

PRODUCT CATALOG

**AICROV FILLING
MACHINE
ON PALLET MODEL : ROBOT FILLER**



ALL THE POWER OF A ROBOT AT THE FILLING SERVICE

Automatic machine for weight filling of containers from 20 to 1500 liters, placed on a pallet. Designed to operate with conveyors.

Main features:

- Automatic bunghole detection by artificial vision.
- Easy to use.
- High reliability and durability of the equipment.
- Multiformat.
- ATEX Certification (optional).
- Food grade (optional).



WHY A ROBOT?

1. **SERVICE:** Wherever your production is, there is a 24/7 service station nearby.
2. **EXPERIENCE:** With millions of units installed since its inception, the industrial robot is now a highly sophisticated and reliable product.
3. **PERSONALIZATION AND VERSATILITY:** Robots are easily adaptable to fill different container formats.
4. **GREEN TECHNOLOGY:** Current devices have a level of energy efficiency far superior to any dedicated machine on the market.



OPERATION

Steps for its implementation:

1. Enter filling recipe.
2. Place pallets with empty containers in the input conveyor.
3. Machine will uncap (optional), fill, cap (optional) and seal (optional) each container on the pallet.
4. Remove the pallets with full containers from the exit conveyors.



RF FILLING FUNCTION

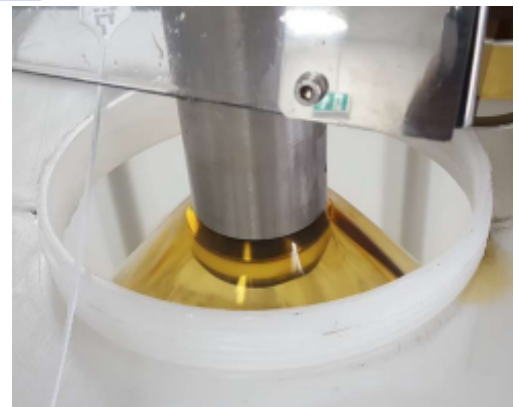
Filling is the main function of this type of equipment and, therefore, all AiCROV machines use the **AicrovFill®** filling function, developed and tested over 22 years.

The goal: to fill the containers with your product in the shortest possible time and with the highest precision.

The filling time & filling accuracy ratio is adjustable.

Each product / company is unique, so that each machine is configured according to customer's needs.

Filling is done at two speeds, gross filling for about 95% of the container and fine filling for the rest.



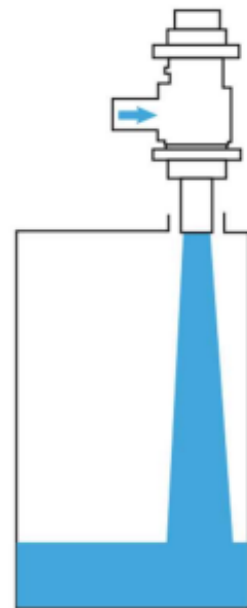
UNDER BUNGHOLE FILLING MODE

In AiCROV machines, filling assembly is the electromechanical assembly that allows the vertical displacement of the dispenser.

Movement is electric by means of a gear motor and a belt.

This type of under bunghole filling mode is suitable for filling products that are non-foaming, non-flammable, non-explosive, with high density or viscosity, etc.

The dispenser descends until it is slightly inserted into the container and fills from that position.



IMMERSION FILLING MODE

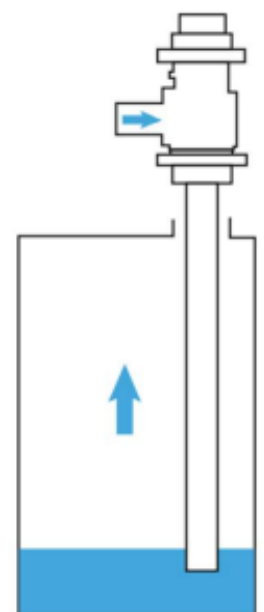
Suitable for filling foaming, flammable and explosive products.

