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DEF-FA/76-V

Operation Manual

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1 Introduction

With the SOCO DEF series for long lengths, it is possible to simultaneously chamfer both ends of a tube, with up to 3000mm in working length. With an optional BTM (Bundle Loading Magazine), the machines offer a completely automatic loading, feeding and chamfering process. This range is suitable for a clean and even chamfer on both ends of the tube, with chamfering the inside + outside (I/O) and face of the material or making a radius (round) chamfer. It may also be used for outside chamfering of solid bars.

Double Tube Ends Chamfering with Long Working Lengths from 250mm~3000mm. Capacity up to $\varnothing 76$ mm. Automatic Loading, Feeding and Chamfering. May connected to the SA-78NCE be an Automation Cells.

2 Safety Precautions

2-1 Introduction

1. Machine operators must read the manual thoroughly, and fully understand the functions of the machine and its safety requirements before usage.
2. No one other than qualified operators should operate the machine.
3. This machine design has complied with safety requirements of your company. In case of any concern, check on the detail of each requirement as needed.
4. The operator should check to ensure that the machine is connected to proper power source before usage.
5. Depress emergency stop button and shut off power source if any unusual situation occurs during usage.
6. Un-plug power source while installing, dismantling, maintaining, or adjusting the machine
7. During the process of adjusting or testing the machine, if the electric power needs to be on, the operator should pay extra attention to the action of automatic mode to ensure people safety.
8. Keep the machine and its surrounding clean and bright to ensure operation safety.
9. Maintain the machine periodically to ensure normal functions of each part of the machine.
10. Do not operate the machine beyond its specifications.
11. 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. The dangerous areas are:
 - a. Tool head and cutting bits area.
 - b. Cylinder stroke areas.
 - c. Clamping die areas.
 - d. Cutting chips flying away area.
 - e. Motor pulley and belt areas.
12. The operator must wear eye protective goggle while operating the machine.

2-2 Personal Protective Equipment

1. Operators and maintenance personnel carrying out various operations on the machine must used personal protection equipment, e.g. goggles, boots and gloves to eliminate the possible risks related to the various activities being carried out.

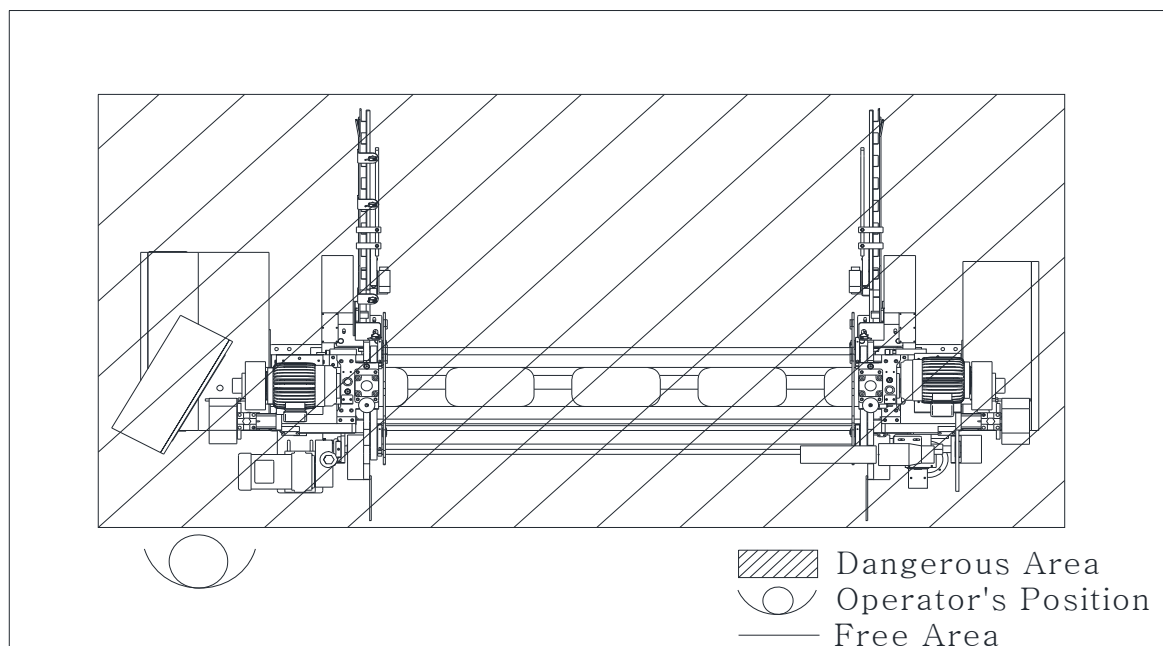
2. The clothing of machine operators and maintenance personnel must comply with the essential safety requirements specified in community Directives 89/656/EEC, 89/686/EEC and laws in force in the country where the machine is installed.
3. Do not wear accessories or jewelers, including bracelets, watches, rings or necklaces, when carrying out maintenance operations in which operation in unprotected area is required to avoid mechanical risks, such as dragging, entrapment or other.
4. Wear safety boots and protective gloves during all working phases and when changing the tools, filling the tubes, handling cut parts, setting the machine and carrying out maintenance operations.

2-3 Danger Zones

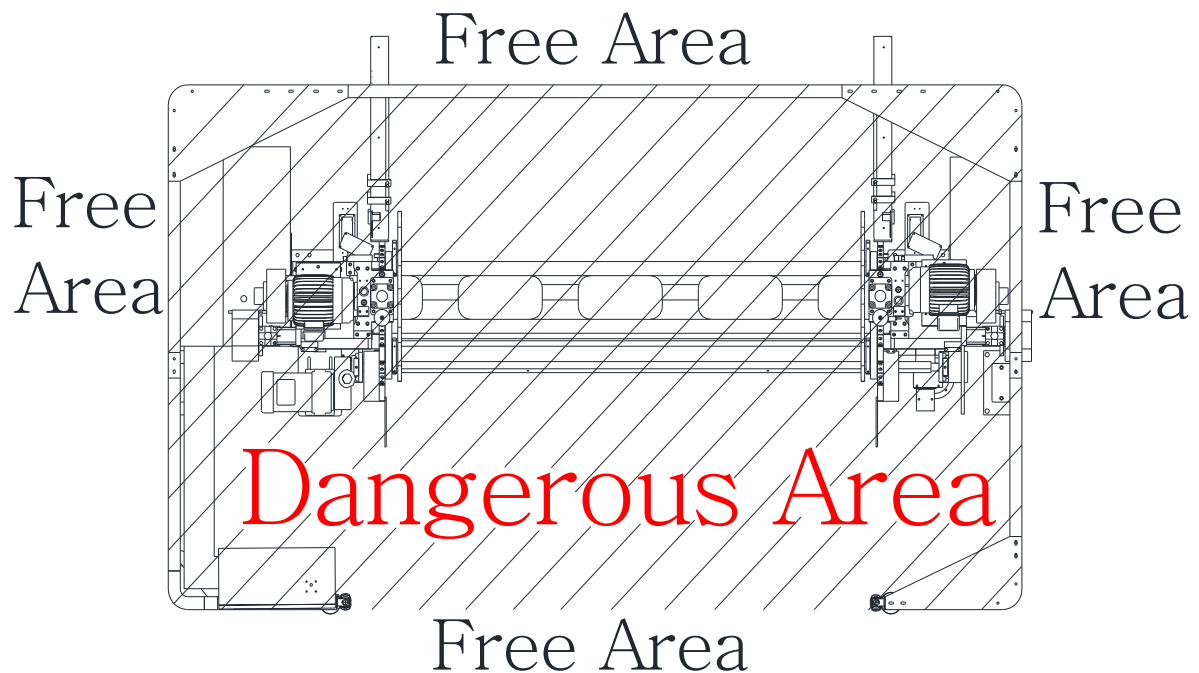
1. Standard type

The operator's workplace and the necessary free space around the system to ensure regular activities related to the machine.

A free space of at least one meter around the entire perimeter of the machine is required to ensure safe operation.



2. Fence type



2-4 Safety Devices

- Emergency stop button

Red emergency stop mushroom buttons are arranged on the machine.

