PRIDE FLOATING TOOL PACK

USER'S MANUAL

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Pride Engineering, LLC | 10301 Xylon Avenue North, Suite 100 | Minneapolis, MN 5544 USA
Phone: +1 763.427.6250 | E-mail: customer@pridecan.com
www.pridecan.com

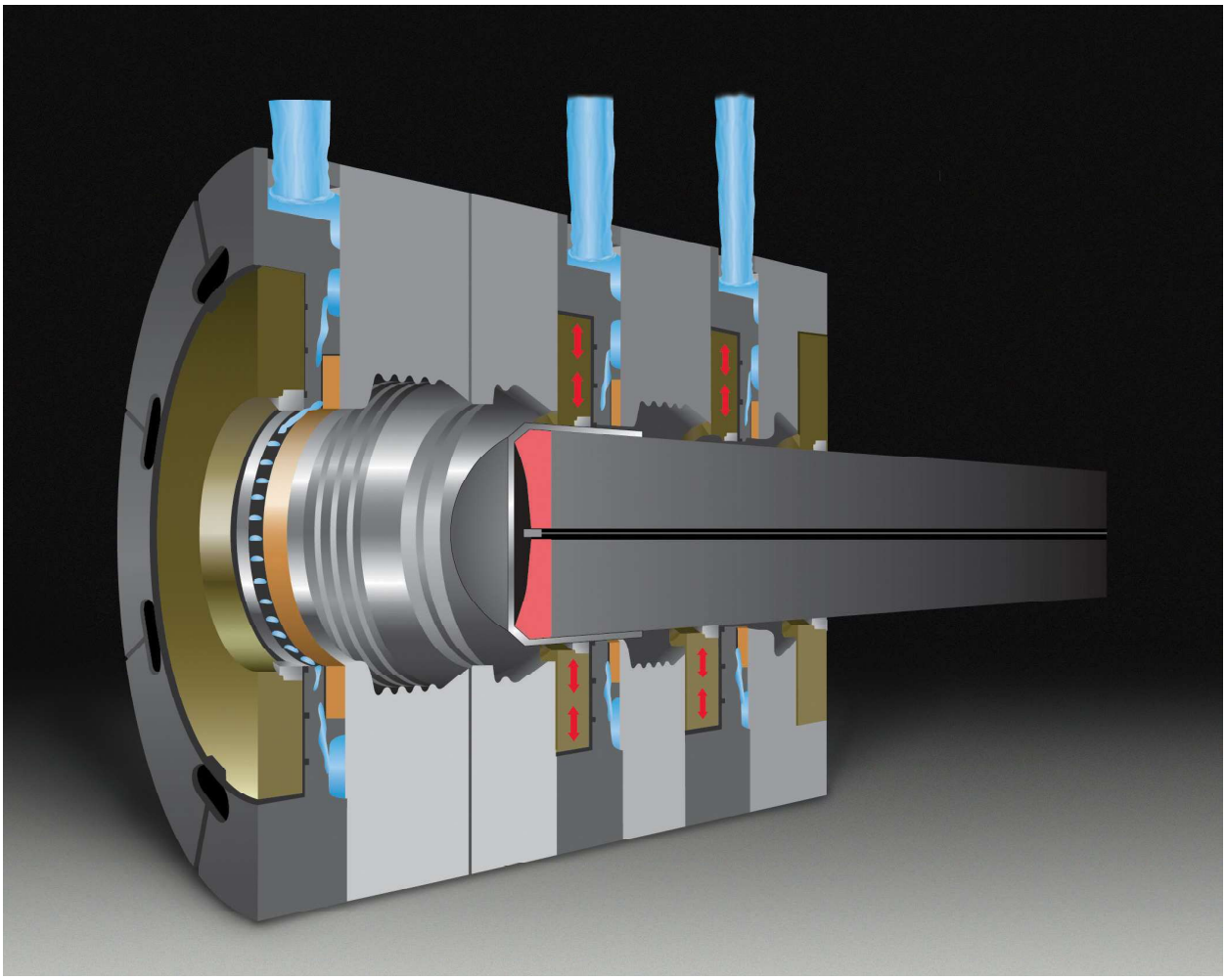
TABLE OF CONTENTS

FLOATING TOOL PACK

I. THE FLOATING TOOL PACK CONCEPT— HOW IT WORKS

PRIDE ENGINEERING

1. The Floating Tool Pack Concept—How it Works



The Pride Floating Tool Pack uses a die suspension system with springs and pins mounted in a precision Module to support the ironing die. The Pride floating suspension system allows the ironing die to move to align with the punch instead of forcing the punch to align with a fixed die. Pride's system of floating the ironing dies reduces stress on both the can wall and tooling.

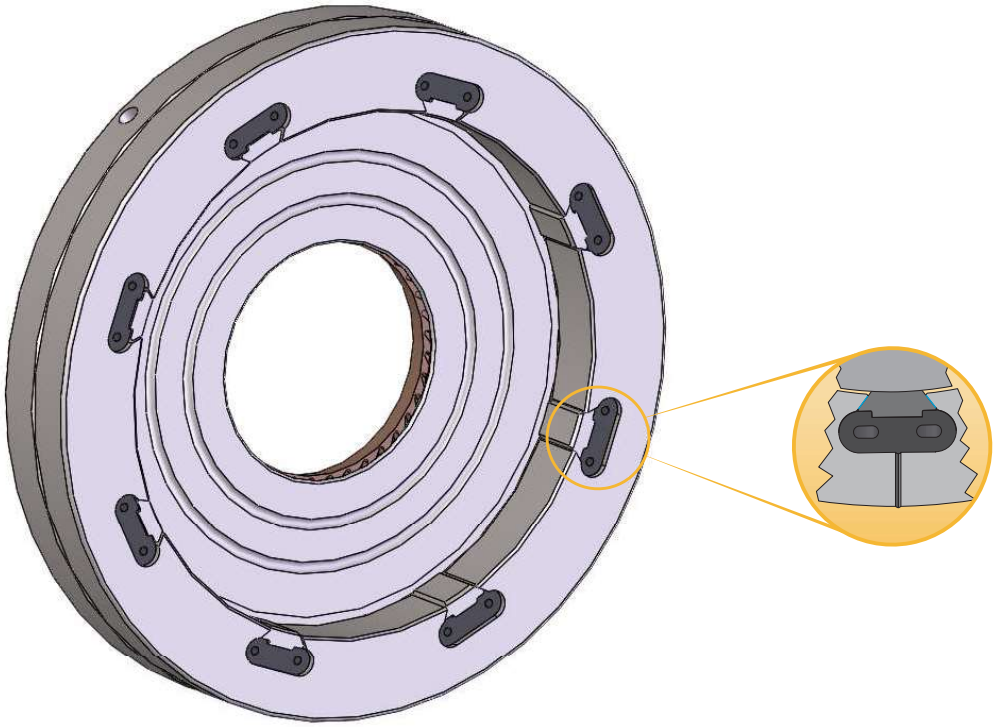
Unlike other "Floating" tool packs, Pride Floating Tool Pack Modules are designed so that the springs can't push the die past center. Allowing the dies to float to the center reduces die wear, tear offs, can wall variation and stress on the can wall.

