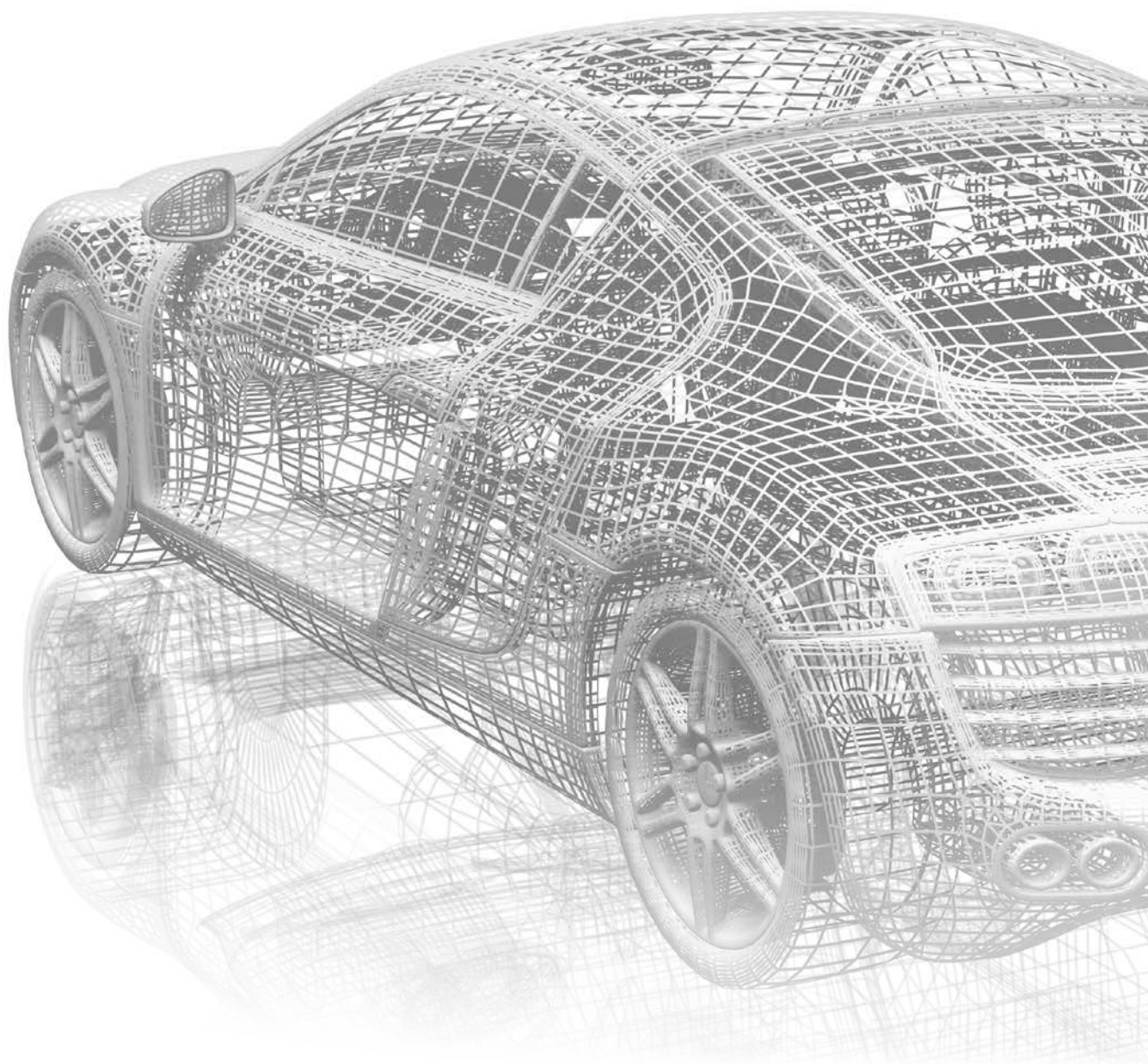


AUTOMOTIVE

MACHINING SOLUTIONS FOR
ELECTRIFIED VEHICLE COMPONENTS,
AXLES, BRAKES & ENGINE COMPONENTS



INDEX

3 MACHINING SOLUTIONS FOR ELECTRIFIED VEHICLE COMPONENTS

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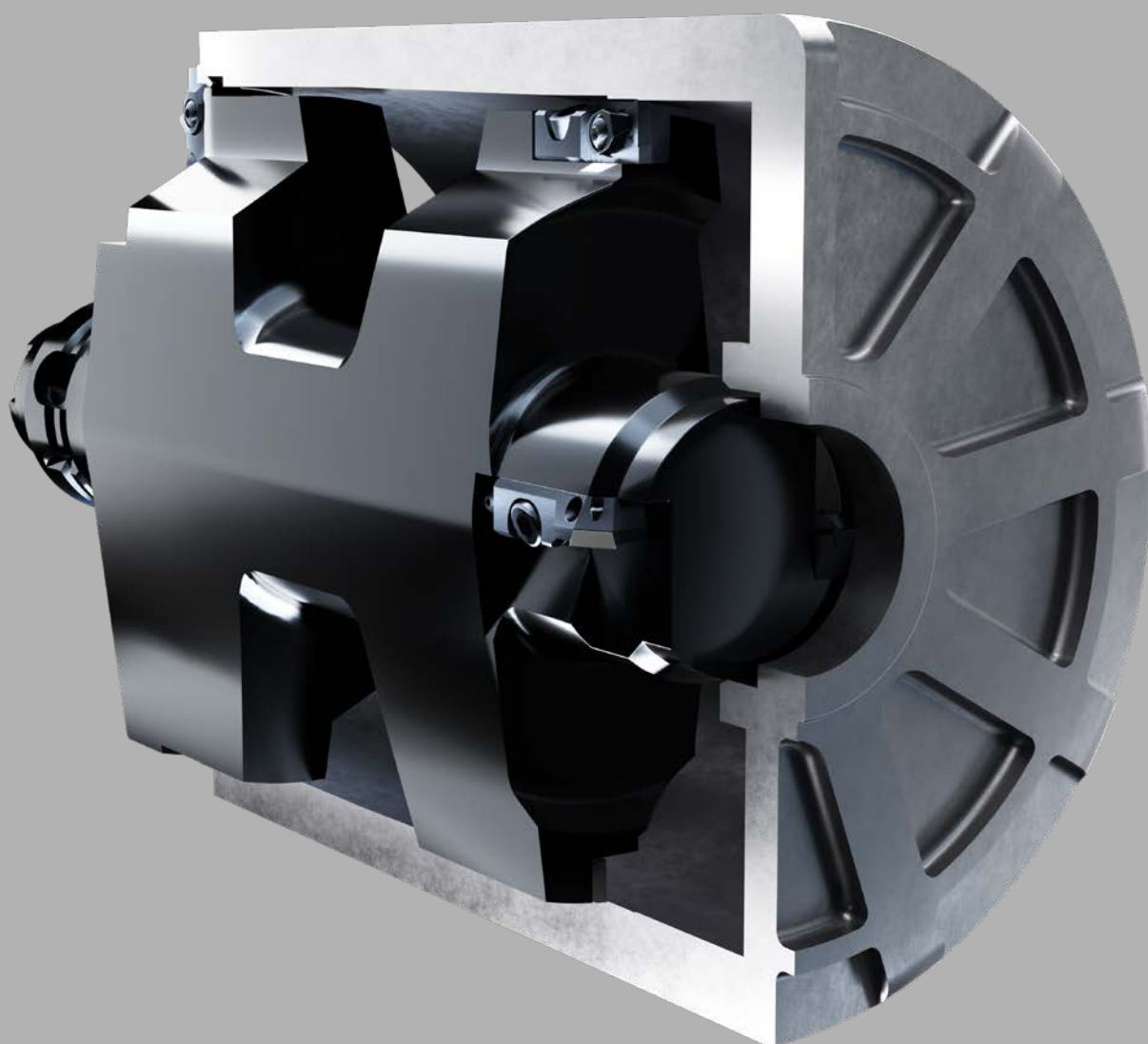
The QR codes in this document can be clicked or scanned and will lead to the relevant brochure or website.

ELECTRIFIED VEHICLE COMPONENTS

NEXT-GENERATION POWERTRAIN MACHINING SOLUTIONS FOR A CARBON-FREE SOCIETY

The electrification of automobile powertrains is one of many global efforts toward realising a carbon emissions-free society.

Applying the technology cultivated over many years of developing tools for conventional powertrains and applying it to solutions based on customers needs for electric vehicles, will contribute to the realisation of carbon neutrality in the automotive industry.

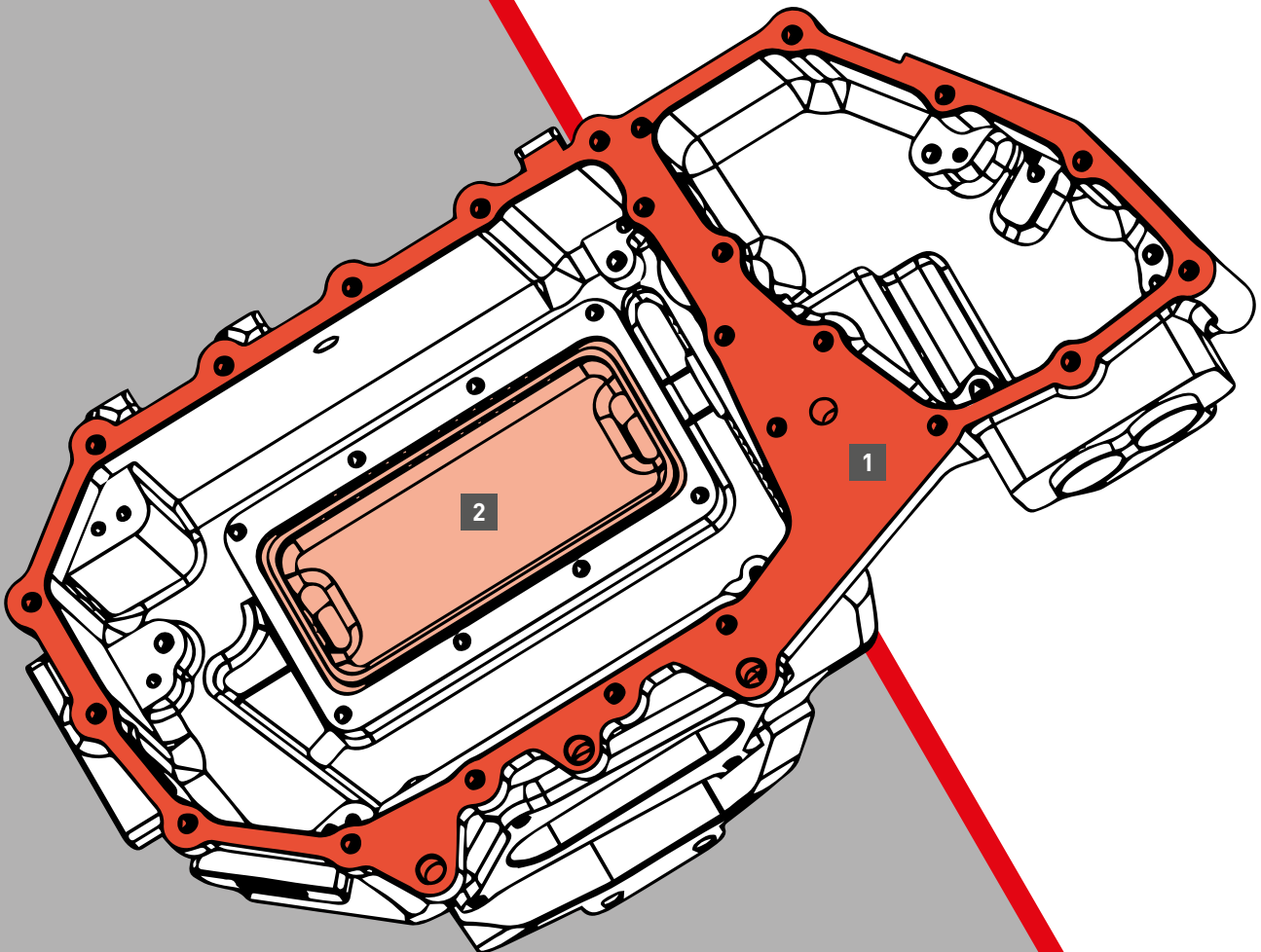


MILLING

INVERTER CASE MACHINING SOLUTION

1 FMAX

2 C2MAL/C2XLAL/C3MAL

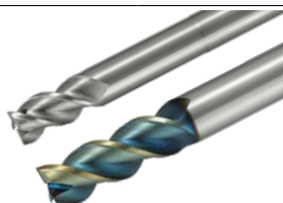


REFERENCE PRODUCT EXAMPLES

High quality milling products ideal for the machining aluminium alloy cases.
Standard products readily available from stock.

