



# Service Manual

## 2K Pumping System

### Non-Heated

Issue 1.7 18/08/22  
Ref. NR-00026-ENG



***Before installing the unit and starting it up, read all the technical and safety documentation included in this manual carefully. Pay special attention to the information to know and understand the operation and the conditions of use of the unit. All of the information is aimed at enhancing User Safety and avoiding possible breakdowns derived from the incorrect use of the unit.***



## WARRANTY

HI-TECH SPRAY EQUIPMENT, S. A. (hereinafter “HI-TECH”) grants this Limited Guarantee to the original buyer (hereinafter the “Client”) for the unit and the original accessories given with the unit (hereinafter the “Product”) against any fault in the design, materials or manufacture of the Product at the time of the first purchase by the user and for a duration of two (2) years thereafter.

If during the guarantee period and under normal conditions of use, the Product should fail to work correctly due to defects of design, material or manufacture, the authorised distributor of the country where the HI-TECH Product or technical assistance service has been purchased shall repair or replace the Product in accordance with what is established in the following:

### CONDITIONS

- a) The validity of this guarantee will be subject to the presentation of the original invoice issued by the HI-TECH authorised distributor for the sale of the Product along with the Product handed over for repair or replacement, which must show the date of purchase and the serial number. HI-TECH reserves the right to refuse to give the guarantee service when the indicated data fail to appear on the invoice or have been modified after the purchase of the Product.
- b) The repaired or replaced Product will continue to maintain the original guarantee for the time remaining until the end of the guarantee or for three (3) months from the repair date, if the remaining period of the original guarantee were shorter.
- c) This guarantee will not be applied to the faults in the Product caused by its faulty installation, the natural wear and tear of the components, any use other than that considered normal for this Product or which should fail to strictly comply with the instructions of use provided by HI-TECH; due to accident, carelessness, adjustments, alterations or modifications of the Product not authorised by HI-TECH or due to the use of accessories, heating devices, pumping equipment and/or dispensers that have not been approved or manufactured by HI-TECH.
- d) The guarantee applicable to the components and accessories forming part of the Product and which have not been made by HI-TECH will be limited to the guarantee offered by the original manufacturer thereof.

**HI-TECH WILL NOT RECOGNISE ANY EXPRESS ORAL OR WRITTEN GUARANTEES OTHER THAN THIS PRINTED LIMITED GUARANTEE. ALL IMPLICIT GUARANTEES, INCLUDING, WITHOUT LIMIT, ADAPTATION FOR A SPECIFIC USE, ARE SUBJECT TO THE DURATION OF THIS WRITTEN GUARANTEE. HI-TECH DOES NOT ASSUME ANY KIND OF COMMITMENT OR RESPONSIBILITY FOR ALL POSSIBLE DAMAGE OR EXPENSE CAUSED BY FAULTS IN THE OUTPUT OF THE PRODUCT, ITS WORKING OR THE DISPENSING OF MATERIAL THROUGH THE PRODUCT, INCLUDING, WITHOUT LIMITATION, ALL EXPENSES CAUSED BY DAMAGE TO PEOPLE OR PROPERTY. EQUALLY, HI-TECH WILL IN NO CASE ACCEPT LIABILITY FOR THE LOSS OF SPECULATIVE PROFITS OR COMMERCIAL LOSSES. ALL REPAIRS OR REPLACEMENT OF FAULTY PRODUCTS WILL CONSTITUTE THE COMPREHENSIVE FULFILMENT OF HI-TECH'S OBLIGATIONS WITH RESPECT TO THE CLIENT. HI-TECH DOES NOT IN ANY WAY GUARANTEE THE SUITABILITY OR APTITUDE OF ITS PRODUCT FOR ANY PARTICULAR PURPOSE OR APPLICATION.**

All information provided on components which have not been manufactured by HI-TECH and which is based on reports received from the original manufacturer, though considered precise and reliable, is provided without any guarantee or responsibility of any explicit or implicit kind.

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The restrictions on the guarantee suppose no limitation on the legal rights of the consumer established in applicable national legislation, nor do they affect any rights derived from the bargain and sale agreement between the consumer and supplier.

All the information provided in this manual has been included in the confidence that it is true, although it does not constitute any responsibility or implicit or explicit guarantee. HI-TECH reserves the right at any time and without prior warning to make all improvements and modifications necessary to this manual, in order to rectify any possible typographical errors, increase the information contained or insert the changes caused to the characteristics and performance of the unit.



## SAFETY AND HANDLING

The equipment described in this manual has been designed and manufactured in compliance with the following European Directives, following as application guide the harmonized standards detailed and in conformity with the relevant UK Statutory Instruments (and their amendments):



**Directive 2006/42/EC on machinery (UK Supply of Machinery (Safety) Regulations 2008)**

UNE EN 12100:2012 (BS EN ISO 12100:2010)

**Directive 2014/68/EU on pressure equipment (UK Pressure Equipment (Safety) Regulations 2016)**

UNE EN 809:1999 +A1 (BS EN 809:1998 +A1:2009)

**Directive 2003/10/EC on noise level (UK The Control of Noise at Work Regulations 2005)**

UNE EN ISO 3740 (BS EN ISO 3740:2019)

UNE EN ISO 3746 (BS EN ISO 3746:2010)

## TRANSPORT AND STORAGE

Proper precautions must be taken so that the equipment can withstand the effects of transport and storage temperatures between -25°C and +55°C or up to +70°C for short periods that do not exceed 24 hours. Also, appropriate means to prevent damage from moisture, vibrations or shocks must be foreseen.



*Before installing the unit and starting it up, read all the technical and safety documentation included in this manual carefully. Pay special attention to the information to know and understand the operation and the conditions of use of the unit. All of the information is aimed at enhancing User Safety and avoiding possible breakdowns derived from the incorrect use of the unit.*

**WARNING!** establishes information to alert on a situation that might cause serious injuries if the instructions are not followed.

