



WC200 STAINLESS STEEL CAPPER OPERATING MANUAL

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1. DESCRIPTION

1.1 Intended Purpose

The Silgan White Cap sealing machines were designed to close containers (generally made of glass) with Twist-Off® & Press On-Twist-Off® metal caps as well as Band Guard (BG) and Plasti-Twist® plastic caps for food industries. Furthermore, under special circumstances it is possible to use the sealing machine as a means of transport for other types of cap systems.

1.2 Description of Function

The Twist-Off® caps are transported to the cap track of the sealing machine, by a cap sorting and transport system like; a hopper or a magnet- elevator, through a cap chute so that they are supplied to the capping machine in the right direction. The filled containers (jars or bottles) run through the machine in a straight line to the pick-up area of the caps, at the lower cap track. The caps get taken out of the pick-up by the upper part and finish of the container and are held horizontally on the jars by the Duck-Bill plates. The rubber of the side drag arm is pre-spinning the caps with its lugs to the entrance of glass thread of the jar finish. The sealing shoe seals the caps firmly to the thread of the glass finish. PT caps are pressed onto the finish only and not twisted onto the jar.

The whole sealing procedure is done under steam. That means that the machine head is continuously kept with an adjustable amount of steam and at a specified temperature. After cap application, the steam inside the container cools down and condensation forms. As a result, a vacuum is created inside the head space of the container.

1. DESCRIPTION

1.3 Layout

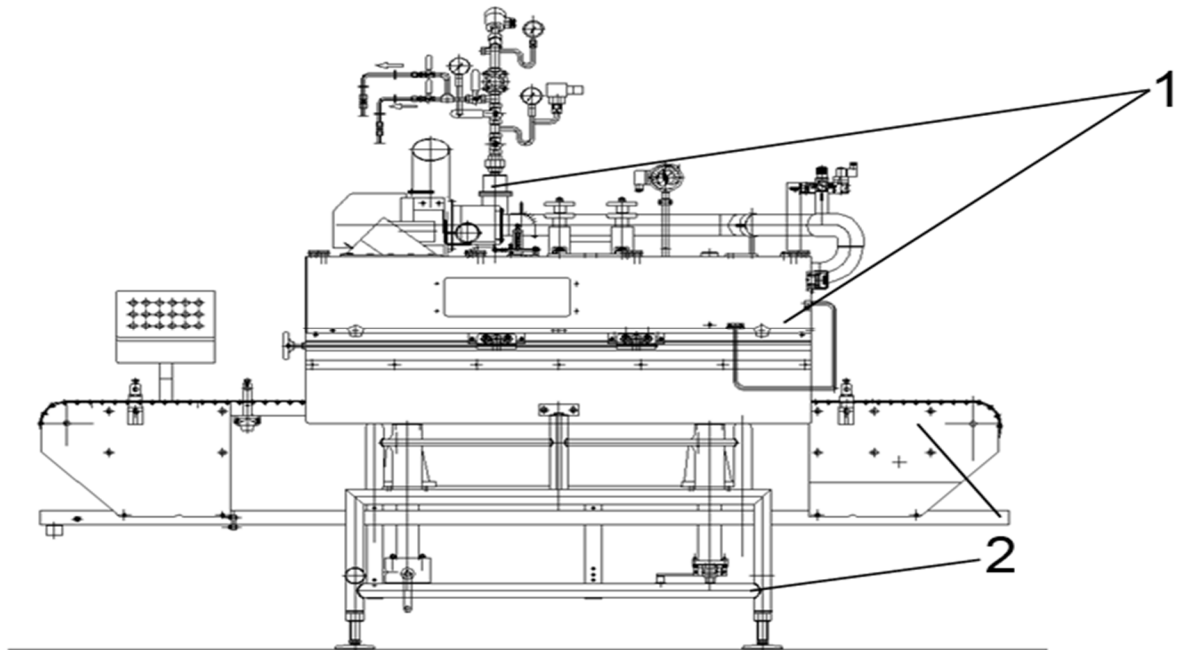


Figure 1-1: Basic Layout of the WC200 Capper

The WC200 consists of two main construction units: The machine base, and the machine head.

The machine base consists of: Conveyor Chain Drive

Head Height Adjustment

Chain Guide and Return Channel

Base

Head Stabilization

The machine head consists of: Head Drive

Steam Supply

Change Parts

Steam Drain

The machines are divided into right and left hand operated machines. Exceptions are: AWC 400, AWC 200 and AWC 60 VA. These exceptions are only right-hand operated machines. Right-hand operated machines operate with the jars passing from the left to the right side through the machine. Left-hand operated machines operate with the jars passing from the right to the left side through the machine.

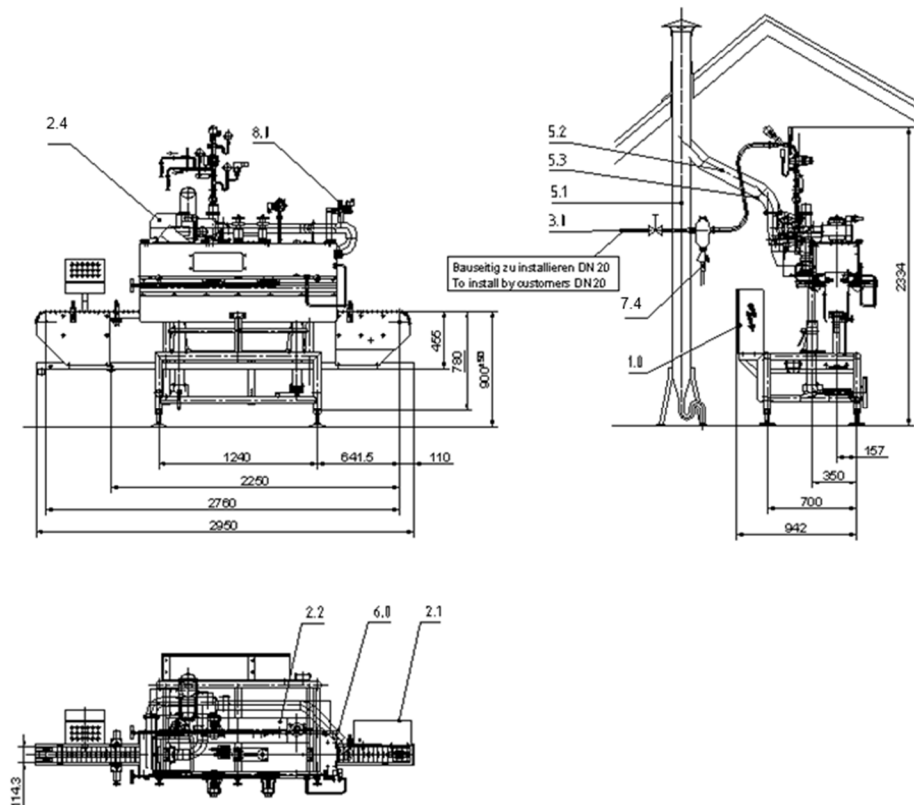
1. DESCRIPTION

1.4 Technical Data (Standard Machine)

1.4.1 Supply

1.0	Cabinet	240 or 480 VAC, 60 HZ, 3 Phase
2.1	Motor – Conveyor Drive	0.75 KW
2.2	Motor – Head Drive	0.75 KW
2.4	Motor – Blower Exhaust	0.72 KW
3.0	Steam Supply Line	8 bar, DN 20, Consumption until appr. 190 kg / h
4.0	Condensate Line	G ½"
5.1	Exhaust Steam Main	Ø150 Minimum
5.2	Exhaust Steam Flexible Tube	Ø114,3 inside / 4,5" ID
5.3	Connection Piece	45°, Ø 114,3mm / 4,5" OD
6.0	Water (softwater, if possible)	G ¼"
7.0	Drain water, Waste Pipe Field Connection	DN 65
8.0	Compressed air	6 bar, G ¼"

Table 1-2: WC200 Supply and Layout Information



1. DESCRIPTION

1.4.2 Dimensions and Weight

This information applies to the standard machine. Deviations could result from length and height extensions of the conveyor and additional delivered cap chutes, etc.

Length	3200 mm
Width	1250 mm
Height	1800 mm
Weight	1000 kg

Table 1-3: WC200 Dimensions and Weight Information

2. SAFETY INSTRUCTIONS

2.1 Operator Duty of Care

The sealing machine was designed and constructed after a careful revision of the applicable standards and regulations and further technical specifications. It presents state-of-the-art technology and guarantees maximum safety during the operation.

Changes in the construction of the machine are only permitted after prior written approval by the manufacturer.

The safety of the machine only applies in daily operation, if all required measures are taken. It is the duty of the operator, to plan these measures and to monitor their implementation.

The operator is especially obliged to make sure that:

The machine is only used for the intended purpose (*Section 1.1*).

The machine is only operated while the machine is in perfect working order.

The safeguards are regularly tested for proper functioning.

The personal safety equipment is available for and used by anyone operating or maintaining the machine.

The operation manual is available in a legible condition near the machine at all times.

The machine is only operated, maintained, and repaired by qualified staff.

The staff is regularly trained with respect to work safety and environmental protection.

The staff is informed about the operation manual and the included safety instructions.

All safety advice and warnings indicated on the machine are not removed and remain legible.

2. SAFETY INSTRUCTIONS

2.2 Safety Instructions and Symbols Used

This operation manual includes safety notes. These notes point out risk during the operation of the machine. These risks include dangers for: persons, product and machine, and the environment. The main objective of the safety notes is to prevent injuries to anyone operating, maintaining, or around the machine.

Symbol	Description
 Danger	This symbol indicates danger for persons. (Danger of life and limb, injuries)
 Attention	This symbol indicates danger for the machine, the product or the environment.
 Note	This symbol indicates notes that support a better understanding of the machine and the corresponding procedures.

Table 2-1: Safety and Note Symbols

2. SAFETY INSTRUCTIONS

2.3 Safety Instructions for Normal Machine Operation

The machine must be operated by qualified and authorized staff only. The staff must know of and understand this operation manual. The staff must operate and maintain the machine according to the information in this manual. Before starting the machine, make sure that only authorized staff is present in the vicinity. Ensure that nobody can be hurt when the machine is started

Before starting the production, check the machine for any visible signs of damage. Make sure that it is in perfect working order. Report any fault immediately to your superior. Remove any glass or other objects that are not required for the production from the area around the machine. Ensure all safety equipment is in good shape and is functional.

Perform monthly check-ups.

Main steam valve: This must only turn on after the suction is turned on and the reset button was pressed once (operation panel).

Condensation drain: Verify condensation comes out of the pipe after a few minutes of operation.

2.4 Safety Instructions for Maintenance

Observe the inspection and maintenance intervals as indicated in the operation manual. Rope or mark off the area around the machine before starting maintenance or repair works. This is intended to keep unauthorized persons away from the area during maintenance.

Before starting the maintenance, switch-off the main power supply to the machine. Lock it with a padlock. The key to the padlock must be with the person working on the machine! If your organization has a Lock-Out/Tag-Out policy, use it. Use only adequate craning devices and loading aids to exchange heavy parts of the machine. Check whether all hot parts of the machine have cooled down to room temperature. The operating temperature of the machine is approx. 100°C. Do not touch the surface of the machine head or any of the steam pipes or steam exhaust assemblies.

Use safety gloves to protect yourself from burning and/or injury to your hands; especially if touching hot filled bottles or glass fragments. Do not get your hands and arms into the entrance or discharge side of the capping machine. Do not get your hands and arms into the conveyor chain or into the stream of running jars or bottles during operation or when jogging the machine in manual mode. Do not wear loose clothing. Dispose lubricants, coolants and detergents according to your local regulations.

2. SAFETY INSTRUCTIONS

2.4.1 Working on Electric Equipment

Repairs or exchange of components of the electrical equipment of the machine must be made by a qualified electrician. Check the electrical equipment regularly. Tighten loose connections. Exchange damaged wires/cables immediately. Always keep the switch cabinet closed. Access is only allowed for authorized staff with key/tool. Never clean the switch cabinet or other covers of electrical equipment with water jets from a hose.

2.4.2 Working on Pneumatic Equipment

Maintenance and repair work on pneumatic equipment must be made by specially qualified staff only. Before starting work on the pneumatic equipment, release the pressure from the system. For preventive maintenance, exchange the pipes regularly. Verify there is no visible damage. When replacing, observe the indications of the manufacturer of the pipes.

After maintenance, but before starting the machine:

- Ensure screws/fasteners are tight
- Ensure all removable covers, sieves, or filters are in place.
- Ensure all material, tools, and other equipment used for the maintenance have been removed from the area of the machine.
- Ensure any spilled liquids are removed.
- Ensure all safety devices of the system operate properly.

2.5 Environmental Protection Rules

When operating, maintaining, installation, or tear down of the machine, legal regulations to reduce waste and the orderly disposal of fluids must be observed. Ensure contaminants do not enter the drainage system or contaminate the work floor. These materials must be collected, stored, transported, and disposed in proper containers according to your local regulations.

Examples of such fluids include, but are not limited to:

- lubricant grease or oil
- hydraulic oil
- coolant
- solvent-containing detergents

3. INSTALLATION, ASSEMBLY, OPERATION

3.1 General Notes

It is important to ensure the sealing machine, the connected transport conveyors, and any additional devices are installed correctly. A correct installation has a fundamental influence on the production and the performance of the whole production line.

It is important to select the right type of machine during the planning phase of the whole production line. Choose according to the product range and the desired performance. For high performance systems, select the synchronous operation of the filler and the sealing machine. Use a direct passage of for the containers from the filler discharge conveyor to the transport chain of the sealing machine.

3.2 Assembly

The sealing machine must be placed on a solid floor and aligned with metal calottes below each of the four adjusting feet. For non-standard transport conveyor heights and height adaptation, strong safety bases or base leg pipe extensions should be used. Silgan Equipment Company does offer and supply these parts on request. The machine must be exactly aligned crosswise and lengthwise. Under normal circumstances it is not necessary to secure the machine to the floor. Welding on or removal of any part of the machine without prior consultation with Silgan Equipment Company is prohibited.

