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MATE AUTOMATION

Horizontal Spiral Wound Gasket Machine

MH-02

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.

Company brief

SUZHOU INDUSTRIAL PARK MATE AUTOMATION TECHNOLOGY CO.,LTD
ADD: BUILDING 15-1 PUTIAN PRIVATE INDUSTRIAL ZONE WEITING SIP JIANGSU 215122
TEL: 0086-512-6285 0086 FAX: 0086-512-6285 0087

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;

Kammprofile machine;

Guide ring grooving machine;

Inner ring beveling machine;

Bend & weld machine;

Laser 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 in the Asia USA Europe Middle east and South America.

We welcome all customers from abroad and home.

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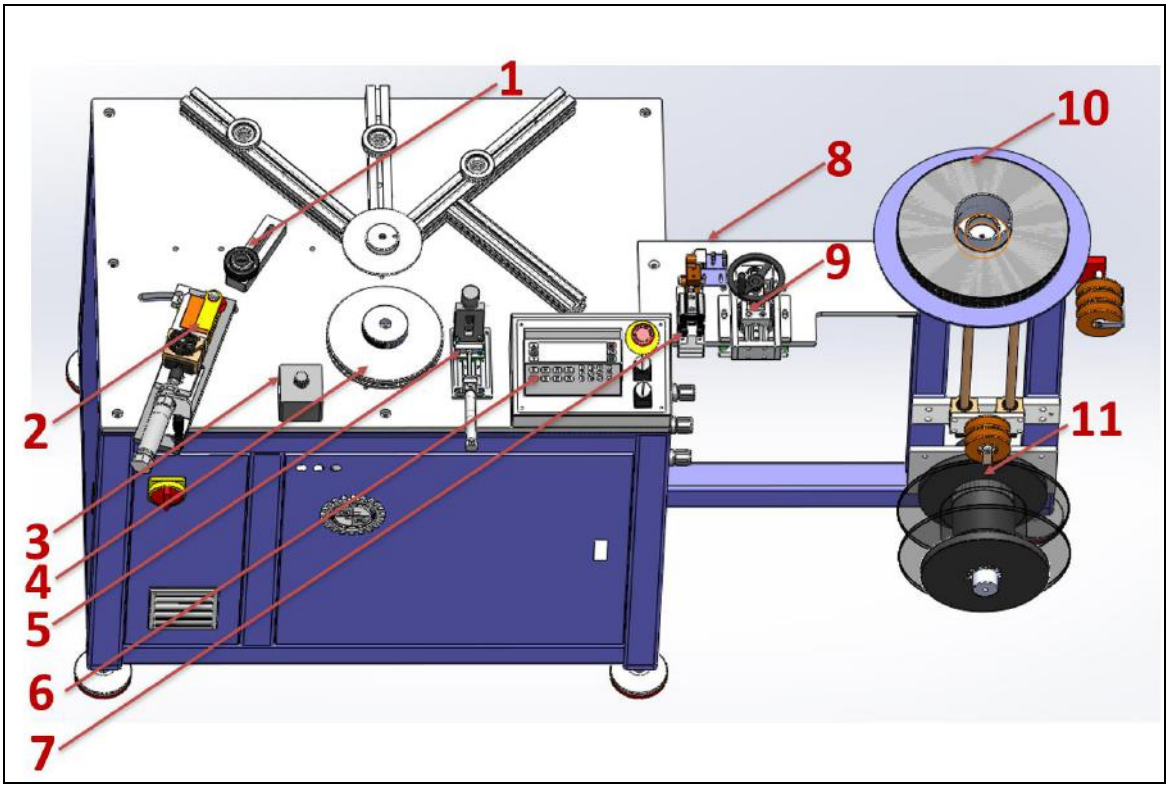
MH-02 Horizontal Spiral wound gasket machine (Pic)

Machine Main body



1. Support roller
2. Welder
3. Speed tuner
4. Press roller
5. Strip height adjust
6. Panel
7. Strip cutter
8. Graphite sensor
9. Strip former
10. Graphite disc
11. Strip bobbin

Tips

Support roller, it provides support from inside of the mandrel (or inner ring) towards to the welding roller.

Strip height adjust, adjust the strip during winding process, when you see the gasket deform towards upside, adjust down a little bit; when see the gasket deform towards downside, adjust strip up a little bit. This device is very useful to the wide flange gasket.

Graphite sensor, machine will stop when graphite tape break or runout.

Features and specification

1. PLC controlled program, significantly improve productivity.

2. Automatic measuring the flange width, save great time from manual measuring during

the process.

