

# Well Development Pump Installation & Operation Manual

Models HR4105D and HR4105SS

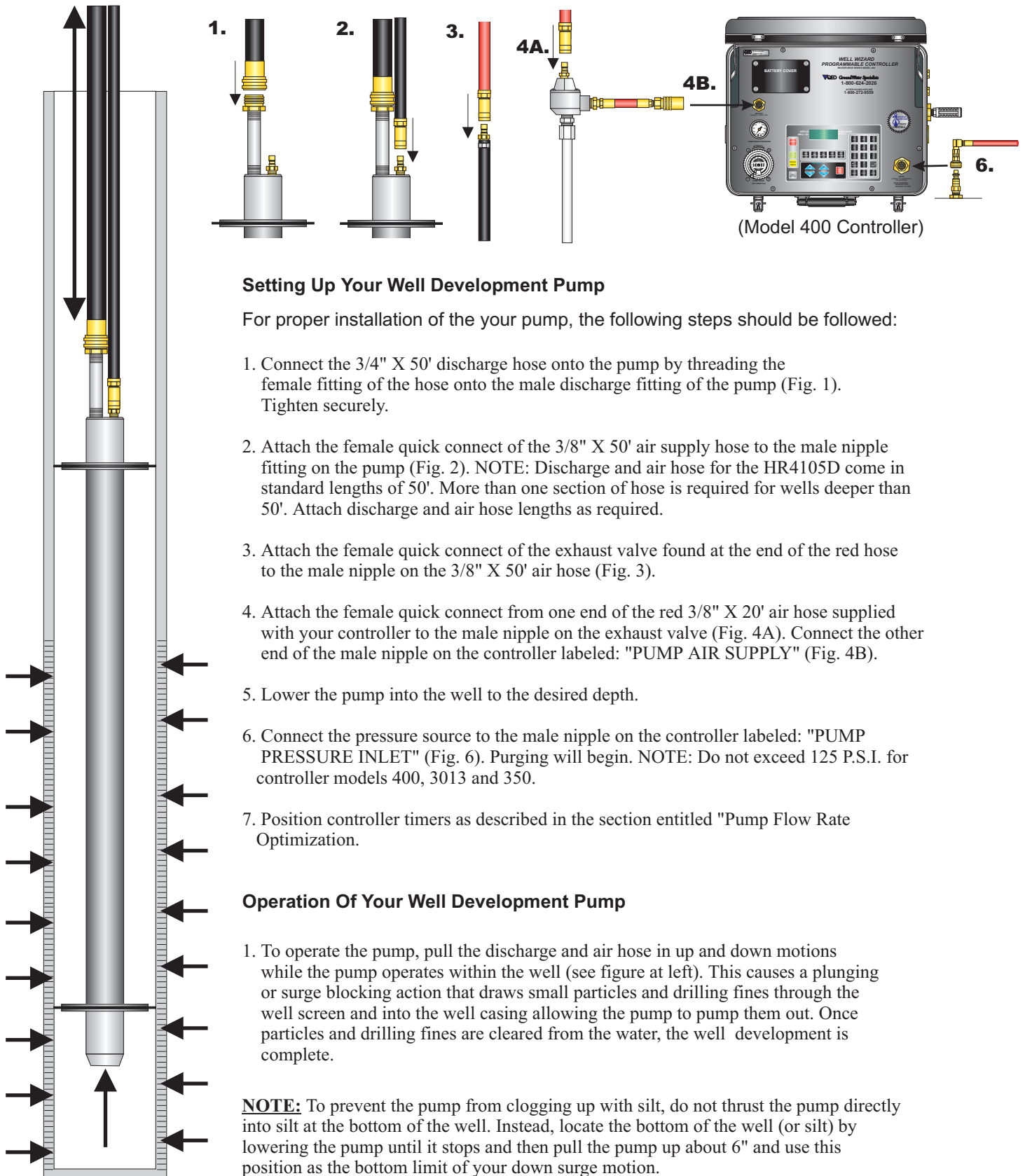
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QED's well development pumps are double action high rate purge pumps designed to develop 2" and 4" wells. As the operator lifts the pump within the well by pulling up on the tubing, flexible wipers attached to the pump sweep the well casing wall creating a surge-block action. The Surging draws small particles through the well screen and into the well casing, where the well development pump pumps them out.



