D4-L

User Manual

Polígono Industrial Agustinos, calle G, nave D-34
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31160 ORCOYEN (Navarra) ESPAÑA
e-mail:melton@melton.es
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Declaration of conformity

The product: _____

Model no.: _____

Serial no.: _____

Year of manufacture:_____

Described in the enclosed documentation is in conformity with:

- Directive 2006/42/CE of 29 December 2009 replacing the Directive 98/37/EC of 22 June 1998 relating to the approximation of the laws of the Member States relating to machinery, combining in a single text Directives 89/392/EEC of 14 June 1989, 91/368/EEC of 20 June 1991, 93/44/EEC of June 14, 1993 and 93/68/EEC of 22 July 1993. Directive used law UNE-EN ISO12100:2012, relative to safety of the machines. Evaluate of risk, law UNE-EN 60204-1, relative to safety of the machines, laws UNE-EN 61310-1, UNE-EN 61310-2 and UNE-EN 61310-3, relative to safety in machines. Indication, marking and actuation.

- Directive 2014/35/UE of April, relating to electric equipment.

- Directive 2014/30/UE of April, relating to electromagnetic compatibility.

- Directive 93/68/EEC of July, amending Directive 73/23/EEC, and Directive 89/336/EEC.

Within the scope of the specifications indicated in the chapter describing the equipment with a B1 risk level. Since it is intended to form part of a set of machines which, to obtain a result, are arranged and connected to perform together, it cannot be operated until the set of machines has been declared in conformity with the applicable Directives by the person responsible for the final assembly.

*Orcoyen, on :*_____

*Signed.:*_____

Gonzalo Marco, Managing Director

VALCO MELTON

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31160 ORCOYEN (Navarra) SPAIN

VALCO MELTON

CONTROL REGISTRATION

CONTROL #: .....

DATE: .....

ELECTRIC CHECK: o

CONTROL BOARD CHECK: o

TEMPERATURE CONTROL CHECK 150/180°C: o

HYDRAULIC CHECK (100 bar): o

PNEUMATIC CHECK: o

APPLICATOR SERIAL NUMBER:

VALCO MELTON

GUARANTEE

DISTRIBUTOR:.....

CONTACT:.....

ADRESS:.....TELEPHON.....

OEM:.....

ADDRESS:.....

TYPE:.....BRAND:.....MODEL:.....

USER:.....

CONTACT:.....

ADDRESS:.....TELEPHONE :.....

SYSTEM LOCATION:.....

DATE OF INSTALLATION: ..... GUARANTEE UNTIL:

APPLICATOR SERIAL NUMBER:

IMPORTANT!

THIS INSTRUCTION MANUAL SHOULD BE KEPT IN AN ACCESSIBLE PLACE KNOWN TO ALL OPERATORS AND MAINTENANCE PERSONNEL.

READ THE INSTRUCTIONS CAREFULLY BEFORE OPERATING THE MACHINE AND FOLLOW THEM WHILE THE MACHINE IS IN OPERATION.

FOLLOW THE SAFETY INSTRUCTIONS PROVIDED IN THIS MANUAL WHEN USING AND HANDLING THE MACHINE.

IF YOU FAIL TO FOLLOW THE SAFETY INSTRUCTIONS, THIS MAY GIVE RISE TO BURNS, INJURIES AND EVEN IRREVERSIBLE DAMAGE. YOU MAY ALSO DAMAGE THE EQUIPMENT OR OTHER MATERIALS.

WARNING:

If you alter the function, performance or safety aspects of the machine, replacing original parts with other similar but not identical components (substantial alterations), without the authorisation of MELTON and as specified in Directive 89/392/EEC, you will be classified as a manufacturer and therefore become liable for the alterations made.

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CHAPTER 1
SAFETY INSTRUCTIONS

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1.1. SYMBOLS AND TERMS:

Miscellaneous prohibitions

European Community markings

Danger: hot surface

Note of special interest

Miscellaneous precautions

Use of goggles required

Precaution: electric current

Use of safety gloves required

Precaution: flammable liquid

Precaution: risk of fluid leakage under high pressure

Precaution: risk of entrapment between mobile parts

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Burns:

Burns can be caused by the uncovered parts of the applicator, such as the guns or by splashes of hot melt.

The hot adhesive under pressure in the nozzles can cause serious injuries to the skin.

Qualified personnel:

This is personnel (technical staff) who have acquired sufficient know-how in a specific field, either through training or from experience.

These personnel must be familiar with safety and accident prevention standards, and have general knowledge of the technical aspects of the machine.

Protective clothing:

This clothing will be compliant with EN510 and EN340 standards, protecting against fast-moving particles and high temperatures.

It will be as tight as possible to prevent it from catching on mobile machine parts, and the sleeves, waist, legs, etc. will be adjustable to the size of the wearer.

Goggles and face shields:

They will be compliant with the EN 166 standard, protecting against fast-moving particles and high temperatures.

Goggles only protect the eyes. Face shields are therefore preferable, since they protect the entire face.

Protective gloves:

They will be compliant with EN 407 and EN 420 standards, protecting the hands against the burns caused by external thermal masses at temperatures of above 100°C.

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1.2. PURPOSE:

This unit has been manufactured according to current safety standards.

This unit has been designed for the purpose described in chapter 2 of this manual, Description.

To use the machine correctly, follow the instructions provided in the Operating Manual, particularly:

- The machine should only be installed and used by qualified personnel, previously familiarised with the operating instructions (contacting the manufacturer whenever necessary) and the risks involved, the safety measures required, including adjustment and maintenance, and expressly forbidden operations.
- This unit has not been manufactured to operate in hazardous, explosive and/or flammable atmospheres
- When working with this machine, wear protective clothing, gloves and face shields and remove rings, bracelets and watches.
- Since the machine is designed to form part of a series of machines, arranged to work together, the hot melt applicator cannot be operated until the entire series has been declared in compliance with applicable directives.
- This machine should never work without the guards provided (which should not be removed). These guards should be checked and maintained with the specified frequency.
- Make sure that the equipment is properly grounded.
- Never operate the machine if you are aware that there is a leak in the glue circuit.
- Maintenance operations and/or repairs should be performed by personnel with basic knowledge of the machine and the mechanical, pneumatic and electric circuits involved.
- Maintenance operations and/or repairs should always be performed with the machine switched off at the mains, and with the main switch blocked.
- Maintenance operations and/or repairs should always be performed with the machine de-pressurised and disconnected from the pressure circuit.

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1.3. FIRST AID:

In case of burns:

Immerse affected part in cold clean water as quickly as possible until the adhesive has cooled.

Do not attempt to remove the adhesive from the skin even when it has cooled as this may cause more serious injury.

Seek qualified medical attention immediately.

In case of an accident with the solvent:

CONTACT WITH THE SKIN: Wash with soap and water and discard all contaminated cloths.

CONTACT WITH EYES: Wash in an eye bath for at least 15 minutes.

INHALATION: In case of overexposure take patient to fresh air and let them rest.

INGESTION: Do not attempt to induce vomiting. Seek medical attention at once.

In case of entrapment:

Press directly the wound with a clean cloth to control hemorrhage..

Protect and immobilize the injured area.

Seek qualified medical attention immediately.

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CHAPTER 2
DESCRIPTION

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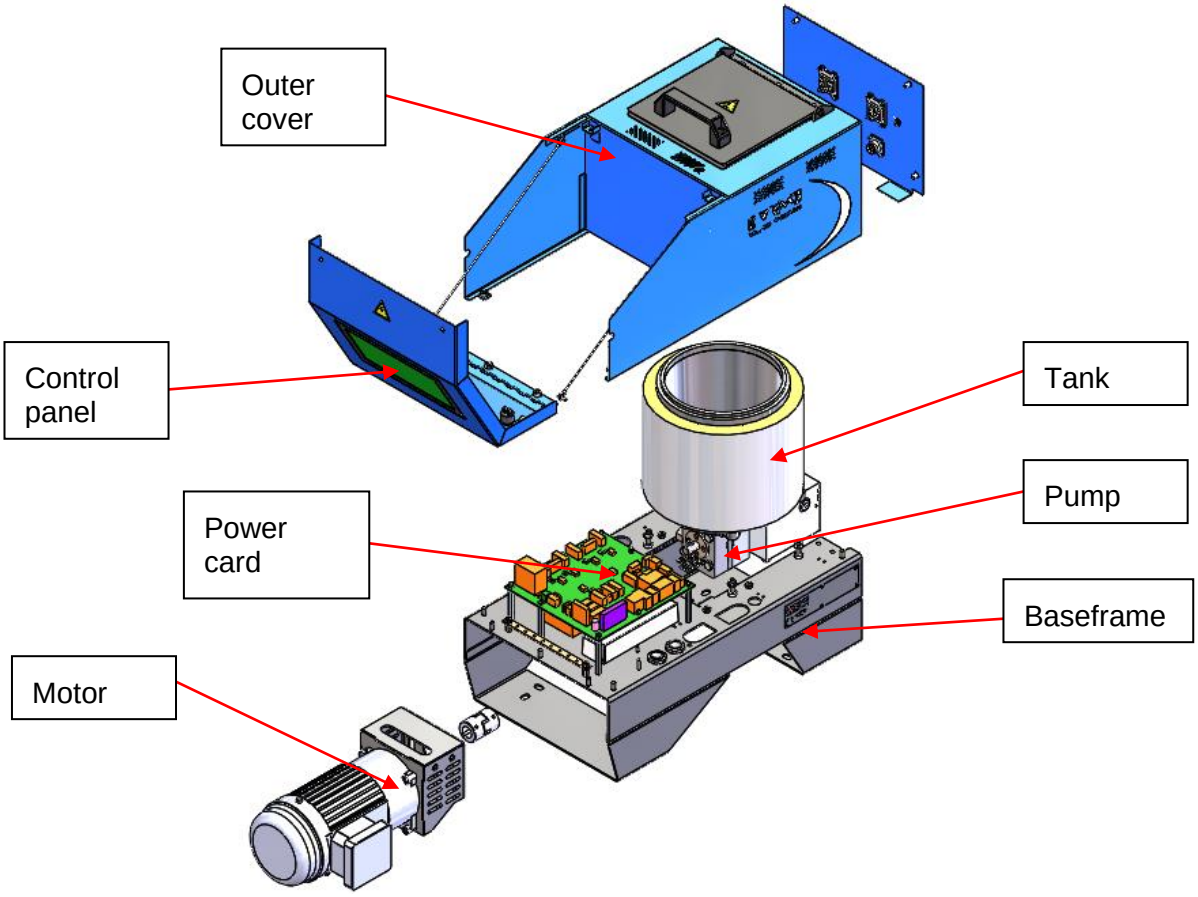
2.1. INTRODUCTION:

This machine transforms the hot-melt or polyurethane (or similar materials) contained in a heated tank from a solid to a liquid state by means of a thermal action. A pump absorbs the adhesive and raised it to a certain pressure to send it to the place of use through hoses.

2.2. MAIN PARTS:

The main parts of the D4-L machine are shown in the following figure:



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2.2.1. Baseframe:

The base that supports the entire machine and where the manifold, the pump and the motor are stored.

2.2.2. Tank:

This is where the hot-melt or other materials are melted; these materials may be in bulk form or in chunks.

The tank is made of cast aluminium and is coated with Teflon to prevent soot and crystallisations. It includes a resistance heating system with probe temperature control (PT-100 or nickel, depending on the temperature control model) from the main control.

2.2.3. Outer Cover:

Prevents accidental access to the inside of the machine as well as possible operational interferences.

2.2.4. Pumping and Distribution System:

It features the following components:

Manifold:

This manifold distributes the Hot Melt to the hoses and guns. Made of aluminium, it is assembled inside the bench. It heats up through internal resistors. The manifold features outlets to connect the hoses and a filter to remove impurities and a regulator. The regulator controls the unit's output pressure.

The manifold should not be dismantled; this operation should only be done if there is an adhesive leak between the tank and the manifold.

Pump:

The pump is what moves the Hot Melt or other thermal fusible product at a certain pressure from the pump manifold through the manifold to the hoses and guns.

The pump is located inside the bench and is driven by an alternating current gearbox. The pump speed is shown on the display located on the front of the control panel.

Gearbox:

The purpose of the gearbox is to control the pump. It is an alternating current motor that is controlled by a vector-controlled frequency variator which transmits the power through a connection to the pump. The motor speed can be manually or automatically adjusted depending on the ratio required in the main machine. It can not exceed 100 rpm.

2.2.5. Electrical System:

It is in the electrical box with the exception of the heat resistors and the motors. All of the control electronics and the power needed to operate the machine are located here.

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2.2.6. Control panel:

It is situated at the front of the machine with the machine operating and adjustment switches.

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2.3. TECHNICAL SPECIFICATIONS:

COMPONENT	*DATA*
GENERAL	
Power supply voltage	220V I+N+T (50/60 Hz)
Hoses (max.)	2
Hydraulic pressure (maximum operating)	2.8 – 55 bar
Noise level	63 dB
Net weight	Depending model
Operating temperature	-10ºC – 50 ºC (32ºF – 122ºF) HR 20% to 80% not condensed
CONTROL	
Operational programming range	15º - 230º C (60º - 446º F)
Temperature control accuracy	+/- 0.5º C (+/- 1º F)
Control type	PID
PUMP	
Pumping capacity (Kg/h)	28,6
Rotational speed	150 rpm
TANK	
Volume (litres)	4
Melting capacity (kg/h)	4,9
Power consumption(W)	1460

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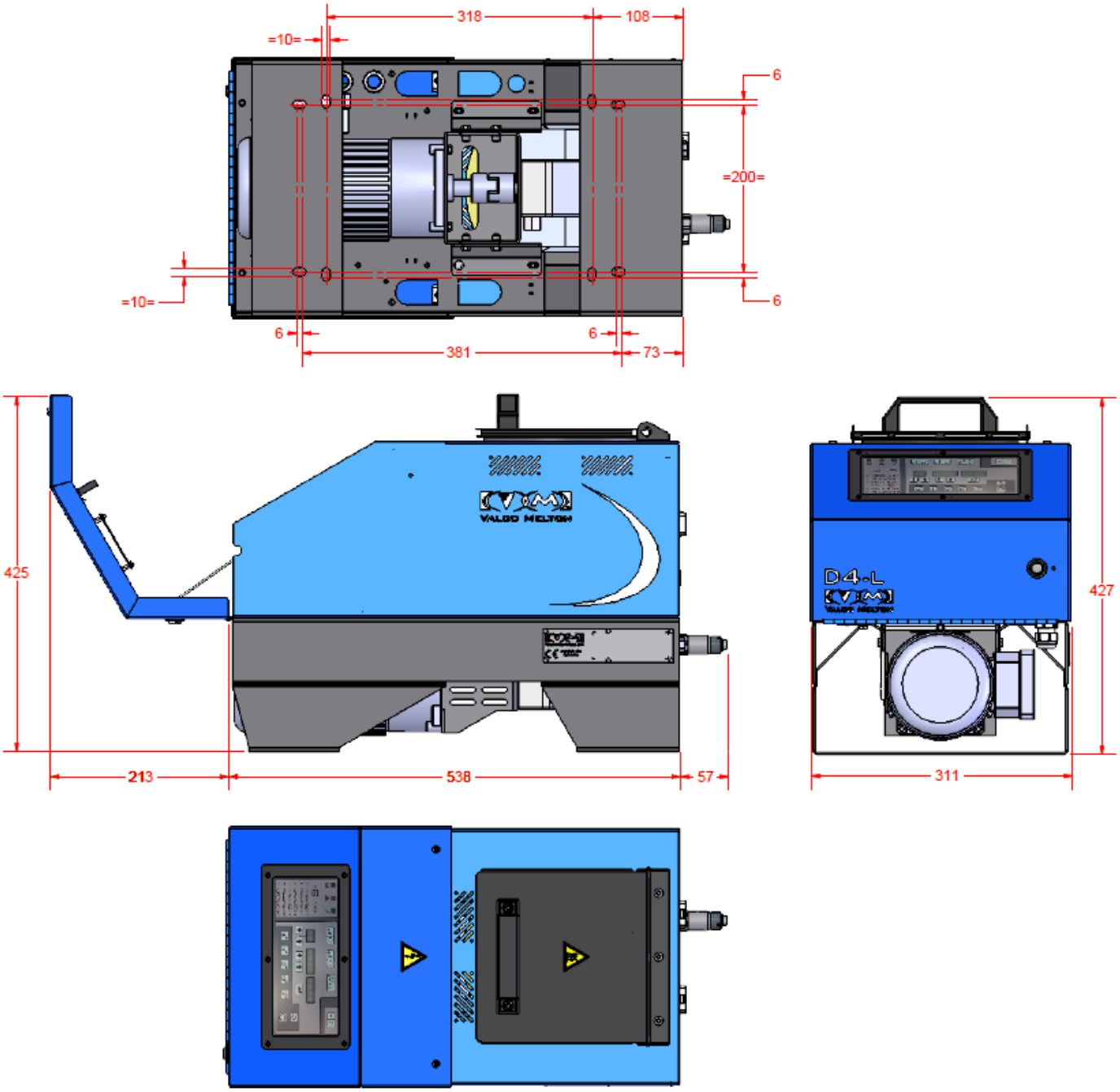
2.4. GENERAL DIMENSIONS:



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CHAPTER 3
MACHINE INSTALLATION

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3.1. INTRODUCTION:

This chapter explains how to install the machine correctly.

WARNING: The operations described in this chapter should be performed by qualified personnel, following the safety instructions.

3.2. TRANSPORT:

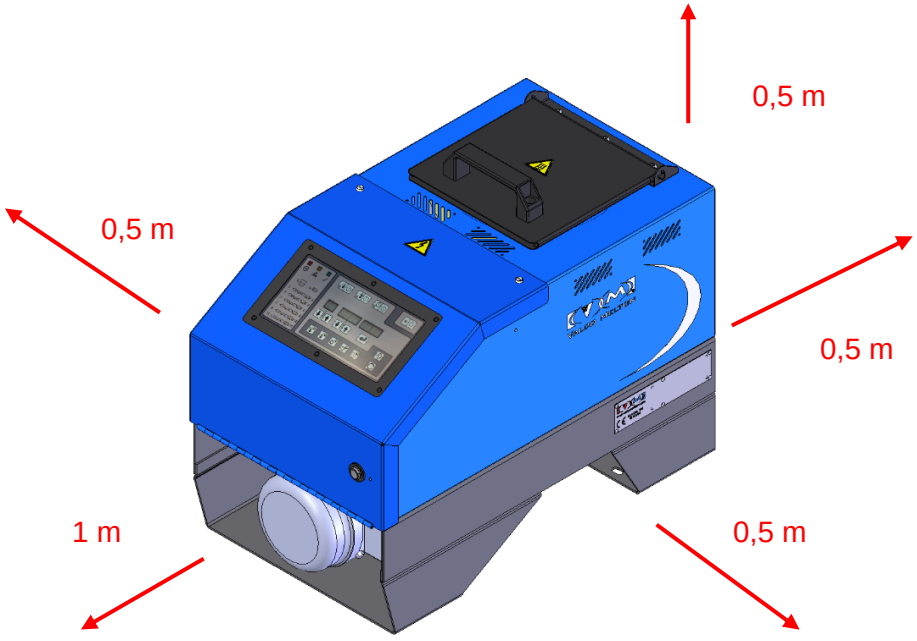
The machine is supplied on a pallet with a wooden frame.

Remove the top and front covers to unpack.

Unpack carefully to prevent damage to the machine. Inspect the machine for damages caused during transport.

3.3 INSTALLATION REQUIREMENTS:

Install the D4-L machine leaving enough space for it to be accessed during operations.



Avoid extreme temperatures (below -10ºC and above +50ºC).

Try to avoid installing the machine where there are draughts. If this is not possible, the guns will need to be protected because they may not work properly if the temperature suddenly drops.

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3.4. MECHANICAL INSTALLATION:

The mechanical installation involves the following:

Positioning the machine:

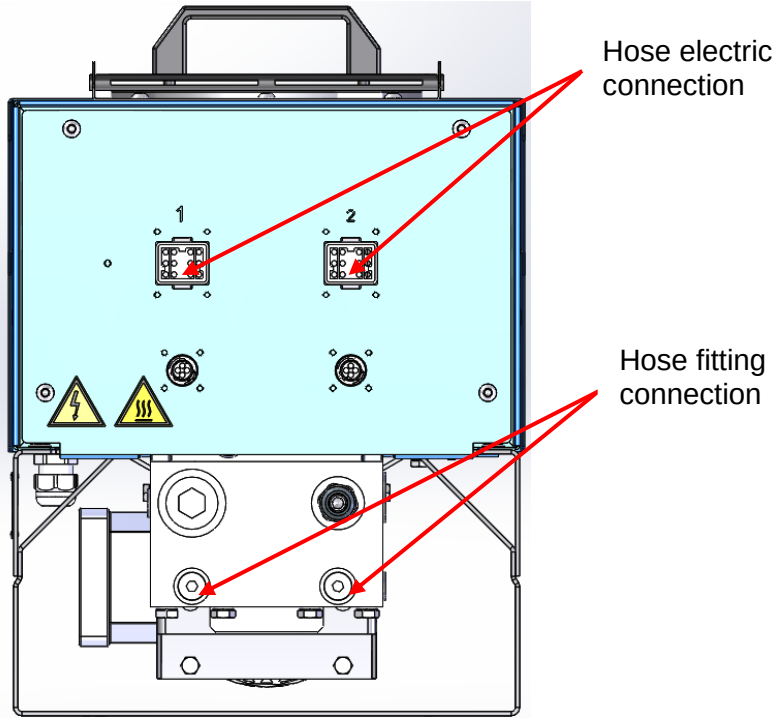
Remove the machine from the pallet using a forklift and position according to the installation requirements (chapter 3.3). The machine features anchor holes on the legs.

Connecting the hoses:

Proceed as follows to connect the hoses:

Make sure the machine has been depressurised before connecting the hose. Set the motor control selector to zero. Heat the machine to melt any adhesive that may be present.

1. Remove the manifold cap. Screw the plug and socket connector together as per the hose diameter. Apply a torque of 40 Nm.
2. Screw the hose to the connector.
3. Hook up the hose electrical connections.
4. Once the hose is at the right temperature, re-tighten the male connectors and the hose.



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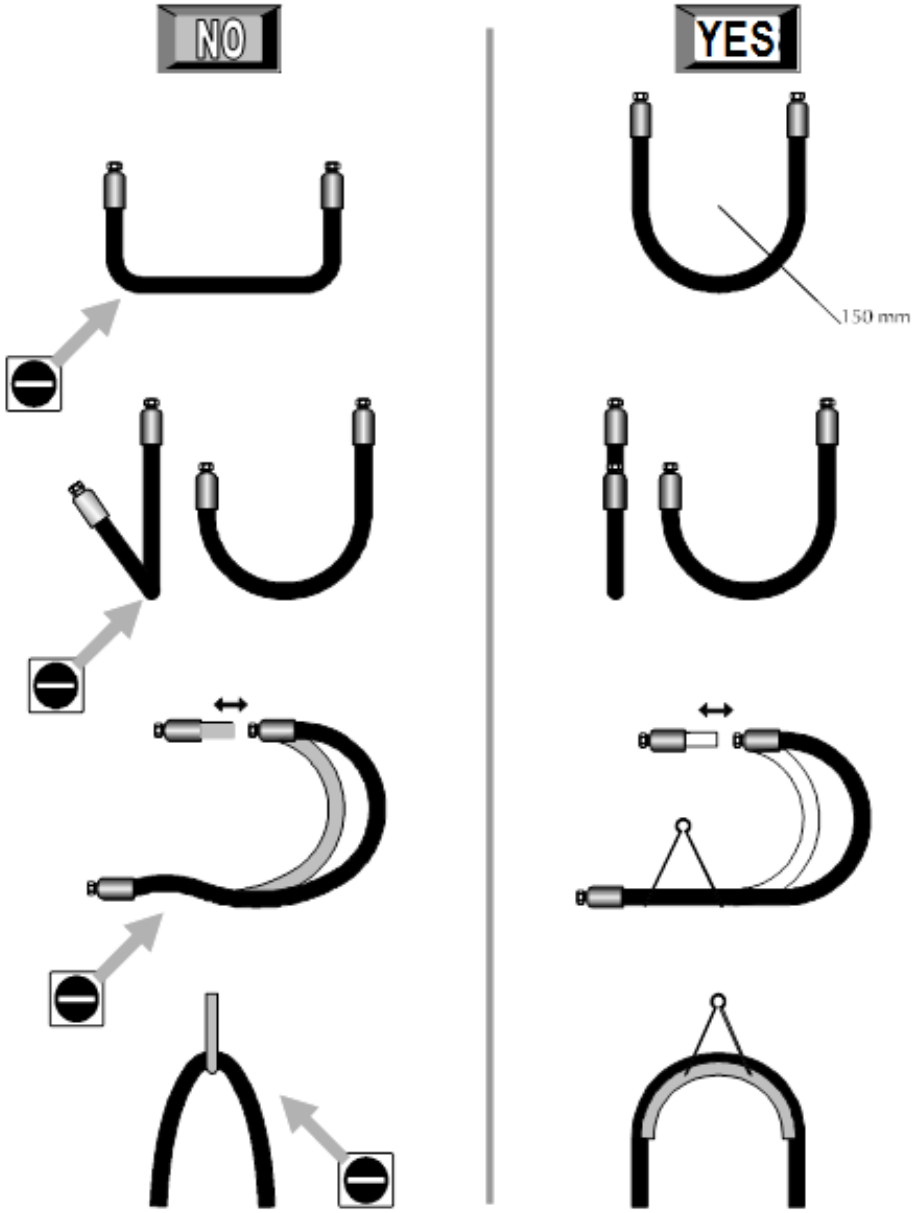
3.4.1. HOSE POSITION:

Never bend the hoses to angles with a radius of less than 150 mm.



