

Operating Instructions

KVM-W Series

**Wireless Series
Kilovolt Meters**

Version 1.1

WARNING

Before operating the instrument, be sure to read and fully understand the operating instructions. This instrument measures hazardous voltages. It is the responsibility of the user to ensure that the system is operated in a safe manner.



This equipment contains exposed terminals carrying hazardous voltages. There are no user serviceable components in the unit. All repairs and upgrades that require the unit to be opened must be referred to HIPOTRONICS or one of their nominated agents.

HIPOTRONICS and its sales partners refuse to accept any responsibility for consequential or direct damage to persons and/or goods due to the lack of observance of instructions contained herein or due to incorrect use of the equipment.

Further be aware that safety is the responsibility of the user!

Any correspondence regarding this instrument should include the exact type number, instrument serial number and firmware version number. With the exception of the firmware version number, this information can be found on the registration plate on the right panel of the instrument. The firmware version can be found in the bottom right corner of the settings window.

Unauthorized opening of the unit may damage the EMI protection of the system and will reduce its resistance to interference and transients. It may also cause the individual unit to be no longer compliant with the relevant EMC emission and susceptibility requirements. If the unit has been opened, the calibration will be rendered invalid and the warranty will be void.

Note

HIPOTRONICS has a policy of continuing improvement on all their products. The design of this instrument will be subject to review and modification over its life. There may be small discrepancies between the manual and the operation of the instrument, particularly where software has been upgraded in the field.

HIPOTRONICS retains the right to modify the functionality, specification or operation of the instrument without prior notice.

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Manual Conventions

In the manual, the following conventions are used:



Indicates a matter of note.

If it refers to a sequence of operations, failure to follow the instructions could result in errors in measurement.



Indicates hazards.

There is a risk of equipment damage or personal injury or death. Carefully read and follow the instructions. Be sure to follow any safety instructions given in addition to those for the site at which tests are being performed.

Foreword

Welcome, new user of the “KVM-W Series”. Thank you for placing your confidence in our product.

With the purchase of this measuring instrument you have opted for all the advantages that have built a world-wide reputation for a HIPOTRONICS Instrument: robustness, performance and quality. As a result, this instrument provides a solution which achieves the optimal combination of traditional know-how and leading edge technology.

This operating manual is designed for completeness and easy location of the required information. Customers who already have experience with this kind of equipment will find this document to be of assistance as an extended help.

If you find a mistake or inconsistency in the operating manual then please feel free to inform our Customer Support department with your corrections so that other users may benefit.

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1 Introduction

1.0 Receiving Instructions

When received, any possible transport damage should be noted. A written record should be made of any damage. A suitable remark should be recorded on the delivery documents.

A claim for damage must be reported immediately to the transport company and to the Customer Support Department of HIPOTRONICS or the local agent. It is essential to retain the damaged packing material until the claim has been settled.

Check the contents of the shipment for completeness immediately after receipt (See chapter "Scope of Supply"). If the shipment is incomplete or damaged, then this must be reported immediately to the transport company and the Customer Support Department of HIPOTRONICS or the local agent. Repair or replacement of the instrument can then be organised immediately.

1.1 General

The KVM-W Series AC/DC Wireless Kilovoltmeters are highly accurate, portable and modern voltage measurement and calibration systems. Each model in this series contains a high voltage divider assembly, wireless control and measurement device, durable carrying case, and mobile App. The carrying case and battery operation mode make the system completely portable for field testing, while the precision divider assembly and readout device make it suitable for laboratory use. The KVM-W Series products perform multiple functions including DC, AC Peak, AC RMS, AC Absolute Average, Frequency and Crest Factor measurements. Units are available in 100kV, 200kV, 300kV and 400kV for a wide variety of applications.

1.2 Scope of Supply

1.2.1 Standard Scope of Supply

The following items are supplied with the standard instrument:

Qty	Description
1	High Voltage Divider
1	Wireless Measurement Module
1	USB-C Charging Cable
1	20" BNC Cable
1	Mobile App (Available in Apple App Store)
1	Calibration Certificate

1.3 Technical Data: KVM-W

1.3.1 Physical and Environmental Specifications

Power Input for Charging	5VDC 2A
Operating temperature	14...122° F (-10 .. 50°C)
Storage temperature	-4...158° F (-20 .. 70°C)
Humidity	5 .. 95 % r.h. non-condensing
Dimensions (W x D x H)	Wireless Module: 7.3"x4.25"x3.3" (18.5cm x 10.8cm x 8.4cm) KVM100W-DO: 11"x11"x25" (28cmx28cmx62cm) KVM200W-DO: 11"x11"x45" (28cmx28cmx116cm) KVM300W-DO: 45.8"x41.7"x80.5" (116.4cmx106cmx204.4cm) KVM400W-DO: 45"x39"x103.2" (114.3cmx99cmx262cm)
Weight	Wireless Module: 2.5 lbs (1.1kg) KVM100W-DO: 11 lbs (5kg) KVM200W-DO: 26 lbs (11.8kg) KVM300W-DO: 260 lbs (118kg) KVM400W-DO: 280 lbs (127kg)

1.3.2 Measurement

Voltages	Accuracy: +/-1% reading Resolution 0.1kV
Frequency	Accuracy: +/- 1Hz Resolution: 1Hz

2 Safety



**Remember:
Hazardous voltage can shock, burn or cause death !**



The unit should only be operated after carefully reading the user manual which is an integral part of the instrument.

HIPOTRONICS and its sales partners refuse to accept any responsibility for consequential or direct damage to persons and/or goods due to none observance of instructions contained herein or due to incorrect use of the equipment.

Further be aware that Safety is the responsibility of the user!

2.0 General

Safety is the most important aspect when working on or around high voltage electrical equipment.

Personnel whose working responsibilities involve testing and maintenance of the various types of high voltage equipment must have understood the safety rules written in this document and the associated safety practices specified by their company and government. Local and state safety procedures should also be consulted. Company, regional or national regulations must be fulfilled beyond HIPOTRONICS recommendations.

If the instrument is damaged or it is possible that damage has occurred, for example during transportation, do not apply any voltage. The instrument may only be used under dry operating conditions.

Do not open the unit; it contains no user replaceable parts.

People with heart pacemakers should not be in the vicinity of this system during operation.



Safety is the responsibility of the user. Always operate the equipment in accordance with the instructions, always paying full attention to local safety practices and procedures.