**Setting Up Your Well Development Pump**

For proper installation of your pump, the following steps should be followed:

1. Connect the 3/4" X 50' discharge hose onto the pump by threading the female fitting of the hose onto the male discharge fitting of the pump (Fig. 1). Tighten securely.
2. Attach the female quick connect of the 3/8" X 50' air supply hose to the male nipple fitting on the pump (Fig. 2). NOTE: Discharge and air hose for the HR4105D come in standard lengths of 50'. More than one section of hose is required for wells deeper than 50'. Attach discharge and air hose lengths as required.
3. Attach the female quick connect of the exhaust valve found at the end of the red hose to the male nipple on the 3/8" X 50' air hose (Fig. 3).
4. Attach the female quick connect from one end of the red 3/8" X 20' air hose supplied with your controller to the male nipple on the exhaust valve (Fig. 4A). Connect the other end of the male nipple on the controller labeled: "PUMP AIR SUPPLY" (Fig. 4B).
5. Lower the pump into the well to the desired depth.
6. Connect the pressure source to the male nipple on the controller labeled: "PUMP PRESSURE INLET" (Fig. 6). Purging will begin. NOTE: Do not exceed 125 P.S.I. for controller models 400, 3013 and 350.
7. Position controller timers as described in the section entitled "Pump Flow Rate Optimization."

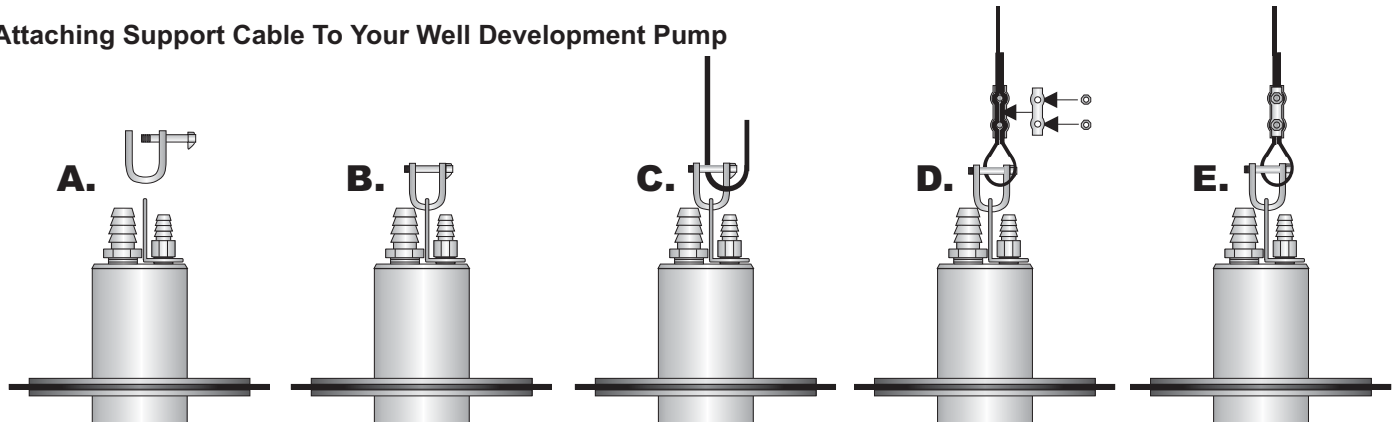
**Operation Of Your Well Development Pump**

1. To operate the pump, pull the discharge and air hose in up and down motions while the pump operates within the well (see figure at left). This causes a plunging or surge blocking action that draws small particles and drilling fines through the well screen and into the well casing allowing the pump to pump them out. Once particles and drilling fines are cleared from the water, the well development is complete.

**NOTE:** To prevent the pump from clogging up with silt, do not thrust the pump directly into silt at the bottom of the well. Instead, locate the bottom of the well (or silt) by lowering the pump until it stops and then pull the pump up about 6" and use this position as the bottom limit of your down surge motion.

