

# CNC WEST

**THE MAGAZINE FOR WESTERN METAL WORKING MANUFACTURING**

## TURNING ISSUE

■ **GROVTEC - PUTTING THEIR TRUST IN CITIZEN'S CNC TURNING CENTERS**

■ **TDC - GEARING UP FOR MANUFACTURING**

■ **NO SUCH THING AS WASTED TIME AT FAST LANE PRECISION**

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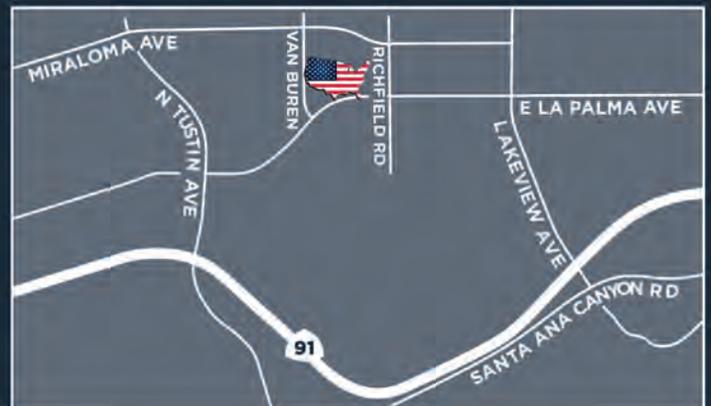
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Loading Capacity: 176 lbs  
ATC Tool Capacity: 60 Tools

## MX-520

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Travels (X,Y,Z): 24.80", 22.04", 20.07"  
Rapids (X,Y,Z): 1574.8 IPM  
Max. Work Size: 20.47"W x 13.77"H  
Loading Capacity: 440 lbs  
ATC Tool Capacity: 60 Tools

## MX-850

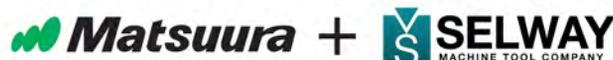
Spindle: 12k RPM (15K, 20K opt)  
Travels (X,Y,Z): 35.43", 30.70", 25.59"  
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# CNC West

June/July 2019 • Volume XXXVII No 5

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*Family is a big part of the manufacturing process at TDC. You can never be too young or old to learn about lean manufacturing.Pg.40*

### Coming in Aug/Sept 2019

EDM, Waterjet & Grinding Issue: This issue provides readers with profit-making ideas in three major metalworking areas – EDM, Waterjet and Grinding. We’ll visit western plants to report on innovative methods and equipment involving wire and sinker EDM, Waterjet and new ideas in grinding. *We will also preview the Westec show in Long Beach*  
*Editorial: July 21, 2019*  
*Ad Space: July 25, 2019*  
*Ad Material: August 3, 2019*



**VOL. XXXVII NO.5**

**June/July 2019**

The oldest regional industrial publication serving the Western States manufacturing managers, owners and engineers from 1 employee to those larger plants of 5,000 or more. Its editorials feature numerical control applications in all size machine shops, tooling, programming, robotics and shop operations, training personnel, financing of new equipment, cutting tools and all related manufacturing requirements. Coverage extends to all of Arizona, California, Oregon, Washington, Nevada, Utah, Idaho, Colorado, New Mexico and Texas.

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**PROD. ASST:** Jennifer Hallman

**ADVERTISING SALES:**

**(714) 840-1300**

CNC WEST (0747-3362) is published bi-monthly by ARNOLD PUBLICATIONS, INC., 16835 Algonquin St., No. 158, Huntington Beach, CA 92649. Periodical Rate postage paid at Huntington Beach, CA. and additional mailing offices. Postmaster: Send address changes to CNC WEST, P.O. Box 2029, Huntington Beach, CA, 92647. SUBSCRIPTIONS: Available without cost in U.S. only to company officials and managers of production, manufacturing engineering and purchasing agents. MUST be requested. All others may subscribe at \$10.00 per year. Single copy \$2.00. Please send paid subscription order to Circulation Manager, CNC West, P.O. Box 2029, Huntington Beach, CA 92647

Publisher's notice: We assume no responsibility for the validity of claims in connection with items appearing in CNC West Magazine. Addresses are given to facilitate further inquiry.

**ISSUANCE AND CLOSING DATES:** Published every other month, October, December, February, April, June and August. Issued second week of the publication month.

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# Summer is Here and the Reading is Easy

Hopefully you are reading this issue of CNC WEST while on vacation with some warm sand between your toes and a cold beverage next to you. That is probably not the case, but I can dream for you right? The June/July issue normally hits our readers hands right when summer starts. It is always our Turning issue and this issue we have two articles about shops featuring turning machines by Sean Buur.

For our cover story Sean flew out to Oregon to visit Grovtec Machining. It is a shop that in 2006 was in a 5,000 square foot building and had five employees. Just 13 short years later they employ 91 people in a 70,000 square foot building. They rely on Citizen Swiss machines to do a lot of the work in their shop. While they started out doing mostly firearms work but diversifying has done wonders for their bottom line. Read all about it on page 22.

The other turning Sean did was on Fastlane Precision in Riverside. Named after the famous Eagles song, the company has added a Doosan mill-turn to their huge stable of Swiss machines. The Doosan adds capabilities the Swiss machines can not do and has become a great investment. In fact, there is no wasted time on the Doosan as the shop takes it to the limit.

Another shop profile is on TDC a kart parts manufacturer in Redlands, CA. These are not the go karts you went on as a kid. They can hit speeds of 100 mph and there is a competitive racing series for them. When the company that was making their sprockets went out of business, TDC decided to bring the sprockets in-house instead of finding another shop to make them. They have not looked back since.

There is also the usual informative article from Tim Paul, an article about IMTS, product news, industry news and much much more. Our next issue is our WESTEC issue. We will try to provide all the info you need before you go to the show to make it a pleasurable experience. We will have lots of booth previews along with a lot of WESTEC exhibitors running ads letting you know they will be at the show. This promises to be our BIGGEST issue of the year and one you won't want to miss, be it reader or potential advertiser.

Thanks for reading CNC WEST and have a great summer!

Sincerely,

*Shawn Arnold*

Shawn Arnold

Publisher

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51 Z-5.1103 A-48.5782  
22 Z-5.0731 A-49.0828  
13 Z-5.0358 A-49.5848 B  
5 Z-4.9985 A-50.0835 B  
18 Z-4.9611 A-50.5784 B  
Z-4.9236 A-51.0688 B  
14 Z-4.8861 A-51.5539 B28.4544 F686.13 N29 X-.3059 Y.6084 Z-4.8861 A-51.5539 B28.4544 F6  
18 Z-4.8486 A-52.0331 B27.3917 F710.23 N30 X-.1599 Y.6058 Z-4.8486 A-52.0331 B27.3917 F7  
13 Z-4.811 A-52.5057 B26.2988 F734.35 N31 X-.0138 Y.6033 Z-4.811 A-52.5057 B26.2988 F73  
Z-4.7733 A-52.9708 B25.1754 F758.19 N32 X-.1324 Y.6008 Z-4.7733 A-52.9708 B25.1754 F75  
Z-4.7358 A-53.4419 B24.0211 F78  
Z-4.6978 A-53.9130 B22.8357 F80  
Z-4.6603 A-54.3841 B21.7499 F82  
Z-4.6228 A-54.8552 B20.6651 F84  
Z-4.5853 A-55.3263 B19.5803 F86  
Z-4.5478 A-55.7974 B18.4955 F88  
Z-4.5103 A-56.2685 B17.4307 F90  
Z-4.4728 A-56.7396 B16.3659 F92  
Z-4.4353 A-57.2107 B15.3011 F94  
Z-4.3978 A-57.6818 B14.2363 F96  
Z-4.3603 A-58.1529 B13.1715 F98  
Z-4.3228 A-58.6240 B12.1067 F100  
Z-4.2853 A-59.0951 B11.0419 F102  
Z-4.2478 A-59.5662 B10.0000 F104  
Z-4.2103 A-60.0373 B9.9352 F106  
Z-4.1728 A-60.5084 B9.8704 F108  
Z-4.1353 A-60.9795 B9.8056 F110  
Z-4.0978 A-61.4506 B9.7408 F112  
Z-4.0603 A-61.9217 B9.6760 F114  
Z-4.0228 A-62.3928 B9.6112 F116  
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# EXEC HOTLINE

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## French Aerospace Firm Buys Semtech Sensor Technology

Semtech Corp. is supplying its long-range, low-power technology to sensors for a French aerospace company to track its parts.

The Camarillo, CA. semiconductor company's product will be used by Ineo-Sense, in Nimes, France, its is Clover-Core series of sensors used for smart asset tracking in manufacturing plants.

Ineo-Sense has contracted with Lauak Group, a company in southwestern France that makes parts and sub-assemblies for the aerospace industry, to provide 14,000 sensors with the Semtech technology

The sensors will be integrated in Lauak's manufacturing containers for accurate monitoring of the parts, which are constantly in transit throughout large manufacturing facilities.

Marc Pegulu, vice president of Internet of Things at Semtech, said that according to industry research, asset tracking is expected to grow to a \$27 billion market by 2023 and that the company's technology is an ideal platform to support it.

---

## Harbor Freight Closing Distribution Center

Harbor Freight Tools is shutting down its Camarillo, CA. distribution center, resulting in the loss of 51 jobs.

The Calabasas, CA. discount tool and equipment retailer notified the state Employment Development Department that the layoffs would take place between June 22 and July 1.

"The current operation is being relocated to their existing Moreno Valley, CA. distribution center where they will be adding positions to support our direct-to-consumer operation.

Employees have been told they are eligible for positions elsewhere in the company and have started offering transition classes through Ventura County Rapid Response Services and Harbor Freight's internal talent acquisition team, the company said.

---

## GA-ASI Donates Gray Eagle as Part of Army Museum Support

The National Museum of the United States

Army was the recipient of an unmanned aircraft system donation and \$50,000 from General Atomics Aeronautical Systems Inc. The Poway-based company said the donations will aim to show tourists the value of military technologies in the armed forces.

GA-ASI provided a one-fifth-scale model of the MQ-1C Gray Eagle Unmanned Aircraft System to the museum, slated to open in 2020 near Washington, D.C.

The defense and aerospace systems firm broke ground on its 150,000-square-foot hangar in El Mirage, California in March

---

## San Diego Based Drone Provider Wins Government Contract

Counter-drone provider Citadel Defense Company in mid May won another government contract - snagging a U.S. Airforce agreement to deploy the Titan mobile anti-drone system.

Rogue drones present a new threat to military personnel in a myriad of battle scenarios - especially from aircraft launched by terrorist groups such as ISIS. The contract is Citadel's seventh award in as many months. Recently, the company signed an agreement to provide the U.S. Defense Logistics Agency counter-drone measures in support of Special Operations Command requirements.

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## California High School Rated #1 High School Robotic Team

Madera High School's Madtown 1323 is ranked number one in the world - and the group of 15 students is preparing to defend that ranking after months of hard work.

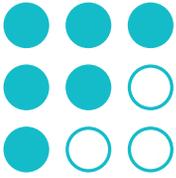
"They usually put in over 200 plus hours because of programming. They are manufacturing all these different parts. And they work on the weekends," said Vernon Valmonte, Madera High School teacher.

Each year robotic teams across the country are given specific instructions and a timeline to build a robot for competitions.

Madtown 1323 recently won the top spots at the Central Valley and Sacramento regionals.

They are currently ranked number one the in world. An outside party tracks the points

Continued on page 96.....

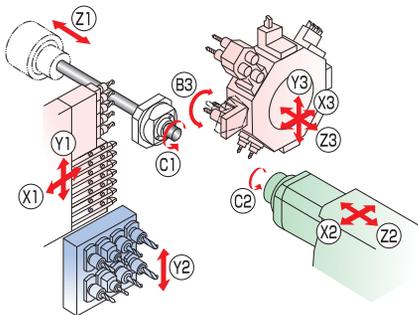


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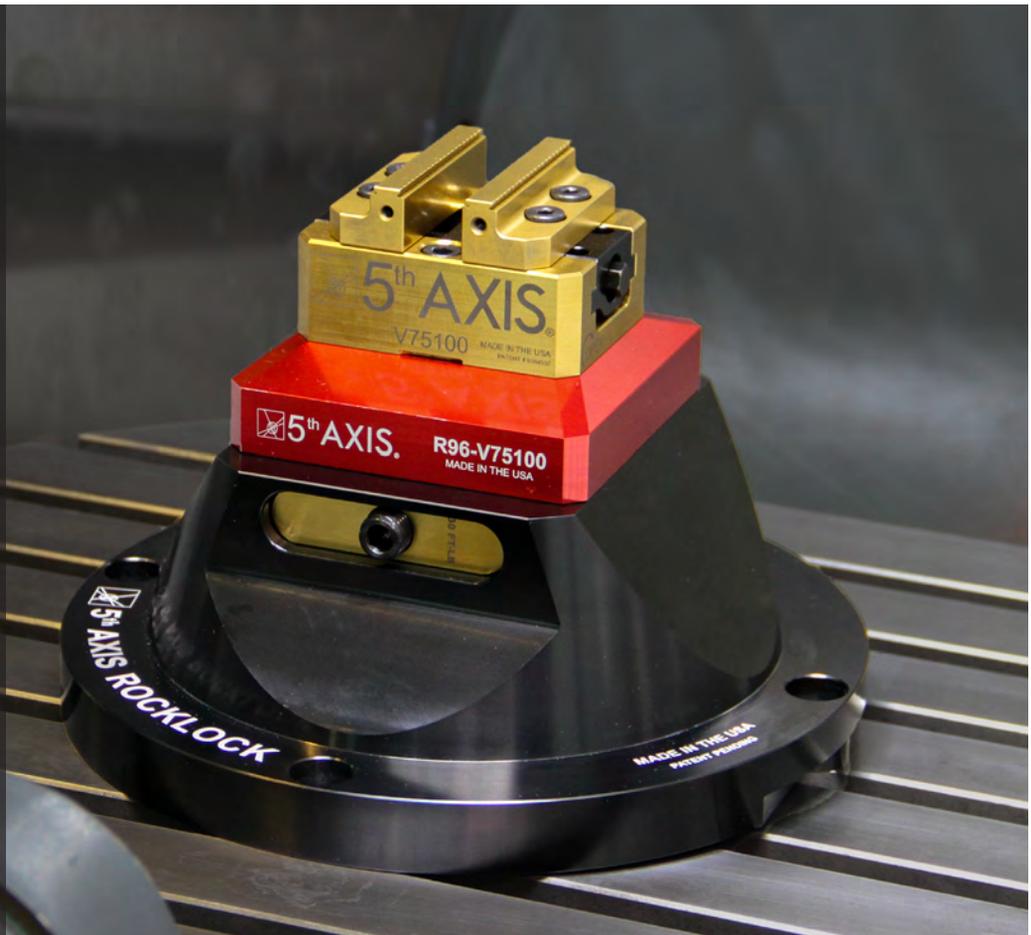
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					4	TG-6400F	\$ 71.66	8"	8-RTG-6400A	\$ 158.83
8"	.312	.499	3/8	1.750	2	TG-8200F	\$ 22.15	8"	RTG-8200A	\$ 103.80
					3	TG-8300F	\$ 64.44	10"	10-RTG-8300A	\$ 240.33
10"	.501	.749	1/2	2.125	2	TG-10200F	\$ 23.83	12"	12-RTG-10200A	\$ 184.94
					4	TG-10400F	\$ 75.33	15"	15-RTG-10400A	\$ 607.05
12"	.501	.749	1/2	2.500	2.5	TG-12250F	\$ 72.22	15"	15-RTG-12250A	\$ 494.11
					4	TG-12400F	\$ 102.35	18"	18-RTG-12400A	\$ 851.69
15"	.501	.749	5/8	3.000	2.5	TG-15250F	\$ 87.22	21"	21-RTG-15250A	\$ 908.09
					4	TG-15400F	\$ 113.74	24"	24-RTG-15400A	\$ 1,550.55

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Model	Chuck Size	Groove Width	Screw Size	Hole Space	Hgt Inch	ALUMINUM	
						Part Number	Set Price
Kit B206 N206 HS-06	6"	0.472	10MM	0.787	2	RKT-6200A	\$ 72.61
					3	RKT-6300A	\$ 104.86
					4	RKT-6400A	\$ 118.88
Kit B208 N208 HS-08	8"	0.551	12MM	0.984	2	RKT-8200A	\$ 85.36
					3	RKT-8300A	\$ 134.30
					4	RKT-8400A	\$ 159.83
Kit B210 HS-10	10"	0.630	12MM	1.181	2	RKT-10200A	\$ 126.28
					4	RKT-10400A	\$ 193.60
Kit B12 HS-12	12"	0.709	14MM	1.181	2	RKT-12200A	\$ 184.71
					3	RKT-12300A	\$ 245.72
Kit B212 BBM 315	12"	0.827	16MM	1.181	2	RKT-12208A	\$ 184.71
					3	RKT-12308A	\$ 278.56



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- Additional heights available
- We make specials!



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(Must be same part number)

Model	Chuck Size	Groove Width	Screw Size	Hole Space	Hgt Inch	STEEL		ALUMINUM	
						Part Number	Set Price	Part Number	Set Price
Kit B206 HO27M6 HS-06	6"	0.472	10MM	0.787	2	KT-6200F	\$ 34.37	KT-6200AF	\$ 31.59
					3	KT-6300F	\$ 44.99	KT-6300AF	\$ 41.12
					4	KT-6400F	\$ 95.71	KT-6400AF	\$ 86.08
Kit B208 ZA6-8 HS-08	8"	0.551	12MM	0.984	2	KT-8200F	\$ 40.70	KT-8200AF	\$ 38.56
					3	KT-8300F	\$ 46.82	KT-8300AF	\$ 50.90
					4	KT-8400F	\$ 61.00	KT-8400AF	\$ 62.11
Kit B210 HS-10	10"	0.630	12MM	1.181	2	KT-10200F	\$ 45.84	KT-10200AF	\$ 46.66
					4	KT-10400F	\$ 76.14	KT-10400AF	\$ 67.46
Kit B12 HS-12	12"	0.709	14MM	1.181	2	KT-12200F	\$ 72.00	KT-12200AF	\$ 74.05
					3	KT-12300F	\$ 107.96	KT-12300AF	\$ 90.10
Kit B212 BBM 315	12"	0.827	16MM	1.181	2	KT-12208F	\$ 72.00	KT-12208AF	\$ 74.05
					3	KT-12308F	\$ 107.96	KT-12308AF	\$ 90.10

\*For Pointed Soft Jaws, replace the "F" w/ "P" & add \$4.00 (6"-10") /\$7.00 (12" & above) per set.



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- Suitable for CNC lathes
- Easy to attach-no tools needed!
- Jaws are bored at same clamping pressure used to hold part
- Economical-3 jaw boring rings cover chucks sizes from 5"-12"!

