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INSTALLATION AND OPERATIONS MANUAL
RETROFLEX, INC. MACHINE # 20175886

Enclosed Doctor Blade Cavity
Assembly # - 11012279
Cavity – S21 x 109" Lg

SHIPPING AND RECEIVING

This equipment and its components have been inspected, crated and 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.

NOTICE

This manual is provided as a guide for setup and alignment of a Retroflex Series S21 Spare Doctor Blade Cavity. This cavity has been designed to fit existing customer equipment. Refer to your original machine manual for other adjustments and settings.

ENCLOSED BLADE SYSTEM THEORY OF OPERATION

WIPE THE ENGRAVED 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.

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.

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.

REDUCED 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.

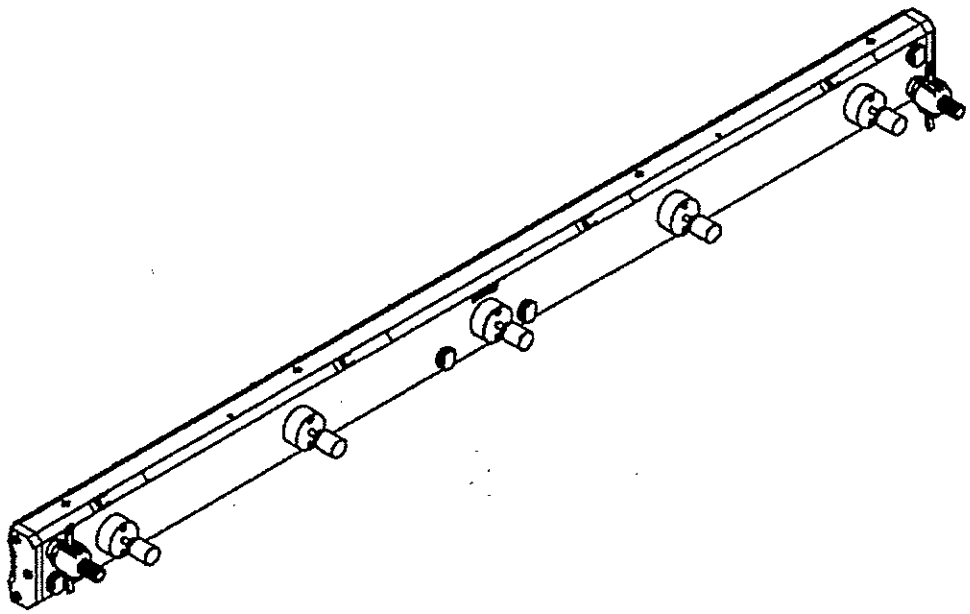

FIGURE 1-1 SPARE CAVITY ASSEMBLY

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.

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Section 1 Safety Information

A. 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.*

B. 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.

C. 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.

D. 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.

E. MAINTENANCE & 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.

F. SAFETY SIGNS

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

Section 2 Component Installation

A. GENERAL

It is recommended, for ease of setup and shorter downtime, a second blade cavity is available and ready to go at all times. Blade and seal changes and cleanup can then be performed off-line. See page 2 for spare cavity setup.

B. INSTALLATION

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, the RETROFLEX Reverse Angle Doctor Blade System is shipped completely assembled except for the cavity, the catch pan and components that need to be attached to existing frames. Components that need modification are shown in the attached drawings as well as any additional installation information.

This cavity must be properly aligned to the engraved roll before fluid is pumped to the unit. First Time Alignment procedures are provided herein.

Please feel free to contact Retroflex if you have any questions or problems with the installation of this equipment. Proper installation, adjustment and cleanliness are the keys to optimum performance of this equipment.

Section 3 Blade Installation

A. 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.*

B. 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 spare cavity not yet setup and aligned to press/coater.

1. 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.
2. Remove end plates, seals, and the blade clamps. Set them aside.
3. Wipe all surfaces and be sure that they are clean and dry.
4. Cut two pieces of doctor and trailing blade material normally used for production to the same length as the blade clamps.

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.*

1. Loosen the locking handle(s) and rotate the cavity away from the engraved roll or remove completely. Wrap the engraved roll to protect it.
2. Remove end plates, seals, blade clamps and old blades.
3. 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.*
4. Cut two pieces of doctor and trailing blade material normally used for production to the same length as the blade clamps.