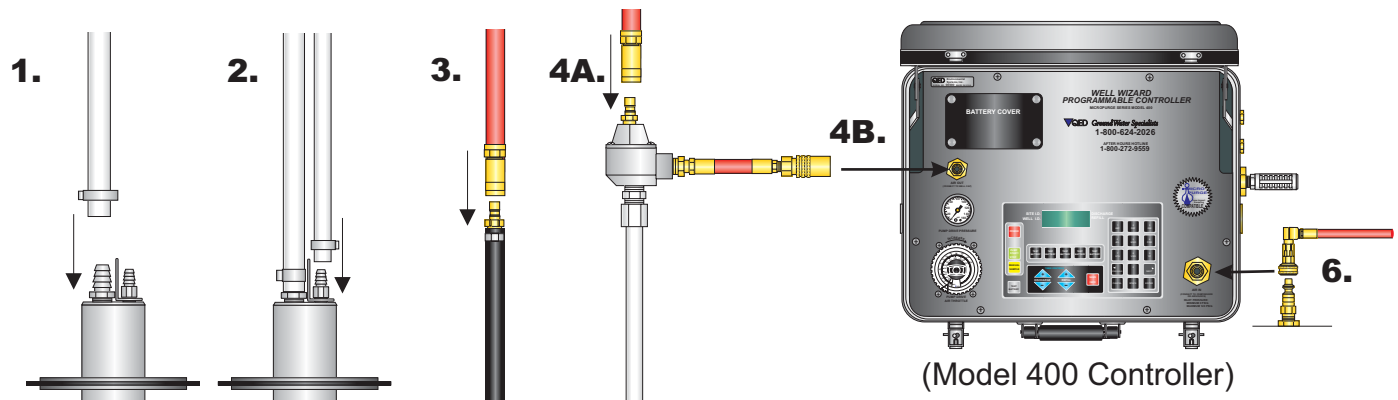
QED's well development pumps are double action high rate purge pumps designed to develop 2" and 4" wells. As the operator lifts the pump within the well by pulling up on the tubing, flexible wipers attached to the pump sweep the well casing wall creating a surge-block action. The Surging draws small particles through the well screen and into the well casing, where the well development pump pumps them out.

**Attaching Support Cable To Your Well Development Pump**



1. Unthread post from horseshoe clamp (fig. A). Insert clamp through the hole in the cable support bracket and thread post fully back into the clamp (fig. B).
2. Pass support cable through the horseshoe clamp (fig. C). Remove Nuts and pressure plate from the cable clamp then thread the support cable through the cable clamp (fig. D)
3. Place clamp pressure plate on clamp and thread nuts down on the pressure plate until clamp is tight and secure (fig. E).

**Setting Up Your Well Development Pump**



1. Slide clamp over 3/4" discharge tube then connect the tube to the pump discharge barb fitting. Position clamp over the barb fitting then using the clamp tool crimp clamp down onto tubing (fig. 1).
2. Slide clamp over 1/2" pump air supply tube then connect the tube to the pump air supply fitting. Position clamp over the barb fitting then using the clamp tool crimp clamp down onto tubing (fig. 2).
3. Attach the female quick connect of the exhaust valve found at the end of the red hose to the male nipple on the air supply tubing (Fig. 3).
4. Attach the female quick connect from one end of the red 3/8" X 20' air hose supplied with your controller to the male nipple on the exhaust valve (Fig. 4A). Connect the other end of the male nipple on the controller labeled: "PUMP AIR SUPPLY" (Fig. 4B).
5. Lower the pump into the well to the desired depth.
6. Connect the pressure source to the male nipple on the controller labeled: "PUMP PRESSURE INLET" (Fig. 6). Purging will begin. **NOTE:** Do not exceed 125 P.S.I. for controller models 400, 3013 and 350.

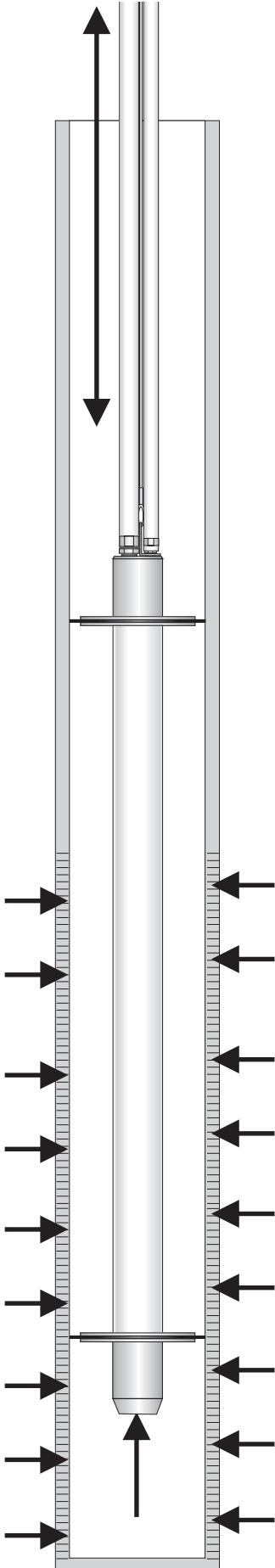
### Setting Up Your Well Development Pump Continued...