With the immersion filling mode, 3 different types of operation can be used:

1. **Under bunghole:** The dispenser works as if the filling was done under the bunghole (see under bunghole mode). It can be used as under bunghole dispenser.
2. **From the bottom of the container:**
_The dispenser descends to its lowest position and perform all the filling from that position.

Suitable for extremely foamy products.

3. **Rising up with the product:** The dispenser raises as the container fills.





- **With position control:** In applications where the position between product outlet and product level in the container is critical, we can find the automatic position control. The distance between the dispenser is set in the recipe (positive: above the product; or negative: inside the product) and during filling the dispenser automatically adjusts to that position.
- **Without position control:** By pressing the filling button, the dispenser descends to the lower detector (adjustable) and opens. While filling, it rises at an adjustable speed (potentiometer on the control panel) to the safety detector, a position where the dispenser remains until the filling is complete.

FINE FILLING MODE

AiCROV machines have three different ways of fine-tuning the filling of the container (fine-tuning meaning the moments before the end of the filling, in which we must reduce the flow to be able to adjust the final weight to the objective).

1. Fine-tuning in machine: Dispenser can switch from gross low to fine when necessary. The fine flow level is mechanically adjustable.

2. Proportional fine-tuning: The substitution of an actuator for the opening of the 3-position dispenser (closed – gross – fine) by a proportional actuator, allows the link of the opening level during refining with the filling parameters. Its adjustment is done from the operation panel and not mechanically. Suitable when products of different viscosity



Shock control: When the operator presses “fill”, the dispenser descends until it is inserted into the container. If during the descent the scale detects an increase in weight (adjustable on the operation panel) the dispenser returns to its upper position and awaits the operator to press the button again.

Final weight and filling up: When the scale indicate that the nominal net weight value has been reached, the dispenser automatically closes. At this moment and for a period of time (adjustable on the operation panel), a filling quality control is carried out. In case the net weight value is below the nominal value, the dispenser will open again until the nominal value is reached. This operation can be repeated as many times as necessary.

Anti-drip: The machine has a draining function to facilitate the emptying operation of the line and the dispenser when finalizing a batch. In the operational panel, time and maximum weight allowed can be adjusted. When the operator presses " fill" with this function running, the dispenser lowers and opens for the established time or until the set weight is reached. (See FLUSHING accessory).

Filling flow monitoring: During filling, machine is calculating the flow value in kilograms per second and compares it with a theoretical flow value. If the during filling, flow value decreases approaching the value 0 for a while, the machine stops the filling with an alarm and notifies the operator.

Tare control: When pallet is inserted into the weighing conveyor (an action that is carried out automatically), the system compares the gross weight of the pallet with the theoretical weight. If the difference in weight is greater than the safety margin (adjustable on the operation panel), the machine warns the operator and waits for instructions. This function prevents overfilling in an incorrect container or with product inside.

Final weight control: When every container on the pallet have been filled, the machine performs a weight comparison to check that the final weight is within the expected tolerances. The machine compares the current gross weight of the pallet (with filled containers) with the result of the operation of multiplying the number of containers on the pallet by its nominal value and adding the initial tare. The real – theoretical difference must be les that the established filling tolerance.

WEIGHING SYSTEM

4000 kgs weighing platform:

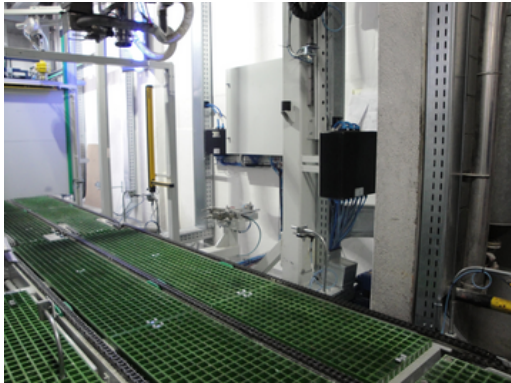
Conveyor with integrated scale. Easy to clean and maintain.

Weighing electronics:

- Top brand weighing electronic integrated in control system.

