Hand-Held Scarifiers

Needleguns

Walk-Behind Scarifiers

Impact Tools

Sanders

Specialty Tools

Industrial Vacuums

FX-Flushplate

Hand-held Rotary Scarifier

Pneumatic

Pneumatic FX-Flushplate Configurations

Part	Description	Hub(s) Included	Accessories Furnished
110.216	FX System	Reloadable Cutter, Roto-Peen, and Roto-Hammer	Whip assembly, oil bottle, tool kit, carrying case & air regulator*.
110.212	FX w/Roto-Peen	Roto-Peen	Tool kit, air regulator*
110.2133	FX w/Reloadable Cutter	Reloadable Cutter	Tool kit
110.211	FX Bare	None	None

*Note: Air regulator required for speed control when using Roto-Peen.

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Contents

CHAPTER 1 – General Information

1.1 Introduction

This publication describes the Desco FX-Flushplate hand held rotary scarifier. Topics covered in this manual include operator safety, proper operation, maintenance procedures, and troubleshooting.

1.2 Purpose and Function

The machine is a lightweight, portable, pneumatic-powered tool designed for the removal of scale, paint, and corrosion from hard surfaces using a rotating head fitted with Roto-Hammers, Cutters or Roto-Peen flaps.

1.3 Capabilities

The machine can be used to remove paint, primer, nonskid, corrosion or contaminants, and to feather paint on many surfaces, including steel, aluminum or concrete. The FX-Flushplate provides high productivity for horizontal surfaces where weight is not a consideration. When weight is an issue, such as vertical or overhead surfaces, the Mini-Flushplate is recommended. The interchangeable hub assemblies excel at these tasks.

Cutters are used to remove heavy coatings including epoxy and elastomeric type coatings, mastic removal, non-skid removal, as well as concrete scarification. Two types of cutter hubs are available:
1) Welded – when cutters wear out the hub is discarded (pictured).
2) Reloadable – when cutters wear out, the hub is reloaded. A reload kit is available which includes cutters and other wear parts.

Roto-Hammers are very effective in removing fracturable coatings. Due to their design, they are also ideal for removing coatings from irregular surfaces or surfaces with holes or protruding objects such as nuts, bolts, welds and tie downs. Due to the Roto-Hammer design, they perform much like a needlegun in terms of both profile and versatility. Hammers will step over obstacles like bolt heads and step into depressions, in the same manner as the needles of a needlegun.

Roto-Peen Flaps are used to remove fracturable coating up to a 20 mil thickness. Roto-Peen was designed to provide a shotblast type profile and meets the 1 to 3 mil profile specified by SSPC SP-11. Roto-Peen is approved for use on steel, aluminum and concrete substrates. Roto-Peen are long wearing when used properly. Proper use includes maintaining proper height adjustment, speed and the avoidance of excessive heat buildup. Roto-Peen is designed for use on flat surfaces and not for running over weld bead or other surfaces with protruding objects. See operating instructions for more information.

1.4 Specifications

Air Requirement:	85 psi @ 39 cfm
Speed (no load):	4,500 rpm
Horsepower:	1.0
Weight:	11 lbs. (motor & shroud, no hub)
Length:	12-3/4"
Air Hose Requirement	
Diameter:	1/2" ID
Length:	100′ maximum (optimum for maximum CFM)
Vacuum Hose Requirement	
Diameter:	1-1/2" ID
Length:	10′ standard, 25′ maximum

1.5 Preparation for Use

This machine is ready to use when received from the manufacturer, with the exception of attaching the whip assembly to the air motor and air hose. See Chapter 3, paragraph 3.1 for instructions on filling lubricator with oil.

Depending on the tool configuration purchased (see front cover), the tool comes with zero-to-three hubs. If the operator elects to use a different hub from that which comes installed on the machine, he should turn to Chapter 4, paragraph 4.3 for instructions on how to replace the various hubs.

1.6 Consumables and Accessories

Part	Description
	Interchangable Hubs
110.032	Hub, Cutter, Reloadable, w/cutters
110.027	Hub, Cutter, welded (not reloadable), w/cutters
110.022	Hub, Roto-Hammer (eq. to a high speed needlegun)
110.054	Hub, Roto-Peen, w/"C" flaps
110.012	Hub, Roto-Peen, w/o flaps
	Consumables
110.033	Reload, cutters
110.006	Reload, Roto-Peen, type "C", (12 pcs, 2"ea.)
	Accessories
110.016	Roto-Peen keeper pin (6 required)
110.047	Roller Kit, for use with Roto-Peen
110.049	Roller (Must purchase 2)
110.001	Replacement Brush Set for Dust Collector. Comes with brush, channels and rivets
500.057	Carry case
500.008	Filter/lubricator (“Whip Assembly”)
500.015	Oil bottle
110.020	Air regulator (required when using Roto-Peen)

CHAPTER 2 – Safety Precautions

WARNING Read and understand all instructions
Failure to follow all instructions listed below may result in damage to the tool and/or serious personal injury.

2.1 Read Operating Instructions

Always become familiar with all the instructions and warnings before operating any power tool.

2.2 Always Wear Approved Eye Protection

Impact resistant eye protection should meet or exceed the standards as set forth in the United States ANSI Z87.1, Occupational and Educational Eye and Face Protection. Look for the marking Z87.1 on your eye protection to insure that it is an approved style. For further information, ANSI Z87.1, Occupational and Educational Eye and Face Protection, is available from the American National Standards Institute, Inc., 11 West 42nd Street, New York, NY 10036.

2.3 Hearing Protection is Recommended

Hearing protection should be used when the noise level exposure equals or exceeds an 8 hour time-weighted average sound level of 85dBA. Process noise, reflective surfaces, other tools being operated nearby, all add to the noise level present in your work area. If you are unable to determine your noise level exposure, we recommend the use of hearing protection.

2.4 Avoid Prolonged Exposure to Vibration

Pneumatic tools can vibrate during use. Prolonged exposure to vibration or very repetitive hand and arm movements, can cause injury. Stop using any tool if discomfort, tingling feeling or pain occurs. You should consult your physician before resuming use of the tool.

