

# **WATER MIST MANUAL**



## **MAINTENANCE RG W-FOG UAC CYLINDERS SYSTEMS**

**-CONSTANT & CONTROLLED FLOW TECHNOLOGY**

**-COMBI MANIFOLD SYSTEMS (CMS)**

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## 1- Introduction

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This section provides the user with guidelines for the inspection and maintenance of Water Mist systems. These guidelines must be performed regularly in accordance with regulations. If problems arise, corrective must be taken.

**CAUTION**

**ALWAYS BEAR IN MIND AND COMPLY WITH THE FIRE PROTECTION REGULATIONS**

Take note of the following precautions:

This extinguishing system must be maintained by qualified personnel only.

Any environmental or operating condition which causes shorting or grounding of system components can cause system malfunctions or actual discharge.

Before servicing any component, disarm the protection system.

Agent storage cylinders, are pressurized vessels containing IG-100 fluid super-pressurized to 2900 or 4350 psi at 69.8° F (200 or 300 bar at 21° C). This pressure causes considerable thrust if the discharge valve is actuated, thus, the safety cap supplied with the cylinder must be installed when handling or storing the cylinder, or whenever it is not securely fastened down. The safety cap prevents objects from striking the burst disc valve, and reduces and redirects the thrust if the cylinder is accidentally discharged.

Handle the cylinder carefully to prevent damaging the gauge and other attached fixtures. The Inert gas cylinder must not be subjected to temperatures below -4° F (-20° C) and above 122° C (+50° C), or the pressure relief device may operate, releasing the agent. The water cylinder must not be subjected to temperatures below 39.92° F (+4.4° C) and above 129.92° F (+54.4° C).

## 2- Maintenance procedures

### CAUTION

**THE CYLINDER VALVE ASSEMBLIES MUST BE HANDLED, INSTALLED, INSPECTED AND SERVICED ONLY BY QUALIFIED AND TRAINED PERSONNEL IN ACCORDANCE WITH THE INSTRUCTIONS CONTAINED IN THIS MANUAL.**

A regular program of systematic maintenance is essential for continuous, proper operation of the extinguishing system. A periodic maintenance schedule must be followed and an inspection log maintained for ready reference. As a minimum, the log must record:

Inspection interval.

The inspection procedure performed.

Maintenance performed, if any, as a result of inspection.

The name of inspector performing the task.

### 3- Inspection programme

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#### Daily

##### *Agent cylinder*

Check the IG-100 agent cylinder pressure gauges for proper operating pressure. If the pressure gauge indicates a pressure loss (adjusted for temperature) of more than 5%, or loss in agent quantity shown on cylinder valve of more than 5%, it shall be refilled.

##### *Pilot bottle*

Check the pilot bottle pressure gauge for proper operating pressure. If the pressure gauge indicates a pressure loss (adjusted for temperature) of more than 5%, it shall be refilled. Remove and recharge the cylinder with nitrogen.

#### Weekly

Inspect the hazard area and check that it is protected from its natural medium to ensure that any changes do not affect the correct working of the fire protection system. The following changes at least must be included:

Contents of the area.

Use of the area.

Ventilation systems in the area.

Openings into the area.

Changes to the floor or ceiling.

Subdivisions.

To be checked: Stored liquid or mass levels. If the IG-100 cylinder has been fitted with an electrical pressure supervising device (pressure switch) or mechanical weighing device (SIEX-WD), check the fault indicating light. Any cylinder showing a net weight loss of 5% or more must be refilled or replaced.

Check that the pressure gauges show the correct pressure, as displayed on the cylinder label.

Carry out: a visual inspection of all components and the condition of the system pipe work and hangers. A visual check that none of the equipment has suffered accidental damage.

Inspect the protected area, access routes, hazard, floor and ceilings, to ensure that the maintenance is correct and there have been no incidents. Make sure that neither direct access to the system nor the remote control have any obstructions.

#### Monthly

Inspect the system and the protected spaces to ensure that safety precautions and operating instructions remain clearly visible. Make a general inspection survey of all cylinders and equipment for damaged or missing parts.

Check that all personnel who may need to work with the equipment or system are correctly trained and authorised to do so, and in particular that new employees have been instructed in its use. Every person who

may be involved in an inspection, examination, maintenance or other work on the fire extinguishing system must be instructed and up to date regarding all operations to be carried out.

Personnel who work in an area protected by a Water Mist extinguishing system must receive instructions regarding its proper operation.

Ensure access to hazard areas, manual pull stations, discharge nozzles, and cylinders are unobstructed and that nothing obstructs the operation of the equipment.

Inspect flexible release hoses for loose fittings, damaged threads, cracks, distortion, cuts, dirt and frayed wire braid. Tighten loose fittings and replace hoses with stripped threads or other damage. If necessary, clean parts. Inspect the adapters, couplings and tees at the pilot bottle outlets and tighten couplings if necessary. Replace any damaged parts.

Inspect the pressure operated switches for physical damage, deterioration, corrosion, distortion, cracks, dirt and loose couplings. Tighten loose couplings. Replace damaged caps. Replace the control head if damaged.

Inspect the electrical actuators for damage, corrosion, and dirt. Check the actuator for loose coupling and tighten if necessary. Replace the electrical actuator if damaged.

Inspect the cylinder and container valve assembly for leakage and physical damage such as cracks, dents, distortion and worn parts. Check the burst disc and pressure gauges for damage. Replace damaged gauges or burst disc.

Inspect the cylinder brackets, straps, cradles and mounting hardware for loose, damaged or broken parts. Check the cylinder brackets, straps and associated parts for corrosion, oil, grease and grime. Tighten any loose hardware. Replace damaged parts.

Inspect discharge nozzles for dirt and physical damage. Replace damaged nozzles.

Inspect pressure switches for deformations, cracks, dirt or other damage. Replace the switch if damaged.

## 4- Service and maintenance (by specialised personnel)

### Quarterly

Inspection of all systems in operation.

Inspection of any detection and alarm equipment in the system in accordance with the recommendations of the applicable fire protection regulations.

### Every six months

Inspection of the cylinders by external personnel for unauthorised changes or any sign of damage.

Check that the pressure gauges show the correct pressure, in accordance with the cylinder label.

Check that the amount of IG-100 and Water in their respective cylinders is correct, by weighing the bottle (contrasting with the label of the bottle).

#### - Cylinder weighing

If the client does not wish to have a service and maintenance contract with RG Systems, the IG-100 and water content may be determined by weighing the cylinders.

#### - Inspection of seals to clean them in case of possible dirt or dust.

Check that all manual or pneumatic actuation devices operate freely. Replace the entire component if necessary.

External inspection of all piping to establish its condition. Replace or thoroughly inspect all pipes which show signs of corrosion or mechanical damage.

#### -Pressure switch test

1.- Ensure that the hazard area operations controlled by the pressure switch are operative.

2.- Disassemble the pressure switch from its place.

