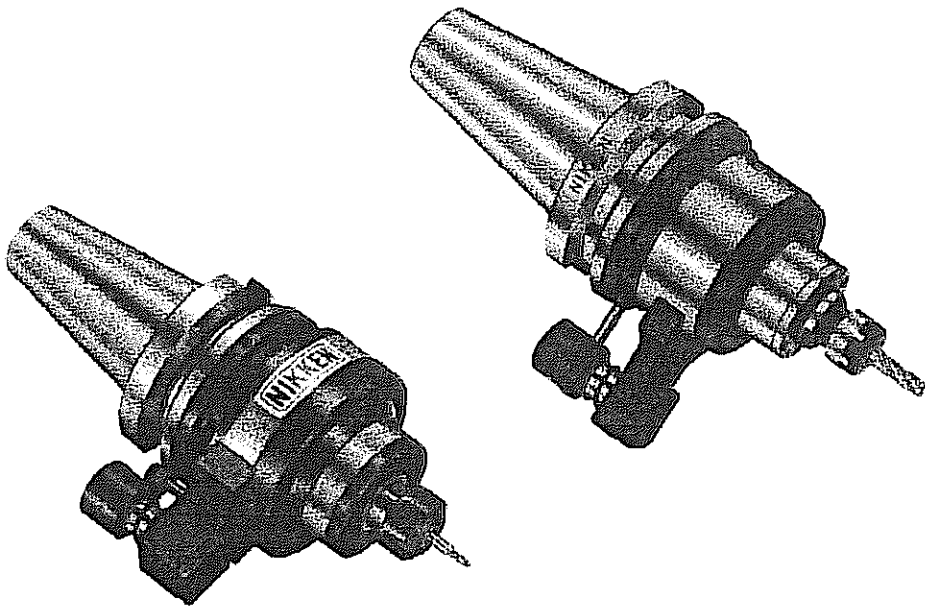


NIKKEN

Spindle Speeder

Instruction Manual

2nd Edition



NIKKEN KOSAKUSHO WORKS, LTD.

Preface

Thank you for your purchase of NIKKEN Spindle Speeder. We have confidence of our Spindle Speeder which can be used for long life with its durability.

Please read this instruction manual for long term safe use.

This unit has built-in mechanism to increase the Spindle rotation speed to 4 or 5 times without increasing. Actual Machining Centre Spindle Speed it can achieve smooth high speed cutting and prevent from raising Machining Centre Spindle heat to help to keep long life of Spindle accuracy.

As (for) fluid ground precision gear built-in. Max 2000 rpm can be achieved on NX5 its available for small dia, cutting and grinding tool.

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- 2-2. Setting of NIKKEN Stopper Block
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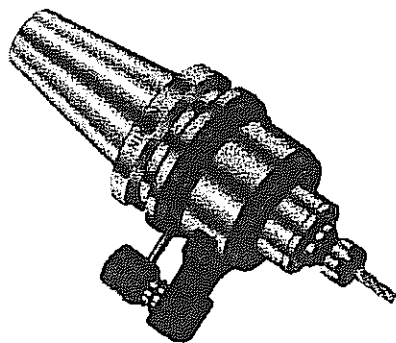
4. Parts List



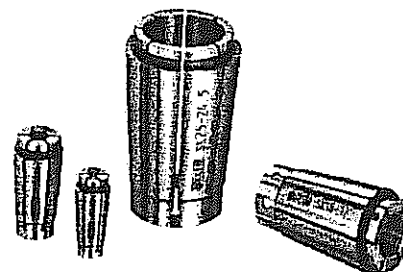
NIKKEN reserves copy right of part/whole this manual the design and specifications are subject to change for improvement without previous notice.

1. Specifications

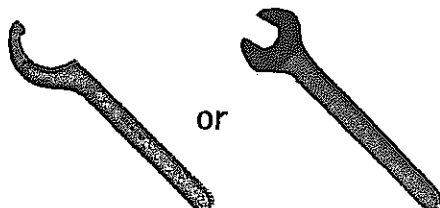
1-1. Package Contents



Spindle Speeder

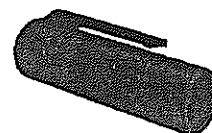


SK Collet (1Set)

