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geotech

Geotech Portable Bladder Pumps

Installation and Operation Manual



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DOCUMENTATION CONVENTIONS

This manual uses the following conventions to present information:



WARNING

An exclamation point icon indicates a **WARNING** of a situation or condition that could lead to personal injury or death. You should not proceed until you read and thoroughly understand the **WARNING** message.



CAUTION

A raised hand icon indicates **CAUTION** information that relates to a situation or condition that could lead to equipment malfunction or damage. You should not proceed until you read and thoroughly understand the **CAUTION** message.



NOTE

A note icon indicates **NOTE** information. Notes provide additional or supplementary information about an activity or concept.



In order to ensure that your pump has a long service life and operates properly, adhere to the cautions below and read this manual before use.

For long term storage greater than 1 week, care should be taken to clean and dry all pump components. This will help with long term reliability. An inert lubricant can be used on the o-ring seals to promote longevity and elasticity.

Pump operation and decontamination should be performed to your standard operating procedures.

Operation of system utilizing non-Geotech OEM parts could result in equipment failure or malfunction. This includes air and fluid tubing.

Avoid operating the system without securely anchoring safety cable attached to down well components.

Always wear gloves and be mindful of contaminated fluids contacting your person and entering the environment when operating any ground water sampling device.



Do not operate this equipment if it has visible signs of significant physical damage other than normal wear and tear.



Notice for consumers in Europe:

This symbol indicates that this product is to be collected separately.

The following apply only to users in European countries:

- This product is designated for separate collection at an appropriate collection point. Do not dispose of as household waste.
- For more information, contact the seller or the local authorities in charge of waste management.

Chapter 1: System Description

Function and Theory

Geotech's pneumatic Portable Bladder Pumps operate with a unique action, ideal for both gentle low-flow sampling and high flow rate purging. Timed on/off cycles of compressed air alternately squeeze the flexible bladder to displace water out of the pump to the surface and exhaust allowing the pump to refill.

Fluid enters the pump through the fluid inlet check valve at the bottom of the pump body, via hydrostatic pressure (automatically by submergence). As a result, the entire pump **MUST** be submerged to operate. Next, the internal part of the bladder fills with fluid. Compressed air enters the space between the bladder and the interior of the pump housing. The inlet check valve closes and the discharge check valve (top) opens. Compressed air squeezes the bladder, pushing the fluid to the surface. The discharge check valve prevents back flow from the discharge tubing as the inlet check valve opens again to fill the pump. Therefore, the discharge check valve engages during the fill cycle and disengages during the exhaust cycle. Driven by the GEOCONTROL PRO or GEOCONTROL II, this cycle automatically repeats.

An optional drop tube can be used to sample from depths below the specified maximum sampling depth. The drop tube assembly connects a remote intake to the pump through a tube connected to the pump inlet. The intake depth can be any custom length of tubing. The pump assembly itself must still be submerged below the water level. This means the depth to water cannot exceed the maximum pumping depth of the pump.

Note: Compressed air does not contact the sample. The bladder prevents contact between the pump drive air and the sample.



Be sure to read and understand your portable generator and/or portable air compressor user manual for proper installation and operation and Earth grounding instructions. If using portable compressed gas tanks, be sure to exercise proper caution, use safety protection devices as outlined by the supplier, and observe any additional safety requirements mandated by local jurisdiction.

System Components:

Geotech's Portable Bladder Pumps consist of four components as follows:

- (1) Bladder Assembly
- (2) External Pump Housing
- (3) Internal Tube Assembly
- (4) Inlet Screen Assembly
- (5) Optional Drop Tube Intake Assembly

System Operation:

The user must determine site specific parameters such as water level, recharge rate and adherence to low flow purging guidelines.



READ BEFORE PROCEEDING ANY FURTHER

Before deploying any sampling pump, secure a safety cable to an anchoring point at or near the well head to the pump.

Geotech Portable Bladder Pumps can be operated using a variety of controllers. Be sure to consult the user guide specific to the controller you are using.

The Geotech Portable Bladder Pump requires two tubing lines. One of the lines is used for the air supply and exhaust. The second line is used for discharge fluid. See the system specifications section of this manual for tubing sizes. When using the 1.66" (4 cm) diameter pump, the larger diameter tube is for fluid and the smaller one for air.

If a Drop Tube Intake assembly is employed, a third tubing line is necessary.