7. Position controller timers as described in the section entitled "Pump Flow Rate Optimization"

### Operation Of Your Well Development Pump

1. To operate the pump, pull the Support cable along with the discharge and air hose in up and down motions while the pump operates within the well (see figure at left). This causes a plunging or surge blocking action that draws small particles and drilling fines through the well screen and into the well casing allowing the pump to pump them out. Once particles and drilling fines are cleared from the water, the well development is complete.

**NOTE:** To prevent the pump from clogging up with silt, do not thrust the pump directly into silt at the bottom of the well. Instead, locate the bottom of the well (or silt) by lowering the pump until it stops and then pull the pump up about 6" and use this position as the bottom limit of your down surge motion.



## Optimizing Flow Rates For The Well Development Pump

The purpose of optimizing flow rates is to create maximum flow rates and pump efficiency at the pump's operating conditions. To accomplish this, both the refill and discharge times on the pump controller must be optimized.

To optimize the refill and discharge times, the following steps should be followed:

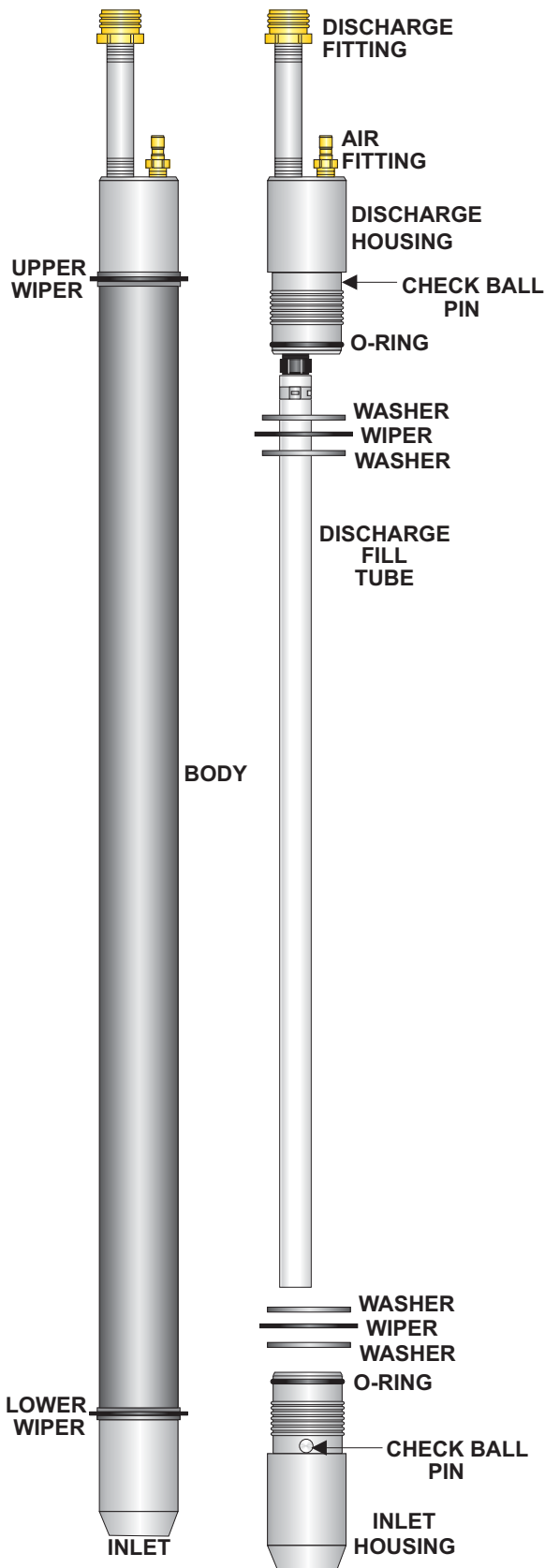
1. Set the refill time on the controller at 15 seconds. Set the discharge time at 1 second if your well depth is under 50', set the discharge time at 3 seconds if your well depth is 51' to 100', for wells with a depth greater than 100' set the discharge timer at 5 seconds. With these settings, it should take 5-15 cycles to purge the air from the discharge line depending on the pump's depth. If liquid fails to discharge after 15 cycles, begin increasing the discharge time (as discussed in step #2 below). When liquid begins to flow from the discharge line, measure the amount of liquid being discharged per cycle. At this point the volume measured is probably less than the full internal volume of the well development pump which is 1.15 liters
2. Begin to increase the discharge time slightly in about 1/2 second increments allowing the pump to cycle 3-5 times between each adjustment. Repeat this operation until air can be detected coming up through the discharge line in the form of bubbles. The amount of liquid being discharged per cycle at this point should be close to the full internal volume of the pump (1.15 liters). If air and water begin to burst out of the discharge line, it means that the pump's discharge time is set too long. Decrease the discharge time and repeat the initial procedure with using smaller time increments (i.e. 1/4 sec. Vs. 1/2 sec.). The Discharge time of the pump should now be optimized.
3. Now begin to decrease the refill time slightly in about 1 second increments allowing the pump to cycle 3-5 times between each adjustment. Repeat this operation until air can be detected coming through the discharge line in the form of air bubbles. The amount of liquid being discharged per cycle at this point should still be close to the full internal volume of the pump (1.15 liters). If air and water begin to burst out of the discharge line hard it means that your refill time is too short. Increase the refill time and repeat the initial procedures this time with smaller time increments (i.e. 1/2 sec. Vs. 1 sec.). Both the discharge and refill times should now be optimized.

