



Environmental Systems

Leaders in Environmental Compliance Products

# APDM

AutoPump Data Module

Well Monitoring Module

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The equipment in this manual is protected under U.S. and foreign patents issued and pending:

U.S. Patents:

Selective Oil Skimmer (SOS)	4,497,370
Specific Gravity Skimmer (SPG)	4,663,037
AutoPump (AP)	5,004,405
Specific Gravity Skimmer (SPG) Product Sensing	5,474,685
Vacuum/Pressure Hydrocarbon Recovery System	4,761,225
SPG PSR technology	5,474,685
AP-2	5,641,272
Genie System	5,704,772

Canada Patent:

Specific Gravity Skimmer (SPG)	1,239,868
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"AP" is a Registered Trademark of "QED Environmental Systems"

"AutoPump" is a Registered Trademark of "QED Environmental Systems"

"SOS" is a Registered Trademark of "QED Environmental Systems"

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# Introduction

Welcome to QED Environmental Systems' APDM (AutoPump Data Module) manual.

To ensure the best operator safety and system performance, it is strongly recommended that the operators read this entire manual before using the Data Module.

This manual reflects our many years of experience and includes comments and suggestions from our sales and service personnel and most importantly from our customers. The chapters, their contents and sequence were designed with you, the user and installer, in mind. We wrote this manual so it can be easily understood by users who may not be familiar with systems of this type or are using a *QED* system for the first time.

## Safety

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Safety has been a cornerstone of our design which has been proven out in building and shipping systems throughout the world. Our high level of performance is achieved by using quality components, building in redundancies or backup systems, and not compromising our commitment to quality manufacturing. The net result is the highest quality and safest pneumatic pump recovery system on the market. We feel so strongly about safety, based on years of working with the leachate extraction and condensate pumping industry, that it is the first section in all of our manuals.

## How to Contact *QED*

If for any reason you are unable to find what you need in this manual please feel free to contact the *QED* Service Department at any time. We encourage you to use following communication methods to reach us at any time:

**Service Department**  
**QED Environmental Systems**  
**[www.qedenv.com](http://www.qedenv.com)**

**San Leandro Service Center**  
1565 Alvarado Street  
San Leandro, California 94577-2640

(800) 537-1767 — North America Only  
(510) 346-0400 — Tele.  
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**Ann Arbor Service Center**  
PO Box 3726  
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(800) 624-2026 — North America Only  
(734) 995-2547 — Tele.  
(734) 995-1170 — Fax  
[info@qedenv.com](mailto:info@qedenv.com) — E-mail

***QED* can be reached 24 hours a day**

We welcome your comments and encourage your feedback regarding anything in this manual and the equipment you have on-site.

Thank you again for specifying *QED* remediation equipment.

# Chapter 1: Safety

Safety has been a prime consideration when designing the APDM System. Safety guidelines are provided in this manual, and the APDM System safety features are listed below. Please do not attempt to circumvent the safety features of this system.

We have also listed some possible hazards involved when applying this system to site remediation. Nothing will protect you as much as understanding the system, the site at which it is being used, and the careful handling of all the equipment and fluids. If you have any questions, please contact the *QED* Service Department for guidance.

As you read through this manual, you will encounter three kinds of warnings. The following examples indicate how they appear and lists their respective purposes.

- Note:** Highlights information of interest.  
**Caution:** Highlights ways to avoid damaging equipment.  
**WARNING:** Highlights personal safety issues.

## A Partial List of Safety Procedures

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**WARNING:**  
The air compressor and any other electrical equipment used with this pneumatic system must be positioned outside of any area considered hazardous because of possible combustible materials.

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These safety procedures should be followed at all times when operating QED equipment on or off site, and should be considered as warnings:

- Wear safety goggles when working with the AutoPump System to protect eyes from any splashing or pressure release.

- Wear chemically resistant rubber gloves, boots, and coveralls when handling the Combo Pump and fluid discharge hose to avoid skin contact with the fluid being recovered.
- Point all hoses away from personnel and equipment when connecting or disconnecting.
- Always ensure that the fluid discharge hose is connected before the air hose to prevent accidental discharge.

*The APDM System minimizes the potential for accidents with the following safeguards:*

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## **Fire and Explosion Protection**

Almost all of QED underground fluid extraction systems are pneumatic. This offers many inherent fire and explosion protection features:

- Compressed air lines eliminates electrical wiring in hazardous areas.
- Standard systems use brass fittings to reduce sparking hazard.

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## **Personal Protection**

On-site, service and maintenance personnel can safely use *QED* equipment. Safety-in-use is the primary design feature in all systems. Following are some samples:


- All standard high pressure air hoses have automatic shut off quick-connects on the supply side which prevents injury due to hose whip or air blown particles. Tubing does not usually have quick-connect fittings, but is pushed over barbs or pushed into compression fittings.
- The air filter bowl is made of metal, providing greater pressure and chemical resistance than plastic bowls and it is less prone to damage if dropped.

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## **Spill Protection**

On-site spills cannot always be prevented. *QED* equipment is designed to take into consideration such unpredictable occurrences that may happen despite strict adherence to standardized safety practices.

- The standard air and fluid hoses are rated at over 800 psi burst pressure to prevent accidental hose breakage.
- Down well quick-connects have locking features to prevent accidental disconnections.



