PARTS, SYSTEMS AND AUTOMATIONS FOR FLUID DISPENSING

USE AND MAINTENANCE MANUAL

TANDEM CONTROL SYSTEM

COD.: **DTVI_TANDEM_2440**
REV.: **00**
DATE: **03/10/2024**

TRANSLATED FROM ORIGINAL
Read carefully before use!

EN

Summary

1 GENERAL INFORMATION

This manual contains information regarding the installation, use, maintenance and end of life of the component and provides indications for the most appropriate behavior for correct operation. This manual has been designed to be simple and as immediate as possible, with a subdivision between chapters and sub-chapters that allows any desired information to be found quickly. Furthermore, the manual begins by giving a general description of the content, then an overview of the component, to arrive at aspects of safety, transport, installation and use and finally the end of life. In case of doubts about the interpretation or reading of this document, please contact the manufacturer.

DAV Tech disclaims all responsibility relating to improper use of the component. Comply with what is specified in this manual.

Read this manual before handling the component or performing any action on it

The manual constitutes an essential safety requirement and must accompany the component throughout its entire life cycle.

It is the responsibility of the end user to optimize the functionality of the component, always keeping in consideration the purpose for which it was built.

This manual must be kept, together with the attached documentation, in good condition, readable and complete. Furthermore, it must be stored near the component or, in any case, in a place accessible and known to all personnel who use the component itself or who must carry out maintenance or inspection interventions. In the event that the manual deteriorates or is no longer complete, a copy must be requested from the manufacturer, indicating the manual code and revision.

The manual is intended for personnel who use the component (operators), who perform maintenance on it (maintenance technicians), and personnel who must carry out checks or inspections. The manufacturer is not liable for damage to the component caused by personnel who have not followed the indications contained within the manual itself.

In case of doubts about the correct interpretation of the information contained in this manual, please contact the manufacturer.

GUARANTEE

During the design phase, a careful selection of materials and components to be used in the project was made and they were subjected to regular testing before delivery. All elements have been designed and manufactured with an adequate degree of safety, such as to withstand stresses greater than those of normal use.

The warranty is valid for a period of 12 months from the commissioning date and in any case not beyond 15 months from the delivery date. Interventions carried out during the warranty period do not extend the validity period of the warranty itself in any way.

The manufacturer is not liable for defects due to normal wear of parts which, by their nature, deteriorate.

1.1 Symbology

The following symbols are used to give greater impact to the importance of the concept to be conveyed.

ATTENTION!
Refers to a warning that could lead to minor damage (minor injuries, damage to the component requiring maintenance technician intervention).

DANGER!
Refers to a major event that could cause significant damage (death, permanent injury, irreversible component failure).

NOTE. Indicates relevant information or elaboration.

OBLIGATION. Indicates an activity that must be performed, related to both the component and the manual.

REFERENCE. Refers to an external document that is important to view.

Furthermore, the symbol list is integrated with that of personnel authorized to use the component and their function, together with other symbols used within the manual.

Operator
Qualified person capable of operating on the component, performing adjustment, cleaning, start-up or restart operations. The operator is not authorized to perform maintenance.

Mechanical maintenance technician
Qualified technician capable of performing mechanical interventions, adjustment, maintenance and ordinary repair described in this manual. Not qualified to perform interventions on electrical systems in the presence of voltage.

Electrical maintenance technician
Qualified technician capable of performing electrical interventions, adjustment, maintenance and ordinary repair described in this manual. Capable of working in the presence of voltage on electrical cabinets and junction boxes. Not qualified to perform interventions on the mechanical side.

Manufacturer's technician
Qualified technician made available by the manufacturer to perform complex operations in particular situations, or in any case according to what has been agreed with the customer.

1.2 Reference standards

The normative and directive references for this manual are as follows:

Directives

- 2006/42/EC – Machinery Directive;

1.3 Declaration of incorporation (Annex II B DIR. 2006/42/EC)

Manufacturer's name: **DAV Tech Srl**
Address: Via G. Ravizza, 30, .36075, Montecchio Maggiore (VI)

DECLARES THAT THE PARTLY COMPLETED MACHINERY

Component:	TANDEM
Model:	Control system for tandem feeding
Serial Number:	
Year:	2024
Intended Use:	Controller for two identical feeding systems working alternately

COMPLIES WITH THE INCORPORATION PROVISIONS DICTATED BY DIRECTIVE 2006/42/EC

The technical documentation has been drawn up in compliance with Annex VII B, as required by the following:

- Machinery Directive 2006/42/EC of the European Parliament and Council of 17 May 2006

FURTHER DECLARES THAT:

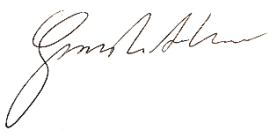
- We undertake to transmit, in response to an adequately motivated request from national authorities, relevant information on this partly completed machinery;
- The technical file has been constituted by Andrea Grazioli, via Ravizza, 30, Montecchio Maggiore (VI), IT.

This partly completed machinery cannot be used until the machinery on which it will be used is declared compliant with standard 2006/42/EC.

Montecchio Maggiore, 03 October 2024

The legal representative

Andrea Grazioli



1.4 Glossary

The following are the most used terms within this manual with their meanings.

TERM	DEFINITION
Enable	Term that defines the act of preparing (enabling) an action. The action will be activated as soon as criteria are satisfied which, as a consequence, lead to the activation of the enabled action.
Activate	The action that is performed instantaneously upon command actuation.
Hold-to-run Commands	Commands that, used for manual operations, must be kept activated for the action to be completed. When the command is released, the action stops.
Two-hand Commands	Hold-to-run commands that require simultaneous actuation of two manual commands to perform an action.
PPE	Personal Protective Equipment. Includes all objects necessary to ensure personnel protection from possible accidental damage (safety shoes, gloves, helmet, and others).
Display	Used to display information. Can be in any form and size, including touch screen.
Manufacturer	Natural or legal person who designed and manufactured the component subject to this manual.
HP	High Pressure. Abbreviation indicating high pressure.
Icon	Small image that symbolically represents a command, function or even a document or operating program, which appears on a computer screen. When selected by the user, it starts the function or program it symbolizes.
Joystick	Lever controller used in command panels.
N/A	Not Applicable, indicating a field that does not apply to this particular manual and cannot be integrated into the component.
Operator Panel	Command station where machine control instruments are located.
P.I.	Possible Implementation, currently absent from the component described in this manual, but possible to add and implement.
Screen	Interface system between man and component. Screen images displayed on the operator panel that allow the user to receive and provide information to the management software.
Control Panel	Composition of buttons and selectors that allow direct action on component behavior.
Keyboard	Keyboard only (standalone element) or in addition to a display (keys only, no selectors or other).
Touch Screen	Touch screen that allows the user to interact with a graphical interface using fingers or special objects.

1.5 Service and manufacturer contact details

For any reason relating to use, maintenance or request for spare parts, the customer must contact the manufacturer directly (or the service center if present), specifying the component identification data.

The customer can avail themselves of commercial technical support from area agents or importers, who are in direct contact with DAV Tech Srl.

Company name	**DAV Tech Srl**
Postal address	Via Ravizza, 30, 37065, Montecchio Maggiore (VI) – (IT)
Telephone	+39 0444 574510
Fax	+39 0444 574324
email	davtech@davtech.it
Website	www.davtech.it

2 PRESENTATION AND OPERATION

This manual aims to provide in-depth information about the TANDEM component, which is a component capable of managing two feeding pumps of any size that work in alternating mode; therefore, when one pump signals that the product is finished, the second one starts working. This working method is useful when continuous working mode is necessary, without ever having to stop the line.

