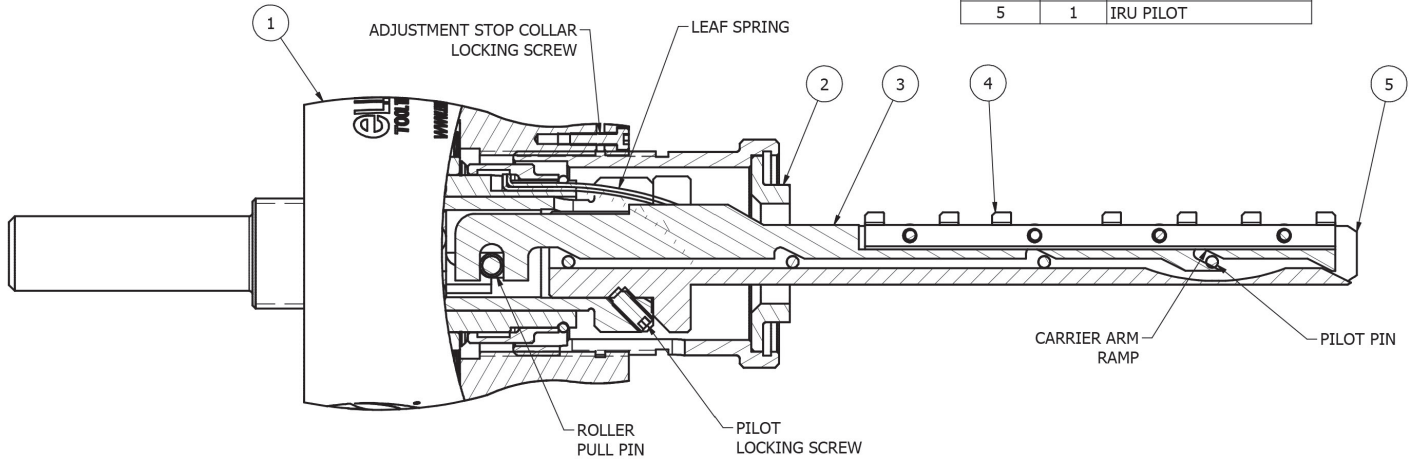


INTERNAL RECESSING UNIT

INSTALLATION AND OPERATING INSTRUCTIONS

PARTS LIST		
ITEM	QTY	DESCRIPTION
1	1	IRU OPERATING HEAD
2	1	IRU NOSE PIECE
3	1	IRU CARRIER ARM
4	1	IRU CUTTER
5	1	IRU PILOT



To assemble (or remove) the cutter, pilot and nose piece:

A complete assembly has the following components: operating head with adjustment stop collar, nose piece, pilot, cutter and/or carrier arm.

Loosen the adjustment stop collar locking screw and remove the adjustment stop collar. If the carrier arm and cutter are separate pieces, create the carrier arm assembly by attaching the cutter to carrier arm.

Hold the integral cutter or carrier arm assembly at 90 degrees to the leaf spring inside the operating head and slide into the head. Then, rotate the cutter/carrier arm assembly 90 degrees so that the U-shaped yoke of the arm straddles the roller pull pin. The leaf spring will come to rest on the pad of the arm.

Next, take the pilot and align the ramp of the cutter onto the pins of the pilot. Then, slide the assembly into the bore inside the operating head. Lock the pilot in place with the pilot locking screw.

Assemble the IRU nose piece to the adjustment stop collar using a snap ring tool.

Install the stop collar/nose piece assembly into the operating head, using care so as not to injure one's self on the sharp cutter or damage the cutter with the stop collar.

The IRU is now ready to be installed in a tool holder. **DO NOT** use a hydraulic chuck or milling chuck (The IRU shank may not be to h6 tolerance). Use a standard collet chuck with thru coolant capability. Be sure to use proper sealing discs or sealed collets as required.

Reverse the above procedure to replace the cutter or pilot.

Operating Instructions:

Pilots are made to order based on the bore's diameter so the bore needs to be accurately machined for consistent recess sizes. Too small and the pilot may bind in the bore during operation causing catastrophic damage, too large and the pilot will deflect causing inconsistent results and possible damage to the pilot from flexing too much. Please consult the factory for the proper bore size for your specific application.

Use the chart below for cutting data

Part Material	Cutting Speed	Cutting feed rate
Aluminum	150-160 SFM	0.001-0.005 Inch/rev
	45-50 M/min	0.025-0.127 mm/rev
Ductile/Nodular Cast Iron	30-40 SFM	0.001-0.005 Inch/rev
	10-15 M/min	0.025-0.127 mm/rev
Gray Cast Iron	100-110 SFM	0.001-0.005 Inch/rev
	30-35 M/min	0.025-0.127 mm/rev
Mild Steel & Forgings	30-40 SFM	0.001-0.005 Inch/rev
	10-15 M/min	0.025-0.127 mm/rev

Note: For bores under $\text{\O}0.500''$ ($\text{\O}12.700$ mm), decrease feed to 0.001-0.002 inch/rev (0.025-0.050 mm/rev).

