

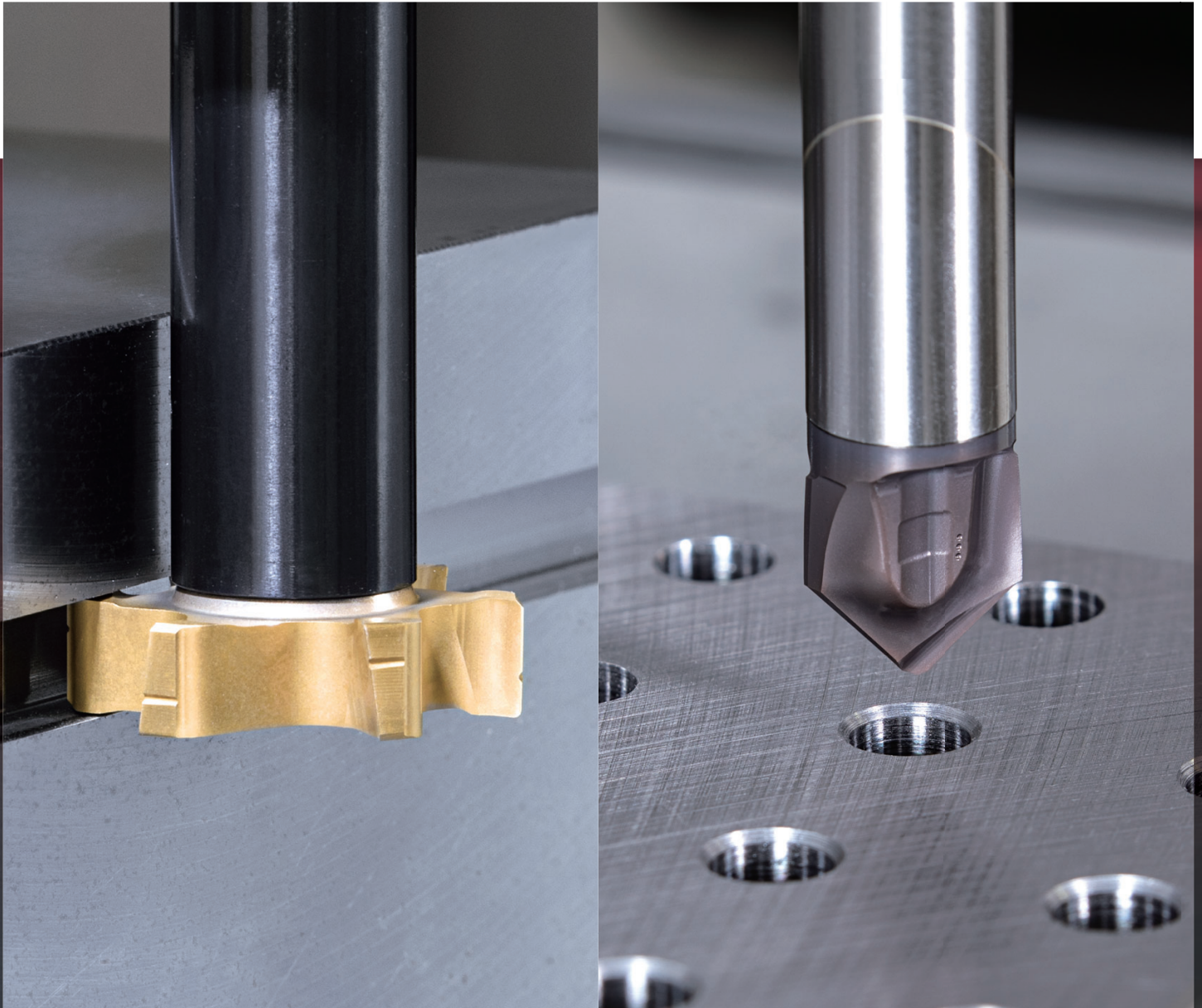


Exchangeable head endmill

TUNGMEISTER

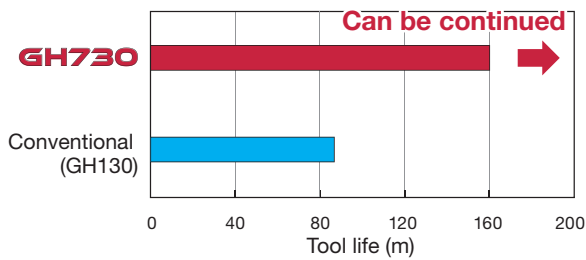
Tungaloy Report No. 381S5-G

Introduction of **GH730** grade for slot milling heads and
Expansion of **chamfering and rough shoulder milling**
head lines



Latest PVD coating technology which provides significant increase of tool life

GH730 P M K S H

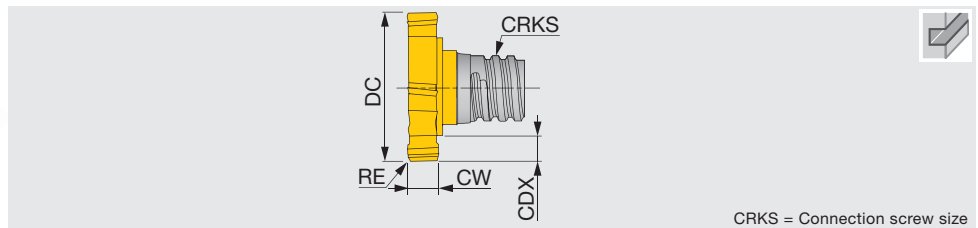


Shank : VSTD12L090S08-S
 Head : VST217W2.00R020-4S08
 Workpiece material : SCM440 /42CrMo4 (300HB)
 Cutting speed : $V_c = 90$ m/min
 Feed per tooth : $f_z = 0.08$ mm/t
 Depth of cut : $a_p = 1.8$ mm
 Width of cut : $a_e = 2$ mm
 Machine : Vertical M/C, BT40