On the .675" (1.7 cm) and .85" (2 cm) diameter pumps, both air and fluid lines are the same size. The letter "A" has been stamped near the hose barb on the top of the pump. This indicates the air supply and exhaust line barb. The remaining barb is for the discharge fluid line.



Failure to attach air and fluid lines to the appropriate ports could result in damage to the bladder.



Use of an air source and controller *not* supplied by Geotech could result in pressure buildup and unexpected pressure storage in the pump and airline. Therefore, operation of the pump is not recommended with equipment other than that provided by Geotech.

Once tubing and safety cable are in place, slowly deploy the pump, screen first, into the well. If depth to water is known, a mark can be placed on the tubing to indicate when the pump has reached the desired level. To operate as designed, the pump should be fully submerged. Optimal pump performance is achieved with submergence of greater than 10 feet of water column. Less submergence could result in reduced pumping performance depending on type of fluid* being pumped and physical condition of the bladder. Older, worn bladders can develop a shape memory and may not be able to fill completely without sufficient submergence. In any case, pumping will still be achieved and the sampling event can be completed.



A thin, less rugged bladder could fill more easily in lower submergence applications. Geotech has chosen to implement the use of more reliable heavy walled Poly or robust PTFE material to accommodate longer life of the bladder and overall reliability of the pump.

* Designed for pumping groundwater only, other fluids at user's risk.

Once the pump is at the desired level within the well bore, set the controller timers to pressurize and exhaust. These settings should be such that the bladder is never over compressed. A good rule of thumb is to set the pressure cycle so that the fluid stream exiting the fluid line just starts to fall off when the Discharge/Charge timer expires. If the controller being used has a pressure gauge, you will notice the pressure level will climb and then 'stall out' during pumping and start to 'climb' after all of the water has been evacuated from the pump. If you notice the pressure climbing after a pump cycle, reduce the pressurization time.

Using the volume per cycle specifications guide in this manual, set the exhaust/delay time to optimize the amount of fluid discharged during the pressure cycle.

Both fill/exhaust times and discharge/pump times will vary depending on submergence, depth to water, tubing size and overall tubing length.

For deployment of optional Drop Tube Assembly attach desired length of drop tube to the intake hose barb and hose barb on bottom of pump. Send the drop tube intake down the well followed by the drop tube tubing, then the pump and finally the air and fluid discharge lines.

More information can be found in the user manual specific to the controller you are using.

Chapter 2: System Maintenance

Bladder Removal Steps:

Remove the lower Teflon® compression ring (#21150042) by pulling off end of the internal center tube assembly (#21150091).

Pull the lower end of the bladder towards the middle of the internal center tube assembly and remove O-ring (#11150319) from the lower end of the tube.

Remove the upper Teflon® compression ring (#21150042) and slide the ring off of the end of the internal center tube assembly (#21150091).

Slide the bladder (#21150054) off of the internal center tube weldment assembly (#21150091).



Note: Part numbers listed in the assembly procedure described above pertain only to the 1.66 Portable Bladder Pump. The .675 and .850 Portable Bladder Pumps assemble similarly, however, with different part numbers which can be found in the following sections.



Note: SS Ball must be inside Intake Assembly. This configuration may damage pump.



Reassembly Steps:

Install O-ring (#11150319) to upper end of the center tube weldment assembly (#21150091).

Slide bladder (#21150054) onto the center tube assembly and over the O-ring (#11150319) on the upper end of the center tube assembly. Be careful not to roll the O-ring when sliding the bladder over this end.

Slide a Teflon® compression ring (#11150042) over the bladder and push down over bladder and upper end of the center tube.

With the upper end of the bladder secured by the Teflon® compression ring, slide the second compression ring over the bladder about mid-way down the assembly.

Slide the bladder up, beyond the bottom of the center tube assembly, exposing the lower end of the center tube and install the O-ring (#11150319) into the groove on the lower end.

Slide the bladder back down over the O-ring being careful not to roll the O-ring.

Now slide the Teflon® compression ring over the bladder until it seats flush with the bottom of the center tube assembly.

Replace the outer housing (21150041). Be sure the outer housing is sealed against the upper cap.

Replace the bottom intake assembly (51150067) by screwing it into the bottom of the pump. There shouldn't be any gaps between the outer housing and top or bottom caps.



Inspect O-rings and bladder for damage. Replace if torn, ripped or excessively worn.