This equipment must be operated only by trained and competent personnel who are aware of the dangers and hazards involved in testing transformers.

2.1 Essential Safety Recommendations



Before connecting the instrument ensure that the device-to-be tested is completely de-energized and isolated from both line and load. Every terminal should be checked and verified before connection of the instrument. Ground connections may be left in place.



Never operate the equipment in an explosive environment or where there are flammable gases or fumes



The instrument must always be grounded (i.e. a safety earth). It must never be operated in a non-grounded configuration as this may result in electrical shock to the user or damage to the instrument.

2.2 Summary

Note: Many accidents that happen around high voltage equipment involve personnel who are not familiar, or perhaps too familiar, with high voltage equipment. Staying alert and ever watchful requires constant training and awareness of the inherent hazards. The greatest hazard is the possibility of getting on a live circuit. To avoid this requires constant vigilance - for oneself and for one's fellow workers.

In addition to the obvious dangers, personnel should be alert to recognize subtle dangers as well. Therefore, **all terminals of a device under test, unless grounded, should be considered to be live while the test is in progress.**

Remember: Safety, FIRST, LAST, and ALWAYS !

3 Theory

3.0 Introduction

Each KVM high voltage divider is calibrated to a specific low-arm wireless module to ensure the highest accuracy and precision of the device. These systems can measure DC and AC waveforms, up to 1kHz, and transmit measurement data to our mobile KVM-W application. The remote app is designed to be simple, user friendly, and informative. The user now has the ability to view any two of the available measurement types at the same time through the application. A 'Hold' button is also located near the bottom of the screen on the app, that when pressed, will retain the instantaneous values of the measurements being displayed. The app also has the capability to record, save, and share test information. All of these new features will be explained in further detail in the remainder of the manual.

3.1 Test Standards

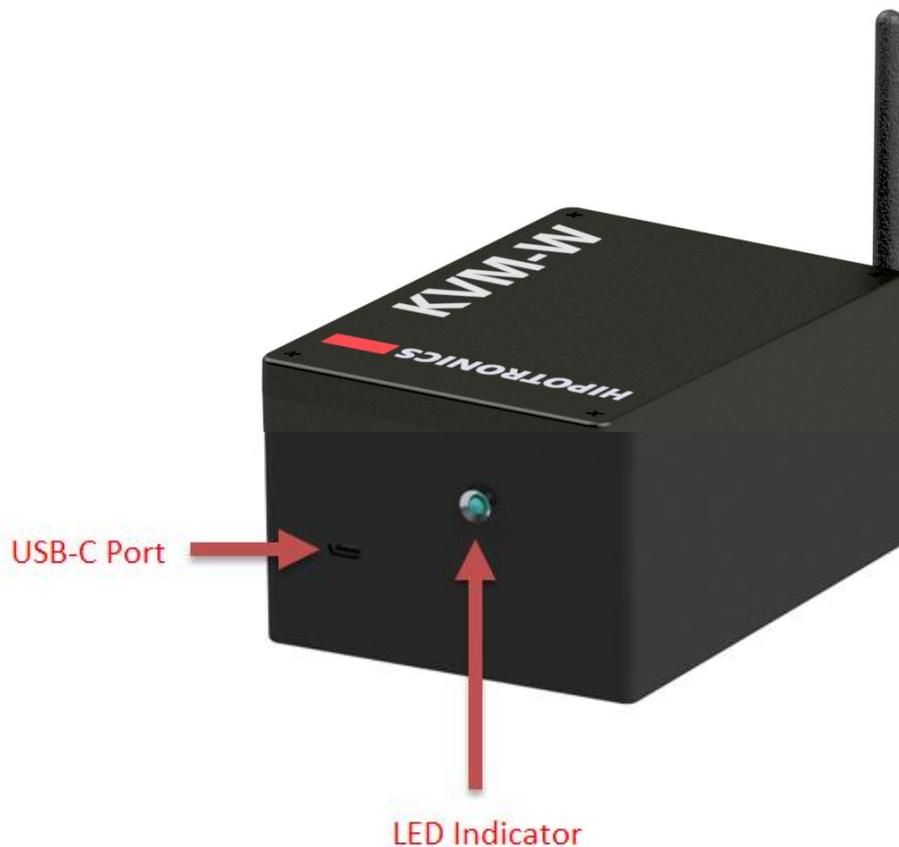
IEEE 4-2013 Measurement system requirement for approved measuring systems
IEC 60060-1

3.2 Application

AC or DC Calibration
High Voltage Measuring and Testing

4 Wireless Module

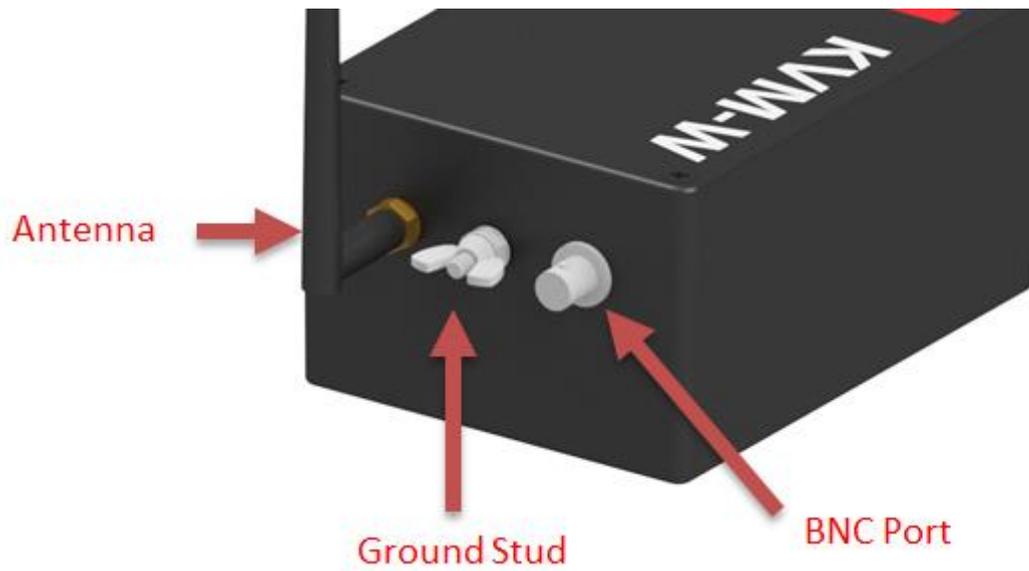
4.0 Ports



USB-C Port: Insert USB-C cable from 5V power module adapter to re-charge the KVM-W

LED Indicator:

- Programmable color from app
- Will turn off when app is not connected to it and not charging, and blink every 30 seconds while in sleep mode
- Will blink every 2 seconds when charging and not connected to an app, then go on solidly when charging complete
- Solid color when connected to app



Antenna: Increases wireless transmission range

Ground Stud: Attach ground cable to this in order to ensure proper reference grounding

BNC Port: Attach BNC from HV Divider to here

5 Connection and Setup

5.0 Ground Connections

First, make sure to connect the ground from the device-under-test to both the HV divider and KVM wireless module. The ground for the HV divider is located at the base, and the KVM wireless module ground stud is on the side (as indicated on pg 10).

