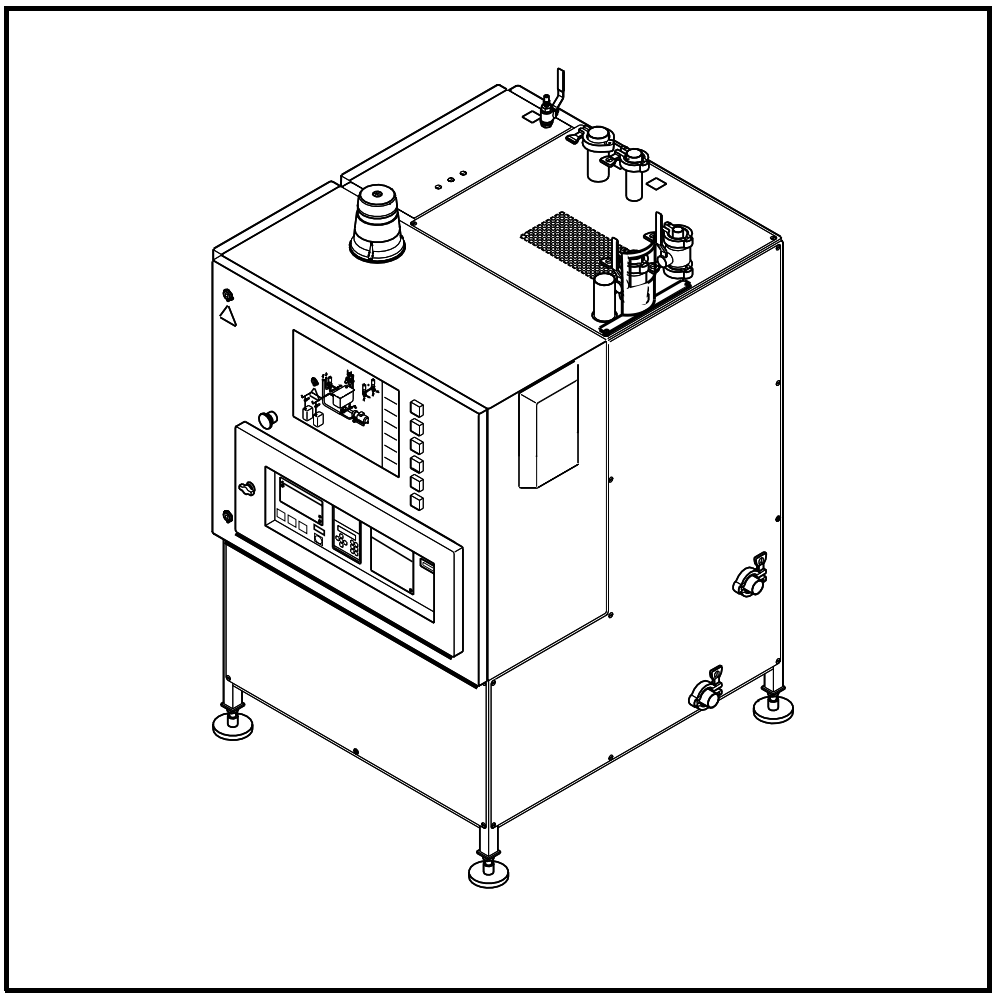
IM

Installation Manual

SCU/4



Tetra Pak

Doc No. IM-82446-0101

This document is valid for:

Series No/ Machine No Sign.

Separate Cleaning Unit 616054-020V

Valid for machine series No.:

22248

Equipment included:

927231-0100
Flowmeter

927232-0100
Recorder

927233-0100
Two-machine installation

1348485-0100
Three-machine installation

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Issue 9808

Doc No. IM-82446-0101

Tetra Pak

Tetra Brik Packaging Systems

Introduction

Safety precautions

1 Machine installation

Table of contents

Introduction

To ensure maximum safety, always read the section **Safety precautions** before doing any work on the equipment or making any adjustments.

Equipment information

Intended use

The purpose of this Tetra Pak equipment is to...

Manufacturer

This Tetra Pak equipment has been manufactured by:

Tetra Brik Packaging Systems AB
Ruben Rausings gata
221 86 LUND
Sweden

or by:

Tetra Brik Packaging Systems S.p.A.
Via Delfini 1
411 00 MODENA
Italy

Service

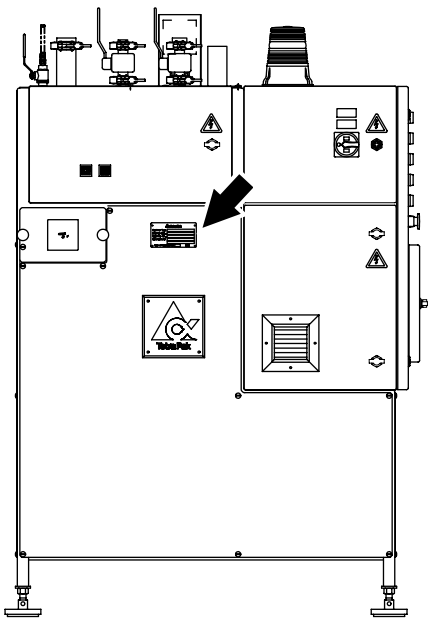
Contact the nearest Tetra Pak service station.

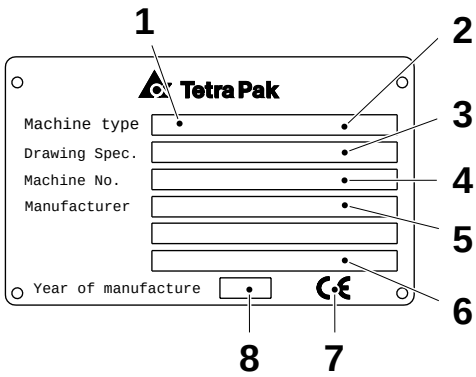
Identification

The figure shows an example of the equipment sign.The sign carries data needed when contacting Tetra Pak concerning this specific equipment.

CE marking

This equipment complies with the basic health and safety regulations of the European Economic Area (EEA).





1 Machine type
2 Volume
3 Drawing specifications
4 Machine serial number
5 Manufacturer
6 (Designed by)
7 CE mark
8 Year of manufacture

Document information

Purpose of Maintenance Manual (MM)

The purpose of this Maintenance Manual is to provide the service technicians with:

- all **scheduled maintenance** procedures listed in the checklists
- information for **unscheduled maintenance** such as:
  - additional maintenance procedures
  - functional descriptions
  - system descriptions

The same **structure**, **codes** and **denominations** used in this MM, are used in the Spare Part Catalogue (SPC) and in the checklists.

It is important to:

- keep the manual for the life of the equipment
- pass the manual on to any subsequent holder or user of the equipment.

Design modifications

The directives in this document are in accordance with the design and construction of the equipment at the time it was delivered from the Tetra Pak production plant.

Technical publications

- Electrical Manual (EM)
- Installation Manual (IM)
- Maintenance Manual (MM)
- Operation Manual (OM)
- Spare Parts Catalogue (SPC)

Additional copies can be ordered from the nearest Tetra Pak service station.

When ordering technical publications, always quote the **document number** that can be found in the machine specification document.

