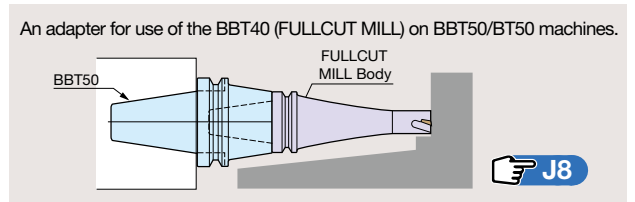


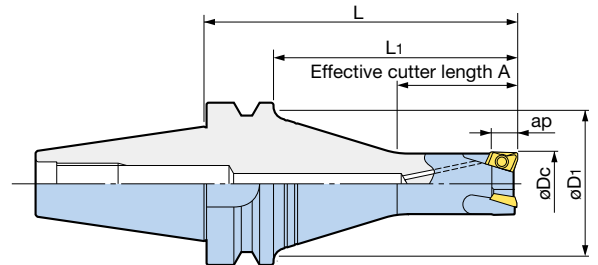
Evolved rigidity realizes both heavy and stable ramping.

- Integral design with a taper shank and dual face contact of BIG-PLUS and HSK provide the highest rigidity.



BBT Integrated Type

[Standard Type]



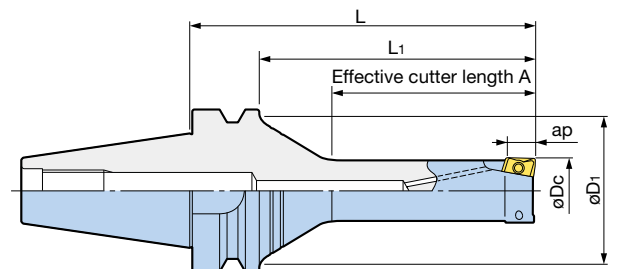
BIG-PLUS (BBT Shank) tools can be used on both BIG-PLUS spindles and conventional BT spindles.

Cutter diameter ϕD_c	Model	Effective cutting edge length ap	ϕD_1	L	L_1	A	Number of inserts	Insert Model	Weight (kg)
16	BBT30-FCR16082- 65	8	40	65	43	28	2	BRG1608□□	0.50
20	-FCR20083- 65			65	43	28	3	BRG2008□□	0.51
25	-FCR25083- 65			65	43	33	3	BRG2508□□	0.55
32	-FCR32103- 65	10		65	43	40	3	BRG3210□□	0.60
16	BBT40-FCR16082- 85	8	60	85	58	25	2	BRG1608□□	1.3
	-120			120	93	30			1.5
	-135			135	108	25			1.6
20	-FCR20083- 85	8	60	85	58	35	3	BRG2008□□	1.2
	-120			120	93	30			1.6
	-135			135	108	30			1.7
25	-FCR25083- 85	8	60	85	58	40	3	BRG2508□□	1.3
	-120			120	93	45			1.6
	-135			135	108	35			1.8
32	-FCR32103- 85	10	60	85	58	45	3	BRG3210□□	1.4
	-120			120	93	50			1.7
	-135			135	108	40			1.9

1. Wrench included. Inserts must be ordered separately.



[Long Type]



BIG-PLUS (BBT Shank) tools can be used on both BIG-PLUS spindles and conventional BT spindles.

Cutter diameter ϕD_c	Model	Effective cutting edge length ap	ϕD_1	L	L_1	A	Number of inserts	Insert Model	Weight (kg)
16	BBT30-FCR16082L- 85	8	40	85	63	45	2	BRG1608□□	0.52
20	-FCR20082L- 85			85	63	50	2	BRG2008□□	0.55
25	-FCR25082L- 85			85	63	50	2	BRG2508□□	0.62
32	-FCR32102L- 85	10		85	63	60	2	BRG3210□□	0.71
16	BBT40-FCR16082L-105	8	60	105	78	45	2	BRG1608□□	1.3
	-120			120	93	45			1.4
	-135			135	108	60			1.5
20	-FCR20082L-120	8	60	120	93	60	2	BRG2008□□	1.4
	-135			135	108	60			1.5
	-FCR25082L-135			135	108	75			1.5
25	-FCR25082L-135	8	60	150	123	75	2	BRG2508□□	1.7
	-150			135	108	80			1.7
	-FCR32102L-135			150	123	90			1.9
32	-FCR32102L-135	10	60	135	108	80	2	BRG3210□□	1.7
	-150			150	123	90			1.9

1. Wrench included. Inserts must be ordered separately.



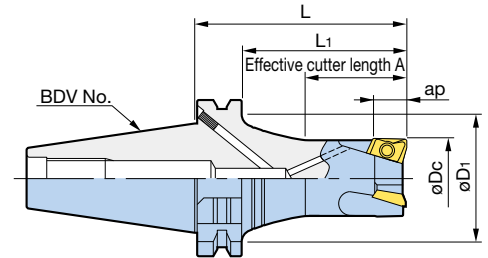
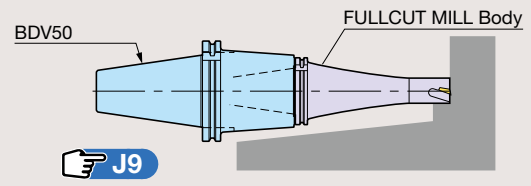
FULLCUT MILL FCR Type

BDV Integrated Type

[Standard Type] Cutter diameter: $\phi 16 - \phi 32$



An adapter for use of the BDV40 (FULLCUT MILL) on BDV50/DV50 machines.



BIG-PLUS (BDV Shank) tools can be used on both BIG-PLUS spindles and conventional DV spindles.

Cutter diameter ϕD_c	Model	Effective cutting edge length a_p	ϕD_1	L	L_1	A	Number of inserts	Insert Model	Weight (kg)
16	BDV40-FCR16082- 85	8	52	85	65	25	2	BRG1608□□	1.3
	-120			120	100	30			1.5
	-135			135	115	25			1.6
20	-FCR20083- 85	8	52	85	65	35	3	BRG2008□□	1.2
	-120			120	100	30			1.6
	-135			135	115	30			1.7
25	-FCR25083- 85	8	52	85	65	40	3	BRG2508□□	1.3
	-120			120	100	45			1.6
	-135			135	115	35			1.8
32	-FCR32103- 85	10	52	85	65	45	3	BRG3210□□	1.4
	-120			120	100	50			1.7
	-135			135	115	40			1.9

1. Wrench included. Inserts must be ordered separately.

For inserts, **J4**

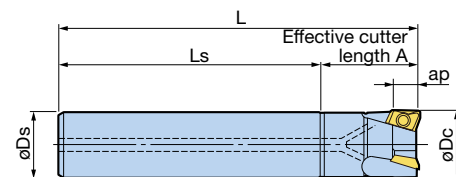
For cutting conditions, **J5**

Cylindrical Shank Type

[Oversize] Cutter diameter: $\phi 16 - \phi 33$



Cutter diameter is **1mm** larger than shank diameter, preventing workpiece interference. (except ST28)



Cutter diameter ϕD_c	Model	ϕD_s	Effective cutting edge length a_p	L	A	L_s	Number of inserts	Insert Model	Weight (kg)
16	ST15-FCR16082-120	15	8	120	25	95	2	BRG1608□□	0.2
17	ST16-FCR17082-120	16	8	120	25	95	2	BRG1608□□	0.2
20	ST19-FCR20082-165	19	8	165	30	135	2	BRG2008□□	0.4
	-FCR20083-135			135		105	3		0.3
21	ST20-FCR21082-165	20	8	165	30	135	2	BRG2008□□	0.4
	-FCR21083-135			135		105	3		0.3
25	ST24-FCR25082-180	24	8	180	35	145	2	BRG2508□□	0.7
	-FCR25083-150			150		115	3		0.6
26	ST25-FCR26082-165	25	8	165	38	127	2	BRG2508□□	0.6
	-FCR26083-150			150		112	3		0.6
32	ST28-FCR32102-180	28	10	180	48	132	2	BRG3210□□	1.1
	-FCR32103-180			180		132	3		1.0
33	ST32-FCR33102-180	32	10	180	48	132	2	BRG3210□□	1.1
	-FCR33103-180			180		132	3		1.0

1. Wrench included. Inserts must be ordered separately.

2. Lower the cutting parameters as needed for long projection length and 3 inserts models.

3. 2-insert models are recommended for medium or heavy milling of slots or pockets.

