RF Type

General Features

The RF type cutter has a special light weight Aluminium body, designed for high speed, high efficiency roughing to finish milling of Aluminium and other non-ferrous metals.

Work Material

- Aluminium and aluminium alloy
- Other non-ferrous metal

(Not suited for cast iron or steel)

Characteristics

- **From Roughing to Finishing Processes :** Roughing : Economical carbide insert / High-precision finishing with SUMIDIA
- **Strong and Light Cutter Body :** Special Aluminium body /40% lighter than steel cutters / Hard-anodized plated body / Improved efficiency in higher rotational speeds, lower spindle loads and shorter tool change time
- **Safe Design :** Anti-centrifugal force design to prevent inserts from dislodging from cutter (Speeds must be within max. recommended conditions) /Non-wedge design to prevent deformation
- **Easy Run-out Adjustment :** External setting gauge is used for easy tool presetting / High precision cutter construction, units fitted are within 10 μm even before setting

Application Examples

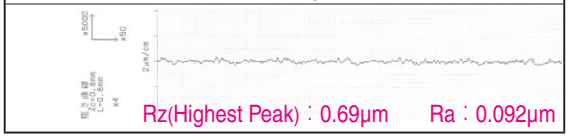
Work (Work Material)	Cutter Insert (Grade)	Cutting Conditions v_c = Cutting Speed (m/min) v_f = Feed Rate (mm/min) a_p = Depth of Cut (mm)	Results
Case (ADC12)	RF4160R SUMIDIA Blade (DA2200)	v_c = 3,000 v_f = 5,730 a_p = 0.10	Surface Finish: Ra=0.2μm Output: 30,000 units 30x tool life of carbide tool
Contact Surface of Transmission Case (ADC12)	RF4125R SUMIDIA Insert (DA1000)	v_c = 3,000 v_f = 7,640 a_p = 1.5	Surface Finish: Ra=0.3μm Output: 20,000 units
Contact Surface of Cylinder Head (AC4C)	RF4250R Carbide Insert (H1)	v_c = 2,000 v_f = 7,535 a_p = 3.5	Rough Cutting Output: 10,000 units

Maximum Allowable Spindle Speed

Cat. No.	n max (min $^{-1}$)
RF4080R	17,000
RF4100R	15,900
RF4125R	13,500
RF4160R	11,000
RF4200R	9,000
RF4250R	7,600
RF4315R	6,000

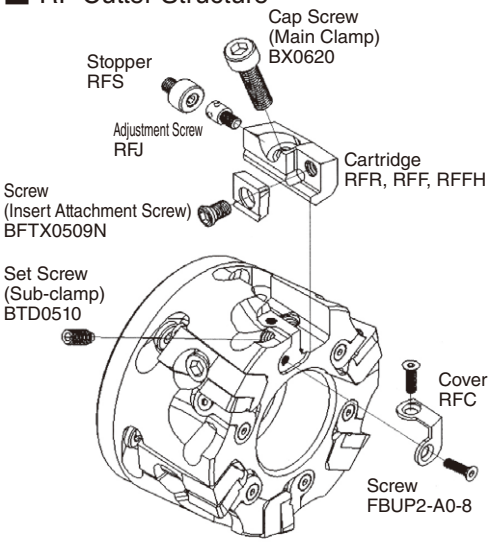
Surface Finish

- Process: Finish Milling
- M/C: Machining Centre
- Arbor: HSK63A
- Work: Si 10 to 12% Al Alloy
- Cutter: RF4100R 6 Teeth (1 Wiper)
- Grade: SUMIDIA (DA1000)
- v_c = 4,990m/min
- n = 15,900min^{-1}
- v_f = 11,400mm/min
- f_z = 0.12mm/t
- a_p = 0.5mm、Wiper a_p = 0.03mm
- Dry



Rz(Highest Peak) : 0.69μm Ra : 0.092μm

RF Cutter Structure



Recommended Cutting Conditions

Si content of 12.6% or less

ISO	Work Material	Hardness	Cutting Speed v_c (m/min) Min.- **Optimum** -Max.	Feed Rate f_z (mm/t) Min.- **Optimum** -Max.	Grade
N	Aluminium Alloy	—	2000-**3500**-5000	0.05-**0.13**-0.20	DA1000 DA2200
		—	1000-**1750**-2500	0.05-**0.13**-0.20	H1

