

Recommended Cutting Conditions

◆ GBA type insert (Ground Chipbreaker)

Workpiece Material	Recommended Insert Grade (Cutting Speed: sfm)									① f at Grooving (ipr) ② f at Traversing (ipr) ③ ap at Traversing (inch)					Remarks
	Cermet		MEGA	PVD Coated Carbide		Carbide	CBN	PCD	GBA○○% 033~100	GBA○○% 125~200	GBA○○% 230~300	GBA○○% 330~400	GBA○○% 400~480		
	TC40	TN90	PR1215	PR930	PR1115	PR905	KW10	KBN510 KBN625	KPD001 (KPD010)	GBA○○% 031N~041N	GBA○○% 047N~078N	GBA○○% 094N~109N	GBA○○% 125N~156N	GBA○○% 172N~188N	
Carbon Steel (SxxC etc.)	☆ 500-725	☆ 500-725	★ 2230-650	☆ 260-600	☆ 260-600	-	-	-	-	①.0012~.0031 ②.Traversing N.A. ③.Traversing N.A.	①.0016~.0035 ②.0016~.0035 ③.Max. .012	①.0020~.0039 ②.0020~.0039 ③.Max. .020	①.0020~.0047 ②.0020~.0039 ③.Max. .020	①.0020~.0047 ②.0020~.0039 ③.Max. .032	Coolant
Alloy Steel (SCM etc.)	☆ 425-650	☆ 425-650	★ 260-600	☆ 260-600	☆ 260-160	-	-	-	-	①.0012~.0028 ②.Traversing N.A. ③.Traversing N.A.	①.0016~.0031 ②.0016~.0031 ③.Max. .012	①.0020~.0035 ②.0020~.0035 ③.Max. .020	①.0020~.0039 ②.0020~.0039 ③.Max. .020	①.0020~.0039 ②.0020~.0039 ③.Max. .032	
Stainless Steel (SUS304 etc.)	-	☆ 230-500	☆ 200-500	☆ 200-425	★ 200-425	-	-	-	-	①.0012~.0028 ②.Traversing N.A. ③.Traversing N.A.	①.0016~.0031 ②.0016~.0031 ③.Max. .012	①.0020~.0035 ②.0020~.0035 ③.Max. .020	①.0020~.0039 ②.0020~.0039 ③.Max. .020	①.0020~.0039 ②.0020~.0039 ③.Max. .032	
Cast Iron (FC/FCD etc.)	-	-	-	-	-	★ 260-600	☆ 200-400	★ 500-1300	-	①.0012~.0031 ②.Traversing N.A. ③.Traversing N.A.	①.0016~.0035 ②.0016~.0035 ③.Max. .012	①.0020~.0039 ②.0020~.0039 ③.Max. .020	①.0020~.0047 ②.0020~.0039 ③.Max. .020	①.0020~.0047 ②.0020~.0039 ③.Max. .032	
Aluminum	-	-	-	-	-	-	★ 500-1300	-	★ 500-6500	①.0020~.0047 ②.Traversing N.A. ③.Traversing N.A.	①.0020~.0059 ②.0020~.0059 ③.Max. .020	①.0020~.0059 ②.0020~.0059 ③.Max. .032	①.0031~.0059 ②.0031~.0059 ③.Max. .032	①.0031~.0059 ②.0031~.0059 ③.Max. .032	
Brass	-	-	-	-	-	-	★ 500-1000	-	★ 650-2600	①.0020~.0047 ②.Traversing N.A. ③.Traversing N.A.	①.0020~.0059 ②.0020~.0059 ③.Max. .020	①.0020~.0059 ②.0020~.0059 ③.Max. .032	①.0031~.0059 ②.0031~.0059 ③.Max. .032	①.0031~.0059 ②.0031~.0059 ③.Max. .032	
Hard materials	-	-	-	-	-	-	-	★ 260-400	-	-	①.0008~.005 ②.Traversing N.A. ③.Traversing N.A.	①.0012~.0028 ②.0.01~.004 ③.Max. .004	-	-	

* Above cutting condition is for external grooving. Set both cutting speed and feed 10% higher for internal grooving. MEGA indicates MEGACOAT. ★ : 1st Recommendation ☆ : 2nd Recommendation

◆ GBA type insert (MY Chipbreaker)

Workpiece Material	Recommended Insert Grade (Vc: sfm)									① f at Grooving (ipr) ② f at Traversing (ipr) ③ ap at Traversing (inch)					Remarks
	Cermet		MEGA	PVD Coated Carbide		Carbide	CBN	PCD	GBA43% 175MY~ 200MY	GBA43% 230MY~ 265MY	GBA43% 300MY	GBA43% 330MY~ 350MY	GBA43% 400MY		
	TN6020	TC40	PR1215	PR930	PR1115	KW10	KBN510	KPD001 (KPD010)	GBA43% 078MYN~	GBA43% 094MYN		GBA43% 125MYN	GBA43% 156MYN		
Carbon Steel (SxxC etc.)	☆ 500-725	-	★ 2230-650	☆ 2230-650	☆ 2230-650	-	-	-	-	①.0012~.0031 ②.0012~.0031 ③.Max. .012	①.0016~.0035 ②.0016~.0035 ③.Max. .012	①.0020~.0039 ②.0020~.0039 ③.Max. .020	①.0020~.0047 ②.0020~.0039 ③.Max. .020	①.0020~.0047 ②.0020~.0039 ③.Max. .032	Coolant
Alloy Steel (SCM etc.)	☆ 425-650	-	★ 260-600	☆ 260-600	☆ 260-600	-	-	-	-	①.003~.007 ②.003~.01 ③.Max. .012	①.0016~.0031 ②.0016~.0031 ③.Max. .012	①.0020~.0035 ②.0020~.0035 ③.Max. .020	①.0020~.0039 ②.0020~.0039 ③.Max. .020	①.0020~.0039 ②.0020~.0039 ③.Max. .032	
Stainless Steel (SUS304 etc.)	☆ 230-500	-	☆ 200-500	☆ 200-500	★ 200-500	-	-	-	-	①.003~.012 ②.003~.01 ③.Max. .012	①.0016~.0031 ②.0016~.0031 ③.Max. .012	①.0020~.0035 ②.0020~.0035 ③.Max. .020	①.0020~.0039 ②.0020~.0039 ③.Max. .020	①.0020~.0039 ②.0020~.0039 ③.Max. .032	

* Above cutting condition is for external grooving. Set both cutting speed and feed 10% higher for internal grooving. MEGA indicates MEGACOAT. ★ : 1st Recommendation ☆ : 2nd Recommendation

◆ GB type insert (Ground Chipbreaker) GB type will be switched to GBA type.