Press one of the mushroom buttons to stop the machine in an emergency. The buttons operate a safety circuit and block all movements.

Carry out the following procedure every 200 hours to test correct operation of the emergency stop circuit:

1. Start the machine.
2. Press an emergency stop button.
3. Reset the emergency stop button.

Repeat this procedure for all emergency stop buttons. You will not be able to restart the machine if the emergency circuit fails.

- Power switch

To disconnect main electric power when it is placed at ON position. For maintenance, you should turn it to OFF position then could open this electric box door.

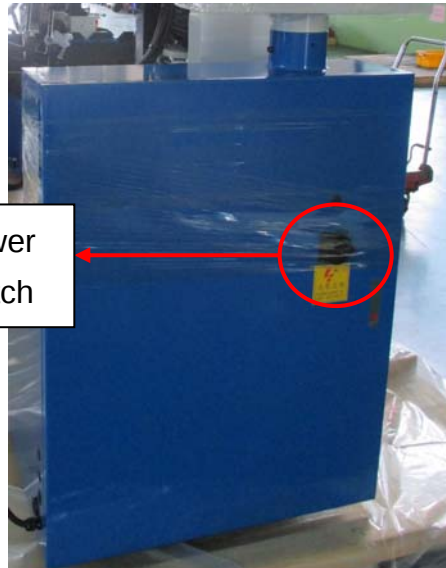
- Safety fence

It is installed to form an operating range and prevent the operator from entering into the operating range.

Emergency
stop button



Power
switch



2-5 Operating 、 Running

Please reading the manual in advance and operating this machine according to the manual instruction.

★ **We will not be responsible for any operating accident due to the customer unauthorized remodeling or adding any additional device.**

1. Operation, always arrange single operator to operate this machine. It is very dangerous to have multiple operators operating this machine in the same time. Please absolutely avoid doing it.
2. Never let hands or body near and inside the machine running partitions. It is very dangerous and please absolutely avoids doing it.



3. Always turn off electrical motor and confirm the machine stop before replacing die. It is very dangerous to do this without turning them off. Please absolutely avoid doing it.
4. Always confirm that there is no tools, fixtures, or any other unnecessary things inside the action area before operating this machine, otherwise machine failure or human injury may happen. Attention required, please.

2-6 Maintenance 、 Inspection

1. Never disassemble and remodel any component of this machine, otherwise it may result in fire, machine failure and malfunctions.
2. Never do directly welding on this machine; otherwise it may result in machine failure and malfunctions.
3. Always cutoff the power supply and wait for 5 minutes before loading/unloading and replacing any components, otherwise it may result in electrical shock or machine failure.
4. Always cutoff the power supply before performing daily inspection, otherwise it may result in electrical shock in the power on condition.
5. In order to avoid non duty person turning on the machine power during the machine maintenance and inspection periods, please paste a warning sign of “No Power On” or “Power On Forbidden” beside the machine primary power at the machine power control panel, otherwise it may result in electrical shock or human injury.
6. Never load or unload any wire, baseboard, and connectors while machine is power on, otherwise it may result in electrical shock, machine failure and malfunctions.
7. Please confirm that every bolts installation, applying tools collection and cover doors of control panel and machine are all well arranged after maintenance and inspection work finished, otherwise it may result in electrical shock, fire, human injury or machine malfunctions.

2-7 Warning Plates and Warnings

The form and contents of warnings are described in the following.

No	DRAWING	EXPLANATION
1.		● Always wear earplug when operating machine.
2.		● This symbol indicates there are high voltage electric facilities with potentially danger and may cause risk to the life and health of individuals. Do not remove this cover without disconnecting main power supply. Not observing these notes may result in injuries.
3.		● Don't open this door before the spindle stop. Not observing these notes may result in severe cutting injuries.



3 Machine Specifications

Please consult appendices 9-2.



4 Installation

Please read the instruction carefully before installation.

If having any question please contact your dealer for prompt service.

4-1 Unpacking and Inspection

1. Check if there is any damage on the wooden case or the plastic bag that used to pack the machine. Should any damage be found on the machine, please claim for the damage against the delivery or insurance company.
2. Check the machine and accessories against the packing list. Should any shortage, please contact your dealer.

4-2 Handling, Lifting, Transporting and Unloading Procedure

4-2-1 Preliminary operations

Follow the preliminary lifting activities listed below before handling the machine:

1. Suitably lock all parts.
2. Remove all tools from the unit, where relevant.
3. Arrange the units so that they are balanced.

4-2-2 Lifting the machine

1. Use a forklift to lift the machine. The operator must be qualified and capable of carrying out the task.
2. Lift the machine a few centimeters and check that the load is balanced.
3. Lift the machine after making sure that it is perfectly balanced.
4. The maximum component weight is of the parts of the machine for transport is shown in 9-2. Table of the Machine data. Make sure the forklift's capacity is enough to lift the machine.
5. The presence of at least two workers is recommended when loading and unloading the machine: one person will operate the forklift and the other will check the lifting making sure that the machine does not collide with other objects.
6. Workers will keep a safety distance greater than 2 meters around the machine when it is lifted for higher than 50mm.
7. Pay the utmost care when carrying out these operations.

4-3 Installation

The machine installation area must be sufficiently wide to house the machine and provide space to move around it for carrying out the various intervention related to machine operation.

Follow the procedure to install the machine:

1. Level the machine by means of the adjustment screws.(Figure 4-2)
2. Connect the delivery and return tubes of the hydraulic unit to the machine. Check that the unit connection plate corresponds to the machine system connection plate.
3. Pour in oil to reach level of 90 liters.
4. Check that all hydraulic connections to the various distributors are correctly made.

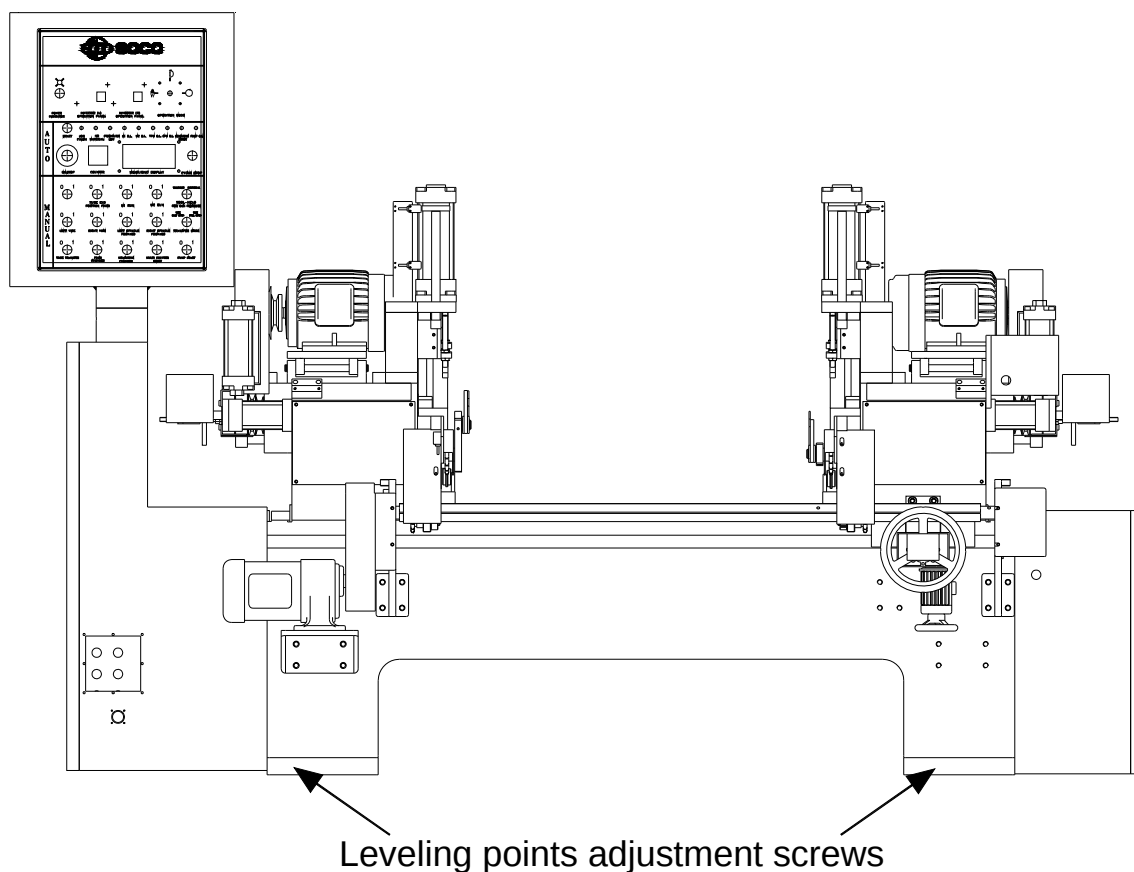


Figure 4-2 Leveling points

4-4 Filling Hydraulic Oil

1. Prepare one of following or equivalent hydraulic oil.
 - VISCONTY ISO VG46
 - MITSUBISHI DIAMOND HYD46
 - SHELL TERAS OIL C46
 - SHOWA SHOSEKI JH46
 - CHINA PETROLEUM AW46
2. Check the oil level gauge. The oil level shall be in the middle height of the gauge.