3.- Manually operate the switch by pulling up and verify that the hazard area operations controlled by the pressure switch shut down.

4.- Return the pressure switch to the ON position.

5.- Reactivate all systems that were shut down by the pressure switch.

#### -Electrical actuator test

This test must be performed without discharging the extinguishing system.

### CAUTION

**ALL ELECTRICAL ACTUATORS MUST BE REMOVED FROM THE CYLINDERS AND PILOT BOTTLES PRIOR TO TESTING TO PREVENT ACCIDENTAL CYLINDER DISCHARGE**

1.- Remove all the electrical actuators from the extinguishing system. Leave all pneumatic or pneumatic-manual actuators and release hoses attached to the cylinders.

2.- Operate the extinguishing electrically. This can be accomplished by actuation of the control panel or by manual operation of an electric pull station.

3.- Ensure that all electrical actuators have operated, that is the pointer has moved to the actuated position. If any electrical actuator has not operated, check the circuit for electric continuity to this particular actuator and repeat the test. Replace all damaged actuators. Repeat the test if any actuator have been replaced.

**CAUTION**

**ELECTRICAL ACTUATORS MUST BE RESETED MANUALLY BEFORE RECONNECTING TO THE CONTAINER VALVES**

Replace any damaged electrical actuator which fails to reset properly before reconnecting to the cylinders. Reattach all electric actuator to the actuation port. Tighten the revolving nut securely. Make sure that each electric actuator is in ON position before assembling to cylinders. Failure to follow this procedure will result in accidental discharge.

**Annually**

All systems with flexible hoses must be examined to assess possible damage. If visual examination reveals any defects in the hoses, they must be replaced.

A complete examination must be carried out every 12 months in the entire enclosed area to determine whether the exit route has changed significantly since the system was installed.

**Every two years**

**CAUTION**

**DO NOT USE WATER OR OXYGEN TO BLOW OUT PIPE LINES.  
USING OXYGEN IS ESPECIALLY DANGEROUS.**

1.- Remove any nozzles from the piping to allow foreign matter to blow clear.

2.- Remove all pneumatic or pneumatic-manual actuators from the container valves.

**CAUTION**

**DO NOT DISCONNECT THE RELEASE HOSE FROM THE PNEUMATIC OR PNEUMATIC-MANUAL ACTUATORS. IF  
THE SYSTEM ACCIDENTALLY**

**DISCHARGES, THE UNATTACHED RELEASE HOSES COULD CAUSE SERIOUS INJURY TO THE PERSONS  
HANDLING THEM AND DAMAGE TO THE SURROUNDING AREA.**

3.- Open the directional valves and keep them open long enough to ensure the pipes are clean.

4.- Blow out all distribution piping with air or nitrogen to ensure it is not obstructed.

5.- Reconnect all pneumatic or pneumatic-manual actuators. Reconnect al nozzles in their positions.



## 5- Hydrostatic pressure test of the cylinder

A hydrostatic pressure test of the cylinder is required, provided there has been no discharge in that period and the cylinders have been subjected to complete inspections every 6 months since entering service. In all cases it is obligatory to subject the cylinders to an inspection to determine whether they may be refilled and whether they are still suitable for use. The interval time between inspections are shown in the following table:

Cylinder Specification	Retest period (years)
DOT-3, DOT-3AX, DOT-3AAX, DOT-3D, DOT-3T,	5
DOT-3A, DOT-3AA, DOT-3B, DOT-3BN	5, 10, or 12 (173.34 (e)(14)(12)(16) and (19)
DOT-3HT	3 (see (e)(15))
DOT-9, DOT-25, DOT-26, DOT-33, DOT-38	5
ISO 4705, ISO 4706, ISO 9809	10
2010/35/EU, 1999/36/CE, 97/23/CE	10

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## 6- Service

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### -Cleaning

Remove dirt from metallic parts using a lint-free cloth moistened with dry cleaning solvent. Dry parts with a clean, dry, lint-free cloth or air blow dry. Wipe non-metallic parts with a clean, dry lint-free cloth. Remove corrosion with a crocus cloth.

### -Nozzle service

Service nozzles after use as follows:

- 1.- Clean the outside of the nozzles with a rag or soft brush.
- 2.- Examine the discharge orifices for damage or blockage. If the nozzles appear to be obstructed, unscrew the nozzles and clean by immersing them in cleaning solvent. Dry thoroughly with lint-free cloth. Replace damaged nozzles. Nozzles must be replaced with the same nozzle type and located in the same position.

### -Repairs

Replace all damaged parts found during inspection. Since replacement for other system components are similar, refer to the installation drawings and assembly drawings for guidance.

Cylinders must be recharged when the cylinder pressure gauge indicates the pressure is below normal, immediately after discharge, when a loss in weight is in excess of 5% of the original charged net weight or when there is a loss of pressure (adjusted for temperature) of more than 5%.

## 7- IG-100 cylinder service and maintenance

### -IG-100 cylinder hydrostatic pressure test

A hydrostatic test must be performed in accordance with the point 5 of this manual.

Nitrogen bottles shall not be recharged and shipped without hydrostatic test if more than five or ten years has elapsed from the date of the last test, (see point 5 of this manual).

Nitrogen bottles continuously in service without discharging can be retained in service for a maximum of five or ten years from the date of the last hydrostatic test (five years for DOT cylinders and ten years for ISO and TPED cylinders). At the end of this time the cylinder shall be visually inspected.

Cylinders must also be hydrostatic pressure tested immediately if the cylinder shows evidence of distortion, cracking, corrosion or mechanical or fire damage.

### -Nitrogen cylinder replacement

#### CAUTION

**WHEN REMOVING A PRESSURIZED CYLINDER DUE TO PRESSURE LOSS, THE ACTUATOR MUST BE IN OFF POSITION. AN ACTUATOR IN THE RELEASED POSITION WILL CAUSE THE REMAINING CONTENTS OF THE CYLINDER TO DISCHARGE RESULTING IN A SYSTEM ACTIVATION WHICH MAY DAMAGE PROPERTY AND CAUSE BODILY INJURY.**

Replace the nitrogen cylinder when loss of pressure occurs, as follow:

- 1.- Remove the actuators from the nitrogen pilot bottle valve.
- 2.- Immediately install the protection cap on the nitrogen cylinder actuation port.
- 3.- Remove the flexible release hose or tubing and adapter from the container valve outlet.
- 4.- Place the safety cap in the outlet cylinder valve.
- 5.- Remove the clamps that secure the nitrogen cylinder to the mounting brackets.

### -Nitrogen pilot bottle installation

- 1.- Install the nitrogen pilot bottle in the mounting bracket.
- 2.- Tighten sufficiently to hold cylinder in place while allowing cylinder enough free play to be manually rotated.
- 3.- Turn the cylinder until the container valve discharge outlet is in the desired position.
- 4.- Securely tighten the mounting bracket clamps and hardware.
- 5.- Remove the safety cap, reconnect the adapter and flexible release hose or tubing to the cylinder container valve outlet port.
- 6.- Remove the protective cap from the container valve actuation port.