Workpiece Material	Recommended Insert Grade (Cutting Speed: sfm)									① f at Grooving (ipr) ② f at Traversing (ipr) ③ ap at Traversing (inch)					Remarks
	Cermet		PVD Coated Carbide		Carbide	CBN	PCD	GB○○% 050~100	GB○○% 125~200	GB○○% 230~300	GB○○% 330~400	GB○○% 400~480			
	TN90	TC40	TC60	PR630	PR930	KW10	KBN510	KPD001 (KPD010)							
Carbon Steel (SxxC etc.)	-	☆ 500-725	☆ 325-500	☆ 250-200	★ 250-180	-	-	-	①.0012~.0031 ②.Traversing N.A. ③.Traversing N.A.	①.0016~.0035 ②.0016~.0035 ③.Max. .012	①.0020~.0039 ②.0020~.0039 ③.Max. .020	①.0020~.0047 ②.0020~.0039 ③.Max. .020	①.0020~.0047 ②.0020~.0039 ③.Max. .032	Wet	
Alloy Steel (SCM etc.)	-	☆ 425-650	☆ 250-425	☆ 250-600	★ 250-525	-	-	-	①.0012~.0028 ②.Traversing N.A. ③.Traversing N.A.	①.0016~.0031 ②.0016~.0031 ③.Max. .012	①.0020~.0035 ②.0020~.0035 ③.Max. .020	①.0020~.0039 ②.0020~.0039 ③.Max. .020	①.0020~.0039 ②.0020~.0039 ③.Max. .032		
Stainless Steel (SUS304 etc.)	-	-	☆ 200-325	☆ 200-500	★ 200-425	-	-	-	①.0012~.0028 ②.Traversing N.A. ③.Traversing N.A.	①.0016~.0031 ②.0016~.0031 ③.Max. .012	①.0020~.0035 ②.0020~.0035 ③.Max. .020	①.0020~.0039 ②.0020~.0039 ③.Max. .020	①.0020~.0039 ②.0020~.0039 ③.Max. .032		
Cast Iron (FC/FCD etc.)	-	-	-	-	-	★ 200-325	-	-	①.0012~.0031 ②.Traversing N.A. ③.Traversing N.A.	①.0016~.0035 ②.0016~.0035 ③.Max. .012	①.0020~.0039 ②.0020~.0039 ③.Max. .020	①.0020~.0047 ②.0020~.0039 ③.Max. .020	①.0020~.0047 ②.0020~.0039 ③.Max. .032		
Aluminum	-	-	-	-	-	★ 500-1300	-	★ 500-6500	①.0020~.0047 ②.Traversing N.A. ③.Traversing N.A.	①.0020~.0059 ②.0020~.0059 ③.Max. .020	①.0020~.0059 ②.0020~.0059 ③.Max. .032	①.0031~.0059 ②.0031~.0059 ③.Max. .032	①.0031~.0059 ②.0031~.0059 ③.Max. .032		
Brass	-	-	-	-	-	★ 500-1000	-	★ 650-2600	①.0020~.0047 ②.Traversing N.A. ③.Traversing N.A.	①.0020~.0059 ②.0020~.0059 ③.Max. .020	①.0020~.0059 ②.0020~.0059 ③.Max. .032	①.0031~.0059 ②.0031~.0059 ③.Max. .032	①.0031~.0059 ②.0031~.0059 ③.Max. .032		

★ : 1st Recommendation ☆ : 2nd Recommendation

◆ Recommended Insert Grade (Tip-Bars)

Workpiece Material	Recommended Insert Grade (Cutting Speed: sfm)				PSG05	PSG06	PSG07	PSG08	Remarks	
	Cermet		PVD Coated Carbide							Carbide
	TC60		PR930	KW10						
General Steel (S45C etc.)	☆ 200-400		★ 100-325		~.0012	~.0020			Wet	
Stainless Steel (SUS304 etc.)	☆ 160-325		★ 100-260		~.0008	~.0012				
Non-ferrous Metals (Aluminum / Brass etc.)				★ ~1000	~.0020	~.0031				

★ : 1st Recommendation ☆ : 2nd Recommendation

Note for using the grooving insert bar PSG-S type

How to Install

Ultra small grooving requires accurate installation because an error of insert height or angle can affect the machining precision. When installing, set the cutting edge higher than the center line as shown in the Table 1. The cutting edge of all the PSG-S type bars is designed to be higher than the center line. (L4 of insert bar dimension)

Recommended Cutting Conditions

TGF insert (Ground Chipbreaker)

Workpiece Material	Recommended Insert Grade (Cutting Speed: sfm)								① f at Grooving (ipr) ② f at Traversing (ipr) ③ // ap (inch)				Remarks
	Cermet		PVD Coated Carbide		Carbide	CBN	PCD	TGF32% 033~050	TGF32% 075~095	TGF32% 100~145	TGF32% 150~250		
	TN90	TC40	TC60	PR930	PR115	KW10	KBN510					KPD001 (KPD010)	
Carbon Steel	☆ 500-725	☆ 500-725	☆ 325-500	☆ 250-600	★ 250-600	-	-	-	①.0004~.0020 ②.Traversing N.A. ③.Traversing N.A.	①.0008~.0028 ②.Traversing N.A. ③.Traversing N.A.	①.0012~.0031 ②.0012~.0024 ③Max..008	①.0012~.0031 ②.0012~.0024 ③Max..008	Coolant
Alloy Steel	☆ 425-650	☆ 425-650	☆ 250-425	☆ 250-600	★ 250-525	-	-	-	①.0004~.0016 ②.Traversing N.A. ③.Traversing N.A.	①.0008~.0024 ②.Traversing N.A. ③.Traversing N.A.	①.0012~.0028 ②.0008~.0020 ③Max..008	①.0012~.0028 ②.0008~.0020 ③Max..008	
Stainless Steel	☆ 230-500	-	☆ 200-325	☆ 200-425	★ 200-425	-	-	-	①.0004~.0016 ②.Traversing N.A. ③.Traversing N.A.	①.0008~.0024 ②.Traversing N.A. ③.Traversing N.A.	①.0012~.0028 ②.0008~.0020 ③Max..008	①.0012~.0028 ②.0008~.0020 ③Max..008	
Cast Iron	-	-	-	-	-	★ 200-325	-	-	①.0004~.0020 ②.Traversing N.A. ③.Traversing N.A.	①.0008~.0028 ②.Traversing N.A. ③.Traversing N.A.	①.0012~.0031 ②.0012~.0024 ③Max..008	①.0012~.0031 ②.0012~.0024 ③Max..008	
Aluminum	-	-	-	-	-	★ 500-1300	-	★ 500-6500	①.0004~.0020 ②.Traversing N.A. ③.Traversing N.A.	①.0008~.0028 ②.Traversing N.A. ③.Traversing N.A.	①.0012~.0031 ②.0012~.0024 ③Max..008	①.0012~.0031 ②.0012~.0024 ③Max..008	
Brass	-	-	-	-	-	★ 500-1000	-	★ 650-2600	①.0004~.0016 ②.Traversing N.A. ③.Traversing N.A.	①.0008~.0024 ②.Traversing N.A. ③.Traversing N.A.	①.0012~.0028 ②.0008~.0020 ③Max..008	①.0012~.0028 ②.0008~.0020 ③Max..008	

TG insert (Ground Chipbreaker)

changes to GBA.

