ARE WE **CRAZY**?
A WHOLE **PRODUCT & INSTALLATION GUIDE** JUST FOR **DIE CASTERS**?

Joanne Couepel,
LEAN Team Leader
Accounting

GROOV-PIN CORP®
Performance Products

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In This Buying Guide:

- Groov-Pin for Die Casters – Our Promise to You
- Parts Comparison for Engineers
- Important Information for Buyers
- Custom Design & Manufacturing
- Installation Guide

OUR PEOPLE LOVE YOUR PARTS

The people of Groov-Pin are 100% committed to serving our die caster clients with highest-quality parts and the utmost-responsive service. We are a proud American manufacturer, supplying pins, inserts and precision turned components as LEAN partners.

GROOV-PIN FOR DIE CASTERS – OUR PROMISE TO YOU

Our Promise to You

At Groov-Pin, we know that our parts make yours even better. So we strive, every day and in every department of our company, to bring you the best. Superior-quality engineered fasteners, pins and inserts and precision turned parts for die casters. A responsive, lean supply process that helps you improve efficiency and get what you need when you need it.

We're an American manufacturer proud to serve other American industries with quality, innovation and the commitment of our people.

Darryl Sweet,
Gildermeister Lead

Technical Comparison for Engineers

Tap-Lok® Hole Series

Designed for use in tough-to-tap, high-strength materials as well as softer metals and plastics. Circular cutting elements self-tap and lock into the base material. They resist extreme vibration with no loss in performance.

BASE MATERIALS	AVAILABILITY	INSTALLATION METHOD
Aluminum and Thermoset Plastics	Steel and Stainless Steel	Thread Cutting

Tap-Lok® Slotted Series

Suitable for use in a wide range of machinable softer metals and plastics, particularly those with abrasive fillers. The cutting slots quickly tap into the base material and lock the insert in place. They are able to resist extreme vibration without loss of performance.

BASE MATERIALS	AVAILABILITY	INSTALLATION METHOD
Aluminum and Thermoset Plastics	Steel, Brass and Stainless Steel	Thread Cutting

Speedserts®

Speedserts® self-threading inserts form strong threads in softer metals and plastics for a very high pull-out resistance. Their locking action makes them very resistant to vibration.

BASE MATERIALS	AVAILABILITY	INSTALLATION METHOD
Aluminum, Wood, Thermoset Plastics, Thermo Plastics	Stainless Steel	Thread Cutting

GROOV-PIN FOR DIE CASTERS – OUR PROMISE TO YOU

Compare Our Parts

Tap-lok® and Speedsert® brand Self-Tapping threaded inserts from Groov-Pin are compared on a number of dimensions to HeliCoil® brand wire coil inserts and Keensert® brand bushing inserts.

Inserts are designed to hold fasteners in the application, provide standard receiving threads, and resist wear better than the soft base material.

Inserts are compared on a number of dimensions, in order of importance:

- Pull-out Resistance
- Installation Simplicity
- Thread Tolerances
- Standard Sizes

Tap-loks and Speedserts

- Have superior holding power
- Twice the performance in small sizes
- Install in one step
- 3x to 4x leaner to install
- Threads to spec from the factory
- Thread tolerances don't depend on installation

Pull-out Resistance

Tap-loks are stronger in terms of pull-out strength. Force required to pull an insert from a material is called pull-out strength. For material of a given shear strength, pull-out strength can be compared in terms of a quantity called effective shear area.

For an insert used in a base material of a given shear strength, tensile pull-out strength is effective shear area multiplied by the material shear strength.

Table A compares Regular length Tap-lok inserts and Speedserts with HeliCoil wire coil Inserts of 1 Diameter, 1½ Diameter and 2 Diameter lengths and both Miniature and Heavy-Duty Keenserts.

To estimate the pull-out strength for given material, multiply effective shear area by shear strength of base material.

POS = ESA x SS

For ¼ = 20, Hole-type, Regular Tap-lok, in 6061-T6 aluminum with shear strength of 30,000 psi

Pull-out Strength = 0.273 x 30,000 = 8,190 lbs

Table A – Effective Shear Area for Comparative Inserts

	Tap-lok	Speedserts	Helicoil			Keenserts	
						Miniature	Heavy Duty
#2	.038	.023	.016	.027	.037	.016	
#4	.059	.033	.027	.045	.064	.030	
6	.092	.059	.040	.070	.097	.033	
8	.127	.070	.060	.092	.137	.067	.152
10	.166	.075	.080	.130	.180	.152	.190
¼	.273	.126	.133	.227	.313	.237	.284
5/16	.405		.213	.347	.487	.305	.359
3/8	.608		.310	.510	.710	.430	.498
7/8	.784		.433	.693	.947	.567	.717
½	1.034		.560	.900	1.253	.718	.888
9/16	1.225		.733	1.133	1.567		1.25
5/8	1.610		.880	1.413	1.947		1.49
3/4	2.360		1.267	2.033	2.800		2.49
Hole Depth Compared to Tap-Lok		1.3x	1.0x	1.5x	1.8x	1.9x	1.9x

Compare Hole-type Regular to Helicoil 1 Diameter wire coil inserts or Keenserts Miniature or Heavy-duty inserts. Hole-types have almost twice the pull-out resistance of comparable Helicoils and light weight Keenserts.