Hoses should not be secured to very broad, cold surfaces.

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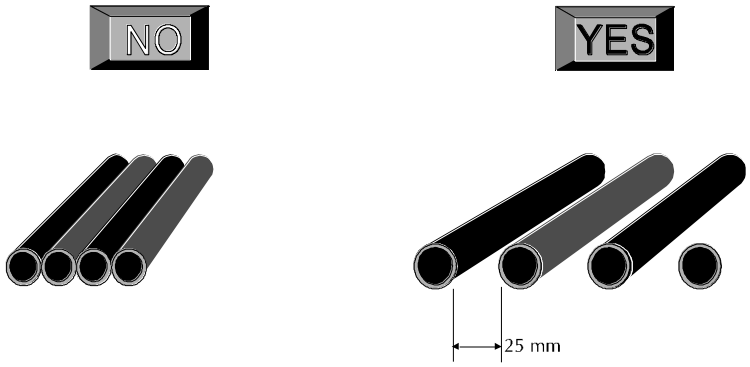
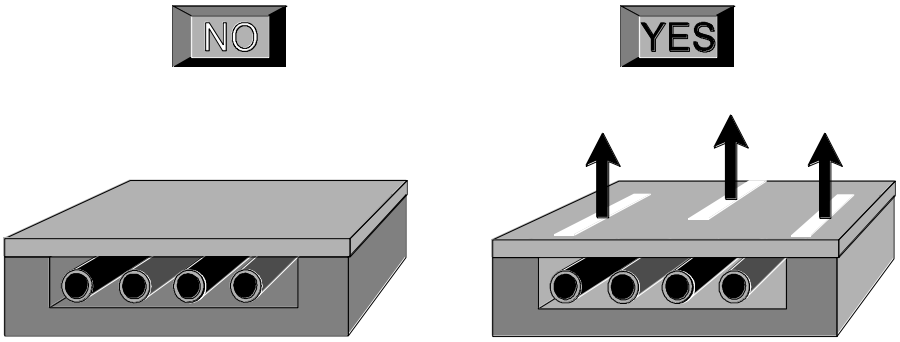
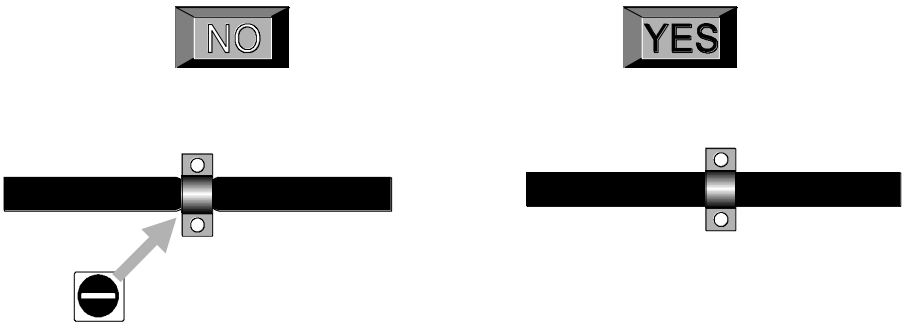
Do not bunch hoses together. Leave at least a 25 mm gap between them so the heat dissipates adequately.



Do not cover hoses. If the hoses need to be covered, make sure there are vents to allow the heat to dissipate.



Do not install hoses with clamps that place pressure on the diameter.



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3.5. ELECTRICAL WIRING:

The electrical wiring depends on the model. See electric diagrams.

Make sure the power source is duly protected and you are using the right cable for the machine's electrical power needs.

Secure the power cord to the machine bench in order to prevent an accident.

Connect the pump permissions to the safety line on the main machine.

When the machine is connected to a main machine, it won't run until the external permission is given.

These terminals are shorted at our factory.

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CHAPTER 4
MACHINE ADJUSTMENTS

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4.1. INTRODUCTION:

The following adjustments should be made before the machine is switched on or while it is working. They will ensure that the machine works properly and safely.

4.2. TEMPERATURE CONTROL:

4.2.1. Introduction:

The temperature of the tank, hoses and guns in the Hot – Melt application equipment is regulated by a digital electronic device controlled by microprocessor.

Regulation is proportional, with factory-set parameters for the separate heating inertias of the tank, hoses and guns.

The temperature is measured by the RTD sensor on each of the heating devices. These can be programmed individually and on each output channel between 30º - 240º C (86ºF – 464ºF).

The range ability (measurement range) of the controller is between -25ºC(-13ºF) and 240ºC(464ºF).

Below -10 °C(40oF), the equipment will display a probe short circuit fault. Above 220 °C(454oF), the display will report on an open probe fault.

4.2.2. Brief description of how the unit operates:

The unit is equipped with proportional temperature control for the heating resistances connected to 2 double hose-gun channels and a special channel for heating the tank, with menus to access parameter programming and control of the operating clearance for the main machine, alarms and different operating functions (PUMP, ENERGY SAVING, etc.), which will be described later.

The control panel includes a 10-digit display with 7 ultra-bright segments showing the unit's operating data, plus the alarms that are produced by the sensor signals. There are also LEDS displaying heating resistance output status, pressure pump, overheating alarms, safety and energy saving status.

Preheat function:

Because the heat inertia of the glue tank is much greater than for all the peripheral devices, these devices reach the programmed temperature much earlier than the tank. This rapid heating process has an ageing effect on resistances and insulation. This phenomenon also creates excessive fluid pressure in the hoses.

To offset this problem, the unit has been fitted with a preheat system that heats all the peripheral devices (hoses and guns) in a sequential manner, while the tank is heated at normal speed. When the tank reaches 75% of the programmed temperature, heat is supplied to the hoses. When the hoses reach 75% of the programmed temperature, heat is supplied to the guns.

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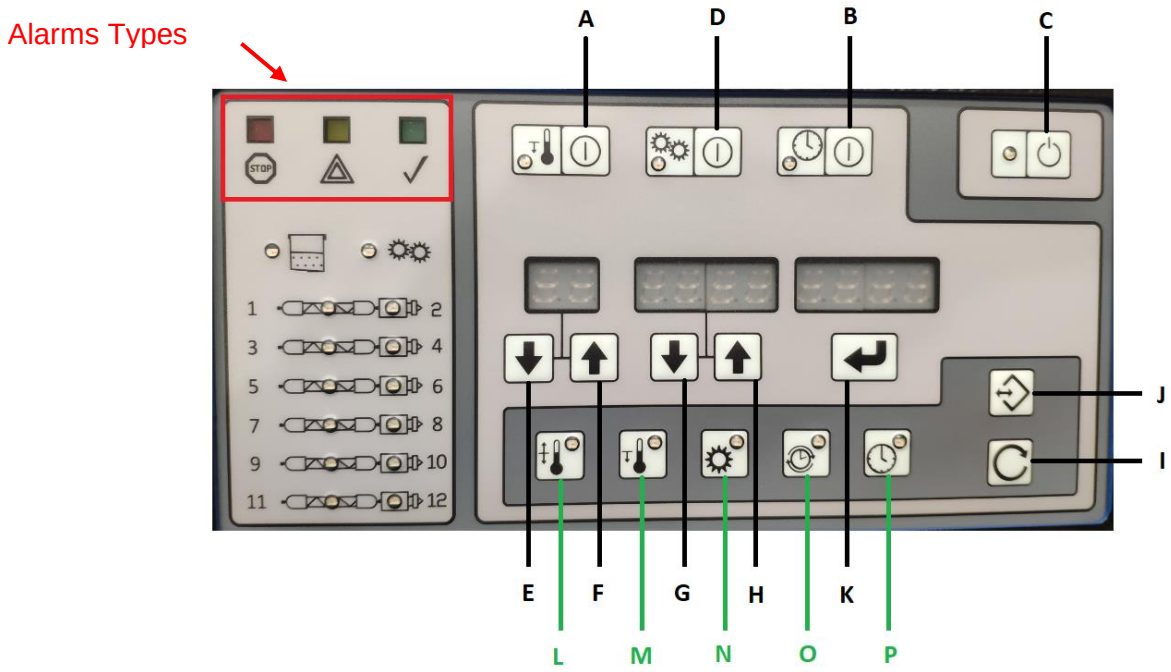
4.2.3. Description of the control panel:

4.2.3.1 Keyboard:

The unit control panel has 11 control keys that provide access to the programme menus and general operating processes.



A KEY: (ENERGY SAVING On/Off). It switches the ENERGY SAVING function on or off, with this function the equipment works with 50%- 80% of energy.

B KEY: (Timer On/Off) It switches on or off the automatic on/off programme of TIMER function.

C KEY: (Heating Control On/Off) It turns on and turns off the equipment. When it is switched on it will return to the operating mode at which it was previously switched off, either ON or ENERGY SAVING. When the equipment is switched off, the display shows the day of the week and the time, and the day of the week and time when it will automatically switch on again if the TIMER function is enabled.

D KEY: (Pump On/Off) It switches the PUMP function on or off.

E AND F KEYS: Navigation keys for channels or programming values.

G AND H KEYS: data change keys for programmable values.

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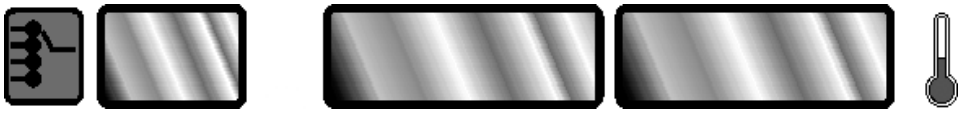
K KEY: (ENTER) This key is used to validate the data that has been changed in the programmes. This key is also used for resetting the audible buzzer alarm.

I KEY: (Programming) Navigation key through all the programming menus.

J KEY: (Enter/Exit Programming) This key enters and exits the programming menu.

4.2.3.2 Display

The control panel has a 10-digit 7-segment display in 3 blocks.



The two digits on the left indicate the device/zone for which the information appears in the blocks of digits further to the right.

The central 4-digit block displays the SET operating temperature and the programmed parameter values.

The 4-digit block on the right displays the PRESENT operating temperature and it is also used as a display in some programming stages.

Channels visualisation*:*

Through navigation keys displays the selected channel, the programmed temperature and the real temperature.

C0	Tank		
C1	Hose EXIT 1	**C7**	Hose EXIT 4
C2	Gun EXIT 1	**C8**	Gun EXIT 4
C3	Hose EXIT 2	**C9**	Hose EXIT 5
C4	Gun EXIT 2	**10**	Gun EXIT 5
C5	Hose EXIT 3	**11**	Hose EXIT 6
C6	Gun EXIT 3	**12**	Gun EXIT 6

4.2.3.3 Indicators LEDs:

- ON/OFF state

LED ON/OFF: This shows the equipment state.

LED TIMER: This shows the TIMER function state.

LED PUMP: This shows the PUMP function state.

LED BM: This shows the ENERGY SAVING function state.

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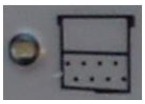
- Heating & pump state

LEDS 1,3,5,7 (9,11 according to equipment): They show the power outputs activation. Hoses.

LEDS 2,4,6,8 (10,12 according to equipment): These lights show that the power outputs to the heating resistances for the extrusion guns are switched on.



LED 0: This shows that the tank heating resistances are switched on.

LED B1: This shows that the pump and the external clearance relay (Ready Signal) are enabled.

- Others estates

LED STOP: stop signal by important failure. Heating off.

LED AL.: show alarm

LED OK: equipment in operative state. (Flashing: waiting time)

LED P. TEMP.: it show that equipment is in temperature programming menu.

LED P. BM.: it show that equipment is in energy saving programming menu.

LED P. PAR.: it show that equipment is in parameters programming menu.

LED P. REL1.: it show that equipment is in on/off TIMER function parameters programming menu.

LED P. REL2.: it show that we are programming the equipment clock

4.2.3.4 Functions:

ON/OFF Function

Heating on/off. By control board, by I/O connection and RS-485 communications. In case of the Modbus communication, it must be connected so the PLC can read the temperatures and controls the equipment.

If is OFF the display shows date and time.

TIMER Function

If it is on, the equipment do the programmed on/off. Estando habilitada, el equipo realiza las conexiones y desconexiones programadas.

PUMP Function:

Press the Pump On/Off Button to turn the pump on (the Pump On/Off LED illuminates green) and turn the pump off (the Pump On/Off LED does not illuminate).

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ENERGY SAVING Function:

The equipment can be set on ENERGY SAVING to obtain important energy savings in five different ways, by selecting the temperatures of all the channels at a programmed % of their operating value (50% to 80%). This function disables the pump and the external permission associated and switches on the LED and the display shows a vertical line.

This function can be entered in five different ways:

- By pressing  the key.
- By programming the timer.
- By enabling the external ENERGY SAVING signal (Option)
- By the end of a programmed time in which there has been no blue shot (Option)
- By RS-485 communications (Modbus). (Option)

Temperature regulation:

This function enables the heating when the temperature descends 2ºC below reference temperature and disables the heating when the temperature is the reference temperature.

This control guarantee a longer durability of the control components and minimize the disturbances emitted to the outside, fulfilling the EMC norm.

Pump and ready unit control:

The pressure pump and the associated external clearance relay (with power-free contacts) are switched on when the temperature of all the resistances (tank, hoses and guns) reaches the temperature range defined by their reference temperature and their maximums deviations. The pump and the ready unit are switched off when any one of them go out of the temperature range.

There is a delayed clearance parameter (P3) that provides extra heating time. The P3 time starts when the last element reaches the temperature range. While the temperature of the tank is in the temperature range, the delay time is inhibited.

In the heating, while the equipment is in a temperature and the delay time is not finished, the Green LED is flashing.

Preheat Function:

The preheat system does that all peripherals (hoses and guns) are warmed up by sequential form while the tank does it at normal speed. When the tank reaches the 75% of the programmed temperature, the energy is applied to hoses. When the hoses reach 75% of the programmed temperature, the energy is applied to the guns.

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4.2.3.5 Alarms:

The unit has several alarms, informing of faults in the measurement sensors, out-of-range temperatures or temperatures above programmed safety levels.

Alarms types

Solid green light: Unit is ready for operation.

Solid yellow light: Temperature is outside set point.

Flashing yellow light + *audible buzzer*: Feeder is not filling the tank.

Solid yellow light and flashing red light: Failure in RTD (displayed by AAA or CCC on display). You have 2.5 minutes to solve warning before machine stop.

Solid red light + *audible buzzer:* Machine security stop. Failure in RTD or overheating. All leds will be disabled and display will flash. Audible buzzer will sound for any feeder or stop alarm. You can stop this buzzer by pressing the  key. Feeder alarm will reset once the level is ok again.

– **Security:**

Whenever a device reaches the programmed safety temperature (P4), the amber LED will light up, the external alarm will be switched on and the red LED will flash off and on for 2.5 minutes. If all the problems have not been solved after 2.5 minutes, the red LED will remain on all the time, the outputs will be blocked (at the main switch) and the equipment will cease to function. The display will flash on and off.

The equipment also includes a safety system with a bimetallic thermostat on the wall of the tank, adjusted to 240ºC (490 oF).

When the thermostat is triggered, it will de-activate the main switch coil, disconnecting the power to the heating resistances but continuing to supply the control electronics, so that the control panel display can identify the device that is the source of the problem.

When the equipment is blocked like this, the sensor temperature readings are frozen and the user can check the status of each sensor.

After repairing the fault, the equipment has to be switched off and on again.

– **Amber:**

Temperature:

Each time the temperature of a device goes outside the programmed ALARM MARGIN (P5, P6 & P7), the alarm signal will be enabled and the out-of-range temperature amber LED will light up solid.

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Sensor faults:

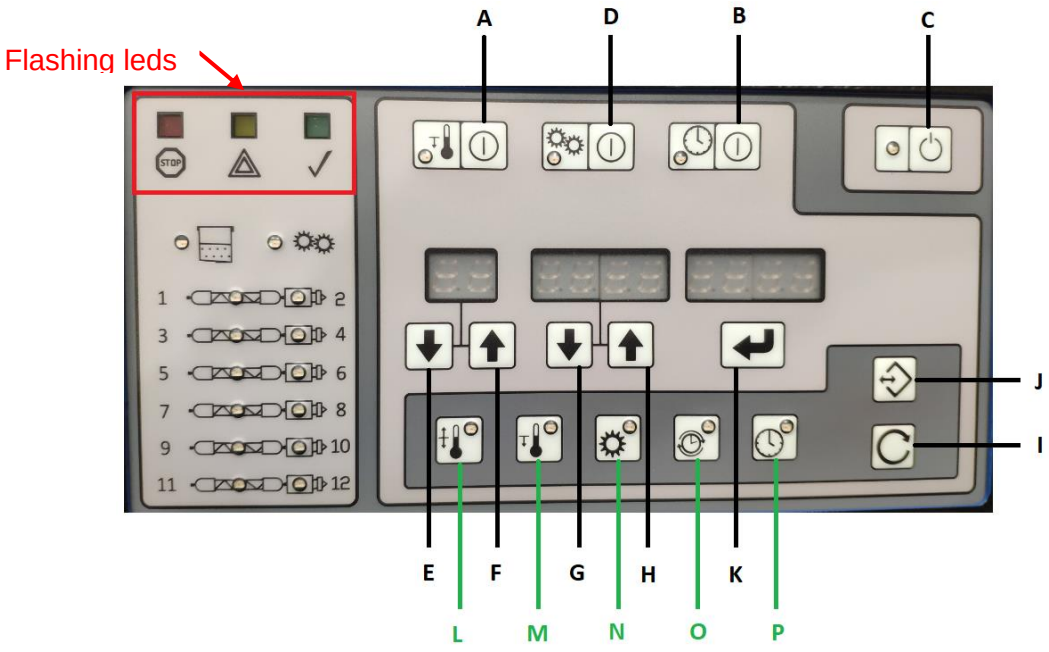
If there is a short circuit in one of the measuring sensors, the equipment will display “CCC” instead of the temperature for the part (tank, hose, gun) involved. If an open circuit sensor fault is detected, the display will show “AAA” instead of the temperature.

When an alarm of this kind occurs and the relevant channel is on, the amber LED will light up, the external alarm will be switched on and the red LED will flash on and off for 2.5 minutes. If all the problems have not been solved after 2.5 minutes, the red LED will remain on all the time, the outputs will be blocked (at the main switch) and the equipment will cease to function.

Filter change alarm:

We get a filter change alarm once the equipment reaches 2000 hours (P10, by default 2000 hours) of work. We can recognize this alarm when the three leds pointed below Start blinking at the same time (Red+Yellow+Green). We can reset the alarm by selecting channel P10 and push clock button.

Alarm reset process as follows:



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Push "J" → You gain access to program menu.

Push "I" → Go to P0. (If you get directly P1 –A go to next step).

Introduce Password → P0 = "123" + ENTER = "K"

Introduce → P1 = "1". + ENTER = "K"

Push "F" until you get to P10.

Push "B" → The filter change alarm is now off.

Push "E" until you get to P1.

Introduce P1 = "0" + ENTER = "K"

Push "J" in order to exit the program menu.

End of filter change alarm reset process.

– **Green**

When this light is on, it means that the temperature of all the devices is correct and that there is no alarm situation. The unit is ready for operation.

4.2.3.6 Connections with the main equipment:

External clearance:

This contact (potential free) is closed when the equipment is prepared to work , that is to say, when the pump permission has occurred.

Alarm indicator:

This contact (free potential) is closed when the control connects the ALARM LED.

Security stop indicator:

This contact (free potential) is closed simultaneously that control activates STOP LED.

Access levels:

There are two level accesses:

a) Programming mode → P0 = 232; P1=[1]

b) Modify all configuration→ P0 = 123; P1=[2]

These two levels imply that the parameter P1 must have three types of access:

a) P1 = 2, no passwords. We can enter with programming mode and modify the parameters P.

b) P1 = 1, we can enter with programming mode but don`t modify the parameters P (except P0 and P1 = [0,1]) ([Acceptable range])

c) P1 = 0, when we try to enter in programming mode appears P0 to introduce the password. If we push ENTER with a incorrect password, the system goes out of the programming mode. Push ENTER button with a correct password the system enter to the programming menu, and then we must confirm to fix the level access. If we don't confirm the access, then we lose the privilege when we go out of the programming

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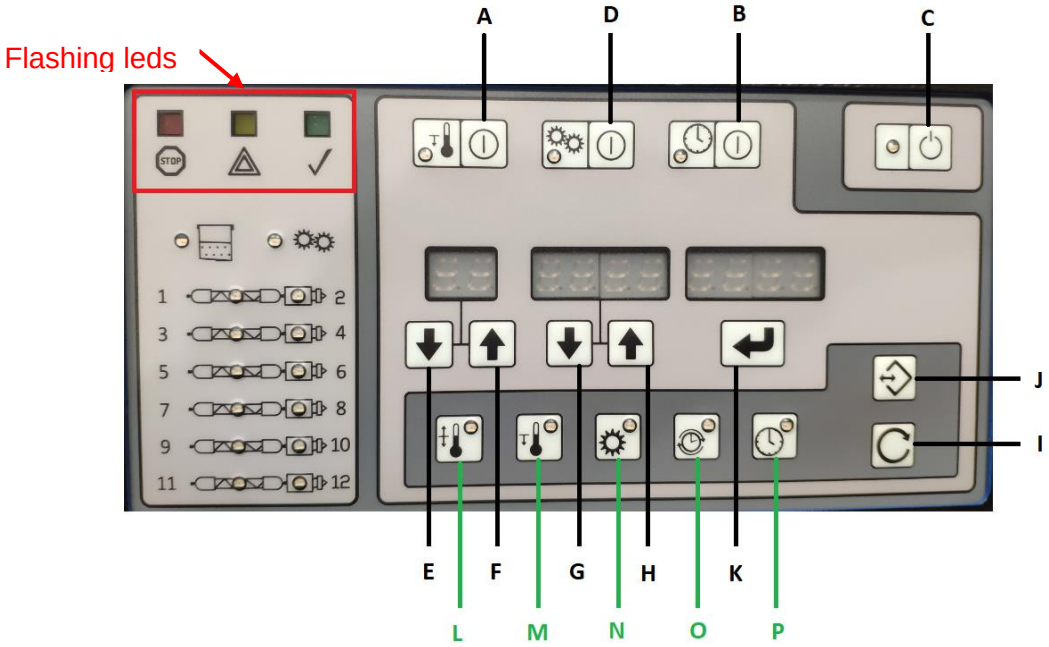
menu. We could introduce both passwords (232, 123), in case of introduce 123, then we could go to programming menu to modify the parameter P1 to 2. (It isn't necessary to introduce the passwords with any order 232→123).

The navigation in the access password (P0) will permit to go 0 to 255 in any direction, growing or decreasing.

The parameter P0 will be free access but when we visualize it, always we see 000, independently of level access.

The parameter P1 will have limited the possible modifications depending on level access or password.

4.2.3.7 Program menus:



Temperature programme menu:

To pre-select the operating temperature for each hose and gun and the tank in a range between 30ºC and 240ºC (86-464ºF). Below 30ºC (86ºF) the device is permanently switched OFF.

LED on: The working temperature of the different devices is being programmed.

ENERGY SAVING programme menu:

To pre-select a % of the operating temperature for the tank, hose and guns.

Different percentages of the operating temperature can be selected for the tank, hoses and guns when the equipment is in ENERGY SAVING mode. Values between 50 and 80% can be selected.

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LED on : The % values of the operating temperatures for the different devices (divided into 3 groups: tank, hoses, guns) are being programmed for adjustment in ENERGY SAVING.

General operating parameters programme menu:

To enter operating parameters (optionally, with a password) such as temperature measurement unit (ºC or ºF), clearance delay time, maximum temperature, temperature deviations that cause alarms, enabled options, display of operating times, etc.

There is a parameter that automatically copies the value of the temperature selected for the tank on all the output channels that are enabled (channels that are not OFF).

LED on : The general operating parameters are being programmed.

Timer programme menu:

To enter automatic switch-on and switch-off times. Up to 2 on/off time groups can be programmed for each day of the week, and the switch-over to ON, OFF or ENERGY SAVING.

LED on : The timer on/off parameters are being programmed.

Time adjustment programme menu:

To enter the current day of the week and the time on the timer.

LED on : The hour and date are being set on the timer

4.2.4. Setting program menus:

To programme operating parameters, press the  button on the control panel, and then press the  button to select the required programme menu.

To end the process, press  again.

In case of the equipment remains during 1 minute in the programming menu without press any button, the equipment log off the programming menu.

Programming operating temperatures:

To enter this programme, press  button once.  (led will light).

The two digits on the left show the code of the channel to be programmed. Select the channel by pressing the  buttons under these digits.

The digits in the centre show the value of the programmed temperature. Use the  keys under them to vary the temperature between 30 and 130ºC (85 and 266ºF).

When the minimum value is reached, the display will show OFF, which means that the channel is disabled.

By pressing the  key, the operating temperature displayed is saved.

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The channels are identified by the following codes:

t0	Tank
t1	OUTLET 1 hose
t2	OUTLET 1 gun
t3	OUTLET 2 hose
t4	OUTLET 2 gun
t5	OUTLET 3 hose
t6	OUTLET 3 gun
t7	OUTLET 4 hose
t8	OUTLET 4 gun
t9	OUTLET 5 hose
10	OUTLET 5 gun
11	OUTLET 6 hose
12	OUTLET 6 gun

The number of outputs depends on the equipment type. 4 is normal can be 6 with control card upgrade.

To end the process, press again.

Programming ENERGY SAVING:

To enter this programme, press button then button until (led is lit). The two digits on the left show the code of the output to be programmed, which is selected by pressing the keys under them. 3 groups can be selected:

b0	Tank
b1	Hoses
b2	Guns

The digits in the centre show the % of the operating temperature that will be used as the adjustment value for ENERGY SAVING. The keys under these digits change the value between 50 and 80%.