★ : 1st Recommendation ☆ : 2nd Recommendation

Workpiece Material	Recommended Insert Grade (Cutting Speed: sfm)								Feed Rate (ipr)					Remarks
	Cermet		PVD Coated Carbide		Carbide	CBN	PCD	TG○○% 075~095	TG○○% 125~200	TG○○% 230~300	TG○○% 330~400	TG○○% 430~450		
	TN60	TC40	TC60	PR630	PR930	KW10	KBN510						KPD001 (KPD010)	
Carbon Steel	★ 500-725	-	-	-	-	-	-	-	.0012-.0028	.0012-.0031	.0020-.0039	.0020-.0047	.0020-.0047	Coolant
Alloy Steel	★ 425-650	-	-	-	-	-	-	-	.008-.0024	.0012-.0028	.0020-.0024	.0020-.0039	.0020-.0039	

* Above cutting condition is for external grooving. Set both cutting speed and feed rate lower than 10% for internal grooving.

★ : 1st Recommendation ☆ : 2nd Recommendation

GH insert (Ground Chipbreaker)

Workpiece Material	Recommended Insert Grade (Cutting Speed: sfm)								① f at Grooving (ipr) ② f at Traversing (ipr) ③ // ap (inch)				Remarks
	Cermet		PVD Coated Carbide		Carbide	Ceramic		GH 40~50	GH 55~70	GH 75~80	GH 100~120		
	TN90	TC40	TC60	PR630	PR930	KW10	A65					A66N	
Carbon Steel	☆ 500-725	☆ 500-725	☆ 325-500	☆ 250-650	★ 250-600	-	-	-	①.0028~.008 ②.0028~.006 ③Max.0.04	①.0028~.008 ②.0028~.006 ③Max.0.04	①.004~.010 ②.0039~.008 ③Max.0.06	①.006~.012 ②.006~.010 ③Max.0.08	Coolant
Alloy Steel	☆ 425-650	☆ 425-650	☆ 250-425	☆ 250-600	★ 250-525	-	-	-	①.0028~.007 ②.0028~.005 ③Max.0.04	①.0028~.007 ②.0028~.005 ③Max.0.04	①.004~.009 ②.004~.007 ③Max.0.06	①.006~.011 ②.006~.022 ③Max.0.08	
Stainless Steel	☆ 230-500	-	☆ 200-325	☆ 200-500	★ 200-425	-	-	-	①.0028~.006 ②.0028~.005 ③Max.0.04	①.0028~.006 ②.0028~.005 ③Max.0.04	①.004~.008 ②.004~.007 ③Max.0.06	①.006~.010 ②.006~.022 ③Max.0.08	
Cast Iron	-	-	-	-	-	★ 200-325	☆ 500-1000	☆ 500-1000	KW10 ①.0028~.008 ②.0028~.006 ③Max.0.04 A65 / A66N ①.0012~.0028 ②.Traversing N.A. ③.Traversing N.A.	KW10 ①.0028~.008 ②.0028~.006 ③Max.0.04 A65 / A66N ①.0012~.0028 ②.Traversing N.A. ③.Traversing N.A.	KW10 ①.004~.010 ②.004~.008 ③Max.0.06 A65 / A66N ①.0020~.0024 ②.Traversing N.A. ③.Traversing N.A.	KW10 ①.006~.012 ②.006~.010 ③Max.0.08 A65 / A66N ①.0020~.0024 ②.Traversing N.A. ③.Traversing N.A.	
Aluminum	-	-	-	-	-	★ 500-1300	-	-	①.0028~.008 ②.0028~.006 ③Max.0.04	①.0028~.008 ②.0028~.006 ③Max.0.04	①.004~.010 ②.004~.008 ③Max.0.06	①.006~.012 ②.006~.010 ③Max.0.08	
Brass	-	-	-	-	-	★ 500-1000	-	-	①.0028~.008 ②.0028~.006 ③Max.0.04	①.0028~.008 ②.0028~.006 ③Max.0.04	①.004~.010 ②.004~.008 ③Max.0.06	①.006~.012 ②.006~.010 ③Max.0.08	
Hard Materials	-	-	-	-	-	-	☆ 130-260	☆ 130-260	①.0008~.0020 ②.0004~.0012 ③Max.0.004	①.0008~.0020 ②.0004~.0012 ③Max..008	①.0008~.0020 ②.0004~.0016 ③Max..008		

* Above cutting condition is for external grooving. Set both cutting speed and feed rate lower than 10% for internal grooving.

★ : 1st Recommendation ☆ : 2nd Recommendation

GHU insert (Molded Chipbreaker)

Workpiece Material	Recommended Insert Grade (Cutting Speed: sfm)								① f at Grooving (ipr) ② f at Traversing (ipr) ③ // ap (inch)			Remarks
	Cermet		CVD Coated Carbide	PVD Coated Carbide		Ceramic		GHU 40	GHU 50	GHU 60		
	TN60	TC40	TC60	CR9025	PR630	PR930	A65				A66N	
Carbon Steel	☆ 425-650	-	-	☆ 250-600	-	-	-	-	①.0024~.0047 ②.0020~.004 ③Max.0.04	①.0024~.0047 ②.0020~.004 ③Max.0.04	①.0024~.006 ②.0020~.0047 ③Max.0.06	Coolant
Alloy Steel	☆ 325-600	-	-	☆ 250-525	-	-	-	-	①.0024~.0047 ②.0020~.004 ③Max.0.04	①.0024~.0047 ②.0020~.004 ③Max.0.04	①.0024~.006 ②.0020~.0047 ③Max.0.06	
Stainless Steel	-	-	-	☆ 200-425	-	-	-	-	①.0024~.004 ②.0020~.0031 ③Max.0.03	①.0024~.004 ②.0020~.0031 ③Max.0.03	①.0024~.0047 ②.0020~.004 ③Max.0.05	

* Above cutting condition is for external grooving. Set both cutting speed and feed rate lower than 10% for internal grooving.