NOTE; *This unit shipped with .050" UHMW doctor blades and .014" Mylar trailing blades.*

NOTE: *Take notice that one edge of the blade is flat and the other edge usually has a bevel or step design (Figure 3-1). 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.*

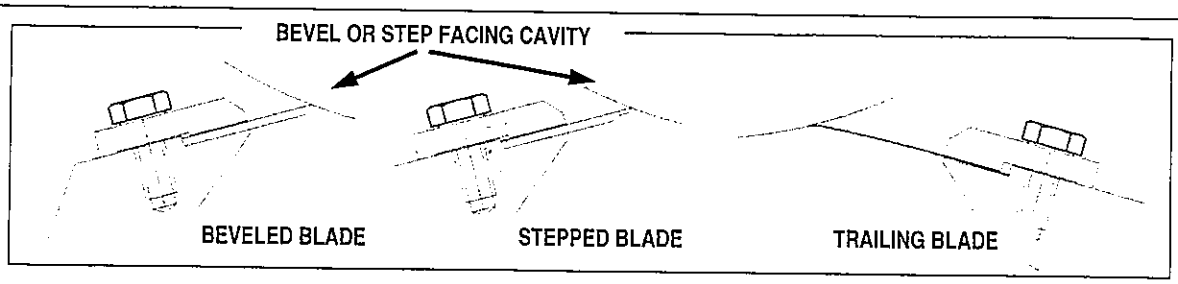


FIGURE 3-1 TYPICAL BLADE CONFIGURATIONS

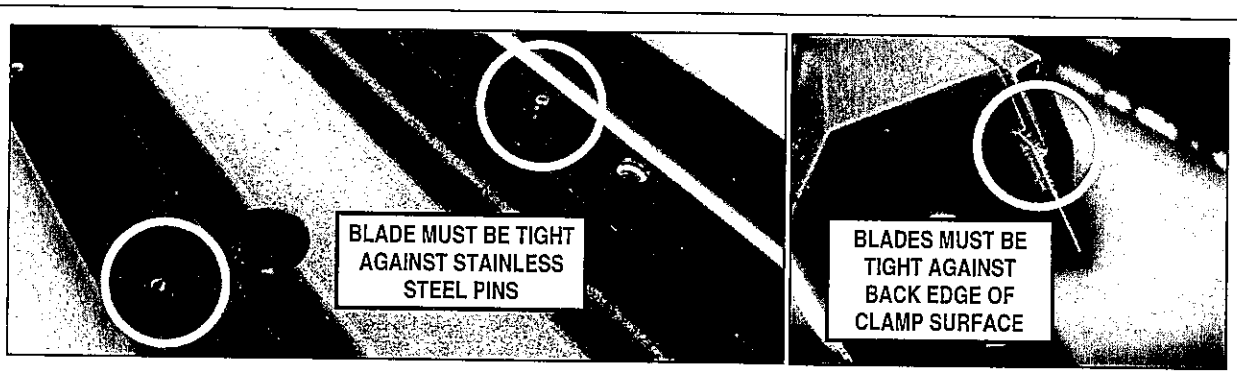


FIGURE 3-2 BLADE CLAMP STYLES

5. 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.
6. 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.
7. 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.*
8. Install End Seals and plates.

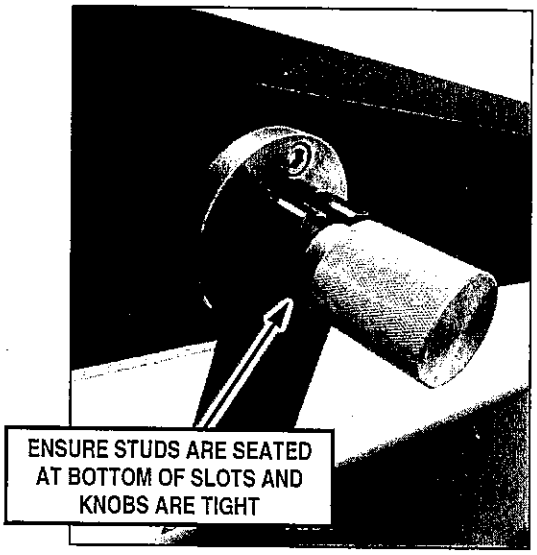


FIGURE 3-3 MOUNTING CAVITY

C. CAVITY MOUNTNG

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.

