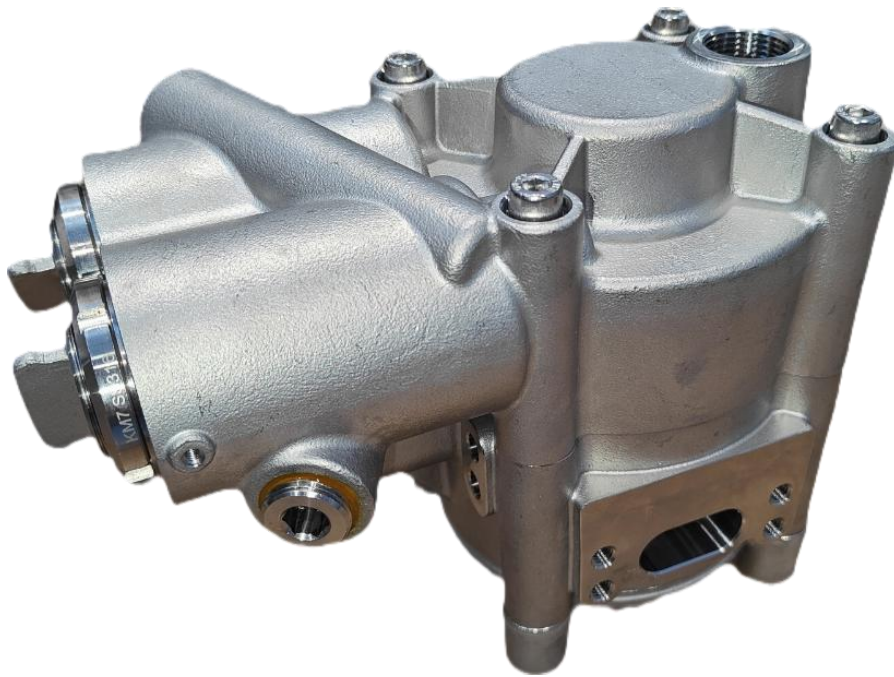


BW

Ultra Volume Booster

INSTRUCTION MANUAL 2072



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-	-		-	-
		Added "ADDENDUM 1: ADDITIONAL SAFETY PRECAUTIONS" – REV00.		
09	12/05/2026	Removed chapter "CERTIFICATION". Added new Cast design. Revised template.	D.Pasini	R.Valoti
08	05/10/2022	Added dust certifications table 7 and IECEx label section 4.1	M.Oberti	N.Zenoni
07	28/01/2025	Revised	M.Oberti	N.Zenoni
Revision	Date	Description	Issued by	Checked by

IMI STI S.r.l has taken every care in collecting and verifying the documentation contained in this Instruction Manual. The information herein contained are reserved property of IMI STI S.r.l.

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1. GENERAL INFORMATION

1.1 GENERAL WARNING



This Instruction Manual is an integral part of the machine, it should be carefully read before carrying out any operation and it should be kept for future references. The operators shall adopt the safety precautions required by the country where the product is installed.

1.2 GENERALITIES

IMI STI products are conceived, manufactured and controlled according to the Quality Control System in compliance with EN ISO 9001 International Standard.

1.3 MANUFACTURER

According to Machinery Directive 2006/42/EC, the Manufacturer of the described product is IMI STI.

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24040 Levate, Bergamo, Italy
Tel. +39 035 29282
Fax +39 035 2928247
imisti.sales@imi-critical.com
sti.support@imi-critical.com

1.4 TERMS AND CONDITIONS

IMI STI guarantees each single product to be without defects and to be conform to current goods specifications. Unless otherwise stated on the purchased order, the warranty period is one year from the date of installation by the user, or eighteen months from the date of shipment to the first user, whichever occurs first, and considering that:

- the warranty does not cover products which have been subject to improper storage, improper installation, misuse, corrosion, or which have been modified or repaired by unauthorised personnel (it is not advisable that customer or end users modify the device characteristics);
- the warranty does not cover special products or components not covered by warranty in their turn by subcontractors.

1.5 MANUFACTURER'S LIABILITY

IMI STI declines all liability in the event of:

- the use of the product does not comply with local legislation on safety at work;
- disregard or incorrect application of the instructions provided on the product label and/or in the instruction manual;
- incorrect installation and/or use of the product;
- modifications without STI's authorisation and/or work done on the unit by unqualified or unsuitable persons.

1.6 APPLICABLE STANDARDS AND DIRECTIVES

2006/42/EC	Machinery Directive
2014/68/EU	Pressure Equipment Directive (PED)
2014/34/EU	ATEX Directive
EN ISO 80079-36	Explosive atmospheres. Non-electrical equipment for explosive atmospheres. Basic method and requirements
EN ISO 80079-37	Explosive atmospheres. Non-electrical equipment for explosive atmospheres. Non-electrical type of protection constructional safety "c", control of ignition sources "b", liquid immersion "k"
EN ISO 80079-34	Explosive atmospheres, Part 34: Application of quality systems for equipment manufacture
EN ISO 12100	Safety of machinery. General principles for design. Risk assessment and risk reduction
EN 60079-0	Explosive atmospheres - Part 0: Equipment - General requirements
EN 1127-1	Explosive atmospheres - Explosion prevention and explosion protection - Part 1
EN ISO 9001	Quality Management Systems. Requirements

Table 1: Applicable Standards

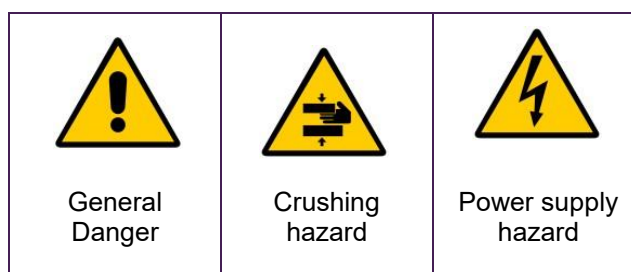
This product is designed in accordance with the applicable International Standards and Directives, but the following regulations must be observed in any case:

- general and safety regulations;
- plant specific regulations and requirements;
- proper use of personal devices, protective devices (glasses, clothing, gloves, etc), tools and transport equipment.

1.7 SYMBOLOGY USED

1.7.1 SIGNS OF WARNING

Be careful where the following symbols are shown. They indicate a potentially hazardous situation and they warn that if the steps are not properly performed, they may cause serious injury, death or long term risks to health of exposed persons.