5.1 Device Connections

The wireless module should be placed close to the divider and has an internal magnet to help secure it on a ferromagnetic surface.

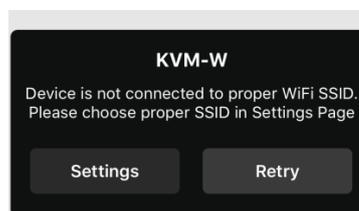
Once the proper ground connections are made, the high voltage portion of the device-under-test should be connected to the top spinning of the HV divider. The BNC cable should attach to the base of the HV divider and run to the KVM wireless module.

To recharge the wireless module, plug the USB cable into the USB-C port and the wall adapter into a mains outlet.

5.2 Connecting KVM-W to Mobile Device

To get the KVM-W app on your mobile device, go to the Apple App Store. Search for KVM-W or Hipotronics, and download the app.

Upon opening the KVM-W app, if you are not already connected to a KVM-W device through WiFi, it will prompt you to connect to one.

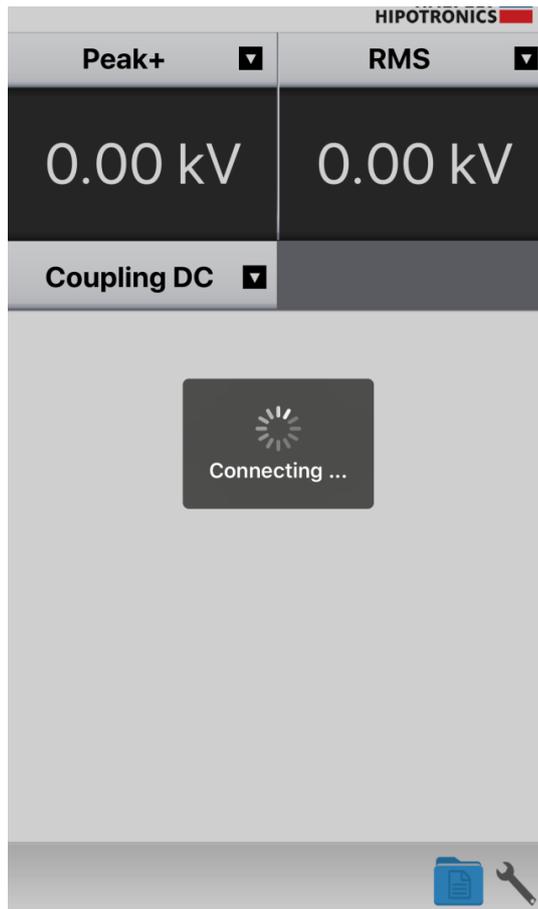


Click on Settings, and it will redirect to the WiFi settings page where you can see all the available devices to connect to. Select the desired KVM-W that you wish to connect to.

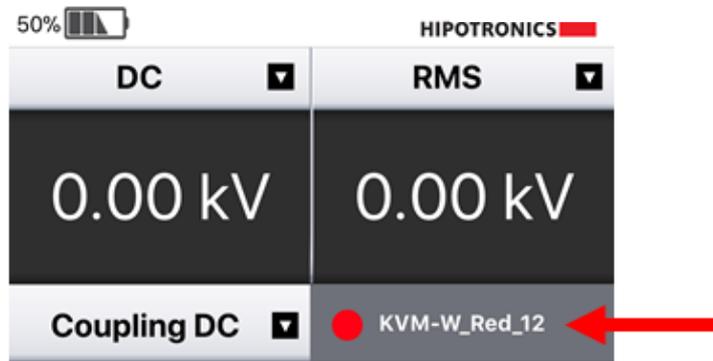
After a couple of seconds it should establish connection, indicated by a check mark next to the network name. Then return to the KVM-W app, either by hitting back in the upper left of the screen, or through normal iOS navigation.



Once returned to the KVM-W app, it will indicate that it is establishing measurement communication with the device as seen below.



If this connecting times out the first try, then press Retry. It should connect within a couple of seconds. If measurement connection is unable to be established, go back to the iPhone Settings menu and make sure you are still connected to the device's WiFi. Once connected, it will display the ID of the device below the right measurement display.

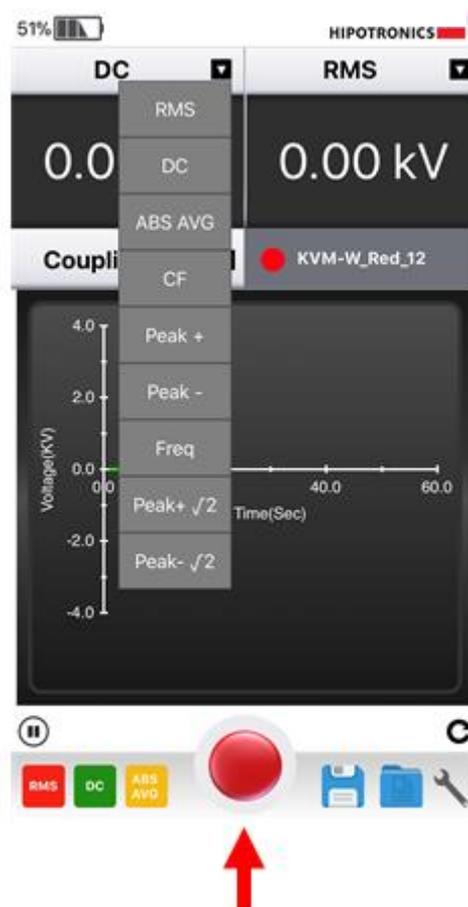


The LED indicator on the KVM-W will be a glowing a solid color when it is connected to a mobile device through WiFi. If there is no device connected to it, then it will automatically go into sleep mode, and the LED will blink once every 30 seconds. If you are charging the device while it is not connected to any mobile device, then the LED will blink every 5 seconds until it is done charging, in which it will then turn a solid color. If the LED does not blink at all after a minute, then the batteries are dead and it will need to be recharged.