Generally used with pumps from the PP family (PP-5, PP-25, PP-50, PP-200), which is why this pump type is often mentioned in the manual. However, the system can work with any type of feeding system.

In other words, the function of this component is:

TO CONTROL TWO PUMPS TO ENABLE CONTINUOUS WORKING MODE

The intended use is considered to be that described in the chapter below, while improper use is considered to be any other use that is not described within this manual, with products of material and format different from those for which it was built.

Figure 01 – TANDEM detail

No.	DESCRIPTION
01	HMI Display
02	Main Switch
03	Emergency Button
04	Luminous Sign
05	3-way Valve Status
06	Pneumatic and fluidic inlet, one per side
07	Electrical inlet
08	Outlet (on the bottom)
09	Central Body

Before using a particular type of fluid, it must be verified that:

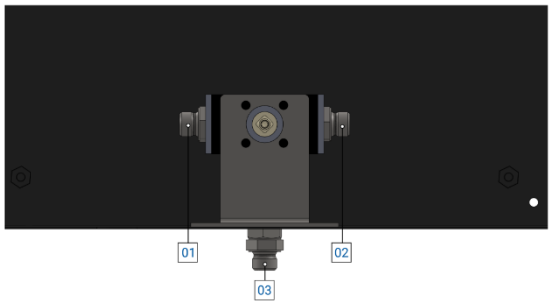
- The viscosity of the fluid is compatible with the component characteristics;
- The fluid characteristics satisfy the desired requirements;
- The fluid technical data sheet provided by the manufacturer contains all information regarding the product such as viscosity, applications, drying and storage times;
- The fluid storage time has not been exceeded;
- The fluid containers are hermetically sealed.

In case it is necessary to use multiple fluids with the same component, it must be cleaned thoroughly to prevent residues from the previous processing from affecting the processing to be performed.

SPECIAL VERSIONS

N.A.

OPERATION



No.	DESCRIPTION
01	Pump 1 fluid inlet
02	Pump 2 fluid inlet
03	Fluid outlet

Figure 02 – TANDEM internal section

This system allows continuous fluid feeding with two pumps positioned in parallel. Therefore, to function, it needs two pumps in parallel, regardless of the model.

While one pump works, the system monitors the fluid level that the pump has reached. When the pump reaches the minimum level, the system sends an alarm to the operator and automatically changes the state of the 3-way valve, starting the other connected pump. Once the operator has changed the empty drum, the system detects that the pump is ready to work because the minimum level alarm no longer arrives, so when the second pump runs out of fluid, the system can perform the pump change automatically, sending the alarm signal that the second pump is empty.

For working pressures, refer to chapter 2.2.

This component cannot operate autonomously. To work correctly, it must be connected to a power source, which is one of the pressure plate pump models, and to a dosing system, based on the customer's needs.

ATTENTION!
It is recommended to connect the component to the sources indicated in this manual in chapter 2.2. Connecting it to other sources or to products with characteristics not indicated in this manual could damage them.

This component has been designed to work autonomously, meaning that once the working parameters are set, the system can manage pump changes automatically.

It is also equipped with a display to show the component status and set parameters to work correctly and customize alarm thresholds based on usage.

The following explains the operation of the TANDEM component.

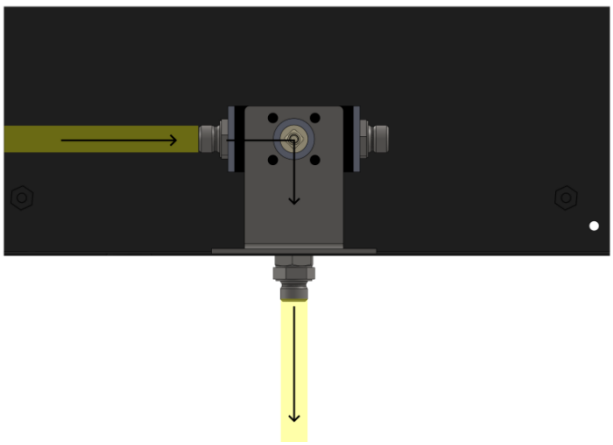


Figure 03 – Pump 1 work phase

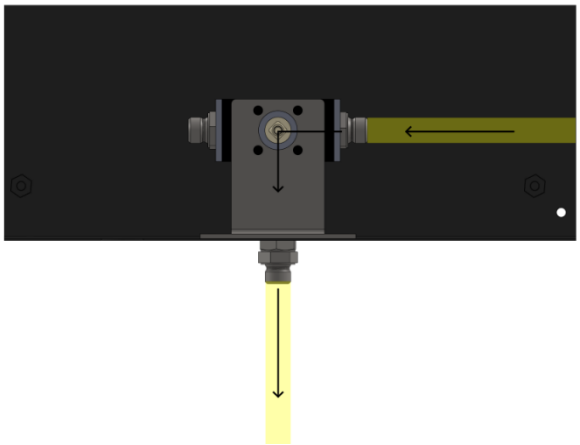
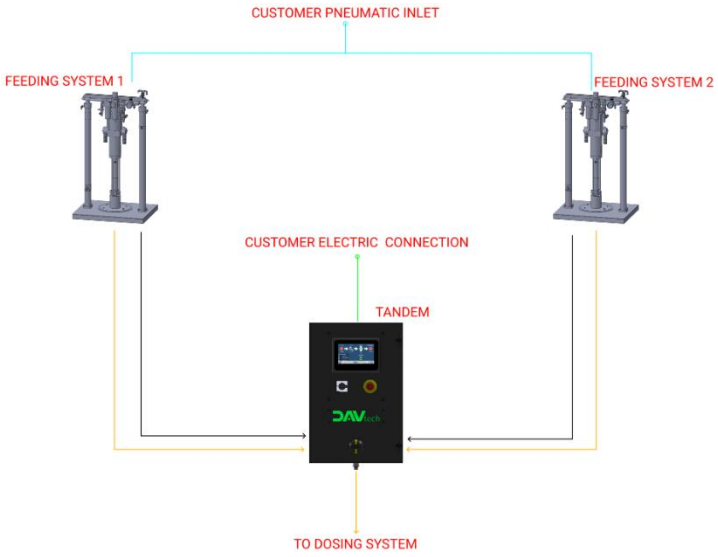


Figure 04 – Pump 2 work phase

During the working phase of pump 1, the fluid enters from the inlet positioned on the left side of the control system (looking at the HMI display), enters the 3-way valve and then continues to the outlet, located at the bottom of the component; during the working phase of pump 2, instead, the fluid enters from the inlet positioned on the right side of the control system, enters the 3-way valve and then continues to the outlet, located at the bottom of the component.

USEFUL TIPS

- In the previous section, it was written that pump 1 fluid enters from the left side of the component (looking at the display), while pump 2 fluid enters from the right side; however, in special cases, this may change. It is always recommended to look at the component structure and how it was assembled, in addition to the signs placed by operators during the assembly phase;
- The fluid entering the 3-way valve from pump 1 and that from pump 2 pass through the same point; this means that the fluid must be the same, otherwise the two fluids mix from the 3-way valve onwards, altering the fluid output from the dosing system and, therefore, the quality of the dosing itself.

