

HV Series

Taps that achieve excellent chip evacuation!

Hybrid Value Spiral
Fluted Taps for Steels

Hybrid Value Spiral
Pointed Taps for Steels

HVSP
HVSP ZP

HVPO

Z-PRO

Ultimate Machining Taps

**New Spiral Pointed Taps
have been released!
Spiral Fluted Tap sizes
have been added!**



A new product line by YAMAWA

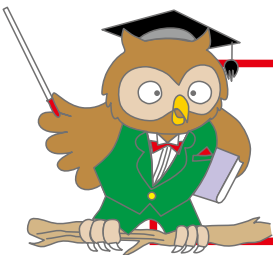


Z-PRO is a new product line created with the concept of developing the ultimate professional tool optimized for machines.

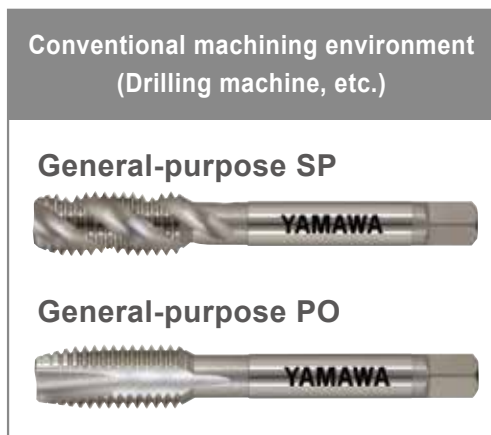
Z-PRO is a combination of "**Z**" = Zenith(peak, highest) and "**PRO**" = Professional/Progress. The specifications and shape are adapted to market changes.

Z-PRO features

What are the most suitable tool specifications and shapes for machines?
Z-PRO is renowned for its "Tap Material" and "Surface Treatment", but its most significant feature is the "**Semi-long Shape**", which is suitable for machining.



Z-PRO improves chip evacuation for stable machining!
For trouble-free machining, the Z-PRO HV Series is recommended!



Achieves stable machining in various machining environments from drilling machine to M/C! (*)



*Workpiece recommendations may vary: Please refer to p.3, p.6 and p.8 for tapping conditions.

Advantages of using HVSP

By increasing the clearance between the holder and work-piece, chip interference is minimized. This prevents issues like chip jamming and breakage.

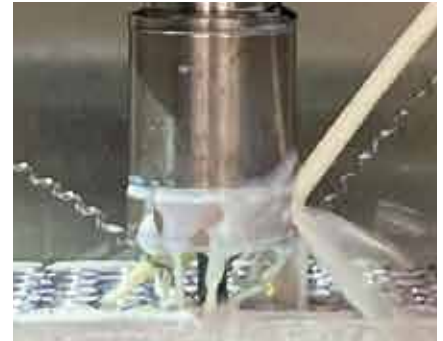
○Comparison photo of Z-PRO "HVSP" vs JIS standard "SP"

Z-PRO HVSP



M12×1.75

SP (JIS standard length)



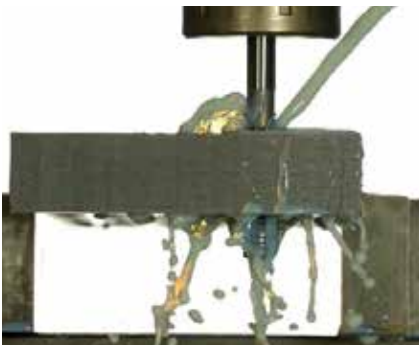
Tapping length : 1.5D (effective thread)
Holding length : 31mm

Advantages of using HVPO

A sufficient amount of cutting oil can be supplied thanks to the increased clearance between the holder and workpiece.
*Extending life of tap
+ reducing heat from tapping.