MILLING – INVERTER CASE MACHINING SOLUTION

For rough and finish machining of components that have mating faces.

Product	Product picture		Description			More information
MILLING						
1 FMAX Series High feed finish milling cutter		For general use Size: Ø 40 – Ø 165	Range of PCD inserts by application			
		For small spindle machines Size: Ø 100, Ø 125				
		Small number of teeth Size: Ø 50 – Ø 125	General purpose type	Long edge type	Burr prevention type	
	Cutters for high speed, efficiency and precision. A cost effective body with fewer teeth for use on smaller machines is now available.					
VPX Series Multi-functional cutter for high efficiency machining		A high strength, multi-functional cutter with a tangential insert. Capable of high-load machining and ramping. VPX200 Size: Ø 16 – Ø 63 VPX300 Size: Ø 25 – Ø 80				
APX Series Multi-functional indexable cutter		Multi-functional shoulder cutter with high strength, low resistance and precision cutting. As with the VPX type, a screw-in head and integrated arbor are available. APX3000 Size: Ø 12 – Ø 100 APX4000 Size: Ø 25 – Ø 160				
AXD Series For machining of aluminium and titanium alloys		A multi-functional cutter for high speed, efficiency and precision. Ideal for any workpiece geometry. Available with a screw-in head. AXD4000 Size: Ø 20 – Ø 125				
2 C2MAL / C2XLAL / C3MAL Solid end mill for aluminium alloys		A highly versatile series with both DLC coated and uncoated types available. Size: Ø 1 – Ø 12 DLC coating / Solid carbide				
iMX-C3A Exchangeable head end mills, Corner radius head, 3 flute, for aluminium alloys		This highly economical exchangeable head end mill has a rigidity close to that of a solid tool, with the head and holder contact surfaces made of carbide. The holder is available in three types: Straight, Undercut and Taper neck. Size: Ø 10 – Ø 28				
TF15 For VPX Series and AXD Series		TF15, with a hardness of 91.5 HRA, offers high stability and wear resistance. Ideal for machining cast materials, non-ferrous metals and non-metals.				

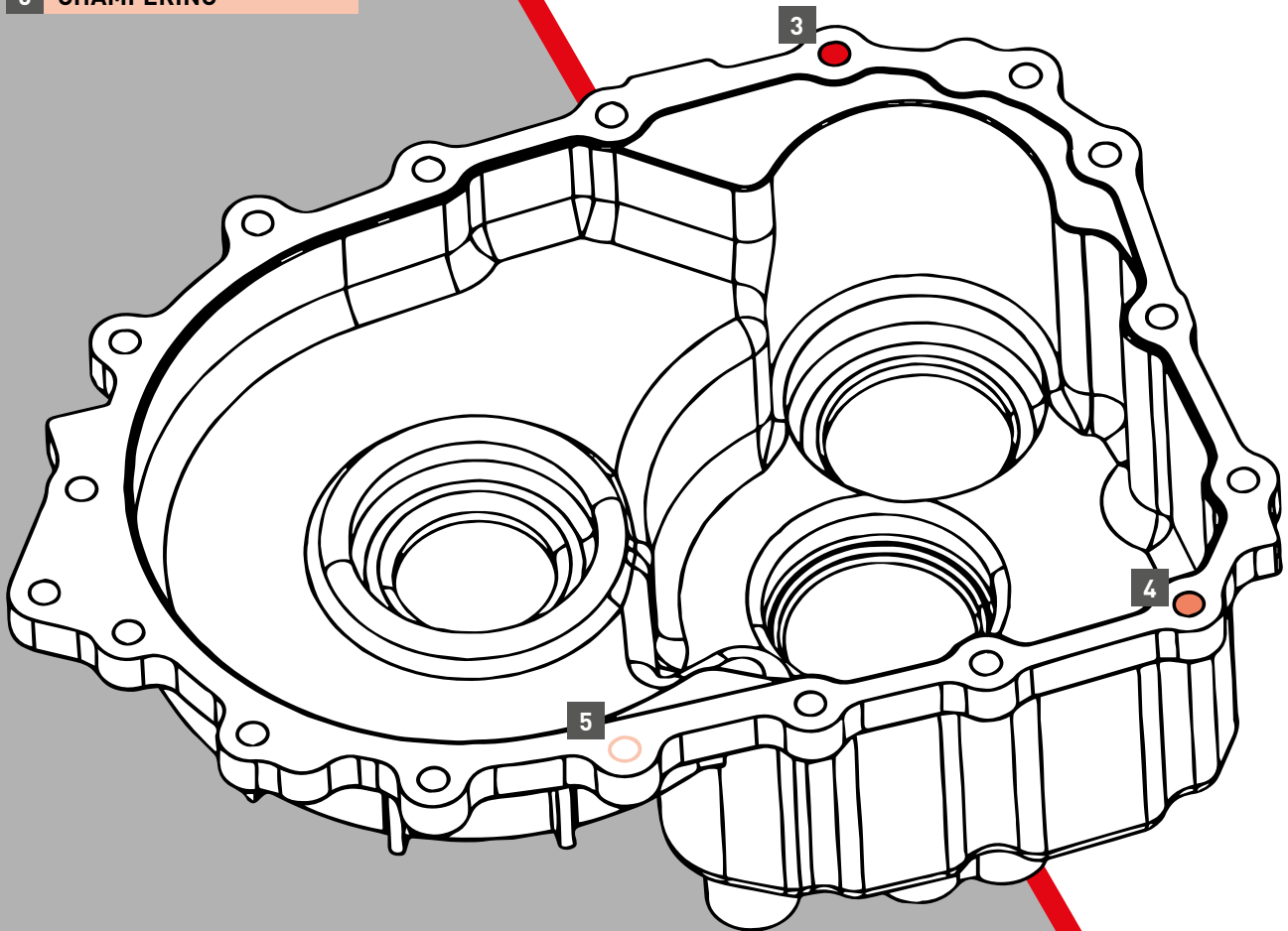
DRILLING

GEAR HOUSING MACHINING SOLUTIONS

3 COMBINED DRILLING

4 DRILLING

5 CHAMFERING



STANDARD AND CUSTOM-MADE PRODUCT REFERENCE EXAMPLES

Specialised, high quality drills for machining aluminium alloys and tools for machining chamfered edges.

Also on offer are custom-made drills for composite machining for customers in Europe.

DRILLING – GEAR HOUSING MACHINING SOLUTIONS

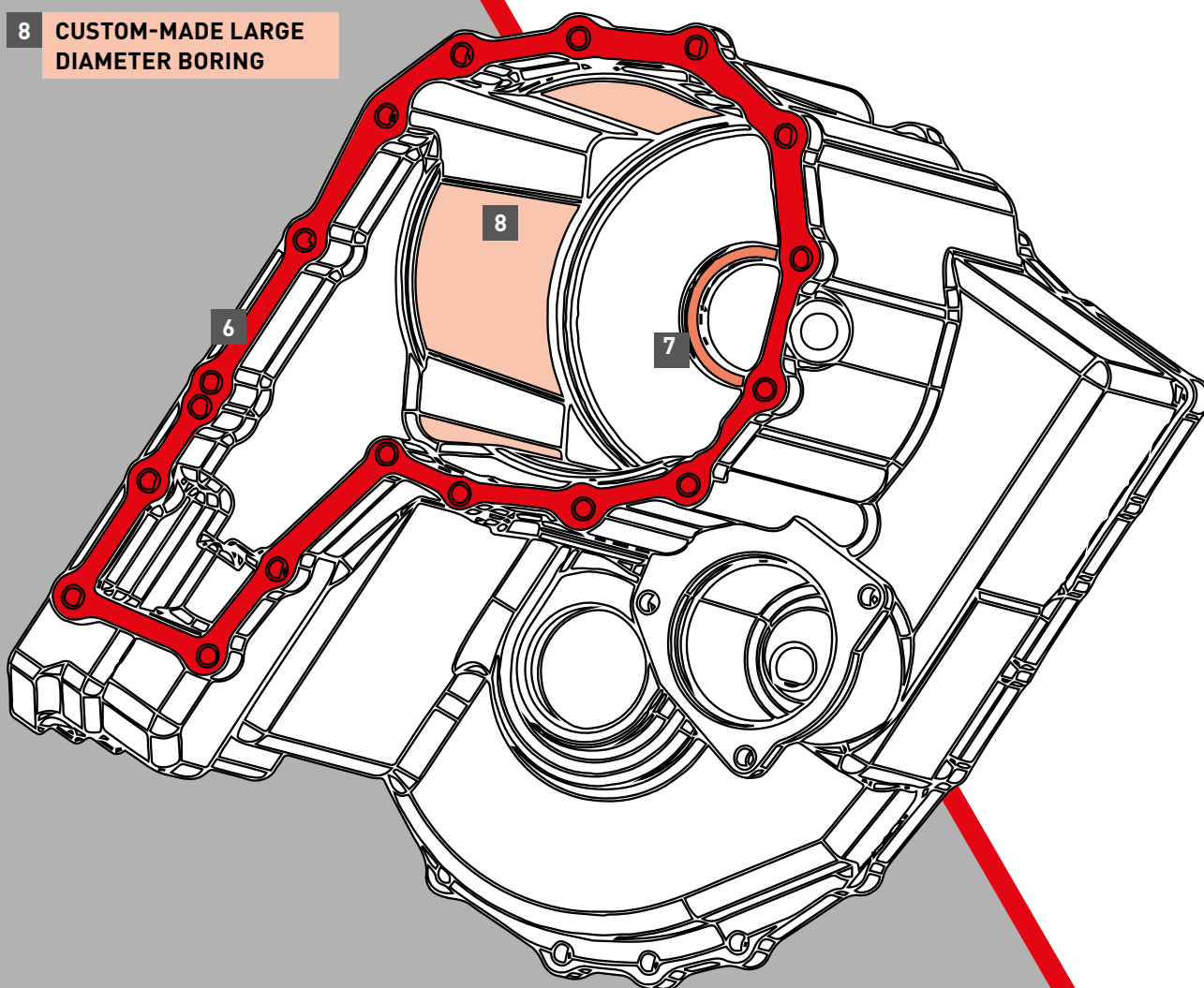
Product	Product picture	Description	More information
COMBINED DRILLING			
3  Step drill PCD step drill PCD drill reamer		Where reduced cycle times and increased tool life are required, it is recommended to use a custom-made tool with a full geometry tailored to the specifications of the workpiece.	
DRILLING			
4 MNS Solid carbide for aluminium alloys WSTAR drill series		Four coolant holes provide pinpoint lubrication, achieving high-feed, highly efficient machining with a feed rate of $V_f = 10.000 \text{ mm/min}$ Size: $\emptyset 3 - \emptyset 14$ L/D: 5 – 30	
MAE/MAS Solid carbide for aluminium alloys		The optimised helix angle of the flutes for aluminium alloy machining and the four margins for extra support enable high-speed, single pass machining with high precision. MAS = Internal coolant / MAE = External coolant Size: $\emptyset 3 - \emptyset 16$ L/D: 3 – 6	 Page 128 - 133
CHAMFERING			
5 DLE Solid carbide drills for centering and chamfering		A versatile centre drill that is ideal for creating a smooth chamfer at the hole entrance before roll tapping. Size: $\emptyset 1 - \emptyset 16$ Point angle: 60°, 90°, 120°, 145°	

CUSTOM-MADE SOLUTIONS

6 CUSTOM-MADE FMAX

7 CUSTOM-MADE
DEEP HOLE BORING

8 CUSTOM-MADE LARGE
DIAMETER BORING



CUSTOM-MADE PRODUCT EXAMPLES

For machining processes that cannot be achieved with standard products, a custom-made tool service for specific needs can now be offered.