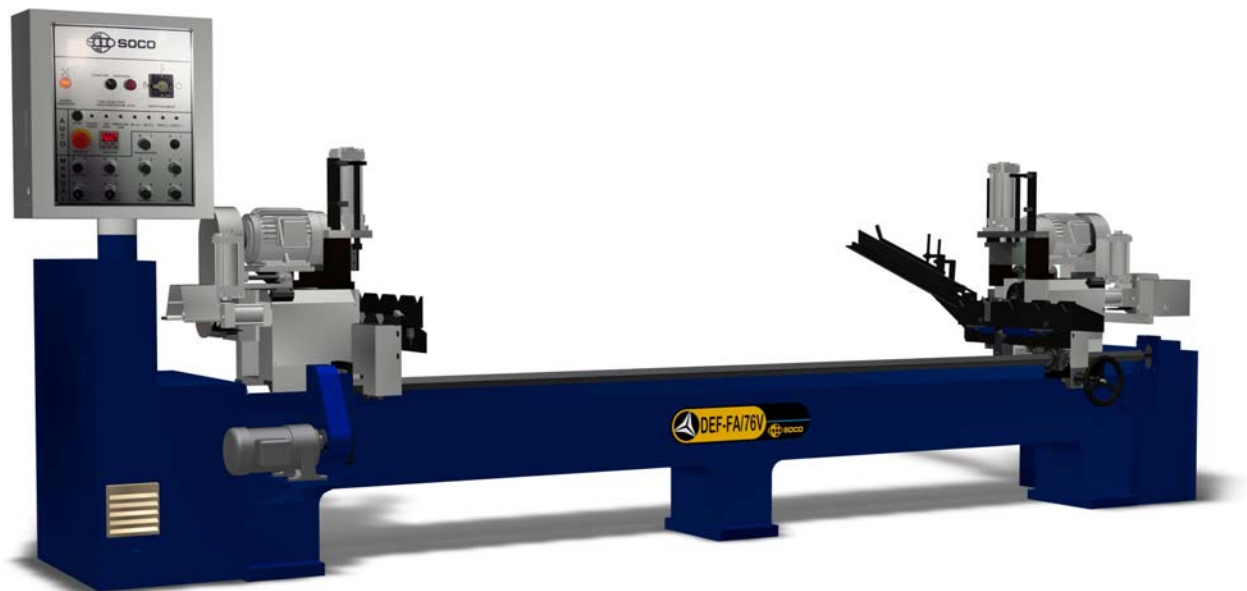
4-5 Connecting Electric Power

Note: Only the qualified electrician is allowed to perform this work.

1. Connect proper electric power and pneumatic source to the machine.
2. Adjust the air pressure to 6 kg/cm² of the air regulator system (refer to pneumatic circuit diagram).
3. 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.
4. Adjust the air pressure to 4 kg/cm² for the measuring station (refer to pneumatic circuit diagram).