Chapter 3: System Specifications

	1.66 Portable	.850 Portable	.675 Portable
Pump Housing	316 SS	316 SS	316 SS
Pump Ends	316 SS	316 SS	316 SS
Bladder Material	Virgin PTFE	Virgin PTFE	Virgin PTFE
Outer Diameter	1.66" (40 mm)	.850" (21.6 mm)	.675" (17 mm)
Length w/Screen	19" (48 cm)	18 5/8" (47 cm)	18 3/4" (47.625 cm)
Weight	3.0 lbs. (1.36 kg)	1.1 lbs. (500 g)	.83 lbs. (376 g)
Volume/Cycle	5 oz. (150 mL)	1 oz. (29 mL)	.5 oz. (15 mL)
Min. Well I.D.	2" (50 mm)	1" (25 mm)	.75" (19 mm)
Max. Operating Pressure	100 psi (7 bar)	100 psi (7 bar)	100 psi (7 bar)
Min. Operating Pressure	5 psi (ash)* (.3 bar)	5 psi (ash)* (.3 bar)	5 psi (ash)* (.3 bar)
Max. Sampling Depth	200' (61 m)	200' (61 m)	200' (61 m)
Tubing Size			
Air	.17" ID x .25" OD (4 mm ID x 6 mm OD)	.17" ID x .25" OD (4 mm ID x 6 mm OD)	.17" ID x .25" OD (4 mm ID x 6 mm OD)
Discharge	.25" ID x .375" OD (6 mm ID x 9.5 mm OD)	.17" ID x .25" OD (4 mm ID x 6 mm OD)	.17" ID x .25" OD (4 mm ID x 6 mm OD)

*ash = above static head

Model: All Portable Bladder Pumps discussed in this manual have the same general specifications.

IP rating: (NA) Submersible to 500 feet (152 m) of water column.

Altitude: 9000 feet (2.75 km) above sea level.



Special air source considerations need to be taken into account 9000 feet (2.75 km) above mean sea level (AMSL).

Operating Temp: 32 (0°C) to 212 (100°C) degrees Fahrenheit ambient air or fluid temperature.



Special care must be taken to avoid burns and exposure to out-gassing of volatiles when pumping fluids at elevated temperatures.

Weight: See individual pump listings above.

Size: See individual pump listings above.

Humidity: (NA)