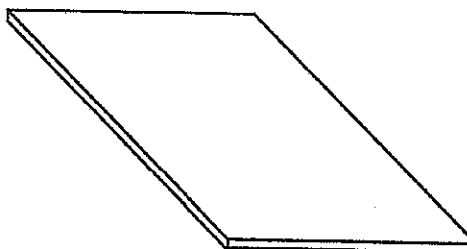


or

Spanner



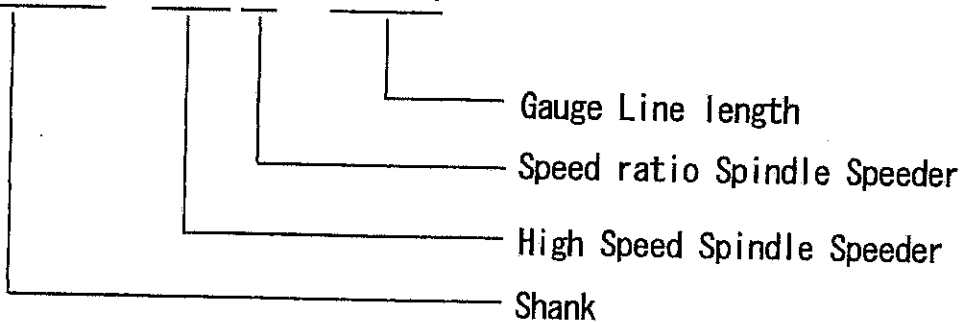
Collet Extractor



Instruction Manual

1-2. Explanation of Code No.

BT50 - NX5 - 15 1



Gauge Line length

Speed ratio Spindle Speeder

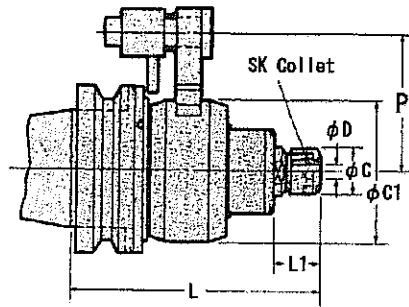
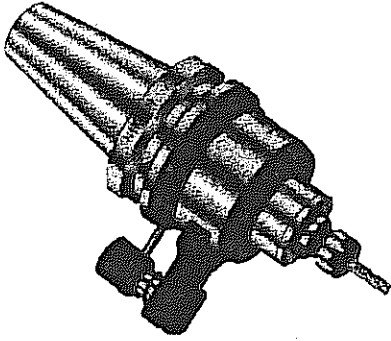
High Speed Spindle Speeder

Shank

1-3. Specifications

1-3-1. NX Type

NIKKEN



Code No.	D	L	C	C1	L1	P	Ratio	MAX rpm	Collet
BT30-NX5-153	1.75-10	153	27.5	85	32	55	5	20000	SK10
BT35-NX5-153						60			
BT40-NX5-153						60			
BT45-NX5-158		82							
BT50-NX5-151		151				82			
BT50-NX4-192	2.75-16	192	40	118	46		4	10000	SK16

Unless specified the following collects are included as standard

NX5 : SK10-6A, SK10-8A, SK10-10A

NX4 : SK16-8A, SK16-10A, SK16-12A, SK16-16A

At your extra purchase of SK collets, please ask SK-A type for End Mill Shank or SK-P type for high precision.

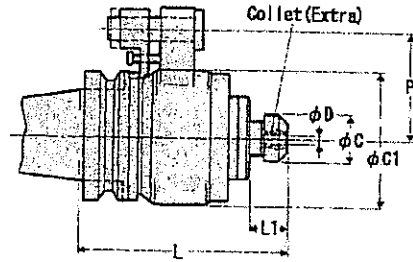
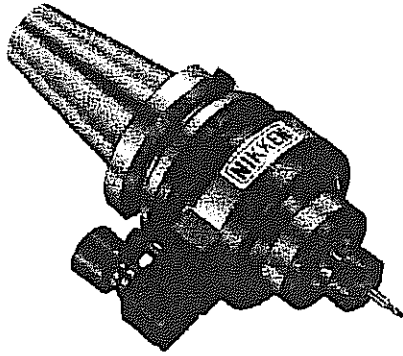
In case of Inch size collets, standard accessory is as follows.

NX5 : SK10-3/16A, SK10-1/4A, SK10-5/16A

NX4 : SK16-5/16A, SK16-3/8A, SK16-1/2A, SK16-5/8A

1-3-2. PX Type

NIKKEN



Code No.	D	L	C	C1	L1	P	Ratio	MAX rpm	Collet
BT30-PX5-	1-7		32	76	28	55	5	20000	ESX12
BT40-PX6-149		149	19		24		6	30000	
BT40-PX10-162	1-8	162	22	98	21		60	10	40000
BT50-PX6-142	1-7	142	19	76	24	82	6	30000	ESX12
BT50-PX7-162	1-13	162	35	105	32		7	18000	ESX20
BT50-PX10-155	1-8	155	22	98	21		10	40000	ETS14



Oil Mist need without fail

1-4. Collet & Adapter

1-4-1. Collet for NX Type

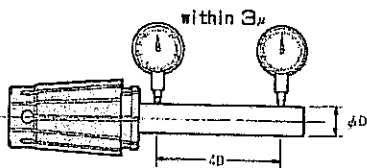
A type collets are available (Collet bore is h8 on A Type Collets)