★ : 1st Recommendation ☆ : 2nd Recommendation

● : Std Stock ○ : World Express



Grooving

Recommended Cutting Conditions

◆ GA insert (Molded Chipbreaker)

Workpiece Material	Recommended Insert Grade (Cutting Speed: sfm)							① f at Grooving (ipr) ② f at Traversing (ipr) ③ // ap (inch)			Remarks	
	Cermet				CVD Coated Carbide	PVD Coated Carbide	Carbide	GA 30	GA 40	GA 50		
	TN60	TN90	TC40	TC60	CR9025	PR630	PR930					KW10
Carbon Steel	☆ 425-650	-	-	-	★ 250-600	-	-	-	①.0024~.007 ②.0020~.006 ③Max. 0.03	①.0024~.008 ②.0020~.017 ③Max. 0.04	①.0024~.010 ②.0020~.008 ③Max. 0.05	Coolant
Alloy Steel	☆ 325-600	-	-	-	★ 250-525	-	-	-	①.0024~.006 ②.0020~.0047 ③Max. 0.012	①.0024~.007 ②.0020~.006 ③Max. 0.020	①.0024~.022 ②.0020~.007 ③Max. 0.03	
Stainless Steel	-	-	-	-	★ 200-425	-	-	-	①.0024~.004 ②.0020~.0031 ③Max. 0.03	①.0024~.004 ②.0020~.0031 ③Max. 0.03	①.0.06~.0047 ②.0020~.004 ③Max. 0.047	

★ : 1st Recommendation ☆ : 2nd Recommendation

◆ GIA insert (Molded Chipbreaker)

Workpiece Material	Recommended Insert Grade (Cutting Speed: sfm)							① f at Grooving (ipr) ② f at Traversing (ipr) ③ // ap (inch)			Remarks	
	Cermet				CVD Coated Carbide	PVD Coated Carbide	Carbide	GIA 30	GIA 40	GIA 50		
	TN60	TN90	TC40	TC60	CR9025	PR630	PR930					KW10
Carbon Steel	☆ 200-400	-	-	-	★ 200-400	-	-	-	①.0016~.0031 ②.0008~.0031 ③Max. 0.012	①.0016~.0024 ②.0008~.0031 ③Max. 0.016	①.0020~.004 ②.0020~.0031 ③Max. 0.020	Coolant
Alloy Steel	☆ 200-325	-	-	-	★ 200-325	-	-	-	①.0016~.0028 ②.0008~.0028 ③Max. 0.012	①.0016~.0028 ②.0008~.0028 ③Max. 0.016	①.0020~.0031 ②.0020~.0031 ③Max. 0.020	
Stainless Steel	-	-	-	-	★ 200-260	-	-	-	①.0016~.0028 ②.0008~.0028 ③Max. 0.012	①.0016~.0028 ②.0008~.0028 ③Max. 0.016	①.0020~.0031 ②.0020~.0031 ③Max. 0.020	

★ : 1st Recommendation ☆ : 2nd Recommendation

◆ GMN insert (CBN / PCD)

Workpiece Material	Recommended Insert Grade (Cutting Speed: sfm)		① f at Grooving (ipr) ② f at Traversing (ipr) ③ // ap (inch)				Remarks		
	CBN		PCD		GMN2	GMN3		GMN4 GMN5	GMN6
	KBN510 KBN525 (KBN10B)		KPD001 (KPD010)						
Aluminum	-	-	★ 500-6500	-	①.0020~.006 ②.0020~.006 ③Max. 0.020	①.0020~.006 ②.0020~.006 ③Max. 0.03	①.0031~.007 ②.0031~.007 ③Max. 0.03	①.0040~.0079 ②.0040~.0080 ③Max. 0.03	Coolant
Brass	-	-	★ 650-2600	-	①.0020~.006 ②.0020~.006 ③Max. 0.020	①.0020~.006 ②.0020~.006 ③Max. 0.03	①.0031~.007 ②.0031~.007 ③Max. 0.03	①.0040~.0080 ②.0040~.0080 ③Max. 0.03	
Cast Iron	★ 500-1300	-	-	-	①.0016~.0024 ②.0016~.0024 ③Max. 0.012	①.0020~.004 ②.0020~.004 ③Max. 0.020	①.0020~.0047 ②.0020~.0047 ③Max. 0.020	①.0020~.006 ②.0020~.006 ③Max. 0.03	
Hard Materials	★ 260-400	-	-	-	①.0008~.0020 ②.0004~.0012 ③Max. 0.004	①.0012~.0028 ②.0004~.0020 ③Max. .008	①.0012~.0031 ②.0012~.0031 ③Max. 0.012	①.0020~.004 ②.0020~.004 ③Max. 0.016	

* Above cutting condition is for external grooving. Set feed rate lower than 20% for face grooving.

★ : 1st Recommendation

■ FMM • FMN

Workpiece Material	Recommended Insert Grade (Cutting Speed: sfm)						Face Grooving (FMM type / FMN type)			Traversing (Case of FMM type)			Remarks
	Cermet	CVD Coated Carbide	PVD Coated Carbide		Carbide		Width inch/mm			Width inch/mm			
	TN90	CR9025	PR915	PR930	PR905	KW10	0.12/3.0	0.16/4.0	0.20-0.24/ 5.0-6.0	0.12/3.0	0.16/4.0	0.20-0.24/ 5.0-6.0	
							f (ipr)			f (ipr)			
Carbon Steel	☆ 325-725	☆ 250-650	☆ 250-650	★ 250-650	-	-	.0012~.0020	.0012~.0031	.0020~.0040	.0020~.0040	.0020~.010	.0040~.0120	Coolant
Alloy Steel	☆ 250-650	☆ 225-600	☆ 225-600	★ 225-600	-	-	.0012~.0020	.0012~.0031	.0020~.0040	.0020~.0040	.0020~.010	.0040~.0120	
Stainless Steel	☆ 225-525	☆ 200-500	★ 200-500	☆ 200-500	-	-	.0012~.0020	.0012~.0031	.0020~.0040	.0020~.0040	.0020~.010	.0040~.0120	
Cast Iron	-	-	-	-	★ 250-600	☆ 230-500	.0012~.0020	.0012~.0031	.0020~.0040	.0020~.0040	.0020~.010	.0040~.0120	
Aluminum	-	-	-	-	-	★ 650-1650	.0012~.0020	.0012~.0031	.0020~.0040	.0020~.0040	.0020~.010	.0040~.0120	
Brass	-	-	-	-	-	★ 325-650	.0012~.0020	.0012~.0031	.0020~.0040	.0020~.0040	.0020~.010	.0040~.0120	

Set the feed rate 1/100 of edge width on the first groove and check chip evacuation.