1.7.2 SIGNS OF OBLIGATION

Be careful where the following symbols are shown. They indicate an obligation that must be respected.

					
General obligation	Obligation to wear protective clothing.	Obligation to wear protective footwear.	Obligation to wear a helmet.	Obligation to protect your eyes.	Obligation to protect your hearing.

2. DEVICE DESCRIPTION

2.1 GENERAL DESCRIPTION

BW Ultra Volume Booster is designed to meet very high speed control applications. It produces an high volume boosting action and contains two integral stabilizing by-pass valves, adjustable by screws, one for supply amplification and the other one for exhaust amplification.

This product is specifically designed to be piloted by a positioner with high CV, such as our FT or SHP positioner.

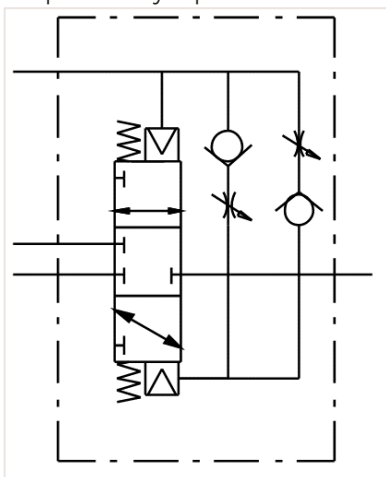


Figure 1: Pneumatic Block

2.2 MODEL SELECTION

BW	-	S	-	M	-	P	-	T	-	C	-	O
-----------	---	----------	---	----------	---	----------	---	----------	---	----------	---	----------

S - SIZE	
32	2"
M - MATERIAL	
S0	Stainless Steel SS316
S1	Stainless Steel SS316 (Copper Free Execution)
S2	Stainless Steel SS316 (Copper Free Execution) - Cast
A0	Aluminium
A1	Aluminium (Copper Free Execution)
A2	Aluminium (Copper Free Execution) - Cast
P - PAINTING	
00	Not Painted
01	Standard Painting Cycle (CVA.01)
99	Customized Painting
T - TEMPERATURE RANGE	
H	-20°C / +85°C
S	-20°C / +70°C
L	-40°C / +70°C
E	-55°C / +70°C
U	-60°C / +100°C
C - CONNECTIONS	
56PPV	Pilot / Supply1 / Supply2 / Actuator / Exhaust
56PPT	Pilot / Supply1 / Supply2 / Actuator / Exhaust
O - OPTIONS	
N	Without Exhaust Regulator
R	With Exhaust Regulator
T	With Double Regulator

Table 2: Model Selection

Below is the legend regarding the model selection relating to the "C - CONNECTIONS" section:

Legend NPT/GAS		Legend HOLES	
1	1/8	A	0mm
2	1/4	B	0mm-5mm
3	3/8	C	12mm-17mm
4	1/2	E	21mm-25mm
5	3/4	G	26mm-31mm
6	1	M	33mm-34mm
7	1 1/4	P	Plug-in
8	1 1/2	T	40mm-45mm
9	2	V	46mm
		W	54mm-56mm
		X	56,1mm-62mm
		Y	69mm-100mm
		Z	160mm-270mm

Table 3: Model Selection - Connections



Not all product configurations are available.
For a better product selection, please contact imisti.sales@imi-critical.com or sti.support@imi-critical.com.

3. TECHNICAL DATA

SIZE	2"
BODY MATERIAL	Stainless steel 316 Aluminium
EXTERNAL PAINTING	Not painted Standard cycle painting (CVA.01) OPTION CUSTOMIZED PAINTING
EXTERNAL SURFACE TREATMENT	None Anodized
GASKET MATERIAL	Nbr Viton Fluorosilicone
WORKING PRESSURE p min [Bar]	2,5
WORKING PRESSURE p max [Bar]	7
DESIGN PRESSURE p des [Bar]	10
WORKING TEMPERATURE T min [°C]	-20
WORKING TEMPERATURE T max [°C]	+85
EXTENDED TEMPERATURE T min [°C]	-60
EXTENDED TEMPERATURE T max [°C]	+100
STORAGE TEMPERATURE T min [°C]	-40
STORAGE TEMPERATURE T max [°C]	+95
PILOT PNEUMATIC CONNECTIONS	3/4"
SUPPLY 1 PNEUMATIC CONNECTIONS	1"
SUPPLY 2 PNEUMATIC CONNECTIONS	Plug-in
ACTUATOR 1 PNEUMATIC CONNECTIONS	Plug-in
EXHAUST PNEUMATIC CONNECTIONS	46mm 44mm
GREASE	-
THREAD LOCKER	-
ADHESIVE	-
FLUID	Air
CV IN MAX	15
CV OUT MAX	15
CV BYPASS MAX	6
INGRESS PROTECTION (IP)	IP67
LIFETIME	30 years

Table 4: Technical Data

- Tubing with diameter equal to 8mm or 3/8" are recommended as pilot tubing;
- Tubing with diameter greater than the product thread connection size are recommended as supply and exhaust tubing.

4. USER PROCEDURES



Not performing the following procedures will invalidate the product warranty.

4.1 TRANSPORT



Always wear protective clothing, gloves, and eyewear to prevent personal injury. The lifting and handling shall be made by qualified staff and in compliance with the laws and valid provisions.

4.2 RECEPTION

Check if the model corresponds with the one reported on the purchase order and if no defects are visible on the product. Product related documents are furnished with documents accompanying the machinery where the product is mounted on. If the product is sold alone, contact IMI STI or download the documentation from IMI STI web site.

4.3 STORAGE

To maintain the product in perfect condition, proper attention must be observed to preserve the product during the storage period. Remember to:

- place the product on a wood surface pallet or on metallic support, avoiding direct contact with the ground;
- protect the product with appropriate covering;
- make sure that plastic plugs are present on the pneumatic connections. If stored outdoor, replace plastic plugs with metal plugs that guarantee perfect tightness;
- keep the product protected from weather conditions.

4.4 INSTALLATION



Always wear protective clothing, gloves, and eyewear to prevent personal injury. Check with your process or safety engineer for any additional measures that must be taken to protect against process media.

4.5 CHECKS TO BE PERFORMED BEFORE INSTALLATION

To allow a correct installation of the product, verify that the product outer surface is free from dust and dirt; if not, clean it and remove anything that might prevent a correct installation. Then, check if the coupling dimensions meet the specified ones and prepare all the necessary tools for the assembly and setting of the unit.