Pressing the key, we will save the % of temperature displayed.

To end the process, press again.

Programming operating parameters:

To enter this programme, press button then button until led is lit.

The two digits on the left show the code of the parameter to be programmed, which is selected by pressing the keys under these digits.

The digits in the centre, and also the digits on the right, will show the value of the parameter. Press the keys under these digits to alter the values within the ranges specified in Table 1.

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Pressing the  key, the operating parameter displayed is saved.

To end the process, press  again.

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Table 1. General parameter codes (standard default values in brackets):

	Nombre	*Descripción*
P0	Enter password (000)	To enter the access code in order to change the level access. [000,255]
P1	Level access (0).	Shape the level access to the equipment. [0,1,2]
P2	Measurement unit (0)	Selects the measurement unit. 0 = ºC and 1 = ºF.
P3	Clearance delay (15)	Delay in minutes for switching on the pump and giving clearance after pre-heating. Values between 0 and 60 minutes.
P4	Maximum temperature (240 ºC / 464 ºF).	This temperature must be above preset operating temperature. [80, 240ºC; 176, 464 ºF].
P5	Tank alarm deviation (5 ºC /9 ºF).	Any sensor that reaches a temperature higher or lower than operating temperature +/- deviation, will switch on the temperature warning lamp and the relevant external alarm.[1, 30ºC; 2, 54ºF].
P6	Hose alarm deviation (5 ºC /9 ºF).	Any sensor that reaches a temperature higher or lower than operating temperature +/- deviation will turn on the temperature warning lamp and the relevant external alarm. [1, 30ºC; 2, 54ºF].
P7	Gun alarm deviation (5 ºC /9 ºF).	Any sensor that reaches a temperature higher or lower than operating temperature +/- deviation will turn on the temperature warning lamp and the relevant external alarm. [1, 30ºC; 2, 54ºF].
P8	Time after last signal (0) to go into ENERGY SAVING	If the selected time (between 1 and 225 minutes) is exceeded with no shot pulses, the equipment will go into ENERGY SAVING mode. A 0 value switches off this function. **(I/O CARD REQUIRED)**
P9	Time counter	Displays the time (hours) that the equipment has been operating
P10	Time between filter change (2000)	In normal conditions, the filter must be changed every 2000 working hours. Depending on the adhesive type, this parameter can be set within this range: [0, 2000].
P11	**Enable/Disable** hose-gun channel 1 (0)	It disables the channel 1, P11=1. [0,1]
P12	**Enable/Disable** hose-gun channel 2 (0)	It disables the channel 2 P12=1. [0,1]
P13	**Enable/Disable** hose-gun channel 3 (0)	It disables the channel 3 P13=1. [0,1]
P14	**Enable/Disable** hose-gun channel 4 (0)	It disables the channel 4 P14=1. [0,1]
P15	**Enable/Disable** hose-gun channel 5 (0)	It disables the channel 5 P15=1. [0,1] **(ONLY IN 6 EXITS EQUIPMENTS)**
P16	**Enable/Disable** hose-gun channel 6 (0)	It disables the channel 6 P16=1. [0,1] **(ONLY IN 6 EXITS EQUIPMENTS)**
P17	Node number (0)	It identify the node number for communications. (4exits and 6exits)

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	Nombre	*Descripción*
P18	I/O Con-1 configurable parameter (0 – Disable)	I/O states configurable functions. [0, 9]
P19	I/O Con-2 configurable parameter (0 – Disable)	I/O states configurable functions. [0, 9]
P20	I/O Con-3 configurable parameter (0 – Disable)	I/O states configurable functions. [0, 9]
P21	I/O Con-1D configurable parameter (0 – Disable)	I/O states configurable functions. [0, 9]
P22	I/O Con-2D configurable parameter (0 – Disable)	I/O states configurable functions. [0, 9]
P23	I/O Con-3D configurable parameter (0 – Disable)	I/O states configurable functions. [0, 9]
P24	I/O Con-4D configurable parameter (0 – Disable)	I/O states configurable functions. [0, 9]
P25	I/O Con-5D configurable parameter (0 – Disable)	I/O states configurable functions. [0, 9]
P26	I/O Con-6D configurable parameter (0 – Disable)	I/O states configurable functions. [0, 9]
P27	RS-485 communications section (0)	External communications mode selection parameter..(0-Disable) **(I/O CARD REQUIRED, NO ACCESS BY COMs.)**
P28	Time after last signal to go into HEATING OFF	If the selected time is exceeded with no shot pulses, the equipment will go into HEATING OFF mode. A 0 value switches off this function.
P29	Motor shutdown time for gun in manual mode	It configures the time it takes the motor to stop since the gun trigger is released in manual mode. A 0 value switches off this function. **(GUN IN MANUAL MODE REQUIRED)**

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1. P4 parameter: Maximum temperature.

If this value is modified and after that it is being below of the programmed temperature of any channel then the channel temperatures will be the same as P4 value.

2. P18 to P26 parameters: I/O configurable parameters.

It is possible to configure the I/O card contacts functions for different functions:

Function	Nu
Disabled	0
Application	1
Star/stop	2
Energy savings	3
Hose-gun channel 1	4
Hose-gun channel 2	5
Hose-gun channel 3	6
Hose-gun channel 4	7
Hose-gun channel 5	8
Hose-gun channel 6	9

- ***Disabled*:**

With this function, we disable this parameter.

- ***Application:***

If there is a “0” (without potential, open contact) the input which has been assigned the application function during more time that appears in P8 parameter (time in minutes) and moreover it´s allowed the pump to work , then the unit goes to energy saving.

If it is selected an “1” (contact is closed) before the P8 parameter time is finished, then the timer is reset and the value of P8 is counted again.

Having the unit in energy saving when an “1” is selected (contact is closed) at the application function assigned input then the unit goes to normal working.

If there is an “1” at any assigned input the unit performance is normal and the timer doesn’t count with the P8.

If P8=0 then the application function is also disabled because the timer is disabled.

- ***Energy savings:***

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While it is a “0” (circuit is open) at the input of the energy saving function the unit keeps in standard working.

When there is an “1” (contact is closed) the unit goes to energy saving. In order to keep the energy saving function on it is necessary to keep that “1” (contact is closed) at the input.

Note:

While we have “0” (open circuit) the equipment will work in normal mode. If we put a “1” (closed circuit) then the equipment will work in energy saving mode.

In case that both application and energy saving functions are configured, the unit gives priority to the “Energy Saving” function but it is allowed to the aplication function to work normaly if there is a “0” in the “Energy Saving” function, in other words, when the unit doesn´t keep in standard working.

- ***Start/Stop:***

If it is a “0” (circuit is open) at the *Start/Stop* function input the unit will keep on working (*Start* function).

If there is an “1”(contact is closed) the unit will turn off.

- ***Hose-gun channel:***

If there is a “0” (circuit is open) at the hose-gun function input then the channel is enabled.

If there is a “1” (contact is closed) at the hose-gun function input then the channel is disabled.

3. P27 parameter: communications modes selection.

This parameter is used to know if external communication are going to be used.

If P27= 0 it means that external communications by PROFIBUS or MODBUS protocols or by I/O States are not going to be used.

If P27= 1 then the MODBUSS communications and the I/O States are activated.

Modbus communications needs specific I/O card for communication mode.

If communications of any of the protocols and the I/O are enabled could be orders conflicts due to the wired communications priority (I/O States) with regards to MODBUS

4. P28 parameter: Time after last signal to go into HEATING OFF

If the selected time is exceeded with no shot pulses, the equipment will go into HEATING OFF mode.

P28 always >= P08.

If P28 = 0 → this function is switched off

If P8 = 0 → this function is switched off

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5. P29 parameter: Motor shutdown time for gun in manual mode

This parameter configures the time it takes the motor to stop since the gun trigger is released in manual mode.

If this parameter has a value other than 0, the motor will only start by pressing the trigger of a gun in manual mode. For the motor to active, the Pump On/Off LED must be green, if not, press the pump button to turn  the green led on.

If P29 = 0 → The manual mode is  cancelled, motor start and stop is done manually from screen by pressing the button

For working with a gun in automatic mode this value have to be 0, otherwise the motor will not start by pressing the button 

Connection description: Hardware Tarjeta I/O:

Connector DB-9:

DB-9		
Pins		Func
1		A+
2		B-
---		---

The RS-485 communications Works by means of a specific component wich works a middleman between the microcontroles and the DB-9 male

The voltage range of communications and electronic components operation is 5V.

Programming the timer:

To enter this programme, press  button, then  button until the  icon is indicated.

The two digits on the left show the code that represents the day of the week (with values from 1 to 7). The digits in the centre show the code of the parameter to be programmed, which is selected by the E and F keys ()

The digits on the right show the value of the parameter. Keys G and H () alter these values, within the ranges specified in Table 2.

By pressing the  , the information on display is saved.

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Table 2. Codes of the timer switch on/off parameters.

1	1	X	Switch-on 1 time (hour)(Monday)
1	2	X	Switch-on 1 time (minute) (Monday)
1	3	X	Type of switch-on 1 (Monday)
1	4	X	Switch-off 1 time (hour) (Monday)
1	5	X	Switch-off 1 time (minute) (Monday)
1	6	X	Type of switch-off 1 (Monday)
1	7	X	Switch-on 2 time (hour) (Monday)
1	8	X	Switch-on 2 time (minute) (Monday)
1	9	X	Type of switch-on 2 (Monday)
1	0	X	Switch-off 2 time (hour) (Monday)
1	1	X	Switch-off time 2 (minute) (Monday)
1	2	X	Type of switch-off 2 (Monday)

This same table is valid for every day of the week, ie, 12 settings for each day.

The TYPE parameter has the following functions:

For switch-on:

TYPE=0	Switch-on selection not active
TYPE=1	The equipment goes from its present status to normal OPERATION
TYPE=2	The equipment goes from OFF to energy saving.

For switch-off:

TYPE=0	Switch-off selection not active

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TYPE=1	The equipment goes from its present status to OFF
TYPE=2	The equipment goes from its present status to LOW MAINT.

For easy programming, you can copy Monday parameters by pressing the  key (D) when the first parameter of the following days is shown.

To end the process, press  again.

Programming the clock

To enter this programme, press  button, then  button until the icon  is indicated.

The two digits on the left show the code of the data to be programmed, which is selected by pressing the  keys under these digits.

The digits in the centre show the present day and time according to the timer. These values are altered by pressing the  keys under these digits.

By pressing the  key, we can save this information.

Identification codes:

r1	Day of the week (1[Monday] to 7[Sunday])
r2	Present time (hour) (0 to 23)
r3	Present time (minute) (0 to 59)

To end the process, press  again.

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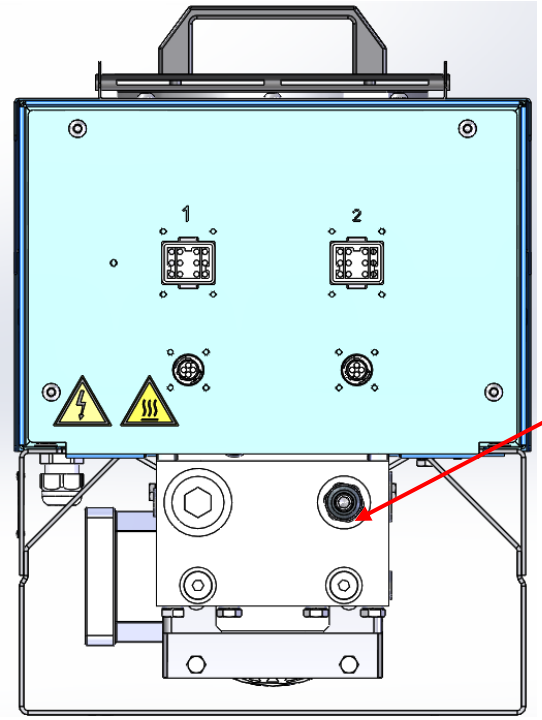
4.3. OUTPUT PRESSURE ADJUSTMENT:

The adhesive output pressure is controlled by the regulator on the manifold. Turn the regulator stud with an Allen wrench until the pressure is suitable for the application.



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CHAPTER 5
OPERATION

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WARNING: This machine should only be used by qualified personnel who understand all the procedures and are familiar with the necessary safety measures.

5.1. INTRODUCTION:

This chapter explains how to use the machine.

First of all, make sure that the person operating the machine is duly protected and that all safety measures are being followed.

5.2. COMMISSIONING:

1. Press the on button.
2. Check that the machine adjustments are appropriate for the desired operation; otherwise readjust them (see chapter 4).
3. When the machine is at the programmed temperature and there are no alarms activated, the pump permission will turn on.
4. Permission from the main machine is given (in case they are connected). The system has two terminals for external connections.
5. The application can start.

When the machine is connected to a main machine, it won't run until the external permission is given.

These terminals are shorted at our factory.

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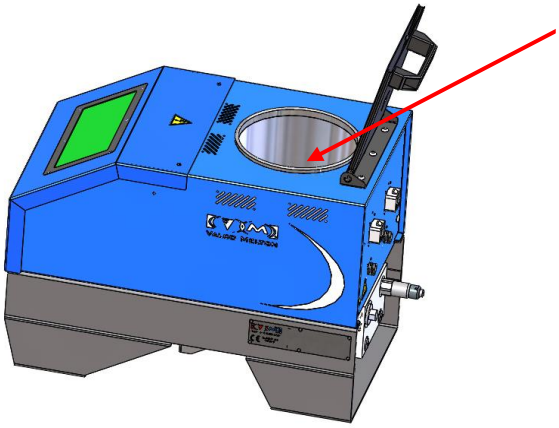
Filling the Tank:

Before filling the tank, put on goggles, gloves and a long-sleeve shirt to prevent possible burns caused by hot adhesive splashing.

Make sure that the tank is clean and free of foreign particles.

Fill the heated tank with the hot–melt material up to a maximum of 10 mm below the edge of the tank.

Close the cover of the tank immediately after filling it.



Note: Never operate the applicator if the tank is empty. If the quantity of hot–melt material is very small, the tank may overheat leading to the carbonisation of the hot-melt material and the formation of deposits inside the unit. This may lead to unnecessary downtimes later on.

5.3. STOPS:

There are two cases:

Pump shut-down:

If you wish to stop pumping, you must turn the pump OFF on the pump screen.

The temperature control will maintain the machine temperature.

If the stop is to last for an extended period, activating the Low Maintenance function is recommended**.**

Total stop:

To completely disconnect the machine, press the general switch.

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CHAPTER 6
MAINTENANCE

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WARNING: The maintenance operations indicated in this chapter must only be done by qualified personnel who understand the steps to take and are familiar with all safety measures.

To apply the appropriate torque when assembling any part of the machine, please check the torque instructions in Annex B.

6.1. INTRODUCTION:

This chapter outlines the procedures for proper maintenance of the D4-L machine. Following these procedures will ensure safe operation and a long useful life of the machine. Carefully read Chapter 1: Safety before starting any maintenance process.

General recommendations for proper maintenance:

- Keep the tank as full of adhesive as possible. This will reduce the formation of soot on the tank's inner walls.
- Keep the tank cover closed. (Any contamination in the tank will increase the possibility of low performance. Humidity, dirt and sooty adhesive are the main causes of injector obstruction).
- Use a cheesecloth to remove material leaking from the joints and other connectors when the machine is hot, but not in operation.
- Completely empty and clean the system when there are frequent obstructions due to dirt and soot.

Before beginning, verify that the operator is duly protected and all safety measures are being followed.

1º Switch off the main switch.

2º Lock the main switch in place.

3º Make sure the electricity is off.

4º Follow applicable safety and health standards.

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6.2. MAINTENANCE RECOMMENDATIONS:

The following table shows how often maintenance operations must be done.

Frequency	Maintenance
As necessary	Change manifold joints and filter cartridge.
Weekly (40 hours)	Clean the outside surface of the machine. Use a liquid cleaner recommended by the adhesive manufacturer.
	Inspect all hydraulic, electrical and pneumatic connections. Change or repair those necessary.
	Check the safety valve.
6 months (2000 hours)	Clean the tank grill.
	Inspect all hydraulic, electrical and pneumatic connections. Change or repair those necessary.
Annually (4000 hours)	Change the adhesive filter.

Vacuum or remove dust and adhesive remains with a soft cloth, especially from the manifold and purging valve.

Periodically clean the control panel with a soft cloth. Do not use dissolvent on the panel as they could corrode the controls.

If using a cleaning agent, make sure it is compatible with the adhesive being used.

Check with the adhesive manufacturer if you have any doubts.

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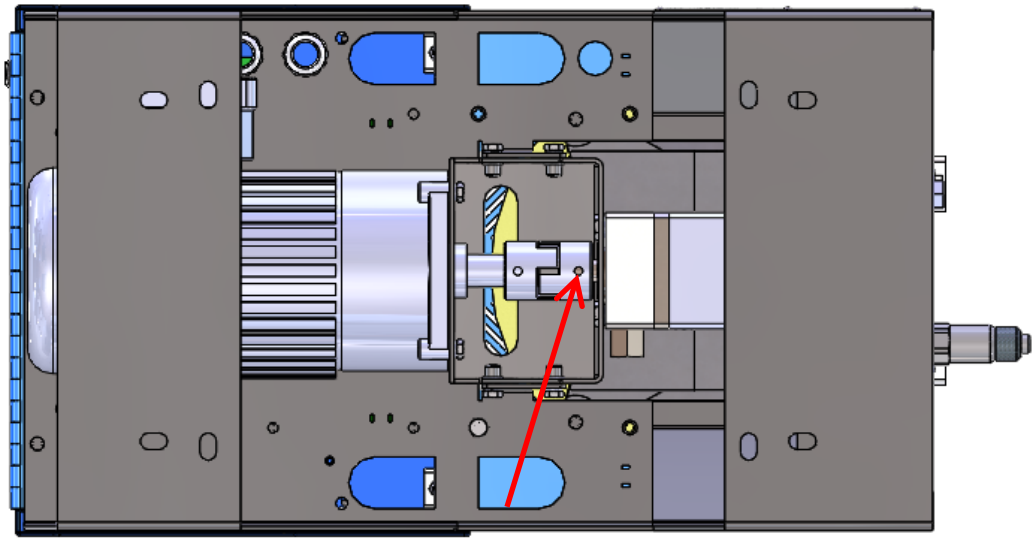
6.3. MAINTENANCE PROCESSES:

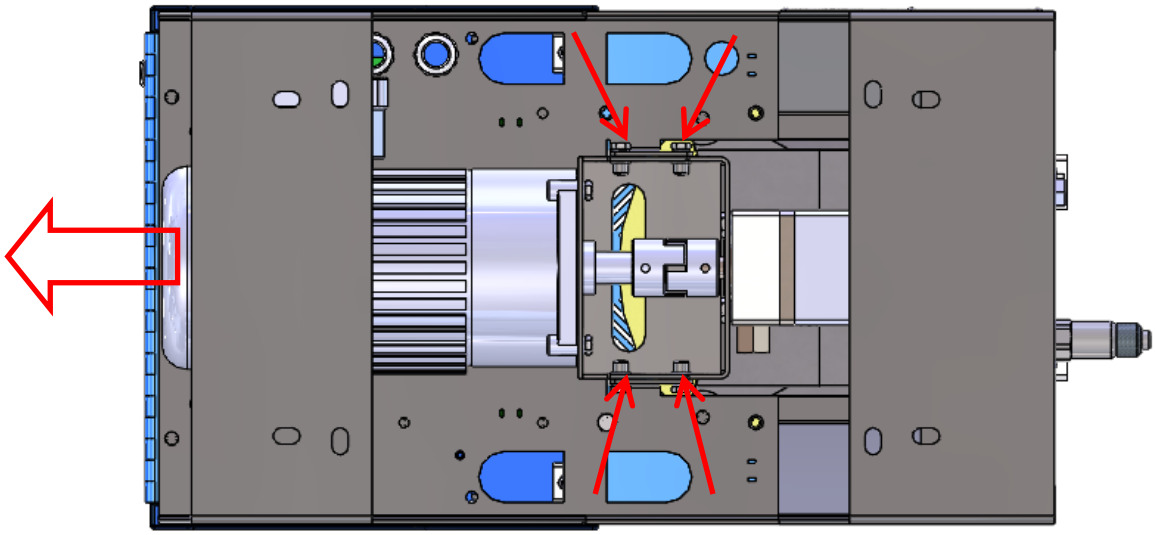
6.3.1. PUMP REPLACEMENT

Follow these steps to replace the pump:

1. Make sure the machine is off.
2. Release the prisoner holding the coupling to the pump shaft with an Allen wrench.



3. Loosen the four Allen screws that secure the motor to the frame support team, to remove the engine, support and link back, leaving the pump.



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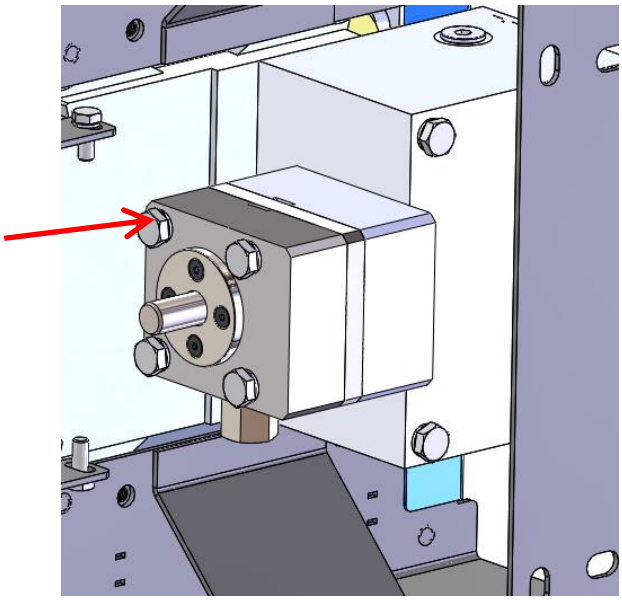
4. Loosen the four Allen screws that secure the pump to the manifold.



5. Place a new pump and follow the above steps in reverse, for re-assembly.

For single pump apply a torque of 22 N • m.

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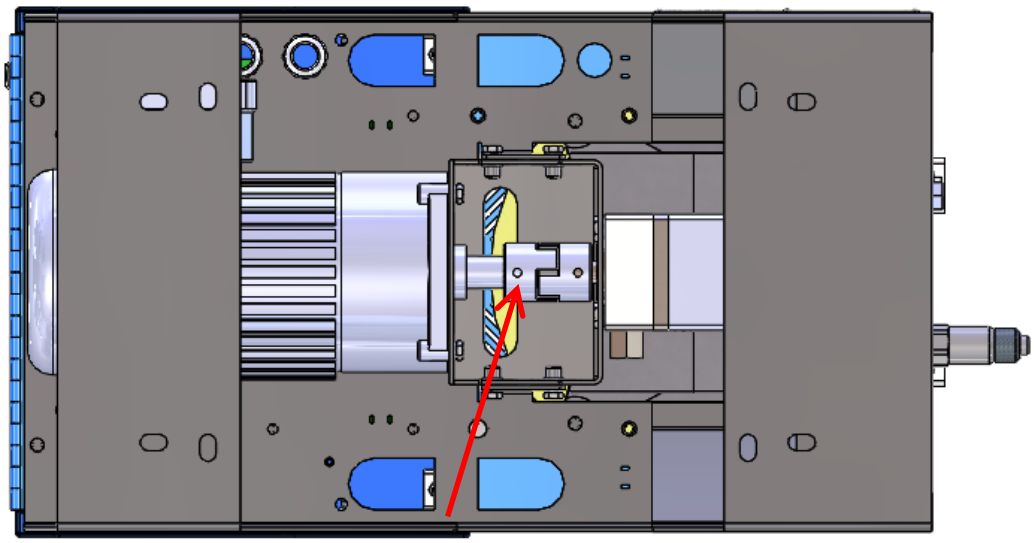
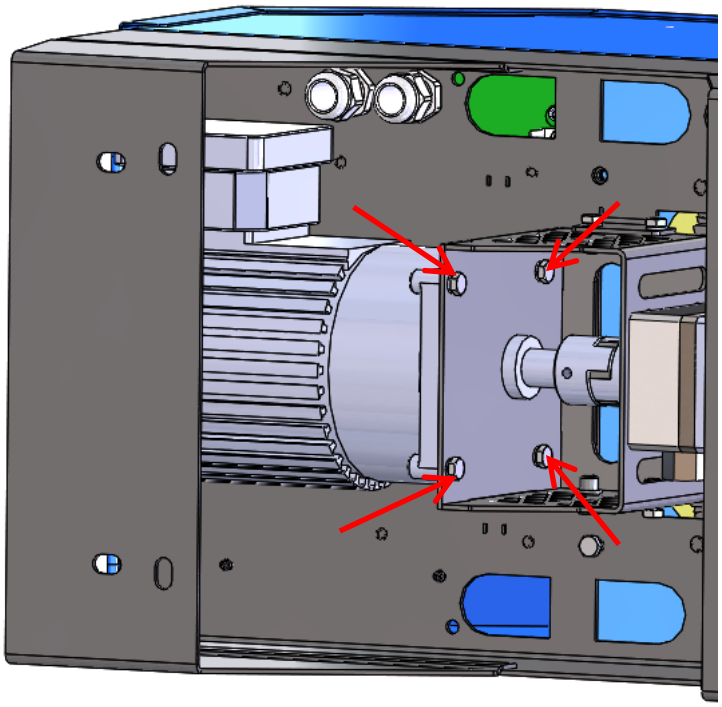
6.3.2. MOTOR REPLACEMENT:

Follow these steps to replace the motor:

1. Make sure the machine is off.
2. In the bottom of the device, release the stud holding the coupling to the motor shaft.