**CAUTION!** establishes information that indicates how to avoid damage to the unit or how to avoid a situation that could cause minor injuries.

**NOTE:** is relevant information on a procedure being carried out.

Careful study of this manual will enable the operator to know the characteristics of the unit and the operating procedures. By following the instructions and recommendations contained herein, you will reduce the potential risk of accidents in the installation, use or maintenance of the unit; you will provide a better opportunity for incident-free operation for a longer time, greater output and the possibility of detecting and resolving problems fast and simply.

Keep this Service Manual for future consultation of useful information at all times. If you lose this manual, ask for a new copy from your **NOVAG** local distributor or directly contact **NOVAG SPRAY EQUIPMENT, S.A.**

**WARNING!** *The design of the novaG-2K series proportioning unit does not allow its use in potentially explosive atmospheres or to exceed the pressure and temperature limits described in the technical specifications of this manual.*

When working with the unit, it is recommended that the operator wear suitable clothing and elements of personal protection, including, without limitation, gloves, protective goggles, safety footwear and face masks. Use breathing equipment when working with the machine in enclosed spaces or in areas with insufficient ventilation. The introduction and follow-up of safety measures must not be limited to those described in this manual. Before starting up the machine, a comprehensive analysis must be made of the risks derived from the products to be dispensed, the type of application and the working environment.



***To prevent all possible bodily harm caused by incorrect handling of the raw materials and solvents used in the process, carefully read the safety information provided by your supplier.***

***Deal with the waste caused according to current regulations.***



***Disconnect the unit from the pneumatic supply before carrying out any operation on the Unit.***



***To avoid damage caused by the impact of pressurized fluids, do not open any connection or perform maintenance work on components subject to pressure until the pressure has been completely eliminated.***

***Use suitable protection when operating, maintaining or remaining in the operating area of the unit. This includes, but is not limited to, the use of masks, protective goggles, gloves, shoes and safety clothing.***



***To prevent serious harm by crushing or loss of limbs, do not work with the unit without the safety guards installed on all moving parts. Make sure that all of the safety protections are correctly reinstalled after all repair or maintenance work is completed.***



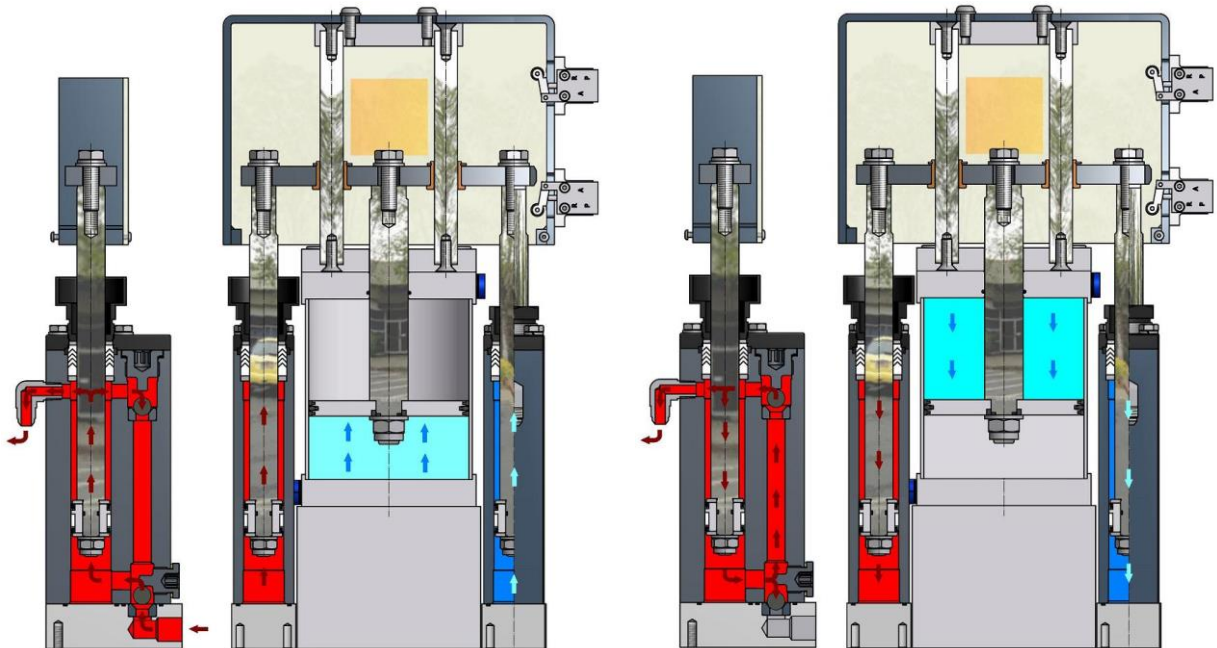
## CHARACTERISTICS

The **novaG-2K** proportioning unit has been designed and built for the application of Polyureas, chemical systems for polyurethane foaming, and some two-component Epoxy systems.

Its reduced size allows easy transport to site. Its easy operation (simply turn the valve switch) reverts into time saving during set up and application.

### Proportioning Pumps

Comprises two positive displacement piston pumps, driven by a pneumatic motor. The system includes two pressure regulators that allow the working pressures to be equalized in the two directions of pump movement, compensating for the imbalance of pressure caused by the difference between the upper and the lower side of the air motor, and the effect of the additional pressure of the transfer pumps.





