



A TESCO COMPANY

OPERATIONS MANUAL

PRECISION TRANSFORMER COMPARATOR

PRODUCT:

KATC-V2

VOLTAGE COMPARATOR OPERATIONS MANUAL



THE EASTERN SPECIALTY COMPANY

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TESCO warrants to the original purchaser that it will correct all defects in material and/or workmanship in the Instrument, test equipment or software covered by this warranty (herein called "**PRODUCT**"), provided that TESCO is notified of such defect within the warranty period (set forth below) in accordance with paragraph four of this Warranty.

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1. Is used for the specific purpose for which it was intended;
2. Is operated in accordance with instructions, if any, supplied by TESCO;
3. Has not been modified, neglected, altered, tampered with, vandalized, abused or misused, or subjected to accident, fire, flood or other casualties;
4. Has not been repaired by unauthorized persons;
5. Has not had its serial number altered, defaced or removed;
6. Has not been connected, installed or adjusted other than in accordance with the instructions, if any, furnished by TESCO.

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1. Notice of defect is given to TESCO by phone, fax, email or mail as soon as the defect is discovered.
2. Notice of defect contains the following information: PRODUCT serial number, PRODUCT model number, date of original installation, and an accurate and complete description of the defect including the exact circumstances leading to the defect.
3. The defective PRODUCT or part is returned only upon authorization from TESCO as evidenced by the issuing of a Return Merchandise Authorization (RMA) number, and that the transportation charges are prepaid (except that TESCO may, at its option, appoint a qualified DISTRIBUTOR to make field inspections of the PRODUCT for which purpose the purchaser shall permit such DISTRIBUTOR to enter upon its premises and examine the PRODUCT).
4. The Return Merchandise Authorization (RMA) number is written on the shipping label and all paperwork defective PRODUCT or part.
5. The defective PRODUCT or part is returned in the original packing or packing approved by TESCO

TESCO is not responsible for drayage charges, damages or labor costs incurred in conjunction with failure, removal or reinstallation of any PRODUCT, all of which shall be at the purchaser's expense. TESCO is not responsible for special, incidental or consequential damages, whether resulting from breach of warranty, negligence or any other reason.

TESCO manufactured parts will be available for a minimum period of at least two years after the manufacture of a PRODUCT has been discontinued.

TESCO will provide original purchaser during the Warranty Period, unlimited telephone consulting time for the purpose of PRODUCT trouble shooting/servicing and for the first thirty (30) days of the Warranty Period, unlimited telephone consulting time for the purpose of PRODUCT/software application.

THE WARRANTY CONTAINED HEREIN IS IN LIEU OF ALL OTHER WARRANTIES AND TESCO MAKES NO OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, WARRANTIES OR CONDITION, DESIGN, MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, OR ANY OTHER MATTER.

No other Warranty, express or implied, is authorized by TESCO, and no DISTRIBUTOR of TESCO or any other person has any authority to amend, extend, modify, enlarge or otherwise alter the foregoing warranty and disclaimers in any way whatsoever, except as provided for in an Extended Limited PRODUCT Warranty Agreement.

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1.0 INTRODUCTION

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1.1 Introduction

KATC-V2 FOR PT QUALIFICATION

The Knopp Type KATC-V2 Precision Transformer Comparator is a next generation of the popular Type KATC-V Comparator. It incorporates NextGen™ metrology technology, processors and software environment for testing and qualifying PT's.

Knopp's KATC-V2 is a highly accurate state-of-the-art voltage transformer comparator that is compatible with all older generation Knopp comparators. The new comparator operates differently than the KATC-V. This requires a different wiring harness between the KVTS chassis and transformers and is provided with the KATC-V2.

The KATC-V2 will be referred to as the "Instrument" throughout the operational manual.

1.2 Contacting TESCO

To contact TESCO, call one of the following telephone numbers:

- Technical Support: 215.785.2338
- Calibration/Repair: 215.785.2338

Visit our website at www.tescometering.com or send an email to support@tescometering.com.

To view, print, or download the latest manual supplement, visit www.tescometering.com.

1.3 General Safety Summary

This manual contains information and warnings that must be observed to ensure safe operation and to keep the Instrument in a safe condition. Operation or service in conditions or in a manner other than specified could compromise safety. For the correct and safe use of this device, it is essential that both operating and service personnel follow accepted safety procedures in addition to the safety precautions specified.

In this manual, a **WARNING** identifies conditions and actions that pose hazard(s) to the user, while a **CAUTION** identifies conditions and actions that may damage the Instrument or the test equipment.



WARNING  

To avoid electrical shock, personal injury, or fire hazard:

- **The device must NOT be switched on if it is damaged or suspected to be faulty.**

- Do not operate the device in wet, condensing, or dusty conditions, or if exposed to explosive gas.
- If the equipment is used in a manner not specified in this manual, the protection provided by the Instrument may be impaired.
- Whenever it is likely that safety protection has been impaired, the device must be made inoperative and be secured against any unintended operation. Inform qualified maintenance or repair personnel.
- Safety protection is likely to be impaired if, for example, the Instrument displays visible damage or fails to operate normally.

