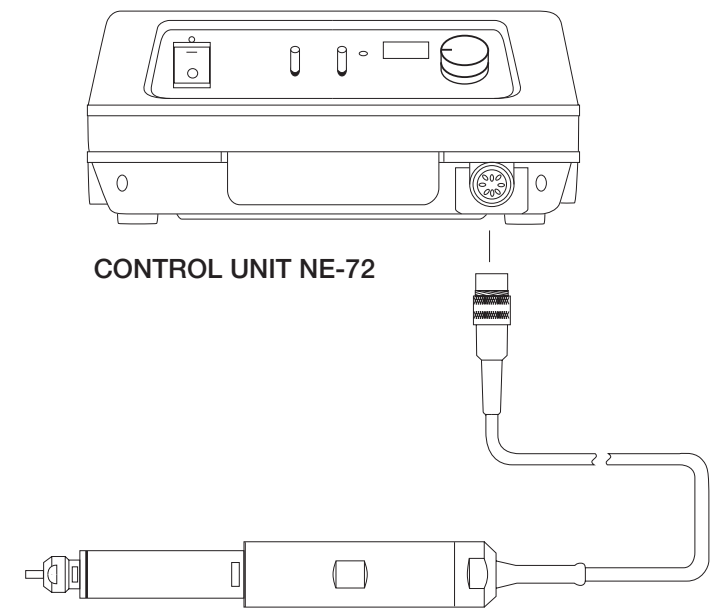


# ASTRO-E 250

## OPERATION MANUAL

OM-K0155E Rev.1



CONTROL UNIT NE-72

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※Specifications may be changed without notice.

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## ⚠ PRECAUTIONS FOR USE

- ❶ Do not block the heat radiation pore at the time of instration because the temperature inside of the control unit increases and disturb the cooling function when the fun runs in a high speed.
- ❷ When Reset Switch works, it is a sign for overload so that use the motor with the load not Reset Switch actuates.
- ❸ When using the motor with loaded condition continuously, use it less than the maximam torque 0.45cN·m (primary current 0.9A).
- ❹ ASTRO-E 250 is not a hand tool. Use it installing on a lathe, NC lathe, automatic machine, special purpose machine, etc.
- ❺ Do not hit or drop the motor spindle because it creates the cause of rotating malfunction, heat generation and the deformation of sheath.
- ❻ Clean the collet chuck often because debris and grinding powder sticking in the collet chuck and spindle may hurt them and creates the cause of run out.
- ❼ Tighten the collet chuck firmly not the bur is thrown out while it is running.
- ❽ Do not tighten the collet chuck and collet cap without mounting a bur because they may apart and very dangerous.
- ❾ When using cooling and dust protection air, always use clean air because if the dust and water are penetrated into the motor and spindle they will create the cause of malfunction.
- ❿ When using cutting lubricant, be sure to supply cooling and dust protection air.

