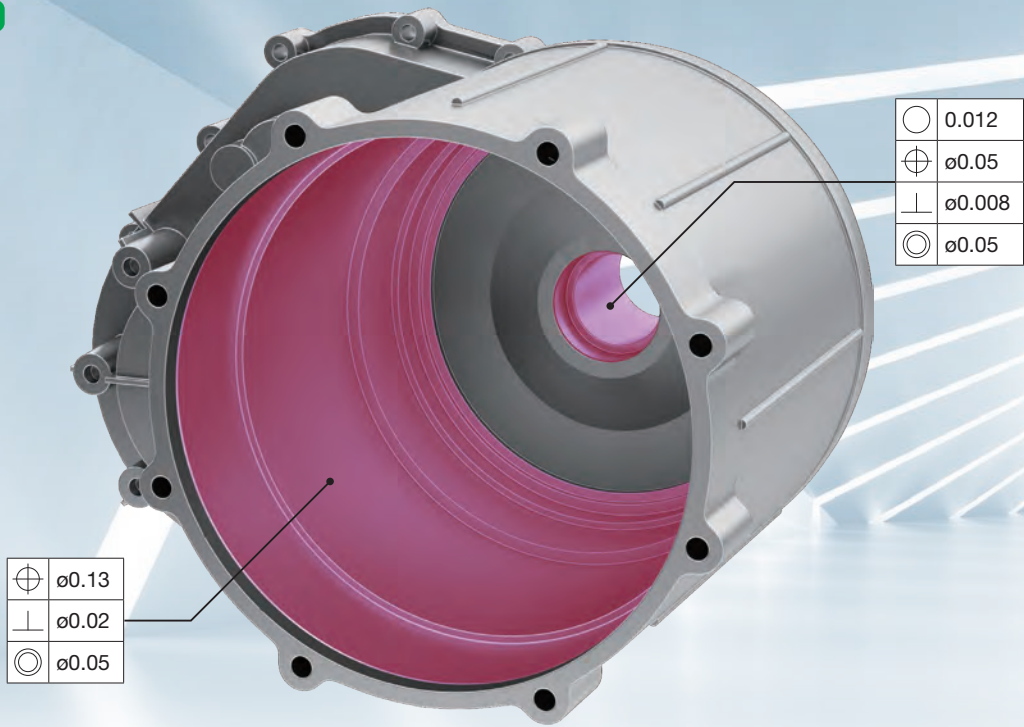


# Tooling Solutions for **EV** Traction System

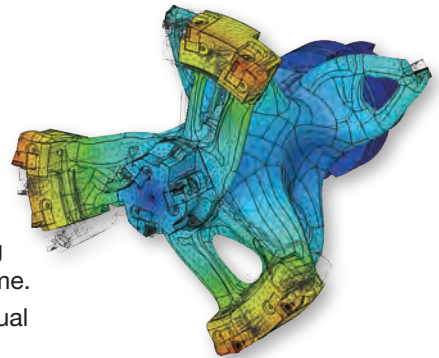
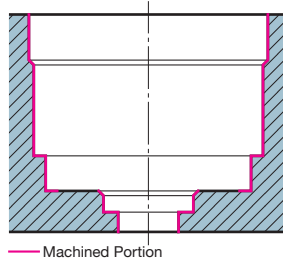
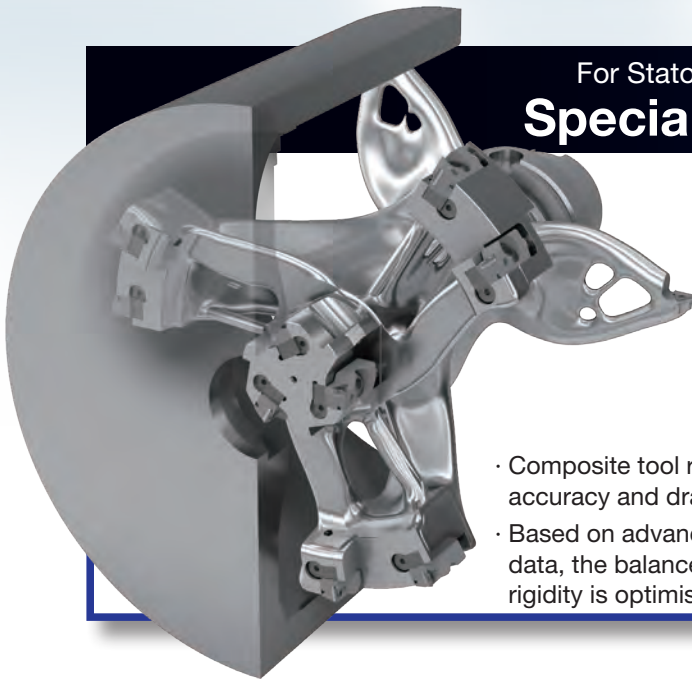
# Stator Housing