The tool pack design includes coolant distribution to provide complete coverage of the die carbide surface. Air distribution provides a means to break potential vacuum forces that could prevent the die from floating as intended.

TOOL PACK SUSPENSION

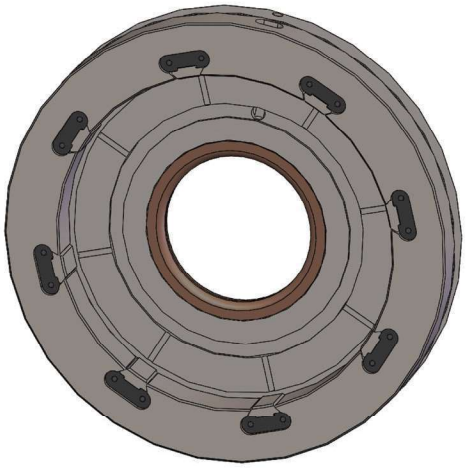
A. DIE SUSPENSIONS

Pride's die suspension utilizes rubber springs with contoured pins ground to match the radius of the die. The rubber springs dampen vibrations generated by the punch passing through each of the dies. The rubber springs absorb the vibration eliminating a source of ribbing on the thin wall of the can. The result is a better bright can appearance.

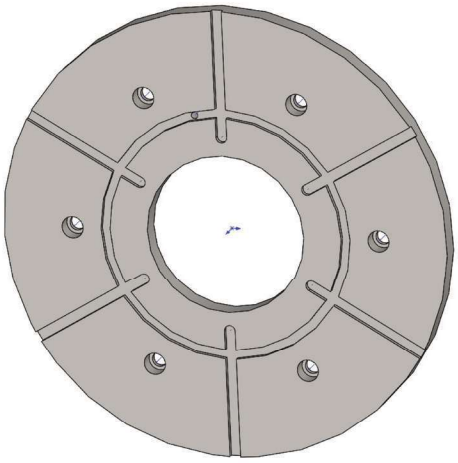


B. AIR

After the ironing dies float to the center of the advancing punch/can, the dies are pressed to the surface of the Module or spacer behind the die. The pressure is so great, that a vacuum forms between the die and the surface behind it. The Tool Pack works best when the dies have returned to center before the next approach of the punch. An air blow-off is required to break this vacuum and allow the springs and suspension pins to return the die to center. The surface behind the die must be equipped with air grooves that are charged from the lid, in the same method as coolant.



See air grooves in Module to break the vacuum behind the die.



When the last die in the Tool Pack rests against the bolster plate, the vacuum must be broken by charging the grooves with air pressure in a plate added to the bolster.

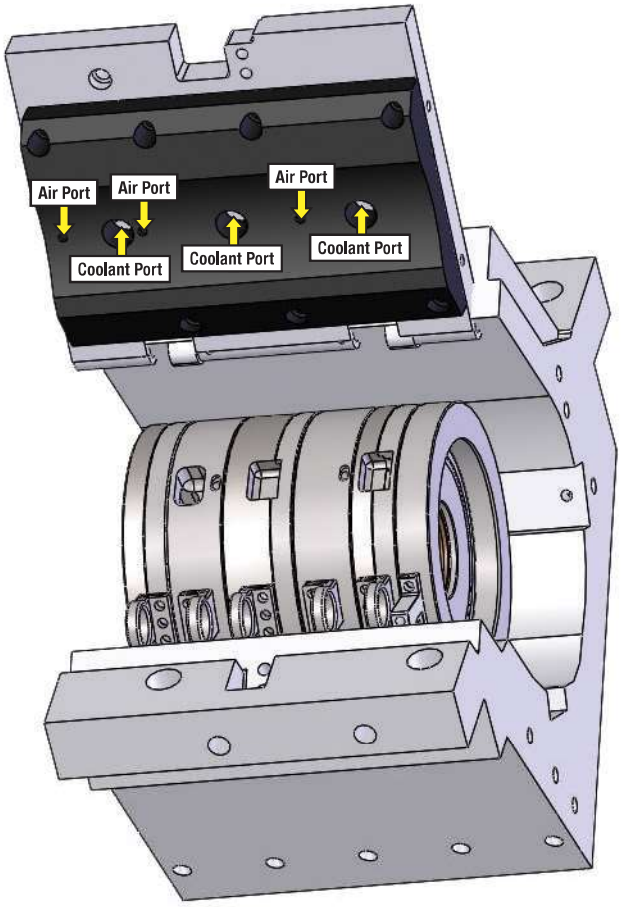
The modern design that utilizes a rubber spring and contoured suspension pin requires more air pressure: **14 - 18 psi (1 - 1.25 bar).**

Every can maker's Tool Pack is different and the can maker can experiment with different air blow-off pressures to achieve the optimum for that can maker. Monitor frequency of tear-offs to find the optimum air pressure.

