麦 特 自 动 化
MATE AUTOMATION

Automatic Winding Machine

MV-01A

Operation Manual

SUZHOU INDUSTRIAL PARK MATE AUTOMATION

TECHNOLOGY CO.,LTD

www.suzhoumate.com

Thanks for using our products. Before use, please read this menu carefully and keep it for future reference. Thanks for your understanding if there's any discrepancies between the manual and practical operation process due to technical update ceaselessly.

SUZHOU INDUSTRIAL PARK MATE AUTOMATION TECHNOLOGY CO.,LTD
ADD: BUILDING 15-1 PUTIAN PRIVATE INDUSTRIAL ZONE WEITING SIP JIANGSU 215122
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Company brief

Suzhou Industrial Park Mate Automation Technology Co., Ltd. is a metallic gasket and equipment manufacturing and selling company. We are located in Suzhou - a city well known for its Chinese classic garden, south of Jiangsu Province, China. With our technology, we offer our customers very wide variety of metallic gasket equipments, such as

Spiral wound gasket winding machine;

Cam profile machine;

Guide rings grooving machine;

Inner ring beveling machine;

Bend & weld machine;

Stamp marking machine;

as well as computer controlled compression tester.

Our concept is to provide our customers with one-stop service for all metallic gasket related products, parts, and equipment. We have successfully sold our products and equipment to customers from over 30 countries around world including the Asia-Pacific, India, USA, Canada, Russia, Europe, South America and Africa.

We welcome all customers from abroad and home.

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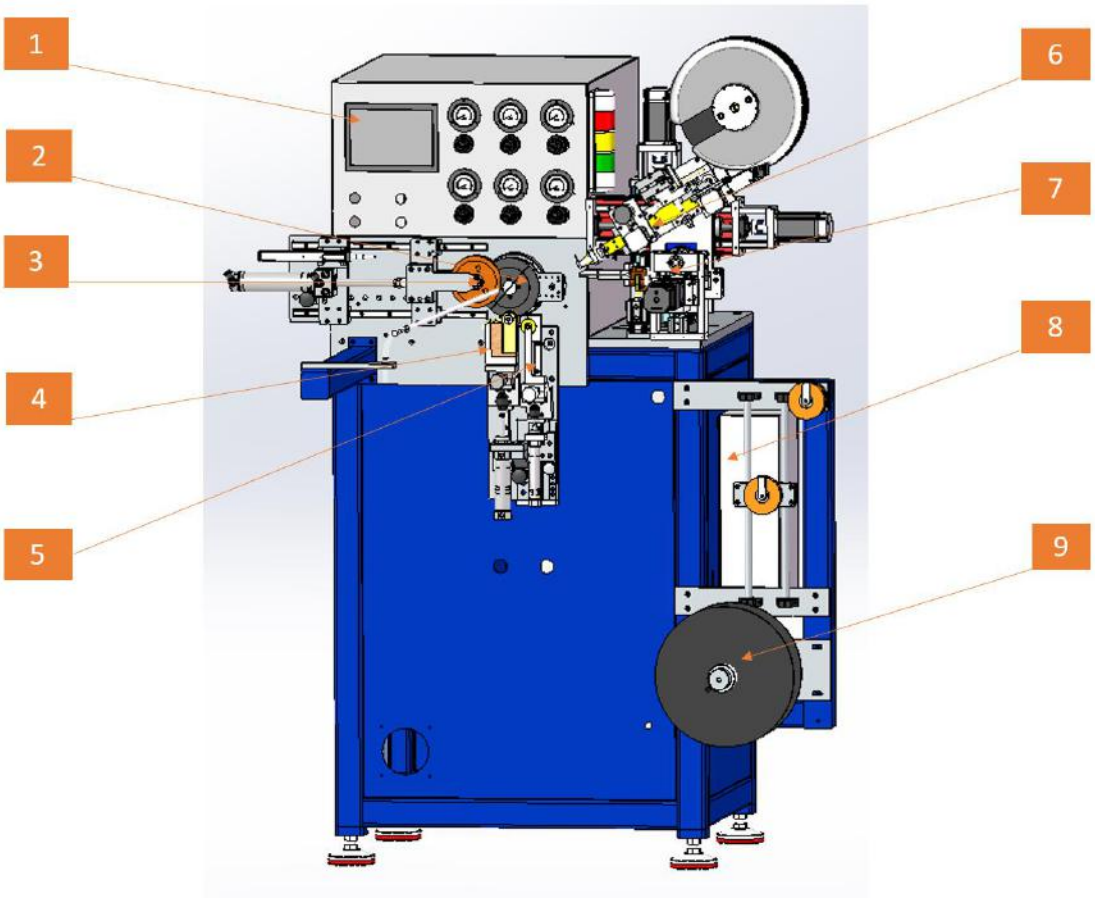
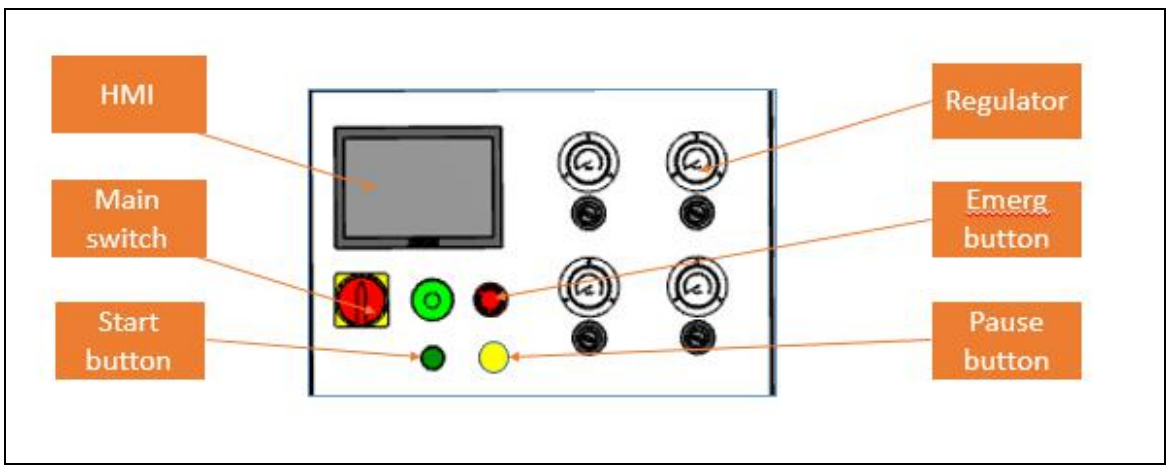
MV-01A Automatic Winding Machine (Pic)



1. HMI
2. Ejector
3. Press roller
4. Weld robot
5. Small press roller
6. Graphite feed system
7. Strip Feeding System
8. Weld controller
9. Strip bobbin

Panel Details



Welder Control details

This machine set up two sets of welding parameters， in most cases, user don't need to use 02, 02 is for wending.the some special alloy or welding different material such as Iron to stainless.