Aluminum Alloy



## For Stator Housing/Bearing Mounting Hole Drilling Special Composite Boring Tool



- Composite tool realises excellent machining accuracy and dramatically reduced cycle time.
- Based on advanced stress analysis and actual data, the balance between tool weight and rigidity is optimised.

### Drilling

#### Mounting Hole Drilling

■ MULTIDRILL  
MDA Series



Diameter: ø1.0 to 12.0mm  
L/D: ø3.0mm or less: 3, 5, 10, 15, 20  
ø3.1mm or more: 3, 5, 10

### Milling

#### Face Milling

■ ALNEX  
ANX Series

ALNEX



#### Endmilling

■ SEC-WaveMill  
WEZ Series



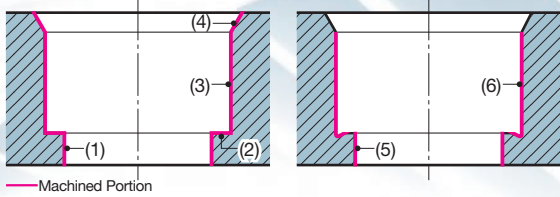


# Reducer Case Bearing mounting pre-cast hole drilling



Aluminum Alloy

## Conventional machining process



- |   |           |
|---|-----------|
| (1) Internal (Small Diameter)           | Roughing  |
| (2) Bottom Surface                      |           |
| (3) Internal (Large Diameter)           |           |
| (4) Entrance Chamfering                 |           |
| (5) Internal (Small Diameter)           | Finishing |
| (6) Internal (Large Diameter) + Necking |           |



○	0.012
⊕	ø0.05
⊥	ø0.008
◎	ø0.05

Conventionally: Different tools required for roughing and finishing

For Bearing Mounting Hole Drilling

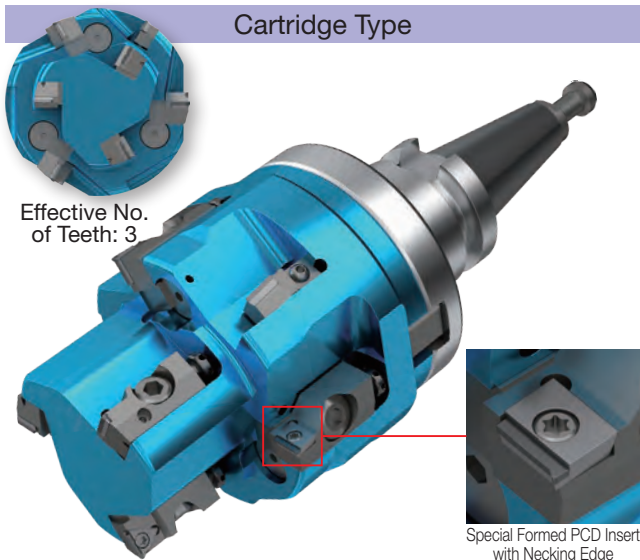
## 1-Pass Roughing and Finishing Tool

### Drilling process

- |  |
|--|
| (1) (5) Internal (Small Diameter) Roughing/Finishing           |
| (2) Bottom Surface   |
| (3) (6) Internal (Large Diameter) Roughing/Finishing + Necking |
| (4) Entrance Chamfering  |

