

MERCATOR EMBA

Automatic

Capping machine

Comet 8

User manual

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Warning!

General

The machines may only be used as described in the manuals. All other use could cause danger to the people by, and close to the machine.

Electrical shocks

The machine is electrical driven and the risque for electrical shocks is normally non. If the electrical cabinet is opened to change components or other service, turn off the supplying electrical power first.

Pneumatic dangers

The machine has certain movements driven by pneumatics. There is a risk for squeeze injuries at every moving part. At leakage on hoses or similar, it is dangerous to point the air jet directly towards the skin/body. Besides pressing the emergency stop, the air inlet is to be closed.

Belts in motion

The machine has belt transmission/-s and there is a risk for squeeze injurys if the instructions are not followed. When opening doors and covers or performing service on the machine the electrical and air supply must be turned off.

Pinions in motion

The machine has pinion transmission/-s and there is a risk for squeeze injurys if the instructions are not followed. When opening doors and covers or performing service on the machine the electrical and air supply must be turned off.

Start and stop

Starting an entirely shut down machine

- 1 Open the air flow.
- 2 Check:
 - * The off/on switch is in position OFF.
 - * The emergency stop is pulled out.
 - * Security doors is closed.
 - * *Ключ на ВКЛ (зона не вст.)*
- 3 Turn the main switch on the main control cabinet to position 1.
- 4 Press the RESET button.
- 5 Wait until the working air pressure has been stabilised.
- 6 All lamps will shine before upstart as a lamp check..
- 7 Clear the infeed screw from bottles. - *ни бутелки!*
- 8 Start the machine with the off/on switch. - *AUTO*

Temporary stop

- 1 Turn the off/on switch to position OFF. *Ø*
- 2 To restart, turn the off/on switch to position ON. *AUTO*

Shutting down

- 1 Turn the off/on switch to position OFF. *Ø*
- 2 Turn the main switch on the main control cabinet to position 0.
- 3 Close the supplying air flow to the machine.

Emergency stop

Reset:

- 1 Press the emergency stop and the machine stops immediately.
- 2 Turn the off/on switch to position OFF. *Ø*
- 3 Remove all damaged bottles/caps. Clear the cap star at the back of the machine.
- 4 Pull out the emergency stop.
- 5 Press the reset button.

Operating panel

Working air

The manometer presents the working air pressure. The pressure should be 0,6-0,65 Mpa, (6-6,5 bar).

EMERGENCY STOP lamp

This lamp shines steady if the emergency stop has been activated, if the security doors are opened, it flashes.

I

Measurements:

- * Turn the AUTO/OFF/MAN. switch to position OFF.
- * Pull out the emergency stop button.
- * Check the security doors so that they are properly closed.
- * Press RESET.
- * Turn the AUTO/OFF/MAN. switch to position AUT.

DOOR GUARD lamp

This lamp turns on if the DOOR GUARD switch is in position OFF. The lamp is shared with the emergency stop lamp which indicates with a steady light.

MAIN DRIVE overload lamp

This lamp turns on if something forces the machine to stop rotate so the main drive friction clutch slips.

This friction clutch is set to a very high torque and is not expected to slip under normal conditions. If the clutch slips and without a reason, contact TREPAK for consultation.

Measurement:

- * Turn the off/on switch to position OFF.
- * Press the emergency stop.
- * Locate and measure the problem.
- * Press the RESET button.

SYNCHRONOUS lamp

This lamp turns on if the cap disc or the infeed screw comes out of their right position.

Measurement for the key person of the production

- * Turn the off/on switch to position OFF.
- * Rotate the infeed screw by hand about one or two revolutions until it distinctively falls into its right position.
- * Rotate the cap disc by hand about one revolution until it distinctively falls into its right position.
- * Press the reset button.

CAP GUARD lamp

This lamp turns on if there is not long queue of caps to the cap disc.

Measurement:

1. Fill the cap hopper container with caps. The machine starts automatically again.
2. If there is no lack of caps, turn the off/on switch to position OFF.
3. Find out why the caps do not reach the cap disc.
4. Examine if there is any cap stuck in the cap chute.
5. Press the reset button.

