



和和機械股份有限公司

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	FM-76V Operation Instruction	
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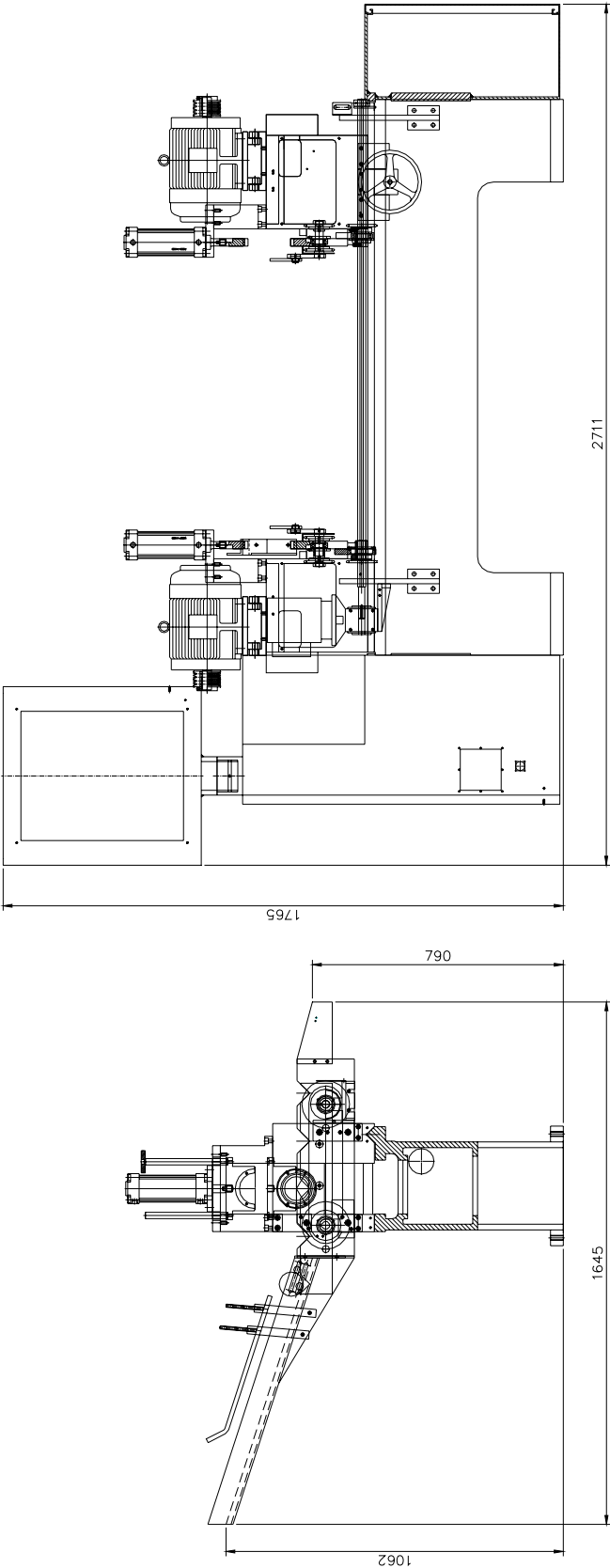
1. Safety

- (1) Read this instruction carefully and understand it thoroughly before installing, operating, and / or adjusting the machine.
- (2) Never place hands, fingers, or any part of body into the dangerous areas of the machine, unless the motor is turned off and all main power switches are in off position and tagged.
- (3) The dangerous areas are:
 - Tool head and cutting bits area,
 - Cylinder stroke areas,
 - Clamping die areas,
 - Cutting chips flying away area,
 - Motor pulley and belt areas.
- (4) Always wear a pair of goggles when operating the machine.
- (5) Press the emergency button immediately if any abnormal happens.

2. Specification

DEF-FA/76-V-Rack	
Item	Specifications
Spindle motor	3HP x 4P For both right head and left head
Spindle RPM	1394/2591 RPM (60Hz)(Option:inverter for various speed)
Working Functions & Capacity	Standard Functions a.Tube inside & outside edge chamfering & facing. Tube O.D. $\phi 16 \sim \phi 76$mm, 3mm max. wall thickness. b.Bar out-edge chamfering. Bar O.D. $\phi 16 \sim \phi 30$mm, C4 chamfer c.Work piece length : c-1.Standard type : 250mm to 1000mm c-2.Extension type : 250mm to 2000mm c-3.Extension type : 250mm to 3000mm Option:with motor to adjust the length.
	Optional Functions d.With special tool's head & tool seat Bar out-edge chamfering & centering, max.O.D. $\phi 25.4$mm.
Standard Accessories	a.One piece standard tool head.(E2A018) b.One set chamfering jaws (for one O.D. size) c.Tool seats E2A021/E2A031/E2A032/E2A034/E2A035 /E2A036, for tube $\phi 16 \sim \phi 76$ mm(O.D.)
Optional Accessories	d.Special tool sets for bar end centering. e.Oil mist system. f.Different size clamping jaws.
Pressure air	6~8 kg/cm ² , 120ml/min
Weight	1470 KG(standard type)
Dimensions W x D x H cm	256 x 122 x 180(standard type)

