



INSTRUCTIONS 1101-T00 e

Section	1101
Effective	January 2008
Replaces	New

Original instructions

Abaque dampeners



INSTALLATION

OPERATION

MAINTENANCE

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BLACKMER PERISTALTIC HOSE PUMP

SAFETY INSTRUCTIONS, INSTALLATION AND MAINTENANCE

MODÈLES : DAMPENERS



SAFETY INFORMATIONS



This is a SAFETY ALERT SYMBOL

When you see this symbol on the product, or in the manual, look for one of the following signal words and be alert to the potential for personal injury, death or major property damage.



Warns of hazards that WILL cause serious personal injury, death or major property damage



Warns of hazards that CAN cause serious personal injury, death or major property damage.



Warns of hazards that CAN cause personal injury or property damage.

NOTICE

Indicates special instructions which are very important and must be followed.

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1. SAFETY WARNINGS

This dampener should only be installed and used by experienced and trained professional mechanics. Observe all safety warnings. Read all safety warnings and operation manuals before using or repairing this Pulsation Dampener, Surge Suppressor or Suction Stabilizer (hereafter referred to as "dampener").

1.1 General safety

Observe these symbols in the operating and installation instructions :



The internal dampener pressure will equal the maximum fluid pressure of the system in which it is installed.

Do not exceed maximum pressure as stated on dampener tag. If tag is missing **DO NOT** use this dampener without consulting distributor or factory for maximum pressure rating.

Always make sure safety shut off valves, regulators, pressure relief valves, gauges etc. are working properly before starting system or assembly.

Verify model received against purchase order and shipper.

Before starting a system or assembly make certain the discharge point of the piping system is clear and safe, and all persons have been warned to stand clear.

Always wear protective safety glasses etc. when installing, charging or repairing this dampener.

Static spark can cause an explosion resulting in severe injury or death. Ground dampeners and pumping system when pumping flammable fluids.

DO NOT put your face or body near dampener when the system or assembly is operating or dampener is pressurized.

DO NOT operate a dampener that is leaking, damaged, corroded or otherwise unable to contain internal fluid, air or gas pressure.

DO NOT pump incompatible fluids through the dampener. Consult your distributor or the factory if you are not sure of the compatibility of the fluids with the dampener materials.

Dampeners, Suppressors and Stabilizers are designed to operate with compressed air or nitrogen. Other compressed gases have not been tested and may be unsafe to use in dampeners. **DO NOT USE OXYGEN !**

Bleed all pressure from system and dampener before removing equipment from the system.

ALWAYS shut off air supply, bleed internal dampener pressure and shut isolation valve before performing maintenance or repair on dampener.

NOTE : EC standard EN-13463-1 (ATEX) requires grounding (earthing) on dampeners when the potential for static sparking is present. A grounding point is located and marked on these dampeners.

1.2 Equipment misuse hazard

1.2.1 General Safety

Any misuse of this equipment, such as over-pressurization, modifying parts, incompatible chemicals, using worn or damaged parts or using gases other than air or nitrogen to charge dampener is not recommended. Any of these circumstances could result in serious bodily injury, death, fire, explosion or property damage.

1.2.2 Over-Pressurization

Never exceed the maximum operation pressure recommended for the dampener model being used. Maximum operation pressure is stated on tag. Unit pressure limits are stated at 70°F / 20°C.

1.2.3 Temperature Limits

Do not exceed the recommended operating temperatures for the shell and/or elastomer materials being used. Excessive temperature will result in dampener failure. Temperature limits are stated at zero psig / bar.

1.2.4 Installation and Start Up Hazards

Install dampener before charging or pressurizing. Do not start system or assembly without first charging or pressurizing dampener. Failure to charge may result in damage to the elastomeric bladder.

1.2.5 Temperature & Pressure Hazard

Temperature and pressure reduce the strength and chemical resistance of plastic, metal rubber and PTFE.

1.2.6 Charging / Pressurization

Charge or pressurize dampener with compressed air or nitrogen only. **Do Not use oxygen.**

1.2.7 Dampener Bladder Failure

Dampeners utilize an elastomeric membrane (bladder) or PTFE Bellows to separate system fluid from the air supply or gas charge. When this bladder ruptures, system fluid may be expelled from the air valve. Always perform preventive maintenance and replace elastomer before excessive wear occurs. O-rings with PTFE Bellows cannot be re-used.

1.2.8 Maintenance Hazards

Never over-tighten fasteners. This may cause leakage of system fluid and damage to dampener shell. Bolts should not be reused as repeated re-torquing reduces bolt strength.

IMPORTANT

AFTER MAINTENANCE OR RE-ASSEMBLY, TORQUE FASTENERS ACCORDING TO SPECIFICATION ON THE UNIT TAG.

2. INSTALLATION & OPERATION CHARGEABLE (C, CT & RC MODELS)

DAMPENER :	SUPPLIER :
SERIAL NUMBER _____	COMPANY _____
MODEL # : _____	CONTACT _____
DATE OF PURCHASE _____	PHONE _____
MATERIALS OF CONSTRUCTION :	FAX _____
BODY _____	E-MAIL _____
BLADDER _____	
PUMP AREA & NUMBER : _____	

TO READ BEFORE INSTALLATION

2.1 Installation

- To prevent pre-charge loss through the fill valve, **always** replace the cap after charging unit.
- If a system pressure test is to be performed, dampener must be charged with 80% of the system test pressure prior to test. This will avoid possible bladder damage.
- Blackmer recommends installing a pressure relief valve in all pump systems to ensure compliance with pressure limits on system equipment.
- Mount dampener as close to pump discharge, inlet and/or quick closing valve as possible, but within 10 pipe diameters.
- Temperature and pressure affect the strength and chemical resistance of plastic and rubber. Please consult factory for additional information.
- Remove all pressure from dampener unit **AND** pumping system before attempting maintenance.
- Do not exceed 150 PSI with plastic models; up to 300 PSI with CT units (all metal models excluding units with plastic nonwetted parts). **Check pressure rating shown on serial tag.**
- Always wear safety glasses when installing, charging or repairing dampeners units.
- Do not operate a dampener that is leaking, damaged, corroded or unable to hold internal fluid, air or gas pressure.
- Pre-charge dampener with compressed air or nitrogen only. **DO NOT USE OXYGEN.**
- **DANGER OF STATIC SPARK : GROUNDING PRECAUTIONS MUST BE CONSIDERED WHEN USED IN FLAMMABLE OR EXPLOSIVE ENVIRONMENTS.**

2.2 Installation for pump discharge pulsation

Step 1 - Installation Position

Install the dampener in-line, as close to the pump discharge as possible to absorb the pulse at its source. Install ahead of any downstream equipment such as risers, valves, elbows, meters, or filters. Dampener installation should be no more than ten pipe diameters from pump discharge. If using a flexible connector from pump to system piping, dampener should be installed at the pump discharge manifold. The flexible connector should be attached to the dampener's tee and system piping (see Figure 1). Since pressure is equal in all directions, dampener can be installed in a vertical, horizontal, or upside-down position. Blackmer recommends a vertical installation for better draining of the unit. Limitations for horizontal and upside-down mounting include high specific gravity, high viscosity, settling of solid material, or possible air entrapment, which could result in shortened bladder life and/or poor dampening performance.

Step 2 - Air Line Connection

Chargeable models do not require an air line connection. Units must be pre-charged with compressed air or Nitrogen, using a hand pump, tank/bottle or compressor. **DO NOT USE OXYGEN.** Charging hose kits are available.

Step 3 - Charging and Start Up - See § PRE-CHARGE NOTES

Prior to starting the pump, pre-charge dampener with compressed air or Nitrogen to approximately 80% of expected system pressure and replace fill valve cap. **DO NOT USE OXYGEN.** The gas pre-charge must always be lower than pump discharge pressure. Generally, pulsation is most effectively minimized when the gas charge is 80% of system pressure. Start the pump to generate system pressure.

NOTE :

Once system pressure is in contact with the bladder, the gas charge will be compressed to the system pressure and the dampener gauge will read the system pressure, not the initial charge pressure. Once working pressure is achieved, adjustment may be necessary. Gradually increase or decrease the gas charge in the dampener by bleeding or filling through the gas valve. Allow the system to respond to each adjustment (this may take a minute or two) before making further adjustments.

2. INSTALLATION & OPERATION

CHARGEABLE (C, CT & RC MODELS) (continued)

2.3 Installation for pump inlet

Step 1 - Installation Position

Install dampener as close to the pump inlet as possible. Install after any upstream equipment such as risers, valves, elbows, meters, or filters. If using a flexible connector from system piping to pump, dampener should be installed to the pump inlet manifold. The flexible connector should be attached to the dampener tee and system piping (see Figure 1).

Step 2 - Air Line Connection

Chargeable models do not require an air line connection. Units must be pre-charged with compressed air or Nitrogen, using a hand pump, tank/bottle or compressor. **DO NOT USE OXYGEN.** Charging hose kits are available.