Chuck Size	ID	OD	Part Number	PRICE
5,6,8"	3.94	6.7	JBR-TL5-8	\$379.00
6,8,10"	4.92	7.9	JBR-TL6-10	\$439.00
8,10,12"	6.30	9.8	JBR-TL8-12	\$519.00



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1 MT	5,000	390	3,730	ROY-10851	\$296.40
2 MT	5,000	390	3,730	ROY-10852	\$274.55
3 MT	5,000	390	3,730	ROY-10853	\$295.45
4 MT	4,500	750	4,990	ROY-10854	\$358.15
5 MT	4,500	750	4,990	ROY-10855	\$402.80



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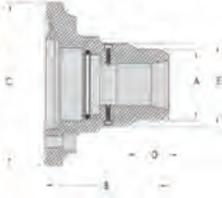
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- Body hardened to Rc 61-63 for rigidity
- Also available for "S", 16C & 3J collets



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Spindle	Threaded Nose	A	B	C	D	E	Max RPM	Part Number	Price
A2-5	N	2.63	5.00	6.45	1.05	3.14	6,000	ROY-42053	\$1,166.20
A2-5	Y	2.187-10	5.00	6.45	1.22	3.14	6,000	ROY-42054	\$1,303.40
A2-6	N	2.63	5.00	7.45	1.05	3.14	6,000	ROY-42055	\$1,372.00
A2-6	N	2.63	6.00	7.45	1.05	3.14	6,000	ROY-42057	\$1,528.80
A2-6	Y	2.187-10	6.00	7.45	1.22	3.14	6,000	ROY-42058	\$1,646.40
A2-8	N	2.63	6.00	9.45	1.05	3.14	4,500	ROY-42059	\$1,685.60

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- Allows for through boring of jaws

Chuck Dia	Part #	Price
4"	JBR-04	\$162.00
5"	JBR-05	\$162.00
6"	JBR-06	\$184.25
8"	JBR-08	\$226.48
10"	JBR-10	\$255.67
12"	JBR-12	\$284.23
15"	JBR-15	\$427.06

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8" Top Jaws For CNC Chucks

Prices Starting At:  
**\$452.00** Set

Part # CPJ-KT0800WS4-Y

## EDGE TECHNOLOGY 5C COLLET STOP



- Fits standard 5C collets with internal threads
- 6 hardened steel stop rods included-1/16", 1/8", 3/16", 1/4", 3/8", 3/4"
- 3/4" stop rod keeps parts square to spindle axis
- Proprietary locking system prevents the possibility of the stop rod slipping in the body
- Body is red anodized 6061-T6 aluminum
- Body fits a 7/8" wrench

**NEW ITEM!** 5C COLLET STOP  
Part # EDGE-45000  
Mfg's List: \$49.99  
**\$29.99 ea**

## EDGE TECHNOLOGY CHUCK STOP SET



- 10 sets of hardened parallel bars
- 0.0002" parallelism accuracy
- Parallel heights: 1/2" to 1-5/8" x 1/8" inc.
- Magnets secure the stop to chuck face
- Centering plug fits ID of the chuck and keeps the Chuck Stop centered
- Included centering plug diameters are 1.4", 2.0", 2.5", 3.0", 3.5", and 4.0"
- The Chuck Stop is 6.0" in diameter
- Designed for 3 jaw chucks only
- For use on 6" diameter chucks and larger

**NEW ITEM!** CHUCK STOP SET  
Part # EDGE-30000  
Mfg's List: \$199.99  
**\$149.99 ea**

## HARD JAWS For 1.5mm x 60° Serrations Chucks



GRIP-RITE



XTRA BITE



- Designed for first operation roughing, expect runoff between 0.005-0.010
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- 2 steps (1 step hard jaws also available)
- Ground body for improved run-out
- OEM Style features ground tips
- XTRA BITE: Very aggressive bite with conical teeth for extra gripping

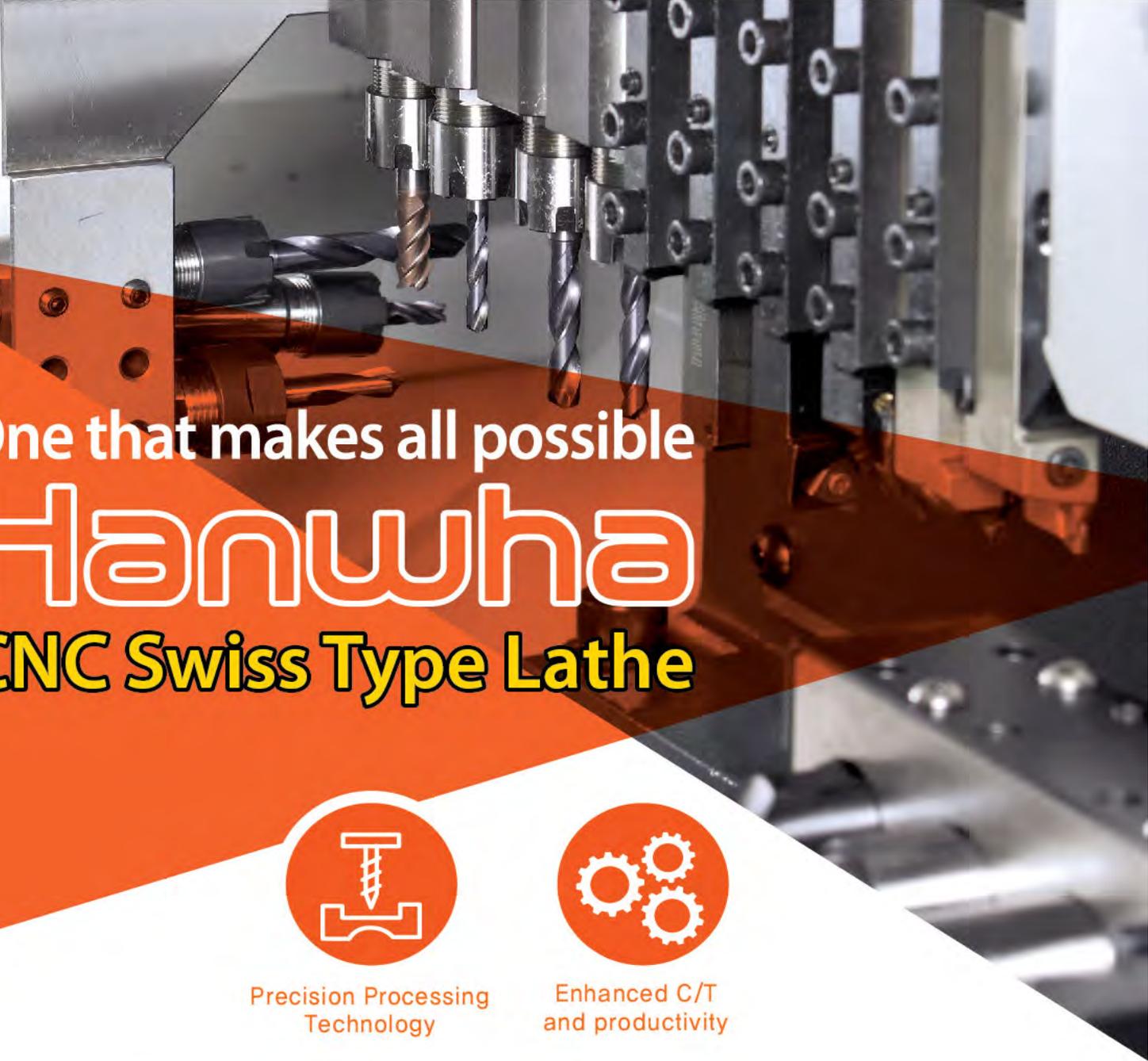
For Kitagawa®, STRONG®, Samchully®, Seoam®, MMK® & Many Other 1.5mm x 60° Serration Chucks!

Chuck Model	Chuck Dia	GRIP-RITE OEM STYLE		XTRA BITE	
		Part Number	Price Per Set	Part Number	Price Per Set
B206, HS06	6"	KT-60HJ2-U	\$245.75	KT-60HJ2-X	\$256.55
B208, HS08	8"	KT-80HJ2-U	\$294.53	KT-80HJ2-X	\$312.71
B210, HS10	10"	KT-100HJ2-U	\$336.60	KT-100HJ2-X	\$370.44
B-12	12"	KT-120HJ2-U	\$391.99	KT-120HJ2-X	\$415.42
B-212, HS12	12"	KT-128HJ2-U	\$390.92	KT-128HJ2-X	\$416.29
B-15	15"	KT-150HJ2-U	\$504.90	KT-150HJ2-X	\$554.85



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# Northrop Grumman's Omega on Track to Support Certification Launch in 2021



**Northrop Grumman successfully conducted a full scale static test of the first stage of its Omega rocket May 30, 2019 at the company's facility in Promontory, Utah. Photo credit Northrop Grumman**

In late May, Northrop Grumman Corporation successfully conducted a full-scale static fire test of the first stage of its new OmegaATM rocket in Promontory, Utah. This milestone keeps OmegaA on track to perform its first launch in 2021 and begin operational launches of national security payloads in 2022.

"The OmegaA rocket is a top priority and our team is committed to provide the U.S. Air Force with assured access to space for our nation's most critical payloads," said Scott Lehr, vice president and general manager, flight sys-

tems, Northrop Grumman. "We committed to test the first stage of OmegaA in spring 2019, and that's exactly what we've done."

During the test, the first stage motor fired for approximately 122 seconds, producing more than two million pounds of maximum thrust—roughly the equivalent to that of eight-and-a-half jumbo jets. The test verified the performance of the motor's ballistics, insulation and joints as well as control of the nozzle position.

Last October, the U.S. Air Force awarded Northrop Grumman a \$792 million contract to complete detailed design and verification of OmegaA and launch sites. The test verified performance of the first stage solid rocket motor for the intermediate version of OmegaA.

The 2015 National Defense Authorization Act specified that a domestic next-generation rocket propulsion system "shall be developed by not later than 2019." With today's successful test fire, Northrop Grumman demonstrated the company is on track to meet this Congressionally-mandated schedule.

"Congratulations to the entire team on today's successful test," said Kent Rominger, OmegaA vice president, Northrop Grumman. "OmegaA's design using flight-proven hardware enables our team to meet our milestones and provide an affordable launch system that meets our customer's requirements and timeline."

A full-scale static fire test of OmegaA's second stage is planned for this fall.

OmegaA's design leverages flight proven technologies from Northrop Grumman's Pegasus®, Minotaur and Antares™ rockets as well as the company's interceptors, targets and strategic rockets. Northrop Grumman has conducted nearly 80 successful space launch missions and has decades of experience launching critical payloads for the U.S. Department of Defense, civil and commercial customers.

The company's vehicle development team is working on the program in Arizona, Utah, Mississippi and Louisiana, with launch integration and operations planned at Kennedy Space Center in Florida, and Vandenberg Air Force Base in California. The program will also support thousands of jobs across the country in its supply chain.

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# GROVTEC MACHINING

## PUTTING THEIR TRUST IN CITIZEN'S CNC TURNING CENTERS

**W**ood Village, Oregon is just east of Portland, and is the manufacturing headquarters of Grovtec Machining and Grovtec Firearms Accessories. Grovtec is split between two sales channels with a single purpose of producing quality parts in the USA.

Bob Grover founded Grovtec back in 2006. He worked for a local firearm accessories manufacturer which was bought out and moved their manufacturing offshore. Bob was tasked with training the Chinese manufactures how to produce the parts. It wasn't going well, and he pitched the idea that he could purchase some of the old equipment and continued to produce parts that were made in the USA for them. They agreed on a short term basis to complete a few existing contracts. Grovtec started with five employees and 11 machines in a 5,000 sq.ft. building. Today, their manufacturing plant is just under 70,000 sq.ft. housing just over 150 machines. They are staffed by 91 hard working Oregonians.

Tyler Grover is the sales and marketing manager, and head of Grovtec Machining. He grew up on the shop floor and was known to skip school to keep the Davenport's running. A lot of moms might have taken issue with that, but his was right there with him in the shop. "My mom's a firecracker, and we had hot orders to get out," tells Tyler. "Back then all of us did every job we could. There were no departments, just people pitching in anywhere that needed it. We have two primary sales channels, but Grovtec Firearms Accessories is where we got our start. You will find our products in all the big box stores and they get sold in bulk as OEM to other manufactures. The second channel is the one I head up, Grovtec Machining. Grovtec Machining is us opening up our experience to other industries. We are AS9100 Rev D and ITAR registered. We are big in aerospace and defense industries along with dental

Article by *Sean Buur*

Photos by *Sean Buur* and supplied by *Grovtec*





Grovetec Machining's newest addition is a Citizen Miyano BNX51 2" lathe and Tyler has been quite impressed with its capabilities. Because of its simultaneous machining they've seen a dramatic reduction in cycle times over their older CNC lathes. They are in the process of simplifying the shop for better cross training. Part of that is reducing the number of brands and controllers into a more centralized platform. With so many Citizens on the floor, it made sense to buy a new lathe that has similar operations to their dozen Swiss turning centers.



**Top - The Citizen Miyano BNX51 is a highly stable machining platform equipped with the popular Mitsubishi control. The 12-station turret, allows for revolving tools to be mounted at all stations. Its most impressive feature is "Superimposition control" where machining is performed with the movement of the back spindle synchronized with that of the tool slide. Bottom Left - Tyler Grover makes a quick parts check as the Miyano runs unattended for most of the day. Bottom Right - The Miyano delivers a finished part and thanks to simultaneous machining that part is delivered as much as 3 times faster than it was before getting the new lathe.**

and medical. The firearms industry is a bumpy ride so diversification comes from the Grovtec Machining side of the business. Our core competency is high production manufacturing, so we produce hundreds of thousands of cable connectors, specialty fasteners, spacers, washers, electronic housings, barbed fasteners, quick releases, mechanical assemblies, and plastic insulators."

When Bob opened Grovtec they focused on multi spindle screw machines, and over the years has amassed quite the stable of machine tools. "We started with six Davenport model B's," tells Tyler. "Then we began add-

ing single spindle Brown & Sharpes and CNC's. Two years ago we branched out a little and purchased 7 larger Wickman screw machines." They also have three Haas vertical mills, a 6 pallet EC400 horizontal Haas mill, a couple Doosan lathes and a dozen Citizen Swiss turning centers. "We've purchased a lot of Citizen machines from Aaron Johnson and Jamie Herman at Spinetti Machinery over the years," continues Tyler. "They've been a big part of us growing the company. Their service is top notch and put some of our other vendors to shame. Our first Citizen we bought at auction in the late 2000's

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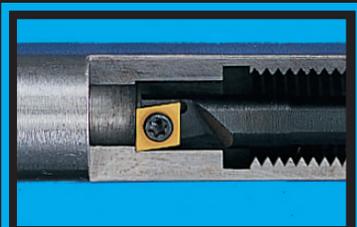
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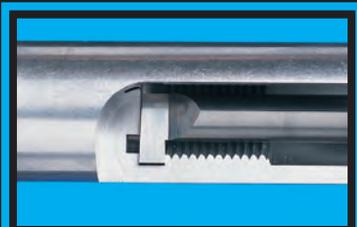
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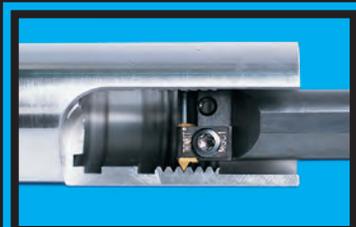
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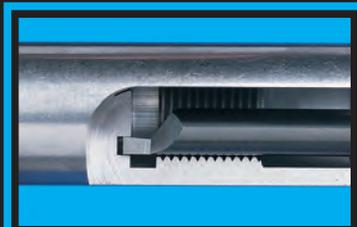
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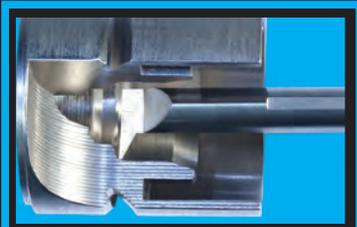
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Grovtec has a lot of Brown & Sharpe machines and the reason is they don't have a Citizen with Low Frequency Vibration (LFV) chip breaking technology. They run a ton of Delrin, Peek and polycarbonate plastics. The plastics have different issues than machining metal, the biggest being chip removal. Chips don't break apart, but instead get wrapped around tooling. It is a nightmare, but the Brownies are open bed so their operators can reach in with a hook chip puller and remove the chips without shutting down the machines. They have 24 machines on line with bar loaders and another half dozen that they use as chuckers.

and had no idea what we were doing. We had to reach out to them dozens of times. My mom was running second shift, and Jamie at Spinetti would take calls and texts from her at all hours. She'd call at 11pm not knowing how to get the bar to feed and they would walk her through the process and make sure the machine stayed running. That kind of support goes a long way. Since then we have added a bunch of L12's, and L32s. Most of our L12s have upgraded L16 guts, making them 5/8" capacity machines instead of 1/2". We did a lot of research into unattended running before picking up that first Citizen at auction. We were all beat to death with 16 hours shifts. The Citizens and lights out manufacturing have been a big game changer for us. Demand was so high at

the time that we had to turn down work. That changed when we added the Citizens."

Grovtec Machining's newest addition is a Citizen Miyano BNX51 which is a 2" capacity lathe and Tyler has been quite impressed with its capabilities. "The Miyano has been a great addition to our shop," touts Tyler. "We've been able to do simultaneous machining, and reduce our cycle times drastically over our older CNC lathes. We are seeing cycle times drop from 9 minutes to 3.5 minutes. Our older machines have 4' bar loaders, but we added a 12' hydraulic loader on the Miyano. The hydraulic loader allows us to save some money by running extruded material. It isn't a fair comparison of course machine to machine, but that doesn't change the fact we



**Grovtec's core competency is high production manufacturing and Citizen Swiss turning centers play a large part of that process. They purchased their first Citizen at auction after extensive research into unattended manufacturing. After receiving excellent support from Spinetti Machinery they've added more and more.**

are doing the part faster with newer technology. We sent guys down to California for training to maximize the performance offered by the simultaneous machining. Basically the turret comes in and starts machining on the main spindle while the back of the turret is machining on the sub spindle. It is a super efficient way to machine parts. We are in the process of simplifying the shop for better cross training. Part of that is reducing the number of brands and controllers into a more centralized platform. With so many Citizens on the floor, it made sense to buy a new lathe that has similar operations. The guys know the controls already so it is way easier to move people around as needed. We hire a lot of Swiss guys and have to completely retrain them if we want them to run the Doosans. As everyone in the industry knows good employees are not easy to find, so we want to be able to utilize our workforce throughout the shop."

Grovtec is in a constant hiring process as they try to keep up with their expedited growth. With 91 people on staff already, building a skilled and cohesive workforce needs to start with a grassroots program. They begin grooming future employees while they are still in high school, and are involved in a variety of different local programs. "The joke is we have too many millennials working here so we need to hire more Gen Z," laughs Tyler. "Making sure that we have a constant flow of new talent means we need to get to them early. We work closely with all the local schools as well as specialized programs like Center for Advanced Learning, East Metro Steam Partnership, and the Pacific Northwest Joint Apprenticeship

Committee. Pacific Northwest Joint Apprenticeship Committee is the area's first multi-employer supported program based off of competency for machinists. We had our first apprentice graduate from that program last year.

Most of the local high schools have some form of manufacturing programs. Grovtec sends a variety of employees to the campuses to speak with the students about career opportunities and what it is like to work in the industry. It generates a lot of interest from the students and they like that they can ask questions and receive real world answers. "The coolest thing for me is manufacturing day," explains Tyler. "We have schools from all over come and tour our facility. We had one student take so much of an interest in what we do that we hired her. She works here part time while going to school for manufacturing and programming. One thing I think we do well is hire for fit regardless of experience. If you are passionate, and driven with the right soft skills you move up quickly here. When you look at our staff you will notice that a lot of our leads and supervisors are actually pretty young. We have a lot of trust in our employees and helping them succeed helps us to succeed."

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**FV series**

Vertical 5-axis Machining Centers

X / Y / Z : 22.04" / 20.07" / 18.11" ( FV-560 )

X / Y / Z : 37.79" / 23.62" / 18.89" ( FV-960 )



**FCV-620 series**

High Speed 5-axis Machining Centers

X / Y / Z : 25" / 21.06" / 18.11"



**FCV-800 series**

Gantry Type 5-axis Machining Centers

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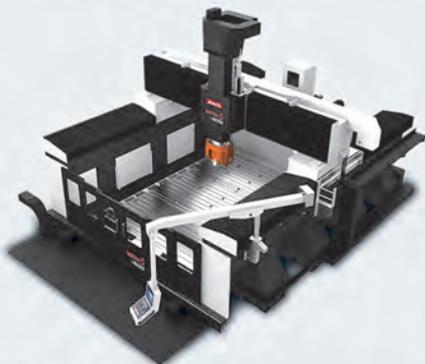


**MEGAS P series**

Bridge Type 5-axis Machining Centers

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Z : 39.37" / 47.24" B : ±110° C : ±240° ( TCH-30F )



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# FAST LANE PRECISION

## NO SUCH THING AS WASTED TIME DOOSAN'S TWIN TURRET, TWIN SPINDLES



Article & Photos by Sean Buur

Kevin Jimenez (left) is the head of the mill-turn department and is a Doosan specialist. He and Fast Lane Precision's owner Barry Kitchen (right) discuss some of the intricacies required on the print. With 24 tools and twin spindles the Doosan delivers finished parts right off the machine.

# SION

# WITH INDLE PUMA TT



After spending a decade working for a screw machine shop in Yucaipa, CA, Barry Kitchen set out on his own, opening Fast Lane Precision in 2001. “We began as a Swiss turning shop because that was what I knew how to do,” tells Barry. “I still love the screw machines, but to better service my customers we have added 5 axis milling, traditional turning and mill turn machines. Customers were asking for parts that were either too big for our Citizens or they wanted a square part. I got an old mill and an old lathe to test the waters, but found that I really liked the added capabilities. We began adding new state of the art milling and turning machines. The Swiss guy in me likes parts coming off the machines finished so we have multiple 5 axis Haas mills, a couple 4 axis Haas mills and a Doosan Puma TT mill-turn lathe to go along with our eleven Citizen screw machines.”

Fast Lane Precision in Riverside, CA, is a do it all shop geared towards aerospace and defense. From tiny fasteners to full assemblies they take it to the limit. The more difficult the part, the more they like it. “We thrive on the materials other shops hate,” explains Barry. “We run a lot of exotic material like Inconel and A286 along with more traditional metals like titanium, brass, aluminum, plastics, and stainless.” A286 is a favorite go to material for aerospace engineers designing fasteners with threads. Fast Lane Precision machines tens of thousands of A286 fasteners for the aerospace industry every year; it is one of their specialties. “When I invest in new machine tools they have to be up to the task at hand,” continues Barry. “I rely on trusted brands that built their reputations on service and support. Inconel and A286 are difficult to machine, so when Ken Bennett of Ellison Technologies began to talk up the Doosan PumaTT1800SY mill-turn I listened. I wanted a machine that would deliver a finished part and give me the ability to run a larger diameter than we could on the Swiss. The Puma is a dual turret, twin spindle machine with 7 axis and can run 2.6” bar all day long. It fit the bill nicely. This was our first machine tool purchase from Ellison. They are well regarded in the industry for their service and we’ve found that to be true. They are organized and quick to respond. The techs get in and out when you need them and don’t sit around milking the clock on my dime. I like that. Ken was easy to deal with and is the running to get another sale when we add to the mill-turn department later in the year.”