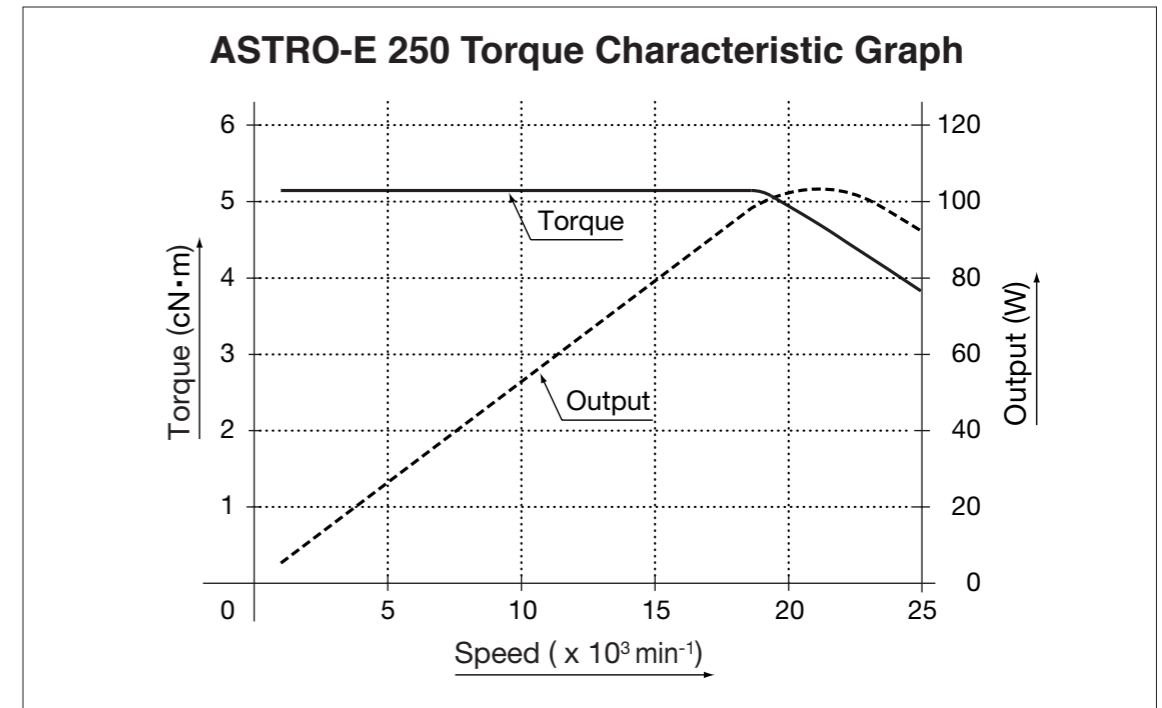
## FEATURES OF ASTRO-E 250

- ❶ Brushless DC motor eliminates the nuisance of carbon brush replacement.
- ❷ Precise digital display accurately indicates motor speed.
- ❸ Variable speeds at constant torque of 2,000 to 25,000min<sup>-1</sup> made possible of precision work.
- ❹ Sequence control terminal of control unit on NE-72 can be assembled to a machine to make a automatic machine.
- ❺ Alminium (A6061B) is used for motor and the outside diameter is 30mm with an air inlet for cooling and dust protection.
- ❻ Torque can be increased with the combination of Speed Reducers.
- ❼ Wide selection of collet chucks are available.
- ❽ Spindles and Speed Reducers from ASTRO system can be used.

## SPECIFICATIONS

Unit	
Model	NE-72
Power Source	120V, 230V
Power Consumption	75W
Weight	3.2kg (7.05Lbs)
Dimensions (mm)	W225 × D195 × H97

Motor & Spindle	
Model / Motor	EM-250, EM-255
Model / Spindle	NR-302
Speed	2,000 ~ 25,000min <sup>-1</sup>
Weight	481g w / Cord