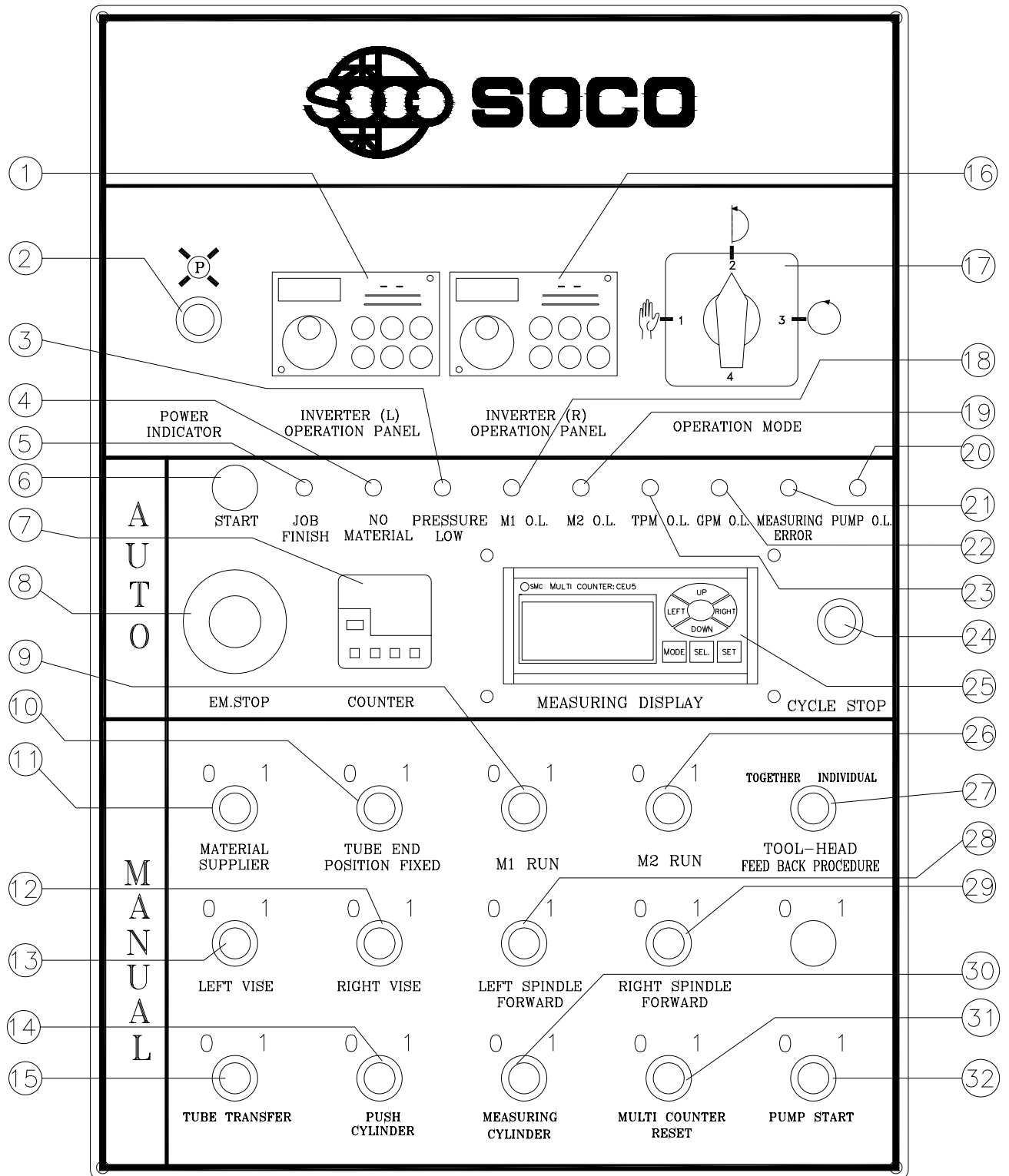
3. Outline(standard type)



4. Installation

- (1) Remove packing material.
- (2) Check the machine for any damage.
- (3) Check the accessories for any shortage.
- (4) Lift or move the machine with a sling and hoist or a forklift of proper capacity.
- (5) Install the machine on a level and rigid floor. Fix the machine with anchor bolts
- (6) Connect proper electric power and pneumatic source to the machine.
- (7) Adjust the air pressure to 6 kg/cm^2 of the air regulator system (refer to pneumatic circuit diagram).
- (8) Check the motor running direction. If the direction is not same as the marked direction, exchange connective sequence of any 2 wires of main power.
- (9) Keep the area around the machine and the dangerous area empty and clear to avoid interfering the machine's operation and injure the operator.
- (10) Adjust the air pressure to 4 kg/cm^2 for the measuring station (refer to pneumatic circuit diagram).

