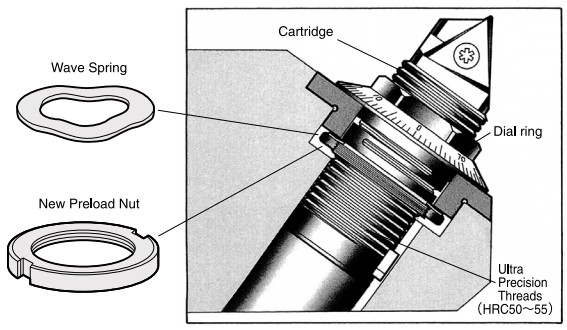
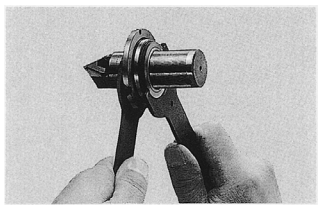
NIKKEN MICRO-CUT BORING HEAD MAC BORING HEAD INSTRUCTION MANUAL

VER.1.0

Preload Nut 〈MICRO-CUT〉〈MAC-UNIT〉



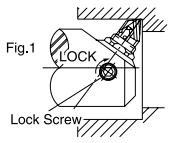
HOW TO REPLACE AND ADJUST A CARTRIDGE

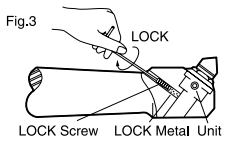


For replacing a cartridge, loosen a new type preload nut. Then, you can remove a cartridge easily. When re-assembling, be sure to preload nut little by little, and adjust to get the suitable torque.

★Min. dial readout (on dia) : 0.02mm (Sub scale : 0.002mm)

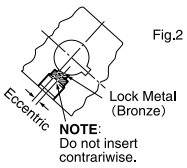
■HOW TO USE THE SURE LOCK SCREW

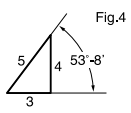




On all NIKEN MICRO-CUT/MAC Boring Bars, the Sure Lock Screw (Fig.1 & Fig.4) is provided. Before practical boring on the machine, please read the following instructions carefully.

1) The Lock Screw is always tighten when machining.
2) The Lock Screw is always loosened when adjusting the Dial Ring.
3) Adjustment always has to be done in clockwise (+ direction), and if you go beyond the required graduation, rewind the dial ring half a turn and readjust.
4) When the Lock Metal (bronze) is replaced, insert it in the right deirection as shown in (Fig.2).
5) The Angular Mounting Type BCB Boring Unit has the angle of 53°8' (Fig.4), which makes the triangle ratio of 5:4:3. Thus when Boring Unit is adjusted by 0.4mm in radius, it automatically changes the axial length by 0.3mm.

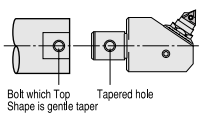




■Modular Connection

Connection system is the Face Contact System by drawing into with the bolt, which top shape is gentle taper.

1) Insert a Head by adjusting the position of a hole.
2) Tighten the bolt temporary, then loosen slightly.
3) Tighten the bolt again by moving a Head clockwise and counterclockwise. This operation is to centralize the each other.
4) Then, tighten the bolt completely until face contact.