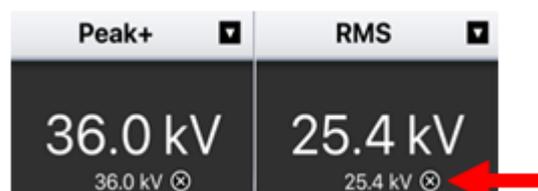
6 Operating Modes

6.0 Measurement Displays

Press the drop-down arrow on either of the top left or right measurement titles to choose from a list of available measurements, as seen in the image below. Both displays update constantly at a rate of 4 times per second. Below the left measurement display is an option for selecting either DC or AC Coupling.

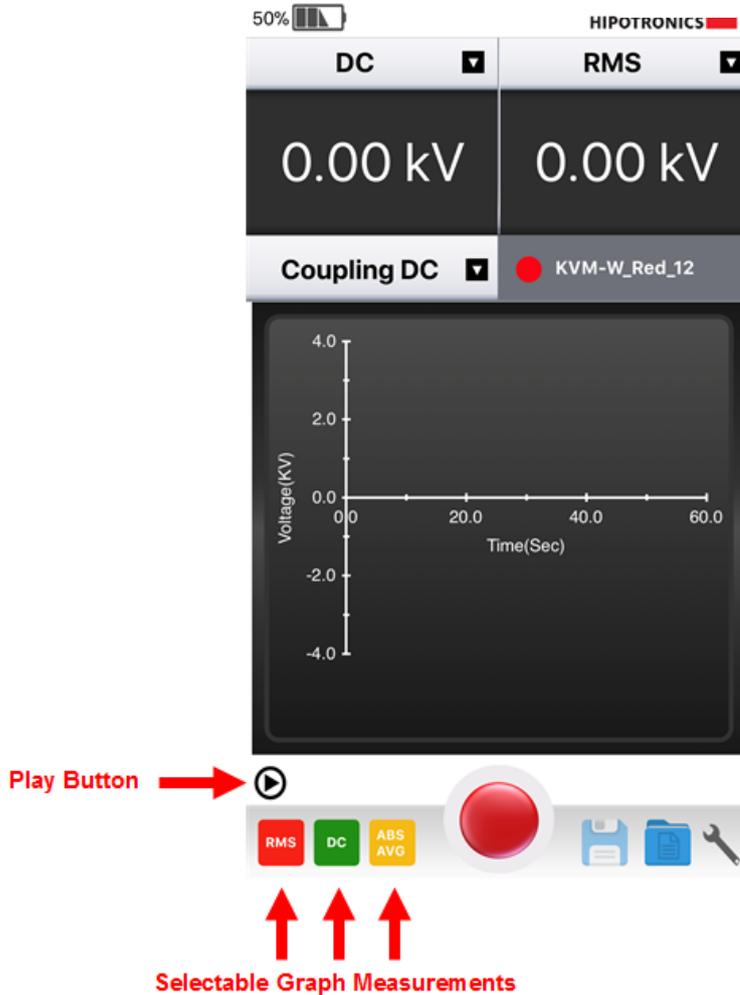


At the bottom middle of the screen, there is a hold button that, when pressed, will grab the instantaneous value of both measurements being displayed, and store them right below the main measurement display numbers. Each time this hold button is pressed, it will update these stored values. The hold values can be removed by pressing the 'x' just to the right of them.

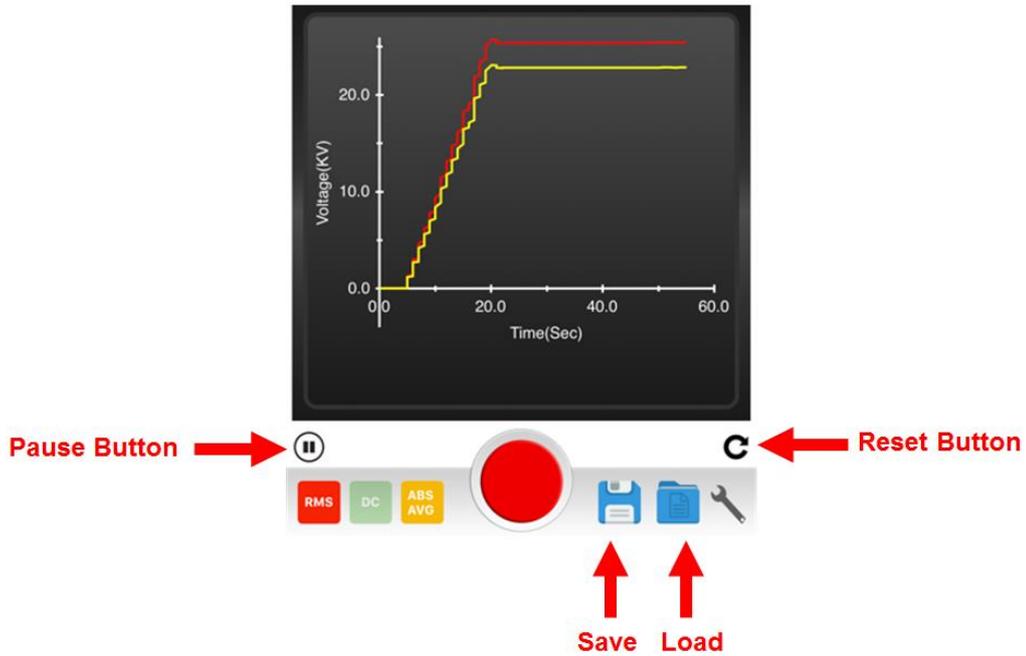


6.1 Graph

The app can record test data values for RMS, DC, and Absolute Average. To start recording, press the Play button located to the bottom left of the graph display. The graph will then begin updating automatically with incoming data values once per second. There are three selectable measurements to display on the graph. In the bottom left corner of the screen, the labelled buttons indicate whether the graph is plotting those values or not. To enable or disable any of those options, just click on the button. A solid color indicates that the measurement is being plotted, and if the button is mostly transparent, then it is disabled from the graph. The color of the button also correlates to its respective plotted line color on the graph.