Step 3 - Charging and Start Up - See § PRE-CHARGE NOTES

- A. Suctions Lift/Accumulator : No pre-charge is required in a lift/accumulator installation. Start the pump to generate working pressure. As system pressure and vacuum is created, the acceleration head created with each suction stroke will compress the air trapped in the bladder. For better inlet stabilization, a dampener "J" Model is recommended.
- B. Positive Inlet Pressure : Pre-charge dampener with 50% of the static pressure realized at the pump inlet. Start the pump to generate working pressure. Minor pressure adjustments may be required. Allow the system to respond to each adjustment (this may take a minute or two) before making further adjustments.

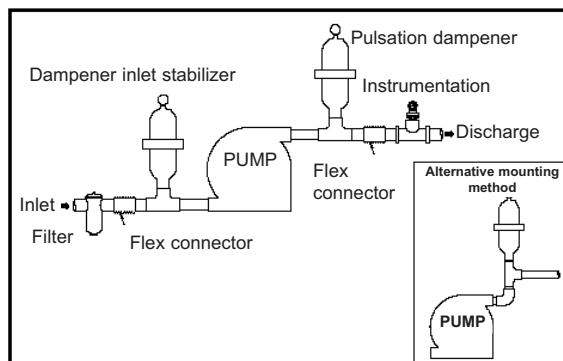


Figure 1

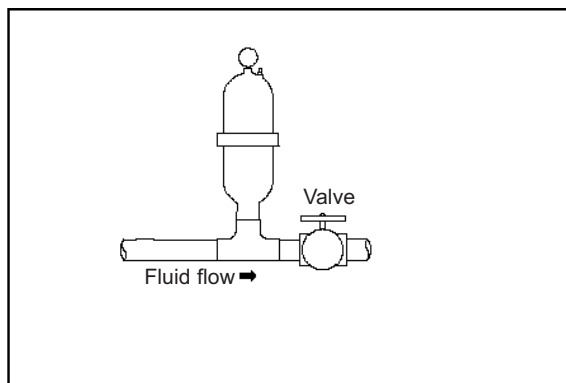


Figure 2

2.4 Installation for water hammer / surge

Step 1 - Installation Position

Install dampener up stream from valve, as close as possible but no more than ten pipe diameters from the valve (see Figure 2).

Step 2 - Air Line Connection

Chargeable models do not require an air line connection. Units must be pre-charged with compressed air or Nitrogen, using a hand pump, tank/bottle or compressor. **DO NOT USE OXYGEN.** Charging hose kits are available.

Step 3 - Charging and Start Up – See § PRE-CHARGE NOTES

Prior to operating system, pre-charge dampener to 90% of system pressure and replace fill valve cap. Start the system.

2.5 Pre-charge notes

Gas molecules will diffuse through elastomer membranes, the speed of which depends on elastomer material, temperature and pressure. As a rule of thumb, the pre-charge pressure should be checked every month. Checks must occur when no system pressure is present or inaccurate readings will be recorded. If temperature is above ambient and/or pressure is over 300 PSI, checks should be performed more frequently. **Also, to prevent pre-charge loss through the fill valve, always replace the cap after charging.** A proper gas charge is the key to dampener effectiveness and bladder life.



IMPORTANT : AFTER MAINTENANCE OR RE-ASSEMBLY, TORQUE FASTENERS ACCORDING TO SPECIFICATION ON THE UNIT TAG.

Standard Product Warranty : Blackmer warrants its products to be free of defective material and workmanship under normal use and service for two years from date of shipment. The remedy for any product defect covered under this warranty shall be limited to the replacement or repair of the defective part or parts and Blackmer will not be responsible for damages or injury caused to other products, machinery, buildings, property or person. This warranty shall be null and void if the product has been altered, misapplied, misused, or neglected of maintenance. Damage or loss resulting from over-pressurization of a product, whether from gas or fluid does not constitute a defect covered under this warranty nor will Blackmer be responsible in any way for any such damage or loss. Because Blackmer cannot anticipate or control the many different conditions under which its products may be used, Blackmer does not guarantee the applicability or suitability of its products for any particular use or purpose. Each user of Blackmer products should conduct its own tests to determine the suitability of each product for its intended uses or purposes.

Blackmer products are sold with this limited warranty and each buyer assumes all responsibility for loss or damage, including consequential damage, arising from the handling and use of Blackmer products whether used in accordance with Blackmer's directions or otherwise. Statements concerning the possible use of Blackmer products are not intended as recommendations for any specific use of such products. This Standard Product Warranty shall be governed by and construed in accordance with the laws in France.

3. MAINTENANCE & TROUBLESHOOTING

3.1 Preventative maintenance

Pulsation Dampeners require very little maintenance. The rubber bladder or PTFE bellows is the only wear part of the unit.

Bladder replacement should be part of the system preventive maintenance program. Bladder life is a function of many variables. Normal life can be from a few months to several years depending upon usage, proper charge and dampener size, system design, and/or the harshness of the process fluid and application temperature.

Dampeners units used in conjunction with diaphragm pumps should have the rubber bladders replaced at least every second time the diaphragms in the pump are replaced. This does not apply to PTFE bellows. As with any pumping system, component wear is dependent upon many factors; therefore, this suggested maintenance program might need to be adjusted based upon specific applications.

Periodic inspection of units should be as follows :

1. Dampeners housings and fasteners should be inspected for signs of over pressurization, stress, fatigue, corrosion, or UV attack. Housings and fasteners must be replaced at the first indication of deterioration.
2. Fastener tightness should be checked before initial startup. Consult factory for torque specifications.
3. Fasteners on metal units should be replaced at each reassembly.
4. Check the gas precharge in the unit while no system pressure is present. If system pressure is present, the gauge will display system pressure, NOT the precharge pressure.
5. Check the unit pressure gauge during operation. If the dampener is properly charged, the gauge needle should be fluctuating with each pump discharge stroke. Replace the gauge if needed.
6. Adjust the regulator on adjustable models to insure maximum dampening. Replace the selfrelieving regulator if needed.

3.2 Effective dampening tips

The primary factors that determine the level of dampening obtained with a dampener are capacity, location, and the pressure charge.

3.2.1 Capacity

The dampener must be properly sized so that the volume of compressed gas inside is enough to absorb fluid shock, and also enough liquid volume capacity to accumulate the fluid pulse. A key element of effective dampening is the relationship of the gas charge to the fluid volume necessary for the pressure range required. An undersized dampener will result in insufficient dampening and can lead to excessive bladder wear and early failure.

The capacity of a pulsation dampener must be in the correct ratio to the volume per stroke of the pump and the number of pump heads. The larger the ratio is, the higher the level of dampening will be. For an Air Operated Diaphragm Pump the ratio between the dampener capacity and the pump stroke volume should be from 1.5:1 to 5:1, based upon the level of dampening required. For a metering pump the ratio is 10:1 to 30:1, based upon the level of dampening required.

3.2.2 Location

Location is important because of wave frequency and fluid dynamics. Location directly effects dampener performance. The pulsation dampener should be installed as close as possible to the pump discharge and no further away than 10 pipe diameters. Installation should be on a tee in the fluid flow path. Do not install the dampener on a branch or riser. The farther away the dampener inlet is from the pump discharge, the less effective the unit will be.

A dampener installed on a riser or deadend leg of pipe can actually increase pulsation. A pulse traveling toward the dampener has another pulse directly behind it. When the first pulse is reversed after contact with the dampener, it crashes into the next pulse disrupting the entire wave sequence. This action can change the system's fluid harmonics, which may lead to increased pulsation

3.2.3 Charge

The compressed gas charge applied to any dampener will vary with each application and can have a significant effect on performance. To properly charge the unit, an accurate reading of the system fluid pressure is required. A pressure gauge should be installed on the system piping downstream from the unit. Any time the gas charge is equal to or greater than the system pressure, the dampener will not function properly. An over charged unit will force the internal bladder down, covering the inlet port – shutting off the dampener.

3.3 Troubleshooting

3.3.1 No dampening or insufficient dampening effect

1. Check the location of the dampener. Dampeners should be mounted within 10 pipe diameters of the pump discharge on a tee in the fluid flow path. The use of elbows and risers will decrease dampener performance.
2. Check the capacity of the dampener in relation to the pump stroke volume. An undersized dampener will decrease dampener performance and shorten bladder life.
3. Check the discharge head. Dampeners do perform better under a little discharge pressure (at least 5 psi). A slow stroking pump may not be filling the discharge pipe completely, creating zero discharge head between strokes. A slight discharge head can be created with a ball valve or back pressure valve.
4. Check for bladder failure. Replace bladder.
5. Check the dampener inlet fluid port for any blockage or restriction.

3. MAINTENANCE & TROUBLESHOOTING (continued)

3.3.2 Leaking fluid or air

1. All plastic and PTFE components take an initial set after manufacture. The fasteners may need tightening. Consult factory for torque specifications.
2. Check the air controls and gauge threads for an airtight seal. Tighten if needed. Consult factory for torque specifications.
3. Check the ring flange or clamp band bolts for proper torque. Tighten if needed. Consult factory for torque specifications.
4. Check for a bladder rupture. Replace the bladder if it has failed.

3.3.3 Bladder rupture or failure



IF A SYSTEM PRESSURE TEST IS TO BE PERFORMED, THE UNIT MUST BE CHARGED WITH 80% OF THE SYSTEM TEST PRESSURE PRIOR TO THE TEST. FAILURE TO CHARGE THE DAMPENER CAN CAUSE BLADDER FAILURE.