3. Making big size of gaskets from 8'' up to 4 meter diameter of gasket and having the flexibility of making winding with and without inner ring.

4. Automatic welding saves great deal of time, moreover, makes welding points strong and reliable, and welding span even. One switch shift between automatic and manual welding.

5. One charge can load 15-to-20-kilogram wire, save lot of working time, especially on making big size gaskets.

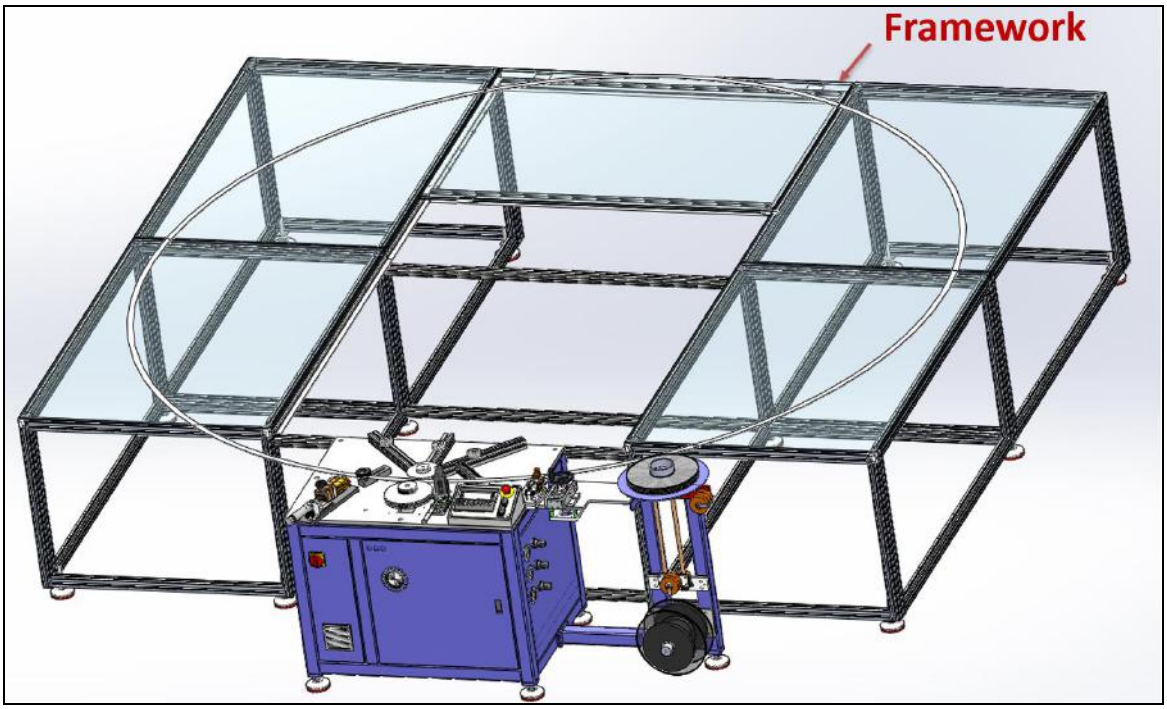
6. One charge can load up to 15 of graphite. Having adjustable graphite holder.

7. Successfully use man-machine engineering principle, location most high frequent operation within arm-reach area, significantly reduce operator's work load.