Problems and Check Points on Boring Operation

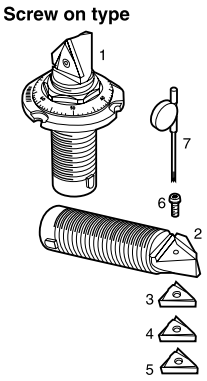
Trouble	Work Condition	Hole to be bored	Inserts	Boring Bar	Cutting condition
Vibrations	·Check the shape of the work and the rigidity of the work clamping.	·Check if the stock removal is adequate.	·Choose the smaller Nose R insert.	·Too much extended length. ·Check the condition of the machine spindle and Taper shank of the boring bar.	·Check if the cutting speed and the feed is too much. ·Check the coolant volume and splash direction.
Poor surface finish	·Check the shape of the work and the rigidity of the work clamping.	·Check if the stock removal is adequate.	·Check the grade of the insert. ·Check the Nose R.	·Check the condition of the machine spindle and Taper shank of the boring bar.	·Vibration?. ·Check if Built-up edge is made. ·Check if the cutting condition is adequate. ·Check the coolant volume and splash direction.
Poor roundness	·Check the shape of the work and the rigidity of the work clamping. ·Is there any intermittent part in the bore?	·Check if the stock removal is adequate. ·Check if the pre-boring hole is adequate.		·Check the balance of the Boring Bar. ·Check the condition of the machine spindle and Taper shank of the boring bar.	·Check if the cutting condition is adequate. ·Check the coolant volume and splash direction.
Unstable finish size	·Is there any intermittent part in the bore?	·Check if the stock removal is adequate. ·Check if the pre-boring hole is adequate.	·Check the grade of the insert.	·Check the condition of the machine spindle and Taper shank of the boring bar.	·Check if the cutting condition is adequate. ·Check if Built-up edge is made. ·Check the coolant volume and splash direction.
Bell-mouth			·Check if the break-in cutting is done. ·Check the grade of the insert.		·Check the coolant volume and splash direction.
Scratches and damage in the bore	·Is any transmission of the impact at work change on the machine with APC.	·Check if the pre-boring hole is adequate.	·Check if any damage on the insert cutting edge.		·Check if Built-up edge is made. ·Check the coolant volume and splash direction.

MICRO-CUT BORING UNIT PARTS LIST

NIKKEN

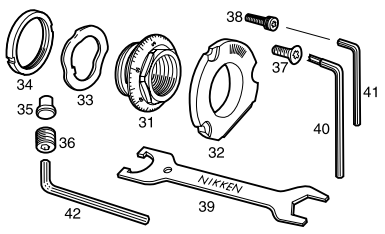
BCB

Screw on type



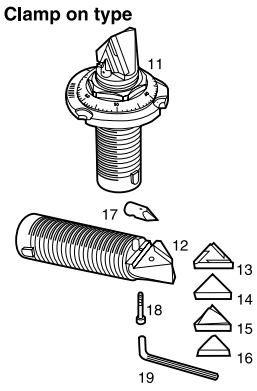
Relation between Micro-Cut Boring Arbor and Micro-Cut Boring Unit

NIKKEN Micro-Cut Boring Arbor is provided with Micro-Cut Boring Unit. When ordering each parts for spare, please place the order by Code No. of Insert, Cartridge and Unit of the following parts list.



BCB

Clamp on type



Boring Range	Screw on type 1 BCB Unit	2 Cartridge	3 Insert for Alloy Steel	4 Insert for Cast Iron	5 Insert for Steel, Stainless Steel	6 Insert Clamp Bolt	7 Insert Clamp Handle	Clamp on type 11 BCB Unit	12 Cartridge	13 Insert for Alloy Steel	14 Insert for Cast Iron	15 Insert for Steel, Stainless Steel	16 Insert Breaker	17 Clamp Piece	18 Insert Clamp Bolt	19 Insert Clamp Handle
12.7～14.5	M 1-12.7	–	1MP-E	1MP-F	1MP-T	M61	10S	M 1S-2	M 1S-2C*	–	–	–	–	–	–	–
14.5～19.5	M 1-14.5	–						M 1L-2	M 1L-2C*	–	–	–	–	–	–	–
19 ～22.5	M 2-19	M 2-19 C	3MS-E	3MS-F	3MS-T	M68	13S	M 2S-2	M 2S-2C*	–	–	–	–	–	–	–
22 ～29.5	M 2-22	M 2-22 C						M 2L-2	M 2L-2C*	–	–	–	–	–	–	–
29 ～ 41	M 3-29	M 3-29 C				M63		M 3L-2S	M 3L-2SC	3P-E	3P-F	3P-T	–	CP- 3	B183	M1.5
38 ～ 50	M 5-38	M 5-38 C	6MP-E	6MP-F	6MP-C	M2577	T8	M 5S-2S	M 5S-2SC	5P-E	5P-F	5P-T	5CB	CP- 5	B185	M2
48 ～ 65	M 5-48	M 5-48 C						M 5L-2S	M 5L-2SC							
62 ～ 90	M 7-62	M 7-62 C	10MP-E	10MP-T	10MP-T	M67	20S	M 7L-2S	M 7L-2SC	7P-E	7P-F	7P-T	7CB	CP- 7	B187	M2.5
82 ～110						M60		M10L-2S	M10L-2SC	10P-E	10P-F	10P-T	10CB	CP-10	B180	M3
100～140	M10-100	M10-100 C														

★Each Unit and Cartridge are supplied without Insert Tip.

