OPERATING INSTRUCTIONS

for

MODEL ICP-ACAP & RC1 AUTOMATIC CAP TIGHTENING MACHINE

fitted with

TWIN DWELL PNEUMATIC TIMER CONTROL UNIT

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SECTION 1

TYPES OF CONTROL

for

MODEL RC1 AUTOMATIC CAP TIGHTENING MACHINE

The ICP-ACAP & RC1 Automatic Cap Tightening Machine is available with three (3) types of operating control, viz:

1.1 CONTROL BY THE FILLING MACHINE

The filling machine provides a pneumatic signal of adjustable duration. For a single-nozzle filling machine, this signal is provided to the capper once in every filling machine cycle.

A multiple-nozzle filling machine must provide a number of pneumatic signals in each cycle equal to the number of filling nozzles, to avoid filled bottles banking-up at the capper.

In multi-head filling machines (AV4-style), this signal to the capping machine is provided from a pneumatic valve operated by a multi-lobed split cam. One cam lobe is provided for each filling nozzle on the machine and the split cam arrangement enables the dwell (ON period) of the valve to be lengthened or shortened according to the operating time required for the capper for the particular container/closure being used.

Container Clamping Jaws and Cap Tightening Chuck normally operate in unison. Where it is required for the jaws to open slightly after the chuck starts to rise (for recessed chuck applications), a special pneumatic delay timer is fitted to the cap tightening machine.

1.2 **CONTROL BY ELECTRONIC TIMER CONTROL UNIT** with a photoelectric sensor for container detection.

This type of control enables the capping machine to operate completely independently of the filling machine. Therefore the capper can be used for tightening (or untightening if supplied with reversible air motor) caps on containers without running the filling machine. This type of controller also affords much greater flexibility and accuracy in capper control, particularly when running difficult cap/container combinations.

Because of its independent mode of operation, this execution is ideal for dedicated cap tightening operations or where an automatic cap tightener is to be fitted to an existing filling line.

1.2.1 Twin Delay/Dwell

The timer and circuitry provided in this version operates the Clamping Jaws independently of the Tightening Chuck.

This feature is essential when tightening closures such as spray pumps, Tampertel-type, or other closures which, due to their shape, require tightening chucks that enclose the closure (recessed chucks) for adequate tightening.

In these cases it is necessary to momentarily hold the container with the Clamping Jaws after tightening whilst the Tightening Chuck rises clear of the closure, i.e. the twin delay/dwell feature enables the dwell time for the Jaws to be set slightly longer than the dwell time for the Chuck.

Please refer to the enclosed Operating Instructions for the type of control fitted to your Automatic Cap Tightening Machine.

1.3 **CONTROL BY PNEUMATIC TIMER CONTROL UNIT** with pneumatic whisker switch for container detection.

This type of control enables the capping machine to operate completely independently of the filling machine. Therefore the capper can be used for tightening (or untightening if supplied with reversible air motor) caps on containers without running the filling machine. This type of controller also affords much greater flexibility and accuracy in capper control, particularly when running difficult cap/container combinations.

Because of its independent mode of operation, this execution is ideal for dedicated cap tightening operations or where an automatic cap tightener is to be fitted to an existing filling line.

The all pneumatic control allows this capping unit to be used in flameproof applications.

The Pneumatic Timer Control Unit offers these features:

1.3.1 Single Delay

The timer and circuitry operates the Clamping Jaws and the Tightening Chuck at the same time, i.e. when the container Clamping Jaws start to close, the Tightening Chuck starts to descend.

1.3.2 Twin Dwell

The timer and circuitry operates the dwell time for the Clamping Jaws independently of the Tightening Chuck.

This feature is essential when tightening closures such as spray pumps, Tampertel-type, or other closures which, due to their shape, require tightening chucks that enclose the closure (recessed chucks) for adequate tightening.

In these cases it is necessary to momentarily hold the container with the Clamping Jaws after tightening whilst the Tightening Chuck rises clear of the closure, i.e. the twin dwell feature enables the dwell time for the Jaws to be set slightly longer than the dwell time for the Chuck.

Please refer to the enclosed Operating Instructions for the type of control fitted to your Automatic Cap Tightening Machine.