## TECHNICAL SPECIFICATIONS NOVAG-2K

### Electrical

Main Voltage: \_\_\_\_\_ -  
Frequency: \_\_\_\_\_ -  
Electrical Consumption: \_\_\_\_\_ -  
Heater Power: \_\_\_\_\_ -  
Transformer Active Power: \_\_\_\_\_ -  
Total Active Power: \_\_\_\_\_ -

### Mechanical

Maximum Working Pressure (air supply 9 bar): \_\_\_\_\_ 200 bar (20 MPa)  
Maximum Production Ratio 1:1: \_\_\_\_\_ 4 kg/min  
Minimum Production: \_\_\_\_\_ 1 kg/min  
Maximum Hose Length: \_\_\_\_\_ 93 m  
Recommended Compressor: \_\_\_\_\_ 7,5 HP one-phase  
Approximate weight: \_\_\_\_\_ 77 kg  
Dimensions: \_\_\_\_\_ H: 1035 mm / W: 610 mm / L: 640 mm

### Acoustic

A-weighted sound pressure level: \_\_\_\_\_ 74,2 dB (A)  
A-weighted sound power level: \_\_\_\_\_ 88,6 dB (A)

**Values obtained according to UNE-EN ISO 3746:1995 standard.**





## GENERAL DESCRIPTION

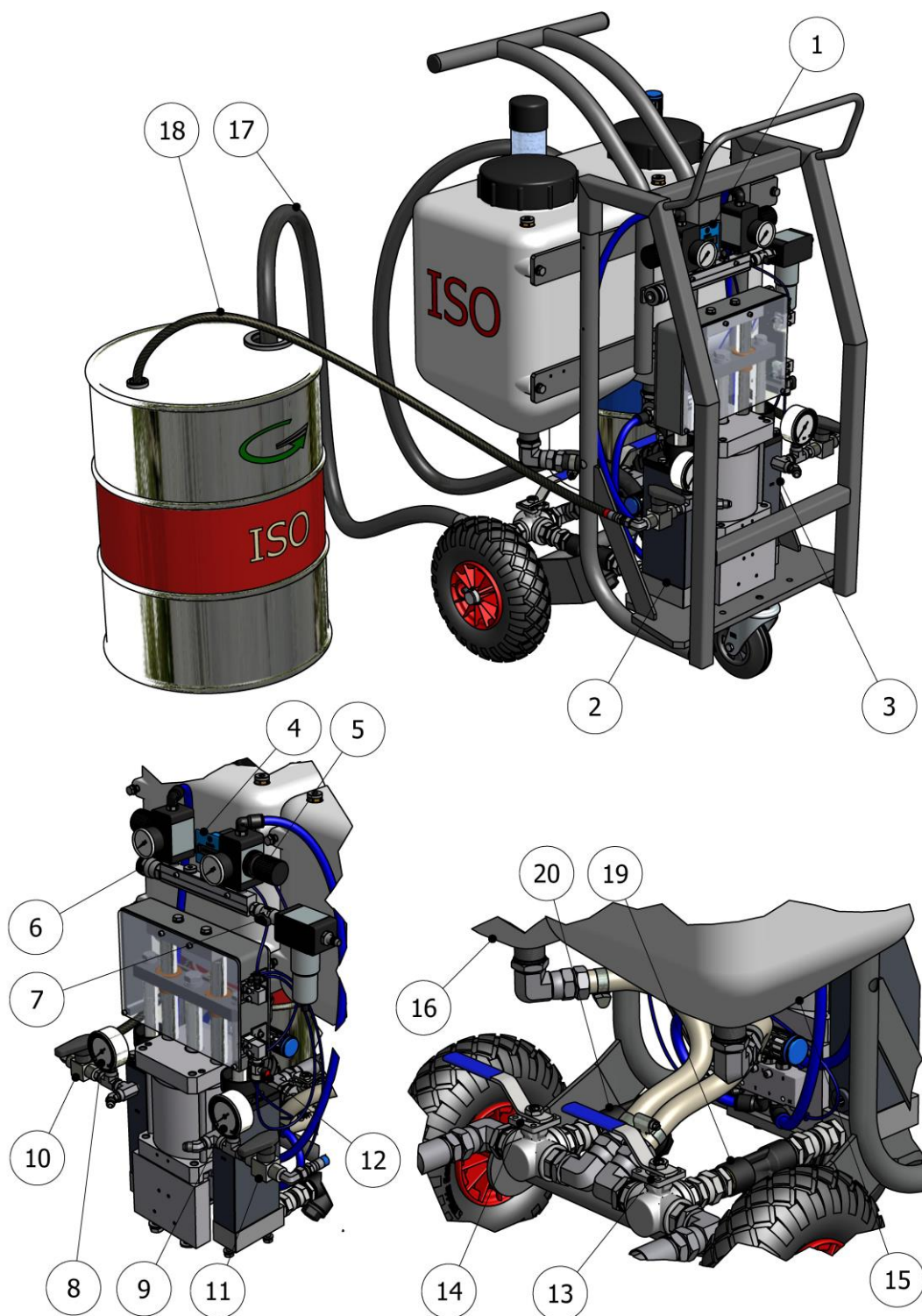


Figure 1. General Description novaG-2K





## Service Manual

### 1. Pneumatic Control

Controls and regulates the operation of the unit.

### 2. Isocyanate Proportioning Pump

Meters the Isocyanate.

### 3. Polyol Proportioning Pump

Meters the Polyol.

### 4. Cycle Counter

Counts cycles. It is increasing and can be reset by pressing the RESET key which is located at left of the numeric counter.

### 5. Pressure Regulators

Using the two air pressure regulators, select the pressure for the down stroke and the up stroke of the pneumatic cylinder.

### 6. Auxiliary Air Connection

Air connection for the Gun.

### 7. Supply Air Valve

Open & Close the supply air to pneumatic circuit to Unit. The valve has an exhaust in close position for depressurized the Unit.

### 8. Isocyanate Pressure Gage

Indicates the pressure in the Isocyanate system.

### 9. Polyol Pressure Gage

Indicates the pressure in the Polyol system.

### 10. Isocyanate Recirculation valve

Open & Close the recirculation from ISO Pump to external ISO tank.

