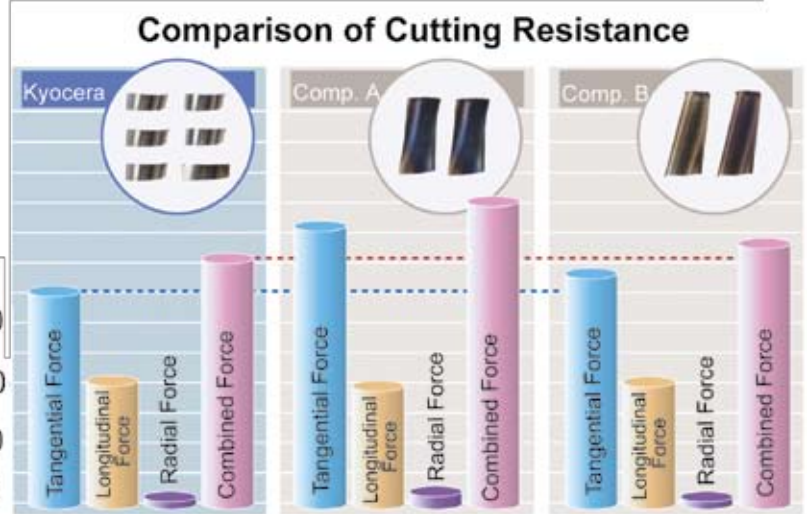
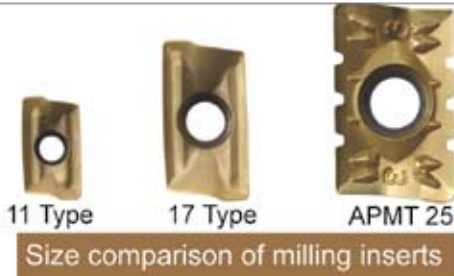
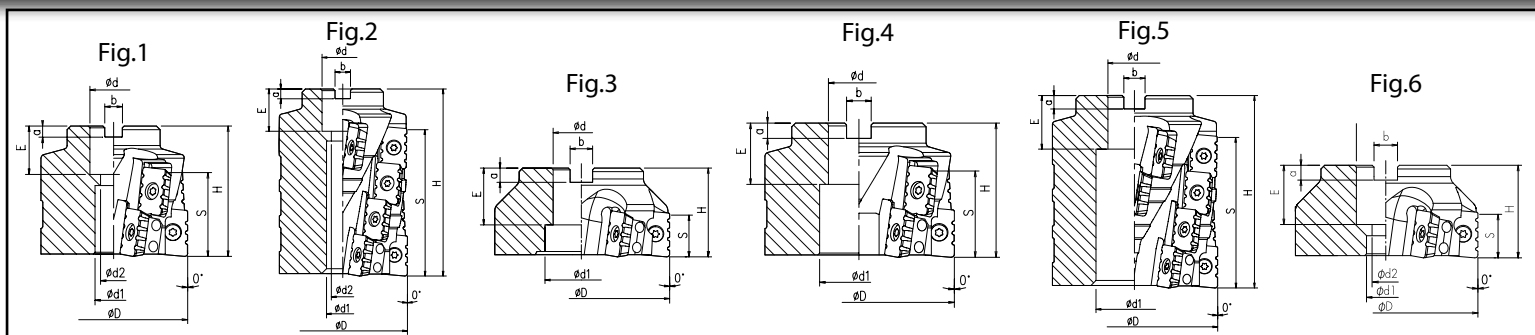


# MSR

## Heavy Roughing Milling Cutters

- Double the metal removal rate; double the productivity
- Notched inserts promote larger depths of cut and excellent chip control
- Heavy machining with low cutting forces





## ■ MSR Inch φD / Inch φd

Description	Stock	# of inserts	# of flutes	Dimensions										Rake Angle		Fig.
				unit	Inch φD	Inch φd	φd1	φd2	H	E	a	b	S	A.R.	R.R.	
MSR 300R -1	●	4	4	in	3.00	1.00	.790	-	1.970	1.020	.240	.370	.925	+9°	-5°	3
MSR 300R -2	●	8	4		3.00	1.00	.790	-	2.760	1.020	.240	.370	1.77			4
MSR 400R -1-1.5ID	●	6	6		4.00	1.50	1.610	-	1.970	1.260	.310	.500	.925			3
MSR 400R -2-1.5ID	●	12	6		4.00	1.50	1.610	-	2.760	1.260	.310	.500	1.77			4