3.2.1 Conveyor Chains and Side Guide Rails

When installing the sealing machine and other components of the system, use the existing lateral side guides already installed at the plant. Already installed conveyors and guide rails at the plant serve as a visual aid in calibrating the position of the sealing machine and other components.

The connecting conveyor and chains should be installed as close as possible next to the sealing machine conveyor chain (*Figure 3-1*). This results in an undisturbed transfer of the container. This is especially important at the machine entrance to keep always the same distance between the containers. This helps avoid loss due to sloshing.

3. INSTALLATION, ASSEMBLY, OPERATION

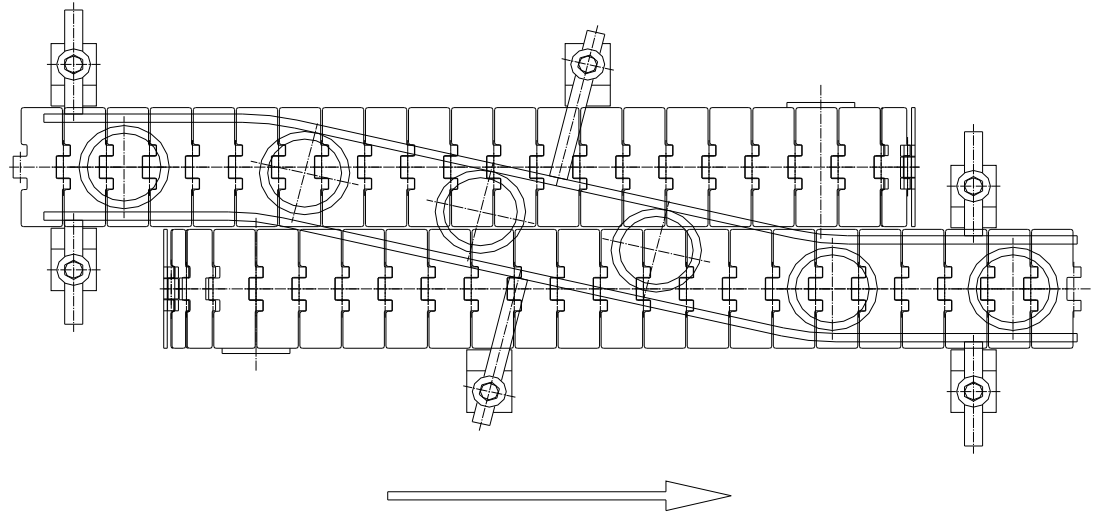


Figure 3-1: Conveyor Chains Installed Next to Each Other

When installing conveyor chains, the following dimensions should be kept if possible:

Distance between the conveyor chains at least 2-3mm.

Distance between the axles of the two idlers up to 250 jars/minute = 350mm minimum.

Distance between the axels of the two idlers over 250 jars/minute = 500mm minimum.

The longer the transition section of the container (between the conveyors) the lower the risk that the container starts moving together.

3. INSTALLATION, ASSEMBLY, OPERATION

3.2.2 Steam Supply System

Refer to prior information regarding the installation of the supply and drain lines for steam, water and electricity (*Section 1.4.1*). These installations are to be performed by the customer.

The steam supply assembly is mounted to the machine head. This includes a flexible DN 25 hose. The DN 25 hose is mounted on the steam main valve of the sealing machine. It must be connected to the plant's steam supply system. Ensure the hose maintains smooth curves and is free of tight coils and/or kinks. Check the hose condition after the machine head height is adjusted.

The steam supply line and the intake pipe bend of the steam supply unit should run in exactly the same direction and be vertically one above the other. The hose of the steam supply should not start to bend or twist at the time the conveyor chain height gets adapted and/or the sealing machine height gets adjusted.

Distance "X" between conveyor chain and connection point of y-valve at middle sealing machine head adjustment (*Figure 3-2*):

Standard steam supply unit: $880\text{mm} \pm 150\text{mm}$

Steam supply unit with additional super-heater: $1170\text{mm} \pm 150\text{mm}$

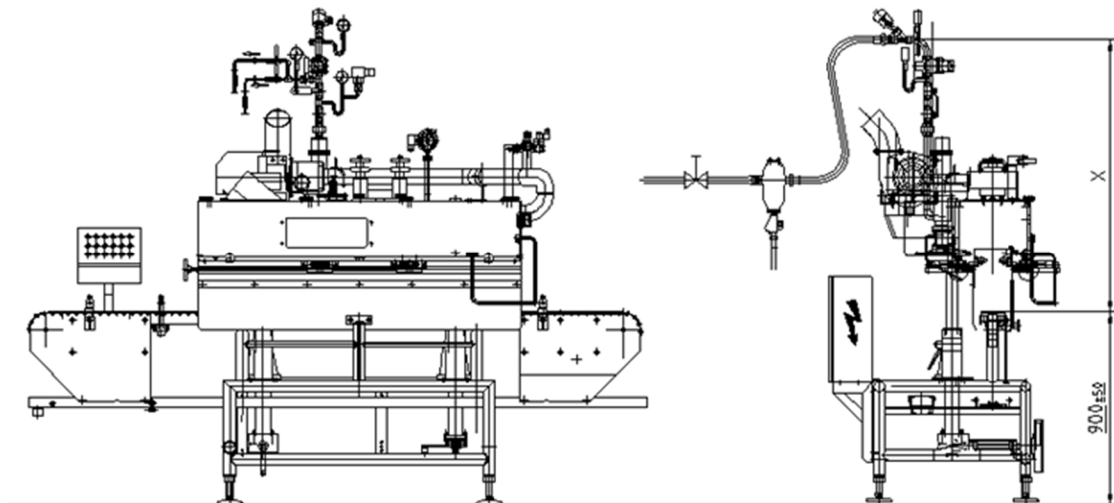


Figure 3-2: The Indicated Height of 900mm for the Conveyor is a Standard Dimension

3. INSTALLATION, ASSEMBLY, OPERATION

3.3 Operation

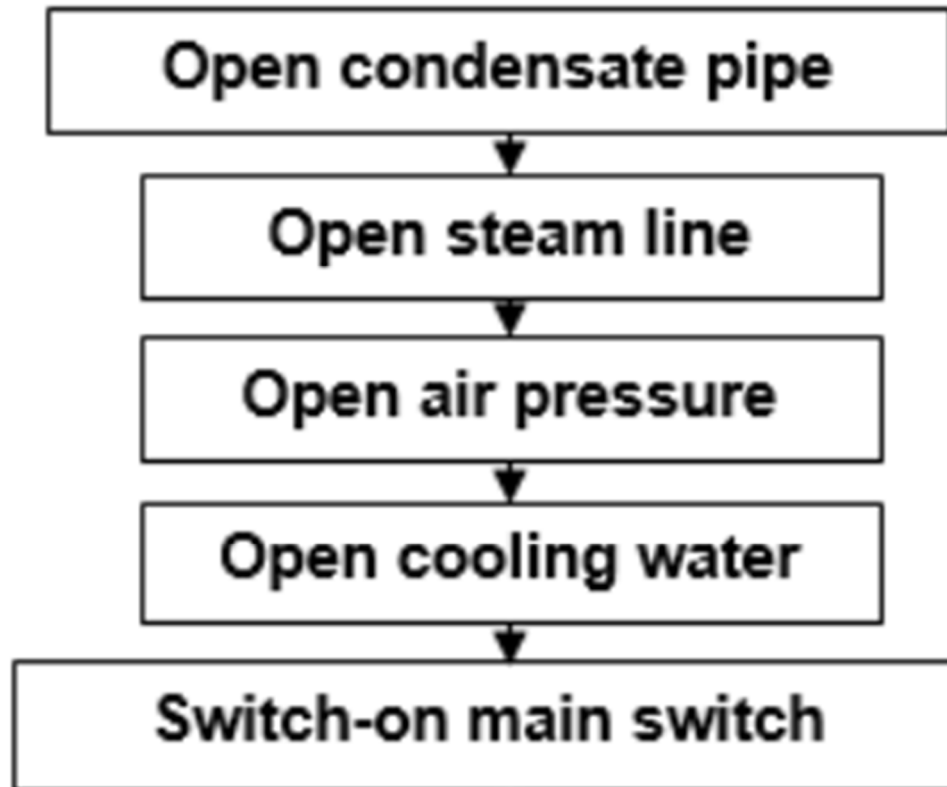


Figure 3-3: Operation Diagram

3. INSTALLATION, ASSEMBLY, OPERATION

3.3.1 Electrical Control System

Electrical Specifications:

- Supply power: 240 or 480 Vac, 60 Hz., 3 phase
- Incoming power fuse protection: 25 amps(240Vac), 20 amp(480Vac)
- Full load current: 21.4 amps(240Vac), 10.8 amps(480Vac)
- Short circuit current rating: 5 kA RMS symmetrical at 240 or 480Vac
- Control voltage: 24VDC
- 120VAC available to operate hopper motion control and 6R17 fan motor, where used.
- NEMA 4X enclosure rating



Figure 3-4: Control Panel

3. INSTALLATION, ASSEMBLY, OPERATION

Emergency Stop and Safety Circuit

To stop all machine operations and remove power from the electrical devices, press the emergency stop button. The emergency stop button must be pulled back out before machine will restart.

Do not use the emergency stop button as a substitute for a machine lockout.

After the emergency stop button has been pressed, power up the machine. The safety circuit is disengaged. Before the machine can be restarted, the safety circuit must be engaged. To do this, press the safety reset button. The button will illuminate, indicating the safety circuit is now engaged. The machine can be restarted.

If the capper door is opened, another safety circuit will disengage. This will prevent the capper from running under power, and will prevent the steam from turning on. While the door is open, the safety reset indicator light will flash. When the door is closed, the guard switch safety circuit will automatically engage. The capper can be restarted.

Jogging the Capper

To run the capper at a very slow speed, set the jog/run selector to jog. Press the jog button to run the capper. The capper will only run at the very slow speed while the jog button is pressed. The capper will not jog when the door is in the open position.

Hopper Start/Stop

A wide selection of cap feeder/hoppers may be used with the WC200. Some hopper motors will be driven from the motor controls in the capper control panel. Some hoppers will operate on their own (standalone).

Pressing the hopper start button will start, or arm the hopper. The hopper motor may not immediately turn on, but it may start running whenever cap feed is called for. The hopper stop button will disarm the hopper.

If the hopper has a standalone operation, the hopper start and stop buttons at the capper may not be wired into the hopper control circuit. However, an interface signal would normally be wired from the hopper telling the capper that the hopper is armed and ready for production. The green hopper start button will illuminate when the hopper is armed and ready.

3. INSTALLATION, ASSEMBLY, OPERATION

Steam Start/Stop

When the **steam start** button is pressed, it engages the startup cycle. The exhaust blower will turn on. After a short delay, the steam is released into the capper. When the steam **stop button** is pressed, the shutdown cycle begins. During the shutdown cycle, the steam release is stopped. Then the exhaust blower is allowed to run for a short delay before shutting down. The steam will only turn on if the capper door is closed.

Capper Start/Stop

There are two capper run modes: **manual**, and **automatic**. The run mode is selected by the **manual/auto** selector switch.

Manual Mode:

Press the capper start button while the manual/auto selector switch is set to manual. The machine will run as long as no machine faults are occurring. Press the capper stop button to stop the capper motion. The manual mode is normally not used when running production.

Automatic Mode:

This is the run mode used to run production. Before the capper will start motion, the following conditions must be met:

- Line equipment is ready to run (when this interface signal is used)
- Hopper is running (green light illuminated on hopper start button)
- steam is on
- Capper temperature is at or above the setpoint
- There must be caps present at the inlet chute, if a cap runout sensor is installed (optional).
- There must be no jar jams, if a jar sensor is used on the capper conveyor (optional).

***Note:** This applies once the capper is running in automatic mode and a missing cap detector is installed (optional). If the missing cap detector identifies five consecutive jars with missing caps, the capper will shut down.*

3. INSTALLATION, ASSEMBLY, OPERATION

Display Screen:

The following is a list of various display screen information an operator might encounter when working with the capper (*Figure 3-5*):

- **Startup Screen** Touch anywhere on this screen to advance to next screen.
- **Main Screen** The top two lines display fault and prompt messages. The third line indicates temperature relation to setpoint. The bottom left displays the current temperature. Press next to advance.
- **Temp. Setpoint** The top two lines display temperature setpoint. Press top screen area to change setpoint. The range is 0 to 250°F. To allow capper to run irregardless of setpoint, enter zero as the setpoint. Press the NEXT> or <BACK button to navigate.
- **Capper Speed** The capper running speed is displayed in feet per minute. Press the setpoint number area to change setpoint. Range is 35 to 155 ft/min. Press the NEXT> or <BACK button to navigate.
- **Hopper Speed** The hopper running speed is displayed in percentage. Press the setpoint number area to change setpoint. Range is 25 to 100%. Press the NEXT> or <MAIN button to navigate.
- **BYPASS MODE select** When the capper is needed to convey product along the conveyor without applying caps, use this screen to activate the BYPASS MODE. In this mode, the conveyor will run, but the sealing belts will not. Raise up the capper head enough to not interfere with the product passing through the machine. The capper will only enter or exit the BYPASS MODE when the capper motors are off.
- **Bowl Hopper Stop Delay** Used for the 6R18 hopper only. There are 2 sensors on the 6R18 cap chute, one to detect CAP SUPPLY (upper), and the other to detect CAP MOTION (lower). When either the CAP SUPPLY sensor does not see a cap backup, or the CAP MOTION sensor sees pulses (indicating caps are in motion), the hopper disc will be running. When both, the CAP SUPPLY sensor sees a backup, and the CAP MOTION sensor does not see pulses, this HOPPER STOP DELAY will time out before the hopper disc turns off. Set this delay for a duration enough to allow the entire cap chute to be filled with caps before the motor turns off.