## Chapter 2: Overview

The QED AutoPump Data Module is a water-resistant enclosure that protects and shields surface instrumentation from weather and/or harsh site conditions while providing easy access, via a see-through window, to key system instrumentation readings. The AutoPump Data Module is available in many configurations to satisfy site specific needs. The options available for inclusion inside the NEMA 3R enclosure are a filter/regulator, pump cycle counter, level sensor regulator & gauge with air flow meter, a fluid level indicator with an On/Off switch, an Air Inlet Supply Gauge, and a Vacuum/Pressure Reference with Gauge.

The various AutoPump Data Module options:

- Allow the user to adjust the air pressure to the pump.
- Record the number of times the AutoPump has cycled.
- Show the fluid level in relationship to the pump's inlet, and thus the drawdown distance is obtained.
- Show if there is sufficient fluid to actuate the pump.
- Allow flow rate versus submergence to be determined & checked against pump curve.
- Show flow rate of bubbler gas.
- Show pressure of air to the module.

### **METHOD OF OPERATION**

The AutoPump Data Module is mounted in series at each well head after the air supply and before the AutoPump. During operation, compressed air is supplied to the data module via an air-in quick-connect. (The optional Air Inlet Supply Gauge shows the supply pressure before entering any of the Module's internal components.) The compressed air first passes through a filter/regulator that allows air pressure adjustment, filters the air to 5 microns, and automatically drains condensate build-up in the air supply line.

The Pump Cycle Counter, mounted after the filter/regulator, passes compressed air to the pump. In a piston-like action, the internally located magnet slide, moves forward (in the direction of air flow) during the on cycle and returns to a seated position in the off cycle. The digital display senses the completion of this to-and-fro movement and records the cycle, increasing the number by one digit (which is shown through the digital display). This process repeats itself for each pump cycle.

The level sensor regulator & gauge, mounted after the pump cycle counter, displays the air pressure available to the level indicator, and the air flow meter displays the amount of air being consumed by the level indicator in SCFH.

This level indicator, which is connected to a down-well pneumatic sensor, measures water column pressure in inches above its outlet in the well (e.g., fluid intake of pump) and has an “On/Off switch that allows measurement only when required, reducing energy costs.

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**Note:**

**The APDM is designed to be mounted vertically.**

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**Figure 1** illustrates an overview of an APDM and AP4+ system.