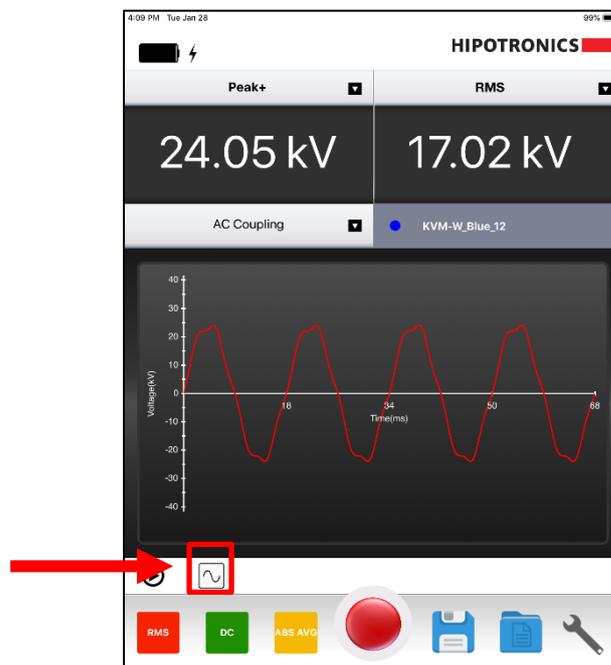
Once the Play button is pressed, the graph will begin updating, a Pause button will replace where the Play button just was, and a Reset button will appear under the right corner of the graph display. To stop recording values, press Pause. This will then replace the Pause button with the Play button. When ready to resume the test and continue recording values, press Play again. To reset the test and start a fresh recording of measurement values and graph, press Reset.



To save a report of the recorded values, press the Save icon in the bottom right side of the screen. You can then find these tests by pressing the Load icon.

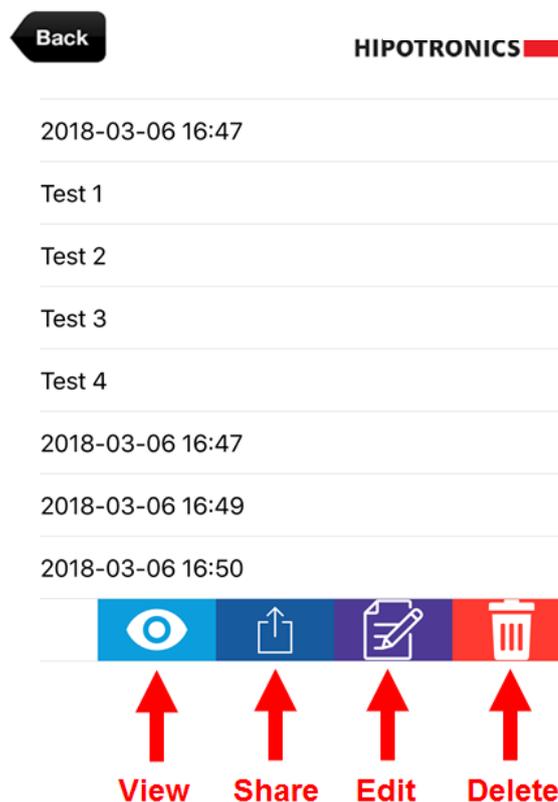
6.2 Waveform Capture

To view a snapshot of the signal that is currently being measured by the KVM-W, click the waveform button on the app, next to the graph play/pause button. The module will then transmit the information and display the signal on the graph area.



6.3 Reports

After pressing the Load icon in the main measurement screen, it will bring up the Reports menu screen where all of the saved tests will be listed. When you select a report, there will be an option to view, share, edit the name, or delete the report. To view a saved test, press the View icon, as indicated below, and it will display the graph from that test. To share a report, press the Share icon, as indicated below, and it will list several options that you can share through, including email, Numbers, etc. The report will be shared as a .csv file where the columns are time, rms voltage, dc voltage, peak voltage respectively. The name of the test can be changed by selecting the Edit icon, typing in a new title, and then pressing 'done'. If you wish to permanently delete the test report data, then press the Delete icon. Only 50 tests can be saved at one time.

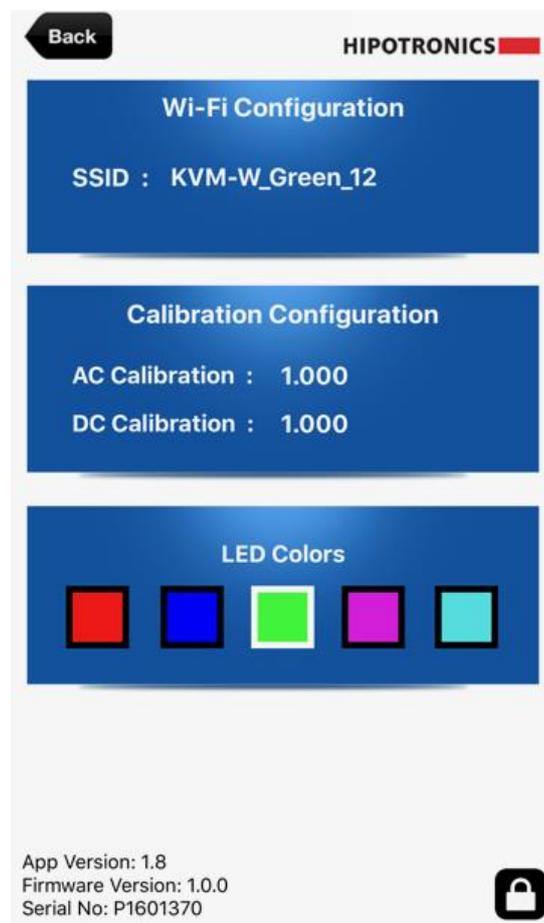


6.4 Settings

To get to the settings window, press the Settings icon in the lower right corner of the main measurements screen, as seen below.



Once in settings, you will have the ability to change the LED color display of the wireless module that you are connected to, and the SSID display name of the device. When either of these are changed, the app will need to reboot and reconnect to the wireless module. So after the app closes, it will direct you to the iPhone WiFi settings, where you can reconnect to the new SSID name or color, and then open the app again.



The app version, wireless device firmware version, and wireless device serial number are all displayed on the lower left corner of the settings window. The calibration values are viewable in the center of the screen, but are factory password protected for editing.