○Comparison photo of Z-PRO "HVPO" vs JIS standard "PO"

Z-PRO HVPO



M12×1.75

PO (JIS standard length)

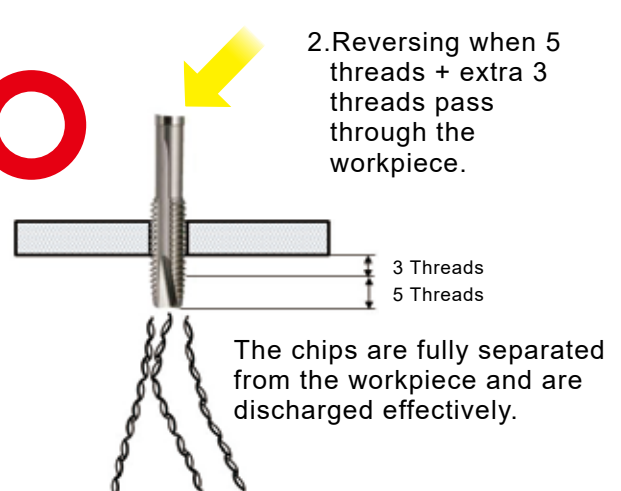
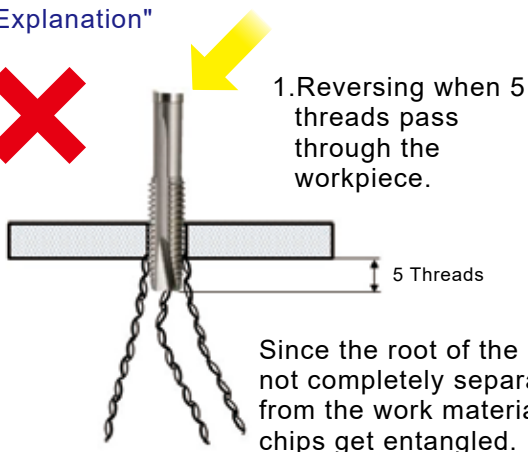


Tapping length : 1.5D (effective thread)
Holding length : 31mm



Extra full 3 threads of stroke ensures better chip evacuation and prevents chipping of taps.

"Explanation"





The uniquely designed flute shape+BLF(special relief on the full thread area) dramatically reduce chipping issues.

- Specially designed flute shape and relief on the full thread area improves chip ejection.
- Heel cut performance has been improved in order to accurately cut the chips deep inside the internal thread and eliminate the remaining chips.
- Due to improved chip ejection, chipping of the chamfer area is less likely to occur during the reversal of the tap.
- The threads on HVSP are specially designed with three full threads and subsequent threads ground down to the pitch diameter to prevent chipping.

Tapping conditions:HVSP M36X4

Workpiece Materials	SS400
Tapping Speed	3m/min
Tapping Length	50mm
Machine Type	Radial drilling machine
Tapping Fluid	Non-water soluble cutting oil

○Full Thread Part

Conventional Product

Chipping



HVSP 250 Holes Ongoing Processing Without Chipping



Tapping conditions:HVSP M10X1.5

Workpiece Materials	S45C
Tapping Speed	Tapping Speed 12m/min
Tapping Length	Tapping Length 17mm
Machine Type	Machine Type Horizontal MC
Tapping Fluid	Water soluble cutting fluid

Smooth chip evacuation



1,184 Holes processed without chipping



Compatible with a wide range of workpiece machining

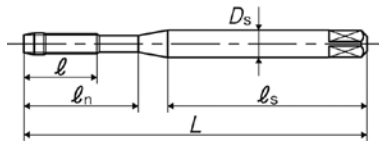
Workpiece Materials	Guideline for tapping speed (m/min)		
	M3~M5	M6~M16	M18~M48 , U1~U2
Low Carbon Steels ~S20C/SS400	3~9	3~12	3~8
Medium Carbon Steels S25C~S45C	3~9	3~12	3~8
High Carbon Steels S45C~	3~9	3~12	3~8
Alloy Steels SCM/SCr	3~9	3~12	3~8
Thermal Refined Steels 25~35HRC	~5	~5	~5
Cast Steels SC	3~9	3~12	3~8
Stainless Steels SUS303/SUS304	~5	~5	~5

(For both synchronous and asynchronous feed)

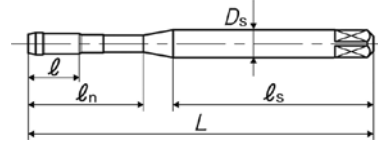


Dimensions and Sizes

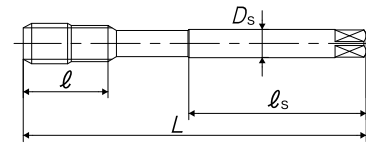
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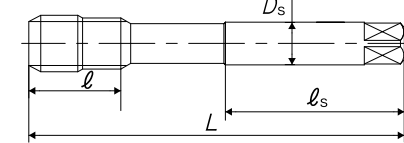
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TYPE:3