5 Machine Outline

A. Standard type

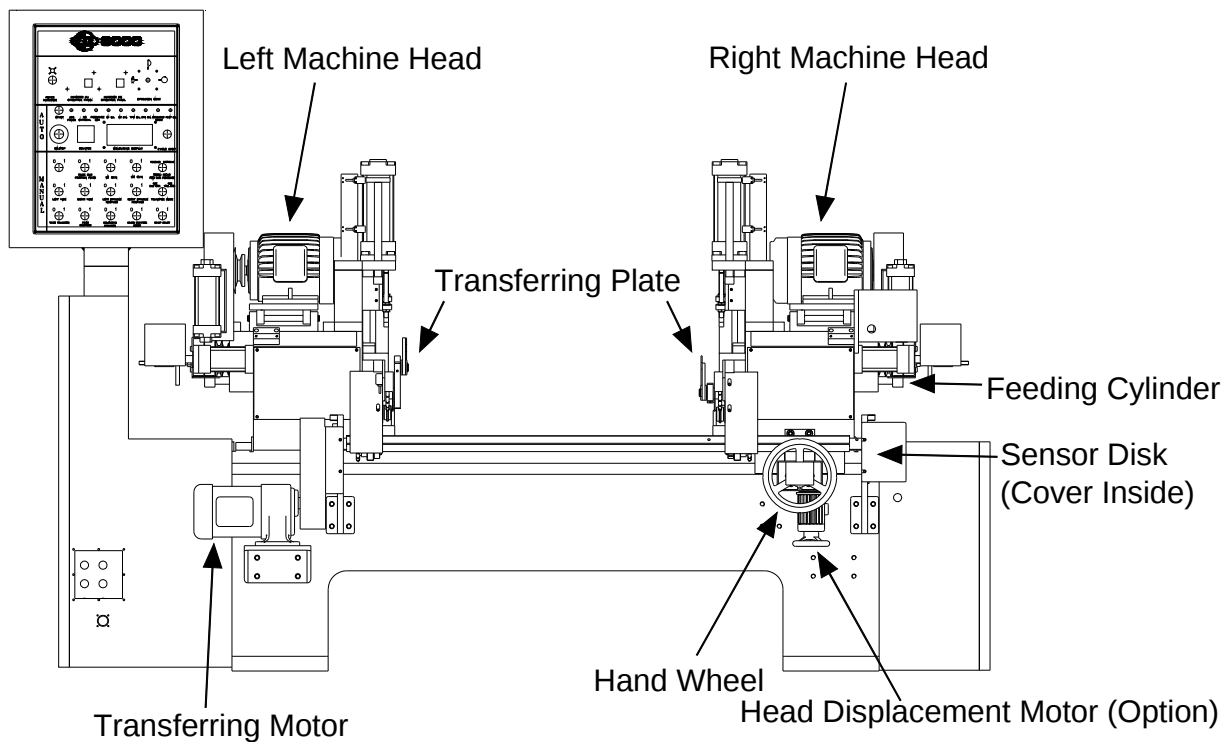


B. Fence type

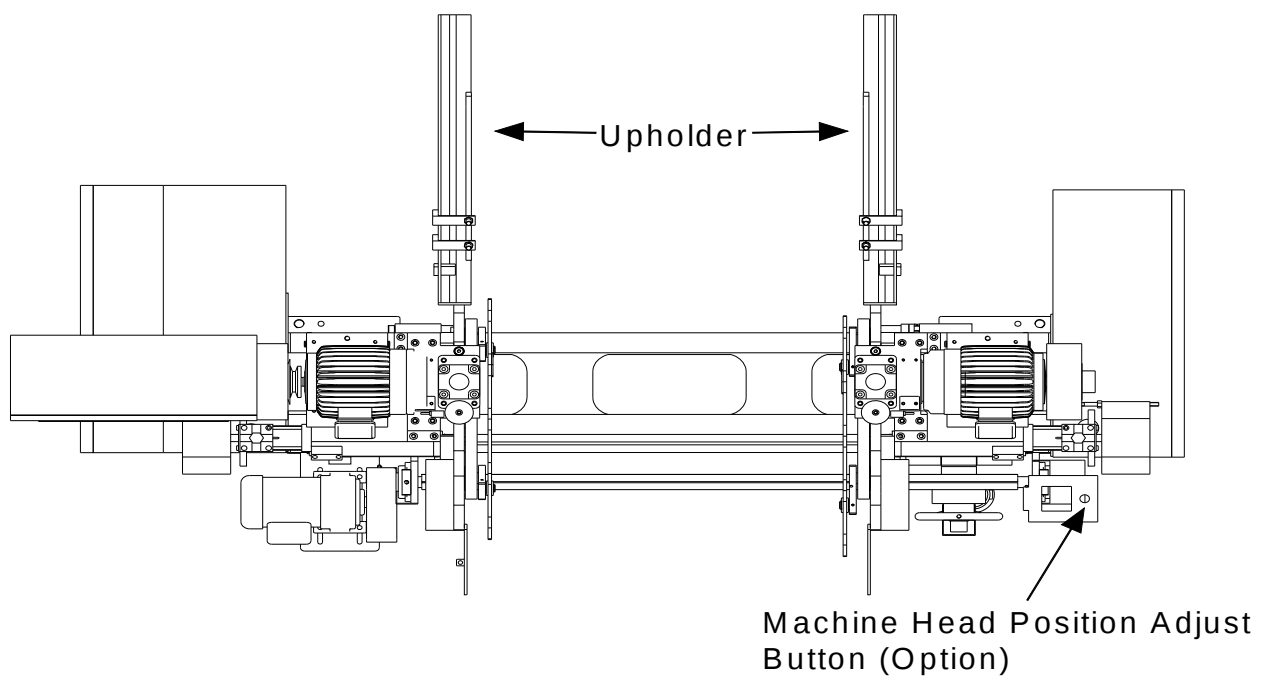


5-1 Machine Outline and Major Components

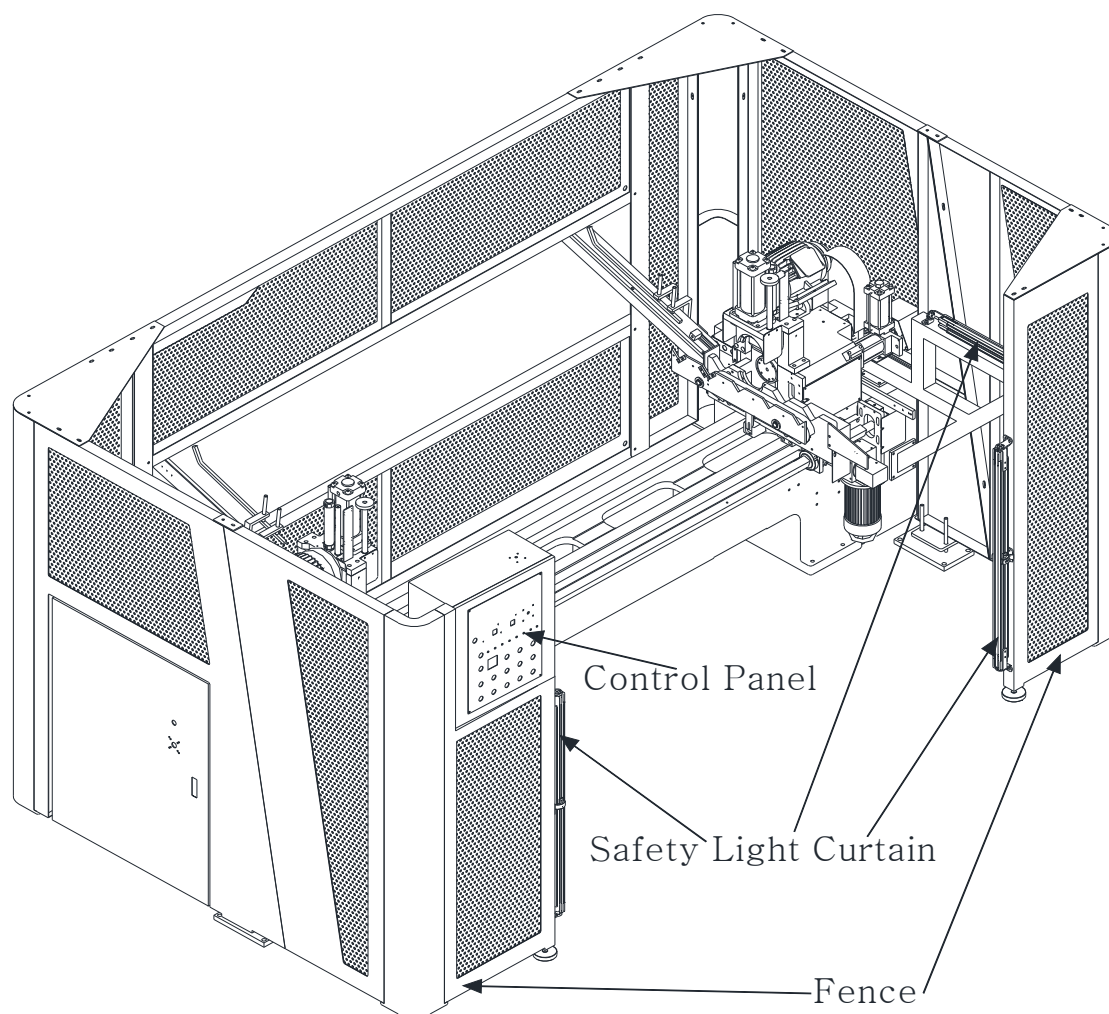
5-1-1 Front view



5-1-2 Section view

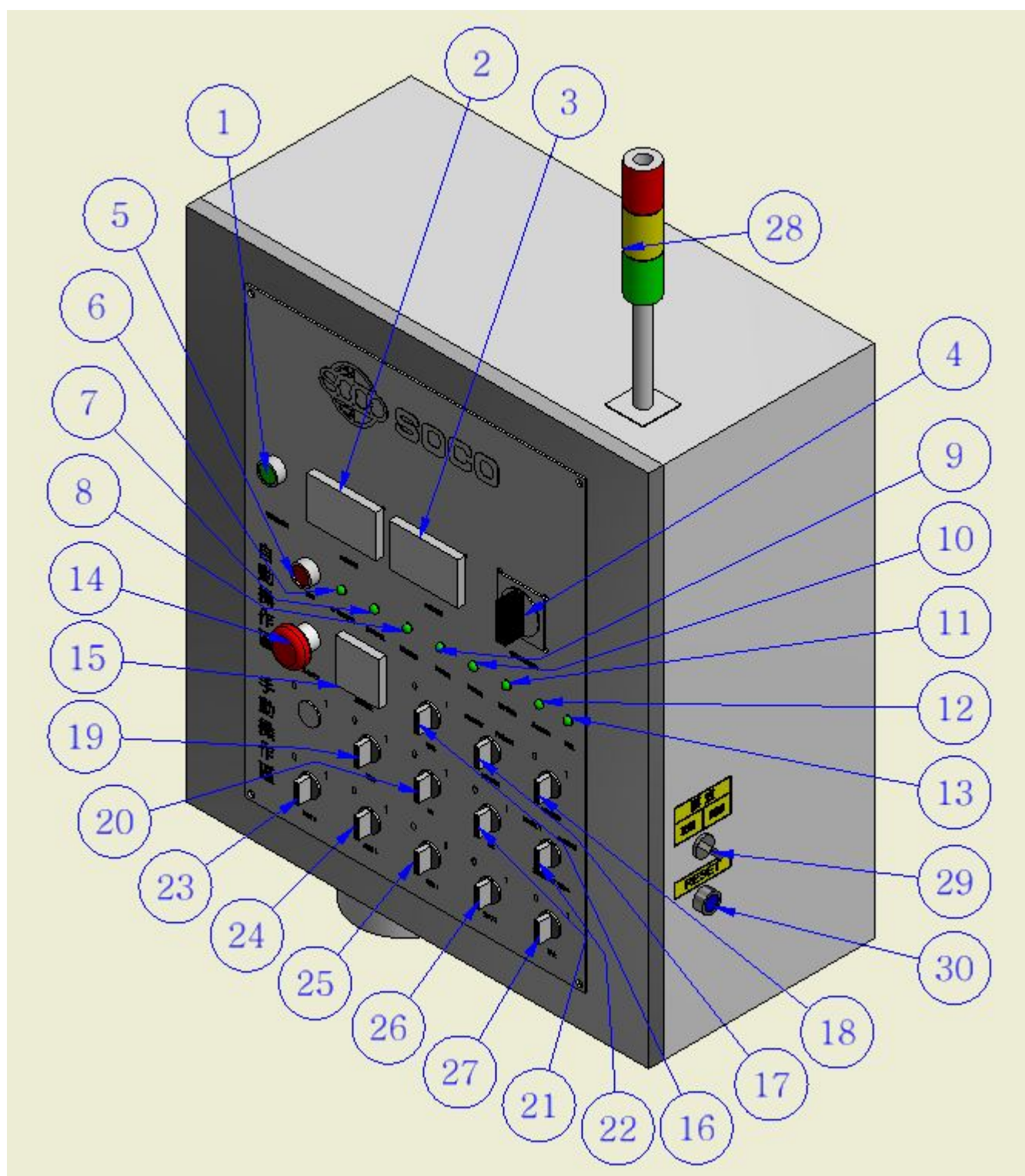


5-1-3 Dimensional view(fence type)



