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DigiVac

Home of Vacuum Engineering Excellence

Precise Practical Personal

DIGIVAC Model 450

INSTRUCTION MANUAL

Digital Vacuum Gauge and Vacuum Level Controllers

YOU MUST READ THIS MANUAL BEFORE USE



The Digivac Company

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www.Digivac.com

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CONTENTS

1.0 Description and Principle of Operation

2.0 Construction

3.0 Unpacking and Inspection

4.0 Installation

5.0 Operation
- 5.1 Switch Functions
- 5.2 Software

6.0 Servicing, Maintenance and Calibration
- 6.1 Factory Repair and Calibration

7.0 Notes on Calibration

8.0 Understanding Torr

9.0 Accessories and Modifications

10.0 Attachments, Illustrations and Specifications

11.0 Terms and Conditions

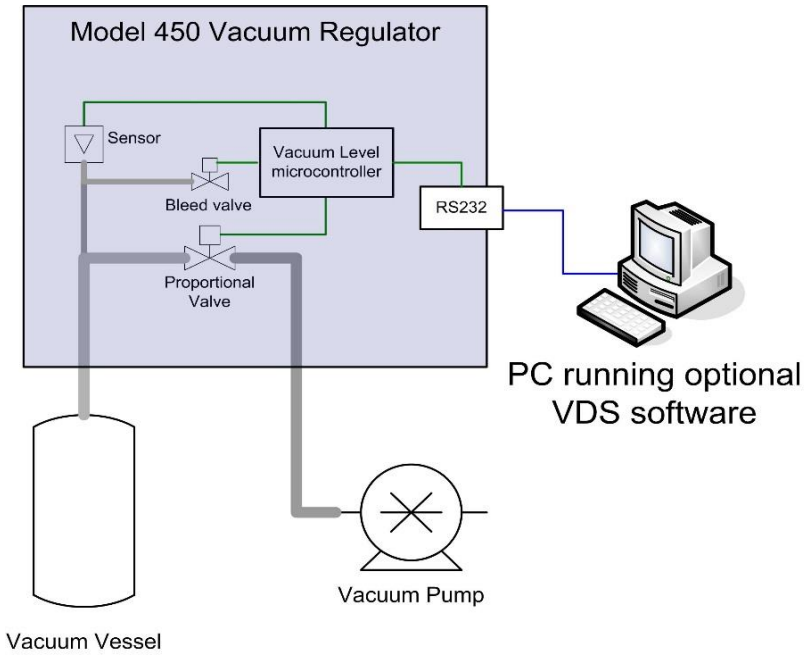
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1.0 DESCRIPTION AND PRINCIPLE OF OPERATION

The DIGIVAC Model 450 Digital Vacuum Gauge is a self-contained, vacuum level control unit for maintaining pressures between 2 and 760Torr. This instrument works in conjunction with a precision isolated integrated circuit pressure transducer, and a large bore proportional solenoid valve to measure and control vacuum.

It has a proportional valve that allows the controller to make precise changes in vacuum flow to achieve a very stable vacuum level. The unit has a bleed valve that adds bleed control from atmospheric pressure, or customer supplied gas.

The DigiVac Model 450 operates when the valve opens proportionally from 0 to 100%. The voltage to the valve is controlled by using a PWM (FET transistor pulse width modulating) technique, which allows precise positioning of the valve plunger without developing heat or EMI (electro-magnetic interface.



2.0 CONSTRUCTION

The Model 450 is housed in a vinyl clad metal enclosure. The valves and plumbing are mechanically fastened to the Aluminum plate base. The circuitry and wiring all terminate on a control board, near the display,

It has full manual control available via a dial on the front panel, or can be controlled remotely via RS232.

The Model 450 includes an easy to read, back-lit LCD display with an intuitive readout of the current vacuum level set point, current vacuum level, valve duty cycle, and mode.

3.0 UNPACKING AND INSPECTION

After the DIGIVAC Model 450 is received, it should be carefully unpacked and inspected for damage during shipment and for completeness. In the event of a loss shipment, a claim should immediately be made to the common carrier as applicable.