1.4 Description of Safety-related Icons

| ICONS | DESCRIPTION |
|---|--|
|  | Risk of danger. Important information. See manual. |
|  | Hazardous voltage. Risk of electrical shock. |

1.5 Protective Earth / Grounding

WARNING

To avoid electrical shock or personal injury, do not intentionally or unintentionally interrupt the protective ground conductor inside or outside the Instrument. Interrupting the protective ground conductor is likely to make the Instrument dangerous. Intentional interruption is prohibited.

1.6 Product Features

1.6.1 Key Features

- 178ppi Full Color LCD Screen
- Front Keypad for Data Entry
- Front USB and Ethernet Connectivity
- Powerful, multi-core, 32-bit processors
- 0.001 Accuracy Class Resolution, 0% to 400% of Accuracy Class Measurable
- Reduced Testing Time

1.6.2 Standard Features

- Automatic Sensing of 50 or 60 Hertz
- Configurable Units
(Degrees, MilliRads, Minutes),(Volts, %Ratio),(RCF, %Error)
- 120V Secondary Voltage Measurement
- 3U Compatible Enclosure

1.7 General Specifications

1.7.1 Input Characteristics

| PARAMETERS | Value |
|------------------|-------------|
| Power Supply | 120 VAC, 2A |
| Supply Frequency | 45-65Hz |

1.7.2 Dimensions

| PARAMETERS | KATC-V2 |
|------------|-----------------|
| Height | 5.25" |
| Width | 19" |
| Depth | 16" |
| Weight | Vary by product |

1.7.3 Measurement Resolution

Valid for 50Hz/60Hz and Voltage of 30VAC to 150VAC.

| PARAMETERS | RCF | Phase Angle | Acc. Class |
|-------------------------|-------------|-------------|------------|
| 0.0% ≤ Acc. Cl. < 0.2% | 0.000 000 1 | 0.001' | 0.000 1 |
| 0.2% ≤ Acc. Cl. < 0.7% | 0.000 000 1 | 0.001' | 0.000 1 |
| 0.7% ≤ Acc. Cl. < 1.4% | 0.000 000 1 | 0.001' | 0.000 1 |
| 1.4% ≤ Acc. Cl. < 10.0% | 0.000 000 1 | 0.001' | 0.000 1 |
| 10.0% ≤ Acc. Cl. | 0.000 000 1 | 0.001' | 0.000 1 |

1.7.4 Measurement Accuracy

Valid for all current comparators, provided Calibration Certification will provide further detail.

Valid for 50Hz/60Hz and Voltage of 30VAC to 150VAC.

| PARAMETERS | RCF | Phase Angle | Acc. Class |
|------------|-------|-------------|------------|
| 30-150V | 50ppm | 2.0' | 0.01% |

1.8 About this Operations Manual

This manual provides complete information for installing and operating the Instrument. This document instructs the user on the following operations of the KATC-V2:

- Installation
- Front Panel Features
- Graphical User Interface (GUI)
- Instrument Maintenance

2.0 INSTALLATION

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2.1 Introduction

This chapter provides instructions for unpacking and installing the Instrument. Read this chapter before you operate the Instrument. Instructions for cable connections can be found here.

2.2 Unpacking and Inspection

The Instrument is shipped in a container designed to prevent damage during shipping.

Inspect the Instrument carefully for damage, and immediately report any damage to the shipper. A packing list is included in the packaging. When you unpack the Instrument, check for all the standard equipment listed and check the shipping order for any additional items ordered. Report any shortage to the place of purchase, to your distributor, or directly to TESCO.

2.3 Mounting



The instrument contains four mounting holes, ① as shown above, on the front panel and should be mounted to the KVTS where the previous comparator was placed. All four screws can then be mounted as they were prior through the four mounting holes. If not in a KVTS, mount as normal into a 3U enclosure.

2.4 Main Power Supply

The Instrument can be powered by plugging it to a 120V-Single Phase AC line. An AC line power cord is provided.



Figure 2.4. KATC-V2 Main Power Supply

| NUMBER | DESCRIPTION |
|--------|------------------|
| 1 | Power Switch |
| 2 | 5A Fuse |
| 3 | Power Inlet Port |
| 4 | Chassis Ground |

Table 2.4. KATC-V2 Main Power Supply sections

WARNING

The Instrument should only be plugged to an AC outlet with a 90 – 120V voltage range to avoid damaging the Instrument.

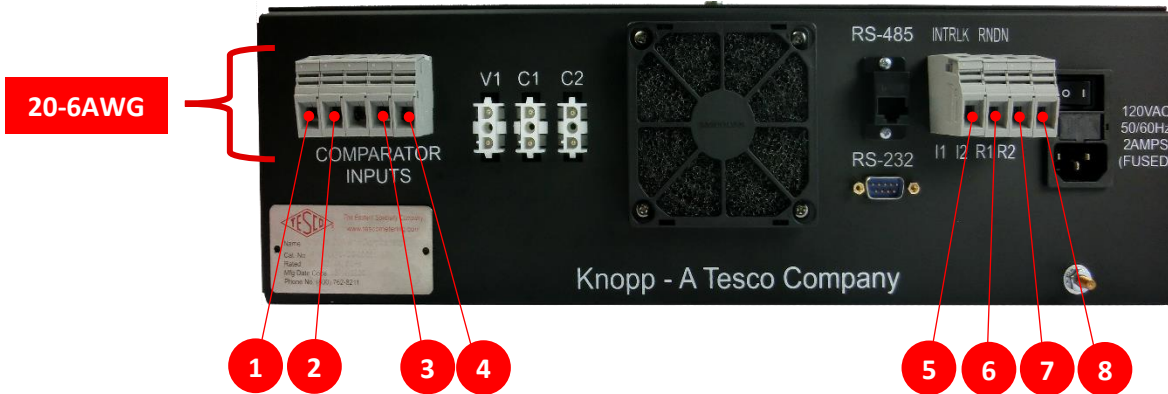
To avoid electrical shock, personal injury, or fire hazard, connect the factory-supplied three-conductor-line power cord to a properly grounded power outlet.

