VACUGUARD USER'S GUIDE

PORTABLE VACUUM MEASUREMENT

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SECTION & TITLE

PLEASE READ THIS MANUAL THOROUGHLY BEFORE USING THIS INSTRUMENT. REPORT ANY PROBLEMS IMMEDIATELY.

CHAPTER 1

Description

The VacuGuard is a small, self-contained instrument, designed to power and read Televac 2A series or competitor compatible DV4 and DV6 series thermocouple sensors. The VacuGuard is powered by a 1.5V 'D' cell and will accept either single use or rechargeable 'D' cells. Front panel controls consist of a toggle power switch and a three-position sensor select switch. The digital display is a four digit; seven segment red LED, 0.6" high, protected by a red neutral density filter that permits use in bright ambient conditions. The instrument reads directly in torr or millitorr. Overall size is: 4"x2.5"x5.5". Instrument weight is 23 oz.

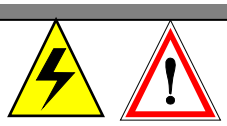
FEATURES

- Wireless Portability: A replaceable "D" cell eliminates 110VAC extension cords and their associated safety hazards.
- Rugged Construction: Powder coated extruded aluminum enclosure and an available hands-free carrying case will go the distance for years of productive service.
- Large Digital Display: Bright red LED display won't wash out in direct sunlight.
- Display reads in Torr or Millitorr, as appropriate to sensor type
- Position switch permits reading Televac 2A/ 2A Mini or DV4 and DV6 sensors.

CHAPTER 2

Safety Instructions

START BY READING THESE IMPORTANT SAFETY INSTRUCTIONS AND NOTES collected here for your convenience and repeated with additional information at appropriate points in these instructions.



These safety alert symbols in this manual or on the Product rear panel mean cautions - personal safety, property damage or danger from electrical shock. Read these instructions carefully.

In these instructions the word "product" refers to the **MV2A** and all of its approved parts and accessories.

NOTE: **These instructions do not and cannot provide for every contingency that may arise in connection with the installation, operation, or maintenance of this product. Should you require further assistance, please contact Televac at the address on the title page of this manual.**

This product has been designed and tested to offer reasonably safe service provided in it's installed, operated and serviced in strict accordance with these safety instructions.

Failure to comply with these instructions may result in serious personal injury, including death, or property damage.

- These safety precautions must be observed during all phases of operation, installation, and service of this product.
- Failure to comply with these precautions or with specific warnings elsewhere in this manual violates safety standards of design, manufacture, and intended use of the instrument. Televac disclaims all liability for the customer's failure to comply with these requirements.

The service and repair information in this manual is for the use of Qualified Service Personnel. To avoid shock, do not perform any procedures in this manual or perform any Servicing on this product unless you are qualified to do so.

- ***READ Instructions***:
  Read all safety and operating instructions before operating the product.

- ***RETAIN instructions***:
  Retain the Safety and Operating Instructions for future reference.

- ***HEED warnings:***
  Adhere to all warnings on the product and in the operating instructions.

- ***FOLLOW instructions:***
  Follow all operating and maintenance instructions.

- ***ACCESSORIES***:
  Do not use accessories not recommended in this manual as they may require a technician to restore the product to its normal operation.

To reduce risk of fire or electric shock, do not expose this product to rain or moisture.

Objects and Liquid Entry – Never push objects of any kind into this product through openings as they may touch dangerous voltage points or short out parts that could result in a fire or electric shock. Be careful not to spill liquid of any kind onto the products.

Do not substitute parts or modify instrument.
Because of the danger on introducing additional hazards, do not install substitute parts or perform any unauthorized modifications to the product. Return the product to Televac for service and repair to ensure that safety features are maintained. Do not use this product if it has unauthorized modifications.

Install the Battery

A convention 1.5 volt “D” size dry cell battery is provide with the VacuGuard instrument unless you’ve purchase the optional 1.5 volt NiCad rechargeable battery. You will need to install the battery. Access to the battery compartment will be found on the rear on the instrument case.

Fit a quarter or wide blade screwdriver into the slot on the battery compartment cover. Turn the cover 90 degrees counter clockwise. The alignment tabs on the interior of the cover should be visible at the 6 and 12 o’clock positions in the slots of the battery compartment. Turn the instrument to a vertical orientation and allow the cover to fall into your hand.

Insert the battery into the compartment with the positive (+) terminal facing toward the rear of the instrument. The negative (-) contact plate inside the compartment is spring-loaded, allowing for battery travel of as much as 0.75” Align the battery compartment cover over the end of the battery, so that the alignment tabs are again at the 6 and 12 o’clock positions. Press the cover into place and rotate it 90 degree clockwise with a quarter or flat blade screwdriver to lock the cover into place.

Install the Cable(s)

The VacuGuard is equipped to power and display the output of either Hastings type DV4, DV6 or Televac 2A series thermocouple sensors. Two modular (RJ Type) cable ports are provides for this purpose on the rear of the instrument. A DV4/DV6 cable will fit into the left hand port, while one of the two type 2A cables will fit the right hand port. Note that while the modular plugs are of different sizes, the modular plug of the 2A cable will fit either port, but will only work properly in the correct right hand port. The DV4/DV modular plug will only fit the left hand port.

If you are planning to use both sensor types, be sure to install only one cable at a time. Install a cable now.

Test your VacuGuard

Connect the cable you've installed in step 3 to the proper thermocouple sensor. Move the selector switch to the position for that sensor and turn on the instrument's power switch. Record the sensor's reading. In routine operation, the instrument's display will flash about once per second.