### 11. Polyol Recirculation valve

Open & Close the recirculation from POL Pump to external POL tank.

### 12. Retract Valve

Sets the piston rod of the Isocyanate proportioning pump to the retract position and prevents the crystallization of Isocyanate on the piston rod. Close the RETRACT valve every time the unit is stopped by the operator.

### 13. Isocyanate Inlet Selector

3-way valve that determine the origin of inlet ISO product.

### 14. Polyol Inlet Selector

3-way valve that determine the origin of inlet POL product.

### 15. Isocyanate tank (internal)

30 Lt ISO tank, included on the frame of Unit.

### 16. Polyol tank (internal)

30 Lt POL tank, included on the frame of Unit.

### 17. Supply Hoses from external tank

Supply hoses product from external tanks.

### 18. Recirculation Hoses

Recirculation hoses from pumps to external tanks.

### 19. Isocyanate Inlet Filter

Avoids the penetration of solid particles inside the Isocyanate pump of the unit.

### 20. Polyol Inlet Filter

Avoids the penetration of solid particles inside the Polyol pump of the unit.

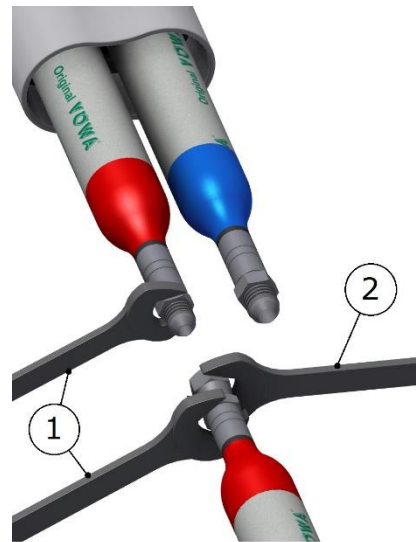


## METHOD OF THREADED UNION OF THE HOSES

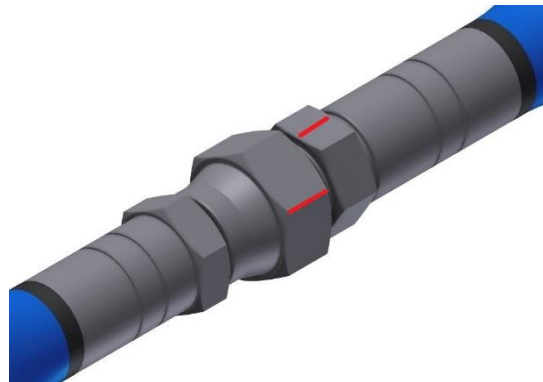
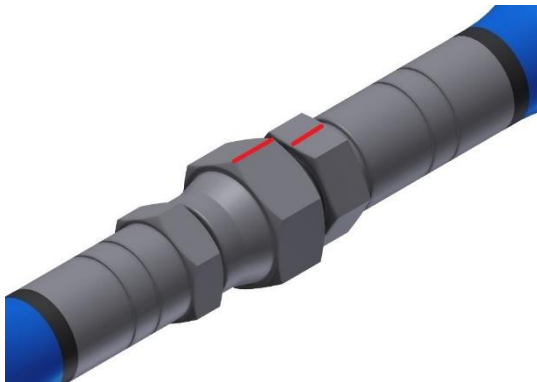
Follow the torques for threaded joints listed in **Table 1** according to thread sizes of hose fittings to ensure their proper assembly.

There is also an alternative procedure to obtain an equivalent torque without using special tools: joint both ends of the hoses to be connected, tighten a swivel nut by hand (without using spanner) until there is resistance on the nut. Fit two spanners (1) on the fixed ends of the hoses and turn the swivel nut with a third spanner (2) as many flats from wrench resistance (FFWR) as indicated in **Table 1**.

<b>Table 1. Tightening Threaded Joints</b>		
THREAD SIZE	TORQUE Nm	FFWR
1/2"-20	23	2 (or 120°)
9/16"-18	30	1-1/2 (or 90°)



**NOTE:** 1 FFWR corresponds to one complete shear of a flat marked with red between swivel and fitting or else 60°.



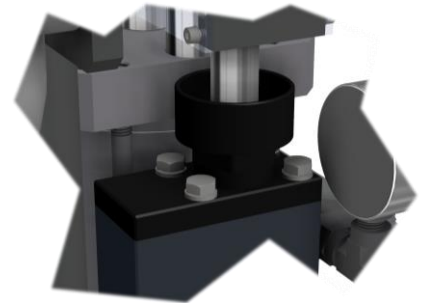


## INSTALLATION

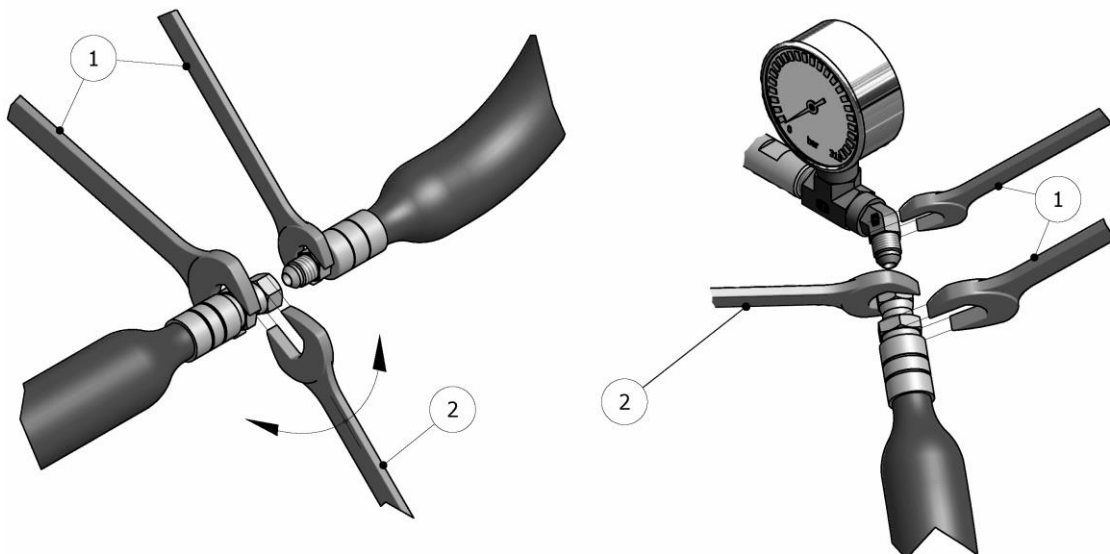
**CAUTION!** Use suitable protection and follow the recommendations in the safety information provided by product suppliers when installing or working with the unit.