During test operation, a two-conductor adapter or extension cord **MUST NOT** be used. This will break the protective ground connection and will affect the measurement accuracy of the Instrument.

The power outlets supplying the Instrument system should be controlled by an emergency switch so that power can be switched off if a hazard arises.

2.5 Connection to KVTS

The Instrument is powered by plugging it into a 120V-Single Phase AC line. An AC line power cord is provided. KVTS has a cable within cabinet for this purpose.



| Input # | Input Label | Signal | Value | Polarity | Transformer |
|---------|-------------|----------------------|--------|----------|------------------------------------|
| 1 | S | Reference Input | 0-150V | High | KVTS Reference Transformer |
| 2 | G | Common Ground | 0V | Low | Both |
| 3 | U | TUT Input* | 0-150V | High | Customer Supplied Test Transformer |
| 4 | C | Cal (TESCO use only) | - | - | - |

*TUT stands for Transformer Under Test

| Input # | Input Label | Usage | Rated Value | Description |
|---------|-------------|-------------------------|-------------|---|
| 5 | I1 | Interlock Relay Contact | 120v | Interlock Shutdown System. Comparator must be on to apply power to KVTS |
| 6 | I2 | Interlock Relay Contact | 120v | |
| 7 | R1 | Rundown Relay Contact | 120v | Run Down System. System power will run down automatically post measurement. (If equipped) |
| 8 | R2 | Rundown Relay Contact | 120v | |

These are Normally open relay contacts rated for 120VAC. They do not supply voltage.

3.0 KATC-V2 FUNCTIONS

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3.1 Introduction

This chapter is a reference for the functions and locations of the Instrument's front panel features and provides brief descriptions of each feature for quick access. **Please read this information before operating the Instrument.** Front panel operating instructions for the Instrument are provided in this chapter.

3.2 Front Panel Features

Front panel features (including all controls, displays, indicators, and terminals) are shown in Figure 3.2.1. Each front panel feature is briefly described in Table 3.2.1.

3.2.1 KATC-V2 Front Panel

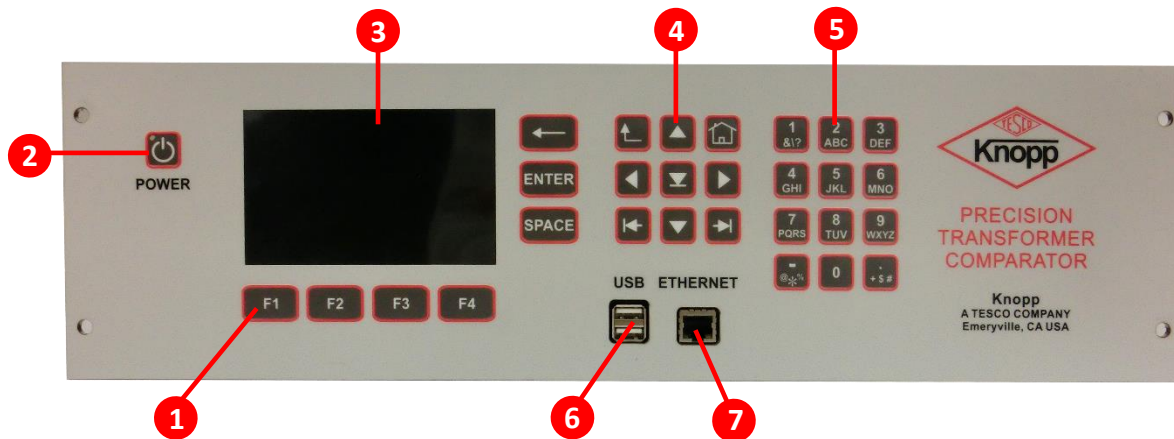
















Figure 3.2.1. KATC-V2 Front Panel

| NUMBER | DESCRIPTION |
|--------|---|
| 1 | Function keys |
| 2 | Power button |
| 3 | TFT LCD Screen. 5" 800x480, full color TFT LCD screen |
| 4 | Navigation Keys |
| 5 | Alphanumeric membrane keyboard |
| 6 | Dual USB Connection |
| 7 | RJ45 Ethernet Connection |