01 parameter setting,

JL-08A Welding controller	
PARA	Value
SQUEEZE	001
	000
SLOPE1	001
	000
WELD1	01
	001
WELD1 CURRENT	01
	50-80
COOL	01
	001
WELD2	01
	000
WELD2 CURRENT	01
	50-80
SLOPE2	01
	000
HIOLD	01
	000
OFF	01
	000

Features and specification

1. This machine make basic type of gasket fully automatically, to make inner ring type of gasket, operator only need to load inner ring and unload it when its process finished.
2. Machine can achieve much more productivity and quality reliability. Use 4' 150/300 as example, this machine can reach 18 to 20 seconds cycle time per piece.
3. PLC program process control, can save up to 500 sets of parameters so operator can easily pick up the product code, start the production immediately, save lots of time from setting the parameters each time.
4. Provide both English and Chinese reading, we can also provide other language as per customers' requirement.
5. Wire forming and winding synchronize, save one-step of wire pre-forming compare to

the old generation of machine. Furthermore, one charge can load 15 to 20 kilos of wire, so can save half to 1 hour of working time in shift (8 hrs' shift)

6. Machine deployed strip and graphite fully automatic feeding system, automatically feed and cut off both material.
7. Automatic welding saves great deal of working time, moreover, makes welding points strong and reliable, and welding span even.
8. Successfully use man-machine engineering principle, locate the frequent operation within arm-reach area, and significantly reduce operator's workload.
9. Good compatibility, one machine can make 1/2' to 6' sizes of gasket, both basic and inner ring gasket.
10. With the buffering mechanism, this makes wire tension stable.

MV-01A Automatic Winding Machine Specification	
Machine profile	1200*950*1750mm
Power supply	3 phase 380 V
Drive motor	750 W Servo motor
Working mode	Automatic
Work range	ASME standard 1/2"to 6"
Standard suitable	Suitable for all standards
Gasket type	Basic type and inner ring type
Standards	All standards
Cycle time	18 seconds for 3" gasket
Change over time	From 5 to 10 minutes
Process control	PLC programmed automatic control
Inner ring loading & unloading	Manual
Welding	Automatic
Gasket ejection	Yes
Parameter setting storage	Memory can save 500 sets of para
Filler break sensor	Yes
Steel former	Yes
Strip feeding and cut off	Automatic
Filler feeding and cut off	Automatic
Strip protection	Optional
Flange width measuring	Yes
Filler control by wraps	Yes
Steel strip spool support	Yes, one charge 15 kg

Machine set up and basic introduction

1. Connect cable to power.
2. Connect air pipe to compressed air source. Recommended air pressure setting:

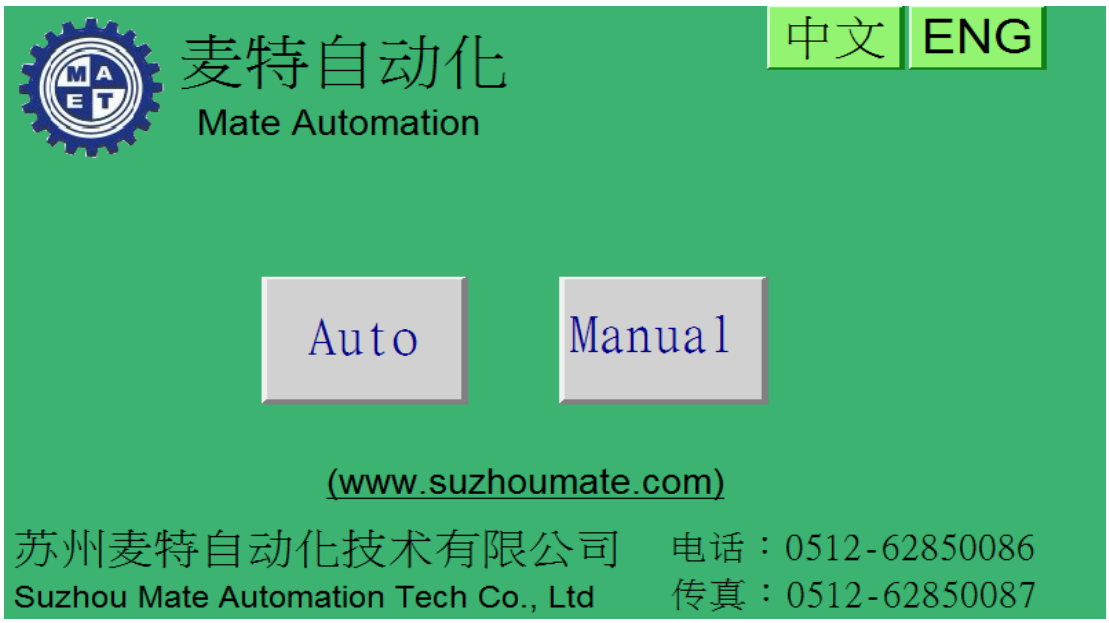
2-1 Welder 0.5 MPa
2-2 Press roller 0.25-0.3 MPa

2-3 Small press roller 0.15-0.2 MPa

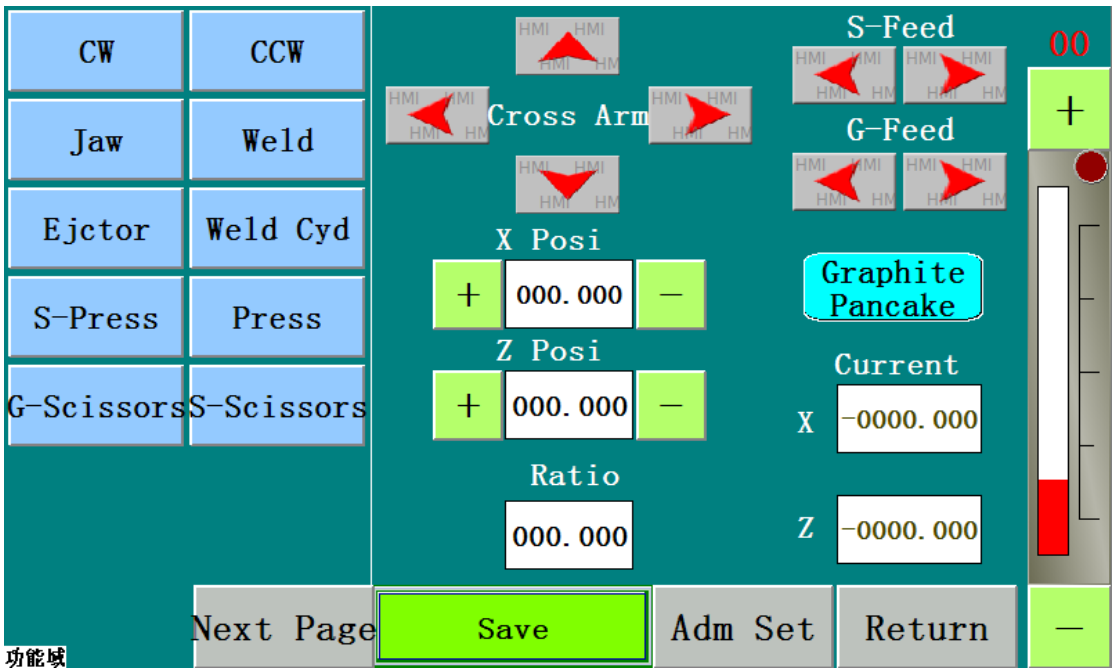
2-4 Ejector 0.5-0.6 MPa

2-5 G-press roller 0.2-0.3 MPa

3. Turn on power, the interface will show the first page as below, Manufacturer's name and web information, as well as language options, Chinese or English. It also show tow buttons give you choices between Automatic and Manual.



