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## DIRECTIONS FOR USE AND MAINTENANCE BVF BU

### CE 0426\*

\*Notified Body Nr. 0426 – ITALCERT- Viale Sarca 336 – Milan (Notified body that carries out the manufacture control according to art. 11B of the 89/686/CE directive, module D of the ME 96/98/CE directive and module D of the 97/23/CE directive)

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## WARNING

Only close observance of the instructions laid out in this booklet can guarantee perfect service and safe use of the apparatus. SPASCIANI SPA and its appointed Agents take no responsibility for damages which may occur due to incorrect or inappropriate use of the apparatus, nor following maintenance carried out by un-authorized people.

Breathing Apparatus are PPE of 3rd category as stated in the 89/686 directive and therefore they must always be used by especially trained people under the supervision of personnel well aware of the limits of application and of the laws in being.

### 1. INTRODUCTION

This manual refers to the Back Up breathing apparatus type BVF BU. The apparatus is a **Type 1** breathing apparatus that can be used in one of the following configurations:

- as a normal unit in which the alarms activates when the pressure air inside the cylinder drops below 70 bar
- as a back up unit in which the alarms is always on when the apparatus is in use.

The different models of BVF BU mainly differ in the cylinder(s) size.

### 2. FIELD OF APPLICATION

#### 2.1 BVF BU Type 1

The BVF are light duty b.a. designed for short inspection and maintenance interventions in chemical plants and in the BU version they are ideal for giving an extra safety margin to leave a dangerous area in case the main feeding line is cut off.

#### 2.2 Warnings and limits for use

It is very important to follow the instructions for use written in this booklet

The described b.a. **SHALL NOT BE USED UNDERWATER** even if their operation is unaltered when accidentally submerged.

The duration depends on the air reserve in the cylinder. For details please see table of par. 5.

#### 2.3 Special application – 4 way valve

The Four Way Valve that comes with the product allows connecting the b.a. to an airline to increase the duration. During the feeding from airline (set to 5.5 bar) the cylinder is automatically shut off.

### 3. BVF BU - DESCRIPTION

The Breathing apparatus BVF BU marked by the numbers resumed in table A at the end of this booklet, are made of:

- Supporting harness with 4 way valve
- Cylinder
- Pressure reducer
- Pressure gauge
- Medium pressure hose with safety quick coupling
- Automatic demand valve with audible warning

- Full face mask

### 3.1 Supporting harness (6)

It consists of a shoulder strap and waist belt that hold the cylinder adherent to the body

### 3.2 Cylinder (12)

Cylinders can have different dimensions and capacity, see par. 5.1

Cylinders are equipped of EN 144 and/or UNI 4410 hand wheel valves which are painted in accordance to EN 1089-3:2005.

Identification data are marked on the cylinders according to the legislation in force or on a specific label permanently attached to the cylinder (composite cylinders)

### 3.3 Pressure reducer (09) (refer to drawing 2)

The reducer assembly is made of a High Resistance Brass body, nickel plated, in which there are the devices that actually deliver a constant pressure of 5.5 Bar irrespective of cylinder pressure. As the cylinder pressure drops below 70 Bar, a unique device increases the outlet pressure to 8.0 bar and so actuates the audible warning in the demand valve.

The pressure reducer is fitted with:

- High pressure connector (B)
- Gauge (C)
- Medium pressure hose (D) provided with female safety quick coupling (E) that shall be connected to the male quick coupling of the four way valve
- Auxiliary outlet (F)
- Mode level (A): it allows to chose the working mode. If the level mode is the “NORMAL” position the alarm activates when the alarm setting is reached, if the level mode is in the “BACK UP” position the alarm activates immediately when the apparatus is in use (this mode is mainly used when using the BVF as a “Back Up” system in the configuration with a four way valve – see par. 5 for details)

### 3.4 Automatic demand valve with audible warning device (refer to drawing 3)

A Fibreglas reinforced plastic housing holds both the device that delivers the air and the audible warning. It is coupled to the pressure reducer by medium pressure hose (D in drawing 2) with articulated connector. The button (17) locks the device which is then unlocked by the first breath-in. The demand valve can be of type A (4) or BN (5) according to the connector provided, see par. 3.5. The demand valve shall be connected to one of the female quick couplings on the four way valve.

