

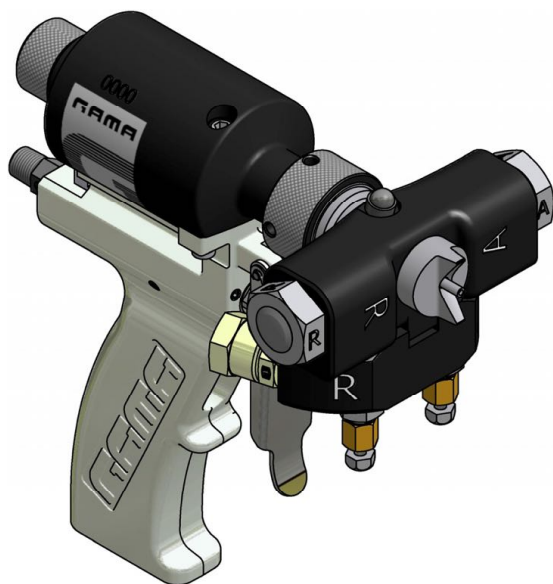


Service Manual

Spray Gun

Series Master II

1.4 Issue 25/05/2010
Ref. NR-00021-ENG



Before installing and starting up the MASTER II gun, carefully read all the technical and safety documentation included in this manual. Special attention should be paid to the information in order to know and understand the handling and conditions of use of the Unit. All of the information is aimed at enhancing User Safety and avoiding possible faults due to incorrect use of the Unit.



WARRANTY

GARRAF MAQUINARIA, S. A. (hereinafter "GAMA") grants this **LIMITED WARRANTY** 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, the materials or the 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 period of guarantee and under normal conditions of use, the Product should stop working properly due to faults in the design, the materials or the manufacture, the authorised distributor in the country where the Product has been purchased or the GAMA technical service will 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 GAMA 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. GAMA 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 during the time remaining until its end, or for three (3) months after the repair date, if the remaining period of the 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 GAMA; due to accident, carelessness, adjustments, alterations or modifications of the Product not authorised by GAMA or due to the use of accessories, heating devices, pumping equipment and/or dispensers that have not been approved or manufactured by GAMA.
- d) The guarantee applicable to the components and accessories forming part of the Product and which have not been made by GAMA will be limited to the guarantee offered by the original manufacturer thereof.

GAMA WILL NOT RECOGNISE ANY EXPRESS ORAL OR WRITTEN GUARANTEES OTHER THAN THIS PRINTED LIMITED WARRANTY. ALL IMPLICIT GUARANTEES, INCLUDING, WITHOUT LIMIT, ADAPTATION FOR A SPECIFIC USE, ARE SUBJECT TO THE DURATION OF THIS WRITTEN WARRANTY. GAMA 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, GAMA 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 GAMA'S OBLIGATIONS WITH RESPECT TO THE CLIENT. GAMA IN NO WAY GUARANTEES THE IDEALNESS OR SUITABILITY OF ITS PRODUCT FOR ANY PURPOSE OR SPECIFIC APPLICATION.

All of the information provided on components which have not been manufactured by GAMA 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.

All concession, sale or financial leasing of the Product by GAMA in no case explicitly or implicitly constitutes any authorisation, acceptance or concession for the use of any rights or patents, nor does it encourage, nurture or back their infringement.

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.



Service Manual

All of the information provided in this Service Manual has been included in the confidence that it is true, although it does not constitute any responsibility or implicit or explicit guarantee. GAMA reserves the right at any time without forewarning to make all necessary improvements and modifications to this Service Manual in order to rectify any possible typographical errors, increase the information contained and enter the changes made to the characteristics and performances of the gun.

SAFETY AND HANDLING

This chapter contains important information on safety, handling and use of your **GAMA MASTER II** series gun.

Before installing and starting up the gun, carefully read all the technical and safety documentation included in this manual. Special attention should be paid to the information for knowing and understanding the handling and conditions of use of the gun. All of the information is aimed at enhancing User Safety and avoiding possible faults due to incorrect use of the gun.

A **WARNING!** establishes information for alerting you on the situations which could cause serious injury if the instructions are not followed.

A **PRECAUTION!** establishes information which indicates how to avoid damage to the gun and how to avoid a situation which could cause minor injuries.

A **NOTE** is relevant information on the procedure being carried out.

Careful study of this manual will help you to become more acquainted with the gun and the procedures. Following the instructions and recommendations here will reduce the potential risk of accidents in installing, using or maintaining the gun, and will give you the problem-free operation for a longer time, greater output and the possibility of detecting and resolving problems quickly and simply.

Keep this Service Manual for consultation and useful information at any time. If you lose the manual, ask for a new copy from your local **GAMA** distributor or make direct contact with **Garraf Maquinaria, S. A.**

WARNING: *The gun's design and configuration do not allow it to be used in potentially explosive atmospheres or to exceed the pressure and temperature limits described in the technical specifications of this manual.*

Always use liquids and solvents that are compatible with the unit. In the event of doubt, consult the **GAMA** technical service.



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When working with the gun, it is essential to dress suitably and use personal protection equipment, including the unlimited use of gloves, protective goggles, safety footwear and face masks. Use breathing equipment when working with the gun in enclosed or insufficiently ventilated atmospheres. The introduction and monitoring of safety measures must not be limited to those described in this manual. Before starting to use the gun, a rigorous analysis must be made of the risks derived from the products to be dispensed, the type of application and the working environment.

The gun forms part of the projection equipment, which is why all safety measures must be taken that are provided for the start-up use of the equipment, in addition to all specific measures for the use of the gun.



Carefully read the safety data sheet provided by your supplier to prevent any possible injury caused by incorrect handling of the raw materials and solvents used in the process.

Deal with all waste caused according to current regulations.



To prevent serious damage caused by the impact of fluids under pressure, never open a connection or do maintenance work on components subject to pressure until you are sure that all pressure has been eliminated.