4. Press “Manual”, it will come to the following page, each buttons located at left area, touch once it will on, touch again back to off, those buttons control each functions of the machine,

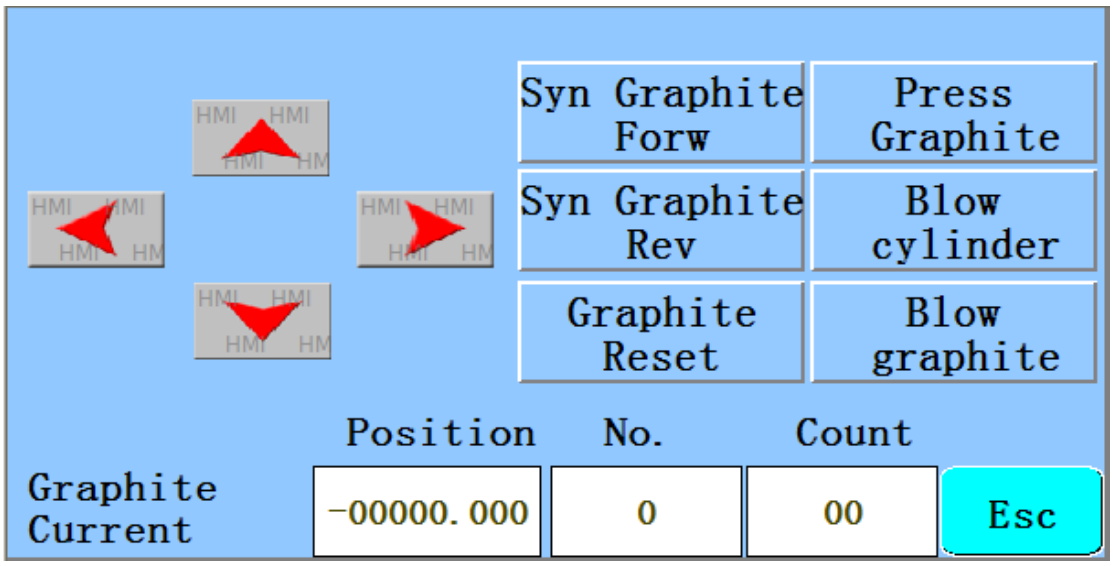


Description for each function button

4-1. CW, motor rotate clockwise;

4-2. CCW, motor rotate counterclockwise.

4-3. Jaw, control jaw expand and shrink;
4-4. Weld, control spot weld, press it, it will weld once;
4-5. S-Feed, Stainless strip feed cylinder out;
4-6. G-Feed, Graphite feed cylinder out;
4-7. Ejector controls the ejector push out and back once;
4-8. Weld out, controls the welder's cylinder go out and back;
4-9. S-Press, control the small press roller up and down;
4-10. Press, control the big press roller move forward and back;
4-11. Cross arm, control the X axis and Z axis moving;
4-12. S-Feed, control the steel strip feed forward or reverse;
4-13. G-Feed, control the graphite tape feed forward or reverse;
4-14. X posi, shows the X axis position;
4-15. Z posi, shows the Z axis position;
4-16. Ratio controls the single moving speed of both X and Z axis;
4-17. Graphite pancake button, touch once it will show below page, this page is to control the multiple graphite pancakes under manual mode, two vertical res arrows control the graphite pancake move forward and back; while the horizontal arrows control the drive motor right under the graphite pancake. Other buttons are used for manual control each function of graphite feeding system, details see their definitions below,



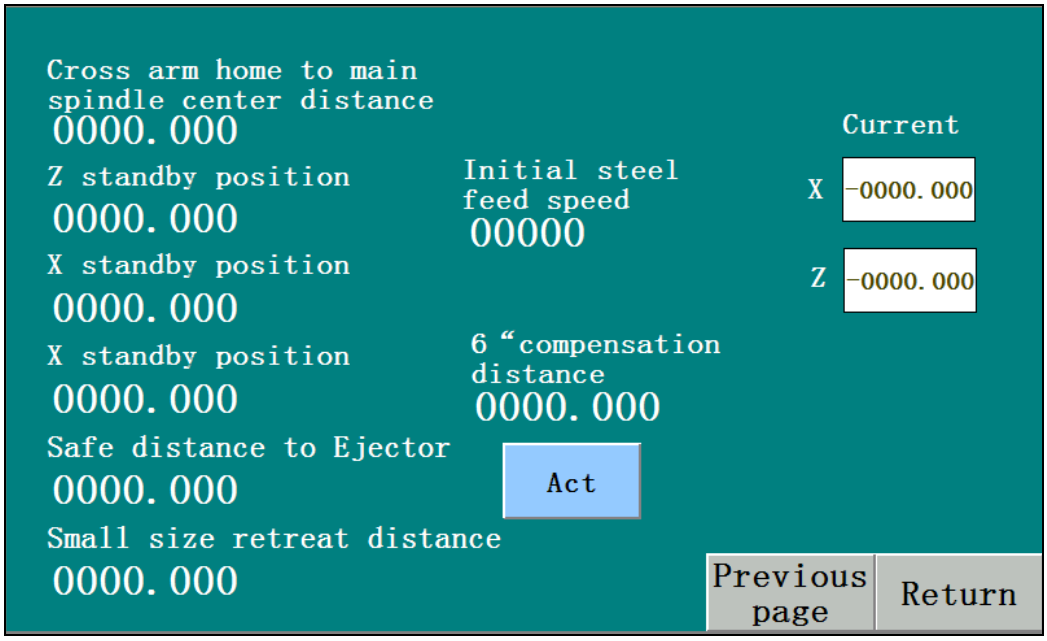
4-17-1. Syn Graphite Forw --- Control drive the graphite tape forward, both driving motors will turn synchroniously.
4-17-2. Syn Graphite Rev --- Control drive the graphite tape reverse, both driving motors will turn synchroniously.
4-17-3. Graphite Reset --- After reload the graphite, you will need to press this button once, so the program will start from the first pancake of graphite. Or if you type in a number in the block under "No.", the program will start from that no of pancake, for example, if you type in "2", the program will start from the second pancake.
4-17-4. Press Graphite --- There is one press roller at left side of the pancakes, this button controls this press roller up and down.
4-17-5. Blow Cylinder --- Control the blow pipe move forward and back.

4-17-6. Blow graphite --- Control the blowing on and off.