2.5 85 PSI Maximum

This tool is designed to operate at an air pressure of 85 pounds per square inch gauge pressure (85 PSI) maximum, at the tool. Use of higher air pressure can, and may cause injury. Also, the use of higher air pressure places the internal components under loads and stresses they were not designed for, causing premature tool failure. The air supply should be clean and dry, preferably lubricated. For best results, drain the moisture from your compressor daily.

2.6 Work Area

1. **Keep work area clean and well lit**. Cluttered benches and dark areas invite accidents.
2. **Do not operate power tools in explosive atmospheres**, such as in the presence of flammable liquids, gasses, or dust. Power tools create sparks which may ignite dust or fumes.
3. **Keep bystanders away** while operating a power tool.

2.7 Personal Safety

1. **Stay alert**, watch what you are doing and use common sense when operating a power tool. Do not operate tool when tired or substance impaired.
2. **Dress properly.** Do not wear loose clothing or jewelry. Contain long hair. Keep hair, clothing and hands away from moving parts.
3. **Use safety equipment**. Always wear eye protection. Other precautions may be required depending on the situation. These include: ear protection (ear plugs) vibration protection (gloves), steel toe shoes or hard hats.
4. **Avoid accidental starting**. Be sure the switch is off before attaching to power source.
5. **Do not overreach**. Keep proper footing and balance at all times.

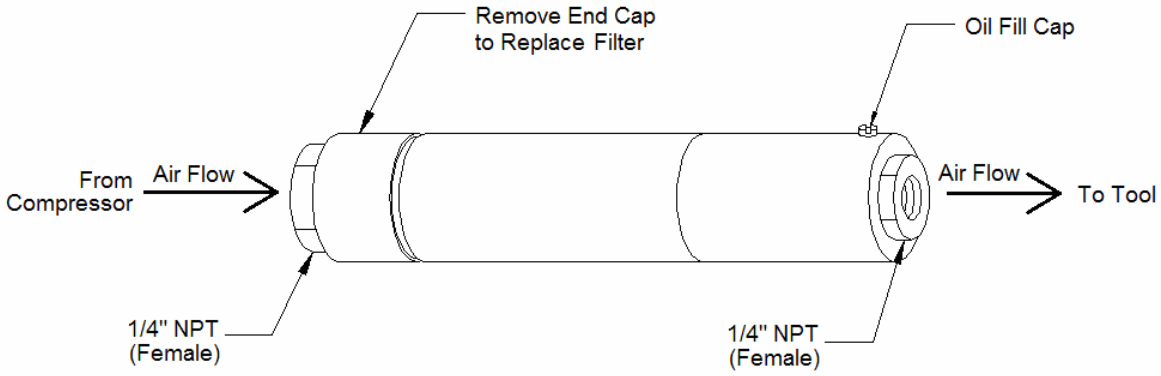
2.8 Tool Use and Care

1. **Secure the work.** Use clamps or other securing method to firmly hold work to a stable platform. Do not attempt to hold work in one hand and operate the tool with the other hand.
2. **Do not force tool.** Apply light hold down pressure and let the tool do the work. Use the correct tool for your application.
3. **Do not tape trigger closed** to fashion a trigger lock. If you drop or otherwise loose control of the tool, it will continue to run and may cause dangerous results.
4. **Disconnect from power source before making adjustments** or changing accessories. Failure to disconnect may result in injury if the tool were to accidentally start while adjusting.
5. **Store tools out of reach of untrained persons.** Tools are dangerous in the hands of untrained users.
6. **Maintain tools with care**. Keep cutting tools sharp and clean. Properly maintained tools, with sharp cutting edges are less likely to bind and are easier to control.
7. **Check for misaligned or binding of moving parts**, breakage of parts, and any other condition that may affect the tool's operation. If damaged, have the tool serviced before using. Many accidents are caused by poorly maintained tools.

CHAPTER 3 – Operating Instructions

3.1 Pre-Operation

- ***Hub*** – Install hub of choice for task. Check consumables for remaining life. Replace consumables as required. See *Inspection and Replacement* below.
  Note:
  1) ***Use rollers*** with the roto-peen hub to maintain proper height.
  2) ***Do not use rollers*** with the cutter hub or hammer hub.
- ***Air Supply*** – Setup all things needed to supply clean, dry compressed air to the tool at your job site at the required pressure (85psi) and volume (39cfm). This includes: fittings, a hose and a filter/lubricator. A 50′, ½" ID hose is recommended as well as large body fittings to allow maximum air flow. Inspect hoses and fittings before each use.
- ***Vacuum*** – Connect to power source and connect vacuum hose to tool. Vacuum is ***highly recommended*** when using ***roto-peen*** to dissipate heat. Vacuum is optional when using cutters or roto-hammers.
- ***Safety*** – You have considered the job site environment and implemented safety precautions that are situation appropriate.
- ***Lubricator*** – Remove oil fill cap and place ½ oz of light machine oil (ISO VG32 or equal lubricating oil) in the lubricator. Use plastic oil bottle (included in kit), hold firmly against opening and squeeze. The ball check valve prevents oil from flowing out the fill hole. Top off oil in lubricator at 8 hour intervals.
  Note: If loss of air pressure occurs, the filter in lubricator may need to be replaced. Stop machine, shut off air supply, and disconnect hose from machine. To replace filter, simply remove end cap, remove old filter, insert new filter, and replace cap as shown previously in Figure 2-1.



- **Inspection and replacement**

Part	Inspection	Replacement
Hammers	Daily	Replace when worn (when hammer doesn't strike surface), or when hammer is broken.
Cutters	Daily	Replace when worn to within 1/8" of solid core.
Roto-Peen flaps	Daily	Replace when tips are worn off or fabric is torn.
Hoses & fittings	Daily	If leaks are discovered, hose should be replaced. If leaks are around fittings, hose may be repairable.

