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TOOL NEWS

2007.6 Update **B021A**

Multi-functional Indexable Insert Endmill

AQX

A cutting tool to operate from drilling to end milling.

A cutting tool to intensify your machining

One insert geometry realizes
■ Easy tool management.
(It is possible to use inserts twice by rotating.)

The 2-flute geometry of lower cutting edge serves to
■ Strengthen cutting edge and increase tool life.

Miracle Coated *VP15TF*

Miracle coating displays high weld resistance therefore it can be used for machining a wide range of workpiece materials such as plain steels, mild steels, low carbon steels and stainless steels.

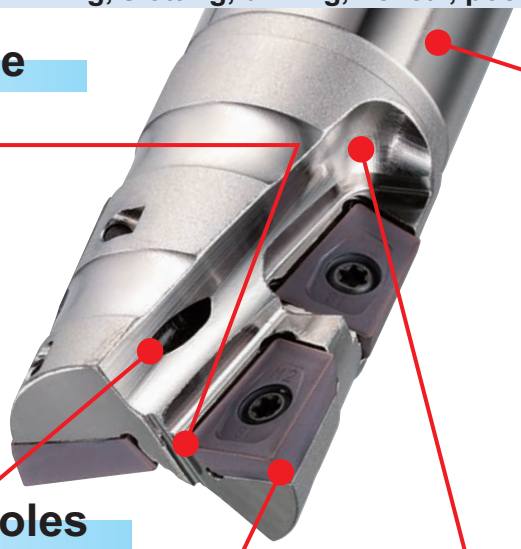
Multi-functional Indexable Insert Endmill

AQX

Features

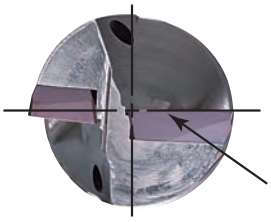
Sizes available ø.625", ø.672", ø.750", ø.797", ø1.000", ø1.047", ø1.250", ø1.297", ø1.500"

Application Shoulder milling, slotting, drilling, helical, pocketing, ramping, copying



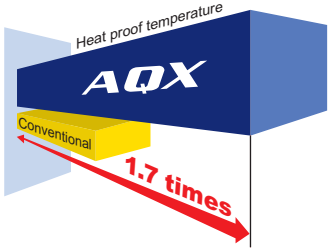
Center Cutting Edge

The ***AQX*** is designed with a center cutting edge, making it is possible to drill, helical mill and pocket without a prepared hole.



Heat Resistant Body

The body of the tool is made from a special alloy steel that has high heat resistant properties. A special surface treatment is used to increase wear and corrosion resistance.



Through Coolant Holes

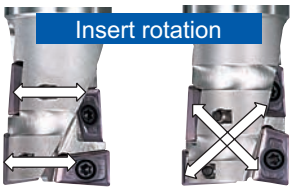
The body is designed with through coolant holes to improve cooling and chip disposal. The ***AQX*** is also available without coolant holes.

Improved pocket shape for better chip discharge

Improved pocket design maintains high body rigidity.

One Insert Type

Tool management is simplified by using only one type of insert for all 4 cutting edges. By rotating the inserts it's possible to use inserts twice.



2 Insert Bottom Cutting Edge

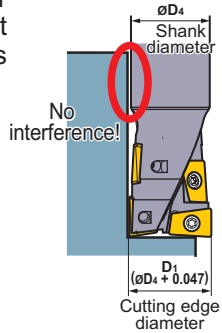
The lower cutting edge consists of 2 inserts, resulting in higher cutting edge strength and increased tool life.

Undercut type standardized

The cutting edge diameter has been designed so that it is 0.047inch larger than the shank diameter, making it possible to machine vertical faces without any interference.

Order number	D_1	D_4
AQXUR11○SA10L	0.672	0.625
AQXUR13○SA12L	0.797	0.750
AQXUR17○SA16L	1.047	1.000
AQXUR21○SA20L	1.297	1.250

For further details please refer to Page 3.