5-2 Control Panel

5-2-1 Machine control panel



Item	Description
1	Power indicator
2	Operation mode switch for manual, semi-auto, auto mode
3	Left inverter operation panel (optional)
4	Right inverter operation panel (optional)
5	Start button, start the semi-auto or auto-cycle operation
6	Figure finish indicator
7	No pipe indicator
8	Pressure low indicator
9	Left head motor overload indicator
10	Right head motor overload indicator
11	Transferring motor overload indicator
12	BTM motor overload indicator
13	Pump indicator (Pressure type)
14	Emergency stop button
15	Counter, showing the number of output worked pieces
16	Manual push button for transferring motor
17	Transfer mode vice half open/vice full open
18	Hydraulic pump start
19	Manual push button for the pushing cylinder at the 1 st station
20	Manual push button for left head motor on/off
21	Manual push button for right head motor on/off
22	Manual switch for tool-head feed back procedure

Item	Description
23	Manual switch for left clamping cylinder down/up
24	Manual switch for right clamping cylinder down/up
25	Manual push button for right head feeding/return
26	Manual push button for right head feeding/return
27	Cycle stop button
28	Warning lamp: Red-Emergency stop 、 Yellow-Abnormal 、 Green-Running
29	Security key: It is normal mode for general operation, and it is maintenance mode for permanent maintain.
30	Reset: When the machine stops after touching the light curtain, press the button to restart

Note!!

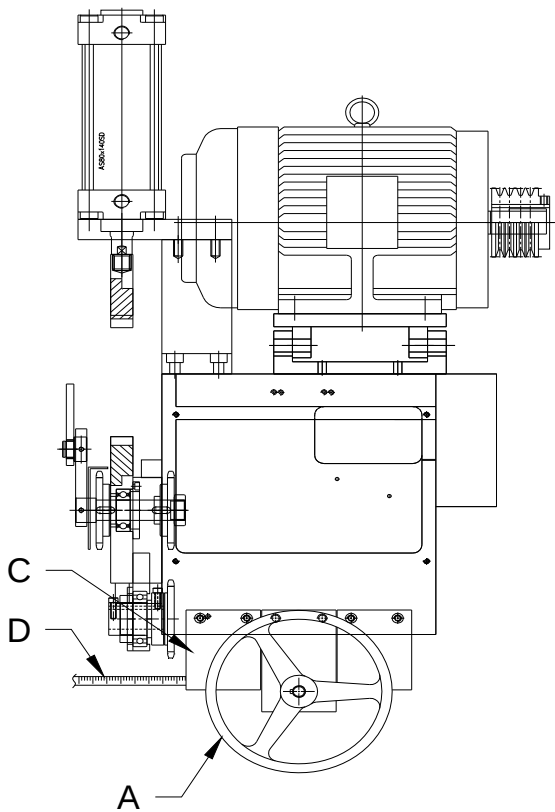
1. Item 27, push this button the machine will finish current cycle then stop. Push item 5 to restart the auto cycle.
2. Item 16, push this button the transferring plate will turn once and stop.
3. Item 16~27 belong to the manual mode area. They are used for the purpose of testing and adjusting the machine. Be sure to switch the item 4 to position 1 to make these buttons and switches operable.
4. If any red indicators of Item 6~13 turns to bright, means there are abnormal conditions in the machine. It needs to solve the problems which cause the abnormal 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 the left and the right clamp cylinders are at the uppermost position, otherwise the machine will not start.
6. Item 29~30 belong fence type.

6 Operation Mode

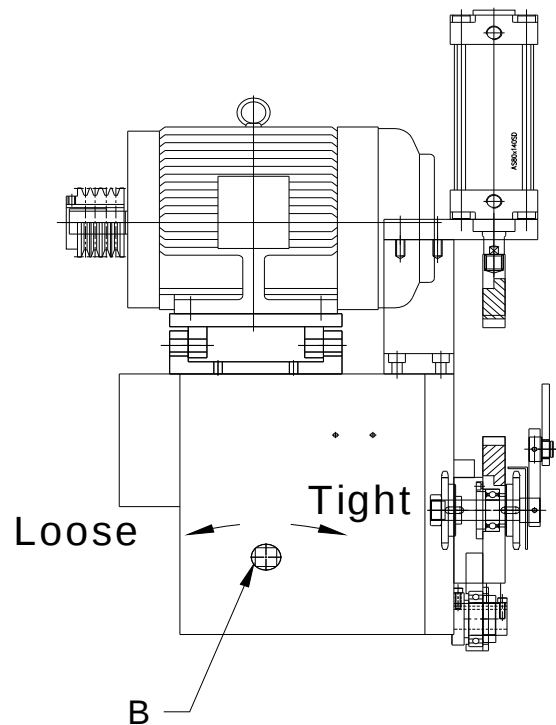
6-1 Adjust the Distance of the Two Heads

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 hand wheel (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

6-2 Replace the Clamping Jaws

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.
2. When change different size jaws, release fixing screws, and replace new jaws.



3. Screw in those fixing screws, but do not tighten them.
4. Set the operation mode to manual mode on the control panel.
5. Take one piece of working tube, put it into the clamping jaws.
6. Turn item 10 or 11 on the panel to clamp the tube.
7. Now, tighten those fixing screws.
8. Check and make sure the tube has been clamped firmly.

CAUTION!!

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

6-3 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.

6-3-1 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.
 - a. Turn the selection switch to manual operation.
 - b. Adjust the feeding stroke to its shortest stroke.
 - c. Turn main power on.
 - d. 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.

- e. Press the motor run button.
- f. Push the feeding button to move the head forward. The tool bit will cut the tube end.
- g. When the head reaches the forward most position, push the feeding button again to move the head backward.
- h. Check the cutting, according to the adjusting method described in section 6-5 to increase the cutting stroke gradually and repeat step (f),(g) until the bit can cut the tube's end face. The recommend cutting length is 0.3~0.5mm.
- i. Press the motor run button again to stop the motor. After the motor has stopped completely, open the clamp.
- j. 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.
- k. Stop the motor and turn off power.

6-3-2 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.
 - a. Turn the selection switch to manual operation.
 - b. Turn main power on.
 - c. 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.
 - d. Press the motor run switch.
 - e. Push the feeding button to move the head forward. The tool bit will cut the tube end.
 - f. When the head reaches the forward most position, push the feeding button again

to move the head backward.