4.6 DIMENSIONAL DRAWING

For dimensional drawings, sections and spare parts, see chapter 5.0

4.7 PNEUMATIC CONNECTIONS



Check that the supply pressure is lower than the product design pressure.
Use appropriate pipes and fittings (type, rating, material and dimensions).
The connection shall be made by qualified staff only.

To guarantee the best performances, follow the procedure:

- properly deburr the ends of rigid pipes;
- properly clean the interior of pipes sending through them plenty of the supply fluid used in the system;
- mould and fasten the connection pipes in order to avoid overstress on the connection parts and to avoid loosening of the threaded connections;
- use the recommended quantity of pipe sealant, only on male threads (no-hardening sealant is strongly recommended);
- make the connections according to the machinery (i.e. actuator) pneumatic diagram;
- check that no leakage occurs from pneumatic connections. If necessary, tighten the fittings;
- collect tubing as indicated in the technical data table.
- It is recommended that, when possible, the accessory is mounted with exhaust connections facing down.

4.8 EARTHING CONNECTIONS

When mounted on IMI STI actuators, earth connection is guaranteed through the screws to the actuator. Following proper procedures, which depend on the type and model of the actuator, it is possible to ground the whole system. When mounted on other brand's actuators, if it is not possible to ground the accessory, an earth terminal can be installed directly on the accessory. To ensure proper grounding, use a wire with a section of at least 4 mm² and a resistance of less than 1 ohm.

4.9 DISASSEMBLING



Before starting any disassembly operations, it is mandatory to disconnect the pneumatic power and exhaust the product (no fluid under pressure inside the product, fittings, tubing).
The staff must be qualified for the required operation.

5. OPERATION AND USE



It is severely forbidden to use the product for purpose or application other than those for which it was designed and here above specified.
The product contains fluid under pressure: be careful when using it.

5.1 OPERATION DESCRIPTION

In the following paragraphs you will find information regarding the dimensional drawings, part list and the list with all the models currently available for each type of accessory with the relative spare parts.