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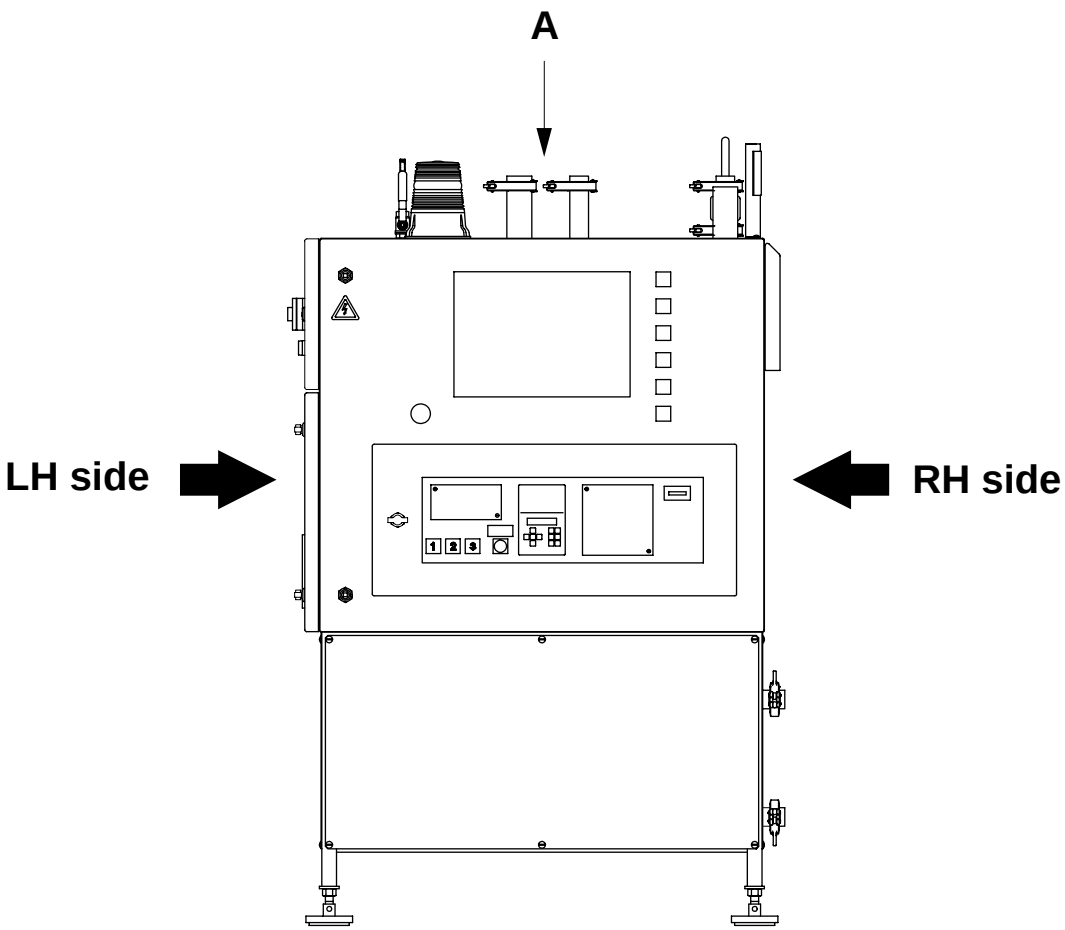
Number of pages

This document contains a total of *34* pages.

Abbreviation used in this manual

LH	Left hand (side)
max	maximum
min	minimum
RH	Right hand (side
SCU	Separate cleaning unit
SPC	Spare Parts Catalogue
TPMS	Tetra Pak Maintenance System

Machine orientation



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Safety precautions

To ensure maximum safety, always read this section carefully before doing any work on the equipment or making any adjustments.

Hazard information

General

Failure to observe information marked “DANGER!” **puts your life in danger**.

Failure to observe information marked “WARNING!” can result in **personal injury and/or serious damage to or destruction of equipment**.

Caution! Failure to observe information marked “Caution!” can result in **damage to equipment**.

Mandatory signs

 **Wear eye protection**	 **Wear hearing protection**
 **Wear head protection**	 **Wear protective gloves**
 **Disinfect hands/gloves**	

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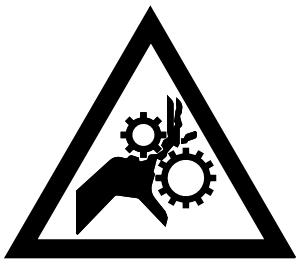
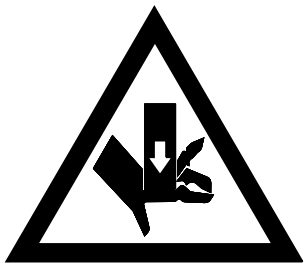
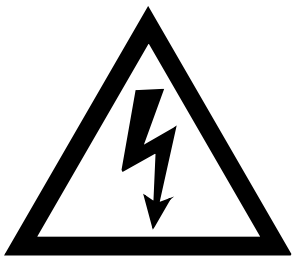
Warning signs

 **Risk of entanglement!**	 **Risk of corrosion and acid burn!**
 **Risk of crushing!**	 **Risk of cutting/amputation!**
 **Risk of burns!**	 **Risk of electrocution!**

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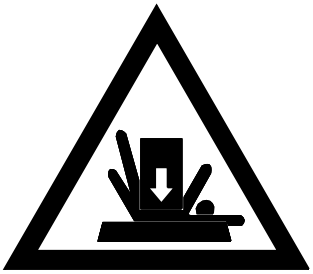
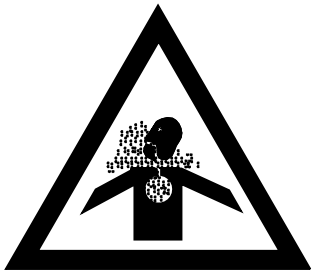
 **Risk of crushing!**	 **Risk of intoxication!**
 **Risk of falling!**	

Personnel

Only skilled or instructed persons are allowed to work on the equipment.

The manufacturer declines all responsibility for injury or damage if the instructions in this manual are not followed.

Personnel are responsible for:

- the equipment and the work area around the equipment
- all personnel in the vicinity of the equipment
- making sure that all safety devices are fully operational

Personnel must regard all electrical equipment as live. In general switch the equipment off at the mains power and padlock the switch before carrying out maintenance or repair work.

Electricians should be certified according to local regulations and have experience of similar types of installations, proven skills in reading and working from drawings and cable lists, and knowledge of local safety regulations regarding power and automation. Work with the electrical equipment must be performed only by skilled or instructed technicians.

According to EN 60204-1, 3.30 an instructed person is:

– *An individual adequately advised or supervised by a skilled person to enable that individual to avoid hazards which electricity can create (e.g. operating and maintenance staff).*

According to EN 60204-1, 3.55 a skilled person is:

– *An individual with technical knowledge or sufficient experience to enable that individual to avoid hazards which electricity can create.*

General safety precautions

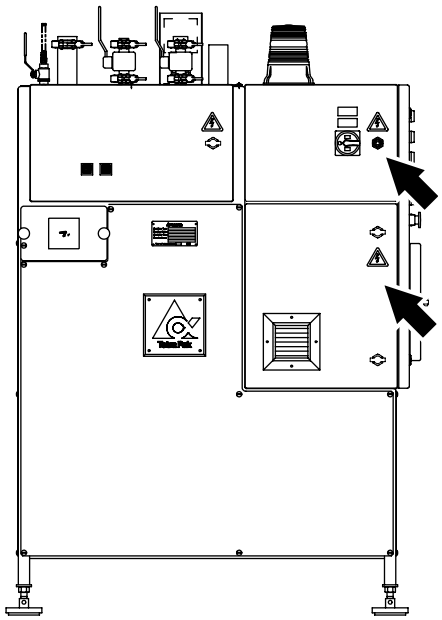
Wear hearing protection while the equipment is running.