CUSTOM-MADE SOLUTIONS

CUTTING EDGE HEIGHT ADJUSTABLE SMALL DIAMETER PCD CUTTER (CUSTOM-MADE FMAX)

6

This small diameter PCD cutter has an adjustable cutting edge height so that it can be used for rough and finish machining. The insert uses a standard design insert.



CUSTOM-MADE DEEP HOLE BORING

7

By using a hybrid body of steel and aluminium alloys a significant weight saving has been made. An optimal design is achievable for each workpiece.



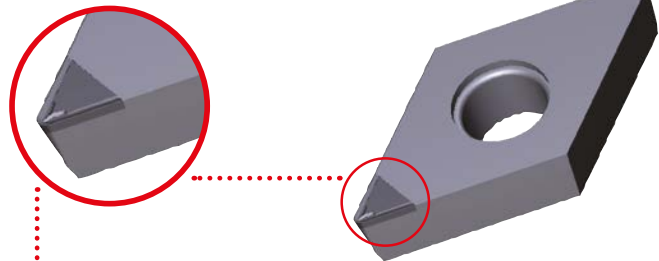
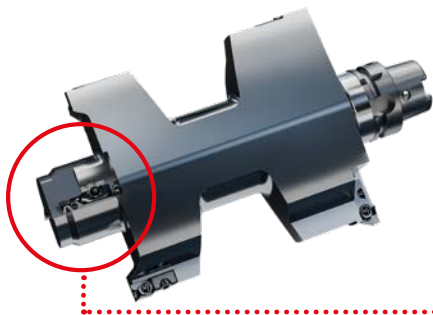
CUSTOM-MADE LARGE DIAMETER BORING

8

Multi-stage boring tools improve machining efficiency.

PCD insert with special 3D chipbreaker

The three-dimensional chipbreaker significantly reduces resistance during cutting and provides excellent chip control.



CARTRIDGE RANGE EXPANSION

In order to handle various EV applications through machining, small sized custom-made cartridges can be purchased.

FEATURES

Changes in chamfer shape

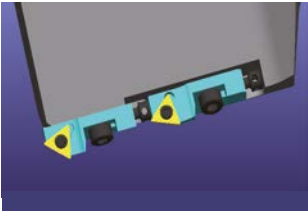
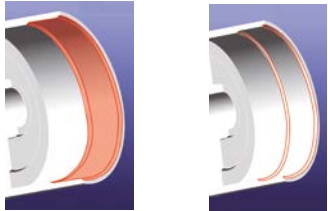
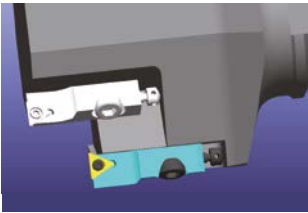
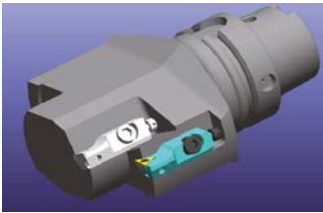
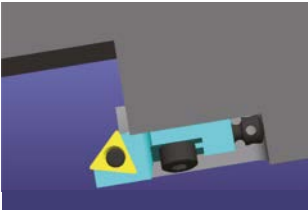
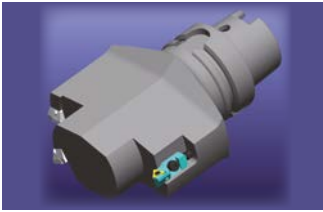
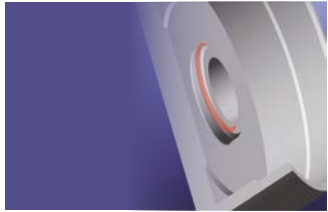
The chamfer geometry of inserted parts with seals has changed. To prevent galling and damage of the seal, chamfer angles have changed from 30° to 45° and from 15° to 40° with a corner radius. A range of cartridges are available suited to the new chamfer angles.

TOOL WEIGHT REDUCTION

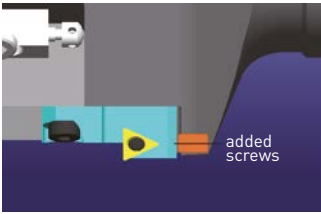
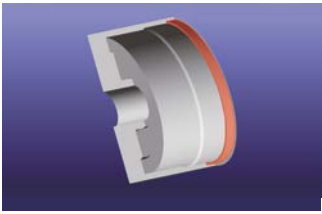
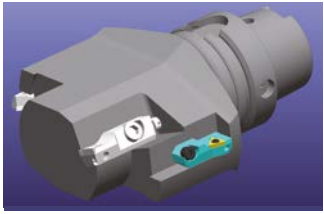
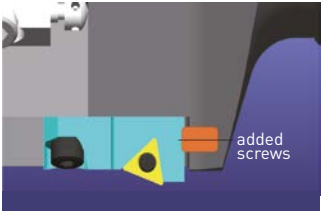
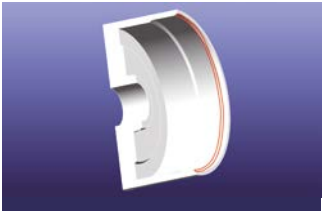
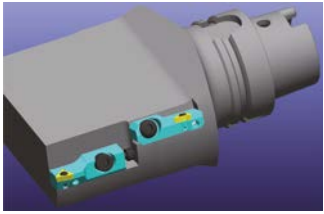
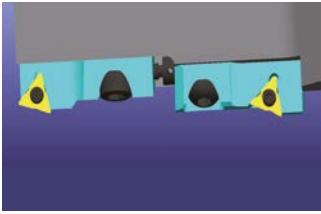
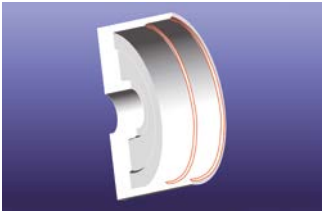
Due to the miniaturisation of equipment, a shift to a configuration with small interfaces such as BT30 is underway. Space saving is achieved by limiting tool weight and momentum. Furthermore, a range of cartridges that can be mounted on composite processing tools to shorten the process are available.

SEAT SURFACE PROCESSING AVAILABLE

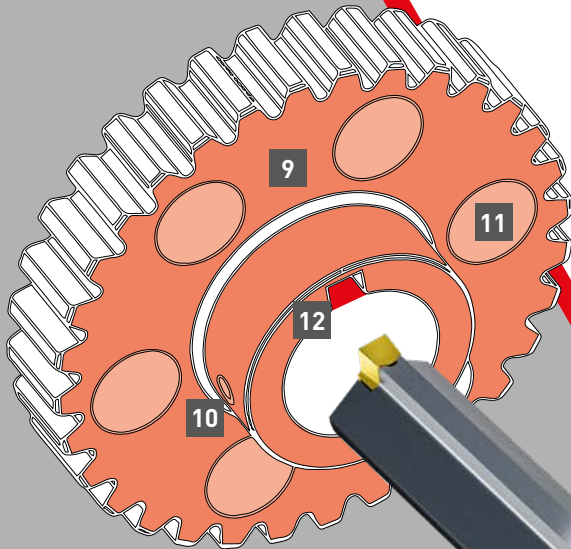
A range of cartridges are now available that enables machining of the inner end surface and chamfering of the outer diameter of the boss.

Cartridge for angled counterbore and chamfering/ Cartridge for chamfering with radius		Machined area
		
Cartridge for boss outer diameter machining		Machined area
		
Cartridge for boss hole entrance chamfering		Machined area
		

CARTRIDGE RANGE EXPANSION

Lightweight cartridge for external diameter machining			Machined area
			
Lightweight cartridge for chamfering			Machined area
			
Lightweight cartridge for chamfering with radius			Machined area
			

GEAR PRODUCTION MACHINING SOLUTIONS



9 BC8200 SERIES

10 MINI-DVAS

11 MVX

Choose between solid carbide and indexable insert drill bits depending on the diameter and tolerance requirements.

12 SLOT MACHINING

This is a special design that enables keyway machining. This previously required dedicated equipment such as a broaching machine, but can now be preformed on a multi-tasking machine.

Slot machining is available as a specialised process. Please contact our technical department for more information.

REFERENCE EXAMPLE OF GEAR MACHINING

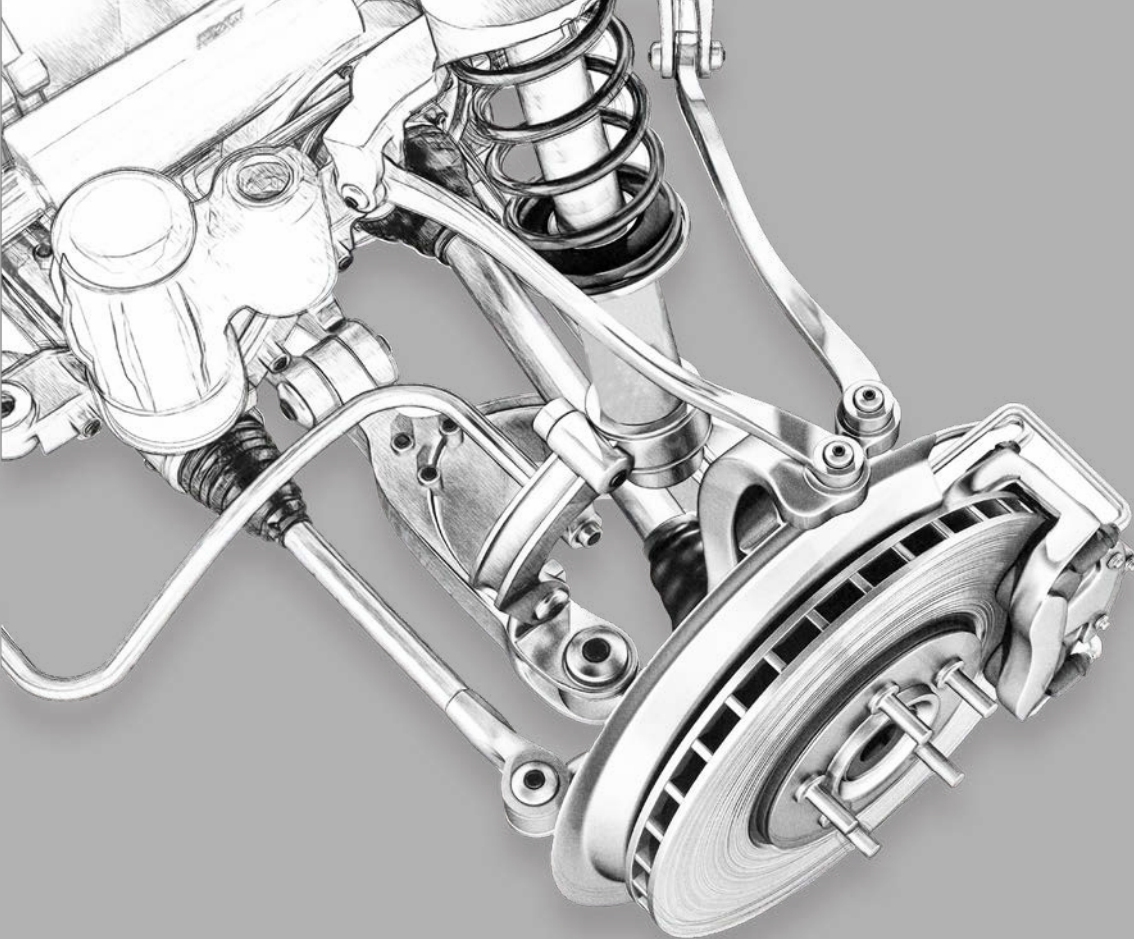
For gear machining of a wide variety of small batches, integrated machining using a multitasking machine, including keyway machining, drilling, etc., is now possible.

