

# PHAZER®

## Watt-hour Meter Test & Calibration System



- **Now tests watt-hour meters with installed Turtle® made by Hunt Technologies®. No need to take the Turtle® out of operation.**
- **For testing socket-mounted meters as well as panel-mounted and bottom-connected meters**
- **True three-phase and single-phase testing capabilities**
- **Fully automatic operation**
- **32-bit operating software - use with Windows® 95, 98, 2000, ME, NT 4.0 and XP**
- **State-of-the-art optical sensing system**

### DESCRIPTION

The PHAZER family of watt-hour meter test sets are true three-phase, fully automatic systems capable of testing virtually all types of ANSI socket-mounted and bottom-connected single- and three-phase (three and four wire) electricity meters.

The PHAZER family consists of specific models for testing socket-mounted meters and specific models for testing panel-mounted and bottom-connected meters.

### Hardware - PHAZER System Configuration

Major components of each PHAZER model include a built-in three-phase reference standard; remote optical sensor/control system (ROC); and programmable voltage



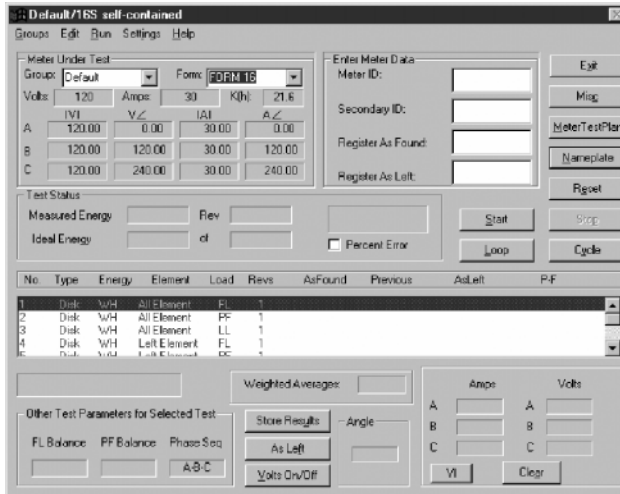
Utility watt-hour meter test shops regularly depend on the PHAZER for fast, accurate, fully automatic meter testing.

and current sources. A computer is needed as a system controller in order to operate this system. The 32-bit software is Microsoft® Windows® based, and allows the operator to perform all standard tests, develop meter test plans and calibrate the system to an external reference standard. Default test plans for each major meter format are provided within the software. Meter information and test results are stored in a database for search and reporting capabilities, and are also available in ASCII format for easy importing into other application software.

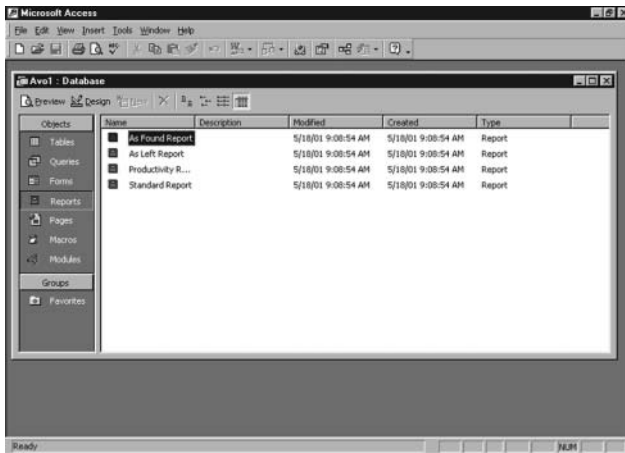
In addition, the PHAZER Watt-hour Meter Test Set easily tests any meter with an installed Turtle® made by Hunt Technologies®. Therefore, there is no need to take the Turtle® out of operation.

PHAZER models for testing socket-mounted meters feature a new, improved automated meter test socket. The meter test socket design, with its powerful solenoid actuated jaws, allows automation of the insertion of the meter into the socket. When the meter is moved up to the socket opening, the meter socket jaws sense the approaching meter and automatically open. When the meter is inserted firmly into the socket jaws, they will also automatically close. This feature offers a significant saving in set up time in high volume meter test applications. It also allows the use of two hands for insertion of large, heavy meters.

PHAZER models for testing panel-mounted and bottom-connected meters (T20 & T120), feature current and voltage output binding posts for connections to the panel-mounted meter without disturbing the meter installation. A remote optical/control unit allows the meter disk rotation to be sensed at distances from the test set of up to 6 ft (2 m).