**CAUTION**


**ENSURE THE ACTUATOR MUST BE IN OFF POSITION. AN ACTUATOR IN THE RELEASED POSITION WILL CAUSE THE CONTENTS OF THE CYLINDER TO DISCHARGE RESULTING IN A SYSTEM ACTIVATION WHICH MAY DAMAGE PROPERTY AND CAUSE BODILY INJURY.**

7.- Install the control head to the cylinder valve and tighten securely.

## 8- Annex A: Guide for inspection of system after installation

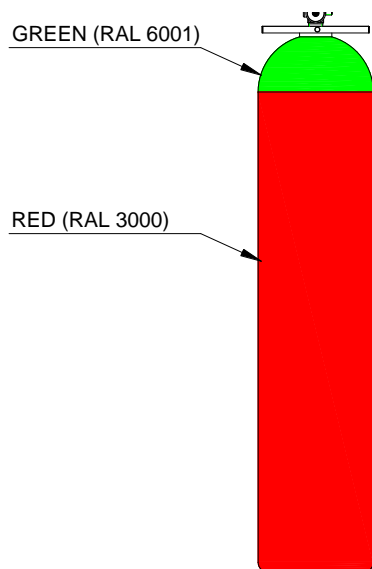
All cylinders shall include a sticker with its number, tare, total weight, date of filling, pressure, quantity of agent, pressure of the bursting disc...

AGENTE EXTINTOR EXTINGUISHING AGENT / AGENT EXTINCTEUR	
HMIS / HMIS / HMIS	
NOMBRE DEL PRODUCTO CONTENIDO CONTENTS PRODUCT NAME / CONTENTS PRODUCT NAME	
Nº. DE CILINDRO / Nº DE REFERENCIA CYLINDER No. / PART NUMBER Nº DE CYLINDER / Nº REFERENCE	
PRESION DE FUNCIONAMIENTO A 21°C OPERATING PRESSURE AT 21°C PRESSION DE FONCTIONNEMENT A 21°C	Bar
PRESION DE PRUEBA DEL CILINDRO FACTORY TEST PRESSURE OF THE CYLINDER PRESSION DE ESSAI	Bar
FABRICANTE DEL GAS / GAS MANUFACTURER / FABRICANT DU GAZ	
PRESION ROTURA DISCO SEGURIDAD BURSTING PRESSURE OF THE SAFETY DISC PRESSION DE RUPTURE DU DISQUE DE SÉCURITÉ	Bar
CARGA / FILL / CHARGE	Kgs.
PRESURIZADO CON PRESSURIZED WITH / PRESSURISÉ AU	
TARA / TARE / TARE	Kgs.
PESO TOTAL TOTAL WEIGHT / POIDS TOTAL	Kgs.
FECHA DE CARGA FILL DATE / DATE DE CHARGE	
ESTE SISTEMA DE EXTINCION SOLO SE PUEDE TRANSPORTAR Y ALMACENAR EN VERTICAL THIS EXTINGUISHING SYSTEM UNIT IS FOR VERTICAL TRANSPORTATION AND STORAGE ONLY CET APPAREIL SYSTEME D'EXTINTION EST VERTICAL TRANSPORT ET STOCKAGE SEULEMENT TEMPERATURA DE FUNCIONAMIENTO DE -18°C A 50°C WORKING TEMPERATURE FROM -18°C TO 50°C / TEMPERATURE DE FONCTIONNEMENT DE -18°C A 50°C Sellado herméticamente / Hermetically Sealed / Hermetiquement scellé	



POL. IND. VILLALONQUEJAR  
 C/ MERINDAD DE MONTIJA Nº6  
 09001 (BURGOS) - SPAIN  
 Tel.: (34) 947 281108 Fax: (34) 947 281112

Check that the paint of the cylinders and the manifold are in good condition. The colour used for water cylinders are red (RAL 3000) and for inert gas cylinders are red (RAL 3000) and the shoulder green (RAL 6001).



**Inert Gas Cylinder**

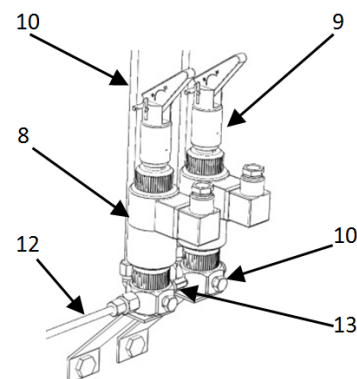
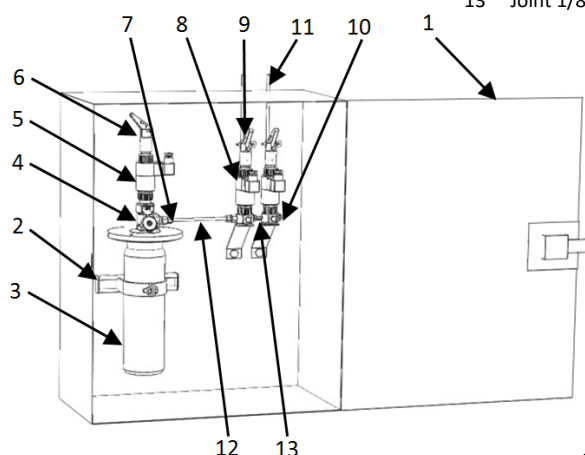


**Water Cylinder**

If the system has selector valves installed, they should be in closed position. Also check that the connections between the pilot bottle in selector cabinet and the pneumatic cylinder of the selector valves are correct.

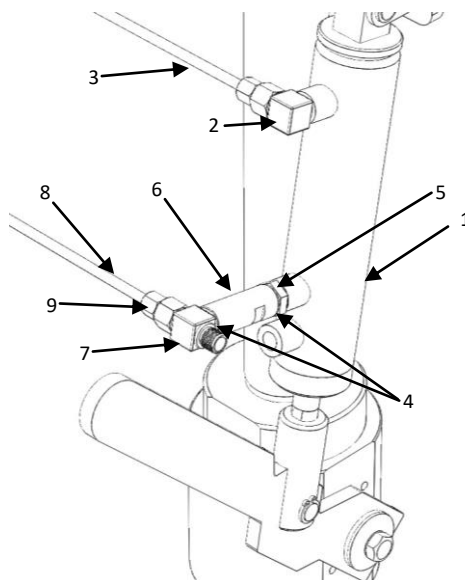
- | Nº | Denomination   |
|----|--|
| 1  | Selector cabinet   |
| 2  | Pilot cylinder bracket   |
| 3  | Pilot cylinder   |
| 4  | Pilot cylinder valve RGS-MAM-11-4/12-4/<br>RD9/RD11  |
| 5  | Re-assembled electrical actuator head<br>227SOL / 227SOLC / 227SOL125 /<br>227SOL220 / 227SOLC125 / 227SOLC220                             |
| 6  | Manual actuator head 227DM, 227DMS,<br>227CMC, 227CMCC   |
| 7  | Adapter POA21CU<br>Re-assembled electrical actuator head<br>227SOLR / 227SOLCR / 227SOLR125 /<br>227SOLR220 / 227SOLCR125 /<br>227SOLCR220 |
| 8  | Manual actuator head 227DM, 227DMS,<br>227CMC, 227DMR  |
| 9  | RGS-MAM-03 valve   |
| 10 | Outlet copper tube for selector valve<br>connection  |
| 11 | Copper tube POLATCU  |
| 12 | Joint 1/8" NPT   |