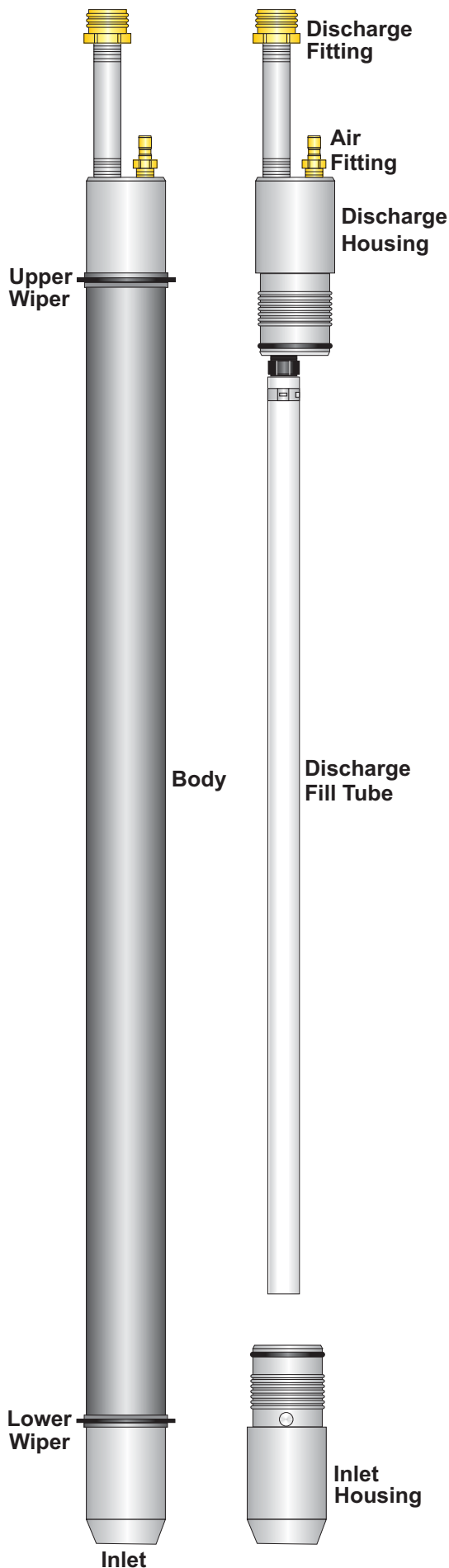
**NOTE:** The best of flow rates are obtained when the pump's submergence is 10' or more. Partial submergence of the well development pump will severely lower the pumps efficiency and flow rates.