3. Loosen the four hex nuts that secure the motor to the support, to remove the motor backwards.



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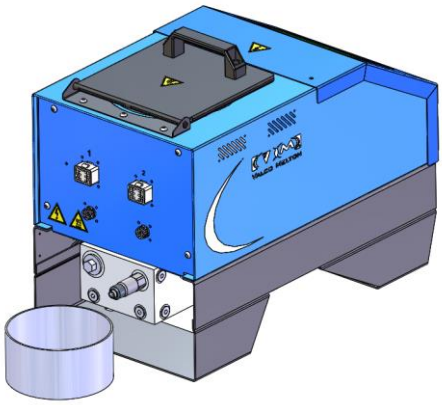
4. Place the new engine and follow the reverse process explained above.
5. For the screws that attach the motor to the bracket applying a torque of 8.7 N • m.

6.3.3. REPLACING THE ADHESIVE FILTER:

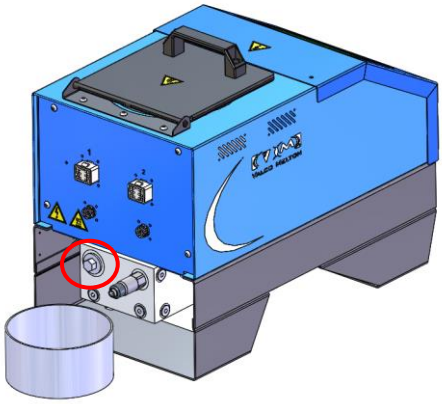
Before changing the filter, put on a face shield, gloves and a long-sleeve shirt to prevent possible burns caused by hot adhesive splashing.

Keeping a filter or mesh in stock to replace when necessary is recommended. This replacement is quick and improves the machine performance.

1. Warm the machine to the operating temperature.
2. Stop the pump.
3. Place an appropriate container under the manifold to collect the adhesive.
4. Activate the applicators manually to eliminate any pressure build-up and loosen the pressure regulator if the system is hot.



5. Use a spanner to unscrew the filter screw and remove it from the casing.



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6. Dismantle the filter, replace the inner mesh and clean all of the other parts.

7. Clean all of the components well and replace any defective ones.

If using a cleaning agent, make sure it is compatible with the adhesive being used.Check with the adhesive manufacturer if you have any doubts.

8. Replace the o-rings.
9. Assemble the complete filter again and carefully insert it inside the hot manifold casing.
10. Tighten the filter cover with a spanner and close the purging valve.
11. Put the machine at operating speed and bleed the gun circuit.

6.3.4. REPLACING THE PROBE AND RESISTORS

The steps for replacing the resistors and/or temperature probe are described below.

Before repairing the element, clean the outside to prevent adhesive from getting into the electric box.

1. Release the screws on the electric box cover.
2. Remove the element to be replaced (probe or resistor).
3. Release the element from the ceramic strip or terminal.
4. Peel the 15 mm wire tips.
5. Connect the element to the ceramic strip or terminal.
6. Insert the replaced part into the hole and close the cover.
7. Re-connect the electricity from the gun to the hose.

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CHAPTER 7
TROUBLESHOOTING

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WARNING: The maintenance operations described in this chapter should only be performed by qualified personnel understanding the processes and familiar with the safety measures involved.

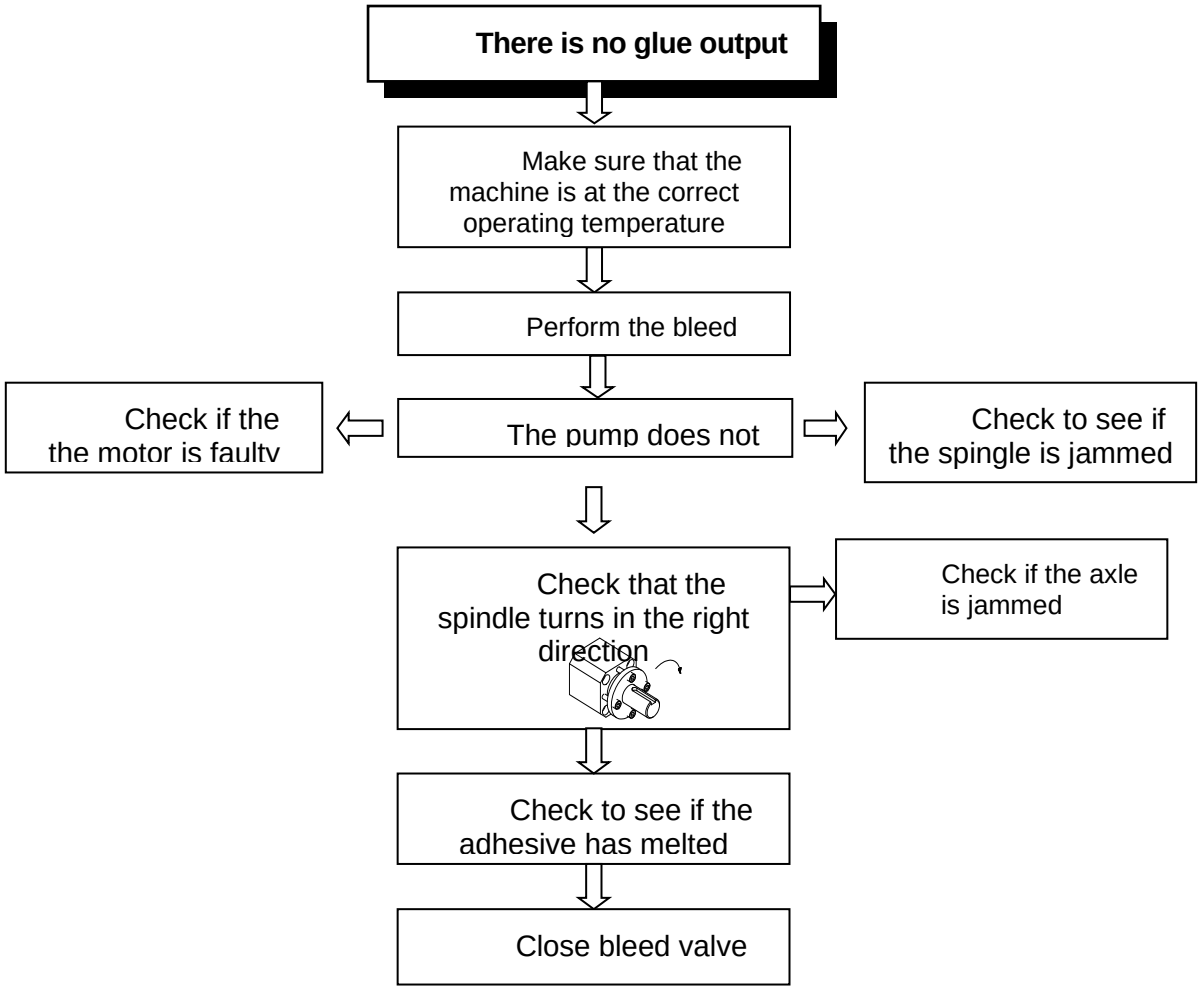
7.1. INTRODUCTION:

This chapter refers to the most common faults in your equipment.

Breakdowns occur when the flow of glue is reduced or stops, or the alert system informs of a fault. Try to solve the problem with the help of this manual.

If the problem cannot be solved with the information provided here, contact your Melton representative.

7.2. MECHANICAL FAULTS:



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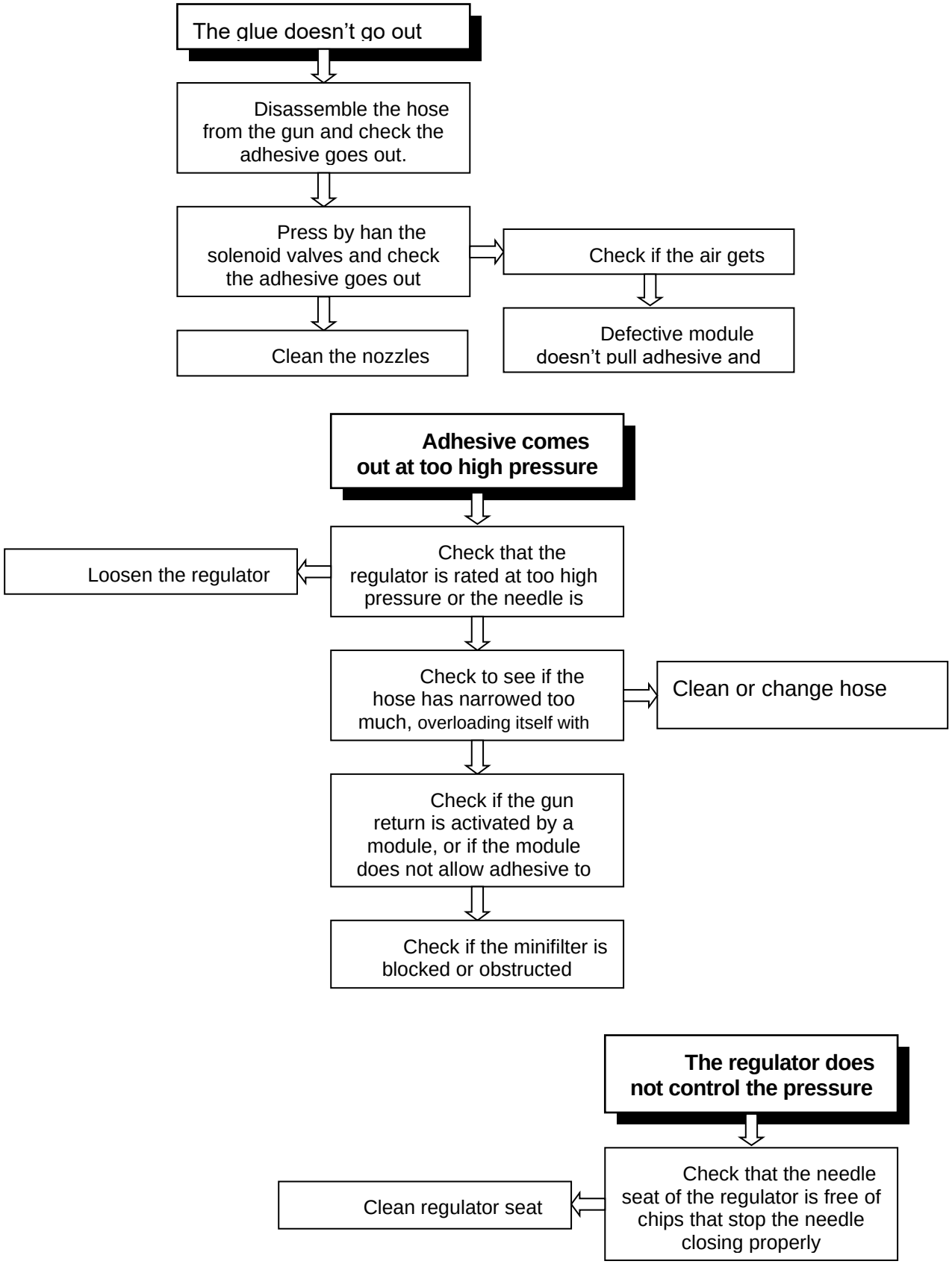

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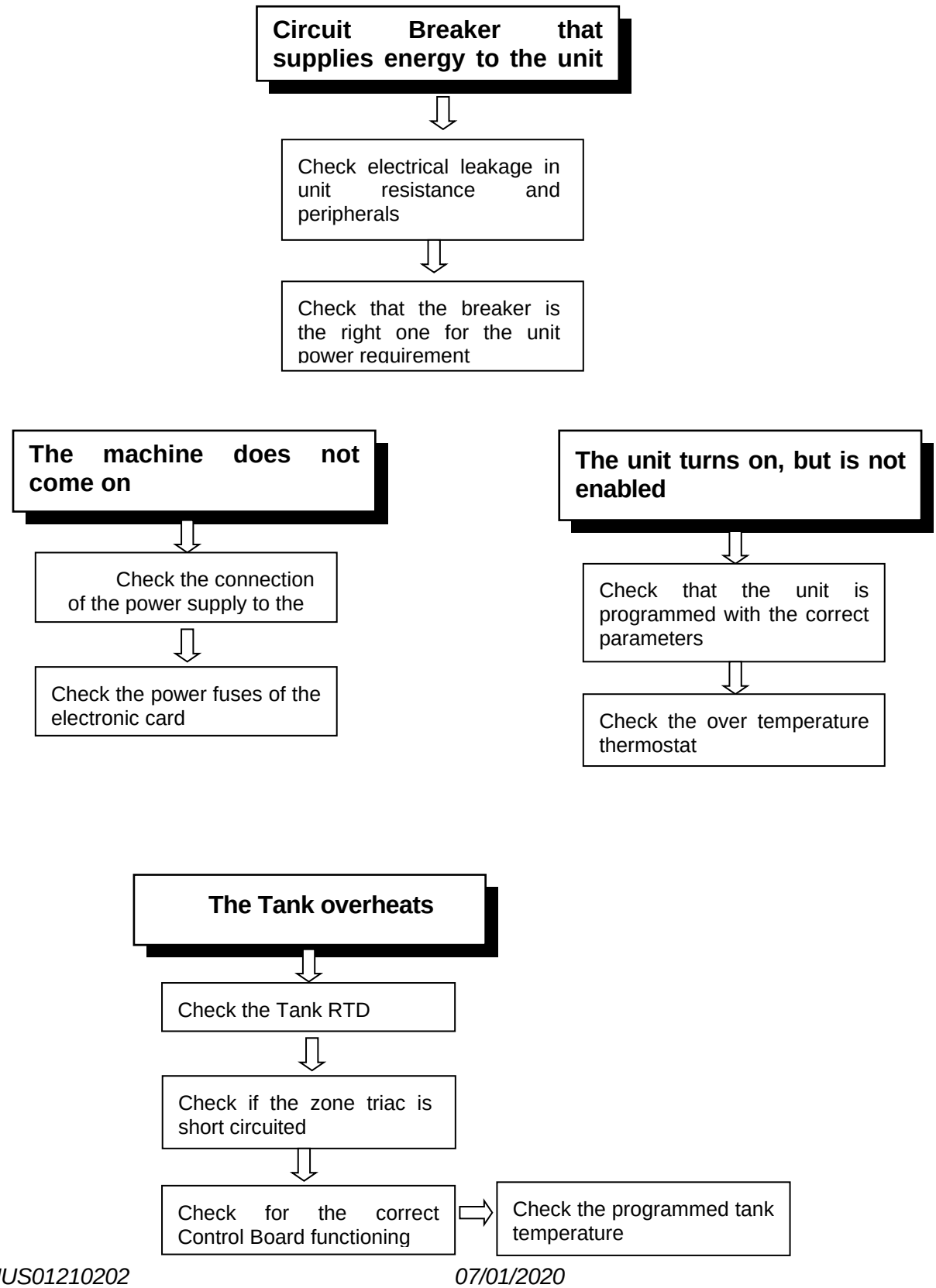
7.3. ELECTRICAL FAULTS:



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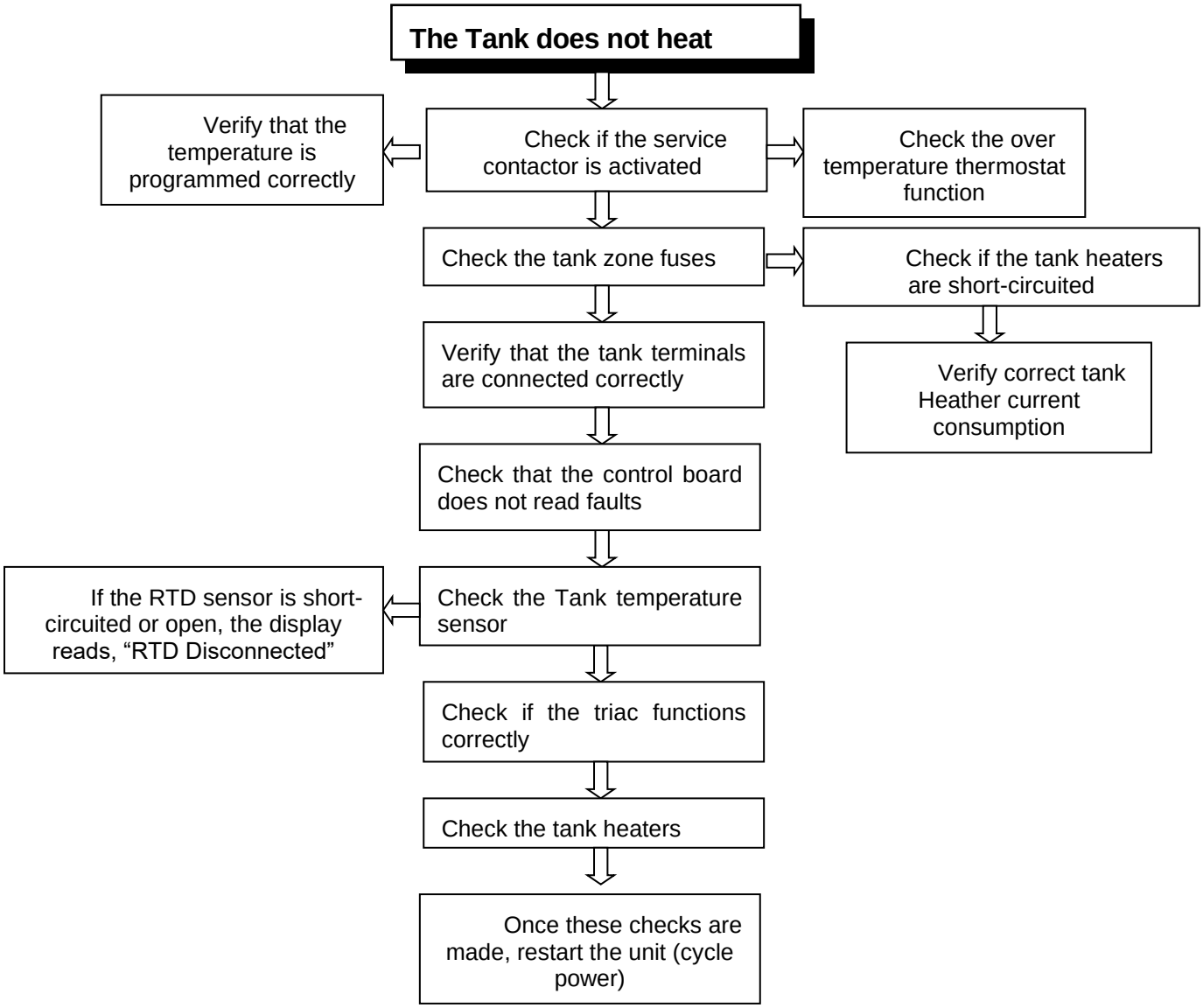

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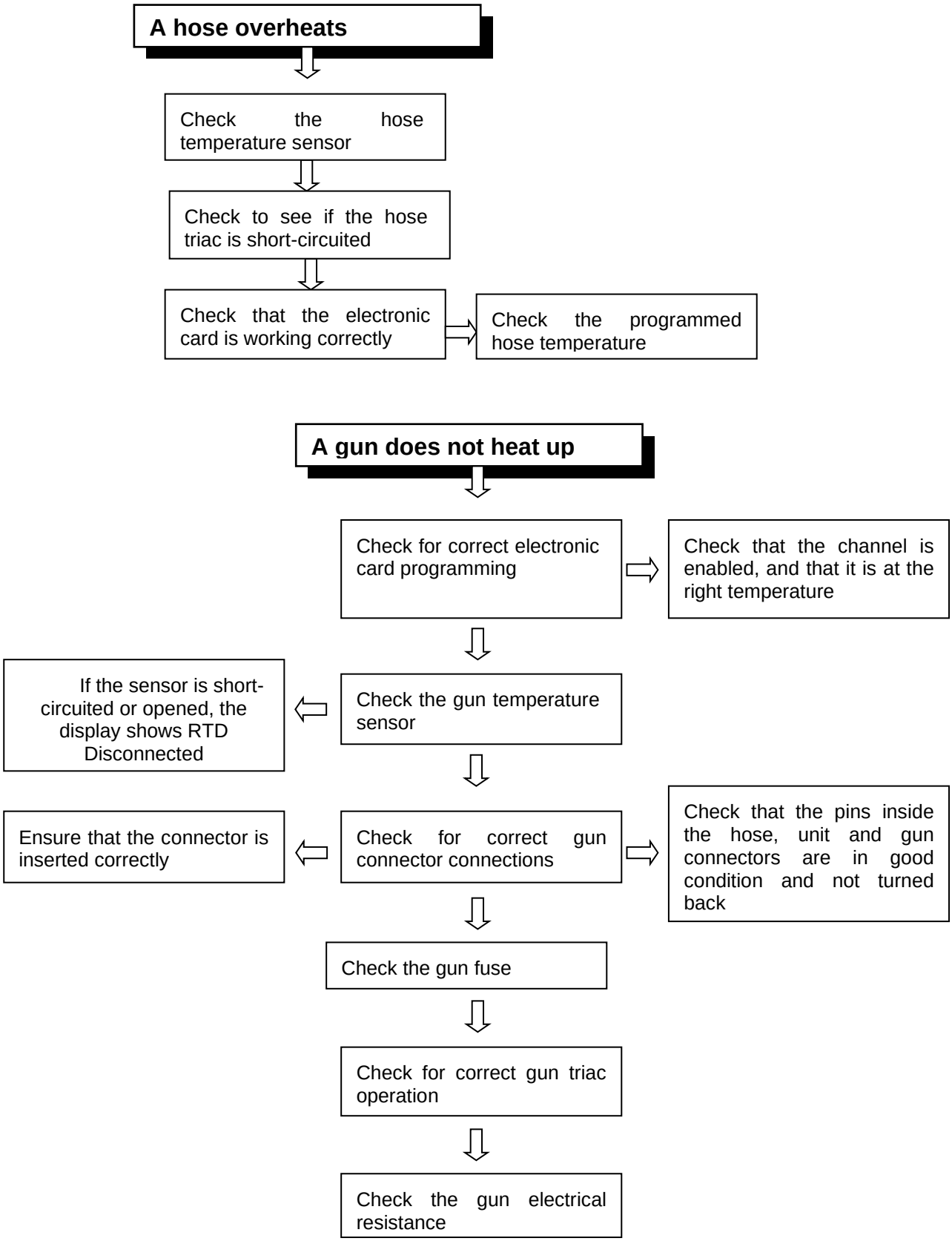

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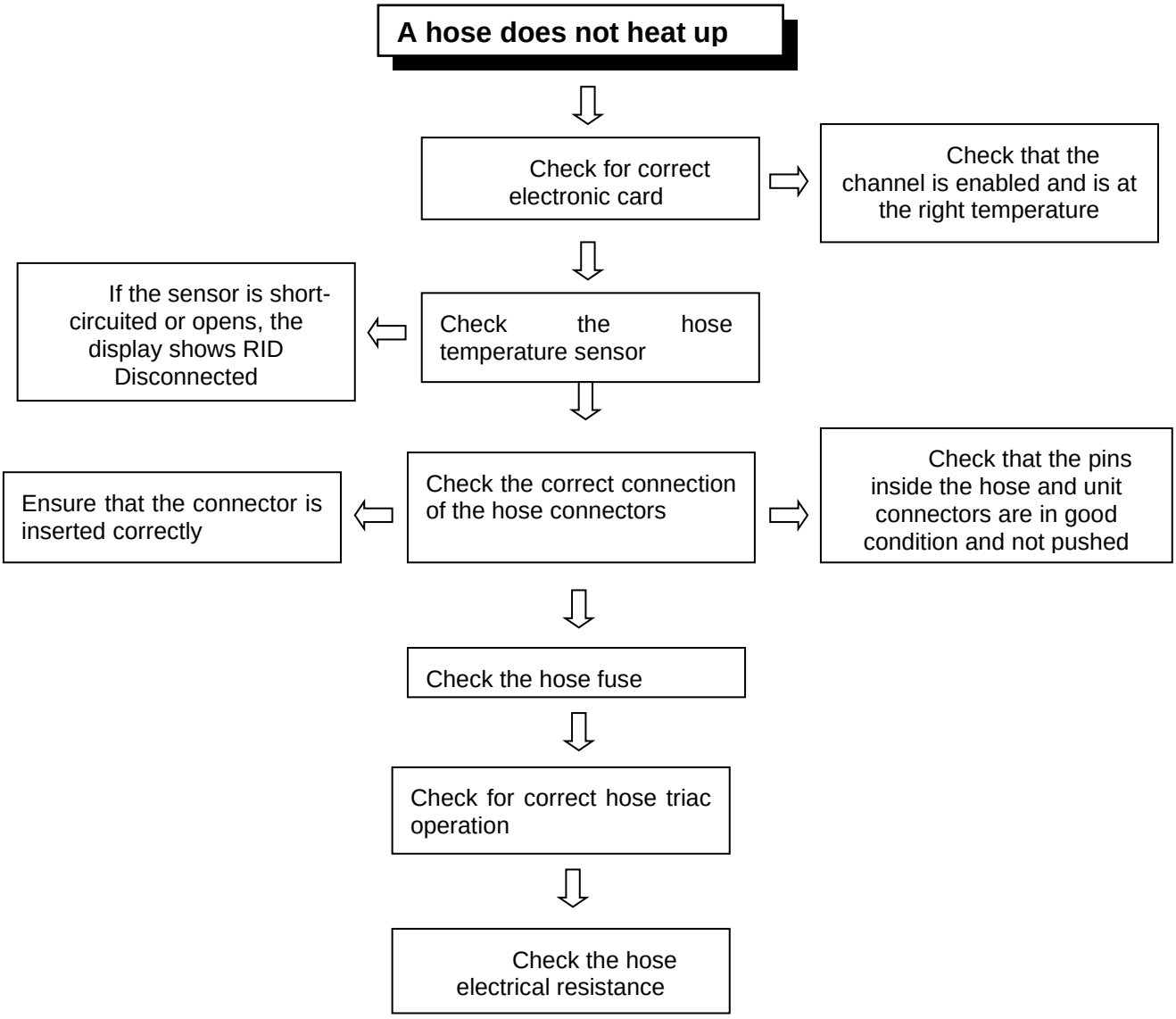