Admittedly, Fast Lane wasn’t utilizing the Doosan to its full potential. That changed when they hired Kevin Jimenez, a Doosan mill-turn specialist. Kevin has been with Fast Lane now 8 months and has completely taken over the turning department, freeing Barry up to focus his efforts elsewhere. “Kevin has been a great fit,” touts Barry. “He is young, smart, driven and is always learn-

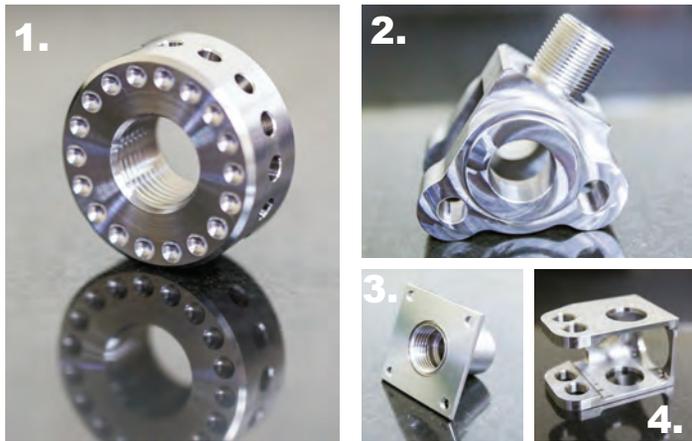


**Barry Kitchen opened Fast Lane Precision as a Swiss turning house in 2001. Over the years they have added automated milling and turning to support their customers, but he is still a Swiss guy through and through. The Swiss department is made up of 11 Citizen machines ranging in size from the L12 to the L20.**

Having twin turrets obviously offers you twice the tooling of a single turret style machine, but the Doosan's tooling is half indexed, essentially doubling the available tooling yet again. "We have 24 tools on the top and 24 tools on the bottom at our disposal," explains Kevin. "It is a lot of tooling, but on some jobs you need every bit of those capabilities. With all the available tools on the two turrets it is nice to be able to keep a variety of popular tools always loaded and ready to go. We have a few standard tooling items we utilize and they are pretty much always locked, loaded and ready to cut chips." A typical run quantity on the Doosan is between 800 and 2000 parts. Not running onesie-twosie allows Kevin to dial in the performance of the Doosan through programming and tooling. "On

a longer run you can see how one tool performs better than another and figure out a strategy to maximize production," explains Kevin. "I can see right away if buying a better tool makes a difference or if a lower cost one lasts and performs just as well. In automation tooling is very important. We almost exclusively use Sumitomo for our turning inserts and parting off inserts, in milling we use a lot of Cobra Carbide and SGS."

The twin spindle Doosan is exactly that, a twin spindle. Two identical spindles are neatly tucked inside the machine ready to tackle jobs in various ways. "The Doosan Puma is two machines in one," touts Kevin. "The two matched spindles can run independently of each other or in unison. Both are an actual rigid spindle and not a spin-



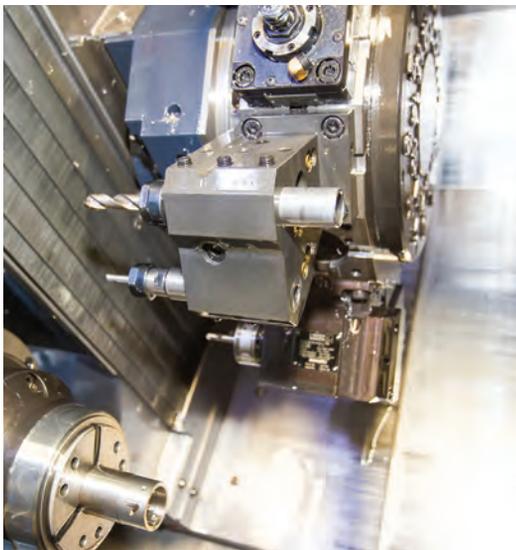
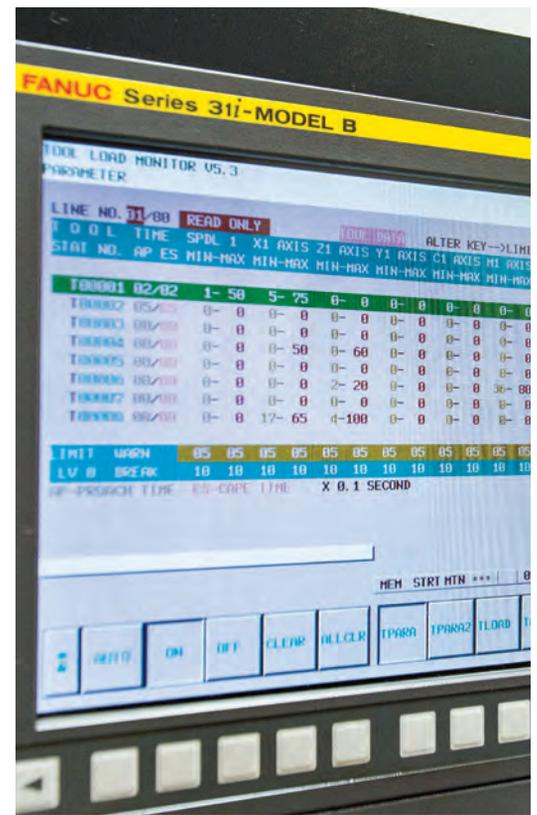
Left - **1.** This Nut was originally ran in a total of 3 ops (one on the lathe and two on the mill) with loading and unloading on all 3 ops plus machining it took 12-14min. Now the part comes off the Puma TT complete in less the 5min. with no one having to stand next to it. **2.** This Clevis is ran on one of are 5 axis machines and only requires 2 ops. Vs 5 ops if they were to run it on a standard 3 axis mills. They are saving time and also producing better quality parts. **3.** This Body is ran on the Puma TT complete in under 4min. This part would require 3 ops. (two lathe ops and one mill op.) and would roughly take 15min+. Jobs like this are the ones that show how powerful the Puma TT machine is. **4.** This Housing is ran on one of their 5 axis machines and only requires 2 ops. Vs 6 ops on a standard 3 axis mill.

dle and sub spindle. Anything I can run on one spindle I can run on the other. This gives me great flexibility when it comes to programming and I don't have to worry if a sub spindle is up to the task." Kevin programs the Doosan to share the workload in the most efficient manner. Sometimes that is looking at it as two separate machines and other times as one super machine. "Anytime both spindles are cutting parts at the same time the profitability is maximized," describes Kevin. "You can see by our parts that the ability to run off either spindle and to cut with either turret is a big advantage over traditional turning. The part we have on the machine right now takes us 4 minutes. In comparison on a live tool, y-axis, sub spindle machine it would take 8 minutes. It needs two lathe ops and two mill ops, or one pass through our Doosan. With simultaneous running we drop a finished part in under 4 minutes. We clean it, pack it, and ship it right to the customer. Splitting the part exactly in half is an art form that really yields results. 50-50 is critical to making money and as we continue to add parts to the Doosan that aspect of machining is one of the first things we prioritize."

In the long run, lights out manufacturing gives Barry a peaceful easy feeling. The automation built into the Doosan fit right in to Fast Lane's Swiss turning mentality. The combination of experience and ideas spread throughout the departments means no one is the last line of defense. It is a team effort though and through. "The knowledge base is incredible here at Fast Lane," concludes Kevin. "Coming from a huge corporate shop to a mom and pop place has been a big change, but one that I welcomed. I have more freedom here to experiment and improve work processes. If I want to reprogram a part to save us time, Barry says go for it, and I do. That is the great thing about the Doosan Puma is that the more I learn the faster it gets. Here at Fast Lane it is all about automation. Start to finish the Doosan is my baby and anything we can do to increase profits and reduce costs is encouraged. That is why Barry got the Doosan in the first place. It is like having two machines in one."



Barry added milling because of customers requesting square parts. After buying an older mill and recognizing the added benefits, he began to update the milling department. The milling department is made up entirely of Haas machine tools. All the machines are equipped with Renishaw spindle probing and optical tool setters. Machines vary from standard VF2s up to 4th and 5th axis automated machining centers. All the mills utilize a variety of Chick Workholding Solutions.



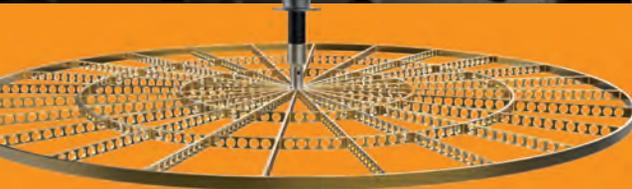
“The Puma TT is such a fun machine,” tells Kevin. “I know fun isn’t a word normally associated with a machine tool, but man I have fun at work. It is a challenge every day and that’s fun for me. I don’t want to do the same thing day after day after day and go home wondering what it was I actually did. I come to work and look forward to what we can make on the Doosan Puma TT and how we can make it faster or better. I am constantly learning, and building off that new knowledge. What else can it do is a daily question that we try to answer. The tool loader for example measures the load on every single tool. If one tool goes higher than the load I determined the machine will stop. It avoids a broken tool, it avoids a crash it avoids bad parts. That’s power, that’s fun. So many people don’t even use that feature because it is more complicated, but once you get it is it one of the most useful features on the machine. With all the automation we run the Doosan lights out almost every night.”

ing. He pushes his programming to extract every ounce of performance and automation from the Doosan.”

“I like to say that Barry loves money,” jokes Kevin. “But what I mean is Barry loves seeing automated processes, and finished parts coming off the machine with a minimal amount of human contact. Simultaneous running on the Doosan is like dollar signs flying off the machine and into the bank.” The Doosan PUMA TT1800 series machine is a horizontal multi-turret turning center designed with automation in mind. It has a bar capacity of 2.6” and is

equipped with twin opposed spindles and upper / lower turrets. The left and right spindles can process work pieces independently or simultaneously to maximize productivity. Each spindle is equipped with an independent part catcher and unloading system for automated manufacturing. “There are so many features on the Doosan that I utilize every day,” tells Kevin. “Lets just talk turrets and spindles. They are key elements that make this such a popular machine.”

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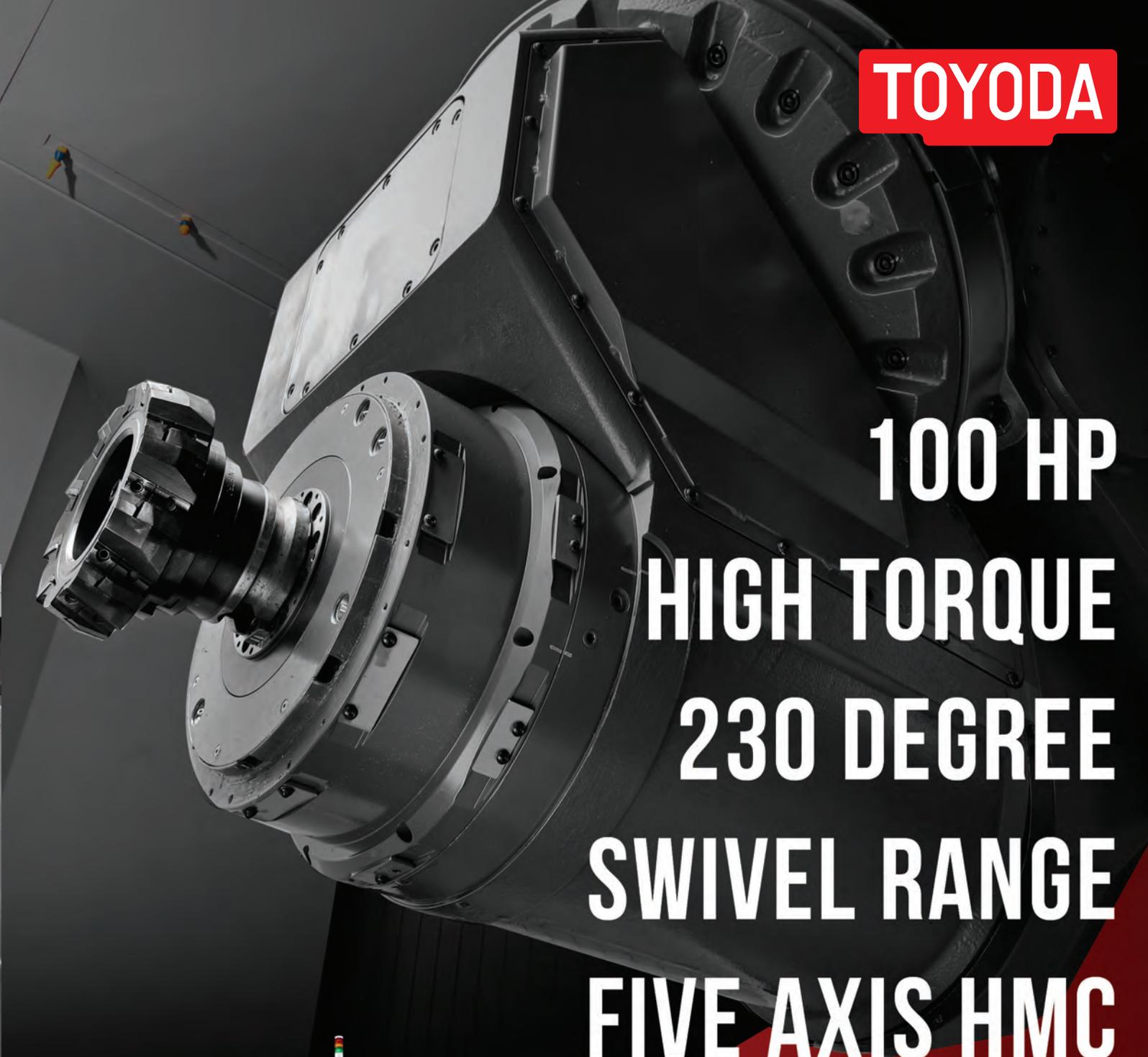
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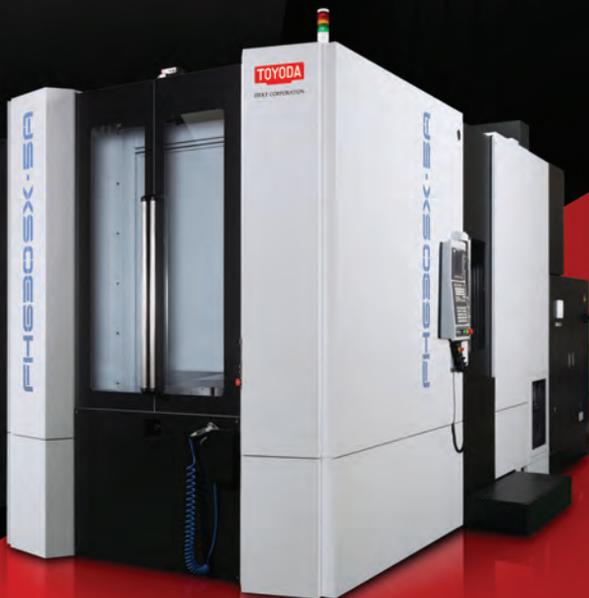
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# TDC GEARING UP FOR MANUFACTURING

Article by Sean Buur

Photos by Sean Buur and TDC

**TDC**  
RACING COMPONENTS



TDC's current setup yields 3 sprockets every time the button is pushed. In the near future Joe hopes to convert this VF2 into a prototype machine and buy a new, faster, and larger milling center more geared towards production runs.



Family is a big part of the manufacturing process at TDC. Joe took over the business from his father and works side by side with his fiancée Sydney. Even the kids get to help when they are not in school. You can never be too young or old to learn about lean manufacturing.

**T**DC was purchased in 2006 as a way for Empire Karts of Redlands, CA to add to their already impressive lineup of products for 100 mph racing karts. Originally TDC stood for Tom's Die Cutting and top dead center, but now it's TDC Manufacturing and there is no one named Tom and they do way more than die cutting. "My family used to own a large kart racing shop," explains TDC owner and operator Joe Barros. "TDC made die cut stickers, numbers and gaskets along with sprockets aimed at the karting market. So, we filled our shelves with TDC products and sold them nationwide to other kart shops and racers." The die cutting was done onsite, but they subbed out the manufacturing of the sprockets. Not long after TDC got rolling under the new ownership they were given the news that they had to find a new supplier for the sprockets. Bill Barros, always an entrepreneur and man of action thought that buying a couple CNCs to bring the manufacturing in-house was the best idea. Secretly those around him thought it was just an excuse for him to learn how to run a CNC mill and lathe.

TDC bought a basic Haas CNC VF2 mill and a Haas SL20 lathe. No one had any experience programming, but they were also able to buy from the old shop all the fixtures and programs, so they didn't have to start from scratch. Fortunately, Bill was familiar with smaller manual machines used in building kart racing engines, so he had an understanding of the core concepts of milling and turning. At the time Joe was called Joey and more interested in racing and pursuing his passion for photography

than being a part of any manufacturing. He was young, didn't really have a plan, but for some reason he started showing up after school to help his dad out. "I was going to college for photography," explains Joe. "I don't know why, but after class I'd go see what my dad was making at TDC. It grew on me in a way I never imagined. To take a block of metal and make it into something else was awesome. Instead of destroying these parts on track I was making them, and it was a very satisfying feeling. I obtained a student copy of Solid Works from a friend and really took to it. My dad wasn't great at it, but the artist in me gravitated to all the features and what I could create. I wanted to learn more, so I went to Valley College and checked out their machining program. I met the reps for Autodesk at a Haas open house and they told me about their free software for students. I started using their CAM software a lot and began designing aftermarket parts for Ruckus scooters like custom foot pegs." He completed the manual portion of the machining program at Valley and started the CNC classes. He was so far ahead that Joe helped the instructor teach other students how to use the controls and to set up jobs. Instead of having 20 students around one machine, they could split it up ten and ten for more personalized instruction.

Once Joe had the basics down the racer in him began to appear. Speed, he needed more speed. Speed in racing never comes cheap or easily, so he was prepared for the worst. What he found was that he was so far from optimized that even little changes netted him large gains. "Probably the last two years I've spent getting faster,



Joe just converted over to using Fusion360 so he can take advantage of their cloud resources. It allows him to seamlessly go between work stations and not worry. He likes that everything is built in and flows together. It is easy to switch between the CAD and CAM and updates sync across both.

getting better tooling, and putting systems in place,” describes Joe. “Something as simple as tooling is so critical to throughput, and I honestly didn’t have any idea. My dad wanted to run high-speed steel tooling because it was cheap, but with a nice carbide end mill I can run 3 times faster and it only costs twice as much. My cycle time on the sprockets has come down so much just by using better tooling.”

Lean manufacturing was a term Joe never heard of before, but it turned out he was utilizing some of the practices and didn’t even know it. When Joe took over TDC it was haphazardly arranged and one of the first things he did was reorganize. “The shop wasn’t set up for manufacturing,” continues Joe. “We had collets right in front of the machine high on a shelf. The holders were around the back and the drills were in another place. The kart shop dad bought in 1999 was his “retirement” and I’m

fairly certain that the machine shop he bought in 2006 was his second retirement. He had the mentality that the shop was really just an extension of his garage and as long as the TDC products got done then he was good. He thought I was crazy to buy a large toolbox just to keep all the stuff together and within easy reach. Everything is right there and you don’t have to go anywhere to do a setup. It seemed almost too simple but learning as we go has been fun.”

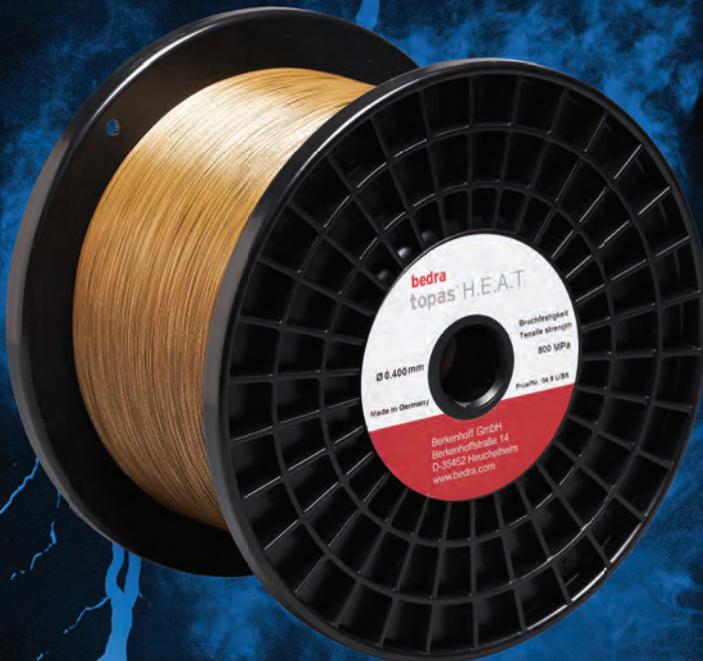
TDC’s highest quantity product line is their karting sprocket for 219 chains. Sizing starts at a 65 tooth and goes up as high as 89 in one tooth increments. Each one is a different program file, but they all use the same setup and tooling. Karting sprockets are a disposable, high wear item and racers go through a lot of them. “There’s a big variety of karting sprockets in the market,” details Joe. “Ours give the customer a lot more value for only a

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Two of TDC's best selling products came from the need to improve on what the karting OEM's were supplying to customers. The TDC billet radiator mount (left) is a vast improvement over the flattened tube style one that comes on the \$7000 kart. TDC's motor mount (right) has a sliding system within the mount. It reduces the bind on the chain and is perfectly aligned. You just slide the top portion with the motor attached to it along the base and tighten at the desired length. So no guesswork.

little bit more money. Our sprockets are CNC machined using domestically sourced USA aluminum. You can feel the difference right away compared to a cheap stamped \$5 sprocket from overseas. Because our sprockets are actually round and have the same pitch on each tooth you get much better wear on the sprocket as well as the chain. The life expectancy is dramatically improved. We get customers coming to us who bought brand new stamped products that don't even fit on the carrier because the die was worn out and no one even noticed. All our sprockets are within .005, which is overkill, but I know that every part that leaves here is a quality sprocket."