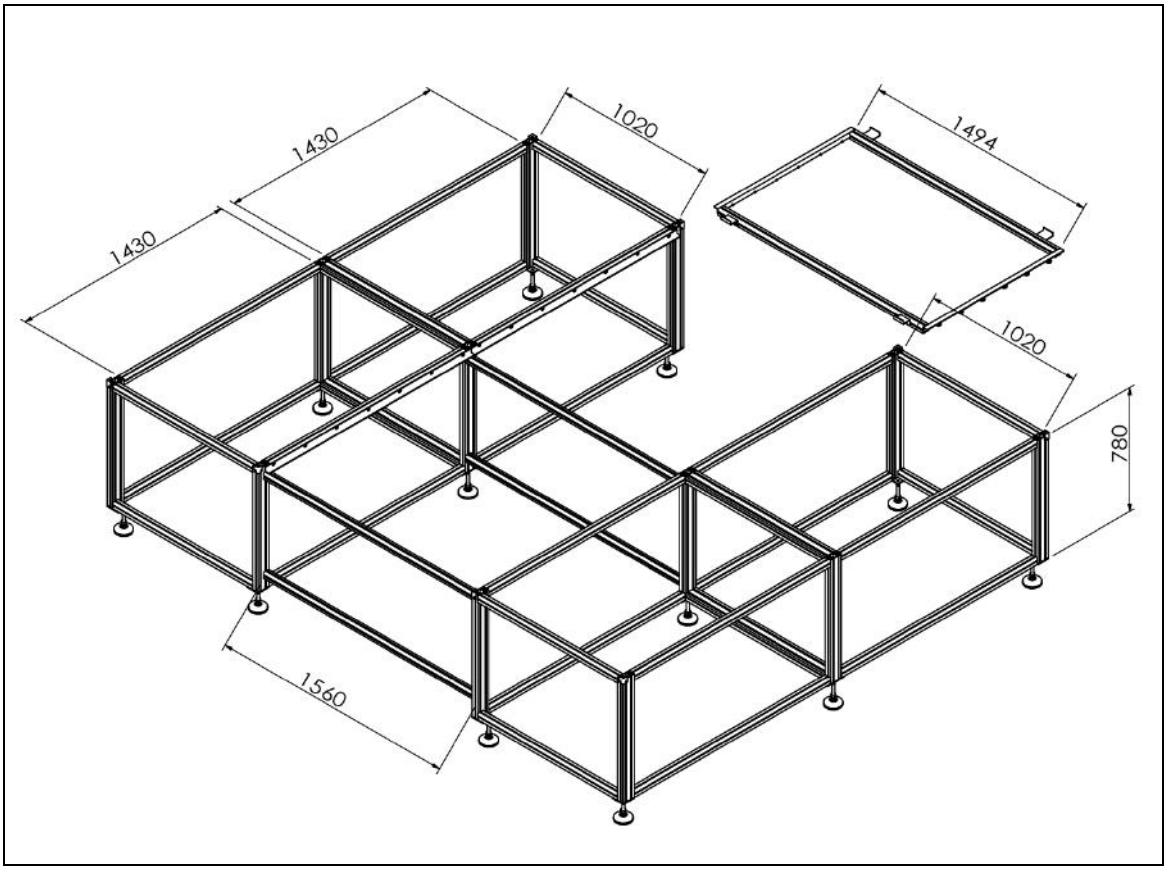
Specification

Machine profile	**4000*3500*1100mm**
Voltage	**3 phase 380 V**
Drive motor	**750 W**
Driving power	**Variable frequency motor**
Working mode	**Semi-automatic**
Size	**10'' up to 150''**
Filler Material	**Any**
Gaskets type	**Standard and inner ring gasket**
Standards	**All standards**
Cycle time	**6-8 minutes for a 24" gasket**
Change over time	**5 to 15 minutes**
Process control	**Programmed by PLC**
Material feed and cut	**Manually**
Welding	**Automatic**
Strip tension	**Adjustable**
Winding speed	**Manually adjustable**
Filler break control	**Yes**
Steel form assistant	**Yes**
Steel former	**Yes**
Flange width measuring	**Yes**
Steel spool support	**Load up to 15 kg strip**
Filler Plate support	**Load over 6 pancakes**