7 Troubleshooting

7.0 Diagnostics

Trouble connecting to the wireless KVM module from mobile device:

- Make sure your mobile device that you are trying to connect is within 50ft of the KVM wireless module.
- Make sure the wireless module has enough charge, the LED should blink once every 30 seconds if it is in sleep mode and waiting to be connected to. If you do not see the LED blink after 1 minute, charge the device.
- If the mobile device established connection in the iPhone WiFi settings page, but will not connect in the app, then press Retry a couple of times on the KVM-W app. If it still will not connect, close the app, disconnect from the KVM's WiFi, and try again. If you are still unable to connect, remove the charging cable, turn the unit off, and then on again.

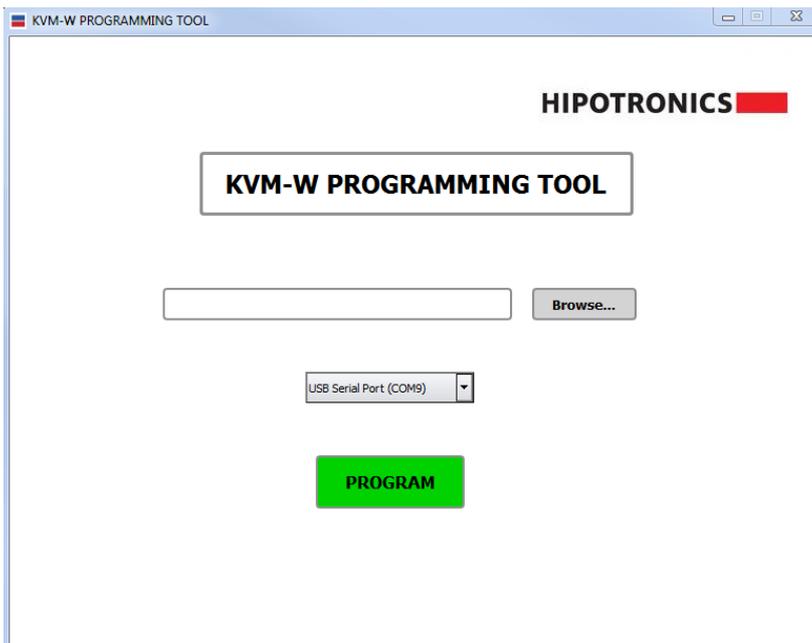
7.1 Warning and Error Messages

Low Battery Please Recharge the battery	
Please connect to new SSID	
Unable to Change Constant in Offline Mode	Connect to a wireless module
Invalid	Input to a dialog was invalid
Failed to Save	
Connecting...	The app is attempting to connect to the KVM
LED Indicators	

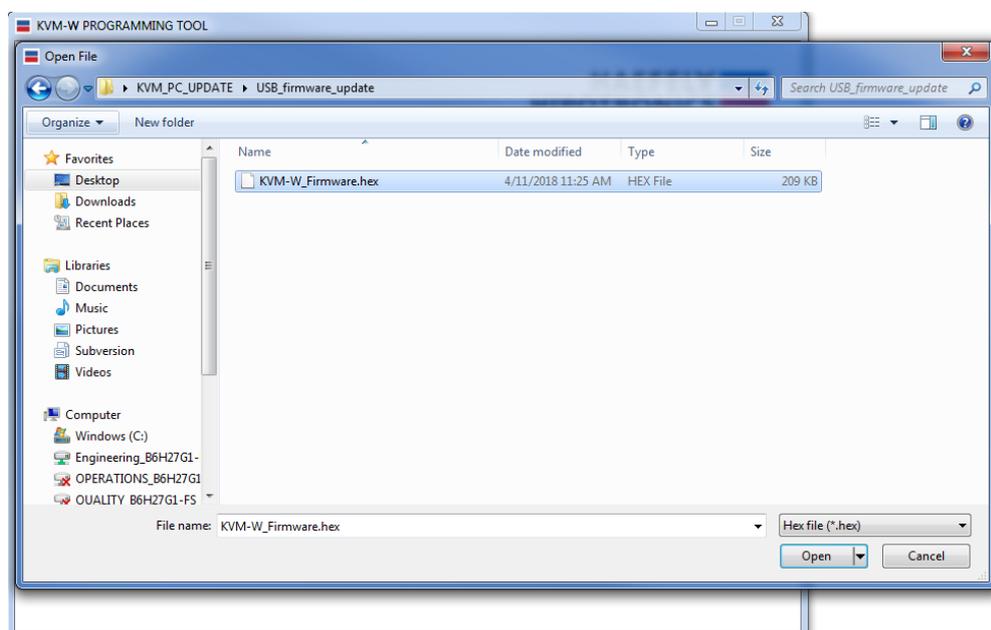
7.2 Firmware Update

1. If you have not done so on your computer already, install the USB CDM serial drivers
 - a. Run the CDM21228_Setup application that came on your USB drive with the KVM-W
 - i. Click 'Extract'
 - ii. Click 'Next'
 - iii. Select 'I accept this agreement'
 - iv. Click 'Next'
 - v. Click 'Finish'

2. Run the KVM-W_Programming_Tool that was included on your USB drive with the KVM-W



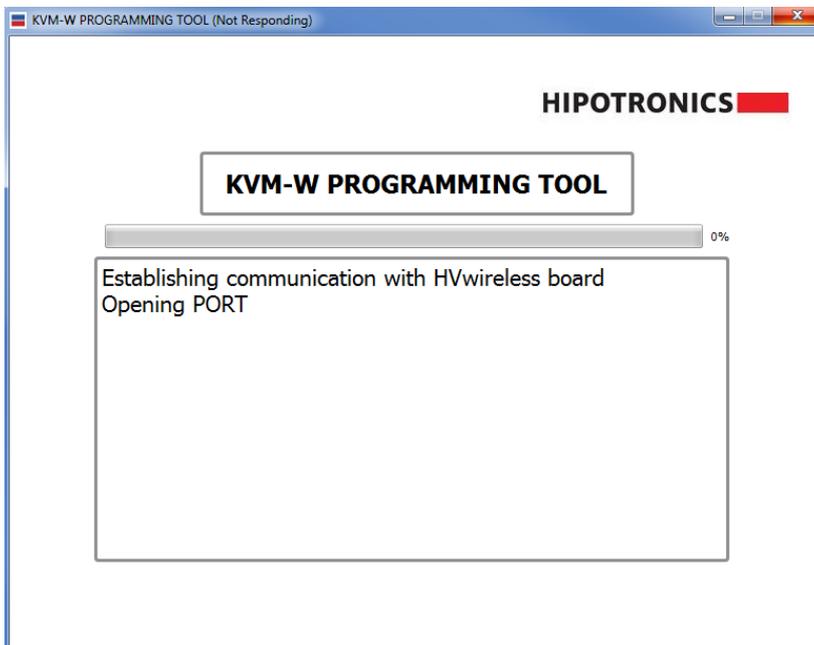
a. Click 'Browse...' and select the file on that same USB drive with the extension ".hex"