-Good balance between wear and chipping resistance
-First choice for slotting of various materials

VTB-06...**

6 flute, for T-slotting



CRKS = Connection screw size

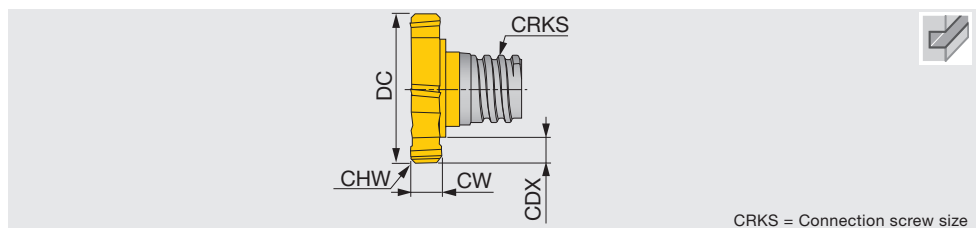
Designation	GH730	AH735	GH130	NOF	FHA	DC -0.005	CW±0.02	CDX	CRKS	RE	Wrench	Torque*
VTB135W3.00R04-06S05	●		▲	6	0°	13.5	3	2.65	S05	0.4	KEYV-T20	7
VTB135W4.00R04-06S05	●		▲	6	0°	13.5	4	2.65	S05	0.4	KEYV-T20	7
VTB160W2.00R04-06S06	●		▲	6	0°	16	2	2.9	S06	0.4	KEYV-T20	10
VTB160W3.00R04-06S06	●		▲	6	0°	16	3	2.9	S06	0.4	KEYV-T25	10
VTB160W4.00R04-06S06	●		▲	6	0°	16	4	2.9	S06	0.4	KEYV-T25	10
VTB165W2.00R04-06S06	●		▲	6	0°	16.5	2	3.15	S06	0.4	KEYV-T20	10
VTB165W3.00R04-06S06	●		▲	6	0°	16.5	3	3.15	S06	0.4	KEYV-T25	10
VTB165W4.00R04-06S06	●		▲	6	0°	16.5	4	3.15	S06	0.4	KEYV-T25	10
VTB195W4.00R04-06S08	●		▲	6	0°	19.5	4	3.45	S08	0.4	KEYV-T30L	15
VTB195W5.00R04-06S08	●		▲	6	0°	19.5	5	3.45	S08	0.4	KEYV-T30L	15
VTB195W6.00R04-06S08	●		▲	6	0°	19.5	6	3.45	S08	0.4	KEYV-T30L	15
VTB225W5.00R04-06S08	●		▲	6	0°	22.5	5	4.95	S08	0.4	KEYV-T40L	15
VTB225W6.00R04-06S08	●		▲	6	0°	22.5	6	4.95	S08	0.4	KEYV-T40L	15
VTB225W8.00R04-06S08	●		▲	6	0°	22.5	8	4.95	S08	0.4	KEYV-T40L	15
VTB250W6.00R04-06S08	●		▲	6	0°	25	6	5.9	S08	0.4	KEYV-T50L	15
VTB250W8.00R04-06S08	●		▲	6	0°	25	8	5.9	S08	0.4	KEYV-T50L	15
VTB250W5.00R04-06S10	●		▲	6	0°	25	5	4.3	S10	0.4	KEYV-T50L	28
VTB250W6.00R04-06S10		▲	▲	6	0°	25	6	4.3	S10	0.4	KEYV-T50L	28
VTB250W8.00R04-06S10	●		▲	6	0°	25	8	4.3	S10	0.4	KEYV-T50L	28

Torque*: Recommended clamping torque (N·m)
 2 pieces per package

● : New product
 ▲ : To be discontinued

VTBC15-06...**

6 flute, for T-slotting with 45° chamfer



CRKS = Connection screw size

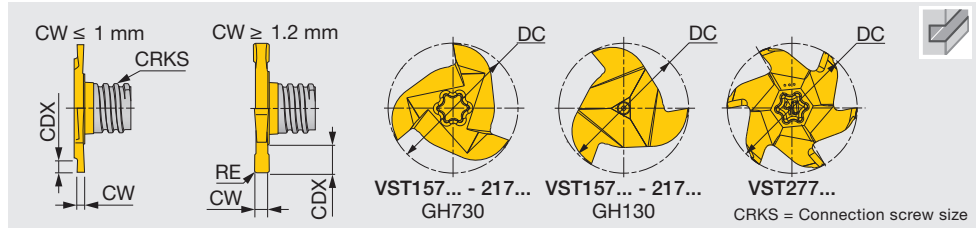
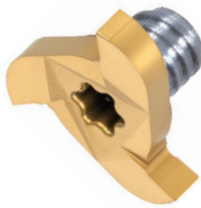
Designation	GH730	GH130	NOF	FHA	DC -0.005	CW±0.02	CDX	CRKS	CHW	Wrench	Torque*
VTB135W2.00C15-06S05	●	▲	6	0°	13.5	2	2.65	S05	0.15	KEYV-T20	7

Torque*: Recommended clamping torque (N·m)
 2 pieces per package

● : New product
 ▲ : To be discontinued

VST*-3/4/6...