TYPE:4

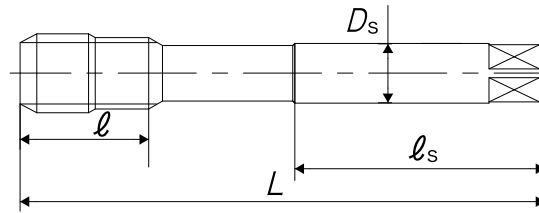


Size	Class	Code	Chamfer	L (mm)	l (mm)	ln (mm)	ls (mm)	Ds (mm)	No. of flutes	TYPE	MSRP(JPY)
M3×0.5	P3	SY3.0GREEXJ	2.5P	56	9	18	32	4	3	1	1,400
M3×0.35	P3	SY3.0DREEXJ	2.5P	56	6.5	18	32	4	3	2	2,390
M4×0.7	P4	SY4.0ISEEXJ	2.5P	63	13	21	36	5	3	1	1,400
M4×0.5	P4	SY4.0GSEEXJ	2.5P	63	9	21	36	5	3	2	2,050
M5×0.8	P4	SY5.0KSEEXJ	2.5P	70	14	25	40	5.5	3	1	1,410
M5×0.5	P4	SY5.0GSEEXJ	2.5P	70	9	25	40	5.5	3	2	2,050
M6×1	P4	SY6.0MSEEXJ	2.5P	80	15	30	45	6	3	1	1,610
M6×0.75	P4	SY6.0JSEEXJ	2.5P	80	15	30	45	6	3	1	2,270
M6×0.5	P4	SY6.0GSEEXJ	2.5P	80	9	30	45	6	3	2	2,270
M8×1.25	P4	SY8.0NSEEXJ	2.5P	90	19	-	46	6.2	3	3	2,270
M8×1	P4	SY8.0MSEEXJ	2.5P	90	19	-	46	6.2	3	3	2,580
M10×1.5	P4	SY010OSEEXJ	2.5P	100	23	-	51	7	3	3	2,970
M10×1.25	P4	SY010NSEEXJ	2.5P	100	23	-	51	7	3	3	2,970
M10×1	P4	SY010MSEEXJ	2.5P	100	23	-	51	7	3	3	3,520
M12×1.75	P4	SY012PSEEXJ	2.5P	110	26	-	56	8.5	3	3	4,000
M12×1.5	P4	SY012OSEEXJ	2.5P	110	26	-	56	8.5	3	3	4,000
M12×1.25	P4	SY012NSEEXJ	2.5P	110	26	-	56	8.5	3	3	4,000
M14×2	P4	SY014QSEEXJ	2.5P	110	26	-	56	10.5	3	3	5,470
M14×1.5	P4	SY014OSEEXJ	2.5P	110	26	-	56	10.5	3	3	5,470
M16×2	P4	SY016QSEEXJ	2.5P	110	26	-	56	12.5	3	3	7,300
M16×1.5	P4	SY016OSEEXJ	2.5P	110	26	-	56	12.5	3	3	7,300
M18×2.5	P5	SY018RTEEXJ	2.5P	125	33	-	64	14	4	3	9,760
M18×1.5	P5	SY018OTEEXJ	2.5P	125	33	-	64	14	4	3	9,760
M20×2.5	P5	SY020RTEEXJ	2.5P	140	33	-	71	15	4	4	13,300
M20×1.5	P5	SY020OTEEXJ	2.5P	140	33	-	71	15	4	4	13,300
M22×2.5	P5	SY022RTEEXJ	2.5P	140	33	-	71	17	4	4	16,800
M22×1.5	P5	SY022OTEEXJ	2.5P	140	33	-	71	17	4	4	16,800
M24×3	P5	SY024STEEXJ	2.5P	160	37	-	82	19	4	4	21,000
M24×1.5	P5	SY024OTEEXJ	2.5P	160	37	-	82	19	4	4	21,000
M27×3	P5	SY027STEEXJ	2.5P	160	37	-	82	20	4	4	29,700
M27×1.5	P5	SY027OTEEXJ	2.5P	160	37	-	82	20	4	4	29,700
M30×3.5	P6	SY030TUEEXJ	2.5P	180	44	-	92	23	4	4	37,700
M30×3	P6	SY030SUEEXJ	2.5P	180	44	-	92	23	4	4	37,700
M30×1.5	P6	SY030OUEEXJ	2.5P	180	44	-	92	23	4	4	37,700
M33×3.5	P6	SY033TUEEXJ	2.5P	180	46	-	92	25	4	4	44,000
M33×3	P6	SY033SUEEXJ	2.5P	180	46	-	92	25	4	4	44,000
M36×4	P6	SY036UUEEXJ	2.5P	200	52	-	102	28	4	4	50,700
M36×3	P6	SY036SUEEXJ	2.5P	200	52	-	102	28	4	4	50,700
M39×4	P6	SY039UUEEXJ	2.5P	200	52	-	102	30	4	4	58,200
M39×3	P6	SY039SUEEXJ	2.5P	200	52	-	102	30	4	4	58,200
M42×4.5	P6	SY042VUEEXJ	2.5P	200	59	-	102	32	4	4	70,800
M42×3	P6	SY042SUEEXJ	2.5P	200	59	-	102	32	4	4	70,800
M48×5	P6	SY048WUEEXJ	2.5P	250	65	-	128	38	4	4	103,000
M48×3	P6	SY048SUEEXJ	2.5P	250	65	-	128	38	4	4	103,000



