



TESCO METERING

OPERATIONS MANUAL



Three Phase Voltage Synthesizer

CATALOG NO. 6440

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TESCO METERING

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LIMITED WARRANTY & LIMITATION OF LIABILITY

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.

WARRANTY PERIOD. The warranty period shall begin on the date of shipment of the **PRODUCT** or the date of the issuance of this warranty certificate, whichever is later. If no warranty period is specified below and signed by an authorized **DISTRIBUTOR** of TESCO, the warranty period shall be one (1) year. In no event shall this warranty remain in effect for more than the stated warranty period plus two (2) months after the date of shipment. TESCO's sole obligation and the purchaser's sole remedy under this warranty is limited to repair or replacement, at TESCO's option, free of charge, F.O.B. TESCO's factory at Bristol, PA of any workmanship and/or part which in TESCO's sole judgment displays evidence of defect. On-site warranty repairs will be made when in TESCO's judgment the **PRODUCT** cannot practically be shipped to TESCO's factory. Any modifications, additions or upgrades made to the **PRODUCT** or control software after this warranty becomes effective shall not extend the term of this warranty.

COVERAGE. The warranty set forth above shall be applicable only if the **PRODUCT**:

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.

The warranty set forth herein DOES NOT APPLY to defects resulting from ordinary wear, tear and usage, or any cause, similar or dissimilar, not resulting solely from defective material and/or workmanship.

The warranty set forth herein shall NOT be effective unless:

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

A Compact and Versatile Voltage Source for Everyday Site Testing

The 3 Phase Voltage Synthesizer is designed for technicians who require a portable, isolated, and selectable three phase voltage source. It delivers synthesized test voltages for meters that require a variety of load conditions and voltage configurations, all within a small, lightweight package built for site testing applications.

As one of the most versatile site testing tools available, the Voltage Synthesizer provides flexibility and control for meter testing environments where an isolated voltage source is required. Its portable design makes it easy to transport and deploy in the field without sacrificing performance.

The Voltage Synthesizer is ideal for customers who own the 6330, as well as those who need an isolated voltage source for any meter testing application.

Since 1904, customers have trusted TESCO for accuracy and reliability. When you think metering, think TESCO.

Catalog Number 6440 will be referred to as “Voltage Synthesizer” throughout this operational manual.

1.2 Contacting TESCO

For Technical Support or Calibration/Repair, please call 215.228.0500.

You can also send an email to support@tescometering.com with any questions.

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

1.3 General Safety Summary

This manual contains information and warnings that must be observed to ensure safe operation and 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, dusty, or explosive gas conditions.
- 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.
- Use of any fuse other than specified may cause damage.
- Defeating any safety devices may result in electric shock and potential death.

1.4 Description of Safety-related Icons

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

1.5 Product Features

The Voltage Synthesizer is built to deliver a stable, selectable, and fully isolated three phase voltage source for a wide range of metering applications. It provides true three phase output with up to 100 VA per phase and supports common voltage configurations used throughout the metering industry.

Designed with Class D technology for improved efficiency and performance, the unit maintains low total harmonic distortion and consistent voltage accuracy. Its rugged, water resistant enclosure and straightforward rotary voltage selection make it dependable and easy to operate in field environments.

1.5.1 Key Features

Voltage Drive: 0-480V, 830V Peak

Current Drive: None

1.5.2 Standard Features

- Unit provides True Three Phase with an isolated voltage output of 100 VA per phase.
- Easy rotary switch select for supplying common voltage used in the metering industry.
 - 69/120V WYE
 - 120/208 WYE
 - 120/240V DELTA
 - 277/480V WYE
 - 240/480 Delta
- Uses Class D technology providing better efficiency, performance and reliability.
- Rugged durable and water-resistant case

1.5.3 Standard Unit (what's in the box)

These are the standard items included in the package:

- 6440 Synthesizer
- Voltage Cable Set
- Power Cords (2)

1.5.4 Optional Accessories

- THD-100 Handheld (Future feature for customer voltages pending customer need)
- 2 ft. HDMI Cable
- Diamond Level Support

1.6 General Specifications

The following specifications apply to the 6440 Voltage Synthesizer. These values reflect the certified product performance characteristics and verified mechanical and electrical design parameters.

