



# SMALL BORING BAR SERIES

## Features

### Tools



#### MICRO-MINI TWIN (P2-)

- Solid carbide shank
- Minimum cutting diameter 2.2mm
- Economical because of two cutting edges
- Boring, Grooving, Threading, Copying



#### MICRO-MINI (P6-)

- Solid carbide shank
- Minimum cutting diameter 3.2mm
- Various cutting edge forms are possible



#### MICRO-DEX (P7-)

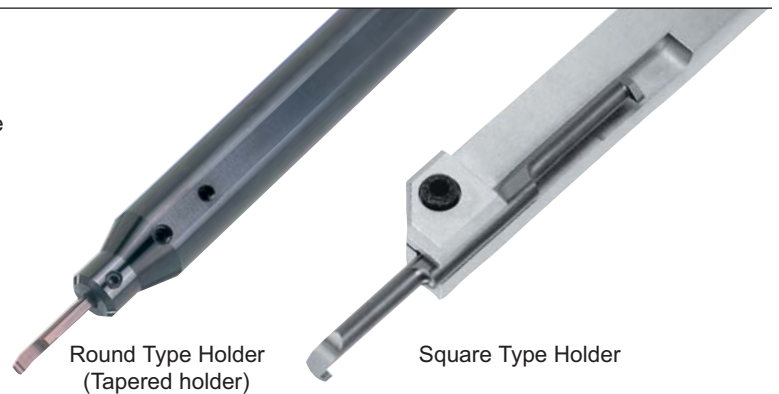
- Indexable type solid carbide shank
- Minimum cutting diameter 5.0mm

### Holders

#### Round Type Holder / Square Type Holder (P11-)

- Compatible with any type of automatic or NC lathes
- The shape of the cutting point contributes to good chip control and coolant supply
- Square holder for easy tool mounting

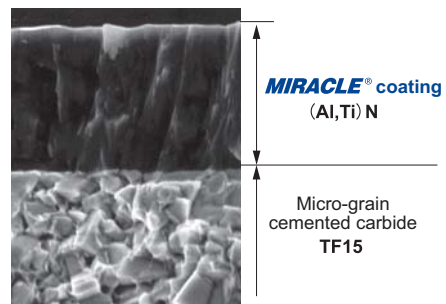
<Machine makers>  
Citizen Machinery Co., Ltd.  
Star Micronics Co., Ltd.  
Tsunami Corporation  
Miyano Machinery, Inc.



### Grade



**MIRACLE** coated **VP15TF** displays excellent welding resistance for machining a wide range of workpiece materials from mild and carbon steels through to stainless steels and cast iron.



Micro-structure of **VP15TF**

## Application

		Minimum cutting diameter (mm)							Reference page
		φ2	φ3	φ4	φ5	φ6	φ7	φ8	
MICRO-MINI TWIN (Solid carbide type)	Boring	CB02	CB03	CB04	CB05				P2~
	Grooving		CG03	CG04	CG05	CG06	CG07		
	Threading		CT03	CT04		CT05	CT06		
	Copying		CR03	CR04	CR05				
MICRO-MINI (Solid carbide type)	Grooving		C03	C04	C05				P6
		*By grinding the cutting edge, the same bar can be used for boring and threading.							
MICRO-DEX (Indexable insert type)	Boring				C04 SCLC	C05 SCLC	C06 SCLC	C07 SCLC	P7~
							C07 STUC		
					C05 SWUB	C06 SWUB	C07 SWUB		

\* Other small tools for automatic lathes can be found in the catalogue C003J.

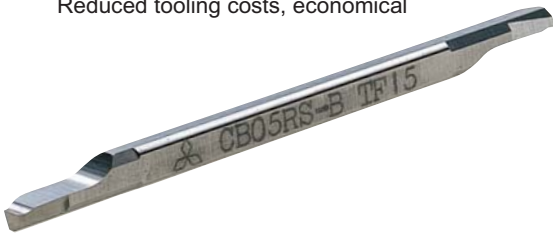
# Small Boring Bar Series

# MICRO-MINI TWIN

## Features

### ● 1 tool offering 2 cutting edge types.

Reduced tooling costs, economical



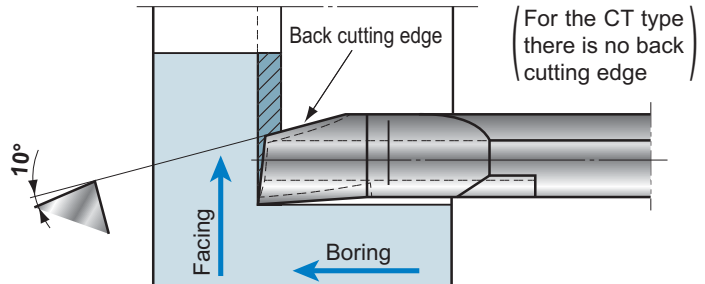
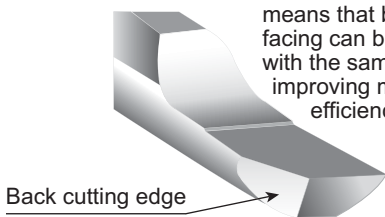
### ● Wide range available

- Boring  
Minimum cutting diameter  $\phi 2.2\text{mm}$ -  
Nose R: 0.05, 0.1, 0.2
- Grooving  
Minimum cutting diameter  $\phi 3\text{mm}$ -
- Threading  
Minimum cutting diameter  $\phi 3\text{mm}$ -
- Copying  
Minimum cutting diameter  $\phi 3.5\text{mm}$ -

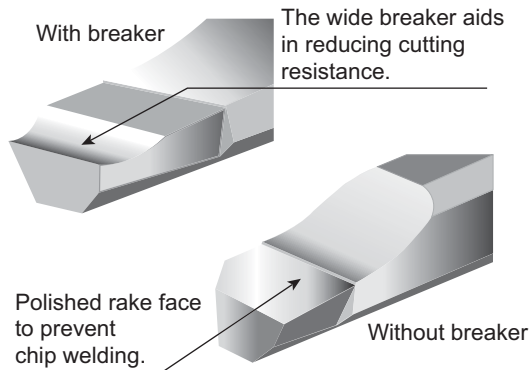


### ● Back cutting edge

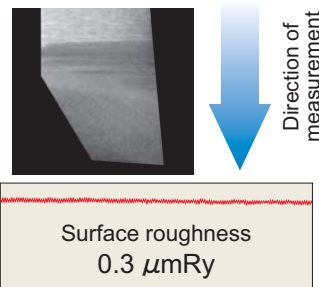
Use of a back cutting edge means that boring and facing can be performed with the same tool, thereby improving machining efficiency.



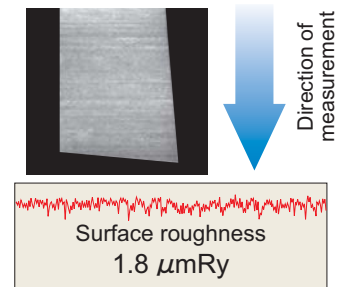
### ● Available with or without a breaker



#### ● MICRO-MINI TWIN (Polished rake face)



#### ● Conventional product



Highly polished rake face. The smooth surface of the cutting edge is far superior to that of conventional boring bars.

## Cutting Performance

### ● Polished rake face

#### ■ Machining of stainless steel

The polished rake face prevents chip welding and provides an excellent surface finish.

<Cutting conditions>

Workpiece: JIS SUS304

Feed : 0.02mm/rev

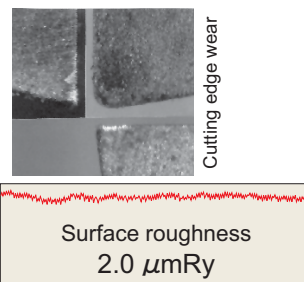
Tool : CB05RS, VP15TF

Depth of cut: 0.1mm

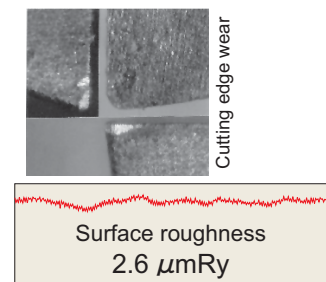
Cutting speed : 100m/min

Wet

#### ● MICRO-MINI TWIN (Polished rake face)



#### ● Conventional product

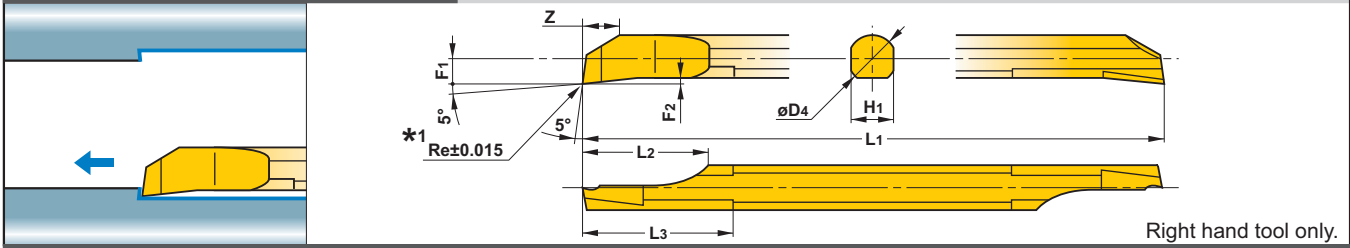




# MICRO-MINI TWIN

**CB**

(Boring)