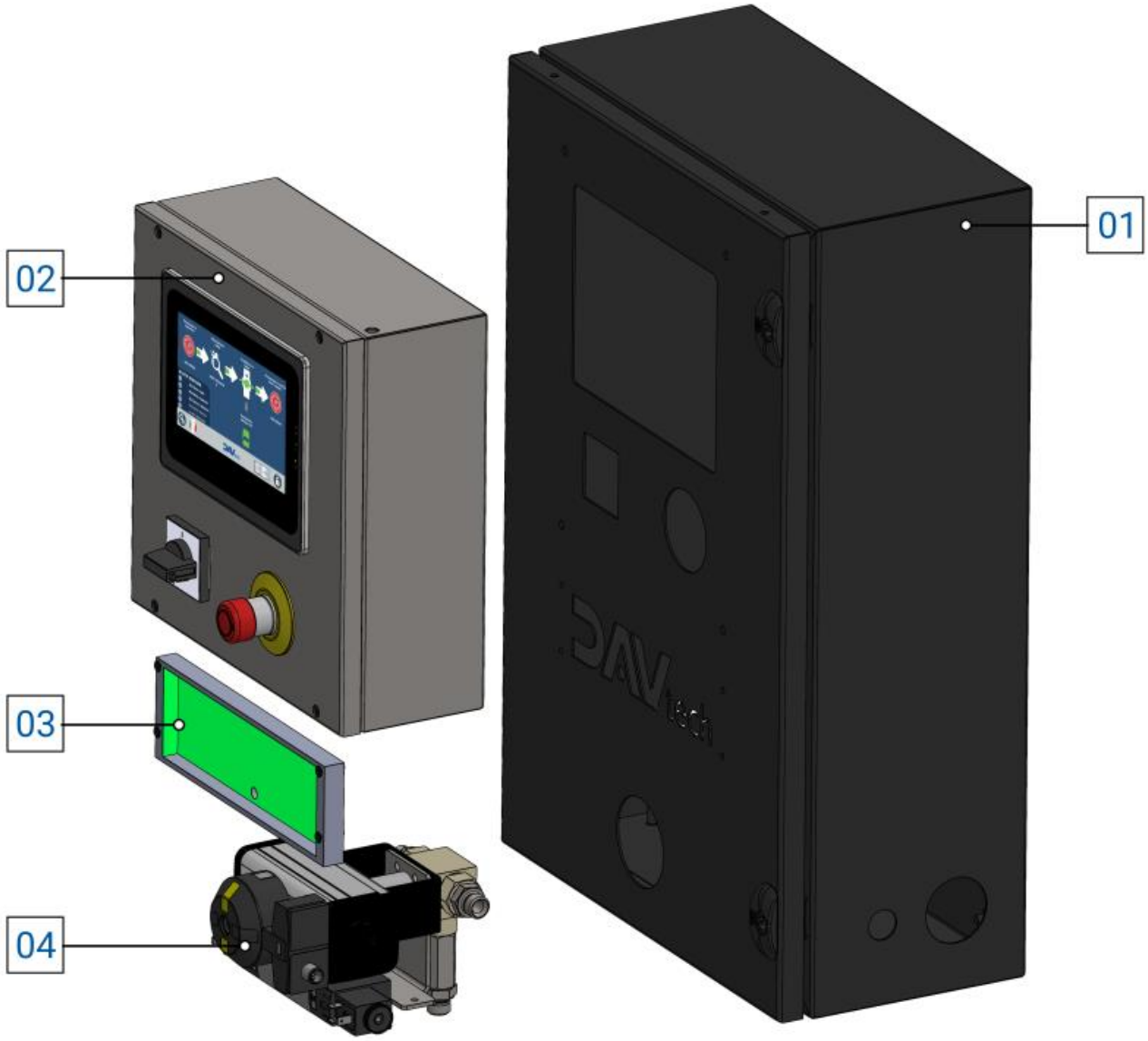


COLOR	MEANING
CYAN	Main air
YELLOW	Product
GREEN	Power supply
BLACK	Data
RED	Notes

Figure 05 – Connection example

2.1 Exploded view

The following is a list of the main component elements.



No.	Description	Var.	Code	Variant details
01	COMPONENT COVER	\	\	\
02	HMI DISPLAY WITH ELECTRICAL PANEL	\	\	\
03	STATUS INDICATOR DISPLAY	\	\	\
04	3-WAY VALVE	\	\	\

2.2 Technical data

The following indicates all the technical characteristics regarding the component of this manual.

TECHNICAL CHARACTERISTICS		
Description	**UdM**	**Values**
General features		
General characteristics		
Model	\	TANDEM
Drive type	\	Electric
Electrical Characteristics		
Power consumption	W	100
Power supply type	V	100 -- 230V ± 10%
Frequency	Hz	50 -- 60
Pneumatic characteristics		
Pneumatic tube section	mm	8X6
Inlet pneumatic pressure	bar	5.5 ÷ 8
Fluid characteristics		
3-way valve fluid inlet thread	\	3/8" GAS
3-way valve fluid outlet thread	\	3/8" GAS
Maximum fluid pressure at inlet	bar	150
Outlet fluidic pressure regulation range	bar	30 ÷ 120

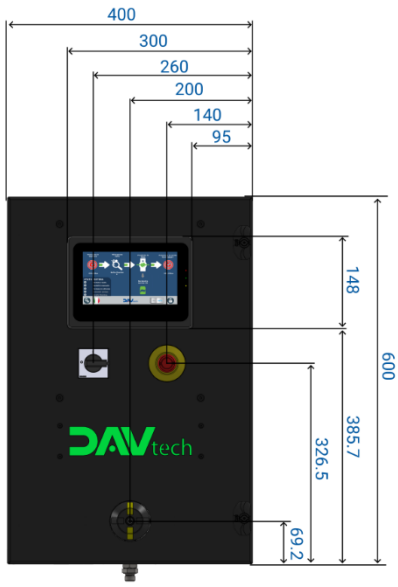
ATTENTION!
Performing outlet fluidic pressure regulation higher than indicated may lead to breakage of the component's internal pipes.

ENVIRONMENTAL CHARACTERISTICS		
Description	**UdM**	**Values**
Working Ambient Temperature	°C	5 ÷ 45
Storage Ambient Temperature	°C	-20 ÷ 55
Permissible non-condensing humidity	%	5 ÷ 90

USABLE FLUIDS
Greases
Various medium-high viscosity products (contact the manufacturer for more information)

DIMENSIONAL AND WEIGHT CHARACTERISTICS		
Description	**UdM**	**Value**
Component length (min ÷ max)	mm	400
Component depth (min ÷ max)	mm	200
Component height (min ÷ max)	mm	600
Component weight	kg	30

Component



It is possible to request the component 3D model in the desired version from the manufacturer without any commitment.

3 SAFETY

The following presents the list of warnings regarding the component that is the subject of this manual. Please read carefully before proceeding with the next chapters.

DANGER!
Before putting the component into operation or performing any action on it, read this manual carefully.

DANGER!
Do not use the component under the influence of drugs or other substances that may alter attention and reaction capacity.

DANGER!
Operators must only perform operations or interventions that are within the competence of their assigned role and qualification.

FIRE/EXPLOSION HAZARD!
This component is not designed to work in ATEX environment.

DANGER!
Pay close attention during component maintenance, especially when dismounting components that have pressurized springs inside.