Use suitable protection when operating, maintaining or simply being in the area where the equipment is working. This includes, but is not limited to, the use of protective goggles, gloves, shoes and safety clothes and breathing equipment.

The equipment includes components which reach high temperatures and may cause burns. The hot parts of the unit must not be handled or touched until they have completely cooled.



To prevent serious injury caused by crushing or amputations, do not work with the equipment if the safety protections of the moving parts are not duly installed. Make sure that all safety protections are correctly fitted after carrying out repair or maintenance work on the equipment



CHARACTERISTICS

- * High-pressure internal mixture
- * Automatic cleaning by pressurised air
- * No solvents required
- * Mechanical spraying
- * Exterior greasing of the mix chamber

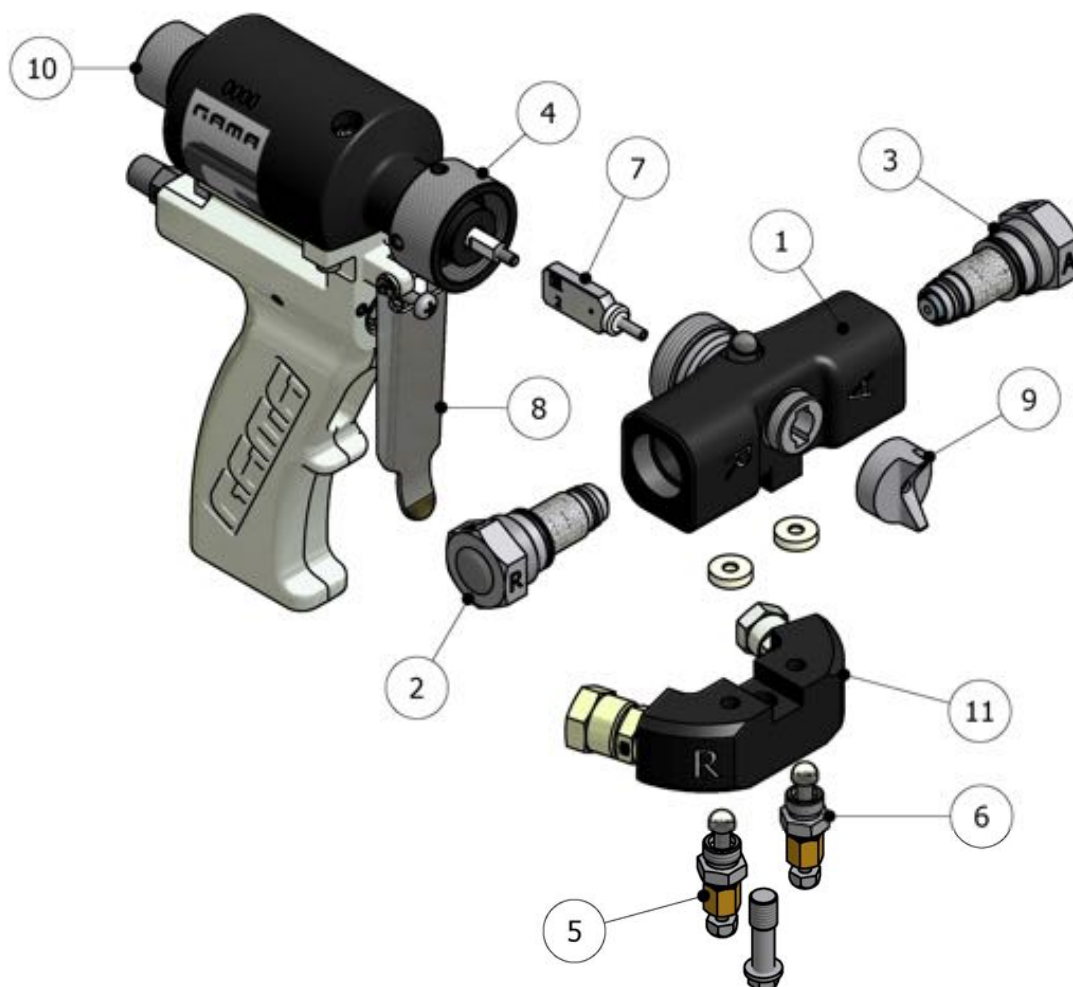
Approximate weight: 1 Kg

Dimensions: H 19 cm / W 10 cm / L 19 cm

SPECIFICATIONS

Maximum working pressure:	210 Kgf/cm ² (20.6 MPa) / 3000 psi
Required air pressure:	6-8 Kgf/cm ² (0.6-0.8 MPa) / 85-114 psi
Maximum production ratio 1:1:	18 Kg/min / 40 lb/min
Minimum production ratio 1:1:	1.5 Kg/min / 3.3 lb/min
Opening force @ 6 bar:	90 Kg / 200 lb
Closing force @ 6 bar:	93 Kg / 205 lb
Approximate air consumption @ 6 bar (50 series/min):	307 litres/minute

GENERAL DESCRIPTION



The main components and their description are given for better knowledge of the elements of the **MASTER II** series gun. For more precise identification, see the Components Manual ref. NR-00020-ENG

1. Gun block unit
2. Polyol side cartridge unit
3. Isocyanate Side Cartridge Unit
4. Block Fixture Nut
5. Polyol manual valve
6. Isocyanate manual valve
7. Mix chamber
8. Trigger
9. Diffuser
10. Blocking device
11. Coupling block