Chapter 4: Replacement Parts List

MODEL 1.66 PORTABLE BLADDER PUMP CE – 81150034

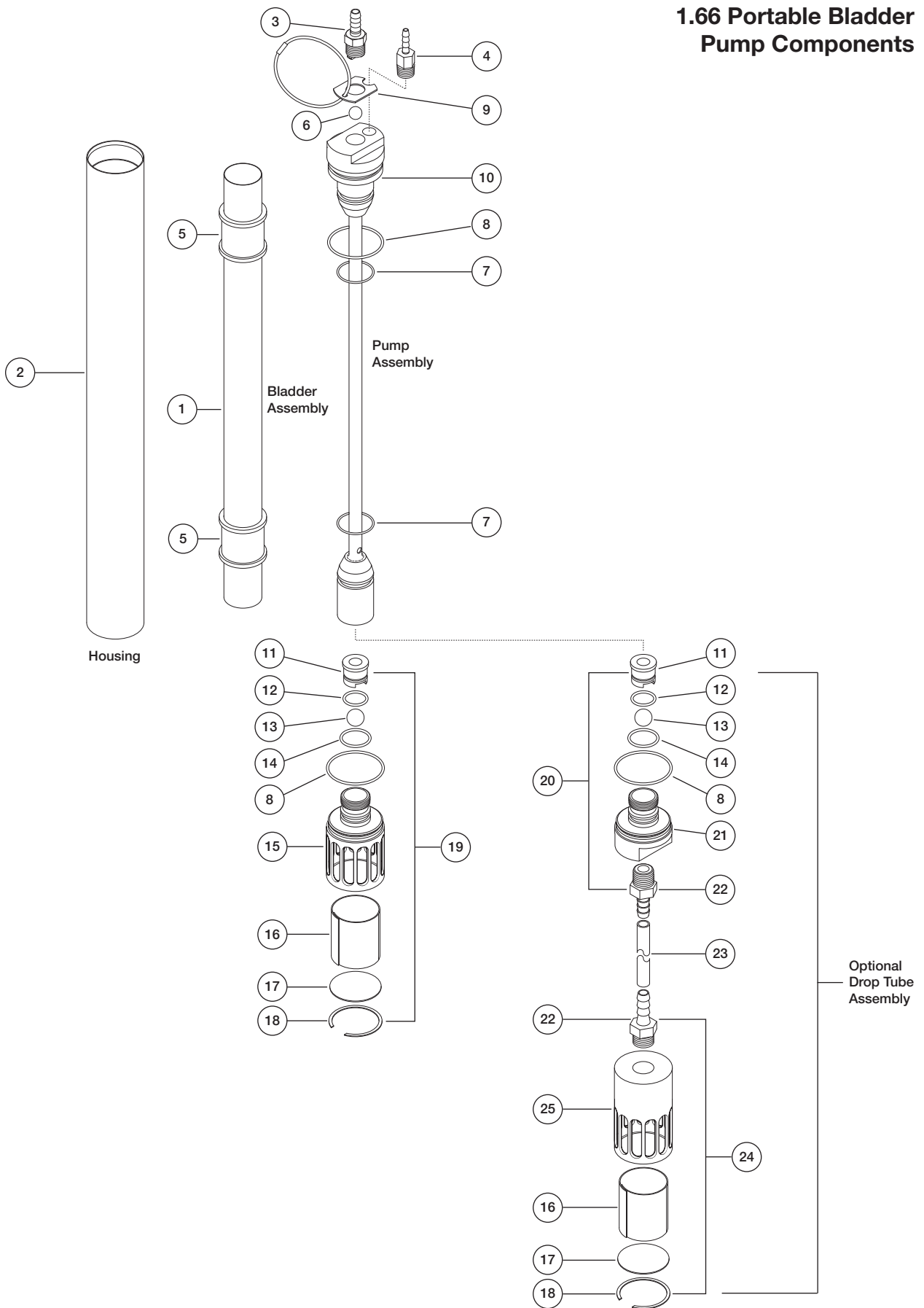
Item	Qty	Description	Part No.
1	1	BLADDER, PTFE, 1.66 PORTABLE	21150054
	§	BLADDER, PE, 1.66 PORTABLE, EA	21150055
	§	BLADDER, PE, 1.66 PORT, 12PK	21150056
2	1	HOUSING, SS6, 1.66, PORTABLE BP	21150041
3	1	HOSEBARB, SS6, MOD, 1/4 X 1/4 MPT MODIFIED DISCHARGE	11150106
4	1	HOSEBARB, SS6, .170 X 1/8 MPT AIR LINE	21150019
5	2	RING, COMPRESSION, PTFE 1.66 BP, CE PORTABLE	21150042
6	1	BALL, SS6, 3/8"	17500081
7	2	O-RING, VITON, 2.5MM X 23MM	11150319
8	2	O-RING, VITON, 2.5MM X 36MM	11150318
9	1	ASSY, HANGER, 166, PBP, SFTY CB, CE	51150068
10	1	CAP UPPER WELDMENT, SS, 1.66, PBP CE	21150091
11	1	PLUG, BALL RETAINER, 1.66 PBP CE	21150096
12	1	O-RING, VITON, #014	17500119
13	1	BALL, SS6, 1/2"	17500082
14	1	ORING, VITON, 2MM X 20MM	11150332
15	1	CAP LOWER, SS, 1.66, PRTBL BP, CE	21150094
16	1	SCREEN, INTAKE, 1.66, SS6, PBP, CE	21150095