Homologations:

- CE-M
- EN45501
- OIML R-76
- OIML R-61 (MID)
- OIML R-51 (MID)



MATERIALS AND FINISHES

Materials and finishes of AiCROV’s machine are as following:

Materials:	Carbon steel
	Stainless Steel 304 (standard)
	Stainless Steel 316
Surface finishes:	Sandblasted (standard)
	Painted
	Epoxy painted



CONTROL SYSTEM

AiCROV control systems are the following:

CONTROLLERS:	SIEMENS S7-1200 (STANDARD)
	SIEMENS S7-1500
	AB COMPACT LOGIX
HMI:	SIEMENS TÁCTIL 4" COLOR (STANDARD)
	SIEMENS TÁCTIL 9" COLOR
	AB PANEL VIEW 7" COLOR



INERTIZATION WITH NITROGEN

Many products need to be filled in oxygen-free atmospheres, either to prevent oxidation of the product or to prevent possible ignition in explosive or flammable. For these cases, AiCROV has an optional inerting system that allows nitrogen or any other gas to be dosed before, during and at the end of the filling



Through a dedicated valve, the piping assembly channels the gas to the dispenser and a special double jacket dispenser. Gas flows from the customer connection to the inside of the containers.

Timing of gas flowing can be selected at the HMI.

ZONE CLASSIFICATION

No certification	Machine will not be installed in a classified area nor will it be used to fill explosive or flammable liquid products
Machine with classification ATEX II 3G T4	Machine will be installed in an area classified as 3G or 3GD but will not be used to fill explosive or flammable liquid products
Machine with classification ATEX II 2G T4	Machine will be installed in an area classified as 2G or 2GD and can be used to fill explosive or flammable liquid products



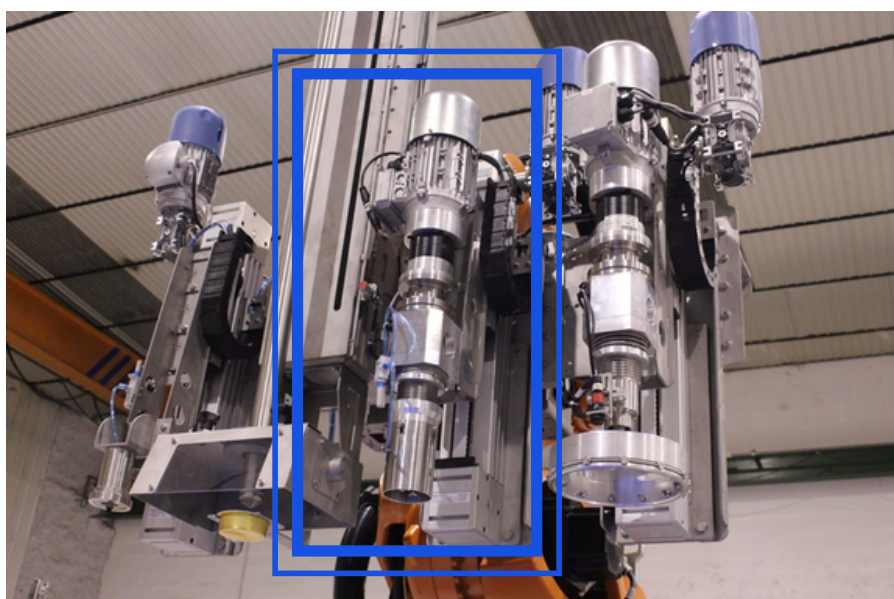
CAPPING/UNCAPPING STATION

Machine can be equipped with an automatic drum capping and uncapping head.

The uncapping and capping movement is carried out with an electric actuator.