Style	Code No.	ϕD
SK10 & SK10P	SK10-2	1.75~2.0
	-2.25	2.0~2.25
	-2.5	2.25~2.5
	-2.75	2.5~2.75
	-3	2.75~3.0
	-3.5	3.0~3.5
	-4	3.5~4.0
	-4.5	4.0~4.5
	-5	4.5~5.0
	-5.5	5.0~5.5
	-6	5.5~6.0
	-6.5	6.0~6.5
	-7	6.5~7.0
	-7.5	7.0~7.5
	-8	7.5~8.0
	-8.5	8.0~8.5
	-9	8.5~9.0
	-9.5	9.0~9.5
	-10	9.5~10.0

Style	Code No.	ϕD
SK16 & SK16P	SK16-3	2.75~3.0
	-3.5	3.0~3.5
	-4	3.5~4.0
	-4.5	4.0~4.5
	-5	4.5~5.0
	-5.5	5.0~5.5
	-6	5.5~6.0
	-6.5	6.0~6.5
	-7	6.5~7.0
	-7.5	7.0~7.5
	-8	7.5~8.0
	-8.5	8.0~8.5
	-9	8.5~9.0
	-9.5	9.0~9.5
	-10	9.5~10.0
	-10.5	10.0~10.5
	-11	10.5~11.0
	-11.5	11.0~11.5
	-12	11.5~12.0
	-12.5	12.0~12.5
-13	12.5~13.0	
-13.5	13.0~13.5	
-14	13.5~14.0	
-14.5	14.0~14.5	
-15	14.5~15.0	
-15.5	15.0~15.5	
-16	15.5~16.0	

Explanation of P Class Collet

Run-out accuracy within $3 \mu m$ at $4 D$ guaranteed.



All A Type Collets are P Class.

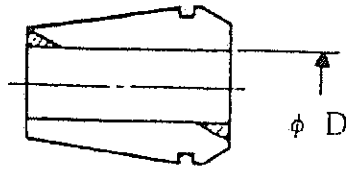
1-4-2. Adapter for Drill Chuck

Adapter of Drill Chuck is applicable for NX5 Type.



Code No.	JT No.
SK10-J1	JT 1

1-4-3. Collet for PX Type

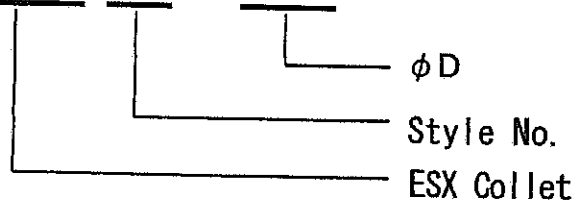


Style	Code No.	φD
PX6	ESX12-1	0.5-1.0
	ESX12-1.5	1.0-1.5
	ESX12-2	1.5-2.0
	ESX12-2.5	2.0-2.5
	ESX12-3	2.5-3.0
	ESX12-4	3.0-4.0
	ESX12-5	4.0-5.0
	ESX12-6	5.0-6.0
PX5	ESX12-7	6.0-7.0
	ESX16-1	0.5-1.0
	ESX16-1.5	1.0-1.5
	ESX16-2	1.5-2.0
	ESX16-2.5	2.0-2.5
	ESX16-3	2.5-3.0
	ESX16-4	3.0-4.0
	ESX16-5	4.0-5.0
	ESX16-6	5.0-6.0
	ESX16-7	6.0-7.0
	ESX16-8	7.0-8.0
	ESX16-9	8.0-9.0
ESX16-10	9.0-10.0	

Styl	Code No.	φD
PX7	ESX20-1	0.5-1.0
	ESX20-1.5	1.0-1.5
	ESX20-2	1.5-2.0
	ESX20-2.5	2.0-2.5
	ESX20-3	2.5-3.0
	ESX20-4	3.0-4.0
	ESX20-5	4.0-5.0
	ESX20-6	5.0-6.0
	ESX20-7	6.0-7.0
	ESX20-8	7.0-8.0
	ESX20-9	8.0-9.0
	ESX20-10	9.0-10.0
	PX10	ESX20-11
ESX20-12		11.0-12.0
ESX20-13		12.0-13.0
ETS14-1		0.5-1.0
ETS14-1.5		1.0-1.5
ETS14-2		1.5-2.0
ETS14-2.5		2.0-2.5
ETS14-3		2.5-3.0
ETS14-4		3.0-4.0
ETS14-5		4.0-5.0
ETS14-6		5.0-6.0
ETS14-7	6.0-7.0	
ETS14-8	7.0-8.0	

Explanation of code No.