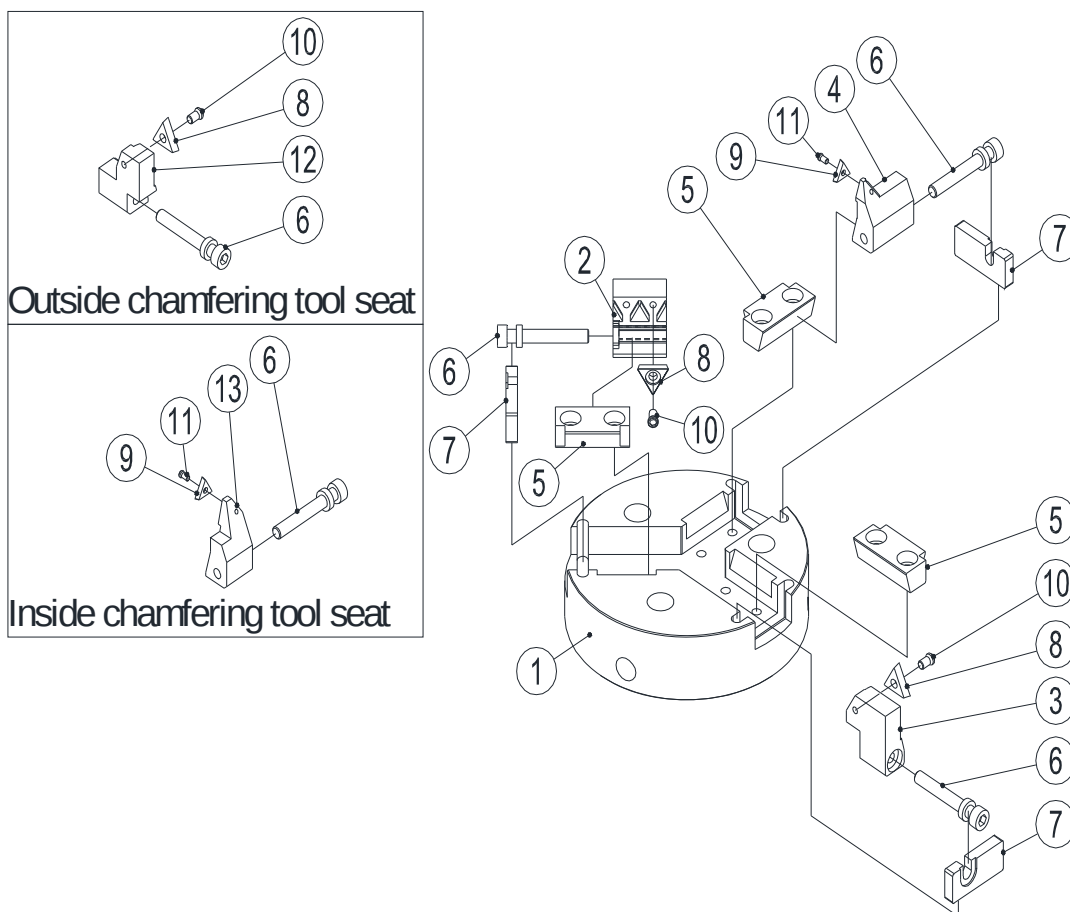
- g. Press the motor run button again to stop the motor. After the motor has stopped completely, open the clamp.
- h. Check the outside chamfering quality. If not acceptable, release the fixing screw of the outside chamfering tool seat, rotate the positioning screw to move the seat to the correct position. Repeat the testing steps above until the chamfering quality is acceptable.
- i. Stop the motor and turn off power.

6-3-3 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.
 - a. Turn the selection switch to manual operation.
 - b. Turn main power on.
 - c. 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.
 - d. Press the motor run switch.
 - e. Push the feeding button to move the head forward. The tool bit will cut the tube end.
 - f. When the head reaches the forward most position, push the feeding button again to move the head backward.
 - g. Press the motor run button again to stop the motor. After the motor has stopped completely, open the clamp.
 - h. 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.
 - i. 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.

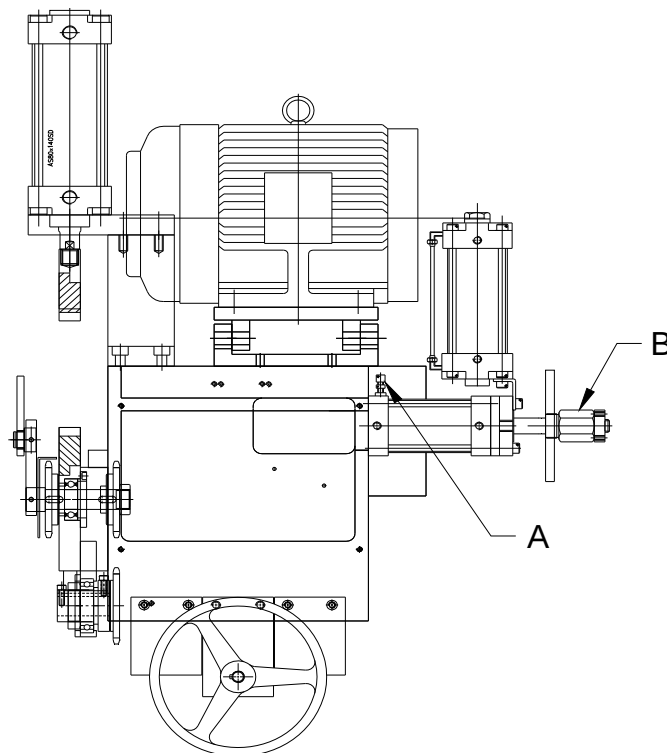


No.	Pate number	Product name	Quantity	Specification
1	E3K234	Tool head	2	6t
2	E3K235	Facing tool seat	2	
3	E3K205	Outside chamfering tool seat 30°	2	16~45
4	E3K253	Inside chamfering tool seat 30°	2	16~45
5	E3K236	Briquetting	6	
6	E3K160	Special screw	10	
7	E3K220	Block	6	6t
8	ZH0186	Knife	6	TCMT 16T308 U5735(MITSUBISHI)
9	ZH0020	Knife	4	TCMT 110204 U5735(MITSUBISHI)
10	ZK0376	Fixed screw	6	M4*P0.7*L10
11	ZK0377	Fixed screw	4	M2.5*P0.45*L6.5
12	E3K211	Outside chamfering tool seat 30°	2	45~60
13	E3K169	Inside chamfering tool seat 30°	2	45~60

6-4 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.



6-5 Adjust the Cutting Stroke

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

1. Release the fixing screw of the nut first.
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.
3. For shorter cutting stroke, turn the screw nut clockwise.
4. Tighten up the fixing screw of the nut.

NOTE!

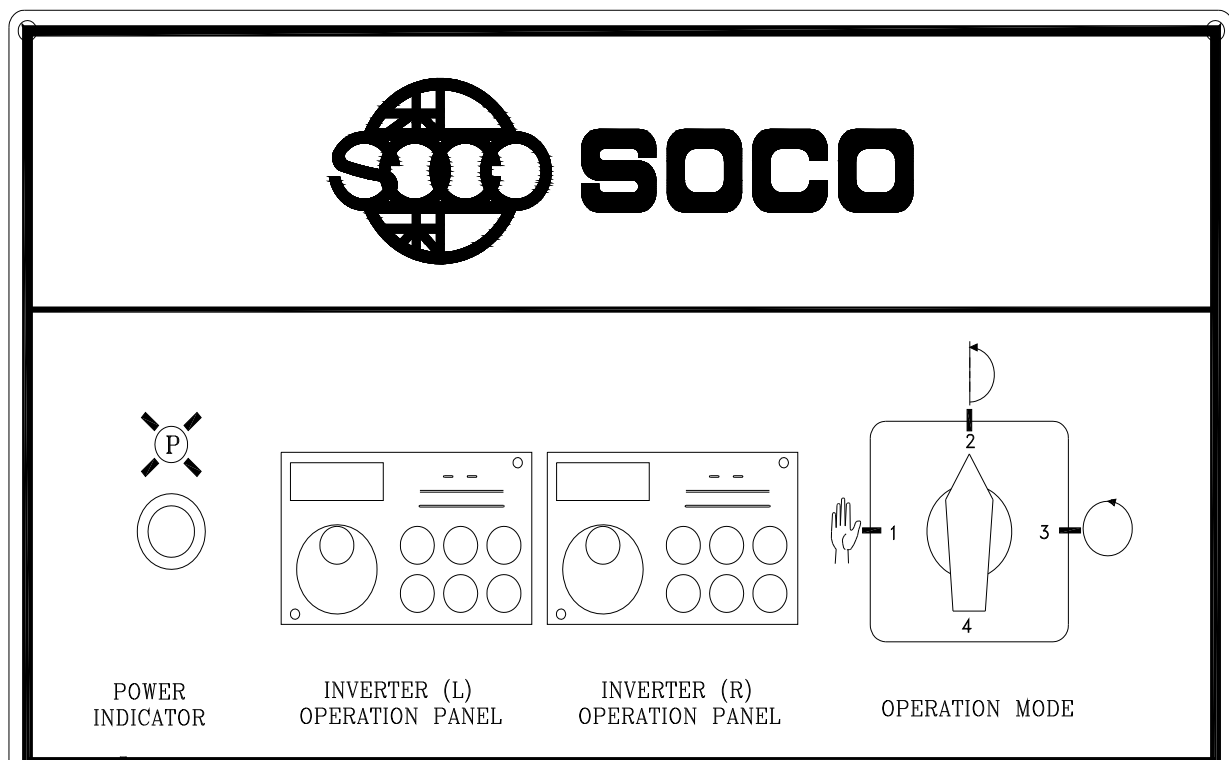
When adjusting the cutting stroke, do not turn the screw nut too much at a time.