### 3.5 Full face mask

The mask can be of the following types:

- Type **TR 82 A** (2), **TR 2002 A** (1) or **TR 2002 S A** to EN 136:98 Cl. 3, provided with threaded connector to EN 148-3. (see table A)

The proper functioning of the b.a. provided with EN 148-3 connector can be achieved with any other mask which were approved to the same standard BUT only in case of emergency and only if the original mask is not available

- Type **TR 2002 BN** (3) or **TR 2002 S BN** to EN136:98 Cl. 3 with bayonet connector to DIN 58600 for SPASCIANI compatible breathing apparatus. (see table A)

This mask is also provided with a special patented mechanism that enables use with negative pressure devices such as b.a. demand valves or canister having a standard thread connector to EN 148-1. For more details please refer to relevant instructions.

## 4. FOUR WAY VALVE CONFIGURATION – USE AND LIMITATION

The 4 way valve is an automatic device with two medium pressure inlet provided with male quick connectors and two medium pressure outlet provided with female quick connectors.

The devices is mounted on an holder provided with two slits for the connection on the support belt of the BVF BU breathing apparatus.

Two feeding sources at medium pressure can simultaneously be connected to the inlets, two operators can be fed by connecting their demand valves to the outlets.

The feeding sources that can be connected to the inlets are:

- Secondary feeding from the line (LINE inlet)
- Main feeding from BVF

**Warning:**

- The feeding source shall always give air of breathable quality according to EN12021 standard and at a pressure between 5.5 and 6 bar, with a minimum flow rate of 600 l/min
- The connection to the LINE inlet of the 4 way valve shall be done by quick couplings type Spasciani RRF or Euro coupling.

To the two outlets, two operators shall be connected, the main user and a second operator.

**Warning:**

- The 4 way valve can be used when the foreseeable use conditions can bring back to the classification 1 (type 1) according to EN137:2006 standard (industrial use)
- In case of use with two operators pay attention to the reduced autonomy of use.
- Any air withdrawal not oriented to the feeding of respirators described in this manual shall not exceed 110 lt/min (air flow fixed for test by the EN137:2006)
- The use of the 4 way valve is permitted for Spasciani respirators provided with TR82A, TR2002A o TR2002 BN masks (see par 3.5) and compatible demand valve. The use of other masks, exceptionally permitted in case of emergency following the C annex to EN137:2006, should be avoid in case of use with four way valves and feeding from the line because in that case there may be the possibility not to reach the limits necessary for the positive pressure preservation inside the mask.

**5. TECHNICAL DATA - Dimensions Weight Duration**

CYLINDER			B. A.			
Capacity Liters	Pressure Bar	reserve N liters	Dimensions mm (1) <sup>(Ω)</sup>	Weight Kg (2) <sup>(Ω)</sup>	Duration min (3) <sup>(Ω)</sup>	Alarm setting
3 @	300**	830***	155x600x110	5,4	27	70 ± 5
3	300**	830***	155x600x110	9,6	27	70 ± 5

@ Composite cylinder according to EN 12245

(Ω) Data related to apparatuses equipped of most commonly used cylinders and valves. These data can change depending on cylinders and valves models used

(1) Dimensions considered with set laying on a flat surface.

(2) With Mask and fully charged cylinder (s).

(3) At an average flow of 30 l/min with only one operator.

\* Cylinder with UNI 4410 connector towards the pressure reducer

\*\* Cylinder with EN 144-2 connector towards the pressure reducer

\*\*\* At 300 bar the formula PxV to calculate the volume of available air is not valid any more. The compressibility factor that reduces the volume of some 8% shall be considered.

**6. OPERATING PRINCIPLE**

Compressed air from Cylinder (s) (2) is reduced in pressure by the Pressure Reducer (3) at 5.5 bar and led to the Automatic Demand Valve (4) connected to the Face Mask (5)

After the first inhalation which releases the device (17), the Demand Valve injects the necessary quantity of air into the mask and keeps a positive pressure no matter what the demand.

The “MODE LEVEL” (A) (drawing 2) on the reducer permits to chose one of the following working modes:

## **6.1 “NORMAL MODE” – LEVEL IN THE NORMAL POSITION**

As the pressure decreases below the values listed in the “Alarm setting” column in par. 5 the medium pressure suddenly increases to 8 bar thus actuating the Audible Warning at the mask. With every inhalation it is then produced a sounding vibration which will continue till the air reserve is completely used up.

The position of the warning device at the mask, being close to the operator's ears, makes it possible to hear the whistle even in the noisiest environment.