GEAR PRODUCTION MACHINING SOLUTIONS

Product	Product picture	Description	More information
TURNING			
9 BC8200 Series Coated PCBN grade for turning hardened steel		Provides long tool life plus excellent wear and fracture resistance when machining high hardness steels. A new BR chipbreaker is provided for large depths of cut.	
MC6100 Series CVD coated grade for steel turning		The further evolved Super Nano Texture Technology improves tool life and wear resistance through a fine, high-density crystal growth process. Achieves stable machining over a wide application range.	
DRILLING			
10 Mini-DVAS Solid carbide TRISTAR drill series		Ideal for small deep hole drilling when reliability is paramount. Featuring a straight cutting edge that improves chip evacuation and a double flute margin for precise hole dimensions. Size: Ø 1.0 – Ø 2.9 L/D: 2D – 50D	
MPS1 High performance solid carbide drill		High performance solid carbide drill. An optimised edge and flute geometry, together with through coolant enables high quality deep hole drilling. Size: Ø 3.0 – Ø 20.0 L/D: 2D – 40D (depending on the diameters)	
11 MVX Indexable insert drill		Increased hardness of the drill body surface improves abrasion resistance from chips. A wide range of insert types are available, including a UH chipbreaker to prevent chipping when machining hardened steels. Size: Ø 14 – Ø 63 L/D: 2 – 6	

INSERT RECOMMENDATION FOR MVX

Material	1st Recommendation		When outer insert fractures	
	Outer Insert	Inner Insert	Outer Insert	Inner Insert
P Mild steel, Alloy steel	MC1020	VP15TF	VP15TF	VP15TF
				
	UM Chipbreaker	UM Chipbreaker	UM Chipbreaker	UM Chipbreaker



AXLE AND BRAKE

MACHINING SOLUTIONS FOR AXLE AND BRAKE SYSTEM PARTS THAT HAVE EVOLVED WITH THE DEVELOPMENT OF THE AUTOMOBILE INDUSTRY

Since the development of the world's first steam powered three-wheeled automobile by Nicolas-Joseph Cugnot in 1769, there has been huge technological advances in powertrains and drivetrains.

Axles and brake components have also undergone significant evolution as consumers seek automobiles that combine speed, comfort and safety. With the trend towards electrification of automobiles, it is expected that even greater advances will be made, such as lighter weight axles and brake parts, electronic control and regenerative energy mechanisms.

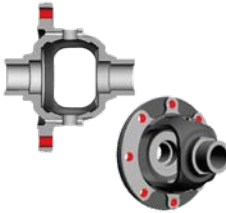
Amid these changes, Mitsubishi Materials will continue to evolve and develop through the use of inherited technologies.



DUCTILE CAST IRON



DIFFERENTIAL CASE MACHINING SOLUTIONS

Product	Product picture	Description	Machining area	More information
TURNING				
MC5100 Series CVD coated grades for cast iron turning		The advanced Super Nano Texture technology improves tool life and wear resistance through a fine, high-density crystal growth process. A series of grades have been developed with different concepts to accommodate a wide range of turning applications, including grey and ductile cast iron, continuous and interrupted cutting.		
MILLING				
VPX Series Multi-functional cutter for high efficiency machining		A high strength, multi-functional cutter with a tangential insert. Capable of high-load machining and ramping. Also available with a screw-in head. VPX200 Size: Ø 16 – Ø 63 VPX300 Size: Ø 25 – Ø 80		
MV1000 Series Coated carbide grade for milling		This coated carbide grade achieves excellent wear resistance by adopting the newly developed Al-Rich coating technology, which uses an (Al,Ti)N film that combines a high Al content ratio with extreme hardness that significantly improves oxidation resistance. It demonstrates an unprecedented high performance when machining ductile cast iron.		
DRILLING				
MPS1 High performance solid carbide drill		High performance solid carbide drill. An optimised cutting edge and flute geometry, together with through coolant enables high quality deep hole drilling. Size: Ø 3.0 – Ø 20.0 L/D: 2D – 40D (depending on the diameters)		
REAMING				
RX1S Exchangeable head reamer		Exchangeable head reamer that achieves high contact accuracy of 3 µm or less on the front and outer circumference by utilising the double restraint of the tapered surface and centre lock screw. The finishing hole tolerance meets h7 standards. Head size: Ø 14 – Ø 29		

DIFFERENTIAL CASE MACHINING SOLUTIONS

CUSTOM-MADE PRODUCTS

For machining processes that cannot be achieved with standard products, a custom-made tool service for specific needs can now be offered.

BORING TOOLS



COUNTER BORING TOOL

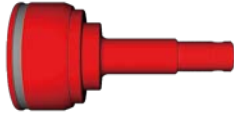
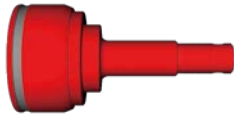
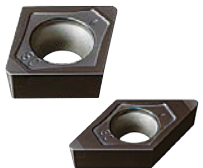
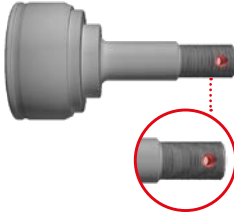
This is an economical indexable tool designed for case inner diameter machining using a dedicated machine.



Banana geometry tool

P CARBON STEEL

CONSTANT VELOCITY JOINT MACHINING SOLUTIONS

Product	Product picture	Description	Machining area	More information
TURNING				
BC8200 Series Coated CBN grade for turning hardened steel		Provides long tool life plus excellent wear and fracture resistance when machining high hardness steels. A new BR chipbreaker is provided for larger depths of cut.	 For finish machining	
MC6100 Series CVD coated grade for steel turning		The advanced Super Nano Texture Technology improves tool life and wear resistance through a fine, high-density crystal growth process. Achieves stable machining over a wide application area.	 For rough machining	
BC8130 Coated CBN grade for turning hardened steel		Provides long tool life plus excellent wear and fracture resistance when machining high hardness steels. It has the highest fracture resistance in the BC8100 series, making it ideal for unstable and heavy interrupted machining.		
DRILLING				
DFAS Internal coolant type solid carbide flat bottom drill		Adoption of Tri-Cooling technology with a unique coolant hole geometry improves chip evacuation and cutting heat dissipation. In addition, XR thinning exhibits low cutting resistance and excellent chip breaking properties. Size: Ø 3 – Ø 14 L/D: 3D, 5D		

CONSTANT VELOCITY JOINT MACHINING SOLUTIONS

CUSTOM-MADE PRODUCTS

For machining processes that cannot be achieved with standard products, a custom-made tool service for specific needs can now be offered.

MILLING TOOLS SOLID CARBIDE END MILLS

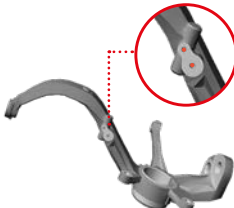


When machining the window frame of the ball cage, the high cutting edge rigidity suppresses deflection during machining. The use of a highly wear-resistant surface treatment and carbide substrate achieves a long tool life.





STEERING KNUCKLE MACHINING SOLUTION

Product	Product picture	Description	Machining area	More information
MILLING				
VPX Series Multi-functional cutter for high efficiency machining		A high strength, multi-functional cutter with a tangential insert. Capable of high-load machining and ramping. VPX200 Size: Ø 16 – Ø 63 VPX300 Size: Ø 25 – Ø 80		
WWX Series Double sided inserts type, shoulder mill		A unique X-geometry insert is used to maximise rigidity, and the economy of having six usable corners on both sides and the Large R-wiper edge provides a good surface finish. WWX200 Size: Ø 25 – Ø 160 WWX300 Size: Ø 50 – Ø 250		
Mplus... DCV3/4/5 Exchangeable inserts, side cutter		The side cutter is a tool for machining grooves and sides of workpieces. Featuring excellent suppression of chatter and vibration due to its low resistance and strong clamping force. Inserts are available from stock and cutter bodies can also be custom-made.		
MV1000 Series Coated carbide grade for milling		This coated carbide grade achieves excellent wear resistance by adopting the newly developed Al-Rich coating technology, which uses an (Al,Ti)N film that combines a high Al content ratio with extreme hardness that significantly improves oxidation resistance. It demonstrates an unprecedented high performance when machining ductile cast iron.		
DRILLING				
MPS1 High performance solid carbide drill		High performance solid carbide drill. An optimised cutting edge and flute geometry, together with through coolant enables high quality deep hole drilling. Size: Ø 3.0 – Ø 20.0 L/D: 2D – 40D (depending on the diameters)		
Mini-DVAS Solid carbide TRISTAR drill series		Ideal for small deep hole drilling when reliability is paramount. Featuring a straight cutting edge that improves chip evacuation and a double flute margin for precise hole dimensions. Size: Ø 1.0 – Ø 2.9 L/D: 2D – 50D		

STEERING KNUCKLE MACHINING SOLUTION

Product	Product picture	Description	Machining area	More information
INDEXABLE DRILL				
MVX Indexable insert drill		Increased hardness of the drill body surface improves abrasion resistance to chips. A wide range of insert types are available, including a UH chipbreaker to prevent chipping when machining hardened steels. Size: Ø 14 – Ø 63 L/D: 2D – 6D		
				2/2

INSERT RECOMMENDATION FOR MVX

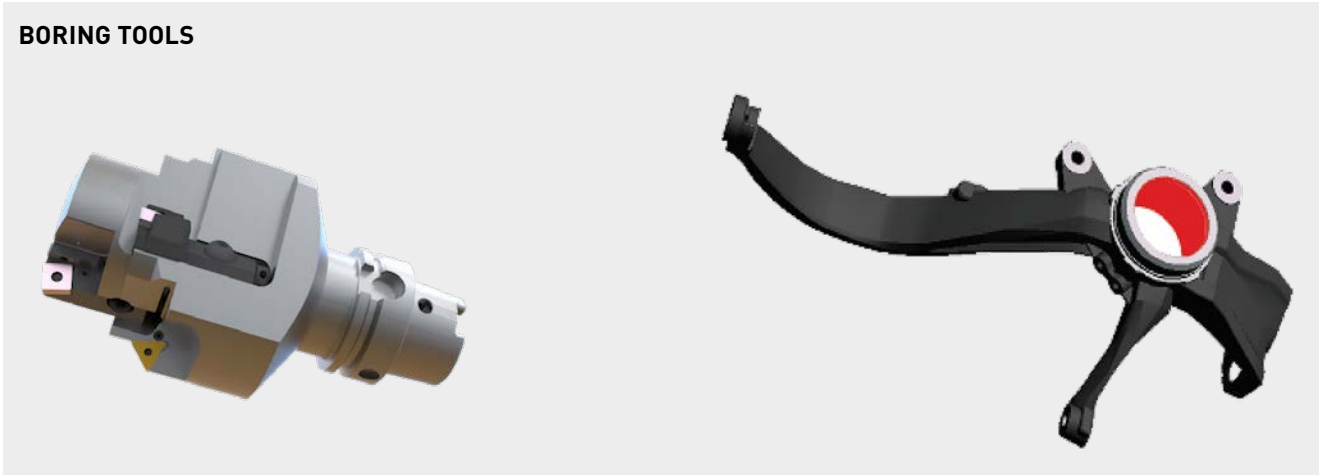
Material	1st Recommendation		When outer insert fractures	
	Outer Insert	Inner Insert	Outer Insert	Inner Insert
K Cast iron	MC5020	VP15TF	VP15TF	VP15TF
				