4. For medium or heavy slot milling or ramping with projection length exceeding 2.5 times the diameter, 2-insert models are recommended.

For inserts, **J4**

For cutting conditions, **J5**

Evolved rigidity realizes both heavy and stable ramping.

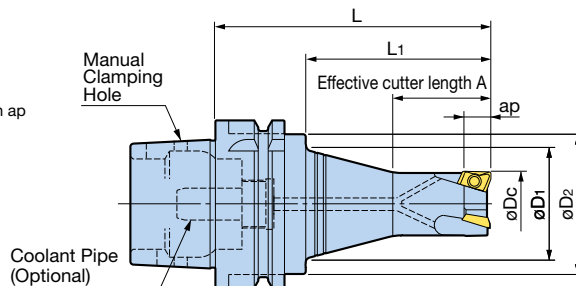
HSK Integrated Type



[Standard Type]



- Model Description
HSK-A50 - FCR 16 08 2 - 75
 - HSK SHANK No.
 - FCR Type
 - Cutter diameter ϕD_c
 - Effective cutting edge length ap
 - Number of inserts
 - L dimension



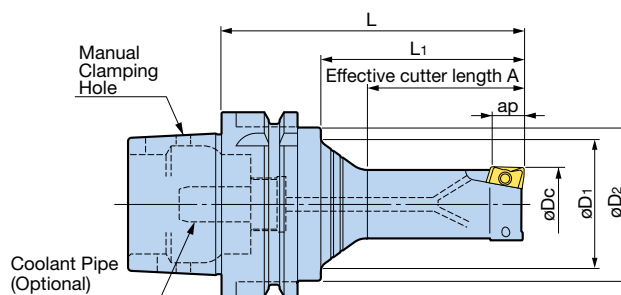
A Type (DIN69893-1) (ISO12164)

Cutter diameter ϕD_c	Model	Effective cutting edge length ap	ϕD_1	ϕD_2	L	L ₁	A	Number of inserts	Insert Model	Weight (kg)
16	HSK-A50-FCR16082- 75	8	32	40	75	41	27	2	BRG1608□□	0.5
20	-FCR20083- 75				75	41	28	3	BRG2008□□	0.6
25	-FCR25083- 75				75	41	33	3	BRG2508□□	0.6
32	-FCR32103- 75				10	—	75	41	39	3
16	HSK-A63-FCR16082- 85	8	45	50	85	51	25	2	BRG1608□□	0.9
	-120				120	86	30			1.1
	-135				135	101	25			1.2
20	-FCR20083- 85	8	45	50	85	51	32	3	BRG2008□□	1.0
	-120				120	86	30			1.2
	-135				135	101	30			1.3
25	-FCR25083- 85	8	45	50	85	51	35	3	BRG2508□□	1.0
	-120				120	86	45			1.2
	-135				135	101	35			1.4
32	-FCR32103- 85	10	45	50	85	51	40	3	BRG3210□□	1.1
	-120				120	86	50			1.4
	-135				135	101	40			1.5

1. Wrench included. Inserts must be ordered separately.
2. Coolant pipe is not included. Please order separately. See page [C65](#)

For inserts, **J4** For cutting conditions, **J5**

[Long Type]



A Type (DIN69893-1) (ISO12164)

Cutter diameter ϕD_c	Model	Effective cutting edge length ap	ϕD_1	ϕD_2	L	L ₁	A	Number of inserts	Insert Model	Weight (kg)
16	HSK-A63-FCR16082L- 85	8	45	50	85	51	40	2	BRG1608□□	0.9
	-120				120	86	45			1.0
20	-FCR20082L-105	8	45	50	105	71	50	2	BRG2008□□	1.1
	-120				120	86	60			1.2
25	-FCR25082L-105	8	45	50	105	71	55	2	BRG2508□□	1.1
	-120				120	86	65			1.1
32	-FCR32102L-120	10	45	50	120	86	70	2	BRG3210□□	1.4
	-135				135	101	80			1.4

1. Wrench included. Inserts must be ordered separately.
2. Coolant pipe is not included. Please order separately. See page [C65](#)

For inserts, **J4** For cutting conditions, **J5**

Endmilling

<Insert>

- Exclusive design with relief angles and rake angles optimized for each cutter size.



● Model Description

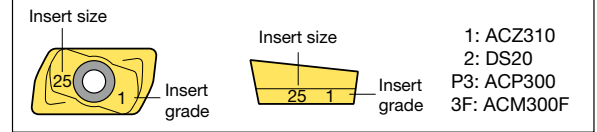
BRG16 **08** **08** **ACP300**

● Grade

● Nose Radius

● Effective cutting edge length:
 $\phi 16 - 26 \dots 08$ $\phi 32 - 33 \dots 10$


Insert Marking Description



Cutter diameter	Insert Model	Effective cutting edge length	Nose radius	Insert grade			
				ACP300 (for steel)	ACM300F (for stainless steel)	ACZ310 (for cast iron)	DS20 (for aluminum)
$\phi 16, \phi 17$	BRG160808	8	0.8	<input type="radio"/> NEW	<input type="radio"/> NEW	<input type="radio"/>	<input type="radio"/>
$\phi 20, \phi 21$	BRG200808	8		<input type="radio"/> NEW	<input type="radio"/> NEW	<input type="radio"/>	<input type="radio"/>
$\phi 25, \phi 26$	BRG250808	8		<input type="radio"/> NEW	<input type="radio"/> NEW	<input type="radio"/>	<input type="radio"/>
$\phi 32, \phi 33$	BRG321008	10	3.2	<input type="radio"/> NEW	<input type="radio"/> NEW	<input type="radio"/>	<input type="radio"/>
	BRG321032	10		—	—	—	<input type="radio"/>

1. Inserts are available in packets of 10 pcs.

Please specify the insert model number and grade when ordering.

**Caution**

- Inserts are exclusive for each cutter diameter. Be sure to purchase an insert suited to the cutter diameter, as the use of a different insert may cause problems.
- Not compatible with inserts for FULLCUT MILL FCM Type.