Joe's involvement in karting never stopped, and his driver development and chassis-tuning programs are the inspiration for many of TDC's new product lines. A billet radiator mount for the IAME and ROK karting engines came out of frustration with OEM radiator mounts breaking in the heat of battle. "The factory radiator mounts are junk," details Joe. "They are round tubing that have been flattened with holes drilled in it for adjustment. It has a couple of weak points that are exacerbated by the weight of the radiator and the vibration of the kart. People think of karts as kid's toys to drive in the lawn, but as you know they are 100 mph rocket ships that turn 3 g's and have no suspension. Harmonic vibration alone can kill a poorly designed radiator bracket in one on track session. Our mount is anodized billet aluminum with slots and supports to tackle the roughest track days. When you spend \$7000 on a racing kart and a \$50 item ends your race weekend it's a real bummer. Spending a little more on quality products designed to last makes a

big difference throughout the race season."

Growing outside sales and expanding their customer base is the top goal for TDC in 2019. Joe took over the business in January 2018 and since then TDC has become his pride and joy. "Business has been slowing increasing for us," concludes Joe. "Even though we have our own product lines we are focusing a lot of our growth efforts on being a job shop. Word of mouth is getting us more and more business thanks to happy customers. Our Instagram feed is also a fantastic source for new customers and information. An awesome little CNC machining video gets crazy play online and people reach out to us. I've met some really cool people doing amazing things thanks to Instagram and YouTube. I'm really grateful to all of those talented people sharing their knowledge with me. We keep getting better and better and I can't wait to see what the future holds for TDC."



TDC purchased a LIT fiber laser so they could work our magic on bare metal as well as anodized surfaces. All of TDC's products are anodized and laser marked, but they also offer private label and fully customizable engraving for their customers.

# 3-Jaw Chuck vs. Collet Chuck



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Parts that vary significantly in size. From .5" to 7.5" diameter clamping range	✓		✓
Ideal for clamping on raw cast or forged parts	✓	✓	✓
10-second clamping head [collet] changes		✓	✓
High RPM machining without significant loss of radial clamping force		✓	✓
Tight concentricity		✓	✓
Large surface area gripping close to the material diameter makes for secure gripping without marring the material		✓	✓
More rigidity for enhanced life and precision of cutting tools		✓	✓
Superior tool clearance allows for machining very close to the chuck face		✓	✓
O.D. to I.D. to 3-jaw clamping with modular adaptation in under 2 minutes			✓
Face driver, morse taper and magnet module adaptations			✓
Proprietary vulcanization [hardened rubber] of clamping heads [collets] endures extreme environments with minimal wear			✓
Modular adaptations utilized in vertical and horizontal machining centers			✓
Hexagonal alternative for increased clamping force and superior resistance to contamination			✓

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# 10 Effective Cost-Saving Tips for Manufacturers

*Provided by Steven Brand CMTA*

When it comes to cost-saving techniques, many manufacturers instinctively look toward making cuts; this could mean anything from laying off employees to pulling back on new technology. However, these methods can bring down morale and quash innovation, which allows competitors to get ahead.

Good news: there are other ways to save money that won't hurt business—and can actually help it thrive. We have compiled a list of ten ways to save that may help to cut costs without cutting personnel or creativity. These ideas often involve several small cost-cutting efforts that ultimately add up to a significant amount of savings, and they can be applied to manufacturers across all industries.

## Ten Ways Manufacturers Can Save Money

### **1. Perform a Complete Assessment**

A thorough and realistic assessment of all manufacturing facilities should be the first step taken when tackling any problem. Cost efficiency, cost reduction, and spend analytics need to be at the top of the list when it comes to supply chain management (SCM) and procurement. In fact, according to Deloitte's 2018 Global Chief Procurement Officer (CPO) Study, nearly 80% of CPOs cite cost reduction as a strong business priority. Of course, other areas of operation may also need to be put under a microscope. By taking the time to look at the entire picture and make objective assessments of each component, manufacturers can set themselves up for success in the short term and long run. Because internal evaluators may miss the forest for the trees, it can help to bring in a third-party consultant.

### **2. Prioritize ROI (and Consider ROX)**

Following an assessment, it's important to prioritize findings. Oftentimes, manufacturers go several years without a comprehensive audit which results in obsolete processes, procedures, and technologies. Therefore, it's important to take an objective approach to prioritization. Manufacturers may also want to consider ROX, or Return on Experience. Cutting costs should also benefit end-users, and provide them with a better experience. If money can be moved around in order to invest more in the areas that will ultimately improve interactions with customers—and provide measurable results—it's worth looking into.

### **3. Seek Improvement from Within**

It's impossible to know where the next big idea will come from, so it's important to reach out to employees on

the factory floor. They are in the trenches every day, and can be a great source of ideas for improving processes in order to generate value. It's also important to begin keeping a record of tribal knowledge. With nearly 25% of the United States population expected to be 60 years of age or older by 2025, manufacturers will be losing many employees to retirement, so it's imperative to capture their knowledge and experiences in order to pass it along to the next generation of workers.

### **4. Reconsider Old Ideas**

Don't throw the baby out with the bath water. A common phrase, and one that manufacturers are all too often guilty of. When a cost-saving method doesn't work out, they may abandon it completely, not realizing that there is the seed of a great idea in place. Original ideas are not necessarily bad ideas and, by going back and re-evaluating previously proposed cost-saving methods, it may spur new ideas or cause reconsideration.

### **5. Follow ISO 9001 Standards**

It's a small price to pay to gain an edge. Whether a facility has one employee or one million, the ISO 9001 outlines the requirements an organization must maintain in its quality system for certification. The standard enables manufacturers to meet their customers' requirements for their product or service while fulfilling any regulatory requirements. It also helps manufacturers to consistently provide quality products, improving customer satisfaction and system processes.

**6. Reduce Energy Consumption** Energy consumption is second only to labor when it comes to manufacturing expenses. To reduce energy costs following an assessment, manufacturers should begin making production decisions based on demand. In doing so, they can save on energy costs without sacrificing output or customer satisfaction. Being eagle-eyed when it comes to monitoring the production process and operating conditions in real time is also essential to managing how much energy is expended (and raising costs).

### **7. Work Smarter Through Automation**

By automating or consolidating repetitive manual processes, manufacturers can increase product quality, improve throughput, and potentially cut down costs. Robotics and automation have steadily advanced since they were first introduced to factory floors in the early 1960s. Today, with advances in sensing and machine learning, robots are more intelligent, versatile, flexible, and steadily falling in cost. With

collaborative robots (cobots), workers are able to safely interact with the machines that can now do repetitive, hazardous, and ergonomically challenging tasks. The result is improved worker safety and reduced lost-time costs.

### 8. Sell Scrap to Vendors

One man's trash is another man's treasure. This certainly applies to manufacturers, who may all-too often send off excess material to a landfill. But selling scrap to vendors is a useful—yet often overlooked—approach to cashing in on metal, batteries, and electronics. So, not only does selling scrap earn manufacturers money, it also helps ensure a brighter future for the next generation through recycling. Have unused material? Many manufacturers can also find a liquidator to take it off their hands and manage the sale of it, while also putting cash in their pocket.

### 9. Negotiate with Suppliers and Freight Carriers

Building long-lasting relationships with suppliers and freight companies is essential to a manufacturer's success, but that doesn't mean the first price presented should be accepted. Manufacturers need to take advantage of their position and try to renegotiate for better rates. Negotiations shouldn't be viewed as a negative; they can actually contribute significantly to the success of a business.

## 10. Embrace Lean Manufacturing

Lean Manufacturing removes or minimizes non-value work activity from the manufacturing process, from the front office to distribution. This results in a reduced manufacturing cost and increased speed to market, helping manufacturers realize their full potential. Lean manufacturing reduces waste—addressing motion, inventory, waiting time, transportation, information, quality, overproduction, processing, and creativity. Lean manufacturing should become part of the company culture, which does require teamwork and cooperation, but in the end, Lean's focus on "continuous improvement" makes a business—and its bottom line—much better.

By implementing even just a few of the cost-saving ideas outlined above, manufacturers can be on their way to becoming more profitable. Before beginning a cost savings journey, there is one thing to remember: although cutting costs and saving money feels good, it's important not to sacrifice the quality of your product or service. End-users need to always remain priority #1.



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# Makino V90S Offers High Quality Finishes with Continuous 5-Axis Machining



Makino offers the V90S, its next-gen vertical machining center (VMC) for true 5-axis continuous processing. This high-precision VMC evolved from the 3-axis Vi series and features an updated spindle and tilting/rotating axis unit that supports tighter tolerances and decreased machining and polishing times.

“The V90S combines quick machine movements and accuracies with the latest software for high-speed motion control,” said a company spokesperson.

“Designed for high-speed finishing of multifaceted 3-D contours, the V90S cuts cycle times and reduces handwork in complex specialty dies and molds.”

“Now more than ever, mold manufacturers are struggling to meet demands for the utmost quality and accuracy, while managing capacity constraints. This is why a new level of 5-axis machine performance is essential in today’s market,” said William Howard, vertical product line manager, Makino. “The V90S was designed to meet these accuracy requirements, provide the finest finishes, maintain tight tolerance and increase productivity to boost capacity. Its lightweight, 20,000 RPM spindle is ideal for high-speed finish machining of dies and molds.”

To maximize work zone volume and load capacity, the V90S can accommodate workpiece sizes up to 2,200 mm x 1,500 mm x 700 mm and weighing 5,000 kg, such as automobile door inner panels and front grilles. The X, Y and Z axes (2,000 mm x 1,300 mm x 800 mm) provide swift movements with rapid traverse rates of 58,000 mm/min and cutting feedrates of 40,000 mm/min. “The V90S’s A-axis tilts at +/-30°, wide enough to machine holes for an angular pin, while the C-axis rotates at +/-60°, ensuring that tool tip can be positioned to provide optimum contact

with the workpiece-extending tool life, providing outstanding surface finishes and minimizing post-machining hand processes,” said the spokesperson.

Equipped with a wide-open front door and open-ceiling design, the V90S provides improved ergonomics for operators to load and unload workpieces, and open ceilings for overhead crane access to the worktable. The work zone of the machine is designed to move chips into internal troughs; they are then evacuated with the lift-up chip conveyor. “As a result, the V90S extends tool life and has exceptional surface finishes, even in applications requiring fine tool blends and matches,” said the spokesperson.

With a rigid base construction using a slant column structure, the V90S minimizes spindle overhang and reduces deformation to provide a stable platform for high-precision processing, convenient access to the work area and improved tooling flex-

ibility. This stiffness, combined with tilting spindle capability, enables manufacturers to process curved surfaces using multiple sides of ball-end mills, leading to higher quality machined surfaces. Additionally, the machine’s slim spindle nose design (165 mm diameter) provides greater accessibility and closer proximity to critical workpiece features with a wider variety of tools. The standard V90S automatic tool changer (ATC) can store up to 40 tools, with a maximum tool length of 300 mm and diameter of 70 mm, improving production times and tool carrying capacity.

The V90S features Makino’s Professional 6 (Pro6) control. With streamlined screen layouts, operator assistance features and new machine functions, Pro6 offers a seamless interface for operators to maximize productivity.

Within the Pro6 control is Makino’s Super Geometric Intelligence (SGL.5) software-built specially for high-feedrate, tight-tolerance machining of complex 3-D contoured shapes involving continuous tiny blocks of NC data.

“SGL.5 enables the machine to feed at rates faster than standard CNC systems while maintaining high levels of accuracy using a combination of highly refined AC digital servos and proprietary software,” said the spokesperson.

“Its high-resolution, 3 million pulses per revolution (PPR) feedback system ensures that the servo system operates at optimum performance during execution of the tool-path..”

The V90S features Makino’s proprietary Collision Safe Guard technology—a function that runs real-time interference checks to avoid spindle crashes. By combining on-board machine geometry models with workpiece, fixture and tooling data input by the user, Collision Safe Guard is able to predict and stop the machine prior to collision.

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High End Technology Available for Citizen Machines

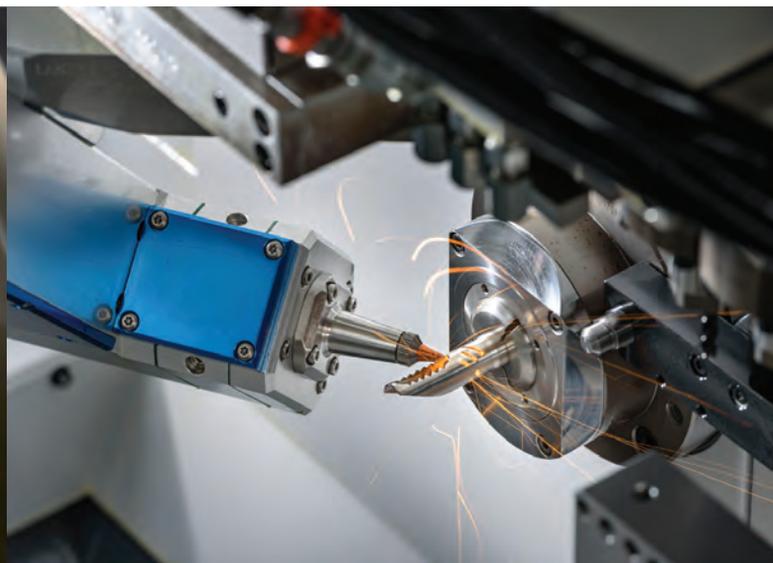


**LFV**  
technology

## Low Frequency Vibration (LFV) technology from Citizen

*Avoid the problem of spiraling chips, entanglement of chips and built-up edges*

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# NEW FLOOR PLAN FOR IMTS 2020 REFLECTS MANUFACTURING INDUSTRY RENEWAL

*Emerging technologies represent nearly 40 percent of exhibitors*



**Quality Assurance Pavilion: The Quality Assurance Pavilion will expand by 11 percent at IMTS 2020, reflecting the growing role metrology equipment plays in closed-loop systems.**

exhibitors to feature larger and heavier systems, use double-deck booth designs and hang larger signs from the ceiling. The pavilion will occupy approximately 44,765 sq. ft. of floor space at IMTS 2020, which is 40 percent larger than at IMTS 2018.

Complementing this expansion, the West 375 Ballroom directly across the concourse from the pavilion will host the Additive Manufacturing Conference on Sept. 15 and 16. Presented by IMTS partner Gardner Business Media, this technical conference runs concurrently with IMTS during show years. It attracted more than 575 registrants at IMTS 2018, the most in conference history.

The International Manufacturing Technology Show has unveiled a new floor plan for IMTS 2020 that dramatically increases the size of the Quality Assurance and Additive Manufacturing Pavilions by more than 10 and 40 percent, respectively. The plan also consolidates the EDM Pavilion into the Metal Cutting Pavilion, which has been renamed the Metal Removal Pavilion. IMTS 2020 runs from Sept. 14-19, will occupy all four buildings of Chicago's McCormick Place and is poised to offer more than 1.42 million sq. ft. of exhibit space.

"The floor plan for IMTS 2020 reflects a renewal of the manufacturing industry, with growth powered by digitization, additive manufacturing, automation and software," says Peter R. Eelman, Vice President & CXO at AMT – The Association For Manufacturing Technology, which owns and produces IMTS. "Emerging technologies represented 38 percent of the exhibits at IMTS 2018, an incredible number considering less than 15% of IMTS exhibits just eight years ago were new technology based. That percentage doesn't include new product introductions by exhibitors in the Metal Removal Pavilion, where connected and digitally-enhanced solutions emerged as the new norm."

## Additive Pavilion 40 Percent Larger

The Additive Manufacturing Pavilion will continue to occupy the space at the entrance to the West Building, as well as expand into the exhibition area on the west side of the hall, which has higher ceilings. This move allows

## East Building Activity

The number of exhibitor booths in the Quality Assurance Pavilion, located in the East Building, grew from 90 to 144 in eight years. We anticipate an 11 percent expansion for a total of 128,975 sq. ft. at IMTS 2020

"The capabilities of quality assurance systems and software continues to expand as manufacturers seek to reduce waste and bring products to market faster," says Eelman. "Rather than a discrete activity that ends a process, metrology equipment has become an essential component of closed-loop systems."

AMT's Emerging Technology Center demonstrated the benefits of physically and digitally connected systems with a robot arm that autonomously transferred a milled part from a CNC milling machine to a CMM. Using data from the CMM, the CNC compensated for tool wear by recalculating its offsets to maintain tolerances closer to the median of the specification.

HANNOVER FAIRS USA, produced alongside IMTS since 2012, will remain in the East Building. The number of companies exhibiting as part of HANNOVER FAIRS USA has grown from less than 100 to more than 500.



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Strap yourself in — we're just getting started.

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ALU-POWER HPC

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**NEW!** | 4-flute (true double core) and 5-flute options for roughing and finishing in titanium. With many options for reach and corner radius, productivity in titanium and stainless steels is maximized.

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### MINICUT WAVECUT



The **PATENTED** geometry of these high-performance super cobalt end mills provides superior metal removal rates in titanium, aluminum and stainless steel alloys.

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**NEWLY ENGINEERED!** The unique flute design provides excellent surface finish, long tool life and minimal delamination, while requiring less force in both roughing and finishing.

Aerospace solutions from YG-1 cut your production time and slice through the most demanding materials, like 17-4PH, 15-5PH, 300/400 stainless steels, heat-resistant alloys and titanium. And new high-production mills, like the ALU-POWER HPC, take on the most daunting challenges in aluminum, all at maximum metal removal rates.

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## 6" MACHINE VISE



- 6" vise, full 9" opening
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- Recessed pocket for easier lifting
- Thru-body chip evacuation
- Same bed height as D688
- 4 bolt stationary design fastens from the top



### KURT DX6

6" Vise w/9" Opening

Mfg's List: \$617.00

**\$569.00** each

Part # KURT-DX6



Quick-Change

## SERRATED VISE JAWS FOR 6" VISES



- Hardened and ground
- For maximum gripping power
- Ideal for holding castings
- Serrations provide downward biting motion
- Caution-may leave bite marks on workpiece

	W x H	Part Number	Set Price
Socket Head Cap Screws (Pkg of 4)	3/4" x 1-1/2"	SN-6SER-150	\$232.75
	1" x 2"	SN-6SER-200	\$232.75
	1" x 2-1/2"	SN-6SER-250	\$242.25
	1" x 3"	SN-6SER-300	\$270.75

MADE IN USA  
Part # SN-6LHS-13  
**\$9.69**



## TOUCH OFF GAGE



- Accurately establishes tool length offsets for CNC milling machines
- The contact face is lightly spring loaded to protect against overrun
- Contact face diameter is 0.250"
- Rectangular base and recessed indicator fits between vise jaws on a pair of parallels
- Offset height 4.000 in (101.6mm)
- Large 2.2" easy to read indicator face
- Easy calibration check using 1-2-3 blocks
- Gage graduations 0.001"-repeatability 0.0002"
- Body and contact face are red anodized 6061-T6 aluminum
- Base: 2.4" W x 1.3" D x 4" H
- Padded case and manual included



### NEW ITEM! TOUCH OFF GAGE

Part # EDGE-52000  
Mfg's List: \$124.99

**\$99.99 ea**

Set Tools Accurately!  
Dramatically Decrease Set Up Time!  
Eliminate Tool Path Mismatch!  
Standardize Tool Offsets In Your Shop!