**The Software Main Screen provides the operator with a single location featuring all of the main elements necessary to set up and run a meter test.**



**A series of standard meter test reports are provided. These reports can be modified or entire new ones created.**

A magnetic base is employed to affix the remote optical/control unit to the meter panel or test station. A specially designed articulation positioning arm facilitates the alignment of the optical emitter/detector.

**Software - Test Configuration and Operational Sequence**

Each PHAZER model features a powerful Windows® 95, 98, 2000, ME, NT or XP based operating system which will automatically configure itself to test virtually any single- or three-phase meter.

The software Main Screen provides a single location from which the user has access to all the main elements of the Meter Test Software. The focus of the software design is to simplify the operations needed to open, run, create and modify Meter Test Plans. All operations are performed right at the Main Screen. Additionally, all information regarding the selected test configuration, test status and actual values applied to the meter are available at a glance.

The first step is to simply select the appropriate Meter Test Plan. When the Meter Test Plan is selected the PHAZER

will automatically configure the meter with the proper voltage and current connections, set the amplitude of the voltage and current and set the phase angles. Also, the measurement parameters such as Kh, pulses/rev, revs/test, etc. are initialized. Other fields on the Main Screen hold parameters such as Meter ID, Meter Manufacturer, Meter Model, As Found/Left Register Readings and Meter Class.

Several test parameters and status messages are displayed on the screen during and after the execution of the Meter Test Plan. This allows you to view important test parameters as the test is being executed.

Meter test results are stored to the Microsoft Access® compliant database at the end of each test unless the test failed, in which case the software will prompt the user for confirmation to save failed results to the database. The MS Access database is completely open to the user. This means that no proprietary software is required to access meter test results. The software is shipped with a number of standard reports for the user to start using “right out of the box.” \*See Ordering Information, page 5.

Since the database is a Microsoft Access compliant database, a user can modify the reports desired without the need for a special program or programmer. In addition, the meter test results are easily exported to other Microsoft tools.

The Meter Test Plan is comprised of a sequence of meter test points that are executed sequentially in such a manner that full functionality and accuracy of the meter is evaluated. Also, for your convenience, the PHAZER is shipped from the factory with more than 1000 predefined Meter Test Plans. Any of these Meter Test Plans can be edited to create new, user defined Meter Test Plans. The number of Meter Test Plans available is limited only by disk space on your computer.

Finally, each meter test point in the Meter Test Plan can be fully configured for the desired Test Type, Energy Type, Element Selection, Load Type and Phase Rotation.

**Energy Measurement Reference Standard**

Each PHAZER has an integrated, three-phase energy reference standard. This standard has maximum current of 120 Amperes and voltage of 600 Volts per phase, respectively. This standard uses advanced Data Acquisition and DSP technology to perform real-time measurements of real and reactive energy. This energy can then be interpreted and displayed in terms of Watt-, VAR-, VA- and Q-hour format and is fully compliant with ANSI C12.1 performance requirements.

**Optical Sensor System and Pulse Inputs**

The PHAZER models for testing socket mounted meters are equipped with the most advanced optical sensor system on the market today. This universal system is capable of measuring disk revolutions in reflect, LED, LCD and through hole detection modes without the use of costly adapters. The PHAZER Meter Test and Calibration System’s optical positioning arm is the first to truly achieve a balance between the need for stability and durability and the need for minimal operator interference and ease of adjustment.



PHAZER Model T20 (for testing panel-mounted or bottom-connected meters) features external current and voltage output binding posts and a remote optical/control unit.

### APPLICATIONS

The PHAZER units are ideal instruments for testing virtually all types of ANSI socket-mounted, panel-mounted and bottom-connected (3 or 4 wire) electricity meters.

The PHAZER J120 Models are specifically designed for the fast, accurate and efficient testing of socket-mounted meters in watt-hour meter test shops. They are also highly efficient in performing “assembly-line” accuracy verification testing by major meter manufacturers.

The PHAZER T20 and T120 models are ideal for testing panel-mounted and bottom-connected meters. These units include external current and voltage output binding posts which provides the ability to make connections to the panel-mounted meter without disturbing the meter installation. Also included is a special remote optical/control device which allows the meter disk rotation to be sensed at distances of 6 ft (2 m) from the test set. It features a magnetic base so it can easily be affixed to the meter panel or test station, and an easy-to-use positioning arm which helps facilitate the alignment of the device.

