

ANHUI KOYO BEVERAGE MACHINERY .CO.,LTD
安徽蓬源饮料机械有限公司

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RXGF18-18-6 Wshing, Filling and Capping Machine

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I. Overview

1.1 Product Features

The machine adopts hanging bottle conveyor structure, with the use of bottles lift making the filling more precise and reliable. Different types of bottles can achieve the function just by adjusting the conveyor height and replacing some parts, so that the operation is more convenient and effortless. This machine adopts the micro-gravity vacuum filling principle. With the Spring loaded flush pliers hand, empty bottles can automatically flip 180° to rinse the bottle. The machine uses magnetic torque screw lid for screw capping. The power of the screw capping can also be fixed, and the cap will not be damaged, the capping is reliable; machine adopts automatic control technology such as the stepless frequency speed adjustment, with such functions as low temperature automatic shutdown, filling and reflux automatic control, free bottles of them off cap, lid shut-down in the inner cap chut.

1.2 Main application and scope

It is mainly applicable to the round bottles of such packaging hot-filled and sealing as juice and tea drinks.

Bottle-shaped: the capacity range of the bottle: 250--1250ml

Bottle diameter range: $\phi 50$ - $\phi 85$ mm

Bottle height range: 150--290mm

Bottle inner diameter: $\phi 20$ - $\phi 30$ mm

1.3 Control process;

The extracted and mixed tea with ingredients or fruit juice through UHT (UHT) system reaching process requirements is sent to the cylinder of the filling machine, and assigned to the filling valves without filling. The materials are returned to the reflux tank through the filling valve. If its temperature through detection process does not meet the requirements, the materials will be back to the UHT for re-sterilization while reaching the detection requirements, the materials will be filled. The reflux tank holds the micro negative pressure at 10mbar so that air in the bottle and the excess foam material can quickly flow back to the reflux tank a when filling, ensuring the requirements of full filling. The reflux tank is equipped with a float level control, once the tank level is reached at the upper limit, the reflux pump will automatically open, so that the material that is cooled by the plate heat exchanger can be sent back into the UHT balance tank, and then re-enter the UHT for sterilization, so as to ensure the juice flavor unchanged. Once the tank temperature can not reach the temperature requirements during production, the machine will automatically stop and return so as to ensure the filling

temperature. The machine is also equipped with a CIP cleaning system. During cleaning, UHT stops working. With the cup filling valve holding the cleaning cup, cleaning liquid (acid, lye, water) enters the filling cylinder, filling valve, vat through the mouth of the filling machine with 1 ~ 2kg / c square meters of pressure. The reflux tank is equipped with a spray ball for cycle cleaning the top of the tank etc., and finally sent back to the CIP cleaning machine by the return pump.

1.4 Varieties and specifications

Variety - Bottle Filling Capping Machine

Specification--RXGF18

1.5 Composition and symbolic meaning of the RXGF18

X-- Rinser RXGF--hot filling machine F-- capping machine

1.6 Security

The machine is manufactured in accordance with the relevant safety regulations. Its structure can be assured for safe operation in adjustment, maintenance, maintenance, repair and troubleshooting. During the above operations, the machine must only be operated manually, or is operated with the jog switch.

In the course of maintenance and repair, the machine needs to stop working only by trained and authorized personnel. At any time before the power is turned on, it is supposed to check whether there is tool in the bottle passage and cleaning utensils as well as whether there are obstacles in all of the operation of institutions.

It is particularly important to carefully read all safety regulations and safety instructions of the full-time staff. In addition, the main thing is to see the following points:

1. Do not wear any loose clothing
2. Protect the long hair by putting on the hairnet, or some other form of work cap.
3. When dealing with the chemicals, hot water and steam, you are required to wear protective clothing under the regulations to prevent corrosion injuries.
4. When the filling machine is during the normal operation, a sudden power off is not allowed.