ESX 12 - 1 . 0



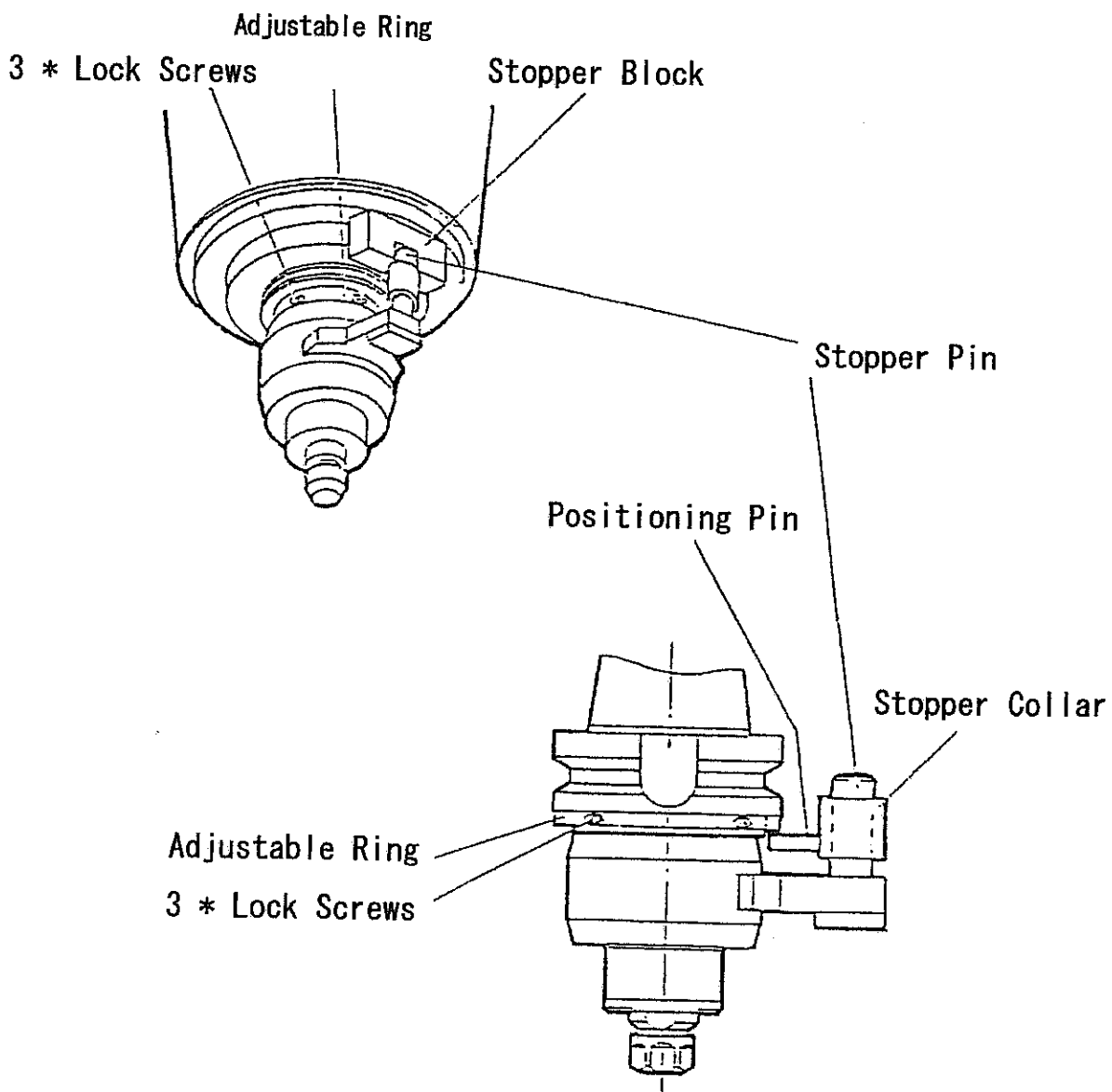
2. Operations

2-1. Adjustment of positioning pin

Before installation, positioning pin should be set at the required position.

If readjustment is required, follow the set procedure described below :

- 1) Loosen 3 Lock Screws on the adjustable ring
- 2) After orientation of Machining Centre Spindle, fit the Angle Head.
At the same time, Positioning Pin should be set into Stopper Block.
- 3) Check the correct position between groove of adjustable ring and Positioning Pin, and tighten 3 Lock Screws on the Adjustable Ring.
- 4) Try to auto change on machine tool where applicable, and readjust where necessary. (Use step 1 to 3)