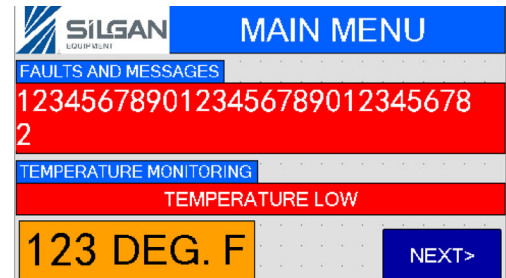
3. INSTALLATION, ASSEMBLY, OPERATION

- **Bowl Hopper Priming Delay** Used for the 6R18 hopper only. Every time the HOPPER START button is pressed, the disc motor will stay running for the duration of this HOPPER PRIMING DELAY before it is allowed to turn off. This ensures the cap chute will be filled with caps, and also provides a way to force on the hopper disc, even when the sensors are telling the disc to stop.
- **Program Exit** If the CFG button on the last screen was pressed, this screen will be displayed. NO,GO BACK navigates back to the WC200 program. YES will enter the PanelView operating system. If you have left the WC200 program by mistake, power down the capper, and power back up. The WC200 program will be restarted.

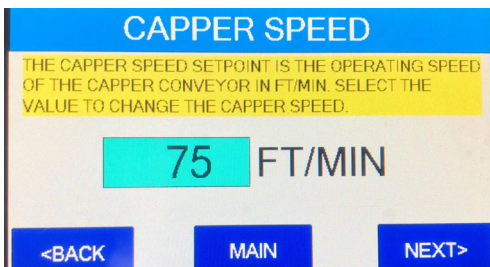
3. INSTALLATION, ASSEMBLY, OPERATION



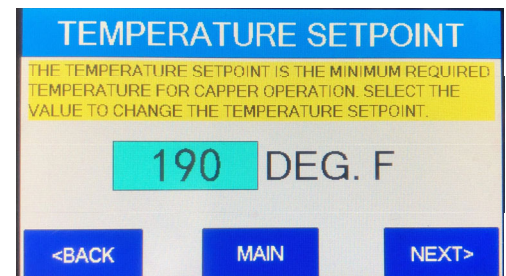
Startup Screen



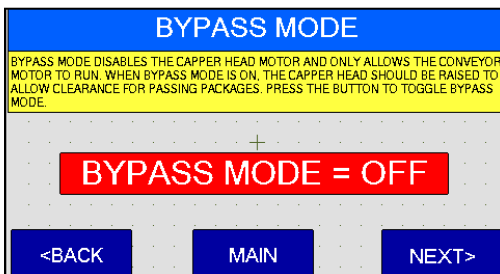
Main Screen



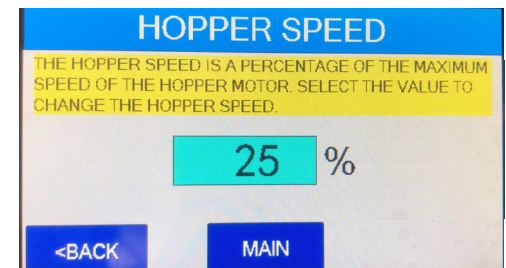
Read/Adjust Capper Speed



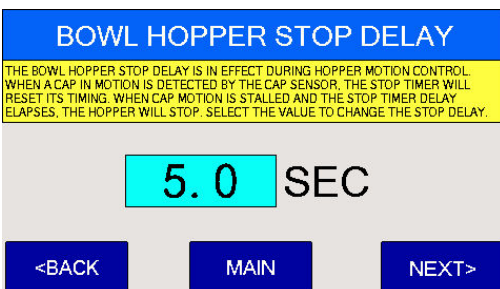
Read/Adjust Temperature Setpoint



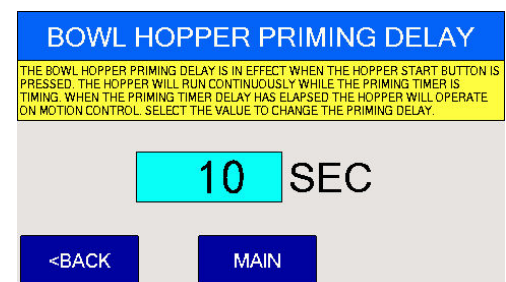
Bypass Mode Select



Read/Adjust Hopper Speed



Bowl Hopper Stop Delay



Bowl Hopper Priming Delay

Figure 3-5: HMI Touchscreen Display Screens

3. INSTALLATION, ASSEMBLY, OPERATION

3.4 Maintenance

3.4.1 Daily Checklist

Open the front door and check the following points:

Cap chute and cap track (*Figure 3-6*) - The cap track should be moveable up, down and laterally (*Item 1*). Check the stop pins by feeling the spring pressure (*Item 2*).

Side Belts (*Figure 3-7*) - Inspect the side belts for: wear, loose particles, alignment (in correct grooves and on rollers), slippage on the drive pulley, tension (*Item 1*). Check the tensioning roller (entrance) and idler roller (discharge) (*Items 2 and 5*). Ensure they rotate without effort. All bracket rolls should rotate without effort. Verify all springs (brackets and guiding axles) work as intended. Verify bracket guides can be pressed against the springs by hand and that the springs are not broken.

Sealing Shoe (*Figure 3-8*) - Check the condition of sealing belt (*Item 1*). Check the drive pulley coating for wear (*Item 2*). Ensure the sealing belt does not slip on the pulley (*Item 3*). Check the condition of the sealing shoe kit (*Item 4*). Inspect the axles and bushings for wear. The rollers should rotate without effort. The sealing shoe should move up and down without jamming. Double check the spacing between jars (*Item 6*). The standard value is 1 to 1-1/2 times the cap diameter or two conveyor chain links. Ensure the links of the transport chain are moveable and lie flat against the wear strips (*Item 7*). Verify the thickness of the plastic wear strips. New strips are 12mm. Replace the strip if the thickness is less than 11mm. Check conveyor chain for elongation. A new chain consisting of forty links measures 1,524 mm long. Replace the chain if this dimension exceeds 1,534 mm.

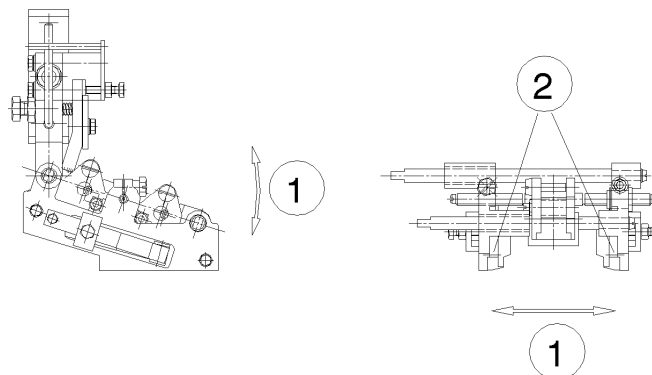


Figure 3-6: Cap Chute and Cap Track

3. INSTALLATION, ASSEMBLY, OPERATION

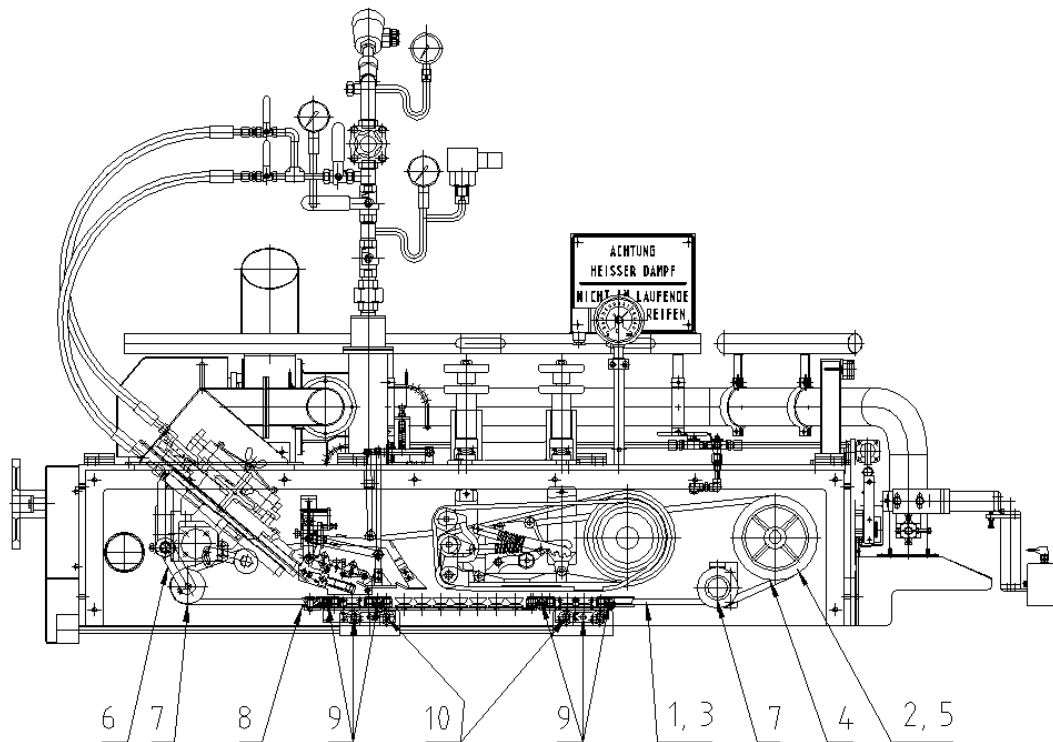


Figure 3-7: Side Belts

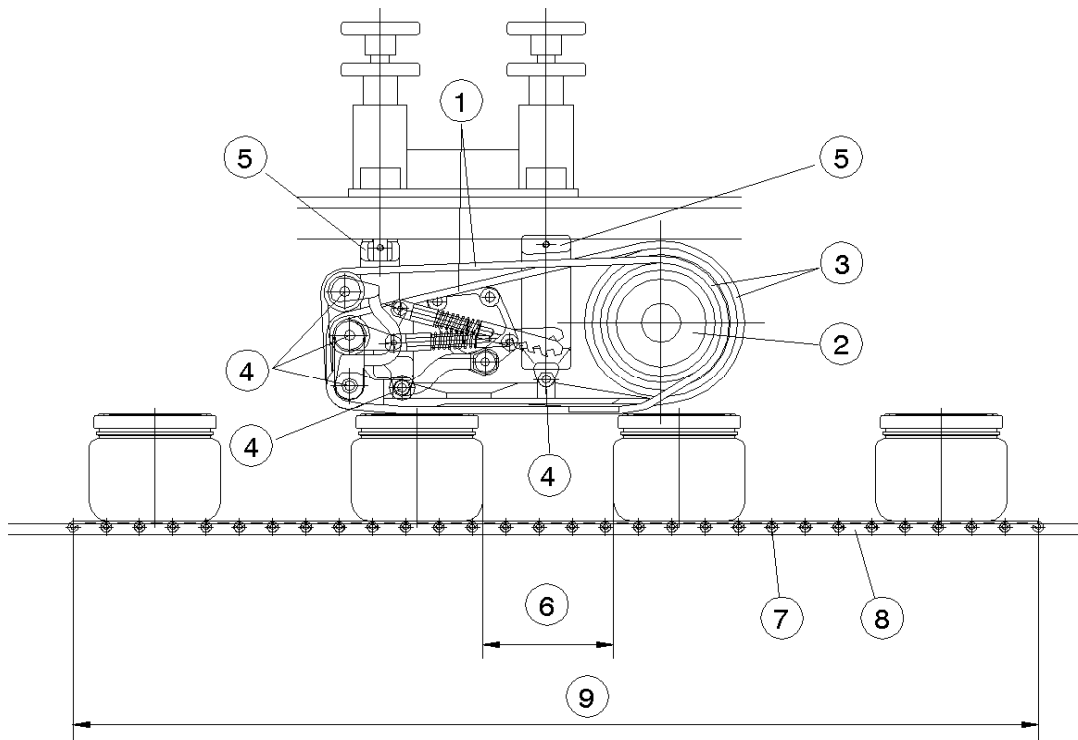


Figure 3-8: Sealing Shoe

3. INSTALLATION, ASSEMBLY, OPERATION

3.4.2 Weekly Checklist

Lubrication - Check all gear boxes for correct oil level and signs of penetration by water. Lubricate according to the Lubrication Schedule (*Section 3.4.4*).

Springs, Bearings and Rollers - Check springs for breakage or wear, and for even pressure. Movable parts should spring back without sticking. Verify bearings rotate without effort. Bearings to verify include those found in the tension and deflection idler of the side belts, and drive pulley bearings. Check the integrity of the bracket rollers, cap and jar guides, cap chute, and cap track. Inspect the stop pins for wear and accumulation of product residue. Check the lower cap tracks for parallel alignment with the conveyor chain. Check the duck-bill and hold down plate. They should be parallel to the cap on container. Check the position of the jars in the sealing machine. The position of the jars should be centered from the jar centering device to just behind the sealing shoe (*Section 4.1*).

Timing Belt - Check the toothed drive belt at the machine head for tension, wear, and damage.

3.4.3 Cleaning

Most parts of the machine are made of corrosion resistant materials such as stainless steel or suitable plastics. Corrosion can cause unnecessary wear on parts causing more frequent maintenance and part replacement. Frequent and thorough cleaning can extend the life of parts prone to wear. Cleaning after the production is required at least once daily. Cleanliness and hygiene are indispensable in the food processing industry.