★ : 1st Recommendation ☆ : 2nd Recommendation

FMN type Inserts are only for Deep Grooving, and when used for traversing, set to ap=0.2mm and under.

◆ See the notes below for traversing conditions.

ap and f of FMM

	Recommended Conditions	
ap (MAX) mm	under 50% of Edge Width	• ap ≤ 0.5w
f (MAX) mm/rev	under 3~5% of Edge Width	• f ≤ [0.03 (Min.)~0.05 (MAX.)] w

ap×f should be as follows.

Load (mm ²)	Edge Width (mm)			
	3.0	4.0	5.0	6.0
ap×f	~0.09	~0.14	~0.25	~0.36

• ap×f ≤ 0.01 w²

● : Std Stock ○ : World Express

G

Grooving

Recommended Cutting Conditions

◆ GV insert (Ground Chipbreaker)

Workpiece Material	Recommended Insert Grade (Cutting Speed: sfm)						① f at Grooving (ipr) ② f at Traversing (ipr) ③ // ap (inch)						Remarks	
	Cermet			PVD Coated Carbide		Carbide	GV% 100SS-300SS 100S-300S	GV% 145B-185B	GV% 200B-280B	GV% 300B-400B				
	TN90	TC40	TC60	PR630	PR930	KW10	GV% 100A-340A 100AR-150AR		GV% 100BR	GV% 150BR	GV% 280C-300C	GV% 340C-400C		GV% 430C-500C
Carbon Steel	☆ 400-600	☆ 400-600	☆ 250-400	☆ 250-525	★ 250-460	-	①.0012-.0031 ②.0012-.0031 ③Max. 0.012	①.0012-.0031 ②.0012-.0031 ③Max. 0.012	①.0016-.0024 ②.0016-.0024 ③Max. 0.012	①.0020-.0047 ②.0020-.004 ③Max. 0.020	①.0016-.0024 ②.0016-.0024 ③Max. 0.012	①.0020-.0047 ②.0020-.004 ③Max. 0.020	①.0020-.0047 ②.0020-.004 ③Max. 0.020	
Alloy Steel	☆ 325-525	☆ 325-525	☆ 250-100	☆ 250-140	★ 250-400	-	①.0012-.0028 ②.0012-.004 ③Max. 0.012	①.0012-.0028 ②.0012-.004 ③Max. 0.012	①.0016-.0031 ②.0016-.0031 ③Max. 0.012	①.0020-.004 ②.0020-.004 ③Max. 0.020	①.0016-.0031 ②.0016-.0031 ③Max. 0.012	①.0020-.004 ②.0020-.004 ③Max. 0.020	①.0020-.004 ②.0020-.004 ③Max. 0.020	
Stainless Steel	☆ 230-130	-	☆ 200-325	☆ 200-425	★ 200-360	-	①.0012-.0028 ②.0012-.004 ③Max. 0.012	①.0012-.0028 ②.0012-.004 ③Max. 0.012	①.0016-.0031 ②.0016-.0031 ③Max. 0.012	①.0020-.004 ②.0020-.004 ③Max. 0.020	①.0016-.0031 ②.0016-.0031 ③Max. 0.012	①.0020-.004 ②.0020-.004 ③Max. 0.020	①.0020-.004 ②.0020-.004 ③Max. 0.020	
Cast Iron	-	-	-	-	-	★ 200-325	①.0012-.0031 ②.0012-.0031 ③Max. 0.012	①.0012-.0031 ②.0012-.0031 ③Max. 0.012	①.0016-.0024 ②.0016-.0024 ③Max. 0.012	①.0020-.0047 ②.0020-.004 ③Max. 0.020	①.0016-.0024 ②.0016-.0024 ③Max. 0.012	①.0020-.0047 ②.0020-.004 ③Max. 0.020	①.0020-.0047 ②.0020-.004 ③Max. 0.020	
Aluminum	-	-	-	-	-	★ 500-1000	①.0020-.0047 ②.0020-.0047 ③Max. 0.020	①.0020-.0047 ②.0020-.0047 ③Max. 0.020	①.0020-.006 ②.0020-.006 ③Max. 0.020	①.0031-.006 ②.0031-.006 ③Max. 0.03	①.0020-.006 ②.0020-.006 ③Max. 0.020	①.0031-.006 ②.0031-.006 ③Max. 0.03	①.0031-.006 ②.0031-.006 ③Max. 0.03	
Brass	-	-	-	-	-	★ 325-820	①.0020-.0047 ②.0020-.0047 ③Max. 0.020	①.0020-.0047 ②.0020-.0047 ③Max. 0.020	①.0020-.006 ②.0020-.006 ③Max. 0.020	①.0031-.006 ②.0031-.006 ③Max. 0.03	①.0020-.006 ②.0020-.006 ③Max. 0.020	①.0031-.006 ②.0031-.006 ③Max. 0.03	①.0031-.006 ②.0031-.006 ③Max. 0.03	

* Use PVD coated grade or carbide for traversing with edge width 1mm (GV% 100SS / 100S / 100A)

★ : 1st Recommendation ☆ : 2nd Recommendation

◆ GVF insert (Ground Chipbreaker)