LOW PRESSURE lamp

This lamp turns on when the WORKING AIR PRESSURE drops too low. This can be caused by a temporarily pressure fall in the supplying air. The machine stops.

Measurements:

- * Check the WORKING AIR PRESSURE and the supplying air pressure. It should be 0,6-0,65 Mpa, (6-6,5 bar).
- *

QUEUE IN lamp

This lamp turns on when the machine has stopped because of too short infeed queue or if any bottle is lying down on the infeed conveyor.

- * Correct eventually lying bottles.
- * Make sure that the queue of bottles in to the machine is long enough.

The machine starts automatically again.

QUEUE OUT lamp

This lamp turns on when the machine has stopped because the queue guard sensor is indicating that bottles are in queue after the machine. As soon the queue is gone the machine starts again.

CAP CONTROL lamp

This lamp turns on if the machine stops because the cap control is sending a stop signal.

Measurement:

- * Turn the off/on switch to position OFF.
- * Measure the problem.
- * Reset the cap control.

**AUTO/OFF/
MANUAL-switch**

When this switch is in position AUTO the machine is working. When it is turned over to position OFF, the machine stops after finishing the current cycle. In position MANUAL it is possible to jog the machine slowly forward with the portable jog button.

DOOR GUARD switch

This key switch is meant to be used when doing a change over. By turning it over to the OFF position when the machine is in MAN mode it bypasses the door guard and it is possible to open the security doors without stopping the machine. If the doors are opened while the machine is in AUTO, it will stop, independently in which position the door guard switch is in.

Warning!

The key to this keyswitch shall not by security reasons be attached in the key hole while the machine is in use other then when doing a change over operation.

Capping speed

This potentiometer adjust the speed of capping. Should be adjusted together with conveyor speed.

**SORTING UNIT
SPEED**

This potentiometer adjusts the speed of the sorting unit. Should be adjusted to achieve no queue pressure.

EMERGENCY STOP

When this button is pressed, all air is evacuated from the machine, everything stops and the EMERGENCY STOP lamp turns on.

To reset see EMERGENCY STOP lamp.

RESET button

This button resets the error messages. If the problems is not proper measured the messages will be repeted. When the off/on switch is in position OFF you can jog forward. (If you press the RESET button when the off/on switch is in position ON the error messages will be reseted and the machine starts again.)

Conveyor STOP

Stops the conveyor.

Conveyor START

Starts the conveyor.

Conveyor speed

This potentiometer adjusts the speed of the conveyor through the capping machine.

Change-over and settings

Change-over:

For machines with only different bottles, only parts marked * should be changed.

Side/lid in cap conveyor.

Cap chute.

Collector.

Sorting disc.

Cap stop.

Outer guide at cap disc.

Cap disc.

* **Centring support.**

* **Centring device.**

* **Infeed timing screw.**

* **Side belt**

Grippers

To set up the machine for a new bottle and cap you have to:

Change of SIDE IN CAP CONVEYOR

This keeps the caps in order on the cap conveyor. To change it you have to:

* Loosen the lock handle that hold the cap conveyor up to the cap chute (leader 1), and lower it.

* Lift up the side in the cap conveyor by loosen two knobs on the conveyors back side (leader 2, 3).

(*) If cap disc should be changed see "Change of cap disc".

* Put the new side in the machine.

* Lift the cap conveyor up to the cap chute and tighten the lock handle.

Change of CAP CHUTE

The cap chute flip the caps so the thread come downwards. To change the cap chute you have to:

* Loosen the lock handle that hold the cap conveyor up to the cap chute and lower it.

- * Loosen the knob that holds the cap chute together with the discharging top cover.
- * Loosen the knob on front of the cap chute and take it off.
- * Adjust the height of the sorter pillar depending on the radius of the new cap chute.
- * Put the new cap chute on its place and tighten both knobs.
- * Lift the cap conveyor up to the cap chute and tighten the lock handle or see "Change of side in cap conveyor".

