

Operation Manual

Precision Quick-Change Orifice Plate Wellhead

For landfill gas applications. For Professional use only.



QED Environmental Systems Inc.
2355 Bishop Circle West
Dexter, MI 48103

A Graco Company
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Safety Warnings

The following warnings are for the setup, use, grounding, maintenance, and repair of this equipment. The exclamation point symbol alerts you to a general warning and the hazard symbols refer to procedure-specific risks. When these symbols appear in the body of this manual or on warning labels, refer back to these Warnings. Product-specific hazard symbols and warnings not covered in this section may appear throughout the body of this manual where applicable.

 WARNING	
	<p>EQUIPMENT MISUSE HAZARD</p> <p>Misuse can cause death or serious injury.</p> <ul style="list-style-type: none"> • Do not operate the unit when fatigued or under the influence of drugs or alcohol. • Do not exceed the maximum working pressure or temperature rating of the lowest rated system component. See Technical Data in all equipment manuals. • Use fluids and solvents that are compatible with equipment wetted parts. See Technical Data in all equipment manuals. • Do not leave the work area while equipment is energized or under pressure. • Turn off all equipment and disconnect air lines when equipment is not in use. • Do not alter or modify equipment. Alterations or modifications may void agency approvals and create safety hazards. • Make sure all equipment is rated and approved for the environment in which you are using it. • Use equipment only for its intended purpose. Call QED Environmental for information. • Route hoses and cables away from traffic areas, sharp edges, moving parts, and hot surfaces. • Do not kink or over bend hoses or use hoses to pull equipment. • Keep children and animals away from work area. • Comply with all applicable safety regulations.
	<p>PERSONAL PROTECTIVE EQUIPMENT</p> <p>Wear appropriate protective equipment when in the work area to help prevent serious injury, including eye injury, hearing loss, inhalation of toxic fumes, and burns. This protective equipment includes but is not limited to:</p> <ul style="list-style-type: none"> • Protective eyewear, and hearing protection. • Respirators, protective clothing, and chemically resistant gloves



The QED Precision Fine Tube Control Valve is a metered rising stem, angle globe valve. The Valve has been designed to allow fine tuning of the gas flow from landfill gas collection wells, especially at very low gas flow rates. The rising stem valve exposes more of the metered scale as it is opened, allowing the customer to see and record, numerically, exactly how far open the valve is.

Installation:

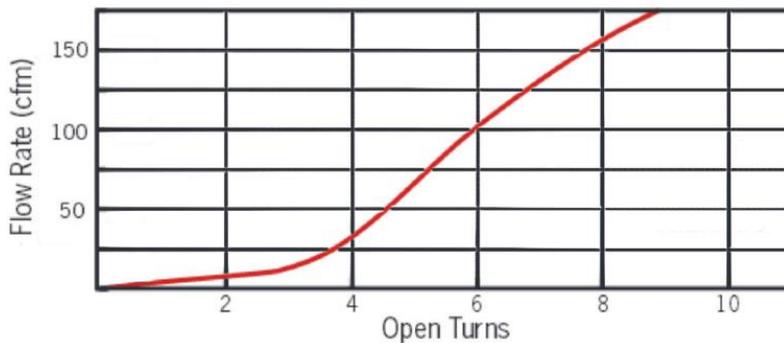
The valve will work in any orientation, regardless of which pipe port is connected to the intake gas.

Operation:

Turn the valve handle counterclockwise to open. As the valve is opened, the yellow metered label will expose, indicating the relative position of the valve. The chart below shows the approximate gas flow rate (at 40 in. water column vacuum) that can be expected for a given number of turns of the valve from the closed position.