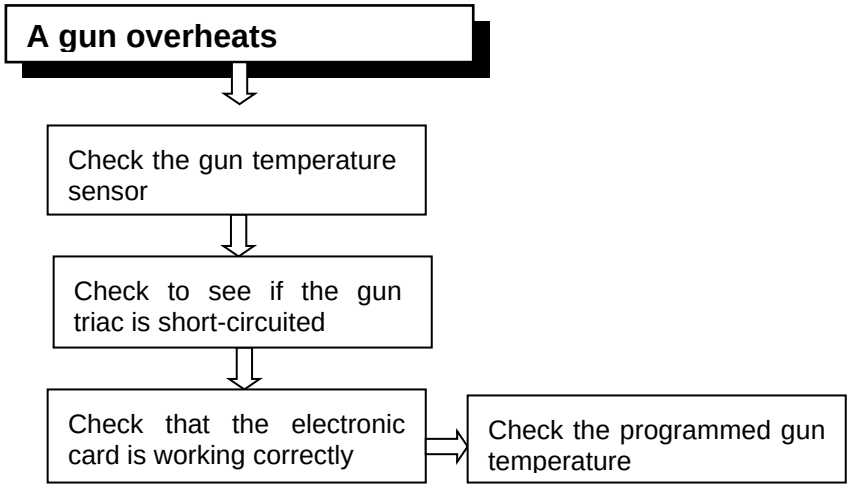

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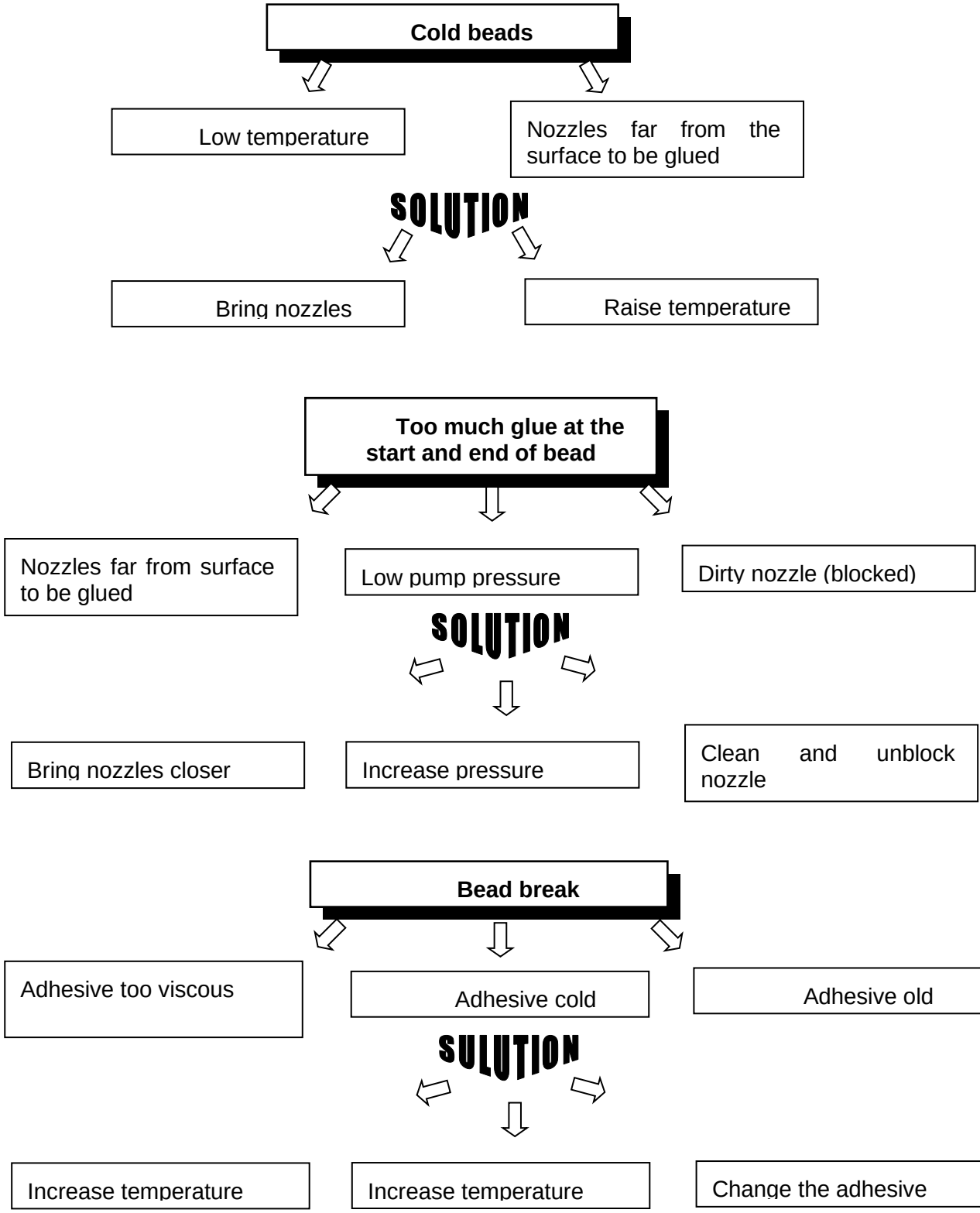
7.4. ADHESIVE APPLICATION PROBLEMS:



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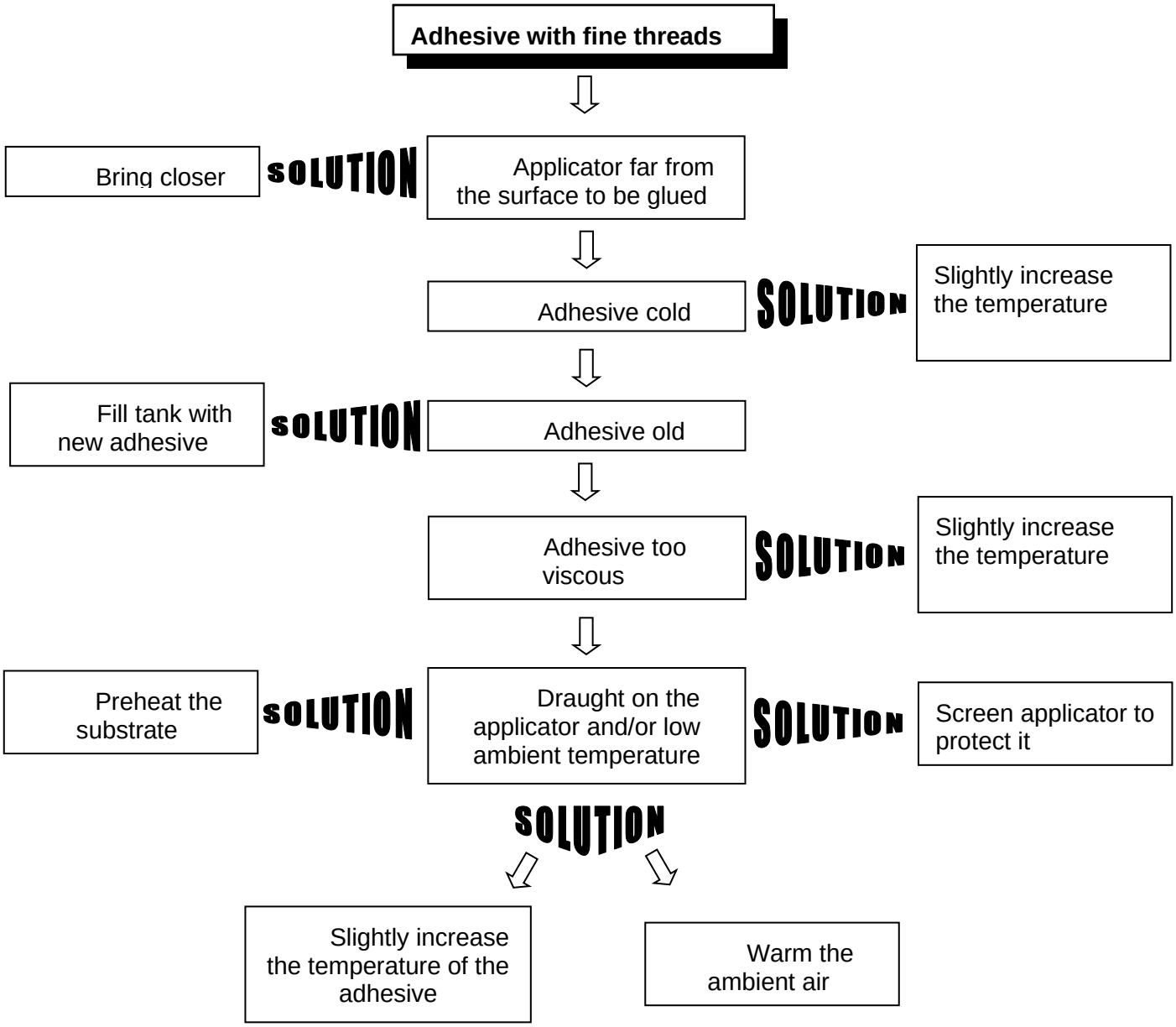

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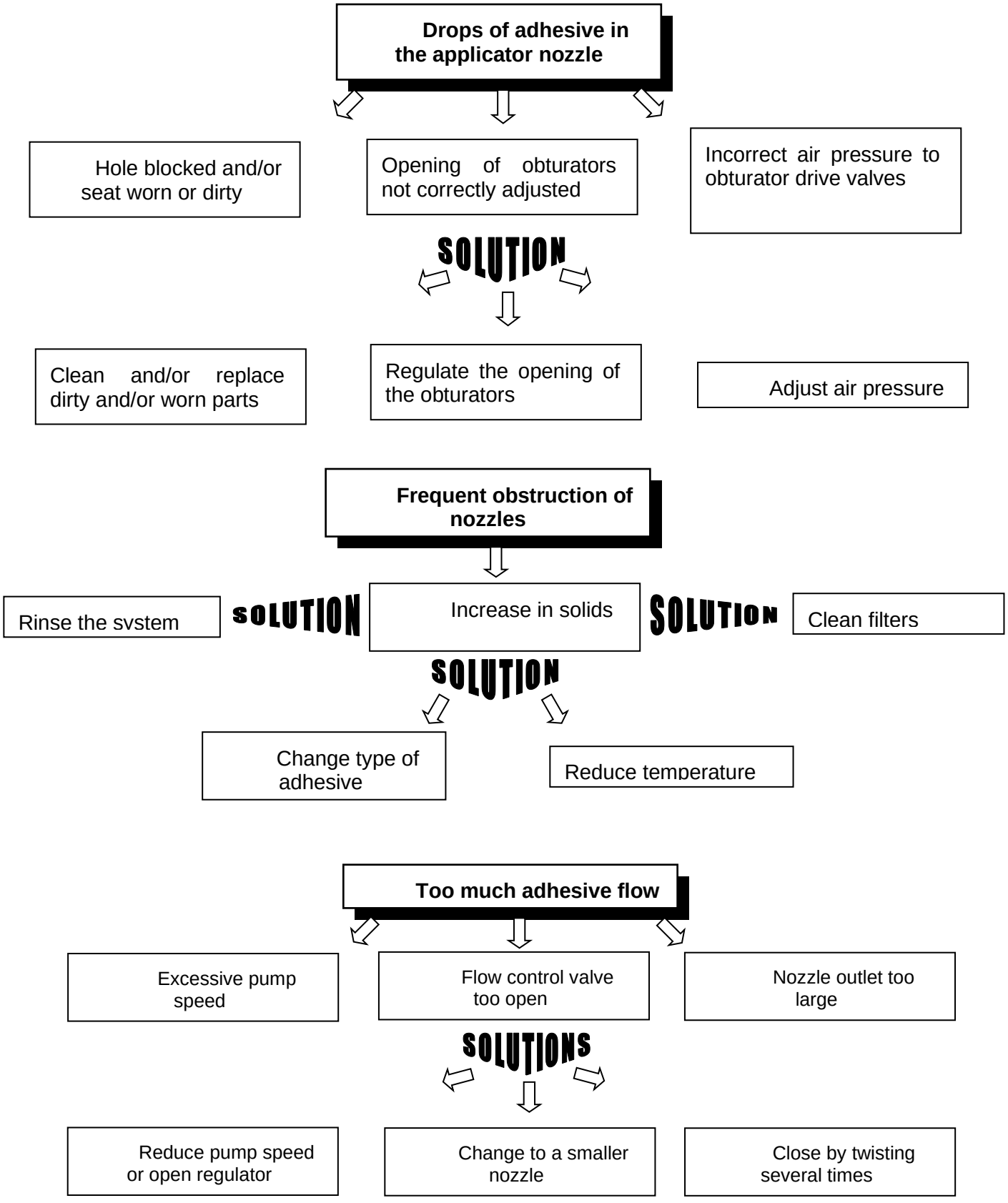

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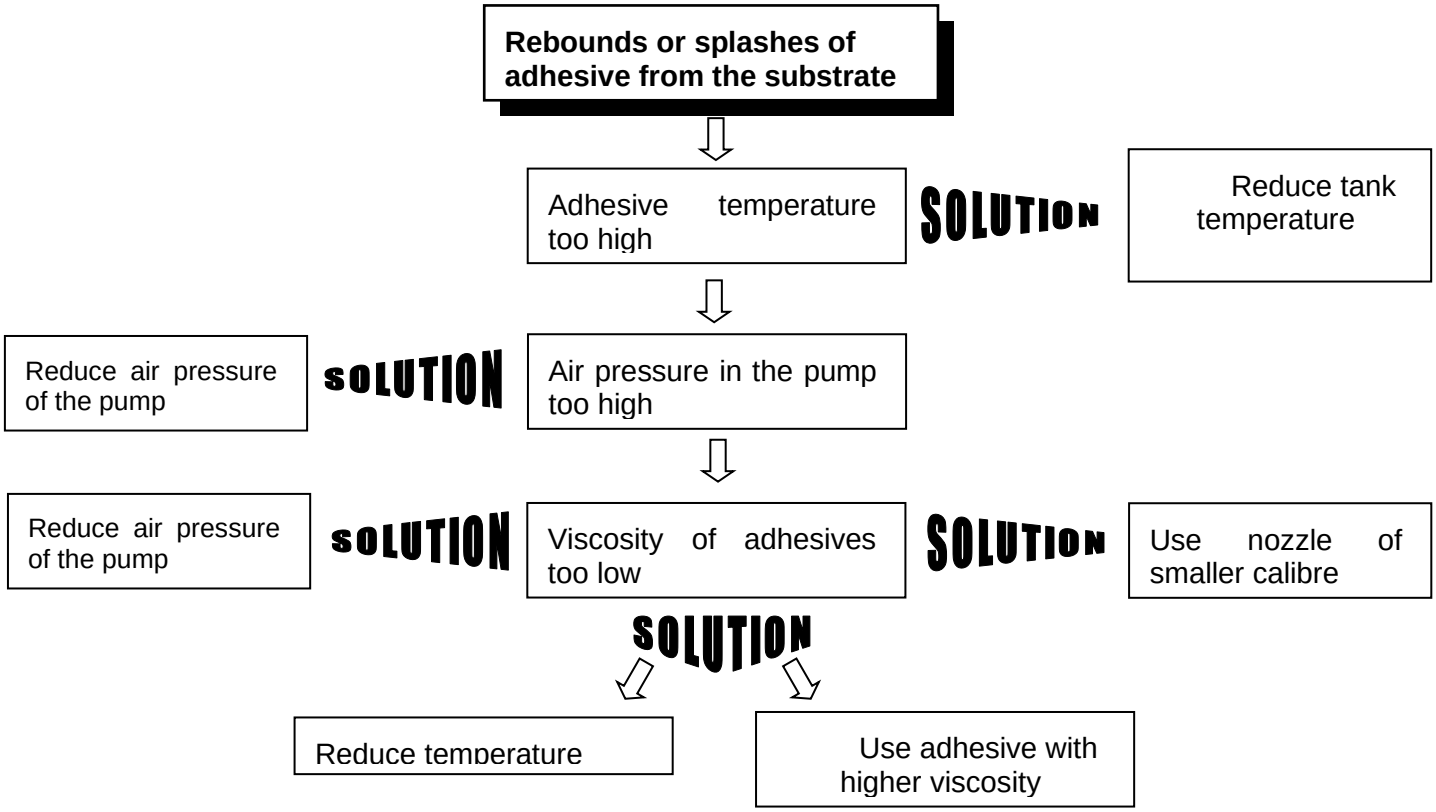

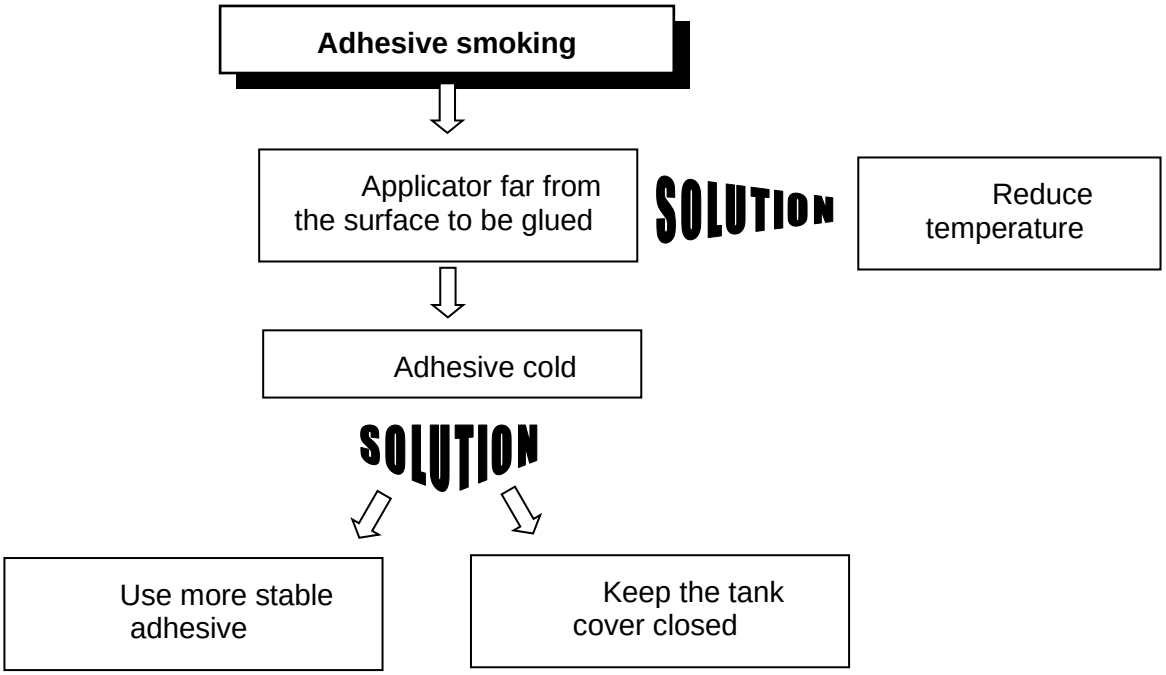

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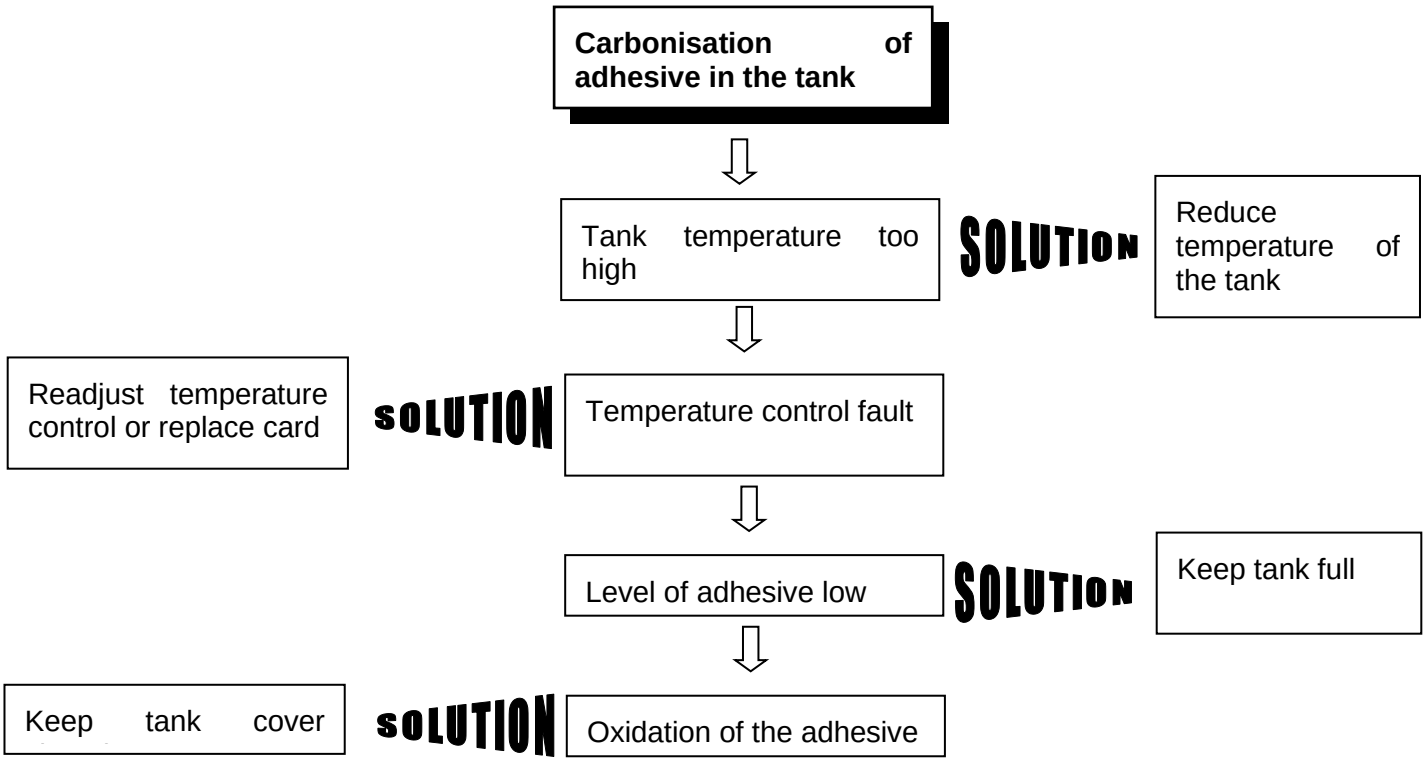

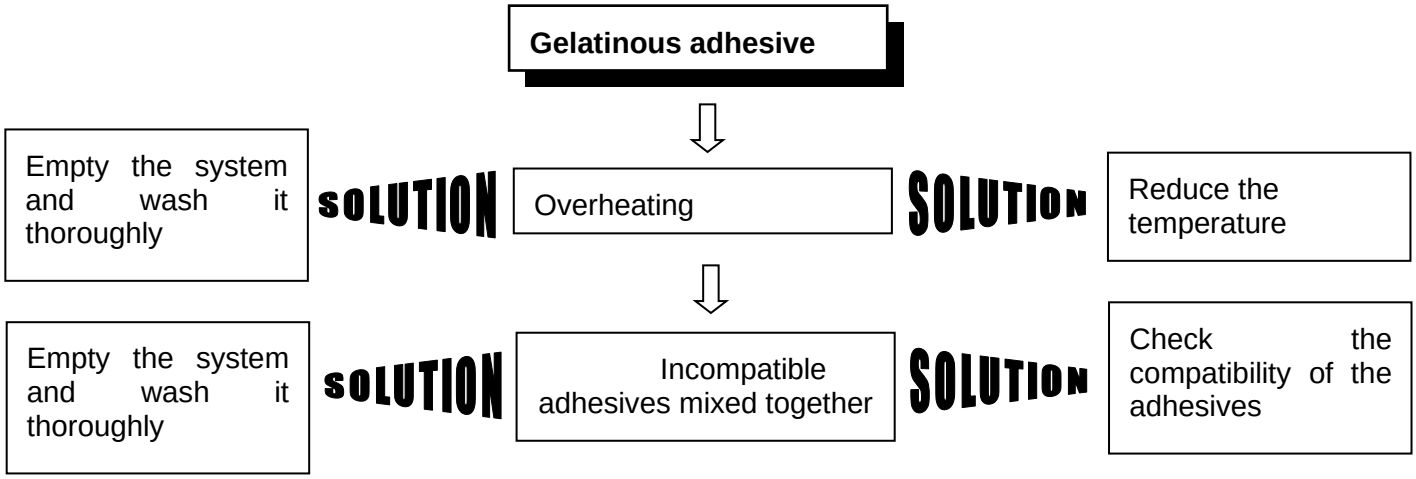

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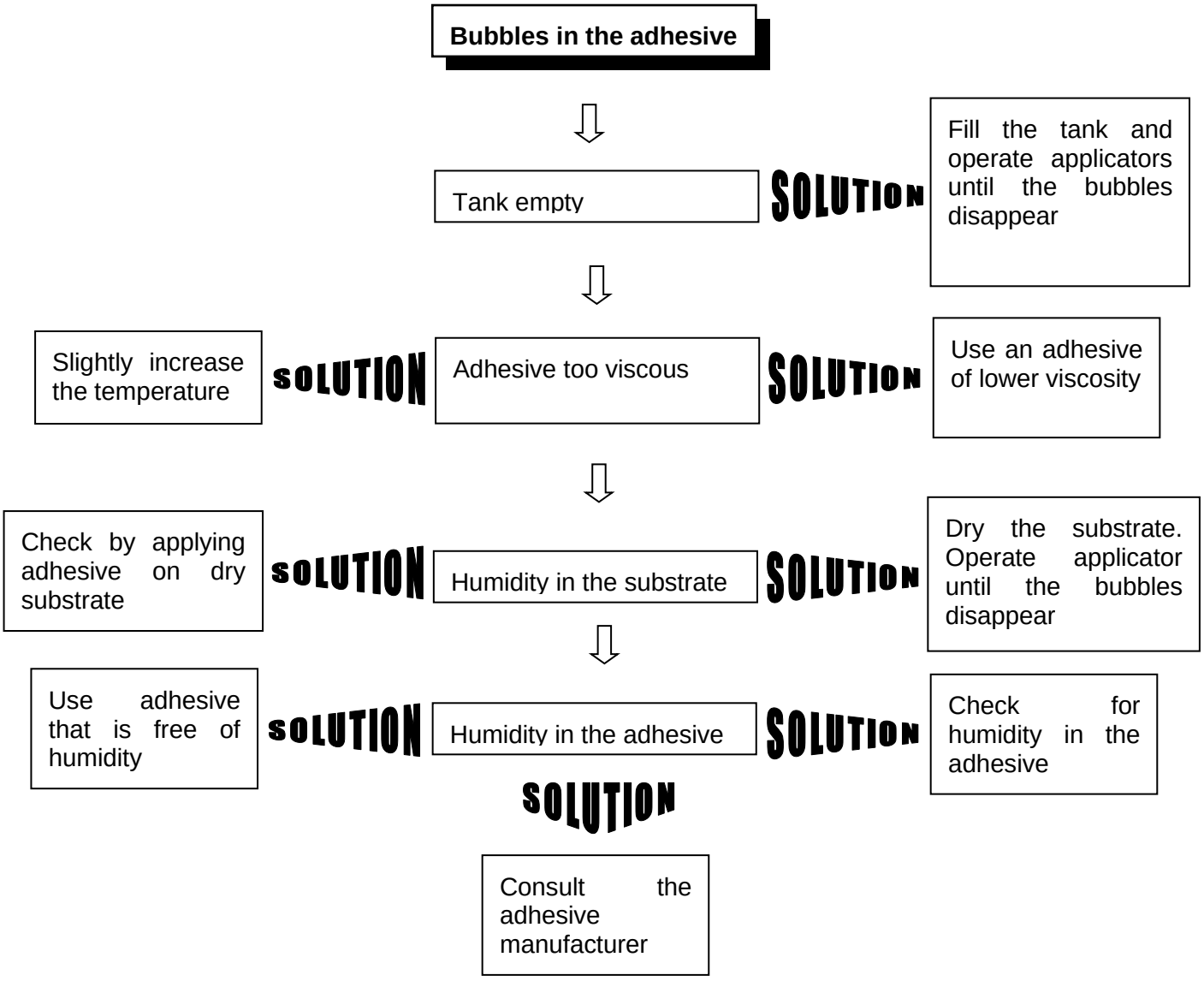

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ANNEX A
TORQUE INSTRUCTIONS

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Torque and UNF Connectors:

Apply the torque shown in the following table.