## ALUMINUM 10 PACK VISE JAWS



- Fits KURT & standard machine vises
- Machinable aluminum- customize jaws for your application
- Buy the 10 pack and save BIG!
- Made in USA

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Prices Starting At Only \$13.27 per pair  
**SAVE UP TO 15%!**

Length	Height	Width	Part Number	Reg. Price	PROMO!
6"	2"	3/4"	VJ-601-10	155.20	132.70
6"	2"	1"	VJ-602-10	172.30	147.32
6"	2"	1-1/4"	VJ-603-10	203.80	174.25



## PRO VISE STOPS

- Low profile design stays below the top surface of vise jaws
- Quickly and accurately positioned 1/4" hardened stop rod
- Stop rod stays parallel to milling machine table
- Lever arm can be rotated out of the way for cutter clearance
- Two sets of mounting holes for added versatility
- Mounting hardware included
- Locate long stock with the included stop rod collar
- Large 1/2"-13" bolt used to rigidly attach lever arm
- Utilizes non-marring 1/4"-20 set screws
- Body made from red anodized 6061-T6 aluminum



**NEW ITEM!**



Single Side  
Part # EDGE-03000  
Mfg's List: \$59.99

**\$49.99**

Double Side  
Part # EDGE-18000  
Mfg's List: \$89.99

**\$74.99**

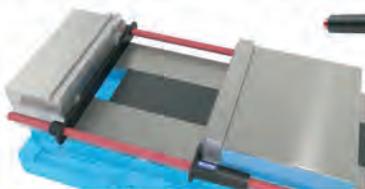


## PARALLEL SEPARATOR

The Parallel Separator is designed to firmly hold the parallel bars against the vise jaws during machining operations. Strong compressionsprings are used to expand the unit. Sized to fit a 6" machine vise, features durable, metal construction and can be disassembled for cleaning.



**NEW ITEM!**



### PARALLEL SEPARATOR

Part # EDGE-49000  
Mfg's List: \$59.99

**\$49.99 ea**



## 1/8" PARALLEL SET

- Made from high quality tool steel
- Stress relieved against distortion
- Precision ground and hardened
- 1/8" thick with 2 holes
- 10 pairs, 6" Length
- Heights: 1/2", 5/8", 3/4", 7/8", 1", 1-1/8", 1-1/4", 1-3/8", 1-1/2" and 1-5/8"
- Complete w/ fitted case



### 1/8" Parallel Set

Part # A-3900-3010

**\$54.00**

### 1/4" Parallel Set

9 Pair (#A-3900-3009) **\$90.00**



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**KINGSTON:** Balanced to 15,000 RPM @ g6.3  
**SPIN TRU:** Balanced to 20,000 RPM @ g2.5

- Balanced on a **HAIMER** machine
- Includes certificate of balancing
- **Runout 0.0002" TIR or better**
- Manufactured to ISO 9002 quality control standards
- Traverse ground taper to AT3 specs
- H5 bore tolerance
- Collet chucks, Shell mill, Jacobs/Morse Taper holders available



**BUY 10 OR MORE-GET 10% OFF!**



Dia	Proj	BALANCED TO 15,000 RPM		BALANCED TO 20,000 RPM	
		KINGSTON Part Number	Price Each	SPIN TRU Part Number	Price Each
1/8"	1.75"	C40-01EM175-K	\$ 49.95	C40-01EM175-KB	\$ 69.99
3/16"	1.38"	C40-18EM138-K	\$ 49.95	C40-18EM138-KB	\$ 69.99
1/4"	1.38"	C40-25EM138-K	\$ 49.95	C40-25EM138-KB	\$ 69.99
	1.75"	C40-25EM175-K	\$ 53.85	C40-25EM175-KB	\$ 69.99
5/16"	1.38"	C40-31EM138-K	\$ 53.85	C40-31EM138-KB	\$ 69.99
3/8"	1.38"	C40-37EM138-K	\$ 49.95	C40-37EM138-KB	\$ 69.99
	2.50"	C40-37EM250-K	\$ 53.85	C40-37EM250-KB	\$ 69.99
1/2"	1.75"	C40-50EM175-K	\$ 53.85	C40-50EM175-KB	\$ 69.99
	4.00"	C40-50EM400-K	\$ 53.85	C40-50EM400-KB	\$ 69.46
5/8"	1.75"	C40-62EM175-K	\$ 53.85	C40-62EM175-KB	\$ 69.99
	3.00"	C40-62EM300-K	\$ 53.85	C40-62EM400-KB	\$ 73.02
3/4"	1.75"	C40-75EM175-K	\$ 53.85	C40-75EM175-KB	\$ 69.99
	3.00"	C40-75EM300-K	\$ 53.85	C40-75EM300-KB	\$ 69.99
1"	1.75"	C40-10EM175-K	\$ 53.85	C40-10EM175-KB	\$ 69.99
	6.00"	C40-10EM600-K	\$ 60.45	C40-10EM600-KB	\$ 74.47
1-1/4"	2.00"	C40-12EM200-K	\$ 53.85	C40-12EM200-KB	\$ 69.99

## CAT-40 BALANCED COLLET CHUCKS

**KINGSTON:** Balanced to 15,000 RPM @ g6.3  
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- Balanced on a **HAIMER** machine
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- Manufactured to ISO 9002 quality control standards
- Traverse ground taper to AT3 specs
- H5 bore tolerance
- Collet chucks, Shell mill, Jacobs/Morse Taper holders available



**BUY 10 OR MORE-GET 10% OFF!**

Collet Series	Proj	BALANCED TO 15,000 RPM		BALANCED TO 20,000 RPM	
		KINGSTON Part Number	Price Each	SPIN TRU Part Number	Price Each
ER 16	2.50"	C40-16ER250-K	\$ 79.95	C40-16ER250-KB	\$ 93.08
	3.12"	C40-16ER312-K	\$ 82.45	C40-16ER312-KB	\$ 93.08
ER 20	2.50"	C40-20ER250-K	\$ 82.44	C40-20ER250-KB	\$ 93.08
ER 25	4.00"	C40-25ER400-K	\$ 82.44	C40-25ER400-KB	\$ 92.49
ER 32	2.50"	C40-32ER250-K	\$ 82.44	C40-32ER250-KB	\$ 93.08
ER 32	4.00"	C40-32ER400-K	\$ 82.45	C40-32ER400-KB	\$ 92.49
ER 40	2.50"	C40-40ER250-K	\$ 87.94	C40-40ER250-KB	\$ 98.07

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- Change retention knobs, collets, drills and end mills quickly
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Taper	Part Number	Mfg's List	Our Price
CAT/BT 40	TF-4001-K	\$ 89.00	\$ 74.99
CAT/BT 50	TF-5001-K	\$ 110.00	\$ 93.50

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 • **TRUE INCH** and metric sizes  
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 • TG, DA & AF collets also available  
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**PRICES REDUCED OVER 45%!**

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 Prices Starting At:  
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 Prices Starting At:  
**\$ 9.75** each  
 OLD Price: \$18.00

**ER 32**  
 Prices Starting At:  
**\$ 10.25** each  
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ULTRA PRECISION (0.0002" TIR) COLLETS ALSO AVAILABLE!

## RETENTION KNOBS

Your VALUABLE Machine Deserves A Premium Knob!



**QUANTITY DISCOUNTS**  
**10% OFF!**  
 10 or more knobs

- Individually Magnetic Particle Tested
- Made in the USA!
- **LARGE VARIETY** Available!
- Made of 8620, Heat Treated to Rc 56/58
- Exceeds Industry Standards For Tolerance (ANSI, DIN, JMTBA)

Machine	Thread	Head Dia	Angle	Coolant	Part Number	Price EA
Fadal BT40	M16-2.0	.740	90°	No	B40-4501S	\$ 17.72
HAAS BT40	M16-2.0	.590	45°	Yes	B40-4500H	\$ 22.80
HAAS CAT40	5/8-11	.589	45°	No	C40-4501S	\$ 17.72
Fadal CAT40	5/8-11	.740	45°	No	C40-4500S	\$ 15.20
Okuma CAT40	5/8-11	.589	60°	No	C40-6000S	\$ 17.72
Mazak CAT40	5/8-11	.740	45°	Yes	C40-4500H	\$ 15.75
Mori Seiki CAT50	1-8	.905	90°	No	C50-9000S	\$ 21.85

## SUPER PRECISION KEYLESS DRILL CHUCKS



**SAVE 25% OFF**  
 Mfg's List Prices

- T.I.R. not to exceed 0.0016"
- High precision, keyless operation
- Self-tightening mechanism automatically increases clamping forces in proportion to the increase in torque during the drilling operation
- All exposed components are hardened
- Finely crafted in Spain

Compare To Jacobs!

Industry Ref#	Cap.	Mount	Part Number	Mfg. List	SALE!
JKP100-J2	0-3/8"	J2	LAM-L9681B	\$245.00	\$183.75
JKP100-J33	0-3/8"	J33	LAM-L9680B	\$245.00	\$183.75
JKP130-J2	1/32-1/2"	J2	LAM-L9683B	\$255.00	\$191.25
JKP130-J33	1/32-1/2"	J33	LAM-L9682B	\$255.00	\$191.25
JKP130-J6	1/32-1/2"	J6	LAM-L9684B	\$255.00	\$191.25
JKP160-J6	1/8-5/8"	J6	LAM-L9685B	\$301.94	\$226.46

## PLASTIC TOOLHOLDER TRAYS

- Sturdy trays protect your valuable toolholders
- An inexpensive way to organize your tooling
- Available in CAT/BT 30, 40 & 50 taper versions
- 30/40 taper-10 holes, CAT 50-6 holes



Taper	# of Holes	Part Number	Price
CAT/BT 30	10	TRAY30-10	\$ 32.00
CAT/BT 40	10	TRAY40-10	\$ 29.50
CAT 50 (not BT)	6	TRAY50-6	\$ 36.00



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# CAD/CAM/CNC Perspective

By: Tim Paul

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## Where is the future of American manufacturing?

Yesterday I had the privilege of talking to Gary Potter's students from Golden West High School in Visalia California. Mr. Potter reached out to me through Instagram asking if I could talk to his students about careers in the manufacturing industry as well as share my experience working in the industry. Naturally I brushed up on some career trends while preparing to talk to Mr. Potter's class, and I found some statistics that were quite alarming.

Here are some highlights that tell an important story.

-70% of Americans think American manufacturing is important.

-Only 30% of parents encourage their children to pursue a career in manufacturing.

-Only 17% of Americans view manufacturing as a top career choice.

Despite the fact that the average Mfg. salary is 22% higher than other industries in America, the above statistics don't trend towards a growing American manufacturing work force. Over the next decade, a predicted 4.6 million American manufacturing jobs will be needed, and 2.4 million will likely go unfilled due to the skills gap America faces.

America's student loan debt passed credit card debt or auto loan debt at \$1.5 Trillion in 2018. More than a million student loan borrowers default on their loans each year. By 2023, nearly 40% of student loan borrowers are expected to go into default. These statistics alone beg the question: why is it still a widely accepted belief that we should be striving to prepare all students for college? If you dig down a little deeper, you'll find that 1 in 3 people who owe less than \$5000 for their education will default within four years, compared to just 15% of borrowers that owe more than \$35,000. Many people who drop out of college have less debt, but it's a larger burden since they don't have the benefit of a college degree.

You don't have to look very hard to find workshops at high schools that teach everything needed to apply for college and student loans. Our system teaches students – and their parents – that college is an investment worth going into debt for. Why does our system not teach our kids and parents how to calculate a likely return on investment (ROI) for that debt? Is it because too often an honest ROI assessment would steer a student on another path? The old saying, "compensation drives behavior" applies to school administrations and counselors just as much as it does to sales people. Are schools judged based on the percentage of their students that go to college?

Now, I'm not saying that we shouldn't push students to prepare for and pursue a college education. But I do think we should have an honest conversation with students that are not prepared

for college and help them prepare a sensible plan for their future that has the highest likely ROI. Just as importantly, we should teach students that are prepared for college how to assess the cost to return potential of the education path they want to pursue.

When I was in high school, I struggled terribly in most of my classes. If it weren't for my A's in PE, shop class, and drafting, I never would have



Shop modernization construction at GW High

made the C- average I needed to play sports. There have been few times in my life when I felt like my future was less bright than the last couple years of my high school career. Two things become clear when I reflect back on why I felt so pessimistic about my future and why I struggled so much at school. First, I struggle with nothing in life more than trying to focus and learn something I have no interest in. I doubt I am the only person that finds myself in this situation, and I found myself in it often through high school. I've always been good at and passionate about making things. Luckily for me, I stumbled on the



manufacturing industry through my early days working on bikes. Second, I have no memory of being exposed to a promising career path that didn't require going to college first. There was no shortage of adults telling me I needed to do better in school if I expected to get through college, and it was implied that college was required to secure a successful career. Even with 3 years of drafting and metal shop classes, I was never exposed to what a career in manufacturing could be. I couldn't be happier with my career, but it didn't even seem like a viable option in high school.

There are far too many kids in America that don't know what career they want to pursue, and there are far too many career opportunities in Manufacturing for our industry to pass up on the opportunity to our youth.

After sharing my story, perspective on the Manufacturing industry, and a few nuggets of unsolicited advice I was able to spend some time talking with Mr. Potter where I learned more about his story and the program he is building. Mr. Potter's rich background drives his passion behind building and growing his program while exposing his kids to different opportunities available to them, whether that opportunity is further education after high school or going straight into a trade. I applaud the effort that Mr. Potter puts into his program. I've seen a handful of successful high school manufacturing programs across our country and I have no doubt that Mr. Potter's class will serve his students well for as many years as he



has the energy to continue. This is "hero" effort that only comes from a select few. It is far from the scalable, systematic, effort needed from our school systems to fill the 2.4m skills gap that we are facing.

We can't all be Mr. Potter, but here is what I think can make a difference.

Start young. I think our public schools should expose more kids to making things at a young age, continuing through high school where the projects can connect to industry. In high school, students should be exposed to a variety of industries and encouraged to explore many different career paths with an honest understanding of where their strengths are and how those strengths can connect to a successful career path. As an industry, we need to be more involved in exposing our youth to the bright futures possible in manufacturing.

Educate our educators. Educators need two things from the manufacturing industry. 1: More resources to teach their students about the opportunities that are available in the manufacturing industry, including what paths will have a high success rate.

Teachers want to see their students succeed, and we need to give them the resources to help them achieve that goal. 2:

Our teachers need continued education from experts in the industry. Companies like Haas are the most active in this space, but what

is available is still unattainable to all but the most committed teachers as many have to pay much of the cost themselves. Small businesses have a huge opportunity to connect with their local schools to build out these programs, benefiting the schools and giving those businesses a larger hiring pool.



Systematic recalibration, starting with how success is measured. If school administration's success is measured by their students' success by college admission, then they are going to spend time and effort preparing students for college. If this metric of success changes to students' success in an overall career, I am confident that schools would more appropriately prepare and guide their students to an appropriate path for each individual. This sounds like a beast of a problem, considering college is a half-trillion-dollar business. But I have hope that the more success CTE (Career Technical Education) and similar programs achieve by appropriately placing youth on the path to a successful career – with or without college – the more momentum they will get.

# Easy Volumetric Compensation- Fagor Automation



Fagor Automation's Volumetric Compensation feature is designed to ensure accuracy by correcting typical geometric errors, making sure that more products end up in the hands of the customer and not the scrap pile.

"Previously, Volumetric Compensation, in most cases, was only applied on large high-performance machine tools due to the high cost of the equipment necessary to gather the data points, as well as the lengthy time it takes to complete the procedure," said a company spokesperson. "Despite the costs, there is still quite a lot of demand for less expensive machines to obtain the type of accuracy and repeatability that only Volumetric Compensation can give. Therefore, as requested by our customers, Fagor Automation has developed a new feature we call 'Easy Volumetric.'"

## ***Volumetric Compensation-What It Is***

"Applications requiring acute accuracy-not just on individual applications, but also in uniformed applications that tie together, as frequently seen in the aerospace

market-have become commonplace," said the spokesperson. "For over 30 years, traditionally offered linear compensation tables have been the final solution for providing machine tool accuracy.

However, to comply with global accuracy standards, as frequently required within the aerospace industry, these conventional compensation tools are insufficient considering they do not take into account the machine's kinematics and other factors related to the mechanical and electrical relationship between the multiple combinations of axes of motion."

Primary causes of the lack of machine tool accuracy and precision derive from geometric machine errors that can arise during manufacturing and assembly and also in production machine wear and abuse, which can cause premature deformations of the machine.

The Volumetric Compensation feature corrects these geometric errors, thus improving machine tool repeatability and accuracy. The volume to be compensated is defined by a cloud of points, in each of which the error to be corrected is measured. This error is recorded in a file that is then uploaded to the CNC. Therefore, the conventional compensation tools must be complemented with more advanced tools that adapt to the different designs of the machine and their specific kinematic.

"Volumetric Compensation can be an expensive feature that requires expensive hardware-as well as valuable time-to gather all compensation data points and then apply to the CNC," said the spokesperson. "This expense is well accepted for large high-performance machine tools but is much more difficult to justify for small to mid-size machine tools. Hence, in conjunction with our customer's request, this is why Fagor has developed Easy Volumetric that simplifies the process, thus making it not just an acceptable process, but desirable for all machines."

"Easy Volumetric Compensation limits the points to just 25 per axis, thus is much faster to calibrate the points and integrate to the CNC," said the spokesperson. "It improves accuracy dramatically, yet is fast and easy to integrate. We at Fagor feel this is a groundbreaking development for small machines."

Both the Fagor 8065 and 8070 CNC platforms allow for both complex medium/large machine Volumetric Compensation or the Easy Volumetric compensation. Traditional ball screw and backlash compensation can still be utilized but is not necessary since Volumetric compensates for these errors as well. However, operators can still utilize these tables and the CNC will automatically integrate them into the compensation matrix.



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# PRECISION MACHINING

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# New Series of the hP Hydraulic Press Brakes- Prima Power



Prima Power has signed an agreement with Gasparini for the distribution of products in the Gasparini range with Prima Power brand and colors. Thanks to this collaboration Prima Power expands the range of its press brakes, combining the models of the servo-electric eP series, produced in the Prima Power plant of Cologna Veneta (VR), with the new family of the hP hydraulic press brakes, ten medium-large format models covering a range from 270 to 650 tons. At the base of the agreement there is a real industrial project, valid at a global level, which entails that hP press brakes are not only marketed but also assisted by the Prima Power network.

The two technologies, electric and hydraulic, have complementary advantages and applications. Fast, accurate, clean and energy-efficient, the servo-electric eP press brakes are ideal for processing sheet metal with medium-low thicknesses. Powerful and flexible, the hP series products cover the highest tonnage range of applications. Having both technologies, Prima Power always offers the perfect solution for every bending needs.

Hydraulic press brakes are ideal for the agricultural and earthmoving sector, characterized by high-thickness components, and thus become complementary to high-power and large-format laser machines dedicated to this sector, considered strategic by Prima Power. The hydraulic press brakes, the 10 kW fiber laser for 2D machines and the new Laser Sharp 2060 are designed for customers who need particularly flexible products in terms of materials, thick-

nesses, and sheet sizes to be processed.

The Adaptive Crowning and the Reflex system make it possible to compensate any deflection of the frame, which are inevitable during the bending process, thanks to sensors and control systems that guarantee the repeatability of the angle, whatever the material and thickness.

The DSP laser safety system protects the operator from the danger of being crushed between the upper and lower tool. It represents the evolution of the safety of the press brakes and allows a reduction in the bending cycle time.

The hP can be connected in tandem, or integrated into automated lines or robotic cells. Furthermore, the performances of hP press brakes can be further increased thanks to the possibility of configuring the machine according to the customer's production requirements. The front supports, the bending follower for large sized or very heavy sheet metal, the wireless digital gauge for the automatic correction of the bending parameters, the flattening table for increased productivity and easy operations, the Laser Check, which measures the bend angle and corrects it automatically using a laser beam and a video camera, are some of the main options available.

To further increase energy efficiency and environmental compatibility, the hP series can be equipped with the innovative ECO system: the motor is controlled by an inverter that manages speed and power.

AutoPol bending software is the solution for the most demanding programming tasks. It is an easy to use and effective tool for off-line programming of Prima Power hP series machines. The sophisticated bending simulation allows to study the feasibility of the pieces to be executed, check the bending sequence and directly produce the machine program.

Like all Prima Power products, the hP press brakes are also Industry 4.0 and have a series of software solutions such as Data Logger and Tulus Reporting View, for the control and reporting of production and system performance, or as Production Manager, for communication with the customer's ERP and the creation of work queues.

# Total Double Columns Solutions

## Accuracy YCM



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- Glass scales & rigid roller guideways on all 3 axes.
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and so much more ...

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**CTS** Ready   **STC** Ready   **31i** FANUC   **M** MECHANITE   **FEM** Finite Element Analysis

## Flexibility YCM



### NDC CECIFIC Outstanding Rigidity & Performance Multi-Faces Double Column VMC

- High rigidity one piece column & octagonal milling head.
- High damping boxway on Z-axis.
- Glass scales & rigid roller guideways on all 3 axes.
- High clamping force with 4 independent pull studs.
- German made 90° head with anti-drop safety.

and so much more ...