1. Chemical Attack
Swelling, hardening, and distortion are some of the indications of chemical attack. Check the chemical compatibility charts. Consult factory for assistance.
2. Cut Bladder
Check for a sharp object that may have been introduced into the dampener through the pumped fluid.
3. Torn Bladder
 - Check for an insufficient air charge in the dampener. Properly charge the unit for the application.
 - Check for a transient highpressure spike created by pump start up, pump shut down, vertical pipe runs, or a quick closing valve, all of which can destroy a bladder. A Surge Suppressor should be installed at the location where a pressure spike originates.
4. Excessive Bladder Wear
 - Check the size of the unit. An undersized unit does not have the capacity to absorb the volume of the pump stroke, forcing the bladder to be overworked.
 - Check the air charge in the unit. An undercharged unit will cause the bladder to rub excessively and wear against the body housing.

4. PARTS LIST AND EXPLODED VIEW

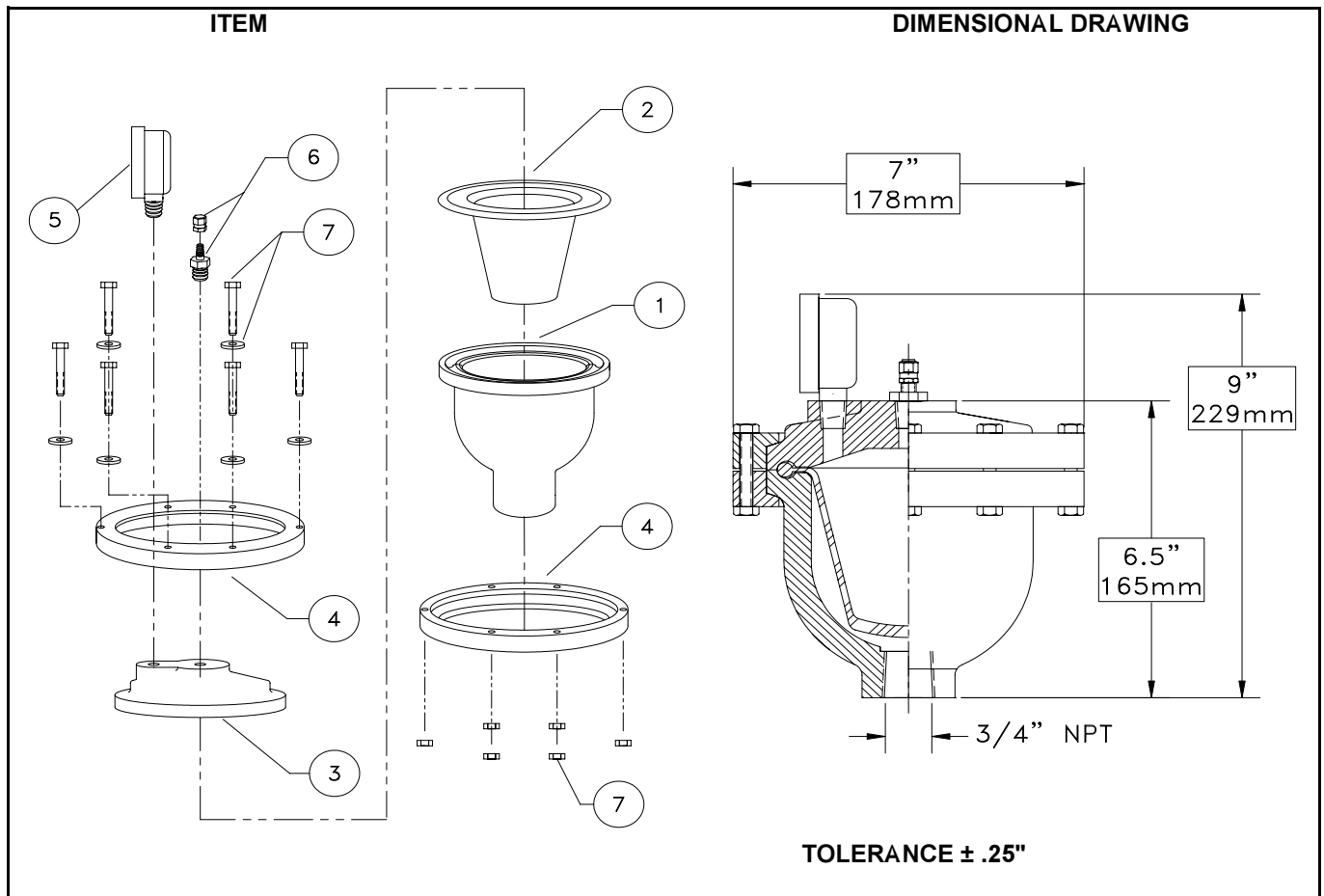
4.1 Maxi pressure : 10 bar

4.1.1 - A10 pump

BLACKMER REF #:	225487
MAXIMUM PRESSURE:	150 PSI/10 BAR
CAPACITY:	36 CUBIC INCHES/.59 LITERS
WETTED HOUSING:	PVDF
NONWETTED HOUSING:	GLASS FILLED POLYPROPYLENE
BLADDER:	EPDM
INLET:	3/4" FNPT
AIR CONTROL:	CHARGEABLE

DESCRIPTION				
ITEM	PART #	QTY	Component	Material
1	401-27	1	Wetted Housing	PVDF
2	401-28	1	Bladder	EPDM
3	301-33	1	Nonwetted Housing	Glass Filled Polypropylene
4	102-51	1	Ring Band Assy	Aluminum (Includes Fastener Assy)
5	101-33	1	Gauge	Plastic, Brass, Bronze
6	101-70	1	Fill Valve	Brass
7	109-51	1	Fastener Assy	Stainless Steel

12/28/2005



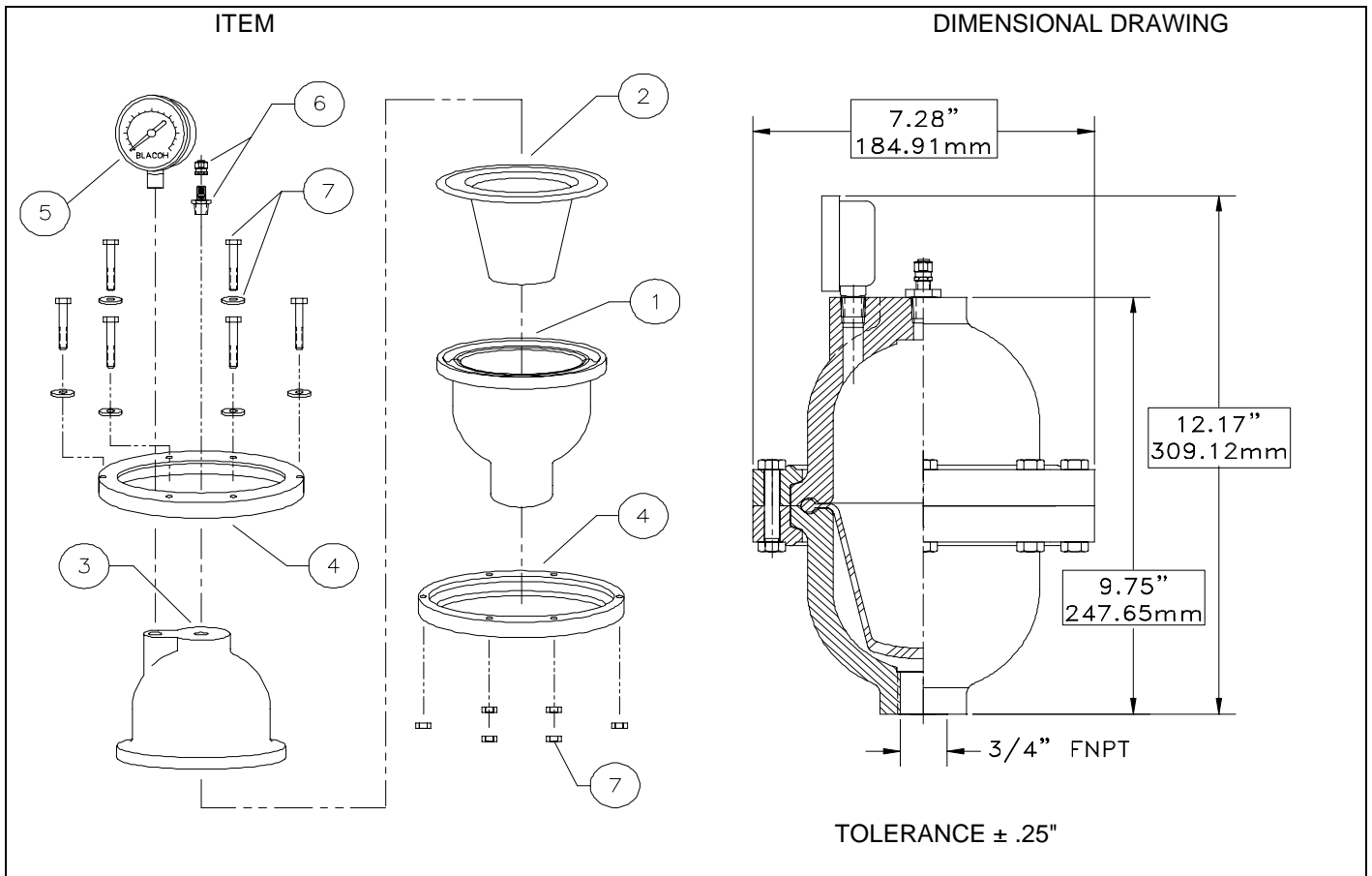
4. PARTS LIST AND EXPLODED VIEW (continued)