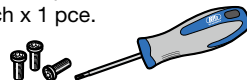
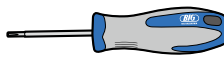
■ Insert Grade Description

ACP300	ACM300F	ACZ310
Material for general steel, with a super multi-layered PVD coating on a super-tough substrate. Excellent chipping and thermal fracture resistance allows interrupted cutting as well.	Uses a new coating with improved smoothness and adhesiveness on a newly developed ultra-hard carbide substrate. Excellent welding and chipping resistance, and capable of stable stainless steel machining.	Material for cast iron and ductile cast iron machining, with a PVD multilayer coating on an ultra-fine particle alloy substrate. Highly wear-resistant and also resistant to machine impact.

DS20
Material for non-ferrous metals, with a special diamond coating (DLC) realizing high adhesion and low friction, on K20 class carbide.

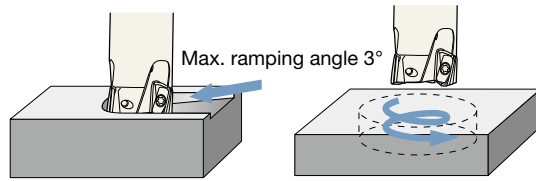
<Insert Clamping Screw Set>

Insert clamp screws and tightening wrench are consumables. Order periodically for replacement or spares.

		● Insert Clamping Screw Set	● Driver-Type Wrench
		Screw x 10 pcs Wrench x 1 pce. 	
Cutter diameter	Insert Model	Set Model	Wrench Model
$\phi 16, \phi 17$	BRG1608□□	S2506DS	DA-T8
$\phi 20, \phi 21$	BRG2008□□		
$\phi 25, \phi 26$	BRG2508□□	S3508DS	DA-T15
$\phi 32, \phi 33$	BRG3210□□		

FULLCUT MILL FCR Type

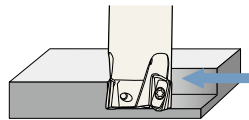
Cutting Conditions



Cutter diameter	Blind Hole Helical Machining		Through Hole Helical Machining
	Max. diameter	Min. diameter	Min. diameter
ø16	ø30	ø27	ø22
ø20	ø38	ø36	ø29
ø25	ø48	ø45	ø39
ø32	ø62	ø59	ø48

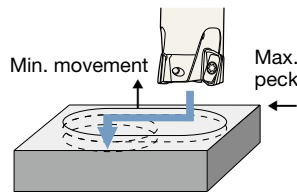
Ramping/Helical Milling

Cutter diameter	Material	Carbon Steel Alloy Steel	Unalloyed Steel	Pre-hardened Steel HRC40 or less	Stainless Steel	Tool Steel (SKD11)	Cast Iron	Aluminum
	Insert grade	ACP300		ACM300F			ACZ310	DS20
	Cutting fluid	Dry						Dry/Wet
ø16 - ø17	Cutting speed Vc (m/min)	100 - 200	150 - 220	60 - 80	100 - 150	60 - 80	100 - 180	200 - 1,000
	Feed rate fz (mm/t)	0.06 - 0.12	0.06 - 0.12	0.05 - 0.08	0.08 - 0.16	0.06 - 0.1	0.08 - 0.18	0.06 - 0.24
ø20 - ø26	Cutting speed Vc (m/min)	100 - 200	150 - 200	60 - 100	120 - 150	60 - 100	100 - 180	200 - 1,000
	Feed rate fz (mm/t)	0.08 - 0.2	0.08 - 0.2	0.05 - 0.1	0.12 - 0.2	0.06 - 0.1	0.02 - 0.18	0.1 - 0.35
ø32 - ø33	Cutting speed Vc (m/min)	100 - 200	150 - 200	60 - 100	120 - 150	60 - 120	100 - 180	200 - 1,000
	Feed rate fz (mm/t)	0.08 - 0.2	0.08 - 0.2	0.05 - 0.1	0.12 - 0.2	0.08 - 0.12	0.06 - 0.2	0.1 - 0.35



Shoulder Milling/Slotting

Cutter diameter	Material	Carbon Steel Alloy Steel	Unalloyed Steel	Pre-hardened Steel HRC40 or less	Stainless Steel	Tool Steel (SKD11)	Cast Iron	Aluminum
	Insert grade	ACP300		ACM300F			ACZ310	DS20
	Cutting fluid	Dry						Dry/Wet
ø16 - ø21	Cutting speed Vc (m/min)	100 - 200	100 - 200	60 - 80	120 - 180	80 - 120	100 - 180	200 - 1,000
	Feed rate fz (mm/t)	0.08 - 0.18	0.08 - 0.18	0.05 - 0.1	0.12 - 0.18	0.08 - 0.12	0.08 - 0.18	0.1 - 0.3
ø25 - ø33	Cutting speed Vc (m/min)	100 - 200	100 - 200	60 - 100	120 - 180	80 - 120	100 - 180	200 - 1,500
	Feed rate fz (mm/t)	0.08 - 0.2	0.08 - 0.2	0.05 - 0.1	0.12 - 0.2	0.08 - 0.12	0.08 - 0.2	0.1 - 0.35



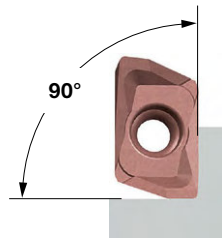
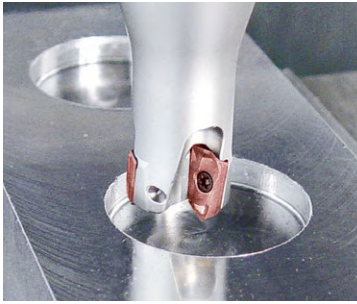
Cutter diameter	Max. peck	Min. movement
ø16	0.5	14
ø20	1	18
ø25	1	23
ø32	2	30

Peck-drilling

Cutter diameter	Material	Carbon Steel Alloy Steel	Unalloyed Steel	Pre-hardened Steel HRC40 or less	Stainless Steel	Tool Steel (SKD11)	Cast Iron	Aluminum
	Insert grade	ACP300		ACM300F			ACZ310	DS20
	Cutting fluid	Dry/Air Blow						Air/Wet
ø16 - ø17	Cutting speed Vc (m/min)	80 - 120	80 - 120	60	80 - 120	60 - 80	80 - 160	200 - 350
	Feed per rev. f (mm/rev)	0.06 - 0.1	0.06 - 0.1	0.04 - 0.06	0.05 - 0.08	0.05 - 0.08	0.06 - 0.1	0.06 - 0.1
ø20 - ø26	Cutting speed Vc (m/min)	100 - 160	100 - 160	60 - 100	100 - 160	60 - 100	80 - 180	200 - 500
	Feed per rev. f (mm/rev)	0.1 - 0.25	0.1 - 0.25	0.1 - 0.25	0.12 - 0.25	0.1 - 0.2	0.08 - 0.3	0.1 - 0.3
ø32 - ø33	Cutting speed Vc (m/min)	100 - 160	100 - 160	60 - 100	100 - 160	60 - 100	80 - 180	200 - 600
	Feed per rev. f (mm/rev)	0.1 - 0.3	0.1 - 0.3	0.1 - 0.3	0.12 - 0.3	0.1 - 0.2	0.08 - 0.4	0.1 - 0.3

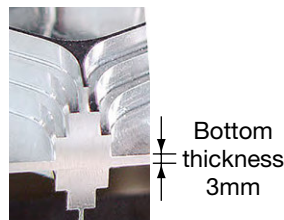
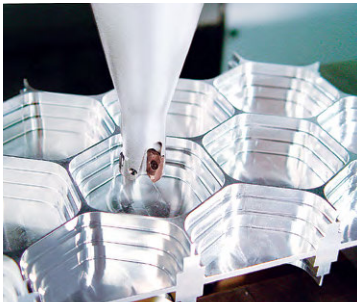
Caution

- This table is a guideline for selecting cutting parameters. Adjust them as needed according to the machine and workpiece conditions.
- Be sure to use safety enclosures, as chips may scatter.
- Do not use oil-based cutting fluid, as there is a risk of fire.
- Dry cutting is recommended for stainless steel as well; however, wet cutting may extend insert life in case severe built-up edge occurs.