The Audible Warning, moreover, does not waste any air since the sound is made by the air being breathed.

## **6.2 “BACK UP MODE” – LEVEL IN THE “BACK UP” POSITION**

If the Mode level is positioned on the Back up position the Audible Warning at the mask is always on and with every inhalation a sounding vibration is produced. The alarm features are the same explained in 5. This mode position must be used when the BVF is used as a back up unit relied to an air line system as detailed in par 5, in this case the 4 way valve automatically switches on the BVF when something fails in the air line source and the alarm immediately activates allowing the user to use the complete air reserve inside the cylinder to leave the dangerous area.

**WARNING: Always select the operating mode before opening the cylinder valve to avoid forcing on the selection level**

## **7. OPERATING SEQUENCE**

N.B.: Only previously tested B.A. shall be used. Before use it is mandatory to perform the following checks.

### **7.1 Connecting cylinder**

Insert the cylinder into its holder and fix it by means of the special buckle. Connect the cylinder valve to the reducer.

### **7.2 Demand valve connection**

Insert the male and female quick connectors of the medium pressure hose. Connect with a small pressure.

N.B.: To disconnect apply a slight axial force whilst sliding back the female connector ring. Do not disconnect when the hose is under pressure!

Press button (17) to avoid air leaks when donning the set.

### **7.3 Check the Mode**

Check that the Mode level on the reducer is in the right position for the application

### **7.4 Checking cylinder pressure**

Lock demand valve by pushing button (17). Open cylinder valve; the pressure gauge should read not less than 190 bar, for 200 bar cylinder, or not less than 280 bar for 300 bar cylinder.

### **7.5 Checking the high pressure section tightness**

Open cylinder valve and pressurize the set. Shut cylinder valve, the Gauge shall not drop by more than 20 bar within one minute.

### **7.6 Checking the audible warning (for Apparatus with Mode Level in the Normal Mode)**

- Open cylinder valve and pressurize the set.
- Shut cylinder valve.
- Release the valve locker (17) by pushing rubber button.
- With the palm of your hand, keep the demand valve outlet shut and vent the air off slowly. At pressure reading of approx the values listed in the “Alarm setting” column in par. 5, release the air quickly. A sounding vibration shall then be heard which will end when the air has been completely vented off.

N.B.: It is advisable to vent the air off very slowly and wait few seconds at the values listed in the “Alarm calibration” column in par. 5.

- Re-lock button (17)

## 8. DONNING THE SET

Wear the shoulder strap over the right shoulder and fasten waist belt. Both straps are adjustable in length.

The cylinder can be kept on one's side or in front as preferred.

*Once the set has been donned:*

- Don the mask and check the face seal tightness (see relevant instructions).
- Open hand wheel valve by at least two turns.
- Connect the Demand valve to the mask; the first breath-in releases button (17) and set the positive pressure in the mask cavity.
  - **Type A Demand valve and Mask**, threaded connector to EN 148-3 (M45x3): Screw completely the male swivel of the demand valve on the mask female connector
  - **Type BN Demand valve and Mask**, snap in connector: Insert the male connector of the demand valve in the mask connector and push it in place. The pins of the demand valve shall hook to the edge fitting on the mask.

N.B.: The connection to the mask of the demand valve shall be made and checked by an assistant.

*The set is now ready for use*

### 8.1 During Use

When in use check from time to time the pressure gauge and plan the work load to suit the air left in the cylinder(s). Be aware that at the values listed in the “Alarm setting” column in par. 5 or when in use for back up mode unit, the audible warning will sound at every inhalation. At this point the user should leave the contaminated area.

If in strenuous conditions more air is required, you may press the Rubber Button placed in front of the demand valve

**WARNING: Always leave the dangerous area immediately when the alarm activates.**

### 8.2 After Use

- Close the cylinder valve
- Disconnect demand valve from the mask. Excess air will be vented off.
  - **Type A Demand valve and Mask**, Unscrew the male swivel
  - **Type BN Demand valve and Mask**, Press simultaneously the blocking buttons in the demand valve and remove the demand valve from the mask
- Unfasten waist belt and slide back the shoulder straps
- Put off the mask
- Place the set, cylinder up, on a clean surface.

## 9. MAINTENANCE

SPASCIANI SPA and its appointed Agents take no responsibility for damages which may occur due to incorrect or inappropriate maintenance carried out by un-authorized people.

### 9.1 Cylinder

For recharging, national regulations shall be followed.