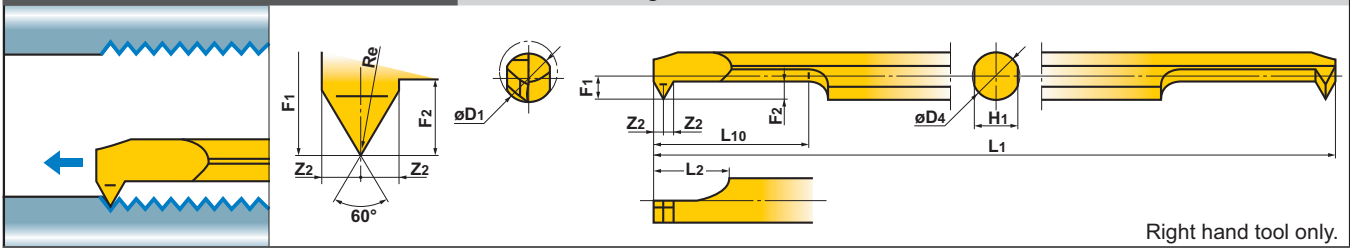


Order Number	Stock		Breaker	Minimum Cutting Diameter (mm)		Dimensions (mm)									
	Micrograin Carbide	Coated Carbide		l/d ≤ 3	l/d > 3	Re	D4	L1	L2	L3	F1	F2	H1	Z	
	TF15	VP15TF													
CB02RS	●	●	Without	2.2	3.6	0.05	2	50	5	6	1.0	0.25	1.8	1.4	
02RS-B	●	●	With	2.2	3.9	0.05	2	50	5	6	1.0	0.25	1.8	1.4	
02RS-01	●	●	Without	2.2	3.6	0.1	2	50	5	6	1.0	0.25	1.8	1.4	
02RS-01B	●	●	With	2.2	4.2	0.1	2	50	5	6	1.0	0.25	1.8	1.4	
02RS-02	●	●	Without	2.2	3.6	0.2	2	50	5	6	1.0	0.25	1.8	1.4	
02RS-02B	●	●	With	2.2	4.9	0.2	2	50	5	6	1.0	0.25	1.8	1.4	
03RS	●	●	Without	3.2	4.2	0.05	3	50	7.5	9	1.5	0.35	2.7	2.3	
03RS-B	●	●	With	3.2	4.4	0.05	3	50	7.5	9	1.5	0.35	2.7	2.3	
03RS-01	●	●	Without	3.2	4.2	0.1	3	50	7.5	9	1.5	0.35	2.7	2.3	
03RS-01B	●	●	With	3.2	4.5	0.1	3	50	7.5	9	1.5	0.35	2.7	2.3	
03RS-02	●	●	Without	3.2	4.2	0.2	3	50	7.5	9	1.5	0.35	2.7	2.3	
03RS-02B	●	●	With	3.2	4.8	0.2	3	50	7.5	9	1.5	0.35	2.7	2.3	
04RS	●	●	Without	4.2	5.1	0.05	4	60	10	12	2.0	0.45	3.6	3.1	
04RS-B	●	●	With	4.2	5.2	0.05	4	60	10	12	2.0	0.45	3.6	3.1	
04RS-01	●	●	Without	4.2	5.1	0.1	4	60	10	12	2.0	0.45	3.6	3.1	
04RS-01B	●	●	With	4.2	5.3	0.1	4	60	10	12	2.0	0.45	3.6	3.1	
04RS-02	●	●	Without	4.2	5.1	0.2	4	60	10	12	2.0	0.45	3.6	3.1	
04RS-02B	●	●	With	4.2	5.5	0.2	4	60	10	12	2.0	0.45	3.6	3.1	
05RS	●	●	Without	5.2	6.0	0.05	5	70	12.5	15	2.5	0.55	4.5	3.9	
05RS-B	●	●	With	5.2	6.1	0.05	5	70	12.5	15	2.5	0.55	4.5	3.9	
05RS-02	●	●	Without	5.2	6.0	0.2	5	70	12.5	15	2.5	0.55	4.5	3.9	
05RS-02B	●	●	With	5.2	6.4	0.2	5	70	12.5	15	2.5	0.55	4.5	3.9	

\*1 The Re dimension represents the size before grinding a chip breaker.

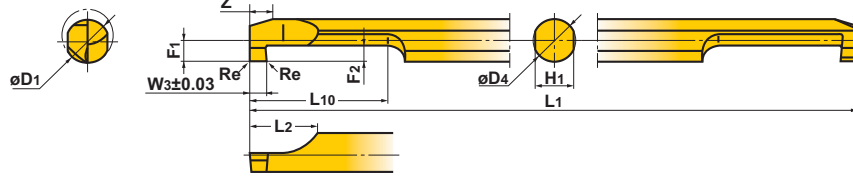
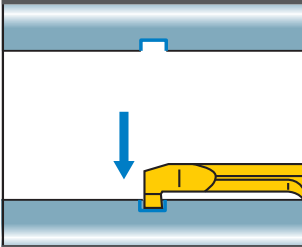
**CT**

(Internal threading)



Order Number	Stock		Breaker	Threads				Minimum Cutting Diameter D1	Dimensions (mm)								
	Micrograin Carbide	Coated Carbide		Metric		Unified			Re	D4	L1	L10	L2	F1	Z2	F2	H1
	TF15	VP15TF		Thread	Pitch (mm)	Thread	Pitch (thread/inch)										
CT03RS-M4	●	●	Without	≥M4	0.5-1.0	≥NO.8-32UNC	36-24	3	0.03	3	50	10.2	6	1.3	0.6	1.2	2.7
03RS-M4B	●	●	With	≥M4	0.5-1.0	≥NO.8-36UNF	36-24	3	0.03	3	50	10.2	6	1.3	0.6	1.2	2.7
04RS-M6	●	●	Without	≥M6	0.75-1.25	≥1/4-20UNC	28-20	4.5	0.05	4	60	15.6	7	1.8	0.8	1.7	3.6
04RS-M6B	●	●	With	≥M6	0.75-1.25	≥1/4-28UNF	28-20	4.5	0.05	4	60	15.6	7	1.8	0.8	1.7	3.6
05RS-M8	●	●	Without	≥M8	0.75-1.5	≥5/16-18UNC	24-18	6	0.05	5	70	21	8	2.3	1	2.2	4.5
05RS-M8B	●	●	With	≥M8	0.75-1.5	≥5/16-24UNF	24-18	6	0.05	5	70	21	8	2.3	1	2.2	4.5
06RS-M10	●	●	Without	≥M10	0.75-1.75	≥3/8-16UNC	24-16	7	0.05	6	75	21	8	2.8	1	2.2	5.4
06RS-M10B	●	●	With	≥M10	0.75-1.75	≥3/8-24UNF	24-16	7	0.05	6	75	21	8	2.8	1	2.2	5.4

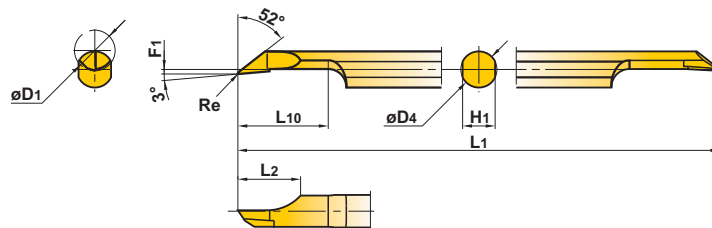
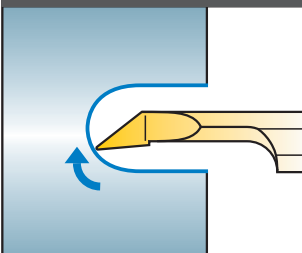
\* Refer to P14 for holders.



Right hand tool only.