INSTALLATION AND START-UP

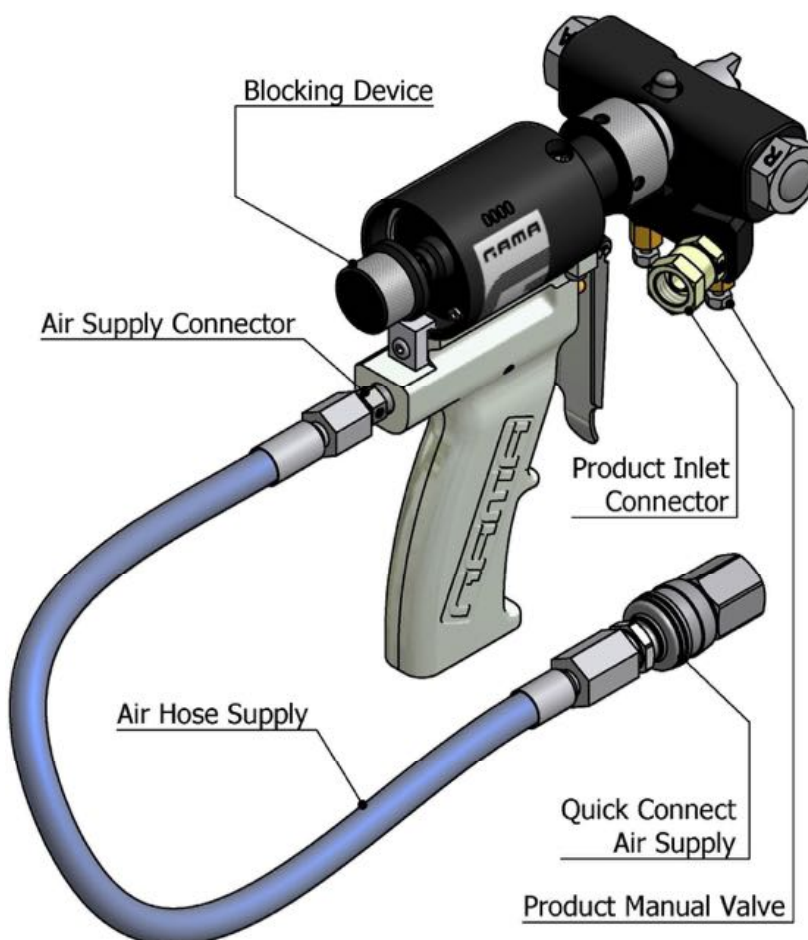
PRECAUTION: When working with the gun or doing maintenance on it, all suitable protection must be used in accordance with the recommendations and specifications given by the product suppliers.

GAMA provides a series of tools and accessories which are necessary for assembling the gun. The unit comprises the following elements:

Metal brush, tube spanner, chuck, pliers for seeger rings, socket, set of Allen keys, tube for extension of pneumatic connection, grease tube, nozzle stopper, greaser stopper, greasing pump, air connection pipe, fast plug, tracks for cleaning, operations manual and components manual.

1. Completely close the manual valves by turning them clockwise. The manual valves control the input flow of each product to the chamber and are located on the Coupling Block.
2. Connect the air supply pipe to the connector at the rear of the gun.
3. Connect the Isocyanate hose (red terminal) to the Isocyanate input connector (letter A) on the Coupling Block.
4. Connect the Polyol hose (blue terminal) to the Polyol input connector (letter R) on the Coupling Block.

NOTE: The product hoses have been distinguished with red and blue in order to allow them to be rapidly identified. The red corresponds to the Isocyanate hose and the blue corresponds to the Polyol hose. To avoid connection errors, the Isocyanate and Polyol hose coupling connectors are of different sizes, which makes it impossible for connections to be swapped.





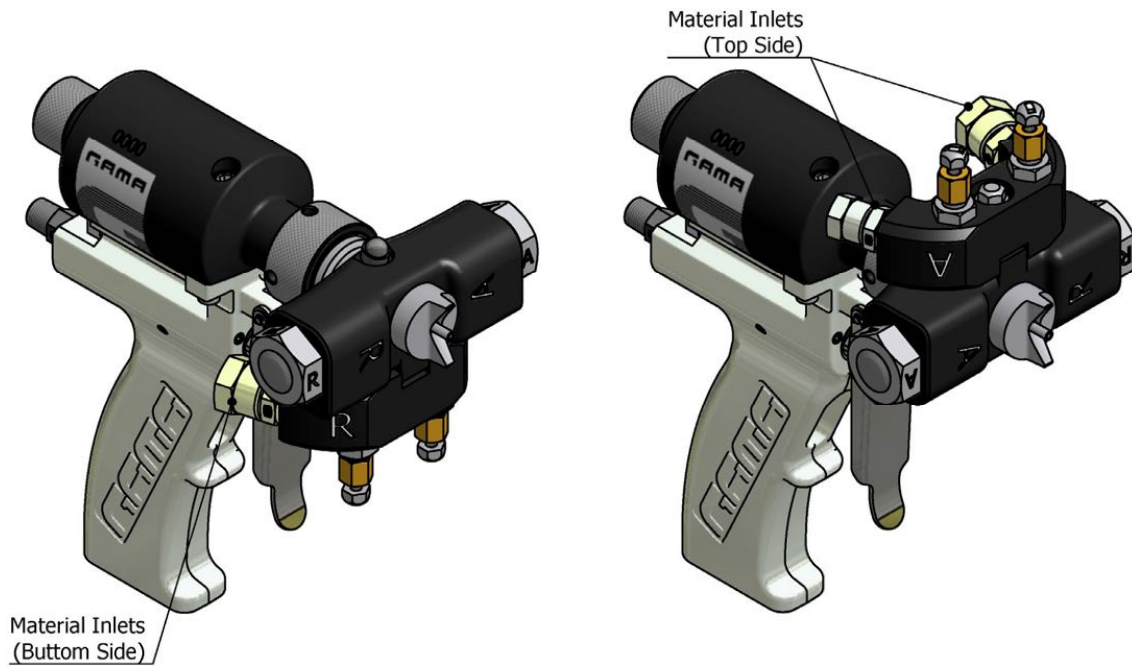
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5. Open the manual air valve
6. Pressurise the unit and make sure there are no leaks.
7. Activate the trigger several times to make sure the mix chamber moves correctly.
8. Make sure that the pressure in the machine and the temperature of the heaters and the hoses are correct (see the Machine Service Manual).
9. Completely open the manual valves of each product by turning them anticlockwise.
10. Press the blocking device and turn it anticlockwise to leave it in projection mode or position.
11. Make a test projection in a vessel

WARNING: Before carrying out maintenance, repair or cleaning work, press the blocking device and turn it clockwise to leave it in blocking position or mode. Always remove the coupling block from the gun, completely close the manual product input valves and disconnect the air supply to avoid any possible accident.