Workpiece Material	Recommended Insert Grade (Cutting Speed: sfm)								① f at Grooving (ipr) ② f at Traversing (ipr) ③ // ap (inch)					Remarks
	Cermet				CVD Coated Carbide	PVD Coated Carbide	Carbide	GVF% 200A-340A	GVF% 250B-350B	GVF% 400B-490B	GVF% 350C-450C	GVF% 500C-600C		
	TN60	TN90	TC40	TC60	CR9025	PR630	PR930	KW10	GVF% 100AR-150AR	GVF% 150BR	GVF% 200BR			
Carbon Steel	-	☆ 500-725	☆ 500-725	☆ 325-500	-	☆ 250-650	★ 250-600	-	①.0012-.0031 ②.0012-.0031 ③Max. 0.012	①.0016-.0024 ②.0016-.0024 ③Max. 0.012	①.0020-.004 ②.0020-.004 ③Max. 0.020	①.0020-.0047 ②.0020-.004 ③Max. 0.020	①.0020-.0047 ②.0020-.004 ③Max. 0.03	
Alloy Steel	-	☆ 425-650	☆ 425-650	☆ 250-425	-	☆ 250-600	★ 250-525	-	①.0012-.0028 ②.0012-.004 ③Max. 0.012	①.0016-.0031 ②.0016-.0031 ③Max. 0.012	①.0020-.0024 ②.0020-.004 ③Max. 0.020	①.0020-.004 ②.0020-.004 ③Max. 0.020	①.0020-.004 ②.0020-.004 ③Max. 0.03	
Stainless Steel	-	☆ 230-500	-	☆ 200-325	-	☆ 200-500	★ 200-425	-	①.0012-.0028 ②.0012-.004 ③Max. 0.012	①.0016-.0031 ②.0016-.0031 ③Max. 0.012	①.0020-.0024 ②.0020-.004 ③Max. 0.020	①.0020-.004 ②.0020-.004 ③Max. 0.020	①.0020-.004 ②.0020-.004 ③Max. 0.03	
Cast Iron	-	-	-	-	-	-	-	★ 200-325	①.0012-.0031 ②.003-.0031 ③Max. 0.012	①.0016-.0024 ②.0016-.0024 ③Max. 0.012	①.0020-.004 ②.0020-.004 ③Max. 0.020	①.0020-.0047 ②.0020-.004 ③Max. 0.020	①.0020-.0047 ②.0020-.004 ③Max. 0.03	
Aluminum	-	-	-	-	-	-	-	★ 500-1300	①.0020-.0047 ②.0020-.0047 ③Max. 0.020	①.0020-.006 ②.0020-.006 ③Max. 0.020	①.0020-.006 ②.0020-.006 ③Max. 0.03	①.0031-.006 ②.0031-.006 ③Max. 0.03	①.0031-.006 ②.0031-.006 ③Max. 0.03	
Brass	-	-	-	-	-	-	-	★ 500-1000	①.0020-.0047 ②.0020-.0047 ③Max. 0.020	①.0020-.006 ②.0020-.006 ③Max. 0.020	①.0020-.006 ②.0020-.006 ③Max. 0.03	①.0031-.006 ②.0031-.006 ③Max. 0.03	①.0031-.006 ②.0031-.006 ③Max. 0.03	

* The ap should be under 0.5mm if a good surface finish is required.

★ : 1st Recommendation ☆ : 2nd Recommendation

◆ FTK Recommended Cutting Conditions

Workpiece Material	Recommended Insert Grade (Cutting Speed: sfm)					Edge Width inch/mm				Remarks
	Cermet	CVD Coated Carbide	PVD Coated Carbide	Carbide		0.16/4.0	0.20/5.0			
	TN90	CR9025	PR660	PR930	KW10	f (ipr)				
Carbon Steel	☆ 400-650	★ 250-600	☆ 200-425	☆ 200-425	-	.0020~.006	.0020~.006			
Alloy Steel	☆ 325-525	★ 230-500	☆ 200-425	☆ 200-425	-	.0020~.006	.0020~.006			
Stainless Steel	☆ 250-500	☆ 200-450	★ 160-400	☆ 160-400	-	.0020~.006	.0020~.006			
Cast Iron	-	-	-	-	★ 160-325	.0040~.0120	.0040~.0120			
Aluminum	-	-	-	-	★ 650-1500	.0020~.010	.0020~.010			
Brass	-	-	-	-	★ 325-650	.0020~.010	.0020~.010			

★ : 1st Recommendation ☆ : 2nd Recommendation

G



Grooving

Recommended Cutting Conditions

GMG • GMM • GMN • GMGA

Workpiece Material	Recommended Insert Grade (Cutting Speed: sfm)						Grooving				Traversing				Remarks
	Cermet TN90	CVD Coated Carbide CR9025	PVD Coated Carbide		PR905	Carbide KW10	Width inch/mm				Width inch/mm				
			PR915	PR930			0.08~0.12/ 2.0~3.0	0.16/4.0	0.20/5.0	0.24~0.32/ 6.0~8.0	0.08~0.12/ 2.0~3.0	0.16/4.0	0.20/5.0	0.24~0.32/ 6.0~8.0	
Carbon Steel	☆ 325~725	☆ 250~650	☆ 250~650	★ 250~650	-	-	f (ipr)				f (ipr)				Coolant
Alloy Steel	☆ 250~650	☆ 225~600	☆ 225~600	★ 225~600	-	-	.0020-.006	.0040-.010	.006-0.35	0.20-0.35	.0040-.0079	.006-.0120	.008-.016	.010-0.40	
Stainless Steel	☆ 230~525	☆ 200~500	★ 200~500	☆ 200~500	-	-	.0020-.006	.0040-.0079	.006-0.35	0.20-0.35	.0040-.0079	.006-.010	.008-.016	.010-0.40	
Cast Iron	-	-	-	-	★ 325~650	☆ 230~500	.0020-.0079	.0040-.0120	.006-0.40	.008-.016	.0040-.010	.006-0.35	.008-.018	.010-.016	
Aluminum	-	-	-	-	-	★ 650~1650	.0020-.0079	.0031-.010	.0040-.010	.0047-.0120	.0040-.0079	.0040-.010	.0040-.010	.006-0.30	
Brass	-	-	-	-	-	★ 325~650	.0020-.006	.0031-.0079	.0040-.010	.0047-.0120	.0040-.0079	.0040-.010	.0040-.010	.006-.0120	

★ : 1st Recommendation ☆ : 2nd Recommendation

◆ See the notes below for traversing conditions.

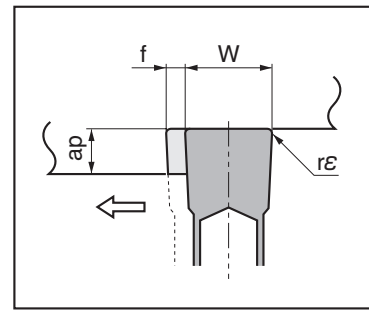
① Case of KGM Toolholder

	Recommended Conditions	
ap (MAX) mm	under 80% of Edge Width	• $ap \leq 0.8w$
f (MAX) mm/rev	under 10% of Edge Width	• $f \leq 0.1w$

(ap)×f shall not exceed 1/2 of ap(Max)×f(Max)

Load (mm ²) \ Edge Width (mm)	2.0~2.5	3.0	4.0	5.0	6.0	8.0
ap×f	~0.20	~0.36	~0.64	~1.00	~1.44	~2.56

