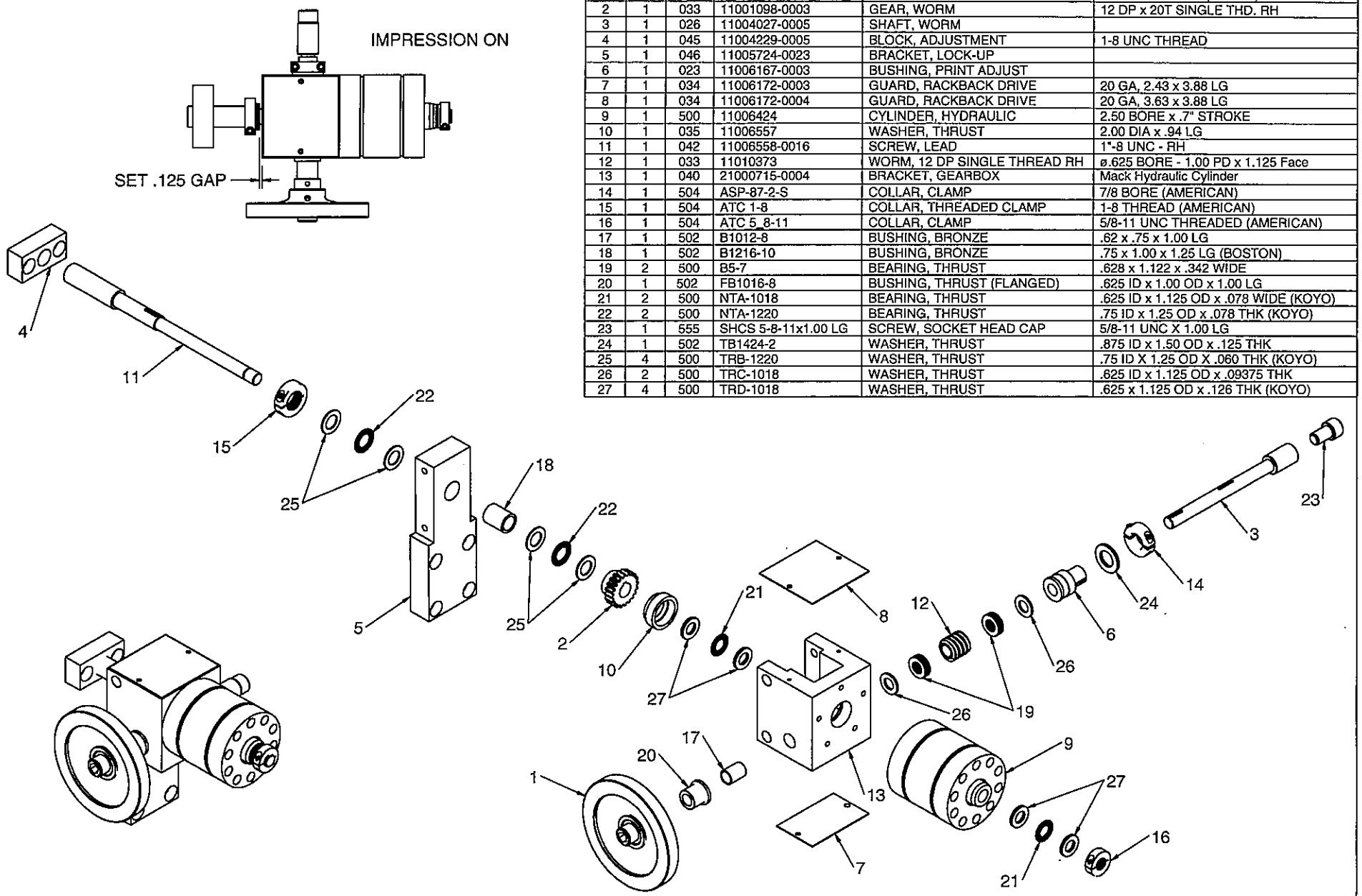
PART NAME: ASSY, PRINT ADJUST	PATH:U:\421\Specialty\	DESIGNED: RLH	THIS PRINT IS PROPERTY OF RETROFLEX, INC. IT MUST NOT BE COPIED, REPRODUCED, OR MANUFACTURED WITHOUT WRITTEN PERMISSION BY RETROFLEX, INC.	**RETROFLEX, INC.** 1205 Broadway St. Wrightstown, WI 54180					
PART DESCRIPTION: ANILOX, L.H.	SURFACE FINISH: FINISHED SURFACES TO 9E (125) UNLESS SPECIFIED	DRAWN: RLH							
	TOLERANCE: 2 DECIMAL DIM ± .02, 3 DECIMAL DIM ± .005, FRACTIONAL DIM ± 1/64, UNLESS OTHERWISE NOTED								
MATERIAL: SEE BILL OF MATERIAL	MATERIAL DESCRIPTION: ASSEMBLY	CHECKED: WAGNER	WEIGHT: 40.60	REVISION:	DATE: 10/03/17	CODE NO.: 421	SHEET: 1 OF 1	DRAWING NO.: 11012301-0002	