Screw	Torque
½-8 o'clock	32 Nm
9/16-6 o'clock	40 Nm
¾-14 o'clock	70 Nm

To tighten sliding nuts and hoses, tighten the screw with your hand until you can't tighten anymore. Then, tighten with a wrench 1 more turn.

Torque and NPT/BSP Connectors:

Apply high temperature sealant to the screw at 2 opposite points.

Screw the cover by holding the hex key by the hexagon until you can't tighten anymore. Then, tighten with a wrench 3 more turns.

Tightening Screws on Steel or Helicoil:

Apply the torque shown in the following tables. Helicoil is considered to be a non-lubricated joint.

Non-lubricated joint	
Screw	Torque
M4	2.6
M5	5.1
M6	8.7
M8	22
M10	43
M12	75
M14	119
M16	189
M18	265
M20	373

Lubricated joint	
Screw	Torque
M4	1.7
M5	3.4
M6	5.8
M8	14
M10	28
M12	49
M14	77
M16	120
M18	175
M20	240

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Tightening Screws on Other Materials:

Apply the torque shown in the following table.

Screw	M3	M4	M5	M6	M8	M10
Aluminium	0.36	0.85	1.6	2.8	7	13
Brass	0.5	1.2	2.2	3.9	9	17

Tightening Screws on Electrical Elements:

Connection Type	Torque (Nm)	Situations
Power	2	differential, magneto-thermal, breakers, contactors, 6 to 10 mm^2 terminals and solid-state relays.
Manoeuvre	1	Small relays, power sources, 4 mm^2 terminals.
Control	0.5	Control terminal blocks of Allen Bradley and B&R variators, terminals up to 2.5mm^2. In general, any control terminal block.

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ANNEX B
SOFTWARE SPECIFICATIONS

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9.1. I/O FUNCTIONS. I/O CARD PULSES:

I/O car diagram:

Besides supporting communications by RS-485 the I/O card is able to have a wired communication. This wiring system has four functions.

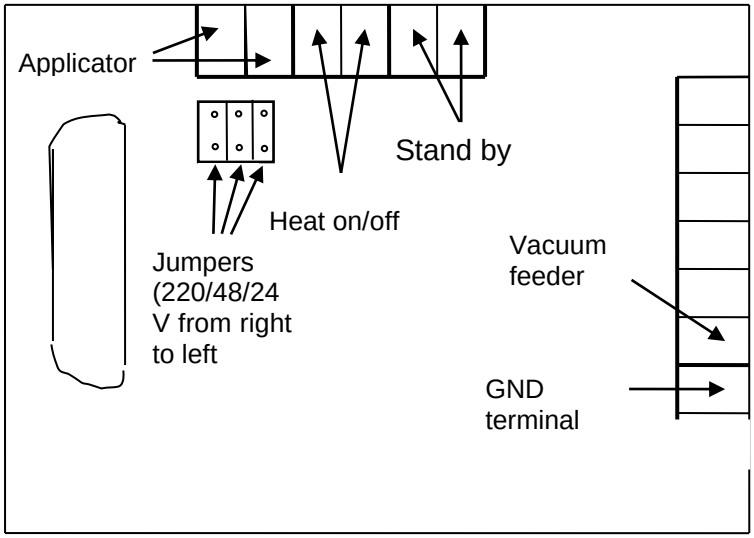
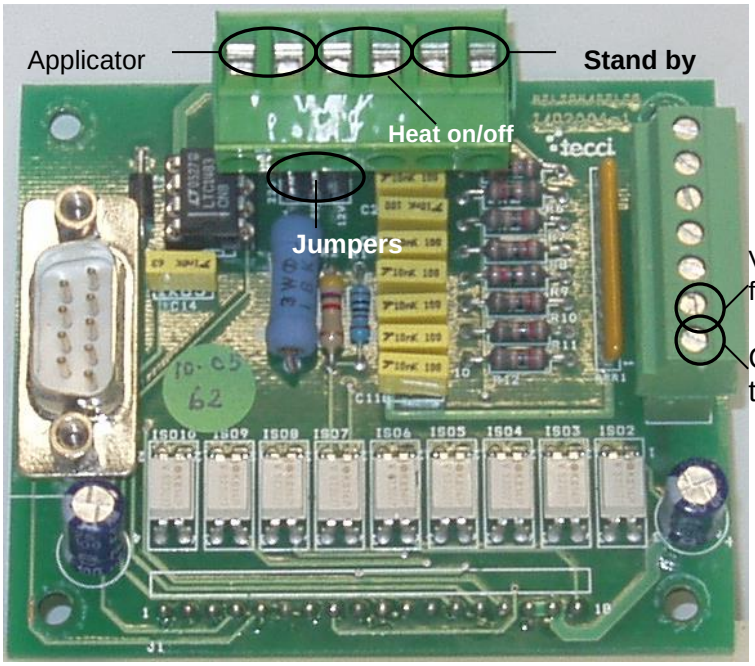


Photo of the I/O card



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Connector	Function
Applicator	Application fuction
Heat on/off	Heat on/off function
Stand by	Stand by function
Vacuum feeder	Level sensor input

Application function

This function operates as following:

When the pulse signal is no longer received for a time (minutes) exceeding the value set in P8 the unit goes to stand-by mode.

Once the unit is in stand-by mode there are two options for setting the unit in standard operation:

a) Pressing the button situated in the panel

b) Causing a signal at the stand by function input.

If a pulse is caused at the input before finishing the P8 time then the time resets and begins to count again.

Heat on/off function

The operating mode of the unit changes if there is a pulsed on/off signal.

Stand by function

The unit goes into stand-by mode if there is a pulsed on/off signal.

Feeder alarm function.

The unit is enabled to deal the feeder alarm by this input. This function will be always wired and working for the right working of the feeder system.

When we close the circuit between the GNR and the I/O card then it send a pulse. If the contact is close, it cann't send signal to others contacs.

Con1 (1-2) ***Con X D – GND***

Con2 (3-4)

Con3 (5-6)

It can't send more than one pulse.

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9.2. MODBUS COMMUNICATIONS:

9.2.1. COMMUNICATION STRUCTURE:

Communication modes selection: P27 parameter.

This parameter is used to know if external communication are going to be used.

If P27= 0 it means that external communications by PROFIBUS or MODBUS protocols or by I/O States are not going to be used.

If P27= 1 then the MODBUSS communications and the I/O States are activated.

In both cases, when it used 4 exits equipments in the position that it isn't used, because they are exclusive that 6 exits equipments, the system send a "0".

In both cases, when we use 4 exits equipments in the position that it isn't used, because they are exclusive of the 6 exits equipments, the system sends a "0".

Micro-controller functions:

The micro-controller (µC) always communicates by Modbus functions.

The programming of the µC only supports two functions:

(0x03): reading of stored register

(0x10): writing of multiple register

(0x03) : Reading of stored register:

This function realizes a continuous reading of register list. The function specifies first register address and then it reads as the number of values that the function shows.

Function characteristics:

Petition:

Function code:	1Byte	0x03.
Start address:	2 Bytes	0x0000 a 0xFFFF.
Register quantity:	2 Bytes	1 a 125 (0x7D).

Reply:

Function code:	1Byte	0x03.
Bytes quantity:	1 Bytes	2 x N* (Register quantify)
Register values:	N* x 2 Bytes.	

Error:

Error code:	1 Byte	0x83
Exception code:	1 Byte	01 ó 02 ó 03 ó 04

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Example:

Petition			**Reply**			
Function 03			Function		03	
Start address	Hi	00	Bytes quantity	06		
Start address	Lo	6B	Register value	Hi	(108)	02
Nº register	Hi	00	Register value	Lo	(108)	2B
Nº register	Lo	03	Register value	Hi	(109)	00
			Register value	Lo	(109)	00
			Register value	Hi	(110)	00
			Register value	Lo	(110)	64

(0x10): Writing of multiple register:

This function realizes a continuous block writing of no more than 120 registers (in our case 32).

The sending writes in two bytes the values of one register. The answer sends function code, Start address and register quantity.

Function characteristics:

Sending:

Function code:	1Byte 0x10.
Start address:	2 Bytes0x0000 a 0xFFFF.
Register quantity:	2 Bytes0x0001 a 0x0078
Bytes quantity:	1 Bytes2 x N* (Cantidad de Registros)
Register values:	N* x 2 Bytes.

Reply:

Function code:	1Byte 0x10.
Start address:	2 Bytes0x0000 a 0xFFFF.
Register quantity:	2 Bytes1 a 123 (0x7B)

Error:

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Error code:	1 Byte	0x90
Exception code:	1 Byte	01 ó 02 ó 03 ó 04

Example:

Sending				**Reply**			
Function			10	Function		10	
Start address		Hi	00	Start address	Hi	00	
Start address		Lo	01	Satart address		Lo	01
Register quantity	Hi	00		Register quantity	Hi	00	
Register quantity	Lo	02		Register quantity	Lo	02	
Bytes quantity			04				
Register value		Hi	00				
Register value		Lo	0A				
Register value		Hi	01				
Register value		Lo	02				

9.2.2. COMMUNICATION MODES: MODBUS (RS-485, 8N +1)

With this communication mode, the micro-controller is a slave, that is to say, it waits for PLC request about state of values that it wants.

Using previous functions, PLC starts communications, and it makes that micro-controller sends the state of values.

PLC reads continuously the equipment values to actualize them.

MODBUS PROTOCOL ADDRESSES:

MODBUS DATA AND ADDRESS		
NECESSARY DATA	**MODBUS HEX ADDRESS**	**NOTES**
Dep prog	0x0100	L/E
M1 prog	0x0101	L/E
P1 prog	0x0102	L/E
M2 prog	0x0103	L/E
P2 prog	0x0104	L/E
M3 prog	0x0105	L/E

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P3 prog	0x0106	L/E
M4 prog	0x0107	L/E
P4 prog	0x0108	L/E
M5 prog	0x0109	L/E 6 exits
P5 prog	0x010A	L/E 6 exits
M6 prog	0x010B	L/E 6 exits
P6 prog	0x010C	L/E 6 exits
B1	0x010D	L/E
B2	0x010E	L/E
B3	0x010F	L/E
P1	0x0110	L/E
P2	0x0111	L/E
P3	0x0112	L/E
P4	0x0113	L/E
P5	0x0114	L/E
P6	0x0115	L/E
P7	0x0116	L/E
P8	0x0117	L/E
P11	0x0118	L/E
P12	0x0119	L/E
P13	0x011A	L/E
P14	0x011B	L/E
P15	0x011C	L/E Channel 5 in 6 exits in 4 exits – it sends “0”
P16	0x011D	L/E Channel 6 in 6 exits in 4 exits – it sends “0”
P17	0x011E	L/E Nº Terminal. 4 and 6 exits
P18	0x011F	L/E 4 and 6 exits
P19	0x0120	L/E 4 and 6 exits

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P20	0x0121	L/E 4 and 6 exits
P21	0x0122	L/E 4 and 6 exits
P22	0x0123	L/E 4 and 6 exits
P23	0x0124	L/E 4 and 6 exits
P24	0x0125	L/E 4 and 6 exits
P25	0x0126	L/E 4 and 6 exits in 4exits – it sends “0”
P26	0x0127	L/E 4 and 6 exits in 4exits – it sends “0”
HC1	0x0128	L/E MONDAY
MC1	0x0129	L/E MONDAY
TC1	0x012A	L/E MONDAY
HD1	0x012B	L/E MONDAY
MD1	0x012C	L/E MONDAY
TD1	0x012D	L/E MONDAY
HC2	0x012E	L/E MONDAY
MC2	0x012F	L/E MONDAY
TC2	0x0130	L/E MONDAY
HD2	0x0131	L/E MONDAY
MD2	0x0132	L/E MONDAY
TD2	0x0133	L/E MONDAY
HC1	0x0134	L/E TUESDAY
MC1	0x0135	L/E TUESDAY
TC1	0x0136	L/E TUESDAY
HD1	0x0137	L/E TUESDAY
MD1	0x0138	L/E TUESDAY
TD1	0x0139	L/E TUESDAY
HC2	0x013A	L/E TUESDAY
MC2	0x013B	L/E TUESDAY

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TC2	0x013C	L/E TUESDAY
HD2	0x013D	L/E TUESDAY
MD2	0x013E	L/E TUESDAY
TD2	0x013F	L/E TUESDAY
HC1	0x0140	L/E WEDNESDAY
MC1	0x0141	L/E WEDNESDAY
TC1	0x0142	L/E WEDNESDAY
HD1	0x0143	L/E WEDNESDAY
MD1	0x0144	L/E WEDNESDAY
TD1	0x0145	L/E WEDNESDAY
HC2	0x0146	L/E WEDNESDAY
MC2	0x0147	L/E WEDNESDAY
TC2	0x0148	L/E WEDNESDAY
HD2	0x0149	L/E WEDNESDAY
MD2	0x014A	L/E WEDNESDAY
TD2	0x014B	L/E WEDNESDAY
HC1	0x014C	L/E THURSDAY
MC1	0x014D	L/E THURSDAY
TC1	0x014E	L/E THURSDAY
HD1	0x014F	L/E THURSDAY
MD1	0x0150	L/E THURSDAY
TD1	0x0151	L/E THURSDAY
HC2	0x0152	L/E THURSDAY
MC2	0x0153	L/E THURSDAY
TC2	0x0154	L/E THURSDAY
HD2	0x0155	L/E THURSDAY
MD2	0x0156	L/E THURSDAY
TD2	0x0157	L/E THURSDAY
HC1	0x0158	L/E FRIDAY

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MC1	0x0159	L/E FRIDAY
TC1	0x015A	L/E FRIDAY
HD1	0x015B	L/E FRIDAY
MD1	0x015C	L/E FRIDAY
TD1	0x015D	L/E FRIDAY
HC2	0x015E	L/E FRIDAY
MC2	0x015F	L/E FRIDAY
TC2	0x0160	L/E FRIDAY
HD2	0x0161	L/E FRIDAY
MD2	0x0162	L/E FRIDAY
TD2	0x0163	L/E FRIDAY
HC1	0x0164	L/E SATURDAY
MC1	0x0165	L/E SATURDAY
TC1	0x0166	L/E SATURDAY
HD1	0x0167	L/E SATURDAY
MD1	0x0168	L/E SATURDAY
TD1	0x0169	L/E SATURDAY
HC2	0x016A	L/E SATURDAY
MC2	0x016B	L/E SATURDAY
TC2	0x016C	L/E SATURDAY
HD2	0x016D	L/E SATURDAY
MD2	0x016E	L/E SATURDAY
TD2	0x016F	L/E SATURDAY
HC1	0x0170	L/E SUNDAY
MC1	0x0171	L/E SUNDAY
TC1	0x0172	L/E SUNDAY
HD1	0x0173	L/E SUNDAY
MD1	0x0174	L/E SUNDAY
TD1	0x0175	L/E SUNDAY

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HC2	0x0176	L/E SUNDAY
MC2	0x0177	L/E SUNDAY
TC2	0x0178	L/E SUNDAY
HD2	0x0179	L/E SUNDAY
MD2	0x017A	L/E SUNDAY
TD2	0x017B	L/E SUNDAY
DIA	0x017C	L/E
HOUR	0x017D	L/E
MINUTES	0x017E	L/E
HEAT ON/OFF	0x017F	L/E
TIMER	0x0180	L/E
ENERGY SAVING	0x0181	L/E
P10	0x0182	L/E= HOURS TO FILTER CHANGE
P9	0x0183	L
Tank present	0x0184	L
Hose 1 present	0x0185	L
Gun 1 present	0x0186	L
Hose 2 present	0x0187	L
Gun 2 present	0x0188	L
Hose 3 present	0x0189	L
Gun 3 present	0x018A	L
Hose 4 present	0x018B	L
Gun 4 present	0x018C	L
Hose 5 present	0x018E	L 6 EXITS
Gun 5 present	0x018F	L 6 EXITS
Hose 6 present	0x0190	L 6 EXITS
Gun 6 present	0x0191	L 6 EXITS

Note 1: L = reading y E= writing

Note 2: where only appear 6 exits are data that 6 exits card utilizes. In 4 exits cards sends value “0”.

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Note 3: Positions where appear C series, means that N series has not this data so N series sends value “0”

Note 4: P10 changes of direction from 0x0119 to 0x0182 because in a 4 outputs series it is only a reading data.(C6 L/E in that way it becomes compatible)

Note 5: P9 changes from 0x0118 to 0x183 because it is only a L data.

Note 4 and 5: Changes are done to have all the L/E data together and all the L data together to permit in that way ask all data at once.

Important:: When the current temperature is readed, 25 (Centigrade scale) must be subtracted to the sent answer. In that way measuring negatives values of temperature is avoided, which can’t be sent. For example:

If the answer is 1 the PLC must subtract 25, getting in that way the real value of the measured temperature,-24º C. real temperature.

When Fahrenheit scale is used, you have to subtract 13 to have the value of the real temperature.

Summing up, the following operations must be applied depending on the used scale.

CENTIGRADE SCALE: Current real Tª(ºC)=Current measured Tª-25
FARENHEIT SCALE: Current real Tª (F)= Current measured Tª-13

It happens in directions from 0x0184 to 0x0191.(Current temperature)

Status Word: 0,0,0,0,0,0,0,0,0,0, Pump permissive, Fault, Warning, OK

I/O contacts in 4 exits equipment will be configurable too like 6 exits equipment

Node number will be in the same parameter 4 as well as 6 outputs.P17

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ANNEX C
LOG SHEETS

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S121020201
D4-L

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COVER PAGE

PROJECT: S121020201 D4-L

REV.	DATE	NAME	CHANGES
0	02/10/2019	mayestaran	

REVISION 0

SCHEME 01

1-Document book

Drawing	Function	Location	Revision	Date	Created by	Description
01	F1	P1				Cover page
02	F1	P1				Drawing list
03	F1	P1				Wiring line diagram
04	F1	P1				SERVICE WIRES
05	F1	P1				POWER OUTPUTS
06	F1	P1				RTD
07	F1	P1	0	03/10/2019	mayestaran	Electrical cabinet/Baseframe
08	F1	P8	0	03/10/2019	mayestaran	Front Panel
09	F1	P1	0	03/10/2019	mayestaran	Bill of materials
10	F1	P1	0	03/10/2019	mayestaran	Bill of materials
11	F1	P1	0	03/10/2019	mayestaran	Bill of materials
12	F1	P1	0	03/10/2019	mayestaran	List of wires
13	F1	P1	0	03/10/2019	mayestaran	List of wires
14	F1	P1	0	03/10/2019	mayestaran	List of the cables
15	F1	P1	0	03/10/2019	mayestaran	List of cable strands

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DRAWING LIST

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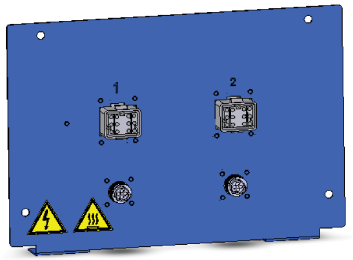
REVISION 0

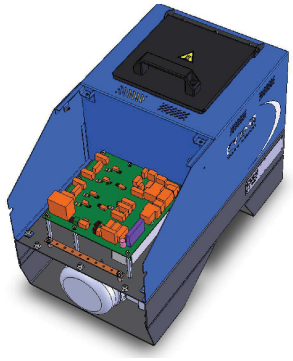
SCHEME 02

1	2	3	4	5	6	7	8	9	10

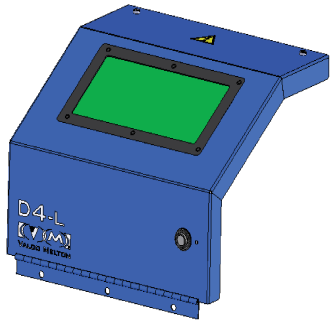
+P3 - Connectors plate



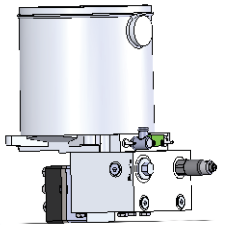
+P1 - Electrical cabinet/Baseframe



+P8 - Front panel



+P2 - Tank



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WIRING LINE DIAGRAM

PROJECT: S121020201 D4-L

REV.	DATE	NAME	CHANGES
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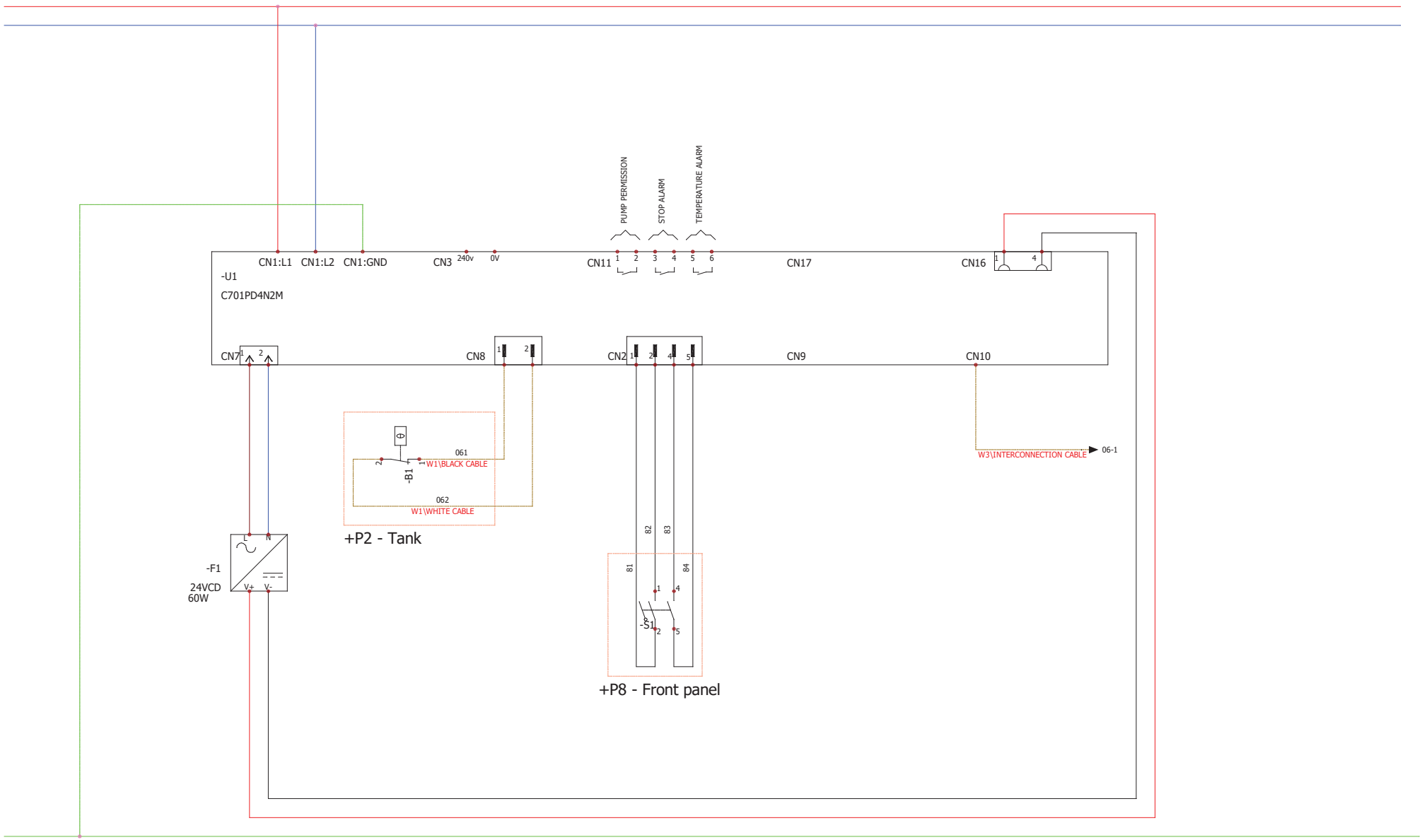
REVISION 0