1.6.1 Input Characteristics

PARAMETERS	DATA
Supply Frequency	50/60Hz
Voltage Input Range	85 – 305 VAC
Power	~350W

1.6.2 Mechanical

PARAMETERS	DATA
Case Dimension (LxWxH)	18.2" x 13.9" x 6.7"
Weight	25 lbs. (11.4 kg)
Operating Temperature	-10F to 120F

1.6.3 Accuracy

PARAMETERS	DATA
Voltage Setting Accuracy	100VA +/-0.5%
Total Harmonic Distortion	<3%

1.7 About this Operations Manual

This manual provides complete information for setting up and operating the Voltage Synthesizer. This document instructs the user on the following operations of the CAT. 6440:

- Setup
- Front Panel Features
- How to perform tests
- Maintenance

2.0 INSTALLATION

2.1 Introduction

2.2 Unpacking and Inspection

2.3 Set-up and Cooling Considerations

2.3.1 Set-up and Placement

2.3.2 Running the Test

2.4 Main Power Supply

2.1 Introduction

This chapter provides instructions for unpacking and the proper setup for the Voltage Synthesizer. Read this chapter before you operate the Voltage Synthesizer. Instructions for cable connections can be found here.

2.2 Unpacking and Inspection

The Voltage Synthesizer is shipped in a container designed to prevent damage during shipping. A packing slip can be found in the package. Inspect the package carefully for damage and immediately report any damage to your distributor or directly to TESCO. A packing list consists of (1) 6440 Main unit (2) Voltage Cable Set (3) Power Cord Standard (4) Power Cord, Field Test



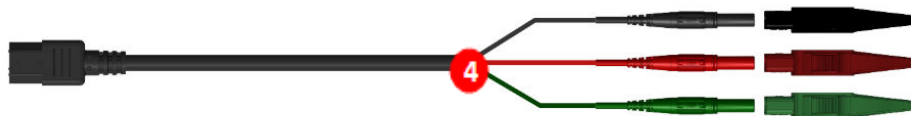
Figure 2.2.1a 6440 Main Unit



Figure 2.2.1b Voltage Cable Set



2.2.1c Power Cord Standard



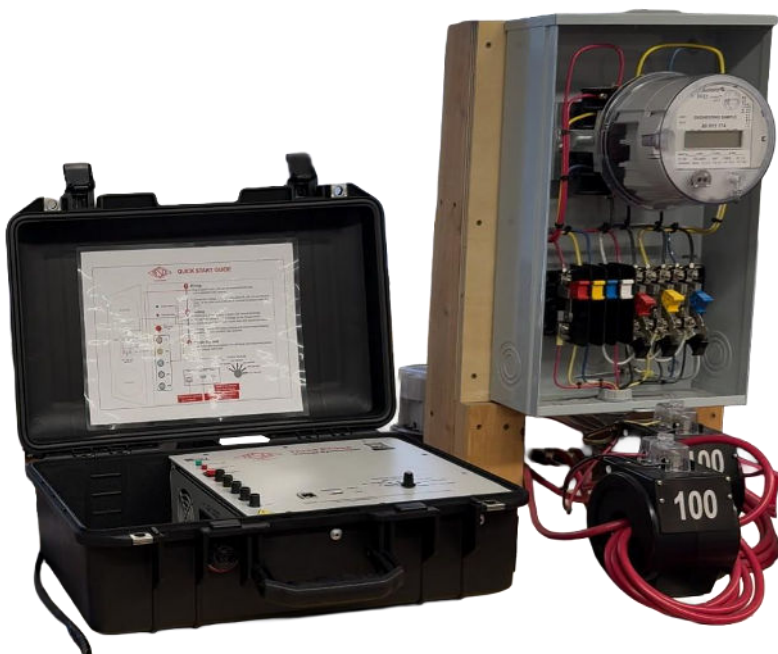
2.2.1d Power Cord, Field Test

2.3 Set-up and Cooling Considerations

Place the Voltage Synthesizer on a stable, flat surface that allows adequate airflow around all sides of the unit. Ensure that the input power connection and voltage output terminals are accessible and that there is sufficient space to safely route the voltage cable set and power cords.