Wide Range of Inserts

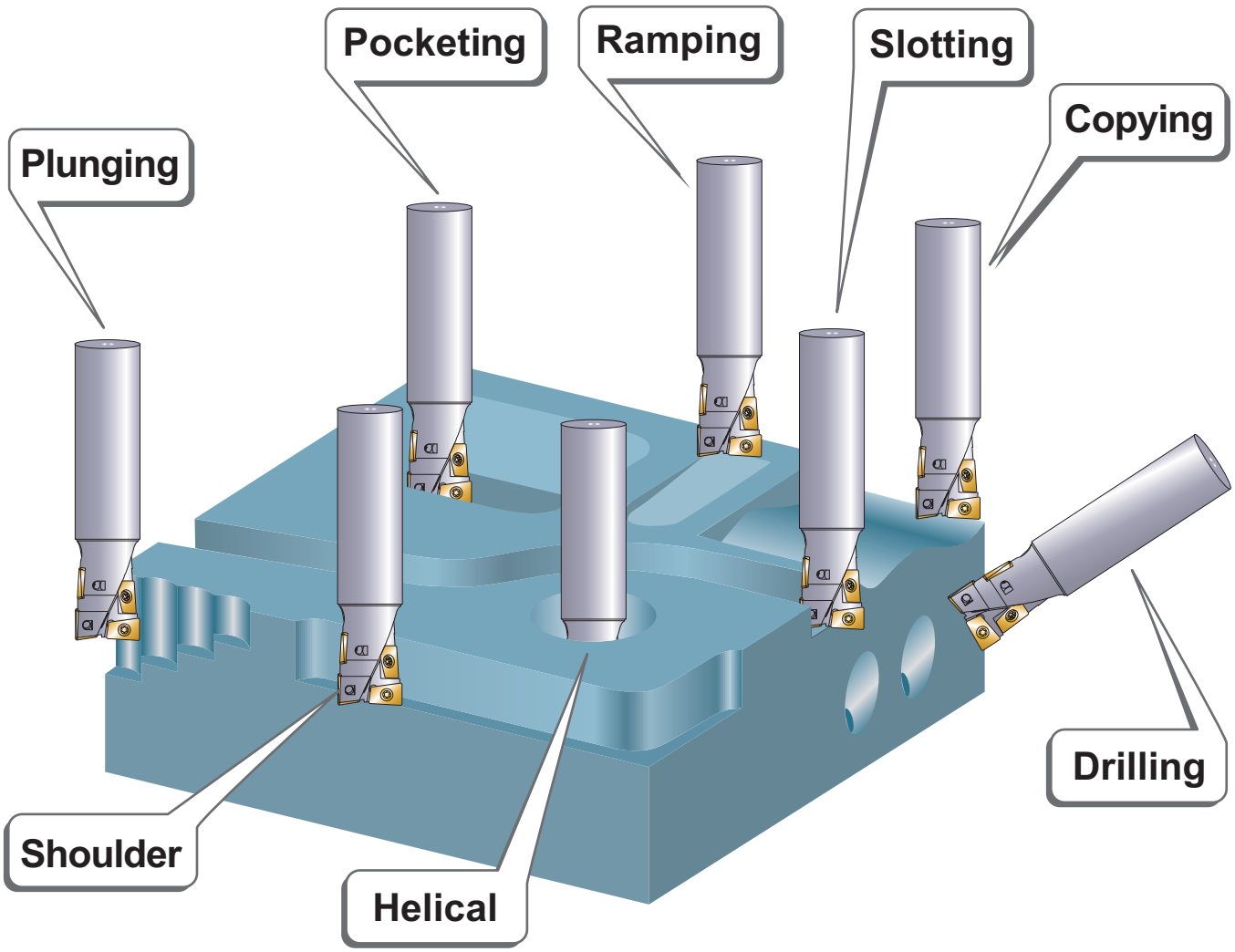
M2 breaker

- Economical molded inserts.
- Suitable for machining a wide range of workpiece materials under various cutting conditions.

G1 breaker

- High accuracy peripherally ground inserts.
- Large rake angle to provide high cutting edge sharpness.
- An HTi10 insert is available with a polished rake face to prevent welding problems when machining aluminium alloys.

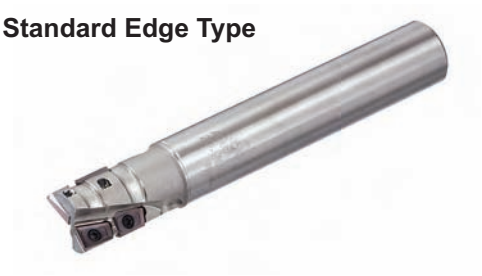
Effective Multi-functional Machining



Multi-functional Indexable Insert Endmill

AQX

Standard Edge Type



Light Alloy	Cast Iron	General Steel	Stainless Steel	Hardened Steel

Fig.1

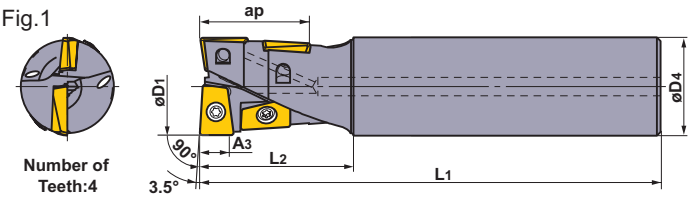


Fig.2

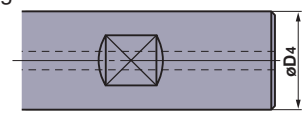
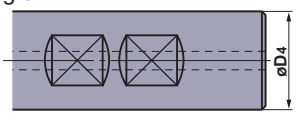


Fig.3

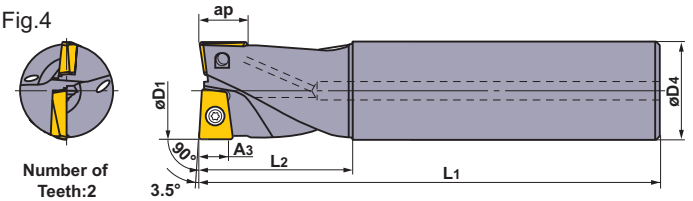


Right hand tool holder only.