17	1	DISC, PTFE, 1.66, PBP PORTABLE	21150043
18	1	RING, SNAP, SS6, INTERNAL, 1.66 BP PORTABLE	11150051
19	1	ASSY, BOTTOM INTAKE 1.66 PBP, CE	51150067
20	§	ASSY, LOWER CAP, 1.66 PBP, DROP TUBE, CE	51150128
21	1	DROP TUBE, CAP LOWER, 1.66 PBP, CE SS	21150098
22	2	HOSEBARB, SS6, 1/2 X 3/8 MPT	16600217
23	§	TUBING, PE, 3/8 X 1/2, FT POLYETHYLENE	87050503
24	§	ASSY, INTAKE, 1.66 PBP, DROP TUBE, CE	51150071
25	1	INTAKE, DROP TUBE, 1.66 PBP, DROP TUBE, CE	21150113
	1	MANUAL, PBP, CE	11150323
	§	SPARE PARTS KIT, 1.66, PBP, CE [Items 5 (2), 6, 7 (2), 8 (2), 12, 13, 14, 16, 17, 18]	51150066
	§	KIT, 1.66 PBP, O-RING SET, CE O-RING SERVICE KIT [Items 7 (2), 8 (2), 12, 14]	91150012

§ = Sold Separately

1.66 Portable Bladder Pump Service Kits

If pump purchased before 10/18/10, you can access the legacy manual part number 11150272 on our website at www.geotechenv.com or contact Geotech directly for more information.