Follow the recommended procedure in the indicated order to install the unit:

- a) Fill the Isocyanate pump lubricating cup with DOTP plasticizer.
- b) Connect the pressure hose of each product to the outlet of the respective pumps (the Isocyanate hose to the Isocyanate pump and the Polyol hose to the Polyol pump).



**NOTE:** The product hoses have been identified with red (Isocyanate) and blue (Polyol), enabling them to be rapidly distinguished. To avoid errors in connecting the coupling connectors of the Isocyanate and Polyol hoses, the connectors are of different sizes to make it impossible for connections to be swapped.



**Figure 2. Method of union of the Hoses**

**WARNING!** To join the hoses together or to connect them to the heaters or the gun, use two spanners to hold the parts to be joined (1) and a third spanner to tighten or loosen the connecting nut (2) as shown in the illustrations in Figure 2. The connections must be tightened to a torque indicated in Table 1, pg.10.

The hoses receive vacuum drying treatment and are supplied interconnected at the ends to prevent them from absorbing moisture. Do not separate them until they are going to be installed in the unit.



**NB:** Assure the proper mechanical connection of the hoses to avoid possible product leakage.

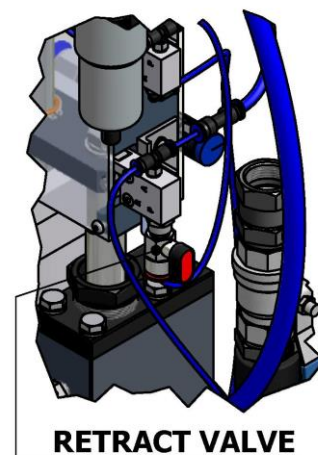
- a) Connect the air hoses.
- b) Connect the hoses to the connectors of the coupling block of the gun, making sure that the manual valves are closed.
- c) Proceed to install the supply hoses paying special attention to connect each hose to “its” product, as changing the hoses would cause a reaction in the products inside them and make them useless. Identify each hose with a tape of color with the typical product definition (blue for the Polyol and red for the Isocyanate) is a good method for avoiding errors in connection.

Do the following steps to install the hoses:

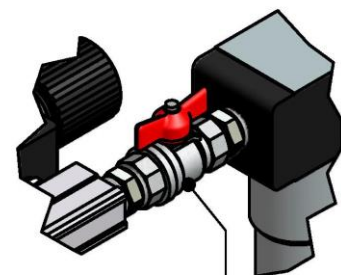
- a) Make sure that the inlet valves of the products to the unit are closed.
- b) Connect one end of the Polyol hose to the Polyol valve and the other end in to the external POL tank.
- c) Connect one end of the Isocyanate hose to the Isocyanate valve and the other end in to the external ISO tank.

Before using the unit, the retained air and the residual oil from the operating tests made in the factory must be eliminated. To purge the whole circuit, proceed as follows:

- a) Open the inlet ball valves. Make sure there are no leaks.
- b) Keep the coupling block with each product's outlet in separate vessels and open the valves of each product.
- c) Turn the pneumatic pressure regulator anti-clockwise until the end.
- d) Turn the RETRATC valve.
- e) Turn the GENERAL valve, the proportioning pumps will move upwards due to the aspiration of the same.
- f) If necessary, increase the pneumatic pressure by turning the regulator clockwise until the product pumps begin to move slowly.
- g) Allow the materials to come out of the recirculation hose until the residual oil and the air bubbling has disappeared completely.
- h) Close the manual valves of each product and remove any remains of product in the coupling block.
- i) Slowly increase the pneumatic pressure to check for product leaks in the hose connections. Re-tighten and tape-cover the union connectors to protect them from possible damage.
- j) Turn the RETRATC valve.
- k) Turn the GENERAL valve
- l) Mount the gun on the coupling block.



**RETRACT VALVE**



**GENERAL VALVE**



## START-UP PROCEDURES

Follow the recommended procedure in the indicated order.

**PRECAUTION!** *The start-up procedures assume that all of the necessary adjustments have been correctly performed.*

- a) Check the state of the DOTP plasticizer in the Isocyanate pump lubrication cup. Change the oil if you see changes in the color or signs of solidification and retighten the packing nut to ensure the seal.
- b) Check the inlet filters of the products. Clean them if necessary.
- c) Open the inlet ball valves of the products to the unit.
- d) Turn the general pneumatic valve ON.
- e) Turn the RETRATC valve (in vertical position), the proportioning pumps will move.
- f) Using the pneumatic pressure regulators, choose the pressure for the decreasing cycle of the proportioning pumps first, and then adjust the pressure for the increasing cycle. A little pressure imbalance between the increasing and the decreasing cycle of the pump will occur. This is due to the difference between the upper and the lower side of the air motor. In order to balance the pressures, the value of the pneumatic pressure in the increasing cycle must be slightly lower (between 0.2 and 0.4 kg/cm<sup>2</sup>) than the set value of the pneumatic pressure of the decreasing cycle of the pumps.  
The pressures must be practically the same and remain constant.  
Should the pressures fluctuate on each stroke, consult the fault section before continuing.
- g) Connect the air supply to the gun; open the manual valves of each product; make a test projection and check the pressures on the product gauges. If the projection test is correct and the pressures remain equal, proceed with the application.