APPLICATION EXAMPLES

S50C helical machining was accomplished stably at 1,100mm/min. feed, with excellent perpendicularity.

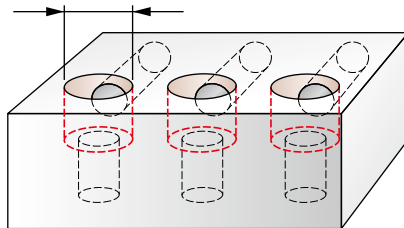
FULLCUT MILL Model	BBT40-FCR20083-120
Insert Model	BRG200808 (ACP300)
Workpiece material	S50C/Air blow
Cutting speed Vc (m/min)	150
Feed Vf (mm/min)	1,100
Axial cutting depth ap (mm)	2mm x 3 times
Machining hole diameter	ø38



Even with less-rigid workpiece with 3mm bottom thickness clamped by a vise, machining at 4,300mm/min. feed on both sides of the workpiece is achieved.

FULLCUT MILL Model	BBT40-FCR20083-85
Insert Model	BRG200808 (DS20)
Workpiece material	A2017/Air blow
Cutting speed Vc (m/min)	750
Feed Vf (mm/min)	4,300
Axial cutting depth ap (mm)	6mm x 3 times
Radial cutting depth ae (mm)	Max. 20

with ø30 side hole

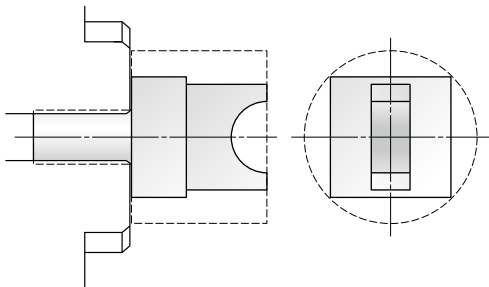


Side holes caused frequent machining defects with conventional ø30 drilling, while helical machining achieved excellent stability.

No problems with machining surface or steps either.

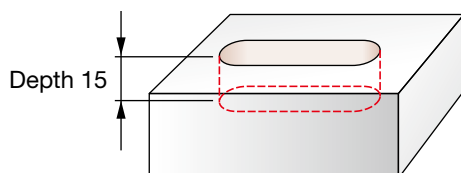
FULLCUT MILL Model	BBT40-FCR25083-85
Insert Model	BRG250808 (ACP300)
Workpiece material	SS400/Dry cutting
Cutting speed Vc (m/min)	160
Feed Vf (mm/min)	600
Hole depth (mm)	25

Machining from bar material



Even with less-rigid cantilever chucking of a workpiece on a millturn machine, low cutting resistance allowed high-precision, high-efficiency machining with no problems.

FULLCUT MILL Model	BBT40-FCR16082-85
Insert Model	BRG160808 (ACP300)
Workpiece material	S45C/Dry cutting
Cutting speed Vc (m/min)	160
Feed Vf (mm/min)	650
Axial cutting depth ap (mm)	2
Radial cutting depth ae (mm)	10



Excellent surface finish for indexable insert endmills, and no finishing required. No problems with steps either. Achieved 7 times greater cutting efficiency than conventional carbide drills and endmills.

FULLCUT MILL Model	BBT40-FCR20083-85
Insert Model	BRG200808 (DS20)
Workpiece material	A2017/Wet cutting
Cutting speed Vc (m/min)	350
Feed Vf (mm/min)	2,000
Axial cutting depth ap (mm)	5mm Peck-drilling
Radial cutting depth ae (mm)	20

Indexable insert endmills which combine sharpness and toughness are comparable to solid endmills.

● Abundant variations from cylindrical shanks to DUAL CONTACT integrated types.

BBT Integrated Type

Slotting
Shoulder milling

- Tough 7/24 taper shank integrated type. Equipped with DUAL CONTACT <BIG-PLUS> to further improve rigidity and precision!

[Standard Type]



● Model Description

- BBT30 - FCM 16 09 2 - 65**
- L dimension
 - Number of inserts
 - Effective cutting edge length ap
 - Cutter diameter ϕDc
 - FCM Type
 - BIG-PLUS BT No.

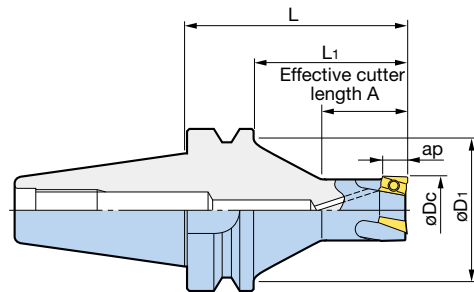
Holder with DUAL CONTACT as standard



- BT type dual contact system.
- Improvement of rigidity, Z-axis accuracy, and ATC repeatability.

Caution

BIG-PLUS spindles produced by licensed machine or spindle builders are strictly controlled in dimensions by the BIG original MASTER GAUGE. Only the BIG-PLUS HOLDERS can achieve the optimal performance of these spindles fully and safely.



BIG-PLUS (BBT Shank) tools can be used on both BIG-PLUS spindles and conventional **BT spindles**.

Cutter diameter ϕDc	Model	Effective cutting edge length ap	$\phi D1$	L	L1	A	Number of inserts	Insert Model	Weight (kg)
16	BBT30-FCM16092- 65	9	40	65	43	23	2	ARG1609□□	0.50
20	-FCM20093- 65				43	28	3	ARG2009□□	0.51
25	-FCM25093- 65				43	33	3	ARG2509□□	0.55
32	-FCM32113- 65	11	—	50	43	38	3	ARG3211□□	0.60
40	-FCM40114- 50				25	4	ARG4011□□	0.60	
50	-FCM50115- 50				28	5		0.73	
16	BBT40-FCM16092- 85	9	55	85	58	23	2	ARG1609□□	1.2
	-105		58	105	78	30			1.3
	-120		60	120	93	25			1.4
	-150		60	150	123				1.7
20	-FCM20093- 85	9	55	85	58	28	3	ARG2009□□	1.2
	-105		58	105	78	35			1.3
	-120		60	120	93	30			1.4
	-150		60	150	123				1.7
25	-FCM25093- 85	9	55	85	58	33	3	ARG2509□□	1.2
	-120		58	120	93	45			1.4
	-135		60	135	108	40			1.6
	-165		60	165	138				1.9
32	-FCM32113- 85	11	55	85	58	38	3	ARG3211□□	1.3
	-120		58	120	93	60			1.5
	-135		60	135	108	50			1.7
	-165		60	165	138	40			2.1
40	-FCM40114- 85	11	55	85	58	43	4	ARG4011□□	1.4
	-120		58	120	93	65			1.7
	-135		60	135	108	60			2.0
	-165		60	165	138	50			2.4
50	-FCM50115- 70	11	—	70	43	38	5	ARG4011□□	1.5
	-120		60	120	93	65			2.2
	-135		60	135	108	60			2.4
	-165		60	165	138	50			3.0

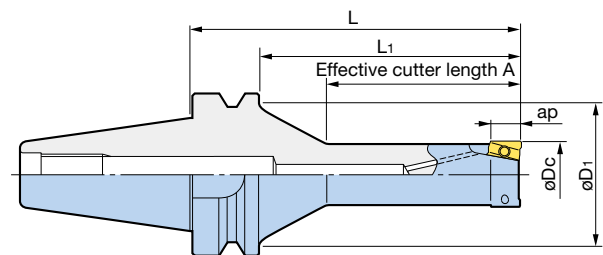
1. Wrench included. Inserts must be ordered separately.

