

CGN208-D Semi Automatic Capsule Filling Machine

User Manual



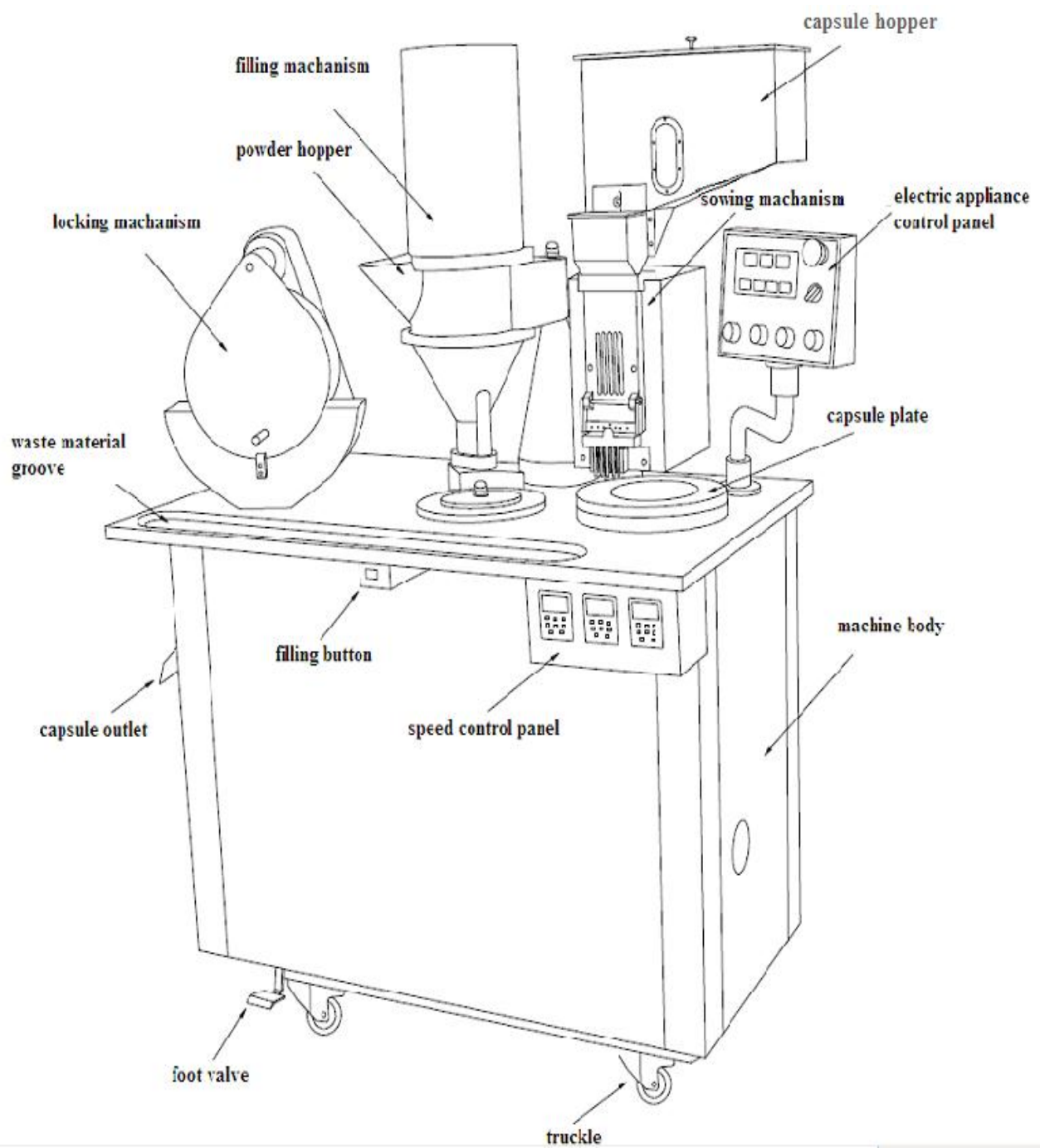
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<https://pharmamachinecn.com/semi-automatic-capsule-filling-machine/>

CONTENT

I. Machine Profile Drawing	2
II. Summary	3
III. Main Technique Parameters	3
IV. Function of Main Parts	4
V. Adjustment and Operation	11
VI. Electrical Circuit Drawing	13
VII. Electric Components List	17
VIII. Expandable of CGN-208-D Capsule Filling Machine	17

I. Machine Profile Drawing



Picture 1

II. Summary

CGN-208D capsule filling machine is a latest model with great efficiency, developed on the base of DTJ-C (old model). It adopts straight pins to position the whole sowing assembly, reducing the time of changing and adjusting mould to 5~8 minutes. Comparing to the old model, this machine is more simple and intuitive on capsule feeding, turning around, vacuum separating and human operation, with higher rate of good finished capsules. It combines electric appliances with pneumatic system to control, novel structure and beautiful appearance. We equip this machine with automatic counting device, PLC and frequency converter to control speed, which can respectively finish capsule feeding, separating, filling and locking, instead of handwork, to reduce the labor intensity and enhance productivity with accurate filling weight, in accordance with the pharmacy hygiene requirements.