C. COOLANT

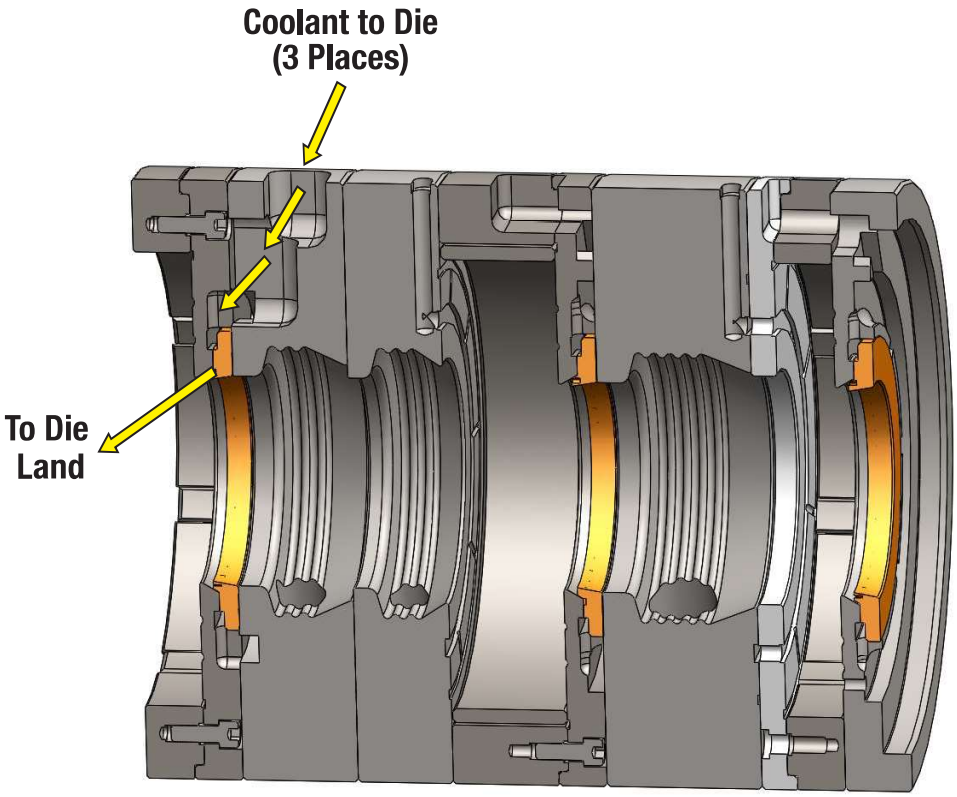
The D & I (Draw & Iron) process requires large quantities of bodymaker coolant to cool and lubricate the can material as it is pushed through the drawing and ironing tools in the Tool Pack. Coolant must be fed to the entire tool surface that will touch the can material as it passes through the ironing die on each die. The bodymaker coolant feeds the Tool Pack through the bodymaker's lid with coolant ports.

The bodymaker Tool Pack requires approximately **16 to 22 gallons of coolant per minute (60 to 83 liter/minute).** Longer stroke bodymakers, like 26" stroke bodymakers, may use still more coolant: up to 25 gallons per minute (95 liter/minute)

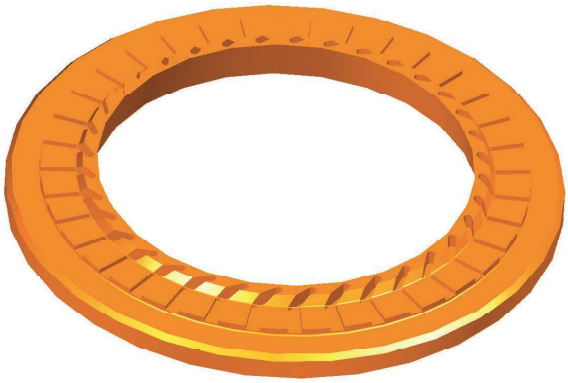


See the three coolant ports in the lid.

The coolant ports in the Tool Pack Modules or coolant spacers route the coolant to the Lube Rings. The Lube Rings distribute the coolant around all working surfaces of the ironing die (usually the carbide).



The teeth in the Lube Ring control the distribution of coolant to cover all working surfaces of the ironing die.



FLOATING TOOL PACK

II. MAINTAINING AND SERVICING THE PRIDE TOOL PACK

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2. Maintaining and Servicing the Pride Tool Pack

The Pride Tool Pack was designed for low maintenance and long life. The following instructions will help keep the Tool Pack running well, so it can provide high quality, extended service.

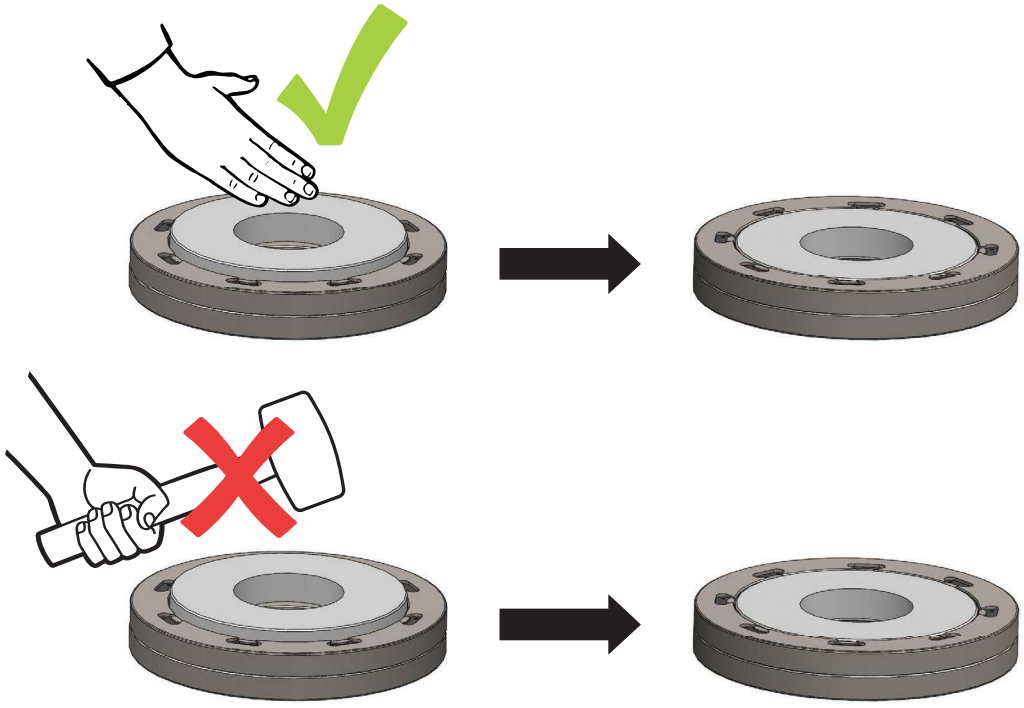
Each time the Tool Pack, or just part of the Tool Pack is removed, care must be used when returning it to the cradle. If an accident happens, stone the damaged Module and cradle mounting rails then clean them off before re-installing.