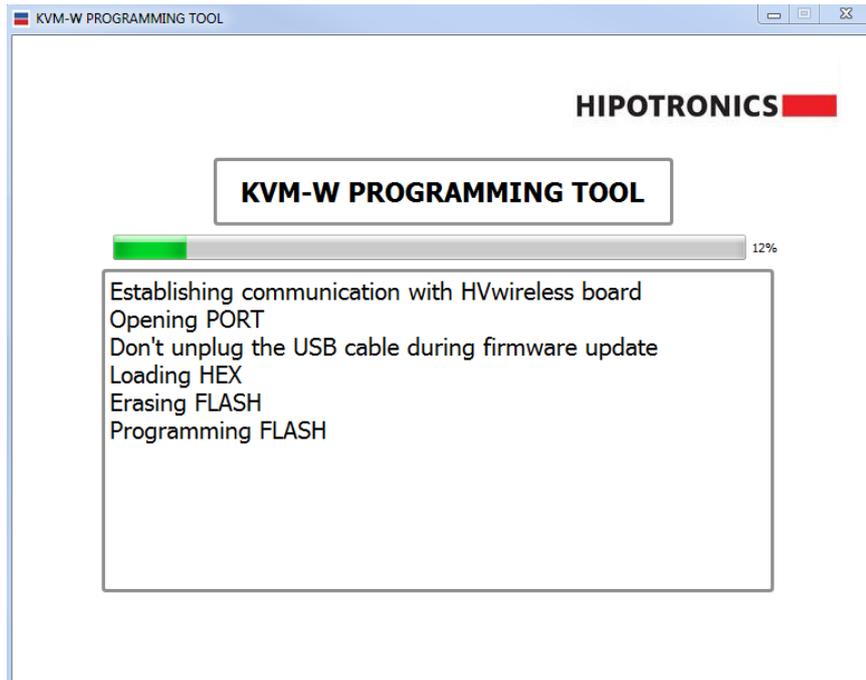
- b. Select the correct COM Port from the drop down menu, which should appear as “USB Serial Port (COM#)”



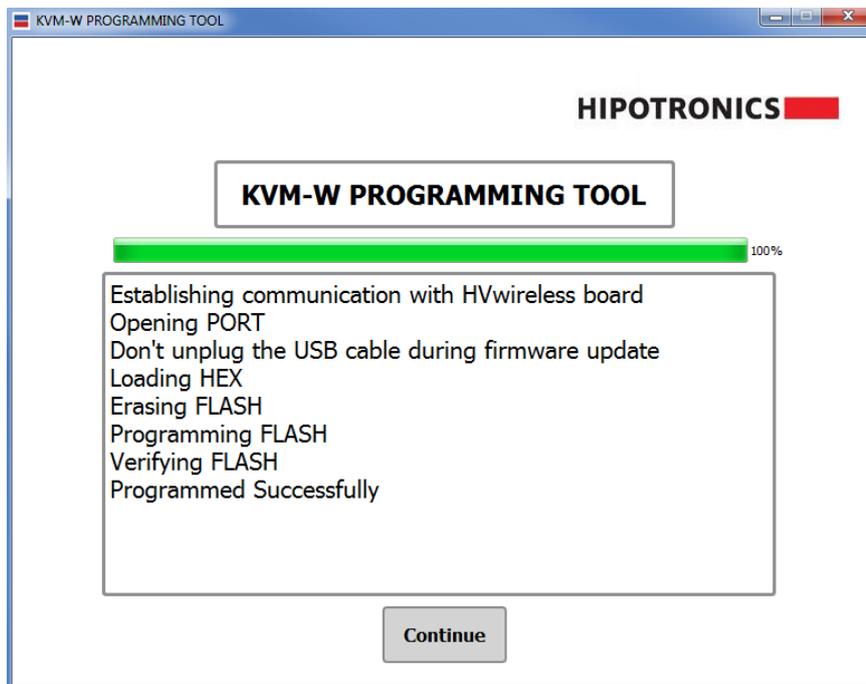
- c. Click Program, and the application will start to establish communication with the wireless module



- d. Do not close the application or unplug the module while programming is in process



- e. Once the programming is complete, it will display 'Programmed Successfully', and you may then close the application and unplug the device



8 Miscellaneous

8.0 Care and Maintenance

The KVM instrument is basically service free, as long as the specified environmental conditions are adhered to. As a result, service and maintenance is restricted to cleaning of the equipment and calibration at intervals stipulated by the application for which the instrument is used.

The insulation of all cables should be periodically checked for damage. If any damage to the insulation is detected then a new measuring cable should be ordered from HIPOTRONICS.

8.0.1 Cleaning the Instrument

The instrument should be cleaned with a lint free cloth, slightly moistened using mild household cleanser, alcohol or spirits. Caustic cleansers and solvents (Trio, Chlorothene, etc.) should definitely be avoided.

8.0.2 Instrument Calibration

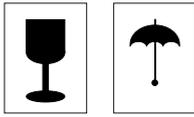
When delivered new from the factory, the instrument is calibrated in accordance with the calibration report provided. An annual calibration of the instrument is recommended.

As the calibration process is fairly extensive, the instrument is recommended to be calibrated and, if necessary, adjusted at HIPOTRONICS's factory. An updated calibration report will then be issued.

8.1 Instrument Storage

If the instrument is to remain unused for any length of time, it is recommended to leave the wireless module on trickle charge so that the internal batteries do not completely drain and become unuseable. In addition, it is advisable to protect this high precision instrument from moisture and accumulation of dust and dirt with a suitable covering.