Si content of over 12.6%

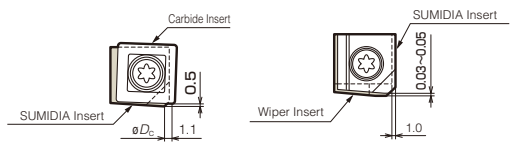
N	Aluminium Alloy	—	400-**600**-800	0.05-**0.13**-0.20	DA1000 DA2200
		—	200-**300**-400	0.05-**0.13**-0.20	H1

Note The cutting conditions above are a guide. Actual conditions will need to be adjusted according to machine rigidity, work clamp rigidity, cutting depth, and other factors.

Insert Setup

For setting of Carbide inserts with SUMIDIA inserts/ blade

- Roughing and finishing in the same process
- When using wiper edge



⚠ CAUTIONS (For more details, refer to the instruction manual included with the product)

As it is possible to mix different types of inserts / blades, it is important to take note of the following.

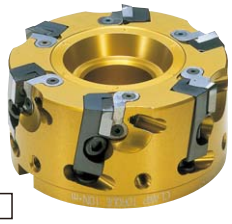
- Do not mix reground and new inserts or even inserts with different regrinding amount on the same cutter.
- Carbide and SUMIDIA inserts must be arrange in an alternate manner.
- Ensure proper balancing by fixing SUMIDIA inserts of blades on opposite positions of the cutter.

High-Efficiency Aluminum Cutter

RF 4000 Type

High Speed Milling Cutter RF4000 Series for Aluminum

High-speed Finishing for Non-Ferrous Metal



RF4080R only

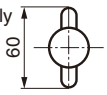


Fig 1

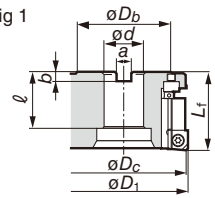
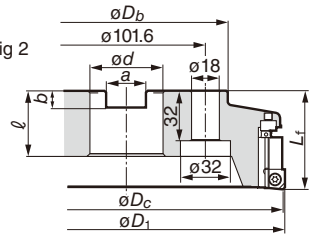


Fig 2



Body Inch

Cat. No.	Stock	Dimensions (mm)								No. of Teeth	Weight (kg)	Fig
		øD_c	øD_1	øD_b	L_f	ød	a	b	ℓ			
RF 4080R	●	**80**	82	60	50	**25.40**	9.5	6	30	6	0.7	1
4100R	●	**100**	102	75	50	**31.75**	12.7	8	38	6	1.0	1
4125R	●	**125**	127	75	63	**38.10**	15.9	10	38	8	1.6	1
4160R	●	**160**	162	100	63	**50.80**	19.1	11	38	10	2.6	1
RF 4200R	●	**200**	202	130	63	**47.625**	25.4	14	42	12	3.6	2
4250R		**250**	252	130	63	**47.625**	25.4	14	42	16	6.0	2
4315R		**315**	317	240	80	**47.625**	25.4	14	42	18	11.0	2

Cartridges, blades and inserts are sold separately

* Please use a collar bolt for securing the cutter to the arbor.

Inserts / Cartridges

P Steel | M Stainless Steel | K Cast Iron | N Non-Ferrous Metal | S Exotic Alloy | H Hardened Steel

Grade		Carbide	DLC-Coat	SUMIDIA		SUMI CRYSTAL
Application	High Speed/Light	N	N	N	N	N
	General Purpose	N	N	N	N	
	Roughing	N	N	N	N	

Refer to page M44 for details of SUMICRYSTAL.

Cat. No.	H1	DL1000	DA1000	DA2200	SC10	Fig	Cartridge Cat. No.	Cartridge Stock	Cartridge Fig
SDET 1204ZDFR	●	●	—	—	—	3	RFR	●	8
NF-SNEW 1204ADFR	—	—	●	▲	—	4	RFF	●	9
120404ADFR-H	—	—	●	—	—	5	RFF(Others) * RFFH(RF4080R)	●	9
1204ADFR-W	—	—	●	▲	—	6	RFF	●	9
SNEW 1204ADFR-WS	—	—	—	—	●	7	RFF	●	9

Cartridge

Fig 8

(RFR)

Fig 9

(RFF)

* When using large depth of cut (a_p = 3mm or longer) with RF4080R, use RFFH unit. (RFF is possible for normal cutting.)