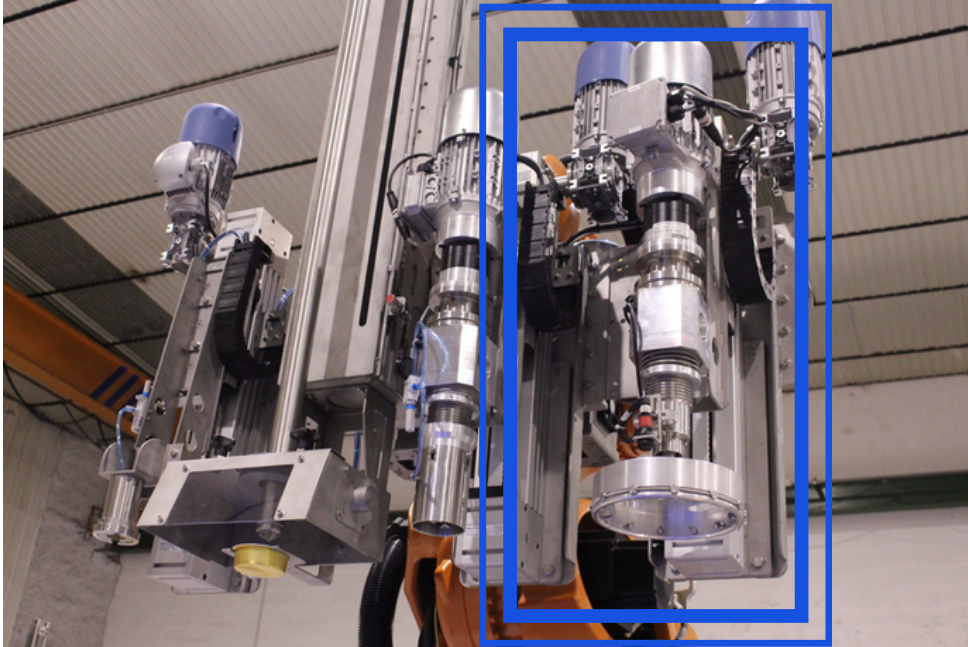
An uncapping and capping program monitors the bung hole during the process.

The cap is held in the bung hole by a vacuum system.



IBC CAPPING/ UNCAPPING STATION

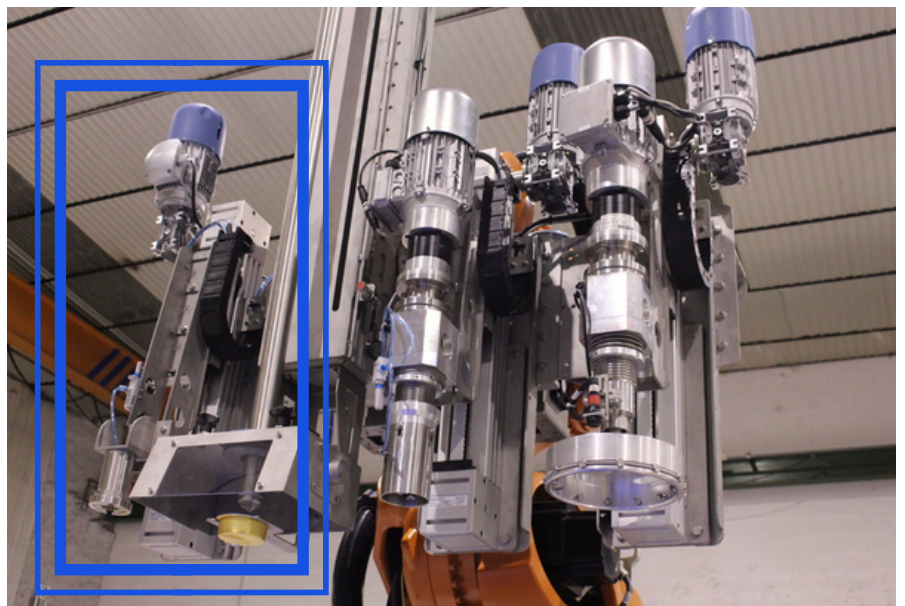
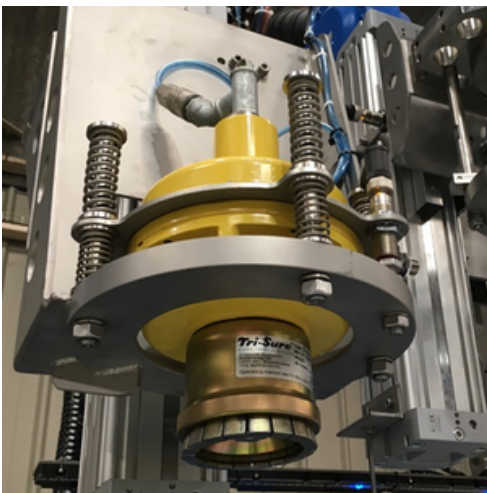
Machine can be equipped with an automatic IBC uncapping and capping head. The capping and uncapping movement is carried out with an electrical actuator. An uncapping and capping program monitors the torque during the process. The cap is held in the head by a vacuum system.