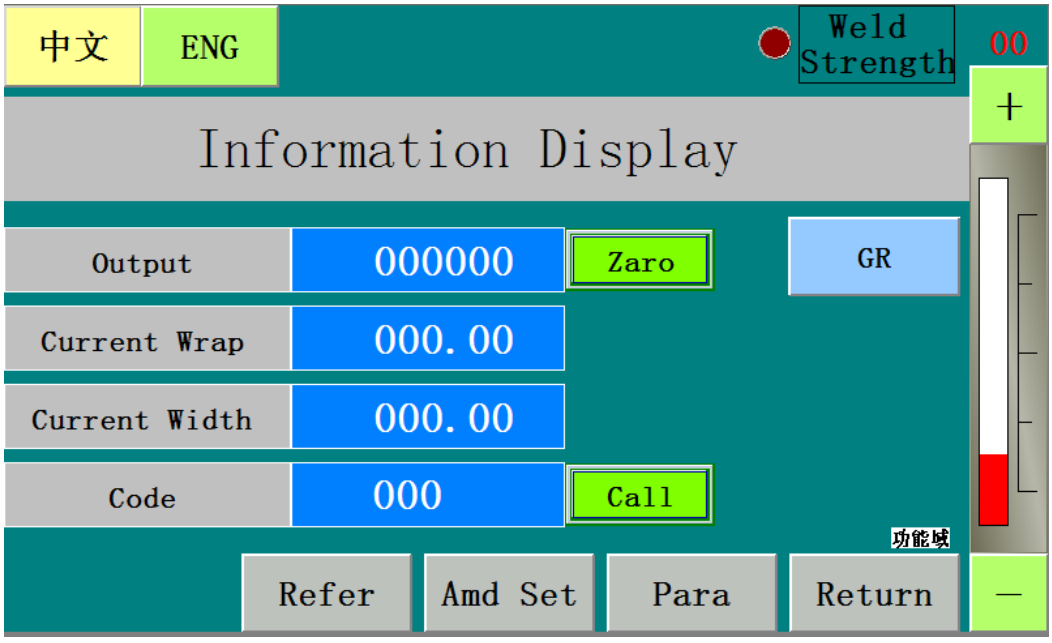
4-18. Current posi, show current positions of both X and Z;

4-19. Manual mode provides some basic functions for machine adjustment and maintenance purposes. The red bar shows the current welding intensity setting. It can be adjusted by click the "+" or "-"at the two ends.

5. Press "next page" it will come to the second page as below. This page is for administrator's purpose, user doesn't need to use them in most cases. Only if you want to make 6" gasket, you will need to activate the compensation distance by press the "Act" button, this action will make the graphite pre-feeding a little longer.



6. If you select Auto, then the screen will show the page as below,



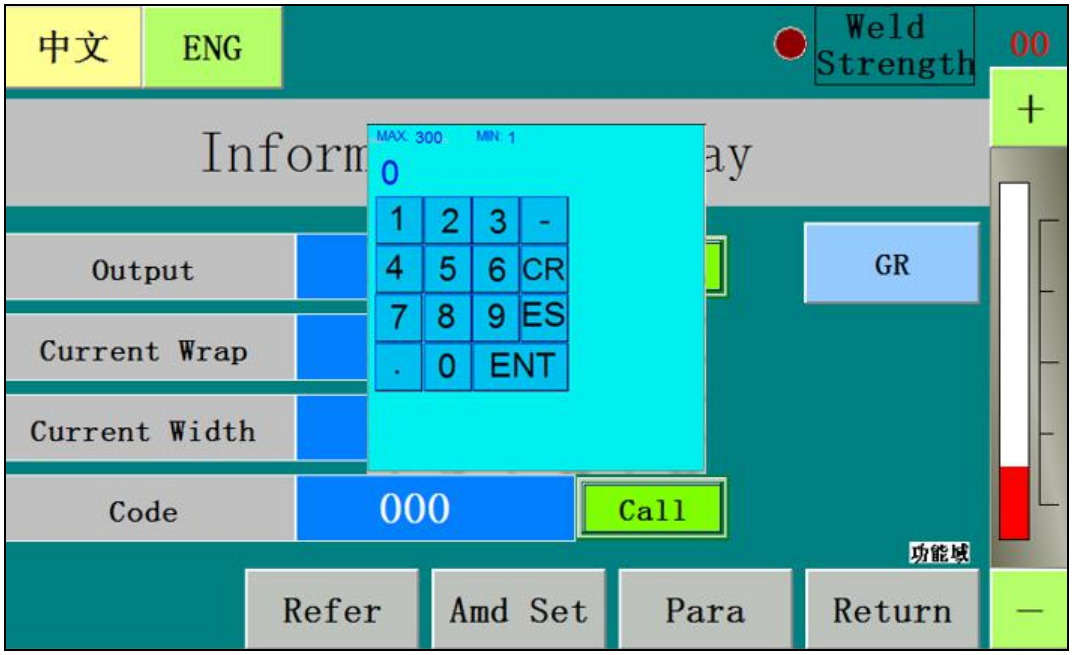
6-1. Under Auto mode, it will show some production related information, such as current overall wraps, current width of flange, and current product code.

"Code" means product code，indicate a specific type of product is under processing; Each code represents a set of parameter setting for a specific type of product saved in machine memory. This machine can save up to 500 sets of parameter setting.

6-2. How to use a code to save a set of parameter setting?

Para ⇨ Define a code ⇨ Setup parameters ⇨ Press "Save" to save parameters

Once you saved the para setting, next time when want to make the same type of gasket again, you can press " Refer", then the screen will show to the below chart, this Metrix show all each code represents one certain type of product. You can refer to it, find the right code, put it into the blue block right after "Code". It will pop out the below display, type in the code number, then press " Call" the parameter setting is done, you can start production, save lots of time from repetitive setting.



6-3. If press the button " Refer", it will bring you to the below page as, you can type in the size and LBS as you want in this matrix, and use it as your reference in the future.

Size \ LBS	150	300	400	600	900	1500	2500
1/2"	1	7	13	19	25	31	37
3/4"	2	8	14	20	26	32	38
1"	3	9	15	21	27	33	39
1 1/2"	4	10	16	22	28	34	40
1 1/4"	5	11	17	23	29	35	41
2'	6	12	18	24	30	36	42