II The introduction to the composition and structure of the equipment

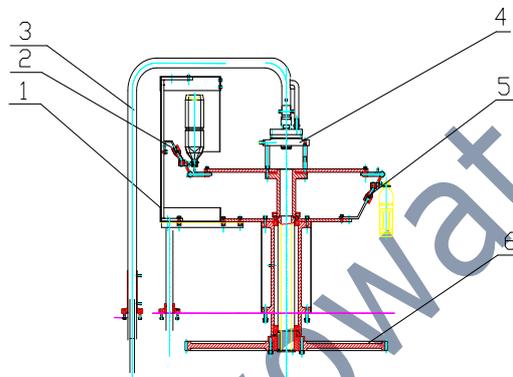
2.1 Equipment composition

a. rinser; b. filling machine; c. sealing machine; d. workbench;
e. drive part; f transmission part g. electro-pneumatic controller

2.2 Structure Introduction

2.2.1 rinser <figure 1 >

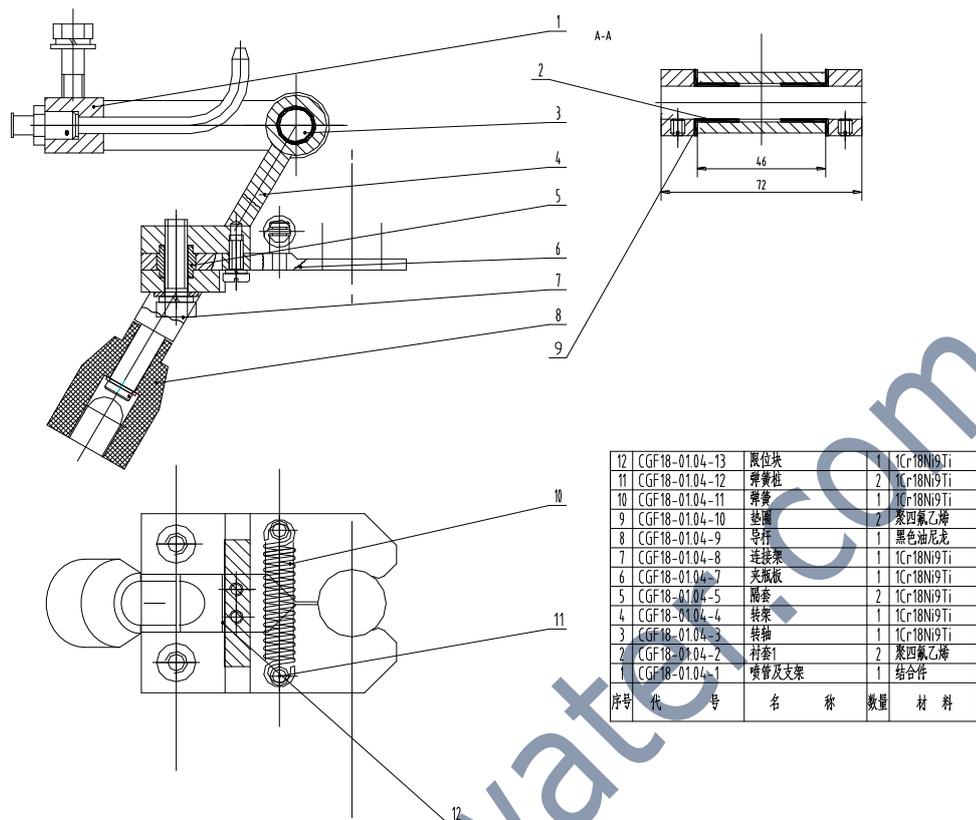
It is mainly composed of the main gear, holder, bottle clip device, distributor, anti-rotation stand column, flip cams and so on.



2.2.1.1 Clamp device <figure 2 >

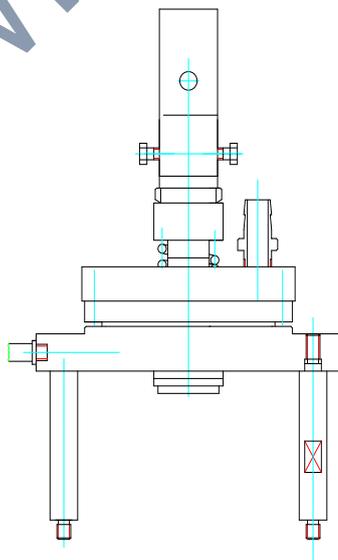
In the figure, it can be seen that the guide bar moves following the flip cam, leading the bottle clip body to rotate around the axle making the bottle clip flipped 180 °. The bottle clip automatically opens or clamps with bottles during the turntable movement.