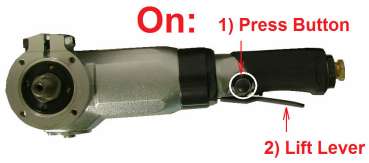
3.2 Operation

When setup steps are complete, you are ready to operate the tool. The following are step-by-step procedures for operating the FX-Flushplate hand-held rotary scarifier.

3.2.1 Power On/Off

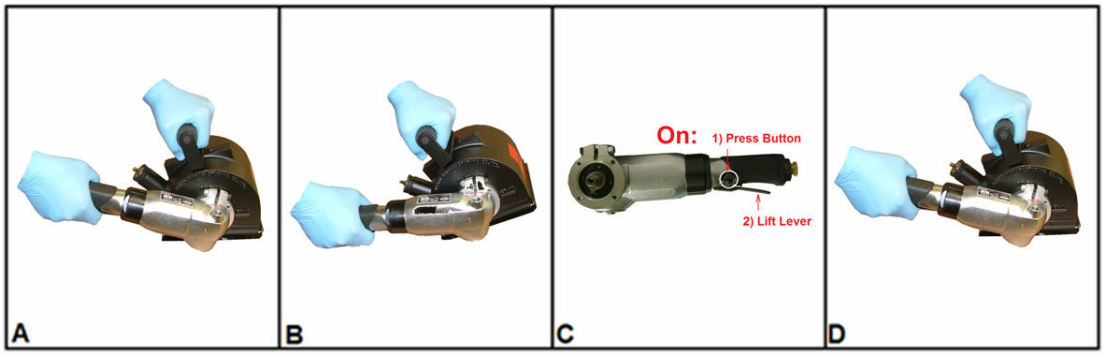
Power is controlled with a throttle leaver which has a double safety lock-off feature designed to prevent accidental starting of the tool. To operate, slide the lock-out pin forward then squeeze the leaver. To stop, release the leaver.

The *power on/off sequence* is **critical** to effective dust containment.

Sequence	First Action	Second Action
On	Vacuum **On** 	Tool **On** 
Off	Tool **Off** 	Vacuum **Off** 

3.2.2 Starting the Tool

A. ***Grasp Firmly*** – with both hands. Left on handle, right on motor.
B. ***Heal Down/Toe Up*** – The rear of the tool body should be touching the surface while the front is elevated about 2" to allow the hub to spin free.
C. ***Power On*** – Start the tool using the above power on sequence. Continue to hold the front up until the motor comes up to operating speed.
D. ***Level Tool*** – With motor up to speed, ease the front down to the surface to engage the abrasive.



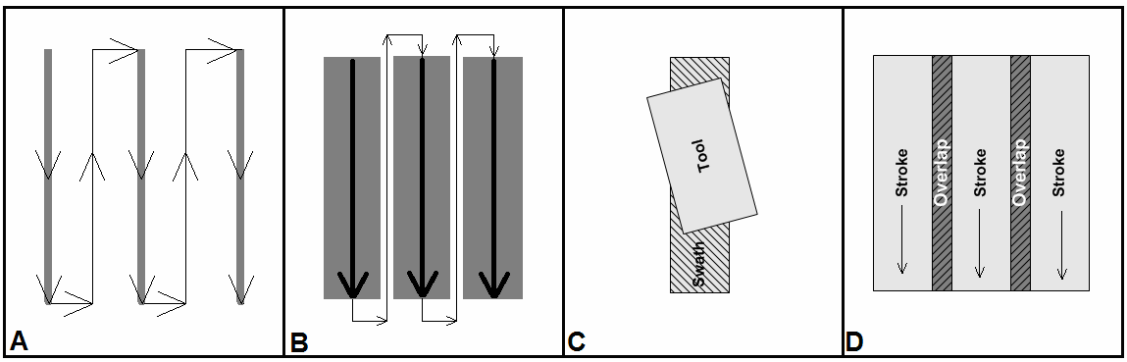
3.3.3 Working the Surface

A. ***Grid Pattern*** – Move tool in a system of grid patterns. Complete one grid before moving to the next. Cut a swath, move to the right 4 inches and repeat. Use a stroke length that is convenient to the surface and your arm length.

B. ***Cut on Back Stroke*** – While the tool will cut in either the forward or backward direction, the backward direction is more effective due to the direction of rotation.

C. ***Skew the Stroke*** – When using Roto-Peen, hold the machine angled about 5 to 10 degrees from straight. Angling (skewed) results in a cleaner surface with less streaking than a straight motion.

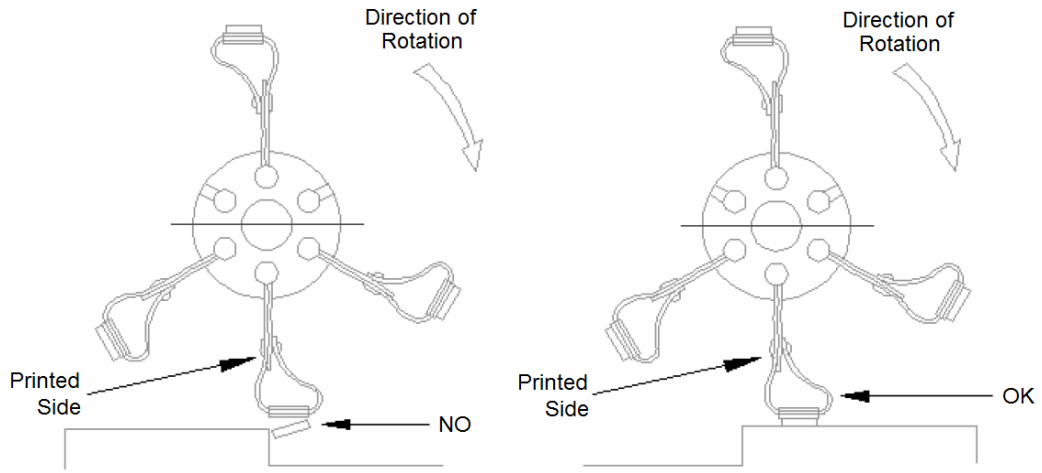
D. ***Work the Edge*** – Overlap each stroke to maximize productivity. The edge refers to the freshly cut edge left by a stroke of the tool. The very first pass is more difficult because it has to break through the coating. Subsequent passes are more efficient because the coating surface has been broken.