A. CHANGING DIES

Inspect Tool Pack parts for burrs, nicks, dents, etc. and stone smooth raised damage. Remove die(s). Inspect internal area of Tool Pack where die(s) were removed. Stone and clean up any rough or damaged surfaces inside the Tool Pack Modules. Blow out the Module to get Tool Pack free of dirt, fines and other contamination.

Check new dies to make sure the OD and faces are free of nicks, dents, burrs or any other rough surface condition. Repair or replace dies that are not in good condition.

The ironing die should fit into the centering pins and go into the Module quite smoothly. It should not be so loose that it drops freely into the Module, and not so tight so that it can not be pushed into the Module using just your fingers. If the die is too loose, check its OD. Try a different die just for test purposes. If still loose, the Tool Pack springs should be changed. If the die is too tight, check for burrs, damage, or dirt obstructing the Module. If the die does fit correctly go on to the next step.

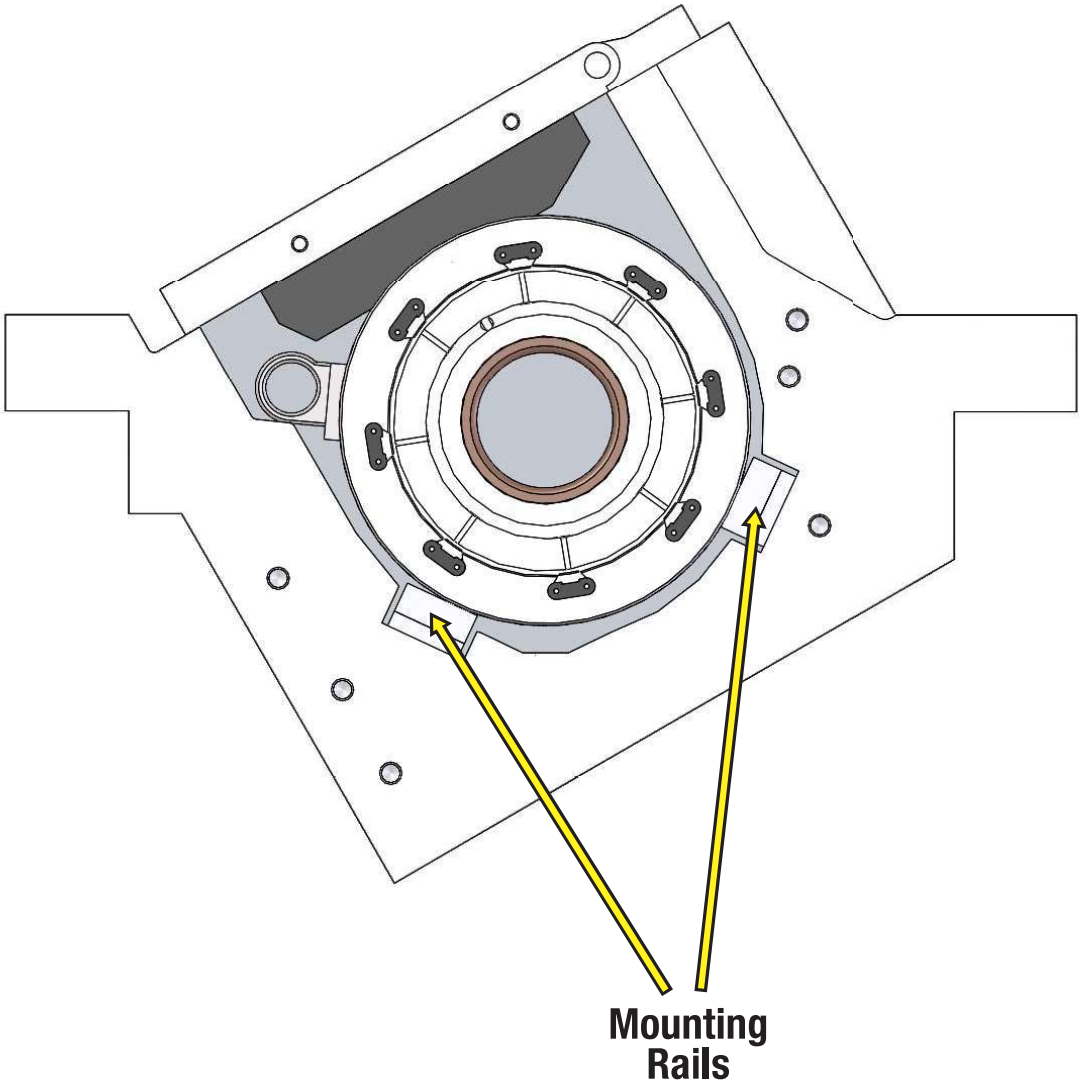


Use a straight edge to make certain that the die is below open face of the Module.

Replacing the redraw die should be done in the same manner, although there is no float built into the Redraw Carrier. The fit must be quite close and smooth, but must not require force or hammering to install the die. Contact Pride Engineering any time you have a question or problem.