SECTION 2

OPERATING INSTRUCTIONS

for

TWIN DWELL PNEUMATIC TIMER CONTROL UNIT

fitted to

MODEL RC1 AUTOMATIC CAP TIGHTENING MACHINE

2.1 CONTROL UNIT FEATURES

The pneumatic timer control unit for the Model RC1 Cap Tightening Machine is comprised of the following main features:

Front Panel:

Three pre-settable timers.

On/Off switch.

Internal:

Pneumatic valves for operating tightening chuck and clamping jaws.

2.2 SET-UP PROCEDURE

2.2.1 Ensure that the main air supply line to the capping machine is either DISCONNECTED or EXHAUSTED if fitted with an exhausting valve.

2.2.2 Position pneumatic sensor to detect the container as it enters the capping machine jaws by ensuring that the whisker is deflected enough by the container wall to operate the valve.

Note: The sensor is usually placed so as to detect a container two to three containers on the infeed side of the capper.

2.2.3 Approximate values for the following three (3) timed periods will have been

previously programmed at the factory:

(i) Tightening Chuck, Clamping Jaws DELAY TIME
(ii) Tightening Chuck DWELL TIME
(iii) Clamping Jaws DWELL TIME

If you need to change them, refer to following section "PNEUMATIC TIMER".

2.2.4 Adjust the Cap Tightening Machine Clamping Jaws and Tightening Chuck - refer section "CAP TIGHTENING MACHINE ADJUSTMENT", Section 3.

2.2.5 Connect main air supply to the Cap Tightening Machine. Supply pressure should be 500 to 600kPa.

2.2.6 Test containers can now be fed to the machine and any final adjustments to timing or mechanical settings made to ensure smooth operation of the machine with adequate tightening of the cap.

2.2.7 WHEN MAKING ADJUSTMENTS TO OR NEAR THE TIGHTENING CHUCK OR CLAMPING JAWS - ENSURE THAT **AIR PRESSURE IS FULLY EXHAUSTED** FROM SUPPLY LINE AND/OR THAT MAIN ON/OFF SWITCH ON CONTROL UNIT IS **OFF**.

2.3 PNEUMATIC TIMER - TWIN DWELL TYPE

2.3.1 ON/OFF SWITCH

With the Pneumatic Timer Control Unit connected to the Cap Tightening Machine, and a pneumatic whisker sensor connected to detect containers as they arrive at the machine, the entire system is turned ON and OFF by the main ON/OFF switch on the front panel of the Control Unit. When turned off, the timer will re-set itself to zero so that when next turned on, a complete normal cycle will commence providing a container is present and detected by the pneumatic sensor.

2.3.2 PNEUMATIC TIMERS

The timers incorporated in the front panel of the control case are all pneumatic.

To adjust any timer:

Turning CLOCKWISE INCREASES delay time

Turning ANTICLOCKWISE DECREASES delay time

The timers are configured to provide three (3) timed periods for the capper operation, ie.

2.3.3 DELAY ON - delays the beginning of the capping cycle after the completion of the previous cycle. This allows enough time for the container to be centrally

positioned between the Clamping Jaws before the Tightening Chuck descends. The length of the delay required depends on the length of the container and the speed of the conveyor.

2.3.4 AIR MTR DWELL - determines the length of time the Tightening Chuck is operating. When this part of the cycle commences, the Tightening Chuck Air Cylinder descends and the Tightening Chuck Air Motor starts. When the Air Mtr Dwell Timer times out the Tightening Chuck Air Cylinder retracts and the Tightening Chuck Air Motor stops rotating.

The Dwell Time can be adjusted to allow sufficient time for the container to be clamped, the tightening chuck to descend, tighten the cap to the required torque (chuck should be **stalled** with the cap fully tightened), and then the chuck ascends when the dwell time times out. The dwell time should be adjusted so that it times out just after the cap and chuck have stopped turning. It is unnecessary (and reduces container throughput) for the container to remain clamped and the chuck stalled on the cap for long periods.

2.3.5 JAWS/GATE DWELL - determines the length of time the Clamping Jaws are holding the container during the tightening procedure and the time that the Container Gating Cylinder is retracted to allow the previously capped container to clear the tightening area.