Electrical cabinet

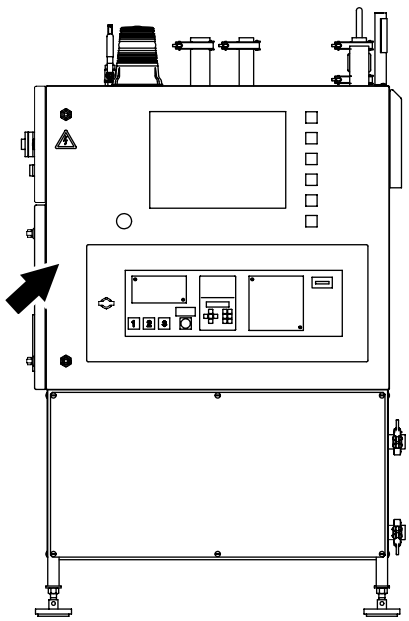
There is high voltage in the electrical cabinet (up to 400 V). In case of accident call for medical attention immediately.

Work inside the electrical cabinet must be performed by skilled or instructed persons only.

Electrical cabinet doors locked with screws may be opened only by skilled or instructed persons.



LH side



Front side

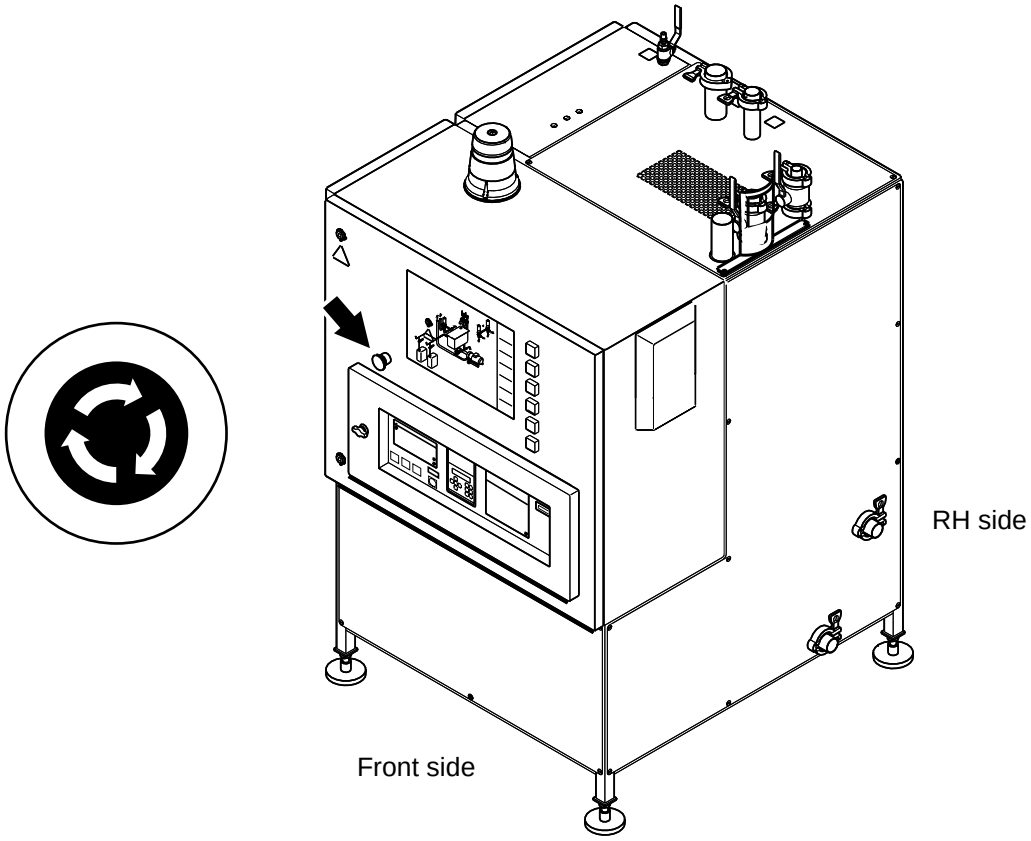
Machine safety devices

Emergency stop button

Learn the position of the **Emergency stop** button in order to stop the equipment immediately in case of danger to people or damage to the equipment.

The **Emergency stop** button does not switch off the power at the mains power switch.

Pushing the **Emergency stop** button will reset the equipment program to **Zero** position and deactivate all pneumatic cylinders.



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Doors, covers and guards

Make sure that all doors, covers and guards are in place and functioning.

Never remove covers or guards while the equipment is operating.

WARNING!

Some equipment parts protected by doors, covers and guards may be hot.

In case of accident, call for medical attention.

Chemical products

WARNING!

Risk of personal injury!
Certain chemical products are toxic and/or inflammable. Carefully follow the instructions on the container label.

Follow the supplier's instructions for handling and disposal of the chemical products.

Personal protective equipment

- **Safety goggles**, TP No. 779130-102
- **Apron**, TP No. 90303-5
- **Shoes** made of PVC, PE plastic or rubber
- **Protective gloves** made of neoprene, TP No. 90303-4

Before starting work with any chemical products, make sure that:

- the showers work
- a portable, TP No. 90303-6, or wall-mounted eyewash device is available at or near each machine site
- there are additional washing facilities

General emergency procedures

If you accidentally **swallow** chemical products, drink large amounts of lukewarm water.

If you get splashes or vapour from chemical products in your **eyes**, wash your eyes thoroughly with lukewarm water for 15 minutes (keeping eyelids wide apart).

If chemical products come into contact with **skin** or **clothes**:

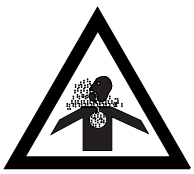
- rinse immediately with plenty of water
- if skin burns appear, call for medical attention immediately
- thoroughly wash clothes before wearing them again

If you experience irritation or pain due to having **inhaled** chemical products vapour:

- leave the affected area and get some fresh air
- if the symptoms get worse, call for medical attention

Caustic soda

Risk of personal injury!
Slow corrosive action. May be harmful if inhaled. Can cause shortness of breath. Caustic soda may cause irritation or damage if it comes in contact with skin and eyes.



Handling of caustic soda

- Never mix caustic soda with nitric acid!
- Make sure that the areas used for handling of caustic soda are well ventilated.
- If caustic soda is spilt on the floor, soak it up with sand, turf dust or other suitable absorbent. Dispose of the absorbent appropriately.
- Rinse the floor with water afterwards.

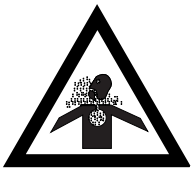
Caustic soda container

The container should be kept closed.

Nitric acid

WARNING!

Risk of personal injury!
Quick corrosive action. Very harmful if inhaled. The fumes of nitric acid can cause serious damage to the lungs. Nitric acid may cause burns if it comes into contact with skin and eyes.



WARNING!

Handling of nitric acid

- Never mix caustic soda with nitric acid!
- Before starting any work with nitric acid, make sure that respiratory equipment is on hand for emergency situations.
- Make sure that the areas used for handling of nitric acid are well ventilated.
- If nitric acid is spilt on the floor, soak it up with sand, turf dust or other suitable absorbent. Dispose of the absorbent appropriately.
- Rinse the floor with water afterwards.

WARNING!