Position the Voltage Synthesizer away from moisture, excessive dust, and high heat sources. Maintain proper clearance around the enclosure to support safe and reliable operation.

2.3.1 Set-up and Placement



The Voltage Synthesizer is a portable unit that is easy to use and movable at a meter substation or inside a meter shop.

The long cords allow for the placement for a Voltage Synthesizer to be as close or as far from the site as possible.

General Set up Checklist

1. **Ensure Proper Orientation.** Make sure to lay the equipment flat when using it in the field.
2. **Ensure Proper Cooling and Ventilation.** Ensure the cable bay compartment is free from any obstruction for the unit to get cooling and proper ventilation. Blower fans force air from right side of the case to the left.
3. **Inspect Wiring.** Ensure the power cords and voltage cable sets are plugged in properly.

2.3.2 Running the Test

The unit can be operated in three basic steps:

1. Wiring
 - Plug in one of the 2 included power cords. The unit can be powered with the standard 120V plug OR powered via site voltage from 85-305 VAC. Refer to figure 2.4.1 and 2.4.2
 - Connect the voltage cable sets into ports VA, VB, VC and Neutral ports. At the other end of the cable, connect to device under test (DUT).
2. Testing

On the face panel as shown in Figure 3.2.1 make the following steps:

- PRESS the power button. A green LED should illuminate.
- SELECT the desired output voltage on the Rotary switch.
- PRESS the amplifier button. A solid Red LED should illuminate.

Warning:

If Red LED keeps blinking and buzzer keeps beeping, it means an error condition has occurred.

3. Finishing the test
 - When the test is completed, turn off power and disconnect the power and voltage cable sets.

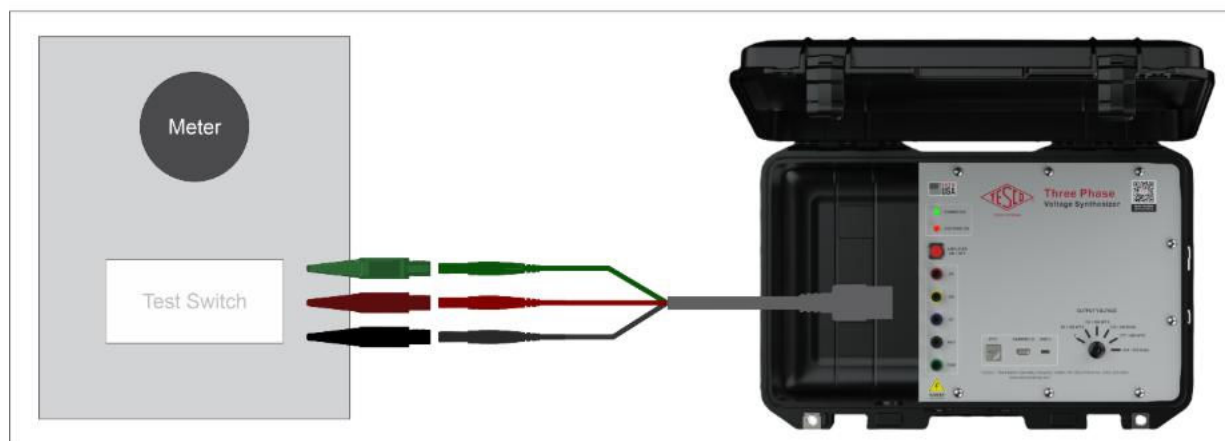
2.4 Main Power Supply

The Voltage Synthesizer gets power from an AC power source. The unit has an input range of 85 to 305 VAC. The unit is factory supplied with two power cords that allow connections to a site meter **test switch** and to a standard AC source in a meter shop.