Dimensions and Sizes

TYPE:4



Size	Class	Code	Chamfer	L (mm)	l (mm)	l _n (mm)	l _s (mm)	D _s (mm)	No. of flutes	TYPE	MSRP(JPY)
1-8UNC	P5	SYU16XTEEXJ	2.5P	160	37	-	82	19	4	4	32,600
1-12UNF	P4	SYU16SSEEXJ	2.5P	160	37	-	82	19	4	4	32,600
1 1/8-7UNC	P6	SYU18YUEEXJ	2.5P	180	44	-	92	23	4	4	40,800 *
1 1/8-8UN	P5	SYU18XTEEXJ	2.5P	180	44	-	92	23	4	4	40,800 *
1 1/8-12UNF	P4	SYU18SSEEXJ	2.5P	180	44	-	92	23	4	4	40,800 *
1 1/4-7UNC	P6	SYU20YUEEXJ	2.5P	180	44	-	92	24	4	4	47,700 *
1 1/4-8UN	P5	SYU20XTEEXJ	2.5P	180	44	-	92	24	4	4	47,700 *
1 1/4-12UNF	P4	SYU20SSEEXJ	2.5P	180	44	-	92	24	4	4	47,700 *
1 3/8-6UNC	P6	SYU22ZUEEXJ	2.5P	200	52	-	102	28	4	4	60,000 *
1 3/8-8UN	P5	SYU22XTEEXJ	2.5P	200	52	-	102	28	4	4	60,000 *
1 3/8-12UNF	P4	SYU22SSEEXJ	2.5P	200	52	-	102	28	4	4	60,000 *
1 1/2-6UNC	P6	SYU24ZUEEXJ	2.5P	200	52	-	102	30	4	4	64,000 *
1 1/2-8UN	P5	SYU24XTEEXJ	2.5P	200	52	-	102	30	4	4	64,000 *
1 1/2-12UNF	P4	SYU24SSEEXJ	2.5P	200	52	-	102	30	4	4	64,000 *
1 3/4-5UNC	P6	SYU28OUEEXJ	2.5P	220	59	-	112	35	4	4	80,900 *
1 3/4-8UN	P5	SYU28XTEEXJ	2.5P	220	59	-	112	35	4	4	80,900 *
1 3/4-12UN	P4	SYU28SSEEXJ	2.5P	220	59	-	112	35	4	4	80,900 *
2-4 1/2UNC	P7	SYU329VEEXJ	2.5P	250	73	-	128	40	4	4	117,000 *
2-8UN	P6	SYU32XUEEXJ	2.5P	250	73	-	128	40	4	4	117,000 *

*Specific distribution product (Made-to-Order item)

Product Features

- The standard line includes tap classes that are optimal for tapping internal threads before zinc plating.
- We developed 3 types of oversized taps in +0.1mm, +0.2mm, +0.3mm, which are in high market demand in certain applications.
- The specifications are based on HVSP (Hybrid Value Spiral Fluted Tap) and can be used with various workpiece materials and machines.
- Stable tapping without chipping is possible in both vertical and horizontal machining.