It is allowed to exceed filling pressure by not more than 10% since when the cylinder cools down, the pressure will become the nominal working pressure.

For refilling ensure that:

- Air meet EN 12021 (breathable air)
- The date of last pressure test be engraved onto the cylinder

Cylinder valve has to be kept shut whilst being sent to refilling to avoid moisture from entering it. Cylinder shall be protected from shocks during transport and storage. Do not carry cylinders by the hand wheel valve.

### 9.2 Cleaning and disinfecting

The demand valve can be washed in lukewarm soapy water and rinsed with fresh running water.

N.B.: SPASCIANI SPA supplies on request the suitable cleaning and disinfecting agents. In the use of chemical products do not exceed suggested concentrations. Avoid the use of organic solvents which may damage plastic or rubber parts.

## 10. TESTING

N.B.: The following tests shall in any case be performed after cleaning or repairs.

The Demand valve membrane as well as all rubber parts shall be replaced if they show signs of alteration or ageing (sticky, hardened, creased etc.). All fittings shall be free from evident alteration. SPASCIANI SPA supplies on request the equipment for proper testing.

In the following paragraphs some of the tests that can be carried out with such an equipment are described.

### 10.1 Demand valve tightness at +7 mbar

- Connect cylinder to pressure reducer. Cylinder shall be kept shut.
- Connect the demand valve to the medium pressure line
- Release button (17) by pushing on rubber button (4)
- Connect the demand valve to the testing instrument
- Pump some air into the demand valve to reach a pressure of some +7 mbar. Pressure drop shall not exceed 1 mbar within one minute.

### 10.2 Positive pressure of the demand valve

- Open cylinder valve.
- Connect demand valve to testing equipment.
- Release button (17) by pushing on rubber button

The control pressure gauge shall read 3.2 to 3.9 mbar.

### 10.3 Pressure in the cylinder

See par. 7

### 10.4 Tightness of the high pressure section

See par. 7

### 10.5 Warning device

See par. 7

## 11. STORAGE

It is advisable to store the respirators herein described in suitable areas at normal room temperature, away from sun light, heat sources, humidity and corrosive chemicals.

Dry and clean breathing apparatus can be stored in special dust free cabinets. In this case make sure that the sets lay on their back plate and that the straps are not creased.

## 12. TRANSPORT

The breathing apparatus, kept in their original packing or in the transport case (see par. 15), do not require particular care for transport. It is anyhow advised to follow the information already given for storage.

### 13. SCHEDULED MAINTENANCE TABLE

The following table shows the maintenance schedule

Part	Activity	1	2	3	4	5	6	7
Complete B.A.	Cleaning			x				
Complete B.A.	Function, tightness	X			X			
Demand valve	Cleaning			X				
Demand valve	Disinfecting			X				
Demand valve	Membrane check			X <sup>a</sup>	X			
Demand valve	Membrane replacement						X	
High pressure connector	Thread test							X
High pressure connector gasket	Replacement					X		
Reducer	Revision							X
Cylinder	Test <sup>c</sup>							X <sup>b</sup>

1: Before allowing the use  
 2: Before use  
 3: After use  
 4: Every six months

5: Annually  
 6: Every three years  
 7: Every six years

a) After use in corrosive areas or in extreme ambient conditions b) In accordance to national regulations, c) WARNING: Every time the valve is disassembled / assembled from/to the cylinder for maintenance and/or testing, the valve shall be replaced. Refer to the specific information notice that comes with the cylinder or to the label of composite cylinder for the appropriate torque forces.

After the replacement of any part whatsoever it is mandatory to perform all checks on function and pneumatic tightness as indicated in par. 11.

### 14. IDENTIFICATION

All parts important for safety are marked with the serial number and the date of manufacture.

- Hoses are marked with the date of manufacture
- Reducer and demand valve are marked with six digits and one letter. The first two tell the year, the subsequent (from 1 to 6) the two months period of manufacture. The letter tells the model of reducer or demand valve and the last three digits are the serial number.
- The reducer is factory sealed and the seal clamp is stamped with the date of the last revision.
- The demand valve membrane and other parts made of rubber bear a so called "rubber clock" which indicates the year and month of manufacture
- The complete set bear a label on the belt (example A) that shows:
  - Name and address of manufacturer
  - the name of the type (A1), model (A1a) (BVF/A 1303 BU) and the mask (A1b). Breathing apparatus bearing the letter "A" (A1b) are equipped with type A mask and comply with Annex A of the EN137 standard.
  - CE marking (A2) with the year of manufacture (A3) that indicates the conformity to the essential safety requirement established by European Directives 89/686/CEE and 97/23/CE. The CE markings are followed by the Nr of the notified body that carries the manufacture control. (A4)
  - Nr of the reference standard (A5): EN 137 with revision year and breathing apparatus type (A6)
  - A7: Max and Min working temperature
  - A8: Max and Min working pressure