### FEATURES AND BENEFITS

- **Fully automatic operation:** Easy-to-use Windows® 95, 98, 2000, ME, NT or XP based software simplifies setup and reduces testing time.
- **Three-phase output:** Six independently programmable amplifiers (three voltage and three current) simulate true power conditions to the meter under test.
- **Universal application:** The system is designed to test all commonly used single-phase and three-phase watt-hour meters.
- **Meters with Turtle® installed:** The system also easily tests watt-hour meters with installed Turtle® made by Hunt Technologies®. No need to take the Turtle® out of operation.
- **State-of-the-art optical sensing:** The system operates in reflect, infrared, LCD, LED and through-hole detect modes; no adapters needed.

- **Built-in calibration routine:** Full three-phase watt-hour system calibration can be performed using only one single-phase external standard to be connected to the test system.
- **Default and user-definable test plans:** Included with the operating software are standard test plans for all common meter types. User-defined test plans can be added for later retrieval.
- **Built-in database:** Test results and meter information can be stored in a database that includes several standard reports.
- **Optional bar code reader:** Meter nameplate data may be entered automatically with the bar code reader wand and AEP meter adapter codes. See [www.AEP.com](http://www.AEP.com) for definitions. The test plan is selected and started without operator input.
- **Automated meter test socket:** Uniquely designed solenoid actuated jaws automatically opens when the meter is moved toward the socket opening and automatically closes when the meter is inserted. This saves significant set-up time in high volume meter test applications.

### SPECIFICATIONS

#### Input

120 V or 240 V  $\pm 10\%$ , 50 or 60 Hz, 750 VA

#### Output

The solid-state voltage and current amplifiers are regulated to their programmed values. The operator will be warned if the amplifier output distorts excessively.

**Voltage Amplifier Regulation:**  $\pm 1\%$  @ 10 to 100% of range

**Current Amplifier Regulation:**  $\pm 1\%$  or  $\pm 5\text{mA}$  whichever is greater @ 10 to 100% of range

**Current and Voltage Distortion:**  $\pm 0.5\%$  THD



A Universal A-base adapter can easily be installed on a PHAZER Model J120 to facilitate the efficiency of testing both S-base and A-base watt-hour meters.



Measurement Type	System Accuracy (20-25° C)
Watt-hour, VA-hour @ 1.0 pf	±0.05% (±0.02% typical)
Watt-hour, VA @ 0.5 pf	±0.10% (±0.03% typical)
Q-hour @ 1.0 pf	±0.10% (±0.03% typical)
Q-hour @ 0.5 pf	±0.05% (±0.02% typical)
VAR @ 0.0 pf	±0.05% (±0.02% typical)
VAR-hour @ 0.866 pf	±0.10% (±0.03% typical)

**Programmable Current:** Three isolated, independent floating currents, 0 to 120 A or 0 to 20 A, depending on the model selected, each programmable with a resolution of 0.01 A

**Programmable Voltage:** Three independent, wye-connected potentials, 0 to 600 Vac, each programmable with a resolution of 0.1 V

**Programmable Phase:** Each of the three current and voltage channels is programmable for 0 to 360°, with a resolution of 0.1°. Phase accuracy at the meter will be within ±1° or ±1.5° at currents below 0.2A

### Optics

Adjustable sensitivity, modulated visible light output, with a 10-segment bar-graph display of reflected intensity. Capable of reflect mode, LCD, LED and infrared detection.

### Accuracy

Error increases with temperature 20 ppm/C°

### Pulse Inputs

Pulse initiator inputs accommodate meters with up to eight separate KYZ outputs.

### Reference Standard

A state-of-the-art, three-phase sampling energy standard that incorporates 16-bit A/D converters to achieve very high accuracy is used. Meets ANSI C12.1 performance requirements.

### Protective Circuits

Each system monitors itself for over-temperature, overcurrent and harmonic distortion. Open current or shorted voltage coils result in amplifier shutdown and warning to the operator.

### Computer/Controller

The controller may be ordered from Megger, with a choice of three difference configurations:

- Standard Controller
- Deluxe Controller
- Notebook Controller

Minimum specification of the supplied computer are: 600 Mhz Pentium, 32 megabytes of RAM, 810-megabyte hard disk, SVGA monitor, 800 to 1600 dpi resolution, and Microsoft Windows® 95, 98, 2000, ME, NT or XP.

Note: Controller specifications are based on current available hardware.

### External Connections

A 9-pin female serial interface located on the back panel for connection to the computer.

A BNC jack on the front panel for pulse input from an external reference standard. This is used during calibration or reference tests.