4.1.2 - A20 / A25 pumps

BLACKMER REF #:	225489
MAXIMUM PRESSURE:	150 PSI/10 BAR
CAPACITY:	85 CUBIC INCHES/1.39 LITERS
WETTED HOUSING:	PVDF
NONWETTED HOUSING:	GLASS FILLED POLYPROPYLENE
BLADDER:	EPDM
INLET:	3/4" FNPT
AIR CONTROL:	CHARGEABLE

		DESCRIPTION		
ITEM	PART #	QTY	Component	Material
1	401-42	1	Wetted Housing	PVDF
2	401-28	1	Bladder	EPDM
3	301-24	1	Nonwetted Housing	Glass Filled Polypropylene
4	102-51	1	Ring Band Assy	Anodized Aluminum (Includes Fastener Assy)
5	101-33	1	Gauge	Plastic, Brass, Bronze
6	101-70	1	Fill Valve	Brass
7	102-26H	1	Fastener Assy	Stainless Steel

10/5/2007



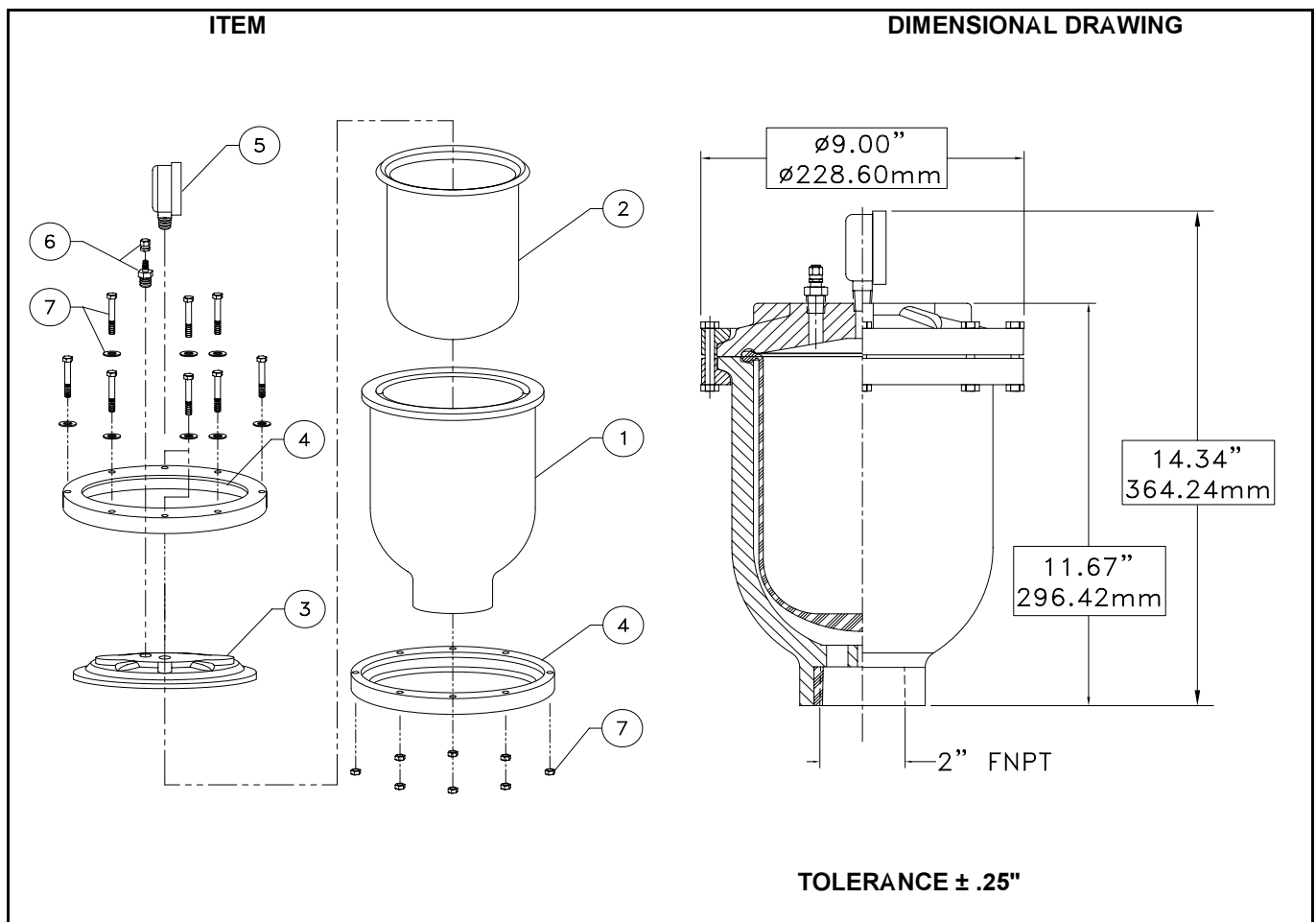
4. PARTS LIST AND EXPLODED VIEW (continued)

4.1.3 - A40 / AX40 pumps

BLACKMER REF #:	225491
MAXIMUM PRESSURE:	150 PSI/10 BAR
CAPACITY:	175 CUBIC INCHES/2.86 LITERS
WETTED HOUSING:	PVDF
NONWETTED HOUSING:	GLASS FILLED NORYL
BLADDER:	EPDM
INLET:	2" FNPT
AIR CONTROL:	CHARGEABLE

DESCRIPTION				
ITEM	PART #	QTY	Component	Material
1	201-27	1	Wetted Housing	PVDF
2	201-28	1	Bladder	EPDM
3	141-43	1	Nonwetted Housing	Glass Filled Noryl
4	103-26	1	Ring Band Assy	Anodized Aluminum (Includes Fastener Assy)
5	101-33	1	Gauge	Plastic, Brass, Bronze
6	101-70	1	Fill Valve	Brass
7	109-26	1	Fastener Assy	Stainless Steel

6/15/2006



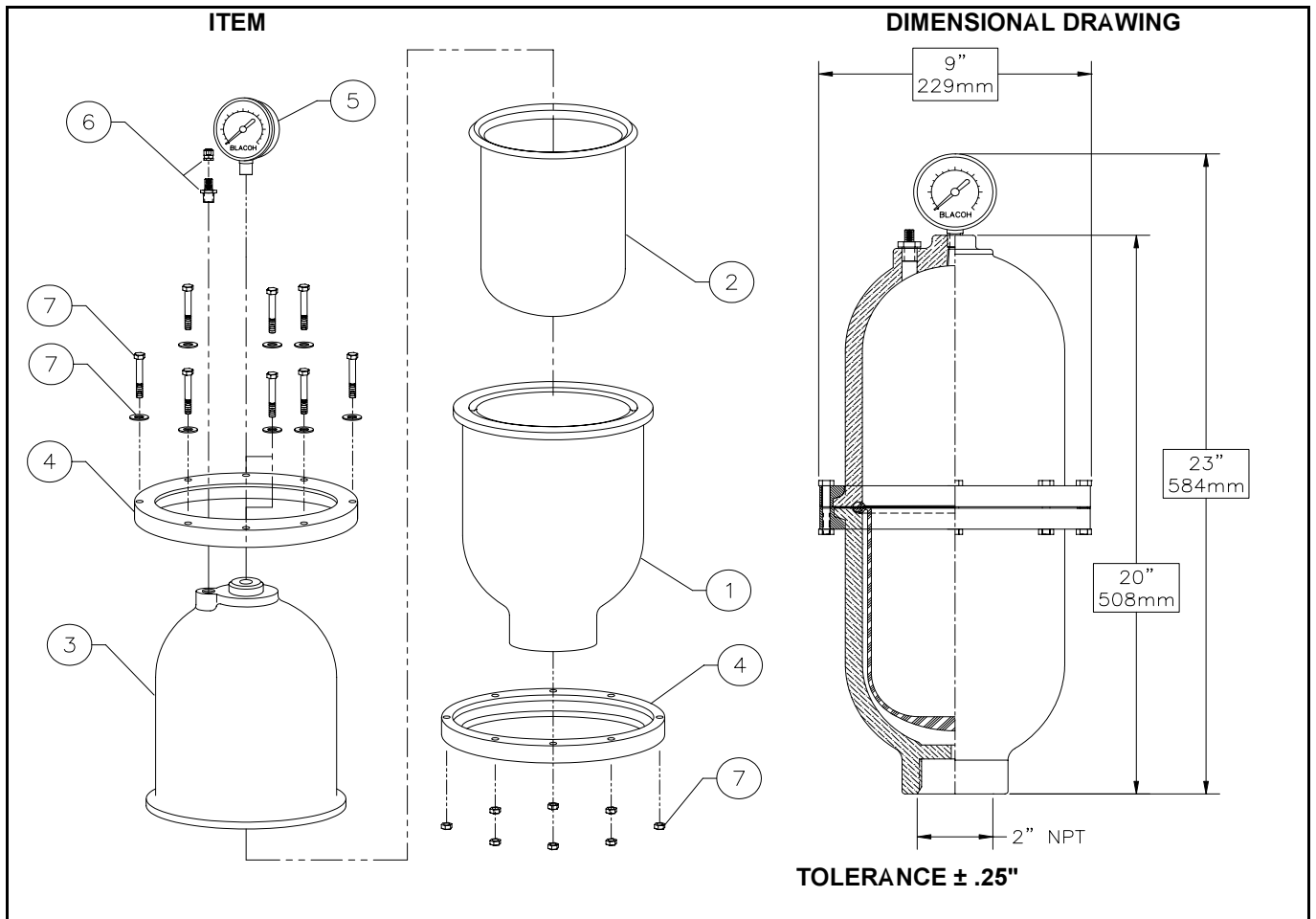
4. PARTS LIST AND EXPLODED VIEW (continued)