★*In case of Boring range is from φ12.7～29.5mm, the Insert is brazed. When ordering, please inform the cartridge No.

★Brazed type cartridge for φ29～200mm is available.

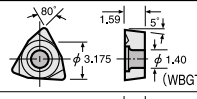
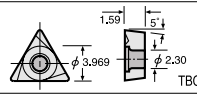
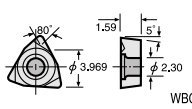
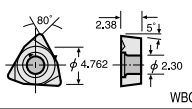
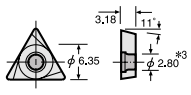
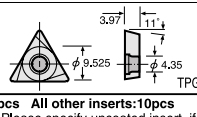
Boring Range	31 Dial Ring	32 Lock Flange	33 Wave Spring	34 Pre-Load Nut	35 Lock Metal	36 Lock Screw	37 Unit Mounting Bolt A	38 Unit Mounting Bolt B	39 Adjustment Handle	40 Wrench for Unit Mounting Bolt A	41 Wrench for Unit Mounting Bolt B	42 Wrench for Lock Screw
12.7～14.5	B311	B321	B331	B341	B351	B361	–	B381	M391	–	M1.27	M1.5
14.5～19.5												
19 ～22.5	B312	B322	9M216W	9M216P	B352	B362	–	B382	M392	–	T6	M2
22 ～29.5						M363						
29 ～ 41	B313	B323	M333	9M325P	B353	B363	–	B384	M393	–	13S	M2.5
38 ～ 50	B315	B325	M335	9M542P	B355	B365		B386	M395	–	20S	M3
48 ～ 65		B326			B356	B366	M375	–		M405	–	M4
62 ～ 90	B317	B327	M337	9M770P	B357	B367	M377	B387	M397	M407	M405	M5
82 ～110						B368						
100～140	B310	B320	M330	9M108P	B350	B360	M370	B380	M390	M400		M6

★31, 32, 33 and 34 are set for spare parts. When ordering, please add "**D**" at the end of Code No.
e.g. D.M2-22 for Boring Range: φ22～29.5mm

NIKKEN INSERT SPECIFICATION TABLE

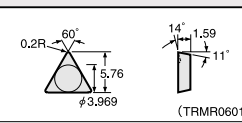
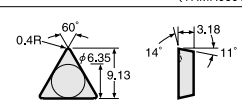
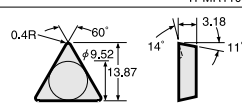
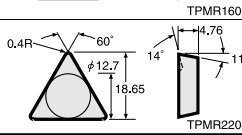
NIKKEN