Capable of machining in **1 pass!**  
Tool count reduced  
Contributes to reduced cycle time

### Cartridge Type



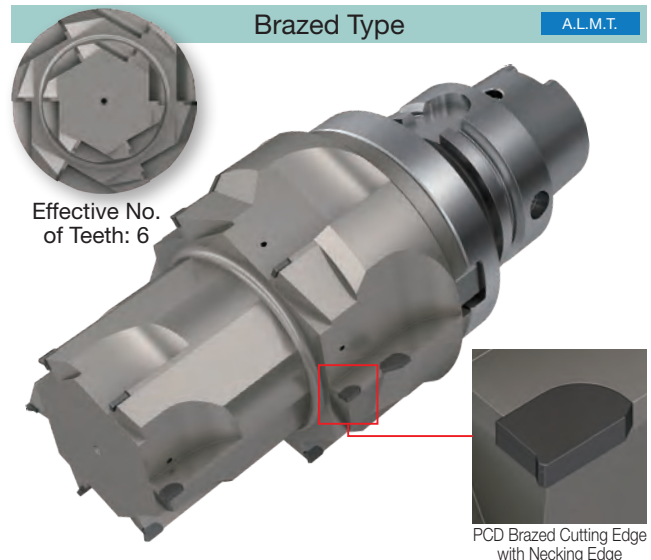
Effective No. of Teeth: 3

Special Formed PCD Insert with Necking Edge

- The use of three formed inserts enables one-pass finishing even on pre-cast hole work with large variations in machining allowance.
- The introduction of a parallel adjustment mechanism maintains high squareness accuracy even when diameter height is adjusted.
- Utilising an aluminum alloy body enables usage on small M/C with weight limitations.

### Brazed Type

A.L.M.T.



Effective No. of Teeth: 6

PCD Brazed Cutting Edge with Necking Edge

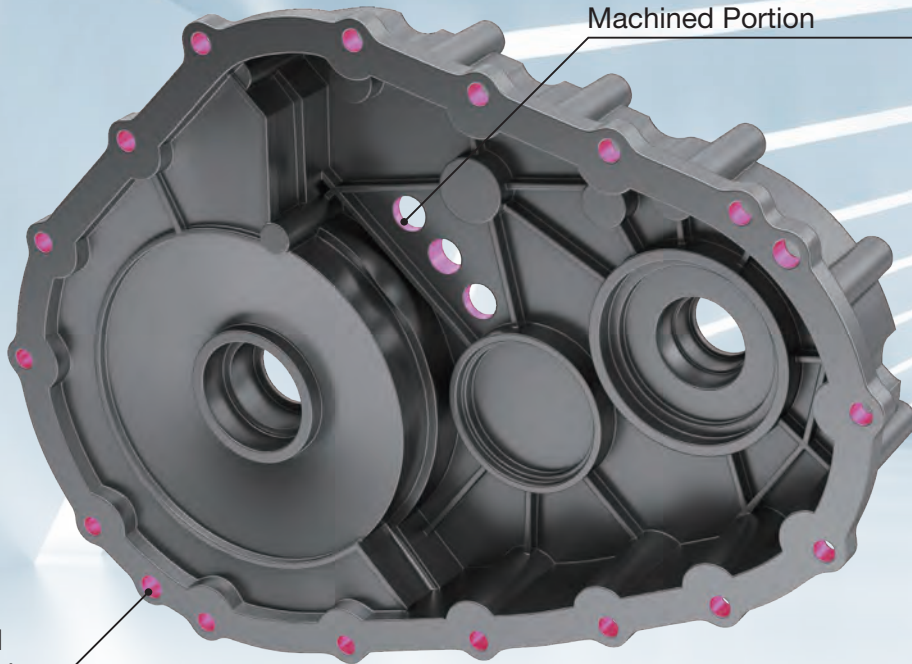
- By brazing the PCD cutting edges directly to the body, the number of effective cutting edges can be increased (from 3 to 6), achieving even higher machining efficiency.