3.3.4 Roto-Peen Cautions

Roto-peen flaps are easily damaged when not used properly. Please observe the following precautions when using Roto-Peen.

- ***Tool Height*** – to set Roto-Peen at proper height, tool must always be used with supplied rollers. When operating tool, both rollers must be in contact with surface.
- ***Tool Speed*** – to insure Roto Peen is operated at proper speed, an air regulator *must* be attached to the air inlet bushing.
- ***Vacuum*** – Using a vacuum with Roto-Peen is highly recommended to generate air flow to dissipate heat. Failure to use vacuum with Roto-Peen may result in premature failure of the Roto-Peen flaps.
- ***Objects*** – When using Roto-Peen, DO NOT run the machine over bolt heads or other protruding objects.
- ***Sharp Edges*** – When using Roto-Peen on an area which has a sharp edge, never allow flaps to rotate onto an edge; this will damage them. To clean the edge, move the machine so that flaps are rotating off the edge, or operate parallel to the edge.



3.3 Post-Operation and Stowage

Disconnect whip assembly from machine and place 5-8 drops of light machine oil (ISO VG32 or equal lubricating oil) in air inlet. Reconnect whip assembly to air inlet and run motor for 2-3 seconds (just long enough for oil to get into motor, but not pass through) to flush the system.

Wipe off all dust and dirt with a dry rag.

Remove, coil, and secure air hose with a piece of string or wire.

CHAPTER 4 – Maintenance Instructions

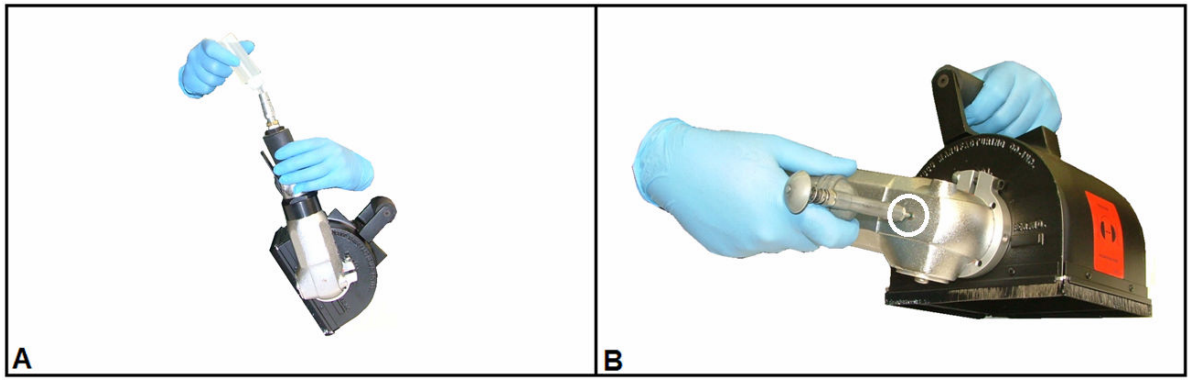
4.1 Cleaning and Lubrication

Clean the FX-flushplate after each use by wiping off all dust and dirt with a clean, dry cloth.

Lubricate the FX-flushplate as follows:

A) **Every 8 hours** of operation the motor should be lubricated by placing 3-4 drops of pneumatic tool oil into the air fitting. Re-attach an air hose and run tool for a few seconds to disburse the oil.

B) **Every 250 hours** of operation the ring gears should be lubricated by injecting high temperature bearing grease into the grease fitting using a compact style grease gun.



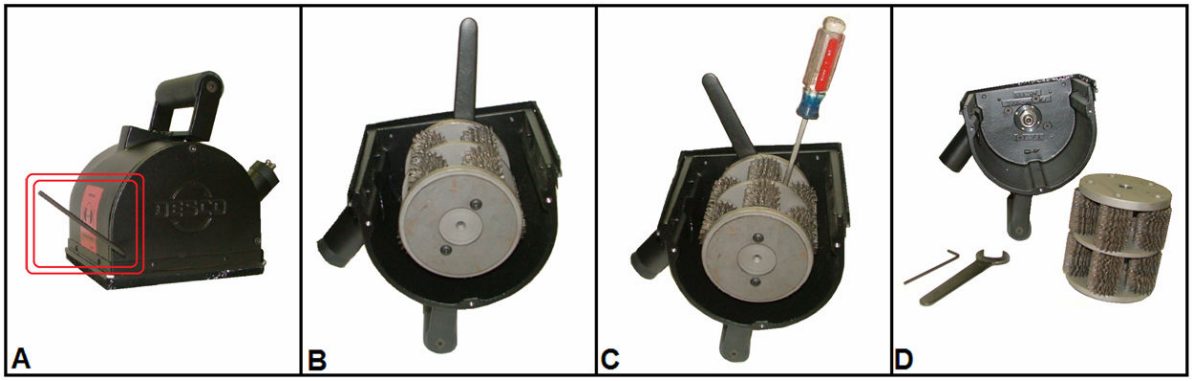
4.2 Performance Verification

Check “ON/OFF” handle to make sure the double safety lock-off lever is operating properly.

4.3 Removal and Replacement of Hub Assemblies

WARNING – Always disconnect tool from power supply before performing any maintenance or inspection operation.

Hubs are removed and replaced to facilitate reloading consumables or adapting to a new application better served by a different abrasive. Change hubs using the following procedure.



A. *Remove Side Cover* – Using the supplied Allen wrench, remove the three (3) Allen head bolts. Set cover aside. Save bolts for re-assembly.