ATTENTION!
Modifications to the component to obtain performance different from that for which it was designed and built must not be performed, unless authorized by the manufacturer.

ATTENTION!
Avoid introducing foreign bodies into the pneumatic system, even small ones, which could cause system malfunction and compromise machine safety.

The component can only be used by trained and authorized operators and only for the purpose for which it was designed and built.

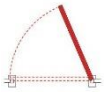
The component is built in compliance with the safety technical standards in force at the time of its construction.

3.1 Component safety devices

ATTENTION!
Replacement of component safety components is reserved exclusively for the manufacturer's technicians. This operation must be performed respecting the component manufacturing specifications.

Safety devices must be maintained in efficient condition. For any replacement of safety components, use only original spare parts.

The component safety devices are all those components (both mechanical and electrical) installed to guarantee that personnel can work safely and in compliance with the regulations in force at the time of construction. Nevertheless, personnel are required to maintain an adequate level of attention while in the vicinity of the component. The following lists the symbols used for some of the safety devices.

Symbol	Meaning	Presence
	**Emergency button:** It is a button that, when pressed, removes power from the motors, securing the work area	YES
	**Fixed guards:** These are devices that are designed to be static, for example doors that need a key to be opened. Generally they do not need to be connected to alarms or block component functions since they can only be accessed with a key or other unlocking device.	YES
	**Interlocked movable guards:** These are devices that serve to protect the operator while they are closed. If they are opened while the component is operating, an alarm is triggered and torque is removed from the motors.	NO
	**Safety labels:** These are labels placed in places where there is a danger and attention is recommended.	YES
	**Valve air interceptor:** is a device capable of maintaining air in a specific location even if line air is lost	NO
	**Pneumatic isolator:** It is a device that serves to regulate the inlet air pressure and, if necessary, remove it (in case of interventions or problems)	NO
	**Electrical isolator:** It is positioned just outside the electrical panel and serves to remove torque from the motors and voltage from the entire component	YES
	**Light signals:** It is a device that indicates the component status. It is indicated in this chapter because it also serves to indicate alarm states.	YES
	**Acoustic signals:** These are devices that serve to alert personnel of a particular event (can be an error or even end of cycle, based on settings)	YES

3.1.1 Static signaling devices

These are all those devices that serve to signal to the operator or maintenance technician the presence of a danger. In general, static signaling devices can be labels or signs.

The positions of the static signaling devices are shown within the protection panel. The signals are shown below.

ATTENTION!
Labels must be replaced if they are worn or, in any way, illegible.

3.1.2 Guards (fixed and mobile interlocked)

These are all those devices that are used to secure personnel by closing/blocking certain areas of the component, thus avoiding accidental crushing problems. If they are opened or are not functioning, the system sends an error to the operator's HMI panel with the relative message.

In this machine, the following devices are present:

- Fixed guard: 1 device consisting of the electrical cabinet

DANGER!
Opening the electrical cabinet doors is not linked to the general electrical switch; therefore, before opening them, the general switch must be set to "OFF". Furthermore, their opening is only allowed to personnel authorized to operate inside the cabinet.

3.1.3 Electrical and pneumatic disconnecting devices

These are all those devices that serve to interrupt the electrical or pneumatic flow in case of emergency or if component maintenance needs to be performed. Pneumatic isolation devices serve to remove air from the system, but electrical power is maintained; while electrical isolation devices serve to remove voltage from the system.

In this component there is a single device, namely:

- The electrical isolation system (main switch) is located in position 02, figure 01, chapter 2.

ATTENTION!
Handling of isolation devices must only be performed by specialized personnel.

The electrical isolation system has two working modes, namely:

- Position 0 -- "OFF": The operator panel and component are not powered;
- Position 1 -- "ON": The operator panel and component are powered.

Furthermore, the possibility of applying a padlock when the switch is in position 0 is provided to secure the component.

3.1.4 Emergency stop devices

These are all those devices that serve to interrupt component operation instantly, removing torque from the motors and deactivating auxiliary circuits.

In this component there is a single emergency stop device, located in position 03 in figure 01 at chapter 2.

DANGER!
The emergency device does not remove voltage from the component. Pay attention to the component parts that are touched.

To resume normal working activity after pressing the emergency stop button, the button must be reset following the instructions written on it, eliminate active errors on the HMI display (perform an alarm reset, chapter 9)

Use the emergency button only in case of actual necessity.

3.1.5 Signaling devices (light and sound)

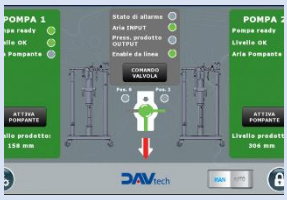
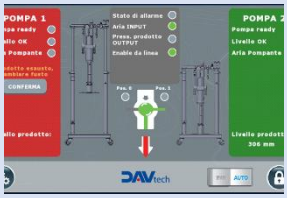
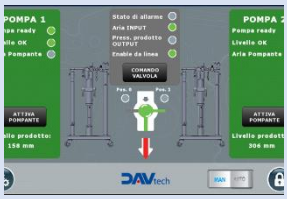
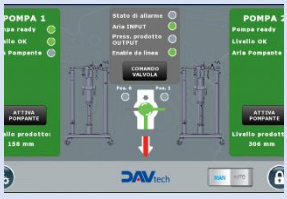
These are devices that signal certain component states to personnel. These signals can occur in two modes:

- Visual: through indications of lights of various colors positioned so as to be visible even from a distance;
- Audible: through sound indications.

In this component there is one type of visual device and one type of audible device, namely:

- A luminous sign, located in the front part of the component and bearing the manufacturer's writing;
- An audible alarm in case of alarms.