Order Number	Stock		Breaker	Minimum Cutting Diameter D1	Groove Width W3	Max Groove Depth F2	Dimensions (mm)							
	Micrograin Carbide TF15	Coated Carbide VP15TF					Re	D4	L1	L10	L2	F1	H1	Z
CG03RS-10	●	●	Without	3	1	1	0.05	3	50	10	6	1.3	2.7	1.2
03RS-10B	●	●	With	3	1	1	0.05	3	50	10	6	1.3	2.7	1.2
03RS-20	●	●	Without	3	2	1	0.1	3	50	11	6	1.3	2.7	1.2
03RS-20B	●	●	With	3	2	1	0.1	3	50	11	6	1.3	2.7	1.2
04RS-10	●	●	Without	4	1	1.5	0.05	4	60	15	7	1.8	3.6	2.0
04RS-10B	●	●	With	4	1	1.5	0.05	4	60	15	7	1.8	3.6	2.0
04RS-20	●	●	Without	4	2	1.5	0.1	4	60	16	7	1.8	3.6	2.0
04RS-20B	●	●	With	4	2	1.5	0.1	4	60	16	7	1.8	3.6	2.0
05RS-10	●	●	Without	5	1	2	0.05	5	70	20	8	2.3	4.5	2.8
05RS-10B	●	●	With	5	1	2	0.05	5	70	20	8	2.3	4.5	2.8
05RS-20	●	●	Without	5	2	2	0.1	5	70	21	8	2.3	4.5	2.8
05RS-20B	●	●	With	5	2	2	0.1	5	70	21	8	2.3	4.5	2.8
06RS-10	●	●	Without	6	1	2	0.05	6	75	20	8	2.8	5.4	2.8
06RS-10B	●	●	With	6	1	2	0.05	6	75	20	8	2.8	5.4	2.8
06RS-20	●	●	Without	6	2	2	0.1	6	75	21	8	2.8	5.4	2.8
06RS-20B	●	●	With	6	2	2	0.1	6	75	21	8	2.8	5.4	2.8
07RS-10	●	●	Without	7	1	2	0.05	7	85	25	8	3.3	6.4	2.8
07RS-10B	●	●	With	7	1	2	0.05	7	85	25	8	3.3	6.4	2.8
07RS-20	●	●	Without	7	2	2	0.1	7	85	26	8	3.3	6.4	2.8
07RS-20B	●	●	With	7	2	2	0.1	7	85	26	8	3.3	6.4	2.8

\* Refer to P14 for holders.



Right hand tool only.

Order Number	Stock		Breaker	Minimum Cutting Diameter D1	Dimensions (mm)						
	Micrograin Carbide TF15	Coated Carbide VP15TF			Re	D4	L1	L10	L2	F1	H1
CR03RS-01	●	●	Without	3.5	0.1	3	50	8	6	0.15	2.7
CR03RS-01B	●	●	With	3.5	0.1	3	50	8	6	0.15	2.7
CR04RS-01	●	●	Without	4.5	0.1	4	60	10	7	0.15	3.6
CR04RS-01B	●	●	With	4.5	0.1	4	60	10	7	0.15	3.6
CR05RS-01	●	●	Without	5.5	0.1	5	70	12	8	0.15	4.5
CR05RS-01B	●	●	With	5.5	0.1	5	70	12	8	0.15	4.5

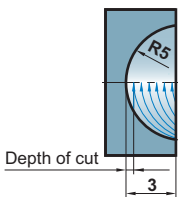
## Machining Methods of the CR Type

### ● Profile turning

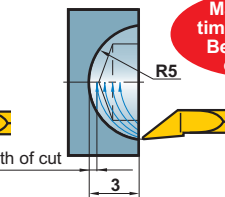
By drilling a pre-prepared hole, the machining time will be shortened and chip control will be improved.  
<Cutting conditions>

Workpiece : JIS S20C  
Holder : CR05RS-01B  
Cutting speed : 80m/min  
Feed : 0.05mm/rev  
Depth of cut : 0.05mm  
Wet

Machining a work piece without a pre-prepared hole



Machining a work piece with a pre-prepared hole

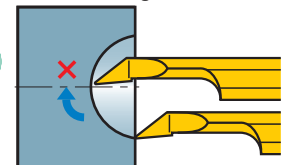


Machining time reduced  
Better chip control

### ■ Notes

Profile turning, Inner end facing

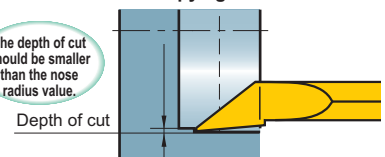
The cutting edge should not be cross the centre line of the work piece.



If the cutting edge crosses the centre line of a work piece, the cutting edge can fracture.

Copying

The depth of cut should be smaller than the nose radius value.



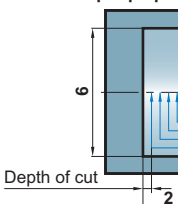
With depths of cut larger than the nose radius value, burrs will be formed.

### ● Inner end facing

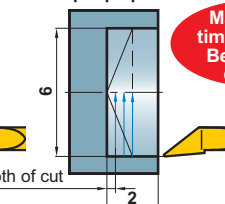
By drilling a pre-prepared hole, the machining time will be shortened and chip control will be improved.  
<Cutting conditions>

Workpiece : JIS S20C  
Holder : CR05RS-01B  
Cutting speed : 80m/min  
Feed : 0.05mm/rev  
Depth of cut : 0.05mm  
Wet

Machining a work piece without a pre-prepared hole



Machining a work piece with a pre-prepared hole



Machining time reduced  
Better chip control

## Recommended Cutting Conditions

Work Material	CB Type				CG Type			CT Type	CR Type		
	Cutting Speed (m/min)	Feed (mm/rev)	Depth of Cut (mm)	Tool Overhang (l/d)	Cutting Speed (m/min)	Feed (mm/rev)		Cutting Speed (m/min)	Cutting Speed (m/min)	Feed (mm/rev)	
						03RS/04RS	05RS/06RS/07RS			03RS/04RS	05RS
<b>P</b> General Steel	80 (40-120)	0.03 (0.01-0.05)	0.2 (0.1-0.3)	3-5	80 (40-120)	0.02 (0.01-0.03)	0.03 (0.01-0.05)	50 (30-80)	80 (40-120)	0.02 (0.01-0.03)	0.03 (0.01-0.05)
<b>M</b> Stainless Steel	80 (40-120)	0.03 (0.01-0.05)	0.2 (0.1-0.3)	3-5	80 (40-120)	0.02 (0.01-0.03)	0.03 (0.01-0.05)	50 (30-80)	80 (40-120)	0.02 (0.01-0.03)	0.03 (0.01-0.05)
<b>K</b> Cast Iron	80 (40-120)	0.03 (0.01-0.05)	0.2 (0.1-0.3)	3-5	80 (40-120)	0.03 (0.01-0.05)	0.03 (0.01-0.05)	50 (30-80)	80 (40-120)	0.03 (0.01-0.05)	0.03 (0.01-0.05)
<b>N</b> Non-ferrous Materials	120 (80-160)	0.05 (0.01-0.08)	0.3 (0.1-0.5)	3-5	120 (80-160)	0.03 (0.01-0.05)	0.05 (0.01-0.08)	80 (50-100)	120 (80-160)	0.03 (0.01-0.05)	0.05 (0.01-0.08)

Note 1) Wet machining recommended.

Note 2) Please remember when machining small diameters at high speeds there is the possibility that the machine cannot maintain the set feed rate. (CT type)

Note 3) Refer to P11 for recommended tool overhangs of CG, CT and CR types.

## Thread Pitch for the CT Type

Order Number	Metric Thread								Unified Thread						
	P (pitch)								P (thread/inch)						
	0.50	0.70	0.75	0.80	1.00	1.25	1.50	1.75	36	32	28	24	20	18	16
<b>CT03RS-M4</b> <b>CT03RS-M4B</b>	○	○	○	○	○	-	-	-	○	○	○	○	-	-	-
<b>CT04RS-M6</b> <b>CT04RS-M6B</b>	-	-	○	-	○	○	-	-	-	-	○	○	○	-	-
<b>CT05RS-M8</b> <b>CT05RS-M8B</b>	-	-	○	-	○	○	○	-	-	-	-	○	○	○	-
<b>CT06RS-M10</b> <b>CT06RS-M10B</b>	-	-	○	-	○	○	○	○	-	-	-	○	○	○	○

Note) For internal threads that are larger than the minimum diameter of the Micro Mini Twin (CT type) it is possible to machine the thread pitches above. For the minimum diameter please refer to the tool standards.