## DAILY SHUTDOWN

Follow the recommended procedure in the indicated order:

- a) Turn the RETRATC valve.
- b) Use the gun to project into a waste container until the Isocyanate proportioning pump is in the retract position and the pressure begins to fall.

**CAUTION!** *To avoid possible product leakage and early failure of the pump seals, the pressure must not be reduced to zero. It is recommended to keep the system with a minimum pressure of 30 bar (400 psi) to extend the life of the seals.*

- c) Turn the air supply valve in OFF position (transversal respect to the flow direction).
- d) Close the manual valves at the inlet of the filters.
- e) Roll the hoses.
- f) Close the manual valves on the coupling block and dismantle the gun to perform the corresponding maintenance.



## CLEANING

To avoid possible contamination, the circuits of the unit must be flushed clean (pumps and hoses) whenever applications have to be made that require a change of components.

Follow the recommended procedures in the order indicated to perform the cleaning:

- a) Place two drums of DOTP cleaning agent close to the machine. If you use external product tanks, you can use the 30 Lt tanks attached to the frame for this purpose.
- b) Dismantle the gun and leave the coupling block connected to the hoses.
- c) Remove the supply hoses of the product drums and place them in the drums of the DOTP cleaning agent. If using the 30Lt tanks for the DOTP agent, turn the 3 way valves at the pump inlet.
- d) Place 2 separate vessels under the coupling block to gather up the products contained inside the machine.
- e) Open the manual valves on the coupling block.
- f) Turn the RETRATC valve.
- g) Turn the air supply valve, the proportioning pumps will move.
- h) Allow the products to come out until you see that only DOTP cleaning agent comes out free of impurities.
- i) Close the valves on the coupling block and turn the air supply valve.
- j) Place the hoses in the drums of the new products. If you have used the 30 Lt tanks for the DOTP agent, replace the 3 way valves in the feed position from the external tanks.
- k) Place two separate vessels under the coupling block to collect the DOTP cleaning agent.
- l) Open the valves on the coupling block and turn the air supply valve, the proportioning pumps will move.
- m) Allow the DOTP cleaning agent to come out until you see that only the new products come out.
- n) When the products come out without the contamination produced by the effect of the DOTP cleaning agent, the cleaning process is complete and you can proceed as normal.





## LONG TERM SHUTDOWN PROCEDURES

When you plan to shut down the machine for more than FOUR weeks, the products contained in the machine must be replaced by DOTP plasticizing agent.

Follow the recommended procedures in the order indicated:

- a) Turn the air supply valve OFF (transversal to the flow air direction).
- b) Place two drums of DOTP cleaning agent close to the machine. If you use external product tanks, you can use the 30 Lt tanks attached to the frame for this purpose.
- c) Dismantle the gun and leave the coupling block connected to the hoses.
- d) Remove the supply hoses of the product drums and place them in the drums of the DOTP cleaning agent. If using the 30Lt tanks for the DOTP agent, turn the 3 way valves at the pump inlet.
- e) Place 2 separate vessels under the coupling block to gather up the products contained inside the machine.
- f) Open the manual valves on the coupling block and turn the air supply valve, the proportioning pumps will move.
- g) Allow the products to come out until you see that only DOTP cleaning agent comes out free of impurities.
- h) Turn the RETRATC and the air supply valve, disconnect the supply system and the process is finished. The proportioning pumps and the hoses must be full of DOTP plasticizing oil. ***Never leave the machine or the hoses empty of product or DOTP plasticizing oil.***

***NOTE:*** *Never use liquids not recommended or not approved by HI-TECH. Never use approved liquids that have been contaminated with water or ISO/POL. If you are not sure in the quality of the liquid you are going to use we strongly recommend that you check the machine 2-3 times every 2 weeks after you have filled it by recirculating through hoses (see p. 15) with fresh plasticizer unless you make sure the liquid that comes out is completely pure and clean.*



## TROUBLESHOOTING

The **novaG-2K** unit has been designed and built to withstand severe working conditions with a high degree of reliability, provided it is used suitably. This chapter contains information on possible faults that may prevent the continuation of work with the unit. The information provided must serve as guideline to detect and resolve the large majority of the problems before calling for the assistance of the authorized distributor or **HI-TECH** technical service. In any case, feel free to contact the technical assistance service of **HI-TECH SPRAY EQUIPMENT, S.A.** where a qualified technician will advise you on whatever you may need.

**NOTE:** *All repairs performed by unqualified personnel or the use of spares other than originals may cause damage to the unit and put the operator at risk.*



*To prevent possible bodily harm caused by incorrect handling of the raw materials and solvents used in the process, carefully read the safety information provided by your supplier.*

*Deal with the waste caused according to current regulations.*



*Disconnect the unit from the pneumatic supply before carrying out any operation of maintenance.*



*To avoid damage caused by the impact of pressurized fluids, do not open any connection or perform maintenance work on components subject to pressure until the pressures have been completely eliminated.*



*Use suitable protection when operating, maintaining or remaining in the operating area of the unit. This includes, but is not limited to, the use of face masks, protective goggles, gloves, shoes and safety clothing.*

*To prevent serious harm by crushing or loss of limbs, do not work with the unit without the safety duly installed on all moving parts. Make sure that all of the safety protections are correctly fitted after all repair or maintenance work.*



## Proportioning Pumps

**WARNING!** Before resolving any kind of defect, make sure all of the pushbuttons are off, that the general switch is in shutdown position and that the unit is disconnected from the pneumatic supply source.