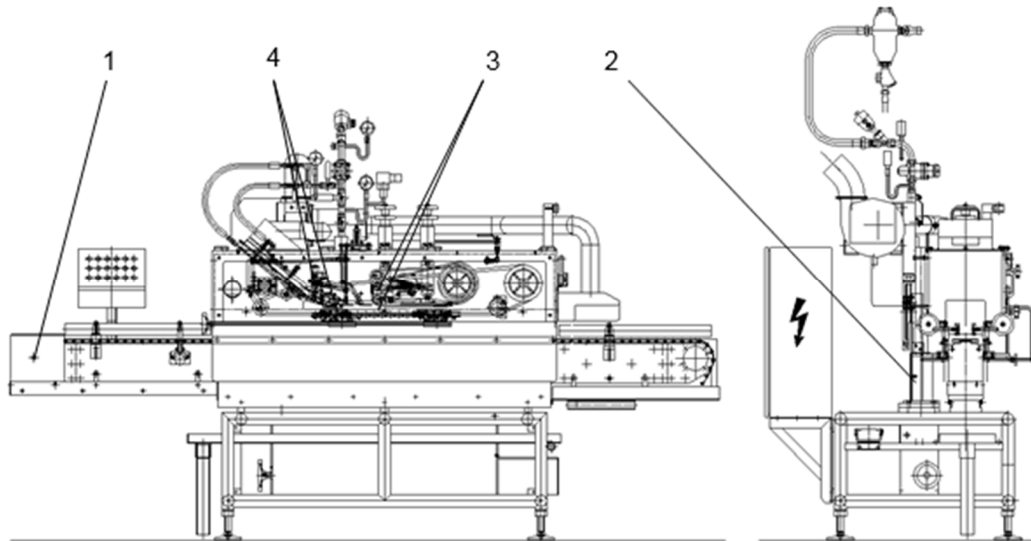
The complete machine can be cleaned by steam or water jet from the outside and from the inside. At each cleaning, open the front door (cover) of the machine. Use hot water and the company standard cleaning agents. Do not use any muriatic acids for cleaning.

If any breakage of glass occurred, make sure to remove all pieces of glass thoroughly from the machine before restarting the operation.

3. INSTALLATION, ASSEMBLY, OPERATION

3.4.4 Lubrication Schedule

Lubrication Points:



1. Guide posts	2 nipples	every 50 hours
2. Posts (threaded spindle)	2 nipples	every 50 hours
3. Sealing shoe rollers	3 nipples	every 10 hours (carefully - no grease at sealing belts!)
4. Cap track axles	by hand	every 10 hours

Figure 3-9: Lubrication Points

Lubrication Grease: Use Lubriplate SYNX FG1

Lubricating Oil: A high quality high pressure oil similar to oils used in automobiles (approximately SAE 90 weight) oil or any AGMA rating No. 8 oil.

4. ADJUSTMENTS FOR PRODUCTION

4.1 Pre-Centering the Jars on the Transport Chain

Guide rails(1): Guide rails center the containers on the transport chain.

Handwheel(2): The handwheel is used to adjust the guide rails. These are adjusted to accommodate the container width.

The pre-centering device is aligned before the machine is delivered. The width of the container will need to be adjusted prior to starting the production.

The guides should be adjusted so that a container with the maximum dimensional deviation will still go through without jamming.

Note: The side guides of the conveyor should be installed and connected to the pre-centering device, to automatically adjusted to the diameter of the container used.

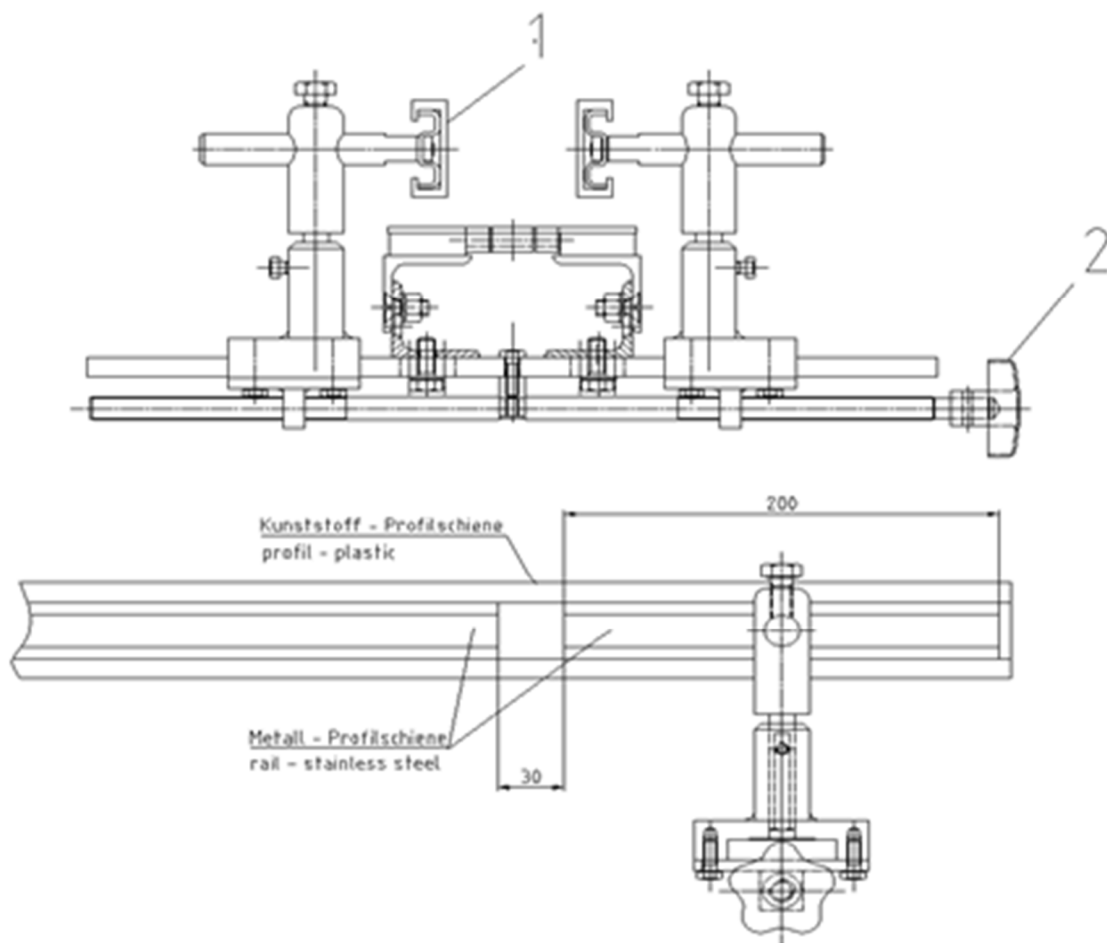


Figure 4-1: Pre-Centering Device

4. ADJUSTMENTS FOR PRODUCTION

4.2 Side Guides (Brackets)

Various side guide packages have been developed to guide the various sizes and shapes of jars through the sealing machine. These are adjustable in height and can be set to four different positions (*Figure 4-2*).

Standard Bracket Position: This standard position is used for 70-80 % of all jar shapes and is ideal to guide jars with standard shapes.

Low Bracket Position: The low bracket position is selected if curves or heels in the shape of the jar would lift the jar up in the standard setting.

Low Low Bracket Position: This position is selected for large jars that are round (spherically shaped). The base of the jars must be large enough to prevent them from tipping over.

High Bracket Position: High position is used to process jar shapes with a negative body angle of approximately 5° or if the jar is curved at the level of the standard position.

Use the Belt Roller Bracket Gauge (Silgan P/N 20R3124) to determine the height at which the brackets contact the jar in the various positions. The gauge may be ordered through Silgan Equipment Customer Service. As a rule, the brackets should guide the jar as close to the top rim as possible.

4. ADJUSTMENTS FOR PRODUCTION

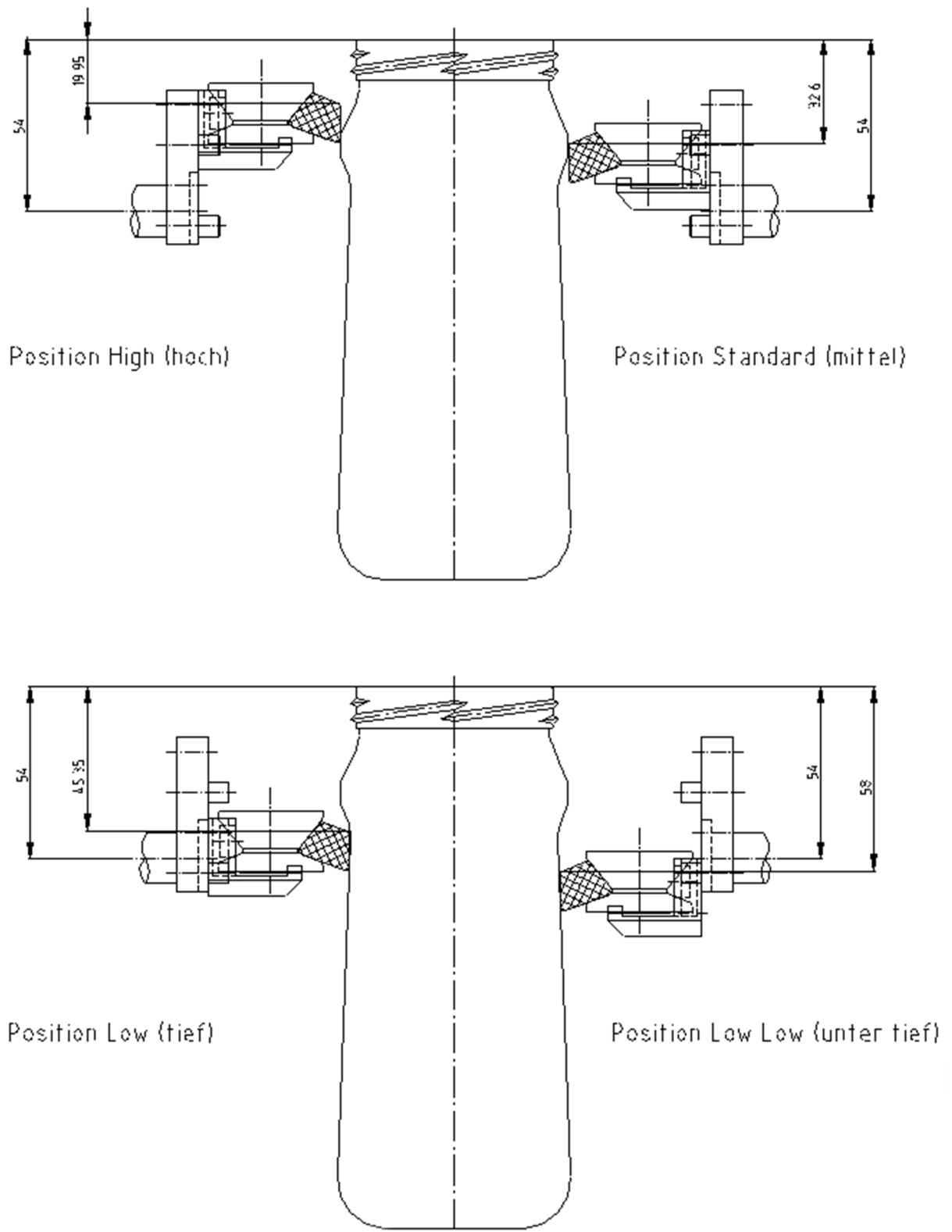


Figure 4-2: Bracket Guide Positions

4. ADJUSTMENTS FOR PRODUCTION

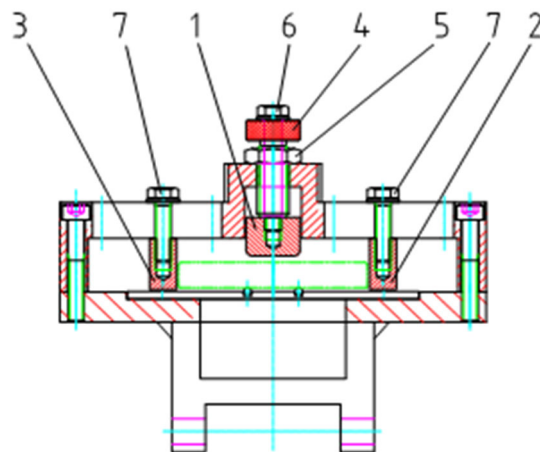
4.3 Pre-Centering Closures in the Upper Cap Track

The closures travel from the cap chute via the upper cap track to the lower cap track.

Note: The basic adjustments of the cap track are already made in the factory before delivery (Section 4.4).

Adjustment:

- Loosen two locknuts, two hex head screws, and two knurled screws. Move the top guide up (*Items 4, 5, and 6*).
- Loosen four hex head screws, and pull the side rails apart (*Items 2, 3, and 7*). Slide the brackets outward until the closures fit between the brackets (*Item 3*).
- Fill the entire upper cap track with closures.
- Press the brackets together until the closures are jammed between them. Slide the entire package laterally until the closures are in the middle.
- Adjust the brackets so there is a 2mm gap between the closure and the side rails. Tighten the hex head screws (*Items 3 and 7*).
- Adjust the top guide so that there is a 2mm gap between the top edge of the closure and the rail. Tighten the hex head screws. Tighten the locknuts (*Items 5 and 6*).
- Perform a function test. The caps should pass through the lower cap track assembly with ease.