3, 4, 6 flute, for slotting



Designation	GH730	AH735	GH130	NOF	FHA	DC	CW±0.02	RE	CRKS	CDX	Wrench	Torque*
VST157W1.50R010-3S06	●		▲	3	0°	15.7	1.5	0.1	S06	2.8	KEYV-177 ⁽²⁾ / KEYV-T20 ⁽³⁾	10
VST157W1.57R020-3S06	●		▲	3	0°	15.7	1.57	0.2	S06	2.8	KEYV-177 ⁽²⁾ / KEYV-T20 ⁽³⁾	10
VST157W2.00R020-3S06	●		▲	3	0°	15.7	2	0.2	S06	2.8	KEYV-177 ⁽²⁾ / KEYV-T20 ⁽³⁾	10
VST157W2.39R020-3S06	●		▲	3	0°	15.7	2.39	0.2	S06	2.8	KEYV-177 ⁽²⁾ / KEYV-T20 ⁽³⁾	10
VST157W2.50R020-3S06	●		▲	3	0°	15.7	2.5	0.2	S06	2.8	KEYV-177 ⁽²⁾ / KEYV-T20 ⁽³⁾	10
VST157W3.00R020-3S06	●		▲	3	0°	15.7	3	0.2	S06	2.8	KEYV-177 ⁽²⁾ / KEYV-T25 ⁽³⁾	10
VST157W3.17R020-3S06			▲	3	0°	15.7	3.17	0.2	S06	2.8	KEYV-177	10
VST177W1.20R005-3S06	●		▲	3	0°	17.7	1.2 ⁽¹⁾	0.05	S06	3.8	KEYV-177 ⁽²⁾ / KEYV-T20 ⁽³⁾	10
VST177W1.40R005-3S06	●		▲	3	0°	17.7	1.4 ⁽¹⁾	0.05	S06	3.8	KEYV-177 ⁽²⁾ / KEYV-T20 ⁽³⁾	10
VST177W1.50R010-3S06	●		▲	3	0°	17.7	1.5	0.1	S06	3.8	KEYV-177 ⁽²⁾ / KEYV-T20 ⁽³⁾	10
VST177W1.57R020-3S06	●		▲	3	0°	17.7	1.57	0.2	S06	3.8	KEYV-177 ⁽²⁾ / KEYV-T20 ⁽³⁾	10
VST177W1.70R005-3S06	●		▲	3	0°	17.7	1.7 ⁽¹⁾	0.05	S06	3.8	KEYV-177 ⁽²⁾ / KEYV-T20 ⁽³⁾	10
VST177W2.00R020-3S06	●		▲	3	0°	17.7	2	0.2	S06	3.8	KEYV-177 ⁽²⁾ / KEYV-T20 ⁽³⁾	10
VST177W2.20R110-3S06			▲	3	0°	17.7	2.20	1.1	S06	3.8	KEYV-177	10
VST177W2.39R020-3S06			▲	3	0°	17.7	2.39	0.2	S06	3.8	KEYV-177	10
VST177W2.50R020-3S06	●		▲	3	0°	17.7	2.5	0.2	S06	3.8	KEYV-177 ⁽²⁾ / KEYV-T20 ⁽³⁾	10
VST177W3.00R020-3S06	●	▲	▲	3	0°	17.7	3	0.2	S06	3.8	KEYV-177 ⁽²⁾ / KEYV-T25 ⁽³⁾	10
VST177W3.17R020-3S06			▲	3	0°	17.7	3.17	0.2	S06	3.8	KEYV-177	10
VST217W0.76R000-4S08	●		▲	4	0°	21.7	0.76 ⁽¹⁾	-	S08	1.5	KEYV-217 ⁽²⁾ / KEYV-T25 ⁽³⁾	15
VST217W0.86R000-4S08			▲	4	0°	21.7	0.86 ⁽¹⁾	-	S08	1.7	KEYV-217	15
VST217W0.96R000-4S08	●		▲	4	0°	21.7	0.96 ⁽¹⁾	-	S08	1.9	KEYV-217 ⁽²⁾ / KEYV-T25 ⁽³⁾	15
VST217W1.00R005-4S08	●		▲	4	0°	21.7	1	0.05	S08	2	KEYV-217 ⁽²⁾ / KEYV-T25 ⁽³⁾	15
VST217W1.20R005-4S08	●		▲	4	0°	21.7	1.2 ⁽¹⁾	0.05	S08	4.5	KEYV-217 ⁽²⁾ / KEYV-T25 ⁽³⁾	15
VST217W1.40R005-4S08	●		▲	4	0°	21.7	1.4 ⁽¹⁾	0.05	S08	4.5	KEYV-217 ⁽²⁾ / KEYV-T25 ⁽³⁾	15
VST217W1.57R000-4S08	●		▲	4	0°	21.7	1.57	-	S08	4.5	KEYV-217 ⁽²⁾ / KEYV-T25 ⁽³⁾	15
VST217W1.70R010-4S08	●		▲	4	0°	21.7	1.7 ⁽¹⁾	0.1	S08	4.5	KEYV-217 ⁽²⁾ / KEYV-T25 ⁽³⁾	15
VST217W1.95R020-4S08	●		▲	4	0°	21.7	1.95 ⁽¹⁾	0.2	S08	4.5	KEYV-217 ⁽²⁾ / KEYV-T25 ⁽³⁾	15
VST217W2.00R020-4S08	●		▲	4	0°	21.7	2	0.2	S08	4.5	KEYV-217 ⁽²⁾ / KEYV-T25 ⁽³⁾	15
VST217W2.25R020-4S08	●		▲	4	0°	21.7	2.25 ⁽¹⁾	0.2	S08	4.5	KEYV-217 ⁽²⁾ / KEYV-T25 ⁽³⁾	15
VST217W2.39R020-4S08	●		▲	4	0°	21.7	2.39	0.2	S08	4.5	KEYV-217 ⁽²⁾ / KEYV-T25 ⁽³⁾	15
VST217W2.50R020-4S08	●	▲	▲	4	0°	21.7	2.5	0.2	S08	4.5	KEYV-217 ⁽²⁾ / KEYV-T25 ⁽³⁾	15
VST217W2.75R020-4S08	●		▲	4	0°	21.7	2.75 ⁽¹⁾	0.2	S08	4.5	KEYV-217 ⁽²⁾ / KEYV-T25 ⁽³⁾	15
VST217W3.00R020-4S08	●	▲	▲	4	0°	21.7	3	0.2	S08	4.5	KEYV-217 ⁽²⁾ / KEYV-T30L ⁽³⁾	15
VST217W3.17R020-4S08	●		▲	4	0°	21.7	3.17	0.2	S08	4.5	KEYV-217 ⁽²⁾ / KEYV-T30L ⁽³⁾	15
VST217W3.25R020-4S08	●		▲	4	0°	21.7	3.25 ⁽¹⁾	0.2	S08	4.5	KEYV-217 ⁽²⁾ / KEYV-T30L ⁽³⁾	15
VST217W4.00R020-4S08	●		▲	4	0°	21.7	4	0.2	S08	4.5	KEYV-217 ⁽²⁾ / KEYV-T30L ⁽³⁾	15
VST217W4.25R020-4S08	●		▲	4	0°	21.7	4.25 ⁽¹⁾	0.2	S08	4.5	KEYV-217 ⁽²⁾ / KEYV-T30L ⁽³⁾	15
VST217W4.75R020-4S08	●		▲	4	0°	21.7	4.75	0.2	S08	4.5	KEYV-217 ⁽²⁾ / KEYV-T30L ⁽³⁾	15
VST217W5.25R020-4S08	●		▲	4	0°	21.7	5.25 ⁽¹⁾	0.2	S08	4.5	KEYV-217 ⁽²⁾ / KEYV-T30L ⁽³⁾	15
VST277W2.50R020-6S10	●		▲	6	0°	27.7	2.5	0.2	S10	6	KEYV-T40L	28
VST277W5.25R020-6S10	●		▲	6	0°	27.7	5.25 ⁽¹⁾	0.2	S10	6	KEYV-T40L	28
VST277W10.0R020-6S10	●		▲	6	0°	27.7	10	0.2	S10	6	KEYV-T40L	28