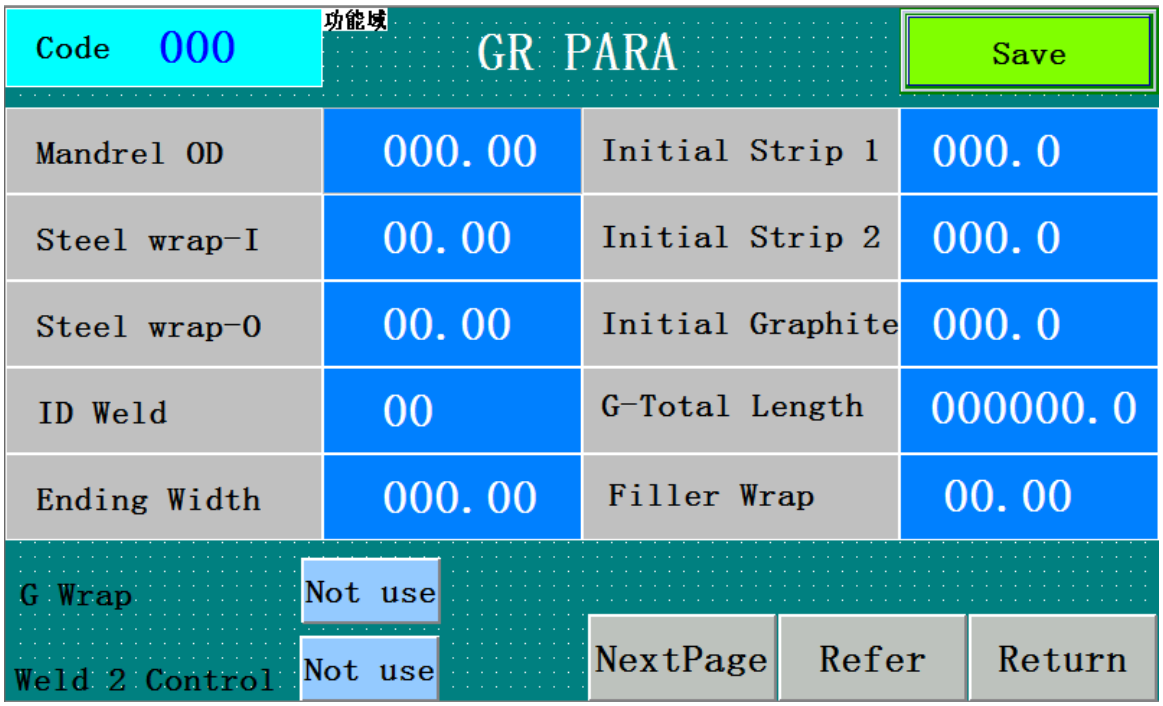
Code 000 | Call | 功能域 | Next page | Esc

Parameter setting

"Code" determines what type of product the user want to produce; each code refer to one set of parameters for one type of gasket which was saved in first time trial run. Machine can save up to 500 different types of products in the memory, so the user can store all most frequent use types of products into the memory.

Tips: After making the first good quality of product, you can save it under one product code, therefore, you can pick that code up when you make the same gasket next time.

1. The page below is the parameter setting for basic type of gasket, e.g. the gasket without inner ring, we name it as GR below,



1-1 Mandrel OD, refer to the OD of mandrel for standard gasket;

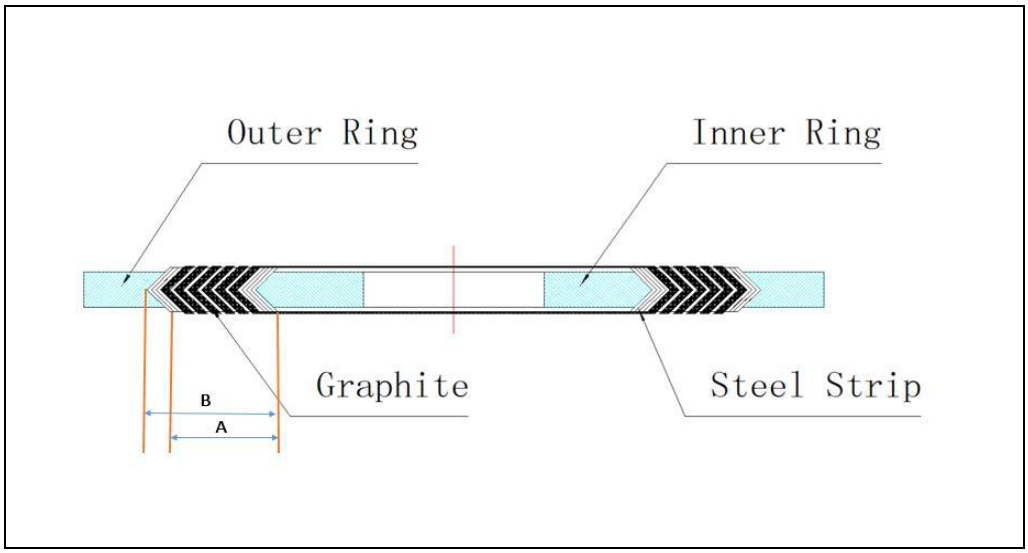
1-2 Steel strip-I, this means how many wraps of streel strip for inside, e.g. before feeding graphite tape.

1-3 Steel strip-O, this means how many wraps of streel strip for outside, e.g. after winding graphite wraps.

1-4 ID weld, means how many welding points you want to put on the ID after first circle of steel wrap, ASME has require on the interval space between two welding points on the inside of the first steel wrap, calculate carefully the welding points as per ASME requirement, the welding points will be allocated even on the inside circle;

1-5 End width, the final flange width, this determines the final single flange width of winding, therefore it also determines the final OD of winding.

One more important tip about the "Ending Width", it refer the dimension of the below drawing A, not B. The central piece of press roller has the V shape profile.



1-6 Initial strip 1 means the standby length, the strip feeding system will feed certain length ready for next product after finish one.
1-7 Initial strip 2 means the feeding length when the feeding head move to the slot of the mandrel, this length should be long enough that jaw can clamp it.
1-8 Initial graphite means the standby length, the graphite feeding system will maintain certain length ready for next product after finish one process.
1-9 G-Total length means the graphite tape total length for the one single pancake of graphite, this setting controls the pancake switch. Type in the actually length of graphite tape, Normally you will need to verify this setting when you change graphite supplier, the length maybe different if they are from different resource.

Volume plan allows you to set up planned volume you want, after volume finished, the machine will stop automatically.
1-10 Filler wraps determine how many wraps of filler material you want to setup. This setting is only for some customers who have special requirement on filler wraps, if they want certain number of wraps in winding, and this number must be integer, then they will need to use this setting. Pay attention to the following tips if you need to do so.

How to calculate filler wraps?

For example if you want to make ASME 4” 150 basic type of gasket, assume,
Graphite thickness 0.75mm
Steel strip thickness 0.20 mm
MV-01A Fully automatic winding machine deployed a electronic caliper under the table, which can measure the flange width of gasket being built. It zero the value when the press roller move up to the position where clamp the mandrel, during all the winding process, the caliper is constantly measuring the flange width, and display on the screen.
With this concept in mind, you can understand how to calculate the “Filler wraps” and “Ending width”
According to the ASME, 4” 150 gasket inside diameter is 127 mm, gasket inside diameter equal to the outside of mandrel, so the mandrel OD is also 127mm.
So you have the first parameter setting,

Mandrel OD 127 mm;

ID Wrap, according to the ASME, should be 3 wraps, this is normally same even size change. So you have the second parameter

ID Wrap 3;

Filler wrap, filler wrap is determined by the ending width. So we set up the ending width first.

4” 150 gasket outside diameter is 149.4. so ending width=(149.4-127)/2=11.2 mm.

Ending width 11.2mm, ending width is actually the gasket flange width.

Now we can calculate the filler wraps, gasket flange width (actually is the ending width)=ID steel wraps normally 3 *0.2mm+Filler wrap X * 0.9mm(steel strip thickness+graphite thickness)+ outside steel wraps normally 3 wraps, or more according to ASME.