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This **MASTER II** series model comes with a head turning mechanism so that it can be turned according to the inlet position of the product hoses.



Do the following to make the change:

1. Completely close the manual valves by turning them clockwise.
2. To eliminate the pressure from the gun, press the trigger and project with the gun until the projection fan begins to narrow.
3. Press the blocking device and turn it clockwise to leave it in blocking position or mode
4. Close the air inlet valve.
5. Remove the coupling block from the gun. Use a cloth dampened in solvent to clean the contact surfaces and the seals of the coupling block.
6. Turn the isocyanate cartridge two turns anticlockwise.
7. Turn the polyol cartridge two turns anticlockwise.
8. Turn the locknut two turns anticlockwise.
9. Pull lightly on the mixing head and turn it 180° (half a turn) clockwise.
10. Gently press the head until it is seated on the throat of the sleeve and cannot turn.
11. Tighten the locknut on the throat of the sleeve to immobilise the head.
12. Tighten the two side cartridges.
13. Connect the coupling block to the mixhead and fix it firmly with the central screw. Pay attention to the seating of the seals.
14. To leave the gun operative, carry out the following steps for **Installation and Start-up**.

NOTE: Always turn the head clockwise to pass from one position to another.

STANDSTILL METHOD

1. Perform the Unit Standstill Method with the procedure indicated in the Machine Service Manual.
2. Completely close the manual valves of each product by turning them clockwise.
3. To eliminate the pressure from the gun, press the trigger and project with the gun until the projection fan begins to narrow.
4. Press the blocking device and turn it clockwise to leave it in blocking position or mode
5. Remove the coupling block from the gun. Use a cloth dampened with solvent to clean the contact surfaces and the seals of the coupling block.
6. Remove the non-return unit, filter and contact bushing from the polyol side in the mixing block. Clean the unit with gun cleaning solvent.
7. Remove the non-return unit, filter and contact bushing from the isocyanate side in the mixing block. Clean the unit with gun cleaning solvent.
8. Remove the filter. Carefully clean the filter with gun cleaning solvent, making sure that there are no remains of product left in the mesh.

PRECAUTION: To avoid spilling the rest of the product which has accumulated in the side cartridges onto the floor, always remove the coupling block and the side cartridges on a waste vessel.

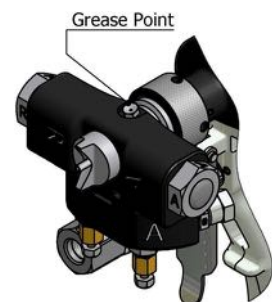
9. Remove the central block by turning the locknut anticlockwise. Clean the block with gun cleaning solvent.
10. Clean the two contact surfaces of the mix chamber.

PRECAUTION: Use wooden or plastic utensils or a brass brush for cleaning. Do not use metal utensils, which can scratch the contact surfaces.

11. Fit all the components and put the coupling block in the gun.
12. Remove the stopper and grease the mix chamber with the greasing pump supplied in the kit with the gun. This will prevent the cleaning air of the gun from drying the ISOCYANATE product, and will therefore prevent it from crystallising and scratching the chamber and the bushing. Fit all the components and put the coupling block in the gun.

NOTE: The action of greasing the gun at the end of the day will avoid maintenance time, as it will not be necessary to dismantle the chamber each day to clean it.

PRECAUTION: To avoid possible contamination by product remains on the gun components, do not swap Isocyanate parts with Polyol parts. The gun has the isocyanate side marked with the letter A.



If the product hoses still have pressure, follow the Standstill Method indicated in the Machine Service Manual.

To eliminate the pressure from the hoses with the gun dismantled, put the product inlet block in a suitable container, remain at a careful distance and very carefully, very slowly open the manual valves. With pressure, the product will come out of the top side of the coupling block.



MAINTENANCE

To get the most of your **MASTER II** series gun, periodical maintenance must be carried out.



Carefully read the safety data sheet provided by your supplier to prevent any possible injury caused by incorrect handling of the raw materials and solvents used in the process.

Deal with all waste caused according to current regulations.



To prevent serious damage caused by the impact of fluids under pressure, never open a connection or do maintenance work on components subject to pressure until you are sure that all pressure has been eliminated.

Use suitable protection when operating, maintaining or simply being in the area where the equipment is working. This includes, but is not limited to, the use of protective goggles, gloves, shoes and safety clothes and breathing equipment.