(1) CW is based on DIN471 / 472

(2) Applicable for GH130, AH735

(3) Applicable for GH730

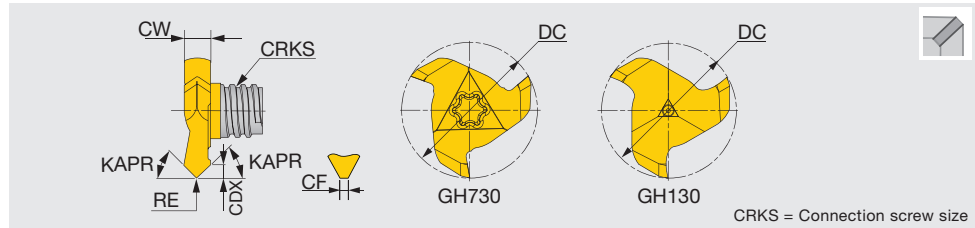
Torque*: Recommended clamping torque (N·m)

2 pieces per package

● : New product
▲ : To be discontinued

VST**A45...

3, 4 flute, for slotting with 45° chamfer



Designation	GH730	GH130	NOF	FHA	DC	CW	KAPR	CRKS	CDX	CF	RE	Wrench	Torque*
VST177L01.40A45-3S06	●	▲	3	0°	17.7	3.4	45°	S06	1.4	-	0.1	KEYV-177 ⁽¹⁾ / KEYV-T25 ⁽²⁾	10
VST217L01.70A45-4S08	●	▲	4	0°	21.7	5.5	45°	S08	1.7	1.5	-	KEYV-217 ⁽¹⁾ / KEYV-T30L ⁽²⁾	15

(1) Applicable for GH130

(2) Applicable for GH730

Torque*: Recommended clamping torque (N·m)

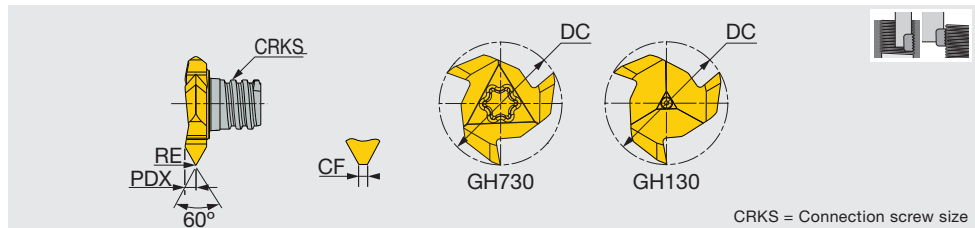
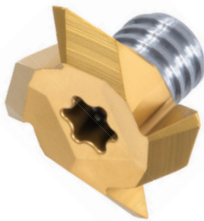
2 pieces per package

● : New product
▲ : To be discontinued

60° partial profile

VTR***IS...