Tap-lok Regular inserts have similar strength to larger Helicoils and Heavy-duty Keenserts but those inserts require tapped holes between 1.5x and 1.9x deeper and longer fasteners, adding to casting and installation expense (see arrows at left).

Please visit www.groov-pin.com for graphs and additional information.

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Simple Installation

Tap-Lok and Speedsert inserts compare favorably in terms of the number of steps required to install – by a factor of 3 to 4 times.

Tap-lok and Speedsert inserts install in one step into drilled or cored holes. Helicoils and Keenserts require at best 4x and 3x respectively as many steps to install. Certain conditions add another one or two steps to installation of Keenserts and Helicoils. Additional steps mean more time, cost, and potential for error in installation.

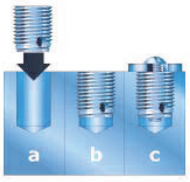

Table B – Installation Steps Required

Tap-lok and Speedserts	Helicoil	Keenserts
1	4 – 6	3 – 4
Install	Tap* / Gage } x1 or 2 Install Break Tang	Tap Gage Broach† Press key

*Some conditions require two tapping operations.

†Broaching Req'd in HC30 or harder Matl's, Anodized AL

Thread Tolerances

As expected, thread tolerances are comparable across the insert types. Thread tolerances for Tap-Loks and Speedserts are established during manufacturing and are not dependent upon the installation process. The thread fit for each Helicoil insert is dependent upon the tapping operation during installation. If the tapping is not done properly on each individual hole, the thread tolerance will not be met. Tap-Lok/Speedserts, gives peace of mind, particularly if there are many threaded holes in an expensive casting.

Table C – Internal Thread Tolerances

Tap-Lok and Speedserts		Helicoil	Keenserts	
(Commercial)	(Military)		(Steel)	(Stainless)
Unified	American STD	Unified	MIL-S-8879	UNJC
Class 2B	Class 3B	Class 2B or 3B	Class 2B	Class 3B
ISO 6H		ISO 5H or 4H5H	ISO 5H	ISO 5H

Standard Sizes

There is no inherent limit to how large or how long a Tap-Lok insert can be. We have seen most activity in the size range specified. Short lengths of inserts are generally selected because of size constraints or cost. Longer lengths of i nserts are selected for greater pull-out resistance, up to the point where the mating fastener fails.

Table D – Standard Insert Sizes

Tap-Lok	Speedsert	Helicoil	Keenserts Miniature	Keenserts Heavy-duty
UNC #2 to 3/4	UNC #2 to 1/4	UNC #2 to 1/2	UNC #0 - #8	UNC #8 - 1
UNF #2 to 3/4	UNF #2 to 1/4	UNF #2 to 1 1/2		UNF #8 - 1
Metric M2 to M18	M2 to M6	Metric M2 to M39	M2 to M4	M5 to M24

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Information for Buyers

Why Buy Groov-Pin Parts?

American Quality

Groov-Pin Corporation and a subsidiary, Precision Turned Components (PTC), operate from ISO 9001-2008 certified facilities in Smithfield, RI and Newnan, GA along with field application offices located around the U.S. Groov-Pin manufactures pins, inserts and precision turned parts in two factories. Our team of professionals has been servicing die caster clients, with quality products and a bend-over-backwards attitude.

Reliable, Responsive Service

At Groov-Pin, we're serious about understanding and meeting client needs and demands. We understand that higher-quality products, improved availability and competitive pricing are the hallmarks of every solid business, and we are committed to those pillars of success for ourselves and our clients.

LEAN Manufacturing

Groov-Pin is undergoing a LEAN transformation. Both our factories have streamlined value streams and reshaped processes to eliminate waste – and bring new levels of quality and responsiveness to our customers. All of Groov-Pin's people are engaged and energized, celebrating our path to improvement and the positive impact it has on each of our clients.

A History of Innovation

Our company has been in business since 1926, when we developed the potential for a patented press fit fastener called a grooved pin. Over the years, we innovated threaded inserts as well, and were awarded patents for those in the 1950s. Today, our lines of these engineered fasteners find applications in a wide range of industries from automotive to aerospace, electronics to energy, die casting to dental. Through the years, and with a set of studied acquisitions, Groov-Pin grew in capability, product line offerings and services. Since our acquisition of Precision Turned Components, a contract machining business, we have become a recognized leader in the manufacturing of components for components for high-precision applications.