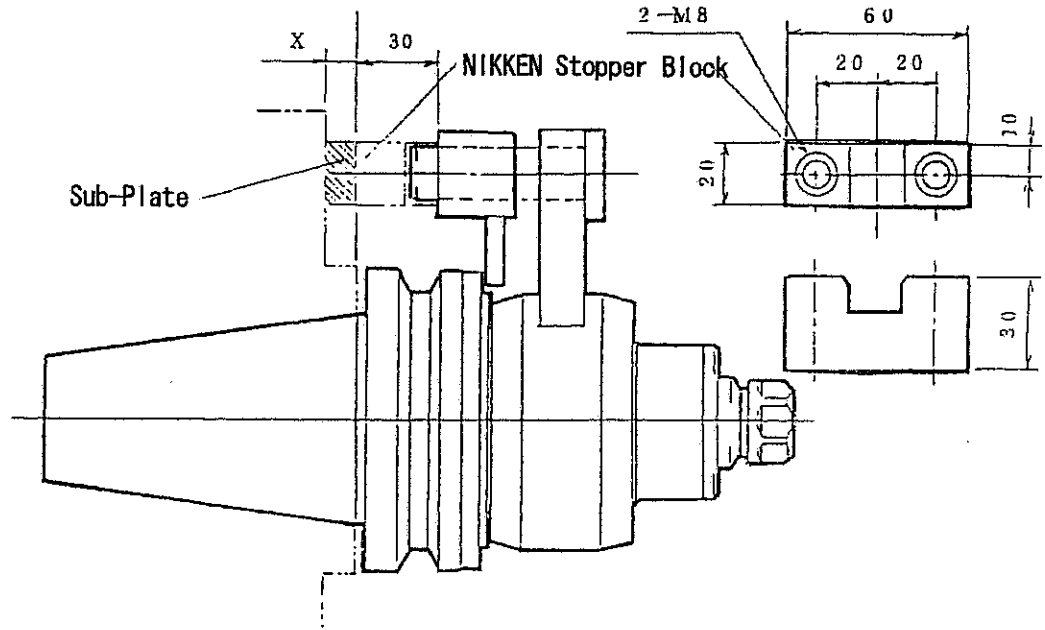
2-2. Setting of NIKKEN Stopper Block

In case of setting of NIKKEN Stopper Block, please supply Sub-Plate according to the following dimensions.

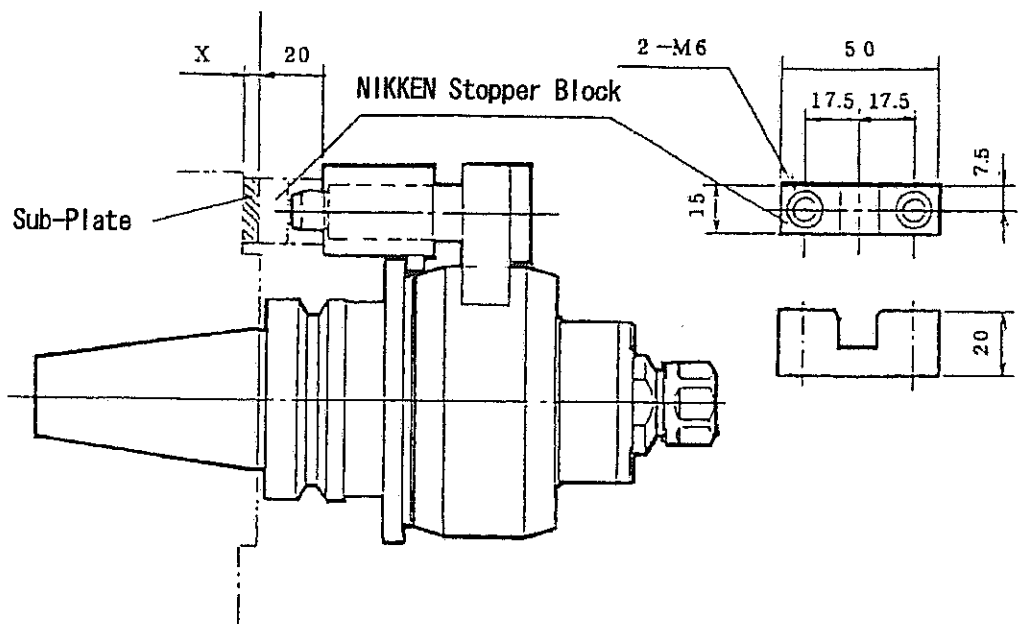
(Stopper Block should be located in Machining Centre Spindle Flange without any interference with A.T.C)

In case of Proper Stopper Block for each specified machine model, Sub-Plate is not necessary.

BT 50



BT 40

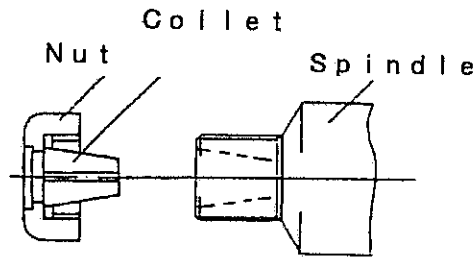


2-3. Setting of Collet & Adapter

1) Setting of Collet

Stand Collet up and push down Nut on it.