Applications

It is mainly used for tapping internal threads before plating to prevent rust and corrosion in applications such as road development, bridges, large structures, etc.



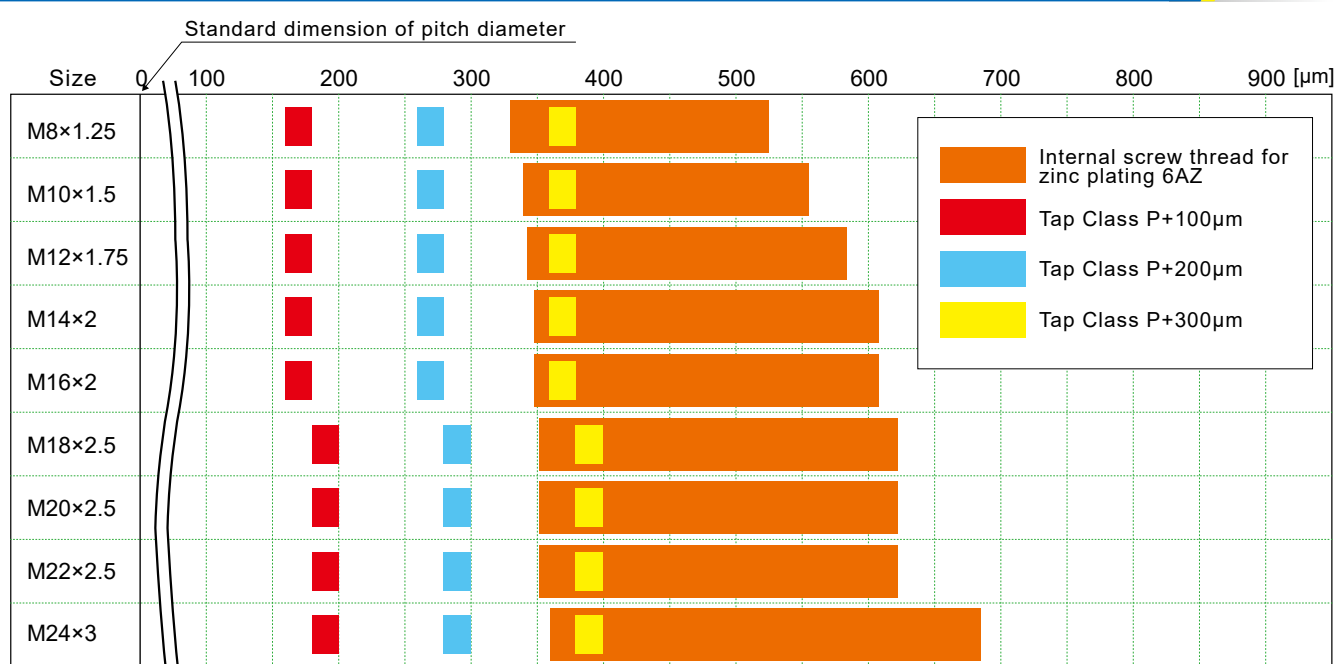
Compatible with a wide range of work materials

[Applicable Workpiece Materials / Tapping Speed (m/min)]

Workpiece materials	Size	Guideline for tapping speed
Low Carbon Steels ~S20C/SS400	M8~M16	3~12
	M18~M24	3~8
Medium Carbon Steels S25C~S45C	M8~M16	3~12
	M18~M24	3~8
High Carbon Steels S45C~	M8~M16	3~12
	M18~M24	3~8

Workpiece materials	Size	Guideline for tapping speed
Alloy Steels SCM/SCr SCM/SCr	M8~M16	3~12
	M18~M24	3~8
Thermal Refined Steels 25~35HRC	M8~M16	~5
	M18~M24	~5
Stainless Steels SUS303/SUS304/SUS316	M8~M16	~5
	M18~M24	~5
Cast Steels SC	M8~M16	3~12
	M18~M24	3~8