When Your Parts are Unique

Custom Design & Manufacturing

Many Groov-Pin customers – including many die casting companies – count on us to help them with the design and manufacturing of custom parts. They know that our design and engineering teams, LEAN expertise and manufacturing capabilities make Groov-Pin the perfect partner for:

- highly collaborative work processes
- product dimension development and review
- product manufacturing and quality testing, and
- product stocking and ongoing inventory management

If your needs include custom design and manufacturing of pins, inserts and fasteners, consider Groov-Pin.

Our Mission

Our Mission is to improve performance of manufacturers' assemblies and operations with our expertise in pin fasteners, threaded inserts, and precision turning via responsive support and superior properties of our engineered fasteners and components.

Our Values

We hold the following values in dealing with each other and our customers:

- Responsiveness
- Mutual Respect
- Dependability
- Teamwork
- Frank Communication
- Initiative
- Improvement
- Innovation

Installation Guide

Tap-Lok® and Speedserts® Self-tapping Inserts

Installation

Installation tools for Tap-Lok thread-cutting and Speedserts thread-forming inserts feature hardened studs for twisting the threaded insert into the base material and a release mechanism for easy removal of the tool once the insert is locked into the base material.

For installation, the insert is twisted onto the tool stud and into contact with the tool nose piece.

The tool is then used to twist the threaded insert into the base material.

To remove the tool from the insert, the insert must be released. Production tools automatically release the insert when torque on the tool is reversed. Hand tools must be released manually.

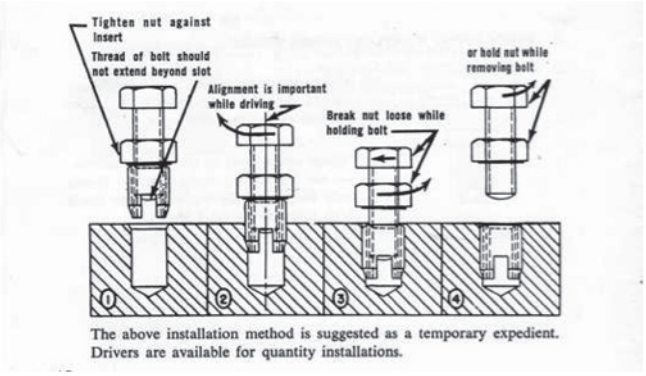
There are two basic Tap-Lok drivers:

Production Driver

Low-volume Driver

Driving the Tap-Lok Insert

Field Installation



The above installation method is suggested as a temporary expedient. Drivers are available for quantity installations.

Hand Tool Installation

To Install:

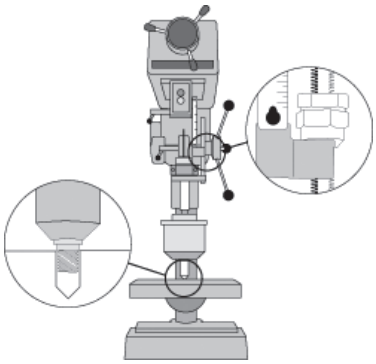
Install low-volume driver in a holding device such as a drill press chuck or hand-tapping fixture to assure perpendicular alignment with work.

Caution: Do not use power. Chucking the hand tool on a drill press is for alignment purposes only.

Drill Press Installation-Production Tool

3 Easy Steps:

1. Bring end of nose piece tightly against surface of material. Hold in position.
2. Lock spindle in position.
3. Set drill press stop. (Readjust stop after testing for exact insert depth.) Release the spindle.



After set-up is complete, hold the insert so that the rotating tool drive stud will thread into it. Hold the insert by the outer thread until it is snug against the nose piece.

Maintain the speed of the installation stud to between 100 and 500 RPM.

Adjust the stop on your drill press so that the tapping head clutch will release at the required depth for seating the insert. **Avoid over-driving or bottoming the driver**. This can break driver studs, and, in weak materials, any cause a partial shearing of threads newly cut by the insert.

If you are using the Production driver, be sure that the shell moves freely against the return spring and returns to the drive position (fully clockwise looking down).

Notice that the shell usually assumes the correct position as the insert is threaded onto the driver stud.

When the drill or tapper head reverses, the spring release feature allows the driver stud to loosen, backing the shell off the top of the insert.

Note: If you are tapping head normally runs in the reverse or left-hand direction, the removal of the small spring inside of some tapping attachments will reverse the direction.

Now align both driver and work material for a straight installation…and, after a final check on your procedure, drive the insert with steady, even pressure.

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Our People Want to Help Your People

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