6-6 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's 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.

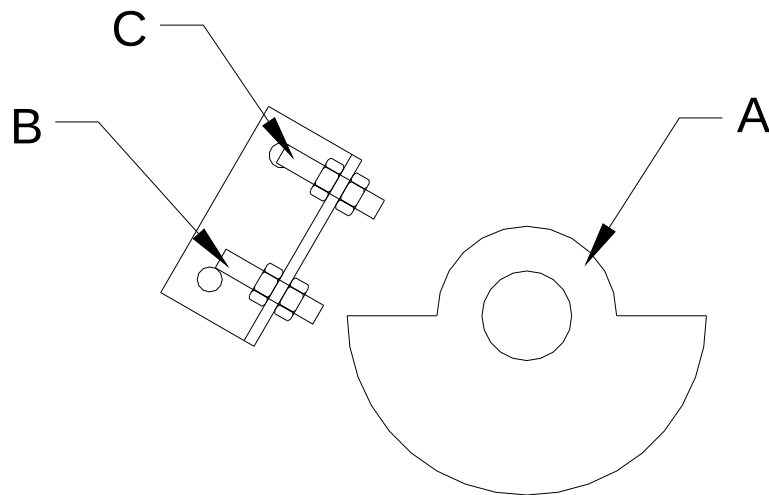


6-7 Adjust the Sensor Disk

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.



6-8 Operation

6-8-1 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.

6-8-2 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.

6-8-3 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.

7 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.

8 Troubleshooting

1. No function of machine

Possible Cause	Action
Outside power is not good.	Check outside power.
Main power switch is off.	Set main power switch at ON position.
Emergency stop switch is in pressed position.	Turn emergency stop switch clockwise to release its stop position.
Pre-set cutting quantity has reached.	Re-enter cutting quantity.
Pre-set maximum saw blade motor current has reached.	Replace a new saw blade. Re-set a suitable maximum current.

2. Noise in saw blade motor but spindle no rotation

Possible Cause	Action
One phase of power is lost.	Check power connection. Check fuse.
Motor relay function is not correct.	Replace motor relay.

3. No coolant spray out

Possible Cause	Action
Low coolant level.	Fill coolant to sight glass level.
Check valve is blocked.	Remove obstacle or replace a new valve.
Coolant pump is out of function.	Replace a new pump.
Coolant pump rotates in wrong direction.	Exchange two phases of connecting power leads.

4. Machine vibrating and noising

Possible Cause	Action
Machine is not installed on flat floor.	Re-install machine on flat floor. Recommend use anchor bolts.
Work piece is not clamped firmly.	Rotate vise hand wheel 1/4 turn clockwise.
Clamping vise is loosened.	Tight up vise fixing screws.
Saw blade is dull.	Replace a new blade.
Selection of saw blade is not correct.	Replace a correct saw blade.



5. Cutting head trembling when sliding

Possible Cause	Action
Auto lubricator lacks oil.	Re-fill lube oil.
The fitness between sliding guide and sliding key is not properly adjusted.	Re-adjust the sliding key carefully.
Cylinder is worn.	Replace a new cylinder.
Hydraulic oil contains air bubbles.	Adjust the Saw head Traveling Stroke to the full stroke and let air bubbles separate from oil.

Note: Should any problem fail to be solved, Please don't operate the machine to avoid risk of danger. Please contact SOCO or SOCO's agent. Our personnel would be glade to provide any service.