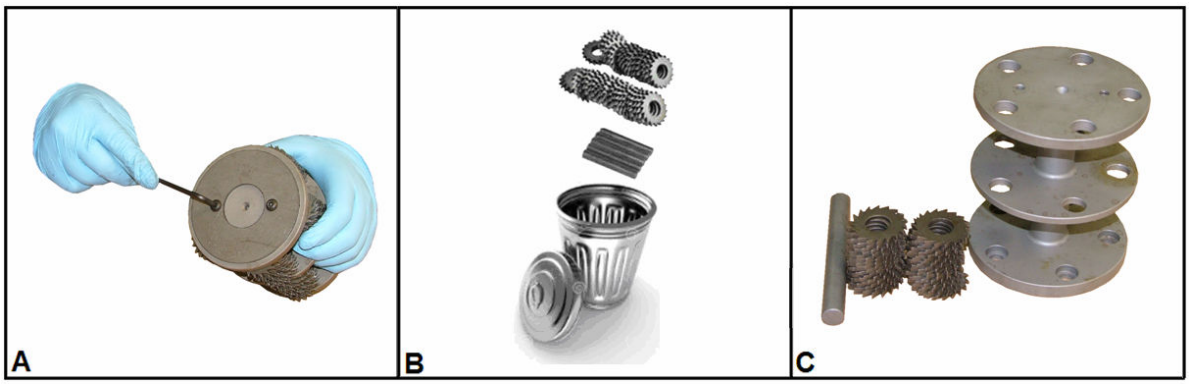
B. *Lock the Spindle* – Using the supplied end wrench, hold the spindle in place. Do so by inserting the wrench between the hub and the tool body.

C. *Remove Hub* – While holding the spindle locked with the end wrench, turn the hub in a counter-clockwise direction until it separates from the spindle. If the hub is too tight to turn by hand, insert a screw driver to provide greater leverage.

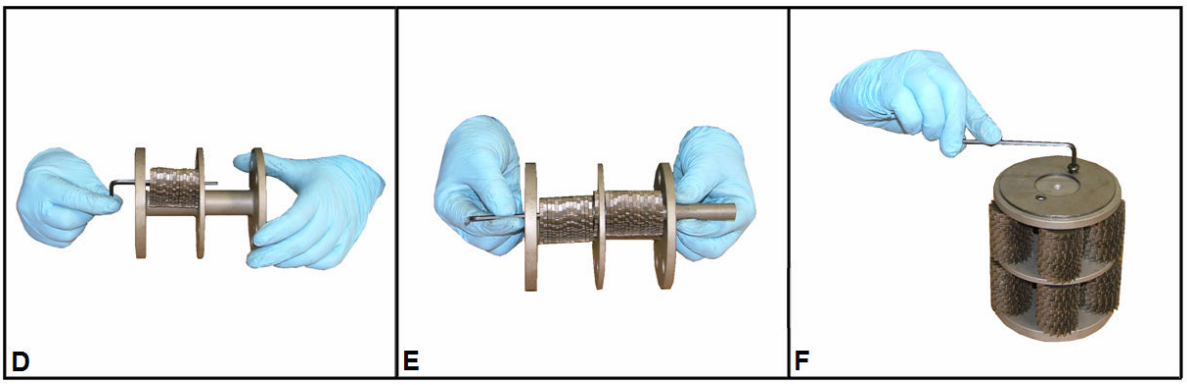
D. *Replace Hub* – Install new hub by reversing the dis-assembly procedure.

4.4 Reload Cutter Hub using Re-load Kit

Begin by removing the hub as described in paragraph 4.3.



A. *Remove End Plate* – Remove the two (2) Allen head bolts securing the end plate. Set aside end plate for later use.
B. *Remove & Discard Cutters* – Discard old cutters, pins and Allen bolts.
C. *Count Cutters* – Count into stacks of 15 cutters and hold the first stack in your hand.

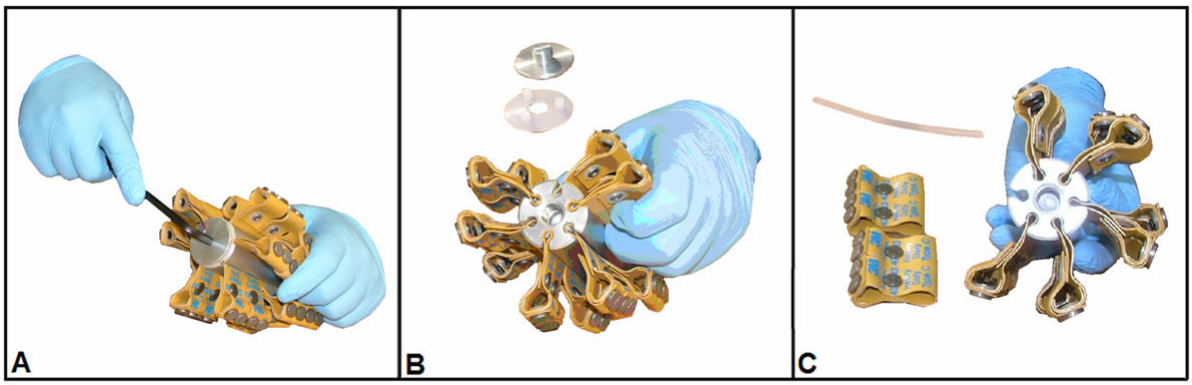


D. Use the Allen wrench to temporarily hold the cutters in place.
E. Load cutters on opposite side directly on the pin. Then slide pin through hole, pushing out Allen wrench and leaving pin holding cutters. Repeat steps D-E for each row of cutters.
F. *Replace Cover* – Replace end cover. Secure with new Allen bolts provided.

Note: Pins should be replaced when they become bent, worn or otherwise damaged. When using the re-load kit that comes with pins, the pins should be replaced with each cutter load. However, when reloading with bulk cutters, the pins may be reused one time provided that they are undamaged.