PROBLEMS	SOLUTIONS
The pumps fail to maintain the pressure when the unit is shut down.	1
There are pressure differences between the proportioning pumps.	1-2-3
There is cavitation in the proportioning pump.	1-2-3
The proportioning pumps do not change direction.	4
The proportioning pumps fail to move and the direction indicator lights are out.	4
The movement of the proportioning pumps is erratic.	4
Difference of pressure or speed in the up stroke against the down stroke.	5

### SOLUTIONS

#### 1. Loss in the Ball Checks

Check the pressure gauges to identify which pump is not maintaining pressure. To determine which ball valve is failing, check in which displacement direction the pump is losing pressure. If pressure is lost in an ascending direction, check the discharge ball valve (upper valve), if pressure is lost in a descending direction, check the aspiration ball valve (lower valve).

Proceed as follows to check the ball checks:

- Disconnect the machine from the pneumatic supply and close all supply valves and the supply system to the hoses products.
- Depressurise the proportioning pump and remove the corresponding ball check.
- The loss from the ball checks is usually caused by foreign particles that prevent the perfect coupling of the ball in the housing at the top of the closing bushing. Clean the ball and the seat of the bushing and make sure there are no faults from nicks, marks or scratches to the bushing or the ball. If cleaning fails to resolve the problem or any fault is observed, replace the bushing and the ball.

#### 2. Unbalanced Pressures

Pressures are unbalanced when there is an obstruction in the hose or in the gun that prevents one of the components from leaving freely through the gun chamber when it is projected, or when a problem in the pumping system prevents one of the components reaching the gun in the required amount.

To identify which component is relatively easy if we bear in mind that the chemical components used in the polyurethane foaming are of a different color. By observing the color of the material that leaves the gun, we can determine which component is missing.



To determine if the decompensation occurs as a result of an obstruction or as a result of a problem in the pumping system, project with the gun, observe the pressure indicated by the manometer corresponding to the missing component and compare it with the pressure indicated by the manometer of the other component: if the pressure of the missing component is greater, decompensation is a consequence of an obstruction, if the pressure is lower the decompensation is a consequence of a problem in the pumping system

### 3. Cavitation

Cavitation occurs when the proportioning pump requires a larger volume of material than that supplied by the feeding system, causing the formation of a vacuum in the proportioning pump. The causes of cavitation are the following:

- a) High viscosity: the polyurethane foaming systems normally require a minimum transfer temperature of 12° C; at lower temperatures, the product increases in viscosity, making the pumping more difficult. When the ambient conditions prevent the products from being maintained at a minimum temperature of 12° C auxiliary heating elements must be used to condition the products as the minimum temperature required for the transfer.
- b) The product inlet filter is obstructed (see Maintenance).
- c) The inlet ball valve has leaks as a result of wear or possible faults in the ball or the closing surface of the bushing, which means that part of the material supplied returns to the supply tank and that the proportioning pump supplies a smaller volume of material in the discharge cycle, causing an incorrect ratio.

### 4. Fault in the Direction Change Micro

The pneumatic cylinder that drives the supply pumps has two magnetic position detectors for making the change of direction. Each detector includes an led to indicate when it is active. Any accidental movement of the detection position will prevent the pumps from making the change in direction, which will oblige the detector to be put back into the correct position by using the gauge supplied with all of the accessories.

### 5. Rising Movement Pressure Regulator

During the up stroke, the pumps must self-aspirate the products through the feeding hoses. Adjust the up-stroke regulator so that the pressure of the proportioning pumps is the same in both directions.



## MAINTENANCE

To achieve maximum output from the **novaG-2K** unit, certain daily or regular maintenance operations are needed.



*To prevent all possible body harm caused by incorrect handling of the raw materials and solvents used in the process, carefully read the safety information provided by your supplier.*

*Deal with the waste caused according to current regulations.*



*Disconnect the unit from the pneumatic supply before carrying out any operation of maintenance.*

*To avoid damage caused by the impact of pressurized fluids, do not open any connection or perform maintenance work on components subject to pressure until the pressures have been completely eliminated.*



*Use suitable protection when operating, maintaining or remaining in the operating area of the unit. This includes, but is not limited to, the use of masks, protective goggles, gloves, shoes and safety clothing.*



*To prevent serious harm by crushing or loss of limbs, do not work with the unit without the safety duly installed on all moving parts. Make sure that all of the safety protections are correctly fitted after all repair or maintenance work.*



## Proportioning Pumps

***WARNING!*** Before resolving any kind of defect, make sure all of the pushbuttons are off, that the general switch is in shutdown position and that the unit is disconnected from the power supply source. Never handle the inside of the control panel with the unit connected to the power supply. The metering pumps are components that work under pressure; do not open any connection or perform repair or maintenance work on components subject to pressure until all pressures have been completely released.

When pumps are functioning properly, it is not unusual for a small amount of resin to seep through the pump packing onto the resin pump shaft. Periodically inspect shaft and wipe away any residue when the proportioner is turned off.

Disassemble and clean the proportioning pumps annually, even if there are no apparent signs of leakage. Make sure to replace all packings, o-rings and bushings during this maintenance, even if there is no apparent damage. Not doing this can result in a premature failure of the new components (please refer to tables 16 in the Service Manual NR-00025 for p/n of the different models and sizes). Also inspect the lower and upper ball and the seat assembly, looking for wear, hits or marks that may affect the normal functioning of the pump.

Check the condition of the ISO pump lubricant daily. Change the DOTP if it becomes gelatinous or darker. Gel formation is due to moisture absorption by the pump lubricant. The interval between changes depends on the environment in which the equipment is operating. The pump lubrication system minimizes exposure to moisture, but some contamination is still possible. Lubricant discoloration is due to continual seepage of small amounts of isocyanate past the pump packings during operation. If the packings are operating properly, lubricant replacement due to discoloration should not be necessary more often than every 3 or 4 weeks.

For those situations where the unit is operating under severe working loads or in special working conditions, disassemble and clean the proportioning pumps every 6 months.