Item	Description
1	Top Guide
2	Side Rail
3	Side Rail
4	Knurled Screw
5	Lock Nut
6	Hex Head Screw
7	Hex Head Screw

Figure 4-3: Pre-Centering Device Section View Diagram

4. ADJUSTMENTS FOR PRODUCTION

4.4 Standard Cap Track

4.4.1 Component Parts

1. Adjusting screw for parallel alignment of the cap track to the conveyor chain
2. Cap track top guide
3. Cap track sides supporting brackets
4. Use adjusting screw to align bottom edge of the supporting brackets parallel to the conveyor chain. Tighten counter nut again, after adjustment.
5. Lower cap track entrance
6. Locking screw for adjustment spindle for passage width of the lower cap tracks
7. Locking screw for top guide
8. Adjustment spindle for the width of the lower cap tracks (diameter of cap)

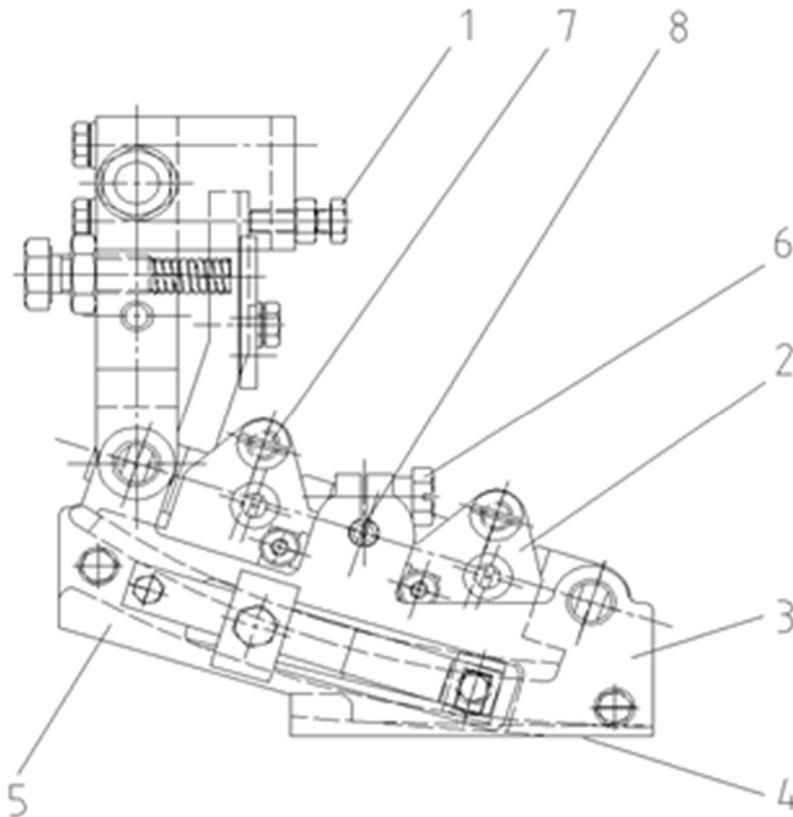
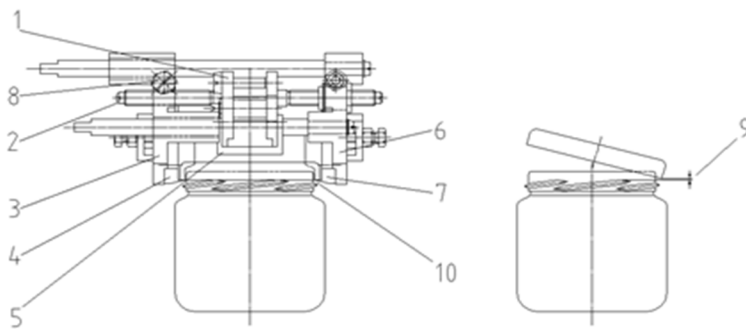


Figure 4-4: Cap Track Diagram

4. ADJUSTMENTS FOR PRODUCTION

4.4.2 Basic Adjustment

- Lift the top guide.
- Loosen the locking screw if the caps do not easily flow through the track. Retighten the locking screw once the adjustments has been completed. *(Item 1).*
- Loosen the locking screw to adjust the side play *(Item 8).*
- Use the adjusting spindle to adjust the side guides. Turn the spindle to the left until an inserted cap slides onto the stop pins without lateral play. The clearance for a cap with a diameter of 27-70mm is set by turning the adjusting spindle an additional 1/3 revolution *(Item 2).*
- For a cap with a diameter of 70-110 mm, the clearance is set by turning the adjusting spindle an additional 1/2 revolution *(Item 2).*
- During height adjustment, verify the finish of the bottle can easily pass through. If it cannot easily pass through, open the side guides.
- Slide the jar through the empty cap track again. The bottom edge of the lower cap track must not touch the threads of the jar *(Item 7).*



Item	Description
1	Locking Screw
2	Adjusting Spindle
4	Front Cap Track Support
5	Lower Track at Front
6	Upper Cap Track
7	Rear Cap Track Support
8	Locking Screw

Figure 4-5: Cap Track Diagram

4. ADJUSTMENTS FOR PRODUCTION

4.4.3 Stop Pin Adjustment

The stop pins are located in the lower cap tracks. They determine the exact pickup point at which the jar removes the cap from the lower cap tracks (*Item 1*).

The adjusting screws provide for the spring pressure of the leaf springs. The spring pressure should be adjusted in the manner to keep the caps in front of the stop pins. The caps should not push thorough. They should be able to be removed easily by the jar. Two leaf spring packages should be used for the stop pin tension (*Items 2 and 4*).

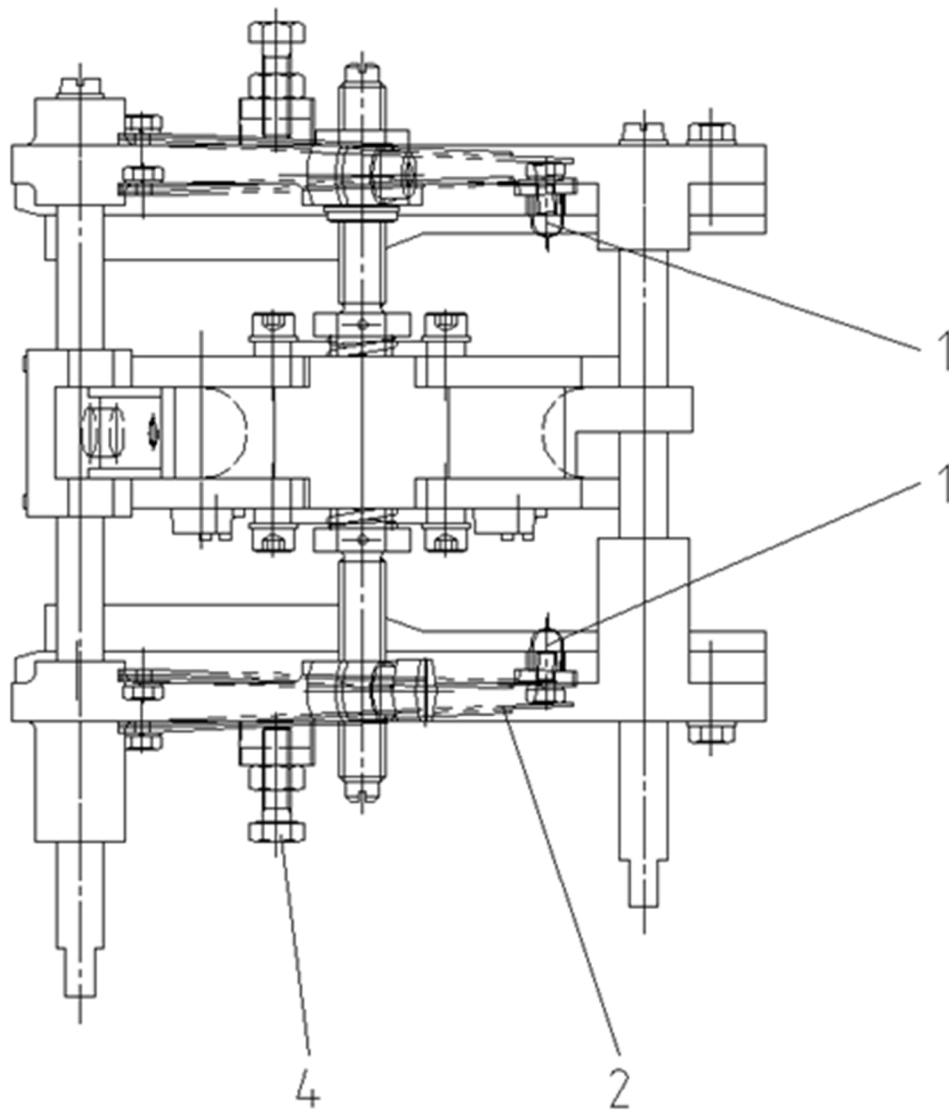


Figure 4-6: Adjustment - Stop Pins

4. ADJUSTMENTS FOR PRODUCTION

4.4.4 Cap Track / Top Guide Adjustment

To adjust the top cap guide, loosen the locking screws just enough to permit shifting of the head guide. The head guide must not be able to move on its own, especially when the second eccentric bolt is adjusted (*Items 2*).

The top guide is adjusted by means of the two eccentric bolts (*Items 3*). Set the entrance side of the top guide by turning the first eccentric bolt until the distance to the cap is 1 to 2 mm.

Slightly tighten the locking screw of the top guide (*Items 2*).

Turn the second eccentric bolt to set discharge side of the top guide so that the distance to the cap is approx. 0.2 mm (*Items 4*).

If you manually pull the cap into the outlet in front of the stop pins of the cap track, it should neither jam under the head curve nor have too much clearance.

If the top guide is set too high at the entrance, the cap will jam in the head curve discharge.

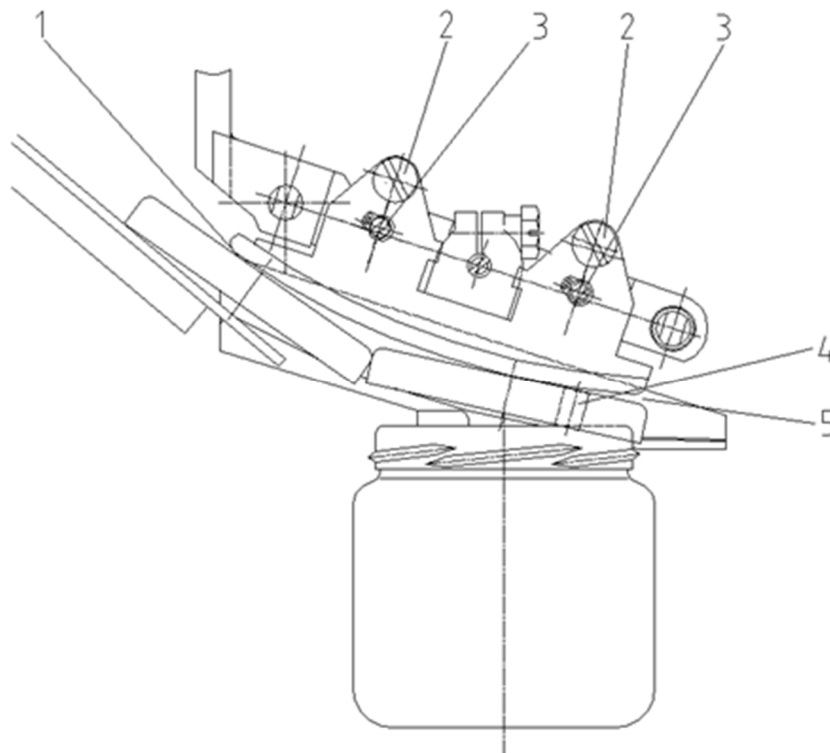


Figure 4-7: Adjustment - Cap Track / Top Guide

4. ADJUSTMENTS FOR PRODUCTION

4.4.5 Cap Track Adjustment Verification

The cap track must be able to adapt; moving to the correct position. The cap track must also compensate for possible off-center jar finishes (*Item 1*).

Ensure the movement through the track is smooth. Excessive movement during production runs could cause the jar to move out of center to the lower cap track.

Adjustment the side belts to ensure the jars are straight and centered when passing through the cap track and the sealing shoe (*Item 2*).

The side belts must not lift the jar up from the conveyor chain (*Item 3*). If the jar is lifted up, check the brackets for wear and vertical play. Also check wear and tear of the side belts and the tension of the side belts. Tension has to be sufficient to avoid any slack. Adjustment is important, particularly for jars with critical shapes such as slanted walls and narrow bottom. The side play of the cap track must be equal on both sides of the opening of the jar (*Item 4*). V-belts are always used for standard jar forms (*Item 5*).

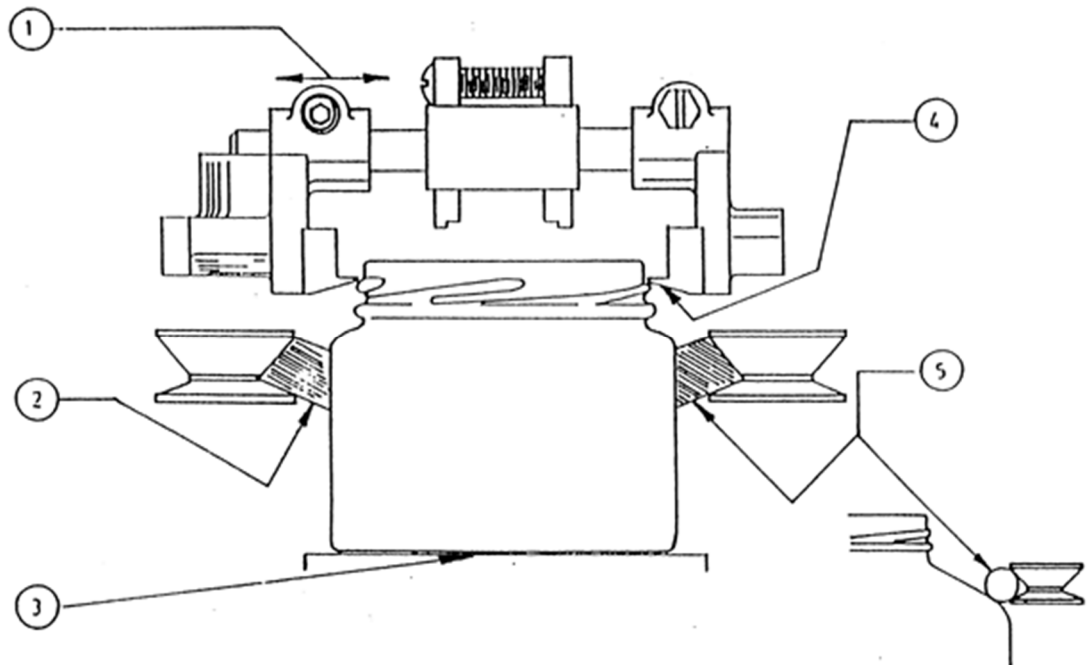


Figure 4-8: Verify Cap Track Adjustment

4. ADJUSTMENTS FOR PRODUCTION

4.4.6 Cap Chute & Cap Track Checklist

Ensure the upper cap chute discharge lines up with the lower cap track entrance. The distance between the upper cap track and lower cap track must not exceed a maximum of 5 mm.

Test the cap track. Lift it up and allow it to return to its initial horizontal position. It should move with little effort and force. The cap should slide with an even movement all the way to the stop pins and must not stop between or bounce back.