Machine whole view

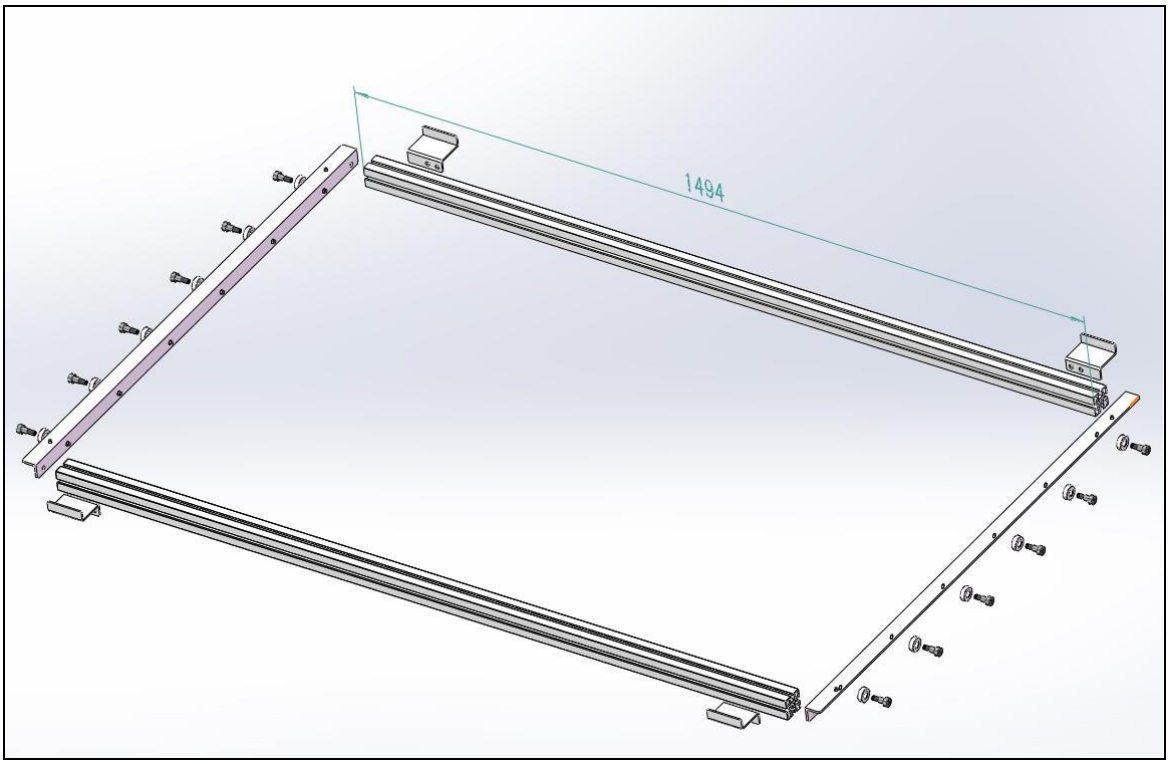


MH-02 Machine Framework Drawing



Moveable plate Put the glass on top it after assembly the plat

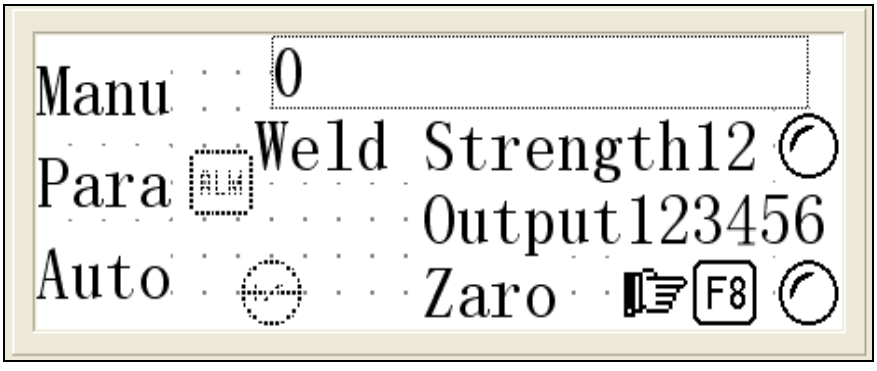
according to the drawing below, this plat is moveable as per the different size of gasket.



Parameter Setup

1. Connect cable to power.
2. Connect air pipe to compressed air source.
3. Turn on power, the interface will show the first page as below

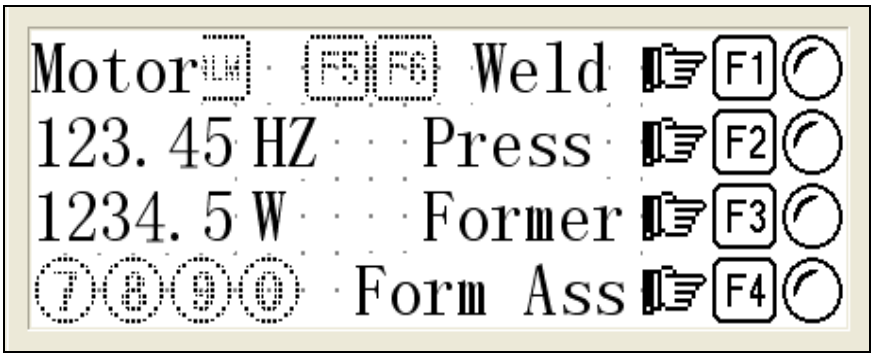
(See Page1)



Manu---go to Manual mode;
Para---go to Parameter setting page;

Auto---go to Auto mode;
Weld Strength---Welding strength, “SET” to bring the light to area to change the number;
Output---Count production volume;
Zero---Reset the volume;

Press “Manu” go to the Page2 as below,



F1---Control welder
F2---Control Press roller
F3---Control strip former
F4---Control former assistant (Air clutch)

Press “Auto” go to the page 3 below,

In “Auto” mode, it show some information such as current wrap / current width / current product code.

Code means product code，indicate a specific type of product is under building; Each code represents a set of parameter setting for a specific type of product saved in machine memory. This machine can save up to 200 sets of parameter setting.