5. Description of Control Panel



Item	Description
1	Left inverter operation panel (optional)
2	Power indicator
3	Pressure low indicator
4	No pipe indicator
5	Figure finish indicator
6	Start button, start the semi-auto or auto-cycle operation
7	Counter, showing the number of output worked pieces.
8	Emergency stop button
9	Manual push button for left head motor on/off
10	Manual push button for the pushing cylinder at the 1 st station
11	Manual push button for BTM feeding/stop
12	Manual switch for right clamping cylinder down/up
13	Manual switch for left clamping cylinder down/up
14	Manual push button for the pushing cylinder at the 4 th station
15	Manual push button for transferring motor
16	Right inverter operation panel (optional)
17	Operation mode switch for manual, semi-auto, auto mode
18	Left head motor overload indicator
19	Right head motor overload indicator
20	Hydraulic pump motor overload indicator (hydraulic type)
21	Measuring error indicator
22	BTM motor overload indicator
23	Transferring motor overload indicator
24	Cycle stop button

25	Measuring display
26	Manual push button for right head motor on/off
27	Manual switch for tool-head feed back procedure
28	Manual push button for left head feeding/return
29	Manual push button for right head feeding/return
30	Manual push button for measuring cylinder feeding/return
31	Multi counter reset for setting standard length
32	Hydraulic pump motor on/off (hydraulic type)

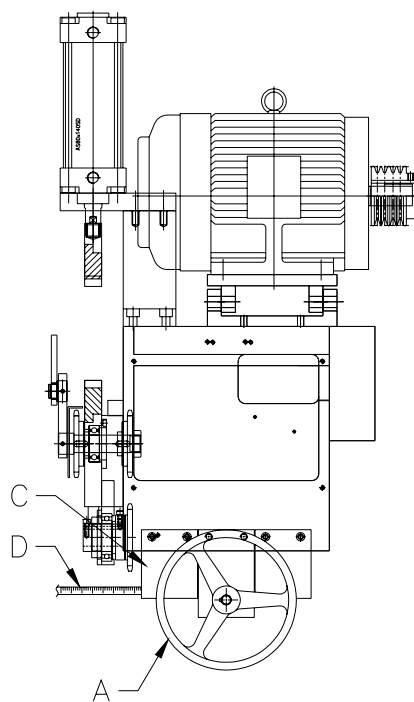
Note!!

- (1) Push this button Item 24 the machine will finish current cycle then stop.
Push the button Item 6 to restart the auto cycle.
- (2) Push this button Item 15 the transferring plate will turn once and stop.
- (3) Item 9~15, 26, 28~31 belong to the manual mode area. They are used for the purpose of testing and adjusting the machine. Be sure to switch the Item 17 to position 1 to make these buttons and switches operable.
- (4) If any one red indicator of Item 3~5 and 18~23 turns to bright, it means there is one abnormal condition in the machine. It needs to solve the problem which causes the abnormal condition before the machine can be operated normally again.
- (5) Before push the start button, make sure the transferring plates are at the downside and both of the left and the right clamp cylinders are at the uppermost position, otherwise the machine will not start.

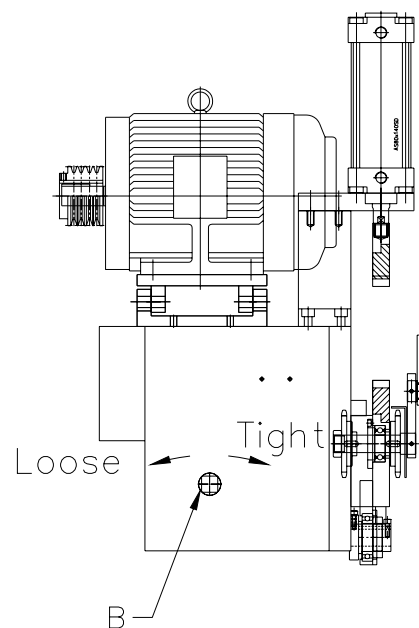
6. Adjust the distance of the two heads

Please refer to the diagram below:

- (1) Loose the headlock by using a wrench to turn the locking shaft B counterclockwise.
- (2) Use the plate C's left edge as indicator and the graduated scale D as a reference.
- (3) Turn the handwheel A clockwise to move the head leftward and counterclockwise to move the head rightward.
- (4) According to the tube's length move the head to the proper position then turn the locking shaft B clockwise to lock the head.



Front side



Rear side

7. Replace the clamping jaws

7-1.The I.D. of the clamping jaws should be the same as the O.D. of the working piece. Make sure the 4 piece jaws have the same and the correct I.D.

7-1.When change different size jaws, release fixing screws, and replace new jaws.

7-3.Screw in those fixing screws, but do not tighten them.

7-4.Set the operation mode to manual mode on the control panel.

7-5.Take one piece of working tube, put it into the clamping jaws.

7-6.Turn item 10 or 11 on the panel to clamp the tube.

7-7.Now, tighten those fixing screws.

7-8.Check and make sure the tube has been clamped firmly.

CAUTION!!

Be careful! Do not put your hand into the clamping jaws' area.

8. Adjustment of Cutting Bits

Generally, there are 3 sets of tool seat and cutting bit of

- (1) end facing,
 - (2) outside wall chamfering,
 - (3) inside wall chamfering,
- on a standard tool head.

For special propose, the number of set of tool seat and cutting bit may be 1 or 2 or 4, depending on the requirement of the shape to be finished.

Here, a tool head with 3 sets of tool seat and cutting bit is used as an example to illustrate the adjustment procedure.

Adjustment these cutting bits shall be as the following sequence.

8.1 Adjustment of tool seat and cutting bit for end facing

1. Loosen the fixing screws for 3 sets of tool seat.
2. Take a piece of working tube against the left clamping die and slide it to tool head to check the cutting bit position. Use the tube end as the position reference for checking.
3. Adjust the positioning screw of the end facing to have the cutting bit be able to cut the tube end exactly.
4. Adjust the positioning screws of the outside wall chamfering and the inside wall chamfering to have the cutting bits move away the tube end.
5. Tighten the fixing screws for 3 sets of tool seat.