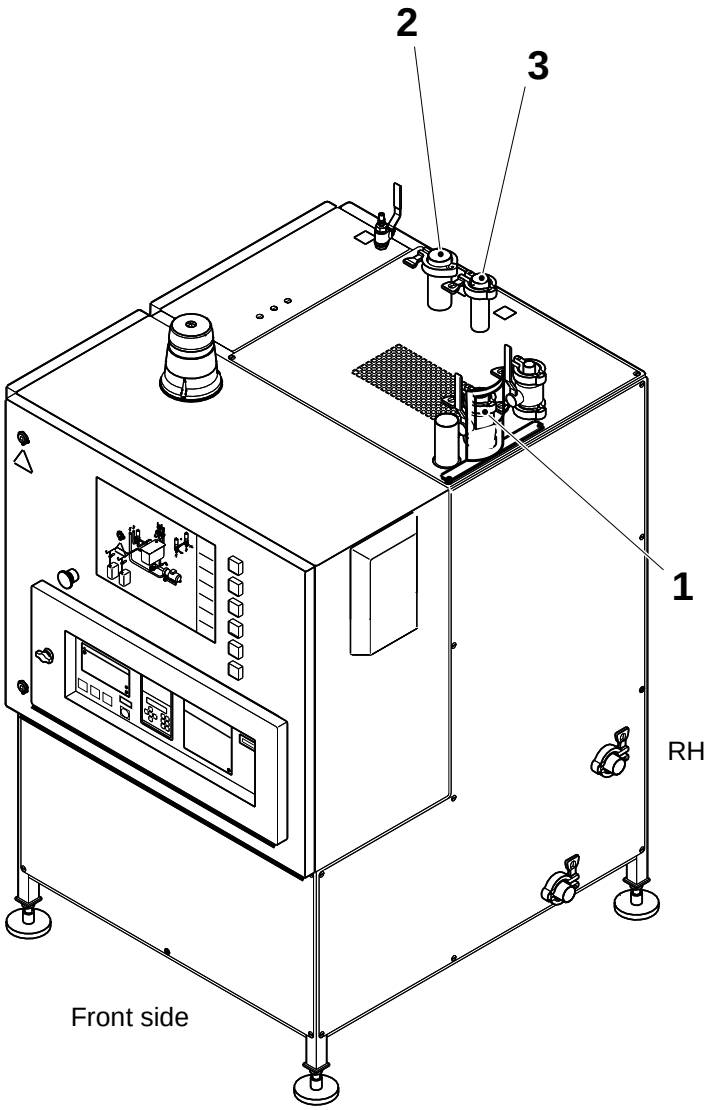
Nitric acid container

- The container should be kept closed.
- To prevent damage to the lungs, it is advisable to put on a gas mask with an filter suitable for fumes produced by nitric acid before opening the container.
- When moving the container ensure that the valves are closed and that the protection nuts and safety caps are securely fastened.
- Follow the supplier’s instructions and the local regulations for disposing of the empty containers.

Hot parts

WARNING!

Risk of personal injury!
The steam connection (1), the outlet solution connection (2) and the inlet solution connection (3) reach temperatures above 60° C. Use a pair of protective gloves to prevent burns.



1 Steam connection
2 Outlet solution connection
3 Inlet solution connection

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Equipment for lifting and moving loads

WARNING!

Make sure that the capacity of the lifting equipment is adequate and that the equipment itself is in good working order.

If lifting tackle has to be joined to make up the necessary lengths, make sure that the joins are secure and have the same lifting capacity as the rest of the tackle.

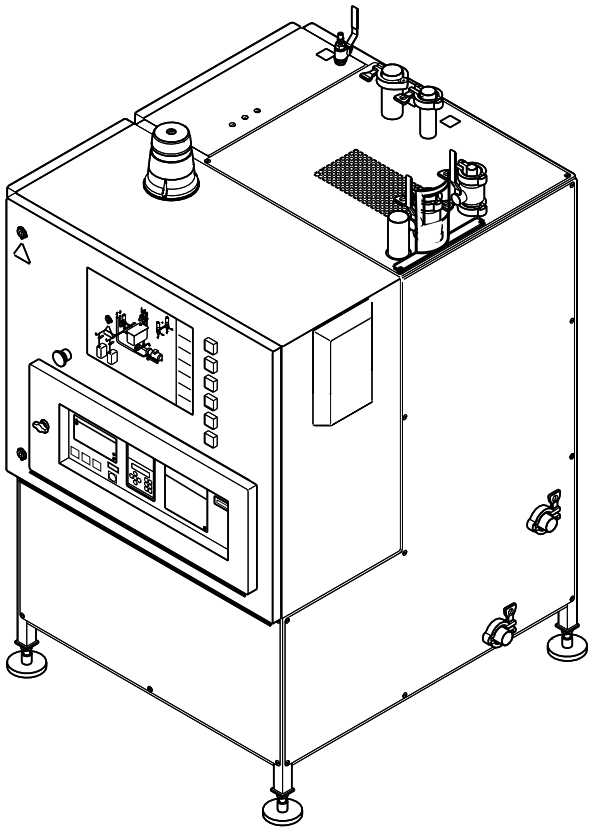
Always engage the safety clip on lifting hooks to prevent the tackle from lslipping off.

Use ropes or poles to steady and manoeuvre loads. Do **not** use hands or feet.

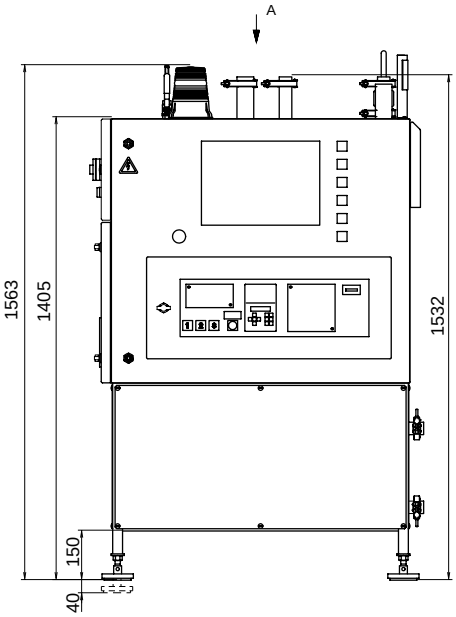
Make sure that the route and the destination are free from obstacles before moving a suspended load. It must be possible to lower the load to the floor quickly and safely in an emergency.

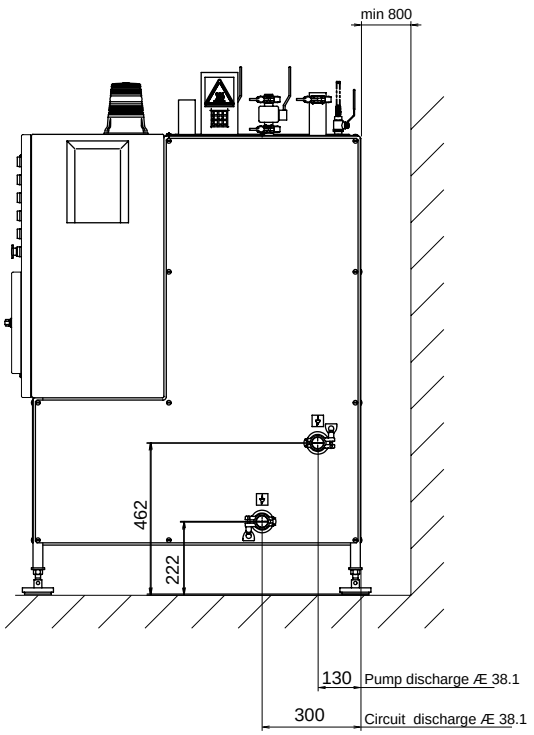
When depositing loads, keep the lifting equipment in place until the stability of the load has been checked.