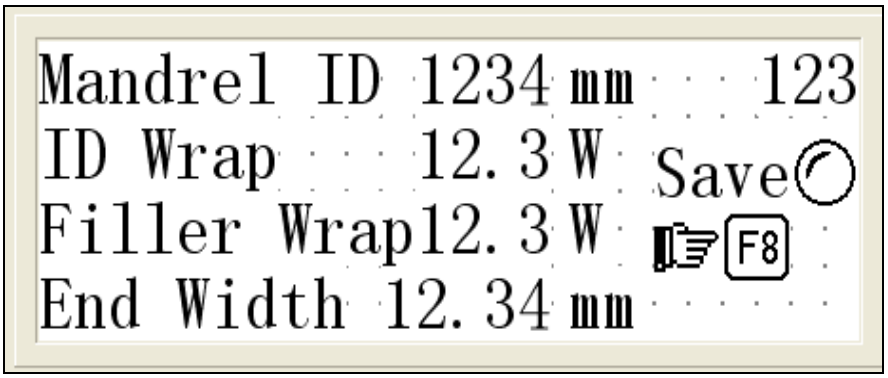
How to use a code to save a set of parameter setting?

Para ⇨ Define a code ⇨ Setup parameters ⇨ Press F8 save parameters

Define a code, Please see the below photo,

Under this page, press "SET" repeatively until the light to code area at top right corner. Key in the number you want, then press "ENT".

Press "Para" go to the Page 4 as below, in this page, the operator can set up all the parameters to produce one specific type of production.



Mandrel ID---means inside diameter of mandrel, this is key parameter which determine lots of logical calculations in the program;
ID Wrap---means steel strip inicial wraps, normally 3-4 wraps;
Filler Wrap---determine how many wraps to be set;
End Width---means what winding flange width you want, this determines the overall dimenssion of gasket, which should be fit to the ID of guide ring, so make right ending width is important to do the next assembly process.
After set up all those parameters in this page, press F8 to save them

How to calculate filler wraps?

For example if you wanto to make ASME 24" 150 Gasket,

Assume Mandrel width 15mm
Graphite thickness 0.75mm
Steel strip thickness 0.20 mm

MH-02 Horizontal 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 claimp the mandrel, during all the winding process, the caliper is constantly meansuring 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, 24" 150 gasket inside diameter is 627.8mm, gasket inside diameter equal to the outside of mandrel, so the mandrel OD is also 627.8mm, therefore, the inside diameter of mandrel should be 627.8-15*2(mandrel flange width is 15mm, see above assume) =597.8mm

So you have the first parameter Setting,

Mandrel ID 597.8 mm

ID Wrap, according to the ASME, should be 3 wraps, this is normal same, so you don't change when you change mandrel size. It should remain same.

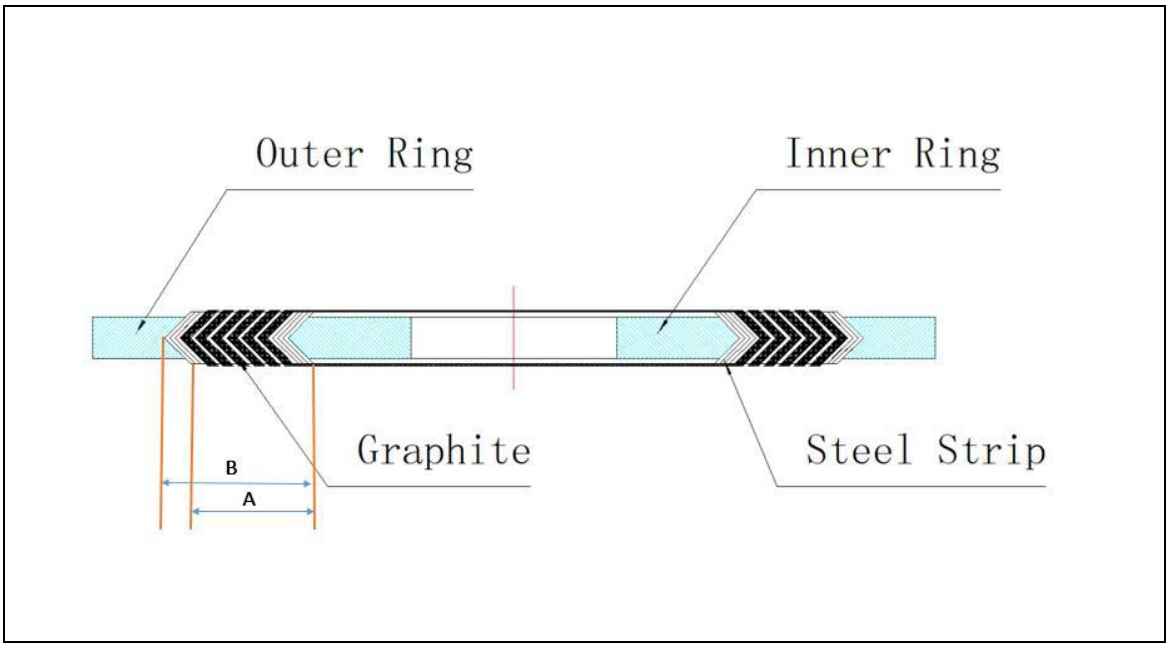
Filler wrap, filler wrap is determined by the ending width. So we set up the ending width first.