## NOMENCLATURE

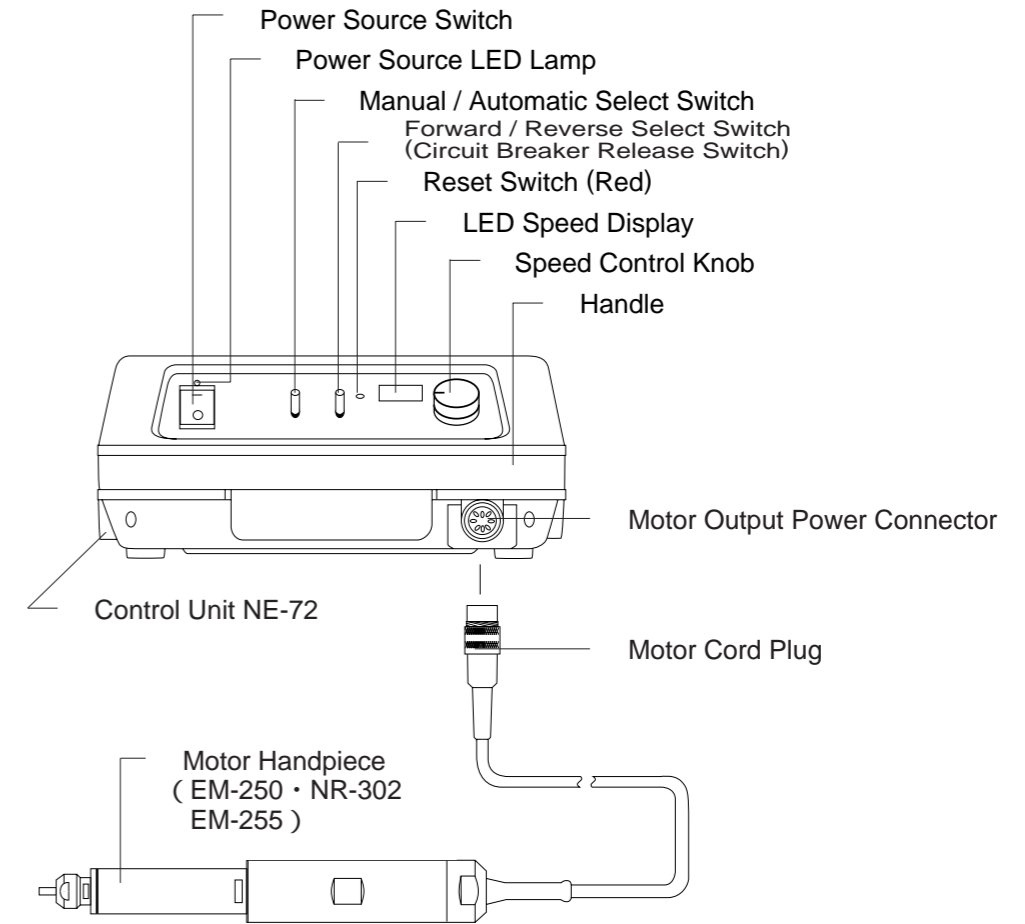


Fig. 1

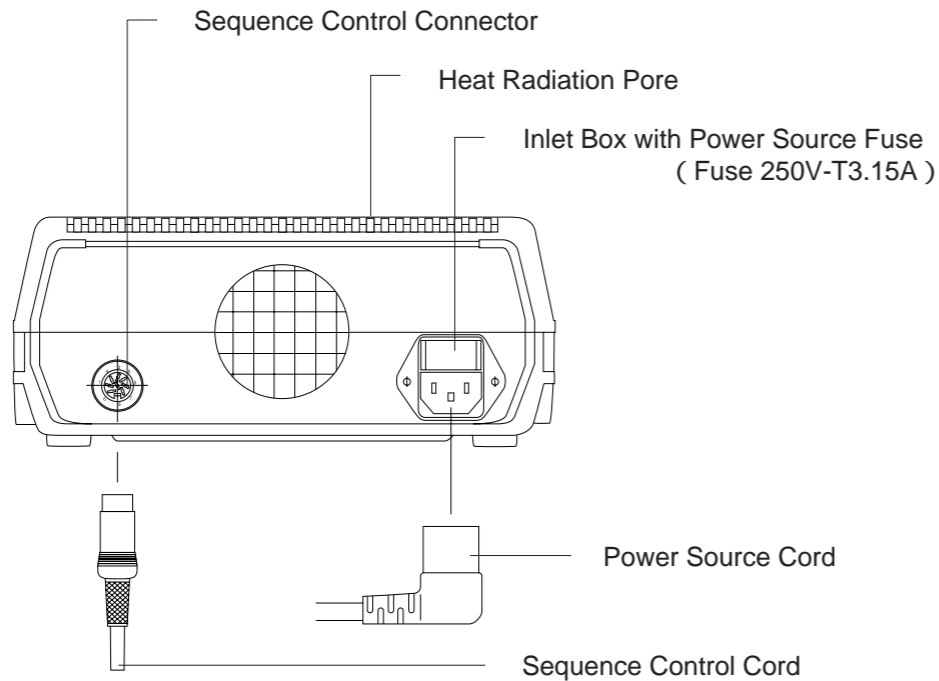
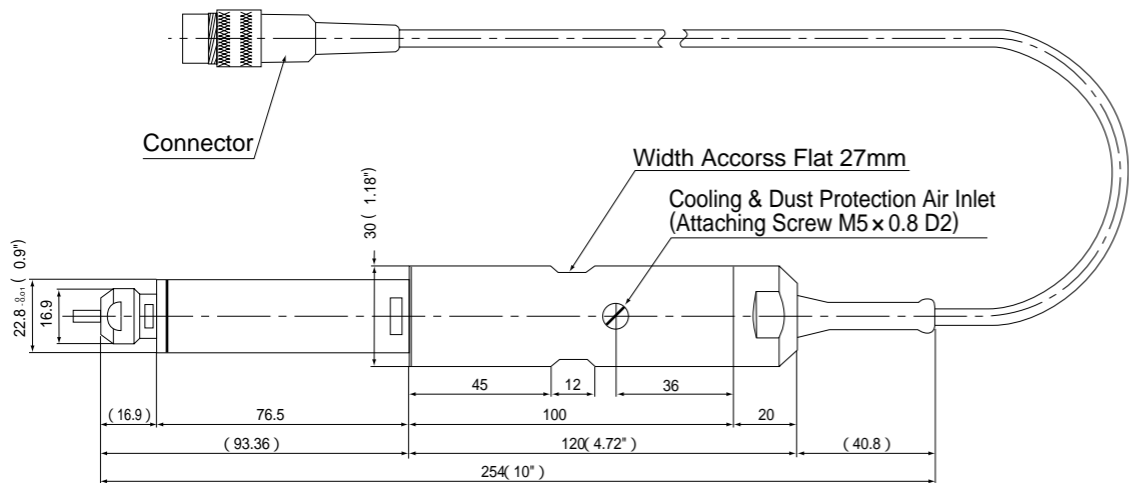


Fig. 2

**Dimension of Motor & Spindle**



Spindle NR-302

Motor EM-250  
EM-255(Cord with intermediate connector)