5.2 DIMENSIONAL DRAWINGS (MODELS BW-xx-x0 and BW-xx-x1)

5.2.1 PRODUCT TYPE 21

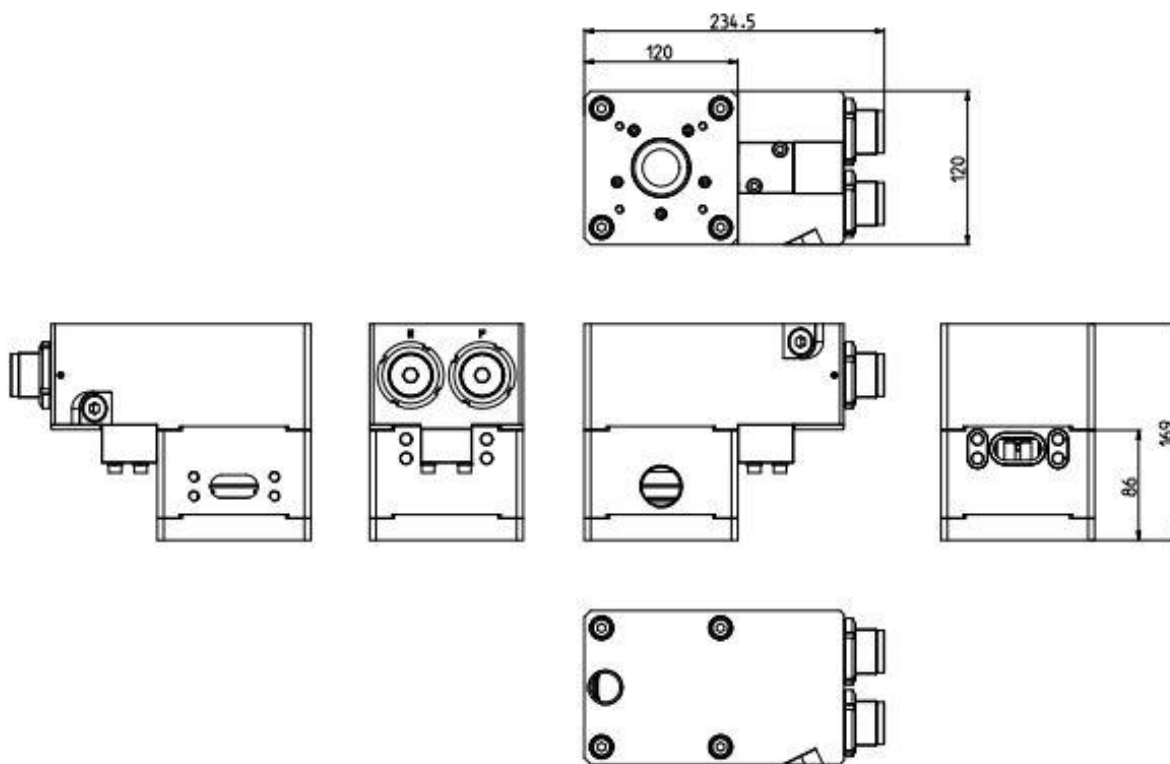


Figure 2: Machined BW - Without Exhaust Regulator

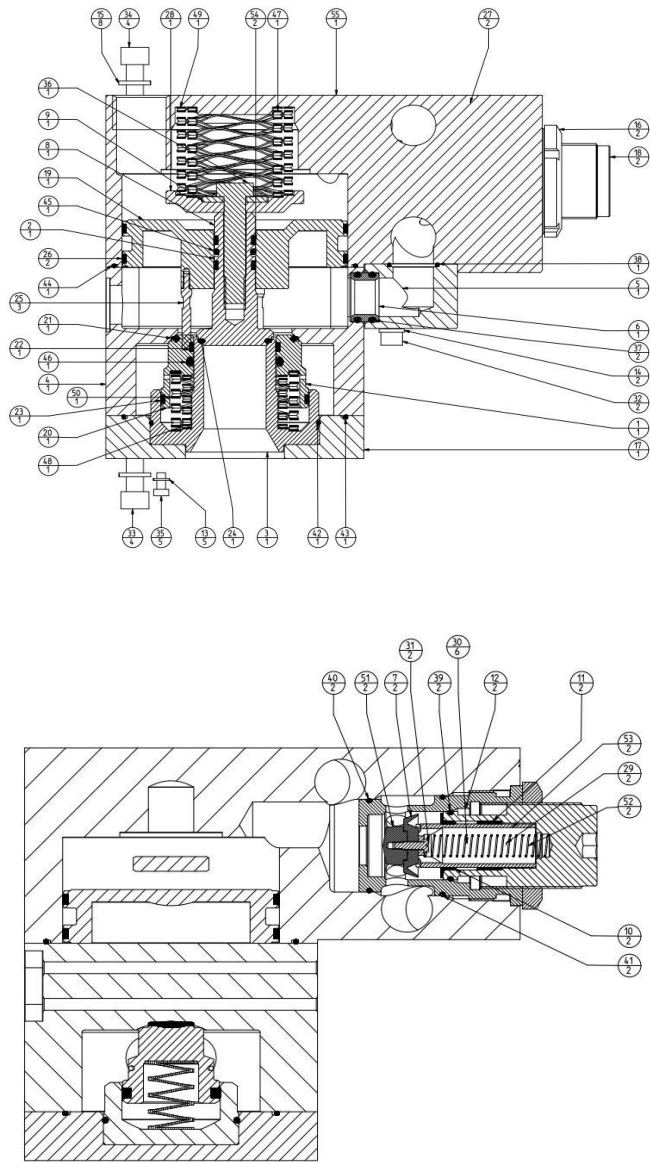


Figure 3: Machined BW - Without Exhaust Regulator - Components

PART LIST		
Pos	Q.ty	Description
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EXISTING PRODUCTS AND SPARE PARTS			
MODEL	PART NUMBER	SPARE	POSITION
BW-32-S1-00-H-56PPV-N	107752	181166	ALL + 2 OR3125
		137882	7-22-23-26-37-38-39-40-41-42-43-44-45-46-54+2 OR3125
BW-32-A1-01-H-56PPV-N	107753	180847	ALL + 2 OR3125
		177882	7-22-23-26-37-38-39-40-41-42-43-44-45-46-54+2 OR3125
BW-32-S1-00-S-56PPV-N	107752	181166	ALL + 2 OR3125
		137882	7-22-23-26-37-38-39-40-41-42-43-44-45-46-54+2 OR3125
BW-32-A1-01-S-56PPV-N	107753	180847	ALL + 2 OR3125
		137882	7-22-23-26-37-38-39-40-41-42-43-44-45-46-54+2 OR3125
BW-32-S1-00-L-56PPV-N	122472	181173	ALL + 2 OR3125
		180815	7-22-23-26-37-38-39-40-41-42-43-44-45-46-54+2 OR3125
BW-32-A1-01-L-56PPV-N	126628	170454	ALL + 2 OR3125
		180815	7-22-23-26-37-38-39-40-41-42-43-44-45-46-54+2 OR3125
BW-32-S1-00-E-56PPV-N	122472	181173	ALL + 2 OR3125
		180815	7-22-23-26-37-38-39-40-41-42-43-44-45-46-54+2 OR3125
BW-32-A1-01-E-56PPV-N	126628	170454	ALL + 2 OR3125
		180815	7-22-23-26-37-38-39-40-41-42-43-44-45-46-54+2 OR3125
BW-32-S1-00-U-56PPV-N	122472	181173	ALL + 2 OR3125
		180815	7-22-23-26-37-38-39-40-41-42-43-44-45-46-54+2 OR3125
BW-32-A1-01-U-56PPV-N	126628	170454	ALL + 2 OR3125
		180815	7-22-23-26-37-38-39-40-41-42-43-44-45-46-54+2 OR3125

Table 5: Machined BW - Without Cast Regulator - Spare parts



The previous models are those currently available. For further models refer to the model selection in **par. 2.2** or contact imisti.sales@imi-critical.com or sti.support@imi-critical.com.