Specifications:

- Recommended Pressure:** 5 psi.
- Maximum Temperature:** 200 °F (93.3 °C)
- Flow at 40 in. wc vacuum:** 200 scfm
- Materials:** 304 SS, Glass-filled polypropylene, Viton





Reinforced Nylon Orifice Plates

40770 – 2 Inch Orifice Plate Kit:

Model	Hole Size	Optimal Flow Range*	Color
40771	0.40 (1.01 cm)	1 – 5 scfm	White
40772	0.50 (1.27 cm)	2.5 – 8 scfm	Red
40773	0.75 (1.90 cm)	6 – 19 scfm	Yellow
40774	1.00 (2.54 cm)	11 – 34 scfm	Green
40775	1.25 (3.18 cm)	18 – 56 scfm	Blue
40776	1.40 (3.56 cm)	24 – 75+ scfm	Grey

QED's Quick-Change Orifice Plates are constructed of 1/16" SS or Fiber reinforced nylon. With several sizes of orifice plates available, it is easy to select the right plate for the appropriate pressure drop allowing for

Stainless Steel Orifice Plates for Vertical Wellheads

40747 – 1.25 Inch Orifice Plate Kit:

Model	Hole Size	Optimal Flow Range*
40745	0.26 (0.66 cm)	0 – 2.5 scfm
40642	0.50 (1.27 cm)	2.5 – 8 scfm
40643	0.75 (1.90 cm)	6 – 20 scfm
40746	0.95 (2.41 cm)	12 – 36+ scfm

40640 – 2 Inch Orifice Plate Kit:

Model	Hole Size	Optimal Flow Range*
40641	0.40 (1.01 cm)	1 – 5 scfm
40642	0.50 (1.27 cm)	2.5 – 8 scfm
40643	0.75 (1.90 cm)	6 – 19 scfm
40644	1.00 (2.54 cm)	11 – 34 scfm
40645	1.25 (3.18 cm)	18 – 56 scfm
40646	1.40 (3.56 cm)	24 – 75+ scfm

40660 – 3 Inch Orifice Plate Kit

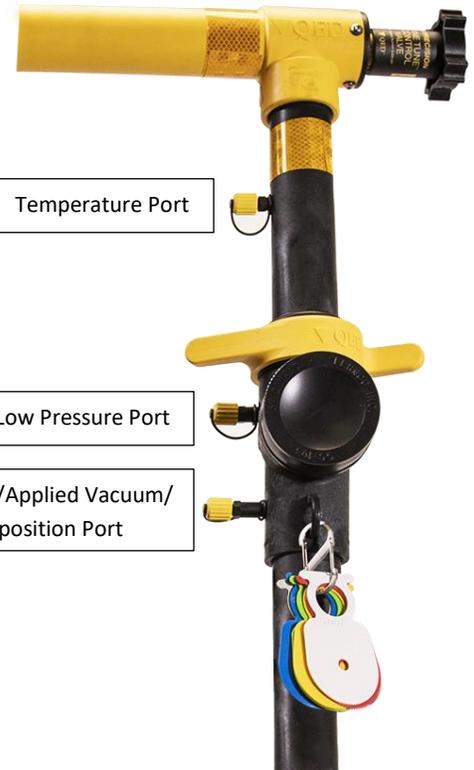
Model	Hole Size	Optimal Flow Range*
40664	1.25 (3.18 cm)	16 – 52 scfm
40666	1.75 (4.45 cm)	34 – 107 scfm
40668	2.10 (5.33 cm)	54 – 170+ scfm

Stainless Steel orifice Plates for Horizontal Wellheads

40690 – 2 Inch Orifice Plate Kit:

Model	Hole Size	Optimal Flow Range*
40691	0.40 (1.01 cm)	1 – 5 scfm
40692	0.50 (1.27 cm)	2.5 – 8 scfm
40693	0.75 (1.90 cm)	6 – 19 scfm
40694	1.00 (2.54 cm)	11 – 34 scfm
40695	1.25 (3.18 cm)	18 – 56 scfm
40696	1.40 (3.56 cm)	24 – 75+ scfm

Available Vacuum (System) Port



Temperature Port

Low Pressure Port

High Pressure/Applied Vacuum/
Gas Composition Port

* For best practice and most efficient operation, use the next smaller orifice plate when the pressure differential is less than 0.5 inches of water column; Use the next larger orifice plate when the pressure differential is greater than 5 inches of