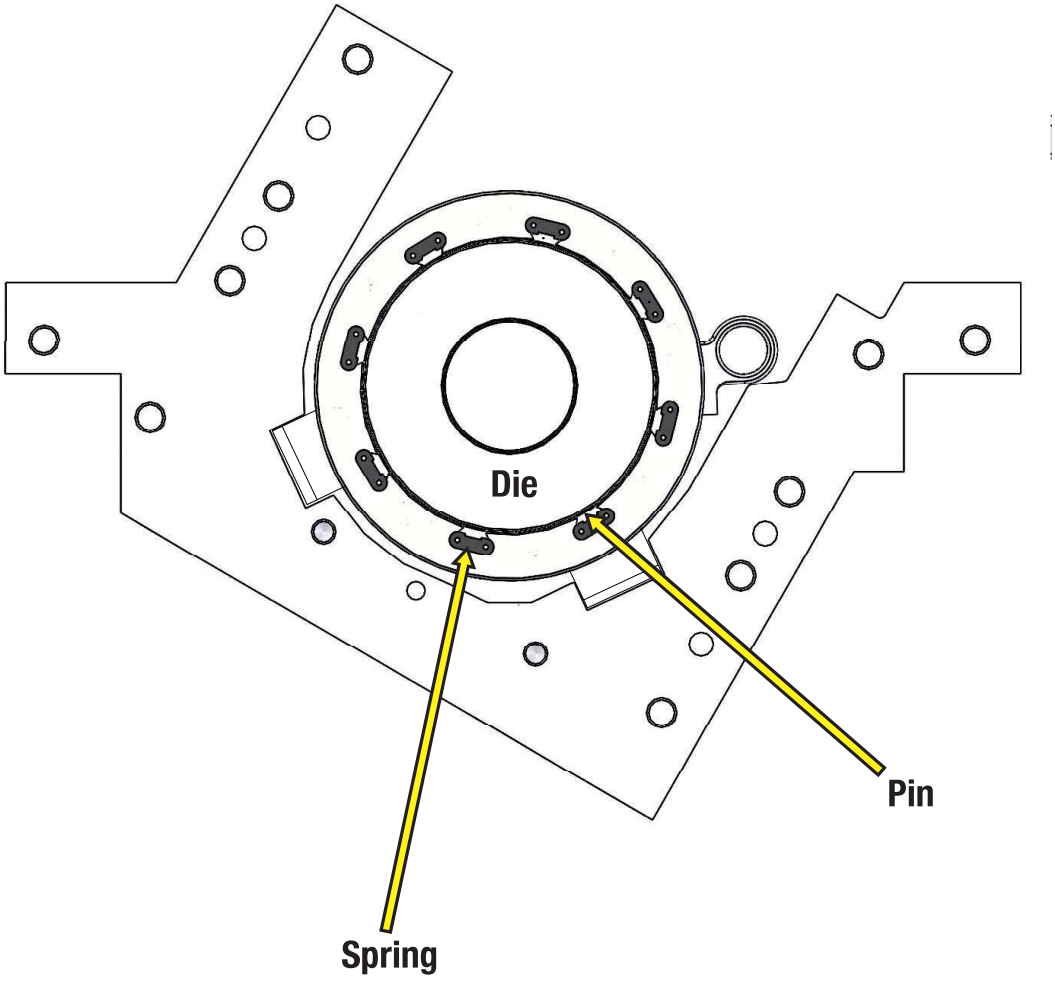
Check again that the dies are installed correctly into the Modules, it is very easy to install a die facing the wrong direction. Also make certain that the progression is installed in the proper Modules in the proper order.

Stone the mounting rails in the cradle, making certain that the surface is smooth and free of burrs. Clean out the cradle well and carefully install the Tool Pack Modules.

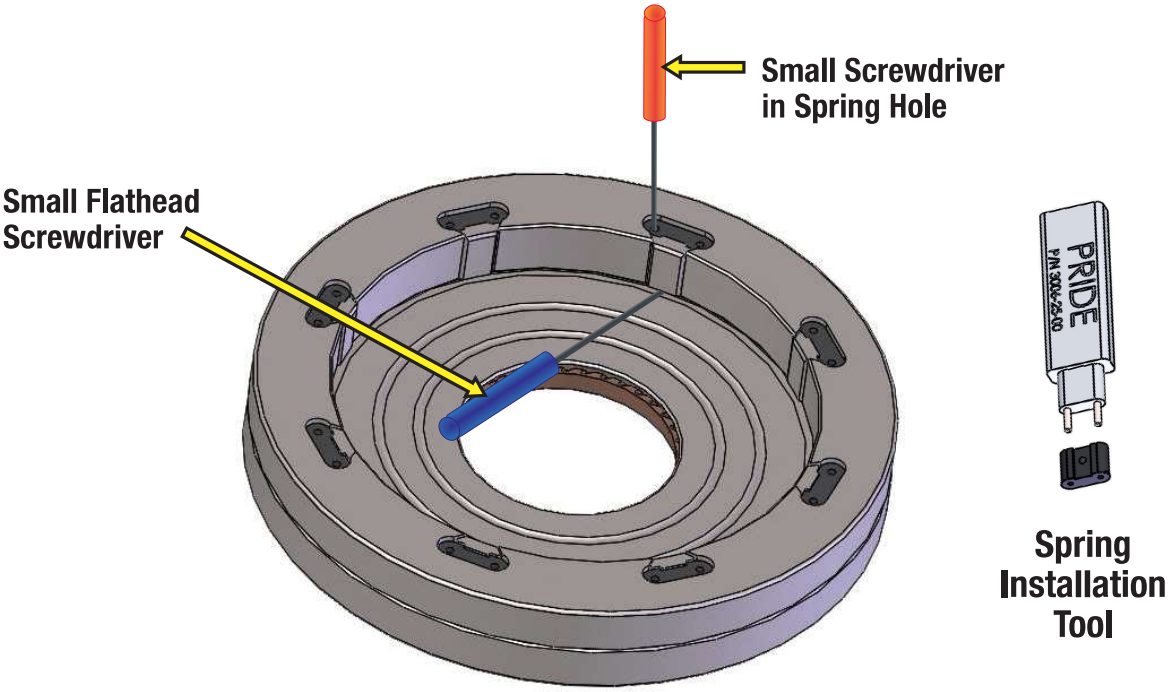


B. CHANGING SPRINGS & SUSPENSION PINS

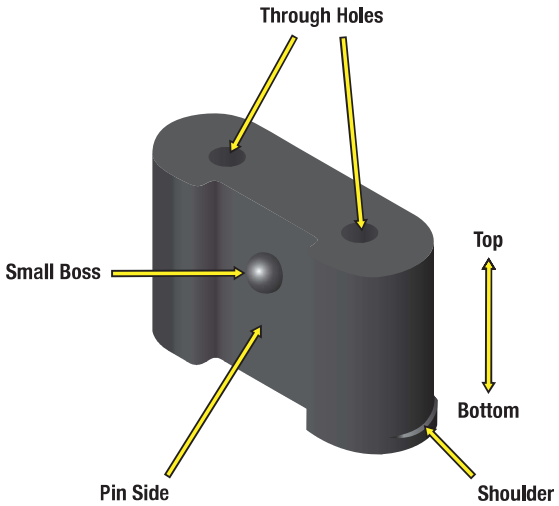
Springs may wear out differently depending on several factors. Since each plant has unique situations that will lengthen or shorten the spring life. Checking the springs each time you change dies is the best way to know if it is time to change the springs. Because the springs are so inexpensive, and very easy to change, it is not a good idea to wait until the springs are totally unusable or until specifications suffer. Change the springs any time that you feel that they have become weak.