Change of ROTATING CAP PLATE and DISCHARGING TOP COVER

The rotating cap plate sorts the caps so they enter the discharging top cover equally. To change these you have to:

- * Remove the sorter seiling by loosen the three knobs on the outside of the cap sorter unit.
- * Remove the discharging top cover by loosen the knob under it completely and pull it out.
- * Remove the photocell by loosen the clamp that holds it.
- * Remove the old rotating cap plate by lifting it out of the sorting unit.
- * Place the new rotating cap plate in the sorter and let it fall down over the four knobs near the middle of the sorting unit.
- * Put the photocell back with its holder. Make sure that it indicates too low cap level.
- * Put the new discharging top cover in place and tighten the the knob under it.
- * Put the sorter seiling back and tighten the three knobs on the outside of the cap sorter unit.

Change of CAP DISC and OUTER CURVE

The cap disc feeds the cap grippers with caps when the machine indicates a bottle, or else the cap is prohibited to enter the cap disc. To change the cap disk and the outer curve you have to:

- * Take off the side in the cap conveyor (see "Change of side in cap conveyor").



- * Remove the cap stopper by loosen the knob under the pneumatic cylinder on the stopper. (Don't disconnect the hoses.)
- * Remove the outer curve by the cap disc by loosen the knob. [There is two knobs on the left hand machine.]
- * Remove the cap disc by loosen the knob in the middle and lift straight up.
- * Put the new cap disc on its place and pay attention to the locating pin.
- * Put the new outer curve on its place and tighten the knob (pay attention to the steering pin). [There is two knobs and no locating pin on the left hand machine.]
- * Put the cap stopper on place and tighten the knob.
- * Put back the side in the cap conveyor (see "Change of side in cap conveyor").
- * Replace the snap distances on the cap stopper with the new ones. [There is only one snap distance on the left hand machine.]

Change of CENTERING DEVICE and CENTERING SUPPORT

To achieve a precision position of the container just in that moment when the chuck goes down to the container bottle, the machine is equiped with a centering device. To make the centering device work satisfying it has to work against a centering support accross the container. To change the centering device and the centering support you have to:

- * Remove the old centering device from the machine by unscrewing the knob under it.
- * Replace it with the new and be sure that the surfaces are clean and that it is tightend in its inner position.
- * Remove the old centering support from the machine by unscrewing the knob on the front and lift the support up.
- * Replace it with the new and be sure that the bottom surface is clean and that it is tightend in its lowest position.

Change of INFEED SCREW

The infeed screw is attached to the machine in a way that allows you to change infeed screw quickly. It has a driving arrangement in the outfeed side and a spring in the infeed side. To change infeed screw you have to:

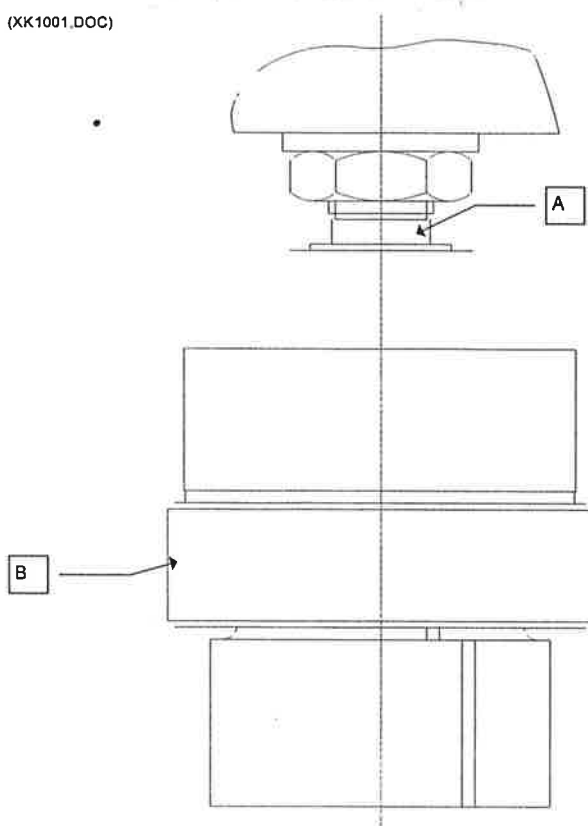
- * Remove the centering support (leader 1).
- * Grab the infeed screw in its outfeed end and press the spring together in the infeed end (leader 2). Now the screw is loose.
- * Place the new screw in the machine and be sure that the drive arrangement really is in position.
- * Loosen the lock handle under the wheel (leader 3), adjust the new screw to its right scale reference, tighten the lock handle again.
- * The outer screw is adjusted to the scale reference, the inner via a bottle between the screws.
- * See "Change of centering".