### Selector cabinet

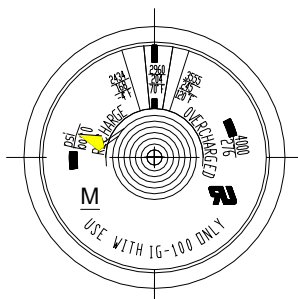


### Selector valves

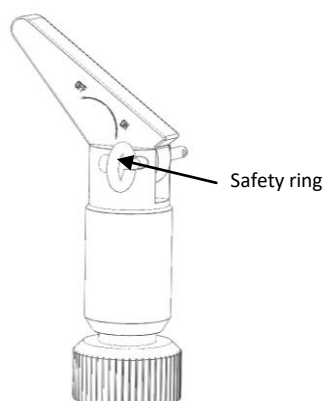
- | Nº | Denomination   |
|----|--|
| 1  | Pneumatic cylinder   |
| 2  | Elbow 1/4 "G to 0.24 in (6 mm)                             |
| 3  | Copper tubing 0.24 in (6 mm)                               |
| 4  | Metaloplastic washer 1/4 "                                 |
| 5  | Adaptor male to male 1/4 "G                                |
| 6  | Check valve 1/4 "G   |
| 7  | "T" or elbow 1/4 "G, as appropriate                        |
| 8  | Teflon hose 1/4 "G   |
| 9  | Bi-cone adapter 1/4 "G to 0.24x0.16<br>in (6x4 mm)         |
| 10 | Pilot bottle 2 l   |
| 11 | Electrical-manual actuator for<br>selector valves SIEX-SVS |



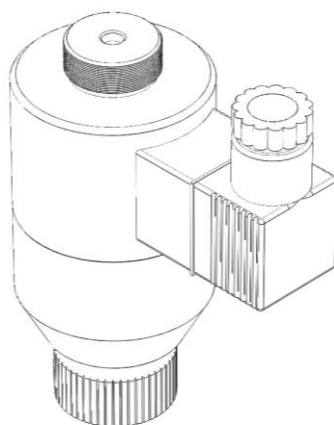
All pressure gauges will indicate the correct pressure for each cylinder, including the pilot bottle. They have to be orientated to make easier their monitoring.



The manual actuator head 227DM shall have inserted its security pin.

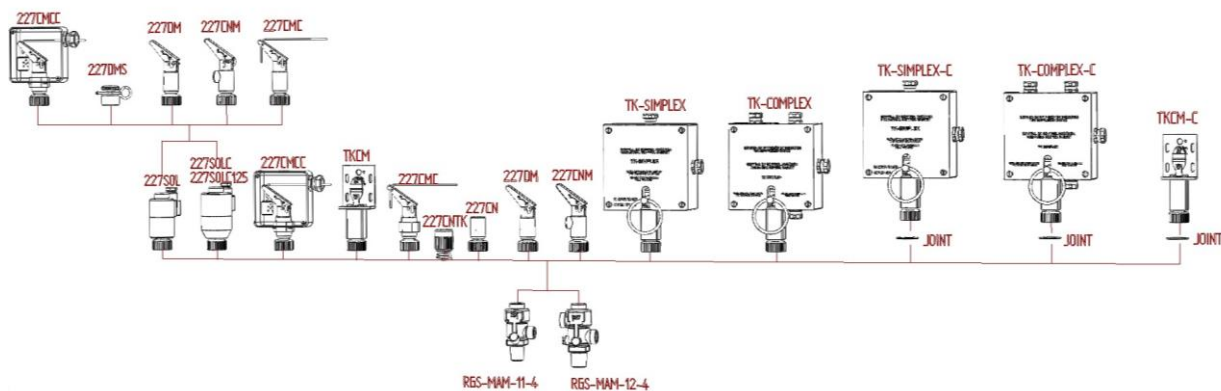
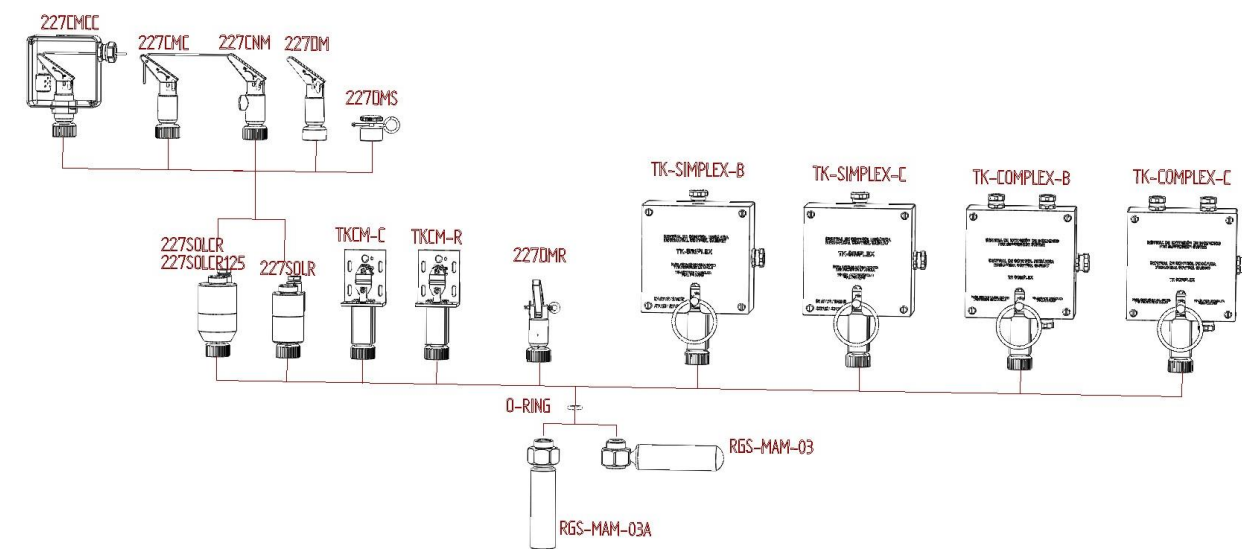


The electrical actuator head 227SOL should be correct electrically connected.