## Depth of Cut for the CT Type

### ● Metric thread

P (Pitch)	0.5	0.7	0.75	0.8	1	1.25	1.5	1.75				
Depth of Cut (mm)	0.3	0.43	0.46	0.44	0.49	0.62	0.6	0.76	0.92	1.09		
Re*(Nose Radius)	0.03	0.03	0.03	0.05	0.03	0.03	0.05	0.05	0.05	0.05		
Number of Passes	1	0.06	0.06	0.06	0.06	0.07	0.07	0.07	0.07	0.07		
	2	0.05	0.06	0.06	0.06	0.06	0.07	0.07	0.07	0.07		
	3	0.05	0.06	0.06	0.05	0.06	0.06	0.06	0.07	0.07	0.07	
	4	0.04	0.05	0.05	0.05	0.05	0.06	0.06	0.07	0.07	0.07	
	5	0.04	0.05	0.05	0.05	0.05	0.05	0.06	0.06	0.07	0.07	
	6	0.03	0.04	0.04	0.04	0.04	0.05	0.05	0.06	0.06	0.07	
	7	0.03	0.04	0.04	0.04	0.04	0.05	0.05	0.06	0.06	0.06	
	8		0.04	0.04	0.03	0.04	0.04	0.04	0.05	0.06	0.06	
	9		0.03	0.03	0.03	0.03	0.04	0.04	0.05	0.05	0.06	
	10			0.03	0.03	0.03	0.04	0.04	0.05	0.05	0.06	
	11					0.03	0.03	0.03	0.04	0.05	0.05	
	12						0.03	0.03	0.04	0.05	0.05	
	13							0.03	0.04	0.04	0.05	
	14								0.03	0.04	0.05	
	15									0.04	0.04	
	16										0.04	
	17										0.03	
	18											0.04
	19											0.04
	20											0.03

### ● Unified thread

P (Thread/inch)	36	32	28	24	20	18	16			
Depth of Cut (mm)	0.43	0.49	0.56	0.54	0.66	0.64	0.78	0.87	0.98	
Re*(Nose Radius)	0.03	0.03	0.03	0.05	0.03	0.05	0.05	0.05	0.05	
Number of Passes	1	0.06	0.06	0.07	0.06	0.07	0.07	0.07	0.07	
	2	0.06	0.06	0.06	0.06	0.07	0.07	0.07	0.07	
	3	0.06	0.06	0.06	0.06	0.06	0.06	0.07	0.07	
	4	0.05	0.05	0.06	0.05	0.06	0.06	0.06	0.07	
	5	0.05	0.05	0.05	0.05	0.06	0.06	0.06	0.07	
	6	0.04	0.04	0.05	0.05	0.05	0.05	0.06	0.06	
	7	0.04	0.04	0.04	0.04	0.05	0.05	0.06	0.06	
	8	0.04	0.04	0.04	0.04	0.04	0.05	0.05	0.06	
	9	0.03	0.03	0.04	0.04	0.04	0.04	0.05	0.05	
	10		0.03	0.03	0.03	0.04	0.04	0.05	0.05	
	11			0.03	0.03	0.03	0.03	0.04	0.05	
	12				0.03	0.03	0.03	0.04	0.05	
	13					0.03	0.03	0.04	0.04	
	14						0.03	0.04	0.04	
	15							0.03	0.04	
	16								0.03	
	17									0.03
	18									0.03
	19									
	20									

\* Even though the pitch maybe the same, the depth of cut varies according to the nose radius. For the Micro Mini Twin CT type CT03RS-M4, and CT03RS-M4B the nose radius is 0.03mm, for other types it is 0.05mm. For further details please refer to the standards section.

# MICRO-MINI

## Micro-Mini

Geometry	Order Number	Stock	Dimensions (mm)				Minimum Cutting Diameter	Max Groove Depth F <sub>2</sub>
			R	W <sub>3</sub>	D <sub>4</sub>	L <sub>1</sub>		
<p>Right hand tool only.</p>	<b>C03FR-BLS</b>	●	2.0	3	80	15	<b>3.2</b>	1.0
	<b>C04FR-BLS</b>	●	2.5	4	80	20	<b>4.2</b>	1.5
	<b>C05HR-BLS</b>	●	3.0	5	100	25	<b>5.2</b>	2.0

## Recommended Cutting Conditions

Work Material	Cutting Speed (m/min)	Feed (mm/rev)	Depth of Cut (mm)	Tool Overhang (l/d)	Edge Condition	
					* Corner Radius or C	* Honing
<b>P</b> General Steel	40 (30–50)	0.05 (–0.1)	0.2 (0.1–0.3)	5	0.1–0.5	0.01–0.05
<b>M</b> Stainless Steel	40 (30–50)	0.05 (–0.1)	0.2 (0.1–0.3)	5	≤0.4	≤0.03 (Not required for boring applications)
<b>K</b> Cast Iron	40 (30–50)	0.05 (–0.05)	0.2 (0.1–0.3)	5	0.1–0.5	0.01–0.05
<b>N</b> Non-ferrous Materials	80 (60–100)	0.05 (–0.1)	0.3 (0.1–0.5)	5	0.1–0.5	≤0.03 (Not required for boring applications)

\* Cutting edge is not honed. Please hone according to the workpiece before machining.

## Grinding the cutting edge of the MICRO-MINI boring bar

- MICRO-MINI boring bar can be applied to boring and grooving without any modifications. It can also be reground as shown below.
- For shaping and regrinding, use diamond whetstone approximately #250 - #400. Please grind according to the application using the figure below as a reference.

Application	Boring	Grooving	Threading

\* Refer to P14 for holders.

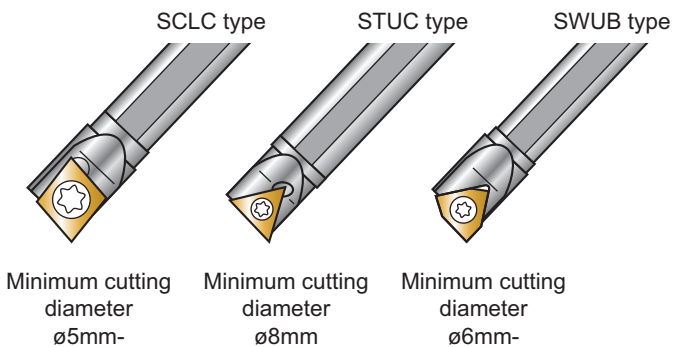
# Small Boring Bar Series

# MICRO-DEX

## Features

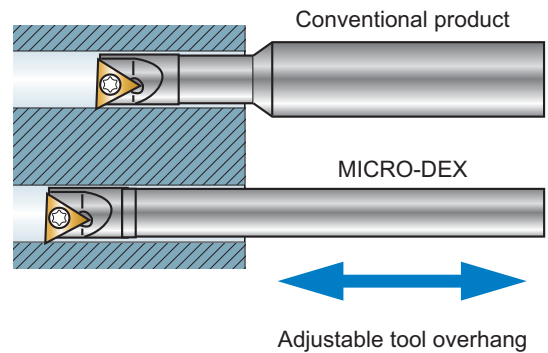
### ● Indexable type boring bars for a minimum bore diameter of 5.0mm

Screw on type for applications with a minimum bore diameter of 5.0mm (SCLC type)



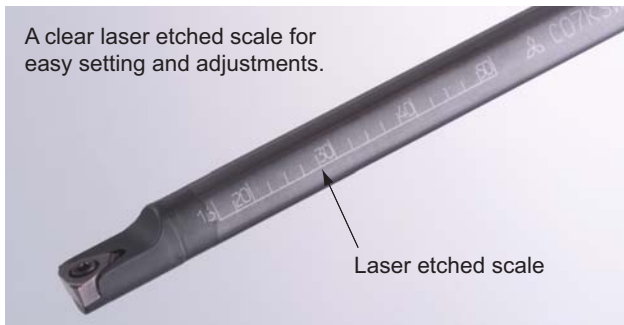
### ● Constant diameter design

Conventional type boring bars restrict the amount of tool overhang. This straight shank design allows greater adjustability for deeper cutting.

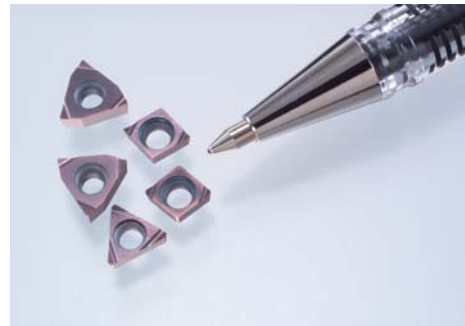


### ● Highly rigid carbide shank

A clear laser etched scale for easy setting and adjustments.



### ● Smallest inserts utilised



### ● Two grades to cover a wide application range.

Two standardised insert grades for all applications are available.

Cermet

**NX2525**

General steel  
(JIS S45C, JIS SCM440)

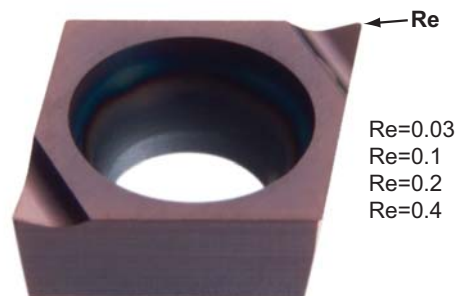
Coated carbide

**VP15TF**

Stainless steel  
(JIS SUS304, 420)  
Non-ferrous materials  
(Aluminium, Brass)  
Cast iron  
(JIS FC, JIS FCD)

### ● Various nose radii

Standardised nose radii of 0.03mm - 0.4mm are available for small parts machining.





### SCLC type (Rhombic 80° insert)

Features : A precise, stable cutting edge and a small minimum cutting diameter.