## ■ MSR Metric φD / Inch φd

Description	Stock	# of inserts	# of flutes	Dimensions										Rake Angle		Fig.			
				unit	Metric φD	Inch φd	φd1	φd2	H	E	a	b	S	A.R.	R.R.				
MSR 063R -1	○	4	4	mm	63	25.4 (1 in)	20	14	65	26	6	9.5	23.5	+9°	-5°	6			
MSR 063R -2	○	8							85				45			1			
MSR 080R -2	○	8	4		80	25.4 (1 in)	20	14	70	26	6	9.5	45			90	1		
MSR 080R -4	●	16							115				90				2		
MSR 080R 43175	○	16	4		31.75	26	18	115	32	8	12.7	90	1						
MSR 100R -1	○	6	6		100	31.75 (1.25 in)	41	-	50	32	8	12.7	23.5			45	90	3	
MSR 100R -2	○	12							70				45						4
MSR 100R -4	○	24							115				90						5
MSR 125R -1	●	6	6		125	38.1 (1.5 in)	58	-	60	38	10	15.9	23.5			45	90	3	
MSR 125R -2	○	12							70				45						4
MSR 125R -4	○	24							115				90						5
MSR 160R -1	○	8	8		160	50.8 (2 in)	68	-	60	38	11	19.3	23.5			45	90	3	
MSR 160R -2	○	16							70				45						4
MSR 160R -4	○	32							115				90						5
MSR 200R -1	○	10	10		200	47.63 (1.875 in)	-	-	60	38	14	25.7	23.5			45	90	3	
MSR 200R -2	○	20							90				45						4
MSR 250R -1	○	12		12					250				47.63 (1.875 in)	-	-				60
MSR 250R -2	○	24	90		45	4													

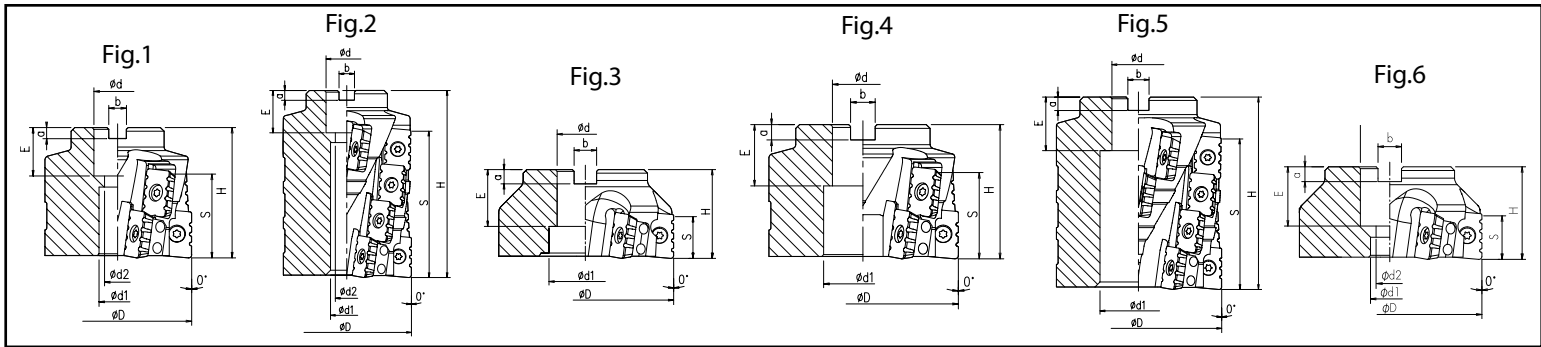
It is important to install the appropriate notched insert into the correct position. Failure to do so may result in damage to the cutter body. The appropriate insert is marked on the pockets of the cutter body.

● : Standard Stock  
○ : World Express

### Note: All cutters require the following hardware:

- If marked with a "3" in the pocket, use AP..ER-NB3
- If marked with a "4" in the pocket, use AP..ER-NB4

Screws: SB-60120TR & SB-40140TR  
Wrench: TT-25L & DT-15  
Shim: MAP-2506  
Anti-seize compound: MP-1



■ Metric  $\phi D$  / Metric  $\phi d$

Description	Stock	# of inserts	# of flutes	Dimensions										Rake Angle		Fig.
				Unit	Metric $\phi D$	Metric $\phi d$	$\phi d1$	$\phi d2$	H	E	a	b	S	A.R.	R.R.	
MSR 063R -1M	○	4	4	mm	63	27	20	14	65	22	7.2	12.4	23.5	+9°	-5°	6
MSR 063R -2M	○	8							85				45			1
MSR 080R -1M	○	4	4		80	27	20	14	50	22	7.2	12.4	23.5			6
MSR 080R -2M	○	8							70				45			1
MSR 080R -4M	○	16			115	90	2									
MSR 100R -1M	○	6	6		100	32	48	-	50	28	8	14.4	23.5			3
MSR 100R -2M	○	12							70				45			4
MSR 100 R-4M	○	24			115	90	5									
MSR 125R-1M	○	6	6		125	40	58	-	60	30	9	16.4	23.5			3
MSR 125R -2M	○	12							70				45			4
MSR 125R -4M	○	24			115	90	5									
MSR 160R -1M	○	8	8		160	40	68	-	60	30	10	16.4	23.5			3
MSR 160R -2M	○	16							70				45			4
MSR 160R -4M	○	32			115	90	5									
MSR 200R -1M	○	10	10		200	60	-	-	60	38	15	25.4	23.5			3
MSR 200R -2M	○	20							90				45			4
MSR 250R -1M	○	12	12	250	60	-	-	60	38	15	25.4	23.5	3			
MSR 250R -2M	○	24						90				45	4			