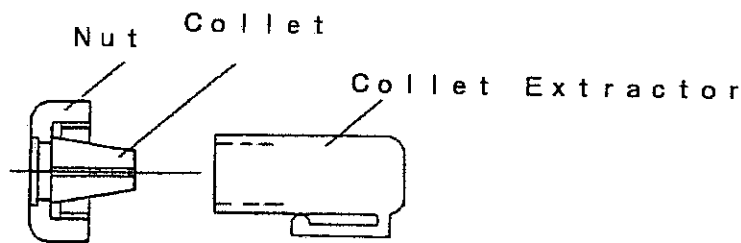
Screw the Nut into Spindle by hand slightly, then insert tool, and tighten the Nut by 2 Spanners at the Nut and Spindle. Please avoid to tighten the Nut by spanners on Machining Centre Spindle since it might cause damage the Machining Centre.



2) Removal

At loosening of the Nut, also use 2 spanners at the Nut and Spindle.

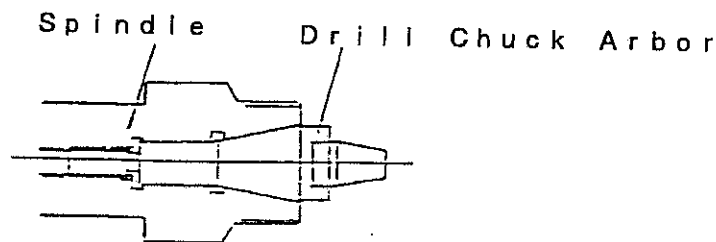
Insert Collet extractor up to the end, and pull it down to remove the collet.



Drill Chuck Arbor

Remove Nut and Screw the Arbor into Spindle Head.

Tighten by 2 wrenches.

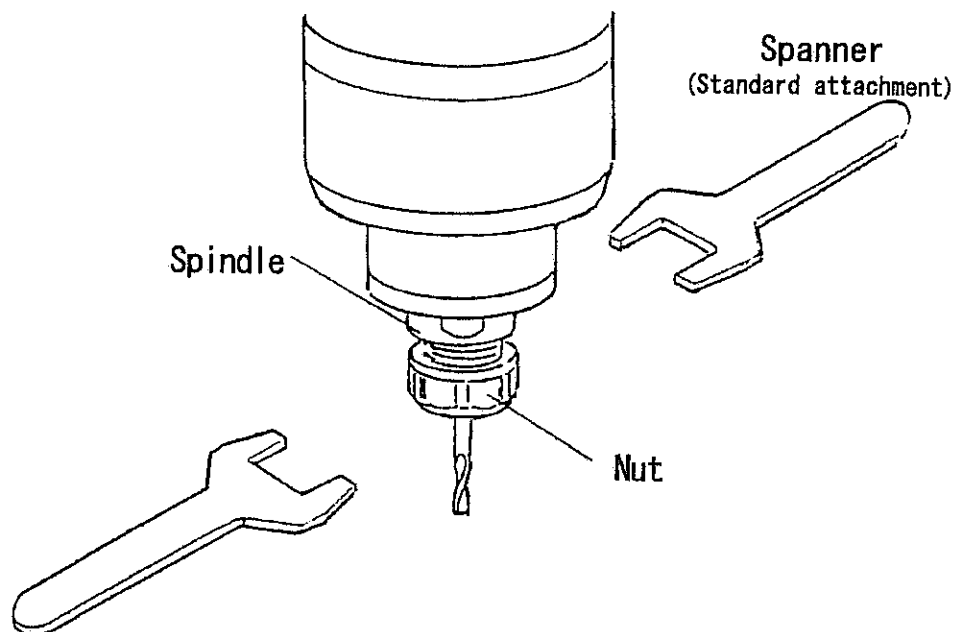




3. Important information

3-1. Tightening of Nut

Please tighten or loosen the Nut by 2 Spanners
Please pay attention to operate cutting tools.



3-2. Heat Generation

Expected heat generation should be Max 35° c + Room temperature as guaranteed.

In case of unusual noise or heat generation. Please contact your local service agent with Model No. of Spindle Speeder Machining Centre model and cutting details, and do not disassemble by yourself.

3-3. Maintenance

The internal mechanism has seal-up grease lubrication system. Please grease after each 1000 hours use. (First 1000 hours, or approx. 6 months as normal use is maintenance-free.) Lubrication nozzle is as extra.

Recommended grease

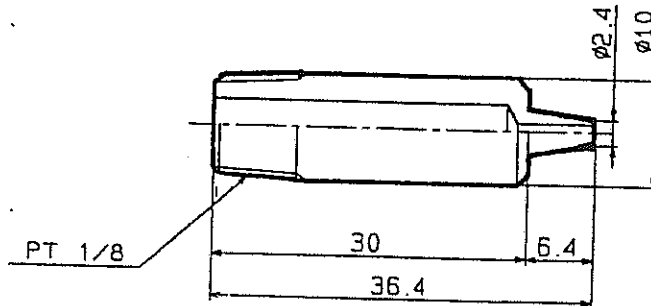
Makers Name	Grease	Volume(cc)
OMEGA	OMEGA73	1-3

Please use following grease alternatively.