<b>SCLC</b>		(Solid carbide shank)							<b>CCO inserts</b>		Finish	
											L-F  (03,04)	
Order Number	Stock	Insert Number	Dimensions (mm)					Minimum Cutting Diameter D1	Standard Corner Radius Re			PCD/CBN  (03,04)
	R		D4	L1	F1	H1	RR°					
<b>C04GSCLCR03</b>	●	CCGT NP-CCMW	03S1 $\odot$ L-F	4	90	2.5	3.7	15	5	0.2	TS16	TKY06F
<b>C05HSCLCR03</b>	●		03S1 $\odot$ L-F	5	100	3.0	4.7	13	6	0.2	TS16	TKY06F
<b>C06JSCLCR04</b>	●		04T0 $\odot$ L-F	6	110	3.5	5.7	13	7	0.2	TS21	TKY06F
<b>C07KSCLCR04</b>	●		04T0 $\odot$ L-F	7	125	4.0	6.7	11	8	0.2	TS21	TKY06F

\* Refer to P14 for holders.

### STUC type (Triangular insert)

Features : Cost effective back boring can be utilised.

<b>STUC</b>		(Solid carbide shank)							<b>TCGT inserts</b>		Finish	
											L-F  (06)	
Order Number	Stock	Insert Number	Dimensions (mm)					Minimum Cutting Diameter D1	Standard Corner Radius Re			Depth of cut is limited when back cutting.
	R		D4	L1	F1	H1	RR°					
<b>C07KSTUCR06</b>	●	TCGT	0601 $\odot$ L-F	7	125	4.0	6.7	12	8	0.2	TS2C	TKY06F

\* Refer to P14 for holders.

### SWUB type (Hexagonal insert)

Features : Cost effective with a precise, stable cutting edge.

<b>SWUB</b>		(Solid carbide shank)							<b>WBGT inserts</b>		Finish	
											L-F  (02,L3)	
Order Number	Stock	Insert Number	Dimensions (mm)					Minimum Cutting Diameter D1	Standard Corner Radius Re			Right hand tool holder only.
	R		D4	L1	F1	H1	RR°					
<b>C05HSWUBR02</b>	●	WBGT	0201 $\odot$ L-F	5	100	3.0	4.7	13	6	0.2	TS21	TKY06F
<b>C06JSWUBR02</b>	●		0201 $\odot$ L-F	6	110	3.5	5.7	13	7	0.2	TS2C	TKY06F
<b>C07KSWUBRL3</b>	●		L302 $\odot$ L-F	7	125	4.0	6.7	11	8	0.2	TS2	TKY06F

\* Refer to P14 for holders.

● : Inventory maintained.

# MICRO-DEX

## Inserts

### ● Coated carbide and cermet

Order Number	Class	Stainless Steel Non-ferrous Materials Cast Iron	General Steel	Dimensions (mm)			Geometry
		Coated	Cermet	D1	S1	Re	
		<b>VP15TF</b>	<b>NX2525</b>				
<b>CCGT03S1V3L-F</b>	G	●	●	3.57	1.39	0.03	
<b>03S101L-F</b>	G	●	●	3.57	1.39	0.1	
<b>03S102L-F</b>	G	●	●	3.57	1.39	0.2	
<b>03S104L-F</b>	G	●	●	3.57	1.39	0.4	
<b>CCGT04T0V3L-F</b>	G	●	●	4.37	1.79	0.03	
<b>04T001L-F</b>	G	●	●	4.37	1.79	0.1	
<b>04T002L-F</b>	G	●	●	4.37	1.79	0.2	
<b>04T004L-F</b>	G	●	●	4.37	1.79	0.4	
<b>TCGT0601V3L-F</b>	G	●	●	3.97	1.59	0.03	
<b>060101L-F</b>	G	●	●	3.97	1.59	0.1	
<b>060102L-F</b>	G	●	●	3.97	1.59	0.2	
<b>060104L-F</b>	G	●	●	3.97	1.59	0.4	
<b>WBGTL0201V3L-F</b>	G	●	●	3.97	1.59	0.03	
<b>020101L-F</b>	G	●	●	3.97	1.59	0.1	
<b>020102L-F</b>	G	●	●	3.97	1.59	0.2	
<b>020104L-F</b>	G	●	●	3.97	1.59	0.4	
<b>WBGTL302V3L-F</b>	G	●	●	4.76	2.38	0.03	
<b>L30201L-F</b>	G	●	●	4.76	2.38	0.1	
<b>L30202L-F</b>	G	●	●	4.76	2.38	0.2	
<b>L30204L-F</b>	G	●	●	4.76	2.38	0.4	

### ● CBN and polycrystalline diamond inserts

Order Number	Class	Non-ferrous Materials	Brazed Steel	Dimensions (mm)			Geometry
		Diamond	CBN	D1	S1	Re	
		<b>MD220</b>	<b>MB810</b>				
<b>NP-CCMW03S102</b>	M	●	●	3.57	1.39	0.2	
<b>03S104</b>	M	●	●	3.57	1.39	0.4	
<b>04T002</b>	M	●	●	4.37	1.79	0.2	
<b>04T004</b>	M	●	●	4.37	1.79	0.4	
<b>NP-CCMW03S102F</b>	M	●	●	3.57	1.39	0.2	
<b>03S104F</b>	M	●	●	3.57	1.39	0.4	
<b>04T002F</b>	M	●	●	4.37	1.79	0.2	
<b>04T004F</b>	M	●	●	4.37	1.79	0.4	

## Recommended Cutting Conditions

	Work Material	Grade	Cutting Speed (m/min)	Feed (mm/rev)	Depth of Cut (m/m)	Tool Overhang (l/d)
<b>P</b>	General Steel	<b>NX2525</b>	80 (40–120)	0.03 (0.01–0.05)	0.2 (0.1–0.3)	3–5
<b>H</b>	Brazed Steel	<b>MB810</b>	80 (40–120)	0.03 (0.01–0.05)	0.1 (0.03–0.2)	3–5
<b>M</b>	Stainless Steel	<b>VP15TF</b>	80 (40–120)	0.03 (0.01–0.05)	0.2 (0.1–0.3)	3–5
<b>K</b>	Cast Iron	<b>VP15TF</b>	80 (40–120)	0.03 (0.01–0.05)	0.2 (0.1–0.3)	3–5
<b>N</b>	Non-ferrous Materials	<b>VP15TF</b>	120 (80–160)	0.05 (0.01–0.08)	0.4 (0.1–0.6)	3–5
		<b>MD220</b>	120 (80–160)	0.05 (0.01–0.08)	0.4 (0.1–0.6)	3–5

# Precautions when using the **MICRO-DEX** and **MICRO-MINI TWIN**

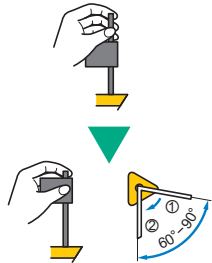
## MICRO-DEX

- We recommended using cutting fluid to improve tool life and accuracy of the machined surface.
- Indexable inserts and clamp screws are small and can easily be lost.
- If the insert screw is overtightened, the screw or wrench may be damaged.

Follow the guidelines shown below when tightening the clamp screw. The appropriate insert tightening torque is **0.5 (N/m)**.

### Tightening of insert screw

① Hold the wrench flag as shown in the diagram and turn it until finger tight.



② Hold the wrench flag and turn it approximately 60° to 90° (reference tightening angle).



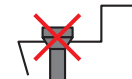
### Screw tightening without an insert

The main screw part may be damaged if tightened.

Correct

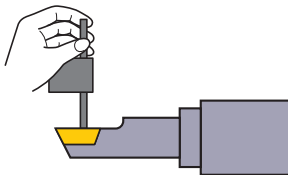


Incorrect



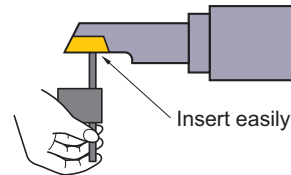
- Note that the procedures are performed starting with the insert screw on the back side when using a reverse holder.

Normal use



Start with the insert clamp on the front side.

Reverse holder use



Start with the insert clamp on the back side.

- Use within recommended specification ranges.  
Maximum  $L/d=5$  (L : total length; d : shank diameter)  
If the L/d ratio exceeds the recommended value, lower the cutting conditions.

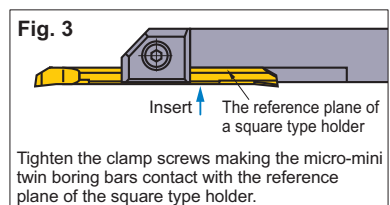
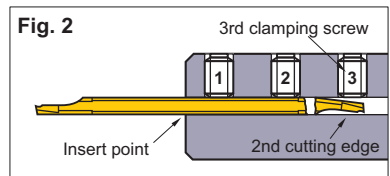
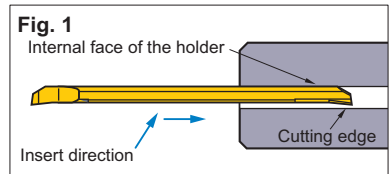
## Repair

- If the holders break, Mitsubishi Materials can repair them.