3, 4 flute, partial profile, for internal/external thread



Designation	GH730	GH130	TP		Smallest Possible thread	DC	NOF	RE	CF	PDX	CRKS	Wrench	Torque*
			TPN	TPX									
VTR160L12IS05-3S06	●	▲	0.5	2	M20	15.7	3	-	0.05	1.4	S06	KEYV-177 ⁽¹⁾ / KEYV-T25 ⁽²⁾	10
VTR160L12IS15-3S06	●	▲	1.5	2	M22	15.7	3	0.05	-	1.4	S06	KEYV-177 ⁽¹⁾ / KEYV-T25 ⁽²⁾	10
VTR220L28IS30-4S08	●	▲	3	4.5	M36	21.7	4	0.2	-	2.8	S08	KEYV-217 ⁽¹⁾ / KEYV-T30L ⁽²⁾	15

(1) Applicable for GH130

(2) Applicable for GH730

Torque*: Recommended clamping torque (N·m)

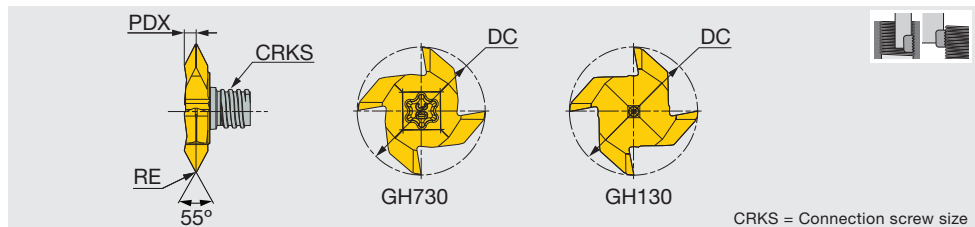
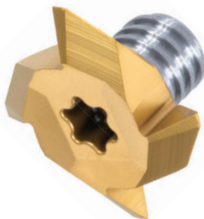
2 pieces per package

● : New product
▲ : To be discontinued

55° partial profile

VTR***W...

4 flute, partial profile, for internal/external thread



Designation	GH730	GH130	TPI		Smallest Possible thread	DC	NOF	RE	PDX	CRKS	Wrench	Torque*
			TPIN	TPIX								
VTR220L24W14-4S08	●	▲	14	11	3/4	21.7	4	0.2	2.4	S08	KEYV-217 ⁽¹⁾ / KEYV-T30L ⁽²⁾	15

(1) Applicable for GH130

(2) Applicable for GH730

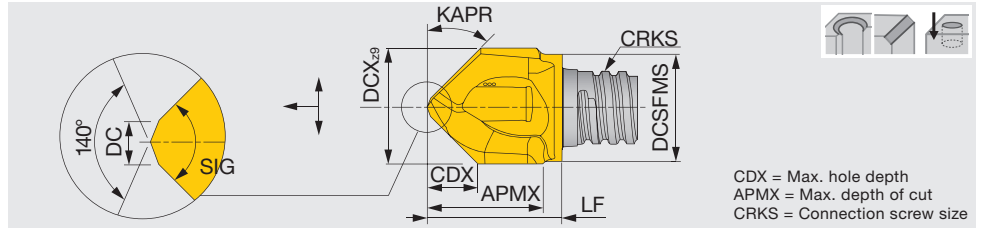
Torque*: Recommended clamping torque (N·m)

2 pieces per package

● : New product
▲ : To be discontinued

VCP**-02...

2 flute, chamfering angle: 30°, 45°, 60°



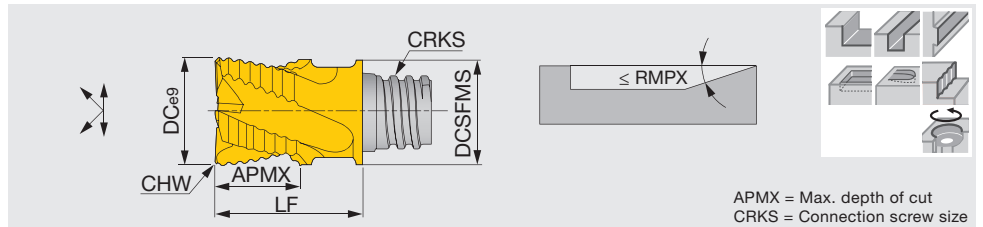
Designation	AH715	AH725	SIG	NOF	FHA	DCX	DCSFMS	APMX	CDX	CRKS	LF	DC	KAPR	Wrench	Torque*
VCP100L09.5A30-02S06		●	60°	2	0°	10	9.5	8.5	7.5	S06	11.75	1.5	60°	KEYV-S06	10
VCP120L12.0A30-02S08	●	●	60°	2	0°	12	11.5	11	9.2	S08	15.4	1.5	60°	KEYV-S08	15
VCP160L15.0A30-02S10	●	●	60°	2	0°	16	15.2	16	12	S10	20.2	2.5	60°	KEYV-S10	28
VCP080L07.7A45-02S05	●	●	90°	2	0°	8	7.6	7.5	3.7	S05	9.75	1	45°	KEYV-S05	7
VCP083L07.9A45-02S05		●	90°	2	0°	8.3	7.6	7.5	3.8	S05	10	1	45°	KEYV-S05	7
VCP100L09.0A45-02S06	●	●	90°	2	0°	10	9.5	9.5	4.4	S06	11.75	1.5	45°	KEYV-S06	10
VCP104L09.0A45-02S06		●	90°	2	0°	10.4	9.5	9.5	4.6	S06	11.75	1.5	45°	KEYV-S06	10
VCP120L12.0A45-02S08	●	●	90°	2	0°	12	11.5	11.5	5.4	S08	15.4	1.5	45°	KEYV-S08	15
VCP124L12.0A45-02S08		●	90°	2	0°	12.4	11.5	11.5	5.6	S08	15.4	1.5	45°	KEYV-S08	15
VCP160L15.0A45-02S10	●	●	90°	2	0°	16	15.2	15	7.1	S10	18.8	1.5	45°	KEYV-S10	28
VCP165L15.0A45-02S10		●	90°	2	0°	16.5	15.2	15	7.1	S10	18.8	1.5	45°	KEYV-S10	28
VCP100L09.5A60-02S06		●	120°	2	0°	10	9.5	9.5	2.7	S06	12.7	1.5	30°	KEYV-S06	10
VCP120L12.0A60-02S08	●	●	120°	2	0°	12	11.5	11.5	3.3	S08	15.2	1.5	30°	KEYV-S08	15
VCP160L15.5A60-02S10	●	●	120°	2	0°	16	15.2	16	4.4	S10	19.9	1.5	30°	KEYV-S10	28