Be sure the cavity is seated properly in the mounting arm slots and knobs or handles are tight.

Section 4 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.

A. 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 to 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

PROBLEM	PROBABLE CAUSE	POSSIBLE REMEDY
		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, 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.

Section 5 Maintenance and Lubrication

A. MAINTENANCE 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.

C. LUBRICATION AND PREVENTIVE MAINTENANCE

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

IMPORTANT: *Use recommended lubricant or functional equivalent.*

NOTE: *The following lubrication intervals are given as a guide only. Actual lubrication schedules will vary due to the number of hours the line is run, speed of the web, environmental conditions, etc. Adjust intervals as necessary and determined by experience with this equipment. Proper records must be maintained in order to assure timely preventative maintenance.*

ITEM KEY *	MAINTENANCE POINTS	MAINTENANCE INTERVALS	LUBRICANT / NOTES
A	Doctor Blades and End Seals	Daily	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.**
B	Clean-up – Cavity system, pan, and hoses	Daily	**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.

* See 'Preventive Maintenance Notes' for item key information.

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 fluid).

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.

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.

4. 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.
5. Continue this process until it appears the returning fluid is clean.
6. Stop the pump, allow the lines to drain.
7. Tilt back the cavity and remove the supply and drain lines.
8. 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.

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

F. 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.

Section 6 Spare Parts

Please see the parts drawings provided at the back of this manual for a complete list of all parts that make up the RETROFLEX Series S21 Doctor Blade System. 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 20175886) 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