Makers Name	Grease	Volume(cc)
MOBIL	MOBIL FLEX 47	2-7
ESSO	RISTAN 1	
SHELL	ALBANIA GREASE 2	
IDEMITSU	DAPHNEI COLONEX GREASE No.1	
NISSEKI	MULTI-KNOCK DELAX 1	
DAIKYOU	DYNAMIC GREASE MP-1	

Lubrication Nozzle (Option)

Code No.	Thread Size
NX-GSN	PT 1/8



3-4. Please see the following tables as standard cutting condition.

1) Recommended cutting speed for each material (table 1)

Work Piece	Cutting Speed(m/min.)	
	HSS	Carbide
Aluminium	80-100	100-150
Cast Iron	30-50	80-100
Steel	20-25	40-60

Note) Please see the specifications issued by each tool makers for more details.

2) Suitable Spindle rotation (rpm) for tool dia & cutting speed

Speed (m/min)	Tool Dia							
	φ1	φ2	φ3	φ4	φ5	φ6	φ8	φ10
10	3200	1600						
15	4800	2400	1600					
20	6400	3200	2100	1600				
25	8000	4000	2650	2000	1600			
30	9600	4800	3100	2500	1900	1600	1200	950
40	12700	6400	4250	3200	2500	2150	1600	1300
50	15900	8000	5300	4000	3200	2650	2000	1600
80		12800	8500	6300	5100	4250	3200	2500
100		15900	10500	8000	6400	5300	4000	3200
120		19100	12800	9500	7600	6400	4800	3800
150			15900	11900	9500	7950	6000	4750

《How to use table 1 & 2》

(EX) Work Materials : Aluminum

Cutting Tool : Carbide End Mill of 5 mm dia

- 1) Cutting speed could be 120 m/min according to table 1.
- 2) Cutting speed of 120 m/min and Tool dia of 5 mm gives 7600 rpm as suitable spindle rotation—according to Table 2.

Machine spindle rpm should be therefore either 1900 rpm ($7600 \div 4=1900$) with model NX4 or 1520 rpm ($7600 \div 5=1520$) with model NX5.

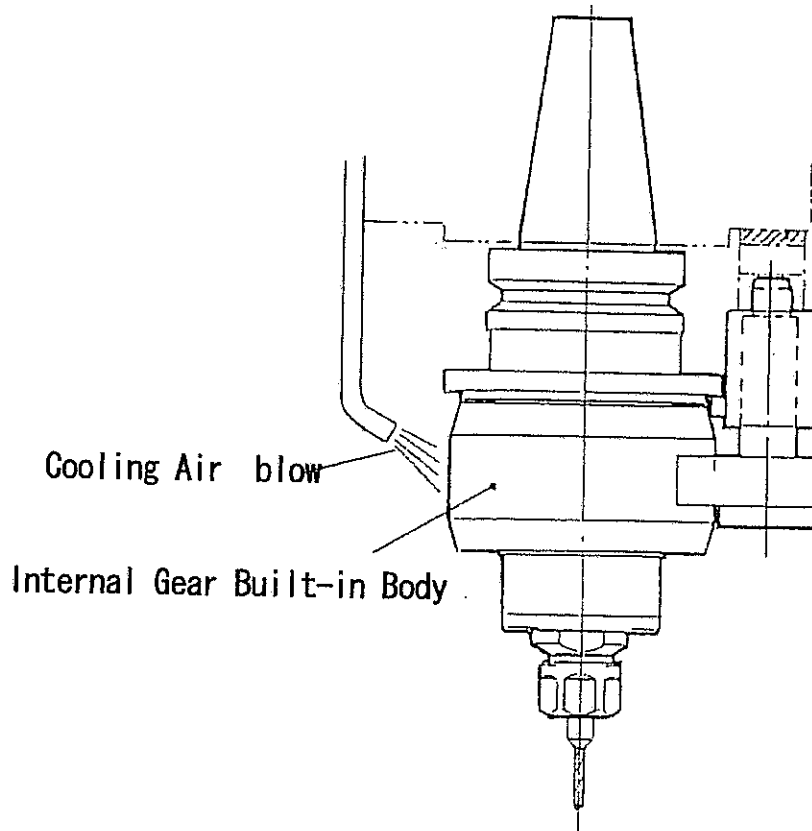
3-5. Continuous running

For continuous running use over 1 hour at 15000 rpm on NX5 or 6000 rpm on NX4.

Please give cooling (not coolant) air blow on internal gear built-in body to reduce heat generation.