2. For medium/heavy grooving exceeding L = 120mm at $\phi 20$ or L = 135mm at $\phi 25$ or more, we recommend the LONG TYPE (next page).

In such cases, 2-flute LONG TYPEs can perform machining using several times greater axial cutting depth, achieving machining efficiency significantly higher than 3-flute models.

For inserts, **J14**

For cutting conditions, **J15**

[Long Type]

BIG-PLUS (BBT Shank) tools can be used on both BIG-PLUS spindles and conventional **BT spindles**.

Cutter diameter ϕD_c	Model	Effective cutting edge length a_p	ϕD_1	L	L_1	A	Number of inserts	Insert Model	Weight (kg)
16	BBT30-FCM16092L- 85	9	40	85	63	45	2	ARG1609□□	0.52
20	-FCM20092L- 85				63	50		ARG2009□□	0.55
25	-FCM25092L- 85				63	50		ARG2509□□	0.62
32	-FCM32112L- 85	11			63	60		ARG3211□□	0.71
16	BBT40-FCM16092L-105	9	60	105	78	45	2	ARG1609□□	1.3
	-120			120	93				1.4
20	-FCM20092L-120	9	60	120	93	60	2	ARG2009□□	1.4
	-135			135	108				1.5
25	-FCM25092L-135	9	60	135	108	75	2	ARG2509□□	1.5
	-150			150	123				1.7
32	-FCM32112L-135	11	60	135	108	80	2	ARG3211□□	1.7
	-150			150	123				90

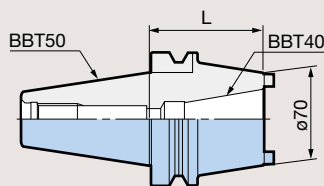
1. Wrench included. Inserts must be ordered separately.

For inserts, **J14**

For cutting conditions, **J15**

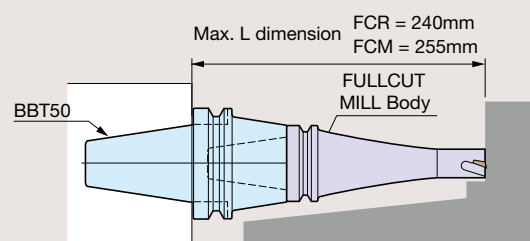
Adapter

An adapter for use of the BBT40 (FULLCUT MILL) on BBT50/BT50 machines.



Model	L
BBT50-BBT40-50	50
-90	90

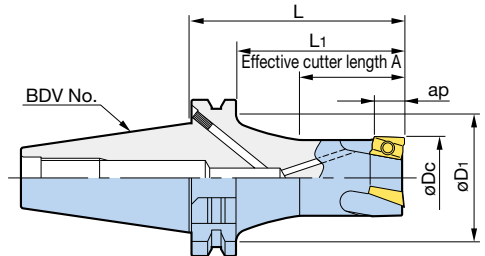
For the head interchangeable holder **CONTACT GRIP**, **BBT50** models are also available. Refer to J21 for details.



Combination with the Long Type enables further workpiece interference countermeasures.

BDV Integrated Type

[Standard Type]



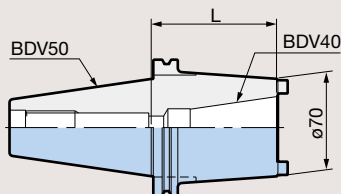
BIG-PLUS (BDV Shank) tools can be used on both BIG-PLUS spindles and conventional DV spindles.

Cutter diameter ϕD_c	Model	Effective cutting edge length a_p	ϕD_1	L	L_1	A	Number of inserts	Insert Model	Weight (kg)
16	BDV40-FCM16092- 85	9	52	85	65	23	2	ARG16	1.2
	-105			105	85	35			1.3
	-120			120	100	34			1.4
20	-FCM20093- 85	9	52	85	65	35	3	ARG20	1.2
	-105			105	85	40			1.3
	-120			120	100	39			1.4
25	-FCM25093- 85	9	52	85	65	33	3	ARG25	1.2
	-120			120	100	45			1.4
	-135			135	115	40			1.6
32	-FCM32113- 85	11	52	85	65	38	3	ARG32	1.3
	-120			120	100	60			1.5
	-135			135	115	50			1.7
40	-FCM40114- 85	11	52	85	65	45	4	ARG40	1.4
	-120			120	100	65			1.7
	-135			135	115	60			2.0
50	-FCM50115- 70	11	52	70	50	50	5	ARG40	1.5
	-120			120	100	100			2.2
	-135			135	115	115			2.4

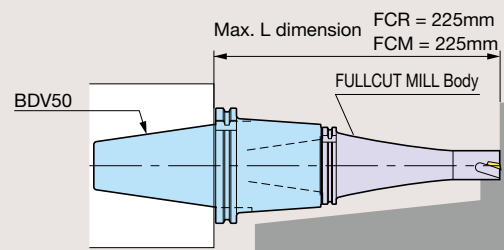
1. Wrench included. Inserts must be ordered separately.

For inserts, **J14** For cutting conditions, **J15**

Adapter An adapter for use of the BDV40 (FULLCUT MILL) on BDV50/DV50 machines.



Model	L
BDV50-BDV40-50	50
-90	90



Cylindrical Shank Type

Slotting
Shoulder milling

- Highly versatile Cylindrical Shank Type.
Make cutting easier by combining with the **BIG** MEGA DOUBLE POWER CHUCK!

We recommend the **BIG** MEGA DOUBLE POWER CHUCK for chucking.