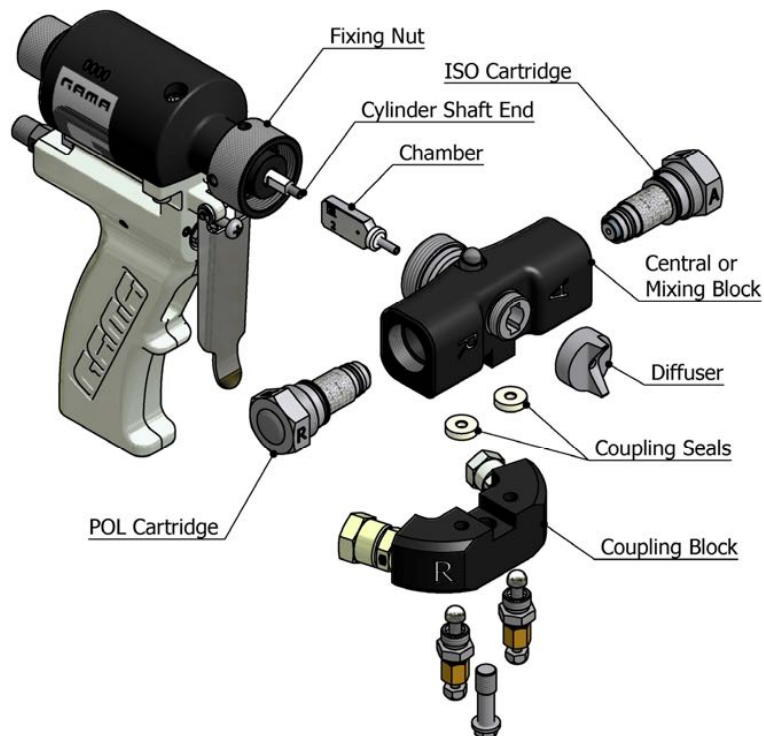
The equipment includes components which reach high temperatures and may cause burns. The hot parts of the unit must not be handled or touched until they have completely cooled.



To prevent serious injury caused by crushing or amputations, do not work with the equipment if the moving part safety protections are not duly installed. Make sure that all safety protections are correctly fitted after carrying out repair or maintenance work on the equipment

Gun block unit and mix chamber

WARNING: Before carrying out maintenance work on the gun, make sure that the unit has been completely stopped, that all of the push buttons and the main switch are turned off and that the unit is disconnected from the main power supply. The gun is a component which works under pressure. No connection must be opened or maintenance work be done on component subject to pressure until the pressure has been completely eliminated.



1. Remove the coupling block.
2. Use a cloth dampened with solvent to clean the contact surfaces and the seals of the coupling block.

PRECAUTION: To avoid spilling the rest of the product which has accumulated in the side cartridges onto the floor, always remove the coupling block and the side cartridges on a waste vessel.

3. Screw on the diffuser.
4. Turn the isocyanate cartridge two turns anticlockwise.
5. Turn the polyol cartridge two turns anticlockwise.
6. Remove the central block by turning the locknut anticlockwise.
7. Put the block in a vessel with gun cleaning solvent.
8. To eliminate all product remains, put the gun block unit in a vessel with gun cleaning solvent and use a brass brush.

PRECAUTION: Use wooden or plastic utensils or a brass brush for cleaning. Do not use metal utensils which can scratch the contact surfaces.



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9. Use a spanner to hold the end of the shaft of the pneumatic cylinder while you unscrew the mix chamber. Clean the mix chamber and, if necessary, redo the product holes with a drill. Make sure the chamber is not scratched or marked.
10. Replace the chamber if it shows any small fault.
11. Screw the chamber on to the end of the shaft of the pneumatic cylinder.
12. Fit the gun block unit by sliding it through the chamber and fixing it to the gun with the fixing nut.
13. Turn the isocyanate cartridge clockwise until it blocks.
14. Turn the polyol cartridge clockwise until it blocks.
15. Fit the coupling block.
16. Fit the diffuser.

Side cartridge unit

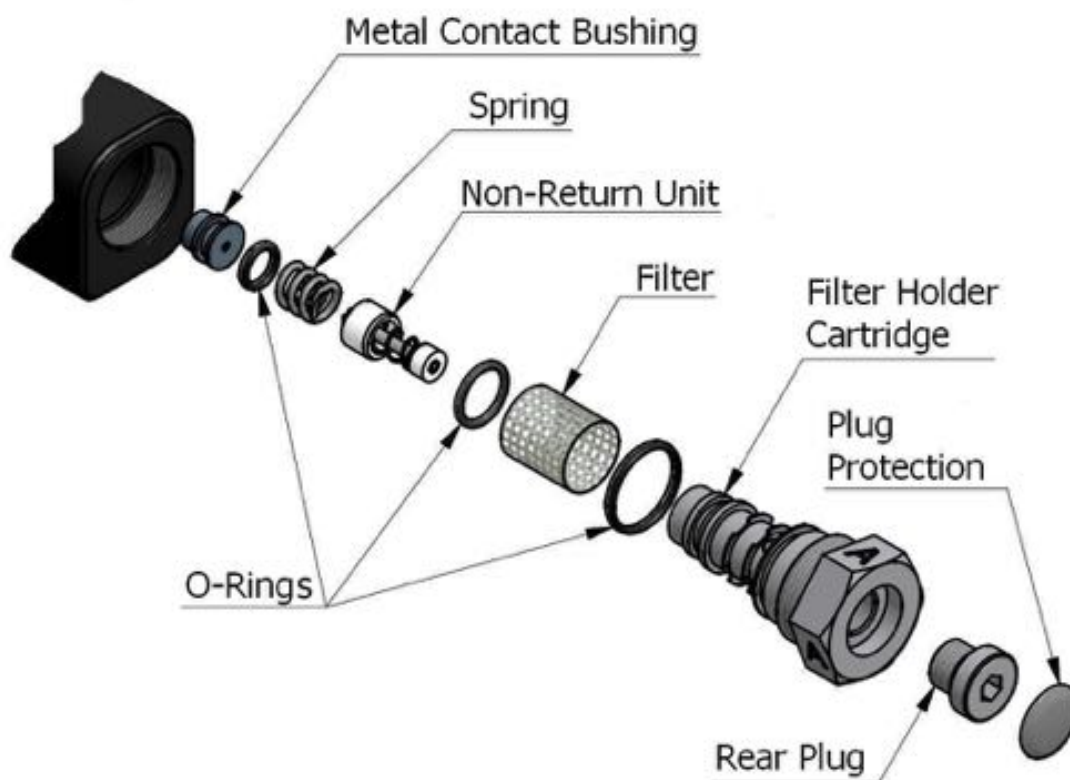
WARNING: Before carrying out maintenance work on the gun, make sure that the unit has been completely stopped, that all of the push buttons and the main switch are turned off and that the unit is disconnected from the main power supply. The gun is a component which works under pressure. No connection must be opened or maintenance work be done on components subject to pressure until the pressures have been completely eliminated.