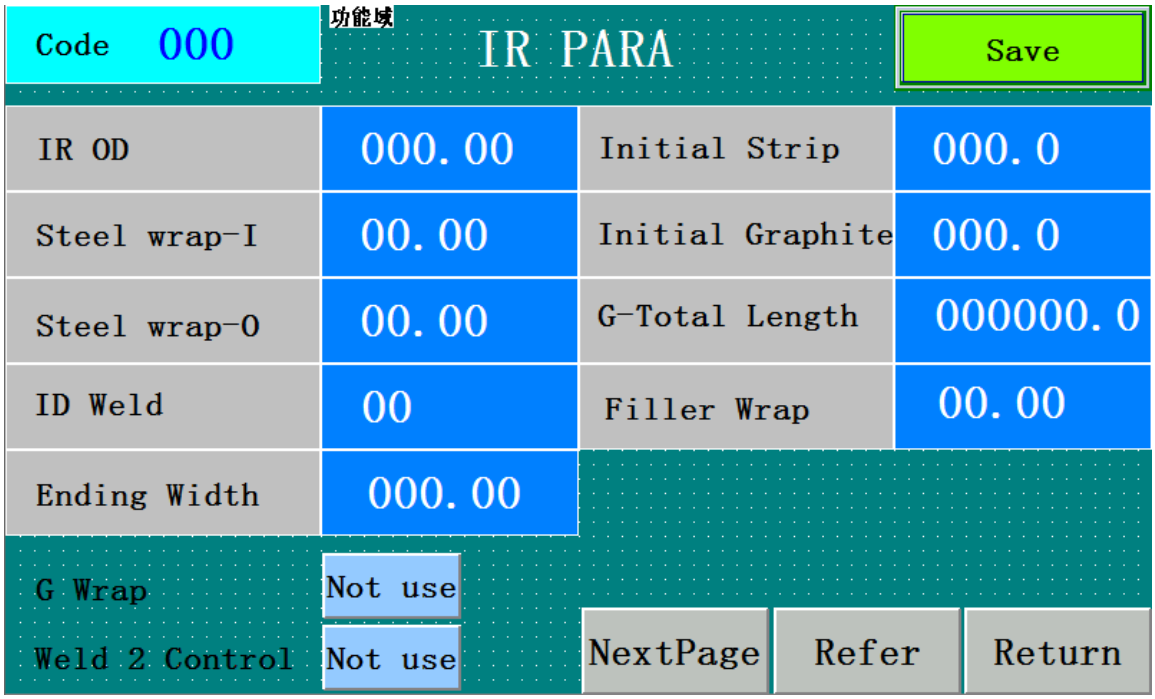
So Filler wrap X = 11.2-3*0.2(inside steel wraps)-3*0.2(outside steel wraps)=10/0.9(steel strip thickness+graphite thickness)=11.1, filler wraps must be full wraps, so take the 11 as filler wraps, one principle is, always take the integer smaller than X actual value.

So you have the 3rd para setting,

Filler Wrap 11;

Ending width is 11.2mm.

This machine can also produce inner type of gasket, to make inner gasket, operator need to move the front bar away, and manually load the inner ring to the mandrel, then press start, the rest of proves are all same as basic type. Operator also need to take it off after process finished. The following instructions is about parameter setting for inner ring type.

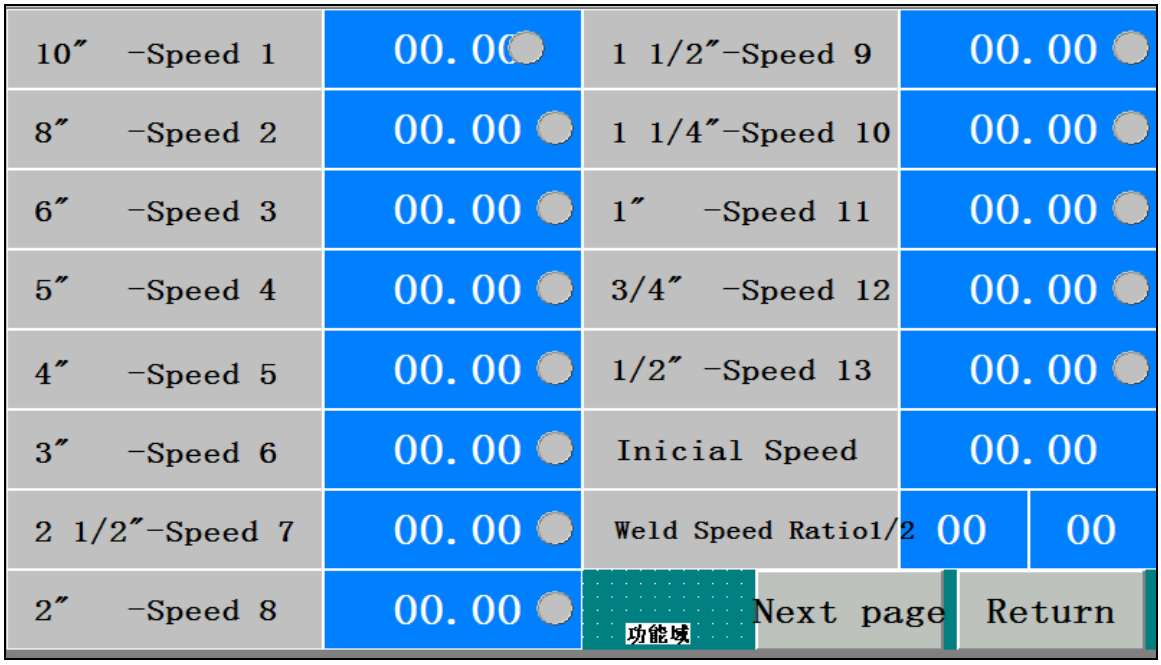


2. The page above is the parameter setting for inner ring type of gasket, after set up the following parameters, operator need to load the inner ring manually to the mandrel, then

press the “Start”, then the machine will make the gasket automatically, operator will also need to pick up the finished products after process finished.

2-1 IR OD, refer to the OD of inner ring.
1-2 Steel strip-I, this means how many wraps of streel strip for inside, e.g. before feeding graphite tape.
1-3 Steel strip-O, this means how many wraps of streel strip for outside, e.g. after winding graphite wraps.
1-4 ID weld, means how many welding points you want to weld the strip with inner ring ,. This setting is different with GR process, we advise 2 points is sufficient enough.
2-5 End width, the final flange width, same as the GR setting. 1-6 Initial strip 1 means the standby length, the strip feeding system will feed certain length ready for next product after finish one.
1-7 Initial strip 2 means the feeding length when the feeding head move to the slot of the mandrel, this length should be long enough that jaw can clamp it.
1-8 Initial graphite means the standby length, the graphite feeding system will maintain certain length ready for next product after finish one process.
1-9 G-Total length means the graphite tape total length for the one single pancake of graphite, this setting controls the pancake switch. Type in the actually length of graphite tape, normally you will need to verify this setting when you change graphite supplier, the length may be different if they are from different resource.