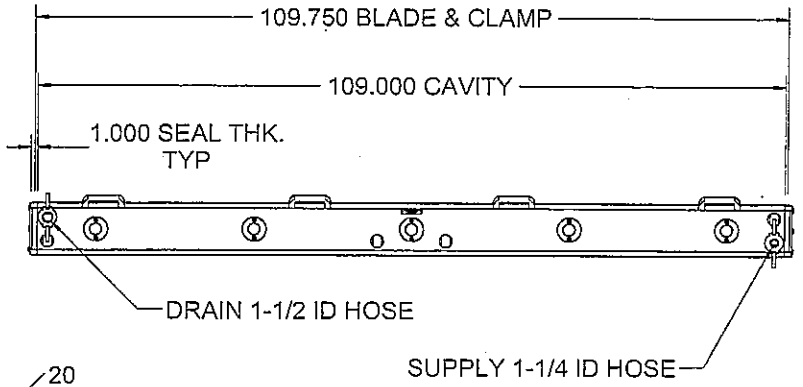
Wrightstown, WI 54180

A. DRAWINGS

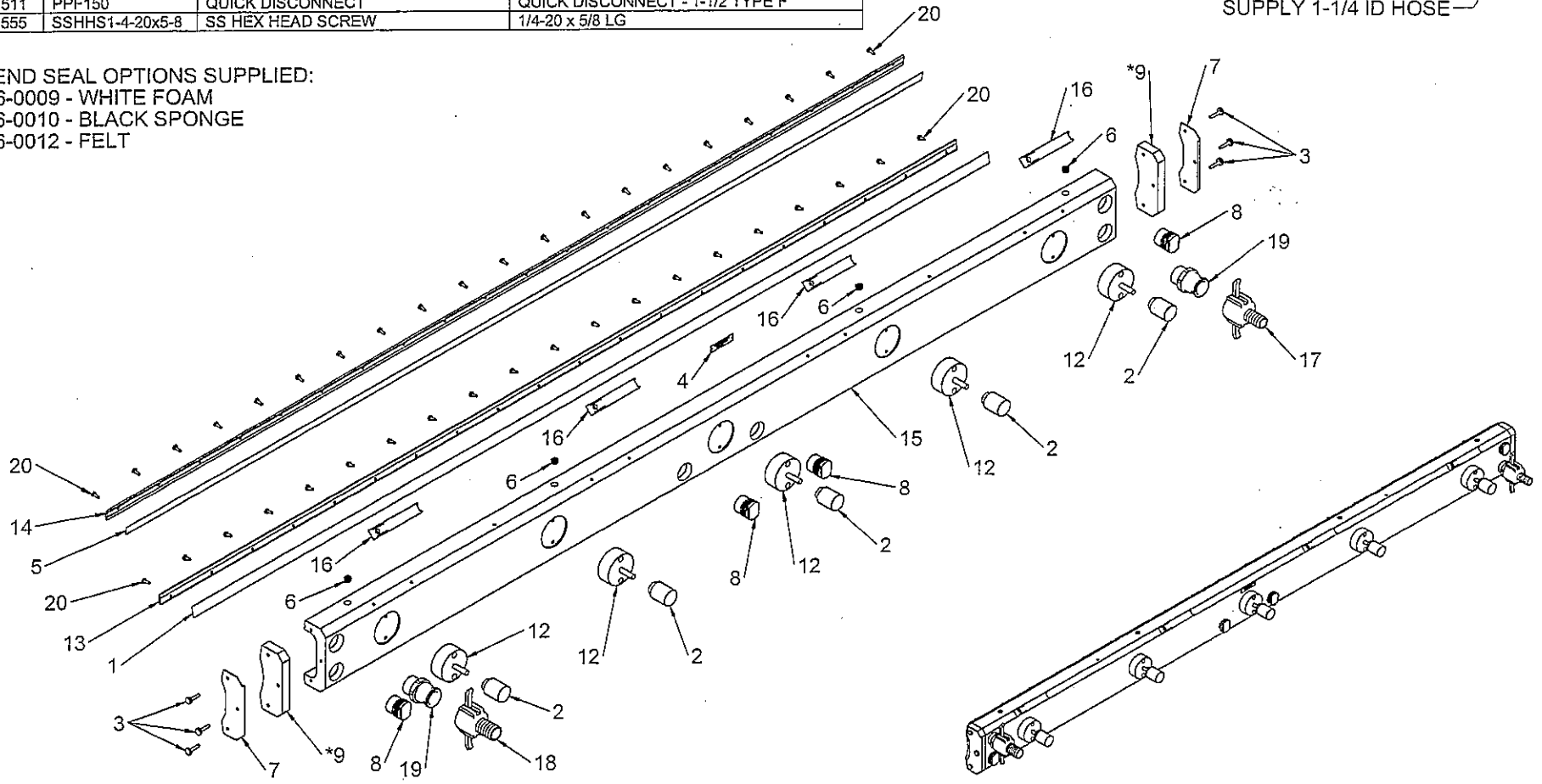
The following drawings are provided for parts identification.