24" 150 gasket outside diameter is 685.8. so ending width=(685.8-628.7)/2=28.5mm.

Ending width 28.5mm, ending width is actually the gasket flange width. One more important tip about the "Ending Width", it refer the dimension of the below drawing A, not B, so the actual ending with A=B-1.5mm (V shape dead height is 1.5mm), so the actual ending width setting should be 27mm.

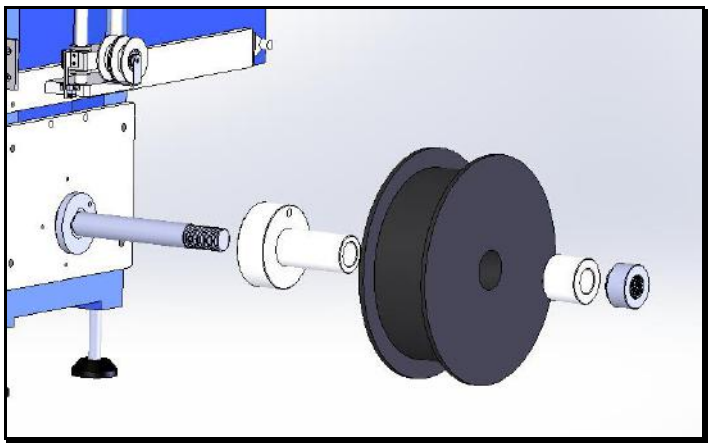
Now we can calculate the filler wraps, gasket flange width (actually is the ending width)=ID steel wraps normally 3 *0.2mm+Filler wrap X * 0.9mm(steel strip thickness+graphite thickness)+ outside steel wraps normally 3 wraps, or more according to ASME.

So Filler wrap X =27 (Ending width) - 3*0.2 (inside steel wraps) - 3*0.2(outside steel wraps) = 25.8/0.9 (steel strip thickness+graphite thickness) =28.7 filler wraps must be full wraps, so take 28 as filler wraps, one principle is always take the integer smaller than X actual value.

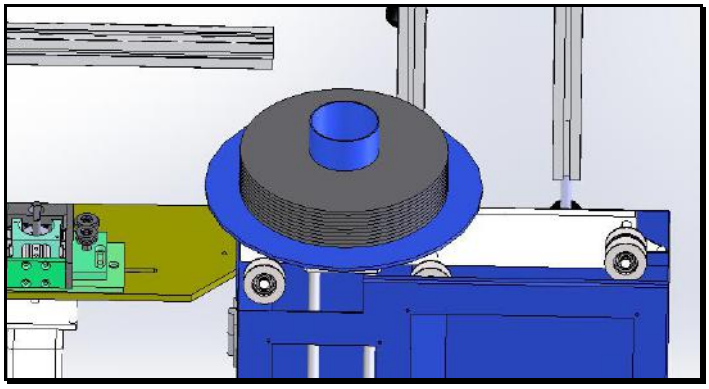


Machine Setup

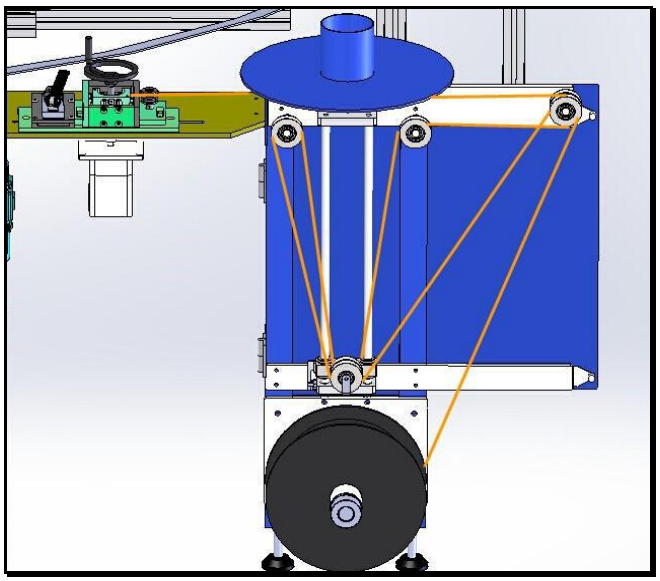
1. Load strip, see Pic 11 below, put spool on the shaft, then tight the nut to proper tightness. (Pic 8)