Figure 2.4.1 Power the 6440 unit at the meter shop using a 120VAC / 240VAC source using a standard power cord (Nema 5-15 plug). The supplied cord is about 10 feet long (3 meters)



Figure 2.4.2 Power the 6440 unit at a meter site test switch using the field test power cord. The cord length is about 10 feet. Red is L1, Black is L2 or Neu, Green is Earth GND. Make sure to connect 6440 at the line side of the test switch.



WARNING ⚡ ⚠

- A flashing red indicator with an audible alarm indicates a fault condition. Press **AMPLIFIER (OFF)** to de-energize output immediately. Identify and correct the fault before re-energizing.

3.0 FUNCTIONALITY

3.1 Introduction

3.2 Panel Features

3.2.1 Front Panel

3.2.2 Side Panel

3.1 Introduction

This chapter explains the basic functions and features of Voltage Synthesizer equipment.

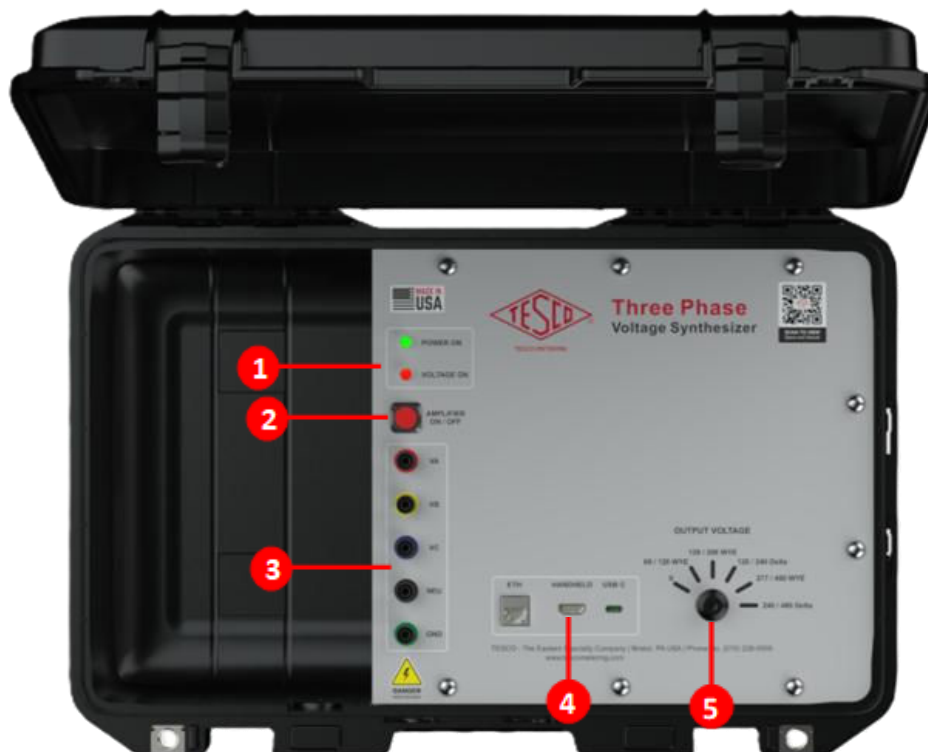
Please read this information before operating. Front panel operating instructions for the Voltage Synthesizer are provided in this chapter.

3.2 Panel Features

Front panel features such as LED indicators, button and switches and side panel sections (terminals) are shown in Figure 3.2.1 and Figure 3.2.2 respectively.