Table 3.2.1. KATC-V2 Front Panel

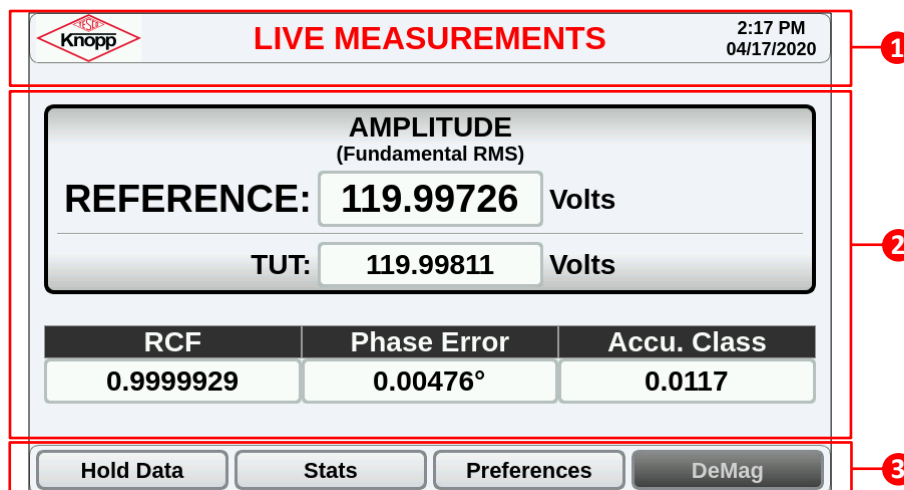
3.2.2 KATC Navigation Keys

| Symbol | Description |
|---|---|
|  or  | Functions any of the following: <ul style="list-style-type: none"> Selects the NEXT or PREVIOUS MENU item. Moves the SELECTED LINE UP or DOWN Select an Item from a dropdown menu |
|  or  | Functions any of the following: <ul style="list-style-type: none"> Moves the cursor left/right of the current character in text boxes. Moves the selection left/right of the current selected cell in tables. |
|  or  | Selects the NEXT or PREVIOUS TAB item. |
|  | Deletes the previous character |
|  | Returns to the previous screen |
|     | Function Keys |
|  | Power button |
|  | Selects a response |

3.3 The Graphical User Interface (GUI)

3.3.1 Graphical User Interface (GUI) Screens

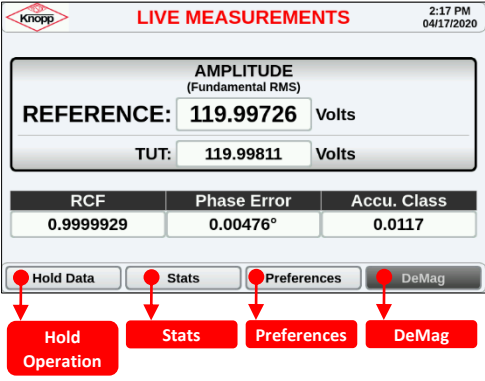

The user interface is divided into three sections.



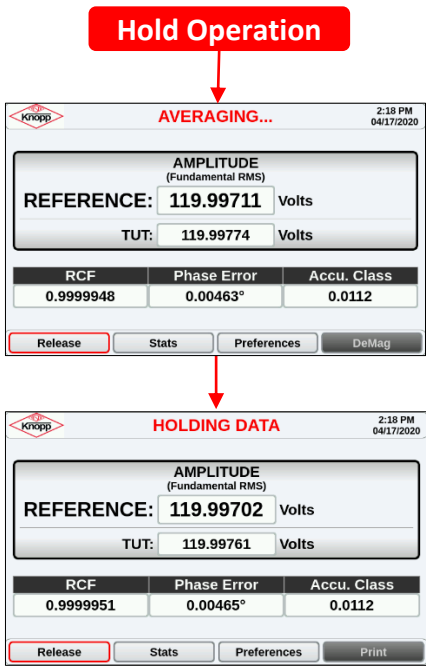
| NUMBER | DESCRIPTION |
|--------|------------------|
| 1 | Screen Title |
| 2 | Screen Data |
| 3 | Function Buttons |

Table 3.3.1. KATC-V2 GUI Sections

3.3.2 DEFAULT MENU

| SCREEN | DESCRIPTION | | | | | | | | | | | | |
|---|--|---|-----------|-----------------------------|----|-------|--|----|-------------|---|----|-------|-------------------------------------|
|  <p>NOTE: KATC-V2 is used in the example above.</p> | <p>DEFAULT MENU</p> <p>The MAIN MENU screen consists of the following function buttons: HOLD DATA, STATS, PREFERENCES & DEMAG. Press arrow keys to navigate through the main menu or directly press the function keys below buttons.</p> <p>KEYPAD & FUNCTION KEYS:</p> <table border="1"> <tr> <td>F1</td> <td>Hold Data</td> <td>Press to take a Measurement</td> </tr> <tr> <td>F2</td> <td>Stats</td> <td>Press to open the extended data screen</td> </tr> <tr> <td>F3</td> <td>Preferences</td> <td>Press to open data measurement settings</td> </tr> <tr> <td>F4</td> <td>DeMag</td> <td>Unused. KVTS does not support DeMag</td> </tr> </table> <p>To return to the previous screen, press  at any time.</p> | F1 | Hold Data | Press to take a Measurement | F2 | Stats | Press to open the extended data screen | F3 | Preferences | Press to open data measurement settings | F4 | DeMag | Unused. KVTS does not support DeMag |
| F1 | Hold Data | Press to take a Measurement | | | | | | | | | | | |
| F2 | Stats | Press to open the extended data screen | | | | | | | | | | | |
| F3 | Preferences | Press to open data measurement settings | | | | | | | | | | | |
| F4 | DeMag | Unused. KVTS does not support DeMag | | | | | | | | | | | |