SCHEME 03



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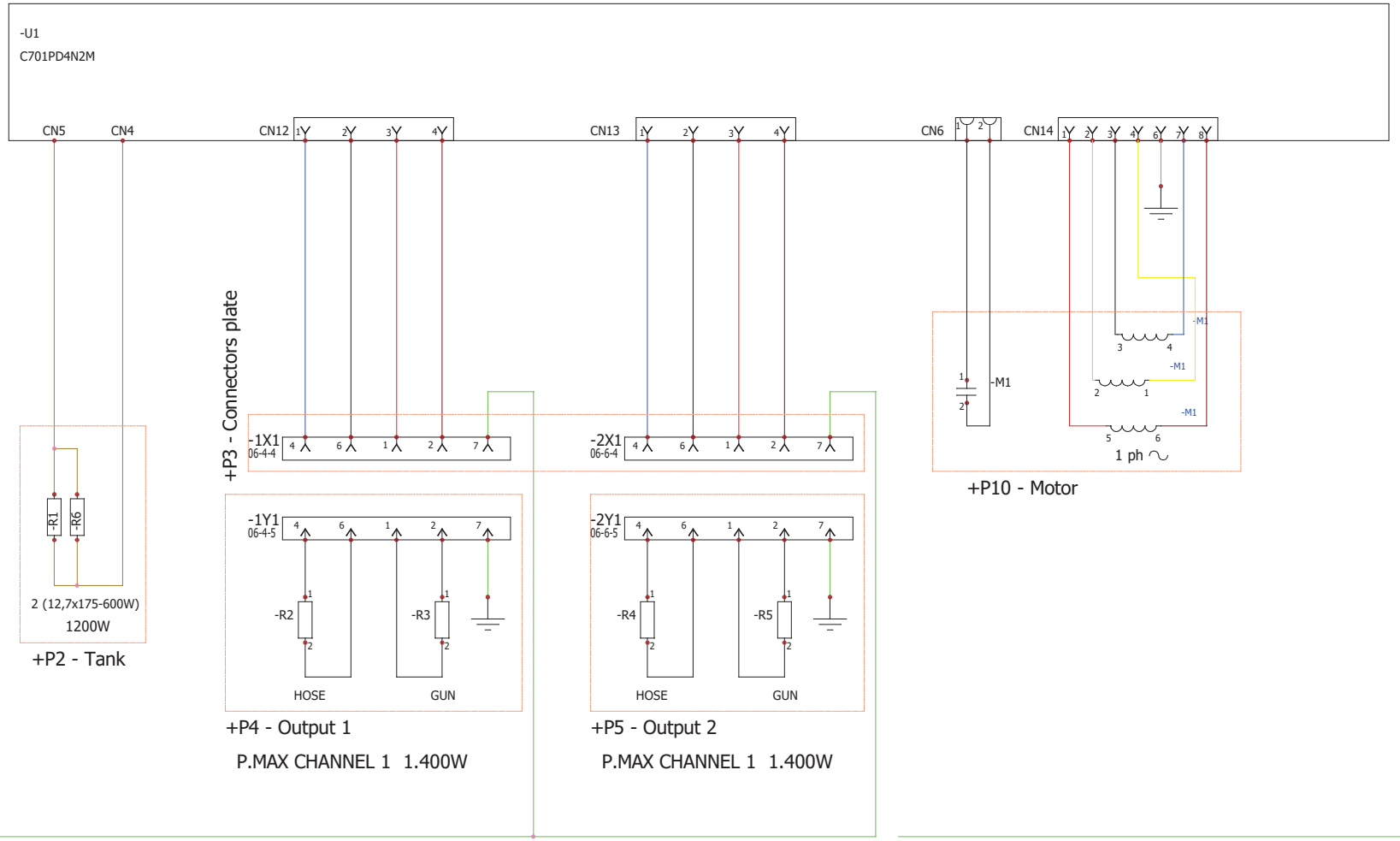
SERVICE WIRES, POWER SUPPLY, THERMOSTAT CONNECTION

PROJECT: S121020201 D4-L

REV.	DATE	NAME	CHANGES
0	02/10/2019	mayestaran	

REVISION 0

SCHEME 04



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POWER HOSE - GUN OUTPUTS AND MOTOR CONNECTION

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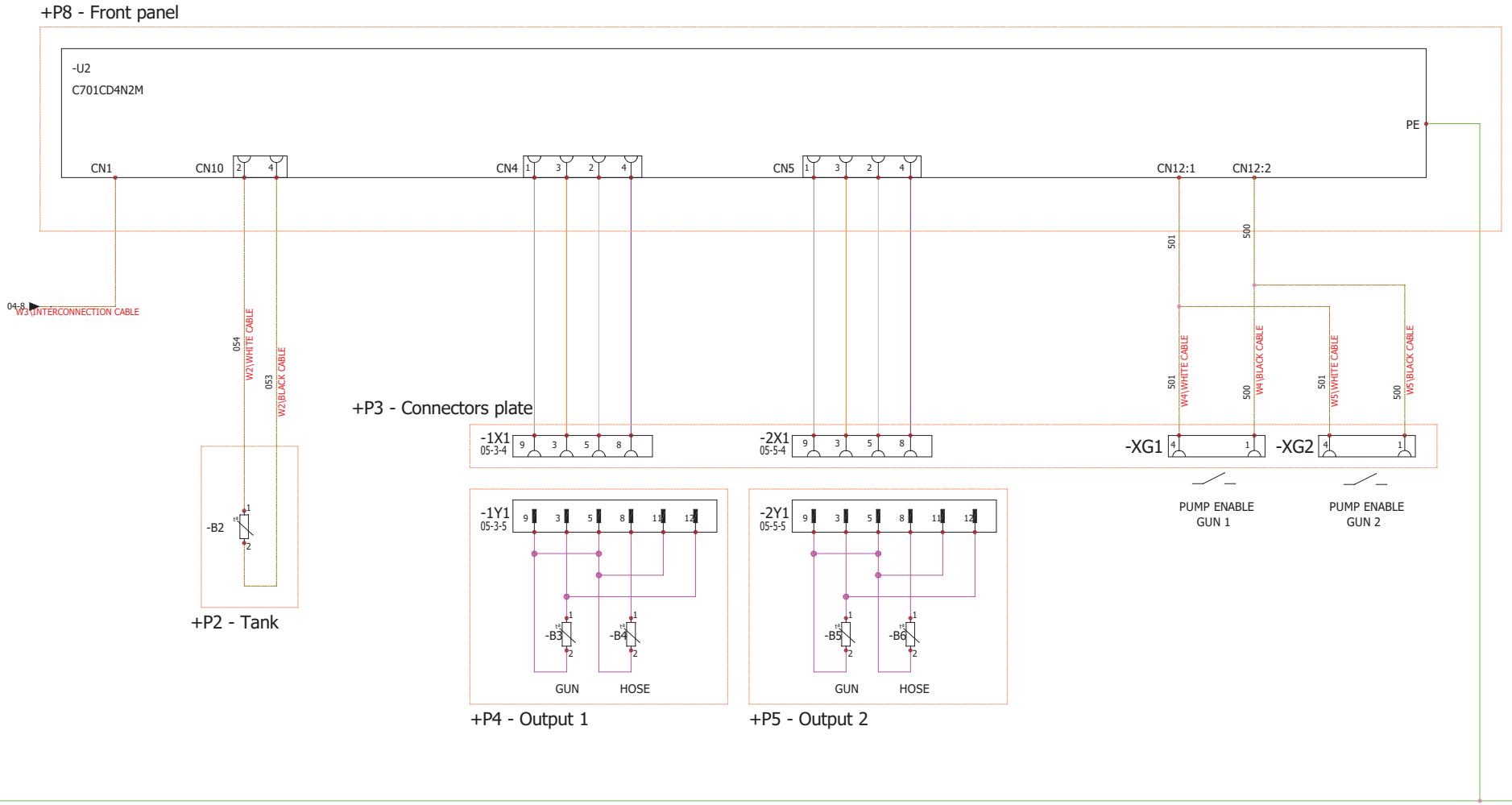
REV.	DATE	NAME	CHANGES
0	02/10/2019	mayestaran	

REVISION 0

SCHEME 05



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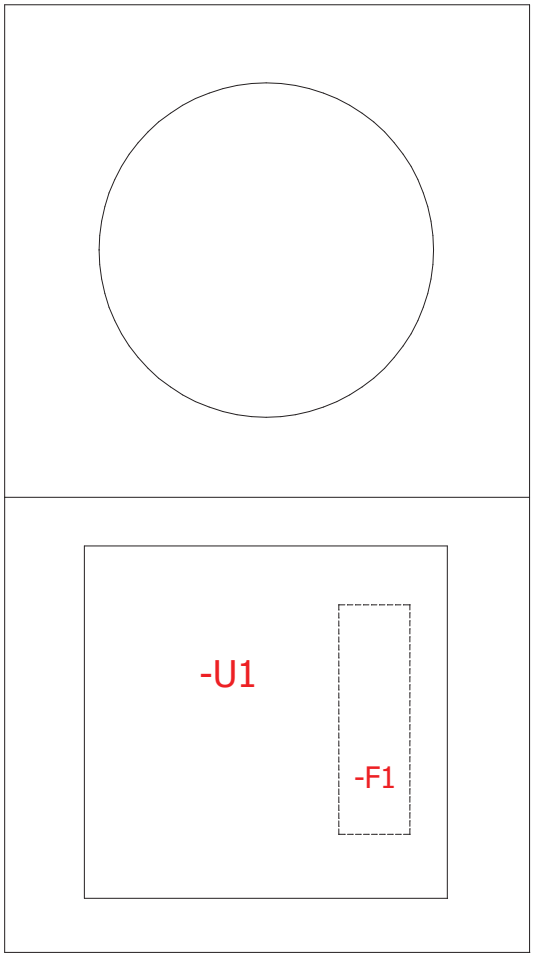
TANK AND OUTPUTS RTD CONNECTION AND INTERCONNECTION CABLE

PROJECT: S121020201 D4-L

REV.	DATE	NAME	CHANGES
0	02/10/2019	mayestaran	

REVISION 0

SCHEME 06



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Electrical cabinet/Baseframe Construction

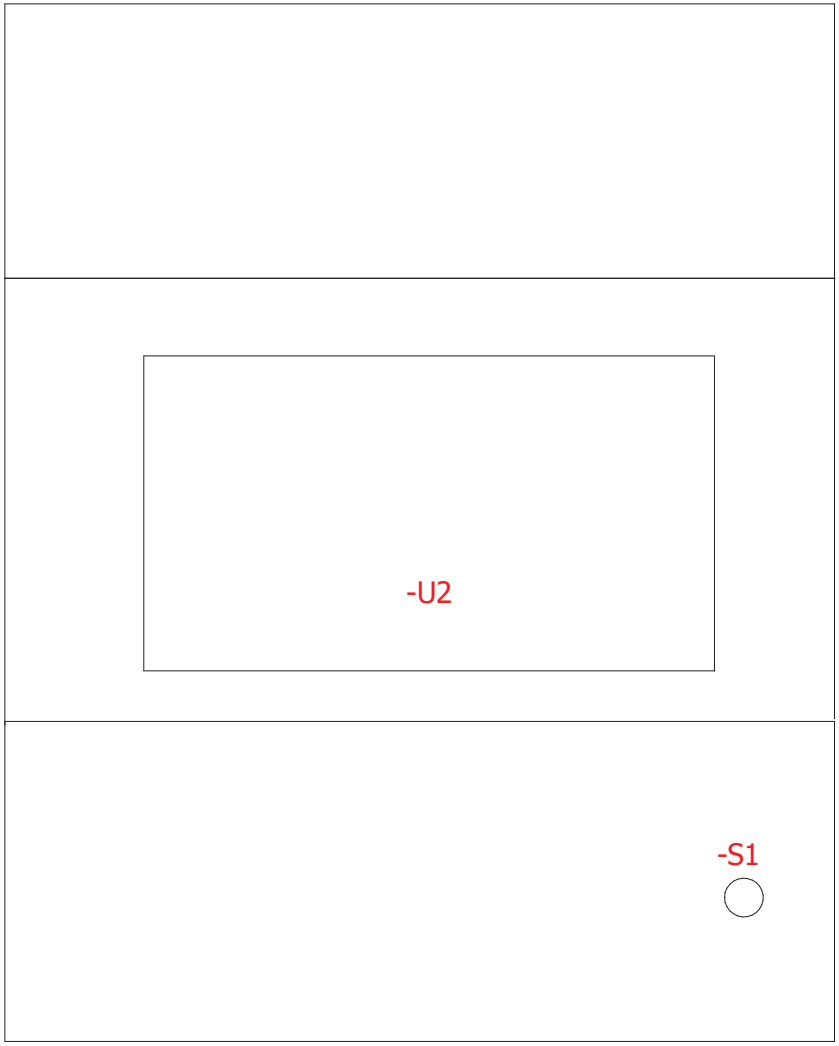
PROJECT: S121020201 D4-L

REV.	DATE	NAME	CHANGES
0	03/10/2019	mayestaran	

SCALE 1 / 3

REVISION 0

DRAWING 07



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Front Panel Construction

PROJECT: S121020201 D4-L

REV.	DATE	NAME	CHANGES
0	03/10/2019	mayestaran	

SCALE 1 / 2

REVISION 0

DRAWING 08

ANEXO A

DESPIECE / PART LISTING

EQUIPO D4-L

D4-L EQUIPMENT

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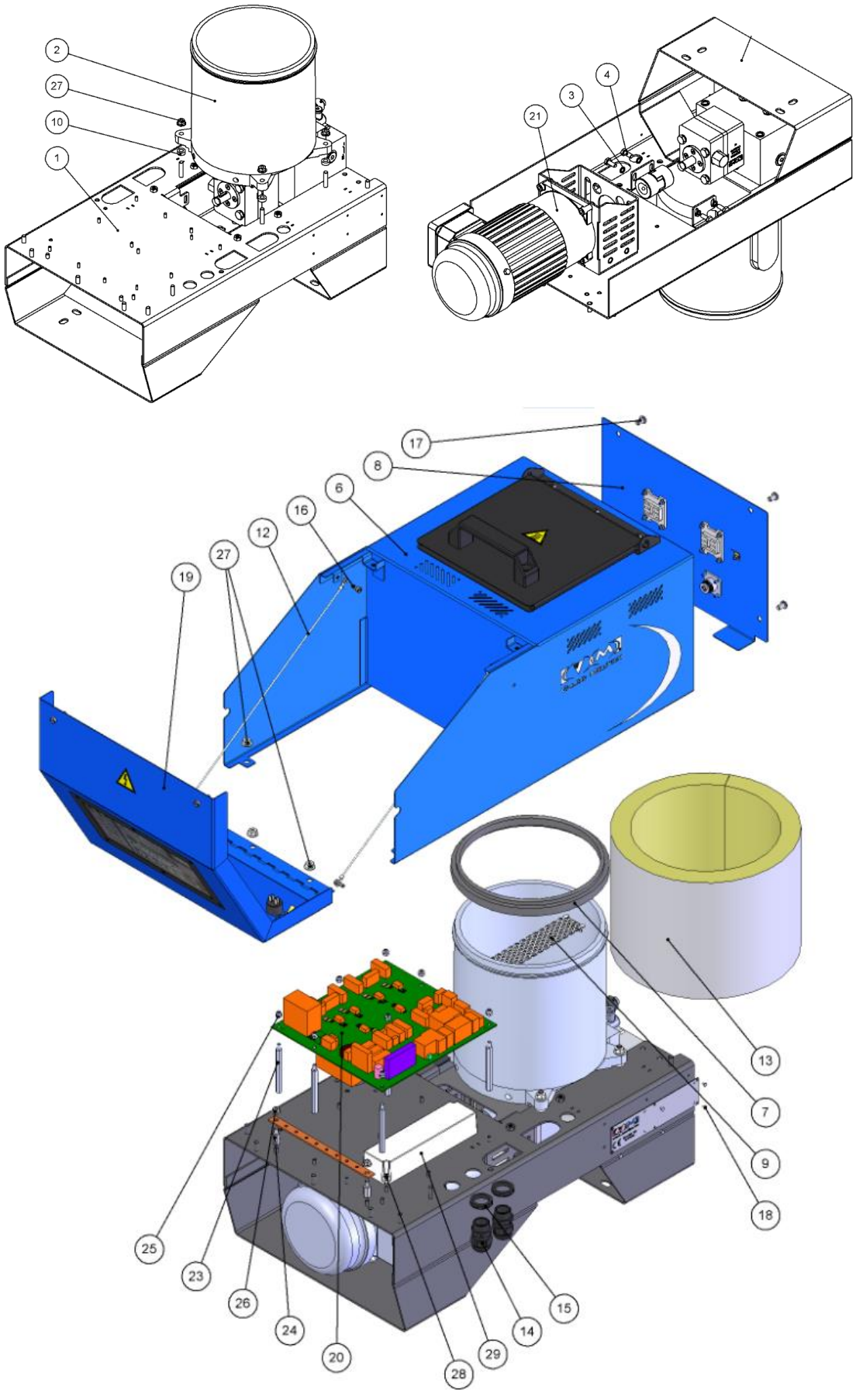
1. CONJUNTO EQUIPO D4-L / D4-L EQUIPMENT ASSEMBLY



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Nº	*Descripción*	*Description*	*Ref.*	*Qty*
1	BASTIDOR D4-E	D4-E BASEFRAME		1
2	SUBCONJUNTO DEPOSITO D4-L	D4-L TANK ASSEMBLY	Page 5	1
3	ARANDELA GROWER M6 INOX.	GROVER WASHER M6 STAINLESS	910XX131	4
4	TORNILLO HEXAGONAL M6X16 INOX.	HEXAGONAL SCREW M6X16 STAINLESS	911XX314	4
5	ACOPLAMIENTO Ø19,06-Ø12,7	COUPLING Ø19,06-Ø12,7	913XX601	1
6	SUBCONJUNTO CARCASA CENTRAL	CENTRAL CASING ASSEMBLY	Page 8-9	1
7	GASKET RESERVOIR	GASKET RESERVOIR	782XX098	1
8	SUBCONJUNTO PANEL TRASERO D4-L	D4-L REAR PANEL ASSEMBLY	Page 10	1
9	REJILLA DEPOSITO	REJILLA DEPOSITO	782XX297	1
10	STANDOFF	STANDOFF	775XX857	4
11	CHAPA MATRICULA	ID SHEET	917XX326	1
12	SIRGA APERTURA PORTON D4-L/D4-D4-PUR	D4-L/D4-D4-PUR FRONT PANEL OPENING CORDON		2
13	CAMISA AISLANTE D4 LABELING	D4 LABELING INSULATION CASING	912XX279	1
14	PRENSA PVC PG-13 NEGRO	PG-13 BLACK PVC PRESS		2
15	TUERCA PVC PG13 NEGRO	PG-13 BLACK PVC NUT	911XX302	2
16	TORNILLO ALLEN M4X10 INOX.	ALLEN SCREW M4X10 STAINLESS	910XX129	4
17	BHCS,M6 X 10.0 LG,S.S.	BHCS,M6 X 10.0 LG,S.S.	784XX491	4
18	REMACHES POP 2,4X5,1 (MANG.)	2,4X5,1 POP RIVET	915XX249	6
19	SUBCONJUNTO PANEL DELANTERO D4-E SELCO	D4-E SELCO FRONT PANEL ASSEMBLY	Page 11	1
20	TARJETA POTENCIA D4-L SELCO	D4-L SELCO POWER CARD	900XX406	1
21	SUBCONJUNTO MOTOR D4-L	D4-L MOTOR ASSEMBLY	Page 7	1
22	REGLETA TOMA DE TIERRA	GROUND CONNECTION TERMINAL	913XX793	1
23	DISTANCIAL HEXAGONAL M-H M4X65	M-F M4X65 HEXAGONAL SPACER		8
24	DISTANCIAL HEXAGONAL M5X15	M5X15 HEXAGONAL SPACER	913XX794	2
25	TUERCA HEX. AUTOBLOCANTE M4 DIN 985	HEXAGONAL AUTOBLOC.M4 DIN985 NUT	912XX441	8
26	TUERCA DENTADA M5	M5 SPROCKET NUT		2
27	NUT FLANGE M6 ZINC	NUT FLANGE M6 ZINC	784XX677	11
28	TUERCA HEX. AUTOBLOCANTE M3 DIN 985	HEXAGONAL AUTOBLOC.M3 DIN985 NUT	911XX326	2
29	MAZO FUENTE DE ALIMENTACION D4-L	D4-L POWER SUPPLY WIRING		1

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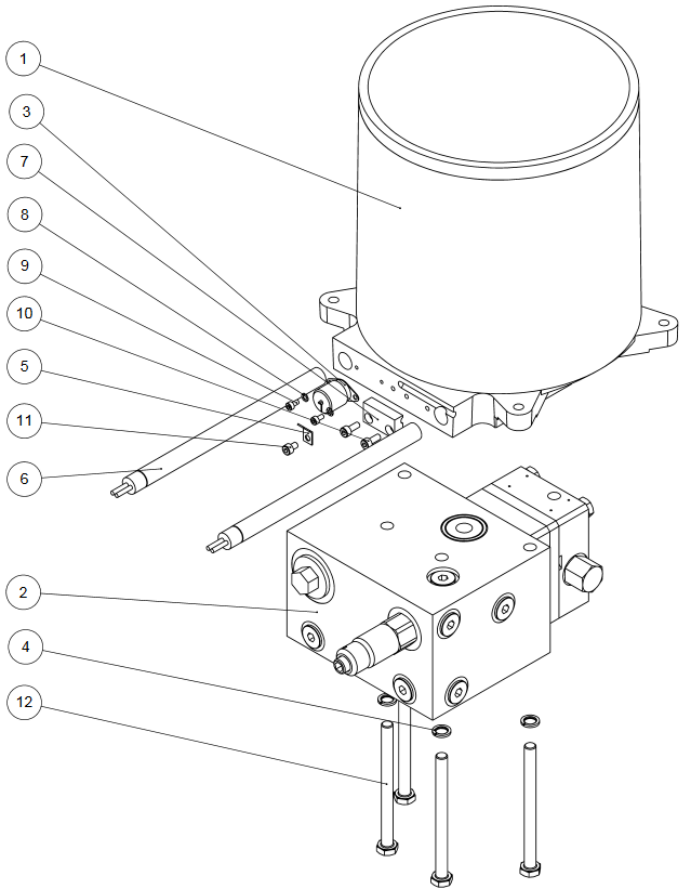
2. CONJUNTO DEPOSITO D4-L/ D4-L TANK ASSEMBLY



Nº	*Descripción*	*Description*	*Ref.*	*Qty*
1	KIT DEPOSITO D4-E	D4-E TANK KIT	916XX808	1
2	SUBCONJUNTO DISTRIBUIDOR D4-E	D4-E MANIFOLD ASSEMBLY	Page 6	1
3	MAZO TERMOSTATO D4-L	D4-L THERMOSTAT CORDSET		1
4	ARANDELA GROWER M8 INOX.	M8 GROVER WASHER STAINLESS	910XX135	4
5	TERMINAL FASTON M-PANEL	FASTON M-PANEL TERMINAL	915XX158	1
6	RESISTENCIA 12,7X175 600W 230V	12,7X175 600W 230V HEATER	900XX405	2
7	BRIDA SONDA C	C PROBE BRIDLE	914XX169	1
8	ARANDELA DENTADA M3	TOOTHED WASHER M3	910XX397	2
9	TORNILLO ALLEN M3X6 INOX.	ALLEN SCREW M3X6 STAINLESS	911XX132	2
10	TORNILLO ALLEN M4X10 INOX.	ALLEN SCREW M4X10 STAINLESS	910XX129	2
11	TORNILLO ALLEN M4X6 INOX.	ALLEN SCREW M4X6 STAINLESS	910XX004	1
12	TORNILLO HEXAGONAL M8x100 INOX.	HEXAGONAL SCREW M8X100 STAINLESS		4