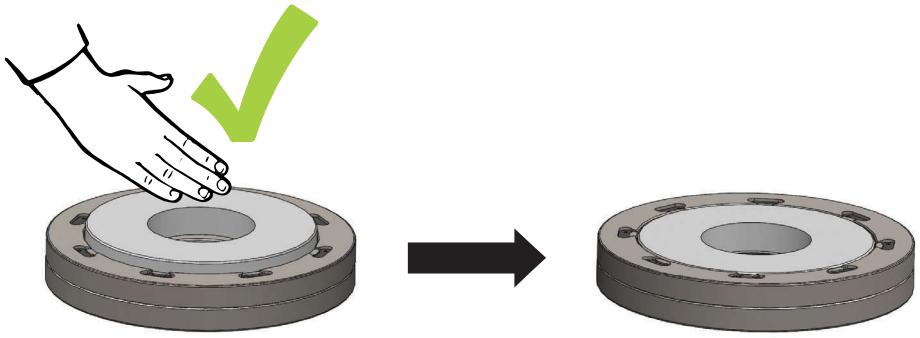
The springs and pins can easily be removed with a small flat head screwdriver. Carefully pry the pin out by inserting the flat head screwdriver under the pin and lift it out of its machined pocket. Once the pin is removed, push a small screw driver into one of the two holes of rubber spring and lift it out. Take care not to scratch or nick the Module with the screw driver.



Note the small shoulder (lip) on the bottom of the rubber spring. This shoulder will fit into a machined slot at the bottom of each pin/spring pocket on the Die Modules (8 places). This will ensure the spring and pin will not fall out of the Die Module when a mechanic is changing the dies. You will see how to put the spring and pin together as the rubber spring has a small boss that fits into a small hole on the back side of the pin. Use the spring insertion tool (P/N 3006-25-00) to press the springs into position.



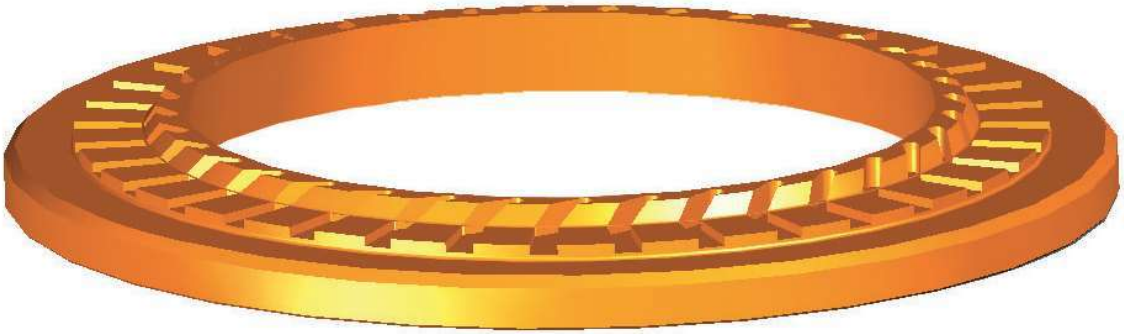
After replacing the springs, the die (or carrier ring) should require finger pressure to insert into the Module. If the die (or carrier ring) drop in by its own weight check the OD of the die (or carrier ring) to make sure it is within specification. If the OD is within specification, install new centering pins.



When pins are worn or damaged you must replace the whole set. The pins are interchangeable with each other when new or when used and kept as a set. Any pin may go in any position.

C. LUBE RINGS

Check the Tool Pack for coolant flow. Inspect all **lube rings** for damage or coolant blockage.

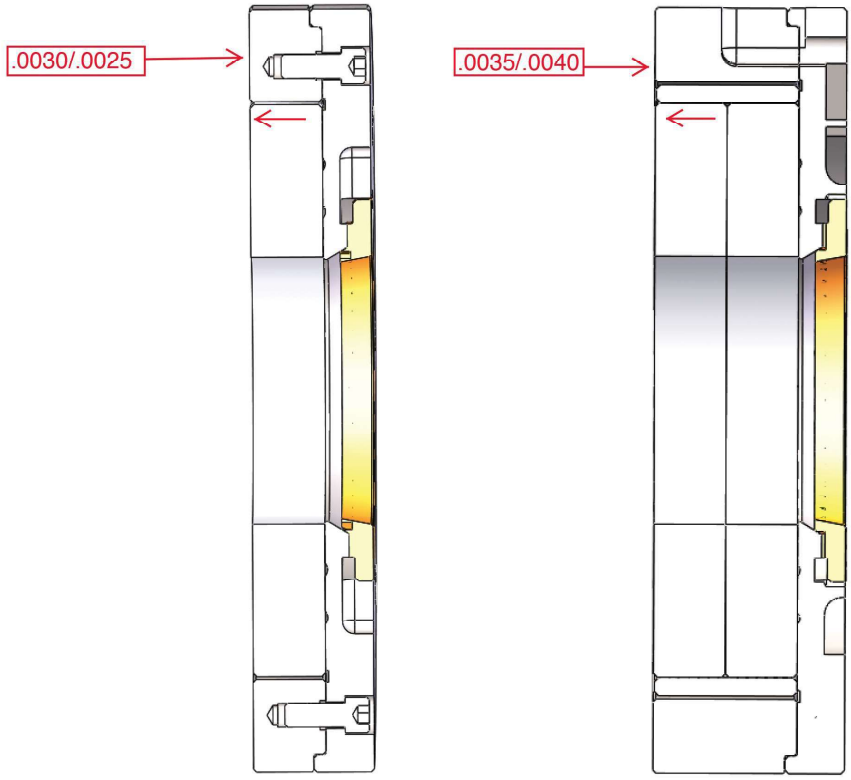


Damage or blockage will alter coolant flow: Pride Tool Packs are designed for 360 degree overage over all ironing surfaces. Anything that alters coolant flow may alter the path of the ram or cause scratches on the can wall.

D. TOOL PACK GEOMETRY

1. GAP, AXIAL FLOAT

If the die(s) do not float and the die(s) check to the proper size, you would then check the Module.



Check the flatness of surfaces that contact the die including the inside of the Module and adjoining spacer surfaces. The die should sit in a single die Module at a minimum of 0.0025" (0.063mm) below the surface and a minimum of 0.0035" (0.089mm) of a double die Module.