4.5 Reload Roto-peen Flaps using Re-load Kit

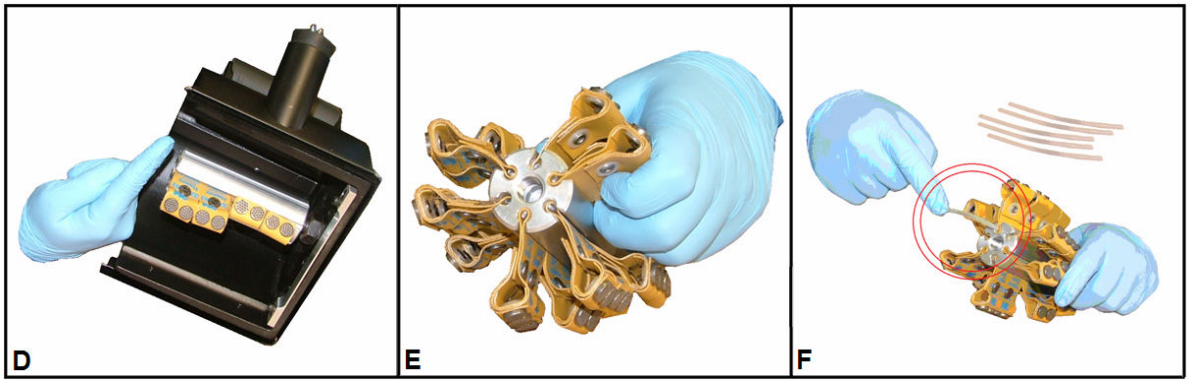
Begin by removing the hub as described in paragraph 4.3.



A. *Loosen* end cap with Allen wrench provided.

B. *Remove* end cap and spacer. Set aside for later use.

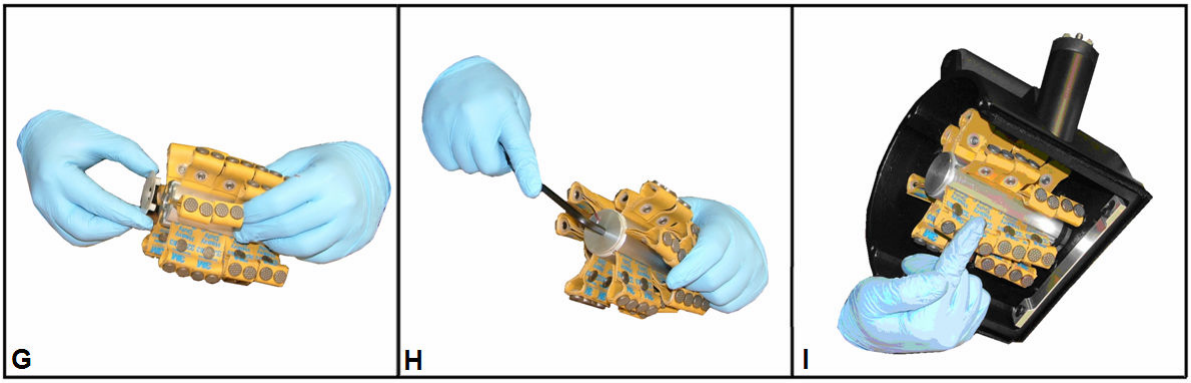
C. *Remove* and discard old Roto-Peen flaps. Set aside plastic keeper pins for later use.



D. *Install **FIRST** new Roto-Peen Flap* – While holding the hub with the threaded end next to spindle, install first Roto-Peen flap with lettering facing the vacuum exhaust port. **Roto-Peen flaps are directional. It is critical that they be installed in the correct direction. Use this exhaust port reference as a guide**.

E. *Install **REMAINING** new Roto-Peen Flaps* – Insert remaining flaps with the printed side facing the same direction as the first flap.