The cap track must be centered (within 1 mm) in relation to the machine head centre line.

The lower edge of the lower tracks "front" and "back" must be parallel to the transport chain within 0 to 1 mm at the front edge (never healing up at front).

Pre-centering must align a jar without a cap so that it is centered for its entire way through all positions of the sealing machine. The finish of the jar must be as close to the cap supports as possible. It should not jam or tilt and should never lift the lower cap track up, by running through.

4. ADJUSTMENTS FOR PRODUCTION

4.5 Drag Arm Adjustment

Ensure the prior adjustments and tests have been performed first; side belt adjustment, jar passes smooth and without interruption, the cap is removed from the stop pins and applied to the finish. Jog the jar a little further in the position of the side drag bar rubber. Adjust the angle of the side drag arm so that the drag arm is approximately 3° tilted toward inside of the machine in the direction of travel. Adjust the drag arm in direction of the cap. Loosen screw “b” and move the arm until the entrance edge of the drag arm rubber is near to the cap, but not touching. Retighten screw “b” with the locknut. Ensure the last third of the rubber is touching the cap. Move approximately 5mm to outside, to be sure that the caps gets properly pre-spun. The cap lugs should be underneath of the jar thread. The drag rubber should not touch the cap before the cap has left the cap track and fallen onto the opening of the jar (*Item 1*).

Verify the drag arm is freely moveable at the pivot (*Item 2*).

The lugs have to be turned under the jar thread. For small cap diameters, this is achieved with normal leaf spring pressure at the drag arm and drag rubber. Higher spring pressure is needed for larger 100 and 110 mm cap diameters. Under some circumstances, it may be necessary to use an additional leaf spring (*Item 3*).

The spring pressure adjusted to hold down plate and drag arm rubber should be approximately equal.

Note: Make sure to replace the rubber when the edge is worn. Add this line item to your maintenance schedule. It should be replaced after a determined production time.

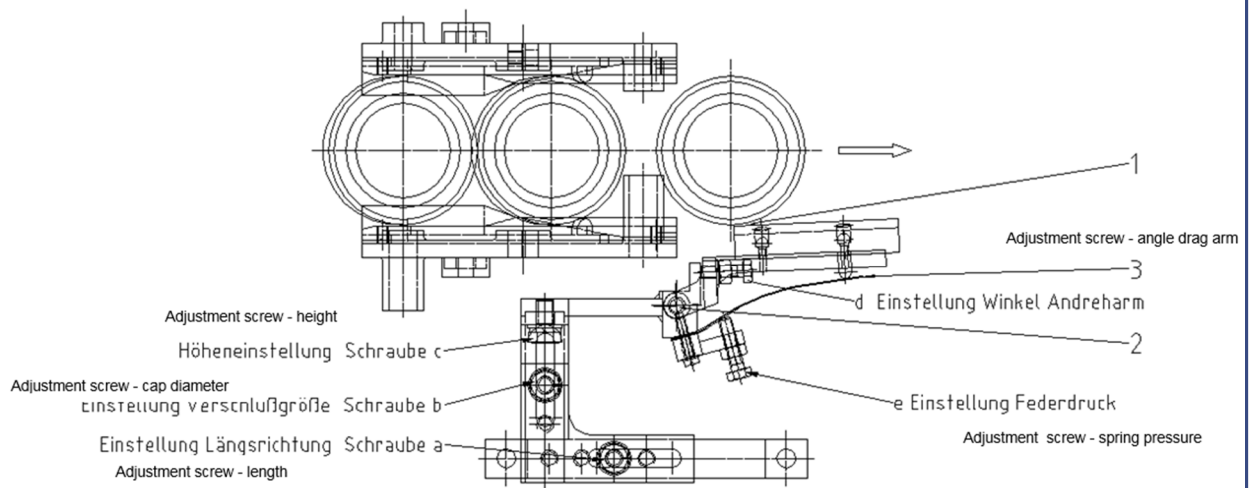


Figure 4-9: Adjustment Diagram

4. ADJUSTMENTS FOR PRODUCTION

4.5.1 Drag Arm Adjustment Measurements

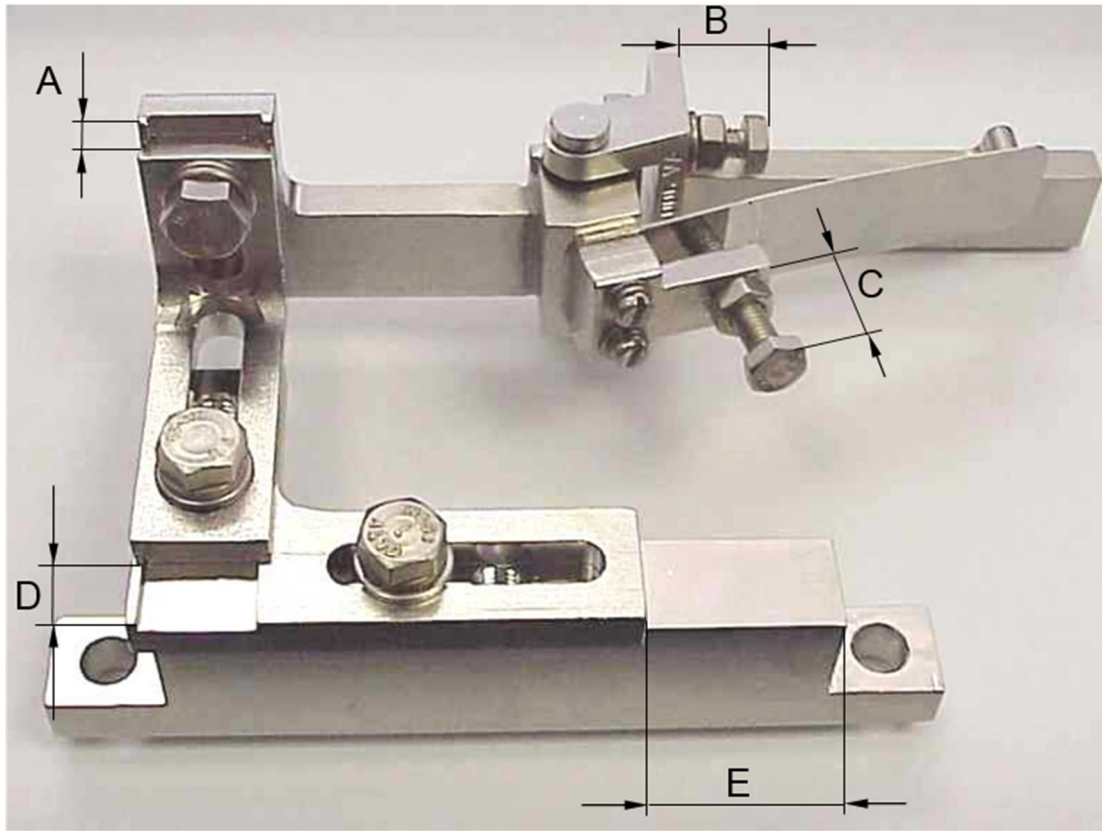


Figure 4-10: Drag Arm Adjustment

Measurement			
A		Line	
B		Product	
C		Cap Ø	
D		Date	
E		Name	

Table 4-11: Drag Arm Adjustment

4. ADJUSTMENTS FOR PRODUCTION

4.6 Duck Bill & Hold Down Device

The duck bill plate entrance should be approximately 10mm into the cap track. It should not touch the cap at the cap pick-up position. The duck bill and hold down plates should allow free/easy movement. They should not interfere with the lower cap tracks or the upper guide of the cap track. The first duck bill, hold down plates, and their bushings must not exceed 1mm of vertical movement. The duck bill and hold down devices must not exceed 2mm of side movement. The duck bill and hold-down plates should be aligned so that they are exactly parallel with a cap twisted finger-tight onto the jar. The duck bill and hold down plate should not be tilted and/or out of line. This will cause back spin and lead to a higher cap misapplication rate.

Note: To facilitate the adjustment refer to recorded notes/dimensions (Section 4.6.1). The dimensions noted can be reproduced easily when adapting the machine to use a different cap and can also be used to check settings in the event of malfunctions.

4. ADJUSTMENTS FOR PRODUCTION

4.6.1 Duck Bill & Spring Bracket Adjustment Measurements

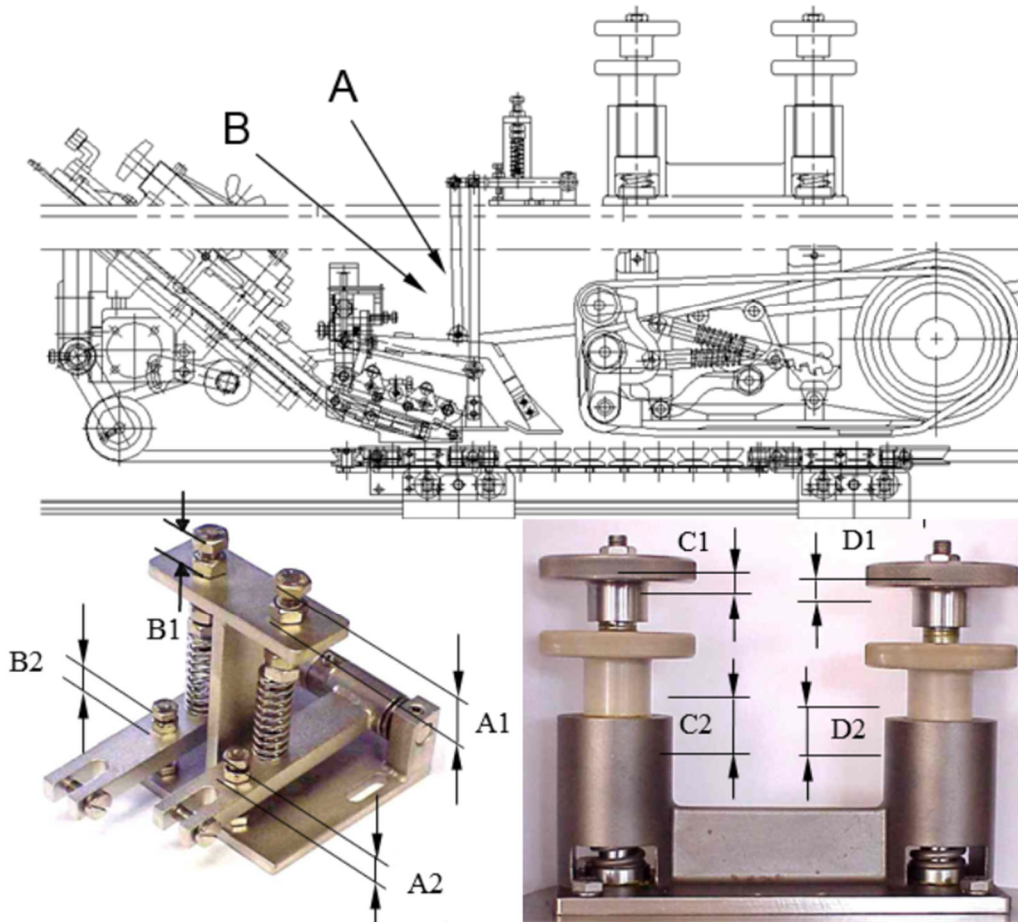


Table 4-12: Duck Bill and Spring Adjustment

Measurement			
A1		Product	
A2		Cap Ø	
B1		Date	
B2		Name	
C1			
C2			
D1			
D2			

Table 4-13: Duck Bill and Spring Adjustment

4. ADJUSTMENTS FOR PRODUCTION

4.7 Sealing Shoe Adjustment

The sealing shoe hangers, eccentric arm, and pin hold the sealing shoe assembly in right position (*Item 9*). The water spray nozzle lubricates and cools the sealing belts and the sealing shoe with a continuous low quantity of water. The dimensions of the front and rear sealing belts are identical. For small cap diameters, the belts can be exchanged, front to rear side and from rear- to front side and used again, if worn out, without changing the right (and before) running direction. Take off the sealing belt tension spanner to take off of the sealing belts (*Item 4*).

Hold your hand underneath to support the sealing shoe and remove the pins (*Item 5*). Lift up the sealing shoe support to take off the complete sealing shoe assembly (*Item 9*).

When product is moving through the system, the upper movement of the sealing shoe height should be approximately 1 mm at the entrance. It should be 2 mm at the discharge. The movement limit can be adjusted with the upper adjusting knob (*Item 6 and 7*).

The lower adjusting knobs are used to adjust the spring pressure on the sealing shoe. Counter-clockwise turns will reduce pressure. Clockwise turns increase pressure (*Item 8*).

Note: Too much movement at the sealing shoe entrance may allow the jars to tip or tilt over. This will prevent secure twisting of the cap onto the jar finish. The compound impression is adjusted by the front knurled grip. The safety measurement of the cap is adjusted by the rear knurled grip.