## MICRO-MINI TWIN

- When using a holder for general purpose / small automatic lathe.

- ① To avoid chipping of the 2nd cutting edge take care when inserting the boring bar into the holder. Refer to fig.1. If the 2nd edge contacts the internal face of the holder there is a possibility that it may chip.
- ② When using this type of holder, there is a possibility that damage to the shank and the 2nd cutting edge can occur. Make sure that the clamping screws are tightened to the set torque value. Additionally make sure that there is no clamping screw near the 2nd cutting edge as this can break the boring bar.
- ③ When using Mitsubishi holders  
When using holders with a tool overhang of recommended quantity, ensure that the 3rd clamping screw is removed prior to machining. The set torque value for clamping screw is 2.0 N•m.



- When using a square type holder:

- ① When installing the boring bar into the holder, tighten the clamp screws after ensuring the flats on the tool holder are parallel to the reference flats on the micro-mini bar. Refer to fig.3.
- ② Make sure that the clamping screws are tightened to the recommended values.
- ③ Do not tighten the clamp screw without a bar in place, otherwise the bridge will be deformed.

# Small Boring Bar Series

# HOLDERS

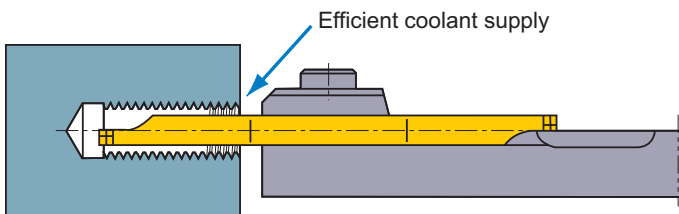
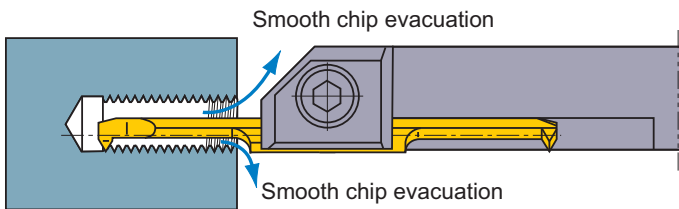
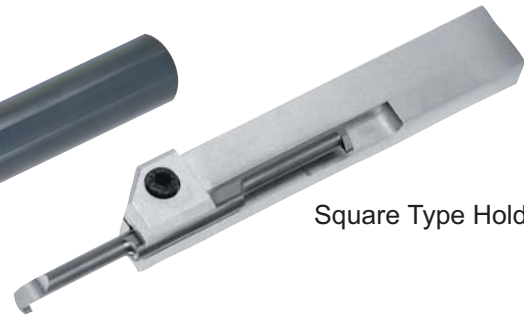
## Features

- Compatible with any type of automatic and NC lathe

Round Type Holder  
(Tapered holder)



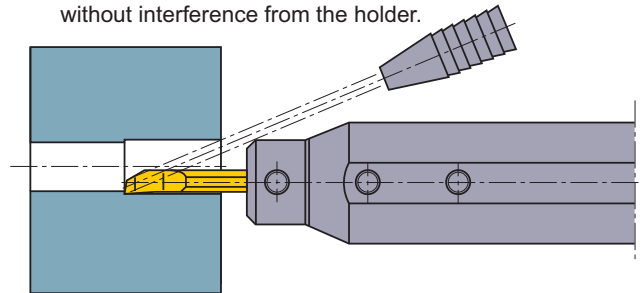
Square Type Holder



- The shape of the cutting point contributes to good chip control and coolant supply.

Small holder for easy coolant supply as well as excellent chip evacuation.

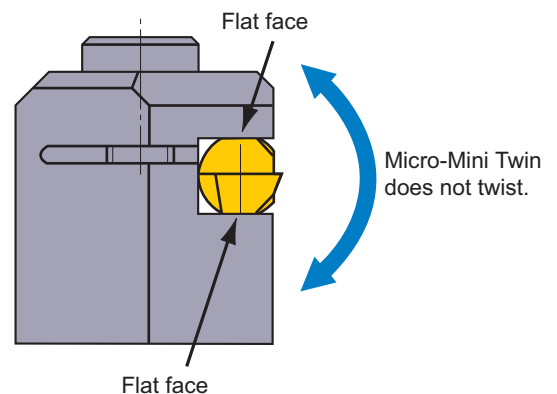
Coolant flows to the cutting edge without interference from the holder.



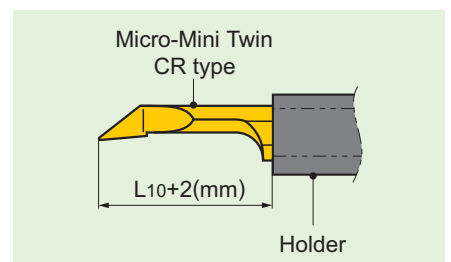
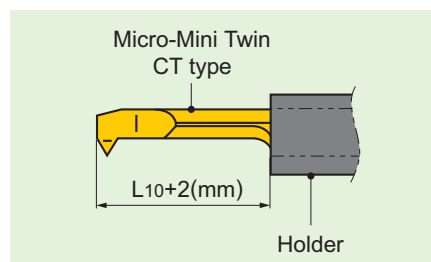
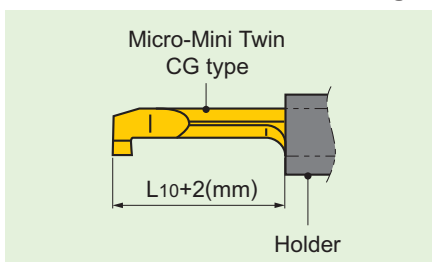
- Square holder for easy installation

Flat clamp faces fix the position of the top cutting edge.

\* The MICRO-DEX and MICRO-MINI cannot be fitted to square holders.



## Recommended tool overhang

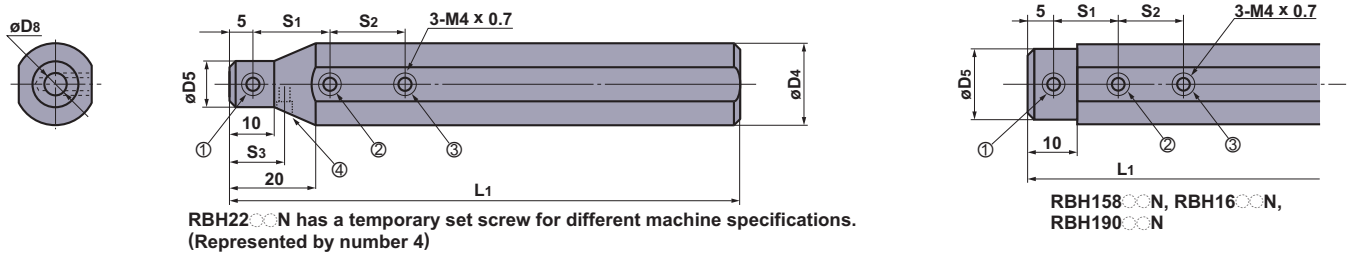


Note) For L10, please refer to the tool standards (page 3 for CT type and page 4 for CG and CR types).