This machine consists of sowing mechanism, filling mechanism, locking mechanism, frequency converter, pneumatic and electric control systems, protection device, vacuum pump and its accessories (optional), suitable for machine-made capsule in domestic or imported and hand-made capsule. The qualified rate of finished capsules can reach 98% or above.

III. Main Technique Parameters

Capacity	10-25 thousands/hour
Capsule Models	000#/00L#/00#/0L/0#/1#/2#/3#/4#
Filling Material Type	powder and small granule without stickiness and humidity
Total Power	4.0KW
Air Pressure	0.03m ³ /min 0.7Mpa
Vacuum Pump Capacity	40m ³ /h
Dimension (L*W*H)	1.14×0.7×1.63 (m)
Weight	380kg

IV. Function of Main Parts

1. Sowing Mechanism

The sowing plate moves up and down to transport the empty capsules from hopper to sowing tubes. There is capsule-releasing switch at the right bottom of sowing tubes, when the tubes moving down, the switch will be opened by cam action to release a row of capsules; when moving up, it will be closed to keep the capsules inner tubers from falling down. The capsule falling in the comb will be pushed forward and turned around (with capsule cap inward and body outward) by transmission fork, then it will become vertical from horizontal status by the action of capsule-pressing head, and falling down the capsule plate with the effect of negative pressure produced by vacuum pump. The capsule cap will remain in the upper mould hole for the blocking of a small step inner hole, while the body goes on sliding down the lower mould hole by the effect of negative pressure. Thus, the sowing mechanism finishes releasing, turning around and separating the capsules, as picture 2.

The frequency converter motor drives the cam, rocker and ratchet mechanism to run. Each circle the cam rotating, the ratchet will push one tooth forward, namely, the capsule plate is pushed forward a row of holes. At the same time, the cam drives rocker arm to make capsule sowing plate move up and down. As with auto-control design for counting quantity, this mechanism will stop at the top dead centre automatically to ensure the convenience of next movement when the plate is filled with capsules. (Top dead centre: the point that the sowing tube just moves downward from the top place. If necessary, it also can be stopped manually. The speed is adjusted by the knob on the frequency converter, showed on the instrument. If there are some capsules separated incompletely, turn the capsule plate 1~2 circles with hand to separate all the capsules completely by the sucking force of vacuum.

We will match a set of mould for each machine, as for additional moulds or spare parts, the users can choose to buy them according to accessory list.

Difference: the device of model 00# and 00L# (L means lengthening) has 5 holes per row, and the capsule plate has 300 holes (5*60), the ejector pin tray has 300 pins, the corresponding capsule-pressing head, sowing plate and comb have 5 rows.

the device of model 0# and 0#L (L means lengthening) has 6 holes per row, and the capsule plate has 360 holes (6*60), the ejector pin tray has 360 pins, the corresponding-capsule pressing head, sowing plate and comb have 6 rows.

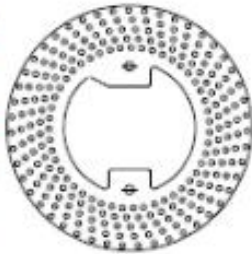
the device of model 1#, 2#, 3#, 4# and 5# has 7 holes per row, and the capsule plate has 420 holes (7*60), the ejector pin tray has 420 pins, the corresponding capsule-pressing head, sowing plate and comb have 7 rows.