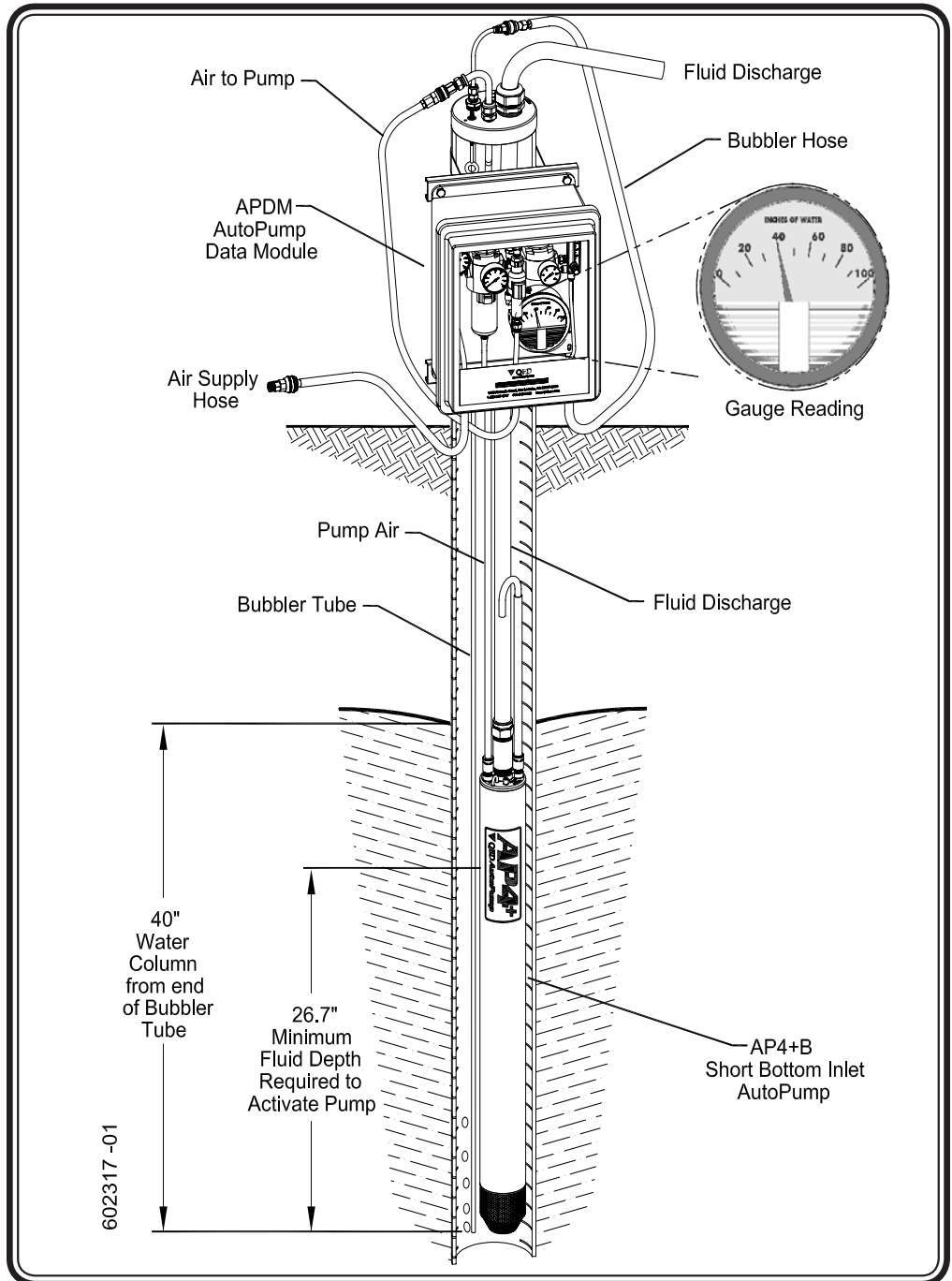


Figure 1 -Overview of a well with no vacuum Data Module and AutoPump System

## Chapter 3: Equipment

### APDM Major Components

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See Figure 2

#### **FILTER/REGULATOR**

- Consists of a single-stage, 5 micron particulate filter contained in a metal bowl.
- Includes a float-operated condensate drain.
- Includes a pressure regulator that is adjustable from 0-125 psi and is rated for 200 psi.
- Allows for the adjustment of supply air pressure to the value necessary to operate the pump and overcome discharge head requirements

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#### **WARNING:**

Always refer to the AutoPump manual for the type of pump and site specification for air supply adjustments.

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#### **PUMP CYCLE COUNTER**

The Pump Cycle Counter is mounted between the Filter/Regulator and the Level Sensor Regulator. The counter has a digital display that:

- Is a six digit counter and counts from 0 - 999,999 before resetting itself.
- Has a clear viewing lens that is water- and impact- resistant.
- Handles air pressures from 40 - 200 psi.

The Pump Cycle Counter has a display assembly and magnet housing that:

- Has clear marks on the outside that indicate the correct direction of air flow.
- Is made of materials resistant to rust, corrosion, and physical damage.
- Protects the counter from damage by particles.
- Utilizes an internally-located magnet slide secured in a sliding magnet housing.

The PCC can be used on at least 150 feet (45.7 m) of 3/8 inch (9.5mm) or 1/4 inch (6.4mm) air hose with air pressure supply 30% higher than the total developed head or each pump cycle.

Performance of the PCC is dependent upon the air hose size and the length, the type of pump and the system pressure. Air flow control valves can affect counter performance. Please contact QED for application assistance.

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**Note:**

The PCC will not function properly beyond certain distance limits from the pump, or, above or below optimum air line diameters. Safe limits are as follows:

AP-4: 250 ft. maximum with 1/4 inch or 3/8 inch ID air hose.

AP-3: 150 ft. maximum with 1/4 inch or 3/8 inch ID air hose.

AP-2: 75 ft. maximum with 1/4 inch or 3/8 inch ID air hose.

Contact QED for advice.

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### LEVEL SENSOR REGULATOR & GAUGE WITH AIR FLOW METER

The Level Sensor Regulator & Gauge with Air Flow Meter is located between the Pump Cycle Counter and Fluid Level Indicator.

- The Fluid Level Regulator is factory set to match the range of the Fluid Level Indicator.
- The Fluid Level Sensor Gauge displays the air pressure to the level indicator.
- The Level Sensor Air Flow Meter displays the volume of air being used by the level indicator in SCFH.

### FLUID LEVEL INDICATOR GAUGE WITH VACUUM/PRESSURE REFERENCE AND WITH OR WITHOUT ON/OFF SWITCH

The Fluid Level Indicator with optional On/Off Switch is located after the air flow meter. It:

- Displays water column pressure in inches above its outlet in the well (e.g., fluid intake of pump).
- Vacuum reference available for the level indicator on sites with wells under vacuum or pressure.

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**Note:**

Vacuum/Pressure Reference connection required on well head assembly.

**Warning**

Do not connect Vacuum/Pressure Reference line to Vacuum Lateral

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### MATERIAL OF CONSTRUCTION

- Aluminum
- Engineering plastics
- Clear Polycarbonate Plastic
- Viton
- Stainless Steel
- Brass
- Nylon