Fig. 3

**CONNECTION OF MOTOR CORD PLUG**

Confirming the position of Motor Cord Plug, insert the plug into Motor Output Connector located on the front side of control unit and tighten with the union nut. (Fig. 4)

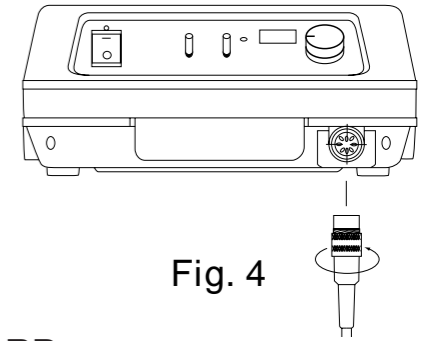


Fig. 4

**CONNECTION OF POWER SOURCE CORD**

Insert AC power source cord firmly into Inlet Box assembled with power source fuse located on the rear panel of Control Unit (Fig. 5)

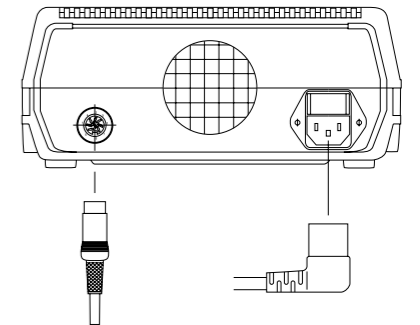


Fig. 5

**CONNECTION OF SEQUENCE CONTROL TERMINAL**

Confirming the position of Sequence Control Plug, insert it firmly into the Sequence Control Connector located on the rear panel of Control Unit. (Fig. 5)

In case of making speed control without using sequence control, turn Manual / Auto Select Switch to MANUAL. Starting and stopping the motor can be operated with Forward / Reverse Select Switch so that the connection of Sequence Control Cord is not necessary.

- Motor runs when ON / OFF terminals (No. 3, 4) are made short circuit and motor stops when the terminals are OFF.
- When Reset Switch works during the rotation, the transistor connected to TRIP terminals (No. 1, 2) are ON and can be used for the control of other machinery. (The max. standard of transistor is  $V_{CE0}=50V$   $I_c=50mA$   $P_c=100mW$ . So, use it less than the max. standard value)

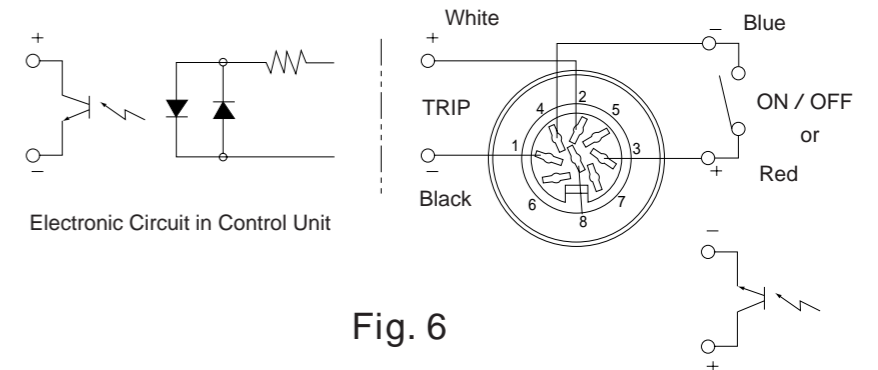


Fig. 6

- Wiring of Sequence Control Cord is as follows :

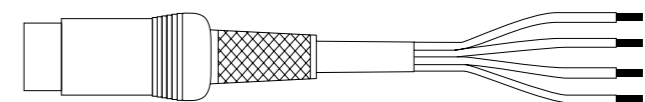


Fig. 7

- Black : No. 1
- White : No. 2
- Red : No. 3
- Blue : No. 4

## CONNECTION OF COOLING AND DUST PROTECTION AIR JOINT

- 1 Remove the filler screw of air intake inlet with a screw driver. (Fig. 8)
- 2 Install the air joint (KJL-04-M5(SMC) ) with provided 7mm spanner wrench. (Fig. 9)  
Check if spacers are included. If the spacers are missing, air is not supplied to the motor and spindle properly. (Fig. 10)
- 3 Insert and fasten 4mm tubing into Air Joint. (Fig. 11)
- 4 Connect another end of tubing to air source and supply air.  
Air pressure should be 0.2 ~ 0.4MPa (28.5 ~ 57 psi).