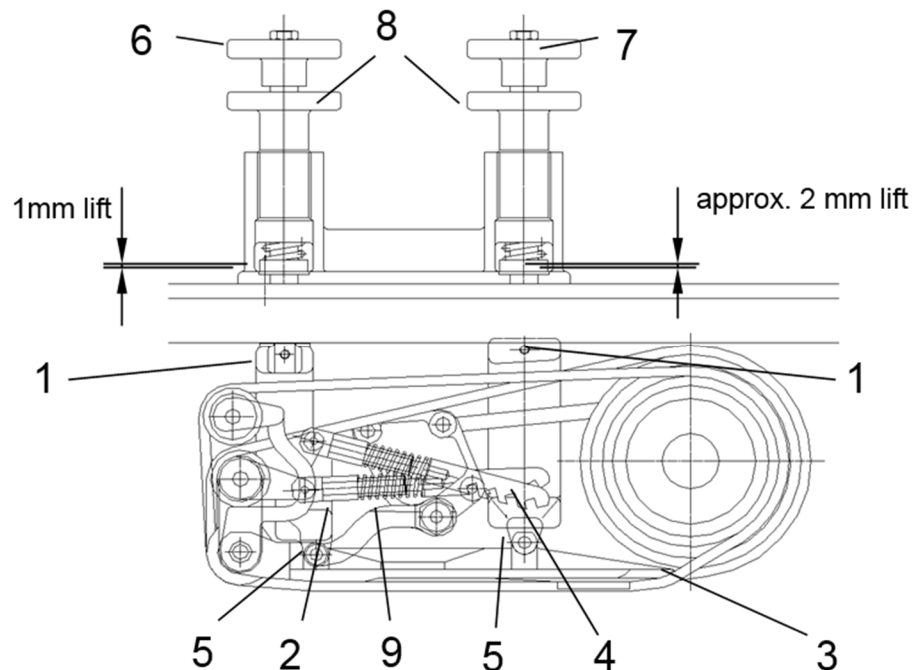


Figure 4-14: Sealing Shoe Adjustment

4. ADJUSTMENTS FOR PRODUCTION

4.7.1 Sealing Shoe Checklist

Center the eccentric arm (*Item 8*). Apply high and low spring pressure to the sealing shoe. It should have easy vertical movement. Remove the sealing belt. Rotate the sealing shoe rollers. They should easily rotate. They should not have too much clearance/wear.

When reinstalling the sealing belts, verify a few things. Make sure the belts match the turn direction. The arrow and joint should be on the inside. Place the belt on the rollers. Tension levers should rest in the notch. It should not lift out of the notch by the sealing shoe hanger motion (*Item 4*). Verify the tension of the sealing belt and spring pressure. The springs should not be fully compressed. If there is excessive pressure and wear, replace the springs.

Note: After installation and first time use, the sealing belts will shrink. This is due to the belts becoming wet then drying out. They will only shrink once.

Larger cap diameters, from 53mm, spring tension at the sealing shoe discharge influence the safety measure of the cap on the jar. Smaller cap diameters entrance and discharge side adjustments influence the proper cap application. The container finish diameter and cap under the discharge of the sealing shoe and belts should be exactly centred from the two inside and outside edges of the belts. The rinsing and cooling device for the sealing belts should be free of obstructions. Check the synchronisation of the belt speeds. With a transport chain distance of 228mm (6 links), the belts should move as follows: Front sealing belt - chain path minus 28 ± 3 mm, Rear sealing belt - chain path plus 28 ± 3 mm.

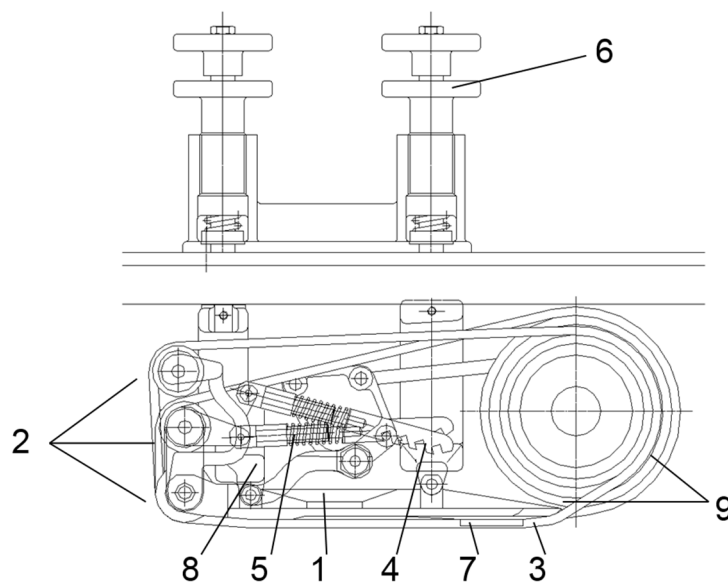


Figure 4-15: Sealing Shoe Checklist

4. ADJUSTMENTS FOR PRODUCTION

4.8 Bracket Adjustment

The brackets are adjusted with the hand wheel. Place the jar at the center of the cap track. Close the front cover. Place the side belts in the right direction on the deflection roller and the bracket roller. Look into machine from the entrance. Turn one of the hand wheels (*Item 3*). These move the brackets together. Move the brackets until one lateral guide belt comes within approx. 1mm of the centered jar (*Item 2*). Set both lateral guides to the same distance to the jar (*Item 2*). Move both brackets together. Do this by turning the hand wheels in reverse direction and same number of revolutions to the middle. The washer at the entrance support should lift up by 1mm (*Item 5*). Test a jar by running it through the machine. Ensure the jar can travel through without any issues.

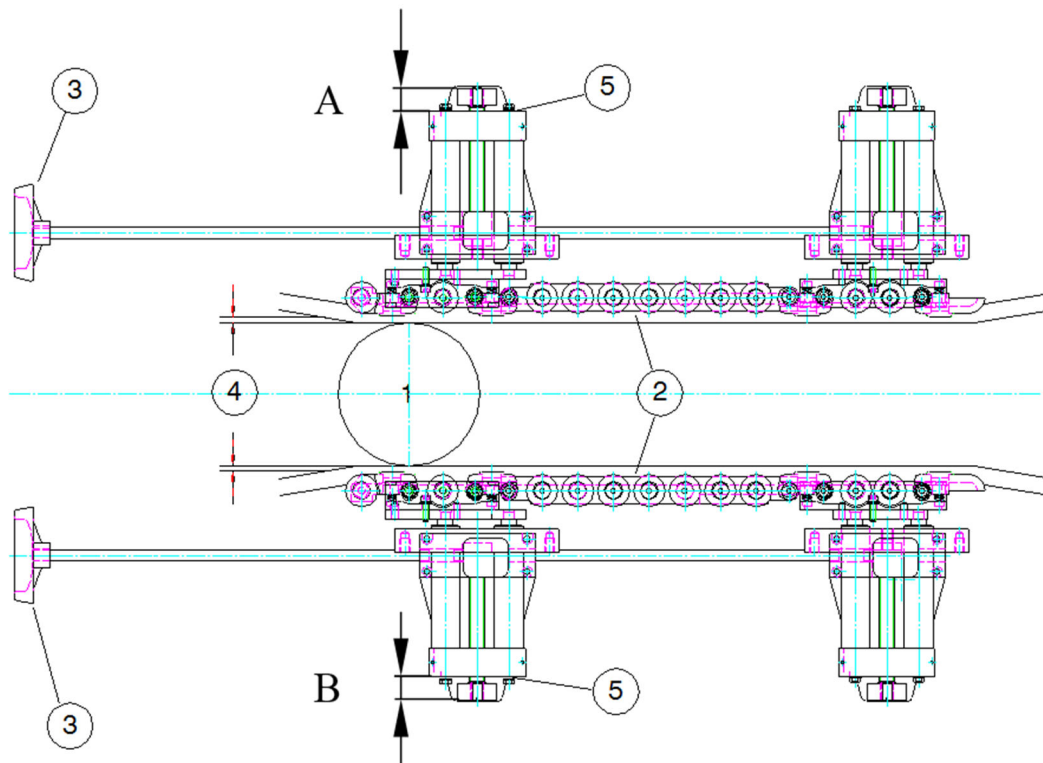


Figure 4-16: Bracket Adjustment

Measurement			
A		Product	
B		Cap Ø	
		Date	
		Name	

Table 4-17: Bracket Adjustment Checklist

4. ADJUSTMENTS FOR PRODUCTION

4.9 Side Belt Checklist

Ensure all rollers rotate without effort (*Item 1*). Check belt tensioning rollers for proper height to bracket position. Check springs inside bracket joints (yokes) and twin bushings (bracket guides) for faultless operation and that the springs are not broken. Verify the movement of the shafts inside the guide bushings is smooth and easy. Check twin bushing guide blocks for wear (*Items 3,4, and 5*).

Check lifting out (bump) of brackets when a jar passes through the machine. It should be approximately 1mm at entrance side and 2mm at discharge side. Check the front and rear side of the machine. Check the tension of the side belts. Ensure the proper position of the belts on the guide rollers. Check front and rear brackets for equal height (*Item 8*).

Check the faultless flow of the running water for cooling when the machine is in operation (*Item 9*). Check synchronised running of the side belts to the conveyor chain to the following measurement if problems occur. $9.5 \pm 3\text{mm}$ in advance (faster) at 610mm travel of the conveyor chain (16 links). Dimensions of side belts: width $16,7 \pm 0,8\text{ mm}$ / height $11,1 \pm 0,8\text{ mm}$ (*Item 10*).

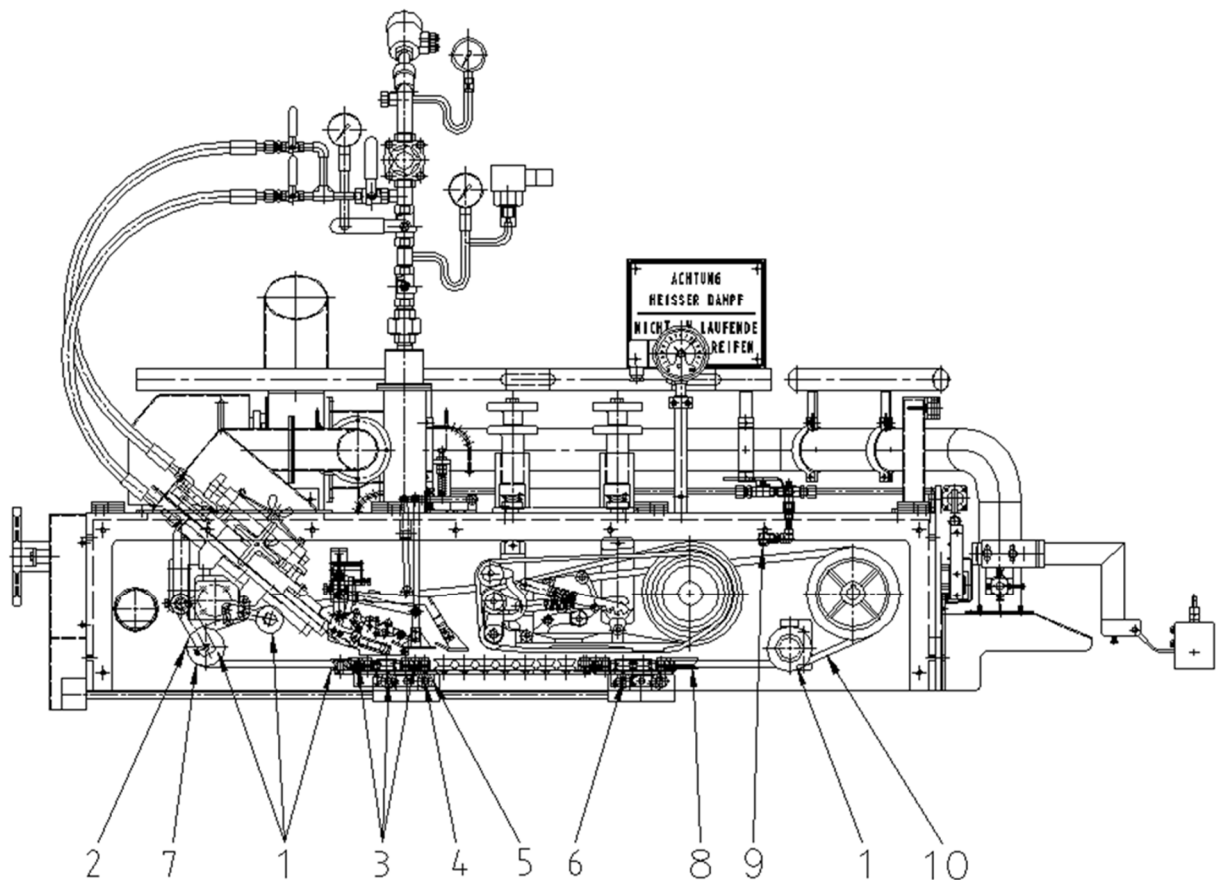


Figure 4-18: Side Belt Checklist. Figure of a WC500-1 Head

4. ADJUSTMENTS FOR PRODUCTION

4.10 Machine Head Height Adjustment

Height adjustment is performed with the hand wheel at the base of the machine. One revolution of the hand wheel is equivalent to .25mm height adjustment.

To set the correct jar height, install the cap track in accordance to the instruction. Adjust it to the cap size. Verify the bottom edge of front cap track support is parallel to the conveyor chain. It should be horizontal and never face up. Place some caps inside the cap track. The first cap is in **pick-up position**. It should be resting in front of the stop pins. Place the jar on the conveyor chain with the finish into the **pick-up position** cap. Turn the cap with one of the lugs in front and the jar finish with the highest point exactly underneath the cap lug. Adjust the height by turning hand wheel.