In the figure, the guide rod and the rollers are vulnerable parts manufactured by the black oil nylon.



2.2.1.2 Allocator <figure 3>

Media distributor connects the medium for washing to the device through the user pipeline and by assigning the medium to each terminal straight tube connector, so that the medium can ultimately be assigned to the nozzle. The timber parts are stainless steel and special materials in line with food hygiene requirements.



2.2.1.3 Flip cam

Flip cam is operated as the follow: the clamp flips up the bottle requiring rinsing at infeed star wheel and send it to be washed, drained (if flushing with sterile gas or disinfecting gas, you do not need to drain it), and then flip down the bottle and send it to the bottle star wheel for output, and finally complete washing the bottle.

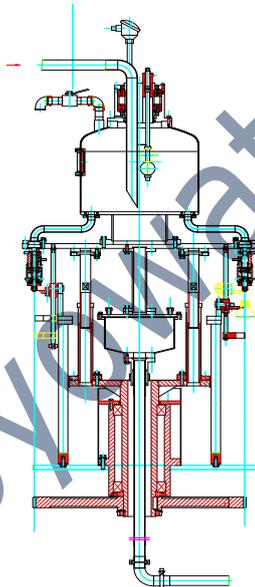
When turned on, the bottle goes down following upward;

When turned downward, the bottle goes upward from downward.

The section has been adjusted at the factory, please do not adjust.

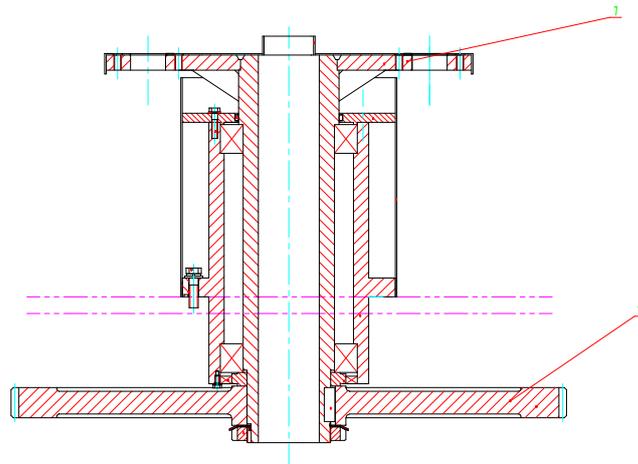
2.2.2 Filling part <figure 1>

Filling part is composed of the swivel, height adjustment mechanism, filling cylinders, cylinder systems reflux and reflux tank system components.



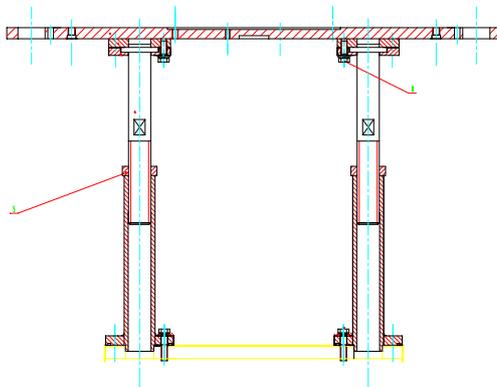
2.2.2.1 Swivel <figure 2>

Swivel serves as the critical component to connect the filling machine with the table and the drive system. A No. 14 rotary filling machine gear is rotated to drive the No. 7 turntable to rotate connected with the filling plate with the aligning elevation gear in order to achieve the rotation of the filling.