Cutter diameter from $\phi 12 -$

- Model Description
- ST16 - FCM 12 09 1 - 90**
- ST16: Cylindrical shank diameter
 - FCM: FCM Type
 - 12: Cutter diameter ϕDc
 - 09: Effective cutting edge length ap
 - 1: Number of inserts
 - 90: L dimension

Fig. 1

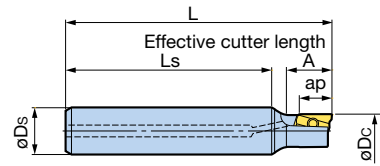
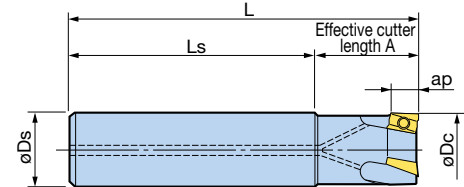


Fig. 2



Cutter diameter ϕDc	Model	Fig.	ϕDs	Effective cutting edge length ap	L	A	Ls	Number of inserts	Insert Model	Weight (kg)
12	ST16-FCM12091- 90	1	16	9	90	15	70	1	ARG1609□□	0.1
14	-FCM14091- 90					17				0.1
16	-FCM16092- 90					25				0.1
20	ST20-FCM20093-110	2	20	9	110	30	80	3	ARG2009□□	0.2
25	ST25-FCM25093-120					35				0.4
32	ST32-FCM32113-130					35				0.7
40	-FCM40114-130	2	32	11	130	35	95	3	ARG3211□□	0.7
40	-FCM40114-130					90				0.8
40	-180					140				1.2
50	-FCM50115-130	2	32	11	130	40	90	5	ARG4011□□	1.0

1. Wrench included. Inserts must be ordered separately.

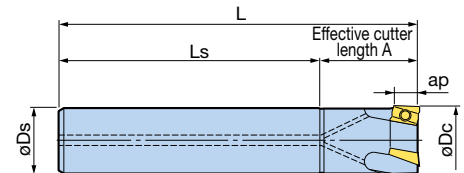
For inserts, **J14**

For cutting conditions, **J15**

[Oversize]



Cutter diameter is **1mm** larger than shank diameter, preventing workpiece interference.



Cutter diameter ϕDc	Model	ϕDs	Effective cutting edge length ap	L	A	Ls	Number of inserts	Insert Model	Weight (kg)
17	ST16-FCM17092-120	16	9	120	25	95	2	ARG1609□□	0.2
21	ST20-FCM21092-165	20	9	165	30	135	2	ARG2009□□	0.4
	-FCM21093-135			135		3	0.3		
26	ST25-FCM26092-165	25	9	165	38	127	2	ARG2509□□	0.6
	-FCM26093-150			150		3	0.6		
33	ST32-FCM33112-180	32	11	180	48	132	2	ARG3211□□	1.1
	-FCM33113-180			180		3	1.0		

1. Wrench included. Inserts must be ordered separately.

2. We recommend 2-flute models for medium/heavy grooving.

3. For medium or heavy slot milling with projection length exceeding 2.5 times the diameter, 2-insert models are recommended.

For inserts, **J14**

For cutting conditions, **J15**

● Machining of S55C



Model	ST32-FCM33112-180
Cutting speed Vc (m/min)	120
Feed rate fz (mm/t)	0.1
Axial DOC ap (mm)	10mm x 10 steps
Radial DOC ae (mm)	Max. 33mm

Result

Machining was problem-free even under heavy cutting conditions of projection 110mm and ap 10mm.

HSK Integrated Type

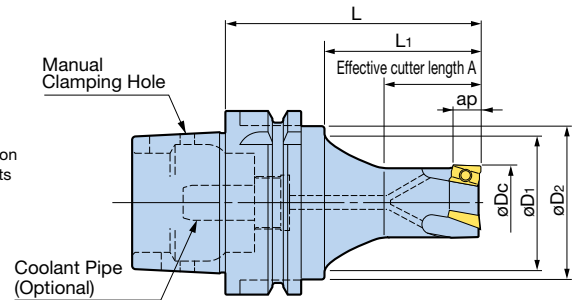
Slotting

Shoulder milling

[Standard Type]



- Model Description
- HSK-A40** - **FCM** **16** **09** **2** - **65**
- HSK SHANK No.
- FCM Type
- Cutter diameter ϕD_c
- Effective cutting edge length a_p
- Number of inserts
- L dimension



A Type (DIN69893-1) (ISO12164)

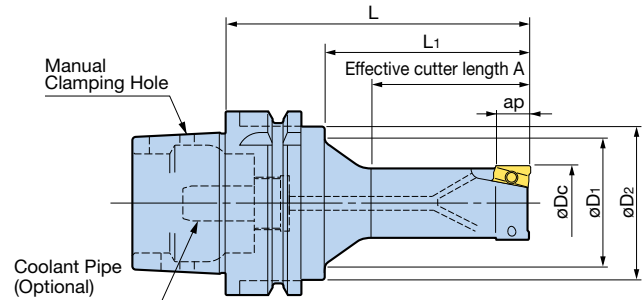
Cutter diameter ϕD_c	Model	Effective cutting edge length a_p	ϕD_1	ϕD_2	L	L ₁	A	Number of inserts	Insert Model	Weight (kg)
16	HSK-A40-FCM16092- 65	9	25	34	65	37	23	2	ARG1609□□	0.3
20	-FCM20093- 65						28	3	ARG2009□□	0.3
25	-FCM25093- 65						35	3	ARG2509□□	0.4
32	-FCM32113- 65						39	3	ARG3211□□	0.5
40	-FCM40114- 65	11	—	—	—	—	45	4	ARG4011□□	0.6
50	-FCM50115- 65						5	5		ARG4011□□
16	HSK-A50-FCM16092- 75	9	32	40	75	41	23	2	ARG1609□□	0.6
20	-FCM20093- 75						28	3	ARG2009□□	0.6
25	-FCM25093- 75						33	3	ARG2509□□	0.6
32	-FCM32113- 75						39	3	ARG3211□□	0.7
40	-FCM40114- 75	11	—	—	—	—	48	4	ARG4011□□	0.9
50	-FCM50115- 75						5	5		ARG4011□□
16	HSK-A63-FCM16092- 85	9	45	50	85	51	23	2	ARG1609□□	0.9
	-105				105	71	30			1.0
	-120				120	86	25			1.1
	-150				150	116	25			1.3
20	-FCM20093- 85	9	45	50	85	51	28	3	ARG2009□□	1.0
	-105				105	71	35			1.1
	-120				120	86	30			1.2
	-150				150	116	30			1.4
25	-FCM25093- 85	9	45	50	85	51	33	3	ARG2509□□	1.0
	-120				120	86	45			1.2
	-135				135	101	40			1.3
	-165				165	131	40			1.5
32	-FCM32113- 85	11	45	50	85	51	38	3	ARG3211□□	1.1
	-120				120	86	60			1.3
	-135				135	101	50			1.4
	-165				165	131	40			1.7
40	-FCM40114- 85	11	45	50	85	51	43	4	ARG4011□□	1.3
	-120				120	86	65			1.5
	-135				135	101	60			1.7
	-165				165	131	50			2.1
50	-FCM50115- 70	11	—	53	70	28	28	5	ARG4011□□	1.3
	-120				120	78	78			1.9
	-135				135	93	93			2.2
	-165				165	123	123			2.8

1. Wrench included. Inserts must be ordered separately.
2. Coolant pipe is not included. Please order separately. See page [C65](#)

For inserts, **J14**

For cutting conditions, **J15**

Endmilling

[Long Type]**A Type (DIN69893-1) (ISO12164)**

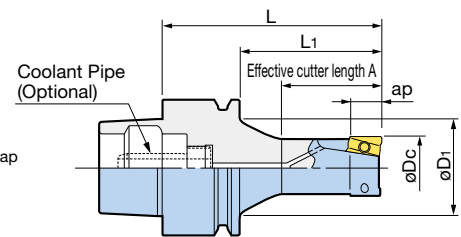
Cutter diameter ϕD_c	Model	Effective cutting edge length a_p	ϕD_1	ϕD_2	L	L ₁	A	Number of inserts	Insert Model	Weight (kg)
16	HSK-A63-FCM16092L- 85	9	45	50	85	51	40	2	ARG1609□□	0.9
	-120				120	86	45			1.0
20	-FCM20092L-105	9	45	50	105	71	50	2	ARG2009□□	1.1
	-120				120	86	60			1.2
25	-FCM25092L-105	9	45	50	105	71	55	2	ARG2509□□	1.1
	-120				120	86	65			1.2
32	-FCM32112L-120	11	45	50	120	86	70	2	ARG3211□□	1.3
	-135				135	101	80			1.4