* Wiper inserts are indicated by a -W or -WS suffix. -H indicates deep cutting (a_p) insert

Fig 3

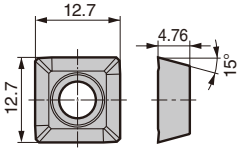


Fig 4

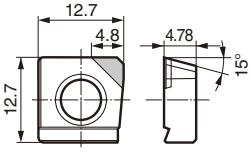


Fig 5

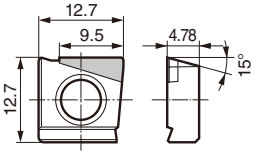


Fig 6 Surfing Insert

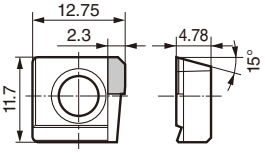
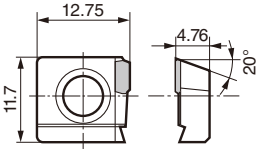
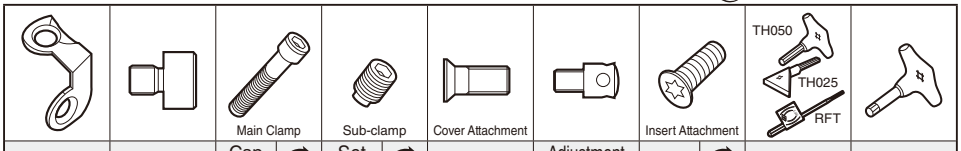


Fig 7 Surfing Insert



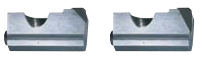
Spare Parts

N·m Recommended Tightening Torque (N·m)



Cover	Stopper	Cap Screw	N·m	Set Screw	N·m	Screw	Adjustment Screw	Screw	N·m	Spanners	Spanners
RFC	RFS	BX 0620	10.0	BTD 0510	3.0	FBUP2 -A0-8	RFJ	BFTX 0509N	6.0	TH050 TH025 RFT	TTX20

Blades / Dummy Blades



Description	Cat. No.	SUMIDIA DA2200
SUMIDIA Blade	RFB	●
SUMIDIA Wiper Blade	RFBW	●
Dummy Blade	RFD	●(Steel)

* Protect the body as well as maintain balance by using dummy blades for unused teeth.

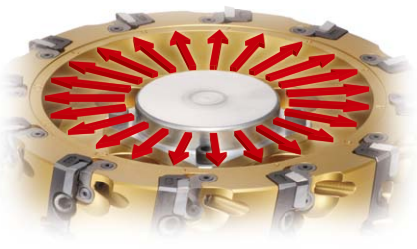
Internal Coolant Attachments

Use an internal coolant holder or a standard clamp bolt with coolant hole when using internal coolant. Typical examples are given in the table below. For standards, contact each manufacturer directly.

Body Cat. No.	Internal Coolant Holder	Standard Clamp Bolt with Coolant Hole (Ex.) MST Corporation	Big Daishowa Seiki Co. Ltd.
RF 4080R	—	MBC-M12	TMBA-M12
RF 4100R	—	MBC-M16	TMBA-M16
RF 4125R	—	MBC-M20	TMBA-M20
RF 4160R	—	MBC-M24	TMBA-M24
RF 4200R	RF-CLT	—	—
RF 4250R	RF-CLT	—	—
RF 4315R	RF-CLT	—	—

Internal Coolant Holder
RF-CLT (Standard stocked item)

Standard Clamp Bolt with Coolant Hole
[Representative example] MBC-M12 to M24 (Sold Separately)



Direction of Coolant Supply

External Setting Parts

Cartridge design allows inserts to be mounted away from the machine with high precision.