Type	Order Number	Stock	Dimensions (inch)						Insert	Insert Screw	Wrench	Type (Fig.)
		R	D1	L1	D4	L2	A3 *1	ap *2				
Standard	AQXUR124WA12S	●	.750	4.125	.750	1.375	.219	.750	QOG/MT0934R-○○	TS25	①TKY08F	3
	164WA16S	●	1.000	4.875	1.000	1.625	.281	1.000	1443R-○○	TS32	②TKY08D	2
	204WA20S	●	1.250	5.250	1.250	2.000	.375	1.250	1651R-○○	TS407	②TKY15D	2
	244WA20S	●	1.500	5.625	1.250	2.375	.438	1.500	1959R-○○	TS5	②TKY25D	2
Long	AQXUR124SA12L	●	.750	7.250	.750	2.375	.219	.750	QOG/MT0934R-○○	TS25	①TKY08F	1
	134SA12L	●	.797	7.250	.750	1.375	.219	.750	0934R-○○	TS25	①TKY08F	1
	164SA16L	●	1.000	8.500	1.000	3.000	.281	1.000	1443R-○○	TS32	②TKY08D	1
	174SA16L	●	1.047	8.500	1.000	1.625	.281	1.000	1443R-○○	TS32	②TKY08D	1
	204SA20L	●	1.250	9.000	1.250	3.500	.375	1.250	1651R-○○	TS407	②TKY15D	1
	214SA20L	●	1.297	9.000	1.250	2.000	.375	1.250	1651R-○○	TS407	②TKY15D	1
	244SA20L	●	1.500	9.500	1.250	2.375	.438	1.500	1959R-○○	TS5	②TKY25D	1

Short Edge Type

Fig.4



Right hand tool holder only.

Type	Order Number	Stock	Dimensions (inch)						Insert	Insert Screw	Wrench	Type (Fig.)
		R	D1	L1	D4	L2	A3 *1	ap *2				
Standard	AQXUR102WA10S	●	.625	3.688	.625	1.125	.188	.281	QOG/MT0830R-○○	TS2A	①TKY06F	3
	122WA12S	●	.750	4.125	.750	1.375	.219	.344	0934R-○○	TS25	①TKY08F	3
	162WA16S	●	1.000	4.875	1.000	1.625	.281	.469	1443R-○○	TS32	②TKY08D	2
	202WA20S	●	1.250	5.250	1.250	2.000	.375	.563	1651R-○○	TS407	②TKY15D	2
	242WA20S	●	1.500	5.625	1.250	2.375	.438	.688	1959R-○○	TS55	②TKY25D	2
Long	AQXUR102SA10L	●	.625	6.875	.625	2.000	.188	.281	QOG/MT0830R-○○	TS2A	①TKY06F	4
	112SA10L	●	.672	6.875	.625	1.125	.188	.281	0830R-○○	TS2A	①TKY06F	4
	122SA12L	●	.750	7.250	.750	2.375	.219	.344	0934R-○○	TS25	①TKY08F	4
	132SA12L	●	.797	7.250	.750	1.375	.219	.344	0934R-○○	TS25	①TKY08F	4
	162SA16L	●	1.000	8.500	1.000	3.000	.281	.469	1443R-○○	TS32	②TKY08D	4
	172SA16L	●	1.047	8.500	1.000	1.625	.281	.469	1443R-○○	TS32	②TKY08D	4
	202SA20L	●	1.250	9.000	1.250	3.500	.375	.563	1651R-○○	TS407	②TKY15D	4
	212SA20L	●	1.297	9.000	1.250	2.000	.375	.563	1651R-○○	TS407	②TKY15D	4
	242SA20L	●	1.500	9.500	1.250	2.375	.438	.688	1959R-○○	TS55	②TKY25D	4

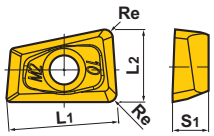
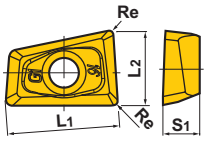
(Note 1) ✶1 A3 represents the depth of cut when the cutting edge consists of 2 edges. ✶2 ap: Maximum depth of cut.
(Note 2) When exceeding A3 depth of cut, reduce feed rates by 50%.
(Do not exceed ap depth of cut). Reference page 4.