1. Wrench included. Inserts must be ordered separately.

2. Coolant pipe is not included. Please order separately. See page [C65](#)For inserts, **J14**For cutting conditions, **J15****[Standard Type]**

● Model Description

HSK-E25	-	FCM	16	09	2	-	45
● HSK-E SHANK No.		● FCM Type	● Cutter diameter $\phi 16$	● Effective cutting edge length a_p	● Number of inserts	● L dimension	

**E Type (DIN69893-5)**

Cutter diameter ϕD_c	Model	Effective cutting edge length a_p	ϕD_1	L	L ₁	A	Number of inserts	Insert Model	Weight (kg)
16	HSK-E25-FCM16092-45	9	19	45	35	23	2	ARG1609□□	0.17
	-E32-FCM16092-55		26	55	35	23			0.20
	-E40-FCM16092-65		34	65	45	28			0.45

1. Wrench included. Inserts must be ordered separately.

2. Coolant pipe is not included. Please order separately. See page [C65](#)For inserts, **J14**For cutting conditions, **J15****⚠ Caution**

As the HSK-E type interface does not have drive key grooves, there is a risk that it may slip in the machine spindle and damage it if cutting load exceeds clamping force of the machine tool. Starting from the lowest possible conditions, increase them gradually while observing the cutting status, and find the optimum with sufficient safety margin.

BIG CAPTO Integrated Type

Slotting

Shoulder milling

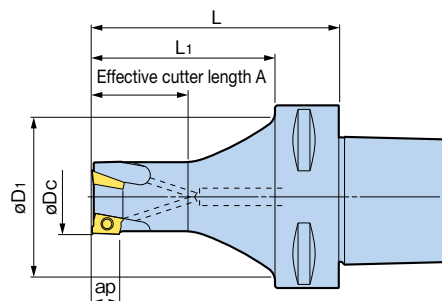
CAPTO is a trademark licensed by Sandvik Coromant.

[Standard Type]

● Model Description

C5 - FCM 16 09 2 - 65

- Shank No.
- FCM Type
- Cutter diameter ϕD_c
- Effective cutting edge length a_p
- Number of inserts
- L dimension



C5

Cutter diameter ϕD_c	Model	Effective cutting edge length a_p	ϕD_1	L	L ₁	A	Number of inserts	Insert Model	Weight (kg)
16	C5-FCM16092 - 65	9	40	65	45	23	2	ARG1609□□	0.5
	- 90		44	90	70	30			0.6
20	-FCM20093 - 65	9	40	65	45	28	3	ARG2009□□	0.5
	- 90		44	90	70	35			0.6
25	-FCM25093 - 65	9	40	65	45	33	3	ARG2509□□	0.6
	- 90		44	90	70	40			0.7
32	-FCM32113 - 65	11	40	65	45	38	3	ARG3211□□	0.6
	- 90		44	90	70	45			0.8
40	-FCM40114 - 50	11	—	50	30	25	4	ARG4011□□	0.6
	- 90		46	90	70	60			1.0
50	-FCM50115 - 50	11	—	50	30	25	5	ARG4011□□	0.7
	- 90		—	90	70	65			1.0

1. Wrench included. Inserts must be ordered separately.

*For the C6 size, we offer the head interchangeable holder CONTACT GRIP (FCM/FCR).

J22



For inserts, J14



For cutting conditions, J15

FULLCUT MILL FCM Type

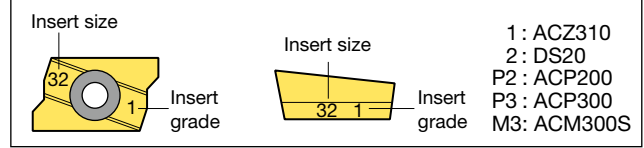
<Insert>



● Model Description
ARG16 **09** **02** **ACP300**

● Grade
 ● Nose Radius
 ● Effective cutting edge length:
 ø12 - 26...09 ø32 - 50...11

Insert Marking Description



Cutter diameter	Insert Model	Effective cutting edge length	Nose radius	Insert grade				
				ACP300 (for steel)	ACP200 (for pre-hardened steel)	ACM300S (for stainless steel)	ACZ310 (for cast iron)	DS20 (for aluminum)
ø12 - ø17	ARG160902	9	0.2	○	—	○	○	○
	160904		0.4	○	○	○	○	○
ø20, ø21	ARG200902	9	0.2	○	—	○	○	○
	200904		0.4	○	○	○	○	○
ø25, ø26	ARG250902	9	0.2	○	—	○	○	○
	250904		0.4	○	○	○	○	○
ø32, ø33	ARG321102	11	0.2	○	—	○	○	○
	321104		0.4	○	○	○	○	○
ø40, ø50	ARG401102	11	0.2	○	—	○	○	○
	401104		0.4	○	○	○	○	○

1. Inserts are available in packets of 10 pcs.
 Please specify the insert model number and grade when ordering.



Caution

- Inserts are exclusive for each cutter diameter. Be sure to purchase an insert suited to the cutter diameter, as the use of a non-compatible insert may cause problems.
- Not compatible with inserts for FULLCUT MILL FCR Type.
- Insert with nose radius 0.2 is for light cutting.

Insert Grade Description

ACP300	ACP200	ACM300S	ACZ310
Material for general steel, with a PVD multilayer coating on an ultra-tough substrate. Resistant to chipping and thermal fractures, allowing interrupted cutting as well.	With multilayers of nano-order TiAlN and AlCrN on a high-hardness base, it has superior wear resistance in pre-hardened steel machining.	Uses a new coating with improved film hardness and oxidation start temperature on a newly developed high-strength carbide substrate. Our most highly recommended material for stainless steel machining, combining wear resistance and fracture resistance.	Material for cast iron and ductile cast iron machining, with a PVD multilayer coating on an ultra-fine particle alloy substrate. Highly wear-resistant and also resistant to machine impact.

DS20
Material for non-ferrous metals, with a special diamond coating (DLC) realizing high adhesion and low friction, on K20 class carbide.

Both ACP300 and ACP200 can be used for steel machining

ACP200 has excellent wear resistance, while ACP300 has superb chipping resistance. For steel machining, we recommend ACP300 the most highly. ACP300 provides stable machining, but for even higher speeds or when wear resistance is required, use ACP200. Note that ACP200 is not recommended for heavy interrupted cutting or heavy cutting.

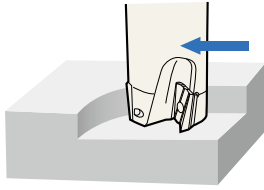
<Insert Clamping Screw Set>

Insert clamp screw and tightening wrench are consumables. Order periodically for replacement or spares.