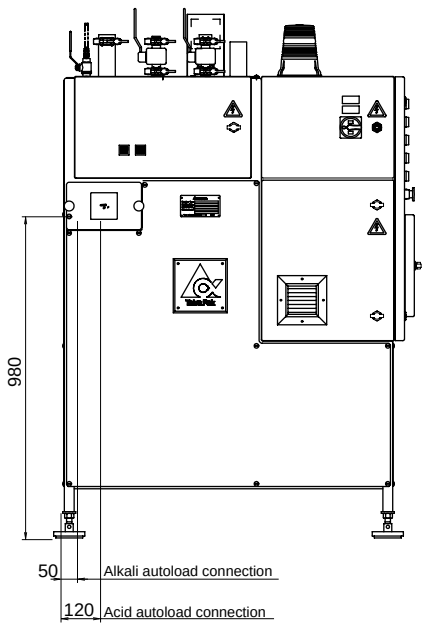
1 Machine installation



1-1 Dimensions and connections







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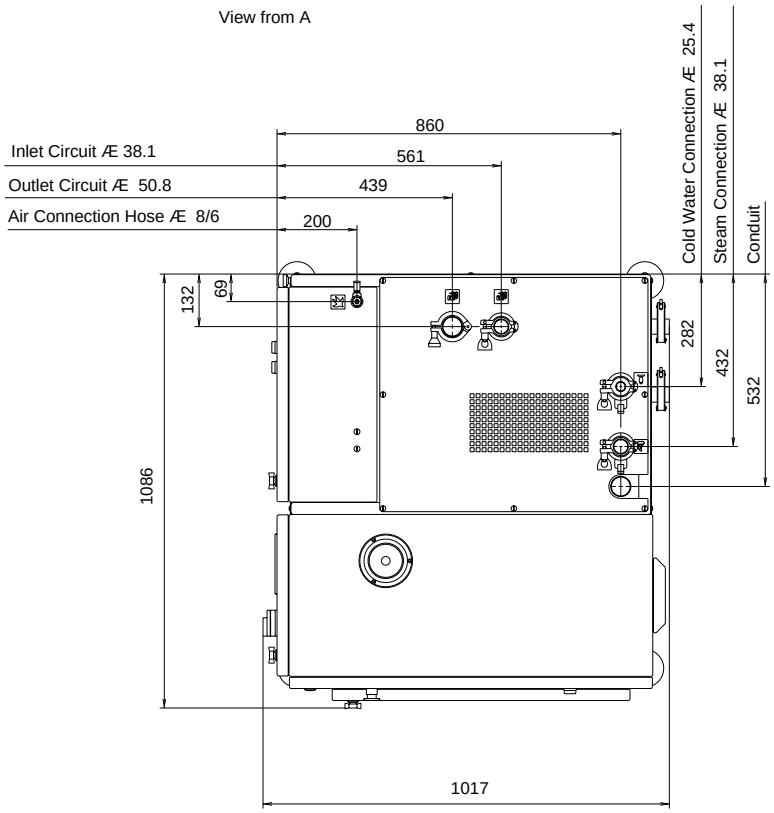

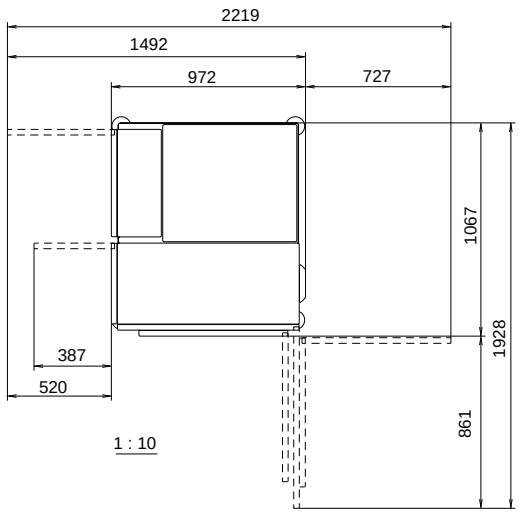

Dimensions with doors open

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1-2 Machine installation

Environment

Environment operating temperature admitted +5° up to + 55° C.

Noise

The table below give the noise level measurement for the Separate Cleaning Unit under the following conditions:

- machine on a concrete floor supported by standard feet
- production under normal operating conditions

Characteristic	Symbol	Declared value	Rounded	Notes
Equivalent sound pressure level, operator position	Leq	71.0 dB(A)	0.5 dB	Measured near operator panel, 1m from machine, 1.6 m from floor
Maximum equivalent sound pressure level	Leq	72.5 dB(A)	0.5 dB	Highest value measured within the parallelepiped area
Peak C-weighted instantaneous sound pressure	S.P.L. peak	98 dB(C)	1 dB(A)	Measured near operator panel, 1m from machine, 1.6 m from floor
Sound power level	Lw	85.5 dB(A)	0.5 dB	
Environmental acoustic factor	K	0.6 dB	0.1 dB	Measured at position 1 - 9
Surface sound pressure level (Log average)	Lpf	69.3 dB(A)	0.5 dB	Measured at position 1 - 9

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Positioning

Site the unit as near as possible to the packaging machine (max. 30 m) using the lowest number of pipe bents and using pipes with diameter Š of 38 mm (1 1/2”). The aim is that the piping should be as short as possible in order to optimize alkali, acid and steam consumption.

Electrical connection

Use a potential free contact **Ready for cleaning** on the filling machine and connect it to the SCU according to the Electrical Manual. Pay attention to the main cable position (the cable conduit is positioned near the steam connection that can reach temperatures around 130°C).

Unpacking

Check:

- that the packaging is not damaged.
- that there is no damage to the equipment.
- that no components are missing, and that nothing has shaken loose during transport.

Fitting

Check that the SCU 4 will be placed according to the following rules:

- The SCU 4 must be positioned so that the rear panel can be opened and the operator has enough space for working (min. 800 mm).
- the side for the connections must be accessible.
- the cleaning unit has adjustable feet and is placed directly on the floor.
- check that the floor has an inclination of 3° to the draining circuit.
- Installation time 2 man hours.

Compressed air quality

Compressed air used to feed SCU 4 must have the following properties:

Max particles (µm)	20
Max particles (mg/m^3)	25
Dew point (°C)	2
Oil content (mg/m^3)	0.01

Water quality

Drinking water quality is necessary according to Corporate Standard M1282.812.

Steam quality

Culinary quality is necessary according to Corporate Standard M1282.812.

Waste connection

The drain from cleaning unit must be fixed to the waste tank/plant.

Technical data

Machine	Separate Cleaning Unit	Type SCU/4
Weight	kg	350
Electricity	Electrical connection; (V AC+3P+N+PE,Hz) Recommended main fuse; (A) Consumption (kW)	400/230;50/60 16 4.5
Compressed air	Connection pressure; (MPa/bar) One machine daily cycle; (Nlt/cycle) One machine weekly cycle; (Nlt/cycle) Two machines daily cycle; (Nlt/cycle) Two machine weekly cycle; (Nlt/cycle)	0.6-0.7/6-7 approx. 19 approx. 27 approx. 43 approx. 49
Steam	Connection pressure; (MPa/bar) One machine alkali cleaning; (kg) Two machines alkali cleaning; (kg) One machine alkali-acid cleaning; (kg) Two machines alkali-acid cleaning; (kg)	0.3-0.5/3-5 approx. 7 approx. 12.5 approx. 10 approx.15.5
Water	Connection pressure; (MPa/bar) One machine alkali cleaning; (kg) Two machines alkali cleaning; (kg) One machine alkali-acid cleaning; (kg) Two machines alkali-acid cleaning; (kg)	0.3-0.4/3-4 approx. 400 approx. 750 approx. 600 approx. 1150
Alkali 35%	Consumption; (lt/cycle)	approx. 2.4
Acid 55%	Consumption; (lt/cycle)	approx. 1.01