1. Perform the Unit Standstill Method with the procedure indicated in the Machine Service Manual.
2. Completely close the manual valves of each product by turning them clockwise.
3. To eliminate the pressure from the gun, press the trigger and project with the gun until the projection fan begins to narrow.
4. Disconnect the air supply from the gun.
5. Unscrew the isocyanate side cartridge by turning it anticlockwise and remove it from its housing. Clean the housing with gun cleaning solvent and make sure no loose particles remain inside.
6. Remove the filter and clean it with gun cleaning solvent.
7. Make sure the mesh filter is not obstructed. If you see that the mesh is obstructed over more than 20% of its surface, replace it.
8. Unscrew the rear stopper from the cartridge and use a screwdriver to press the non-return unit to remove it from its housing, as well as the contact bushing.
9. Clean all of the components meticulously to eliminate all product remains using a cloth dampened with gun cleaning solvent and a brass brush.
10. Make sure the holes of the filter holder cartridge are not blocked by remains of crystallised product. If you should see any dirt, clean the communicating drill holes with a drill and a brass brush.

PRECAUTION! Use wooden or plastic utensils or a brass brush for cleaning. Do not use metal utensils that can scratch the surface.

Before cleaning the cartridge housing and contact bushing with solvent, remove all of the o-rings in these components to avoid them being damaged by the solvent or the brass brush.

11. Check the seals of the cartridge and the contact bushing. Replace them if they are worn or damaged.
12. Check the metal bushing for wear and measure its complete length. Replace it if the length is under 7 mm.
13. Grease all of the components and refit them in the cartridge.
14. Screw the isocyanate cartridge unit into its housing until it blocks. Make sure it is correctly tightened to avoid product leaks.
15. Do the same with the polyol cartridge. (points 5-14).
16. Carry out the projection procedure indicated in the start-up section.
17. Start the gun.

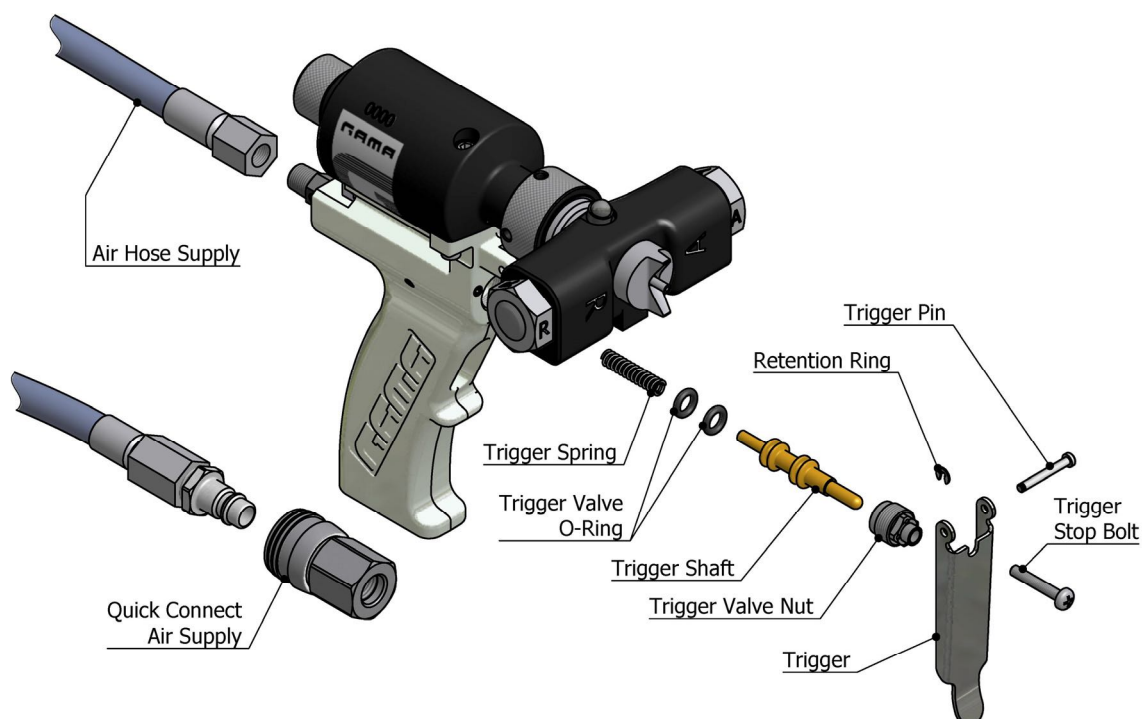


PRECAUTION! Use wooden or plastic utensils or a brass brush for cleaning. Do not use metal utensils, which can scratch the contact surfaces.



Trigger and valve

WARNING: Before carrying out maintenance work on the gun, make sure that the unit has been completely stopped, that all of the push buttons and the main switch are turned off and that the unit is disconnected from the main power supply. The gun is a component which works under pressure. No connection must be opened or maintenance work be done on components subject to pressure until the pressures have been completely eliminated.



1. Remove the coupling block.
2. Use a cloth dampened with solvent to clean the contact surfaces and the seals of the coupling block.
3. Disconnect the air hose supply.
4. Unscrew the trigger stop bolt.
5. Remove the retention ring and extract the pin holding the trigger.
6. Unscrew the nut of the trigger valve.
7. Remove the trigger shaft and hold it carefully for the end with a few pliers to extract it from the hole. The trigger shaft has a spring in the base. Make sure you do not lose it.
8. Check the o-rings of the trigger shaft. Replace them if they are damaged. Apply a little grease to make assembly easier.