Pitch diameter tolerance range comparison table for tap and internal screw thread classes (for zinc plating)

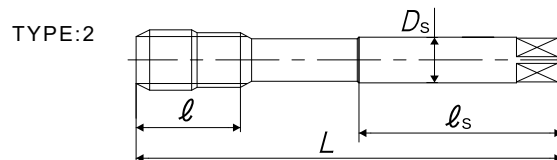
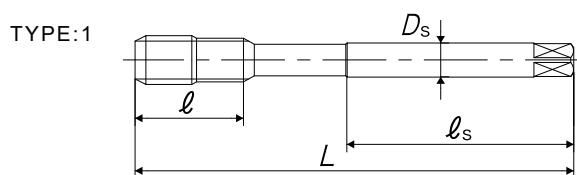


*M8x1.25 was calculated using the dimensional tolerance formula, which is the basis for tolerance positions 6AZ specified in JIS B0209-5.

"Explanation"

- The graph above is a comparison between the allowable dimensional limits of the internal screw thread of tolerance class 6AZ per JIS B 0209-5". The allowable dimensional limits of internal threads to be mated with zinc plating external thread with a tolerance position of h before plating" and the class and pitch diameter of HVSP ZP tap.
- For example, if the nominal size is M10x1.5 and the tolerance class is 6AZ, you can use P4+300µm(P4+0.3mm).
- Because the plating thickness varies depending on the plating type and processing method, there are cases where the required internal thread diameter does not conform to the above standards. Therefore, HVSP ZP has P class +100 µm (+0.1 mm), P class +200 µm (+0.2 mm), P class +300 µm (+0.3 mm), which are highly requested by the market as standard.

Dimensions and Sizes



In addition to our Hybrid Value Spiral Fluted Taps for steels, we have added oversized taps that are ideal for threading before zinc plating. They can be used pre-plating for the internal threads of building materials such as those used in roads, railroads, public transportation facilities, and bridges.

Size	Class	Code	Chamfer	L (mm)	ℓ (mm)	ℓ _n (mm)	ℓ _s (mm)	D _s (mm)	No. of flutes	TYPE	MSRP(JPY)
M8×1.25	P4+0.1	1112201064	2.5P	90	19	-	46	6.2	3	1	2,960
	P4+0.2	1112301064	2.5P	90	19	-	46	6.2	3	1	2,960
	P4+0.3	1112401064	2.5P	90	19	-	46	6.2	3	1	2,960
M10×1.5	P4+0.1	1112201078	2.5P	100	23	-	51	7	3	1	3,870
	P4+0.2	1112301078	2.5P	100	23	-	51	7	3	1	3,870
	P4+0.3	1112401078	2.5P	100	23	-	51	7	3	1	3,870
M12×1.75	P4+0.1	1112201088	2.5P	110	26	-	56	8.5	3	1	5,200
	P4+0.2	1112301088	2.5P	110	26	-	56	8.5	3	1	5,200
	P4+0.3	1112401088	2.5P	110	26	-	56	8.5	3	1	5,200
M14×2	P4+0.1	1112201100	2.5P	110	26	-	56	10.5	3	1	7,120
	P4+0.2	1112301100	2.5P	110	26	-	56	10.5	3	1	7,120
	P4+0.3	1112401100	2.5P	110	26	-	56	10.5	3	1	7,120
M16×2	P4+0.1	1112201114	2.5P	110	26	-	56	12.5	3	1	9,490
	P4+0.2	1112301114	2.5P	110	26	-	56	12.5	3	1	9,490
	P4+0.3	1112401114	2.5P	110	26	-	56	12.5	3	1	9,490
M18×2.5	P5+0.1	1112201128	2.5P	125	33	-	64	14	4	1	12,700
	P5+0.2	1112301128	2.5P	125	33	-	64	14	4	1	12,700
	P5+0.3	1112401128	2.5P	125	33	-	64	14	4	1	12,700
M20×2.5	P5+0.1	1112201141	2.5P	140	33	-	71	15	4	2	17,300
	P5+0.2	1112301141	2.5P	140	33	-	71	15	4	2	17,300
	P5+0.3	1112401141	2.5P	140	33	-	71	15	4	2	17,300
M22×2.5	P5+0.1	1112201156	2.5P	140	33	-	71	17	4	2	21,900
	P5+0.2	1112301156	2.5P	140	33	-	71	17	4	2	21,900
	P5+0.3	1112401156	2.5P	140	33	-	71	17	4	2	21,900
M24×3	P5+0.1	1112201167	2.5P	160	37	-	82	19	4	2	27,300
	P5+0.2	1112301167	2.5P	160	37	-	82	19	4	2	27,300
	P5+0.3	1112401167	2.5P	160	37	-	82	19	4	2	27,300