4.1.4 - A65 pump

BLACKMER REF #:	225493
MAXIMUM PRESSURE:	150 PSI/10 BAR
CAPACITY:	370 CUBIC INCHES/6.06 LITERS
WETTED HOUSING:	PVDF
NONWETTED HOUSING:	GF POLYPROPYLENE
BLADDER:	EPDM
INLET:	2" NPTF
AIR CONTROL:	CHARGEABLE

DESCRIPTION				
ITEM	PART #	QTY	Component	Material
1	201-27	1	Wetted Housing	PVDF
2	201-28	1	Bladder	EPDM
3	101-24	1	Nonwetted Housing	GF Polypropylene
4	102-26	1	Ring Band Assembly	Anodized Aluminum (Includes Item 7)
5	101-33	1	Gauge	Plastic, Brass, Bronze
6	101-70	1	Fill Valve	Brass
7	109-26	1	Bolt Assembly	Stainless Steel

GF=GLASS FILLED



4. PARTS LIST AND EXPLODED VIEW (continued)

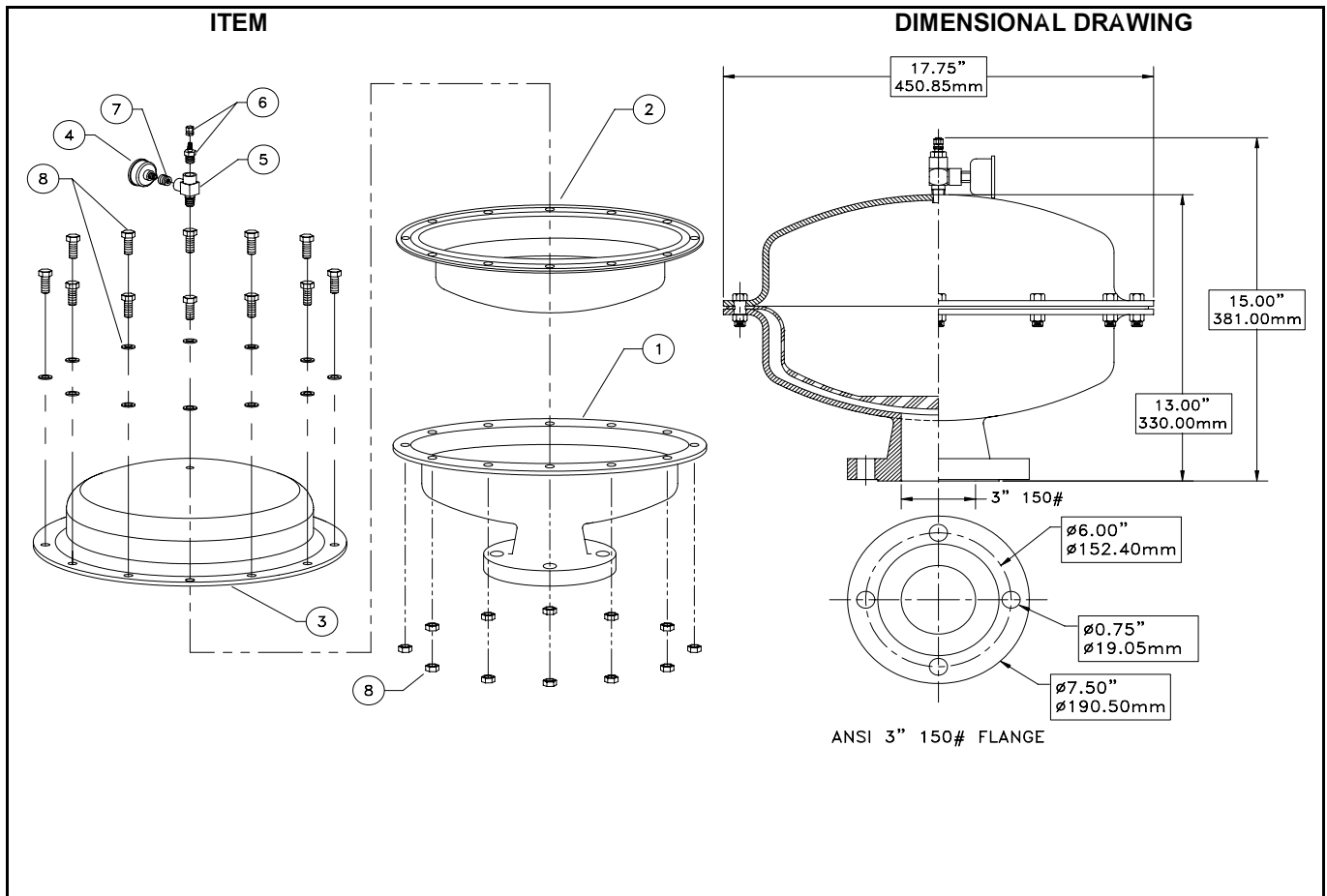
4.1.5 - A80 /AX80 pumps - Epoxy coated carbon steel body

BLACKMER REF #:	225495
MAXIMUM PRESSURE:	150 PSI/10 BAR
CAPACITY:	5 GALLONS/18.93 LITERS
WETTED HOUSING:	EPOXY COATED CARBON STEEL
NONWETTED HOUSING:	EPOXY COATED CARBON STEEL
BLADDER:	EPDM
INLET:	3" 150# CLASS FLANGE
AIR CONTROL:	CHARGEABLE

5/8/2003

DESCRIPTION				
ITEM	PART #	QTY	Component	Material
1	4045-27	1	Wetted Housing	Epoxy Coated Carbon Steel
2	4000-28	1	Bladder	EPDM
3	4045-24	1	Non-wetted Housing	Epoxy Coated Carbon Steel
4	101-20	1	Gauge	Plastic
5	101-46	1	Tee	Steel
6	101-71	1	Fill Valve	Stainless Steel
7	1000-42	1	Bushing	Steel
8	4020-47	1	Fastener Kit	Stainless Steel

5/8/2003



4. PARTS LIST AND EXPLODED VIEW (continued)

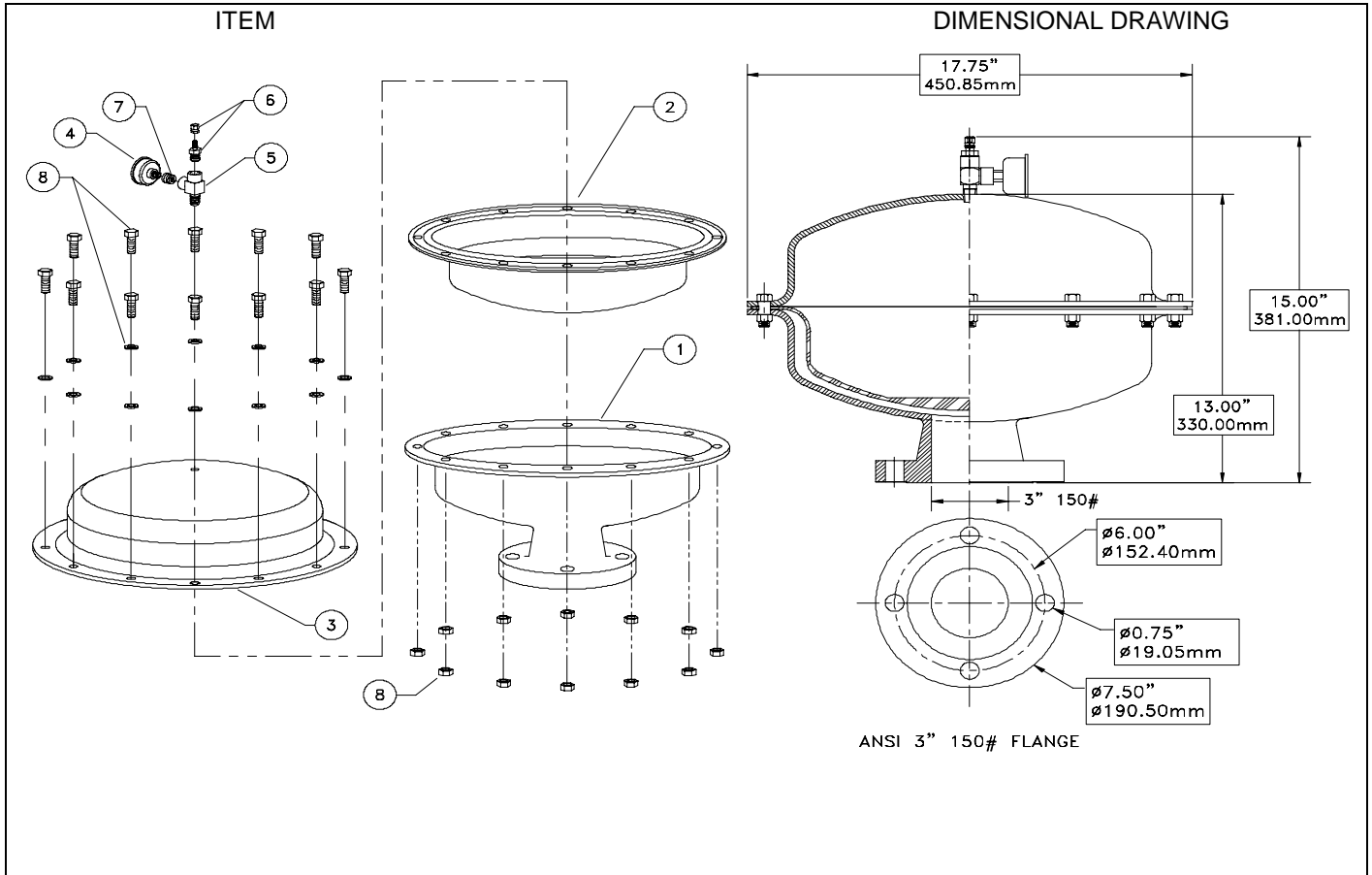
4.1.6 - A80 /AX80 pumps - Stainless steel body