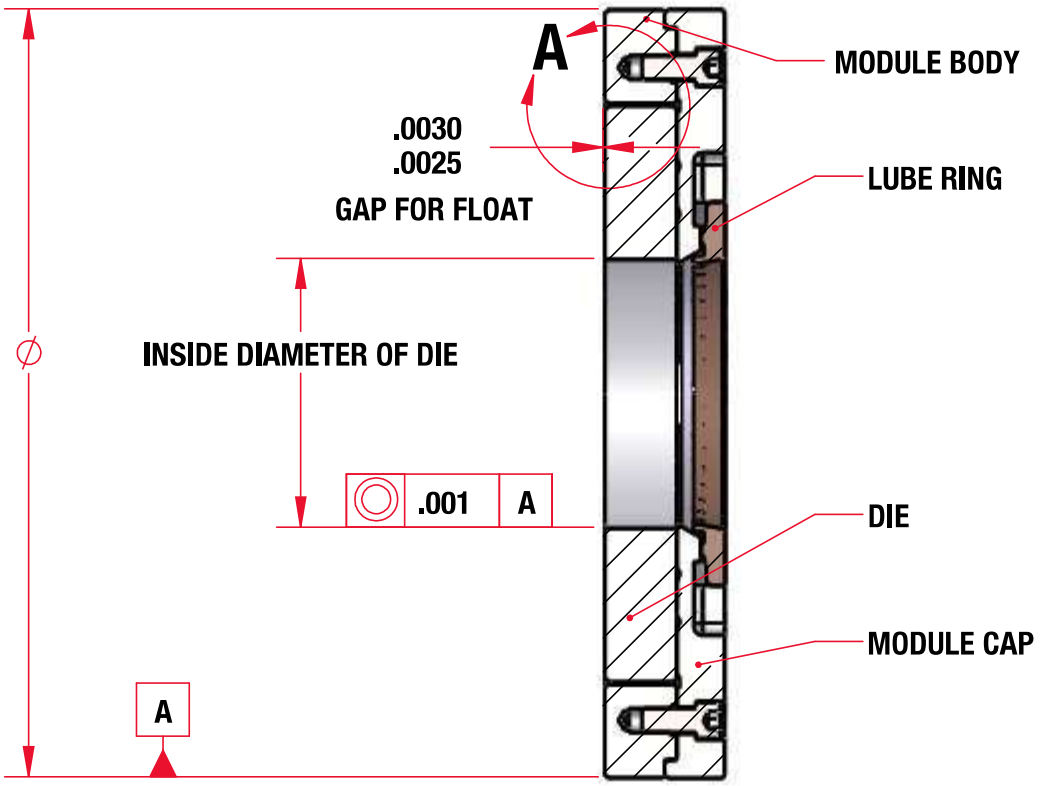
Next to check, is the dimension from the surface immediately above the pins to the inside face of the Module, over many points.

Both these measurements should be done on a granite surface plate with an accurate height gauge.

2. MODULE CONCENTRICITY

The Tool Pack Module is manufactured to center the die in the cradle before the die floats over to center on the advancing punch. Tool Pack Modules are manufactured with a concentricity of .0002" or 5µm, so the Module will hold the die as close to center as possible. The path of the punch will be slightly different with each advance of the ram and the Tool Pack will allow the die to move over responding to each new variation in the path of the punch. The closer the die is to center, the less the die will need to move in response to the punch.

Checking concentricity with the die in the Module will provide a check of the springs, the suspension pins and the Module. In most instances, changing springs is all that will be required to bring the die to center. Change the pins if new springs do not return the die to center or if the the die drops freely into the Module.