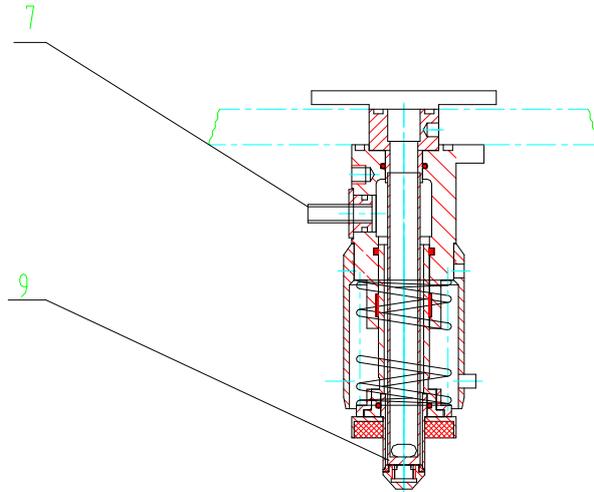
2.2.2.2 Aligning elevation gear <figure 3>

To ensure that the filling valve when filling the bottle and the bottle valve gasket are completely sealed, the screw rod filling plate height is used to adjust the height of the valve, and then lock the nut 5 and screw 8.



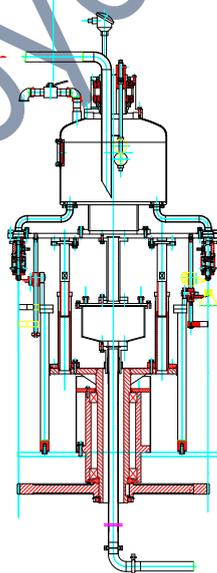
2.2.2.3 Filling valve <figure 4>

Filling valve serves as the key components of the equipment. Internal part is designed by streamline to ensure there is no health blind corner. Thanks to adopt the No. 7 for returning air and No. 9 for the entry of the liquid, the full filling requirements can be met with. When cleaning, fake glass can be put on to circulate the cleaning fluid in the valve body.

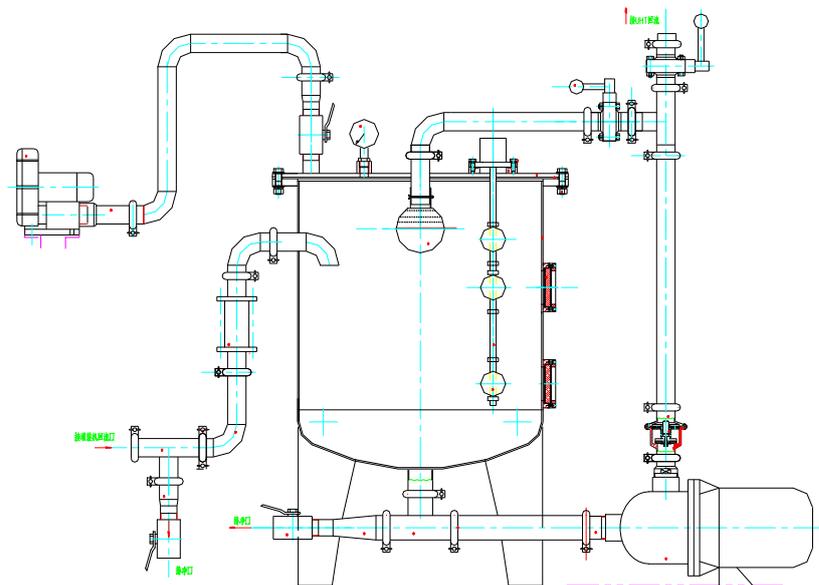


2.2.2.4 Filling cylinders and reflux cylinder system <figure 5>

The material enters the filling cylinder from the inlet tube, and then is distributed manifold to be delivered to each filling valve for filling, at that time without filling, the materials are returned to the reflux tank through the filling valve. If the temperature detection does not meet the process requirements, the material will be back to the UHT for re-sterilization, otherwise filling.