3.3.3 HOLD OPERATION

| SCREEN | DESCRIPTION | | | | | | | | | | | | | | | | | | | | | | |
|--|--|---|---------|---|----|-------|--|----|-------------|---|----|-------|---|-----------|---|-----|--|-----|-------------------------|-------------|---|-------------|-------------------------------------|
|  | <p>HOLD OPERATION</p> <p>HOLD is how single measurements are taken. It starts by allowing the input to settle, then averages over the preset time allotted. It will then Hold the Data until the user has recorded it and releases the instrument by pressing F1 again. Step of hold operation is indicated by title at top of screen.</p> <p>NOTE: The preset averaging time can be changed and will be shown later in the manual.</p> <p>KEYPAD & FUNCTION KEYS</p> <table border="1"> <tr> <td>F1</td> <td>Release</td> <td>Press to Release the Holding/Averaging function to go back to Live Data</td> </tr> <tr> <td>F2</td> <td>Stats</td> <td>Press to open the extended data screen</td> </tr> <tr> <td>F3</td> <td>Preferences</td> <td>Press to open data measurement settings</td> </tr> <tr> <td>F4</td> <td>Print</td> <td>Save results to database. (Feature available in future software update)</td> </tr> </table> <p>DATA</p> <table border="1"> <tr> <td>Reference</td> <td>Measured Amplitude of Reference Transformer (Volts)</td> </tr> <tr> <td>TUT</td> <td>Measured Amplitude of Transformer under Test (Volts)</td> </tr> <tr> <td>RCF</td> <td>Ratio Correction Factor</td> </tr> <tr> <td>Phase Error</td> <td>Phase Angle difference between Ref and TUT with relation to Ref (Minutes/Degrees/milliRads)</td> </tr> <tr> <td>Accu. Class</td> <td>Accuracy Class Rating based on Test</td> </tr> </table> <p>WARNING: Never exceed 150 Volts!</p> | F1 | Release | Press to Release the Holding/Averaging function to go back to Live Data | F2 | Stats | Press to open the extended data screen | F3 | Preferences | Press to open data measurement settings | F4 | Print | Save results to database. (Feature available in future software update) | Reference | Measured Amplitude of Reference Transformer (Volts) | TUT | Measured Amplitude of Transformer under Test (Volts) | RCF | Ratio Correction Factor | Phase Error | Phase Angle difference between Ref and TUT with relation to Ref (Minutes/Degrees/milliRads) | Accu. Class | Accuracy Class Rating based on Test |
| F1 | Release | Press to Release the Holding/Averaging function to go back to Live Data | | | | | | | | | | | | | | | | | | | | | |
| F2 | Stats | Press to open the extended data screen | | | | | | | | | | | | | | | | | | | | | |
| F3 | Preferences | Press to open data measurement settings | | | | | | | | | | | | | | | | | | | | | |
| F4 | Print | Save results to database. (Feature available in future software update) | | | | | | | | | | | | | | | | | | | | | |
| Reference | Measured Amplitude of Reference Transformer (Volts) | | | | | | | | | | | | | | | | | | | | | | |
| TUT | Measured Amplitude of Transformer under Test (Volts) | | | | | | | | | | | | | | | | | | | | | | |
| RCF | Ratio Correction Factor | | | | | | | | | | | | | | | | | | | | | | |
| Phase Error | Phase Angle difference between Ref and TUT with relation to Ref (Minutes/Degrees/milliRads) | | | | | | | | | | | | | | | | | | | | | | |
| Accu. Class | Accuracy Class Rating based on Test | | | | | | | | | | | | | | | | | | | | | | |

Stats

STATISTICS 2:18 PM 04/17/2020

Raw Data Std Deviation Direct vs Computed Harmonic Distortion

| | AMPLITUDE (Fundamental RMS) | PHASE Degrees |
|---------------|-----------------------------|---------------|
| Reference: | 119.99745 | 0.00000° |
| Error: | 0.00995 | 5098.617' |
| TUT Direct: | 119.99779 | -0.010' |
| TUT Computed: | 119.99832 | 0.284' |

Sample Length: 1 Seconds

Raw Stdev Dir Vs Comp. Distortion

STATISTICS 2:18 PM 04/17/2020

Raw Data Std Deviation Direct vs Computed Harmonic Distortion

| | AMPLITUDE (Fundamental RMS) | PHASE Degrees |
|---------------|-----------------------------|---------------|
| Reference: | 119.99745 | 0.00000° |
| Error: | 0.00995 | 84.97695° |
| TUT Direct: | 119.99779 | -0.00017° |
| TUT Computed: | 119.99832 | 0.00473° |

Sample Length: 1 Seconds

Raw Stdev Dir Vs Comp. Distortion

STATISTICS 2:18 PM 04/17/2020

Raw Data Std Deviation Direct vs Computed Harmonic Distortion

| | AMPLITUDE (Fundamental RMS) | PHASE Degrees |
|-------------|-----------------------------|---------------|
| Reference: | 0.00023 | 0.00000° |
| Error: | 0.00001 | 0.03315° |
| TUT Direct: | 0.00018 | 0.00013° |

| RCF | Phase Error | Accu. Class |
|-----------|-------------|-------------|
| 0.0000001 | 0.00000° | 0.0000 |