6. Use manual operation to check and adjust the cutting bit.
- (1) Turn the selection switch to manual operation.
 - (2) Adjust the feeding stroke to its shortest stroke.
 - (3) Turn main power on.
 - (4) Take one piece of working tube into the rack, use the manual function to transfer the tube into the clamping area and turn the clamping switch to closing position to hold the tube.
 - (5) Press the motor run button.
 - (6) Push the feeding button to move the head forward. The tool bit will cut the tube end.
 - (7) When the head reaches the forwardmost position, push the feeding button again to move the head backward.
 - (8) Check the cutting, according to the adjusting method described in section 10 to increase the cutting stroke gradually and repeat step (6),(7) until the bit can cut the tube's end face. The recommend cutting length is 0.3~0.5mm.
 - (9) Press the motor run button again to stop the motor. After the motor has stopped completely, open the clamp.
 - (10) Check facing quality. If not acceptable, release the fixing screw of the facing seat, rotate the positioning screw to move the seat to the correct position. Repeat the testing steps above until the facing quality is acceptable.
 - (11) Stop the motor and turn off power.

8.2 Adjustment of tool seat and cutting bit for outside wall chamfering

1. Loosen the fixing screw of the tool seat for outside wall chamfering.
2. Take a piece of working tube against the left clamping die and slide it to tool head to check the outside chamfering bit's position. Use the tube end as the position reference for checking.
3. Adjust the positioning screw of the outside wall chamfering to have the cutting bit be able to cut the tube's outside edge exactly.
4. Tighten the fixing screws of the tool seat for outside wall chamfering.
5. Use manual operation to check and adjust the cutting bit.
 - (1) Turn the selection switch to manual operation.
 - (2) Turn main power on.
 - (3) Take one piece of working tube into the rack, use the manual function to transfer the tube into the clamping area and turn the clamping switch to closing position to hold the tube.
 - (4) Press the motor run switch.
 - (5) Push the feeding button to move the head forward. The tool bit will cut the tube end.
 - (6) When the head reaches the forwardmost position, push the feeding button again to move the head backward.
 - (7) Press the motor run button again to stop the motor. After the motor has stopped completely, open the clamp.
 - (8) Check the outside chamfering quality. If not acceptable, release

the fixing screw of the outside chamfering tool seat, rotate the positioning screw to move the seat to the correct position.

Repeat the testing steps above until the chamfering quality is acceptable.

(9) Stop the motor and turn off power.

8.3 Adjustment of tool seat and cutting bit for inside wall chamfering

1. Loosen the fixing screw of the tool seat for inside wall chamfering.
2. Take a piece of working tube against the left clamping die and slide it to tool head to check the inside chamfering bit's position. Use the tube end as the position reference for checking.
3. Adjust the positioning screw of the inside wall chamfering to have the cutting bit be able to cut the tube's inside edge exactly.
4. Tighten the fixing screws of the tool seat for inside wall chamfering.
5. Use manual operation to check and adjust the cutting bit.

(1) Turn the selection switch to manual operation.

(2) Turn main power on.

(3) Take one piece of working tube into the rack, use the manual function to transfer the tube into the clamping area and turn the clamping switch to closing position to hold the tube.

(4) Press the motor run switch.