2.2.2.5 Reflux tank system <figure 6>



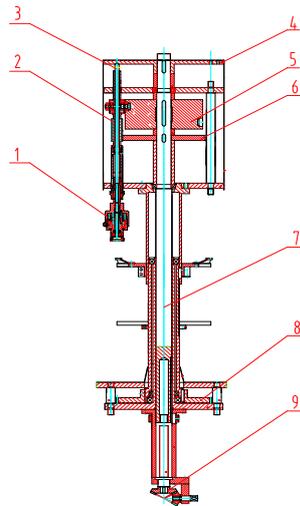
The refluxed material from the filling valve flows to the reflux tank. By observing the sight glass, the return flow can be known. The reflux tank has certain negative pressure (about 10mbar) so as to reflux liquid and the excess foam and the like after filling the bottle. Once the liquid in the tank reaches a high level, the liquid pumped from the reflux pump is sent to the balance tank ahead of the UHT machine after cooling by plate type exchanger for re-sterilization. The reflux tank and its connected pipeline have been polished inside and outside without any health blind corner. The cleaning nozzle is mounted on the top of the tank, thus ensuring to meet the health requirements.

2.2.3 Sealer

The sealing machine is mainly composed of the sealing machine principal axis, screw lid parts, slide tray cover unit, hopper devices and so on. The machine uses air control hopper, dial cover plate to take cover and catch lid accurately and in a reliable way. Screw lid and magnetic overload are under protection to ensure constant torque screw cap.

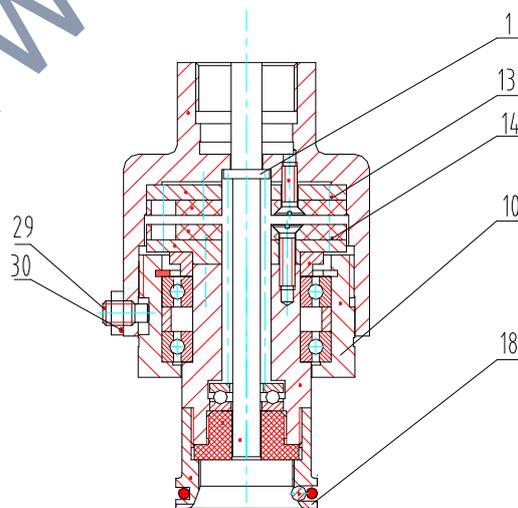
2.2.3.1 Sealing machine spindle part

Sealing machine principal axis is composed of a capping head (No. 1), the gear shaft (No. 2), back cover shaft (No. 3), the cap (No. 4), the cam (No. 5), the sun gear (No. 6), the spindle (No. 7), the spindle gear (No. 8), height adjustment gear (No. 9) and so on.



2.2.3.2 Screw lid (Fig. 2)

Screw lid is made of the stainless steel, inside which consists of a magnetic screw cap and overload protection to ensure accurate balance of the given moment of the screw cap. The screw lid torque is adjusted by adjusting the magnetic field distance between the No. 13 and 14. Loosening the nut NO.29 and the screw NO.30 and implementing clockwise rotation to the No. 10 drive body, the moment force of the screw cap thus increases, otherwise reduces. No. 1 bottle jack plays the protective effect when without the bottle but a lid, so that the top of the cap screw lid that has strayed into can be pushed out. No. 18 is the screw cap ring for capping.