**35** HP   **6,000** RPM   **498 ft.lbs.** Torque   **26,455 lbs.** Max. Table Load   **Max. 60T** 32T ATC Std.

**Automatic** Head Changer   **BBT-50** Spindle Taper   **CTS** H&V Ready   **M** MECHANITE   **FEM** Finite Element Analysis



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WCMT 1.211	\$12.04 ea
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WCMX 21.52	\$7.75 ea
WCMX 2.522	\$7.75 ea

Dia	Shank	LOC	Part Number	Price EA	Uses Insert
0.500	0.625	1.340	UD-0500-2D-063	\$138.32	WCMT 1.211
0.625	0.625	2.815	UD-0625-4D-063	\$198.68	WCMX 1.81.52
0.750	0.750	1.748	UD-0750-2D-075	\$153.40	WCMX 21.52
0.750	0.750	3.698	UD-0750-4D-075	\$220.05	WCMX 21.52
1.000	1.000	2.345	UD-1000-2D-100	\$168.49	WCMX 2.522
1.000	1.000	4.635	UD-1000-4D-100	\$242.68	WCMX 2.522
1.125	1.000	4.760	UD-1125-4D-100	\$242.68	WCMX 2.522

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Am Std#	Dia	Width	OAL	Part Number	Price
202	1/4"	1/16"	2-1/16	KEO-62010	\$26.30
303	3/8"	3/32"	2-3/32	KEO-63030	\$26.30
204	1/2"	1/16"	2-1/16	KEO-62040	\$26.30
304	1/2"	3/32"	2-3/32	KEO-63040	\$26.30
405	5/8"	1/8"	2-1/8	KEO-64050	\$26.56
806	3/4"	1/4"	2-1/4	KEO-68060	\$27.83
608	1"	3/16"	2-3/16	KEO-66080	\$33.24



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Insert No.	Rad.	Grade	Chip-Breaker	Application/ Material	Part Number	BOX QTY EACH
CNMG431	.015	T9125	TM	Steels	TO-3514	\$8.51
CNMG432	.031	AH120	TM	Super Alloys	TO-1364	\$8.51
DNMG431	.015	AH120	TM	Super Alloys	TO-1709	\$11.15
DNMG432	.031	T6130	SM	Stainless	TO-6805431	\$11.68
TNMG431	.015	AH120	TM	Super Alloys	TO-2833	\$9.24
TNMG432	.031	AH120	TM	Super Alloys	TO-2868	\$9.24
WNMG431	.015	T6030	SM	Stainless	TO-6827354	\$8.51
WNMG432	.031	AH120	TM	Super Alloys	TO-3338	\$8.51

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- TiAIN Coated-for general purpose use on all materials
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Dia	LOC	Shank Dia	OAL	4 Flute TiAIN Coated	Price Each
1/8"	1/2	1/8	1-1/2	MO-EM001067-4	\$ 7.91
3/16	5/8	3/16	2	MO-EM001107-4	\$ 10.68
1/4	3/4	1/4	2-1/2	MO-EM001137-4	\$ 15.35
5/16	13/16	5/16	2-1/2	MO-EM001153-4	\$ 21.84
3/8	1	3/8	2-1/2	MO-EM001177-4	\$ 25.39
1/2	1	1/2	3	MO-EM001207-4	\$ 40.75
5/8	1-1/4	5/8	3-1/2	MO-EM001226-4	\$ 74.00
3/4	1-1/2	3/4	4	MO-EM001244-4	\$ 109.50

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Shank	Arbor Hole	Part Number	Price Ea
.500	.250	SIE-SA-250	\$ 41.52
1/2"	.375	SIE-SA-375	\$ 43.51
	.500	SIE-SA-500	\$ 46.29
.750	.625	SIE-SA-625	\$ 50.50
3/4"	1.000	SIE-SA-1000	\$ 58.70
	1.250	SIE-SA-1250	\$ 59.28

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Dia	LOC	Shank	OAL	Part Number	Price EA
1/8	3/8	1/8	1-1/2	YG-EMUGMF8901	\$ 13.51
1/4	3/4	1/4	2-1/2	YG-EMUGMF8905	\$ 23.07
3/8	7/8	3/8	2-1/2	YG-EMUGMF8907	\$ 38.02
1/2	1	1/2	3	YG-EMUGMF8909	\$ 58.42
5/8	1-1/4	5/8	3-1/2	YG-EMUGMF8911	\$ 117.96
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1	1-1/2	1	4	YG-EMUGMF8913	\$ 272.90

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Description	I.C	Thick.	Radius	Part Number	Price Ea
<b>CCGT Inserts</b>					
CCGT 21.50.5 AK H01	1/4	3/32	0.008	KOY-1024	\$7.87
CCGT 21.51 AK H01	1/4	3/32	0.016	KOY-1026	\$7.87
CCGT 32.50.5 AK H01	3/8	5/32	0.008	KOY-1028	\$9.22
CCGT 32.51 AK H01	3/8	5/32	0.016	KOY-1030	\$9.22
CCGT 32.52 AK H01	3/8	5/32	0.031	KOY-1032	\$9.22
<b>DCGT Inserts</b>					
DCGT 21.50.5 AK H01	1/4	3/32	0.008	KOY-1199	\$7.87
DCGT 21.51 AK H01	1/4	3/32	0.016	KOY-1201	\$7.87
DCGT 32.50.5 AK H01	3/8	5/32	0.008	KOY-1203	\$9.22
DCGT 32.51 AK H01	3/8	5/32	0.016	KOY-1205	\$9.22
DCGT 32.52 AK H01	3/8	5/32	0.031	KOY-1207	\$9.22

Description	I.C	Thick.	Radius	Part Number	Price Ea
<b>TCGT Inserts</b>					
TCGT 21.51 AK H01	1/4	3/32	0.016	KOY-1458	\$8.02
TCGT 21.52 AK H01	1/4	3/32	0.031	KOY-1460	\$8.02
TCGT 32.50.5 AK H01	3/8	5/32	0.008	KOY-1462	\$10.14
TCGT 32.51 AK H01	3/8	5/32	0.016	KOY-1464	\$10.14
TCGT 32.52 AK H01	3/8	5/32	0.031	KOY-1466	\$10.14
<b>VCGT Inserts</b>					
VCGT 220.5 AK H01	1/4	1/8	0.008	KOY-1632	\$9.67
VCGT 221 AK H01	1/4	1/8	0.016	KOY-1634	\$9.67
VCGT 222 AK H01	1/4	1/8	0.031	KOY-1636	\$9.67
VCGT 330.5 AK H01	3/8	3/16	0.008	KOY-1638	\$11.04
VCGT 331 AK H01	3/8	3/16	0.016	KOY-1640	\$11.04



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7447B	Gen. Purpose (Bulk)	Maroon	60	3M-04229-9	\$ 73.18
6444	Extra Duty Hand Pad	Brown	20	3M-16553-0	\$ 31.43
6448	Light Duty Hand Pad	Dark Gray	20	3M-16555-4	\$ 28.55
7440	Heavy Duty Hand Pad	Tan	20	3M-04050-9	\$ 36.02
7445	Light Duty Cleansing Pad	White	20	3M-16976-7	\$ 27.44

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- AO-Aluminum oxide
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OD x W x AH	Density	Mineral Type	Grade	Part Number	Price Each
6" x 1/2" x 1"	8	SC	Fine	3M-09548-6	\$ 53.58
	9	SC	Fine	3M-05790-3	\$ 53.58
6" x 1" x 1"	8	AO	Medium	3M-13617-2	\$ 75.01
	8	SC	Fine	3M-09549-3	\$ 75.01
	9	SC	Fine	3M-05132-1	\$ 75.01

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1 Gal	CAST-MOLYDEE	\$ 150.00

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	B10S*	Long Reach	SHAVIV-29256	\$ 23.25
E	E100S+	For Extra-Close Work	SHAVIV-29251	\$ 22.23
	E100S*	Long Reach	SHAVIV-29254	\$ 29.10

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1.75 lb	FXB-16130	\$179.50
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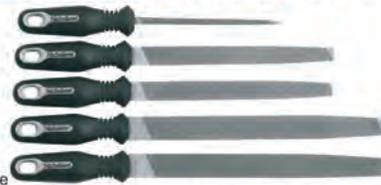
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# Industry News



## Fastems Appoints New CEO

The board of directors of intelligent factory automation solutions provider Fastems Oy Ab has appointed Mr. Mikko Nyman, as its new chief executive officer. The former CEO, Mr. Tomas Hedenborg, will continue as an advisor to the board of directors, as well as support Mr. Nyman in his new role until the end of the 2019.

Mr. Nyman has worked at Fastems as a business unit vice president since the beginning of 2017 and as deputy CEO since the fall of 2018. Prior to those posts, he was Fastems' CFO since 2014.

"Fastems has experienced strong growth since 2016 and expanded its operations from machine automation for the metal cutting industries to intelligent factory automation software design," said Mr. Kai Öistämö, chairman of the board of Fastems. "In the recent years, Tomas and Mikko have worked closely to lead Fastems, and together with the staff, have set the company on a strong growth track. I am confident that Mikko is the best possible person to take Fastems to the next phase."

According to Mr. Nyman, the application of digitalization in the manufacturing industry is still in its

early stages. The future of industrial manufacturing will be about small production batches and flexible automation that aims to increase efficiency. Fastems is already strong in these areas. "The core of our competitive edge is in intelligent factory automation systems that enable better optimization and scheduling of manufacturing," said Mr. Nyman.

## Jergens, Inc. Appoints Ken Marvar as National Sales Manager for the Workholding Solutions Group



Cleveland OH, Jergens, Inc. announces that Ken Marvar assumed the role of national sales manager, Jergens Workholding Solutions Group. "In his new role, Ken is responsible for the sales of our workholding products through our network of partner distributors and for the management of our national network of manufacturers' representatives", says Jergens general manager, Matt Schron.

Ken has over 40 years of sales management and customer service experience in industrial and consumer markets. His responsibilities have ranged from new business development to customer retention programs, organic growth objectives, LTA and

pricing negotiations, sales forecasting as well as brand identity and marketing strategies. Prior to joining Jergens, Mr. Marvar held senior sales and marketing management positions representing a variety of contract manufacturers.

## CNC Software Launches New Streamlined Mastercam Website

CNC Software has rebuilt their website ([www.mastercam.com](http://www.mastercam.com)) from the ground up in an effort to better market Mastercam on a global scale. Launched on May 2, 2019, the new website offers users a cleaner, user-friendly experience, allowing customers and prospects to access Mastercam materials easier than ever before.

The enhanced site also provides a more streamlined layout for finding information. Organization of the site has been improved for quicker access to information. Without having to navigate into the site, the front page displays many hot topics such as Solutions, Support, and Community.

Since Mastercam is such a popular choice in the educational market, the updated website has a section dedicated entirely for instructors and students. It contains information on curriculum, gives information on student competitions, details on Mastercam University and certification, and much more.

## Optomec Partners with Select Additive Technologies to Distribute LENS Metal 3D Printing Technology

Optomec - a leading global supplier of production-grade additive manufacturing systems for 3D printed metals announced it has signed an agreement with Select Additive Technologies, a division of the Morris Group, Inc., making the full range

# Industry News

of Optomec's Laser Engineered Net Shaping (LENS) 3D Metal Printing systems accessible through one of the largest CNC machine tool distribution networks in North America.

"Adding Optomec's industry-leading LENS systems to our distributors' existing lineup of CNC machine tools enhances our end-to-end suite of advanced solutions for precision metal part repair and production," said Jeff Holtzapple, business development manager, Select Additive Technologies. "Optomec integrates decades of experience in directed energy deposition (DED) into its LENS metal additive manufacturing solutions, resulting in high-quality, affordable metal 3D printing solutions."

A division of Morris Group, Inc., Select Additive Technologies specializes in the area of additive manufacturing.

Having the Optomec LENS product lines represented by Select Machining Technologies is a huge milestone in helping metal additive manufacturing gain deeper penetration into the industrial mainstream," said Mr. Dave Ramahi, Optomec president and CEO.

Select Additive Technologies will represent the full range of Optomec's LENS systems, which use high-powered lasers to build structures layer by layer directly from powdered metals, alloys, ceramics or composites.

## Suhner Has a New Location

Suhner has moved to a new marketing and sales office. Originally located in Buffalo Grove, IL, the company's new office is in Barrington, IL.

This new office has sample models of Suhner's products, such as its tapping and drilling units. Real-world examples show where the tapping and drilling units can be used and what they are used in.

In this location, Suhner runs two divisions: the Machining Division and the Transmission Division. Suhner's flex shafts have made particular ad-

vances in the medical industry, as well as in the company's primary automotive market for power windows, seats, side view mirrors and roof retraction.

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## CGTech Proctors SkillsUSA/NIMS Contest Submissions with VERICUT

CGTech Technical Support Engineers will be on hand at the National Leadership and Skills Conference

(NLSC) in Louisville, KY, June 25-27. Each year, CGTech staff proctor multiple SkillsUSA/NIMS competitions related to CNC machining. In addition to grading competitions, CGTech will run its latest version of

VERICUT CNC simulation software, in Booth S145.

The weeklong event is expected to draw more than 18,000 participants including students, teachers, and business partners. The event is to help prepare students for the workforce.

“This is a great opportunity to help prepare students for employment in CNC programming, and also see where their skill level is compared to their peers,” said Steve Arteman, CGTech technical support engineer.

Participants will be graded by CGTech in two categories: CNC Milling and CNC Lathe machine operations. Each category will be evaluated to measure the contestant’s level of understanding and preparation of CNC programs. The contest assesses real world scenarios such as the ability to write CNC programs, interpret prints, and measure/gage parts. Participants will also demonstrate theoretical knowledge of CNC machine configuration, setup, and operations.

VERICUT software will be used to evaluate the accuracy of the participant’s NC programs created, while ensuring their programs run without violating safety standards or damaging machines. After each student’s NC program has been simulated, the virtual workpiece will be compared to the original design model.

CGTech’s VERICUT machine simulation software detects collisions and near-misses between all machine tool components.

## TCI Precision Metals Donates Milling Solution to the Striking Vikings, Robotics Team

TCI Precision Metals in collaboration with the National Tooling and Machining Association (NTMA) and Tormach has donated a Tormach, PCNC 440 mill to the Downey High School, California Striking Vikings



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# Industry News

robotics team. The new addition will help the team machine and fabricate their battlebot robots, which they enter into National Robotics League competitions.

The Downey High School robotics team is an after-school club made up of students enrolled in the schools innovative engineering workforce development program. Lead by instructor Glenn Yamasaki, the program provides students with an introduction to engineering design, principles of engineering, aerospace engineering, and engineering physics. “We are very happy to have been selected by TCI Precision Metals to receive the Tor-mach mill; it will allow our battlebot/robotics students to spend more time developing innovative ideas and less

time improvising ways to complete their projects,” said Yamasaki.

In addition to the milling solution, TCI Precision Metals will support the Striking Vikings robotics program with Machine-Ready Blanks for their projects. “Just like our commercial customers, Machine-Ready Blanks will help the students get right to the high-value work of finish machining,” said Ben Belzer, president, and COO of TCI Precision Metals.

The donation of the milling machine by TCI Precision Metals is part of a coordinated effort with the National Robotics League, a manufacturing workforce development program of the NTMA, designed to help students explore and consider manufacturing as a viable career option.

## Chick Workholding Hires New West Coast Territory Manager

Chick Workholding Solutions, Inc. has hired California native Patrick Bullington to fill the role of territory manager for Southern California.

Patrick will be working directly with existing partners and end users of Chick Workholding, as well as educating potential customers about the benefits Chick delivers to the machinists’ experience. He will report to Chick’s sales manager, Douglas Sain.

Sain expressed, “Our goal is to continue our growth successes in the SoCal market and we are excited to bring Patrick on board. Both his professional attributes and previous sales experience are a great fit.”

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## ZEISS Opens New Quality Excellence Center in CA.

ZEISS Industrial Quality Solutions has opened a new facility for metrology services in Lake Forest, CA, near Los Angeles. "These excellence centers offer a solution-based approach for local manufacturers. The new location offers contract measuring services, support, training and project management," said Al Chiasson, vice president of applications, aftermarket and metrology services for Carl Zeiss Industrial Metrology, LLC.

"We are excited to have a new facility for our customers in the Los Angeles area," said Gil Flor, site manager of Metrology Services for Carl Zeiss Industrial Metrology, LLC. "In addition to measuring services, this excellence center allows us to offer our customers several types of software training, including the different CALYPSO levels and PiWeb reporting software that connects machines together to control and analyze quality data."

ZEISS engineers onsite can provide programming, consulting and specialized training. A broad range of contact and optical measurement systems and sensors are available, including the larger measuring range MICURA CMM with active scanning and submicron accuracy, suitable for measuring intricate parts. For optical measurements, the O-INSPECT system features both optical and contact scanning for reliable 3-D accuracy. There are also the latest surface, form and geometry systems to round out inspection capabilities.

## Trust Automation Moves to Larger Facility

Trust Automation Inc., a supplier of automation and cyber defense systems for industrial and military applications, announced that it is moving to a larger facility in San Luis Obispo, CA.

At 96,000 sq. ft., the new facility

more than doubles the amount of space Trust has for its U.S.- based engineering, manufacturing and business operations. The company's current facility is located less than a mile away.

Trust will use the extra space to expand its established semiconductor, defense and industrial businesses. The new facility also includes additional room for the company's recently an-

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nounced Trust Intelligence Systems division, which focuses on cyber defense devices for legacy IoT networks.

Trust's new facility was formerly occupied by Lockheed Martin and includes dedicated areas for engineering, research & development, quality control and manufacturing.

## Fives Lund Receives Supplier of the Year Award from Boeing

Fives Lund has been recognized as Supplier of the Year in the Technology category by The Boeing Company. Fives Lund was one of 13 companies honored May 8, 2019 for distinguished performance in working with Boeing.

This year's recipients represent an elite group among more than 12,000 active Boeing suppliers around the world. This selection was based on stringent performance criteria for quality performance, delivery performance, cost, environmental initiatives, customer service and technical expertise.

## Omax and Hypertherm Have Successful Close of Merger Agreement

Omax Corporation, a manufacturer of abrasive waterjet systems, and Hypertherm, a U.S. based manufacturer of industrial cutting systems and software, announced the successful closing of a previously announced agreement to

establish Omax as a wholly-owned subsidiary of Hypertherm.

The agreement, first announced on March 20, formally combines Omax's industry leading direct drive pumps, software, and applications technologies with Hypertherm's complementary portfolio of intensifier-based pumps and abrasive recycling systems to form the industry's leading waterjet technology offering."

"We are confident the combination of Omax and Hypertherm will advance our strategy of delivering diverse, technology-driven cutting solutions focused on dramatic improvements in customer outcomes. In uniting with Omax, Hypertherm can combine the strengths of two highly talented en-



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# Industry News

engineering groups—Omax engineers in Washington state with our waterjet group in Minnesota—to accelerate new waterjet technologies to market,” said Hypertherm president and CEO Evan Smith.

## GF Machining Solutions to Debut Four New Products at 2019 Solutions Days

GF Machining Solutions will unveil four new products at its 2019 GF Solutions Days: the AgieCharmilles CUT C 350; the Microlution ML-10 and MLTC; and the DMP Flex 350. The two-day event will occur at two

locations. On Thursday, June 27th, the company’s U.S. Headquarters in Lincolnshire, Illinois, will feature machine demonstrations, presentations and seminars. The event moves to GF Machining Solutions’ newly expanded Microlution production facility in Chicago, Illinois, on Friday, June 28th for a ribbon-cutting ceremony, facility tour and technical discussions.

The new AgieCharmilles CUT C 350 offers GF Machining Solutions’ quality at low operating costs. The machine is not only cost-effective, but also provides optimized cutting speed and reliable accuracy, while the equipped AC CUT HMI 2 system makes for easy programming through efficient EDM expert modules.

Created in collaboration with 3D

Systems, the DMP Flex 350 builds upon the success of the DMP Factory 500. DMP Flex 350 is made to handle R&D projects and high-volume production .

Microlution’s new ML-10 further improves upon their laser micro-machining platform, the ML-5. The perfect femtosecond solution for industries ranging from automotive to medical, the ML-10 extends GF Machining Solutions’ range. For tube-cutting applications, the company will also be introducing its MLTC model.

Solutions Days will include the introduction of new products – and lunch in the new showroom – participants will have the chance to receive tours of the facility and see demonstrations of Microlution’s ML-5, ML-10, MLDS



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and MLTC.

The event will offer numerous presentations and seminars by GF Machining Solutions experts.

New machines at the event will be accompanied by others from GF

Machining Solutions, including the Mikron HSM 200 U LP, MILL P 500 U and MILL P 900; the AgieCharmilles FORM P 350 with System 3R Transformer, DRILL 20 and CUT P 550; and the AgieCharmilles LASER P 400 U

fs, LASER S 1000, Microlution ML-5 and MLDS.

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## Reshoring Initiative 2018 Data Report: A Record 1,389 Companies An- nounce the Return of 145,000 Jobs

In 2018 the number of companies reporting new reshoring and foreign direct investment (FDI) was at the highest level in history, up 38% from 2017. The combined reshoring and related FDI announcements totaled over 145,000 jobs, the second highest annual rate in history. Including upward revisions of 36,000 jobs in prior years, the total number of manufacturing jobs brought to the United States from offshore is over 757,000 since the manufacturing employment low of 2010.