		● Insert Clamping Screw Set Screw x 10 pcs Wrench x 1 pce.	● Driver-Type Wrench
Cutter diameter	Insert Model	Set Model	Wrench Model
ø12	ARG1609□□	S2505DS	DA-T8
ø14, ø16, ø17			
ø20, ø21	ARG2009□□	S2506DS	
ø25, ø26	ARG2509□□	S3508DS	DA-T15
ø32, ø33	ARG3211□□		
ø40	ARG4011□□		
ø50			

Cutting Conditions

■ Shoulder Milling/Slotting

**Caution**

- FULLCUT MILL FCM Type cannot be used for machining with Z-direction tool feed, such as ramping or drilling.

Light to medium cutting

Cutter diameter	Material	Carbon Steel Alloy Steel	Unalloyed Steel	Pre-hardened Steel HRC40 or less	Stainless Steel	Cast Iron	Aluminum
	Insert grade	ACP300		ACP200	ACM300S	ACZ310	DS20
	Cutting fluid	Dry					Dry/Wet
ø12 - ø14	Cutting speed Vc (m/min)	150 - 250	180 - 250	80 - 140	140 - 180	100 - 200	200 - 750
	Feed rate fz (mm/t)	0.1 - 0.2	0.1 - 0.2	0.08 - 0.12	0.12 - 0.18	0.1 - 0.2	0.10 - 0.3
ø16 - ø21	Cutting speed Vc (m/min)	150 - 250	180 - 250	80 - 140	140 - 180	100 - 200	200 - 1,000
	Feed rate fz (mm/t)	0.1 - 0.2	0.1 - 0.2	0.08 - 0.12	0.12 - 0.18	0.1 - 0.2	0.10 - 0.3
ø25 - ø33	Cutting speed Vc (m/min)	180 - 280	200 - 280	80 - 140	140 - 200	100 - 200	200 - 1,500
	Feed rate fz (mm/t)	0.1 - 0.24	0.1 - 0.22	0.08 - 0.14	0.12 - 0.2	0.1 - 0.2	0.10 - 0.35
ø40 - ø50	Cutting speed Vc (m/min)	180 - 280	200 - 280	80 - 140	140 - 200	80 - 200	200 - 1,500
	Feed rate fz (mm/t)	0.1 - 0.24	0.1 - 0.22	0.08 - 0.14	0.12 - 0.2	0.1 - 0.2	0.10 - 0.35

Heavy interrupted cutting/Heavy cutting

Cutter diameter	Material	Carbon Steel Alloy Steel	Unalloyed Steel	Stainless Steel	Cast Iron	Aluminum
	Insert grade	ACP300		ACM300S	ACZ310	DS20
	Cutting fluid	Dry				Dry/Wet
ø12 - ø14	Cutting speed Vc (m/min)	100 - 200	150 - 200	120 - 180	100 - 180	200 - 750
	Feed rate fz (mm/t)	0.08 - 0.14	0.1 - 0.15	0.12 - 0.15	0.08 - 0.18	0.10 - 0.2
ø16 - ø21	Cutting speed Vc (m/min)	100 - 200	150 - 200	120 - 180	100 - 180	200 - 1,000
	Feed rate fz (mm/t)	0.08 - 0.14	0.1 - 0.15	0.12 - 0.15	0.08 - 0.18	0.10 - 0.2
ø25 - ø33	Cutting speed Vc (m/min)	100 - 200	160 - 220	120 - 180	100 - 200	200 - 1,500
	Feed rate fz (mm/t)	0.1 - 0.16	0.1 - 0.15	0.12 - 0.15	0.08 - 0.2	0.10 - 0.3
ø40 - ø50	Cutting speed Vc (m/min)	100 - 200	160 - 220	120 - 180	100 - 220	200 - 1,500
	Feed rate fz (mm/t)	0.1 - 0.16	0.1 - 0.15	0.12 - 0.15	0.08 - 0.2	0.10 - 0.3

**Caution**

- As the nose radius 0.2 insert is for light cutting, pay attention to the axial and radial cutting depth and the feed rate.
- This table is a guideline for selecting cutting parameters. Adjust them as needed according to the machine and workpiece conditions, considering the cutting width as well.
- For the oversize type, we recommend 2-flute models for medium/heavy slotting.
- Dry (or air blow) cutting is recommended for steel machining, except finishing. Dry cutting is recommended for stainless steel as well; however, wet cutting may extend insert life in case severe built-up edge occurs.

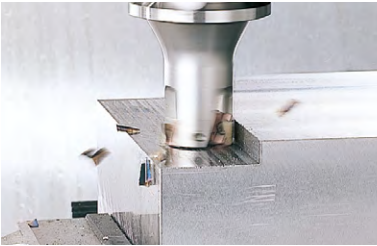
APPLICATION EXAMPLES

※ All the following examples are dry cutting.

Slotting

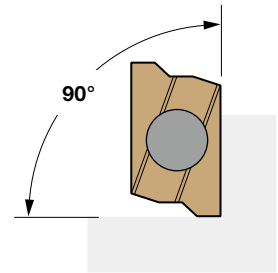
Only the FULLCUT MILL was able to achieve these parameters on a BT40 machine.

FULLCUT MILL Model	BBT40-FCM32113-85
Insert Model	ARG321104 (ACP300)
Workpiece material	S50C
Cutting speed Vc (m/min)	150
Feed rate fz (mm/t)	0.12
Axial DOC ap (mm)	9

**Shoulder Milling**

Excellent perpendicularity was achieved.

FULLCUT MILL Model	BBT40-FCM32113-85
Insert Model	ARG321104 (ACP300)
Workpiece material	S50C
Cutting speed Vc (m/min)	200
Feed rate fz (mm/t)	0.15
Axial DOC ap (mm)	11
Radial DOC ae (mm)	5

**Face Milling**

Even at Vc = 200 and fz = 0.15, finishing surface roughness of Ry = 2.53 was achieved.

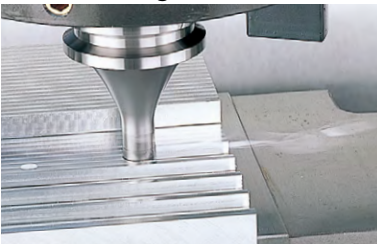
FULLCUT MILL Model	BBT40-FCM50115-70
Insert Model	ARG401104 (ACP300)
Workpiece material	S50C
Cutting speed Vc (m/min)	200
Feed rate fz (mm/t)	0.15
Axial DOC ap (mm)	1
Radial DOC ae (mm)	30

	Bottom surface roughness Ry
BIG	2.53
General Cutter A	3.75
General Cutter B	4.32

Difficult-to-Cut Material Machining

High-efficiency machining with SUS304 (feed Vf = 1,140mm/min) was achieved stably.

FULLCUT MILL Model	ST25-FCM25093-120
Holder Model	BBT50-MEGA25D-105
Insert Model	ARG250904 (ACM300S)
Workpiece material	SUS304
Cutting speed Vc (m/min)	150
Feed rate fz (mm/t)	0.2
Axial DOC ap (mm)	9
Radial DOC ae (mm)	3

**Aluminum High-Speed Machining**

Excellent chips and surface roughness were achieved even in high-speed machining of duralumin A2017 (spindle speed n = 12,000min⁻¹).

FULLCUT MILL Model	BBT40-FCM16092-85
Insert Model	ARG16094 (DS20)
Workpiece material	A2017
Cutting speed Vc (m/min)	600
Feed rate fz (mm/t)	0.15
Axial DOC ap (mm)	9