Advanced parameter setting, there are two pages for advanced parameter setting as below, first page is motor speed setting, it is strongly advised by machine maker don’t make any change unless very necessary.



Press next page it will shows as below, the parameters in this page are not often use ones only being used as per customer’s special request,
Extra tail allow you to set up certain length of additional strip tail, some users want to

have this extra tail for better fit guide ring when they do assembly.

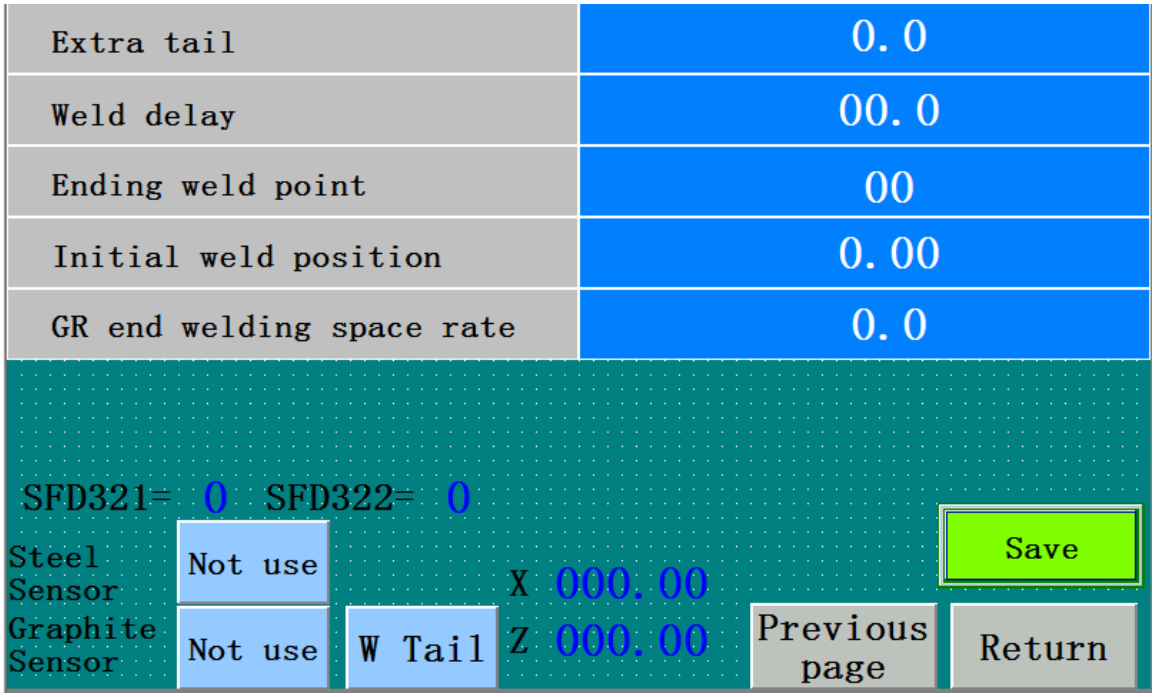
Weld delay only being used when user want to make winding without tail, in this case, user will need to press the W Tail button, the button will change to Wo Tail, then user can set up proper weld delay to make the final welding points right cover to the tail end.

Ending weld point determine how many weld points you want at the ending point, normally 3-5 points.

Initial weld position means the first weld point position, user does not need to change unless very necessary. This parameter only affects GR process.

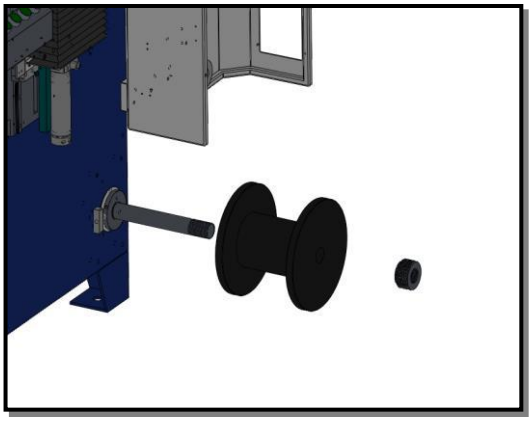
GR end welding space rate, this normally set as half of ID welding space, user does not need to change unless very necessary.

The others like Steel sensor, Graphite sensor are all set as default, don't need change unless very necessary.

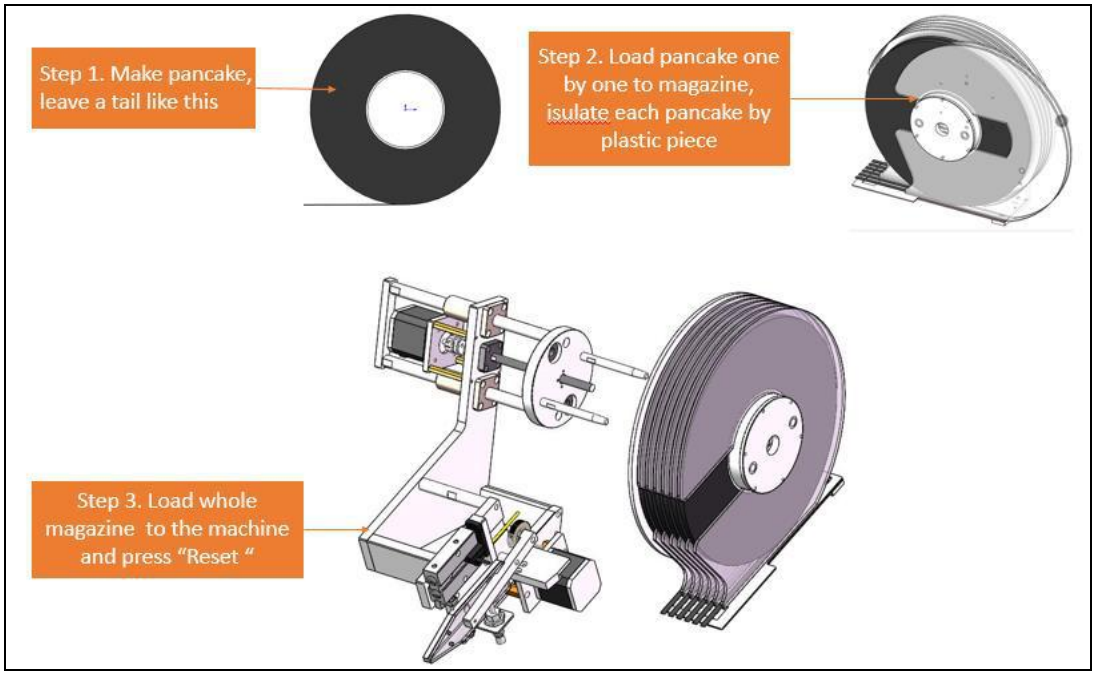


Machine preparation

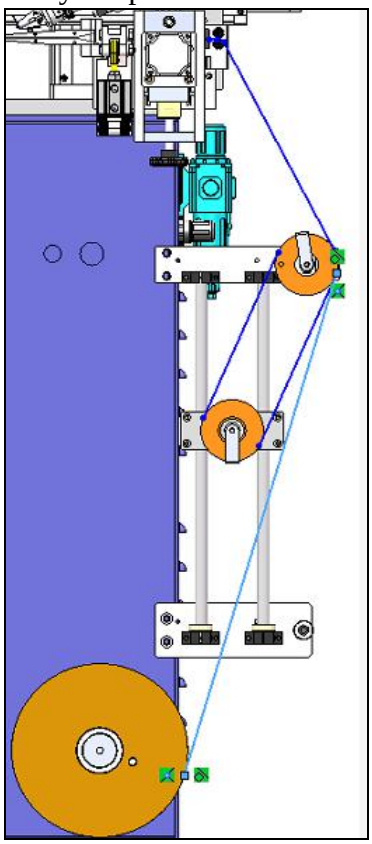
1. Load strip, see Pic 11 below, put spool on the shaft, then tight the nut to proper tightness.