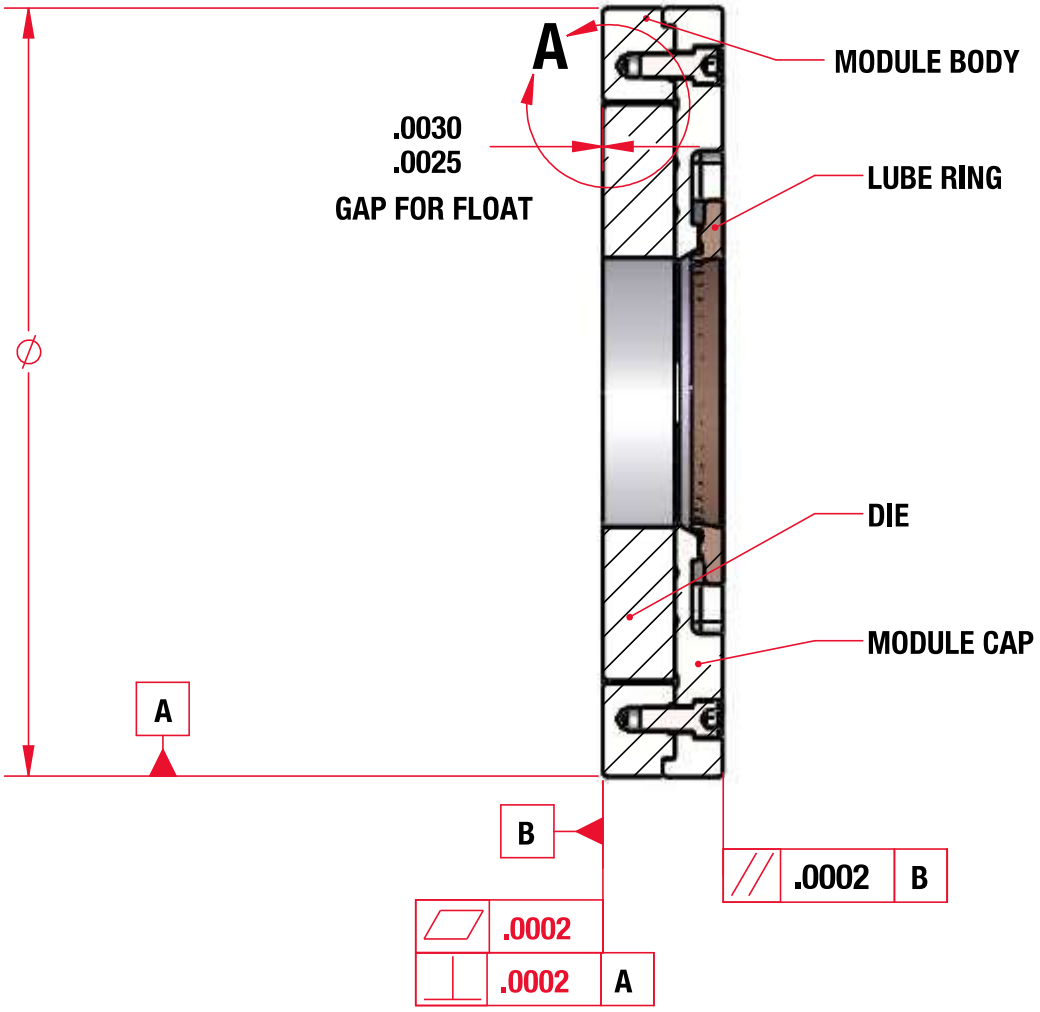


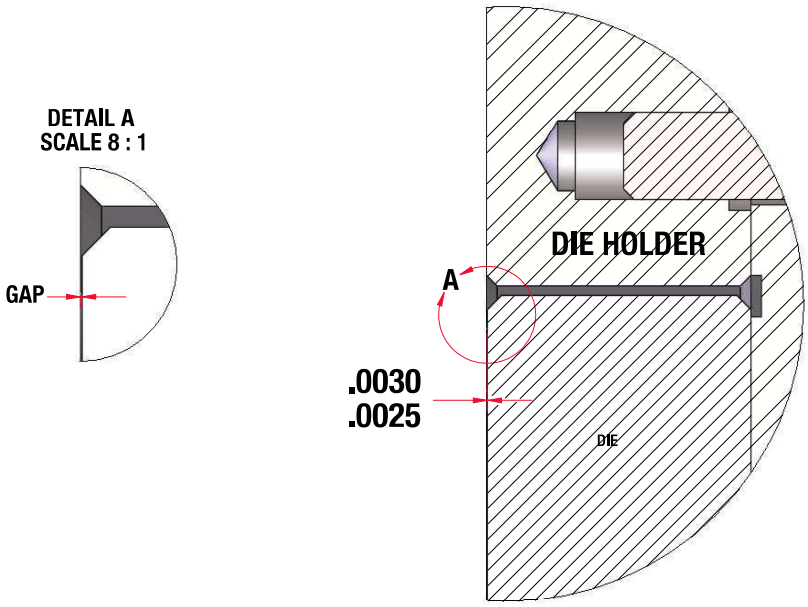
If the new pins and springs do not return the Module to center you will need to look at the Module. The Module rests on the bodymaker's two cradle rails. After prolonged use, the Module will wear where it rests on the cradle rails.

As the Tool Pack wears, the center of the die will move lower presenting the die to the punch below center. Die wear will increase as the die gets farther from center. When die regrinding frequency increases substantially the can maker will need to replace the Module.

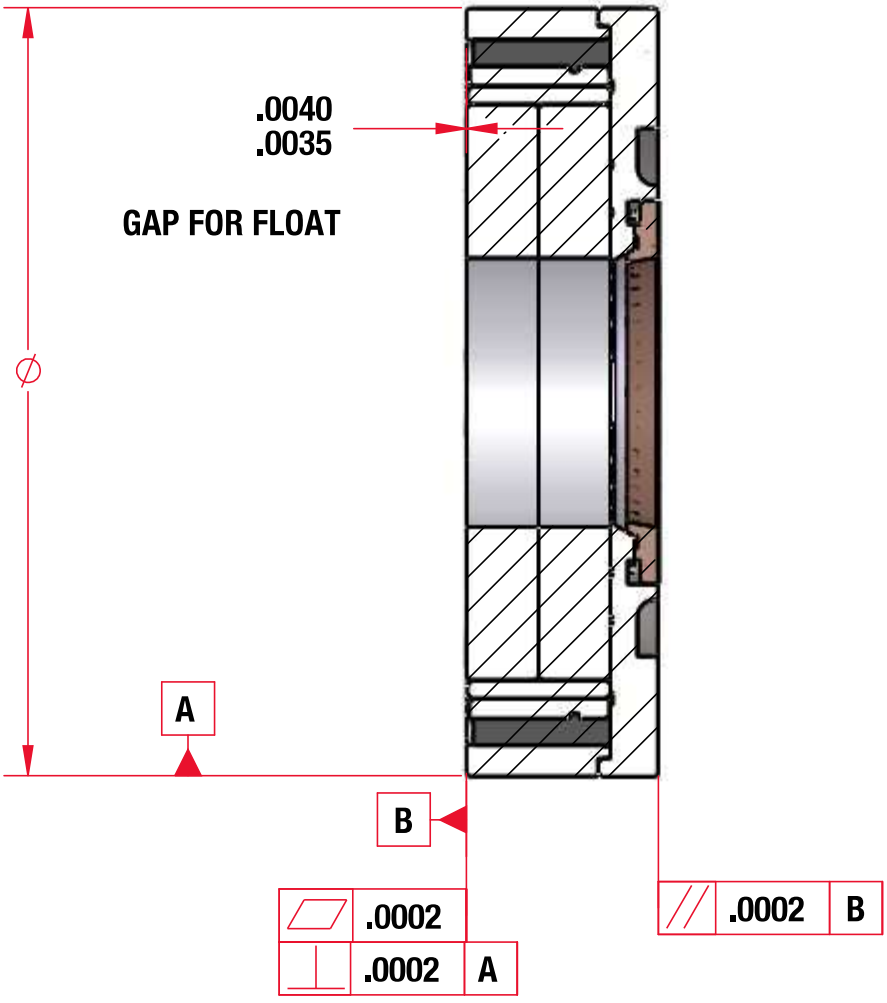
3. TOOL PACK SQUARENESS

All surfaces of the Tool Pack, including the Redraw Die Carrier, Die Modules and all Spacers should be square within 0.0002" (5µm). Loss of squareness will lead to can concentricity problems and increased tear-offs.





DIE SHOULD FIT INTO DIE HOLDER
.0030/.0025 BELOW THE END SURFACE
OF THE DIE HOLDER.



FLOATING TOOL PACK

III. REPLACEMENT

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3. Replacement

Once a Module looses its squareness or concentricity, it must be replaced.

DO NOT CHROME AND REGRIND THE MODULE. NEVER INTRODUCE CHROME INTO THE TOOL PACK.

Small particles of chrome will eventually crack off the chromed component and become suspended in the bodymaker coolant. Chrome, suspended in the bodymaker coolant system, will adhere on the carbide of the dies and scratched cans will result. Chrome particles are extremely difficult to purge from the bodymaker coolant system.