3.2.1 Front Panel

In this section, the user interacts with the face panel



NUMBER	DESCRIPTION	Function
1	LED Indicators	- Green LED indicates Power On - Red LED indicates Voltage Amplifier On
2	Amplifier Button	Allows user to turn amplifier ON
3	Voltage Output Ports	Ports for voltage cable set out to Device Under Test
4	Input / Output (IO)	Comms, external devices and test report
5	Rotary Switch	Allows user to set desired voltage output

Table 3.2.1a 6440 Front Panel Sections

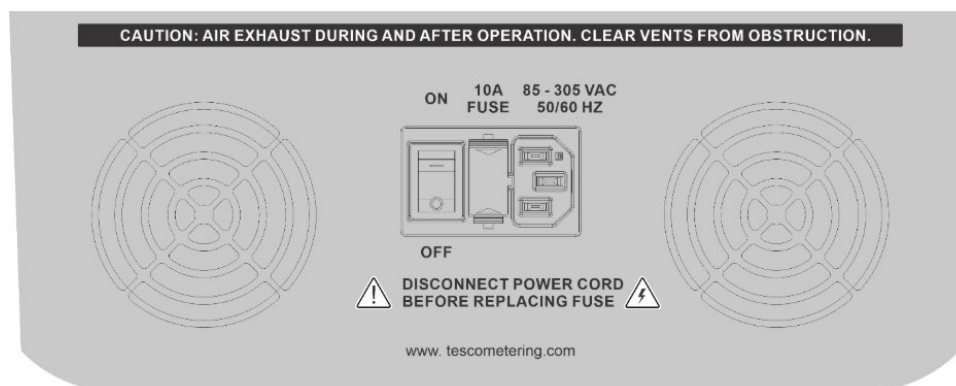
3.2.2 Side Panel

The side panel holds the Power Entry Module (PEM) and the equipment ventilation (exhausts). In this panel, the user can plug in the supplied power cords, service fuses and turn the unit ON. The panel has caution and warning label markings for user safety.



WARNING 

Make sure to disconnect the power cord before replacing fuses. Recommended fuse is 5X20 mm, Slow Blow Ceramic, 10A 600VAC.



4.0 MAINTENANCE

4.1 Introduction

4.2 Cleaning the Equipment

4.2.1 Cleaning the Air Filters

4.2.2 Cleaning the Instrument External Surface(s)

4.3 Repair/Parts Replacement/Recalibration

4.1 Introduction

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

Most of the maintenance will be handled by the technical team from TESCO. The user can, however, perform the basic maintenance routine of cleaning the meter Voltage Synthesizer's external surface.

4.2 Cleaning the Equipment

The Voltage Synthesizer should be kept clean to ensure proper operation and long term reliability. If dust, debris, or surface contamination is present, wipe the exterior enclosure with a clean, dry cloth. Do not use solvents or excessive moisture when cleaning the unit.

4.2.1 Cleaning the Air Filters

The air filters are removable by snapping off the cover as shown in Figure 4.2.1. Clean the dust filter by air cleaning the product.



Damage caused by overheating may occur if the area around the fan is restricted, the air intake is too warm, or the air filter becomes 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

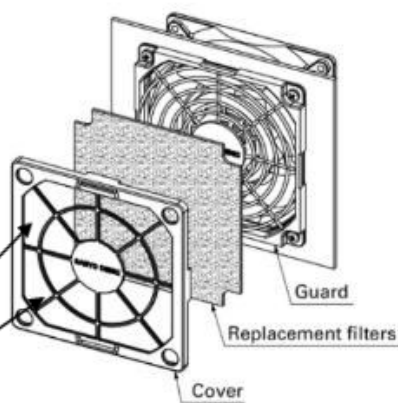


Figure 4.2.1a Fan Filter Install/Removal

4.2.2 Cleaning the Instrument External Surface(s)

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



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

4.3 Repair/Parts Replacement/Recalibration

For equipment repair, parts replacement, and recalibration, directly contact TESCO through phone or email. See section **1.2 Contacting TESCO** for contact details. TESCO recommends recalibration once every three years. Further details can be found on the Calibration Certificate provided with your Voltage Synthesizer.



Figure 4.3.1a QR Code to 6440 Webpage.