Allowing for a two-year lag from announcement to hire, the cumulative announcements since 2010 have driven 31% of the total increase in U.S. manufacturing jobs during that period and 3.3% of total end-of-2018 manufacturing employment of 12.8 million.

The Reshoring Initiative largely attributes the increases to greater U.S. competitiveness due to corporate tax and regulatory cuts. Similar to the previous few years, FDI continued to exceed reshoring in terms of total jobs added, but reshoring has closed most of the gap since 2015.

The Reshoring Initiative’s 2018 Reshoring Report contains data on U.S. reshoring and FDI by companies that have shifted production or sourcing from offshore to the United States. The report includes cumulative data from 2010 through 2018, as well as projections for 2019. The numbers demonstrate that reshoring and FDI are major contributing factors to the country’s rebounding manufacturing sector.

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show companies that their peers are successfully reshoring and that they should reevaluate their sourcing and siting decisions,” said Harry Moser, founder and president of the Reshoring Initiative. “With 5 million manufacturing jobs still offshore, as measured by our \$800 billion/year goods trade deficit, there is potential for much more growth. We call on the administration and Congress to enact policy changes to make the United States competitive again. Our Competitiveness Toolkit is available to help quantify the impact of policy alternatives, including a stronger skilled workforce, continued corporate tax and regulatory reductions as well as a lower U.S. dollar.”

## New CEO for Chiron America

Dr. Markus Flik, CEO, Chiron Group recently announced the appointment of Steve Morris as Chiron America’s new president and chief executive officer effective immediately. Chiron America is a unit of Chiron Group, Tuttingen Germany.

With over 30 years of business development experience in production systems and technical services, Steve brings a wealth of customer-focused direction and strategy to Chiron America. Having previously served in leadership positions with Husky Injection Molding Systems and Milacron, his

contributions have been fundamental in creating lasting models for success within both organizations. Steve’s accomplishments and diverse executive background make him an ideal fit for Chiron America’s strategic vision and next stages of growth. He holds an MBA in Strategic Management from Niagara University, New York.



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# Industry News

## Fagor Automation Becomes Member of CFAA

Fagor Automation CNC controls and high precision encoders have been used to create parts for both aeronautics engineering and astronautics engineering. For this reason, the governing board of the Business Association for the Development of Advanced Aeronautical Manufacturing Techniques (AEDTFAA) has accepted the incorporation of Fagor Automation as a full member.

Being a member of this group automatically grants membership to the Advanced Aeronautical Manufacturing Center (CFAA). The CFAA is a public-private initiative dedicated to the development of manufacturing projects. It was founded from the inspiration and support of the Basque Government, through the Department of Economic Development and Infrastructures in Spain, and the Provincial Council of the Basque Country at the request of a group of companies in the sector led by ITP and Danobat.

This project was later joined by the Biscaya technology park, as manager.

“The goal of Fagor Automation joining CFAA is to provide the aeronautical industry with the latest advances in automation and control systems, encoders with nanometric resolution, connectivity, monitoring and optimization of processes, predictive maintenance, advanced programming, additive manufacturing and ultra-precision machining,” said a company spokesperson.

## ROHM Products of America Hires West Coast Regional Sales Manager

RÖHM Products of America has hired Jessica Ramos as regional sales manager. Ramos will oversee sales operations in the West Coast region, to initially include California, Oregon, Washington, Arizona and Nevada.

National sales manager Steven Onik

stated, “We are delighted to have Jessica on the team. She brings a stellar professional background and considerable manufacturing experience to the table. We believe that she will do great things for RÖHM in the West Coast region.”

Ramos has been a part of the manufacturing industry for the last 12 years. Most recently, she worked as an office manager and executive administrative assistant for Innovative Tools of Anaheim, CA. There she managed marketing campaigns and promotions, coordinated trade shows and company events and oversaw daily operations. She also managed inside sales, customer service and warehouse personnel; as well as supervised inventory and freight operations. In addition, she provided administrative support to

the company president and maintained the organization’s IT systems.

## Mazak Expands State-of-the-Art Spindle Rebuild Center in Kentucky

The expanded and newly updated department, which will now be located in the South Building on Mazak’s Kentucky manufacturing campus, will further improve the company’s ability to quickly deliver spindles and reduce customer downtime.

The grand opening of the new Spindle Rebuild Department will take place during the company’s DISCOVER 2019 event, which will be held on November 4-15 at the Kentucky manufacturing campus. As the largest private manufacturing event in North



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America, DISCOVER 2019 will present attendees with new technology, advanced manufacturing solutions and valuable industry insight to increase their operational efficiency and global competitiveness.

DISCOVER 2019 attendees will have the opportunity to tour the Spindle Rebuild Department, which supports every Mazak machine tool spindle in North America – over 2,000 different models covering a wide range of horsepower ratings and speeds. The expanded department will keep upwards of 1,000 rebuilt spindles in stock and ready for exchange, particularly those found in Mazak's most popular machine models.

To guarantee that all original spindle specifications are met or exceeded, experienced factory-trained techni-

cians use only genuine Mazak replacement parts to rebuild Mazak spindles. These experienced technicians perform every stage of the repair and rebuild process, provide complete trackable spindle documentation and conduct stringent testing of every spindle, all within the short turnaround time. The expansion will not only make room for additional technicians, but will also allow the department to boost its rebuild output to 100 spindles per month.

## Weiler Abrasives Celebrates 75th Anniversary

Weiler, a provider of abrasives, power brushes and maintenance products for surface conditioning celebrated its 75th anniversary at the company's

National Sales Meeting April 22.

Founded by Karl E. Weiler in 1944 as the Weiler Brush Co., the company continues to be privately owned and operated at its current headquarters in Cresco, Pennsylvania, under the fourth-generation leadership of Chris Weiler, CEO. His father, Karl M. Weiler, serves as chairman. The company now has 1,300 employees across eight different countries, but it still does business with its first 1944 customer. "We are proud of the growth Weiler Abrasives has undergone in its 75 years in business and the innovation it brings to the marketplace," says Chris Weiler. "The hard work of our employees, our customers' loyalty and the support of our community have been the backbone of our success."

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# New Products

## Tool and Cutter Grinding System

### —Unison Corporation

Unison Corporation offers its Model 9300 6-axis CNC tool and cutter grinding system. “The model can manufacture ultra-precise drills, end mills and reamers quickly and precisely with its powerful 21.5 HP direct drive dual grinding spindles,” said a company spokesperson. This grinder features Yaskawa AC drive amplifiers and servomotors as well as an automatic pick-n-place parts loader/unloader for continuous grinding of parts. The Model 9300 is equipped with a Schaublin pneumatic work-holding system and a precise probe assembly to provide repeatability of

parts. It is built on a polymer cast base and can be equipped with an on-board electric wheel dressing system.

It features Unison’s EZ Software, allowing the machine’s operator to customize and/or modify tool geometry with a user-friendly interface by filling in blanks and then verifying the part program by using the machine’s real-time 3-D parts predictor. Each machine is supplied with a complete software package and library of tool programs. The Model 9300’s computer control monitors critical machine functions and alerts the operator to problems encountered during grinding as well as errors are tracked and logged within the control to help identify problems. The model 9300 can be networked and/or monitored via the internet and can

be equipped with a Remote Connect feature allowing direct communication with Unison.

## Double Column High-Speed Machining Center

### —Takumi

The Takumi H12 CNC double-column machining center is designed for parts that require speed, accuracy and surface finish in the die/mold, aerospace and other high-speed applications. The ladder structure and double-column design provide rigidity and support to the head casting, while the one-piece base absorbs the inertia of high cutting feeds. The machine features a 15,000-rpm Big Plus CAT



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# New Products

40 inline direct-drive spindle. Thirty of the machine's components are hand-scraped for accurate alignment.

The H12 is equipped with the Fanuc 31-i-MB control, which features AI Contour Control (AICC) 2 with high-speed processing, machine condition selection and Nano smoothing. The control provides 600-block look ahead and a 1-GB data server with editing capabilities.

## G2 Control Now Available for Bed Mills-Acu-Rite



Heidenhain's Acu-rite-brand MILLPWRG2 control is now also available for bed mills with AC motors. Combining the latest technology with the finest qualities in traditional machining, this new bed mill control package offers many useful machining features including full 3-D contouring capabilities. It is available as a complete retrofit package for 2- or 3-axis machines or already installed on many new machines.

With its conversational 2-1/2 axis shop floor programming and built-in calculators, the MILLPWRG2 continues to provide convenience to machinists by eliminating time-consuming calculations and the need

to learn complicated programs. In addition, it has the ability to run G-code files from CAD/CAM programs, which gives users the capability of the full 3-D contouring. Consequently, it maximizes productivity for machinists of all levels, from the less experienced operator to the most seasoned veteran.

## Tooling Systems Reduces Setup and Change Times —Exsys

Exsys Tool's Compacto base holder and Preci-Flex modular tooling system are said to reduce setup and tool change times for CNC turning centers. The Compacto is available in C3, C4, C5 and C6 sizes and is especially useful for standard PSC adapters.

The base holder's connection interface is said to offer space and clearance, even for large workpieces. It also provides torque transmission and rigidity to enable accuracy. Exsys reports the polygon-shaped connection increases its precision and on-line or off-line quick change. A built-in release mechanism on the outer spindle diameter of base holder enables operators to lock and unlock the adapters with a small torque key for fast tool changes. The automatic ejection of the adapters is said to further increase the speed of tool exchanges.

The Preci-Flex offers a fast, accurate solution for lathe tooling changeovers. The design is said to ensure transmission and rigidity, enabling accuracy and productivity. Additionally, its conical and flat face planar interface enables the use of either an adapter or a standard ER collet, and enables collets, end mill holders, expanding collet chucks and shrink fit tooling to be mounted on a single base holder. Available in a range of sizes, the system offers repeatability within 5 microns.

## Updated Solution to Giddings & Lewis 8000 Control

### —Fives

As a Fanuc Authorized Integrator, Fives has been able to bring the OEM proprietary features of the Giddings & Lewis 8000 control platform, such as axis tracking, to a Fanuc solution. This translates to added performance, increased applications abilities, commercially-available components, improved quality, and increased productivity, all while modernizing your Giddings & Lewis equipment today.



Fives has a rich and long-standing legacy of Giddings & Lewis 8000 controls and will continue to provide technical support and service at a limited capacity. But due to the progression of new technology the Giddings & Lewis 8000 control has reached the end of its life and Fives will no longer offer any updates or enhancements for this product. Following the commercial announcement from Kollmorgen on March 29, 2019, regarding the closure of its support efforts for the G & L 8000 control, Fives invites you to turn to the OEM for the solution to control problems. Fives and its Machine Tool Services

# New Products

## HOLDERS TARGET COOLANT FOR CHIP CONTROL AND PROCESS STABILITY —Seco



New additions to JETI (Jetstream Integrated) tooling from Seco Tools eliminate coolant-through tooling and connector interference that hinders grooving, parting-off and other turning operations. With interference-free internal coolant capabilities and the option to switch the underside stream channel on and off as required, these expansions to the range of MDT (Multi-Directional Turning) X4 (grooving and parting-off) and 150.10 (parting-off) tool holders add operational stability and reliability while they improve surface finishes.



To optimize machining, chip control and process reliability, Jetstream Tooling® aims high-pressure coolant directly into the cutting zone through internal channels in the tool holder. Unlike other tool holders, Jetstream Tooling® Duo incorporates upper and lower cooling channels, with the ability to activate the underside stream as needed. Side and back coolant connections enable these holders to function on machines with conventional coolant supplies.

Jetstream Tooling® provides application flexibility and the productive convenience of coolant delivery without external hoses, fittings and spare parts that can diminish productivity and raise costs. Square-shanked MDT,

X4 and 150.10 holders are available in 20 mm x 20 mm and 25 mm x 25 mm sizes. MDT holders accept inserts in 2, 3, 4, 5, 6 and 8 mm. 105.10 holders accept 15-size blades.



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# New Products



## New Threading and Grooving Heads —Seco

Seco offers the new GL threading and grooving heads for Steadyline®  $\phi 1$ " diameter turning and boring bars from Seco Tools. The company reports

the new heads extend the range of GL Heads and Steadyline® bars, increase production accuracy, improve surface finishes and reduce down time from insert indexing and head changing.

Offered in right-hand and left-hand versions, these compact new heads provide the high repeatability of the Seco GL25 connection. The GL connection's optimized wall thickness achieves centering accuracy and probing repeatability within 5  $\mu\text{m}$ , and the connection provides for increased operational versatility and faster, easier tool changes. Seco Tools designed these new GL25 threading heads for integration with Seco Jetstream Tooling® high-pressure coolant capability.

On small and large holes, Steady-

line® turning bars facilitate stable, easy turning and boring to depths up to 10xD with an effective vibration damping system. For operations inside deep hole diameters as small as 1.181" shops can take advantage of the system's reach/overhang capabilities and highly effective anti-vibration technology.

## Auto Fast Change Tool System for Swiss-Style Auto Lathes, Machining —Arno Werkzeuge USA

ARNO-Werkzeuge USA offers the Auto Fast Change (AFC) Tool Systems for Swiss-style machining. "The quick-

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# New Products

change tool system provides faster set-ups and reduces downtime with in-process tool changes in Swiss-style machining operations,” said a company spokesperson. “It also eliminates the need for external plumbing to facilitate cooling. The mess and problems created by excess chips and debris mixed in with coolant inside the machine is minimized as well.” The ARNO AFC comes pre-configured with built-in through-coolant capabilities. In total, there are five inlets for porting the coolant on the AFC toolholder block that operators can use to direct coolant flow.

The AFC system is comprised of a two-piece universal toolholder mounted inside the machine. A separate quick-change toolholder slides into the end of the stationary block and locks in to place simply by giving two screws a quarter-turn each.

## New Toolholder Size —Big Kaiser

Big Kaiser has expanded its range of BIG Capto toolholders with the addition of a new size, C4, which, according to the company, is becoming increasingly popular as a quick-change system for turret tooling on lathes.

In accordance with ISO 26623-1, the polygon shape of the taper on this toolholder provides for highly repeatable accuracy and torque transmission. This system complements Big Kaiser’s MEGA chuck rotating tooling program.

BIG Capto C4 is now offered for both rotating toolholders and turning tools for lathes. Its integral design allows for holding a variety of common inserts for different approach angles and clearance requirements in both left- and right-hand orientations. These compact and rigid tools also allow for large depth of cuts and high feedrates.



## New Range of Quick Loc™ Pallet Systems —Jergens

Jergens Inc. announces its Quick Loc™ pallet systems for fixturing solutions on horizontal, vertical and five-axis operations. These low-profile adapters and pallets ensure repeatability of 0.0003” for small tooling platforms and provide clamping forces of nearly 14,000 lbs. Jergens Quick Loc is manufactured from case-hardened steel for high rigidity and features a single drive screw for fast operation and reduced setup / change-over time for both fixtures and workpieces. The complete range of receivers, risers, pallets and cubes can be configured for almost any application.

Receivers are square, rectangle and round in either 52mm and 96mm patterns. They are available with or without mounting holes to allow users to add their own custom mounting configuration. They are also compatible with many other industry-standard pallet systems. Risers permit greater machining (part) access. Cubes and twin bases function like small columns holding multiple fixture setups.

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# New Products

## Five-Axis VMC Offers Versatility, Accuracy —Okuma

Okuma's MU-5000V-L vertical machining center (VMC) is designed for 5-axis multi-sided machining. Standard ball screw cooling and a rigid left-right, mobile trunnion table support high precision and heavy-duty cutting power in a compact footprint.

It is available with a standard No. 40 or 50 spindle, providing a configuration for nearly any 5-axis job. An in-machine coil chip conveyor allows for safe, reliable chip discharge. Close proximity of the spindle and control panel, in addition to easy access to the workpiece, give this machine enhanced



operator functionality.

An array of automation options are available. The design places the pallet changers at the back of the machine, allowing easy connection to a PALLE-TACE flexible manufacturing system, pallet pool, large capacity ATC and

robots to deliver high productivity in addition to high accuracy.

“The MU-5000V-L can be equipped with Okuma's exclusive Super-NURBS function, enabling high feedrates and ultra-fine finishes,” said a company spokesperson. “Optional Machining Navi monitors cutting conditions and displays optimal spindle speed to eliminate chatter. 5-Axis Auto Tuning achieves higher accuracies by automatically measuring and correcting machine misalignments in minutes. Okuma's Thermo-Friendly Concept and Collision Avoidance System are standard Intelligent Technologies to ensure this 5-axis machining center performs consistently from the first part to the last.”

A background image for the Valley Financial Services advertisement showing a scenic view of a mountain range with green valleys and blue skies.

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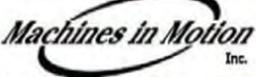
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# New Products

## Line of Horizontal Hobbing and Gear Shaping Machines From Samputensili CLC

### —Star SU

Star SU LLC announced it has expanded its comprehensive gear manufacturing product offering to include a line of horizontal hobbing and gear shaping machines available in the North American market.

Star SU technology partner, Samputensili, has recently signed an agreement between its Machine Tools Group and CLC, a reputable Italian producer of hobbing and shaping machines. The newly created company, Samputensili CLC S.r.l. can now offer new machines from its manufacturing plant located

near Bologna, Italy.

The agreement helps complete Star SU's line of gear hobbing machines for shafts and long workpieces, as well as the addition of gear shaping, strengthening its position as a globally recognized leader of gear manufacturing solutions.



## HU100-TS Tilt-Spindle 5-Axis Horizontal Machining Center Launched

### — Mitsui Seiki

Mitsui Seiki's new HU100-TS 100 tilt-spindle 5-axis horizontal machining center is built to handle machining of large, hard-metal workpieces that

are better suited for tilt-spindle processing than trunnion table operations. The machine's fixed table and tilting head arrangement facilitates production of heavier and larger parts and can permit use of shorter, more rigid tooling. The new machine offers high rigidity and accuracy when machining tough materials such as titanium and Inconel that are common in aerospace,

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# New Products

power generation and other high-value applications.

The horizontal table of the HU-100TS can accommodate workpieces up to 76" long and 50" in diameter, weighing up to 4,400 lbs. X, Y and Z-axis travels are 52", 60" and 56" respectively, with B axis rotation of 360° and A-axis rotation of -30° to +120°. The machine's compact 221"x 337" footprint is similar to that of its 4-axis equivalent.

The column width and length/height ratio of the HU100-TS are engineered to maximize stability in heavy machining. The machine's HSK-A100 taper spindle provides up to 150 kW (201 hp) power and 1508 N-m (1,112 lb-

ft) torque. A standard automatic tool changer has capacity for 60 tools (180 optional), up to 20" in length. Maximum tool diameter is 5"; tools stored without adjacent tools can be up to 8.6" in diameter.

Scott Walker, chairman of Mitsui Seiki USA said, "For aerospace manufacturers and others machining tough alloys, the new HU100-TS offers five-axis, tilt-spindle flexibility and the automation potential of a horizontal machining center as well as the rigidity, accuracy and reliability of a heavy-duty design."



## The Skinny-Vise™, a Low-Profile Fixture Solution For Small Parts —Phillips Precision

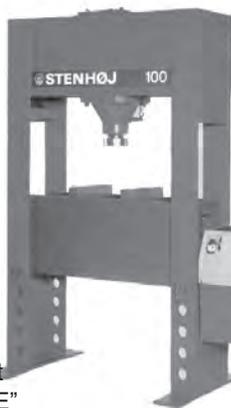
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# New Products

of the new Skinny-Vise™. Improve visibility, and repeatability on your CMM and Vision Systems. Inspectors can easily hold small, thin and odd parts with simplicity and precise repeatability.

“Expose more of the part and keep the clamp as non-intrusive as possible,” explains Victor Rinaldi, product engineer at Phillips Precision. “With the Skinny-Vise™, you can easily see past the fixture on vision systems and CMM probes can easily access nearly 100% of the surface of a part.”

Two options of the Skinny-Vise™ are available. One version is hand tightened with a twist of a thumb screw and the other spring-loaded to maintain consistent pressure between operators.

The static jaw for both is adjustable up to 1.5” allowing for incredibly fast swaps and repeat inspection of very thin, small parts. Machinable aluminum jaws can be customized to hold parts of all shapes including pins and spheres and the vise base can be mounted in any direction desired, giving inspectors even more options to hold parts more efficiently than ever before.

The spring-loaded Skinny-Vise™ comes with 3 replaceable compression springs of 10, 15, and 25-lbs providing consistent and repeatable force for production inspection. Simply press down on the movable jaw to open and release to close.

## Reliable and Cost-Efficient Turning Processes —DMG-MORI

Modern equipment options, compact dimensions, and a high level of automation all contribute to the efficiency of a turning machine. DMG MORI has considered this in the development of the ALX series to meet the high demands of serial production in the automotive and other sectors.

The ALX 2000, a new turning machine that DMG MORI produces in Davis, California is a stable, dynamic, and compact turning machine that combines excellent standards from a max. spindle speed of 4,500 min-1 to the BMT turret with twelve powered



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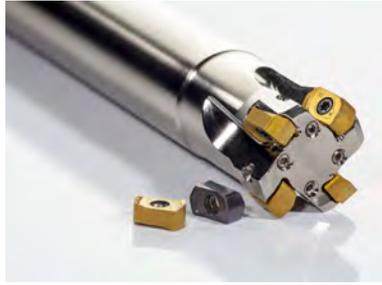
# New Products

tools and tailstock.