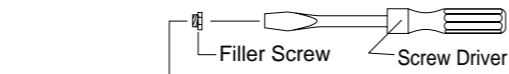


Fig. 8

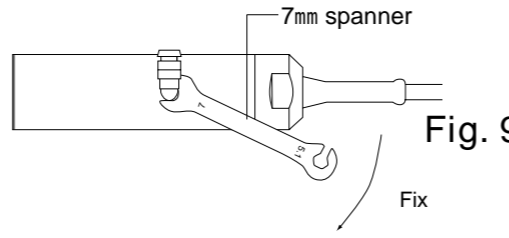


Fig. 9

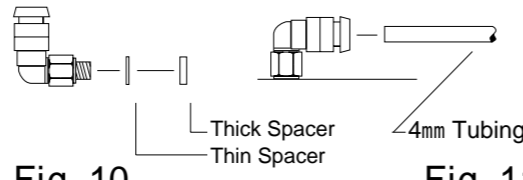


Fig. 10

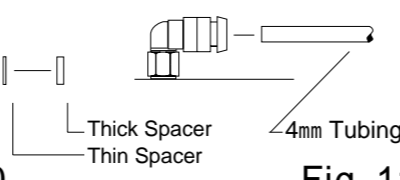


Fig. 11

**CAUTION :**  
Be sure to supply clean air excluding moisture, oil, dirt, by using air filter.

## OPERATION PROCEDURES

### Operation-1

Turn Power Source Switch **5** ON.  
(Green LED lamp is ON) (Fig. 12)

### Operation-2

Manual / Auto Select Switch **12** (Select switch for motor ON / OFF operated by manual or sequence control) (Fig. 12)

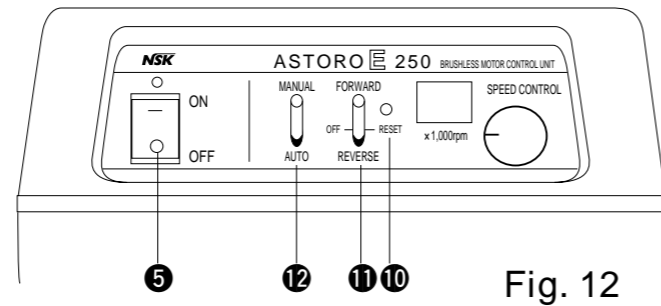


Fig. 12

- Toggle Switch is turned to MANUAL position  
Select the desired speed with Speed Control Knob.  
Along with the motor speed, the figure on Speed Display is changed from 1 ~ 25 ± 1.  
The most suitable speed of bur for grinding and polishing can be read easily. (Fig. 13)
- Toggle Switch is turned to AUTO position  
Motor ON / OFF control is made by sequence control.

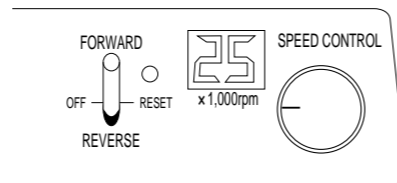


Fig. 13

### Operation-3

Forward / Reverse Select Switch **11**

This switch selects the rotating direction. Usually, forward (clockwise) direction is selected. (Fig. 12)

**When toggle switch is in neutral (OFF) position, the motor does not run.**

## MOTOR PROTECTION CIRCUIT (Release of Reset Switch)

Electronic circuit breaker works to protect the motor when overloaded. When the circuit breaker works during the operation, red LED lamp by Forward / Reverse Select Switch lights up. (Fig. 12)

**The cooling fan inside the control unit runs in a high speed if a certain amount of load is assigned.**

### 1 Releasing Reset Circuit in Manual Mode

There is a neutral (Reset) position in the center of Forward / Reverse Select Switch. When Forward / Reverse Switch is set to the neutral position, protective circuit is released and the red lamp is turned off. To restart the motor, select the rotating direction by Forward / Reverse Select Switch.

### 2 Releasing Reset Circuit in Auto Mode

When ON / OFF terminal is OFF (motor is OFF), the protective circuit is released. To restart the motor, turn the ON / OFF terminal ON (motor ON).

**If the motor is overloaded often, motor stops without lighting up the red LED lamp or turning off the green LED lamp. In such case, leave the motor as it is. Then, green LED lamp lights up and motor runs.**

## REPLACING FUSE

Fuses (250V-T3.15A) are removed by depressing the small latches from the both side of the fuse box and pull out. (Fig. 14)

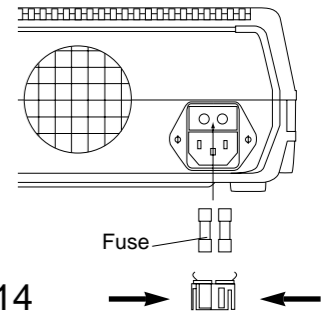


Fig. 14

## HANDLING MOTOR AND SPINDLE

### 1 Connecting Motor and Spindle

Match the screw threads on front side of motor and the rear side of spindle and turn to clockwise. If the drive shaft of motor does not match to the drive dog on the attachment, the screw threads on motor does not turn more than 2½ turns. In such case, do not force to screw in. Turn the bur with fingers as the drive shaft of the motor matches to the drive dog of the spindle by turning back the spindle. Then, screw in the spindle and tighten firmly with 27mm spanner wrench sold in market place and 20mm spanner wrench provided with the spindle.