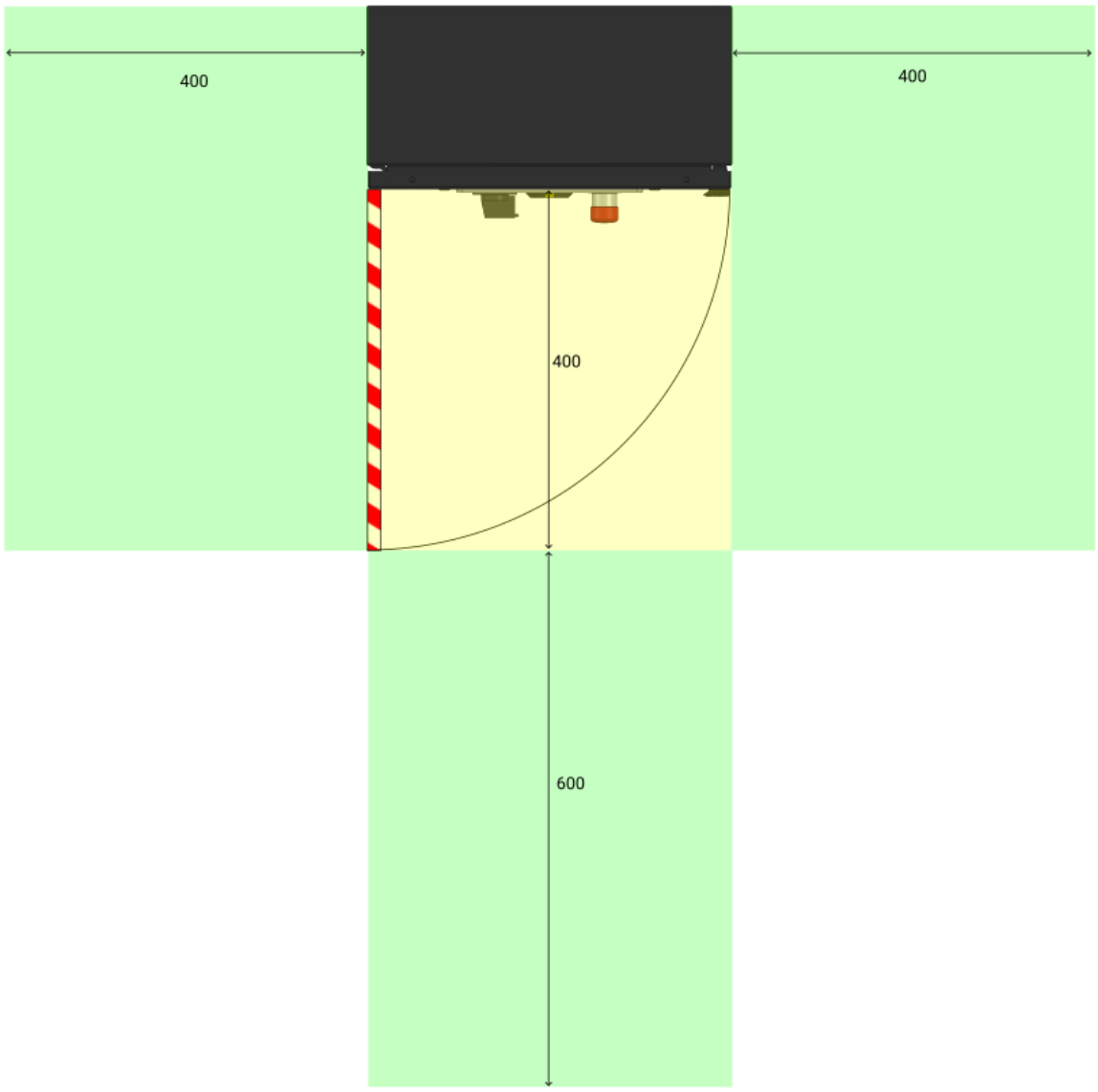
The indications are shown below.

LIGHT INDICATION	SCREEN	OTHER	MEANING
			**SYSTEM READY**
			**SYSTEM IN ALARM**
			**SYSTEM IN MANUAL MODE**
			**SYSTEM WITH PUMP NOT READY**

3.2 Required free spaces

These are spaces that must be respected during component installation and serve to allow personnel passage safely, as well as allow maintenance and cleaning operations to be performed safely.

For the electrical panel, a free space equal to the dimension of the open door increased by 60cm is required.



In this image, the areas that are clear of any obstacles are marked in green and the areas that may contain obstacles are marked in yellow; the red-white lines serve to indicate the maximum extension of the doors.

3.3 Risk and residual risk zones

These are areas whose danger has not been completely removed and personnel are recommended to pay particular attention when near those areas. Some methods that remove risk can be the presence of two-hand commands or protections on doors in moving areas and on electrical cabinet doors.

AREAS AT RISK

In this component there are no risk zones present since they are all zones protected by safety systems.

RESIDUAL RISK AREAS

These are areas in which risks remain even if appropriate safety measures have been taken to reduce them.

In this case there is one residual risk zone, given by the protection panel (A).

DANGER!
Risk of electrocution and electrocution due to the presence of residual electric current. Once the switch is set to position "0 -- OFF", at least two minutes must be waited before intervening on the internal part of the cabinet.

Opening the electrical cabinet doors is not linked to the position of the general electrical switch.

The machine is also free of burrs, corners and sharp edges; however, maximum attention is required during loading and unloading phases to avoid hitting body parts against the pallet.

4 TRANSPORT AND HANDLING

Once the goods are received, it must be verified that the packaging is intact and that there is an exact correspondence with the ordered material.

ATTENTION!
The original configuration of the component must not be modified. The manufacturer is not responsible for damage caused by inappropriate use of the component.

ATTENTION!
If the packaging is not intact, immediately contact the manufacturer, also sending photos of the packaging condition. Do not open it before notifying the manufacturer.

5 INSTALLATION

The component installation is performed by the customer. If necessary, they can contact the manufacturer to have a specialized technician help them.

The component has been designed to work in a dosing line, meaning it must be installed between the feeding system (pressure plate pumps) and the dosing system; therefore, the component cannot operate autonomously.

Furthermore, the component has been designed to be installed on a special aluminum support.

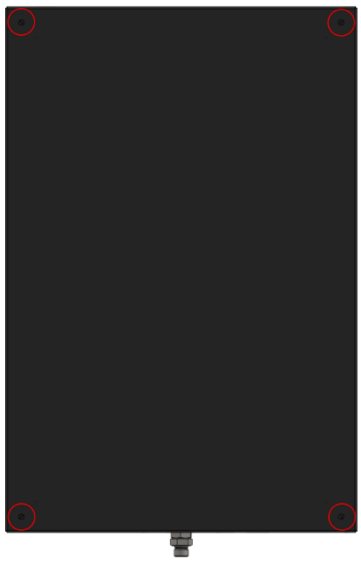
It is recommended to perform a component check before starting installation. If it shows obvious damage, please contact the manufacturer.

ATTENTION!
Please remove the packaging with maximum care. In case damage is caused to the component, the manufacturer is not responsible.

Dispose of packaging correctly, taking into account the different nature of the components and following the regulations in force in the Country.

5.1 Positioning

For positioning, the component has been designed mainly to be installed on a special aluminum structure, which is then connected to the structure of the PP pumps to which it is associated. To install it on this structure, M6 screws are used.



ATTENTION!
It can also be installed as a stand-alone on a wall support, but it is recommended to ask for help from the manufacturer's technicians for particular needs.

5.2 Connections

This chapter aims to explain the connection method to be used for the component. The following types of connections are provided:

- Electrical connection;
- Pneumatic connection;
- Fluidic connection

5.2.1 Electrical

Authorized personnel		**PPE to wear**					
Component Status	Installed component, with cable with outgoing industrial socket						
Supply Values	See chapter 2.2						
Required Preparations	Electrical system with industrial plug and correct power supply						
Required Material	N.A.						
Required Equipment	N.A.						

The electrical connection is the customer's responsibility.

The electrical connection must only be performed upon completion of positioning and any fixing and at the end of assembly of all parts that make up the component.

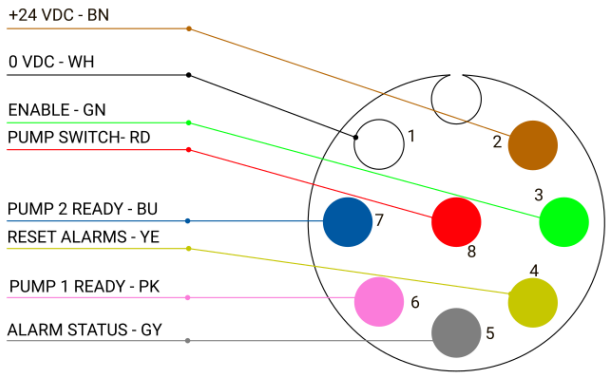
To perform the electrical connection, take the cable with the industrial electrical plug supplied (if the plug is blue it must be connected to a system with voltage equal to 110 VAC or 220 VAC, otherwise if red it must be connected to a system with voltage equal to 380 VAC) and connect it to the customer's company electrical system.