# Reducer Case Pre-cast hole drilling



Aluminum Alloy

Regrindable  
PCD Reamer with Chip Breaking Function  
Machined Portion



DLC Coat Drill  
Machined Portion

For Pre-cast Hole Drilling  
**DLC Coat Drill**

Diameter:  $\phi 5.0$  to  $12.0\text{mm}$  (large dia. max.  $\phi 16.0\text{mm}$  and below)

Positioning accuracy for  **$\phi 0.4$  and below** is possible even at feed rate of  **$f=1.0\text{mm/rev}$**

- Special flute design achieves both drilling accuracy and high efficiency, even in pre-cast hole drilling where hole positions tend to be misaligned.

**Regrindable** A.L.M.T.  
**PCD Reamer with Chip Breaking Function**

Diameter:  $\phi 5.0$  to  $80.0\text{mm}$

- Special chipbreaker shape improves chip breaking.
- It is possible to regenerate a new chipbreaker upon regrinding.
- Applicable feed rate range is  $f = 0.2$  to  $0.4$  mm/rev (4 flutes).



# Rotor Shafts and Gears



Special Steel

Ultra-hard Alloy Steel

For High-efficiency Hardened Steel Machining

## Hard Skiving Tool



**10x** machining efficiency compared to conventional machining methods  
Surface roughness of **Rz 2 μm and below** is possible



- Our proprietary machining method achieves both machining accuracy and high efficiency while significantly reducing cycle time.
- Meets the strict machining accuracy required for high-speed rotating for EV rotor shafts.



Hardened Steel Turning  
Coated SUMIBORON **BNC2115/BNC2125**

### Turning

#### Pre-hardening Turning

■ Coated Carbide Grades for Steel Turning  
AC8000P Series

AC8015P  
AC8020P  
AC8025P  
AC8035P

### Drilling

#### Small Hole Drilling

■ MULTIDRILL  
NeXEO MDE Type

Diameter:  $\phi$ 1.0 to 20.0mm  
L/D: 2, 3, 4, 5, 8

#### Hollow Shaft Drilling

■ SEC-MULTIDRILL ■ SumiDrill  
SMD Series WDX Series

Diameter:  $\phi$ 12.0mm up  
L/D: 3, 5, 8

Diameter:  $\phi$ 13.0 to 68.0mm  
L/D: 2, 3, 4, 5

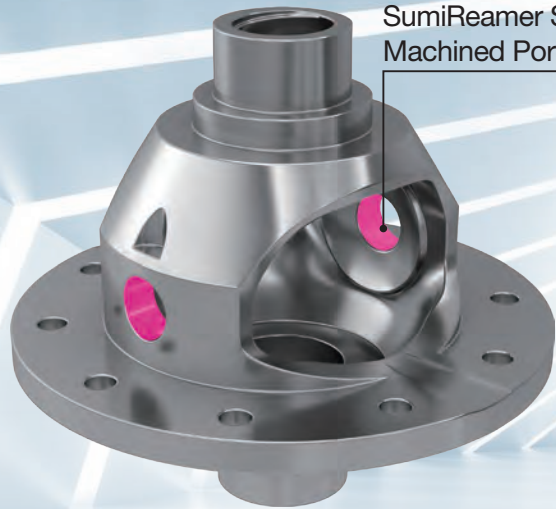
# Differential Case



Ductile Cast Iron



High-efficiency Drills  
Machined Portion



SumiReamer SSR Series  
Machined Portion

### For Ring Gear Mounting Hole Drilling

## High-efficiency Drills

Diameter:  $\varnothing 3.0$  to 14.0mm

**2x** conventional feed rate  
 **$f = 0.4$  to  $0.5\text{mm/rev}$**   
 possible

- Our proprietary low-resistance cutting edge design realises high-efficiency drilling.
- High efficiency reduces power consumption by about 40%, contributing to energy savings toward SDGs.