BLACKMER REF #:	225496
MAXIMUM PRESSURE:	150 PSI/10 BAR
CAPACITY:	5 GALLONS/18.93 LITERS
WETTED HOUSING:	316L STAINLESS STEEL
NONWETTED HOUSING:	316L STAINLESS STEEL
BLADDER:	EPDM
INLET:	3" 150# RAISED FACE FLANGE
AIR CONTROL:	CHARGEABLE

8/11/2006

		DESCRIPTION		
ITEM	PART #	QTY	Component	Material
1	4020-27	1	Wetted Housing	316L Stainless Steel
2	4000-28	1	Bladder	EPDM
3	4020-24	1	Non-wetted Housing	316L Stainless Steel
4	101-20	1	Gauge	Plastic, Brass, Bronze
5	101-46	1	Tee	Steel
6	101-71	1	Fill Valve	Stainless Steel
7	1000-42	1	Bushing	Steel
8	4020-47	1	Fastener Assy	Stainless Steel

8/11/2006

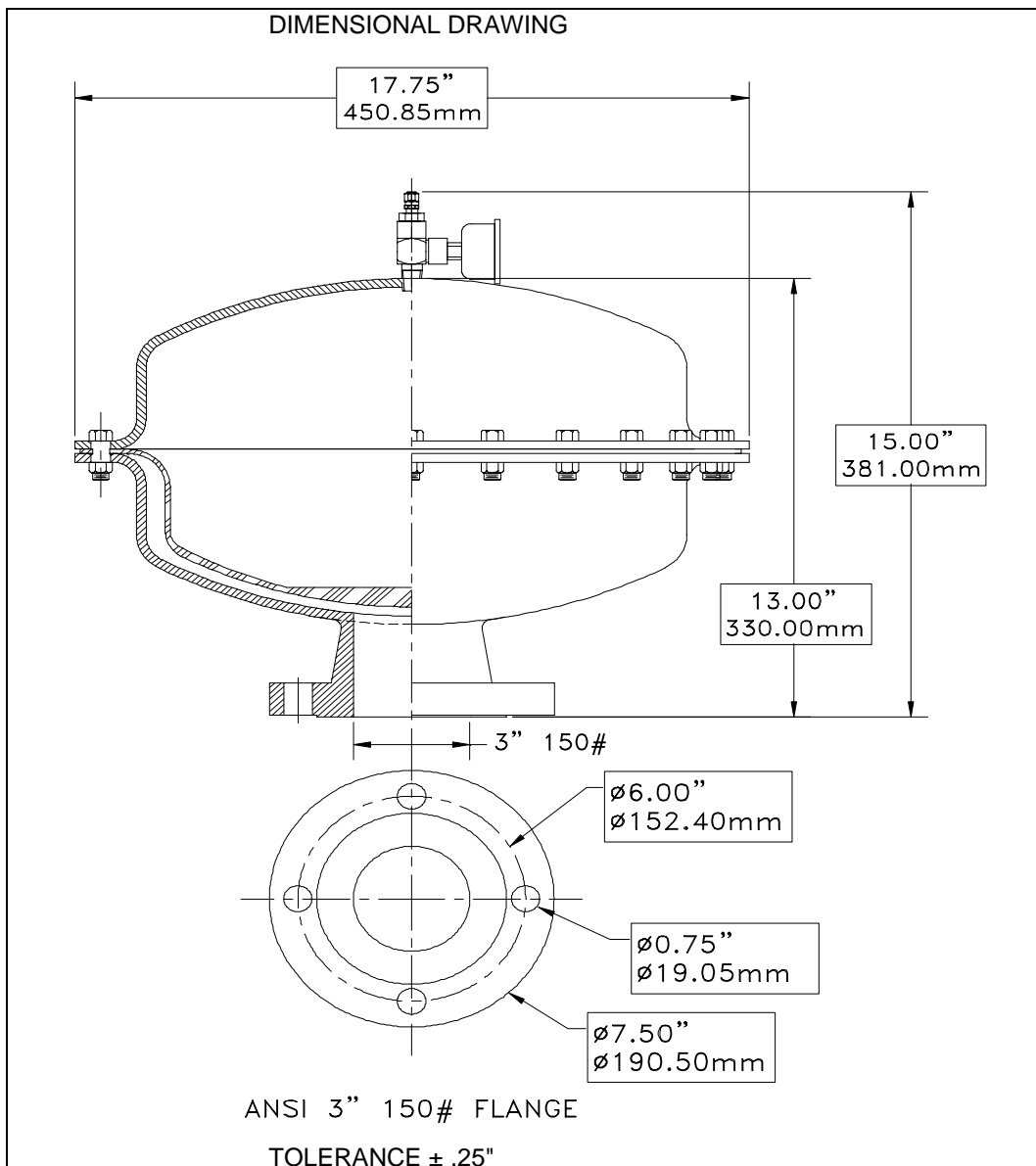


4. PARTS LIST AND EXPLODED VIEW (continued)

4.2 Maxi pressure : 18 bar

4.2.1 - A80 /AX80 pumps - Epoxy coated carbon steel body

BLACKMER REF #:	225497
MAXIMUM PRESSURE:	275 PSI/18.96 BAR
CAPACITY:	5 GALLONS/18.93 LITERS
WETTED HOUSING:	EPOXY COATED CARBON STEEL
NONWETTED HOUSING:	EPOXY COATED CARBON STEEL
BLADDER:	EPDM
INLET:	3" 150# RAISED FACE FLANGE
AIR CONTROL:	CHARGEABLE



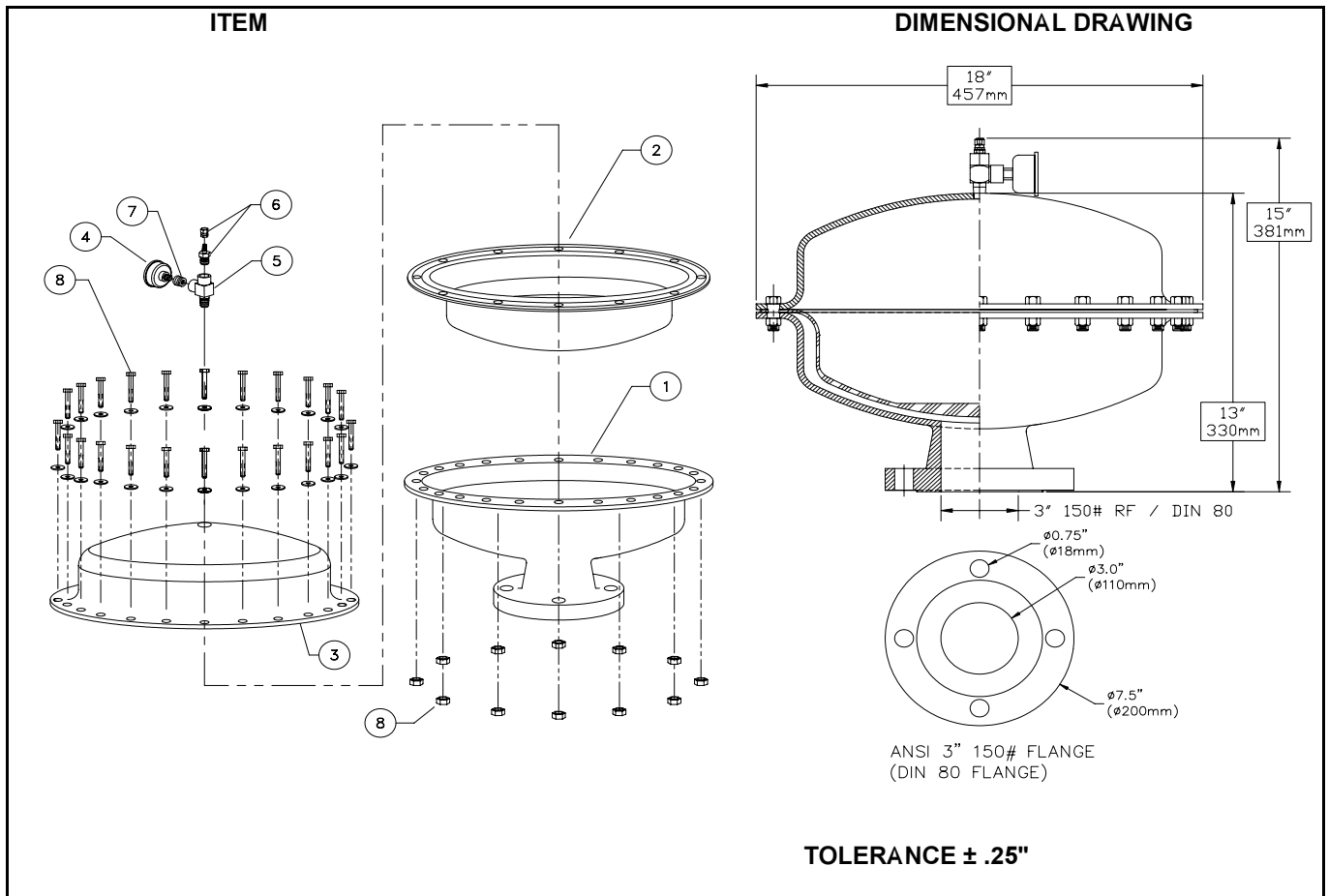
4. PARTS LIST AND EXPLODED VIEW (continued)