For connections to PP pumps, there are two 3-pole cables and earth for each pump that must go to the appropriate pump; specifically, to the solenoid valve that controls the pumping system and to the level sensor. Follow the connections shown in the pump manual.

ATTENTION!
This is a standard, but there may be variations. Check the specific project drawing for your system.

ATTENTION!
In case of need for cables of particular dimensions, contact the manufacturer's technicians.

Furthermore, it is possible to connect it to an external interface, so as to control it remotely, through appropriate Ethernet connectors (located inside the electrical panel, in the door area, under the display block) and M12 -- 8 pole connector.



PIN	COLOR	DESCRIPTION
1	WHITE	0 VDC
2	BROWN	+24 VDC
3	GREEN	ENABLE
4	YELLOW	ALARM RESET
5	GRAY	ALARM STATUS
6	PINK	PUMP 1 READY
7	BLUE	PUMP 2 READY
8	RED	FALSE: PUMP 1 RUN TRUE: PUMP 2 RUN

Through this connector the component can communicate with an external system, providing system status signals and, in case of alarm, allows the execution of anomaly reset from remote. Signals are exchanged through clean contacts, just provide the indicated power supply in the respective pins.

ATTENTION!
The contact must not be powered with voltages different from those indicated

ATTENTION!
Being a continuous system, if the power connections are reversed, the component is damaged, even permanently.

5.2.2 Pneumatic

Authorized personnel		**PPE to wear**					
Component Status	Component installed and shut down						
Supply Values	See chapter 2.2						
Required Preparations	Working pneumatic air system						
Required Material	N.A.						
Required Equipment	N.A.						

The pneumatic connection is the customer's responsibility.

To connect the air system, bring the tube of dimensions indicated in chapter 2.2 to the customer's pneumatic system inlet.

For connections to PP pumps, there is an 8x6 dimension tube output that must be connected to the pneumatic inlet of the feeding system (one for each pump). Follow the connections shown in the pump manual.

ATTENTION!
In case of need for tubes of particular dimensions, contact the manufacturer's technicians.

5.2.3 Fluidic

Authorized personnel		**PPE to wear**					
Component status	Component installed and shut down						
Necessary preparations	Dosing system present (no need for it to be working)						
Materials needed	Connection hose with nut for locking on the system						
Equipment needed	Dedicated fixing key						

The fluidic connection is the customer's responsibility.

To connect the component to the dosing system, bring a tube to the component's fluidic outlet, which is located at number 08, Figure 1, chapter 2, with the dimensions shown in chapter 2.2.

For connecting tubes to pumps, there is an armored tube at the component inlet for each pump, which must be connected to the pump's fluidic outlet. Follow the connections shown in the pump manual.

ATTENTION!
Make sure the tube is well connected and securely, otherwise there is a risk of fluid leaks from the fitting.

5.3 Commissioning

Component commissioning is performed once the positioning and connection operations are completed. Before performing component commissioning, the following checks must be performed:

- Verify that component positioning has been performed correctly;
- Verify that connections have been connected correctly;
- Verify that the component is free of dirt or residues of various types;

ATTENTION!
If even one of the points above is not compliant, commissioning must not proceed.
Commissioning must only proceed when all points have been completed successfully.

6 SOFTWARE

This chapter aims to provide in-depth information about the software part of the component, specifically looking at both the operator terminal and the screens that are displayed and how to change screens.

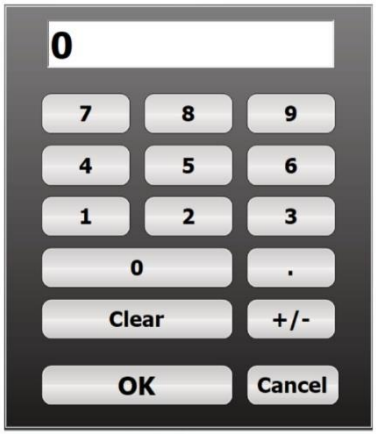
The operator terminal is touch type (touch screen) and is used to view the current screen, change screens, control the status of values within the component. The software is started automatically as soon as the component is powered.

This symbol appears in any screen when an alarm occurs. By pressing this symbol, you access the ALARMS AND SIGNALS screen and you can view the alarm and, if necessary, reset it.

By pressing any interactive field of a screen, the numeric keypad appears that helps the operator fill in the field itself. The keypads can be of two types:

Alphanumeric keypad: appears in case you need to enter texts as well as numbers. It is typically used to enter username, password, recipe name, or similar fields. Some particular keys are:

- CAPS LOCK: Select lowercase/uppercase character;
- BACK: delete the last character inserted;
- CLEAR: Clear all values in the field;
- OK (ENTER): confirm the characters entered and close the keypad;
- CANCEL: Close the keypad without making any changes.



Numeric keypad: appears if you only need to enter numbers. It is typically used to enter passwords or similar fields. Some particular keys are:

- +/-: converts values from positive to negative;
- CLEAR: Clears all typed values;
- OK: Confirms the entered heats and closes the keypad;
- CANCEL: Closes the keypad without making any changes.

The list of messages (if present) and alarms that may appear for this system are shown in chapter 9.

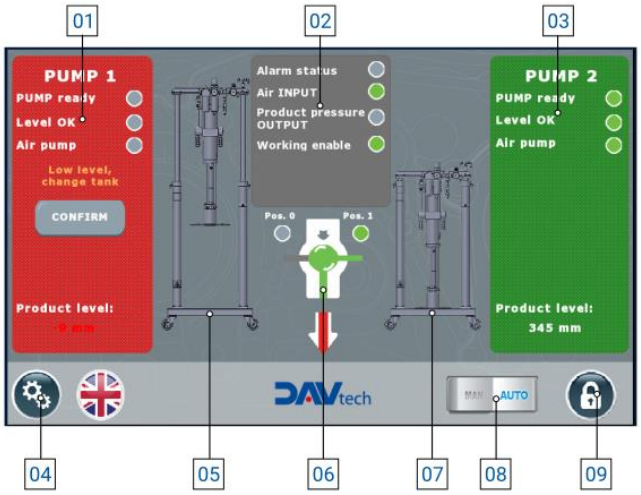
In case of alarms in progress, when the program starts, the ALARMS AND SIGNALS screen immediately appears accompanied by an intermittent sound.