Change of CAP GRIPPER

The cap gripper is fixed to a chuck with a threaded ring. To change the cap gripper you have to:

- * Press the EMERGENCY STOP.
- * Hold the chuck with one hand and unscrew the threaded ring with the other hand. The cap gripper will follow the threaded ring when it comes off.
- * Place the new cap gripper in the chuck.
- * Check the pins in the chuck so they fit into the holes on the washer which holds the cap grippers together, before tightening the ring.

(XK1001.DOC)



A= Wrench grip.

B= Threaded ring for cap gripper.

Setting the height of the CAPPING PILLAR and the SORTING PILLAR.

To be able to run containers with different heights, the machine is adjustable in height by two pillars. (The height difference between the cap conveyor's entrance and its exit may not exceed 50mm.)

To change the height of the capping pillar.

- * Loosen the lock handle.
- * Use the ratchet handle, turn clockwise to rise the capping pillar, to the reference value.
- * Tighten the lock handle again.

To change the height of the sorting pillar.

- * Loosen the two lock handles.
- * Use the ratchet handle, turn clockwise to rise the sorting pillar. To the same value as the capping pillar.
- * Tighten the lock handle again.

Adjustments of the CAP TORQUE

With this knob you control the torque of the cap and it can be adjusted after desire.

Adjustments of the capping heads pressure down against the vertical curve

This control is placed near the machines rotating air distributor to the capping heads. It affects the pressure to those pneumatic cylinders who press the capping heads, (on which the chucks are attached) to a curve which guides the heads movement up and down. It should not be manipulated with.

Maintenance

Air filter

Empty the condensed water from the filter.

Belts

Check the tension of all belts and tighten if necessary.

Lubrication

Lubrication of the machine should be done regularly and depending on local conditions.

1. Dismount the cover plate on the capping head and lubricate:
 - * The curve and the bearing.
 - * The piston rods on the cylinders on each capping head.
 - * Chains and chain wheels.
2. Lubricate the mechanism for height adjustment with the nipples at the height adjustment shafts
3. Lubricate spindles and chains at the infeed timing screw adjustment mechanism.

Change of spareparts

Change of tooth belt that drives the cap disc

1. Remove the cover under the cap disc.
2. Loosen the belt stretchers.
3. Move the belt away from the tooth belt pulley next to the cardan joint.
4. Loosen the bellow by the cardan joint. Unscrew the screws that holds the cardan joint together with the tooth belt pulley (four M5).
5. Replace the belt.
6. Fasten the screws that holds the cardan joint together with the tooth belt pulley (four M5). Fasten the bellow by the cardan joint.
7. Put the belt on the tooth belt pulley.
8. Tighten the belt stretchers.
9. Adjust the cap disc (see "Precision adjustments of the cap disc").

Change of tooth belt that drives the sidebelt

- 1 Follow the operations 1 to 4 in "Change of tooth belt that drives the cap disc and side belt".
- 2 Remove the detension ring located on the tooth belt pulley.
- 3 Move the tooth belt aside.
- 4 Loosen the bearing house by removing three M8 screws.
- 5 Loosen the bearing (2 socket head cap screws).
- 6 Lift the bearing and bearing house as high as possible.
- 7 Put the tooth belt down through the hole.
- 8 Put the new tooth belt up through the hole.
- 9 Lower the bearing house and fasten it with its screws.
- 10 Lower the bearing and fasten it with its screws.
- 11 Put the tooth belt on place.
- 12 Put the detension ring back on the pulley.
- 13 Follow the operations 6 to 9 in "Change of tooth belt that drives the cap disc and side belt".

Change of tooth belt at the main drive

- 1 Loosen the tooth belts by:
 - * Loosen the motor and push it forward.
 - * Loosen the belt stretcher to the infeed screw.
- 2 Loosen the console under the bearing house to the main drive and remove it (see picture on next page).
- 3 Change tooth belts.
- 4 Put the console back and tighten the screws.
- 5 Tighten the belts.
- 6 See "Precision adjustments of the infeed screw".