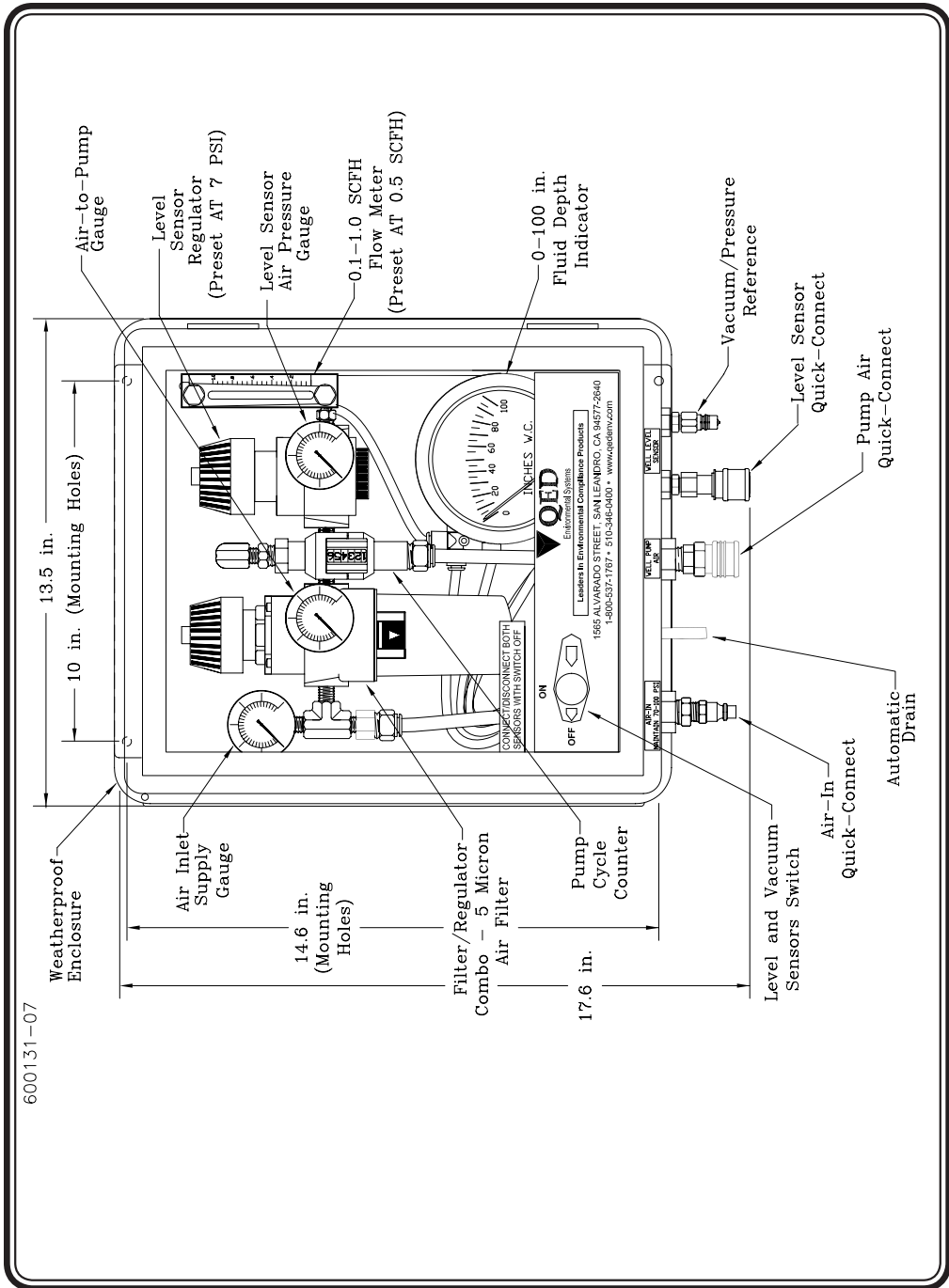


Figure 2 - APDM with with Quick-Connects for Level and Vacuum Switch

## Chapter 4: Installation and Setup

There are three basic data module types the model numbers vary depending on the connections requested below are three basic types.

- Number 303111 APDM Filter/Regulator with Cycle Counter includes five foot pigtailed with brass quick connect fittings with hose barbed /tubing mates. Spec Sheet # 602295
- Number 303115 APDM Filter/Regulator with Cycle Counter, Depth Gauge and Flow Meter includes five foot pigtailed with brass quick connect fittings with hose barb /tubing mates. (Vacuum Reference note included) Spec Sheet # 602302
- Number 303117 APDM Filter/Regulator with Cycle Counter, Depth Gauge and Flow Meter includes five foot pigtailed with brass quick connect fittings with hose barb/tubing mates. (Vacuum Reference included) Spec Sheet # 602301

See Figure 3

### Mounting

All AutoPump Data Module boxes have mounting tabs on top and bottom on the back surface of the box with a total of four holes two on top and two on bottom. They accept ¼-20 machine screws. The mounting pattern distance for the box holes are provided on each Data Module 600000 ser. drawing. QED also can provide mounting brackets that will attach to well casings for 4", 6" and 8" well casings. See drawing # 602303 for details. See below for the part numbers that are available.

- # 303122 4" Well Pipe Mounting Bracket Kit
- # 303123 6" Well Pipe Mounting Bracket Kit
- # 303124 8" Well Pipe Mounting Bracket Kit
- Other Sizes are available contact your local QED Service or Sales Rep.

