ErmaFlex #4

Cam capper

Jar or bottle screwing system with mechanical synchronisation and pick and place system

CAP CIP - Bac Pro PLP - MSPC
BTS MS - IUT
Universities - Engineering schools

Capper in the blink of an eye

➢ **Highlights & Key Activities**
✓ Mechanical adjustments during campaign changes
✓ Study of the transformation of movements

➢ **Specific components**
✓ Cam drive and synchronisation system
✓ Pneumatically clamped screwdriver head
✓ Pick-and-Place device for placing the plugs
✓ Control cabinet with Siemens S7-1200 PLC and Siemens KTP700 dialogue terminal
✓ IO-Link master and intelligent sensors.
✓ 1 variable speed drive on screwing head, 1 variable speed drive on conveyor and 1 variable speed drive on cam drive motor
✓ Can be extended downstream of the system with a labeller, weight control and supervision
➢ This system is accompanied by a technical and educational file

References

✓ **BO50**: Corking machine
✓ **BO51**: Option: Accessories for the maintenance of the Ermaflex cam capper
✓ **UC41**: Siemens Remote Desk Option on iPad (Included)
✓ **UC90**: Option: Fault box for electrical cabinet, remotely configurable on a tablet (Not supplied)
✓ **UC51**: Option: Visual Instructions & Monitoring of Production Indicators on the Tulip open application environment and touch pad, for one machine
✓ **UC52**: Option Visual instructions on Tulip open application environment and touch pad, for one machine
✓ **UC13**: Industrial supervision for a machine
✓ **MB10**: Mechanical module Cam capper (subsystem)

Functional description

The capper is integrated into the ERMAFLEX production line which manufactures, packages and palletises cosmetic products. This capping station ensures the distribution of the corks (or lids), their positioning and screwing onto the bottles (or pots).

Vial Transfer Subassembly

✓ It transfers the bottles from the conveyor of the dosing unit to the capping unit and then to the grouping and packing unit
✓ It consists mainly of:
- 1 pallet chain conveyor located at the exit of the conveyor of the capping unit
- 1 three-phase asynchronous electric motor to drive the blades
- 1 bottle stop and locking device with 4 cylinders
- 1 photoelectric bottle presence detector at the inlet of the capping unit (IO-Link)
- 1 photoelectric bottle presence detector at the cap dispensing station (IO-Link)
- 1 photoelectric bottle presence detector at the screwing station (IO-Link)
- 1 photoelectric detector at the output of the screwing station to detect any jamming

Bottle capping sub-assembly

✓It allows to position a stopper on the mouth of the bottles and to ensure the screwing
✓It is mainly made up of:
- A capping machine powered by a main motor
- A variable torque screwing head driven in rotation by a first motor and in vertical translation by a second motor and a cam system
- A cylinder for opening the screwing clamp
- A rotary cork removal device associated with a jack and a venturi vacuum generator (device driven in rotation by a motor and a cam system)
- A sensor for the upper position of the cap removal device
- A motorised cap conveyor
- A mini-cylinder to block the caps and allow their separation
- A photoelectric detector for the presence of caps on the conveyor

✓A cam transmission assembly ensures the synchronisation between the different components of this sub-assembly

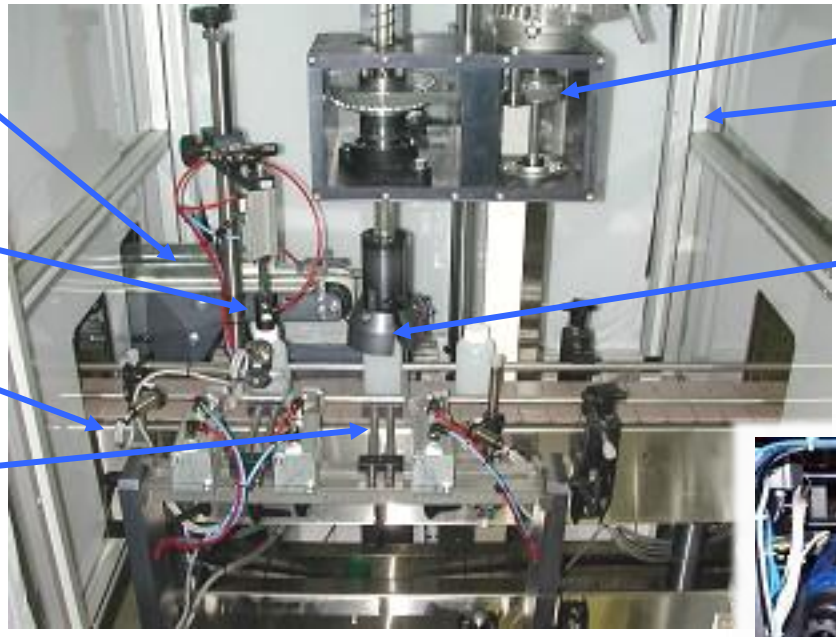
Control cabinet

✓ It is mainly made up of:
- Three circuit breakers
- A Preventa safety relay to manage the emergency stop
- A set of fuse holders
- A power supply to supply all the low voltage circuits
- Contactors and relays controlling the various electrical actuators
- Four variable speed drives to control the speed of the product conveyor, the labeller's counter-roller (optional), the cam and the screwing head
- A programmable logic controller
- Terminal blocks