11012279	Spare Cavity Assembly
11000608-0001	Blade Configurations

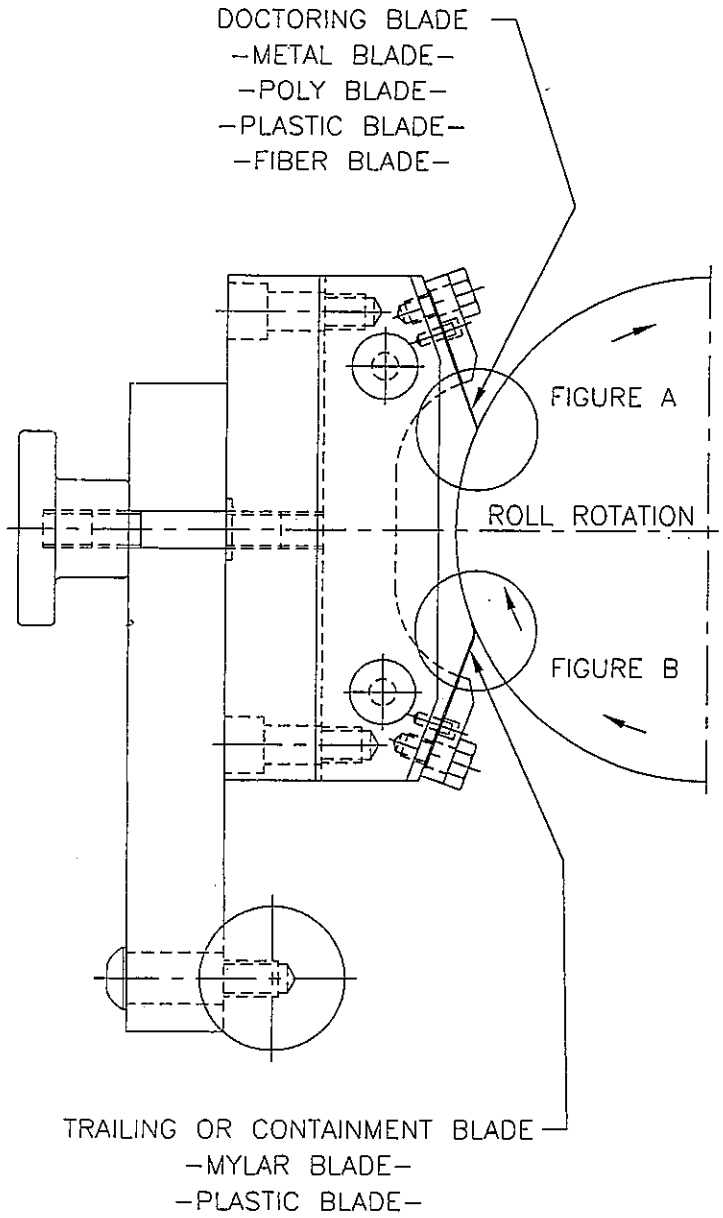
ITEM	QTY	CODE	PART NUMBER	RETROFLEX PART NAME	RETROFLEX PART DESCRIPTION
1	1	001	11000028-0144-6	BLADE, TRAILING - MYLAR	STR: .014 x 1.38 x 109.75 LG
2	5	525	11000085-0031	KNOB, KNURLED	Ø1.75 & 1/2-13 UNC TAP
3	6	016	11000313-0013	SCREW, KNURLED HEAD	1/4-20 UNC, (FOR 1" THK SEAL)
4	1	038	11000455-0019	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	11012041-0004	STUD & SPACER, CAVITY - ø1/2	ø3.50 x 1.098 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	1	511	PPC125	QUICK DISCONNECT	QUICK DISCONNECT - 1-1/4 TYPE C
18	1	511	PPC150	QUICK DISCONNECT - 1-1/2 TYPE C	QUICK DISCONNECT - 1-1/2 TYPE C
19	2	511	PPF150	QUICK DISCONNECT	QUICK DISCONNECT - 1-1/2 TYPE F
20	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								
MATERIAL: SEE BILL OF MATERIAL	TOLERANCE 2 DECIMAL DIM ± .02, FRACTIONAL DIM ± 1/64, 3 DECIMAL DIM ± .005, UNLESS OTHERWISE NOTED	DRAWN: RLH							
MATERIAL DESCRIPTION: FITS RETROFLEX PRINTER		CHECKED: WAGNER	WEIGHT: 169.28	REVISION:	DATE: 09/18/17	CODE NO.: 201	SHEET: 1 OF 1	DRAWING NO.: 11012279	