SEALING STATION

Machine can be equipped with an automatic drum sealing head.

There are two versions:
-Metal seal. Tri-sure compatible.
-Plastic seal (pressure).



SEAL DOSING STATION

To be able to seal, we must feed the machine with seals, whether metallic or plastic. For this, a feeding carousel have been designed, which the operator must feed when the seals amount finish.



TECHNICAL FEATURES

Nominal Production (products similar to water):

60 / 45 /30 drums of 200 liters per hour (product similar to water). Only filling / capping / uncapping / sealing.

15 / 12 IBC of 1.000 liters per hour. Only filling / capping / uncapping / sealing.

Weight: 1.000 – 1.100 kgs.

Scale resolution:

- 3.000 divisions: +/- 250 grams.

- 6.000 divisions: +/- 125 grams.

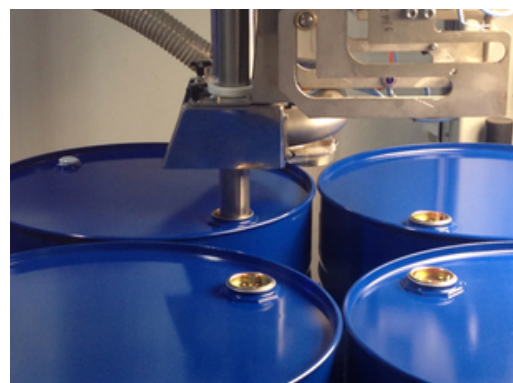
- 10.000 divisions: +/- 75 grams.

Filling accuracy: Greater than 75 grams.

Adjustable according to precision needs and filling rate.

Power supply: 3 x 380 VAC + N + T

Pneumatics supply: 6 bars.



NOZZLES (1)



External opening dispenser



Internal opening dispenser



Special dispenser for the filling of open mouth containers. 3" nominal diameter.

Static closure for the filling of solidifiable or crystallizable products (optional).

Dispenser with double jacket for the contribution of nitrogen (optional)

More than 80 different combinations available depending on the product and container

NOZZLES (2)



- Materials:**
- AISI 316L stainless steel (standard).
 - Hastelloy.
 - Titanium.
 - PVC.
 - Teflon.

- Temperatures:**
- Up to 80° C (standard).
 - Up to 210° C (optional).

- Input diameters:**
- 1"
 - 1'5"
 - 2'5"
 - 3"

Lance diameters: from 15 mm to 80 mm.

Lance length: from 250 mm to 1300 mm.

- Product connections:**
- Male camlock (standard)
 - DIN flange (optional)



NOZZLES CHANGE

AiCROV machines dispensers are interchangeable easily, quickly, safely and without tools.

The operator doesn't need to manipulate any electrical or pneumatic connection to perform a change of dispenser



ACCESSORIES

- | | |
|----------------------------------|----------------------------------|
| Gas hood extractor. | Filling recipes. |
| Drip collection cup. | Nozzle support rack. |
| Anti-drip system. | Nozzle number control. |
| Filling records management. | Overfill detection. |
| Electrostatic discharge control. | Uncapping station |
| Product hose holding arm. | Caping and sealing station |
| Cleaning system CIP. | Integrated extractor in machine. |
| Draining set. | Accessory for filling bags. |
| Proportional filling. | Security fence. |
| Product pump control. | Cabin. |
| Connection with site. | |

GAS HOOD

Passive hood located between the nozzle and the bunghole of the container to be filled.

It has a D40 connection to be connected to the extractor (optional).

Made of polished stainless steel.

Includes pointer to facilitate the work of the operator.



The gas hood supports and includes a product scraper and an anti-drip set (optional, several options).