holes of each type capsule with 000 model machine

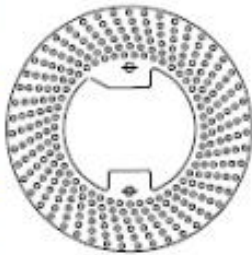
000#: 4 capsules/row, 47 rows



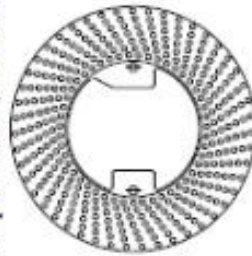
00#: 5 capsules/row, 47 rows



0#: 6 capsules/row, 47 rows

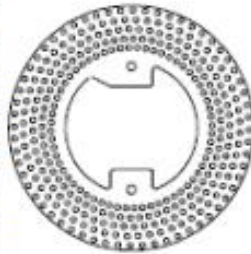


1# 2# 3# 4#:
7 capsules/row, 47 rows

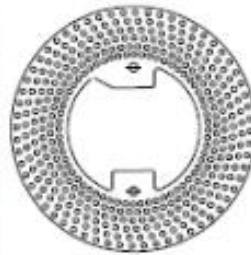


holes of each type capsule with 00 model machine

00#: 5 capsules/row, 60 rows

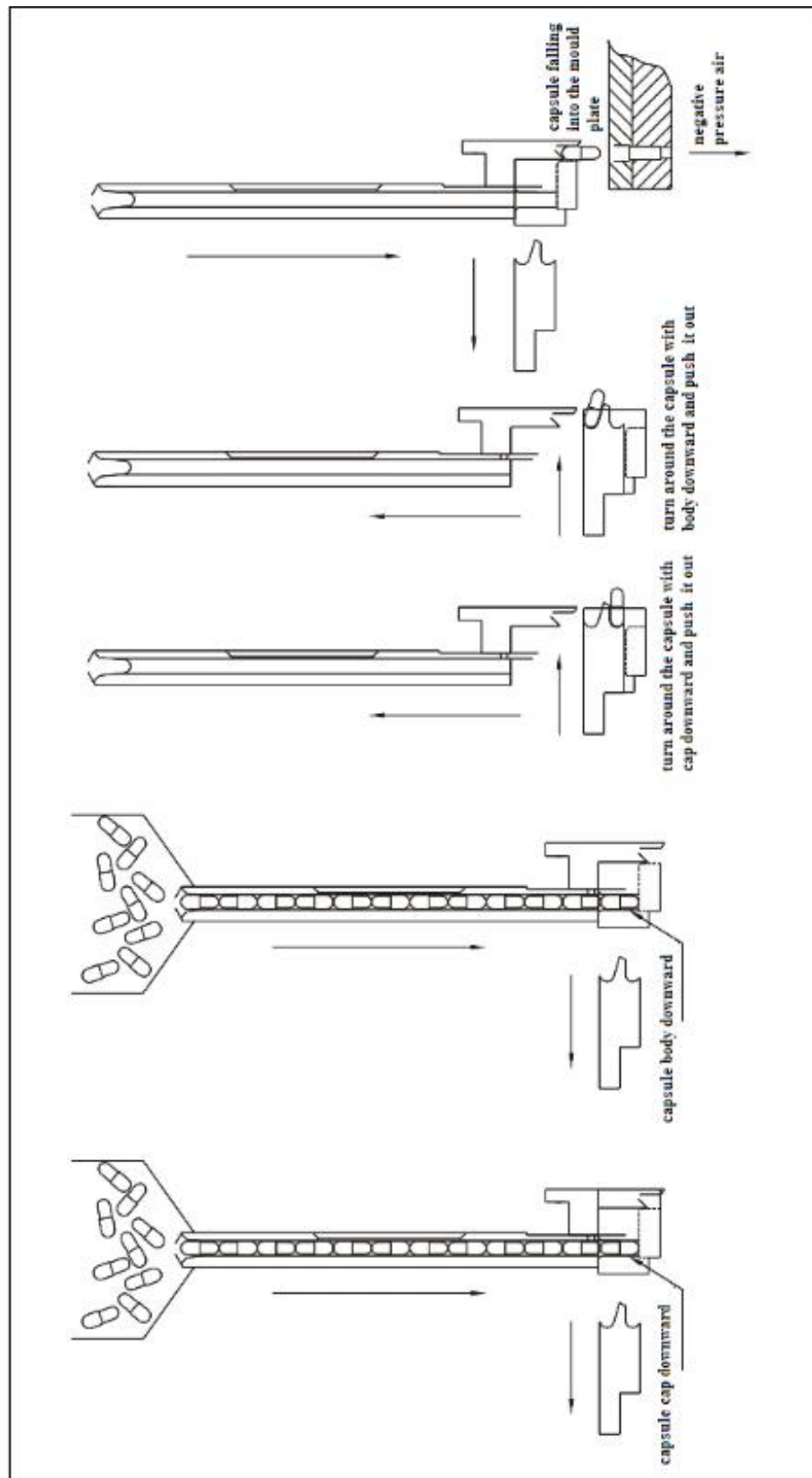


0#: 6 capsules/row, 60 rows



1# 2# 3# 4#:
7 capsules/row, 60 rows





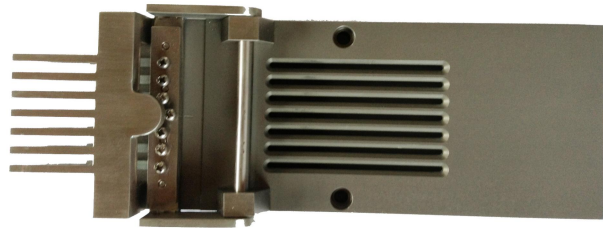
Picture 1

Accessory list of changing mould: for different models of capsule, we need to install corresponding mould assembly, including ejector pin tray, sowing plate, capsule plate, sowing comb, transmission fork.

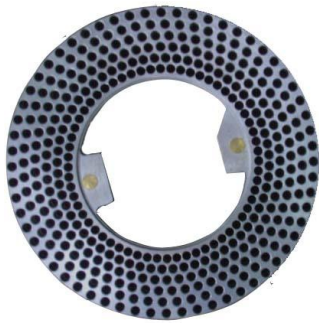
See the picture 2 as below:



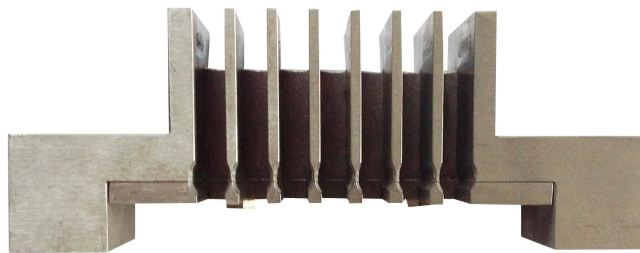
Ejector pin tray



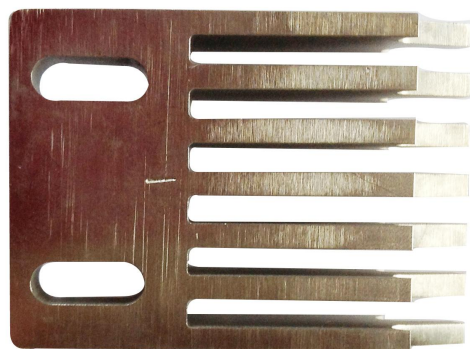
Sowing Plate



Capsule Plate



Sowing Comb



Transmission Fork

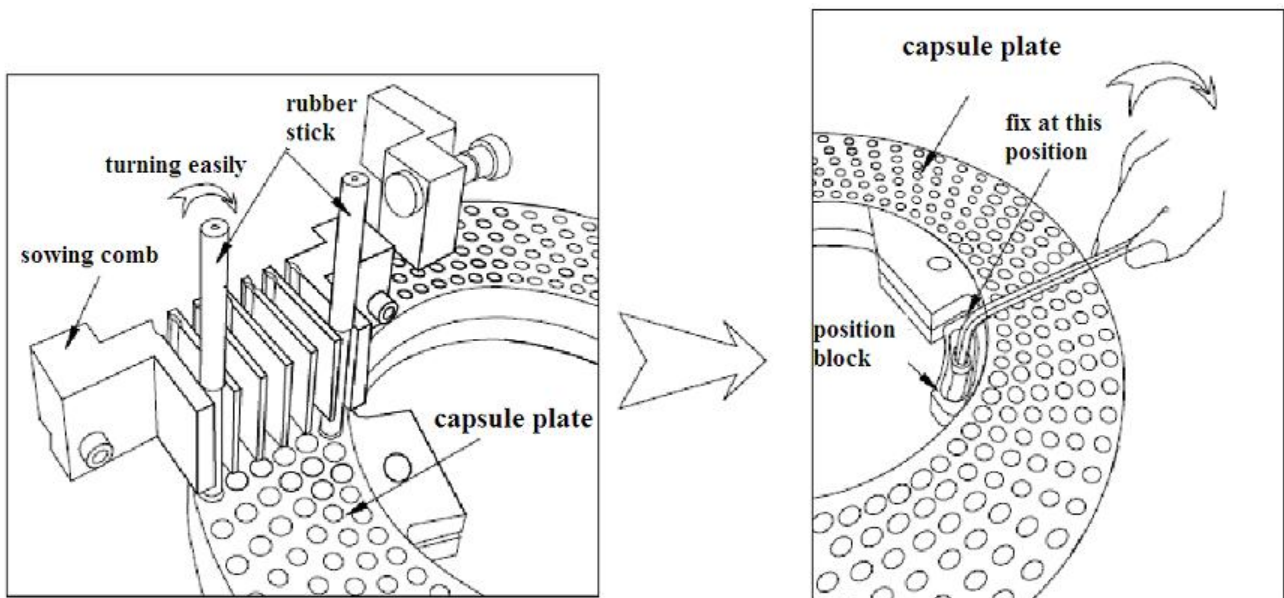
Picture 2

Steps for changing mould

- 1) Remove the mould
 - 1.1 Remove the sowing plate after loosening the two M6 screws on it by 8# hex wrench.
 - 1.2 Remove the sowing comb after loosening the two M6 screws on it by 8# hex wrench.
 - 1.3 Inch the capsule transmission fork forward and stop it at the front dead point, then remove the transmission fork after loosening the two M6 screws on it by 8# hex wrench.
 - 1.4 Remove the ejector pin tray after loosening the M16 round head nut at the centre position by 24# open end spanner.

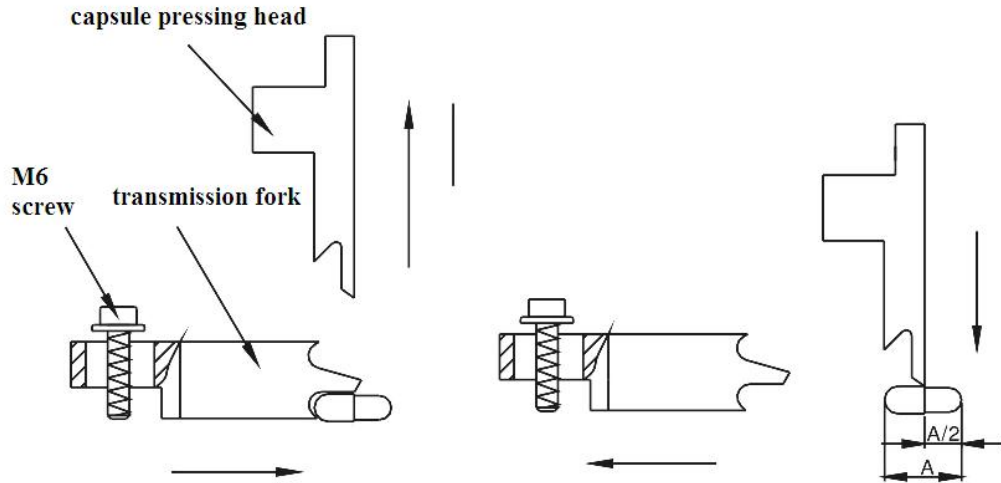
Mould installation and adjustment

- 1) Sowing comb installation: just align the two location holes (on the back of sowing comb) at the cylindrical pin and then tighten up the M6 screws.
- 2) Capsule plate location: put the capsule plate on the rotary table after inching the movable stand to the lower dead centre. Then insert two rubber sticks along the R&L slots of sowing comb into the corresponding holes of capsule plate, the sticks turning easily. At last tighten up the M6 screw of position block. See the picture 3 as below:



Picture 3

- 3) Sowing plate installation: just align the two location holes (on the back of sowing plate) at the cylindrical pin and then tighten up the M6 screws.
- 4) Transmission fork installation: at first slightly screw up the transmission fork, then inch it to the front dead point and adjust it until the cutting edge of capsule pressing head aligns at the half position of capsule, at last tighten up the screw completely. See the picture 4 as below:

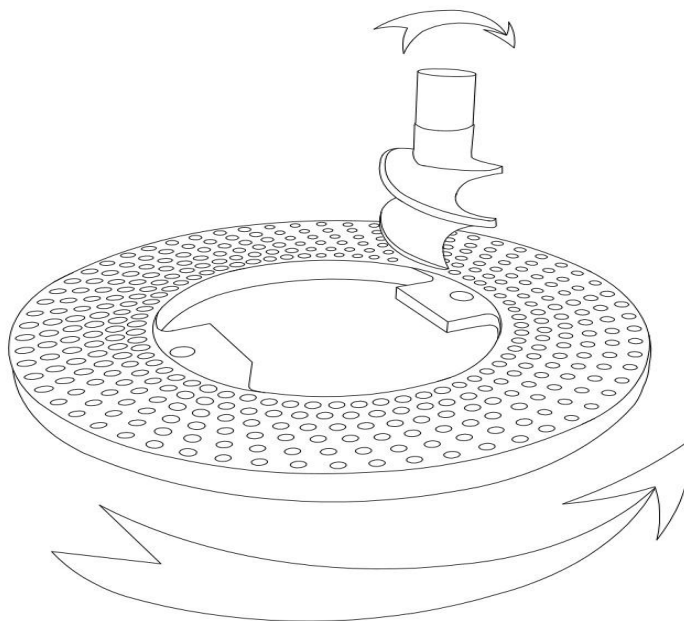


Picture 4

2. Filling Mechanism

The function of this mechanism is filling the medicine material into the empty capsules automatically. The hopper is equipped with variable frequency motor, (the instrument displaying speed), which drives the propeller to fill the material into empty capsules. The lower plate also is driven by variable frequency motor to rotate one circle under the feeding mouth. When pressing the start button, the hopper will be pushed by air cylinder toward the capsule plate mould until it reaches to the certain place, and then motors of the rotary plate and material hopper start to work automatically. The capsule plate mould will stop turning after one circle, meantime, material hopper retreats from the mould, driven by air cylinder.

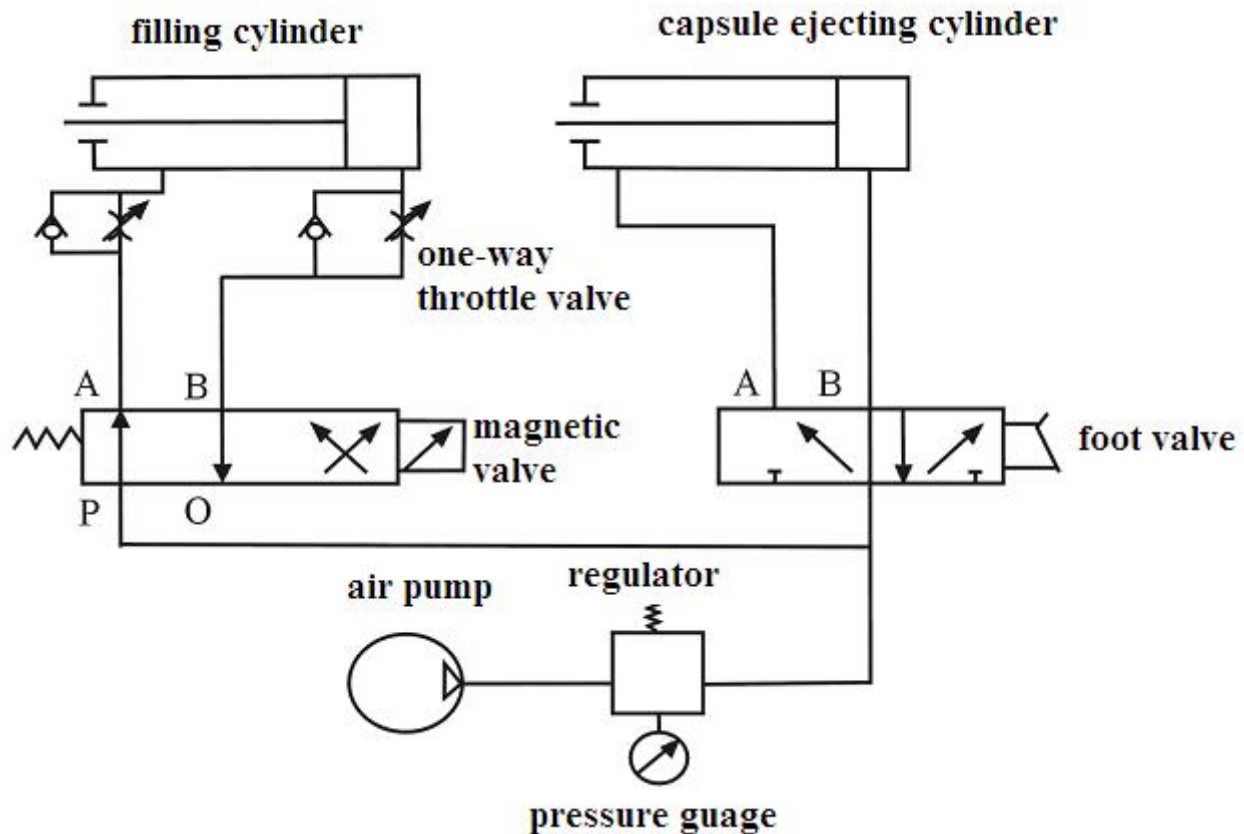
Filling quantity adjustment: it can be adjusted by the rotational speed of propeller and rotary plate, which are controlled by frequency converter. When the propeller rotating slowly and the rotary plate quickly, the filling quantity will be less; on the contrary, the propeller rotating quickly and the rotary plate slowly, the filling quantity will be more.