● : Inventory maintained. ★ : Inventory maintained in Japan.

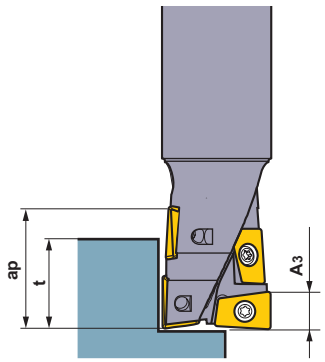
Inserts

Work Material		
P	Steel	● ✱
M	Stainless Steel	● ✱
K	Cast Iron	✱
N	Non-Ferrous Metal	●
S	Heat-resistant Alloy, Titanium Alloy	●
H	Hardened Materials	●

Cutting Conditions :
● : Stable Cutting ● : General Cutting ✱ : Unstable Cutting

Shape	Order Number	End Mill Dia.	Class	Coated VP15TF	Coated VP30RT	Carbide HTi10	L1	L2	S1	Re	Geometry
M breaker 	**QOMT0830R-M2**	ϕ.625, ϕ.672	M	●	●		.350	.220	.120	.031	
	0934R-M2	ϕ.750, ϕ.797	M	●	●		.401	.264	.134	.031	
	1443R-M2	ϕ1.000, ϕ1.047	M	●	●		.528	.350	.169	.031	
	1651R-M2	ϕ1.250, ϕ1.297	M	●	●		.650	.433	.200	.031	
	1959R-M2	ϕ1.500	M	●	●		.768	.512	.232	.031	
G breaker 	**QOGT0830R-G1**	ϕ.625, ϕ.672	G	★		●	.350	.220	.120	.016	
	0934R-G1	ϕ.750, ϕ.797	G			●	.401	.264	.134	.016	
	1443R-G1	ϕ1.000, ϕ1.047	G			●	.528	.350	.169	.016	
	1651R-G1	ϕ1.250, ϕ1.297	G	★		●	.650	.433	.200	.016	
	1959R-G1	ϕ1.500	G			●	.768	.512	.232	.016	

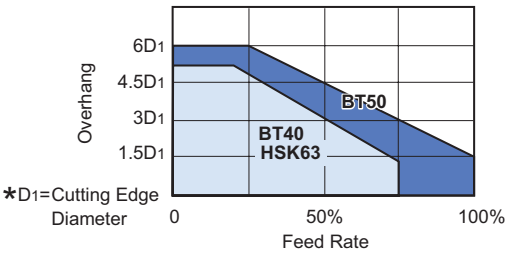
Recommended Cutting Conditions



★Figures for A3 and ap are shown in the table of holder standard.

- A3 is the depth of cut for the full dual blade portion at the end of the cutting edge.
- Beyond the range of A3 where overlapping occurs, there is an area where the cutting edge becomes single bladed, not forming full dual blade configuration. As such, please pay special attention to the relationship between depth of cut and feed.
- In general, the edge at the border of cut tends to suffer from damages. At large depth of cut operations, applying the following depth of cut (t), at which the edge is full dual bladed at the border of cut, is recommended to prevent damage to the cutting edge.

Tool diameter	Recommended depth of cut t (inch)
ϕ.625, ϕ.672	.472-.551
ϕ.750, ϕ.797	.551-.669
ϕ1.000, ϕ1.047	.669-.866
ϕ1.250, ϕ1.297	.866-1.102
ϕ1.500	1.102-1.378



★D1=Cutting Edge Diameter

- Chatter vibration and other problems tend to occur at operations where overhang length is large and/or machine rigidity is low, resulting in unstable machining.
- Please reduce feed accordingly, using the above chart as a guideline.