## SumiReamer SSR Series

Diameter:  $\varnothing 2.97$  to 12.0mm

	1.8 $\mu\text{m}$
	2.3 $\mu\text{m}$
	Ra 0.1

- A balanced design that combines sharpness and cutting edge strength, to achieve high feed rate of  $f=1.6\text{mm/rev}$ .

## Turning

### Roughing

■ Cast Iron Turning Grades  
AC4000K Series

AC4010K  
AC4015K  
AC420K

### Finishing

■ For Ductile Cast Iron Turning  
Coated SUMIBORON BNC500

## Reaming

### Internal Diameter Finishing

■ SumiReamer  
SR Series

Diameter:  $\varnothing 11.9$  to 140.6mm



## Spherical Cutters

Available sizes: Consult us (actual sizes supported so far:  $\varnothing 35$  to 64mm)

### Lay-flat Insert Type

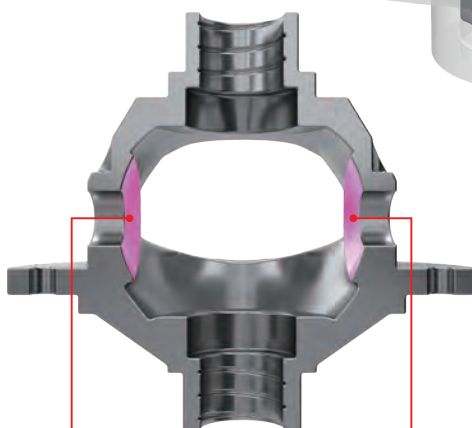


- Ideal for small differential case machining.

### Tangential Insert Type



- Tangential mounting increases insert rigidity, ideal for high-feed and high-efficiency machining.



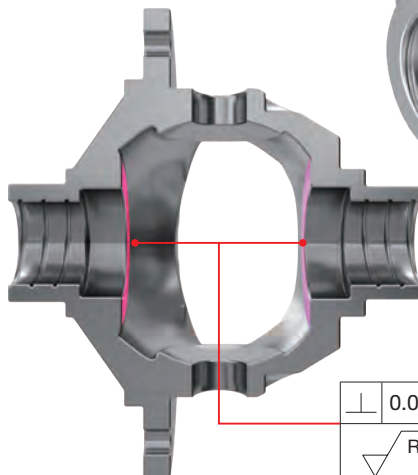
Required tolerance range for spherical surface is  $90\ \mu\text{m}$  or below

## Face Cutters

Available sizes: Consult us (actual sizes supported so far:  $\varnothing 48$  to 100mm)



- Special cutter for dedicated machines achieves outstanding mass production performance.
- High-precision cutter body and ground type insert support stringent machining accuracy.
- Highly economical with indexable inserts.



$\perp$	0.05
$\sqrt{\text{Ra}}$	3.2



- Very hot or lengthy chips may be discharged while the machine is in operation. Therefore, machine guards, safety goggles or other protective covers must be used. Fire safety precautions must also be considered.

< SAFETY NOTES >

- Please handle with care as this product has sharp edges.
- Improper cutting conditions or mis-handling of the tool may result in breakages or projectiles. Therefore, please use the tool within its recommended conditions.

- When using non-water soluble cutting oil, precautions against fire must be taken and please ensure that a fire extinguisher is placed near the machine.

 Sumitomo Electric Industries, Ltd.

<https://www.sumitool.com/global>



Hardmetal Division

Global Marketing Department : 1-1-1, Koyakita, Itami, Hyogo 664-0016, Japan

 A.L.M.T. Corp.

<https://www.allied-material.co.jp/en.html>



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