#### Example A



## 15. SPARES AND ACCESSORIES

Description	P/N
Mask TR2002 A	113000000
Mask TR 2002 S A	113060000
Mask TR 2002 A Cl. 2	113040000
Mask TR2002BN	113010000
Mask TR 2002 S BN	113070000
Mask TR 2002 BN Cl. 2	113050000
Mask TR82 A	112300000
Demand valve MK2/BN	157910000
Demand valve MK2/A	158850000
Cylinder 7 l 200 Bar *	924070000
Cylinder 6 l 300 Bar *	924630000
Composite Cylinder 6.8 l 300 Bar *	92446000C
Cylinder 3 l 300 Bar *	923030000
Composite Cylinder 3 l 300 Bar *	92303000C
Composite Cylinder 9 l 300 Bar *	92449000C
Demand valve membrane	607100000
Metallic cabinet for RN	158500000
Carrying case for RN	158450000

\* The apparatuses are certified for use with steel cylinders manufactured by the companies Worthington, ECS and ISER and with cylinders in composite material manufactured by the companies Luxfer, Worthington, SCI and MCS. Different models of valves manufactured by the companies VTI and SAN-O-SUB may be assembled on the cylinders

ATTENTION: Only exceptionally it is possible to use other cylinders with BVF breathing apparatuses, due to the standard connectors according to EN 144 and UNI 4410, and exclusively in emergency situations (in case the included cylinders are not available).

The user must check that the pressure equipment corresponds to the requirements set by regulations in force concerning high-pressure containers and related accessories and their compatibility, also for the design (for example connectors and maximum sizes), of the cylinders with the equipment. SPASCIANI declines any responsibility for eventual not authorized assembly of cylinders not supplied by them and not mentioned in this manual, or however for every possible assembly carried out differently from what specifically indicated in this manual.