Push the jar manually into the cap track, until the glass finish touches the cap in pick-up position. The clearance between the cap lug, in centre of the finish, and the highest point of the glass thread should be: 1mm for caps with $\varnothing 27$ to $\varnothing 89$ mm, 2mm for caps with $\varnothing 100$ to $\varnothing 110$ mm, and deep drawn caps (DWO)

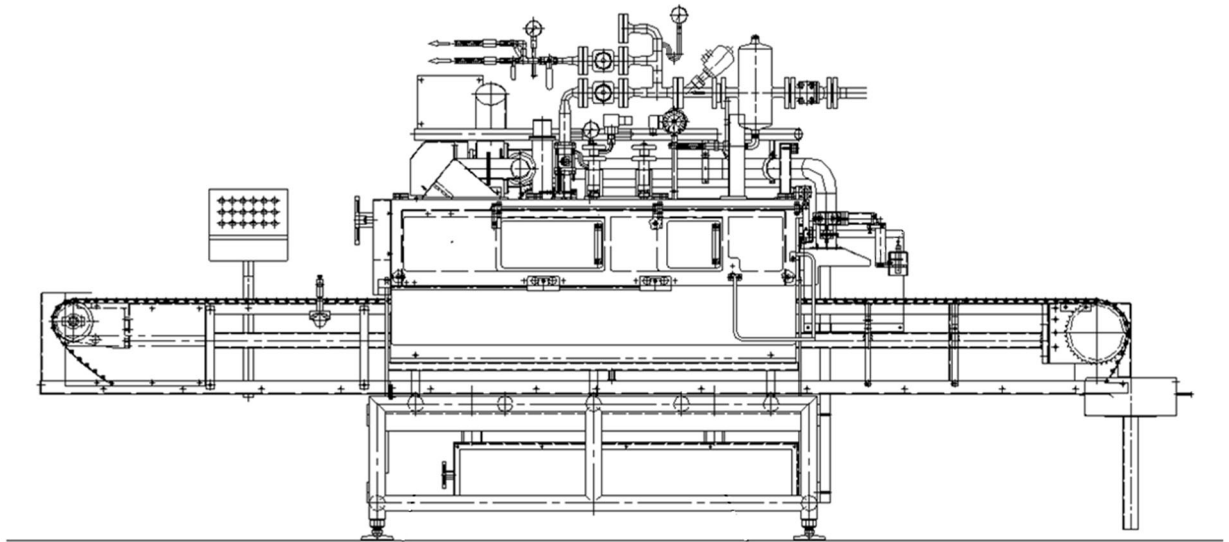


Figure 4-19: Height Adjustment of the Machine Head. Figure of a AWC600-1

4. ADJUSTMENTS FOR PRODUCTION

4.11 Steam Supply Adjustment & Maintenance

1. Dirt trap (clean periodically)
2. Steam dryer
3. Steam trap (inspect for proper function)
4. Flexible metal hose (install without twisting: "U" or "C" shape)
5. Solenoid valve
6. Manometer for steam admission pressure
7. Pressure regulator
8. Manometer for working steam pressure
9. Pressure monitor (Pressure switch)
10. Manometer for steam pressure pre-heating / acceleration
11. Stop ball valve for steam distributor (close during maintenance and adjustment work)
12. Hi/Low ball valve (adjustment of the steam volume)
13. Stop ball valve pre-heating / acceleration (close during maintenance and adjustment work)
14. Manual ball valves for cap pre-heating and acceleration to adjust the steam flow
15. Sound absorber (clean regularly)
16. Steam distributor

Note: There are quick adjustment values available (Section 4.11.1). Use these after a product change.

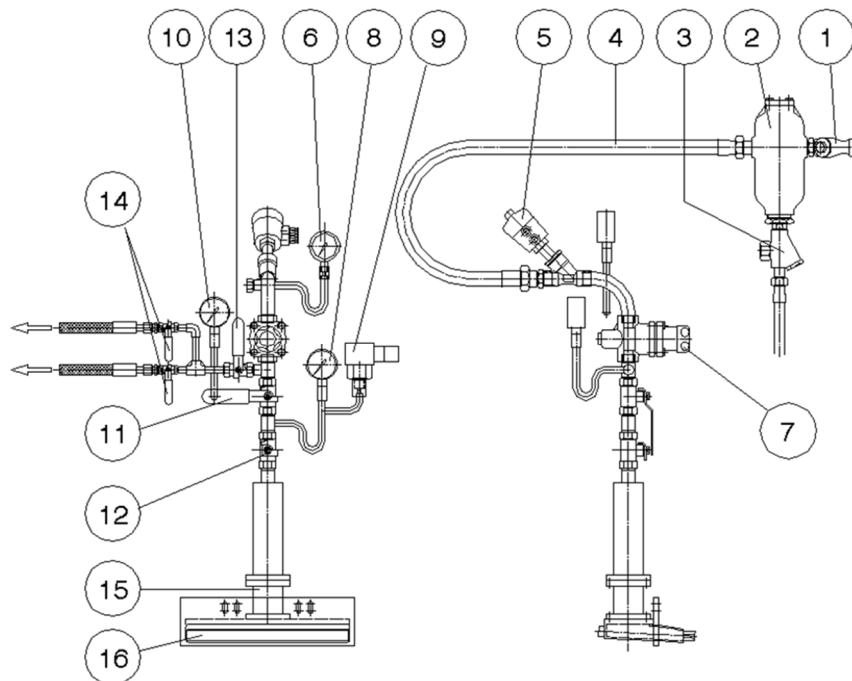
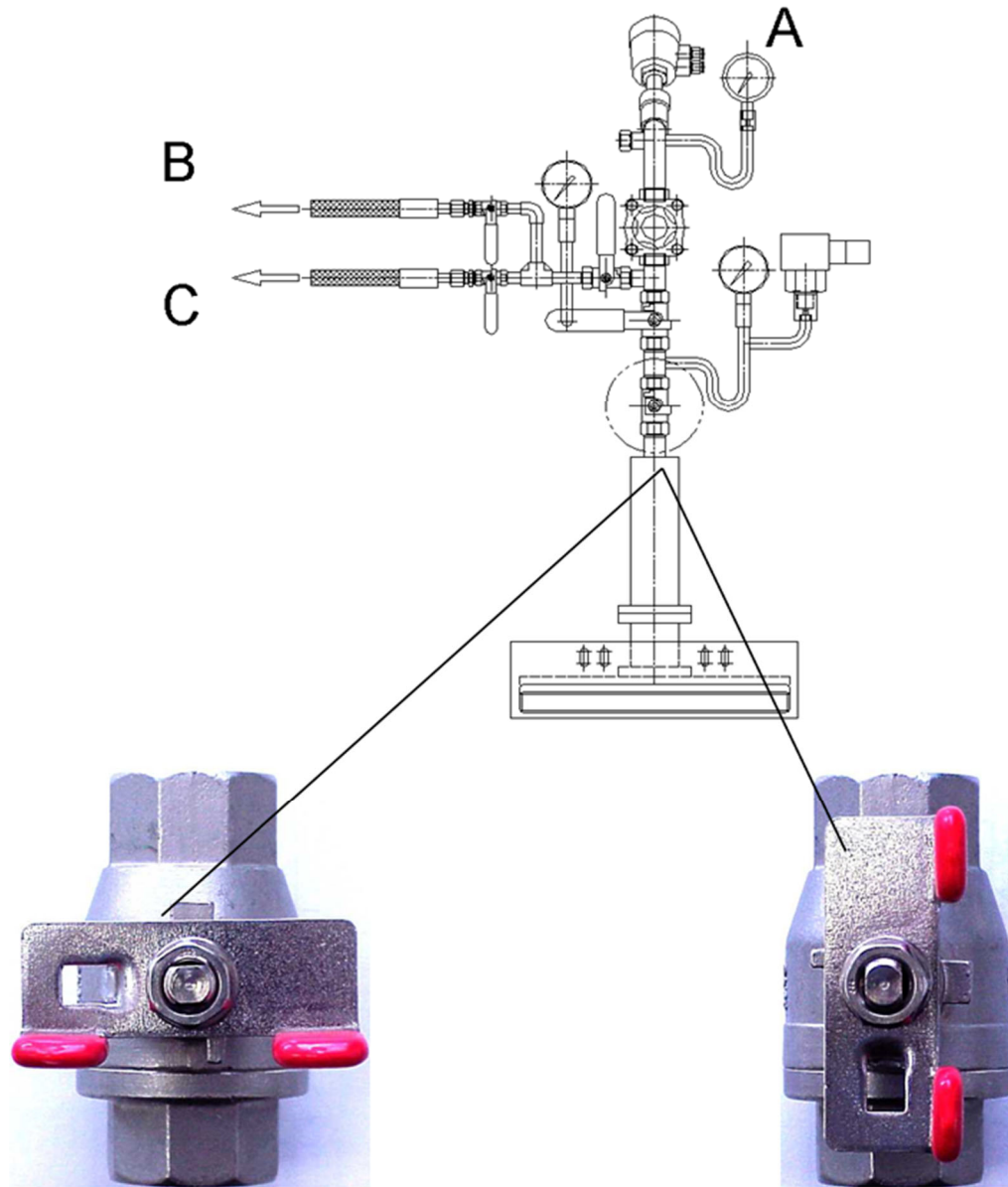


Figure 4-20: Steam Supply System

4. ADJUSTMENTS FOR PRODUCTION

4.11.1 Adjustment Values



Measurement			
A - System Steam Pressure(bar)		Product	
B - Preheating open/close(bar)		Date	
C - Cap Acceleration open/close(bar)		Line	
		Name	

Table 4-21: Adjustment Values

4. ADJUSTMENTS FOR PRODUCTION

4.12 Best Practices Guide

The following points are prerequisites for perfect packaging. Following this guide will ensure trouble free processing which meets the requirements of processing and filled products.

1. The steam system/sealing machine must be preheated to operating temperature < 75 °C.
2. The jars must be properly filled and run without interruption or movement.
3. Dirty jar finishes should be avoided and/or cleaned before sealing.
4. A constant headspace level should be kept in accordance to the vacuum requirements. This is needed in regards to the thermal processing and filled product.
5. The spacing between jars is important. It is both dependent on the cap and jar diameters. It also depends on the filler discharge star wheel pitch. Filler and capper should be synchronized. Small cap diameters can achieve this at a minimum of one conveyor link (approx. 40 mm) between the containers. Larger cap diameters require up to two conveyor links (approx. 80 mm). The perfect spacing should remain constant throughout the production run.
6. Jars should run straight through the sealing machine, especially in the area of the cap track, to avoid cap misapplication as well as any bumping, tipping, falling down or cracking of jars.

Note: If the machine is cold, high amounts of condensation will be produced at start-up.

4. ADJUSTMENTS FOR PRODUCTION

4.13 Summary

Prior to production start, check the height adjustment; the cap lug highest point of glass thread.

The drag arm that pre-spins the cap lug under the glass thread should be checked for spring pressure. Ensure all lugs are under the threads of the jar. Check for rubber wear.

If the cap is seated too low in the front side of the travel direction, it may be caused by one or more of the following issues:

- Cap track is too low (head height)

- Duck bill or hold-down device has too much stroke or are not straight (avoid return spin)

- Spring pressure of duck bill and hold-down devices are improperly adjusted.

If the cap is cocked at the side position, it may be caused by one or more of the following issues:

- Drag arm too close to the jar or touching cap too early

- Drag arm's spring pressure is too strong

- Jar is not centered when passing through the machine

If the cap is seated too low in the rear side of the travel direction,

The cap is seated too low in the rear side of the travel direction, it may be caused by one or more of the following issues:

- Hold down spring pressure is too low

- Duck bill spring pressure is too strong

- Duck bill and/or hold down plate is not straight

If the impression of the jar finish into the compound is too low or high

- (Low) Cap pre-heating is insufficient

- (Low) Sealing shoe pressure is too low

- (High) Cap pre-heating is too strong

- (High) Sealing shoe pressure is too strong

Ensure a proper cap application. The lugs do not have to be fully applied to the stop end of the finish. They should be minimally applied to the straight part of the finish. They should never rest at the thread entrance angle.

5. TROUBLESHOOTING

5.1 Troubleshooting

Troubleshooting	
Problem	Possible Cause
Cap Track Jumps	Cap track width or top guide is set too narrow (caps jamming in cap track) Cap track is not adjusted in relation to jar finish (width or height) Cap track is tilted toward or upwards the conveyor chain by more than 1.5mm Side belts are not centred in relation to the centre of the cap track
Jar Tips Over Backwards When Passing Through Machine	Stop pins are seizing at the cap track Spring pressure at the stop pins are too high Jar is not centred when moving through the cap track Cap guides are set too narrow Side belts are slipping Sealing shoe is too low Excessive spring pressure at the sealing shoe
Drag Rubber Does Not Twist the Lugs Under the Jar Thread	Caps are cocked at the finish when removed from the cap track Excessive spring pressure on the hold-down device Drag rubber is worn out; not enough side contact and pressure during pre-spinning Drag arm moves less than 3mm with new rubber Spring pressure adjustment on drag arm is too low Drag rubber and outer cap surface provides too little friction
Jars Loose the Caps	Machine head and cap track set too high Top guide in the cap track is set too high at discharge Hold-down device is too low or set with too much pressure Duck bill plate and/or hold-down plate are too high or do not lie parallel against the cap
Side Belts Slip	Side belt tension rollers are without sufficient spring tension Tensioning rollers and/or idler pulleys are not freely turning Stroke and spring pressure of the brackets is too large or not sufficient Side belts are worn out, twisted, not on the rollers or stretched Brackets are not parallel or not centred to cap track Side belt pulley is worn out
Cap Misapplication	Cap track is not moving sideward any more Cap track set too wide or cap tracks at front and rear are at different height Cap track/machine head is set too low, one lug falls in front under the thread Cap track with low tracks is not parallel to conveyor chain Duckbill is not parallel or excessive pressure does push the lug over the thread Some links of the conveyor chain are bended or not moving down any more Wear strips under the transport chain are worn out Glass fragments are underneath or on top of the wear strips

5. TROUBLESHOOTING

5.1 Troubleshooting

Troubleshooting

Problem	Possible Cause
Lugs Come off or Bend Up	Caps were not warmed sufficiently before the sealing process Excessive spring pressure on sealing shoe (cap over-applied) Security measurement too large, resulting in excessive strain on lugs of the closure Sealing belt tension spanner force too high The thermal process is not kept under control or not in accordance to the cap processing guidelines
Further Causes of Misapplication and/or Vacuum Loss	Steam pressure insufficient Temperature too low Cap acceleration not sufficient) Caps are not suitable to the product, process or does not match to the glass finish Glass tolerances and/or coating do not comply with Silgan White Cap standards Speed synchronisation and spacing between the jars are insufficient. The line stops with remaining jars inside the capping machine. Jars jam up, inside the machine. Process flow parameter changed (sterilization and pasteurization temperatures and holding times, as well as counter pressure conditions.) Rough handling of finished packages Pallets have been stacked too high

6. ORDERING SPARE PARTS

6.1 Ordering Spare Parts

Spare Parts If you want to order spare parts, please provide the following information:

- Type of machine (refer to technical data sheet)
- Brief description of the part(s) in question
- Part number(s) listed in the Parts Catalog

Change parts and wear parts When ordering a complete set of change parts, please provide the following information:

- Machine type (see specification sheet)
- Previous processed cap types
- New cap types to be processed
- Modified jar shape (sample).

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