2. Load pancake of filler material. The machine is designed to load more than 10 layers of filler material once. That will significantly save material changing over time. After loading material, put the cover on top of it.(Pic 8)



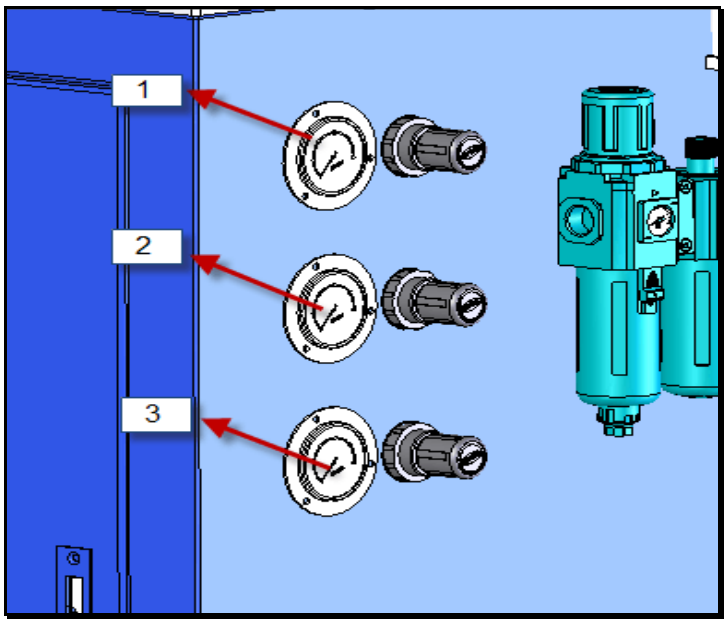
3. Lead strip through 3 dancing wheels as indicated, then go through form rollers, it will be ready for production. (Pic 9)



4. Before start making process, set air pressure properly. (Pic10)
Pressure recommended as following,
Press roller 0.2-0.3 Mpa;

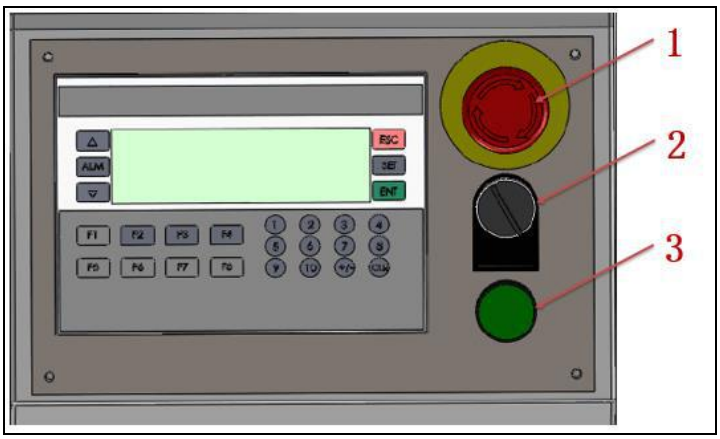
Form roller 0.3-0.4 Mpa;

Welder 0.2-0.3 Mpa;



1) Press roller 2) Form roller 3) Welder

5. Operation button indicate. (Pic 10)

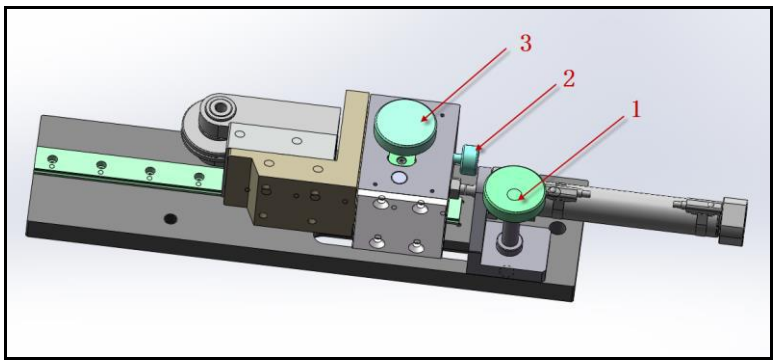


1) Emergency stop

2) “P” & “W” Switch, “P” means Press roller, switch to “P”, the press roller will go up; “W” means Welder, switch to “W”, the welder will go up.