Each Model 450 should come with:

A vacuum gauge controller
An isolated vacuum sensor (internal) or optional outboard capacitance manometer
An AC adapter that runs on 100-230VAC, 50/60 Hz with line cord
Pre-tested under actual vacuum against a NIST standard

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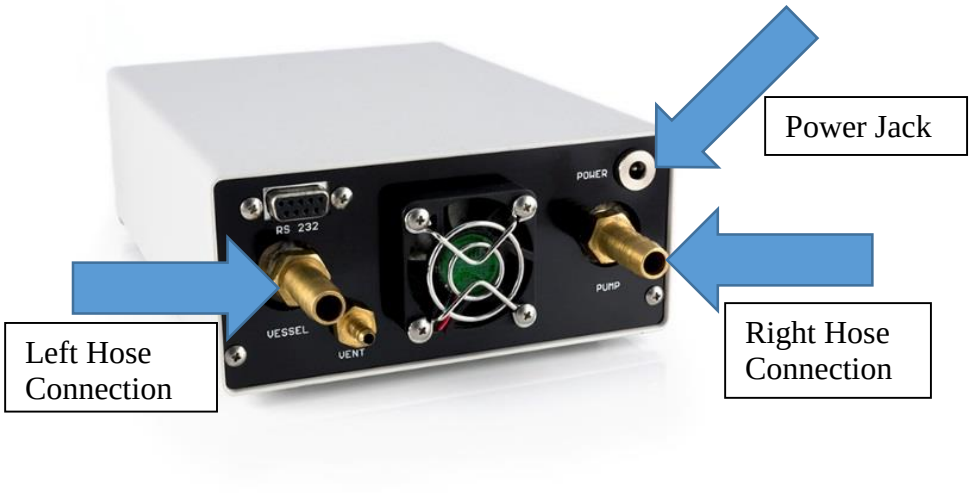
4.0 INSTALLATION

Position the unit as desired and make the following connections:

- Connect the power supply to AC power 115 to 230 volts 50/60/400 Hz.
- Connect the power jack to the rear of the unit
- Connect the Right Hose connection (as seen from the rear of the unit) to the vacuum pump
- Connect the Left Hose connection (as seen from the rear of the unit) to the system
- Connect RS232 (if applicable)

Rack Installation:

The unit may be mounted in a standard rack with tray fittings available from VWR Scientific and other vendors.



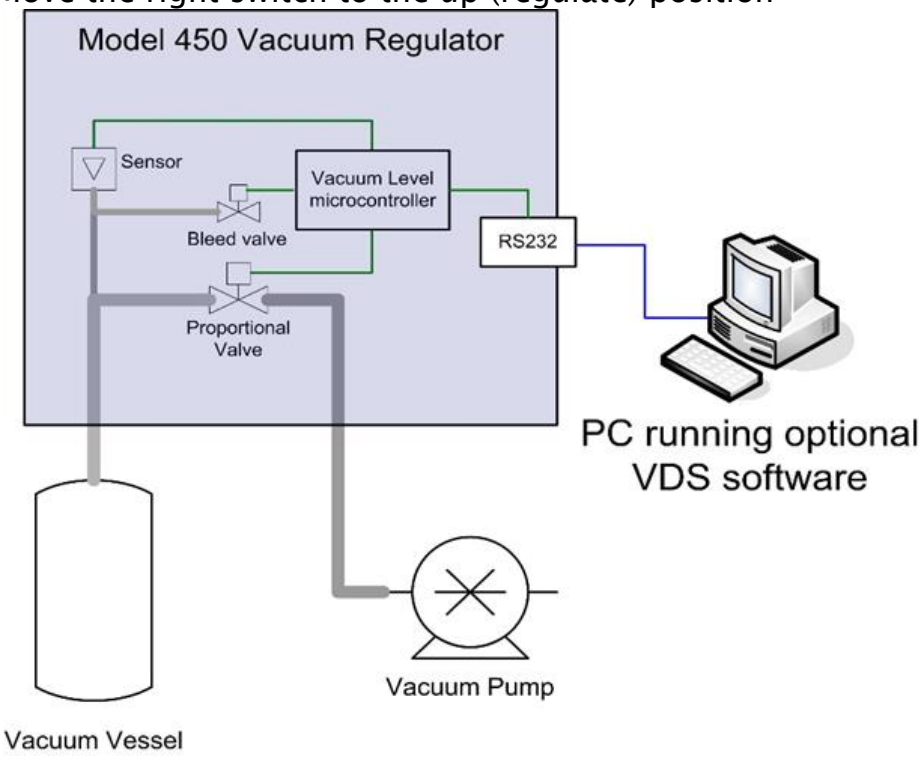
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5.0 OPERATION

After installation, the instrument is ready for immediate operation.