Sample Length: 1 Seconds

Raw Stdev Dir Vs Comp. Distortion

STATISTICS 2:18 PM 04/17/2020

Raw Data Std Deviation Direct vs Computed Harmonic Distortion

Measured directly:

| RCF | Phase Error | Accu. Class |
|-----------|-------------|-------------|
| 0.9999974 | -0.00013° | 0.0003 |

Computed using reference and error:

| RCF | Phase Error | Accu. Class |
|-----------|-------------|-------------|
| 0.9999923 | 0.00466° | 0.0115 |

Sample Length: 1 Seconds

Raw Stdev Dir Vs Comp. Distortion

STATISTICS 2:18 PM 04/17/2020

Raw Data Std Deviation Direct vs Computed Harmonic Distortion

THD (Total harmonic distortion): The square root of the sum of harmonics squared divided by the fundamental. (RMS of harmonics divide by Fundamental)

| THD | |
|-------------|-------|
| Reference: | 0.000 |
| Error: | 0.010 |
| TUT Direct: | 0.000 |

Sample Length: 1 Seconds

Raw Stdev Dir Vs Comp. Distortion

STATS

After a Hold Operation, or Live Measurements, further data can be viewed by pressing **Stats**. From here further menus allow looking at extended Raw Data, Standard Deviation, Direct Measurement vs. Computed (computed is used for main screen), and Harmonic Distortion.

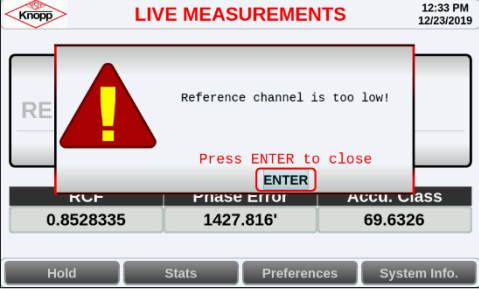
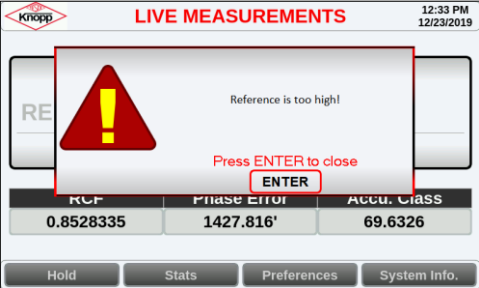
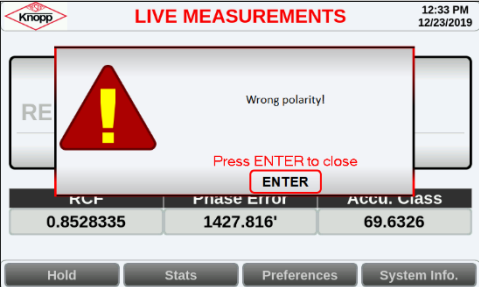
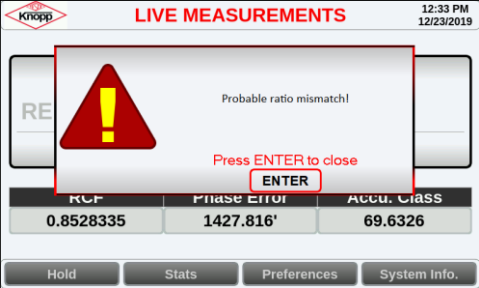
KEYPAD & FUNCTION KEYS

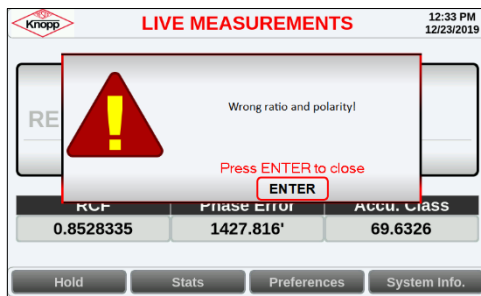
| | | |
|----|--------------|---|
| F1 | Raw | View Raw Data (minutes/degrees/milliRads) |
| F2 | Stdev | View Standard Deviation |
| F3 | Dir Vs Comp. | Direct vs. Computed TUT measurements |
| F4 | Distortion | Total Harmonic Distortion |

DATA

| | |
|--------------|---|
| Reference | Measured Amplitude of Reference Transformer (Volts) |
| Error | Measured Current difference between REF and TUT |
| TUT Direct | Measured Amplitude of Transformer under Test (Volts) |
| TUT Computed | Calculated Measurement of TUT from REF and Error values |
| RCF | Ratio Correction Factor |
| Phase Error | Phase Angle difference between Ref and TUT with relation to Ref (Minutes/Degrees/milliRads) |
| Accu. Class | Accuracy Class Rating based on Test |