ITEM	QTY	CODE	PART NUMBER	RETROFLEX PART NAME	RETROFLEX PART DESCRIPTION
1	1	016	11000350-0013	HANDWHEEL	ALTER #7101016 (WINCO)
2	1	033	11001098-0003	GEAR, WORM	12 DP x 20T SINGLE THD. RH
3	1	026	11004027-0005	SHAFT, WORM	
4	1	045	11004229-0005	BLOCK, ADJUSTMENT	1-8 UNC THREAD
5	1	046	11005724-0023	BRACKET, LOCK-UP	
6	1	023	11006167-0003	BUSHING, PRINT ADJUST	
7	1	034	11006172-0003	GUARD, RACKBACK DRIVE	20 GA, 2.43 x 3.88 LG
8	1	034	11006172-0004	GUARD, RACKBACK DRIVE	20 GA, 3.63 x 3.88 LG
9	1	500	11006424	CYLINDER, HYDRAULIC	2.50 BORE x .7" STROKE
10	1	035	11006557	WASHER, THRUST	2.00 DIA x .94 LG
11	1	042	11006558-0016	SCREW, LEAD	1"-8 UNC - RH
12	1	033	11010373	WORM, 12 DP SINGLE THREAD RH	ø.625 BORE - 1.00 PD x 1.125 Face
13	1	040	21000715-0003	BRACKET, GEARBOX	Mack Hydraulic Cylinder
14	1	504	ASP-87-2-S	COLLAR, CLAMP	7/8 BORE (AMERICAN)
15	1	504	ATC 1-8	COLLAR, THREADED CLAMP	1-8 THREAD (AMERICAN)
16	1	504	ATC 5_8-11	COLLAR, CLAMP	5/8-11 UNC THREADED (AMERICAN)
17	1	502	B1012-8	BUSHING, BRONZE	.62 x .75 x 1.00 LG
18	1	502	B1216-10	BUSHING, BRONZE	.75 x 1.00 x 1.25 LG (BOSTON)
19	2	500	B5-7	BEARING, THRUST	.628 x 1.122 x .342 WIDE
20	1	502	FB1016-8	BUSHING, THRUST (FLANGED)	.625 ID x 1.00 OD x 1.00 LG
21	2	500	NTA-1018	BEARING, THRUST	.625 ID x 1.125 OD x .078 WIDE (KOYO)
22	2	500	NTA-1220	BEARING, THRUST	.75 ID x 1.25 OD x .078 THK (KOYO)
23	1	555	SHCS 5-8-11x1.00 LG	SCREW, SOCKET HEAD CAP	5/8-11 UNC X 1.00 LG
24	1	502	TB1424-2	WASHER, THRUST	.875 ID x 1.50 OD x .125 THK
25	4	500	TRB-1220	WASHER, THRUST	.75 ID X 1.25 OD X .060 THK (KOYO)
26	2	500	TRC-1018	WASHER, THRUST	.625 ID x 1.125 OD x .09375 THK
27	4	500	TRD-1018	WASHER, THRUST	.625 x 1.125 OD x .126 THK (KOYO)

PART NAME: ASSY, PRINT ADJUST	PATH:U:\421\Specialty\	DESIGNED: RLH		**RETROFLEX, INC.** 1205 Broadway St. Wrightstown, WI 54180					
PART DESCRIPTION: PLATE, R.H.	SURFACE FINISH: FINISHED SURFACES TO BE (125) UNLESS SPECIFIED	DRAWN: RLH							
MATERIAL: SEE BILL OF MATERIAL	MATERIAL DESCRIPTION: ASSEMBLY	CHECKED: WAGNER	WEIGHT: 39.18	REVISION:	DATE: 10/03/17	CODE NO.: 421	SHEET: 1 OF 1	DRAWING NO.: 11012302-0001	