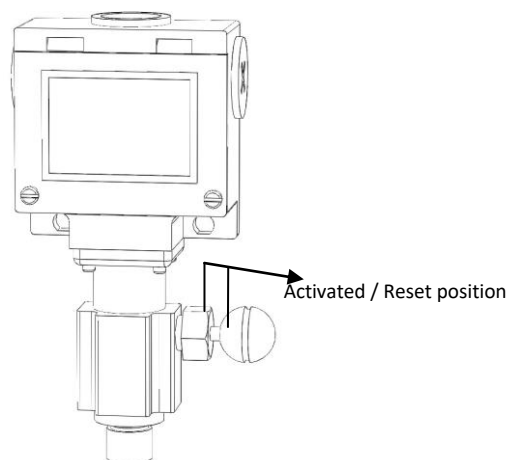




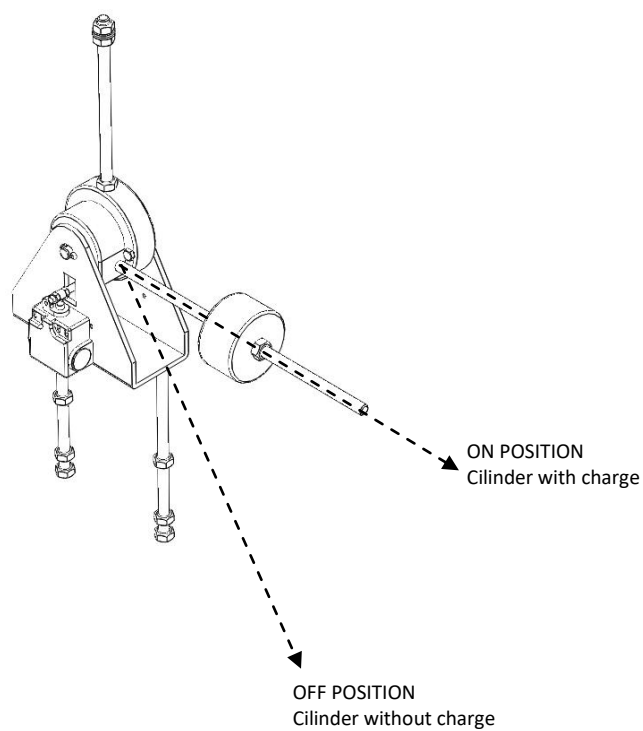
All the actuator heads should be connected correctly, if not, review their tightening with the hand until you cannot screw them more. Do not use any type of tool for their installation.



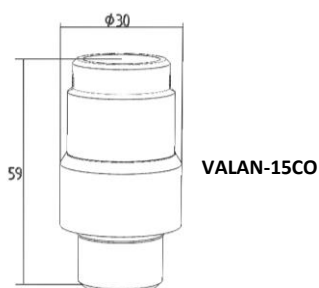
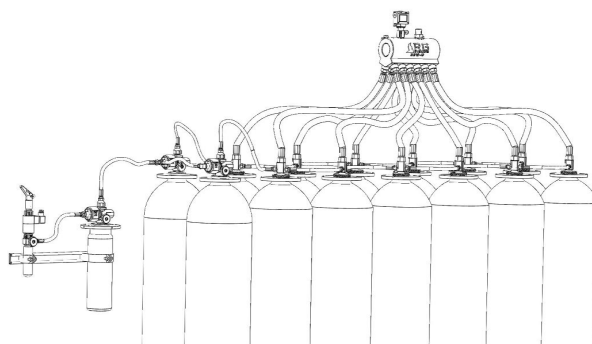
The pressure switch should be reset, for do that, pull out the plastic ball.



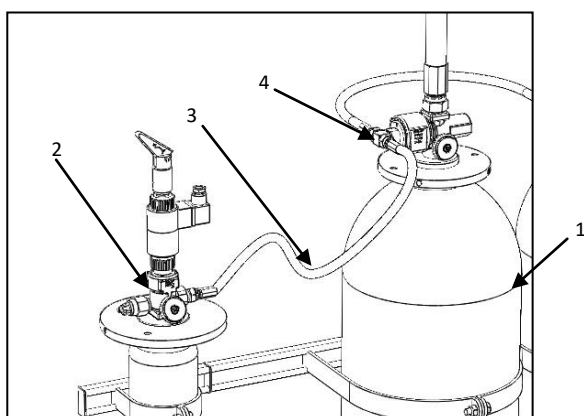
The weighing device (in case we use it) shall be in its correct position for all cylinders (horizontal).



Make sure that in case we use the weighing device in our installation.

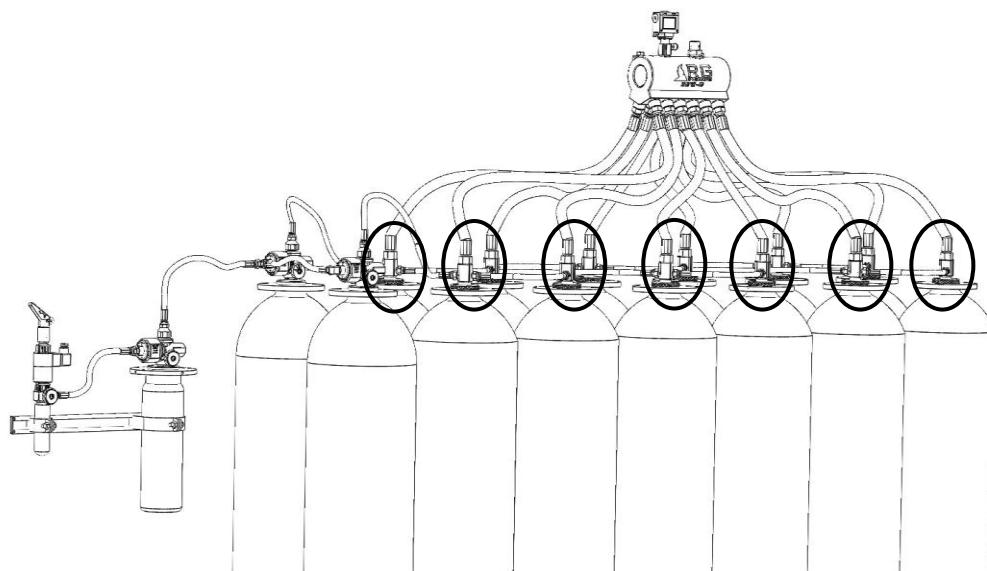


Confirm that the connection between the pilot bottle (in case we use it) and the pilot line are well done.

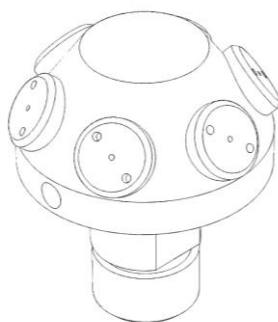


- 1 Cylinder
- 2 Cylinder valve RGS-MAM-11-2/12-2/12-2C/12-3
- 3 Flexible hose FH-6PO / FH-7PO / DH-10 / DH-10I / DH-11 / DH-11I
- 4 Tee or elbow 1/4" G

Check again all connections of the discharge hoses and the activation hoses, verifying that all nuts are well tightened with the help of a fixed spanner.