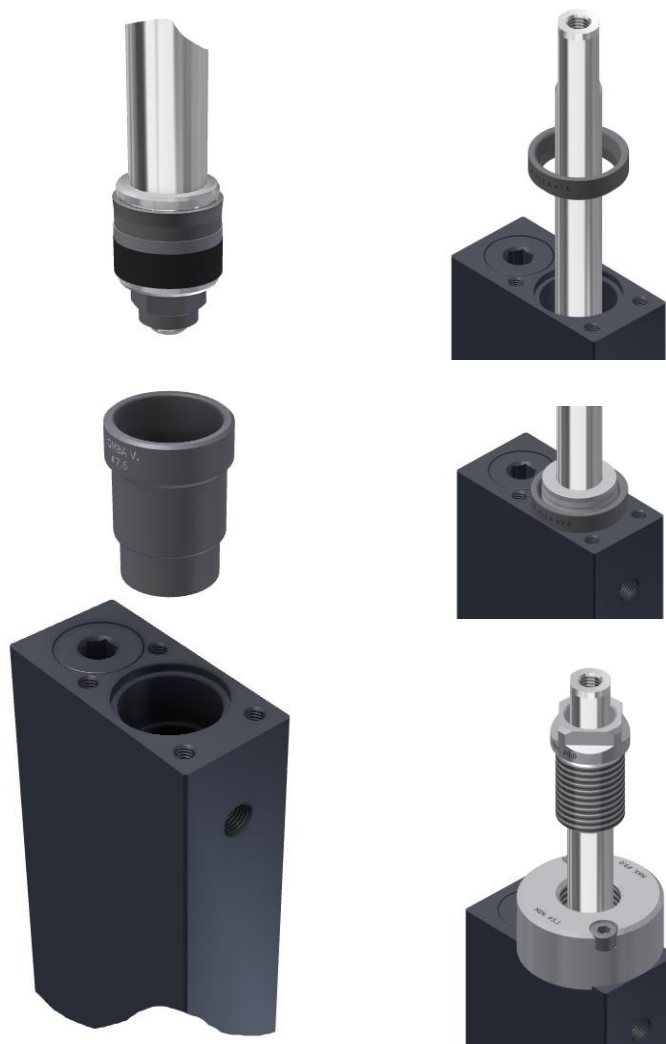
Inspect shafts, pistons and cylinder inner surface looking for scratches that could cause premature leakage or damage to the seals.

Maintenance work may only be carried out by authorized professional, with the right knowledge.

To assemble the pump, there are specific tools that prevent damage to the seal lips of both the piston and the cylinder head.

First, assemble the rod set with the piston and all its components. Ensure that the piston seal lips are facing upwards.

Insert the assembled piston set inside the sleeve with the specific tool (1) (see **Table 2** on page 22).



Once you have inserted the piston into the sleeve, you must assemble the cylinder head seal. First place the seal funnel tool (2).

Next, place the cylinder head seal with the lips facing downwards.

Subsequently, you must place and fasten the tool (3) to the sleeve and insert the plunger (4) inside the rod. Screw as far as it will go.

Remove all the tools and finish the pump assembly by placing the guide with its joint, and fastening the piston and the nut with the bowl.

**Table 2. List of Tools**

	Tool (1)	Tool (2)	Tool (3)	Tool (4)
Size				
#4,5	HT-00034	HT-00116	HT-00119	HT-00121
#7,6	HT-00031	HT-00117	HT-00120	HT-00122

**Note:** These tools not supplied with the machine, they are optional parts on request.





## ***Inlet supply filters***

The filter bodies have a filter screen that prevents solid particles from entering the unit. Inspect the filters each day as part of the machine start-up, and clean them. Replace the filter screen if necessary.

Isocyanate is a product that crystallizes with ambient moisture or freezing. If the storage and transfer is correct and the operating procedures are respected, the risk of contamination of the Isocyanate filter will be minimized.

***NOTE: Clean the Isocyanate inlet filter before the daily start-up; it should not be cleaned after the machine has been stopped for the day. Immediately beginning to project after cleaning the filter reduces the risk of absorption of moisture and the possibility of contamination through the reaction with the solvent used in the cleaning operation.***

To check the product inlet filters, proceed as follows:

- a) Disconnect the unit from the power supply and close the inlet ball valve from the filter you wish to check.
- b) Place a suitable vessel under the filter to collect the product coming out on removal. Carefully loosen the filter stopper to allow the product to be emptied into the vessel below. Completely unscrew the stopper.
- c) Remove the seal, the spring and the mesh and clean it all with the solvent used for cleaning the gun. Dry it all and check that the mesh is not obstructed. The holes in the mesh must be completely free. Replace the mesh if more than 10% of the surface is obstructed.
- d) Refit the mesh, the spring and the seal. Screw on the stopper.
- e) Open the product entry valve of the filter, make sure there are no leaks and proceed with the normal operation.



## ***Isocyanate pump lubrication system***

Each day, inspect the lubrication cup of the Isocyanate pump and check the state of the DOTP plasticizing oil. Replace the oil when it shows changes in color or signs of solidification.

The DOTP oil solidifies as a result of the absorption of moisture and the maintenance interval will depend on the working conditions.

The oil discoloration is due to the small film of Isocyanate that lies on the pump shaft during the pumping operation. If the gaskets and the seals are in a good state, the plasticizing oil will not have to be changed so frequently.

To replace the plasticizing oil of the pump, proceed as follows:

- a) Use the gun to project until the Isocyanate proportioning pump is at the highest point of the rising run. Turn OFF the air supply valve (transversal to the flow air direction).
- b) Remove the existing DOTP oil from the cup, clean the cup and the shaft of the pump, eliminating any remain power supply of polluted oil or crystallized material. Use a wooden or plastic tool to clean the shaft. Fill the cup with new DOTP plasticizing oil.



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