(5) Push the feeding button to move the head forward. The tool bit

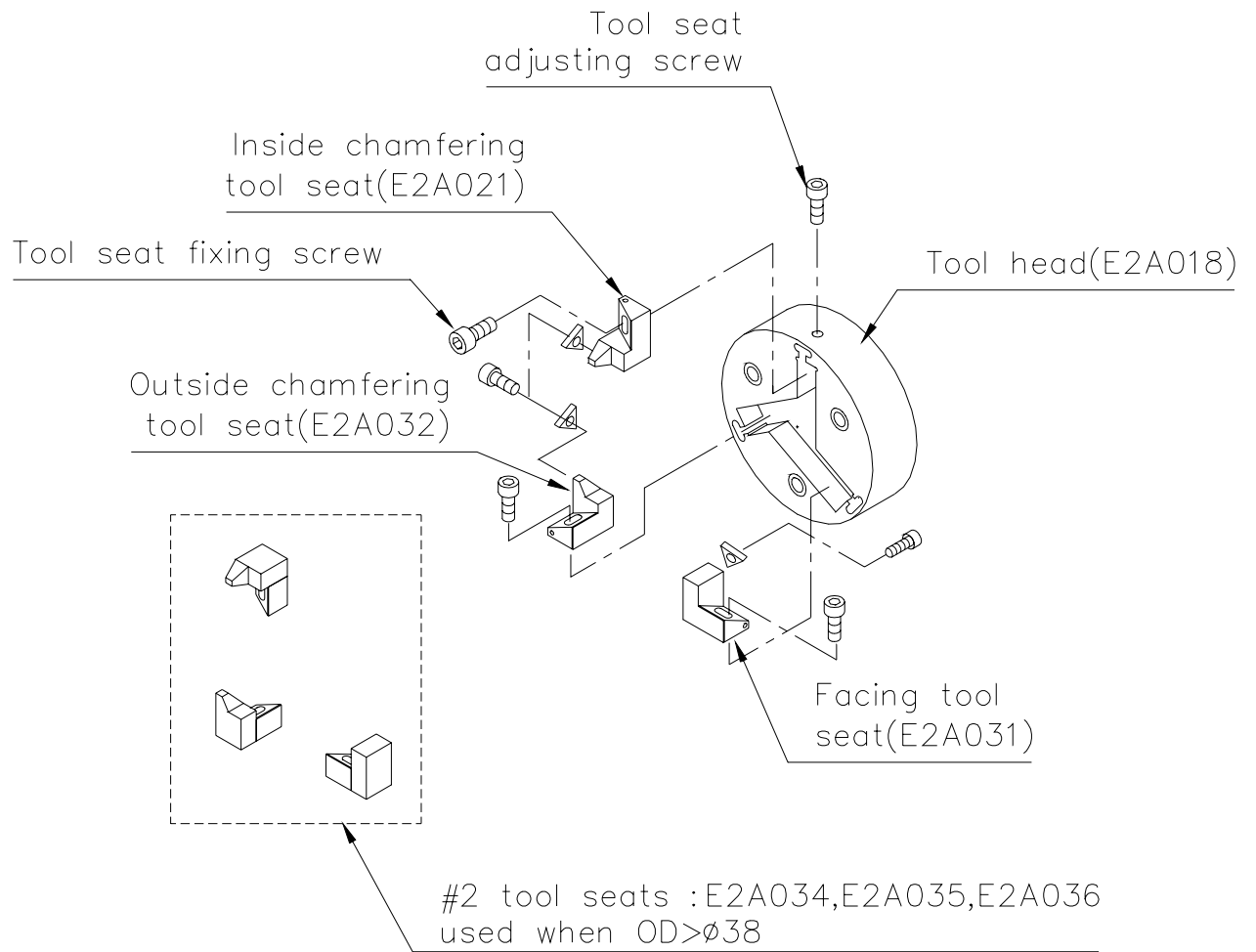
will cut the tube end.

- (6) When the head reaches the forward most position, push the feeding button again to move the head backward.
- (7) Press the motor run button again to stop the motor. After the motor has stopped completely, open the clamp.
- (8) Check inside chamfering quality. If not acceptable, release the fixing screw of the inside chamfering tool seat, rotate the positioning screw to move the seat to the correct position. Repeat the testing steps above until the chamfering quality is acceptable.
- (9) Stop the motor and turn off power.

Warning

- (1) Tool bit fixing screws must be sure been solidly tighten to prevent any vibration happens.
- (2) Chip protection cover must be in right position to prevent any chip flying out of machine.

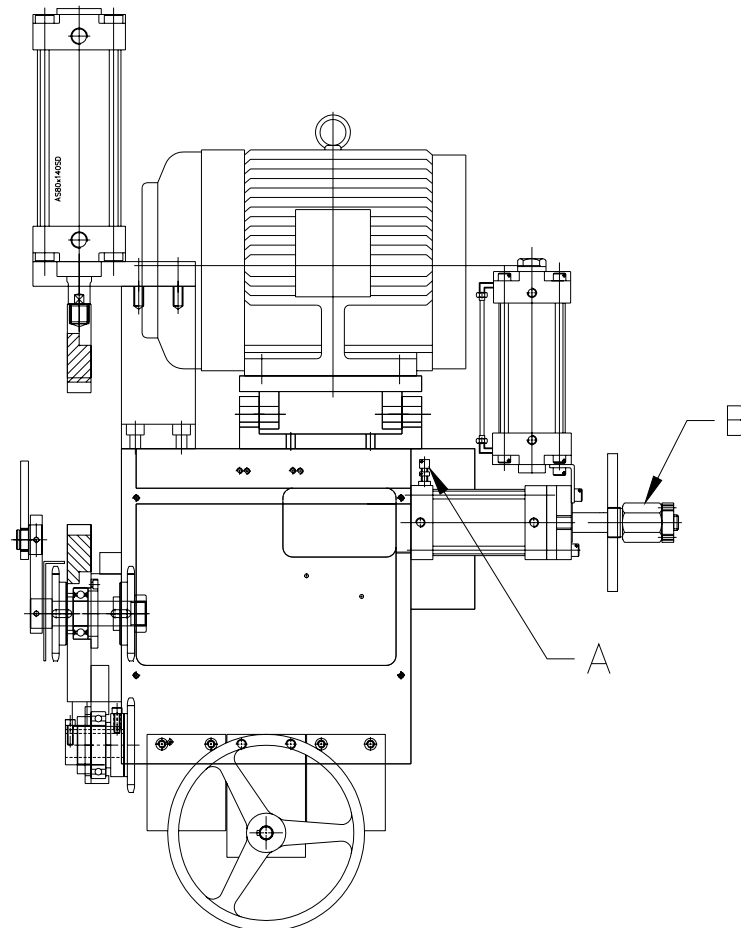
Drawing of standard tool head, E2A018



9. Adjustment of Feeding Speed

The feeding speed shall be adjusted according to the material property, the diameter, thickness of wall of the workpiece. The stainless steel, the larger diameter, or thicker wall tube shall use slower feeding speed. The correct feeding speed results in smooth cutting, low noise, unburned chips, and longer cutting bit's life.