The nozzles shall be located according to the isometric drawings supplied by RG, complying also with the restrictions of diameters and lengths of the pipe web.

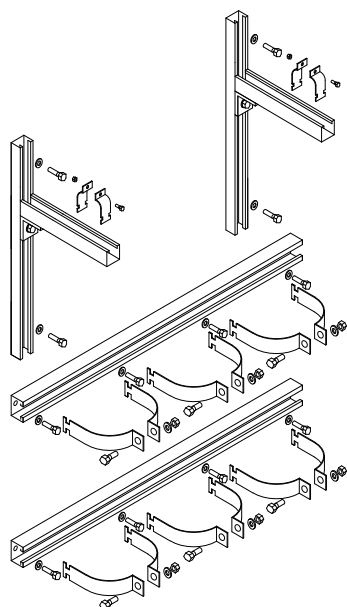


The pipe web should maintain a security distance with the nearest tension conduit not isolated.

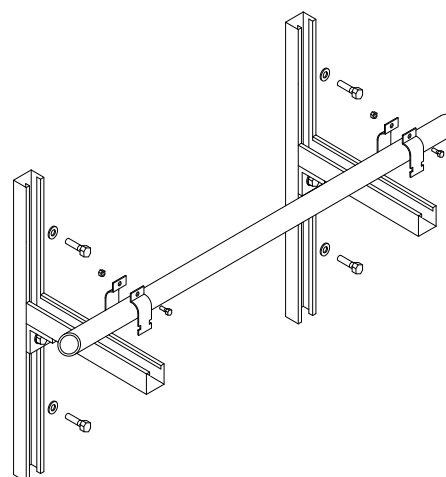
### SECURITY DISTANCE

Máximum nominal tension (KV)	Until the nearest tension conduit not isolated Ft (m)	To the nearest part not at earth potential of an insulator supporting a live conductor (ground clearance) Ft (m)
15	8.5 (2.59)	-
33	8.99 (2.74)	-
44	9.48 (2.89)	-
66	10.01 (3.05)	-
88	10.5 (3.20)	8.2 (2.5)
110	10.99 (3.35)	8.2 (2.5)
132	11.48 (3.50)	8.2 (2.5)
165	12.5 (3.81)	8.2 (2.5)
220	14.01 (4.27)	8.2 (2.5)
275	14.99 (4.57)	8.2 (2.5)

The cylinder or battery system brackets shall be adjusted and fixed correctly in the way that the cylinders do not move. Also, check that the manifold brackets are well fixed.



BATTERY SYSTEM BRACKETS



MANIFOLD BRACKETS

## 9- Annex B: Refilling procedure of the Inert gas cylinders

### CAUTION

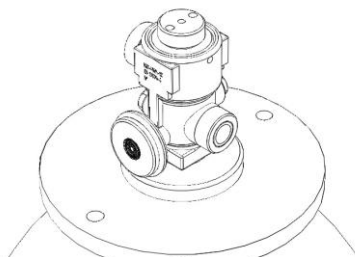
### **YOU ARE HANDLING PRESSURISED EQUIPMENT**

**WATER MIST CYLINDERS AND CYLINDER VALVE ASSEMBLIES  
 MUST BE REFILLED AND HANDLING IN ACCORDANCE WITH THE CONTENTS OF THIS MANUAL.**

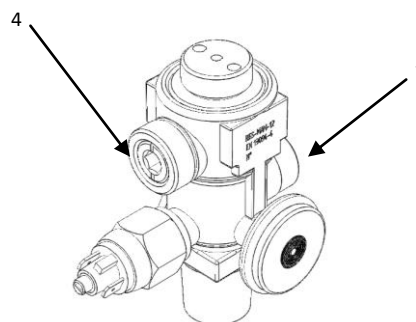
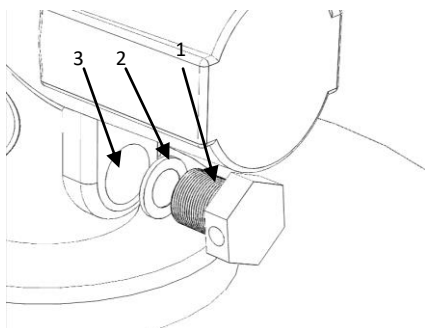
**FAILURE TO FOLLOW THESE INSTRUCTIONS MAY CAUSE  
 THE CYLINDERS DISCHARGING VIOLENTLY, WHICH COULD CAUSE SERIOUS INJURY TO THE PERSONS  
 HANDLING THEM AND DAMAGE TO THE SURROUNDING AREA.**

After an operation of the system, the cylinders shall be refilled with the correct amount of gas. All the information needed for the correct refilling (quantity of gas, pressure...), appears in the stickers of the cylinders. In case of doubt, please contact RG. Follow the next steps to refill the cylinders correctly:

**1<sup>o</sup>**- Check if there is not any rest of gas in the cylinders to be refilled, if it is not the case, empty the cylinders completely.



**2<sup>o</sup>**- Check the connections to the pressure gauge, pressure switch, bursting or actuation disc in the valve. And if it is necessary replace them.

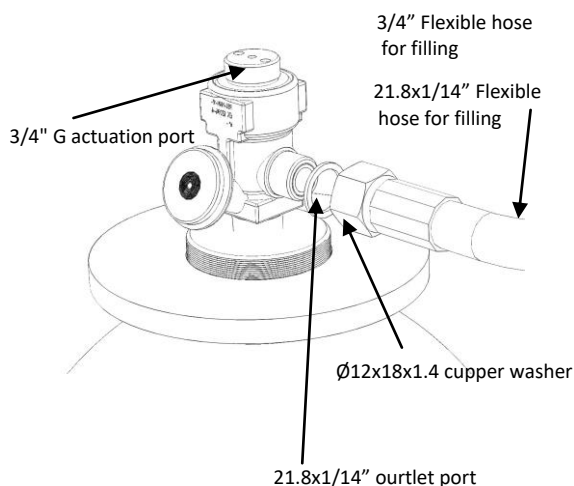


The burst disc assembly consists of:

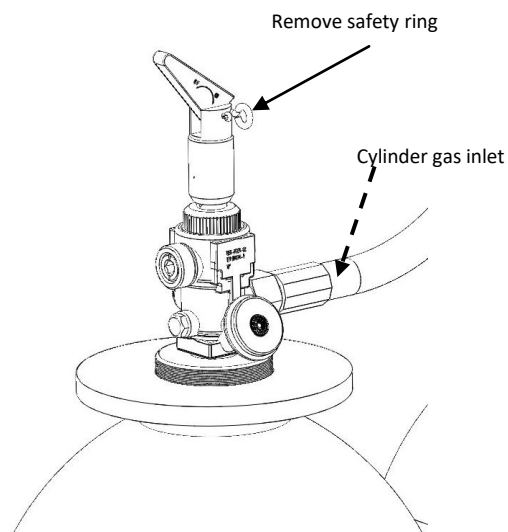
- 1-Disc housing in the valve
- 2-Burst disc
- 3-Exhaust plug
- 4-Pressure switch
- 5-Pressure gauge