Torque*: Recommended clamping torque (N·m)
2 pieces per package

● : New product
● : Line up

VEE**R...

4, 5, 6 flute, roughing, serrated cutting edge



Designation	AH715	AH725	NOF	FHA	DC	DCSFMS	APMX	CHW	CRKS	LF	RMPX	Wrench	Torque*
VEE080L05.0C25R04S05	●	●	4	45°	8	7.7	5	0.25	S05	10	5°	KEYV-S05	7
VEE100L07.0C30R04S06	●	●	4	45°	10	9.7	7	0.3	S06	13	5°	KEYV-S06	10
VEE120L09.0C35R04S08	●	●	4	45°	12	11.7	9	0.35	S08	16.5	5°	KEYV-S08	15
VEE160L12.0C40R05S10	●	●	5	45°	16	15.3	12	0.4	S10	20.5	5°	KEYV-S10	28
VEE200L15.0C40R06S12		●	6	45°	20	18.3	15	0.4	S12	25.5	3°	KEYV-S12	28
VEE250L22.0C50R06S15		●	6	45°	25	23.9	22	0.5	S15	37	3°	KEYV-W20	40

Torque*: Recommended clamping torque (N·m)
VEE080 - VEE200: 2 pieces per package
VEE250: 1 piece per package

● : New product
● : Line up

STANDARD CUTTING CONDITIONS

VTR

Threading

ISO	Material		Condition	Tensile strength [N/mm²]	Hardness	Cutting speed Vc (m/min)	Tool dia.: DC (mm)		
							Feed per tooth: fz (mm/t)		
							ø15.7	ø21.7	
P	Non-alloy steel and cast steel, free cutting steel	< 0.25 %C	Annealed	420	125 HB	100 - 250	0.12	0.15	
		≥ 0.25 %C	Annealed	650	190 HB	80 - 210	0.12	0.15	
		< 0.55 %C	Quenched and tempered	850	250 HB	65 - 170			
		≥ 0.55 %C	Annealed	750	220 HB	110 - 180	0.1	0.12	
			Quenched and tempered	1000	300 HB	95 - 160	0.1	0.12	
	Low alloy steel and cast steel (less than 5% of alloying elements)		Annealed	600	200 HB	90 - 160	0.07	0.08	
		Quenched and tempered		930	275 HB	65 - 200	0.07	0.08	
				1000	300 HB	70 - 210	0.07	0.08	
				1200	350 HB	95 - 160	0.07	0.08	
	High alloyed steel, cast steel, and tool steel		Annealed	680	200 HB	130 - 170	0.07	0.08	
			Quenched and tempered	1100	325 HB	75 - 100	0.07	0.08	
Stainless steel and cast steel		Ferritic/martensitic	680	200 HB	110 - 170	0.07	0.08		
		Martensitic	820	240 HB	70 - 155	0.07	0.08		
M	Stainless steel		Annealed	600	180 HB	85 - 100	0.07	0.08	
K	Cast iron nodular (GGG)	Ferritic/martensitic			180 HB	120 - 160	0.12	0.15	
		Pearlitic			260 HB	75 - 160	0.12	0.15	
	Grey cast iron (GG)	Ferritic			160 HB	70 - 150	0.12	0.15	
		Pearlitic			250 HB	110 - 140	0.12	0.15	
	Malleable cast iron	Ferritic			130 HB	120 - 160	0.12	0.15	
		Pearlitic			230 HB	110 - 140	0.21	0.15	
N	Aluminium-wrought alloy	Not cureable			60 HB	160 - 300	0.12	0.15	
		Cured			100 HB				
	Aluminium-cast, alloyed	≤12% Si	Not cureable			75 HB	150 - 350	0.12	0.15
			Cured			90 HB			
	>12% Si	High temperature			130 HB	100 - 250	0.07	0.08	
		Free cutting			110 HB				
	Copper alloys	>1% Pb	Brass			90 HB			
			Electrolytic copper			100 HB			
	Non-metallic	Duroplastics, fiber plastics				100 - 400	0.15	0.18	
		Hard rubber							
S	High temp. alloys	Fe based	Annealed			200 HB			
			Cured			280 HB			
		Ni or Co based	Annealed			250 HB	20 - 80	0.04	0.04
			Cured			350 HB			
			Cast			320 HB			
	Titanium Ti alloys	RM 400							
		Alpha+beta alloys cured	RM 1050		20 - 80	0.04	0.04		
H	Hardened steel	Hardened			55 HRC	55 - 65			
		Hardened			60 HRC	45 - 55			
	Chilled cast iron	Cast			400 HB	90 - 105			
	Cast iron	Hardened			55 HRC	55 - 65			