The feeding speed is adjusted through a valve (A) on the feeding cylinder head as shown on the following drawing.



10.Adjust the cutting stroke

The cutting stroke can be adjusted by the screw nut (B) as shown on the above diagram.

10-1.Release the fixing screw of the nut first.

10-2.For more deep cutting stroke, turn the screw nut counterclockwise. The screw's pitch is 1.5mm which means one turn will move the stopper 1.5mm backward and increase the cutting stroke by 1.5mm.

10-3.For shorter cutting stroke, turn the screw nut clockwise.

10-4.Tighten up the fixing screw of the nut.

NOTE!

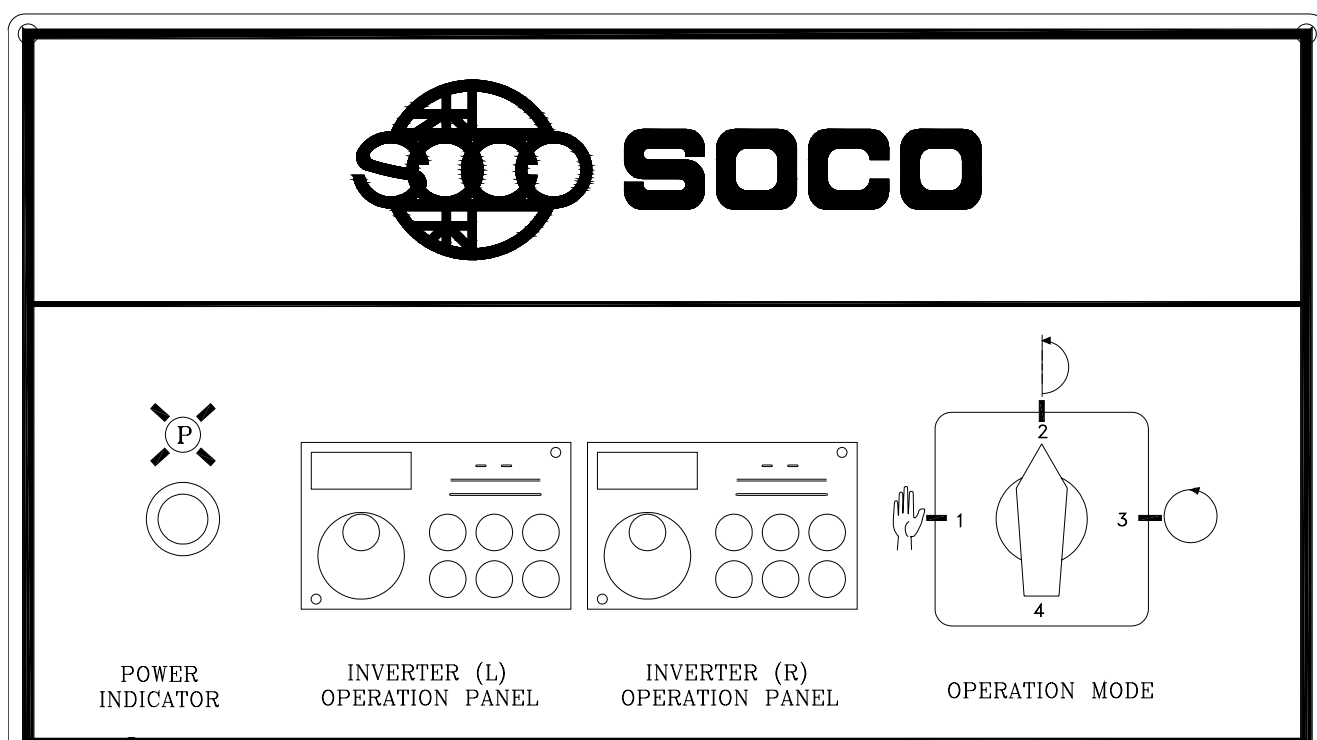
When adjusting the cutting stroke, do not turn the screw nut too much at a time.

11.Adjust the Spindle Speed (optional)

The spindle speed can be adjusted to various speed, if the machine has been installed the inverters which is an optional function.

To adjust the spindle speed, there are two knobs on the control panel as shown on the following diagram. The inverter (L) is used to adjust the left head' spindle speed, and the inverter (R) is used to adjust the right head's spindle speed.

Check the current frequency of the inverter on the control pad of the inverter inside the electrical box.

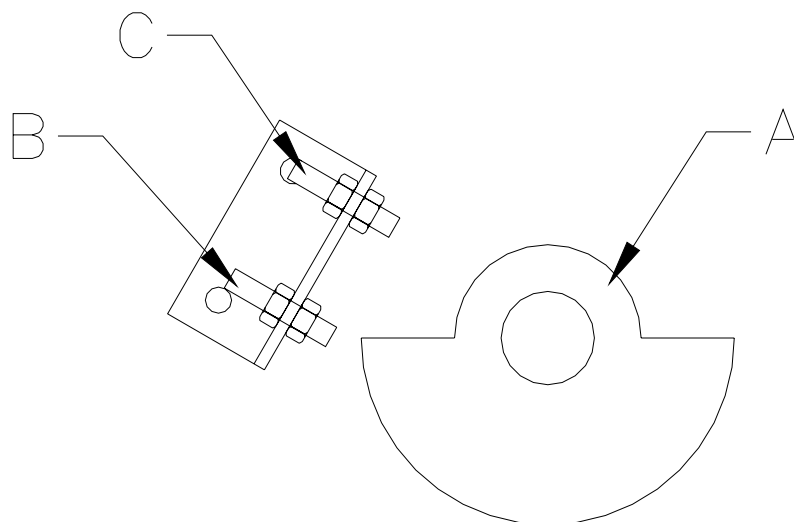


12. Adjust the sensor disk

The sensor disk is used to detect and control the transferring plate's position. Please refer to the drawing below.