The included S-Biner® Stainless Steel Dual Carabiner is designed and engineered by Nite Ize, Inc. in Boulder, CO USA. MANUFACTURED IN CHINA. Patent and Trademark Information at Niteize.com/IP. The distinctive shapes, styles, configuration and overall appearance of all Nite Ize products are trademarks of Nite Ize,



Terms, Conditions & Warranty

Five Year Warranty

This limited warranty is in lieu of and excludes all other representations made by advertisements, distributors, agents, or manufacturers sales representatives, 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. This warranty applies only when the product is installed, operated, and maintained in accordance with QED's written recommendations.

All warranty durations are calculated from the original date of purchase—determined as beginning the date of shipment from QED facilities and the date QED is notified of a warranty claim. This warranty shall be limited to the duration and conditions set forth below.

- 1. AP4+, AP4.5 Auto Pumps** - Warranted for five (5) years: 100% material and 100% workmanship. This limited warranty coverage only applies to long and short AP4+, AP4.5 Pumps purchased with this warranty. There will be no warranty for application or material compatibility. The materials used in pumps vary depending upon application and the customer is responsible for knowing the environment in which the pump will be operating and working with QED to determine what materials of construction will be best for the application. The warranty is valid when the following conditions exist: when the site has a pH between 2 and 12, has a salinity of 9,000ppm or less, is between 40 and 180 degrees Fahrenheit (250 degrees F for high temperature pumps), is noncorrosive to the construction materials of the pump, and is not abrasive. Typical commercial fuels are acceptable materials in free and dissolved phase. The pumps and accessories must be operated within the specifications and limits given in the manual for the particular piece of equipment.
- 2. Hose, Tubing, Fittings, And Air Filtration Housings** - Warranted for one (1) year: 100% material and 100% workmanship. There will be no warranty for application or material compatibility. The materials used vary depending upon application and the customer is responsible for knowing the environment in which the equipment will be operating and working with QED to determine what materials of construction will be best for the application.
- 3. Wellheads, Well Caps, Flow Meters, Pneumatic Data Modules** - Warranted for one (1) year: 100% material and 100% workmanship.
- 4. Precision Fine Tune Control Valves** - Warranted for two (2) years: 100% material and 100% workmanship.
- 5. Parts and Repairs** - Warranted for ninety (90) days: 100% material and 100% workmanship; when repairs are performed by QED or its appointed agent; 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: 100% materials and 100% workmanship.

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

Chemical attack by liquids, gases or abrasive substances 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 buyer's application. QED will only warrant that the supplied 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 modified by persons other than QED service personnel (unless such modification by others is made with the written consent of QED); resold to other parties; and/or moved to or used on a site other than



originally specified.

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.

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.

Illustrations and Drawings

Reasonable 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. However, products may change to meet user requirement and therefore may not be reflected in the literature. In addition, literature may be updated to reflect the most recent equipment revision(s). Changes to either or both equipment and/or literature can be made without notice.

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.

Changes without Notice

Prices and specifications are subject to change without notice.

Shipping Dates

Shipping dates are approximate and are subject to delays beyond our control.

F.O.B. Point and Title

All material is sold F.O.B. factory. Title to all merchandise sold shall pass to Buyer upon delivery by Seller to carrier at factory. All freight insurance is the responsibility of the Buyer and shall be charged to the Buyer on the invoice unless directed in writing. All Freight claims are the Buyer's responsibility.

Terms

Payment terms are Net 30 days; 1.0% per month past due.

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.

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.

Warranty Claims Procedure (Responsibility of purchaser)

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:

1. 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.
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. After obtaining authorization from QED, sending the malfunctioning component via a RMA# (Return Material Authorization number) to the address below or to its appointed agent:

QED Environmental Systems
2355 Bishop Circle West
Dexter, MI 48130

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. All equipment returned to QED will be appropriately cleaned of contamination before shipping.



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A Graco Company
The Graco logo consists of a blue square with a white stylized "G" inside, followed by the word "GRACO" in a bold, black, sans-serif font.