5.2.2 PRODUCT TYPE 22

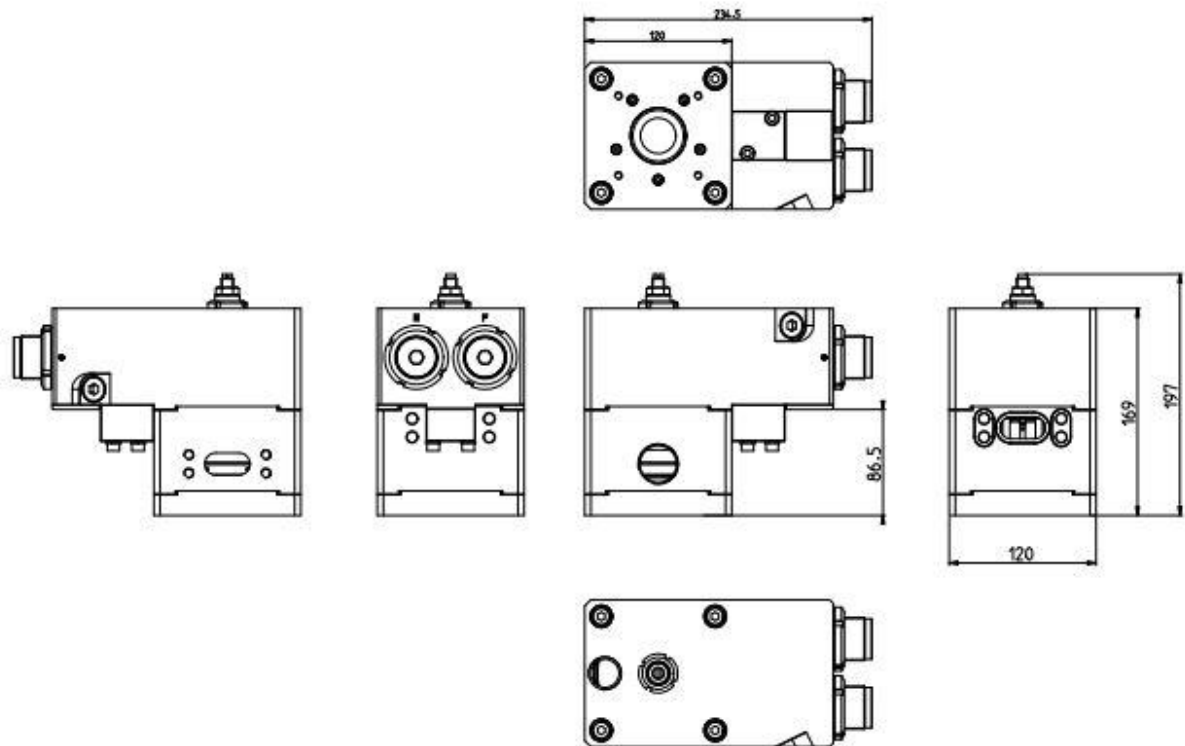


Figure 4: Machined BW - With Exhaust Regulator

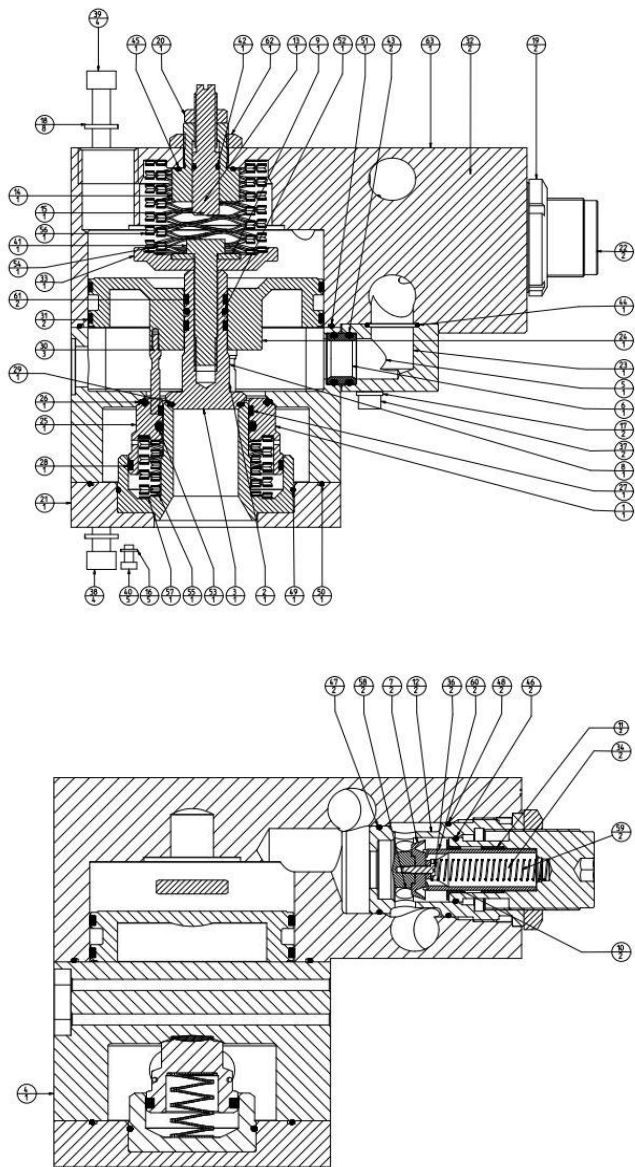


Figure 5: Machined BW - With Exhaust Regulator - Components

PART LIST		
Pos	Q.ty	Description
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EXISTING PRODUCTS AND SPARE PARTS			
MODEL	PART NUMBER	SPARE	POSITION
BW-32-A1-01-H-56PPV-R	152776	181175	ALL + 2 OR3125
		180816	7-27-28-31-42-43-44-45-46-47-48-49-50-51-52-53-61+2 OR3125
BW-32-A1-01-S-56PPV-R	152776	181175	ALL + 2 OR3125
		180816	7-27-28-31-42-43-44-45-46-47-48-49-50-51-52-53-61+2 OR3125

Table 6: Machined BW - With Exhaust Regulator - Spare Parts

	The previous models are those currently available. For further models refer to the model selection in <u>par. 2.2</u> or contact <u>imisti.sales@imi-critical.com</u> or <u>sti.support@imi-critical.com</u>.
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5.3 DIMENSIONAL DRAWINGS (MODELS BW-xx-x2)