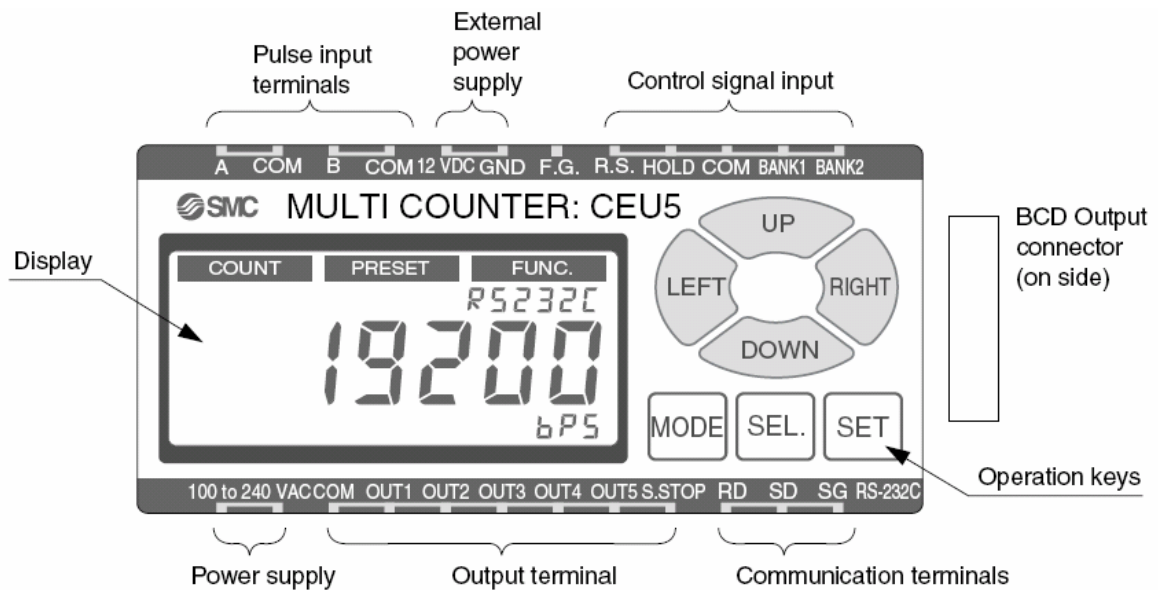
The sensor disk A will rotate with the shaft of the transferring plate, when it reaches sensor B the transferring plate will stop. To change the transferring plate's stop position:

- (1) Loose the fixing nut of the sensor disk.
- (2) Turn the transferring plate to the desired position.
- (3) Turn the sensor disk to reach the sensor B.
- (4) Tighten up the fixing nut of the sensor disk.



13. Measurement function

13.1 Display introduction



Display : Show the setting value and measuring value.

MODE : Press this button to change the mode, three modes are available – (COUNT, PRESET and FUNC. MODE)

SEL. : Move the cursor among the parameters.

SET : Writes displayed data into the memory when setting.

UP : To increase the parameter.

DOWN : To decrease the parameter.

LEFT : Move the cursor to the left.

RIGHT : Move the cursor to the right.

13.2 Setting plus and minus sign

In order to let the plus and minus of the measuring result meet with one real work piece length. Need to set the input type of signal:

(1) Press MODE button till FUNC. MODE, as below:



(2) Then press UP/DOWN button till Input type, as below:



(3) If the shows are not “-2PHASE”, must change the setting.

(4) Press SEL. button to move cursor to “-2PHASE” as above.

(5) Then press UP or DOWN button to change the word to “-2PHASE”.