TOP DOCTORING

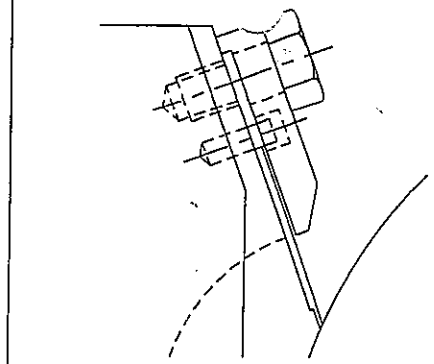


FIGURE A
WITH STEPPED METAL BLADE

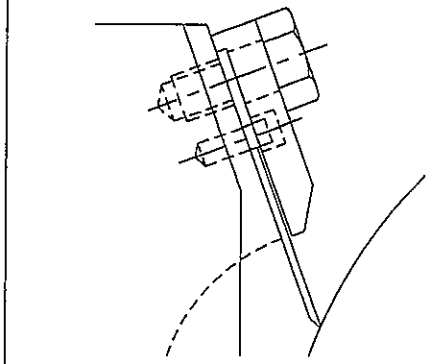


FIGURE A
WITH BEVELED PLASTIC BLADE

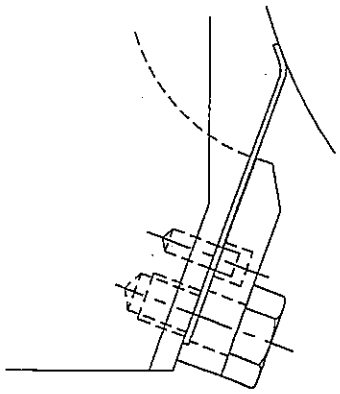
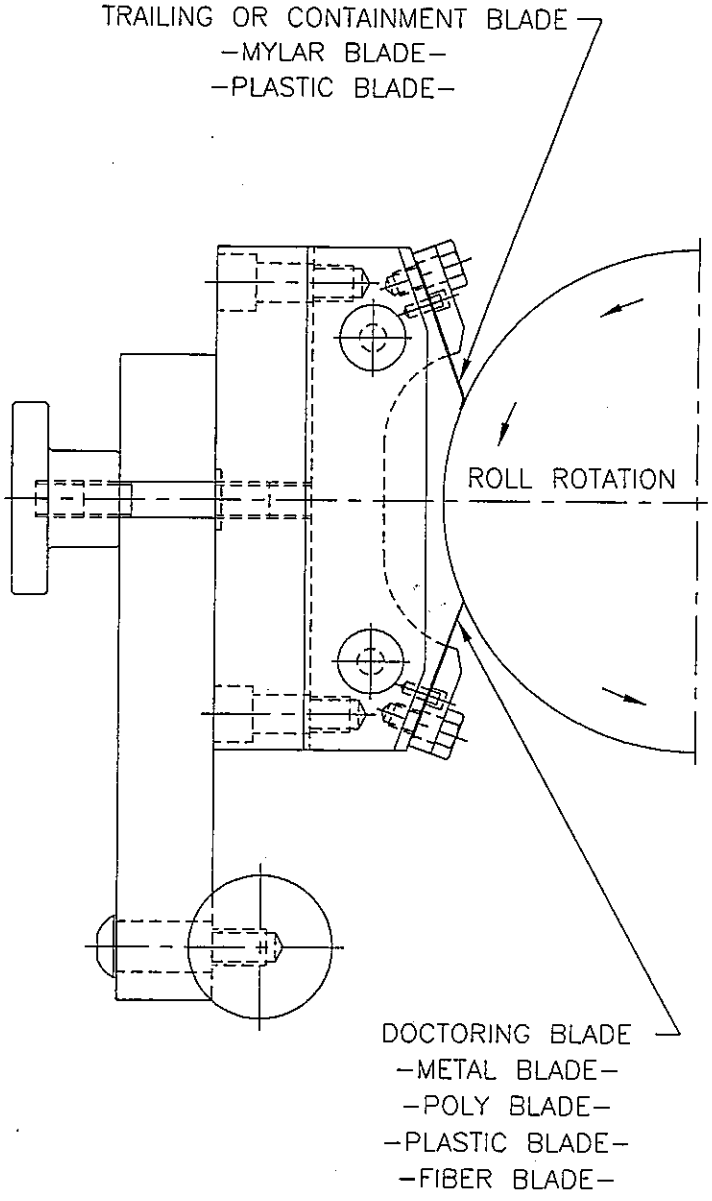


FIGURE B
TRAILING OR CONTAINMENT BLADE



BOTTOM DOCTORING

NO.	REVISION DESCRIPTION	DATE	INT
1	ADDED FIGURE B	5/24/02	TRS

PART NAME: LAYOUT, MECHANICAL

MATERIAL OR DESCRIPTION: BLADE LOCATIONS FOR TOP & BOTTOM DOCTORING

SURFACE FINISH: ALL FINISHED SURFACES UNLESS OTHERWISE INDICATED SHALL HAVE A FINISHED (125)

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

RETROFLEX, INC.
1205 Broadway St. Wrightstown, WI 54180

DRAWN	CHECKED	SCALE	DATE	CODE NO.	SHEET	DRAWING NO.
SMET	SMET	FULL	23 SEP 93	302	1 OF 1	11000608-0001