Cutting Conditions For Shoulder Milling

Work Material		Hardness	Grade	Cutting Speed (SFM)	ϕ.625", ϕ.672" Depth of Cut (inch)	Width of Cut (inch)	Feed (inch/rev)	ϕ.750", ϕ.797" Depth of Cut (inch)	Width of Cut (inch)	Feed (inch/rev)	ϕ1.000", ϕ1.047" Depth of Cut (inch)	Width of Cut (inch)	Feed (inch/rev)	ϕ1.250", ϕ1.297" Depth of Cut (inch)	Width of Cut (inch)	Feed (inch/rev)	ϕ1.500" Depth of Cut (inch)	Width of Cut (inch)	Feed (inch/rev)
P	Mild Steel	≤180HB	VP15TF	590 (490–720)	–.177	–.315	.010	–.236	–.394	.012	– .295	–.492	.014	– .374	–.630	.016	– .472	–.787	.020
					.177–.472	–.197	.006	.236–.551	–.276	.010	.295– .669	–.315	.011	.374– .866	–.433	.013	.472–1.102	–.512	.016
					.472–.669	–.118	.004	.551–.866	–.157	.007	.669–1.063	–.197	.008	.866–1.378	–.236	.010	1.102–1.732	–.276	.012
	Carbon Steel Alloy Steel	180–350HB	VP15TF	525 (395–655)	–.177	–.315	.008	–.236	–.394	.010	– .295	–.492	.012	– .374	–.630	.014	– .472	–.787	.016
					.177–.472	–.157	.006	.236–.551	–.236	.008	.295– .669	–.276	.010	.374– .866	–.394	.011	.472–1.102	–.472	.013
					.472–.669	–.079	.003	.551–.866	–.118	.006	.669–1.063	–.157	.007	.866–1.378	–.197	.008	1.102–1.732	–.236	.010
M	Stainless Steel	≤270HB	VP30RT	490 (395–590)	–.177	–.315	.008	–.236	–.394	.010	– .295	–.492	.012	– .374	–.630	.014	– .472	–.787	.016
					.177–.472	–.157	.006	.236–.551	–.236	.008	.295– .669	–.276	.010	.374– .866	–.394	.011	.472–1.102	–.472	.013
					.472–.669	–.079	.003	.551–.866	–.118	.006	.669–1.063	–.157	.007	.866–1.378	–.197	.008	1.102–1.732	–.236	.010
K	Cast Iron	Tensile Strength ≤450MPa	VP15TF	590 (490–720)	–.177	–.315	.010	–.236	–.394	.012	– .295	–.492	.014	– .374	–.630	.016	– .472	–.787	.020
					.177–.472	–.197	.006	.236–.551	–.276	.010	.295– .669	–.315	.011	.374– .866	–.433	.013	.472–1.102	–.512	.016
					.472–.669	–.118	.004	.551–.866	–.157	.007	.669–1.063	–.197	.008	.866–1.378	–.236	.010	1.102–1.732	–.276	.012
N	Aluminum Alloy	—	HTi10 (G1 Breaker)	1640 (655–2620)	–.177	–.433	.012	–.236	–.551	.014	– .295	–.689	.016	– .374	–.906	.018	– .472	–1.102	.022
					.177–.472	–.315	.008	.236–.551	–.394	.012	.295– .669	–.492	.013	.374– .866	–.630	.015	.472–1.102	–.787	.018
					.472–.669	–.197	.006	.551–.866	–.236	.009	.669–1.063	–.295	.010	.866–1.378	–.394	.012	1.102–1.732	–.472	.014
H	Hardened Steel	45–55HRC	VP15TF	260 (160–390)	–.177	–.197	.006	–.236	–.236	.008	– .295	–.276	.009	– .374	–.315	.010	– .472	–.394	.012
					.177–.472	–.118	.004	.236–.551	–.157	.006	.295– .669	–.157	.007	.374– .866	–.197	.008	.472–1.102	–.236	.009
					.472–.669	–.039	.002	.551–.866	–.079	.005	.669–1.063	–.079	.006	.866–1.378	–.079	.006	1.102–1.732	–.079	.007

(Note 1) Please pay special attention on the depth of cut when using the short edge type.
(Note 2) When using the G1 breaker (VP15TF) please reduce the feed rate by 20%.