5.3.1 PRODUCT TYPE 90: without "Double Regulator"

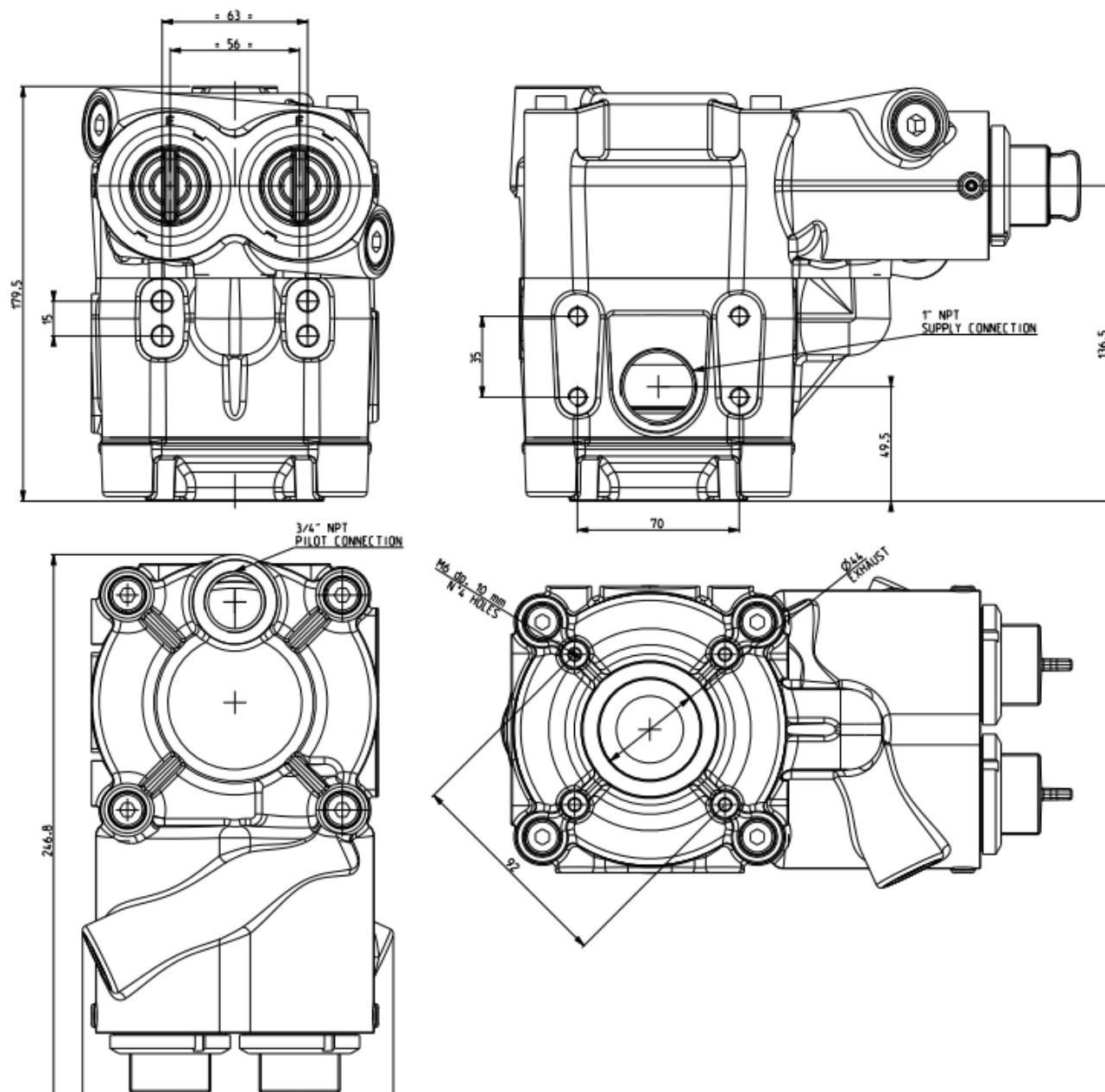


Figure 6: Cast BW - Without Double Regulator - Dimensions

5.3.2 PRODUCT TYPE 91: with "Double Regulator"

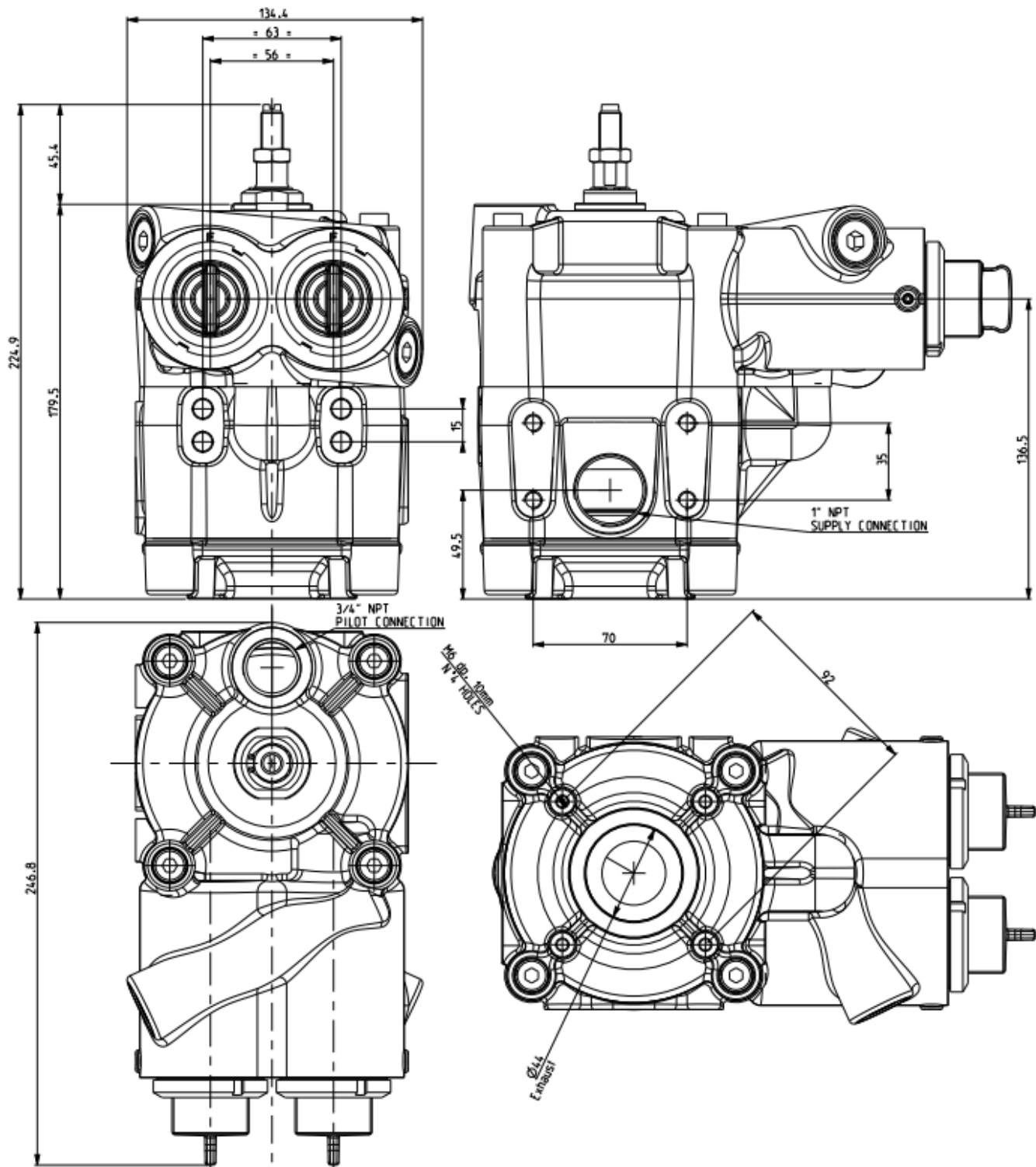


Figure 7: Cast BW - With Double Regulator - Dimensions

5.4 INTENDED USE

IMI STI will not be liable for any possible damage or physical injury resulting from use in other than the designated applications or by lack of care during installation, operation, adjustment or maintenance. Such risks lie entirely with the user.

Considering that IMI STI has no direct control over applications, operation or maintenance conditions, it is the operator's responsibility to comply with all applicable safety rules: it is the sole responsibility of the operator to ensure that the local health and safety regulations are adhered to.

Depending on the specific working conditions, additional precautions may be requested.

Please inform IMI STI if you face unsafe situations not described in this Instruction Manual.

5.5 REASONABLY FORESEEABLE MISUSE

A short list of reasonably foreseeable misuse:

- installation in ambient with not planned conditions (i.e. climatic conditions different from the specified conditions);
- incorrect fluid under pressure inside the product;
- supply pressure out of required range.

5.6 OPERATING LIMITS

The product label and/or this manual indicate the main operating conditions of this product.

5.7 RESIDUAL RISKS

A short list of possible risks:

- risk due to movements of loads during mounting phase;
- crushing during assemblage servicing;
- extreme high or low surface temperature, as consequence of ambient temperature, has to be considered a risk of person injury in case of contact;
- hazardous fluid emission (i.e. when natural gas is used as fluid under pressure).