4.2.2 - A80 /AX80 pumps - Stainless steel body

BLACKMER REF #:	225498
MAXIMUM PRESSURE:	275 PSI/18.96 BAR
CAPACITY:	5 GALLONS/18.93 LITERS
WETTED HOUSING:	316 STAINLESS STEEL
NONWETTED HOUSING:	316 STAINLESS STEEL
BLADDER:	EPDM
INLET:	3" 150# RAISED FACE FLANGE
AIR CONTROL:	CHARGEABLE

DESCRIPTION				
ITEM	PART #	QTY	Component	Material
1	4020-27-24	1	Wetted Housing	316 Stainless Steel
2	231-028	1	Bladder	EPDM
3	4020-24-24	1	Nonwetted Housing	316 Stainless Steel
4	G22	1	Gauge	Stainless Steel / Brass / Bronze
5	101-46	1	Tee	Steel
6	101-71	1	Fill Valve	Stainless Steel
7	1000-42	1	Bushing	Galvanized Steel
8	4020-50	1	Fastener Assy	Stainless Steel

4/16/2004



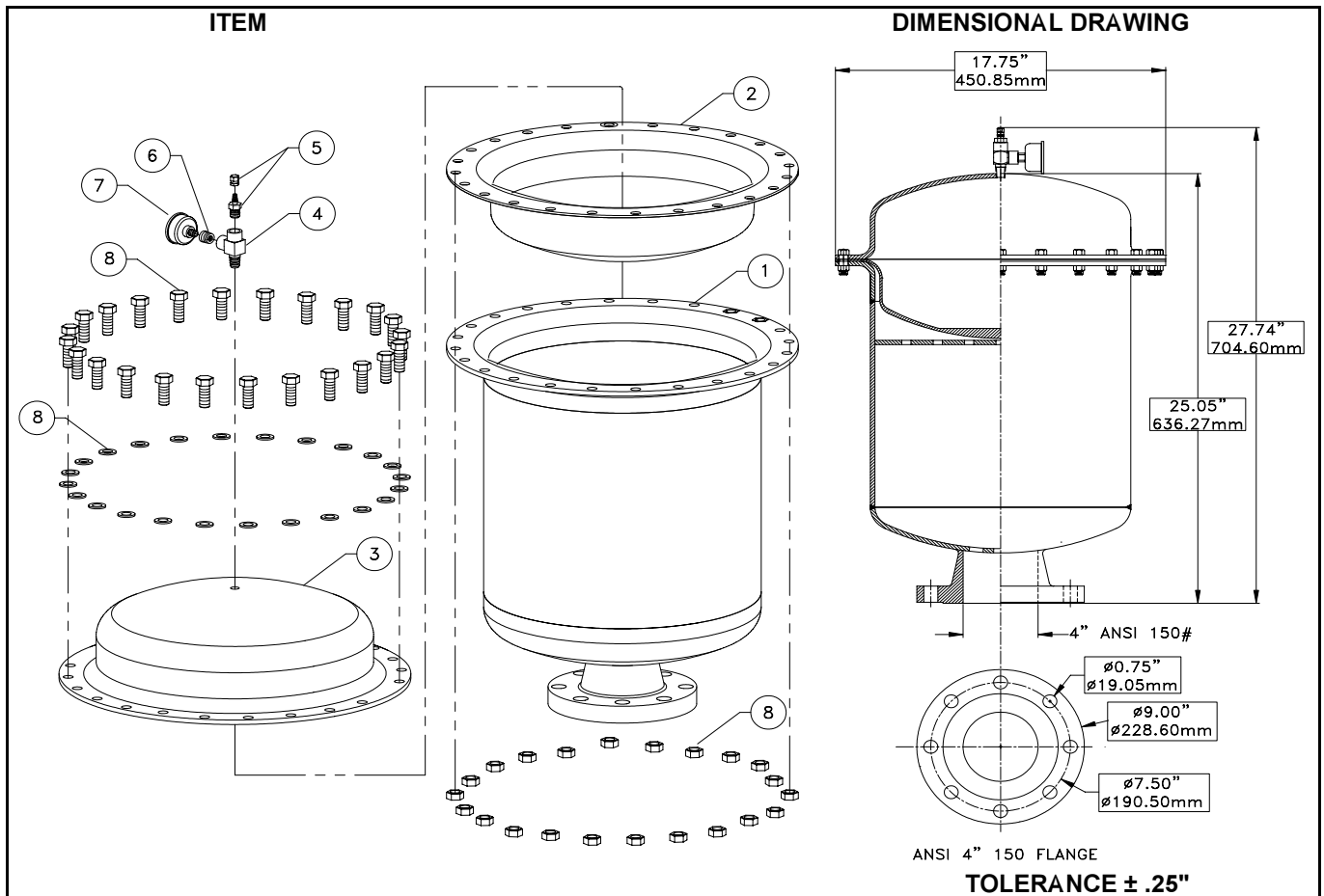
4. PARTS LIST AND EXPLODED VIEW (continued)

4.3.2 - A100 / AS125 pumps - Stainless steel body

BLACKMER REF #:	225500
MAXIMUM PRESSURE:	250 PSI/17.23 BAR
CAPACITY:	10 GAL /37.85 LITERS
WETTED HOUSING:	316 STAINLESS STEEL
NONWETTED HOUSING:	316 STAINLESS STEEL
BLADDER:	EPDM
INLET:	4" 150# RAISED FACE FLANGE
AIR CONTROL:	CHARGEABLE

DESCRIPTION				
ITEM	PART #	QTY	Component	Material
1	5420-27	1	Wetted Housing	316 Stainless Steel
2	231-028	1	Bladder	EPDM
3	4020-24-24	1	Nonwetted Housing	316 Stainless Steel
4	101-46	1	Tee	Steel
5	101-71	1	Fill Valve	Stainless Steel
6	1000-42	1	Bushing	Galvanized Steel
7	G38	1	Gauge	Stainless Steel, Brass
8	4020-50	1	Fastener Assy	Stainless Steel