1.66 Portable Bladder Pump Components

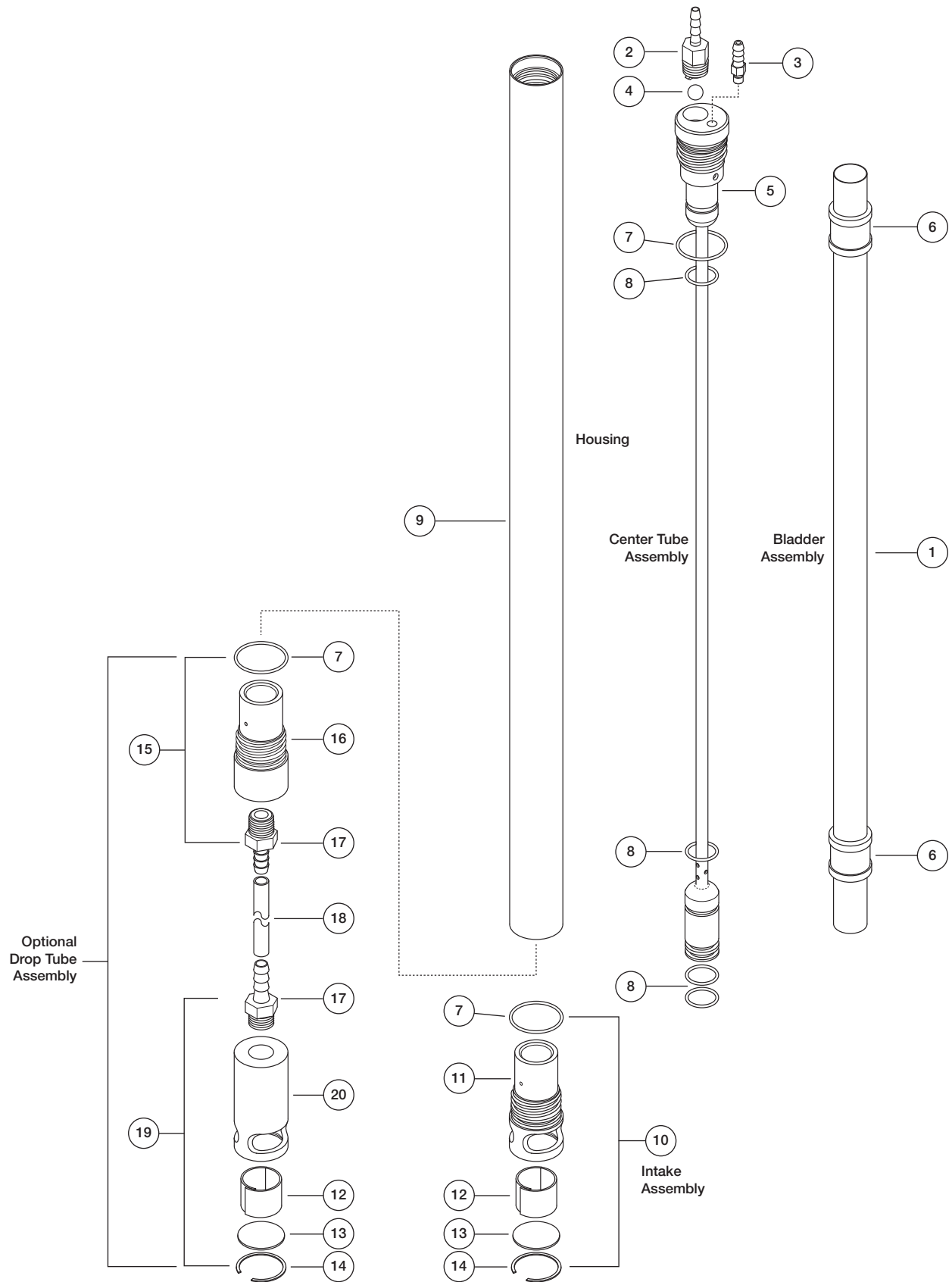


MODEL .85 PORTABLE BLADDER PUMP CE – 81150115

Item	Qty	Description	Part No.
1	1	BLADDER ,PTFE, .85 PORTABLE BP	51150051
	§	BLADDER, PE, .85" PORTABLE BP, EA	21150100
	§	BLADDER, PE, .85 PORT, CE, 12PK	21150099
2	1	HOSEBARB, SS6, MOD, .170 X 1/8 NPT DISCHARGE	11150118
3	1	HOSEBARB, SS6, .170 X 10/24 AIR	17200245
4	2	BALL, SS6, 1/4"	17500079
5	1	CAP UPPER WELDMENT, SS6, .85 BP PORTABLE	21150045
6	2	RING, COMPRESSION, PTFE, .850, CE, PORTABLE BP	21150048
7	2	O-RING, VITON, CS .0629, ID 17.1MM	17500112
8	4	O-RING, VITON, #012	17500111
9	1	HOUSING, SS6, .850, PORTABLE BP	21150047
10	1	ASSY, BOTTOM INTAKE, .85 PBP PORTABLE	51150118
11	1	CAP, LOWER, SS6, .850, PORTABLE BP	21150046
12	1	SCREEN, INTAKE, SS6, .85 PORT BP PORTABLE	21150050
13	1	DISC, PTFE, .85 PBP PORTABLE	21150049
14	1	RING, SNAP, SS6, INTERNAL, .85 BP	11150053
15	§	ASSY, LOWER CAP, .850 PBP, DROP TUBE, CE	51150129
16	1	DROP TUBE, CAP LOWER, .850 PBP, CE SS	21150109
17	2	HOSEBARB, SS6, 1/4 X 1/8 MPT	17200072
18	§	TUBING, PE, 1/4 X 3/8, FT POLYETHYLENE	87050502
19	§	ASSY, INTAKE, .850 PBP, DROP TUBE CE	51150069
20	1	INTAKE, DROP TUBE, .850 PBP, CE, SS	21150111
	1	MANUAL, PBP, CE	11150323
	§	SPARE PARTS KIT, .85, PBP, CE [Items 4 (2), 6 (2), 7 (2), 8 (4), 12, 13, 14]	51150123
	§	KIT, .85 PBP, O-RING SET, CE, O-RING SERVICE KIT [Items 7 (2), 8 (4)]	91150013