# HOLDER

## Round Type Holder



Order Number	Stock	Dimensions (mm)							Clamp Screw *1				Wrench	Torque (N/m)
		D4	D8	D5	L1	S1	S2	S3	①	②	③	④		
<b>NEW</b> RBH15820N	●	15.875	2	15	100	10	—	—	B	B	—	—	HKY20F	2.0
<b>NEW</b> 15830N	●	15.875	3	15	100	10	10	—	A	A	A	—	HKY20F	2.0
<b>NEW</b> 15840N	●	15.875	4	15	100	15	15	—	A	A	A	—	HKY20F	2.0
<b>NEW</b> 15850N	●	15.875	5	15	100	15	15	—	A	A	A	—	HKY20F	2.0
<b>NEW</b> 15860N	●	15.875	6	15	100	20	20	—	A	A	A	—	HKY20F	2.0
<b>NEW</b> 15870N	●	15.875	7	15	100	20	20	—	A	A	A	—	HKY20F	2.0
RBH1620N	●	16	2	15	100	10	—	—	B	B	—	—	HKY20F	2.0
1630N	●	16	3	15	100	10	10	—	A	A	A	—	HKY20F	2.0
1640N	●	16	4	15	100	15	15	—	A	A	A	—	HKY20F	2.0
1650N	●	16	5	15	100	15	15	—	A	A	A	—	HKY20F	2.0
1660N	●	16	6	15	100	20	20	—	A	A	A	—	HKY20F	2.0
1670N	●	16	7	15	100	20	20	—	A	A	A	—	HKY20F	2.0
*2 RBH19020N	●	19.05	2	18	125	10	—	—	C	C	—	—	HKY20F	2.0
*2 19030N	●	19.05	3	18	125	10	10	—	B	B	B	—	HKY20F	2.0
*2 19040N	●	19.05	4	18	125	15	15	—	B	B	B	—	HKY20F	2.0
*2 19050N	●	19.05	5	18	125	15	15	—	B	B	B	—	HKY20F	2.0
*2 19060N	●	19.05	6	18	125	20	20	—	B	B	B	—	HKY20F	2.0
*2 19070N	●	19.05	7	18	125	20	20	—	B	B	B	—	HKY20F	2.0
RBH2020N	●	20	2	11	125	10	—	—	A	A	—	—	HKY20F	2.0
2030N	●	20	3	12	125	10	10	—	A	A	B	—	HKY20F	2.0
2040N	●	20	4	13	125	15	15	—	A	B	B	—	HKY20F	2.0
2050N	●	20	5	14	125	15	15	—	A	B	B	—	HKY20F	2.0
2060N	●	20	6	15	125	20	20	—	A	B	B	—	HKY20F	2.0
2070N	●	20	7	16	125	20	20	—	A	B	B	—	HKY20F	2.0
RBH2220N	●	22	2	11	125	10	—	10	A	B	—	A	HKY20F	2.0
2230N	●	22	3	12	125	10	10	10	A	B	C	A	HKY20F	2.0
2240N	●	22	4	13	125	15	15	12.5	A	B	B	A	HKY20F	2.0
2250N	●	22	5	14	125	15	15	12.5	A	B	B	A	HKY20F	2.0
2260N	●	22	6	15	125	20	20	15	A	B	B	A	HKY20F	2.0
2270N	●	22	7	16	125	20	20	15	A	B	B	A	HKY20F	2.0
RBH2520N	●	25	2	11	150	10	—	—	A	B	—	—	HKY20F	2.0
2530N	●	25	3	12	150	10	10	—	A	B	C	—	HKY20F	2.0
2540N	●	25	4	13	150	15	15	—	A	C	C	—	HKY20F	2.0
2550N	●	25	5	14	150	15	15	—	A	C	C	—	HKY20F	2.0
2560N	●	25	6	15	150	20	20	—	A	C	C	—	HKY20F	2.0
2570N	●	25	7	16	150	20	20	—	A	C	C	—	HKY20F	2.0
<b>NEW</b> RBH25420N	●	25.4	2	11	150	10	—	—	A	B	—	—	HKY20F	2.0
<b>NEW</b> 25430N	●	25.4	3	12	150	10	10	—	A	B	C	—	HKY20F	2.0
<b>NEW</b> 25440N	●	25.4	4	13	150	15	15	—	A	C	C	—	HKY20F	2.0
<b>NEW</b> 25450N	●	25.4	5	14	150	15	15	—	A	C	C	—	HKY20F	2.0
<b>NEW</b> 25460N	●	25.4	6	15	150	20	20	—	A	C	C	—	HKY20F	2.0
<b>NEW</b> 25470N	●	25.4	7	16	150	20	20	—	A	C	C	—	HKY20F	2.0

\*1 Order number of clamp screw A=HSS04004, B=HSS04006, C=HSS04008

\*2 Revised order number

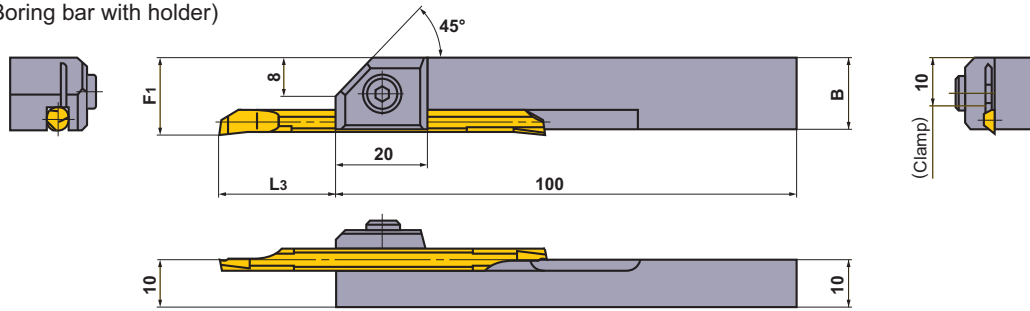
Conventional order number	Revised order number
RBH1920N	RBH19020N
1930N	19030N
1940N	19040N
1950N	19050N
1960N	19060N
1970N	19070N

● : Inventory maintained.

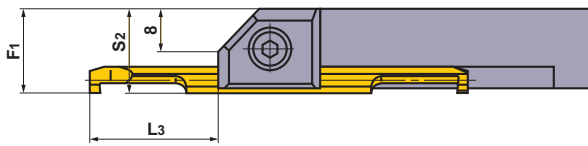
# HOLDER

## Square Type Holder

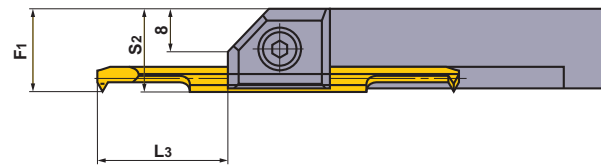
CB type (Boring bar with holder)



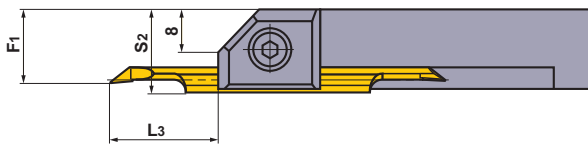
CG type (Boring bar with holder)



CT type (Boring bar with holder)



CR type (Boring bar with holder)



Order Number	Stock	Dimensions (mm)										Micro-Mini Twin				Clamp Screw	Wrench	Torque (N/m)	
		F1				Maximum Tool Overhang L3 (Recommended tool overhang when machining general steels)				S2	B	CB	CG	CT	CR				
		CB	CG	CT	CR	CB	CG.RS-10 CG.RS-10B	CG.RS-20 CG.RS-20B	CT										CR
<b>SBH1020R</b>	●	13	—	—	—	6—24 (6—10)	—	—	—	—	—	12.9	02RS 02RS-B	—	—	—	HSC 04010	HKY 30R	4.8
<b>1030R</b>	●	14	13.8	13.8	12.65	8.5—22 (9—15)	13—17.5 (14)	14—16.5 (15)	13—17.5 (14)	11—19.5 (12)	14	13.8	03RS 03RS-B	03RS-00 03RS-00B	03RS-M4 03RS-M4B	03RS-01 03RS-01B	HSC 05012	HKY 40R	9.5
<b>1040R</b>	●	15	14.8	14.8	13.15	11—29.5 (12—20)	18—22.5 (19)	19—21.5 (20)	18.5—22 (19.5)	13—27.5 (14)	15	14.7	04RS 04RS-B	04RS-00 04RS-00B	04RS-M6 04RS-M6B	04RS-01 04RS-01B	HSC 05012	HKY 40R	9.5
<b>1050R</b>	●	16	15.8	15.8	13.65	13.5—37 (15—25)	23—27.5 (24)	24—26.5 (25)	24—26.5 (25)	15—35.5 (16)	16	15.6	05RS 05RS-B	05RS-00 05RS-00B	05RS-M8 05RS-M8B	05RS-01 05RS-01B	HSC 05012	HKY 40R	9.5
<b>1060R</b>	●	—	16.8	16.8	—	—	23—32.5 (24)	24—31.5 (25)	24—31.5 (25)	—	17	16.5	—	06RS-00 06RS-00B	06RS-M10 06RS-M10B	—	HSC 05012	HKY 40R	9.5
<b>1070R</b>	●	—	17.8	—	—	—	28—38 (29)	29—37 (30)	—	—	18	17.4	—	07RS-00 07RS-00B	—	—	HSC 05012	HKY 40R	9.5

\* The MICRO-DEX and MICRO-MINI cannot be fitted to square holders.