8.2 Packing and Transport



The packing of the KVM instrument provides satisfactory protection for normal transport conditions. Nevertheless, care should be taken when transporting the instrument. If return of the instrument is necessary, and the original packing crate is no longer available, then packing of an equivalent standard or better should be used. Whenever possible protect the instrument from mechanical damage during transport with padding. Mark the container with the pictogram symbols "Fragile" and "Protect from moisture".

8.3 Recycling

When the instrument reaches the end of its working life it can, if required, be disassembled and recycled. No special instructions are necessary for dismantling.

The instrument is constructed of metal parts (mostly aluminum) and synthetic materials. The various component parts can be separated and recycled, or disposed of in accordance with the associated local rules and regulations.

9 Customer Support

All error messages appear on the display of the HVT measuring instrument. If persistent problems or faulty operation should occur then please contact the Customer Support Department of HAEFELY HIPOTRONICS or your local agent.

The Customer Support Department can be reached at the following address:

HIPOTRONICS
Customer Service
1650 Route 22
Brewster, NY 10509

Tel: +1 (845) 279-3644
E-mail: service@Hipotronics.com



We prefer contact via email. Then the case is documented and traceable. Also the time zone problems and occupied telephones do not occur.



Complete information describing the problem clearly helps us to help you:

Failure description

Used settings

DUT type

Firmware Version

Serial Number

MAC address

Printouts, Pictures



Software Version & Serial No. can be found in “Settings”

9.0 Declaration of Conformity

Hipotronics, Inc.

1650 Route 22 North
PO Box 414
Brewster, NY 10509
USA

Declared, under his own responsibility, that the below mentioned product complies with the requirements of the listed standards or other normative documents.

So, the product complies with the requirements of the EMC directive 2004/108/EC and the low voltage directive 2006/95/EC.

Product: **KVM-W**

Description: The KVM-W Series AC/DC Wireless Kilovoltmeters are highly accurate, portable and modern voltage measurement and calibration systems.

Standards: EN 61010-1: 2001
EN 61326-1: 2006

Michael Carson
Product Engineering Manager
Hipotronics, Inc.
1650 Route 22 North
USA

Brewster, May 25, 2018


.....
(Signature)

9.1 Warranty

HIPOTRONICS, INC. warrants to the original purchaser of any new merchandise that the merchandise is free from defects in materials and workmanship under normal use and service for a period of one (1) year from the date of shipment. The obligation of Hipotronics, Inc. under this warranty is limited, in its exclusive option, to repair, replace or issue credit for parts or materials which prove to be defective, and is subject to Purchaser's compliance with the Hipotronics, Inc. Warranty Claim Procedure as set forth below. The happening of any one or more of the following events will serve to void this warranty and any defect or damage resulting therefrom is specifically excluded from Warranty coverage:

- (a) defects due to accident, negligence, alteration, modification, faulty installation, abuse or misuse by Purchaser or Purchaser's agents or employees.
- (b) attempted or actual dismantling, disassembling, service or repair by any person, firm or corporation not specifically authorized in writing by Hipotronics, Inc.
- (c) defects caused by or due to handling by carrier or incurred during shipment, transshipment or other move.

This Warranty covers only those parts and/or materials deemed by Hipotronics, Inc. to be defective within the meaning of this Warranty. The liability of Hipotronics, Inc. shall be limited to the repair, replacement or issuance of credit for parts deemed defective within the meaning of this Warranty. Costs incurred by purchaser for labor or other expenses incidental to the inspection, repair, replacement or issuance of credit for such parts and/or materials shall be the sole responsibility of purchaser. This Warranty shall not apply to any accessories, parts or materials not manufactured or supplied by Hipotronics, Inc. and if, in the sole discretion of Hipotronics, Inc., Purchaser's claim relates to any materials of a component part, or of the manufacturer of a device of which the defective part is a component, Hipotronics, Inc. reserves the right to disclaim liability under this Warranty and to direct that the Purchaser deal directly with such supplier or manufacturer. Hipotronics, Inc. agrees to assist the purchaser in processing or settling any such claim without prejudicing its position as to liability purchaser in processing or settling any such claim without prejudicing its position as to liability.

Warranty Claim Procedure

Compliance with the following Warranty Claim Procedure is a condition precedent to the obligation of Hipotronics, Inc. under this Warranty.

- (a) Purchaser must notify Hipotronics, Inc. in writing by certified or registered mail, of the defect claimed within twelve (12) months after the date of original shipment. Said notice shall describe in detail the defect, the defective part and the alleged cause of the defect.
- (b) At the exclusive option of Hipotronics, Inc., Purchaser shall dismantle or disassemble at Purchaser's cost and expense and shall ship the defective part or material, prepaid, to Hipotronics, Inc., Brewster, New York 10509, for inspection, or permit an authorized service representative of Hipotronics, Inc. to inspect the defective part or material at the Purchaser's premises. Purchaser shall provide facilities for, and at Purchaser's cost and expense, dismantle, disassemble, or otherwise make accessible the subject part or material whether or not same is a component of, or installed in, a device other than that manufactured or supplied by Hipotronics, Inc. If disclosure shows that the defect is not one for which Hipotronics, Inc. is liable, the Purchaser agrees to reimburse Hipotronics, Inc. for all expense incurred.
- (c) Upon receipt of the defective part or material, or after access to same, Hipotronics, Inc. shall inspect the part or material to determine the validity of Purchaser's claim.

The validity of any Warranty Claim, Purchaser's compliance with Hipotronics, Inc. Warranty Claim Procedure, the obligation to either repair, replace or issue credit, or direct the purchaser to deal directly with a manufacturer or supplier are to be determined solely and exclusively by Hipotronics, Inc. any determination so made shall be final and binding.

THIS WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES EXPRESSED OR IMPLIED ON THE PART OF HIPOTRONICS, INC., INCLUDING THE WARRANTIES OF MERCHANTABILITY AND FITNESS FOR USE AND CONSEQUENTIAL DAMAGES ARISING FROM ANY BREACH THEREOF AND HIPOTRONICS, INC. NEITHER ASSUMES NOR AUTHORIZES ANY OTHER PERSON, FIRM OR CORPORATION TO ASSUME ANY LIABILITY OR OBLIGATION IN CONNECTION WITH THIS SALE ON ITS BEHALF AND PURCHASER ACKNOWLEDGES THAT NO REPRESENTATIONS EXCEPT THOSE MADE HEREIN HAVE BEEN MADE TO PURCHASER.