	UM Chipbreaker	UM Chipbreaker	UM Chipbreaker	UM Chipbreaker

STEERING KNUCKLE MACHINING SOLUTION

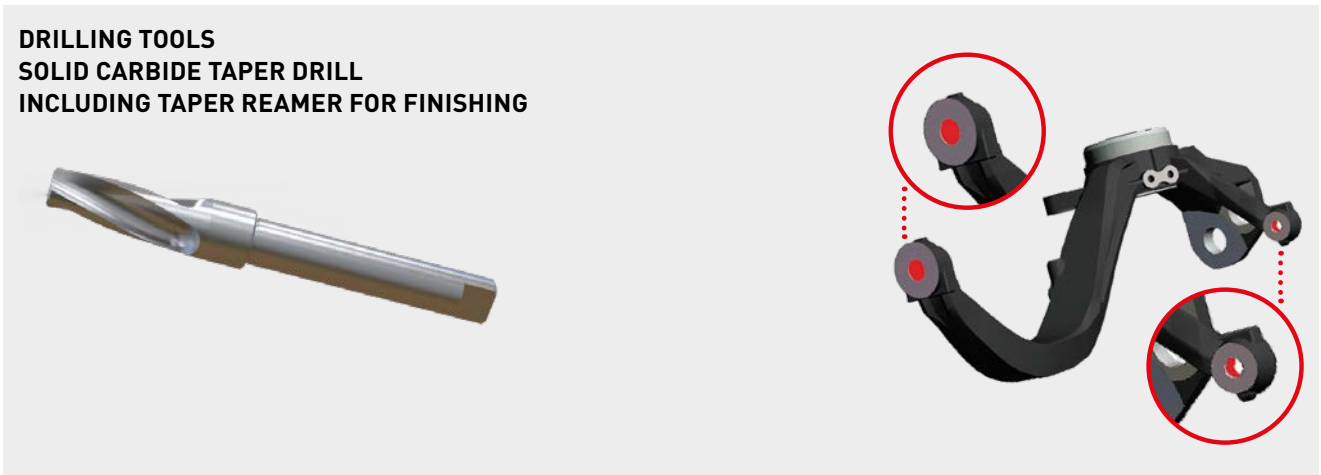
CUSTOM-MADE PRODUCTS

For machining processes that cannot be achieved with standard products, a custom-made tool service for specific needs can now be offered.

BORING TOOLS



DRILLING TOOLS SOLID CARBIDE TAPER DRILL INCLUDING TAPER REAMER FOR FINISHING



N ALUMINIUM ALLOYS


STEERING KNUCKLE MACHINING SOLUTION

Product	Product picture	Description	Machining area	More information
MILLING				
AXD Series For machining of aluminium and titanium alloys		A multi-functional cutter that realizes high speed, high efficiency and high precision machining featuring a unique technology and can handle any machining form. With a newly designed screw-in head. The inserts available are a DLC coated grade LC15TF, which exhibits excellent welding resistance. AXD4000 Size: Ø 20 – Ø 125		
SFMAX-S FMAX-S Cutting edge height adjustable small diameter PCD cutter		This small diameter PCD cutter has an adjustable cutting edge height that can be used for rough and finish machining. The cutter body uses a screw-in head type, and the arbor can be selected from a wide variety depending on the application. Size: Ø 20 – Ø 38	 semi-standard	
 DCV3/4/5 Exchangeable inserts, side cutter		The side cutter is a tool for machining grooves and sides of workpieces, and features excellent suppression of chatter and vibration due to its low resistance and strong clamping force. Insert grades for non-ferrous metals and cutter bodies are custom-made. Only uncoated inserts are available but they can be coated at a later date. Information is available from the technical department.		
DRILLING				
MNS Solid carbide for aluminium alloys		Four coolant holes provide pinpoint lubrication, achieving high-feed, highly efficient machining with a feed rate of $V_f = 10.000 \text{ mm/min}$ Size: Ø 3 – Ø 20 L/D: 5D – 30D		
DLC coated solid carbide drill		When drilling aluminium alloys, the highly lubricating DLC coating improves welding resistance and achieves high-quality surfaces and stable machining.		

STEERING KNUCKLE MACHINING SOLUTION

CUSTOM-MADE PRODUCTS

For machining processes that cannot be achieved with standard products, a custom-made tool service for specific needs can now be offered.

BORING TOOLS



P CARBON STEEL

HUB

MACHINING SOLUTIONS

Product	Product picture	Description	Machining area	More information
TURNING				
MC6100 Series CVD coated grade for steel turning		The advanced Super Nano Texture Technology improves tool life and wear resistance tenfold by a fine, high-density crystal growth process. Achieves stable machining over a wide application range.		
Dimple Bar Series Chatter resistant boring bars		The highly rigid, lightweight head geometry created through simulation analysis prevents deflection during machining and suppresses chatter and vibration. Internal coolant type is also available for both carbide and steel shanks.		
DRILLING				
DLE Solid carbide drills for centering and chamfering		The excellent point and sharp cutting edge geometry reduces cutting resistance and achieves good hole quality. Size: $\varnothing 1 - \varnothing 16$ Point Angle: 60°, 90°, 120°, 145°		
MVX Indexable insert drill		Increased hardness of the drill body surface improves abrasion resistance by chips. A wide range of insert types are available, including a UH chipbreaker to prevent chipping when machining hardened steels. Size: $\varnothing 14 - \varnothing 63$ L/D: 2D - 6D		

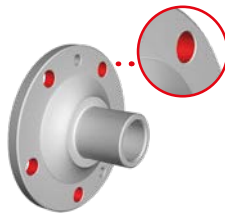
INSERT RECOMMENDATION FOR MVX

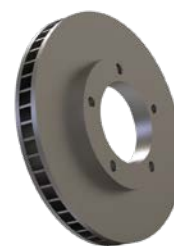
Material	1st Recommendation		When outer insert fractures	
	Outer Insert	Inner Insert	Outer Insert	Inner Insert
P Mild steel, Alloy steel	MC1020	VP15TF	VP15TF	VP15TF
	UM Chipbreaker	UM Chipbreaker	UM Chipbreaker	UM Chipbreaker

HUB MACHINING SOLUTIONS

CUSTOM-MADE PRODUCTS

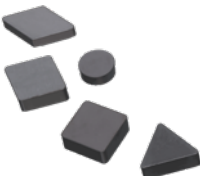
For machining processes that cannot be achieved with standard products, a custom-made tool service for specific needs can now be offered.

Product	Product picture	Description	Machining area	More information
DRILLING				
DP6020 PVD coated carbide grade for solid drills		The "Al-Cr-Si-Ti-N" multi-layer coating provides incredible wear resistance during high-speed and high-efficiency drilling of carbon steel and alloy steels.		

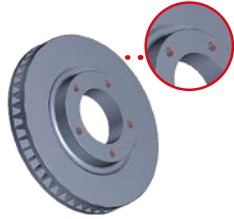
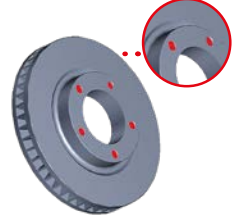
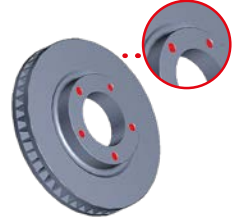
K CAST IRON

DISC BRAKE

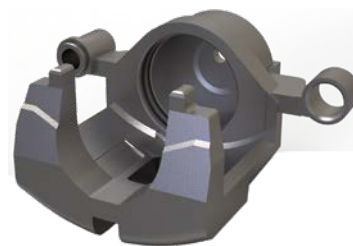
MACHINING SOLUTIONS

Product	Product picture	Description	Machining area	More information
TURNING				
MC5100 Series CVD coated grades for cast iron turning		The advanced Super Nano Texture technology improves tool life and wear resistance through a fine, high-density crystal growth process. A series of grades have been developed with different concepts to accommodate a wide range of turning applications, including continuous and interrupted cutting of grey and ductile cast iron.		
BC5110 Coated CBN grade for cast iron		Suitable for $ap < 1$ mm - mainly for finishing operations where a tough grade for long tool life is required. Max. cutting speed 1.000 m/min; but recommendation of max. 600 m/min; mainly for old machines that cannot run at higher speeds.		
MB4120 Uncoated CBN insert		Suitable for $ap < 1$ mm - mainly for finishing operations at cutting speeds > 600 m/min. Lower cost compared to BC5110.		
MBS140 Solid PCBN grade for machining cast iron and sintered alloy		Uncoated, solid CBN insert. Suitable for $ap > 1$ mm - mainly for roughing operations.		
Dimple Bar Series Chatter resistant boring bars		The highly rigid, lightweight head geometry created through simulation analysis prevents deflection during machining and suppresses chatter and vibration. Internal coolant type is also available for both carbide and steel shanks.		
GY Series Grooving system		Adoption of the "TRI-LOCK System" greatly improves holder rigidity, enabling highly efficient machining even with modular tools. Combinations of holders and inserts can be used to meet a wide variety of machining needs.		

DISC BRAKE MACHINING SOLUTIONS

Product	Product picture	Description	Machining area	More information
DRILLING				
DLE Solid carbide drills for centring and chamfering		The excellent point and sharp cutting edge geometry reduces cutting resistance and achieves good hole quality. Size: Ø 1 – Ø 16 Point Angle: 60°, 90°, 120°, 145°		
MPS1 High performance solid carbide drill		High performance solid carbide drill. An optimised edge and flute geometry, together with through coolant enables high quality deep hole drilling. Size: Ø 3.0 – Ø 20.0 L/D: 2D – 40D (depending on the diameters)		
Mini-DVAS Solid carbide TRISTAR drill series		Ideal for small deep hole drilling when reliability is paramount. Featuring a straight cutting edge that improves chip evacuation and a double flute margin for precise hole dimensions. Size: Ø 1.0 – Ø 2.9 L/D: 2D – 50D		

2/2



BRAKE CALIPER MACHINING SOLUTIONS

Product	Product picture	Description	Machining area	More information
MILLING				
Mplus... DCV3/4/5 Exchangeable inserts, Side cutter		The side cutter is a tool for machining grooves and sides of workpieces. Featuring excellent suppression of chatter and vibration due to its low resistance and strong clamping force. Inserts are available from stock and cutter bodies can be custom-made.		
MV1000 Series Coated carbide grade for milling		This coated carbide grade achieves excellent wear resistance by adopting the newly developed Al-Rich coating technology, which uses an (Al,Ti) ₂ N film that combines a high Al content ratio with extreme hardness that significantly improves oxidation resistance. It demonstrates an unprecedented high performance when machining ductile cast iron.		
DRILLING				
MPS1 High performance solid carbide drill		High performance solid carbide drill. An optimised edge and flute geometry, together with through coolant enables high quality deep hole drilling. Size: Ø 3.0 – Ø 20.0 L/D: 2D – 40D (depending on the diameters)		
Mini-DVAS Solid carbide TRISTAR drill series		Ideal for small deep hole drilling when reliability is paramount. Featuring a straight cutting edge that improves chip evacuation and a double flute margin for precise hole dimensions. Size: Ø 1.0 – Ø 2.9 L/D: 2D – 50D		
TURNING				
MC5100 Series CVD coated grades for cast iron turning		The advanced Super Nano Texture technology improves tool life and wear resistance through a fine, high-density crystal growth process. A series of grades have been developed with different concepts to accommodate a wide range of turning applications, including continuous and interrupted cutting of grey and ductile cast iron.		