Setting Gauge
RF-SET (Sold separately, Standard stocked item)

Clamp Jig
RF-JIG (Sold separately, Standard stocked item)

SRF Type

General Features

Small diameter milling cutter SRF type is most suited for high-speed aluminium machining on small machines.

Characteristics

- **Best Suited For Small Machines**
  Especially reliable on BT30 class small machines.
- **From Roughing To Finishing Processes Utilising SUMIDIA DA1000**
  Insert with a side edge of 5mm.
- **Economical NF-type Inserts**
  NF-type SUMIDIA DA1000 inserts lower tooling costs.
- **High Speed Cutting With SUMIDIA**
  Maximum spindle speeds of up to n = 20,000min^{-1}
  (Actual spindle speeds must be set within the rotational limits of your machine and arbor.)
- **Simple design for insert run-out**
  Simple insert mounting design for easy yet precise tool adjustments.

Application Examples

Work (Work Material)	Cutter Insert (Grade)	Cutting Conditions n = Spindle Speed (min^{-1}) v_f = Feed Rate (mm/min) a_p = Depth of Cut (mm)	Results
Cam Case (ADC12)	SRF50R NF-SNEW09T3ADTR (DA1000)	n =6,000 v_f =2,400 a_p=0.5	12,000 pcs produced with no problems.
Computer Case (ADC12)	SRF50R NF-SNEW09T3ADTR (DA1000)	n =15,000 v_f =7,500 a_p=0.2	Improved efficiency of endmill operation by 2.5 times.
Differential Case (ADC12)	SRF63R NF-SNEW09T3ADTR (DA1000)	n =8,000 v_f =4,000 a_p=0.5	No obstructions on tool magazine when mounting ø63mm cutter on small machines.

Recommended Cutting Conditions

Si content of 12.6% or less.

ISO	Work Material	Hardness	Cutting Speed v_c (m/min) Min.- **Optimum** -Max.	Feed Rate f_z (mm/t) Min.- **Optimum** -Max.	Grade
N	Aluminium Alloy	—	2,000- **3,000** -4,000	0.05- **0.13** -0.20	DA1000

Si content of over 12.6%

N	Aluminium Alloy	—	400- **600** -800	0.05- **0.13** -0.20	DA1000

Note The cutting conditions above are a guide. Actual conditions will need to be adjusted according to machine rigidity, work clamp rigidity, cutting depth, and other factors.

SRF Type

Rake Angle		
	Radial	−2° to +4°
	Axial	+6°

5mm 90°

P Steel | M Stainless Steel | K Cast Iron | N Non-Ferrous Metal | N Aluminum | S Exotic Alloy | H Hardened Steel

High-speed Finishing for Non-Ferrous Metal

Fig 1

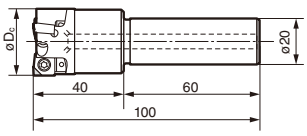


Fig 2

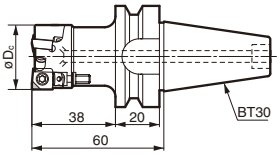


Fig 3

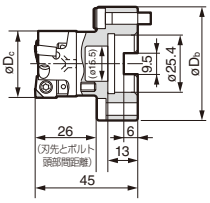
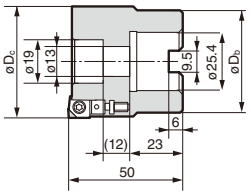
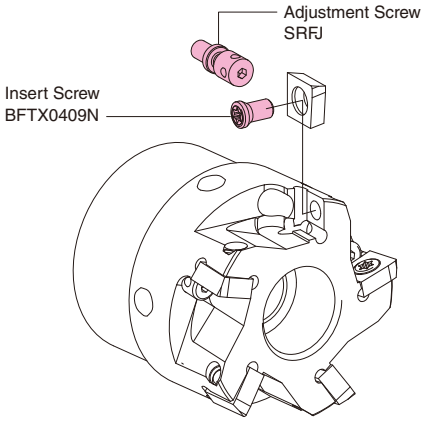


Fig 4



Body Inch

Cat. No.	Stock	øDc(mm)	øDc(mm)	No. of Teeth	Fig.	Weight (kg)
SRF 30R-ST	●	**30**	—	3	1	0.34
40R-ST	●	**40**	—	4	1	0.50
SRF 30R-BT30	●	**30**	—	3	2	0.57
40R-BT30	●	**40**	—	4	2	0.72
SRF 30R	●	**30**	**50.0**	3	3	0.27
40R	●	**40**	**50.0**	4	3	0.35
50R	●	**50**	**46.5**	5	4	0.59
63R	●	**63**	**45.0**	6	4	0.67



Inserts are not included.