F. *Install Keeper Pins* – Insert keeper pins saved from step C. One pin per flap row is required.

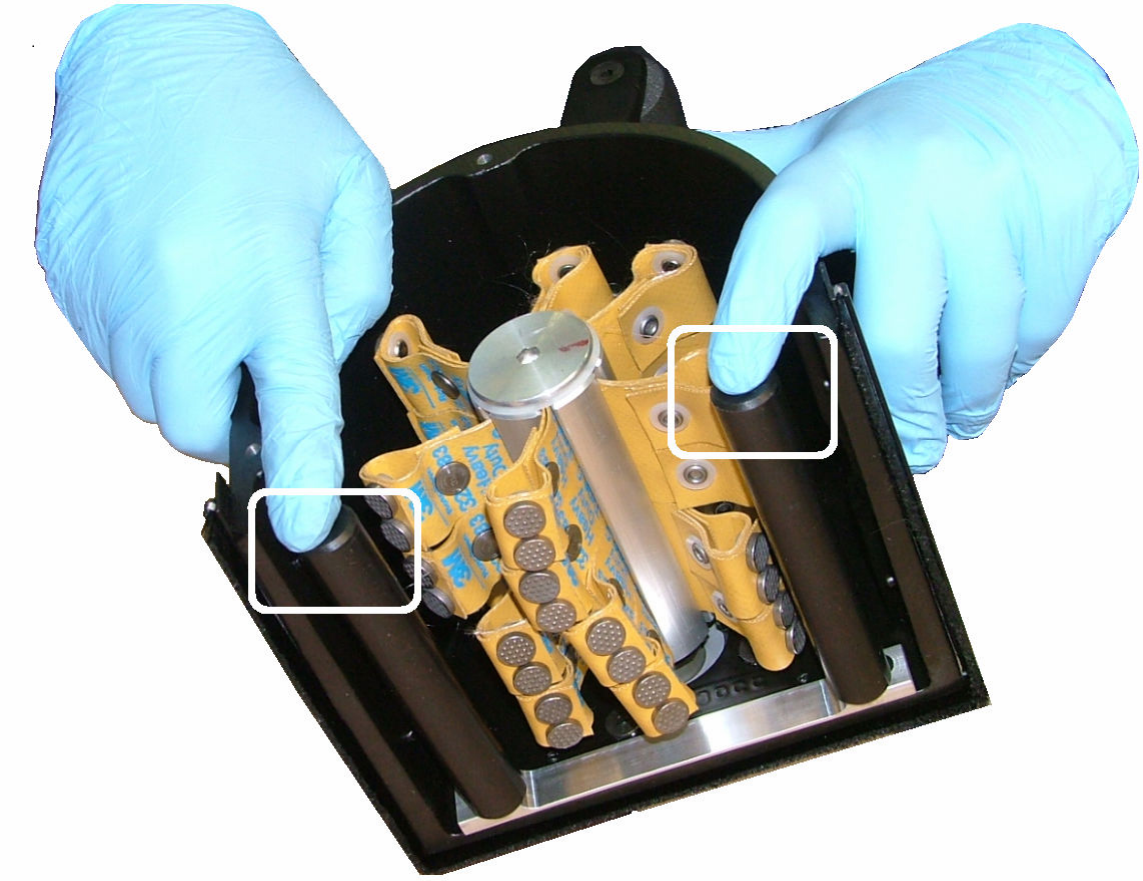


G. *Replace Spacer* – Insert plastic spacer as shown.

H. Replace end cap – Secure with Allen wrench. Re-install hub in tool.
Note: Rollers must be installed when replacing side cover. They are critical for use with Roto-Peen.

I. *Check Directionality* – With reloaded hub reinstalled, slowly spin hub by hand. Observe that the lettering on all flaps is pointing toward the vacuum exhaust port. Correct if necessary.

Note: Be sure to install rollers when using Roto-Peen as shown below.

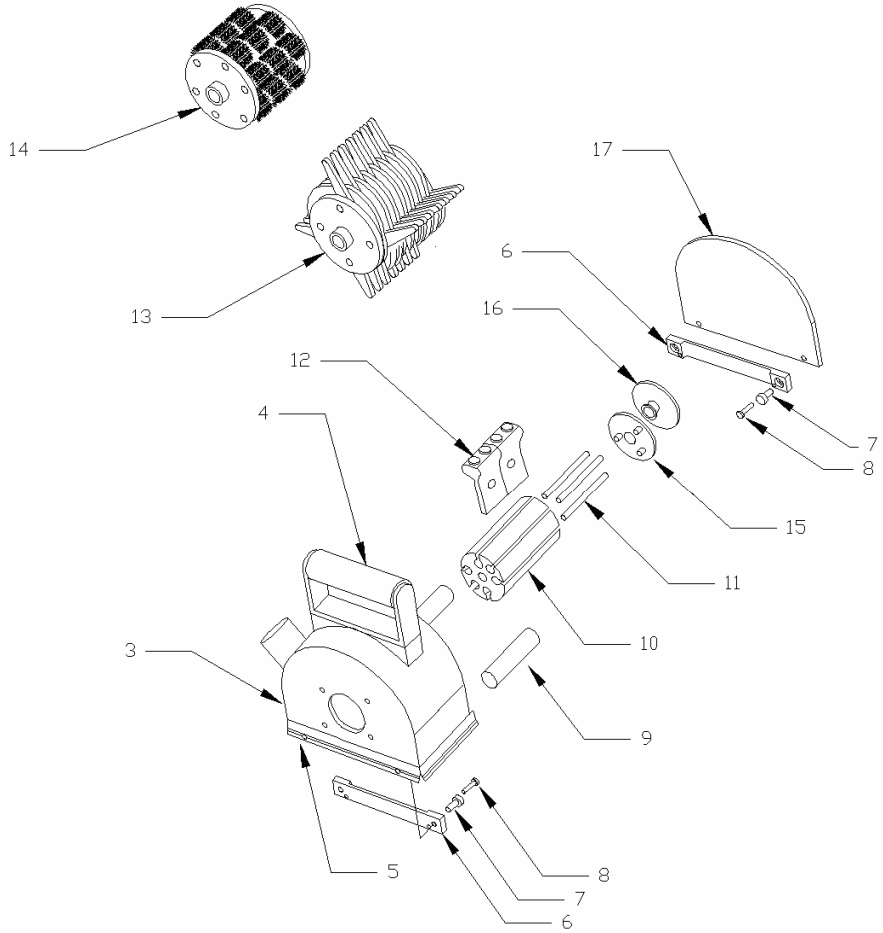


CHAPTER 5 – Troubleshooting

Malfunction	Probable Cause	Solution
Loss of air pressure	Filter clogged	Replace filter.
	Air motor rotor blades frozen	Clean motor and replace blades.
	Air passing through without motor turning	Clean motor and replace blades.
	Washer reversed	Reinstall so smaller diameter is against diffuser.
Difficult to remove hub assembly	Nut on shaft arbor loosening	Hold nut in vice with spindle assembly slightly threaded into nut. Place 1 drop of loctite on bottom of threads. Safely turn on tool so threads are securely tightened into nut.
Roto-peen flaps wearing prematurely	Printed side reversed	Reinstall flaps with printed side hitting surface first.
	Speed too fast	Air regulator missing, damaged or improperly adjusted. Should operate at or below 3,200 RPM.
	Flaps are overheating and metal buttons are separating from flap	Attach vacuum to dust collector attachment to provide airflow and dissipate heat.
	Flaps hitting surface on heel side of fabric	Make sure that the rollers are on surface.
	Running over bolt heads/weld beads	Use correct procedure.
Cutters breaking	Bearing down too hard on tool	Hold tool with enough pressure to keep in contact surface, but no more. Do not bear down.
	Using cutters beyond useful life	Replace cutters when they become ineffective.
	Tool bouncing on deck	Start tool with cutters slightly off the working surface and slowly lower when operating.
		When stopping tool, rock the tool back just enough so that cutters are not making contact with surface and turn off motor.
Spindle shaft breaking	Running cutters over protruding objects	Utilize hammer hub assembly.