Multi-functional Indexable Insert Endmill

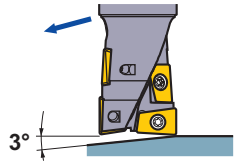
Cutting Conditions For Slotting

Work Material		Hardness	Grade	Cutting Speed (SFM)	ϕ.625", ϕ.672"		ϕ.750", ϕ.797"		ϕ1.000", ϕ1.047"		ϕ1.250", ϕ1.297"		ϕ1.500"	
					Depth of Cut (inch)	Feed (inch/rev)	Depth of Cut (inch)	Feed (inch/rev)	Depth of Cut (inch)	Feed (inch/rev)	Depth of Cut (inch)	Feed (inch/rev)	Depth of Cut (inch)	Feed (inch/rev)
P	Mild Steel	≤180HB	VP15TF	590 (490–720)	–.177	.006	–.236	.007	– .295	.008	– .374	.010	– .472	.012
					.177–.472	.004	.236–.551	.006	.295– .669	.006	.374– .866	.008	.472–1.102	.010
					.472–.669	.003	.551–.866	.004	.669–1.063	.005	.866–1.378	.006	1.102–1.732	.007
	Carbon Steel Alloy Steel	180–350HB	VP15TF	525 (395–655)	–.177	.006	–.236	.006	– .295	.007	– .374	.008	– .472	.010
					.177–.472	.004	.236–.551	.005	.295– .669	.006	.374– .866	.006	.472–1.102	.008
					.472–.669	.002	.551–.866	.004	.669–1.063	.004	.866–1.378	.005	1.102–1.732	.006
M	Stainless Steel	≤270HB	VP30RT	490 (395–590)	–.177	.006	–.236	.006	– .295	.007	– .374	.008	– .472	.010
					.177–.472	.004	.236–.551	.005	.295– .669	.006	.374– .866	.006	.472–1.102	.008
					.472–.669	.002	.551–.866	.004	.669–1.063	.004	.866–1.378	.005	1.102–1.732	.006
K	Cast Iron	Tensile Strength ≤450MPa	VP15TF	590 (490–720)	–.177	.006	–.236	.007	– .295	.008	– .374	.010	– .472	.012
					.177–.472	.004	.236–.551	.006	.295– .669	.006	.374– .866	.008	.472–1.102	.010
					.472–.669	.003	.551–.866	.004	.669–1.063	.005	.866–1.378	.006	1.102–1.732	.007
N	Aluminum Alloy	–	HTi10 (G1 Breaker)	1640 (655–2620)	–.177	.007	–.236	.008	– .295	.009	– .374	.011	– .472	.013
					.177–.472	.005	.236–.551	.006	.295– .669	.007	.374– .866	.009	.472–1.102	.011
					.472–.669	.004	.551–.866	.005	.669–1.063	.006	.866–1.378	.006	1.102–1.732	.008
H	Hardened Steel	45–55HRC	VP15TF	260 (160–390)	–.177	.004	–.236	.005	– .295	.006	– .374	.006	– .472	.007
					.177–.472	.003	.236–.551	.004	.295– .669	.005	.374– .866	.005	.472–1.102	.006

(Note 1) Please pay special attention on the depth of cut when using the short edge type.
(Note 2) When using the G1 breaker (VP15TF), please reduce the feed rate by 20%.

Recommended Cutting Conditions

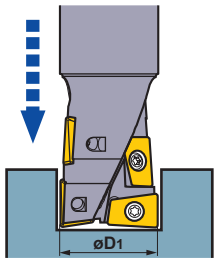
Cutting Conditions (For Ramping)



- When machining steel the recommended ramping angle is 3°. If a ramping angle larger than 3° is used, then the chips may not be broken effectively resulting in chips wrapping around the tool.
- When ramping, it is recommended to reduce the feed rate by 40%.

Cutting Conditions (For Drilling and Plunging)

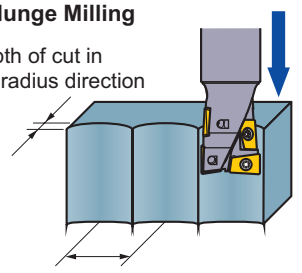
Drilling



- The recommended drilling depth is less than .5D1.
- Use step feed when drilling (.01–.02 inch) to ensure that the chips are effectively broken.
- Use internal or external cooling to ensure that the chips disposal is sufficiently achieved.
- The chips generated can discharge in any direction, so ensure that adequate safety precautions are taken.

Plunge Milling

Depth of cut in the radius direction



- The feed for plunging is the same as the feed for drilling.
- No step feed necessary.
- Please refer to the following table for the depth of cut at plunging operations.

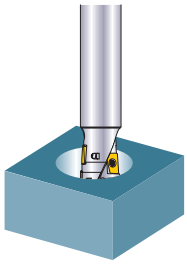
Depth of Cut in the Radius Direction	≤ .4D1
Peck Feed	≤ .5D1

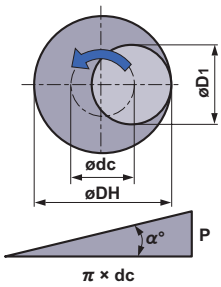
Work Material		Hardness	Grade	Cutting Speed (SFM)	ϕ.625", ϕ.672"		ϕ.750", ϕ.797"		ϕ1.000", ϕ1.047"		ϕ1.250", ϕ1.297"		ϕ1.500"	
					Feed (inch/rev)	Step (inch)	Feed (inch/rev)	Step (inch)	Feed (inch/rev)	Step (inch)	Feed (inch/rev)	Step (inch)	Feed (inch/rev)	Step (inch)
P	Mild Steel	≤180HB	VP15TF	590 (490–720)	.001–.003	.008	.002	.012	.002	.012	.002	.012	.002	.012
	Carbon Steel Alloy Steel	180–350HB	VP15TF	525 (395–655)	.001–.003	.008	.002	.012	.002	.012	.002	.012	.002	.012
M	Stainless Steel	≤270HB	VP30RT	490 (395–590)	.001–.003	.006	.002	.010	.002	.010	.002	.010	.002	.010
K	Cast Iron	Tensile Strength ≤450MPa	VP15TF	590 (490–720)	.002–.004	.016	.002	.020	.002	.020	.003	.020	.003	.020
N	Aluminum Alloy	–	HTi10 (G1 Breaker)	1640 (655–2620)	.002–.004	.008	.002	.012	.002	.012	.003	.012	.003	.012
H	Hardened Steel	45–55HRC	VP15TF	260 (160–390)	.001–.003	.006	.001	.010	.001	.010	.002	.010	.002	.010

(Note 1) Helical grooving is strongly recommended for machining of tempered steel.
(Note 2) When using the G1 breaker (VP15TF), please reduce the feed rate by 20%.