See Figure 4

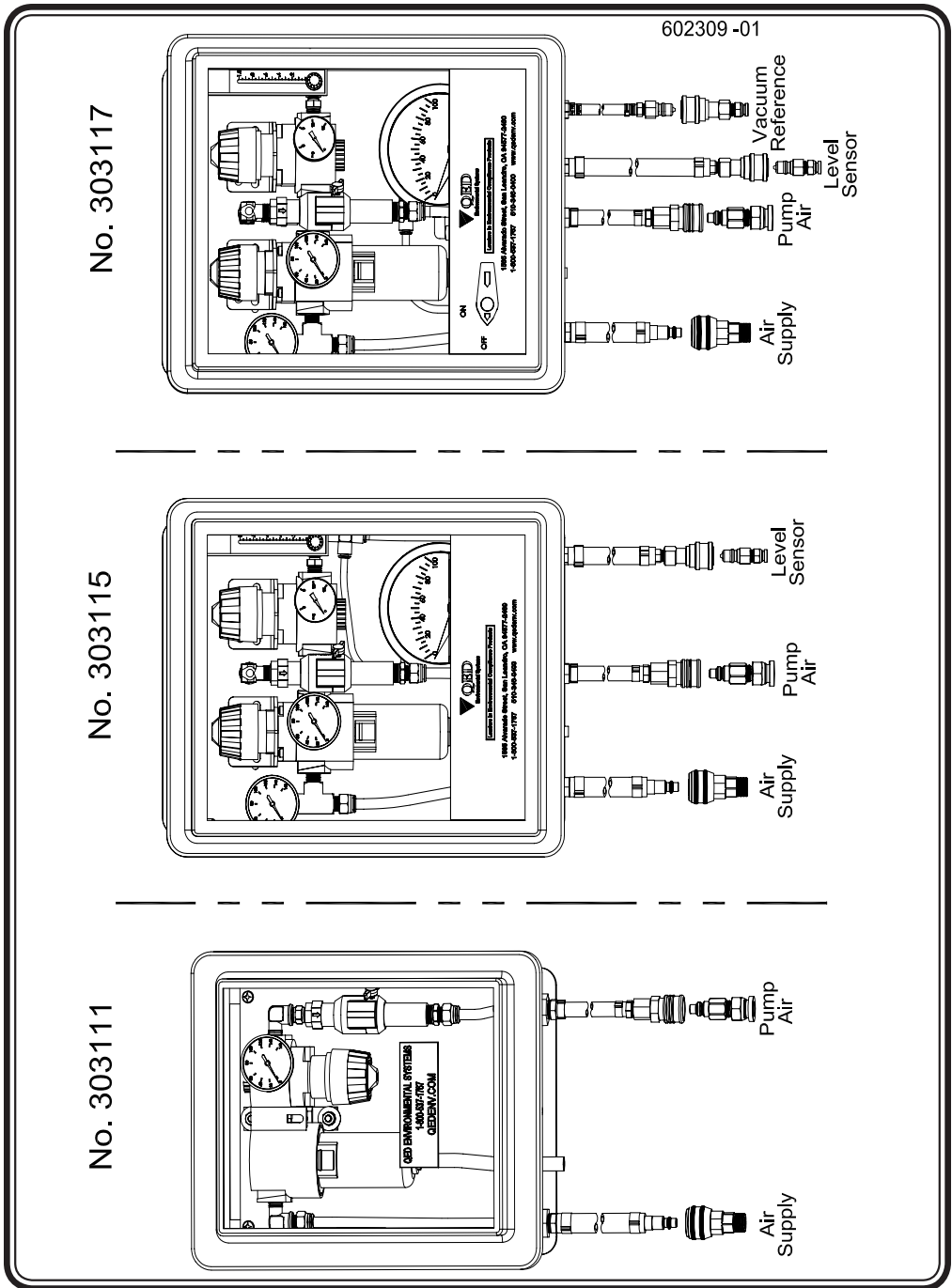
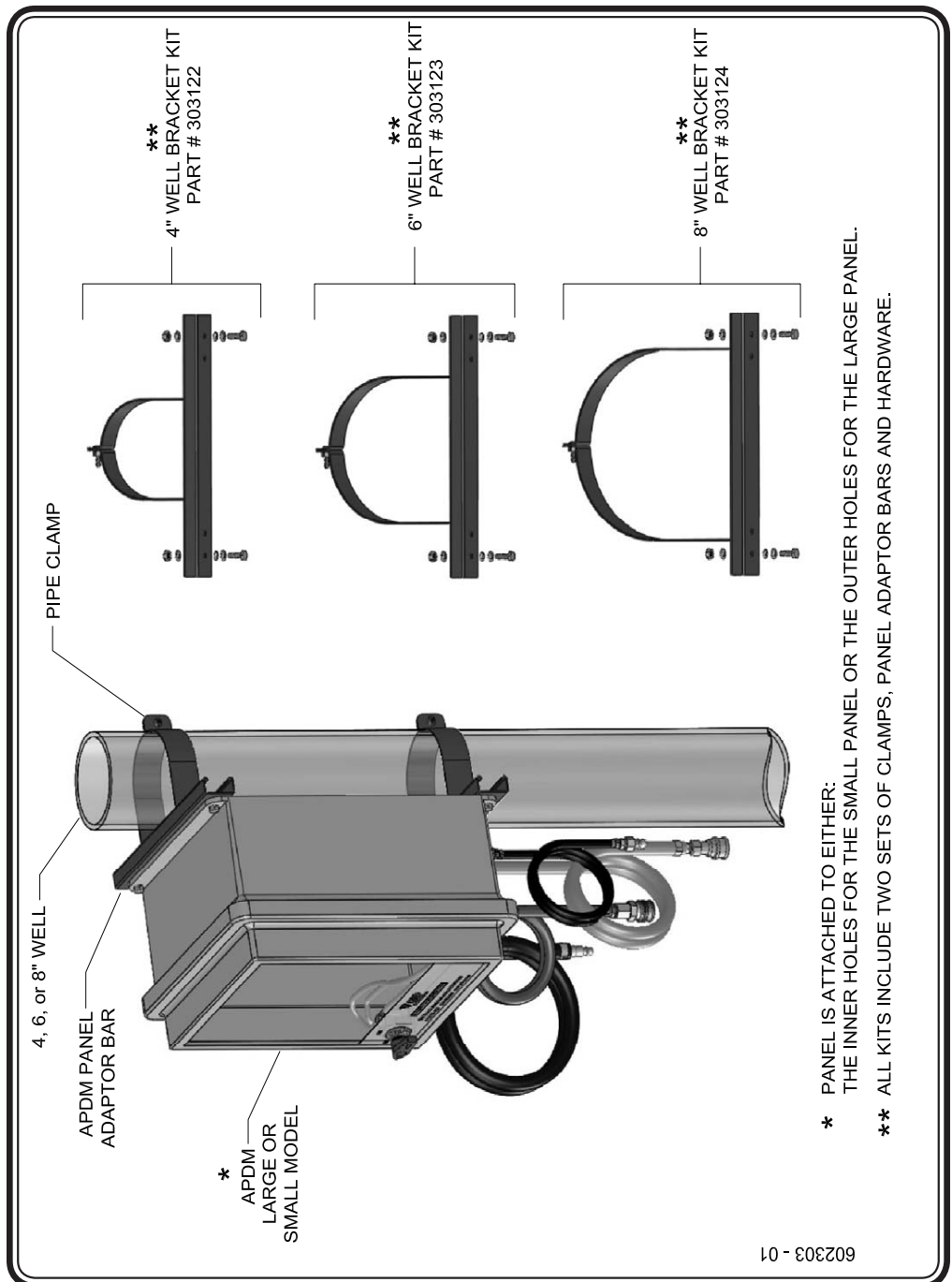