§ = Sold Separately

.850 Portable Bladder Pump Components

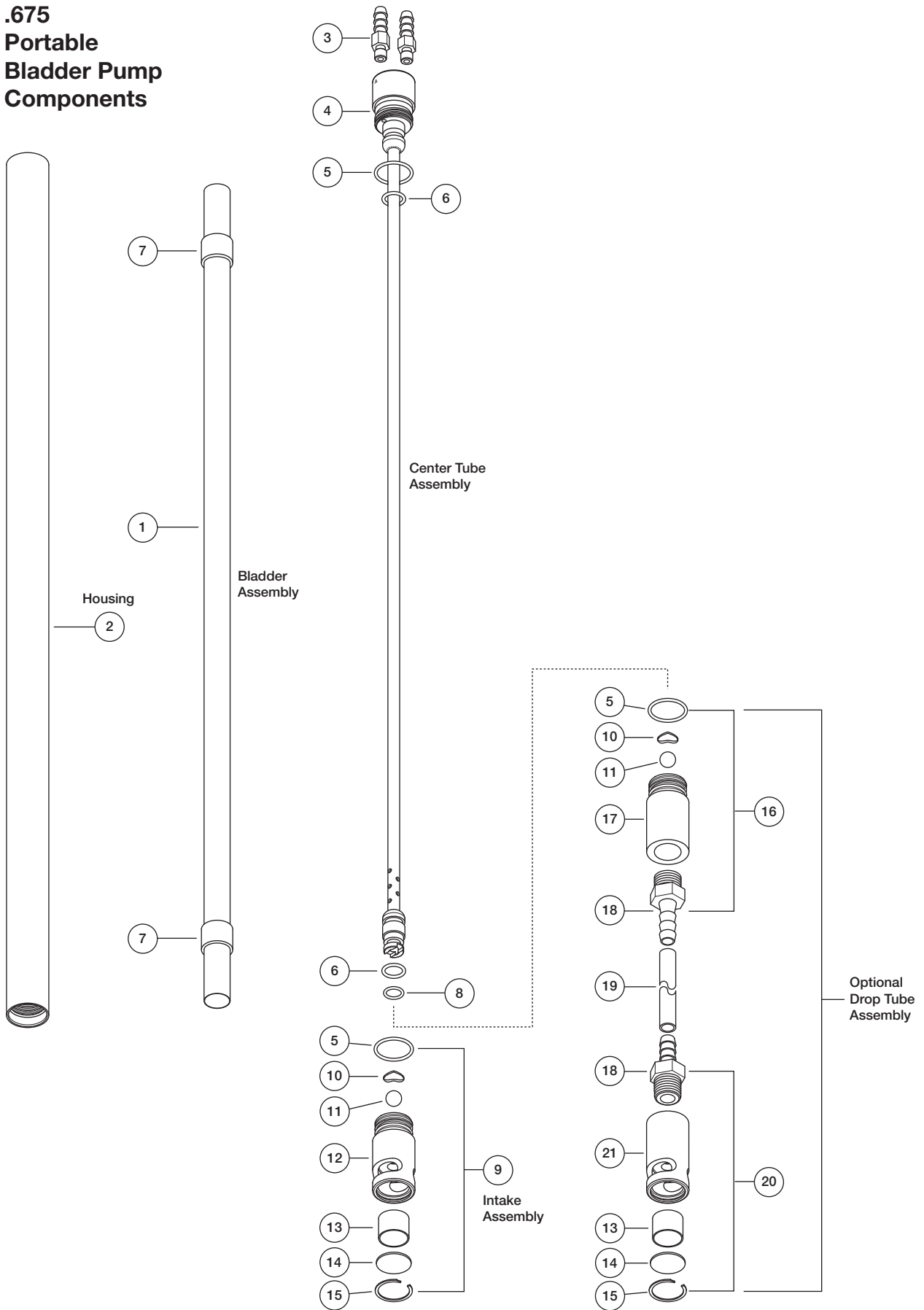


MODEL .675 PORTABLE BLADDER PUMP CE – 81150117

Item	Qty	Description	Part No.
1	1	BLADDER, PTFE, .675, PBP, CE	51150126
	§	BLADDER, PE, .675 PORTABLE, EA	21150102
	§	BLADDER, PE, .675 PORT, CE, 12PK	21150101
2	1	HOUSING, SS6, .675, PORTABLE BP	21150032
3	2	HOSEBARB, SS6, .170 X 10/24 AIR	17200245
4	1	WELDMENT, INNER, SS6, .675 PBP	51150125
5	2	O-RING, VITON, #014	17500119
6	2	O-RING, VITON, #107	17500604
7	2	RING, COMPRESSION, PTFE, .675 PORTABLE BP, CE	21150106
8	1	O-RING, VITON, #009	17500113
9	1	ASSY, BOTTOM INTAKE, .675", PBP	51150120
10	1	RETAINER, BALL, .675 PBP, TACO	21150087
11	1	BALL, SS6, 1/4"	17500079
12	1	CAP, LOWER, SS6, .675 BP	21150031
13	1	SCREEN, INTAKE, SS6, .675 PBP	11150317
14	1	DISC, PTFE, .675 BP	21150033
15	1	RING, SNAP, SS, .675 PBP	11150182
16	§	ASSY, LOWER CAP, .675 PBP, DROP TUBE, CE	51150130
17	1	DROP TUBE, CAP LOWER, .675 PBP, CE SS	21150110
18	2	HOSEBARB, SS6, 1/4 X 1/8 MPT	17200072
19	§	TUBING, PE, 1/4 X 3/8, FT POLYETHYLENE	87050502
20	§	ASSY, INTAKE .675 PBP, DROP TUBE CE	51150070
21	1	INTAKE, DROP TUBE, .675 PBP, CE, SS	21150112
	1	MANUAL, PBP, CE	11150323
	§	SPARE PARTS KIT, .675, PBP, CE [Items 6 (2), 7 (2), 8 (2), 9, 11, 12, 14, 15, 16]	51150124
	§	KIT, .675 PBP, O-RING SET, CE O-RING SERVICE KIT [Items 6 (2), 7 (2), 9]	91150014

§ = Sold Separately

**.675
Portable
Bladder Pump
Components**



System Troubleshooting:



Be sure to read and understand your portable generator and/or portable air compressor user manual for proper installation and operation and Earth grounding instructions. If using portable compressed gas tanks be sure to exercise proper caution and safety protection devices as outlined by the supplier and any additional safety requirements mandated by local jurisdiction.