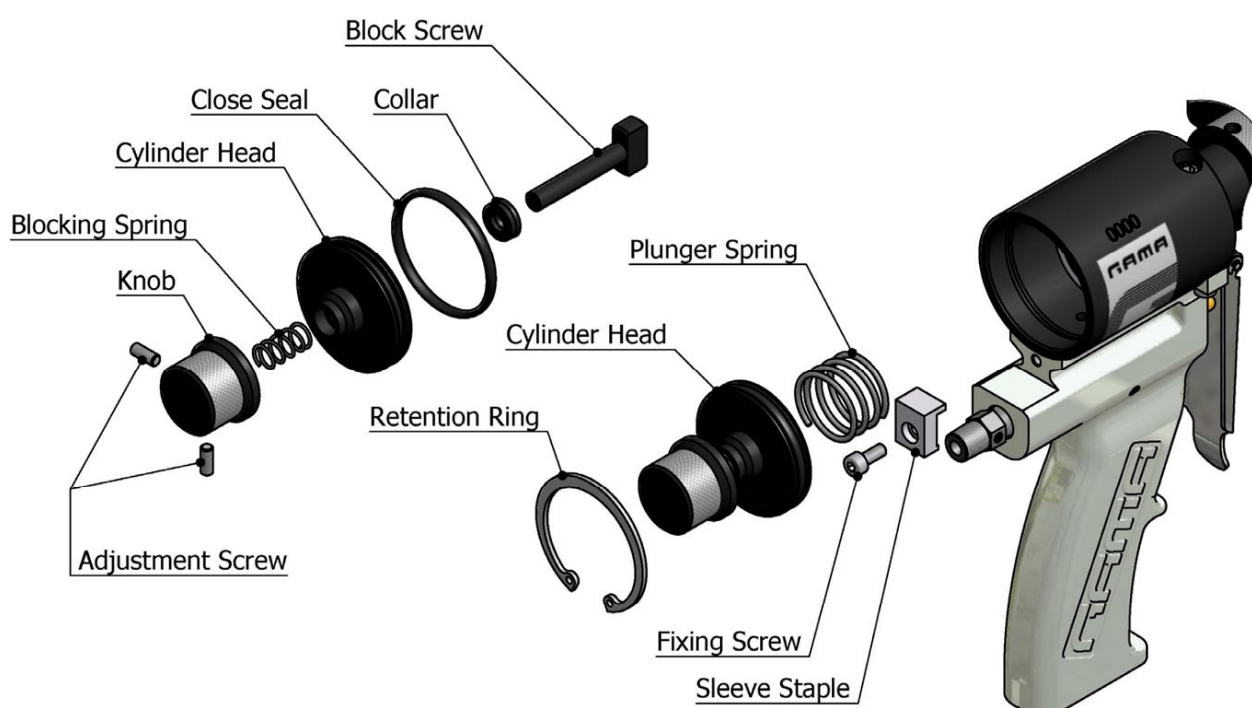
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9. Verify that the accommodation of the trigger shaft is free of dirt and wall light a small fat layer in his interior.
10. Mount the air hose in the rear part of the gun using sealing paste in the thread to avoid air escapes.
11. Insert the trigger shaft in to the spring and insert it inside the handle taking special care not to damage the o-rings. You will note a certain resistance caused by the interference of the seals with the housing wall.
12. Screw down the trigger valve nut until it does ceiling in the fund.
13. Fit the trigger with the pin and hold it with the retention ring.
14. Place the trigger stop bolt. It must be tight up to eliminating the roominess of the trigger shaft (without to displace the shaft).
15. Fix the mixing block according to the procedure described in the pistol block unit and mix chamber assembly section.
16. Start the gun.



Cylinder block and blocking device

WARNING: Before carrying out maintenance work on the gun, make sure that the unit has been completely stopped, that all of the push buttons and the main switch are turned off and that the unit is disconnected from the main power supply. The gun is a component which works under pressure. No connection must be opened or maintenance work be done on components subject to pressure until the pressures have been completely eliminated.

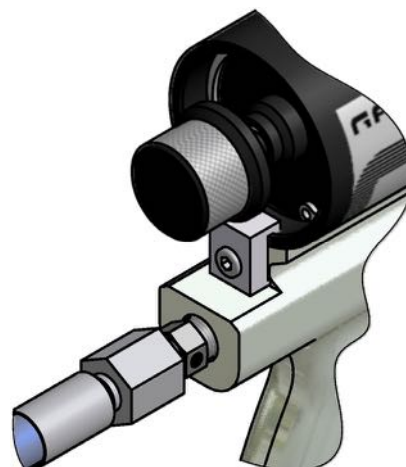


1. Unscrew the screw fixing the sleeve staple on the rear of the gun.
2. Remove the retention ring positioning the cylinder block, using pliers for seeger rings.
3. Pull hard on the blocking device to remove the whole unit from the cylinder sleeve. Also remove the plunger spring.
4. Check the state of the closing seal of the cylinder block. Replace it if it is damaged.
5. Apply a little grease to make it easier to assemble.
6. Loosen the two adjustment screws on the blocking device. Remove the blocking screw and the blocking spring from the device.
7. Separate the cylinder block from the blocking screw.
8. Remove the collar from the cylinder block and replace it if it is damaged. Apply a little grease to make it easier to assemble.
9. Pay special attention to correctly fit the collar: **the closing lips must be faced towards the side of the cylinder.**

10. Fit the cylinder block on the blocking screw. Slip the spring and the blocking device on the blocking screw. Screw in the two adjustment screws, making sure that they are perfectly flush with the flats at the end of the blocking screw. Make sure the blocking device is well fixed.
11. Insert the spring in the rear housing of the plunger. Put the cylinder block unit inside the sleeve, pressing until it stands out from the insertion groove of the retention ring.
12. Fit the retention ring, using pliers for seeger rings.