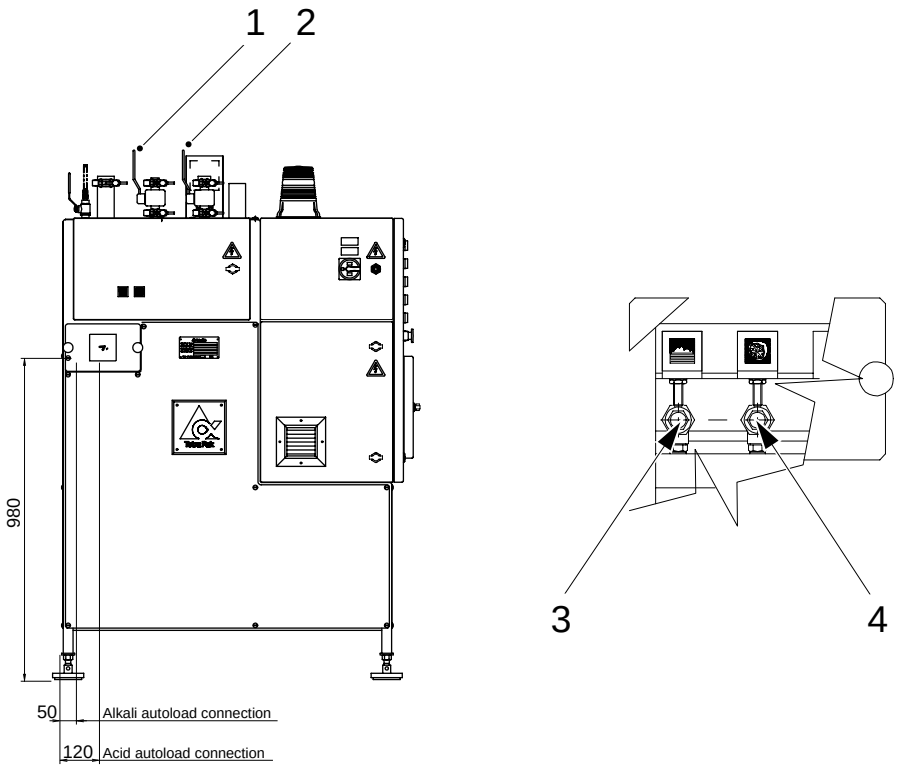
WARNING!

Identification colour code

Risk of personal injury!
A wrong connection operation of steam and water circuit, or a wrong connection of concentrated autoload system can cause serious damage to people and/or to the machine.

The identification colours are:

- Water valve handle (1): GREY
- Steam valve handle (2): GREEN
- Alkali quick release coupling (3): ORANGE
- Acid quick release coupling (4): YELLOW



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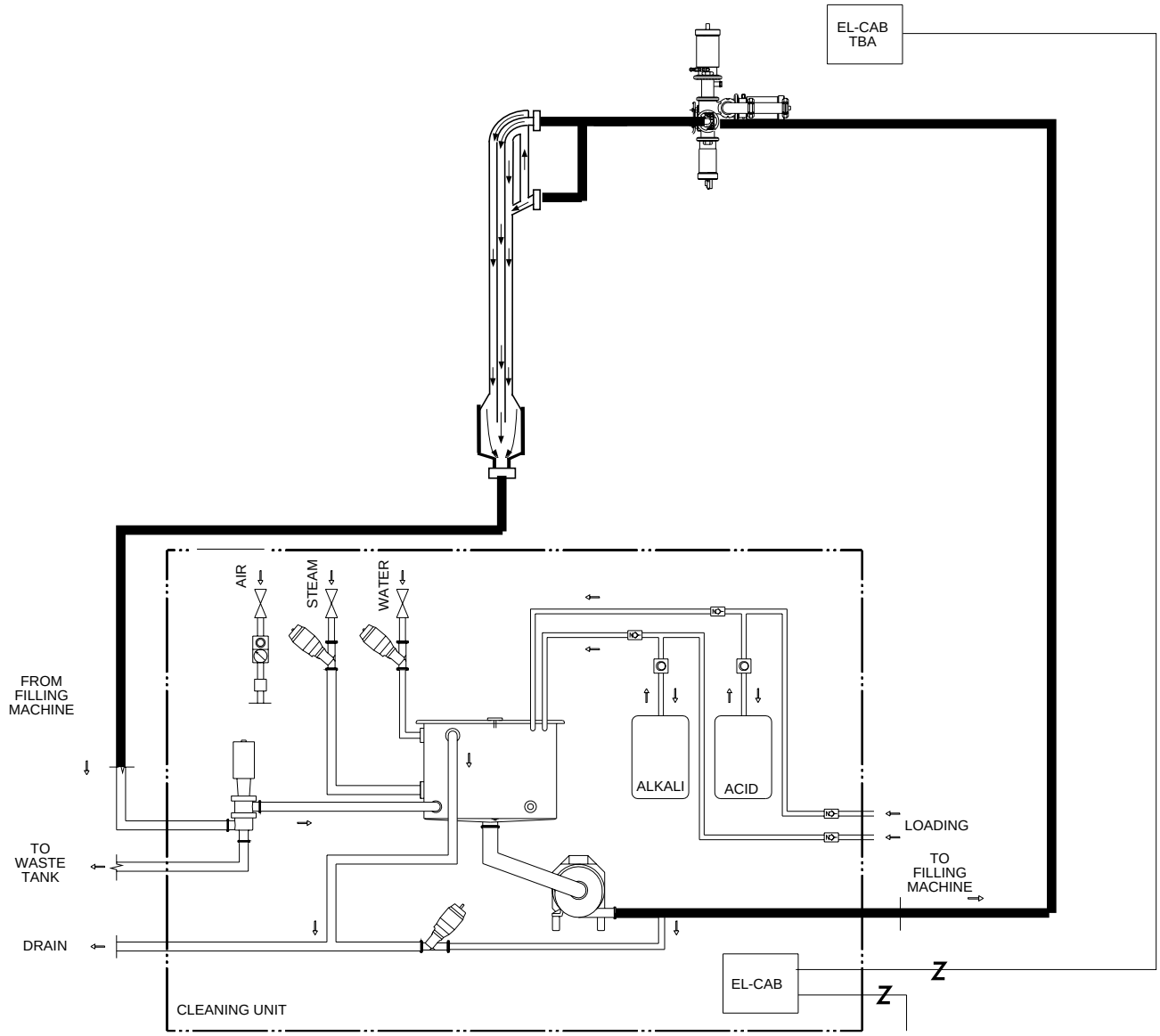
1-3 One machine installation