The purpose of having a separate dwell time for the Clamping Jaws is to enable the jaws to be opened a short time AFTER the Tightening Chuck has started to ascend. As previously mentioned, this feature is essential when tightening closures such as spray pumps, Tampertel-type, or other special closures which, due to their shape, require tightening chucks that enclose the closure (recessed chucks) for adequate tightening.

These chucks can tend to lift the container by the closure when the chuck starts to ascend. By setting the Clamping Jaws Dwell Time slightly longer than the Tightening Chuck Dwell Time, the container is held firmly in place whilst the chuck starts to ascend.

In addition, the depth of engagement of some of these special chuck designs requires the chuck to ascend some distance before it clears the top of the closure. If the container is released by the clamping jaws too early, the container will start to move with the line conveyor whilst the closure is still within the chuck, causing the container to topple.

The Clamping Jaw Dwell Time should therefore be set slightly longer than the Tightening Chuck Dwell Time to allow the chuck to clear the top of the closure before the jaws release the container.

SECTION 3

RC1 AUTOMATIC CAP TIGHTENING MACHINE

CAP TIGHTENING MACHINE ADJUSTMENT

For models fitted with Twin Dwell Pneumatic Timer Control Unit.

The following covers the mechanical set-up and adjustment of the Cap Tightening Machine on the filling line conveyor. Before proceeding with these adjustments, the set-up procedure for the Pneumatic Timer Control Unit should be carried out - refer Section 2.

3.1 SET-UP PROCEDURE

3.1.1 ENSURE THAT the main air supply line to the machine is connected but EXHAUSTED by turning the Hand Valve to **EXH**.

3.1.2 Loosen the ratchet handle holding the Container Clamping Jaws air cylinders and slide them apart.

3.1.3 Temporarily push the air cylinder rods on which the jaws are mounted back in the cylinders as far as they will go.

3.1.4 Ensure that the bar holding the Tightening Chuck Air Motor is in its FULLY DOWN position, i.e. that the air cylinder piston rod connected to the bar is fully extended.

3.1.5 Hand tighten a closure onto a container and place the container on the conveyor directly under the Tightening Chuck.

Lift the Revolving Grip on the Handwheel until it clicks into place.

The vertical height of the Tightening Chuck may be adjusted to accommodate the container by loosening the knurled Lock Ring on the main height adjustment threaded rod and turning the Height Adjustment Handwheel on the top of the machine.

Lock Ring: To LOOSEN, turn
CLOCKWISE, viewed from above

Height Adjustment Handwheel:

To RAISE, turn
CLOCKWISE, viewed from above

If Lock Ring is tight, turning Height Adjustment Handwheel anti-clockwise slightly will loosen it.

3.1.6 With the container in position, turn the Height Adjustment Handwheel ANTI-CLOCKWISE to lower the Tightening Chuck onto the container closure.

When the friction liner of the Tightening Chuck just makes contact with the closure, turn the Handwheel two (2) more full turns anti-clockwise. Tighten the Lock Ring.

When the machine is subsequently operating in automatic cycle, the tension spring connected to the Tightening Chuck air cylinder piston rod will be compressed by the amount representing the 2 additional handwheel turns above (approximately 5mm). As the piston rod always fully extends to move the Tightening chuck down in normal operation, the 5mm spring compression represents the down-force of the Tightening Chuck on the closure (and container). This down-force may need to be adjusted further when test running the machine to ensure adequate friction between Chuck Friction Liner and the closure. Excessive down-force may tend to deform some thin-walled plastic containers. For special applications, different spring ratings are available from the factory.

3.1.7 Slide the container Clamping Jaws toward the container. With the Clamping jaws in firm contact with the container, ensure that their operating piston rods are FULLY EXTENDED from their air cylinders then tighten the ratchet handles.

After running, you may require more grip to stop the container rotating while the cap is being tightened. Loosen the ratchet handle and move the Clamping Jaw assemblies closer to the container by 1mm to 2mm. Retighten the ratchet handle.

3.1.8 Place a second container on the conveyor on the downstream side of the one under the Tightening Chuck. This container should be touching the container under the chuck.

3.1.9 Adjust the CONTAINER GATING CYLINDER mounted on the conveyor guide rails so that its extended piston rod is just touching the leading (furthest downstream) edge of this second container. Tighten the adjusting clamp.