Recommended Cutting Conditions

Cutting Conditions (Helical Cutting)





● How to calculate the theoretical center of the cutter path.

$$\text{Ø dc} = \text{Ø DH} - \text{Ø D1}$$

Theoretical center of the tool — Desired hole diameter — Cutting edge diameter

● Depth of cut for a pass.

$$P = \pi \times dc \times \tan \alpha°$$

*α° ≤ 3°

- Min. machined hole diameter at helical cutting : $1.2D_1$
  Max. machined hole diameter at helical cutting : $1.8D_1$
- For chip discharge, please always apply air blow.
  (When aluminum cutting, please use coolant.)
- When helical cutting, it is recommended to reduce the feed rate by 40%.
- When using the G1 breaker (VP15TF), please reduce feed rate by 20%.

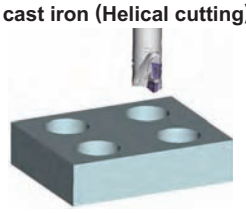
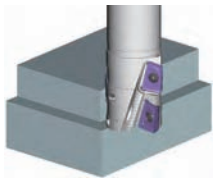
Work Material		Hardness	Grade	Cutting Speed (SFM)	ϕ.625", ϕ.672"				ϕ.750", ϕ.797"				ϕ1.000", ϕ1.047"			
					Machining Diameter (inch)	Max. Depth of Cut (inch)	Feed (inch/rev)	DOC/pass (inch/pass)	Machining Diameter (inch)	Max. Depth of Cut (inch)	Feed (inch/rev)	DOC/pass (inch/pass)	Machining Diameter (inch)	Max. Depth of Cut (inch)	Feed (inch/rev)	DOC/pass (inch/pass)
P	Mild Steel	≤180HB	VP15TF	590 (490–720)	.787	.315	.006	.017	.945	.394	.007	.017	1.181	.492	.008	.022
					.984	.472	.006	.039	1.181	.591	.006	.043	1.496	.748	.007	.056
					1.142	.630	.005	.056	1.417	.787	.006	.069	1.772	.984	.006	.087
	Carbon Steel Alloy Steel	180–350HB	VP15TF	525 (395–655)	.787	.315	.006	.013	.945	.394	.006	.013	1.181	.492	.007	.016
					.984	.472	.005	.029	1.181	.591	.006	.032	1.496	.748	.006	.042
					1.142	.630	.004	.042	1.417	.787	.005	.052	1.772	.984	.006	.065
M	Stainless Steel	≤270HB	VP30RT	490 (395–590)	.787	.118	.006	.009	.945	.157	.006	.009	1.181	.197	.007	.011
					.984	.197	.005	.019	1.181	.276	.006	.022	1.496	.354	.006	.028
					1.142	.315	.004	.028	1.417	.394	.005	.035	1.772	.492	.006	.043
K	Cast Iron	Tensile Strength ≤450MPa	VP15TF	590 (490–720)	.787	.394	.006	.022	.945	.551	.007	.022	1.181	.709	.008	.027
					.984	.512	.006	.048	1.181	.669	.006	.054	1.496	.827	.007	.070
					1.142	.630	.005	.070	1.417	.787	.006	.086	1.772	.984	.006	.108
N	Aluminum Alloy	—	HTi10 (G1 Breaker)	1640 (655–2620)	.787	.394	.007	.017	.945	.551	.008	.017	1.181	.709	.009	.022
					.984	.512	.006	.039	1.181	.669	.007	.043	1.496	.827	.008	.056
					1.142	.630	.006	.056	1.417	.787	.006	.069	1.772	.984	.007	.087
H	Hardened Steel	45–55HRC	VP15TF	260 (160–390)	.787	.118	.004	.009	.945	.157	.005	.009	1.181	.197	.006	.011
					.984	.197	.003	.019	1.181	.276	.004	.022	1.496	.354	.005	.028
					1.142	.315	.002	.028	1.417	.394	.003	.035	1.772	.492	.004	.043