TO ACCESS THE SETTINGS MENU, THE FOLLOWING CREDENTIALS MUST BE USED:

USERNAME: adm **PASSWORD:** 574510

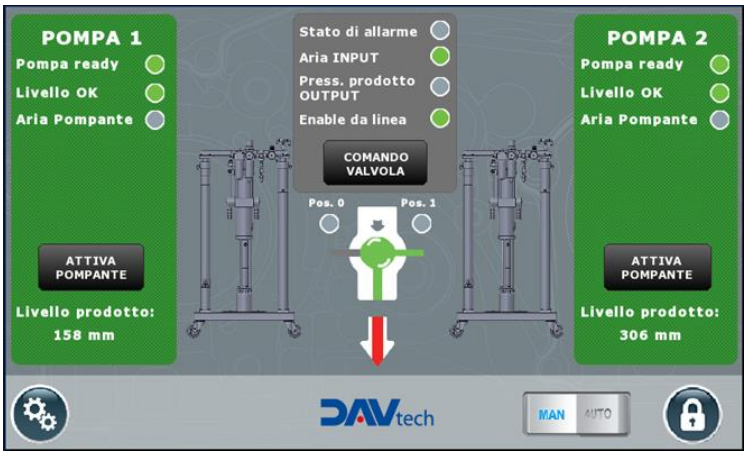
Access and modification of parameters in the menu is allowed only with prior authorization from the manufacturer's technicians

6.1 HOME screen



1) Menu that identifies the status of **PUMP 1**, in which the following are present:
   a) **Pump ready:** Indicates that the pump is ready to work;
   b) **Level OK:** Indicates that the fluid has not reached the minimum level;
   c) **Pumping air:** Indicates that the pump is pneumatically powered;
   d) **Confirm:** In this case, the fluid inside the pump is exhausted; therefore, the drum change alarm is present. Once the drum is changed, this button must be pressed to signal to the system that the pump is OK;
   e) **Product level:** When the level is OK, the product level is indicated in real time.
2) Menu that identifies the status of the **PP-TANDEM** component, in which the following are present:
   a) **Alarm status:** Identifies if an alarm is present within the component (not related to pumps);
   b) **INPUT air:** Indicates whether the component is pneumatically powered or not;
   c) **OUTPUT product pressure:** Indicates if pressure is present from the output product, through appropriate pressure switch; that is, if the product is going to the dosing system;
   d) **Enable from line:** Indicates that the server to which it is connected, or the system to which it is connected, has given it work enable confirmation.
3) Menu that identifies the status of **PUMP 2**, in which the following are present:
   a) **Pump ready:** Indicates that the pump is ready to work;
   b) **Level OK:** Indicates that the fluid has not reached the minimum level;
   c) **Pumping air:** Indicates that the pump is pneumatically powered;
   d) **Product level:** When the level is OK, the product level is indicated in real time.
4) Button to access the **settings** menu (chapter 6.2);
5) Animated image that indicates the state of the pump, based on the drum change alarm;
6) Animated image that indicates the state of the 3-way valve, whether it takes fluid from pump 1 or pump 2;
7) Animated image that indicates the state of the pump, based on the drum change alarm;

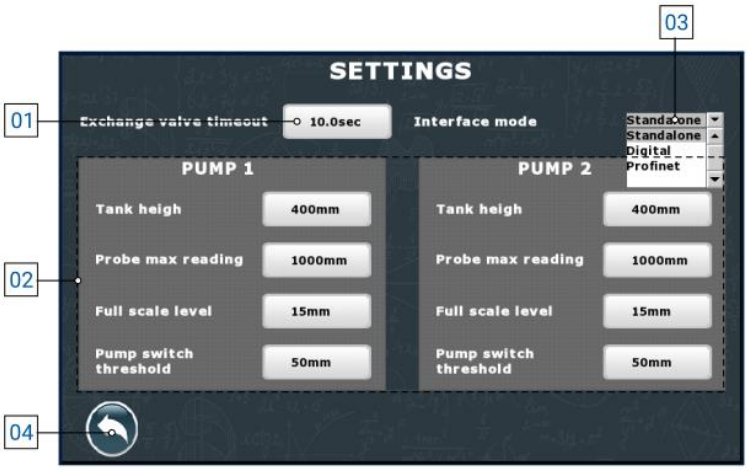
8) Selector that allows the component to go into **automatic or manual mode**. If the selector is set to manual mode, the main screen changes and becomes as follows:



In this case, you can decide which of the two feeding systems to activate through the appropriate "**ACTIVATE PUMPING**" button, while with the "**VALVE COMMAND**" button you change the state of the 3-way valve, so as to put it in communication with the desired feeding system;

9) Button that allows to **unlock** the selector and the settings menu;

6.2 SETTINGS MENU screen



1) **Valve change timeout:** System waiting time to wait for the 3-way valve to perform the state change. If it does not occur within this time, it sends an alarm signal to the system;
2) **Menu of the two pumps, in which there is:**
   a) **Drum height:** Indicates the actual drum height. This parameter is used to calculate the sensor stroke and, therefore, when the drum reaches the minimum level;
   b) **Max sensor reading:** Indicates the maximum reading range that the sensor can have beyond which it sends an incorrect reading alarm;
   c) **Level FS:** Indicates the drum height compensation value to have a correct reading of the actual fluid height;
   d) **Pump change threshold:** Indicates the value at which the level sensor must arrive before performing the pump change;
3) **Interface mode:** Indicates the mode with which you want to perform communication with the component, namely:
   a) **Standalone:** Indicates that commands are given from the screen that accompanies the component;
   b) **Digital:** The machine works in automatic mode;
   c) **Profinet:** Indicates that the machine is connected via cable to the customer network and is controlled by the customer system.
4) **Back:** Returns to the previous menu, see chapter 6.1

7 PROCEDURE

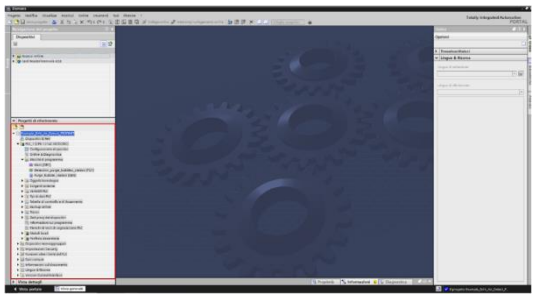
This chapter aims to explain the main configurations that can be used on the component that is the subject of this manual. Specifically, it aims to explain in detail:

- How to perform system configuration for communication via PROFINET;

7.1 PROFINET configuration

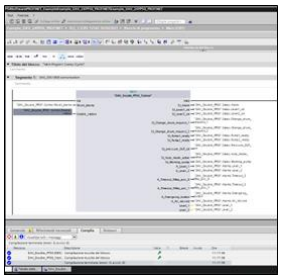
The bubble detection and purge system can be connected via PROFINET to communicate with a PLC or external line to provide process data, such as pressure values, number of purges performed, alarm states. The program used to perform the configuration is TIA Portal v17.

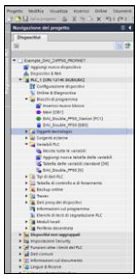
01



- Open TIA Portal V.17
- Make sure to be in offline mode;
- Open the example in the "Reference Projects" section;
- The .gsd file necessary for communication with the component is automatically installed.

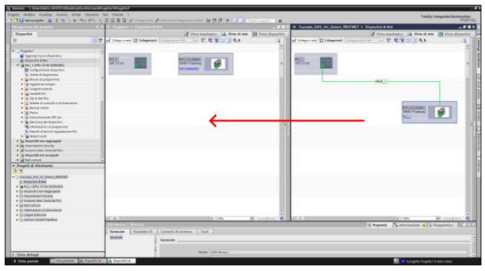
02





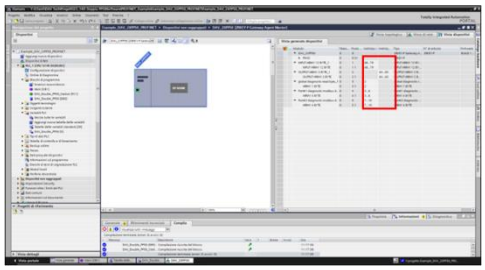
- Copy the FC function "DAV_2XPP50_Station"
- Copy the variable table "DAV_Double_PP50"