DO NOT OPERATE THIS EQUIPMENT IF IT HAS BEEN DAMAGED, BROKEN, SMASHED OR EXCESSIVELY WORN. BROKEN COMPONENTS POSE A SEVERE THREAT TO THE SAFETY OF THE OPERATOR AND HIS OR HER ENVIRONMENT. CONTACT GEOTECH FOR ANY SERVICE OR REPAIR NEEDS.

Problem: Air in fluid line or flow cell.

Solution: Ensure timer settings on controller are such that the bladder is not being over pressurized. Verify Teflon® collar is in place at either end of the bladder. Inspect o-rings for damage and replace if needed. Inspect bladder for cuts and holes and replace if needed.

Occasionally, significant amounts of dissolved gasses can be encountered in ground water. Especially in deep well areas with significant hydraulic pressures. When this fluid is exposed to atmosphere out-gassing may occur. Refer to your SOP for specifics on dealing with this situation.

Problem: Not pumping any fluid (and no air either).

Solution: Verify the pump is below static water level. Inspect air line tubing for kinks, cracks or breaks. Make sure you are not getting leaks at any fittings. Replace damaged or worn tubing. Cut tubing back and re-terminate at leaking fitting joint.

Problem: Not pumping any fluid (air is coming out fluid discharge line).

Solution: Disassemble pump and inspect the o-rings and bladder. Replace either or both if damaged. Verify the pump is below static water level.

Notes:

THE WARRANTY

For a period of one (1) year from date of first sale, product is warranted to be free from defects in materials and workmanship. Geotech agrees to repair or replace, at Geotech's option, the portion proving defective, or at our option to refund the purchase price thereof. Geotech will have no warranty obligation if the product is subjected to abnormal operating conditions, accident, abuse, misuse, unauthorized modification, alteration, repair, or replacement of wear parts. User assumes all other risk, if any, including the risk of injury, loss, or damage, direct or consequential, arising out of the use, misuse, or inability to use this product. User agrees to use, maintain and install product in accordance with recommendations and instructions. User is responsible for transportation charges connected to the repair or replacement of product under this warranty.

Equipment Return Policy

A Return Material Authorization number (RMA #) is required prior to return of any equipment to our facilities, please call 800 number for appropriate location. An RMA # will be issued upon receipt of your request to return equipment, which should include reasons for the return. Your return shipment to us must have this RMA # clearly marked on the outside of the package. Proof of date of purchase is required for processing of all warranty requests.

This policy applies to both equipment sales and repair orders.

FOR A RETURN MATERIAL AUTHORIZATION, PLEASE CALL OUR SERVICE DEPARTMENT AT
1-800-833-7958

Model Number: _____

Serial Number: _____

Date of Purchase: _____

Equipment Decontamination

Prior to return, all equipment must be thoroughly cleaned and decontaminated. Please make note on RMA form, the use of equipment, contaminants equipment was exposed to, and decontamination solutions/methods used.

Geotech reserves the right to refuse any equipment not properly decontaminated. Geotech may also choose to decontaminate equipment for a fee, which will be applied to the repair order invoice

Declaration of Conformity

Geotech Environmental Equipment Inc.
2650 E 40th Avenue
Denver, CO 80205

Following products are covered:

Geotech product PN
81150034 1.66 PORTABLE BLADDER PUMP CE
81150115 .85 PORTABLE BLADDER PUMP CE
81150117 .675 PORTABLE BLADDER PUMP CE

- Conforms with the principal safety objectives of the **European Directive 73/23/EEC**, [for UK only - as implemented by the *Electrical Equipment (Safety) Regulations 1994*], by application of the following standards: EN 61010 Year of affixation of the CE Marking: 2010
- Conforms with the protection requirements of the **European Directive 89/336/EEC**, [for UK only - as implemented by the *Electromagnetic Compatibility Regulations 1992*], by application of the following standards: EN 61326-1, emissions class A.

Signatory:



Joe Leonard
Product Development

Year of manufacture: 2010
EMC conformity established 3/3/2010.
This declaration is issued under the sole responsibility of
Geotech Environmental Equipment Inc.

Model _____

Serial Number _____



Geotech Environmental Equipment, Inc.

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