BRAKE CALIPER MACHINING SOLUTIONS

CUSTOM-MADE PRODUCTS

For machining processes that cannot be achieved with standard products, a custom-made tool service for specific needs can now be offered.

BORING TOOLS



BOOT GROOVE MACHINING TOOLS



N ALUMINIUM ALLOYS


BRAKE CALIPER MACHINING SOLUTIONS

CUSTOM-MADE PRODUCTS

For machining processes that cannot be achieved with standard products, a custom-made tool service for specific needs can now be offered.

Product	Product picture	Description	Machining area	More information
MILLING				
<i>Mplus...</i> DCV3/4/5 Exchangeable inserts, side cutter		The side cutter is a tool for machining grooves and sides of workpieces, and has excellent suppression of chatter and vibration due to its low resistance and strong clamping force. Grades for non-ferrous metals and cutter bodies are custom-made.		
DRILLING				
DLC coated solid carbide drill		When drilling aluminium alloys, the highly lubricating DLC coating improves welding resistance and achieves high-quality surfaces and stable machining.		

K DUCTILE CAST IRON

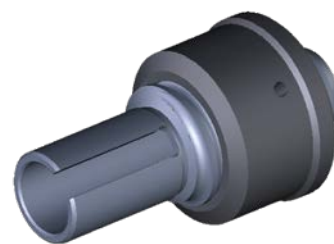
MOUNTING BRACKET

MACHINING SOLUTION

Product	Product picture	Description	Machining area	More information
MILLING				
Mplus... DCV3/4/5 Exchangeable inserts, Side cutter		The side cutter is a tool for machining grooves and sides of workpieces, and has excellent suppression of chatter and vibration due to its low resistance and strong clamping force. Inserts are stocked as standard items, and cutter bodies can be custom-made to meet your needs.		
APX Series Multi-Functional indexable cutter		Multi-functional shoulder cutter that pursues high strength, low resistance and precision cutting. A screw-in head and integrated arbor is also offered. APX3000 Size: Ø 12 – Ø 100 APX4000 Size: Ø 25 – Ø 160		
MV1000 Series Coated carbide grade for milling		This coated carbide grade achieves excellent wear resistance by adopting the newly developed Al-Rich coating technology, which uses an (Al,Ti)N film that combines a high Al content ratio with extreme hardness that significantly improves oxidation resistance. It demonstrates an unprecedented high performance when machining ductile cast iron.		
DRILLING				
Mini DVAS Solid carbide TRISTAR drill series		A fast, reliable and accurate series of small diameter drills. Using the new DP1120 coated carbide grade, advanced through coolant, a new XR point geometry and a tough but sharp cutting edge. Size: Ø 1.0 – Ø 2.9 L/D: 2D – 50D		

P CARBON STEEL

Tools for Swiss-Type Automatic Lathes

**BALL SCREW MACHINING SOLUTION FOR
ELECTRO-HYDRAULIC BRAKE SYSTEM**

Product	Product picture	Description	Machining area	More information
TURNING				
MC6100 Series CVD coated grade for steel turning		The advanced Super Nano Texture Technology improves tool life and wear resistance through a fine, high-density crystal growth process. Achieves stable machining over a wide range of applications.	 For rough turning	
MP3025 PVD coated cermet grade for steel turning		The improved adhesion and uniform flank wear characteristics, supported by the improved PVD coating technology and dedicated base material, ensures excellent surface quality. Ideal for mass production of small parts.	 For finish turning	
Monoblock holder for Swiss-Type Automatic Lathes Cutting off and grooving system		A new high-rigidity design has been adopted that optimises the geometry of the upper and lower jaws of the holder to suppress chatter and vibration during machining and improve machining defects during cut-off such as core residue and chipping.		
DRILLING				
DWAE Solid carbide drills for Swiss-Type Automatic & Small CNC lathes WSTAR drill series		The flute length has been optimised for Swiss-type automatic lathe machining. Tool rigidity and chip evacuation are improved by adopting a cutting edge treatment that achieves both sharpness and durability due to an optimised groove geometry. Size: Ø 1 – Ø 14 L/D: 2D, 4D		
MILLING				
MP2ES/ MP3ES/ MP4EC For small parts machining		The overall length and cutting length are designed to fit overhanging tool posts of Swiss-type automatic lathes, allowing machining without interference. The optimised cutting edge geometry improves chipping resistance and reduces burrs. MP2ES 2 flute Size: Ø 3 – Ø 10 MP3ES 3 flute Size: Ø 3 – Ø 12 MP3ES 4 flute Size: Ø 3 – Ø 14		
BORING TOOLS				
Boring bars For small parts machining		Three types of overall length are standardised to suit Swiss-type automatic lathes. Convenience has been improved by eliminating the need to cut the shank to prevent interference. Shank materials can also be selected.		

Tools for Swiss-Type Automatic Lathes

BALL SCREW MACHINING SOLUTION FOR ELECTRO-HYDRAULIC BRAKE SYSTEM

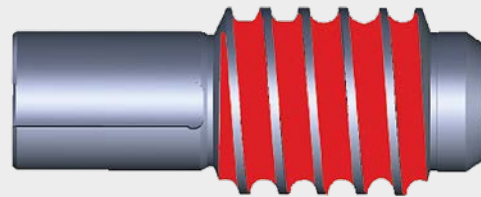
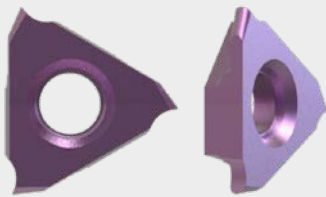
CUSTOM-MADE PRODUCTS

For machining processes that cannot be achieved with standard products, a custom-made tool service for specific needs can now be offered.

TURNING TOOLS

Custom-Made
Thread cutting tools

GTAT INSERTS



P CARBON STEEL

Tools for Swiss-Type Automatic Lathes

PISTON ROD



Product	Product picture	Description	Machining area	More information
TURNING				
MS6015 / MS7025 / MS9025 PVD coated grades for high precision and small parts machining		When cutting a variety of work materials on an automatic lathe, the combination of a dedicated carbide substrate and PVD coating ensures stable surface finishes and dimensional accuracy.		
DRILLING				
DFAS Internal coolant type solid carbide flat bottom drill		Adoption of Tri-Cooling technology with a unique coolant hole geometry improves chip evacuation and cutting heat dissipation. In addition, XR thinning exhibits low cutting resistance and excellent chip breaking properties. Size: Ø 3 – Ø 14 L/D: 3D, 5D		

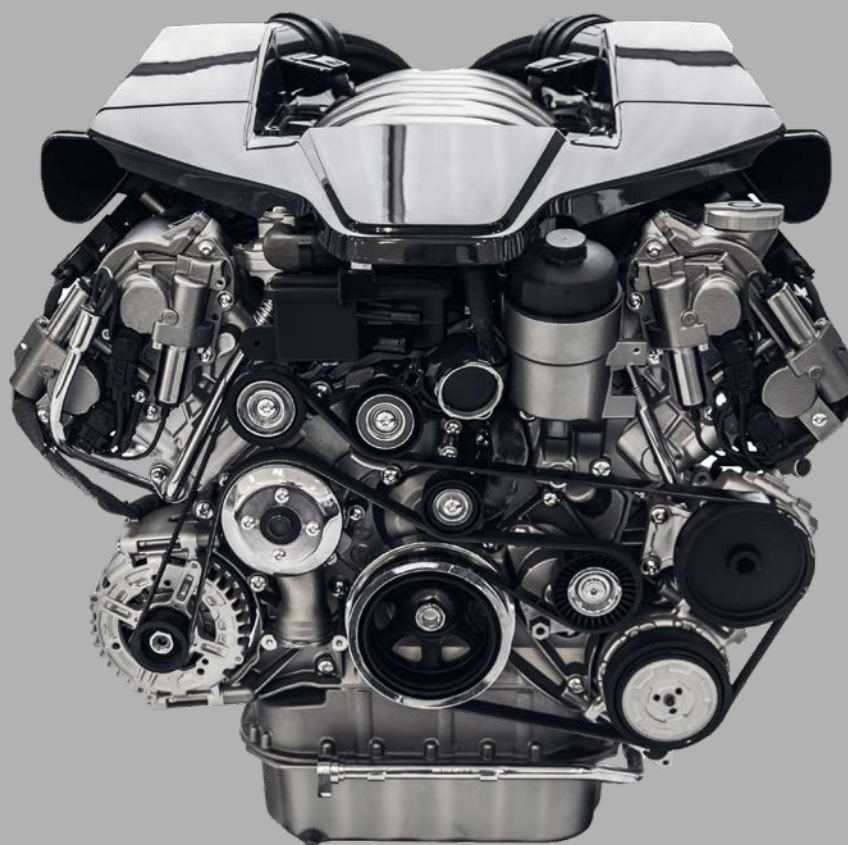
ENGINE COMPONENTS

MACHINING SOLUTIONS FOR INTERNAL COMBUSTION ENGINE COMPONENTS - ENSURING YOUR COMPETITIVENESS ALSO IN FUTURE

Despite the transition to electromobility, the combustion engine will remain the most important drive concept in the coming years – in some cases expanded by electric drives to form complex hybrid powertrains.

In a global automotive market set to undergo complete transformation in the coming decades, the need for continuous process optimisation and increased productivity is more pressing than ever.

Their extensive experience in this field means that Mitsubishi Materials are the optimum partner to choose for the challenges of the future – feel free to contact us!

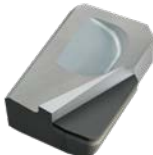




CYLINDER CRANKCASE

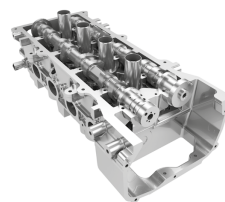
ENGINE CYLINDER BLOCK

Maintaining the engine's stability and lubrication while withstanding a variety of temperatures and loads. Transferring oil to all parts of the engine, lubricating all the critical components, via a number of oil galleries.