• $ap \times f \leq \frac{1}{2} \times 0.8w \times 0.1w = 0.04w^2$



② Case of KGM-T Toolholder (Deep Grooving Type) : Use 90% of KGM conditions

③ Case of KGMM / KGMS / KFMS-8 Toolholder

	Recommended Conditions	
ap (MAX) mm	under 50% of Edge Width	• $ap \leq 0.5w$
f (MAX) mm/rev	under 4% of Edge Width	• $f \leq 0.04w$

ap×f should be as follows. (Under 50% of KGM)

Load (mm ²) \ Edge Width (mm)	2.0~2.5	3.0	4.0	5.0	6.0	8.0
ap×f	~0.10	~0.18	~0.32	~0.50	~0.72	~1.28

• $ap \times f \leq 0.02w^2$

④ Case of KIGM Toolholder

	Recommended Conditions	
ap (MAX) mm	under 70% of Edge Width	• $ap \leq 0.7w$
f (MAX) mm/rev	under 8% of Edge Width	• $f \leq 0.08w$

ap×f should be as follows. (Under 70% of KGM)

Load (mm ²) \ Edge Width (mm)	3.0	4.0	5.0
ap×f	~0.25	~0.44	~0.70

• $ap \times f \leq 0.04w^2$

GMG / GMM / GMGA 8030 (Face Grooving)

Workpiece Material	Recommended Insert Grade (Cutting Speed: sfm)						Face Grooving			Traversing			Remarks
	Cermet TN90	CVD Coated Carbide CR9025	PVD Coated Carbide		PR905	Carbide KW10	Width inch/mm			Width inch/mm			
			PR915	PR930			0.32/8.0			0.32/8.0			
Carbon Steel	☆ 325~725	☆ 250~525	☆ 250~525	★ 250~525	-	-	f (ipr)			f (ipr)			Coolant
Alloy Steel	☆ 250~525	☆ 230~525	☆ 230~525	★ 230~525	-	-	.004~.008			.004~.010			
Stainless Steel	☆ 230~460	☆ 200~425	★ 200~425	☆ 200~425	-	-	.004~.008			.004~.010			
Cast Iron	-	-	-	-	★ 250~600	☆ 230~425	.004~.012			.004~0.35			
Aluminum	-	-	-	-	-	★ 200~300	.0031~.010			.0031~.0120			
Brass	-	-	-	-	-	★ 325~500	.0031~.010			.0031~.0120			

★ : 1st Recommendation ☆ : 2nd Recommendation

● : Std Stock ○ : World Express

G

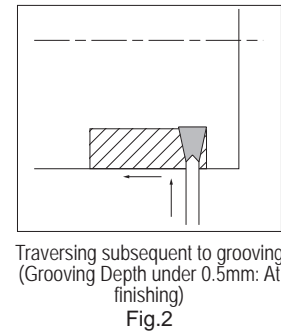
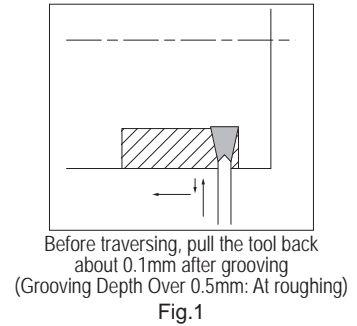
Grooving

|||

Guide for External Grooving

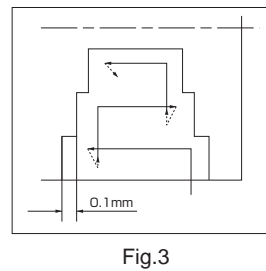
● Point (I) (Traversing after Grooving)

- ① Grooving Depth Over 0.5mm: At roughing (Refer to Fig.1)
Before traversing, pull the tool back about 0.1mm after grooving, instead of traversing subsequent to grooving.
(Failure to pull the tool back before traverse cutting will result in an unbalanced load applied on only one side of the cutting edge.)
- ② Grooving Depth under 0.5mm: At finishing (Refer to Fig.2)
Traversing subsequent to grooving is possible because shallow groove depths relate a small load on the cutting edge.
(Dwell-motion is not necessary.)



● Point (II)

When widening the groove width, apply the “Step Turning” as shown in Fig.3.
The widened groove and side walls should be finished last.
(For better chip control, ap over 0.5mm is recommended.)
Note: If the workpiece is not supported at the center, reduce the feed rate when grooving towards center



Guide for Face Grooving

〈Toolholder Selection〉

- ① Choose the best tool depending on the groove width.
The machining Dia. ϕD listed in the catalog indicates the depth of the first plunge of face grooving as shown in Fig.1.



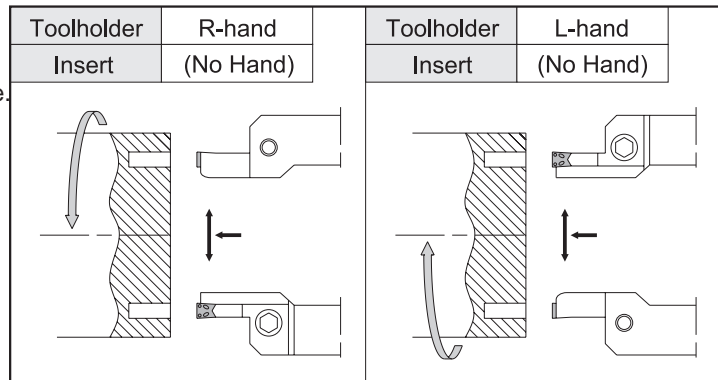
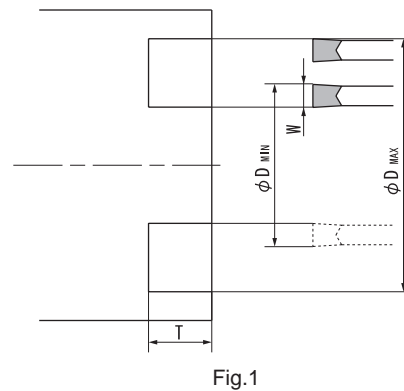
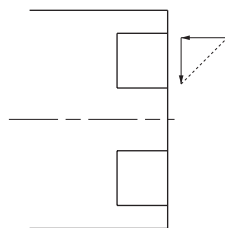
- ② Confirm Grooving Depth (dimension T)



- ③ Toolholder's hand is recommended so as to be mounted in reverse. (Fig.2)
This will provide smooth chip flow and chip clearance.

〈Traversing Tips〉

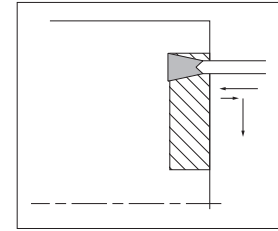
Traversing direction should be from the outer diameter to the inner diameter as shown in Fig.3.
This improves chip evacuation.