WARNING: To guarantee that the cylinder block is correctly fixed, make sure that the retention ring is perfectly housed in the fixing groove. To avoid any possible error in assembly, avoid approaching the cylinder block when pressure is applied to the gun after performing any cleaning, repair or maintenance work.

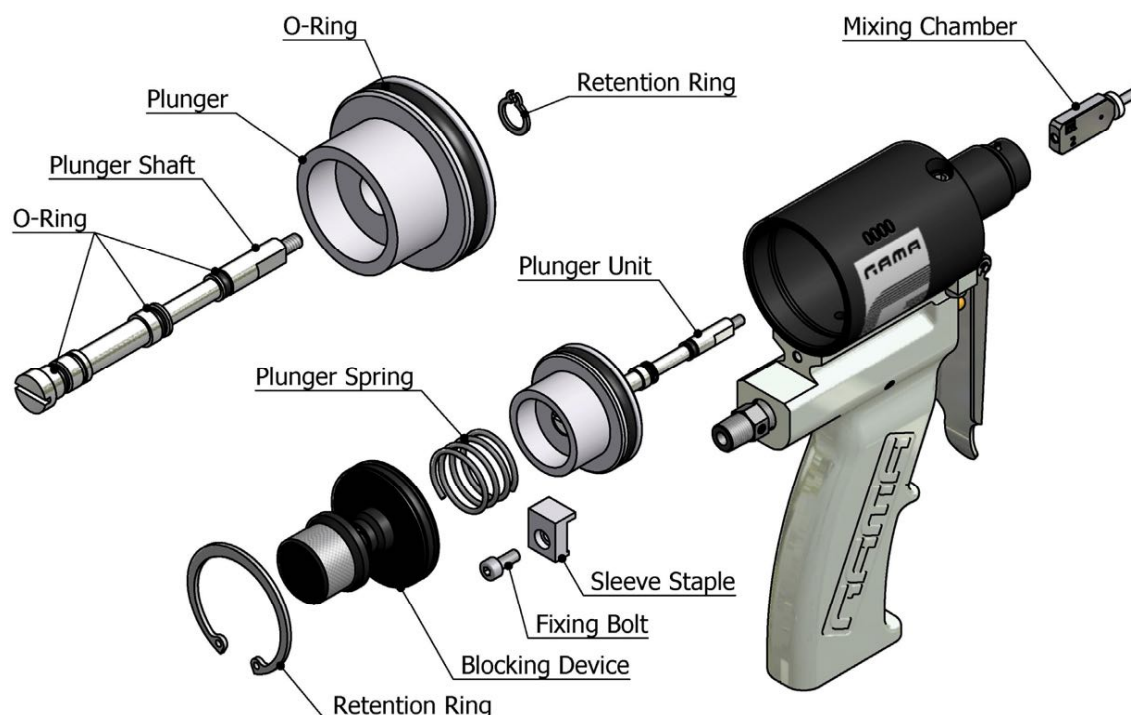
13. Fit the sleeve staple and fix it with the screw to the rear of the gun.
14. Start the gun.





Pneumatic cylinder

WARNING: Before carrying out maintenance work on the gun, make sure that the unit has been completely stopped, that all of the push buttons and the main switch are turned off and that the unit is disconnected from the main power supply. The gun is a component which works under pressure. No connection must be opened or maintenance work be done on component subject to pressure until the pressure has been completely eliminated.



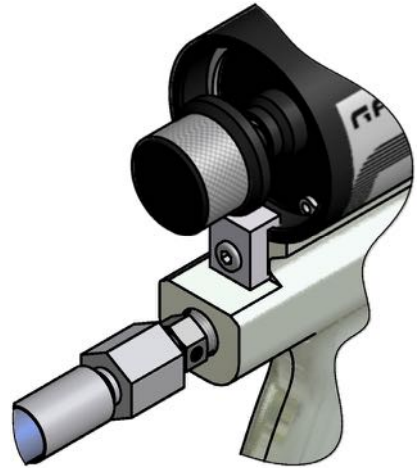
1. Proceed to remove the mix chamber following the procedure indicated in the **Gun block unit and mix chamber** section. Clean the mix chamber and, if necessary, redo the holes with a drill.
2. Removes the screw fixing the sleeve staple to the rear of the gun.
3. Remove the retention ring positioning the cylinder block using pliers for seeger rings.
4. Pull hard on the blocking device to remove the whole unit from the cylinder sleeve. Also remove the spring and the plunger from inside the cylinder.
5. Use pliers for seeger rings to remove the retention ring from the shaft, and extract the plunger.
6. Check the state of the o-rings of the shaft and the plunger. Replace them if they are damaged. Apply a little grease to make it easier to assemble.
7. Fit the plunger by sliding it along the shaft, taking special care not to damage the o-rings. Fit the retention ring.
8. Fit the plunger inside the cylinder sleeve.
9. Insert the spring in the rear housing of the plunger. Put the cylinder block unit inside the sleeve, pressing until it stands out from the insertion groove of the retention ring.
10. Fit the retention ring, using pliers for seeger rings.



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WARNING: To guarantee that the cylinder block is correctly fixed, make sure that the retention ring is perfectly housed in the fixing groove. To avoid any possible error in assembly, avoid approaching the cylinder block when pressure is applied to the gun after performing any cleaning, repairs or maintenance work.

11. Fit the sleeve staple and fix it with the screw to the rear of the gun.
12. Tighten the mix chamber by hand, using a spanner to hold the end of the pneumatic cylinder shaft.
13. Fit the gun block unit by sliding it through the chamber and fix it to the gun with the fixing nut. Make sure you fit the o-ring between the block and the sleeve, replacing it if it is damaged.
14. Tighten the two side cartridges. Screw down the diffuser.
15. Start the gun.





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