VST, VTB

Slotting

ISO	Workpiece material	Hardness	VST		VTB	
			Cutting speed Vc (m/min)	Feed per tooth fz (mm/t)	Cutting speed Vc (m/min)	Feed per tooth fz (mm/t)
P	Carbon steel S45C, S55C, etc. C45, C55, etc.	- 300 HB	80 - 180	0.05 - 0.15	80 - 180	0.08 - 0.18
	Alloy steel SCM440, SCr420, etc. 42CrMo4, 20Cr4, etc.	- 300 HB	60 - 120	0.04 - 0.12	60 - 120	0.05 - 0.15
M	Stainless steel SUS304, SUS316, etc. X5CrNi18-9, X5CrNiMo17-12-2, etc.	- 200 HB	50 - 120	0.04 - 0.12	50 - 120	0.05 - 0.15
K	Grey cast iron FC250, FC300, etc. 250, 300, etc., GG250, GG300, etc.	150 - 250 HB	100 - 200	0.05 - 0.15	100 - 200	0.08 - 0.18
	Ductile cast iron FCD450, etc. 450-10S, etc., GGG450, etc.	150 - 250 HB	100 - 200	0.04 - 0.12	100 - 200	0.05 - 0.15
N	Aluminium alloys Si < 13%	-	200 - 600	0.05 - 0.15	200 - 600	0.08 - 0.18
	Aluminium alloys Si ≥ 13%	-	100 - 300	0.03 - 0.13	100 - 300	0.05 - 0.15
S	Titanium alloys Ti-6Al-4V, etc.	-	40 - 60	0.04 - 0.12	40 - 60	0.05 - 0.15
	Heat-resistant alloys Inconel 718, etc.	-	15 - 35	0.02 - 0.1	15 - 35	0.02 - 0.1

VCP

Spot drill

ISO	Workpiece material	Hardness	Cutting speed Vc (m/min)	Feed f (mm/rev)
P	Carbon steel S45C, S55C, etc. C45, C55, etc.	- 300 HB	60 - 100	0.06 - 0.12
	Alloy steel SCM440, SCr420, etc. 42CrMo4, 20Cr4, etc.	- 300 HB	50 - 80	0.06 - 0.12
	Prehardened steel PX5, NAK80, etc.	30 - 40 HRC	40 - 70	0.06 - 0.12
M	Stainless steel SUS304, SUS316, etc. X5CrNi18-9, X5CrNiMo17-12-2, etc.	- 200 HB	30 - 50	0.06 - 0.12
K	Grey cast iron FC250, FC300, etc. 250, 300, etc., GG250, GG300, etc.	150 - 250 HB	80 - 120	0.06 - 0.12
	Ductile cast iron FCD450, etc. 450-10S, etc., GGG450, etc.	150 - 250 HB	80 - 120	0.06 - 0.12
N	Aluminium alloys	-	100 - 200	0.08 - 0.16
S	Titanium alloys Ti-6Al-4V, etc.	-	30 - 50	0.05 - 0.1
	Heat-resistant alloys Inconel 718, etc.	-	20 - 40	0.04 - 0.08
H	Hardened steel SKD6, SKT4, etc. 55NiCrMoV7, etc.	40 - 50 HRC	30 - 50	0.05 - 0.1
	Hardened steel SKD11, SKH51, etc. HS6-5-2, etc.	50 - 60 HRC	20 - 40	0.04 - 0.08