Advice: "Guideline for bored hole size"

[Bored Hole Size Guideline]

When threading before zinc plating, it is recommended to use a bored hole with a larger diameter by the plating thickness. Please refer to the attached materials and confirm final dimensions.

Unit: mm

Size	Oversized bored hole size for reference			Internal threads 6H Class minimum minor diameter
	Oversize + 0.1mm	Oversize + 0.2mm	Oversize + 0.3mm	
M8×1.25	6.95	7.05	7.15	6.647
M10×1.5	8.70	8.80	8.90	8.376
M12×1.75	10.5	10.6	10.7	10.106
M14×2	12.2	12.3	12.4	11.835
M16×2	14.2	14.3	14.4	13.835
M18×2.5	15.7	15.8	15.9	15.294
M20×2.5	17.7	17.8	17.9	17.294
M22×2.5	19.7	19.8	19.9	19.294
M24×3	21.2	21.3	21.4	20.752

*The drill hole diameter before normal plating is twice(2t) the plating thickness (t).



Product Features

- The unique flute shapes achieve excellent internal threads and longer tool life by improving chip evacuation and cutting resistance!
- The longer overall length increases the clearance between the holder and workpiece, ensuring sufficient supply of cutting oil.

Tapping data

Tapping conditions: HVPO M10x1.5

Workpiece material	SS400
Tapping Speed	10m/min
Tapping Length	24mm
Machine Type	Vertical MC
Tapping Fluid	Water soluble cutting fluid

Excellent machining conditions

Thanks to the unique flute shape and semi-long overall length of the tap, water-soluble cutting fluid is sufficiently supplied.

Excellent internal threads

In SS400 tapping, an excellent internal thread surface can be obtained even using water-soluble cutting fluid.

Excellent ejected chips

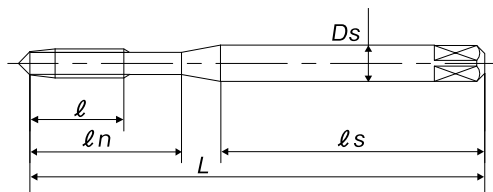
Workpiece material and tapping speed

Workpiece materials		Guideline for tapping speed (m/min)	
		M3~M5	M6~M16
Low Carbon Steels	~S20C/SS400	3~9	3~12
Medium Carbon Steels	S25C~S45C	3~9	3~12
High Carbon Steels	S45C~	3~9	3~12
Alloy Steels	SCM/SCr	3~9	3~12
Thermal Refined Steels	25~35HRC	3~9	3~12
Cast Steels	SC	3~9	3~12
Stainless Steels	SUS303/SUS304	~5	~5

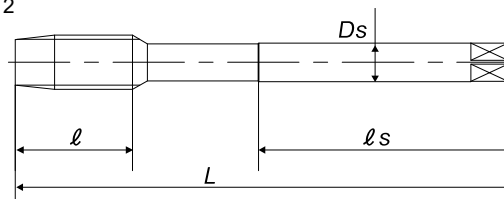
(For both synchronous and asynchronous feed)