Product	Product picture		Description	More information
MILLING				
FMAX Series High feed finish milling cutter		For general use Size: Ø 40 – Ø 165	Range of PCD inserts by application	
		For small spindle machines Size: Ø 100, Ø 125		
		Small number of teeth Size: Ø 50 – Ø 125		
	Cutters for high speed, efficiency and precision. A cost effective body with fewer teeth for use on smaller machines is now available.			
ASX445 Stable face milling under high-load conditions			• Stability even at high loads • Secure anti-fly insert clamping • Cutter bodies and insert grades for a wide range of applications • For steels, cast iron and aluminium alloy Size: Ø 50 – Ø 315	
VPX Multi-functional cutter for high-efficiency machining			• Improved chip evacuation • Insert grades for a wide range of materials • Large wiper flats for better surface finish • Longer cutter body tool life VPX200 Size: Ø 16 – Ø 63 VPX300 Size: Ø 25 – Ø 80	
Mini DVAS Solid carbide TRISTAR drill series			A fast, reliable and accurate series of small diameter drills. Using the new DP1120 coated carbide grade, advanced though coolant, a new XR point geometry and a tough but sharp cutting edge. Size: Ø 1.0 – Ø 2.9 L/D: 2D – 50D	
MNS W-Star drill series for machining for aluminium alloys			• Optimum flute and cutting edge geometry • Increased lubrication to the drill point • High-feed, high efficiency drilling • Stable drilling of deep holes Size: Ø 1.0 – Ø 2.9 L/D: 2D – 30 D	
MAS Solid carbide drill for aluminium alloy and cast iron			• Through coolant drill with burnishing effect • 10° helix angle for excellent chip discharge • 4 point support gives high hole accuracy • Reduced noise drilling Size: Ø 3.0 – Ø 16.0 L/D: 3D – 6D	

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N ALUMINIUM ALLOYS



CYLINDER HEAD

ENGINE CYLINDER HEAD

Maintaining the engine's stability and lubrication while withstanding a variety of temperatures and loads.
Transferring oil to all parts of the engine, lubricating all the critical components, via a number of oil galleries.

Product	Product picture		Description	More information
MILLING				
FMAX Series High feed finish milling cutter		For general use Size: Ø 40 – Ø 165	Range of PCD inserts by application	
		For small spindle machines Size: Ø 100, Ø 125		
		Small number of teeth Size: Ø 50 – Ø 125		
	Cutters for high speed, efficiency and precision. A cost effective body with fewer teeth for use on smaller machines is now available.			
MAS Solid carbide drill for aluminium alloy and cast iron			• Through coolant drill with burnishing effect • 10° helix angle for excellent chip discharge • 4 point support gives high hole accuracy • Reduced noise drilling Size: Ø3.0 – Ø16.0 L/D: 3D – 6D	 Page 128 – 133
MNS W-Star drill series for machining for aluminium alloys			• Optimum flute and cutting edge geometry • Increased lubrication to the drill point • High-feed, high efficiency drilling • Stable drilling of deep holes Size: Ø1.0 – Ø2.9 L/D: 2D – 30 D	
VPX Multi-functional cutter for high-efficiency machining			• Improved chip evacuation • Insert grades for a wide range of materials • Large wiper flats for better surface finish • Longer cutter body tool life VPX200 Size: Ø 16 – Ø 63 VPX300 Size: Ø 25 – Ø 80	
AXD Multi-functional machining of aluminium and titanium alloys			• High speed, efficiency and safety • High spindle speeds possible • Optimally designed chip pocket • High rigidity body AXD4000 Size: Ø 20 – Ø 125	
Mini DVAS Solid carbide TRISTAR drill series			A fast, reliable and accurate series of small diameter drills. Using the new DP1120 coated carbide grade, advanced through coolant, a new XR point geometry and a tough but sharp cutting edge. Size: Ø 1.0 – Ø 2.9 L/D: 2D – 50D	

K GREY CAST IRON

CYLINDER CRANKCASE

ENGINE CYLINDER BLOCK

Maintaining the engine's stability and lubrication while withstanding a variety of temperatures and loads.
Transferring oil to all parts of the engine, lubricating all the critical components, via a number of oil galleries.

Product	Product picture	Description	More information
MILLING			
AHX640W Ideal for general roughing of cast iron on medium and larger machines		• Diameter range Ø 80 – 315 mm (8 – 44 teeth) • Double sided insert with 14 cutting edges • Maximum depth of cut 6 mm (APMX) • High rigidity Anti-Fly (AFI) wedge clamping system	
AHX640S Ideal for general roughing on medium and larger machines		• Diameter range Ø 63 – 200 mm (4 – 12 teeth) • Double sided insert with 14 cutting edges • Maximum depth of cut 6 mm (APMX) • With through coolant holes (Ø 63 – 125 mm)	
WSF406W Milling cutters for cast iron		• Diameter range Ø 80 – 250 mm (6 – 32 teeth) • High efficiency cast iron machining • Accuracy provided by an adjustable run out system • Low cutting resistance geometry	
WWX200 90° Face milling cutter		• Diameter range Ø 25 – 160 mm • Cost effective 6 cutting edges • Robust design with high clamping rigidity • For accurate 90 degree wall machining • Suitable for a wide range of materials	
WWX400 90° Face milling cutter		• Diameter range Ø 50 – 250 mm • Cost effective 6 cutting edges • Robust design for larger depths of cut • For accurate 90 degree wall machining • Suitable for a wide range of materials	
VPX Series Multi-functional cutter for high efficiency machining		A high strength, multi-functional cutter with a tangential insert. Capable of high-load machining and ramping. Also available with a screw-in head. VPX200 Size: Ø 16 – Ø 63 VPX300 Size: Ø 25 – Ø 80	

CYLINDER CRANKCASE

Product	Product picture	Description	More information
MILLING			
<i>Mplus...</i> DCV3/4/5 Exchangeable inserts, Side cutter		The side cutter is a tool for machining grooves and sides of workpieces, and has excellent suppression of chatter and vibration due to its low resistance and strong clamping force. Inserts are stocked as standard items, and cutter bodies can be custom-made.	
MV1000 Series Coated carbide grade for milling		A coated carbide grade achieves excellent wear resistance by adopting the newly developed Al-Rich coating technology, which uses an [Al,Ti]N film that combines a high Al content ratio with high hardness and significantly improves oxidation resistance. Demonstrating unprecedented high performance when machining ductile cast iron.	
REAMING			
RX1S Exchangeable head reamer		Exchangeable head reamer that achieves high runout accuracy of 3µm or less by utilising the double restraint of the tapered surface and centre lock screw. The finished hole tolerance meets h7 standards. Head Size: Ø 14 – Ø 29	
DRILLING			
MVX Indexable insert drill		Optimum positioning of inserts with different grades for the outer and inner positions. Ideal positioning of the through coolant holes for maximum cooling and chip discharge. Inserts are economical 4 corner types and have a specially designed chipbreaker. Size: Ø14.0 – Ø 63	
MPS1 High performance solid carbide drill		High performance solid carbide drill. An optimised cutting edge and flute geometry, together with through coolant enables high quality deep hole drilling. Size: Ø 3.0 – Ø 20.0 L/D: 2D – 40D (depending on the diameters)	

2/3

INSERT RECOMMENDATION FOR MVX

Material	1st Recommendation		When outer insert fractures	
	Outer Insert	Inner Insert	Outer Insert	Inner Insert
K Cast iron	MC5020	VP15TF	VP15TF	VP15TF
				
	UM Chipbreaker	UM Chipbreaker	UM Chipbreaker	UM Chipbreaker

CYLINDER CRANKCASE

Product	Product picture	Description	More information
TURNING			
MC5100 Series CVD coated grades for cast iron turning		The advanced Super Nano Texture technology improves tool life and wear resistance through a fine, high-density crystal growth process. A series of grades have been developed with different concepts to accommodate a wide range of turning applications, including continuous and interrupted cutting of grey and ductile cast iron.	
COUNTERBORING TOOL FOR CYLINDER BORES			
BMR Indexable insert cutter for cylinder bores		Special cutting tool for cylinder bore machining with economical hexagonal double sided inserts, creating a very cost effective solution. High clamping rigidity ensures accuracy and repeatability.	
			3/3

K GREY CAST IRON

CYLINDER HEAD

ENGINE CYLINDER HEAD

Maintaining the engine's stability and lubrication while withstanding a variety of temperatures and loads. Transferring oil to all parts of the engine, lubricating all the critical components, via a number of oil galleries.

Product	Product picture	Description	More information
MILLING			
VPX Series Multi-functional cutter for high efficiency machining		A high strength, multi-functional cutter with a tangential insert. Capable of high-load machining and ramping. Also available with a screw-in head. VPX200 Size: Ø 16 – Ø 63 VPX300 Size: Ø 25 – Ø 80	
AHX640W Ideal for general roughing of cast iron on medium and larger machines		• Diameter range Ø 80 – 315 mm (8 – 44 teeth) • Double sided insert with 14 cutting edges • Maximum depth of cut 6 mm [APMX] • High rigidity Anti-Fly (AFI) wedge clamping system	
AHX640S Ideal for general roughing on medium and larger machines		• Diameter range Ø 63 – 200 mm (4 – 12 teeth) • Double sided insert with 14 cutting edges • Maximum depth of cut 6 mm [APMX] • With through coolant holes (Ø 63 – 125 mm)	
WSF406W Milling cutters for cast iron		• Diameter range Ø 80 – 250 mm (6 – 32 teeth) • High efficiency cast iron machining • Accuracy provided by an adjustable run out system • Low cutting resistance geometry	
WWX200 90° Face milling cutter		• Diameter range Ø 25 – 160 mm • Cost effective 6 cutting edges • Robust design with high clamping rigidity • For accurate 90 degree wall machining • Suitable for a wide range of materials	
WWX400 90° Face milling cutter		• Diameter range Ø 50 – 250 mm • Cost effective 6 cutting edges • Robust design for larger depths of cut • For accurate 90 degree wall machining • Suitable for a wide range of materials	

CYLINDER HEAD

Product	Product picture	Description	More information
MILLING			
MV1000 Series Coated carbide grade for milling		A coated carbide grade achieves excellent wear resistance by adopting the newly developed Al-Rich coating technology, which uses an (Al,Ti)N film that combines a high Al content ratio with high hardness and significantly improves oxidation resistance. Demonstrating unprecedented high performance when machining ductile cast iron.	
REAMING			
RX1S Exchangeable head reamer		Exchangeable head reamer that achieves high runout accuracy of 3 µm or less by utilising the double restraint of the tapered surface and centre lock screw. The finished hole tolerance meets h7 standards. Head Size: Ø 14 – Ø 29	
TURNING INSERTS			
MC5100 Series CVD coated grades for cast iron turning		The advanced Super Nano Texture technology improves tool life and wear resistance through a fine, high-density crystal growth process. A series of grades have been developed with different concepts to accommodate a wide range of turning applications, including continuous and interrupted cutting of grey and ductile cast iron.	
DRILLING			
MPS1 High performance solid carbide drill		High performance solid carbide drill. An optimised cutting edge and flute geometry, together with through coolant enables high quality deep hole drilling. Size: Ø 3.0 – Ø 20.0 L/D: 2D – 40D (depending on the diameters)	
MVX Indexable insert drill		Optimum positioning of inserts with different grades for the outer and inner positions. Ideal positioning of the through coolant holes for maximum cooling and chip discharge. Inserts are economical 4 corner types and have a specially designed chipbreaker. Size: Ø 14.0 - Ø 63	

2/2

INSERT RECOMMENDATION FOR MVX

Material	1st Recommendation		When outer insert fractures	
	Outer Insert	Inner Insert	Outer Insert	Inner Insert
K Cast iron	MC5020	VP15TF	VP15TF	VP15TF
				
	UM Chipbreaker	UM Chipbreaker	UM Chipbreaker	UM Chipbreaker



CRANKSHAFT / CAMSHAFT

The camshaft controls the opening and closing of valves through the combustion process. The crankshaft takes the power produced from the combustion process and transfers it to the transmission.