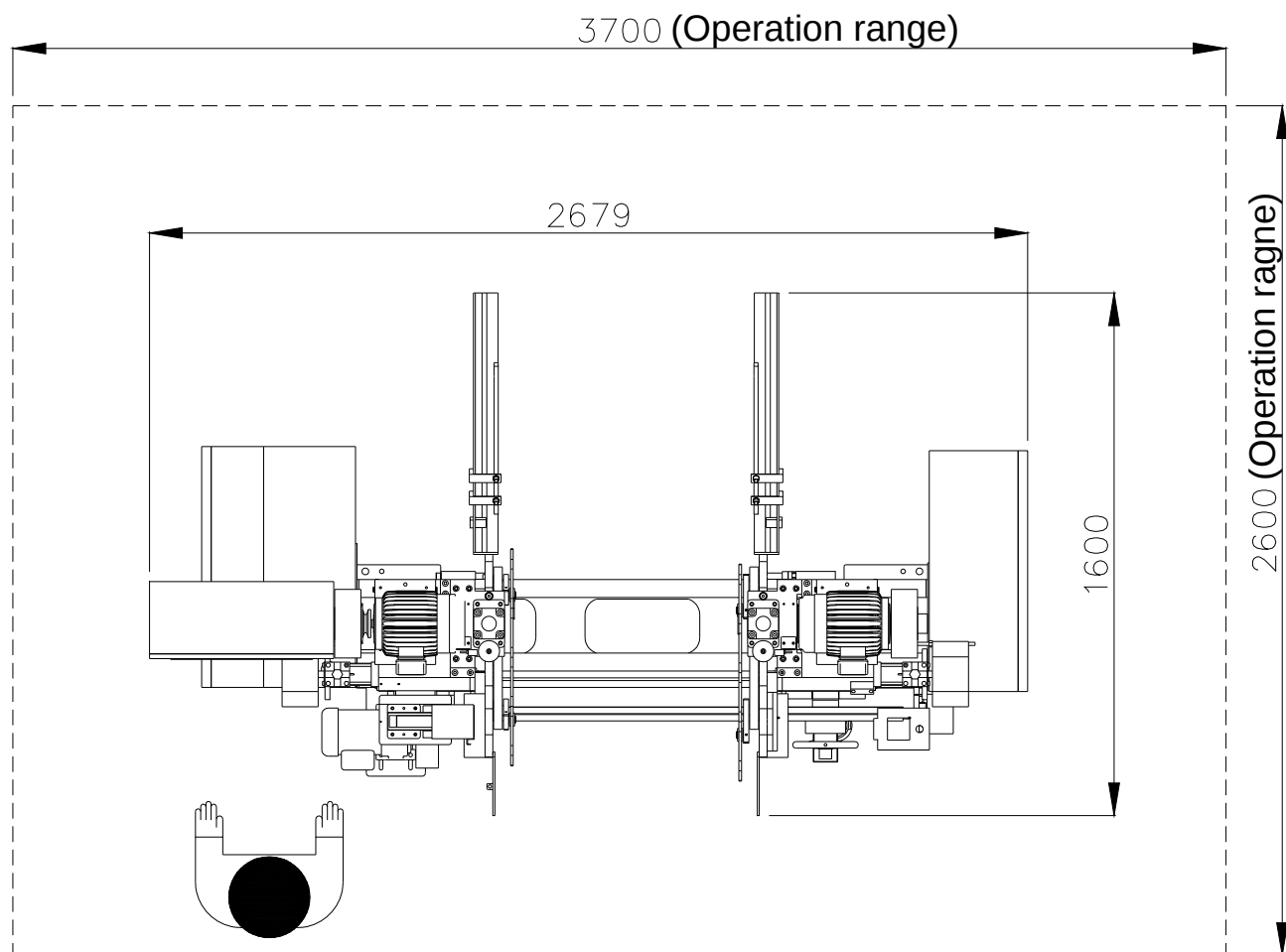


9 Appendix

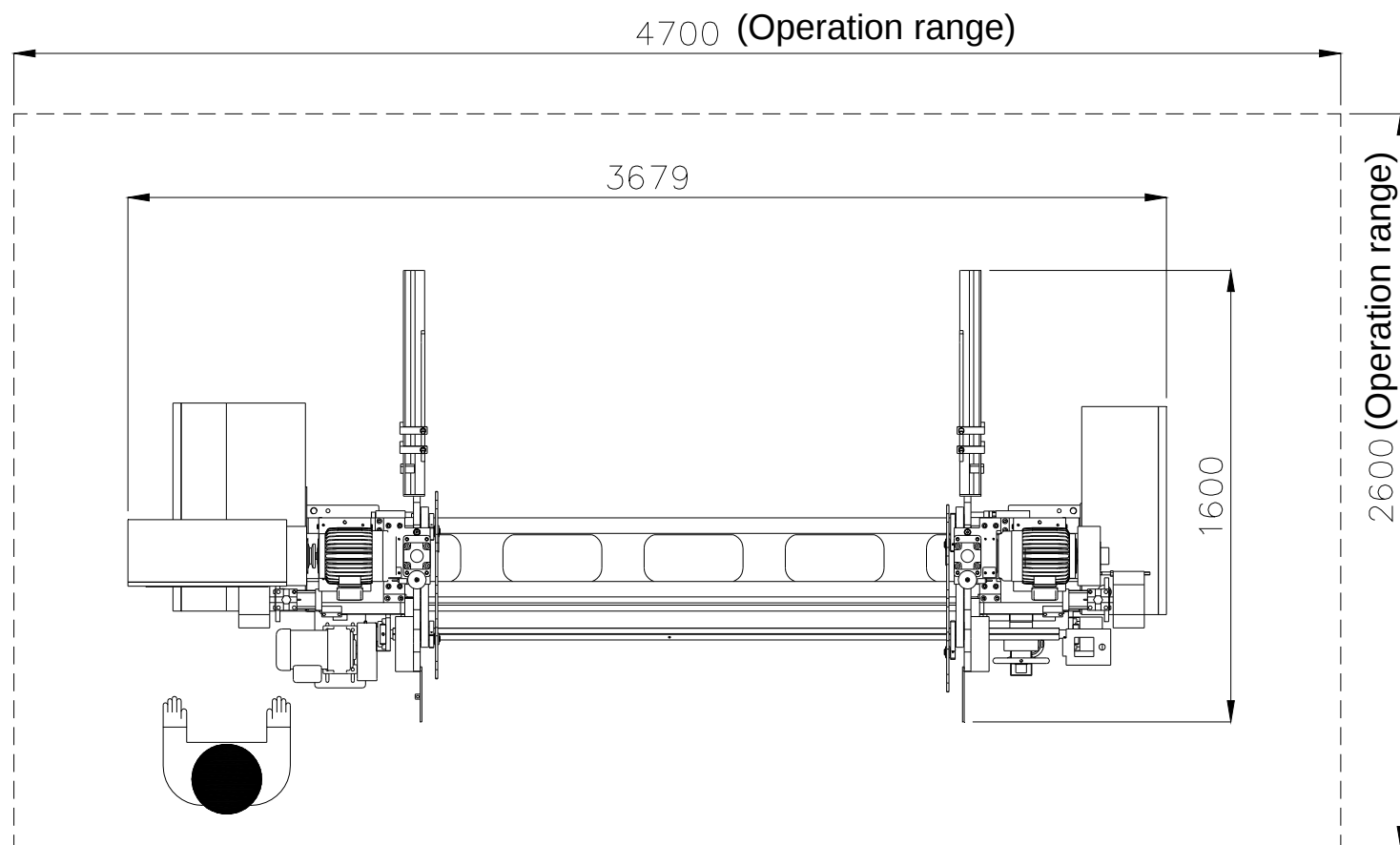


9-1 Machine Operates Range Pictures

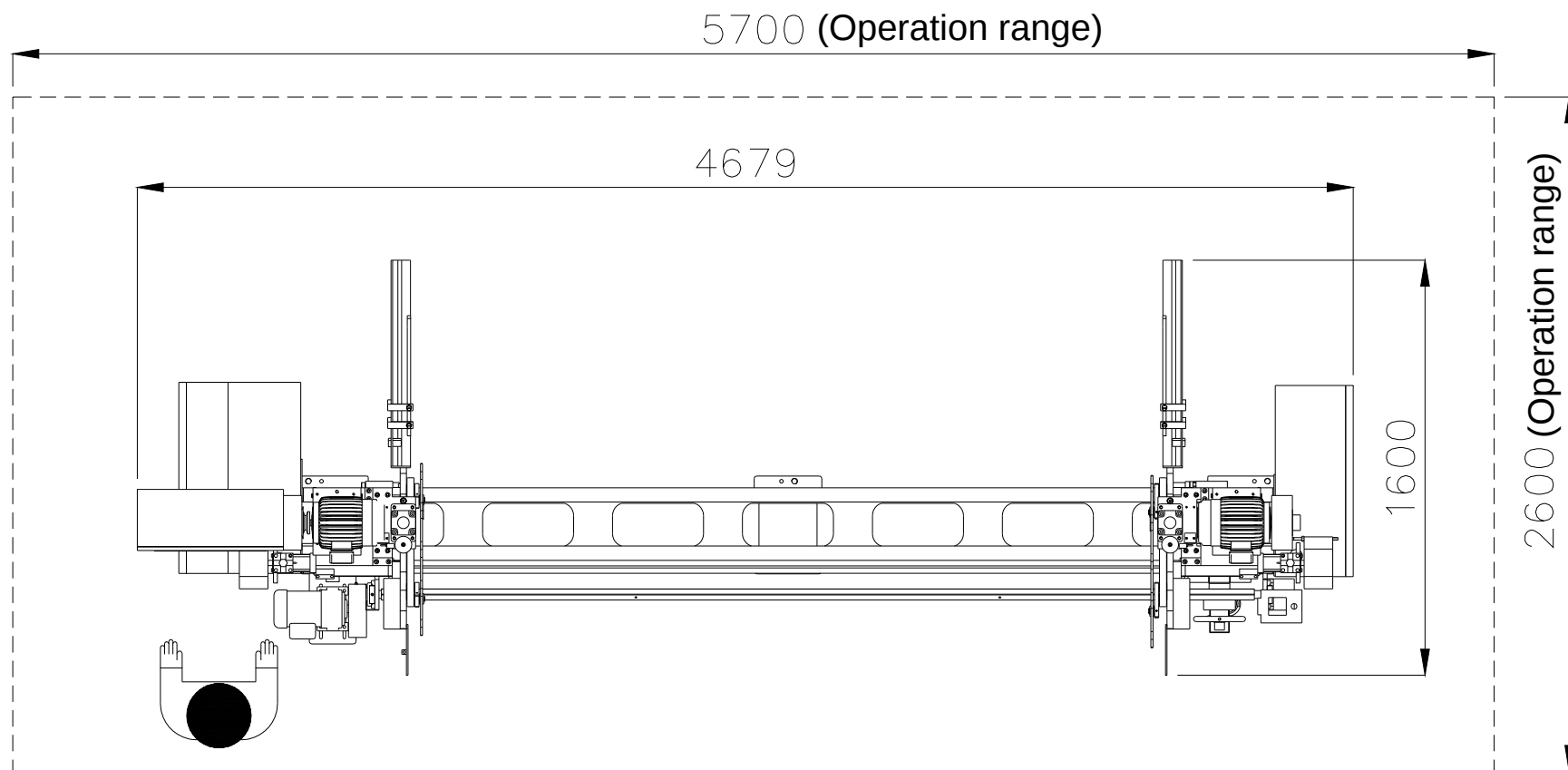
9-1-1 DEF-FA/76-V1



9-1-2 DEF-FA/76-V2



9-1-3 DEF-FA/76-V3





9-2 Machine Specifications

9-3 Hydraulic Circuit Diagram and Air Circuit Diagram



9-4 Electrical Circuit Diagram



9-5 Parts Lists and Drawings