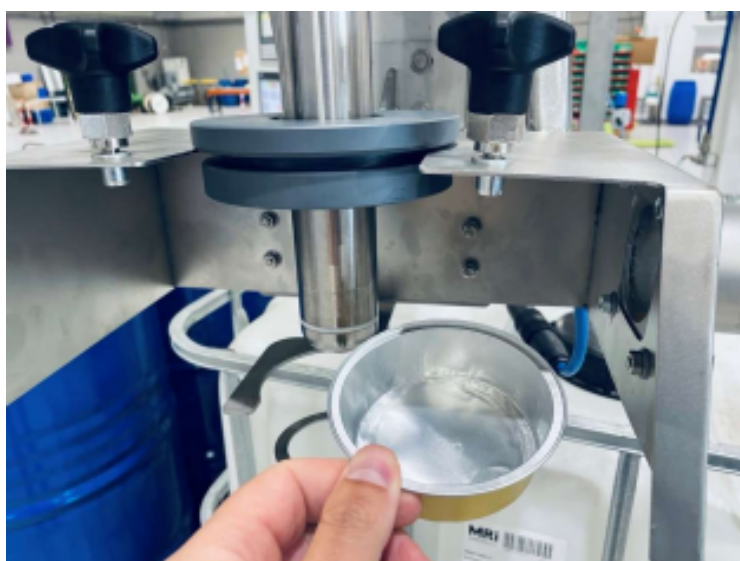
Easily removable front panel without the need for tools, including a transparent polycarbonate peephole

DRIP COLLECTION CUP

Pneumatically actuated, a disposable aluminum cup is placed under the nozzle while in rest position.

When the nozzle goes down, a pneumatic actuator previously moves the cup to a safety position.

The cup can be removed and emptied by the operator without the need of tools



The standard cup supplied is a disposable aluminum cap, but optionally and on request, we can manufacture cups in different materials such as AISI 304, stainless Steel, PVC, or others.

Recommended for pasty, crystallizable or solidifiable products.

Suitable for food products.

ANTI-DRIP SYSTEM

Actuated by the nozzle, a spoon collects the drained product from the nozzle and returns it to the container in the next movement of the nozzle.

With this system, is not necessary to change the drip collecting cup, the rest of the product is recovered in the next filled container.

The spoon is made of 304 stainless Steel, but optionally and on request, we can manufacture it in different materials such as PVC or others.

Recommended for non-pasty, non-crystallizable or solidifiable products. Not suitable for food products.



FILLING RECORDS MANAGEMENT

HMI or operation panel generates a *.csv type data file on an SD memory card placed on the back of the HMI itself. This file can be opened with any word processing program such as Microsoft Excel.



The systems save a line for each filled container. By default, the information is stored as: Date - Time - Container tare (Kg.) - Net dosed (Kg.).

Date	Time	Tare (kg)	Net (kg)
10/10/10	09:50:05	17,5	200,2
10/10/10	09:51:10	17,2	200,1
10/10/10	09:52:00	17,4	200,2
10/10/10	09:53:21	17,6	200,3

ELECTROSTATIC DISCHARGE CONTROL

Electrostatic discharge of metal containers before and during filling is a mandatory requirement for products considered explosive or flammable, or when filling is done in ATEX classified environments.



Operator must place a clamp on each container to be filled. The clamp is connected to an electronic system that monitors that the container is grounded, giving the permission to proceed with the filling. The filling valve closes automatically if the system loses the filling permissive.

As functional safety, the system checks that the operator removes and reconnects the clamp after each filling.

AUTOMATIC CONTROL OF ELECTROSTATIC CHARGE

Electrostatic discharge of metal containers before and during filling is a mandatory requirement for products considered explosive or flammable, or when filling is done in ATEX classified environments

A set of spikes connected to the ground and to the discharge verification system scratches a small part of the Paint of the container to cause the electrical connection of the container. This set operates automatically.

The fill valve closes automatically if the system loses the fill permission.