TOLERANCE: 2 DECIMAL DIM ± .02 FRACTIONAL DIM ± 1/64; 3 DECIMAL DIM ± .005 UNLESS OTHERWISE NOTED



ITEM	QTY	CODE	PART NUMBER	RETROFLEX PART NAME	RETROFLEX PART DESCRIPTION
1	1	016	11000350-0013	HANDWHEEL	ALTER #7101016 (WINCO)
2	1	033	11001098-0003	GEAR, WORM	12 DP x 20T SINGLE THD. RH
3	1	026	11004027-0005	SHAFT, WORM	
4	1	045	11004229-0005	BLOCK, ADJUSTMENT	1-8 UNC THREAD
5	1	046	11005724-0023	BRACKET, LOCK-UP	
6	1	023	11006167-0003	BUSHING, PRINT ADJUST	
7	1	034	11006172-0003	GUARD, RACKBACK DRIVE	20 GA, 2.43 x 3.88 LG
8	1	034	11006172-0004	GUARD, RACKBACK DRIVE	20 GA, 3.63 x 3.88 LG
9	1	500	11006424	CYLINDER, HYDRAULIC	2.50 BORE x .7" STROKE
10	1	035	11006557	WASHER, THRUST	2.00 DIA x .94 LG
11	1	042	11006558-0016	SCREW, LEAD	1"-8 UNC - RH
12	1	033	11010373	WORM, 12 DP SINGLE THREAD RH	ø.625 BORE - 1.00 PD x 1.125 Face
13	1	040	21000715-0004	BRACKET, GEARBOX	Mack Hydraulic Cylinder
14	1	504	ASP-87-2-S	COLLAR, CLAMP	7/8 BORE (AMERICAN)
15	1	504	ATC 1-8	COLLAR, THREADED CLAMP	1-8 THREAD (AMERICAN)
16	1	504	ATC 5_8-11	COLLAR, CLAMP	5/8-11 UNC THREADED (AMERICAN)
17	1	502	B1012-8	BUSHING, BRONZE	.62 x .75 x 1.00 LG
18	1	502	B1216-10	BUSHING, BRONZE	.75 x 1.00 x 1.25 LG (BOSTON)
19	2	500	B5-7	BEARING, THRUST	.628 x 1.122 x .342 WIDE
20	1	502	FB1016-8	BUSHING, THRUST (FLANGED)	.625 ID x 1.00 OD x 1.00 LG
21	2	500	NTA-1018	BEARING, THRUST	.625 ID x 1.125 OD x .078 WIDE (KOYO)
22	2	500	NTA-1220	BEARING, THRUST	.75 ID x 1.25 OD x .078 THK (KOYO)
23	1	555	SHCS 5-8-11x1.00 LG	SCREW, SOCKET HEAD CAP	5/8-11 UNC X 1.00 LG
24	1	502	TB1424-2	WASHER, THRUST	.875 ID x 1.50 OD x .125 THK
25	4	500	TRB-1220	WASHER, THRUST	.75 ID X 1.25 OD X .060 THK (KOYO)
26	2	500	TRC-1018	WASHER, THRUST	.625 ID x 1.125 OD x .09375 THK
27	4	500	TRD-1018	WASHER, THRUST	.625 x 1.125 OD x .126 THK (KOYO)

PART NAME: ASSY, PRINT ADJUST	PATH:U:\421\Specialty\	DESIGNED: RLH	THIS PRINT IS PROPERTY OF RETROFLEX, INC. IT MUST NOT BE COPIED, REPRODUCED, OR MANUFACTURED WITHOUT WRITTEN PERMISSION BY RETROFLEX, INC.	**RETROFLEX, INC.** 1205 Broadway St. Wrightstown, WI 54180					
PART DESCRIPTION: PLATE, L.H.	SURFACE FINISH: FINISHED SURFACES TO BE (125) UNLESS SPECIFIED	DRAWN: RLH							
MATERIAL: SEE BILL OF MATERIAL	MATERIAL DESCRIPTION: ASSEMBLY	TOLERANCE: 2 DECIMAL DIM ± .02, 3 DECIMAL DIM ± .005, FRACTIONAL DIM ± 1/64, UNLESS OTHERWISE NOTED	CHECKED: WAGNER	WEIGHT: 39.18	REVISION:	DATE: 10/03/17	CODE NO.: 421	SHEET: 1 OF 1	DRAWING NO.: 11012302-0002