We highly recommend you purchase a reference standard for the type of thermocouple sensor you are using. The reference standard will allow you to verify the correct operation of the VacuGuard Instrument. A list of recommended spares and options are noted on **Chapter 8** of the User's Guide.

0-1000 MICRONS	+ - 1 MICRON	34,35,36……998,999,1000
1000-2000 MICRONS	100 MICRONS	1000,1100,1200…..1999,2000
2 TORR (2000 MICRONS) – 20 TORR	0.1 TORR	2.1,2.2,2.3…….19.8, 19.9, 20.0
If the display has a decimal point	TORR UNITS	

MV2A UNITS DISPLAY

CHAPTER 6

Useful Information

Vacuum Terminology and the VacuGuard

- Atmospheric pressure is defined at 760 torr (at sea level, when the barometric pressure is 29.92 Hg).
- One torr is 1/760 of atmospheric pressure. One torr can also be expressed as 1000 millitorr or 1000 Microns.
- One millitorr or one micron is 1/760,000 of atmospheric pressure.

The thermocouple sensor that are used with your VacuGuard instrument are designed to measure a small portion of that wide band of reduce pressure that extends from atmospheric pressure to a region known as very ultrahigh vacuum (~$1x10^{-14}$ torr). This total spectrum of measurable vacuum contains about 18 decades of pressure.

For example:

The TELEVAC 2A series sensor measure from 20 torr to 1 millitorr. *Five decades.*
The DV-6/DV-6R sensors measure from 1 torr to 1 millitorr. *Four decades.*
The DV-4 measures from 20 torr to 0.1 torr. *Two decades.*

Please realize that the smaller the dynamic range of the sensor, the less visibility the user has to pressure changes.

Practical issues to consider with thermocouples sensors

- The most common failure mechanism is gross contamination. If there is a probable risk of contamination by particulate or liquids, we recommend the use of one of our sensor filters.
- Vertical orientation with electrical pins "Up" (where practical) is usually preferred to inverted or horizontal orientation.

- If your application requires a sensor that's immune to shock, vibration, excessive heat and/or severe weather conditions, contact us for information on our family of Miniature 2A sensors.
- It is usually useful to have a known reference to periodically check the instrument and/or sensor performance. Refer to the information the next page about our expensive reference standards.

Contacting us

- Our main telephone number: 215-938-4444 and normal hours are 8:00 am to 5:00 pm eastern time.
- Our Fax number: 215-947-7464
- Our main email address: vacuum@televac.com
- You can locate the name and contact information of your local TELEVAC representative through our website: www.televac.com

Troubleshooting

No Digital Display

- Power switch is “off” => **Turn it “on”**
- Battery is dead => **Replace or recharge as appropriate**

Improper Reading

- Wrong cable or cable port is being used => **Choose correct cable or (see chapter 4).**
- Selector switch is wrong position => **Move to correct position (see chapter 5).**
- Thermocouple sensor may be defective => **Test a known good thermocouple sensor or reference standard.**

Entire display or a single decimal point is flashing

- Indication of low battery power => **Replace with a new or freshly recharged cell.**

Specifications

Software version 1.70

Power source
1.5 volt “D” size dry cell or optional NiCad battery
Cell Utilization
Approx. 60 hours per disposal cell or approx. 12-20 hours per NiCad charge *
Display
Red LED, 0.56” high, four digits
Sensor Input
Televac 2A or 2A Miniature, DV4 or DV6, DV6R compatible
Cable Interface
RJ modular jack
Display Output
Torr or Millitorr as appropriate to sensor type
Size
4.0”x2.5”x5.5”
Weight with battery
23 oz

* The rate of battery drain is a function of which brand thermocouple sensor is being measured.

Recommended Options & Spares

Televac 2A reference standard, 0 millitorr	P/n 2-2100-237
Televac 2A sensor cable	P/n 2-9800-081
Televac 2A miniature sensor cable, NASA type	P/n 2-9800-082
DV4/DV6 sensor cable	P/n 1-2400-036
Rechargeable NiCad battery, pack of 2 cells	P/n 1-5400-025
Battery charger	P/n 1-5400-024
Soft sided carrying case	P/n 1-2600-26

VACUGUARD W/2A CABLE, BAG	2-3001-103
VACUGUARD W/ 2AMINI CABLE, BAG	2-3001-104
VACUGUARD W/2A & DV4/6 CABLE,	2-3001-105
VACUGUARD W/2A &DV4/6 CABLE, w/ BAG & NICAD BATTERY & CHARGER	2-3001-106

Unpacking and inspection

Inventory the Contents

- Compare the list of items from your original purchase documents against the items listed on our shipping documents.
- Compare these against the actual contents of the shipping container.
- Report any differences to TELEVAC.

Damage

- In the unlikely event that the shipping container was damaged in transit, carefully inspect the contents for damage.
- If the MV2A Instrument or any of its accessories were damaged in transit, contact the freight carrier and tell them you wish to make a damage claim.
- Contact TELEVAC for further instructions on replacement of damaged materials.

Should any of the above problems be encountered, contact the factory immediately. Any unauthorized repairs will void the warranty.

Warranty Information

- The Fredericks Company warrants all instruments and components of its manufacture to be free of defects in materials and workmanship.

- Our obligation under this warranty is limited to servicing or adjusting any instrument returned to us and replacing any part, except those specifically exempt from this guarantee, which shall within one year after delivery to the original purchaser be returned to us with transportation charges prepaid, and which our examination should disclose to our satisfaction to have been defective. Those portions specifically exempt from this guarantee are gauge tubes, batteries as well as meters, which have been dissembled or physically damaged.

- The Fredericks Company does not assume any other obligation than that stated in this warranty nor does it authorize any person to assume for them any liability in connection with the sale, service or use of the Fredericks Company's instruments.