6. INSTRUCTION FOR THE OPERATOR

During the start-up of the product, proceed as follows:

- check that the pressure and quality of the air supply (filtering degree, dehydration) are as prescribed;
- check that there are no leaks in the pneumatic connections. If necessary, tighten the fittings;
- set the product according the schematic diagram.

If the accessory is mounted in an hazardous location requiring an ATEX certification, read and apply the "ADDENDUM 1: ADDITIONAL SAFETY PRECAUTIONS" of this instruction manual.

6.1 DYNAMIC RESPONSE REGULATION

The Ultra Volume Booster BW is equipped with two adjustable bypasses valves, for feed (F) and exhaust (E). The bypass valves allow for adjustment of the speed at which the pilot pressure and the actuator's chamber pressure equalize. By tuning them, different performances in the two phases can be obtained, depending on the needs. The bypass valves allow to tune the accessory to the application, in order to obtain the performances that best suit the valve and the application.

Decreasing the action of the bypass valve will lead to the actuator moving more violently, leading to possible overshooting and higher impact velocities. This can be achieved by turning clockwise the bypass regulator. Increasing the action of the bypass valve will lead to the actuator moving with an higher degree of precision towards the required position, at the expense of speed of movement. This can be achieved by turning counterclockwise the bypass regulator.

Depending on the model, the adjustment process can be different:

- For models **BW-xx-x0** and **BW-xx-x1**: untight the stopping ring on the desired bypass and screw/unscrew until the desired position is reached. For these models a tool is advised, such as an Allen key, in order to screw/unscrew. Finally, secure the stopping ring so to avoid unwanted changes that could alter the performance during use.

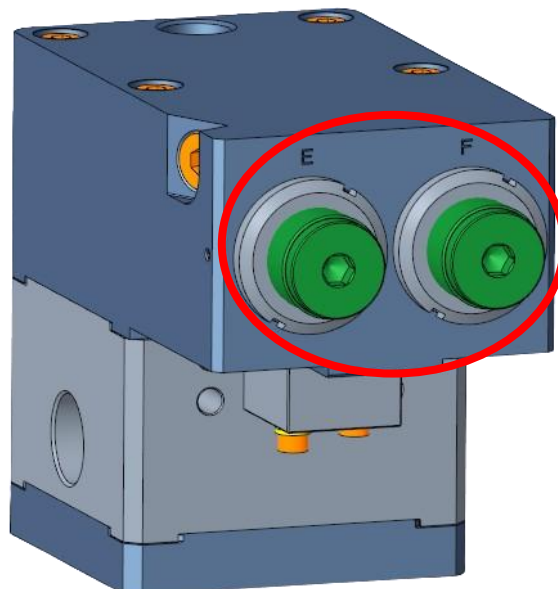


Figure 8: Machined BW - Bypass valve regulators

- For models **BW-xx-x2**: untight the stopping ring on the desired bypass and screw/unscrew until the desired position is reached. For these models, there is no need for a tool. The bypasses are mounted with an integrated key. Finally, secure the stopping ring so to avoid unwanted changes that could alter the performance during use.

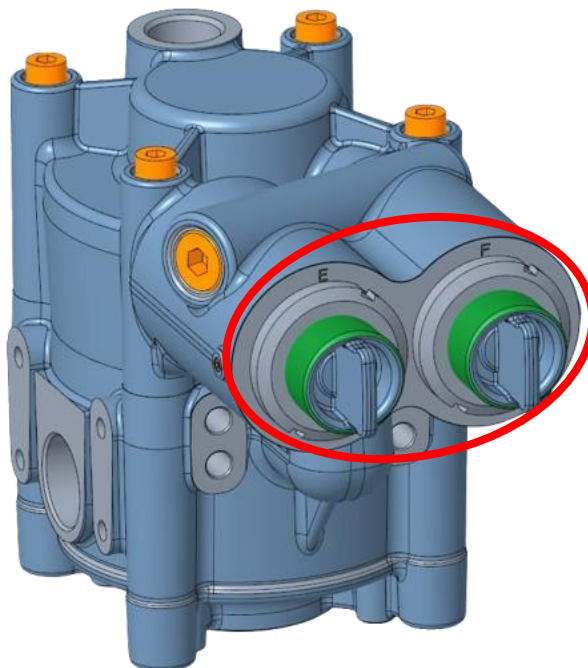


Figure 9: Cast BW - Bypass valve regulators

In order to setup the Ultra Volume Booster, the bypass valves should be first completely opened, meaning that they should be totally unscrewed.

Then the positioner can be configured according to the needs.

If the response of the BW accessory does not meet the requirement, close the bypass valve until the dynamic response in each direction reaches the required time.



Completely closing the bypass valves can cause hunting and overshooting, particularly for small steps.

6.2 CV REGULATION

6.2.1 Maximum supply CV regulation

In case a mechanical limitation of the maximum supply CV is required, the option “T - With Double Regulator” can be selected onto the BW-xx-x2 versions.

With this limiter, it is possible to mechanically limit the CV of the supply from the maximum to 0. To manipulate the CV, adjust the stem limiter positioned on top of the accessory. By using a wrench and unscrewing it, the maximum CV decreases.



By mechanically limiting the maximum supply CV to 0, the only supply of the BW accessory will be through the Bypass valve (F). If it is closed as well, the actuator will not be able to be supplied with the working fluid.

6.2.2 Maximum exhaust CV regulation

In case a mechanical limit of the maximum exhaust CV is required, select option "R – with Exhaust Regulator" for models BW-xx-x0 and BW-xx-x1 or select option "T - With Double Regulator" for models BW-xx-x2.

The screw on top allows for a customization of the exhaust CV. By screwing it in, the maximum exhaust CV reduces.



By mechanically limiting the maximum exhaust CV to 0, the only exhaust of the BW accessory will be through the Bypass valve (E). If it is closed as well, the actuator will not be able to exhaust.



For safety reasons, the locknut on the exhaust limiter must always be completely engaged during use.

If the option "T-With Double Regulator" or "R-With Exhaust Regulator" is selected, when regulating the CV, make sure to start from the position of maximum CV:

- Feed: completely screwed.
- Exhaust: completely unscrewed.