## Holder Cross Reference List

Holder		MICRO-MINI TWIN				MICRO-DEX	MICRO-MINI	Machine Makers
Type	Order Number	CB	CG	CT	CR		C	
Round Type Holder φ15.875	RBH15820H	02RS 02RS-B	—	—	—	—	—	Citizen Machinery Co., Ltd.
	15830H	03RS 03RS-B	03RS 03RS-B	03RS-M4 03RS-M4B	03RS-01 03RS-01B	—	03FR-BLS	
	15840H	04RS 04RS-B	04RS 04RS-B	04RS-M6 04RS-M6B	04RS-01 04RS-01B	C04GS○○○R○○○	04FR-BLS	
	15850H	05RS 05RS-B	05RS 05RS-B	05RS-M8 05RS-M8B	05RS-01 05RS-01B	C05HS○○○R○○○	05HR-BLS	
	15860H	—	06RS 06RS-B	06RS-M10 06RS-M10B	—	C06JS○○○R○○○	—	
	15870H	—	07RS 07RS-B	—	—	C07KS○○○R○○○	—	
Round Type Holder φ16	RBH1620N	02RS 02RS-B	—	—	—	—	—	Tsugami Corporation NC lathes
	1630N	03RS 03RS-B	03RS 03RS-B	03RS-M4 03RS-M4B	03RS-01 03RS-01B	—	03FR-BLS	
	1640N	04RS 04RS-B	04RS 04RS-B	04RS-M6 04RS-M6B	04RS-01 04RS-01B	C04GS○○○R○○○	04FR-BLS	
	1650N	05RS 05RS-B	05RS 05RS-B	05RS-M8 05RS-M8B	05RS-01 05RS-01B	C05HS○○○R○○○	05HR-BLS	
	1660N	—	06RS 06RS-B	06RS-M10 06RS-M10B	—	C06JS○○○R○○○	—	
	1670N	—	07RS 07RS-B	—	—	C07KS○○○R○○○	—	
Round Type Holder φ19.05	RBH19020N	02RS 02RS-B	—	—	—	—	—	Citizen Machinery Co., Ltd.
	19030N	03RS 03RS-B	03RS 03RS-B	03RS-M4 03RS-M4B	03RS-01 03RS-01B	—	03FR-BLS	
	19040N	04RS 04RS-B	04RS 04RS-B	04RS-M6 04RS-M6B	04RS-01 04RS-01B	C04GS○○○R○○○	04FR-BLS	
	19050N	05RS 05RS-B	05RS 05RS-B	05RS-M8 05RS-M8B	05RS-01 05RS-01B	C05HS○○○R○○○	05HR-BLS	
	19060N	—	06RS 06RS-B	06RS-M10 06RS-M10B	—	C06JS○○○R○○○	—	
	19070N	—	07RS 07RS-B	—	—	C07KS○○○R○○○	—	
Round Type Holder φ20	RBH2020N	02RS 02RS-B	—	—	—	—	—	Citizen Machinery Co., Ltd. Tsugami Corporation Miyano Machinery, Inc. NC lathes
	2030N	03RS 03RS-B	03RS 03RS-B	03RS-M4 03RS-M4B	03RS-01 03RS-01B	—	03FR-BLS	
	2040N	04RS 04RS-B	04RS 04RS-B	04RS-M6 04RS-M6B	04RS-01 04RS-01B	C04GS○○○R○○○	04FR-BLS	
	2050N	05RS 05RS-B	05RS 05RS-B	05RS-M8 05RS-M8B	05RS-01 05RS-01B	C05HS○○○R○○○	05HR-BLS	
	2060N	—	06RS 06RS-B	06RS-M10 06RS-M10B	—	C06JS○○○R○○○	—	
	2070N	—	07RS 07RS-B	—	—	C07KS○○○R○○○	—	
Round Type Holder φ22	RBH2220N	02RS 02RS-B	—	—	—	—	—	Star Micronics Co., Ltd.
	2230N	03RS 03RS-B	03RS 03RS-B	03RS-M4 03RS-M4B	03RS-01 03RS-01B	—	03FR-BLS	
	2240N	04RS 04RS-B	04RS 04RS-B	04RS-M6 04RS-M6B	04RS-01 04RS-01B	C04GS○○○R○○○	04FR-BLS	
	2250N	05RS 05RS-B	05RS 05RS-B	05RS-M8 05RS-M8B	05RS-01 05RS-01B	C05HS○○○R○○○	05HR-BLS	
	2260N	—	06RS 06RS-B	06RS-M10 06RS-M10B	—	C06JS○○○R○○○	—	
	2270N	—	07RS 07RS-B	—	—	C07KS○○○R○○○	—	
Round Type Holder φ25	RBH2520N	02RS 02RS-B	—	—	—	—	—	Tsugami Corporation Miyano Machinery, Inc. NC lathes
	2530N	03RS 03RS-B	03RS 03RS-B	03RS-M4 03RS-M4B	03RS-01 03RS-01B	—	03FR-BLS	
	2540N	04RS 04RS-B	04RS 04RS-B	04RS-M6 04RS-M6B	04RS-01 04RS-01B	C04GS○○○R○○○	04FR-BLS	
	2550N	05RS 05RS-B	05RS 05RS-B	05RS-M8 05RS-M8B	05RS-01 05RS-01B	C05HS○○○R○○○	05HR-BLS	
	2560N	—	06RS 06RS-B	06RS-M10 06RS-M10B	—	C06JS○○○R○○○	—	
	2570N	—	07RS 07RS-B	—	—	C07KS○○○R○○○	—	
Round Type Holder φ25.4	RBH25420H	02RS 02RS-B	—	—	—	—	—	Citizen Machinery Co., Ltd.
	25430H	03RS 03RS-B	03RS 03RS-B	03RS-M4 03RS-M4B	03RS-01 03RS-01B	—	03FR-BLS	
	25440H	04RS 04RS-B	04RS 04RS-B	04RS-M6 04RS-M6B	04RS-01 04RS-01B	C04GS○○○R○○○	04FR-BLS	
	25450H	05RS 05RS-B	05RS 05RS-B	05RS-M8 05RS-M8B	05RS-01 05RS-01B	C05HS○○○R○○○	05HR-BLS	
	25460H	—	06RS 06RS-B	06RS-M10 06RS-M10B	—	C06JS○○○R○○○	—	
	25470H	—	07RS 07RS-B	—	—	C07KS○○○R○○○	—	
Square Type Holder	SBH1020R	02RS 02RS-B	—	—	—	—	—	NC lathes
	1030R	03RS 03RS-B	03RS 03RS-B	03RS-M4 03RS-M4B	03RS-01 03RS-01B	—	—	
	1040R	04RS 04RS-B	04RS 04RS-B	04RS-M6 04RS-M6B	04RS-01 04RS-01B	—	—	
	1050R	05RS 05RS-B	05RS 05RS-B	05RS-M8 05RS-M8B	05RS-01 05RS-01B	—	—	
	1060R	—	06RS 06RS-B	06RS-M10 06RS-M10B	—	—	—	
	1070R	—	07RS 07RS-B	—	—	—	—	

\* Mitsubishi Materials obtained the makers' approval before entering their names in the list.

# MICRO-MINI TWIN

## Application Examples

Tool		CB05RS-B	CG05RS-20B	CT05RS-M8B
Grade		VP15TF	VP15TF	VP15TF
Overhang (mm)		15	23	23
Machine		Small NC lathe	Small NC lathe	Small NC lathe
Workpiece		Flange: JIS SUS316 	JIS S45C 	JIS S45C 
Cutting Conditions	Cutting Speed (m/min)	60	40	40
	Feed (mm/rev)	0.02	0.03	—
	Depth of Cut (mm)	0.1	Groove depth: 1.5	14 passes, M8 x 1.25 (0.07-0.03)
Coolant		Cutting oil	W.S.O.	W.S.O.
Results		Problems related with poor chip control were eliminated.	Conventional tools with a flat land on the rake face caused high cutting resistance and tended to break. The sharp edge of the Micro Mini Twin improves cutting edge reliability.	Conventional tools left burrs on the thread, whereas the Micro Mini Twin with a chip breaker left no burrs.

# MICRO-DEX

## Application Examples

Tool		C05HSCLCR03	C07KSTUCR06	C05HSWUBR02
Grade		35	35	15
Overhang (mm)		CCGT03S101L-F(VP15TF)	TCGT060102L-F(VP15TF)	WBG0201V3L-F(VP15TF)
Machine		NC automatic lathe	NC automatic lathe	NC automatic lathe
Workpiece		JIS SUS303 	JIS SUS303 	JIS SUS303 
Cutting Conditions	Cutting Speed (m/min)	57	63	110
	Feed (mm/rev)	0.05	0.04	0.03
	Depth of Cut (mm)	0.1	0.08	0.03
Coolant		W.S.O.	Cutting oil	Cutting oil
Results		Improved resistance to insert wear and tool life increased by 300%.	Improved resistance to insert wear and tool life increased by 30%.	Compared to non coated inserts, tool life is extended by 50%.

**For Your Safety**

- Don't handle inserts and chips without gloves. ● Please machine within the recommended application range and exchange expired tools with new ones in advance of breakage. ● Please use safety covers and wear safety glasses. ● When using compounded cutting oils, please take fire precautions. ● When attaching inserts or spare parts, please use only the correct wrench or spanner. ● Grinding or heating of cutting tools produces dust and mist. Inhaling large amount of dust or contacting with eyes and skins may harm your body.

**MITSUBISHI MATERIALS CORPORATION**



The Scope of the Registration  
Design, Development and  
Production of General  
Carbide Tools and Carbide  
Blanks



The Scope of the Registration:  
Design, Development and  
Production of Cutting Tools  
Wear-resistant Tools, Rock  
Drilling Tools, Cemented  
Carbide Blanks and Coated  
Products



GRCA  
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Design, Development and  
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Carbide Tools and Carbide  
Blanks

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