Product	Product picture	Description	More information
MILLING AND DRILLING			
Mini DVAS Solid carbide TRISTAR drill series		A fast, reliable and accurate series of small diameter drills. Using the new DP1120 coated carbide grade, advanced through coolant, a new XR point geometry and a tough but sharp cutting edge. Size: $\varnothing$ 1.0 – $\varnothing$ 2.9 L/D: 2D – 50D	
VPX Multi-functional cutter for high-efficiency machining		- Improved chip evacuation - Insert grades for a wide range of materials - Large wiper flats for better surface finish - Longer tool life of the cutter body VPX200 Size: $\varnothing$ 16 – $\varnothing$ 63 VPX300 Size: $\varnothing$ 25 – $\varnothing$ 8	
WWX Series Double sided inserts type, face mill		- Generous insert thickness & strong X geometry - Excellent control and chip abrasion resistance - Optimized insert clamping - Variety of cutter types, diameters and pitches Size: $\varnothing$ 25 – $\varnothing$ 250	
DRILLING			
MPS1 High performance solid carbide drill		High performance solid carbide drill. An optimised cutting edge and flute geometry, together with through coolant enables high quality deep hole drilling. Size: $\varnothing$ 3.0 – $\varnothing$ 20.0 L/D: 2D – 40D (depending on the diameters)	
DFAS Internal coolant type solid carbide flat bottom drill		Adoption of Tri-Cooling technology with a unique coolant hole geometry improves chip evacuation and cutting heat dissipation. In addition, XR point thinning exhibits low cutting resistance and excellent chip breaking properties. Size: $\varnothing$ 3 – $\varnothing$ 14 L/D: 3D, 5D	
TURNING			
MC6100 Series CVD coated grade for steel turning		The advanced Super Nano Texture Technology improves tool life and wear resistance through a fine, high density crystal growth process. Achieves stable machining over a wide range of applications.	



CONNECTING ROD

ENGINE CONNECTING ROD

A connecting rod is the part of a piston engine which connects the piston to the crankshaft. Together with the crank, the connecting rod converts the reciprocating motion of the piston into the rotation of the crankshaft.

Product	Product picture	Description	More information
MILLING			
WSX General purpose double-sided Insert type face mill		• Low cutting resistance • Through coolant holes • Unique double Z insert geometry • Balance of versatility and high efficiency Size: Ø 25 – Ø 250	
ASX General use screw-on type shoulder and face milling cutter		• Insert grades for a wide range of materials • Chipbreakers for a wide range of applications • Stable, long tool life • High accuracy body Size: Ø 32 – Ø 250	
DRILLING			
MPS1 High performance solid carbide drill		High performance solid carbide drill. An optimised cutting edge and flute geometry, together with through coolant enables high quality deep hole drilling. Size: Ø 3.0 – Ø 20.0 L/D: 2D – 40D (depending on the diameters)	
MXV Indexable insert drill		Optimum positioning of inserts with different grades for the outer and inner positions. Ideal positioning of the through coolant holes for maximum cooling and chip discharge. Inserts are economical 4 corner types and have a specially designed chipbreaker. Size: Ø 14.0 – Ø 63	

INSERT RECOMMENDATION FOR MXV

Material	1st Recommendation		When outer insert fractures	
	Outer Insert	Inner Insert	Outer Insert	Inner Insert
K Cast iron	MC5020	VP15TF	VP15TF	VP15TF
				
	UM Chipbreaker	UM Chipbreaker	UM Chipbreaker	UM Chipbreaker

MEMO

MTEC

MITSUBISHI MATERIALS TECHNOLOGY & EDUCATION CENTRE

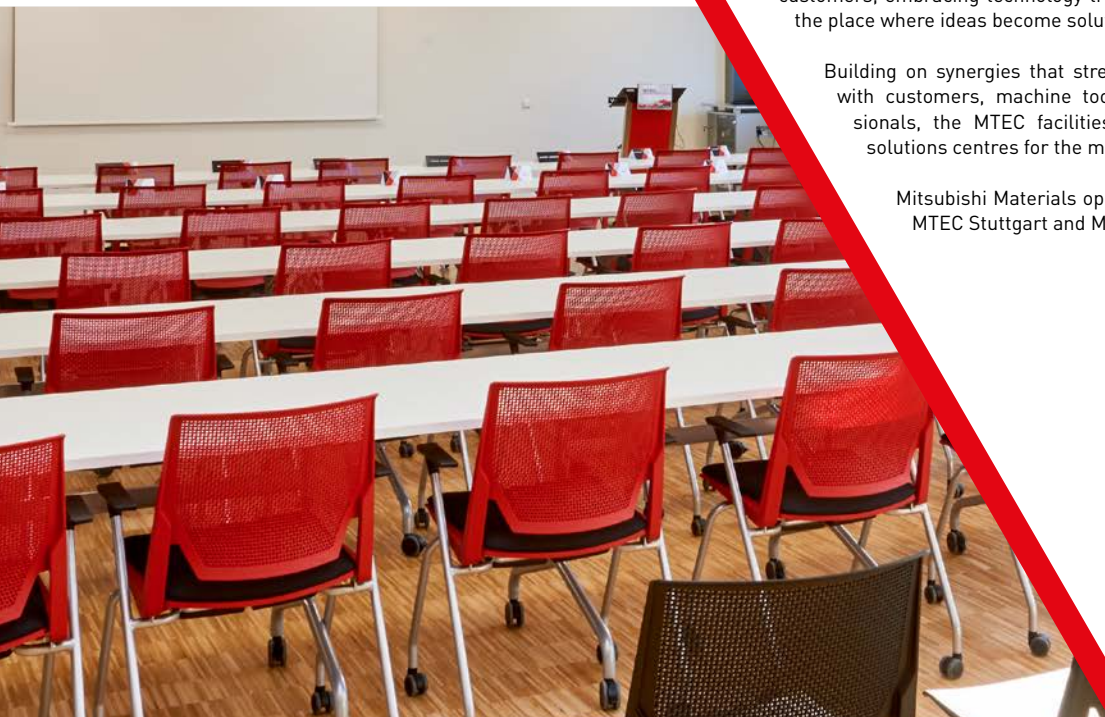


Industries are rapidly evolving and market requirements are growing at the same pace; better service, future-proof technologies, highly advanced turnkey solutions. Mitsubishi Materials has responded to increased customer needs by establishing MTEC facilities across the globe.

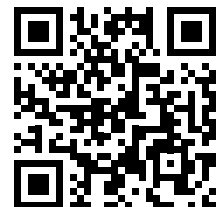
The facilities accommodate international teams of cutting tool experts specialised in project analysis, from tool design and testing, through to the implementation of the final solution. Highly competent application engineers explore new machining paths and develop innovative ideas in close cooperation with customers, embracing technology transfer and open innovation. MTEC is the place where ideas become solutions.

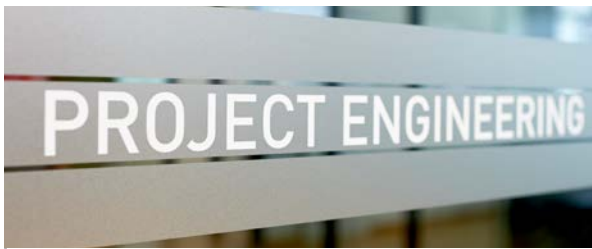
Building on synergies that strengthen the collaborative framework with customers, machine tool builders and engineering professionals, the MTEC facilities now offer sophisticated technical solutions centres for the metal working industry.

Mitsubishi Materials operates two MTEC facilities in Europe; MTEC Stuttgart and MTEC Valencia.



**More Information
about MTEC**





PROJECT ENGINEERING

CUSTOMISED TOOLING SOLUTIONS

- Tailor-made tooling solutions for all projects
- Competence via a broad project engineering network
- Increased flexibility and efficiency
- Solutions easily scalable to global projects



CUTTING TRIALS

A COMPREHENSIVE APPROACH

- Fully customised high-end solutions
- Easier and faster deployment into existing manufacturing processes
- Complete solutions from a single source
- Maximised speed to market



PROCESS OPTIMISATION

ENGINEERING FOR ULTIMATE PERFORMANCE

- Significant cost savings
- Increased efficiency and productivity
- Improved utilisation of infrastructure and resources
- Reduction of the total number of processes
- Higher precision and overall quality



EDUCATION

EXPANDING EXPERTISE IN THE LATEST TECHNOLOGIES

- Training on the latest technology and tools
- Combination of theory and practice
- Networking with industry experts
- Global connectivity provides synergies of knowledge and information flow



COLLABORATION

BUILDING SYNERGIES

- Know-how and capability sharing
- Solution optimisation through joint development
- New perspectives for problem solving and innovation
- Increased efficiency, reduced risks

MTEC STUTTGART

 **MITSUBISHI MATERIALS TOOLS EUROPE**

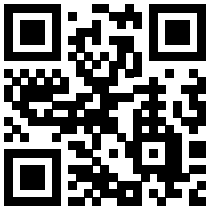
RECONDITIONING SERVICE & SPECIAL TOOLS

COMPREHENSIVE TOOL SERVICES

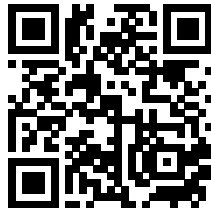
Mitsubishi Materials is a comprehensive solution provider, offering expert support throughout the entire cutting tool lifecycle. This includes everything from the initial offer and tool design to precision production and responsive after-sales service.

Mitsubishi Materials Tools Europe now offers customers state-of-the-art reconditioning and recoating services, as well as a wide range of special tools. This has been made possible through the strategic integration of UFP (formerly U.F.P. S.r.l.) and Mitsubishi Materials España's modern facilities. These developments ensure first-class quality and unbeatable delivery times.

Serving a wide range of industries, including aerospace, medical, automotive, energy and defense, Mitsubishi Materials Tools Europe is committed to unlocking the full potential of cutting tools and maximising performance and productivity



UFP-Website



MME Special tools



PRODUCTION IN EUROPE

MANUFACTURING CAPABILITIES IN EUROPE

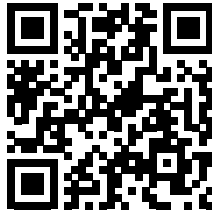
Mitsubishi Materials operates state-of-the-art production facilities in Europe, including Mitsubishi Materials España and UFP, which was recently acquired by Mitsubishi Materials Tools Europe. These facilities manufacture high-performance standard tools and customised solutions that are engineered to meet the specific demands of a diverse range of industries.

The European manufacturing sites utilise the latest developments in precision engineering and cutting edge technologies to ensure that every tool is optimised for the most demanding applications.

The local manufacturing presence in Europe ensures faster lead times, greater flexibility and responsiveness, allowing customers to achieve optimal performance.



Video MME



Video UFP



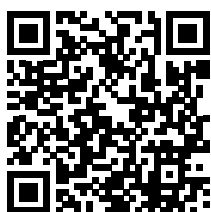
RECYCLING SIMPLE AND UNCOMPLICATED

SUSTAINABILITY AS A FUNDAMENTAL PRINCIPLE

Mitsubishi Materials is committed to sustainability, focusing on the recycling of carbide tools and developing solutions that contribute to a sustainable future. With the two group companies; Japan New Metals and H.C. Starck Tungsten Powders, Mitsubishi Materials is a world leader in the recycling of materials containing tungsten and one of the leading providers of tungsten powder.

H.C. Starck Tungsten Powders can extract pure tungsten from almost all forms of tungsten scrap and production waste, including mixed hardmetal, drills, end mills, inserts and drill bits. Tungsten recycling has been based at the headquarters in Goslar, Germany for more than 100 years.

H.C. Starck is also represented in other strategically relevant areas with powder production sites in Canada (Sarnia) and China (Ganzhou). These production sites are supported by numerous sales offices and other facilities within the Mitsubishi Materials Corporation Group.

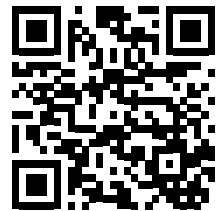


**More Information
about Recycling**



WORLDWIDE

METALWORKING SOLUTIONS COMPANY



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www.mmc-carbide.com



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P652E 

Published by:  MITSUBISHI MATERIALS TOOLS EUROPE | 2025.10