PRODUCT HOSE HOLDING ARM

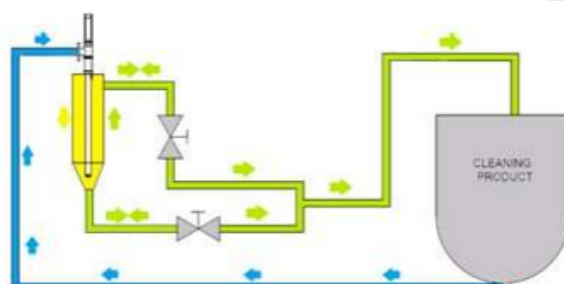
Depending on the position of the product connection to the product hose and its length (Please note that product hose is not supplied with the equipment), it will be necessary to support the weight externally, so that the nozzle doesn't have to support the weight of the hose with the product, limiting the useful life of the equipment.



CLEANING SYSTEM C.I.P

CIP system is a mechanical assembly that allows the draining and subsequent internal and external cleaning of the nozzle.

The system works with pressure, which is capable of recirculate the cleaning product.



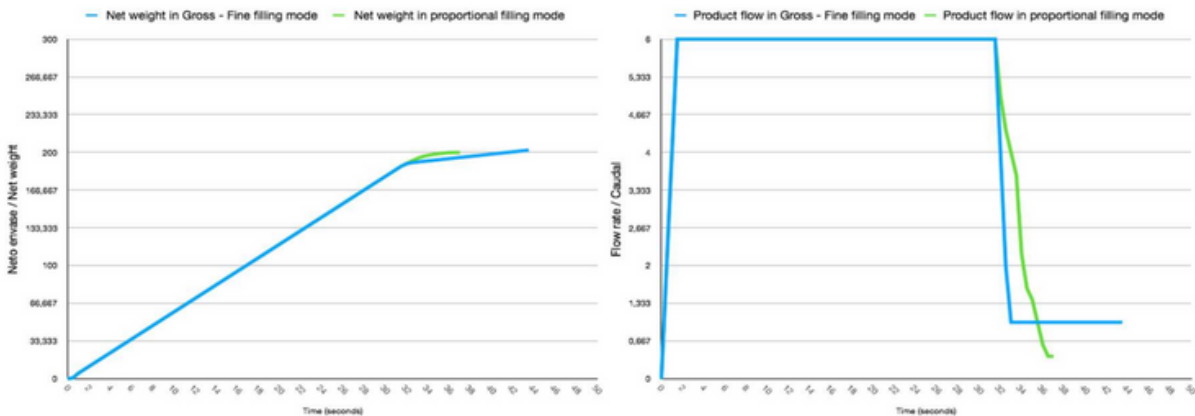
DRAINING SET

Draining set consists in a funnel on which the nozzle is placed. By means of a wringing program, it descends to a known position and opens.

The program ends when the established time for draining has expired.



PROPORTIONAL FILLING



Proportional filling is used to increase the speed of the filling, decreasing the final refining time and increasing the productivity of the machine.

It can be done directly in the nozzle (a recirculation system or reduction of the product flow rate connected to the machine is recommended) or using other external methods such as product pump control, proportional valves, recirculation control, etc.

The objective is to control the product flow in real time according to filling level and speed.

PRODUCT PUMP CONTROL

A control panel for the product pump is included in the equipment supply. This panel includes magneto-thermal protection and a frequency variator to regulate the speed of the pump. Speed adjustment is made directly on the machine's operating panel.



This accessory can be used in two different ways:

- To turn on or turn off the pump and to switch from gross to fine flow. In this way, overpressures in the dispenser and the piping system are avoided.
- To regulate the flow, together with the “Proportional filling” accessory. In this case, the pump should not be more than 30 linear meters from the machine in order to be effective.

CONNECTION WITH SITE

Different options are available for connecting the machine with site:

Option 0: Standard.

Standard on all machines. 3 x potential-free output signals: machine running, alarm, gross filling, fine filling.

Option 1: 4In / 4Out.

4 x potential-free input signals: filling permissive, valves open, free, free. 4 x potential-free output signals: machine running, alarm, gross filling, fine filling.

Option 2: Simple industrial communication.

4 x input signals: filling permissive, paths open, free, free. 4 x output signals: machine running, alarm, gross filling, fine filling. With the “Proportional filling” accessory, the required flow signal is included in kgs per second.

Option 3: Complex industrial communication.

Same as above but with filling parameters communication (nominal value, fine tuning value).