### Cleaning And Disassembly Of The Well Development Pump

Please observe the following recommendations when disassembling or assembling your well development pump.

1. It is important to make sure that all sand or like substances are washed off of the pump. These particles can cause damage to the threads on the discharge and inlet housings.
2. The pump should be taken apart by hand. **DO NOT USE A WRENCH OR YOU MAY DAMAGE THE PUMP.** Both the inlet and the discharge housings simply unthread from the main body of the pump.
3. The pump's 2 wiper assemblies will slide off after removal of the inlet and the discharge housings. Both 2" and 4" wipers come with your pump and may need occasional replacement due to abrasion wear from the well casing and screen.
4. Both the Inlet and the discharge housings checkballs are held in place by pins which prevents loss during disassembly.





**Pump Type:** Gas Displacement

**Dimensions:**

**Pump O.D.:** 1.66" (42 mm)  
**Length:** 65" (165 mm)  
**Weight:** 6 lbs. (2.7 kg)

**Materials:** PVC, Stainless Steel, Viton (O-Rings) and Buna-N (Wipers)

**Fittings:** Brass

**Discharge Size:** 3/4" (19 mm) O.D.

**Air Supply Size:** 3/8" (9.5 mm) O.D.

**Casing Wipers:** 2" (50 mm) Wipers For 2" Casings  
 4" (100 mm) Wipers For 4" Casings

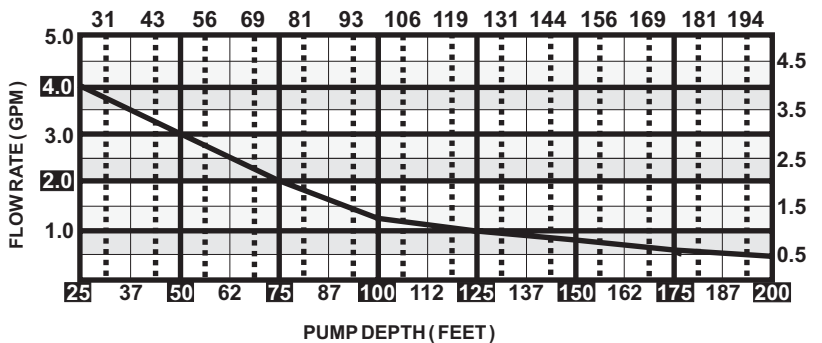
**PUMP PERFORMANCE:**

**Maximum Lift:** 200 Feet (60 m)

**Pump Stroke Volume:**

LITERS	MILLILITERS	GALLONS	OUNCES
<b>1.15</b>	<b>1150</b>	<b>.30</b>	<b>38.4</b>

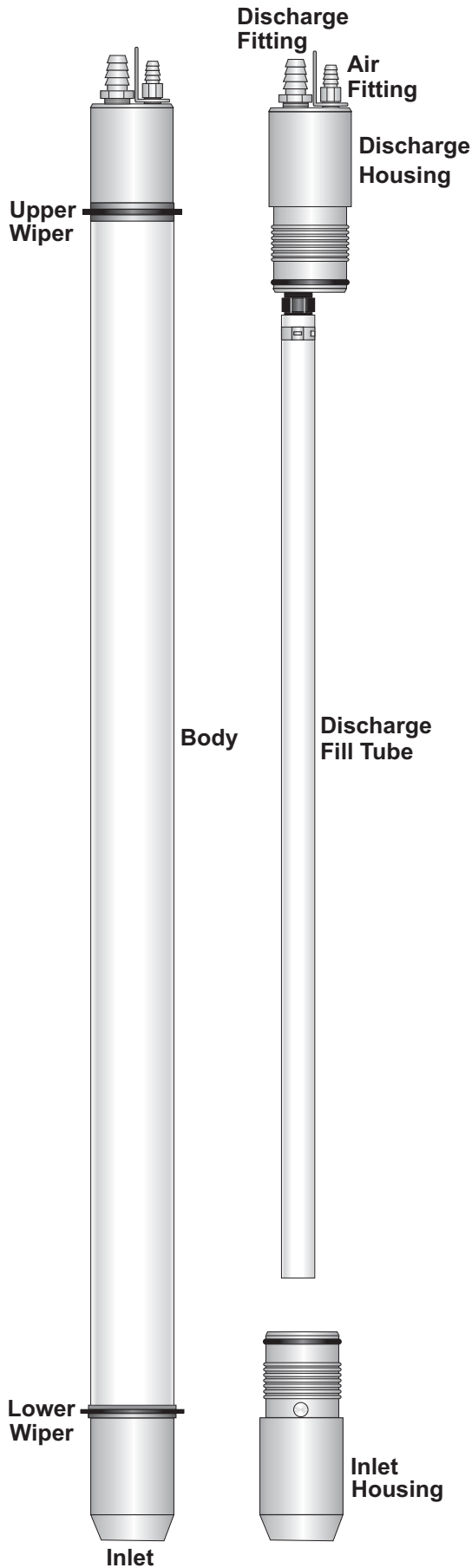
**HR4105D FLOW RATES**



**NOTE:** Flow rates are based on pump submergence of 25 feet (7.6 m) and operating gas pressure of 100 p.s.i. (9.6 bar) / 4.5 s.c.f.m.

**ACCESSORIES:**

- P/N P5700** 50' (15 m) Flexible Hose Bundle 3/4" x 3/8"
- P/N 35347** 2" (50 mm) PVC Washer