7. MAINTENANCE

7.1 PERIODIC INSPECTIONS



Take care that a build-up of dust or dirt on the product can inhibit cooling and contribute to increase surface temperature. The user should plan and provide for a periodic cleaning / maintenance program that will maintain the external surface of the accessory free from excessive layer of dust.
Operation and maintenance shall be carried out by skilled staff.

Product disassembling and reassembling shall be carried out only by IMI STI authorized operators.

7.2 SPECIAL MAINTENANCE

The product does not need special maintenance considering standard applications. If special maintenance is required, send back the device to IMI STI.

Product disassembling and reassembling shall be carried out only by IMI STI authorized operators.



For the available part lists of each accessory refer to 6.2 and subsequent paragraphs or contact imisti.sales@imi-critical.com or sti.support@imi-critical.com.

7.3 REPAIRS

Repairs shall be carried out by authorized operators. When needed, send back the device to IMI STI for any repairing.

Product disassembling and reassembling shall be carried out only by IMI STI authorized operators.



For the available part lists of each accessory refer to 6.2 and subsequent paragraphs or contact imisti.sales@imi-critical.com or sti.support@imi-critical.com.

8. TROUBLESHOOTING

Event	Possible cause	Remedy
Does not work properly	Lack of pneumatic supply	Check supply line
	Low supply pressure	Adjust supply pressure
	Uncorrected by-pass stem adjustment	See Instruction for the operator
	Defective internal component (shutter, piston, ecc.)	Call IMI STI S.r.l.
Hunting or overshooting	Incorrect bypass valve adjustment	See instruction for the operator
Leakages on pneumatic circuits	Deterioration and/or damage to gasket and/or loosed fittings	Call IMI STI S.r.l.
	Damage to fittings	Call IMI STI S.r.l.
Slow movement	CV regulator (feed or exhaust) is engaged. Applicable only if option T or T is selected	Regulate the CV. See chapter 6 of this manual.

Table 7: Troubleshooting

9. DECOMISSIONING

Subject	Hazardous	Recyclable	Disposal
Metals	No	Yes	Use licensed recyclers
Plastics	No	Yes	Use specialist recyclers
Rubber (seals and O-rings)	Yes	No	May require special treatment before disposal, use specialist waste disposal companies
Oil and grease	Yes	Yes	May require special treatment before disposal, use specialist waste disposal companies

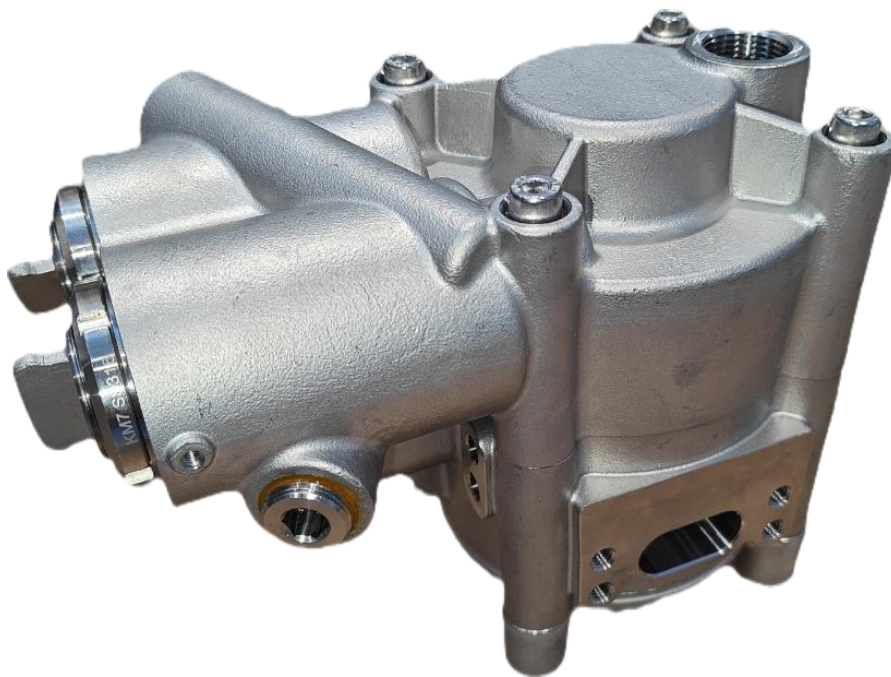
Table 8: Decomissioning

	Before starting any disassembly operations, it is mandatory to disconnect the pneumatic power and exhaust the product (no fluid under pressure inside the product, fittings, tubing). The staff must be qualified for the required operation.
	The product decommissioning shall be made by specialized operators. Check local authority regulation before disposal

BW

Ultra Volume Booster

ADDENDUM 1: ADDITIONAL SAFETY PRECAUTIONS



The Ultra Volume Booster (BW) accessory is ATEX certified under the following standards:

- DIRECTIVE 2014/34/UE.
- EN ISO 80079-36.
- EN ISO 80079-37.

According to the standards, the Ultra Volume Booster is marked as:

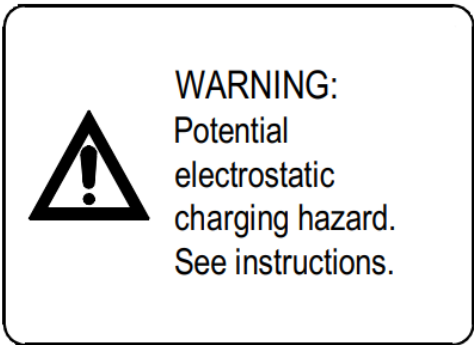
- Ex h IIB T6/T5/T4 Gb or Gc.
- Ex h IIC T6/T5/T4 Gb or Gc.

When certified, the product will be marked with the following label (or a similar one with the same information):

Ex h IIB T4/T5/T6 Gb or Gc	Ex h IIC T4/T5/T6 Gb or Gc
MODEL: SERIAL N°: Ta: °C to °C Ex h IIC 75°C(T6)/90°C(T5)/120°C(T4) Gb Deposit number X   II2G	

Some residual risks are present. Therefore, it is mandatory to follow the following instruction:

- The accessory must be grounded. This can be performed in two ways:
 - Ensuring electrical continuity between the product and the actuator upon which it is mounted on. The actuator must be properly grounded.
 - If available, by using one threaded hole to connect an earthing cable. The earthing cable shall be secured by employing proper means to avoid any unwanted unscrewing or rotation of the connector.
- For aluminium and stainless steel models, only if painting is requested, any charging mechanism stronger than manual rubbing must be avoided. When this must be respected, an additional label is positioned onto the casing:



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