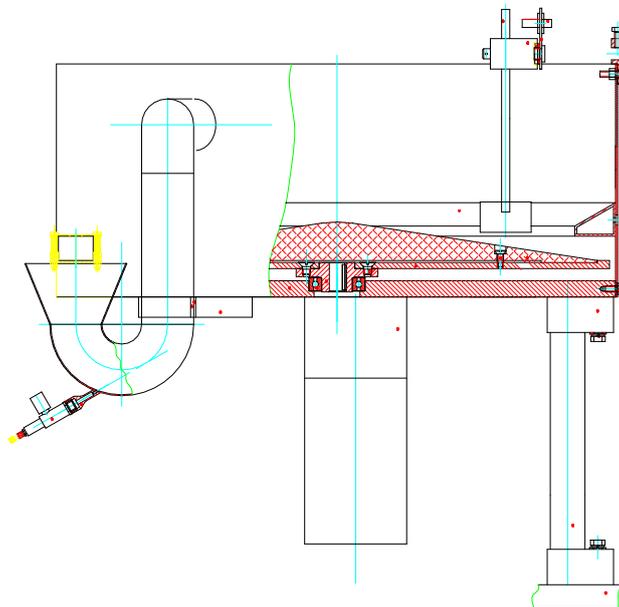


2.2.3.3 Slide tray cover unit (Fig. 3)

Slide plays the role in arrange the package cover in order to be transported to the cap taken part, the hopper and chute are made by processing the stainless steel in full compliance with the food requirements.

2.2.3.4 Hopper (FIG. 4)

The hopper makes the package lid ordered and delivered. The hopper of the machine makes the packaging lid ordered by swing plus wind control. The hopper is mainly made by processing the stainless steel and polyethylene in full compliance with the food requirements.



2.2.4 Guide Bottle

Inlet and outlet field spider of the guide bottle is mainly composed of inlet filed spider, transition filed spider, outlet field spider and the guide plate. The machine uses bottleneck positioning delivery to make it easy to connect with the wind system, reducing wear of the bottle appearance and also greatly reduce the number of the parts requiring changing and thus make it easy when changing the bottle species.

2.2.5 Transmission parts

Transmission is mainly composed of the main drive gear, rinser main drive, infeed star wheel drive, transition star-wheel drive, the main drive filling machine, capping machine main drive, a bottle star wheel conveyors and so on. The machine adopts the hanging structure which contributes to reduce maintenance time and the space occupied

by the body.

2.3.1 The transmission system is driven by a motor reducer drive, with the main drive for the frequency control, open-gear and bevel gear to ensure the rinser, filling machine, capping machine synchronous reaction.

2.3.2 The washer washing is controlled by the jetting pump and check valve. The synchronization with the main motor means that the main motor is turned on and the jetting pump opened, the check valve plays the role of back pressure to prevent the result that when the pump is stopped, due to the water storage tank in a high level, the water will automatically flows out of the nozzle.

2.3.3 The cover supply system (hopper motor) is under synchronous operation with the main motor.

2.3.4 The machine bottle conveying system has no power and thus need to be connected with the bottle conveying belt.

III The technical characteristics

Production capacity: 0.5L 5000p / h

Bottle type: (PET, PVC bottle)

Bottle diameter: $D = 50 \sim 85\text{mm}$

Bottles of high-range: $H = 150 \sim 290\text{mm}$

Heads: red bottle, filling heads: 18, screw lid Number: 6.

Power: Main motor: 3KW

Hopper Motor: 0.18KW transport motor: 0.75KW

Operating voltage AC: 380V jetting pump: 0.37KW

Control voltage DC: 24V vortex pump: 0.75KW

Return pump: 0.75KW

Filling temperature: $\leq 88\text{ }^{\circ}\text{C}$

Filling forms: canned gravity slightly negative pressure (10bar)

Water consumption (red bottle of water): $\approx 1\text{ tons / hour}$

Pressure: 0.4Mpa

Compressed air: $0.5 \sim 0.6\text{Mpa}$

IV Size and weight

Dimensions (L × W × H): $2950 \times 2300 \times 2750\text{mm}$

Weight: $\approx 4000\text{kg}$

V. Installation and adjustment

5.1 basic equipment, installation conditions and installation technical requirements:

Ground level, the load for the unit square centimeter is greater than 10kg; plant height is of not less than 3 meters.

5.2 Setup, methods and considerations

5.2.1 As the equipment is so heavy that there is no need using anchor bolts to fix the machine on the ground. The equipment should be installed on the basis of that can carry on. The machine adjusts the anchor bolt to ensure the machine to remain the level. The working height should be adjusted at the same height as the entire line. The connector connecting the adjusted parts should be examined concerning the tightness and if the moving parts moves freely.