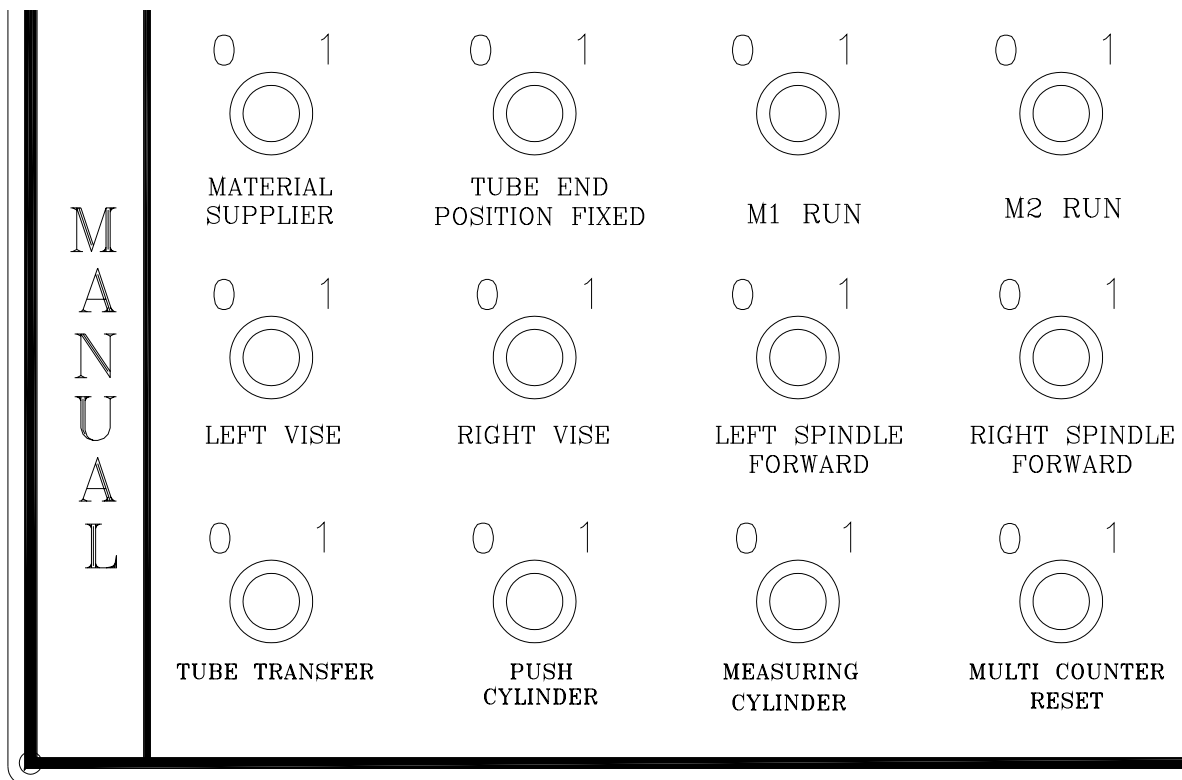
(6) Press SET button to save the setting.

13.3 Length reset

Take a standard tube to reset length value before measuring. All of the workpieces of after working can be compared with the standard value. Setting way as below:

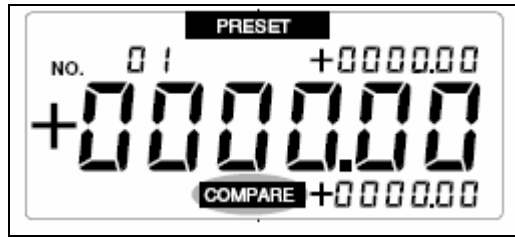
(1) Change operation mode on control panel to manual mode.

- (2) Confirm the MODE on measuring display is COUNT MODE.
- (3) Take a worked tube as the standard basis; put it on the 4th station (measuring station).
- (4) Press the “PUSH CYLINDER” button to clamp tube.
- (5) Press the “MEASURING CYLINDER” button to measure.
- (6) Press the “MULTI COUNTER RESET” button, let the measuring value reset.



13.4 Setting tolerance

- (1) Press the MODE button on the measuring display till PRESET MODE.



The “NO. 01” in the above picture represents the first setting value (FM-76V only uses the first setting value; please don’t set any value on the other NO.)

There are three “+0000.00”(mm) on the picture:

Up – upper limit

Medium – standard length setting value (remain +0000.00)

Down – lower limit

(2) Change the output type of measuring value to COMPARE.

If the word shows on the display is not COMPARE (maybe is 1SHOT or HOLD). Then, press SEL. button to let the cursor moves there, then press LEFT/RIGHT button makes the words change to COMPARE and press SET to save the setting.

(3) Press SEL. button to set tolerance. The cursor will flash. Press SEL. button once more to move the cursor to the upper limit.

(4) Press LEFT/RIGHT button can move the cursor to the desired setting digit

(5) Press UP/DOWN button can change the value and the sign of plus and minus.

(6) Repeat the step (3) ~ (5) for setting the lower limit.

(7) Press SET button to finish setting.

13.5 Setting tolerance

- (1) Press the MODE button till COUNT MODE when all settings were finished.
- (2) Change operation mode on control panel to be auto mode and then chamfering and measuring.
- (3) The FM-76 will stop running and show measuring error when the measuring value of the tube is over setting tolerance.

14. Operation

14.1 Manual operation

- (1) Manual operation is used to adjust and check the tool head, tool seats, cutting bits, feeding speed, spindle speed, etc. and test the machine running. For above operation please refer to the previous sections for details.
- (2) Be sure to switch the mode selection switch to the manual mode (position 1) to make the manual area buttons and switches operable.

14.2 Semi-auto operation

- (1) Switch the mode selection switch to position 2.
- (2) The machine will do the auto-cycle once to check all the settings and adjustments are correct before proceeding to do the mass production.

14.3 Auto-cycle operation

- (1) Switch mode selection switch to position 3.
- (2) If everything has been set correctly, use this mode to start the mass production.

15. Maintenance

- (1) Everyday before starting the machine, check main power wire and compressed air hose if they are in good connection and good condition.
- (2) Check the hydraulic oil is in proper level.
- (3) Everyday after finishing working, remove all chips and dirt and wipe it clean. Apply some lube oil on moving parts.
- (4) Release condensed water trapped in the air treatment assembly from time to time.