**3º-** Proceed to fill the cylinder with the gas as follow. Note that is not permitted to use the pressure gauge of the cylinder as a master gauge to determine the correct charges pressures. If a high pressure gas tank is used to pressurize the cylinder, then a pressure regulator shall be used:

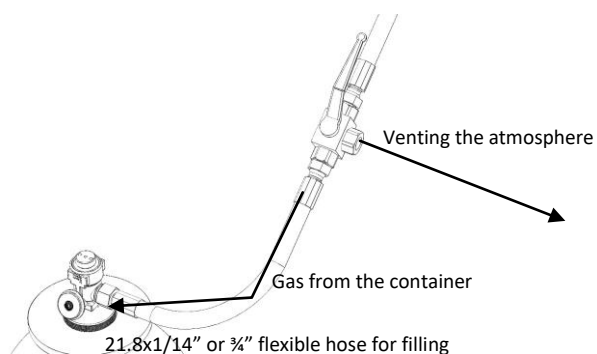
For filling the cylinder through valves **RGS-MAM-11-4/12-4**, connect a flexible hose to the outlet port of the valve and as well to the manual actuator 227DM to the  $\frac{3}{4}$ " upper actuation port in the valve.



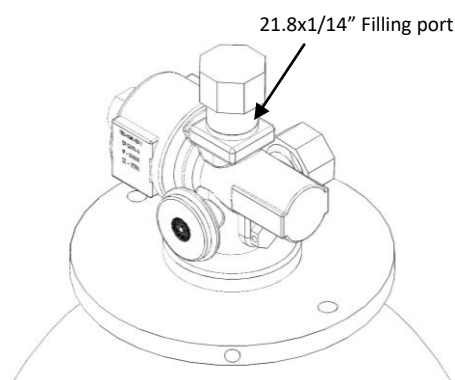
Remove the safety pin from the manual actuator 227DM, then actuate the lever by turning it and place it in position ON (triggered position). At this point fill the extinguishing agent up to complete the filling of the cylinder controlling the pressure by means for the pressure gauge.



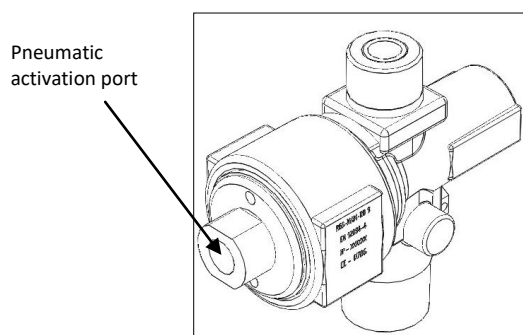
Once the filling of the cylinder is completed, return the lever of the manual actuator 227DM to OFF position (stand-by position) and install the safety pin and remove the actuator from the upper port. Then open the 3-way valve in order to release the gas from the flexible hose in a controlled way, check if there is any leakage by means of soapy water and disconnect the flexible hose for filling.



For filling the cylinder through valves **RGS-MAM-RD-9/11**, connect a flexible hose to the filling port of the container valve.



Remove the valve core or "Schrader" from the pneumatic activation port of the container valve.



Start the filling of the cylinder with the inert gas (IG-100). For do that, open the ball valve which allows the flow of the gas from the source of nitrogen to the cylinder. Once the required pressure is reached, close the ball valve, vent the filling hose and then the cylinder is filled.



## 10- Annex C: Refilling procedure of the Water cylinders

### CAUTION

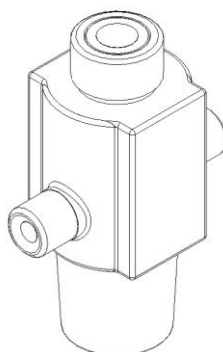
#### **YOU ARE HANDLING PRESSURISED EQUIPMENT**

**WATER MIST CYLINDERS AND CYLINDER VALVE ASSEMBLIES  
MUST BE REFILLED AND HANDLING IN ACCORDANCE WITH THE CONTENTS OF THIS MANUAL.**

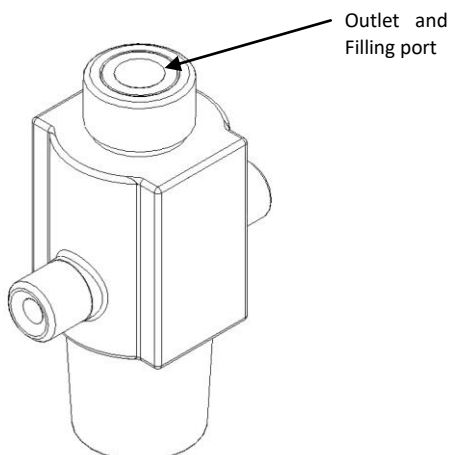
**FAILURE TO FOLLOW THESE INSTRUCTIONS MAY CAUSE  
THE CYLINDERS DISCHARGING VIOLENTLY, WHICH COULD CAUSE SERIOUS INJURY TO THE PERSONS  
HANDLING THEM AND DAMAGE TO THE SURROUNDING AREA.**

After an operation of the system, the cylinders shall be refilled with the correct amount of gas. All the information needed for the correct refilling (quantity of gas, pressure...), appears in the stickers of the cylinders. In case of doubt, please contact RG. Follow the next steps to refill the cylinders correctly:

**1<sup>o</sup>**- Check if there is not any rest of gas in the cylinders to be refilled, if it is not the case, empty the cylinders completely.



**2<sup>o</sup>**- Fill with clean and filtered water the cylinder from the outlet port of the container valve with the correct amount of water by weighing the cylinder.



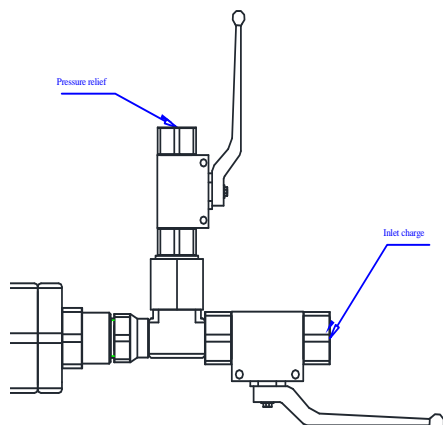
## 11- Annex D: List of Replacement parts

The following list shows the possible replacement pieces that we can supply to maintain the system correctly. After a refilling procedure is necessary to check some points of the system to check that everything is correct, that there is no leakage in the container valve, that the pressure gauge and pressure switch are good for use it.