Guide for Face Grooving (Continued)

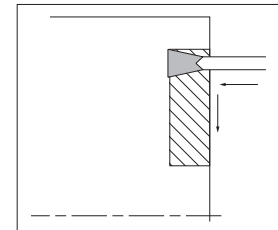
Point (I) (Traversing after Grooving)

- ① Grooving Depth Over 0.5mm: At roughing (Refer to Fig.4)
Before traversing, pull the tool back about 0.1mm after grooving, instead of traversing subsequent to grooving.
(Failure to pull the tool back before traverse cutting will result in an unbalanced load applied on only one side of the cutting edge.)



Before traversing, pull the tool back about 0.1mm after grooving
(Grooving Depth Over 0.5mm: At roughing)
Fig.4

- ② Grooving Depth under 0.5mm: At finishing (Refer to Fig.5)
Traversing subsequent to grooving is possible because shallow groove depths relate a small load on the cutting edge.
(Dwell-motion is not necessary.)



Traversing subsequent to grooving
(Grooving Depth under 0.5mm: At finishing)
Fig.5

Point (II)

When widening the groove width, apply the “Step Turning” as shown in Fig.6.

The widened groove and side walls should be finished last.
(For better chip control, ap over 0.5mm is recommended.)

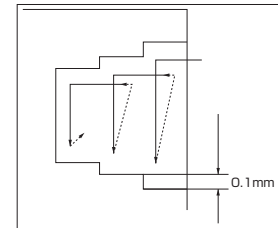
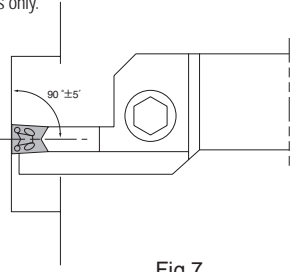


Fig.6

Trouble shooting

Trouble	Countermeasures
Whitish trace remains at the groove bottom.	<ol style="list-style-type: none"> ① Increase the cutting speed for finishing process only. (This can handle most of the cases). If the method is not successful, try ② as follows. ② Check the insert edge's parallelness. (Adjustment: Apply the insert edge to the work face and adjust the toolholder within the angle of $\pm 5'$. (Fig.7) 
Chips are entangled.	<ol style="list-style-type: none"> ① Apply the toolholder's reverse mounting. Adjust the coolant flow to the cutting edge. ② When widening the groove, do not machine one deep groove. Instead, repeat shallow grooving and turning.
Insert cracks when traversing.	Reverse the facing direction.
Groove is not straight.	Check the edge's parallelness. Decrease the feed rate.

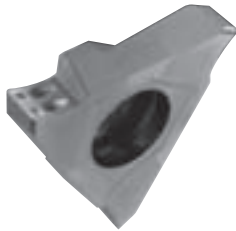
Guide for Grooving by Cermet Insert (Steel)

1. Set the f under 0.12mm/rev (0.05~0.10mm/rev normally).
2. Coolant is recommended.
3. Set the cutting speed $V_c=150-220$ m/min.
4. Set the toolholder overhang as short as possible.

How to Improve Surface Finish (when surface roughness below 3 μ m Rz is required)

1. Increase the cutting speed ($V_c=220$ m/min.MAX)
2. Program dwell-motion at the groove bottom.
3. Apply a light hone to the cutting edge by hand lapper.

Chip Control of Grooving Insert with Molded Chipbreaker.

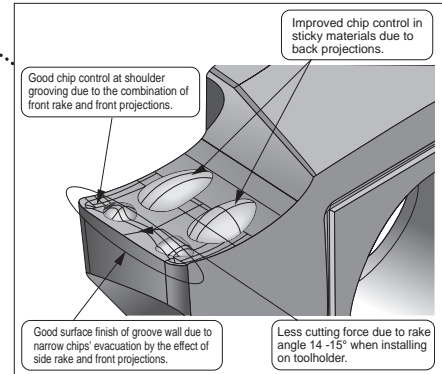
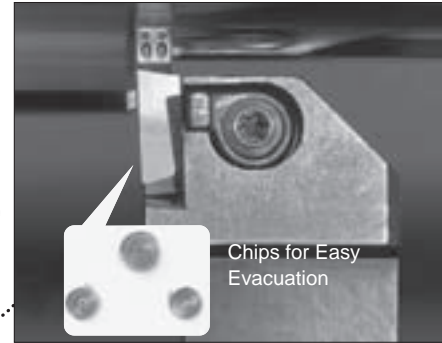


GBA-MY

3-Edge Molded Chipbreaker

Advantages of MY Chipbreaker

1. Molded chipbreaker curls chips spirally and evacuates chips easily.
2. High precision molded Insert with economical 3 cutting edges.
3. Can be used in automated production.



Alternative Toolholder Reference Table for Grooving Toolholder

Description	Conventional Toolholder				Alternative Toolholder			
	Overall length (mm)	Spare Parts			Description	Overall length (mm)	Remarks	Ref. Page
		Clamp Screw	Wrench	Wrench				
KTGF [®] / _L 1010K-16F	125	SB-4070TRW	FT-8	-	KTGF [®] / _L 1010JX-16F	120		G16
1212M-16F	150				1212JX-16F	120		
1616M-16F	150				1616JX-16F	120		
KGM [®] / _L 0810K-1.5-125	125	SE-40120TR	-	LTW-15S	-	-	No replacement	G36
1010K-1.5-125	125				KGM [®] / _L 1010JX-1.5	120		
1212M-1.5-150	150				1212JX-1.5	120		
KGM [®] / _L 0810K-2-125	125	SE-40120TR	-	LTW-15S	-	-	No replacement	G36
1010K-2-125	125				KGM [®] / _L 1010JX-2	120		
1212M-2-150	150				1212JX-2	120		
KGM [®] / _L 1010K-2.5-125	125	SE-50125TR	-	LTW-20	1616JX-2	120		G36
1212M-2.5-150	150				KGM [®] / _L 1010JX-2.5	120		
1616M-2.5-150	150				1212JX-2.5	120		
KGM [®] / _L 1010K-2.5-125	125	SE-40120TR	-	LTW-15S	1616JX-2.5	120		G36
1212M-2.5-150	150				KGM [®] / _L 1010JX-2.5	120		
1616M-2.5-150	150				1212JX-2.5	120		
KGM [®] / _L 1616M-3-150	150	SE-50125TR	-	LTW-20	KGM [®] / _L 1616JX-3	120		

Note) The corresponding replacements may be different from the conventional parts in insert clamping system or insert size. Make sure their specifications referring to the catalog or other documents.