3. Locking Mechanism

This mechanism is used to lock up the capsules (put the upper and lower moulds together) filled with medicinal material, and drive the ejecting cylinder to work by foot valve; then push the capsule mould manually to reset the ejector pins and release the capsules into finished products box.

4. Air Control System (as picture 5)



Picture 5

The pressure of this system is between 0.4 and 0.7Mpa, the compressed air will be sent to foot valve and magnetic valve after getting through the pneumatic F.R.L (Filter/Regulator/Lubricator).

- 1) The first step of F.R.L. is filtering the compressed air, the second is regulating pressure, the third is gasifying the oil to supply for lubricating gas path system. Regulate the oil injection rate as one drop per 1-3mins, common engine oil can be accepted.
- 2) The movement of locking cylinder is controlled by foot valve. When pressing down the valve, the locking cylinder will push forward to lock the capsules; when releasing the valve, the cylinder will retreat.
- 3) The magnetic valve is commanded by electric system to control the filling hopper, there are two one-way throttle valves at its exit, used to control the running speed of air cylinder.

5. Electrical Control System

1) Brief Introduction

- 1.1. It adopts three-phase four-wire system with 380V/50Hz, adding one more ground protection wire. The user must connect the ground wire well before powering on.

- 1.2. It adopts three variable speed motors to drive the running of each transmission, convenient to maintain and operate.
- 1.3. Via the switching mode power supply, reduce the control voltage AC 220V to regulated DC 5V and 17V to supply the touching control panel.

2) Operating Principle of Electrical Control System

Remark: please refer to the frequency converter instruction for changing frequency parameter.

- 2.1. The vacuum pump is commanded by a pairs of “on and “off” buttons, interlocking with an alternative current contactor in the box. When touching “on”, the vacuum pump self-locks and starts working; when touching “off”, it stops working. The vacuum pipe system is equipped with one cylindrical filter, to avoid empty capsule debris or dust entering it. There is a vacuum meter on the right of machine body to display the system pressure, and a throttle valve to adjust the system pressure.
- 2.2. The air pump itself has pneumatic compressing switch. if high energy, it will stop working; and low energy, it stats working automatically.
- 2.3. The sowing mechanism is driven by a single variable speed motor, the button “R” regulating rotary speed. When touching “on”, the sowing mechanism starts to run; “off”, it stops. The sowing mechanism will run a circle (60times) after switching on, and then stop automatically, the parameter value of auto-stop control has been set as 60 times by the counter.
- 2.4. The filling mechanism is driven by two variable speed motors to run the material hopper and rotary plate respectively, cooperating with the air cylinder, magnetic valve and counter to run regularly and cyclically. The tachometer displays the running speed of hopper and rotary plate. When touching “on”, the magnetic valve opens the air pipe to supply air for cylinder, pushing hopper toward rotary plate. At the same time, the delay (factory setting is 2-3 seconds) will time for the cylinder. When the hopper reaching to the certain place, the delay device finishes timing and the motor starts driving the rotary plate to run at the same time. From this point, counting for the rotary plate starts on, after it running a circle (factory setting is 30 times), the motors of both rotary plate and hopper stop working, the magnetic valve also recovers to pull the hopper backward its original position. Either touching screen or control panel is equipped with another feeding button (convenient for two operators to control sowing and filling process at the same time) to improve working efficiency.