**CAUTION :**

**When connecting the spindle to the motor, make sure the hand and the connecting parts are clean not to insert the dirt into the inside of the motor and the spindle.**

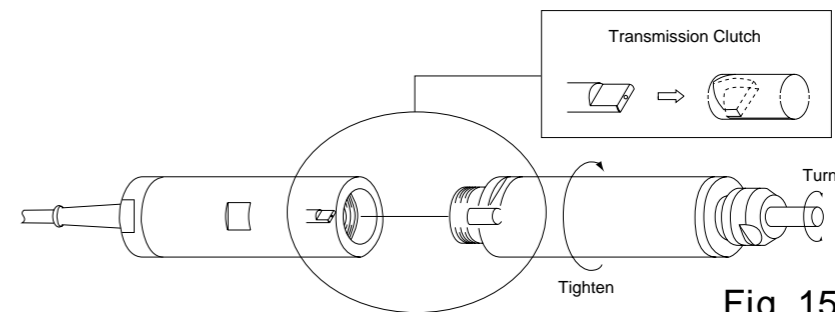


Fig. 15

## REPLACING CUTTING TOOL

- 1 Set the spindle with the provided 12mm spanner wrench.
- 2 Place the provided 14mm spanner wrench on the collet cap, turn it to counter-clockwise to loosen the collet chuck and pull out the cutting tool. (Collet chuck will not open with a release of one time. When the collet cap is made about a full turn, the collet chuck becomes tight again. Collet chuck will open when the collet cap is turned to counter-clockwise further.)
- 3 Insert another cutting tool and turn the collet chuck clockwise to fasten the cutting tool.

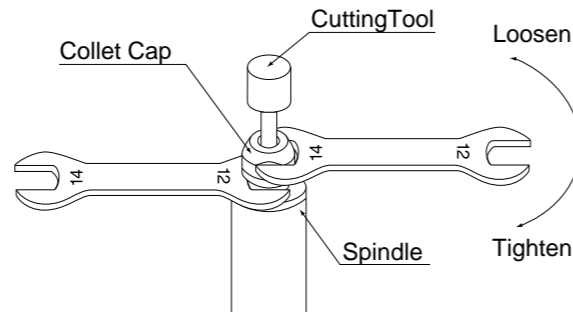


Fig. 16

## REPLACING COLLET CHUCK

Follow the procedures below to replace the collet chuck

- 1 Loosen the collet cap with cutting tool and remove according to the "Replacing Cutting Tool" steps above. (Fig. 17)
- 2 To remove the collet chuck from the collet cap, hold the collet cap in one hand and incline the collet chuck toward the spanner slit of the collet cap. (Fig. 18)
- 3 To mount a new collet chuck, incline the collet chuck toward the spanner slit of the collet cap and insert. (Fig. 18)

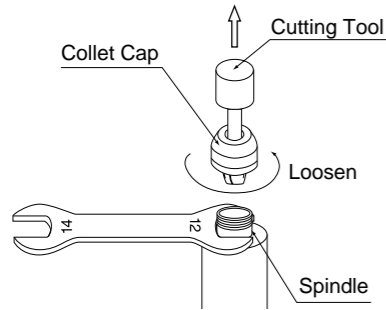


Fig. 17

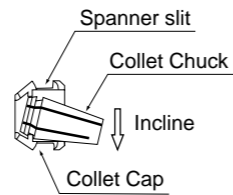


Fig. 18

\*

Standard collet chuck is 3.0mm.

Optional collet chucks are available from 0.5mm ~ 6.0mm in every 0.1mm and 2.35mm( 3/32"), 3.175mm( 1/8"), and 6.35mm( 1/4").

Optional Collet Chuck No. CHK- (Fill I.D. in )

### CAUTION :

- If the collet cap is tightened too much without mounting a tool, the collet chuck is squeezed up too much and apart from the collet cap and becomes difficult to remove from the spindle even if the collet cap is loosened.
- Do not remove the collet chuck often other than cleaning because it may hurt the collet chuck.

## INSTALLING OF SPINDLE

To install the spindle on a holder, the installation method as shown in Fig.19 is recommended. If it is not possible, install it as shown in Fig.20. Do not use mounting screws pushing directly on the spindle as shown in Fig.21, because it could damage the housing and may result in failure of rotation, overheating, etc.