In addition, the ALX 2000 offers a high degree of automation thanks to the optional gantry loader, a deciding factor for cost-effectiveness in production.

## High Feed Cutting with High Versatility —Dormer Pramet

The versatile Pramet ISBN10 cutters are suitable for high feed milling, copy milling, ramping, helical interpolation, slotting and plunging. The unique pocket design in combination with the ANHX10 insert also perform shoulder and face milling, offering a complete package for mold and die applications, from roughing to finishing.



A range of diameters are available from 0.625 inch – 1.500 inch and multiple types, including Parallel and, Modular shanks and Shell mills.

To go with the ISBN10, the Pramet BNGX10 is a patented, double sided insert with four cutting edges.

The company reports the design makes it suitable for high feed roughing even with long overhangs, while

being compatible with three geometries covering most machined materials. Geometry M is for steels and cast irons, MM for low carbon steels, stainless steels and super alloys, while HM is suitable for hardened materials.

A new range of Pramet ANHX10 inserts are now available for finishing operations in shoulder milling, suited for wall and bottom finishing. The single-sided insert has two cutting edges and a positive geometry for long overhangs.

Both inserts offer a smoother cut, while a special through coolant design directs lubrication nearer to the cutting edge. This allows for high feed rates with axial depth of cut up to 040”in.

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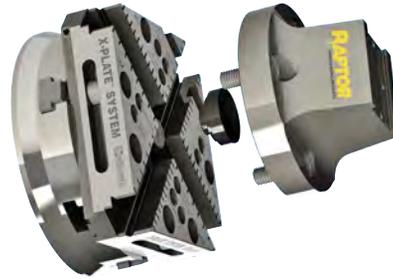
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# New Products

## Three New Clamps —Mitee Bite

Mitee-Bite Products has introduced three new products, The X-Plate™ system, The Power Bar™ and Heavy-Duty™ T-Slot Clamp. The latest in the Mitee-Bite Products line up these clamps are all designed to save time, material costs and easily solve many of your workholding needs.

The X-Plate™ System is a versatile modular fixturing platform for 3, 4 and 5 axis applications, providing many mounting options including a precision quick-change system when clamped in your vise or t-slot table. It includes a provision on the bottom for the Mitee-Bite diamond/taper locating pins to precisely mount to sub-plate, plus the



primary function as a multi-functional face plate for your indexers and 5 axis machining centers.

The Power Bar™ is a modular platform. Utilizing any of the DK model OK-Vise® wedge clamps or the largest Mitee-Bite Pitbull® clamps, you have the options to elevate your workpiece for mill/drill through operations or forcing your parts onto the machine

table. Precisely ground to the same height as the Mitee-Bite In-line clamps and stops, multi-fixture clamps and stops and Modular Pitbull® for added versatility, ideal for running in series for large aerospace and automotive application, designed to be used opposing each other for the most demanding operations.

The heavy duty™ T-Slot Clamps are capable of generating over 20,000 pounds of pressure. Mitee-Bite reports that this design utilizes some of the strongest, lowest-profile clamps in the industry - the Pitbull® and OK-Vise® Clamps. These can be used on the same base with many configurations.

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# New Products

## Thread Mills For Aerospace/ Nickel Alloys —Emuge

Emuge Corp., has introduced advanced Threads-all™ ZGF-S-Cut Solid Carbide Thread Mills featuring multiple teeth, a helical flute form and multi-layer TiAlN T46 coating.

To efficiently thread challenging, expensive materials we offer our new ZGF-S-Cut Thread Mills,” said Marlon Blandon, thread milling product manager, Emuge Corp. “The new thread mills are an ideal solution when threading Inconel and other high temperature alloys because the heat is carried away during chip evacuation and does not



stay with the part.”

Emuge ZGF-S-Cut Thread Mills have multiple teeth, the first acting as a rougher and the next two teeth per-

forming finishing. By dividing functions into three cutting edges, speeds and feeds can be increased, and threads can be produced in a single pass. A 10° left-hand helical flute form and chamfer geometry combine to optimize chip evacuation in the forward direction and add strength to the cutting teeth. And for increased tool strength, Emuge ZGF-S-Cut Thread Mills have multiple flutes.

The tools are available in 2xD lengths, have coolant-fed options starting at 1/4” diameter, and one tool easily makes STI threads for both through and blind holes.

The entire Emuge Threads-all™




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# New Products

## New Sturdy DRO with Touch Screen for Machining —Heidenhain

Heidenhain announces the new POSITIP 8016 digital readout (DRO) with touch screen for manual machine tool applications. With its sturdy machined aluminum housing, this DRO was made to add reliability and ease-of-use to its milling, drilling, boring and turning jobs.

The PT 8016 DRO has a multitude of functions including a Taper calculator, Bolt-Hole Pattern routine and Tool Radius Compensator. This DRO

also includes distance-to-go modes in both absolute and incremental. It can control of up to three NC analog, point-to-point axes and a spindle with the PT 8016 “ACTIVE Version”.

This new Heidenhain PT 8016 DRO features a shop-hardened 12” Color TFT Touch Screen for an IP65 front panel and an IP40 back panel. Users can plug-in up to six encoders - either 1Vpp or 11µApp incremental or absolute EnDat 2.2 pure serial. It has storage for up to 100 datums and 100 tool parameters, as well as the capability to create, store and execute programs.

The PT 8016 replaces Heidenhain’s long-time workhorse – the PT 880. It stands alongside the recently released ND 5023 and ND 7013 to round-out the new Heidenhain family of digital readouts.

## DMP 70 New Highly Dynamic Production Machine —DMG-MORI

As the successor of the MILLTAP 700 (with more than 3,000 machines installed), the new DMP 70 stands for

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# New Products

maximum productivity on the smallest space. With a footprint of just 46.28ft<sup>2</sup> it is 10 percent smaller than the MILL-TAP 700.

DMG MORI has designed the compact production machine for applications in medical technology, job shops, as well as the aerospace sector and other demanding industries. Travel paths of 27 x 16 x 15 inches and the optional integrated swivel/rotary table enable 5-axis simultaneous machining of a wide range of components making the DMP 70 the ideal addition to any shop floor.

## Lollipop from Sphinx New Endmill Cutter —Big Kaiser

Big Kaiser, introduces the Lollipop from Sphinx, the newest addition to its end mill cutter lineup. The Lollipop from Sphinx is ideal for machining undercuts, deburring and multi-axis machining.

Lollipop cutters, also known as undercutting end mills, can be useful for certain situations. Undercuts are commonly known to be difficult to machine with a standard end mill, especially on 3-axis machines. The Lollipop from Sphinx can be used in 3-axis and 5-axis applications, although 5-axis applications are more common due

to the operator's ability to rotate and index the tool for any given reason.

According to the company, this end mill also provides a great surface finish due to its edge-breaking capabilities – a critical final step to create a part that looks and feels like a finished product and is safe to handle.

The under cutting angle used in



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# New Products

most operations is between 220° and 300°, and the corresponding angle for the Lollipop from Sphinx is 270°. Although frequently associated with a singular use, lollipop cutters are versatile tools for a variety of shop-floor operations.

## Large Swing Vertical Turret Lathe with Traveling Column Design —Fryer

The new Fryer VT Series is a compact, large swing vertical turret lathe available in 60" or 80" swing sizes. "This series features an innovative traveling column design that allows a large swing in a small footprint ma-

chine. The unique horizontal turret features clearance for long and short tools alike," said a company spokesperson. "The VT is available with full C-axis contouring and positioning as well as a powerful live tool turret."

The new VT series is equipped with a Fryer-Siemens Touch 2200 CNC control that features shop floor conversational programming, G-code programming, 3-D graphics and fast set-up cycles.

## Mill/turn for XXL Work-piece Sizes —Starrag

Starrag XXL milling/turning center offers accuracy because of its rigid

design and hydrostatic guide concept. A working area of 748" × 354" × 118" enables the processing of large work-pieces in a single clamping operation. There is also an option for flexible five-axis processing because of the integrated C-axis with stepless rotation and the fork-type milling head, featuring a B-axis that swivels ± 203 degrees. The sixth-axis (W) is a 217" continuously movable crossbeam.

The machining center uses a 134-hp main spindle with a torque of as much as 66,372, transmitted via vertical and horizontal milling heads; two fork-type milling heads designed for five-axis operation as well as a slim outboard bearing for drilling. Additional heads can be used for milling, turning, grinding and turning out.



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# New Products

The robot magazine, which has space for as many as 400 tools, supplies the milling and turning heads with three tool systems.

The table construction, which features two tables (236" x 315"), is said to ensure efficient machining. This construction means that one table can be used under the spindle while the other is loaded/unloaded outside the work area. Extra-long workpieces are machined simultaneously, for which tables are extended to 709". Each table also features an integrated rotary table with a diameter of 236". Because of the two 149-hp main drives, the turning of components weighing as much as

440,925 pounds is also possible. The rotary table can be used as a C-axis for positioning when milling and drilling.

## New Tooling For Specific Turning Center Brands —Heimatec

Heimatec, announces immediate availability of live tooling for all popular models in the Hyundai, Miyano and Nakamura turning center lines. According to master North American importer for Heimatec, Preben Hansen, Platinum Tooling Technologies, Inc. president, "We're carrying a



substantial inventory of live tools for our customers' machines now and it represents a substantial financial and warehouse space commitment we've made to support them in the North



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# New Products

American market.”

Hansen added that the company will be announcing its in-stock arrangement for many other lines of machine tools, moving forward, as the company commits a major investment to the market. Platinum Tooling Technologies, Inc. serves its North American customers with a full team of manufacturers’ rep firms, plus its Chicagoland facility offers stocking, repair, application engineering and service for the company’s line of live tools, multi-spindle tool, adapters, UTEC® right angle heads and other items offered.

## CAMWorks® 2019 Provides First Additive-Subtractive Solution for SOLIDWORKS®-HCL Technologies

HCL Technologies announced the release of CAMWorks Version 2019, which includes Additive Manufacturing, Tolerance-Based Machining (TBM) for turn and mill/turn parts, and improvements to Technology Database (TechDB).

CAMWorks Additive Manufacturing, powered by Materialise® technology, introduces the first additive-subtractive solution available for SOLIDWORKS to allow users

to prepare models for their 3D metal printers inside SOLIDWORKS. The 3D printer model is then used as stock, and CAMWorks will generate the CNC subtractive machining operations and toolpaths needed to remove the build supports and machine other user-defined areas of the part, all inside of SOLIDWORKS. The design, additive and subtractive information are all stored within a single file, making it fully associative with the SOLIDWORKS model.

CAMWorks 2019 also expands Tolerance-Based Machining (TBM) to turn and mill/turn parts, now with full integration inside CAMWorks. Tolerance-Based Machining provides

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# New Products

technology to help users move their programming to Industry 4.0 procedures by recognizing and using Product and Manufacturing Information (PMI) – such as GD&T dimensions, notes and callouts – as well as Model Based Definition (MBD) information in the 3D model. With this information in the 3D model, users can eliminate the cost and manual tasks involved when using 2D drawings. CAMWorks TBM automatically selects the correct machining strategies to meet the tolerance requirements, and because it is fully associative with SOLIDWORKS, any tolerance changes made to the model will automatically be updated in the CNC programming.

CAMWorks 2019 also provides several improvements to TechDB – the

CAMWorks Technology Database that captures programmers’ best practices and allows them to save and reuse the information that defines how they prefer to machine parts. With TechDB, users can define their preferred tools, speeds and feeds, machining strategies and associative parameters for the CNC machines on their shop floor. In addition, the TechDB can be shared with other programmers and designers working together.

Among the additional enhancements released in CAMWorks 2019 are significant improvements to 5-axis swarf milling, multi-turret synchronization, production multi-turret turning, toolpath editing, collision checking, multi-axis chamfer milling and additional feature recognition functionality.

## New Diamond Inserts for Hard Machining Applications

### —Carmex

Carmex Precision Tools, Ltd., has recently introduced new diamond turning inserts designed for machining hard materials.

The company reports the diamond PCD inserts excel in the machining of non-ferrous materials, including high Si Aluminum, copper and brass alloys, magnesium, carbon fiber reinforced plastics, and composites.

CVD is designed for machining aluminum and magnesium alloys, high-silicon aluminum, precious metal alloys, plastics with abrasive fillers, tungsten carbide, and ceramic green



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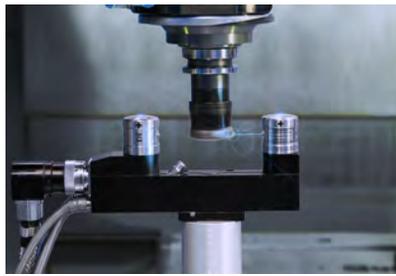


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Carmex states the diamond PCBN inserts deliver high-precision performance and excellent surface finish in materials including hardened and heat-treated steels up to 72

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tics, Renishaw's NC4+ Blue systems deliver significant improvements in tool measurement accuracy, ensuring components can be machined more precisely and with reduced cycle times.

Renishaw reports that compared to red laser sources found in conventional non-contact tool setters, blue laser technology has a shorter wavelength, resulting in improved diffraction effects and optimized laser beam geometry. This enables the measurement of very small tools, while minimizing tool-to-tool measurement errors – a critical consideration when machining with a wide range of cutting tools.

NC4+ Blue systems also use Renishaw's latest non-contact tool setting software packages, which include a new dual measurement mode with auto optimization technology. Combined, these features ensure fast and reliable tool measurement – even in wet conditions.

NC4+ Blue support is now embedded into Renishaw's extensive range of graphical user interfaces, including on-machine and mobile apps such as Renishaw Set and Inspect, and Go-Probe. These consistent, easy-to-use programming platforms are perfect for users who are new to probing or have little machine code knowledge, while still offering operational benefits to more experienced users.

## Blue Laser for On-Machine Tool Measurement —Renishaw

Renishaw announces the launch of its latest non-contact tool setting solution. The new NC4+ Blue system joins the many smart factory process control solutions developed by Renishaw which have been proven to help machine shops across many industries transform their production capabilities.

Building on the success of the enhanced NC4 range of tool setters launched in 2017, the NC4+ Blue is Renishaw's latest evolution of the non-contact tool setter, delivering a step-change in tool measurement accuracy, with tool-to-tool performance proven to the most up-to-date ISO230-10 standards.

Featuring what they report is the industry's first blue laser technology (patent pending) and improved op-

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# ...Hotline Continued From Page 8

from all competitions from 4,000 teams around the globe.

"You got to have sense of timing and you got to be ready for the next match. You could possibly lose a match and lose points," said John Akana, a Madera High School student. The team's captain and driver feel that pressure. In addition to designing the robot, they have the responsibility of making sure the robot performs and accomplishes a certain task in about two minutes.

"So for us - we pick up a ball. We have a roller and it is able to pick up the ball. Other teams use suction cups to pick up the ball and have crazy arms," said Akana.

---

## Ballistic Missile Work in Chandler, AZ.

Orbital Sciences Corp. (a wholly owned subsidiary of Northrop Grumman Innovation Systems), Chandler, Arizona, is being awarded a modification to a previously awarded contract. Under this modification, the contractor will provide Intercontinental Ballistic Missile (ICBM) target capability upgrade kits and associated nonrecurring engineering. The work will be performed in Chandler, Arizona. The performance period is from April 2019 through December 2023.

---

## Western Region Gets Next Generation Jammer Work

L3 Technologies Inc., Salt Lake City, Utah, is awarded \$13,686,773 for modification P00004 to a previously awarded cost-plus-fixed-fee contract to expand the analysis and design of the Next Generation Jammer Low Band (NGJ LB) controller, receiver, exciter, and power generation subsystems. In addition, this modification provides for NGJ LB technique development, incorporation of updated goals documents, and environmental testing of the transmitter group. Work will be performed in Salt Lake City, Utah (53 percent); Carlsbad, California (15 percent); Boulder, Colorado (14 percent); Stuart, Florida (14 percent); Guthrie, Oklahoma (2 percent); and Fullerton, California (2 percent), and is expected to be completed in June 2020.

## Northrop Grumman Woodland Hills, CA. Contract

Northrop Grumman Systems Corp., Woodland Hills, California, has been awarded a contract for Embedded Global Positioning System (GPS)/Inertial Navigation System (EGI) engineering, manufacturing and development. The contract modification provides for the engineering design, development, and test capability to incorporate a modernized GPS receiver card into existing fielded and reducing the number of configurations of future production EGIs. Work will be performed in Woodland Hills, California, and is expected to be complete by Nov. 27, 2020, with two one-year options.

---

## New Plant in Marysville, WA. Will Create 75-100 Jobs

A company that supplies carbon-fiber composite-plastic materials to the aerospace industry in customized configurations will build a new plant in Marysville, mainly to supply Boeing's 777X operation.

Web Industries, headquartered outside Boston, Massachusetts, plans to employ 75 to 100 people once the plant is up to full rate, according to John Jaskot, who runs the company's Boeing and aerospace operations.

To encourage Web to locate the plant in Washington the Department of Commerce provided the company a \$150,000 grant from Gov. Jay Inslee's economic-development strategic-reserve fund.

In a statement welcoming Web's announcement, Inslee said the company's planned investment is "a tremendous addition to one of the most robust carbon fiber composite manufacturing clusters anywhere in the world."

The new facility, to be built on 12 acres of land, will occupy 75,000 square feet for its composites slitting and winding technology, as well as 9,000 square feet of refrigerated warehousing.

Groundbreaking is scheduled for this spring. The plant will begin operations once the building is constructed, equipment is qualified and employees are trained, all targeted for January 2021.

Continued on page 98.....

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# ...Hotline Continued From Page 96

## Electric Vehicle Battery Maker Raises \$88 Million

Electric vehicle battery maker Romeo Systems Inc., also known as Romeo Power Technology, raised \$88 million in a funding round, according to a May 20 filing with the Securities and Exchange Commission.

The Vernon, CA-based company supplies energy-efficient battery packs to car, motorcycle, truck, bus and forklift manufacturers.

The three-year-old company, headed by Michael Patterson, uses lithium-ion technology to boost the energy efficiency of its battery packs and liquid coolant to keep the battery packs from overheating. It's also developed thermal engineering that boosts charging efficiency.

It opened an 113,000-square-foot automated manufacturing facility in Vernon in 2017.

## Viasat Gets \$10M Military Satellite Contract

Carlsbad, CA based Viasat Inc. said it received a contract to build a low Earth orbit satellite for the U.S. military's Link 16 radio system. The Space Enterprise Consortium of the U.S. Air Force made the \$10 million award.

Viasat is developing both the platform and the payload, said Ken Peterman, president of the company's government systems business. The contract includes options for additional capabilities, including cross links between satellites in a future constellation.

## BYD to Install Solar at Antelope Valley, CA. Plant

BYD Motors Ltd. has partnered with Apparent Inc. on a two-megawatt solar and energy storage project at its Lancaster, CA. manufacturing plant.

The Chinese electric vehicle manufacturer will co-own with Apparent, in Novato, the solar energy system and will supply the solar panels and batteries. Apparent will provide its predictive, intelligent grid operating software.

The system is expected to be operational this fall at BYD Coach & Bus, the Lancaster facility that makes electric buses, which will buy power from the system.

## Funrise Acquires Caterpillar Toy License

Funrise Inc. in Van Nuys, CA. has inked a multi-year licensing agreement with Caterpillar Inc. to manufacture and distribute a line of toys based on the company's construction machines and vehicles.

The line will include a wide range of styles in multiple scales for indoor and outdoor use. Some machines will feature working motors, lights, sound effects and radio controls, while others will be freewheeling. Toys will be made of steel and safe for use by kids ages 3 and up.

Funrise also holds the license for Hasbro's Tonka trucks—another line of steel toys modeled after construction vehicles and machinery.

## San Diego Company Adds New 5-Axis CNC Machine

For the last 18 months, Rock West Composites has been engaged in the expansion of machining capability at its San Diego facility. The most recent addition is a new DMS 5-axis CNC machining center with 5' x 10' x 4' of useable volume for working on large composite parts, as well as metallic materials. Rock West Composites will use this high-precision tool to drill, trim and contour parts, including masters, molds, prototypes and composite hardware.

## Boeing Invest in Robotic Skies

Boeing announced its investment in Robotic Skies, a services provider that connects manufacturers and operators of commercial unmanned aircraft systems (UAS) with a global network of more than 170 civil aviation authority-certified repair stations.

"With safety as a cornerstone, we are shaping a robust operational ecosystem for on-demand mobility that supports the future of aircraft, air vehicles and autonomous systems," said Brian Schettler, managing director for Boeing HorizonX Ventures.

Unmanned and autonomous commercial aircraft operations are increasingly mirroring those in manned aviation, including the need for quality maintenance provided by certified technicians," said Brad Hayden, founder and CEO of Robotic Skies. "This latest investment will allow us to continue to grow our global footprint and expand operational capabilities to support customers."

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