To operate:

- Plumb the unit in between vacuum pump and vessel
- Attach source of bleed air, (if nothing is attached, atmospheric air will be used)
- Place both front panel toggle switches in the center position
- Using the set point adjustment knob, set the desired system pressure
- Move the right switch to the up (regulate) position



The unit will now read:

- The first line shows the current pressure and the set point
- The second line shows the percent the valve is open, followed by mode of operation

760 Torr	758 Set
48% pwm	loc or RMT

5.1 SWITCH FUNCTIONS

Controls

Loc (local control)	Vacuum control will proceed according to the mode of operation selected on front panel switches
RMT (remote control)	Ignores front panel local control settings, controlled remotely via RS232. Remains in RMT until released by a Loc command (or power cycle)

Modes of Operation (right switch)

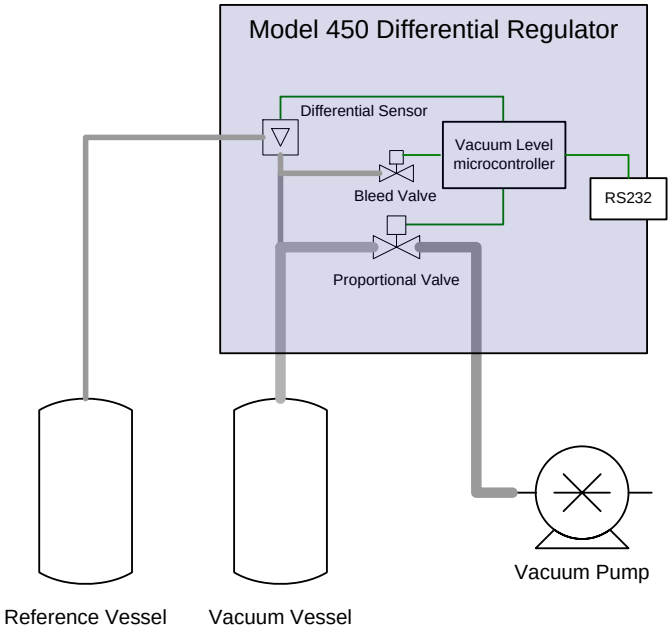
Regulation (up position)	regulates vacuum according to selected set point
Off (center position)	standby mode
Full (down position)	opens valve fully regardless of selected set point setting

Purge Control (left switch)

Vent (“up” position)	Placing the switch in the “up” position causes the vent valve to open relieving system pressure
Purge Switch	The center position is standby mode (no venting)
Ref	Used for custom features, such as the differential control feature



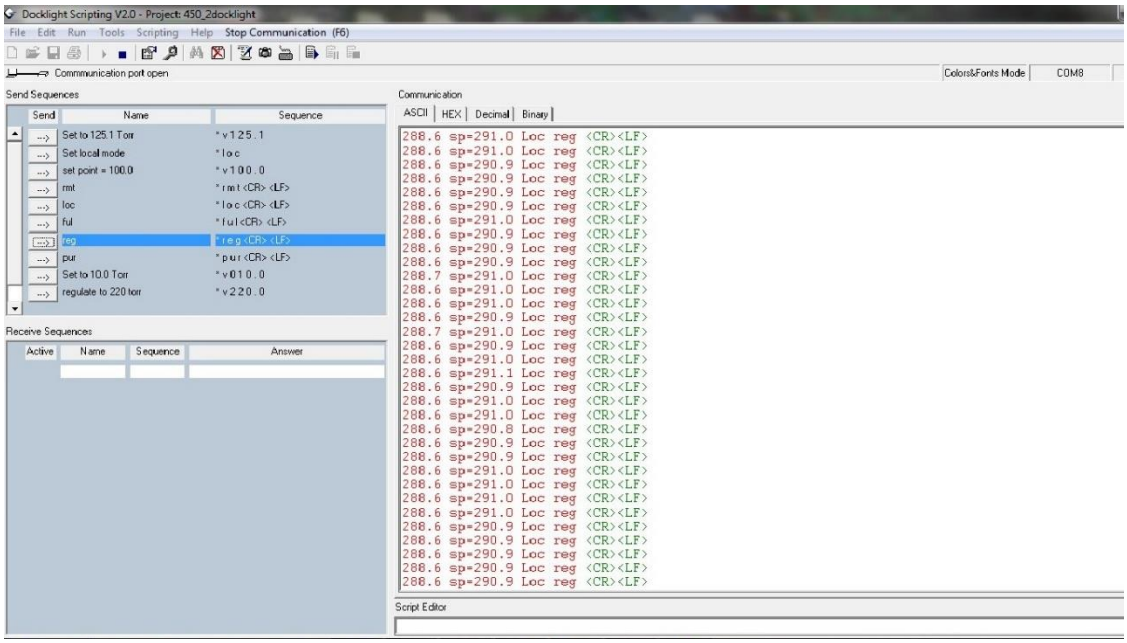
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In the differential configuration, when the unit is in "REF" mode it will regulate the pressure in the vacuum vessel to the same pressure in the reference vessel

5.2 REMOTE CONTROL VIA RS232

The model 450 can be controlled via RS232 by a simple command set, using a terminal program such as Putty (http://www.putty.org/) or Docklight (http://docklight.de/). A docklight command set project is available for download at http://www.digivac.com/product/model-450/ . Serial protocol is 9600-8-N-1. The m450 transmits data at approximately 1 line per second.