Please use hexagonal bolt (JISB1176) M12 x 30-35 mm for securing ϕ50 and ϕ63 cutter to the arbor.

Inserts

Wiper Insert

Fig 5

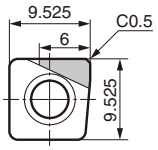


Fig 6

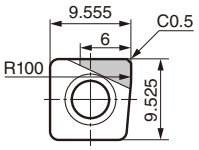
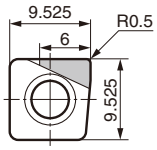
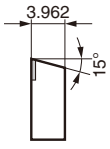


Fig 7



Side View (Same For All)

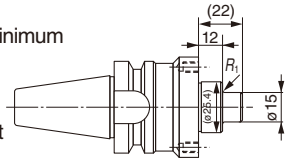


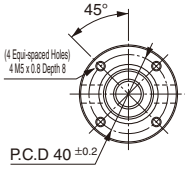
P Steel | M Stainless Steel | K Cast Iron | N Non-Ferrous Metal | S Exotic Alloy | H Hardened Steel

Grade		SUMIDIA	
Application	High Speed/Light	N	N
	General Purpose	N	N
	Roughing	N	N

Cat. No.	DA1000	DA2200	Fig	Cutting Edge
NF-SNEW 09T3ADTR	●	▲	5	Standard
09T3ADTR-U	●	▲	6	Wiper
09T3ADTR-R	●	▲	7	Nose Radius

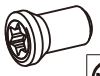
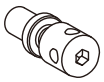
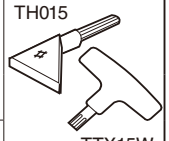
- ● Standard inserts and wiper inserts can be used on the same cutter body.
- ● Inserts with nose radius can reduce the clattering. These cannot be used with wiper inserts.
- ● Inserts can be reground 3 times (up to minimum IC diameter 9.225mm).
- ● Do not mix new and reground inserts, or even inserts with different regrind amount on the same cutter.
- ● When using reground inserts, it is advisable to re-confirm insert height and cutting diameter with a tool pre-setter.
- ● Arbor for SRF30R, SRF40RS





When using SRF30R and SRF40R cutters, there is a requirement to modify the arbor as shown above.
(1. Reduce part of the arbor's adaptor shaft from ø25.4mm to ø15mm.
2. Add 4 tap holes for (M5) cap screws.) Please use a hexagonal bolt M5 x 20 mm for securing the body.

Spare Parts

Insert Screw	Adjustment Screw	Spanners
		 TH015
BFTX0409N 4.0 (N·m)	SRFJ	TTX15W

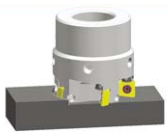
(N·m) Recommended Tightening Torque (N·m)

Maximum Depth Of Cut Guide (SRF50R, 5 Teeth)

The table below contains guidelines on the maximum depth of cut determined from internal tests. ' ○ ' marks indicate the possible application range. Actual cutting conditions should be set based on actual machine and work characteristics.

Depth of Cut a_p(mm) \ Feed Rate	Feed Rate v_f (mm/min)		
	2,500	4,000	5,000
	Feed Rate Per Tooth f_z (mm/t)		
	0.05	0.08	0.10
0.5	○	○	○
1.0	○	○	○
1.5	○	○	○
2.0	○	○	○
2.5	○	○	○
3.0	○	○	○
3.5	○	○	—
4.0	○	—	—
4.5	○	—	—
5.0	○	—	—

Cutting Conditions
Cutter: SRF50R
Insert: NF-SNEW 09T3ADTR (DA1000)
n = 10,000min^{-1}
Arbor: BT30 FMA25.4-45
Work: A-5052
Width: 35mm at depth of cut indicated above



▲mark :To be replaced by new item (Please confirm stock availability)