When calculating the cutting RPM, please be sure to use the diameter of the part feature being machined, not the pilot diameter. Otherwise, the RPM will be too fast for proper tool life.

Setting Cutter Position:

Using a tool pre-setter or other method, take a fully assembled IRU and adjust the stop collar/nose piece assembly to required depth from designated cutter. Then, tighten the collar locking set screw. If using a stop on a fixture, the distance would be from there and not the top of the part. This length may need to be adjusted after test cutting a part.

Setting Recess Diameter:

The size of the recess diameter is a function of how far the IRU is fed forward. Setting the recess diameter size is different depending on what type of machine you are using to recess the parts.

See below for the different methods. Recommended coolant pressure is 500-1000 PSI (35-70 Bar)

CNC Machine

Approach - Fig. 1:

Feed the IRU into the part using 5x the feed rate you will be using for cutting the recesses. Make sure the internal coolant supply is off during this time.

In Feed - Fig. 2:

Once the nose piece touches the part surface or fixture detail, the cutter arm will begin to feed out. Turn on internal coolant.

Actuate - Fig. 3:

Slow to the appropriate cutting feed rate for the material and application. The size of the recess is a 1:1 ratio on diameter to the forward stroke amount. If you are machining a wide recess, you may need to "peck" the feed; feed up and stop for a few revolutions and repeat until the desired size is reached. This process allows the chips to be flushed out of the bore. When the desired diameter is reached, allow the cutter to dwell for a few revolutions to make sure all feature(s) are cleanly machined.

Retract - Fig. 4:

Back out the IRU at a rate of 3x the cutting feed rate until back to the start. If high coolant pressure is on, shut it off to allow the cutter arm to seat properly into the pilot. Once back to the start position, dwell again for a few revolutions to make sure the arm is seated in the pilot. Withdraw the IRU completely and check for proper recess location and diameter. Make adjustments as required to the stop collar for position changes and to the CNC program for diameter changes.

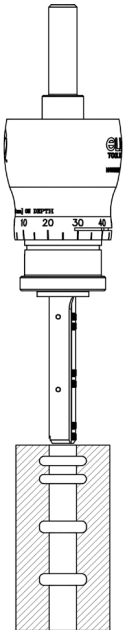
Transfer lines, dial or manual machines (drill press, etc.)

The cutter position is set the same way as for CNC machines (see previous section). The recess diameter is set using the stop nut on the IRU shank. In a tool pre-setter, manually actuate the tool to adjust the stop nut to the proper diameter. It is very important to use an over-travel adapter for these types of machines. The adapter is spring loaded and will absorb any over-stroke issues with the machine, preventing damage to the IRU unit. Consult the factory for proper spindle size adapter before operating IRU.

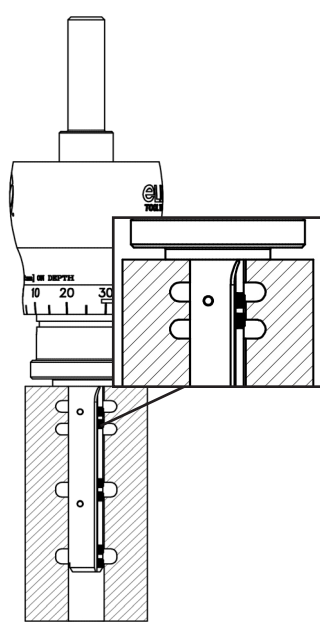
With the coolant off, slowly feed the IRU into the bore. As the nose piece touches the part face or fixture detail, slow to the proper cutting speed before the IRU begins to cut the recess. Turn on internal coolant and continue to feed in until the IRU reaches its max diameter and the overload is slightly compressed. Dwell for a few revolutions and then begin to retract the IRU at a rate 3x the cutting in feed. Shut off high pressure coolant to allow the cutter arm to seat into the pilot properly. Once back to the start position, dwell again for a few revolutions to make sure the arm is seated in the pilot.

Withdraw the IRU completely and check for proper recess location and diameter. Make adjustments as required to the stop collar for position changes and to the stop nut on the shank for diameter changes.

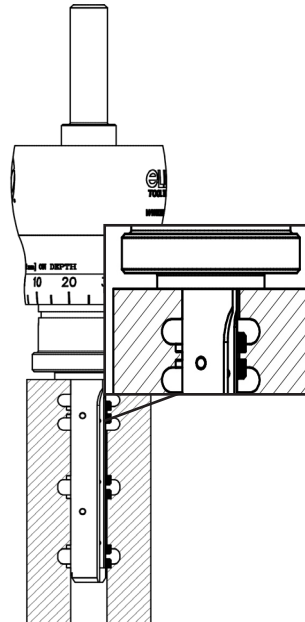
Approach - Fig. 1



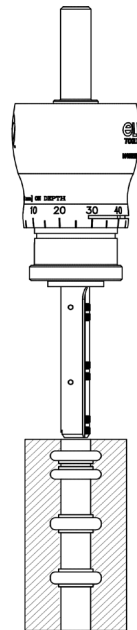
In Feed - Fig. 2



Actuate - Fig. 3



Retract - Fig. 4



For additional technical support:

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