450 commands:

*rmt <cr> <lf> enables remote mode
*loc <cr> <lf> return to local mode
*ful <cr> <lf> full on (valve 100% open)
*off <cr> <lf> off (valve 0% open, closed)
*reg <cr> <lf> regulate
*pur <cr> <lf> purge (vent)
*v123.0 <cr> <lf> set vacuum to 123 Torr
(Note the set point must be sent in
a format of XXX.X, although tenths are not
indicated on local display.)

6.0 SERVICING AND MAINTENANCE

MAINTENANCE

Your vacuum controller should give you many years of trouble free service. There are no regularly scheduled maintenance intervals. If consistent accuracy is required, it is recommended that the instrument and power supply tube be returned for a yearly calibration check.

6.1 FACTORY REPAIR AND CALIBRATION

The 450 vacuum control is designed to provide years of trouble-free service, and the liberal internal use of plug-in components make it easily repairable. No field servicing of the unit is recommended, but factory servicing and calibration are available at a nominal cost and fast turn-around times.

7.0 NOTES ON CALIBRATION

Each DigiVac vacuum controller is calibrated and ready for immediate use. Consult factory if the calibration is in question.

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8.0 UNDERSTANDING TORR

The DIGIVAC vacuum instrument and many similar instruments are calibrated in microns or "milliTorr." It is appropriate to discuss what microns are and to relate microns to other measures of pressure and vacuum. Microns are not really a measure of vacuum at all, but rather of absolute pressure. It will be recalled that the pressure of the atmosphere is 14.696 or approximately 14.7 pounds per square inch at sea level. This pressure is due to the weight of all of the air in the earth's atmosphere above any particular square inch. This 14.696 psi is equivalent to the pressure produced by a mercury column of approximately 29.92 inches high or .76 meters (about 3/4 of a yard) or 760 millimeters of mercury. Atmospheric pressure varies greatly with altitude. It decreases approximately 1 inch of mercury per thousand feet of altitude. It also varies widely with local weather conditions. (Variations of one half inch in a single day are common.)

The word vacuum means pressure lower than atmospheric or "suction," but, in describing negative pressure, the atmosphere is only a satisfactory reference if we are dealing with values of vacuum down to about 27 inches of mercury. Below that, it is much more useful to talk in terms of absolute pressure, starting from absolute zero.

The Model 450 measures from 2-760 Torr. One TORR, a commonly used unit, is an absolute pressure of one millimeter of mercury. A milliTorr is equal to one thousandth of a TORR. A MICRON is the same as a milliTorr.

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9.0 ACCESSORIES AND MODIFICATIONS

Optional Features:

Options	Description
NISTCal	Calibration of a DIGIVAC vacuum gauge against a NIST traceable standard with data
SS	Makes vacuum path mostly composed of stainless steel to reduce effects of a corrosive environment
Differential	Gives the ability to control a differential vacuum level from -3.0 to +3.0 PSI

Please consult the product guide and website for the latest available.

10.0 SPECIFICATIONS

Range	1-760
Units	Torr
Bleed Interface	3/32 inch Silicon I.D Hose
Vac Interface	3/8 inch I.D. Hose
Sensor	Isolated Transducer or capacitance manometer
Display	Blue LCD Character 16x2
Dimensions	2.75" high, 5.5" wide, 7.5" deep
Power	100-240VAC 50/60 Hz CE rated

INSTRUMENT ACCURACY

0 to 20 Torr	+/- 1 Torr
21 to 760 Torr	+/- 2 Torr

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For repair or recalibration, return gauges to:

The DigiVac Company
105B Church Street
Matawan, NJ 07747
Ph: 732.765.0900
Fax: 732.765.1800
E-mail: Direct from our website www.DigiVac.com

The DigiVac Company manufactures a complete line of vacuum gauges and process computers. Contact us or your distributor if you wish for further information.
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11.0 TERMS AND CONDITIONS

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