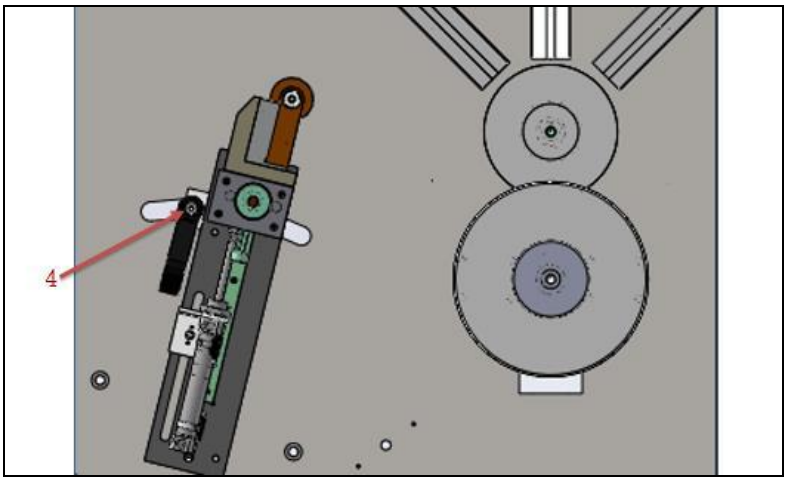
3) Start button, for each step of process, press “Start” to go on.

6. Welder can adjust altitude/reach out position same as vertical machine, the welder on horizontal machine can also adjust the angle.

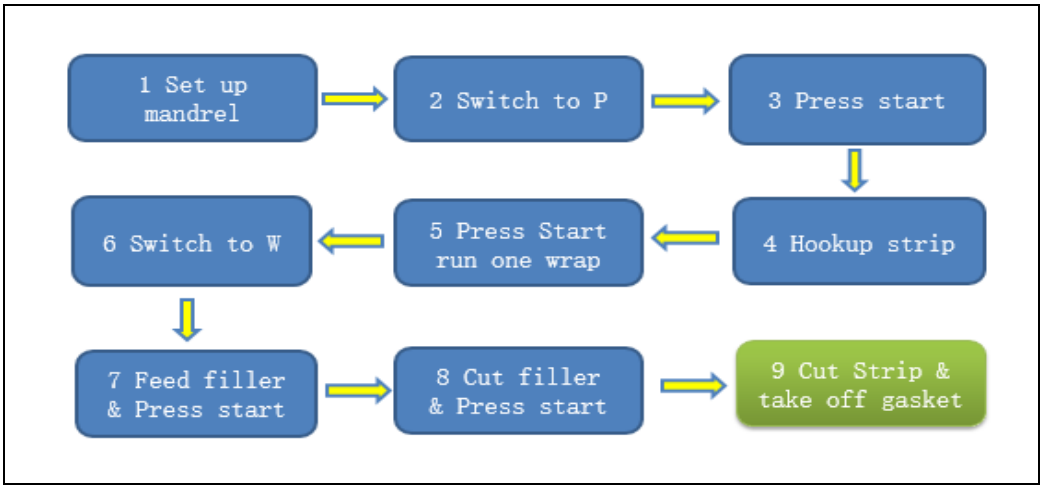


1 Adjust initial position
2 Altitude lock
3 Adjust altitude

Adjust initial position of welder according to different sizes
Altitude lock after adjust the altitude of welder tips to proper height, tight it to keep the set altitude
Adjust Altitude is to set up the altitude of the welder tips to make sure tow welder tips evenly touch the shoulder of formed strip.



7. Gasket making process（Process Map）



Step 1 manually set up the mandrel to holding rollers, and make the mandrel same level as the drive wheel;
Step 2 switch to “P”, the press roller will move up to clamp the mandrel;

Step 3 constantly press “Start” button to bring the mandrel slot to the proper position where the slot is roughly face to the direction of strip coming;
Step 4 hook up the steel strip to the slot of mandrel;
Step 5 constantly press “Start” button to run one full circle, make it a little over forward;
Step 6 switch to “W”, the welding robot will move up, and start automatic welding process, after finish welding process, the machine pause;
Step 7 feed the filler, then press “Start”, machine will run all filler wraps set, and pause;
Step 8 cut off filler, then press “Start”, machine ran several steel wraps until gasket flange width hit the “Ending width” set, then machine automatically welding 3 ending weld points and stop.
By then, the operator can cut off the steel strip and take off the gasket from mandrel.

IR gasket process flow is same except “Hookup strip” change to “weld the strip to IR”.

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.(for Vertical winding machine only)	
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 tail.
2. When feed strip, especially filler material, make sure keep finger safe 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