It is important to install the appropriate notched insert into the correct position. Failure to do so may result in damage to the cutter body. The appropriate insert is marked on the pockets of the cutter body.

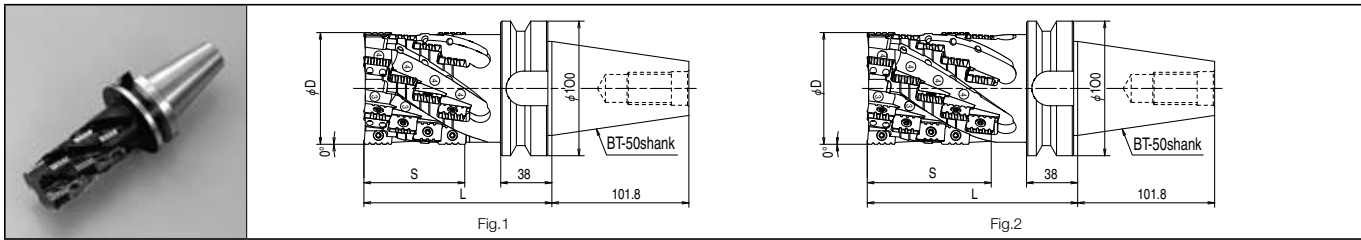
● : Standard Stock  
○ : World Express

- If marked with a "3" in the pocket, use AP..ER-NB3
- If marked with a "4" in the pocket, use AP..ER-NB4

**Note: All cutters require the following hardware:**

- Screws: SB-60120TR & SB-40140TR
- Wrench: TT-25L & DT-15
- Shim: MAP-2506
- Anti-seize compound: MP-1

## MSR-BT50 Type



## Holder Dimensions (BT50 Integral Arbor Type)

Description	Stock	No. of Insert	No. of Flute	No. of Stage	Dimension (mm)			Rake Angle (°)		Shape	Weight (kg)	Spare Part					
					φD	L	S	A.R.	R.R.			Clamp Screw	Wrench	Shim	Clamp Screw	Wrench	Anti-seize Compound
MSR 063R-BT50-4	○	16	4	4	63	160	90	+9°	-8°	Fig.1	5.7	SB-60120TR	TT-25L	-	-	-	MP-1
MSR 063R-BT50-5	○	20	4	5		180	111							Fig.2	6.2		
MSR 080R-BT50-4	○	16	4	4	80	160	90	+9°	-8°	Fig.1	6.9	SB-60120TR	TT-25L	MAP-2506	SB-40140TR	DT-15	MP-1
MSR 080R-BT50-5	○	20		5		180	111										
MSR 100R-BT50-4	○	24	6	4	100	160	90	+9°	-5°	Fig.1	9.6	for Insert Clamp	for Shim Clamp				
MSR 100R-BT50-5	○	30		5		180	111							Fig.2	10.5		

- Shim is not available for MSR063R (Dia. D=63).
- It is not recommended using only top edge part (D.O.C 30mm) for 4 stages/5 stages type. If D.O.C is small, use previous page's 1 stage type or 2 stages type. 4 and 5 stage cutters are not recommended.
- Deep slotting is not recommended for this cutter.

## MSR Inserts

Insert	Description	Dimension					Angle		Insert Grade				
		A	T	φd	W	R	α	β	PVD Coated			MEGACOAT PVD Coated	
									PR660	PR830	PR905	PR1210	PR1230
 NB3(P) NB4(P)	APMT 250608 ER-NB3	0.625	0.250	0.256	0.984	0.031	15°	11°	○	●	○	●	●
	APMT 250608 ER-NB4								○	●	○	●	●
	APMT 250616 ER-NB3	0.625	0.250	0.256	0.984	0.063			●	●	●	●	●
	APMT 250616 ER-NB4								●	●	●	●	●
	APMT 250616 ER-NB3P*	0.625	0.250	0.256	0.984	0.063				○		●	●
	APMT 250616 ER-NB4P*									○		●	●
	APMT 250640 ER-NB3	0.625	0.250	0.256	0.984	0.157			●	○	●	●	
APMT 250640 ER-NB4	●						○	●	●				