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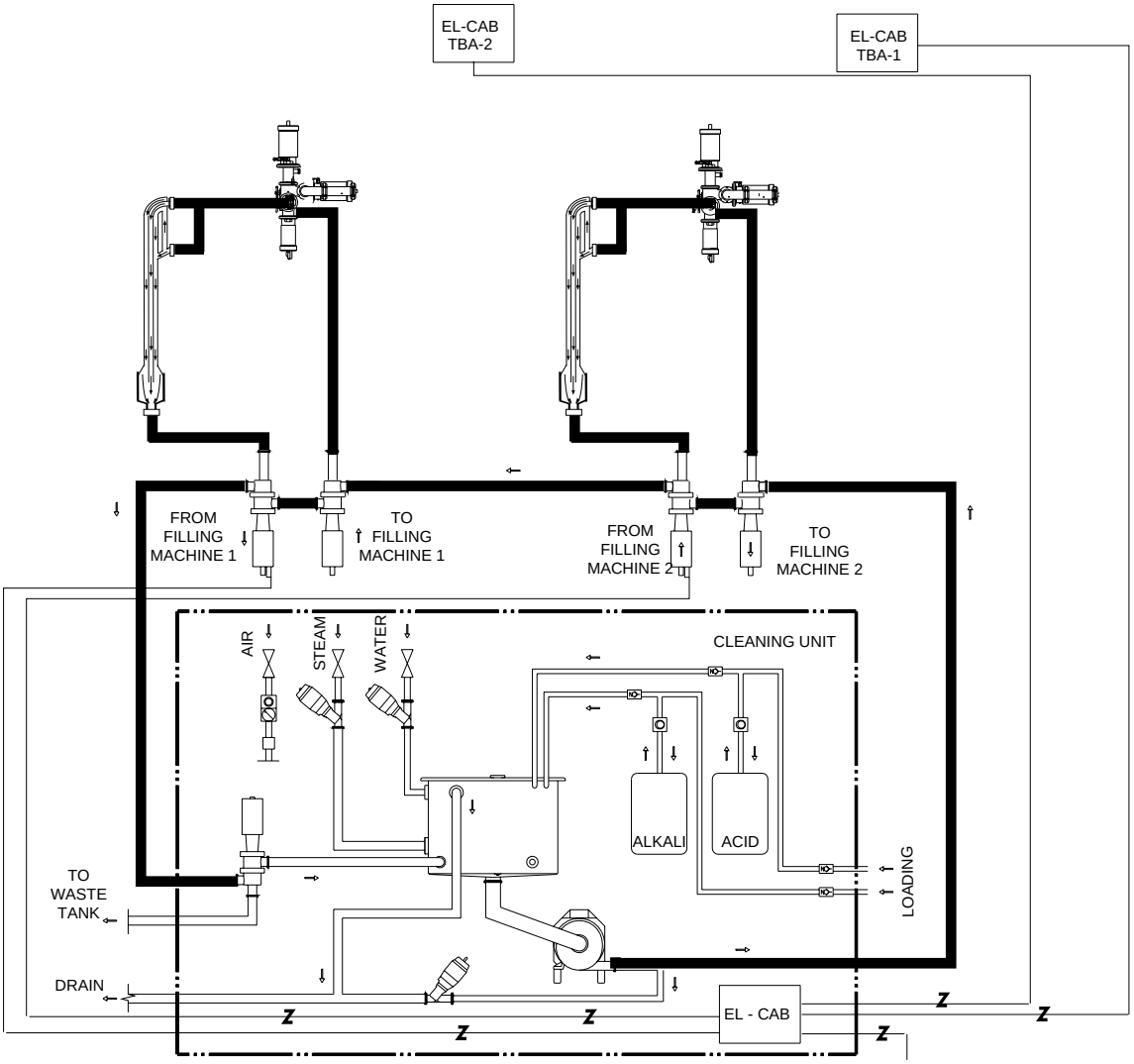
1-4 Two machine installation



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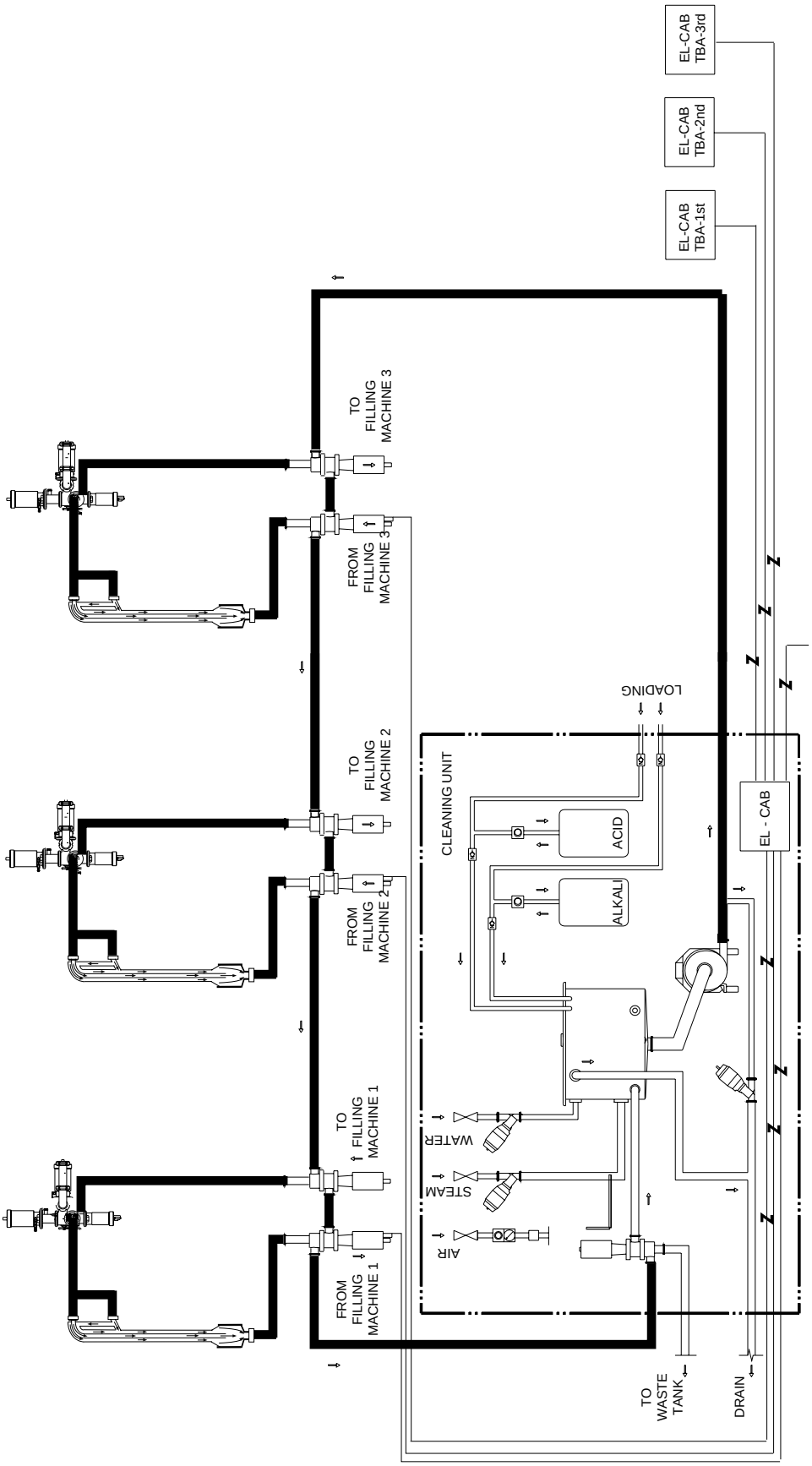
1-5 Three machine installation



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1-6 Start-Up

Concentrated circuit functioning time

In order to optimize the functioning of the conductivimeter-pump group, is possible to modify the functioning time of the pump in the sub-routine **Setting of the PLC programme**.

V_{ec}= Circuit volume (lt)

V_p= Pipeline volume (lt)

V_{NaOH}= Alkali volume (lt)

V_{HNO3}= Acid volume (lt)

NaOH%= Alkali scheduled titration

HNO_3%= Acid scheduled titration

T_{c1}= Alkali pump continuous running time (sec)

T_{c2}= Alkali pump continuous running time (sec)

Pipeline volume is the volume of the pipes of connections from SCU to the filling machines. Circuit volume is the pipeline volume added to the tank volume and the product tube volume.

Alkali total volume

V_{NaOH}= [(V_{ec}/100)x 0.9] x NaOH% (lt)

Alkali volume needed for scheduled titration.

Acid total volume

V_{HNO3}= [(V_{ec} /100) x 0.8] x HNO_3% (lt)

Acid volume needed for scheduled titration.

Alkali time

T_{c1}= V_{NaOH} /0.028 (the value must be written in the const of **Move int**, rung 0009, sub routine **Setting**).

Acid time

T_{c2}= V_{HNO3} /0.028 (the value must be written in the const of **Move int**, rung 0010, sub routine **Setting**).