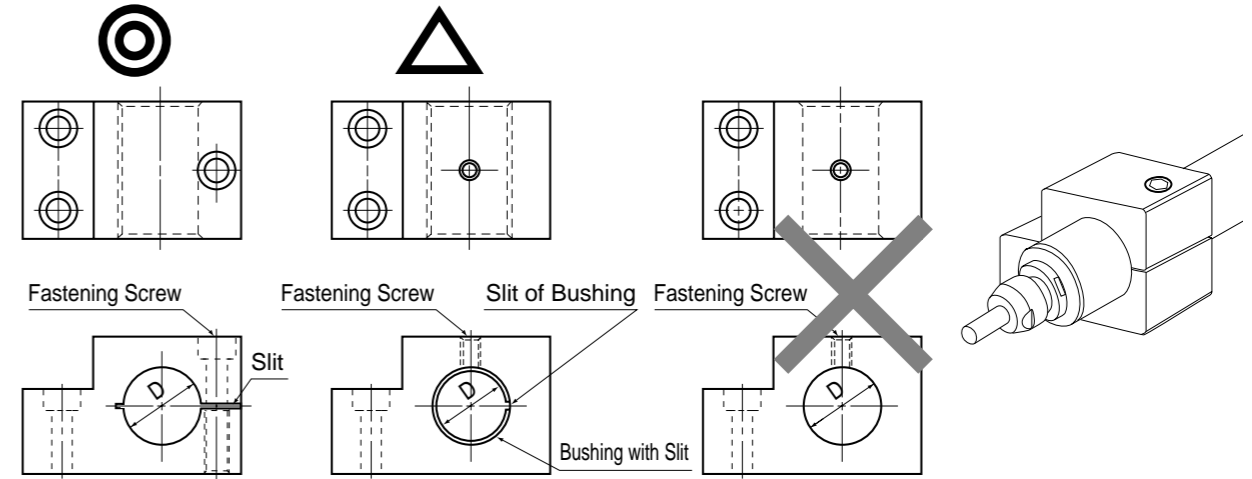


Fig. 19

Fig. 20

Fig. 21

### CAUTIONS FOR CUTTING TOOLS IN USE

- 1 Since the proper peripheral speed range of vitrified stemmed grindstone is 600 ~ 1,800m/min(1,970 ~ 5,900ft/min), it is recommendable to use within the proper speed range. (Do not use beyond the peripheral speed of 2,000m/min(6,560ft/min) since it is dangerous)
- 2 The overhanging mode of stemmed grindstone should be within 13mm, If the overhanging mode must be made beyond 13mm, use it by slowing down the motor speed. (Fig. 22)
- 3 Do not use the poor quality of grindstone with run-out, hurts, cracks, etc.
- 4 It is recommendable to use the grindstone after dressing is made.
- 5 In case of grinding, the depth of cutting per cycle is max. of 0.01mm. After one cycle of grinding, repeat reciprocating motion a few times and start next cycle of grinding.
- 6 In case of drilling, end milling, etc., follow the manufacturers' recommended speed.
- 7 Clean the shank of tool before mounting. If the dirt or foreign materials get into the collet chuck, they will create the cause of run-out.
- 8 Do not give a strong shock and do not disassemble uselessly.