Three banana jack receptacles and a 25-pin connector for use with KYZ pulse initiator signals are included on the front panel.

A 9-pin serial interface located on the back panel for connection of a bar code reader.

### Environment

#### Operating

32 to 112° F (0 to 45° C), 5 to 90% non-condensing RH

#### Storage

-4 to +122° F (-20 to +50° C)

### Meter Test Socket

For PHAZER models that test socket-mounted meters, the meter test socket is an electrically operated solenoid with a manual switch control that opens and closes the socket. The socket will remain closed upon power failure.

The meter test socket will test the following meter forms:

1 through 6  
8 through 17  
19 through 23  
25, 26, 29, 35, 36 and 45

The built-in socket accepts all self-contained S-Base meters. Optional adapters are available for A-Base and K-Base style meters (see page 5).

### Dimensions and Weight

#### PHAZER models for testing socket-mounted meters:

##### PHAZER J120 Dimension

20 H x 22 W x 17.5 D in.  
(508 H x 560 W x 445 D mm)

#### Weight

135.2 lbs (61.4 kg)

#### PHAZER models for testing panel-mounted and bottom-connected meters:

##### PHAZER T120 and T20 Dimensions

18.7 H x 21.3 W x 13.7 D in.  
(475 H x 540 W x 349 D mm)

#### Weight

112.2 lb (51 kg)

### Optional ADAPTERS

#### Universal A-base Adapter

Megger's Universal A-base Adapter permits the PHAZER systems constructed with Megger's automated jaw assembly to test virtually all A-base watt-hour meters. This allows the system additional flexibility when there is the need to test both S-base and A-base watt-hour meters.

### Regulatory

Complies with CE marking requirements. Including but not limited to: IEC 61326-1, EN 50081-1, EN 50082-1.

### K-base Adapter

Megger offers two types of K-base Adapters, single and three-phase models. The K-base adapter allows PHAZER systems constructed with Megger's automated jaw assembly to test K-base style watt-hour meters. This allows the system additional flexibility when there is the need to test both S-base and K-base watt-hour meters.



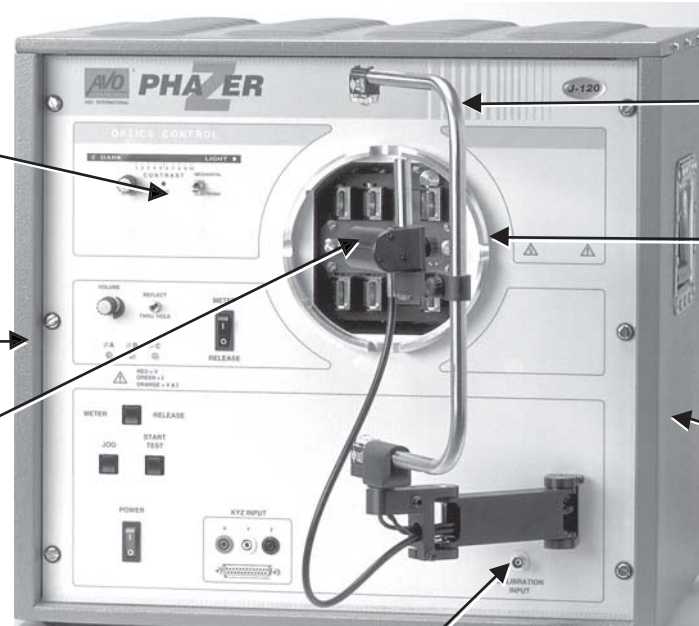
**ANATOMY OF THE PHAZER WATTHOUR METER TEST SYSTEM**

**PHAZER J-120 Models**

Most advanced optical sensing unit available today. Operates in reflect, infrared, LCD, LED and through-hole detect modes. No adapters needed.

32 bit operating software - use with Windows 95, 98, 2000, ME, NT 4.0 or XP

Unique "bubble lens" precisely picks up LED and edge-of-the-disk



Easy-to-position C-Arm with through-hole sensor

Strong solenoid actuated jaws automatically open and close around a meter

Housed in a rugged steel enclosure with large recessed handles

Built-in full three-phase system calibration using only one single-phase external standard