Operator console

✓ It includes all the dialogue components that enable the capping and labelling part of the system to be conducted
✓The Supervision switch is mounted if the supervision option has been ordered

Functional Architecture (continued)



Cam drive and synchronisation system

Pedagogical approach

Educational activities

- ✓ Functional analysis
- ✓ Study of technologies: electrical, pneumatic and mechanical
- ✓ Programming
- ✓ Steering
- ✓ Settings
- ✓ Production
- ✓ Maintenance
- ✓ Assembly/disassembly
- ✓ Study of the transformation of movements
- ✓ Change of campaign
- ✓ Supervision

Features

- ✓ L/ W/ H: 1000 x 600 x 2000 mm
- ✓ Electrical energy: 400V three-phase + neutral
- ✓ Pneumatic energy: 7 bar
- ✓ Consumables: Machine supplied with ø 60mm and h 60mm jars and ø 50mm and h 100mm vials

Examples of practical work

TP1: Study of a cam system

Chronology:

- Presentation of the Corker
- Dual cam system identification
- Linkage analysis
- Kinematics of a cam transmission

TP2: Diagnosis and intervention of corrective mechanics (broken capper)

Chronology:

- Finding out about the failure
- Prepare your intervention
- Identify the failure
- Locate the faulty function
- Propose and prioritise hypotheses
- Expertise
- Triggering the repair
- Controlling the risks associated with the intervention
- Carry out the repair
- Putting back into service

TP 3: Insulation measurement on asynchronous motor three-phase

Chronology:

- Implement a preventive maintenance operation (motor insulation measurement)
- Drawing up a report
- Controlling risks during an intervention

TP 4: Electrical fault diagnosis on capper (Impossible to get out of emergency stop state)

✓ Objective: To implement a diagnostic operation:

✓ Chronology:

- Propose a methodology and implement it.
- Analyse the results and conclude
- Drawing up a report

✓ Controlling risks during an intervention

Related & complementary products

Sick TDCE Smart IoT Gateway Kits & Smart Sensors

www.erm.li/sk10

Smart IoT Sick TDCE & Smart Sensors Case (SK00)

The Smart IoT Sick TDCE & Smart Sensor Gateway Toolkit contains several industrial smart sensor application cases.

www.erm.li/sk00

IO-Link electrical and pneumatic measurement package (IO00)

Study and implementation of an energy measurement system, communicating and IOT compatible

www.erm.li/io00

IO-Link Ethernet Master Kit, Supervision & IO-Link Sensors (IO01)

Design and implementation of IO-Link master and IOT compatible sensors

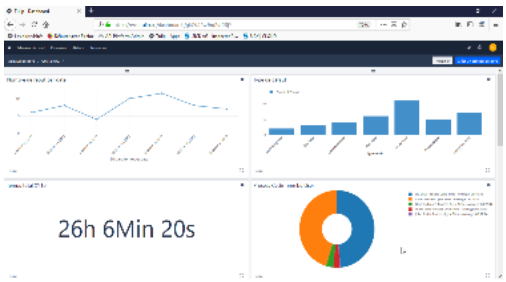
www.erm.li/io10

Visual instructions & Monitoring of production indicators (UC51-UC52)

Tulip is a web-based environment for creating applications on tablets and touch screens designed to digitalise workstations

- ✓ Visual 0-paper intervention procedures
- ✓ Supervision of machines by OPC-UA to retrieve production data
- ✓ Declarations of production stoppages and defects
- ✓ Suggestions for continuous improvement by operators
- ✓ 0-paper control thanks to connected tools (Scale...)
- ✓ Dashboards for monitoring production indicators (OEE, output, etc.)
- ✓ Easy to modify applications and create new ones (100% graphical)
- ✓ Implementation of lean manufacturing concepts (Andon, 5S...)

TULIP



www.erm.li/tul

Mechanical module Cam capper

Mechanical module for the study and maintenance of motion conversion solutions (cams, bearings, gears, pinions, springs, etc.)

- Module from the Ermaflex line capper (capper file supplied)
- **Instrumented system with rulers and protractors for kinematic studies**

www.erm.li/mb

Zoom on the cams

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