3.1.10 Place 2 or 3 containers (depending on the length of the container) on the infeed side of the one under the Tightening Chuck and position the pneumatic sensor as in Item 2.2.2.

3.1.11 Reinstate the main air supply to the Cap Tightening Machine and test in accordance with Items 2.2.5, 2.2.6, and 2.2.7 in Section 2 "SET-UP PROCEDURE".

3.2 NOTES ON RUNNING ADJUSTMENTS

3.2.1 The torque applied to the closure is adjusted by the AIR PRESSURE REGULATOR on the front panel of the control box.

This Air Pressure Regulator controls the air pressure delivered to the Tightening Chuck Air Motor. When the closure has stopped turning (fully tightened) both the closure AND THE TIGHTENING CHUCK SHOULD BE STATIONARY.

At this moment, the Tightening Chuck Air Motor is exerting the torque value represented by the air pressure reading then showing on the air pressure gauge next to the regulator. A pressure setting of around 2.0kPa is usually adequate but may be adjusted to obtain more or less torque on the closure.

3.2.2 If the Tightening Chuck slips against the closure when the closure tightens:

3.2.2.1 The torque (pressure) setting for the Tightening Chuck may be too high. Check a tightened closure for correct tightness. If closure is too tight, reduce air pressure on the regulator by turning adjusting knob anti-clockwise. If too loose:

3.2.2.2 Increase down-force of Tightening Chuck on closure by unlocking and turning Height Adjustment Handwheel ANTI-CLOCKWISE (viewed from above) 2 turns at a time and re-test.

3.2.2.3 A different type of Chuck Friction Liner may be required. Various types of liner compound are available from RENTAFILL to suit particular closure designs. These include soft rubber, hard rubber, and polyurethane.

3.2.2.4 It should be noted that not only will the Chuck slipping against the closure give inadequate or inconsistent tightening, but it will cause excessive wear of the Chuck Friction Liner.

3.3 SPEED OF CONTAINER CLAMPING JAWS AND TIGHTENING CHUCK

The closing and opening speed of the Container Clamping Jaws, and the descent and ascent speed of the Tightening Chuck are independently adjustable via the flow control valves fitted to these devices, as follows:

3.3.1 CONTAINER CLAMPING JAWS

CLOSING SPEED
To increase - open flow control valve (turn anti-clockwise) located on the rear of the control box - left hand control.

To decrease - close flow control valve above (turn clockwise).

OPENING SPEED
To increase - open flow control valve (turn anti-clockwise) located on the rear of the control box - right hand control.

To decrease - close flow control valve above (turn clockwise).

3.3.2 TIGHTENING CHUCK

DESCENT SPEED

To increase - open flow control valve (turn anti-clockwise) connected to the Tightening Chuck Air Cylinder **lower** port.

To decrease - close flow control valve above (turn clockwise).

ASCENT SPEED
To increase - open flow control valve (turn anti-clockwise) connected to Tightening Chuck Air Cylinder **upper** port.

To decrease - close flow control valve above (turn clockwise).

3.4 LUBRICATOR

The lubricator is situated on the rear panel of the control box. This unit is designed to lubricate the air motor only, and should be adjusted via the small screw in the top of the housing to give one (1) drop of oil (viewed through clear plastic dome on top of lubricator) approximately every fifty (50) machine cycles.

Insufficient lubrication will cause premature wear of the air motor. Excessive lubrication will cause oil to be discharged through the air motor's exhaust silencer.

Lubricator oil bowl should be refilled as necessary with PNEUMATIC LUBRICATING OIL.

3.5 AIR LINE FILTER

The Air Line Filter is part of the Filter/Regulator located on the rear panel of the control box to remove dirt and moisture from the main air supply. The filter bowl is fitted with a drain valve at the bottom. Depressing this valve when there is air connected to the machine will readily drain accumulated water from the bowl. This should be done DAILY.

SECTION 4

OPERATING INSTRUCTIONS

for

PUMPTITE CAPPING UNIT

If RC-1 Cap Tightener has been supplied with Pumptite Unit attached, proceed to paragraph 4.1.5.