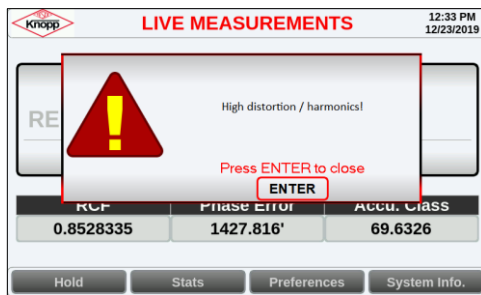
3.3.4 ERROR MESSAGES

| SCREEN POPUP | DESCRIPTION |
|---|--|
|  | <p>Reference Channel is too low: Likely have not turned variac up. If TUT is measuring a normal Amplitude, shut down system and check connections.</p> |
|  | <p>Reference is too high: Turn down Variac and confirm ratio, also check TUT connections.</p> |
|  | <p>Wrong Polarity: Shut down system and check TUT polarity. (Primary or secondary could be reversed)</p> |
|  | <p>Probable Ratio Mismatch: Shut down system and verify TUT ratio.</p> |



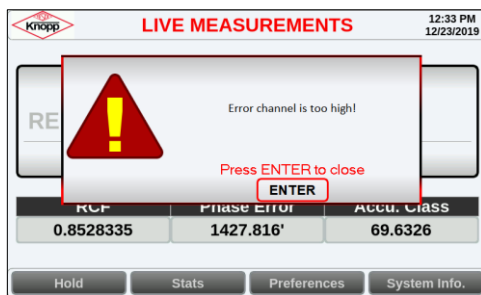
Wrong Ratio and Polarity:

Shut down system. Both wrong polarity and ratio are selected for TUT. Check and try again. If error persists, TUT may be damaged internally.



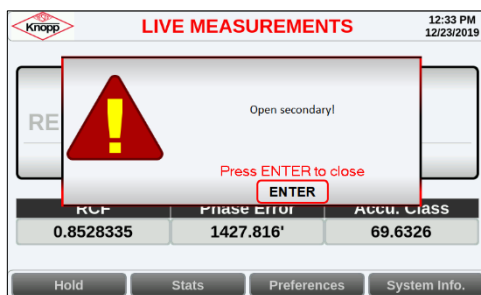
High Distortion/Harmonics:

Shut down system and make sure all connections are solid. If it persists, TUT may be damaged internally and should be checked by other methods.



Error Channel is too High:

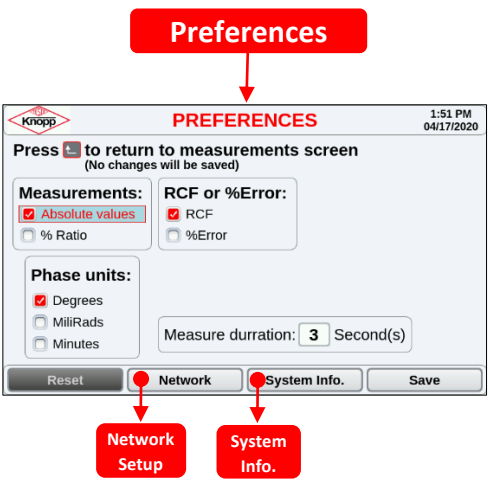
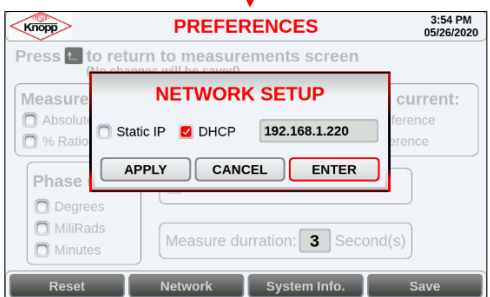
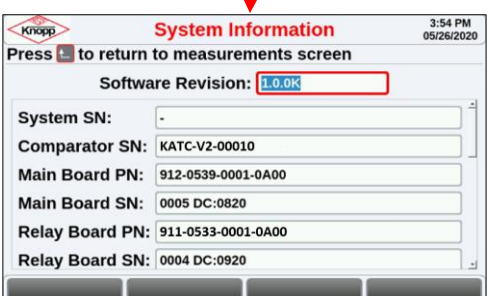

Turn Variac down. Error cannot exceed 138 Volts or instrument may be damaged. Verify Ratio is correct.



Open Secondary:

Shut down system. Check TUT connections.