Figure 3 - APDM Models



**Figure 4 - APDM Mounting and Well Head Mounting Kits**

## Connections

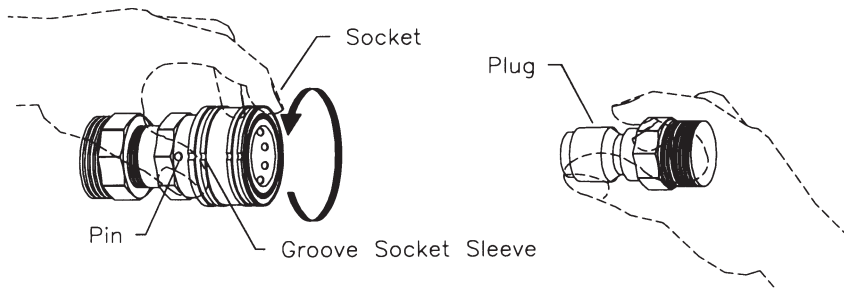
- The air inlet fittings on all data modules are located on the bottom left hand side of the box whine looking at the box window. **See Figure 2.**
- The maximum inlet air pressure is 160 P.S.I. that is what the gauge is rated for.
- The air output or pump air is located on the bottom right hand side of the data module without level sensor. **See Figure 2.**
- The data modules with level sensor have the air output or pump air located in the center on the bottom on the box. **See Figure 2.**
- All AutoPump Data Module main air regulators are factory set at 80 P.S.I. they can be set to 125 P.S.I. if needed.
- All air inlet hoses or main air supply hoses are blue 3/8" hose.
- The air output hose would be a green 3/8" hose or if requested 1/2" black nylon tubing.
- Data Module level sensors connections are located on the right side of the box.
- The Data Module with level sensor only will have one connection the module with level sensor and vacuum reference will have two connections.
- Of the two sensor connections the one to the right is the reference connection and the one to the left is the bubbler sensor connection.
- The maximum inlet air pressure is 160 P.S.I. that is what the gauge is rated for.

### Quick-Connect Types For instructions See Figure 5, 6, 8.

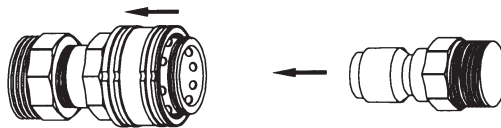
- Air Supply Inlet Connection Quick Connect 3000 Series in 3/8" in Hose Barbs, 3/8" FPT and MPT (Quick Connect Mounted on Box is a 3000 Series Plug)
- Pump Air Output Connections Quick Connect 600 Series in 3/8" Hose Barbs, 3/8" FPT and MPT (Quick Connect Mounted on Box is a 600 Series Socket)
- Level Sensor Bubbler Connections Quick Connect 1HK Series in 1/8" or 1/4" Hose Barbs, 1/8" FPT and MPT (Quick Connect Mounted on Box is a 1HK Series Socket)
- Vacuum Reference Connections Quick Connect 1HK Series in 1/8" or 1/4" Hose Barbs, 1/8" FPT and MPT (Quick Connect Mounted on Box is a 1HK Series Plug)

**Data Module also come with push to connect fittings for nylon tubing in sizes 1/4" O.D. to 1/2" O.D.**

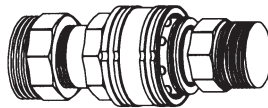




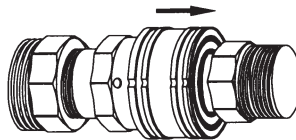
- a. Rotate socket sleeve until groove is aligned with the pin close to the hex.



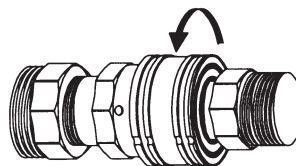
- b. Pull socket sleeve against the hex (the pin will be totally covered). Hold in this position for plug insertion.



- c. Push plug into socket until the plug is almost covered.



- d. Let the socket sleeve go in. It must slide all the way until the pin is visible again.



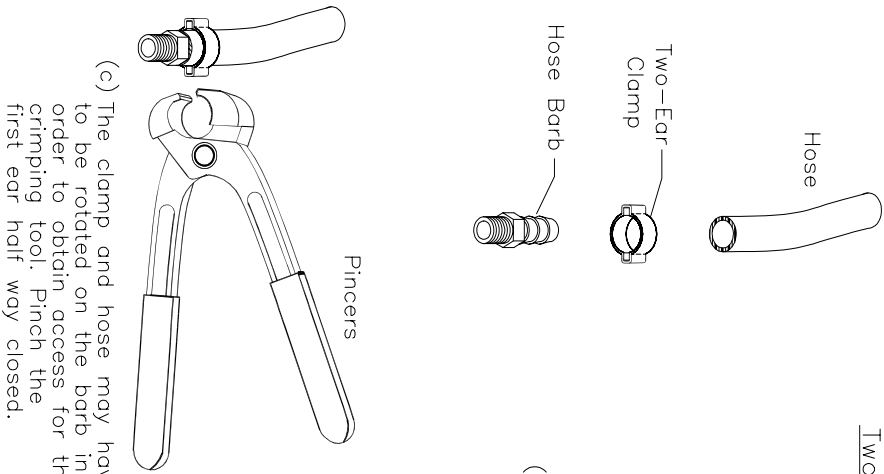
- e. Rotate the socket sleeve so the groove does not align with the pin. To test, gently pull hexes of both fittings in opposite directions. Fittings must remain attached.