The time must be added to the **Setting** sub routine in the following cases:

- check the correct value during functional test check
- scheduled titration

These values are readable on the conductivity meter display. If the conductivity value is higher than the default value of 6-7 mS/cm, reduce T_{c1} or T_{c2} of 3-5 sec.

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Handshake

To start the cleaning cycle, the SCU 4 needs a signal from the filling machine(s) called **Ready for CIP**. For each filling machine connected, the SCU 4 is allowed to send two kinds of signals:

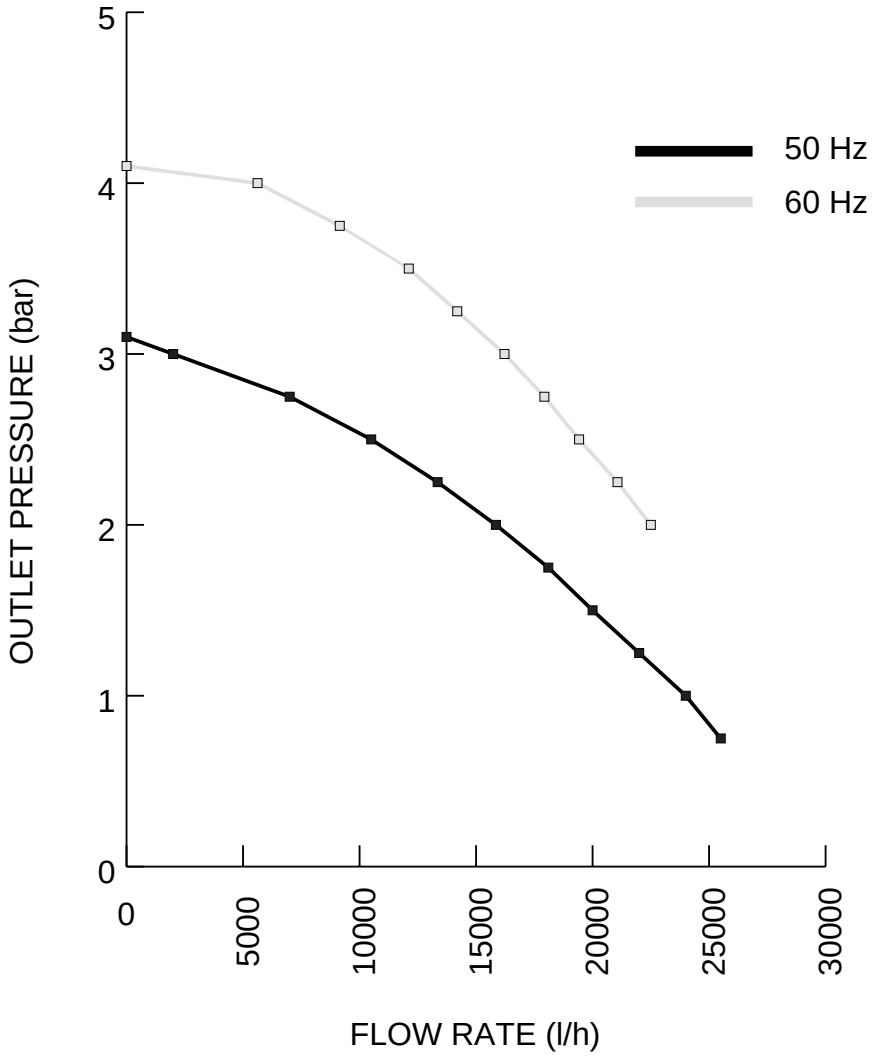
"Cleaning pump running on filler....."

This signal starts when the cleaning pump M.M001 starts. The signal sent is **Circuit in pressure** (used only for HVA kits).

CIP flow rate verification

When the installation is completed, the CIP flow needs to be measured; it should be more than 8000 l/h unless different values are stated in specific filling machine documentation. The chart below shows the capacity curve of SCU/ 4.

Note! The chart is valid for installations with one, two, or three machine as the cleaning phases are carried out one machine at a time. The pressure drop will be higher due to the change-over valves in the CIP circuit.



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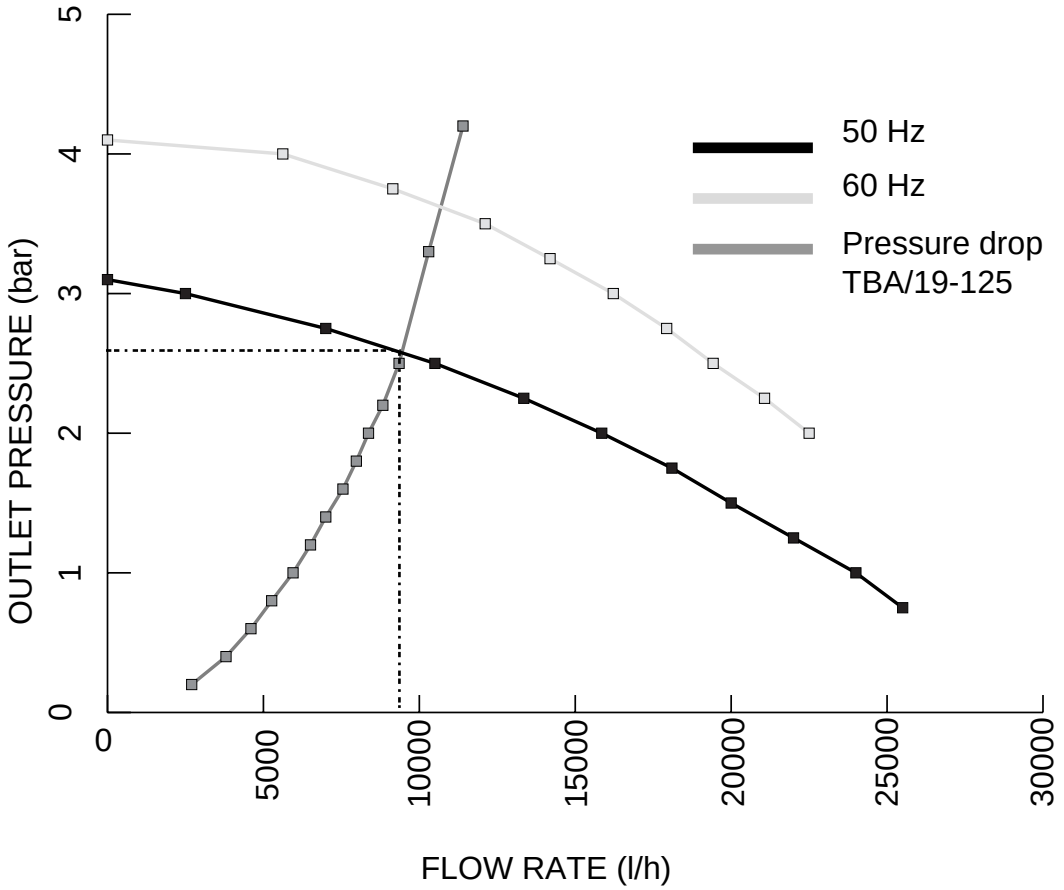
When the capacity curve of the SCU/4 overlaps the pressure drop curve of the filling machine to be cleaned, the crossing point is the theoretical flow/ pressure value of the SCU/4 applied to the machine. The chart below shows an example of capacity curve of a SCU/4 connected to a TBA/19-125 filling machine.

Note! The chart is valid for installations with one, two, or three machine as the cleaning phases are carried out one machine at a time. The pressure drop will be higher due to the change-over valves in the CIP circuit.

With a power supply frequency of 50 Hz to the cleaning unit, the CIP flow should be 9000 l/h with a pressure of approx. 2.6 bar. The actual result will be lower than the theoretical due to the pressure drop along the pipeline between the SCU/4 and the filling machine. For this reason the cleaning unit should be positioned as near as possible to the machine.



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