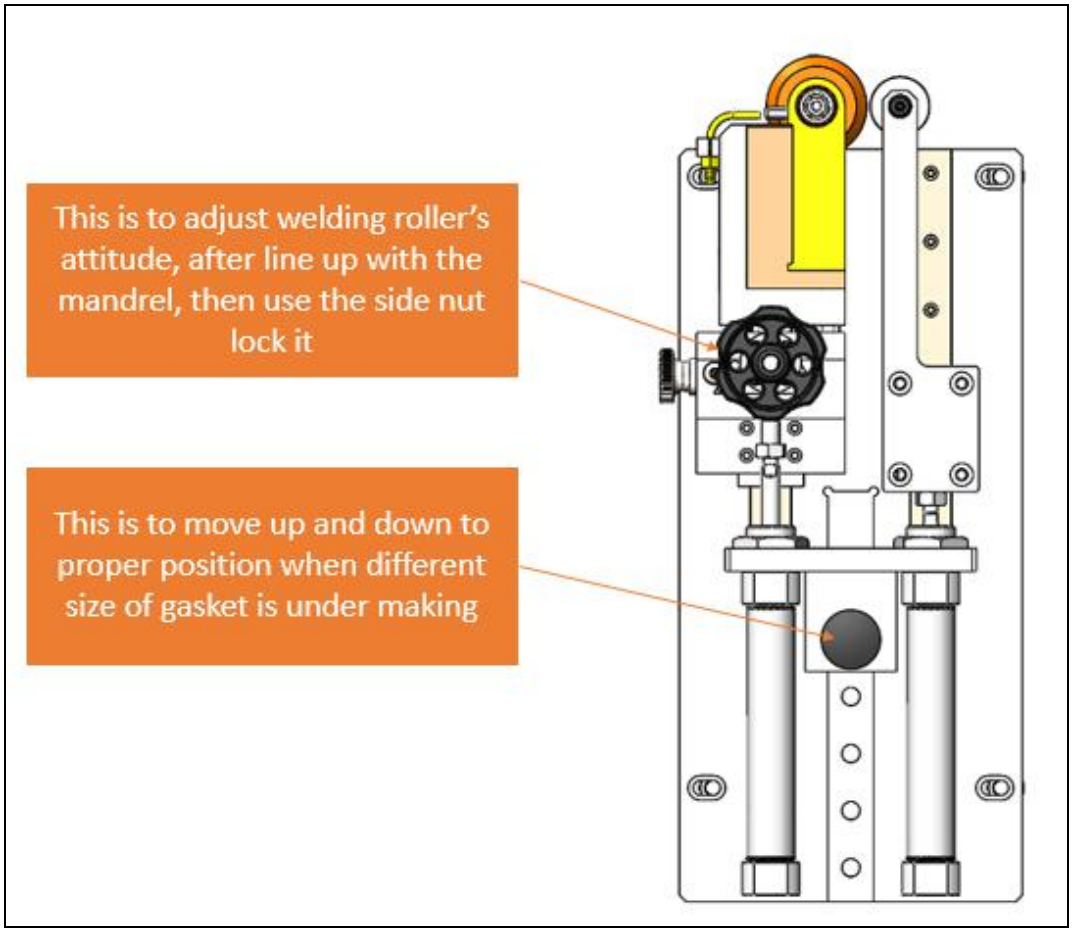
2. Load graphite pancake as shown below, one charge can load maximum 6 pancakes,



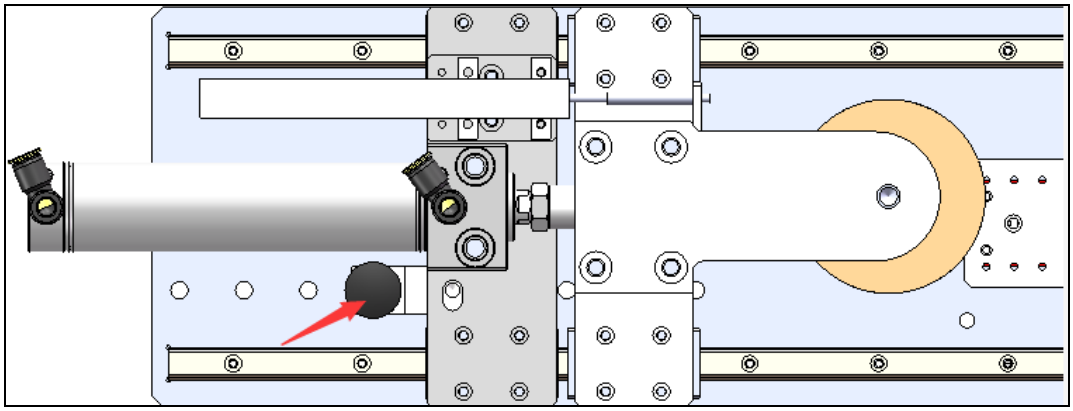
3. Load strip through 3 dancing wheels as indicated, then go through form rollers, make it ready for production.



4. Welder and small press roller adjustable like show below.



5. Press roller is also adjustable, pull up the pin (see red arrow pointed), slide to the proper position then release the pin, it will lock to the position.



Trouble Shooting Maintenance Tips

Welding spark	1.Welder tips not move;
	2.Welder tip position not right;
No welding	1.Welder intensity is not strong enough;
	2.Welder tips burned， need to be replaced or re-lathed on OD.
	3.Solid relay broken, check if it power on
Welder not move	Sensor broken or no pressure
Welder move too fast	Throttle valve open too big, adjust back to the proper speed
Press roller not move	Sensor broken or no pressure
Press roller move too fast	Throttle valve open too big, adjust back to the proper speed
Jaw needs to grease in daily basis.	
Welder tips need to lathe on the OD on regular basis, weekly is recommended.	
Empty oil-water separator on weekly.	

Safe Instruction

1. Operator must ware glass to protect from welding spark, or strip.
2. When feed strip, especially filler material, make sure keep finger certain distance away from the press roller.
3. Operator must ware glove, don't pull strip with hand in any cases.
4. Don't open electronic box when electrician is absence.

END