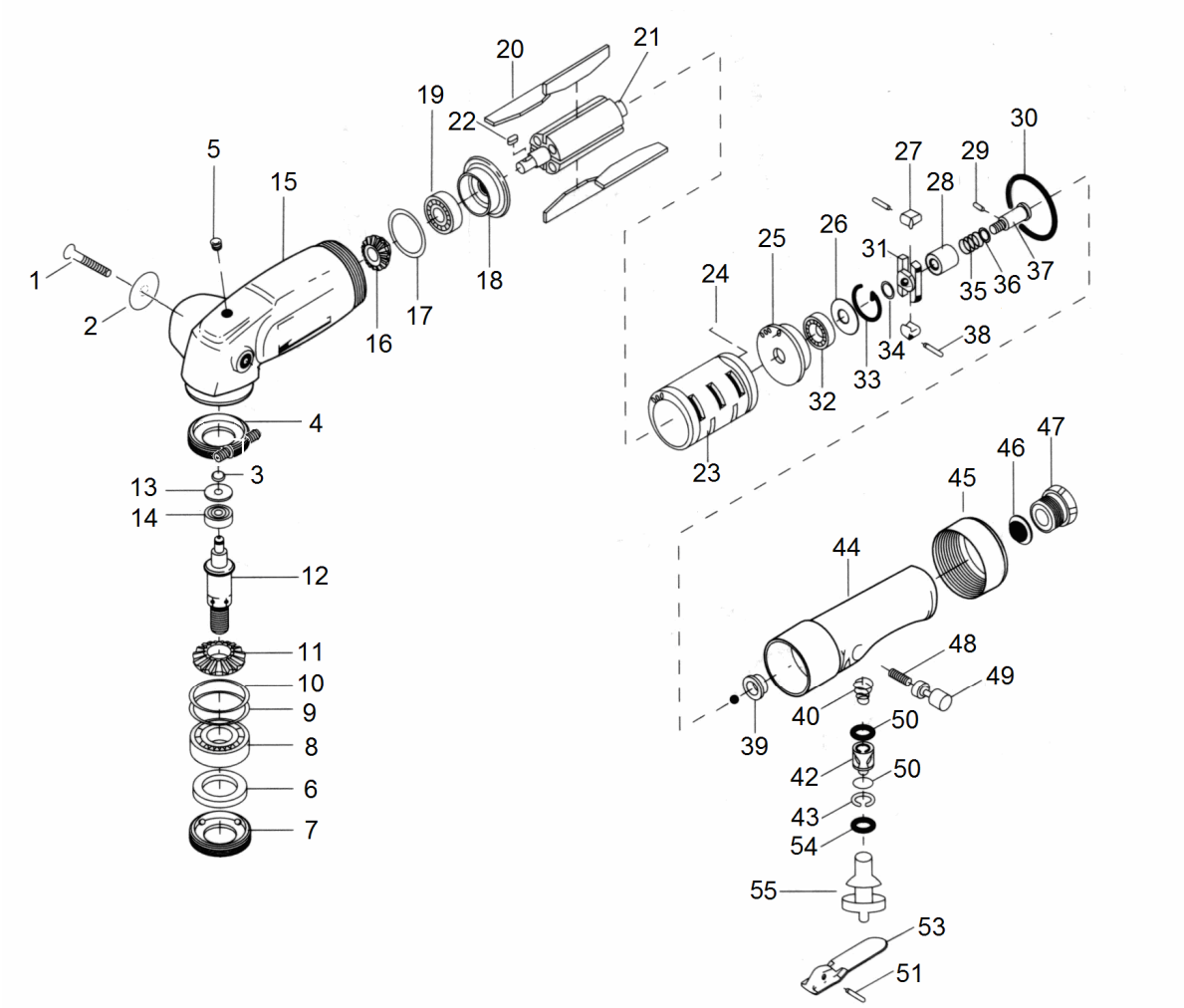
CHAPTER 6 – Schematics

Tool Body and Major Components Schematic



Ref	Part No	Description
1	110.014	Motor, Pneumatic (not pictured)
3	110.035	Dust Collector, (for pneumatic motor)
4	500.055	Handle Assembly
5	110.001	Replacement Brush Set
-	110.047	Roller Kit (includes items 6-9)
6	110.048	Roller mounting rail
7	550.211	Roller rail mounting spacer
8	550.210	Roller rail securing screw
9	110.049	Roller
10	110.011	Roto-peen hub
11	110.016	Roto-peen, keeper pin
12	820.302	Roto-peen, flap
13	110.022	Hub, hammer
14	110.027	Hub, cutter, welded
-	110.032	Hub, cutter, reloadable (not pictured)
15	500.155	Spacer ring
16	500.068	Roto-peen, hub flange, end cap
17	110.010	Flush Guard. Door. Included in tool body, pn 110.035

Pneumatic Motor Schematic



Ref	Part	Description
1	110.019	Screw
2	110.018	Muffler
3	550.297	Snap ring
4	110.057	Pinch clamp
5	550.280	Plug
6	550.305	Felt ring
7	550.262	Casing cover
8	550.302	Ball bearing
9	550.291	Spacer
10	550.288	Spacer
11	550.277	Driven gear
12	550.275	Spindle
13	550.256	Rear cover
14	550.299	Ball bearing

Ref	Part	Description
15	550.261	Casing
16	550.276	Driving gear
17	550.290	Spacer
18	550.273	Front plate
19	550.301	Ball bearing
20	550.272	Blade (4 req)
21	550.271	Rotor
22	550.286	Key
23	550.270	Cylinder
24	550.283	Roll pin
25	550.269	Rear end plate
26	550.274	Spacer
27	550.268	Governor weight
28	550.264	Governor valve

Ref	Part	Description
29	550.281	Pin
30	550.304	O-ring
31	550.267	Governor cage
32	550.300	Ball bearing
33	550.295	Snap ring
34	550.287	Spacer
35	550.293	Spring
36	550.289	Spacer
37	550.266	Governor spindle
38	550.284	Roll pin
39	550.265	Valve bushing
40	550.294	Cone spring
41	000.000	n/a
42	550.263	Valve bushing

Ref	Part	Description
43	550.296	Snap ring
44	550.260	Handle
45	550.278	Valve body nut
46	550.258	Filter
47	550.255	Air inlet bushing
48	550.292	Spring
49	550.259	Safety pin
50	550.303	O-ring (2 req)
51	550.285	Roll pin
52	000.000	n/a
53	550.279	Lever
54	550.7020	O-ring
55	550.4009	Valve