### 1.- ADAPTERS FOR FILLING CYLINDERS

They make easier the filling procedure. It is used with all types of container valves.

#### Technical Information



#### ADAPTERS FOR FILLING CYLINDERS

Part number	Container valves
CGAC21	RGS-MAM-11-4/12-4 RGS-MAM-RD9/11

### 2.- PRESSURE GAUGE

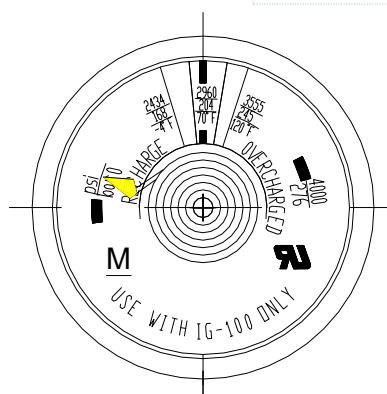
In case they are broken or not monitoring the pressure correctly, they should be changed.

#### Technical Information

PRESSURE GAUGES	
Part number	Working pressure
UF40I-P200	up to 2901 psi (200 Bar)
UF40I-P300	up to 4351 (300 Bar)
UF40I-P0-100	0 to 1450 psi (0 to 100 bar)
UF40I-P150	2175 psi (150 Bar)

#### Technical Information

PRESSURE GAUGES WITH SWITCH CONTACT	
Part number	Working pressure
UF40I-E200	up to 2901 psi (200 Bar)
UF40I-E300	up to 4351 psi (300 Bar)
UF40I-E0-100	0 to 1450 psi (0 to 100 bar)
UF40I-E150	2175 psi (150 Bar)

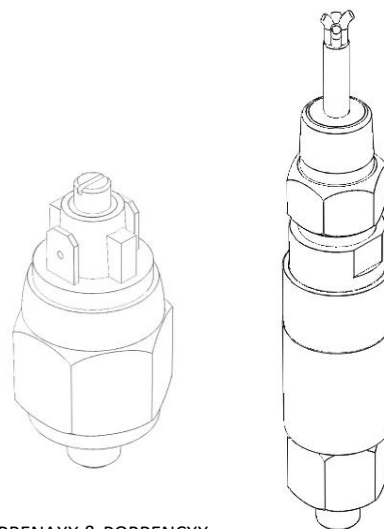


### 3.- PRESSURE SWITCH

In case they are broken or not monitoring the pressure correctly, they should be changed.

#### Technical Information

PRESSURE SWITCH	
Part number	Regulation field
POPRENA250	1450-3626 psi (100–250 bar)
POPRENA300	725-4351 psi (50 – 300 bar)
POPRENC250	1450-3626 psi (100–250 bar)
POPRENC300	725-4351 psi (50 – 300 bar)
POPRECO-AD 413	2000-6000 psi (137,9 – 413,7 bar)



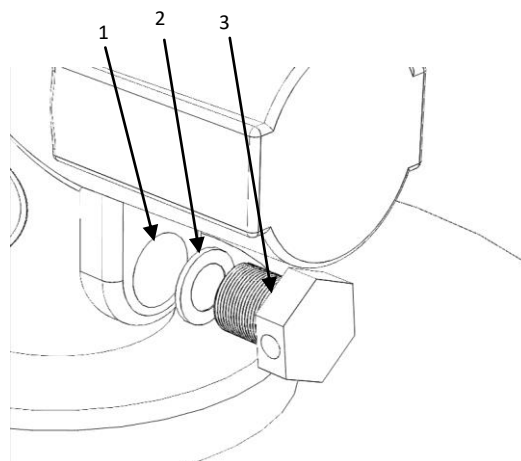
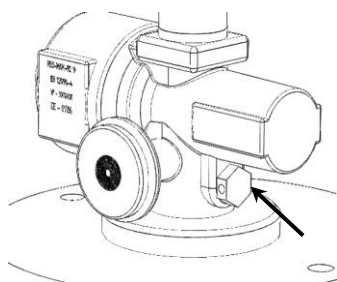
POPRENAXX & POPRENCXX

POPRECO-ADXX

### 4.- BURSTING DISC

Sometimes, the burst disc can broke due to an overpressure caused, for example, by an excess of temperature. Always that we refill a cylinder, we have to check that the bursting disc is in good conditions before start with the refilling. We have to replace the bursting disc in this case.

BURSTING DISC					
Part number	Size of disc	Burst disc Pressure	Torque of the burst disc cap	Container pressure	Container valve
ufbd-06x210-8382	433x236.22 In 11x6 mm	3045.80 psi (210 bar)	20 Nm	2175 psi 150 bar	RGS-MAM-11-4, 12-4
ufbd-06x270-8778	433x236.22 In (11x6 mm)	3916.02 psi (270 bar)	20 Nm	2901 psi (200 bar)	RGS-MAM-11-4, 12-4, RGS-MAM-RD9/11
ufbd-06x310-8072	433x236.22 In (11x6 mm)	4496.17 psi (310 bar)	20 Nm	2901 psi (200 bar)	RGS-MAM-11-4, 12-4, RGS-MAM-RD9/11
ufbd-06x410-8779	433x236.22 In (11x6 mm)	5946.55 psi (410 bar)	20 Nm	4351.13 psi (300 bar)	RGS-MAM-RD9/RD11
ufbd-06x430-8373	433x236.22 In (11x6 mm)	6236.62 psi (430 bar)	20 Nm	4351.13 psi (300 bar)	RGS-MAM-RD9/RD11
ufbd-08x310-8611	547.24x314.96 In (13.9x8 mm)	4496.17 psi (310 bar)	40 Nm	-	Manifold (VREC, VREC-O)
ufbd-08x350-8613	547.24x314.96 In (13.9x8 mm)	5076.32 psi (350 bar)	40 Nm	-	Manifold (VREC, VREC-O)
ufbd-08x430-8612	547.24x314.96 In (13.9x8 mm)	6236.62 psi (430 bar)	40 Nm	-	Manifold (VREC, VREC-O)

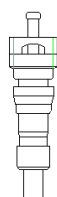


The burst disc assembly consists of:

- 1-Disc housing in the valve
- 2-Burst disc
- 3-Exhaust plug

#### 5.- VALVE CORE

The valve core is a device which allows to activate the container valve and not permits that the gas goes out in its normal position. During its activation (made by the actuator heads) or during the refilling procedure the valve core can broke. In that case, we will proceed to replace it.



Valve core: UFOB-T1-41071-06D



Tool for valve core: UFOB-T1-TOOL

#### 6.- PISTON ASSEMBLY OF THE CONTAINER VALVE

The piston of the container valve is the piece which makes the sealing of the valve and activates it by its vertical movement depending on the pressure of the upper chamber. If we see a leakage during its refilling, it should be changed.

PISTON ASSEMBLY	
Part number	Container valves
UFPA-11-4	RGS-MAM-11-4 / 12-4 RGS-MAM-RD9 / RD11