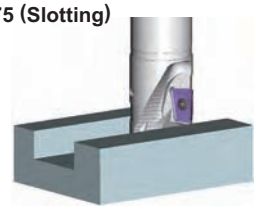
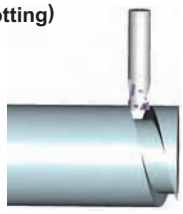
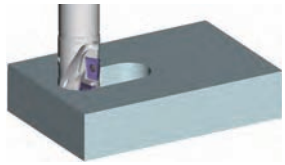
Work Material		Hardness	Grade	Cutting Speed (SFM)	ϕ1.250", ϕ1.297"				ϕ1.500"			
					Machining Diameter (inch)	Max. Depth of Cut (inch)	Feed (inch/rev)	DOC/pass (inch/pass)	Machining Diameter (inch)	Max. Depth of Cut (inch)	Feed (inch/rev)	DOC/pass (inch/pass)
P	Mild Steel	≤180HB	VP15TF	590 (490–720)	1.496	.630	.010	.026	1.890	.787	.012	.035
					1.890	.945	.009	.069	2.362	1.181	.010	.086
					2.283	1.260	.008	.112	2.835	1.575	.009	.138
	Carbon Steel Alloy Steel	180–350HB	VP15TF	525 (395–655)	1.496	.630	.008	.019	1.890	.787	.010	.026
					1.890	.945	.007	.052	2.362	1.181	.009	.065
					2.283	1.260	.006	.084	2.835	1.575	.008	.104
M	Stainless Steel	≤270HB	VP30RT	490 (395–590)	1.496	.236	.008	.013	1.890	.315	.010	.017
					1.890	.433	.007	.035	2.362	.551	.009	.043
					2.283	.630	.006	.056	2.835	.787	.008	.069
K	Cast Iron	Tensile Strength ≤450MPa	VP15TF	590 (490–720)	1.496	.866	.010	.032	1.890	1.102	.012	.043
					1.890	1.063	.009	.086	2.362	1.339	.010	.108
					2.283	1.260	.008	.141	2.835	1.575	.009	.173
N	Aluminum Alloy	—	HTi10 (G1 Breaker)	1640 (655–2620)	1.496	.866	.011	.026	1.890	1.102	.013	.035
					1.890	1.063	.009	.069	2.362	1.339	.011	.086
					2.283	1.260	.009	.112	2.835	1.575	.009	.138
H	Hardened Steel	45–55HRC	VP15TF	260 (160–390)	1.496	.236	.006	.013	1.890	.315	.007	.017
					1.890	.433	.006	.035	2.362	.551	.006	.043
					2.283	.630	.005	.056	2.835	.787	.006	.069

Multi-functional Indexable Insert Endmill

AQX

Application Examples

Tool (grade)		AQXUR164WAI6S(VP15TF)	AQXUR204WA20S(VP15TF)	AQXUR124WA12S(VP30RT)
Workpiece		1055 Steel (Drilling) 	Gray cast iron (Helical cutting) 	304 (Shoulder milling) 
Component		Machine part	Metal mold part	Machine part
Cutting conditions	Cutting speed (SFM)	524	600	490
	Feed (IPR)	.002	.008	.006
Result		· The task was too difficult to be performed by using a drill. As such, an end mill was employed. · AQX reduced the cutting time by 8 times and achieved 5 times longer tool life, greatly reducing costs.	· A competitor's conventional product suffered from chipping to a large degree due to the fact that it has a single, not dual, blade configuration at the end tip portion of the edge. As such, feed could not be increased. · AQX achieved twice as high feed as it has full dual blade configuration at the end of the edge, displaying reliable performance.	Higher fracture resistance than conventional products. Insert life extended 2 - 3 times.

Tool (grade)		AQXUR164WA16S(HTi10)	AQXUR124SA12L(VP30RT)	AQXUR244SA20L(VP15TF)
Workpiece		A7075 (Slotting) 	1045 (Slotting) 	H13 (Drilling+Slotting) 
Component		Machine part	Machine part	Mold
Cutting conditions	Cutting speed (SFM)	1640	400	335
	Feed (IPR)	.009	.004	.002 (drilling), .006 (slotting)
Result		Improved tool sharpness and surface finish compared to conventional products.	Tool life doubled.	Better sharpness and longer tool life than conventional products.

For your safety
●Don't touch breakers and chips without gloves. ●Please machine within recommended application range, and exchange expired tools with new parts in advance. ●Please use safety cover and wear safety glasses. ●When using compounded cutting oils, please take fire prevention. ●When attaching chips or spare parts, please use the attached wrench or spanner. ●When using tools in revolution machining, please make a trial run to check run-out, vibration, abnormal sounds etc.

MITSUBISHI MATERIALS CORPORATION

Tsukuba Plant ISO 9001-2000 Registration No. JSAQ 080 Gifu Plant ISO 9001-2000 Registration No. JSAQ 094 Tsukuba Plant ISO 14001-1996 Registration No. JSAE 036

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Printed in U.S.A. 06/07