4.1 SET-UP PROCEDURE

4.1.1 Disconnect the air line fitting (elbow) from the Tightening Chuck Air Motor and remove the two (2) button head screws securing the motor to the bar.

4.1.2 Position the Pumptite Unit beneath the bar and secure the unit with two (2) M6 SHCS supplied.

* Note: Air motor to be facing the infeed side of the capper.

4.1.3 Re-connect air line to air motor.

4.1.4 Connect the black and blue air lines from the Pumptite Unit to their corresponding fittings on the rear of the control box.

4.1.5 Screw flow controls for Tightening Chuck Air Cylinder fully in. Back off top flow control two (2) turns and lock controls.

4.1.6 Connect main air and open hand valve.

4.1.7 With the Height Adjustment Handwheel, raise Pumptite Unit high enough to allow capped container to be positioned centrally beneath tightening wheels.

* Note: Ensure cap is fully tightened.

4.1.8 Lower Pumptite Unit until the centre line of the tightening wheels is level with the centre line of the cap (vertically).

4.1.9 Raise the capper lock on the left hand linear shaft until it comes in contact with the lower face of the linear bearing housing. Tighten the hand lever.

4.1.10 Turn off the air.

4.1.11 With the container centred between all four tightening wheels, press the yellow button (situated on the front panel of the control box). Keep the button depressed ensuring container is gripped by all four wheels and is centralised with its base square on the conveyor slat. Release the button.

4.1.12 Set guide rails, gate and jaws as per RC1 Automatic Cap Tightening Machine

Operating Instructions.

4.1.13 Turn on air and remove container. Unscrew cap until it is held by approximately half a turn. Position container beneath Pumptite Unit.

4.1.14 Raise Pumptite Unit with the Height Adjustment Handwheel until the centre line of the tightening wheels is level with the centre line of the loosened cap (vertically). Tighten the lockring.

Refer to Section 2 and Section 3 of the Operating Instructions for the Cap Tightening Machine and the Twin Timer set-up and adjustments.

4.2 **PUMP HEAD PRE-ALIGNMENT** - Refer to layout drawings at the end of this section.

4.2.1 Position the 2 guide rail blocks and rod assemblies approximately 230mm from centre of capper (infeed side) on the guide rails on each side of the conveyor.

4.2.2 Fit an aluminium block over each of the vertical rods. Fit the short end of the guide rod into the top block with the long side horizontal and its end positioned approximately 10mm from the black polyethylene Pump Alignment Jaw.

4.2.3 With the container positioned on the conveyor and the pump/trigger loose, raise or lower the guide blocks so that the guide is the same height as the pump/trigger. Position the guide to allow the pump/trigger to enter the centre of the Pumptite Unit.

4.2.4 Turn the pump/trigger at right angles to the conveyor and adjust the angle of the guides so that the short side of the pump/trigger (**tail**) clears the guide by approximately 10mm.

4.2.5 When the operator places the pump/trigger on the container and starts the thread, the pump/trigger must be within a 270 deg. arc with the **head** facing away from the Pumptite Unit.

4.3 **MAINTENANCE AND ADJUSTMENTS**

4.3.1 Ensure that lubricator delivers approximately one drop of oil per fifty cycles.

4.3.2 No other components of the Pumptite Unit require lubrication as they are made from oil filled engineering plastics or Teflon coated bushes.

4.3.3 To remove tightening wheels, grip wheel by hand and turn clockwise when viewed from below.

4.3.4 Remove stainless steel washer and push tightening wheel off drive spigot.

Note: Tightening spindles are left hand thread.

Note: Do not use tools to loosen wheels. If they appear tight, twist quickly by

hand to release thread.

4.3.4 Tightening wheels and pump alignment jaws self adjust. Pump alignment jaws can be used in two positions depending on height of pump head above cap. Unit is supplied with alignment jaws in their lowest position (best to suited to pump dispensers). To adjust to trigger pumps: remove tightening wheels, loosen M6 SHCS holding alignment jaws to unit. Undo two turns at a time until jaws are removed. Remove the four hexagonal spacers leaving four spacers attached to underside of gearboxes. Refit alignment jaws and tightening wheels. If alignment of pump head to container is not important, alignment jaws can be removed altogether.