- P/N 35348** 2" (50 mm) Buna Washer
- P/N 35382** 4" (100 mm) PVC Washer
- P/N 35383** 4" (100 mm) Buna Washer



**Pump Type:** Gas Displacement

**Dimensions:**

**Pump O.D.:** 1.66" (42 mm)  
**Length:** 65" (165 mm)  
**Weight:** 15 lbs. (6.8 kg)

**Materials:** Stainless Steel, Teflon, Viton (O-Rings) and Buna-N (Wipers)

**Fittings:** Stainless Steel Barb

**Discharge Size:** 3/4" (19 mm) O.D.

**Air Supply Size:** 1/2" (12.7 mm) O.D.

**Casing Wipers:** 2" (50 mm) Wipers For 2" Casings  
 4" (100 mm) Wipers For 4" Casings

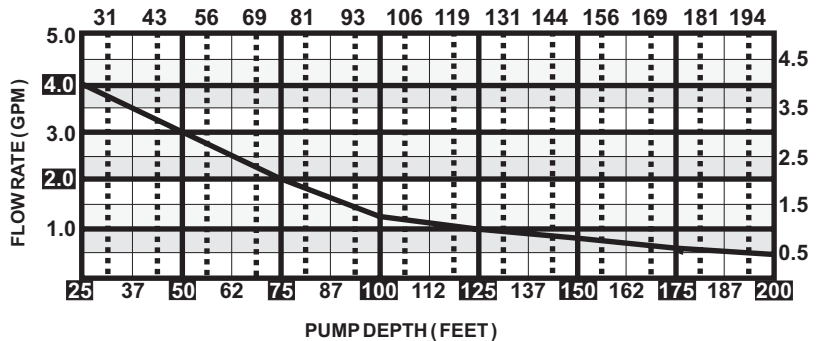
**PUMP PERFORMANCE:**

**Maximum Lift:** 200 Feet (60 m)

**Pump Stroke Volume:**

LITERS	MILLILITERS	GALLONS	OUNCES
<b>1.15</b>	<b>1150</b>	<b>.30</b>	<b>38.4</b>

**HR4105D FLOW RATES**



**NOTE:** Flow rates are based on pump submergence of 25 feet (7.6 m) and operating gas pressure of 100 p.s.i. (9.6 bar) / 4.5 s.c.f.m.

**ACCESSORIES:**

- P/N P5610** Poly Tubing 3/4" (19 mm) + 1/2" (12.7 mm)
- P/N 35998** 2" (50 mm) Stainless Steel Washer
- P/N 35999** 2" (50 mm) Teflon Washer
- P/N 36001** 4" (100 mm) Stainless Steel Washer
- P/N 36002** 4" (100 mm) Teflon Washer
- P/N 8330** 3/32" (2.4 mm) Stainless Steel Teflon Coated Support Cable

QED Environmental Systems, Inc. (QED) warrants to the original purchaser of its products that, subject to the limitations and conditions provided below, the products, materials and/or workmanship shall reasonably conform to descriptions of the products and shall be free of defects in materials and workmanship. Any failure of the products to conform to this warranty will be remedied by QED in the manner provided herein

This warranty shall be limited to the duration and the conditions set forth below. All warranty durations are calculated from the original date of purchase.