5.2.2 The bottle conveying belt should be well connected, and the relative position and height should be adjusted.

5.2.3 Connect the equipment with the external pipes.

- a. the main liquid pipe
- b. compressed air pipe
- c. washer water inlet
- d. rinser return water pipe
- e. other pipelines

5.2.4 Electrical connection

The electrical control cabinet should be placed in the left of the machine, can also be placed in accordance with the production line flat map. The electric control has been adjusted at the factory.

5.3 Adjustment

The adjustment on the equipment (pre-production) before test is so important that the machine should be carefully adjusted and the preparation should be done well before the test. The bottle and the cap should be the same as the normal production when conducting the adjustment.

A. the machine height is consistent with the bottle conveying belt and the speed as well the same of the bottle conveying belt and the revolving line speed.

B. The rinser working height is well adjusted. In fall bottleneck star wheel plate jaw (open state) meshing with the lip, the lip portion of the maximum outer jaws and non-interference, and in the upper and lower jaw in 2 ~ 3mm range of activities is appropriate. Check or adjust open, closed cam is correct.

C. The working height of the filling machine is adjusted. The height difference between the wheel plate (fixed bottleneck) and the bottleneck positioning block of the filling machines is less than 0.5mm,

the material can enter or exit smoothly, level control correctly, the reflux tank vacuum was maintained at less than 10mbar.

D. The working height of the cap-tightener is adjusted. The height difference between the wheel plate (fixed bottleneck) and the bottleneck positioning block of the cap-tightener is less than 0.5mm, the screw cap torque is adjusted at 12 ~ 22kg.m (or according to user requirements).

5.4 The project, method and judgment for acceptance after the installation, adjustment

A. star wheel driving bottles and bearing are stable and smooth, without jamming.

B. the rinser can stably enter and exit stably and smoothly, the bottle holder can hold stably and can flip flexibly. Rinser machine can enter the return pipe without any leakage.

C. the flow of the filling valve is larger than 110ml / s with constant return flow, the fill level is within a distance of 10 ~ 15mm from the mouth of the bottle. The filling system and the capping system are connected for transmission stably, with the material within the bottle without splashing anywhere.

D. the cap-tightener is constant in the capping torque without leakage in the air-inlet.

E. the outer surface of the cap has no scratches.

5.5 preparation, launch, and trial before the test run under production conditions permit:

A. check the electrical properties and the movement to see if consistent with the design requirements;

B. check if the equipment is well connected with the external pipe, water, gas and other pipeline and if there is leakage;

C. check if the bottle needed to test has a sufficient number of bottles;

D. check all partial changed parts to see if they are consistent with the bottle;

E. check if the hopper lid is consistent with the hopper, and whether the number is sufficient;

F. before the test run, check the external and inner circumstances of the equipment (pay attention to protecting the electrical components);

G. test run (can be rinsed with tap water of city life);

After the test is completed, the equipment is cleaned in accordance with the requirements for cleaning.

VI. Application and operation

6.1 Preparation before check

6.1.1 CIP cleaning

The purpose of food production line cleaning process is to ensure the final product to meet the quality standards. The machine cleaning steps are as follows:

The machine is stopped, the filling valve is mounted with the false cup, and set the control in the cleaning state, the CIP cleaning can be achieved. The cleaning fluid (acid, lye, water) enters from the mouth of the inlet through the filling cylinder, filling valve, cleaning cup, reflux tank, reflux tank and then is pumped back to the CIP cleaning machine by reflux pump.

6.2 Introduction to the electrical equipment

The equipment adopts the programmable logic controller (PLC) for accurate, reliable, high degree of automation control. The main motor adopts frequency adjustment, and the machine runs smoothly and reliably. The speed is controlled by the potentiometer on the control panel to achieve the continuously variable machine speed on the panel, and the speed is displayed on the panel, which is easy and intuitive. All of the electrical appliances adopt brand-name products under reliable operation. The machine is powered with three-phase four-wire, to be alone equipped, as well as the equipment of the grounding wire.