■ Insert Tip for BCB (screw on type)、MAC

Insert Tip Code No. R0.2	R0.4	R0.8	Dimension	Grade	Material	Applicable Arbor
1MP-T2				Cermet	Alloy Steel, Stainless Steel	BCB12.7 BCB14.5
-E2				P10	Alloy Steel	
-F2				K10	Cast Iron, Aluminium	
			(WBGT050102L)			
3MS-T2				Cermet	Alloy Steel, Stainless Steel	BCB19,BCB22, BCB29
-E2				P10	Alloy Steel	
-F2				K10	Cast Iron, Aluminium	
-B2			TBGT0601○L	CBN	Hardened steel	
3MP-C2	3MP-C4			Coated	Alloy Steel, Stainless, Cast Iron	ZMAC16,ZMAC20, ZMAC25 DJ Bit*1 MAC20,MAC25.5
-E2				P10	Alloy Steel	
-F2				K10	Cast Iron, Aluminium	
	-B4			CBN	Hardened steel	
-D2	-D4		WBGT0601○L	Diamond	Aluminium,High Speed	
4MP-C2	4MP-C4			Coated	Alloy Steel, Stainless, Cast Iron	ZMAC32 MAC33
-E2				P10	Alloy Steel	
-F2				K10	Cast Iron, Aluminium	
	-B4			CBN	Hardened steel	
-D2	-D4		WBGT0802○L	Diamond	Aluminium,High Speed	
6MP-C2	6MP-C4	6MP-C8		Coated	Alloy Steel, Stainless, Cast Iron	ZMAC42,ZMAC55, ZMAC70,ZMAC85, ZMAC100,ZMAC140 BCB38,BCB48, DJ Bit,MCC130 BAC130～BAC530 MAC42,MAC56
-T2	-T4	-T8		Cermet	Alloy Steel, Stainless Steel	
-E2	-E4	-E8		P10	Alloy Steel	
	-F4	-F8		K10	Cast Iron, Aluminium	
	-B4	-B8		CBN	Hardened steel	
-D2*2	-D4*2	-D8*2	TPGT1103○L	Diamond	Aluminium,High Speed	
10MP-T2	10MP-T4	10MP-T8		Cermet	Alloy Steel, Stainless Steel	DAC Ctype BCB62,BCB82, BCB100 MAC80,MAC100
-E2	-E4	-E8		P10	Alloy Steel	
	-F4	-F8		K10	Cast Iron, Aluminium	
		-B8	TPGT16T3○L	CBN	Hardened steel	

★**Minimum order quantity of CBN, Diamond insert:1pcs All other inserts:10pcs**
★ **"T"** grade (Cermet) insert is TiN Coated as standard. Please specify uncoated insert, if required for deep hole boring applications.
★For NIKKEN Special Geometric Nose Inserts for deep hole boring application, please specify Code No. adding **"-SR"**.
★Insert Tip of DJ Bit marked *1 was changed from **3MS** to **3MP**. ★**Special clamp screw (M2562D) is required for 6MP-D marked *2.**
★*3 **The hole dia. for 6MP insert is φ2.8mm. In case of hole φ3.0mm, special clamp screw (M2562D) is required.**

■ Insert Tip for BCB (clamp on type)

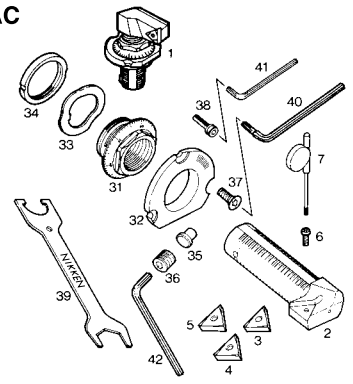
Insert Tip Code No.	Dimension	Grade	Material	Applicable Arbor	Optional Nose Radius 0.4R	0.8R
3P-E		P10	Cast Iron	BCB Clamp on Type BCB 29		
-F		K10	Cast Iron, Aluminium			
-T		Cermet	Alloy Steel, Stainless Steel			
	(TRMR060102)					
5P-E		P10	Cast Iron	BCB Clamp on Type BCB 38, BCB48		
-F		K10	Cast Iron, Aluminium			
-T		Cermet	Alloy Steel, Stainless Steel			
-B	TPMR1103OL	CBN	Harden ed Steel			
7P-E		P10	Cast Iron	BCB Clamp on Type BCB 62, BCB82		7P-E8
-F		K10	Cast Iron, Aluminium			7P-F8
-T		Cermet	Alloy Steel, Stainless Steel			
-B	TPMR1603OL	CBN	Hardened Steel			
10P-E		P10	Cast Iron	BCB Clamp on Type BCB 100		10P-E8
-F		K10	Cast Iron, Aluminum			10P-F8
-T		Cermet	Alloy Steel, Stainless Steel			
-B	TPMR2204OL	CBN	Hardened Steel			

★Standard **"F"** grade insert (for Cast Iron or Aluminium) is without a chip breaker.
★Minimum order quantity of **CBN** : 1pcs. All other inserts : 10pcs.