Option 4: Customized.

During the project definition phase, communication variables are agreed.

FILLING RECIPES

EL2-E filling machine operation is very simple.

1. Working or stopped,
2. Automatic or Manual,
3. Nominal value to fill,
4. Tuning value,
5. Various values depending on options.

Using the recipe system allows to save in the HMI terminal hundreds of predetermined recipes, so that the operator only has to select the correct one according to the product or container or according to the work order to be carried out.

Recipes can be named with the code that customer prefers batch number, product, family, SAP...

The screenshot shows the AICROV SMART FILLING HMI interface. At the top, there are buttons for 'PARO' (Stop) and 'MANUAL', along with 'CONFIRMACION RECETA', 'Alarmas', and 'Mensajes'. Below this, there is a 'Nombre de registro:' field with a dropdown menu showing 'TEST' and a 'N.º:' field with a dropdown menu showing '1'. The main area is a table with 'Nombre de entrada' and 'Valor' columns. The table contains the following data:

Nombre de entrada	Valor
Valor nominal	200,0
Tolerancia Llenado	1,0
Valor de Afinado final	5,0
Modo de Llenado	Subiendo con ...
Tara Bidon	60,0
Tiempo Subiendo	2500
Peso Subida Caña	25,0

At the bottom of the screen, there are icons for file operations (copy, save, delete, print) and a 'Registro leído' status indicator.

NOZZLE SUPPORT RACK



Different nozzle Support racks are available:

- Support for 2, 4, 6, 8 o 10 nozzles.
- Support for 2, 4, 6, 8 o 10 nozzles and a cleaning station.
- Support for 2, 4, 6, 8 o 10 nozzles with a dedicated cleaning station per nozzle.

NOZZLE NUMBER CONTROL

Do you have different nozzles? Do you have different product families to be used on the same machine? The chance of error should be minimized to the maximum.

For this, we have a nozzle coding system. The system confirms that the nozzle mounted in the machine is the one chosen in the active recipe.

If the number of the selected nozzle doesn't correspond to the one mounted, the machine doesn't allow filling.

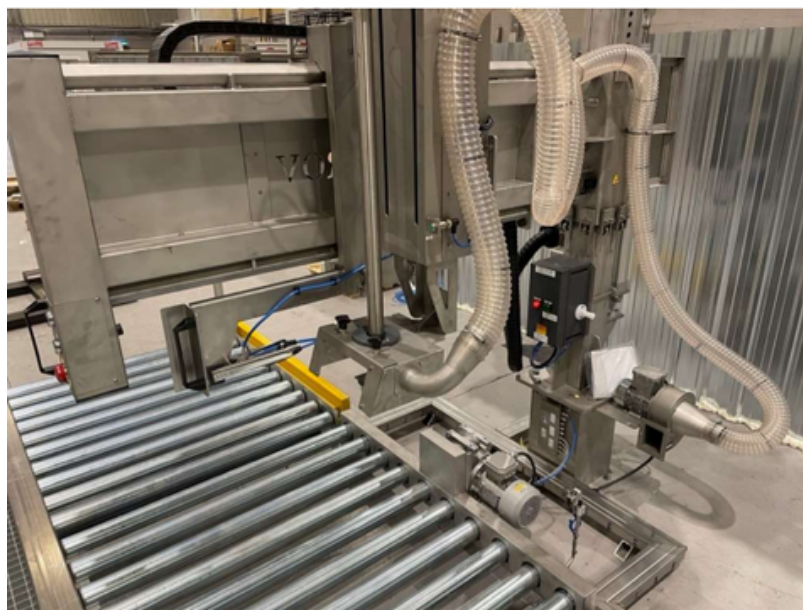


OVERFILLING DETECTION

An electro-pneumatic system placed in the nozzle detects if the level of the product inside the container is higher than the safety level.

The machine stops filling with an alarm and waits for instructions from the operator.

ACTIVE GAS EXTRACTOR



PROTECTION

Adapted to the available space, the security fence protects the operator from the automatic movement of the equipment.

CE



CABIN

When products to be filled are harmful or dangerous, it is recommended to fill them in a closed and controlled space.



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