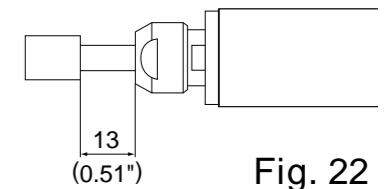
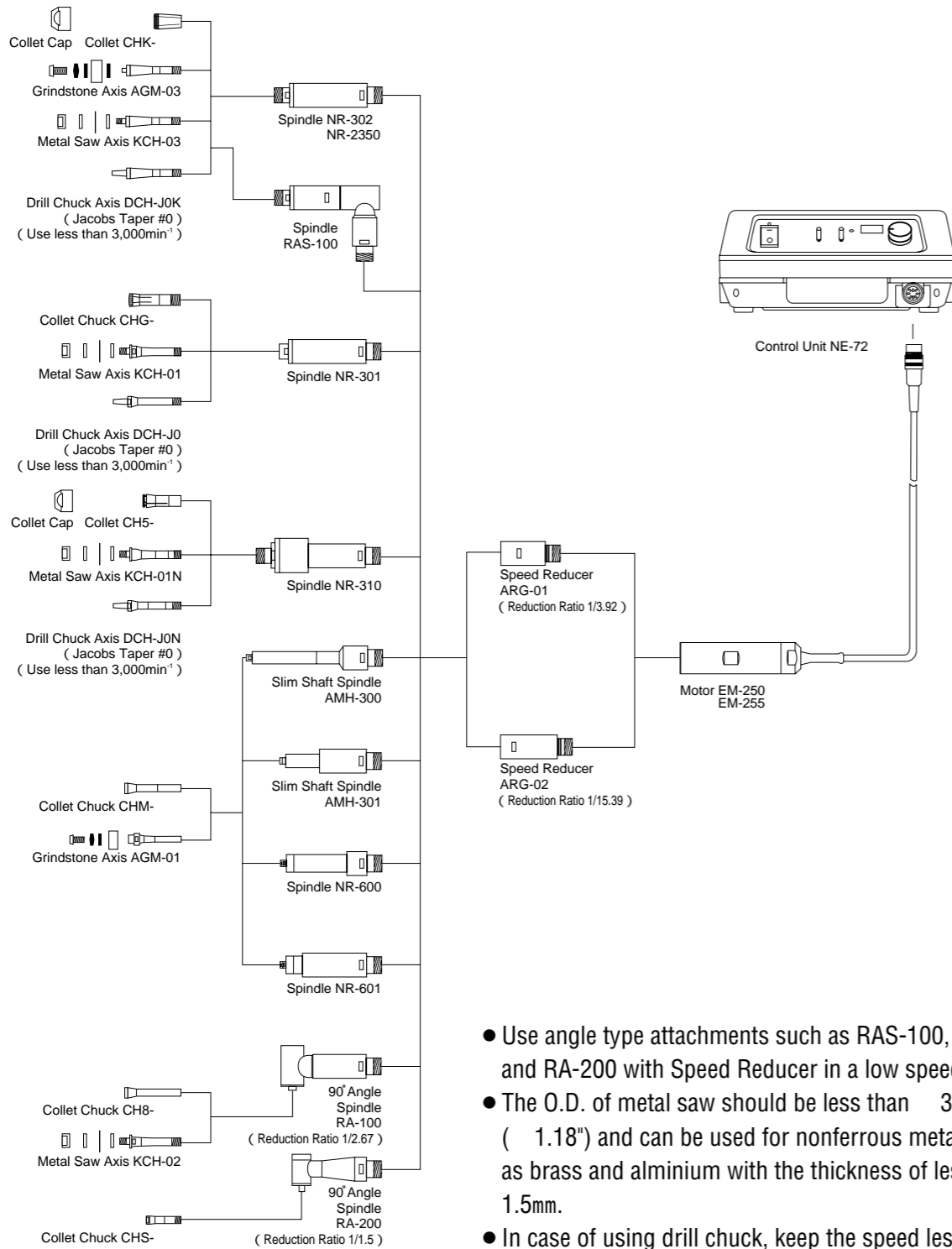


Fig. 22

# ASTRO-E 250 ATTACHMENT SYSTEM CHART



- Use angle type attachments such as RAS-100, RA-100 and RA-200 with Speed Reducer in a low speed.
- The O.D. of metal saw should be less than 30mm ( 1.18") and can be used for nonferrous metal such as brass and aluminium with the thickness of less than 1.5mm.
- In case of using drill chuck, keep the speed less than 3,000min<sup>-1</sup>.

# TROUBLE SHOOTING

Please check the following points before asking for repair.

## Unit · Motor

Trouble	Check Points	Probable Cause	Action Taken	
Motor does not run.	Power Source lamp does not light up.	<ul style="list-style-type: none"> <li>● Power plug is not connected properly.</li> <li>● Fuse is brown out.</li> </ul>	<ul style="list-style-type: none"> <li>● Connect the plug properly.</li> <li>● Replace the fuse 250V3. 15A.</li> </ul>	
		Overloaded so often.	Wait for the light up the power source lamp.	
	Power Source Lamp does not light up.	When Manual mode, motor does not run even if either FWD / REV Switch is ON.	Check if the reset lamp is light up.	Release the reset circuit. (Ref. P. 6)
			Reset lamp does not turn off even if the reset circuit is released.	Check the connection of motor plug if it is tight.
		When Auto mode, motor does not run even if either FWD / REV SWItch is ON.	FWD / REV Switch is OFF.	Switch to either FWD / REV of the converting switch.
			ON / OFF terminal is not connected properly.	Connect the ON / OFF terminal properly. (Ref. P. 4)

## Spindle

Trouble	Probable Cause	Action Taken
Run-out of bur.	Check if dirt is in the collet or spindle.	Clean the collet and the inside of spindle.
	Collet Cap is not mounted properly.	Mount Collet Cap properly on the Collet.
	Wear of ball bearing.	Repair at authorized NSK repair shop.
Noise and vibration occur during rotation.	<ul style="list-style-type: none"> <li>● Foreign materials are in the ball bearing.</li> <li>● Wear of ball bearing.</li> </ul>	Repair at authorized NSK repair shop.
	Bur shank is bent.	Replace with a good bur.