V. Adjustment and Operation

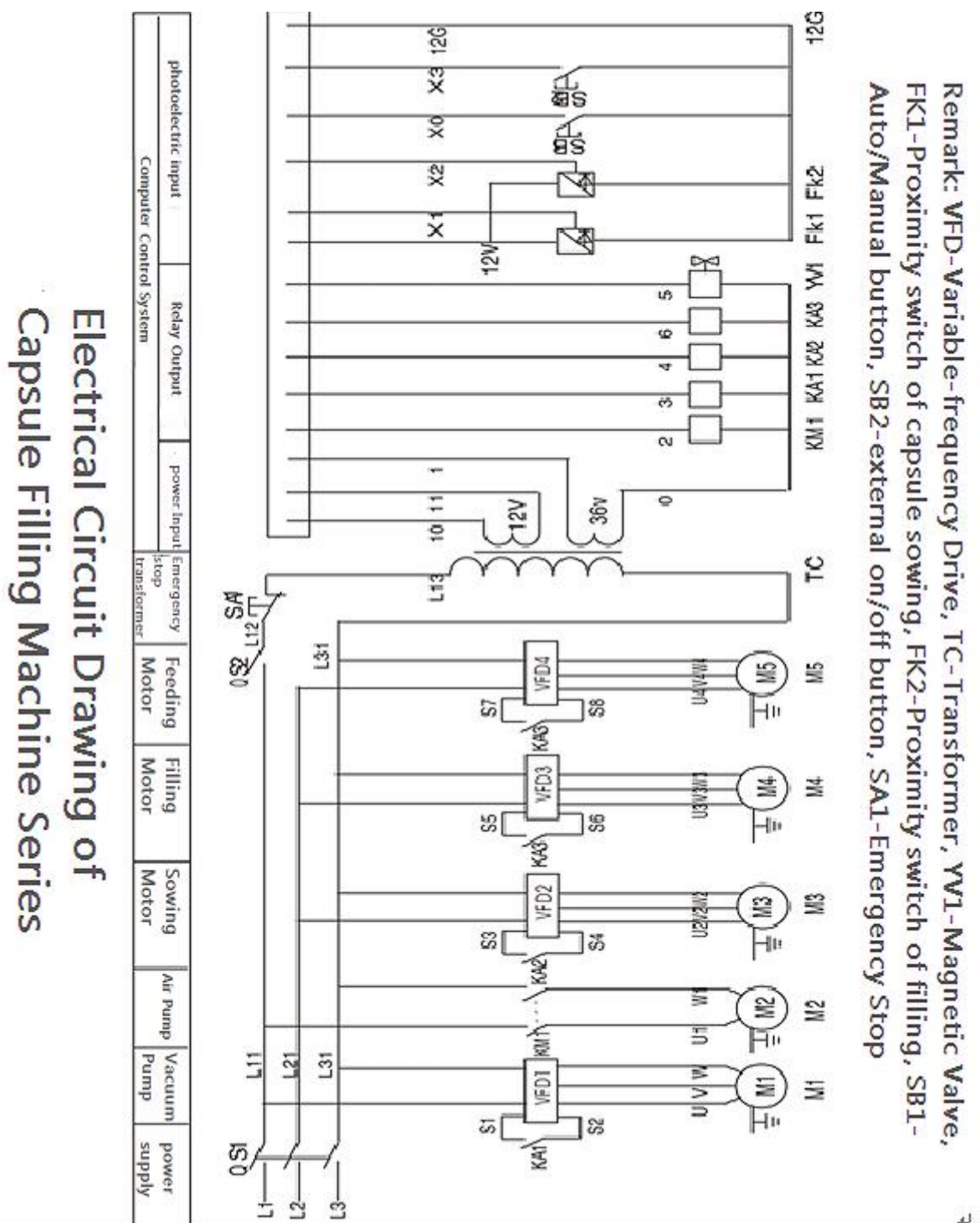
1. Before test-running the machine, the operators must know well about the instruction, the working performance of each part and the function of all the buttons on the control panel. See the picture 7 as below.
2. Preparation before test-running
 - 2.1 It should use three-phase AC power supply of 380V/50Hz or 220V/60Hz, must ground or connect to neutral reliably according to local power system requirements.
 - 2.2 Inspect each part of the machine without any damage and lubricate the regulated parts by oil.
 - 2.3 Power on the machine and close the air switch on the electric cabinet, the parameter display of control panel will light on. Touching the “on” button to start the vacuum pump and check if the direction of motor spinning conforms to the arrow.
 - 2.4 Connect the air pump with 380V or 220V (optional), check if the direction of air pump spinning conforms to the arrow.
3. Adjustment and operation
 - 3.1. Start the vacuum pump and air pump, their spinning direction must be the same with arrow indicating. Turn the “R” knob to the lower position and then start the sowing motor. Touching

“on” button and turn the “R” knob to speed up the sowing mechanism gradually until reaching the max speed. There should be no mechanical clamping symptom and abnormal noise during this process. Pour the empty capsules into the hopper, try separating the capsules with low speed, and then speed up gradually under normal condition. Adjust its running speed according to the empty capsule quality, good quality with higher speed, poor quality with lower speed.

- 3.2. Lock the lower mould on the rotary plate and feed medicinal granules into material hopper, touching the “on” button to start filling capsules with medicine.
- 3.3. Cover the upper mould back on the lower mould, which has been filled with medicine. Then move them to the locking station together and just align the ejector pins at the mould holes. Turn the locking cover plate down, stepping on the foot valve gently to lock up the capsules and discharge them to the box with finished products.

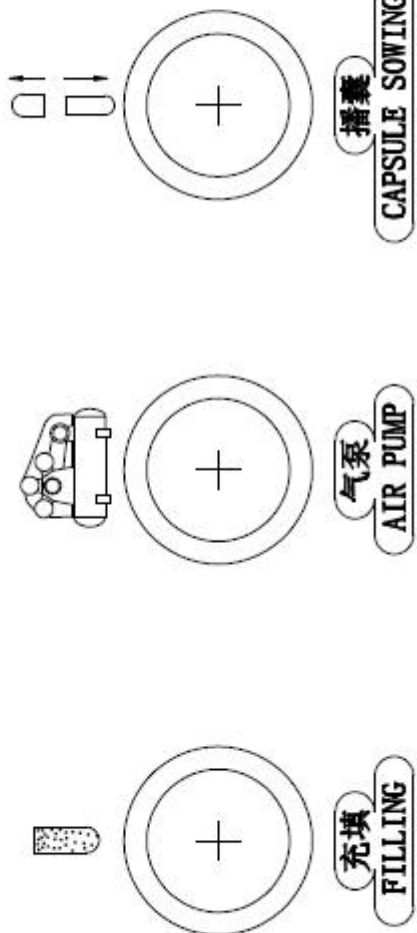
For the performance and adjustment methods, please refer to the related chapters above.