600259 02

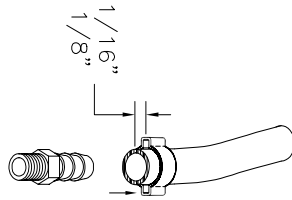
**Figure 5 - Locking Quick-Connects**

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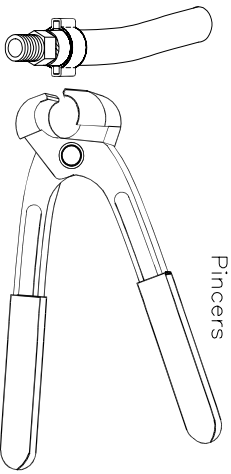
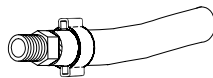
Two-Ear Clamp and Hose Barb



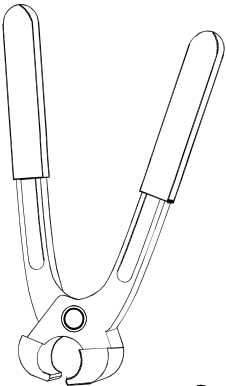
(a) Slide the ear clamp onto the hose. Move it  $1/16''$  to  $1/8''$  in from the end of the hose.



(b) Insert the hose barb into the hose until the hex is flush with the end of the hose.



(c) The clamp and hose may have to be rotated on the barb in order to obtain access for the crimping tool. Pinch the first ear half way closed.



(d) Pinch the second ear all the way closed.

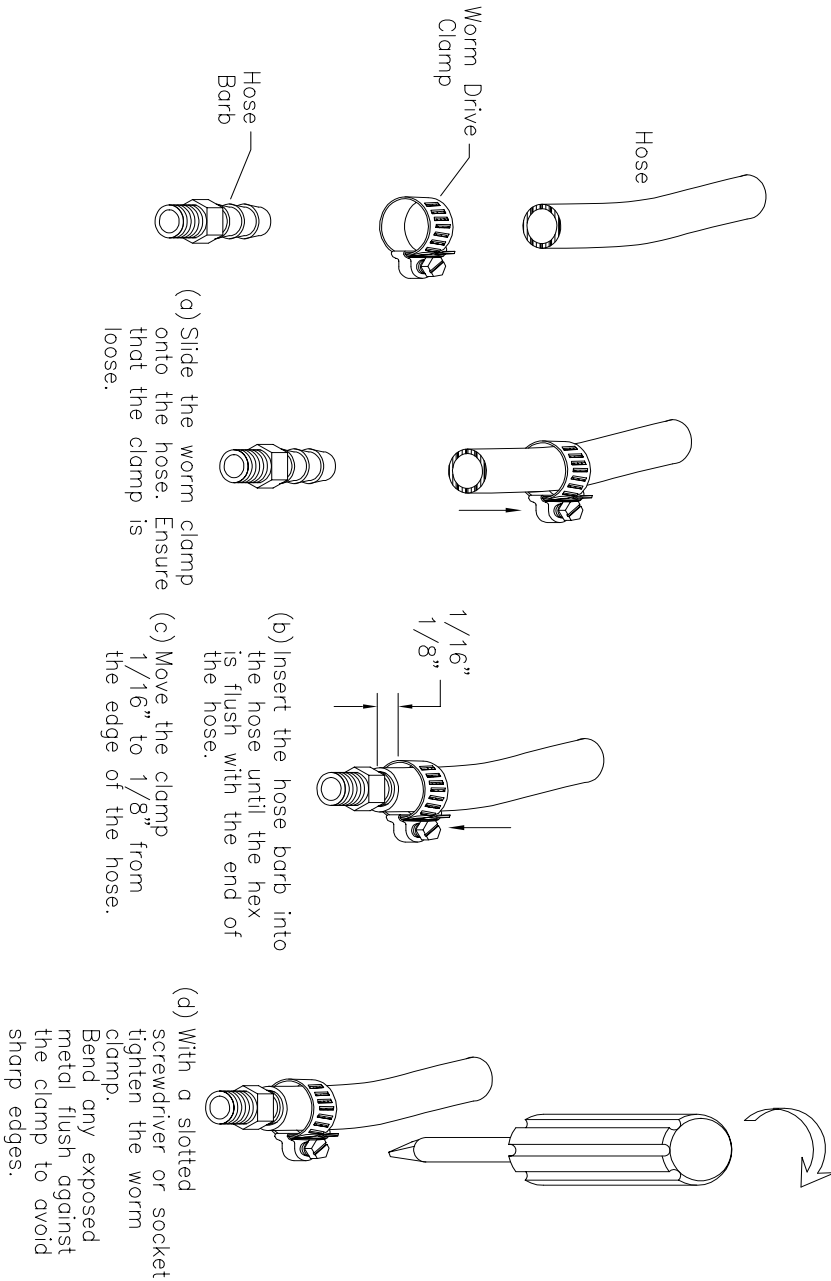


(e) Go back to the first ear and pinch it all the way closed. The other ear may open somewhat. This is normal.

**Figure 6 - Two-Ear Clamp and Hose Barb Assembly Instructions**

600518 02

Worm Drive Clamp and Hose Barb



**Figure 7 - Worm Drive Clamp and Hose Barb Assembly Instructions**

## Chapter 5: Performance and Maintenance

### Default Settings;

The default factory settings for the APDM are:

a- Filter/Regulator = 80 PSI

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**Note:**

Always refer to the AutoPump manual for the type of pump and site specification for pump performance and air supply adjustments.