VEE-R

Shoulder milling

ISO	Workpiece material	Hardness	Cutting speed V_c (m/min)	Feed per tooth: f_z (mm/t)						Depth of cut a_p (mm)	Width of cut a_e (mm)
				Tool diameter: DC (mm)							
				8	10	12	16	20	25		
P	Carbon steel S45C, etc., C45, etc.	- 300 HB	80 - 180	0.05 - 0.09	0.07 - 0.12	0.08 - 0.13	0.09 - 0.15	0.1 - 0.17	0.1 - 0.17	0.6 x DC	0.25 x DC
	Alloy steel SCM440, etc., 42CrMo4, etc.	- 300 HB	60 - 140	0.05 - 0.09	0.07 - 0.12	0.08 - 0.13	0.09 - 0.15	0.1 - 0.17	0.1 - 0.17	0.6 x DC	0.25 x DC
	Prehardened steel PX5, NAK80, etc.	30 - 40 HRC	60 - 120	0.05 - 0.09	0.07 - 0.12	0.08 - 0.13	0.09 - 0.15	0.1 - 0.17	0.1 - 0.17	0.6 x DC	0.25 x DC
M	Stainless steel SUS304, etc., X5CrNi18-9, etc.	- 200 HB	40 - 100	0.05 - 0.09	0.07 - 0.12	0.08 - 0.13	0.09 - 0.15	0.1 - 0.17	0.1 - 0.17	0.6 x DC	0.25 x DC
K	Grey cast iron FC250, etc., 250, etc., GG250, etc.	150 - 250 HB	80 - 200	0.05 - 0.09	0.07 - 0.12	0.08 - 0.13	0.09 - 0.15	0.1 - 0.17	0.1 - 0.17	0.6 x DC	0.25 x DC
	Ductile cast iron FCD450, etc., 450-10S, etc., GGG450, etc.	150 - 250 HB	80 - 200	0.05 - 0.09	0.07 - 0.12	0.08 - 0.13	0.09 - 0.15	0.1 - 0.17	0.1 - 0.17	0.6 x DC	0.25 x DC
N	Aluminium alloys Si < 13%	-	200 - 700	0.05 - 0.09	0.07 - 0.12	0.08 - 0.13	0.09 - 0.15	0.1 - 0.17	0.1 - 0.17	0.6 x DC	0.25 x DC
	Aluminium alloys Si ≥ 13%	-	100 - 300	0.05 - 0.09	0.07 - 0.12	0.08 - 0.13	0.09 - 0.15	0.1 - 0.17	0.1 - 0.17	0.6 x DC	0.25 x DC
S	Titanium alloys Ti-6Al-4V, etc.	-	40 - 80	0.05 - 0.09	0.07 - 0.12	0.08 - 0.13	0.09 - 0.15	0.1 - 0.17	0.1 - 0.17	0.6 x DC	0.25 x DC
	Heat-resistant alloys Inconel 718, etc.	-	20 - 40	0.05 - 0.09	0.07 - 0.12	0.08 - 0.13	0.09 - 0.15	0.1 - 0.17	0.1 - 0.17	0.6 x DC	0.25 x DC
H	Hardened steel SKD6, etc., 55NiCrMoV7, etc.	40 - 50 HRC	40 - 80	0.05 - 0.09	0.07 - 0.12	0.08 - 0.13	0.09 - 0.15	0.1 - 0.17	0.1 - 0.17	0.6 x DC	0.25 x DC
	Hardened steel SKD11, etc., HS6-5-2, etc.	50 - 60 HRC	20 - 60	0.05 - 0.09	0.07 - 0.12	0.08 - 0.13	0.09 - 0.15	0.1 - 0.17	0.1 - 0.17	0.6 x DC	0.25 x DC

Slotting

ISO	Workpiece material	Hardness	Cutting speed V_c (m/min)	Feed per tooth: f_z (mm/t)						Depth of cut a_p (mm)
				Tool diameter: DC (mm)						
				8	10	12	16	20	25	
P	Carbon steel S45C, etc., C45, etc.	- 300 HB	50 - 70	0.03 - 0.04	0.04 - 0.05	0.05 - 0.06	0.06 - 0.08	0.07 - 0.1	0.07 - 0.1	0.5 x DC
	Alloy steel SCM440, etc., 42CrMo4, etc.	- 300 HB	40 - 80	0.03 - 0.04	0.04 - 0.05	0.05 - 0.06	0.06 - 0.08	0.07 - 0.1	0.07 - 0.1	0.5 x DC
	Prehardened steel PX5, NAK80, etc.	30 - 40 HRC	40 - 70	0.03 - 0.04	0.04 - 0.05	0.05 - 0.06	0.06 - 0.08	0.07 - 0.1	0.07 - 0.1	0.5 x DC
M	Stainless steel SUS304, etc., X5CrNi18-9, etc.	- 200 HB	30 - 60	0.03 - 0.04	0.04 - 0.05	0.05 - 0.06	0.06 - 0.08	0.07 - 0.1	0.07 - 0.1	0.5 x DC
K	Grey cast iron FC250, etc., 250, etc., GG250, etc.	150 - 250 HB	50 - 120	0.03 - 0.04	0.04 - 0.05	0.05 - 0.06	0.06 - 0.08	0.07 - 0.1	0.07 - 0.1	0.5 x DC
	Ductile cast iron FCD450, etc., 450-10S, etc., GGG450, etc.	150 - 250 HB	50 - 120	0.03 - 0.04	0.04 - 0.05	0.05 - 0.06	0.06 - 0.08	0.07 - 0.1	0.07 - 0.1	0.5 x DC
N	Aluminium alloys Si < 13%	-	130 - 400	0.03 - 0.04	0.04 - 0.05	0.05 - 0.06	0.06 - 0.08	0.07 - 0.1	0.07 - 0.1	0.5 x DC
	Aluminium alloys Si ≥ 13%	-	70 - 200	0.03 - 0.04	0.04 - 0.05	0.05 - 0.06	0.06 - 0.08	0.07 - 0.1	0.07 - 0.1	0.5 x DC
S	Titanium alloys Ti-6Al-4V, etc.	- 40 HRC	20 - 40	0.03 - 0.04	0.04 - 0.05	0.05 - 0.06	0.06 - 0.08	0.07 - 0.1	0.07 - 0.1	0.5 x DC
	Heat-resistant alloys Inconel 718, etc.	- 40 HRC	10 - 20	0.03 - 0.04	0.04 - 0.05	0.05 - 0.06	0.06 - 0.08	0.07 - 0.1	0.07 - 0.1	0.5 x DC
H	Hardened steel SKD6, etc., 55NiCrMoV7, etc.	40 - 50 HRC	25 - 60	0.03 - 0.04	0.04 - 0.05	0.05 - 0.06	0.06 - 0.08	0.07 - 0.1	0.07 - 0.1	0.5 x DC
	Hardened steel SKD11, etc., HS6-5-2, etc.	50 - 60 HRC	10 - 30	0.03 - 0.04	0.04 - 0.05	0.05 - 0.06	0.06 - 0.08	0.07 - 0.1	0.07 - 0.1	0.5 x DC



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