VI. Electrical Circuit Drawing



Picture 6

SEMI-AUTO CAPSULE FILLING MACHINE



14

Appendix of Picture 7

Parameters Setting on Touching Control Panel

Operation	Switch	Digital Display	Note
①power on	Counting of filling	30	Monitor mode Factory setting
	Delay filling	02	
	Capsule separated	60	
②change parameter value	Keep pressing “off” button of capsule sowing for 10s, and then release it.	30	Display parameter Screen flickering
		30	
③parameter setting	Increase or reduce the value by pressing “on” and “off” buttons of vacuum pump	32	Factory setting Set required parameter
		30	
		28	
④push forward	press “on” button of capsule sowing	30	Repeat the action if need to push forward
		02	

Remark: please change the factory setting of

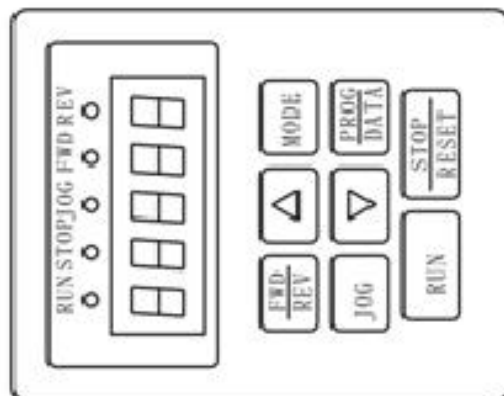
30

60

02

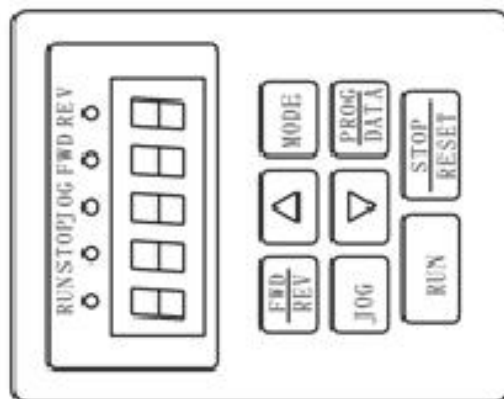
 according to the example above.

Introduction of Speed Control Panel



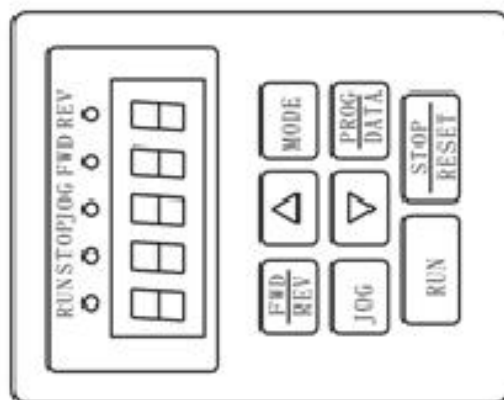
播囊调速

Capsule sowing adjustor



螺杆调速

Scvew speed adjustor



转盘调速

Rotating plate speol adjustor

Picture 8

VII. Electric Components List

Name	Model	Origin	Qty	Remark
Transformer	JBK3-63	Ruian Transformer factory	1	
Intermediate Relay	JTX-2C	CHINT, China	2	
AC Relay	CJX2-12	HUYU, China	2	
Circuit Breaker	DZ47-63 D20	CHINT, China	1	
Circuit Breaker	DZ47-63 C6	CHINT, China	1	
Emergency Stop Switch	Y090-11X	HUYU, China	1	
Control Panel	PC	Yongmao	1	
Optoelectronic Switch	GL-8F	SUNX, Japan	1	
Proximity Switch	H12-D5NK	Ruixiang, Shanghai	1	

VIII. Expandable Parts of CGN-208-D Capsule Filling Machine

									
No.	PictureNo.	Name	Unit	Material	No.	PictureNo.	Name	Unit	Material
1	05-12	Vacuum pad	1	PTFE	2	02-02	Feeding pad	1	PTFE
									
No.	PictureNo.	Name	Unit	Material	No.	PictureNo.	Name	Unit	Material
3	02-24	Hollow shaft sleeve	1	PTFE	4	02-25	Screw shaft sleeve	1	PTFE

Packing List

No.	Description	Specification	QTY	Remarks
1.	Main machine	CGN208-D	1 Set	Included 2 pcs 0# capsule rings
2.	Extra capsule size change parts	Non		
3.	Oil cycle type vacuum pump		1 Set	
4.	Water Barrel with one small hand cart		1 Set	
5.	User Manual		1 copy	
6.	Frequency Inverter manual		Each 1	
7.	Quality Certificate		1 copy	