Change of friction disk in overload clutch on main drive

- 1 Loosen the main drive belt by loosen the motor and push it forward.
- 2 Loosen the locking screw to the shaft under the gear.
- 3 Lift it up and take it out.
- 4 Dismount the clutch by:
 - a) Loosen and remove the locking nut.
 - b) Divide the house.
 - c) Loosen and remove the adjustments ring.
- 5 Replace the old friction discs with new ones.
- 6 Assemble the clutch.
- 7 Put it back on the gear.

8 Tighten the belts and fasten the motor.

Change of belts by the cap conveyor.

A To change the conveyor belt follow the operations 1-6, 8-11, 13-17.

B To change the conveyors driving belt follow the operations 1-7, 12-17.

- 1 Take off all change over parts close to the cap conveyor and the cap stopper.
- 2 Loosen the cap conveyor motor by removing two socket head cap screws.
- 3 Remove the photocells (or the fibre optic sensors) from the cap conveyor (see leader 1 on next page).
- 4 Loosen those two nuts with springs under the cap disc.
- 5 Remove the lock handle by the cap chute (see leader 2 on next page).
- 6 Lift down the complete cap conveyor.
- 7 Take the drive cover off.
- 8 Loosen the cap conveyor belts stretching screws (see leader 3 on next page).
- 9 Remove the conveyor side opposite to the driving belt side.
- 10 Replace the old belt with a new.
- 11 Put the conveyor side back again.
- 12 Put the drive cover back again.
- 13 Put the conveyor back on the machine and fasten it by the cap chute and the cap disc.
- 14 Put the photocells (or the fibre optic sensors) back.
- 15 Put the motor back and put the driving belt on.
- 16 Stretch the cap conveyor belt.
- 17 Place those change over parts back which you removed on instruction 1

Change of side belt

- 1 Remove the infeed screw.
- 2 Remove the detension rings on both bolts that penetrates the whole construction of the side belt (see picture).
- 3 Remove both bolts and lift the whole construction of the side belt.
- 4 Loosen the stretching screws to the side belt and take the stretching parts off.

- 5 Change side belt.
- 6 Put the stretching parts back and tighten the the stretching screws to the side belt.
- 7 Lift the whole construction of the side belt back on the machine insert both bolts.
- 8 Lock the bolts with the detension rings.
- 9 Put the infeed screw back again.

Stretching the drive chain up/down

1. Remove the cover.
2. Loosen the two screws which holds the centring.
3. Loosen the four screws at the chain wheel up and down.
4. Tighten the chains with the tension screw.
5. Tighten the four screws up and down.
6. Tighten the two screws which holds the centring.
7. Put the cover back.

Precision adjustment of the infeed screw

This is a very sensitive operation and should, if it's properly done once, not be necessary to do it again.

- 1 Loosen the clamp connection near the infeed screws outfeed end.
- 2 Adjust the infeed screw so there is a bottle in the right position under each chuck on the front side.
- 3 Tighten the clamp connection.
- 4 Run a test.
- 5 Repeat this till the capping is satisfying.

Adjustment of the release torque of the synchronous clutch at the cap disc

1. Loosen the lock screw under the clutch.
2. Adjust the clutch by turning the notch ring. Turn maximum a quarter of a revolution at the time.
3. Tighten the lock screw.

Fine adjustment of the drive of the cap disc

1. Jog a chuck so it is in line with the capping pillar and in center of the cap disc.
2. Turn the disc so a cap position is under the chuck.
3. Adjust by moving the drive belt one tooth inside the machine frame and/or by loosen the three screws on the cap disc and turn the cap star to another position in the notches.
4. Tighten the screws again.

Changing PROM**Mitsubishi PLC type FX and FX0N.**

When a PROM is inserted in the PLC, the program in the PROM is preferred. When the PROM is removed, the old program in the PLC's memory is current again. The program in the PLC's memory is dependent on power supply from the back-up battery when the main power is down. If the battery runs low, the program will be lost.

1. Turn off the main power to the machine.
2. Remove the small lid on the PLC.
3. Remove the existing PROM in the socket below the battery by lifting the metal grip and pull straight out.
4. Place the new PROM in the socket.
5. Place the lid back on the PLC.
6. Turn on the power to the machine.
7. The machine is now ready with the new program.