1. Liquid contacting equipment (including pumps), tubing, liquid contacting supplies and flow totalization equipment are warranted for 1 year.
2. Control devices, control device mounting, and surface air supply hose are warranted for 1 year.
3. Separately sold parts and spare parts kits are warranted for ninety (90) days.
4. Repairs performed by QED are warranted for ninety (90) days from date of repair or for the full term of the original warranty, whichever is longer.

Buyer's exclusive remedy for breach of said warranty shall be as follows: if, and only if, QED is notified in writing within the applicable warranty period of the existence of any such defects in the said products, and QED upon examination of any such defects, shall find the same to be within the term of and covered by the warranty running from QED to buyer, QED will, at its option, as soon as reasonably possible, replace or repair any such product, without charge to the buyer. If QED for any reason, cannot repair a product covered hereby within four (4) weeks after receipt of the original Purchaser's/Buyer's notification of a warranty claim, then QED's sole responsibility shall be, at its option, either replace the defective product with a comparable new unit at no charge to the buyer, or to refund the full purchase price.

In no event shall such allegedly defective products be returned to QED without its consent, and QED's obligations of repair, replacement or refund are conditioned upon the Buyer's return of the defective product to QED.

IN NO EVENT SHALL QED ENVIRONMENTAL SYSTEMS, INC. BE LIABLE FOR CONSEQUENTIAL OR INCIDENTAL DAMAGES FOR BREACH OF SAID WARRANTY.

The foregoing warranty does not apply to major subassemblies and other equipment, accessories, and other parts manufactured by others, and such other parts, accessories, and equipment are subject only to the warranties, if any, supplied by their respective manufacturers. QED makes no warranty concerning products or accessory, QED will give reasonable assistance to Buyer in obtaining from the respective manufacturer whatever adjustment is reasonable in light of the manufacturer's own warranty.

THE FOREGOING WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED, IMPLIED OR STATUTORY (INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE), WHICH OTHER WARRANTIES ARE EXPRESSLY EXCLUDED HEREBY, and of any other obligations or liabilities on the part of QED, and QED neither assumes nor authorizes any person to assume for it any other obligation or liability in connection with said products, materials and/or workmanship.

It is understood and agreed that QED shall in no event be liable for incidental or consequential damages resulting from its breach of any of the terms of this agreement, nor for special damages, nor for improper selection of any product described or referred to for a particular application.

This warranty will be void in the event of unauthorized disassembly of component assemblies. Defects in any equipment that result from abuse, operation in any manner

outside the recommended procedures, use and applications other than for intended use, or exposure to chemical or physical environment beyond the designated limits of materials and construction will also void this warranty.

Chemical attack to liquid contacting equipment and supplies shall not be covered by this warranty. A range of materials is available from QED and it is the Buyer's responsibility to select materials to fit the Buyer's application. QED will only warrant that the supplied liquid contacting materials will conform to published QED specifications and generally accepted standards for that particular material.

QED shall be released from all obligations under all warranties if any product covered hereby is repaired or modified by persons other than QED's service personnel unless such repair by others is made with the written consent of QED. If any product covered hereby is actually defective within the terms of this warranty, Purchaser must contact QED for determination of warranty coverage. If the return of a component is determined to be necessary, QED will authorize the return of the component, at owner's expense. If the product proves not to be defective within the terms of this warranty, then all costs and expenses in connection with the processing of the Purchaser's claim and all costs for repair, parts and labor as authorized by owner hereunder shall be borne by the Purchaser.

The original Purchaser's sole responsibility in the instance of a warranty claim shall be to notify QED of the defect, malfunction, or other manner in which the terms of this warranty are believed to be violated. You may secure performance of obligations hereunder by contacting the Customer Service Department of QED and:

1. Identifying the product involved (by model or serial number or other sufficient description that will allow QED to determine which product is defective).
2. Specifying where, when, and from whom the product was purchased.
3. Describing the nature of the defect or malfunction covered by this warranty.
4. Sending the malfunctioning component, after authorization by QED to:

QED Environmental Systems Inc.  
6155 Jackson Rd.  
Ann Arbor, MI 48103

Telephone: 1-734-995-2547  
1-800-624-2026  
1-519-485-0290 (Canada)  
1-734-995-1170 (Fax)



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