MAC UNIT PARTS LIST

NIKKEN

MAC



Relation between MAC Boring arbor and MAC Boring Unit

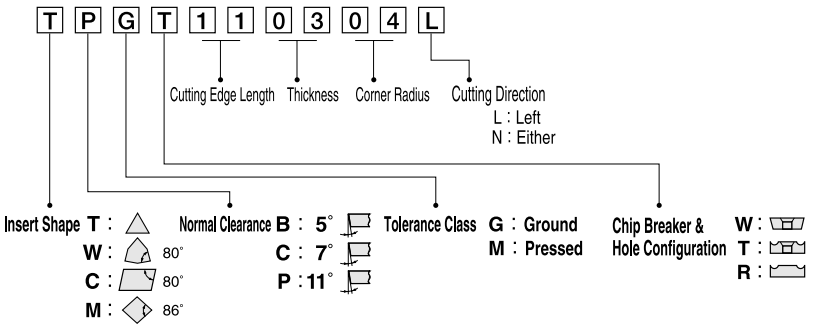
NIKKEN MAC Boring Arbor is provided with MAC Boring Unit. When ordering each parts as for spare, please Place the order by Code No. of throw away tip, cartridge and unit of following parts list.

Boring Range	37 Unit Mounting Bolt A	38 Unit Mounting Bolt B	39 Adjustment Handle	40 Wrench for Unit Mounting A	41 Wrench for Unit Mounting B	42 Wrench for Lock Screw
20 ～ 26	–	B382	M392	–	–	M1.5
25.5 ～ 34	–		M393	–	–	M2
33 ～ 43	–	B384	M394	–	–	M2.5
42 ～ 58	M375	–	M395	M405	–	
56 ～ 85		–			–	
80 ～110	M377	–	M397	M407	–	M4
100 ～160	M370	–	M390	M400	–	

Boring Range	1 MAC Unit	2 Cartridge	3 Tip for Steel Stainless Steel	4 Tip for Alloy Steel	5 Tip for Cast Iron	6 Tip Clamp Bolt	7 Tip Clamp Handle	31 Dial Ring	32 Lock Flange	33 Wave Spring	34 Preload Nut	35 Lock Metal	36 Lock Screw
20 ～ 26	M 2H-20	M 2H-20C	3MP-C	3MP-E	3MP-F	M62	13S	M312	M322	9M216W	9M216P	M352	M362
25.5～ 34	M 3H-25.5	M 3H-25.5C						M313	M323	M333	9M325P	M353	M363
33 ～ 43	M 4H-33	M 4H-33C	4MP-C	4MP-E	4MP-F	M64		M314	M324	M334	M344	M355	M364
42 ～ 58	M 5H-42*1	M 5H-42C	6MP-C	6MP-E	6MP-F	2577	T8	M315	M325	M335	9M542P		M365
56 ～ 85	M 6H-56	M 6H-56C				M65	13S						M366
80 ～110	M 7H-80	M 7H-80C	10MP-T	10MP-E	10MP-F	M67	20S	M317	M327	M337	9M770P	M357	M367
100 ～160	M10H-100	M10H-100C				M60		M310	M320	M330	9M108P		M360

★Tip is a Optional accessory. ★*1 **M5H-42** Unit is used for **BAC** lange dia. boring bar.

■Code No. of ISO standard Insert Tip



The majority of ISO inserts available are designed for turning where the workpiece rotates and are not recommended for use in boring as it's the tool which is rotating,however these inserts can be fitted on to the cartridge if the size is the same.
Diameters of centre holes on ISO standard insert can vary and you may, therefore have to change the clamp screw to suit the insert.

⚠ −Quatation fee of the repair is always necessary whether repair or not.

This manual is for basic instruction and information for safety use of our product. Please contact with us for the further details.
Please note that we could not take a responsibility of the accidental damage on our product which is modified the specifications by the customer without our approval.

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e-mail : osaka@nikken-kosakusho.co.jp