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b- Level Sensor Regulator = 7 PSI

c- Flow Meter = 0.5 SCFH

### Maintenance

Equipment	Biweekly	Monthly	As Required
Air Quality Check                      Single Stage Filter/Regulator	X		
Check Pump Cycle Counter      *	X		
Auto Pump Service                      **			X

\* Refer to the “PCC, Pump Cycle Counter” O&M Manual

\*\* Refer to the Specific AutoPump being used O&M Manual

## **Terms, Conditions, and Warranty**

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### **1. Warranty Claims Procedure —Purchaser Responsibility —**

**APDM, AutoPump Data Module** is warranted for one (1) year 100% material and 100% workmanship.

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

- a. Identifying the product involved by model or serial number, or other sufficient description, that will allow QED, or its appointed agent, to determine which product is defective.
- b. Specifying where, when, and from whom the product was purchased.
- c. Describing the nature of the defect or malfunction covered by this warranty.
- d. Sending the malfunctioning component, after obtaining authorization from QED, via a RMA# (Return Material Authorization number) to:

**QED Environmental Systems  
1565 Alvarado Street  
San Leandro, California 94577-2640  
USA**

**((510) 346-0400 • (800) 537-1767 • FAX (510) 346-0414**

or to its appointed agent.

If any product covered hereby is actually defective within the terms of this warranty, purchaser must contact QED, or its appointed agent, for determination of warranty coverage. If the return of a component is determined to be necessary, QED, or its appointed agent, will authorize the return of the component at Purchasers 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, labor, and shipping and handling, as authorized by owner hereunder, shall be borne by the Purchaser. In no event shall such allegedly defective products be returned to QED, or its appointed agent, without its consent, and QED's, or its appointed agent's, obligations of repair, replacement or refund are conditional upon the buyer's return of the defective product to QED, or its appointed agent.

2. **Limited Warranty:** This express limited warranty is in lieu of and excludes all other representations made by advertisements or by agents and all other warranties, both express and implied. **THERE ARE NO IMPLIED WARRANTIES OF MERCHANTABILITY OR OF FITNESS FOR A PARTICULAR PURPOSE FOR GOODS COVERED HEREUNDER.**

QED Environmental Systems warrants to the purchaser of its products that, subject to the limitations and conditions provided within the Terms & Conditions of Sale, products, materials and/or workmanship shall reasonably conform to descriptions of the products and shall be free of defects in material and workmanship.

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

- a. Pneumatic Logic Control Panels — All components, material and workmanship are warranted for one (1) year.
- b. Pumps, hose, tubing, fittings, heater, condensers and air filtration housings are warranted for one (1) year, material and workmanship. THERE WILL BE NO WARRANTY FOR APPLICATION OR MATERIAL COMPATIBILITY.
- c. Parts and Repairs — Repairs performed by QED, or its appointed agent, are warranted for ninety (90) days from date of repair or for the full term of the original warranty, whichever is longer. Separately sold parts are warranted for ninety (90) days.

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 environments beyond the designated limits of materials and construction, will also void the warranty.

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

QED Environmental Systems shall be released from all obligations under all warranties if any product covered hereby is repaired or modified by persons other than QED service personnel unless such repair by others is made with the written consent of QED.

It is understood and agreed that QED Environmental Systems 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. Liability under this warranty is limited to repair or replacement F.O.B. QED's factory, or its appointed agent's shop, of any parts which prove to be defective within the duration and conditions set forth herein, or repayment of the purchase price at the option of QED, provided the products have been returned in accordance with the duration and conditions set forth herein.

**3. Subassemblies and Other Equipment Manufactured by Others**

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 accessories not manufactured by QED. In the event of failure of any such product 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.

**4. Illustrations and Drawings**

Every effort has been made to have all illustrations and drawings accurately represent the product(s) as it actually was at the time of doing the illustrations and drawings.

Obviously, however, to effectively continue to meet the requirements of users, changes in some items may be made during the life of this manual - which on occasion, may be made without notice.

**5. Buyer's Remedies:** The buyer's exclusive and sole remedy on account of or in respect to the furnishing of defective material or workmanship shall be to secure replacement thereof as aforesaid. QED shall not in any event be liable for the cost of any labor expended on any such product or material or for any special, direct, indirect or consequential damages to any one by reason of the fact that it shall have been deemed defective or a breach of said warranty.

**6. Prices and Specifications** are subject to change without notice.

**7. Shipping Dates** are approximate and are subject to delays beyond our control.

**8. Terms:** net 30 days; 1.5% per month past due.

**9. F.O.B. Point and Title:** All material is sold F.O.B. factory. Title to all material sold shall pass to buyer upon delivery by seller to carrier at shipping point. All freight insurance and freight claims are the responsibilities of the Buyer.

**10. State and Local Taxes:** Any taxes, duties or fees which the seller may be required to pay or collect upon or with respect to the sale, purchase, delivery, use or consumption of any of the material covered hereby shall be for the account of the Buyer and shall be added to the purchase price.

**11. Acceptance:** All orders shall be subject to the terms and conditions contained or referred to in the Seller's quotation, acknowledgments, and to those listed here and to no others whatsoever. No waiver, alteration or modification of these terms and conditions shall be binding unless in writing and signed by an executive officer of the Seller. All orders subject to written acceptance by QED Environmental Systems, Ann Arbor, MI, U.S.A.