3.3.5 PREFERENCES

| SCREEN | DESCRIPTION | | | | | | | | | | | | |
|---|--|--------------------------------------|--------------------------|---------------------------|---|---------|--|----|--------------|--------------------------------------|----|------|------------------------|
|  | <p>PREFERENCES</p> <p>Edit Settings such as Units/Ratio, and measurement averaging duration.</p> <p>KEYPAD &FUNCTION KEYS</p> <table border="1" data-bbox="885 493 1469 672"> <tr> <td>F1</td> <td>Reset</td> <td>Resets setting to default</td> </tr> <tr> <td>F2</td> <td>Network</td> <td>Access NETWORK screen</td> </tr> <tr> <td>F3</td> <td>System Info.</td> <td>Access Comparator System information</td> </tr> <tr> <td>F4</td> <td>Save</td> <td>Saves current settings</td> </tr> </table> | F1 | Reset | Resets setting to default | F2 | Network | Access NETWORK screen | F3 | System Info. | Access Comparator System information | F4 | Save | Saves current settings |
| F1 | Reset | Resets setting to default | | | | | | | | | | | |
| F2 | Network | Access NETWORK screen | | | | | | | | | | | |
| F3 | System Info. | Access Comparator System information | | | | | | | | | | | |
| F4 | Save | Saves current settings | | | | | | | | | | | |
|  | <p>3.3.5.1 NETWORK SETUP</p> <p>Edit/View Network Configuration and IP. Use arrow keys for navigation, and keypad for IP entry.</p> <p>KEYS</p> <table border="1" data-bbox="885 1092 1388 1270"> <tr> <td>Apply</td> <td>Applies Network Settings</td> </tr> <tr> <td>Cancel</td> <td>Cancel changes and return to PREFERENCES screen</td> </tr> <tr> <td>Enter</td> <td>Apply changes and return to PREFERENCES screen</td> </tr> </table> | Apply | Applies Network Settings | Cancel | Cancel changes and return to PREFERENCES screen | Enter | Apply changes and return to PREFERENCES screen | | | | | | |
| Apply | Applies Network Settings | | | | | | | | | | | | |
| Cancel | Cancel changes and return to PREFERENCES screen | | | | | | | | | | | | |
| Enter | Apply changes and return to PREFERENCES screen | | | | | | | | | | | | |
|  | <p>3.3.5.2 SYSTEM INFORMATION</p> <p>View the Software and Hardware configuration, and Serial Numbers. Use the  Key to return to Preferences Screen.</p> | | | | | | | | | | | | |

4.0 MAINTENANCE

| | |
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4.1 Introduction

This chapter explains how to perform the routine user maintenance required to keep your Instrument in optimal operating condition.

The topics covered in this chapter include:

- Replacing the Fuse
- Cleaning the Air Filter
- Cleaning the Instrument External Surface



Figure 5.2. KATC-V2 Fuse and Air Filter location

4.2 Replacing the Fuse

The fuse is accessible from the Instrument's rear panel. See Figure 5.2.

WARNING

To avoid electrical shock or personal injury, ensure that the Instrument is switched off and disconnected by removing the line power cord from the power input socket before attempting to access the power fuse.

To access & replace the fuses, proceed as follows:

1. Disconnect line power.
2. Using a standard 5mm wide screwdriver, insert it to the slit and pull upwards for both ends until the cap and fuse are disengaged.
3. Pull the fuse holder and replace the defective fuses. Use the recommended fuse ratings and manufacturer in Table 5.2.
4. Return the fuse holder by pushing down the cap until it completely closes.

| Description | Voltage | Amperage | Manufacturer | Part Number |
|---|---------|----------|---------------|-------------|
| (1x) AC DC Fuse Cartridge, Glass, Time Lag, 5mm x 20mm | 250V | 5.0A | Bel Fuse Inc. | 5ST 5-R |

Table 5.2. Recommended Fuse Replacement

4.3 Cleaning the Air Filters

The air filter is accessible from the Instrument's rear panel. See Figure 5.2.

CAUTION

Damage caused by overheating may occur if the area around the fan is restricted, the intake air is too warm, or the air filter is clogged. The air filter must be removed and cleaned at least every 30 days or more frequently if the Instrument is operated in a dusty environment.

To access and clean the air filters, proceed as follows:

1. Disconnect line power.
2. Remove the filter retainer by holding its two upper corners or two lower corners and pulling it outward until it disengages from the fan guard.
3. Remove the air filter that is in between the Filter Retainer and Fan Guard. See Figure 5.3.
4. Clean the filter by washing it in soapy water. Rinse and dry it thoroughly before reinstalling.
5. Place the filter at the back of the retainer.
6. Reinstall the retainer in the fan guard. The retainer is snapped on the four sides for the fan guard.

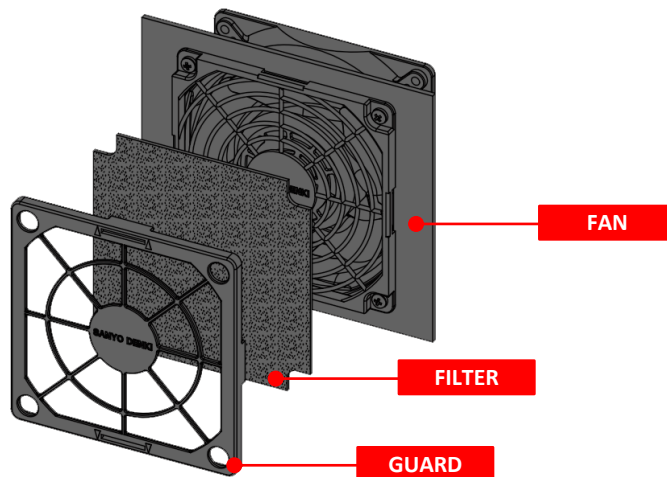


Figure 5.3: KATC-V2 Fan Filter Assembly

4.4 Cleaning the Instrument External Surface

Clean the exterior of the instrument using a soft cloth slightly dampened with either water or a non-abrasive mild cleaning solution that is not harmful to plastics.

CAUTION

Do not use hydrocarbons or chlorinated solvents for cleaning. They can damage the plastic materials used in the Instrument.

4.5 Recalibration

For the Instrument's recalibration, directly contact TESCO through phone or email. See section **1.2 Contacting TESCO** for contact details. TESCO recommends recalibration on an annual basis. Further details can be found on the Calibration Certificate provided with your instrument.