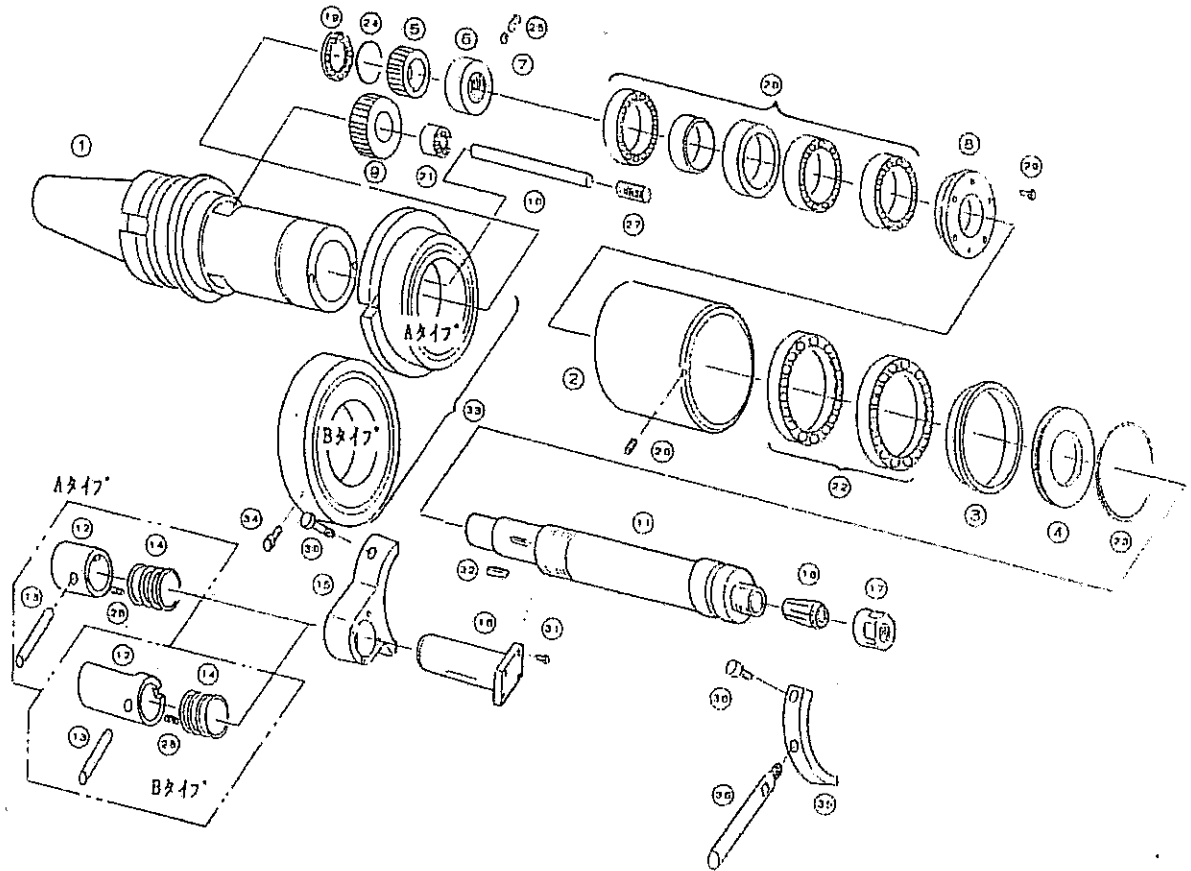
Also please see the following table for allowed continuous running time.

Model	r.p.m.	Hour	Note
NX5	- 12000	12	
	12000 - 15000	5	
	15000 - 18000	1	Cooling Air blow require
	18000 - 20000	0.5	Cooling Air blow require
NX4	- 5000	12	
	5000 - 6000	5	
	6000 - 8000	1	Cooling Air blow require
	8000 - 10000	0.5	Cooling Air blow require



4. Parts List

4 パーツリスト



- | | |
|------------------------|--|
| 1 Main Body | 19 Ball Bearing |
| 2 Gear Built-in Collar | 20 Angular Contact Bearing |
| 3 Bearing Holder | 21 Needle Bearing |
| 4 Collar | 22 Ball Bearing |
| 5 Main Gear | 23 Circlip |
| 6 Round Nut | 24 Snap Ring |
| 7 Setting Piece | 25 Set screw |
| 8 Flanger | 26 Set screw |
| 9 Planetary Gear | 27 Set Screw |
| 10 Gear Pin | 28 Set Screw |
| 11 Spindle | 29 Hexagon Screw |
| 12 Stopper Collar | 30 Hexagon Screw |
| 13 Positioning Pin | 31 Hexagon Screw |
| 14 Spring | 32 Guide Key |
| 15 Positioning Arm | 33 Angle Adjust Collar |
| 16 Stopper Pin | 34 Angle Adjust Bolt |
| 17 Chucking Nut | 35 Positioning Arm for Conventional Type |
| 18 SK Collet | 36 Stopper for Conventional Type |