\* A lower cutting force insert

● : Standard Stock  
○ : World Express

## ■ MSR Recommended Cutting Condition

Work Material	Feed Rate(inch/tooth)		Insert Grade(SFM)			
	Low Cutting Force	Normal Cutting Force	MEGACOAT		PVD Coated	
	NB3P + NB4P	NB3 + NB4	PR1230	PR1210	PR830	PR905
Cast Iron	0.006	0.008	-	★ 325~500~650	-	☆ 325~450~600
Carbon Steel	0.006	0.008	★ 325~500~650	-	☆ 325~450~600	-
Stainless Steel	Not Recommended					
Aluminum / Non-Ferrous Materials	Not Recommended					



■ MSR Case Studies

Ductile Iron	
<ul style="list-style-type: none"> <li>• Construction part</li> <li>• V=550 SFM</li> <li>• d x w = 0.20 x 2.0"</li> <li>• F = 26 in/min</li> <li>• No coolant</li> <li>• MSR 100R-2 with APMT 250616ER-NB3 APMT 250616ER-NB4 PR905</li> </ul>	
<b>MSR</b>	Chip evacuation = 165cc/min
<b>Competitor D</b>	Chip evacuation=51cc/min
<p>Machining efficiency is 3 times better than the competitor due to the greater chip evacuation</p> <p style="text-align: right;">Evaluation from the customer</p>	

Steel	
<ul style="list-style-type: none"> <li>• V=650 SFM</li> <li>• d x w = 1.6 x 1.0"</li> <li>• F = 16 in/min</li> <li>• No coolant</li> <li>• MSR 100R-2 with APMT 250616ER-NB3 APMT 250616ER-NB4 PR660</li> </ul>	
<b>MSR</b>	2 pieces per hour
<b>Competitor B</b>	0.5 piece per hour
<p>Machining efficiency is 4 times better than the competitor</p> <p style="text-align: right;">Evaluation from the customer</p>	

Steel	
<ul style="list-style-type: none"> <li>• Construction part</li> <li>• V=500 SFM</li> <li>• d x w = 0.80 x 0.3"</li> <li>• F = 29 in/min</li> <li>• No coolant</li> <li>• MSR 63R-4 with APMT 250616ER-NB3 APMT 250616ER-NB4 PR905</li> </ul>	
<b>MSR</b>	Chip evacuation = 120cc/min
<b>Competitor E</b>	Chip evacuation=29cc/min
<p>Machining efficiency is 4 times better than the competitor, with less vibration and machining noise</p> <p style="text-align: right;">Evaluation from the customer</p>	

Structural Steel	
<ul style="list-style-type: none"> <li>• Plate</li> <li>• V=400 SFM</li> <li>• d x w = 1.0 x .20"</li> <li>• F = 16 in/min</li> <li>• No coolant</li> <li>• MSR 100R-2 with APMT 250616ER-NB3 APMT 250616ER-NB4 PR660</li> </ul>	
<b>MSR</b>	Chip evacuation = 50cc/min
<b>Competitor B</b>	Chip evacuation=7cc/min
<p>Machining efficiency is 7 times better than the competitor due to the greater chip evacuation</p> <p style="text-align: right;">Evaluation from the customer</p>	

Steel	
<ul style="list-style-type: none"> <li>• Cover</li> <li>• V=450 SFM</li> <li>• d x w = ~.250 x ~2.5"</li> <li>• F = 13 in/min</li> <li>• No coolant</li> <li>• MSR 400R1 with APMT 250616ER-NB3 APMT 250616ER-NB4 PR830</li> </ul>	
<b>MSR</b>	Material Removal = 8.5 in <sup>3</sup> /min
<b>Competitor B</b>	Material Removal=5 in <sup>3</sup> /min
<p>Metal removal rate increases by ~ 70% with fewer passes required.</p> <p style="text-align: right;">Evaluation from the customer</p>	

Steel	
<ul style="list-style-type: none"> <li>• Cover</li> <li>• V=500 SFM</li> <li>• d x w = ~.75 - 1.75" x ~.5 - 3.75"</li> <li>• F = 14 in/min</li> <li>• No coolant</li> <li>• MSR 400R-2 with APMT 250616ER-NB3 APMT 250616ER-NB4 PR830</li> </ul>	
<b>MSR</b>	Material Removal = 42 in <sup>3</sup> /min
<b>Competitor B</b>	Material Removal=30 in <sup>3</sup> /min
<p>Metal removal rate increases by ~ 40% and cycle time decreases by ~ 30%.</p> <p style="text-align: right;">Evaluation from the customer</p>	