Malfunction

When one motor is overloaded, the corresponding motor thermal protection device "hot relay" works, and at this time the thermal relay acts to transmit the signal to the programmable controller. The signal lights of the corresponding motor flashes on the operation panel, indicating to stop the whole machine. When the reason that motor is overload is removed, the thermal relay reset button can be pressed (blue button on the thermal relay), to restart the machine working.

VII. Multifunction Analysis and Troubleshooting

7.1 The machine does not rotate

Possible causes:

Inadequate or improper voltage electrical operation; slide lack of cover; the flat belt of the bottle with a block. Check whether the motor is "out of phase or operator error; manually start hopper motors to ensure the slide to be filled with the cover; clean the flat belt for outlet bottle that is blocked.

7.2 bottles can not enter or normally shaken

Possible causes:

Quality problems of the bottles; the star wheel is blocked the bottle; synchronization star wheel positioning plate or the level of problems. Check the bottle's quality problems; adjust the star wheel block squeeze bottle; adjust the synchronization star wheel positioning plate or height.

7.3 clip bottle instability, poor clamp flip

Possible causes:

Star wheel and clamp jaws centers do not coincide; jaw installation errors or worn; clamp open or closed position incorrect; clamp failure. Adjust the star wheel and washer synchronization; readjust or replace parts; readjust open clamp cam position; readjust or replace parts.

7.4 rinsing is not normal

Possible causes:

Crooked nozzle; jet of water or bulk water can not be rushed to the bottom; there is debris on the dispenser wear plate, resulting in leakage; electricity or gas control system failure. Improper installation, reinstall, or parts manufacturing error, replacement parts; check whether the water pressure meets the requirements or there is a foreign matter in the nozzle exit or the piping and remove them; reinstall and readjust; reinstall and readjust; identify the cause and clear it.

7.5 Filling is not normal

Possible causes:

Filling valve is not open enough; there is a foreign matter inside the filling valve; poor air return in the gas filling valve; no standard bottle size and shape; not enhance the overall level of the cam. Adjust the filling valve opening; remove foreign matter inside the filling valve; remove foreign matter in the air return tube of the filling valve; remove the defective bottles; restructure to enhance the overall level of the cam.

7.6 filling valve leakage

Possible causes:

The main spring pressure of the filling valve is not enough; O-ring damage. Replace the main spring of the filling valve; replace the O-ring.

7.7 poor out of the bottle of the filling machine

Possible causes:

The parapet derails the outlet bottle; the outlet bottle star wheel and filling machines are not synchronized. Adjust the parapet of the outlet bottle; adjust the outlet bottle star wheel and filling machine to be synchronized.

VIII. Maintenance and repair

8.1 routine maintenance, maintenance, calibration

8.1.1 Daily maintenance after the operation

A. Discharge the residue in the medium pipeline, filling tanks and its pipeline, clean up the remaining lid in the hopper.

B. Clean up the bottles or debris in the table and bottle conveying belt.

C. Check the bottle star wheel and guide plate, and there are the above problems which should be resolved or the parts should be replaced.

D. Check the washer nozzles, media distributor.

E. Check if the washer clamp (fork, jaws, and nozzles) is damaged.

F. Check if the filling machine and the filling valve (spring, seal) are damaged.

G. Check if the screw lid of the screw cap machine is damaged, and adjust the torque of the screw lid.

H. Check if the capping machine bottleneck positioning block is damaged.

I. Check if the sleeve is damaged.

J. Check if the hopper slide is damaged.

K. After the completion, the internal and external cleaning equipment should be thoroughly cleaned, and it is the best to add some oil on the lubrication points exposed after cleaning is completed.

8.1.2 Weekly maintenance

A. check if the height adjustment (rinser, filling machine, capping machine should be examined respectively) is flexible.

B. Check if the plastic parts of the rinser clamps are worn.

C. Check if the filling valve spring of the filling machine is flexible and if the sealer is damaged.

D. Clean the pipeline of the filling machine.

E. Check the washer nozzle medium dispenser and the filling machine distributor.

F. If necessary, please check the oil level and if necessary, add oil into the refuel gearbox.

G. Check the gear and make maintenance.

H. Check hopper and clean it.