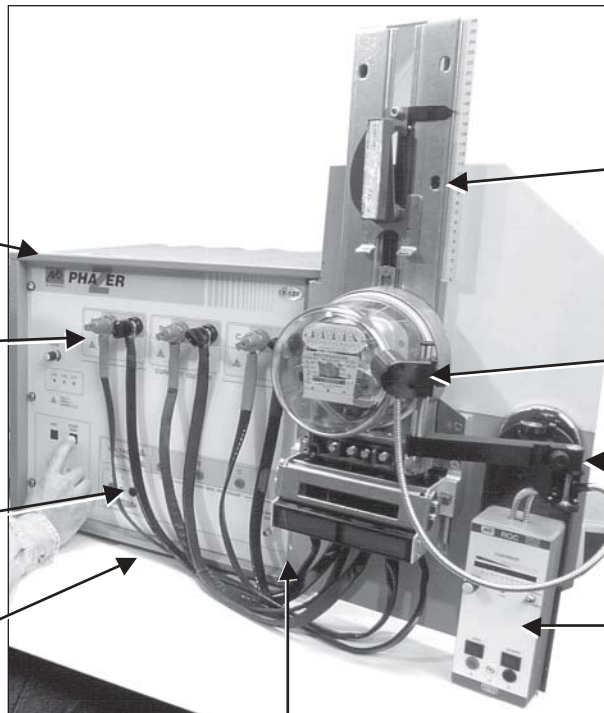
**PHAZER T20 & T120 Models**

Housed in a rugged steel enclosure with large recessed handles.

External current and voltage output binding posts for connecting to panel meters without disturbing the installation.

T20 & T120 Models include all necessary interconnect cables and current and voltage leads.

32 bit operating software - use with Windows 95, 98, 2000, ME, NT 4.0 or XP



Improve efficiency of meter installation and removal using the optional IEC Meter Test Station.

Unique "bubble lens" precisely picks up LED and edge-of-the-disk.

Flexible positioning arm facilitates the alignment of the "bubble lens" for even the largest panel meters.

Remote optical/control unit allows the meter disk rotation to be sensed at distances up to 6 ft (2m) from the test set. It's also magnetized to affix easily to the meter panel or test station.

Built-in full three-phase system calibration using only one single-phase external standard.

## ORDERING INFORMATION

Item (Qty)	Cat. No.	Item (Qty)	Cat. No.
<b>PHAZER models for testing socket-mounted meters</b>		<b>PHAZER models for testing panel-mounted and bottom-connected meters 20 ampere model</b>	
120 V, 60 Hz	PZR-J120-160	115 V, 60 Hz	PZR-T20-160
120 V, 50 Hz	PZR-J120-150	240 V, 50 Hz	PZR-T20-250
240 V, 50 Hz	PZR-J120-250	<b>120 ampere model</b>	
240 V, 60 Hz	PZR-J120-260	115 V, 60 Hz	PZR-T120-160
120 V, 60 Hz (Canada)	PZRC-J120-160	240 V, 50 Hz	PZR-T120-250
<b>Included Accessories</b>		<b>Included Accessories</b>	
RS-232 serial cable, 9-pin	16350	RS-232 serial cable, 9-pin	16350
Calibration input coaxial cable, 1 m	6593	ROC interconnect cable, 9-pin	15763
Input line cord	6828	Calibration input coaxial cable, 1m	6593
Instruction manual	750001	Input line cord	6828
Fuse 7A 250V MDL-7 (2) [115V systems only]	11848	Instruction manual	750005
Fuse 5A 250V MDA-5 (2) [230V systems only]	952	Fuse 7A 250V MDL-7 (2) [115V systems only]	11848
PHAZER software	544049	Fuse 5A 250V MDA-5 (2) [230V systems only]	952
<b>Optional Accessories</b>		PHAZER software	544049
Standard controller	16517-X_	<b>20 ampere model</b>	
Deluxe controller	16517-X_	Voltage leads, 12 ft	50254
Notebook controller	16517-X_	Current leads, 12 ft Black (3)	50691
Bar code scanner	17293-1	Current leads, 12 ft Red (3)	50692
Calibration adapter	50631	<b>120 ampere model</b>	
A-base adapter, quick connect	50916	Voltage leads, 4/C 6 ft (1)	50252
K-base adapter, single-phase	16412	Current leads, 2 ft Black (3)	50256
K-base adapter, 3-phase	16411	Current leads, 2 ft Red (3)	50257
75 adapter	17000	<b>Optional Accessories</b>	
245 adapter	17001	IEC Meter Test Station c/w 30 in. current leads	50362



**PEWA**  
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**Important Notes**

A computer is NOT INCLUDED when ordering any PHAZER model. The computer must be ordered separately.

\* To print test results Microsoft Access is required. Microsoft Access software is not included.