Table A - BVF BU models

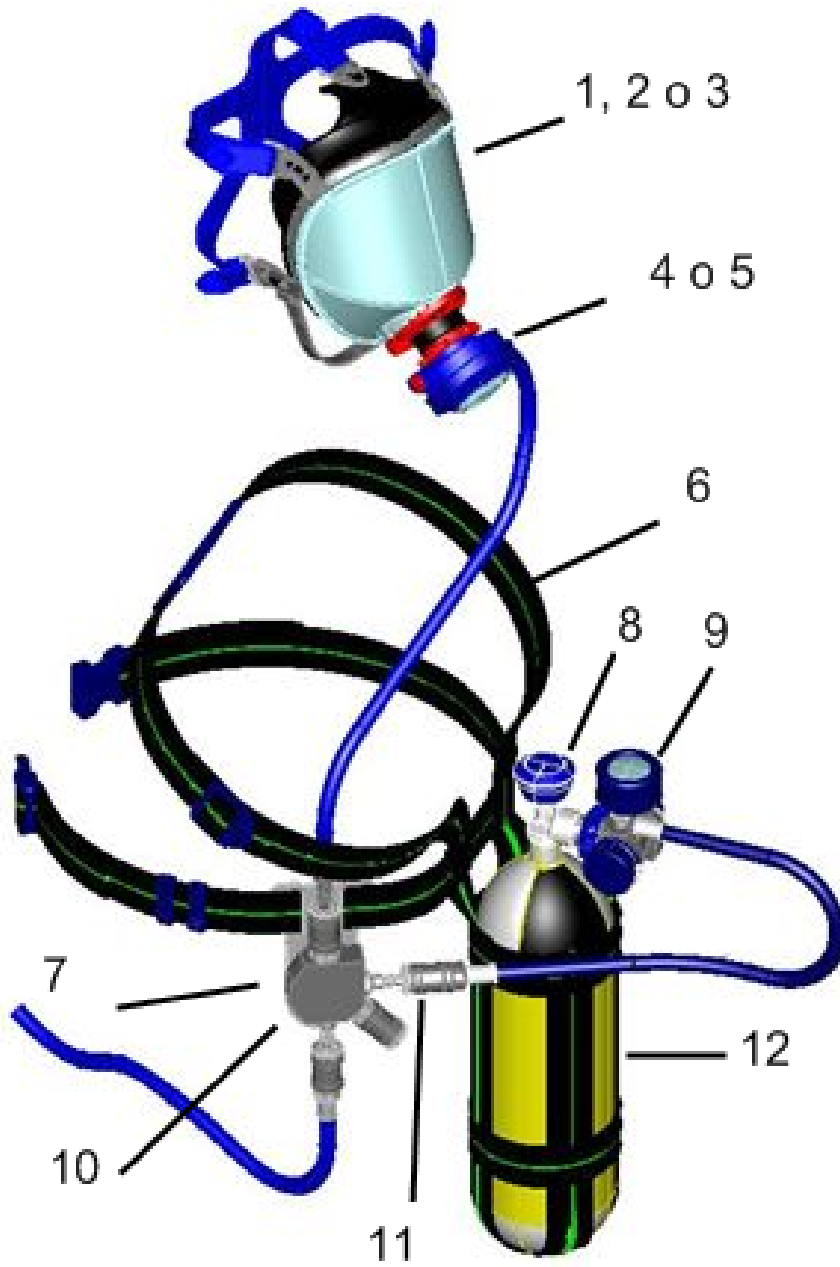
N°	Type 1	MASK type	Cylinder	
			liters	BAR
1	BVF/A 1303 BU	TR 82 A	3	300
2	BVF/A 1303 BU	TR 2002 A	3	300
3	BVF/A 1303 BU	TR 2002 S A	3	300
4	BVF/BN 1303 BU	TR 2002 BN	3	300
5	BVF/BN 1303 BU	TR 2002 S BN	3	300
6	BVF/A 1303 C BU	TR 82 A	3	300
7	BVF/A 1303 C BU	TR 2002 A	3	300
8	BVF/A 1303 C BU	TR 2002 S A	3	300
9	BVF/BN 1303 C BU	TR 2002 BN	3	300
10	BVF/BN 1303 C BU	TR 2002 S BN	3	300

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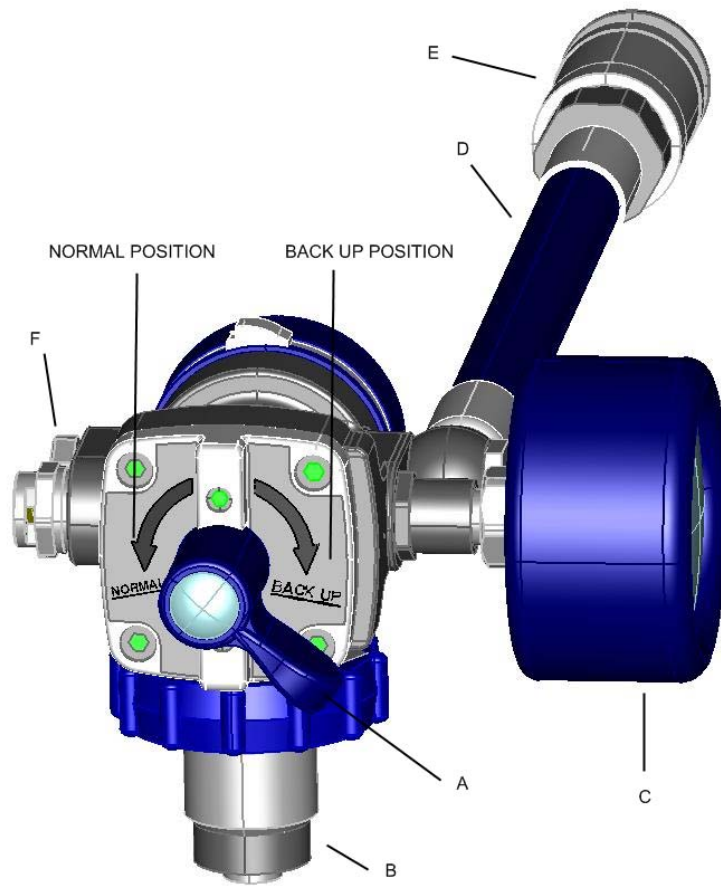
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**BVF BU – Drawing 1**



**Particular of the BVF BU reducer – Drawing 2**



**TR 82 – TR 2002 – Drawing 3**