03



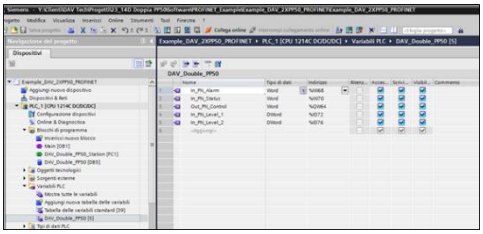
- Copy the GSD device "DAV_2XPP50" in your Devices&Networks section and assign the desired IP address

04



- Set the INPUT and OUTPUT addresses you want to have in your project

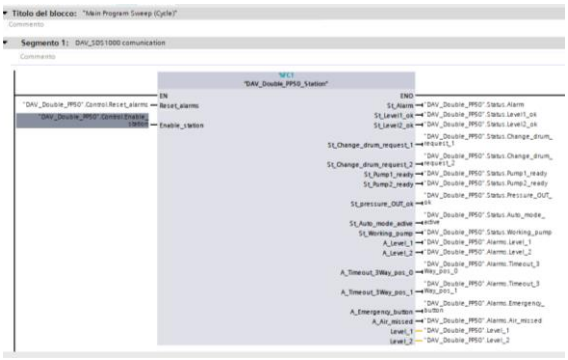
05



- Update the variable table "DAV_Double_PP50" with the new INPUT and OUTPUT addresses
- Compile the Hardware and Software configuration and load it into your device;
- Activate TIA Portal online mode;
- Verify correct communication with devices

The following provides a brief description of the PLC-set commands for the tandem station.

CATEGORY	DESCRIPTION
System status	Alarm
System status	Level 1 OK
System status	Level 2 OK
System status	Drum change request 1
System status	Drum change request 2
System status	Pump 1 ready
System status	Pump 2 ready
System status	Output product pressure OK
System status	False = MAN mode / True = AUTO mode
System status	False = Pump1 run / True = Pump2 Run
Alarm	Pump 1 level
Alarm	Pump 2 level
Alarm	3-way valve timeout position 0
Alarm	3-way valve timeout position 1
Alarm	Emergency pressed
Alarm	Supply air
Process data	Pump 1 level
Process data	Pump 2 level
Control	Alarm reset command
Control	Station enable command



8 MAINTENANCE

Maintenance interventions are all those activities to be performed on the component which, if performed correctly, allow it to have a longer life. In general, maintenance is divided into two groups:

- **Ordinary maintenance**, which are interventions at regular intervals or that can be performed by the customer's personnel, are the most important activities as they allow the component to be maintained in good working conditions;

ATTENTION!
Ordinary maintenance interventions must be performed with the methods and timing indicated in the following chapters.

- **Extraordinary maintenance**, i.e., all those interventions that are not at regular intervals or that have not been foreseen, or interventions that cannot be performed by the customer. They can also arise from the lack of ordinary maintenance interventions.

ATTENTION!
Extraordinary maintenance interventions must be performed together with the manufacturer's specialized technicians.

Regarding frequency, it must be considered that:

- **When necessary:** Operation to be performed when the need to perform it is seen;
- **Every machine start or end of work:** Indicates a daily time period, in general. This can imply every 24 hours (therefore at the beginning of shift every day, or end of shift every day), or even more frequently, based on applications;
- **Long pause:** Indicates a time period greater than approximately one hour;
- **Every drum change:** Indicates every time the supply system is changed (tank, drum, cartridge or other);
- **Every mixer disassembly:** Indicates that every time the mixer is replaced, a specific operation must be performed;
- **Weekly:** Indicates a time span equal to seven calendar days;
- **Monthly:** Indicates a time span equal to one calendar month;
- **Semi-annual:** Indicates a time span equal to six calendar months;
- **Annual:** Indicates a time span equal to one calendar year.

ATTENTION!
The times indicated below are indicative as they depend on how the component is used. Follow the variations suggested by technicians.

Assigned	Description	Frequency	Chapter
	Perform superficial cleaning of the component	Every component start or end of work	\
	Perform a check for leaks from the pneumatic and/or fluidic circuit	Every component start or end of work	\

9 SYSTEM MESSAGES

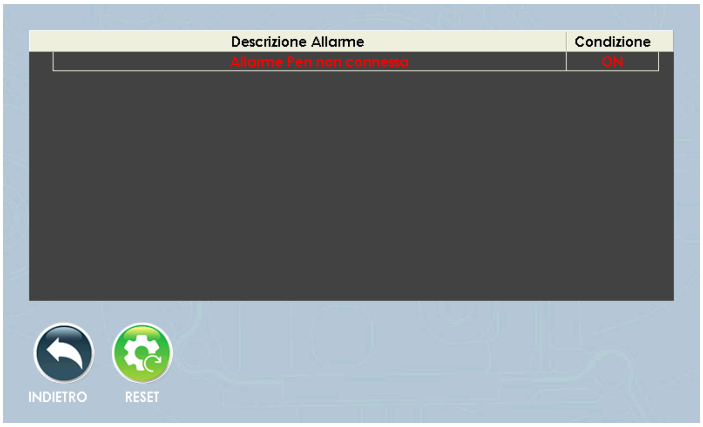
This chapter deepens and lists the two types of messaging that are present within the component. Specifically, these types are present:

- **Alarm:** warning signal from the component to the operator indicating a problem, which can be electrical, pneumatic or generic in nature;

This chapter lists all the messages that the system produces, with related explanation, and all the alarms that the system emits, with related explanation and method of resolving the specific alarm.

In general, to remove an alarm, you must:

- Identify the alarm (if more than one alarm is present, identify only one);
- Resolve the cause of the alarm, as indicated in the next chapter;
- From the operator terminal access the alarm screen by pressing the yellow triangle symbol. A screen like the following figure opens;
- Reset the specific alarm;



9.1 Alarms

ALARM	CAUSE	SOLUTION
3-way timeout alarm pos. (0/1) **Emergency pressed alarm** **Missing air alarm**	The 3-way valve cannot reach the commanded position Emergency button pressed 5 bar inlet is not reached	Check that the connector mounted on the check box positioned on the upper part of the component is correctly connected and powered. Verify that there are no foreign bodies that prevent correct operation. Check the inlet air pressure
		Resolve the problem for which the button was pressed and reset it
		Verify correct system power supply
3-way timeout alarm pos. (0/1)	The 3-way valve cannot reach the commanded position	Check that the connector mounted on the check box positioned on the upper part of the component is correctly connected and powered. Verify that there are no foreign bodies that prevent correct operation. Check the inlet air pressure
Emergency pressed alarm	Emergency button pressed	Resolve the problem for which the button was pressed and reset it

10 END OF LIFE

End of life means all those activities that put the component out of service. End of life activities can be:

- **Storage**, meaning when the component is temporarily placed in the warehouse for future use;
- **Stocking**, meaning when the component is placed in the warehouse for an unspecified period waiting for a third party to buy the component;
- **Dismantling**, meaning when the component has reached the end of working period, whether due to age, obsolescence or failures that cannot be repaired, or that can be repaired but it is more convenient to buy a new component.

If installation is not planned in the short term, the component can remain packaged and must be stored in a sheltered and preferably closed place. The ambient temperatures to be respected are shown in chapter 2.2.

Instead, for dismantling and consequent scrapping of the component or its parts, the different nature of the various components must be taken into account and differentiated scrapping must be performed. It is recommended to entrust specialized companies for this purpose and the laws in force regarding waste disposal must always be observed.