2/15/2006



4. PARTS LIST AND EXPLODED VIEW (continued)

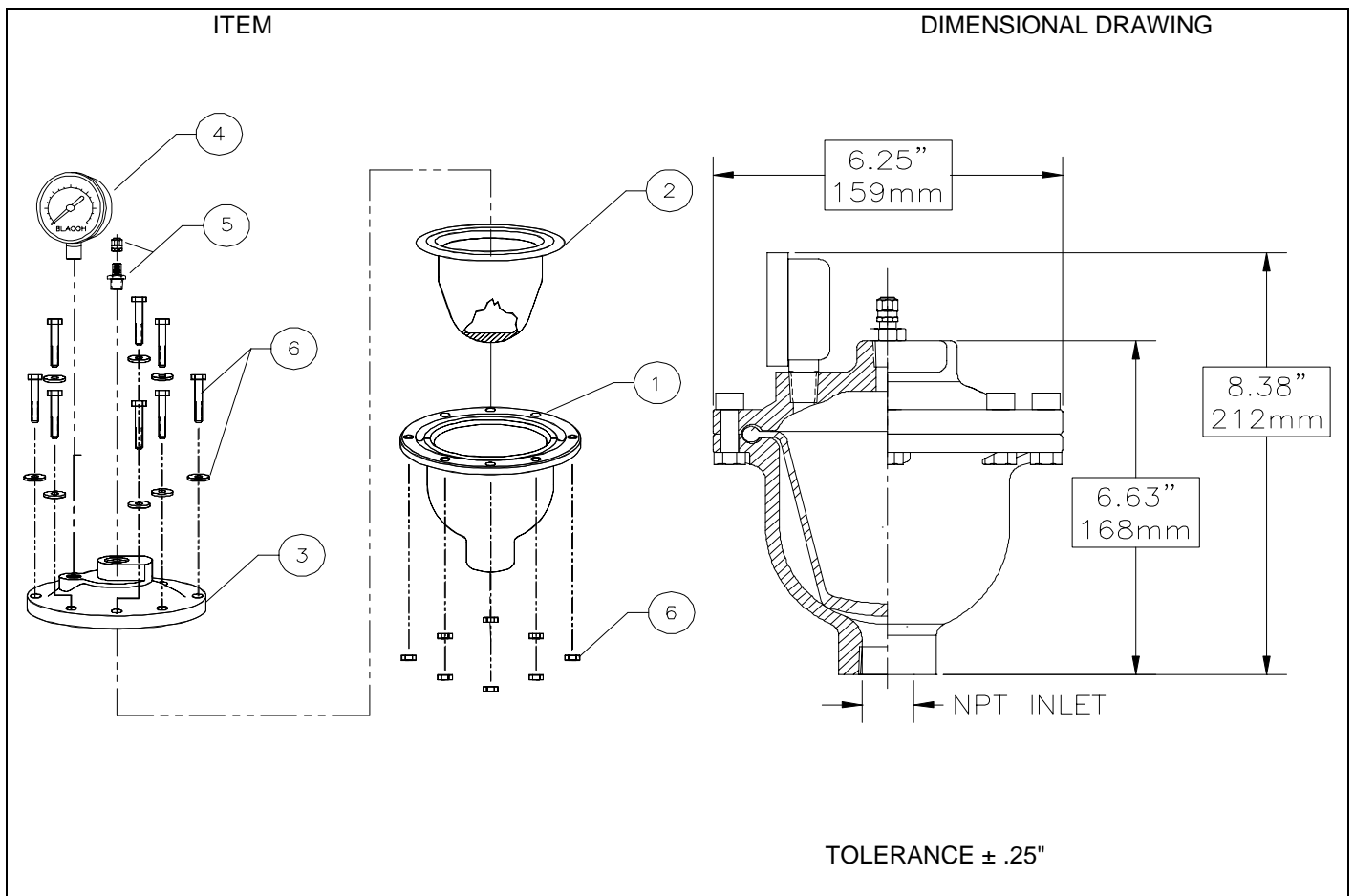
4.4 Maxi pressure : 20 bar

4.4.1 - A10 pump

BLACKMER REF #:	225488
MAXIMUM PRESSURE:	300 PSI/20.5 BAR
CAPACITY:	36 CUBIC INCHES/0.589 LITERS
WETTED HOUSING:	316L STAINLESS STEEL
NONWETTED HOUSING:	316L STAINLESS STEEL
BLADDER:	EPDM
INLET:	3/4" FNPT
AIR CONTROL:	CHARGEABLE

DESCRIPTION				
ITEM	PART #	QTY	Component	Material
1	2901-27	1	Wetted Housing	316L Stainless Steel
2	402-28	1	Bladder	EPDM
3	2901-33	1	Nonwetted Housing	316L Stainless Steel
4	G40	1	Gauge	SS/Brass/Bronze
5	101-71	1	Fill Valve	Stainless Steel
6	2924-00	1	Fastener Assy	Stainless Steel

5/20/2005



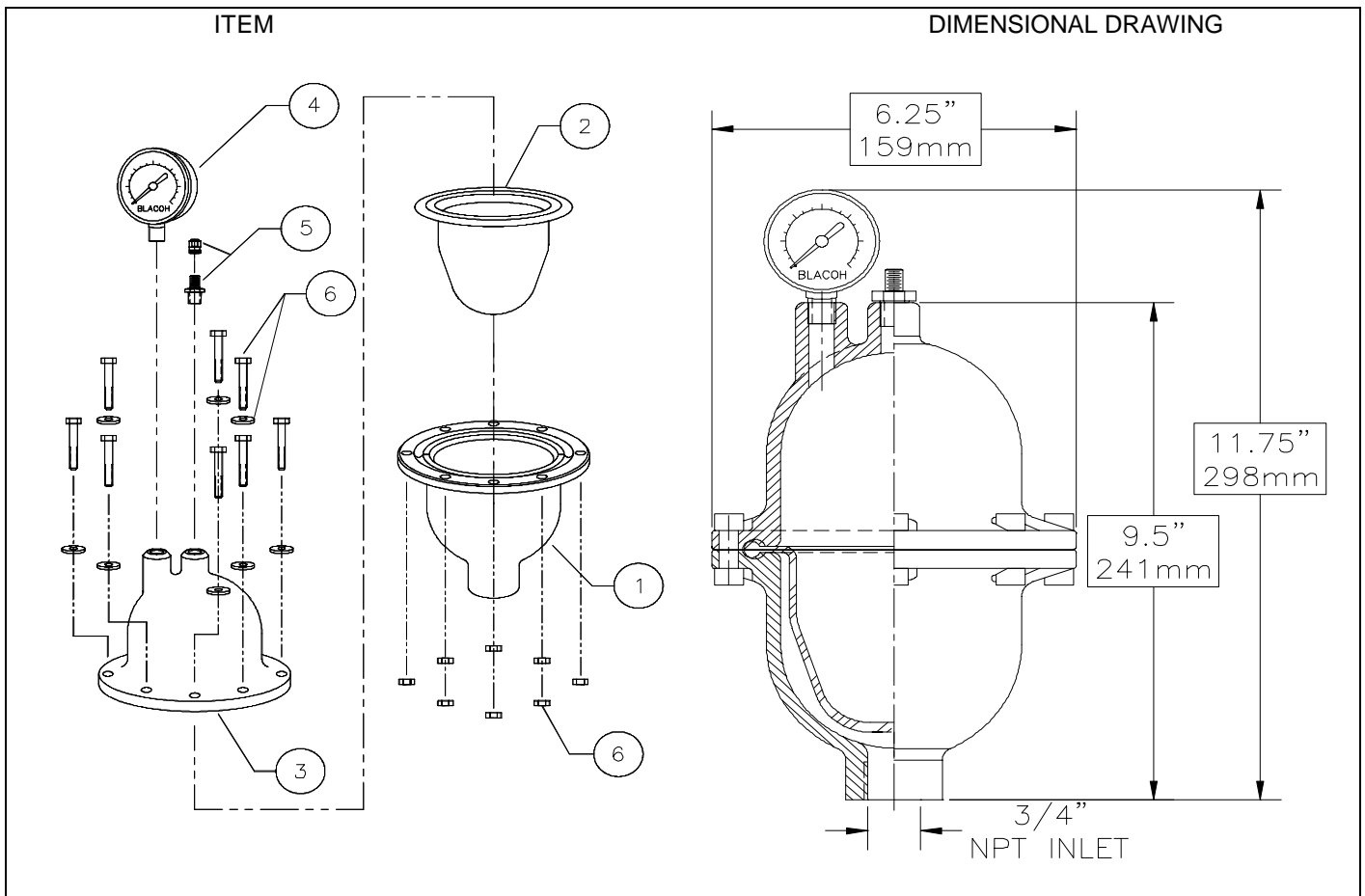
4. PARTS LIST AND EXPLODED VIEW (continued)

4.4.2 - A20 / A25 pumps

BLACKMER REF #:	225490
MAXIMUM PRESSURE:	300 PSI/20.5 BAR
CAPACITY:	85 CUBIC INCHES/1.39 LITERS
WETTED HOUSING:	316L STAINLESS STEEL
NONWETTED HOUSING:	316L STAINLESS STEEL
BLADDER:	EPDM
INLET:	3/4" FNPT
AIR CONTROL:	CHARGEABLE

DESCRIPTION					
ITEM	PART #	QTY	Component	Material	
1	2901-27	1	Wetted Housing	316L Stainless Steel	
2	401-28	1	Bladder	EPDM	
3	2901-24	1	Nonwetted Housing	316L Stainless Steel	
4	G40	1	Gauge	SS/Brass/Bronze	
5	101-71	1	Fill Valve	Stainless Steel	
6	2901-00	1	Fastener Assy	Stainless Steel	

8/23/2006



4. PARTS LIST AND EXPLODED VIEW (continued)

4.4.4 - A65 pump

BLACKMER REF #:	225494
MAXIMUM PRESSURE:	300 PSI/20.6 BAR
CAPACITY:	370 CUBIC INCH
WETTED HOUSING:	STAINLESS STEEL
NONWETTED HOUSING:	STAINLESS STEEL
BLADDER:	EPDM
INLET:	2" FNPT
AIR CONTROL:	CHARGEABLE

DESCRIPTION				
ITEM	PART #	QTY	Component	Material
1	901-28	1	Wetted Housing	Stainless Steel
2	201-28	1	Bladder	EPDM
3	901-24	1	Nonwetted Housing	Stainless Steel
4	101-33	1	Gauge	Plastic, Brass, Bronze
5	101-71	1	Fill Valve	Stainless Steel
6	901-47	1	Bolt Assembly	Stainless Steel

6/19/2003