Dimensions and Sizes

TYPE:1



TYPE:2



Size	Class	Code	Chamfer	L (mm)	l (mm)	ln (mm)	ls (mm)	Ds (mm)	No. of flutes	TYPE	MSRP(JPY)
M3×0.5	P3	1113101035	5P	56	9	18	32	4	3	1	1,400
M4×0.7	P3	1113101042	5P	63	13	21	36	5	3	1	1,400
M5×0.8	P3	1113101049	5P	70	14	25	40	5.5	3	1	1,410
M6×1	P3	1113101055	5P	80	15	30	45	6	3	1	1,610
M8×1.25	P3	1113101064	5P	90	19	-	46	6.2	3	2	2,270
M10×1.5	P4	1113101078	5P	100	23	-	51	7	3	2	2,970
M10×1.25	P3	1113101079	5P	100	23	-	51	7	3	2	2,970
M12×1.75	P4	1113101088	5P	110	26	-	56	8.5	3	2	4,000
M14×2	P4	1113101100	5P	110	26	-	56	10.5	3	2	5,470
M16×2	P4	1113101114	5P	110	26	-	56	12.5	3	2	7,300

*....Additional size to be added

	Size	Class
*	M3×0.5	P4
*	M3×0.35	P2
*	M3.5×0.6	P2
*	M3.5×0.6	P3
*	M4×0.7	P4
*	M4×0.5	P3
*	M5×0.8	P4
*	M5×0.5	P3
*	M6×1	P4
*	M6×0.75	P3
*	M6×0.5	P3
*	M7×1	P3
*	M7×1	P4
*	M7×0.75	P3
*	M7×0.5	P3
*	M8×1.25	P4
*	M8×1	P3
*	M8×1	P4
*	M8×0.75	P3
*	M8×0.75	P4
*	M8×0.5	P3
*	M8×0.5	P4
*	M9×1	P3
*	M9×1	P4
*	M10×1.5	P5
*	M10×1.25	P4
*	M10×1	P3
*	M10×1	P4
*	M12×1.75	P5
*	M12×1.5	P4
*	M12×1.5	P5
*	M12×1.25	P4
*	M12×1.25	P5
*	M12×1	P4
*	M12×1	P5
*	M14×2	P5
*	M14×1.5	P4
*	M14×1.5	P5
*	M16×2	P5
*	M16×1.5	P4
*	M16×1.5	P5

*....Additional size to be added

	Size	Class
*	M1.4×0.3	—
*	M1.6×0.35	—
*	M2×0.4	—
*	M2.5×0.45	—
*	M2.6×0.45	—
*	M18×2.5	—
*	M18×1.5	—
*	M20×2.5	—
*	M20×1.5	—
*	M22×2.5	—
*	M22×1.5	—
*	M24×3	—
*	M24×1.5	—
*	M27×3	—
*	M27×1.5	—
*	M30×3.5	—
*	M30×3	—
*	M30×1.5	—
*	M33×3.5	—
*	M33×3	—
*	M36×4	—
*	M36×3	—
*	M39×4	—
*	M39×3	—
*	M42×4.5	—
*	M42×3	—
*	M48×5	—
*	M48×3	—

YAMAWA's website contains a lot of valuable information!



Understanding YAMAWA products by Manga

Understanding by Manga!
YAMAWA's Tools

Bored Hole size / Bar diameter

NC Program

Safety Data Sheet (SDS)

Catalog · Flyer

ANSI standard taps (UN/UNJ) selection software

A convenient app that allows you to search anywhere on your smartphone! You can search for products, calculate speeds, and even check recommended drill hole diameters! Please download and use it.



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A handy application for quick search

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Bored Hole Size: Use the built-in calculator to calculate a recommended bored hole size for a specific thread dia.

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- At a production site: If you need a new tap on-site, search for it on your smartphone right away.
- In a design department: Input search parameters to find the best suited tap for your design drawing from many of YAMAWA's products.
- At a trading company: If you find it difficult to search through many products, use the tool on your smartphone to narrow down the product candidates.

Warning

- ◆Tools may shatter. Wear cover or eye glasses to avoid injury during tapping.
- ◆Tools may shatter. Use tools under the proper tapping condition.
- ◆Never wear gloves during turning operations as the gloves may get caught with the tools.
- ◆Wear safety shoes to avoid injuring yourself by the falling tools.
- ◆On attaching tools to the machine, fasten firmly to avoid chattering and run-out.
- ◆Fasten the work pieces firmly so that they never move during operation. Never use worn tools or damaged tools with chipping.
- ◆Take a special care to fire trouble. High temperature during machining may cause fire.

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YAMAWA group for Overseas

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