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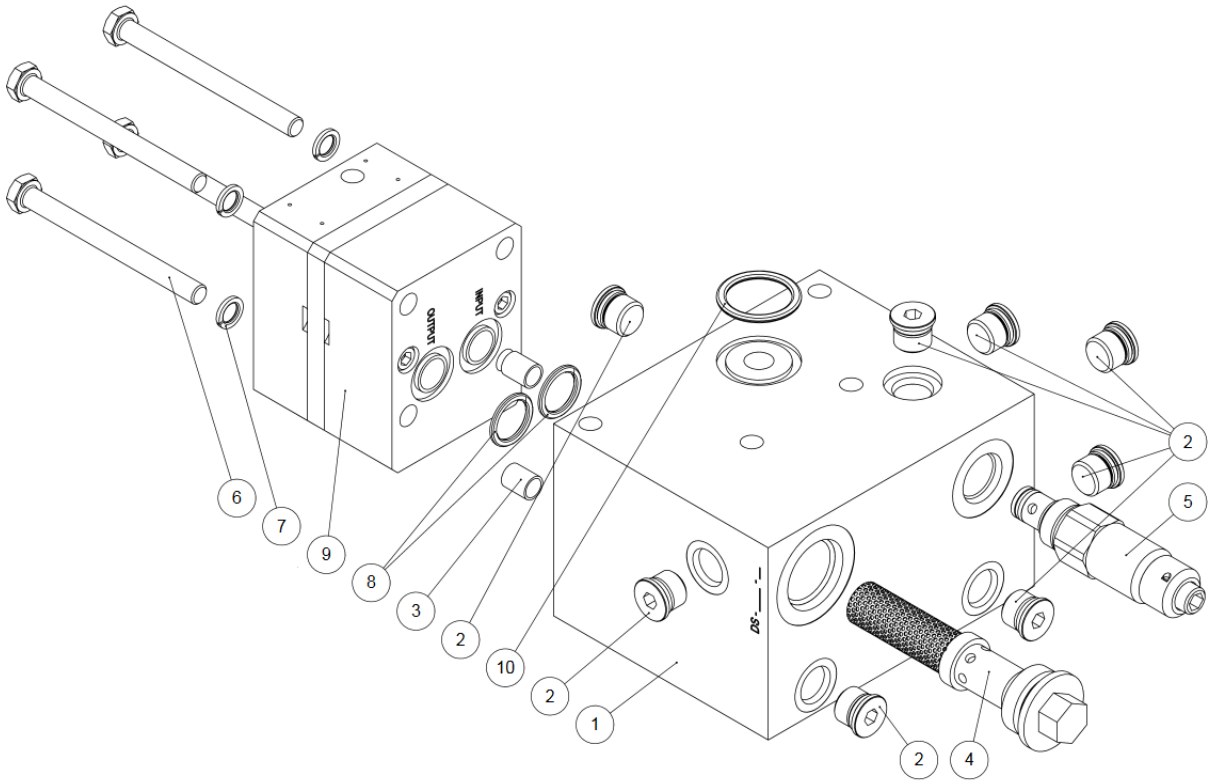
3. CONJUNTO DISTRIBUIDOR D4-e SIN TRANSDUCTOR/ MANIFOLD ASSEMBLY D4-e WITH OUT TRANSDUCER



Nº	*Descripción*	*Description*	*Ref.*	*Ref.*	*Qty*
1	DISTRIBUIDOR D4-E S/TRANSDUCTOR	DISTRIBUTOR D4-E		911XX867	1
2	TAPON 9/16" CON JUNTA JUNTA TORICA VITON 12X2	9/16" CAP WITH O-RING VITON O-RING Ø12X2	910XX049	917XX031	8
3	HELICOIL M8X12 TANGFREE	TANGFREE M8X12 HELICOIL		915XX173	4
4	FILTER ASSY	FILTER ASSY		593XX461	1
5	KIT REGULADOR DE PRESION TARADO 55 BAR	55 BAR TARED PRESSURE REGULATOR KIT		912XX170	1
6	TORNILLO HEXAGONAL M8X90 INOX.	STAINLESS M8X90 HEXAGONAL SCREW			4
7	ARANDELA GROWER M8 INOX.	STAINLESS M8 GROWER WASHER		910XX135	4
8	JUNTA TORICA VITON 17X2.62	VITON O-RING Ø17X2.62		917XX828	2
9	GEAR PUMP, STANDARD WIDTH	GEAR PUMP, STANDARD WIDTH		561XX308	1
10	JUNTA TORICA VITON 26,64X2,62	26,64X2,62 VITON O-RING		918XX921	1

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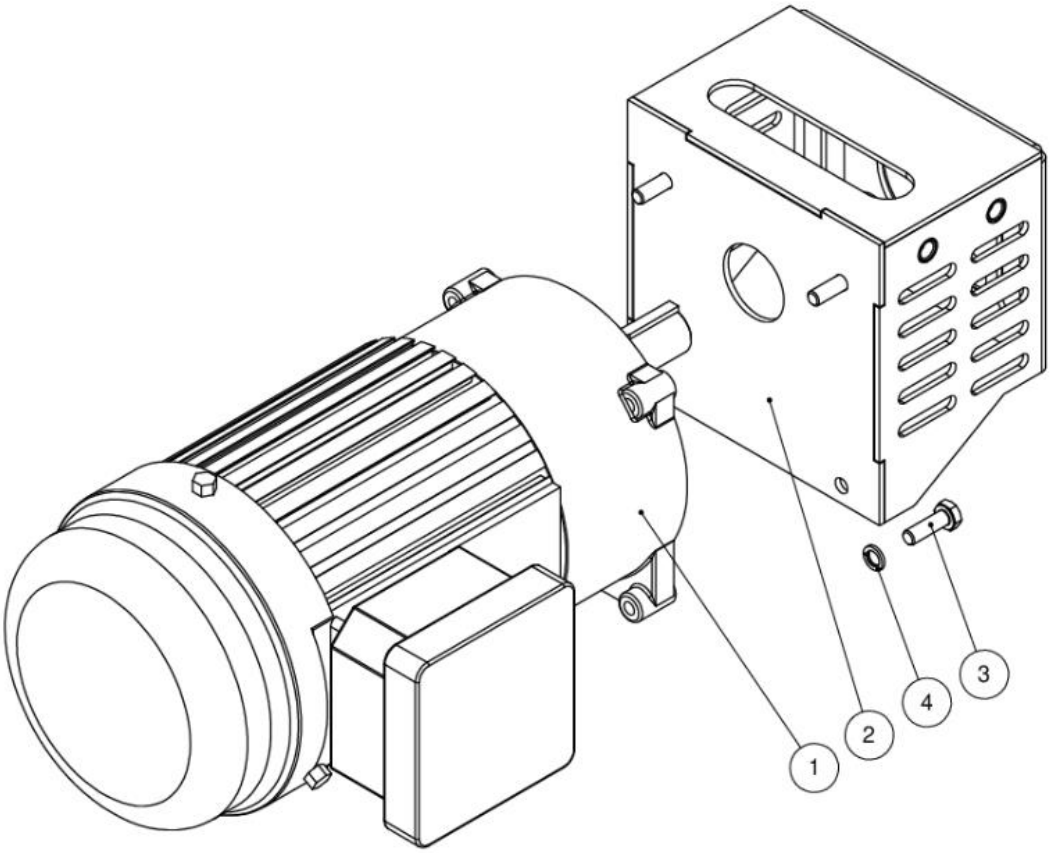
4. CONJUNTO MOTOR D4-L/ D4-L MOTOR ASSEMBLY



Nº	*Descripción*	*Description*	*Ref.*	*Qty*
1	MOTOR D4-E ZD-EMR0053 CE	D4-E ZD-EMR0053 CE GEAR MOTOR	900XX404	1
2	SOPORTE MOTOR D4-L	D4-E MOTOR SUPPORT		1
3	HHCS 1/4-28 X 3/4 ZINC	HHCS 1/4-28 X 3/4 ZINC	884XX004	4
4	ARANDELA GROVER M6 INOX.	STAINLESS M6 GROVER WASHER	915XX163	4

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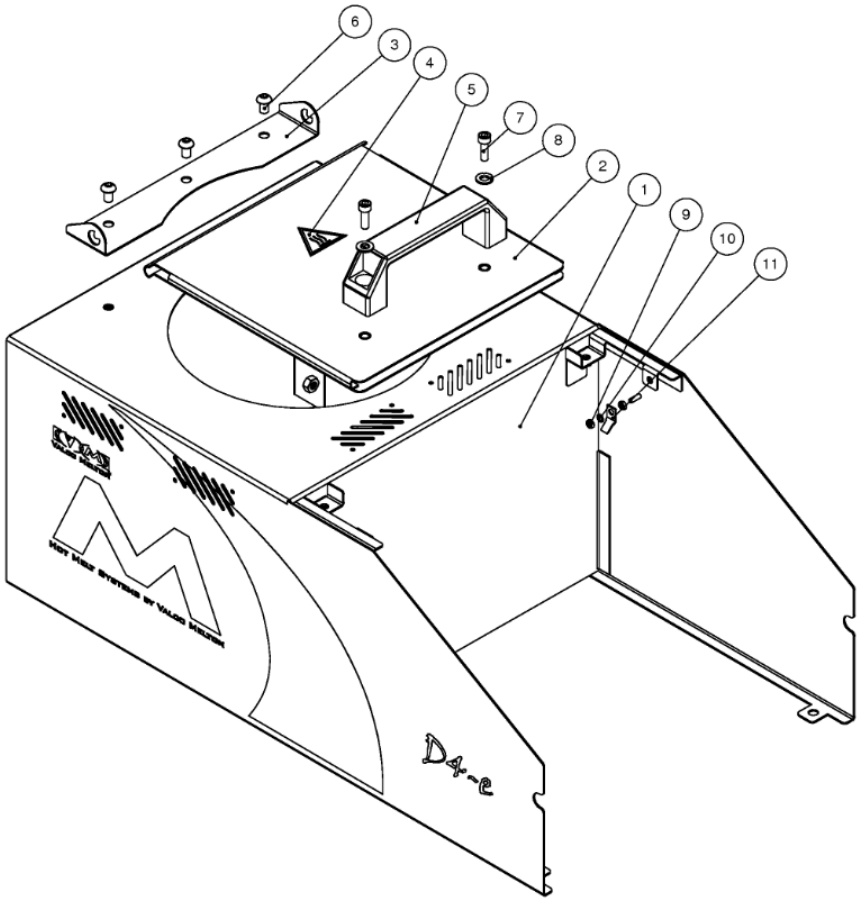
5.1. CONJUNTO CARCASA CENTRAL D4-E/ D4-E CENTRAL HOUSING ASSEMBLY



Nº	*Descripción*	*Description*	*Ref.*	*Qty*
1	CARCASA D4-E	D4-E HOUSING		1
2	TAPA DEPOSITO D4-E	D4-E TANK LID		1
3	BRACKET,RESERVOIR LID	BRACKET,RESERVOIR LID	775XX862	1
4	LABEL,WARNING-HOT SURFACE	LABEL,WARNING-HOT SURFACE	781XX629	1
5	ASA GRANDE NEGRA	BLACK BIG HANDLE	918XX788	1
6	BHCS,M6 X 10.0 LG,S.S.	BHCS,M6 X 10.0 LG,S.S.	784XX491	3
7	TORNILLO ALLEN M5X16 INOX.	ALLEN SCREW M5X16 STAINLESS	912XX309	2
8	ARANDELA PLANA M6 INOX.	PLAIN WASHER M6 STAINLESS	917XX498	2
9	TUERCA HEXAGONAL M3 INOX.	HEXAGONAL NUT M3 STAINLESS	914XX982	2
10	ARANDELA DENTADA M3	TOOTHED WASHER M3	910XX397	1
11	TERMINAL FASTON M-PANEL	FASTON M-PANEL TERMINAL	915XX158	1

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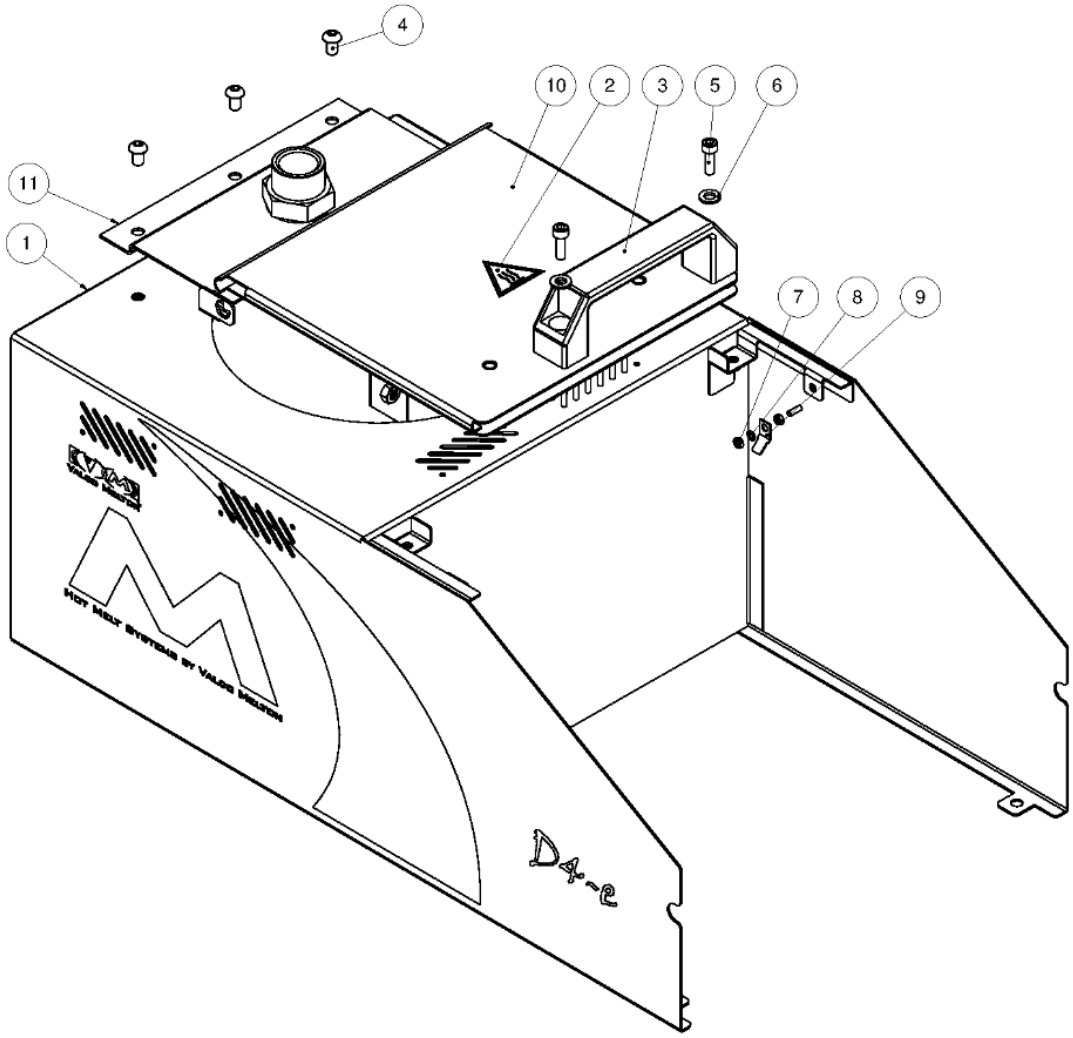
5.2. CONJUNTO CARCASA CENTRAL D4-LABELING / D4-LABELING CENTRAL HOUSING ASSEMBLY



Nº	*Descripción*	*Description*	*Ref.*	*Qty*
1	CARCASA D4-E	D4-E HOUSING		1
2	LABEL,WARNING-HOT SURFACE	LABEL,WARNING-HOT SURFACE	781XX629	1
3	ASA GRANDE NEGRA	BLACK BIG HANDLE	918XX788	1
4	BHCS,M6 X 10.0 LG,S.S.	BHCS,M6 X 10.0 LG,S.S.	784XX491	3
5	TORNILLO ALLEN M5X16 INOX.	ALLEN SCREW M5X16 STAINLESS	912XX309	2
6	ARANDELA PLANA M6 INOX.	PLAIN WASHER M6 STAINLESS	917XX498	2
7	TUERCA HEXAGONAL M3 INOX.	HEXAGONAL NUT M3 STAINLESS	914XX982	2
8	ARANDELA DENTADA M3	TOOTHED WASHER M3	910XX397	1
9	TERMINAL FASTON M-PANEL	FASTON M-PANEL TERMINAL	915XX158	1
10	TAPA DEPOSITO D4-E	D4-E TANK LID		1
11	BISAGRA D4 LABELING	BRACKET D4 LABELING		1

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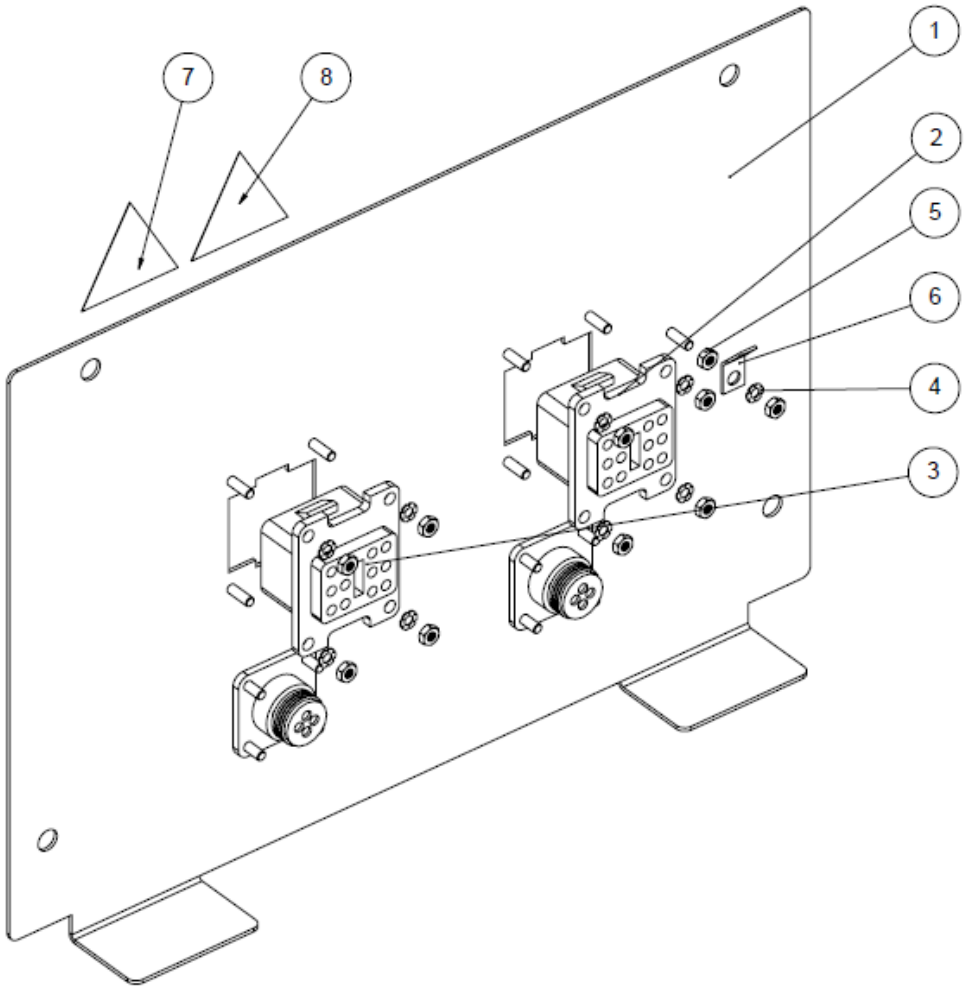
6. CONJUNTO PANEL TRASERO D4-L/ D4-L REAR PANEL ASSEMBLY



Nº	*Descripción*	*Description*	*Ref.*	*Qty*
1	PANEL TRASERO D4-E	D4-E REAR PANEL		1
2	MAZO SALIDA MANGUERA PISTOLA 1 D4-L	D4-L 1 GUN/HOSE OULTET WIRING		1
3	MAZO SALIDA MANGUERA PISTOLA 2 D4-L	D4-L 2 GUN/HOSE OULTET WIRING		1
4	ARANDELA DENTADA M3	TOOTHED WASHER M3	910XX397	9
5	TUERCA HEXAGONAL M3 INOX.	HEXAGONAL NUT M3 STAINLESS	914XX982	10
6	TERMINAL FASTON M-PANEL	FASTON M-PANEL TERMINAL	915XX158	1
7	LABEL,WARNING-HOT SURFACE	LABEL,WARNING-HOT SURFACE	781XX629	1
8	LABEL, WARNING-ELEC.HAZARD	LABEL, WARNING-ELEC.HAZARD	781XX630	1

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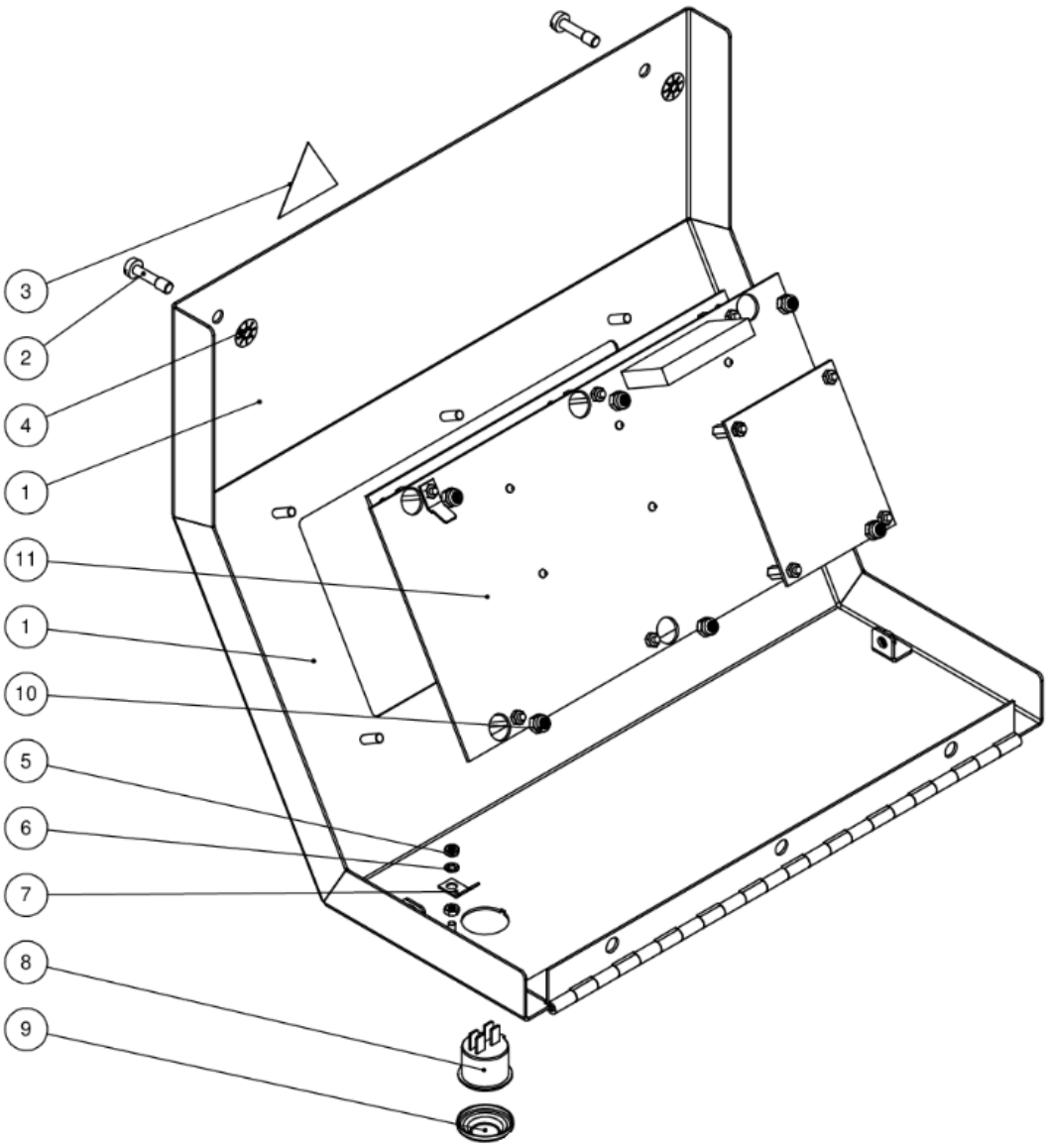
7. CONJUNTO PANEL DELANTERO D4-L / D4-L FRONTAL PANEL ASSEMBLY



Nº	*Descripción*	*Description*	*Ref.*	*Qty*
1	PANEL TARJETA D4-E SELCO	D4-E SELCO BOARD PANEL	900XX407	1
2	TORNILLO AMARRE CARCASAS INOX	HOUSING FIXING STAINLESS SCREW	900XX047	2
3	LABEL, WARNING-ELEC.HAZARD	LABEL, WARNING-ELEC.HAZARD	781XX630	1
4	RETEN ACERO INOX 302	STAINLESS 302 LOCK	900XX046	2
5	TUERCA HEXAGONAL M3 INOX.	HEXAGONAL NUT M3 STAINLESS	914XX982	2
6	ARANDELA DENTADA M3	TOOTHED WASHER M3	910XX397	1
7	TERMINAL FASTON M-PANEL	FASTON M-PANEL TERMINAL	915XX158	1
8	INTERRUPTOR REDONDO 2 POLOS	2 POLES ROUND SWITCH	918XX637	1
9	PROTECCION INTERRUPTOR 2 POLOS	2 POLES SWITCH PROTECTION	918XX638	1
10	TUERCA HEX. AUTOBLOCANTE M4 DIN 985	HEXAGONAL AUTOBLOC.M4 DIN985 NUT	912XX441	6
11	TARJETA CONTROL D4-L SELCO	D4-L SELCO CONTROL CARD		1

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